Draft Environmental Impact Report

Volume II
(Technical Appendices B through C)

Metropolitan Transportation Authority West Los Angeles Transportation Facility *and* Sunset Avenue Project

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Appendix B – Air Quality:

West Los Angeles Transportation Facility & Sunset Avenue Project

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West Los Angeles Transportation Facility

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West Los Angeles Transportation Facility & Sunset Avenue Project

B1 – Air Quality Analysis Methodology and SCAQMD Rules (403 & 1166)

CONSTRUCTION AND OPERATIONAL EMISSION CALCULATION METHODOLOGIES

INTRODUCTION

The air quality impact analysis addresses the potential impacts from air pollutants generated by the project. The analysis evaluates air emissions attributable to the project's construction and post-construction (e.g., operational) activities. Construction-related activities that generate pollutants include site preparation, travel by construction workers to and from the site, delivery and hauling of construction materials to and from the site, fuel combustion by on-site construction equipment, asphalt off-gassing, and the application of architectural coatings and other building materials that release pollutants. In addition, there is a potential for the release of small amounts of Reactive Organic Compounds (ROC) and toxic air contaminants (TAC) during site grading activities and the removal of building foundations and asphalt pavement as a result of previous uses on the sites. Types of activities addressed in the post-construction analysis include the consumption of electricity and natural gas for site activity, and the operation of on-road vehicles. Area sources were also considered in the operations analysis, including among other sources, consumer/commercial solvent usage and landscaping equipment.

The analyses of construction and operational activities include regional emissions. An analysis of the potential impacts on ambient particulate concentrations (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), and air toxics from project related construction activities is also conducted. For post-construction operations, the analysis addresses local area concentrations of a specific pollutant, CO, generated by mobile sources. The modeling techniques, factors and assumptions for each analysis are discussed in the following sections.

CONSTRUCTION

The project consists of demolition of existing uses and construction of new buildings on two separate sites, one located on Jefferson Boulevard and the other on Sunset Avenue. The Los Angeles County Metropolitan Transportation Authority (MTA) proposes to develop a new West Los Angeles Transportation Facility (WLATF) for a fleet of clean-fuel compressed natural gas (CNG) buses. The 4.66-acre property is located on the east side of Jefferson Boulevard between Rodeo Road and National Boulevard in the City of Los Angeles.

Following the completion of the new WLATF, the existing Division 6 Bus Depot, which is presently located at 100 East Sunset Avenue in the Venice Community of the City of Los Angeles, would be permanently vacated by the MTA. The existing structures at the Division 6 Bus Depot, consisting of approximately 15,300 square feet of floor area, would be removed and any contamination associated with the site's previous use would be remediated. The existing Division 6 Bus Depot would be displaced with a development that is largely residential, but would also include some neighborhood retail space.

Construction Regional Impacts

Construction emissions for the proposed project are based on emission factor data and the magnitude of development for each project site. The total amount of construction, the duration of construction, and the intensity of construction activity could have a substantial effect upon the amount of construction emissions, pollutant concentrations, and resulting impacts. As such, the emission forecasts reflect a specific set of conservative assumptions based on the expected construction scenario wherein a large amount of construction is occurring in a relatively intensive manner. Because of these conservative assumptions, actual emissions of individual construction projects will, in all probability, be less than those forecasted.

Construction of the proposed project will generate pollutant emissions from the following activities: (1) site preparation operations (grading and related activities); (2) travel by construction workers to and from the project site; (3) delivery and hauling of construction materials and supplies to and from the project site; (4) fuel combustion by on-site construction equipment; (5) paving operations; (6) the application of architectural coatings and other building materials that release ROC. In addition, during site grading activities and the removal of building foundations and asphalt pavement there is a potential for small amounts of ROC and related TAC emissions to be released into the environment as a result of previous uses on the sites. In order to ensure that the maximum potential air quality impacts of the proposed project are addressed, construction emissions were calculated on a worst-case basis for each phase.

Pollutant emissions were estimated using the California Air Resource Board's URBEMIS2002 model.[1] The URBEMIS2002 model separates the construction process into three phases. The first phase is building demolition with emissions resulting from demolition dust, debris haul truck trips, equipment exhaust, and worker commute exhaust. The second phase of construction is site grading with emissions resulting from fugitive dust, soil haul truck trips, equipment exhaust, and worker commute exhaust. The third phase is subdivided into building equipment, architectural coating, and asphalt. Emissions from the third phase of construction include equipment exhaust from building construction and asphalt paving, and ROC

[1] *URBEMIS is an approved SCAQMD model for calculation of emissions for land use development projects.*

emissions from architectural coating and asphalt paving. Equipment exhaust emissions were determined using URBEMIS2002 default values for horsepower and load factor. Refer to the URBEMIS2002 User's Manual (http://www.aqmd.gov/ceqa/urbemis.html) for further information regarding phasing and default assumptions. The on-site estimate of potential soils-release ROC emissions during demolition and site preparation were calculated based on EPA's *Estimating Air Emissions from Petroleum UST Cleanups, 1998.*

Various mitigation measures were incorporated into the project construction analysis. Mitigation measures were based on mandatory compliance with SCAQMD Rule 403 and additional control efficiency measures obtained from the URBEMIS 2002 User's Manual. Mitigation measures applied to construction activities were:

1. 30 percent PM_{10} reduction for applying soil stabilizers to inactive areas;

2. 15 percent PM_{10} reduction for quickly displacing ground cover in disturbed areas;

3. 9.5 percent PM_{10} reduction for covering all dirt stockpiles with tarps;

4. 45 percent PM_{10} reduction for watering all unpaved haul roads three times per day;

5. 40 percent PM_{10} reduction for reducing driving speed to less than 15 miles per hour on all unpaved roads; and

6. 50 percent PM_{10} reduction for watering all exposed surfaces three times per day.

A copy of SCAQMD Rules 403 and 1166 are included in Appendix B-1 of this report, while the URBEMIS2002 modeling outputs files are provided in Appendices B-2 and B-3 of this report for the WLATC and Sunset Avenue site locations, respectively.

Local Criteria Pollutant Construction Impacts

While the SCAQMD *CEQA Air Quality Handbook* (*CEQA Handbook*, 1993), does not provide any localized thresholds, the SCAQMD currently recommends localized significance thresholds (LST) for PM_{10}, NO_2, and CO in its adopted document titled "SCAQMD Localized Significance Threshold Methodology (SCAQMD LST Guidance)," June 2003. While the SCAQMD does not require that lead agencies use the LST Guidance, it has been used for purposes of evaluating potential localized construction impacts from the proposed project. The following information is primarily based on the SCAQMD LST Guidance.

The LST analysis evaluated whether project-related construction emissions will likely cause or contribute to an exceedance of the most stringent applicable Federal or State ambient air quality standards (AAQS) based on the future conditions with the project (i.e., adding the project's incremental concentration to the maximum ambient concentrations of that pollutant over the last three years of monitoring data at the relevant monitoring station).

The pollutants of concern for local analysis from construction activities are NO_X and CO combustion emissions from construction equipment[2] and fugitive PM_{10} dust from construction site preparation activities. LSTs are developed based upon the size or total area of the emissions source, the ambient air quality[3] in each SRA where the emission source is located, and the distance to the sensitive receptor. LSTs are derived using one of three methodologies depending upon the attainment status of the pollutant. For attainment pollutants, nitrogen dioxide (NO_2) and CO, the LSTs are derived by adding the incremental emission impacts from the project activity to the peak background NO_2 and CO concentrations and comparing the total concentration to the most stringent ambient air quality standards. Background criteria pollutant concentrations are represented by the highest measured pollutant concentration in the last three years at the air quality monitoring station nearest to the proposed project site. The most stringent standard for NO_2 is the one-hour state standard of 25 parts per hundred million (pphm); and for CO it is the one-hour and eight-hour state standards of nine parts per million (ppm) and 20 ppm, respectively.

Construction PM_{10} LSTs are developed using a dispersion model to back-calculate the emissions necessary to exceed a concentration equivalent to 50 micrograms per cubic meter ($\mu g/m^3$) averaged over five hours, which is the control requirement in SCAQMD Rule 403. The equivalent concentration for developing PM_{10} LSTs is 10.4 $\mu g/m^3$, which is a 24-hour average.

Technical Approach

SCAQMD LST Guidance provides LST lookup tables to allow a user to readily determine if the daily emissions for proposed construction activities could result in significant localized air quality impacts. If the calculated emissions for the proposed construction are fellow the LST emission levels found on the LST lookup tables, then the proposed construction activity is not significant. Projects whose calculated emission budgets for the proposed construction activities are above the LST emission levels found in the LST lookup tables should not assume that the project would necessarily generate adverse impacts. Detailed emission calculations

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2 *Construction equipment also emits PM_{10}, but for simplicity these emissions were combined with the fugitive PM_{10} dust when using the LST procedures.*

3 *Ambient air quality information is based on the pollutant concentrations measured at the SCAQMD's monitoring stations in or near the specified SRA.*

and/or air dispersion modeling may demonstrate that pollutant concentrations are below localized significant levels.

With to the proposed project, the analysis demonstrated that worst-case maximum emissions for CO, NO_X, and PM_{10} would not exceed SCAQMD LST significance thresholds.

OPERATIONS

Regional Operations Impacts

Air pollutant emissions associated with occupancy and operation of the proposed project and Alternatives will be generated by stationary sources (e.g., the consumption of electricity and natural gas), mobile sources (e.g., the operation of on-road vehicles), and area sources (e.g., among other things, landscaping equipment, consumer/commercial solvent usage, and architectural and automotive coatings).

Stationary Sources

To estimate the daily emissions from electricity consumption, the gross square footage for each type of land use (or the number of units for residential land uses), the electricity usage rate, and emission factors for criteria pollutants have been determined. Electricity usage rates and emission factors were obtained from the *CEQA Handbook* and were used in the following equation:

Emissions from Electricity Consumption

$$E = \{([F \times G] / 365) / 1000\} \times H \qquad \textbf{EQ. 1}$$

where
E = Emissions of criteria pollutants in lbs/day
F = Gross square foot of each type of land use or number of units for residential uses
G = Electricity usage rate to determine annual usage in kWh/sq.ft./yr or kWh/unit/yr
H = Emission factors for criteria pollutants in pounds per megawatt-hours

Source: CEQA Handbook; Tables A9-11, A9-11-A, and A9-11-B; SCAQMD, 1993.

The electricity usage rates and emission factors vary by land use and by pollutant, respectively. Although electricity generation will not occur on the project site, it will occur somewhere in the region, and, therefore, the associated emissions are included in the operational emissions analysis. Emissions from natural gas consumption are determined in a similar manner as emissions from electricity usage. Natural gas consumption rates and emission factors were obtained from the *CEQA Handbook* and were used in the following equation:

Emissions from Natural Gas Usage

E = {([F x G] / 30) / 1,000,000} x H **EQ. 2**
where
E = Emissions of criteria pollutants in lbs/day
F = Gross square foot of each type of land use or number of units for residential uses
G = Natural gas usage rate to determine daily usage
H = Emission factors for criteria pollutants in pounds per million cubic feet

Source: CEQA Handbook; Tables A9-11, A9-11-A, and A9-11-B; SCAQMD, 1993.

The natural gas consumption rates and emission factors vary by land use and by pollutant, respectively. The daily emissions obtained using the above equation account for natural gas used for space heating, water heating, cooking and other miscellaneous gas fired sources. Worksheets providing calculations for electricity consumption and natural gas usage for the project and Alternatives are presented in Appendices A-3 and A-4, respectively.

Mobile Sources

Emissions modeled in the regional on-road air quality analysis were compiled using the URBEMIS2002 emission inventory model. This computer model projects emission rates for motor vehicles based on a desired year of analysis, a projected vehicle fleet mix, projected vehicle speeds, and whether these emissions are projected to occur during the summer or the winter months and other factors. Average daily trips were provided in the RAD-Sunset Traffic Impact Study and the RAD-Jefferson Traffic Impact Study, prepared by Overland Traffic Consultants, May 2004 (See Appendix Q). It was assumed that external trips will have trip lengths equal to the default values provided in URBEMIS2002. Table 1 on page 14 provides the input parameters used in the URBEMIS2002 runs. The URBEMIS2002 output files for the project are included in Appendices B-2 and B-3 for the WLATF and Sunset Avenue developments, respectively.

URBEMIS2002 output is provided as daily emissions of criteria pollutants. The emission rates for CO, NO_X, and ROC are obtained at temperatures of 60, 75, and 85 degrees Fahrenheit, respectively. The selected temperatures are identified in Table A9-5-J of the *CEQA Handbook*. PM_{10} and SO_X emissions are independent of temperature.

Area Sources

Potential localized PM_{10} impacts from project-related stationary source operational emissions are anticipated to be minimal, since the project does not include any industrial, manufacturing or similar types of facilities (e.g., power plants, landfills, concrete batch plants, and warehouse/distribution facilities) wherein large stationary combustion equipment would be

Table 2

URBEMIS2002 INPUT PARAMETERS USED TO ESTIMATE EMISSIONS FROM MOBILE SOURCES

Variable	Value	Unit	Reference
Air Basin	South Coast	—	Based on Project location
Average Daily Trips	297 (Jefferson); 1,493 (Sunset)	trips/day	Traffic Study (Appendix Q)
Vehicle Fleet Mix	LDA = 54.4 LDT (< 3750 lbs) = 15.3 LDT (3751 – 5750 lbs) = 16.4 MDT = 7.3 LHDT (8504 – 10000) = 1.1 LHDT (10001 – 14000) = 0.3 MHDT = 1.0 HHDT = 0.8 Urban Bus = 0.2 School Bus = 0.1 Motorcycle = 1.6 Motor Home = 1.5	%	Defaults for URBEMIS2002
Target Year	2006 (Jefferson); 2009 (Sunset)		Projected buildout year
Trip Percentages	Default values	%	Defaults for URBEMIS2002
Trip Lengths	Default values	miles	Defaults for URBEMIS2002
Trip Speeds	Default values	mph	Defaults for URBEMIS2002
Temperature	60,75 and 85	degrees Fahrenheit	Analysis temperatures for CO, NOx, and ROG, respectively.
Variable Starts	Default values	%	Defaults for URBEMIS2002
Road Dust	Default values	%	Defaults for URBEMIS2002

Source: CARB, URBEMIS2002.

located. Potential stationary combustion equipment that may occur within the Project site would include boilers and water heaters.

Miscellaneous Area Sources

Miscellaneous sources include, but are not limited to, consumer/commercial solvents and landscaping equipment. Emissions from these sources were calculated using URBEMIS2002 default emission factors.

Summary for Operational Emissions

Emissions from stationary sources and mobile sources (from vehicles), as well as area sources, were summed to determine total daily emissions. These totals were then compared to SCAQMD significance thresholds.

Local Impacts

Due to the number of daily trips generated by the project and the prevalence of congested roadways in the project vicinity, project-related traffic during the operational phase could have the potential to cause local area impacts. An analysis at selected intersections was performed to determine the potential for the creation of CO hot spots attributable to project-related increases in traffic volumes. The analysis considered peak-hour traffic volumes associated with buildout of the project, as this represents the worst-case scenario. Local area CO concentrations were projected using the CALINE4 traffic pollutant dispersion model. The analysis of CO impacts followed the protocol recommended by the California Department of Transportation and published in the document titled *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol), December 1997. The methodology is also consistent with CO impact evaluation procedures presented in the SCAQMD's *CEQA Air Quality Handbook*. CALINE4 output files for the project are provided in Appendix A-3 of the Technical Report.

Intersections with the highest potential for CO hotspot formation are selected for analysis based on intersection traffic volumes, poor Levels of Service (LOS), high project-related traffic volumes, and the proximity of the intersections to sensitive receptors. A poor LOS occurs when the intersection is functioning near or above capacity and is represented by the ratings "D," "E," and "F." The CALINE4 model determines CO concentrations attributable to vehicular traffic. Emissions from traffic attributable to the full development of RAD-MTA project, without mitigation, are evaluated against a baseline condition that did not involve emissions from traffic generated from the project.

Several input parameters are required for the CALINE4 model, including traffic volumes, emission factors, roadway coordinates, receptor coordinates, wind speed and direction, stability class, mixing height, surface roughness, and temperature. The methodology used to obtain each of these parameters is discussed below.

Traffic volumes for the A.M. and P.M. peak hours were obtained from the RAD-Sunset Traffic Impact Study and the RAD-Jefferson Traffic Impact Study, provided by Overland Traffic Consultants (see Appendix Q). The EMFAC2002 model was used to obtain emission factors for the vehicle fleet based on the desired year of analysis (the year of project buildout).

Vehicle travel speeds are assigned to the selected intersections based on Tables B.9 and B.10 of the CO Protocol and range from 25 to 40 miles per hour. These speeds are then adjusted as recommended in the CO Protocol based on percent red time, which is a function of vehicles per hour per lane. The adjusted speed is used to select the appropriate emission factors for vehicles approaching and departing the intersection. Lanes are assumed to be 15 feet in width and receptors were placed 10 and 23 feet from the roadways, at each corner of the intersection, as recommended in the CO Protocol.

Worst-case atmospheric conditions are selected for input into the CALINE4 model including a wind speed of 1.0 meter/second, worst-case wind direction (a model option), and a stability class of “F” (very stable). A standard mixing height of 1,000 meters, a surface roughness of 100, and temperature of 15.6 degrees Celsius (60 degrees Fahrenheit) are also used as inputs to represent conditions in the vicinity of the Project.

The CALINE4 model generates results of CO concentrations averaged over a 1-hour time period for each of the eight receptors. Eight-hour concentrations are calculated by converting 1-hour concentrations to 8-hour equivalents, using the conversion protocol recommended by the CO Protocol. The conversion factor is obtained from Table B.15 of the CO Protocol.

Future local CO concentrations are then determined by adding the CALINE4 results to a predicted background concentration. Year 2006 and 2009 ambient concentrations are determined from predicted CO concentration tables provided by the CARB.[4] The forecasted background concentrations for 2009 (Sunset Avenue Project) are 4.54 ppm for the one-hour averaging period and 2.88 ppm for the eight-hour averaging period and for 2006 (WLATF Project) are 4.96 ppm for the one-hour averaging period and 3.12 ppm for the eight-hour averaging period. The final step in the local CO analysis is the comparison of the future local CO concentrations to State and National Ambient Air Quality Standards (AAQS). State and National AAQS for 1-hour averaging periods are 20 ppm and 35 ppm, respectively. Both the State and National AAQS for 8-hour averaging periods is 9 ppm. If no significant impacts were identified for the intersections with the highest potential for CO hotspot formation, it was assumed that no significant impacts will occur at any other locations in the study area.

[4] http://www.aqmd.gov/ceqa/hdbk. *(CO Concentrations for Hotspot Analysis – West Los Angeles Monitoring Station.)*

(Adopted May 7, 1976) (Amended November 6, 1992)
(Amended July 9, 1993) (Amended February 14, 1997)
(Amended December 11, 1998)(Amended April 2, 2004)

RULE 403. FUGITIVE DUST

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(10) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(11) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(12) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(13) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(14) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(15) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(16) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(17) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(18) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(19) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(20) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(21) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(22) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(23) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(24) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(25) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(26) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(27) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(28) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(29) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(30) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(31) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(32) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(34) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent

method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) After January 1, 2005, no person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

(B) Pave the surface extending at least 100 feet and at least 20 feet wide.

(C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).

(e) Additional Requirements for Large Operations

(1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:

(A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;

(B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

(C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) after January 1, 2005, install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) after January 1, 2005, identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Agricultural operations directly related to the raising of fowls or animals and agricultural operations, provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(B) Agricultural operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(C) Agricultural operations outside the South Coast Air Basin, until January 1, 2005, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(D) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(E) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(F) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(G) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(H) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(I) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

(i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;

(ii) records are maintained in accordance with subparagraph (e)(1)(C).

(B) To unpaved roads, provided such roads:

(i) are used solely for the maintenance of wind-generating equipment; or

(ii) are unpaved public alleys as defined in Rule 1186; or

(iii) are service roads that meet all of the following criteria:

(a) are less than 50 feet in width at all points along the road;

(b) are within 25 feet of the property line; and

(c) have a traffic volume less than 20 vehicle-trips per day.

(C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

(3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.

(4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:

(A) Blasting operations which have been permitted by the California Division of Industrial Safety; and

(B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan

provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	**Control Measure**	**Guidance**
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	**Control Measure**	**Guidance**
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Unpaved roads/parking lots	19-1 Stabilize soils to meet the applicable performance standards; and 19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
Vacant land	20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

TABLE 2

DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		**CONTROL ACTIONS**
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

TABLE 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		**CONTROL ACTIONS**
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

TABLE 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3

CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		CONTROL MEASURES
Earth-moving	(1A)	Cease all active operations; OR
	(2A)	Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B)	On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR
	(1B)	Apply chemical stabilizers prior to wind event; OR
	(2B)	Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR
	(3B)	Take the actions specified in Table 2, Item (3c); OR
	(4B)	Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C)	Apply chemical stabilizers prior to wind event; OR
	(2C)	Apply water twice per hour during active operation; OR
	(3C)	Stop all vehicular traffic.
Open storage piles	(1D)	Apply water twice per hour; OR
	(2D)	Install temporary coverings.
Paved road track-out	(1E)	Cover all haul vehicles; OR
	(2E)	Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

(Adopted August 5, 1988)(Amended July 14, 1995)(Amended May 11, 2001)

RULE 1166. VOLATILE ORGANIC COMPOUND EMISSIONS FROM DECONTAMINATION OF SOIL

(a) Applicability

This rule sets requirements to control the emission of Volatile Organic Compounds (VOC) from excavating, grading, handling and treating VOC-contaminated soil as a result of leakage from storage or transfer operations, accidental spillage, or other deposition.

(b) Definitions

(1) EXCAVATION is the process of digging out and removing materials, including any material necessary to that process such as the digging out and removal of asphalt or concrete necessary to expose, dig out and remove known VOC contaminated soil.

(2) GRADING is the process of leveling off to produce a smooth surface including the removal of any material necessary to that process such as asphalt and concrete necessary to expose known VOC contaminated soil.

(3) SOIL DECONTAMINATION MEASURE is any process approved by the Executive Officer to remediate, destroy, remove, or encapsulate VOC and VOC-contaminated soil.

(4) UNDERGROUND STORAGE TANK means any one or combination of tanks, including pipes connected thereto, which is used for the storage of organic liquid which is more than 50% beneath the surface of the ground.

(5) VOC CONTAMINATED SOIL is a soil which registers a concentration of 50 ppm or greater of Volatile Organic Compounds as measured before suppression materials have been applied and at a distance of no more than three inches from the surface of the excavated soil with an organic vapor analyzer calibrated with hexane.

(6) VOC CONTAMINATED SOIL MITIGATION PLAN is a plan to minimize VOC emissions to the atmosphere during excavation and any subsequent handling of VOC-contaminated soil.

(7) VOLATILE ORGANIC COMPOUND (VOC) is any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds. Exempt compounds are defined in Rule 102—Definition Of Terms.

(8) VOLATILE ORGANIC MATERIALS include gasoline, diesel, crude oil, lubricant, waste oil, adhesive, paint, stain, solvent, resin, monomer, and/or any other material containing VOC.

(c) Requirements

(1) A person excavating an underground storage tank and/or transfer piping storing or previously storing VOC materials, or excavating or grading soil containing VOC materials shall:

(A) Apply for, obtain and operate pursuant to a mitigation plan approved by the Executive Officer prior to commencement of excavation or handling. The mitigation plan general requirement and application requirements are found in Attachment A to this rule. A copy of the approved plan must be on site during the entire excavation period.

(B) Notify the Executive Officer at least 24 hours prior to excavation using a form approved by the Executive Officer which is fully completed.

If the excavation does not commence on start date, renotification is required.

An alternative notification procedure may be authorized for multiple excavations within a single facility, with prior written approval from the Executive Officer.

(C) Monitor for VOC contamination pursuant to subdivision (e), at least once every 15 minutes commencing at the beginning of excavation or grading and record all VOC concentration readings in a format approved by the Executive Officer; and

(D) When VOC-contaminated soil is detected during excavation or grading:

(i) Implement the approved mitigation plan (Attachment A).

(ii) Notify the Executive Officer within 24 hours of detection of VOC-contaminated soil.

(iii) Monitor and record VOC concentration readings as prescribed in the plan. Monitoring records must be kept available on site.

(iv) Keep calibration records for all monitoring instruments available on site.

(2) A person handling VOC-contaminated soil at or from an excavation or grading site shall:

(A) Segregate VOC-contaminated stockpiles from non-VOC contaminated stockpiles such that mixing of the stockpiles does not take place.

(B) Spray VOC-contaminated soil stockpiles with water and/or approved vapor suppressant and cover them with plastic sheeting for all periods of inactivity lasting more than one hour.

(C) Conduct a daily visual inspection of all covered VOC contaminated soil stockpiles to ensure the integrity of the plastic covered surfaces. A daily inspection record must be maintained on site.

(D) Comply with the provisions in subparagraph (c) (1)(A) and clause (c)(1)(D)(i).

(E) Maintain a record of the identification and business addresses of the generator, transporter and storage/treatment facilities. Such record shall be signed by each party at the time custody is transferred.

(F) Treat or remove contaminated soil from an excavation or grading site within 30 days from the time of excavation.

(3) If the VOC concentration in the excavated soil is measured at greater than 1000 ppm, spray the soil with water or vapor suppressant and:

(A) As soon as possible, but not more than 15 minutes, place the soil in sealed containers, or

(B) As soon as possible, but not more than 15 minutes, load into trucks, moisten with additional water, cover and transport off site, or

(C) Implement other alternative storage methods approved in writing by the Executive Officer.

(4) A person treating VOC-contaminated soil shall:

(A) Obtain a permit to construct and operate treatment equipment, as applicable, from the Executive Officer, and

(B) Implement VOC-contaminated soil decontamination measures, as approved by the Executive Officer in writing, which result in Best Available Control Technology applied during all segments, and which include, but are not limited to, at least one of the following:

(i) Installation and operation of an underground VOC collection system and a disposal system prior to excavation.

(ii) Collection and disposal of the VOC from the excavated soil on-site using equipment approved by the Executive Officer.

(iii) Any equivalent VOC-contaminated soil control measure previously approved in writing by the Executive Officer.

(5) A person shall not engage in or allow any on-site or off-site spreading, grading or screening of VOC-contaminated soil, which results in uncontrolled evaporation of VOC to the atmosphere.

(6) Loading trucks for contaminated soil must meet the following:

(A) The truck and trailer shall be adequately tarped prior to leaving the site; no excavated materials shall extend above the sides or rear of the truck or trailer to prevent soil spillage during transport, and

(B) The exterior of the truck, trailer and tires shall be cleaned off prior to the truck leaving the site.

(d) Exemptions

(1) The provisions of this rule shall not apply to the following:

(A) Excavation, handling, and treating of less than one (1) cubic yard of contaminated soil.

(B) Removal of soil for sampling purposes.

(C) Accidental spillage of five (5) gallons or less of VOC containing material.

(2) The provisions of paragraphs (c)(1) and (c)(2) shall not apply to soil excavation or handling as a result of an emergency as declared by an authorized health officer, agricultural commissioner, fire protection officer, or other authorized agency officer. Whenever possible, the Executive Officer shall be notified by telephone prior to commencing such excavation. The Executive Officer shall be notified in writing no later than 48 hours following such excavation. Written notification shall include written emergency declaration from the authorized officer.

(e) Test Methods

(1) A person shall measure excavated soils for volatile organic compounds to determine contamination by:

(A) Using an organic vapor analyzer calibrated with hexane, complying with 40 CFR Part 60 Appendix A, EPA Reference Method 21 Section 3 or any equivalent method with prior approval in writing by the Executive Officer. If other calibrating gases are used, then the measured readings shall be correlated to and expressed as hexane.

(B) Placing the probe inlet at a distance of no more than three inches from the surface of the excavated soil and while slowly moving the probe across the soil surface, observe the instrument readout. If an increased meter reading is observed, continue to sample the excavated soil until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately double the instrument response time. If the maximum observed meter reading is greater than the 50 ppm standard in the regulation, record and report the results.

(2) The presence of VOC in stored or spillage materials shall be determined by SCAQMD Method 313 [Determination of Presence of Volatile Organic Compounds (VOC) in Headspace] and/or Method 304 (Determination of Volatile Organic Compounds in Various Materials) contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(f) Enforcement

(1) Violation of any provision of this rule or the violation of the approved mitigation plan shall be grounds for the Executive Officer to amend or revoke the mitigation plan, in addition to penalties provided by the Health & Safety Code.

(2) If the owner or operator is served with a Notice of Violation for creating a public nuisance, the owner or operator shall suspend operation until the public nuisance is mitigated to the satisfaction of the Executive Officer.

ATTACHMENT A

GENERAL MITIGATION PLANS REQUIREMENTS

VOC Contaminated Soil Mitigation Plans shall be written to minimize VOC emissions to the atmosphere during excavation, grading, handling and treatment of VOC contaminated soil. VOC Contaminated Soil Mitigation Plans shall consist of three types: Various Locations, Site Specific and Facility Treatment.

(1) General Requirements

(A) A plan is not transferable.

(B) A person responsible for the excavation, grading or handling of VOC contaminated soil must be completely familiar with the plan and must adhere to the plan requirement. The Executive Officer may require that the plan be signed by the owner and/or operator.

(C) A plan may be amended upon renewal.

(D) Permission to excavate, grade or handle VOC contaminated soil may be withdrawn by the District upon a finding by the Executive Officer that the excavation, grading or handling of the VOC contaminated soil is causing a public nuisance or violating other AQMD rules or regulations.

(2) Various Location Plans:

(A) Shall be limited to the excavation of 2000 cubic yards or less of VOC contaminated soil in any consecutive 12 month period at the same site.

(B) Shall not be used in conjunction with any other various location plan at the same site within a consecutive 12-month period.

(C) Shall expire after one year from issuance unless renewed.

(D) Shall not be issued for nor used for operations that involve grading, soil treatment or remediation, or landfills.

(3) Site Specific Plans:

(A) Shall be for excavation of greater than 2000 cubic yards of VOC contaminated soil.

(B) Shall be issued for specific excavation or grading locations for a period not to exceed two years.

(C) Shall not be renewable.

(4) Facility Treatment Plans:

(A) Shall be issued for a treatment facility at a permanent location.

(B) Shall expire after one year from issuance unless renewed.

(5) Applications for Site Specific Plans shall contain as a minimum:

(A) Reasons for excavation or grading.

(B) Cause of VOC soil contamination and history of the site.

(C) Description of tanks or piping associated with the soil contamination.

(D) An estimate of the amount of contaminated soil.

(E) The operating schedule for excavation and removal.

(F) Description of how the excavation or grading will be conducted.

(G) Description of mitigation measures for dust, odors and VOC.

(H) Details of disposal of VOC contaminated soil, including the ultimate receptor.

(I) Description of monitoring equipment and techniques.

(J) A map showing the facility layout, property line, and surrounding area up to 2500 feet away, and including any schools, residential areas or other sensitive receptors such as hospitals or locations where children or elderly people live or work.

(K) Designation of a person who can conduct a site inspection with the Executive Officer prior to issuance of the plan.

(6) Applications for Facility Treatment Plans shall at a minimum:

(A) Include a list of all AQMD permits to construct or operate which have been issued for that treatment and control equipment.

(B) Provide for the implementation of VOC-contaminated soil decontamination measures, as approved by the Executive Officer in writing, which result in Best Available Control Technology during all operations.

(C) Provide a map showing the facility layout including the location of all proposed VOC and non-VOC contaminated soil stockpiles.

(D) Specify the total amount of VOC contaminated soil proposed to be stockpiled on site.

(E) Provide for VOC contaminated soil stockpiles to be kept moist with water or suppressant and be covered to prevent fugitive emissions.

(F) Provide for VOC contaminated soil stockpiles to be segregated from non-VOC contaminated soil stockpiles.

(G) Provide for maintenance of records for stockpiles according to the source name, address and dates of reception.

(H) Provide for records of the generator, transporter and storage/treatment facilities and indicate their identification and business addresses. Such records shall be signed by each party at the time custody is transferred.

(I) Provide a map showing the facility layout, property line, and surrounding area up to 2500 feet away, and including any schools, residential area or other sensitive receptors such as hospitals, or locations where children or elderly people live or work.

(J) Designation of a person who can conduct a site inspection with the Executive Officer prior to issuance of the plan.

(K) Specify the operating schedule and maximum amount of VOC-contaminated soil proposed to be remediated on a daily basis.

(7) In approving a plan, the Executive Officer require reasonable conditions deemed necessary to ensure the operations comply with the plan and AQMD rules. The conditions may include, but shall not be limited to, procedures for ensuring responsibility for the implementation of the plan, accessibility to the site for AQMD staff, notification of actions required by the plan, identification of emission receptors, monitoring and testing, suppression and covering of stockpiles, prevention of public nuisance from VOC or dust emissions, prevention of fugitive emissions of VOC contaminated soil, loading of truck trailers, and disposal and treatment.

(8) In approving a plan, the Executive Officer may require any records deemed necessary to be maintained by the operator to demonstrate compliance with the plan. Such records shall be retained for at least 2 years and be made available to the Executive officer upon request.

West Los Angeles Transportation Facility

B2 – Air Quality Data Sheets

Appendix B-2

West Los Angeles Transportation Facility Printout Sheets

- Construction-period Mass Emissions (URBEMIS 2002 printout sheets)
- Operations-period Mass Emissions (URBEMIS 2002 printout sheets)
- Operations-period Localized CO Evaluation (CALINE-4 printout sheets)

MTA-Jefferson (Unmitigated)

URBEMIS 2002 For Windows 7.5.0

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA Jefferson\Air Quality\URBEMIS\Jefferson (Construction) - Unmitigated - Revised.urb
Project Name: Jefferson (Construction)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: March, 2005
Construction Duration: 16
Total Land Use Area to be Developed: 4.66 acres
Maximum Acreage Disturbed Per Day: 2.33 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 44000

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2005***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	3.78	-	3.78
Off-Road Diesel	5.50	46.04	37.68	-	2.15	2.15	0.00
On-Road Diesel	1.81	40.77	6.77	0.55	0.96	0.82	0.14
Worker Trips	0.06	0.16	1.56	0.00	0.01	0.00	0.01
Maximum lbs/day	7.37	86.97	46.01	0.55	6.90	2.97	3.93
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	10.44	-	10.44
Off-Road Diesel	5.54	38.69	43.92	-	1.67	1.67	0.00
On-Road Diesel	3.39	61.79	12.69	1.03	1.79	1.53	0.26
Worker Trips	0.04	0.02	0.46	0.00	0.01	0.00	0.01
Maximum lbs/day	8.97	100.50	57.07	1.03	13.91	3.20	10.71
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	7.12	54.95	52.19	-	2.45	2.45	0.00
Bldg Const Worker Trips	0.13	0.07	1.49	0.00	0.02	0.00	0.02
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	7.24	55.02	53.67	0.00	2.47	2.45	0.02
Max lbs/day all phases	8.97	100.50	57.07	1.03	13.91	3.20	10.71
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	7.12	52.89	53.55	-	2.30	2.30	0.00
Bldg Const Worker Trips	0.12	0.07	1.41	0.00	0.02	0.00	0.02
Arch Coatings Off-Gas	37.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.11	0.05	1.33	0.00	0.02	0.00	0.02
Asphalt Off-Gas	0.03	-	-	-	-	-	-
Asphalt Off-Road Diesel	1.04	8.29	7.38	-	0.38	0.38	0.00
Asphalt On-Road Diesel	0.01	0.11	0.03	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.01	0.00	0.07	0.00	0.00	0.00	0.00
Maximum lbs/day	38.19	52.96	54.96	0.00	2.33	2.31	0.02
Max lbs/day all phases	38.19	52.96	54.96	0.00	2.33	2.31	0.02

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
Phase 2: Stockpiles: Cover all stock piles with tarps
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)

Phase 1 - Demolition Assumptions
Start Month/Year for Phase 1: Mar '05
Phase 1 Duration: 1.0 months
Building Volume Total (cubic feet): 90000
Building Volume Daily (cubic feet): 9000
On-Road Truck Travel (VMT): 1335
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Other Equipment	50	0.620	8.0
1	Rubber Tired Dozers	352	0.590	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Apr '05
Phase 2 Duration: 1 months
On-Road Truck Travel (VMT): 2500
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Excavators	180	0.580	8.0
1	Graders	174	0.575	8.0
3	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: May '05
Phase 3 Duration: 14 months
Start Month/Year for SubPhase Building: Jun '05
SubPhase Building Duration: 10 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Concrete/Industrial saws	84	0.730	8.0
1	Cranes	190	0.430	4.0
3	Other Equipment	50	0.620	8.0
1	Paving Equipment	111	0.530	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
1	Skid Steer Loaders	62	0.515	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Start Month/Year for SubPhase Architectural Coatings: Apr '06
SubPhase Architectural Coatings Duration: 2 months
Start Month/Year for SubPhase Asphalt: May '06
SubPhase Asphalt Duration: 1.5 months
Acres to be Paved: 0.4
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Paving Equipment	111	0.530	8.0

MTA-Jefferson (Mitigated)

URBEMIS 2002 For Windows 7.5.0

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA Jefferson\Air Quality\URBEMIS\Jefferson (Construction) - Mitigated - Revised.urb
Project Name: Jefferson (Construction)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: March, 2005
Construction Duration: 16
Total Land Use Area to be Developed: 4.66 acres
Maximum Acreage Disturbed Per Day: 2.33 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 44000

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2005***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	3.78	-	3.78
Off-Road Diesel	5.22	43.74	35.80	-	2.04	2.04	0.00
On-Road Diesel	1.81	40.77	6.77	0.55	0.96	0.82	0.14
Worker Trips	0.06	0.16	1.56	0.00	0.01	0.00	0.01
Maximum lbs/day	7.10	84.67	44.13	0.55	6.79	2.86	3.93
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	7.91	-	7.91
Off-Road Diesel	5.26	36.76	41.72	-	1.59	1.59	0.00
On-Road Diesel	3.39	61.79	12.69	1.03	1.79	1.53	0.26
Worker Trips	0.04	0.02	0.46	0.00	0.01	0.00	0.01
Maximum lbs/day	8.69	98.57	54.87	1.03	11.29	3.12	8.18
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.76	52.20	49.58	-	2.33	2.33	0.00
Bldg Const Worker Trips	0.13	0.07	1.49	0.00	0.02	0.00	0.02
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	6.89	52.27	51.06	0.00	2.35	2.33	0.02
Max lbs/day all phases	8.69	98.57	54.87	1.03	11.29	3.12	8.18
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.76	50.25	50.87	-	2.18	2.18	0.00
Bldg Const Worker Trips	0.12	0.07	1.41	0.00	0.02	0.00	0.02
Arch Coatings Off-Gas	37.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.11	0.05	1.33	0.00	0.02	0.00	0.02
Asphalt Off-Gas	0.03	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.99	7.88	7.01	-	0.36	0.36	0.00
Asphalt On-Road Diesel	0.01	0.11	0.03	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.01	0.00	0.07	0.00	0.00	0.00	0.00
Maximum lbs/day	38.14	50.31	52.28	0.00	2.21	2.19	0.02
Max lbs/day all phases	38.14	50.31	52.28	0.00	2.21	2.19	0.02

Construction-Related Mitigation Measures

Phase 1: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)
Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
Phase 2: Soil Disturbance: Water exposed surfaces - 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 50.0%)
Phase 2: Stockpiles: Cover all stock piles with tarps
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 2: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)
Phase 3: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)
Phase 3: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)

Phase 1 - Demolition Assumptions
Start Month/Year for Phase 1: Mar '05
Phase 1 Duration: 1.0 months
Building Volume Total (cubic feet): 90000
Building Volume Daily (cubic feet): 9000
On-Road Truck Travel (VMT): 1335
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Other Equipment	50	0.620	8.0
1	Rubber Tired Dozers	352	0.590	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Apr '05
Phase 2 Duration: 1 months
On-Road Truck Travel (VMT): 2500
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Excavators	180	0.580	8.0
1	Graders	174	0.575	8.0
3	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: May '05
Phase 3 Duration: 14 months
Start Month/Year for SubPhase Building: Jun '05
SubPhase Building Duration: 10 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Concrete/Industrial saws	84	0.730	8.0
1	Cranes	190	0.430	4.0
3	Other Equipment	50	0.620	8.0
1	Paving Equipment	111	0.530	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
1	Skid Steer Loaders	62	0.515	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Start Month/Year for SubPhase Architectural Coatings: Apr '06
SubPhase Architectural Coatings Duration: 2 months
Start Month/Year for SubPhase Asphalt: May '06
SubPhase Asphalt Duration: 1.5 months
Acres to be Paved: 0.4
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Paving Equipment	111	0.530	8.0

MTA Division 6 Bus Maintenance Facility

Regional Emission Calculations (lbs/day)

	CO	NOx	PM10	ROC	SOx
Project					
Mobile	-190	-23	-18	-14	-0.2
Stationary	0.3	0.8	0.0	0.1	0.1
Total Project	**-190**	**-22**	**-18**	**-14**	**-0.1**
SCAQMD Significance Threshold	550	55	150	55	150
Difference	**(740)**	**(77)**	**(168)**	**(69)**	**(150)**
Significant?	**No**	**No**	**No**	**No**	**No**

Electricity Usage

		Electricity			Emission Factors (lbs/MWh) [b]				
		Usage Rate [a]	Total Electricity Usage		CO	ROC	NOx	PM10	SOx
Land Use	1,000 Sqft	(kWh\sq.ft\yr)	(KWh\year)	(MWh\Day)	0.2	0.01	1.15	0.04	0.12
Project									
Bus Depot	30.0	10.5	315,000	0.863	**0.173**	**0.009**	**0.992**	**0.035**	**0.104**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[b] Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

MTA Jefferson Operations - CO

URBEMIS 2002 For Windows 7.4.2

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA Jefferson\URBEMIS - Operations (Sam).urb
Project Name: Jefferson Boulevard MTA Bus Maitenance Facility - Operations
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Winter)

AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.06	0.81	0.32	-	0.00
Wood Stoves	0.00	0.00	0.00	0.00	0.00
Fireplaces	0.00	0.00	0.00	0.00	0.00
Landscaping - No winter emissions					
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.06	0.81	0.32	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Bus Depot	15.35	27.11	190.37	0.18	18.06
TOTAL EMISSIONS (lbs/day)	15.35	27.11	190.37	0.18	18.06

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2005 Temperature (F): 60 Season: Winter

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Bus Depot	38.50 trips / 1000 sq. ft.	30.00	1,155.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	56.10	2.30	97.10	0.60
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.50	1.90	96.80	1.30
Med Truck 5,751- 8,500	6.80	1.50	95.60	2.90
Lite-Heavy 8,501-10,000	1.00	0.00	80.00	20.00
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.80	0.00	12.50	87.50
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.60	87.50	12.50	0.00
School Bus	0.30	0.00	0.00	100.00
Motor Home	1.40	14.30	78.60	7.10

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
Bus Depot				100.0	0.0	0.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2005.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 75.
The operational summer selection item changed from 8 to 5.
The double counting other trip limit changed from to -577.5

MTA Jefferson Operations - NOx

URBEMIS 2002 For Windows 7.4.2

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA Jefferson\URBEMIS - Operations (Sam).urb
Project Name: Jefferson Boulevard MTA Bus Maitenance Facility - Operations
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.06	0.81	0.32	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.06	0.81	0.32	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Bus Depot	13.41	23.22	183.53	0.18	18.06
TOTAL EMISSIONS (lbs/day)	13.41	23.22	183.53	0.18	18.06

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2005 Temperature (F): 75 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Bus Depot	38.50 trips / 1000 sq. ft.	30.00	1,155.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	56.10	2.30	97.10	0.60
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.50	1.90	96.80	1.30
Med Truck 5,751- 8,500	6.80	1.50	95.60	2.90
Lite-Heavy 8,501-10,000	1.00	0.00	80.00	20.00
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.80	0.00	12.50	87.50
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.60	87.50	12.50	0.00
School Bus	0.30	0.00	0.00	100.00
Motor Home	1.40	14.30	78.60	7.10

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
Bus Depot				100.0	0.0	0.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2005.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 75.
The operational summer selection item changed from 8 to 5.
The double counting other trip limit changed from to -577.5.

MTA Jefferson Operations - ROG

URBEMIS 2002 For Windows 7.4.2

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA Jefferson\URBEMIS - Operations (Sam).urb
Project Name: Jefferson Boulevard MTA Bus Maitenance Facility - Operations
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.06	0.81	0.32	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.06	0.81	0.32	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Bus Depot	14.32	21.37	210.60	0.19	18.06
TOTAL EMISSIONS (lbs/day)	14.32	21.37	210.60	0.19	18.06

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2005 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Bus Depot	38.50 trips / 1000 sq. ft.	30.00	1,155.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	56.10	2.30	97.10	0.60
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.50	1.90	96.80	1.30
Med Truck 5,751- 8,500	6.80	1.50	95.60	2.90
Lite-Heavy 8,501-10,000	1.00	0.00	80.00	20.00
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.80	0.00	12.50	87.50
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.60	87.50	12.50	0.00
School Bus	0.30	0.00	0.00	100.00
Motor Home	1.40	14.30	78.60	7.10

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
Bus Depot				100.0	0.0	0.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2005.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 85.
The operational summer selection item changed from 8 to 6.
The double counting other trip limit changed from to -577.5.

MTA - Jefferson

CALINE4 Modeling Results and Estimated Local 1-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 1-Hour CO Concentrations (ppm) [a]

Monitoring Station: West LA

Year	1-Hr Concentration
2006	4.96

Intersection and Receptor Locations	Future Without Project		Future With Project + Mitigation		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
Jefferson Boulevard and National Boulevard AM					
NE	3.1	8.1	3.2	8.2	NO
SE	2.1	7.1	2.2	7.2	NO
SW	3.0	8.0	3.1	8.1	NO
NW	3.1	8.1	3.2	8.2	NO
Jefferson Boulevard and National Boulevard PM					
NE	3.2	8.2	3.4	8.4	NO
SE	3.0	8.0	3.1	8.1	NO
SW	3.3	8.3	3.5	8.5	NO
NW	2.8	7.8	3.1	8.1	NO
Jefferson Boulevard and La Cienega Boulevard AM					
NE	4.9	9.9	5.0	10.0	NO
SE	4.2	9.2	4.2	9.2	NO
SW	3.6	8.6	3.7	8.7	NO
NW	3.8	8.8	3.9	8.9	NO
Jefferson Boulevard and La Cienega Boulevard PM					
NE	4.3	9.3	4.3	9.3	NO
SE	5.2	10.2	5.2	10.2	NO
SW	4.6	9.6	4.6	9.6	NO
NW	3.8	8.8	3.8	8.8	NO
Jefferson Boulevard and Rodeo Road AM					
NE	2.8	7.8	2.8	7.8	NO
SE	2.2	7.2	2.2	7.2	NO
SW	3.0	8.0	3.1	8.1	NO
NW	4.2	9.2	4.2	9.2	NO
Jefferson Boulevard and Rodeo Road PM					
NE	2.2	7.2	2.2	7.2	NO
SE	2.2	7.2	2.2	7.2	NO
SW	2.2	7.2	2.3	7.3	NO
NW	2.5	7.5	2.5	7.5	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The 1-hour traffic contribution (ppm) is determined by inputing total traffic volumes into the CALINE4 model.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 1-hour CO concentrations is 20 ppm.

MTA - Jefferson

CALINE4 Modeling Results and Estimated Local 8-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 8-Hour CO Concentrations (ppm) [a]

Monitoring Station: West LA

Year	8-Hr Concentration
2006	3.12

Average Persistence Factor = 0.70

Intersection and Receptor Locations	Future Without Project		Future With Project + Mitigation		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
Jefferson Boulevard and National Boulevard AM					
NE	1.8	4.9	1.8	4.9	NO
SE	1.1	4.2	1.2	4.3	NO
SW	1.7	4.8	1.8	4.9	NO
NW	1.6	4.7	1.7	4.8	NO
Jefferson Boulevard and National Boulevard PM					
NE	1.8	4.9	1.9	5.0	NO
SE	1.5	4.7	1.6	4.7	NO
SW	1.8	4.9	1.9	5.0	NO
NW	1.5	4.7	1.8	4.9	NO
Jefferson Boulevard and La Cienega Boulevard AM					
NE	2.6	5.7	2.7	5.8	NO
SE	2.1	5.2	2.1	5.2	NO
SW	2.2	5.3	2.2	5.3	NO
NW	2.1	5.2	2.1	5.2	NO
Jefferson Boulevard and La Cienega Boulevard PM					
NE	2.5	5.6	2.5	5.6	NO
SE	2.6	5.7	2.6	5.7	NO
SW	2.5	5.6	2.5	5.6	NO
NW	2.0	5.2	2.1	5.2	NO
Jefferson Boulevard and Rodeo Road AM					
NE	1.8	4.9	1.8	4.9	NO
SE	1.2	4.3	1.2	4.3	NO
SW	1.8	4.9	1.8	4.9	NO
NW	2.0	5.1	2.0	5.1	NO
Jefferson Boulevard and Rodeo Road PM					
NE	1.3	4.4	1.3	4.4	NO
SE	1.2	4.3	1.2	4.3	NO
SW	1.2	4.3	1.2	4.3	NO
NW	1.3	4.5	1.3	4.5	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The persistence factor is calculated as recommended in Table B.15 in the Transportation Project-Level Carbon Monoxide Protocol (Institute of Transportation Studies, UC Davis, Revised 1997). This is a generalized persistence factor likely to provide a conservative estimate in most situations.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 8-hour CO concentrations is 9 ppm.

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and National Boule AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S   Z0= 100. CM   ALT= 0. (FT)
BRG= WORST CASE   VD= .0 CM/S
CLAS= 7 (G)   VS= .0 CM/S
MIXH= 1000. M   AMB= .0 PPM
SIGTH= 5. DEGREES   TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	605	5.2	.0	50.0
B. NA	15	-500	15	0	AG	605	13.1	.0	33.0
C. ND	1800	0	1900	0	AG	0	7.0	.0	33.0
D. NE	1800	0	1900	0	AG	0	5.2	.0	50.0
E. SF	1800	0	1900	0	AG	0	5.2	.0	35.0
F. SA	1800	0	1900	0	AG	0	12.2	.0	33.0
G. SD	-15	0	-15	-500	AG	1237	13.1	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1237	5.2	.0	50.0
I. WF	1500	23	500	23	AG	1886	5.2	.0	50.0
J. WA	500	23	0	23	AG	854	7.7	.0	45.0
K. WD	0	23	-500	23	AG	854	5.5	.0	33.0
L. WE	-500	23	-1500	23	AG	854	5.2	.0	50.0
M. EF	-1500	-23	-500	-23	AG	521	5.2	.0	50.0
N. EA	-500	-23	0	-23	AG	521	7.7	.0	33.0
O. ED	0	-23	500	-23	AG	921	5.6	.0	33.0
P. EE	500	-23	1500	-23	AG	921	5.2	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	12.2	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	12.2	.0	33.0
S. WL	0	0	500	15	AG	1032	7.9	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	7.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	48	6.0
2. SE3	40	-48	6.0
3. SW3	-40	-48	6.0
4. NW3	-40	48	6.0
5. NE7	53	61	6.0
6. SE7	53	-61	6.0
7. SW7	-53	-61	6.0
8. NW7	-53	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. NE3	188.	3.1	.0	1.1	.0	.0	.0	.0	.9	.1
2. SE3	189.	2.1	.0	1.1	.0	.0	.0	.0	.9	.1
3. SW3	82.	3.0	.0	.3	.0	.0	.0	.0	.9	.0
4. NW3	174.	3.1	.1	.4	.0	.0	.0	.0	2.0	.1
5. NE7	191.	2.5	.0	.8	.0	.0	.0	.0	.9	.0
6. SE7	276.	1.6	.0	.4	.0	.0	.0	.0	.5	.0
7. SW7	80.	2.4	.0	.3	.0	.0	.0	.0	.7	.0
8. NW7	171.	2.3	.0	.4	.0	.0	.0	.0	1.4	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
	CONC/LINK (PPM)											
1. NE3	.0	.4	.0	.0	.0	.0	.2	.0	.0	.0	.3	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.3	.3	.0	.0	.0	.0	.7	.0	.0	.0	.5	.0
4. NW3	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.3	.0	.0	.0	.0	.2	.0	.0	.0	.3	.0
6. SE7	.0	.0	.0	.2	.0	.4	.0	.0	.0	.0	.0	.0
7. SW7	.2	.3	.0	.0	.0	.0	.5	.0	.0	.0	.5	.0
8. NW7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and National Boule PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	.5 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	993	5.2	.0	50.0
B. NA	15	-500	15	0	AG	993	13.1	.0	33.0
C. ND	1800	0	1900	0	AG	0	6.3	.0	33.0
D. NE	1800	0	1900	0	AG	0	5.2	.0	50.0
E. SF	1800	0	1900	0	AG	0	5.2	.0	35.0
F. SA	1800	0	1900	0	AG	0	10.6	.0	33.0
G. SD	-15	0	-15	-500	AG	1025	10.2	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1025	5.2	.0	50.0
I. WF	1500	23	500	23	AG	972	5.2	.0	50.0
J. WA	500	23	0	23	AG	330	7.4	.0	45.0
K. WD	0	23	-500	23	AG	330	5.5	.0	33.0
L. WE	-500	23	-1500	23	AG	330	5.2	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1445	5.2	.0	50.0
N. EA	-500	-23	0	-23	AG	1445	8.7	.0	33.0
O. ED	0	-23	500	-23	AG	2055	6.5	.0	33.0
P. EE	500	-23	1500	-23	AG	2055	5.2	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	10.6	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	10.6	.0	33.0
S. WL	0	0	500	15	AG	642	7.7	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	7.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	48	6.0
2. SE3	40	-48	6.0
3. SW3	-40	-48	6.0
4. NW3	-40	48	6.0
5. NE7	53	61	6.0
6. SE7	53	-61	6.0
7. SW7	-53	-61	6.0
8. NW7	-53	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	3.2	.0	1.7	.0	.0	.0	.0	.5	.2
2. SE3	276.	3.0	.0	.7	.0	.0	.0	.0	.4	.0
3. SW3	84.	3.3	.0	.5	.0	.0	.0	.0	.6	.0
4. NW3	173.	2.8	.2	.7	.0	.0	.0	.0	1.4	.0
5. NE7	189.	2.5	.0	1.2	.0	.0	.0	.0	.5	.0
6. SE7	277.	2.2	.0	.6	.0	.0	.0	.0	.4	.0
7. SW7	82.	2.5	.0	.4	.0	.0	.0	.0	.5	.0
8. NW7	171.	2.2	.0	.7	.0	.0	.0	.0	1.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.4	.0	.0	.0	.2	.0
2. SE3	.0	.0	.0	.1	.1	1.5	.0	.0	.0	.0	.0	.0
3. SW3	.3	.0	.0	.0	.0	.0	1.5	.2	.0	.0	.2	.0
4. NW3	.0	.0	.1	.0	.0	.4	.0	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.4	.0	.0	.0	.2	.0
6. SE7	.0	.0	.0	.0	.1	1.0	.0	.0	.0	.0	.0	.0
7. SW7	.2	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.2	.0
8. NW7	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and La Cienega Bou AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	3139	4.9	.0	65.0
B. NA	30	-500	30	0	AG	2973	8.2	.0	60.0
C. ND	30	0	30	500	AG	3593	6.1	.0	45.0
D. NE	30	500	30	1500	AG	3593	4.9	.0	65.0
E. SF	-30	1500	-30	500	AG	2056	4.9	.0	65.0
F. SA	-30	500	-30	0	AG	1968	7.4	.0	60.0
G. SD	-30	0	-30	-500	AG	1677	5.3	.0	45.0
H. SE	-30	-500	-30	-1500	AG	1677	4.9	.0	65.0
I. WF	1500	30	500	30	AG	1152	5.8	.0	50.0
J. WA	500	30	0	30	AG	1037	10.8	.0	60.0
K. WD	0	30	-500	30	AG	1417	12.2	.0	33.0
L. WE	-500	30	-1500	30	AG	1417	5.8	.0	50.0
M. EF	-1500	-30	-500	-30	AG	1091	5.8	.0	50.0
N. EA	-500	-30	0	-30	AG	605	10.4	.0	60.0
O. ED	0	-30	500	-30	AG	751	7.7	.0	33.0
P. EE	500	-30	1500	-30	AG	751	5.8	.0	50.0
Q. NL	0	0	15	-500	AG	166	7.0	.0	33.0
R. SL	0	0	-15	500	AG	88	7.0	.0	33.0
S. WL	0	0	500	23	AG	115	10.4	.0	33.0
T. EL	0	0	-500	-23	AG	486	10.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	63	55	6.0
2. SE3	63	-55	6.0
3. SW3	-63	-55	6.0
4. NW3	-63	55	6.0
5. NE7	76	68	6.0
6. SE7	76	-68	6.0
7. SW7	-76	-68	6.0
8. NW7	-76	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	264.	4.9	.0	.0	1.1	.0	.0	.4	.0	.0
2. SE3	352.	4.2	.0	.7	2.0	.1	.4	.3	.0	.0
3. SW3	6.	3.6	.0	.0	.1	.6	.2	1.6	.0	.0
4. NW3	169.	3.8	.2	.8	.0	.0	.0	.5	.9	.0
5. NE7	258.	3.7	.0	.0	.9	.0	.0	.4	.0	.0
6. SE7	279.	3.0	.0	1.1	.0	.0	.0	.0	.2	.0
7. SW7	8.	3.1	.0	.0	.2	.6	.1	1.2	.0	.0
8. NW7	162.	3.0	.0	.9	.0	.0	.0	.2	.6	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.6	2.0	.1	.3	.1	.0	.0	.0	.0	.0	.1
2. SE3	.0	.4	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	.0	.0	.5	.0	.0	.3	.0	.0	.0	.0	.0	.2
4. NW3	.0	.0	1.0	.0	.0	.2	.0	.0	.0	.0	.0	.2
5. NE7	.0	.3	1.4	.0	.0	.3	.0	.0	.0	.0	.0	.3
6. SE7	.0	.0	.3	.3	.0	.6	.0	.0	.0	.0	.0	.3
7. SW7	.0	.0	.5	.0	.0	.3	.0	.0	.0	.0	.0	.2
8. NW7	.0	.0	.8	.0	.0	.2	.0	.0	.0	.0	.0	.2

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and La Cienega Bou PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
     U=    .5 M/S             Z0= 100. CM            ALT=     0. (FT)
   BRG= WORST CASE            VD=   .0 CM/S
  CLAS=     7 (G)             VS=   .0 CM/S
  MIXH= 1000. M              AMB=   .0 PPM
 SIGTH=    5. DEGREES       TEMP=   .5 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	2636	4.9	.0	65.0
B. NA	30	-500	30	0	AG	2563	8.8	.0	60.0
C. ND	30	0	30	500	AG	3426	8.2	.0	45.0
D. NE	30	500	30	1500	AG	3426	4.9	.0	65.0
E. SF	-30	1500	-30	500	AG	1931	4.9	.0	65.0
F. SA	-30	500	-30	0	AG	1857	8.5	.0	60.0
G. SD	-30	0	-30	-500	AG	2084	5.8	.0	45.0
H. SE	-30	-500	-30	-1500	AG	2084	4.9	.0	65.0
I. WF	1500	30	500	30	AG	832	5.8	.0	50.0
J. WA	500	30	0	30	AG	768	9.5	.0	60.0
K. WD	0	30	-500	30	AG	725	6.8	.0	33.0
L. WE	-500	30	-1500	30	AG	725	5.8	.0	50.0
M. EF	-1500	-30	-500	-30	AG	2374	5.8	.0	50.0
N. EA	-500	-30	0	-30	AG	1606	10.4	.0	60.0
O. ED	0	-30	500	-30	AG	1538	10.8	.0	33.0
P. EE	500	-30	1500	-30	AG	1538	5.8	.0	50.0
Q. NL	0	0	15	-500	AG	73	7.9	.0	33.0
R. SL	0	0	-15	500	AG	74	7.9	.0	33.0
S. WL	0	0	500	23	AG	64	9.5	.0	33.0
T. EL	0	0	-500	-23	AG	768	10.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	63	55	6.0
2. SE3	63	-55	6.0
3. SW3	-63	-55	6.0
4. NW3	-63	55	6.0
5. NE7	76	68	6.0
6. SE7	76	-68	6.0
7. SW7	-76	-68	6.0
8. NW7	-76	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	259.	4.3	.0	.0	1.4	.0	.0	.5	.0	.0
2. SE3	352.	5.2	.0	.7	2.5	.1	.4	.3	.0	.0
3. SW3	84.	4.6	.0	.7	.0	.0	.0	.0	.6	.0
4. NW3	169.	3.8	.2	.8	.0	.0	.0	.5	1.1	.0
5. NE7	257.	3.6	.0	.0	1.2	.0	.0	.4	.0	.0
6. SE7	344.	3.7	.0	.3	1.7	.0	.0	.6	.0	.0
7. SW7	10.	3.5	.0	.0	.5	.4	.0	1.3	.0	.0
8. NW7	164.	2.9	.0	.9	.0	.0	.0	.2	.8	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.4	.5	.0	.1	.7	.0	.0	.0	.0	.0	.6
2. SE3	.0	.2	.0	.0	.0	.0	.9	.0	.0	.0	.0	.0
3. SW3	.3	.1	.0	.0	.0	.8	1.9	.1	.0	.0	.0	.0
4. NW3	.0	.0	.3	.0	.0	.5	.0	.0	.0	.0	.0	.3
5. NE7	.0	.2	.4	.0	.0	.7	.0	.0	.0	.0	.0	.5
6. SE7	.0	.2	.0	.0	.0	.0	.8	.0	.0	.0	.0	.0
7. SW7	.0	.0	.1	.0	.0	.8	.0	.0	.0	.0	.0	.3
8. NW7	.0	.0	.2	.0	.0	.5	.0	.0	.0	.0	.0	.3

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and Rodeo Road AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	664	4.9	.0	50.0
B. NA	23	-500	23	0	AG	583	8.8	.0	45.0
C. ND	23	0	23	500	AG	647	5.7	.0	33.0
D. NE	23	500	23	1500	AG	647	4.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1222	4.9	.0	50.0
F. SA	-23	500	-23	0	AG	1060	9.5	.0	45.0
G. SD	-23	0	-23	-500	AG	2077	11.4	.0	33.0
H. SE	-23	-500	-23	-1500	AG	2077	4.9	.0	50.0
I. WF	1500	30	500	30	AG	2149	4.9	.0	35.0
J. WA	500	30	0	30	AG	1065	8.8	.0	45.0
K. WD	0	30	-500	30	AG	1166	9.1	.0	33.0
L. WE	-500	30	-1500	30	AG	1166	4.9	.0	35.0
M. EF	-1500	-23	-500	-23	AG	106	4.9	.0	50.0
N. EA	-500	-23	0	-23	AG	100	8.2	.0	45.0
O. ED	0	-23	500	-23	AG	251	5.5	.0	33.0
P. EE	500	-23	1500	-23	AG	251	4.9	.0	50.0
Q. NL	0	0	15	-500	AG	81	8.8	.0	33.0
R. SL	0	0	-15	500	AG	162	8.8	.0	33.0
S. WL	0	0	500	30	AG	1084	8.8	.0	33.0
T. EL	0	0	-500	-15	AG	6	8.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	189.	2.8	.0	.7	.0	.0	.0	.0	.9	.2
2. SE3	351.	2.2	.0	.2	.5	.0	.1	.5	.0	.0
3. SW3	78.	3.0	.0	.2	.0	.0	.0	.0	1.3	.0
4. NW3	173.	4.2	.1	.2	.0	.0	.0	.3	2.6	.0
5. NE7	191.	2.5	.0	.5	.0	.0	.0	.0	.9	.1
6. SE7	348.	1.7	.0	.0	.3	.0	.0	.5	.0	.0
7. SW7	77.	2.5	.0	.2	.0	.0	.0	.0	1.0	.0
8. NW7	171.	2.8	.0	.2	.0	.0	.0	.0	1.8	.0

CONC/LINK (PPM) for columns A–H.

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
2. SE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.1	.4	.0
3. SW3	.0	.5	.0	.0	.0	.0	.2	.0	.0	.0	.7	.0
4. NW3	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
6. SE7	.0	.3	.0	.0	.0	.0	.0	.0	.0	.1	.3	.0
7. SW7	.0	.4	.0	.0	.0	.0	.1	.0	.0	.0	.6	.0
8. NW7	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and Rodeo Road PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)	
BRG= WORST CASE	VD= .0 CM/S		
CLAS= 7 (G)	VS= .0 CM/S		
MIXH= 1000. M	AMB= .0 PPM		
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
	LINK COORDINATES (FT)								
A. NF	23	-1500	23	-500	AG	801	4.9	.0	50.0
B. NA	23	-500	23	0	AG	751	8.2	.0	45.0
C. ND	23	0	23	500	AG	828	5.5	.0	33.0
D. NE	23	500	23	1500	AG	828	4.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1218	4.9	.0	50.0
F. SA	-23	500	-23	0	AG	782	8.2	.0	45.0
G. SD	-23	0	-23	-500	AG	1476	6.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1476	4.9	.0	50.0
I. WF	1500	30	500	30	AG	1181	4.9	.0	35.0
J. WA	500	30	0	30	AG	528	8.8	.0	45.0
K. WD	0	30	-500	30	AG	569	6.6	.0	33.0
L. WE	-500	30	-1500	30	AG	569	4.9	.0	35.0
M. EF	-1500	-23	-500	-23	AG	475	4.9	.0	50.0
N. EA	-500	-23	0	-23	AG	438	8.8	.0	45.0
O. ED	0	-23	500	-23	AG	802	5.7	.0	33.0
P. EE	500	-23	1500	-23	AG	802	4.9	.0	50.0
Q. NL	0	0	15	-500	AG	50	8.2	.0	33.0
R. SL	0	0	-15	500	AG	436	8.5	.0	33.0
S. WL	0	0	500	30	AG	653	9.1	.0	33.0
T. EL	0	0	-500	-15	AG	37	8.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
	COORDINATES (FT)		
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. NE3	185.	2.2	.1	.9	.0	.0	.0	.0	.1	.4
2. SE3	351.	2.2	.0	.2	.6	.0	.1	.3	.0	.0
3. SW3	80.	2.2	.0	.2	.0	.0	.0	.0	.5	.0
4. NW3	95.	2.5	.0	.0	.2	.0	.0	.4	.0	.0
5. NE7	188.	1.8	.0	.6	.0	.0	.0	.0	.2	.3
6. SE7	350.	1.7	.0	.0	.4	.0	.1	.3	.0	.0
7. SW7	77.	1.7	.0	.2	.0	.0	.0	.0	.4	.0
8. NW7	96.	1.9	.0	.0	.1	.0	.0	.3	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
	CONC/LINK (PPM)											
1. NE3	.0	.3	.0	.0	.0	.0	.2	.0	.0	.0	.3	.0
2. SE3	.0	.2	.0	.0	.0	.0	.3	.0	.0	.3	.2	.0
3. SW3	.0	.2	.0	.0	.0	.2	.6	.0	.0	.0	.5	.0
4. NW3	.1	.7	.2	.0	.0	.0	.0	.2	.0	.2	.4	.0
5. NE7	.0	.3	.0	.0	.0	.0	.1	.0	.0	.0	.2	.0
6. SE7	.0	.2	.0	.0	.0	.0	.2	.0	.0	.2	.2	.0
7. SW7	.0	.2	.0	.0	.0	.0	.4	.0	.0	.0	.4	.0
8. NW7	.1	.6	.0	.0	.0	.0	.0	.2	.0	.1	.4	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and National Boule AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	632	5.2	.0	50.0
B. NA	15	-500	15	0	AG	632	13.1	.0	33.0
C. ND	1800	0	1900	0	AG	0	7.0	.0	33.0
D. NE	1800	0	1900	0	AG	0	5.2	.0	50.0
E. SF	1800	0	1900	0	AG	0	5.2	.0	35.0
F. SA	1800	0	1900	0	AG	0	12.2	.0	33.0
G. SD	-15	0	-15	-500	AG	1295	13.1	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1295	5.2	.0	50.0
I. WF	1500	23	500	23	AG	1944	5.2	.0	50.0
J. WA	500	23	0	23	AG	854	7.7	.0	45.0
K. WD	0	23	-500	23	AG	854	5.5	.0	33.0
L. WE	-500	23	-1500	23	AG	854	5.2	.0	50.0
M. EF	-1500	-23	-500	-23	AG	521	5.2	.0	50.0
N. EA	-500	-23	0	-23	AG	521	7.7	.0	33.0
O. ED	0	-23	500	-23	AG	948	5.6	.0	33.0
P. EE	500	-23	1500	-23	AG	948	5.2	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	12.2	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	12.2	.0	33.0
S. WL	0	0	500	15	AG	1090	7.9	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	7.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	48	6.0
2. SE3	40	-48	6.0
3. SW3	-40	-48	6.0
4. NW3	-40	48	6.0
5. NE7	53	61	6.0
6. SE7	53	-61	6.0
7. SW7	-53	-61	6.0
8. NW7	-53	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	188.	3.2	.0	1.1	.0	.0	.0	.0	1.0	.1
2. SE3	189.	2.2	.0	1.1	.0	.0	.0	.0	.9	.1
3. SW3	82.	3.1	.0	.3	.0	.0	.0	.0	1.0	.0
4. NW3	174.	3.2	.1	.4	.0	.0	.0	.0	2.1	.1
5. NE7	191.	2.6	.0	.8	.0	.0	.0	.0	.9	.0
6. SE7	276.	1.7	.0	.4	.0	.0	.0	.0	.6	.0
7. SW7	80.	2.5	.0	.3	.0	.0	.0	.0	.8	.0
8. NW7	171.	2.4	.0	.5	.0	.0	.0	.0	1.5	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.4	.0	.0	.0	.0	.2	.0	.0	.0	.4	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.3	.3	.0	.0	.0	.0	.7	.0	.0	.0	.5	.0
4. NW3	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.3	.0	.0	.0	.0	.2	.0	.0	.0	.3	.0
6. SE7	.0	.0	.0	.2	.0	.4	.0	.0	.0	.0	.0	.0
7. SW7	.2	.3	.0	.0	.0	.0	.5	.0	.0	.0	.5	.0
8. NW7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and National Boule PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1007	5.2	.0	50.0
B. NA	15	-500	15	0	AG	1007	13.1	.0	33.0
C. ND	1800	0	1900	0	AG	0	6.3	.0	33.0
D. NE	1800	0	1900	0	AG	0	5.2	.0	50.0
E. SF	1800	0	1900	0	AG	0	5.2	.0	35.0
F. SA	1800	0	1900	0	AG	0	10.6	.0	33.0
G. SD	-15	0	-15	-500	AG	1101	12.2	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1101	5.2	.0	50.0
I. WF	1500	23	500	23	AG	1048	5.2	.0	50.0
J. WA	500	23	0	23	AG	330	7.4	.0	45.0
K. WD	0	23	-500	23	AG	330	5.5	.0	33.0
L. WE	-500	23	-1500	23	AG	330	5.2	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1445	5.2	.0	50.0
N. EA	-500	-23	0	-23	AG	1445	8.7	.0	33.0
O. ED	0	-23	500	-23	AG	2069	6.5	.0	33.0
P. EE	500	-23	1500	-23	AG	2069	5.2	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	10.6	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	10.6	.0	33.0
S. WL	0	0	500	15	AG	718	7.7	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	7.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	48	6.0
2. SE3	40	-48	6.0
3. SW3	-40	-48	6.0
4. NW3	-40	48	6.0
5. NE7	53	61	6.0
6. SE7	53	-61	6.0
7. SW7	-53	-61	6.0
8. NW7	-53	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	187.	3.4	.0	1.7	.0	.0	.0	.0	.7	.2
2. SE3	276.	3.1	.0	.7	.0	.0	.0	.0	.5	.0
3. SW3	83.	3.5	.0	.5	.0	.0	.0	.0	.8	.0
4. NW3	173.	3.1	.2	.7	.0	.0	.0	.0	1.7	.0
5. NE7	189.	2.7	.0	1.2	.0	.0	.0	.0	.7	.1
6. SE7	277.	2.3	.0	.6	.0	.0	.0	.0	.5	.0
7. SW7	82.	2.7	.0	.4	.0	.0	.0	.0	.6	.0
8. NW7	171.	2.5	.0	.7	.0	.0	.0	.0	1.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.4	.0	.0	.0	.2	.0
2. SE3	.0	.0	.0	.1	.1	1.5	.0	.0	.0	.0	.0	.0
3. SW3	.2	.0	.0	.0	.0	.0	1.5	.0	.0	.0	.3	.0
4. NW3	.0	.0	.1	.0	.0	.4	.0	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.4	.0	.0	.0	.2	.0
6. SE7	.0	.0	.0	.0	.1	1.0	.0	.0	.0	.0	.0	.0
7. SW7	.2	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.2	.0
8. NW7	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and La Cienega Bou AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	3139	4.9	.0	65.0
B. NA	30	-500	30	0	AG	2973	8.2	.0	60.0
C. ND	30	0	30	500	AG	3613	6.1	.0	45.0
D. NE	30	500	30	1500	AG	3613	4.9	.0	65.0
E. SF	-30	1500	-30	500	AG	2107	4.9	.0	65.0
F. SA	-30	500	-30	0	AG	2019	7.4	.0	60.0
G. SD	-30	0	-30	-500	AG	1677	5.3	.0	45.0
H. SE	-30	-500	-30	-1500	AG	1677	4.9	.0	65.0
I. WF	1500	30	500	30	AG	1154	5.8	.0	50.0
J. WA	500	30	0	30	AG	1039	10.8	.0	60.0
K. WD	0	30	-500	30	AG	1470	12.2	.0	33.0
L. WE	-500	30	-1500	30	AG	1470	5.8	.0	50.0
M. EF	-1500	-30	-500	-30	AG	1114	5.8	.0	50.0
N. EA	-500	-30	0	-30	AG	608	10.4	.0	60.0
O. ED	0	-30	500	-30	AG	754	7.7	.0	33.0
P. EE	500	-30	1500	-30	AG	754	5.8	.0	50.0
Q. NL	0	0	15	-500	AG	166	7.0	.0	33.0
R. SL	0	0	-15	500	AG	88	7.0	.0	33.0
S. WL	0	0	500	23	AG	115	10.4	.0	33.0
T. EL	0	0	-500	-23	AG	506	10.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	63	55	6.0
2. SE3	63	-55	6.0
3. SW3	-63	-55	6.0
4. NW3	-63	55	6.0
5. NE7	76	68	6.0
6. SE7	76	-68	6.0
7. SW7	-76	-68	6.0
8. NW7	-76	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	263.	5.0	.0	.0	1.1	.0	.0	.4	.0	.0
2. SE3	352.	4.2	.0	.7	2.0	.1	.4	.3	.0	.0
3. SW3	6.	3.7	.0	.0	.1	.6	.2	1.6	.0	.0
4. NW3	169.	3.9	.2	.8	.0	.0	.0	.5	.9	.0
5. NE7	258.	3.8	.0	.0	.9	.0	.0	.4	.0	.0
6. SE7	279.	3.0	.0	1.1	.0	.0	.0	.0	.2	.0
7. SW7	8.	3.1	.0	.0	.2	.6	.1	1.2	.0	.0
8. NW7	162.	3.0	.0	.9	.0	.0	.0	.2	.6	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.6	2.1	.0	.3	.2	.0	.0	.0	.0	.0	.2
2. SE3	.0	.4	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	.0	.0	.5	.0	.0	.3	.0	.0	.0	.0	.0	.2
4. NW3	.0	.0	1.0	.0	.0	.2	.0	.0	.0	.0	.0	.2
5. NE7	.0	.3	1.4	.0	.0	.3	.0	.0	.0	.0	.0	.4
6. SE7	.0	.0	.3	.3	.0	.6	.0	.0	.0	.0	.0	.3
7. SW7	.0	.0	.5	.0	.0	.3	.0	.0	.0	.0	.0	.2
8. NW7	.0	.0	.8	.0	.0	.2	.0	.0	.0	.0	.0	.2

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and La Cienega Bou PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	2636	4.9	.0	65.0
B. NA	30	-500	30	0	AG	2563	8.8	.0	60.0
C. ND	30	0	30	500	AG	3437	8.2	.0	45.0
D. NE	30	500	30	1500	AG	3437	4.9	.0	65.0
E. SF	-30	1500	-30	500	AG	2002	4.9	.0	65.0
F. SA	-30	500	-30	0	AG	1928	8.5	.0	60.0
G. SD	-30	0	-30	-500	AG	2084	5.8	.0	45.0
H. SE	-30	-500	-30	-1500	AG	2084	4.9	.0	65.0
I. WF	1500	30	500	30	AG	833	5.8	.0	50.0
J. WA	500	30	0	30	AG	769	9.5	.0	60.0
K. WD	0	30	-500	30	AG	797	6.8	.0	33.0
L. WE	-500	30	-1500	30	AG	797	5.8	.0	50.0
M. EF	-1500	-30	-500	-30	AG	2388	5.8	.0	50.0
N. EA	-500	-30	0	-30	AG	1609	10.4	.0	60.0
O. ED	0	-30	500	-30	AG	1541	10.8	.0	33.0
P. EE	500	-30	1500	-30	AG	1541	5.8	.0	50.0
Q. NL	0	0	15	-500	AG	73	7.9	.0	33.0
R. SL	0	0	-15	500	AG	74	7.9	.0	33.0
S. WL	0	0	500	23	AG	64	9.5	.0	33.0
T. EL	0	0	-500	-23	AG	779	10.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	63	55	6.0
2. SE3	63	-55	6.0
3. SW3	-63	-55	6.0
4. NW3	-63	55	6.0
5. NE7	76	68	6.0
6. SE7	76	-68	6.0
7. SW7	-76	-68	6.0
8. NW7	-76	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	259.	4.3	.0	.0	1.4	.0	.0	.5	.0	.0
2. SE3	352.	5.2	.0	.7	2.6	.1	.4	.3	.0	.0
3. SW3	84.	4.6	.0	.7	.0	.0	.0	.0	.6	.0
4. NW3	169.	3.8	.2	.8	.0	.0	.0	.5	1.1	.0
5. NE7	257.	3.6	.0	.0	1.2	.0	.0	.5	.0	.0
6. SE7	344.	3.7	.0	.3	1.7	.0	.0	.7	.0	.0
7. SW7	10.	3.6	.0	.0	.5	.4	.0	1.4	.0	.0
8. NW7	164.	3.0	.0	.9	.0	.0	.0	.2	.8	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.4	.6	.0	.1	.7	.0	.0	.0	.0	.0	.6
2. SE3	.0	.2	.0	.0	.0	.0	.9	.0	.0	.0	.0	.0
3. SW3	.3	.1	.0	.0	.0	.8	1.9	.1	.0	.0	.0	.0
4. NW3	.0	.0	.3	.0	.0	.5	.0	.0	.0	.0	.0	.3
5. NE7	.0	.2	.5	.0	.0	.7	.0	.0	.0	.0	.0	.5
6. SE7	.0	.2	.0	.0	.0	.0	.8	.0	.0	.0	.0	.0
7. SW7	.0	.0	.2	.0	.0	.8	.0	.0	.0	.0	.0	.3
8. NW7	.0	.0	.3	.0	.0	.5	.0	.0	.0	.0	.0	.3

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and Rodeo Road AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
	LINK COORDINATES (FT)								
A. NF	23	-1500	23	-500	AG	667	4.9	.0	50.0
B. NA	23	-500	23	0	AG	586	8.8	.0	45.0
C. ND	23	0	23	500	AG	659	5.7	.0	33.0
D. NE	23	500	23	1500	AG	659	4.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1239	4.9	.0	50.0
F. SA	-23	500	-23	0	AG	1066	9.5	.0	45.0
G. SD	-23	0	-23	-500	AG	2083	11.4	.0	33.0
H. SE	-23	-500	-23	-1500	AG	2083	4.9	.0	50.0
I. WF	1500	30	500	30	AG	2158	4.9	.0	35.0
J. WA	500	30	0	30	AG	1074	8.8	.0	45.0
K. WD	0	30	-500	30	AG	1166	9.1	.0	33.0
L. WE	-500	30	-1500	30	AG	1166	4.9	.0	35.0
M. EF	-1500	-23	-500	-23	AG	106	4.9	.0	50.0
N. EA	-500	-23	0	-23	AG	100	8.2	.0	45.0
O. ED	0	-23	500	-23	AG	262	5.5	.0	33.0
P. EE	500	-23	1500	-23	AG	262	4.9	.0	50.0
Q. NL	15	-500	0	0	AG	81	8.8	.0	33.0
R. SL	-15	500	0	0	AG	173	8.8	.0	33.0
S. WL	500	0	0	0	AG	1084	8.8	.0	33.0
T. EL	-500	-15	0	0	AG	6	8.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
	COORDINATES (FT)		
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. NE3	189.	2.8	.0	.7	.0	.0	.0	.0	.9	.2
2. SE3	351.	2.2	.0	.2	.5	.0	.1	.5	.0	.0
3. SW3	81.	3.1	.0	.2	.0	.0	.0	.0	1.3	.0
4. NW3	173.	4.2	.1	.2	.0	.0	.0	.3	2.6	.0
5. NE7	191.	2.5	.0	.5	.0	.0	.0	.0	.9	.1
6. SE7	348.	1.7	.0	.0	.3	.0	.0	.5	.0	.0
7. SW7	80.	2.5	.0	.2	.0	.0	.0	.0	1.0	.0
8. NW7	171.	2.8	.0	.2	.0	.0	.0	.0	1.8	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
	CONC/LINK (PPM)											
1. NE3	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
2. SE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.1	.4	.0
3. SW3	.2	.4	.0	.0	.0	.0	.2	.0	.0	.0	.7	.0
4. NW3	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0
6. SE7	.0	.3	.0	.0	.0	.0	.0	.0	.0	.1	.3	.0
7. SW7	.2	.3	.0	.0	.0	.0	.2	.0	.0	.0	.6	.0
8. NW7	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jefferson Boulevard and Rodeo Road PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	802	4.9	.0	50.0
B. NA	23	-500	23	0	AG	752	8.2	.0	45.0
C. ND	23	0	23	500	AG	834	5.5	.0	33.0
D. NE	23	500	23	1500	AG	834	4.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1231	4.9	.0	50.0
F. SA	-23	500	-23	0	AG	786	8.2	.0	45.0
G. SD	-23	0	-23	-500	AG	1480	6.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1480	4.9	.0	50.0
I. WF	1500	30	500	30	AG	1186	4.9	.0	35.0
J. WA	500	30	0	30	AG	533	8.8	.0	45.0
K. WD	0	30	-500	30	AG	569	6.6	.0	33.0
L. WE	-500	30	-1500	30	AG	569	4.9	.0	35.0
M. EF	-1500	-23	-500	-23	AG	475	4.9	.0	50.0
N. EA	-500	-23	0	-23	AG	438	8.8	.0	45.0
O. ED	0	-23	500	-23	AG	811	5.7	.0	33.0
P. EE	500	-23	1500	-23	AG	811	4.9	.0	50.0
Q. NL	0	0	15	-500	AG	50	8.2	.0	33.0
R. SL	0	0	-15	500	AG	445	8.5	.0	33.0
S. WL	0	0	500	30	AG	653	9.1	.0	33.0
T. EL	0	0	-500	-15	AG	37	8.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	2.2	.1	.9	.0	.0	.0	.0	.1	.4
2. SE3	351.	2.2	.0	.2	.6	.0	.1	.3	.0	.0
3. SW3	80.	2.3	.0	.2	.0	.0	.0	.0	.5	.0
4. NW3	95.	2.5	.0	.0	.2	.0	.0	.4	.0	.0
5. NE7	188.	1.8	.0	.6	.0	.0	.0	.0	.2	.3
6. SE7	350.	1.7	.0	.0	.4	.0	.1	.3	.0	.0
7. SW7	77.	1.7	.0	.2	.0	.0	.0	.0	.4	.0
8. NW7	96.	1.9	.0	.0	.1	.0	.0	.3	.0	.0

CONC/LINK (PPM)

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.2	.0	.0	.0	.3	.0
2. SE3	.0	.2	.0	.0	.0	.0	.3	.0	.0	.3	.2	.0
3. SW3	.0	.2	.0	.0	.0	.2	.6	.0	.0	.0	.5	.0
4. NW3	.1	.7	.2	.0	.0	.0	.0	.2	.0	.2	.4	.0
5. NE7	.0	.3	.0	.0	.0	.0	.1	.0	.0	.0	.2	.0
6. SE7	.0	.2	.0	.0	.0	.0	.2	.0	.0	.3	.2	.0
7. SW7	.0	.2	.0	.0	.0	.0	.4	.0	.0	.0	.4	.0
8. NW7	.1	.6	.0	.0	.0	.0	.0	.2	.0	.1	.4	.0

Title : Los Angeles County Subarea 2006 Winter Default Title
Version : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/07/04 09:34:39
Scen Year: 2006 -- Model Years: 1965 to 2006
Season : Winter
Area : Los Angeles (SC)

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Year:2006 -- Model Years 1965 to 2006 Inclusive -- Winter
Emfac2002 Emission Factors: V2.2 Sept 23 2002

Los Angeles (SC) Los Angeles (SC) Los Angeles (SC)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
3	9.238	14.226	13.862	28.957	51.153	43.117	12.180
4	8.885	13.589	13.313	28.957	51.153	43.117	11.754
5	8.556	13.000	12.806	28.957	51.153	43.117	11.359
6	8.249	12.454	12.179	26.636	46.838	41.282	10.842
7	7.962	11.949	11.603	24.552	42.984	39.605	10.367
8	7.694	11.480	11.074	22.679	39.537	38.075	9.929
9	7.443	11.044	10.588	20.993	36.448	36.680	9.524
10	7.207	10.639	10.139	19.473	33.676	35.408	9.150
11	6.986	10.261	9.725	18.100	31.185	34.250	8.803
12	6.779	9.909	9.342	16.860	28.944	33.198	8.482
13	6.583	9.580	8.988	15.738	26.924	32.244	8.182
14	6.399	9.273	8.659	14.721	25.101	31.382	7.904
15	6.225	8.985	8.354	13.798	23.455	30.606	7.645
16	6.060	8.716	8.071	12.960	21.966	29.909	7.403
17	5.905	8.463	7.807	12.199	20.618	29.289	7.177
18	5.758	8.226	7.562	11.506	19.396	28.740	6.965
19	5.619	8.004	7.333	10.876	18.288	28.259	6.768
20	5.487	7.795	7.120	10.301	17.281	27.843	6.583
21	5.362	7.598	6.921	9.777	16.367	27.489	6.409
22	5.243	7.413	6.735	9.299	15.536	27.196	6.246
23	5.131	7.240	6.561	8.863	14.780	26.960	6.093
24	5.024	7.076	6.399	8.465	14.093	26.782	5.950
25	4.923	6.923	6.248	8.101	13.468	26.659	5.815
26	4.826	6.778	6.106	7.769	12.899	26.591	5.689
27	4.735	6.642	5.974	7.467	12.382	26.577	5.570
28	4.648	6.515	5.851	7.191	11.913	26.618	5.459
29	4.565	6.395	5.736	6.940	11.486	26.714	5.355
30	4.487	6.283	5.629	6.711	11.100	26.865	5.257
31	4.412	6.178	5.529	6.504	10.751	27.073	5.165
32	4.342	6.079	5.437	6.316	10.437	27.338	5.080
33	4.275	5.988	5.351	6.146	10.154	27.663	5.000
34	4.212	5.902	5.272	5.994	9.901	28.049	4.925
35	4.153	5.823	5.199	5.857	9.676	28.499	4.856
36	4.097	5.750	5.133	5.735	9.477	29.017	4.792
37	4.044	5.683	5.072	5.628	9.303	29.604	4.733
38	3.994	5.621	5.018	5.534	9.153	30.266	4.679
39	3.948	5.565	4.969	5.453	9.025	31.006	4.630
40	3.904	5.515	4.925	5.385	8.919	31.831	4.586

Sunset Avenue Project

B3 – Air Quality Data Sheet

Appendix B-3

Sunset Avenue Site Printout Sheets

- Construction-period Mass Emissions (URBEMIS 2002 printout sheets)
- Operations-period Mass Emissions (URBEMIS 2002 printout sheets)
- Operations-period Localized CO Evaluation (CALINE-4 printout sheets)
- AQMP Consistency Evaluation (URBEMIS 2002 printout sheets)

MTA-Sunset (Unmitigated)

URBEMIS 2002 For Windows 7.5.0

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA-Venice\URBEMIS\Sunset (Construction) Unmitigated - Revised.urb
Project Name: RAD-MTA (Construction)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: June, 2006
Construction Duration: 24
Total Land Use Area to be Developed: 3.13 acres
Maximum Acreage Disturbed Per Day: 1.57 acres
Single Family Units: 0 Multi-Family Units: 225
Retail/Office/Institutional/Industrial Square Footage: 10000

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	6.43	-	6.43
Off-Road Diesel	6.85	52.22	50.65	-	2.33	2.33	0.00
On-Road Diesel	3.47	63.02	12.95	1.13	1.78	1.49	0.29
Worker Trips	0.11	0.13	2.64	0.00	0.01	0.00	0.01
Maximum lbs/day	10.43	115.37	66.24	1.13	10.55	3.82	6.73
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	7.03	-	7.03
Off-Road Diesel	6.87	44.88	55.87	-	1.68	1.68	0.00
On-Road Diesel	7.66	171.69	28.54	2.48	3.92	3.29	0.63
Worker Trips	0.05	0.03	0.61	0.00	0.01	0.00	0.01
Maximum lbs/day	14.58	216.60	85.02	2.48	12.64	4.97	7.67
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	5.44	39.42	41.56	-	1.68	1.68	0.00
Bldg Const Worker Trips	0.54	0.30	6.43	0.00	0.10	0.01	0.09
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	5.97	39.72	47.99	0.00	1.78	1.69	0.09
Max lbs/day all phases	14.58	216.60	85.02	2.48	12.64	4.97	7.67
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	5.44	37.97	42.50	-	1.54	1.54	0.00
Bldg Const Worker Trips	0.50	0.29	6.05	0.00	0.10	0.01	0.09
Arch Coatings Off-Gas	56.38	-	-	-	-	-	-
Arch Coatings Worker Trips	0.50	0.29	6.05	0.00	0.10	0.01	0.09
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	62.81	38.55	54.60	0.00	1.73	1.55	0.18
Max lbs/day all phases	62.81	38.55	54.60	0.00	1.73	1.55	0.18
*** 2008***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	5.44	36.53	43.41	-	1.40	1.40	0.00
Bldg Const Worker Trips	0.46	0.27	5.64	0.00	0.10	0.01	0.09
Arch Coatings Off-Gas	56.38	-	-	-	-	-	-
Arch Coatings Worker Trips	0.46	0.27	5.64	0.00	0.10	0.01	0.09
Asphalt Off-Gas	0.04	-	-	-	-	-	-
Asphalt Off-Road Diesel	1.90	12.54	15.29	-	0.46	0.46	0.00
Asphalt On-Road Diesel	0.01	0.13	0.03	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.01	0.01	0.13	0.00	0.00	0.00	0.00
Maximum lbs/day	62.73	37.07	54.69	0.00	1.59	1.41	0.18
Max lbs/day all phases	62.73	37.07	54.69	0.00	1.59	1.41	0.18

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
Phase 2: Stockpiles: Cover all stock piles with tarps
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)

Phase 1 - Demolition Assumptions
Start Month/Year for Phase 1: Jun '06
Phase 1 Duration: 2 months
Building Volume Total (cubic feet): 153000
Building Volume Daily (cubic feet): 15300
On-Road Truck Travel (VMT): 2718
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Other Equipment	50	0.620	8.0
1	Rubber Tired Dozers	352	0.590	8.0
1	Rubber Tired Loaders	165	0.465	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Aug '06
Phase 2 Duration: 3 months
On-Road Truck Travel (VMT): 5994
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
2	Excavators	180	0.580	8.0
1	Other Equipment	50	0.620	8.0
1	Rubber Tired Loaders	165	0.465	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 19 months
Start Month/Year for SubPhase Building: Nov '06
SubPhase Building Duration: 16 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Concrete/Industrial saws	84	0.730	8.0
1	Cranes	190	0.430	4.0
3	Other Equipment	50	0.620	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
1	Skid Steer Loaders	62	0.515	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0

Start Month/Year for SubPhase Architectural Coatings: Oct '07
SubPhase Architectural Coatings Duration: 8 months
Start Month/Year for SubPhase Asphalt: May '08
SubPhase Asphalt Duration: 1 months
Acres to be Paved: 0.3
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Paving Equipment	111	0.530	8.0
1	Rollers	114	0.430	8.0

MTA-Sunset (Mitigated)

URBEMIS 2002 For Windows 7.5.0

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA-Venice\URBEMIS\Sunset (Construction) Mitigated- Revised.urb
Project Name: RAD-MTA (Construction)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: June, 2006
Construction Duration: 24
Total Land Use Area to be Developed: 3.13 acres
Maximum Acreage Disturbed Per Day: 1.57 acres
Single Family Units: 0 Multi-Family Units: 225
Retail/Office/Institutional/Industrial Square Footage: 10000

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	6.43	-	6.43
Off-Road Diesel	6.51	49.61	48.12	-	2.21	2.21	0.00
On-Road Diesel	3.47	63.02	12.95	1.13	1.78	1.49	0.29
Worker Trips	0.11	0.13	2.64	0.00	0.01	0.00	0.01
Maximum lbs/day	10.09	112.76	63.71	1.13	10.43	3.70	6.73
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	5.33	-	5.33
Off-Road Diesel	6.53	42.64	53.08	-	1.60	1.60	0.00
On-Road Diesel	7.66	171.69	28.54	2.48	3.92	3.29	0.63
Worker Trips	0.05	0.03	0.61	0.00	0.01	0.00	0.01
Maximum lbs/day	14.24	214.36	82.23	2.48	10.85	4.89	5.97
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	5.17	37.45	39.48	-	1.60	1.60	0.00
Bldg Const Worker Trips	0.54	0.30	6.43	0.00	0.10	0.01	0.09
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	5.70	37.75	45.91	0.00	1.69	1.60	0.09
Max lbs/day all phases	14.24	214.36	82.23	2.48	11.62	4.89	6.73
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	5.17	36.07	40.37	-	1.46	1.46	0.00
Bldg Const Worker Trips	0.50	0.29	6.05	0.00	0.10	0.01	0.09
Arch Coatings Off-Gas	56.38	-	-	-	-	-	-
Arch Coatings Worker Trips	0.50	0.29	6.05	0.00	0.10	0.01	0.09
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	62.54	36.65	52.47	0.00	1.65	1.47	0.18
Max lbs/day all phases	62.54	36.65	52.47	0.00	1.65	1.47	0.18
*** 2008***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	5.17	34.70	41.24	-	1.33	1.33	0.00
Bldg Const Worker Trips	0.46	0.27	5.64	0.00	0.10	0.01	0.09
Arch Coatings Off-Gas	56.38	-	-	-	-	-	-
Arch Coatings Worker Trips	0.46	0.27	5.64	0.00	0.10	0.01	0.09
Asphalt Off-Gas	0.04	-	-	-	-	-	-
Asphalt Off-Road Diesel	1.80	11.91	14.53	-	0.44	0.44	0.00
Asphalt On-Road Diesel	0.01	0.13	0.03	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.01	0.01	0.13	0.00	0.00	0.00	0.00
Maximum lbs/day	62.46	35.24	52.52	0.00	1.52	1.34	0.18
Max lbs/day all phases	62.46	35.24	52.52	0.00	1.52	1.34	0.18

Construction-Related Mitigation Measures

Phase 1: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)
Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
Phase 2: Soil Disturbance: Water exposed surfaces - 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 50.0%)
Phase 2: Stockpiles: Cover all stock piles with tarps
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 2: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)
Phase 3: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)
Phase 3: Off-Road Diesel Exhaust: Keep Engines Properly Tuned
Percent Reduction(ROG 5% NOx 5% CO 5% SO2 5% PM10 5%)

Phase 1 - Demolition Assumptions
Start Month/Year for Phase 1: Jun '06
Phase 1 Duration: 2 months
Building Volume Total (cubic feet): 153000
Building Volume Daily (cubic feet): 15300
On-Road Truck Travel (VMT): 2718
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Other Equipment	50	0.620	8.0
1	Rubber Tired Dozers	352	0.590	8.0
1	Rubber Tired Loaders	165	0.465	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Aug '06
Phase 2 Duration: 3 months
On-Road Truck Travel (VMT): 5994
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
2	Excavators	180	0.580	8.0
1	Other Equipment	50	0.620	8.0
1	Rubber Tired Loaders	165	0.465	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 19 months
Start Month/Year for SubPhase Building: Nov '06
SubPhase Building Duration: 16 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Concrete/Industrial saws	84	0.730	8.0
1	Cranes	190	0.430	4.0
3	Other Equipment	50	0.620	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
1	Skid Steer Loaders	62	0.515	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0

Start Month/Year for SubPhase Architectural Coatings: Oct '07
SubPhase Architectural Coatings Duration: 8 months
Start Month/Year for SubPhase Asphalt: May '08
SubPhase Asphalt Duration: 1 months
Acres to be Paved: 0.3
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Paving Equipment	111	0.530	8.0
1	Rollers	114	0.430	8.0

Sunset Avenue Project

Regional Emission Calculations (lbs/day)

	CO	NOx	PM10	ROC	SOx
Net Project					
Net Mobile	154	19	19	15	<1
Net Stationary	<1	5	<1	<1	<1
Net Area	5	<1	<1	11	<1
Total Net	160	24	19	26	<1
SCAQMD Significance Threshold	550	55	150	55	150
Difference	**(390)**	**(31)**	**(131)**	**(29)**	**(150)**
Significant?	**No**	**No**	**No**	**No**	**No**

Electricity Usage

		Electricity			Emission Factors (lbs/MWh) [b]				
		Usage Rate [a]	Total Electricity Usage		CO	ROC	NOx	PM10	SOx
Land Use	1,000 Sqft	(kWh\sq.ft\yr)	(KWh\year)	(MWh\Day)	0.2	0.01	1.15	0.04	0.12
Existing					Emissions from Electricity Consumption (lbs/day)				
Office	0.0	12.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Retail	0.0	13.55	0	0.000	0.000	0.000	0.000	0.000	0.000
Hotel/Motel	0.0	9.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Restaurant	0.0	47.45	0	0.000	0.000	0.000	0.000	0.000	0.000
Food Store	0.0	53.30	0	0.000	0.000	0.000	0.000	0.000	0.000
Warehouse	0.0	4.35	0	0.000	0.000	0.000	0.000	0.000	0.000
College/University	0.0	11.55	0	0.000	0.000	0.000	0.000	0.000	0.000
High School	0.0	10.50	0	0.000	0.000	0.000	0.000	0.000	0.000
Elementary School	0.0	5.90	0	0.000	0.000	0.000	0.000	0.000	0.000
Hospital	0.0	21.70	0	0.000	0.000	0.000	0.000	0.000	0.000
Miscellaneous	0.0	10.50	0	0.000	0.000	0.000	0.000	0.000	0.000
Residential (DU)	0.0	5,627	0	0.000	0.000	0.000	0.000	0.000	0.000
Total Existing			**0**	**0.000**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Project									
Office	0.0	12.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Retail	2.0	13.55	27,100	0.074	0.015	0.001	0.085	0.003	0.009
Hotel/Motel	0.0	9.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Restaurant	1.0	47.45	47,450	0.130	0.026	0.001	0.150	0.005	0.016
Food Store	0.0	53.3	0	0.000	0.000	0.000	0.000	0.000	0.000
Warehouse	0.0	4.35	0	0.000	0.000	0.000	0.000	0.000	0.000
College/University	0.0	11.55	0	0.000	0.000	0.000	0.000	0.000	0.000
High School	0.0	10.5	0	0.000	0.000	0.000	0.000	0.000	0.000
Elementary School	0.0	5.9	0	0.000	0.000	0.000	0.000	0.000	0.000
Hospital	0.0	21.7	0	0.000	0.000	0.000	0.000	0.000	0.000
Miscellaneous	7.0	10.5	73,500	0.201	0.040	0.002	0.232	0.008	0.024
Residential (DU)	225.0	5,627	1,265,963	3.468	0.694	0.035	3.989	0.139	0.416
Total Project			**1,414,013**	**3.874**	**0.78**	**0.04**	**4.46**	**0.16**	**0.47**
Net Emissions From Electricity Usage					**0.78**	**0.04**	**4.46**	**0.16**	**0.47**

Natural Gas Usage

		Natural Gas			Emission Factors (lbs/MCuft) [d]				
		Usage Rate [c]	Total Natural Gas Usage		CO	ROC	NOx	PM10	SOx
Land Use	1,000 Sqft	(cu.ft\sq.ft\mo)	(cu.ft\mo)	(cu.ft\DAY)	20	5.3	120/80 [e]	0.2	0
Existing					Emissions from Natural Gas Consumption (lbs/day)				
Office	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Retail	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Hotel/Motel	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Restaurant	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Food Store	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Warehouse	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
College/University	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
High School	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Elementary School	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Hospital	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Miscellaneous	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Residential (Single Family DU)	0.0	6,665	**0**	**0**	0.000	0.000	0.000	0.000	
Residential (Multi-Family DU)	0.0	4,012	**0**	**0**	0.000	0.000	0.000	0.000	--
Total Existing			**0**	**0**	**0.00**	**0.00**	**0.00**	**0.00**	--
Project									
Office	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Retail	2.0	2.9	**5,800**	**193**	0.004	0.001	0.023	0.000	--
Hotel/Motel	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Restaurant	1.0	4.8	**4,800**	**160**	0.003	0.001	0.019	0.000	--
Food Store	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Warehouse	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
College/University	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
High School	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Elementary School	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Hospital	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Miscellaneous	7.0	2.9	**20,300**	**677**	0.014	0.004	0.081	0.000	--
Residential (Single Family DU)	0.0	6,665	**0**	**0**	0.000	0.000	0.000	0.000	
Residential (Multi-Family DU)	0.0	4,012	**0**	**0**	0.000	0.000	0.000	0.000	--
Total Project			**30,900**	**1,030**	**0.02**	**0.01**	**0.12**	**0.00**	--
Net Emissions From Natural Gas Usage					**0.02**	**0.01**	**0.12**	**0.00**	**--**

Summary of Stationary Emissions

	CO	ROC	NOx	PM10	SOx
Total Existing Emissions (lbs/day)	0.00	0.00	0.00	0.00	0.00
Total Project Emissions (lbs/day)	0.80	0.04	4.58	0.16	0.47
Total Net Emissions (lbs/day)	**0.80**	**0.04**	**4.58**	**0.16**	**0.47**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[b] Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[c] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[d] Emission Factors from Table A9-12-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[e] The emission factors for NOx in lbs per million cuft of natural gas are 120 for nonresidential uses and 80 for residential uses.

