CHRISTIAN WHEELER
ENGINEERING

REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE, LA JOLLA, CALIFORNIA

PREPARED FOR

LOOKOUT DRIVE, LLC
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PREPARED BY

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April 14, 2014

Lookout Drive, LLC CWE 2130434.01
8400 Miramar Road, Suite 270
San Diego, California 92123
Attention: Justin Mandelbaum

Subject: Report of Preliminary Geotechnical Investigation
Proposed Remodel, Addition, and Future Single-Family Residences
Parcels 1, 2, 4, & 5, Parcel Map 17817, 7727 Lookout Drive, La Jolla, California

Ladies and Gentlemen:

In accordance with our proposal and agreement dated September 27, 2013 we have completed a preliminary geotechnical investigation for the subject project. We are presenting herein our findings and recommendations.

In general, we found the subject property suitable for the proposed construction, provided the recommendations provided herein are followed. Based on the results of our investigation, the most significant geotechnical condition to affect the proposed construction is the presence of surficial veneer of potentially compressible, heterogeneous soils consisting of man-placed fill, topsoil, and Quaternary-age slopewash across the majority of the site. The site is also located in relatively close proximity to the active Rose Canyon Fault Zone. However, based on our review of pertinent aerial photographs, topographic maps, and numerous reports of fault hazard evaluations conducted at the subject site as well as within the immediate vicinity of the site, it is our opinion that the subject site is not considered to by underlain by active or potentially-active faulting.

In addition to our findings, conclusions and recommendations for the anticipated development of the subject site, several of the geotechnical and geologic studies, performed both by our firm and other consultants, used to address the potential for active or potentially-active faulting bisecting the study area are included in the appendices at the rear of this report.

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,

CHRISTIAN WHEELER ENGINEERING

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INTRODUCTION AND PROJECT DESCRIPTION

This report presents the results of a preliminary geotechnical investigation performed for a proposed residential remodel, addition, and two future one- and two-story single-family residences to be constructed at 7727 Lookout Drive in the community of La Jolla in the city of San Diego, California. The following Figure Number 1 presents a vicinity map showing the location of the project.

We understand that it is proposed to remodel the existing residence on Parcel 1 and perhaps construct a lateral addition onto the northwest portion of that residence. We also understand that a one-to two-story single-family residence and associated appurtenances is proposed on Parcel 2, and that Parcels 4 and 5 will be combined and the construction of a one- to two-story single-family residence on the combined lot is also being contemplated. We anticipate that the proposed residences as well as the contemplated lateral addition onto the existing residence will be of conventional, wood frame construction with either on-grade concrete floor slabs or raised wooden floors. We also anticipate that the proposed residences, addition, and associated improvements will be supported by conventional shallow foundations. Grading to accommodate the proposed improvements is expected to consist of cuts and fills of up to approximately 5 feet from existing grades.

To assist in the preparation of this report, our firm has been provide with and obtained several geologic and geotechnical reports for sites located within and adjacent to the study area and we have obtained topographic, parcel, and ortho-topographic maps of the study area and surrounding parcels from SANGIS (www.sangis.org). Copies of the ortho-topographic map and parcel map were used as the base for our Site Plan and Geotechnical Maps, included herewith as Plate Nos. 1 and 2.

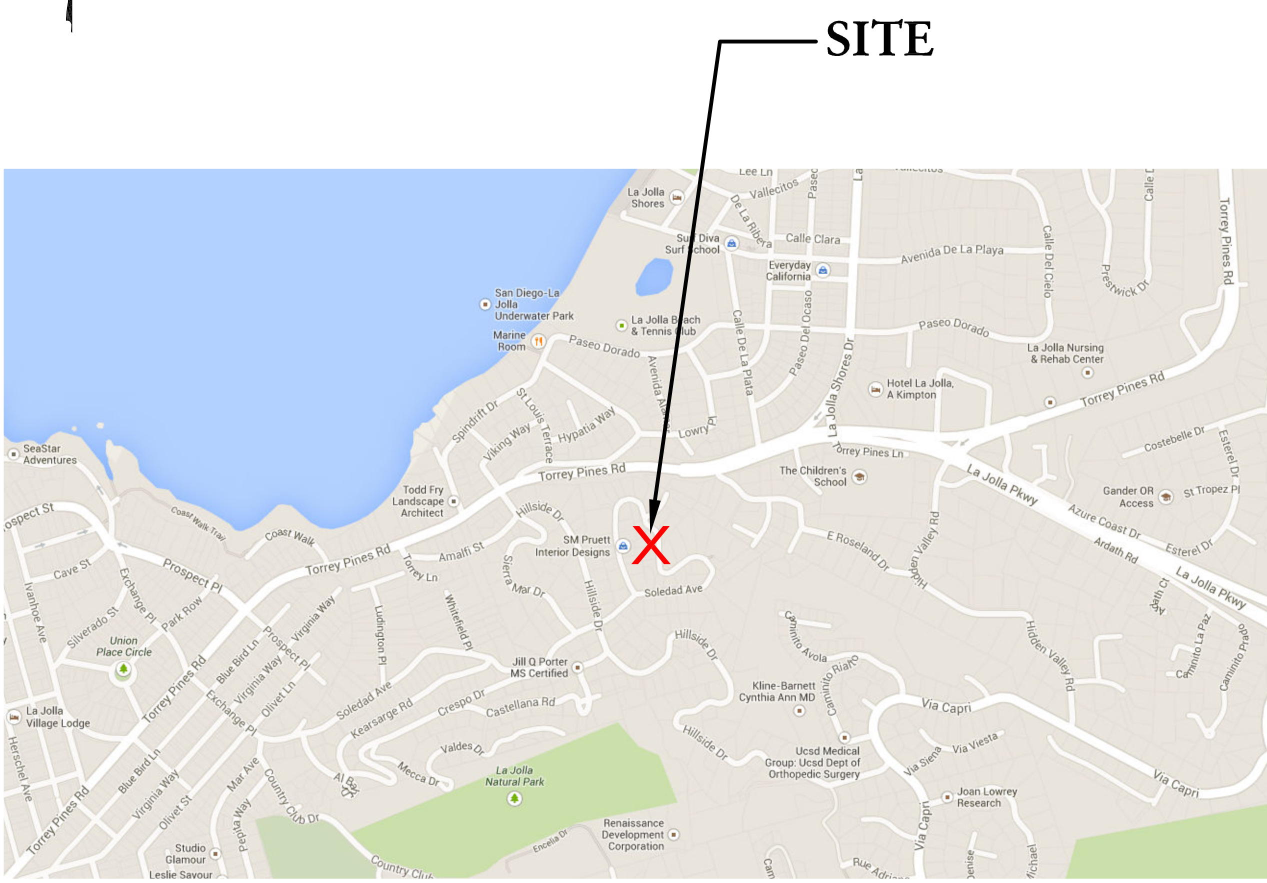
Site Vicinity Map

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES

PARCELS 1, 2, 4, & 5, PARCEL MAP 17817

7727 LOOKOUT DRIVE

LA JOLLA, CALIFORNIA



This report has been prepared for the exclusive use of Lookout Drive, LLC, and its 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.

PROJECT SCOPE

Our preliminary geotechnical investigation consisted of surface reconnaissance, subsurface exploration, obtaining representative soil samples, laboratory testing, analysis of the field and laboratory data, and review of relevant geologic literature. Our scope of service did not include assessment of hazardous substance contamination, recommendations to prevent floor slab moisture intrusion or the formation of mold within the structure, or any other services not specifically described in the scope of services presented below. More specifically, our intent was to provide the services listed below.

- Explore the subsurface conditions of the site.
- Evaluate, by laboratory tests and our past experience with similar soil types, the engineering properties of the various strata that may influence the proposed construction, including bearing capacities, expansive characteristics, settlement potential, and corrosive characteristics.
- Describe 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 as required by the current edition of the California Building Code.
- Address potential construction difficulties that may be encountered due to soil conditions, groundwater or geologic hazards, and provide recommendations concerning these problems.
- Develop soil engineering criteria for site preparation and grading.
- Recommend an appropriate foundation system for the type of structures anticipated and develop soil engineering design criteria for the recommended foundation design.
- Provide design parameters for restrained and unrestrained retaining walls.

- Prepare this report, which includes, in addition to our conclusions and recommendations, a plot plan showing the area extent of the geological units and the locations of our exploratory test trenches, exploration logs, and a summary of the laboratory test results.

Although tests were performed to categorize the potential severity of corrosive material within the soils that may be in contact with reinforced concrete or metal pipes, it should be understood Christian Wheeler Engineering does not practice corrosion engineering. If such an 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 these tests should only be used as a guideline to determine if additional testing and analysis is necessary.

FINDINGS

SITE DESCRIPTION

The subject site consists of four contiguous, residential parcels located at 7727 Lookout Drive in the La Jolla area of the City of San Diego, California. The parcels are identified as Assessor's Parcel Numbers 352-012-16, -17, -19, and -20. The site currently supports a single-story, single-family residence with an attached garage and other normally associated improvements on Parcel 1 (APN 352-012-16). The site is bounded on the east and west by Lookout Drive, and is otherwise bounded by single-family residential property. Topographically, most of the site is relatively level with an overall downward gradient towards the north and northeast. The eastern portions of Parcels 1, 4, and 5 (APN's 352-012-16, -19, and -20) descend up to about 10 feet to the adjacent portions of Lookout Drive.

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 results of our subsurface exploration, analysis of readily available, pertinent geologic literature, and review of the referenced documents, it was determined that the project area is underlain by a surficial veneer of heterogeneous soils consisting of man-placed fill, topsoil, and Quaternary–age slopewash deposits, which overlies Quaternary-age old paralic (marine terrace) deposits. The near surface materials encountered during our investigation, which will be encountered during site construction, are described below.

ARTIFICIAL FILL (Qaf): Man-placed fill soils were encountered within three of our nine exploratory test trenches, T-5, T-6, and T-8. The thickness of the fill encountered in our borings ranged from approximately 2 feet to 5 feet. The encountered fill materials generally consisted of light brown to brown and brown to dark brown, silty sand and clayey sand that were typically moist and loose to medium dense in consistency. Fill soils also exist within our exploratory trenches and the fault hazard trench excavations performed by others at the site (SJ, 2013 and GEI, 2001).

TOPSOIL/SLOPEWASH (Unmapped/Qsw): A surficial layer of native topsoil and Quaternary-age slopewash were encountered in six of our nine exploratory test trenches, T-1 – T-4, T-7, and T-9. The thickness of the undifferentiated topsoil/slopewash was noted to range from about 1 foot to 6 feet across the study area. The soil layer of topsoil/slopewash was noted in our explorations to consist of brown to dark brown, silty sand and poorly-graded sand with silt, which was generally dry to moist and loose to very loose in consistency. Abundant roots were encountered within the surficial soils.

OLD PARALIC DEPOSITS (Qop): Quaternary-age paralic deposits (terrace deposits) were encountered underlying the fill and undifferentiated topsoil/slopewash in all nine of our exploratory test trenches. These materials were found at depths ranging from about 1 foot to 6 feet below existing grades. Within our test trenches, the old paralic deposits consisted of interbedded layers of light gray, orangish-brown, and dark gray silty sand, clayey sand, and sandy clay, yellowish-brown, brown to dark brown poorly-graded sand with silt, grayish-brown clayey sand, and reddish-brown silty sand. Descriptions of the old paralic deposits (previously referred to as marine terrace deposits in the referenced geologic and geotechnical reports) correlate well with the observations made within our subsurface explorations. Generally, the encountered old paralic deposits were moist and medium dense and stiff in consistency. Slight roots and cobbles up to about 6 inches in diameter were also encountered in this material.

GROUNDWATER: No groundwater or seepage was encountered in our subsurface explorations. However, it should also be recognized that minor groundwater seepage problems might occur after site construction and landscaping are completed, even at sites 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. It is further our opinion that these problems can be most effectively corrected on an individual basis if and when they occur.

TECTONIC SETTING: 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 zones) are classified as "active" according to the criteria of the California Division of Mines and Geology (CDMG). The Alquist-Priolo Earthquake Fault Zoning Act as codified in the state of California Public Resources Code, Division 2, Chapter 7.5, requires the State Geologist to delineate special studies zones around Quaternary-age faults that are "sufficiently active and well-defined" as to be subject to surface rupture. Cities and Counties affected by the Alquist-Priolo Earthquake Fault Zoning Act are required to adopt zoning laws, ordinances, rules, and regulations for implementing the Act and must regulate specified "projects" within Special Studies Zones.

Active fault zones are those that have shown conclusive evidence of faulting during the Holocene Epoch (the most recent 11,000 years). The Division of Mines and Geology used the term "potentially active" on Earthquake Fault Zone maps until 1988 to refer to all Quaternary-age (last 1.6 million years) faults for the purpose of evaluation for possible zonation in accordance with the Alquist-Priolo Earthquake Fault Zoning Act and identified all Quaternary-age faults as "potentially active" except for certain faults that were presumed to be inactive based on direct geologic evidence of inactivity during all of Holocene time or longer. Some faults considered to be "potentially active" would be considered to be "active" but lack specific criteria used by the State Geologist, such as *sufficiently active* and *well-defined*. Faults older than Quaternary-age are not specifically defined in Special Publication 42, Fault Rupture Hazard Zones in California, published by the California Division of Mines and Geology. However, it is generally accepted that faults showing no movement during the Quaternary period may be considered to be "inactive". The City of San Diego guidelines indicate that since the beginning of the Pleistocene Epoch marks the boundary between "potentially active" and "inactive" faults, unfaulted Pleistocene-age deposits are accepted as evidence that a fault may be considered to be "inactive."

Much of the site is within an Alquist-Priolo Earthquake Fault Zone associated with the Rose Canyon Fault Zone (see Plate Nos. 1 and 2). The active Rose Canyon Fault Zone (RCFZ) consists of a complex zone of anatomizing and en echelon faults that trend north-northwest from near the Mexican border through San Diego Bay to La Jolla. In the San Diego County area, the RCFZ is the onshore portion of a more extensive fault zone that includes the South Coast Offshore Zone of Deformation and the Newport-Inglewood Fault to the north, and several possible extensions southward, both onshore and offshore. This longer zone is part of the San Andreas Fault system of northwest-trending strike-slip faults in southern California and the Southern California Continental Borderland. The RCFZ is predominantly composed of right-lateral strike-slip faults that extend south-southeast through the San Diego Metropolitan area. Various fault strands display strike-slip, normal, oblique, or reverse components of displacement.

The City of San Diego Seismic Safety Study map and several local geology maps indicate that the Mount Soledad Fault, one of the active faults in the Rose Canyon Fault Zone, has been mapped within or near the northern portion of the subject site. As described below in the Surface Rupture and Soil Cracking section of this report, numerous fault investigation reports prepared for the subject site and nearby parcels have been performed over the last two decades. Based on our review of these reports, the observations made within our subsurface explorations made on-site, and our experience within the immediate vicinity of the site, it is our professional opinion and judgment that no active or potentially active faults bisect the subject site.

Other active fault zones in the region that could possibly affect the site include the Coronado Bank Fault Zone 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.

GEOLOGIC HAZARDS

CITY OF SAN DIEGO SEISMIC SAFETY STUDY: As part of our services, we have reviewed the City of San Diego Seismic Safety Study (2008). This study is the result of a comprehensive investigation of the city, and rates areas according to geological risk potential (nominal, low, moderate, and high), and identifies possible potential geotechnical hazards and/or describes geomorphic conditions.

The City of San Diego Seismic Safety Study identifies the site as being within Geologic Hazard Category 27, which is assigned to areas underlain by slide-prone formations. In addition, the majority of the project site is located within Geologic Hazard Category 11, which is assigned to areas within the Alquist-Priolo Earthquake Fault Zone established by the State Geologist in 1991 around portions of the active Rose Canyon Fault Zone. Furthermore, the western portion of the site is located in Geologic Hazard Category 12, which is an overlay category assigned to areas adjacent to faults that are not currently considered to be active, where the risks are also classified as "low to moderate."

Certain projects within Category 11 require a full-scale geologic investigation with extensive subsurface exploration to evaluate the possible presence of on-site faulting. A fault hazard study of the subject site has been prepared by Steven E. Jacobs, CEG and is included in Appendix C of this report (Jacobs, 2013). We have reviewed this report and agree with the findings and conclusions of said report.

SURFACE RUPTURE AND SOIL CRACKING: As noted previously, the majority of the site is within an Alquist-Priolo Earthquake Fault Zone established by the State Geologist in 1991 around the active, Rose-Canyon Fault Zone. In addition, the western portion of the site is located within the City's Geologic Hazard Category 12, which is an overlay category assigned to areas adjacent to faults that are not currently considered to be active. Appendix C of this report includes a copy of a fault hazard evaluation performed for the subject site by Steven E. Jacobs, CEG, in which it was concluded that the subject site is not underlain by active or potentially active faulting. Additionally, Appendices D through I of this report present copies of fault/geologic studies prepared by Geotechnical Exploration Inc. (2001 and 2005), Michael W. Hart, CEG (2002), Steven C. Suitt and Associates (1994), Bryan Miller-Hicks, CEG (2008), and Christian Wheeler Engineering (2010) for sites immediately west, north, and east of the subject site. Based on the observations made within the test trenches conducted for each of these investigations as well as correlation with other nearby explorations, like the Jacobs' report, each of these reports also concluded that those sites of study/investigation are not underlain by active or potentially active faulting. The locations of the fault trenches excavated during the generation of the above-described fault hazard studies are presented on Plate Nos. 1 and 2 of this report.

It should also be noted that two exploratory trenches were excavated within the northern portion of the adjacent lot (APN 352-012-27 or Lot 33 of La Jolla Hills (Map 1749)) by Geotechnical Exploration, Inc.

(GEI), between October 28 and November 6, 2002. A certified engineering geologist (CEG) from our firm provided third-party observations of the fieldwork associated with such investigation. As noted by both our CEG present during that investigation as well as the CEGs from GEI who geologically logged those trenches, no evidence of faulting was encountered during that investigation, and laterally continuous and overlapping stratigraphic units within the old paralic (marine terrace) deposits were observed.

The CDMG Note 49, "Guidelines for Evaluating the Hazard of Surface Fault Rupture", which was adopted on May 9, 1996 by the State Mining and Geology Board, discusses the rationale for evaluating surface and near-surface faults and presents some suggested topics, considerations, and guidelines for investigations and reports. CDMG Note 49 states the following: "The evaluation of a given site with regard to the potential hazard of surface rupture is based extensively on the concepts of *recency* and *recurrence* of faulting along existing faults. In a general way, the more recent the faulting, the greater the probability for future faulting. Stated another way, faults of known historic activity during the last 200 years, as a class, have a greater probability for future activity than faults classified as Holocene age (last 11,000 years) and a much greater probability of future activity than faults classified as Quaternary age (last 1.6 million years)."

Based on the information available to date, including the site-specific fault investigation report (Jacobs, 2013) and data from the numerous other fault investigations described above, it is our professional opinion that no active or potentially active faults are present at the subject site. Thus, 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 indicates that the site is situated within Relative Landslide Susceptibility Area 3-1, which is considered to be the "generally susceptible" area; Subarea 3-1 contains slopes that are at or near their stability limits due to a combination of weak material and steep slopes. Based on the lack of any steep, unsupported slopes at or adjacent to the site, it is our opinion that the risk of either deep-seated or significant surficial slope instability can be considered to be low.

LIQUEFACTION: The near-surface soils encountered at the site are not considered susceptible to liquefaction due to such factors as depth to the groundwater table, soil density and grain-size distribution.

FLOODING: The site is located outside the boundaries of both the 100-year and the 500-year floodplains according to the maps prepared by the Federal Emergency Management Agency.

TSUNAMIS: Tsunamis are great sea waves produced by submarine earthquakes or volcanic eruptions. Due to the site's elevation and location, the risk of the site being affected by a tsunami is considered low.

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

CONCLUSIONS

It is our professional opinion and judgment that no geotechnical conditions exist at or within the general vicinity of the subject property that would preclude the construction of the proposed remodel and addition to the existing residence or the construction of future residential structures and associated improvements, provided the recommendations presented herein are followed. The main geotechnical conditions affecting the proposed construction include potentially compressible near surface soils and cut/fill transitions. These conditions will require special site preparation consideration as described in the recommendations section of the report.

The site was found to be underlain by a relatively thin layer of potentially compressible fill materials and undifferentiated topsoil/slopewash. In general, these deposits are relatively shallow, and do not exceed about 6 feet in depth. These potentially compressible soils, as well as all backfill within exploratory trenches, are considered unsuitable, in their present condition, for the support of settlement-sensitive improvements. This condition will require special site preparation consideration.

The proposed grading scheme and site preparation recommendations contained in this report may result in cut/fill transitions underlying the proposed improvements. This configuration is not desirable due to the potential for fill and formational soils to perform and settle differentially. In order to mitigate this condition, special site preparation is recommended.

The site is located in an area that is relatively free of geologic hazards that will have a significant 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 County 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 pre-grade 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 existing vegetation, existing improvements, and deleterious materials within the project areas. The removals should include all abandoned utilities, foundations, slabs, vegetation, construction debris and other deleterious materials from the site. This should include all significant root material. The resulting materials should be disposed of off-site in a legal dumpsite.

SITE PREPARATION: Existing topsoil, slopewash, man-placed fill soils (including backfill within exploratory trenches), and old paralic deposits disturbed during site preparation operations underlying proposed fills and settlement-sensitive structures and improvements should be removed to the contact with competent native materials (old paralic deposits). Based on our subsurface explorations, the maximum removal depth is expected to be about 6 feet. However, it may be deeper in areas of the site not investigated or due unforeseen conditions encountered. The removals should extend at least 5 feet outside the perimeter of such improvements or a horizontal distance equal to the removal depth, whichever is more. No removals are recommended beyond property lines and within 2 feet from the existing structure. All areas cleaned out of unsuitable soils should be approved by the geotechnical engineer or their 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.

CUT/FILL TRANSITIONS: It is recommended that cut portions of the proposed building pads be undercut to a minimum depth of three feet below finish pad grade or two feet below the bottom of footings (one foot below retaining wall footing keys), whichever is deeper. The undercuts should be performed in such a way that low areas with impaired drainage are not created. Undercut areas should be backfilled with properly compacted, low expansive fill (EI between 21 to 50).

PROCESSING OF FILL AREAS: Prior to placing any new fill soils or constructing any new improvements in areas that have been cleaned out to receive fill and approved by the geotechnical consultant or his representative, the exposed soils should be scarified to a depth of 12 inches, moisture conditioned, and compacted to at least 90 percent relative compaction.

COMPACTION AND METHOD OF FILLING: All structural fill and backfill material placed at the site should be compacted to a relative compaction of at least 90 percent of maximum 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 our soil technicians or project geologist. Fill material should be free of rocks or lumps of soil in excess of twelve inches in maximum dimension; however, this should be reduced to six inches within four feet of finish grade. All utility trench backfill should be compacted to a minimum of 90 percent of its maximum dry density.

SURFACE DRAINAGE: The drainage around the existing and proposed improvements should be designed to collect and direct surface water away from proposed improvements and the top of slopes toward appropriate drainage facilities. Rain gutters with downspouts that discharge runoff away from the structures 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 structures be sloped away at a minimum gradient of 2 percent. Densely vegetated areas where runoff can be impaired should have a minimum gradient of 5 percent for the first five feet from the structure. It is essential that new and existing drainage patterns be coordinated to produce proper drainage. Pervious hardscape surfaces adjacent to structures and associated improvements should be similarly graded.

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.

GRADING PLAN REVIEW: The final grading plans should be submitted to this office for review in order to ascertain that the geotechnical recommendations remain applicable to the final plan and that no additional recommendations are needed due to changes in the anticipated development. Our firm should be notified of changes to the proposed project that could necessitate revisions of or additions to the information contained herein.

FOUNDATIONS

GENERAL: Based on our findings and engineering judgment, the proposed additions, new structures and associated improvements may be supported by conventional shallow continuous and isolated spread footings founded on newly compacted fill. Existing footings should not be utilized for the support of new structural loads. The following recommendations are considered the minimum based on the anticipated soil conditions after site preparation as recommended in this report is performed, and are not intended to be lieu of structural considerations. All foundations should be designed by a qualified professional.

SHALLOW FOUNDATIONS: Spread footings supporting the proposed structures should extend at least 18 inches below lowest adjacent finish pad grade. Continuous and isolated footings should have a minimum width of 12 inches and 24 inches, respectively. Spread footings supporting the proposed miscellaneous exterior improvements should be embedded at least 12 inches below lowest adjacent finish pad grade. Continuous and isolated footings supporting exterior improvements should have a minimum width of 12 inches and 18 inches, respectively. Retaining wall footings should have a minimum embedment depth of 18 inches below lowest adjacent finished pad grade and a minimum width of 24 inches. Footings located adjacent or within slopes should extend to a minimum depth such that a horizontal distance of at least 8 feet exists between the face of the slope and the bottom of the footing. For retaining walls over 5 feet in height, the minimum horizontal distance should be increased to at 10 feet.

BEARING CAPACITY: Spread footings supporting the proposed structures with a minimum embedment depth of 18 inches and minimum width of 12 inches may be designed for an allowable soil bearing pressure of 2,500 pounds per square foot (psf). This value may be increased by 500 psf for each additional foot of embedment depth and 300 psf for each additional foot of width, up to a maximum of 4,000 psf. Spread footings supporting the proposed exterior improvements with a minimum embedment depth of 12 inches and minimum width of 12 inches may be designed for an allowable soil bearing pressure of 2,000 pounds per square foot (psf). This value may be increased by psf for each additional foot of embedment depth and 300 psf for each additional foot of width, up to a maximum of 4,000 psf. The bearing values may also 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 two No. 5 bars positioned near the bottom of the footing and two No. 5 bars positioned near the top of the footing. New footings located adjacent to exising footings or slabs should be doweled as recommended by the project structural enginner.

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 0.30. The passive resistance may be considered to be equal to an equivalent fluid weight of 300 pounds per cubic foot. This assumes 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.

UNDERPINNING: Underpinning of portions of the existing structure may be necessary for the construction of the proposed addition. Underpinning recommendations should be provided by the project structural designer based on the aforementioned foundation recommendations.

SETTLEMENT CHARACTERISTICS: The anticipated total and differential settlement is expected to be less than about one inch and one inch over forty 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: Provided that the site preparation recommendations contained in this report are implemented, the foundation soils are expected to have a low expansive potential (EI between 21 to 50). The recommendations within this report reflect these conditions.

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.

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 these tests indicate that the soil samples had soluble sulfate contents of 0.011 and 0.007 percent. Soils with a soluble sulfate content of less than 0.1 percent are considered to be negligible.

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 2013 California Building Code. The site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters are presented in the following Table I.

TABLE I: SEISMIC DESIGN FACTORS

Site Coordinates: Latitude Longitude	32.8482° -117.2585°
Site Class	D
Site Coefficient F_a	1.0
Site Coefficient F_v	1.5
Spectral Response Acceleration at Short Periods S_s	1.298 g
Spectral Response Acceleration at 1 Second Period S_1	0.503 g
$S_{MS}=F_aS_s$	1.298 g
$S_{M1}=F_vS_1$	0.754 g
$S_{DS}=2/3*S_{MS}$	0.865 g
$S_{D1}=2/3*S_{M1}$	0.503 g

Probable ground shaking levels at the site could range from slight to moderate, 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 SLABS

GENERAL: It is our understanding that the floor systems of the proposed addition and new structures may include concrete slabs-on-grade. The following recommendations are considered the minimum slab requirements based on the soil conditions and are not intended in lieu of structural considerations.

INTERIOR SLAB: We recommend that the interior slab-on-grade floor be at least 5 inches thick (actual) and be reinforced with at least No. 4 bars spaced at 18 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 six 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. This is the most common under-slab vapor retarder system used in San Diego County. The vapor retarder should be at least 15-mil plastic 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.”

EXTERIOR CONCRETE FLATWORK: Exterior concrete slabs on grade should have a minimum thickness of 4 inches and should be reinforced with at least No. 3 bars placed at 18 inches on center each way (ocew). Where patio slabs, walkways and porch slabs abut perimeter foundations, they should be doweled into the footings. The driveway slab, if re-constructed, should have a minimum thickness of 5 inches and should be reinforced with at least No. 4 bars placed at 18 inches on center each way (ocew). Driveway slabs should be provided with a thickened edge at 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.

A concrete mix with a 1-inch maximum aggregate size and a water/cement ratio of less than 0.6 is recommended for exterior slabs. Lower water content will decrease the potential for shrinkage cracks. Consideration should be given to using a concrete mix for the driveway that has a minimum compressive strength of 3,000 pounds per square inch. This suggestion is meant to address early driveway use prior to full concrete curing. Both coarse and fine aggregate should conform to the latest edition of the "Standard Specifications for Public Works Construction" ('Greenbook").

Special attention should be paid to the method of concrete curing to reduce the potential for excessive shrinkage and resultant random 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 300 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 0.30 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 32 and 55 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. 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 7H 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. 14 report for informational purposes. Additionally, outlets 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 test pits, 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 client’s responsibility, or its 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

Nine subsurface explorations were made at the locations indicated on the Site Plan included herewith as Plate Numbers 1 and 2 on the date of October 11, 2013. These explorations consisted of nine test trenches excavated with a Case 580L Backhoe equipped with an 18-inch bucket. The fieldwork was conducted under the observation and direction of our engineering geology personnel.

The test trenches were carefully logged when made. The test trench logs are presented in the attached Plate Nos. 3 through 11. The soils are described in accordance with the Unified Soils Classification. In addition, a verbal textural description, the wet color, the apparent moisture and the density or consistency are provided. The density of granular soils is given as either 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. Undisturbed samples of typical and representative soils were obtained and returned to the laboratory for testing. Bulk samples of disturbed soil were also collected in bags from the test trenches and were transported to the 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 is 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.

b) **MOISTURE-DENSITY:** In-place moisture contents and dry densities were determined for selected soil samples in accordance with ASTM D 1188. The results are summarized in the test pit logs.

c) **MAXIMUM DRY DENSITY AND OPTIUM MOISTURE CONTENT TEST:** The maximum dry density and optimum moisture content of selected soil samples were determined in the laboratory in accordance with ASTM D 1557, Method A. The results of this test are presented on Plate Number 12.

d) **DIRECT SHEAR TEST:** Direct shear tests were performed on selected samples of the on-site soils in accordance with ASTM D 3080. The results of these tests are presented on Plate Number 12.

e) **EXPANSION INDEX:** An expansion index test was performed on a selected remolded soil samples. The test was performed in accordance with ASTM D 4829. The results of the test are presented on Plate Number 12.

f) **GRAIN SIZE DISTRIBUTION:** The grain size distribution of selected soil samples was determined in accordance with ASTM D 422. The results of these tests are presented on Plate Number 12.

g) **ATTERBERG LIMITS:** The Liquid Limit, Plastic Limit and Plastic Index of a selected soil sample was determined in accordance with ASTM D424. The results of these tests are presented on Plate Number 13.

h) **SOLUBLE SULFATES:** The soluble sulfate content was determined for a selected soil samples in accordance with California Test Method 417. The test results are presented on Plate Number 13.

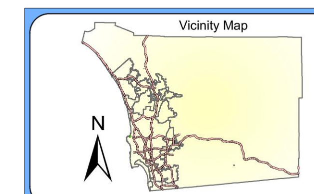
CWE LEGEND

T-9	APPROXIMATE TEST TRENCH LOCATION
SS-2	APPROXIMATE TEST TRENCH LOCATION *(STEVEN C. SUITT & ASSOC., 1994)*
GEI-2	APPROXIMATE TEST TRENCH LOCATION *(GEOTECHNICAL EXPLORATION, 2001a, b)*
SJ-2	APPROXIMATE TEST TRENCH LOCATION *(STEPHEN E. JACOBS, 2013)*
MH-1	APPROXIMATE TEST TRENCH LOCATION *(MICHAEL W. HART, 2002)*
H-5	APPROXIMATE TEST TRENCH LOCATION *(MILLER-HICKS, 2008)*
GEI-2	APPROXIMATE TEST TRENCH LOCATION *(GEOTECHNICAL EXPLORATION, 2005)*
CWE-1	APPROXIMATE TEST TRENCH LOCATION *(CWE REPORT 2090707.03, 2010)*
ZONE 11	ACTIVE, ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE *(CITY OF SAN DIEGO SEISMIC SAFETY STUDY, 2008)*
ZONE 12	POTENTIALLY ACTIVE *(CITY OF SAN DIEGO SEISMIC SAFETY STUDY, 2008)*
Qaf/Qsw / *Qop*	ARTIFICIAL FILL AND/OR SLOPEWASH OVER OLD PARALIC DEPOSITS

0 50' 100'

SCALE: 1" = 50'

W+E



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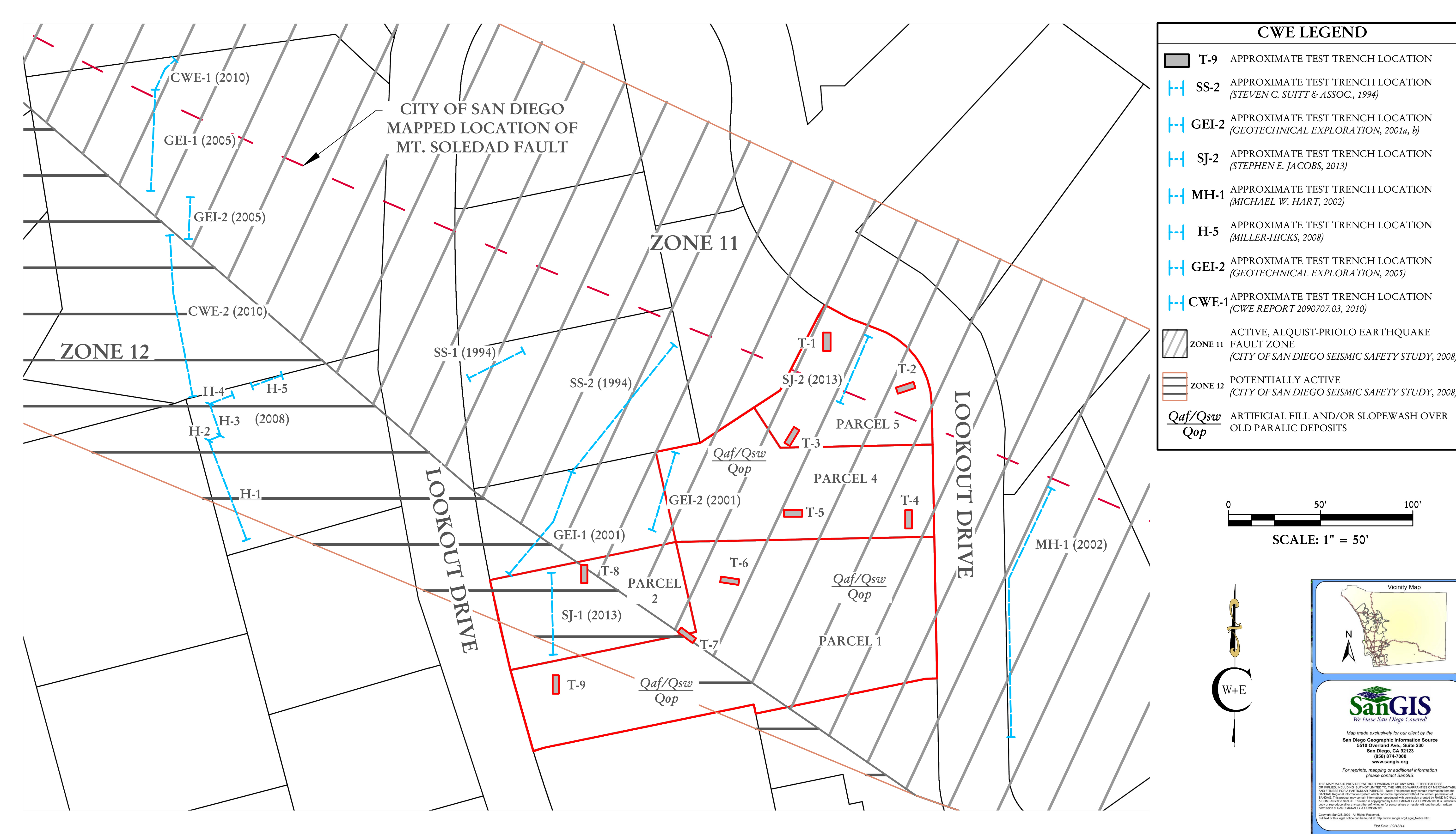
SITE PLAN AND GEOTECHNICAL MAP

PROPOSED REMODEL, ADDITION, AND SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	1

CHRISTIAN WHEELER
ENGINEERING



SITE PLAN AND GEOTECHNICAL MAP

PROPOSED REMODEL, ADDITION, AND SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	2

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST TRENCH T-1

Sample Type and Laboratory Test Legend

Cal Modified California Sampler
SPT Standard Penetration Test
ST Shelby Tube
CK Chunk Density
DR Density Ring

MD Max Density
SO4 Soluble Sulfates
SA Sieve Analysis
HA Hydrometer
SE Sand Equivalent
PI Plasticity Index
CP Collapse Potential
DS Direct Shear
Con Consolidation
EI Expansion Index
R-Val Resistance Value
Chl Soluble Chlorides
Res pH & Resistivity

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

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			SM	**Topsoil/Slopewash:** Brown to dark brown, moist, very loose, fine- to coarse-grained, slightly SILTY SAND; heavy roots.							
			SM	**Old Paralic Deposits (Qop):** Yellow to orangish-brown, moist, medium dense, fine- to medium-grained, SILTY SAND; moderate roots.		CK		6.5	115.8		
5			SM SC CL	Light gray, orangish-brown, and dark gray, moist, medium dense and stiff to very stiff, INTERBEDDED, fine- to medium-grained, SILTY SAND, fine- to medium-grained, CLAYEY SAND and SANDY CLAY; slight roots.		CK					
				Test trench terminated at 8 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
** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	3

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-2

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density 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		

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-SM	**Topsoil/Slopewash:** Brown to dark brown, moist, loose, fine- to coarse-grained, POORLY GRADED SAND with SILT; heavy roots.							
5				Moderate roots.							
			SP-SM	**Old Paralic Deposits (Qop):** Yellowish-brown, moist, medium dense, medium- to coarse-grained, POORLY-GRADED SAND with SILT; slight roots.							MD DS
						CK		1.5	108.6		
10											
				Test trench terminated at 11 feet. No groundwater or seepage encountered.							
15											
20											
25											
30											

Notes:

Symbol Legend

- ∇ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	4

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-3

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal Modified California Sampler
SPT Standard Penetration Test
ST Shelby Tube
CK Chunk Density
DR Density Ring

MD Max Density
SO4 Soluble Sulfates
SA Sieve Analysis
HA Hydrometer
SE Sand Equivalent
PI Plasticity Index
CP Collapse Potential
DS Direct Shear
Con Consolidation
EI Expansion Index
R-Val Resistance Value
Chl Soluble Chlorides
Res pH & Resistivity

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			SM	**Topsoil:** Dark brown, damp, very loose, fine- to medium-grained, SILTY SAND; highly porous.		CK					
			SC	**Old Paralic Deposits (Qop):** Brown to reddish-brown, moist, medium dense, fine- to coarse-grained, CLAYEY SAND.		CK		4.6	118.8		
5			SP-SM	Brown to dark brown, moist, medium dense, medium- to coarse-grained, POORLY-GRADED SAND with SILT.		CK		1.5	107.6		SA
				Test trench terminated at 7 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
** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	5

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST TRENCH T-4

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density 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		

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			SM	**Topsoil:** Brown to dark brown, dry to moist, loose, fine- to medium-grained, SILTY SAND; heavy roots.							
			SC	**Old Paralic Deposits (Qop):** Grayish-brown, moist, medium dense, fine- to medium-grained, CLAYEY SAND; moderate roots.		CK					SO4 PI MD DS
				Slight roots.							
5						CK					
				Test trench terminated at 6 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
- ** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	6

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-5

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density 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		

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			SM	**Artificial Fill (Qaf):** Light brown to brown, moist, medium dense, fine- to coarse-grained, slightly SILTY SAND with gravel-size rock.		CK CK					
5			SC	**Old Paralic Deposits (Qop):** Grayish-brown with orange, moist, medium dense, fine- to medium-grained, CLAYEY SAND.		CK		13.6	114.7		
				Test trench terminated at 6½ 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
- ** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	7

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST TRENCH T-6

Sample Type and Laboratory Test Legend

Cal Modified California Sampler
SPT Standard Penetration Test
ST Shelby Tube
CK Chunk Density
DR Density Ring

MD Max Density
SO4 Soluble Sulfates
SA Sieve Analysis
HA Hydrometer
SE Sand Equivalent
PI Plasticity Index
CP Collapse Potential
DS Direct Shear
Con Consolidation
EI Expansion Index
R-Val Resistance Value
Chl Soluble Chlorides
Res pH & Resistivity

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

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			SC	**Artificial Fill (Qaf):** Brown to dark brown, moist, loose, fine- to medium-grained, CLAYEY SAND with some concrete and brick debris; heavy roots Light brown to brown, loose to medium dense.		CK					
			SC	**Old Paralic Deposits (Qop):** Light brown to brown, moist, medium dense, fine- to medium-grained, CLAYEY SAND; moderate roots.		CK		8.7	113.5		
5			SM	Light reddish-brown, moist, medium dense, fine- to medium-grained, SILTY SAND; slight roots.							
				Test trench terminated at 6 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
** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	8

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-7

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density 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		

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			SM	**Topsoil:** Brown to dark brown, moist, loose, fine- to medium-grained, SILTY SAND; abundant roots.							
			SC-CL	**Old Paralic Deposits (Qop):** Gray and orange, moist, medium dense to stiff, fine- to medium-grained, CLAYEY SAND-SANDY CLAY; gravel layer and minor roots.		CK		12.2	111.5		EI SA
			SM	Grayish-brown, moist, medium dense, fine- to medium-grained, SILTY SAND with CLAY.		CK		11.1	107.7		MD DS SO4
5				Trace amount of cobble-size rock up to 6 inches.							
				Test trench terminated at 5 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
- ** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	9

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-8

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density 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		

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			SM	**Artificial Fill (Qaf):** Brown to dark brown, moist, loose to medium dense, fine- to medium-grained, SILTY SAND; abundant roots.		CK					
			SM	**Old Paralic Deposits (Qop):** Light brown to brown, moist, medium dense, fine- to medium-grained, SILTY SAND.		CK					
			SC-CL	Gray and orange, moist, medium dense to stiff, fine- to medium-grained, CLAYEY SAND-SANDY CLAY; minor roots.		CK		17.6	102.4		
5			SC	Grayish-brown, moist, medium dense, fine- to medium-grained, CLAYEY SAND.		CK					
				Test trench terminated at 5½ 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
- ** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	10

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST TRENCH T-9

Date Drilled:	10/11/13	Equipment:	Case 580L with 18" Bucket
Logged By:	TSW	Auger Type:	N/A
Existing Elevation:	N/A	Drive Type:	N/A
Proposed Elevation:	N/A	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density 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		

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			SM	**Topsoil:** Brown to dark brown, moist, loose, fine- to medium-grained, SILTY SAND; abundant roots.		CK					
			SM	**Old Paralic Deposits (Qop):** Light brown, dry to moist, medium dense, fine- to medium-grained, SILTY SAND; minor roots.		CK					
			SC	Grayish-brown, moist, medium dense, fine- to medium-grained, CLAYEY SAND.		CK					
5				Test trench terminated at 5 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
- ** Erroneous Blow Count (rocks present)

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	MLM	PLATE NO.:	11

CHRISTIAN WHEELER ENGINEERING

LABORATORY TEST RESULTS

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES

PARCELS 1, 2, 4, & 5, PARCEL MAP 17817

7727 LOOKOUT DRIVE

LA JOLLA, CALIFORNIA

MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557)

Sample Location	**Trench T-2 @ 6'-11'**	**Trench T-4 @ 1'-6'**	**Trench T-7 @ 2½'-5'**
Sample Description	Yellowish-Brown, Poorly-Graded Sand (SP)	Light Brown, Clayey Sand (SC)	Brown, Silty Sand (SM)
Maximum Density	112.5 pcf	124.5 pcf	127.2 pcf
Optimum Moisture	14.1 %	10.2 %	9.3 %

DIRECT SHEAR (ASTM D3080)

Sample Location	**Trench T-2 @ 6'-11'**	**Trench T-4 @ 1'-6'**	**Trench T-7 @ 2½'-5'**
Sample Type	Remolded to 90 %	Remolded to 90 %	Remolded to 90 %
Friction Angle	34°	18°	26°
Cohesion	300 psf	400 psf	325 psf

EXPANSION INDEX TESTS (ASTM D4829)

Sample Location	**Trench T-7 @ 1½'-2½'**
Initial Moisture:	10.9 %
Initial Dry Density	103.5 pcf
Final Moisture:	22.5 %
Expansion Index:	45 (low)

GRAIN SIZE DISTRIBUTION (ASTM D422)

Sample Location	**Trench T-3 @ 4'-7'**	**Trench T-7 @ 1½'-2½'**
Sieve Size	*Percent Passing*	*Percent Passing*
1½"		100
1"		99
¾"		99
½"		99
⅜		98
#4		98
#8	100	97
#16	78	96

#30	29	91
#50	18	78
#100	13	64
#200	9	52

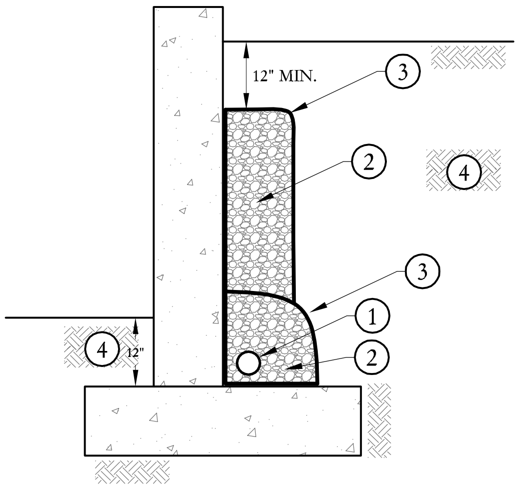
LABORATORY TEST RESULTS (Continued)

ATTERBERG LIMITS (ASTM D424)

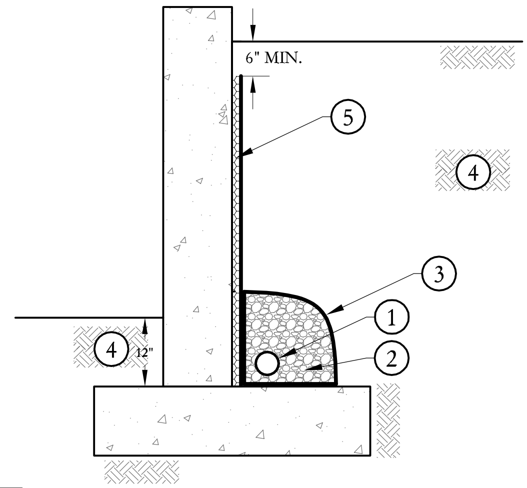
Sample Location	**Trench T-4 @ 1'-6'**
Liquid Limit	32
Plastic Limit	17
Plasticity Index	15

SOLUBLE SULFATES (CALIFORNIA TEST METHOD 417)

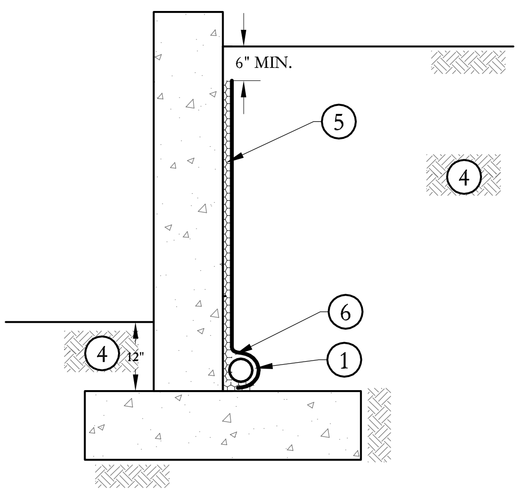
Sample Location	**Trench T-4 @ 1'-6'**	**Trench T-7 @ 2½'-5'**
Soluble Sulfate	0.011 % (SO_4)	0.007 % (SO_4)



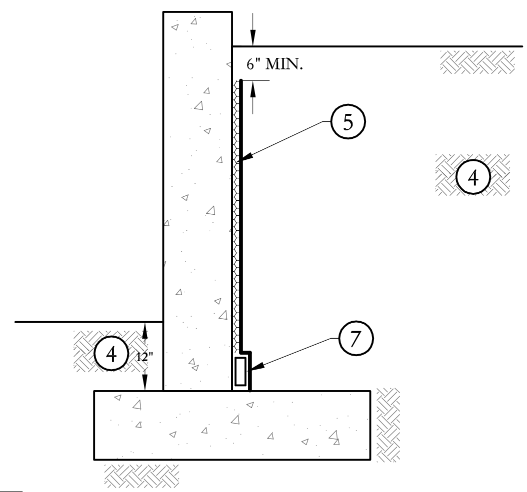
1 DETAIL



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. GEOFABRIC 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

PROPOSED REMODEL, ADDITION, AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE, LA JOLLA, CALIFORNIA

DATE:	APRIL 2014	JOB NO.:	2130434.01
BY:	JDB	PLATE NO.:	14

CHRISTIAN WHEELER
ENGINEERING

APPENDIX A

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REFERENCES

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TOPOGRAPHIC MAPS

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City of San Diego, 1979, Ortho-Topographic Map Sheet 246-1689; Scale: 1 inch = 200 feet

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United States Geological Survey, 1967, La Jolla Quadrangle; Scale 1 inch = 2000 feet

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PHOTOGRAPHS

San Diego County, 1928, Flight, Photographs 52 C-1 and C-2; Scale: 1 inch = 1000 feet (approximate)

San Diego County, 1953, Flight 7, Photographs 188 and Flight 8, Photographs 3, 88 and 89, Scale: 1 inch = 1000 feet (approximate)

San Diego County, 1966, Flight 1, Photographs 41 and 42; Scale: 1 inch= 1000 feet (approximate)

San Diego County, 1973, Flight 31, Photographs 18 and 19; Scale: 1 inch= 1000 feet (approximate)

San Diego County, 1978, Flight 17B, Photographs 53 and 54; Scale: 1 inch= 1000 feet (approximate)

San Diego County, 1983, Photographs 553 and 554; Scale: 1 inch= 2000 feet (approximate)

PHOTOGRAPHS (continued)

San Diego County, 1989, Photograph 1-201; Scale: 1 inch = 2640 feet (approximate)

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APPENDIX B

RECOMMENDED GRADING SPECIFICATIONS
GENERAL PROVISIONS

RECOMMENDED GRADING SPECIFICATIONS - GENERAL PROVISIONS

PROPOSED REMODEL, ADDITION AND FUTURE SINGLE-FAMILY RESIDENCES
PARCELS 1, 2, 4, & 5, PARCEL MAP 17817
7727 LOOKOUT DRIVE, 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 D-1557-91
Density of Soil In-Place - ASTM D-1556-90 or ASTM D-2922

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 12 inches, brought to the proper moisture content, compacted and tested for the specified minimum degree of compaction. All loose soils in excess of 12 inches thick should be removed to firm natural ground, which is defined as natural soil that 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 preparation of 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 ASTM Test D 4289-95.

OVERSIZED MATERIAL: Oversized fill material is generally defined herein as rocks or lumps of soil over 6 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.

APPENDIX C

FAULT-RUPTURE HAZARD INVESTIGATION
STEPHEN E. JACOBS, 2013

STEPHEN E. JACOBS, C.E.G. 1307
Engineering Geologist
2871 Sanford Lane, Carlsbad, CA 92010-6553

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July 25, 2013

Project 13004

Justin Mandelbaum
Mira Investments
8400 Miramar Road, Suite 270
San Diego, CA 92126

Subject: **FAULT-RUPTURE HAZARD INVESTIGATION**
Parcels 1, 2, 4, and 5, Parcel Map PM 17817
7727 Lookout Drive
La Jolla, CA 92037

Dear Mr. Mandelbaum:

In accordance with your request, I have performed a fault-rupture hazard investigation of the subject property located at the third and fourth residential lots north of the southwest corner of Soledad Avenue and Lookout Drive in the City of San Diego, California. The results of the study indicate the subject property is underlain by shallow surficial soils and old paralic deposits. Careful inspection and logging was performed in one exploratory trench. No offset of stratigraphic units or soil horizons was detected in the exploratory trench or reported in trenches by previous consultants on neighboring sites. On this basis it is concluded most of the site, except for the northern portion of Parcel 5, is not traversed by any Holocene-age or Active faults and not traversed by any Pleistocene-age or Potentially Active faults.

The opportunity to provide consulting services to you on this project is appreciated. If you have any questions regarding the report, please contact the undersigned at your convenience.

Respectfully submitted,

Stephen E. Jacobs
Engineering Geologist
PG 3978, CEG 1307

CERTIFIED ENGINEERING GEOLOGIST
STEPHEN E. JACOBS
No. 1307
Exp.
ENGINEERING GEOLOGY
STATE OF CALIFORNIA

#13004
7727 Lookout Drive
La Jolla, CA

2cc: Addressee

Attachments: Appendix A: References
Appendix B: Text Figures and Photographs
Appendix C: Plot Plans, Cross Sections and Fault Trench Logs

FAULT-RUPTURE HAZARD INVESTIGATION
7727 Lookout Drive, La Jolla
San Diego, CA 92037

INTRODUCTION

This report presents the results of a fault-rupture hazard investigation of an existing residential property that is to be sold as four individual residential lots. The property is located at the third and fourth residential lots north of the southwest corner of Soledad Avenue and Lookout Drive in the La Jolla area of the City of San Diego, California (Figure 1). Most of the property, except for the southwestern portion, is located within the Rose Canyon fault zone that is designated "Active" as determined by the City of San Diego. Accordingly, the primary purpose of this study was to determine if any strands of the Rose Canyon fault zone in San Diego underlie the parcels of the subject property. In addition, general geologic characteristics of the site including potential geologic/geotechnical hazards to which the site may be susceptible were addressed.

This report has been prepared for the exclusive use of Mira Investments, their representatives and direct clients, and because conditions may change over time due to earthquakes, rainstorms, construction, and other causes, this report may require an updated investigation. This report is not to be provided to any other third party without my authorization and my on-site inspection. Should this report be provided to another third party without my authorization and my on-site inspection, then Stephen E. Jacobs, CEG, the undersigned, will assume no liability, whatsoever.

SITE AND PROPOSED PROJECT DESCRIPTION

The 4-parcel property is described as APN 352-012-16-00, APN 352-012-17-00, APN 352-012-19-00, and APN 352-012-20-00. The four irregular-shaped parcels, designated as Parcels 1, 2, 4, and 5, comprise 0.154, 0.118, 0.172, and 0.115 acre, respectively (Figure 9). Parcel 1 contains an existing one-story single-family residential building with an attached garage and other improvements. Parcels 2, 4, and 5 are currently vacant lots. Parcels 1 and 2 are nearly level and Parcels 4 and 5 have northerly slopes of about 10 feet in height with a gradient of approximately 1½:1 (horizontal to vertical ratio). Elevations on the property range from approximately 190 feet above MSL (mean sea level) on the southern edge of Parcel 2 to approximately 165 feet above MSL on the northern edge of Parcel 5 (Figure 2). The property is bounded by other residential structures to the north and south and Lookout Drive to the west and east.

REVIEW OF GEOLOGIC AND OTHER DOCUMENTS

As part of my study, I reviewed available documents including aerial photographs (County of San Diego, 1928; U.S. Geological Survey, 1966), topographic maps (Figures 1 and 2), and published geologic literature by Kennedy (1975, Figure 3), Kennedy and others (1975), Treiman (1993, Figure 6), Tan (1995, Figure 8), Kennedy and Tan (2008, Figure 4), City of San Diego (2008, Figure 7), and unpublished geotechnical and geological investigation reports by Steven C. Suitt and Associates (1994), Geotechnical Exploration, Inc. (2001a; 2001b), Michael W. Hart (2002), and Christian Wheeler Engineering (2011) on or near the subject property. Regional and local fault maps are shown on Figures 5 and 6, respectively. A list of references is presented in Appendix A. Text figures and photographs are presented in Appendix B. Copies of selected plot plans, fault trench logs, and geologic cross sections prepared by previous consultants are presented in Appendix C.

FIELD WORK

In order to determine if faulting is present beneath the property, one fault trench was excavated with a backhoe in an approximately north-south orientation across a portion of the property, as shown on the parcel base map of Figure 9, in order to supplement coverage of the fault trend across the property and vicinity by fault investigations performed by previous consultants. The trench was excavated on July 10, 2013. The location of the trench is shown on the Site Geology Map (Figure 9). The trench was excavated to a depth of approximately 5 feet. After careful cleaning of the trench wall, it was logged at a scale of 1" = 5'. The log of the fault trench and explanation are presented on Figures 11 and 12, respectively, in Appendix B of this report. Three geologic cross sections across the property are presented on Figure 10.

GENERAL GEOLOGY AND GEOLOGIC SETTING

The site is located within the coastal plain section of the Peninsular Ranges Geomorphic Province of California. The coastal plain generally consists of subdued landforms underlain by sedimentary bedrock. Near-surface materials exposed in the vicinity of the subject property along the southwest side of the Mount Soledad fault strand of the Rose Canyon fault zone in San Diego consists of artificial fill, colluvium/topsoil, subsoil and old paralic (previously called terrace) deposits. Old paralic deposits have not been recognized in the site vicinity on any of the published geologic maps.

Kennedy (1975, Figure 3) and Kennedy and Tan (2008, Figure 4) mapped the material underlying the site as Point Loma Formation (Kp). Kennedy (1975) described the Point

Loma Formation as interbedded fine-grained dusky-yellow sandstone and olive-gray clay shale. The sediments of the Point Loma Formation were deposited in late Cretaceous time (approximately 65 to 80 million years before present) according to Kennedy (1975). Point Loma Formation was not encountered in my fault trench, and was not reported in any of the fault trenches on neighboring parcels by previous consultants. Point Loma Formation is conjectured to lie at a depth of about 15 to 20 feet below the present grade on the subject property (Figure 10).

Most of the site lies on the southwest side of the northwest-southeast trending Mount Soledad fault strand of the Rose Canyon fault zone, which passes through the metropolitan area of San Diego (Treiman, 1993). However, the northern half of Parcel 5 appears to lie on the northeast side of this fault strand (Figures 7 and 9).

SPECIAL STUDIES FAULT ZONE

The site is located within an Earthquake Fault Zone (CDMG, 1991) as defined by the 1972 California Alquist-Priolo Earthquake Fault Zoning Act and within the City of San Diego Geologic Hazard Category 11 (Active Fault Zone). This fault zone requires that special studies be undertaken to locate the possible existence of active faulting at the site (City of San Diego, 2008).

STRATIGRAPHY

The results of the trenching indicate the site is capped with a thin veneer of artificial fill resting on Holocene to Pleistocene age colluvium (slope wash)/topsoil underlain by Pleistocene age old paralic (previously called terrace) deposits with argillic paleosols. Kennedy (1975, Figure 3) and Kennedy and Tan (2008, Figure 4) did not map any Pleistocene deposits in the near vicinity of the site. Surficial and pedogenic soils, consisting primarily of colluvium/topsoil and argillic horizons are present on the site and are described in detail on Figures 11 and 12 of Appendix B. The appearance of these soils is illustrated in Photos 1 and 2.

Fill:

Undocumented shallow artificial fill, approximately ½ to locally 2 feet thick, was noted below the ground surface. Geologic logging of the fault trench excavated for this study indicates that the fill consists of loose, slightly moist, dark brown, medium- to coarse-grained silty sand and clayey sand with abundant angular fine gravel and some construction debris. Deeper fill on most of the property is anticipated to reach a maximum depth of about 10 feet on Parcel 5 (Figures 9 and 10).

Colluvium/Topsoil:

Colluvium/topsoil noted in the trench underlying the fill is an approximately 1- to 2½-foot thick soil that consists of loose to medium dense, slightly moist to moist, brown to dark brown, silty sand to clayey sand with an subangular blocky soil structure.

Subsoil:

Subsoil noted in the trench underlying the colluvium/topsoil is an approximately ½- to 2-foot thick argillic Bt-soil horizon that consists of firm to stiff, moist to very moist, mostly dark brown to very dark brown, clayey sand to sandy clay with an angular to sub angular blocky soil structure.

Old Paralic Deposlits:

Geologic logging of the fault trench excavated for this study indicates that the old paralic (formerly called terrace) deposits consists of two arbitrarily defined subunits: sand to silty sand and clayey sand to clayey silt. The sand/silty sand subunit, approximately ½- to 1-foot thick, is lenticular, medium dense to dense, moist, light gray and pale brown to brown. The clayey sand/clayey silt subunit is firm to stiff, moist to very moist, brown and dark brown to dusky yellow-brown.

STRUCTURE

Bedding in the old paralic deposits appears to be nearly horizontal, or it follows the very gentle northerly slope gradient. Bedding within the underlying Point Loma Formation (not exposed in fault trenches) as reported by Kennedy (1975, Figure 3) and Kennedy and Tan (2008, Figure 4) ranges from 30- to 40-degrees to the south.

RESULTS OF TRENCHING

The City of San Diego Seismic Safety Study (2008, Figure 7) map indicates the site lies within an active zone of the Rose Canyon fault. The northwesterly trending Mount Soledad fault strand in this zone is shown on published geologic maps to cross the northern portion of the site. Accordingly, the fault trench for this study was oriented in such a manner to intercept faults with similar trends. The fault trench was located in the front yard (western part) of Parcel 2 on the property and was approximately 48 feet in length (Figures 9 and 11).

The results of detailed logging and inspection of the roughly north-south trending fault trench (Figures 11 and 12) indicate the colluvium/topsoil, subsoil and old paralic deposits occurs as a mainly massive, fine- to medium-grained, pale brown sand and brown to dark brown, silty sand, clayey sand, sandy clay, and clayey silt unbroken by faulting.

The trench exposed two arbitrarily defined pedogenic soil horizons: An upper argillic (Bt) horizon and lower thin laminar argillic (Bt) horizons within the old paralic deposits. The argillic (Bt) horizons contain mostly illuvial clays. Based on the illuvial clay development and mostly angular to subangular blocky soil structure of the soil horizons, the age of this soil is estimated to be older than early late Pleistocene (about 80 to 125 ka

Kern, 1977). Based on the estimated basal elevation of 180 feet for the old paralic deposits, they may be correlated with the Stuart Mesa or Guy Fleming terraces present in the Solana Beach and Encinitas area and dated 225,000 and 345,000 years old, respectively (Kern and Rockwell, 1992).

Age Assessment of On-Site Pedogenic Soils:

The relative ages of the geologic and pedogenic soil units exposed in the trench were estimated using soil stratigraphic techniques (Birkeland and others, 1991). The soils and sediments exposed are described according to the characteristics and nomenclature set forth by the Soil Survey Staff (1975, 1992) and Birkeland (1984). Colors of the various soil horizons exposed in the trench were typically described using the Munsell Soil Color Charts (1975). I looked at the amount and thickness of trans-located clay films, the color of the soils, the looseness or induration of the sediments, and the structure and plasticity of the soils, to evaluate whether the sediments exposed are Holocene or pre- Holocene age, less than or greater than 11,000 years B.P. (before the present).

The estimated age of the argillic (Bt) horizons exposed in the fault trench are estimated to be older than about 125,000 years B.P. based on soil profile development analysis.

GEOLOGIC/GEOTECHNICAL HAZARDS AND SEISMICITY

Additional geologic/geotechnical hazards addressed for this report include the potential for ground shaking from local and regional active faults, landsliding, tsunamis, seiches, groundwater, liquefaction and seismically induced settlement. Each of these potential geologic/geotechnical hazards is discussed below.

The subject property is located within the City of San Diego Geologic Hazard Category 27 (Figure 7), which is described as having one of the "slide-prone formations."

Local Faulting:

The site lies within a zone designated as the "active" Mount Soledad fault strand of the Rose Canyon fault zone (Kennedy, 1975; Kennedy and others, 1975; Kennedy and Tan, 2008; City of San Diego, 2008). A possible southern strand of the Mount Soledad fault, shown as a shear zone on the seismic hazards and fault map by the City of San Diego (2008; Figure 7), appears to cross the middle of the property, and the main strand to the north appears to cross Parcel 5 (Treiman, 1993; Figure 6). This generally northwest-southeast trending fault lies within the Rose Canyon fault zone that trends southeasterly toward the "Downtown Special Fault Zone," (City of San Diego, 2008) which is transitional between the predominantly right-lateral slip characteristics of the fault zone north of the downtown area and the predominantly dip-slip faulting characterizing the many faults making up the southern portion of the fault zone. The nearest "active" strand in the Rose Canyon fault zone is the Mount Soledad fault, which crosses the northeastern portion of the property according to published geologic maps.

South of the downtown area, the major faults making up the southern end of the Rose Canyon fault zone are the Spanish Bight, Coronado, and Silver Strand faults. The east side of the zone is represented by the potentially active La Nacion fault zone (Treiman, 1993). Together, these faults define a wide and complexly faulted basin occupied by San Diego Bay and a narrow section of the continental shelf west of the Silver Strand.

Faults associated with the "Downtown Graben" comprise the southernmost known active faults and are located approximately 5 miles south-southeast of the site. The results of investigations by several geotechnical firms for sites within the Downtown Graben confirm that several faults within this zone are included in an "Earthquake Fault Zone" (formerly known as an "Alquist-Priolo Special Studies Zone") that extends southward from Russ Boulevard along a somewhat sinuous pattern southward into San Diego Bay and the Silver Strand.

On-Site Faulting from Fault Trench

No evidence of fault scarps, offset strata or soil horizons was observed crossing the property as exposed in the fault trench, and none were reported by previous consultants in fault trenches on parcels near the subject property.

Regional Faulting and Seismicity

A detailed seismicity evaluation for the site is beyond the scope of this report; however, a summary of relevant faults and a brief discussion of the potential for seismic shaking are included herein. The site will be affected by seismic shaking due to earthquakes on major local and regional active faults throughout the southern California region. The Rose Canyon fault zone is the nearest active fault system to the site, because it has revealed evidence of Holocene-age movement (Lindvall and others, 1990). The Mount Soledad fault strand of the Rose Canyon fault zone, which is currently classified as Active by the City of San Diego (2008) and the State of California (CDMG, 1991), crosses the northern portion of the subject property; a shear zone crosses the middle portion of the property (City of San Diego, 2008, Figure 7).

The Rose Canyon fault which branches off the Mount Soledad fault to the southeast apparently dies out just south of the La Jolla area. The Mission Bay fault, another branch of the Rose Canyon fault zone, extends from San Diego Bay on the south to La Jolla on the north. The Del Mar Segment extends from La Jolla to the vicinity of Oceanside. According to Lindvall and Rockwell (1995), the Mission Bay fault segment is capable of generating an $M_w6.4$ earthquake with an estimated recurrence time interval of approximately 720 years. The Rose Canyon fault system is capable of producing an $M_w6.9$ event if the Mission Bay and Del Mar segments both rupture simultaneously. The recurrence interval for such an event is estimated to be approximately 1800 years

DESCRIPTION OF UNITS:

Surficial Soils

af — Fill: Silty sand (SM) and clayey sand (SC), medium- to coarse-grained, dark brown (10YR-4/3 to -3/3) and dark grayish brown (10YR-4/2), abundant angular (crushed rock) ¼-½" gravels, few round gravels to 3", few light gray sandstone fragments, abundant roots and rootlets to 1½ ", some construction debris (ceramic tile, plastic sheet, lumber), loose, slightly moist

Qc — Colluvium/Topsoil: Silty sand (SM) to clayey sand (SC), fine- to medium-grained, brown (10YR-5/3) to dark brown (10YR-4/3 to -3/3), numerous roots and rootlets to ¼", granular to moderately developed subangular blocky soil structure, common pores, locally common white caliche-filled rootlet casts, loose to medium dense, slightly moist to moist

Pedogenic Soils

Bt — Subsoil (Argillic horizon): Clayey sand/sandy clay (SC/CL), fine- to medium-grained sand, dark brown (10YR-4/3) to dusky yellow-brown (10YR-4/4), grayish brown (10YR-5/2) to very dark grayish brown (10YR-4/2) and very dark brown (10YR--2/2) to very dark grayish brown (10YR-3/2), some roots and rootlets, moderate to strongly developed angular to subangular blocky soil structure, firm to stiff, moist to very moist, slight gradation into underlying deposits

Old Paralic (Terrace) Deposits

Qop-1 — Sand to silty sand (SP/SM), clean to silty, fine- to medium-grained, light gray (10YR-7/2) to pale brown (10YR-6/3) and brown (10YR-5/3), common reddish brown (5YR-3/3 to -3/4) iron-oxide stains, poorly indurated, granular to weakly developed subangular blocky structure, pale brown (10YR-6/3) and brown (10YR-5/3), few roots and rootlets, medium dense to dense, moist

Qop-2 — Clayey sand to clayey silt (SC/ML), very fine- to fine-grained sand, locally medium-grained, brown (10YR-5/3) and dark brown (10YR-3/3) to dusky yellow-brown (10YR-4/4), numerous laminar argillic (Bt) soil lenses and rootlet casts, few roots and rootlets, moderate to strongly developed subangular, blocky soil structure, common pale brown (10YR-6/3) mottles, some iron-oxide stains, few black manganese oxide stains, firm to stiff, moist to very moist

OTHER FEATURES:

—— Contact between pedogenic/geologic units

— — Approx. contact between pedogenic/geologic units

┬┬┬ Top of pedogenic soil horizon

FAULT TRENCH LOG EXPLANATION

7727 Lookout Drive, La Jolla, CA

Logged by SEJ on 7/10/2013

Project No. 13004 — Figure 12

Stephen E. Jacobs, CEG

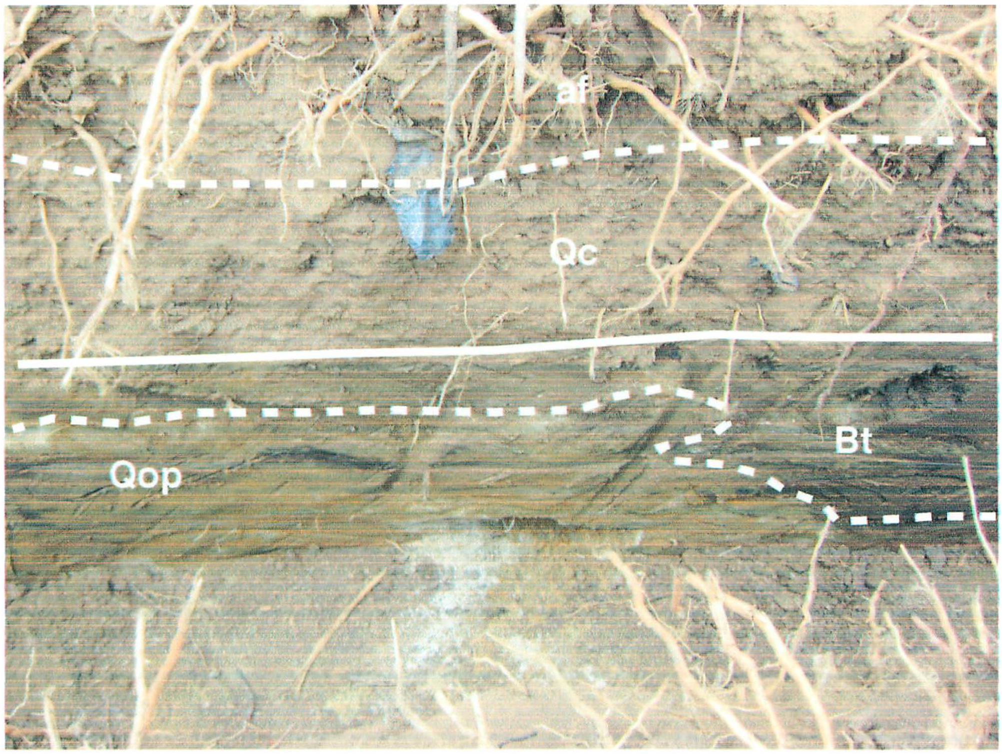

Photo 1. Soil profile near north end of west face of fault trench (af = fill; Qc = colluvium/topsoil; Bt = argillic horizon; Qop = old paralic deposits)

Photo 2. Another view of soil profile toward north end of fault trench (af = fill; Qc = colluvium/topsoil; Bt = argillic horizon; Qop = old paralic deposits)

(Lindvall and Rockwell, 1995). Such an event could produce ground shaking at the site on the order of 0.5g (Sangines and others, 1991). The maximum credible earthquake on the Rose Canyon fault system is currently determined to be M_w7.2 (Cao and others, 2003).

Other regional active faults, the Coronado Bank, Elsinore, San Jacinto, and San Andreas faults, are approximately 13, 39, 61, and 87 miles, respectively, from the site. Ground shaking resulting from major earthquakes on these faults will occur more frequently than shaking produced from the Rose Canyon fault zone, but since these faults are located at greater distances, the intensity of shaking will be lower (Table I).

TABLE I: DETERMINISTIC SITE PARAMETERS For SELECTED FAULTS

FAULT	DISTANCE (mi.)[1]	MAX. CRED.. MAGNITUDE[2]	PEAK SITE ACC. (g)[3]
Rose Canyon	0	7.2	0.48
Coronado Bank	13	7.6	0.25
Elsinore	39	6.8	0.07
San Jacinto	61	6.8	0.04
San Andreas	87	7.2	0.04

Earthquakes near the Rose Canyon Fault Zone since about 1980 occurred mostly during the 1985, 1986 and 1987 earthquake clusters (magnitudes 4.6 or less) located just south of the southernmost surface exposure of the fault zone (Magistrale, 1993). The

[1] Fault distances measured from Jennings and Bryant (2010) and Treiman (1993)
[2] Maximum moment magnitude calculated from relationships (rupture area) derived from Wells and Coppersmith (1994; values listed in Appendix A of Cao and others, 2003)
[3] Interpolated (or extrapolated) value estimated from attenuation relation of Campbell and Bozorgnia (1994; 2003; site is assumed to be comprised of stiff soil)

epicenters of these earthquake clusters are located about 10 miles southeast of the subject site.

The epicentral area of the April 4, 2010, Mw (moment magnitude) 7.2 Baja California, Mexico earthquake, that was generated on a strike-slip fault at a depth of about 6 miles, is located about 105 miles southeast of the subject site.

Earthquakes on one of the major active faults in Southern California will probably cause moderate to severe ground shaking at the subject site during the life of the property. The Modified Mercalli intensity in the area of the property due to the April 4, 2010, Mw 7.2 Baja California, Mexico earthquake was mapped as intensity V (SCSN, 2010) [i.e., *Felt by nearly everyone, many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.*].

Tsunamis:

Tsunamis are large sea waves produced by a submarine earthquake, landslide, or volcanic eruption. The site is not near the ocean coastline and not within a tsunami hazard zone as designated by the California Emergency Management Agency (2009), and therefore is not considered susceptible to tsunamis.

Seiches:

Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not near any large bodies of water, and therefore is not considered susceptible to seiches.

Liquefaction and Seismically Induced Settlement:

At anticipated foundation depths, surficial soils or old paralic deposits will underlie any proposed structures. These materials consist of mainly fine- to medium-grained, medium dense to dense silty sand and firm to stiff clayey sand, sandy clay, and clayey silt, generally not considered susceptible to seismically induced liquefaction or settlement.

Landslides:

The subject property is located within the City of San Diego Geologic Hazard Category 27 (Figure 7), which is described as having one of the "slide-prone formations."

The site lies within "Subarea 3-1" of the Landslide Susceptibility Map prepared by Tan (1995, Figure 8). Slopes within Subarea 3-1 are considered "at or near their stability limits due to a combination of weak materials and steep slopes (many slope angles exceed 15 degrees). Although most slopes within Subarea 3-1 do not currently contain landslide deposits, they can be expected to fail, locally, when adversely modified." (Tan, 1995, p. 3)

Review of topographic maps and aerial photographs (see Appendix A) indicates there is no geomorphic evidence of ancient deep-seated landslides on or adjacent to the property. The nearest mapped landslide is located about 0.1 mile south of the site (Figures 4 and 8).

Groundwater:

Groundwater was not encountered in the fault trench, and not reported in fault trenches on neighboring sites by previous consultants. However, Christian Wheeler Engineering (2011) reported some seepage in a test pit and fault trench by Steven C. Suitt and Associates (1994) on the property two lots north of Parcel 2 of the subject property.

Since regional groundwater is likely at depths greater than 50 feet, it is not anticipated to affect the site. Localized perched groundwater can develop on the site and is usually associated with landscape irrigation or excessively heavy rainfall.

CONCLUSIONS AND RECOMMENDATIONS

1. Artificial fill, colluvium/topsoil, subsoil, and Pleistocene old paralic deposits underlie the site. The colluvium/topsoil consists of brown to dark brown silty sand and clayey sand. The subsoil is a pedogenic soil (argillic) horizon consisting of mostly dark brown to very dark brown clayey sand to sandy clay. The underlying Point Loma Formation was not exposed in the fault trench and was not reported by previous consultants in any of their fault trenches on neighboring sites.

2. The subject site is located within the subzone of the active Mount Soledad fault segment of the Rose Canyon fault zone. Fault trench logs prepared by previous consultants on neighboring parcels are mostly situated within an intercept angle of 30 degrees from the mapped fault trend except on Parcel 5. Based on no offset of stratigraphic or pedogenic units detected in my exploratory fault trench or reported in fault trenches by previous consultants on neighboring parcels, it is my professional opinion that most of the property is likely not traversed by active or potentially active faulting, except for the northern portion of Parcel 5.

3. Fault trenching by previous consultants was performed on parcels nearest to the subject site. Based on my review of fault trench logs by these previous consultants for nearby sites, I judge that their fault investigation reports provide sufficient evidence, in conjunction with the fault trench of the current study, to characterize the subject project site with respect to the presence of faulting. Accordingly, based on my review of their fault investigation reports and the fault-rupture hazard map by the City of San Diego, it is my professional opinion that "active" or "potentially active" fault traces likely do not cross the subject property, except for northern portion of Parcel 5.

4. The results of this investigation indicate there is no evidence of ancient deep-seated landslides on the property. The site is characterized by nearly level to moderately sloping graded terrain, which may be locally susceptible to landslides but where no landslides have been mapped.

5. I recommend that geotechnical investigations with adequate subsurface exploration and foundation recommendations be performed on all the subject parcels individually prior to the start of any development on these parcels.

LIMITATIONS

This fault-rupture hazard investigation report is prepared for the exclusive use of Mira Investments and their representatives and direct clients. The opinions expressed herein are for the purpose of evaluating potential geologic/geotechnical hazards affecting the subject property and investigating the presence of faults on the subject property. This investigation is limited to the depth explored in the trench and the location of the trench. The possibility of fault strands at greater than the explored depths and at other locations crossing the subject property cannot be ruled out because of the limited excavation. The possibility of future earthquakes generated by as yet unrecognized faults crossing the subject property should be considered. This report is intended for use only by the client named above for the purpose stated; no other use of this report is authorized, and transfer to any other person or agency without my notification and authorization is not advisable. No warranties, either express or implied, are given as to the geologic, soils, or foundation conditions of the subject property.

Appendix A

REFERENCES

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[φ] Currently called California Geological Survey (CGS) as of 2001

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Appendix B

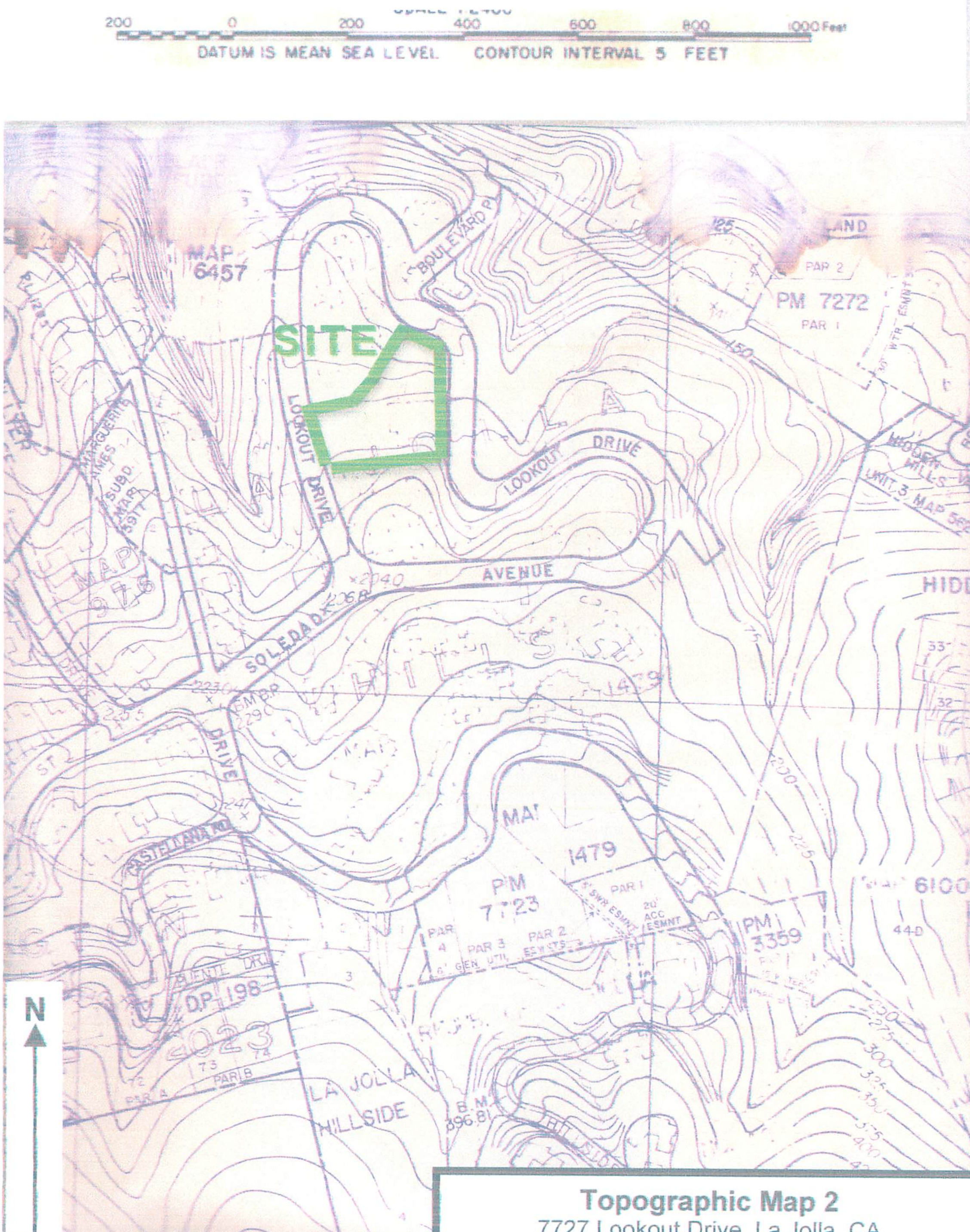
TEXT FIGURES AND PHOTOGRAPHS

Reference: USGS La Jolla 7½' quadrangle (1996)

Site Location and Topographic Map
7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 1**

Stephen E. Jacobs, CEG

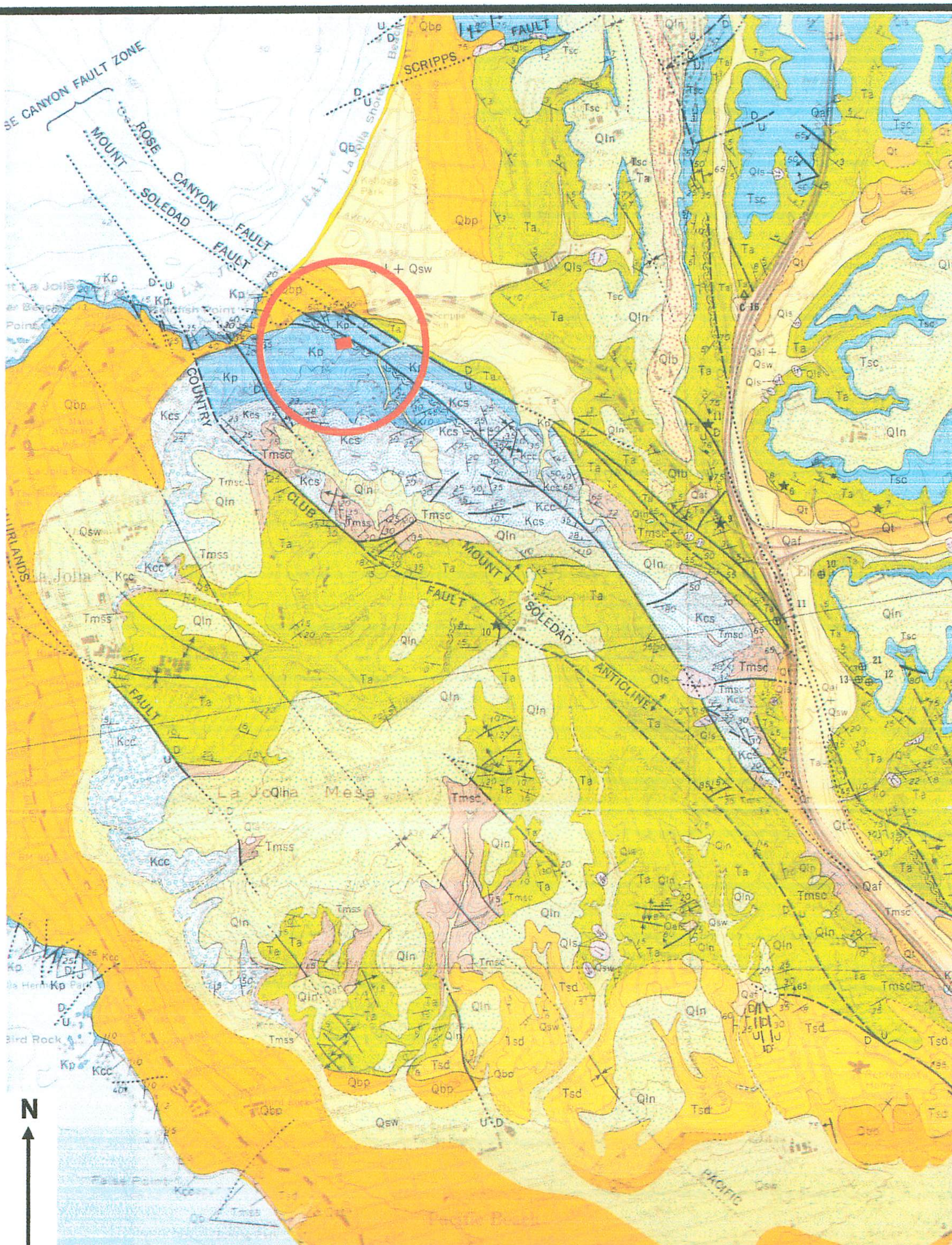


Reference: County of San Diego Topographic Map Sheet 246-1689 (1963)

Topographic Map 2
7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 2**

Stephen E. Jacobs, CEG

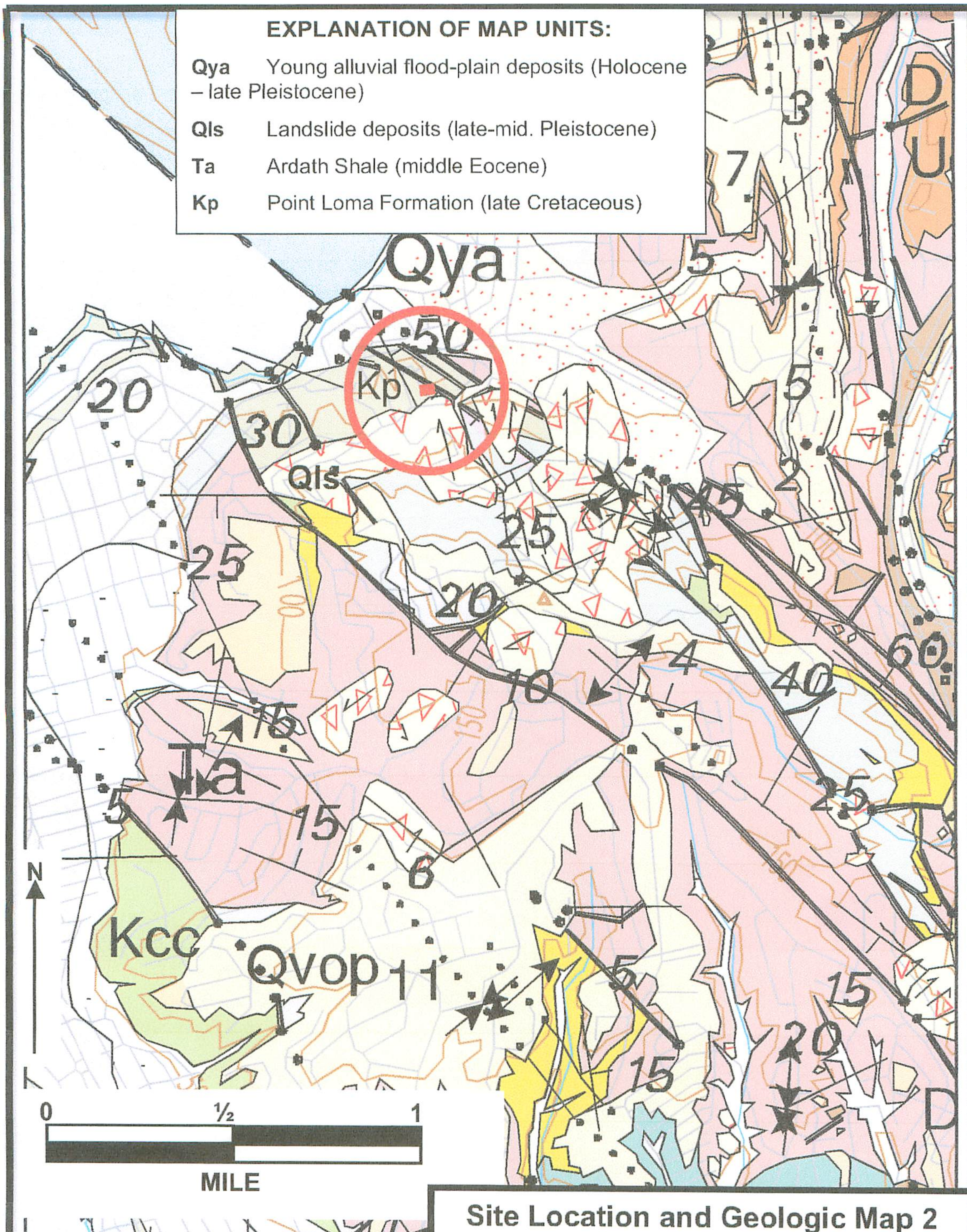


Reference: Geology of the La Jolla Quadrangle, San Diego County, California (Kennedy, 1975)

Site Location and Geologic Map 1
7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 3**

Stephen E. Jacobs, CEG

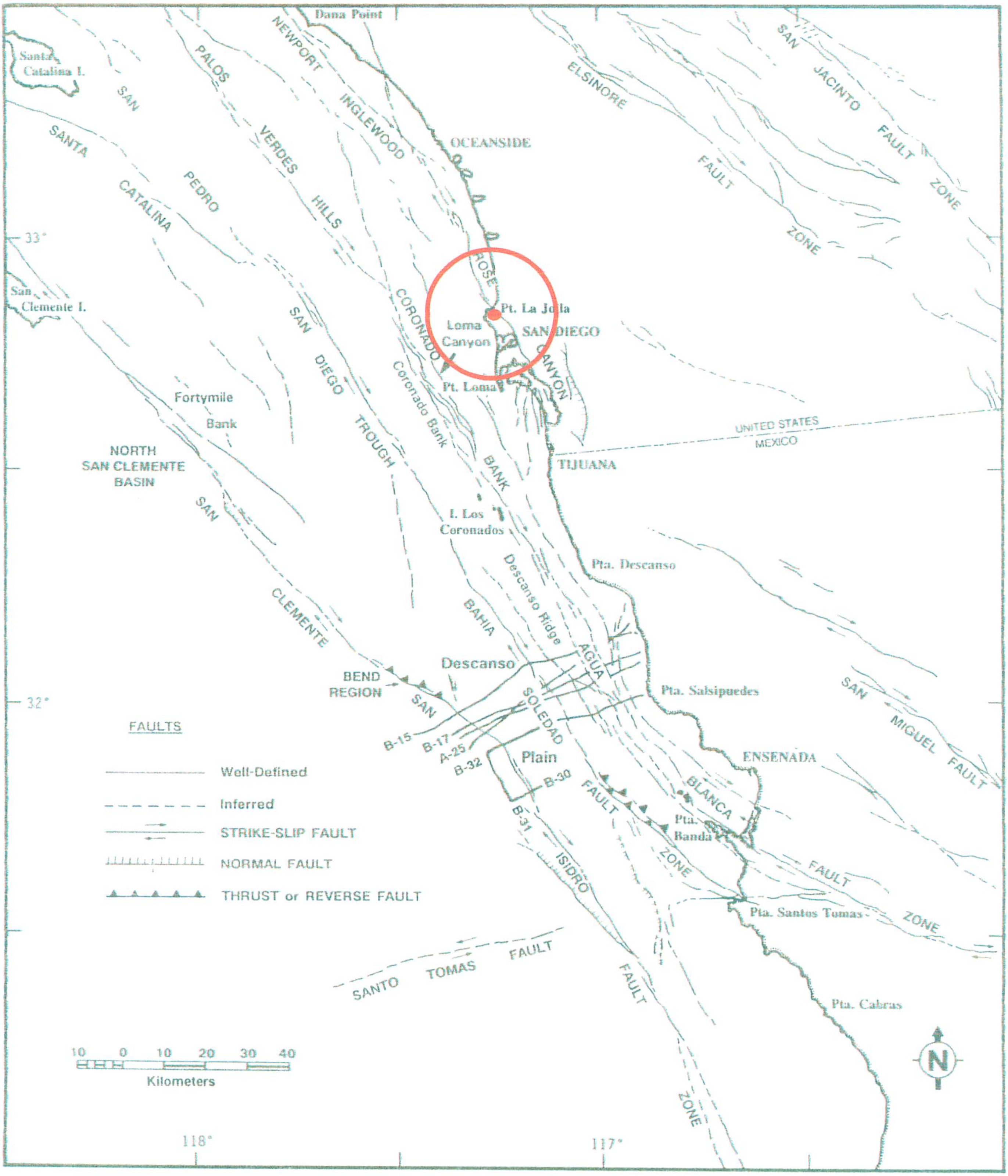


Site Location and Geologic Map 2
7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 4**

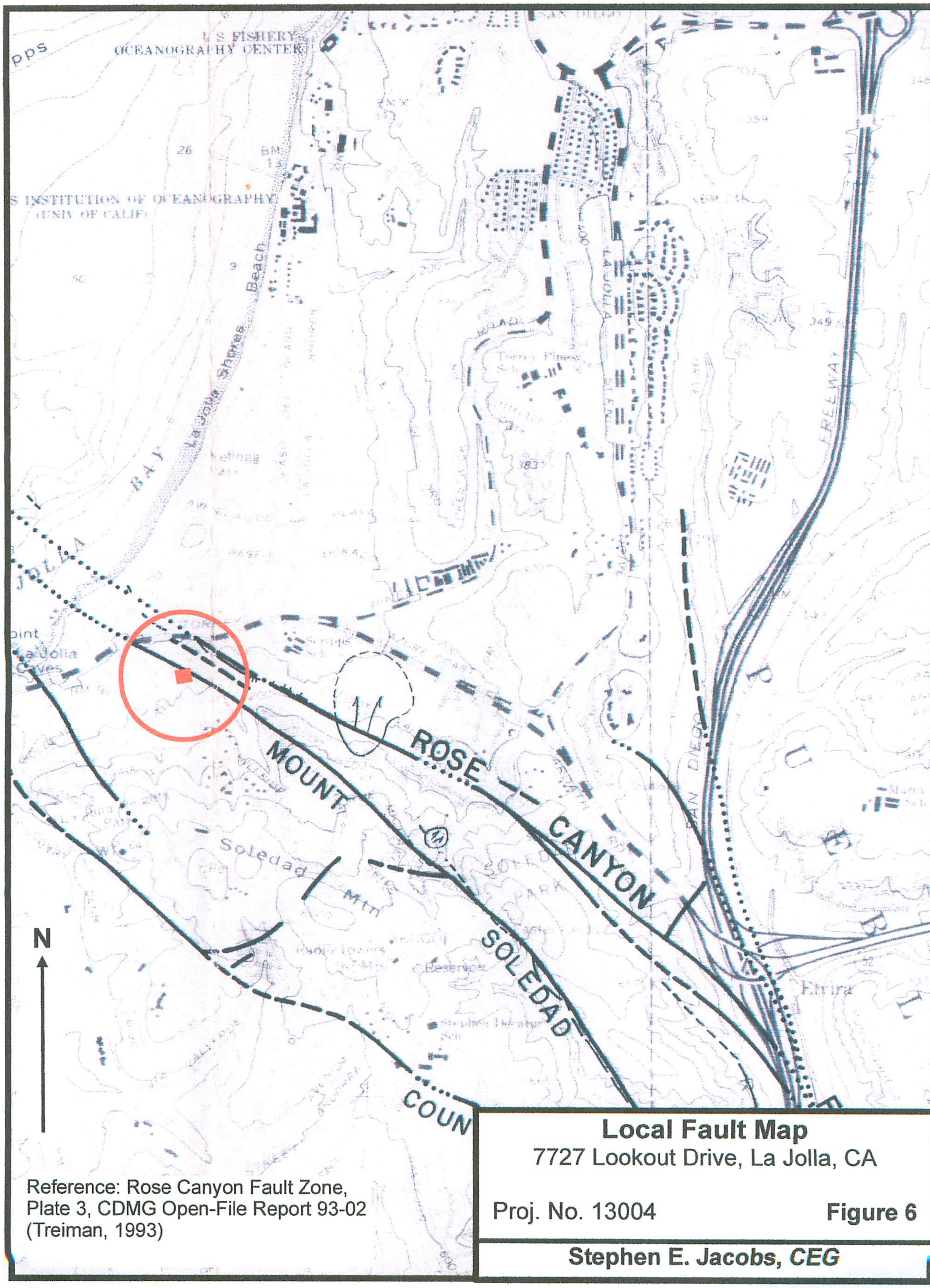
Stephen E. Jacobs, CEG

Reference: Geologic Map of the San Diego 30' x 60' Quadrangle, CGS Regional Geologic Map Series, Map No. 3 , California (Kennedy and Tan, 2005)



. Map showing the major late Cenozoic fault zones of the inner California Continental Borderland and adjacent as in the vicinity of San Diego and northern Baja California, Mexico (after Gastil and others, 1975; Greene others, 1979; Jennings, 1975; Kennedy and others, 1980; Legg, 1985). Location of seismic profiles presented as other figures are shown.

Figure 5. Regional fault map of San Diego area showing site location



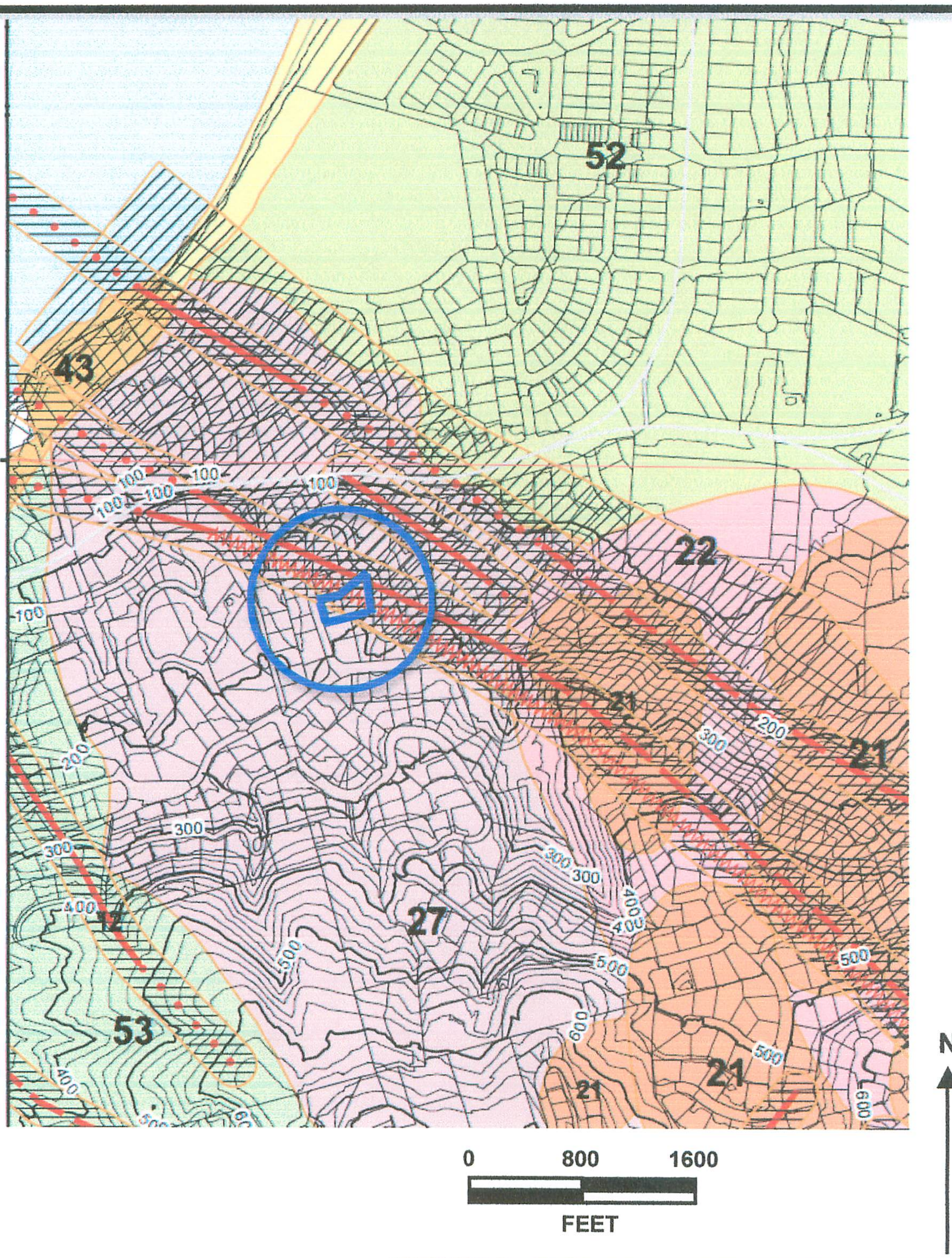
Reference: Rose Canyon Fault Zone, Plate 3, CDMG Open-File Report 93-02 (Treiman, 1993)

Local Fault Map

7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 6**

Stephen E. Jacobs, *CEG*



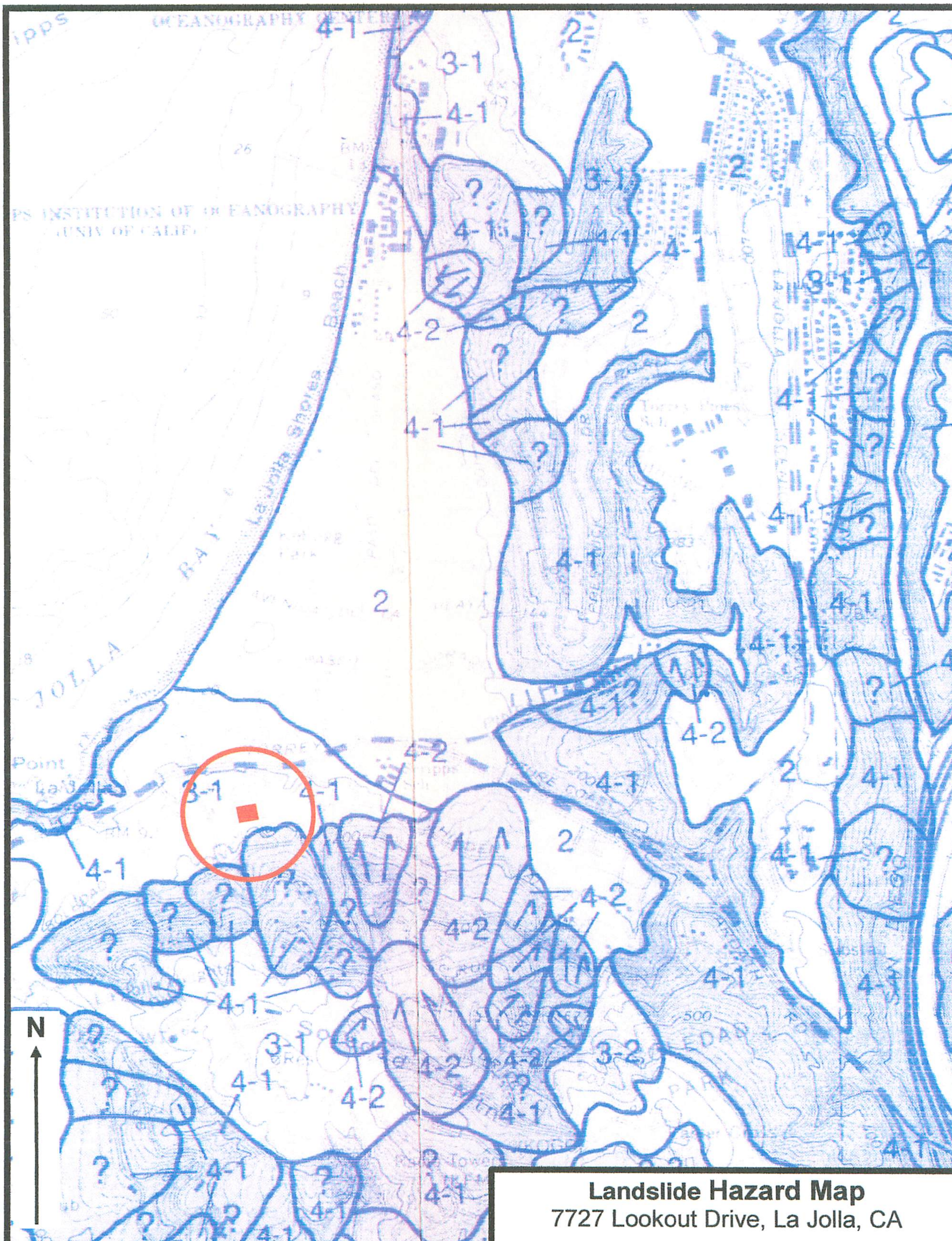
Seismic Safety Study Map
7727 Lookout Drive, La Jolla, CA

Proj. No. 13004

Figure 7

Stephen E. Jacobs, CEG

Reference: Seismic Safety Study Geologic Hazards and Faults, Map 30 (City of San Diego, 2008)



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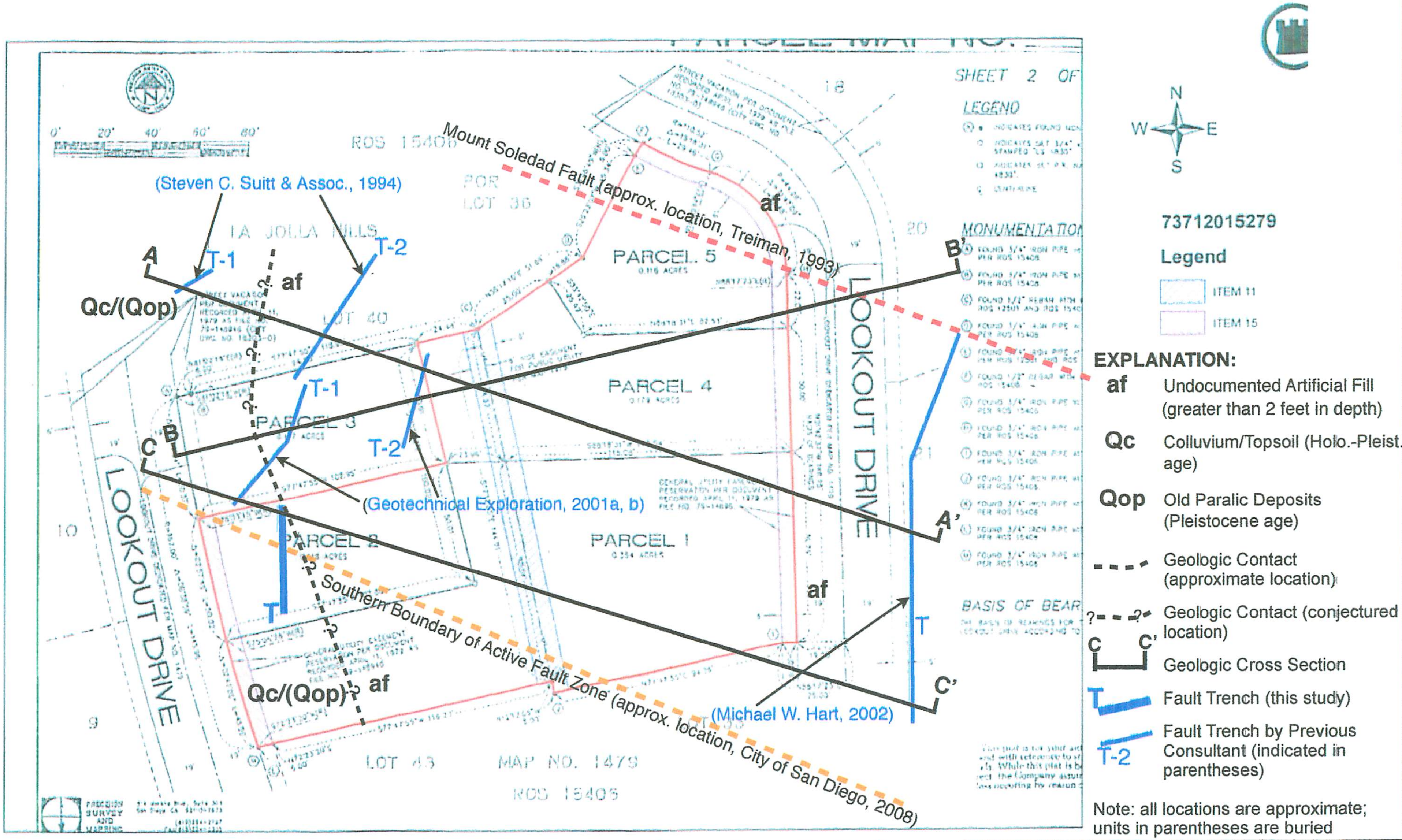
Landslide Hazard Map

7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 8**

Stephen E. Jacobs, CEG



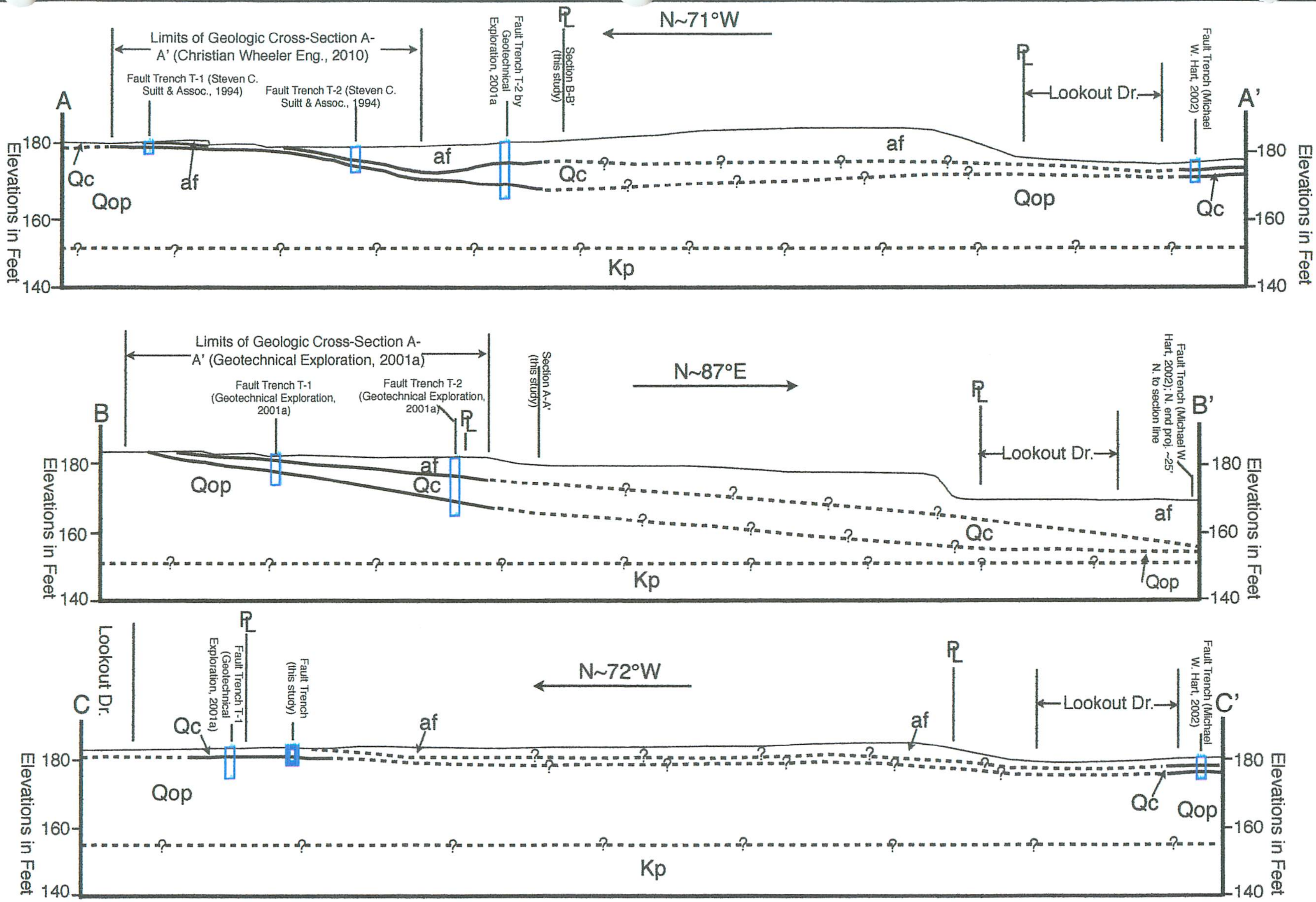
This map with plotted easement(s) is provided as a courtesy. The location of the easement(s) is believed to be approximately correct, but is not guaranteed. Chicago Title will not assume responsibility for its accuracy. If you want such a guarantee, you should obtain the services of a licensed surveyor or engineer.