Sunset Avenue Project Operations - CO

URBEMIS 2002 For Windows 7.4.2

File Name: C:\Documents and Settings\e.yan\Desktop\RAD-MTA\Sunset\URBEMIS\Sunset (Operations).urb
Project Name: Sunset (Operations)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.56	0.05	4.50	0.09	0.01
Consumer Prdcts	11.01	-	-	-	-
TOTALS(lbs/day,unmitigated)	11.57	0.05	4.50	0.09	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Single family housing	5.71	9.53	68.94	0.05	8.31
Racquetball/health	0.71	1.32	9.19	0.01	1.13
High turnover (sit-down)	0.86	1.60	11.17	0.01	1.37
Regnl shop. center	0.39	0.72	5.04	0.00	0.62
TOTAL EMISSIONS (lbs/day)	7.67	13.17	94.35	0.06	11.44

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2009 Temperature (F): 60 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Single family housing	3.64 trips / dwelling units	225.00	819.00
Racquetball/health	18.57 trips / 1000 sq. ft.	7.00	129.99
High turnover (sit-down)	158.00 trips / 1000 sq. ft.	1.00	158.00
Regnl shop. center	36.50 trips / 1000 sq. ft.	2.00	73.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.90	1.30	98.40	0.30
Light Truck < 3,750 lbs	15.10	2.60	95.40	2.00
Light Truck 3,751- 5,750	16.10	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	75.00	25.00	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
Racquetball/health				5.0	2.5	92.5
High turnover (sit-down) rest.				5.0	2.5	92.5
Regnl shop. center				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The natural gas option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2009.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 60.
The operational summer selection item changed from 8 to 3.
The double counting internal work trip limit changed from to 15.8595.
The double counting shopping trip limit changed from to 7.92975.
The double counting other trip limit changed from to 337.20075.

Sunset Avenue Project Operations - NOx

URBEMIS 2002 For Windows 7.4.2

File Name: C:\Documents and Settings\e.yan\Desktop\RAD-MTA\Sunset\URBEMIS\Sunset (Operations).urb
Project Name: Sunset (Operations)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.56	0.05	4.50	0.09	0.01
Consumer Prdcts	11.01	-	-	-	-
TOTALS(lbs/day,unmitigated)	11.57	0.05	4.50	0.09	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Single family housing	6.69	8.19	65.50	0.05	8.31
Racquetball/health	0.70	1.14	8.61	0.01	1.13
High turnover (sit-down)	0.80	1.38	10.46	0.01	1.37
Regnl shop. center	0.37	0.62	4.71	0.00	0.62
TOTAL EMISSIONS (lbs/day)	8.56	11.33	89.28	0.07	11.44

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2009 Temperature (F): 75 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Single family housing	3.64 trips / dwelling units	225.00	819.00
Racquetball/health	18.57 trips / 1000 sq. ft.	7.00	129.99
High turnover (sit-down)	158.00 trips / 1000 sq. ft.	1.00	158.00
Regnl shop. center	36.50 trips / 1000 sq. ft.	2.00	73.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.90	1.30	98.40	0.30
Light Truck < 3,750 lbs	15.10	2.60	95.40	2.00
Light Truck 3,751- 5,750	16.10	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	75.00	25.00	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
Racquetball/health				5.0	2.5	92.5
High turnover (sit-down) rest.				5.0	2.5	92.5
Regnl shop. center				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The natural gas option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2009.
The operational winter temperature changed from 50 to 75.
The operational winter selection item changed from 3 to 5.
The operational summer temperature changed from 90 to 75.
The operational summer selection item changed from 8 to 5.
The double counting internal work trip limit changed from to 15.8595.
The double counting shopping trip limit changed from to 7.92975.
The double counting other trip limit changed from to 337.20075.

URBEMIS 2002 For Windows 7.4.2

File Name: C:\Documents and Settings\e.yan\Desktop\RAD-MTA\Sunset\URBEMIS\Sunset (Operations).urb
Project Name: Sunset (Operations)
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.56	0.05	4.50	0.09	0.01
Consumer Prdcts	11.01	-	-	-	-
TOTALS(lbs/day,unmitigated)	11.57	0.05	4.50	0.09	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Single family housing	7.93	7.56	74.04	0.05	8.31
Racquetball/health	0.77	1.05	9.71	0.01	1.13
High turnover (sit-down)	0.85	1.27	11.81	0.01	1.37
Regnl shop. center	0.40	0.58	5.31	0.00	0.62
TOTAL EMISSIONS (lbs/day)	9.95	10.46	100.87	0.07	11.44

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2009 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Single family housing	3.64 trips / dwelling units	225.00	819.00
Racquetball/health	18.57 trips / 1000 sq. ft.	7.00	129.99
High turnover (sit-down)	158.00 trips / 1000 sq. ft.	1.00	158.00
Regnl shop. center	36.50 trips / 1000 sq. ft.	2.00	73.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.90	1.30	98.40	0.30
Light Truck < 3,750 lbs	15.10	2.60	95.40	2.00
Light Truck 3,751- 5,750	16.10	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	75.00	25.00	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
Racquetball/health				5.0	2.5	92.5
High turnover (sit-down) rest.				5.0	2.5	92.5
Regnl shop. center				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The natural gas option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2009.
The operational winter temperature changed from 50 to 85.
The operational winter selection item changed from 3 to 6.
The operational summer temperature changed from 90 to 85.
The operational summer selection item changed from 8 to 6.
The double counting internal work trip limit changed from to 15.8595.
The double counting shopping trip limit changed from to 7.92975.
The double counting other trip limit changed from to 337.20075.

Sunset Avenue Project

CALINE4 Modeling Results and Estimated Local 1-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 1-Hour CO Concentrations (ppm) [a]

Monitoring Station: West LA

Year	1-Hr Concentration
2009	4.54

Intersection and Receptor Locations	Future Without Project		Future With Project + Mitigation		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
Rose Ave. and Lincoln Blvd AM					
NE	2.4	6.9	2.4	6.9	NO
SE	2.3	6.8	2.3	6.8	NO
SW	2.0	6.5	2.0	6.5	NO
NW	2.0	6.5	2.0	6.5	NO
Rose Ave. and Lincoln Blvd PM					
NE	2.4	6.9	2.4	6.9	NO
SE	2.0	6.5	2.0	6.5	NO
SW	2.7	7.2	2.7	7.2	NO
NW	2.2	6.7	2.2	6.7	NO
Main St. and Rose Ave. AM					
NE	1.4	5.9	1.4	5.9	NO
SE	1.2	5.7	1.2	5.7	NO
SW	1.2	5.7	1.3	5.8	NO
NW	1.2	5.7	1.3	5.8	NO
Main St. and Rose Ave. PM					
NE	1.3	5.8	1.4	5.9	NO
SE	1.2	5.7	1.3	5.8	NO
SW	1.6	6.1	1.7	6.2	NO
NW	1.6	6.1	1.7	6.2	NO
Pacific Ave. and Venice Blvd North AM					
NE	1.6	6.1	1.7	6.2	NO
SE	1.5	6.0	1.7	6.2	NO
SW	1.1	5.6	1.2	5.7	NO
NW	1.1	5.6	1.2	5.7	NO
Pacific Ave. and Venice Blvd North PM					
NE	1.7	6.2	1.7	6.2	NO
SE	1.6	6.1	1.6	6.1	NO
SW	2.0	6.5	2.0	6.5	NO
NW	2.0	6.5	2.0	6.5	NO
Pacific Ave. and Venice Blvd South AM					
NE	2.1	6.6	2.1	6.6	NO
SE	2.1	6.6	2.1	6.6	NO
SW	1.4	5.9	1.4	5.9	NO
NW	1.4	5.9	1.4	5.9	NO
Pacific Ave. and Venice Blvd South PM					
NE	1.9	6.4	1.9	6.4	NO
SE	1.8	6.3	1.8	6.3	NO
SW	2.2	6.7	2.2	6.7	NO
NW	1.9	6.4	1.9	6.4	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The 1-hour traffic contribution (ppm) is determined by inputing total traffic volumes into the CALINE4 model.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 1-hour CO concentrations is 20 ppm.

Sunset Avenue Project

CALINE4 Modeling Results and Estimated Local 8-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 8-Hour CO Concentrations (ppm) [a]	
Monitoring Station: West LA	Average Persistence Factor = 0.70
Year: 2009 — 8-Hr Concentration: 2.88	

Intersection and Receptor Locations	Future Without Project		Future With Project + Mitigation		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
Rose Ave. and Lincoln Blvd AM					
NE	1.3	4.1	1.3	4.1	NO
SE	1.1	3.9	1.1	3.9	NO
SW	1.1	3.9	1.1	3.9	NO
NW	1.0	3.9	1.0	3.9	NO
Rose Ave. and Lincoln Blvd PM					
NE	1.3	4.1	1.3	4.1	NO
SE	1.1	4.0	1.1	4.0	NO
SW	1.4	4.3	1.4	4.3	NO
NW	1.2	4.1	1.2	4.1	NO
Main St. and Rose Ave. AM					
NE	0.7	3.6	0.7	3.6	NO
SE	0.6	3.5	0.6	3.5	NO
SW	0.6	3.5	0.6	3.5	NO
NW	0.6	3.5	0.6	3.5	NO
Main St. and Rose Ave. PM					
NE	0.7	3.6	0.8	3.7	NO
SE	0.6	3.5	0.7	3.6	NO
SW	0.8	3.7	0.8	3.7	NO
NW	0.7	3.6	0.8	3.7	NO
Pacific Ave. and Venice Blvd North AM					
NE	0.7	3.6	0.8	3.7	NO
SE	0.7	3.6	0.7	3.6	NO
SW	0.6	3.4	0.6	3.4	NO
NW	0.5	3.4	0.6	3.4	NO
Pacific Ave. and Venice Blvd North PM					
NE	0.8	3.7	0.8	3.7	NO
SE	0.8	3.7	0.8	3.7	NO
SW	0.8	3.7	0.8	3.7	NO
NW	0.8	3.7	0.8	3.7	NO
Pacific Ave. and Venice Blvd South AM					
NE	0.9	3.8	0.9	3.8	NO
SE	0.8	3.7	0.8	3.7	NO
SW	0.6	3.5	0.6	3.5	NO
NW	0.7	3.6	0.7	3.6	NO
Pacific Ave. and Venice Blvd South PM					
NE	0.9	3.8	0.9	3.8	NO
SE	0.8	3.7	0.8	3.7	NO
SW	1.0	3.9	1.0	3.9	NO
NW	0.8	3.7	0.8	3.7	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The persistence factor is calculated as recommended in Table B.15 in the Transportation Project-Level Carbon Monoxide Protocol (Institute of Transportation Studies, UC Davis, Revised 1997). This is a generalized persistence factor likely to provide a conservative estimate in most situations.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 8-hour CO concentrations is 9 ppm.

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Rose Ave. and Lincoln Blvd. AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	.5 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	2001	3.8	.0	50.0
B. NA	23	-500	23	0	AG	1942	6.0	.0	45.0
C. ND	23	0	23	500	AG	2180	4.8	.0	33.0
D. NE	23	500	23	1500	AG	2180	3.8	.0	50.0
E. SF	-23	1500	-23	500	AG	1330	3.8	.0	50.0
F. SA	-23	500	-23	0	AG	1263	5.7	.0	45.0
G. SD	-23	0	-23	-500	AG	1334	4.3	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1334	3.8	.0	50.0
I. WF	1500	23	500	23	AG	529	3.8	.0	35.0
J. WA	500	23	0	23	AG	474	8.4	.0	33.0
K. WD	0	23	-500	23	AG	399	8.8	.0	33.0
L. WE	-500	23	-1500	23	AG	399	3.8	.0	35.0
M. EF	-1500	-15	-500	-15	AG	380	3.8	.0	50.0
N. EA	-500	-15	0	-15	AG	312	8.4	.0	45.0
O. ED	0	-15	500	-15	AG	327	5.1	.0	33.0
P. EE	500	-15	1500	-15	AG	327	3.8	.0	50.0
Q. NL	0	0	15	-500	AG	59	5.5	.0	33.0
R. SL	0	0	-15	500	AG	67	5.5	.0	33.0
S. WL	0	0	500	23	AG	55	8.4	.0	33.0
T. EL	0	0	-500	-8	AG	68	8.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	48	40	6.0
2. SE3	48	-40	6.0
3. SW3	-48	-40	6.0
4. NW3	-48	40	6.0
5. NE7	61	53	6.0
6. SE7	61	-53	6.0
7. SW7	-61	-53	6.0
8. NW7	-61	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	2.4	.2	1.5	.0	.0	.0	.0	.0	.3
2. SE3	352.	2.3	.0	.3	1.2	.0	.2	.3	.0	.0
3. SW3	5.	2.0	.0	.0	.1	.4	.1	1.0	.0	.0
4. NW3	172.	2.0	.2	.4	.0	.0	.0	.2	.7	.0
5. NE7	187.	1.8	.1	1.0	.0	.0	.0	.0	.0	.2
6. SE7	353.	1.5	.0	.0	.8	.1	.2	.1	.0	.0
7. SW7	7.	1.5	.0	.0	.1	.3	.0	.7	.0	.0
8. NW7	170.	1.4	.1	.4	.0	.0	.0	.0	.5	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Rose Ave. and Lincoln Blvd. PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1498	3.8	.0	35.0
B. NA	23	-500	23	0	AG	1381	8.1	.0	33.0
C. ND	23	0	23	500	AG	1499	4.8	.0	33.0
D. NE	23	500	23	1500	AG	1499	3.8	.0	35.0
E. SF	-23	1500	-23	500	AG	1918	3.8	.0	35.0
F. SA	-23	500	-23	0	AG	1831	8.1	.0	33.0
G. SD	-23	0	-23	-500	AG	1876	4.8	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1876	3.8	.0	35.0
I. WF	1500	23	500	23	AG	386	3.8	.0	35.0
J. WA	500	23	0	23	AG	316	9.4	.0	33.0
K. WD	0	23	-500	23	AG	480	9.4	.0	33.0
L. WE	-500	23	-1500	23	AG	480	3.8	.0	35.0
M. EF	-1500	-15	-500	-15	AG	454	3.8	.0	35.0
N. EA	-500	-15	0	-15	AG	368	9.4	.0	33.0
O. ED	0	-15	500	-15	AG	401	9.1	.0	33.0
P. EE	500	-15	1500	-15	AG	401	3.8	.0	35.0
Q. NL	0	0	15	-500	AG	117	5.5	.0	33.0
R. SL	0	0	-15	500	AG	87	5.5	.0	33.0
S. WL	0	0	500	23	AG	70	8.8	.0	33.0
T. EL	0	0	-500	-8	AG	86	8.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	48	40	6.0
2. SE3	48	-40	6.0
3. SW3	-48	-40	6.0
4. NW3	-48	40	6.0
5. NE7	61	53	6.0
6. SE7	61	-53	6.0
7. SW7	-61	-53	6.0
8. NW7	-61	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	186.	2.4	.0	1.4	.0	.0	.0	.0	.2	.3
2. SE3	349.	2.0	.0	.0	.8	.0	.0	.7	.0	.0
3. SW3	6.	2.7	.0	.0	.1	.3	.0	1.7	.0	.0
4. NW3	171.	2.2	.1	.5	.0	.0	.0	.0	1.0	.0
5. NE7	188.	1.8	.0	.9	.0	.0	.0	.0	.2	.2
6. SE7	348.	1.6	.0	.0	.6	.0	.0	.6	.0	.0
7. SW7	8.	2.0	.0	.0	.2	.2	.0	1.2	.0	.0
8. NW7	169.	1.7	.0	.5	.0	.0	.0	.0	.7	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Main St. and Rose Ave. AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1008	3.8	.0	50.0
B. NA	15	-500	15	0	AG	928	5.7	.0	45.0
C. ND	15	0	15	500	AG	1004	4.2	.0	33.0
D. NE	15	500	15	1500	AG	1004	3.8	.0	50.0
E. SF	-23	1500	-23	500	AG	478	3.8	.0	35.0
F. SA	-23	500	-23	0	AG	367	5.5	.0	33.0
G. SD	-23	0	-23	-500	AG	424	4.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	424	3.8	.0	35.0
I. WF	1500	8	500	8	AG	295	4.6	.0	35.0
J. WA	500	8	0	8	AG	254	9.1	.0	33.0
K. WD	0	8	-500	8	AG	223	5.7	.0	33.0
L. WE	-500	8	-1500	8	AG	223	4.6	.0	35.0
M. EF	-1500	-8	-500	-8	AG	193	4.6	.0	35.0
N. EA	-500	-8	0	-8	AG	173	8.4	.0	33.0
O. ED	0	-8	500	-8	AG	323	6.4	.0	33.0
P. EE	500	-8	1500	-8	AG	323	4.6	.0	35.0
Q. NL	0	0	8	-500	AG	80	5.5	.0	33.0
R. SL	0	0	-8	500	AG	111	5.5	.0	33.0
S. WL	0	0	500	8	AG	41	8.4	.0	33.0
T. EL	0	0	-500	-8	AG	20	8.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	1.4	.1	.8	.0	.0	.0	.0	.0	.1
2. SE3	354.	1.2	.0	.0	.5	.0	.1	.0	.0	.0
3. SW3	85.	1.2	.0	.2	.0	.0	.0	.0	.1	.0
4. NW3	94.	1.2	.0	.0	.2	.0	.0	.1	.0	.0
5. NE7	186.	1.0	.1	.5	.0	.0	.0	.0	.0	.1
6. SE7	354.	.9	.0	.0	.3	.1	.1	.0	.0	.0
7. SW7	84.	.9	.0	.2	.0	.0	.0	.0	.0	.0
8. NW7	96.	.9	.0	.0	.1	.0	.0	.1	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.3	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	.0	.5	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	.0	.3	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Main St. and Rose Ave. PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
       U=    .5 M/S             Z0= 100. CM           ALT=     0. (FT)
     BRG= WORST CASE            VD=    .0 CM/S
    CLAS=     7 (G)             VS=    .0 CM/S
    MIXH= 1000. M              AMB=    .0 PPM
   SIGTH=    5. DEGREES       TEMP=    .5 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	762	3.8	.0	50.0
B. NA	15	-500	15	0	AG	697	5.5	.0	45.0
C. ND	15	0	15	500	AG	729	4.1	.0	33.0
D. NE	15	500	15	1500	AG	729	3.8	.0	50.0
E. SF	-23	1500	-23	500	AG	973	3.8	.0	35.0
F. SA	-23	500	-23	0	AG	845	5.7	.0	33.0
G. SD	-23	0	-23	-500	AG	987	4.8	.0	33.0
H. SE	-23	-500	-23	-1500	AG	987	3.8	.0	35.0
I. WF	1500	8	500	8	AG	363	4.6	.0	35.0
J. WA	500	8	0	8	AG	248	8.4	.0	33.0
K. WD	0	8	-500	8	AG	267	6.2	.0	33.0
L. WE	-500	8	-1500	8	AG	267	4.6	.0	35.0
M. EF	-1500	-8	-500	-8	AG	234	4.6	.0	35.0
N. EA	-500	-8	0	-8	AG	208	8.4	.0	33.0
O. ED	0	-8	500	-8	AG	349	6.2	.0	33.0
P. EE	500	-8	1500	-8	AG	349	4.6	.0	35.0
Q. NL	0	0	8	-500	AG	65	5.5	.0	33.0
R. SL	0	0	-8	500	AG	128	5.5	.0	33.0
S. WL	0	0	500	8	AG	115	8.4	.0	33.0
T. EL	0	0	-500	-8	AG	26	8.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	1.3	.0	.6	.0	.0	.0	.0	.0	.2
2. SE3	353.	1.2	.0	.0	.4	.0	.1	.2	.0	.0
3. SW3	5.	1.6	.0	.0	.0	.2	.0	.9	.1	.0
4. NW3	175.	1.6	.2	.1	.0	.0	.0	.1	.9	.0
5. NE7	187.	1.0	.0	.4	.0	.0	.0	.0	.1	.2
6. SE7	352.	.9	.0	.0	.3	.0	.1	.2	.0	.0
7. SW7	84.	1.1	.0	.1	.0	.0	.0	.0	.2	.0
8. NW7	174.	1.0	.2	.1	.0	.0	.0	.0	.5	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.1	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave. and Venice Blvd. North AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	911	3.8	.0	35.0
B. NA	15	-500	15	0	AG	904	5.8	.0	33.0
C. ND	15	0	15	500	AG	1048	4.8	.0	33.0
D. NE	15	500	15	1500	AG	1048	3.8	.0	35.0
E. SF	-15	1500	-15	500	AG	533	3.8	.0	35.0
F. SA	-15	500	-15	0	AG	533	5.7	.0	33.0
G. SD	-15	0	-15	-500	AG	644	4.2	.0	33.0
H. SE	-15	-500	-15	-1500	AG	644	3.8	.0	35.0
I. WF	1500	8	500	8	AG	314	3.8	.0	35.0
J. WA	500	8	0	8	AG	186	9.1	.0	33.0
K. WD	0	8	-500	8	AG	66	5.7	.0	33.0
L. WE	-500	8	-1500	8	AG	66	3.8	.0	35.0
M. EF	1500	8	500	8	AG	0	3.8	.0	35.0
N. EA	500	8	0	8	AG	0	9.1	.0	33.0
O. ED	0	8	-500	8	AG	0	5.7	.0	33.0
P. EE	-500	8	-1500	8	AG	0	3.8	.0	35.0
Q. NL	0	0	15	-500	AG	7	5.5	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	5.5	.0	33.0
S. WL	0	0	500	8	AG	128	9.1	.0	33.0
T. EL	0	0	500	8	AG	0	9.1	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	184.	1.6	.1	1.0	.1	.0	.0	.0	.0	.1
2. SE3	355.	1.5	.0	.1	.9	.0	.1	.2	.0	.0
3. SW3	5.	1.1	.0	.0	.2	.2	.0	.6	.0	.0
4. NW3	175.	1.1	.2	.2	.0	.0	.0	.0	.5	.0
5. NE7	186.	1.0	.0	.6	.0	.0	.0	.0	.0	.1
6. SE7	354.	1.0	.0	.0	.5	.0	.1	.1	.0	.0
7. SW7	6.	.8	.0	.0	.2	.2	.0	.3	.0	.0
8. NW7	173.	.7	.1	.2	.0	.0	.0	.0	.3	.0

CONC/LINK (PPM)

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

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          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1

              JOB:   Pacific Ave. and Venice Blvd. North   PM NP
              RUN:                (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=    .5 M/S             Z0= 100. CM            ALT=     0. (FT)
       BRG= WORST CASE            VD=    .0 CM/S
      CLAS=     7 (G)             VS=    .0 CM/S
      MIXH= 1000. M              AMB=    .0 PPM
     SIGTH=    5. DEGREES       TEMP=    .5 DEGREE (C)


   II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (FT)  *               EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (FT)  (FT)
  ---------------*------------------------*------------------------------
  A. NF          *   15 -1500    15  -500 *  AG    665   3.8     .0  35.0
  B. NA          *   15  -500    15     0 *  AG    648   5.7     .0  33.0
  C. ND          *   15     0    15   500 *  AG    841   4.4     .0  33.0
  D. NE          *   15   500    15  1500 *  AG    841   3.8     .0  35.0
  E. SF          *  -15  1500   -15   500 *  AG   1269   3.8     .0  35.0
  F. SA          *  -15   500   -15     0 *  AG   1269   6.0     .0  33.0
  G. SD          *  -15     0   -15  -500 *  AG   1415   4.8     .0  33.0
  H. SE          *  -15  -500   -15 -1500 *  AG   1415   3.8     .0  35.0
  I. WF          * 1500     8   500     8 *  AG    498   3.8     .0  35.0
  J. WA          *  500     8     0     8 *  AG    324   8.8     .0  33.0
  K. WD          *    0     8  -500     8 *  AG    176   5.2     .0  33.0
  L. WE          * -500     8 -1500     8 *  AG    176   3.8     .0  35.0
  M. EF          * 1500     8   500     8 *  AG      0   3.8     .0  35.0
  N. EA          *  500     8     0     8 *  AG      0   8.8     .0  33.0
  O. ED          *    0     8  -500     8 *  AG      0   5.2     .0  33.0
  P. EE          * -500     8 -1500     8 *  AG      0   3.8     .0  35.0
  Q. NL          *    0     0    15  -500 *  AG     17   5.5     .0  33.0
  R. SL          *    0 -1900     0 -1800 *  AG      0   5.5     .0  33.0
  S. WL          *    0     0   500     8 *  AG    174   8.8     .0  33.0
  T. EL          *    0     0   500     8 *  AG      0   8.8     .0  33.0


  III.  RECEPTOR LOCATIONS

              *     COORDINATES (FT)
    RECEPTOR  *    X       Y      Z
  ------------*---------------------
  1. NE3      *     33      25    6.0
  2. SE3      *     33     -25    6.0
  3. SW3      *    -33     -25    6.0
  4. NW3      *    -33      25    6.0
  5. NE7      *     46      38    6.0
  6. SE7      *     46     -38    6.0
  7. SW7      *    -46     -38    6.0
  8. NW7      *    -46      38    6.0


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *        * PRED  *                CONC/LINK
              *   BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG)  * (PPM) *   A    B    C    D    E    F    G    H
 -------------*--------*-------*----------------------------------------
  1. NE3      *  185.  *   1.7 *   .0   .7   .0   .0   .0   .0   .3   .2
  2. SE3      *  355.  *   1.6 *   .0   .0   .7   .0   .2   .3   .0   .0
  3. SW3      *    5.  *   2.0 *   .0   .0   .2   .2   .0  1.3   .2   .0
  4. NW3      *    5.  *   2.0 *   .0   .0   .1   .2   .1  1.5   .0   .0
  5. NE7      *  186.  *   1.1 *   .0   .4   .0   .0   .0   .0   .2   .2
  6. SE7      *  353.  *   1.1 *   .0   .0   .4   .0   .2   .3   .0   .0
  7. SW7      *    6.  *   1.2 *   .0   .0   .1   .1   .0   .8   .0   .0
  8. NW7      *   96.  *   1.1 *   .0   .0   .1   .0   .0   .4   .0   .0


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE)     (CONT.)

              *                            CONC/LINK
              *                              (PPM)
   RECEPTOR   *   I    J    K    L    M    N    O    P    Q    R    S    T
  ------------*-------------------------------------------------------------
  1. NE3      *   .0   .2   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  2. SE3      *   .0   .1   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  3. SW3      *   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  4. NW3      *   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  5. NE7      *   .0   .2   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  6. SE7      *   .0   .1   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  7. SW7      *   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0   .0
  8. NW7      *   .0   .4   .0   .0   .0   .0   .0   .0   .0   .0   .2   .0
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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave and Venice Blvd. South AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1036	3.8	.0	35.0
B. NA	15	-500	15	0	AG	1036	8.1	.0	33.0
C. ND	15	0	15	500	AG	927	4.5	.0	33.0
D. NE	15	500	15	1500	AG	927	3.8	.0	35.0
E. SF	-15	1500	-15	500	AG	680	3.8	.0	35.0
F. SA	-15	500	-15	0	AG	520	5.7	.0	33.0
G. SD	-15	0	-15	-500	AG	646	4.2	.0	33.0
H. SE	-15	-500	-15	-1500	AG	646	3.8	.0	35.0
I. WF	-1500	-8	-500	-8	AG	0	3.8	.0	35.0
J. WA	-500	-8	0	-8	AG	0	9.4	.0	33.0
K. WD	0	-8	500	-8	AG	0	6.9	.0	33.0
L. WE	500	-8	1500	-8	AG	0	3.8	.0	35.0
M. EF	-1500	-8	-500	-8	AG	297	3.8	.0	50.0
N. EA	-500	-8	0	-8	AG	213	9.4	.0	33.0
O. ED	0	-8	500	-8	AG	440	6.9	.0	33.0
P. EE	500	-8	1500	-8	AG	440	3.8	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	5.5	.0	33.0
R. SL	0	0	-15	500	AG	160	5.5	.0	33.0
S. WL	0	0	-500	-15	AG	0	9.4	.0	33.0
T. EL	0	0	-500	-15	AG	84	9.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
	COORDINATES (FT)		
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	2.1	.1	1.5	.0	.0	.0	.0	.0	.1
2. SE3	185.	2.1	.1	1.7	.0	.0	.0	.0	.1	.1
3. SW3	5.	1.4	.0	.0	.2	.2	.0	.6	.0	.0
4. NW3	173.	1.4	.0	.5	.0	.0	.0	.0	.5	.0
5. NE7	186.	1.3	.0	.9	.0	.0	.0	.0	.0	.1
6. SE7	187.	1.1	.0	.9	.0	.0	.0	.0	.0	.1
7. SW7	6.	.9	.0	.0	.1	.2	.0	.3	.0	.0
8. NW7	171.	1.0	.0	.5	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1	.0	.0
4. NW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave and Venice Blvd. South PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	773	3.8	.0	35.0
B. NA	15	-500	15	0	AG	773	6.9	.0	33.0
C. ND	15	0	15	500	AG	651	4.3	.0	33.0
D. NE	15	500	15	1500	AG	651	3.8	.0	35.0
E. SF	-15	1500	-15	500	AG	1393	3.8	.0	35.0
F. SA	-15	500	-15	0	AG	1139	6.0	.0	33.0
G. SD	-15	0	-15	-500	AG	1216	4.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1216	3.8	.0	35.0
I. WF	-1500	-8	-500	-8	AG	0	3.8	.0	35.0
J. WA	-500	-8	0	-8	AG	0	9.4	.0	33.0
K. WD	0	-8	500	-8	AG	0	6.9	.0	33.0
L. WE	500	-8	1500	-8	AG	0	3.8	.0	35.0
M. EF	-1500	-8	-500	-8	AG	395	3.8	.0	50.0
N. EA	-500	-8	0	-8	AG	291	9.4	.0	33.0
O. ED	0	-8	500	-8	AG	694	8.8	.0	33.0
P. EE	500	-8	1500	-8	AG	694	3.8	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	5.5	.0	33.0
R. SL	0	0	-15	500	AG	254	5.7	.0	33.0
S. WL	0	0	-500	-15	AG	0	9.4	.0	33.0
T. EL	0	0	-500	-15	AG	104	9.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	1.9	.0	1.0	.0	.0	.0	.0	.3	.2
2. SE3	353.	1.8	.0	.2	.5	.0	.1	.4	.0	.0
3. SW3	4.	2.2	.0	.0	.1	.1	.2	1.2	.1	.0
4. NW3	175.	1.9	.1	.3	.0	.0	.0	.2	1.0	.0
5. NE7	187.	1.3	.0	.6	.0	.0	.0	.0	.2	.2
6. SE7	352.	1.2	.0	.0	.3	.0	.1	.3	.0	.0
7. SW7	6.	1.4	.0	.0	.1	.1	.1	.7	.0	.0
8. NW7	173.	1.2	.1	.2	.0	.0	.0	.0	.6	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.4	.0	.0	.2	.0	.0
3. SW3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2	.0	.0
4. NW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.1	.0	.0
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1	.0	.0
8. NW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Rose Ave. and Lincoln Blvd. AM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	2008	3.8	.0	50.0
B. NA	23	-500	23	0	AG	1942	6.0	.0	45.0
C. ND	23	0	23	500	AG	2182	4.8	.0	33.0
D. NE	23	500	23	1500	AG	2182	3.8	.0	50.0
E. SF	-23	1500	-23	500	AG	1330	3.8	.0	50.0
F. SA	-23	500	-23	0	AG	1263	5.7	.0	45.0
G. SD	-23	0	-23	-500	AG	1342	4.3	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1342	3.8	.0	50.0
I. WF	1500	23	500	23	AG	533	3.8	.0	35.0
J. WA	500	23	0	23	AG	478	8.4	.0	33.0
K. WD	0	23	-500	23	AG	410	8.1	.0	33.0
L. WE	-500	23	-1500	23	AG	410	3.8	.0	35.0
M. EF	-1500	-15	-500	-15	AG	396	3.8	.0	50.0
N. EA	-500	-15	0	-15	AG	326	8.4	.0	45.0
O. ED	0	-15	500	-15	AG	333	5.1	.0	33.0
P. EE	500	-15	1500	-15	AG	333	3.8	.0	50.0
Q. NL	0	0	15	-500	AG	66	5.5	.0	33.0
R. SL	0	0	-15	500	AG	67	5.5	.0	33.0
S. WL	0	0	500	23	AG	55	8.4	.0	33.0
T. EL	0	0	-500	-8	AG	70	8.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	48	40	6.0
2. SE3	48	-40	6.0
3. SW3	-48	-40	6.0
4. NW3	-48	40	6.0
5. NE7	61	53	6.0
6. SE7	61	-53	6.0
7. SW7	-61	-53	6.0
8. NW7	-61	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	2.4	.2	1.5	.0	.0	.0	.0	.0	.3
2. SE3	352.	2.3	.0	.3	1.2	.0	.2	.3	.0	.0
3. SW3	5.	2.0	.0	.0	.1	.4	.1	1.0	.0	.0
4. NW3	172.	2.0	.2	.4	.0	.0	.0	.2	.7	.0
5. NE7	187.	1.8	.1	1.0	.0	.0	.0	.0	.0	.2
6. SE7	353.	1.5	.0	.0	.8	.1	.2	.1	.0	.0
7. SW7	7.	1.5	.0	.0	.1	.3	.0	.7	.0	.0
8. NW7	170.	1.4	.1	.4	.0	.0	.0	.0	.5	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Rose Ave. and Lincoln Blvd. PM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S
BRG= WORST CASE
CLAS= 7 (G)
MIXH= 1000. M
SIGTH= 5. DEGREES

Z0= 100. CM
VD= .0 CM/S
VS= .0 CM/S
AMB= .0 PPM
TEMP= .5 DEGREE (C)

ALT= 0. (FT)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
	LINK COORDINATES (FT)								
A. NF	23	-1500	23	-500	AG	1513	3.8	.0	35.0
B. NA	23	-500	23	0	AG	1381	8.1	.0	33.0
C. ND	23	0	23	500	AG	1502	4.8	.0	33.0
D. NE	23	500	23	1500	AG	1502	3.8	.0	35.0
E. SF	-23	1500	-23	500	AG	1928	3.8	.0	35.0
F. SA	-23	500	-23	0	AG	1841	8.1	.0	33.0
G. SD	-23	0	-23	-500	AG	1881	4.8	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1881	3.8	.0	35.0
I. WF	1500	23	500	23	AG	392	3.8	.0	35.0
J. WA	500	23	0	23	AG	322	9.4	.0	33.0
K. WD	0	23	-500	23	AG	511	9.4	.0	33.0
L. WE	-500	23	-1500	23	AG	511	3.8	.0	35.0
M. EF	-1500	-15	-500	-15	AG	466	3.8	.0	35.0
N. EA	-500	-15	0	-15	AG	377	9.4	.0	33.0
O. ED	0	-15	500	-15	AG	405	9.1	.0	33.0
P. EE	500	-15	1500	-15	AG	405	3.8	.0	35.0
Q. NL	0	0	15	-500	AG	132	5.5	.0	33.0
R. SL	0	0	-15	500	AG	87	5.5	.0	33.0
S. WL	0	0	500	23	AG	70	8.8	.0	33.0
T. EL	0	0	-500	-8	AG	89	8.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
	COORDINATES (FT)		
1. NE3	48	40	6.0
2. SE3	48	-40	6.0
3. SW3	-48	-40	6.0
4. NW3	-48	40	6.0
5. NE7	61	53	6.0
6. SE7	61	-53	6.0
7. SW7	-61	-53	6.0
8. NW7	-61	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. NE3	186.	2.4	.0	1.4	.0	.0	.0	.0	.2	.3
2. SE3	349.	2.0	.0	.0	.8	.0	.0	.7	.0	.0
3. SW3	6.	2.7	.0	.0	.1	.3	.0	1.7	.0	.0
4. NW3	171.	2.2	.1	.5	.0	.0	.0	.0	1.0	.0
5. NE7	188.	1.8	.0	.9	.0	.0	.0	.0	.2	.2
6. SE7	348.	1.6	.0	.0	.6	.0	.0	.6	.0	.0
7. SW7	8.	2.0	.0	.0	.2	.2	.0	1.2	.0	.0
8. NW7	169.	1.7	.0	.5	.0	.0	.0	.0	.7	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
	CONC/LINK (PPM)											
1. NE3	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Main St. and Rose Ave. AM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= .5 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1042	3.8	.0	50.0
B. NA	15	-500	15	0	AG	962	5.7	.0	45.0
C. ND	15	0	15	500	AG	1023	4.2	.0	33.0
D. NE	15	500	15	1500	AG	1023	3.8	.0	50.0
E. SF	-23	1500	-23	500	AG	492	3.8	.0	35.0
F. SA	-23	500	-23	0	AG	381	5.5	.0	33.0
G. SD	-23	0	-23	-500	AG	458	4.2	.0	33.0
H. SE	-23	-500	-23	-1500	AG	458	3.8	.0	35.0
I. WF	1500	8	500	8	AG	306	4.6	.0	35.0
J. WA	500	8	0	8	AG	254	9.1	.0	33.0
K. WD	0	8	-500	8	AG	223	5.7	.0	33.0
L. WE	-500	8	-1500	8	AG	223	4.6	.0	35.0
M. EF	-1500	-8	-500	-8	AG	203	4.6	.0	35.0
N. EA	-500	-8	0	-8	AG	183	8.4	.0	33.0
O. ED	0	-8	500	-8	AG	339	6.4	.0	33.0
P. EE	500	-8	1500	-8	AG	339	4.6	.0	35.0
Q. NL	0	0	8	-500	AG	80	5.5	.0	33.0
R. SL	0	0	-8	500	AG	111	5.5	.0	33.0
S. WL	0	0	500	8	AG	52	8.4	.0	33.0
T. EL	0	0	-500	-8	AG	20	8.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	1.4	.1	.8	.0	.0	.0	.0	.0	.1
2. SE3	354.	1.2	.0	.0	.6	.0	.1	.0	.0	.0
3. SW3	85.	1.3	.0	.2	.0	.0	.0	.0	.1	.0
4. NW3	94.	1.3	.0	.0	.2	.0	.0	.1	.0	.0
5. NE7	186.	1.0	.1	.5	.0	.0	.0	.0	.0	.1
6. SE7	354.	.9	.0	.0	.3	.1	.1	.0	.0	.0
7. SW7	84.	.9	.0	.2	.0	.0	.0	.0	.1	.0
8. NW7	96.	.9	.0	.0	.1	.0	.0	.1	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.3	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	.0	.5	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	.0	.3	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Main St. and Rose Ave. PM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	787	3.8	.0	50.0
B. NA	15	-500	15	0	AG	722	5.5	.0	45.0
C. ND	15	0	15	500	AG	743	4.1	.0	33.0
D. NE	15	500	15	1500	AG	743	3.8	.0	50.0
E. SF	-23	1500	-23	500	AG	1011	3.8	.0	35.0
F. SA	-23	500	-23	0	AG	883	5.7	.0	33.0
G. SD	-23	0	-23	-500	AG	1071	4.8	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1071	3.8	.0	35.0
I. WF	1500	8	500	8	AG	394	4.6	.0	35.0
J. WA	500	8	0	8	AG	248	8.4	.0	33.0
K. WD	0	8	-500	8	AG	267	6.2	.0	33.0
L. WE	-500	8	-1500	8	AG	267	4.6	.0	35.0
M. EF	-1500	-8	-500	-8	AG	250	4.6	.0	35.0
N. EA	-500	-8	0	-8	AG	224	8.4	.0	33.0
O. ED	0	-8	500	-8	AG	361	6.9	.0	33.0
P. EE	500	-8	1500	-8	AG	361	4.6	.0	35.0
Q. NL	0	0	8	-500	AG	65	5.5	.0	33.0
R. SL	0	0	-8	500	AG	128	5.5	.0	33.0
S. WL	0	0	500	8	AG	146	8.4	.0	33.0
T. EL	0	0	-500	-8	AG	26	8.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	1.4	.0	.6	.0	.0	.0	.0	.1	.2
2. SE3	353.	1.3	.0	.0	.4	.0	.1	.2	.0	.0
3. SW3	5.	1.7	.0	.0	.1	.2	.0	.9	.1	.0
4. NW3	175.	1.7	.2	.2	.0	.0	.0	.1	.9	.0
5. NE7	187.	1.1	.0	.4	.0	.0	.0	.0	.1	.2
6. SE7	352.	1.0	.0	.0	.3	.0	.1	.2	.0	.0
7. SW7	84.	1.2	.0	.1	.0	.0	.0	.0	.3	.0
8. NW7	174.	1.1	.2	.1	.0	.0	.0	.0	.5	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.1	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave. and Venice Blvd. North AM WP (Main)
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
      U=    .5 M/S            Z0= 100. CM           ALT=     0. (M)
    BRG= WORST CASE           VD=    .0 CM/S
   CLAS=     7 (G)            VS=    .0 CM/S
   MIXH= 1000. M             AMB=    .0 PPM
  SIGTH=     5. DEGREES      TEMP= 15.6 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	5	-450	5	-150	AG	915	3.9	.0	10.5
B. NA	5	-150	5	0	AG	908	5.8	.0	9.9
C. ND	5	0	5	150	AG	1052	4.8	.0	9.9
D. NE	5	150	5	450	AG	1052	3.9	.0	10.5
E. SF	-5	450	-5	150	AG	539	3.9	.0	10.5
F. SA	-5	150	-5	0	AG	539	5.7	.0	9.9
G. SD	-5	0	-5	-150	AG	650	4.3	.0	9.9
H. SE	-5	-150	-5	-450	AG	650	3.9	.0	10.5
I. WF	450	2	150	2	AG	314	3.9	.0	10.5
J. WA	150	2	0	2	AG	186	9.1	.0	9.9
K. WD	0	2	-150	2	AG	66	5.7	.0	9.9
L. WE	-150	2	-450	2	AG	66	3.9	.0	10.5
M. EF	450	2	150	2	AG	0	3.9	.0	10.5
N. EA	150	2	0	2	AG	0	9.1	.0	9.9
O. ED	0	2	-150	2	AG	0	5.7	.0	9.9
P. EE	-150	2	-450	2	AG	0	3.9	.0	10.5
Q. NL	5	-150	0	0	AG	7	5.5	.0	9.9
R. SL	0	-540	0	-570	AG	0	5.5	.0	9.9
S. WL	150	2	0	0	AG	128	9.1	.0	9.9
T. EL	150	2	0	0	AG	0	9.1	.0	9.9

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	10	8	1.8
2. SE3	10	-8	1.8
3. SW3	-10	-8	1.8
4. NW3	-10	8	1.8
5. NE7	14	11	1.8
6. SE7	14	-11	1.8
7. SW7	-14	-11	1.8
8. NW7	-14	11	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	184.	1.7	.1	1.0	.1	.0	.0	.0	.1	.2
2. SE3	355.	1.7	.0	.1	1.0	.0	.1	.2	.0	.0
3. SW3	5.	1.2	.0	.0	.2	.2	.0	.6	.0	.0
4. NW3	175.	1.2	.2	.3	.0	.0	.0	.0	.6	.0
5. NE7	186.	1.1	.0	.6	.0	.0	.0	.0	.1	.1
6. SE7	354.	1.0	.0	.0	.6	.0	.1	.1	.0	.0
7. SW7	6.	.8	.0	.0	.2	.2	.0	.4	.0	.0
8. NW7	173.	.8	.1	.2	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave. and Venice Blvd. North PM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	.5 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	672	3.8	.0	35.0
B. NA	15	-500	15	0	AG	655	5.7	.0	33.0
C. ND	15	0	15	500	AG	848	4.4	.0	33.0
D. NE	15	500	15	1500	AG	848	3.8	.0	35.0
E. SF	-15	1500	-15	500	AG	1274	3.8	.0	35.0
F. SA	-15	500	-15	0	AG	1274	6.0	.0	33.0
G. SD	-15	0	-15	-500	AG	1420	4.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1420	3.8	.0	35.0
I. WF	1500	8	500	8	AG	498	3.8	.0	35.0
J. WA	500	8	0	8	AG	324	8.8	.0	33.0
K. WD	0	8	-500	8	AG	176	5.2	.0	33.0
L. WE	-500	8	-1500	8	AG	176	3.8	.0	35.0
M. EF	1500	8	500	8	AG	0	3.8	.0	35.0
N. EA	500	8	0	8	AG	0	8.8	.0	33.0
O. ED	0	8	-500	8	AG	0	5.2	.0	33.0
P. EE	-500	8	-1500	8	AG	0	3.8	.0	35.0
Q. NL	0	0	15	-500	AG	17	5.5	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	5.5	.0	33.0
S. WL	0	0	500	8	AG	174	8.8	.0	33.0
T. EL	0	0	500	8	AG	0	8.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	1.7	.0	.7	.0	.0	.0	.0	.3	.2
2. SE3	355.	1.6	.0	.0	.7	.0	.2	.3	.0	.0
3. SW3	5.	2.0	.0	.0	.2	.2	.0	1.3	.2	.0
4. NW3	5.	2.0	.0	.0	.1	.2	.1	1.5	.0	.0
5. NE7	186.	1.2	.0	.4	.0	.0	.0	.0	.2	.2
6. SE7	353.	1.1	.0	.0	.4	.0	.2	.3	.0	.0
7. SW7	6.	1.2	.0	.0	.1	.1	.0	.8	.0	.0
8. NW7	96.	1.1	.0	.0	.1	.0	.0	.4	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave and Venice Blvd. South AM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 5. DEGREES	TEMP= .5 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1040	3.8	.0	35.0
B. NA	15	-500	15	0	AG	1040	8.1	.0	33.0
C. ND	15	0	15	500	AG	931	4.5	.0	33.0
D. NE	15	500	15	1500	AG	931	3.8	.0	35.0
E. SF	-15	1500	-15	500	AG	686	3.8	.0	35.0
F. SA	-15	500	-15	0	AG	526	5.7	.0	33.0
G. SD	-15	0	-15	-500	AG	652	4.3	.0	33.0
H. SE	-15	-500	-15	-1500	AG	652	3.8	.0	35.0
I. WF	-1500	-8	-500	-8	AG	0	3.8	.0	35.0
J. WA	-500	-8	0	-8	AG	0	9.4	.0	33.0
K. WD	0	-8	500	-8	AG	0	6.9	.0	33.0
L. WE	500	-8	1500	-8	AG	0	3.8	.0	35.0
M. EF	-1500	-8	-500	-8	AG	297	3.8	.0	50.0
N. EA	-500	-8	0	-8	AG	213	9.4	.0	33.0
O. ED	0	-8	500	-8	AG	440	6.9	.0	33.0
P. EE	500	-8	1500	-8	AG	440	3.8	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	5.5	.0	33.0
R. SL	0	0	-15	500	AG	160	5.5	.0	33.0
S. WL	0	0	-500	-15	AG	0	9.4	.0	33.0
T. EL	0	0	-500	-15	AG	84	9.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	184.	2.1	.1	1.5	.0	.0	.0	.0	.1	.1
2. SE3	185.	2.1	.1	1.7	.0	.0	.0	.0	.1	.1
3. SW3	5.	1.4	.0	.0	.2	.2	.0	.6	.0	.0
4. NW3	173.	1.4	.0	.5	.0	.0	.0	.0	.5	.0
5. NE7	186.	1.3	.0	.9	.0	.0	.0	.0	.1	.1
6. SE7	187.	1.2	.0	.9	.0	.0	.0	.0	.0	.1
7. SW7	6.	.9	.0	.0	.1	.2	.0	.3	.0	.0
8. NW7	171.	1.0	.0	.5	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1	.0	.0
4. NW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Pacific Ave and Venice Blvd. South PM WP (Main)
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
     U=    .5 M/S             Z0= 100. CM           ALT=     0. (FT)
   BRG= WORST CASE            VD=   .0 CM/S
  CLAS=     7 (G)             VS=   .0 CM/S
  MIXH= 1000. M              AMB=   .0 PPM
 SIGTH=    5. DEGREES       TEMP=   .5 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	780	3.8	.0	35.0
B. NA	15	-500	15	0	AG	780	6.9	.0	33.0
C. ND	15	0	15	500	AG	658	4.3	.0	33.0
D. NE	15	500	15	1500	AG	658	3.8	.0	35.0
E. SF	-15	1500	-15	500	AG	1398	3.8	.0	35.0
F. SA	-15	500	-15	0	AG	1144	6.0	.0	33.0
G. SD	-15	0	-15	-500	AG	1221	4.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1221	3.8	.0	35.0
I. WF	-1500	-8	-500	-8	AG	0	3.8	.0	35.0
J. WA	-500	-8	0	-8	AG	0	9.4	.0	33.0
K. WD	0	-8	500	-8	AG	0	6.9	.0	33.0
L. WE	500	-8	1500	-8	AG	0	3.8	.0	35.0
M. EF	-1500	-8	-500	-8	AG	395	3.8	.0	50.0
N. EA	-500	-8	0	-8	AG	291	9.4	.0	33.0
O. ED	0	-8	500	-8	AG	694	8.8	.0	33.0
P. EE	500	-8	1500	-8	AG	694	3.8	.0	50.0
Q. NL	0	-1900	0	-1800	AG	0	5.5	.0	33.0
R. SL	0	0	-15	500	AG	254	5.7	.0	33.0
S. WL	0	0	-500	-15	AG	0	9.4	.0	33.0
T. EL	0	0	-500	-15	AG	104	9.4	.0	33.0

(LINK COORDINATES (FT): X1, Y1, X2, Y2)

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

(COORDINATES (FT))

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. NE3	185.	1.9	.0	1.0	.0	.0	.0	.0	.3	.2
2. SE3	353.	1.8	.0	.2	.5	.0	.1	.4	.0	.0
3. SW3	4.	2.2	.0	.0	.1	.2	.2	1.2	.1	.0
4. NW3	175.	1.9	.1	.3	.0	.0	.0	.2	1.0	.0
5. NE7	187.	1.3	.0	.6	.0	.0	.0	.0	.2	.2
6. SE7	352.	1.2	.0	.0	.3	.0	.1	.3	.0	.0
7. SW7	6.	1.4	.0	.0	.1	.1	.1	.7	.0	.0
8. NW7	173.	1.2	.1	.2	.0	.0	.0	.0	.6	.0

(CONC/LINK (PPM): A–H)

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.4	.0	.0	.2	.0	.0
3. SW3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2	.0	.0
4. NW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.1	.0	.0
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1	.0	.0
8. NW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

(CONC/LINK (PPM): I–T)

Title : Los Angeles County Subarea 2009 Winter Default Title
Version : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/07/04 09:48:30
Scen Year: 2009 -- Model Years: 1965 to 2009
Season : Winter
Area : Los Angeles (SC)
****

Year:2009 -- Model Years 1965 to 2009 Inclusive -- Winter
Emfac2002 Emission Factors: V2.2 Sept 23 2002

Los Angeles (SC) Los Angeles (SC) Los Angeles (SC)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
3	6.872	11.396	11.332	20.646	46.497	37.203	9.423
4	6.624	10.905	10.885	20.646	46.497	37.203	9.107
5	6.392	10.450	10.474	20.646	46.497	37.203	8.814
6	6.175	10.027	9.988	18.998	42.571	35.670	8.426
7	5.972	9.635	9.542	17.518	39.065	34.267	8.068
8	5.781	9.271	9.131	16.187	35.929	32.985	7.739
9	5.602	8.932	8.751	14.988	33.119	31.813	7.433
10	5.434	8.616	8.401	13.907	30.598	30.742	7.151
11	5.276	8.321	8.076	12.931	28.332	29.766	6.889
12	5.127	8.046	7.775	12.048	26.294	28.877	6.645
13	4.986	7.788	7.495	11.249	24.457	28.069	6.418
14	4.852	7.547	7.236	10.525	22.800	27.337	6.207
15	4.726	7.321	6.994	9.867	21.303	26.675	6.009
16	4.607	7.108	6.769	9.270	19.950	26.079	5.825
17	4.494	6.909	6.558	8.727	18.724	25.546	5.652
18	4.386	6.721	6.362	8.233	17.613	25.071	5.491
19	4.285	6.545	6.179	7.783	16.606	24.653	5.339
20	4.188	6.379	6.007	7.372	15.691	24.289	5.197
21	4.095	6.223	5.846	6.998	14.860	23.975	5.064
22	4.008	6.075	5.696	6.656	14.104	23.712	4.938
23	3.924	5.936	5.555	6.345	13.418	23.496	4.820
24	3.845	5.805	5.423	6.060	12.793	23.328	4.710
25	3.769	5.682	5.299	5.800	12.225	23.205	4.605
26	3.697	5.565	5.183	5.563	11.708	23.128	4.507
27	3.628	5.456	5.074	5.346	11.238	23.096	4.415
28	3.563	5.352	4.972	5.148	10.811	23.108	4.328
29	3.500	5.255	4.877	4.968	10.424	23.166	4.246
30	3.441	5.163	4.788	4.804	10.073	23.270	4.169
31	3.384	5.077	4.705	4.656	9.756	23.420	4.097
32	3.330	4.997	4.627	4.521	9.470	23.618	4.030
33	3.279	4.921	4.555	4.399	9.213	23.865	3.966
34	3.230	4.850	4.487	4.289	8.983	24.162	3.907
35	3.184	4.785	4.425	4.190	8.779	24.512	3.852
36	3.140	4.723	4.368	4.103	8.598	24.917	3.801
37	3.099	4.667	4.315	4.025	8.440	25.379	3.753
38	3.060	4.614	4.268	3.957	8.303	25.903	3.709
39	3.023	4.567	4.224	3.898	8.187	26.492	3.669
40	2.988	4.523	4.185	3.849	8.091	27.149	3.633

Sunset Avenue Project (Consistency Analysis)

Regional Emission Calculations (lbs/day)

	CO	NOx	PM10	ROC	SOx
Project					
Mobile	146	18	18	12	<1
Stationary	1	7	<1	<1	1
Area	<1	<1	<1	<1	<1
Total Project	**148**	**25**	**19**	**13**	**1**
Net Project					
Net Mobile	146	18	18	12	<1
Net Stationary	1	7	<1	<1	1
Net Area	<1	<1	<1	<1	<1
Total Net	148	25	19	13	1
SCAQMD Significance Threshold	550	55	150	55	150
Difference	**(402)**	**(30)**	**(131)**	**(42)**	**(149)**
Significant?	**No**	**No**	**No**	**No**	**No**

Sunset Avenue Project (Consistency Analysis)

Electricity and Natural Gas Usage

Electricity Usage

Land Use	1,000 Sqft	Electricity Usage Rate [a] (kWh\sq.ft\yr)	Total Electricity Usage (KWh\year)	Total Electricity Usage (MWh\Day)	CO 0.2	ROC 0.01	NOx 1.15	PM10 0.04	SOx 0.12
					Emission Factors (lbs/MWh) [b]				
Existing					Emissions from Electricity Consumption (lbs/day)				
Office	0.0	12.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Retail	0.0	13.55	0	0.000	0.000	0.000	0.000	0.000	0.000
Hotel/Motel	0.0	9.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Restaurant	0.0	47.45	0	0.000	0.000	0.000	0.000	0.000	0.000
Food Store	0.0	53.30	0	0.000	0.000	0.000	0.000	0.000	0.000
Warehouse	0.0	4.35	0	0.000	0.000	0.000	0.000	0.000	0.000
College/University	0.0	11.55	0	0.000	0.000	0.000	0.000	0.000	0.000
High School	0.0	10.50	0	0.000	0.000	0.000	0.000	0.000	0.000
Elementary School	0.0	5.90	0	0.000	0.000	0.000	0.000	0.000	0.000
Hospital	0.0	21.70	0	0.000	0.000	0.000	0.000	0.000	0.000
Miscellaneous	0.0	10.50	0	0.000	0.000	0.000	0.000	0.000	0.000
Residential (DU)	0.0	5,627	0	0.000	0.000	0.000	0.000	0.000	0.000
Total Existing			**0**	**0.000**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Project									
Office	136.3	12.95	1,765,642	4.837	0.967	0.048	5.563	0.193	0.580
Retail	0.0	13.55	0	0.000	0.000	0.000	0.000	0.000	0.000
Hotel/Motel	0.0	9.95	0	0.000	0.000	0.000	0.000	0.000	0.000
Restaurant	0.0	47.45	0	0.000	0.000	0.000	0.000	0.000	0.000
Food Store	0.0	53.3	0	0.000	0.000	0.000	0.000	0.000	0.000
Warehouse	0.0	4.35	0	0.000	0.000	0.000	0.000	0.000	0.000
College/University	0.0	11.55	0	0.000	0.000	0.000	0.000	0.000	0.000
High School	0.0	10.5	0	0.000	0.000	0.000	0.000	0.000	0.000
Elementary School	0.0	5.9	0	0.000	0.000	0.000	0.000	0.000	0.000
Hospital	0.0	21.7	0	0.000	0.000	0.000	0.000	0.000	0.000
Miscellaneous	0.0	10.5	0	0.000	0.000	0.000	0.000	0.000	0.000
Residential (DU)	0.0	5,627	0	0.000	0.000	0.000	0.000	0.000	0.000
Total Project			**1,765,642**	**4.837**	**0.97**	**0.05**	**5.56**	**0.19**	**0.58**
Net Emissions From Electricity Usage					**0.97**	**0.05**	**5.56**	**0.19**	**0.58**

Natural Gas Usage

Land Use	1,000 Sqft	Natural Gas Usage Rate [c] (cu.ft\sq.ft\mo)	Total Natural Gas Usage (cu.ft\mo)	Total Natural Gas Usage (cu.ft\DAY)	CO 20	ROC 5.3	NOx 120/80 [e]	PM10 0.2	SOx 0
					Emission Factors (lbs/MCuft) [d]				
Existing					Emissions from Natural Gas Consumption (lbs/day)				
Office	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Retail	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Hotel/Motel	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Restaurant	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Food Store	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Warehouse	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
College/University	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
High School	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Elementary School	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Hospital	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Miscellaneous	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Residential (Single Family DU)	0.0	6,665	**0**	**0**	0.000	0.000	0.000	0.000	
Residential (Multi-Family DU)	0.0	4,012	**0**	**0**	0.000	0.000	0.000	0.000	--
Total Existing			**0**	**0**	**0.00**	**0.00**	**0.00**	**0.00**	--
Project									
Office	136.3	2.0	**272,686**	**9,090**	0.182	0.048	1.091	0.002	--
Retail	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Hotel/Motel	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Restaurant	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Food Store	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Warehouse	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
College/University	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
High School	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Elementary School	0.0	2.0	**0**	**0**	0.000	0.000	0.000	0.000	--
Hospital	0.0	4.8	**0**	**0**	0.000	0.000	0.000	0.000	--
Miscellaneous	0.0	2.9	**0**	**0**	0.000	0.000	0.000	0.000	--
Residential (Single Family DU)	0.0	6,665	**0**	**0**	0.000	0.000	0.000	0.000	
Residential (Multi-Family DU)	0.0	4,012	**0**	**0**	0.000	0.000	0.000	0.000	--
Total Project			**272,686**	**9,090**	**0.18**	**0.05**	**1.09**	**0.00**	--
Net Emissions From Natural Gas Usage					**0.18**	**0.05**	**1.09**	**0.00**	**--**

Summary of Stationary Emissions

	CO	ROC	NOx	PM10	SOx
Total Existing Emissions (lbs/day)	0.00	0.00	0.00	0.00	0.00
Total Project Emissions (lbs/day)	1.15	0.10	6.65	0.19	0.58
Total Net Emissions (lbs/day)	**1.15**	**0.10**	**6.65**	**0.19**	**0.58**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[b] Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[c] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[d] Emission Factors from Table A9-12-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[e] The emission factors for NOx in lbs per million cuft of natural gas are 120 for nonresidential uses and 80 for residential uses.

URBEMIS 2002 For Windows 7.4.2

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA-Venice\URBEMIS\Sunset (Consistency).urb
Project Name: MTA - Venice Consistency
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Winter)

AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	-	0.00
Wood Stoves	0.00	0.00	0.00	0.00	0.00
Fireplaces	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.48	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
General office building	12.29	20.92	146.38	0.10	18.33
TOTAL EMISSIONS (lbs/day)	12.29	20.92	146.38	0.10	18.33

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2009 Temperature (F): 60 Season: Winter

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
General office building	12.35 trips / 1000 sq. ft.	136.34	1,683.84

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.90	1.30	98.40	0.30
Light Truck < 3,750 lbs	15.10	2.60	95.40	2.00
Light Truck 3,751- 5,750	16.10	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	75.00	25.00	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
General office building				35.0	17.5	47.5

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The natural gas option switch changed from on to off.
The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape length of the summer period (in days) changed from 180 to 365.
The landscape year changed from 2004 to 2009.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2009.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 75.
The operational summer selection item changed from 8 to 5.

URBEMIS 2002 For Windows 7.4.2

File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA-Venice\URBEMIS\Sunset (Consistency).urb
Project Name: MTA - Venice Consistency
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.04	0.01	0.33	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.04	0.01	0.33	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
General office building	11.28	17.99	139.58	0.10	18.33
TOTAL EMISSIONS (lbs/day)	11.28	17.99	139.58	0.10	18.33

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2009 Temperature (F): 75 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
General office building	12.35 trips / 1000 sq. ft.	136.34	1,683.84

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.90	1.30	98.40	0.30
Light Truck < 3,750 lbs	15.10	2.60	95.40	2.00
Light Truck 3,751- 5,750	16.10	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	75.00	25.00	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
General office building				35.0	17.5	47.5

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

The natural gas option switch changed from on to off.
The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape length of the summer period (in days) changed from 180 to 365.
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Changes made to the default values for Operations

The operational emission year changed from 2004 to 2009.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 75.
The operational summer selection item changed from 8 to 5.

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File Name: V:\AQNOISE DIVISION\Active Projects\RAD\MTA-Venice\URBEMIS\Sunset (Consistency).urb
Project Name: MTA - Venice Consistency
Project Location: South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	-	0.00
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.04	0.01	0.33	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.04	0.01	0.33	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
General office building	12.44	16.60	158.40	0.11	18.33
TOTAL EMISSIONS (lbs/day)	12.44	16.60	158.40	0.11	18.33

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2009 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
General office building	12.35 trips / 1000 sq. ft.	136.34	1,683.84

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.90	1.30	98.40	0.30
Light Truck < 3,750 lbs	15.10	2.60	95.40	2.00
Light Truck 3,751- 5,750	16.10	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	75.00	25.00	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Rural Trip Length (miles)	11.5	4.9	6.0	10.3	5.5	5.5
Trip Speeds (mph)	35.0	40.0	40.0	40.0	40.0	40.0
% of Trips - Residential	20.0	37.0	43.0			
% of Trips - Commercial (by land use)						
General office building				35.0	17.5	47.5

Changes made to the default values for Land Use Trip Percentages

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The landscape length of the summer period (in days) changed from 180 to 365.
The landscape year changed from 2004 to 2009.

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2009.
The operational winter temperature changed from 50 to 60.
The operational summer temperature changed from 90 to 85.
The operational summer selection item changed from 8 to 6.

Appendix C – Geology:

West Los Angeles Transportation Facility

C1 – Geotechnical Engineering Study Proposed MTA Transportation Center, Advanced Geotechnical Services, Inc., October 8, 2003.

C2 – Fault-Rupture Assessment in the Alquist-Priolo Hazard Zone Proposed MTA Transportation Center, UltraSystems Environmental Inc., March 2004.

Sunset Avenue Project

C3 – Geotechnical Engineering Study Proposed Multi-Family Residential, Advanced Geotechnical Services, Inc., February 13, 2004.

WEST LOS ANGELES TRANSPORTATION FACILITY

C1 – GEOTECHNICAL ENGINEERING STUDY PROPOSED MTA TRANSPORTATION CENTER, ADVANCED GEOTECHNICAL SERVICES, INC., OCTOBER 8, 2003.

advanced geotechnical services, inc.

October 23, 2003
Client Number 3224
Report Number 6375

Ramey Ward
RAD Jefferson
615 Hampton Drive, Suite A107
Venice, CA 90291

Geotechnical Engineering Study
Proposed MTA Transportation Center
3475 La Cienega Boulevard
Los Angeles, California

Dear Ms. Ward,

In accordance with our proposal dated July 9, 2003, and your authorization, Advanced Geotechnical Services, Inc., has prepared this geotechnical engineering study report for the proposed MTA transportation Center at the subject site. This report presents the results of our data research, subsurface exploration, laboratory testing, and our professional opinions regarding the geotechnical engineering factors that may affect the proposed development. Our services were performed in accordance with presently accepted procedures consistent with the locality and scope of the project.

Based on the results of our geotechnical study, it is our opinion that the site is suitable for construction of the proposed development, provided recommendations of this report are properly incorporated in the design and implemented during construction.

This opportunity to be of service is sincerely appreciated. If you have any questions or if we may be of any further assistance, please do not hesitate to call. We look forward to being of continued service.

Respectfully submitted,
Advanced Geotechnical Services, Inc.

Kenneth J. Palos
President

Don Villafana, RCE 37354
Principal Engineer

Dan Daneshfar
Staff Engineer

REGISTERED PROFESSIONAL ENGINEER
DONALD E. VILLAFANA
No. 37354
Exp 6-04
CIVIL
STATE OF CALIFORNIA

Enclosure: Report Number 6375
cc: (5) Addressee (1) File

advanced geotechnical services, inc.

GEOTECHNICAL ENGINEERING STUDY

Proposed MTA Transportation Center
3475 La Cienega Boulevard
Los Angeles, California

Report to
RAD Jefferson
Venice, California

October 8, 2003
Client Number 3224
Report Number 6375

Contents

Contents (Cont)

List of Plates, Figures and Appendices

Introduction

This geotechnical engineering report and seismicity study have been prepared for the proposed MTA Transportation Center at the subject site. The subject property is located within an Alquist-Priolo Earthquake Fault Zone. A report addressing the site potential for fault rupture will be issued under a separate cover. The purposes of this study, in addition to evaluating the seismicity of the site, are to (1) identify on-site soil conditions that may affect the proposed project, and (2) provide geotechnical recommendations for site preparation, temporary excavations, foundation design, slabs-on-grade, retaining wall design, pavement design, and drainage recommendations. This report presents the findings of our data review, subsurface exploration, laboratory testing, engineering analysis and evaluation, and our conclusions and recommendations.

Figures referenced in this report follow the main text. Appendices, which include logs and laboratory test results, are attached following the main report. The citations of references used in this study and mentioned within this report are included in an appendix.

Proposed Development and Site Description

The subject site consists of about 4.65 acres of mostly level land, just north of the Baldwin Hills, in the city of Los Angeles, California. The study area is bounded by Jefferson Boulevard and Ballona Creek on the west, a paved alleyway on the north, and developed commercial/industrial properties to the south, east and north. The majority of the site is paved with asphalt. Several small buildings are currently located on the site.

Improvements to the site will include, a 5,900-square-foot transportation building, a bus facility consisting of a fueling area, wash area, tire bay, CNG station, tool storage building, and a two-story parking structure. Building loads were not available at the time of this study, but for purposes of this report, we are assuming maximum loads of 4 kips per foot for wall loads and 50 kips for columns.

A grading plan was not available at the time of this study, but we expect site grading to consist of excavation and backfill for the structure and related new utilities, and a minor cut and fill operation to establish grade for the building pads and site drainage. Permanent cut and fill depths are not known at this time.

Scope of Services

This geotechnical engineering study included:

a. Site observation and review of pertinent geotechnical and geologic data of the general study area. A site location map is shown in Figure 1.

b. Drilling, sampling, and logging of 6 borings to a maximum depth of 51 feet for foundation evaluation. Two Cone penetrometer tests (CPT) were performed to maximum depthd of 50 feet to evaluate liquefaction potential and to identify stratigraphic changes. Borings and cone penetrometer probes were located in the field using a tape measure and approximate reference points. Thus, the actual boring and cone penetrometer locations may deviate slightly from the locations on Plate 1. The logs are included in Appendix A, along with a general description of the field operations. The cone penetrometer results are included also in Appendix A.

c. Laboratory testing of selected samples to determine the engineering properties of on-site soils. The results of laboratory testing are presented in Appendix B and on the boring logs in Appendix A. Soil samples will be discarded 30 days after the date of this report, unless this office receives a specific request and fee to retain the samples for a longer period of time.

d. Research of historical earthquake events and determination of seismic parameters for potential on-site ground motion.

e. Engineering analysis of the data and information obtained from our field study, laboratory testing, and literature review.

f. Development of geotechnical recommendations for site preparation and grading, and geotechnical design criteria for building foundations, slab-on-grade construction, underground utility trenches, temporary excavations, retaining walls, pavement section, and drainage.

g. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects of the project site.

The scope of this geotechnical study did not include environmental issues or fault investigation.

Previous Study

The J. Byer Group performed a geotechnical study for the subject site in the year 2001, and did not finalize the results. RAD Jefferson has since obtained permission to utilize the exploratory field data and it is presented herein along with our exploratory field data.

Subsurface Conditions

Soil Conditions

Asphalt and base material was encountered at the surface in several borings that were drilled in pavement areas. Artificial fill was encountered either at the surface or below the asphalt and base material. The fill encountered on the site consisted of silty to silty clayey sands, clayey silt, and sandy to silty clay gravels. The depths of fill materials ranged from 4 to 26 feet. Within borings drilled by AGS, the measured dry densities varied between 89.4 pcf and 119.0 pcf, and measured moisture contents varied between 11.6% and 23.6%. Reportedly fill depths of up to 46 feet exist along the sewer easement.

Alluvium was encountered below the fill in the exploratory borings to the maximum depth explored. Within AGS's borings, this material ranged from sand to silty sand, sandy and clayey silt, and silty clay. The measured dry densities of this material were between 74.9 pcf and 130.4 pcf, and measured moisture contents were between 2.8% and 31.3%.

A compaction curve was developed in this study, and the result is summarized below.

Boring	Depth, Ft	Description	Optimum Moisture Content, %	Maximum Dry Density, pcf
B-1	0-3	DARK BROWN SILTY SAND WITH GRAVEL	10.5	130.0

Using the above values, we computed the relative compaction (measured dry density/maximum dry density found from a laboratory compaction test) of the fill encountered in the borings drilled for this study.

The undrained shear strengths of cohesive soil samples were estimated with a hand penetrometer and with cone penetrometer readings. A direct shear test was used to measure the peak and ultimate shear strength of soil in terms of a cohesion and friction angle. A direct shear test was performed on a remolded sample to evaluate the shear strength properties of a fill compacted to 90% relative compaction. The ultimate cohesion was 60 psf, and the ultimate friction angle was 41 degrees for a silty sand with gravel, and the ultimate cohesion was 260 psf, and the ultimate friction angle was 29 degrees for a sandy clay.

Consolidation tests were performed on two samples; one remolded to a relative compaction of 90%, and one on an undisturbed sample. The purpose of performing consolidation tests is to determine the compressibility characteristics and to determine if the soils would experience hydroconsolidation, which is a decrease in volume (collapse) when subjected to water at a constant load or swell (expand) when exposed to water at a constant load. The consolidation test results showed a slight tendency to hydroconsolidate. The potential for hydroconsolidation tends to increase with a decrease in degree of saturation, a decrease in dry density, and a decrease in the difference between the sand and clay content. The potential for hydroconsolidation is usually nil when the degree of saturation exceeds about 60%, but as the degree of saturation decreases below 60%, the potential for hydroconsolidation may increase. The degree of saturation ranged from 20% to 96%, with an average of 70%.

The potential of the soil to swell or expand increases with an increase in soil density, a decrease in initial moisture content (low percent saturation), an increase in clay content, and an increase in the activity of the clay content. Expansive soils change in volume (shrink or swell) due to changes in the soil moisture content. In addition to swell potential of the soil, the amount of volume change depends on (1) the availability of water, (2) the restraining pressure, and (3) time. The expansion index, the initial moisture content, the initial dry density, and the final moisture content for each specimen used to perform the expansion index test are given below.

Boring	Depth, Ft	Soil Description	Initial Moisture Content, %	Final Moisture Content, %	Initial Dry Density, pcf	Expansion Index
B-1	0 – 5	OLIVE BROWN SILTY SAND WITH CLAY	7.8	17.6	114.3	37

Groundwater

At the time of our field exploration, no standing groundwater was encountered in the borings. Seepage occurred at a depth of 18 feet at the location of boring B-3. Within the cone penetrometer test holes, groundwater pore pressure was measured at depths of 18 to 30 feet, and in the case of CPT-4 and CPT-6, no or little pore pressure was encountered. Groundwater elevations are dependent on seasonal precipitation, irrigation, land use, climatic conditions, among other factors, and as a result fluctuate. Therefore, water levels at the time of construction and during the life of the facility may vary from the observations or conditions at the time of our field exploration.

Overview

For a detailed description of the subsurface conditions encountered in the exploratory borings, refer to the boring logs and the cone penetrometer data presented in Appendix A. The J. Byer Group's exploratory excavations can be found in Appendix E. Information on slab thicknesses and footing depths for those borings excavated to determine this information are shown on the logs.

Summary of Subsurface Conditions

a. The western portion of the property is underlain by deep fill associated with the City of Los Angeles Sewer line and backfill of the former Ballona Creek. The fill is not compacted to modern standards and is not suitable for the structural support of buildings.

b. City of Los Angeles Sewer line passes through the northeast quadrant to the southwest quadrant of the project site. We understand the sewer invert is approximately 43 to 46 feet below the existing grade. The sewer pipe was constructed using cut and cover methods.

c. The layers of fill may be subject to liquefaction and associated settlement and lateral spreading toward Ballona Creek.

d. The eastern portion of the project site is generally considered capable of supporting of the building loads. The amount of fill in the eastern portion is shallow and can be mitigated by removal and compaction and shallow foundation, pile foundation or spread footing on compacted fill can be used in this area.

Faulting and Seismicity

Faulting

The majority of the subject site is located within a state established Alquist-Priolo Earthquake Fault Zone, see the Site Location Map, Figure 1. A fault study will be presented under a separate cover, and is not part of this report. The Alquist-Priolo Special Studies Act of 1972 went into effect in 1973 with the intent to prohibit the location of structures intended for human occupancy to be constructed on the surface trace of a known active fault. Development of areas within an Earthquake Fault Zone can only be accomplished if a geologic investigation performed by a geologist, can adequately demonstrate that the proposed improvements intended for human occupancy are not threatened by surface displacement from potential future faulting. Surface traces of the Newport-Inglewood Fault have been mapped just south of the southern boundary of the subject property. A projection of this fault traces extends northwest-ward across the site.

Seismicity Study

Earthquakes are characterized by magnitude, which is a quantitative measure of the strength of the earthquake based on strain energy released during the earthquake. The magnitude is independent of the site in question. The intensity of an earthquake at a given site, however, is affected by the magnitude, the distance between the site and the hypocenter (focus, the location on the fault at depth where the energy is released), and the geologic conditions between the site and the hypocenter. Intensity, which is often measured by the Mercalli scale, generally increases with increasing magnitude and decreases with increasing distance from the hypocenter. Intensity is also usually greater in areas underlain by unconsolidated material than areas underlain by bedrock.

The development of seismic input parameters for structural design requires knowledge of the faults surrounding the site, the magnitude of earthquakes that each fault can generate, and the attenuation or magnification of ground acceleration that may occur at a given site if an earthquake occurs along a particular fault. Research of historical earthquake events that have occurred in the general study area and both a deterministic and probability evaluation of seismic parameters for potential on-site ground motion consideration can be readily performed today with computer databases and associated software. For this study, we used the computer programs EQSEARCH, and EQFAULT(Blake, 2000a, and 2000b) with the fault models based on California Division of Mines and Geology's fault-database (Blake, 1998a). The locations of these fault zones, defined in the computer database are each represented by a single surface and do not necessarily coincide with the zones shown on the State of California Earthquake Fault Zone maps, where the fault zones may include a main trace and several splays. For purposes of seismic risk, as defined by ground acceleration, the computer database is considered adequate. The State of California fault zone maps and other geologic maps were used as indicated above to evaluate if faults might traverse a given site. Brief descriptions of each program used to evaluate seismic risk are included in Appendix C. To estimate ground acceleration at the site, we used the Bozorgnia, Campbell, and Niazi (1999) acceleration-attenuation relations with EQSEARCH and EQFAULT. The results of EQSEARCH, and EQFAULT studies are presented in Appendix C. A summary of the pertinent information contained in Appendix C is given below.

The seismicity study indicated that there is a potential for the active Newport-Inglewood Fault to pass through the site and as stated earlier, a fault investigation should be performed to assess that potential. The site, however, as all of the Southern California area, is located in a seismically active region and will experience slight to very intense ground shaking as the result of movement along various active faults in the region. The most significant fault system near the site is the Newport-Inglewood fault. The computed peak site acceleration during the time period of 1800 to 1999 is 0.221g (gravity). Computed peak accelerations, which are based on mean attenuation behavior, unless noted otherwise, are only intended to provide estimates and may not reflect actual accelerations experienced at a given site. The maximum magnitude affecting the site since 1800 is 7.7. The maximum acceleration measured at the Camarillo Airport during the Northridge earthquake in 1994 was 0.13g (CDMG seismograph database).

The Uniform Building Code (UBC) is often followed in seismic structural design. The UBC requirements are based on ground motions with a 10% exceedance in 50 years, which corresponds to a return period of 475 years. The site computed peak ground acceleration for a 50-year exposure and 10% exceedance is about 0.49g.

Seismic Design Criteria

Our knowledge of the nature of faulting in California has been greatly enhanced during the last 25 years. Seismology, however, is a relatively new science and standard procedures for predicting the site specific ground accelerations have not yet been widely accepted, and neither the time, location, nor magnitude of an earthquake can be accurately predicted at this time.

Ground motion at a given site depends among other factors on magnitude, epicentral distance, focal depth, fault mechanism, and characteristics of the earth material and geologic structure at the site as well as between the site and the fault generating the earthquake. The influence of all these parameters on site response and their interactions are not well understood at this time. Ground accelerations also can be strongly influenced by local ground conditions. Variations in ground conditions within short distances can lead to substantial differences in ground accelerations between two close sites. For example, strong motion instruments located on sites with level or gently inclined hard bedrock tend to record lower peak ground accelerations than nearby sites underlain by soft alluvial sediments at lower level seismic events, while the reverse may be true at higher level events. Topography can also affect peak ground accelerations. Measurements at the Tarzana Station commonly provide measurements significantly higher than those measured at surrounding stations. The anomalous high readings at this station are generally attributed to local variations in subsurface geologic conditions that produce a focusing effect. During the Northridge event in 1994, the Tarzana Station recorded ground accelerations of 1.82g horizontally and 1.18g vertically. Numerous other such examples of variations in ground motion within short distances can be found in the literature (Seed, Chaney, and Pamukcu, 1991). Thus, predicted ground accelerations given above are only approximations.

Since earthquakes induce a transient, rather than steady state, motion, the maximum or peak ground acceleration is not necessarily a good indicator of the potential structural damage that an earthquake can induce. Damage potential also depends on the frequency characteristics and duration of the ground motion and the dynamic characteristics of the structure. Some methods of analysis have been calibrated using maximum ground motion. One such example is liquefaction analysis, which is discussed later. Liquefaction analysis uses the peak ground motion as input and then within the procedure adjusts the input motion to account for the average amplitude of excitation being less than the peak. Other types of analyses may require a value different from the peak as input. Ploessel and Slosson (1974), for example, indicate that the several repeatable high ground accelerations (RHGA) below the peak and the duration of the ground motion better approximate a design acceleration than the maximum or peak acceleration. For sites within 20 miles of the earthquake epicenter, Ploessel and Slosson (1974) found the RHGA as 65% of the maximum ground acceleration. A more recent study has shown that the RHGA is about 75% of the maximum ground acceleration regardless of the distance between the site and seismic event (Naeim and Anderson, 1993). For purposes here, we recommend that design be based on the maximum ground acceleration when structural dynamic analyses are performed. If structural considerations can support a different value of ground motion for use in structural analyses, we leave it to the structural engineer to adjust these recommendations accordingly.

If the structural design is based on UBC dynamic lateral-force procedures, we recommend that a horizontal ground acceleration of 0.49g, based on the computed peak acceleration for a 50-year exposure and 10% exceedance, be used with the normalized response spectrum for a soil type S_D. Structural design based on the UBC (1997 Uniform Building Code) static force procedure calls for the following seismic parameters.

Seismic Zone Factor, Z	Soil Profile Type	Seismic Source Type	Near-Source Factor, N_a	Near-Source Factor, N_v
0.4	S_D	B	1.3	1.6

Conformance to the above criteria for seismic excitation does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive.

Earthquake Effects

The intensity of ground shaking during an earthquake can result in a number of phenomena classified as ground failure, which include ground rupture due to faulting, landslides, seiches, tsunamis, liquefaction, lurching, and seismically induced settlement. Descriptions of each of these phenomenon and an assessment of each, as it affects the proposed site, are included in the following paragraphs.

Shallow Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects that earth surface. Where associated with reverse faults, such ruptures rarely occur as single breaks or confined to a narrow zone. More commonly, ground rupture associated with reverse faulting is characterized by relatively short segments of faulting that occur over a broad area of the upper plate. In some cases, particularly in unconsolidated alluvial sediments, *ground ruptures* can develop from a number of causes not necessarily related directly to surface rupture of the causative fault. The secondary processes may include ground shaking, seismic settlement, landslides, and liquefaction.

Since there are no known active or potentially active faults passing through the site, the potential of on-site ground rupture or cracking due to shaking from local seismic events is not considered a significant hazard, although it is a possibility at any site. The potential for ground rupture due to other causes is discussed below.

Landsliding

Landslides are slope failures that occur where the horizontal seismic forces act to induce soil failure. As the site is relatively flat, on-site earthquake-induced landsliding is not a hazard.

Ground Lurching

Ground lurching is defined as earthquake motion at right angles to a cliff or bluff, or more commonly to a stream bank or artificial embankment, that results in yielding of material in the direction in which it is unsupported. The initial effect is to produce a series of more or less parallel cracks separating the ground into rough blocks. These cracks are generally parallel with the top of the slope or embankment. The topography of the site does not lend itself to this type of lurching.

Lurching is also sometimes used to describe undulating surface waves in the soil that have some similarities to ground oscillation mentioned below in the section on *Liquefaction*, but generally occurs in soft, saturated, fine-grained soils during seismic excitation. When this phenomena occurs adjacent to bodies of water, lurching can continue for a short time after the seismic shaking stops. The soil conditions at this site are not typical of those associated with lurching, and we do not consider this type of lurching to be a risk at this site.

Seiches and Tsunamis

Seiches are an oscillation of the surface of an inland body of water that varies in period from a few minutes to several hours. Seismic excitations can induce such oscillations. Tsunamis are large sea waves produced by submarine earthquakes or volcanic eruptions. Since the site is not located close to an inland body of water and is at an elevation sufficiently above sea level to be outside the zone of a tsunami runup, the risk of these two hazards is not pertinent to this site.

A Description of Liquefaction

The shear strength of soils is governed by effective stresses, which are equal to the total stresses minus the pore water pressures. In saturated, cohesionless soils, such as sands, pore water pressures tend to increase with cyclic loading, such as that caused by earthquakes. Liquefaction describes a phenomena in which cyclic stresses produced by ground shaking induce excess pore water pressures in cohesionless soils about equal to the total stresses, resulting in near zero shear strength in the soil when the soil behaves as a viscous fluid. Liquefied soils may thereby acquire a high degree of mobility leading to damaging deformations. Liquefaction susceptibility under a given earthquake is related to the gradation and relative density characteristics of the soil, the in-situ stresses prior to ground motion, and the depth to the water table, as well as other factors.

As a general rule, a site is susceptible to liquefaction if it meets the following four conditions:

a. A potential to be affected by seismic activity.

b. Soils that are cohesionless and contain less than 15% of clay sized particles. These soils classify as sand (SP) and (SW), silt (ML), silty sand (SM), and sandy silt (ML).

c. Groundwater exists within 50 feet of the ground surface or a likelihood that groundwater will rise to within 50 feet of the ground surface. This includes a perched water table of significant extent.

d. Soil relative densities less than about 70%.

Liquefaction related or liquefaction-induced phenomena include *lateral spreading*, *ground oscillation*, *flow failure*, *reduction of bearing strength*, *ground fissuring*, and *sand boils*. *Lateral spreading* is the lateral movement of stiff, surficial blocks of sediments as a result of a subsurface layer liquefying. The lateral movements can cause ground fissures or extensional, open cracks at the surface as the blocks move toward a slope face, such as a stream bank or in the direction of a gentle slope. When the shaking stops, these isolated blocks of sediments come to rest in a place different from their original location and may be tilted.

Ground oscillation occurs when liquefaction occurs at depth but the slopes are too gentle to permit lateral displacement. In this case, individual blocks may separate and oscillate on a liquefied layer. Sand boils and fissures are often associated with this phenomenon.

Flow failure, a more catastrophic mode of ground failure than either lateral spreading or ground oscillation, involves large masses of liquefied sediment or blocks of intact material riding on a liquefied layer moving at high speeds over large distances. Generally flow failures are associated with ground slopes steeper than those associated with either lateral spreading or ground oscillation.

Bearing strength decreases with a decrease in effective stress. *Loss of bearing strength* occurs when the effective stresses are reduced due to the cyclic loading caused by an earthquake. Even if the soil does not liquefy, the bearing of the soil may be reduced below its value either prior to or after the earthquake. If the bearing strength is sufficiently reduced, structures supported on the sediments can settle, tilt, or even float upward in the case of lightly loaded structures such as gas pipelines.

Ground fissuring and *sand boils* are surface manifestations associated with liquefaction and lateral spreading, ground oscillation, and flow failure. As apparent from the above descriptions, the likelihood of ground fissures developing is high when lateral spreading, ground oscillations, and flow failure occur. Sand boils occur when the high pore water pressures are relieved by drainage to the surface along weak spots that may have been created by fissuring. As the water flows to the surface it can carry sediments, and if the pore water pressures are high enough create a gusher (sand boil) at the point of exit.

Evaluation of Liquefaction Potential

Since the results of our field exploration and laboratory testing programs indicate that the subject site meets all the above mentioned conditions for being susceptible for liquefaction, we performed a liquefaction analysis to further evaluate the potential and extent of possible liquefaction at this site. The results of this analysis along with other geologic information about the area were then used to evaluate the different liquefaction-induced phenomena mentioned above.

The program of Liqufy2 (Blake) was used with an earthquake magnitude of 7.5 (the weighted magnitude used to generate seismic risk) and a site acceleration of 0.37g (the computed site peak acceleration for a 50-year exposure and 10% exceedance) to perform the liquefaction evaluation. Blow counts were based on correlations with the cone penetrometer data. The results of liquefaction analysis are shown in Appendix D. The analysis indicates that the deeper sands and silty sands may be subject to liquefaction during the assumed earthquake event.

Since the soils at the site may liquefy, further analyses were performed to evaluate the potential and extent of *lateral spreading*, *ground oscillation*, *flow failure*, *reduction of bearing strength*, and surface manifestations of *sand boils* and *ground fissuring*.

Lateral Spreading
We evaluated the potential for lateral spreading using the emprical methodology presented in You and Bartlett (1999), for Ballona Creek located on the west side of Jefferson Bouldevard about 80 feet from the western property line. Based on the results of the analysis, the magnitude of lateral spreading for a M6.9 earthquake could be on the order of 3.5 inches on the western property line. The displacement decreases to about 12.0 and 0.9 inches for about 120 and 200 feet from the western property line. The lateral spreading calculation is provided in Appendix D

An evaluation of the potential of ground damage due to ground fissuring, ground oscillation, and sand boils occurring was made using the procedure of Ishihara (1985). This procedure is only valid for sites not susceptible to ground oscillation or lateral spread and is more of a qualitative than quantitative measure. This analysis showed the potential for ground damage is low.

Since the site is relatively flat, the risk due to flow failure is considered to be remote. Any reduced bearing strength of the soils below the groundwater level is not expected to have a high risk on the structure, since the soil between the footings and the liquefied zone should provide an adequate bridge.

Settlement Due to Seismic Shaking
Granular soils, in particular, are susceptible to settlement during seismic shaking, whether the soils liquefy or not. Site processing, involving removal and recompaction of any shallow on-site soils that are loose and subject to seismically induced settlement, should effectively limit the potential for seismically induced settlement in these materials. The potential for earthquake-induced settlement, however, exists for deeper granular soils both above and below the groundwater level and was evaluated for a design-level seismic event, using the procedures of Tokimatsu and Seed (1987). This procedure is for relatively clean sands. Therefore, the blow counts, as in the liquefaction study, were adjusted for the fine content (Youd and Idriss, 1997). We computed a potential for earthquake-induced settlement of about 1.8 inches in the soils to a depth of 50 feet under multi-directional earthquake shaking.

Differential settlements due to seismic shaking are difficult to predict, and seismically induced settlement data are limited. Nevertheless, estimates equal to be about two-thirds the total settlement appear reasonable (California Department of Conservation, 1997). In this case, differential settlements are estimated to be about 1.2 inches. Potential settlements of this order are probably of no concern structurally. Nevertheless, your structural engineer should evaluate the consequences of such settlement to the proposed structure.

Conclusions and Recommendations

Conclusion
Based on our geotechnical investigation and review of the previously geotechnical investigation for the subject site, we recommend the following:

a. The buildings within the western portion of the project site should be founded on deep pile foundations below the existing fill with structural slabs. It should be noted that due to the presence of deep undocumented fill in the area, the depth of the piles may be as deep as 60 to 70 feet. We can provide you with pile design information if this type of foundation is selected.

b. The eastern portion of the site (about 50 feet from the center line of the existing city of Los Angeles Sewer line), can be used for building construction, provided all the fill materials be removed and recompacted as recommended in our site preparation section, mat type foundation or post-tensioned type foundation can be used for this project. Depending on the fill differential beneath the proposed structures, overexcavation of the building pad may be required to provide a relatively uniform artificial fill cup, as outlined in the Site Preparation, (bullet d).

c. The site is located within an Alquist-Priolo Earthquake Fault Zone. A fault study should be performed to determine if any recent (Holocene) rutptures of the site soil has occurred. Based on that study, setbacks can be applied to the proposed site improvements.

d. Permission and special design requirements may be required to build over the city of Los Angeles Sewer easement.

Our exploration indicated that the strength and compressibility of the upper soils are variable, based on moisture and density variations, and, in our opinion, these near-surface soils are not suitable in their present condition for the support of structures or other improvements, without the potential for detrimental foundation movements occurring. Furthermore, some of the soils are susceptible to hydroconsolidation, and the surficial soils are expansive. Therefore, to mitigate these geotechnical hazards, the upper soils will require removal and recompaction prior to construction of the improvements. Recommendations for minimum removal depths are given below. Greater removal depths, however, may be required if the soils are wetter during construction than they were at the time of excavating the soil borings.

Like most of Southern California, the site lies within a seismically active area. Earthquake resistant structural design is recommended. Designing structures to be earthquake-proof is generally considered to be impractical, especially for private projects, due to cost limitations. Significant damage to structures may be unavoidable during large earthquakes. Structural design based on the 1997 UBC (Uniform Building Code) static-force procedure calls for the seismic parameters given previously in the section *Seismic Design Criteria*. These minimum code values are intended to protect life and may not provide an acceptable level of protection against significant cosmetic damage and serious economic loss. A significantly higher than code lateral design parameter (Z coefficient) would be necessary to further reduce potential economic loss during a major seismic event. Structural engineers, however, often regard higher than code values as impractical for use in structural design. The structural engineer and project owner must decide what level of risk is acceptable and to assign appropriate seismic values for use in structural design.

The site is considered to be susceptible to liquefaction and may experience seismically induced settlement, as mentioned previously. The risk of damage to the proposed structure due to a large earthquake cannot be totally eliminated, and obtaining appropriate insurance as a mitigation measure is strongly recommended.

In addition to the settlement due to seismic shaking, settlement will result from (1) the anticipated live and dead loads of the structure (2) the settlement of the fill and underlying soils due to the weight of the fill, and (3) swell or hydroconsolidation if moisture changes occur within the supporting soils. Settlement is expected to be about 0.5 inches for an 18-inch wide wall footing with the anticipated live and dead loads and designed in accordance with the recommendations in this report. Additional foundation movement due to the weight of fill and swell/hydroconsolidation is expected to be negligible if the recommendations in this report are followed. The amount of differential movement between columns due to these causes, is expected to be less than one inch.

The following additional geotechnical recommendations for site preparation, foundation and retaining wall design, slabs-on-grade, and drainage should be incorporated into final design and construction practice. All such work and design should be in conformance with local governmental regulations or the recommendations contained herein, whichever is more restrictive.

Site Preparation
A grading plan was not available at the time of this study, but we expect only nominal alterations to the existing grade. Building pads should be prepared so that each structure is totally founded in structural fill with a uniform thickness. General guidelines are presented below to provide a basis for quality control during site grading. We recommend that all structural fills be placed and compacted with engineering control under continuous observation and testing by the Geotechnical Engineer and in accordance with the following requirements.

a. After demolishing the existing structures on site, remove all loose soil and other deleterious materials, including old foundations, prior to fill placement. The general depth of stripping should be sufficiently deep to remove the root systems and organic topsoils. A careful search shall be made for subsurface trash, abandoned masonry, abandoned tanks and septic systems, and other debris during grading. All such materials, which are not acceptable fill material, shall be removed prior to fill placement.

b. In areas to receive fill or to support footings and slab-on-grade construction, the existing soil to a depth (D_{er}) of three feet below the existing grade or a minimum of three feet (D_{rs}) below the bottom of the proposed footing, whichever is deeper, should be removed and recompacted as structural fill in the proposed building areas. Furthermore, at footing locations (including those for retaining walls), the existing soil to a depth of 1.5-footing widths for square footings and 2.0-footing widths for continuous footings below the bottom of the proposed footings (D_{rf}) should be removed and recompacted as structural fill. The maximum depth of recompaction below footings (D_{rf}) for buildings and retaining walls can be limited to four feet. The maximum depth of recompaction below footings (D_{rf}) for garden walls or perimeter sound walls, however, can be limited to one foot. In parking areas, driveways, and flatwork areas, a minimum of 12 inches below either existing grade or the structural section, whichever is deeper, should be over-excavated and recompacted. A schematic showing removal depths is included for clarification in Figure 3 for building areas and in Figure 4 for slab-on-grade, flatwork, and pavement areas. During construction where footings are in close proximity, over-excavating the entire structural area may be desirable and less costly.

c. The exposed bottom of removal areas should be scarified, mixed, and moisture conditioned to a minimum depth of 8 inches. This thickness of scarification is included in the thickness of removal and recompaction mentioned above. The scarified soil should be moisture conditioned to at least 2% but no more than 5% above optimum and compacted to a minimum 90% of the laboratory maximum dry density as determined by ASTM D1557-00 for soils with more than 15% fines and a minimum relative compaction of 95% for soils with 15% or less fines. Additional lifts should not be placed until the present lift has been tested and shown to meet the compaction requirements.

d. To reduce the risk of differential foundation movements, we recommend that all footings be supported on structural fill or on deepened piles embedded into competent alluvium, not both. If footings are supported on fill, the thickness of structural fill beneath the footings and slab area should be relatively uniform. Fill caps should be constructed if the fill thickness differential beneath a proposed structure is 30 percent or less. The fill cap over-excavation should be constructed so as to be one-third the deepest fill or a maximum of 10 feet.

The area of existing fill removal and replacement with compacted fill should extend at an 1:1 projection from the base of the footing outward and downward to competent alluvium materials (See Figure 4, Case 1). If this cannot be achieved, then a pile foundation should be constructed as in Figure 4, Case 2).

e. In areas of shallow fill (0 to 10 feet deep), the removals can be limited to the proposed building, pavement, and fill areas but should extend a distance (L_h) not less than 5 feet outside the building lines or fill limits, and 2 feet outside pavement areas, except in situations where a physical constraint, such as a property line or adjacent structure, would prevent such removals from being made. Removal limits for accessory structures need only extend beyond the hardscape footprint a distance equal to the removal depth below the footing. A careful search shall be made for deeper loose soil spots during grading operations. If encountered, these loose spots should be properly removed to the firm underlying soil and properly backfilled and compacted as directed by a representative of the Project Geotechnical Engineer. If the excavation to remove existing subsurface structures, pipelines, and loose fill soils extends below the minimum recommended depth of over-excavation, we recommend that all subsurface structures, utility lines, and uncontrolled fill extending below the over-excavation depth be removed to expose undisturbed, native soils across the entire building pad.

f. The lateral limits and the depths of the removals should be shown by the civil engineer on the grading plans.

g. All fill materials should be placed in controlled, horizontal layers not exceeding 6 to 8 inches thick and moisture conditioned to at least 2% but no more than 5% above optimum. Fill materials with more than 15% fines should be compacted to a minimum 90% of the laboratory maximum dry density, as determined by ASTM D1557-00, and fill materials with 15% or less fines should be compacted to a minimum relative compaction of 95%. Fills greater than 50 feet beneath the proposed grade should be compacted to a minimum relative compaction of 95%. If the moisture content or relative compaction do not meet these criteria, the Contractor should rework the fill until it does meet the criteria. If the fill materials pump (flex) under the weight of construction equipment, difficulties in obtaining the required minimum compaction may be experienced. Therefore, if soil pumping occurs, it may be necessary to control the moisture content to a closer tolerance (e.g., 2 to 3% above optimum).

h. The soils beneath slabs and footings, however, should be moisture conditioned to at least 3 but no more than 5% above optimum moisture content to a depth of 27 inches below the lowest adjacent, final grade. During foundation construction, including any concrete flatwork, construction sequences should be scheduled to reduce the time interval between subgrade preparation and concrete placement to avoid drying and cracking of the subgrade.

i. Subgrade for the support of pavement sections should be moisture conditioned, as required, to obtain a moisture content at least 2% but no more than 4% above optimum, and recompacted to at least 95% of the maximum dry density to a depth of at least 12 inches.

j. The excavated site soils, cleaned of deleterious material, can be re-used for fill. Rock larger than 6 inches should not be buried or placed in compacted fill. Rock fragments less than 6 inches may be used provided the fragments are not be placed in concentrated pockets or within 3 feet of final grade, and a sufficient percentage of finer grained material surrounds and infiltrates the rock voids. Furthermore, the placement of any rock must be under the continuous observation of the Geotechnical Engineer.

k. Each layer of fill under the building area within the upper 48 inches of the finished pad grade should be of similar composition to provide a relatively uniform expansion index beneath the building. Selective grading should be performed to either place the more expansive soils in the deeper portion of the fill or to mix the more expansive soils with less expansive soils.

l. Representative samples of material to be used as compacted fill should be analyzed in the laboratory by the Geotechnical Engineer to determine the physical properties of the materials. If any materials other than that previously tested is encountered during grading, the appropriate analysis of this material should be conducted by the Geotechnical Engineer as soon as practicable. The Geotechnical Engineer or their representative prior to placement should approve any soil imported from off-site sources. Imported material should preferably have less than 15% by weight passing the number 200 sieve, a maximum plasticity index of 10, and a liquid limit less than 25.

m. All grading work shall be observed and tested by the Project Geotechnical Engineer or their representative to confirm proper site preparation, excavation, scarification, compaction of on-site soil, selection of satisfactory fill materials, and placement and compaction of fill. All removal areas and footing excavations shall be observed by the representative of the Project Geotechnical Engineer before any fill or steel is placed.

Utility Trench Backfill

The on-site soils are suitable for backfill of utility trenches from one foot above the top of the pipe to the surface, provided the material is free of organic matter and deleterious substances. The natural soils should provide a firm foundation for site utilities, but any soft or unstable material encountered at pipe invert should be removed and replaced with an adequate bedding material.

The site Civil Engineer in accordance with manufacturer's requirements should specify the type of bedding materials. If the on-site soils are not compatible with the pipe manufacturer's requirements, suitable nonexpansive, granular soils may need to be imported for bedding or shading of utilities.

Trench backfill should be placed in 8-inch lifts, moisture conditioned to at least 2% but no more than 5% above the optimum moisture content, and compacted to at least 90% of the maximum density as determined by ASTM D1557-00, with the exception of the one foot below subgrade in areas to be paved, which should be compacted to 95% of the maximum dry density. If the contractor can demonstrate minimum compaction requirements can be achieved with thicker lifts, the acceptable lift thickness may be increased. Jetting of trench backfill is not acceptable to compact the backfill.

In areas where utility trenches pass through an existing pavement, the trench width at the surface shall be enlarged a minimum of 6 inches on each side to provide bearing on undisturbed material for the new base and paving section to match the existing section.

Major underground utilities shall not cross beneath buildings unless specifically approved by the Project Civil Engineer and respective utility company. If approved, trenches crossing building areas shall be backfilled with a select gravelly sand compacted to 95% relative compaction and at a moisture content at least 2% but no more than 4% above optimum moisture.

Temporary Excavations

Temporary excavations of 5 feet or less in height in on-site soils may not require any special shoring. Vertical excavations more than 5 feet deep, if necessary, will, however, require conventional shoring per CAL/OSHA

Regulations, or the excavation may be laid back with a 1(H):1(V) gradient. Excavations should not be allowed to become soaked with water or to dry out. Surcharge loads should not be permitted within a horizontal distance equal to the height of the excavation from the top of the excavation, unless the excavation is properly shored. Excavations that might extend below an imaginary plane inclined at 45 degrees below the edge of an existing foundation should be properly shored to maintain foundation support of the existing structure.

Foundation Type
Foundations should be supported on compacted fill of relatively uniform thickness. Due to the liquefaction settlement potential and proximity to the fault zone we recommend that structures be supported on either post-tensioned slabs, structural slabs, or conventional shallow footings with raised floors that are designed to accommodate a differential ground movement by being sufficiently stiff and strong to support an unsupported edge span of 10 feet and unsupported interior span of 10 feet.

Post-Tensioned Slab or Structural Slab Foundation
Structural slabs or post-tensioned slabs to support the structure should be designed to accommodate a differential ground movement by being sufficiently stiff and strong to support an unsupported edge span of 10 feet and unsupported interior span of 10 feet to reduce damage potential if ground movement occurs due to either seismic shaking or hydroconsolidation. An allowable bearing pressure for slab support can be taken as 1000 psf at the surface increasing to 1500 psf at an embedment of 18 inches. The allowable bearing pressure includes a safety factor of at least three.

To reduce the potential of moisture migration beneath the structure, we recommend that the stiffening beam around the perimeter of the structure be at least 18 inches below the lowest adjacent grade. A minimum embedment of 12 inches should be used for interior footings.

The design of post-tensioned and structural slabs may count on tensile strength of the concrete for adequate performance. Controlling the water/cement ratio and proper curing are necessary to prevent cracks from developing in the slabs during the curing process. If cracks develop in the slab, the integrity of the slab may be compromised. Thus, any cracks should be brought to the attention of the structural engineer in a timely manner, and the structural engineer should determine if corrective measures are necessary.

The following recommendations may be used for structures supported by either a structural or post-tensioned slab, subject to the guidelines mentioned earlier in the section *Site Preparation*.

a. Where located adjacent to utility trenches, stiffening beams should extend below a one-to-one plane projected upward from the inside bottom of the trench.

b. The bearing capacity can be increased by one-third when considering short duration wind or seismic loads.

c. For design, resistance to lateral loads can be assumed to be provided by friction along the base of the foundation and by passive earth pressures on the side of the foundation. An allowable friction coefficient of 0.35 may be used with the vertical dead loads, and an allowable lateral passive pressure of 240 psf per foot of depth, with a maximum of 2400 psf, can be utilized for the sides of foundations poured against recompacted soil to resist lateral loads. These allowable values can be increased by a factor of 1.5 to convert from allowable to ultimate values.

d. Prior to placing concrete, an observation should be made by the representative of the Project Geotechnical Engineer to ensure that the excavations are free of loose and disturbed soils and are embedded in the recommended earth materials.

Other geotechnical criteria for a post-tensioned slab or structural slab are included in the section *Slab-On-Grade*.

Slab-On-Grade

If earthwork operations are conducted such that the construction sequence is not continuous or if construction operations disturb the surface soils, we recommend that the exposed subgrade to support concrete slabs be tested to verify adequate compaction and moisture conditions. If adequate compaction and moisture conditions are not verified, the disturbed subgrade should be over-excavated, scarified, and recompacted in accordance with the guidelines in *Site Preparation*.