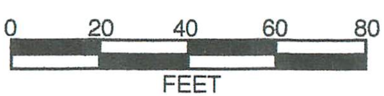
Site Geology Map

7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 9**

Stephen E. Jacobs, CEG





Note: Locations of geologic cross sections are plotted on Figure 9-Site Geology Map; all locations on cross sections are approximate.

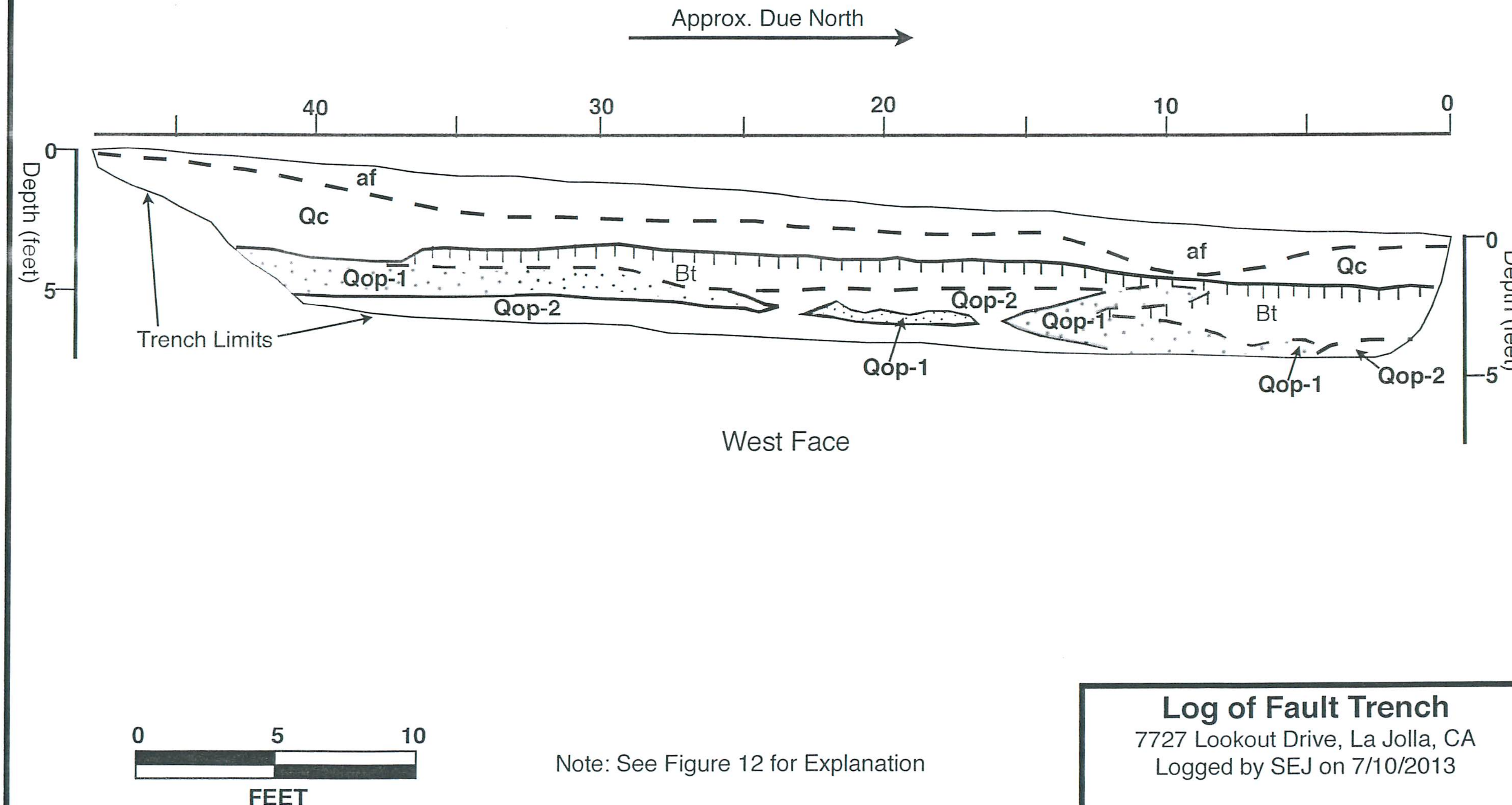
EXPLANATION:

af	Undocumented Artificial Fill (greater than 2 feet in depth)
Qc	Colluvium/Topsoil (Holocene-Pleistocene age)
Qop	Old Paralic Deposits (Pleistocene age)
Kp	Point Loma Formation (late Cretaceous age)
———	Geologic Contact
- - - -	Geologic Contact (approximate location)
?- - -?	Geologic Contact (conjectured location)

Geologic Cross Sections
7727 Lockout Drive, La Jolla, CA

Proj. No. 13004 Figure 10

Stephen E. Jacobs, CEG



Note: See Figure 12 for Explanation

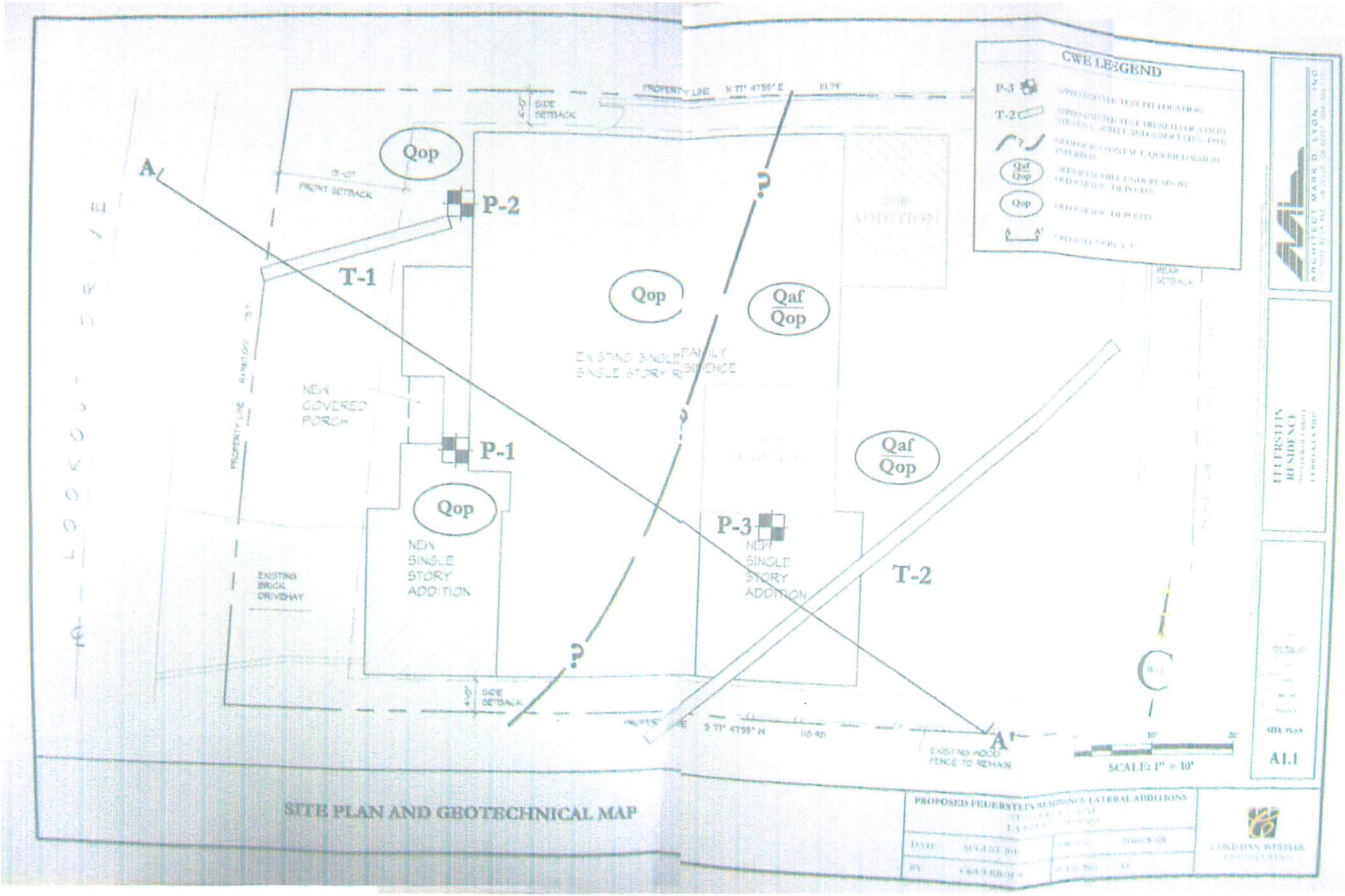
Log of Fault Trench
7727 Lookout Drive, La Jolla, CA
Logged by SEJ on 7/10/2013

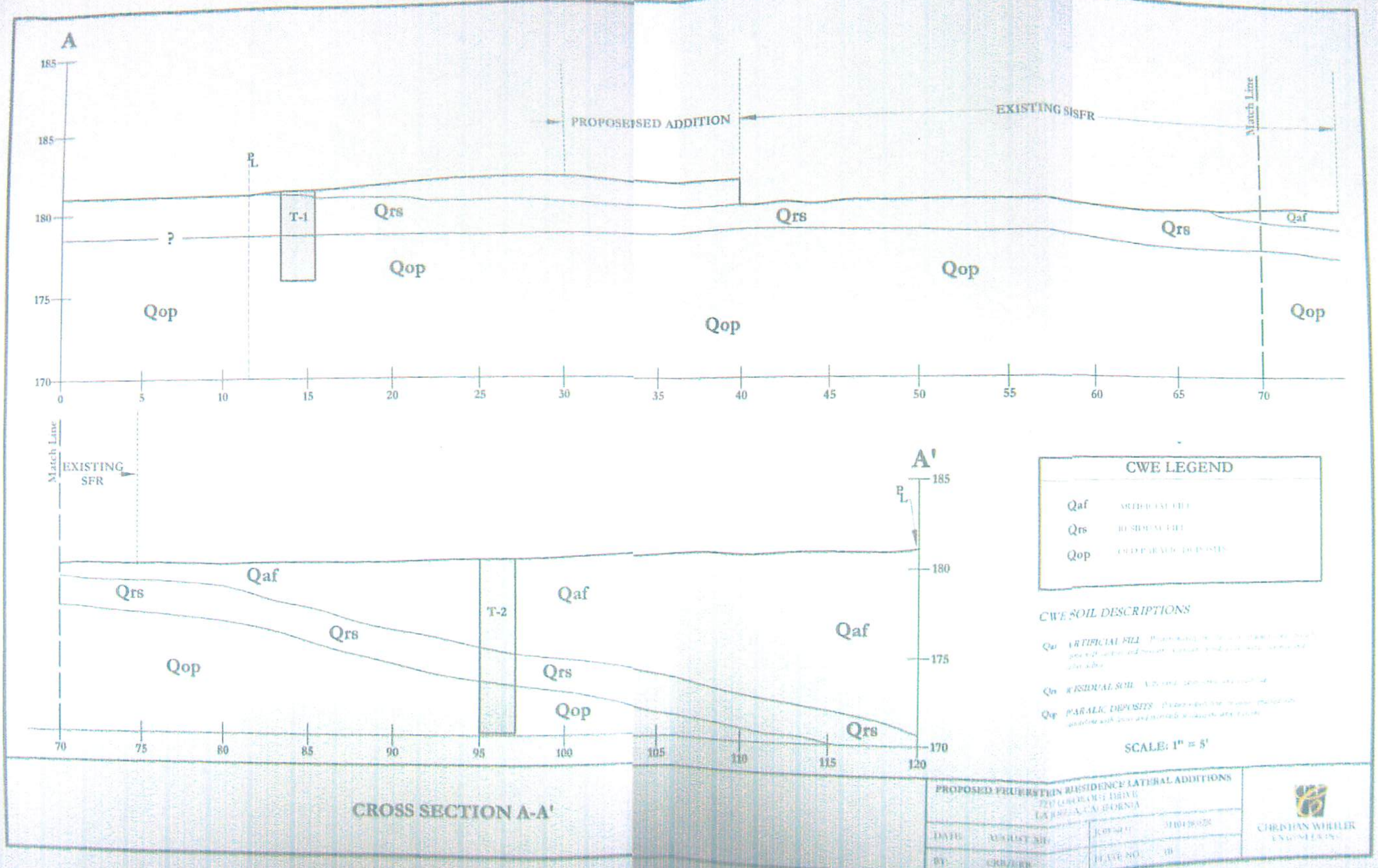
Project No. 13004 **Figure 11**

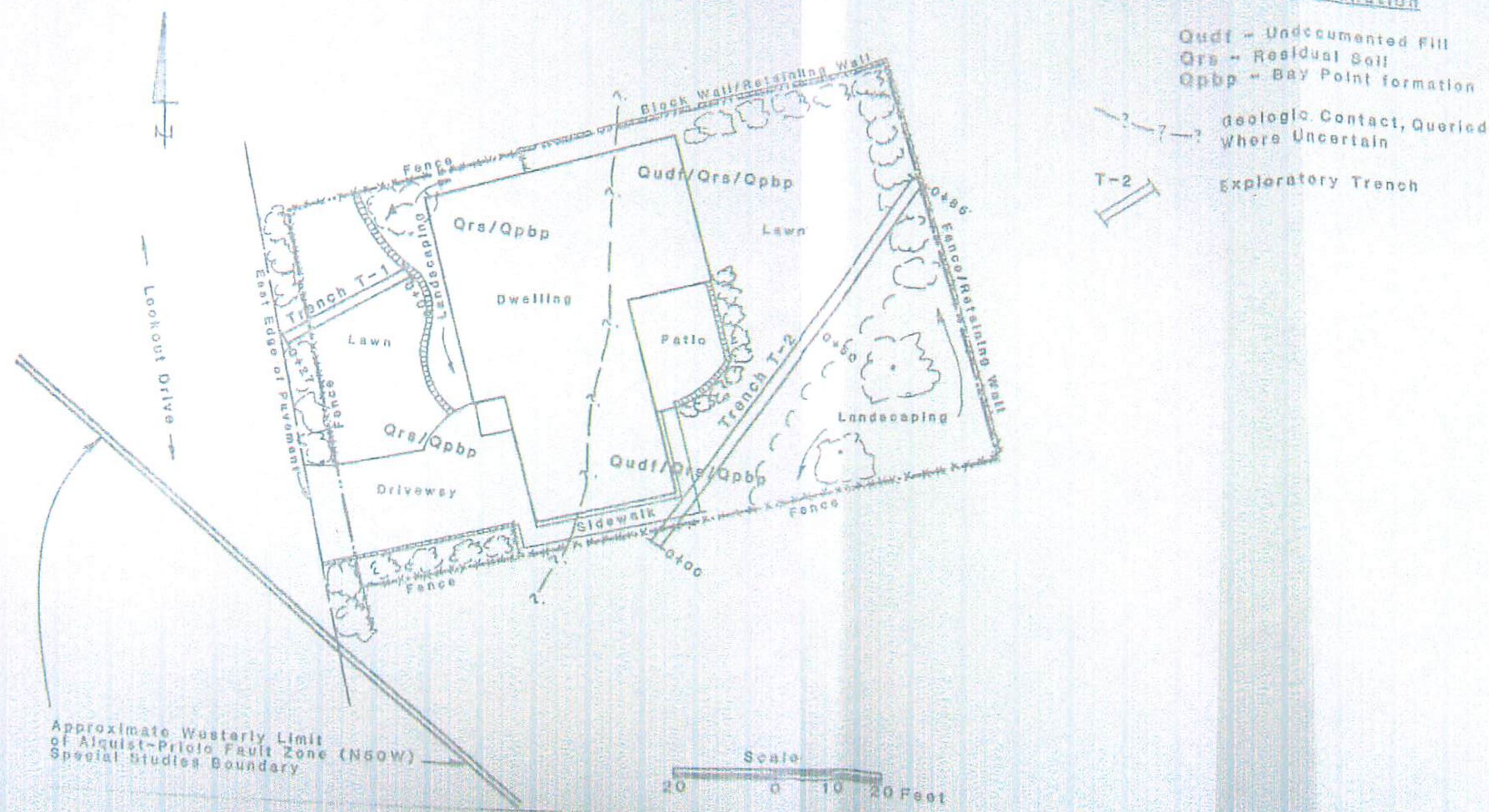
Stephen E. Jacobs, CEG

Appendix C

PLOT PLANS, FAULT TRENCH LOGS, AND CROSS SECTIONS BY PREVIOUS CONSULTANTS


CWE LEGEND
P-3
T-2
Qaf
Qop
Qop
Qop
Qaf
Qop
Qaf
Qop
Qop
Qop
P-2
P-1
P-3
T-1
T-2
A
A'
PROPERTY LINE
SIDE SETBACK
FRONT SETBACK
REAR SETBACK
NEW COVERED PORCH
NEW SINGLE STORY ADDITION
NEW SINGLE STORY ADDITION
EXISTING BRICK DRIVEWAY
PROPERTY LINE
LOOKOUT DRIVE
EXISTING WOOD FENCE TO REMAIN
SCALE: 1" = 10'
A1.1
SITE PLAN
FEUERSTEIN RESIDENCE
SITE PLAN AND GEOTECHNICAL MAP
PROPOSED FEUERSTEIN RESIDENCE LATERAL ADDITIONS
DATE
BY
AUGUST 201
CHRISTIAN WHEELER ENGINEERING


A
PROPOSEISED ADDITION
EXISTING SISFR
Match Line
T-1
Qrs
Qop
Qaf
Match Line
EXISTING SFR
A'
T-2
CWE LEGEND
Qaf
Qrs
Qop
CWE SOIL DESCRIPTIONS
ARTIFICIAL FILL
RESIDUAL SOIL
PARALIC DEPOSITS
SCALE: 1" = 5'
CROSS SECTION A-A'
PROPOSED FEUERSTEIN RESIDENCE LATERAL ADDITIONS
DATE
BY
PLATE NO.
CHRISTIAN WHEELER



Steven C. Suitt and Associates

4CL123A

May 1994

Site Plan/Preliminary Geologic Map

Project Name: A. and S. Walden | Date: 4/15-18/94 | Location: 7701 Lookout Dr. La Jolla
Project Number: 471116 | Elevation: approx. 190' | Logged By: S. Suitt, M. Hart
Equipment: Bicat X331 Excavator

EXPLORATORY TRENCH NO. T-1

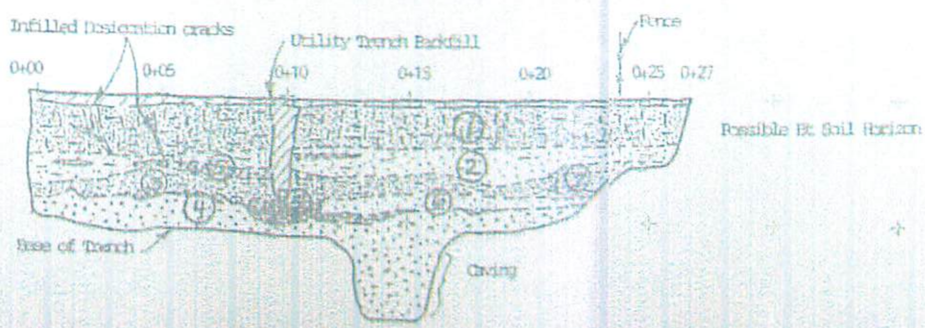
Attitudes	Explanation	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	USCS	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
	B – Bedding J – Joint S – Shear F – Fault F/R – (Filled) Rodent Burrow	1	Qrs	Residual Soil Clayey Sand-Sandy Clay with highly organic cover Fine to med. grained, well graded, moist, med. dense to stiff, some blocky structure, rootlets and roots, Lt. olive brown (2.5Y 5/4-6), forms desiccation upon exposure with some clay infilling.	SC-CL						
		2	Qbp	Bay Point formation Silty Sandstone with Claystone Lenses Fine to med. grained, poorly graded, moist, med. dense, mottled, root hairs, some thin sandstone beds, Olive brown (2.5Y 4/4).	SM						
		3	Qbp	Silty Sandstone Fine grained, poorly graded, micaceous, moist, med. dense, root hairs, sli. porous, Lt.Ol. Br. (2.5Y5/4	SM						
		4	Qbp	Sandstone Coarse grained, moist, loose, poorly cemented, massive, root hairs, Olive (5Y5/6).	SP						
		5	Qbp	Conglomeritic Silty Sandstone Fine to coarse grained, mostly coarse, med. dense, moist, roothairs, permeable, Olive (5Y5/4)	GP						
		6	Qbp	Sandstone Med. grained, moist, med. dense, trace of gravel sized, root hairs, Olive (5Y 4/4)	SP						
		7	Qbp	Sandstone Med. grained, moist, med. dense, interbedded with fine sandstone, crudely laminated, Pale Olive (5Y 6/3)	SP						

Scale: 1" = 5'

Slope: Southwest Trend: S60W

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			8.5



Project Name: R. and S. Suitt Project Number: 43129 Date: 1/15-13/94 Elevation: Approx. 190' Location: 7731 Lookout Dr., La Jolla Logged By: S. Suitt, M. Hart Equipment: [illegible]

EXPLORATORY TRENCH NO. T-2

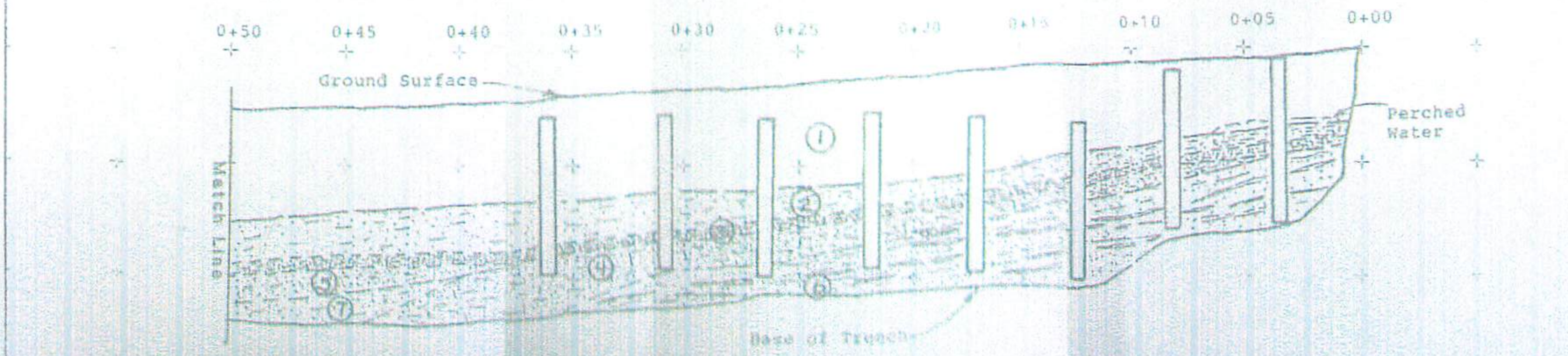
Orig.	Attitudes	See Exp.	Explanation	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	USCS	Soil Consistency	Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			B– Bedding J– Joint S– Shear F– Fault FR–(Filled) Rodent Burrow	1	Qudf	Undocumented Fill Silty Sand to Sand Fine to coarse grained, sli. moist, porous to sli. porous, loose to med. dense, contains cobbles and boulders to 2 feet in dia., contains several organic horizons, and assorted trash, such as; wood, glass brick, concrete, metal and tires.	SM-SP							
				2	Qrs	Residual Soil-Slopewash Clayey to Silty Sand (A Horizon) Fine to med. grained, porous, very moist, med. dense, trace of coarse sand, root hairs, contains a highly organic soil cover (old ground surface; buried), Very Dark Grayish Brown (10YR 3/2)	SC							
				3	Qrs	Clayey Sand (Bt Horizon) Fine to med. grained, dense, sli. porous, blocky structure, clay bridging ped surfaces, some root hairs, sli. moist to moist, some non-continuous semi-smooth surfaces with black oxide staining, d. red brown (5YR 3/2).	SC							
				4	Qbp	Bay Point formation Silty Sandstone Fine to med. grained, med. dense to dense (m. hard), moist to sli. moist, sli. blocky structure, thinly bedded, sli. weathered, sli. fractured, D. Yel. Brown (10YR3/4).	SM							
				5	Qbp	Sandstone Fine to med. grained, dry to sli. moist, v. dense to dense (m. hard), thinly bedded, sli. weathered, sli. fractured, Olive Gray (5Y 4/2).	SP							
				6	Qbp	Sandstone with thinly laminated Claystone and Siltstone interbeds Fine to coarse grained, micaceous, dense (m. hard), Olive Gray to Olive (5Y 3/2 - 4/4), Sli. fractured.	SP							

Scale: 1" = 5'

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Northeast Trend: N35E

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			10



Location: 7731 Lookout Dr. La Jolla
Logged By: S. Sutt, M. Hart
Equipment: Bobcat X331 Excavator

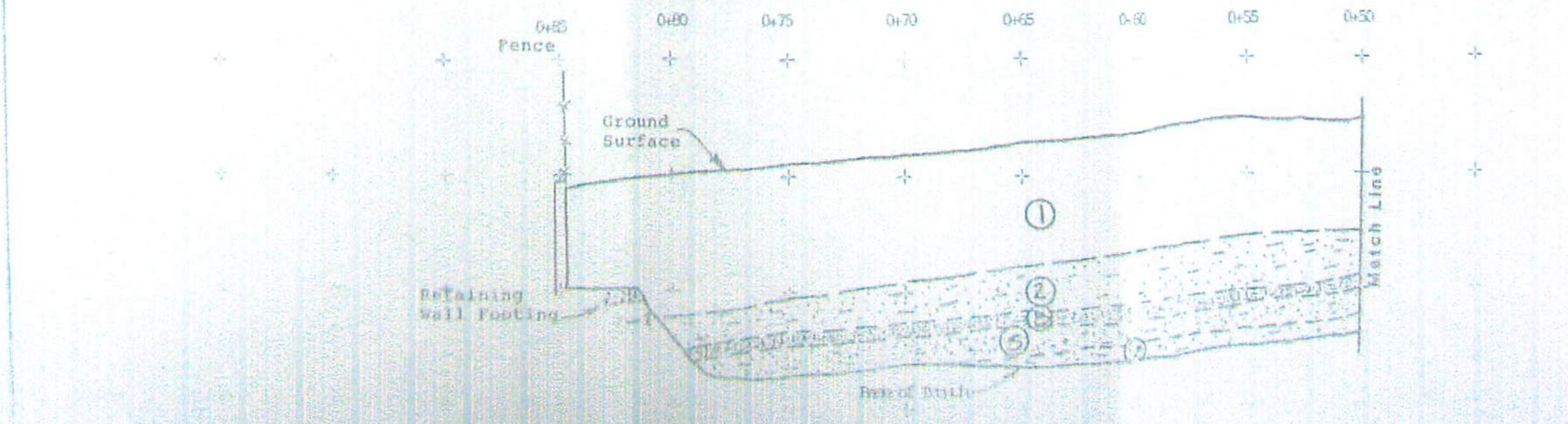
EXPLORATORY TRENCH NO. T-2

Depth	Structure	Explanation	Unit No	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency / Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
		B– Bedding J– Joint S– Shear F– Fault FRB–(Filled) Rodent Burrow	7	Qbp	Bay Point Formation (Qbp) Silty Sandstone Fine to med. grained, dense to m. dense (m. hard), trace of coarse sand, sli. fractured, sli. weathered thinly bedded, Dark Brown (10YR 3/3).	SM						

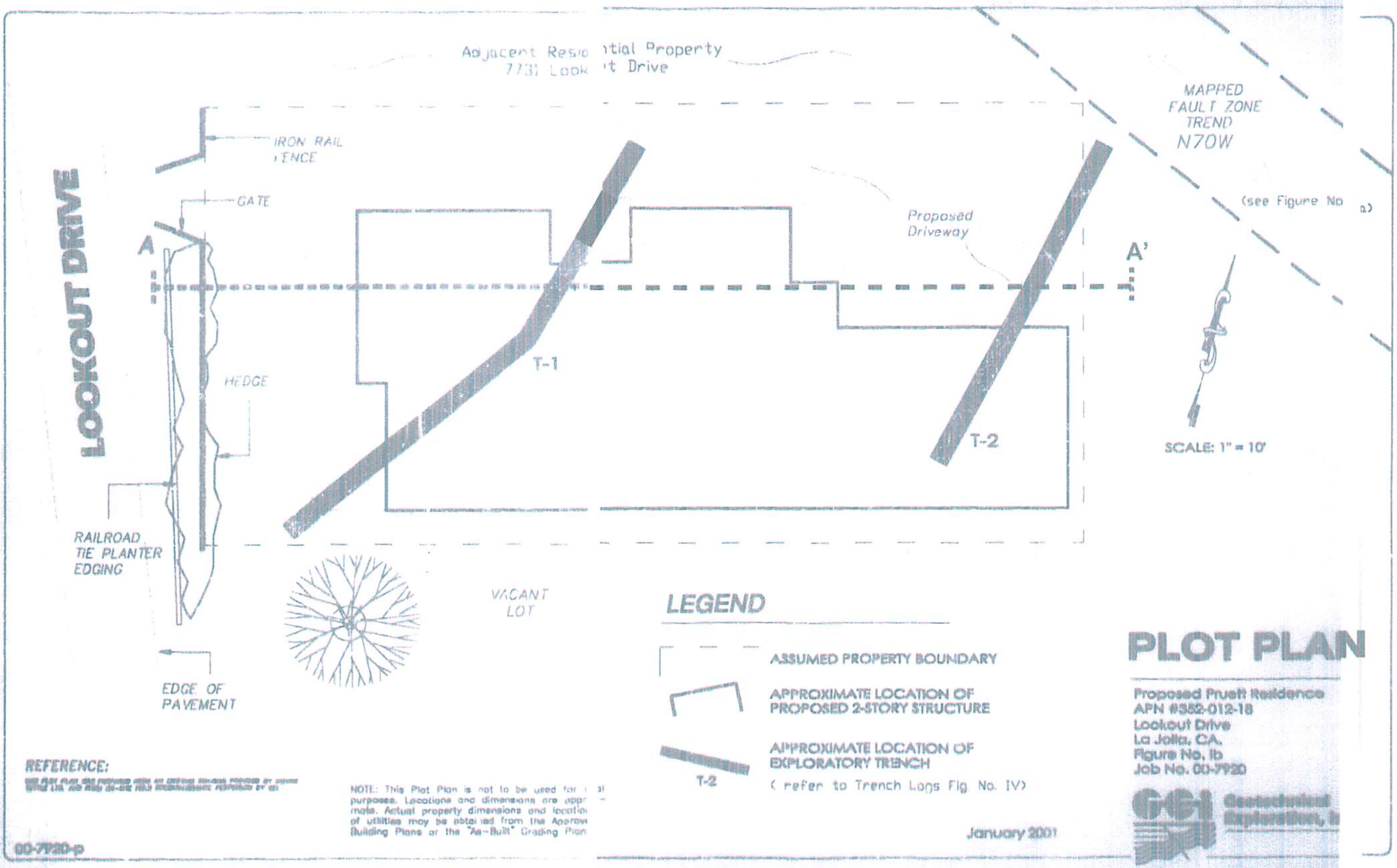
Scale 1" = 5'

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Northeast   Trend: N35E

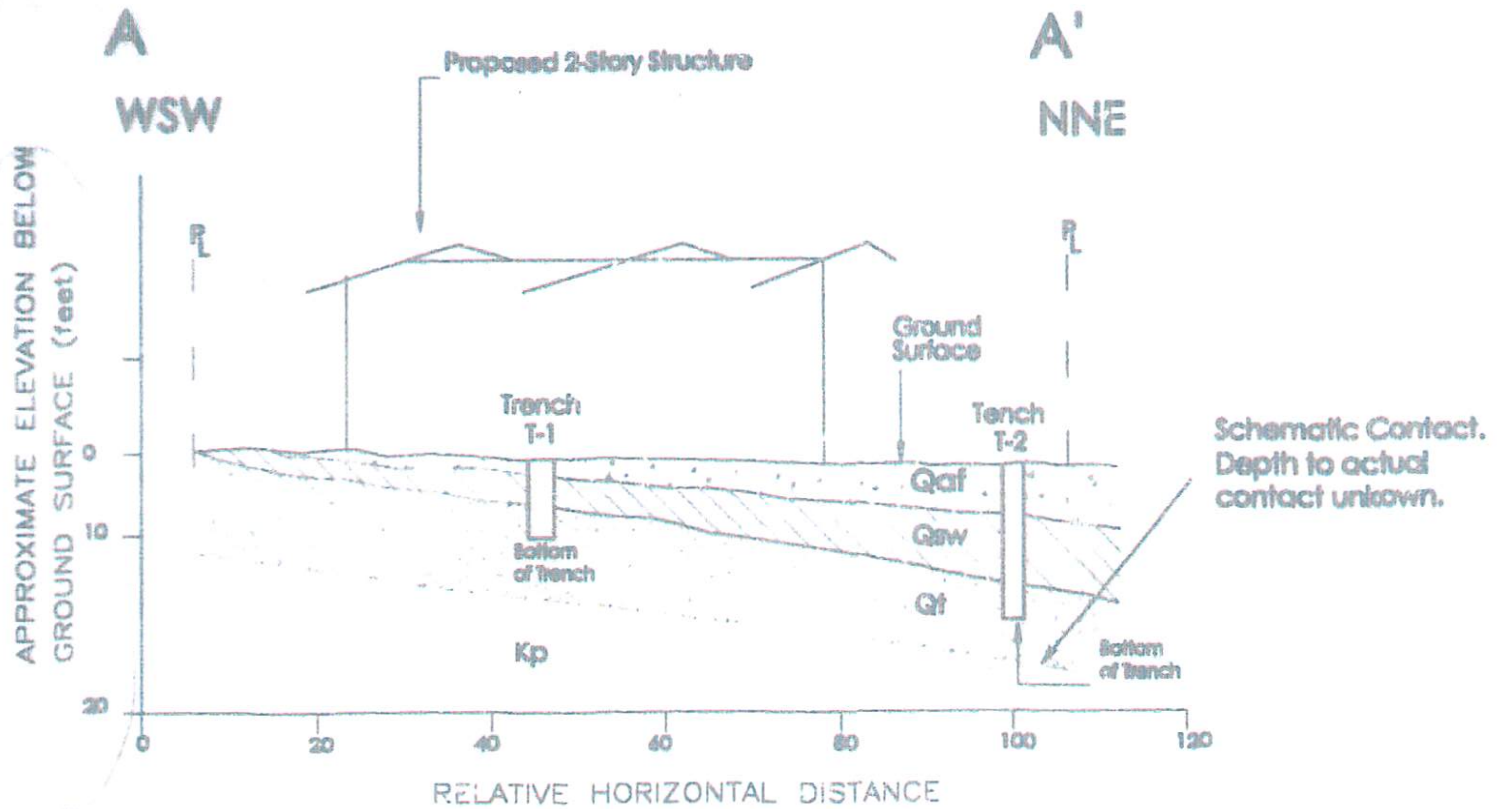


Steven C. Sutt and Associates



Adjacent Resid ntial Property
7731 Look t Drive
MAPPED FAULT ZONE TREND N70W
(see Figure No a)
LOOKOUT DRIVE
IRON RAIL FENCE
GATE
A
A'
Proposed Driveway
T-1
T-2
HEDGE
RAILROAD TIE PLANTER EDGING
VACANT LOT
EDGE OF PAVEMENT
SCALE: 1" = 10'
LEGEND
ASSUMED PROPERTY BOUNDARY
APPROXIMATE LOCATION OF PROPOSED 2-STORY STRUCTURE
APPROXIMATE LOCATION OF EXPLORATORY TRENCH
(refer to Trench Logs Fig. No. IV)
PLOT PLAN
Proposed Pruett Residence
APN #352-012-18
Lookout Drive
La Jolla, CA.
Figure No. Ib
Job No. 00-7920
Geotechnical Exploration, I
January 2001
REFERENCE:
NOTE: This Plot Plan is not to be used for al purposes. Locations and dimensions are appr mate. Actual property dimensions and locatio of utilities may be obtai ed from the Approv Building Plans or the "As-Built" Grading Plan
00-7920-p

Cross Section A-A'



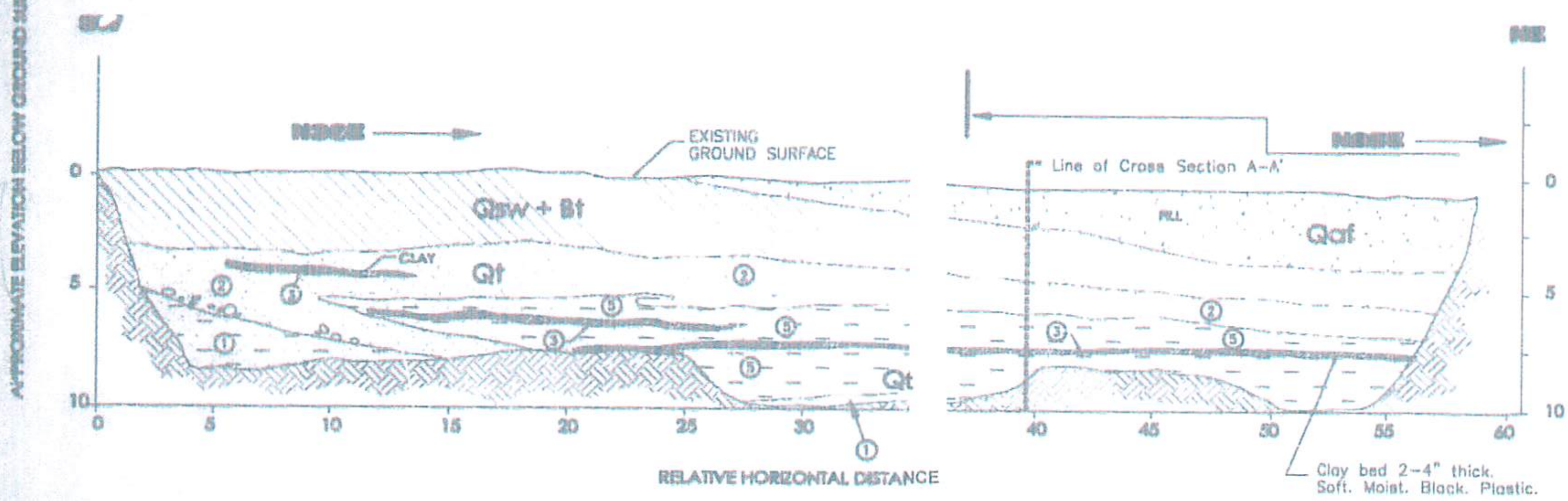
Proposed Pruett Residential Site
APN 352-012-18
Lookout Drive
La Jolla, CA.
Job No. 00-7920

GEI Geotechnical Exploration, Inc.

October 2001

00-7920-cs

EXPLORATORY TRENCH T-1



Legend

FILL/Qaf — SILTY SAND, loose to compact. Dampt to moist. Light Brown with angular gravel to cobble size clasts of cemented sandstone. (SM)

SLOPEWASH/TOPSOIL Qsw/Bt — CLAYEY SAND/SANDY CLAY, medium dense/stiff. Damp–moist. Light brown (SC/CL) to dark brown and black to light brown sandy clay argilic horizon (undifferentiated) Bt topsoil (CL)

TERRACE/Qt

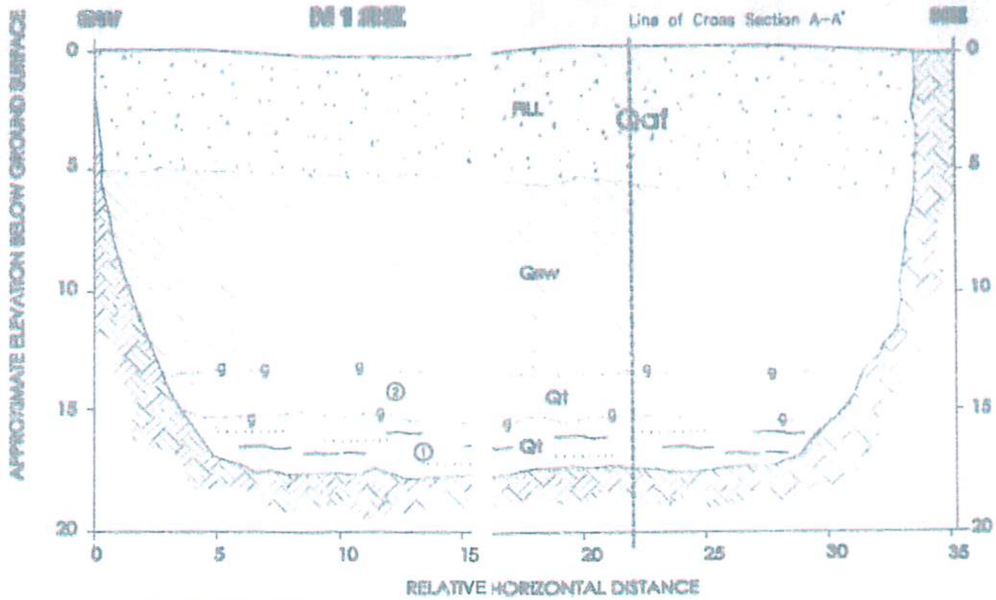
- ① Dense light brown coarse massive sandstone (SP)
- ② Dense, brown coarse silty clayey sand (SC) Massive to well bedded with lenses of cream/light brown thinly bedded siltstone (ML)
- ③ Interbeds of stiff black clay (CL) and very stiff brown silty coarse sandy clay (CL)
- ④ Thinly laminated interbedded light grey to white and light brown fine sand and silt (SM)
- ⑤ Interbedded light brown coarse silty massive sand (SP) to horizontal well bedded and black clay (CL)

October 2001

Geologic Fault Investigation
Proposed Pruett Residence
APN # 352-012-18
Lookout Drive
Job No. 00-7920

Geotechnical Exploration, Inc.

EXPLORATORY TRENCH T-2



g = gradational contact

Legend

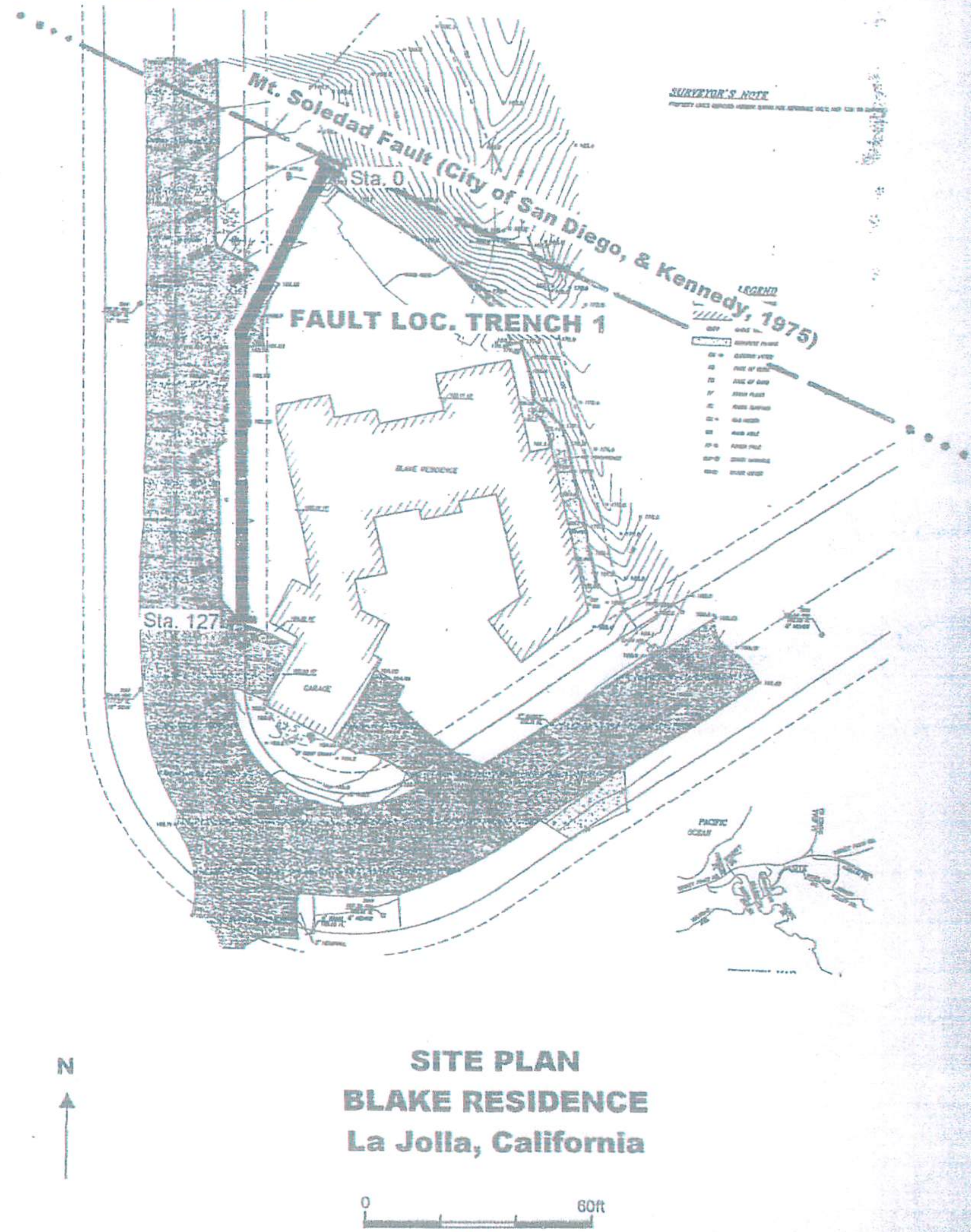
FILL/Qaf	Fine to Medium Sand, very loose, dry with angular chunks of cemented broken sandstone and boulder–size concretionss (SP)
SLOPEWASH/TOPSOIL Qsw	Silty Clay, stiff, damp to moist, dark brown to black (CL)
TERRACE/Qt ①	Interbedded coarse brown medium sand (SP) and alternating light to dark brown Clayey Silt. Medium dense/stiff, moist to wet at trench bottom. Discontinuous horizontal bedding with sufficient overlap to determine lack of faulting.
TERRACE/Qt ②	Clayey Fine Sand and Silt, medium dense, damp–moist, mottled brown and black. Massive. Weathered (SC)(ML)

October 2001

Geologic Fault Investigation
Proposed Pruett Residence
APN # 352-012-18
Lookout Drive
Job No. 00-7920

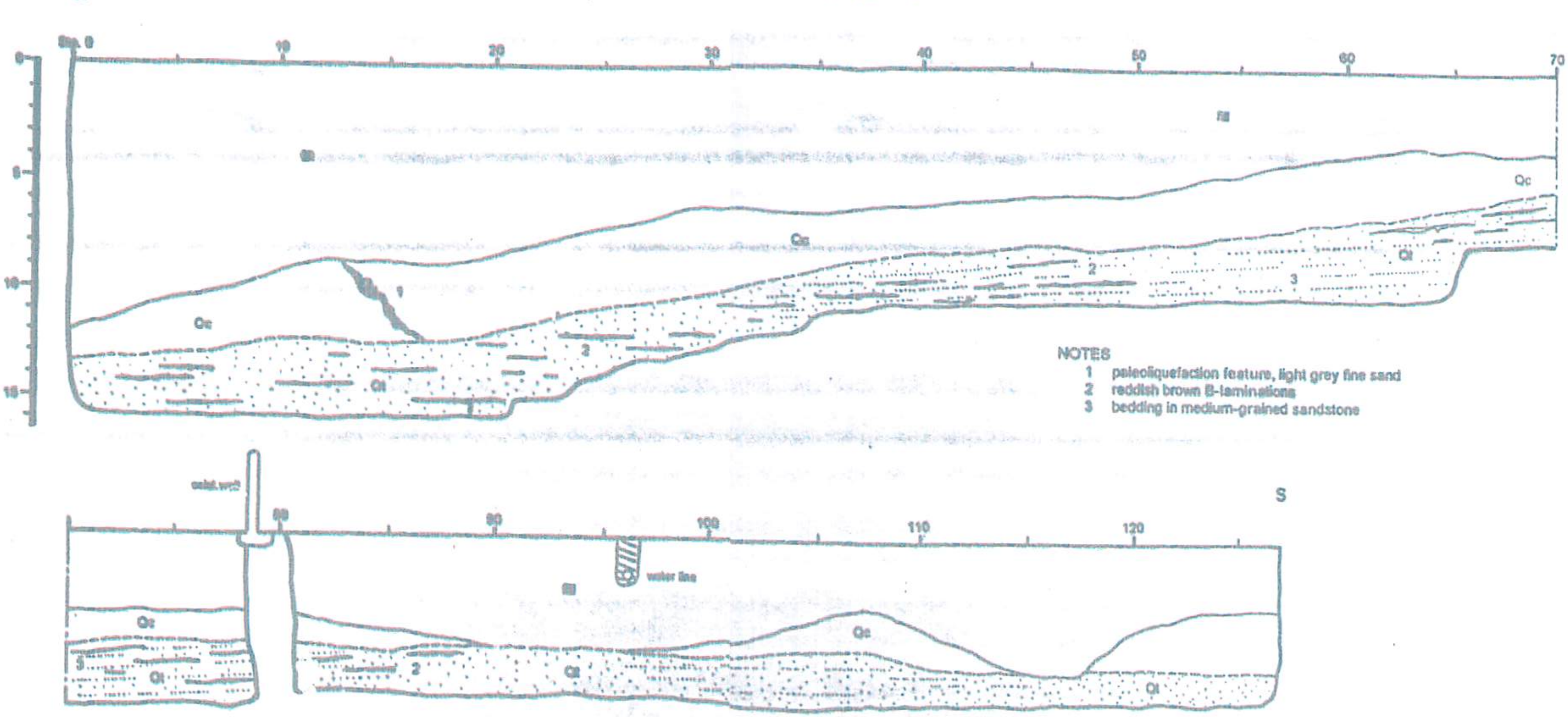
Geotechnical Exploration, Inc.

Blake Residence
La Jolla, California
May, 2002



SITE PLAN
BLAKE RESIDENCE
La Jolla, California

TRENCH 1



LEGEND

Fill — Loose, to compact, moist to wet, dark brown silty clay and clayey sand with zones of loose, dry, siltstone fragments lacking matrix.

Qc — Colluvium and argillic soil horizon, undifferentiated. Firm to soft, moist to wet, black organic clay and sandy clay

Qt — Marine terrace deposits: Orange brown to light-brown, well-sorted medium to coarse-grained sand. Terrace sands are massive to thinly bedded, cohesionless, to exhibiting light cementation. Contains well-developed overlapping B-laminations resulting from illuviation of topsoil clays.

GEOLOGIC LOG OF EXPLORATORY TRENCH Blake Residence, 7820 Lookout Drive, La Jolla, CA		
SCALE: Scale: 1" = 5'	APPROVED BY:	DRAWN BY
DATE:		REVISED
MICHAEL W. HART, ENGINEERING GEOLOGIST P.O. BOX 261227 • SAN DIEGO CALIFORNIA 92196 • (858) 578-4672		
		DRAWING NUMBER Fig. 3

STEPHEN E. JACOBS, C.E.G. 1307
Engineering Geologist
2871 Sanford Lane, Carlsbad, CA 92010-6553

Phone & Fax (760) 434-8503 • Cell (760) 458-5574
Email stephenejacobs3019@gmail.com

September 6, 2013 Project 13004

Justin Mandelbaum
Mira Investments
8400 Miramar Road, Suite 200
San Diego, CA 92126

Subject: **ADDENDUM TO FAULT-RUPTURE HAZARD INVESTIGATION**
Parcel 5, Parcel Map PM 17817
7727 Lookout Drive
La Jolla, CA 92037

Reference: *Fault-Rupture Hazard Investigation, Parcels 1, 2, 4, and 5, Parcel Map PM 17817, 7727 Lookout Drive, La Jolla, CA 92037, prepared by Stephen E. Jacobs, C.E.G., Engineering Geologist, Project 13004, dated July 25, 2013*

Dear Mr. Mandelbaum:

In accordance with your request, I have performed an addendum to my above-referenced fault-rupture hazard investigation of the subject property located at the third and fourth residential lots north of the southwest corner of Soledad Avenue and Lookout Drive in the City of San Diego, California. The results of the study indicate Parcel 5 of the subject property is underlain by shallow surficial soils and old paralic deposits. Careful inspection and logging was performed in one additional exploratory trench. No offset of stratigraphic units or soil horizons was detected in the exploratory trenches on the subject property or reported in trenches by previous consultants on neighboring sites. On this basis it is concluded that the entire property, including Parcel 5, is not traversed by any Holocene-age or Active faults and not traversed by any Pleistocene-age or Potentially Active faults.

The opportunity to provide consulting services to you on this project is appreciated. If you have any questions regarding the report, please contact the undersigned at your convenience.

Respectfully submitted,

Stephen E. Jacobs
Engineering Geologist
PG 3978, CEG 1307

CERTIFIED ENGINEERING GEOLOGIST
STEPHEN E. JACOBS
No. 1307
Exp. 8-31-15
ENGINEERING GEOLOGY
STATE OF CALIFORNIA

2cc: Addressee

Attachments: Appendix A: Text Figures and Photographs

ADDENDUM TO FAULT-RUPTURE HAZARD INVESTIGATION
7727 Lookout Drive, La Jolla
San Diego, CA 92037

INTRODUCTION

This report presents the results of an addendum to my above-referenced fault-rupture hazard investigation report of an existing residential property that is to be sold as four individual residential lots. The property is located at the third and fourth residential lots north of the southwest corner of Soledad Avenue and Lookout Drive in the La Jolla area of the City of San Diego, California. Most of the property, except for the southwestern portion, is located within the Rose Canyon fault zone that is designated "Active" as determined by the City of San Diego. My previous report addressed the potential for active or potentially active fault strands of the Rose Canyon fault zone crossing the subject property except for Parcel 5. Accordingly, the primary purpose of this study was to determine if any strands of the Rose Canyon fault zone in San Diego underlie Parcel 5 of the subject property.

This report has been prepared for the exclusive use of Mira Investments, their representatives and direct clients, and because conditions may change over time due to earthquakes, rainstorms, construction, and other causes, this report may require an updated investigation. This report is not to be provided to any other third party without my authorization and my on-site inspection. Should this report be provided to another third party without my authorization and my on-site inspection, then Stephen E. Jacobs, CEG, the undersigned, will assume no liability, whatsoever.

SITE AND PROPOSED PROJECT DESCRIPTION

Parcel 5 of the 4-parcel property is described as APN 352-012-20-00. The currently vacant, irregular-shaped Parcel 5 comprises 0.115 acre (Figure 1). Parcel 5 has a northerly slope of about 10 to 15 feet in height with a slope angle ranging from about 10° to 25°. Elevations on Parcel 5 of the property range from approximately 180 feet above MSL (mean sea level) on the southern edge to approximately 165 feet above MSL on the northern edge of the parcel. Parcel 5 is bounded by other residential structures to the west, vacant Parcel 4 to the south, and Lookout Drive to the north and east.

REVIEW OF GEOLOGIC AND OTHER DOCUMENTS

As part of my study, I reviewed available documents including aerial photographs, which are listed in Appendix A of my above-referenced report.

FIELD WORK

In order to determine if faulting is present beneath Parcel 5 of the property, one additional fault trench was excavated with a backhoe in an north-northeasterly orientation across the parcel, as shown on the parcel base map of Figure 1, in order to supplement coverage of the fault trend in the vicinity of property by fault investigations performed by previous consultants. The new trench was excavated on August 21, 2013. The location of the trench is shown on the Site Geology Map (Figure 1). The trench was excavated to depths ranging from approximately 4 to 10 feet. After careful cleaning of both trench walls, the faces of the trench were logged at a scale of 1" = 5'. The log of the fault trench and explanation are presented on Figures 2 and 3, respectively, in Appendix A of this report.

GENERAL GEOLOGY AND GEOLOGIC SETTING

The site is located within the coastal plain section of the Peninsular Ranges Geomorphic Province of California. The coastal plain generally consists of subdued landforms underlain by sedimentary bedrock. Materials exposed or reported in the vicinity of the subject property consist of artificial fill, colluvium/subsoil, old paralic (previously called terrace) deposits, and the Point Loma Formation. Old paralic deposits have not been recognized in the site vicinity on any of the published geologic maps. The Cretaceous age Point Loma Formation was not exposed in any of exploratory trenches of the current study, and not reported in fault trenches by previous consultants.

Most of the subject property lies on the southwest side of the northwest-southeast trending Mount Soledad fault strand of the Rose Canyon fault zone, which passes through the metropolitan area of San Diego. However, the northern half of Parcel 5 is on the northeast side of this fault strand according to published geologic maps (Figure 1).

SPECIAL STUDIES FAULT ZONE

The site is located within an Earthquake Fault Zone as defined by the 1972 California Alquist-Priolo Earthquake Fault Zoning Act and within the City of San Diego Geologic Hazard Category 11 (Active Fault Zone). This fault zone requires that special studies be undertaken to locate the possible existence of active faulting at the site.

STRATIGRAPHY

The results of the trenching indicate that much of the ground on Parcel 5 is capped with a thin veneer of artificial fill resting on Holocene to Pleistocene age colluvium (slope wash) and subsoil with argillic paleosols underlain by Pleistocene age old paralic (previously called terrace) deposits. Surficial and pedogenic soils, consisting primarily of colluvium/subsoil and argillic horizons are present on the site and are described in detail on Figures 2 and 3 of Appendix A of this report. The appearance of these soils is illustrated on Photos 1 and 2.

Fill:

Undocumented shallow artificial fill, approximately 2 feet in thickness, was noted below the ground surface. Geologic logging of the fault trench excavated for this addendum study indicates that the fill consists of loose to medium dense, slightly moist, dark brown, medium- to coarse-grained silty sand and clayey sand with some construction debris.

Colluvium/Subsoil:

Colluvium noted in the trench underlying the fill reaches a maximum thickness of approximately 7 feet, but it pinches out near the southern end of the trench. The colluvium consists of medium dense to dense, slightly moist to moist, light to medium brown silty sand to clayey sand. The subsoil within the colluvium has argillic Bt-soil horizons that consist of firm to stiff, moist to very moist, mostly dark brown to very dark brown clayey sand with an angular to sub-angular blocky soil structure.

Old Paralic Deposits:

Geologic logging of the fault trench excavated for this addendum study indicates that the old paralic deposits consists of two arbitrarily defined subunits: silty sand and coarse sand. The silty sand subunit, approximately 2 feet in thickness and exposed only in the southern about 10 feet of the trench, is medium dense to dense, slightly moist to moist, and light gray to pale brown. The underlying coarse sand subunit is dense, slightly moist to wet, and mainly light brownish gray to yellowish brown with numerous overlapping brown B-laminations. The coarse sand is non-cohesive and subject to minor caving when exposed.

STRUCTURE

Bedding in the coarse sand of the old paralic deposits appears to be nearly horizontal.

RESULTS OF TRENCHING

The City of San Diego Seismic Safety Study map indicates that Parcel 5 lies within an active zone of the Rose Canyon fault. The northwesterly trending Mount Soledad fault strand in this zone is shown on published geologic maps to cross Parcel 5 of the site. Accordingly, the fault trench for this addendum study was oriented in such a manner to intercept faults with similar trends. The fault trench was approximately 40 feet in length (Figures 1 and 2).

The results of detailed logging and inspection of both faces of the north-northeasterly trending fault trench (Figures 1 and 2) indicate the colluvium/subsoil and old paralic deposits occurs as a mainly massive, medium- to coarse-grained, brown to dark brown silty sand to clayey sand, light gray to pale brown silty sand, and light brownish gray to yellowish brown sand unbroken by faulting.

The trench exposed two arbitrarily defined pedogenic soil horizons: An upper assemblage of irregular-shaped argillic (Bt) horizons within the colluvium and a lower group of overlapping B-laminations within the coarse sand subunit of the old paralic deposits. The argillic (Bt) horizons contain mostly illuvial clays. Based on the illuvial clay development and mostly angular to sub-angular blocky soil structure of the soil horizons, the age of this soil is estimated to be older than early late Pleistocene (about 80 to 125 ka, Kern, 1977; see Appendix A of above-referenced report). Based on the estimated basal elevation of 160 feet for the old paralic deposits, they may be correlated with the Stuart Mesa or Guy Fleming terraces present in the Solana Beach and Encinitas area and dated 225,000 and 345,000 years old, respectively (Kern and Rockwell, 1992; see Appendix A of above-referenced report).

The trench revealed no evidence of sheared or disturbed zones or offset of pedogenic soils or geologic units. Based on this observation, it is concluded that no active or potentially active faults cross Parcel 5. The change in soil types from south to north across the parcel is probably due to the abrupt change in the paleo-slope angle (as represented by the contact between the colluvium/subsoil and old paralic deposits) and subsequent cutting and placement of artificial fill during grading on the property. This change in paleo-slope angle may have formed by pre-late Pleistocene uplift of Mount Soledad as a result of activity on the judged currently buried Mount Soledad fault strand of the Rose Canyon fault zone on the subject property.

On-Site Faulting from Two Fault Trenches

No evidence of fault scarps, offset strata or soil horizons was observed crossing the property as exposed in the two fault trenches excavated on the subject property, and none were reported by previous consultants in fault trenches on parcels near the subject property.

Groundwater:

Groundwater was not encountered in the two fault trenches and not reported in fault trenches on neighboring sites by previous consultants. However, the coarse sand subunit of the old paralic deposits as exposed at a depth of approximately 6 to 9 feet along the southern about 10 feet of Trench T-2 was very moist to wet during my observation.

Since regional groundwater is likely at depths greater than 50 feet, it is not anticipated to affect the site. Localized perched groundwater can develop on the site and is usually associated with landscape irrigation or excessively heavy rainfall.

CONCLUSIONS AND RECOMMENDATIONS

1. Artificial fill, colluvium/subsoil, and Pleistocene old paralic deposits underlie Parcel 5 of the site. The colluvium/subsoil consists of brown to dark brown silty sand and clayey sand. The subsoil has irregular pedogenic soil (argillic) horizons consisting of mostly dark brown to very dark brown clayey sand. The underlying old paralic deposits consists of mostly light gray silty sand resting on pale brown to yellowish brown coarse sand, which is susceptible to minor caving when exposed in excavations. The underlying Point Loma Formation was not exposed in the either of the fault trenches on the property and was not reported by previous consultants in any of their fault trenches on neighboring sites.

2. Fault trench logs prepared for this study on the subject property and by previous consultants on neighboring parcels are situated within an intercept angle of 30 degrees from the mapped fault trend. Based on my review of fault trench logs by these previous consultants, I judge that their fault investigation reports provide

sufficient evidence, in conjunction with the two fault trenches of the current study, to characterize the subject property with respect to the presence of faulting. Accordingly, based on my review of their fault investigation reports, the current study, and the fault-rupture hazard map by the City of San Diego, it is my professional opinion that "active" or "potentially active" fault traces likely do not cross the subject property including Parcel 5.

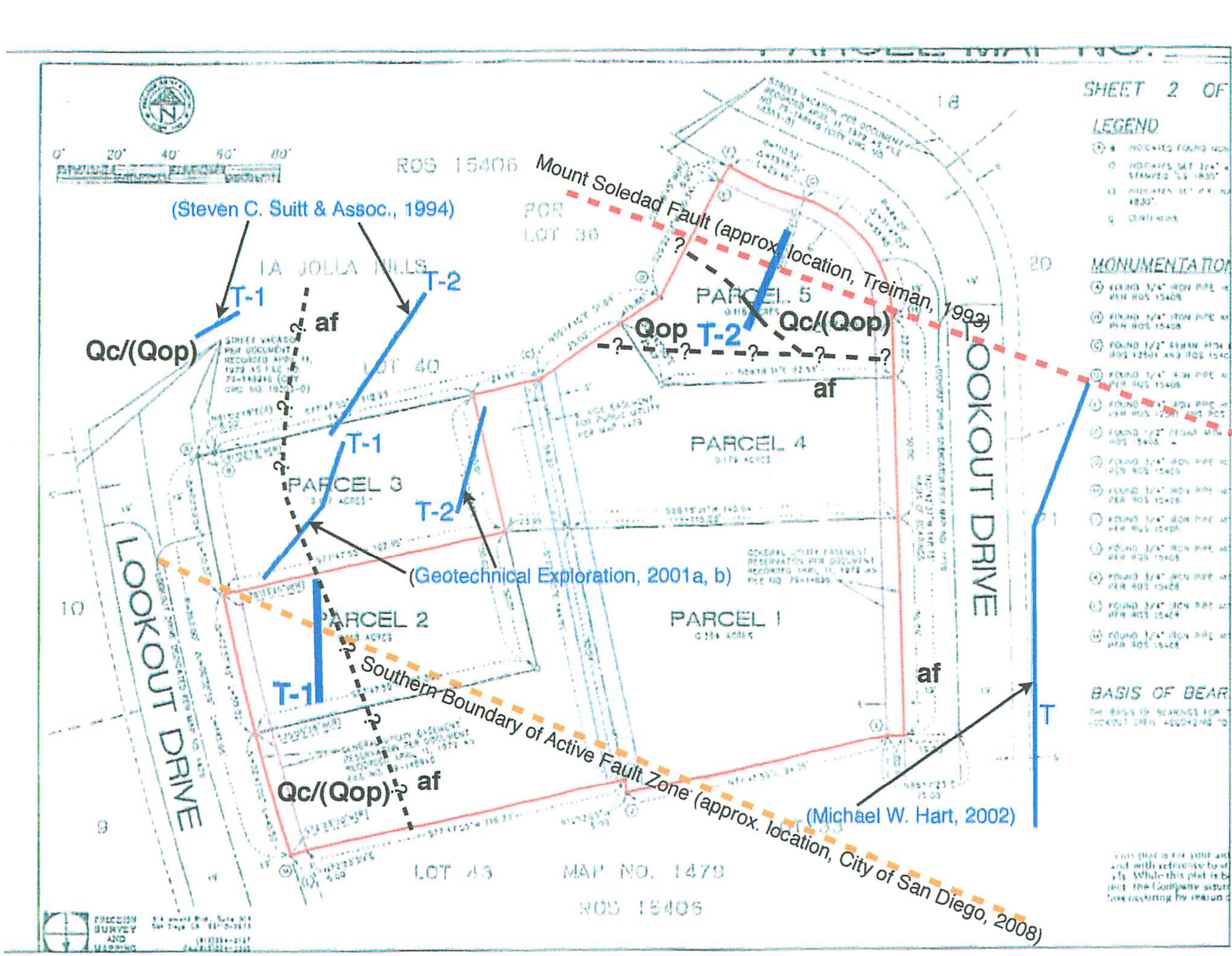
3. The subject property is mostly located within the subzone of the active Mount Soledad fault segment of the Rose Canyon fault zone. Based on no offset of stratigraphic or pedogenic units detected in the two exploratory fault trenches of this study and fault trenches reported by previous consultants on neighboring parcels, it is my professional opinion that the entire property, including Parcels 1, 2, 4, and 5, is likely not traversed by active or potentially active faulting.

4. As mentioned in my above referenced report, I recommend that a qualified geotechnical engineer perform soil investigations with adequate subsurface exploration and foundation recommendations on each of the four parcels individually prior to the start of any development on the subject property. The geotechnical (and structural) engineer should especially consider designing the foundation to reflect the differential soil conditions as exposed in Trench T-2 on Parcel 5. The geotechnical (and structural) engineer should specifically address the potential for soil expansion of the clayey sand within the colluvium/subsoil unit underlying the northern portion of Parcel 5.

LIMITATIONS

This addendum to the fault-rupture hazard investigation report is prepared for the exclusive use of Mira Investments and their representatives and direct clients. The opinions expressed herein are for the purpose of evaluating potential geologic/geotechnical hazards affecting the subject property and investigating the presence of faults on the subject property. This addendum investigation is limited to the depth explored in the additional trench and the location of the trench. The possibility of fault strands at greater than the explored depths and at other locations crossing the subject property cannot be ruled out because of the limited excavation. The possibility of future earthquakes generated by as yet unrecognized faults crossing the subject property should be considered. This report is intended for use only by the client named above for the purpose stated; no other use of this report is authorized, and transfer to any other person or agency without my notification and authorization is not advisable. No warranties, either express or implied, are given as to the geologic, soils, or foundation conditions of the subject property.

Appendix A
TEXT FIGURES AND PHOTOGRAPHS



EXPLANATION:

af	Undocumented Artificial Fill (greater than 2 feet in depth)
Qc	Colluvium/Topsoil (Holo.-Pleist. age)
Qop	Old Paralic Deposits (Pleistocene age)
- - -	Geologic Contact (approximate location)
?- - -?	Geologic Contact (conjectured location)
T-2	Fault Trench (this study)
T-2	Fault Trench by Previous Consultant (indicated in parentheses)

Note: all locations are approximate; units in parentheses are buried

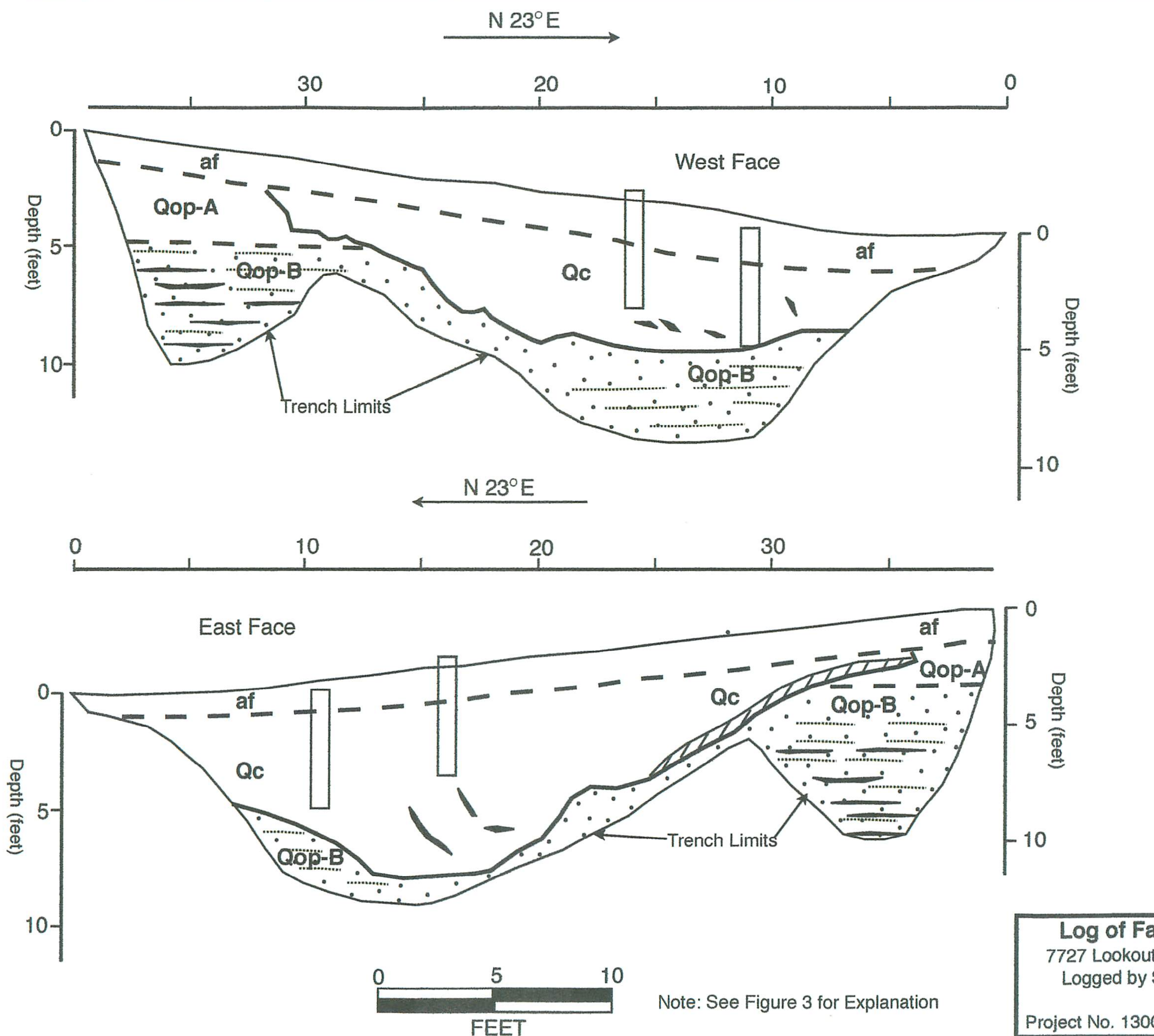
This map with plotted easement(s) is provided as a courtesy. The location of the easement(s) is believed to be approximately correct, but is not guaranteed. Chicago Title will not assume responsibility for its accuracy. If you want such a guarantee, you should obtain the services of a licensed surveyor or engineer.

Site Geology Map

7727 Lookout Drive, La Jolla, CA

Proj. No. 13004 **Figure 1**

Stephen E. Jacobs, CEG



Note: See Figure 3 for Explanation

Log of Fault Trench T-2
7727 Lookout Drive, La Jolla, CA
Logged by SEJ on 8/21/2013

Project No. 13004 **Figure 2**

Stephen E. Jacobs, CEG

DESCRIPTION OF UNITS:

Surficial Soils

af Fill: Silty sand (SM) and clayey sand (SC), medium- to coarse-grained, dark brown (10YR-4/3 to -3/3) and dark grayish brown (10YR-4/2), few round gravels to 3", abundant roots and rootlets to 3/4", some construction debris (metal pipe, plastic, lumber), loose to medium dense, slightly moist

Qc Colluvium/Subsoil (argillic horizon): Silty sand (SM) to clayey sand (SC), medium- to coarse-grained, pale brown (10YR-6/3) to brown (10YR-5/3), dark brown (10YR-4/3 to -3/3), and dark yellowish brown (10YR-4/4) to very dark grayish brown (10YR-3/2), common roots and rootlets, weakly to strongly developed subangular to angular blocky soil structure, common pores, locally common rootlet casts, medium dense to dense (firm to stiff), slightly moist to moist

Old Paralic (Terrace) Deposits

Qop-A Silty sand (SM), medium- to coarse-grained, light gray (10YR-7/2) to pale brown (10YR-6/3), some roots and rootlets, medium dense to dense, slightly moist to moist

Qop-B Sand (SP), coarse- to very coarse-grained, clean to slightly silty, pale brown (10YR-6/3) to light brownish gray (10YR-6/2) and brownish yellow (10YR-6/6) to yellowish brown (10YR-5/6), numerous brown (10YR-5/3) to dark brown (10YR-3/3) well-developed overlapping B-laminations, few roots and rootlets, some gravelly lenses, dense, slightly moist to wet

OTHER FEATURES:

Contact between pedogenic/geologic units

Approx. contact between pedogenic/geologic units

Zone of calcium carbonate concentration

Paleoliquefaction feature: very light gray, fine-grained sand

Brown B-laminations

Bedding in coarse-grained sand

Trench shoring

FAULT TRENCH LOG EXPLANATION

7727 Lookout Drive, La Jolla, CA

Logged by SEJ on 8/21/2013

Project No. 13004 **Figure 3**

Stephen E. Jacobs, CEG

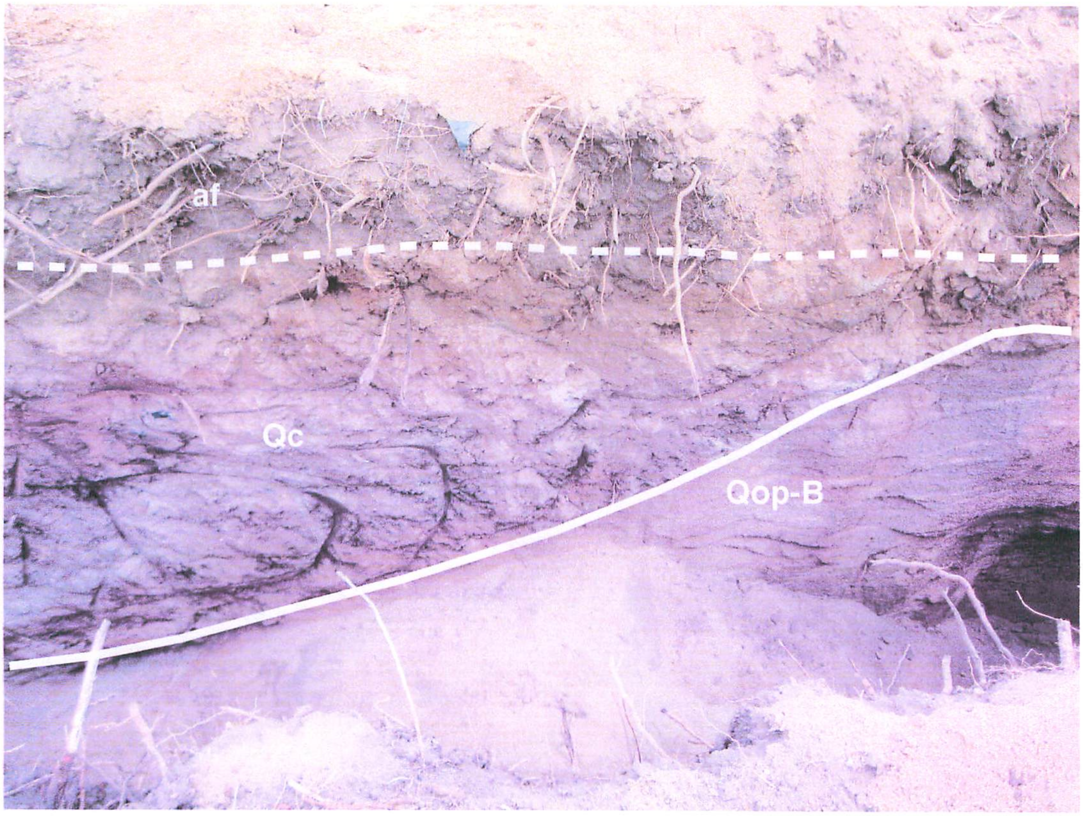


Photo 1. Soil profile exposed on east face of fault trench (af = fill; Qc = colluvium/subsoil; Qop-B = old paralic deposits)

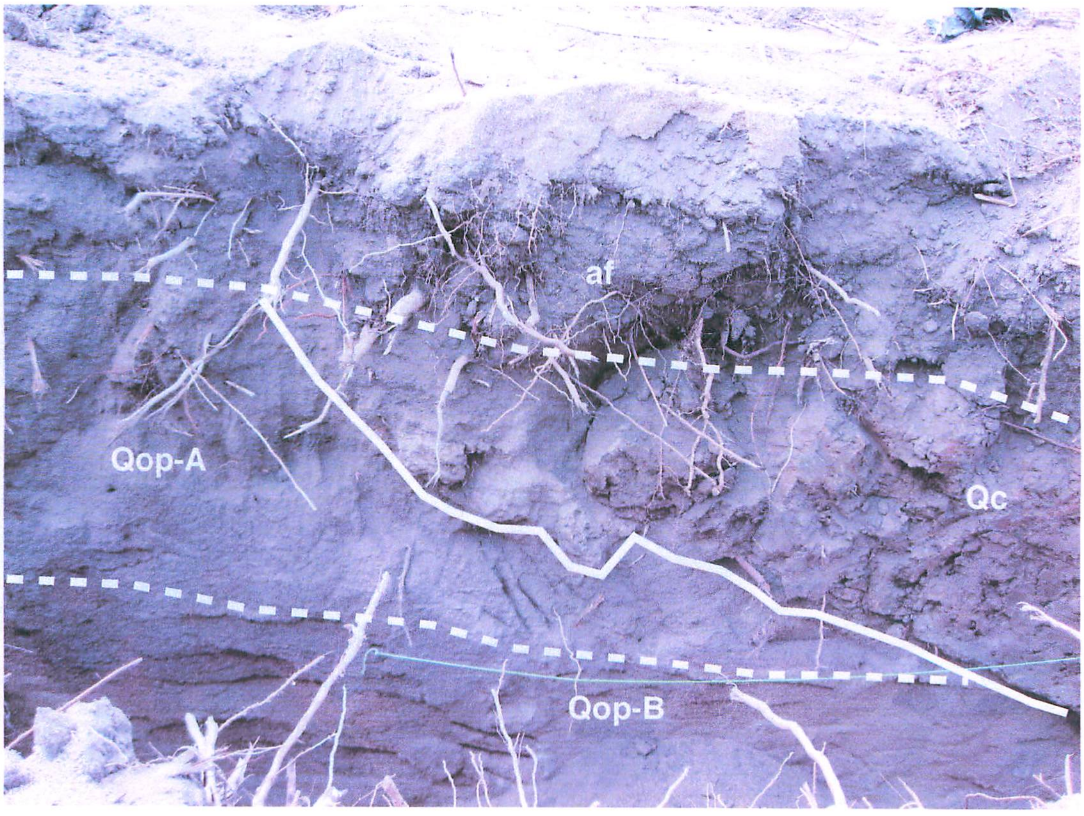


Photo 2. Soil profile exposed on west face of fault trench (af = fill; Qc = colluvium/subsoil; Qop-A and Qop-B = old paralic deposits)

APPENDIX D

GEOLOGIC FAULT INVESTIGATION-ADJACENT RESIDENTIAL PROPERTIES
GEOTECHNICAL EXPLORATION, INC., 2001

GEOTECHNICAL EXPLORATION, INC.

SOIL & FOUNDATION ENGINEERING • GROUNDWATER
HAZARDOUS MATERIALS MANAGEMENT • ENGINEERING GEOLOGY

10 May 2001

Ms. Teresa Yianilos
7727 Lookout Drive
La Jolla, CA 92037

Job No. 01-7984

Subject: **Geologic Fault Investigation -- Adjacent Residential Properties**
Yianilos Property
Buildable Portions of Parcels 1 and 4,
Parcel Map PM17817, APN #352-012-16-00 & APN #352-012-19-00
La Jolla, California

Dear Ms. Yianilos:

Geotechnical Exploration, Inc. recently completed a geologic fault investigation on a former portion of your property in La Jolla, California (see Figure No. Ia). Your former parcel 3 of Parcel Map PM 17817, APN #352-012-18-00, was investigated in November and December of 2000 for a potential purchaser. Two trenches were advanced across parcel 3 to assess whether active or potentially active geologic faults exist on the proposed residential lot. The trenches were placed per City of San Diego requirements and geologically logged by a Certified Engineering Geologist. No geologic faults or evidence of nearby faults was found on parcel 3.

Parcel 4 is immediately adjacent to the east side of parcel 3. The southeast corner of parcel 2 adjoins parcel 4. A review of the City of San Diego Seismic Safety Study indicates that parcel 1 and 4 are located within two fault-risk geologic hazard zones designated as Zones 11 and 12 (Refer to Figure No. Ib). Zone 11 is a State of California-designated fault rupture hazard zone, i.e., an active geologic fault zone, known as the Rose Canyon Fault Zone per City of San Diego maps. This zone extends across the eastern portion of parcel 1 and includes all of parcel 4. The western portion of parcel 1 provides driveway access to the buildable areas of parcels 1 and 4. Zone 12, a potentially active geologic fault zone, covers the eastern two-thirds of parcel 1 and all of parcel 4. Most of the southwestern driveway portion of parcel 1 is not mapped within a fault study zone. The parcels are also within Zone 27, identified as an area underlain by a "slide-prone formation." As such, the City of San Diego requires that a geologic investigation be performed in addition to the required soils investigation that will eventually be required for site development.

The adjacent northerly parcel 3 investigated by our firm in November-December of 2000 is also within these geologic hazard zones. As noted, because of the possibility of the parcel 3 site being located on or within an active or potentially active fault zone, two fault exploratory trenches were excavated on the site in the locations shown on Figure No. Ib. The trenches were aligned in a northeasterly-southwesterly direction in order to intersect the postulated location of the northwest trending fault or shear zone. Detailed geologic logging of the trenches indicated no evidence of faulting. Trench T-1 located in the western portion of the parcel 3 property encountered unbroken, thinly bedded marine terrace sediments consisting of dense, brown, clayey sand, silt and black organic clay. Trench T-2 located in the eastern portion of the parcel 3 site encountered thick deposits of unfaulted clayey slopewash/colluvium and topsoil underlain by massive to thinly bedded, medium dense, moist, brown, medium- to coarse-grained sand and clayey silt.

The property to the north of and adjacent to parcel 3 and addressed as 7731 Lookout Drive (APN 352-012-03) not owned by you, was geologically investigated by others in 1994 for the presence of active and potentially active faults. This property is located farther within the referenced Zones 11 and 12, i.e., closer to the hypothesized map traces of the active fault(s), potentially active fault(s), and a mapped shear zone.

We have reviewed the report that was prepared following the field investigation on this adjacent lot. The report is entitled, "Preliminary Alquist-Priolo Earthquake Fault Zone Study, 7731 Lookout Drive, APN 352-012-03, La Jolla, California..." prepared by Steven C. Suitt & Associates, 4CL123A, May 23, 1994.

Two exploratory trenches were excavated on the 7731 Lookout Drive site in 1994 in the locations shown on Figure No. Ib. These trenches were aligned similarly to our November/December trenches referenced previously: generally perpendicular to the postulated location of the northwest trending fault or shear zones.

The two "overlapping" themselves (with respect to the projected alignment of the referenced fault zone features) encountered continuous non-offset or overlapping lithologic units of the Bay Point Formation. Evidence of faulting or fault-related features was not observed in the trenches. Since the Bay Point Formation is pre-Holocene in age, the report concluded that active faulting (as defined by the California Division of Mines and Geology) "does not transect that portion of the property trenched for the referenced study".

We have utilized results of the trenching investigation on the northerly property and on Parcel 3 to project a zone crossing the parcels 1 and 4 along the northwesterly trend of suspected regional faulting. Refer to Figure No. Ib for the projected zone of nonfaulting. Based on the lack of faulting within these active zones (even extending to the center of the mapped zones), and the lack of any formation disturbance such as tilting of bedding, or breakage such as joints, we consider it very unlikely that active or potentially active fault features underlie the buildable portions of parcels 1 and 4 located in Zone 11 and 12 areas. It is our opinion the existing trench data adequately addresses faults on buildable portions of parcels 1 and 4, and we believe no additional fault investigations are warranted on parcels 1 and 4.

This opportunity to be of service is sincerely appreciated. Should you have any questions regarding this matter, please feel free to contact our office. Reference to our **Job No. 01-7984** will help to expedite a response to your inquiries.

Respectfully submitted,

GEOTECHNICAL EXPLORATION, INC.

Leslie D. Reed, President
C.E.G. 999[exp. 3-31-03]/R.G. 3391

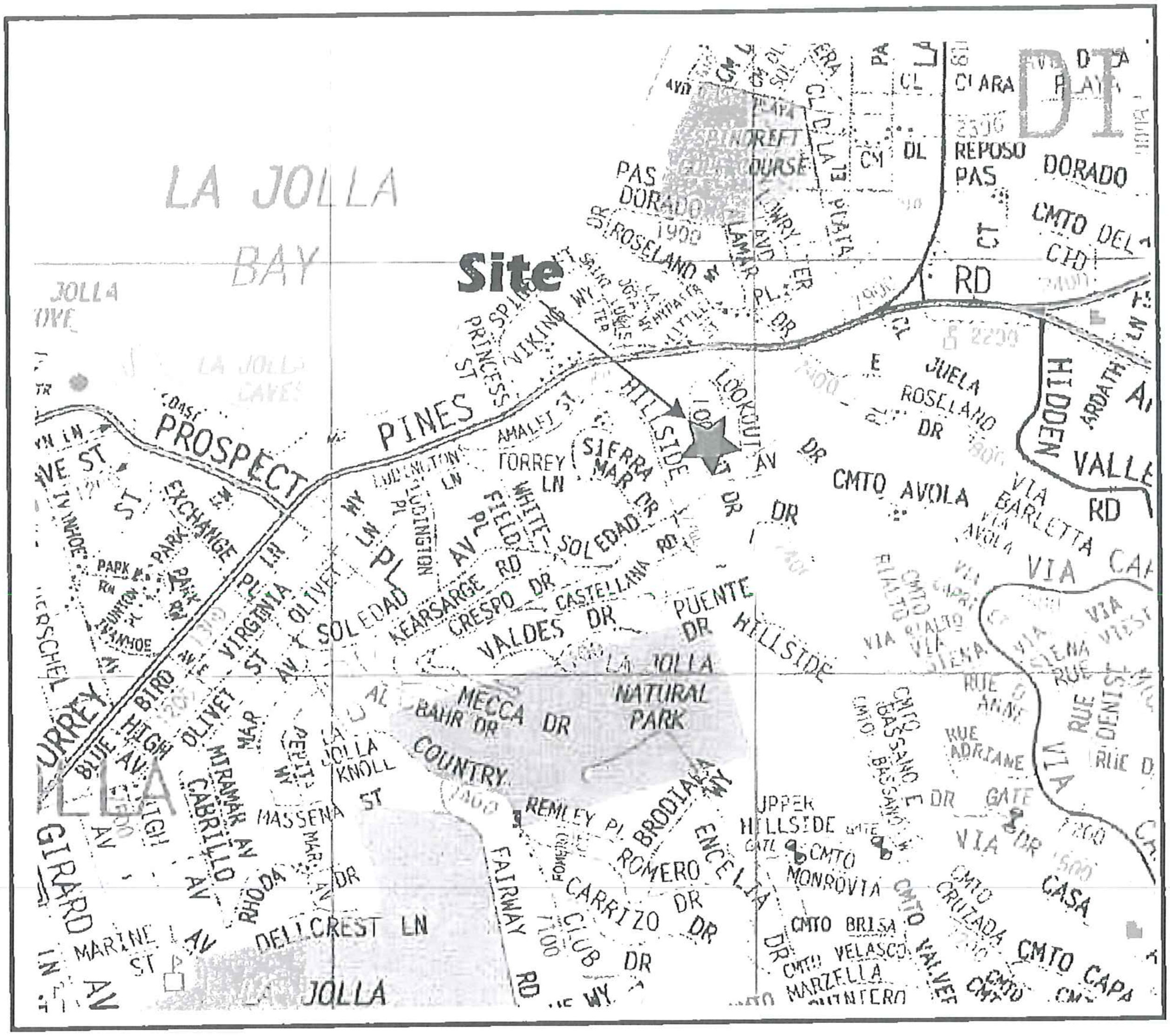
Jaime A. Cerros, P.E.
R.C.E. 34422/G.E. 2007
Senior Geotechnical Engineer

DCV/LDR/JAC/pj

REGISTERED GEOLOGIST
LESLIE
D.
REED
NO. 999
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

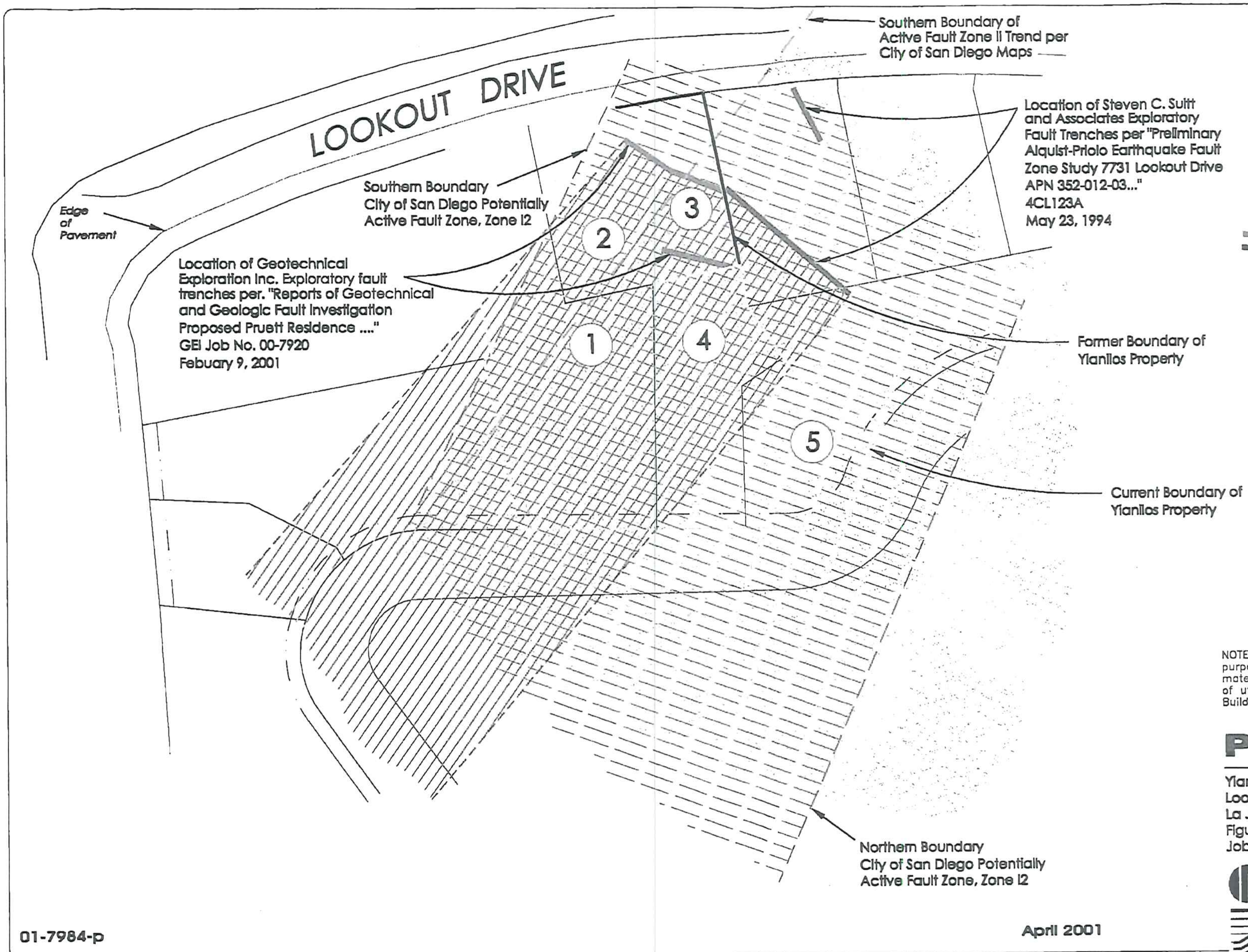
REGISTERED PROFESSIONAL ENGINEER
JAIME A. CERROS
No. 002007
Exp. 9/30/03
GEOTECHNICAL
STATE OF CALIFORNIA

SITE MAP



YIANILOS PROPERTY
Lookout Drive
La Jolla, CA.

Figure No. Ia
Job No. 01-7984



Legend

- City of San Diego Active Fault Zone, Zone II
- City of San Diego Potentially Active Fault Zone, Zone I2
- Projected Cleared Zone (No Faults Suspected Along Trend)
- Approximate Location of Exploratory Trench
- 1 Parcel Number per Parcel Map No. PM17817

S — N

SCALE: 1" = 50'

NOTE: This Plot Plan is not to be used for legal purposes. Locations and dimensions are approximate. Actual property dimensions and locations of utilities may be obtained from the Approved Building Plans or the "As-Built" Grading Plans.

PLOT PLAN

Ylanlios Property
Lookout Drive
La Jolla, California
Figure No. Ib
Job No. 01-7984

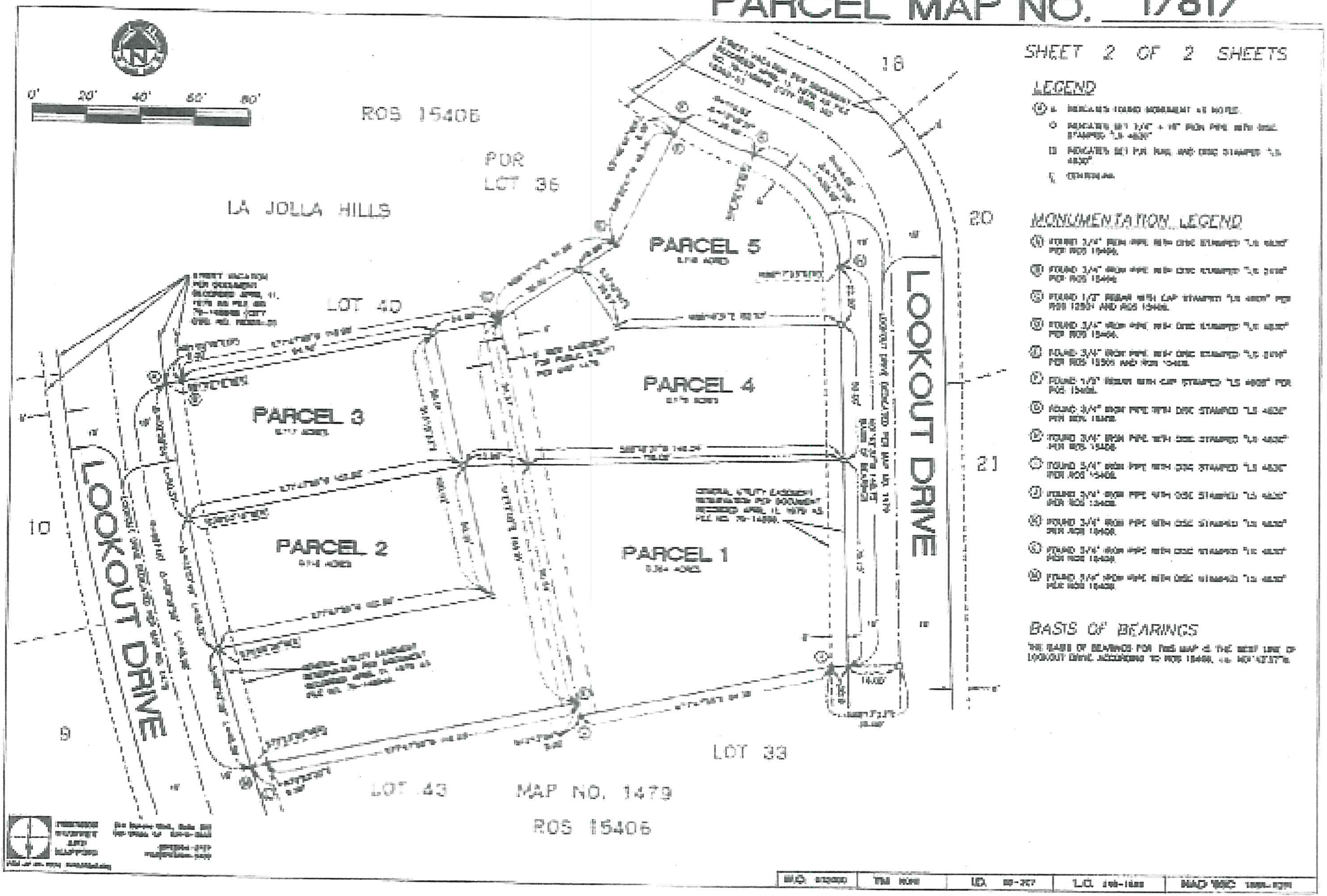
Geotechnical Exploration, Inc.

01-7984-p

April 2001

PARCEL MAP NO. 17817

SHEET 2 OF 2 SHEETS



APPENDIX E

UPDATE OF GEOLOGIC INVESTIGATION
MICHAEL W. HART, 2001

MICHAEL W. HART
ENGINEERING GEOLOGIST
P.O. BOX 261227 • SAN DIEGO • CALIFORNIA • 92196 • 858 578-4672

May 12, 2011

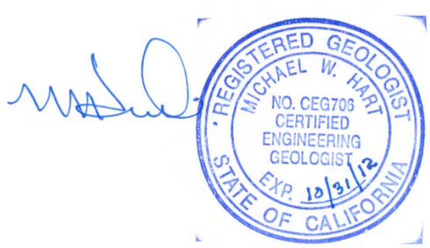
Architect Mark D. Lyon, Inc.
410 Bird Rock Avenue
La Jolla, California
92037

Subject: 7737 Lookout Drive (APN 352-012-03)
La Jolla, California
UPDATE OF GEOLOGIC INVESTIGATION

Dear Mr. Feuerstein:

In accordance with your request I have reviewed the report of the geologic investigation for the residence at 7737 Lookout Drive (previously designated as 7731 Lookout Dr., APN 353-012-03) prepared by Suitt and Associates dated May 23, 1994. The fault investigation included two fault location trenches that extended in depth from 6 to 10 feet. Detailed logging of the trenches by both Steve Suitt, Certified Engineering Geologist, and the undersigned indicated that the property is underlain by unfaulted marine terrace deposits. Based on the results of my review it remains my opinion that the report adequately addresses the fault rupture hazard on the site and that the site is not traversed by an active or potentially active fault.

Respectfully submitted,



Michael W. Hart
Engineering Geologist
CEG 706

1cc addressee

APPENDIX F

PRELIMINARY ALQUIST-PRIOLO EARTHQUAKE, FAULT ZONE STUDY
STEVEN C. SUITT AND ASSOCIATES, 1994

PRELIMINARY ALQUIST-PRIOLO EARTHQUAKE
FAULT ZONE STUDY
7731 LOOKOUT DRIVE
APN. 352-012-03
LA JOLLA, CALIFORNIA

PREPARED FOR:

Anton and Shari Walden
1825 Castellana Road
La Jolla, California 92037

PREPARED BY:

STEVEN C. SUITT AND ASSOCIATES
30020 Windward Drive
Canyon Lake, California 92587
(909) 244-6447

May 23, 1994
4CL123A

Steven C. Suitt and Associates

Consulting Engineering, Mining and Environmental Geologists,
Hydrogeologists and Earth Science Professionals

4CL123A
May 23, 1994

Anton and Shari Walden
1825 Castellana Road
La Jolla, California 92037

Subject: Preliminary Alquist-Priolo Earthquake
Fault Zone Study
7731 Lookout Drive
APN. 352-012-03
La Jolla, California

Ladies and Gentlemen:

Steven C. Suitt and Associates (SCS) is pleased to present the attached Preliminary Alquist-Priolo Earthquake Fault Zone Study for the subject residential lot. The study was performed in general accordance with our proposal dated April 11, 1994, and your verbal acceptance thereof on April 12, 1994.