We recommend that concrete slabs be reinforced. The structural details, such as (1) slab thickness, (2) concrete strength, (3) type, amount, and placement of reinforcing, (4) structural connection between slab and footings, and (5) joint spacing, should be established by your structural engineer and, as a minimum, be in accordance with the requirements of an expansion index category of medium (51–90). The perimeter edge of exterior concrete slabs should be extended a minimum of 8 inches below the bottom of the slab and have a minimum width of 6 inches due to the expansive nature of the soils.

We recommend that a ten-mil (or thicker) plastic vapor barrier be used under floor slabs in moisture sensitive areas. The placement of the vapor barrier should be selected by either your civil engineer or structural engineer giving consideration to the factors discussed in ASTM E1643. In those areas where a moisture barrier is not used, a 4-inch thick sand layer should be placed beneath the slab. The sand should be classified as a *clean sand* (with less than 5% fines in accordance with ASTM D2488-93). Seams of the vapor barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete.

Due to the lightly loaded areas of exterior walkways and patio areas, even soils with low expansion characteristics can lift such flatwork. This lifting will likely vary over the area covered by the flatwork, causing differential slab movements that could result in either a safety hazard or outwardly opening doors hanging up on elevated walkways that abut the structure. Therefore, we recommend that exterior walkways and patio areas abutting the structure where doors open outward with little vertical clearance be doweled into the structure at entrances and at joints to prevent differential movement of such flatwork due to soil expansion.

Cracking of concrete flatwork can occur and is relatively common. Reinforcement and crack control joints are intended to reduce the risk of concrete slab cracking. Also, concrete slabs are generally not perfectly level, but they should be within tolerances included in the project specifications.

Tile flooring can crack, reflecting cracks in the underlying concrete slab. Therefore, if tile flooring is used, the slab designer should consider additional steel reinforcement, above minimum requirements, in the design of concrete slab-on-grade where tile will be installed. Furthermore, the tile installer should consider installation methods, such as using a vinyl crack isolation membrane between the tile and concrete slab, to reduce the potential for tile cracking.

Retaining Wall Design Criteria

Foundations for retaining walls can be designed in accordance with the sections, *Site Preparation* and *Shallow Foundations*.

The earth pressure behind any buried wall depends on the allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, any hydrostatic pressures, and compaction effort. The following equivalent fluid pressures are recommended for vertical walls with no hydrostatic pressure, no surcharge, no seismic effects, and a backfill slope with a gradient less (flatter) than 5(H):1(V).

Wall Movement	Equivalent Fluid Unit Weight, pcf			
	Clean Sand or Gravel Backfill (GW, GP, SW, SP)	Silty Gravel Backfill (GM, GM-GP, SM-SP)	Clayey Sand, Clayey Gravel Backfill (SC, SG)	Silts, Clays, Silty Fine Sand Backfill (CL, ML, SM)
Free to Deflect	30	40	45	55
Restrained	45	60	70	80

In areas where the backslopes are steeper than 5(H):1(V), the equivalent unit weights in the above table should be increased by 13 pcf for gradients of 2(H):1(V) and 30 pcf for gradients of 1.5(H):1(V).

The above values are applicable for backfill placed between the wall stem and an imaginary plane rising at a 45-degree angle from below the edge (heel) of the wall footing. The surcharging effect of anticipated adjacent loads on the wall backfill due to traffic, footings, or other loads, should be included in the wall design. The magnitude of lateral load due to surcharging depends on the magnitude of the surcharge, the size of the surcharge loaded area, the distance of the surcharge from the wall, and the restraint of the wall. We can provide assistance in evaluating the effects of surcharge loading and seismic loading, if desired, once details are known and provided.

Except for the upper two feet, the soil immediately adjacent to backfilled retaining walls should be free-draining filter material (such as Caltrans Class 2 permeable material) with a minimum horizontal distance of two feet. Weep holes and/or drainpipes, as appropriate, should be installed at the base of these walls. In lieu of filter material, crushed stone protected from clogging with the use of synthetic fabric between the natural soil and the gravel may be used. Subdrain pipe material should consist of a minimum 4-inch-diameter perforated PVC pipe meeting ASTM D2729 or better. *Accordion* or similar type pipe is not acceptable for subdrain pipe. The top two feet should be backfilled with less permeable compacted fill to reduce infiltration. A concrete-lined V-shaped drainage swale should be constructed behind retaining walls with ascending backslopes to intercept runoff and debris. Figure 5 shows typical drainage details for retaining walls.

During grading and backfilling operations adjacent to any wall, heavy equipment should not be allowed to operate within 5 feet laterally of the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand-operated equipment should be used to compact the backfill soils.

The retaining wall backfill should be benched into the backcut where the backcut is sloped less than (flatter) 0.75(H):1.0(V).

Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal 1 to 2% deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The spacing between the wall and deck will require periodic caulking to prevent water intrusion into the retaining wall backfill.

Drainage

Proper drainage is important to reduce the potential for hydroconsolidation and soil expansion or shrinkage. Final grading shall provide a positive drainage away from the footings in compliance with the local jurisdiction's grading requirements or a minimum gradient of 3%, whichever is greater, for a distance of at least six feet away from the structure for soil covered areas to reduce the risk of water ponding adjacent to the foundation. For areas abutting the structure covered with concrete for a distance of at least six feet away from the structure, a minimum gradient of 0.5% is acceptable. All pad drainage shall be collected and diverted away from the proposed buildings in non-erosive devices. Gutters and roof drains should be provided, properly maintained, and discharge directly into glue-joined, watertight subsurface piping. A drainage system consisting of area drains, catch basins, and connecting lines should be provided to capture landscape/hardscape sheet flow discharge water. All drainage piping should be watertight and discharge directly to the street or storm drain.

All underground plumbing fixtures should be absolutely leak free. Proper drainage shall also be provided away from the building footings during construction. This is especially important when construction takes place during the rainy season.

Seepage of surface irrigation water or the spread of extensive root systems into the subgrade of footings, slabs, or pavements can cause differential movements and consequent distress in these structural elements. Trees and large shrubbery should not be planted so that roots grow under foundations and flatwork when they reach maturity. Landscaping planters immediately adjacent to structures or paved areas should not be used due to the potential for surface irrigation water to infiltrate either the foundation's subgrade or the pavement's subgrade and base course. Either drains to collect and transmit excess irrigation water to drainage structures, or impervious, above-grade or below-grade planter boxes with solid bottoms and a drainage pipe away from the structure should be used for plantings adjacent to structures. Where landscaping is planned adjacent to pavements, either a cut-off wall should be provided along the edge of the pavement or slab that extends at least 12 inches below the subgrade soil or the area should be lined with a ten-mil (or thicker) plastic moisture barrier. The walls of the moisture barrier should be near vertical and the area should be marked with warning tape to reduce the likelihood of the lining being torn by future digging. Seams of the moisture barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete. Landscaping should be planned with consideration for these potential problems.

Drainage systems should be well maintained, and care should be taken to not over or under irrigate the site. Landscape watering should be held to a minimum while maintaining a uniformly moist condition without allowing the soil to dry out. During extreme hot and dry periods, adequate watering may be necessary to keep soil from separating or pulling back from the foundations. Cracks in paved surfaces should be sealed to limit infiltration of surface waters.

Pavement Structural Section

All areas to be paved should be graded in accordance with the general recommendation for site grading as described in the section *Site Preparation*. Prior to placing base or subbase materials, the subgrade should be scarified to a depth of at least 12 inches, moisture conditioned as required to obtain a moisture content of at least 2% but no more than 4% above optimum, and recompacted to at least 95% of the maximum dry density, if test results show that these moisture and compaction requirements do not exist just prior to placing base or subbase materials.

Two representative soil samples collected during our field exploration were tested for *R*-value in accordance with Department of Transportation, California Test Method No. 301. The tested soil samples had *R*-values of 21. Structural section calculations were performed for asphalt concrete pavement design for a range in traffic indices. Selection of the appropriate traffic index to use should be made by your civil engineer based on their knowledge of traffic flow and loadings, but typically a TI of 4.5 is associated with average residential streets, a TI of 5 is associated with parking lots with no more than one commercial truck or bus per day and with residential collector streets, a TI of 6 is associated with major primary collectors providing traffic movement between minor collectors and major arterials, and a TI of 6.5 is associated with driveways with no more than four commercial trucks or buses per day.

The structural sections for asphalt concrete pavement were computed in general accordance with the Caltrans method (**California Department of Transportation Highway Design Manual, Fourth Edition, Updated February 13, 1995**). The pavements section using an *R*-value of 21 are summarized below:

Traffic Index	Thickness, Inches	
	Asphalt Concrete	Aggregate Base
4.5	3.0	5.4
5.0	3.0	7.8
6.0	3.0	11.4
6.5	3.6	12.0
7.0	3.6	13.8

The base material should extend beneath curbs and gutters. Compaction tests will be required for the recommended asphalt concrete and aggregate base. A minimum relative compaction of 95% is required for the asphalt concrete, aggregate base, and upper 12 inches of subgrade soils. The aggregate base should have a minimum *R*-value of 78 and meet Caltrans Class II specifications. Asphalt should not be placed if the base is pumping.

Considering the higher pavement stresses in trash enclosure loading zones or other areas subject to extensive wheel turning, we recommend that a concrete pavement section be used in these areas. The pavement section in this case should consist of a 4-inch thick Caltrans Class 2 base layer, a 6-inch thick concrete layer with the concrete having a minimum 28-day compressive strength of 3000 psi and with a minimum amount of reinforcement consisting of #4 bars at 18-inch spacing each way.

Actual pavement subgrade materials may differ from those tested for this study due to unanticipated grading, soil variability, or soil import. Therefore, tests may need to be performed on the actual subgrade materials to confirm the *R*-values used to compute the above structural sections.

Pavement section design assumes that proper maintenance practices, such as sealing and repair of localized areas of distress, are employed throughout the design life of the pavement.

Corrosion Protection

The risk of corrosion of construction materials relates to the potential for soil-induced chemical reaction. The rate of deterioration depends on soil resistivity, texture, acidity, and chemical concentration. Preliminary corrosion evaluation was based on an analysis of two surficial soil samples. The results of these tests are summarized in the following table. Sulfate and chloride concentrations are expressed in ppm on a dry weight basis.

Boring	Depth, Ft	Description	pH	Chloride, ppm	Sulfate, ppm	Resistivity, ohm-cm
B-1	1-5	OLIVE BROWN SANDY CLAY	8.7	37.3	54.9	55555

Corrosion of concrete due to sulfate attack is anticipated when on a concentration of sulfates exceeds 1000 ppm in the near-surface soils. Concrete specifications should conform, as a minimum, to UBC requirements (Section 19, Table 19-A-4) for concrete exposed to sulfate. Since the measured sulfate concentrations do not exceed 1000 ppm, sulfate resistant concrete is not required.

If piping or concrete are placed in contact with deeper soils or structural fill using deeper soils, additional tests should be performed also to evaluate their corrosion potential. A detailed study of soil corrosivity was beyond the scope of this study. A corrosion engineer can be consulted to provide a more detailed evaluation of corrosion potential, including the corrosion potential of soils to metal objects and to other potential sources, such as stray currents and groundwater.

Observations and Testing

Prior to the start of site preparation and/or construction, we recommend that a meeting be held with the contractor to discuss the project. We recommend that Advanced Geotechnical Services, Inc., be retained to perform the following tasks prior to and/or during construction.

a. Review grading, foundation, and drainage plans to verify that the recommendations contained in this report have been properly interpreted and are incorporated into the project specifications. If we are not accorded the opportunity to review these documents, we can take no responsibility for misinterpretation of our conclusions and recommendations.

b. Observe and advise during all grading activities, including site preparation, foundation and retaining wall excavation, and placement of fill, to confirm that suitable fill soils are placed upon competent material and to allow design changes if subsurface conditions differ from those anticipated prior to the start of construction.

c. Observe the installation of all drainage devices.

d. Test all fill placed for engineering purposes to confirm that suitable fill materials are used and properly compacted.

Limits and Liability

All building sites are subject to elements of risk that cannot be wholly identified and/or entirely eliminated. Building sites are subject to many detrimental geotechnical hazards, including but not limited to the effects of water infiltration, erosion, concentrated drainage, total settlement, differential settlement, expansive soil movement, seismic shaking, fault rupture, landsliding, and slope creep. The risks from these hazards can be reduced by employing subsurface exploration, laboratory testing, analyses, and experienced geotechnical judgment. Many geotechnical hazards, however, are highly dependent on the property owner properly maintaining the site, drainage facilities, and slope and by correcting any deficiencies found during occupancy of the property. Even with a thorough subsurface exploration and testing program, significant variability between test locations and between sample intervals may exist. Ultimately, geotechnical recommendations are based on the experience and judgment of the geotechnical professionals in evaluating the available data from site observations, subsurface exploration, and laboratory tests. Latent defects can be concealed by earth materials, deposition, geologic history, and existing improvements. If such defects are present, they are beyond the evaluation of the geotechnical professionals. No warranty, expressed or implied, is made or intended in connection with this report, by furnishing of this report, or by any other oral or written statement.

The analysis and recommendations submitted in this report are based in part on our subsurface exploration, laboratory testing, site observations, and provided data on geology and the proposed site development. Our descriptions and the boring logs may show distinctions between fill and native soils, between native (e.g., alluvium, colluvium, slopewash) and bedrock formation, and between soil type (e.g., sands and silty sands). Such distinctions were based on geologic information, grading plans when available, intermittent recovered soil/bedrock samples, and judgment. Delineations between these categories of materials may not be perfect and may be subject to change as more information becomes available. For example, judgments may be clouded when recovered samples are intermittent and small in comparison to the volume of soil under study, and macrostructure that would aid the identification process are not as apparent as they would be when the borehole is geologically downhole logged by entering the excavation. When the age of the fill is old, the difference between the structure of the fill and native may be less pronounced, or the degree of bedrock formation weathering sometimes makes it difficult to distinguish between overlying alluvium, colluvium, or slopewash and bedrock formation. In general, our recommendations are based more on the properties of the materials than on the category of the material type such as fill, alluvium, colluvium, slopewash, or bedrock formation. Furthermore, the actual stratigraphy may be more variable than shown on the logs.

This report is not intended for use as a bid document. Any person using this report for bidding or construction purposes should perform such independent investigation as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered. The nature and extent of variations in subsurface conditions may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Although this report may comment or discuss construction techniques or procedures for the design engineer's guidance, this report should not be interpreted to prescribe or dictate construction procedures or to relieve the contractor in any way of their responsibility for the construction.

Please be aware that the contract fee for our services to prepare this report does not include additional work that may be required, such as grading observation and testing, footing observations, plan review, or responses to governmental (regulatory) plan reviews associated with you obtaining a building permit. Where additional services are requested or required, you will be billed for any equipment costs and on an hourly basis for consultation or analysis.

The geotechnical engineer's actual scope of work during construction is very limited and does not assume the day-to-day physical direction of the work, minute examination of the elements, or responsibility for the safety of the contractor's workers. Our scope of services during construction consists of taking soil tests and making visual observations, sometimes on only an intermittent basis, relating to earthwork or foundation excavations for the project. We do not guarantee the contractor's performance, but rather look for general conformance to the intent of the plans and geotechnical report. Any discrepancy noted by us regarding earthwork or foundations will be referred to the owner, project engineer, architect, or contractor for action.

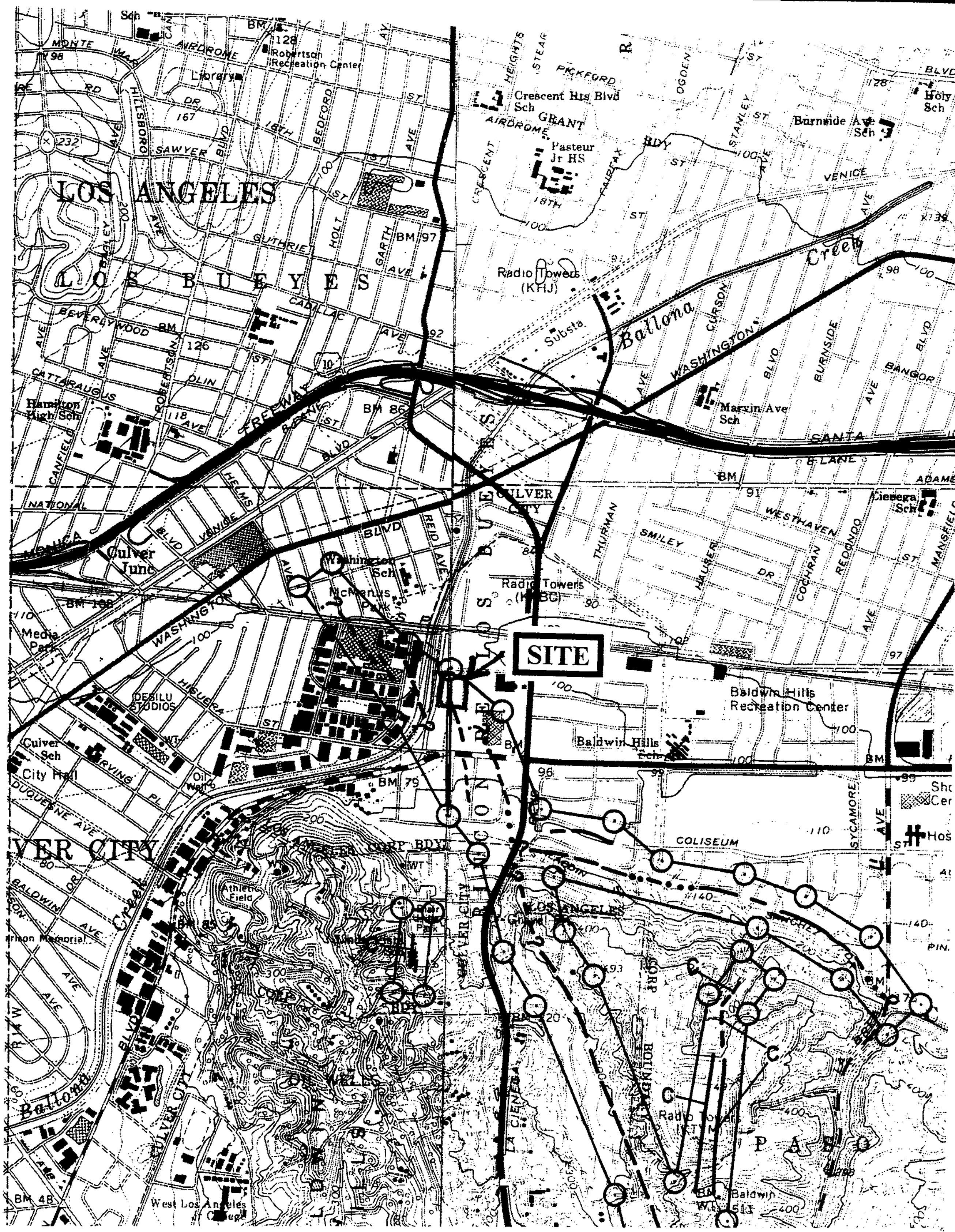
This report is issued with the understanding that it is the responsibility of the Owner, or of their representative, to ensure that the information and recommendations contained herein are called to the attention of the Architect and Engineers for the project and incorporated into the plan and that the necessary steps are taken to see that the Contractor carry out such recommendations in the field. Advanced Geotechnical Services, Inc., has prepared this report for the exclusive use of the Client and authorized agents, and this report should not be considered transferable. We do recommend, however, that the report be given to future property owners for the sole purpose of disclosing the report findings.

Findings of this report are valid as of the date of issuance. Changes in conditions of a property may occur with the passage of time whether attributable to natural processes or works of man on this or adjacent properties. Furthermore, changes in applicable or appropriate standards occur due, for example, to legislation and broadening of knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to our review and remains valid for a maximum period of one year, unless we issue a written opinion of its continued applicability thereafter.

In the event that any changes in the nature and design (including structural loadings different from those anticipated), or other improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report may be subject to review by controlling agencies, and any modifications they deem necessary should be made a part thereof, subject to our technical acceptance of such modifications. All submissions of this report should be in its entirety. Under no circumstances should this report be summarized and synthesized to be quoted out of context for any purpose.

Test findings and statements of professional opinion do not constitute a guarantee or warranty. This report has been prepared in accordance with generally accepted Geotechnical Engineering practices. No other warranties, either expressed or implied, are made as to the professional advice provided under the terms of this agreement.



Reference: CDMG. Special Studies Zones. 1986. Beverly Hills Quadrangle and 1986 Hollowood Quadrangle. Scale 1:24,000. 1"=2000'

0 2000 ft

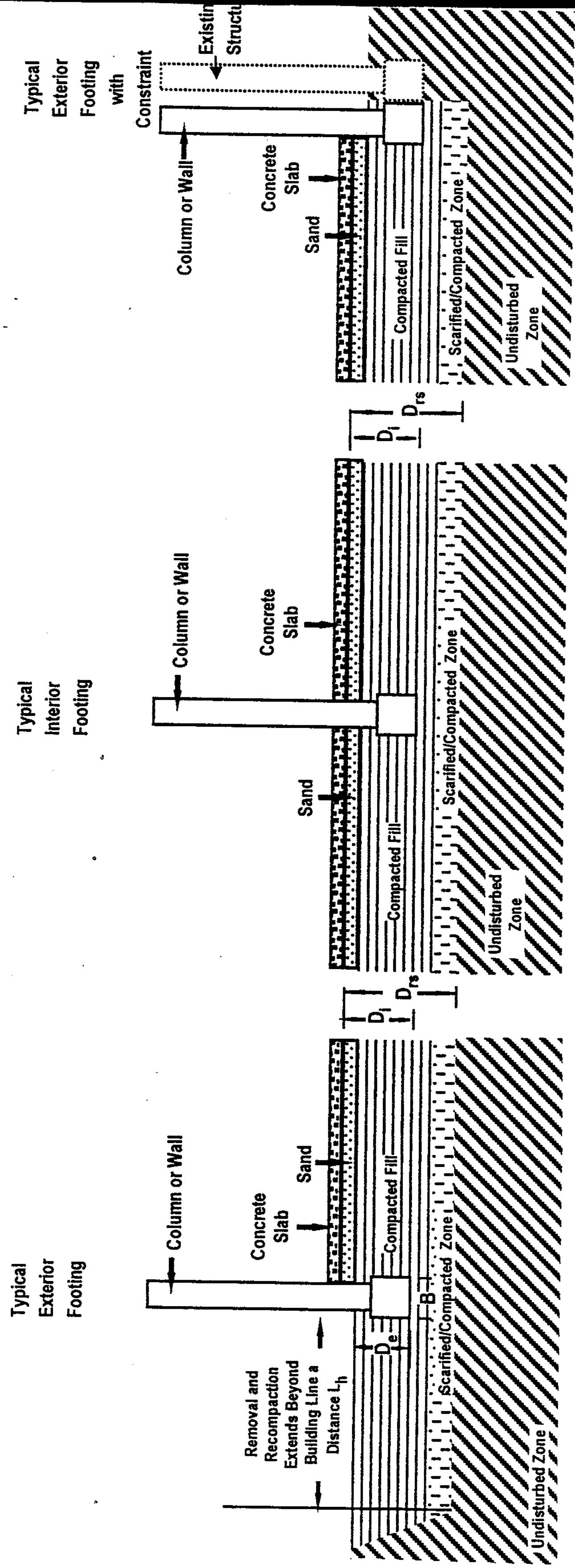
N

Site Location Map

Figure 1

Advanced Geotechnical Services, Inc.

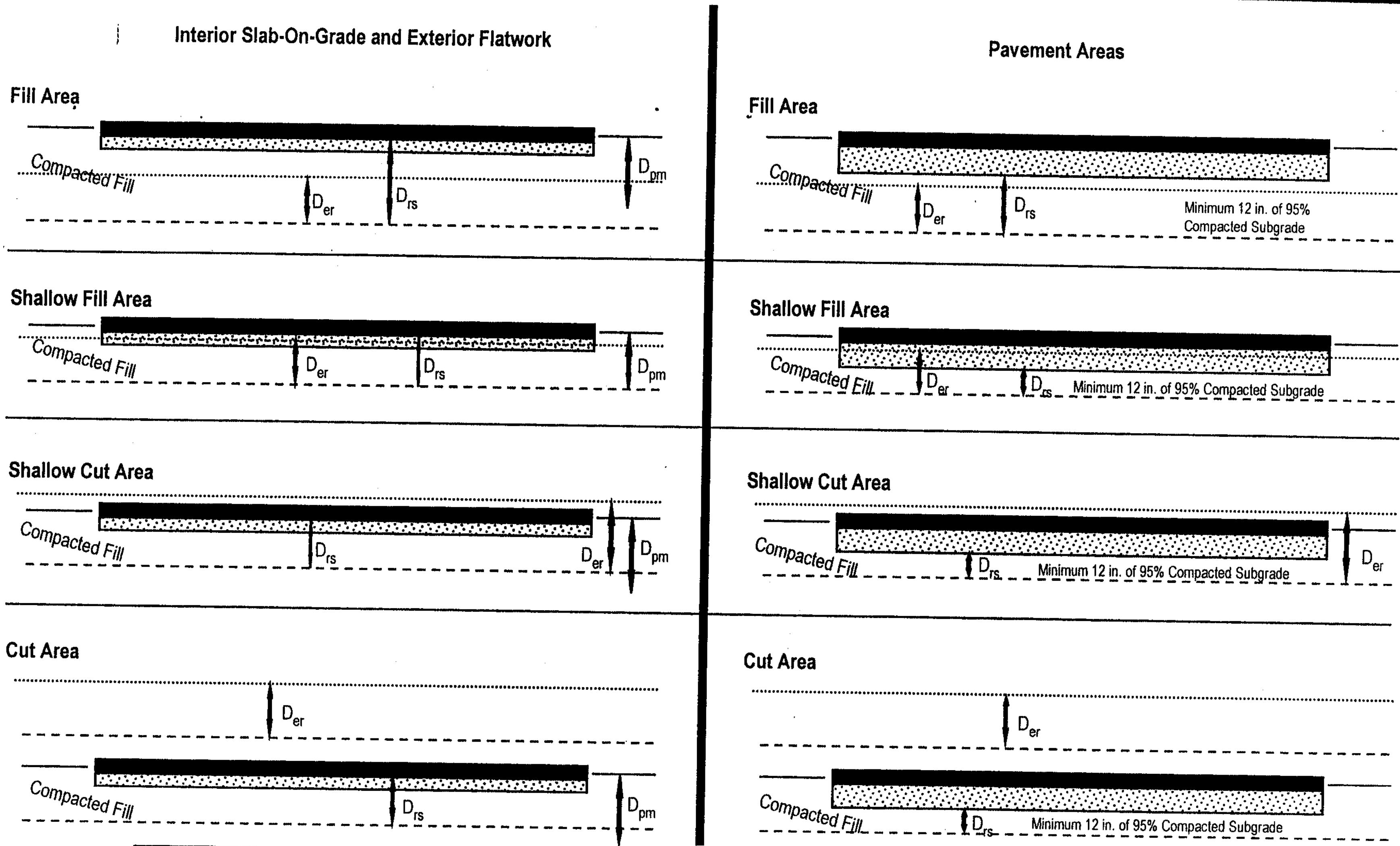
Client Number 3224
Report Number 6375



Notes
B = Footing Width
See Text for Definitions of Other Parameters
Drawing Not To Scale

Removal Depths - Building Area

Figure 2



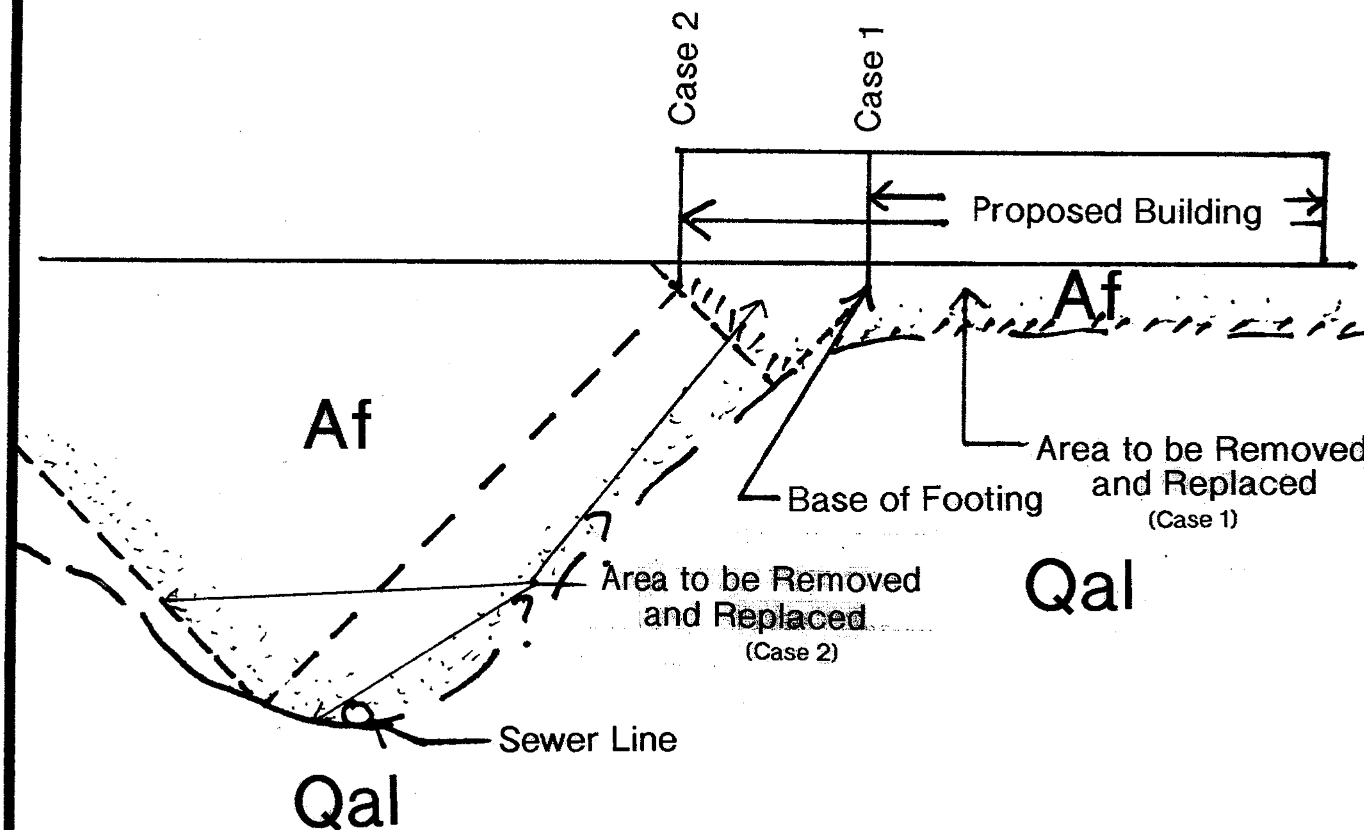
Legend

——— Final Grade	■ Slab or Pavement	D_{er}	Minimum Removal Depth Below Exisitng Grade
.... Existing Grade	▒ Sand or Base	D_{rs}	Minimum Removal Depth Below Slab or Structural Section
- - - - Removal Depth, Greater of D_{er} or D_{rs}, Corresponds to Bottom of Scarified Zone		D_{pm}	Depth of Premoistening Zone

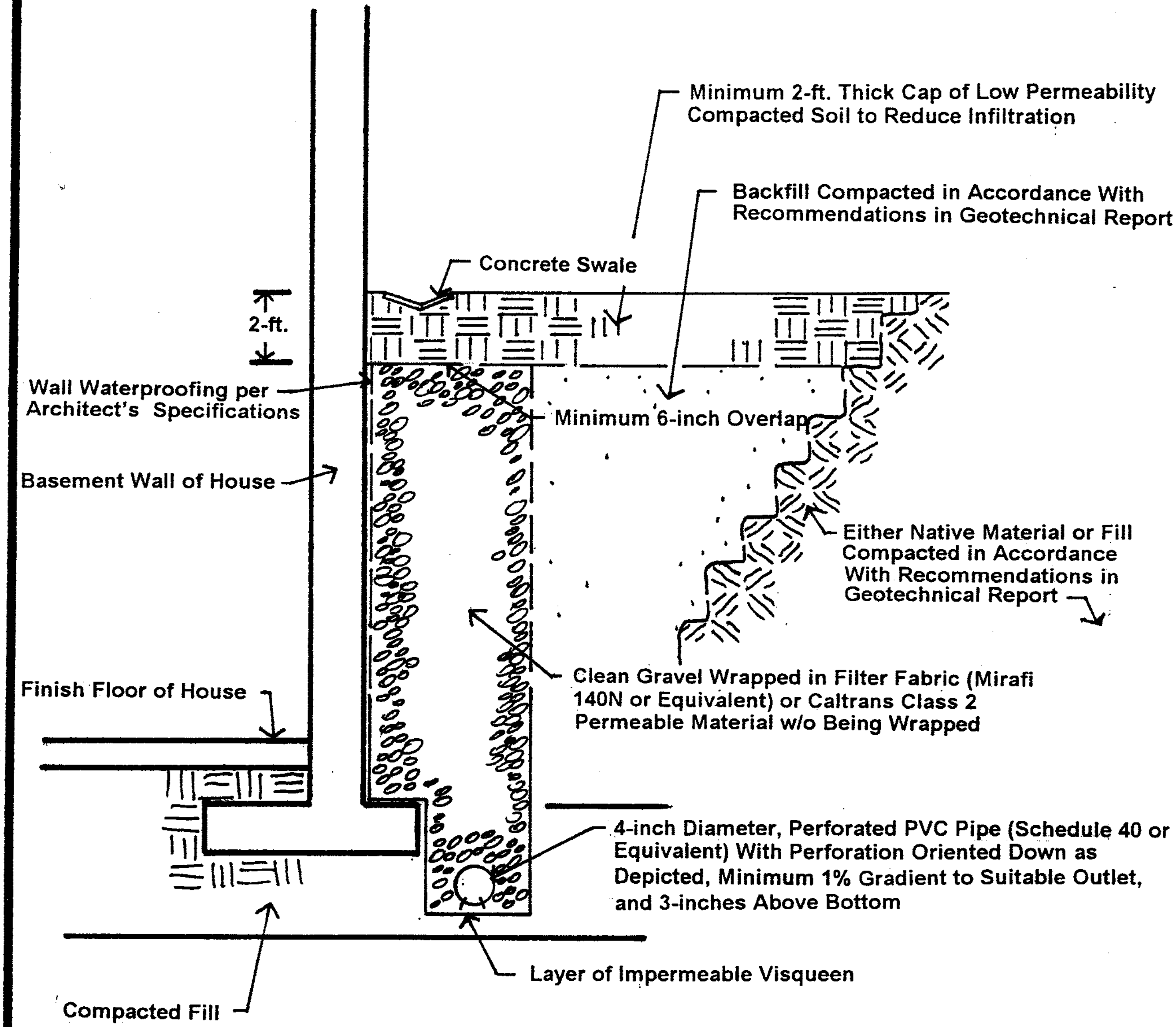
Note: Minimum removal depths [D_{er}, D_{rs}] may differ for interior slabs, exterior flatwork, and pavement areas. See *Site Preparation* section of report for details.

Removal Depth Examples for Interior Slab-On-Grade, Flatwork, and Pavements

Figure 3



REMOVAL FOR STRUCTURES ADJACENT TO DEEP FILL



Typical Retaining Wall Drainage Detail

Appendix A

Field Exploration and Boring Logs

Appendix A
Field Exploration and Boring Logs

The field exploration included a site reconnaissance and subsurface exploration. During the site reconnaissance, the surface site conditions were noted, and the approximate locations of any exploration points were determined. The following descriptions of exploration methods are generic and may include methods not used on this project. Reference to the boring logs can be made to determine which methods are applicable to this project.

The test borings were advanced by either hand digging, digging with a backhoe, or drilling. In the case of drilling, a truck-mounted rotary drilling rig with a hollow-stem auger or bucket was used to advance the borings, unless noted otherwise on the boring logs. For geologic studies when the need for visual examination of the bedding and other stratigraphic features is needed along with engineering data, the larger bucket augers are used to allow a geologist to enter the excavation for visually logging the hole. A prefix B is used to designate a boring made with a drilling rig. When hand dug, the boring numbers have a prefix HB. When a backhoe was used, prefixes TP (test pit) or T (trench) are used. The difference between a trench and test pit being the length of the exploration; a trench being a long narrow exploration, most commonly used for fault studies. In each case, the soils were logged by technical personnel from our office and visually classified in the field in general accordance with the Unified Soil Classification system. The field descriptions have been modified as appropriate to reflect laboratory results.

Relatively undisturbed samples of the subsurface materials were obtained at appropriate intervals in the borings using a steel drive sampler (2.5-inches inside diameter, 3-inches outside diameter) lined with brass, one-inch high sample rings with a diameter of 2.4 inches. This is referred to as a modified California sampler. When the boring is advanced by drilling with a hollow-stem auger, the sampler was usually driven into the bottom of the borehole with successive drops of a 140-lb hammer falling 30 inches. When a bucket auger is used to advance the boring, the driving weights change with depth, depending on the weight characteristics of the telescoping kelley bar, but the height of fall is usually 18 inches. Sampler driving resistance, expressed as blows per six inches of penetration, is presented on the boring logs at the respective sampling depths. When the borings or trenches are excavated with a backhoe, the sampler is pushed into the soil with the force of the backhoe. A hand sampler is used when the borings or trenches are advanced by hand digging or in some cases when a backhoe is used to make the excavation. This hand sampler is similar to the conventional California sampler, but lighter weight. An approximately 8-pound hammer falling about 18 inches is used to drive the hand sampler about six inches into the bottom of the exploration. The type of sampler used is noted on the boring logs. In some cases the hammer weight and falling distance deviate from those given above. The actual conditions are shown on the boring logs and supersede the values given above.

Ring samples were retained in close-fitting, moisture tight containers for transport to our laboratory for testing. Bulk samples, which were collected from cuttings, were placed in bags and transported to our laboratory for testing.

When noted on the boring logs, standard penetration test (SPT) samples were obtained using either a 20-inch or a 32-inch long split-barrel sampler with a 2-inch outside diameter and a 1.375-inch inside diameter when liners are used (1.5-inch inside diameter without liners). Unless noted otherwise, liners are usually used. This sampler is driven into the soil with successive drops of a 140-lb hammer falling 30 inches. The blows are recorded for each 6 inches of penetration for a total penetration of 18 or 24 inches. The sum of the number of blows for the last 12 inches of an 18-inch penetration or the middle 12 inches of a 24-inch penetration is referred to as the N value.

Elevations of the ground surface, if shown on the logs, were determined at the boring locations using a topographic map or determined by using a temporary bench mark shown on the site plan.

Logs, which are presented on Plates at the end of this Appendix, include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and drilling information. Keys to soil and bedrock symbols and terms are included on Plates A-1 and A-2.

Each boring or trench, unless noted otherwise, was backfilled with cuttings at the completion of the logging and sampling. The backfill, however, may settle with time, and it is the responsibility of our client to ensure that such settlement does not become a liability.

On some projects, cone penetrometer tests (CPT) are performed, primarily to provide a basis for evaluating liquefaction potential. Cone penetrometer tests are performed with a truck-mounted cone, by advancing a 10-cm^2 cone with a conical tip into the soil at a rate of 2 cm/sec. The tip resistance and frictional resistance along a sleeve above the tip are measured and recorded. Both a tabulated and graphical presentation of the results are included in this appendix if CPT were performed on this project.

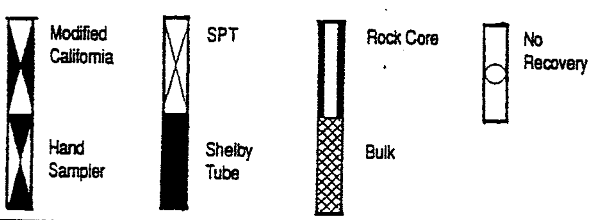
Key to Soil Symbols and Terms

Major Divisions			USCS Group Symbols	Typical Names
Coarse-Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels (More than half of coarse fraction is larger than No. 4 sieve)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand, clay mixtures
	Sands (More than half of coarse fraction is smaller than No. 4 sieve)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sand, little or no fines
			SP	Poorly graded sands, gravelly sands little or no fines
		Sands and fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts and Clays Liquid Limit < 50		ML	Silts and very fine sands, rock-flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low or medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit > 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		Pt	Peat and other highly organic soils

Legend of Laboratory Tests

- G - Grain Size
- A - Atterberg Limits
- P - Compaction
- S - Swell/Expansion
- C - Consolidation
- DS - Direct Shear
- U - Unconfined
- T - Triaxial
- PP - Pocket Penetrometer
- CH - Chemical

Sampler Type



Terms used in this report for describing soils according to their texture or grain size distributions are generally in accordance with the Unified Soil Classification System.

Terms Describing Density and Consistency

Coarse Grained soils (major portion retained on No. 200 sieve) include (1) clean gravels, (2) silty or clayey gravels, and (3) silty, clayey, or gravelly sands. Relative density is related to SPT blow count corrected for overburden pressure or drive energy.

Density		SPT *N* Value Blows/Ft	Relative Density %
Very Loose	vl	0 to 4	0 to 15
Loose	l	4 to 10	15 to 35
Medium Dense	md	10 to 30	35 to 65
Dense	d	30 to 50	65 to 85
Very Dense	vd	> 50	85 to 100

Fine Grained soils (major portions passing No. 200 sieve) inlcude (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shear strength as indicated by penetrometer readings, direct shear, or SPT blow count.

Consistency	Shear Strength, ksf	SPT *N* Value
Very Soft	< 0.25	0 to 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	8 to 16
Very Stiff	2.00 to 4.00	16 to 32
Hard	> 4.00	> 32

Terms Characterizing Soil Structure

Slickensided	Having inclined planes of weakness that are slick and glossy in appearance.
Fissured	Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated	Composed of thin layers of varying color and texture.
Interbedded	Composed of alternate layers of different soil types.
Calcareous	Containing appreciable quantities of calcium carbonate.
Well Graded	Having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly Graded	Predominately one grain size, or having a range of grain sizes with some intermediate sizes missing.
Porous	Having visibly apparent void spaces through which water, air, or light may pass.

Soil Moisture

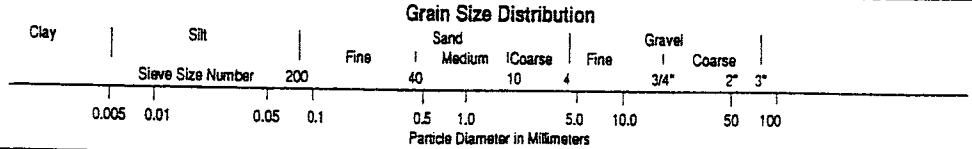
From low to high, the moisture content is indicated by:

Dry	D
Slightly Moist	Sl M
Moist (near optimum for compaction)	M
Very Moist	V M
Wet	W

Size Proportions

Designation	Percent by Weight
Trace	< 5
Few	5 to 10
Little	15 to 25
Some	30 to 45

Grain Size Distribution



Advanced Geotechnical Services

Key to Bedrock Symbols and Terms

Degree of Weathering

Diagnostic Feature

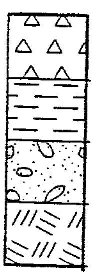
Descriptive Term	Discoloration Extent	Fracture Condition	Surface Characteristics	Original Texture	Grain Boundary Condition
Unweathered	None	Closed or discolored	Unchanged	Preserved	Tight
Slightly Weathered	Less 20% of fracture spacing on both sides of fracture	Discolored, may contain thin filling	Partial discoloration	Preserved	Tight
Moderately Weathered	Greater than 20% of fracture spacing on both sides of fracture	Discolored, may contain thick filling, cemented rock	Partial to complete discoloration, not friable except poorly cemented rocks	Preserved	Partial Opening
Highly Weathered	Throughout		Friable and possibly pitted	Mainly Preserved	Partial Separation
Completely Weathered	Throughout		Resembles a soil	Partly Preserved	Complete Separation

Discontinuity Spacing

Description for Structural Feature: Bedding, Foliation, or Flow Banding	Spacing		Description for Joints, Faults, or Other Fractures
Very Thickly (Bedded, Foliated, or Banded)	More than 2 m	More than 6 ft	Very Widely (Fractured or Jointed)
Thickly	60 cm to 2 m	2 to 6 ft	Widely
Moderately	20 to 60 cm	8 to 24 in.	Medium
Thinly	60 to 200 mm	2.5 to 8 in.	Closely
Very Thinly	20 to 60 mm	0.75 to 2.5 in.	Very Closely

Description for Microstructural Features: Bedding, Foliation, or Cleavage			
Intensely (Laminated, Foliated, or Cleaved)	6 to 20 mm	0.25 to 0.75 in.	Extremely Close
Very Intensely	< 6 mm	< 0.25 in.	

Graphic Symbols - Bedrock

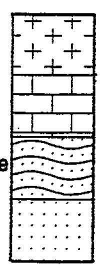


Breccia

Claystone

Conglomerate

Extrusive Igneous

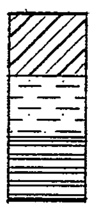


Intrusive Igneous

Limestone

Metamorphic

Sandstone



Shale

Siltstone

Slate

Rock Hardness

Classification	Field Test
Very Weak	Can be dug by hand and crushed with fingers.
Weak	Friable, can be gouged deeply with a knife and will crumble readily under light hammer blows.
Moderately Strong	Can be peeled with a knife. Material crumbles under firm blows with the sharp end of a geologic pick.
Strong	Cannot be scaped or peeled with a knife point. Hand held specimen breaks with firm blows of the pick.
Very Strong	Difficult to scratch with knife point. Cannot break hand held specimen.

Separation of Fracture Walls

Description	Separation of Walls, mm
Closed	0
Very Narrow	0 to 0.1
Narrow	0.1 to 1.0
Wide	1.0 to 5.0
Very Wide	> 5.0

Fracture Filling

Description	Definition
Clean	No fracture filling material
Stained	Discoloration of rock only. No recognizable filling material.
Filled	Fracture filled with recognizable filling material.

Surface Roughness

Description	Classification
Smooth	Appears smooth and is essentially smooth to the touch. May be slickensided.
Slightly Rough	Asperities on the fracture surfaces are visible and can be distinctly felt.
Medium Rough	Asperites are clearly visible and fracture surface feels abrasive to the touch.
Rough	Large angular asperites can be seen. Some ridge and high-side angle steps evident.
Very Rough	Near vertical steps and ridges occur on the fracture surface.

Where slickensides are observed, the direction of the slickensides should be recorded after the standard discontinuity surface description.

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Boring Log B-1

Sheet 1 of 2

Project: RAD Jefferson | Client No.: 3224 | Date Drilled: 8/22/03

Comment: CME 75 with Down Hole Hammer and Safe-T Driver

Drilling Company/Driller: Discovery Drilling/ Dudley | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30 | Hole Diameter (in.): 6

Elevation ____ ft | Depth to Water ____ ft After ____ hrs on ____ | Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0		**Asphalt 0 - 3 inches**					
		Base 3 - 6 inches					
		Artificial Fill (af) 6 in. - 13 ft. SILTY SAND WITH GRAVEL; dark grayish brown; moist; stiff.					
	5 4 7			101.6	20.7	41.2	E.I. = 37
5	5 5 7			103.2	17.5		
	6 8 10	SILTY SANDY CLAY to CLAYEY SAND; dark grayish brown; moist; stiff.		96.5	20.7	56.3	
10	8 9 14			89.4	25.0		
		Alluvium (Qa) 13 - 50.5 ft GRAVELLY SAND; yellowish brown;minor orange iron oxide staining; slightly moist; medium dense.					
15	9 7 14			112.9	3.8	4.9	
		SANDY SILT; dark brown; moist; dense.					
20	10 20 17			111.9	12.6	60.6	
		SILTY SAND WITH ABUNDANT GRAVEL; grayish brown; moist; very dense.					
25	20 57			118.4	13.6	24.5	

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Boring Log B-1

Sheet 2 of 2

Project: RAD Jefferson | Client No.: 3224 | Date Drilled: 8/22/03

Comment: CME 75 with Down Hole Hammer and Safe-T Driver

Drilling Company/Driller: Discovery Drilling/ Dudley | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30 | Hole Diameter (in.): 6

Elevation ____ ft | Depth to Water ____ ft After ____ hrs on ____ | Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
		50 50/1"		CLAYEY SILT to SILTY SAND; grayish brown; moist; hard.		103.3	17.8	92.4	
35		45 50/3"		SILTY SAND;grayish brown, moist, dence		100.6	16.0		
40		75/6"		SANDY SILT; grayish brown; moist; very dense.		100.9	21.4	82.6	
45		35 50/4"		@45 ft		74.9	45.2		
50		45 50/2"		Total Depth = 50.5 ft No Groundwater No Caving		99.7	23.3	87.2	
55									

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Boring Log B-2

Sheet 1 of 1

Project: RAD Jefferson   Client No.: 3224   Date Drilled: 8/22/03

Comment: CME 75 with Down Hole Hammer and Safe-T Driver

Drilling Company/Driller: Discovery Drilling/ Dudley   Equipment: Hollow Stem Auger

Driving Weight (lbs): 140   Average Drop (in.): 30   Hole Diameter (in.): 6

Elevation ____ ft   Depth to Water ____ ft After ____ hrs on ____   Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0				**Asphalt 0 - 3 inches**					
				Base 3 - 7 inches					
				Artificial Fill (af) 7 in. - 14 ft SILTY CLAY WITH GRAVEL; very dark grayish brown; moist; stiff.					
	X	3 6 5				106.5	11.6		
5	X	3 8 9		@ 5 ft grades with sand.		96.9	16.8		
	X	5 7 10		@ 7.5 ft very stiff.		100.6	18.9		
10	X	7 11 14				95.7	23.6		
15	X	12 18 17		**Alluvium (Qa) 14 - 21 ft** CLAYEY SILT with Gravel; dark grayish brown, minor brown iron oxide staining; moist; hard.		110.3	20.0		
20	X	12 14 14							
				Total Depth = 21 ft No Groundwater No Caving					
25									

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Boring Log B-3

Project: **RAD Jefferson** Client No. **3224** Date Drilled **8/22/03**

Comment: **CME 75 with Down Hole Hammer and Safe-T Driver**

Drilling Company/Driller: **Discovery Drilling/ Dudley** Equipment: **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **6**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				Asphalt 0 - 3 inches					
				Artificial Fill 3 in. - 4 ft SILTY CLAY; olive brown; moist; hard; some gravel.					
		9 24 48				119.1	12.8		
5				**Alluvium (Qa) 4 - 51 ft** SILTY CLAYEY SAND; light olive brown; moist; very dense; some gravel.					
		9 24 26				116.4	9.3		
				SANDY SILT; olive brown; moist; dense.					
		16 19 24				116.3	14.0		
10		16 14 12		@ 10 ft no recovery.					
15				SANDY SILT to SILTY SAND; olive gray; micaceous, very moist; very dense; very fine-grained.					
		12 18 50				90.5	31.3		
				FINE-GRAINED SAND; yellowish brown; wet; dense.					
				SILT with thin laminations and lenses of fine grained SAND; micaceous, dark gray; moist; dense.					
20		25 20 18				100.9	25.4		
25		15 20 33		@ 25 ft Grades very dense, Clayey SILT.		99.7	23.1		

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Boring Log B-3

Project: RAD Jefferson | Client No.: 3224 | Date Drilled: 8/22/03

Comment: CME 75 with Down Hole Hammer and Safe-T Driver

Drilling Company/Driller: Discovery Drilling/ Dudley | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30 | Hole Diameter (in.): 6

Elevation ____ ft | Depth to Water ____ ft After ____ hrs on ____ | Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
	X	20 50				99.5	23.5		
35	X	23 50/5"				96.4	23.0		
40	X	37 50				95.6	27.2		
45	X	15 50				101.5	23.1		
50	X	35 50				99.3	18.3		
				Total Depth = 51 ft Seepage at 18 ft No Caving					
55									

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Boring Log B-4

Sheet 1 of 1

Project: RAD Jefferson   Client No.: 3224   Date Drilled: 9/2/03

Comment: CME 75 with Automatic Hammer and Safe-T Driver

Drilling Company/Driller: Jet Drilling/ Brad   Equipment: Hollow Stem Auger

Driving Weight (lbs): 140   Average Drop (in.): 30   Hole Diameter (in.): 6

Elevation ______ ft   Depth to Water ______ ft After ______ hrs on ______   Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				Artificial Fill (af) 0 - 7 ft CLAYEY SILT; dark grayish brown; slightly moist; hard.					
		5 15 30				112.0	17.5		
5		8 16 26		CLAYEY SAND; dark olive brown; moist; dense; fine-grained with some gravels.		120.4	9.9		
		6 11 16		**Alluvium (Qa) 7 - 20.5 ft** SANDY CLAY; olive; moist; hard.		107.9	18.3		
10		8 12 16				113.3	18.2		
				SILTY SAND; dark olive brown with some iron oxide staining; moist; medium dense; cobble in sampler tip.					
15		13 50/3"				97.5	21.7		
				FINE-GRAINED SAND WITH GRAVEL AND COBBBLES; dark grayish brown; moist; very dense.					
20		50				130.4	2.8		
				Total Depth = 20.5 ft No Groundwater No Caving					
25									

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Boring Log B-5

Project: **RAD Jefferson** Client No.: **3224** Date Drilled: **9/2/03**

Comment: **CME 75 with Automatic Hammer and Safe-T Driver**

Drilling Company/Driller: **Jet Drilling/ Brad** Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** Average Drop (in.): **30** Hole Diameter (in.): **6**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By: **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
			Asphalt 0 - 3 inches					
			Base 3 - 6 inches					
			Artificial Fill (af) 6 in. - 21 ft SILTY CLAY; dark grayish brown; moist; stiff.					
	X	4 5 5			92.2	21.4		
			SANDY CLAY; very dark grayish brown; moist; stiff; some gravel.					
5	X	3 3 3			112.0	13.7		
	X	4 4 6			104.2	18.3		
10			SILTY CLAY and SANDY SILT with Gravel; very dark grayish brown and olive gray, mottled; moist; very stiff.					
	X	5 9 9			96.2	22.0		
15	X	8 11 12	@ 15.5 ft brick fragment.					
20	X	5 8 9	@ 20 ft grades firm.		99.0	22.0		
			Total Depth = 21 ft No Groundwater No Caving					
25								

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Boring Log B-6

Sheet 1 of 1

Project: RAD Jefferson | Client No.: 3224 | Date Drilled: 9/2/03

Comment: CME 75 with Automatic Hammer and Safe-T Driver

Drilling Company/Driller: Jet Drilling/ Brad | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30 | Hole Diameter (in.): 6

Elevation ____ ft | Depth to Water ____ ft After ____ hrs on ____ | Logged By: MD

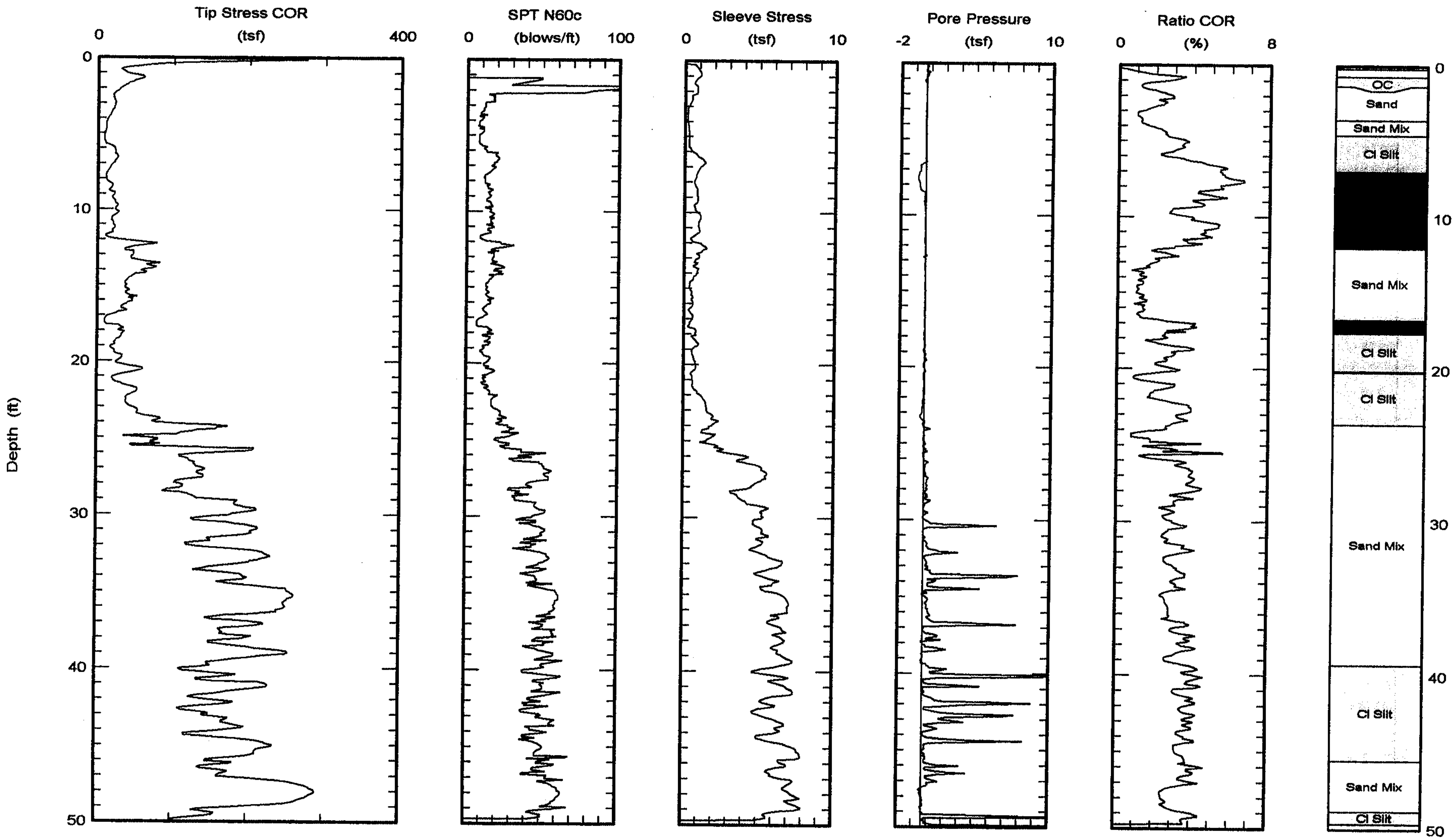
Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0		**Asphalt 0 - 3 inches**					
		Base 3 - 6 inches					
		Artificial Fill 6 in. - 4 ft SILTY CLAY; dark grayish brown; moist; hard.					
	8 11 11			101.5	22.0		
4		**Alluvium (Qa) 4 - 20.25 ft** SANDY CLAY; olive; moist; very stiff; fine-grained.					
5	6 7 9			106.4	20.2		
		SILTY CLAY; olive ; moist; very stiff.					
	9 11 13			103.0	20.0		
10	5 77 18	@ 10 ft grades hard.		106.3	21.6		
		SILTY SAND WITH GRAVEL; multi-colored with iron oxide staining; slightly moist; very dense.					
15	11 38 50/3"			102.8	10.6		
20	50/3"	@ 20 ft no recovery; abundant cobble and gravel.					
25							

Total Depth = 20.25 ft
No Groundwater
No Caivng

KTE Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 28/Aug/2003 Test ID: CPT-1(NW) Project: MTA
	Client: AGS Site: Jefferson Blvd., Los Angeles	

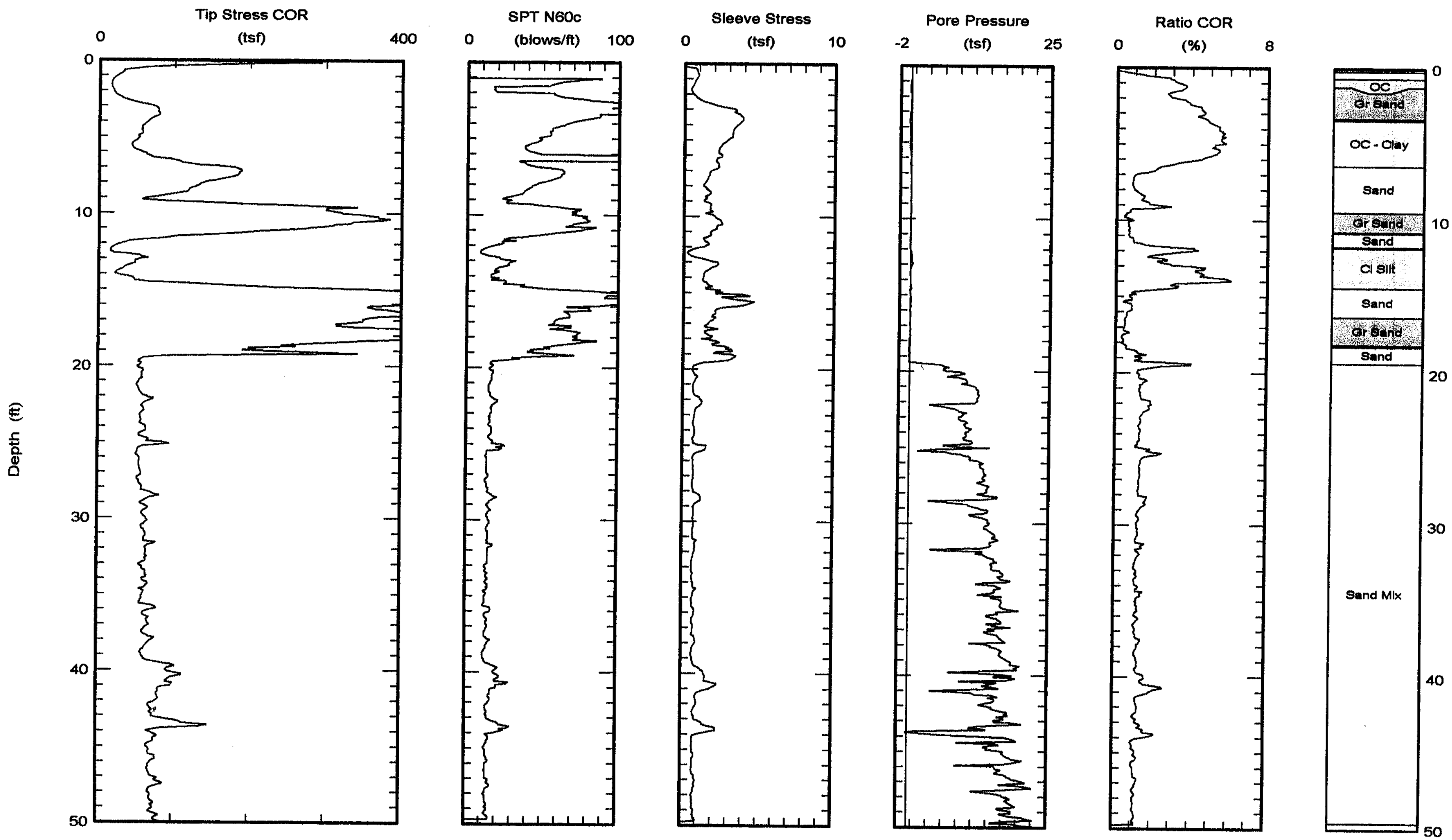


Maximum depth: 50.08 (ft)

Test ID: CPT-1(NW)
File: C28G0302C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
Email: skehoe@msn.com

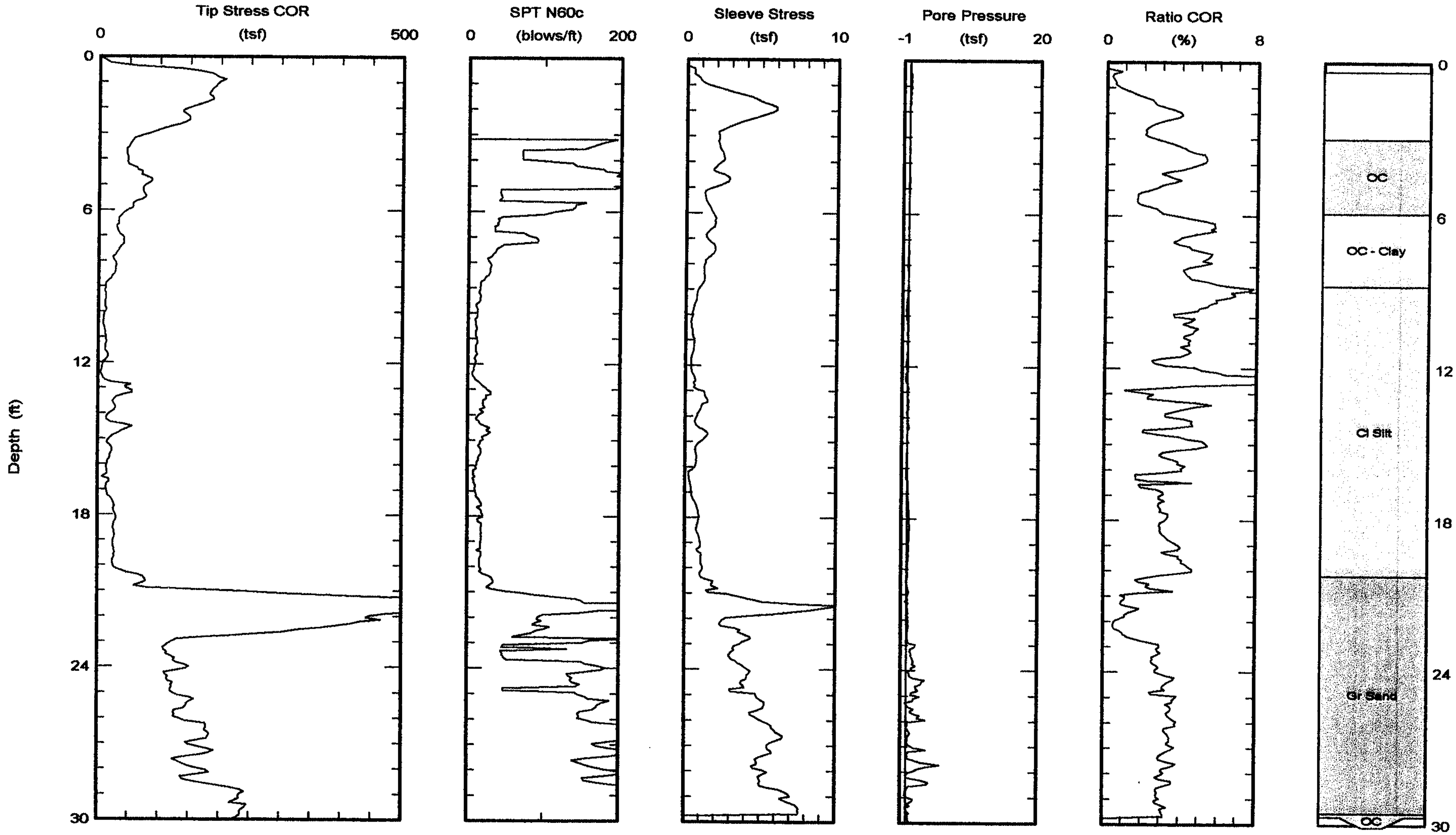
Northing:	Date: 28/Aug/2003
Easting:	Test ID: CPT-2 (SE)
Elevation:	Project: MTA
Client: AGS	
Site: Jefferson Blvd., Los Angeles	



Maximum depth: 50.13 (ft)

Test ID: CPT-2 (SE)
File: C28G0303C.ECP

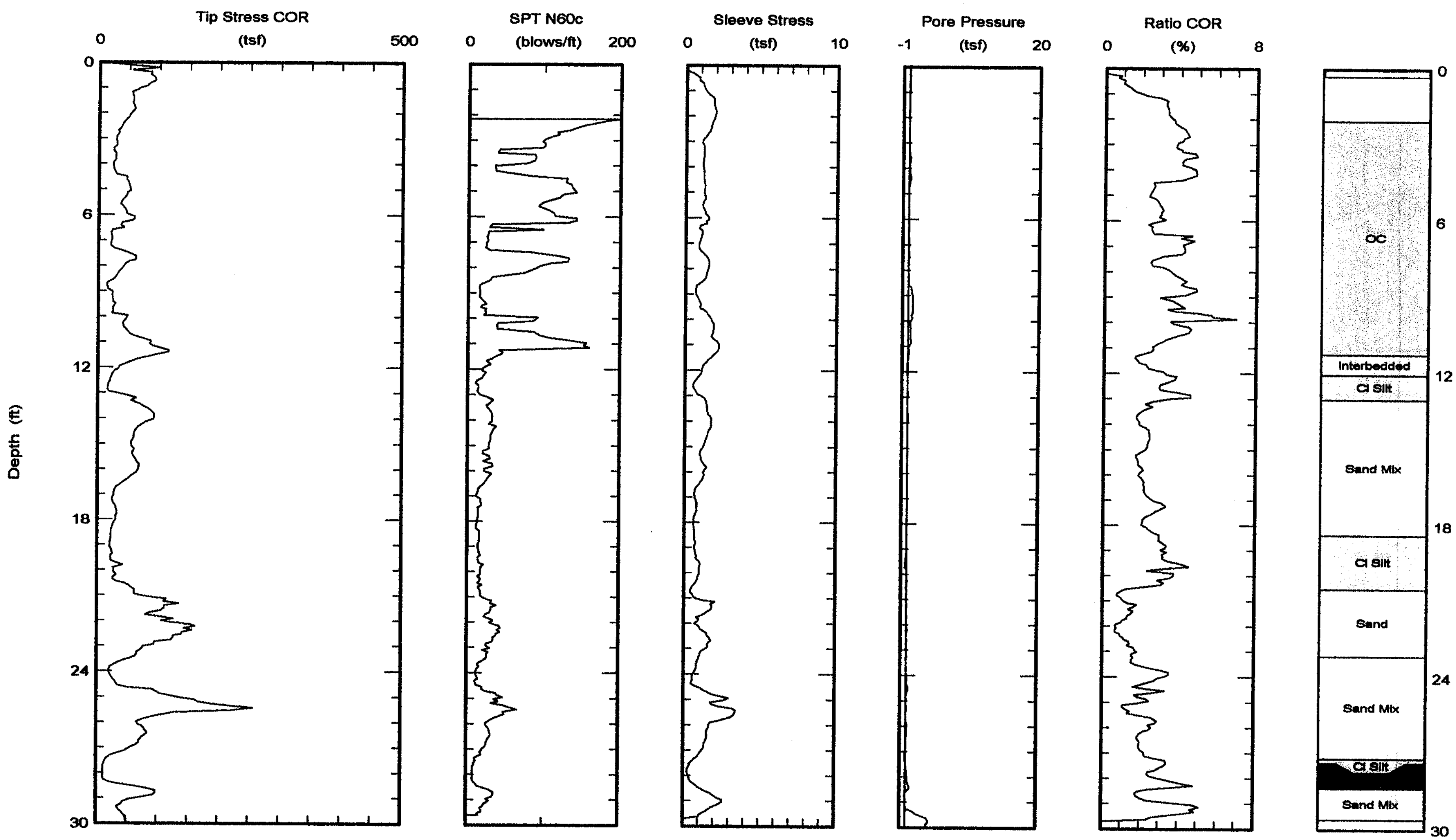
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-3 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



Maximum depth: 30.11 (ft)
Page 1 of 2

Test ID: CPT-3
File: c15o0301c.ecp

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-4 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



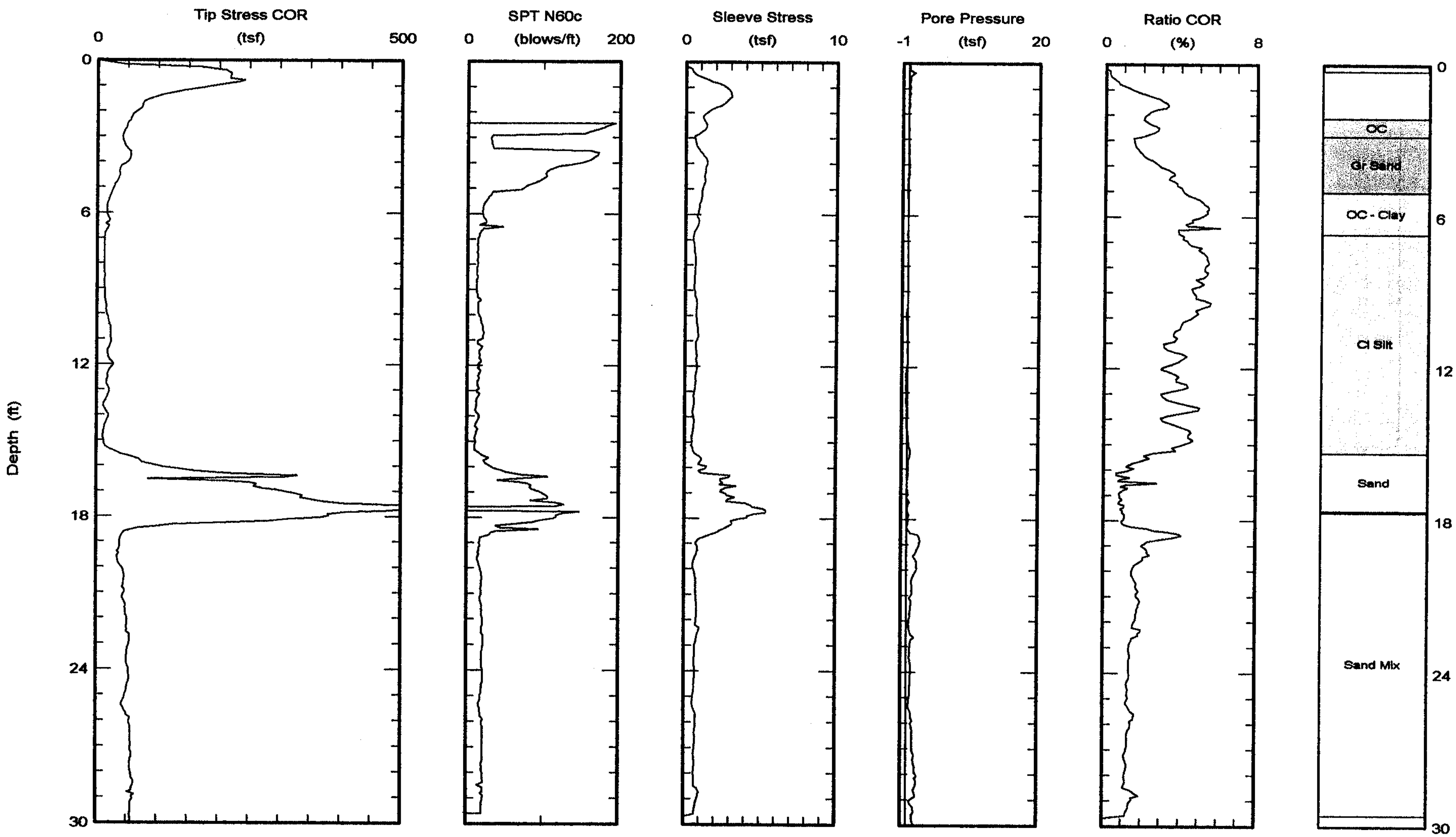
Maximum depth: 30.04 (ft)

Page 1 of 2

Test ID: CPT-4

File: C15O0302C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-5 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	

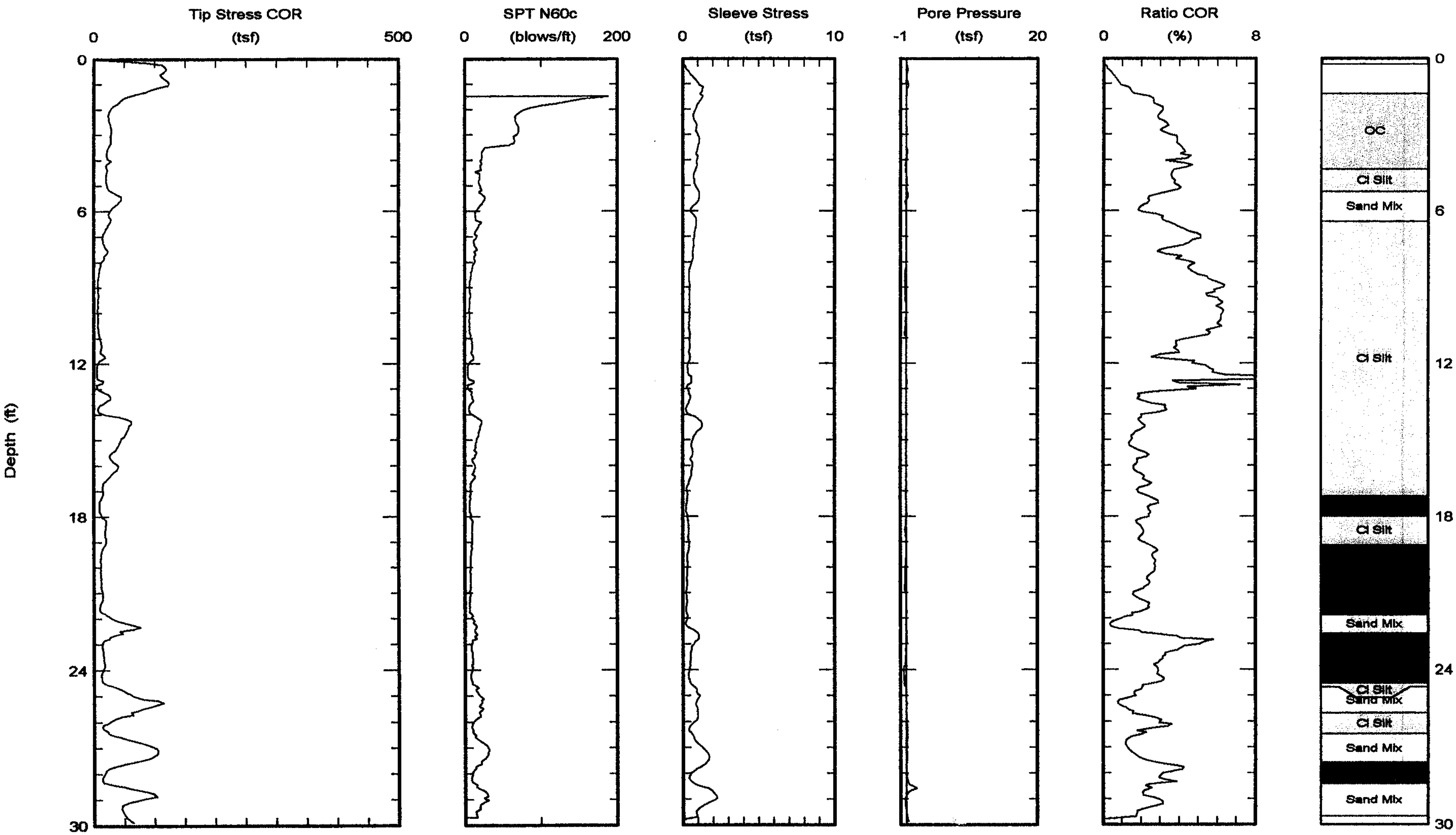


Maximum depth: 30.00 (ft)

Test ID: CPT-5
File: C15O0303C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
Email: skehoe@msn.com

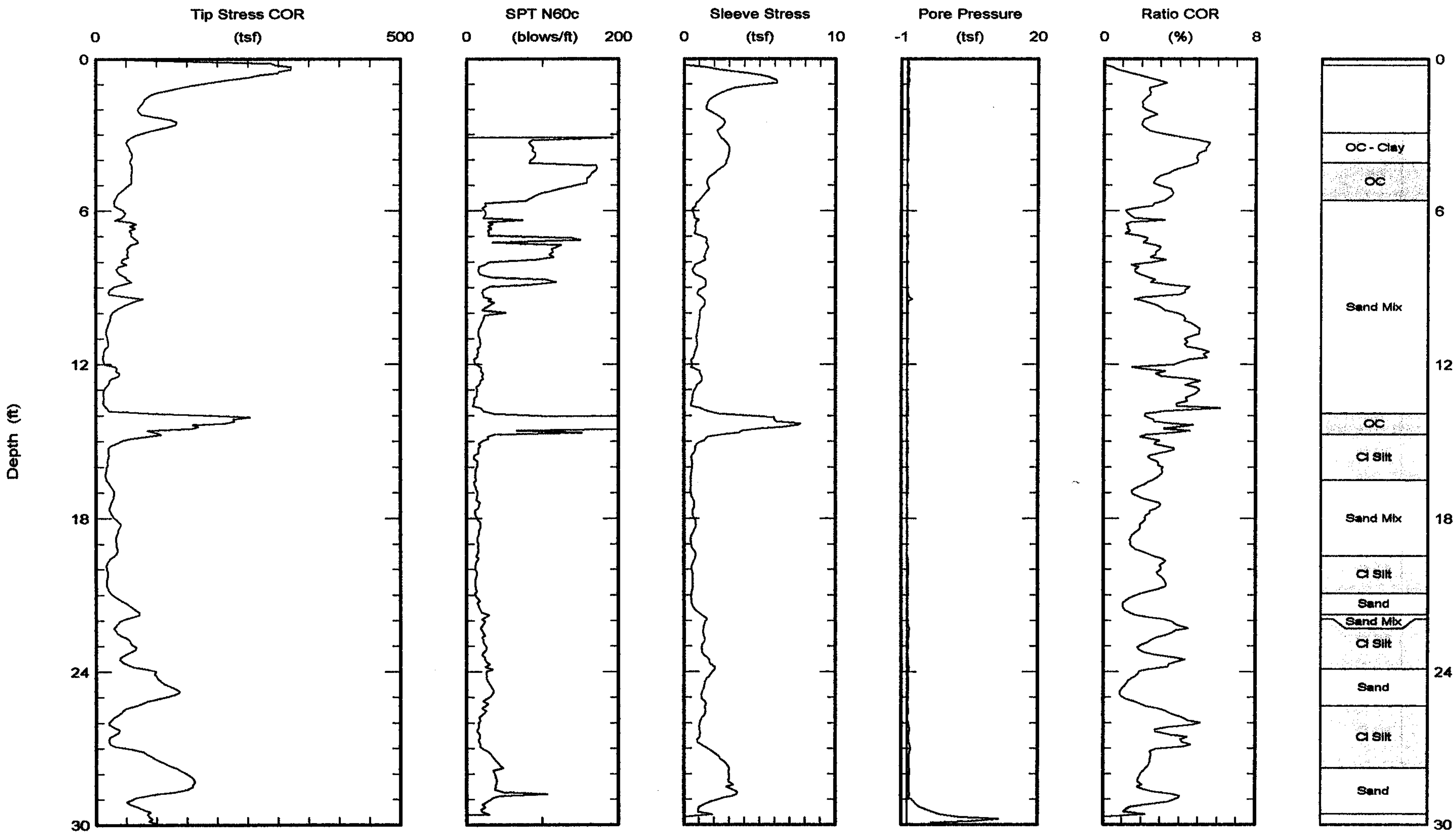
Kehoe Testing & Engineering	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-6 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



Maximum depth: 30.09 (ft)

Test ID: CPT-6
File: C15O0306C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-7 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	

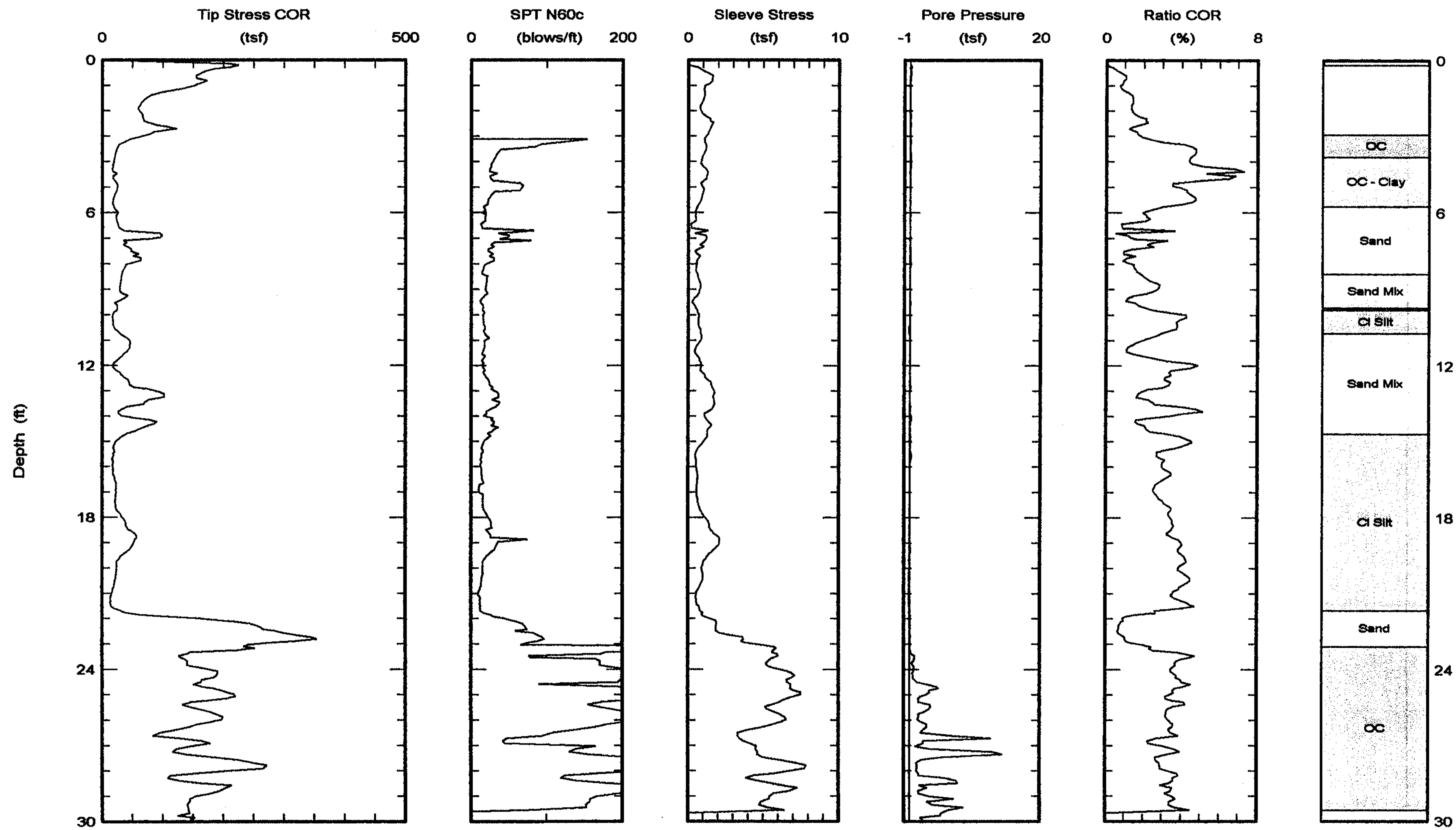


Maximum depth: 30.00 (ft)

Page 1 of 2

Test ID: CPT-7
File: C15O0304C.ECP

KTE Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-8 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	

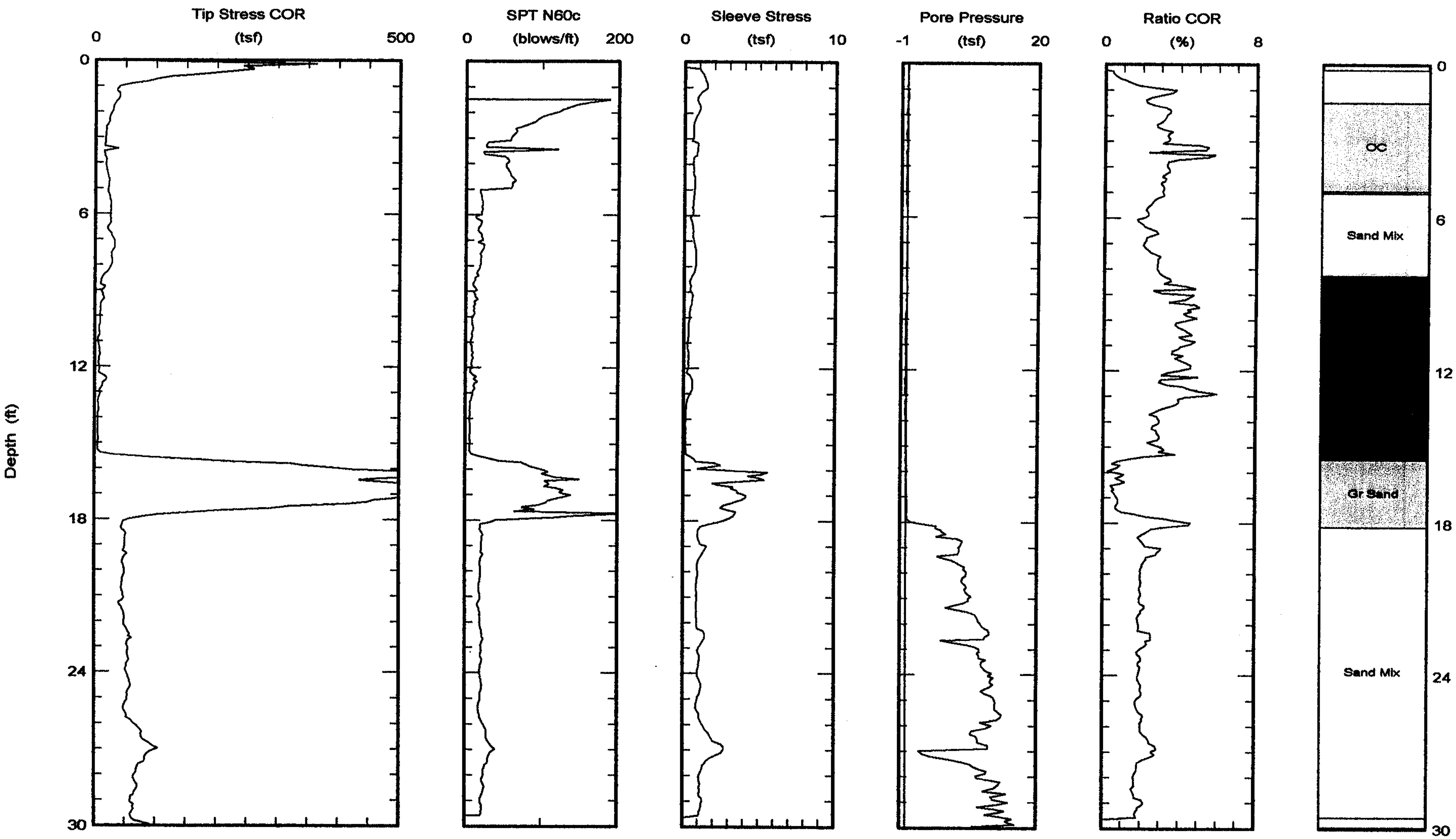


Maximum depth: 29.99 (ft)

Test ID: CPT-8
File: C15O0305C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
Email: skehoe@msn.com

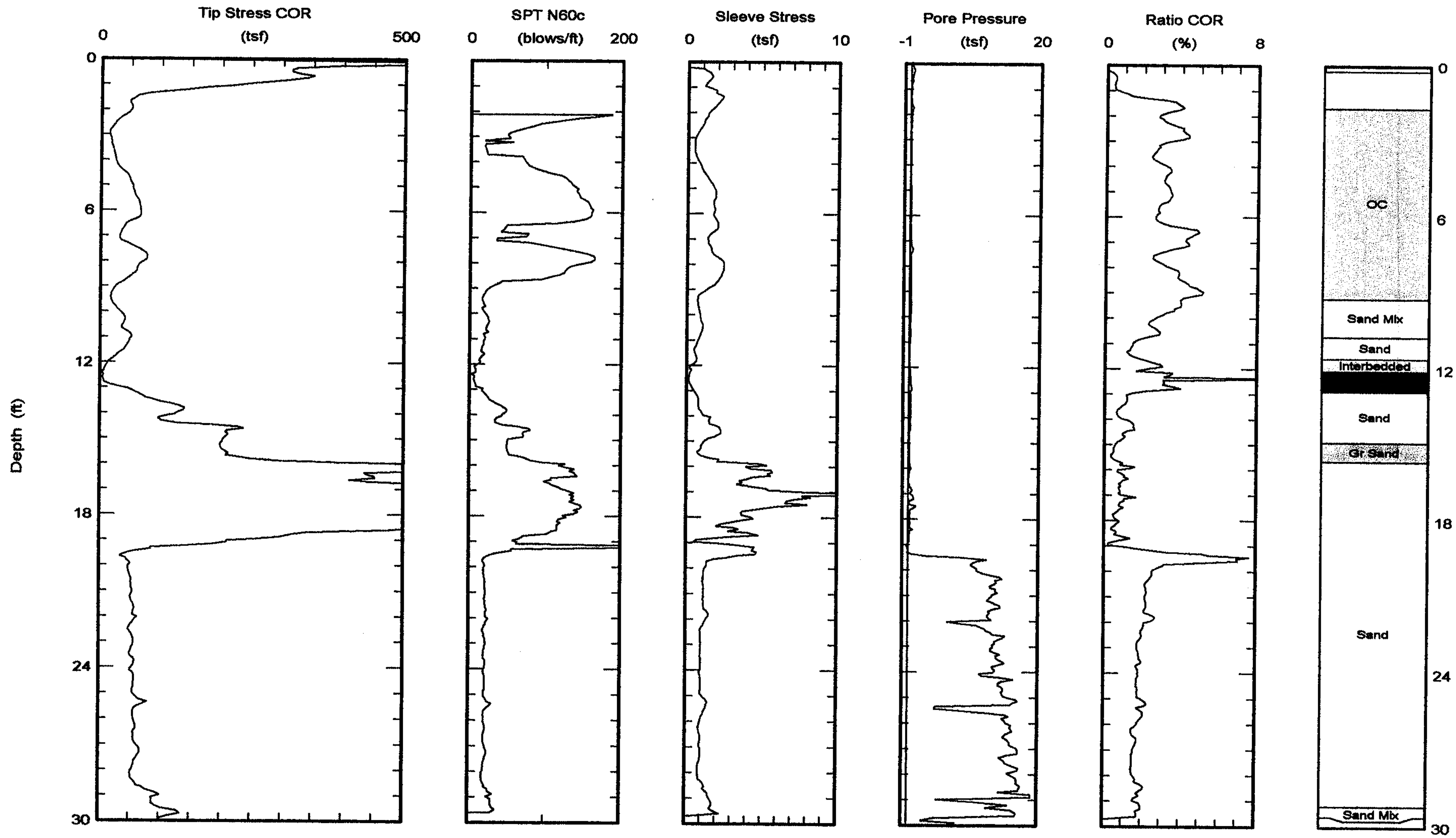
Kehoe Testing & Engineering	Northing:	Date: 15/Oct/2003
	Easting:	Test ID: CPT-9
	Elevation:	Project: MTA
	Client: AGS	
	Site: 3475 La Cienega Blvd	



Maximum depth: 29.95 (ft)

Test ID: CPT-9
File: C15O0306C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-10 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



Maximum depth: 30.02 (ft)

Page 1 of 2

Test ID: CPT-10

File: C15O0307C.ECP

Appendix B

Laboratory Testing

Appendix B
Laboratory Testing

A laboratory test program is designed for each project to evaluate the physical and mechanical properties of the soil and bedrock materials encountered at the site during our field exploration program. Laboratory tests were conducted on representative samples for the purpose of classification and determining their properties for use in analyses and evaluations. The most common laboratory tests include moisture-density, Atterberg limits, grain-size analyses (sieve and hydrometer analyses), sand equivalent, direct shear, consolidation, compaction, expansion index, and *R*-values. The following descriptions of test methods are generic and may include methods not used on this project. Reference to the boring logs and test results on Plates attached to this appendix will show which tests were performed for this project.

Classification Tests
Classification testing is performed to identify differences in material behavior and to correlate the results with shear strength and volume change characteristics of the materials. Classification testing includes unit weight (e.g., dry density), moisture content, Atterberg limits, grain size analyses (sieve and hydrometer), and sand equivalent.

Moisture-Density Test
Site soils were classified in the laboratory in accordance with the Unified Soil Classification System. Moisture contents are performed in general accordance with ASTM Test Designation D2216-98. The dry density of selected driven ring samples was obtained by trimming the end of the sample to obtain a smooth, flat face. The trimmed sample was measured to obtain volume and wet weight, extruded, and visually classified. The samples were dried in an oven maintained at approximately 110 degrees Celsius. After drying, each sample was weighed, and the moisture content and dry density were calculated. Field moisture contents and dry unit weights were determined for the ring samples obtained in the field. Field moisture contents and dry unit weights are shown on the boring logs in Appendix A.

Atterberg Limits
Atterberg Limits were performed in general accordance with ASTM Test Designation D4318-00. If this test was performed, the results are presented on the boring logs in Appendix A.

Sieve Analysis
Sieve analysis tests were conducted on the on-site soils in general accordance with sieve analysis test procedure from ASTM Test Designation D-422-63 (98). This method covers the quantitative determination of the distribution of particle sizes in soils. If this test was performed, the results are presented on Plates attached to this appendix.

Hydrometer Test
Hydrometer tests were performed in general accordance with ASTM Test Designation D422-63 (98). If this test was performed, the results are presented on Plates attached to this appendix.

Sand Equivalent
Sand equivalent is the ratio of sand-size particles to clay-size particles, expressed as a percent. Sand equivalent tests were performed in general accordance with ASTM Test Designation D2419-95. When these tests are performed, the results are included on the boring logs in Appendix.

Shear Tests
Direct shear tests were performed in general accordance with ASTM D3080-98 to determine the shear strength parameters of undisturbed on-site soils or remolded soil specimens. The samples are usually tested in an artificially saturated condition. This is accomplished by soaking the specimens in a confined container for a period of one or 2 days, depending on the permeability of the material. The specimen, 1-inch high and 2.4-inch-diameter, is placed in the shear device, and a vertical stress is applied to the specimen. The specimen is allowed to reach an equilibrium state (swell or consolidate). The specimen is then sheared under a constant rate of deformation. The rate of deformation for a slow test, sufficiently slow to allow drainage, is selected from computed or measured consolidation rates to allow full drainage (full dissipation of any tendency for pore water pressure changes) during shear. The process usually is repeated for 3 specimens, each under different vertical stresses. The results from the 3 tests are plotted on a diagram of shear stress and normal (vertical) stress at failure, and linear approximations are drawn of the failure curves to determine the angle of internal friction and cohesion.

Residual shear resistance is obtained by cycling the specimen between deformations of about 7% of the specimen diameter until an equilibrium shear stress is reached.

If this test was performed, the results are presented on Plates attached to this appendix.

Consolidation Test
Consolidation tests were performed in general accordance with ASTM D2435-96 on selected samples to evaluate the load-deformation characteristics of the soils. The tests were performed primarily on material that would be most susceptible to consolidation under anticipated foundation loading. The soil specimen, contained in a 2.4-inch-diameter, 1.0-inch-high sampling ring, is placed in a loading frame under a seating pressure of 0.1 ksf. Vertical loads are applied to the samples in several geometric increments, and the resulting deformations were recorded at selected time intervals. When the pressure reaches a preselected effective overburden pressure (often 2 ksf) and the specimen has consolidated under that pressure, the laboratory technician adds water to the test cell and records the vertical movement. After the specimen reaches equilibrium with the addition of water, the technician continues the loading process, usually up to a pressure of about 8 ksf. The specimen is then unloaded in increments, and the test is dismantled. The results of the test are presented in terms of percent volume change versus applied vertical stress. If this test was performed, the results are presented on Plates attached to this appendix.

Compaction Test
Compaction tests provide information on the relationship between moisture content and dry density of the soil compacted in a given manner. The maximum density is obtained for a given compaction effort at an optimum moisture content. Specifications for earthwork are in terms of the unit weight (or dry density) expressed as a percentage of the maximum density, and the moisture content compared to the optimum moisture content. Compaction tests were performed in general accordance with ASTM Test Designation D1557-00 to determine the maximum dry densities and optimum moisture contents of the on-site soils. If this test was performed, the results are presented on Plates attached to this appendix.

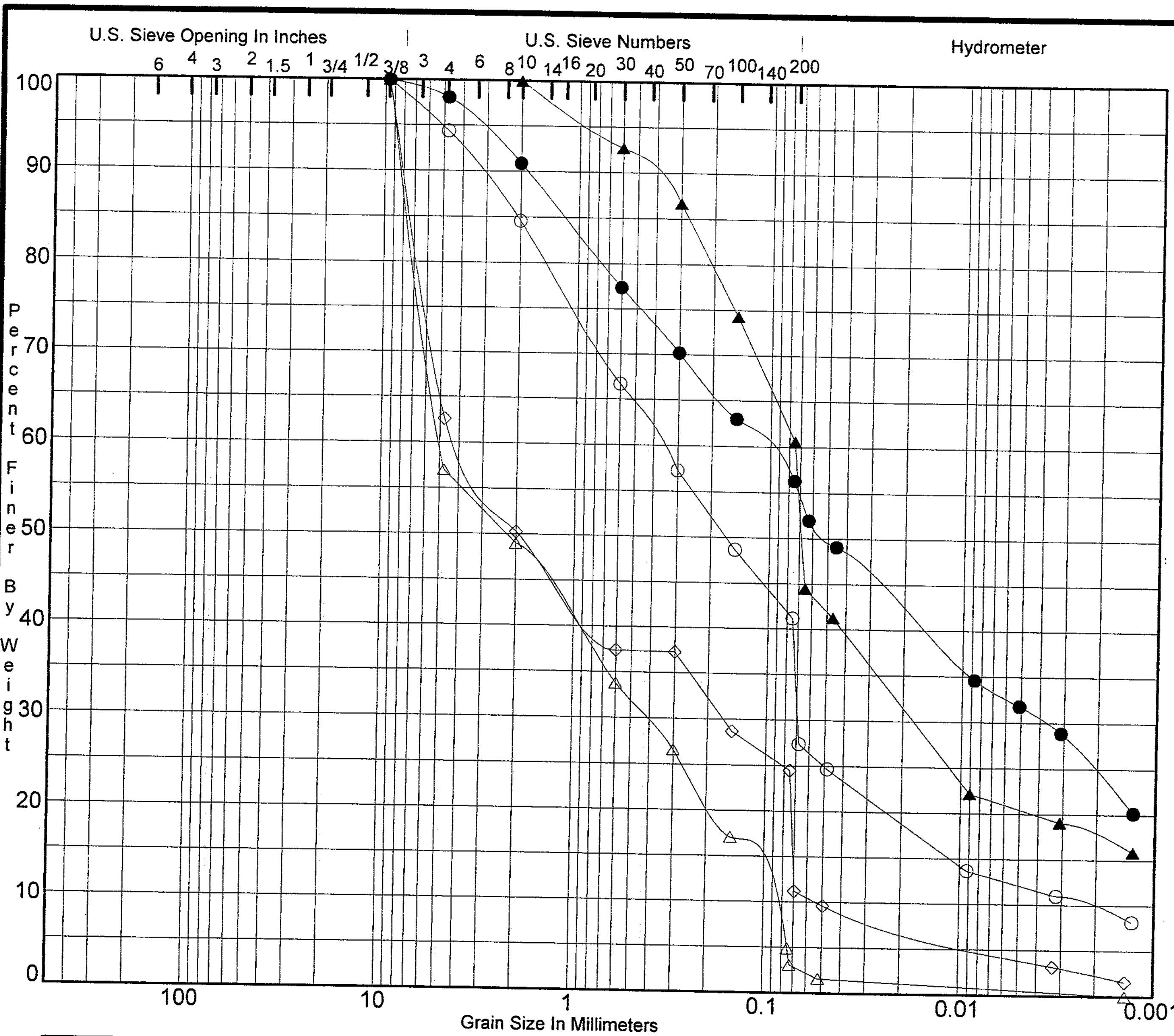
Expansion Index Test
The expansion index test provides an assessment of the potential for expansion or heave that could be detrimental to foundation or slab performance. Expansion Index tests are performed on shallow on-site soils in general accordance with expansion test procedures in ASTM D4829-95. In this test, a specimen is compacted at a degree of saturation between 45 and 55% in a 4.01-inch-diameter, 1.0-inch-high ring. The specimen is subjected to a seating pressure of 144 psf, water is added to the test cell, and swell is monitored until the expansion stops. The volume of swell is converted to an expansion index. Any test results are summarized on the boring logs in Appendix A.