Results of this preliminary fault investigation indicate that faulting associated with the "active" Rose Canyon fault zone was not evident in subsurface trenches excavated within the subject site. Although the potential for surface fault rupture can essentially be precluded, ground shaking due to seismicity on nearby or regional faults should be considered in the design of proposed improvements. The following report presents a discussion of the site conditions geologic setting, our investigation, findings and conclusions.

SCS appreciates the opportunity to be of service on this interesting project. If you should have any questions regarding this report or if we can be of any further assistance, please do not hesitate to contact the undersigned.

Respectfully submitted,
Steven C. Suitt and Associates

Steven C. Suitt, CEG 1453
President

Reviewed by:

Michael W. Hart, CEG 706
Associate

Enclosures: Figure 1: Vicinity Map
Figure 2: Site Plan/Preliminary Geologic Map
Figures 3 and 4: Geologic Exploratory Trench Map
Figure 5: Seismicity Map of San Diego Region

Distribution: (2) Addressee
(1) Mr. Michael W. Hart
(1) Clifford W. LaMonte

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1.0 INTRODUCTION

1.1 Purpose and Scope of Study

The subject lot lies entirely within the westerly limits of a State of California Alquist-Priolo Earthquake Fault Zone, which designates areas subject to potential surface rupture from active faults. Accordingly, the principal purpose of this investigation was to evaluate the potential for active (Holocene-age) faulting within the site and recommend appropriate mitigation measures, if necessary. Other considerations presented with respect to the Earthquake Fault Zone Study are site seismicity and associated secondary effects.

The scope of study for this investigation consisted essentially of the following:

1. Review of available consultant geologic reports and published geologic maps and reports pertaining to the site and adjacent lands.

2. Interpretation of several pairs of stereographic or single aerial photographs.

3. Excavation of two exploration trenches totaling 112 lineal feet with a track-mounted Bobcat excavator.

4. Shoring and benching of each trench, as necessary, and detailed logging by our engineering geologists.

5. Geological evaluation and preparation of this report containing our findings, conclusions and recommendations regarding the potential for fault rupture hazard at the subject site.

The scope of work did not include geotechnical engineering studies for proposed development recommendations, trench backfill observation and testing, any environmental assessment of the property, or an evaluation of the presence of hazardous materials.

This Preliminary Alquist-Priolo Earthquake Fault Zone study has been prepared by SCS for Anton and Shari Walden and their project design consultants, to be used solely in the preliminary design of proposed improvements and for City of San Diego review. This report may not contain sufficient information for other uses or for the purposes of other parties.

1.2 Site Location and Description

The roughly 0.2 acre rectangular shaped site consists of a custom, one-story family dwelling with a covered entryway porch, rear yard patio and attached two car garage. The structure is situated on an east-west trending lot located on the east side of Lookout Drive, approximately 400 feet northerly of Soledad Avenue in La Jolla, California (Figure 1, Vicinity Map). The lot is bounded by custom single family residences on the north, east and west, and on the south by a large lot and structure apparently utilized as a landscape nursery.

The site is nearly flat, or slopes gently to the northeast. Front yard drainage descends at inclinations between 1 and 2% toward Lookout Drive, and rear and side yard slopes descend northerly and easterly at 2 to 4% inclinations. The east and northern portions of the rear yard property line are supported by an up to 6 foot high concrete and concrete block retaining wall.

The subject site is situated on part of a northeasterly trending terrace located at the northerly base of Mount Soledad. Elevations within the terrace generally range between 100 and 200 feet above mean sea level (MSL). The elevation of the site is approximately 190 feet above MSL. Total northeasterly descending relief within the subject lot, which includes retaining walls, ranges from 4 to 10 feet.

Vegetation in the front and rear yards consists of lawn grass, dense shrubs and several varieties of mature trees.

2.0 PROPOSED DEVELOPMENT

A preliminary development or construction concept was not made available for our study. Based upon SCS's discussions with Mr. Anton Walden, the future development scenario may consist of construction of a second story addition over the northern half of the existing structure, or a two story addition attached to the rear of the northeast corner of the dwelling. Development of the rear yard area may also include a lap pool along the eastern property line retaining wall.

Should details involved in the final or actual design vary significantly from those described above, SCS should be notified for review and possible revision of recommendations provided herein.

3.0 FIELD INVESTIGATION

3.1 Previous Investigations

The Rose Canyon fault is shown trending North 50° to 60° West northeasterly of the project area on several published geologic maps (Kennedy, 1975 and Treiman 1984 and 1993). Review of these referenced reports indicate that the fault location is based on geologic mapping, trenching studies and strong geomorphic expression. Additionally, the California Special Study Zone map of the 7.5 minute La Jolla Quadrangle shows the Rose Canyon fault paralleling the northwesterly alignment of Boulevard Place in La Jolla, approximately 450 feet northerly of the site (Figure 1).

Several Rose Canyon fault traces were exposed in a single 100 foot-long trench within close proximity of the site by Geocon, Inc. (1991). Geocon's investigation along the northerly terminus of Boulevard Place encountered at least 60 feet of disturbed formational units with fault strands or fissures trending North 10° to 50° West. The approximate location of Geocon's investigation is depicted on Figure 1. The result of Geocon's study indicates that faulting identified in the single exploratory trench was consistent with the location of the active strand of the Rose Canyon fault zone plotted on the State of California Special Study Zone map. Results of all available previous studies were considered in this report.

3.2 Aerial Photograph Review

Stereopair and single black and white vertical aerial photographs flown in 1928, 1945 and 1966 were reviewed to identify photolineaments within the site which might be related to active faulting. Results are discussed in Section 4.4.1. The stereo pairs or single photos used in this study are listed after the references.

3.3 Exploratory Trenching

Two exploratory trenches (T-1 and T-2), totaling 112 lineal feet of trench, were excavated with a Bobcat trackhoe at nearly right angles to the mapped trace of the Rose Canyon fault zone (Figure 2). Trench locations were somewhat constrained by the existing dwelling, narrow side yard access, concrete driveway and walkways, retaining walls and property boundaries. However, the position of the two "overlapping" trenches made it possible to evaluate nearly the entire parcel in regards to the Alquist-Priolo Earthquake Fault Zone study criteria.

The trench dimensions varied from approximately 2 to 8 feet wide at the surface and about 6 to 10 feet deep. Depth of the trenches was limited by the size of the equipment able to gain access to the rear yard area. Length of trench was limited by property lines and areas not occupied by existing improvements. The trench walls were either shored or benched to achieve an overall wall slope of 1:1 horizontal to vertical to facilitate geologic logging and trench safety. The southern wall of each trench was prepared for logging by removing all smeared materials with hand tools to expose a fresh surface. A string and nail baseline was leveled in each trench, where appropriate, and geologic features were logged at a scale of one inch equals five feet by a Certified Engineering Geologist. Soil and bedrock units in each trench were described using the Unified Soil Classification System (USCS) and Munsell chart color notations.

4.0 GEOLOGIC CONDITIONS

4.1 Regional Geology

The subject property is located on the north side of Mount Soledad, a localized fault bounded, topographic high situated within the western flank of the Peninsular Range Batholith. The positive relief of Mount Soledad and its "seesaw" counterpart depression (Mission Bay), appear to be related to fault activity, such as tilting and rotation, on the west and east bounding Point Loma and Rose Canyon faults, respectively.

In general, the La Jolla area of Mount Soledad is underlain by upper Cretaceous rocks of the Point Loma formation on the west and Eocene strata of the Ardath Shale and Mount Soledad formation on the east. Major portions of the above bedrock units are overlain by the late Pleistocene Bay Point and early Pleistocene Lindavista formations. Based on faunal assemblage studies by (Kern, et. al. 1971), the age of the Bay Point formation has been estimated to range from 95,000 to 140,000 years.

4.2 Site Geology

The earth materials encountered within the site consist of two surficial units overlying bedrock of the late Pleistocene Bay Point formation. The approximate areal distribution of these various geologic units are depicted on Figure 2, Site Plan-Preliminary Geologic Map. A detailed description of each material encountered at the site is presented in Figures 3 and 4, Geologic Exploratory Trench Logs. A brief summary of each unit is presented below:

4.2.1 Undocumented Fill (Qudf)

A majority of the side yard and the entire rear yard area consists of several layers of undocumented fill that combined, are up to seven feet thick. Based on aerial photo review, this yellow brown, silty fine sand to coarse sand material appears to originate from a cut and cover, refuse disposal operation during the late 1920's. Most of this medium dense to loose sandy material contains cobbles and boulders to 2 feet in diameter. An assortment of glass, metal, brick, concrete, tires and woody debris occurred between various layers of fill. Some of the reworked fill occurs as rear yard retaining wall backfill.

4.2.2 Residual Soil/Slopewash (Qrs)

This approximately two foot thick soil occurs as a surficial unit in the front yard portion of the site. This material overlies Bay Point formation sediments and is overlain by fill material in the side and rear yard areas. It consists of porous, stiff to medium dense, light olive brown to dark grayish brown sandy clay, silty sand and clayey sand. In the rear yard area (Trench T-2), the base of this soil unit forms a distinct argillic (Bt) soil horizon that parallels the original ground surface, which is inclined 6 to 8 degrees to the northeast. In the front yard area (Trench T-1), this unit appears to thicken as the original surface flattens out and is less disturbed by previous grading. Where this unit increases in clay content, blocky soil structure and shrinkage cracks are evident. Some of these horizontal and near vertical soil desiccation cracks were infilled with dark gray clay in the front yard trench.

4.2.3 Bay Point formation

The entire parcel is underlain by thin to thickly bedded silty sandstone, sandstone with laminated siltstone interbeds, and lenses of conglomerate and claystone. These combined hard to soft formational units are generally slightly weathered and slightly fractured. Although localized channels are evident, all bedrock lithologic units either overlap or could be traced throughout each entire trench length. No evidence of disturbed areas, such as fissures, fractures, breccia or faulting, was observed in the trench wall exposures.

4.3 Groundwater

Groundwater, in a static condition, was not encountered in the trenches excavated for this study, and is not anticipated at shallow depths. However, localized "perched" groundwater was evident near the base of residual soil in the western portion of the rear yard trench (T-2). At this location, it appears that water originating from the offsite nursery is "perched" on the argillic soil horizon.

4.4 Photolineaments and Faulting

4.4.1 Photolineaments

A review of several sets of stereo or single aerial photographs of the site was performed for this study. No photolineaments, such as those that may be related to active faulting, appear to be evident in the immediate vicinity of the property. There were, however, two photolineaments (L-1 and L-2) observed within 1/4 mile radius of the subject site. The approximate trace of photolineaments L-1 and L-2 are depicted on Figure 1.

Photolineaments L-1 and L-2 were observed 200 and 450 feet northeasterly of the subject site. Photolineament L-1 is expressed by a discontinuous, weak vegetation tonal change. Photolineament L-2 is expressed geomorphically by a linear series of continuous breaks-in-slope, saddles on ridge tops, drainages, landslides and tonal changes. The origin of both photolineaments appear to be related to faulting identified during previous studies within the Mount Soledad area.

4.4.2 Faulting

Faulting has not been reported to extend through the subject site. However, the entire site lies within the 1000 foot-wide Alquist-Priolo Earthquake Fault Study Zone, as defined by the State of California Division of Mines and Geology.

The two overlapping trenches excavated at a right angle to the projected alignment of the identified fault zone encountered continuous or overlapping lithologic units of the Bay Point formation. Evidence of faulting, or fault related features, such as fractures, fissures and breccia zones, were not observed in the trenches. The Bay Point formation is pre-Holocene in age (Kern, et. al. 1971). Accordingly, based on the materials exposed in the trenches, active faulting as defined by criteria established by the California Division of Mines and Geology does not transect that portion of the property trenched for this study.

5.0 SITE SEISMICITY

5.1 General

Regionally, the site lies within the highly seismic southern California area, which has experienced severe seismic activity and intense seismic shaking in the past. Epicenters of pre-1986 earthquakes that have been felt in the San Diego area are shown on Figure 5. Post 1986 Magnitude 6.0 or greater earthquakes with epicenters located in the Superstition Hills, Joshua Tree, Landers, Big Bear and Northridge areas have also generated strong ground motions in the San Diego area.

5.2 Maximum Credible Earthquakes

Earthquakes that may occur on the Rose Canyon, Palos Verdes-Coronado Banks and the La Nacion fault zones are capable of generating very strong ground shaking within a 12 mile radius of the site. Several peak ground motions that might be generated by maximum credible earthquakes within this radius have been calculated and are summarized in Table 1.

TABLE 1

ESTIMATED MAXIMUM CREDIBLE EARTHQUAKES AND
GROUND-MOTION PARAMETERS AT THE SITE

FAULT ZONE	DISTANCE FROM SITE (MILES)	MAXIMUM CREDIBLE MAGNITUDE (1)	PEAK HORIZONTAL BEDROCK ACCELERATION, g	MAXIMUM REPEATABLE BEDROCK ACCELERATION, g(2)
Rose Canyon	>1	7.1	0.72	0.47
La Nacion	8	6.6	0.35	0.23
Palos Verdes - Coronado Banks	12	7.0	0.32	0.21

(1) From Wesnousky (1986).
(2) From Slosson and Ploessel (1974).

5.3 Estimated 100-year Probable Earthquakes

Earthquakes that might occur during an average 100-year time period at the site have been estimated and are summarized in Table 2. The corresponding probabilities of exceedence of the magnitudes listed are approximately 63 percent during an average 100-year period (or 39 percent during 50 years).

TABLE 2

ESTIMATED 100-YEAR PROBABLE EARTHQUAKES AND
GROUND-MOTION PARAMETERS AT THE SITE

FAULT ZONE	DISTANCE FROM SITE (MILES)	100-YEAR PROBABLE MAGNITUDE (1)	PEAK HORIZONTAL BEDROCK ACCELERATION, g	MAXIMUM REPEATABLE BEDROCK ACCELERATION, g (2)
Rose Canyon	>1	5.8	0.55	0.36
La Nacion	8	>5.5	>0.18	>0.12
Palos Verdes - Coronado Banks	12	6.3	0.23	0.15

(1) From Wesnousky (1986), Slemmons (1982), and Anderson, et. al. (1989).
(2) From Slosson and Ploessel (1974).

The Rose Canyon fault zone is considered capable of the highest ground motions at the site. Based on a 100-year probable 5.8 Magnitude event on this fault at the site, the resultant ground motion could produce an estimated peak bedrock acceleration of 0.55g.

5.4 Secondary Seismic Hazards

Secondary seismic hazards that also should be considered for this site include seismic settlement or differential compaction, landsliding or rockfall, earthquake induced flooding, tsunamis and seiches, liquefaction and potential for sympathetic fault movement. Each is addressed below.

- Potential for Lateral Spreading (Lurching), Seismic Settlements and Differential Compaction of Natural and Fill Soils - is considered to be low to moderate based on the depth and loose characteristics of the undocumented fill and evidence of perched, shallow groundwater.

- Potential for Landsliding and Rockfalls - is considered to be very low within the existing terrain based on the nearly flat topography of the site. Additionally, the site is not located in a known or postulated landslide area (Siang Tan, in press), nor is there a history of landsliding in the immediate vicinity of the site. However, several landslides are postulated approximately 1000 feet southerly of the site within the north facing hilltop portion of Mount Soledad.

- Potential for Earthquake Induced Flooding, Tsunamis and Seiches - is considered to be remote or low based on the elevation of the site above MSL (190 feet) and the absence of upgradient bodies of water. Earthquake induced sea waves (tsunamis) generally occur as a result of earthquakes from thrust or normal faults and seldom reach heights of 100 feet. Faults within the offshore project vicinity are considered to have a strike-slip sense of movement, and do not have a history of tsunami generation.

- Potential for Liquefaction - Even though there are numerous faults in the southern California area that have the potential for generating strong ground shaking at the site, the potential for liquefaction is considered to be low due to the following considerations:

  1. Fine to medium grained sandy nature of the underlying soils,

  2. The dense to very dense consistency of native soils and bedrock, and

  3. Absence of static groundwater shallower than 15 feet.

- Potential for Sympathetic Fault Movement - is considered to be low. No evidence of faulting or features that may be related to faulting were observed in the trenches excavated for this study.

6.0 CONCLUSIONS

1) The earth materials within the site consist of undocumented fill and porous residual soils up to 9 feet deep. Undocumented fill and residual soil overly competent Bay Point formation silty sandstone, sandstone and siltstone bedrock.

2) Perched groundwater was evident in the southern side yard area of Trench T-2, and appears to originate from an offsite source.

3) Based on our geologic observations of earth materials exposed in the trenches excavated for this study, active faulting as defined by criteria established by the State of California Division of Mines and Geology does not transect the trenched portion of the project area. Hence, the trenched portion of the project area is considered buildable.

4) A maximum probable earthquake of Magnitude 5.8 on the nearby Rose Canyon fault is capable of producing an estimated peak horizontal ground acceleration of 0.55g.

7.0 RECOMMENDATIONS

- Formulation of specific foundation or grading recommendations for the site was not a part of this study. Geotechnical investigation and engineering analysis should be performed at such time as preliminary building plans are available and/or specific building locations are known.
- Considering that a majority of the exploratory trenches were loosely backfilled, unacceptable settlement may occur. It is recommended that the materials in these undocumented fills be removed completely and replaced under engineering control or monitored for settlement.

8.0 LIMITATIONS AND CLOSURE

This investigation was performed by SCS using the degree of care and skill ordinarily exercised, under similar conditions, by reputable geologists and engineering geologists practicing in this or similar localities. No other warranty expressed or implied, is made regarding the conclusions and professional advice included in this report.

The conclusions and recommendations presented herein are: based on SCS's evaluation and interpretation of findings from the field investigative program; based on interpolation of subsurface conditions between and extrapolations beyond the explorations; and based on the assumption that sufficient engineering geologic observation will be provided by SCS during grading and construction.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the regulatory agencies, if required.

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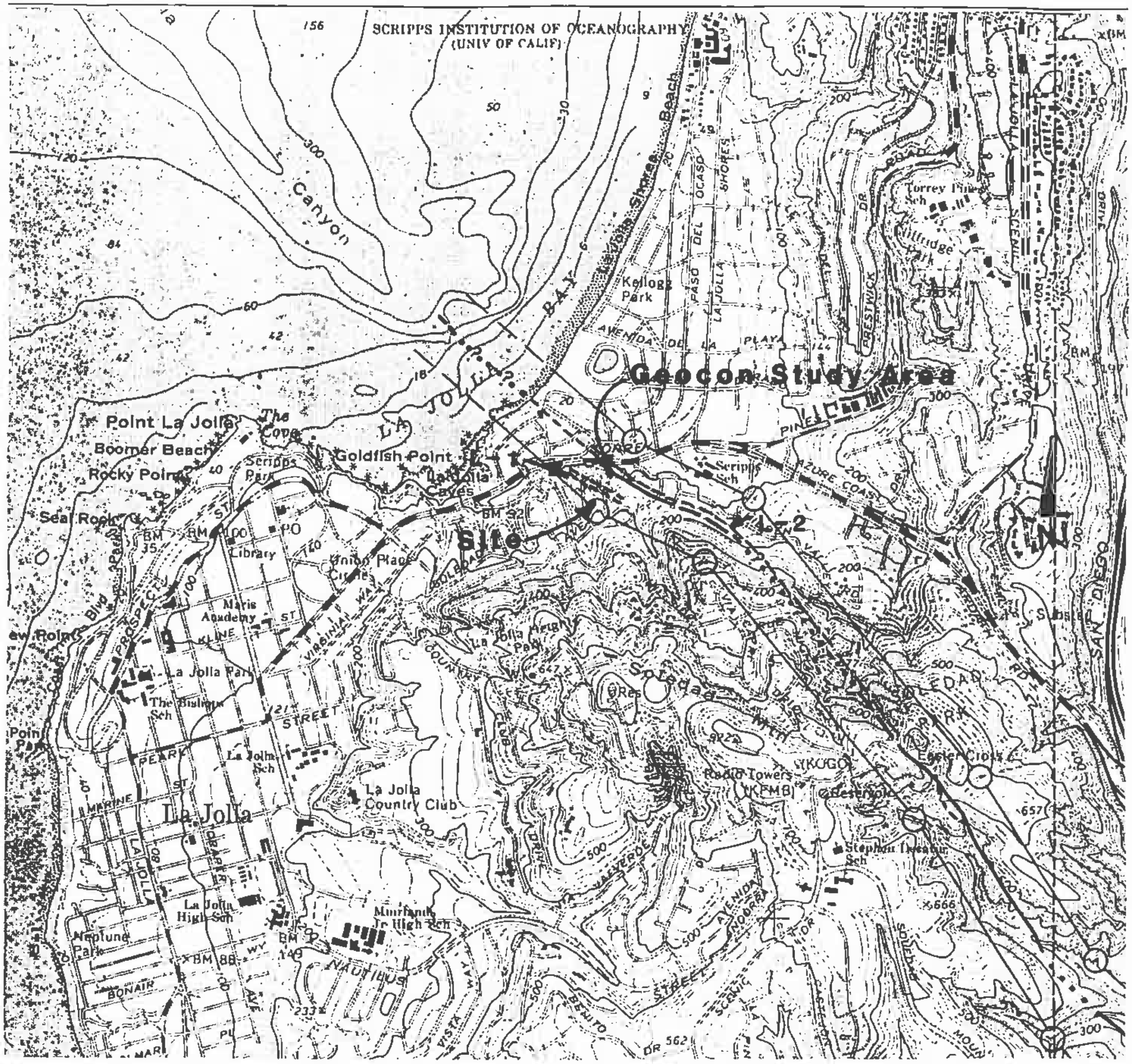
Aerial Photographs Reviewed

Date Flown	I.D. Number	Scale	Source
1928-29	T15S, R4W Photo Numbers 52C1 and 52BX3	1"=1000'	SDCPWD
1945	DWR - 51 No. 9	1"=1000'	SDCPWD
1966	VBD - 1	1"=2000'	SDCPWD

FIGURES



Ref: Calif. Special Study Zone Map, La Jolla Quadrangle, Prel. Review Map of November 1,.1991.

EXPLANATION

L-2 Photolineament

Scale: 1" = 2000'

Project No. 4CL123A

Date May 1994

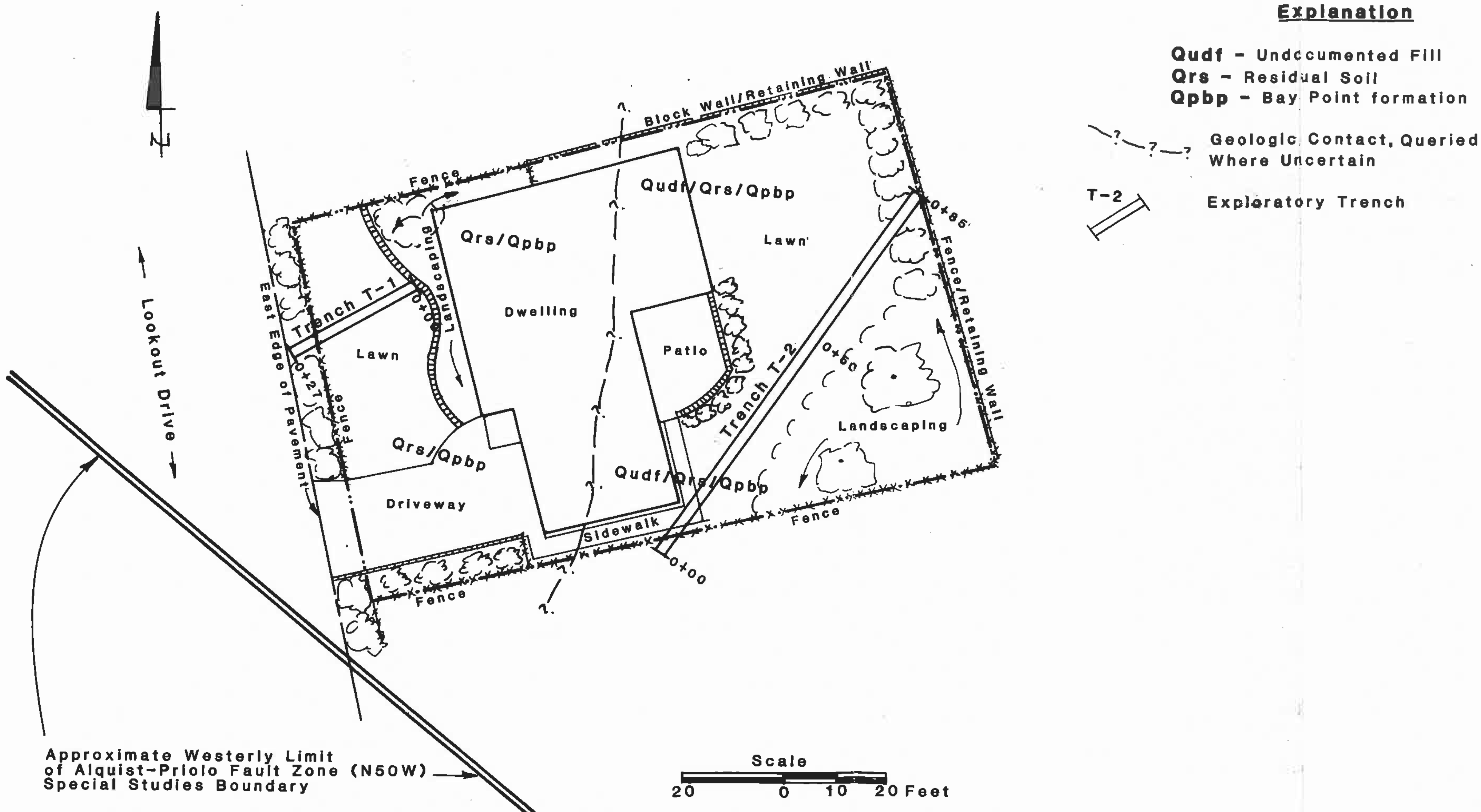
Vicinity Map

Figure 1

Steven C. Suitt and Associates

Consulting Engineering, Mining and Environmental Geologists

Anton and Shari Walden



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists
30020 Windward Dr. Canyon Lake, CA 92587 • (909) 244-6247

Project No. 4CL123A Date May 1994

Site Plan/Preliminary Geologic Map

Figure 2
Anton and Shari Walden
7731 Lookout Drive
La Jolla, Ca.

EXPLORATORY TRENCH NO. T-1

Project Name: A. and S. Walden
Project Number: 4CL123A
Date: 4/15-18/94
Elevation: approx. 190'
Location: 7731 Lookout Dr. La Jolla
Logged By: S. Suitt, M. Hart
Equipment: Bobcat X331 Excavator

Explanation: B– Bedding; J– Joint; S– Shear; F– Fault; (F)R–(Filled) Rodent Burrow

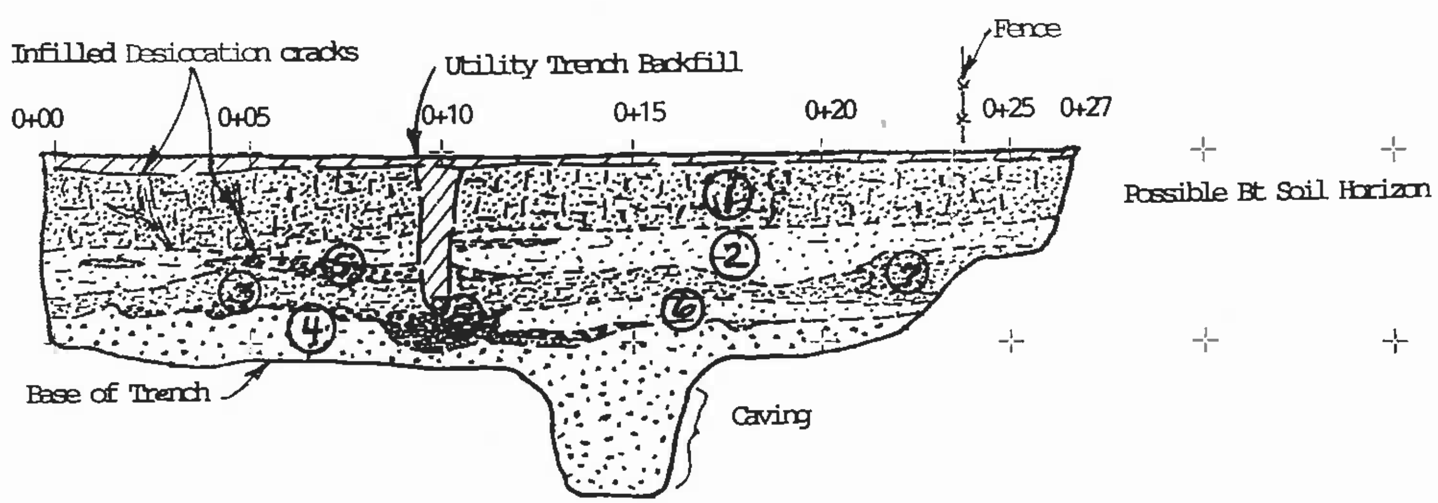
Desig.	Attitudes	See Exp.	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			1	Qrs	Residual Soil Clayey Sand-Sandy Clay with highly organic cover Fine to med. grained, well graded, moist, med. dense to stiff, some blocky structure, rootlets and roots, Lt. olive brown (2.5Y 5/4-6), forms desiccation upon exposure with some clay infilling.	SC-CL						
			2	Qbp	Bay Point formation Silty Sandstone with Claystone Lenses Fine to med. grained, poorly graded, moist, med. dense, mottled, root hairs, some thin sandstone beds, Olive brown (2.5Y 4/4).	SM						
			3	Qbp	Silty Sandstone Fine grained, poorly graded, micaceous, moist, med. dense, root hairs, sli. porous, Lt.Ol. Br. (2.5Y5/4	SM						
			4	Qbp	Sandstone Coarse grained, moist, loose, poorly cemented, massive, root hairs, Olive (5Y5/6).	SP						
			5	Qbp	Conglomeritic Silty Sandstone Fine to coarse grained, mostly coarse, med. dense, moist, roothairs, permeable, Olive (5Y5/4)	GP						
			6	Qbp	Sandstone Med. grained, moist, med. dense, trace of gravel sized, root hairs, Olive (5Y 4/4)	SP						
			7	Qbp	Sandstone Med. grained, moist, med. dense, interbedded with fine sandstone, crudely laminated, Pale Olive (5Y 6/3)	SP						

Scale: 1" = 5'

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Southwest Trend: S60W

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			8.5



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists

Figure 3

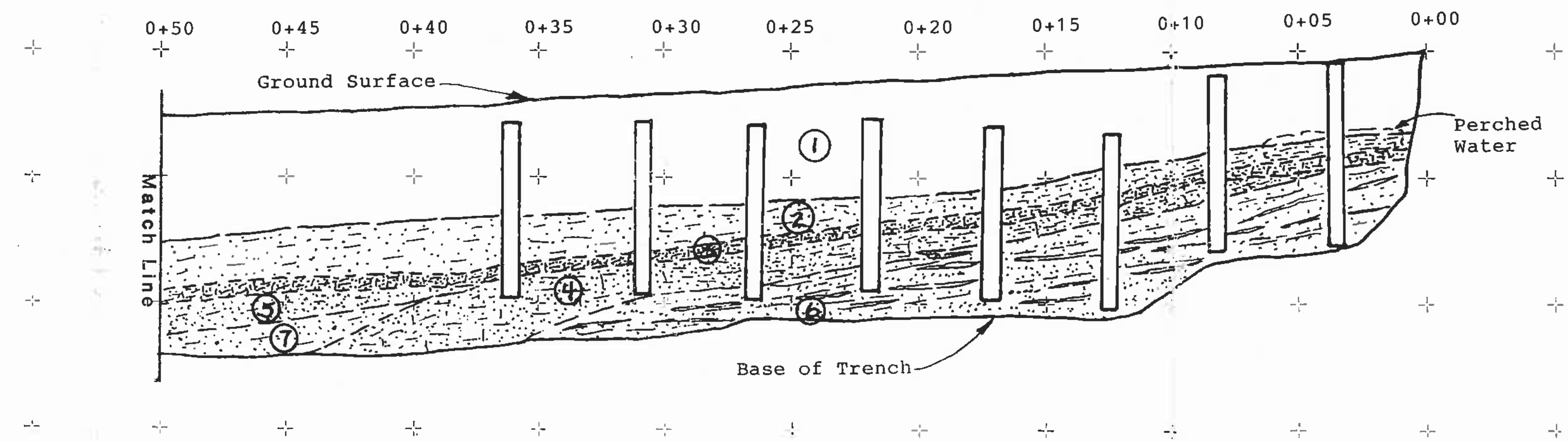
Project Name: A. and S. Walden | Date: 4/15-18/94 | Location: 7731 Lookout Dr. LA Jolla | Equipment: Bobcat X331 Excavator
Project Number: 4CL123A | Elevation: Approx. 190' | Logged By: S. Suitt, M. Hart

EXPLORATORY TRENCH NO. T-2

Desig.	Attitudes	See Exp.	Explanation	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			B– Bedding J– Joint S– Shear F– Fault (F)R–(Filled) Rodent Burrow	1	Qudf	Undocumented Fill Silty Sand to Sand Fine to coarse grained, sli. moist, porous to sli. porous, loose to med. dense,, contains cobbles and boulders to 2 feet in dia., contains several organic horizons, and assorted trash, such as; wood, glass brick, concrete, metal and tires.	SM-SP						
				2	Qrs	Residual Soil-Slopewash Clayey to Silty Sand (A Horizon) Fine to med. grained, porous, very moist, med. dense, trace of coarse sand, root hairs, contains a highly organic soil cover (old ground surface; buried), Very Dark Grayish Brown (10YR 3/2)	SC						
				3	Qrs	Clayey Sand (Bt Horizon) Fine to med. grained, dense, sli. porous, blocky structure, clay bridging ped surfaces,some root hairs, sli. moist to moist, some non-continuous semi-smooth surfaces with black oxide staining ,d.red brown (5YR 3/2).	SC						
				4	Qpbp	Bay Point formation Silty Sandstone Fine to med. grained, med. dense to dense (m. hard), moist to sli. moist, sli. blocky structure,thinly bedded, sli. weathered, sli. fractured, D. Yel. Brown (10YR3/4).	SM						
				5	Qpbp	Sandstone Fine to med. grained, dry to sli. moist, v. dense to dense (m. Hard), thinly bedded, sli. weathered, sli. fractured, Olive Gray (5Y 4/2).	SP						
				6	Qpbp	Sandstone with thinly laminated Claystone and Siltstone interbeds Fine to coarse grained, micaceous, dense (m. hard), Olive gray to Olive (5Y 3/2 - 4/4),Sli. fractured.	SP						

Scale: 1" = 5' | SOUTH TRENCH WALL SCHEMATIC DIAGRAM | Slope: Northeast | Trend: N35E

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			10
			15



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists

Figure 4a

Project Name: A. and S. Walden | Date: 4/15-18/94 | Location: 7731 Lookout Dr. La Jolla | Equipment: Bobcat X331 Excavator

Project Number: 4CL123A | Elevation: Approx. 190' | Logged By: S. Suitt, M. Hart

EXPLORATORY TRENCH NO. T-2

Desig.	Attitudes	See Exp.	Explanation	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			B– Bedding J– Joint S– Shear F– Fault (F)R–(Filled) Rodent Burrow	7	Qdbp	Bay Point formation Cont. Silty Sandstone Fine to med. grained, dense to m. dense (m. hard), trace of coarse sand, sli. fractured, sli. weathered thinly bedded, Dark Brown (10YR 3/3).	SM						

Scale: 1" = 5 '

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Northeast Trend: N35E

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			10
			15

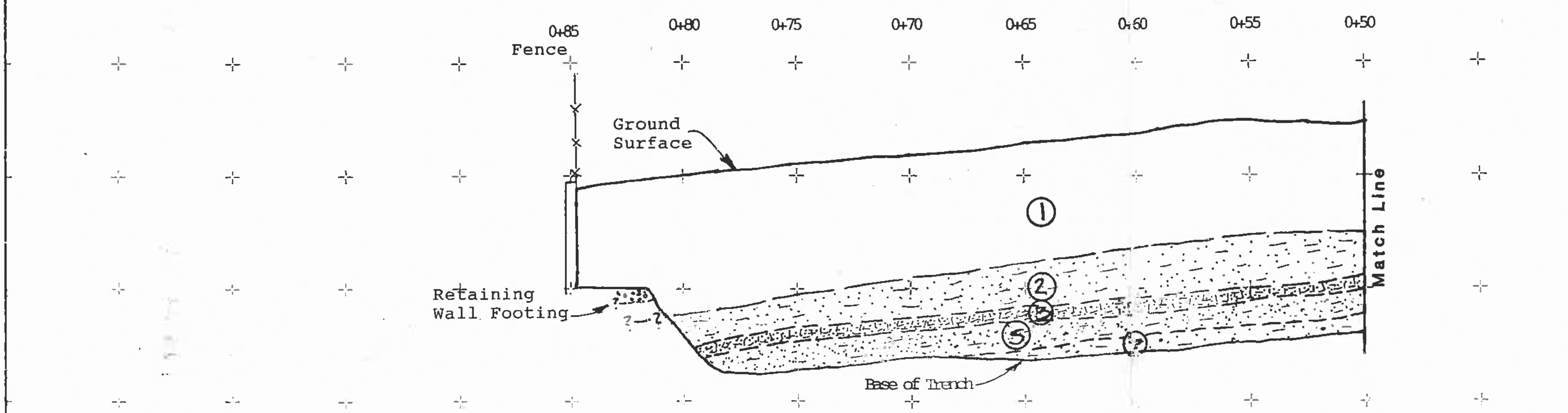


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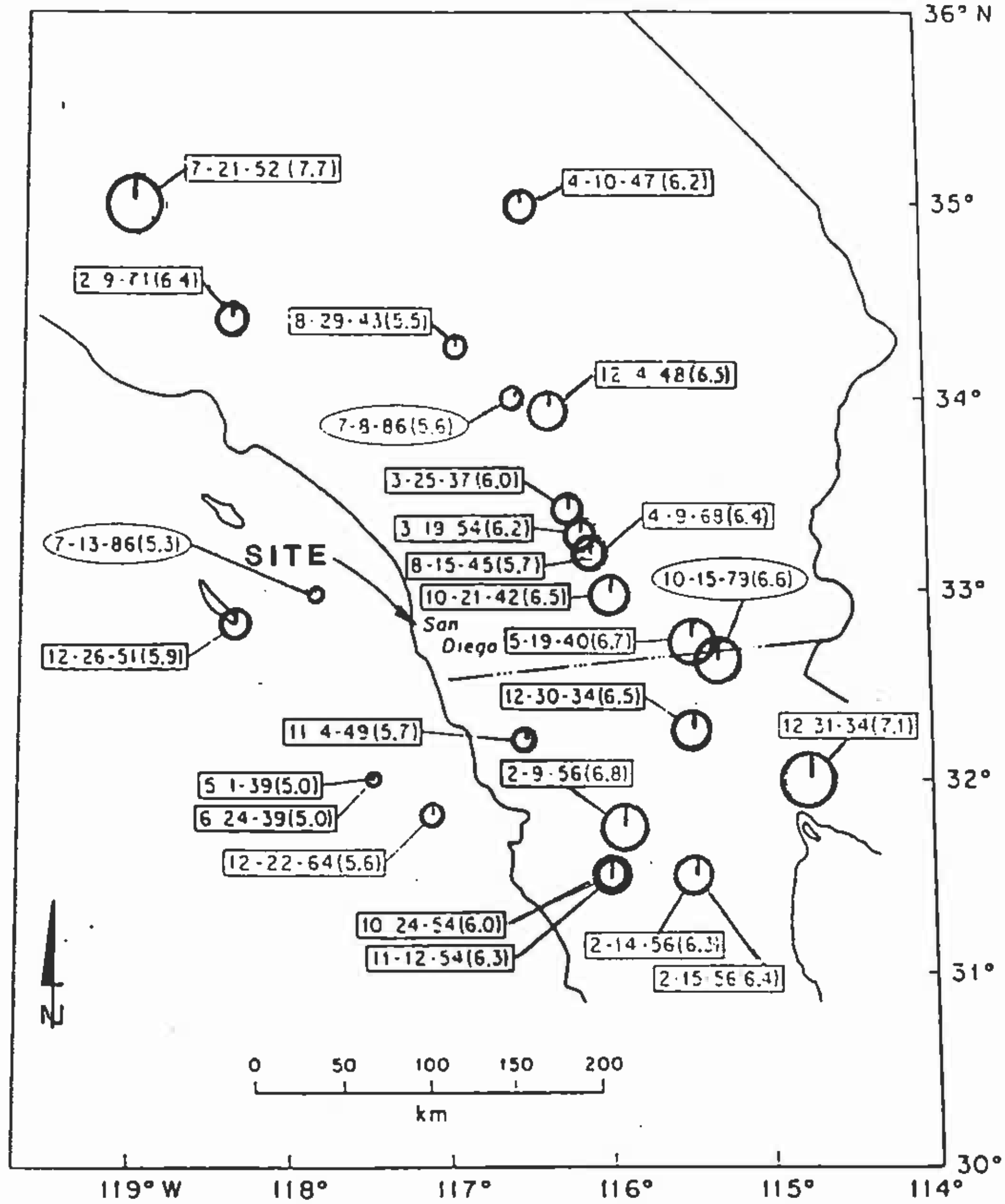
Figure 4b



Epicenters of earthquakes known to have triggered accelerographs in San Diego County through 1986.

Ref: Anderson, J.G., Rockwell, T.K., and Agnew, D.C., 1989, Past and Possible Future Earthquakes of Significance to the San Diego Region, Earthquake Spectra, Vol. 5, No. 2, Pg. 315.

Project No. 4CL123A | Date May 1994

Seismicity Map of
San Diego Region

Figure 5

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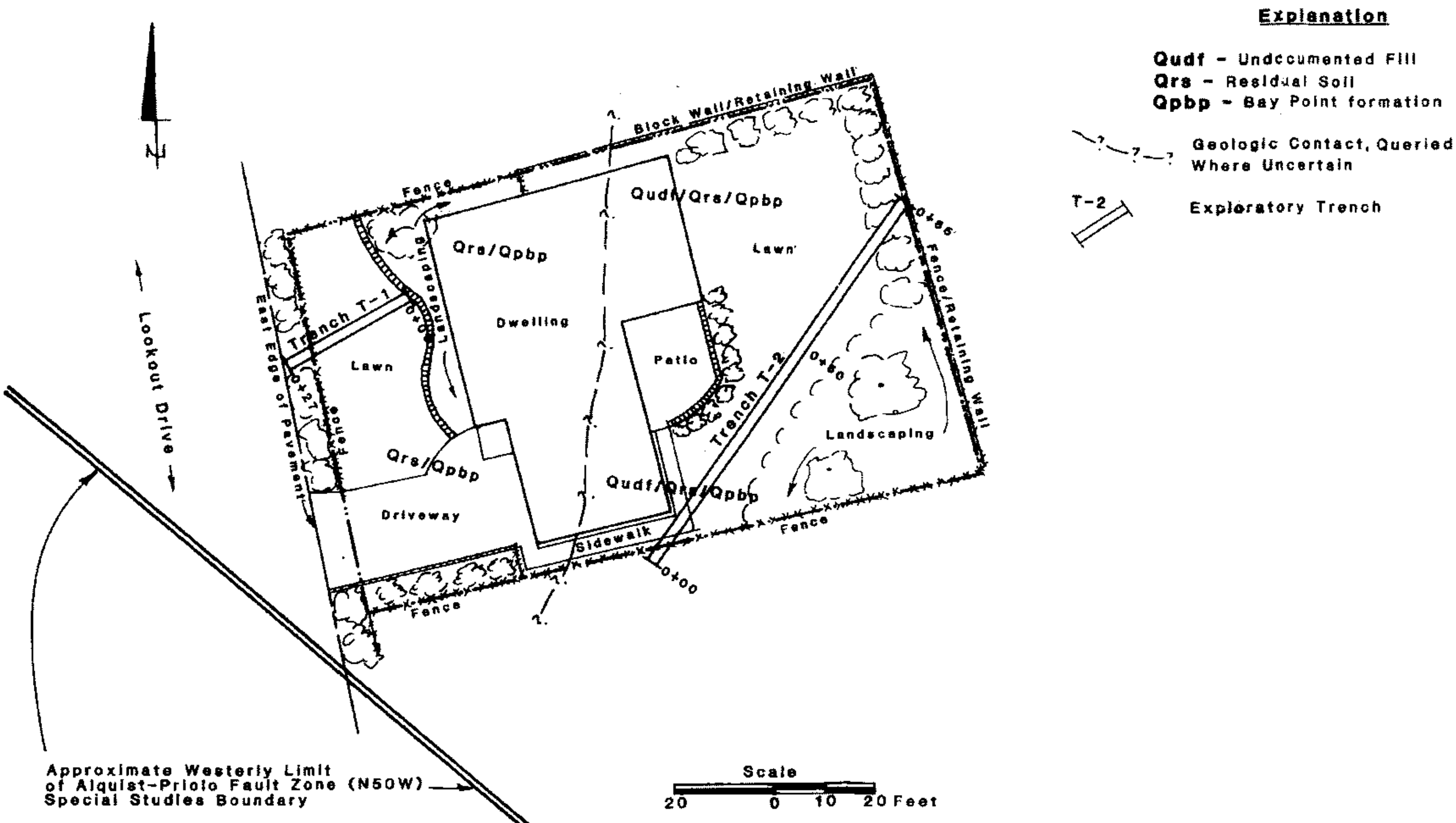
Anton and Shari Walden



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists
30020 Windward Dr. Canyon Lake, CA 92587 - (909) 244-6247

Project No 4CL123A   Date May 1994

Site Plan/Preliminary Geologic Map

Figure 2
Anton and Shari Walden
7731 Lookout Drive
La Jolla, Ca.

Project Name: A. and S. Walden | Date: 4/15-18/94 | Location: 7731 Lookout Dr. La Jolla | Equipment: Bobcat X331 Excavator

Project Number: 4CL123A | Elevation: approx. 190' | Logged By: S. Suitt, M. Hart

EXPLORATORY TRENCH NO. T-1

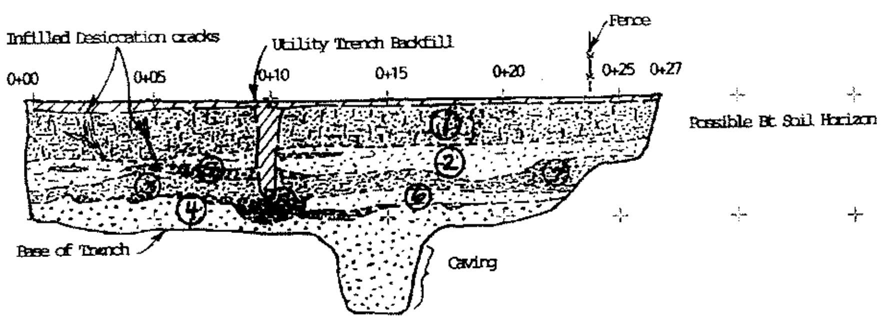
Desig.	Attitudes	See Exp.	Explanation	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			B – Bedding J – Joint S – Shear F – Fault (F)R – (Filled) Rodent Burrow										
				1	Qrs	Residual Soil Clayey Sand-Sandy Clay with highly organic cover Fine to med. grained, well graded, moist, med. dense to stiff, some blocky structure, rootlets and roots, Lt. olive brown (2.5Y 5/4-6), forms desiccation upon exposure with some clay infilling.	SC-CL						
				2	Qbp	Bay Point formation Silty Sandstone with Claystone Lenses Fine to med. grained, poorly graded, moist, med. dense, mottled, root hairs, some thin sandstone beds, Olive brown (2.5Y 4/4).	SM						
				3	Qbp	Silty Sandstone Fine grained, poorly graded, micaceous, moist, med. dense, root hairs, sli. porous, Lt.Ol. Br. (2.5Y5/4	SM						
				4	Qbp	Sandstone Coarse grained, moist, loose, poorly cemented, massive, root hairs, Olive (5Y5/6).	SP						
				5	Qbp	Conglomeritic Silty Sandstone Fine to coarse grained, mostly coarse, med. dense, moist, roothairs, permeable, Olive (5Y5/4)	GP						
				6	Qbp	Sandstone Med. grained, moist, med. dense, trace of gravel sized, root hairs, Olive (5Y 4/4)	SP						
				7	Qbp	Sandstone Med. grained, moist, med. dense, interbedded with fine sandstone, crudely laminated, Pale Olive (5Y 6/3)	SP						

Scale: 1" = 5'

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Southwest Trend: S60W

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			8.5



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists

Figure 3

Project Name: A. and S. Walden
Project Number: 4CL123A
Date: 4/15-18/94
Elevation: Approx. 190'
Location: 7731 Lookout Dr. LA Jolla
Logged By: S. Suitt, M. Hart
Equipment: Bobcat X331 Excavator

EXPLORATORY TRENCH NO. T-2

Explanation: B– Bedding; J– Joint; S– Shear; F– Fault; (F)R–(Filled) Rodent Burrow

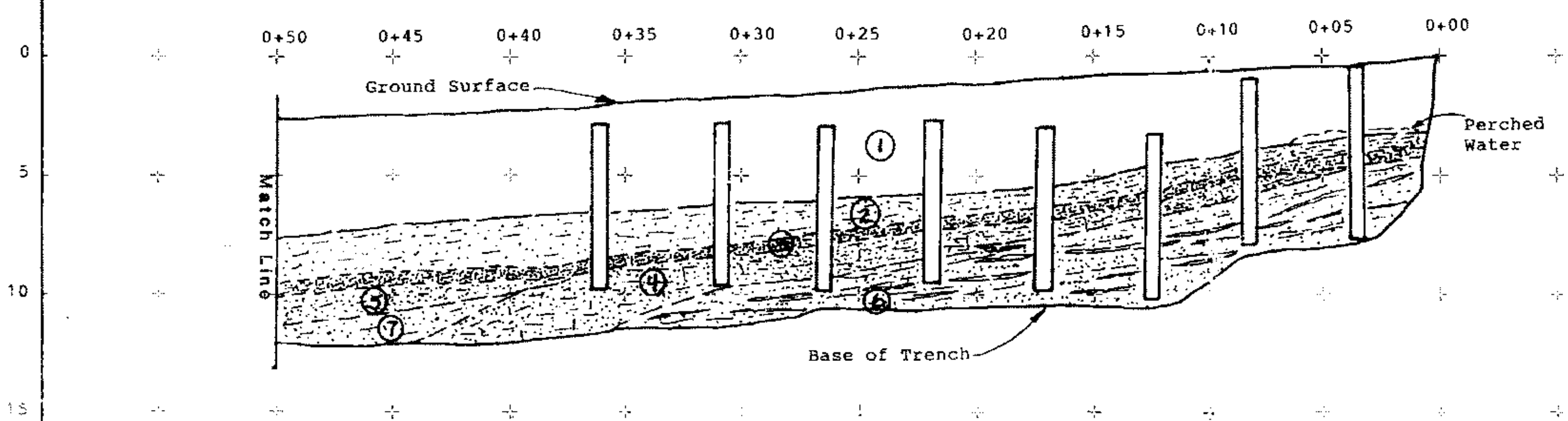
Desig.	Attitudes	See Exp.	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			1	Qudf	<u>Undocumented Fill</u> <u>Silty Sand to Sand</u> Fine to coarse grained, sli. moist, porous to sli. porous, loose to med. dense,, contains cobbles and boulders to 2 feet in dia., contains several organic horizons, and assorted trash, such as; wood, glass brick, concrete, metal and tires.	SM-SP						
			2	Qrs	<u>Residual Soil-Slopewash</u> <u>Clayey to Silty Sand (A Horizon)</u> Fine to med. grained, porous, very moist, med. dense, trace of coarse sand, root hairs, contains a highly organic soil cover (old ground surface; buried), Very Dark Grayish Brown (10YR 3/2)	SC						
			3	Qrs	<u>Clayey Sand (Bt Horizon)</u> Fine to med. grained, dense, sli. porous, blocky structure, clay bridging ped surfaces, some root hairs, sli. moist to moist, some non-continuous semi-smooth surfaces with black oxide staining, d.red brown (5YR 3/2).	SC						
			4	Qbp	<u>Bay Point formation</u> <u>Silty Sandstone</u> Fine to med. grained, med. dense to dense (m. hard), moist to sli. moist, sli. blocky structure, thinly bedded, sli. weathered, sli. fractured, D. Yel. Brown (10YR3/4).	SM						
			5	Qbp	<u>Sandstone</u> Fine to med. grained, dry to sli. moist, v. dense to dense (m. Hard), thinly bedded, sli. weathered, sli. fractured, Olive Gray (5Y 4/2).	SP						
			6	Qbp	<u>Sandstone with thinly laminated Claystone and Siltstone interbeds</u> Fine to coarse grained, micaceous, dense (m. hard), Olive gray to Olive (5Y 3/2 - 4/4), Sli. fractured.	SP						

Scale: 1" = 5'

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Northeast Trend: N35E

Dry Density (pcf)	Moisture Content (%)	Sample	Depth



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists

Figure 4a

Project Name: A. and S. Walden | Date: 4/15-18/94 | Location: 7731 Lookout Dr. La Jolla | Equipment: Bobcat X331 Excavator

Project Number: 4CL123A | Elevation: Approx. 190' | Logged By: S. Suitt, M. Hart

EXPLORATORY TRENCH NO. T-2

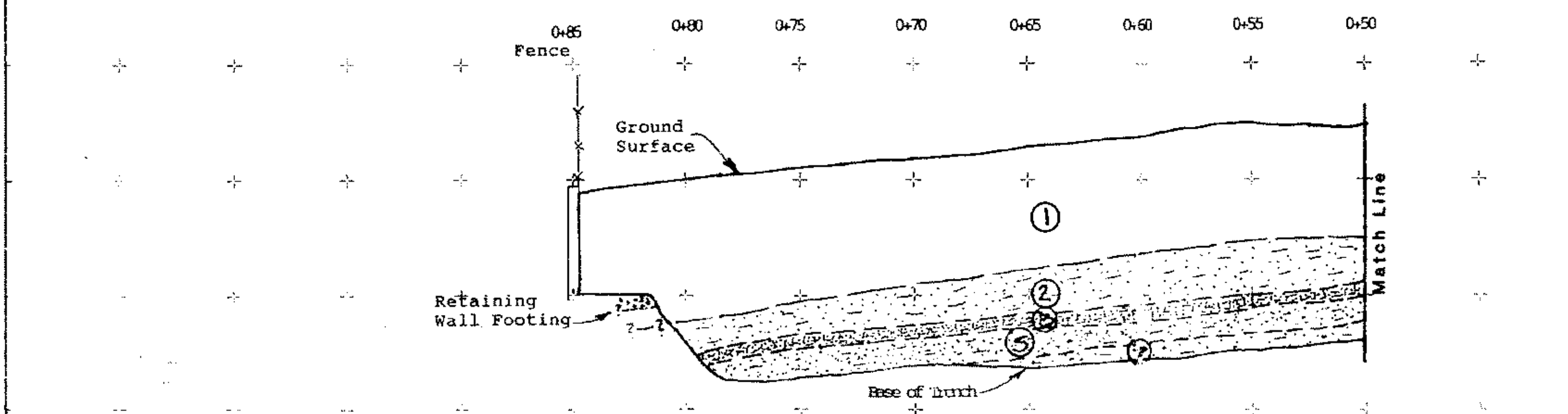
Desig.	Attitudes	See Exp.	Explanation	Unit No.	UNIT	ENGINEERING GEOLOGIC DESCRIPTION	U.S.C.S.	Soil Consistency Density	Bedrock Induration	Bedding Development	Bedding Continuity	Joint Development	Joint Spacing
			B – Bedding J – Joint S – Shear F – Fault (F)R – (Filled) Rodent Burrow	7	Qbp	Bay Point formation Cont. Silty Sandstone Fine to med. grained, dense to m. dense (m. hard), trace of coarse sand, sli. fractured, sli. weathered thinly bedded, Dark Brown (10YR 3/3).	SM						

Scale: 1" = 5'

SOUTH TRENCH WALL SCHEMATIC DIAGRAM

Slope: Northeast | Trend: N35E

Dry Density (pcf)	Moisture Content (%)	Sample	Depth
			0
			5
			10
			15



Steven C. Suitt and Associates
Consulting Engineering, Mining and Environmental Geologists

Figure 4b

APPENDIX G

FAULT INVESTIGATION REPORT, CICONE RESIDENCE
MILLER-HICKS, 2008

Bryan Miller-Hicks
774 Granite Hills Circle
El Cajon, CA
92019
619-733-3724
bryanmillerhicks@gmail.com

December 2, 2008

FAULT INVESTIGATION REPORT

CICONE RESIDENCE

7750 LOOKOUT DRIVE

LA JOLLA , CALIFORNIA

APN 352-010-18

Prepared for:

Mr. John Cicone

Cicone Construction Co., Inc.

6625 Nancy Ridge Drive, # A

San Diego, California

92121

Bryan Miller-Hicks

Project # 08-001A

November 20, 2008

Bryan Miller-Hicks
774 Granite Hills Circle
El Cajon, CA
92019
619-733-3724
bryanmillerhicks@gmail.com

December 2, 2008

Project #08-001A
Mr. John Cicone
Cicone Construction Co. Inc.
6625 Nancy Ridge Drive, #A
San Diego, CA 92121

SUBJECT: Fault Investigation Report
7750 Lookout Drive
La Jolla, California
APN 352-010-18

References: See reference list, Appendix B

Dear Mr. Cicone:

In accordance with your request and my proposal of August 31, 2008, I herein submit my report of a fault investigation report, as required by the City of San Diego as part of the submittal and review process for your building permit. This report has been prepared in response with a request by the City of San Diego, in a review cycle memo dated August 4, 2008. This report is an addendum to my report completed on February 28, 2008.

This report has been prepared in accordance with current City of San Diego guidelines for geotechnical and fault rupture hazard investigations, as well as California Board for Geologists and Geophysicists guidelines.

The scope of work and the contents of this report are limited to an assessment of active faulting which may affect the property. The property contacts a state mandated Earthquake Fault Hazard Zone (formerly Alquist-Priolo zone).

Several trenches were excavated on the western and northern sides of the property, to provide sufficient coverage to discover any active fault traces trending under and through the property, if present. The trenches were excavated to depths of five to nine feet through topsoil, colluvium and artificial fill into the underlying Pleistocene terrace sandstones and Point Loma Formation. Detailed logging of the trenches was completed for this investigation.

Based on the research, mapping, logging and observations detailed herein, there is no evidence of faulting on the property. Therefore there is no evidence of an active or potentially active fault passing beneath the property.

I appreciate the opportunity to be of service.

Respectfully Submitted,

Bryan A. Miller-Hicks, PG, CEG 1323

PROFESSIONAL GEOLOGIST
EXP 5/09
BRYAN MILLER-HICKS
NO. 1323
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

1.0 INTRODUCTION

This report presents the results of a fault investigation report for proposed new residential construction at 7750 Lookout Drive, La Jolla California; APN 352-010-18 (Figures 1 and 2). The existing residence and swimming pool will be demolished and replaced by a new home. Services have been completed in accordance with a proposal dated August 31, 2008 (References). The architect for this project is Mr. James Galvin. The geotechnical engineering consultant is East County Soil Consultation and Engineering, Inc. (ECSCE).

2.0 SCOPE AND INTENT OF REPORT

This report is intended to be used as an addendum to my report of February 28, 2008 (References), as requested by the city in their memo dated August 4, 2008. This report presents the results of research and review of existing and available geologic reports, maps and other documents, along with mapping, observations, and detailed logging of walls of trenches excavated on the property. This report is intended for submission to the City of San Diego for review.

3.0 PROJECT AND SITE DESCRIPTION

The property is a roughly rectangular parcel approximately ¼ acre in size. (Figure 2). It is bound by Lookout Drive to the east, and residential lots to the north and south. A natural canyon draining to the north runs along its western boundary. The eastern one half of the property is a flat graded pad at elevation 180 feet mean sea level (msl) supporting the existing residence and swimming pool. The western one half of the property is mostly ungraded, sloping at approximately 40% down to the west.

The client proposes to replace the existing residence with a three-story, wood-framed residence with a basement, and construct a new swimming pool.

4.0 SEISMIC SETTING AND EARTHQUAKE FAULT RUPTURE HAZARD

San Diego's tectonic setting includes north and northwest striking fault zones, the most prominent and active of which is the Rose Canyon Fault Zone. Other Fault zones lie in eastern and northern San Diego county.

Fault rupture hazard would affect a property if an active fault trace or traces traverse the property. The subject property lies approximately 800 feet southwest of the active Rose Canyon Fault as shown on the City of San Diego Seismic Safety Study Map Sheet 29 (Figures 4 and 5), and on the California Geologic Survey (CGS) Earthquake Fault Zone Maps (Figure 6).

The CGS maps are planning tools, showing earthquake fault zones commonly called "Alquist-Priolo Earthquake Fault Zones", on either side of major active faults. Proposed new construction on properties within these zones is subject to special fault studies, including onsite trenching to show the existence or absence of active Fault traces. On the City of San Diego maps, these state zones are shown

and identified as Geologic Hazard Category 11. The southwest margin of the CGS Rose Canyon Fault Zone (earthquake fault hazard zone) appears to just contact the northeast corner of the property (Figure 5).

Additionally, a portion of the property lies within the City Geologic Hazard Category 12, designated on either side of the Mount Soledad Fault(Figures 4 and 5). The Mount Soledad Fault is considered as potentially active, inactive, presumed inactive or activity unknown.

A detailed seismicity analysis for the site is beyond the scope of this report. However, a summary of regional seismicity can be included here. Seismic shaking will impact the site if significant earthquakes occur on nearby faults, and on active faults located elsewhere in the Southern California region. The nearest fault, the Rose Canyon Fault, may produce a Richter Magnitude 6.9 earthquake, based on numerous studies (Lindvall and Rockwell, 1995). The Uniform Building Code *(1997)* includes parameters for assessing the effects of seismic shaking and ground acceleration on structures. The August 20, 2004 report by ECSCE provides a table summarizing near-source factors and seismic coefficients, which are used by structural engineers in building design. In addition, a deterministic analysis for site earthquake acceleration was included in my February 28, 2008 report . Using Blake's EQFAULT program, it was found that the site could experience a maximum site acceleration of approximately 0.628 g.

5.0 FIELD WORK

Fault investigation trenches were excavated and logged during the months of October and November, 2008. The trenches were excavated in roughly north-south and east-west orientations, comprising five trench segments totaling 113 linear feet (Figure 2, site plan). Trench depths averaged five feet, but trench segment #5 reached a depth of nine feet, due to the presence of deeper artificial fill materials at this location.

The trenches were hand excavated. After the trench walls were carefully scraped and cleaned, they were logged at a scale of 1" = 5' by the author, with assistance from Michael W. Hart, CEG (Figures 7, 8, 9 and 10).

6.0 SITE SUBSURFACE GEOLOGY

The site is within the coastal plain, a portion of the Peninsular Range Geomorphic Province in southern California. The coastal plain in the San Diego area is underlain primarily by sedimentary rocks.

Specifically, the property is underlain by topsoils, colluvium, artificial fill, "unmapped" Pleistocene marine terrace deposits, and Point Loma Formational shales (Figure 3, Site Geology). These units are described below.

Point Loma Formation (Kp):

The Point Loma Formation belongs to the Upper Cretaceous Rosario Group *(Kennedy, 1975)*, which is composed of clastic sedimentary rocks. According to Sliter, *(1968)*, the predominantly fine-grained Point Loma Formation contains inner shelf and bathyal biofacies, indicating shallow water deposits reworked downslope by density currents.

The Point Loma Formation bedrock found onsite is thinly laminated, fractured, stiff to hard clay shale. It is olive gray to pale gray-green in color. Rip-up clasts of the shale were observed in the overlying Pleistocene terrace deposits.

Pleistocene Terrace Deposits (Qt):

These marine terrace deposits are "unnamed", meaning they have not had a formation name assigned to them. They are composed of mostly well-graded medium-grained to coarse-grained sandstone, medium dense to dense, golden-brown, tan and red brown in color. They contain scattered rounded gravels and cobbles, up to 10" in maximum dimension.

Colluvium:

Onsite colluvial soils overlie the formational bedrock; a sharp contact separates them. These soils consist of well-graded silty medium-grained to coarse-grained sand, loose, dry, and dark brown in color. The colluvial soil layers are from one to three-and-a-half feet in thickness, and have been penetrated by roots and rootlets, and small animal burrows.

Topsoils:

Topsoils onsite are layers of organic rich soil primarily used to support landscaping onsite; generally six inches or so in thickness, medium-grained to coarse-grained silty sand, loose and dry, dark brown to black in color.

Artificial Fill (Qaf)

Artificial fill was found only off the northwest corner of the existing house and along the northerly boundary of the property. It consists of silty sand, medium dense and compacted, moist, and containing scattered fragments of charcoal, brick, and concrete. Fill depths reached a maximum of five feet at the eastern end of trench segment #5.

7.0 PREVIOUS FAULT INVESTIGATIONS ON NEARBY PROPERTIES

7762 Lookout Drive Research was done to discover and review any geotechnical and fault investigation reports which may have been completed on adjacent or nearby properties. Geotechnical Exploration Inc. (GEI) had completed a report for the 7762 Lookout Drive property, adjacent to the north (2005). They determined that the CGS Fault Zone for the Rose Canyon Fault included the approximately northeastern one-half of the property at 7762 Lookout Drive. As part of their investigation, they excavated and logged two trenches to identify the presence or absence of any active fault traces.

Their trenches T-1 and T-2 were both oriented approximately N10E, with a combined end to end length of approximately 77 feet, essentially crossing almost the entire width of the CGS fault zone near the northwestern corner of the property. The depths of each trench ranged from 3.5 feet to 5 feet, deep enough to expose the most recent sediments, designated as Pleistocene terrace sediments. These sediments are characterized as poorly to moderately cemented, medium dense, medium- to coarse-grained marine terrace sands. Some bedding structure could be found in these sediments, in the form of thin, subtle laminations, generally horizontal; some of the thin beds also appear to be overlapping.

GEI found no evidence of active faulting, no fault structures, stratigraphic bedding displacements or the like. They found that the contact between coarse recent slopewash (colluviums) and underlying terrace sands is laterally continuous within their trenches, traceable as a horizontal depositional feature. They made the following statement in their report:

"observations within the two fault trenches indicate that active faulting does not cross the subject property within the proposed building addition footprint"

2020 Soledad Avenue GEI also completed a fault investigation report for the property at 2020 Soledad Avenue, a few hundred feet south of the subject property. Again they found no evidence of active fault features in the marine terrace sediments underlying deep fills on this property. They determined that the terrace sediments are essentially flat lying sands with long, continuous bedding planes, dipping approximately 1 to 2 degrees to the NNW.

8.0 RESULTS OF SITE FAULT TRENCHING

Detailed logging and inspection of the trench segments indicate that the site is underlain by unfaulted colluvium and formational bedrock of the Cretaceous Point Loma and the Pleistocene terrace sediments (unnamed).

The contact between the two formations is erosional, and essentially horizontal, although there appear to be channels cut into the Point Loma shale which have been filled by terrace sediments. The terrace sediments also contain rip-up clasts of shale, some gravels and boulders, indicating somewhat high energy deposition.

No displacements of formational contacts, or the contacts between the terrace sediments and the overlying colluvial soils, were noted. No significant disruption of terrace bedding was noted. No fault planes, contorted bedding, or fault gouge were noted. The Point Loma shale is extensively fractured, vertically and horizontally, but no features indicative of faulting were noted.

In conclusion, there is no evidence to suggest that active or potentially active faults underly the site.

APPENDIX A

FIGURES

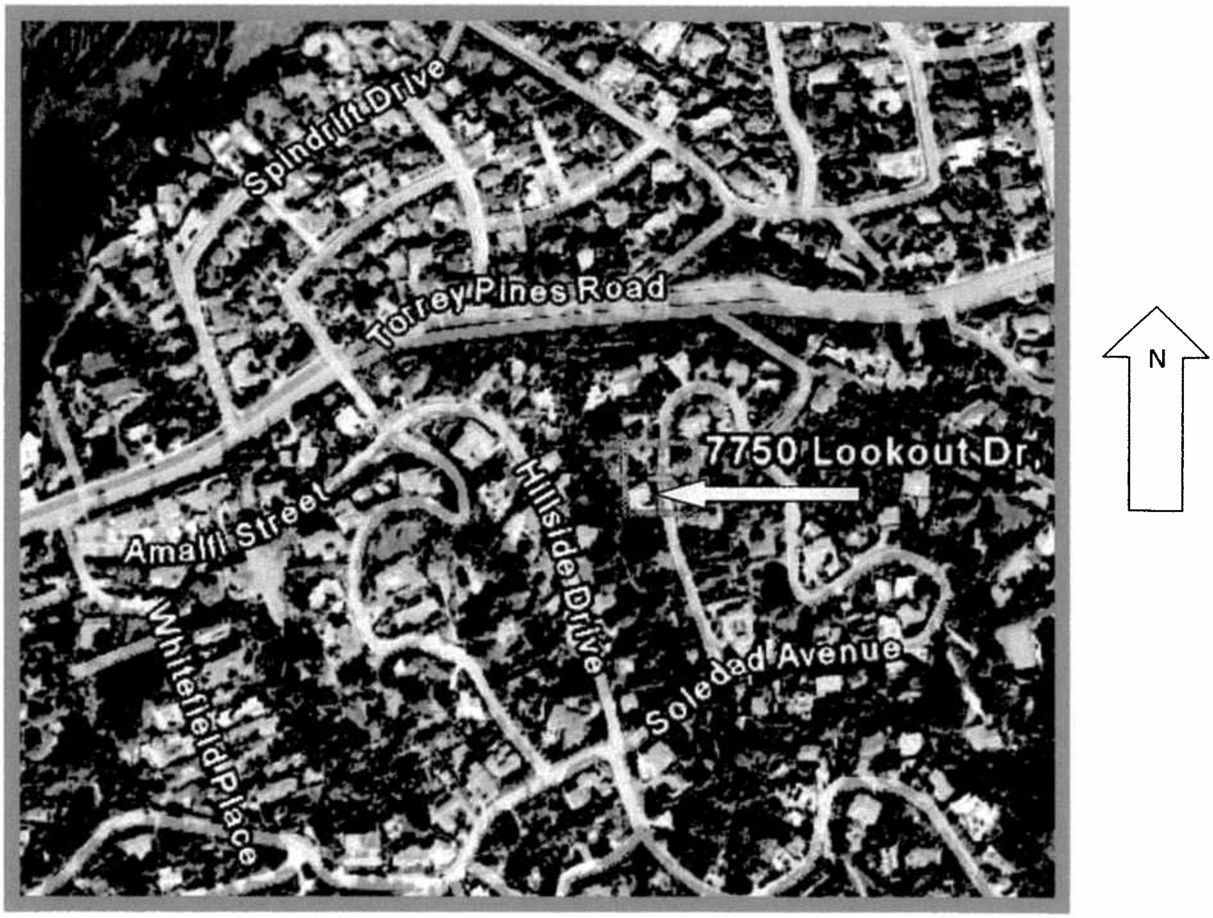


FIGURE 1 VICINITY MAP 7750 LOOKOUT DRIVE

Source: Google Earth—no scale

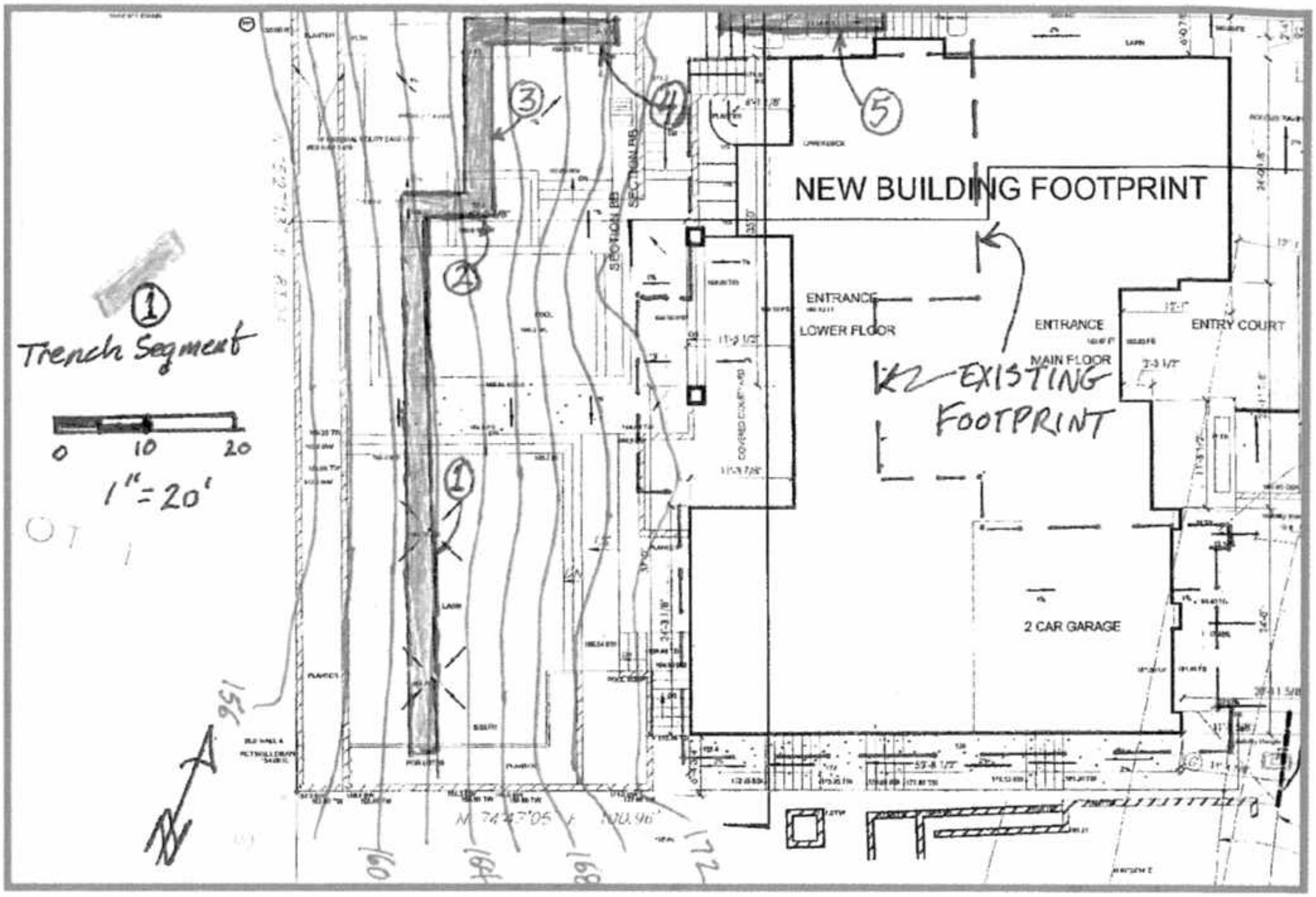


FIGURE 2 SITE PLAN CICONE RESIDENCE, 7750 LOOKOUT DRIVE, LA JOLLA

Scale: 1" = 20'

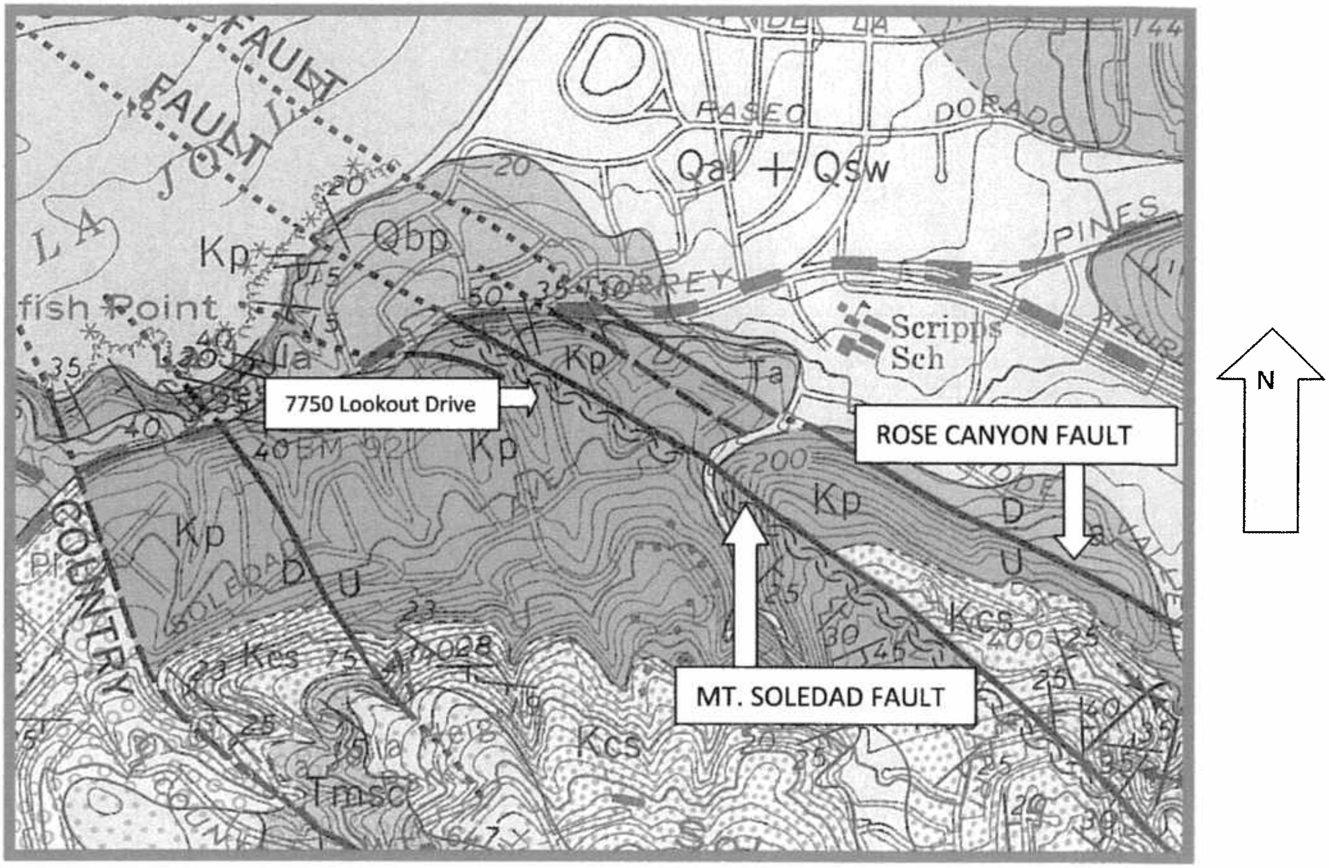
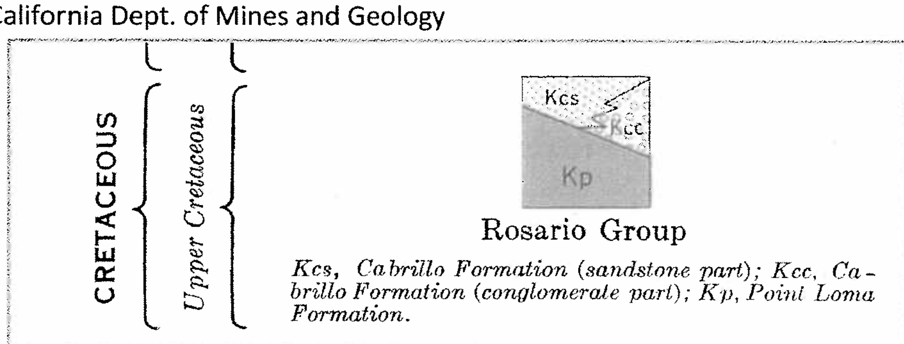


FIGURE 3 SITE GEOLOGY

Scale: 1' = 1000'

Source: Kennedy, M.P., 1975, reprint 2001, Geology of the San Diego Metropolitan Area, California, Bulletin 200, California Dept. of Mines and Geology



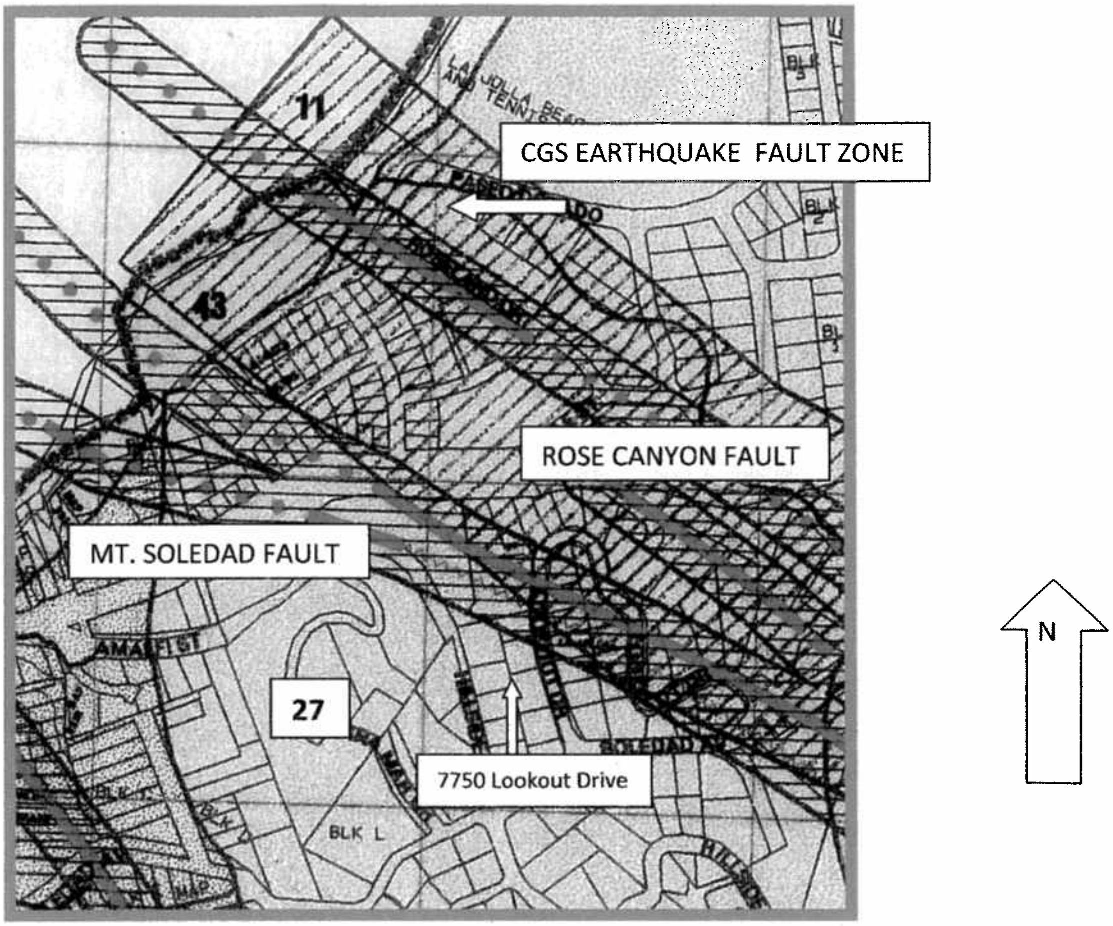


FIGURE 4 FAULT ZONES, Scale: 1" = 600'

Source: City of San Diego, 1995, Seismic Safety Study, Geologic Hazards and Faults, sheet 29

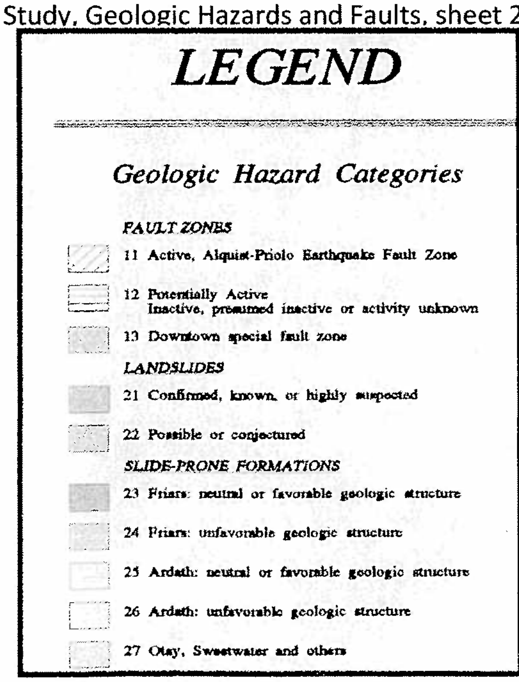
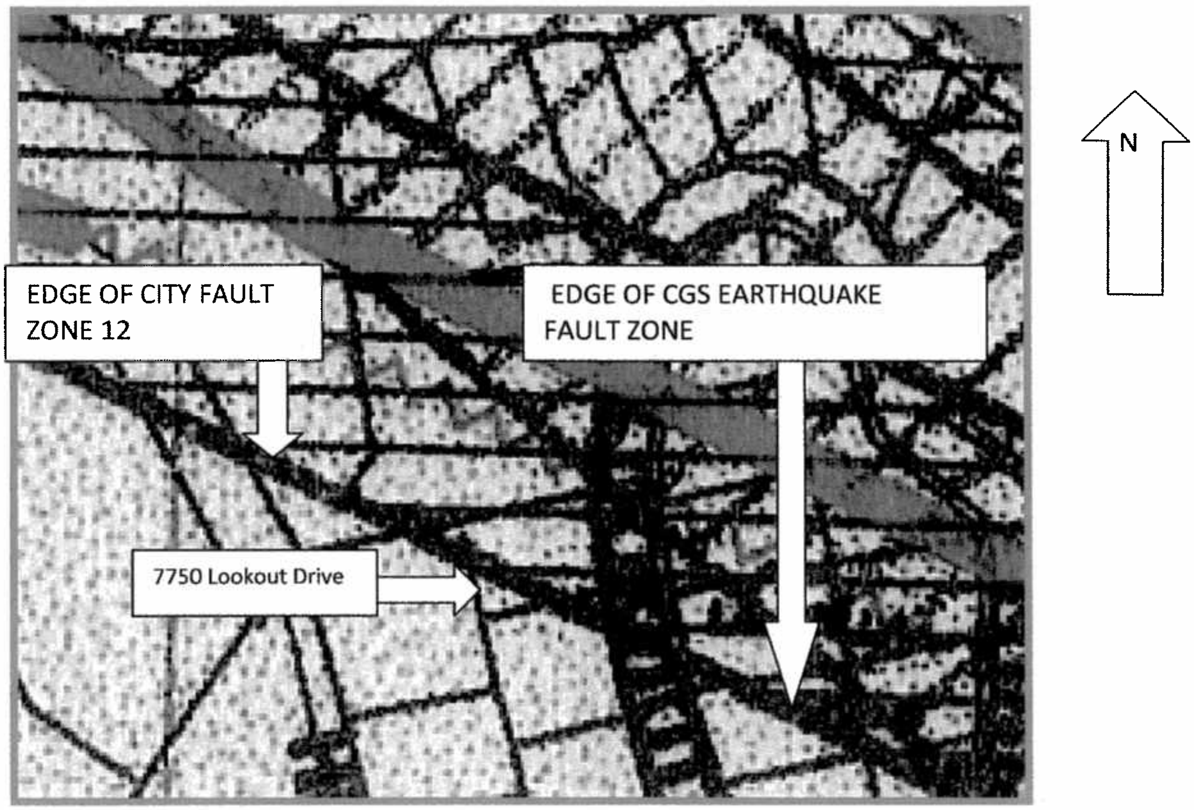


FIGURE 5 FAULT ZONES AND PROPERTY, ENLARGED VIEW

No Scale



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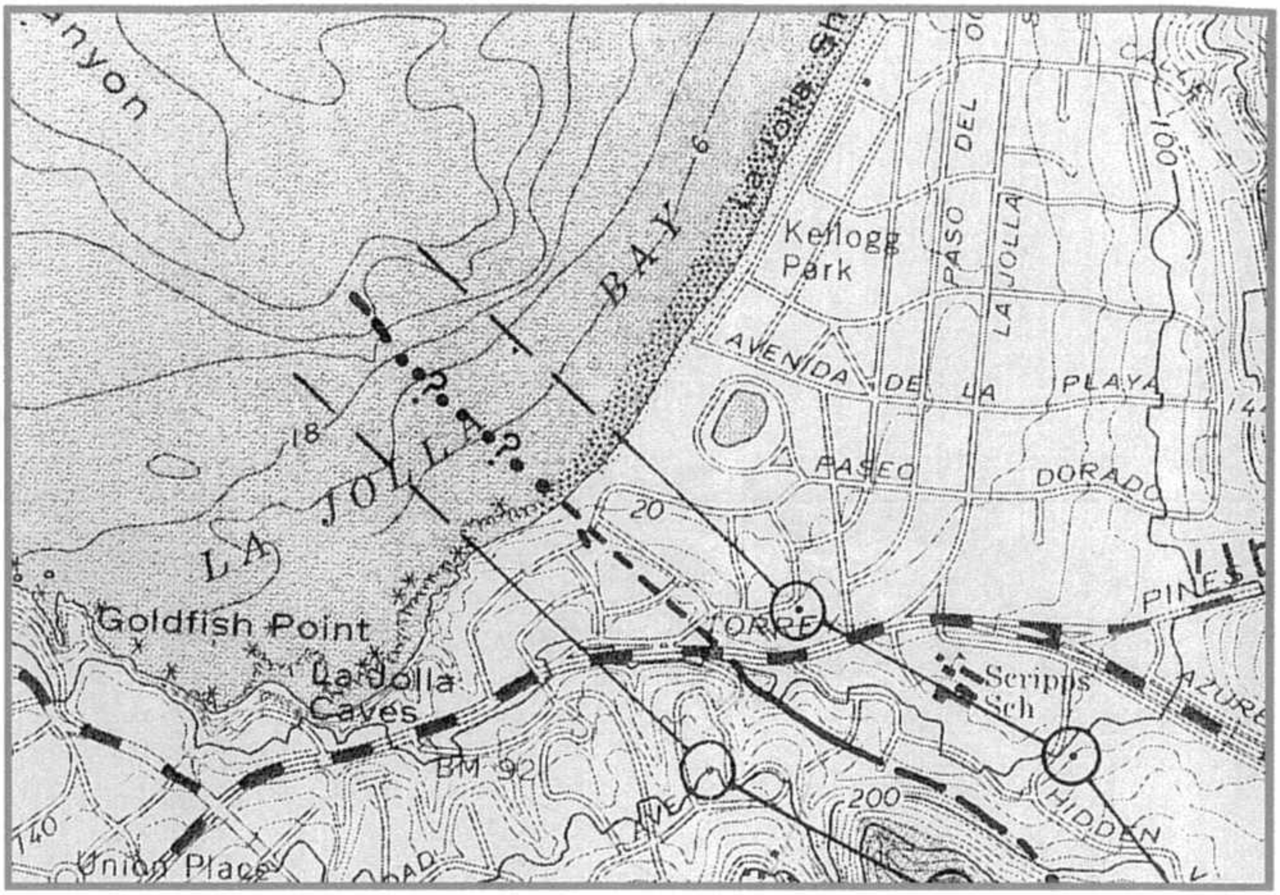

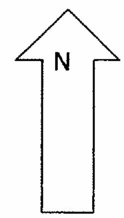

FIGURE 6 CGS EARTHQUAKE FAULT ZONE LA JOLLA QUADRANGLE

Scale: 1" = 1000'

Source: California Geological Survey Earthquake Fault Zone Map, La Jolla Quadrangle, San Diego County

13

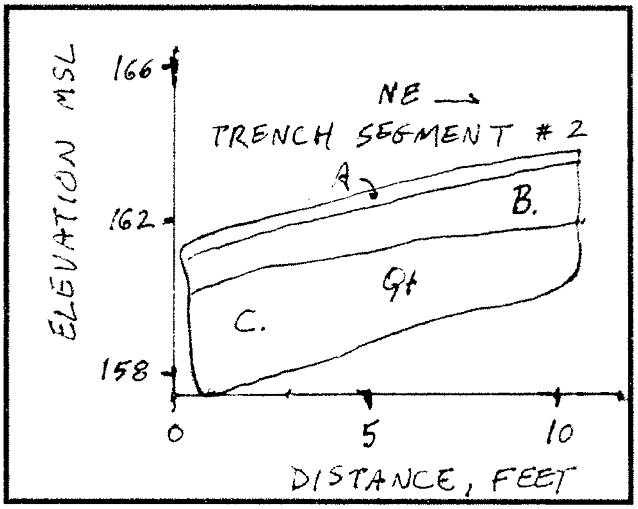

Figure 8 FAULT TRENCH SEGMENT # 2, NORTH WALL, 1" = 5'

LEGEND

Af: artificial fill: silty sand, medium dense, moist with scattered construction debris, dark brown to black

A. topsoil: medium to coarse-grained silty sand, with organic material, loose, dry, dark brown

B. colluvium: silty medium to coarse-grained sand, loose, dry, dark brown, well-graded

C. Quaternary Terrace Deposits (Qt): silty, well-graded sand, poorly to moderately indurated, medium dense to dense, tan/golden brown to oxidized red brown; thinly bedded; contains scattered rounded gravels and cobbles

D. Point Loma Formation (Kp): clay shale, highly fractured, stiff; olive gray to green gray

14

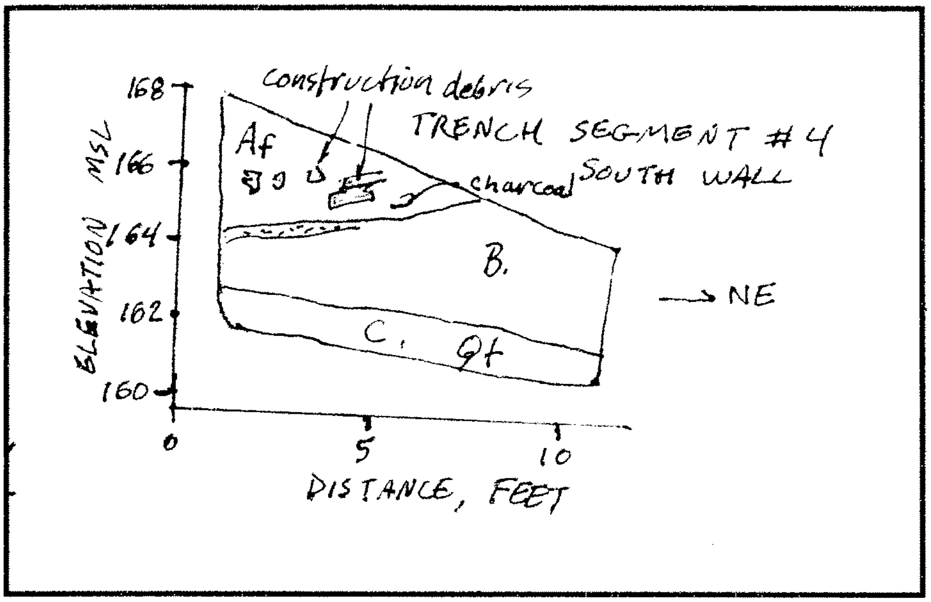

FIGURE 9 FAULT TRENCH SEGMENT #4, SOUTH WALL, 1" =5'

<u>LEGEND</u>

Af: **artificial fill**: silty sand, medium dense, moist with scattered construction debris, dark brown to black

A. topsoil: medium to coarse-grained silty sand, with organic material, loose, dry, dark brown

B. colluvium: silty medium to coarse-grained sand, loose, dry, dark brown, well-graded

C. Quaternary Terrace Deposits (Qt): silty, well-graded sand, poorly to moderately indurated, medium dense to dense, tan/golden brown to oxidized red brown; thinly bedded; contains scattered rounded gravels and cobbles

D. Point Loma Formation (Kp): clay shale, highly fractured, stiff; olive gray to green gray

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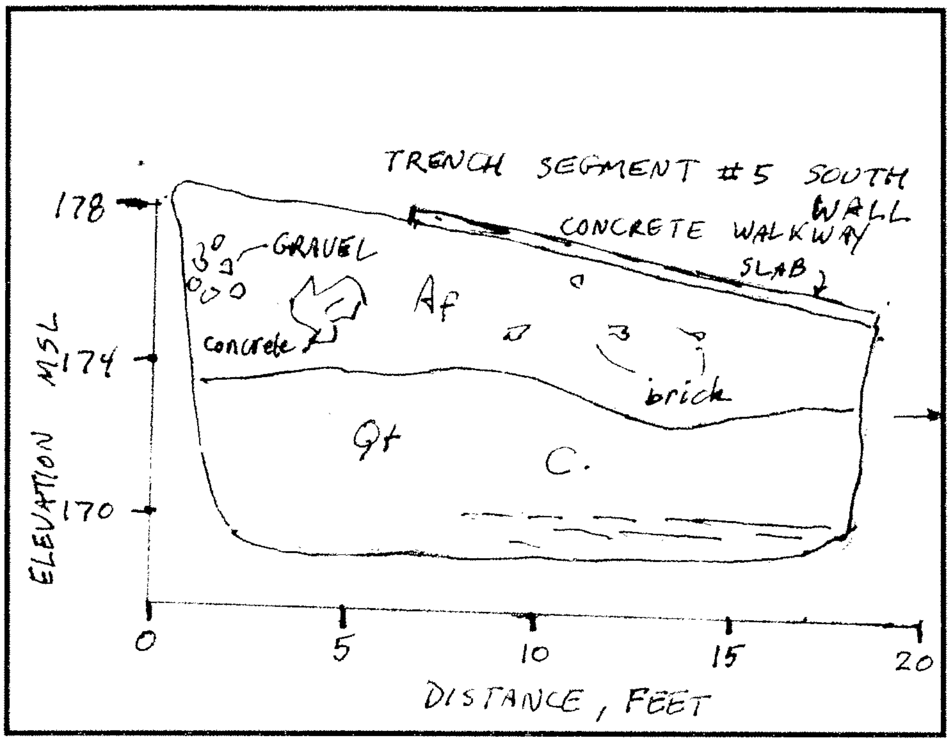

FIGURE 10 FAULT TRENCH SEGMENT # 5, SOUTH WALL, 1" = 5'

LEGEND

Af: **artificial fill**: silty sand, medium dense, moist with scattered construction debris, dark brown to black

A. topsoil: medium to coarse-grained silty sand, with organic material, loose, dry, dark brown

B. colluvium: silty medium to coarse-grained sand, loose, dry, dark brown, well-graded

C. Quaternary Terrace Deposits (Qt): silty, well-graded sand, poorly to moderately indurated, medium dense to dense, tan/golden brown to oxidized red brown; thinly bedded; contains scattered rounded gravels and cobbles

D. Point Loma Formation (Kp): clay shale, highly fractured, stiff; olive gray to green gray

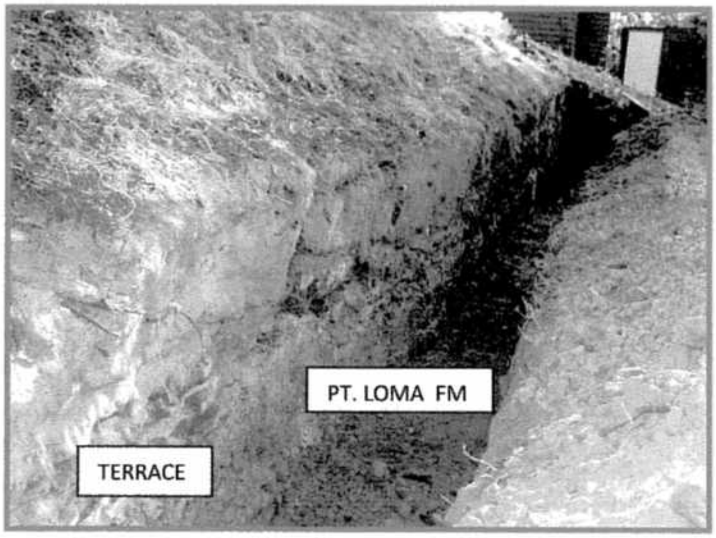

FIGURE 11 TRENCH SEGMENT #1, LOOKING SOUTH

APPENDIX B

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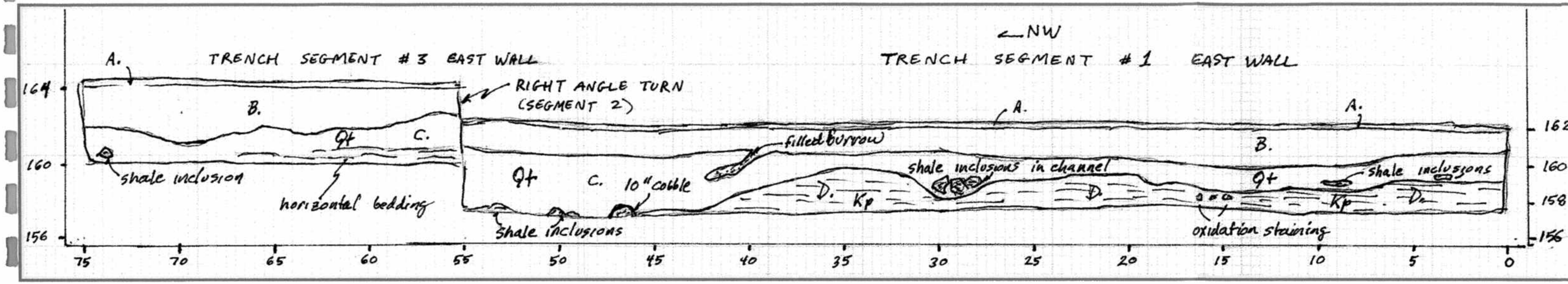

FIGURE 7 FAULT TRENCH SEGMENTS #1 and #3, EAST WALL, 1" = 5'

<u>LEGEND</u>

Af: **artificial fill**: silty sand, medium dense, moist with scattered construction debris, dark brown to black

A. topsoil: medium to coarse-grained silty sand, with organic material, loose, dry, dark brown

B. colluvium: silty medium to coarse-grained sand, loose, dry, dark brown, well-graded

C. Quaternary Terrace Deposits (Qt): silty, well-graded sand, poorly to moderately indurated, medium dense to dense, tan/golden brown to oxidized red brown; thinly bedded; contains scattered rounded gravels and cobbles

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APPENDIX H

REPORT OF LIMITED GEOTECHNICAL AND GEOLOGIC FAULT INVESTIGATION
GEOTECHNICAL EXPLORATION, INC, 2005

GEOTECHNICAL EXPLORATION, INC.

SOIL & FOUNDATION ENGINEERING • GROUNDWATER
HAZARDOUS MATERIALS MANAGEMENT • ENGINEERING GEOLOGY

20 June 2005

Robert and Ann Gotfredson
7762 Lookout Drive
La Jolla, CA 92037

Job No. 05-8877

Subject: **Report of Limited Geotechnical and Geologic Fault Investigation**
Gotfredson Residence Addition
7762 Lookout Drive
La Jolla, California

Dear Mr. and Mrs. Gotfredson:

In accordance with your request and per our proposals dated December 17, 2004, and February 22, 2005, ***Geotechnical Exploration, Inc.*** has prepared this report of geotechnical investigation for the proposed residential additions. Shallow handpits were placed on January 31, 2005. Two fault trenches were excavated between March 11 and 14, 2005 to assess the presence or absence of geologic faulting, per the requirements of the City of San Diego.

In our opinion, if the conclusions and recommendations presented in this report are implemented during site preparation, the site should be suited for the proposed residential addition and associated improvements.

This opportunity to be of service is sincerely appreciated. Should you have any questions concerning the following report, please contact our office. Reference to our **Job No. 05-8877** will help to expedite a response to your inquiry.

Respectfully submitted,

GEOTECHNICAL EXPLORATION, INC.

Leslie D. Reed, President
C.E.G.[exp. 3-31-07]/R.G. 3391

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R.C.E. 34422/G.E. 2007
Senior Geotechnical Engineer

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CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
JAIME A. CERROS
No. 002007
Exp. 9/30/05
GEOTECHNICAL
STATE OF CALIFORNIA

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REPORT OF LIMITED GEOTECHNICAL AND GEOLOGIC FAULT INVESTIGATION

Gotfredson Residence Addition
7762 Lookout Drive
La Jolla, California

JOB NO. 05-8877

The following report presents the findings and recommendations of ***Geotechnical Exploration, Inc.*** for the subject project.

I. EXECUTIVE SUMMARY

It is our understanding, based on communications with your architect, Mr. Drex Patterson of Island Architects, that the existing structure is to be remodeled, including a new addition onto the master bedroom area and associated improvements. The new addition is to be a maximum of two stories in height and is to be constructed of standard-type building materials utilizing conventional foundations with concrete slab-on-grade floors.

With the above in mind, the scope of work is briefly outlined as follows:

1. Identify and classify the surface and subsurface soils in the area of the proposed construction, in conformance with the Unified Soil Classification System.

2. Make note of any faults or significant geologic features that may affect the site.

3. Evaluate the existing surficial soils and formational material.

4. Recommend the allowable bearing capacities for the on-site dense natural soils or properly compacted fills.

5. Recommend site preparation procedures.

6. Evaluate the settlement potential of the bearing soils under the proposed structural loads.

7. Recommend preliminary foundation design information and provide active and passive earth pressures to be utilized in design of any proposed retaining walls and foundation structures.

Our investigation revealed that the proposed addition area of the site is underlain at shallow depth by poorly to moderately cemented, medium dense, medium- to coarse-grained, marine terrace sand materials, which are overlain by approximately 1.5 to 3.5 feet of variable density, silty sand fill, slopewash and weathered terrace materials. The encountered, relatively shallow fill, slopewash and weathered terrace materials are not suitable for bearing support of the proposed structure addition and associated improvements. As such, we recommend that these surficial soils be removed and recompacted as part of site preparation. The underlying natural ground marine terrace materials are of low expansion potential and have excellent load-bearing properties. Observations within the two fault trenches indicate that active faulting does not cross the subject property within the proposed building addition footprint.

II. SITE DESCRIPTION

The property is known as: Assessor's Parcel No. 352-010-19-00, Lot 1, according to Map No. 6457, in the La Jolla area of the City of San Diego, County of San Diego, State of California.

The existing developed lot is located at 7762 Lookout Drive, in the La Jolla area of the City of San Diego (see Figure No. I for site location). The property is an

5. Recommend site preparation procedures.

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II. SITE DESCRIPTION

The property is known as: Assessor's Parcel No. 352-010-19-00, Lot 1, according to Map No. 6457, in the La Jolla area of the City of San Diego, County of San Diego, State of California.

The existing developed lot is located at 7762 Lookout Drive, in the La Jolla area of the City of San Diego (see Figure No. I for site location). The property is a rectangular-shaped building pad located on the west side of Lookout Drive. The lot is bordered to the north and at a lower elevation by a similar residential property; to the south and at a higher elevation by a similar residential property; to the east by the north-south trending portion of Lookout Drive; and to the west by an approximately 30-foot-high, west-facing slope natural slope that abuts a similar residential property on Hillside Drive at its downslope terminus.

The existing structures on the property consist of a two-story, wood frame and stucco-covered, single-family residence with an attached garage, a swimming pool, detached pool house and guesthouse, several decks and associated improvements (see Figure No. II for site plan). The property has been graded into a relatively level building pad at an approximate elevation of 178 feet above mean sea level (MSL). Elevations across the site range from approximately 180 feet above MSL at the southeastern corner, to less than 125 feet above MSL at the northwest corner of the lot. Survey information concerning approximate elevations across the site was obtained from a preliminary topographic survey prepared by Pallamary and Associates.

III. FIELD INVESTIGATION

Seven exploratory hand-excavated pits and auger holes were placed on the site in areas where the new residential addition and improvements are assumed to be located and where feasible due to the existing structures on the site (for exploratory pit locations, refer to Figure No. II).