R-Value Test

R-Value tests are performed on shallow on-site soils for use in pavement design. These tests were performed in general accordance with either ASTM D2844-99 California Test Method 301. If this test were performed, the results are summarized on the boring logs in Appendix A.

Sample Remolding

In some cases remolded samples are used when performing direct shear tests and consolidation tests. Samples are remolded to a specified moisture and density by compacting the soil in a 2.42-inch-diameter sample ring. The specified moisture content is either at optimum or a few percentage points above optimum. The specified dry density is usually at a relative compaction of 90%. The required moisture is added to and mixed with dry soil, providing a homogeneous mixture. A 2.42-inch-diameter ring is placed in a 6-inch-diameter compaction mold, and soil is placed in the mold to above the ring. The soil is then compacted with a 5.5-lb hammer with a free-fall drop of 12 inches. The sample is trimmed, and the dry density is determined. If the dry density deviates more than about one pound per cubic foot from the specified dry density, the process is repeated with the number of blows altered to better achieve the specified dry density.



Cobbles	Gravel		Sand			Silt Or Clay
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	MC%	LL	PL	PI	Cc	Cu
○	**B-1**	**3.0**	**Dark Grayish Brown Silty SAND with Gravel**					**5.64**	**157.8**
●	**B-1**	**8.0**	**Dark Grayish Brown Silty Sandy CLAY**						
△	**B-1**	**15.5**	**Yellowish Brown Gravelly SAND**					**0.35**	**49.8**
▲	**B-1**	**20.0**	**Dark Brown Sandy SILT**						
◇	**B-1**	**25.5**	**Grayish Brown Silty SAND with Abundant Gravel**					**0.13**	**73.2**

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
○	**B-1**	**3.0**	**9.50**	**0.37**	**0.069**	**0.0023**	**5.6**	**53.2**	**29.1**	**12.1**
●	**B-1**	**8.0**	**9.50**	**0.11**	**0.004**		**1.9**	**41.8**	**24.6**	**31.7**
△	**B-1**	**15.5**	**9.50**	**4.99**	**0.416**	**0.1002**	**43.0**	**52.1**	**4.3**	**0.6**
▲	**B-1**	**20.0**	**2.00**	**0.07**	**0.018**		**0.0**	**39.4**	**40.1**	**20.5**
◇	**B-1**	**25.5**	**9.50**	**3.96**	**0.167**	**0.0541**	**37.4**	**38.1**	**20.3**	**4.2**

Project **RAD Jefferson - 3475 La Cienega Blvd.**

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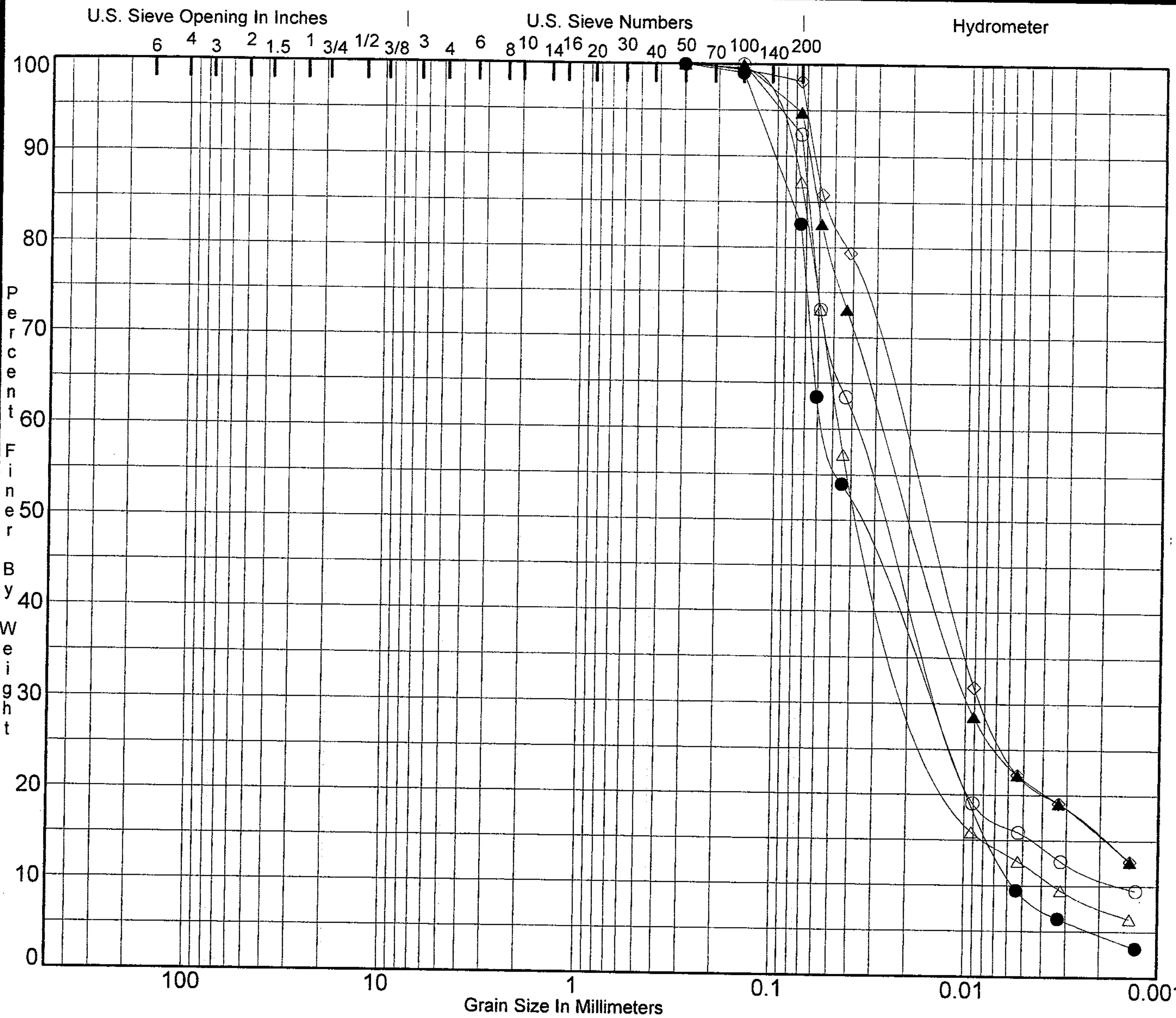
Date **10/9/03**

Gradation Curves

Advanced Geotechnical Services, Inc.

Plate B- 1



Cobbles	Gravel		Sand			Silt Or Clay
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	MC%	LL	PL	PI	Cc	Cu
○	**B-1**	**30.0**	**Grayish Brown Clayey SILT**					**3.12**	**25.4**
●	**B-1**	**40.0**	**Grayish Brown Sandy SILT**					**0.68**	**9.8**
△	**B-1**	**50.0**	**Very Dark Grayish Brown Sandy SILT**					**1.54**	**13.4**
▲	**B-3**	**25.5**	**Dark Gray Clayey SILT**						
◇	**B-3**	**35.5**	**Dark Gray Clayey SILT**						

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
○	**B-1**	**30.0**	**0.15**	**0.04**	**0.013**	**0.0015**	**0.0**	**7.6**	**76.9**	**15.5**
●	**B-1**	**40.0**	**0.30**	**0.05**	**0.014**	**0.0055**	**0.0**	**17.4**	**73.6**	**9.0**
△	**B-1**	**50.0**	**0.30**	**0.05**	**0.016**	**0.0035**	**0.0**	**12.8**	**74.9**	**12.3**
▲	**B-3**	**25.5**	**0.15**	**0.03**	**0.010**		**0.0**	**5.2**	**73.1**	**21.7**
◇	**B-3**	**35.5**	**0.30**	**0.02**	**0.008**		**0.0**	**1.8**	**76.5**	**21.7**

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Gradation Curves

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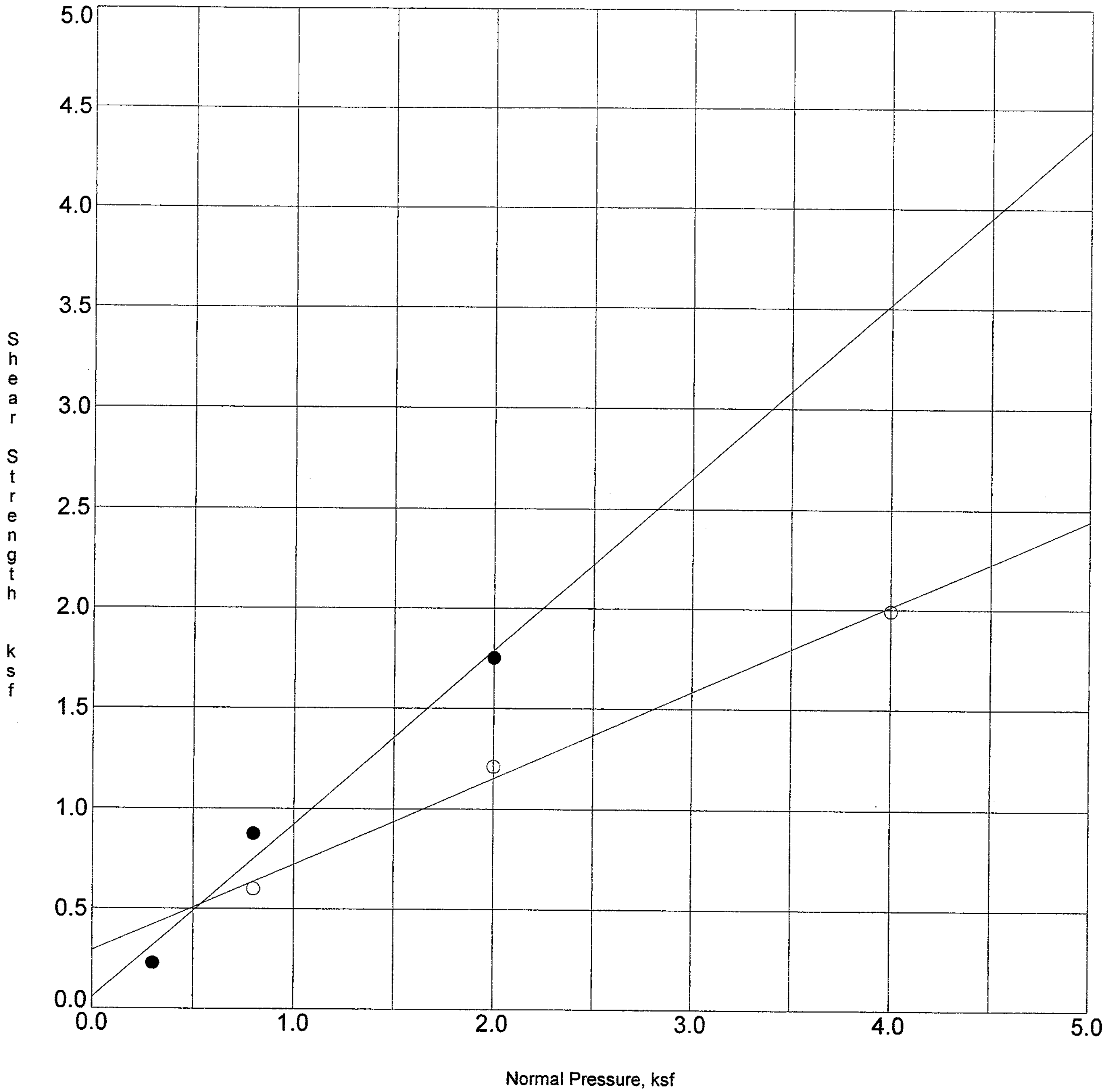
Plate B- 2



○ - Peak Shear ● - Ultimate Shear - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	**B-1**	**3.0**	**Dark Grayish Brown Silty SAND with Gravel**	**117.5**	**12.0**	**0.29**	**23**
●	**B-1**	**3.0**	**(Remolded)**	**117.5**	**14.1**	**0.06**	**41**

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Shear Test Diagram

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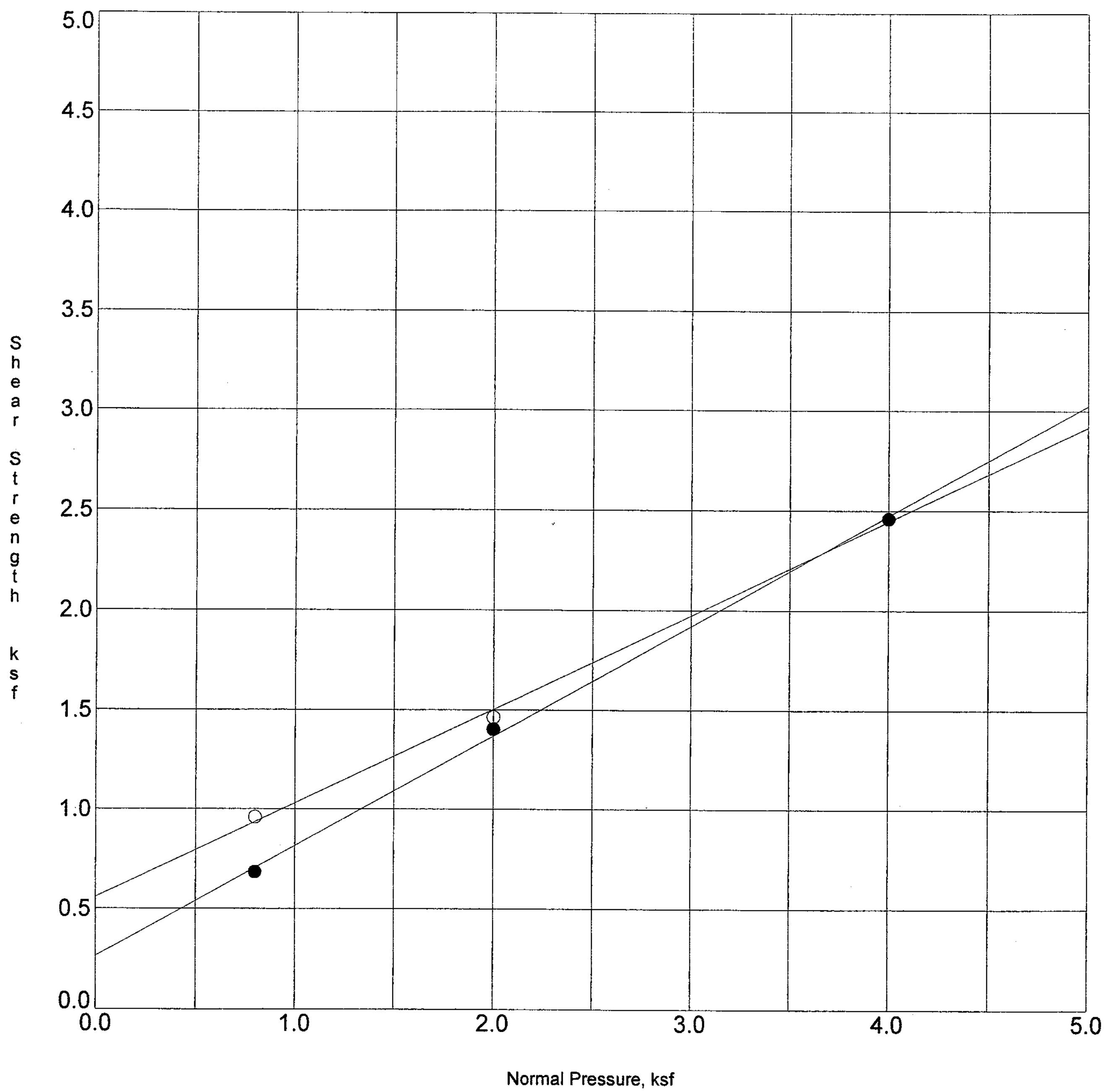
Plate B- 3



○ - Peak Shear ● - Ultimate Shear - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-1	8.0	Dark Grayish Brown Silty Sandy CLAY	97.9	19.4	0.56	25
●	B-1	8.0		97.9	21.4	0.26	29

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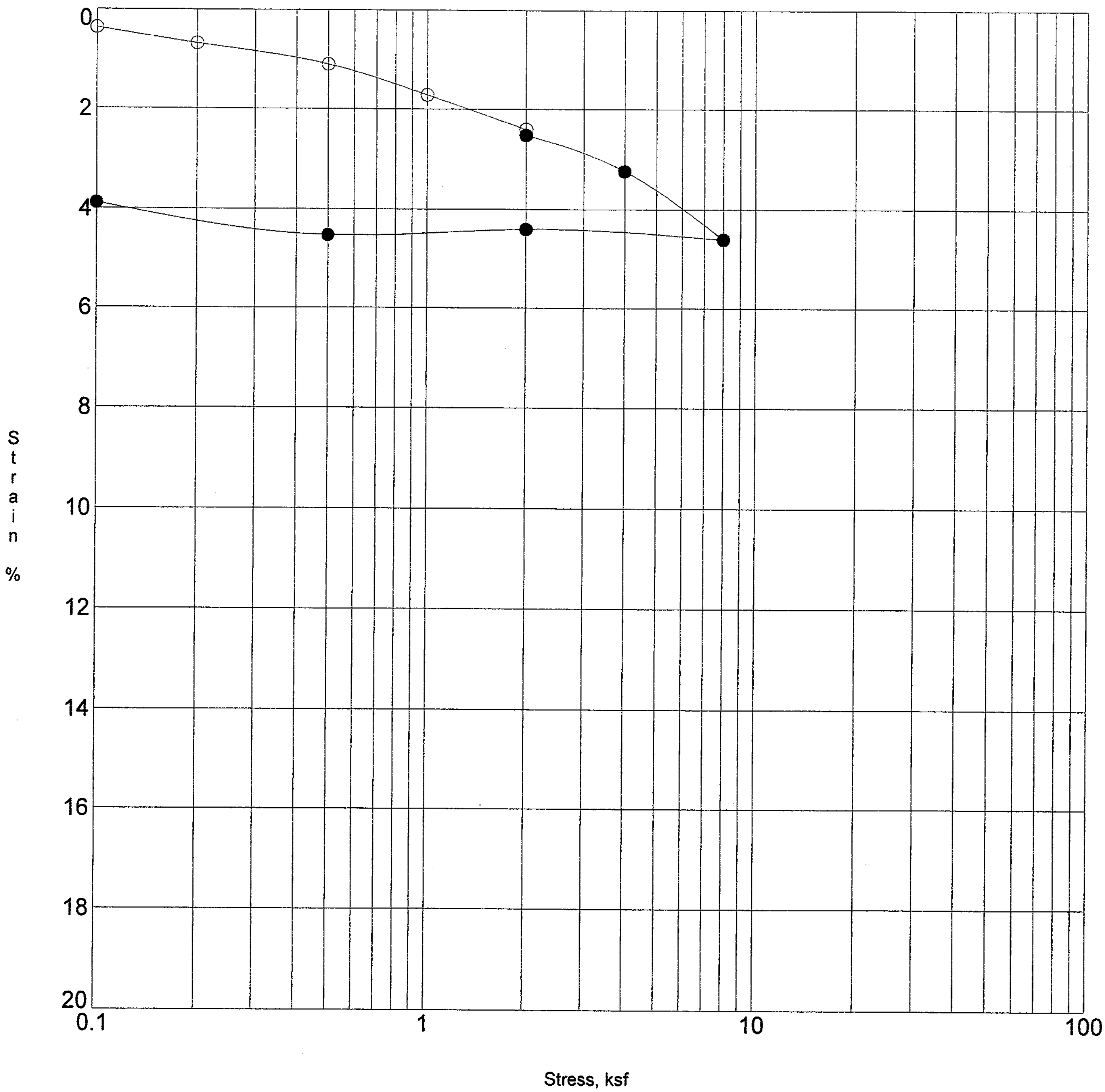
Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 4



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	**B-1**	**3.0**	**Dark Grayish Brown Silty SAND with Gravel**	**116.7**	**12.8**
●	**B-1**	**3.0**	**(Remolded)**	**121.4**	**14.2**

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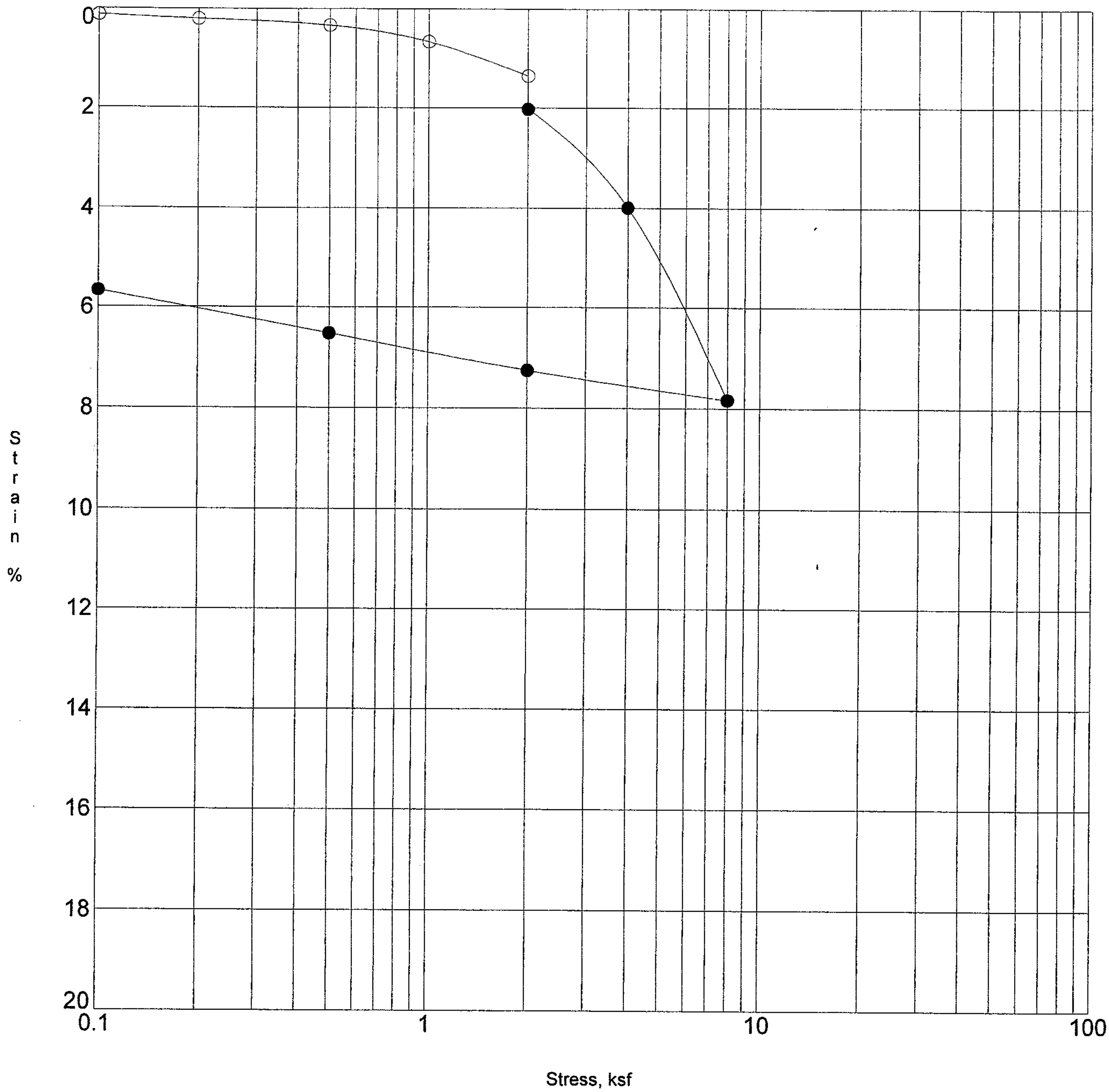
Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 5



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-1	8.0	Dark Grayish Brown Silty Sandy CLAY	96.0	20.7
●	B-1	8.0		101.7	27.6

Project RAD Jefferson - 3475 La Cienega Blvd.

Client No. 3224
Date 10/9/03

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 6

Job No. 3224 Date 10/9/03

Project RAD Jefferson - 3475 La Cienega Blvd.

Source of Material **B-1 3.0**

Description of Material **Dark Grayish Brown Silty SAND with Gravel**

Test Method **1557A**

Test Results

Maximum Dry Density	**130.0 pcf**
Optimum Water Content	**10.5 %**

Atterberg Limits

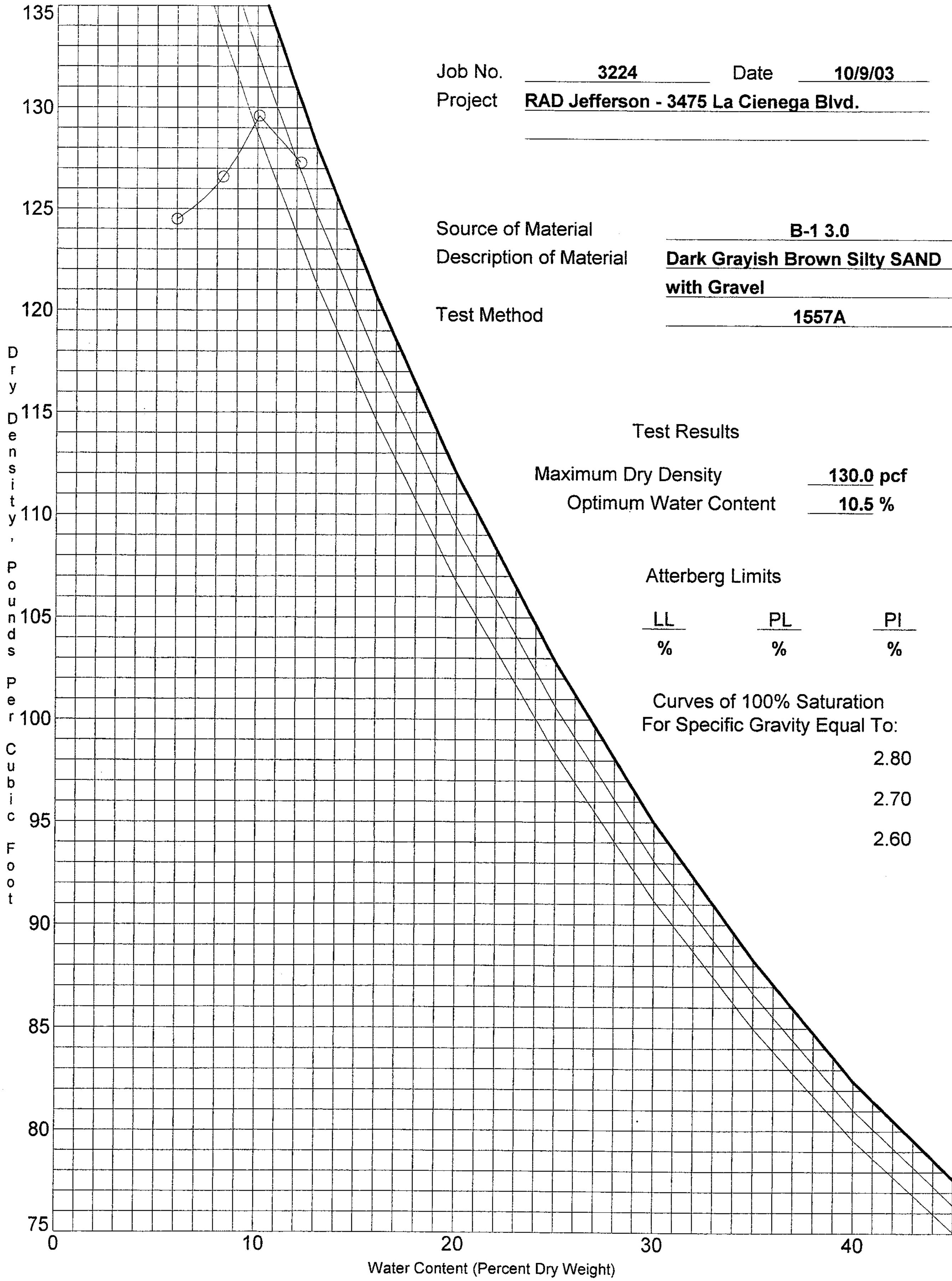
LL	PL	PI
%	%	%

Curves of 100% Saturation
For Specific Gravity Equal To:

2.80

2.70

2.60



Moisture-Density Relationship

Appendix C

Seismicity Study

Seismicity Study

An evaluation of the seismicity of the site was made using a computer database of faults and related seismic data. Each of these programs is briefly described below, and the output is included in this appendix.

UBCSEIS
The program UBCSEIS (Blake, 1998c) evaluates the seismic parameters for the 1997 Uniform Building Code. The International Conference of Building Officials (ICBO) released *Maps of Known Active Fault Near-Surface Zones in California and Adjacent Portions of Nevada* to be used with the 1997 Uniform Building Code. list of faults. The faults in this document differ slightly from the faults in the California Division of Mines and Geology fault database. For our analysis with UBCSEIS, we have used a fault data file similar to those in the ICBO map book. For analyses with EQFAULT, EQSEARCH, and FRISKSP, we have used the CDMG fault database.

EQFAULT
The program EQFAULT (Blake, 1995b) estimates the peak horizontal ground acceleration at a specified site using a data base of up to 150 digitized California faults and specified attenuation relationships. *Maximum credible* and *maximum probable* earthquakes are assigned to each fault. If a fault is found within a user-selected radius, the closest distance between the site and digitized fault is computed and then the specified attenuation relationship is used to compute the peak ground acceleration or the repeatable high ground acceleration (RGHA). Modified Mercalli intensities are also computed for the site for each fault. The output consist of a map showing the locations of the faults and a tabulation of the magnitude, acceleration, and site intensities for both the maximum credible and maximum probable event for each fault as well as the distance between the fault and the site. The results of EQFAULT is a deterministic analysis of the seismicity of the site.

EQSEARCH
The program EQSEARCH (Blake, 1995a) also estimates the peak horizontal ground acceleration at a specified site using a database of historical earthquakes and specified attenuation relationships. If the fault of an earthquake is found within a user-selected radius, the closest distance between the site and digitized fault is computed and then the specified attenuation relationship is used to compute the peak ground acceleration or the repeatable high ground acceleration (RGHA). Modified Mercalli intensities are also computed for the site for each earthquake.

Based on the historically estimated accelerations, the program computes the probability of exceedance for site-specific peak horizontal accelerations. The probability analyses are based on each earthquake being an independent, random event and the historical distribution of epicenters being representative of the future distributions of epicenters.

The output consist of a map showing the locations of the epicenters and a tabulation of the latitude, longitude, date and time of the event, depth, magnitude, site acceleration, site intensity, and magnitude, acceleration, and the distance between the fault and the site for each event. The results of EQSEARCH is a probabilistic analysis of the seismicity of the site, and a tabulation of the probability of exceedance of both acceleration and magnitude are included for several exposure periods.

FRISK
The program FRISKSP (Blake, 1998a) estimates the probabilistic seismic hazard at a site using faults within a specified distance from the site. As with the other two programs, the user selects attenuation relations and then the specified attenuation relationships are used to compute the peak ground acceleration or the repeatable high ground acceleration (RGHA), and when the option is exercised uniform hazard spectra are generated. FRISKSP models earthquake sources as three-dimensional surfaces and evaluates the site-specified probabilities of exceedance of

given peak horizontal acceleration levels for each source. The underlying assumption is that moderate to large earthquakes occur on Quaternary faults and that the occurrence rate of earthquakes on each fault is proportional to the Quaternary fault-slip-rate. The length of rupture of the fault as a function of earthquake magnitude is accounted for, and ground motion estimates are made for the closest distance between the site and fault rupture zone. The program accounts for uncertainty in the earthquake magnitude, the rupture area, the location of the rupture zone on the fault, the maximum possible magnitude of earthquakes, and the acceleration at the site given the magnitude of earthquake and the distance between the rupture zone and site. The probability distribution functions used are a characteristic earthquake distribution that can be used to model a step-truncated exponential distribution for earthquake magnitude, a lognormal distribution for rupture area given a magnitude, a uniform distribution for rupture location on the faults, and a lognormal distribution for site acceleration given the magnitude of the earthquake and distance between the rupture zone and site. The expected numbers from all sources are summed to obtain the average annual expected number of occurrences of an acceleration greater than each of the requested values.

The output consist of a map showing the locations of the faults within the study area and a tabulation of information for each fault and summary tables of the risk levels and the distances between each fault and the site. The results of FRISKSP is a probabilistic analysis of the seismicity of the site.

OUTPUT

The output from the above three computer programs is included below. The first figure, California fault map, shows the location of the site, California faults, and a circle representing the area searched. The second figure, generated by EQSEARCH, is a map that shows the locations of the epicenters of earthquakes in the study area between 1800 and the present. The third figure is a map showing the location of the site and the faults within the study area that was used by the program FRISKSP.

The fourth figure shows the relationship between number of events per year and the earthquake magnitude. This is generated by EQSEARCH and is called the seismic recurrence curve. The fifth figure, generated by EQFAULT, shows the relationship between the peak horizontal acceleration and the distance between the site and the epicenter. This figure includes two graphs. One graph is for maximum credible conditions and the other is for maximum probable conditions. The sixth and seventh figures, which are from the output of FRISKSP, show relationship between the probability of exceedance and different levels of ground acceleration for several exposure periods. The sixth figure is based on the mean attenuation response plus one standard deviation without magnitude weighting, and the seventh figure is for the mean attenuation response plus one standard deviation with magnitude weighting.

The eighth and ninth figures, which are also from FRISKSP, show the relationship between the average return period for different levels of acceleration. The eighth figure is based on the mean attenuation response plus one standard deviation without magnitude weighting, and the ninth figure is for the mean attenuation response plus one standard deviation with magnitude weighting.

If the option in FRISKSP was exercised to generate uniform hazard spectra, tripartite plots of uniform hazard spectra are generated along with graphs showing the relationships between the probability of exceedance and pseudo-relative velocity and between return period and pseudo-relative velocity. These graphs are included as the last group of figures.

Following the figures are the tabulated results from each of the four computer programs, presented in the order described above.

UBCSEIS

Version 1.03

COMPUTATION OF 1997
UNIFORM BUILDING CODE
SEISMIC DESIGN PARAMETERS

JOB NUMBER: 3224 DATE: 10-09-2003

JOB NAME: 3475 La Cienega

FAULT-DATA-FILE NAME: CDMGUBCR.DAT

SITE COORDINATES:
SITE LATITUDE: 34.0245
SITE LONGITUDE: 118.3758

UBC SEISMIC ZONE: 0.4

UBC SOIL PROFILE TYPE: SD

NEAREST TYPE A FAULT:
NAME: CUCAMONGA
DISTANCE: 59.0 km

NEAREST TYPE B FAULT:
NAME: NEWPORT-INGLEWOOD (L.A.Basin)
DISTANCE: 1.1 km

NEAREST TYPE C FAULT:
NAME: [illegible]
DISTANCE: 99999.0 km

SELECTED UBC SEISMIC COEFFICIENTS:
Na: 1.3
Nv: 1.6
Ca: 0.57
Cv: 1.02
Ts: 0.716
To: 0.143

CAUTION: The digitized data points used to model faults are limited in number and have been digitized from small-scale maps (e.g., 1:750,000 scale). Consequently, the estimated fault-site-distances may be in error by several kilometers. Therefore, it is important that the distances be carefully checked for accuracy and adjusted as needed, before they are used in design.

SUMMARY OF FAULT PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
NEWPORT-INGLEWOOD (L.A.Basin)	1.1	B	6.9	1.00	SS
SANTA MONICA	7.0	B	6.6	1.00	DS
HOLLYWOOD	7.1	B	6.5	1.00	DS
MALIBU COAST	14.5	B	6.7	0.30	DS
PALOS VERDES	16.2	B	7.1	3.00	SS
RAYMOND	17.8	B	6.5	0.50	DS
VERDUGO	19.8	B	6.7	0.50	DS
SIERRA MADRE (Central)	25.6	B	7.0	3.00	DS
SIERRA MADRE (San Fernando)	28.3	B	6.7	2.00	DS
ANACAPA-DUME	29.7	B	7.3	3.00	DS
ELSINORE-WHITTIER	33.3	B	6.8	2.50	SS
SAN GABRIEL	33.8	B	7.0	1.00	SS
SANTA SUSANA	34.2	B	6.6	5.00	DS
CLAMSHELL-SAWPIT	38.3	B	6.5	0.50	DS
HOLSER	43.1	B	6.5	0.40	DS
SAN JOSE	44.5	B	6.5	0.50	DS
SIMI-SANTA ROSA	48.9	B	6.7	1.00	DS
OAK RIDGE (Onshore)	49.4	B	6.9	4.00	DS
CHINO-CENTRAL AVE. (Elsinore)	54.3	B	6.7	1.00	DS
SAN CAYETANO	58.0	B	6.8	6.00	DS
CUCAMONGA	59.0	A	7.0	5.00	DS
SAN ANDREAS - 1857 Rupture	63.4	A	7.8	34.00	SS
NEWPORT-INGLEWOOD (Offshore)	64.3	B	6.9	1.50	SS
ELSINORE-GLEN IVY	70.7	B	6.8	5.00	SS
SANTA YNEZ (East)	77.7	B	7.0	2.00	SS
VENTURA - PITAS POINT	79.0	B	6.8	1.00	DS
SAN JACINTO-SAN BERNARDINO	83.6	B	6.7	12.00	SS
SAN ANDREAS - Southern	84.3	A	7.4	24.00	SS
M.RIDGE-ARROYO PARIDA-SANTA ANA	88.1	B	6.7	0.40	DS
CLEGHORN	89.8	B	6.5	3.00	SS
RED MOUNTAIN	93.3	B	6.8	2.00	DS
CORONADO BANK	93.7	B	7.4	3.00	SS
GARLOCK (West)	101.3	A	7.1	6.00	SS
PLEITO THRUST	102.3	B	6.8	2.00	DS
ELSINORE-TEMECULA	103.8	B	6.8	5.00	SS
SAN JACINTO-SAN JACINTO VALLEY	105.0	B	6.9	12.00	SS
SANTA CRUZ ISLAND	105.1	B	6.8	1.00	DS
BIG PINE	105.4	B	6.7	0.80	SS
NORTH FRONTAL FAULT ZONE (West)	105.7	B	7.0	1.00	DS
SANTA YNEZ (West)	126.8	B	6.9	2.00	SS
WHITE WOLF	128.5	B	7.2	2.00	DS
HELENDALE - S. LOCKHARDT	128.6	B	7.1	0.60	SS
ROSE CANYON	132.6	B	6.9	1.50	SS
SAN JACINTO-ANZA	138.1	A	7.2	12.00	SS
SANTA ROSA ISLAND	141.1	B	6.9	1.00	DS
LENWOOD-LOCKHART-OLD WOMAN SPRGS	141.9	B	7.3	0.60	SS

SUMMARY OF FAULT PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
GARLOCK (East)	143.9	A	7.3	7.00	SS
ELSINORE-JULIAN	144.8	A	7.1	5.00	SS
NORTH FRONTAL FAULT ZONE (East)	146.6	B	6.7	0.50	DS
PINTO MOUNTAIN	152.4	B	7.0	2.50	SS
GRAVEL HILLS - HARPER LAKE	159.4	B	6.9	0.60	SS
LANDERS	164.6	B	7.3	0.60	SS
JOHNSON VALLEY (Northern)	165.7	B	6.7	0.60	SS
BLACKWATER	167.4	B	6.9	0.60	SS
LOS ALAMOS-W. BASELINE	169.6	B	6.8	0.70	DS
So. SIERRA NEVADA	171.1	B	7.1	0.10	DS
CALICO - HIDALGO	172.0	B	7.1	0.60	SS
EMERSON So. - COPPER MTN.	178.5	B	6.9	0.60	SS
BURNT MTN.	181.8	B	6.5	0.60	SS
EUREKA PEAK	183.0	B	6.5	0.60	SS
SAN JACINTO-COYOTE CREEK	183.3	B	6.8	4.00	SS
LIONS HEAD	187.0	B	6.6	0.02	DS
LITTLE LAKE	188.4	B	6.7	0.70	SS
EARTHQUAKE VALLEY	190.1	B	6.5	2.00	SS
SAN JUAN	192.2	B	7.0	1.00	SS
SAN LUIS RANGE (S. Margin)	194.5	B	7.0	0.20	DS
PISGAH-BULLION MTN.-MESQUITE LK	195.3	B	7.1	0.60	SS
CASMALIA (Orcutt Frontal Fault)	204.0	B	6.5	0.25	DS
TANK CANYON	207.5	B	6.5	1.00	DS
ELSINORE-COYOTE MOUNTAIN	219.8	B	6.8	4.00	SS
SAN JACINTO - BORREGO	221.0	B	6.6	4.00	SS
PANAMINT VALLEY	221.9	B	7.2	2.50	SS
OWL LAKE	223.6	B	6.5	2.00	SS
LOS OSOS	223.8	B	6.8	0.50	DS
HOSGRI	232.9	B	7.3	2.50	SS
RINCONADA	242.9	B	7.3	1.00	SS
OWENS VALLEY	243.5	B	7.6	1.50	SS
DEATH VALLEY (South)	252.2	B	6.9	4.00	SS
SUPERSTITION MTN. (San Jacinto)	253.6	B	6.6	5.00	SS
BRAWLEY SEISMIC ZONE	257.3	B	6.5	25.00	SS
ELMORE RANCH	257.3	B	6.6	1.00	SS
SUPERSTITION HILLS (San Jacinto)	259.5	B	6.6	4.00	SS
DEATH VALLEY (Graben)	268.3	B	6.9	4.00	DS
ELSINORE-LAGUNA SALADA	271.5	B	7.0	3.50	SS
INDEPENDENCE	276.7	B	6.9	0.20	DS
HUNTER MTN. - SALINE VALLEY	285.9	B	7.0	2.50	SS
IMPERIAL	286.5	A	7.0	20.00	SS
SAN ANDREAS (Creeping)	298.1	B	5.0	34.00	SS
DEATH VALLEY (Northern)	312.5	A	7.2	5.00	SS
BIRCH CREEK	328.2	B	6.5	0.70	DS
WHITE MOUNTAINS	336.4	B	7.1	1.00	SS
DEEP SPRINGS	357.7	B	6.6	0.80	DS

SUMMARY OF FAULT PARAMETERS

Page 3

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
ROUND VALLEY (E. of S.N.Mtns.)	358.9	B	6.8	1.00	DS
FISH SLOUGH	370.9	B	6.6	0.20	DS
DEATH VALLEY (N. of Cucamongo)	371.4	A	7.0	5.00	SS
ORTIGALITA	383.1	B	6.9	1.00	SS
HILTON CREEK	383.6	B	6.7	2.50	DS
CALAVERAS (So.of Calaveras Res)	387.7	B	6.2	15.00	SS
MONTEREY BAY - TULARCITOS	390.1	B	7.1	0.50	DS
PALO COLORADO - SUR	391.6	B	7.0	3.00	SS
QUIEN SABE	401.1	B	6.5	1.00	SS
HARTLEY SPRINGS	405.2	B	6.6	0.50	DS
ZAYANTE-VERGELES	419.2	B	6.8	0.10	SS
SAN ANDREAS (1906)	424.4	A	7.9	24.00	SS
SARGENT	424.6	B	6.8	3.00	SS
MONO LAKE	439.9	B	6.6	2.50	DS
SAN GREGORIO	465.0	A	7.3	5.00	SS
ROBINSON CREEK	470.1	B	6.5	0.50	DS
MONTE VISTA - SHANNON	474.4	B	6.5	0.40	DS
HAYWARD (SE Extension)	474.8	B	6.5	3.00	SS
GREENVILLE	475.2	B	6.9	2.00	SS
CALAVERAS (No.of Calaveras Res)	494.6	B	6.8	6.00	SS
HAYWARD (Total Length)	494.6	A	7.1	9.00	SS
ANTELOPE VALLEY	509.0	B	6.7	0.80	DS
GENOA	532.1	B	6.9	1.00	DS
CONCORD - GREEN VALLEY	542.8	B	6.9	6.00	SS
RODGERS CREEK	581.0	A	7.0	9.00	SS
WEST NAPA	582.3	B	6.5	1.00	SS
POINT REYES	598.9	B	6.8	0.30	DS
HUNTING CREEK - BERRYESSA	605.4	B	6.9	6.00	SS
MAACAMA (South)	643.7	B	6.9	9.00	SS
COLLAYOMI	661.0	B	6.5	0.60	SS
BARTLETT SPRINGS	665.3	A	7.1	6.00	SS
MAACAMA (Central)	685.1	A	7.1	9.00	SS
MAACAMA (North)	744.8	A	7.1	9.00	SS
ROUND VALLEY (N. S.F.Bay)	751.9	B	6.8	6.00	SS
BATTLE CREEK	782.5	B	6.5	0.50	DS
LAKE MOUNTAIN	810.1	B	6.7	6.00	SS
GARBERVILLE-BRICELAND	826.5	B	6.9	9.00	SS
MENDOCINO FAULT ZONE	881.8	A	7.4	35.00	DS
LITTLE SALMON (Onshore)	889.7	A	7.0	5.00	DS
MAD RIVER	893.3	B	7.1	0.70	DS
CASCADIA SUBDUCTION ZONE	894.9	A	8.3	35.00	DS
McKINLEYVILLE	903.6	B	7.0	0.60	DS
TRINIDAD	905.3	B	7.3	2.50	DS
FICKLE HILL	905.4	B	6.9	0.60	DS
TABLE BLUFF	910.1	B	7.0	0.60	DS
LITTLE SALMON (Offshore)	923.5	B	7.1	1.00	DS

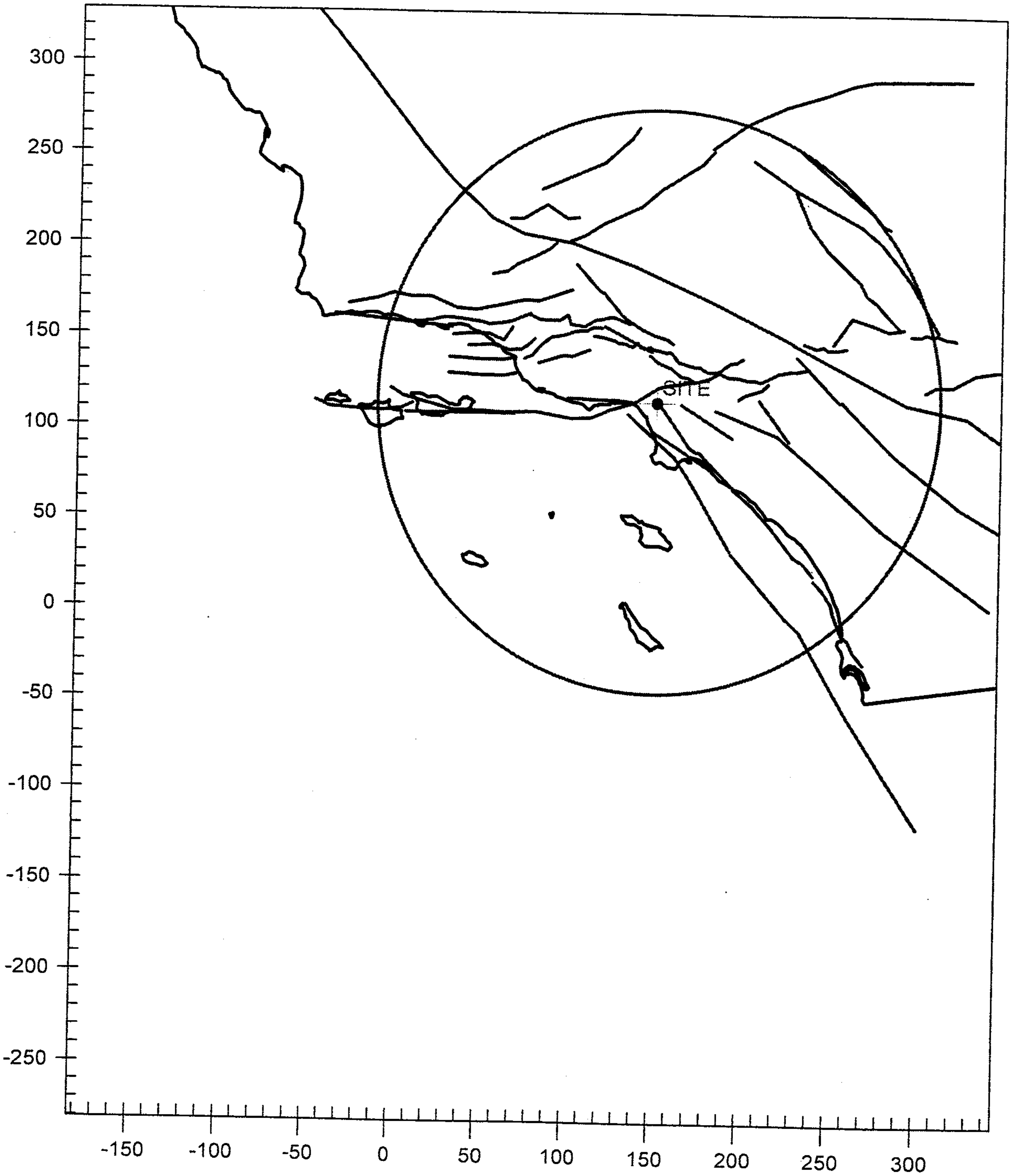
SUMMARY OF FAULT PARAMETERS

Page 4

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
BIG LAGOON - BALD MTN.FLT.ZONE	942.4	B	7.3	0.50	DS

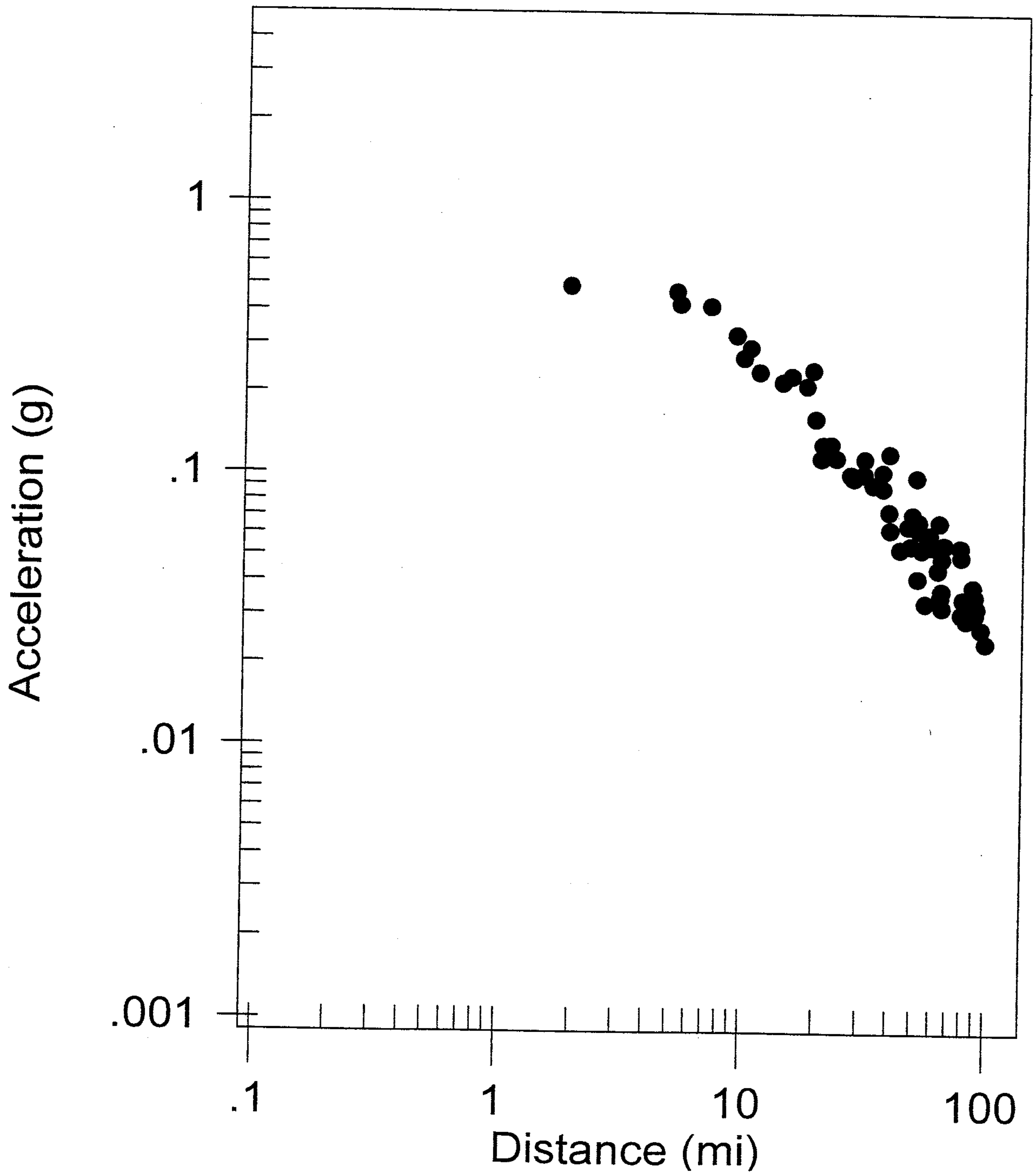
CALIFORNIA FAULT MAP

3475 La Cienega

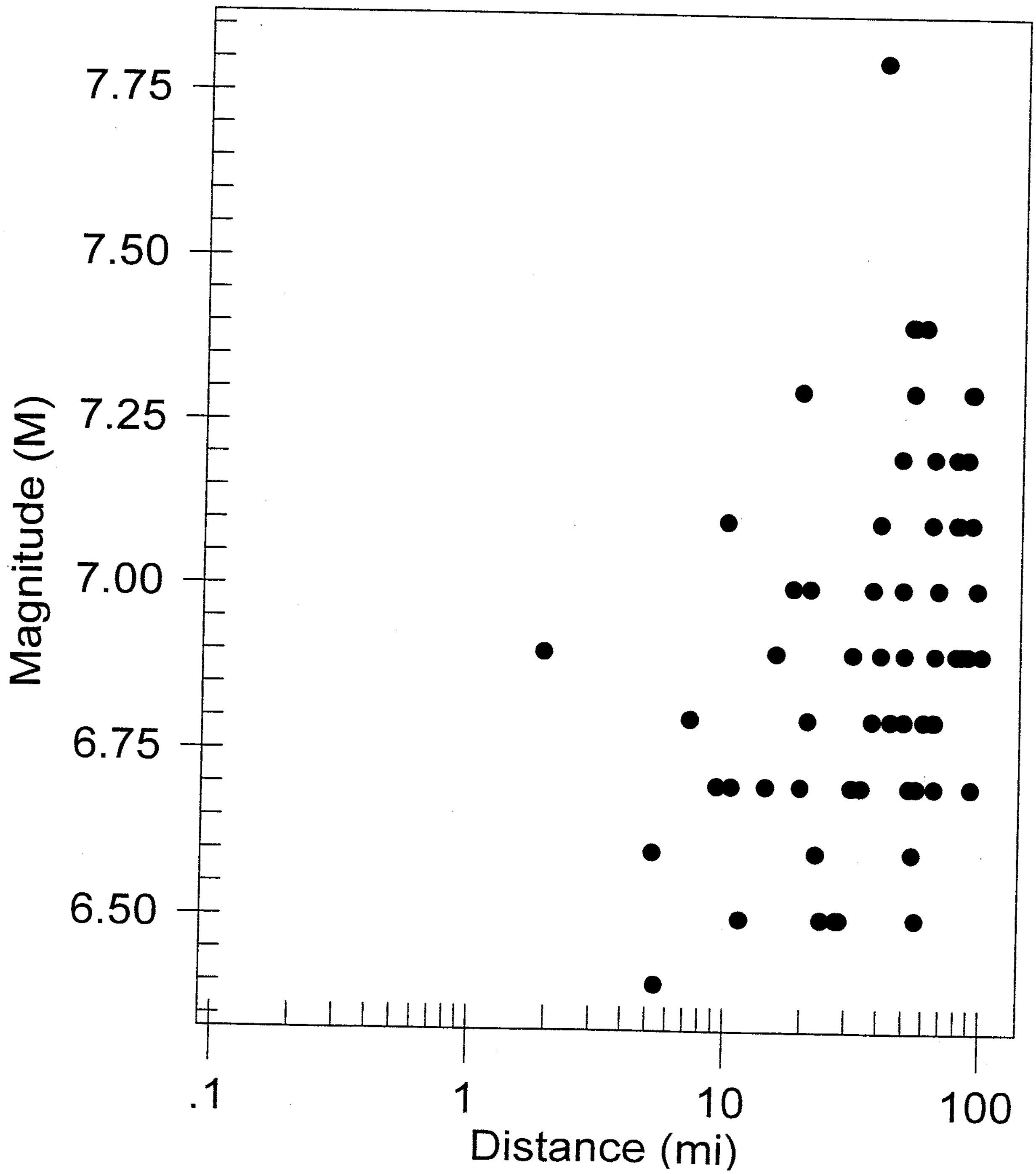


MAXIMUM EARTHQUAKES

3475 La Cienega

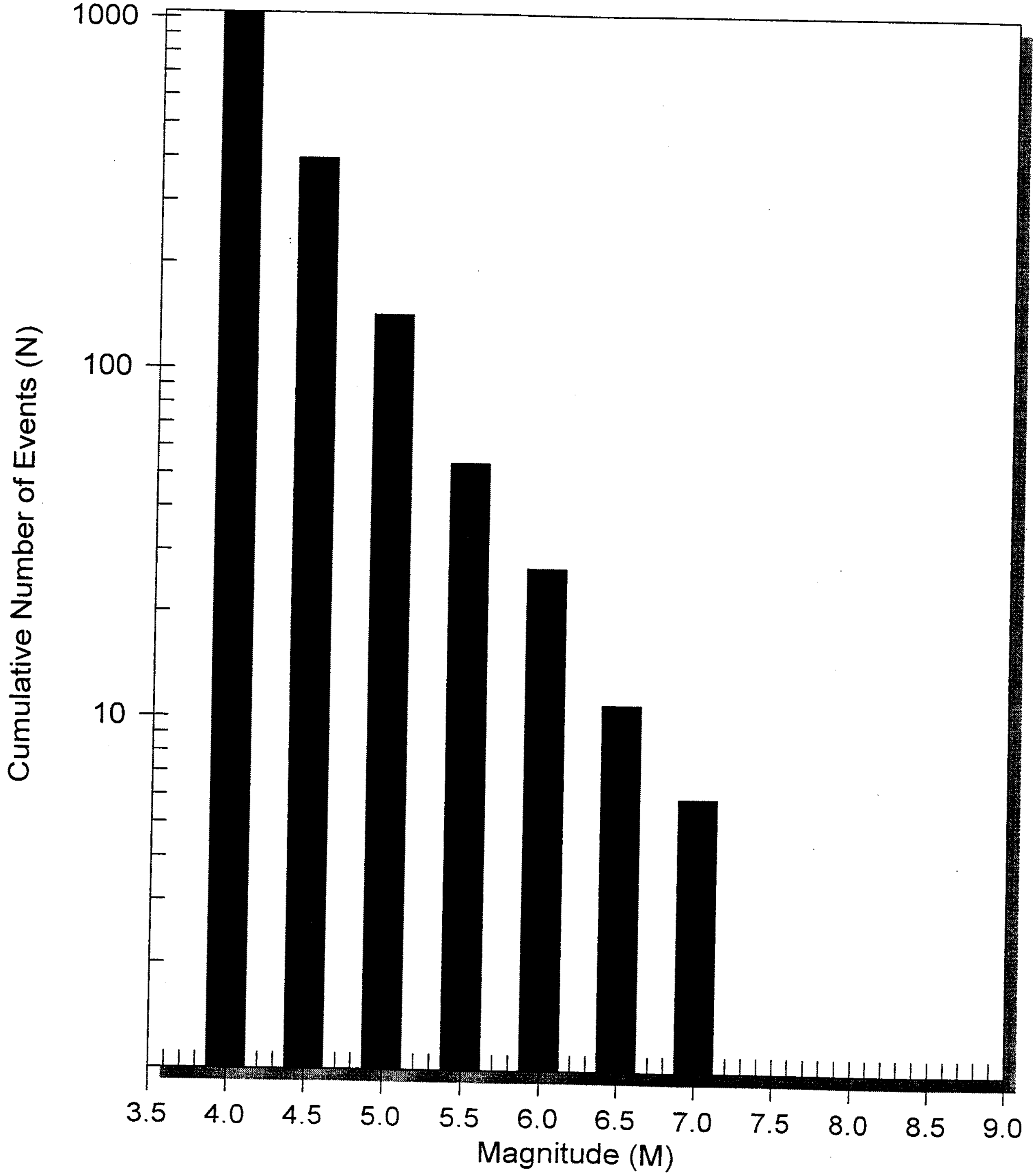


EARTHQUAKE MAGNITUDES & DISTANCES
3475 La Cienega



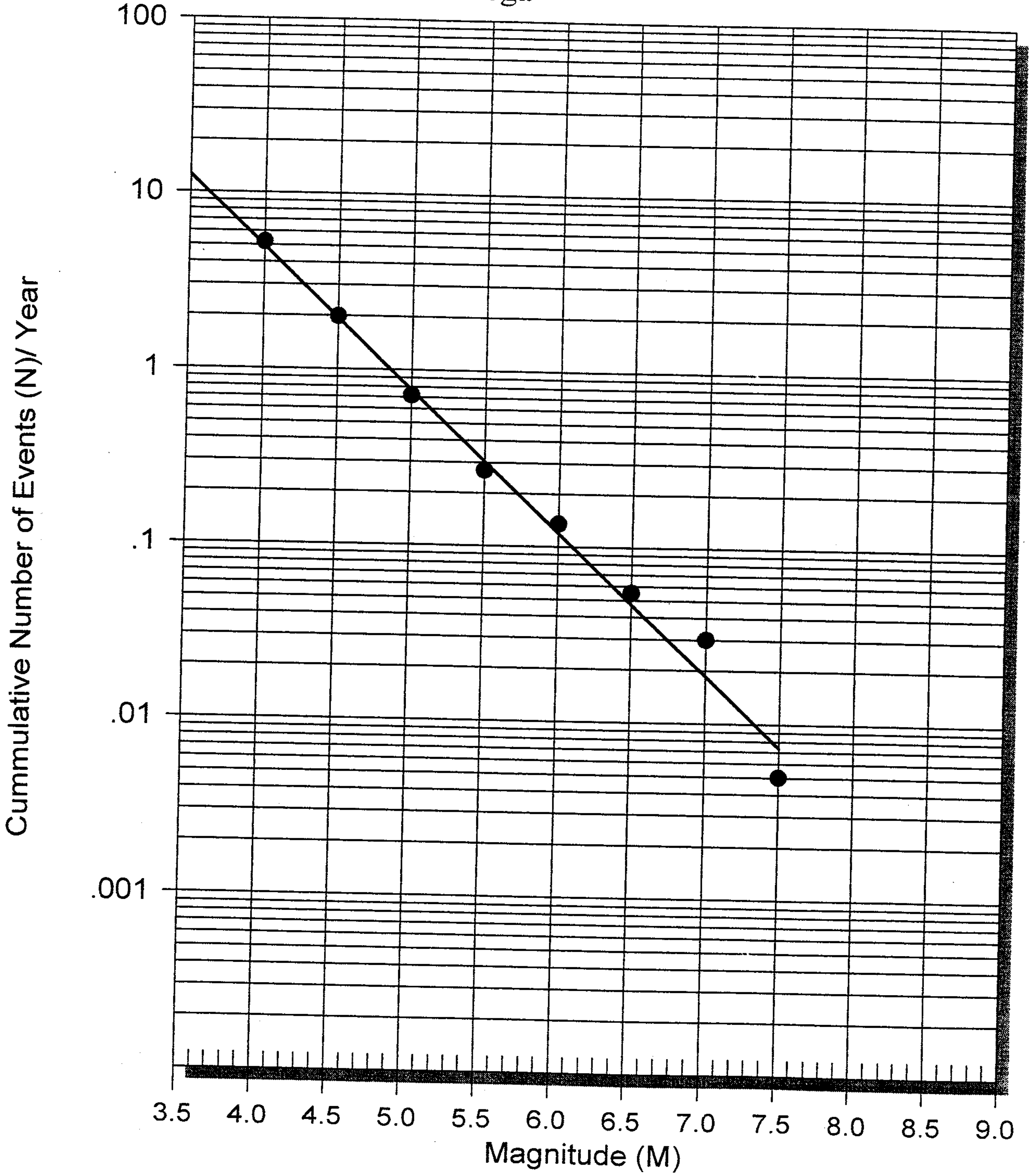
Number of Earthquakes (N) Above Magnitude (M)

3475 La Cienega



EARTHQUAKE RECURRENCE CURVE

3475 La Cienega



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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 3224

DATE: 10-09-2003

JOB NAME: 3475 La Cienega

CALCULATION NAME:

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 34.0245
SITE LONGITUDE: 118.3758

SEARCH RADIUS: 100 mi

ATTENUATION RELATION: 10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km   Campbell SSR: 0   Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
NEWPORT-INGLEWOOD (L.A.Basin)	1.9(3.1)	6.9	0.491	X
SANTA MONICA	5.2(8.4)	6.6	0.470	X
HOLLYWOOD	5.4(8.7)	6.4	0.423	X
COMPTON THRUST	7.2(11.6)	6.8	0.417	X
MALIBU COAST	9.2(14.8)	6.7	0.326	IX
PALOS VERDES	9.9(15.9)	7.1	0.269	IX
ELYSIAN PARK THRUST	10.5(16.9)	6.7	0.293	IX
RAYMOND	11.5(18.5)	6.5	0.239	IX
VERDUGO	14.3(23.0)	6.7	0.219	IX
NORTHRIDGE (E. Oak Ridge)	15.5(25.0)	6.9	0.231	IX
SIERRA MADRE	18.0(28.9)	7.0	0.213	VIII
ANACAPA-DUME	19.1(30.7)	7.3	0.243	IX
SIERRA MADRE (San Fernando)	19.6(31.5)	6.7	0.161	VIII
WHITTIER	20.8(33.4)	6.8	0.115	VII
SAN GABRIEL	21.1(33.9)	7.0	0.129	VIII
SANTA SUSANA	22.7(36.6)	6.6	0.130	VIII
CLAMSHELL-SAWPIT	23.9(38.5)	6.5	0.116	VII
HOLSER	27.4(44.1)	6.5	0.100	VII
SAN JOSE	28.2(45.4)	6.5	0.097	VII
SIMI-SANTA ROSA	31.0(49.9)	6.7	0.101	VII
OAK RIDGE (Onshore)	31.1(50.1)	6.9	0.115	VII
CHINO-CENTRAL AVE. (Elsinore)	33.9(54.5)	6.7	0.092	VII
CUCAMONGA	37.1(59.7)	7.0	0.103	VII
SAN CAYETANO	37.2(59.8)	6.8	0.089	VII
SAN ANDREAS - 1857 Rupture	39.4(63.4)	7.8	0.120	VII
SAN ANDREAS - Mojave	39.4(63.4)	7.1	0.073	VII
NEWPORT-INGLEWOOD (Offshore)	40.0(64.3)	6.9	0.063	VI
ELSINORE-GLEN IVY	43.9(70.7)	6.8	0.053	VI
SAN ANDREAS - Carrizo	47.3(76.2)	7.2	0.065	VI
SANTA YNEZ (East)	48.6(78.2)	7.0	0.055	VI
OAK RIDGE(Blind Thrust Offshore)	49.4(79.5)	6.9	0.072	VI
VENTURA - PITAS POINT	49.5(79.6)	6.8	0.066	VI
CHANNEL IS. THRUST (Eastern)	51.1(82.3)	7.4	0.098	VII
SAN JACINTO-SAN BERNARDINO	52.0(83.7)	6.7	0.042	VI
SAN ANDREAS - Southern	52.4(84.3)	7.4	0.067	VI
SAN ANDREAS - San Bernardino	52.4(84.3)	7.3	0.063	VI
MONTALVO-OAK RIDGE TREND	53.9(86.8)	6.6	0.053	VI
M.RIDGE-ARROYO PARIDA-SANTA ANA	55.7(89.6)	6.7	0.055	VI
CLEGHORN	55.9(89.9)	6.5	0.034	V
CORONADO BANK	58.2(93.7)	7.4	0.060	VI

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
RED MOUNTAIN	59.1(95.1)	6.8	0.055	VI
GARLOCK (West)	63.0(101.4)	7.1	0.045	VI
PLEITO THRUST	63.6(102.4)	7.2	0.067	VI
ELSINORE-TEMECULA	64.5(103.8)	6.8	0.036	V
SAN JACINTO-SAN JACINTO VALLEY	65.2(105.0)	6.9	0.038	V
SANTA CRUZ ISLAND	65.3(105.1)	6.8	0.049	VI
BIG PINE	65.5(105.4)	6.7	0.033	V
NORTH FRONTAL FAULT ZONE (West)	66.8(107.5)	7.0	0.055	VI
WHITE WOLF	77.7(125.1)	7.2	0.054	VI
NORTH CHANNEL SLOPE	78.4(126.1)	7.1	0.050	VI
SANTA YNEZ (West)	78.8(126.8)	6.9	0.031	V
HELENDALE - S. LOCKHARDT	79.9(128.6)	7.1	0.035	V
ROSE CANYON	82.4(132.6)	6.9	0.029	V
SAN JACINTO-ANZA	85.8(138.1)	7.2	0.035	V
SANTA ROSA ISLAND	87.7(141.1)	6.9	0.039	V
LENWOOD-LOCKHART-OLD WOMAN SPRGS	88.2(142.0)	7.3	0.036	V
GARLOCK (East)	89.4(143.9)	7.3	0.036	V
ELSINORE-JULIAN	90.0(144.8)	7.1	0.031	V
NORTH FRONTAL FAULT ZONE (East)	91.0(146.5)	6.7	0.033	V
PINTO MOUNTAIN	94.7(152.4)	7.0	0.027	V
GRAVEL HILLS - HARPER LAKE	99.0(159.4)	6.9	0.024	V

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-END OF SEARCH- 61 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE NEWPORT-INGLEWOOD (L.A.Basin) FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.9 MILES (3.1 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.4913 g

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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 3224

DATE: 10-09-2003

JOB NAME: 3475 La Cienega

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

SITE COORDINATES:
SITE LATITUDE: 34.0245
SITE LONGITUDE: 118.3758

SEARCH DATES:
START DATE: 1800
END DATE: 1999

SEARCH RADIUS:
100.0 mi
160.9 km

ATTENUATION RELATION: 10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
SCOND: 0 Depth Source: A
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 3.0

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	34.0000	118.4000	02/22/1920	1610 0.0	0.0	4.60	0.188	VIII	2.2(3.5)
MGI	34.0000	118.4000	10/01/1930	040 0.0	0.0	4.60	0.188	VIII	2.2(3.5)
MGI	34.0000	118.4000	01/29/1927	2324 0.0	0.0	4.00	0.141	VIII	2.2(3.5)
MGI	34.0000	118.4000	02/07/1927	429 0.0	0.0	4.60	0.188	VIII	2.2(3.5)
DMG	34.0000	118.4170	12/07/1938	338 0.0	0.0	4.00	0.132	VIII	2.9(4.7)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.221	IX	4.7(7.5)
MGI	34.0000	118.3000	06/22/1920	2035 0.0	0.0	4.00	0.109	VII	4.7(7.5)
MGI	34.0000	118.3000	06/30/1920	350 0.0	0.0	4.00	0.109	VII	4.7(7.5)
DMG	33.9830	118.3000	02/11/1940	192410.0	0.0	4.00	0.102	VII	5.2(8.4)
MGI	34.1000	118.3000	07/26/1920	1215 0.0	0.0	4.00	0.086	VII	6.8(10.9)
MGI	34.1000	118.3000	07/16/1920	2127 0.0	0.0	4.60	0.116	VII	6.8(10.9)
MGI	34.1000	118.3000	07/16/1920	2130 0.0	0.0	4.60	0.116	VII	6.8(10.9)
MGI	34.1000	118.3000	07/16/1920	2022 0.0	0.0	4.60	0.116	VII	6.8(10.9)
DMG	34.0000	118.5000	06/22/1920	248 0.0	0.0	4.90	0.128	VIII	7.3(11.8)
DMG	34.0000	118.5000	03/06/1918	1820 0.0	0.0	4.00	0.081	VII	7.3(11.8)
MGI	34.0000	118.5000	03/08/1918	1230 0.0	0.0	4.00	0.081	VII	7.3(11.8)
MGI	34.0000	118.5000	06/23/1920	1220 0.0	0.0	4.00	0.081	VII	7.3(11.8)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.136	VIII	7.3(11.8)
DMG	34.0000	118.5000	11/08/1914	1140 0.0	0.0	4.50	0.104	VII	7.3(11.8)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.136	VIII	7.3(11.8)
T-A	34.0000	118.2500	05/04/1857	6 0 0.0	0.0	4.30	0.093	VII	7.4(11.9)
T-A	34.0000	118.2500	09/23/1827	0 0 0.0	0.0	5.00	0.134	VIII	7.4(11.9)
T-A	34.0000	118.2500	01/17/1857	1 0 0.0	0.0	4.30	0.093	VII	7.4(11.9)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.134	VIII	7.4(11.9)
T-A	34.0000	118.2500	05/02/1856	810 0.0	0.0	4.30	0.093	VII	7.4(11.9)
T-A	34.0000	118.2500	03/21/1880	1425 0.0	0.0	4.30	0.093	VII	7.4(11.9)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.134	VIII	7.4(11.9)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.131	VIII	7.6(12.3)
DMG	33.9030	118.4310	11/29/1938	192115.8	10.0	4.00	0.069	VI	9.0(14.4)
MGI	34.0000	118.2000	06/26/1917	2120 0.0	0.0	4.60	0.084	VII	10.2(16.4)
MGI	34.0000	118.2000	06/26/1917	424 0.0	0.0	4.00	0.062	VI	10.2(16.4)
MGI	34.0000	118.2000	06/26/1917	2115 0.0	0.0	4.60	0.084	VII	10.2(16.4)
MGI	34.0000	118.2000	06/26/1917	2130 0.0	0.0	4.60	0.084	VII	10.2(16.4)
MGI	34.0000	118.2000	02/13/1917	13 5 0.0	0.0	4.60	0.084	VII	10.2(16.4)
DMG	33.8830	118.3170	03/11/1933	1457 0.0	0.0	4.90	0.097	VII	10.3(16.6)
GSP	34.0200	118.1800	06/12/1989	172225.5	16.0	4.10	0.060	VI	11.2(18.0)
GSP	34.0300	118.1800	06/12/1989	165718.4	16.0	4.40	0.069	VI	11.2(18.0)
MGI	34.1000	118.2000	01/27/1860	830 0.0	0.0	4.30	0.065	VI	11.3(18.2)
MGI	34.1000	118.2000	05/02/1916	1432 0.0	0.0	4.00	0.056	VI	11.3(18.2)
MGI	34.1000	118.2000	04/21/1921	1538 0.0	0.0	4.00	0.056	VI	11.3(18.2)
DMG	33.9390	118.2050	01/11/1950	214135.0	0.4	4.10	0.059	VI	11.4(18.4)
MGI	33.9000	118.2000	10/08/1927	1914 0.0	0.0	4.60	0.066	VI	13.2(21.3)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.080	VII	13.6(21.8)
DMG	33.8500	118.2670	03/11/1933	629 0.0	0.0	4.40	0.058	VI	13.6(21.8)
DMG	33.8670	118.2170	06/19/1944	3 6 7.0	0.0	4.40	0.056	VI	14.2(22.8)
DMG	33.8670	118.2170	06/19/1944	0 333.0	0.0	4.50	0.059	VI	14.2(22.8)
DMG	33.8670	118.2000	11/13/1933	2128 0.0	0.0	4.00	0.044	VI	14.8(23.8)
DMG	33.9500	118.1330	10/25/1933	7 046.0	0.0	4.30	0.051	VI	14.8(23.8)
GSP	34.2150	118.5100	01/19/1994	140914.8	17.0	4.50	0.055	VI	15.2(24.5)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.085	VII	15.3(24.7)
T-A	34.1700	118.1700	03/07/1888	1554 0.0	0.0	4.30	0.049	VI	15.5(24.9)
DMG	33.9500	118.6320	08/31/1930	04036.0	0.0	5.20	0.079	VII	15.5(25.0)
PAS	34.0490	118.1010	10/01/1987	144541.5	13.6	4.70	0.059	VI	15.8(25.4)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.196	VIII	15.9(25.7)
PAS	34.0600	118.1000	10/01/1987	1449 5.9	11.7	4.70	0.058	VI	16.0(25.7)
DMG	33.8000	118.3000	11/03/1931	16 5 0.0	0.0	4.00	0.040	V	16.1(25.9)
MGI	33.8000	118.3000	12/31/1928	1045 0.0	0.0	4.00	0.040	V	16.1(25.9)
PAS	33.9190	118.6270	01/19/1989	65328.8	11.9	5.00	0.068	VI	16.1(25.9)
GSP	34.2450	118.4710	01/18/1994	155144.9	12.0	4.00	0.040	V	16.2(26.0)
PAS	34.1490	118.1350	12/03/1988	113826.4	13.3	4.90	0.064	VI	16.2(26.1)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.080	VII	16.2(26.1)
PAS	34.0520	118.0900	10/01/1987	151231.8	10.8	4.70	0.057	VI	16.5(26.5)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.147	VIII	16.6(26.7)
PAS	34.0500	118.0870	10/01/1987	155953.5	10.4	4.00	0.039	V	16.6(26.7)
PAS	34.0760	118.0900	10/01/1987	1448 3.1	11.7	4.10	0.041	V	16.7(26.9)
DMG	33.7830	118.4170	11/01/1940	725 3.0	0.0	4.00	0.039	V	16.8(27.1)
DMG	33.7830	118.4170	11/02/1940	25826.0	0.0	4.00	0.039	V	16.8(27.1)
DMG	33.7830	118.4170	10/14/1940	205111.0	0.0	4.00	0.039	V	16.8(27.1)
DMG	33.7830	118.4170	10/12/1940	024 0.0	0.0	4.00	0.039	V	16.8(27.1)
DMG	33.8170	118.2170	10/22/1941	65718.5	0.0	4.90	0.061	VI	17.0(27.3)
MGI	33.8000	118.5000	06/18/1915	15 5 0.0	0.0	4.00	0.038	V	17.1(27.4)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.110	VII	17.2(27.6)
DMG	34.2680	118.4450	08/30/1964	225737.1	15.4	4.00	0.038	V	17.3(27.8)
PAS	33.9330	118.6690	10/17/1979	205237.3	5.5	4.20	0.040	V	17.9(28.9)
DMG	33.9000	118.1000	07/08/1929	1646 6.7	13.0	4.70	0.052	VI	18.0(28.9)
GSP	34.2280	118.5730	01/17/1994	175608.2	19.0	4.60	0.049	VI	18.0(29.0)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.076	VII	18.2(29.2)
DMG	33.7670	118.4500	10/11/1940	55712.3	0.0	4.70	0.051	VI	18.3(29.4)
PAS	33.9440	118.6810	01/01/1979	231438.9	11.3	5.00	0.060	VI	18.3(29.5)
GSP	34.2930	118.3890	12/06/1994	034834.5	9.0	4.50	0.045	VI	18.5(29.9)
DMG	33.7700	118.4800	04/24/1931	182754.8	0.0	4.40	0.043	VI	18.6(29.9)
GSP	34.2540	118.5450	01/17/1994	130627.9	0.0	4.60	0.048	VI	18.6(29.9)
GSP	34.2610	118.5340	01/17/1994	123939.8	14.0	4.50	0.045	VI	18.7(30.0)
GSP	34.2180	118.6070	01/18/1994	113509.9	12.0	4.20	0.038	V	18.8(30.2)
GSP	34.2870	118.4660	01/19/1994	071406.2	11.0	4.00	0.035	V	18.8(30.3)
DMG	33.9670	118.0500	01/30/1941	13446.9	0.0	4.10	0.036	V	19.1(30.7)
PAS	34.0770	118.0470	02/11/1988	152555.7	12.5	4.70	0.049	VI	19.2(30.8)
GSP	34.2920	118.4660	01/19/1994	144635.2	6.0	4.00	0.034	V	19.2(30.9)
GSB	34.2990	118.4280	01/23/1994	085508.7	6.0	4.20	0.037	V	19.2(30.9)
GSP	34.2910	118.4760	02/06/1994	131926.9	11.0	4.10	0.036	V	19.3(31.0)
GSP	34.2990	118.4390	02/03/1994	162335.4	8.0	4.20	0.037	V	19.3(31.0)
DMG	34.2730	118.5320	06/21/1971	16 1 8.5	4.1	4.00	0.034	V	19.3(31.1)
GSP	34.2970	118.4580	01/21/1994	185344.6	7.0	4.30	0.039	V	19.4(31.2)
DMG	34.2960	118.4640	03/30/1971	85443.3	2.6	4.10	0.035	V	19.4(31.2)
DMG	33.7830	118.2000	12/27/1939	192849.0	0.0	4.70	0.048	VI	19.5(31.3)
GSP	34.3010	118.4520	01/21/1994	185244.2	7.0	4.30	0.039	V	19.6(31.5)
DMG	33.7590	118.2530	08/31/1938	31814.2	10.0	4.50	0.043	VI	19.6(31.6)
GSB	34.3000	118.4660	01/21/1994	183915.3	10.0	4.70	0.047	VI	19.7(31.7)
DMG	34.2860	118.5150	03/31/1971	145222.5	2.1	4.60	0.045	VI	19.7(31.7)
GSP	34.3110	118.3980	06/15/1994	055948.6	7.0	4.20	0.036	V	19.8(31.9)
GSP	34.3120	118.3930	05/25/1994	125657.1	7.0	4.40	0.040	V	19.9(32.0)
DMG	34.2840	118.5280	04/02/1971	54025.0	3.0	4.00	0.033	V	19.9(32.0)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.061	VI	20.1(32.3)
GSP	34.3040	118.4730	01/17/1994	150703.2	2.0	4.20	0.036	V	20.1(32.3)
DMG	34.2650	118.5770	04/15/1971	111432.0	4.2	4.20	0.036	V	20.2(32.5)
GSP	34.2740	118.5630	01/27/1994	171958.8	14.0	4.60	0.044	VI	20.3(32.6)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	34.3110	118.4560	01/17/1994	193534.3	2.0	4.00	0.032	V	20.3(32.7)
GSP	34.2690	118.5760	01/17/1994	125546.8	16.0	4.10	0.034	V	20.4(32.8)
GSB	34.3100	118.4740	01/21/1994	184228.8	7.0	4.20	0.035	V	20.5(33.0)
GSP	34.3170	118.4550	01/17/1994	132644.7	2.0	4.70	0.045	VI	20.7(33.3)
GSP	34.3310	118.4420	01/17/1994	141430.3	1.0	4.50	0.039	V	21.5(34.6)
MGI	34.0000	118.0000	05/05/1929	1 7 0.0	0.0	4.60	0.041	V	21.6(34.7)
MGI	34.0000	118.0000	05/05/1929	735 0.0	0.0	4.00	0.030	V	21.6(34.7)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.051	VI	21.6(34.7)
DMG	34.3350	118.3310	02/09/1971	155820.7	14.2	4.80	0.046	VI	21.6(34.7)
DMG	33.7830	118.1330	01/13/1940	749 7.0	0.0	4.00	0.030	V	21.7(34.9)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.064	VI	21.7(34.9)
DMG	33.7830	118.1330	11/20/1933	1032 0.0	0.0	4.00	0.030	V	21.7(34.9)
DMG	34.3390	118.3320	02/09/1971	141612.9	11.1	4.10	0.031	V	21.9(35.2)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.056	VI	21.9(35.3)
DMG	33.7500	118.1830	08/04/1933	41748.0	0.0	4.00	0.030	V	21.9(35.3)
GSP	34.2780	118.6110	01/29/1994	121656.4	2.0	4.30	0.034	V	22.1(35.5)
MGI	34.1000	118.0000	01/27/1930	2026 0.0	0.0	4.60	0.040	V	22.1(35.6)
GSG	34.3340	118.4840	01/17/1994	223152.1	10.0	4.20	0.032	V	22.2(35.8)
DMG	33.7500	118.1670	05/16/1933	205855.0	0.0	4.00	0.029	V	22.4(36.1)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.051	VI	22.6(36.3)
GSB	34.3190	118.5580	01/18/1994	132444.1	1.0	4.50	0.037	V	22.8(36.8)
GSB	34.2850	118.6240	01/17/1994	135602.4	19.0	4.70	0.041	V	22.9(36.9)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.088	VII	22.9(36.9)
DMG	34.3570	118.4060	02/09/1971	141950.2	11.8	4.00	0.028	V	23.0(37.0)
DMG	33.9960	117.9750	06/15/1967	458 5.5	10.0	4.10	0.030	V	23.0(37.0)
DMG	34.3530	118.4560	03/07/1971	13340.5	3.3	4.50	0.036	V	23.1(37.2)
DMG	33.7670	118.1170	11/04/1939	2141 0.0	0.0	4.00	0.028	V	23.1(37.3)
DMG	33.7500	118.1330	03/11/1933	11 4 0.0	0.0	4.60	0.038	V	23.5(37.8)
DMG	34.3560	118.4740	03/25/1971	2254 9.9	4.6	4.20	0.030	V	23.6(37.9)
DMG	34.3610	118.3060	02/09/1971	141021.5	5.0	4.70	0.039	V	23.6(37.9)
GSP	34.3570	118.4800	02/25/1994	125912.6	1.0	4.10	0.029	V	23.7(38.2)
DMG	34.3680	118.3140	04/25/1971	1448 6.5	-2.0	4.00	0.027	V	24.0(38.6)
DMG	34.3610	118.4870	02/10/1971	143526.7	4.4	4.20	0.030	V	24.1(38.8)
DMG	34.3700	118.3020	02/10/1971	31212.0	0.8	4.00	0.027	V	24.2(39.0)
GSB	34.3450	118.5520	01/24/1994	041518.8	6.0	4.80	0.040	V	24.3(39.1)
MGI	34.2000	118.0000	01/09/1921	530 0.0	0.0	4.60	0.036	V	24.7(39.7)
DMG	34.1000	118.8000	05/10/1911	1340 0.0	0.0	4.00	0.026	V	24.8(39.9)
PAS	34.3800	118.4590	08/12/1977	21926.1	9.5	4.50	0.033	V	25.0(40.2)
DMG	34.3870	118.3640	02/09/1971	143917.8	-1.6	4.00	0.026	V	25.0(40.3)
DMG	33.6630	118.4130	01/08/1967	738 5.3	17.7	4.00	0.026	V	25.0(40.3)
GSP	34.3740	118.4950	01/28/1994	200953.4	0.0	4.20	0.029	V	25.1(40.3)
DMG	34.3840	118.4550	02/10/1971	113134.6	6.0	4.20	0.028	V	25.2(40.6)
DMG	33.7500	118.0830	03/11/1933	2 5 0.0	0.0	4.30	0.030	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	2 4 0.0	0.0	4.90	0.041	V	25.3(40.7)
DMG	33.7500	118.0830	03/14/1933	1219 0.0	0.0	4.50	0.033	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	611 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.051	VI	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	740 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/21/1933	326 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	1738 0.0	0.0	4.50	0.033	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	311 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1944 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/16/1933	1530 0.0	0.0	4.10	0.027	V	25.3(40.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7500	118.0830	03/11/1933	635 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	347 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/15/1933	432 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	436 0.0	0.0	4.60	0.035	V	25.3(40.7)
DMG	33.7500	118.0830	03/14/1933	036 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	513 0.0	0.0	4.70	0.037	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	439 0.0	0.0	4.90	0.041	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	6 1 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/14/1933	2242 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	835 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	524 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	553 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	3 5 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/15/1933	540 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	515 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.043	VI	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	210 0.0	0.0	4.60	0.035	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	211 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/19/1933	2123 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	759 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	832 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	227 0.0	0.0	4.60	0.035	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	837 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/23/1933	840 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/25/1933	1346 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	257 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/31/1933	1049 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1653 0.0	0.0	4.80	0.039	V	25.3(40.7)
DMG	33.7500	118.0830	04/01/1933	642 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	04/02/1933	1536 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	22 0 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	2354 0.0	0.0	4.50	0.033	V	25.3(40.7)
DMG	33.7500	118.0830	03/13/1933	343 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	339 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1147 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1141 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/13/1933	1532 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/13/1933	1929 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1357 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.046	VI	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	616 0.0	0.0	4.60	0.035	V	25.3(40.7)
DMG	33.7500	118.0830	03/15/1933	2 8 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1547 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	926 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	259 0.0	0.0	4.60	0.035	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	3 9 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1956 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/16/1933	1456 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/16/1933	1529 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	2232 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	216 0.0	0.0	4.80	0.039	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	027 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	751 0.0	0.0	4.20	0.028	V	25.3(40.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7500	118.0830	03/11/1933	222 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	448 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	8 8 0.0	0.0	4.50	0.033	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	546 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.046	VI	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	258 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/30/1933	1225 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	911 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	1651 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	1825 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1129 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	336 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1138 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/13/1933	432 0.0	0.0	4.70	0.037	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	23 5 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/13/1933	617 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	440 0.0	0.0	4.70	0.037	V	25.3(40.7)
DMG	33.7500	118.0830	03/20/1933	1358 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	2128 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	2231 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	521 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	2240 0.0	0.0	4.40	0.031	V	25.3(40.7)
DMG	33.7500	118.0830	03/17/1933	1651 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.043	VI	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1025 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	555 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	1045 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	618 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/18/1933	2052 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	034 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	252 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	04/02/1933	8 0 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/12/1933	15 2 0.0	0.0	4.20	0.028	V	25.3(40.7)
DMG	33.7500	118.0830	03/11/1933	11 0 0.0	0.0	4.00	0.026	V	25.3(40.7)
DMG	33.7500	118.0830	03/23/1933	1831 0.0	0.0	4.10	0.027	V	25.3(40.7)
DMG	34.3920	118.4270	02/21/1971	71511.7	7.2	4.50	0.033	V	25.5(41.1)
GSB	34.3330	118.6230	01/18/1994	072356.0	14.0	4.30	0.029	V	25.6(41.1)
DMG	33.7330	118.1000	03/11/1933	15 9 0.0	0.0	4.40	0.031	V	25.6(41.2)
DMG	33.7330	118.1000	03/11/1933	1447 0.0	0.0	4.40	0.031	V	25.6(41.2)
DMG	33.7330	118.1000	03/11/1933	1350 0.0	0.0	4.40	0.031	V	25.6(41.2)
DMG	34.3960	118.3660	02/10/1971	173855.1	6.2	4.20	0.028	V	25.7(41.3)
GSB	34.3600	118.5710	01/19/1994	044048.0	2.0	4.50	0.032	V	25.7(41.4)
DMG	34.3970	118.4390	02/21/1971	55052.6	6.9	4.70	0.036	V	26.0(41.8)
DMG	34.3990	118.4190	02/10/1971	134953.7	9.7	4.30	0.029	V	26.0(41.8)
DMG	34.3990	118.4730	03/09/1974	05431.9	24.4	4.70	0.035	V	26.4(42.6)
DMG	33.8000	118.0000	10/21/1913	938 0.0	0.0	4.00	0.024	V	26.5(42.7)
DMG	34.3440	118.6360	02/09/1971	143436.1	-2.0	4.90	0.039	V	26.6(42.8)
GSP	34.3790	118.5610	01/18/1994	152346.9	7.0	4.80	0.037	V	26.7(42.9)
GSP	34.3790	118.5630	01/18/1994	003935.0	7.0	4.40	0.030	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 150.0	8.0	4.50	0.031	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 346.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 8 4.0	8.0	4.00	0.024	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 154.0	8.0	4.20	0.027	V	26.7(43.0)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.4110	118.4010	02/09/1971	14 730.0	8.0	4.00	0.024	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 439.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 745.0	8.0	4.50	0.031	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 434.0	8.0	4.20	0.027	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 838.0	8.0	4.50	0.031	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 8 7.0	8.0	4.20	0.027	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 133.0	8.0	4.20	0.027	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.049	VI	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 140.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 4 7.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.096	VII	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 550.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 446.0	8.0	4.20	0.027	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 710.0	8.0	4.00	0.024	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 230.0	8.0	4.30	0.028	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 325.0	8.0	4.40	0.030	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 444.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 231.0	8.0	4.70	0.035	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 2 3.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.066	VI	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 159.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 541.0	8.0	4.10	0.025	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 853.0	8.0	4.60	0.033	V	26.7(43.0)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.066	VI	26.7(43.0)
DMG	34.4110	118.3290	02/10/1971	5 636.0	4.7	4.30	0.028	V	26.8(43.2)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.051	VI	26.9(43.3)
GSB	34.3580	118.6220	01/18/1994	040126.8	1.0	4.50	0.031	V	27.0(43.4)
GSP	34.2500	117.9900	06/28/1991	170055.5	9.0	4.30	0.028	V	27.0(43.4)
GSP	34.3620	118.6150	03/20/1996	073759.8	13.0	4.10	0.025	V	27.0(43.5)
DMG	33.6330	118.4000	10/17/1934	938 0.0	0.0	4.00	0.024	V	27.1(43.6)
GSP	34.3590	118.6290	01/24/1994	055024.3	12.0	4.30	0.028	V	27.2(43.8)
PAS	34.3470	118.6560	04/08/1976	152138.1	14.5	4.60	0.032	V	27.4(44.1)
GSP	34.3630	118.6270	01/24/1994	055421.1	10.0	4.20	0.026	V	27.4(44.1)
GSB	34.3430	118.6660	01/17/1994	234925.4	8.0	4.30	0.027	V	27.5(44.3)
DMG	33.6320	118.4670	01/08/1967	73730.4	11.4	4.00	0.023	IV	27.6(44.4)
GSG	34.3040	118.7220	01/17/1994	221922.3	10.0	4.00	0.023	IV	27.6(44.5)
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.056	VI	27.8(44.7)
DMG	34.4260	118.4140	02/10/1971	518 7.2	5.8	4.50	0.030	V	27.8(44.7)
GSP	34.3740	118.6220	01/17/1994	155410.8	12.0	4.80	0.035	V	27.9(44.9)
DMG	34.4280	118.4130	04/01/1971	15 3 3.6	8.0	4.10	0.024	V	27.9(45.0)
GSP	34.3680	118.6370	01/17/1994	194353.4	13.0	4.10	0.024	V	28.0(45.1)
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.041	V	28.0(45.1)
DMG	34.4310	118.3690	08/14/1974	144555.2	8.2	4.20	0.025	V	28.1(45.2)
DMG	34.4330	118.3980	02/09/1971	144017.4	-2.0	4.10	0.024	V	28.2(45.4)
GSP	34.3040	118.7370	01/19/1994	091310.9	13.0	4.10	0.024	V	28.2(45.5)
DMG	34.3800	118.6230	10/29/1936	223536.1	10.0	4.00	0.023	IV	28.3(45.6)
PAS	33.9650	117.8860	01/01/1976	172012.9	6.2	4.20	0.025	V	28.3(45.6)
GSG	34.4080	118.5590	01/17/1994	200205.4	0.0	4.00	0.023	IV	28.5(45.8)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.040	V	28.6(45.9)
DMG	33.7000	118.0670	02/08/1940	165617.0	0.0	4.00	0.023	IV	28.6(45.9)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.040	V	28.6(45.9)
DMG	33.7000	118.0670	07/20/1940	4 113.0	0.0	4.00	0.023	IV	28.6(45.9)
DMG	33.7500	118.0000	11/16/1934	2126 0.0	0.0	4.00	0.023	IV	28.7(46.2)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.6330	118.2000	11/01/1940	20 046.0	0.0	4.00	0.022	IV	28.8(46.4)
GSP	34.3770	118.6490	04/27/1997	110928.4	15.0	4.80	0.034	V	28.9(46.5)
PDP	34.3970	118.6090	07/22/1999	095724.0	11.0	4.00	0.022	IV	29.0(46.6)
DMG	33.6300	118.2000	09/13/1929	132338.2	0.0	4.00	0.022	IV	29.0(46.7)
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.040	V	29.2(47.0)
DMG	34.4460	118.4360	02/10/1971	185441.7	8.1	4.20	0.024	V	29.3(47.2)
GSP	34.3540	118.7040	05/01/1996	194956.4	14.0	4.10	0.023	IV	29.5(47.4)
DMG	34.2000	117.9000	07/13/1935	105416.5	0.0	4.70	0.031	V	29.8(47.9)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.049	VI	29.8(47.9)
DMG	34.4570	118.4270	02/09/1971	161926.5	-1.0	4.20	0.024	IV	30.0(48.3)
DMG	33.6830	118.0500	03/11/1933	1250 0.0	0.0	4.40	0.026	V	30.1(48.4)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.048	VI	30.1(48.4)
GSP	34.3650	118.7080	01/19/1994	044314.5	12.0	4.10	0.022	IV	30.2(48.6)
PAS	34.4630	118.4090	09/24/1977	212824.3	5.0	4.20	0.023	IV	30.3(48.8)
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.040	V	30.5(49.1)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.036	V	30.5(49.1)
GSP	34.0490	118.9150	02/19/1995	212418.1	15.0	4.30	0.024	V	30.9(49.7)
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.047	VI	31.1(50.0)
MGI	33.8000	117.9000	05/22/1902	740 0.0	0.0	4.30	0.024	IV	31.4(50.5)
DMG	33.6170	118.1170	01/20/1934	2117 0.0	0.0	4.50	0.026	V	31.8(51.2)
DMG	33.6710	118.0120	10/20/1961	223534.2	5.6	4.10	0.021	IV	32.1(51.7)
DMG	33.6800	117.9930	11/20/1961	85334.7	4.4	4.00	0.020	IV	32.4(52.1)
DMG	34.4850	118.5210	07/16/1965	74622.4	15.1	4.00	0.020	IV	32.9(52.9)
DMG	33.5430	118.3400	09/14/1963	35116.2	2.2	4.20	0.021	IV	33.3(53.6)
DMG	34.1000	117.8000	03/31/1931	2033 0.0	0.0	4.00	0.019	IV	33.3(53.7)
DMG	33.6540	117.9940	10/20/1961	194950.5	4.6	4.30	0.022	IV	33.7(54.2)
DMG	33.6650	117.9790	10/20/1961	214240.7	7.2	4.00	0.019	IV	33.7(54.2)
PAS	34.0540	118.9640	04/13/1982	11 212.2	16.6	4.00	0.019	IV	33.7(54.2)
DMG	34.0170	118.9670	04/16/1948	222624.0	0.0	4.70	0.027	V	33.8(54.4)
DMG	33.6590	117.9810	10/20/1961	20 714.5	6.1	4.00	0.019	IV	33.9(54.6)
DMG	33.6170	118.0330	05/21/1938	944 0.0	0.0	4.00	0.019	IV	34.3(55.2)
GSP	34.5000	118.5600	07/05/1991	174157.1	11.0	4.10	0.020	IV	34.5(55.5)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.033	V	34.9(56.1)
DMG	33.6170	118.0170	03/15/1933	111332.0	0.0	4.90	0.029	V	34.9(56.1)
DMG	33.6170	118.0170	10/02/1933	1326 1.0	0.0	4.00	0.018	IV	34.9(56.1)
PAS	33.5380	118.2070	05/25/1982	134430.3	13.7	4.10	0.019	IV	35.0(56.3)
PAS	34.0160	118.9880	10/26/1984	172043.5	13.3	4.60	0.025	V	35.0(56.4)
MGI	33.7000	117.9000	07/08/1902	945 0.0	0.0	4.00	0.018	IV	35.3(56.8)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.030	V	35.6(57.3)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.046	VI	35.8(57.5)
DMG	34.0000	119.0000	09/24/1827	4 0 0.0	0.0	7.00	0.106	VII	35.8(57.5)
DMG	33.6000	118.0170	12/25/1935	1715 0.0	0.0	4.50	0.023	IV	35.8(57.6)
DMG	33.6000	118.0000	03/11/1933	231 0.0	0.0	4.40	0.022	IV	36.4(58.5)
DMG	33.6000	118.0000	03/11/1933	217 0.0	0.0	4.50	0.023	IV	36.4(58.5)
MGI	33.8000	117.8000	05/19/1917	635 0.0	0.0	4.00	0.018	IV	36.4(58.7)
MGI	33.8000	117.8000	11/04/1926	2238 0.0	0.0	4.60	0.024	IV	36.4(58.7)
MGI	33.8000	117.8000	05/19/1917	719 0.0	0.0	4.00	0.018	IV	36.4(58.7)
MGI	33.8000	117.8000	11/07/1926	1948 0.0	0.0	4.60	0.024	IV	36.4(58.7)
MGI	33.8000	117.8000	05/20/1917	945 0.0	0.0	4.00	0.018	IV	36.4(58.7)
MGI	33.8000	117.8000	11/10/1926	1723 0.0	0.0	4.60	0.024	IV	36.4(58.7)
MGI	33.8000	117.8000	11/09/1926	1535 0.0	0.0	4.60	0.024	IV	36.4(58.7)
PAS	34.0060	117.7390	02/18/1989	717 4.8	3.3	4.30	0.020	IV	36.5(58.7)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.065	VI	36.6(58.9)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7670	117.8170	08/22/1936	521 0.0	0.0	4.00	0.017	IV	36.6(58.9)
DMG	33.5610	118.0580	01/15/1937	183547.0	10.0	4.00	0.017	IV	36.8(59.3)
DMG	33.5000	118.2500	06/18/1920	10 8 0.0	0.0	4.50	0.022	IV	36.9(59.4)
DMG	33.8540	117.7520	10/04/1961	22131.6	4.3	4.10	0.018	IV	37.6(60.5)
DMG	34.4170	118.8330	06/01/1946	11 631.0	0.0	4.10	0.018	IV	37.6(60.5)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.049	VI	37.8(60.9)
GSP	34.1100	117.7200	04/17/1990	223227.2	4.0	4.60	0.023	IV	38.0(61.1)
DMG	34.5290	118.6440	02/07/1956	21656.5	16.0	4.20	0.019	IV	38.0(61.2)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.032	V	38.4(61.7)
DMG	33.5170	118.1000	03/22/1941	82240.0	0.0	4.00	0.017	IV	38.4(61.9)
GSP	34.1500	117.7200	03/01/1990	032303.0	11.0	4.70	0.024	IV	38.5(61.9)
GSP	33.9510	117.7090	01/05/1998	181406.5	11.0	4.30	0.019	IV	38.5(62.0)
MGI	34.0000	117.7000	12/03/1929	9 5 0.0	0.0	4.00	0.016	IV	38.7(62.3)
DMG	33.5670	117.9830	04/17/1934	1833 0.0	0.0	4.00	0.016	IV	38.8(62.4)
DMG	33.5670	117.9830	07/07/1937	1112 0.0	0.0	4.00	0.016	IV	38.8(62.4)
PAS	34.1360	117.7090	06/26/1988	15 458.5	7.9	4.60	0.022	IV	38.9(62.6)
GSP	33.6200	117.9000	04/07/1989	200730.2	13.0	4.50	0.021	IV	39.0(62.8)
DMG	33.9900	119.0580	05/29/1955	164335.4	17.4	4.10	0.017	IV	39.1(62.9)
GSP	34.1300	117.7000	03/01/1990	003457.1	4.0	4.00	0.016	IV	39.3(63.3)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.031	V	39.5(63.5)
PAS	33.5080	118.0710	11/20/1988	53928.7	6.0	4.50	0.021	IV	39.7(63.9)
DMG	34.1000	117.6830	01/09/1934	1410 0.0	0.0	4.50	0.021	IV	40.0(64.3)
DMG	34.1000	117.6830	01/18/1934	214 0.0	0.0	4.00	0.016	IV	40.0(64.3)
GSP	34.1400	117.6900	03/02/1990	172625.4	6.0	4.60	0.022	IV	40.0(64.4)
DMG	34.5650	118.1130	02/28/1969	45612.4	5.3	4.30	0.018	IV	40.2(64.7)
DMG	34.5860	118.6130	02/07/1956	31638.6	2.6	4.60	0.021	IV	41.1(66.1)
T-A	34.4200	118.9200	03/29/1917	8 6 0.0	0.0	4.30	0.018	IV	41.4(66.6)
DMG	34.4000	117.8000	02/24/1946	6 752.0	0.0	4.10	0.016	IV	41.9(67.4)
PAS	33.4710	118.0610	02/27/1984	101815.0	6.0	4.00	0.015	IV	42.3(68.0)
PAS	34.3780	119.0350	04/03/1985	4 449.8	27.9	4.00	0.014	IV	44.9(72.2)
DMG	33.9500	117.5830	04/11/1941	12024.0	0.0	4.00	0.014	IV	45.7(73.5)
PAS	33.6300	119.0200	10/23/1981	172816.9	12.0	4.60	0.019	IV	45.9(73.9)
PAS	33.9060	119.1660	05/23/1978	91650.8	6.0	4.00	0.014	IV	46.0(74.0)
DMG	33.5450	117.8070	10/27/1969	1316 2.3	6.5	4.50	0.018	IV	46.5(74.8)
DMG	34.1830	117.5830	10/03/1948	24628.0	0.0	4.00	0.014	III	46.6(75.0)
DMG	34.4830	118.9830	09/04/1942	63433.0	0.0	4.50	0.017	IV	46.9(75.5)
DMG	34.4830	118.9830	09/03/1942	14 6 1.0	0.0	4.50	0.017	IV	46.9(75.5)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.023	IV	47.1(75.8)
DMG	33.8000	117.6000	09/16/1903	1210 0.0	0.0	4.00	0.013	III	47.1(75.8)
DMG	33.3670	118.1500	04/16/1942	72833.0	0.0	4.00	0.013	III	47.2(76.0)
PAS	33.6370	119.0560	10/23/1981	191552.5	6.3	4.60	0.018	IV	47.3(76.1)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.079	VII	47.8(77.0)
GSP	34.3740	117.6490	08/20/1998	234958.4	9.0	4.40	0.016	IV	48.0(77.3)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.040	V	48.2(77.6)
DMG	34.1830	117.5480	09/01/1937	163533.5	10.0	4.50	0.017	IV	48.6(78.2)
MGI	34.2000	119.2000	06/16/1914	1052 0.0	0.0	4.60	0.018	IV	48.6(78.3)
DMG	34.1180	119.2200	03/18/1957	185628.0	13.8	4.70	0.019	IV	48.7(78.4)
PAS	33.6710	119.1110	09/04/1981	155050.3	5.0	5.30	0.026	V	48.7(78.4)
DMG	34.1670	117.5330	03/01/1948	81213.0	0.0	4.70	0.018	IV	49.2(79.1)
DMG	34.1270	117.5210	12/27/1938	10 928.6	10.0	4.00	0.013	III	49.4(79.5)
DMG	34.6000	118.9000	05/18/1940	91512.0	0.0	4.00	0.013	III	49.7(80.0)
DMG	34.1400	117.5150	01/01/1965	8 418.0	5.9	4.40	0.015	IV	49.9(80.2)
DMG	34.3040	117.5700	05/05/1969	16 2 9.6	8.8	4.40	0.015	IV	49.9(80.3)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	34.5410	118.9890	06/12/1984	02752.4	11.7	4.10	0.013	III	50.0(80.4)
PAS	34.2110	117.5300	10/19/1979	122237.8	4.9	4.10	0.013	III	50.0(80.5)
DMG	34.2110	117.5300	09/01/1937	1348 8.2	10.0	4.50	0.016	IV	50.0(80.5)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.075	VII	50.1(80.7)
DMG	34.0000	117.5000	07/03/1908	1255 0.0	0.0	4.00	0.013	III	50.1(80.7)
DMG	34.2810	117.5520	09/13/1970	44748.6	8.0	4.40	0.015	IV	50.3(80.9)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.026	V	50.7(81.5)
DMG	33.6040	119.1050	03/25/1956	332 2.3	8.2	4.20	0.014	III	50.9(81.9)
DMG	34.6670	118.8330	01/24/1950	215659.0	0.0	4.00	0.012	III	51.4(82.8)
DMG	34.2000	117.5000	06/14/1892	1325 0.0	0.0	4.90	0.020	IV	51.5(82.9)
DMG	34.1240	117.4800	05/15/1955	17 326.0	7.6	4.00	0.012	III	51.7(83.2)
DMG	34.2670	117.5180	09/12/1970	141011.2	8.0	4.10	0.013	III	51.8(83.3)
DMG	34.1160	117.4750	06/28/1960	20 048.0	12.0	4.10	0.013	III	51.9(83.5)
DMG	33.6820	117.5530	07/05/1938	18 655.7	10.0	4.50	0.015	IV	52.8(84.9)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.050	VI	53.5(86.1)
DMG	34.5000	119.1170	11/17/1954	23 351.0	0.0	4.40	0.014	IV	53.5(86.2)
PAS	34.1350	117.4480	01/08/1983	71930.4	4.6	4.10	0.012	III	53.6(86.3)
DMG	33.7170	117.5170	06/19/1935	1117 0.0	0.0	4.00	0.012	III	53.6(86.3)
DMG	34.2170	117.4670	03/25/1941	234341.0	0.0	4.00	0.012	III	53.6(86.3)
DMG	33.7170	117.5070	08/06/1938	22 056.0	10.0	4.00	0.012	III	54.1(87.1)
DMG	33.7250	117.4980	01/03/1956	02548.9	13.7	4.70	0.017	IV	54.4(87.5)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.026	V	54.4(87.6)
DMG	34.1120	117.4260	03/19/1937	12338.4	10.0	4.00	0.011	III	54.7(88.0)
T-A	34.0000	117.4200	09/10/1920	1415 0.0	0.0	4.30	0.013	III	54.7(88.1)
T-A	34.0000	117.4200	04/12/1888	1315 0.0	0.0	4.30	0.013	III	54.7(88.1)
DMG	34.1320	117.4260	04/15/1965	20 833.3	5.5	4.50	0.015	IV	54.8(88.2)
DMG	33.7480	117.4790	06/22/1971	104119.0	8.0	4.20	0.013	III	54.8(88.2)
DMG	33.5830	119.1830	02/10/1952	135055.0	0.0	4.00	0.011	III	55.4(89.2)
DMG	33.7330	117.4670	10/26/1954	162226.0	0.0	4.10	0.012	III	55.8(89.9)
MGI	34.0000	117.4000	05/22/1907	652 0.0	0.0	4.60	0.015	IV	55.9(89.9)
MGI	34.3000	119.3000	09/28/1926	1749 0.0	0.0	4.00	0.011	III	56.1(90.3)
MGI	34.3000	119.3000	05/01/1904	1830 0.0	0.0	4.60	0.015	IV	56.1(90.3)
MGI	34.3000	119.3000	05/15/1927	1120 0.0	0.0	4.00	0.011	III	56.1(90.3)
DMG	34.1500	119.3500	08/22/1950	224758.0	0.0	4.20	0.012	III	56.4(90.7)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.025	V	57.1(91.9)
USG	34.1390	117.3860	02/21/1987	231530.1	2.6	4.07	0.011	III	57.1(92.0)
DMG	34.6170	119.0830	02/26/1950	0 622.0	0.0	4.70	0.016	IV	57.4(92.4)
DMG	33.8330	117.4000	06/05/1940	82727.0	0.0	4.00	0.011	III	57.4(92.4)
GSP	34.1900	117.3900	12/28/1989	094108.1	15.0	4.50	0.014	IV	57.5(92.5)
DMG	34.6830	119.0000	04/06/1943	223624.0	0.0	4.00	0.011	III	57.7(92.9)
DMG	33.9330	117.3670	10/24/1943	02921.0	0.0	4.00	0.011	III	58.1(93.5)
DMG	33.4300	119.0960	10/31/1969	103929.0	7.3	4.80	0.016	IV	58.3(93.8)
DMG	34.7170	118.9670	06/11/1935	1810 0.0	0.0	4.00	0.011	III	58.5(94.1)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.024	V	58.7(94.4)
DMG	34.0330	117.3500	04/18/1940	184343.9	0.0	4.40	0.013	III	58.7(94.5)
MGI	34.4000	119.3000	08/12/1925	1845 0.0	0.0	4.00	0.011	III	58.8(94.6)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.024	V	58.8(94.6)
DMG	34.1180	117.3410	09/22/1951	82239.1	11.9	4.30	0.012	III	59.5(95.8)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.063	VI	59.6(95.8)
DMG	34.1270	117.3380	02/23/1936	222042.7	10.0	4.50	0.013	III	59.8(96.2)
DMG	34.1400	117.3390	02/26/1936	93327.6	10.0	4.00	0.010	III	59.8(96.3)
GSP	34.1680	117.3370	06/28/1997	214525.1	9.0	4.20	0.011	III	60.2(96.9)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.017	IV	60.3(97.0)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.032	V	60.3(97.0)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.017	IV	60.3(97.0)
DMG	34.7840	118.9020	07/27/1972	03117.4	8.0	4.40	0.013	III	60.4(97.2)
DMG	34.0330	117.3170	09/03/1935	647 0.0	0.0	4.50	0.013	III	60.6(97.5)
T-A	34.1700	117.3200	12/02/1859	2210 0.0	0.0	4.30	0.012	III	61.2(98.5)
MGI	34.1000	117.3000	11/22/1911	257 0.0	0.0	4.00	0.010	III	61.8(99.4)
MGI	34.1000	117.3000	12/27/1901	11 0 0.0	0.0	4.60	0.014	III	61.8(99.4)
DMG	34.1000	117.3000	02/16/1931	1327 0.0	0.0	4.00	0.010	III	61.8(99.4)
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.020	IV	61.8(99.4)
DMG	34.0000	117.2830	11/07/1939	1852 8.4	0.0	4.70	0.014	IV	62.6(100.7)
MGI	34.2000	117.3000	04/13/1913	1045 0.0	0.0	4.00	0.010	III	62.7(100.9)
DMG	33.9860	119.4750	08/06/1973	232917.0	16.9	5.00	0.017	IV	63.0(101.3)
DMG	33.3390	119.1040	10/24/1969	202642.5	-1.8	4.70	0.014	IV	63.2(101.7)
DMG	33.9960	117.2700	02/17/1952	123658.3	16.0	4.50	0.013	III	63.3(101.9)
GSP	34.4810	119.3530	10/23/1996	220929.4	14.0	4.20	0.011	III	64.1(103.1)
DMG	34.0000	119.5000	02/18/1926	1818 0.0	0.0	5.00	0.016	IV	64.4(103.6)
MGI	34.0000	119.5000	05/03/1926	1353 0.0	0.0	4.30	0.011	III	64.4(103.6)
DMG	34.0000	119.5000	03/19/1905	440 0.0	0.0	4.00	0.010	III	64.4(103.6)
DMG	34.0000	117.2500	11/01/1932	445 0.0	0.0	4.00	0.010	III	64.5(103.7)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.035	V	64.5(103.7)
T-A	34.0800	117.2500	10/07/1869	0 0 0.0	0.0	4.30	0.011	III	64.5(103.8)
DMG	34.8670	118.8670	07/22/1952	74455.0	0.0	4.10	0.010	III	64.5(103.9)
PAS	34.0230	117.2450	10/02/1985	234412.4	15.2	4.80	0.015	IV	64.7(104.1)
DMG	33.9170	119.5000	08/26/1954	1348 3.0	0.0	4.80	0.015	IV	64.8(104.3)
GSP	34.0240	117.2300	03/11/1998	121851.8	14.0	4.50	0.012	III	65.6(105.5)
DMG	34.0430	117.2280	04/03/1939	25044.7	10.0	4.00	0.009	III	65.7(105.7)
DMG	34.8350	118.9880	11/29/1936	55445.3	10.0	4.00	0.009	III	65.9(106.1)
DMG	34.2500	119.5000	04/13/1917	359 0.0	0.0	4.50	0.012	III	66.1(106.4)
DMG	34.2500	119.5000	04/21/1917	659 0.0	0.0	4.00	0.009	III	66.1(106.4)
DMG	34.8670	118.9330	09/21/1941	1953 7.2	0.0	5.20	0.018	IV	66.3(106.6)
PAS	34.9430	118.7430	06/10/1988	23 643.0	6.8	5.40	0.020	IV	66.8(107.4)
DMG	34.2670	119.5170	04/12/1944	153310.0	0.0	4.00	0.009	III	67.3(108.3)
DMG	34.9000	118.9000	10/23/1916	244 0.0	0.0	6.00	0.028	V	67.4(108.5)
MGI	34.1000	117.2000	04/23/1923	2113 0.0	0.0	4.00	0.009	III	67.5(108.5)
DMG	34.8430	119.0260	03/07/1939	195331.8	10.0	4.00	0.009	III	67.6(108.7)
DMG	34.3490	119.4920	07/14/1958	52555.3	16.0	4.70	0.013	III	67.6(108.7)
DMG	34.8000	119.1000	09/05/1883	1230 0.0	0.0	6.00	0.028	V	67.6(108.8)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.028	V	67.9(109.2)
USG	34.4180	119.4680	09/07/1984	11 345.2	9.5	4.00	0.009	III	68.0(109.5)
DMG	34.8670	119.0170	07/21/1952	2153 9.0	0.0	4.30	0.010	III	68.7(110.5)
DMG	34.9000	118.9500	08/01/1952	13 430.0	0.0	5.10	0.016	IV	68.7(110.6)
DMG	33.6670	119.5000	11/30/1939	64251.0	0.0	4.00	0.009	III	69.0(111.1)
DMG	33.2910	119.1930	10/24/1969	82912.1	10.0	5.10	0.016	IV	69.1(111.1)
T-A	34.9200	118.9200	01/20/1857	0 0 0.0	0.0	5.00	0.015	IV	69.2(111.3)
T-A	34.9200	118.9200	05/23/1857	0 0 0.0	0.0	5.00	0.015	IV	69.2(111.3)
T-A	34.9200	118.9200	08/29/1857	0 0 0.0	0.0	4.30	0.010	III	69.2(111.3)
DMG	34.8850	119.0020	02/23/1939	91846.7	10.0	4.50	0.012	III	69.3(111.5)
DMG	34.9500	118.8670	07/21/1952	121936.0	0.0	5.30	0.018	IV	69.7(112.2)
DMG	34.9110	118.9730	02/23/1939	84551.7	10.0	4.50	0.011	III	70.0(112.7)
DMG	34.8830	119.0330	08/20/1952	84747.0	0.0	4.20	0.010	III	70.1(112.8)
DMG	34.2670	119.5670	06/29/1968	191357.0	10.0	4.40	0.011	III	70.1(112.8)
DMG	35.0000	118.7330	04/29/1953	124745.0	0.0	4.70	0.013	III	70.3(113.2)
DMG	35.0000	118.7330	08/23/1952	6 3 3.0	0.0	4.30	0.010	III	70.3(113.2)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.2450	119.5880	06/29/1968	203633.6	1.8	4.00	0.009	III	70.9(114.1)
DMG	33.7380	117.1870	04/27/1962	91232.1	5.7	4.10	0.009	III	71.0(114.2)
DMG	34.9280	118.9700	01/15/1955	1 3 6.7	9.1	4.30	0.010	III	71.0(114.2)
DMG	33.0380	118.7340	09/13/1937	221439.5	10.0	4.00	0.009	III	71.2(114.5)
DMG	34.9320	118.9760	03/01/1963	02557.9	13.9	5.00	0.015	IV	71.4(114.8)
DMG	34.9030	119.0380	05/08/1939	248 5.3	10.0	4.50	0.011	III	71.4(114.9)
DMG	34.9000	119.0500	07/22/1952	143018.0	0.0	4.30	0.010	III	71.6(115.2)
DMG	35.0630	118.4230	08/26/1952	205640.6	-0.8	4.40	0.011	III	71.8(115.5)
DMG	34.9500	118.9500	10/16/1952	1222 7.0	0.0	4.30	0.010	III	71.8(115.5)
DMG	34.9450	118.9680	03/04/1963	201042.3	8.5	4.00	0.009	III	71.9(115.8)
DMG	34.5000	119.5000	08/05/1930	1125 0.0	0.0	5.00	0.014	IV	72.1(116.0)
DMG	34.5000	119.5000	12/05/1920	1158 0.0	0.0	4.50	0.011	III	72.1(116.0)
DMG	34.5000	119.5000	06/29/1926	2321 0.0	0.0	5.50	0.019	IV	72.1(116.0)
DMG	34.3330	119.5830	11/21/1941	1656 3.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	945 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/03/1941	1926 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	09/14/1941	14518.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	1820 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	830 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	09/25/1941	51256.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	09/08/1941	31423.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	09/15/1941	137 2.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	819 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	1025 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/02/1941	2219 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	11/18/1941	18 810.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	9 5 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	858 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	821 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	09/08/1941	31245.0	0.0	4.50	0.011	III	72.2(116.1)
DMG	34.3330	119.5830	10/02/1938	1845 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	34.3330	119.5830	07/12/1941	1618 0.0	0.0	4.50	0.011	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	2354 0.0	0.0	4.50	0.011	III	72.2(116.1)
DMG	34.3330	119.5830	07/01/1941	848 0.0	0.0	4.00	0.009	III	72.2(116.1)
DMG	35.0000	118.8330	07/23/1952	181351.0	0.0	5.20	0.016	IV	72.2(116.2)
DMG	35.0000	118.8330	07/23/1952	75319.0	0.0	5.40	0.018	IV	72.2(116.2)
DMG	35.0000	118.8330	12/01/1952	52610.0	0.0	4.40	0.010	III	72.2(116.2)
DMG	34.9410	118.9870	11/15/1961	53855.5	10.7	5.00	0.014	IV	72.2(116.2)
DMG	34.2550	119.6140	07/31/1968	224445.3	15.0	4.00	0.009	III	72.5(116.7)
DMG	34.9830	118.9000	03/23/1953	17 637.0	0.0	4.00	0.009	III	72.6(116.8)
DMG	34.9830	118.9000	07/24/1952	95032.0	0.0	4.30	0.010	III	72.6(116.8)
DMG	34.9670	118.9500	11/27/1952	153641.0	0.0	4.00	0.008	III	72.8(117.2)
DMG	34.9670	118.9500	07/30/1952	11 255.0	0.0	4.10	0.009	III	72.8(117.2)
PAS	33.0330	117.9440	02/22/1983	21830.4	10.0	4.30	0.010	III	72.8(117.2)
DMG	34.3670	119.5830	07/01/1941	75054.8	0.0	5.90	0.024	V	72.9(117.3)
PAS	34.2510	119.6220	03/23/1988	84247.0	16.4	4.00	0.008	III	72.9(117.3)
DMG	33.4000	119.4000	07/24/1947	1654 2.0	0.0	4.30	0.010	III	72.9(117.4)
DMG	35.0670	118.6170	07/23/1952	235136.0	0.0	4.00	0.008	III	73.3(117.9)
DMG	34.2540	119.6280	07/08/1968	91837.2	15.7	4.00	0.008	III	73.3(117.9)
DMG	34.1830	119.6460	06/29/1968	63320.9	8.4	4.00	0.008	III	73.4(118.2)
DMG	34.9500	119.0170	11/11/1952	181225.0	0.0	4.10	0.009	III	73.6(118.4)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.026	V	73.9(119.0)
DMG	35.0830	118.5830	07/22/1952	81624.0	0.0	4.40	0.010	III	74.0(119.1)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.0830	118.5830	08/04/1952	535 0.0	0.0	4.00	0.008	III	74.0(119.1)
DMG	34.9330	119.0670	02/10/1954	235838.0	0.0	4.50	0.011	III	74.0(119.1)
GSP	34.1920	117.0950	04/06/1994	190104.1	7.0	4.80	0.013	III	74.1(119.3)
DMG	34.9670	119.0000	09/02/1952	204556.0	0.0	4.70	0.012	III	74.1(119.3)
GSP	35.0980	118.3060	12/31/1995	214823.1	7.0	4.00	0.008	III	74.2(119.4)
PAS	35.0950	118.5190	06/22/1981	45747.3	5.0	4.00	0.008	III	74.4(119.7)
DMG	34.9220	119.1030	01/09/1963	6 4 3.8	8.7	4.00	0.008	III	74.5(119.9)
DMG	34.9830	118.9830	05/23/1954	235243.0	0.0	5.10	0.015	IV	74.7(120.1)
DMG	35.0330	118.8500	10/07/1953	145921.0	0.0	4.90	0.013	III	74.7(120.2)
DMG	34.2500	119.6540	06/29/1968	153242.8	14.6	4.10	0.009	III	74.7(120.2)
DMG	34.8410	119.2400	01/11/1958	23 847.4	10.8	4.00	0.008	III	74.8(120.4)
DMG	35.0670	118.7670	07/22/1952	21 211.0	0.0	4.20	0.009	III	75.3(121.2)
DMG	35.1000	118.6170	09/26/1952	202120.0	0.0	4.00	0.008	III	75.5(121.5)
DMG	35.1170	118.4810	05/01/1953	64820.9	2.4	4.10	0.009	III	75.7(121.8)
DMG	34.0170	117.0500	02/19/1940	12 655.7	0.0	4.60	0.011	III	75.9(122.1)
DMG	34.9830	119.0330	07/21/1952	235328.0	0.0	4.50	0.010	III	76.0(122.3)
DMG	35.0830	118.7500	07/22/1952	84734.0	0.0	4.70	0.012	III	76.1(122.5)
DMG	35.0830	118.7500	07/26/1952	18 244.0	0.0	4.00	0.008	III	76.1(122.5)
DMG	35.0830	118.7500	07/26/1952	15 831.0	0.0	4.40	0.010	III	76.1(122.5)
DMG	34.1180	119.7020	07/05/1968	04517.2	5.9	5.20	0.015	IV	76.1(122.5)
DMG	35.0330	118.9170	07/23/1952	211658.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1240 0.0	0.0	4.90	0.013	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	12 531.0	0.0	6.40	0.032	V	76.1(122.5)
DMG	35.0000	119.0000	02/16/1919	1557 0.0	0.0	5.00	0.014	III	76.1(122.5)
DMG	35.0000	119.0000	07/23/1952	043 8.0	0.0	4.40	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1451 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	01/25/1919	2229 0.0	0.0	4.00	0.008	III	76.1(122.5)
DMG	35.0000	119.0000	07/22/1952	191024.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1210 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1442 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/25/1952	0 3 0.0	0.0	4.00	0.008	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1225 0.0	0.0	4.70	0.012	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1317 0.0	0.0	4.00	0.008	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1222 0.0	0.0	4.90	0.013	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	18 0 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1218 0.0	0.0	4.40	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1542 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1417 0.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1313 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	14 6 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/22/1952	82122.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/22/1952	133143.0	0.0	4.80	0.012	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1359 0.0	0.0	4.60	0.011	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1638 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	12 7 0.0	0.0	4.70	0.012	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1536 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	03/13/1929	228 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	12 6 0.0	0.0	4.80	0.012	III	76.1(122.5)
DMG	35.0000	119.0000	07/22/1952	175236.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1617 0.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	08/10/1952	194424.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1311 0.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1239 0.0	0.0	4.20	0.009	III	76.1(122.5)