Additionally, two exploratory trenches were logged by our field representative in areas where fault traces could be intercepted if they exist on the lot. A Certified Engineering Geologist logged soils and native materials exposed in the trenches. Trench T-1, placed in a north-south direction and located in the northwestern portion of the west-facing slope, was approximately 50 feet in length and varied from 4 to 5 feet in depth. Trench T-2, placed in a north-south direction and located in the central portion of the west-facing slope, was approximately 22 feet in length and 3½ to 5 feet in depth. Each trench was logged at a scale of 1"=4'. A log of the trenches is included as Figure No. V. For trench locations refer to Figure No. II. A geologic map of the site vicinity is included here as Figure No. VI.

The soils encountered in the exploratory excavations were observed and logged by our project geologist and certified engineering geologist, and samples were taken of the predominant soils throughout the field operation. Exploratory excavation logs have been prepared on the basis of our observations and laboratory testing. The results have been summarized on Figure Nos. III, IV and V. The predominant soils have been classified in conformance with the Unified Soil Classification System (refer to Appendix A).

IV. LABORATORY TESTS AND SOIL INFORMATION

Laboratory tests were performed on the disturbed and relatively undisturbed soil samples in order to evaluate their physical and mechanical properties and their ability to support the proposed structure addition. The following tests were conducted on the sampled soils:

1. *Moisture Content (ASTM D2216-98)*
2. *Laboratory Compaction Characteristics (ASTM D1557-98)*
3. *Determination of Percentage of Particles Smaller than No. 200 (ASTM D1140)*

The moisture content of a soil sample is a measure of the water content, expressed as a percentage of the dry weight of the sample.

Laboratory compaction values establish the Optimum Moisture content and the laboratory Maximum Dry Density of the tested soils. The relationship between the moisture and density of remolded soil samples gives qualitative information regarding soil compaction conditions to be anticipated during any future grading operation.

The -200 sieve size analysis helps to more precisely classify the tested soils based on their fine material content, and to provide qualitative information related to engineering characteristics such as expansion potential, permeability, and shear strength.

The expansion potential of soils is determined, when necessary, utilizing the Uniform Building Code Test Method for Expansive Soils (UBC Standard No. 29-2). In accordance with the UBC (Table 18-1-B), potentially expansive soils are classified as follows:

EXPANSION INDEX	***POTENTIAL EXPANSION***
0 to 20	Very low
21 to 50	Low
51 to 90	Medium
91 to 130	High
Above 130	Very high

Based on our particle-size test results, our visual classification, and our experience with similar soils, it is our opinion that the on-site sandy soils have a low expansion potential (EI less than 20).

Based on the laboratory test data, our observations of the primary soil types on the site, and our previous experience with laboratory testing of similar soils, our Geotechnical Engineer has assigned values for the angle of internal friction and cohesion to those soils that will provide significant lateral support or load bearing on the project. These values have been utilized in assigning the recommended bearing value as well as active and passive earth pressure design criteria for foundations and retaining walls.

V. GENERAL GEOLOGIC DESCRIPTION

The San Diego area is part of a seismically active region of California. It is on the eastern boundary of the Southern California Continental Borderland, part of the Peninsular Ranges Geomorphic Province. This region is part of a broad tectonic boundary between the North American and Pacific Plates. The actual plate boundary is characterized by a complex system of active, major, right-lateral strike-slip faults, trending northwest/southeast. This fault system extends eastward to the San Andreas Fault (approximately 70 miles from San Diego) and westward to the San Clemente Fault (approximately 50 miles off-shore from San Diego) (Berger and Schug, 1991).

During recent history, the San Diego County area has been relatively quiet seismically. No fault ruptures or major earthquakes have been experienced in historic time within the San Diego area. Since earthquakes have been recorded by instruments (since the 1930s), the San Diego area has experienced scattered seismic events with Richter magnitudes generally less than 4.0. During June 1985, a series of small earthquakes occurred beneath San Diego Bay, three of which had recorded magnitudes of 4.0 to 4.2. In addition, the Oceanside earthquake of July 13, 1986, located approximately 26 miles offshore of the City of Oceanside, had a magnitude of 5.3 (Hauksson and Jones, 1988). On June 15, 2004, a 5.3 magnitude earthquake occurred approximately 45 miles southwest of downtown San Diego (26 miles west of Rosarito, Mexico). Although this earthquake was widely felt, no significant damage was reported.

In California, major earthquakes can generally be correlated with movement on active faults. As defined by the California Division of Mines and Geology (Hart, E.W., 1980), an "active" fault is one that has had ground surface displacement within Holocene time (about the last 11,000 years). Additionally, faults along which major historical earthquakes have occurred (about the last 210 years in California) are also considered to be active (Association of Engineering Geologist, 1973). The California Division of Mines and Geology defines a "potentially active" fault as one that has had ground surface displacement during Quaternary time, that is, during the past 11,000 to 1.6 million years (Hart, E.W., 1980).

VI. SITE-SPECIFIC GEOLOGIC DESCRIPTION

The site is located near the northern foot of Mount Soledad, a prominent landmark in the central coastal area of San Diego. Mount Soledad was formed by upward flexure of primarily Cretaceous and Eocene bedrock along the south side of a restraining bend in the Rose Canyon Fault. The site is located within the primary zone of faulting that consists of two primary fault segments, or strands, named the Mount Soledad Fault and the Rose Canyon Fault. Known faults in this portion of La Jolla trend northwest to southeast. The site is mapped within the Rose Canyon fault zone, therefore, a detailed subsurface investigation, including fault location trenching, was required to determine if faulting is present on-site.

A review of the City of San Diego Seismic Safety Study -- Geologic Hazards, indicates that the site is located within moderate to high-risk geologic hazard zones designated as Zones 11, 12 and 27 (see Figure Nos. VIIa and VIIb).

Zone 11 refers to the "active" Rose Canyon Fault Zone, defined by the Alquist-Priolo Act of the State of California (1971) as a Fault Rupture Hazard Zone. This zone crosses the northeastern portion of the property. The fault mapped near the site on the referenced Geologic Hazards Map and the Geologic Map (Figure No. VIa) is identified as the Mount Soledad Fault within the Rose Canyon Fault Zone. Zone 12 refers to potentially active, inactive, presumed active or activity unknown faults. The City of San Diego Seismic Hazard Map (Figure No. VIIa and VIIb) shows a fault mapped through the northeastern portion of the site. Our exploratory trench observations did not reveal evidence of a fault crossing the property. Zone 27 refers to terrain *"underlain by a slide-prone geologic formation."*

A. Stratigraphy

The formational materials encountered on the site are identified on published geologic maps by Kennedy (1975) as the Cretaceous-age Point Loma Formation (Kp) (refer to Figure Nos. VIa and VIb). This investigation, however, revealed the Point Loma Formation to be overlain by a recently identified and unnamed Pleistocene marine terrace deposit. In addition to the marine terrace deposits, the site is underlain by surficial fill soils and slopewash deposits. Site-specific geologic information is presented on Figure Nos. III and V.

Fill Soils: The encountered fill soils consist primarily of dark gray-brown, silty fine- to medium-grained sand with some coarse rock fragments and abundant roots. They are generally in a loose, damp condition and range from approximately 1.5 to 3.5 feet in depth. These surficial soils are not suitable in their current condition for bearing support. Refer to Figure Nos. IIIa-IIIg and Figure No. IV for details.

Slopewash (Qsw): The slopewash soils overlying the medium- to coarse-grained marine terrace sands consist of gray-brown, poorly cemented, coarse-grained sand. They are generally in a loose to medium dense, damp condition and range to approximately 2.5 feet in depth. These slopewash soils are not suitable in their current condition for bearing support. Refer to Figure Nos. IIIa-IIIg and Figure No. IV for details.

Marine Terrace Deposits: The horizontally bedded marine and overlying slopewash sediments exposed in the exploratory trenches and handpits are believed to be a previously unmapped marine terrace on a northerly sloping wave cut platform with basal elevations ranging from 165 feet above MSL to the north, to 172 feet above MSL to the south at the topographic break in slope along the south side of Soledad Avenue. This finding is based on the horizontal nature of bedding, lithologic and depositional characteristics, and survey data on ground surface and wave cut platform elevations.

Colluvial and slopewash soils deposited on and at the base of steep slopes in the Mount Soledad area of La Jolla tend to be a chaotic mixture of dark brown organic sandy clays and cobbles with no discernible bedding. If depositional or bedding features are present, they are usually inclined in the direction of material transport and roughly parallel to the hillside slopes. Marine terrace sediments, on the other hand, are typically deposited in a shallow water environment on wave cut platforms and are laid down relatively horizontal. Slopewash deposits directly overlying the marine terrace sands contain localized anomalous accumulations of gravel and cobble with steeply inclined bedding discontinuities. These stratigraphic features appear to represent localized high-energy deposition of terrestrial sediments into the relatively low energy distal end of the slopewash deposits (i.e., a channel deposit or debris flow). This conclusion is supported by the presence of laminea and thinly bedded sands deposited below, against, and above gravel and cobble accumulations. The subject property is located only a few hundred feet north of a well-defined topographic break where the northern flank of Mount Soledad steepens significantly as it rises to the south. It is, therefore, reasonable to expect periodic high-energy mud or debris flow deposits to be contained within the relatively horizontally bedded distal end slopewash deposits.

The medium to coarse-grained, laminated and thinly bedded relatively unweathered terrace sands are essentially flat-lying, with long, continuous bedding sequences.

The discontinuity between the overlying, coarse-grained slopewash units and the lower medium- to coarse-grained marine terrace sands is laterally continuous and is traceable as a knife-edge, horizontal depositional feature.

The Cretaceous-age Point Loma Formation (Kp) was found to underlie the marine terrace sands. The contact between the Point Loma Formation and the terrace sand slopes very gently to the west, suggesting the marine terrace sands were deposited on a wave-cut platform comprised of the Cretaceous Point Loma Formation. The terrace sand unit is approximately 10 to 12 feet thick.

The marine terrace sand bedding is defined by grain size, varying degrees of fine sediment cementation, retained moisture differentials controlled by grain size and fines content, and occasionally, dark mineral concentrations or iron oxide staining.

Point Loma Formation (Kp): The Cretaceous-age Point Loma Formation underlies the site at depth. It is depicted on the geologic map of the La Jolla Quadrangle (Kennedy, 1975) as underlying this general area of La Jolla. It is comprised of massive shale and sandstone.

B. ***Structure***

The Cretaceous-age Point Loma Formation (Kp) underlies the site. Review of pertinent geologic maps (Kennedy, 1975, refer to Figure No. VI), and observations within our exploratory trench, indicate that the silty sandstone of the Point Loma Formation displays a generally northwest dipping orientation (i.e., approximately 35 to 50 degrees as indicated within our exploratory trench).

VII. GEOLOGIC HAZARDS

The following is a discussion of the geologic conditions and hazards common to the La Jolla area of the City of San Diego, as well as project-specific geologic information relating to development of the subject property.

A. Local and Regional Faults

The City of San Diego Seismic Hazards Maps (1995), and the Geologic Map of the La Jolla Quadrangle (Kennedy, 1975) indicate the site lies partially within an Alquist-Priolo Earthquake Fault Rupture Hazard Zone (A-P Zone) and entirely within Zone 12, defined in the City of San Diego Seismic Safety Study as being within approximately 100 feet of a potentially active fault. Refer to Figure Nos. VIIa and VIIb.

Rose Canyon Fault Zone: The fault within the A-P Zone is identified as the Mount Soledad Fault that is believed to represent the principal Holocene strand of the Rose Canyon Fault Zone (Treiman, 1993). The Rose Canyon Fault Zone is considered to be a complex zone of onshore and offshore, en echelon strike slip, oblique reverse, and oblique normal faults. The Rose Canyon Fault is considered to be capable of causing a 6.9-magnitude earthquake and considered microseismically active, although no significant recent earthquake is know to have occurred on the fault. Investigative work on fault exposures downtown, within San Diego Bay, and at the SDG&E facility in Rose Canyon, has encountered offsets in Holocene (geologically recent) sediments. These findings confirm Holocene displacement on the Rose Canyon Fault and this fault is designated an "active" fault per State of California definitions as of November 1991 (California Division of Mines and Geology -- Fault Rupture Hazard Zones in California, 1999). The on-shore portion of this fault extends from the La Jolla Shores area on the north to Rose Canyon and the northeast corner of Mission Bay where it joins other faults of the Rose Canyon system. Near the crest of Mount Soledad to the southeast of the site, the fault displays geomorphic evidence of Holocene activity such as side hill benches and deflected drainages, and possible scarps in alluvium of Rose Creek (Treiman, 1993). Mapping by Kennedy (1975) indicates a splay of the Mount Soledad Fault extends westerly from the vicinity of Lookout Drive to the coast near Goldfish Point. This fault splay, zoned as a potentially active fault on the Seismic Safety Maps of the City of San Diego, is depicted as passing across the northwest corner of the two-lot property. Recent fault investigations by Murbach (1999) suggest the Mount Soledad Fault actually lies approximately 300 to 400 feet to the north in the vicinity of Boulevard Place and Roseland Drive.

Because of the possibility of the site being located on or within an active or potentially active fault zone, two exploratory fault trenches were excavated on the site in the locations shown on Figure No. II. The trenches were aligned in a northeast-southwest direction in order to intersect the postulated location of the northwest/southeast-trending fault or shear zone. Detailed geologic logging of the trenches indicated no evidence of faulting on-site. Trench T-1, trending N10°E and located in the northwest portion of the site, encountered approximately 2 to 4 feet of fill and sandy topsoil over 1 to 2 feet of marine terrace deposits over the dense sandy Point Loma formational materials. Trench T-2, trending N10°E and located in the northwest portion of the property, encountered 2 to 3 feet of fill over sandy slopewash and marine terrace materials.

Based on the results of our investigation, it is our opinion that no evidence of faulting was encountered on the subject site.

Coronado Bank Fault: The Coronado Bank Fault is located approximately 12 miles southwest of the site. Evidence for this fault is based upon geophysical data (acoustic profiles) and the general alignment of epicenters of recorded seismic activity (Greene, 1979). The Oceanside earthquake of 5.3 magnitude, recorded

July 13, 1986, is known to have been centered on the fault or within the Coronado Bank Fault Zone. Although this fault is considered active, due to the seismicity within the fault zone, it is significantly less active seismically than the Elsinore Fault (Hileman, 1973). It is postulated that the Coronado Bank Fault is capable of generating a 7.0-magnitude earthquake and is of great interest due to its close proximity to the greater San Diego metropolitan area.

Elsinore Fault: The Elsinore Fault is located approximately 38 to 56 miles east and northeast of the site. The fault extends approximately 200 km (125 miles) from the Mexican border to the northern end of the Santa Ana Mountains. The Elsinore Fault zone is a 1- to 4-mile-wide, northwest-southeast-trending zone of discontinuous and en echelon faults extending through portions of Orange, Riverside, San Diego, and Imperial Counties. Individual faults within the Elsinore Fault Zone range from less than 1 mile to 16 miles in length. The trend, length and geomorphic expression of the Elsinore Fault Zone identify it as being a part of the highly active San Andreas Fault system.

Like the other faults in the San Andreas system, the Elsinore Fault is a transverse fault showing predominantly right-lateral movement. According to Hart, et al. (1979), this movement averages less than 1 centimeter per year. Along most of its length, the Elsinore Fault Zone is marked by a bold topographic expression consisting of linearly aligned ridges, swales and hallows. Faulted Holocene alluvial deposits (believed to be less than 11,000 years old) found along several segments of the fault zone suggest that at least part of the zone is currently active.

Although the Elsinore Fault Zone belongs to the San Andreas set of active, northwest-trending, right-slip faults in the southern California area (Crowell, 1962), it has not been the site of a major earthquake in historic time, other than a 6.0-magnitude quake near the town of Elsinore in 1910 (Richter, 1958; Toppozada and Parke, 1982). However, based on length and evidence of late-Pleistocene or

Holocene displacement, Greensfelder (1974) has estimated that the Elsinore Fault Zone is reasonably capable of generating an earthquake with a magnitude as large as 7.5. Faulting evidence exposed in trenches placed in Glen Ivy Marsh across the Glen Ivy North Fault (a strand of the Elsinore Fault Zone between Corona and Lake Elsinore), suggest a maximum earthquake recurrence interval of 300 years, and when combined with previous estimates of the long-term horizontal slip rate of 0.8 to 7.0 mm/year, suggest typical earthquake magnitudes of 6 to 7 (Rockwell, 1985).

B. ***Other Geologic Hazards***

Ground Rupture: Ground rupture is characterized by bedrock slippage along an established fault and may result in displacement of the ground surface. For ground rupture to occur along a fault, an earthquake usually exceeds magnitude 5.0. If a 5.0-magnitude earthquake were to take place on a local fault, an estimated surface-rupture length 1 mile long could be expected (Greensfelder, 1974). Our investigation revealed that the subject site is not directly on a known fault trace and, therefore, the risk of ground rupture is remote.

Ground Shaking: Structural damage caused by seismically induced ground shaking is a detrimental effect directly related to faulting and earthquake activity. Ground shaking is considered to be the greatest seismic hazard in San Diego County. The intensity of ground shaking is dependent on the magnitude of the earthquake, the distance from the earthquake, and local seismic conditions. Earthquakes of magnitude 5.0 Richter scale or greater are generally associated with significant damage. It is our opinion that the most serious damage to the site would be caused by a large earthquake originating on the Rose Canyon Fault Zone. Although the chance of such an event is remote, it could occur within the useful life of the structure. The anticipated ground accelerations from earthquakes on faults within 100 miles of the site are provided in Appendix B.

Landslides: Review of the City of San Diego Seismic Safety Study -- Geologic Hazards Map indicates that the site is located within Category 27 which refers to terrain *"underlain by a slide-prone geologic formation."* Based upon our geologic investigation and a review of the geologic map (Kennedy, 1975) and aerial photographs (4-11-53, AXN-8M-1 and 2), there are no known or suspected ancient landslides located on the site.

Slope Stability: Given that the existing slopes on the site and in the general vicinity appear to have performed well to date, it is our opinion that sufficient near-surface slope stability exists in the building pad area as presently planned. We have evaluated the existing slopes in the rear yard area, with respect to their general gross stability and the influence the proposed development of the site may have on that stability.

Based upon the present slope configurations, results of the laboratory analyses, the existing hillside topography and the geologic structure as we understand it, it appears that the hillside should be grossly stable and should not be adversely affected by the planned development of the site. However, the site-specific surface fill/slopewash soils are loose and will require removal and recompaction within the building pad and improvement areas. Proposed slopes should be landscaped or protected by some type of landscape retaining wall or erosion control devise to reduce the potential for surface failure. Any new foundations located near the top of slopes shall be deepened to satisfy the referenced daylight requirement.

Since no clear evidence of recent or historic landsliding or deep-seated slope instability was found at the site, the risk of deep landsliding is considered low. An evaluation of the regional ancient landslide mass is beyond the scope of this investigation.

Given the site is underlain by dense, unbroken, marine terrace materials and the existing slopes on the site appear to have performed relatively well, it is our opinion that the building pad area, in general, is relatively stable and that the factor of safety against deep-seated failure would exceed 1.5.

Liquefaction: The liquefaction of saturated sands during earthquakes can be a major cause of damage to buildings. Liquefaction is the process in which soils are transformed into a dense fluid that will flow as a liquid when unconfined. It occurs principally in loose, saturated sands and silts when they are shaken by an earthquake. These types of sands do not exist on the subject lot.

On this site, the risk of liquefaction of foundation material due to seismic shaking is considered to be remote due to the dense nature of the natural-ground material and the lack of a shallow water table in this hillside area.

VIII. EARTHQUAKE RISK EVALUATION

Evaluation of earthquake risk requires that the effect of faulting on, and the mass stability of, a site be evaluated utilizing the M_{10} seismic design event (i.e., an earthquake event on an active fault with less than a 10 percent probability of being exceeded in 50 years). Further, sites are classified by the California Building Code (2001 edition) and the UBC 1997 Edition into "soil profile types S_A through S_F." Soil profile types are defined by their shear velocities where shear velocity is the speed at which shear waves move through the upper 30 meters (approximately 100 feet) of the ground. These are:

$S_A \Rightarrow$ Greater than 1500 m/s
$S_B \Rightarrow$ 760 m/s to 1500 m/s
$S_C \Rightarrow$ 360 m/s to 760 m/s
$S_D \Rightarrow$ 180 m/s to 360 m/s
$S_E \Rightarrow$ Less than 180 m/s
$S_F \Rightarrow$ Soil requiring specific soil evaluation

By utilizing an earthquake magnitude M_{10} for a seismic event on an active fault, knowing the site class and ground type, a prediction of anticipated site ground acceleration, g, from these events can be estimated. The subject site has been assigned Classification "S_C."

An estimation of the peak ground acceleration and the repeatable high ground acceleration (RHGA) likely to occur at the project site by the known significant local and regional faults within 100 miles of the site is also included in Appendix B. Also, a listing of the known historic seismic events that have occurred within 100 miles of the site at a magnitude of 5.0 or greater since the year 1800, and the probability of exceeding the experienced ground accelerations in the future based upon the historical record, is provided in Appendix C. Both Appendix B and Appendix C are tables generated from computer programs EQFault and EQSearch by Thomas F. Blake (1989) utilizing a digitized file of late-Quaternary California faults (EQFault) and a file listing of recorded earthquakes (EQSearch). Estimations of site intensity are also provided in these listings as Modified Mercalli Index values. The Modified Mercalli Intensity Index is provided as Appendix D.

It is our opinion that a known "active" fault presents the greatest seismic risk to the subject site during the lifetime of the proposed residence. To date, the nearest known "active" faults to the subject site are the northwest-trending Mt. Soledad Fault in the Rose Canyon Fault Zone, Coronado Bank Fault and the Elsinore Fault.

The owner should understand that there is some risk associated with any construction in the San Diego area due to the proximity of the Rose Canyon Fault, which is considered "active". The maximum probable repeatable horizontal ground acceleration (RHGA) anticipated is .31g. The maximum probable peak horizontal ground acceleration anticipated is .48g. The structural design shall be based on a site acceleration of 0.40g, which has a 10 percent probability of exceedance in 50 years.

Summary: It is our opinion, based upon a review of the available maps and our site investigation, that the site is underlain by relatively stable natural ground materials, and appears suited for the proposed residential construction. No significant geologic hazards are known to exist on the site that would prevent the proposed residential additions and improvements.

IX. GROUNDWATER

No groundwater was encountered during our field investigation and we do not expect significant problems to develop in the future -- if the property is developed as recommended herein and proper drainage is maintained. However, the potential does exist for a perched water condition to occur if rainwater and irrigation waters are allowed to infiltrate through surficial soils and encounter the less permeable formation, or flow beneath the structure along utility laterals if not properly sealed at footing penetration. Attempts must be made to prevent a perched water condition by providing proper surface drainage.

It should also be kept in mind that any required construction operations may change surface drainage patterns and/or reduce permeabilities due to the densification of compacted soils. Such changes of surface and subsurface hydrologic conditions, plus irrigation of landscaping or significant increases in rainfall, may result in the appearance of surface or near-surface water at locations where none existed previously. The damage from such water is expected to be localized and cosmetic in nature, if good positive drainage is implemented, as recommended in this report, during and at the completion of construction.

It must be understood, however, that unless discovered during initial site exploration or encountered during site construction operations, it is extremely difficult to predict if or where perched or true groundwater conditions may appear in the future. When site fill or formational soils are fine-grained and of low permeability, water problems may not become apparent for extended periods of time.

Even without the presence of free water, the capillary draw characteristics, especially of fine-grained soils such as at the site, can result in excessive transmission of water vapor through walls and floor slabs. In order to reduce the potential for moisture-related problems to develop, proper ventilation and waterproofing shall be provided for building retaining walls and slabs of below-grade areas.

Water conditions, where suspected or encountered during construction, should be evaluated and remedied by the project civil and geotechnical consultants. The project developer and homeowner, however, must realize that post-construction appearances of groundwater may have to be dealt with on a site-specific basis.

X. CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The following conclusions and recommendations are based upon the practical field investigation conducted by our firm, and resulting laboratory tests, in conjunction with our knowledge and experience with similar soils in the La Jolla area of the City of San Diego.

Our geotechnical investigation revealed that fill soils, slopewash and weathered terrace soils of varying compaction and of low expansion potential underlie the proposed addition area of the site to depths ranging from 1.5 feet to 3.5 feet. In their present condition, these surficial soils will not provide a stable soil base for the proposed new structure additions and improvements. As such, we recommend these soils be removed and recompacted as part of site preparation. Foundations for the proposed new structure additions and improvements shall be founded into the underlying medium dense terrace/formational materials or properly compacted fill soils.

Construction plans have not been provided to us for the preparation of this report, however, when completed they should be made available for our review. Additional or modified recommendations for foundation design and construction may be provided as warranted.

A. ***<u>Preparation of Soils for Site Development</u>***

1. *<u>Clearing and Stripping:</u>* Any existing structures and vegetation observed on the site for proposed additions or improvements should be removed prior to the preparation of the building pad and areas of associated improvements. This includes any roots from existing trees and shrubbery. Holes resulting from the removal of root systems or other buried obstructions that extend below the planned grades should be cleared and backfilled with properly compacted fill.

2. *<u>Treatment of Existing Fill Soils:</u>* In order to provide suitable foundation support for the proposed residence additions and associated improvements, we recommend that all existing fill soils, slopewash and weathered terrace deposits that remain after the necessary site excavations have been made be removed and recompacted. The recompaction work should consist of (a)

removing existing fill soils, slopewash and weathered terrace soils down to the native formational terrace deposit materials; (b) scarifying, moisture conditioning, and compacting the exposed natural subgrade soils; and (c) replacing the fill material as compacted structural fill. The areal extent and depth required to remove the surficial soils should be determined by our representatives during the excavation work based on their examination of the soils being exposed, but should be at least 5 feet beyond the edge of the perimeter foundations and any areas to receive exterior improvements. Any unsuitable materials (such as oversize rubble and/or organic matter) should be selectively removed as directed by our representative and disposed of off-site.

Any rigid improvements founded on the existing loose surface soils can be expected to undergo movement and possible damage. ***Geotechnical Exploration, Inc.*** takes no responsibility for the performance of any improvements built on loose natural soils or inadequately compacted fills. Any exterior area to receive concrete improvements should be verified for compaction and moisture within 48 hours prior to concrete placement.

3. *Subgrade Preparation:* After the site has been cleared, stripped, and the required excavations made, the exposed subgrade soils in areas to receive fill and/or building improvements should be scarified to a depth of 6 inches, moisture conditioned, and compacted to the requirements for structural fill.

4. *Expansive Soil Conditions:* If medium to highly expansive soils are encountered and used as fill, they should be scarified, moisture conditioned to at least 5 percent above Optimum Moisture content, compacted to at least 90 percent, mixed with on-site, low-expansive soils and preferably placed 4 feet below slab bottoms or outside building areas. Soils of medium or greater expansion potential should not be used as retaining wall backfill soils.

Retaining wall backfill soil is considered the material placed behind the retaining wall and on top of an inclined plane drawn at 30 degrees from vertical, starting at the heel of the wall to the ground surface. Formational soils that are medium expansive should be pre-moistened to 5 percent over optimum moisture content prior to concrete placement. Our field representative should verify the proper soil moisture content within 48 hours of concrete placement.

5. *Material for Fill:* All existing on-site soils with an organic content of less than 3 percent by volume are, in general, suitable for use as fill. Any required imported fill material should be a low-expansion potential (Expansion Index of 50 or less per ASTM D4829-98). In addition, both imported and existing on-site materials for use as fill should not contain rocks or lumps more than 6 inches in greatest dimension. All materials for use as fill should be approved by our firm prior to filling. Backfill material to be placed behind retaining walls should be low-expansive (EI less than 50) and with particles no larger than 3 inches in diameter.

6. *Fill Compaction:* All structural fill should be compacted to a minimum degree of compaction of 90 percent based upon ASTM D1557-98. Fill material should be spread and compacted in uniform horizontal lifts not exceeding 8 inches in uncompacted thickness. Before compaction begins, the fill should be brought to a water content that will permit proper compaction by either: (1) aerating the fill if it is too wet, or (2) moistening the fill with water if it is too dry. Each lift should be thoroughly mixed before compaction to ensure a uniform distribution of moisture. As previously indicated, clayey soils – where allowed – should have a moisture content at least 5 percent over optimum.

No uncontrolled fill soils should remain on the site after completion of the site work. In the event that temporary ramps or pads are constructed of uncontrolled fill soils, the loose fill soils should be removed and/or recompacted prior to completion of the grading operation.

7. *Trench and Retaining Wall Backfill:* All backfill soils placed in utility trenches or behind retaining walls should be compacted to at least 90 percent of Maximum Dry Density. Our experience has shown that even shallow, narrow trenches (such as for irrigation and electrical lines) that are not properly compacted, can result in problems, particularly with respect to shallow groundwater accumulation and migration. Backfill soils placed behind retaining walls and/or crawl space retaining walls should be installed as early as the retaining walls are capable of supporting lateral loads.

B. Design Parameters for Proposed Foundations

8. *Footings:* We recommend that the proposed residence additions be supported on conventional, individual-spread and/or continuous footing foundations bearing on undisturbed formational materials and/or well-compacted fill material. All footings should be founded at least 18 inches below the lowest adjacent finished grade. If the proposed footings are located closer than 8 feet inside the top of slopes, they should be deepened to 1½ feet below a line beginning at a point 8 feet horizontally inside the slopes and projected outward and downward, parallel to the face of the slope and into firm soils (see Figure No. VIII). Footings located adjacent to utility trenches should have their bearing surfaces situated below an imaginary 1.5:1.0 plane projected upward from the bottom edge of the adjacent utility trench. Otherwise, the trenches should be excavated farther from the footing locations.

At the recommended depths, footings may be designed for allowable bearing pressures of 2,500 pounds per square foot (psf) for combined dead and live loads and 3,300 psf for all loads, including wind or seismic. The footings should, however, have a minimum width of 12 inches. Any new footings inside the existing footprint or any footings to underpin the existing footprint should be deepened to bear into dense terrace material or bear in properly compacted fill.

All continuous footings should contain top and bottom reinforcement to provide structural continuity and to permit spanning of local irregularities. We recommend that a minimum of two No. 4 top and two No. 4 bottom reinforcing bars be provided in the footings. A minimum clearance of 3 inches should be maintained between steel reinforcement and the bottom or sides of the footing. Isolated square footings should contain, as a minimum, a grid of three No. 4 steel bars on 12-inch centers, both ways. In order for us to offer an opinion as to whether the footings are founded on soils of sufficient load bearing capacity, it is essential that our representative observe the footing excavations prior to the placement of reinforcing steel or concrete.

NOTE: The project Civil/Structural Engineer should review all reinforcing schedules. The reinforcing minimums recommended herein are not to be construed as structural designs, but merely as minimum reinforcement to reduce the potential for cracking and separations.

9. *Seismic Design Criteria:* Site-specific seismic design criteria to calculate the base shear needed for the design of the residential structure are presented in the following table. The design criteria was obtained from the California Building Code (2001 edition) and is based on the distance to the closest

active fault and soil profile classification. The closest active fault is approximately 300 feet from the site.

Parameter	Value	Reference
Seismic Zone Factor, Z	0.40	Table 16-I
Soil Profile Type	S_c	Table 16-J
Seismic Coefficient, C_a	$0.40N_a$	Table 16-Q
Seismic Coefficient, C_v	$0.56N_v$	Table 16-R
Near-Source Factor, N_a	1.3	Table 16-S
Near-Source Factor, N_v	1.6	Table 16-T
Seismic Source Type	B	Table 16-U

10. *Lateral Loads:* Lateral load resistance for the structure supported on footing foundations may be developed in friction between the foundation bottoms and the supporting subgrade. An allowable friction coefficient of 0.40 is considered applicable. An additional allowable passive resistance equal to an equivalent fluid weight of 300 pounds per cubic foot acting against the foundations may be used in design provided the footings are poured neat against the adjacent undisturbed formational terrace materials and/or compacted fill materials. These lateral resistance values assume a level surface in front of the footing for a minimum distance of three times the embedment depth of the footing and any shear keys.

11. *Settlement:* Settlements under building loads are expected to be within tolerable limits for the proposed residence additions. For footings designed in accordance with the recommendations presented in the preceding paragraphs, we anticipate that total settlements should not exceed 1 inch and that post-construction differential angular rotation should be less than 1/240.

C. ***Concrete Slab-on-grade Criteria***

12. *Minimum Floor Slab Reinforcement:* Based on our experience, we have found that, for various reasons, floor slabs occasionally crack, causing brittle surfaces such as ceramic tiles to become damaged. Therefore, we recommend that all slabs-on-grade contain at least a minimum amount of reinforcing steel to reduce the separation of cracks, should they occur.

    12.1 Interior floor slabs should be a minimum of 4 inches actual thickness and be reinforced with No. 3 bars on 18-inch centers, both ways, placed at midheight in the slab. *The slabs should be underlain by a 2-inch-thick layer of clean sand (S.E. = 30 or greater) overlying a moisture retardant membrane over 2 inches of sand.* Slab subgrade soil should be verified by a ***Geotechnical Exploration, Inc.*** representative to have the proper moisture content within 48 hours prior to placement of the vapor barrier and pouring of concrete.

    12.2 Following placement of any concrete floor slabs, sufficient drying time must be allowed prior to placement of floor coverings. Premature placement of floor coverings may result in degradation of adhesive materials and loosening of the finish floor materials.

13. *Concrete Joints:* We recommend the project Civil/Structural Engineer incorporate isolation joints and sawcut control joints to at least one-fourth the thickness of the slab in any floor designs. The joints and cuts, if properly placed, should reduce the potential for and help control floor slab cracking. We recommend that concrete shrinkage joints be spaced no farther than approximately 20 feet apart, and also at re-entrant corners. However, due to a number of reasons (such as base preparation, construction techniques,

curing procedures, and normal shrinkage of concrete), some cracking of slabs can be expected.

14. *Slab Moisture Emission:* Soil moisture vapor can result in damage to moisture-sensitive floors, some floor sealers, or sensitive equipment in direct contact with the floor, in addition to mold and staining on slabs, walls and carpets.

The common practice in Southern California is to place vapor retarders made of PVC, or of polyethylene. PVC retarders are made in thickness ranging from 10- to 60-mil. Polyethylene retarders, called visqueen, range from 5- to 10-mil in thickness. The thicker the plastic, the stronger the resistance will be against puncturing.

Although polyethylene (visqueen) products are commonly used, products such as Vaporshield possess higher tensile strength and are more specifically designed for and intended to retard moisture transmission into concrete slabs. The use of Vaporshield or equivalent is highly recommended when a structure is intended for moisture-sensitive floor coverings or uses.

14.1 Vapor retarder joints must be lapped and sealed with mastic or the manufacturer's recommended tape. To provide protection of the moisture retarder, a layer of at least 2 inches of clean sand on top and 2 inches at the bottom should also be provided. No heavy equipment, stakes or other puncturing instruments should be used on top of the liner before or during concrete placement. In actual practice, stakes are often driven through the retarder material, equipment is dragged or rolled across the retarder, overlapping or jointing is not properly implemented, etc. All these construction deficiencies reduce the retarder's effectiveness.

14.2 The vapor retarders are not waterproof. They are intended to help prevent or reduce vapor transmission and capillary migration through the soil into the pores of concrete slabs. Waterproofing systems must supplement vapor retarders if full waterproofing is desired. The owner should be consulted to determine the specific level of protection required.

15. *Exterior Slab Reinforcement:* As a minimum for protection of on-site improvements, we recommend that all nonstructural concrete slabs (such as patios, sidewalks, etc.), be at least 4 inches thickness and founded on properly compacted and tested fill or dense native formation and underlain by no more than 3 inches of clean leveling sand, with No. 3 bars at 18-inch centers, both ways, at the center of the slab, and contain adequate isolation and control joints. The performance of on-site improvements can be greatly affected by soil base preparation and the quality of construction. It is therefore important that all improvements are properly designed and constructed for the existing soil conditions. The improvements should not be built on loose soils or fills placed without our observation and testing.

For exterior slabs with the minimum shrinkage reinforcement, control joints should be placed at spaces no farther than 15 feet apart or the width of the slab, whichever is less, and also at re-entrant corners. Control joints in exterior slabs should be sealed with elastomeric joint sealant. The sealant should be inspected every 6 months and be properly maintained.

D. ***Slopes***

16. *Permanent Slopes*: Any new cut or fill slopes should be constructed at an inclination of 2.0:1.0 (horizontal to vertical). Based on the anticipated geometry and strength of the recompacted fill and formation, it is our opinion

that the calculated factor of safety for gross and shallow slope stability of the on-site soils will be at least 1.5.

17. *Temporary Slopes*: A representative of ***Geotechnical Exploration, Inc.*** must observe any steep temporary slopes ***during construction***. In the event that soils and formational material comprising a slope are not as anticipated, any required slope design changes would be presented at that time. Temporary slopes in dense formational soils or properly compacted fill may be cut vertical up to 4 feet in the lower portion of the slope and at 1.0:1.0 (horizontal to vertical) in the upper part of an excavation not exceeding 14 feet in height. This assumes no surcharge loads are applied within 10 feet from the top of the cut edge. Temporary slope conditions should be re-evaluated by our firm after 28 days.

    Where not superseded by specific recommendations presented in this report, trenches, excavations and temporary slopes at the subject site should be constructed in accordance with Title 8, Construction Safety Orders, issued by Cal-OSHA.

18. *Slope Top/Face Performance:* The soils that occur in close proximity to the top or face of even properly compacted fill or dense natural ground cut slopes often possess poor lateral stability. The degree of lateral and vertical deformation depends on the inherent expansion and strength characteristics of the soil types comprising the slope, slope steepness and height, loosening of slope face soils by burrowing rodents, and irrigation and vegetation maintenance practices, as well as the quality of compaction of fill soils. Structures and other improvements could suffer damage due to these soil movement factors if not properly designed to accommodate or withstand such movement. Permanent slopes may be graded at a 2.0:1.0 slope ratio

and the factor of safety against deep and shallow potential failures will be 1.5 or higher.

19. *Slope Top Structure Performance:* Rigid improvements such as top-of-slope walls, columns, decorative planters, concrete flatwork, swimming pools and other similar types of improvements can be expected to display varying degrees of separation typical of improvements constructed at the top of a slope. The separations result primarily from slope top lateral and vertical soil deformation processes. These separations often occur regardless of being underlain by cut or fill slope material. Proximity to a slope top is often the primary factor affecting the degree of separations occurring.

Typical and to-be-expected separations can range from minimal to up to 1 inch or greater in width. In order to minimize the effect of slope-top lateral soil deformation, we recommend that the top-of-slope improvements be designed with flexible connections and joints in rigid structures so that the separations do not result in visually apparent cracking damage and/or can be cosmetically dressed as part of the ongoing property maintenance. These flexible connections may include "slip joints" in wrought iron fencing, evenly spaced vertical joints in block walls or fences, control joints with flexible caulking in exterior flatwork improvements, etc.

In addition, use of planters to provide separation between top-of-slope hardscape such as patio slabs and pool decking from top-of-slope walls can aid greatly in reducing cosmetic cracking and separations in exterior improvements. Actual materials and techniques would need to be determined by the project architect or the landscape architect for individual properties. Steel dowels placed in flatwork may prevent noticeable vertical differentials, but if provided with a slip-end they may still allow some lateral displacement.

E. Retaining Wall Design Criteria

20. *Design Parameters – Unrestrained:* The active earth pressure (to be utilized in the design of any cantilever retaining walls, utilizing imported very low- to low-expansive soils [EI less than 50] as backfill) should be based on an *Equivalent Fluid Weight* of **38** pounds per cubic foot (for level backfill only).

21. *Design Parameters – Restrained:* Retaining walls designed for a restrained condition should utilize a uniform pressure equal to 9xH (nine times the total height of retained soil, considered in pounds per square foot) considered as acting everywhere on the back of the wall ***in addition to the design Equivalent Fluid Weight***. The soil pressure produced by any footings, improvements, or any other surcharge placed within a horizontal distance equal to the height of the retaining portion of the wall should be included in the wall design pressure. The recommended lateral soil pressures are based on the assumption that no loose soils or soil wedges will be retained by the retaining wall. Backfill soils should consist of low-expansive soils with EI less than 50, and should be placed from the heel of the foundation to the ground surface within the wedge formed by a plane at 30° from vertical, and passing by the heel of the foundation and the back face of the retaining wall.

22. *Surcharge Loads:* Any loads placed on the active wedge behind a cantilever wall should be included in the design by multiplying the load weight by a factor of 0.32. For a restrained wall, the lateral factor shall be 0.52.

23. *Wall Drainage:* Proper subdrains and free-draining backwall material or board drains (such as J-drain or Miradrain) shall be installed behind all retaining walls (in addition to proper waterproofing) on the subject project (see Figure No. VIII). ***Geotechnical Exploration, Inc.*** will assume no liability for damage to structures or improvements that is attributable to poor

drainage. The architectural plans should clearly indicate that subdrains for any lower-level walls be placed at an elevation at least 1 foot below the bottom of the lower-level slabs. At least 0.5-percent gradient should be provided to the subdrain. The subdrain should be placed in an envelope of crushed rock gravel up to 1 inch in maximum diameter, and be wrapped with Mirafi 140N filter or equivalent.

F. Site Drainage Considerations

24. *Surface Drainage:* Adequate measures should be taken to properly finish-grade the lot after the residence and other improvements are in place. Drainage waters from this site and adjacent properties should be directed away from the footings, floor slabs, and slopes, onto the natural drainage direction for this area or into properly designed and approved drainage facilities provided by the project civil engineer. Roof gutters and downspouts should be installed on the residence, with the runoff directed away from the foundations via closed drainage lines. Proper subsurface and surface drainage will help minimize the potential for waters to seek the level of the bearing soils under the footings and floor slabs. Failure to observe this recommendation could result in undermining and possible differential settlement of the structure or other improvements on the site or cause other moisture-related problems. Currently, the Uniform Building Code requires a minimum 2-percent surface gradient for proper drainage of building pads unless waived by the building official. Concrete pavement may have a minimum gradient of 0.5-percent.

    In addition, appropriate erosion control measures should be taken at all times during and after construction to prevent surface runoff waters from entering footing excavations or ponding on finished building pad areas.

25. *Planter Drainage:* Planter areas, flower beds and planter boxes should be sloped to drain away from the footings and floor slabs at a gradient of at least 5 percent within 5 feet from the perimeter walls. Any planter areas adjacent to the residence or surrounded by concrete improvements should be provided with sufficient area drains to help with rapid runoff disposal. No water should be allowed to pond adjacent to the residence or other improvements or anywhere on the site.

G. General Recommendations

26. *Project Start Up Notification:* In order to reduce work delays during site development, this firm should be contacted 24 hours prior to any need for observation of footing excavations or field density testing of compacted fill soils. If possible, placement of formwork and steel reinforcement in footing excavations should not occur prior to observing the excavations; in the event that our observations reveal the need for deepening or redesigning foundation structures at any locations, any formwork or steel reinforcement in the affected footing excavation areas would have to be removed prior to correction of the observed problem (i.e., deepening the footing excavation, recompacting soil in the bottom of the excavation, etc.)

XI. GRADING NOTES

Geotechnical Exploration, Inc. recommends that we be retained to verify the actual soil conditions revealed during site grading work and footing excavation to be as anticipated in this "*Report of Limited Geotechnical Investigation and Geologic* " for the project. In addition, the compaction of any fill soils placed during site grading work must be observed and tested by the soil engineer. It is the responsibility of the grading contractor to comply with the requirements on the grading plans and the local grading ordinance. All retaining wall and trench backfill should be properly compacted. ***Geotechnical Exploration, Inc.*** will assume no liability for damage occurring due to improperly or uncompacted backfill placed without our observations and testing.

XII. LIMITATIONS

Our conclusions and recommendations have been based on available data obtained from our field investigation and laboratory analysis, as well as our experience with similar soils and formational materials located in this area of San Diego. Of necessity, we must assume a certain degree of continuity between exploratory excavations and/or natural exposures. It is, therefore, necessary that all observations, conclusions, and recommendations be verified at the time grading operations begin or when footing excavations are placed. In the event discrepancies are noted, additional recommendations may be issued, if required. The work performed and recommendations presented herein are the result of an investigation and analysis that meet the contemporary standard of care in our profession within the County of San Diego. No warranty is provided.

This report should be considered valid for a period of two (2) years, and is subject to review by our firm following that time. If significant modifications are made to the building plans, especially with respect to the height and location of any proposed structures, this report must be presented to us for immediate review and possible revision.

It is the responsibility of the owner and/or developer to ensure that the recommendations summarized in this report are carried out in the field operations and that our recommendations for design of this project are incorporated in the structural plans. We should be retained to review the project plans once they are available, to see that our recommendations are adequately incorporated in the plans.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for the safety of personnel other than our own on the site; the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considered any of the recommended actions presented herein to be unsafe. The firm of ***Geotechnical Exploration, Inc.*** shall not be held responsible for changes to the physical condition of the property, such as addition of fill soils or changing drainage patterns, which occur subsequent to issuance of this report and the changes are made without our observations, testing, and approval.

Once again, should any questions arise concerning this report, please feel free to contact the undersigned. Reference to our **Job No. 05-8896** will expedite a reply to your inquiries.

Respectfully submitted,

GEOTECHNICAL EXPLORATION, INC.

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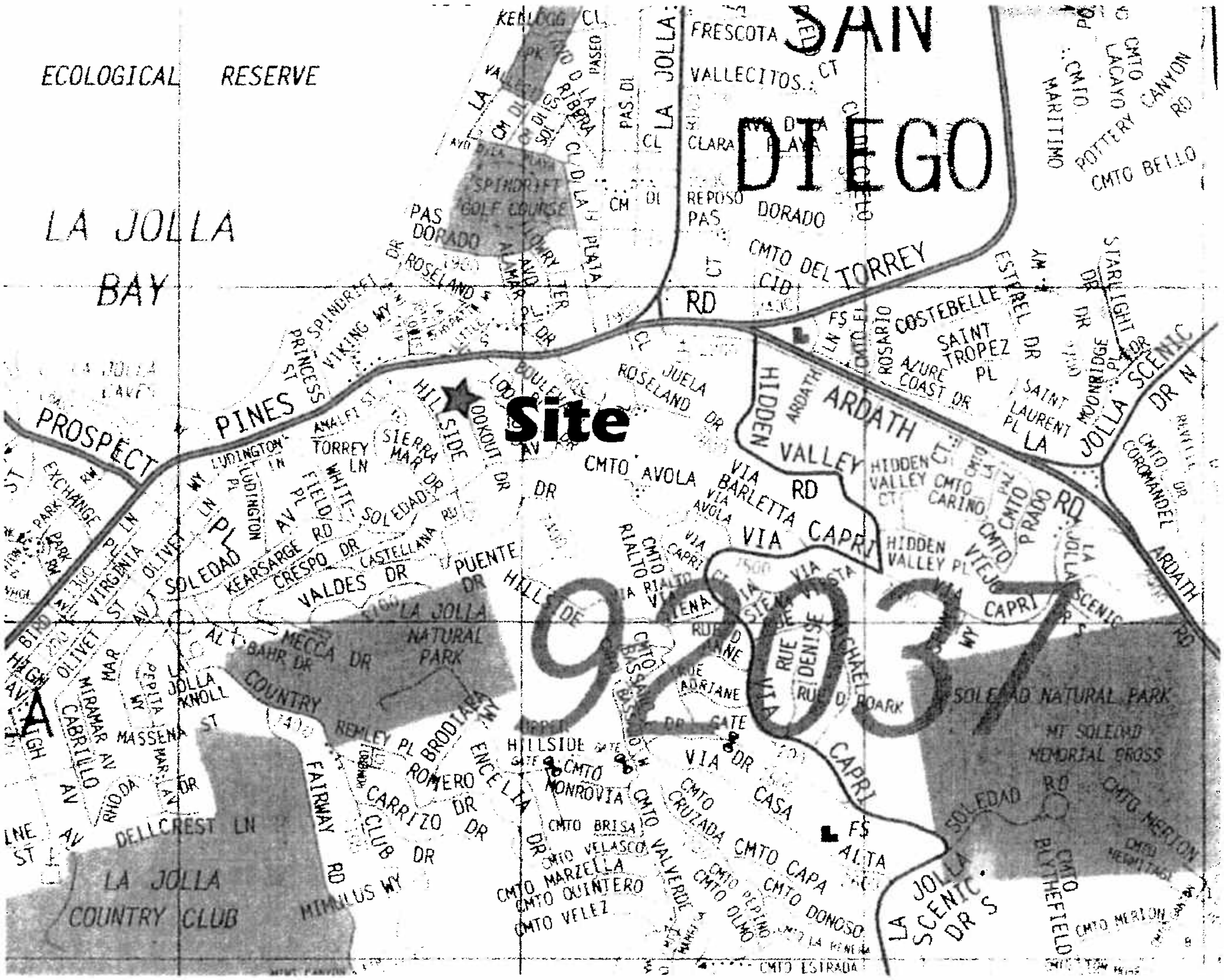
VICINITY MAP

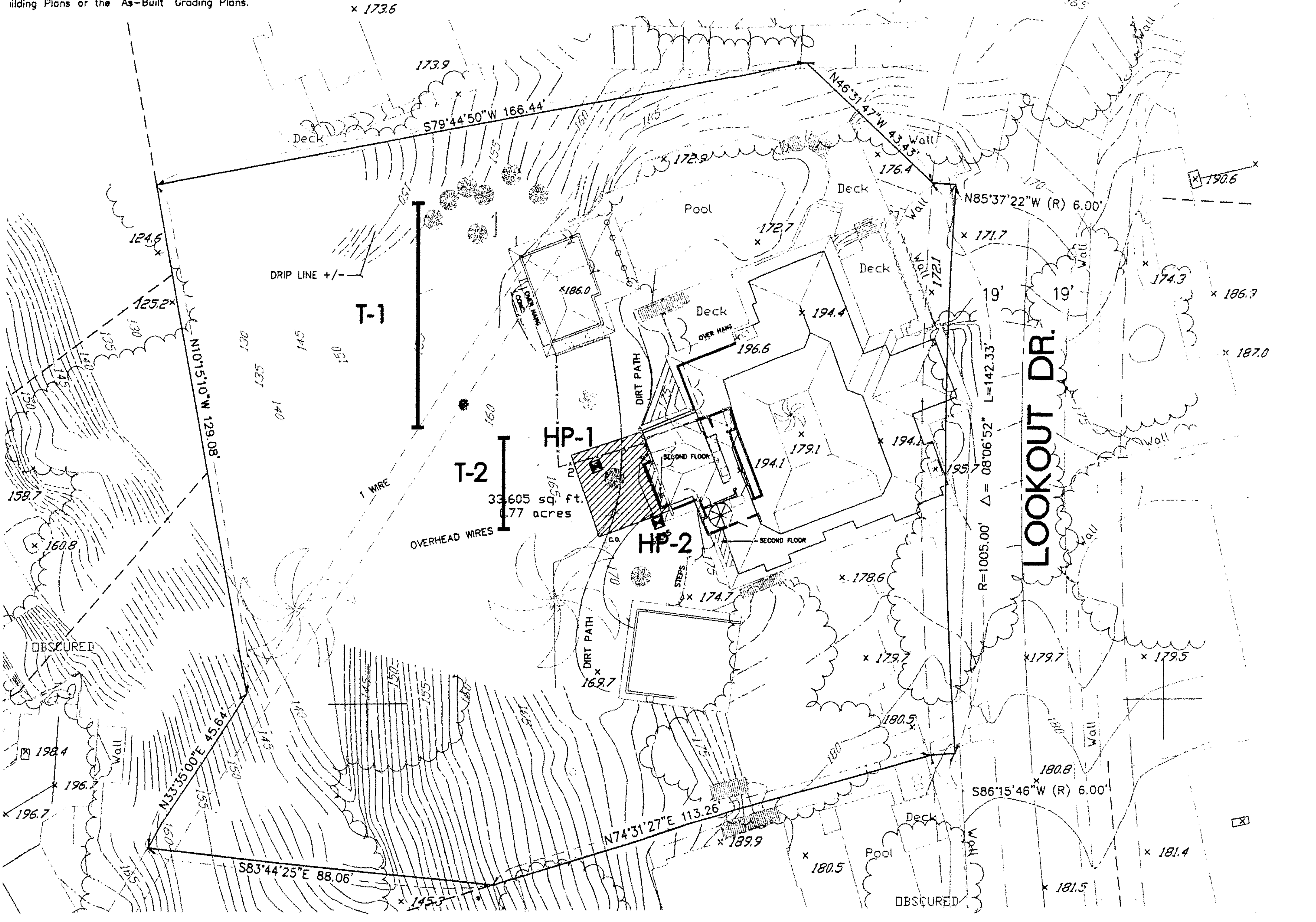


Thomas Bros. Guide San Diego County pg. 1227

Gotfredson Residence
7762 Lookout Drive
La Jolla, CA.

Figure No. I
Job No. 05-8877

ɔTE: This Plot Plan is not to be used for legal
rposes. Locations and dimensions are approxi–
ɔte. Actual property dimensions and locations
utilities may be obtained from the Approved
iilding Plans or the "As–Built" Grading Plans.



EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Tools, Hand Auger	**2' X 3' X 10' Handpit/ Auger Hole**	**1-31-05**
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
± 180' Mean Sea Level	**Not Encountered**	**JKH**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
			SILTY SAND, fine- to medium-grained; with some coarse rock fragments and abundant roots. Loose. Damp. Dark gray-brown.	SM								
			FILL (Qaf) – 10% passing #200 sieve.		5.6		9.0	131.0				
2			**SAND**, medium- to coarse-grained, poorly to moderately cemented. Medium dense. Damp. Tan-brown.	SM-SP								
			MARINE TERRACE									
4			Hand Auger from 4' to 10'.									
6												
8												
			– material becomes light tan-gray.									
10												
			Bottom @ 10'									

WATER TABLE
LOOSE BAG SAMPLE
IN-PLACE SAMPLE
DRIVE SAMPLE
FIELD DENSITY TEST
STANDARD PENETRATION

JOB NAME: **Gotfredson Residence Additions**		
SITE LOCATION: **7762 Lookout Drive, La Jolla, CA**		
JOB NUMBER: **05-8877**	REVIEWED BY: **LDR/JAC**	LOG No. **HP-1**
FIGURE NUMBER: **IIIa**	Geotechnical Exploration, Inc.	