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FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.0000	119.0000	07/21/1952	13 8 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1415 0.0	0.0	4.40	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1259 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1336 0.0	0.0	4.10	0.009	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	132512.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1212 0.0	0.0	4.60	0.011	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1553 0.0	0.0	4.50	0.010	III	76.1(122.5)
DMG	35.0000	119.0000	07/21/1952	1228 0.0	0.0	4.20	0.009	III	76.1(122.5)
DMG	34.2120	119.6910	06/26/1968	181111.2	13.9	4.00	0.008	III	76.3(122.8)
GSP	32.9750	118.7910	03/04/1992	190627.0	6.0	4.20	0.009	III	76.3(122.8)
DMG	33.7000	117.1000	06/11/1902	245 0.0	0.0	4.50	0.010	III	76.5(123.1)
DMG	35.0330	118.9330	07/22/1952	223133.0	0.0	4.70	0.012	III	76.5(123.1)
DMG	35.0000	119.0170	07/21/1952	115214.0	0.0	7.70	0.080	VII	76.6(123.3)
DMG	35.0000	119.0170	05/25/1953	324 1.0	0.0	4.80	0.012	III	76.6(123.3)
DMG	35.0000	119.0170	01/12/1954	233349.0	0.0	5.90	0.023	IV	76.6(123.3)
USG	33.0170	117.8170	07/16/1986	1247 3.7	10.0	4.11	0.008	III	76.6(123.3)
USG	33.0170	117.8170	07/14/1986	11112.6	10.0	4.12	0.009	III	76.6(123.3)
DMG	35.0170	118.9830	08/17/1952	9 9 7.0	0.0	4.10	0.008	III	76.7(123.5)
DMG	35.0500	118.9000	09/25/1952	162136.0	0.0	4.10	0.008	III	76.8(123.6)
DMG	35.1330	118.5170	07/28/1952	54554.0	0.0	4.20	0.009	III	77.0(123.8)
DMG	35.1330	118.5170	07/23/1952	152524.0	0.0	4.00	0.008	III	77.0(123.8)
DMG	35.1330	118.5170	08/14/1952	72822.0	0.0	4.10	0.008	III	77.0(123.8)
DMG	35.1330	118.5170	07/22/1952	141 2.0	0.0	4.50	0.010	III	77.0(123.8)
DMG	35.0000	119.0330	07/21/1952	1155 0.0	0.0	4.50	0.010	III	77.0(124.0)
DMG	35.0000	119.0330	07/21/1952	12 2 0.0	0.0	5.60	0.019	IV	77.0(124.0)
DMG	35.0000	119.0330	07/21/1952	1157 0.0	0.0	4.50	0.010	III	77.0(124.0)
DMG	35.0000	119.0330	07/21/1952	1159 0.0	0.0	4.50	0.010	III	77.0(124.0)
DMG	35.0000	119.0330	07/21/1952	1158 0.0	0.0	4.60	0.011	III	77.0(124.0)
DMG	35.0000	119.0330	07/21/1952	1154 0.0	0.0	4.50	0.010	III	77.0(124.0)
DMG	34.0720	119.7230	07/05/1968	23614.1	4.3	4.00	0.008	III	77.1(124.1)
DMG	34.2530	119.6980	06/29/1968	191221.3	9.5	4.20	0.009	III	77.2(124.2)
DMG	35.0000	119.0500	09/12/1952	103525.0	0.0	4.50	0.010	III	77.5(124.7)
DMG	35.0670	118.8830	08/17/1952	21 442.0	0.0	4.30	0.009	III	77.5(124.8)
DMG	35.0670	118.8830	08/14/1952	114146.0	0.0	4.20	0.009	III	77.5(124.8)
PAS	32.9900	117.8490	07/13/1986	14 133.0	12.0	4.60	0.011	III	77.6(124.9)
PAS	32.9860	117.8440	10/01/1986	201218.6	6.0	4.00	0.008	II	78.0(125.5)
DMG	35.0500	118.9500	11/14/1952	2334 1.4	0.0	4.00	0.008	II	78.0(125.5)
DMG	35.0500	118.9500	08/17/1952	614 4.0	0.0	4.00	0.008	II	78.0(125.5)
DMG	35.0330	119.0000	07/22/1952	101939.0	0.0	4.10	0.008	III	78.2(125.8)
GSP	34.1800	117.0200	12/04/1991	081703.5	11.0	4.00	0.008	II	78.2(125.8)
DMG	34.3170	119.7000	10/21/1953	16 238.0	0.0	4.00	0.008	II	78.2(125.9)
PAS	32.9710	117.8700	07/13/1986	1347 8.2	6.0	5.30	0.016	IV	78.3(126.0)
DMG	34.1920	119.7330	07/05/1968	036 6.4	15.6	4.00	0.008	II	78.3(126.1)
DMG	35.0000	119.0830	11/07/1952	85535.0	0.0	4.60	0.011	III	78.4(126.2)
DMG	35.0170	119.0500	08/05/1953	122059.0	0.0	4.30	0.009	III	78.5(126.3)
PAS	34.3470	119.6960	08/13/1978	225453.4	12.8	5.10	0.014	IV	78.5(126.4)
GSP	32.9850	117.8180	06/21/1995	211736.2	6.0	4.30	0.009	III	78.6(126.5)
DMG	35.0670	118.9330	07/23/1952	223220.0	0.0	4.10	0.008	III	78.6(126.5)
DMG	35.1330	118.7000	09/02/1952	124132.0	0.0	4.60	0.011	III	78.6(126.6)
DMG	34.0000	117.0000	06/30/1923	022 0.0	0.0	4.50	0.010	III	78.7(126.7)
PAS	35.0460	119.0010	06/05/1975	144645.3	9.0	4.10	0.008	III	78.8(126.7)
DMG	35.0450	119.0040	03/23/1956	212327.1	12.1	4.30	0.009	III	79.0(127.1)
PAS	35.0000	119.1030	05/13/1975	02135.6	19.1	4.50	0.010	III	79.0(127.1)

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DMG	35.1500	118.6330	01/27/1954	141948.0	0.0	5.00	0.013	III	79.1(127.2)
GSP	34.1200	116.9980	06/29/1992	144126.0	4.0	4.40	0.010	III	79.1(127.2)
GSP	34.0970	116.9960	12/05/1997	170438.9	4.0	4.10	0.008	III	79.1(127.3)
GSP	34.0850	116.9890	06/30/1992	214900.3	3.0	4.40	0.009	III	79.4(127.8)
DMG	34.1760	119.7540	07/07/1968	143330.8	12.8	4.50	0.010	III	79.5(127.9)
DMG	35.0330	119.0500	08/07/1952	163151.0	0.0	4.90	0.012	III	79.5(127.9)
DMG	35.0330	119.0500	07/27/1952	71611.0	0.0	4.10	0.008	III	79.5(127.9)
DMG	35.0330	119.0500	08/18/1952	44010.0	0.0	4.70	0.011	III	79.5(127.9)
DMG	35.1500	118.6830	08/13/1952	173925.0	0.0	4.70	0.011	III	79.6(128.2)
DMG	35.1330	118.7670	07/21/1952	194122.0	0.0	5.50	0.017	IV	79.7(128.3)
DMG	35.1330	118.7670	07/25/1952	143442.0	0.0	4.40	0.009	III	79.7(128.3)
GSP	32.9700	117.8100	04/04/1990	085439.3	6.0	4.00	0.008	II	79.8(128.4)
DMG	35.0670	118.9830	08/04/1952	194750.0	0.0	4.00	0.008	II	79.8(128.5)
PAS	32.9700	117.8030	07/14/1986	03246.2	10.0	4.00	0.008	II	79.9(128.6)
MGI	34.4000	119.7000	08/09/1926	412 0.0	0.0	4.00	0.008	II	79.9(128.6)
MGI	34.4000	119.7000	07/06/1926	1745 0.0	0.0	4.00	0.008	II	79.9(128.6)
MGI	34.4000	119.7000	06/24/1926	1530 0.0	0.0	4.00	0.008	II	79.9(128.6)
MGI	34.4000	119.7000	08/26/1927	1240 0.0	0.0	4.00	0.008	II	79.9(128.6)
MGI	34.4000	119.7000	03/25/1806	8 0 0.0	0.0	5.00	0.013	III	79.9(128.6)
DMG	34.1670	116.9830	10/16/1951	1241 5.0	0.0	4.00	0.008	II	80.2(129.1)
DMG	32.8670	118.2500	02/13/1952	151337.0	0.0	4.70	0.011	III	80.2(129.1)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.030	V	80.3(129.3)
PAS	34.1510	116.9720	11/20/1978	655 9.5	6.1	4.30	0.009	III	80.7(129.9)
T-A	34.5000	119.6700	06/25/1855	22 0 0.0	0.0	4.30	0.009	III	80.8(130.1)
T-A	34.5000	119.6700	03/14/1857	23 0 0.0	0.0	4.30	0.009	III	80.8(130.1)
T-A	34.5000	119.6700	05/31/1854	1250 0.0	0.0	4.30	0.009	III	80.8(130.1)
T-A	34.5000	119.6700	02/09/1902	15 0 0.0	0.0	4.30	0.009	III	80.8(130.1)
T-A	34.5000	119.6700	06/01/1893	12 0 0.0	0.0	5.00	0.013	III	80.8(130.1)
T-A	34.5000	119.6700	07/09/1885	0 0 0.0	0.0	4.30	0.009	III	80.8(130.1)
PAS	32.9450	117.8310	07/29/1986	81741.8	10.0	4.10	0.008	III	80.9(130.1)
DMG	35.0330	119.1000	09/02/1953	152756.0	0.0	4.00	0.008	II	80.9(130.2)
DMG	35.0330	119.1000	01/13/1954	14531.0	0.0	4.40	0.009	III	80.9(130.2)
DMG	35.0330	119.1000	01/12/1954	234037.0	0.0	4.10	0.008	III	80.9(130.2)
DMG	35.0330	119.1000	02/07/1954	0 953.0	0.0	4.40	0.009	III	80.9(130.2)
DMG	35.1940	118.4650	07/22/1952	19 858.2	3.7	4.30	0.009	III	80.9(130.2)
DMG	33.2670	119.4500	11/18/1947	2159 3.0	0.0	5.00	0.013	III	80.9(130.2)
DMG	35.1830	118.6000	07/26/1952	63850.0	0.0	4.00	0.008	II	81.0(130.3)
DMG	35.1830	118.6000	07/26/1952	2241 3.0	0.0	4.60	0.010	III	81.0(130.3)
DMG	35.1830	118.6000	07/29/1952	154950.0	0.0	4.90	0.012	III	81.0(130.3)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.039	V	81.1(130.5)
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.013	III	81.1(130.5)
DMG	35.0670	119.0330	07/23/1952	175329.0	0.0	4.10	0.008	III	81.1(130.5)
DMG	35.0670	119.0330	07/27/1952	113438.0	0.0	4.10	0.008	III	81.1(130.5)
PAS	35.0180	119.1410	11/10/1981	223435.5	3.1	4.50	0.010	III	81.2(130.7)
PAS	32.9330	117.8410	07/29/1986	81741.6	10.0	4.30	0.009	III	81.4(131.0)
DMG	34.3330	117.0000	02/27/1942	1 853.0	0.0	4.00	0.008	II	81.4(131.0)
PAS	32.9450	117.8060	09/07/1984	11 313.4	6.0	4.30	0.009	III	81.4(131.0)
DMG	35.0660	119.0490	01/24/1974	5 2 0.8	6.4	4.30	0.009	III	81.5(131.1)
DMG	35.1830	118.6500	07/21/1952	151358.0	0.0	5.10	0.013	III	81.5(131.1)
DMG	35.1000	118.9670	08/25/1952	62026.0	0.0	4.70	0.011	III	81.5(131.2)
DMG	35.1990	118.5310	09/01/1961	165148.9	4.5	4.00	0.008	II	81.6(131.3)
DMG	34.4900	119.6910	09/16/1962	181235.2	13.3	4.00	0.008	II	81.6(131.4)
DMG	34.3250	119.7610	08/09/1956	0 849.2	4.0	4.00	0.008	II	81.8(131.6)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	34.1980	116.9590	04/01/1978	105227.4	8.0	4.00	0.007	II	81.9(131.8)
DMG	34.1330	116.9500	06/10/1938	1440 0.0	0.0	4.00	0.007	II	81.9(131.8)
DMG	35.0670	119.0670	02/24/1954	223022.0	0.0	4.50	0.010	III	82.0(132.0)
PAS	35.0120	119.1790	11/10/1981	2237 5.0	9.4	4.20	0.008	III	82.1(132.1)
PAS	35.0350	119.1370	06/16/1978	42131.6	1.8	4.30	0.009	III	82.1(132.1)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.017	IV	82.2(132.3)
DMG	34.2670	116.9670	08/29/1943	35754.0	0.0	4.00	0.007	II	82.2(132.3)
DMG	34.2670	116.9670	08/29/1943	51630.0	0.0	4.00	0.007	II	82.2(132.3)
DMG	35.1000	119.0000	07/22/1952	14 511.0	0.0	4.30	0.009	III	82.3(132.4)
DMG	35.1000	119.0000	07/24/1952	311 7.0	0.0	4.10	0.008	II	82.3(132.4)
DMG	34.2000	119.8000	12/21/1812	19 0 0.0	0.0	7.00	0.044	VI	82.3(132.5)
MGI	34.5000	119.7000	08/26/1919	1457 0.0	0.0	4.00	0.007	II	82.4(132.6)
MGI	34.5000	119.7000	08/26/1919	1212 0.0	0.0	4.00	0.007	II	82.4(132.6)
MGI	34.5000	119.7000	07/29/1925	14 0 0.0	0.0	4.00	0.007	II	82.4(132.6)
DMG	35.2000	118.6330	07/22/1952	321 5.0	0.0	4.40	0.009	III	82.5(132.7)
DMG	34.3500	119.7670	11/10/1940	102510.0	0.0	4.00	0.007	II	82.6(132.9)
DMG	35.0500	119.1330	05/23/1953	75255.0	0.0	4.20	0.008	III	82.9(133.4)
DMG	35.0500	119.1330	08/06/1953	1120 4.0	0.0	4.40	0.009	III	82.9(133.4)
PAS	32.9470	117.7360	01/15/1989	153955.2	6.0	4.20	0.008	III	83.0(133.6)
GSP	34.1210	116.9280	08/16/1998	133440.2	6.0	4.70	0.011	III	83.1(133.7)
T-A	33.5000	117.0700	12/29/1880	7 0 0.0	0.0	4.30	0.009	III	83.2(134.0)
DMG	32.8170	118.3500	12/26/1951	04654.0	0.0	5.90	0.021	IV	83.4(134.2)
GSP	34.1120	116.9200	10/01/1998	181816.0	4.0	4.70	0.011	III	83.5(134.3)
DMG	35.2290	118.5130	06/28/1957	1132 0.8	1.6	4.10	0.008	II	83.5(134.4)
MGI	34.3000	119.8000	07/03/1925	1638 0.0	0.0	5.30	0.015	IV	83.6(134.5)
DMG	34.3000	119.8000	06/29/1925	144216.0	0.0	6.25	0.026	V	83.6(134.5)
MGI	34.3000	119.8000	07/03/1925	1821 0.0	0.0	5.30	0.015	IV	83.6(134.5)
GSP	35.2100	118.0660	07/11/1992	181416.2	10.0	5.70	0.019	IV	83.7(134.7)
GSP	34.1780	116.9220	06/28/1992	170131.9	13.0	4.70	0.010	III	83.8(134.8)
DMG	35.0500	119.1670	12/14/1950	135623.0	0.0	4.40	0.009	III	83.9(135.0)
DMG	35.2330	118.5330	03/17/1953	161517.0	0.0	4.00	0.007	II	83.9(135.0)
DMG	35.2330	118.5330	07/21/1952	174244.0	0.0	5.10	0.013	III	83.9(135.0)
DMG	35.2330	118.5330	07/29/1952	173643.0	0.0	4.40	0.009	III	83.9(135.0)
DMG	35.2330	118.5330	07/22/1952	15 314.0	0.0	4.20	0.008	III	83.9(135.0)
DMG	35.2330	118.5330	07/30/1952	144650.0	0.0	4.10	0.008	II	83.9(135.0)
DMG	35.2330	118.5330	07/24/1952	1735 6.0	0.0	4.20	0.008	III	83.9(135.0)
DMG	34.1800	116.9200	01/16/1930	02433.9	0.0	5.20	0.014	IV	83.9(135.0)
DMG	34.1800	116.9200	01/16/1930	034 3.6	0.0	5.10	0.013	III	83.9(135.0)
DMG	35.2170	118.6670	09/14/1952	204324.0	0.0	4.10	0.008	II	84.0(135.1)
DMG	35.2350	118.5480	03/03/1973	181449.5	8.0	4.00	0.007	II	84.1(135.4)
DMG	35.2390	118.5180	07/21/1952	2021 5.1	-2.0	4.20	0.008	III	84.2(135.6)
DMG	34.4330	116.9830	04/18/1945	458 2.0	0.0	4.30	0.008	III	84.4(135.8)
DMG	35.2330	118.6000	07/22/1952	91025.0	0.0	4.50	0.009	III	84.4(135.8)
DMG	35.2330	118.6000	01/10/1953	221738.0	0.0	4.00	0.007	II	84.4(135.8)
DMG	35.1000	119.0830	12/06/1934	743 0.0	0.0	4.00	0.007	II	84.4(135.9)
DMG	35.1000	119.0830	07/24/1946	019 8.0	0.0	4.00	0.007	II	84.4(135.9)
DMG	34.4710	119.7570	11/16/1958	934 6.1	15.2	4.00	0.007	II	84.6(136.2)
DMG	35.2410	118.5600	07/21/1952	1912 7.4	5.8	4.30	0.008	III	84.6(136.2)
DMG	35.2500	118.4830	07/23/1952	1330 4.0	0.0	4.40	0.009	III	84.8(136.5)
DMG	35.2500	118.4830	07/23/1952	93842.0	0.0	4.20	0.008	III	84.8(136.5)
GSP	34.2560	116.9120	06/28/1992	170557.5	8.0	4.60	0.010	III	85.2(137.0)
MGI	34.2000	116.9000	10/10/1915	5 6 0.0	0.0	4.00	0.007	II	85.2(137.2)
DMG	34.3200	116.9250	04/18/1968	174213.4	4.7	4.00	0.007	II	85.3(137.3)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	34.4000	119.8000	09/09/1929	515 0.0	0.0	4.60	0.010	III	85.3(137.3)
PAS	34.4020	119.8020	03/10/1986	153316.3	18.0	4.10	0.008	II	85.5(137.6)
DMG	34.1000	116.8830	10/24/1935	1527 0.0	0.0	4.00	0.007	II	85.5(137.7)
DMG	34.1000	116.8830	10/24/1935	1451 0.0	0.0	4.50	0.009	III	85.5(137.7)
DMG	34.1000	116.8830	10/24/1935	1452 0.0	0.0	4.50	0.009	III	85.5(137.7)
DMG	33.9680	116.8820	06/27/1959	162211.1	13.8	4.00	0.007	II	85.6(137.7)
PAS	34.2460	116.9010	06/29/1979	55320.5	5.7	4.60	0.010	III	85.7(137.8)
PAS	34.2490	116.9000	06/30/1979	7 353.0	5.6	4.50	0.009	III	85.7(138.0)
DMG	35.2670	118.4500	07/21/1952	191619.0	0.0	4.30	0.008	III	85.9(138.2)
PAS	34.2430	116.8960	06/30/1979	03411.6	5.8	4.90	0.011	III	85.9(138.2)
DMG	34.3330	119.8330	06/26/1933	62752.0	0.0	4.30	0.008	III	85.9(138.3)
DMG	34.3330	119.8330	06/26/1933	62542.0	0.0	4.30	0.008	III	85.9(138.3)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.012	III	86.0(138.3)
DMG	35.0500	119.2330	08/19/1952	191226.0	0.0	4.50	0.009	III	86.0(138.3)
MGI	33.8000	116.9000	04/23/1918	1415 0.0	0.0	4.00	0.007	II	86.0(138.3)
MGI	33.8000	116.9000	12/18/1920	1726 0.0	0.0	4.00	0.007	II	86.0(138.3)
MGI	33.8000	116.9000	06/14/1918	1024 0.0	0.0	4.00	0.007	II	86.0(138.3)
MGI	33.8000	116.9000	04/29/1918	2 0 0.0	0.0	4.00	0.007	II	86.0(138.3)
DMG	35.2170	118.8170	12/15/1953	124436.0	0.0	4.60	0.010	III	86.1(138.5)
DMG	35.2170	118.8170	07/23/1952	1317 5.0	0.0	5.70	0.018	IV	86.1(138.5)
GSP	34.3620	116.9230	12/07/1992	033331.5	1.0	4.00	0.007	II	86.2(138.7)
DMG	33.1500	119.4500	01/05/1940	62052.0	0.0	4.00	0.007	II	86.4(139.0)
DMG	33.1500	119.4500	06/17/1934	243 0.0	0.0	4.00	0.007	II	86.4(139.0)
MGI	34.3000	116.9000	12/01/1915	14 5 0.0	0.0	4.00	0.007	II	86.4(139.1)
DMG	34.3370	116.9090	11/30/1962	2351 5.5	7.0	4.30	0.008	III	86.5(139.2)
DMG	35.1500	119.0500	11/11/1952	1722 8.0	0.0	4.20	0.008	II	86.6(139.4)
USG	32.7700	118.3340	06/16/1985	1027 0.7	5.0	4.14	0.008	II	86.6(139.4)
GSP	34.3610	116.9130	12/04/1992	125942.1	0.0	4.20	0.008	II	86.7(139.5)
GSP	34.3770	116.9180	12/04/1992	052511.2	2.0	4.80	0.011	III	86.7(139.6)
T-A	34.4200	119.8200	00/00/1862	0 0 0.0	0.0	5.70	0.018	IV	86.9(139.8)
DMG	33.5000	117.0000	08/08/1925	1013 0.0	0.0	4.50	0.009	III	86.9(139.8)
GSP	34.3400	116.9000	11/27/1992	160057.5	1.0	5.30	0.014	IV	87.1(140.1)
GSP	34.1410	116.8570	09/19/1997	223714.5	10.0	4.10	0.007	II	87.2(140.4)
DMG	34.4000	116.9170	02/01/1942	16 334.0	0.0	4.50	0.009	III	87.2(140.4)
DMG	34.4000	116.9170	01/25/1942	215133.0	0.0	4.00	0.007	II	87.2(140.4)
DMG	34.4000	116.9170	02/01/1942	151828.0	0.0	4.50	0.009	III	87.2(140.4)
DMG	34.4000	116.9170	02/01/1942	151555.0	0.0	4.00	0.007	II	87.2(140.4)
GSP	34.3640	116.9040	11/27/1992	183225.0	1.0	4.10	0.007	II	87.3(140.4)
DMG	35.2890	118.4110	08/10/1952	122318.0	4.0	4.60	0.010	III	87.3(140.5)
GSP	34.1950	116.8620	08/17/1992	204152.1	11.0	5.30	0.014	IV	87.3(140.5)
GSP	34.1980	116.8620	08/18/1992	094640.7	12.0	4.20	0.008	II	87.4(140.6)
DMG	35.2890	118.4600	07/26/1952	1 221.3	10.8	4.20	0.008	II	87.4(140.7)
DMG	35.2830	118.5500	07/23/1952	34928.0	0.0	4.70	0.010	III	87.5(140.7)
DMG	35.2830	118.5500	08/01/1952	31611.6	0.0	4.50	0.009	III	87.5(140.7)
DMG	35.2830	118.5500	07/22/1952	15151.0	0.0	4.40	0.009	III	87.5(140.7)
DMG	35.2830	118.5500	07/31/1952	41022.0	0.0	4.20	0.008	II	87.5(140.7)
DMG	35.2830	118.5500	07/26/1952	922 6.0	0.0	4.30	0.008	III	87.5(140.7)
DMG	35.2830	118.5500	07/23/1952	737 0.0	0.0	4.80	0.011	III	87.5(140.7)
GSP	34.1630	116.8550	06/28/1992	144321.0	6.0	5.30	0.014	IV	87.5(140.8)
DMG	33.9500	116.8500	09/28/1946	719 9.0	0.0	5.00	0.012	III	87.5(140.8)
DMG	35.2900	118.4700	07/24/1952	12 757.6	14.1	4.10	0.007	II	87.5(140.9)
DMG	34.3240	116.8850	12/01/1962	03548.8	9.6	4.30	0.008	III	87.6(141.0)
DMG	35.2940	118.4010	08/13/1952	42940.6	14.5	4.60	0.009	III	87.7(141.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.2830	118.5830	07/31/1952	1719 8.0	0.0	4.50	0.009	III	87.7(141.1)
GSP	34.3690	116.8970	12/04/1992	020857.5	3.0	5.30	0.014	IV	87.7(141.2)
DMG	34.3120	116.8790	01/31/1972	155 4.2	8.0	4.00	0.007	II	87.8(141.3)
DMG	35.0830	119.2330	03/03/1956	62412.0	0.0	4.20	0.008	II	87.8(141.4)
DMG	34.3330	116.8830	10/14/1943	142844.0	0.0	4.50	0.009	III	87.9(141.4)
GSP	35.1490	119.1040	05/28/1993	044740.6	21.0	5.20	0.013	III	88.0(141.6)
DMG	35.2990	118.4350	07/25/1952	20 6 6.1	-1.4	4.80	0.010	III	88.1(141.7)
DMG	35.3000	118.4320	07/23/1952	61045.9	14.5	4.20	0.008	II	88.1(141.8)
DMG	34.3250	116.8750	12/02/1962	04138.4	6.7	4.40	0.008	III	88.2(141.9)
DMG	35.3000	118.5000	02/19/1953	812 6.0	0.0	4.40	0.008	III	88.3(142.2)
DMG	35.3030	118.4730	08/01/1952	213522.4	4.2	4.00	0.007	II	88.4(142.3)
DMG	35.3030	118.4810	09/04/1952	18 649.1	5.8	4.40	0.008	III	88.5(142.4)
DMG	35.3000	118.5330	07/30/1952	95929.0	0.0	4.00	0.007	II	88.5(142.4)
DMG	35.3000	118.5330	09/02/1952	1638 9.0	0.0	4.00	0.007	II	88.5(142.4)
DMG	35.3000	118.5330	07/21/1952	182628.0	0.0	4.10	0.007	II	88.5(142.4)
DMG	35.3000	118.5330	07/21/1952	182338.0	0.0	4.50	0.009	III	88.5(142.4)
DMG	32.7500	118.2000	06/25/1939	149 0.0	0.0	4.50	0.009	III	88.6(142.5)
GSP	34.2320	116.8460	07/10/1992	012940.0	0.0	4.20	0.008	II	88.6(142.6)
GSP	34.2250	116.8440	07/09/1992	023435.0	0.0	4.10	0.007	II	88.6(142.6)
GSP	34.3700	116.8800	11/29/1992	142120.5	3.0	4.00	0.007	II	88.7(142.7)
DMG	35.3050	118.5070	08/09/1952	10 732.1	-2.0	4.20	0.008	II	88.7(142.8)
DMG	34.3250	116.8650	10/29/1962	24253.9	8.6	4.80	0.010	III	88.8(142.8)
DMG	35.3080	118.5160	07/31/1952	19 515.4	7.3	4.00	0.007	II	89.0(143.2)
DMG	34.3500	116.8670	10/15/1943	1650 1.0	0.0	4.50	0.009	III	89.1(143.3)
GSP	34.1630	116.8270	06/28/1992	150451.5	12.0	4.40	0.008	III	89.1(143.3)
DMG	35.3110	118.4990	07/25/1952	1313 8.2	2.8	5.00	0.012	III	89.1(143.4)
GSP	34.2390	116.8370	07/09/1992	014357.6	0.0	5.30	0.014	III	89.2(143.5)
DMG	35.3130	118.4890	10/20/1952	181443.6	14.0	4.30	0.008	III	89.2(143.5)
DMG	35.3140	118.4820	08/30/1952	45559.8	5.5	4.70	0.010	III	89.2(143.6)
GSN	34.2030	116.8270	06/28/1992	150530.7	5.0	6.70	0.033	V	89.4(143.8)
DMG	35.3160	118.4870	09/15/1952	44013.2	4.2	4.90	0.011	III	89.4(143.9)
DMG	35.3150	118.5160	07/25/1952	194323.7	11.2	5.70	0.017	IV	89.5(144.0)
DMG	35.3140	118.5300	07/26/1952	225856.1	6.8	4.30	0.008	III	89.5(144.0)
DMG	35.3170	118.4940	07/25/1952	19 944.6	5.5	5.70	0.017	IV	89.5(144.0)
GSP	34.3200	116.8500	10/27/1998	154017.1	4.0	4.10	0.007	II	89.5(144.0)
DMG	35.3160	118.5140	07/24/1952	14 525.9	5.4	4.30	0.008	III	89.5(144.1)
DMG	35.3000	118.6670	08/13/1952	212548.0	0.0	4.10	0.007	II	89.6(144.2)
DMG	35.3210	118.4940	02/11/1955	194431.5	14.7	4.50	0.009	III	89.8(144.5)
PDP	34.3220	116.8460	09/20/1999	070249.2	2.0	4.20	0.008	II	89.8(144.5)
DMG	35.3200	118.5180	07/27/1952	0 915.6	6.5	4.20	0.008	II	89.8(144.5)
GSP	34.3230	116.8440	10/27/1998	010840.7	5.0	4.90	0.011	III	89.9(144.7)
DMG	35.3240	118.4860	01/20/1953	81322.8	7.2	4.00	0.007	II	89.9(144.7)
DMG	35.1840	119.0990	07/01/1959	234923.4	9.0	4.70	0.010	III	90.0(144.8)
DMG	35.3210	118.5400	07/24/1952	141012.2	9.5	4.00	0.007	II	90.0(144.8)
DMG	32.8000	117.8330	01/24/1942	214148.0	0.0	4.00	0.007	II	90.1(145.1)
DMG	34.3070	116.8350	08/28/1950	194526.4	11.7	4.20	0.007	II	90.2(145.1)
DMG	34.1000	116.8000	10/24/1935	1448 7.6	0.0	5.10	0.012	III	90.3(145.3)
DMG	33.9670	116.8000	09/07/1945	153424.0	0.0	4.30	0.008	II	90.3(145.3)
PAS	32.7560	117.9880	01/12/1975	212214.8	15.3	4.80	0.010	III	90.4(145.5)
DMG	35.3300	118.5070	05/29/1968	22938.7	3.1	4.00	0.007	II	90.4(145.5)
GSP	34.2370	116.8110	06/28/1992	125730.8	10.0	4.00	0.007	II	90.6(145.8)
GSP	34.1830	116.8020	06/28/1992	192637.6	1.0	4.00	0.007	II	90.6(145.9)
DMG	35.3350	118.4740	07/23/1952	172224.0	6.6	4.50	0.009	III	90.7(145.9)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.3360	118.4720	07/23/1952	105413.5	19.7	4.10	0.007	II	90.7(146.0)
DMG	35.3330	118.5330	08/01/1952	103556.0	0.0	4.00	0.007	II	90.8(146.1)
DMG	34.0290	116.7870	04/30/1954	03623.9	11.1	4.20	0.007	II	90.9(146.3)
DMG	32.7180	118.1720	04/28/1938	6 728.0	10.0	4.50	0.009	III	91.0(146.4)
DMG	35.3330	118.5670	08/08/1952	51718.0	0.0	4.00	0.007	II	91.0(146.4)
DMG	35.3400	118.4730	07/24/1952	5 249.6	2.1	4.50	0.009	III	91.0(146.4)
PAS	33.7010	116.8370	08/22/1979	2 136.3	5.0	4.10	0.007	II	91.0(146.4)
DMG	35.3380	118.5230	08/06/1952	34624.2	12.6	4.30	0.008	II	91.1(146.6)
DMG	35.3370	118.5370	08/30/1952	45954.8	3.5	4.00	0.007	II	91.1(146.6)
DMG	34.4170	116.8500	02/11/1932	231120.0	0.0	4.00	0.007	II	91.2(146.8)
DMG	33.5000	116.9170	11/04/1935	355 0.0	0.0	4.50	0.009	III	91.2(146.8)
DMG	34.7000	117.0000	07/16/1916	1150 0.0	0.0	4.50	0.009	III	91.2(146.8)
DMG	34.7000	117.0000	07/16/1916	1230 0.0	0.0	4.00	0.007	II	91.2(146.8)
DMG	35.3330	118.6000	09/16/1952	142454.0	0.0	4.00	0.007	II	91.2(146.8)
DMG	35.3330	118.6000	07/23/1952	164853.0	0.0	4.50	0.009	III	91.2(146.8)
DMG	35.3330	118.6000	08/10/1952	6 118.0	0.0	4.00	0.007	II	91.2(146.8)
DMG	35.3330	118.6000	07/31/1952	12 9 9.0	0.0	5.80	0.018	IV	91.2(146.8)
DMG	35.3330	118.6000	07/23/1952	161838.0	0.0	4.50	0.009	III	91.2(146.8)
DMG	35.3000	118.8000	12/23/1905	2223 0.0	0.0	5.00	0.011	III	91.3(146.9)
DMG	35.3460	118.4650	12/25/1952	55633.0	4.6	4.10	0.007	II	91.4(147.1)
DMG	34.2290	116.7950	05/11/1956	163050.5	13.3	4.70	0.010	III	91.4(147.2)
PAS	32.7590	117.9060	10/18/1976	172753.1	13.8	4.20	0.007	II	91.5(147.2)
DMG	35.3450	118.5070	07/23/1952	18 328.3	10.4	4.00	0.007	II	91.5(147.2)
PAS	34.3220	116.8150	08/29/1985	759 8.7	6.1	4.10	0.007	II	91.5(147.2)
DMG	33.9760	116.7750	10/17/1965	94519.0	17.0	4.90	0.011	III	91.7(147.6)
GSP	34.2980	116.8040	07/05/1992	200303.1	3.0	4.00	0.007	II	91.8(147.7)
DMG	34.0140	116.7710	06/10/1944	111150.5	10.0	4.50	0.009	III	91.8(147.8)
DMG	35.1830	119.1740	06/04/1956	83319.3	14.3	4.00	0.007	II	92.0(148.0)
DMG	35.3510	118.5270	08/11/1952	132149.2	-2.0	4.40	0.008	III	92.0(148.0)
DMG	33.9730	116.7690	06/10/1944	111531.9	10.0	4.00	0.007	II	92.0(148.1)
DMG	34.3170	116.8000	08/12/1950	21717.0	0.0	4.30	0.008	II	92.3(148.5)
DMG	35.3600	118.4380	08/03/1952	15156.1	7.0	4.10	0.007	II	92.3(148.5)
DMG	35.3560	118.5380	07/19/1955	2 425.5	6.4	4.10	0.007	II	92.4(148.7)
DMG	34.4360	116.8340	07/14/1973	8 020.1	8.0	4.80	0.010	III	92.5(148.8)
DMG	35.3330	118.7330	08/05/1952	65010.0	0.0	4.40	0.008	III	92.6(149.0)
GSP	34.2190	116.7710	07/21/1992	211029.0	1.0	4.10	0.007	II	92.7(149.2)
DMG	34.2990	116.7840	03/18/1956	24217.3	6.3	4.40	0.008	III	92.9(149.5)
DMG	35.3670	118.5000	06/20/1953	231852.0	0.0	4.40	0.008	III	93.0(149.6)
DMG	35.3580	118.6160	08/24/1955	17 540.9	7.2	4.00	0.007	II	93.1(149.8)
DMG	34.2500	116.7700	03/16/1956	203344.3	0.8	4.00	0.007	II	93.1(149.8)
PAS	35.2250	117.6290	05/02/1975	18 323.1	10.0	4.20	0.007	II	93.1(149.8)
GSP	34.2730	116.7740	08/24/1992	135146.0	1.0	4.30	0.008	II	93.1(149.9)
DMG	35.3670	118.5330	07/23/1952	195134.0	0.0	4.20	0.007	II	93.1(149.9)
DMG	34.1170	116.7500	08/22/1942	125913.0	0.0	4.00	0.007	II	93.2(150.0)
GSP	34.2110	116.7600	06/28/1992	152429.3	6.0	4.50	0.008	III	93.3(150.1)
DMG	33.9330	116.7500	08/06/1938	228 0.0	0.0	4.00	0.007	II	93.3(150.1)
DMG	33.9330	116.7500	10/28/1944	183016.0	0.0	4.40	0.008	III	93.3(150.1)
GSP	34.2070	116.7570	06/28/1992	161719.2	3.0	4.20	0.007	II	93.4(150.3)
DMG	33.9170	116.7500	01/25/1933	1444 0.0	0.0	4.00	0.007	II	93.4(150.3)
DMG	35.3670	118.5830	07/23/1952	4 140.0	0.0	4.70	0.009	III	93.4(150.4)
DMG	35.3670	118.5830	07/23/1952	65342.0	0.0	4.20	0.007	II	93.4(150.4)
DMG	35.3670	118.5830	07/23/1952	04738.0	0.0	4.60	0.009	III	93.4(150.4)
DMG	35.3670	118.5830	07/23/1952	31923.0	0.0	5.00	0.011	III	93.4(150.4)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.3670	118.5830	07/27/1952	73539.0	0.0	4.20	0.007	II	93.4(150.4)
DMG	35.3670	118.5830	07/28/1952	154120.0	0.0	4.00	0.007	II	93.4(150.4)
DMG	35.3670	118.5830	09/16/1952	1521 8.0	0.0	4.30	0.008	II	93.4(150.4)
DMG	35.3670	118.5830	07/23/1952	03832.0	0.0	6.10	0.021	IV	93.4(150.4)
DMG	35.3670	118.5830	07/23/1952	62628.0	0.0	4.00	0.007	II	93.4(150.4)
GSP	32.6850	118.1380	06/20/1997	053855.0	6.0	4.20	0.007	II	93.5(150.5)
DMG	33.4540	116.8980	07/29/1936	142252.8	10.0	4.00	0.007	II	93.5(150.5)
DMG	33.4560	116.8960	06/16/1938	55916.9	10.0	4.00	0.007	II	93.6(150.6)
DMG	34.0000	120.0170	04/01/1945	234342.0	0.0	5.40	0.014	IV	93.9(151.2)
DMG	33.2670	117.0170	06/07/1935	1633 0.0	0.0	4.00	0.006	II	94.0(151.3)
DMG	33.0000	117.3000	11/22/1800	2130 0.0	0.0	6.50	0.027	V	94.0(151.3)
GSP	32.6810	118.1090	06/20/1997	043540.5	6.0	4.70	0.009	III	94.0(151.3)
DMG	34.2640	116.7550	03/16/1956	203613.6	3.3	4.00	0.006	II	94.1(151.4)
GSP	34.1300	116.7340	06/30/1992	212254.4	12.0	4.80	0.010	III	94.2(151.5)
DMG	33.9500	116.7330	04/26/1942	151023.0	0.0	4.00	0.006	II	94.2(151.6)
PAS	32.7140	117.9100	10/18/1976	172652.6	15.1	4.20	0.007	II	94.4(151.9)
DMG	34.3060	116.7590	03/16/1956	202933.6	1.3	4.80	0.010	III	94.4(151.9)
DMG	32.6800	118.0770	10/28/1973	22 0 2.7	8.0	4.50	0.008	III	94.4(151.9)
DMG	35.3830	118.5670	07/23/1952	546 3.0	0.0	4.70	0.009	III	94.4(151.9)
DMG	35.3830	118.6000	09/05/1953	192436.0	0.0	4.10	0.007	II	94.7(152.3)
DMG	33.9760	116.7210	06/12/1944	104534.7	10.0	5.10	0.011	III	94.8(152.5)
DMG	35.1060	117.3460	10/11/1966	165912.9	6.5	4.40	0.008	II	94.9(152.7)
MGI	35.3000	119.0000	09/04/1908	0 0 0.0	0.0	4.60	0.009	III	94.9(152.8)
MGI	35.3000	119.0000	01/08/1903	030 0.0	0.0	4.60	0.009	III	94.9(152.8)
DMG	35.3790	118.6680	11/21/1955	205527.6	5.3	4.30	0.007	II	95.0(152.8)
DMG	35.3170	118.9500	09/01/1952	1039 0.0	0.0	4.10	0.007	II	95.0(152.9)
PAS	33.9760	116.7130	08/06/1984	81436.6	14.2	4.30	0.007	II	95.2(153.3)
DMG	33.9940	116.7120	06/12/1944	111636.0	10.0	5.30	0.013	III	95.2(153.3)
DMG	35.3330	118.9170	08/07/1952	1919 7.0	0.0	4.20	0.007	II	95.4(153.6)
DMG	35.3330	118.9170	08/22/1952	224124.0	0.0	5.80	0.017	IV	95.4(153.6)
DMG	35.3330	118.9170	07/31/1952	195314.0	0.0	4.50	0.008	III	95.4(153.6)
DMG	35.3330	118.9170	07/29/1952	195132.0	0.0	4.50	0.008	III	95.4(153.6)
DMG	34.4500	116.7830	05/22/1942	151829.0	0.0	4.00	0.006	II	95.5(153.8)
DMG	32.7170	117.8330	11/06/1950	205546.0	0.0	4.40	0.008	II	95.5(153.8)
GSP	34.2750	116.7300	07/01/1992	204617.8	1.0	4.20	0.007	II	95.6(153.9)
GSP	34.2810	116.7310	07/01/1992	205356.8	1.0	4.00	0.006	II	95.6(153.9)
DMG	35.3950	118.6200	08/08/1955	32150.5	4.1	4.70	0.009	III	95.6(153.9)
GSP	35.0170	117.2030	06/29/1992	041642.6	3.0	4.00	0.006	II	95.6(153.9)
DMG	35.4000	118.5830	07/24/1952	114756.0	0.0	4.40	0.008	II	95.6(153.9)
DMG	35.4000	118.5830	07/25/1952	7 351.0	0.0	4.10	0.007	II	95.7(154.0)
PAS	35.3720	118.7740	12/15/1987	182346.1	3.2	4.10	0.007	II	95.7(154.1)
DMG	34.3360	116.7420	03/16/1956	233456.4	1.7	4.40	0.008	II	95.8(154.1)
DMG	33.9810	116.7020	06/12/1944	222119.5	10.0	4.20	0.007	II	95.8(154.2)
DMG	34.0000	116.7000	08/25/1944	73025.0	0.0	4.20	0.007	II	95.9(154.4)
GSP	34.2500	116.7190	06/29/1992	164141.9	1.0	4.90	0.010	III	96.0(154.4)
DMG	34.1000	116.7000	02/07/1889	520 0.0	0.0	5.30	0.013	III	96.0(154.5)
DMG	32.8500	117.4830	02/23/1943	92112.0	0.0	4.00	0.006	II	96.0(154.5)
DMG	35.4000	118.6330	10/02/1952	231021.0	0.0	4.20	0.007	II	96.1(154.6)
GSP	34.6000	116.8400	06/04/1989	213358.1	2.0	4.50	0.008	III	96.2(154.8)
DMG	33.9170	116.7000	11/17/1943	112841.0	0.0	4.50	0.008	III	96.2(154.9)
DMG	35.3670	118.8330	03/17/1935	2026 0.0	0.0	4.00	0.006	II	96.3(154.9)
GSP	35.3700	118.8500	12/18/1990	165643.0	6.0	4.20	0.007	II	96.7(155.6)
DMG	33.6500	116.7500	09/05/1950	191956.0	0.0	4.80	0.009	III	96.8(155.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
T-A	35.3300	119.0000	01/04/1870	7 0 0.0	0.0	4.30	0.007	II	96.9(155.9)
DMG	35.3530	117.8260	07/03/1944	53823.5	-2.0	4.70	0.009	III	96.9(155.9)
PAS	33.9790	116.6810	12/16/1988	553 5.0	8.1	4.80	0.009	III	97.1(156.2)
DMG	35.3670	118.8830	09/12/1953	64116.0	0.0	4.10	0.007	II	97.1(156.2)
DMG	33.8000	116.7000	08/11/1911	2340 0.0	0.0	4.50	0.008	III	97.3(156.5)
DMG	33.8000	116.7000	08/11/1911	1820 0.0	0.0	4.00	0.006	II	97.3(156.5)
GSP	35.1600	117.3620	06/29/1992	011813.4	4.0	4.70	0.009	III	97.3(156.6)
GSP	33.6500	116.7400	12/02/1989	231647.8	14.0	4.20	0.007	II	97.3(156.6)
GSP	32.6260	118.1510	06/20/1997	080413.6	6.0	4.60	0.008	III	97.4(156.8)
MGI	33.5000	116.8000	03/30/1918	16 5 0.0	0.0	4.60	0.008	III	97.4(156.8)
MGI	33.5000	116.8000	05/31/1917	435 0.0	0.0	4.00	0.006	II	97.4(156.8)
MGI	33.5000	116.8000	11/26/1916	17 5 0.0	0.0	4.00	0.006	II	97.4(156.8)
MGI	33.5000	116.8000	06/02/1917	435 0.0	0.0	4.00	0.006	II	97.4(156.8)
MGI	33.2000	117.0000	07/20/1923	7 0 0.0	0.0	4.00	0.006	II	97.5(156.8)
DMG	35.3500	118.9670	02/04/1954	204841.0	0.0	4.00	0.006	II	97.5(156.9)
DMG	35.3830	118.8500	07/29/1952	7 347.0	0.0	6.10	0.020	IV	97.6(157.0)
DMG	35.3830	118.8500	10/13/1952	222035.0	0.0	4.00	0.006	II	97.6(157.0)
GSP	34.2740	116.6920	07/01/1992	170715.1	4.0	4.20	0.007	II	97.7(157.3)
DMG	35.4400	118.3470	01/02/1964	194841.0	6.3	4.20	0.007	II	97.7(157.3)
GSP	35.1610	117.3500	06/29/1992	012615.6	6.0	4.10	0.007	II	97.8(157.3)
DMG	35.4000	118.8170	07/29/1952	8 146.0	0.0	5.10	0.011	III	98.2(158.1)
PAS	34.0310	116.6570	07/08/1986	92412.8	6.0	4.40	0.008	II	98.4(158.3)
DMG	35.4320	118.6640	09/30/1964	175125.8	7.4	4.00	0.006	II	98.5(158.6)
GSP	35.4530	118.4310	05/06/1997	191253.8	6.0	4.50	0.008	III	98.7(158.8)
PDP	33.6320	116.7190	07/19/1999	220927.5	14.0	4.20	0.007	II	98.8(159.0)
DMG	33.9590	116.6510	09/23/1949	214440.1	12.2	4.00	0.006	II	98.8(159.1)
PAS	33.9910	116.6490	07/17/1986	215445.2	7.4	4.40	0.008	II	98.9(159.1)
DMG	35.4540	118.4760	11/23/1953	2039 0.9	5.9	4.40	0.008	II	98.9(159.1)
PAS	33.9890	116.6490	07/17/1986	203515.0	6.2	4.00	0.006	II	98.9(159.1)
PAS	32.6250	118.0090	07/11/1981	215029.4	5.0	4.30	0.007	II	98.9(159.2)
DMG	33.4880	116.7770	06/12/1959	11 313.0	5.7	4.00	0.006	II	99.0(159.3)
DMG	35.4330	118.7000	05/01/1954	22 439.0	0.0	4.20	0.007	II	99.0(159.3)
GSP	34.1110	116.6460	06/28/1992	140928.8	7.0	4.10	0.006	II	99.1(159.5)
DMG	35.4540	118.6050	02/07/1964	22 750.3	-2.0	4.40	0.007	II	99.6(160.2)

-END OF SEARCH- 1041 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 1999

LENGTH OF SEARCH TIME: 200 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 2.2 MILES (3.5 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.221 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
- a-value= 3.925
- b-value= 0.808
- beta-value= 1.860

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	1041	5.23116
4.5	397	1.99497
5.0	143	0.71859
5.5	54	0.27136
6.0	27	0.13568
6.5	11	0.05528
7.0	6	0.03015
7.5	1	0.00503

```
***********************
*                     *
*    E Q F A U L T    *
*                     *
*    Version 3.00     *
*                     *
***********************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 3224

DATE: 09-26-2003

JOB NAME: Rad

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 34.0247
SITE LONGITUDE: 118.3759

SEARCH RADIUS: 50 mi

ATTENUATION RELATION: 11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
NEWPORT-INGLEWOOD (L.A.Basin)	1.9(3.1)	6.9	0.490	X
SANTA MONICA	5.2(8.3)	6.6	0.442	X
HOLLYWOOD	5.4(8.7)	6.4	0.391	X
COMPTON THRUST	7.2(11.6)	6.8	0.385	X
MALIBU COAST	9.2(14.8)	6.7	0.296	IX
PALOS VERDES	9.9(15.9)	7.1	0.247	IX
ELYSIAN PARK THRUST	10.5(16.9)	6.7	0.265	IX
RAYMOND	11.5(18.5)	6.5	0.214	VIII
VERDUGO	14.3(23.0)	6.7	0.196	VIII
NORTHRIDGE (E. Oak Ridge)	15.5(25.0)	6.9	0.207	VIII
SIERRA MADRE	18.0(28.9)	7.0	0.190	VIII
ANACAPA-DUME	19.1(30.7)	7.3	0.218	IX
SIERRA MADRE (San Fernando)	19.5(31.4)	6.7	0.144	VIII
WHITTIER	20.8(33.4)	6.8	0.103	VII
SAN GABRIEL	21.1(33.9)	7.0	0.115	VII
SANTA SUSANA	22.7(36.6)	6.6	0.115	VII
CLAMSHELL-SAWPIT	23.9(38.5)	6.5	0.103	VII
HOLSER	27.4(44.1)	6.5	0.089	VII
SAN JOSE	28.2(45.4)	6.5	0.086	VII
SIMI-SANTA ROSA	31.0(49.9)	6.7	0.089	VII
OAK RIDGE (Onshore)	31.1(50.1)	6.9	0.102	VII
CHINO-CENTRAL AVE. (Elsinore)	33.9(54.6)	6.7	0.081	VII
SAN CAYETANO	37.1(59.7)	6.8	0.079	VII
CUCAMONGA	37.1(59.7)	7.0	0.091	VII
SAN ANDREAS - 1857 Rupture	39.4(63.4)	7.8	0.107	VII
SAN ANDREAS - Mojave	39.4(63.4)	7.1	0.065	VI
NEWPORT-INGLEWOOD (Offshore)	40.0(64.4)	6.9	0.056	VI
ELSINORE-GLEN IVY	44.0(70.8)	6.8	0.047	VI
SAN ANDREAS - Carrizo	47.3(76.2)	7.2	0.058	VI
SANTA YNEZ (East)	48.6(78.2)	7.0	0.049	VI
OAK RIDGE(Blind Thrust Offshore)	49.4(79.5)	6.9	0.063	VI
VENTURA - PITAS POINT	49.4(79.5)	6.8	0.059	VI

-END OF SEARCH- 32 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE NEWPORT-INGLEWOOD (L.A.Basin) FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.9 MILES (3.1 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.4903 g

```
*****************************************
*                                       *
*       FRISKSP - IBM-PC VERSION        *
*                                       *
*  Modified from *FRISK* (McGuire 1978) *
*   To Perform Probabilistic Earthquake *
*  Hazard Analyses Using Multiple Forms *
* of Ground-Motion-Attenuation Relations *
*                                       *
*   Modifications by:  Thomas F. Blake  *
*            - 1988-2000 -              *
*                                       *
*             VERSION 4.00              *
*           (Visual Fortran)            *
*****************************************
```

```
TITLE: Rad

IPR_FILE
 0

IPLOT
 0

SITE CONDITION
 0.00

BASEMENT     DEPTH (km)
 5.00

RHGA FACTOR      RHGA DIST (km)
    1.000            0.000

NFLT  NSITE   NPROB   NATT    LCD
27      1       2       6       1

ATT       C1        C2        C3        C4        C5         C6         C7         C8         C9         C
10        C11       C12       C13       C14
  1   -4.0330    0.8120    0.0360   -1.0610    0.0410    -0.0050    -0.0180     0.7660     0.0340     0.0
000    0.3430    0.3510    0.0000   -0.1230
ATT       C15       C16       C17       C18       C19        C20        C21        C22        C23        P
ER      DSMIN      SIGA    IRELAF      ICHK
  1   -0.1380   -0.2890    0.0000    1.0000    0.0000     0.0000     1.0000     0.0000     0.0000     0.0
000    3.0000    0.4650      38         0

ATT       C1        C2        C3        C4        C5         C6         C7         C8         C9         C
10        C11       C12       C13       C14
  2   -4.0330    0.8120    0.0360   -1.0610    0.0410    -0.0050    -0.0180     0.7660     0.0340     0.0
000    0.3430    0.3510    0.0000   -0.1230
ATT       C15       C16       C17       C18       C19        C20        C21        C22        C23        P
ER      DSMIN      SIGA    IRELAF      ICHK
  2   -0.1380   -0.2890    0.0000    1.0000    0.0000     0.0000     0.0000     1.0000     0.0000     0.0
000    3.0000    0.4650      38         0

ATT       C1        C2        C3        C4        C5         C6         C7         C8         C9         C
10        C11       C12       C13       C14
  3   -4.0330    0.8120    0.0360   -1.0610    0.0410    -0.0050    -0.0180     0.7660     0.0340     0.0
```

```
000    0.3430    0.3510    0.0000   -0.1230
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23         P
ER     DSMIN      SIGA    IRELAF      ICHK
  3  -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    1.0000    0.0000    0.0000     0.0
000   3.0000    0.4650      38         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9         C
10       C11       C12       C13       C14
  4  -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340     0.0
000   0.3430    0.3510    0.0000   -0.1230
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23         P
ER     DSMIN      SIGA    IRELAF      ICHK
  4  -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    0.0000    1.0000    0.0000     0.0
000   3.0000    0.4650      38         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9         C
10       C11       C12       C13       C14
  5  -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340     0.0
000   0.3430    0.3510    0.0000   -0.1230
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23         P
ER     DSMIN      SIGA    IRELAF      ICHK
  5  -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    0.0000    0.0000    1.0000     0.0
000   3.0000    0.4650      38         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9         C
10       C11       C12       C13       C14
  6  -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340     0.0
000   0.3430    0.3510    0.0000   -0.1230
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23         P
ER     DSMIN      SIGA    IRELAF      ICHK
  6  -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    0.0000    0.0000    1.0000     0.0
000   3.0000    0.4650      38         0

 PROBLEM DATA:

 BOZ. ET AL.(1999)HOR PS COR 1    AMPLITUDES:
     15         0.100     0.200     0.300     0.400     0.500     0.600     0.700     0.800     0.900    1.00
0
                1.100     1.200     1.300     1.400     1.500

      MAGNITUDE WEIGHTING FACTORS:      MWF:   0    MWF MAGNITUDE:      0.00

 BOZ. ET AL.(1999)HOR PS COR 2    AMPLITUDES:
     15         0.100     0.200     0.300     0.400     0.500     0.600     0.700     0.800     0.900    1.00
0
                1.100     1.200     1.300     1.400     1.500

      MAGNITUDE WEIGHTING FACTORS:      MWF:   3    MWF MAGNITUDE:      7.50

 RISKS SPECIFIED:
   5      0.013900  0.010000  0.005000  0.002105  0.001000

 SITE COORDINATES:
  1    -118.3759   34.0247


 FAULT INFORMATION:

 -----------------------------------------------------------------------------

 FAULT  1

 FAULT NAME:  NEWPORT-INGLEWOOD (L.A.Basin)


 NFP     NRL   ATTENUATION CODES:
  5      10       1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA    ECTR    ECDP    COEF
 5.000   0.1000      1  1.0000  2.072   3.200   2.000   1.000
```

```
NMAX AMMAX   PMAX
 1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.832E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00664   0.00449   0.00215


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1     -118.3723   34.0337
  2     -118.1862   33.8073
  3     -118.1510   33.7822
  4     -118.1208   33.7746
  5     -117.9246   33.6061

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        0.0000   13.0000

 Computed Total Fault Area = 0.83E+03

 ------------------------------------------------------------------------------

 FAULT  2

 FAULT NAME:  SANTA MONICA


 NFP    NRL   ATTENUATION CODES:
  3     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  1.400  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.60  1.00


   dmchar ampchar dmpchar
     0.50    6.10    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area     - cm**2
0.364E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.6000  1.0000   0.00597   0.00308   0.00289


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240
```

```
FAULT SEGMENT COORDINATES
 1    -118.4085   34.0814
 2    -118.5244   34.0263
 3    -118.6855   33.9896

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.36E+03

-----------------------------------------------------------------------------

FAULT  3

FAULT NAME:  HOLLYWOOD


NFP    NRL   ATTENUATION CODES:
 4     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA    ECTR    ECDP    COEF
5.000   0.1000      1  1.0000  2.072  0.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.40  1.00


  dmchar ampchar dmpchar
    0.50    5.90    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.238E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX    AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.4000  1.0000   0.00575   0.00229   0.00346


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2302   34.1192
 2    -118.3170   34.1104
 3    -118.3723   34.0991
 4    -118.4063   34.0827

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       4.8000   13.2000

Computed Total Fault Area = 0.25E+03

-----------------------------------------------------------------------------

FAULT  4

FAULT NAME:  ELYSIAN PARK THRUST


NFP    NRL   ATTENUATION CODES:
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```
 2     10      5  6

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.5000  2.072  1.700  2.000  0.500

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area     - cm**2
0.510E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.01006   0.00576   0.00430


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.9173   33.8473
 2    -118.2277   34.0169

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1        0.0000    9.9900
 2        0.0000   10.0000
 3       14.1000   15.1000

Computed Total Fault Area = 0.51E+03

-----------------------------------------------------------------------------

FAULT  5

FAULT NAME:  MALIBU COAST


NFP    NRL   ATTENUATION CODES:
 4     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.3000  2.072  1.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  0.3000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.481E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00174   0.00100   0.00074


IND_RL
```

```
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1    -118.5333   34.0299
 2    -118.6339   34.0412
 3    -118.6666   34.0387
 4    -118.9332   34.0513

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.48E+03

-----------------------------------------------------------------------------

FAULT  6

FAULT NAME:  PALOS VERDES


NFP    NRL   ATTENUATION CODES:
 4     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.030  4.800  2.000  1.000

NMAX AMMAX  PMAX
 1    7.10  1.00


  dmchar ampchar dmpchar
    0.50    6.60    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.125E+14
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.1000  1.0000   0.02038   0.01553   0.00485


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1    -117.9388   33.2825
 2    -118.1977   33.6571
 3    -118.2758   33.7560
 4    -118.5568   33.9720

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   13.0000

Computed Total Fault Area = 0.13E+04

-----------------------------------------------------------------------------

FAULT  7
```

```
 FAULT NAME:  COMPTON THRUST


 NFP    NRL   ATTENUATION CODES:
  2     10      5  6

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.5000  2.072  1.900  2.000  0.500

 NMAX AMMAX  PMAX
  1    6.80  1.00


   dmchar ampchar dmpchar
     0.50    6.30    1.00

 Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.585E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000   0.00935   0.00585   0.00349


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.0582   33.6908
  2    -118.4060   33.8831

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    5.0000
  2        0.0000    5.1000
  3       14.1000   10.1000

 Computed Total Fault Area = 0.58E+03

 -----------------------------------------------------------------------------

 FAULT  8

 FAULT NAME:  RAYMOND


 NFP    NRL   ATTENUATION CODES:
  4     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.5000  2.072  1.000  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.273E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
```

```
     1  6.5000  1.0000   0.00259   0.00118   0.00140


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.0051   34.1670
 2    -118.0579   34.1444
 3    -118.1258   34.1293
 4    -118.2227   34.1217

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.26E+03

-----------------------------------------------------------------------------

FAULT  9

FAULT NAME:  VERDUGO


NFP    NRL   ATTENUATION CODES:
 7     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.522E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00315   0.00180   0.00135


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.1536   34.1313
 2    -118.1865   34.1496
 3    -118.2285   34.1551
 4    -118.2907   34.1971
 5    -118.3657   34.2227
 6    -118.4077   34.2538
 7    -118.4206   34.2612

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000
```

```
Computed Total Fault Area = 0.52E+03

-----------------------------------------------------------------------------

FAULT 10

FAULT NAME:  SIERRA MADRE


NFP    NRL   ATTENUATION CODES:
12     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.072  2.800  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.103E+14
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000   0.02034   0.01469   0.00565


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.7397    34.1231
 2    -117.7691    34.1317
 3    -117.8176    34.1323
 4    -117.8807    34.1470
 5    -117.9402    34.1501
 6    -118.0027    34.1752
 7    -118.0683    34.1758
 8    -118.1118    34.2010
 9    -118.1492    34.2028
10    -118.2461    34.2279
11    -118.2896    34.2751
12    -118.2960    34.2751

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000     0.0000
 2       12.7000    12.7000

Computed Total Fault Area = 0.11E+04

-----------------------------------------------------------------------------

FAULT 11

FAULT NAME:  SIERRA MADRE (San Fernando)


NFP    NRL   ATTENUATION CODES:
 8     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
```

```
 5.000   0.1000       1  2.0000  2.072  0.900  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.324E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00781   0.00447   0.00334


 IND_RL
     2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.2940   34.2782
  2    -118.2951   34.2782
  3    -118.3196   34.2745
  4    -118.3956   34.2905
  5    -118.4189   34.3039
  6    -118.4520   34.2940
  7    -118.4778   34.3027
  8    -118.4790   34.3027

 NDP
  2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      12.7000   12.7000

 Computed Total Fault Area = 0.33E+03

 ------------------------------------------------------------------------------

 FAULT 12

 FAULT NAME:  NORTHRIDGE (E. Oak Ridge)


 NFP    NRL   ATTENUATION CODES:
  2     10      5  6

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000       1  1.5000  2.072  1.500  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.682E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00891   0.00602   0.00288
```

```
IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7027   34.4057
 2    -118.4078   34.2781

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    4.9900
 2       0.0000    5.0000
 3      16.3000   19.7000

Computed Total Fault Area = 0.67E+03

------------------------------------------------------------------------------

FAULT 13

FAULT NAME:  ANACAPA-DUME


NFP    NRL   ATTENUATION CODES:
 6     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.072  3.700  2.000  1.000

NMAX AMMAX  PMAX
 1    7.30  1.00


  dmchar ampchar dmpchar
    0.50    6.80    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.210E+14
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX    AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.3000  1.0000   0.02430    0.02021    0.00409


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.6945   33.9849
 2    -118.7913   33.9530
 3    -118.9120   33.9508
 4    -119.1410   33.9838
 5    -119.3403   33.9792
 6    -119.4963   33.9883

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      19.8000   19.8000

Computed Total Fault Area = 0.20E+04

------------------------------------------------------------------------------
```

FAULT 14

FAULT NAME: WHITTIER

```
NFP    NRL   ATTENUATION CODES:
 2     10      1  3

AMMIN   AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1   2.5000  2.072  1.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
    0.50    6.30    1.00

Slip Rate (  2.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.555E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1   6.8000   1.0000    0.01355   0.00848   0.00506


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1     -118.0180   33.9860
 2     -117.6370   33.8540

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        0.0000   15.0000

Computed Total Fault Area = 0.57E+03
```

FAULT 15

FAULT NAME: SAN GABRIEL

```
NFP    NRL   ATTENUATION CODES:
10     10      1  3

AMMIN   AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1   1.0000  2.072  3.600  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.936E+13
```

LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE	= EX-RATE	+ CH-RATE
1	7.0000	1.0000	0.00616	0.00445	0.00171

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910 0.240

FAULT SEGMENT COORDINATES

1	-118.2802	34.3179
2	-118.3118	34.3394
3	-118.3904	34.3598
4	-118.4577	34.3853
5	-118.5587	34.4363
6	-118.5975	34.4649
7	-118.6873	34.5536
8	-118.7026	34.5700
9	-118.7312	34.5792
10	-118.8761	34.7139

NDP
2

ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	0.0000	13.0000

Computed Total Fault Area = 0.94E+03

FAULT 16

FAULT NAME: SANTA SUSANA

NFP	NRL	ATTENUATION CODES:
8	10	2 4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	5.0000	2.072	1.300	2.000	1.000

NMAX	AMMAX	PMAX
1	6.60	1.00

dmchar	ampchar	dmpchar
0.50	6.10	1.00

Slip Rate (5.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.432E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE	= EX-RATE	+ CH-RATE
1	6.6000	1.0000	0.03249	0.01677	0.01573

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910 0.240

FAULT SEGMENT COORDINATES

1	-118.4950	34.3242
2	-118.4955	34.3242
3	-118.5340	34.3030
4	-118.5811	34.3204
5	-118.6163	34.3229

```
 6    -118.6339   34.3330
 7    -118.7081   34.3506
 8    -118.7672   34.3594

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        9.2000   13.1000

Computed Total Fault Area = 0.41E+03

-----------------------------------------------------------------------------

FAULT 17

FAULT NAME:  CLAMSHELL-SAWPIT


NFP    NRL   ATTENUATION CODES:
 4     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  0.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.50  1.00


  dmchar ampchar dmpchar
    0.50    6.00    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.288E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1  6.5000  1.0000   0.00273   0.00125   0.00148


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.8458   34.2402
 2    -117.8844   34.2218
 3    -117.9279   34.2181
 4    -117.9990   34.1777

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2       12.7000   12.7000

Computed Total Fault Area = 0.30E+03

-----------------------------------------------------------------------------

FAULT 18

FAULT NAME:  SAN JOSE


NFP    NRL   ATTENUATION CODES:
 4     10      2  4
```

```
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.5000  2.072  1.100  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.286E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00271   0.00124   0.00147


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1     -117.6901   34.1141
  2     -117.7305   34.0846
  3     -117.8384   34.0601
  4     -117.8789   34.0393

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        3.4000   12.6000

 Computed Total Fault Area = 0.25E+03

 ------------------------------------------------------------------------------

 FAULT 19

 FAULT NAME:  HOLSER


 NFP    NRL   ATTENUATION CODES:
  5     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.4000  2.072  1.000  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.280E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00212   0.00097   0.00115


 IND_RL
      2
```

```
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1    -118.7533   34.4386
 2    -118.7345   34.4386
 3    -118.6741   34.4499
 4    -118.6427   34.4487
 5    -118.5483   34.4172

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       5.9000   12.7000

Computed Total Fault Area = 0.26E+03

-----------------------------------------------------------------------------

FAULT 20

FAULT NAME:  SIMI-SANTA ROSA


NFP    NRL   ATTENUATION CODES:
 5     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  1.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.450E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00543   0.00311   0.00232


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1    -118.7982   34.2901
 2    -118.9084   34.2578
 3    -118.9364   34.2615
 4    -118.9680   34.2615
 5    -119.1147   34.2261

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    1.0000
 2       0.0000    1.1000
 3       7.5000   14.0000

Computed Total Fault Area = 0.45E+03

-----------------------------------------------------------------------------
```

```
FAULT 21

FAULT NAME:  OAK RIDGE (Onshore)


NFP    NRL   ATTENUATION CODES:
 9     10       2  4

AMMIN   AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000   0.1000      1   4.0000   2.072   2.500   2.000   1.000

NMAX AMMAX  PMAX
 1    6.90  1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00

Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.700E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX    AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.9000  1.0000    0.02235    0.01511    0.00723


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1     -119.2050   34.2481
 2     -119.1582   34.2630
 3     -119.0974   34.3165
 4     -119.0402   34.3522
 5     -118.9589   34.3631
 6     -118.8805   34.3813
 7     -118.8104   34.3850
 8     -118.7742   34.4013
 9     -118.7227   34.3978

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1        0.0000    1.0000
 2        0.0000    1.1000
 3        5.9000   13.7000

Computed Total Fault Area = 0.67E+03

-----------------------------------------------------------------------------

FAULT 22

FAULT NAME:  SAN CAYETANO


NFP    NRL   ATTENUATION CODES:
 9     10       2  4

AMMIN   AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000   0.1000      1   6.0000   2.072   2.200   2.000   1.000

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
```

0.50 6.30 1.00

Slip Rate (6.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.660E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE =	EX-RATE +	CH-RATE
1	6.8000	1.0000	0.03867	0.02422	0.01445

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910 0.240

FAULT SEGMENT COORDINATES

1	-118.7621	34.4361
2	-118.8313	34.4047
3	-118.9130	34.4172
4	-118.9281	34.4587
5	-118.9382	34.4612
6	-118.9835	34.4348
7	-119.0690	34.4361
8	-119.1067	34.4386
9	-119.1708	34.4625

NDP
2

ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	7.5000	13.0000

Computed Total Fault Area = 0.60E+03

FAULT 23

FAULT NAME: CHINO-CENTRAL AVE. (Elsinore)

NFP	NRL	ATTENUATION CODES:
2	10	2 4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	1.0000	2.072	1.400	2.000	1.000

NMAX	AMMAX	PMAX
1	6.70	1.00

dmchar	ampchar	dmpchar
0.50	6.20	1.00

Slip Rate (1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.476E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE =	EX-RATE +	CH-RATE
1	6.7000	1.0000	0.00574	0.00329	0.00245

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910 0.240

```
FAULT SEGMENT COORDINATES
 1    -117.7455   34.0332
 2    -117.5682   33.8275

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       7.2000   15.4000

Computed Total Fault Area = 0.48E+03

-----------------------------------------------------------------------------

FAULT 24

FAULT NAME:  CUCAMONGA


NFP    NRL   ATTENUATION CODES:
 6     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA    ECTR    ECDP    COEF
5.000   0.1000      1  5.0000  2.072  1.400   2.000   1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  5.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area    - cm**2
0.504E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000    0.01809    0.01307    0.00503


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1    -117.4343   34.1842
 2    -117.5088   34.1737
 3    -117.5585   34.1737
 4    -117.6004   34.1671
 5    -117.6278   34.1645
 6    -117.7285   34.1253

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.54E+03

-----------------------------------------------------------------------------

FAULT 25

FAULT NAME:  SAN ANDREAS - 1857 Rupture


NFP    NRL   ATTENUATION CODES:
```

12   10   1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	34.0000	2.072	17.200	2.000	0.500

NMAX	AMMAX	PMAX
1	7.80	1.00

dmchar	ampchar	dmpchar
0.50	7.30	1.00

Slip Rate (34.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.300E+12
Input Fault Area   - cm**2
0.414E+14
LOG10[Mo(m)]   = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE =	EX-RATE +	CH-RATE
1	7.8000	1.0000	0.22372	0.20895	0.01477

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA   B_RA   SIG_RA -3.490   0.910   0.240

FAULT SEGMENT COORDINATES

1	-120.5605	36.0019
2	-120.2928	35.7488
3	-119.8632	35.3106
4	-119.8598	35.3072
5	-119.6673	35.1336
6	-119.4061	34.9395
7	-119.2103	34.8639
8	-118.9010	34.8175
9	-118.5075	34.7006
10	-118.5024	34.6989
11	-118.0075	34.5116
12	-117.5298	34.3106

NDP
2

ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	0.0000	12.0000

Computed Total Fault Area = 0.42E+04

FAULT 26

FAULT NAME: SAN ANDREAS - Mojave

NFP   NRL   ATTENUATION CODES:
3   10   1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	30.0000	2.072	4.900	2.000	0.500

NMAX	AMMAX	PMAX
1	7.10	1.00

dmchar	ampchar	dmpchar
0.50	6.60	1.00

Slip Rate (30.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2

```
0.300E+12
 Input Fault Area     - cm**2
0.119E+14
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
      1  7.1000  1.0000   0.17754   0.13551   0.04202


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.5024   34.6989
  2    -118.0075   34.5116
  3    -117.5298   34.3106

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   12.0000

 Computed Total Fault Area = 0.12E+04

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 FAULT 27

 FAULT NAME:  NEWPORT-INGLEWOOD (Offshore)


 NFP    NRL   ATTENUATION CODES:
  6     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.5000  2.072  3.300  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.858E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.01027   0.00695   0.00333


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -117.9146   33.5910
  2    -117.7989   33.5080
  3    -117.6882   33.4024
  4    -117.5473   33.2515
  5    -117.4870   33.2163
  6    -117.4291   33.1559

 NDP
   2
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ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   13.0000

Computed Total Fault Area = 0.86E+03


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SITE 1 COORDINATES: -118.3759  34.0247

BOZ. ET AL.(1999)HOR PS COR 1
    AMPLITUDES (g):       0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.80
00E+000.9000E+000.1000E+01
    LN (AMPLITUDE):          -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0
.22      -0.11       0.00
  FAULT   1 E(NO/YR)      0.2999E-020.1680E-020.1023E-020.6274E-030.3821E-030.2319E-030.1409E-030.86
10E-040.5302E-040.3296E-04
  FAULT   2 E(NO/YR)      0.4988E-020.3248E-020.1969E-020.1141E-020.6469E-030.3648E-030.2065E-030.11
81E-030.6835E-040.4012E-04
  FAULT   3 E(NO/YR)      0.5277E-020.3659E-020.2163E-020.1183E-020.6276E-030.3312E-030.1761E-030.94
90E-040.5202E-040.2902E-04
  FAULT   4 E(NO/YR)      0.2454E-020.8617E-030.2968E-030.1048E-030.3879E-040.1511E-040.6190E-050.26
56E-050.1189E-050.5527E-06
  FAULT   5 E(NO/YR)      0.8790E-030.3315E-030.1248E-030.4816E-040.1933E-040.8099E-050.3540E-050.16
11E-050.7603E-060.3712E-06
  FAULT   6 E(NO/YR)      0.5352E-020.1789E-020.6310E-030.2269E-030.8461E-040.3300E-040.1348E-040.57
49E-050.2555E-050.1178E-05
  FAULT   7 E(NO/YR)      0.2787E-020.1324E-020.6353E-030.3055E-030.1487E-030.7369E-040.3736E-040.19
39E-040.1030E-040.5601E-05
  FAULT   8 E(NO/YR)      0.1521E-020.4830E-030.1393E-030.4147E-040.1318E-040.4490E-050.1632E-050.62
89E-060.2554E-060.1087E-06
  FAULT   9 E(NO/YR)      0.1681E-020.5272E-030.1514E-030.4447E-040.1387E-040.4630E-050.1648E-050.62
22E-060.2477E-060.1034E-06
  FAULT  10 E(NO/YR)      0.6114E-020.1626E-020.4280E-030.1185E-030.3536E-040.1140E-040.3942E-050.14
53E-050.5666E-060.2323E-06
  FAULT  11 E(NO/YR)      0.2780E-020.5190E-030.9656E-040.2013E-040.4754E-050.1256E-050.3657E-060.11
58E-060.3942E-070.1430E-07
  FAULT  12 E(NO/YR)      0.3354E-020.9231E-030.2513E-030.7181E-040.2206E-040.7300E-050.2586E-050.97
44E-060.3878E-060.1620E-06
  FAULT  13 E(NO/YR)      0.3265E-020.7599E-030.2007E-030.5792E-040.1821E-040.6185E-050.2251E-050.87
03E-060.3550E-060.1518E-06
  FAULT  14 E(NO/YR)      0.1306E-020.9290E-040.9052E-050.1178E-050.1924E-060.3758E-070.8475E-080.21
51E-080.6022E-090.1831E-09
  FAULT  15 E(NO/YR)      0.6095E-030.5938E-040.7150E-050.1085E-050.2000E-060.4312E-070.1057E-070.28
85E-080.8613E-090.2777E-09
  FAULT  16 E(NO/YR)      0.7885E-020.8922E-030.1152E-030.1825E-040.3468E-050.7657E-060.1914E-060.53
05E-070.1605E-070.5239E-08
  FAULT  17 E(NO/YR)      0.5731E-030.4978E-040.5309E-050.7286E-060.1234E-060.2474E-070.5696E-080.14
70E-080.4173E-090.1286E-09
  FAULT  18 E(NO/YR)      0.3435E-030.1889E-040.1491E-050.1640E-060.2333E-070.4051E-080.8250E-090.19
13E-090.4937E-100.1384E-10
  FAULT  19 E(NO/YR)      0.3097E-030.1887E-040.1587E-050.1828E-060.2693E-070.4815E-080.1005E-080.23
79E-090.6260E-100.1794E-10
  FAULT  20 E(NO/YR)      0.5649E-030.3297E-040.2727E-050.3111E-060.4557E-070.8114E-080.1688E-080.39
90E-090.1047E-090.2990E-10
  FAULT  21 E(NO/YR)      0.2334E-020.1791E-030.1799E-040.2377E-050.3917E-060.7692E-070.1741E-070.44
27E-080.1241E-080.3781E-09
  FAULT  22 E(NO/YR)      0.2397E-020.1048E-030.7213E-050.7198E-060.9493E-070.1550E-070.2997E-080.66
35E-090.1632E-090.4294E-10
  FAULT  23 E(NO/YR)      0.4689E-030.2196E-040.1567E-050.1601E-060.2149E-070.3559E-080.6960E-090.15
58E-090.3881E-100.1036E-10
  FAULT  24 E(NO/YR)      0.1304E-020.7948E-040.6764E-050.7874E-060.1172E-060.2113E-070.4446E-080.10
61E-080.2809E-090.8096E-10
  FAULT  25 E(NO/YR)      0.2374E-020.2328E-030.2732E-040.4028E-050.7221E-060.1518E-060.3638E-070.97
17E-080.2845E-080.9008E-09
  FAULT  26 E(NO/YR)      0.2210E-020.6506E-040.3414E-050.2777E-060.3108E-070.4424E-080.7596E-090.14
91E-090.2925E-100.5220E-11
  FAULT  27 E(NO/YR)      0.8371E-040.1297E-050.4711E-070.2968E-080.2730E-090.3286E-100.4577E-110.55
14E-120.0000E+000.0000E+00
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   TOTAL      E(NO/YR)      0.6621E-010.1958E-010.8317E-020.4021E-020.2061E-020.1094E-020.5968E-030.33
32E-030.1901E-030.1106E-03
   TOTAL RISK               0.6407E-010.1939E-010.8283E-020.4013E-020.2059E-020.1094E-020.5966E-030.33
32E-030.1900E-030.1106E-03

      AMPLITUDES (g):       0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
      LN (AMPLITUDE):          0.10       0.18       0.26       0.34       0.41
   FAULT    1 E(NO/YR)      0.2070E-040.1314E-040.8430E-050.5466E-050.3582E-05
   FAULT    2 E(NO/YR)      0.2389E-040.1443E-040.8838E-050.5488E-050.3452E-05
   FAULT    3 E(NO/YR)      0.1648E-040.9528E-050.5601E-050.3345E-050.2029E-05
   FAULT    4 E(NO/YR)      0.2661E-060.1322E-060.6759E-070.3548E-070.1908E-07
   FAULT    5 E(NO/YR)      0.1869E-060.9679E-070.5144E-070.2799E-070.1557E-07
   FAULT    6 E(NO/YR)      0.5625E-060.2771E-060.1404E-060.7305E-070.3893E-07
   FAULT    7 E(NO/YR)      0.3111E-050.1764E-050.1019E-050.5998E-060.3589E-06
   FAULT    8 E(NO/YR)      0.4826E-070.2224E-070.1061E-070.5216E-080.2638E-08
   FAULT    9 E(NO/YR)      0.4507E-070.2041E-070.9571E-080.4631E-080.2306E-08
   FAULT   10 E(NO/YR)      0.9959E-070.4444E-070.2056E-070.9828E-080.4839E-08
   FAULT   11 E(NO/YR)      0.5481E-080.2207E-080.9283E-090.4061E-090.1840E-09
   FAULT   12 E(NO/YR)      0.7069E-070.3207E-070.1507E-070.7310E-080.3650E-08
   FAULT   13 E(NO/YR)      0.6772E-070.3137E-070.1503E-070.7430E-080.3776E-08
   FAULT   14 E(NO/YR)      0.5955E-100.2037E-100.7097E-110.2409E-110.7079E-12
   FAULT   15 E(NO/YR)      0.9568E-100.3488E-100.1333E-100.5217E-110.2049E-11
   FAULT   16 E(NO/YR)      0.1825E-080.6726E-090.2600E-090.1042E-090.4161E-10
   FAULT   17 E(NO/YR)      0.4245E-100.1480E-100.5313E-110.1888E-110.6013E-12
   FAULT   18 E(NO/YR)      0.4013E-110.1106E-110.2260E-120.0000E+000.0000E+00
   FAULT   19 E(NO/YR)      0.5421E-110.1638E-110.4196E-120.5356E-130.0000E+00
   FAULT   20 E(NO/YR)      0.8993E-110.2696E-110.6709E-120.6845E-130.0000E+00
   FAULT   21 E(NO/YR)      0.1233E-090.4219E-100.1485E-100.5132E-110.1561E-11
   FAULT   22 E(NO/YR)      0.1072E-100.2224E-110.0000E+000.0000E+000.0000E+00
   FAULT   23 E(NO/YR)      0.2756E-110.5936E-120.0000E+000.0000E+000.0000E+00
   FAULT   24 E(NO/YR)      0.2463E-100.7629E-110.2169E-110.2586E-120.0000E+00
   FAULT   25 E(NO/YR)      0.3051E-090.1095E-090.4095E-100.1572E-100.5931E-11
   FAULT   26 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT   27 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   TOTAL      E(NO/YR)      0.6554E-040.3952E-040.2422E-040.1507E-040.9512E-05
   TOTAL RISK               0.6554E-040.3952E-040.2422E-040.1507E-040.9512E-05

     SPECIFIED RISKS:          0.013900   0.010000   0.005000   0.002105   0.001000
     ESTIMATED LN AMP.  :       -1.451     -1.294     -1.004     -0.701     -0.488
      ESTIMATED AMP. (g):      0.23440    0.27423    0.36657    0.49631    0.61381

 BOZ. ET AL.(1999)HOR PS COR 2
      AMPLITUDES (g):       0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.80
00E+000.9000E+000.1000E+01
      LN (AMPLITUDE):          -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0
.22      -0.11       0.00
   FAULT    1 E(NO/YR)      0.2292E-020.1168E-020.6381E-030.3498E-030.1914E-030.1052E-030.5834E-040.32
77E-040.1868E-040.1082E-04
   FAULT    2 E(NO/YR)      0.3968E-020.2116E-020.1055E-020.5052E-030.2407E-030.1161E-030.5715E-040.28
82E-040.1489E-040.7880E-05
   FAULT    3 E(NO/YR)      0.4391E-020.2217E-020.9616E-030.3992E-030.1669E-030.7163E-040.3179E-040.14
60E-040.6934E-050.3398E-05
   FAULT    4 E(NO/YR)      0.1611E-020.4373E-030.1172E-030.3357E-040.1043E-040.3501E-050.1260E-050.48
22E-060.1949E-060.8264E-07
   FAULT    5 E(NO/YR)      0.5846E-030.1741E-030.5233E-040.1660E-040.5635E-050.2043E-050.7870E-060.32
00E-060.1366E-060.6089E-07
   FAULT    6 E(NO/YR)      0.3615E-020.1168E-020.3688E-030.1188E-030.4028E-040.1448E-040.5507E-050.22
08E-050.9285E-060.4076E-06
   FAULT    7 E(NO/YR)      0.1956E-020.8114E-030.3360E-030.1396E-030.5936E-040.2609E-040.1188E-040.55
98E-050.2727E-050.1369E-05
   FAULT    8 E(NO/YR)      0.9322E-030.1844E-030.3658E-040.8145E-050.2046E-050.5726E-060.1758E-060.58
44E-070.2081E-070.7870E-08
   FAULT    9 E(NO/YR)      0.1063E-020.2373E-030.5025E-040.1159E-040.2975E-050.8439E-060.2614E-060.87
43E-070.3127E-070.1186E-07
   FAULT   10 E(NO/YR)      0.4064E-020.9206E-030.2009E-030.4783E-040.1264E-040.3680E-050.1167E-050.39
89E-060.1454E-060.5615E-07
   FAULT   11 E(NO/YR)      0.1551E-020.1854E-030.2466E-040.3996E-050.7728E-060.1731E-060.4382E-070.12
28E-070.3753E-080.1235E-08
   FAULT   12 E(NO/YR)      0.2143E-020.4836E-030.1061E-030.2545E-040.6785E-050.1994E-050.6380E-060.21
99E-060.8088E-070.3148E-07
   FAULT   13 E(NO/YR)      0.2369E-020.5487E-030.1353E-030.3672E-040.1096E-040.3566E-050.1250E-050.46
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79E-060.1854E-060.7727E-07
   FAULT  14 E(NO/YR)      0.6167E-030.2801E-040.2026E-050.2117E-060.2910E-070.4928E-080.9841E-090.22
43E-090.5682E-100.1554E-10
   FAULT  15 E(NO/YR)      0.3619E-030.2609E-040.2537E-050.3289E-060.5352E-070.1041E-070.2340E-080.59
18E-090.1652E-090.5004E-10
   FAULT  16 E(NO/YR)      0.3596E-020.2284E-030.1998E-040.2379E-050.3608E-060.6614E-070.1411E-070.34
08E-080.9120E-090.2649E-09
   FAULT  17 E(NO/YR)      0.2194E-030.9635E-050.6609E-060.6573E-070.8640E-080.1407E-080.2712E-090.59
86E-100.1467E-100.3857E-11
   FAULT  18 E(NO/YR)      0.1101E-030.2978E-050.1503E-060.1195E-070.1318E-080.1857E-090.3149E-100.60
85E-110.1220E-110.1556E-12
   FAULT  19 E(NO/YR)      0.1031E-030.3098E-050.1667E-060.1387E-070.1584E-080.2297E-090.4003E-100.79
74E-110.1693E-110.3090E-12
   FAULT  20 E(NO/YR)      0.2290E-030.7704E-050.4478E-060.3954E-070.4736E-080.7145E-090.1290E-090.26
71E-100.6074E-110.1336E-11
   FAULT  21 E(NO/YR)      0.1218E-020.6343E-040.4914E-050.5369E-060.7617E-070.1322E-070.2695E-080.62
53E-090.1612E-090.4496E-10
   FAULT  22 E(NO/YR)      0.9953E-030.2669E-040.1348E-050.1075E-060.1189E-070.1680E-080.2855E-090.55
21E-100.1127E-100.1964E-11
   FAULT  23 E(NO/YR)      0.1775E-030.4728E-050.2363E-060.1866E-070.2047E-080.2871E-090.4848E-100.93
23E-110.1826E-110.2256E-12
   FAULT  24 E(NO/YR)      0.7088E-030.3065E-040.2087E-050.2068E-060.2712E-070.4411E-080.8498E-090.18
75E-090.4592E-100.1200E-10
   FAULT  25 E(NO/YR)      0.2359E-020.2619E-030.3346E-040.5278E-050.1000E-050.2204E-060.5501E-070.15
23E-070.4605E-080.1501E-08
   FAULT  26 E(NO/YR)      0.1170E-020.2542E-040.1108E-050.7892E-070.7968E-080.1042E-080.1631E-090.28
85E-100.4711E-110.0000E+00
   FAULT  27 E(NO/YR)      0.3087E-040.3093E-060.8596E-080.4460E-090.3496E-100.3457E-110.2778E-120.00
00E+000.0000E+000.0000E+00
   TOTAL     E(NO/YR)      0.4244E-010.1137E-010.4152E-020.1706E-020.7524E-030.3501E-030.1703E-030.86
07E-040.4497E-040.2420E-04
   TOTAL RISK              0.4155E-010.1131E-010.4143E-020.1704E-020.7521E-030.3501E-030.1703E-030.86
07E-040.4497E-040.2420E-04

      AMPLITUDES (g):      0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
      LN (AMPLITUDE):         0.10       0.18       0.26       0.34       0.41
   FAULT   1 E(NO/YR)      0.6361E-050.3798E-050.2302E-050.1415E-050.8813E-06
   FAULT   2 E(NO/YR)      0.4267E-050.2361E-050.1333E-050.7675E-060.4497E-06
   FAULT   3 E(NO/YR)      0.1714E-050.8887E-060.4724E-060.2570E-060.1428E-06
   FAULT   4 E(NO/YR)      0.3658E-070.1682E-070.8008E-080.3933E-080.1987E-08
   FAULT   5 E(NO/YR)      0.2821E-070.1353E-070.6700E-080.3413E-080.1785E-08
   FAULT   6 E(NO/YR)      0.1860E-060.8790E-070.4289E-070.2154E-070.1111E-07
   FAULT   7 E(NO/YR)      0.7073E-060.3750E-060.2037E-060.1131E-060.6410E-07
   FAULT   8 E(NO/YR)      0.3137E-080.1310E-080.5704E-090.2577E-090.1204E-09
   FAULT   9 E(NO/YR)      0.4733E-080.1979E-080.8618E-090.3894E-090.1819E-09
   FAULT  10 E(NO/YR)      0.2280E-070.9677E-080.4276E-080.1958E-080.9265E-09
   FAULT  11 E(NO/YR)      0.4337E-090.1611E-090.6256E-100.2509E-100.1058E-10
   FAULT  12 E(NO/YR)      0.1288E-070.5509E-080.2451E-080.1131E-080.5385E-09
   FAULT  13 E(NO/YR)      0.3367E-070.1526E-070.7173E-080.3481E-080.1739E-08
   FAULT  14 E(NO/YR)      0.4420E-110.1176E-110.2085E-120.0000E+000.0000E+00
   FAULT  15 E(NO/YR)      0.1620E-100.5517E-110.1941E-110.6265E-120.1714E-12
   FAULT  16 E(NO/YR)      0.8180E-100.2564E-100.7026E-110.2315E-110.0000E+00
   FAULT  17 E(NO/YR)      0.1005E-110.1906E-120.0000E+000.0000E+000.0000E+00
   FAULT  18 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  19 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  20 E(NO/YR)      0.2006E-120.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  21 E(NO/YR)      0.1307E-100.3742E-110.8695E-120.0000E+000.0000E+00
   FAULT  22 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  23 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  24 E(NO/YR)      0.3076E-110.5558E-120.0000E+000.0000E+000.0000E+00
   FAULT  25 E(NO/YR)      0.5224E-090.1924E-090.7421E-100.2966E-100.1184E-10
   FAULT  26 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  27 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   TOTAL     E(NO/YR)      0.1338E-040.7575E-050.4384E-050.2588E-050.1556E-05
   TOTAL RISK              0.1338E-040.7575E-050.4384E-050.2588E-050.1556E-05