EXPLORATION LOG 8877 GOTFREDSON.GPJ GEO_EXPL.GDT 4/12/05

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Tools, Hand Auger	2' X 3' X 9' Handpit/ Auger Hole	1-31-05
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
± 175' Mean Sea Level	Not Encountered	JKH

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
			SILTY SAND, fine- to medium-grained; with some coarse rock fragments and abundant roots. Loose. Damp. Dark gray-brown. **FILL (Qaf)**	SM								
2			**SAND**, medium- to coarse-grained, poorly cemented. Medium dense. Damp. Gray-brown. **FILL/ WEATHERED MARINE TERRACE (Qaf)**	SM-SP								
4 6 8			**SAND**, medium- to coarse-grained, poorly to moderately cemented. Medium dense. Damp. Tan-brown and orange. **MARINE TERRACE** Hand Auger from 5' to 10'. – material becomes orange-brown.	SM-SP								
10			Bottom @ 9'									

EXPLORATION LOG 8877 GOTFREDSON.GPJ GEO_EXPL.GDT 4/12/05

Legend			
WATER TABLE	JOB NAME: Gotfredson Residence Additions		
LOOSE BAG SAMPLE	SITE LOCATION: 7762 Lookout Drive, La Jolla, CA		
IN-PLACE SAMPLE	JOB NUMBER: 05-8877	REVIEWED BY: LDR/JAC	LOG No.
DRIVE SAMPLE		Geotechnical Exploration, Inc.	HP-2
FIELD DENSITY TEST	FIGURE NUMBER: IIIb		
STANDARD PENETRATION			

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Tools, Hand Auger	2' X 3' X 8' Handpit/ Auger Hole	1-31-05
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
	Not Encountered	JKH

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION — DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2			**SAND**, coarse-grained, poorly cemented. Medium dense. Damp. Gray-brown. **SLOPEWASH (Qsw)**	SP								
2–8			**SAND**, fine- to medium-grained, poorly to moderately cemented. Medium dense. Damp. Orange. **MARINE TERRACE**	SM-SP								
8			Bottom @ 8'									

Depth scale: 2, 4, 6, 8, 10

▼ WATER TABLE
☒ LOOSE BAG SAMPLE
[1] IN-PLACE SAMPLE
■ DRIVE SAMPLE
[S] FIELD DENSITY TEST
▨ STANDARD PENETRATION

JOB NAME		
Gotfredson Residence Additions		
SITE LOCATION		
7762 Lookout Drive, La Jolla, CA		
JOB NUMBER: 05-8877	REVIEWED BY: LDR/JAC	LOG No.
FIGURE NUMBER: IIIc	Geotechnical Exploration, Inc.	HP-3

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Tools, Hand Auger	2' X 3' X 7' Handpit/ Auger Hole	1-31-05
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
	Not Encountered	JKH

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION — DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2			**SAND**, coarse-grained, poorly cemented. Medium dense. Damp. Gray-brown. **SLOPEWASH (Qsw)**	SP								
2–7			**SAND**, fine- to medium-grained, poorly to moderately cemented. Medium dense. Damp. Orange. **MARINE TERRACE** – encountered very dense, tan-white **SAND** at bottom of excavation.	SM-SP								
7			Bottom @ 7'									

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9

EXPLORATION LOG 8877 GOTFREDSON.GPJ GEO_EXPL.GDT 4/12/05

WATER TABLE
LOOSE BAG SAMPLE
1 IN-PLACE SAMPLE
DRIVE SAMPLE
S FIELD DENSITY TEST
STANDARD PENETRATION

JOB NAME		
Gotfredson Residence Additions		
SITE LOCATION		
7762 Lookout Drive, La Jolla, CA		
JOB NUMBER: 05-8877	REVIEWED BY: LDR/JAC	LOG No.
FIGURE NUMBER: IIId	Geotechnical Exploration, Inc.	HP-4

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Tools, Hand Auger	2' X 3' X 4' Handpit/ Auger Hole	1-31-05
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
	Not Encountered	JKH

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION — DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2.5			**SAND**, coarse-grained, poorly cemented. Medium dense. Damp. Gray-brown. **SLOPEWASH (Qsw)**	SP								
2.5–4			**SAND**, fine- to medium-grained, poorly to moderately cemented. Dense. Damp. Tan-gray. **POINT LOMA FORMATION (Kp)**	SP								
4			Bottom @ 4'									

Depth scale: 1, 2, 3, 4, 5, 6, 7

▼ WATER TABLE
☒ LOOSE BAG SAMPLE
1 IN-PLACE SAMPLE
■ DRIVE SAMPLE
S FIELD DENSITY TEST
▨ STANDARD PENETRATION

JOB NAME		
Gotfredson Residence Additions		
SITE LOCATION		
7762 Lookout Drive, La Jolla, CA		
JOB NUMBER 05-8877	REVIEWED BY LDR/JAC	LOG No.
FIGURE NUMBER IIIe	GEI Geotechnical Exploration, Inc.	HP-5

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Tools	**2' X 3' X 3' Handpit/ Auger Hole**	**1-31-05**
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
	Not Encountered	**JKH**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2.5			**SAND**, coarse-grained, poorly cemented. Medium dense. Damp. Gray-brown. **SLOPEWASH (Qsw)**	SP								
2.5–3			**SAND**, fine- to medium-grained, poorly to moderately cemented. Dense. Damp. Tan-gray. **POINT LOMA FORMATION (Kp)**	SP								
			Bottom @ 3'									

Depth scale: 1, 2, 3, 4, 5

Legend			
WATER TABLE	JOB NAME **Gotfredson Residence Additions**		
LOOSE BAG SAMPLE	SITE LOCATION **7762 Lookout Drive, La Jolla, CA**		
IN-PLACE SAMPLE	JOB NUMBER **05-8877**	REVIEWED BY **LDR/JAC**	LOG No. **HP-6**
DRIVE SAMPLE	FIGURE NUMBER **IIIf**	Geotechnical Exploration, Inc.	
FIELD DENSITY TEST			
STANDARD PENETRATION			

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Hand Auger	6-inch diameter Auger Hole	1-31-05
SURFACE ELEVATION	GROUNDWATER/ SEEPAGE DEPTH	LOGGED BY
	Not Encountered	JKH

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2			**SAND**, coarse-grained, poorly cemented. Medium dense. Damp. Gray-brown. **FILL/ SLOPEWASH (Qaf/Qsw)**	SM-SP								
2–3			**SAND**, fine- to medium-grained, poorly to moderately cemented. Medium dense. Damp. Orange-brown. **MARINE TERRACE**	SM-SP								
3			Bottom @ 3'									

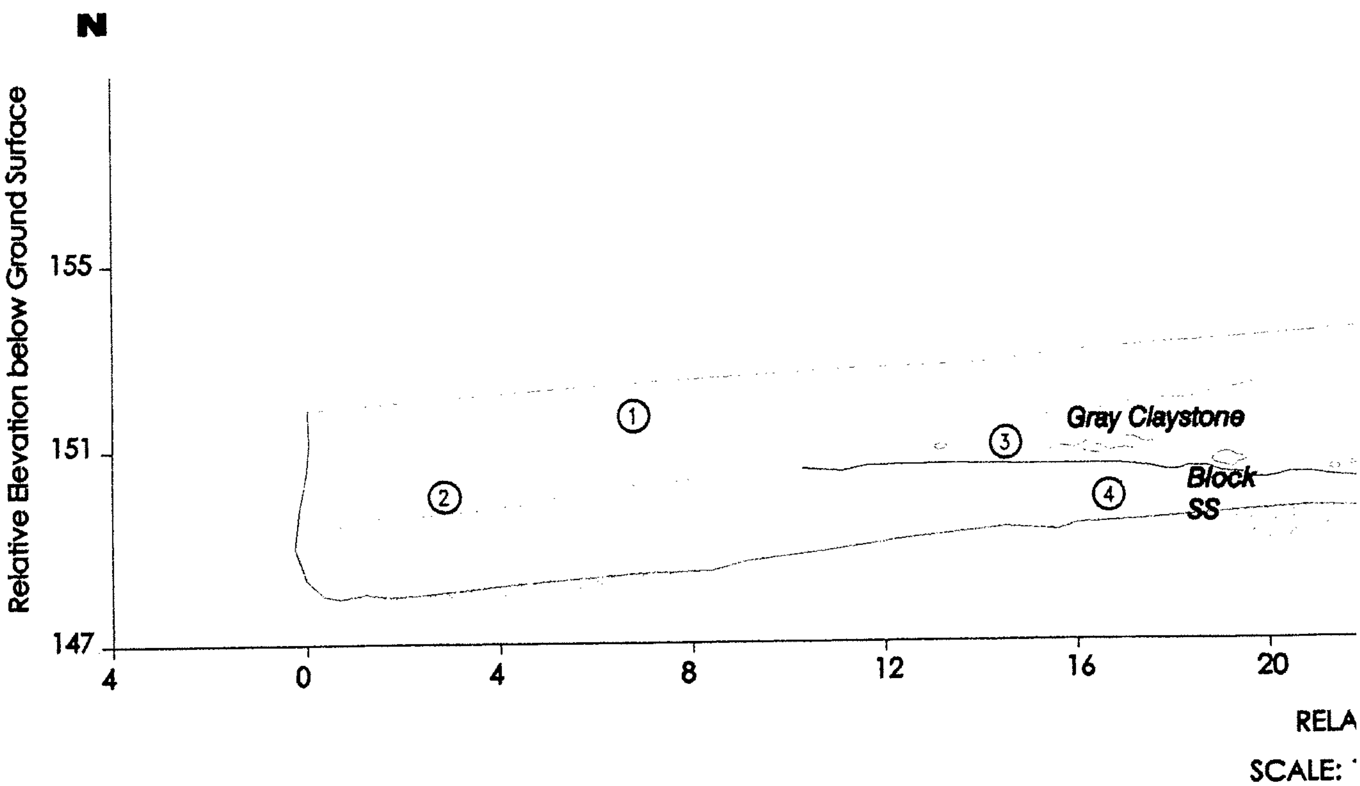
Depth scale: 1, 2, 3, 4, 5, 6

EXPLORATION LOG 8877 GOTFREDSON.GPJ GEO_EXPL.GDT 4/12/05

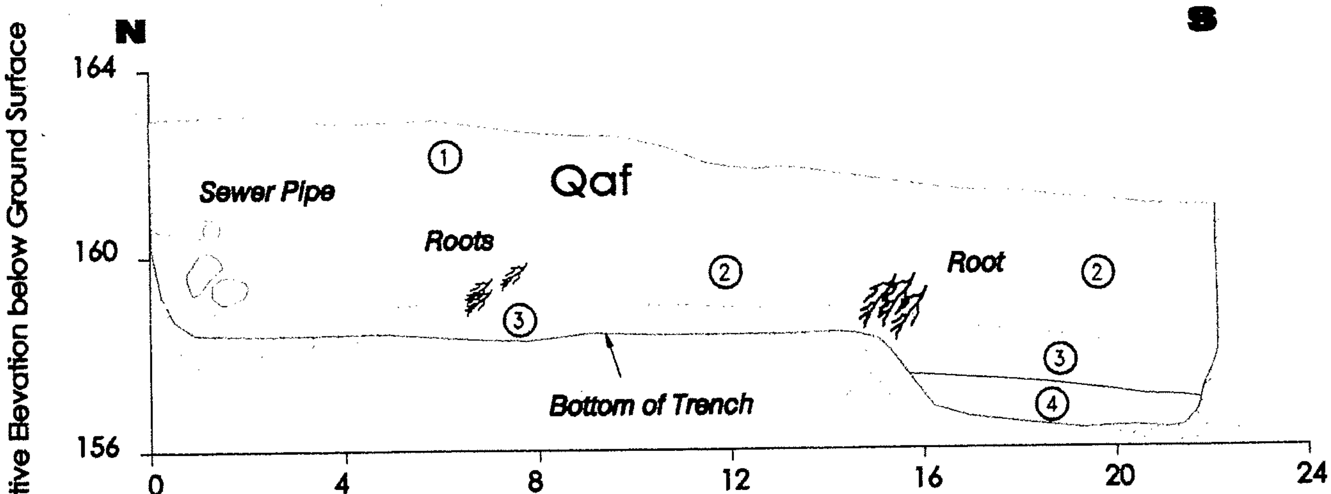
Legend	
▼	WATER TABLE
☒	LOOSE BAG SAMPLE
1	IN-PLACE SAMPLE
■	DRIVE SAMPLE
S	FIELD DENSITY TEST
▨	STANDARD PENETRATION

JOB NAME		
Gotfredson Residence Additions		
SITE LOCATION: 7762 Lookout Drive, La Jolla, CA		
JOB NUMBER: 05-8877	REVIEWED BY: LDR/JAC	LOG No.
FIGURE NUMBER: IIIg	Geotechnical Exploration, Inc.	**HA-1**

Gotfreds



T-2



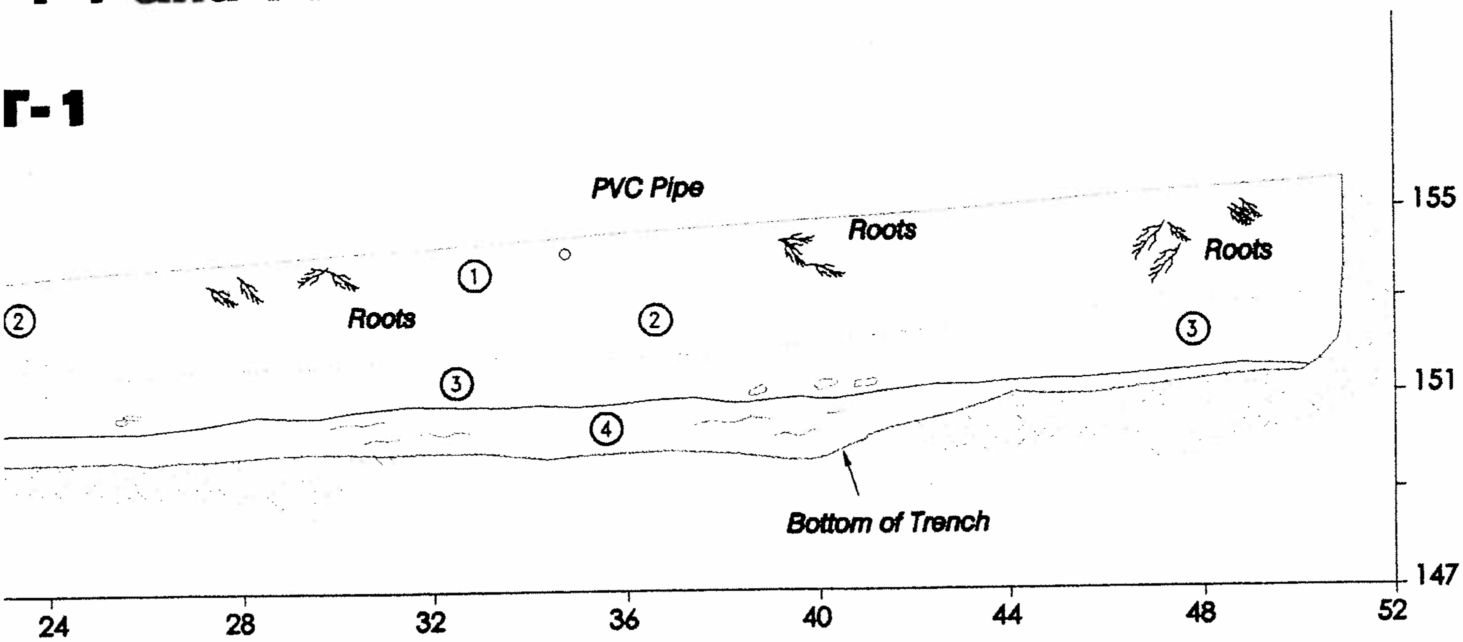
RELATIVE HORIZONTAL DISTANCE
SCALE: 1" = 4' (Horizontal and Vertical)

ı Fault Trench

T-1 and T-2

S

Γ-1



HORIZONTAL DISTANCE

: (Horizontal and Vertical)

Legend UNIT

---

① SAND, Fine–Coarse grained. Gray. (Qaf)

② SILTY SAND with roots, Fine–medium grained. Dark Brown. TOPSOIL

③ SILTY/CLAYEY SAND, Fine to Medium grained. Red–Brown. (Qt)

④ SILTY SAND, fine grained, micaceous and well cemented. Tan–gray. (Kp)

ȷend

) SILTY SAND, fine–grained, micaceous with roots and siltstone fragments. Yellow–Tan. (Qaf)

) SAND, medium–coarse grained, poorly cemented. Gray–brown. (Qsw)

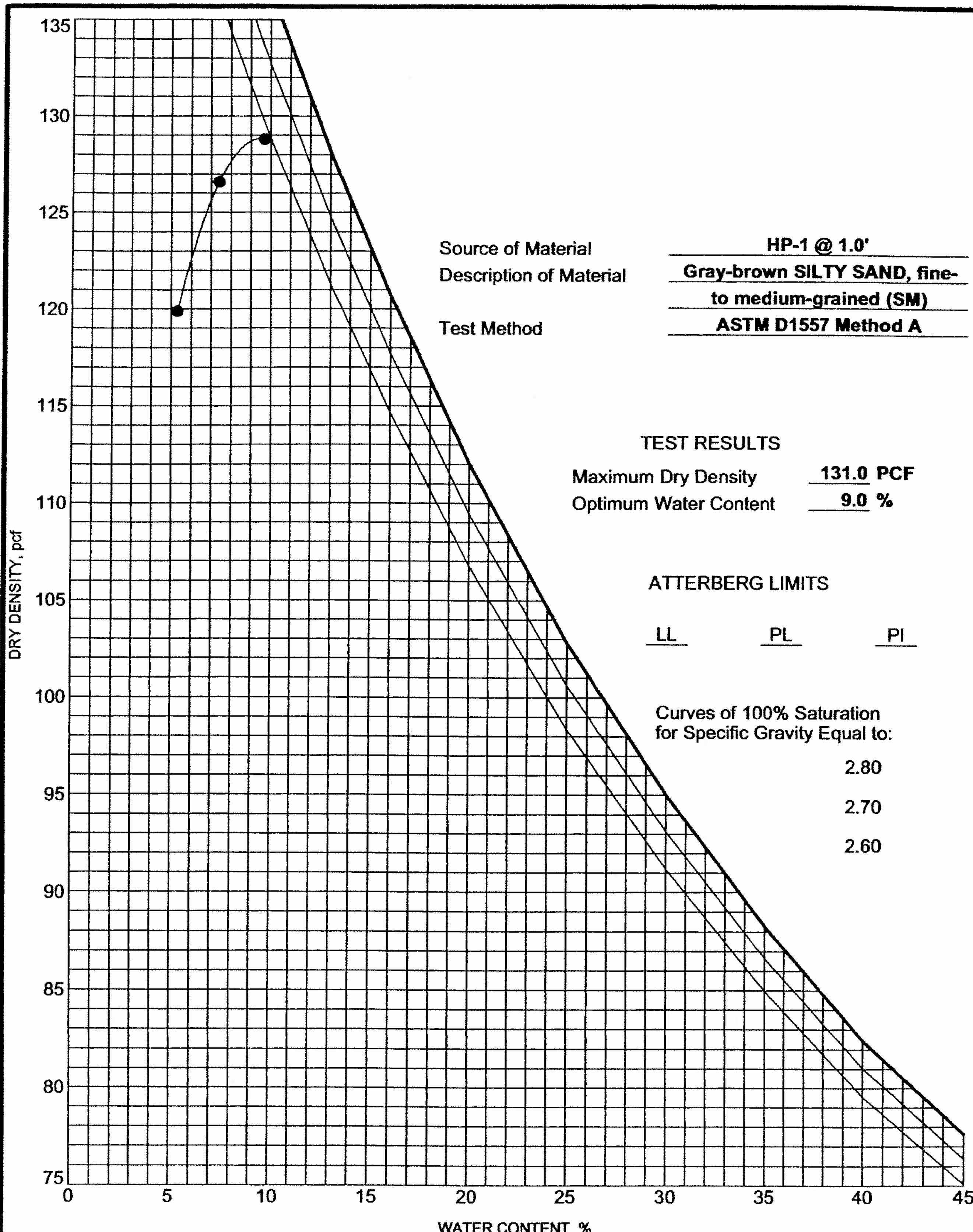
) SILTY/CLAYEY SAND, Fine–coarsed grained. Moderately cemented. Red–Brown. (Qt)

) Fine–coarse Sand, poorly cemented. Tan–gray. Tan–gray. (Qt)

Gotfredson Residence
7762 Lookout Drive
La Jolla, CA.
Figure No. V
Job No. 05-8877

Geotechnical Exploration, Inc.

April 2005



Source of Material	HP-1 @ 1.0'
Description of Material	**Gray-brown SILTY SAND, fine-to medium-grained (SM)**
Test Method	**ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **131.0 PCF**

Optimum Water Content **9.0 %**

ATTERBERG LIMITS

LL	PL	PI

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

US_COMPACTION 8877 GOTFREDSON.GPJ GEO_EXPL.GDT 4/12/05

Geotechnical Exploration, Inc.

MOISTURE-DENSITY RELATIONSHIP

Figure Number: IV

Job Name: Gotfredson Residence Additions

Site Location: 7762 Lookout Drive, La Jolla, CA

Job Number: 05-8877

APPENDIX I

REPORT OF FAULT INVESTIGATION,
EXISTING SINGLE-FAMILY RESIDENCE 7762 LOOKOUT DRIVE,
LA JOLLA, CALIFORNIA
(Appendix B not included)
CHRISTIAN WHEELER ENGINEERING, 2010

CHRISTIAN WHEELER
ENGINEERING

REPORT OF FAULT INVESTIGATION
EXISTING SINGLE-FAMILY RESIDENCE
7762 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

SUBMITTED TO

CLARA WU AND JOE TSAI
c/o JASON BERNARDO
PRUDENTIAL CALIFORNIA REALTY
1299 PROSPECT STREET
LA JOLLA, CALIFORNIA 92037

SUBMITTED BY

CHRISTIAN WHEELER ENGINEERING
3980 HOME AVENUE
SAN DIEGO, CALIFORNIA 92105

CHRISTIAN WHEELER
ENGINEERING

April 8, 2010

Clara Wu and Joe Tsai
c/o Jason Bernardo
Prudential California Realty
1299 Prospect Street
La Jolla, California 92037

CWE 2090707.03

SUBJECT: REPORT OF FAULT INVESTIGATION, EXISTING SINGLE-FAMILY RESIDENCE, 7762 LOOKOUT DRIVE, LA JOLLA, CALIFORNIA

Dear Mrs. Wu and Mr. Tsai,

In accordance with your request and our Proposal dated December 15, 2009 we have completed a preliminary fault investigation for the subject property. We are presenting herewith our findings and recommendations.

In general, the results of our study indicate that no active or potentially active faults underlie the subject site. Therefore, it is our opinion that the site is suitable for the proposed development and setback requirements from the proposed structure to active faults will not be required.

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,

CHRISTIAN WHEELER ENGINEERING

REGISTERED GEOLOGIST
DAVID R. RUSSELL
No. 2215
CERTIFIED
ENGINEERING
GEOLOGIST
Exp. 09-15
STATE OF CALIFORNIA

David R. Russell, CEG #2215
DRR:crb
cc: (5) Submitted

3980 Home Avenue ✦ San Diego, CA 92105 ✦ 619-550-1700 ✦ FAX 619-550-1701

CHRISTIAN WHEELER
ENGINEERING

REPORT OF FAULT INVESTIGATION

EXISTING SINGLE FAMILY RESIDENCE
7762 LOOKOUT DRIVE
LA JOLLA, CALIFORNIA

INTRODUCTION AND SCOPE

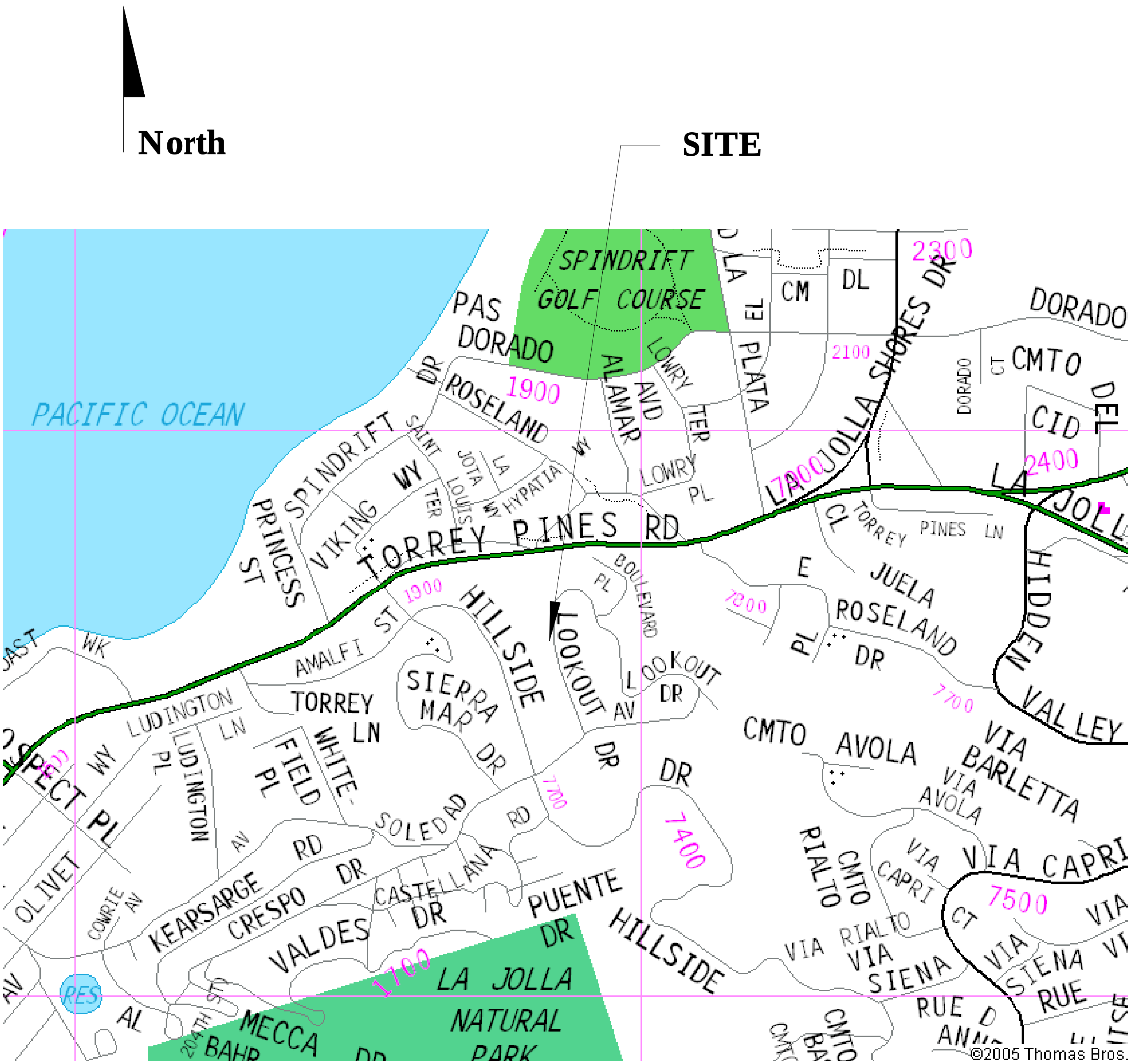
The subject site is located within the zone of influence of the active Rose Canyon Fault Zone. Additionally, the northern and northeastern portions subject site are located within the Alquist-Priolo Earthquake Fault Zone delineated in 1991 around the active Rose Canyon Fault Zone. The Alquist-Priolo Act requires that certain structures for human occupancy not be placed over faults that are considered capable of surface rupture. The Act defines “structure for human occupancy” as “any structure used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy of more than 2,000 person hours per year.” The Act requires affected counties and cities to regulate certain development “projects” within the zones and allows the affected cities and counties to establish policies and criteria that are stricter than those established by the State. The State has an exemption for single-family wood-frame dwellings not exceeding two stories when such dwellings are not part of a development of four or more structures and also for alterations or additions to existing structures when the value of the alteration or addition does not exceed 50 percent of the value of the structure.

The City of San Diego applies the Alquist-Priolo Act to almost all structures designed for human occupancy but does allow an exemption if the addition to an existing structure is less than 500 square feet. As such, the purpose of our fault study was to assess whether active faulting or potentially active faulting is present at the subject site as required by the City of San Diego as part of their land development process. The work was performed in accordance with the State of California Mining and Geology Board publications “Guidelines for Evaluating the Hazard of Surface Fault Rupture”, dated May 9, 1996.

SITE VICINITY MAP

(Adapted from Thomas Brothers Maps)

REPORT OF FAULT INVESTIGATION
7762 LOOKOUT DRIVE
LA JOLLA, CA



Our fault investigation included site visits by members of our engineering geology staff, a review of pertinent literature including previous fault studies performed at the subject site (GEI, 2005) and the adjacent parcel to the south (Hicks, 2008), subsurface exploration, and the preparation of this report that includes, in addition to our findings and conclusions, a site plan and logs of subsurface explorations.

To aid in the preparation of this report, we obtained copies of the various versions of the 200-scale topographic maps from the City of San Diego and reviewed available and pertinent geologic literature. We also received a copy of a Topographic Survey map of the subject site prepared by Pallamary and Associates that shows the configuration of the parcel and the existing site improvements. This map was used as the base for our Fault Trench Location Map included herein as Plate No. 1. In addition to our fault investigation, we have also completed a Report of Geologic Reconnaissance for the subject site and adjacent parcel to the south (7750 Lookout Drive) that has been submitted under separate cover (CWE 2090707.02).

GENERAL SITE CONDITIONS

SITE DESCRIPTION: The subject site consists of a residential parcel identified as Assessor's Parcel Number 352-010-19, located adjacent to and west of Lookout Drive in the La Jolla area of the City of San Diego. The site is also bounded to the north and west by similarly developed residential lots. The existing residence and improvements on the adjacent residential lot to the south (7750 Lookout Drive) are being razed to accommodate the construction of a new single-family residence on that lot. Topographically, the eastern and central portions of the site are relatively level with on-site elevations ranging from about 170 feet to 180 feet above Mean Sea Level (MSL). The western portion of the site is characterized by the eastern flank and a small portion of the western flank of a relatively natural, north draining canyon. Elevations within the western, canyon area of the site range from about 170 feet down to 140 feet (MSL). The lot currently supports a large, single-family residence with a guest home, swimming pool, garage, paved driveway, site walls, and other normally associated appurtenances. Vegetation across the upper, developed portions of the lot consists of typical residential landscaping with grass areas, shrubbery, and several medium to large trees scattered across the lot. During a brief reconnaissance of the existing improvements on-site, no features indicative of significant structural distress were noted. A site vicinity map is provided as Figure No. 1.

SITE HISTORY: A review of the photographs for available years (1928, 1953, 1966, 1970, 1973, 1978, 1983, and 1989) and available topographic maps (1953, 1963, and 1979) revealed that the subject site has been used for residential purposes for over 82 years. As depicted on the referenced topographic maps and aerial photographs, a residential structure had been constructed on the site prior to 1928 and only a few residences existed on Lookout Drive, which was unimproved. From 1928 to 1953 the construction of additional residences on Lookout Drive occurred but the roadway was still unimproved. It appears that between 1953 and 1966 Lookout Drive was improved and residential structures were constructed on a majority of the parcels in the vicinity of the site.

GEOLOGIC CONDITIONS

GEOLOGIC SETTING AND SOIL DESCRIPTION: The subject site is located in the Coastal Plains Physiographic Province of San Diego County. Based on our review of the referenced geotechnical literature, our experience within the vicinity of the site, and our recent subsurface explorations the site was noted to be underlain by Cretaceous-age sediments of the Point Loma Formation that are mantled by Pleistocene-age marine terrace deposits that are overlain by slopewash and fill material. These materials are discussed below in order of increasing age:

ARTIFICIAL FILL (Qaf): Our recent subsurface explorations on the site, our analysis of the referenced aerial photographs and topographic maps of the area around the subject site, and our review of the referenced geotechnical investigations suggest that up to about 1½ to 5 feet of man-placed fill soils may exist across the site. The fill is expected to consist of dark grayish-brown, silty sands (SM). The existing fill is expected to be of variable density and to possess a low expansion index and a moderate settlement potential in its present condition.

SLOPEWASH (Qsw): Slopewash is expected to underlie the artificial fill soils throughout the majority of the site and to consist predominantly of dark brown to grayish-brown, silty sands (SM) that are generally damp to moist and loose to medium dense in consistency. Lesser zones of moist, loose to medium dense, silty sands-sandy gravels (SM-GM) may also be encountered within the slopewash.

MARINE TERRACE (PARALIC) DEPOSITS (Qt): As observed in our recent trenches excavated on the subject lot and described in the referenced geologic and geotechnical investigations of the subject site and adjacent parcel to the south (7750 Lookout Drive), an unmapped sedimentary unit consisting of Pleistocene-age marine terrace (paralic) deposits underlies the slopewash and fill soils on-site. In general, these materials were noted to consist of yellowish-brown to reddish-brown, silty sands (SM) and poorly graded sands (SP) that were generally moist and medium dense to very dense in consistency. Although no individual coarse sand beds (SP) or fine laminations within the silty sand (SM) layers of the terrace deposits were noted to be laterally continuous across the entirety of our test trenches, it should be noted that overlapping lenses of coarse sands and finely laminated silty sands were observed across both test trenches.

POINT LOMA FORMATION (Kp): Beneath the marine terrace deposits, the site is underlain by Cretaceous-age sedimentary deposits of the Point Loma Formation. The materials of the Point Loma Formation predominantly consist of light brown, olive, and gray, sandy clays (CL) with lesser amounts of silty sands (SM). These materials were noted to be generally moist and very stiff/dense to hard/very dense in consistency.

GEOLOGIC STRUCTURE: Based on our recent subsurface explorations and review of the referenced geotechnical investigations and geologic map of the area (Kennedy and Tan, 2005), the bedding of the Cretaceous-age sedimentary deposits (Point Loma Formation) that underlie the site dips approximately 35° to 50° to the northeast within the vicinity of the site. Such bedding orientations are considered to be relatively favorable with regards to the stability of the northwest- to west-sloping site. The marine terrace deposits overlying the Point Loma Formation display faint bedding that dips gently (±2°) to the south-southwest. As presented on the log of our test trench T-1, the erosional contact between the marine terrace deposits and the underlying sediments of the Point Loma Formation was noted to step down towards the north and pockets of rip-up clasts were encountered within the lower portions of the terrace deposits adjacent to the steps in the erosional contact.

GROUNDWATER: No groundwater or subsurface seepage was encountered within our test trenches or the previous explorations performed on-site (GEI, 2005). It should, nevertheless, be recognized that minor groundwater seepage problems might occur after development of a site even where none were present before development. 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 permeability characteristics of the soil and the anticipated usage and development, it is our opinion that any seepage problems which will be minor in extent. These potential "nuisance" problems can be mitigated by the use of proper landscaping techniques.

TECTONIC SETTING: No faults are known to traverse the subject site. However, 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 California Division of Mines and Geology. Active fault zones are those that have shown conclusive evidence of faulting during the Holocene Epoch (the most recent 11,000 years). The Division of Mines and Geology used the term "potentially active" on Earthquake Fault Zone maps until 1988 to refer to all Quaternary-age (last 1.6 million years) faults for the purpose of evaluation for possible zonation in accordance with the Alquist-Priolo Earthquake Fault Zoning Act and identified all Quaternary-age faults as "potentially active" except for certain faults that were presumed to be inactive based on direct geologic evidence of inactivity during all of Holocene time or longer. Some faults considered to be "potentially active" would be considered to be "active" but lack specific criteria used by the State Geologist, such as *sufficiently active* and *well-defined*. Faults older than Quaternary-age are not specifically defined in Special Publication 42, Fault Rupture Hazard Zones in California, published by the California Division of Mines and Geology. However, it is generally accepted that faults showing no movement during the Quaternary period may be considered to be "inactive". The City of San Diego guidelines indicate that since the beginning of the Pleistocene Epoch marks the boundary between "potentially active" and "inactive" faults, unfaulted Pleistocene-age deposits are accepted as evidence that a fault may be considered to be "inactive".

The active Rose Canyon Fault Zone (RCFZ) consists of a complex zone of anatomizing and en echelon faults that trend north-northwest from near the Mexican border through San Diego Bay to La Jolla. In the San Diego County area, the RCFZ is the onshore portion of a more-extensive fault zone that includes the South Coast Offshore Zone of Deformation and the Newport-Inglewood fault to the north, and several possible extensions southward, both onshore and offshore. This longer zone is part of the San Andreas Fault system of northwest-trending strike-slip faults in southern California and the Southern California Continental Borderland. The RCFZ is predominantly composed of right-lateral strike-slip faults that extend south-southeast through the San Diego metropolitan area. Various fault strands display strike-slip, normal, oblique, or reverse components of displacement.

In the La Jolla area, from the ocean to the mouth of Rose Canyon, the RCFZ is approximately 1.5 kilometers wide and is dominated by three relatively continuous faults: The Rose Canyon Fault, the Mount Soledad Fault, and the Country Club Fault. At La Jolla, the zone trends south ±60° east. To the southeast, the RCFZ traverses the northeast flank of Mount Soledad, and the strike gradually shifts until it parallels Rose Canyon (roughly south 40° east). The RCFZ also contains numerous, less continuous fault splays in this portion of the fault zone trending from nearly north-south through northeast to almost east-west (Tremain, 1983).

It should be recognized that the northern and northeastern portions subject site are located within the Alquist-Priolo Earthquake Fault Zone delineated in 1991 around the active Rose Canyon Fault Zone. In the area of the subject site, the Rose Canyon Fault Zone consists of an approximately 800-foot-wide, northwest trending zone containing three mapped fault segments: the Rose Canyon, Mount Soledad and Country Club Faults. Mapping by Kennedy and Tan (2005) indicates that the Mount Soledad Fault traverses the northeast portion of the site trending from the southeast to the northwest. 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 west; the Earthquake Valley and Palos Verdes Fault Zones to the north; and the Elsinore and San Jacinto Fault Zones to the northeast.

BACKGROUND INFORMATION

GENERAL: The California Division of Mines and Geology (CDMG) Note 49, “Guidelines for Evaluating the Hazard of Surface Fault Rupture”, which was adopted on May 9, 1996 by the State Mining and Geology Board, discusses the rationale for evaluating surface and near-surface faults and presents some suggested topics, considerations, and guidelines for investigations and reports. CDMG Note 49 states the following: “The evaluation of a given site with regard to the potential hazard of surface rupture is based extensively on the concepts of *recency* and *recurrence* of faulting along existing faults. In a general way, the more recent the faulting the greater the probability for future faulting. Stated another way, faults of known historic activity during the last 200 years, as a class, have a greater probability for future activity than faults classified as Holocene age (last 11,000 years) and a much greater probability of future activity than faults classified as Quaternary age (last 1.6 million years).”

SEISMIC SAFETY STUDY: As part of our services, we have reviewed the City of San Diego Seismic Safety Study. This study is the result of a comprehensive investigation of the city that rates areas according to geological risk potential (nominal, low, moderate, and high) and identifies potential geotechnical hazards and/or describes geomorphic conditions. The City of San Diego Seismic Safety Study identifies the site as being in Geologic Hazard Category 21, with the northeastern corner of the site also within Hazard Category 11. Hazard Category 21 is assigned to areas underlain by "confirmed, known, or highly suspected" landslides; the potential risks in this category are considered to be moderate to high. Hazard Category 11 is assigned to areas underlain by or adjacent to suspected traces of faults that are considered active (within Alquist-Priolo earthquake fault zones). The following Figure Number 2 presents a portion of the City of San Diego Seismic Safety Study Geologic Hazard and Faults map that shows the location of the site, the Alquist-Priolo Earthquake Fault Zone established around the RCFZ (1991), and the locations of the lesser fault splays associated with the RCFZ in the vicinity of the site.

PREVIOUS STUDIES: As part of our geologic reconnaissance we have reviewed a fault investigation for the subject parcel, titled Report of Limited Geotechnical and Geologic Fault Investigation at 7762 Lookout Drive 2005 by Geotechnical Exploration, Inc. and a Fault Investigation Report for the adjacent lot to the south (7750 Lookout Drive), which was prepared by Bryan Miller-Hicks, CEG in 2008. In reviewing these fault investigations there was no evidence that the portions of the subject parcel or adjacent lot to the south that were investigated were bisected by active or potentially active faulting. However, the above-mentioned fault investigations did not provide geologic data to "cover" the whole site. As such, our fault investigation was conducted across portions of the subject lot to provide additional "coverage" of the subject lot. Copies of these reports are presented in Appendix B of this report.

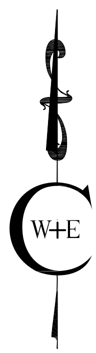
In addition to the reports described above, several other geologic and geotechnical reports have been reviewed in the preparation of this report. These reports are referenced herein. The two reports that were prepared for sites in the closest proximity to the subject site include a report prepared in 2001 by Geotechnical Exploration, Inc. for the residential lot located east of and two lots south of the subject lot (identified as APN 352-012-18) and a report prepared by Michael W. Hart in 1995 for two adjacent parcels that are located three and four lots to the northeast of the subject lot (identified as APNs 352-10-29 an -30). As presented in the report for the lot located two lots to the southeast of the subject sit, "detailed logging of the trenches indicated no evidence of faulting on-site" (GEI, 2001). Hart's 2001

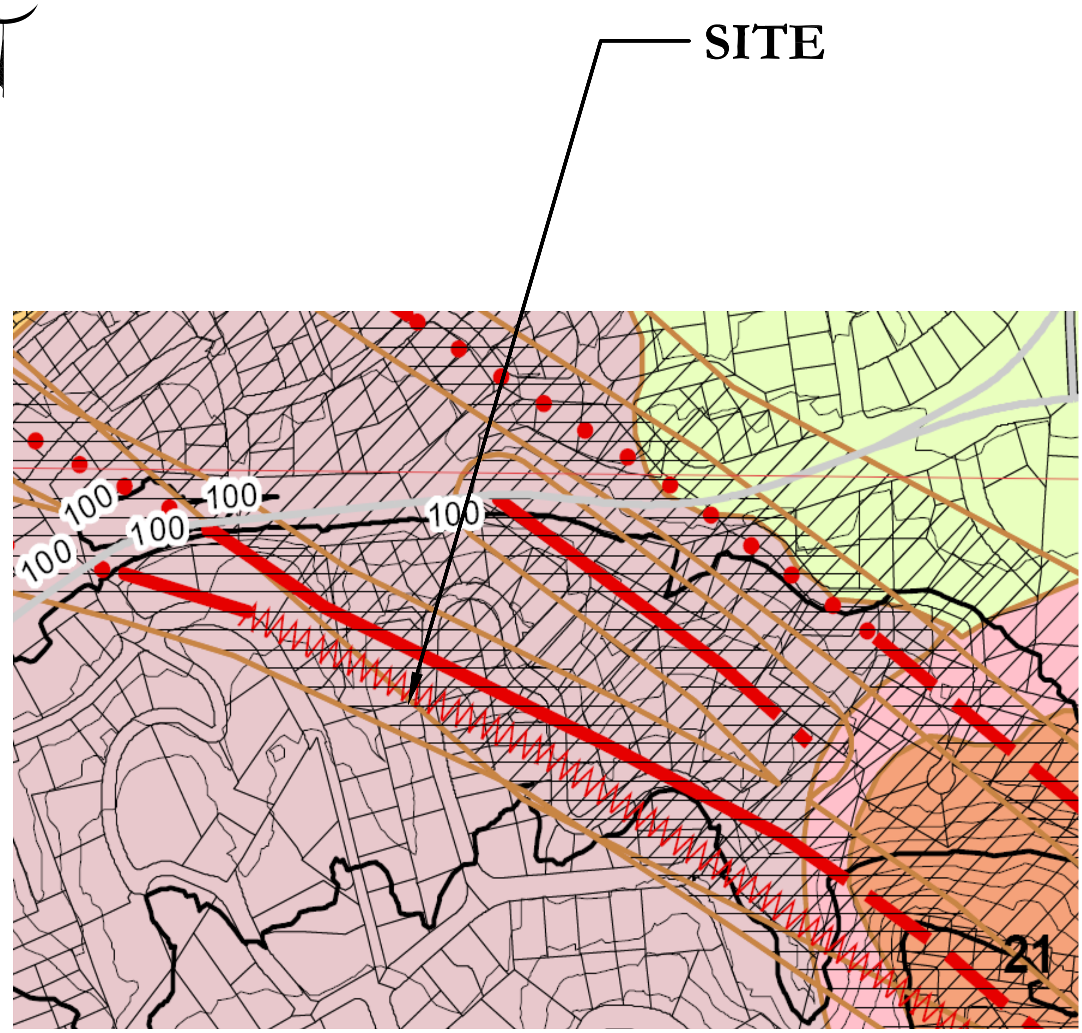
SEISMIC SAFETY STUDY
Geology Hazard & Faults

REPORT OF FAULT INVESTIGATION

7762 LOOKOUT DRIVE

LA JOLLA, CA





report for the lots located three and four lots to the northeast of the subject site along the north side of Lookout Drive states that "no significant faulting was encountered."

Another significant report of geologic investigation within close proximity to the site is a report prepared by Hart in 2002 for the lot located at 7820 Lookout Drive (APN 350-013-05). Similar to the subject site addressed in this report, the northernmost portion of the site located at 7820 Lookout Drive is mapped on the City's Seismic Safety Study as being underlain by the Mount Soledad Fault. However, it should be noted that the geologic report previously prepared for the site located at 7820 Lookout Drive states that that site is underlain by "marine terrace sands that are unbroken by faulting." That report also notes that the results of the study performed at 7820 Lookout Drive "in conjunction with the findings of geologic investigations on nearby properties…suggests Holocene Activity on the Rose Canyon Fault zone is transferred from the Mount Soledad branch of the fault to the Rose Canyon fault in this area" (Hart, 2002).

TRENCHING ON-SITE

In consideration of the predominant northwest-southeast trend of Rose Canyon Fault Zone within the general vicinity the subject site and the locations of the two previously excavated fault trenches that were performed on-site by GEI in 2005, two additional fault trenches were excavated and logged within the western portion of the subject site between December 18 and 24, 2009. The fault trenches, which extended to depths of between 4 feet and 8½ feet below existing site grades, were excavated in a roughly south to north orientation and were sited so that they overlapped and abutted with the previous fault trenches excavated on-site in 2005 by Geotechnical Exploration, Inc. As such, the southerly trench was 92 feet long and extended from the southern property line of the site to roughly the central portion of the rear slope area of the site. The northern trench, which was 19 feet long, was extended from the northernmost point of the previous fault trenches dug on-site (GEI, 2005) to a point within 2 feet from the northern property line of the site. The trenches, when combined with the previously excavated trenches on-site, provide geologic data to "cover" the whole site. Due to site access constraints, the trenches were manually excavated with hand tools.

The excavation, logging, and backfilling of the trenches were performed under the supervision of a certified engineering geologist within our firm. Once excavated and cleaned, the 92-foot-long test trench was also examined by Mr. Leslie D. Reed, the certified engineering geologist who logged the previous fault trenches excavated on-site (GEI, 2005). The approximate locations of the trenches excavated and logged as part of our authorized scope of services for this project as well as the locations of GEI's previous trenches are presented on our Site Plan and Geotechnical Map, included herein as Plate No. 1. Plate No. 2 of this report presents the logs of the exploratory test trenches.

It should be recognized that in accordance with your request, compaction testing of the trench backfill was not performed. As such, the trench backfill, although placed and compacted with a mechanical hand "whacker" with effort to ensure stable backfill conditions, is considered undocumented and thus unsuitable to support settlement-sensitive structures.

CONCLUSIONS

The investigated areas of the site were found to be underlain by a relatively shallow and irregular veneer of surficial soils consisting of man-placed fill soils and Quaternary-age slopewash deposits above a thin layer of Quaternary-age marine terrace (paralic) deposits and Cretaceous-age sediments of the Point Loma Formation. The geologic conditions observed within our exploratory trenches correlate well with the conditions described in the previous Report of Limited Geotechnical and Geologic Fault Investigation for the subject site (GEI, 2005) and those described in a Fault Investigation Report for the adjacent lot to the south (7750 Lookout Drive), which was prepared by Bryan Miller-Hicks, CEG in 2008.

As presented on Plate No. 2 of this report, a very minor fault was observed approximately 27 feet north of the southerly end of test trench T-1 (Station 27). This minor fault, which was measured to display up to 7 inches of vertical offset and to strike N43°E and dip 80°S, was observed by the engineering geologists present during the trench logging to be overlain by unfaulted marine terrace deposits that have been judged to be in excess of 200,000 years old (GEI, 2001). This minor, secondary fault is oriented generally perpendicular to the general trend of the active faults in the Rose Canyon Fault Zone. It is our professional opinion and judgment that this minor, apparently inactive fault is not capable of surface rupture and that no structural setbacks are necessary from this small fault. No other evidence of faulting was observed in either of our two exploratory test trenches or the previously excavated test trenches performed by GEI in 2005.

CWE LEGEND

CWE T-2	APPROXIMATE TRENCH LOCATION(CWE)
GEI T-2	LOCATION OF TRENCH EXCAVATED BY GEI

0 60' 120'

SCALE: 1" = 60'

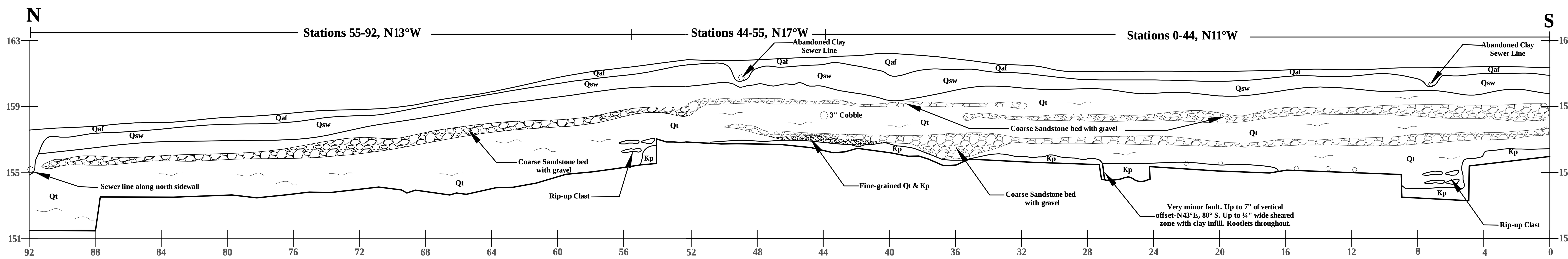
FAULT TRENCH LOCATION

REPORT OF FAULT INVESTIGATION
7762 Lookout Drive, La Jolla, CA

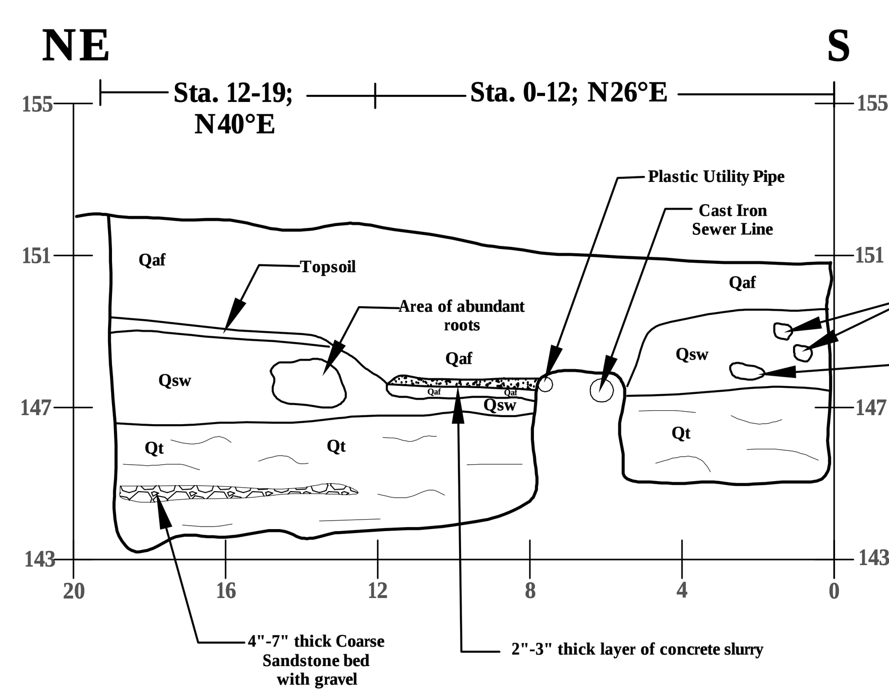
DATE:	APRIL 2010	JOB NO.:	2090707.03
BY:	DRR/MAH	PLATE NO.:	1

CHRISTIAN WHEELER ENGINEERING

TRENCH 1 (EAST SIDEWALL)



TRENCH 2 (EAST SIDEWALL)



NOTE
Backfill from GEI Trench T-1 exposed on south end of trench

LEGEND

Artificial FIll (Qaf): Medium brown to orangish-brown, silty sand with gravel (SM), fine to coarse grained.

Topsoil: Dark grayish-brown, silty sand (SM), fine to medium grained, organic rich.

Slopewash (Qsw): Dark brown to gray, clayey, silty sand (SM), fine to coarse grained, slight gravels and occasional cobbles, porous.

Marine Terrace Deposits (Qt): Yellowish-brown, silty sand (SM), fine to medium grained, failt sub-horizontal laminations.

Point Loma Formation (Kp): Olive brown to grayish-brown, sandy clay (CL), moist, hard.

SCALE: 1" = 4'

LOGS OF FAULT TRENCHES	REPORT OF FAULT INVESTIGATION 7762 Lookout Drive, La Jolla, CA		CHRISTIAN WHEELER ENGINEERING
	DATE: APRIL 2010	JOB NO.: 2090707.03	
	BY: DRR/MAH	PLATE NO.: 2	

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Appendix B

(see Appendices G and H of CWE 2130434.01)