    SPECIFIED RISKS:          0.013900   0.010000   0.005000   0.002105   0.001000
    ESTIMATED LN AMP.  :       -1.719     -1.560     -1.280     -0.985     -0.771
     ESTIMATED AMP. (g):      0.17917    0.21017    0.27807    0.37356    0.46262
```

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO	
1	NEWPORT-INGLEWOOD (L.A.Basin)	0.8	0.8	3.1	0.8	0.9	1.4	km
2	SANTA MONICA	7.0	7.0	8.3	7.0	7.3	7.3	km
3	HOLLYWOOD	7.0	7.0	8.7	7.0	7.6	7.7	km
4	ELYSIAN PARK THRUST	13.7	13.7	16.9	16.9	15.1	18.3	km
5	MALIBU COAST	14.5	14.4	14.8	14.5	15.5	15.6	km
6	PALOS VERDES	15.6	15.6	15.9	15.6	15.6	15.8	km
7	COMPTON THRUST	16.0	6.5	11.6	11.6	7.7	12.3	km
8	RAYMOND	17.8	17.8	18.5	17.8	18.8	18.9	km
9	VERDUGO	19.8	19.8	23.0	19.8	20.6	20.6	km
10	SIERRA MADRE	25.6	25.6	28.9	25.6	26.7	26.7	km
11	SIERRA MADRE (San Fernando)	28.3	28.3	31.4	28.3	29.1	29.1	km
12	NORTHRIDGE (E. Oak Ridge)	28.3	17.3	25.0	25.0	18.6	25.7	km
13	ANACAPA-DUME	29.7	29.7	30.7	29.7	30.9	30.9	km
14	WHITTIER	33.3	33.3	33.4	33.3	34.3	34.3	km
15	SAN GABRIEL	33.8	33.8	33.9	33.8	34.2	34.3	km
16	SANTA SUSANA	34.2	34.2	36.6	34.2	35.0	35.0	km
17	CLAMSHELL-SAWPIT	38.7	38.3	38.5	38.5	39.4	39.6	km
18	SAN JOSE	45.8	44.2	45.4	45.4	45.3	46.4	km
19	HOLSER	46.5	42.2	44.1	44.1	43.4	44.9	km
20	SIMI-SANTA ROSA	48.8	48.8	49.9	48.9	49.9	49.9	km
21	OAK RIDGE (Onshore)	52.4	48.2	50.1	50.1	49.3	50.9	km
22	SAN CAYETANO	58.0	58.0	59.7	58.0	58.7	58.7	km
23	CHINO-CENTRAL AVE. (Elsinore)	58.1	52.3	54.6	54.6	53.4	55.3	km
24	CUCAMONGA	60.7	58.8	59.7	59.7	59.9	60.8	km
25	SAN ANDREAS - 1857 Rupture	63.4	63.4	63.4	63.4	63.4	63.5	km
26	SAN ANDREAS - Mojave	63.4	63.4	63.4	63.4	63.4	63.4	km
27	NEWPORT-INGLEWOOD (Offshore)	64.3	64.3	64.4	64.3	65.4	65.4	km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

Appendix D

Liquefaction Study

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*****************************
*                           *
*      L I Q U E F Y 2      *
*                           *
*       Version 1.50        *
*                           *
*****************************
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EMPIRICAL PREDICTION OF
EARTHQUAKE-INDUCED LIQUEFACTION POTENTIAL

JOB NUMBER: 3224 DATE: 09-30-2003

JOB NAME: Rad

SOIL-PROFILE NAME: 3224.LDW

BORING GROUNDWATER DEPTH: 15.00 ft

CALCULATION GROUNDWATER DEPTH: 15.00 ft

DESIGN EARTHQUAKE MAGNITUDE: 7.50 Mw

SITE PEAK GROUND ACCELERATION: 0.370 g

BOREHOLE DIAMETER CORRECTION FACTOR: 1.00

SAMPLER SIZE CORRECTION FACTOR: 1.00

N60 HAMMER CORRECTION FACTOR: 1.00

MAGNITUDE SCALING FACTOR METHOD: Idriss (1997, in press)

Magnitude Scaling Factor: 1.000

rd-CORRECTION METHOD: Seed and Idriss (1971)

FIELD SPT N-VALUES ARE CORRECTED FOR THE LENGTH OF THE DRIVE RODS.

NCEER [1997] Method   LIQUEFACTION ANALYSIS SUMMARY   PAGE 1

File Name: 3224.OUT

SOIL	CALC. DEPTH	TOTAL STRESS	EFF. STRESS	FIELD N	FC DELTA	C	CORR. (N1)60	LIQUE. RESIST	r	INDUC. STRESS	LIQUE. SAFETY

Thickness (in) | Strain (%) | Settlement (in)

NO.	(ft)	(tsf)	(tsf)	(B/ft)	N1_60	N	(B/ft)	RATIO	d	RATIO	FACTOR
1	0.25	0.015	0.015	20	~	*	*	*	*	*	**
1	0.75	0.045	0.045	20	~	*	*	*	*	*	**
1	1.25	0.075	0.075	20	~	*	*	*	*	*	**
1	1.75	0.105	0.105	20	~	*	*	*	*	*	**
1	2.25	0.135	0.135	20	~	*	*	*	*	*	**
1	2.75	0.165	0.165	20	~	*	*	*	*	*	**
1	3.25	0.195	0.195	20	~	*	*	*	*	*	**
1	3.75	0.225	0.225	20	~	*	*	*	*	*	**
1	4.25	0.255	0.255	20	~	*	*	*	*	*	**
1	4.75	0.285	0.285	20	~	*	*	*	*	*	**
1	5.25	0.315	0.315	20	~	*	*	*	*	*	**
1	5.75	0.345	0.345	20	~	*	*	*	*	*	**
1	6.25	0.375	0.375	20	~	*	*	*	*	*	**
1	6.75	0.405	0.405	20	~	*	*	*	*	*	**
1	7.25	0.435	0.435	20	~	*	*	*	*	*	**
1	7.75	0.465	0.465	20	~	*	*	*	*	*	**
1	8.25	0.495	0.495	20	~	*	*	*	*	*	**
1	8.75	0.525	0.525	20	~	*	*	*	*	*	**
1	9.25	0.555	0.555	20	~	*	*	*	*	*	**
1	9.75	0.585	0.585	20	~	*	*	*	*	*	**
1	10.25	0.615	0.615	20	~	*	*	*	*	*	**
1	10.75	0.645	0.645	20	~	*	*	*	*	*	**
1	11.25	0.675	0.675	20	~	*	*	*	*	*	**
1	11.75	0.705	0.705	20	~	*	*	*	*	*	**
1	12.25	0.735	0.735	20	~	*	*	*	*	*	**
1	12.75	0.765	0.765	20	~	*	*	*	*	*	**
1	13.25	0.795	0.795	20	~	*	*	*	*	*	**
1	13.75	0.825	0.825	20	~	*	*	*	*	*	**
1	14.25	0.855	0.855	20	~	*	*	*	*	*	**
1	14.75	0.885	0.885	20	~	*	*	*	*	*	**
2	15.25	0.915	0.907	12	0.02	0.980	10.8	0.117	0.968	0.235	0.50
2	15.75	0.945	0.922	12	0.02	0.980	10.8	0.117	0.967	0.238	0.49
2	16.25	0.975	0.936	12	0.02	0.980	10.8	0.117	0.966	0.242	0.48
2	16.75	1.005	0.950	12	0.02	0.980	10.8	0.117	0.965	0.245	0.48
2	17.25	1.035	0.965	12	0.02	0.980	10.8	0.117	0.964	0.249	0.47
2	17.75	1.065	0.979	12	0.02	0.980	10.8	0.117	0.963	0.252	0.46
2	18.25	1.095	0.994	12	0.02	0.980	10.8	0.117	0.961	0.255	0.46
2	18.75	1.125	1.008	12	0.02	0.980	10.8	0.117	0.960	0.258	0.45
2	19.25	1.155	1.022	12	0.02	0.980	10.8	0.117	0.959	0.261	0.45
2	19.75	1.185	1.037	12	0.02	0.980	10.8	0.117	0.958	0.263	0.44
2	20.25	1.215	1.051	12	0.02	0.980	10.8	0.117	0.956	0.266	0.44
2	20.75	1.245	1.066	12	0.02	0.980	10.8	0.117	0.955	0.268	0.43
2	21.25	1.275	1.080	12	0.02	0.980	10.8	0.117	0.954	0.271	0.43

84" 2.2% 1.8"

NCEER [1997] Method — LIQUEFACTION ANALYSIS SUMMARY — PAGE 2

File Name: 3224.OUT

SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
2	21.75	1.305	1.094	12	0.02	0.980	10.8	0.117	0.952	0.273	0.43
3	22.25	1.335	1.109	50	~	~	~	~	~	~	~~
3	22.75	1.365	1.123	50	~	~	~	~	~	~	~~
3	23.25	1.395	1.138	50	~	~	~	~	~	~	~~
3	23.75	1.425	1.152	50	~	~	~	~	~	~	~~
3	24.25	1.455	1.166	50	~	~	~	~	~	~	~~
3	24.75	1.485	1.181	50	~	~	~	~	~	~	~~
3	25.25	1.515	1.195	50	~	~	~	~	~	~	~~
3	25.75	1.545	1.210	50	~	~	~	~	~	~	~~
3	26.25	1.575	1.224	50	~	~	~	~	~	~	~~

Total Settlement 1.8"

Differential Settlement 1.2"

3	26.75	1.605	1.238	50	~	~	~	~	~	~	~~
3	27.25	1.635	1.253	50	~	~	~	~	~	~	~~
3	27.75	1.665	1.267	50	~	~	~	~	~	~	~~
3	28.25	1.695	1.282	50	~	~	~	~	~	~	~~
3	28.75	1.725	1.296	50	~	~	~	~	~	~	~~
3	29.25	1.755	1.310	50	~	~	~	~	~	~	~~
3	29.75	1.785	1.325	50	~	~	~	~	~	~	~~
3	30.25	1.815	1.339	50	~	~	~	~	~	~	~~
3	30.75	1.845	1.354	50	~	~	~	~	~	~	~~
3	31.25	1.875	1.368	50	~	~	~	~	~	~	~~
3	31.75	1.905	1.382	50	~	~	~	~	~	~	~~
3	32.25	1.935	1.397	50	~	~	~	~	~	~	~~
3	32.75	1.965	1.411	50	~	~	~	~	~	~	~~
3	33.25	1.995	1.426	50	~	~	~	~	~	~	~~
3	33.75	2.025	1.440	50	~	~	~	~	~	~	~~
3	34.25	2.055	1.454	50	~	~	~	~	~	~	~~
3	34.75	2.085	1.469	50	~	~	~	~	~	~	~~
3	35.25	2.115	1.483	50	~	~	~	~	~	~	~~
3	35.75	2.145	1.498	50	~	~	~	~	~	~	~~
3	36.25	2.175	1.512	50	~	~	~	~	~	~	~~
3	36.75	2.205	1.526	50	~	~	~	~	~	~	~~
3	37.25	2.235	1.541	50	~	~	~	~	~	~	~~
3	37.75	2.265	1.555	50	~	~	~	~	~	~	~~
3	38.25	2.295	1.570	50	~	~	~	~	~	~	~~
3	38.75	2.325	1.584	50	~	~	~	~	~	~	~~
3	39.25	2.355	1.598	50	~	~	~	~	~	~	~~
3	39.75	2.385	1.613	50	~	~	~	~	~	~	~~
3	40.25	2.415	1.627	50	~	~	~	~	~	~	~~
3	40.75	2.445	1.642	50	~	~	~	~	~	~	~~
3	41.25	2.475	1.656	50	~	~	~	~	~	~	~~
3	41.75	2.505	1.670	50	~	~	~	~	~	~	~~
3	42.25	2.535	1.685	50	~	~	~	~	~	~	~~
3	42.75	2.565	1.699	50	~	~	~	~	~	~	~~
3	43.25	2.595	1.714	50	~	~	~	~	~	~	~~

File Name: 3224.OUT

SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
3	43.75	2.625	1.728	50	~	~	~	~	~	~	~~
3	44.25	2.655	1.742	50	~	~	~	~	~	~	~~
3	44.75	2.685	1.757	50	~	~	~	~	~	~	~~
3	45.25	2.715	1.771	50	~	~	~	~	~	~	~~
3	45.75	2.745	1.786	50	~	~	~	~	~	~	~~
3	46.25	2.775	1.800	50	~	~	~	~	~	~	~~
3	46.75	2.805	1.814	50	~	~	~	~	~	~	~~
3	47.25	2.835	1.829	50	~	~	~	~	~	~	~~
3	47.75	2.865	1.843	50	~	~	~	~	~	~	~~
3	48.25	2.895	1.858	50	~	~	~	~	~	~	~~
3	48.75	2.925	1.872	50	~	~	~	~	~	~	~~
3	49.25	2.955	1.886	50	~	~	~	~	~	~	~~
3	49.75	2.985	1.901	50	~	~	~	~	~	~	~~
3	50.25	3.015	1.915	50	~	~	~	~	~	~	~~

15.0

15.0	20.0	0	120.0	10	0.400	8.50
22.0	12.0	1	120.0	5	0.400	21.50
50.5	50.0	0	120.0	5	0.400	46.50

NPUT FILE: a:CPT-1.CSV

Depth (feet)	Qc(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)	CSR (Qc) (ratio)
0.500	87.138	0.800	8	21	32	9E9	0.378
1.500	45.779	1.757	7	15	23	9E9	0.338
2.500	22.892	2.231	6	9	14	9E9	0.150
3.500	19.192	1.143	6	7	11	9E9	0.118
4.500	11.436	2.448	5	5	8	0.744	9E9
5.500	11.850	2.897	4	8	12	0.768	9E9
6.500	24.325	4.369	4	16	24	1.592	9E9
7.500	14.858	5.821	3	14	21	0.954	9E9
8.500	17.650	4.714	3	17	26	1.139	9E9
9.500	23.073	3.498	5	11	17	1.498	9E9
10.500	22.292	4.617	3	21	29	1.442	9E9
11.500	18.336	4.127	4	12	16	1.175	9E9
12.500	51.283	2.322	6	20	24	9E9	0.260
13.500	60.925	1.365	7	19	22	9E9	0.324
14.500	46.958	1.184	7	15	16	9E9	0.247
15.500	41.992	1.275	7	13	14	9E9	0.226
16.500	33.882	1.522	7	11	11	9E9	0.193
17.500	18.915	2.965	5	9	9	1.190	9E9
18.500	28.464	2.735	6	11	10	9E9	0.107
19.500	27.325	2.442	6	10	9	9E9	0.096
20.500	41.571	1.643	7	13	11	9E9	0.193
21.500	35.633	2.082	6	14	11	9E9	0.118
22.500	42.062	3.438	5	20	16	2.710	9E9
23.500	64.269	3.033	6	25	19	9E9	0.204
24.500	116.908	1.441	8	28	20	9E9	0.215
25.500	112.485	2.177	7	36	25	9E9	0.378
26.500	124.683	3.682	6	48	33	9E9	0.403
27.500	129.850	4.040	11	124	83	9E9	9E9
28.500	111.567	3.393	6	43	28	9E9	0.310
29.500	190.683	2.719	7	61	38	9E9	1.217
30.500	174.215	2.883	7	56	34	9E9	0.931
31.500	165.127	3.171	6	63	38	9E9	0.717
32.500	203.383	2.816	7	65	38	9E9	1.217
33.500	172.345	3.297	6	66	38	9E9	0.717
34.500	207.675	2.851	7	66	37	9E9	1.145
35.500	254.033	2.758	7	81	44	9E9	1.645
36.500	201.058	3.118	7	64	34	9E9	0.931
37.500	186.223	3.540	12	89	47	9E9	9E9
38.500	195.073	3.282	6	75	39	9E9	0.788
39.500	182.623	3.570	12	88	44	9E9	9E9
40.500	152.567	4.054	11	147	74	9E9	9E9
41.499	176.723	3.717	12	85	43	9E9	9E9
42.499	145.483	3.715	12	70	35	9E9	9E9
43.499	172.808	3.716	12	83	42	9E9	9E9
44.499	173.108	3.482	12	83	42	9E9	9E9
45.499	203.360	3.674	12	97	49	9E9	9E9
46.499	160.217	3.907	12	77	39	9E9	9E9
47.499	252.367	2.828	7	81	41	9E9	1.431
48.499	266.931	2.839	7	85	43	9E9	1.574
49.499	138.223	3.259	6	53	27	9E9	0.297
50.499	137.500	0.000	9	9E9	9E9	9E9	9E9

$N_{avg} = 12$ #200 4% $D_{50} = 0.4$ M=7.5 $a_{max} = 0.37$

NPUT FILE: a:CPT-2.CSV

Depth (feet)	Qc(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)	CSR (Qc) (ratio)
0.500	79.492	0.829	8	19	29	9E9	0.324
1.500	17.975	3.219	5	9	14	1.190	9E9
2.500	37.877	4.301	4	24	36	2.514	9E9
3.500	75.750	4.891	11	73	110	9E9	9E9
4.500	58.300	5.583	3	56	84	3.866	9E9
5.500	48.045	5.151	3	46	69	3.178	9E9
6.500	93.908	2.404	7	30	45	9E9	9E9
7.500	176.450	0.896	9	34	51	9E9	1.717
8.500	114.808	1.338	8	27	41	9E9	1.645
9.500	220.117	0.794	9	42	63	9E9	0.931
10.500	339.343	0.670	10	54	75	9E9	2.502
11.500	127.515	1.238	8	31	40	9E9	3.359
12.500	31.509	2.574	6	12	14	9E9	0.860
13.500	37.408	4.658	4	24	27	9E9	0.150
14.500	132.225	1.307	8	32	34	2.437	9E9
15.500	485.123	0.750	10	77	79	9E9	0.431
16.500	380.262	0.542	10	61	59	9E9	3.644
17.500	385.658	0.436	10	62	57	9E9	2.216
18.500	314.015	0.757	9	60	53	9E9	2.074
19.500	126.769	1.652	8	30	26	9E9	1.788
20.500	56.200	1.424	7	19	16	9E9	0.285
21.500	52.692	1.458	7	18	14	9E9	0.247
22.500	62.554	1.656	7	21	16	9E9	0.226
23.500	56.100	1.338	7	19	14	9E9	0.247
24.500	59.833	1.286	7	20	14	9E9	0.226
25.500	59.492	1.744	7	20	14	9E9	0.226
26.500	53.650	1.352	7	18	12	9E9	0.226
27.500	53.907	1.304	7	18	12	9E9	0.204
28.500	65.250	1.576	7	22	14	9E9	0.204
29.500	60.079	1.263	7	20	13	9E9	0.226
30.500	59.731	1.243	7	20	12	9E9	0.215
31.500	63.623	1.329	7	21	13	9E9	0.204
32.500	61.277	1.170	7	20	12	9E9	0.215
33.500	58.915	1.175	7	20	11	9E9	0.204
34.500	59.983	1.323	7	20	11	9E9	0.193
35.500	60.455	1.205	7	20	11	9E9	0.193
36.500	63.242	1.197	7	21	11	9E9	0.193
37.500	64.055	1.281	7	21	11	9E9	0.193
38.500	61.183	1.209	7	21	11	9E9	0.193
39.500	76.285	1.334	8	19	10	9E9	0.193
40.500	97.091	1.844	7	32	16	9E9	0.107
41.499	80.615	1.412	7	27	14	9E9	0.247
42.499	69.785	1.236	8	17	9	9E9	0.226
43.499	99.100	1.652	7	32	16	9E9	0.096
44.499	71.133	1.092	8	18	9	9E9	0.247
45.499	69.450	1.157	8	17	9	9E9	0.096
46.499	67.269	1.209	8	17	9	9E9	0.096
47.499	74.557	1.170	8	19	10	9E9	0.096
48.499	69.836	1.138	8	18	9	9E9	0.107
49.499	73.117	0.881	8	18	9	9E9	0.096
50.499	77.700	0.000	9	9E9	9E9	9E9	0.096
							9E9

Lateral Spreading

Data Input in Shade Areas

Client	?	
Client Number	?	
Date		2/17/99

M	6.9	**T_{15}, m**	2.00
R, km	0.8	**F_{15}, %**	5.00
W, %	0.05	**$D_{50\|15}$, mm**	0.10
S, %	0.00		

Estimated Horizontal Ground Displacement, m

Free-Face Component

0.90

Ground-Slope Component

#NUM!

Lateral Spreading

Data Input in Shade Areas

Client	?	
Client Number	?	
Date		2/17/99

M	6.9	**T_{15}, m**	10.00
R, km	0.8	**F_{15}, %**	5.00
W, %	0.08	**$D_{50\|15}$, mm**	0.10
S, %	0.00		

Estimated Horizontal Ground Displacement, m

Free-Face Component

2.05

Ground-Slope Component

#NUM!

Lateral Spreading

Data Input in Shade Areas

Client	?	
Client Number	?	
Date		2/17/99

M	6.9	**T_{15}, m**	10.00
R, km	0.8	**F_{15}, %**	5.00
W, %	0.17	**$D_{50\|15}$, mm**	0.10
S, %	0.00		

Estimated Horizontal Ground Displacement, m

Free-Face Component

3.51

Ground-Slope Component

#NUM!

Appendix E

The J. Byer Group's Geotechnical Data

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 1

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Clay, black moist, firm								
		ALLUVIUM Silt/Sandy Silt, light gray brown, moist, firm to very firm, some clay, light gray caliche veining some clay		---- ML	R	20	20.2	102.8	88.0	
93	5	Sandy Silt, dark brown, slightly moist to moist, very firm, light gray brown caliche veining, some clay		---- ML	R	27	16.1	115.7	99.8	
91	7	Silty Sand, brown, moist, dense, fine to medium grained		---- SM	R	23	15.6	116.2	97.7	
88	10	Sand, light gray to tan, moist, dense, fine to medium grained		---- SW	R	19	18.7	108.5	94.8	
83	15	Silty Sand/Sandy Silt, gray, moist to very moist, very firm, fine grained		---- SM	R	23	24.7	99.7	99.4	
81	17	water at 17 Feet Gravel, light gray to dark gray, wet, dense to very dense, cobbles to 3 Inches		GW						
79	19	End at 20 Feet; Water at 17 Feet; Fill to 1½ Feet.		----	R	50 10"	N/R	N/R	N/R	
78	20									

Surface: Asphalt Parking-3" Asphalt/2" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 2

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Sandy Silt, dark brown, moist, firm, some clay								
		Silty Clay, dark brown to black, moist, firm		----	R	12	13.0	100.1	53.0	
				CL						
93	5	**ALLUVIUM:** Sandy Silt, light gray brown, slightly moist, very firm, fine to medium grained, light gray caliche veining		----	R	38	16.6	112.2	93.0	
				ML						
91	7	Silty Sand, brown, slightly moist, dense to very dense, light gray caliche veining		----	R	37	17.0	112.7	96.7	
				ML						
88	10	Silty Sand/Sandy Silt, gray, slightly moist to moist, firm		----	R	14	17.8	110.1	93.9	
				SM						
84	14	Sand, orange-brown to light bray, slightly moist, very dense, fine to medium grained								
83	15	End at 15 Feet; No Water; Fill to 5 Feet.		SW	R	38	4.8	95.9	17.8	

Elevation scale: 98, 97, 96, 95, 94, 93, 92, 91, 90, 89, 88, 87, 86, 85, 84, 83, 82, 81, 80, 79, 78
Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Surface: Asphalt Parking-3" Asphalt/4" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 3

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Sandy Silt, dark brown, moist, slightly firm								
97	1	Silt, light brown gray, moist, slightly firm								
96	2			----	R	14	22.7	92.3	75.9	
95	3	Clayey Silt, dark brown to black, moist, soft to slightly firm								
94	4			ML						
93	5			----	R	7	18.6	107.2	91.0	
92	6									
91	7	ALLUVIUM: Sandy Silt, gray, brown, moist, firm, light gray caliche veining, fine to medium grained, some clay		----	R	16	20.0	106.6	96.3	
90	8			ML						
89	9									
88	10	Silty Sand, gray, moist, dense, fine grained		----	R	15	20.6	105.6	96.4	
87	11									
86	12			SM						
85	13									
84	14									
83	15	Silty Sand, dark brown, orange-brown, gray, very dense		SM	R	34	19.7	103.7	87.7	
82	16									
81	17	Gravel and cobblers, gray, light brown, unable to continue due to large rock		GW						
80	18	End at 18 Feet; No Water; Fill to 7 Feet.								
79	19									
78	20									

Surface: Asphalt Parking-3" Asphalt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 4

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface							
		2 Inches Aphalt, 7 Inches Concrete, 3 Inches Base							
97	1	FILL: Silty Clay, brown, moist, firm							
96	2		CL	R	17	22.4	103.6	99.9	
93	5	Sandy Silt, brown to dark brown, moist, firm, light gray, caliche veining	ML	R	15	21.1	104.4	95.6	
91	7	Silty Sand, gray, moist, very dense, fine grained, light gray caliche veining	SM	R	24	13.8	115.9	85.5	
88	10	gray to brown, very moist, dense	SM	R	17	20.2	104.9	92.8	
86	12	Sand, greenish gray, very dense, fine to coarse grained, slight petroleum odor	SW	R	32	5.8	107.0	28.1	
83	15	dark gray to greenish gray to light gray, fine to very coarse grained, some gravel, very slight odor of petroleum	GW	R	32	7.7	108.1	38.5	
81	17	water at 17 Feet							
78	20								

Surface: Asphalt Parking

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 4

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
		Clayey Silt, dark gray, moist, very firm		----	R	19	25.7	98.3	100.0	
77	21									
76	22									
75	23			ML						
74	24									
73	25	End at 25 Feet; Water at 17 Feet; Fill to 5 Feet.		----	R	37	24.1	100.9	100.0	
72	26									
71	27									
70	28									
69	29									
68	30									
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Asphalt Parking

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 5

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
97	1	FILL: Silty Sand, dark gray brown, moist, medium dense, some gravel and clay								
96	2	Sandy Clay, black, dark brown, brown, moist to very moist, soft, some gravel		----	R	15	18.7	105.2	86.6	
95	3									
94	4			CL						
93	5			----	R	8	21.9	91.2	88.6	
92	6									
91	7	dark gray brown, white, red, slightly firm to firm		----	R	15	23.1	97.8	94.7	
90	8			CL						
89	9									
88	10	soft		----	R	7	24.6	97.9	88.3	
87	11									
86	12			CL						
85	13									
84	14									
83	15	Sandy Silt, dark gray to brown, moist, firm		----	R	14	18.7	106.0	92.4	
82	16									
81	17			ML						
80	18	Sandy Gravel, gray to dark gray, dense, some cobbles								
79	19			GW						
78	20									

Surface: Asphalt Parking/4" Asphalt 5" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 5

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description (Subsurface Profile)	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
77	21			----	R	14	19.0	107.0	55.4	
76	22	ALLUVIUM: Sandy Silt, gray to dark gray, moist, firm								
74	24			ML						
73	25	dark gray, very moist		----	R	12	----	----	----	No Recovery
71	27			ML						
68	30	End at 30 Feet; No Water; Fill to 22 Feet.		----	R	14	----	----	----	No Recovery

Elevation scale: 77 to 58; Depth scale: 21 to 40.

Surface: Asphalt Parking/4" Asphalt 5" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, brown, black, slightly moist to moist, medium dense, some gravel								
93	5			SM	R	9	13.4	100.2	55.4	
88	10	Sandy Clay, black, brown, moist to very moist, slightly firm, some gravel		----	R	16	24.6	95.3	88.6	
86	12			CL						
83	15	concrete fraghment in tip of sampler, some gravel and cobbles		----	R	21	15.3	104.4	69.5	
81	17	Sandy Clay								
80	18			CL						
79	19	ALLUVIUM: Sandy Silt, gray to dark gray, moist, firm								
78	20									

Surface: Asphalt Parking/3" Asphalt, 5" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 1871.1-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
				ML	R	13	26.0	96.6	96.9	
77	21									
76	22			ML						
75	23									
74	24	dark gray, very moist to wet								
73	25	End at 25 Feet; No Water; Fill to 19 Feet.		----	R	10	28.8	91.7	95.0	
72	26									
71	27									
70	28									
69	29									
68	30									
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Asphalt Parking/3" Asphalt, 5" Base

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 18711-B

Client: McKesson HBOL

Location: Jefferson La Cienega, Los Angeles

Log of Boring 7

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, dark gray-brown to dark gray, slightly moist to moist, dense, fine to very coarse grained, asphalt fragments to 2 inches								
93	5			SM	R	13	14.6	101.1	61.0	
88	10			----	R	15	18.6	98.0	71.6	
84	14	Sand, light tan to brown, slightly moist, medium dense, fine to medium grained, some dirt clods								
83	15	Sandy Silt, light gray, brown, slightly moist, slightly firm, fine grained		SP	R	10	20.3	101.1	84.7	
81	17			ML						
79	19	Sandy Silt, black, slighty moist, firm, fine to medium grained								
78	20									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-B

Client: McKesson HBOL

Location: Jefferson La Cienega, Los Angeles

Log of Boring 7

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
77	21			ML	R	11	11.8	108.4	59.7	
76	22	**ALLUVIUM:** Sandy Silt, gray to light brown, moist, firm, some clay								
75	23			ML	SPT	3 5 8				
74	24	Gravelly Sand, tan to light gray, dry to slightly moist, dense								
73	25			GW	SPT	12 18 31				
72	26									
71	27									
70	28	Sandy Silt, gray, moist, very firm, fine grained		----	SPT	14 14 18				
69	29			ML						
68	30			----	SPT	10 20 22				
67	31									
66	32	Sandy Silt/Silty Sand, dark gray, moist, very firm, fine grained, scattered organic material to ¼ inch								
65	33			ML	SPT	12 19 24				
64	34									
63	35			----	SPT	9 13 21				
62	36									
61	37									
60	38			----	SPT	7 12 19				
59	39									
58	40									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-B

Client: McKesson HBOL

Location: Jefferson La Cienega, Los Angeles

Log of Boring 7

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
		some shell fragments to 1/8 inch		----	SPT	7 11 16				
57	41									
56	42									
55	43			ML	SPT	7 15 18				
54	44									
53	45			----	SPT	8 13 20				
52	46									
51	47									
50	48			----	SPT	9 15 19				
49	49									
48	50	End at 50 Feet; No Water; Fill to 21 Feet.		----	SPT	7 14 17				
47	51									
46	52									
45	53									
44	54									
43	55									
42	56									
41	57									
40	58									
39	59									
38	60									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 8

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, dark gray brown, moist, medium dense to dense, some asphalt fragments								
97	1	dense								
96	2									
95	3			SM						
94	4									
93	5	tan to brown, some gravel		SM	R	15	15.3	111.4	83.6	
92	6									
91	7	brown to dark brown								
90	8			SM						
89	9									
88	10	dark brown, some clay, very dense		----	R	24	10.1	119.8	70.4	
87	11									
86	12			SM						
85	13									
84	14									
83	15	Sandy Silt, mottled greenish gray and dark gray brown, moist, firm		----	R	17	20.4	103.4	90.3	
82	16			ML						
81	17									
80	18									
79	19	ALLUVIUM:								
78	20	Silt, grayish brown, moist to very moist, firm, some shell fragments								

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Sheet: 1 of 2

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 8

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
				ML	R	13	27.8	93.2	95.1	
77	21									
76	22			ML						
75	23									
74	24	gray to dark gray, moist								
73	25	End at 25 Feet; No Water; Fill to 19 Feet.		----	R	19	26.5	96.6	98.7	
72	26									
71	27									
70	28									
69	29									
68	30									
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 9

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, brown to light brown, moist to very moist, medium dense, some clay, some brick fragments		SM						
95	3	dark brown to dark gray brown, fragments of asphalt up to 3 inches								
93	5			SM	R	14	10.1	121.6	74.5	
88	10	Silt, dark gray to grayish brown, moist to very moist, firm		----	R	13	31.5	88.8	97.0	
86	12			ML						
83	15	Gravelly Sand, tan, dark brown, dark gray, slightly moist, dense		----	R	14	18.0	111.8	99.8	
82	16			SW						
81	17	Sandy Gravel, tan, gray, dark brown, black, red, slightly moist, medium dense, fragments of brick and asphalt		----	R	9	19.6	106.4	93.8	
79	19			GW						
78	20									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Sheet: 1 of 2

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 9

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
		fragments of concrete up to 3 inches		----	R	50 10"	18.0	109.1	92.5	
77	21									
76	22	**ALLUVIUM:** Silt, dark gray, moist, firm		---	R	12	26.2	96.5	97.1	
75	23									
74	24			ML						
73	25	some clay		----	R	12	32.4	88.0	97.7	
72	26									
71	27									
70	28									
69	29									
68	30	End at 30 Feet; No Water; Fill to 22 Feet.		----	R	15	30.7	90.7	98.9	
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

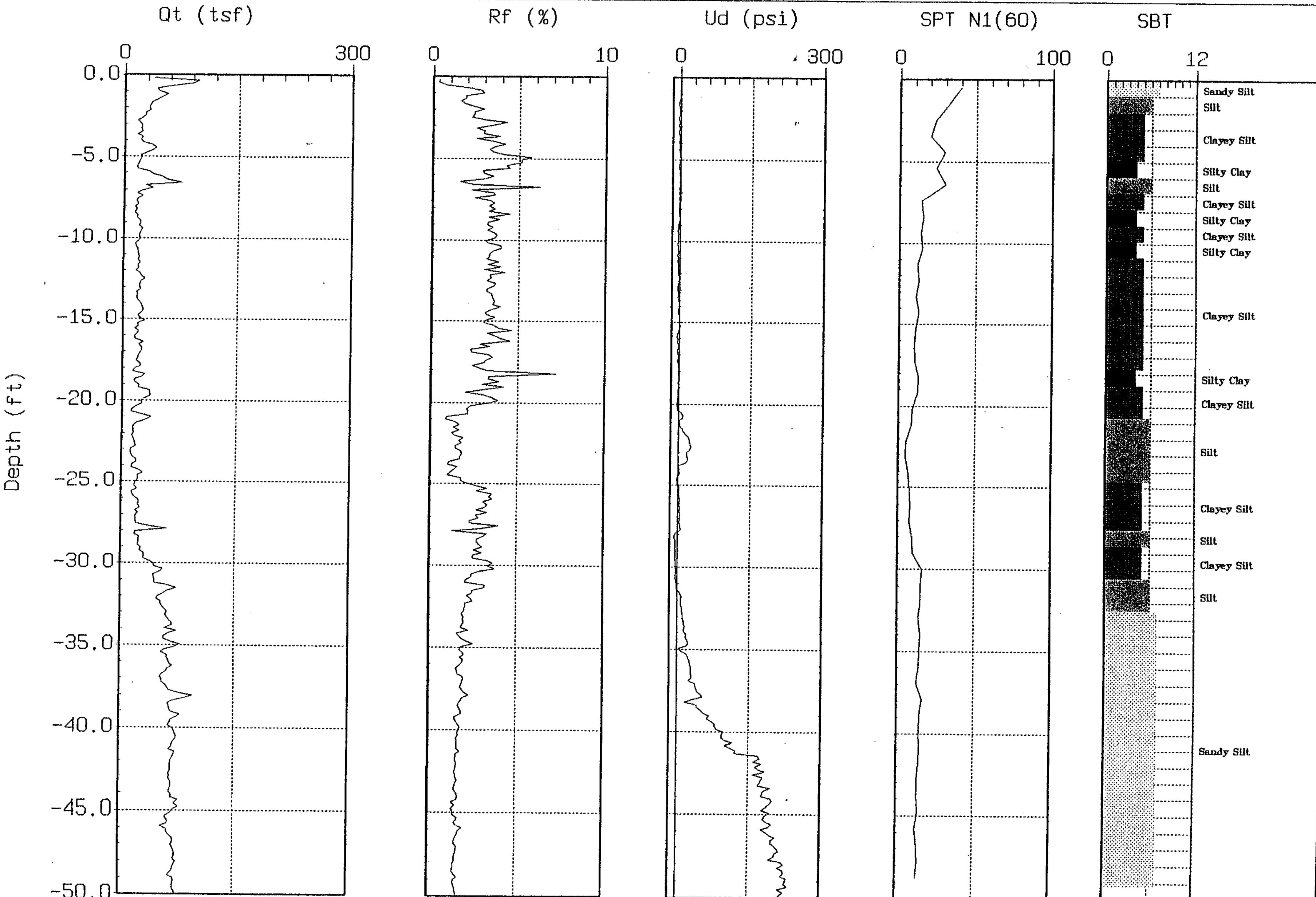
Elevation: 98.0 Feet

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-1

Engineer : J. IRVINE
Date : 03:19:01 08:06



Max. Depth: 50.03 (ft)

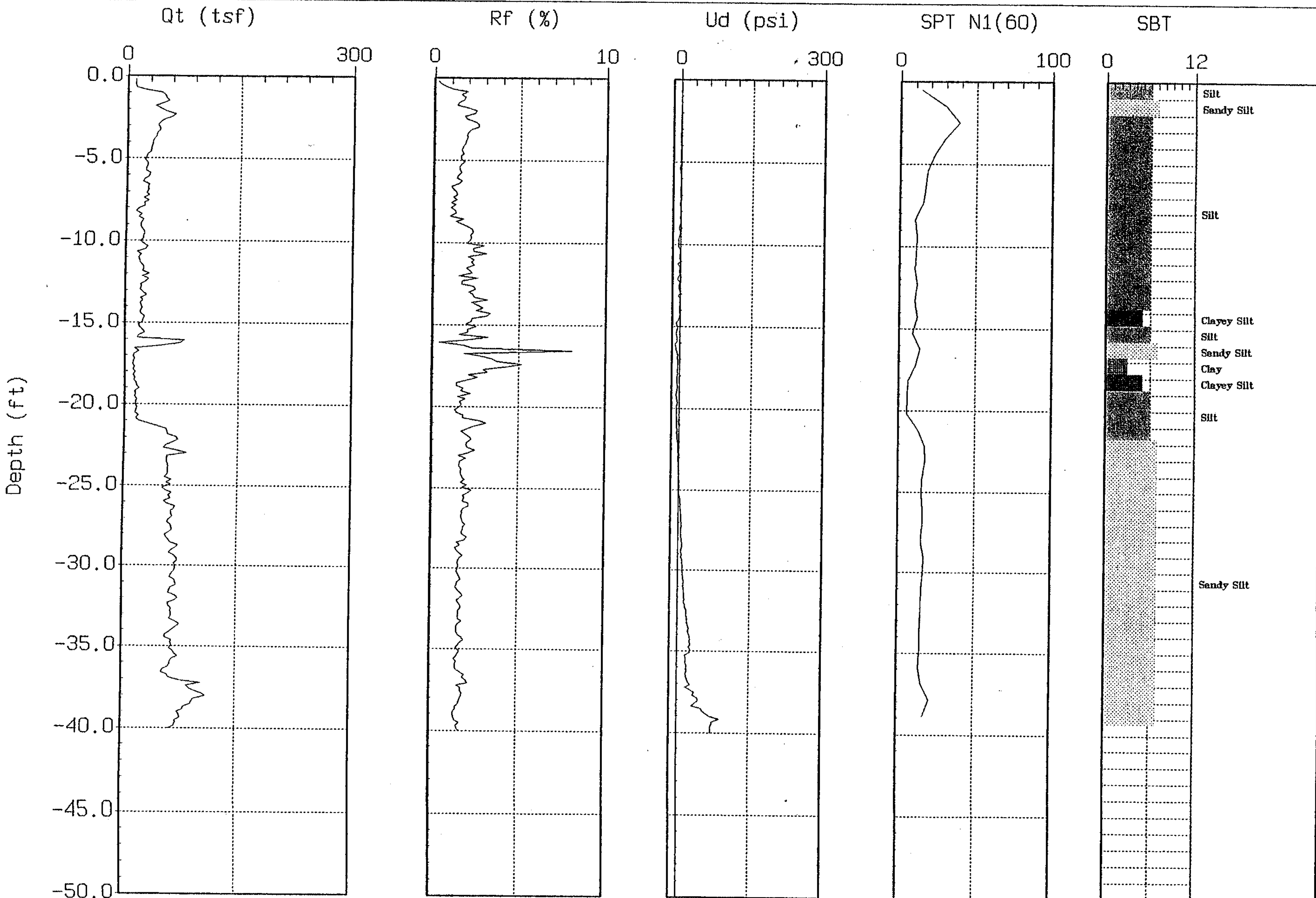
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-2

Engineer : J. IRVINE
Date : 03:19:01 08:41



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

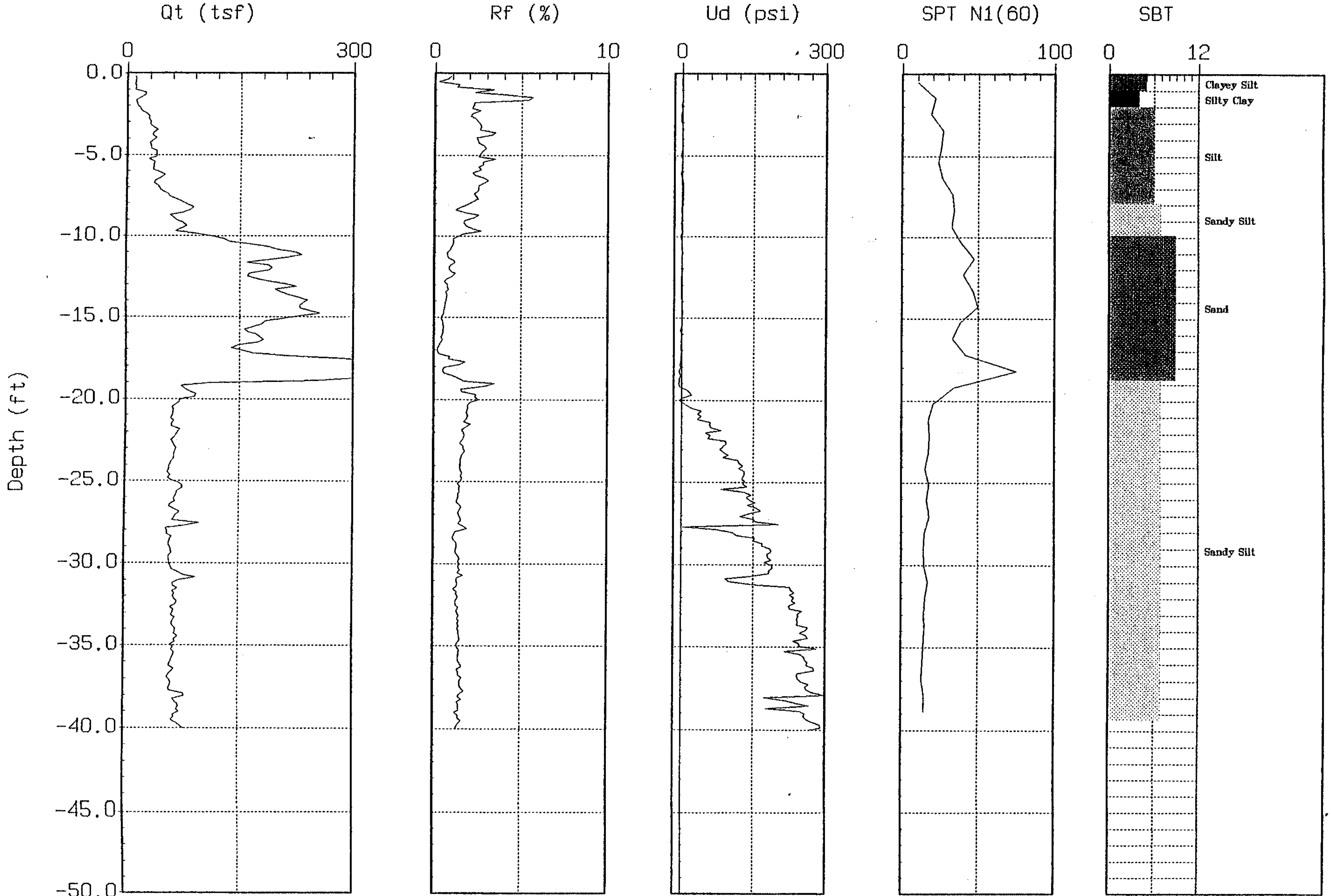
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-3

Engineer : J. IRVINE
Date : 03:19:01 09:04



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

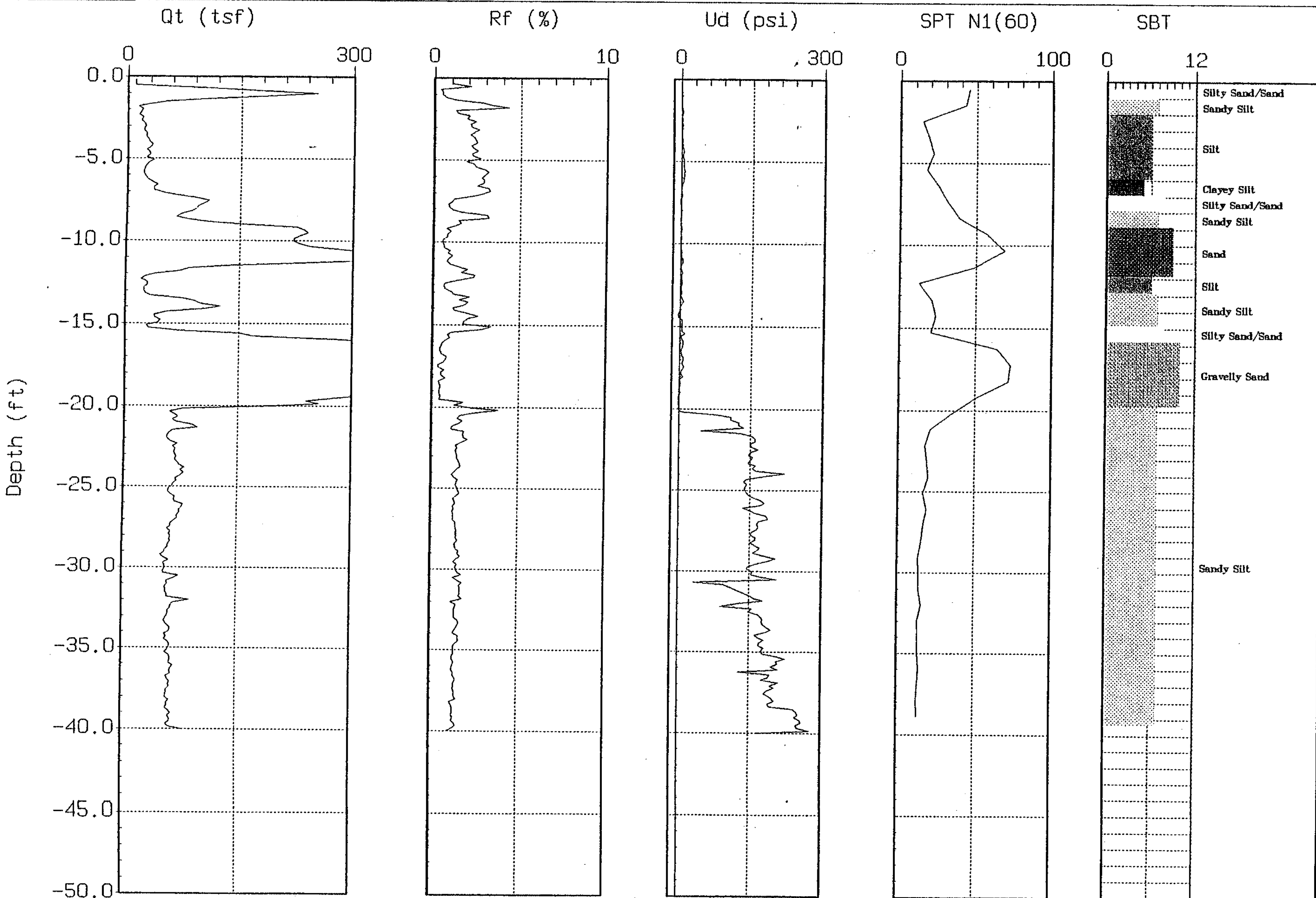
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-4

Engineer : J. IRVINE
Date : 03:19:01 09:27



Max. Depth: 40.03 (ft)

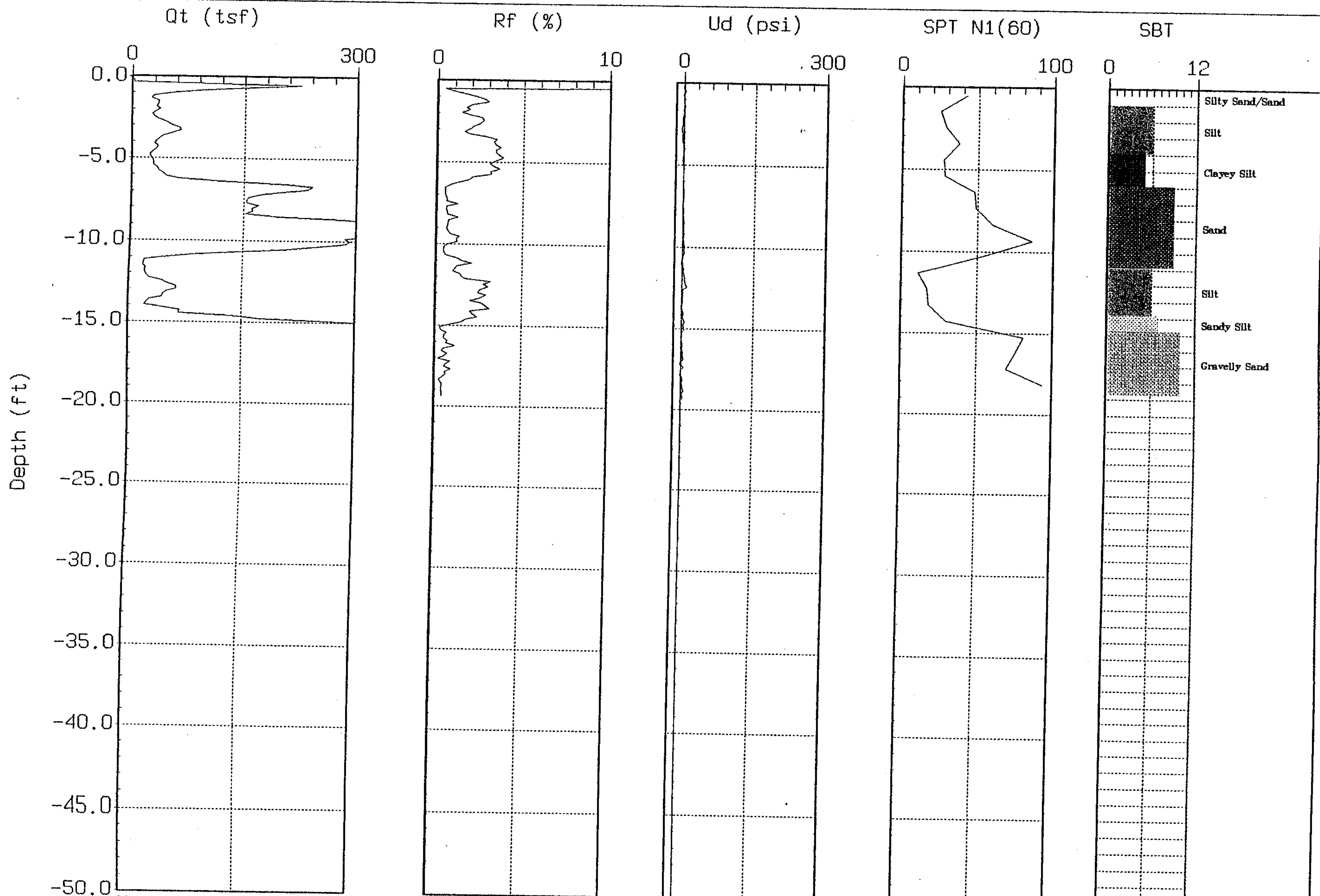
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-5

Engineer : J. IRVINE
Date : 03:19:01 09:47



Max. Depth: 19.36 (ft)

Depth Inc.: 0.164 (ft)

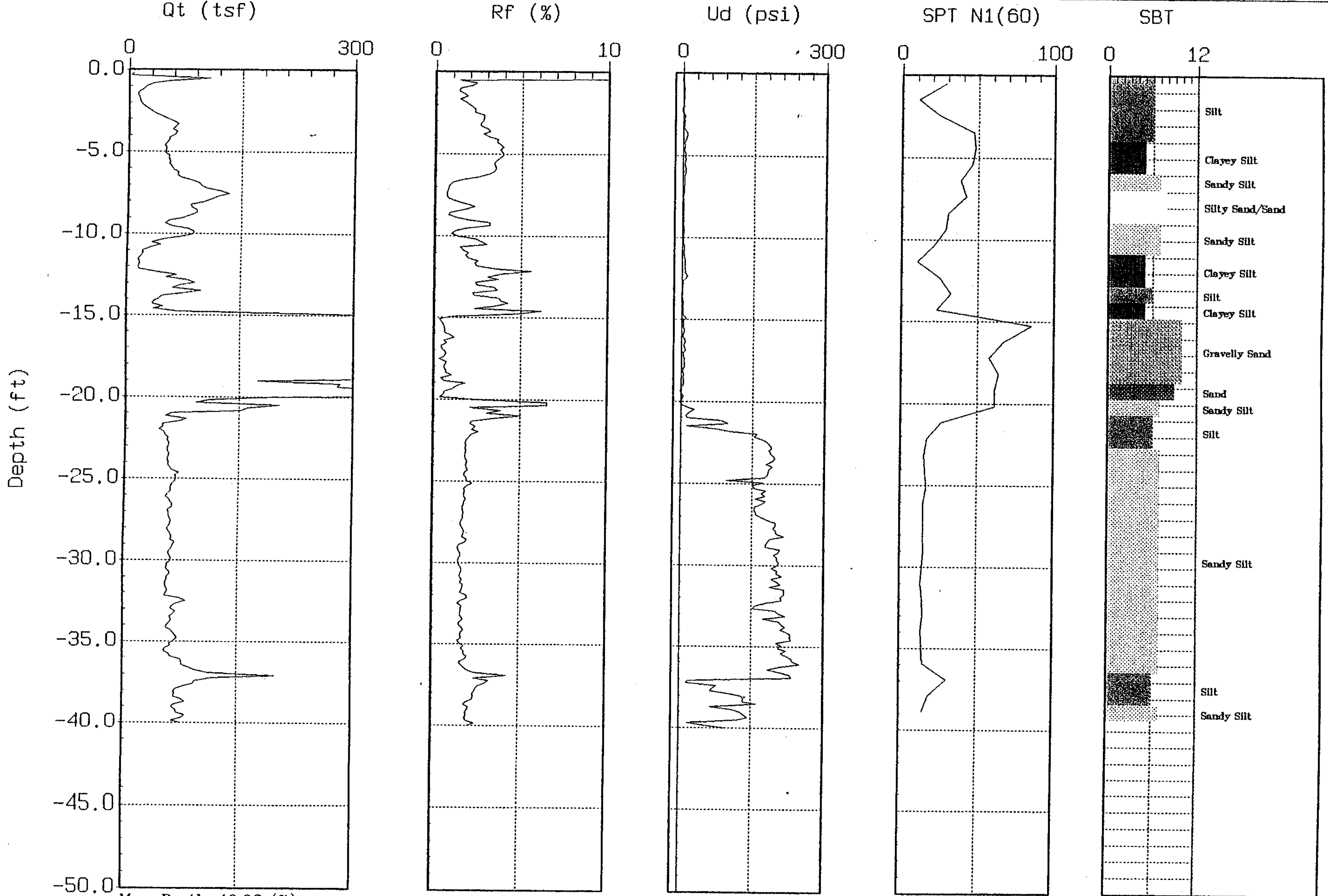
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-6

Engineer : J. IRVINE
Date : 03:19:01 10:12



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

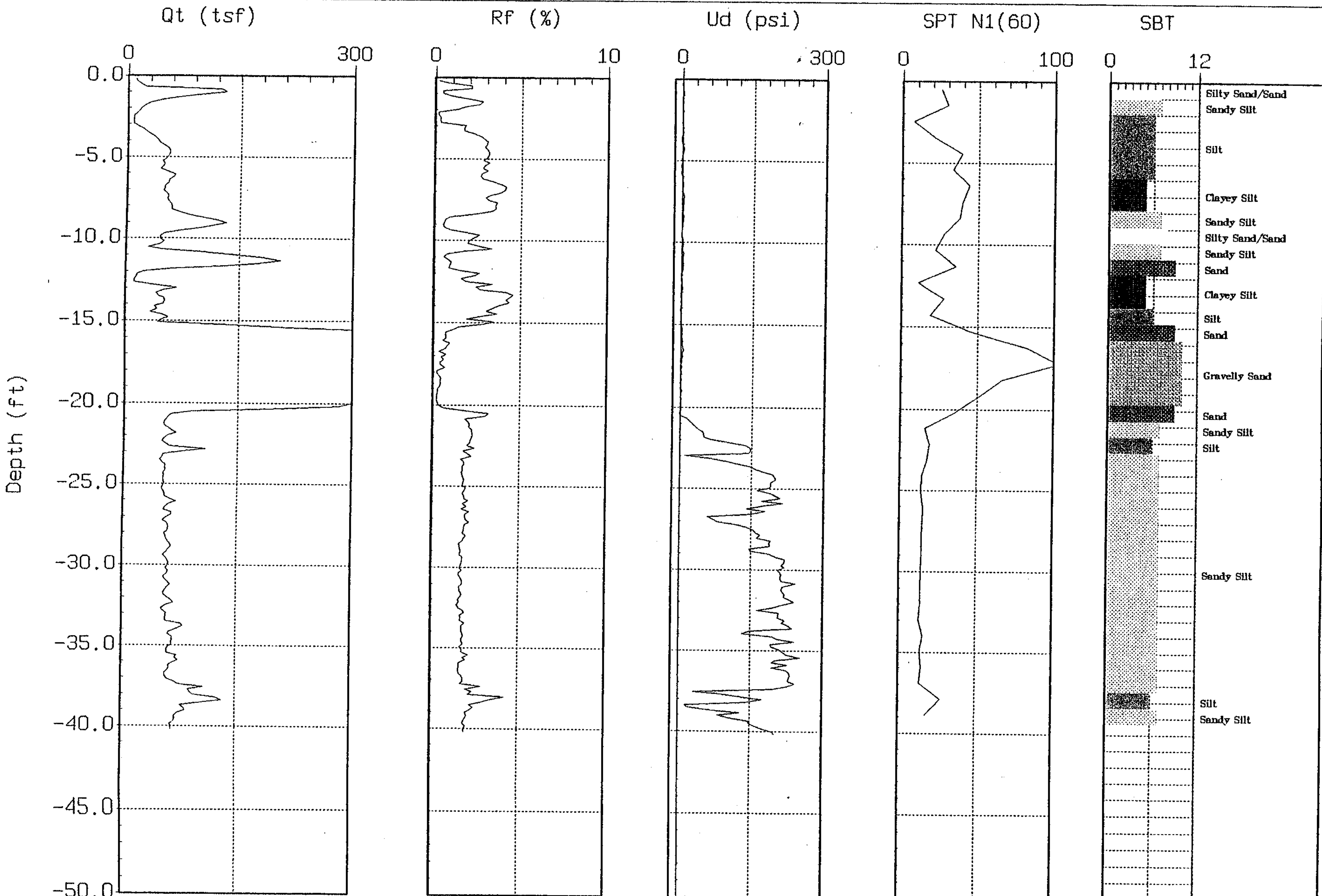
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-7

Engineer : J. IRVINE
Date : 03:19:01 10:38



Max. Depth: 40.19 (ft)

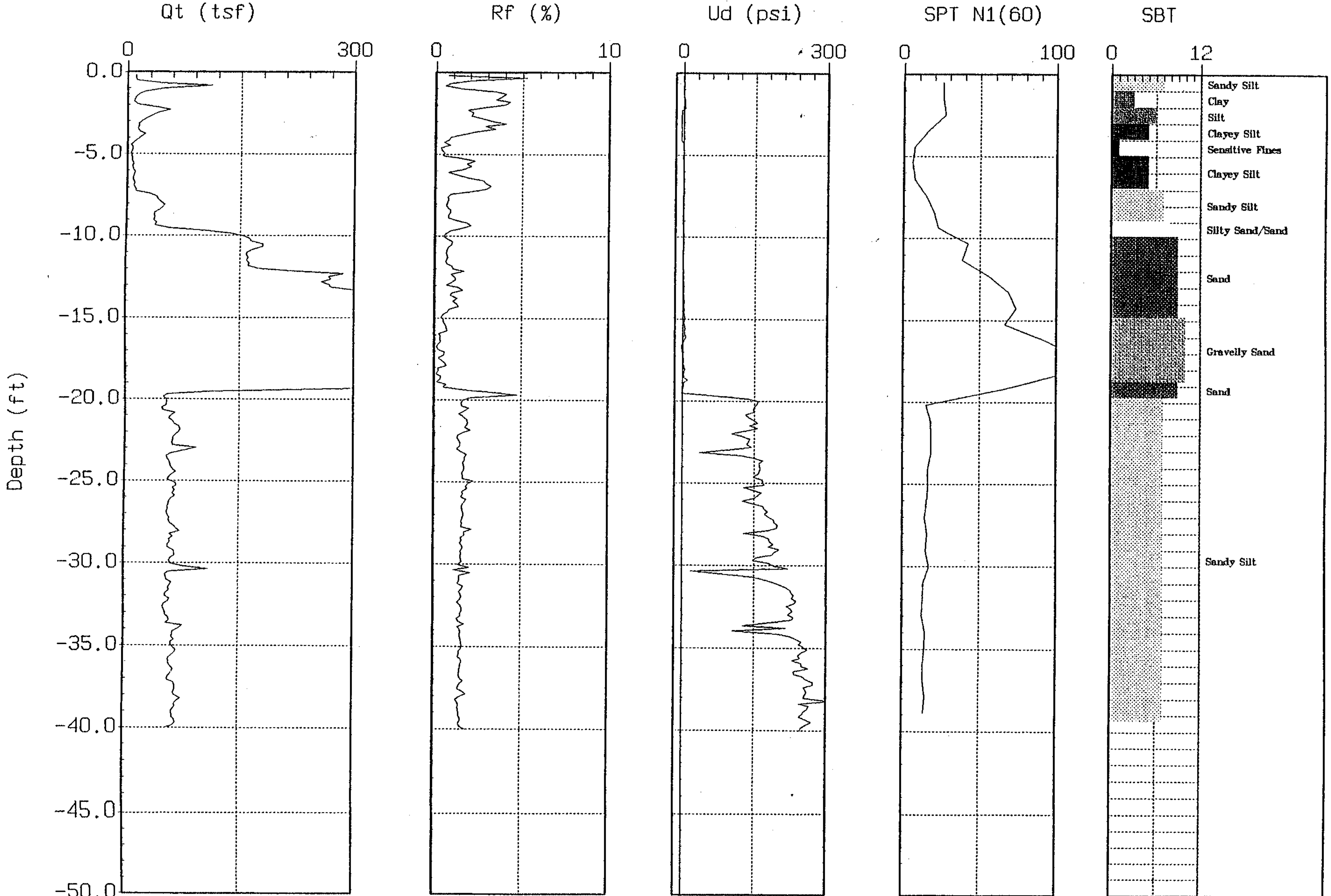
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-8

Engineer : J. IRVINE
Date : 03:19:01 11:08



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

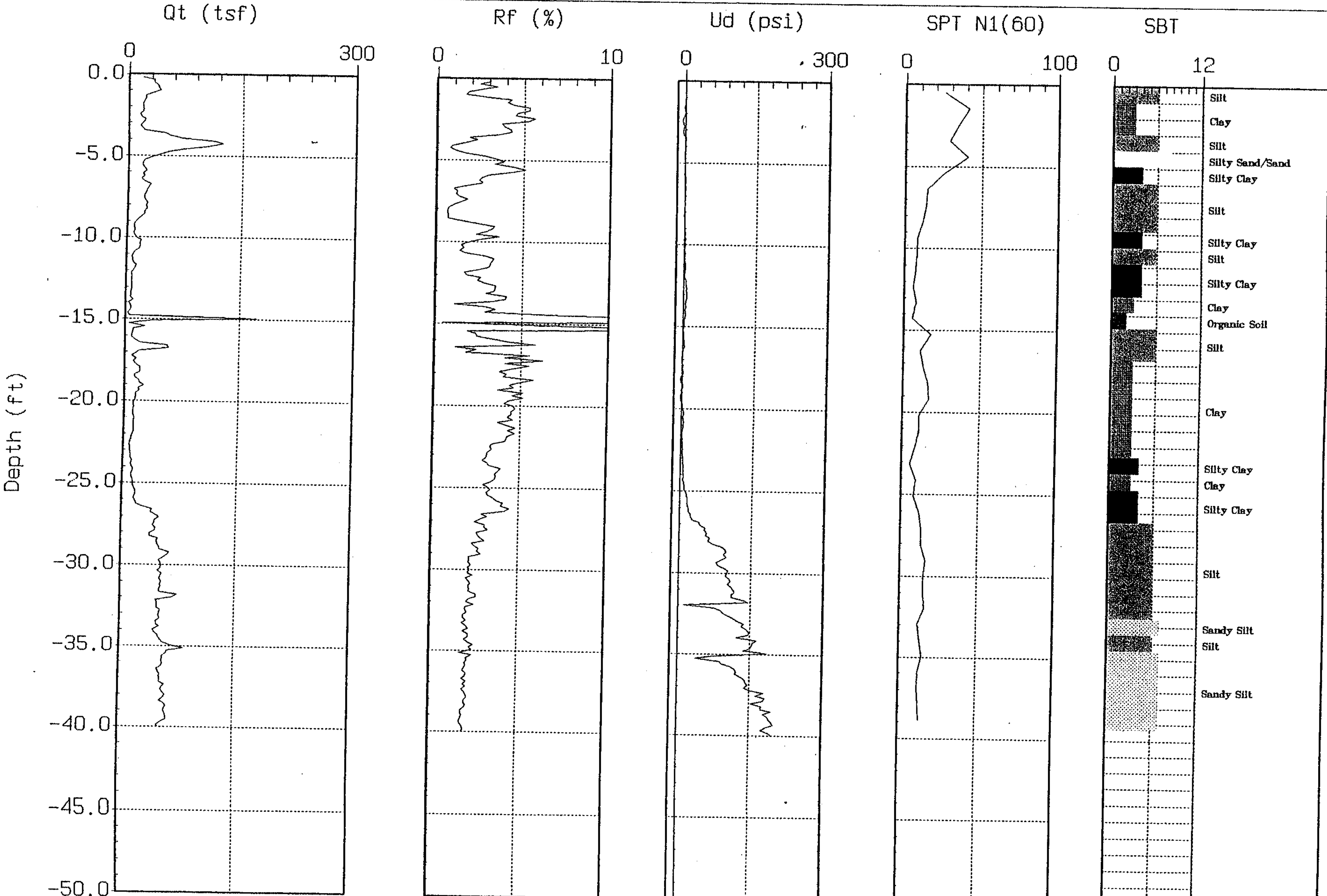
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-9

Engineer : J. IRVINE
Date : 03:19:01 11:41



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

Appendix F

References

References

The following list includes the citations of references referred to in this report.

Blake, T. F. (1995a), **Documentation for *EQSEARCH*, Version 2.20 Update, A Computer Program for the Estimation of Peak Horizontal Acceleration from California Historical Earthquake Catalogs**, Newbury Park, CA 91320.

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Seed, H. B., Chaney, R. C., and Pamukcu, S. (1991), *Earthquake Effects on Soil-Foundation Systems*, Chapter 16, **Foundation Engineering Handbook**, Second Edition, Edited by H-Y Fang, Van Nostrand Reinhold, New York, pp. 594-672.

Tokimatsu, K. and Seed, H. B. (1987), *Evaluation of Settlements in Sands Due to Earthquake Shaking*, **Journal Geotechnical Engineering**, ASCE, Vol. 113, No. 8, pp. 861-878.

C2 – Fault-Rupture Assessment in the Alquist-Priolo Hazard Zone Proposed MTA Transportation Center, UltraSystems Environmental Inc., March 2004.

UltraSystems
environmental | management | planning

March 24, 2004

Ms. Charlotte Bjorlin D'elia
RAD Management, Inc.
615 Hampton Drive, Suite A107
Venice, CA 90291
(310) 399-4474 (Bus)

Re: Fault Investigation for Proposed MTA Transportation Center
3475 La Cienega Boulevard, Los Angeles, CA

Dear Ms. D'elia:

Enclosed are five bound and one unbound copies of:

Fault Rupture Assessment in the Alquist-Priolo Hazard Zone
Proposed MTA Transportation Center
3475 La Cienega Boulevard
Los Angeles, CA
dated March 2004 by UltraSystems Environmental Inc.

To have the report reviewed by the City of Los Angeles, two bound and one unbound, (wet-stamped original) copies MUST BE HAND-DELIVERED to:

Grading Department
City of Los Angeles
201 North Figueroa St., Third Floor
Los Angeles, CA 90012
(213) 482-0480

We recommend that you also include two bound and one unbound (wet-stamped original) copies of:

Geotechnical Engineering Study
Proposed MTA Transportation Center
3475 La Cienega Boulevard
Los Angeles, CA
dated October 23,2003 by Advanced Geotechnical Engineering

A fee of $460.10 payable to the City of Los Angeles must accompany the submittals, and an application must be filed to request a formal review of both reports at the time of delivery. As always, please call if we can be of further assistance.

Sincerely,

Betsy A Lindsay

Betsy Lindsay
President/CEO

FAULT-RUPTURE ASSESESMENT
IN THE
ALQUIST-PRIOLO HAZARD ZONE

Proposed MTA Transportation Center
3475 La Cienega Boulevard,
Los Angeles, CA

Submitted to:

RAD Management Inc.
615 Hampton Drive, Suite A107
Venice, California 90291
(310) 399-4474

Prepared by:

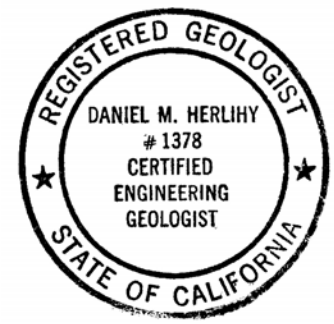
UntraSystems Environmental Inc.
100 Pacifica, Suite 250
Irvine, California 92618
(949) 788-4900

March 2004
Project 5197

PROFESSIONAL CERTIFICATION

FAULT-RUPTURE ASSESSMENT
IN THE
ALQUIST-PRIOLO HAZARD ZONE

Proposed MTA Transportation Center
3475 La Cienega Boulevard,
Los Angeles, CA



This report was prepared by:

Signature — Date: March 24, 2004

Dan Herlihy
Registered Geologist (RG-4388)
Certified Hydrogeologist (HG-107)
Certified Engineering Geologist (CEG-1378)

This report was reviewed and approved by:

Signature — Date: March 24, 2004

Betsy Lindsay
CEO/President

LIMITATIONS

The services described in this report were preformed consistent with generally accepted professional principles and practices for geotechnical consulting firms. Except as set forth herein, no other warrantee, expressed or implied, is made. Opinions and recommendations contained in this report apply to conditions existing when services were preformed and are intended only for the purposes, locations, time frames, and project parameters indicted. The purpose of this assessment was to reasonably evaluate the potential for or actual occurrence of an active fault. When performing a fault assessment, a balance must be struck between a reasonable inquiry and an exhaustive analysis of potential faulting. No investigation is thorough enough to exclude the occurrence of a fault at a given site. Subsurface conditions may exist at the site that cannot or have not been identified. Where subsurface work was performed, professional opinions are based in part, on interpretation of data from discrete sample locations that may not represent actual conditions at locations that were not sampled. In some cases interpretations may have been based on information supplied by others. This information may not have been independently reviewed.

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APPENDICES

EXECUTIVE SUMMARY

UltraSystems Environmental Inc. (UltraSystems) conducted a fault-rupture assessment for a 4.65-acre parcel within the Ballona Gap at the north end of the Newport-Inglewood Fault Zone in keeping with the Alquist-Priolo Earthquake Fault Zoning Act to:

- Assess the occurrence, if any, of surface fault-rupture for the portion of the property within the Alquist-Priolo Hazard Zone.
- Demonstrate that proposed structures for human occupancy will not be placed over or within 50 feet of an active fault in the Alquist-Priolo Hazard Zone.

An active fault is a fault that has experienced movement during the past 11,000 years (Holocene time). The property is the proposed location of a new MTA Transportation Center, and straddles the perimeter of the Alquist-Priolo Hazard Zone east of the Inglewood Fault. A Bus Depot and Tire Repair facility are the only structures proposed for human occupancy within the Alquist-Priolo Hazard Zone.

Until recently, Ballona Creek traversed the property, but has been realigned west of the site. During realignment, artificial fill was placed over the former Ballona Creek channel and an existing City of Los Angeles sewer line. Approximately 20 feet of non-engineered artificial-fill occurs beneath the proposed Bus Depot and Tire Repair facilities. Based on geotechnical investigations, cut slopes in the fill material will be very unstable. Natural gravel sediments beneath the fill are modern reworked channel deposits of the former Ballona Creek. Evidence, if any, of Holocene fault-rupture within the former channel bottom would be unlikely due to reworking of bottom sediments during previous seasonal episodes of erosion and sedimentation. For these reasons, excavation of deep trenches through the fill to assess fault-rupture in channel deposits directly beneath the proposed Bus Depot and Tire Repair facilities would be potentially unsafe and of limited technical value.

To assess the potential for Holocene fault-rupture beneath the proposed Bus Depot and Tire Repair facilities, UltraSystems reviewed: 1) field data from the drilling of on-site borings, 2) findings for trench excavations on an adjoining property to the south, and 3) findings of fault studies at six nearby sites that bracket the proposed MTA Transportation Center to the north and south. Based on the findings:

- No Holocene surface fault-ruptures have been observed in trenches excavated in areas of little or no fill on the adjoining property to the south at distances from the limit of the Alquist-Priolo Hazard Zone similar to the Bus Depot and Tire Repair facilities.
- No Holocene surface fault-ruptures have been reported for Alquist-Priolo fault studies conducted within one-half mile north or south of the property. These studies were reviewed and accepted by the California Division of Mines and Geology and City of Los Angeles.
- Previous researchers have concluded that Holocene deposits within the Ballona Gap have not been displaced by faulting along the Inglewood Fault.

Based on these findings, it is unlikely that Holocene surface fault-rupture occurs in reworked Ballona Creek bed or floodplain deposits at the base of the non-engineered artificial fill within the Alquist-Priolo Hazard Zone of the property.

1.0 INTRODUCTION

UltraSystems Environmental Inc. (UltraSystems) conducted a fault-rupture assessment in the vicinity of a 4.65-acre parcel at 3475 La Cienega Boulevard, Los Angeles, California in keeping with the Aquist-Priolo Earthquake Fault Zoning Act, and in general conformance with guidance provided by the California Department of Conservation, Division of Mines and Geology (CDOC, 1994 - Appendix C). The assessment was conducted at the request of Ms. Charlotte Bjorlin D'Elia of RAD Management Inc. under contract with UltraSystems dated February 19, 2004. The site is located within the Newport-Inglewood Fault Zone west of downtown Los Angeles and east of Ballona Creek (Figure 1).

1.1 Purpose

The purpose of the fault-rupture assessment was to:

- Assess the occurrence, if any, of surface fault-rupture for the portion of the property within the Alquist-Priolo Hazard Zone.
- Demonstrate that proposed structures for human occupancy will not be placed over or within 50 feet of an active fault in the Alquist-Priolo Hazard Zone.

An active fault is a fault that has experienced movement during the past 11,000 years (Holocene time). The site is the proposed location for a new Metropolitan Transportation Authority (MTA) Transportation Center, and will include a bus depot, maintenance bays and ancillary facilities (Figure 2). To obtain building permits within the Alquist-Priolo Hazard Zone, development proponents should demonstrate that building structures for human occupancy would not be placed over or within 50 feet of a surface rupture due to movement along an active fault.

Below is the description of the scope of work for the fault-rupture assessment.

1.2 Scope

For this fault-rupture assessment, UltraSystems implemented the following scope of work:

- Evaluated exploratory boring, cone penetrometer test (CPT) boring, and trenching data within and near the proposed site.
- Reviewed Alquist-Priolo fault studies at nearby sites.
- Rendered an opinion regarding the potential presence of surface fault-rupture for the portion of the property within Alquist-Priolo Hazard Zone.

Below is a discussion of the geology in the vicinity of the proposed MTA Transportation Center.

1.3 Local Geology

1.3.1 Ballona Gap

The proposed MTA Transportation Center is within the Ballona Gap at the north end of the Newport-Inglewood Fault Zone between the Baldwin Hills to the south and Cheviot (Beverly) Hills to the north (Figure 3). The Ballona Gap was formed by an ancestral Los Angeles River that cut into Tertiary (upper Pliocene) marine sediments when sea level was lower than present levels. During

Quaternary (Late Pleistocene and Holocene) time, the Ballona Gap periodically eroded and filled with interbedded silt, sandy-clay and sand sediment. The Los Angeles River changed course in the winter of 1823-24 during a period of extensive flooding, and now discharges to the Pacific Ocean in the vicinity of Long Beach through the Dominguez Gap to the south (CDMG, 1982). The Ballona Gap is now drained by the much smaller Ballona Creek. Unit recently, the creek traversed the property from north to south. Ballona Creek has been diverted, and is currently a concrete-lined channel approximately 100 to 200 feet west of the proposed MTA Transportation Center (Figure 1).

1.3.2 Newport-Inglewood Fault Zone

The Newport-Inglewood Fault Zone is a prominent regional structure extending from Newport Mesa in Orange County northwest approximately 40 miles to the Cheviot Hills. Displacement along the fault zone is both normal and right lateral where right lateral is the principal movement. At depth, the Newport-Inglewood fault is a complex system that forms the boundary between the Catalina Schist basement to the west and granitic basement rocks to the east. The trace of the fault zone is characterized by a series of en-echelon faults, anticlinical folds and domes, which form the Cheviot, Baldwin, Rosecrans, Dominguez, Signal, Bixby Ranch and Landers Hills (Figure 3). Locally, the portion of the fault in the vicinity of Ballona Gap is referred to as the "Inglewood Fault".

Geologically, recent movement along the Newport-Inglewood Fault Zone has suggested displacement of Pliocene and possibly Holocene sediments in the Baldwin Hills south of the Ballona Gap (Trieje 1926). Although numerous faults in the Baldwin Hills were included in the Aquist-Priolo Hazard Zone, most of these faults were inferred, related to uplift folding, and often referred to as "earth cracks" by previous investigators. These cracks were generally delineated by single or en-echelon ruptures of the ground surface along fairly straight, northerly trends (Bryant, November 15, 1995).

The trace of the Inglewood Fault across the Ballona Gap is based on the interpretation of water well data indicating a vertical displacement of Pliocene water bearing units of about 130 feet (Figure 4). In this area, Pliocene sediments east of the fault have dropped down relative to those on the west, and the fault formed a barrier to deep groundwater movement. Poland and others (1959) indicated that the early Holocene 50-foot Gravel is not offset along the fault. The 50-foot Gravel is so named because it reaches a thickness of approximately 50 feet.

1.4 Proposed MTA Transportation Center

The proposed MTA Transportation Center is currently an asphalt-covered vacant lot with several small structures, and contains a City of Los Angeles sewer line buried approximately 25 feet below the existing surface. Non-engineered artificial fill has been placed above the sewer line and former location of Ballona Creek. The site is currently approximately 100 feet above mean sea level, and straddles the east perimeter of the Alquist-Priolo Hazard Zone (Figure 2).

The proposed MTA Transportation Center will include maintenance bays, fueling stations, wash bays, and compressed natural gas (CPG) facilities along the property perimeter. A Bus Depot and Tire Repair facility are the only proposed structures for human occupancy within the Alquist-Priolo Hazard Zone. The proposed MTA facility layout and limits of the Alquist-Priolo Hazard Zone are provided in Figure 2.

2.0 FIELD TESTING

To assess the potential for surface fault-rupture beneath the proposed MTA Transportation Center, UltraSystems evaluated the following:

- Exploratory and CPT boring data throughout the site.
- Trenching data on an adjoining property to the south.
- Alquist-Priolo Fault studies within the Ballona Gap north and south of the proposed facility.

These are discussed below:

2.1 Borings

A total of 15 exploratory borings and 19 CPT borings were drilled throughout the 4.65-acre property by J. Byer Inc. (JBI) in March 2001 and Advanced Geotechnical Services (AGS) in September 2003 to a maximum depth of 50-feet below ground surface (bgs) to evaluate subsurface soils as part of pre-construction geotechnical investigations. Exploratory and CPT boring logs prepared by JBI and AGS are provided in Appendices A and B, respectively. Boring locations are provided in Figure 2.

Based on the findings of the geotechnical investigations and published literature (DWR, June 1961), the following stratigraphy occurs beneath the site:

- Artificial fill to a maximum depth of approximately 25 feet bgs.
- Holocene gravel (50-foot Gravel), sand, silt and sandy clay to a depth of 50 feet bgs.
- Late Pleistocene sand (Exposition Aquifer) at depths greater than 50 feet bgs.

Geologic cross-sections illustrating the thickness of artificial fill and the local stratigraphy beneath the proposed MTA Transportation Center are provided in Figure 5.

Figure 2 shows contours of equal artificial-fill thickness beneath the property, and is based on boring logs prepared by JBI and AGS (Appendices A and B). As illustrated in Figure 2, the property contains a 12 to 25-foot thick sequence of non-engineered artificial-fill above the former Ballona Creek and existing City of Los Angeles sewer line.

Based on the findings on the geotechnical investigation (AGS, October 23, 2003), the following provisions were recommended for construction at the site.

- For buildings within the western portion of the project site, pile foundations should be placed to depths of 60 to 70 beet bgs to penetrate natural sediments.
- For buildings within the eastern portion of the project site (about 50 feet from the centerline of the existing City of Los Angeles sewer line), artificial fill should be removed and re-compacted. Depending on the fill differential, over-excavation of building pads may be required to provide a relatively uniform artificial fill cap.
- For structural design, a horizontal ground acceleration of 0.49g from seismic activity should be used.

More detail regarding the findings and recommendations of the pre-construction geotechnical investigations are reported under separate cover (AGS, October 23, 2003).

2.2 Trenching

As stated previously, non-engineered artificial fill was placed over the former Ballona Creek drainage and the existing City of Los Angeles sewer line throughout most of the portion of the property within the Alquist-Priolo Hazard Zone. Approximately 20 feet of artificial fill occurs beneath the proposed Bus Depot and Tire Repair facilities, and, based on findings of the geotechnical investigations, cut slopes in the fill would be very unstable. Natural gravel sediments beneath the fill are modern reworked channel deposits of the former Ballona Creek. Evidence, if any, of Holocene fault-rupture within the former channel bottom would have been destroyed by seasonal episodes of erosion and sedimentation. For these reasons, excavation of deep trenches within the fill to assess fault-rupture directly beneath the proposed Bus Depot and Tire Repair structures would be of limited technical value and potentially unsafe.

As an alternative, data available for Trench 1 and Trench 2 excavated and logged on the adjoining property to the south (5871 Rodeo Boulevard) were used to assess potential surface fault-rupture in the vicinity (J&J, March 27, 1985). These trenches are approximately the same distance from the east perimeter of the Alquist-Priolo Hazard Zone as the proposed Bus Depot and Tire Repair structures (see Figure 2). Trench locations are shown on Figure 2, trench logs are provided in Appendix C, and details regarding the trenching activities are provided in Appendix D.

The trenches were approximately 75 to 90 feet in length and approximately 15 feet deep. The stratigraphy encountered within the trenches is summarized below:

- Artificial fill up to 0.75 feet bgs.
- Clay and silty-clay to 2 feet bgs.
- Ballona Creek marsh and lacustrine silts and clays to approximately 12 feet bgs.
- Ballona Creek floodplain and channel-fill deposits (50-foot Gravel) to 15 feet bgs.

This stratigraphic sequence is similar to natural stratigraphy, where present, observed beneath the proposed MTA Transportation Center (Figure 5). Based on the findings of the trenching activity, no faulting of the 50-foot Gravel or surface fault-rupture was observed. According to the trenching evaluation (Appendix D), Holocene faulting did not occur within the adjoining property to the south at distances from the perimeter of the Alquist-Priolo Hazard Zone similar to those of the proposed Bus Depot and Tire Repair Facility.

2.3 Nearby Fault Studies

To further assess the potential for surface fault-rupture in the vicinity, six other Alquist-Priolo fault studies conducted within the Ballona Gap north and south of the proposed MTA Transportation Center were evaluated. These studies were provided by the California Department of Conservation, California Geological Survey (formerly California Department of Mines and Geology), were approved by the City of Los Angeles, and represent fault studies of record from 1974 to 2000 between the Baldwin Hills to the south and Santa Monica Boulevard approximately one-half mile north of the proposed MTA Transportation Center (CGS, 2003). Fault study locations are provided in Figure 6, and the fault study reports are provided in Appendices E through I. The findings of the Alquist-Priolo Fault Studies at nearby sites are summarized below:

Nearby Alquist-Priolo Fault Studies in Ballona Gap

Fault Study	Location	Finding	City of LA Approval	Reference
1	8708 Olin Street	No surface-fault rupture	August 17, 1977	Appendix E
2	8707 Venice Boulevard	No surface-fault rupture	March 6 1981	Appendix F
3	5800-5810 Rodeo Road	No surface-fault rupture	June 9, 1980	Appendix G
4	8761 Venice Boulevard	No surface-fault rupture	May 27, 1982	Appendix H
5	6001 Jefferson Boulevard	No surface-fault rupture	September 26, 1989	Appendix I

Based on the results of these fault studies, no surface fault-rupture of Holocene alluvial sediments within the Ballona Gap in the Alquist-Priolo Hazard Zone was identified north or south of the proposed MTA Transportation Center.

2.4 Findings

Based on the field data obtained from the drilling of on-site borings, excavation of trenches on the adjoining property, Alquist-Priolo fault studies at nearby sites, and other researchers:

- Non-engineered artificial fill was probably placed above the former Ballona Creek channel and existing City of Los Angeles sewer line within the property during the construction of the concrete-lined Ballona Creek diversion west of the property.
- Because natural sediments beneath the artificial fill are modern reworked channel bottom deposits of the former Ballona Creek, little evidence, if any, of Holocene faulting would be obtained from trenching in these lithologic units.
- No evidence of Holocene faulting has been observed on the adjoining property to the south, or at other nearby sites where Alquist-Priolo fault studies have been reviewed and approved by the California Division of Mines and Geology and the City of Los Angeles.
- Previous researches (Poland and others, 1959) have concluded that faulting within the Ballona Gap has not displaced early Holocene deposits.

3.0 CONCLUSION

Based on these findings, it is unlikely that Holocene surface fault-rupture occurs in reworked Ballona Creek bed or floodplain deposits at the base of the non-engineered artificial fill within the Alquist-Priolo Hazard Zone of the property.

4.0 REFERENCES

AGS, October 23, 2003, Geotechnical Engineering Study, Proposed MTA Transportation Center, 3475 La Cienega Boulevard, Los Angels, California: Advanced Geotechnical Services, Inc., Camarillo, California.

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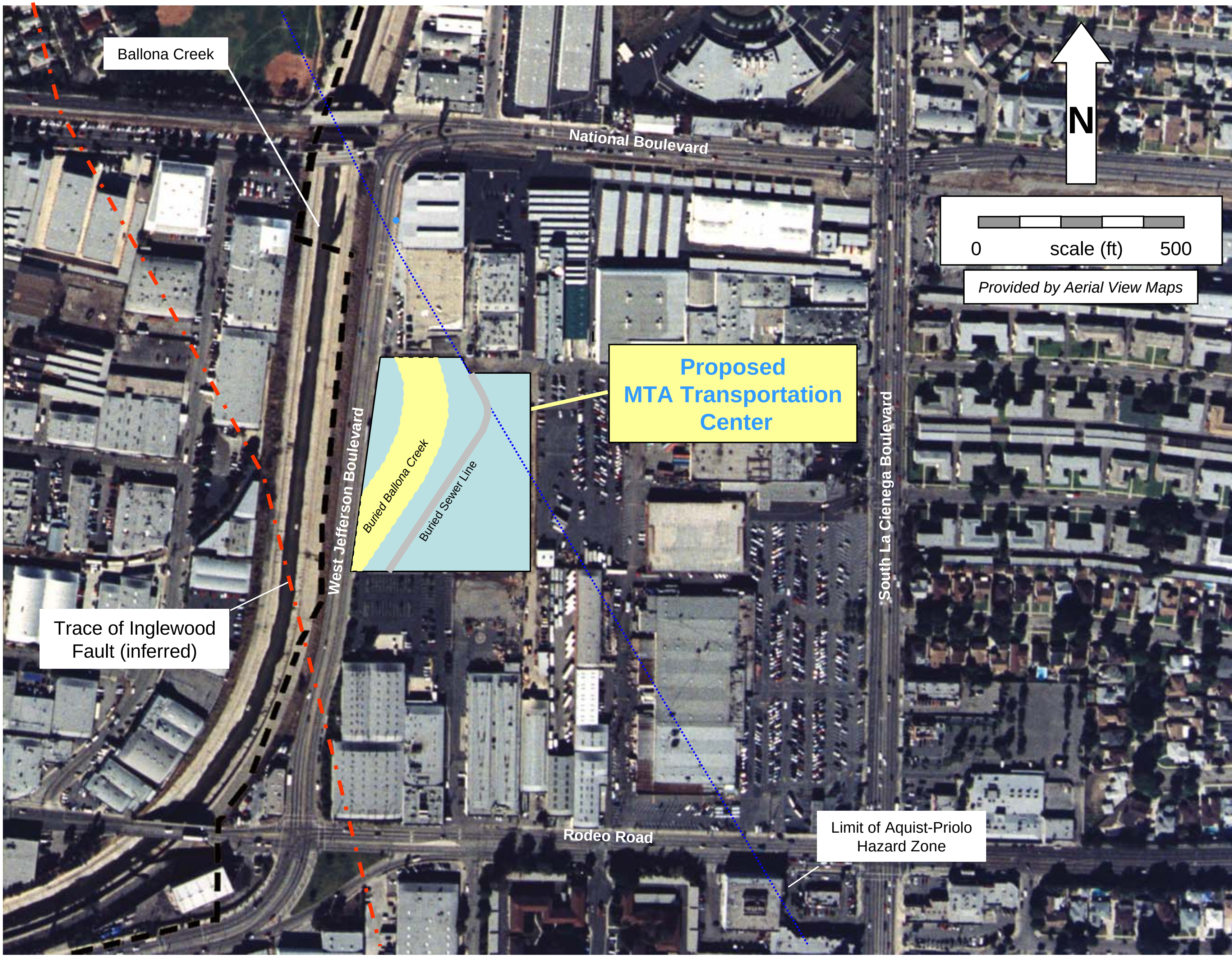
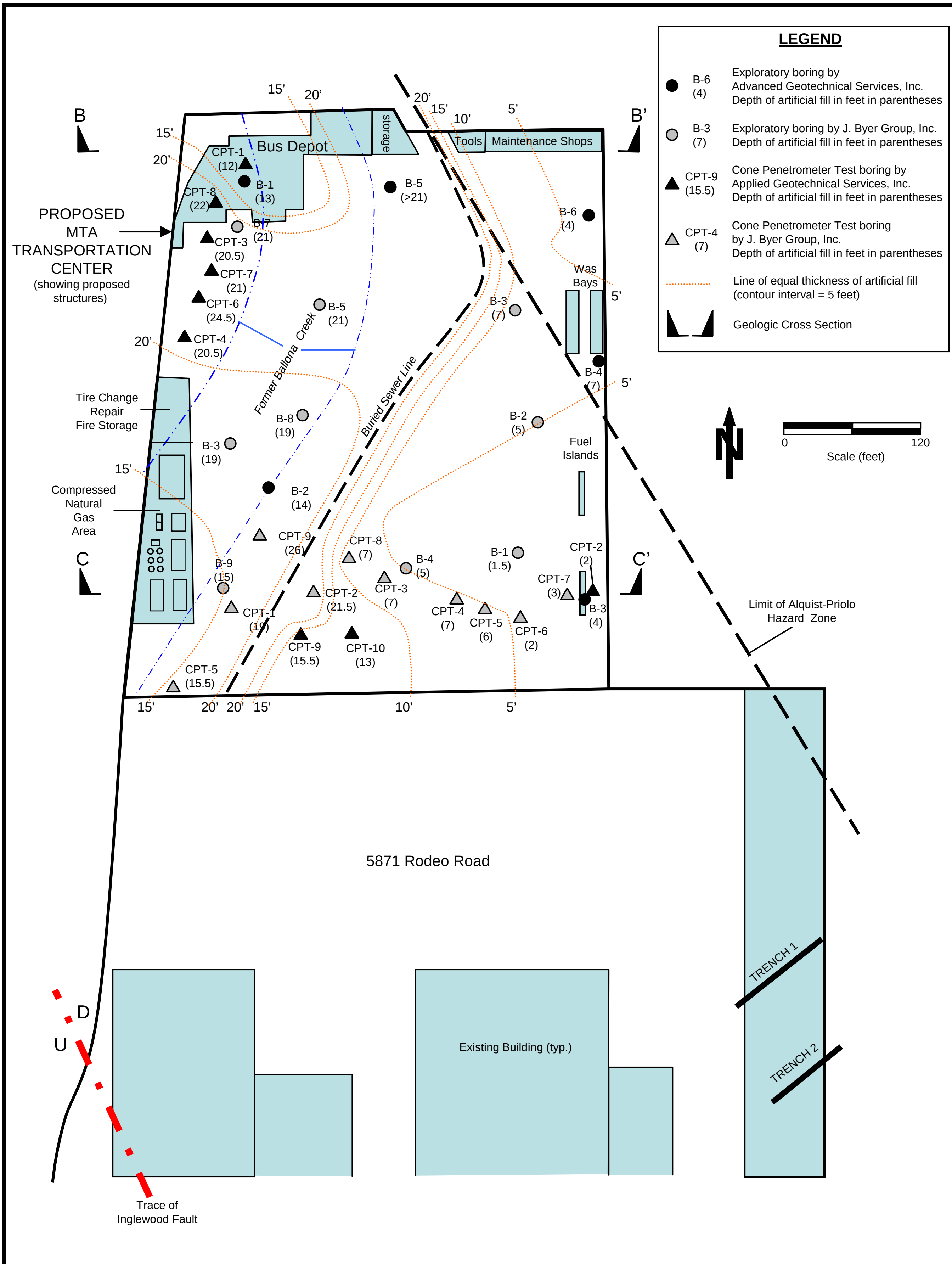
FIGURES



UltraSystems Environmental Inc..	AREIAL PHOTOGRAPH OF VCINITY	FIGURE
Prepared by: Dan Herlihy	Proposed MTA Transportation Center	1



UltraSystems Environmental Inc..

Prepared by: Dan Herlihy

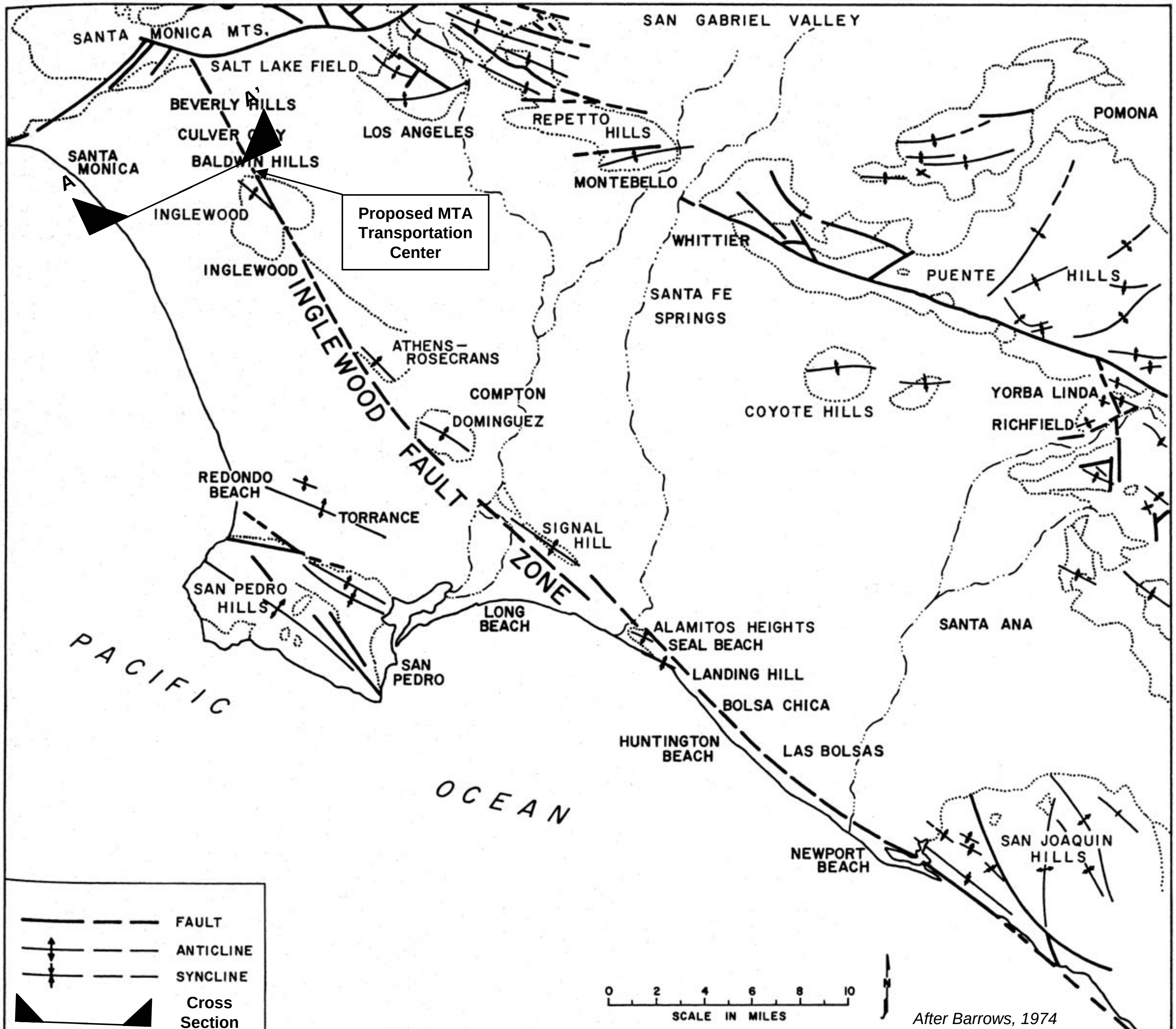
RG #4388, CEG # 1378, CHG #107, REA #224

SITE PLAN

Proposed MTA Transportation Center

3475 La Cienega, Boulevard, Los Angeles, CA

FIGURE 2



UltraSystems Environmental Inc..

Prepared by: Dan Herlihy

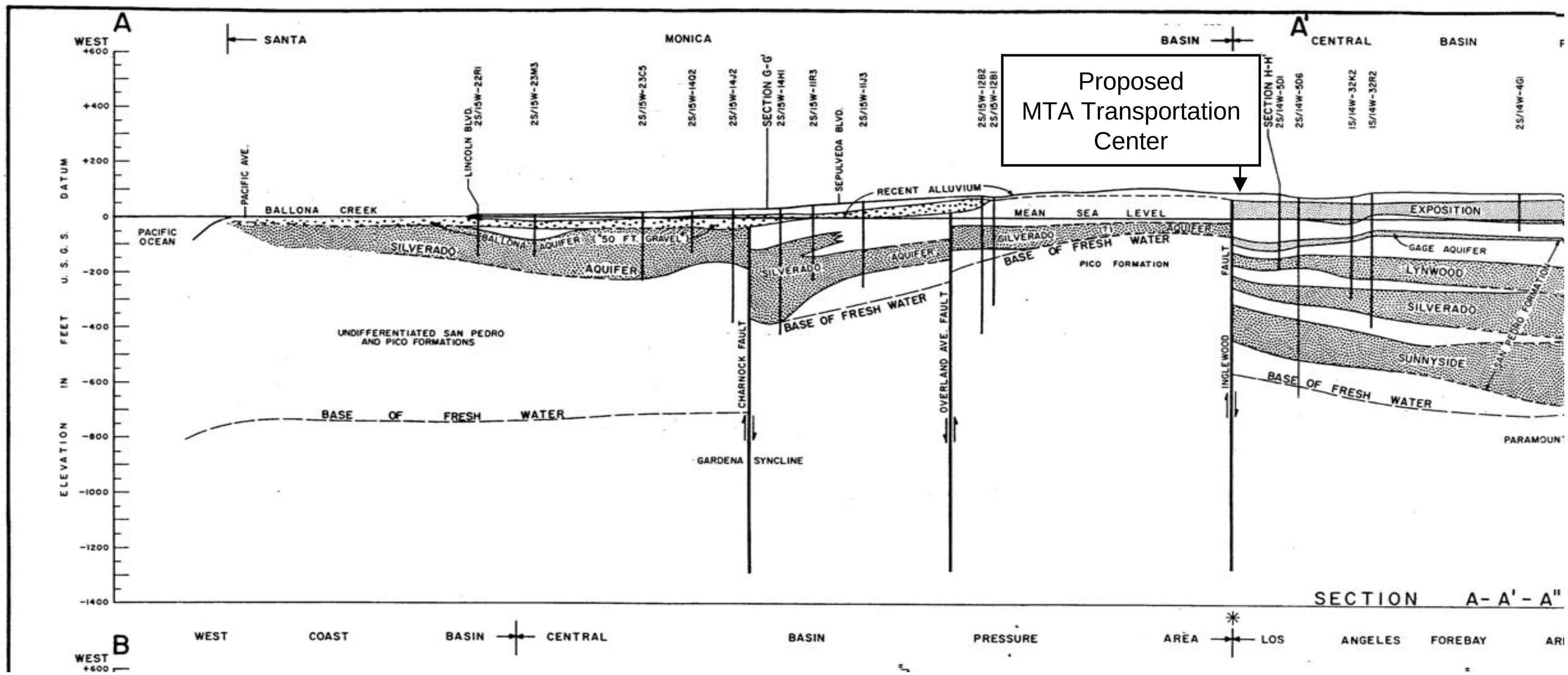
NEWPOER INGLEWOOD FAULT ZONE

Proposed MTA Transportation Center

FIGURE

West

East



LEGEND

- AQUICLUDES AND DEEPER UNDIFFERENTIATED FORMATIONS
- AQUIFERS IN RECENT ALLUVIUM (INCLUDES THE GASPUR AND BALLONA AQUIFERS)
- AQUIFERS IN LAKEWOOD FORMATION (INCLUDES THE ARTESIA, EXPOSITION, GAGE, AND GARDENA AQUIFERS)
- AQUIFERS IN SAN PEDRO FORMATION (INCLUDES THE HOLLYDALE, JEFFERSON, LYNWOOD, SILVERADO, AND SUNNYSIDE AQUIFERS)
- WATER WELLS
- OIL WELLS
- FAULTS

HORIZONTAL SCALE OF FEET
2000 0 2000 4000 6000
1961

After DWR, June 1961-plate 6a

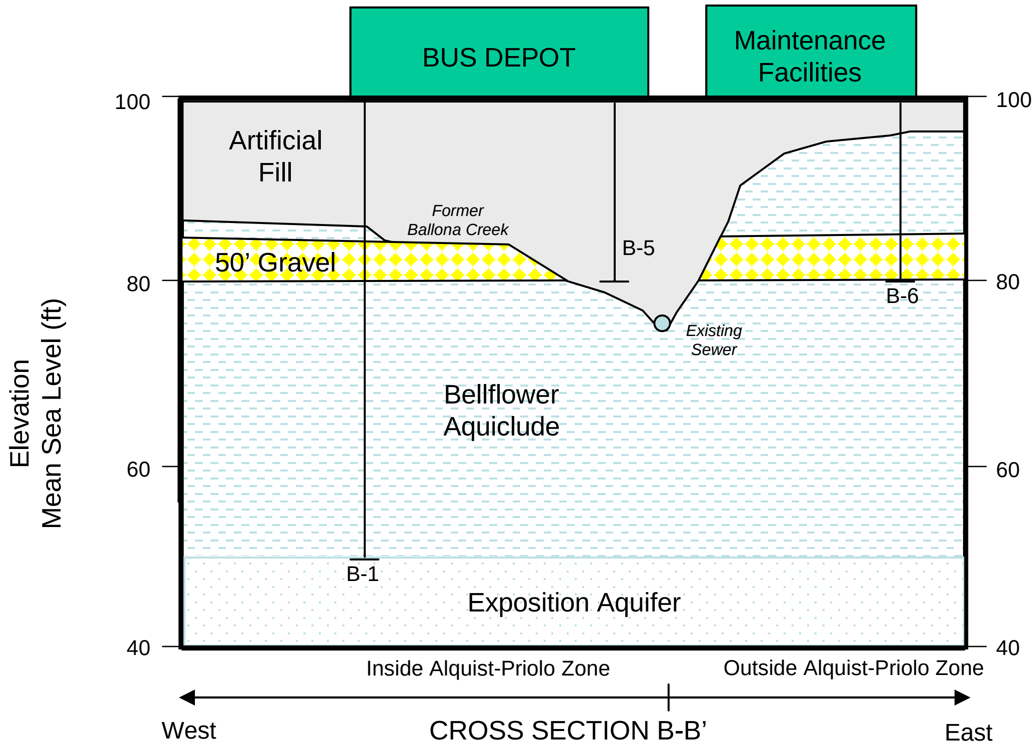
UltraSystems Environmental Inc..

Prepared by: Dan Herlihy

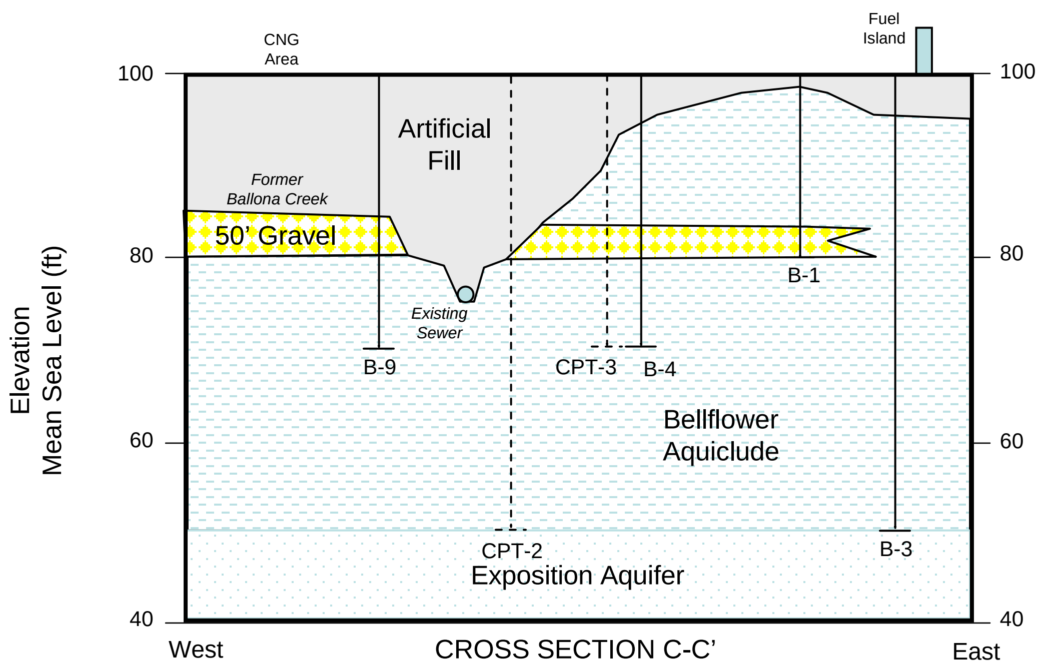
GENERALIZED GEOLOGIC CROSS SECTION A-A'

Proposed MTA Transportation Center

FIGURE



CROSS SECTION B-B'



CROSS SECTION C-C'

LEGEND

- Artificial Fill
- Gravel
- Silt, clay and sandy clay
- Sand
- Hollow-Stem Auger Boring
- CPT Boring

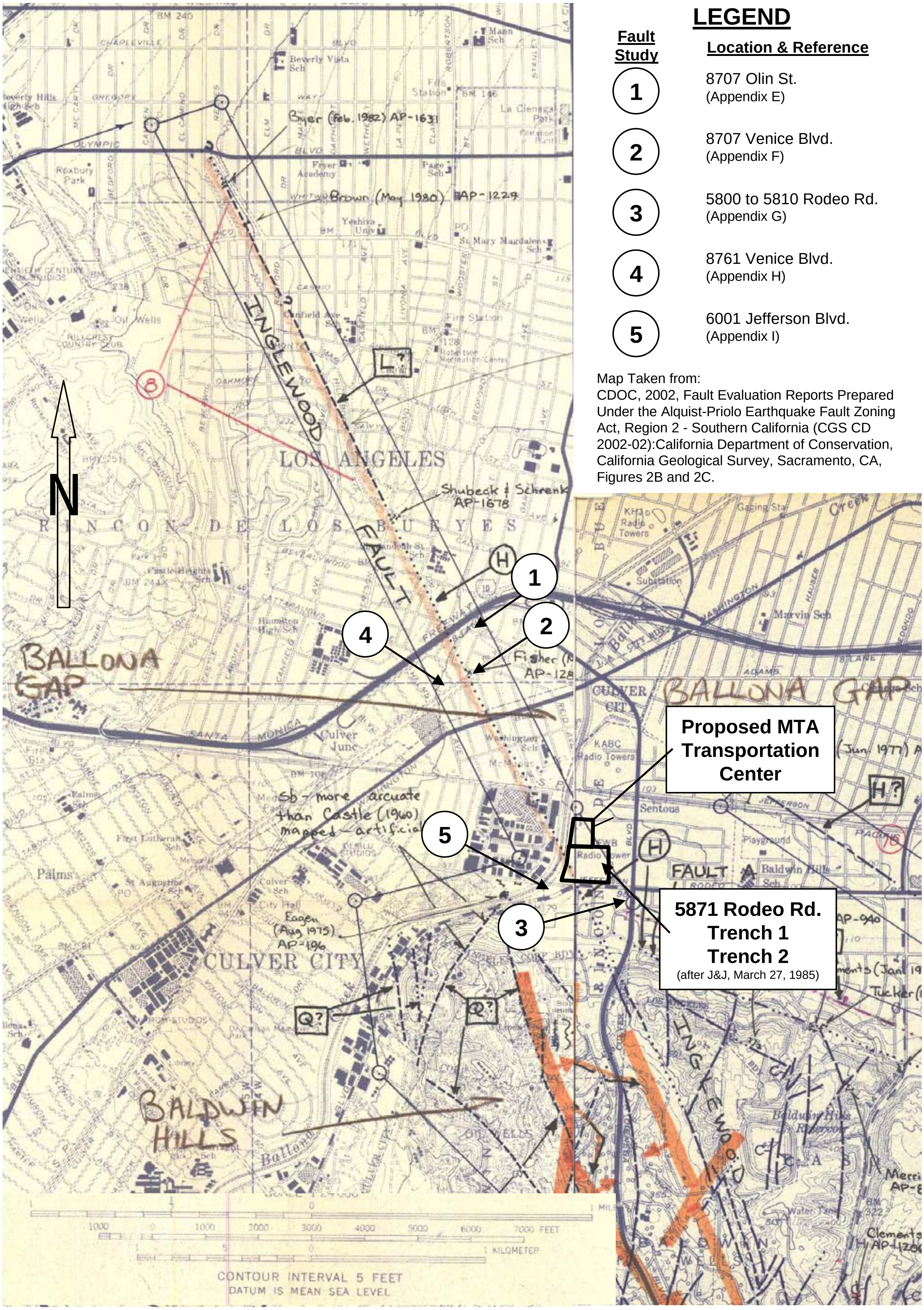
UltraSystems Environmental Inc..

Prepared by: Dan Herlihy
RG #4388, CEG # 1378, CHG #107, REA #224

GEOLOGIC CROSS SECTIONS B-B' AND C-C'

Proposed MTA Transportation Center
3475 La Cienega, Boulevard, Los Angeles, CA

FIGURE 5



UltraSystems Environmental Inc..

Prepared by: Dan Herlihy

PG #4388, CEG # 1378, CHG #107, REA #224

NEARBY AQUIST-PRIOLO STUDIES

Proposed MTA Transportation Center

3475 La Cienega Boulevard, Los Angeles, CA

FIGURE 6

APPENDIX A

BORING LOGS BY J. BYER INC.

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 1

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Clay, black moist, firm								
96	2	ALLUVIUM Silt/Sandy Silt, light gray brown, moist, firm to very firm, some clay, light gray caliche veining some clay		---- / ML	R	20	20.2	102.8	88.0	
93	5	Sandy Silt, dark brown, slightly moist to moist, very firm, light gray brown caliche veining, some clay		---- / ML	R	27	16.1	115.7	99.8	
91	7	Silty Sand, brown, moist, dense, fine to medium grained		---- / SM	R	23	15.6	116.2	97.7	
88	10	Sand, light gray to tan, moist, dense, fine to medium grained		---- / SW	R	19	18.7	108.5	94.8	
83	15	Silty Sand/Sandy Silt, gray, moist to very moist, very firm, fine grained		---- / SM	R	23	24.7	99.7	99.4	
81	17	water at 17 Feet Gravel, light gray to dark gray, wet, dense to very dense, cobbles to 3 Inches		GW						
79	19	End at 20 Feet; Water at 17 Feet; Fill to 1½ Feet.		----	R	50 10"	N/R	N/R	N/R	
78	20									

Surface: Asphalt Parking-3" Asphalt/2" Base

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 2

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Sandy Silt, dark brown, moist, firm, some clay								
96	2	Silty Clay, dark brown to black, moist, firm		----	R	12	13.0	100.1	53.0	
95	3			CL						
93	5	ALLUVIUM: Sandy Silt, light gray brown, slightly moist, very firm, fine to medium grained, light gray caliche veining		----	R	38	16.6	112.2	93.0	
92	6			ML						
91	7	Silty Sand, brown, slightly moist, dense to very dense, light gray caliche veining		----	R	37	17.0	112.7	96.7	
89	9			ML						
88	10	Silty Sand/Sandy Silt, gray, slightly moist to moist, firm		----	R	14	17.8	110.1	93.9	
86	12			SM						
84	14	Sand, orange-brown to light bray, slightly moist, very dense, fine to medium grained								
83	15	End at 15 Feet; No Water; Fill to 5 Feet.		SW	R	38	4.8	95.9	17.8	

Surface: Asphalt Parking-3" Asphalt/4" Base

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 3

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Sandy Silt, dark brown, moist, slightly firm								
97	1	Silt, light brown gray, moist, slightly firm								
96	2			----	R	14	22.7	92.3	75.9	
95	3	Clayey Silt, dark brown to black, moist, soft to slightly firm								
94	4			ML						
93	5			----	R	7	18.6	107.2	91.0	
92	6									
91	7	**ALLUVIUM:** Sandy Silt, gray, brown, moist, firm, light gray caliche veining, fine to medium grained, some clay		----	R	16	20.0	106.6	96.3	
90	8			ML						
89	9									
88	10	Silty Sand, gray, moist, dense, fine grained		----	R	15	20.6	105.6	96.4	
87	11									
86	12			SM						
85	13									
84	14									
83	15	Silty Sand, dark brown, orange-brown, gray, very dense		SM	R	34	19.7	103.7	87.7	
82	16									
81	17	Gravel and cobblers, gray, light brown, unable to continue due to large rock		GW						
80	18	End at 18 Feet; No Water; Fill to 7 Feet.								
79	19									
78	20									

Surface: Asphalt Parking-3" Asphalt

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 187.11-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 4

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		2 Inches Aphalt, 7 Inches Concrete, 3 Inches Base								
97	1	FILL: Silty Clay, brown, moist, firm								
96	2			CL	R	17	22.4	103.6	99.9	
93	5	Sandy Silt, brown to dark brown, moist, firm, light gray, caliche veining		ML	R	15	21.1	104.4	95.6	
91	7	Silty Sand, gray, moist, very dense, fine grained, light gray caliche veining		SM	R	24	13.8	115.9	85.5	
88	10	gray to brown, very moist, dense		SM	R	17	20.2	104.9	92.8	
86	12	Sand, greenish gray, very dense, fine to coarse grained, slight petroleum odor		SW	R	32	5.8	107.0	28.1	
83	15	dark gray to greenish gray to light gray, fine to very coarse grained, some gravel, very slight odor of petroleum		GW	R	32	7.7	108.1	38.5	
81	17	water at 17 Feet								
78	20									

Surface: Asphalt Parking

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 4

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
		Clayey Silt, dark gray, moist, very firm		----	R	19	25.7	98.3	100.0	
77	21									
76	22									
75	23			ML						
74	24									
73	25	End at 25 Feet; Water at 17 Feet; Fill to 5 Feet.		----	R	37	24.1	100.9	100.0	
72	26									
71	27									
70	28									
69	29									
68	30									
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Asphalt Parking

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 5

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, dark gray brown, moist, medium dense, some gravel and clay								
96	2	Sandy Clay, black, dark brown, brown, moist to very moist, soft, some gravel		----	R	15	18.7	105.2	86.6	
94	4			CL						
93	5			----	R	8	21.9	91.2	88.6	
91	7	dark gray brown, white, red, slightly firm to firm		----	R	15	23.1	97.8	94.7	
90	8			CL						
88	10	soft		----	R	7	24.6	97.9	88.3	
86	12			CL						
83	15	Sandy Silt, dark gray to brown, moist, firm		----	R	14	18.7	106.0	92.4	
81.5	16.5			ML						
80	18	Sandy Gravel, gray to dark gray, dense, some cobbles		GW						
78	20									

Surface: Asphalt Parking/4" Asphalt 5" Base

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 5

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
				----	R	14	19.0	107.0	55.4	
77	21									
76	22	**ALLUVIUM:** Sandy Silt, gray to dark gray, moist, firm								
75	23									
74	24			ML						
73	25	dark gray, very moist		----	R	12	----	----	----	No Recovery
72	26									
71	27			ML						
70	28									
69	29									
68	30	End at 30 Feet; No Water; Fill to 22 Feet.		----	R	14	----	----	----	No Recovery
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Asphalt Parking/4" Asphalt 5" Base

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Drill Date: 3-1-01

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, brown, black, slightly moist to moist, medium dense, some gravel								
93	5			SM	R	9	13.4	100.2	55.4	
88	10	Sandy Clay, black, brown, moist to very moist, slightly firm, some gravel		----	R	16	24.6	95.3	88.6	
86	12			CL						
83	15	concrete fraghment in tip of sampler, some gravel and cobbles		----	R	21	15.3	104.4	69.5	
81	17	Sandy Clay		CL						
79	19	ALLUVIUM: Sandy Silt, gray to dark gray, moist, firm								
78	20									

Surface: Asphalt Parking/3" Asphalt, 5" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, brown, black, slightly moist to moist, medium dense, some gravel								
97	1									
96	2									
95	3									
94	4									
93	5			SM	R	9	13.4	100.2	55.4	
92	6									
91	7									
90	8									
89	9									
88	10	Sandy Clay, black, brown, moist to very moist, slightly firm, some gravel		----	R	16	24.6	95.3	88.6	
87	11									
86	12			CL						
85	13									
84	14									
83	15	concrete fraghment in tip of sampler, some gravel and cobbles		----	R	21	15.3	104.4	69.5	
82	16									
81	17	Sandy Clay		CL						
80	18									
79	19	ALLUVIUM: Sandy Silt, gray to dark gray, moist, firm								
78	20									

Surface: Asphalt Parking/3" Asphalt, 5" Base

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-1-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 1871.1-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description (SUBSURFACE PROFILE)	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
				ML	R	13	26.0	96.6	96.9	
77	21									
76	22			ML						
75	23									
74	24	dark gray, very moist to wet								
73	25	End at 25 Feet; No Water; Fill to 19 Feet.		----	R	10	28.8	91.7	95.0	
72	26									
71	27									
70	28									
69	29									
68	30									
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Asphalt Parking/3" Asphalt, 5" Base

Size: 8 Inch

Drill Method: Hollow-Stem Auger Drill Rig

Elevation: 98.0 Feet

Project No: JB 18711-B

Client: McKesson HBOL

Location: Jefferson La Cienega, Los Angeles

Log of Boring 7

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
		FILL: Silty Sand, dark gray-brown to dark gray, slightly moist to moist, dense, fine to very coarse grained, asphalt fragments to 2 inches								
93	5			SM	R	13	14.6	101.1	61.0	
88	10			----	R	15	18.6	98.0	71.6	
84	14	Sand, light tan to brown, slightly moist, medium dense, fine to medium grained, some dirt clods								
83	15	Sandy Silt, light gray, brown, slightly moist, slightly firm, fine grained		SP	R	10	20.3	101.1	84.7	
81	17			ML						
79	19	Sandy Silt, black, slighty moist, firm, fine to medium grained								
78	20									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-B

Client: McKesson HBOL

Location: Jefferson La Cienega, Los Angeles

Log of Boring 7

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
				ML	R	11	11.8	108.4	59.7	
77	21	**ALLUVIUM:** Sandy Silt, gray to light brown, moist, firm, some clay								
76	22			ML	SPT	3 5 8				
75	23									
74	24	Gravelly Sand, tan to light gray, dry to slightly moist, dense								
73	25			GW	SPT	12 18 31				
72	26									
71	27									
70	28	Sandy Silt, gray, moist, very firm, fine grained		----	SPT	14 14 18				
69	29			ML						
68	30			----	SPT	10 20 22				
67	31									
66	32	Sandy Silt/Silty Sand, dark gray, moist, very firm, fine grained, scattered organic material to ¼ inch		ML	SPT	12 19 24				
65	33									
64	34									
63	35			----	SPT	9 13 21				
62	36									
61	37									
60	38			----	SPT	7 12 19				
59	39									
58	40									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-B

Client: McKesson HBOL

Location: Jefferson La Cienega, Los Angeles

Log of Boring 7

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
		some shell fragments to 1/8 inch		----	SPT	7 11 16				
57	41									
56	42			ML	SPT	7 15 18				
55	43									
54	44									
53	45			----	SPT	8 13 20				
52	46									
51	47			----	SPT	9 15 19				
50	48									
49	49									
48	50	End at 50 Feet; No Water; Fill to 21 Feet.		----	SPT	7 14 17				
47	51									
46	52									
45	53									
44	54									
43	55									
42	56									
41	57									
40	58									
39	59									
38	60									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 8

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98		Ground Surface								
	0	FILL: Silty Sand, dark gray brown, moist, medium dense to dense, some asphalt fragments								
97	1	dense								
96	2			SM						
95	3									
94	4									
93	5	tan to brown, some gravel		SM	R	15	15.3	111.4	83.6	
92	6									
91	7	brown to dark brown								
90	8			SM						
89	9									
88	10	dark brown, some clay, very dense		----	R	24	10.1	119.8	70.4	
87	11									
86	12			SM						
85	13									
84	14									
83	15	Sandy Silt, mottled greenish gray and dark gray brown, moist, firm		----	R	17	20.4	103.4	90.3	
82	16			ML						
81	17									
80	18									
79	19	ALLUVIUM: Silt, grayish brown, moist to very moist, firm, some shell fragments								
78	20									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 8

By: JAI

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(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
				ML	R	13	27.8	93.2	95.1	
77	21									
76	22			ML						
75	23									
74	24	gray to dark gray, moist								
73	25	End at 25 Feet; No Water; Fill to 19 Feet.		----	R	19	26.5	96.6	98.7	
72	26									
71	27									
70	28									
69	29									
68	30									
67	31									
66	32									
65	33									
64	34									
63	35									
62	36									
61	37									
60	38									
59	39									
58	40									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 9

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
98	0	Ground Surface								
97	1	FILL: Silty Sand, brown to light brown, moist to very moist, medium dense, some clay, some brick fragments		SM						
96	2									
95	3	dark brown to dark gray brown, fragments of asphalt up to 3 inches								
94	4									
93	5			SM	R	14	10.1	121.6	74.5	
92	6									
91	7									
90	8									
89	9									
88	10	Silt, dark gray to grayish brown, moist to very moist, firm		----	R	13	31.5	88.8	97.0	
87	11									
86	12			ML						
85	13									
84	14									
83	15	Gravelly Sand, tan, dark brown, dark gray, slightly moist, dense		----	R	14	18.0	111.8	99.8	
82	16			SW						
81	17	Sandy Gravel, tan, gray, dark brown, black, red, slightly moist, medium dense, fragments of brick and asphalt		----	R	9	19.6	106.4	93.8	
80	18									
79	19			GW						
78	20									

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

Size: 8 Inch

Elevation: 98.0 Feet

Project No: JB 18711-I

Client: McKesson HBOL

Location: 3475 La Cienega Boulevard, Los Angeles

Log of Boring 9

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
		fragments of concrete up to 3 inches	----	R	50 10"	18.0	109.1	92.5	
77	21								
76	22	ALLUVIUM: Silt, dark gray, moist, firm	----	R	12	26.2	96.5	97.1	
75	23								
74	24		ML						
73	25	some clay	----	R	12	32.4	88.0	97.7	
72	26								
71	27								
70	28								
69	29								
68	30	End at 30 Feet; No Water; Fill to 22 Feet.	----	R	15	30.7	90.7	98.9	
67	31								
66	32								
65	33								
64	34								
63	35								
62	36								
61	37								
60	38								
59	39								
58	40								

Surface: Level Dirt

Drill Method: Hollow-Stem Auger Drill Rig

Drill Date: 3-5-01

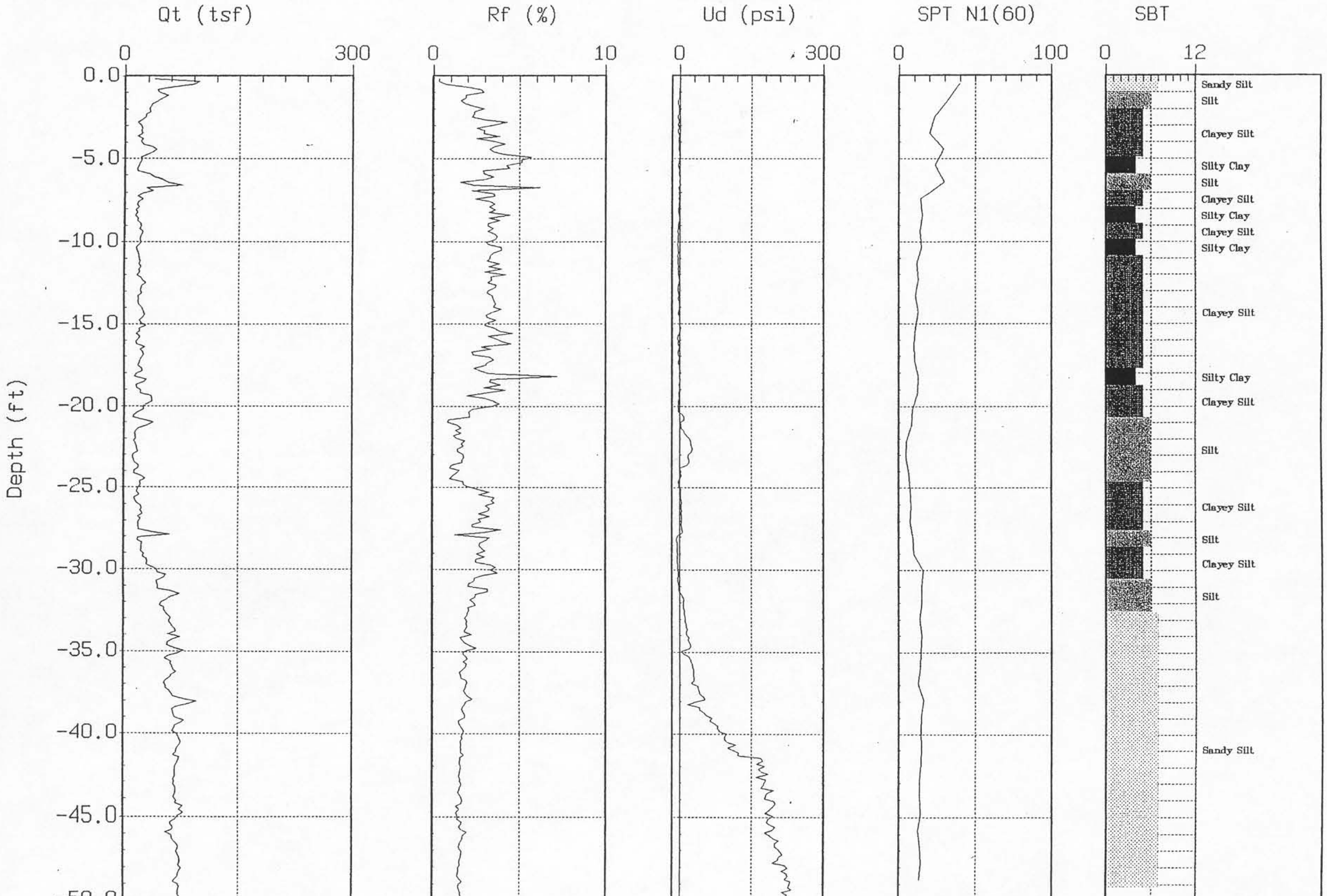
Size: 8 Inch

Elevation: 98.0 Feet

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-1

Engineer : J. IRVINE
Date : 03:19:01 08:06



Max. Depth: 50.03 (ft)

Depth Inc.: 0.164 (ft)

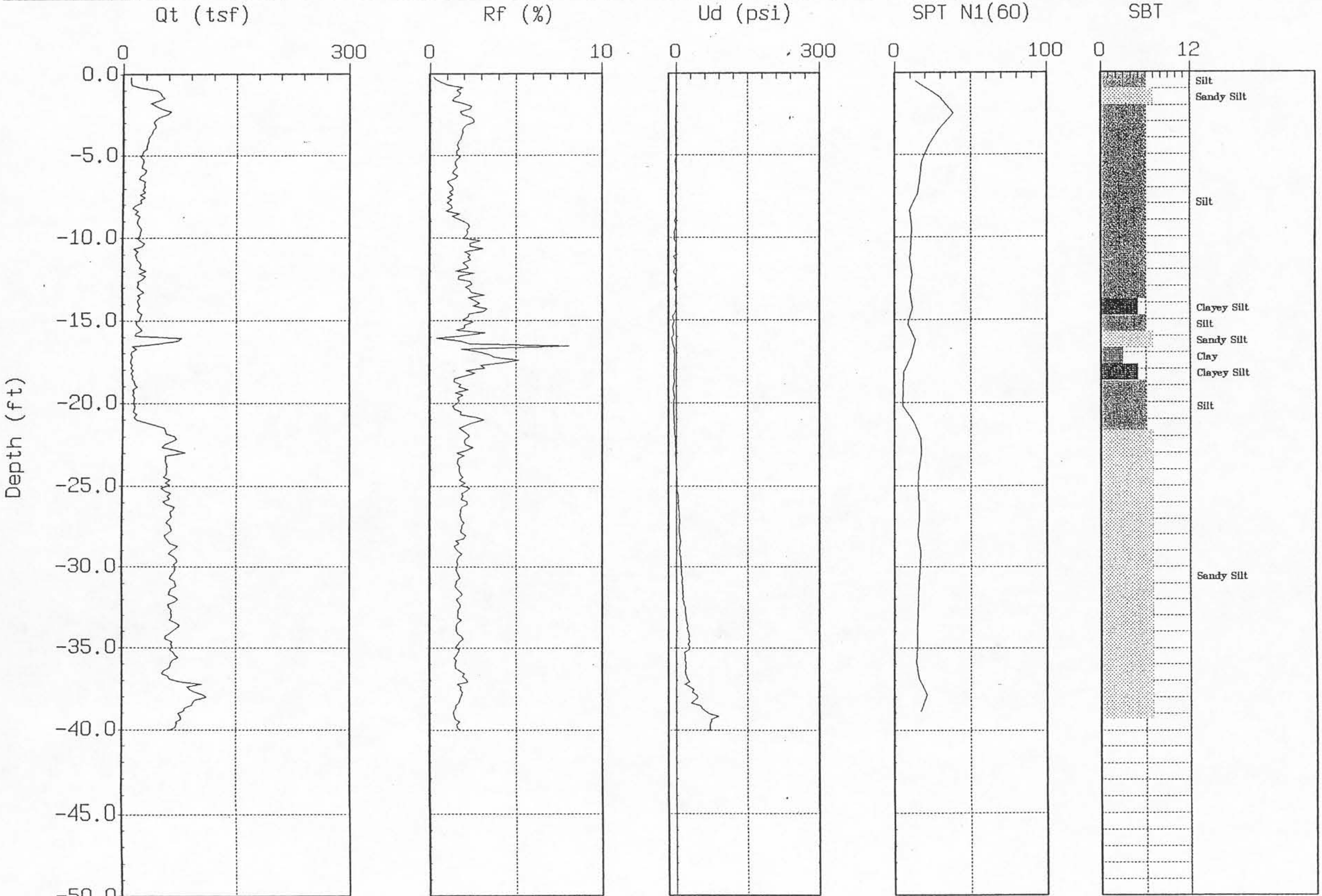
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-2

Engineer : J. IRVINE
Date : 03:19:01 08:41



Max. Depth: 40.03 (ft)

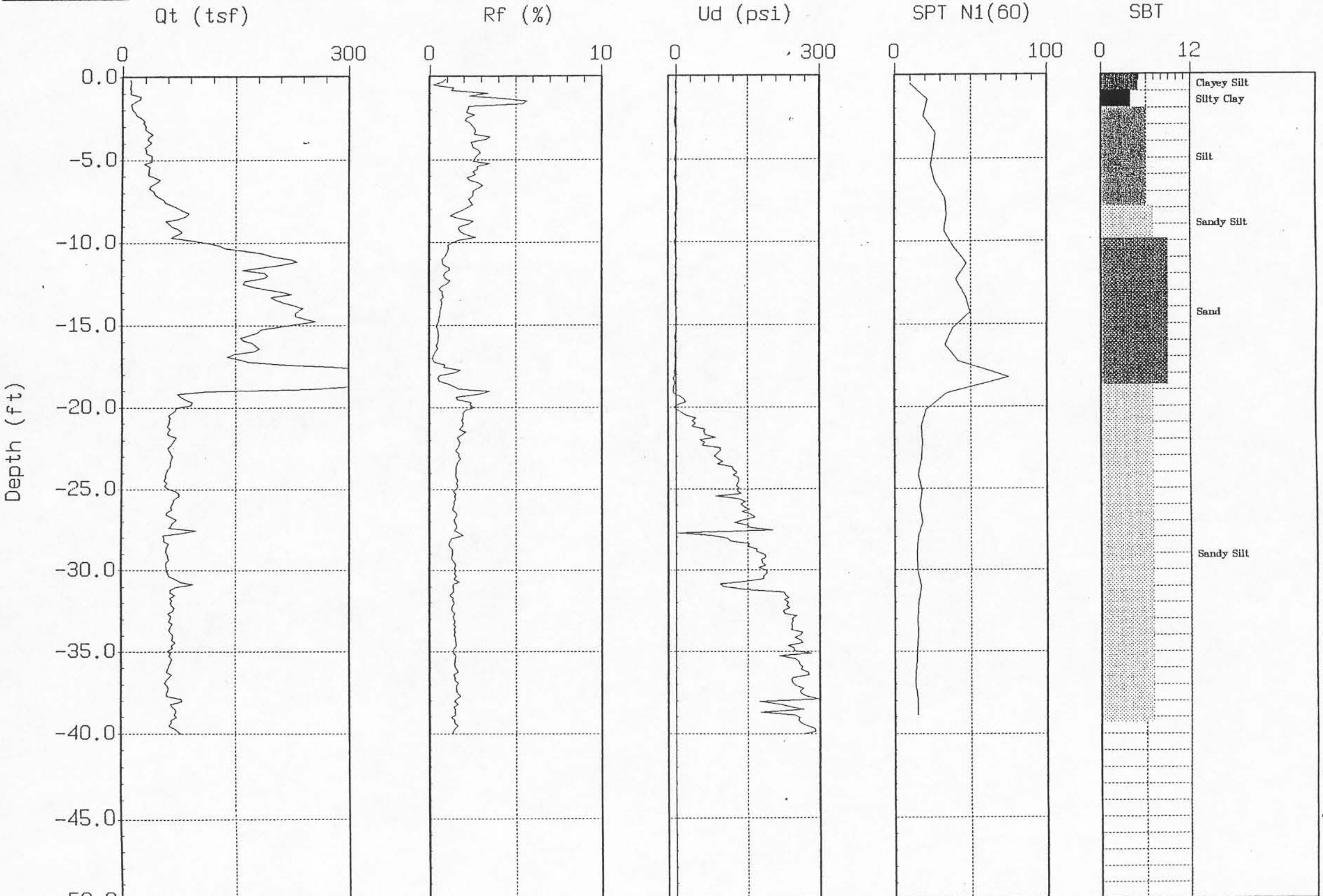
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-3

Engineer : J. IRVINE
Date : 03:19:01 09:04



Max. Depth: 40.03 (ft)

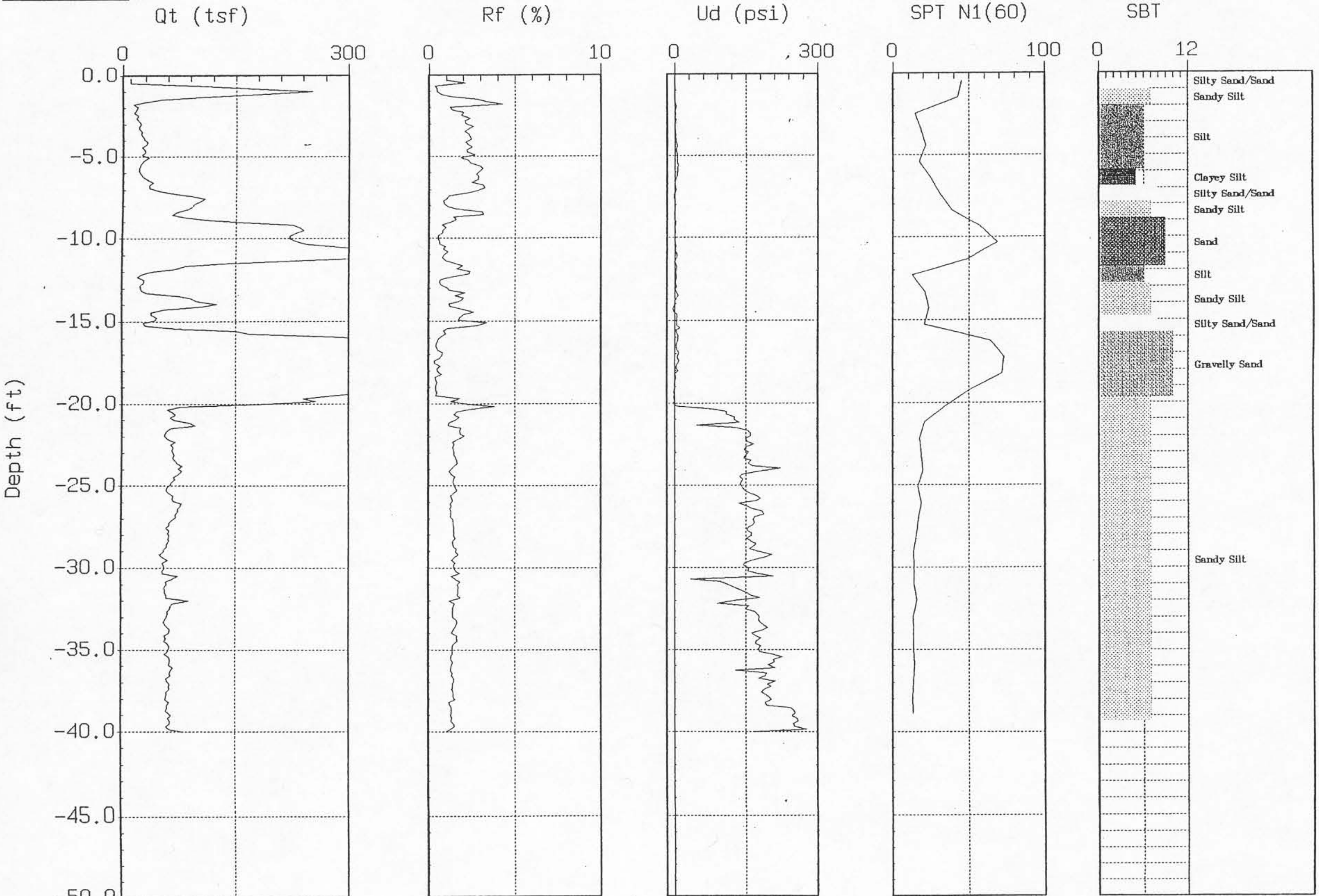
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-4

Engineer : J. IRVINE
Date : 03:19:01 09:27



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

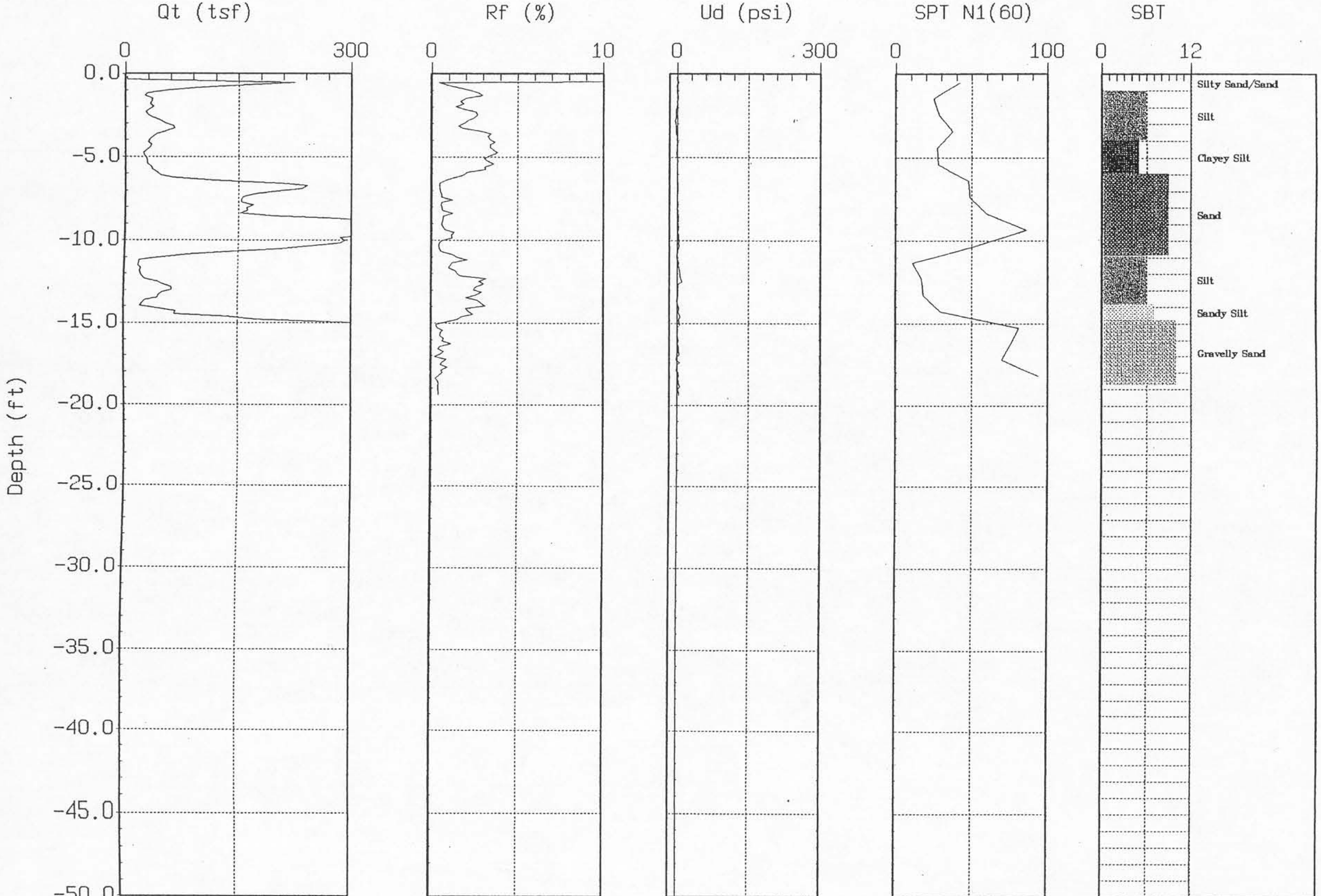
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-5

Engineer : J. IRVINE
Date : 03:19:01 09:47



Max. Depth: 19.36 (ft)

Depth Inc.: 0.164 (ft)

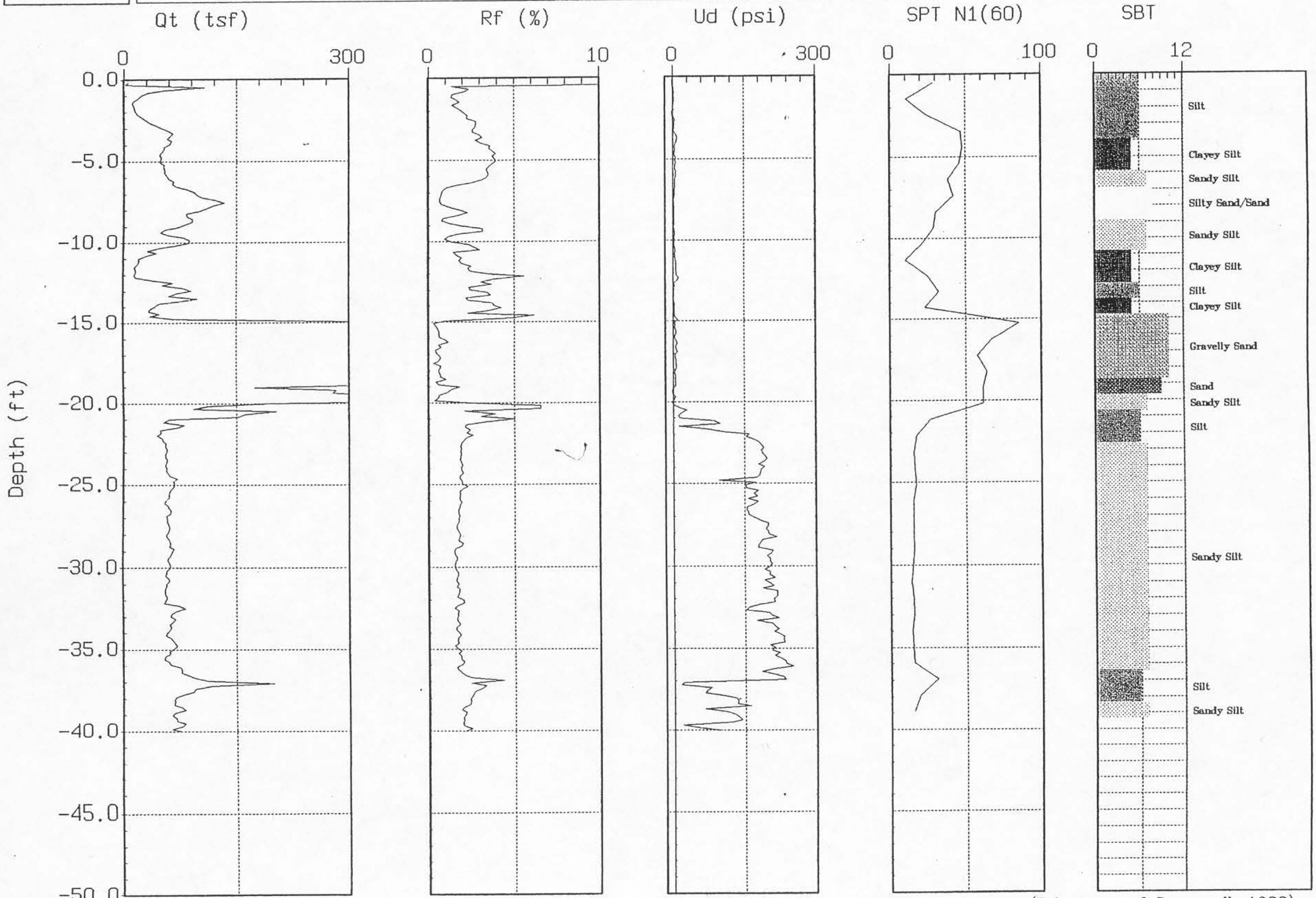
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-6

Engineer : J. IRVINE
Date : 03:19:01 10:12



Max. Depth: 40.03 (ft)

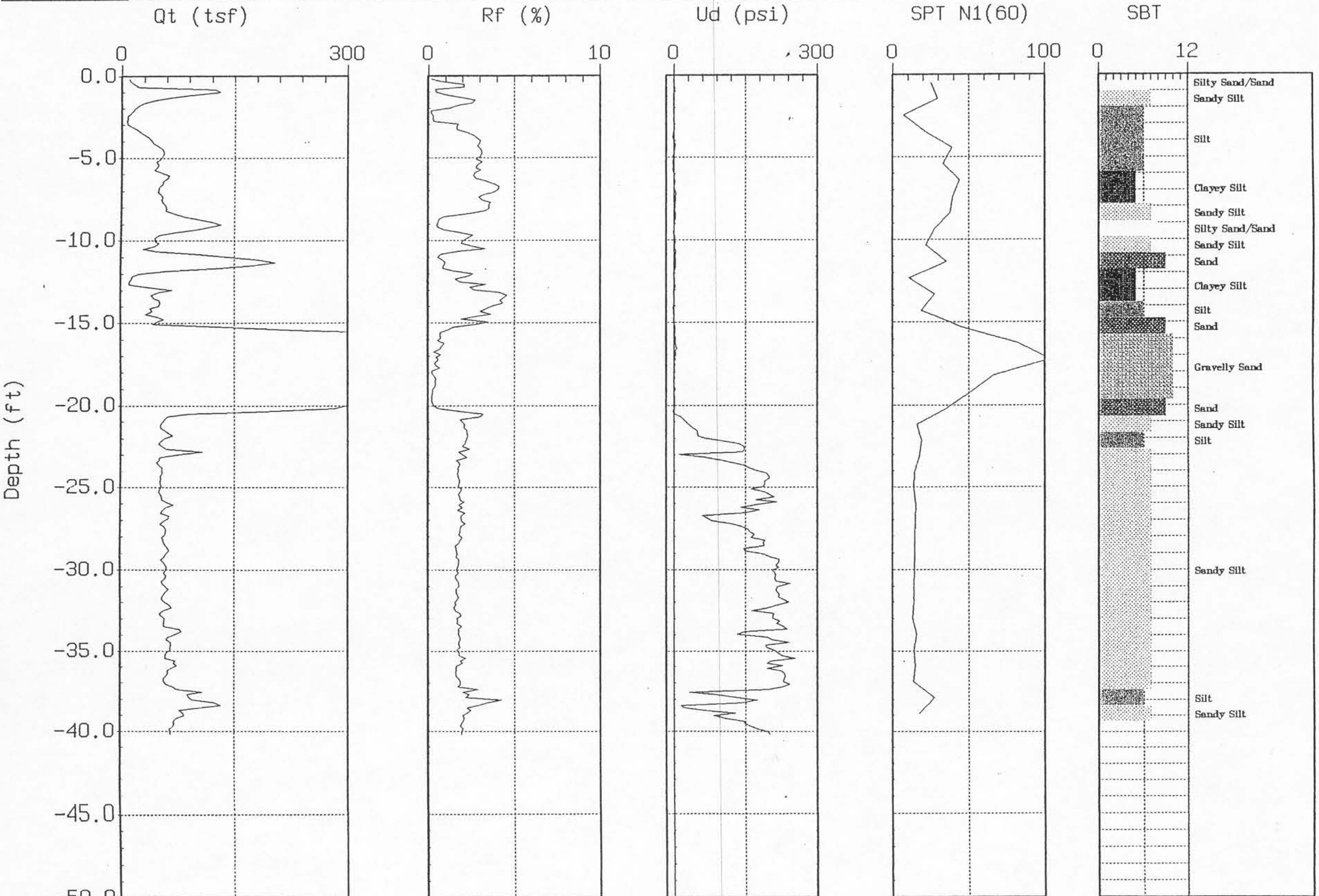
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-7

Engineer : J. IRVINE
Date : 03:19:01 10:38



Max. Depth: 40.19 (ft)

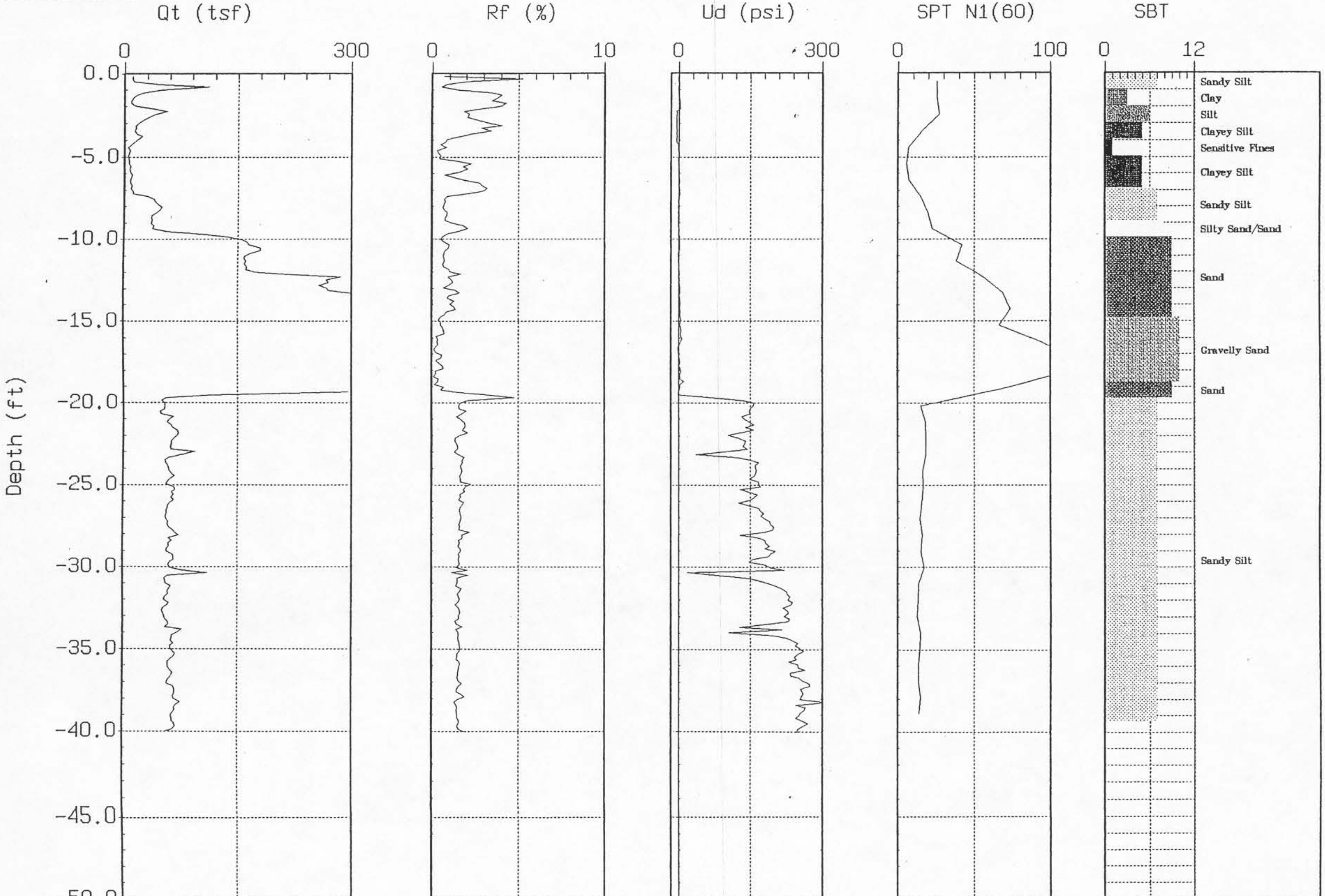
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-8

Engineer : J. IRVINE
Date : 03:19:01 11:08



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

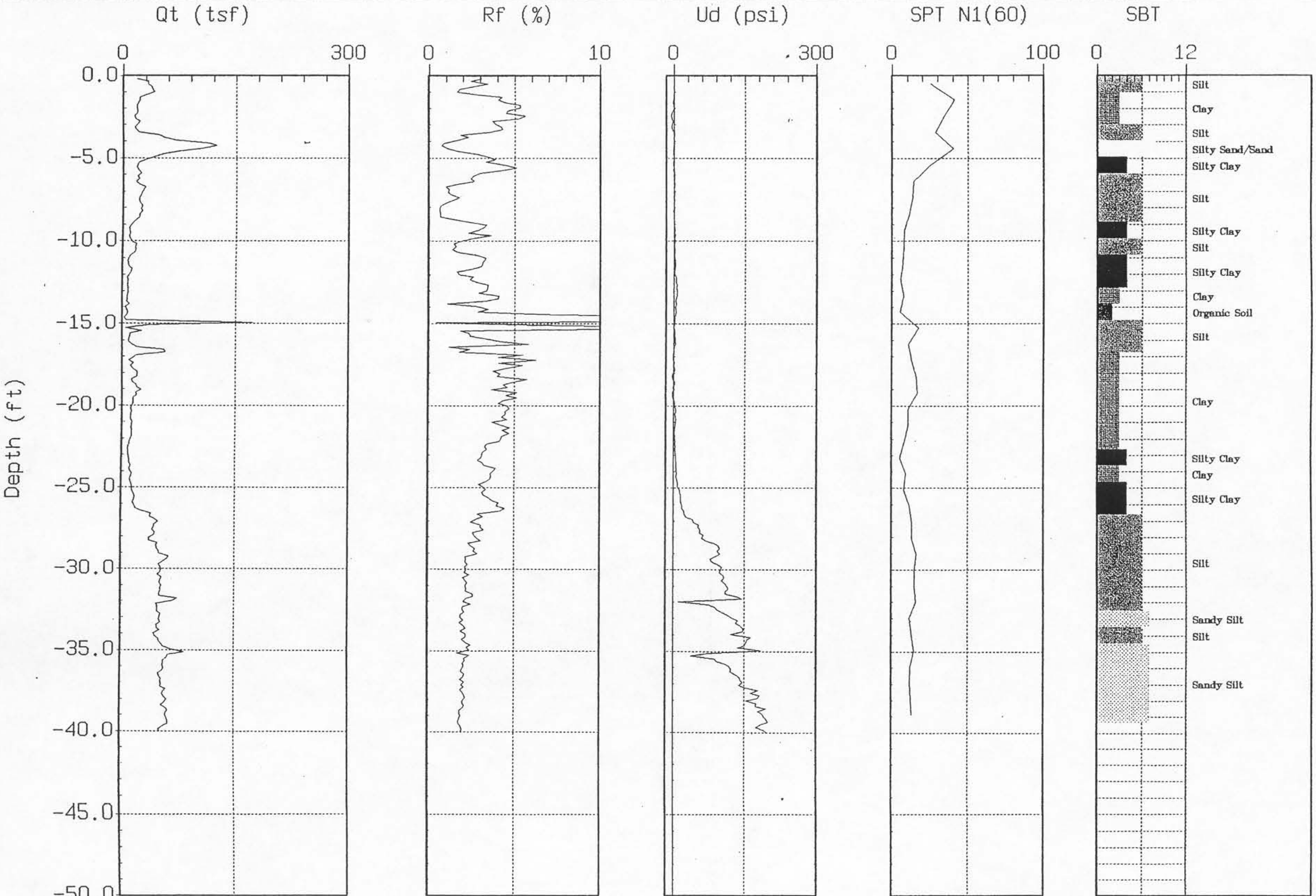
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

THE BYER GROUP

Site : SPARKLETTS
Location : CPT-9

Engineer : J. IRVINE
Date : 03:19:01 11:41



Max. Depth: 40.03 (ft)

Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

APPENDIX B

BORING LOGS BY ADVANCED GEOTECHNICAL RESEARCH, INC.

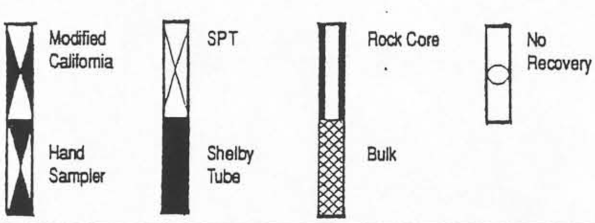
Key to Soil Symbols and Terms

Major Divisions			USCS Group Symbols	Typical Names
Coarse-Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels (More than half of coarse fraction is larger than No. 4 sieve)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand, clay mixtures
	Sands (More than half of coarse fraction is smaller than No. 4 sieve)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sand, little or no fines
			SP	Poorly graded sands, gravelly sands little or no fines
		Sands and fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts and Clays Liquid Limit < 50		ML	Silts and very fine sands, rock-flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low or medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit > 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		Pt	Peat and other highly organic soils

Legend of Laboratory Tests

G - Grain Size
A - Atterberg Limits
P - Compaction
S - Swell/Expansion
C - Consolidation
DS - Direct Shear
U - Unconfined
T - Triaxial
PP - Pocket Penetrometer
CH - Chemical

Sampler Type



Terms used in this report for describing soils according to their texture or grain size distributions are generally in accordance with the Unified Soil Classification System.

Terms Describing Density and Consistency

Coarse Grained soils (major portion retained on No. 200 sieve) include (1) clean gravels, (2) silty or clayey gravels, and (3) silty, clayey, or gravelly sands. Relative density is related to SPT blow count corrected for overburden pressure or drive energy.

Density		SPT *N* Value Blows/Ft	Relative Density %
Very Loose	vl	0 to 4	0 to 15
Loose	l	4 to 10	15 to 35
Medium Dense	md	10 to 30	35 to 65
Dense	d	30 to 50	65 to 85
Very Dense	vd	> 50	85 to 100

Fine Grained soils (major portions passing No. 200 sieve) inlcude (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shear strength as indicated by penetrometer readings, direct shear, or SPT blow count.

Consistency	Shear Strength, ksf	SPT *N* Value
Very Soft	< 0.25	0 to 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	8 to 16
Very Stiff	2.00 to 4.00	16 to 32
Hard	> 4.00	> 32

Terms Characterizing Soil Structure

Slickensided	Having inclined planes of weakness that are slick and glossy in appearance.
Fissured	Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated	Composed of thin layers of varying color and texture.
Interbedded	Composed of alternate layers of different soil types.
Calcareous	Containing appreciable quantities of calcium carbonate.
Well Graded	Having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly Graded	Predominately one grain size, or having a range of grain sizes with some intermediate sizes missing.
Porous	Having visibly apparent void spaces through which water, air, or light may pass.

Soil Moisture

From low to high, the moisture content is indicated by:

Dry	D
Slightly Moist	Sl M
Moist (near optimum for compaction)	M
Very Moist	V M
Wet	W

Size Proportions

Designation	Percent by Weight
Trace	< 5
Few	5 to 10
Little	15 to 25
Some	30 to 45

Grain Size Distribution

Clay | Silt | Sand (Fine | Medium | Coarse) | Gravel (Fine | Coarse)

Sieve Size Number: 200, 40, 10, 4, 3/4", 2", 3"

Particle Diameter in Millimeters: 0.005, 0.01, 0.05, 0.1, 0.5, 1.0, 5.0, 10.0, 50, 100

Advanced Geotechnical Services

Key to Bedrock Symbols and Terms

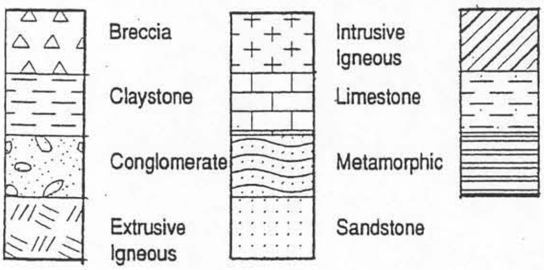
Degree of Weathering
Diagnostic Feature

Descriptive Term	Discoloration Extent	Fracture Condition	Surface Characteristics	Original Texture	Grain Boundary Condition
Unweathered	None	Closed or discolored	Unchanged	Preserved	Tight
Slightly Weathered	Less 20% of fracture spacing on both sides of fracture	Discolored, may contain thin filling	Partial discoloration	Preserved	Tight
Moderately Weathered	Greater than 20% of fracture spacing on both sides of fracture	Discolored, may contain thick filling, cemented rock	Partial to complete discoloration, not friable except poorly cemented rocks	Preserved	Partial Opening
Highly Weathered	Throughout		Friable and possibly pitted	Mainly Preserved	Partial Separation
Completely Weathered	Throughout		Resembles a soil	Partly Preserved	Complete Separation

Discontinuity Spacing

Description for Structural Feature: Bedding, Foliation, or Flow Banding	Spacing		Description for Joints, Faults, or Other Fractures
Very Thickly (Bedded, Foliated, or Banded)	More than 2 m	More than 6 ft	Very Widely (Fractured or Jointed)
Thickly	60 cm to 2 m	2 to 6 ft	Widely
Moderately	20 to 60 cm	8 to 24 in.	Medium
Thinly	60 to 200 mm	2.5 to 8 in.	Closely
Very Thinly	20 to 60 mm	0.75 to 2.5 in.	Very Closely
Description for Microstructural Features: Bedding, Foliation, or Cleavage			
Intensely (Laminated, Foliated, or Cleaved)	6 to 20 mm	0.25 to 0.75 in.	Extremely Close
Very Intensely	< 6 mm	< 0.25 in.	

Graphic Symbols - Bedrock



Rock Hardness

Classification	Field Test
Very Weak	Can be dug by hand and crushed with fingers.
Weak	Friable, can be gouged deeply with a knife and will crumble readily under light hammer blows.
Moderately Strong	Can be peeled with a knife. Material crumbles under firm blows with the sharp end of a geologic pick.
Strong	Cannot be scaped or peeled with a knife point. Hand held specimen breaks with firm blows of the pick.
Very Strong	Difficult to scratch with knife point. Cannot break hand held specimen.

Separation of Fracture Walls

Description	Separation of Walls, mm
Closed	0
Very Narrow	0 to 0.1
Narrow	0.1 to 1.0
Wide	1.0 to 5.0
Very Wide	> 5.0

Fracture Filling

Description	Definition
Clean	No fracture filling material
Stained	Discoloration of rock only. No recognizable filling material.
Filled	Fracture filled with recognizable filling material.

Surface Roughness

Description	Classification
Smooth	Appears smooth and is essentially smooth to the touch. May be slickensided.
Slightly Rough	Asperities on the fracture surfaces are visible and can be distinctly felt.
Medium Rough	Asperites are clearly visible and fracture surface feels abrasive to the touch.
Rough	Large angular asperites can be seen. Some ridge and high-side angle steps evident.
Very Rough	Near vertical steps and ridges occur on the fracture surface.

Where slickensides are observed, the direction of the slickensides should be recorded after the standard discontinuity surface description.

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Boring Log B-1

Sheet 1 of 2

Project: **RAD Jefferson** Client No. **3224** Date Drilled **8/22/03**

Comment: **CME 75 with Down Hole Hammer and Safe-T Driver**

Drilling Company/Driller: **Discovery Drilling/ Dudley** Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** Average Drop (in.): **30** Hole Diameter (in.): **6**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0		**Asphalt 0 - 3 inches**					
		Base 3 - 6 inches					
		Artificial Fill (af) 6 in. - 13 ft. SILTY SAND WITH GRAVEL; dark grayish brown; moist; stiff.					
	5 4 7			101.6	20.7	41.2	E.I. = 37
5	5 5 7			103.2	17.5		
	6 8 10	SILTY SANDY CLAY to CLAYEY SAND; dark grayish brown; moist; stiff.		96.5	20.7	56.3	
10	8 9 14			89.4	25.0		
		Alluvium (Qa) 13 - 50.5 ft GRAVELLY SAND; yellowish brown;minor orange iron oxide staining; slightly moist; medium dense.					
15	9 7 14			112.9	3.8	4.9	
		SANDY SILT; dark brown; moist; dense.					
20	10 20 17			111.9	12.6	60.6	
		SILTY SAND WITH ABUNDANT GRAVEL; grayish brown; moist; very dense.					
25	20 57			118.4	13.6	24.5	

advanced geotechnical services, inc.

Boring Log B-1

Project: **RAD Jefferson** Client No. **3224** Date Drilled **8/22/03**

Comment: **CME 75 with Down Hole Hammer and Safe-T Driver**

Drilling Company/Driller: **Discovery Drilling/ Dudley** Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** Average Drop (in.): **30** Hole Diameter (in.): **6**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
		50 50/1"		CLAYEY SILT to SILTY SAND; grayish brown; moist; hard.		103.3	17.8	92.4	
35		45 50/3"		SILTY SAND;grayish brown, moist, dence		100.6	16.0		
40		75/6"		SANDY SILT; grayish brown; moist; very dense.		100.9	21.4	82.6	
45		35 50/4"		@45 ft		74.9	45.2		
50		45 50/2"		Total Depth = 50.5 ft No Groundwater No Caving		99.7	23.3	87.2	
55									

advanced geotechnical services, inc.

Boring Log B-2

Sheet 1 of 1

Project: **RAD Jefferson** Client No.: **3224** Date Drilled: **8/22/03**

Comment: **CME 75 with Down Hole Hammer and Safe-T Driver**

Drilling Company/Driller: **Discovery Drilling/ Dudley** Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** Average Drop (in.): **30** Hole Diameter (in.): **6**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0			**Asphalt 0 - 3 inches**					
			Base 3 - 7 inches					
			Artificial Fill (af) 7 in. - 14 ft SILTY CLAY WITH GRAVEL; very dark grayish brown; moist; stiff.					
	X	3, 6, 5			106.5	11.6		
5	X	3, 8, 9	@ 5 ft grades with sand.		96.9	16.8		
	X	5, 7, 10	@ 7.5 ft very stiff.		100.6	18.9		
10	X	7, 11, 14			95.7	23.6		
			Alluvium (Qa) 14 - 21 ft CLAYEY SILT with Gravel; dark grayish brown, minor brown iron oxide staining; moist; hard.					
15	X	12, 18, 17			110.3	20.0		
20	X	12, 14, 14						
			Total Depth = 21 ft No Groundwater No Caving					
25								

advanced geotechnical services, inc.

Boring Log B-3

Sheet 1 of 2

Project: **RAD Jefferson** Client No. **3224** Date Drilled **8/22/03**

Comment: **CME 75 with Down Hole Hammer and Safe-T Driver**

Drilling Company/Driller: **Discovery Drilling/ Dudley** Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** Average Drop (in.): **30** Hole Diameter (in.): **6**

Elevation ___ ft Depth to Water ___ ft After ___ hrs on ___ Logged By **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				Asphalt 0 - 3 inches					
				Artificial Fill 3 in. - 4 ft SILTY CLAY; olive brown; moist; hard; some gravel.					
		9 24 48				119.1	12.8		
5				**Alluvium (Qa) 4 - 51 ft** SILTY CLAYEY SAND; light olive brown; moist; very dense; some gravel.					
		9 24 26				116.4	9.3		
				SANDY SILT; olive brown; moist; dense.					
		16 19 24				116.3	14.0		
10		16 14 12		@ 10 ft no recovery.					
				SANDY SILT to SILTY SAND; olive gray; micaceous, very moist; very dense; very fine-grained.					
15		12 18 50				90.5	31.3		
				FINE-GRAINED SAND; yellowish brown; wet; dense.					
				SILT with thin laminations and lenses of fine grained SAND; micaceous, dark gray; moist; dense.					
20		25 20 18				100.9	25.4		
25		15 20 33		@ 25 ft Grades very dense, Clayey SILT.		99.7	23.1		

advanced geotechnical services, inc.

Boring Log B-3

Project: RAD Jefferson Client No.: 3224 Date Drilled: 8/22/03

Comment: CME 75 with Down Hole Hammer and Safe-T Driver

Drilling Company/Driller: Discovery Drilling/ Dudley Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 Average Drop (in.): 30 Hole Diameter (in.): 6

Elevation ___ ft Depth to Water ___ ft After ___ hrs on ___ Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
		20 50				99.5	23.5		
35		23 50/5"				96.4	23.0		
40		37 50				95.6	27.2		
45		15 50				101.5	23.1		
50		35 50				99.3	18.3		
				Total Depth = 51 ft Seepage at 18 ft No Caving					
55									

advanced geotechnical services, inc.

Boring Log B-4

Sheet 1 of 1

Project: RAD Jefferson — Client No.: 3224 — Date Drilled: 9/2/03

Comment: CME 75 with Automatic Hammer and Safe-T Driver

Drilling Company/Driller: Jet Drilling/ Brad — Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 — Average Drop (in.): 30 — Hole Diameter (in.): 6

Elevation ____ ft — Depth to Water ____ ft After ____ hrs on ____ — Logged By: MD

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0			**Artificial Fill (af) 0 - 7 ft** CLAYEY SILT; dark grayish brown; slightly moist; hard.					
	X	5 15 30			112.0	17.5		
5	X	8 16 26	CLAYEY SAND; dark olive brown; moist; dense; fine-grained with some gravels.		120.4	9.9		
	X	6 11 16	**Alluvium (Qa) 7 - 20.5 ft** SANDY CLAY; olive; moist; hard.		107.9	18.3		
10	X	8 12 16			113.3	18.2		
			SILTY SAND; dark olive brown with some iron oxide staining; moist; medium dense; cobble in sampler tip.					
15	X	13 50/3"			97.5	21.7		
			FINE-GRAINED SAND WITH GRAVEL AND COBBBLES; dark grayish brown; moist; very dense.					
20	X	50			130.4	2.8		
			Total Depth = 20.5 ft No Groundwater No Caving					
25								

advanced geotechnical services, inc.

Boring Log B-5

Sheet 1 of 1

Project: **RAD Jefferson** Client No. **3224** Date Drilled **9/2/03**

Comment: **CME 75 with Automatic Hammer and Safe-T Driver**

Drilling Company/Driller: **Jet Drilling/ Brad** Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** Average Drop (in.): **30** Hole Diameter (in.): **6**

Elevation ______ ft Depth to Water ______ ft After ______ hrs on ______ Logged By **MD**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
			Asphalt 0 - 3 inches					
			Base 3 - 6 inches					
			Artificial Fill (af) 6 in. - 21 ft SILTY CLAY; dark grayish brown; moist; stiff.					
	X	4 5 5			92.2	21.4		
			SANDY CLAY; very dark grayish brown; moist; stiff; some gravel.					
5	X	3 3 3			112.0	13.7		
	X	4 4 6			104.2	18.3		
			SILTY CLAY and SANDY SILT with Gravel; very dark grayish brown and olive gray, mottled; moist; very stiff.					
10	X	5 9 9			96.2	22.0		
15	X	8 11 12	@ 15.5 ft brick fragment.					
20	X	5 8 9	@ 20 ft grades firm.		99.0	22.0		
			Total Depth = 21 ft No Groundwater No Caving					
25								

advanced geotechnical services, inc.

Boring Log B-6

Sheet 1 of 1

Project: **RAD Jefferson** — Client No. **3224** — Date Drilled **9/2/03**

Comment: **CME 75 with Automatic Hammer and Safe-T Driver**

Drilling Company/Driller: **Jet Drilling/ Brad** — Equipment: **Hollow Stem Auger**

Driving Weight (lbs): **140** — Average Drop (in.): **30** — Hole Diameter (in.): **6**

Elevation ____ ft — Depth to Water ____ ft After ____ hrs on ____ — Logged By **MD**

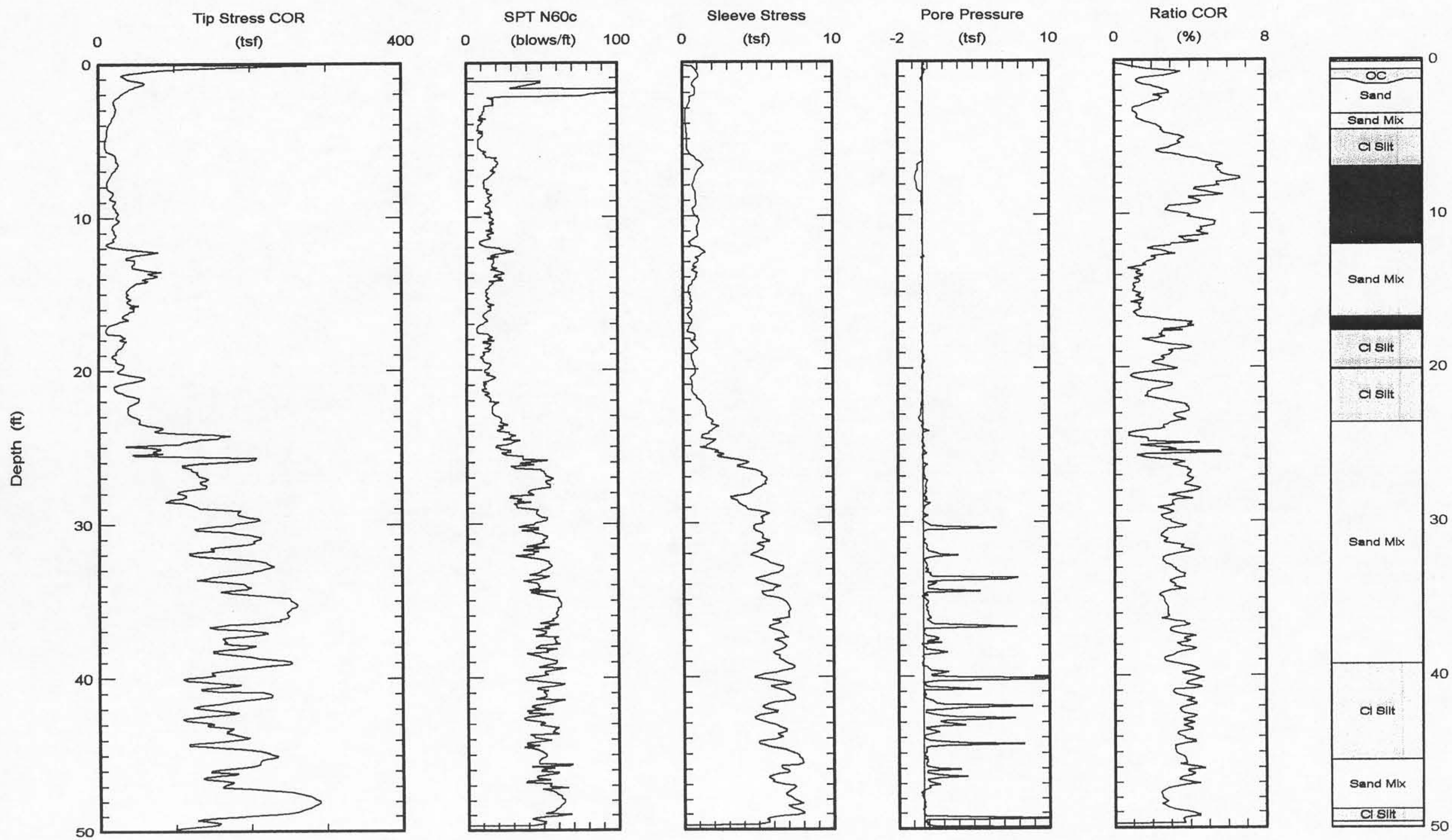
Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0		**Asphalt 0 - 3 inches**					
		Base 3 - 6 inches					
		Artificial Fill 6 in. - 4 ft SILTY CLAY; dark grayish brown; moist; hard.					
~2.5	8 11 11			101.5	22.0		
4		**Alluvium (Qa) 4 - 20.25 ft** SANDY CLAY; olive; moist; very stiff; fine-grained.					
5	6 7 9			106.4	20.2		
~7		SILTY CLAY; olive ; moist; very stiff.					
~7.5	9 11 13			103.0	20.0		
10	5 77 18	@ 10 ft grades hard.		106.3	21.6		
~13.5		SILTY SAND WITH GRAVEL; multi-colored with iron oxide staining; slightly moist; very dense.					
15	11 38 50/3"			102.8	10.6		
20	50/3"	@ 20 ft no recovery; abundant cobble and gravel.					

Total Depth = 20.25 ft
No Groundwater
No Caivng

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 28/Aug/2003 Test ID: CPT-1(NW) Project: MTA
	Client: AGS Site: Jefferson Blvd., Los Angeles	



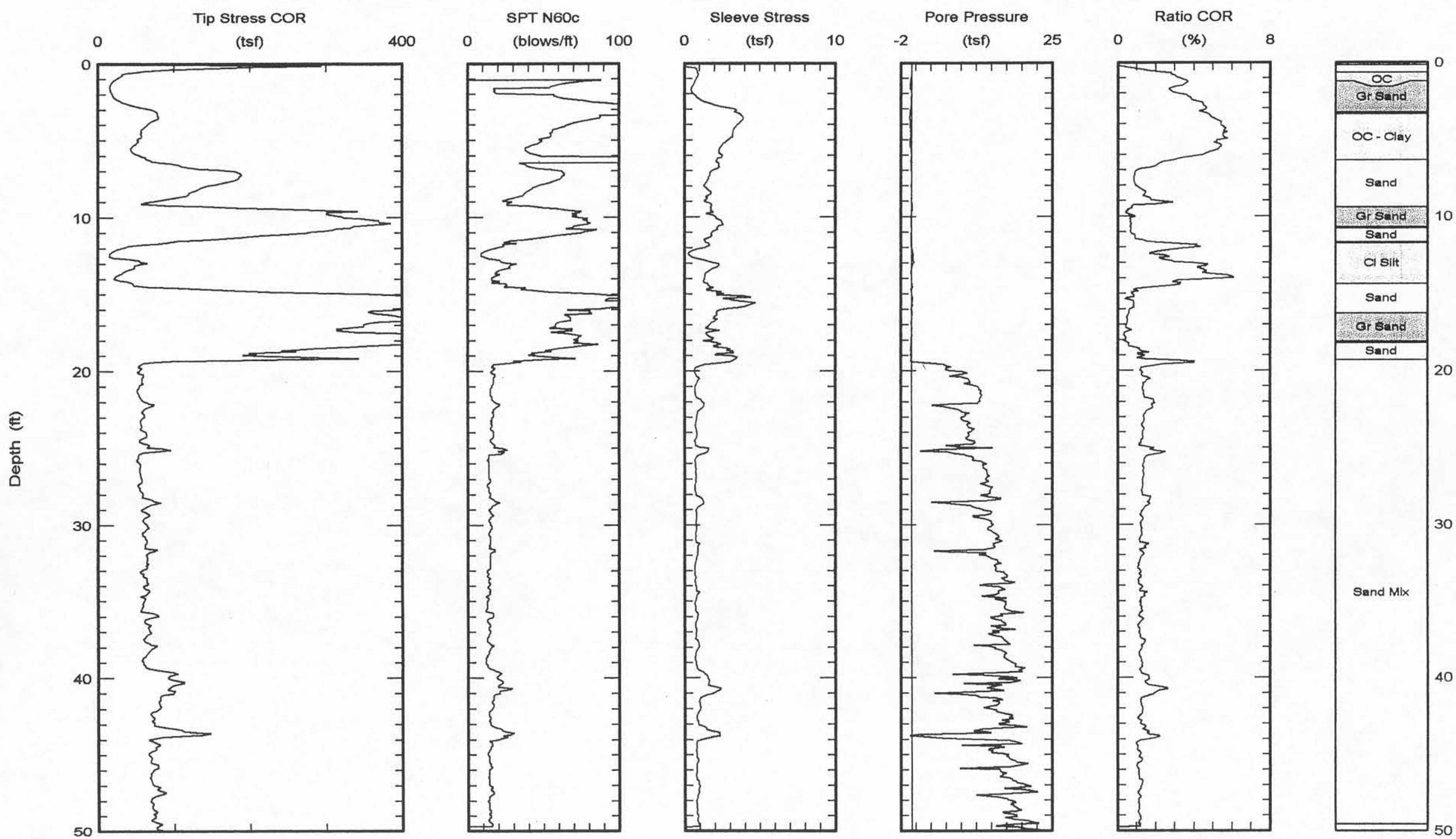
Maximum depth: 50.08 (ft)

Page 1 of 2

Test ID: CPT-1(NW)

File: C28G0302C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 28/Aug/2003 Test ID: CPT-2 (SE) Project: MTA
	Client: AGS Site: Jefferson Blvd., Los Angeles	



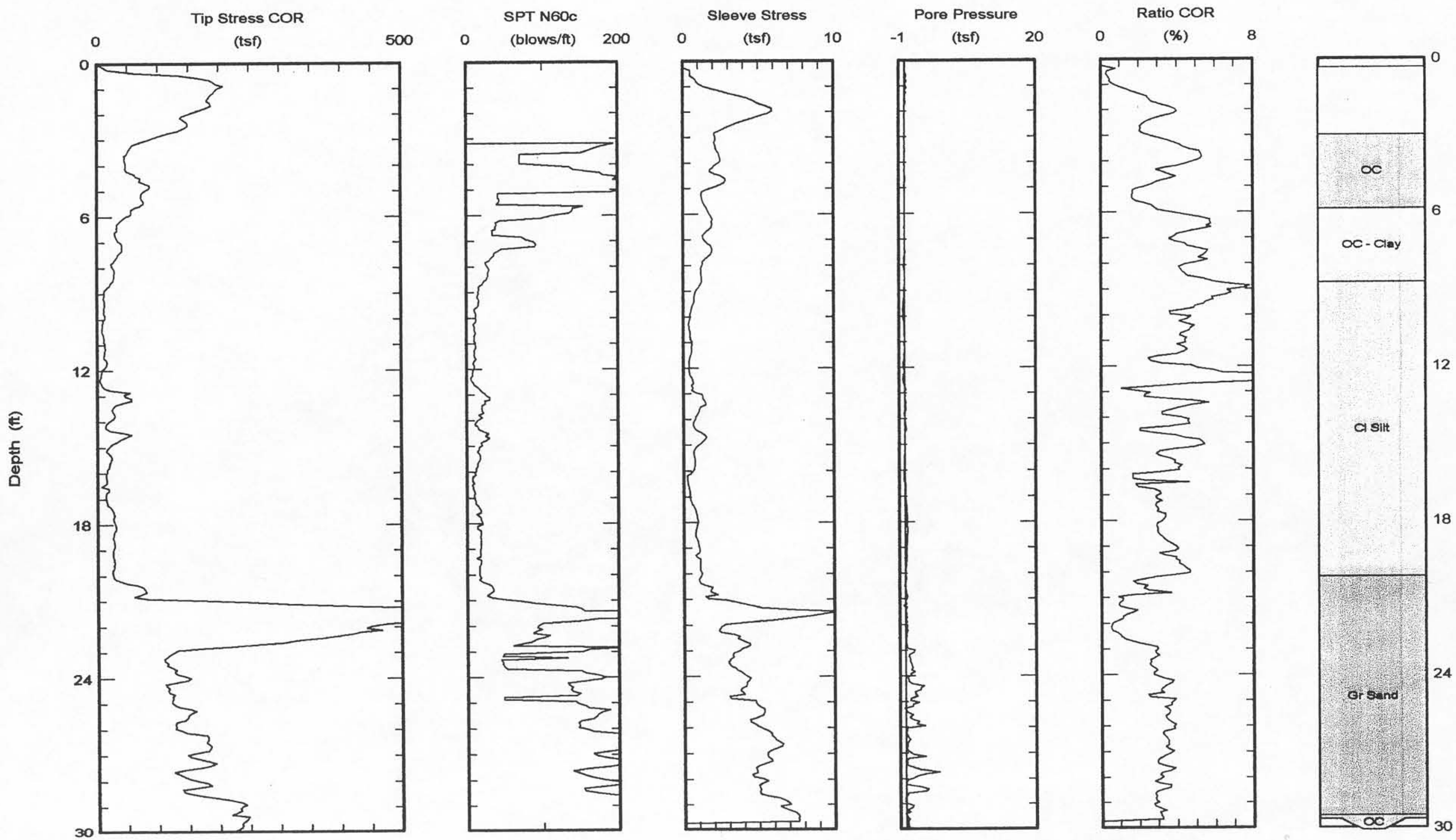
Maximum depth: 50.13 (ft)

Page 1 of 2

Test ID: CPT-2 (SE)

File: C28G0303C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-3 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



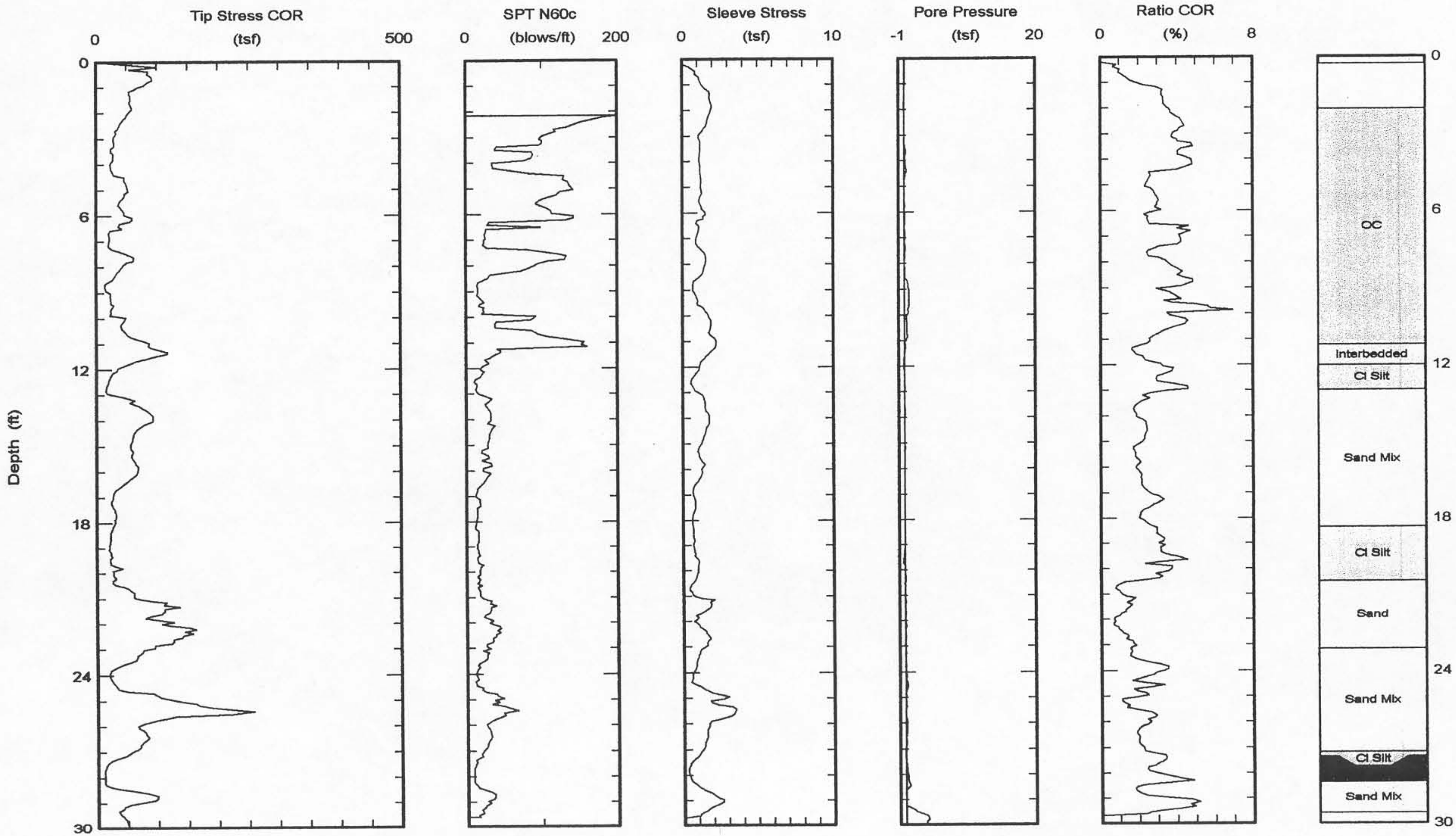
Maximum depth: 30.11 (ft)

Page 1 of 2

Test ID: CPT-3

File: c15o0301c.ecp

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-4 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



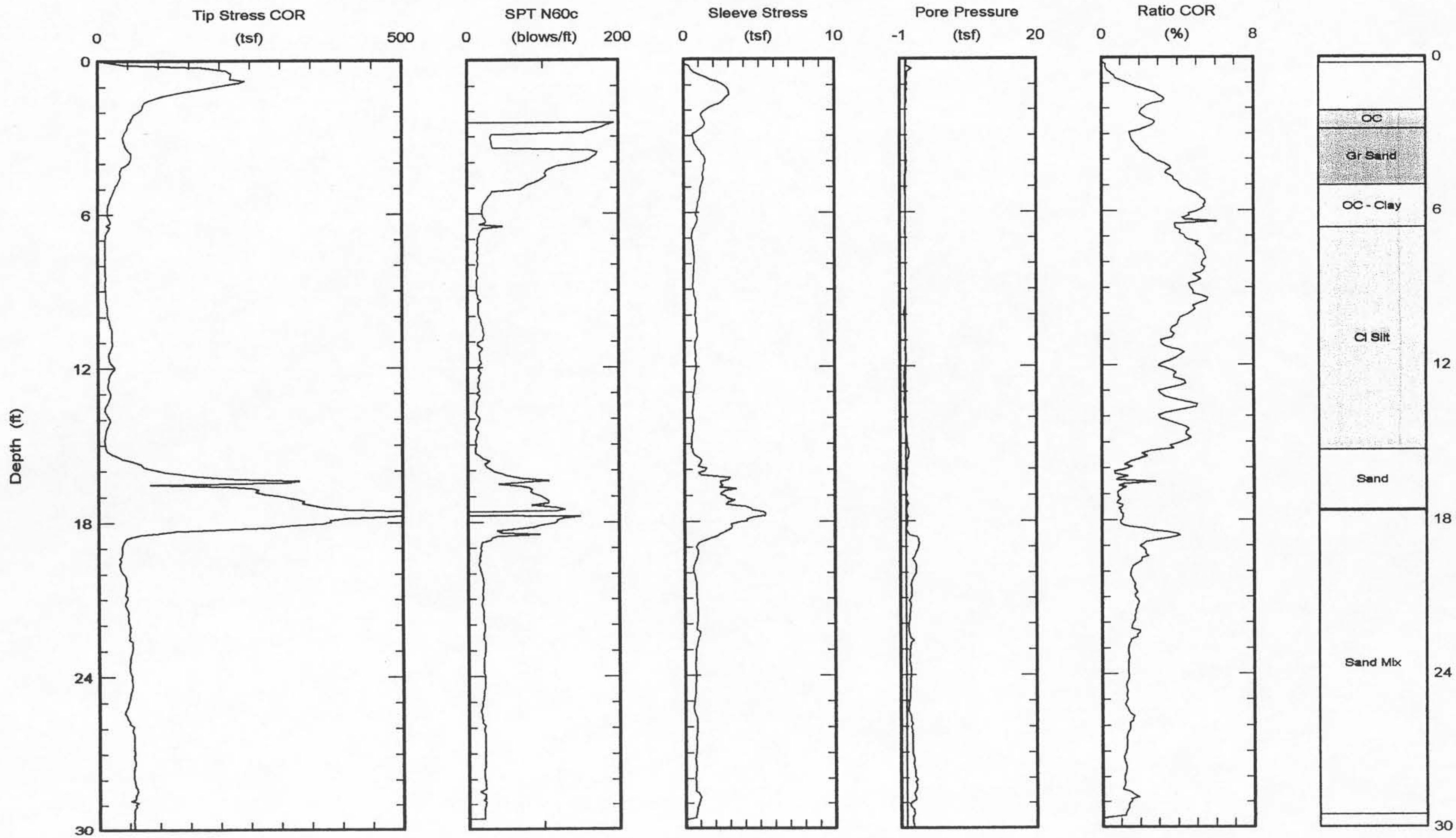
Maximum depth: 30.04 (ft)

Page 1 of 2

Test ID: CPT-4

File: C15O0302C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-5 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	

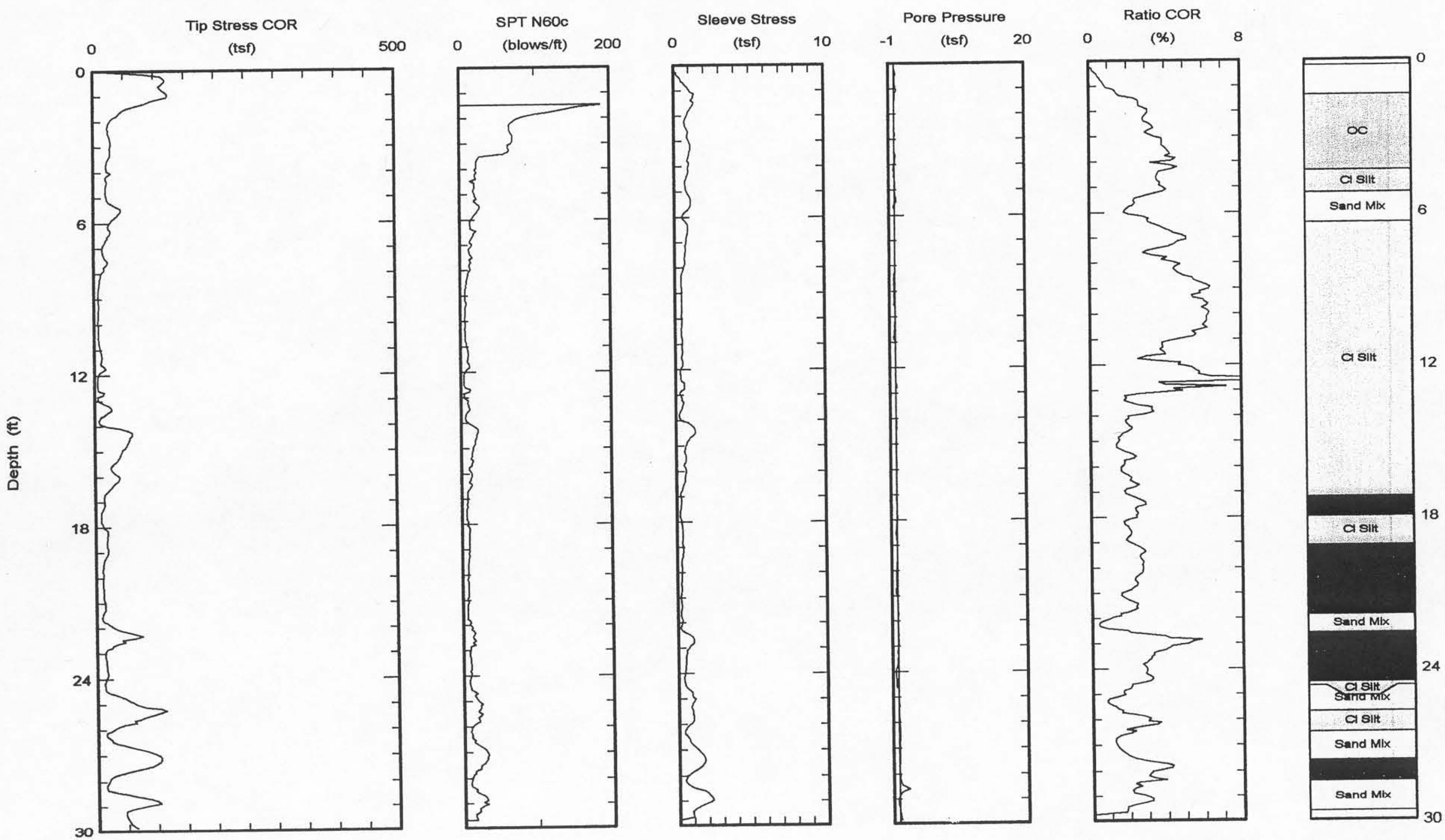


Maximum depth: 30.00 (ft)

Test ID: CPT-5
File: C15O0303C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
Email: skehoe@msn.com

Northing:	Date: 15/Oct/2003
Easting:	Test ID: CPT-6
Elevation:	Project: MTA
Client: AGS	
Site: 3475 La Cienega Blvd	

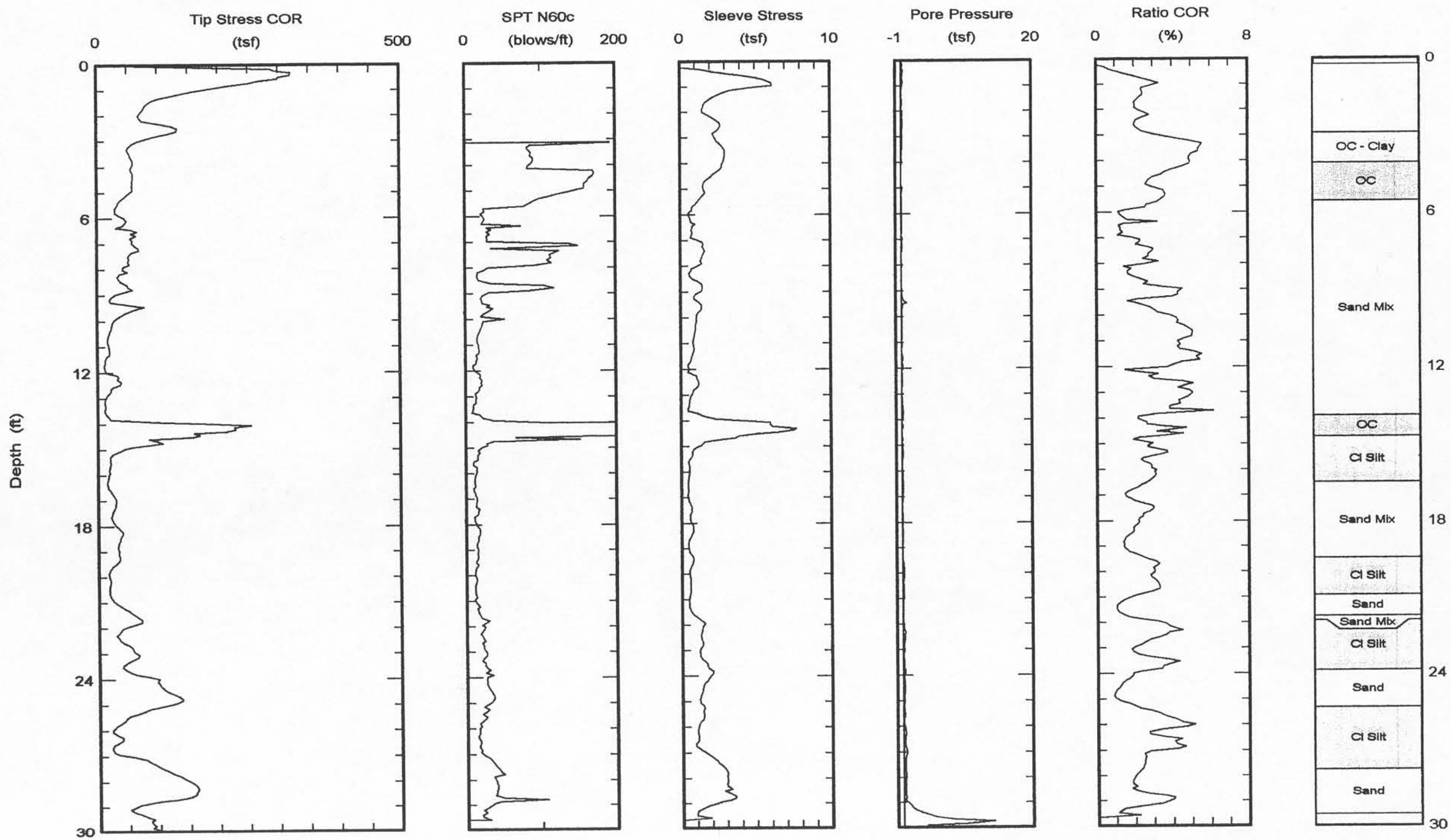


Maximum depth: 30.09 (ft)

Test ID: CPT-6
File: C15O0306C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
Email: skehoe@msn.com

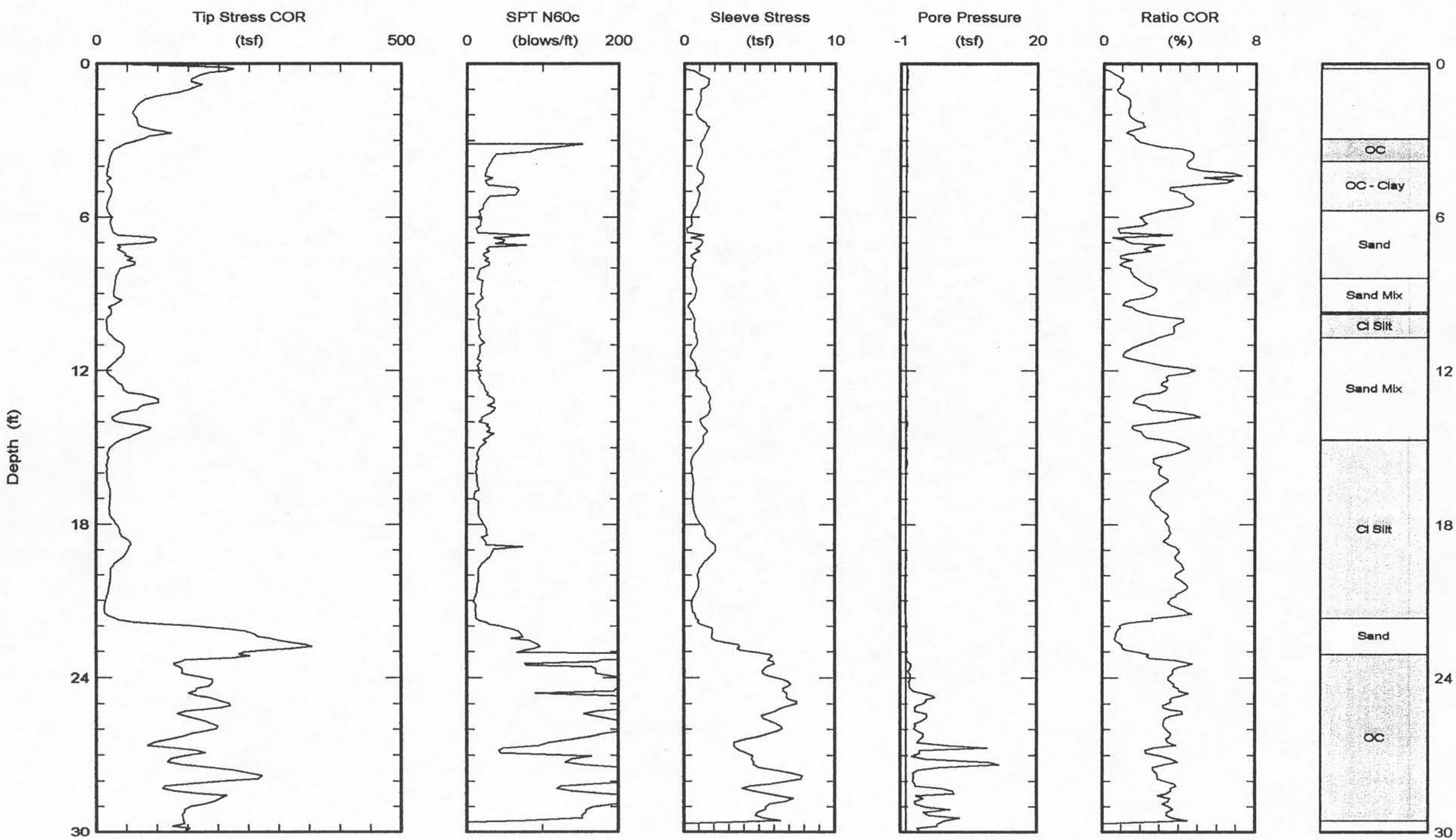
Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-7 Project: MTA
Client: AGS Site: 3475 La Cienega Blvd	



Maximum depth: 30.00 (ft)

Test ID: CPT-7
File: C15O0304C.ECP

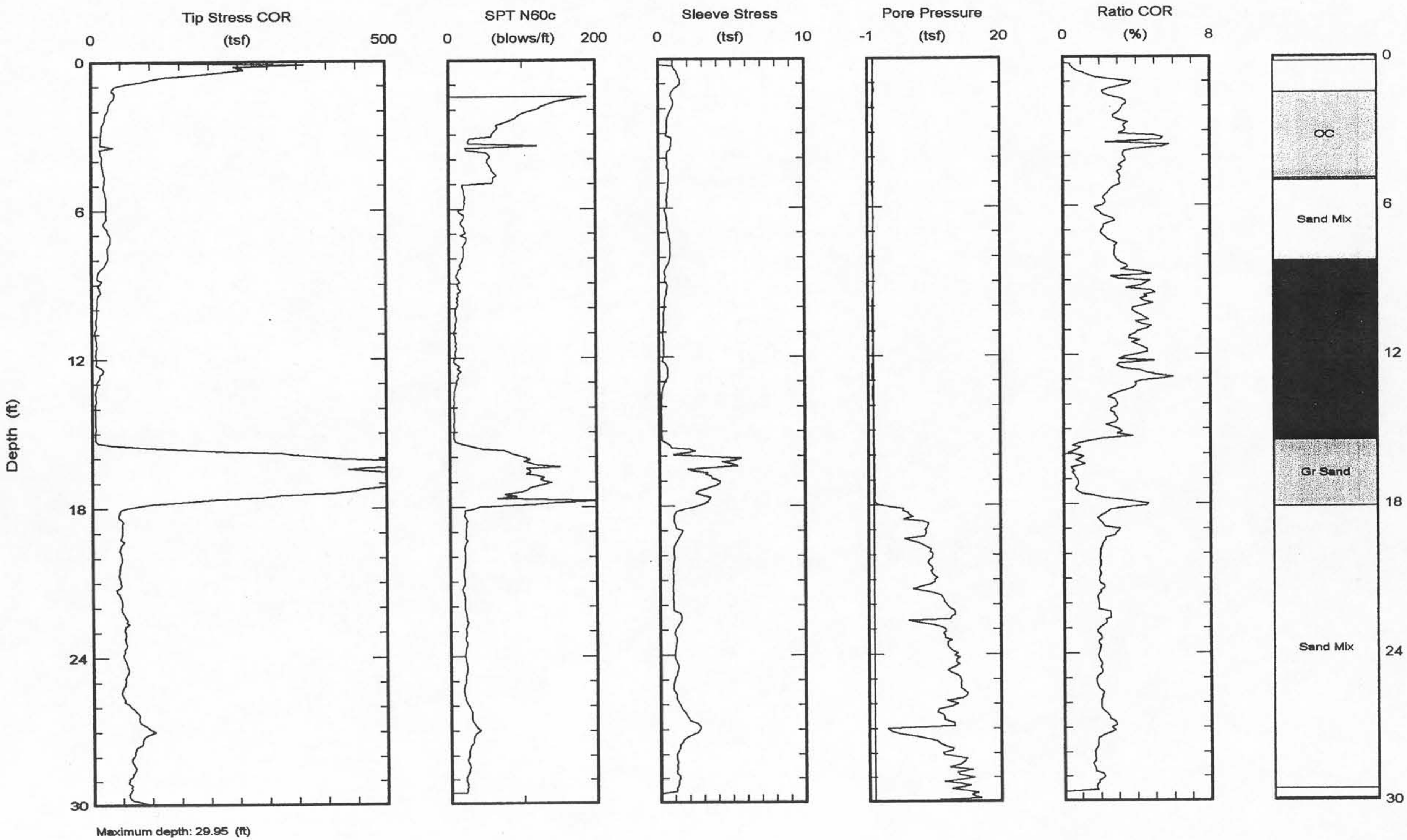
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-8 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



Maximum depth: 29.99 (ft)

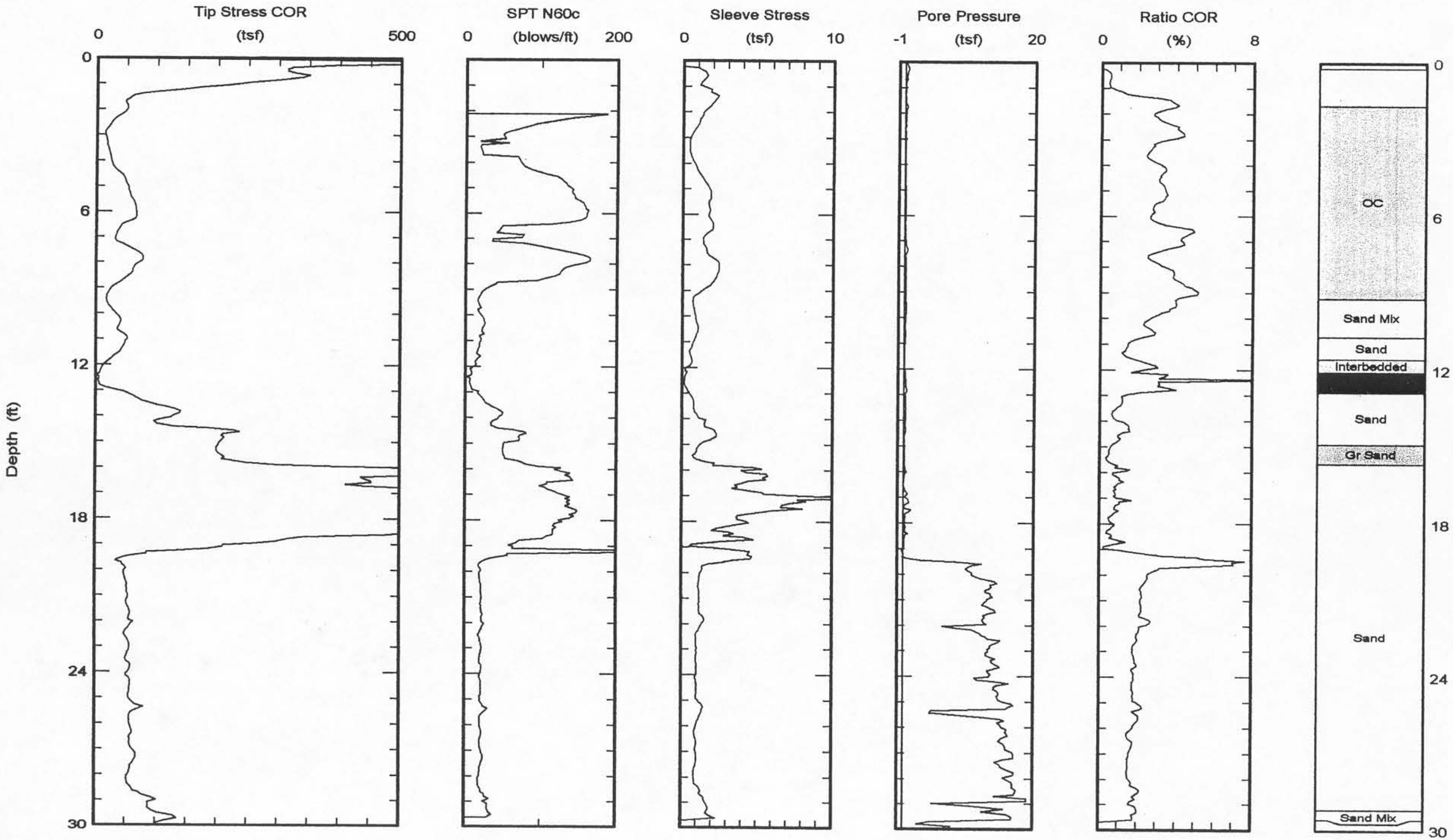
Test ID: CPT-8
File: C15O0305C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-9 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



Test ID: CPT-9
File: C15O0306C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 Email: skehoe@msn.com	Northing: Easting: Elevation:	Date: 15/Oct/2003 Test ID: CPT-10 Project: MTA
	Client: AGS Site: 3475 La Cienega Blvd	



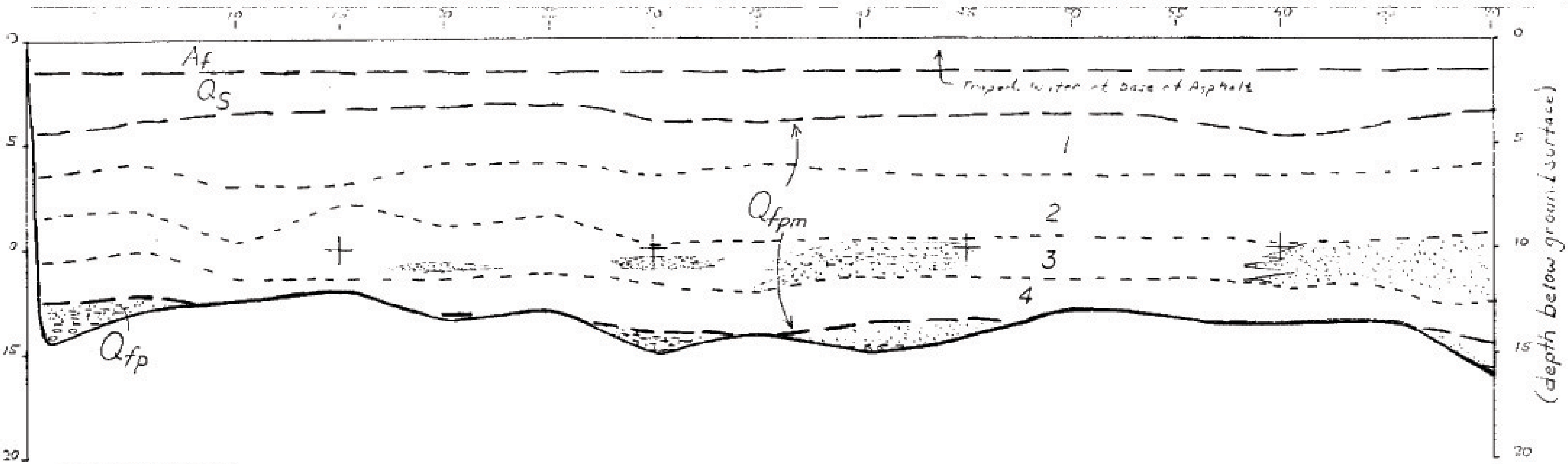
Maximum depth: 30.02 (ft)

Page 1 of 2

Test ID: CPT-10
File: C15O0307C.ECP

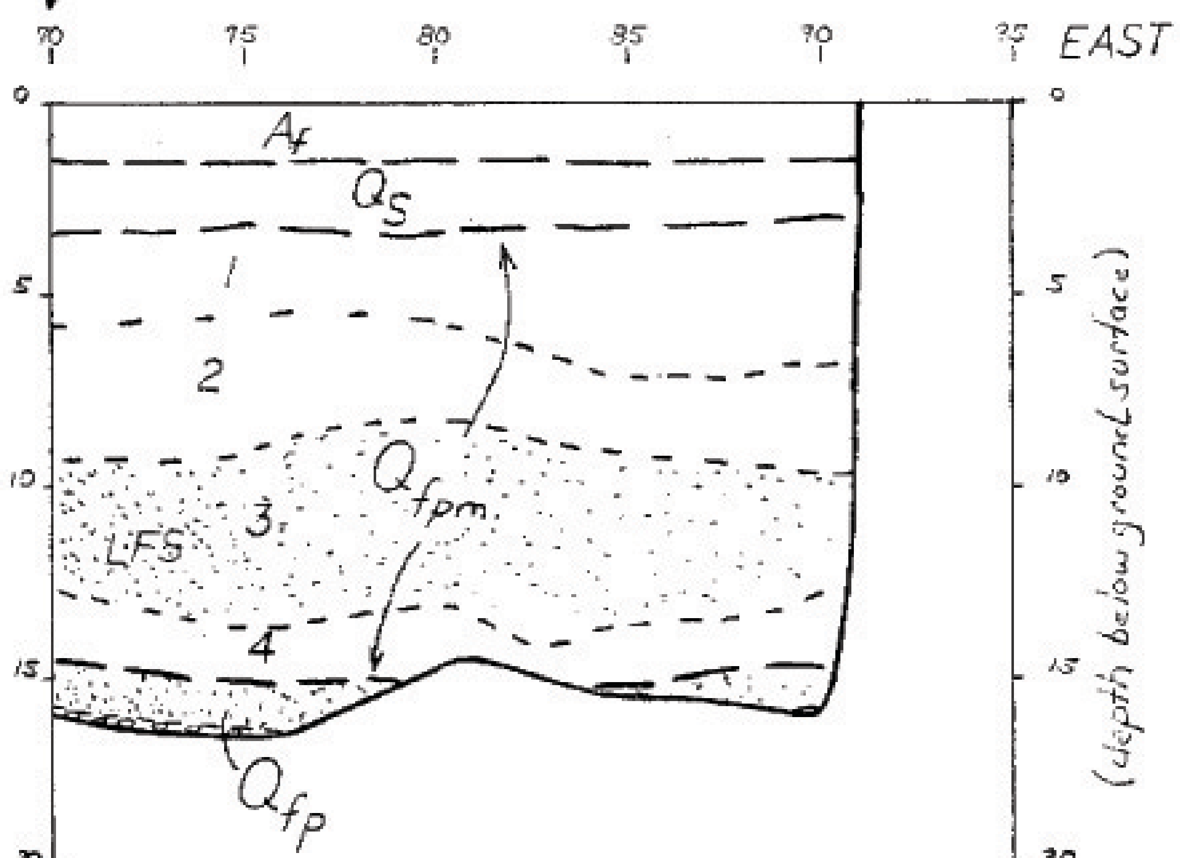
APPENDIX C

LOGS FOR TRENCHES 1 AND 2



SECTION BREAK

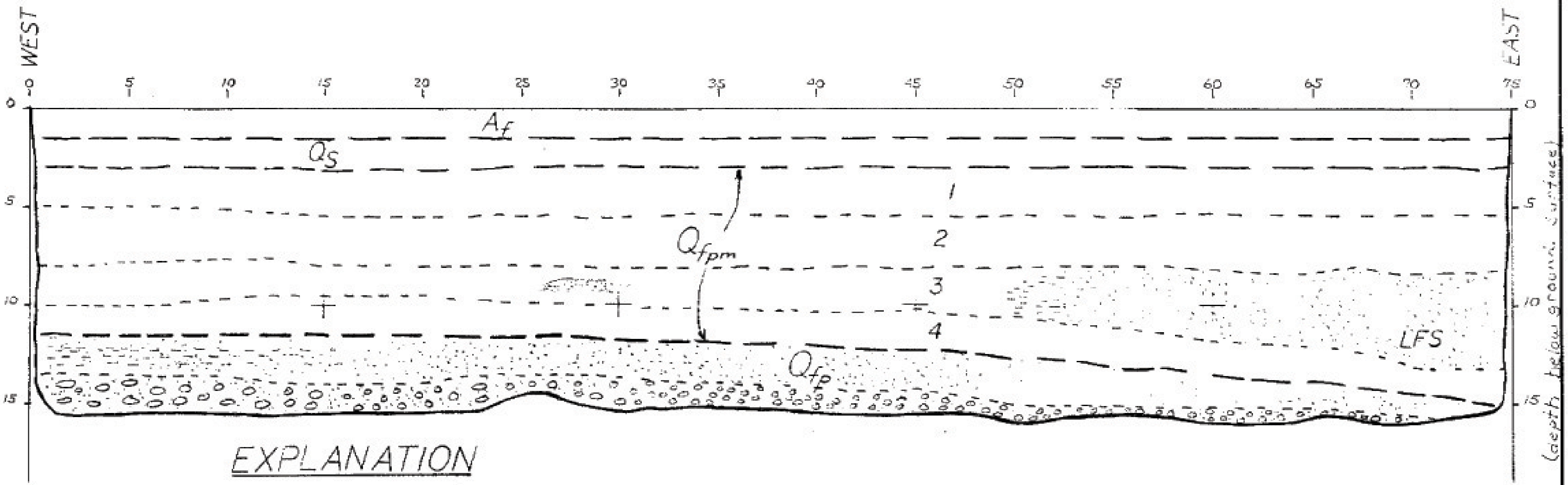
SECTION BREAK



TRENCN 1
(NORTH WALL)

EXPLANATION ON PLATE 6

Jeffrey A. Johnson, Inc. 85-03-224		
SCALE: 1" = 5'		DRAWN BY JAJ
DATE: 3/08/85		REVISED
Trench Log Number One		
5871 Rodeo Rd., Los Angeles, Ca.		DRAWING NUMBER Plate 5



EXPLANATION

Af — Artifical fill-approximately 6 to 8 inches of asphalt underlain by 6 inches of gravel base and an additional 6 inches of "disturbed" soil.

Qs — Soil-moist, dark brown clay to silty clay, no roots.

Qfpm — Ballona Creek(ancient Los Angeles River) marsh and lake deposits-
(1) moist, white to grey silty clay gradational contact with Qs
(2) moist, tan clay silt, illuvial horizon(?)
(3) moist, tan to brown clay silt, "pseudo shears" in zone of high clay content("pseudo shears" are the result of wetting and drying of expansive clays), grades east ward into a silt and then to a clean med. sand. Liquefaction flow structures(LFS) observed in this horizon at station 70 to 75 in Trench 1 and station 65 to 75 in Trench 2
(4) moist, grey green to dark brown clay, fresh-water(?) gastropods are common.

Qfp — Ballona Creek(ancient Los Angeles River) floodplain and channel back fill deposits-moist tan to orange silty, sandy clay that grades east ward in to a tan fine to medium sand and verticaly downward into a blue grey sand, gravel and cobble layer. Cobbles are subrounded to rounded, 2 to 10+ inches in size and are granitic and metamorphic. Qfp is probably the "fifty-foot gravel" of Poland and others(1959).

Jeffrey A. Johnson, Inc.		85-03-224
SCALE: 1" = 5'		DRAWN BY JAJ
DATE: 3/11/85		REVISED
Trench Log Number Two (North Wall)		
5871 Rodeo Rd., Los Angeles, Ca		DRAWING NUMBER Plate 6

APPENDIX D

FAULT STUDY ON ADJOINING PROPERTY: 5871 RODEO RD., LOS ANGELES, CA

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF CONSERVATION

DIVISION OF MINES AND GEOLOGY

BAY AREA REGIONAL OFFICE
380 CIVIC DRIVE, SUITE 100
PLEASANT HILL, CA 94523-1997
PHONE: (415) 671-4920

AP 1782

May 3, 1985

T.D. Nickerson
Staff Geologist,
Building and Safety
402 City Hall
Los Angeles, CA 90012-4869

Dear Mr. Nickerson:

We ar placing on open file the following report, reviewed and approved by the City of Los Angeles in compliance with the Alquist-Priolo Special Studies Zones Act:

Preliminary geologic explorations, Alquist-Priolo Special Study Zone, 5871 Rodeo Blvd., Los Angeles, CA; by J.A. Johnson, Inc.; March 27, 1985.

Geologic-seismic investigation for 2103-2105 Century Blvd. (Lots 156 and 157, Tract 12284), Los Angeles, CA; by Geo/Systems; March 22, 1985.

Sincerely yours,

EWH

Earl W. Hart, CEG 935
Senior Geologist &
Program Manager

EWH:rfg

cc: A-P file (2)

CITY OF LOS ANGELES
CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
402. CITY HALL
LOS ANGELES, CA 90012-4869

FRANK V. KROEGER
GENERAL MANAGER

April 29, 1985

Mr. Earl Hart
Division of Mines
380 Civic Drive Ste. 100
Pleasant Hill, CA 94523

SUBJECT: Geologic-Seismic Study for 5871 RODEO BLVD.

Transmitted herewith is a copy of the Geologic-Seismic Report No. 85-03-224 dated March 27, 1985 prepared by Jeffrey A. Johnson.

The report has been prepared pursuant to Chapter 7.5, Division 2 of the Public Resources Code; i.e., Alquist-Priolo Act.

The City of Los Angeles has reviewed the report and finds it to be acceptable and in general conformance with the minimum requirements of the Special Studies Zones Act. A copy of the Department letter in review of the report, has been enclosed for your files.

JOH D.COLVIN
Chief of Grading Division

TD Nickerson
T.D.NICKERSON
Staff Geologist,
Building and Safety

TDN:kf
485-2160

Attachments: Geologic-Seismic Report
Department Review Letter

B & S B-17 (R 8.84)

City of Los Angeles
DEPARTMENT OF BUILDING AND SAFETY
Grading Division

District L.A.	Log No. 1719
Thomas Guide Index	District Map 120-173 (4998)

APPLICATION FOR REVIEW OF TECHNICAL REPORTS AND IMPORT-EXPORT ROUTES

INSTRUCTIONS

A. Address all communications to the Grading Division, Department of Building and Safety, Room 460A, City Hall, Los Angeles, California 90012-4869. Phone (Area Code 213) 485-3435.
B. Submit 3 copies of application with items (1) through (10) completed (Please print).
C. Attach 3 copies (4 for fault study zone) of reports.
D. Check should be made payable to the Department of Building and Safety.

(1) LEGAL DESCRIPTION
Tract Subd. of So. Portion of Rancho Rincon de Los Bueyes
Blk ______ Lots ptn of lot 12

(2) PROJECT ADDRESS 5871 Rodeo Road

(3) OWNER Utility Refrigeration (Mr. Gerry Dever)
Address 5871 Rodeo Road
City Los Angeles Zip 90016
Phone (213) 870-4679

(4) APPLICANT Metro Steel Bldgs.
Address P.O. Box 726
City Azusa, Ca
Phone (818) 334-5121 Zip 91702

Jeffrey Johnson — 3/27/85

(5) Report(s) Prepared by G.C. Masterman & Assoc. Inc.
(6) Report Date(s) April 8, 1985

(7) Status of project: ☒ Proposed ☐ Under Construction ☐ Storm Damage
(8) Previous site reports? No If yes, give date(s) of report(s) and name of company(s) who prepared report(s).
(9) Previous Department actions? No If yes, please give dates and attach a copy to expedite processing.
Dates ______
(10) Signature of applicant [signature] Position agent-draftsman

(DEPARTMENT USE ONLY)

REVIEW REQUESTED & PROCESSING	FEES	REVIEW REQUESTED & PROCESSING	FEES
☐ Foundation Investigation		☐ Seismology report per 91.2305(d)	
☐ Soils Engineering		☐ Environmental Assessment	
☐ Geology		☐ Import-Export Route	
☑ Combined Soils Engr. & Geol.	276.00	☐ Division of Land	
☐ Supplemental		Sub-total	276.00
☐ Combined Supplemental		One-Stop Surcharge	5.52

THE REPORT IS ☑ APPROVED WITH CONDITIONS ☐ NOT APPROVED — TOTAL FEE 281.52

DEPARTMENT ACTION BY: Theodore D. Nickerson 4/29/85 (For Geology, Date) [signature] 27 Apr 85 (For Soils & Foundation, Date)

☑ Conditions of Approval ☐ Reasons for Non-Approval ☐ See Attached letter ☑ Supplemental Sheet 1 Attached

(1) Existing uncertified fill shall not be used to support fill floor slabs or footings.
(2) No fill shall be placed until City grading inspector has inspected and approved the bottom excavation.
(3) Conditions No. 1-4, 8, 14-16, 25 of the attached "Suppl- (Continued Over)

C 276.00 GR-R
C 5.52 OSS
J 140 5 04/22/85 0281.52 CHTO

DEPARTMENT USE ONLY
Fee Due 281.52
Fee Verified RM
Date 4/22/85

DISTRIBUTION
☑ Owner
☑ Petitioner
☐ ______

☑ Soil Engineer
☐ Geologist
☐ Board files
☑ Tract file

☑ LA Plan Check
☐ VN
☑ WLA
☐ SP/WLA

☑ LA Inspection
☐ VN
☐ WLA
☐ SP/WLA

⊜ mental Conditions For Foundation Investigation Reports."

JEFFREY A. JOHNSON, INC.
1213 Rimmer Ave.
Pacific Palisades, Ca. 90272
(213) 454-0987

March 27,1985
Service No. 85-03-224

Mr. Gerry Dever
5871 Rodeo Road
Los Angeles, California
90016

Attention: Mr. Gerry Dever

Subject: Preliminary Geologic Exploration
Alquist-Priolo Special Study Zone
5871 Rodeo Road
Los Angeles, California

1.0 Introduction

This report summarizes the results of a preliminary geologic exploration of 5871 Rodeo Road, Los Angeles, California (Plate 1). The site lies within the confines of and Alquist-Priolo Special Study Zone (Hart,1980). The purpose of the exploration was to review local geologic and seismic conditions and their potential effect on the proposed warehouse that is to be constructed at the rear of an existing building at the site. Of prime importance is the existance or absence of an active fault at depth below the proposed warehouse.

The exploration was conducted by J.A.Johnson,Ph.D. and consisted of: (1) a review of our files and references listed at the end of this report; (2) two exploratory back hoe excavations were reviewed and logged; (3) review of geologic conditions at the site and in the general site region; and (4) production of this report. No geophysical or other subsurface explorations were conducted as part of this study.

2.0 General Site Conditions

The site is located on the north side of Rodeo Road approximately 570 feet west of the intersection of La Cienega Blvd. and Rodeo Rd.

The entire site is approximately 86 feet wide by 410 feet in length. The study area is the northern most 140 feet of the site. The balance of the site is covered by an existing structure (built in the 1930's) and a parking area along Rodeo Rd.(Plate 1).

The proposed warehouse is to be 55 feet wide by 137 feet in length and will have an 18 foot wide zone along its east side for parking.

It is our understanding that the structure will be one story high and will have a very low human occupancy rate.

The site for the proposed structure and the general site region north of Rodeo Rd. is covered by asphalt. There is no vegetation at the site or general site region. Natural earth materials are not exposed.

3.0 Regional Geology and Seismology

Site is located near the northern end of the Baldwin Hills and south and east of Ballona Creek(Plate 2). The general area is called the Ballona Gap(Poland and others, 1959). The Ballona Gap is considered to be a stream-cut erosional gap that was cut into upper Pleistocene marine sediments by the ancestral Los Angeles River. The Los Angeles River changed coarse in the winter of 1823-24 due to flooding and flowed south into San Pedro Bay(CDMG,1982). Water from the Los Angeles River has flowed west into Ballona Creek only twice since 1824. Both times were during periods of intense flooding in 1861-62 and 1884. The gap was back-filled with fluvial deposits at the end of the Pleistocene start of the Holocene. Sediments in the gap are 50 to 80 feet thick and are called the "50-foot gravel" by Poland and others(1959).

The site is also located near the northern end of the Newport-Inglewood structural zone(Barrows,1974; Plate 3). This northwest-trending zone is regarded as a wide tectonic belt of uplift and en echelon faults. The nearest fault within the zone to the site is the Inglewood (Plate 1).

The zone overlies a major structural boundary between unlike masses of crystalline basement rock. The surface of the zone is characterized by complex discontinuous faulting and associated folds in the Tertiary and Quaternary rocks of the Los Angeles basin.

Geologically recent movement along the Newport-Inglewood zone is indicated by displaced Pleistocene and possibly Holocene sediments in the Baldwin Hills. Seismic activity, including the 6.3 Richter magnitude Long Beach earthquake in 1933, attests to the active status of this fault zone.

Tieje(1926) in a deep trench south of the site noted a fault trending N30W. Movement on the fault displaced sediments, of probable Holocene age, vertically (east side down) to a depth of 30 feet. The sediments in question were found at an average depth of 3 feet below the surface west of the fault. Assuming a vertical displacement of 27 feet and displacement on the fault is mainly vertical that works out to be a an average slip of 0.8mm/yr. in the last 10^4 years. Other investigators (Clark and others,1984) have noted similar slip rates along the Newport-Inglewood zone.

Regional pre-1900 to 1981 historic seismicity is shown on Plates 3 and 4. Major historic events associated with the zone or possibly associated with it include the December 8, 1812 magnitude $6\frac{1}{2}\pm$ earthquake and the events of June 1920, March 1933, October 1941 and June 1944 (Barrows,1974).

4.0 Local Geology

The general geologic conditions in the site region were recently reviewed by the California Division of Mines and Geology(CDMG,1982). As part of their review a detailed survey of available aerial photographs and maps was under taken. Plate 1 of their report shows the results of the study.

The subject property is located on the above Plate 1 approximately 500± feet NE of the northly extension of the Inglewood fault. On Plate 1 of this report the proposed new warehouse is located approximately 400± feet NE of the Inglewood fault.

Based on a review of available literature and current conditions at the site trenchings was chosen as the best method of investigation to satisfy the requirements of the Alquist-Prilo Special Studies Zones Act of 1972 (Hart,1980).

Two seperate trenchs with a combined length of 166 feet were excavated across the location of the proposed warehouse(Plate 1 and Plates 5 and 6). The trenchs were excavated at nearly right angles to the trend of the Inglewood fault as shown on Plate 1 of this report and Plate 1 of the 1982 CDMG report. The average depth of the trenchs was approximately 15 feet.

Six seperate horizons were mapped in three different lithologic or sedimentary units (Plates 5 and 6). In trench 1 the 3/4 contact in Qfpm and the Qfpm/Qfm contact was mapped in detail. In trench 2 the 3/4 contact in Qfpm and gravel/ sand contact in Qfp was mapped in detail. The above contacts were mapped in detail because of the clear facies change.

A complete explanation of the different lithologic units and subunits is given on Plate 6.

Of particular importance to this study in regards to the existence or absence of an active fault on or adjacent to the site is the age, type and continuous nature of the geologic units observed in trenchs 1 and 2.

Ballona Creek floodplain and channel back fill deposits- The fluvial deposits that make up this unit(Qfp) are part of the "fifty-foot gravel" as defined by Poland and others(1959). The gravel is a channel back fill deposit that unconformably rests on upper Pleistocene marine sediments that were deposited by the ancestral Los Angeles River. The gravel was deposited beginning at the end of the Pleistocene.

The correlation of Qfp with the "fifty-foot gravel" is based on lithologic similarity, proximity to the Ballona Gap and lithologic data provided by Tieje(1926).

Tieje(1926) reviewed and logged several major sewer outfall trenchs that were excavated near the Baldwin Hills. Section 10 of one of the trenchs lies due south of the site. The description of the exposed section is similar to that observed at the site. Of importance is the unconformaty at the base of the "bowlder bed." The "bowlder bed" is similar in type and stratagraphic location to Qfp observed at the site and is resting on tilted Pleistocene sediments as is the "fifty-foot gravel."

Qfp and none of the overlying sediments show any evidence of being offset by faulting. It is the opinion of Jeffrey A. Johnson,Inc. that fault rupture has not occurred at the site(location of the proposed warehouse) since the deposition of Qfp or possibly within the last 10^3 to 10^4 years.

Ballona Creek marsh and lake deposits(Qfpm)-The type of deposits observed at the site are also important. Qfpm is composed of marsh and lake deposits. Subunit 4 is clearly a a fresh water lake deposit or marsh deposit as indicated by the occurrance of fresh-water gastropods described by Tieje(1926). The occurrance of the marsh and lake deposits was produced by movement along the Inglewood fault(CDMG,1982). Flow in Ballona Creek was impeded by "barriers made up either by impervious clay gouge of faults of the Inglewood zone or cemented gravels which extend upward into the alluvial ground (CDMG,1982)." Both conditions are believed to be the result of recent activity of faults along the Inglewood zone.

The existance,thickness and continuity of the marsh and lake deposits(Qfpm) at the site clearly indicate that significant recent fault rupture is occurring to the west of the site some distance (most likely greater than 50 feet from the west end of trenchs 1 and 2).

5.0 Conclusions and Recommendations

It is the opinion of JEFFREY A. JOHNSON,INC that the probably of future ground rupture at the site is remote or low and that the site is geologically suitable for the proposed single story warehouse.

The following supports our conclusion:

1. The mapped trace of the Inglewood fault is on the order of 400 ± feet west of the site;

2. The depositional environment at the site(i.e. marsh/lake deposits) and geologic history of vertical movement on the Inglewood fault clearly indicate the existance of the fault at some distance to the west of the site;

3. Observations of Tieje(1926) suggest a 0.8mm/yr slip rate on the Inglewood fault. His observed fault trend of N30W is compatable with that shown on Plate 1 for the Inglewood fault. The 0.8mm/yr slip rate is very similar to estimates made by the USGS (Clark and others,1984) along nearby segments of the Newport-Inglewood zone. The 0.8mm/yr slip rate was estimated assuming Qfp is approximately 10^4 years old.

4. The thickness and generally horizontal stratification of Qfpm suggest the marsh at one time extended a considerable distance to the west. The exact distance cannot be computed based on the observed deposits at the site. However, the distance to the western edge of the marsh or to the Inglewood fault is probably greater than 50 feet.

5. The fault observed by Tiege(1926) offset Qfp approximately 27ft vertically down on the east side. Tiege(1926) concluded "that the cross-fault(Inglewood?) just mentioned diverted the course of the river and the former flood plain became a tule bog; at least it is significant that west of the cross-fault there is very little peaty material, that just east of the cross-fault 32 feet of nearly pure peat caused great distress to the contractors ....."

The following is recommended:

1. The site soil and foundation conditions should be reviewed by a soils engineer. The location of the deep trenchs are shown on Plate 1. The trenchs were back filled although not compacted. It is recommended that the trenchs be properly compacted or that deep foundation supports should be considered at trench locations.

2. Liquefaction is not considered a significant problem at the site. The ground water table is greater than 15 to 16 feet below the ground surface. The underlying layer Qfp is a boulder gravel that is on the order of 10 to 40 feet thick in the general area. Boulder gravels are not generally prone to liquefaction. The boulder gravels rest on Pleistocene sediments that have a low liquefaction potential.

3. A hazardous fault set-back distance or zone is not recommended for the site.

4. Deep excavations (greater than 4 to 5 feet) at the site should be reviewed by an engineering geologist.

6.0 Limitations

The opinions presented herein by Jeffrey A. Johnson, Inc. have been developed based on our understanding of the proposed project and using that degree of care and skill ordinarily exercised, under similar circumstanses, by reputable engineering geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advise included in this report.

The analyses, conclusions and recommendations contained in our report are based on site and groundwater conditions as they existed at the time of our exploration, and further assume that exploratory subsurface excavations are representative of subsurface conditions through out the site. If, during construction, different subsurface geologic and/or groundwater conditions from those encountered during our exploration are observed or appear to be present in excavations, we must be advised promptly so that we can review these conditions and reconsider our recommendations and conclusions where necessary.

The line(s) designating the interface between soil or rock materials on the geologic structure section(s) are determined by interpolation and are therefore approximations. The transition between the materials may be sharp or gradational. Only at locations of subsurface explorations should profiles be considered as reasonably accurate and then only to the degree implied by notes on exploration logs.

The logs of subsurface conditions shown herein apply only at the specific exploration location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times. The final logs included in this report represent our interpretation of the contents of field logs.

Copies of this report should not be made without the written permission of this office.

If there are any questions regarding this report please contact us.

Sincerely,
JEFFREY A. JOHNSON, INC.

J. A. Johnson

J.A.Johnson, Ph.D.
President
C.E.G. 981

JAJ/hs

Enclosures (Pocket)

cc G.C.Masterman and Associates, Inc.

References

1. Barrows, A.G.,1974, A review of the geology and earthquake history of the Newport-Inglewood structural zone, Southern California,CDMG SR114
2. California Division of Mines and Geology,1980, Annual technical report fiscal year 1979-1980, OFR 80-15 SAC.
3. California Division of Mines and Geology,1982,Slope stability and geology of the Baldwin Hills, Los Angeles Co., California, SR152.
4. Clark,M.M. and others,1984, Preliminary slip-rate table and map of late-Quaternary faults of California, USGS OFR 84-106
5. Hart, E.W.,1980, Fault-rupture hazard zones in California, CDMG SP-42, March, includes supplement No. 1
6. Poland,J.F.,Garrett,A.A. and Sinnott,A.,1959, Geology, hydrology and chemical character of ground waters in the Torrance-Santa Monica Area, CA,USGS Water-Supply Paper 1461.
7. Tieje,A.J.,1926,The Pliocene and Pleistocene history of the Baldwin Hills, Los Angeles Co.,CA,AAPG Bull., v.10,no.5,p502-512.

Glossary of Common Terms

alluvium-the general term for stream deposits

anticline- in general terms a fold whose limbs are oppositely inclined

apparent dip-dip of a rock layer or other planar surface that is not at a right angle to strike. Apparent dip is always less than true dip.

attitude-strike and dip of a planar feature

bed-generally the smallest division of a series of stratified rock and marked by a more or less well-defined divisional plane(bedding plane) from its neighbor above and blow

bedrock-solid rock exposed at the surface of the earth or overlain by unconsolidated material

creep-slow down slope movement of rock or soil

dip-the angle at which a planar feature,such as a bed, is inclined from the horizontal. The dip is at a right angle to the strike.

fault-a fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture

active fault-displacement within about the last 11,000 years

potentially active fault-displacement within the last 2-3 million years

fold-a bend in strata or bedding or any planar structure

joint-fracture in rock along which no appreciable movement has occurred

lithology-physical character of a rock

liquefaction-transformation of a solid into a liquid generally resulting from vibratory or seismic ground motion

Glossary(continued)

paleosol-a buried soil

perched ground water-ground water seperated from underlying ground water by an unsaturated or low permeability rock

seismic sea wave-Tsunami, or wave caused by an earthquake or or volcanic eruption. Commonly misnamed "tidal wave."

strike-the direction or bearing of a horizontal line in the plane of an inclined bed or other planar feature

structure section-diagram to show inferred or observed geologic structure as it would appear on the sides of a vertical trench cut into the earth

syncline-a fold in which the beds dip inward

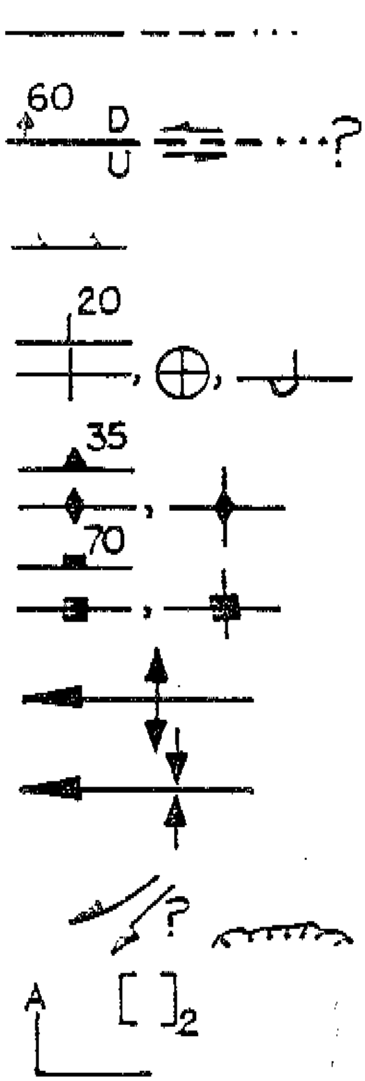
tectonic-deformation of the earth's crust or resulting from crustal deformation

unconformity-a surface of erosion or nondeposition that seperates younger strata from older rocks

JEFFREY A. JOHNSON, INC.

EXPLANATION

General Map Symbols



Contact-dashed where inferred; dotted where concealed

Fault-shows dip and direction of movement; dashed where inferred; dotted where concealed; queried where doubtful; U=upthrown block, D=downthrown block

Reverse fault-sawteeth on upper plate

Strike and Dip

Bedding attitude
- vertical
- horizontal
- overturned

Foliation
- vertical
- horizontal

Joint
- vertical
- horizontal

10, approximate

15 (10), strike and dip of beds and depth below surface in excavation

, strike and dip and bearing of lineation

Anticline-approximately located; showing direction of plunge

Syncline-approximately located; showing direction of plunge

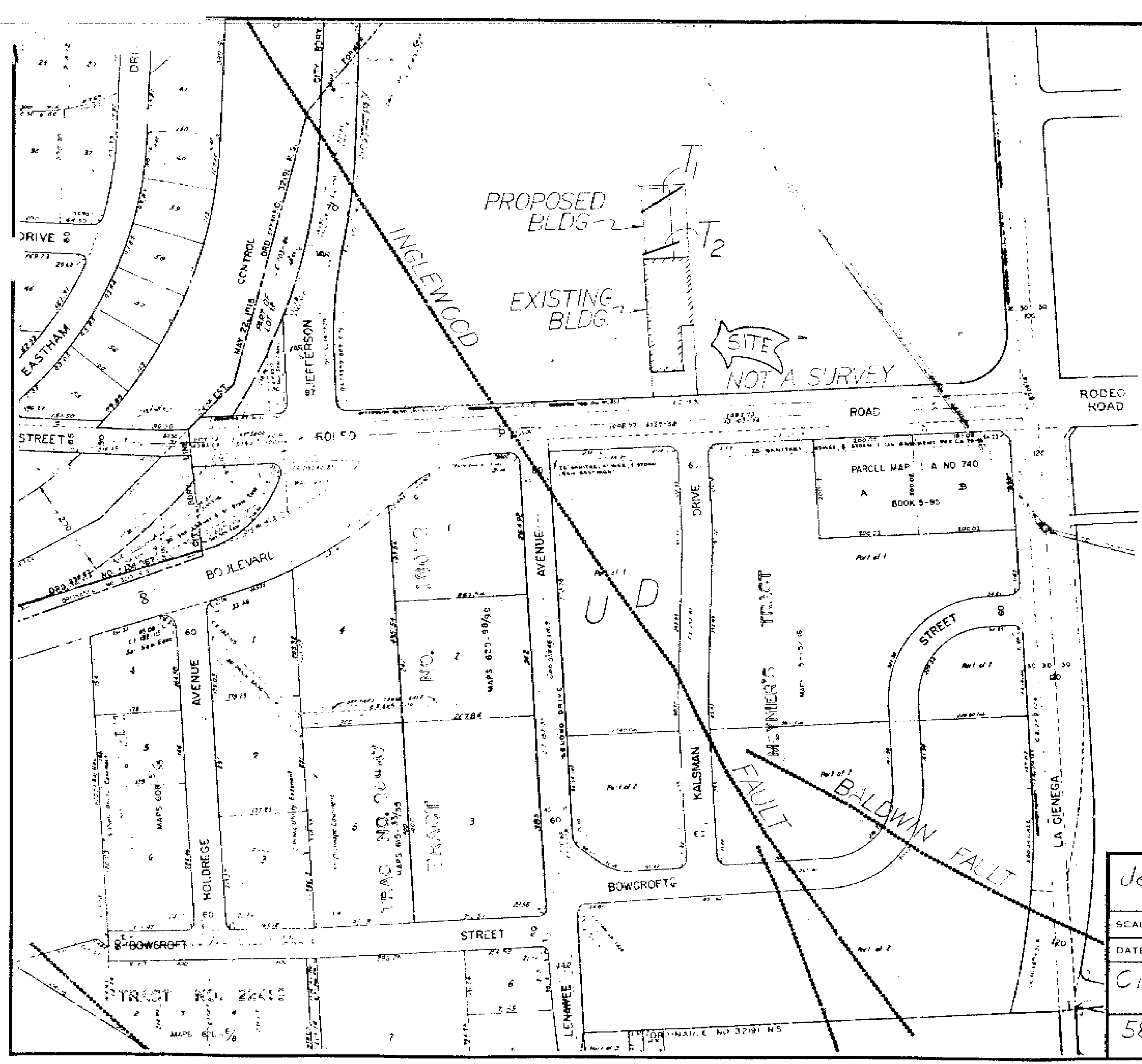
Direction of landslide debris movement; queried where origin of feature doubtful

Fresh landslide scarp

Exploratory excavation location

Structure section

Figure 1



MAP EXPLANATION

Potentially Active Faults

Faults considered to have been active during Quaternary time

Solid line where accurately located

Long dash where approximately located

Short dash where inferred

Dotted where concealed, query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake associated event or C for displacement caused by creep or possible creep

Aerial photo lineaments (not field checked), based on youthful geomorphic and other features believed to be the results of Quaternary faulting

Special Studies Zone Boundaries

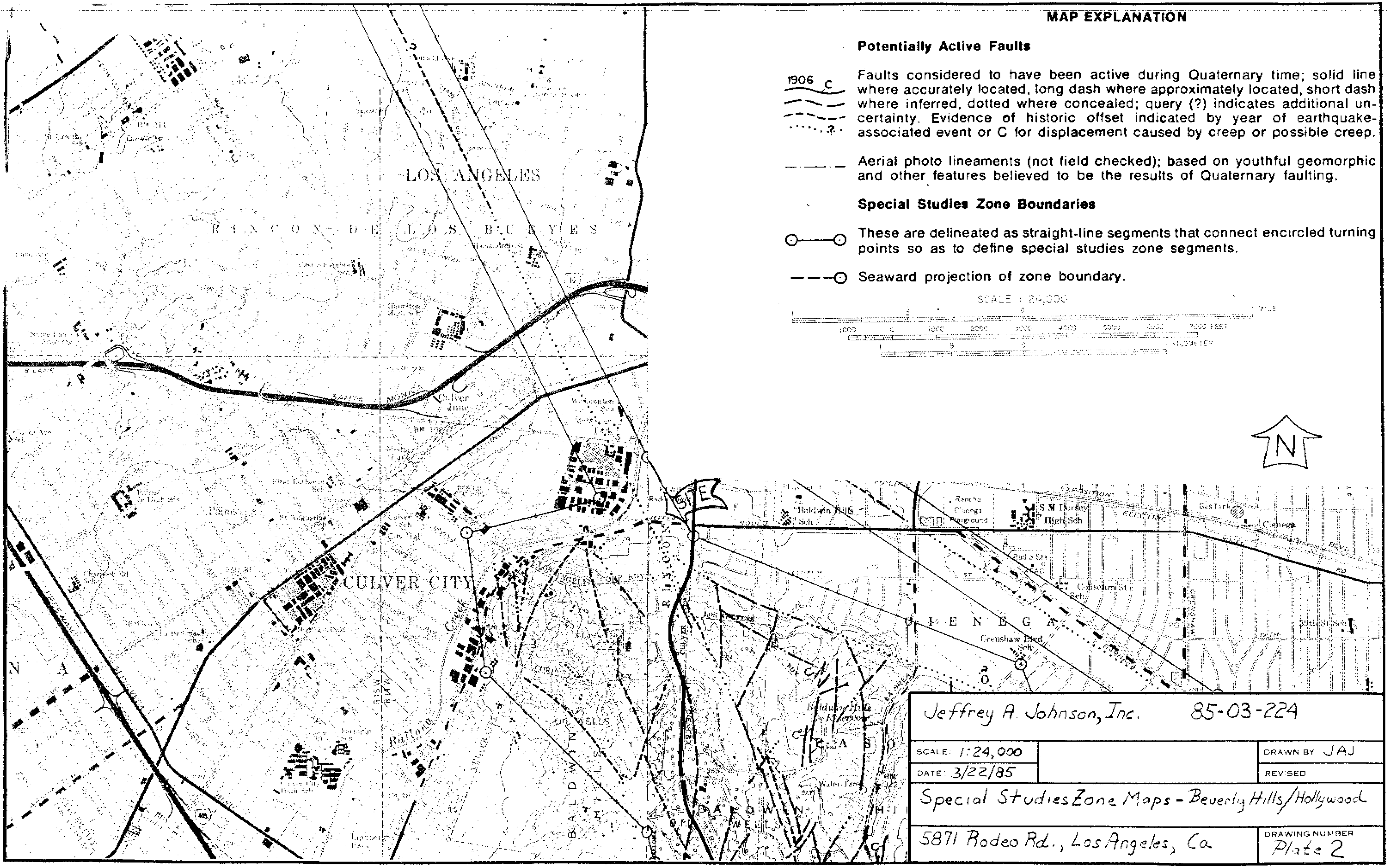
These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments

Seaward projection of zone boundary

IMPORTANT - PLEASE NOTE

1) All fault information, as shown, including the Special Studies Zone boundaries, have been photographically reproduced (and traced) from the California Special Studies Zone maps.
2) This map may not show all potentially active faults, either within the special studies zones or outside their boundaries.
3) Faults shown are the basis for establishing the boundaries of the special studies zones.
4) The identification of these potentially active faults and the location of such fault traces are based on the best available data. Traces have been drawn as accurately as possible at this map scale; however, the quality of data used is highly varied. The faults shown have not been field checked during this map compilation.
5) Fault information on this map is not sufficient to serve as a substitute for information developed by the special studies that may be required under Chapter 7.5, Division 2, Section 2623 of the California Public Resources Code.

Jeffrey A. Johnson, Inc. 85-03-224		
SCALE: 1" = 200'	Map Symbols also on Fig. 1	DRAWN BY JAJ
DATE: 3/22/85		REVISED
City of Los Angeles, Special Studies Zones, Sheet 8 of 22 Beverly Hills / Hollywood Quads		
5871 Rodeo Rd., Los Angeles, CA.		DRAWING NUMBER Plate 1



MAP EXPLANATION

Potentially Active Faults

1906 C — Faults considered to have been active during Quaternary time; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep.

Aerial photo lineaments (not field checked); based on youthful geomorphic and other features believed to be the results of Quaternary faulting.

Special Studies Zone Boundaries

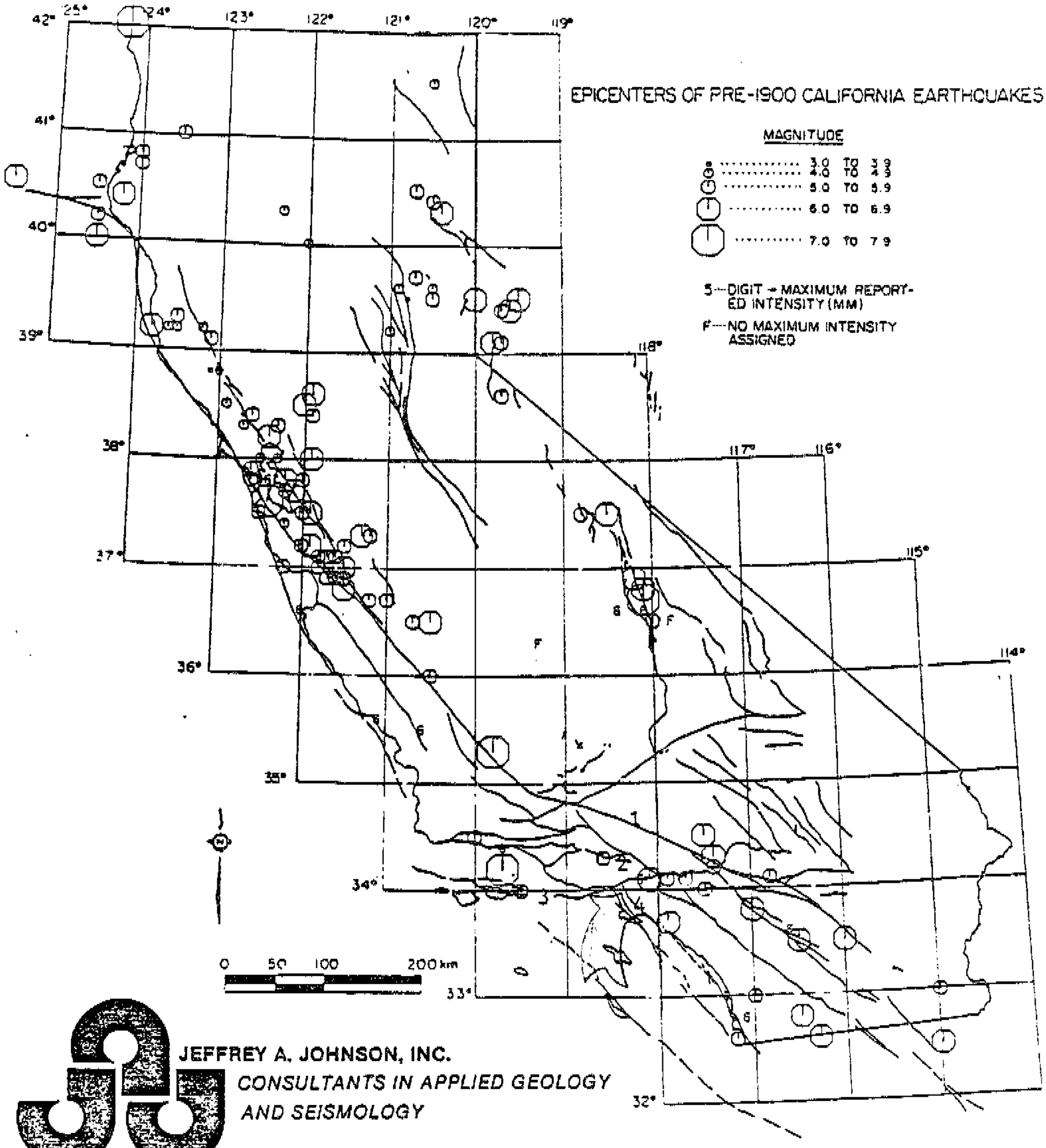
These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments.

Seaward projection of zone boundary.

SCALE 1:24,000

N

Jeffrey A. Johnson, Inc.	85-03-224
SCALE: 1:24,000	DRAWN BY JAJ
DATE: 3/22/85	REVISED
Special Studies Zone Maps - Beverly Hills/Hollywood	
5871 Rodeo Rd., Los Angeles, Ca	DRAWING NUMBER Plate 2



JEFFREY A. JOHNSON, INC.

CONSULTANTS IN APPLIED GEOLOGY AND SEISMOLOGY

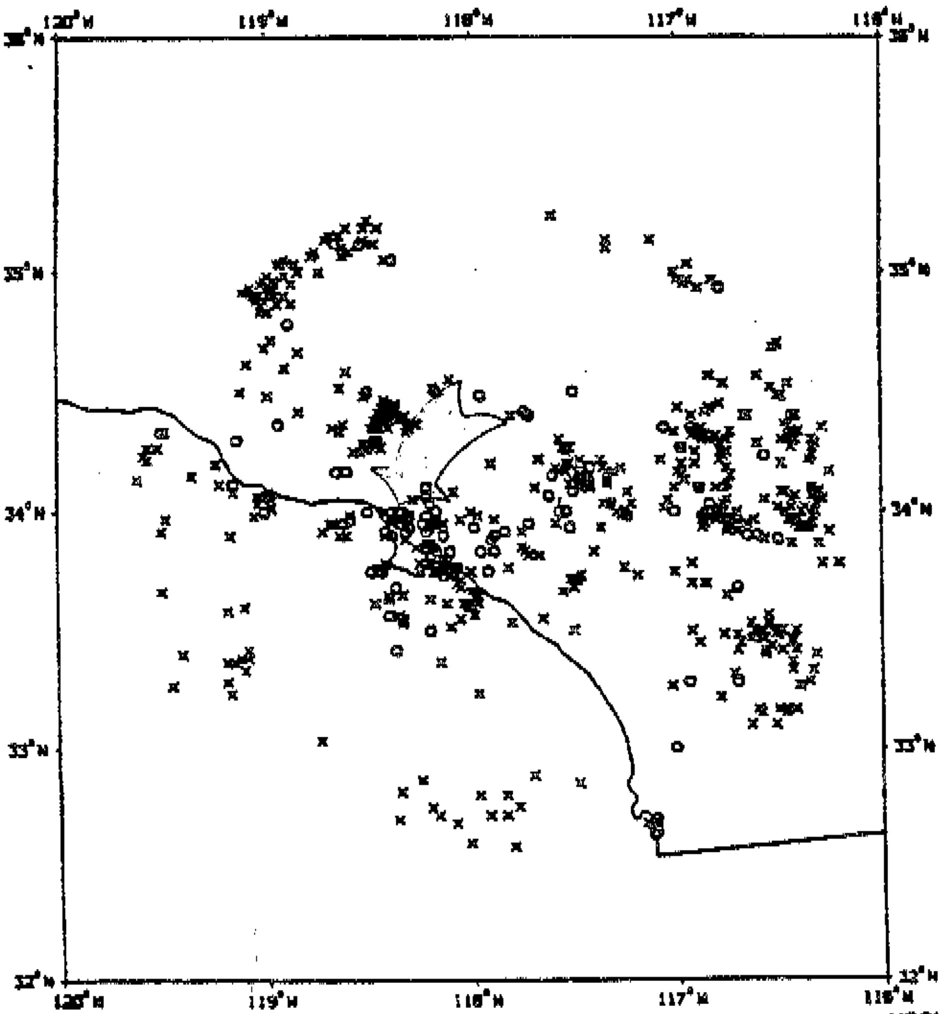
Reference: CDMG OFR 80-15 SAC

1. San Andreas Fault
2. Sierra Madre Fault Zone
3. Santa Monica-Anacapa Fault Zone
4. Newport-Inglewood Structural Zone

Plate 3

JEFFREY A. JOHNSON, INC.

CONSULTANTS IN APPLIED GEOLOGY AND SEISMOLOGY



NGSDC/EDIS/NOAA BOULDER, COLORADO

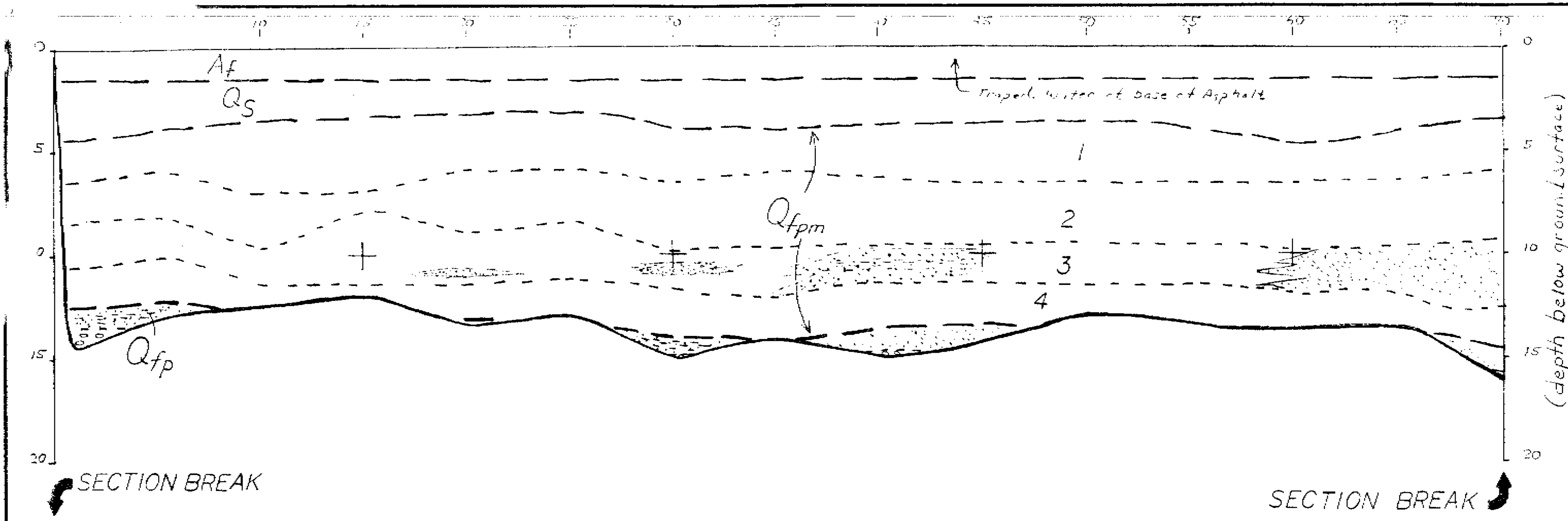
800 EARTHQUAKES PLOTTED

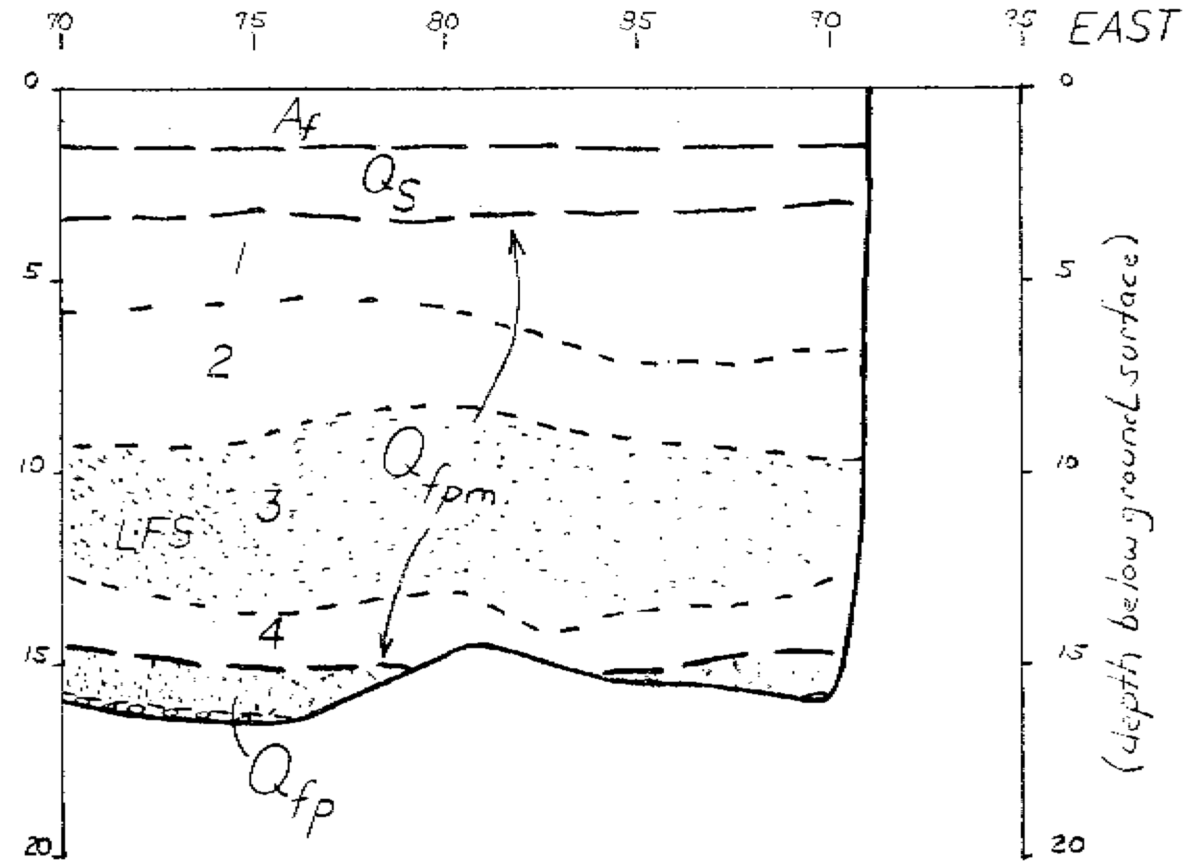
MAGNITUDE

o	0.00 M 3.99
x	3.99 M 6.99
▲	6.99 M 8.90

Historic Seismicity 1855 to 1981

Plate 4

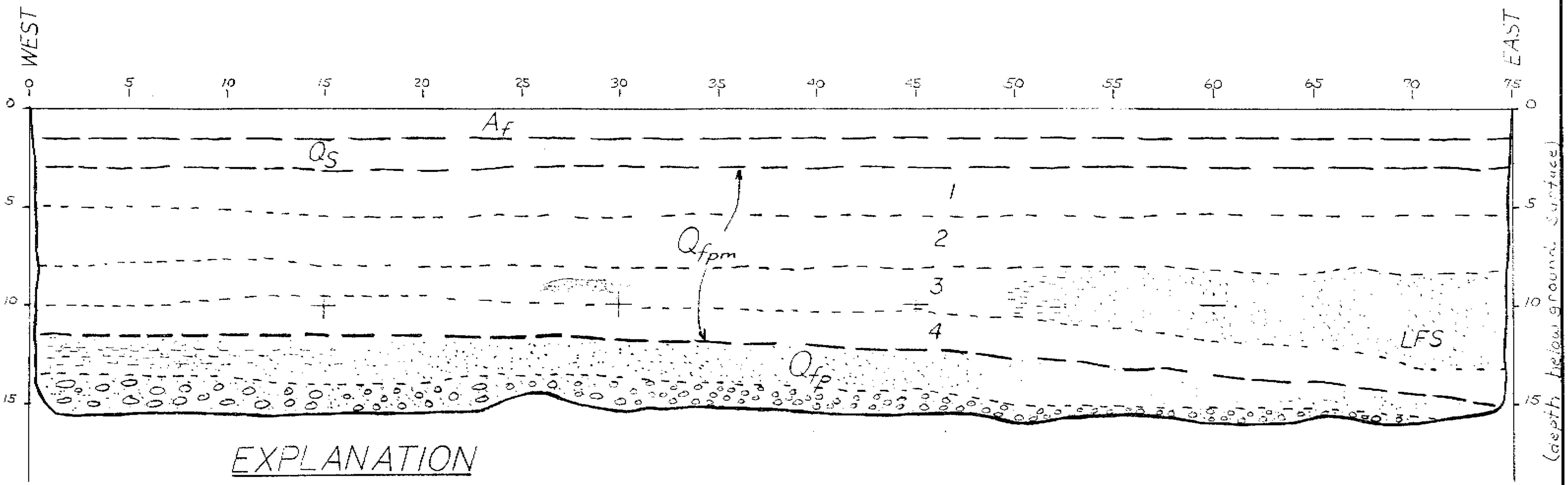




TRENCN 1
(NORTH WALL)

EXPLANATION ON PLATE 6

Jeffrey A. Johnson, Inc.		85-03-224
SCALE: 1" = 5'		DRAWN BY JAJ
DATE: 3/08/85		REVISED
Trench Log Number One		
5871 Rodeo Rd., Los Angeles, Ca.		DRAWING NUMBER Plate 5



EXPLANATION

Af — Artifical fill-approximately 6 to 8 inches of asphalt underlain by 6 inches of gravel base and an additional 6 inches of "disturbed" soil.

Qs — Soil-moist, dark brown clay to silty clay, no roots.

Qfpm — Ballona Creek(ancient Los Angeles River) marsh and lake deposits-
(1) moist, white to grey silty clay gradational contact with Qs
(2) moist, tan clay silt, illuvial horizon(?)
(3) moist, tan to brown clay silt, "pseudo shears" in zone of high clay content("pseudo shears" are the result of wetting and drying of expansive clays), grades east ward into a silt and then to a clean med. sand. Liquefaction flow structures(LFS) observed in this horizon at station 70 to 75 in Trench 1 and station 65 to 75 in Trench 2
(4) moist, grey green to dark brown clay, fresh-water(?) gastropods are common.

Qfp — Ballona Creek(ancient Los Angeles River) floodplain and channel back fill deposits-moist tan to orange silty, sandy clay that grades east ward in to a tan fine to medium sand and verticaly downward into a blue grey sand, gravel and cobble layer. Cobbles are subrounded to rounded, 2 to 10+ inches in size and are granitic and metamorphic. Qfp is probably the "fifty-foot gravel" of Poland and others(1959).

Jeffrey A. Johnson, Inc.		85-03-224
SCALE: 1" = 5'		DRAWN BY JAJ
DATE: 3/11/85		REVISED
Trench Log Number Two (North Wall)		
5871 Rodeo Rd., Los Angeles, Ca.		DRAWING NUMBER Plate 6

G. C. MASTERMAN & ASSOC. INC.
SOILS ENGINEERS

SOILS ENGINEERING INVESTIGATION

PROPOSED WAREHOUSE

UTILITY REFRIGERATION, 5871 RODEO ROAD

LOS ANGELES, CALIFORNIA

FOR

CHAPMAN INVESTMENT COMPANY

APRIL 8, 1985

M 896

14535 HAMLIN STREET, VAN NUYS, CALIFORNIA 91411
(213) 994-8057 (805) 254-1285

C. C. MASTERMAN & ASSOCIATES, INC.

SOILS ENGINEERING INVESTIGATION
CHAPMAN INVESTMENT COMPANY M 896

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SOILS ENGINEERING INVESTIGATION

PROPOSED WAREHOUSE

UTILITY REFRIGERATION, 5871 RODEO ROAD

LOS ANGELES, CALIFONRIA 90016

FOR

CHAPMAN INVESTMENT COMPANY

INTRODUCTION

This report presents the results of our Soils Engineering Investigation performed on the subject property. The purpose of this investigation has been to explore the subsurface conditions existing at the proposed building site, to obtain representative soil samples, to perform laboratory testing and engineering analyses, and to prepare a report containing the results of this investigation with recommendations.

SCOPE

This investigation is based upon:

- -Review of previously prepared reports by this office and others, see Appendix V.
- -The review of two (2) exploratory backhoe trenches.
- -Laboratory testing and analysis of samples obtained during placement of the excavations, see Appendix III.
- -Preparation of the enclosed Plot Plan which locates the proposed development and our explorations, see Appendix I.
- -Preparation of this report.

The data which supports the following summary of findings and recommendations is contained within Appendices I through VIat the back of this report. This report was prepared in close cooperation with Dr. Jeffrey A. Johnson, Inc., the Project Geologist.

SITE DEVELOPMENT

The proposed structure, as outlined in our proposal letter dated February 28, 1985, will consist of a steel-framed warehouse with a metal skin to be constructed north of an existing brick office and warehouse building.

Column loads of 20 to 30 kips are anticipated. These loads reflect both the dead and live load. The dead load is approximately 65 percent of the total load. These design parameters are used as a basis for the recommendations given herein. Should any changes be made, this office must be notified in writing so these changes may be analyzed and the appropriate recommendations made.

SITE CONDITIONS

The property is located at 5871 Rodeo Road, Los Angeles, California.

At the time of exploration, the site consisted of a rectangular parcel of land with an existing office and warehouse located on the southern protion of the lot. North of the existing structure in the area of the proposed warehouse is an existing asphalt covered parking area.

The site is bordered by a commercial building to the north and west, Fedco Department Store to the east and Rodeo Road to the south.

Surface water consists of precipitation which is directed offsite to the city streets by the existing contours.

SUBSURFACE CONDITIONS

The earth materials encountered on the subject property are briefly described below. Approximate depths and more detailed descriptions are given in the test pit logs enclosed in Figures A-1.1 to A-1.2.

Fill material on-site consists of six to eight inches of gravel base. A six inch disturbed soil zone was encountered below the gravel base.

Soil is observed below the fill material to a maximum depth of five (5) feet below existing grade. Soils materials consist of silty clays and clays which are dark brown to black, moist, soft to firm and very porous.

Lake deposits encountered on-site consist of Ballona Creek marsh and lake deposits and flood plain and channel deposits. These deposits consist of silty clays, clayey silts, sandy clays and sands depending upon where they are located and at what depth they are encountered.

Soils profiles may be obtained from individual test pits placed on the subject property. Care should be exercised when using these profiles to determine changes in depth or thickness of the earth materials between the test pits.

Groundwater

Groundwater was not encountered to the maximum depth of exploration. However, it must be noted that fluctuations in the level of the groundwater may occur. The depth to groundwater when encountered in the explorations is only valid for the date of exploration. Changes may occur in this groundwater level due to climatic conditions.

SUMMARY OF FINDINGS

1. Based upon our laboratory testing and analysis, the Ballona Creek marsh and lake deposits found at depths of three (3) to five (5) feet in the test pits should possess sufficient strength to support the proposed structure.

On-site near surface soil materials consisting of clays and silty clays do not possess sufficient strength to support the proposed structure. All foundations shall penetrate any soil materials and be placed into the Ballona Creek marsh and lake deposits.

RECOMMENDATIONS

It is recommended that the proposed warehouse be placed on conventional foundations in the undisturbed firm silty clays and clayey silts of the Ballona Creek marsh and lake deposits.

All proposed footings shall be placed in such a manner as to not surcharge the areas of the exploratory trenches. As an alternative, the entire lengths of both exploratory trenches may be removed and recompated to 90% of the maximum density. Exploratory trenches are located on the Plot Plan, Appendix I.

GRADING AND EARTHWORK

Proposed Grading

Any fill or base placed on the site shall be placed per the enclosed grading specifications. Fill may be placed in order to obtain finished grade for slab support. Existing near-surface fill and disturbed soils will have to be removed and recompacted. These materials exist to an approximate depth of two (2) feet across the site.

FOUNDATIONS

Conventional

It is recommended that the proposed structure be placed on conventional foundations in the undisturbed, firm, clayey silts and silty clays of the Ballona Creek marsh and lake deposits located 3 to 5 feet in the test pits.

Column footings placed into the Ballona Creek marsh and lake deposits may be proportioned using a bearing value of 2500 pounds per square foot, and should be a minimum of two (2) feet in width and 24 inches deep. All column footings shall be tied together with a grade beam and/or the slab on grade.

The bearing values given above are net bearing values; the weight of concrete below grade may be neglected. These bearing values may be increased by one-third for temporary loads such as wind and seismic forces. Lean concrete footing excavations should extend into the recommended bearing material to the recommended depths and may be backfilled with a lean concrete mix. (Reference, Detail Appendix IV).

All drainage from the roof or pad shall be directed away from the proposed development. Landscaping that requires large amounts of water placed adjacent the foundations is not recommended. Landscaping and pad areas shall be graded to slope away from the proposed/existing development. Water shall not be allowed to pond adjacent the foundations or flow towards them.

Settlement

Based upon the anticipated structural loads as given in the "Proposed Development" section, the maximum settlements for the spread footings will range from 1/4 to 1/2 inches. Differential settlement between adjacent spread or continuous footings is not expected to exceed 1/4 inches.

Lateral Load Design

Lateral loads may be resisted by friction at the base of the foundations and by passive resistance within the Ballona Creek marsh and lake deposits. A coefficient of friction of 0.3 may be used between the foundations and the marsh and lake deposits. The passive resistance may be assumed to act as a fluid with a density of 200 pounds per cubic foot. Lateral loads may also be resisted by passive resistance within the soil materials. A coefficient of friction of 0.2 may be used between the foundations and the soil. The passive resistance may be assumed to act as a fluid with a density of 100 pounds per cubic foot. A maximum passive earth pressure of 3000 pounds per square foot may be assumed. When combining passive resistance and friction for resistance of lateral loads, the passive component should be reduced by one-third. For isolated poles the allowable passive earth pressure may be doubled.

EXCAVATIONS

Excavations ranging in vertical height from 5 to 7 feet will be required for the deepened foundations. Conventional excavation equipment may be used to make these excavations. Excavations should expose soil and Ballona Creek marsh and lake deposits. These soils are suitable for vertical excavations up to 7 feet. This should be verified by the project Soils Engineer during construction so that modifications can be made if variations in the soil occur.

All excavations should be stabilized within 10 days of initial excavation. Water should not be allowed to pond on top of the excavation nor to flow towards it. All excavations should be protected from inclement weather. No vehicular surcharge should be allowed within three (3) feet of the top of cut.

FLOOR SLABS

Floor slabs may be supported directly on undisturbed natural soil materials found at an approximate depth of 1/2 feet below existing subgrade or on an engineered compacted fill. Footing trench spoils should either be removed from the slab areas or compacted into place by mechanical means. All slabs should span exploratory trench excavations.

Floor slabs should be reinforced with a minimum of 6x6-6x6 or 12x12-w5.8 welded wire fabric. Where a floor covering that can be affected by moisture will be used, slabs should be protected by polyethylene plastic vapor barrier. This barrier should be covered with a one (1) inch layer of sand, to prevent punctures in the vapor barrier and to aid in the cure of the concrete.

PAVING

Asphaltic concrete paving will be required for the parking areas.

It is recommended that the existing grade be scarified to a depth of twelve (12) inches and recompacted. The soils should be brought to optimum moisture content and recompacted to 90 percent of the maximum density. The maximum density is determined by ASTM D 1557-70. Five (5) inches of asphalt over eight (8) inches of base is recommended. The pavement sections have a general useful life of six (6) years.

Base course should consist of crusher run base or decomposed granite.

DRAINAGE

A comprehensive drainage system should be designed and incorporated into the final plans. All drainage of the site should be collected and directed via non-erosive devices to a location approved by the building official. It is recommended that position pad drainage be maintained throughout the site. Drainage should be directed away from slopes.

Plan Review

The final construction and/or grading plans shall be reviewed and approved by the consultants. This is required to determine if the recommendations of the report have been properly understood and carried forth in the design drawings.

CONSTRUCTION REVIEW

It is required that all footing excavations, and any grading for slab support shall be reviewed by this office. Review will be performed to determine if the intent of the report has been adequately carried forth. This office should be notified at least two working days in advance of any reviews of this nature so that staff personnel may be made available.

LIMITATIONS

This report is prepared in agreement with generally accepted engineering practice. Between exploratory excavations, soils deposits vary in type, strength and many other properties. Conclusions and recommendations presented herein are based on our experience and background. Therefore, our conclusions and recommendations are professional opinions and are not meant to indicate a control of nature. This report makes no other warranty either expressed or implied as to the advice presented herein. Copies of this report should not be made without written permission of this office.

Subsurface conditions were determined on the basis of our field explorations and appear to be relatively uniform. However, the recommendations presented herein are for soil conditions encountered in specific locations. Other soil conditions due to nonuniformity of the soil conditions or manmade alterations may be revealed during construction. At that time, further recommendations may be made if required.

Conclusions on building site stability, settlement, and its effects on offsite property are based upon our visual examination, the placement of explorations, laboratory testing of samples obtained during explorations, analysis of our data and our experience. It is our opinion that our state of the art analysis provides an adequate assessment of the site conditions. Our examination does not, however, imply that the subject property is risk free.

CONSTRUCTION NOTICE

Construction can be difficult. Recommendations contained herein are based upon several windows (explorations) excavated at locations deemed suitable by your consultants.

It is this corporations aim to advise you through this report as to general site conditions, suitability for construction and overall stability. It must be understood that this is an opinion based upon our testing, analysis, and interpretation thereof.

Quantities for foundation concrete and steel may be estimated based on the findings given in this report. However, you must be aware that depths and magnitudes will most likely vary between the excavated windows (explorations) given in the report.

Respectfully submitted,
G.C. MASTERMAN & ASSOCIATES, INC.

Linda Tandy
Field Engineer

Reviewed by:

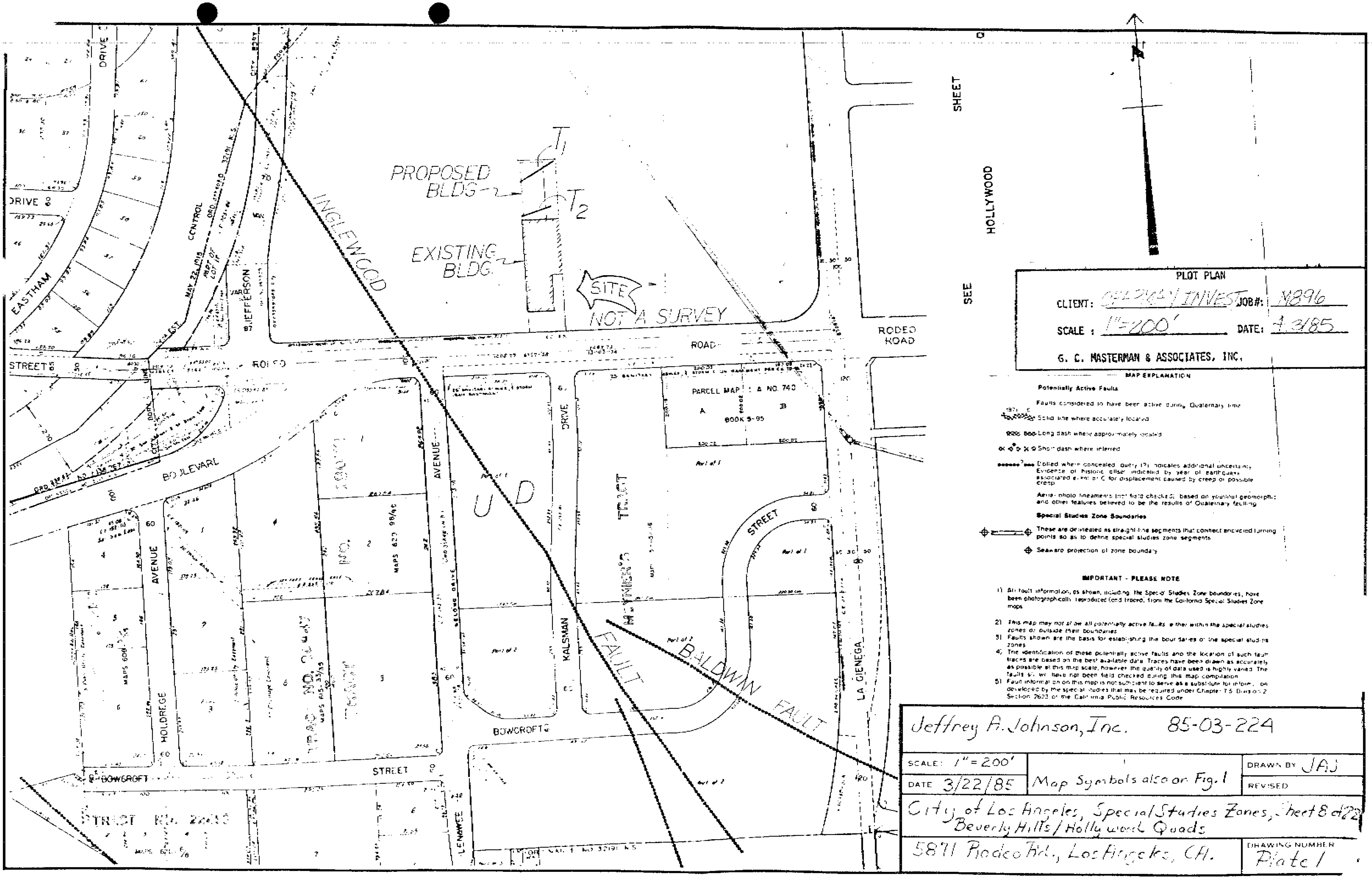
Gary C. Masterman
Chief Engineer, RCE 24890

GCM:lh

xc: (5) Addressee
(2) Metro Steel Building Company

APPENDIX I

PLOT PLAN


PROPOSED BLDG
EXISTING BLDG
SITE
NOT A SURVEY
INGLEWOOD FAULT
BALDWIN FAULT
RODEO ROAD
BOULEVARD
JEFFERSON
CONTROL
EASTHAM
AVENUE
DRIVE
KALSMAN
LA CIENEGA
BOWCROFT
STREET
HOLDREGE
LENAWEE
PARCEL MAP L A NO. 740
BOOK 5-95
SEE HOLLYWOOD SHEET
PLOT PLAN
CLIENT: [illegible] INVEST
JOB#: N896
SCALE : 1"=200'
DATE: 4-3-85
G. C. MASTERMAN & ASSOCIATES, INC.
MAP EXPLANATION
Potentially Active Faults
Faults considered to have been active during Quaternary time
Solid line where accurately located
Long dash where approximately located
Short dash where inferred
Dotted where concealed
Special Studies Zone Boundaries
These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments
Seaward projection of zone boundary
IMPORTANT - PLEASE NOTE
Jeffrey A. Johnson, Inc. 85-03-224
SCALE: 1" = 200'
DATE 3/22/85
Map Symbols also on Fig. 1
DRAWN BY JAJ
REVISED
City of Los Angeles, Special Studies Zones, Sheet 8 of 22
Beverly Hills / Hollywood Quads
5871 Rodeo Rd., Los Angeles, CA.
DRAWING NUMBER
Plate 1

APPENDIX II

FIELD INVESTIGATION

FIGURES A-1.1 THROUGH A-1.2

APPENDIX II

Field Investigation

A field investigation of the site was conducted on March 8 and 11, 1985. At this time the site geologic conditions were mapped by Jeffrey A. Johnson, Inc. Two (2) exploratory backhoe trenches were excavated on the site. These excavations were an average of 15 feet in depth. Plate I in Appendix shows the locations of these subsurface explorations.

The subsurface conditions encountered in these explorations were logged in detail by our field engineer and Jeffrey A. Johnson, Inc., (see Figures A-1.1 and A-1.2). Geologic features encountered were mapped and representative samples of the earth materials were sampled.

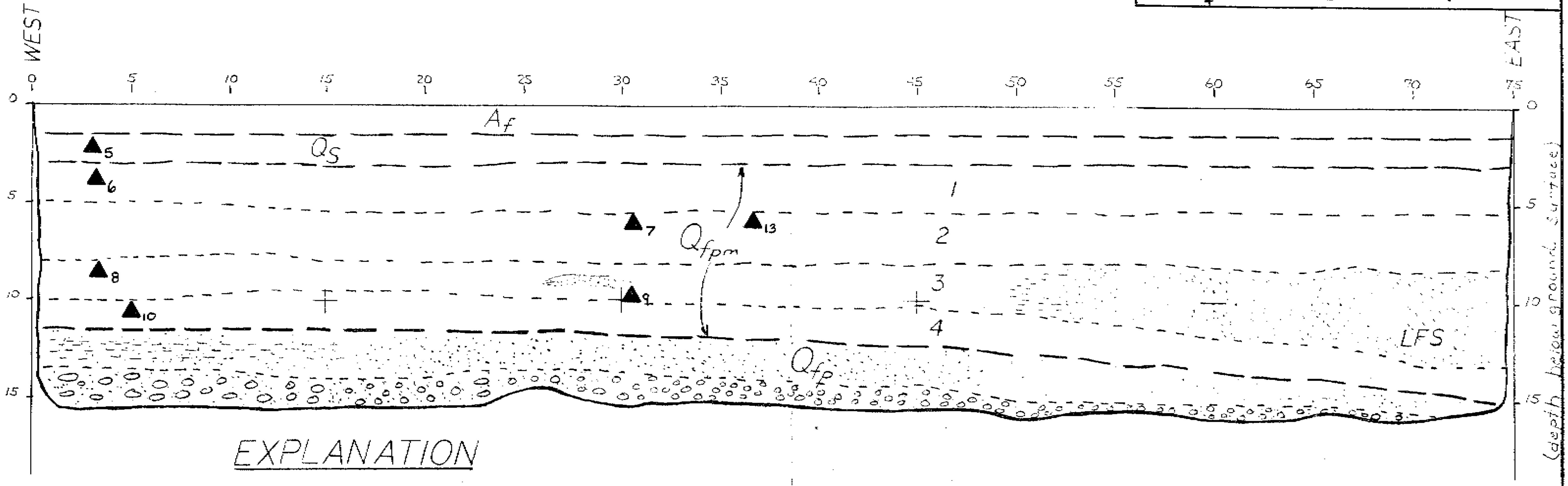
Undisturbed samples were obtained during the exploration through the use of thin-walled steel hand held sampler. The soil is retained in the brass rings of 2.50 inches inside diameter and 1.00 inches in height. Bulk samples were obtained and trimmed to fit into the 2.50 inches inside diameter by 1.00 inches high brass rings. Testing was carried forth on these samples. All undisturbed samples were sent to the laboratory for examination, testing and classification using the Unified Classification System and group symbol.

CLIENT: [illegible] JOB#: [illegible]

SCALE : [illegible] DATE: 4/3/85

G. C. MASTERMAN & ASSOCIATES, INC.

▲ SAMPLE LOCATION



EXPLANATION

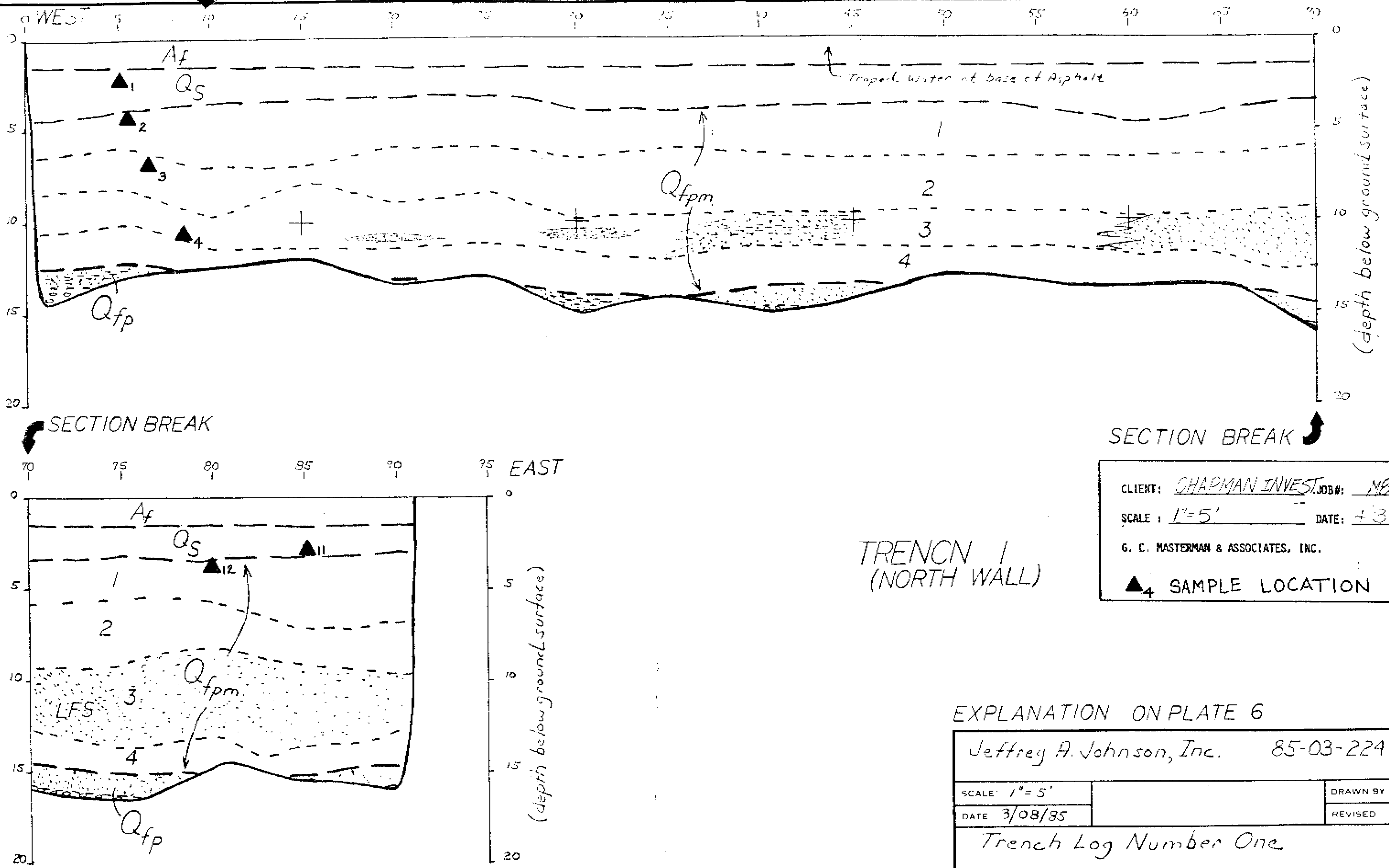
Af — Artifical fill-approximately 6 to 8 inches of asphalt underlain by 6 inches of gravel base and an additional 6 inches of "disturbed" soil.

Qs — Soil-moist, dark brown clay to silty clay, no roots.

QEpm — Ballona Creek(ancient Los Angeles River) marsh and lake deposits-
(1) moist, white to grey silty clay gradational contact with Qs
(2) moist, tan clay silt, illuvial horizon(?)
(3) moist, tan to brown clay silt, "pseudo shears" in zone of high clay content("pseudo shears" are the result of wetting and drying of expansive clays), grades east ward into a silt and then to a clean med. sand. Liquefaction flow structures(LFS) observed in this horizon at station 70 to 75 in Trench 1 and station 65 to 75 in Trench 2
(4) moist, grey green to dark brown clay, fresh-water(?) gastropods are common.

QEp — Ballona Creek(ancient Los Angeles River) floodplain and channel back fill deposits-moist tan to orange silty, sandy clay that grades east ward in to a tan fine to medium sand and verticaly downward into a blue grey sand, gravel and cobble layer. Cobbles are subrounded to rounded, 2 to 10+ inches in size and are granitic and metamorphic. QEp is probably the "fifty-foot gravel" of Poland and others(1959).

Jeffrey A. Johnson, Inc.	85-03-224	
SCALE: 1" = 5'		DRAWN BY JAJ
DATE: 3/11/85		REVISED
Trench Log Number Two (North Wall)		
5371 Rodeo Rd., Los Angeles, Ca		DRAWING NUMBER PLATE A-1.1



CLIENT: CHAPMAN INVEST. JOB#: M696

SCALE: 1"=5' DATE: 4/3/85

G. C. MASTERMAN & ASSOCIATES, INC.

▲4 SAMPLE LOCATION

TRENCN 1
(NORTH WALL)

EXPLANATION ON PLATE 6

Jeffrey A. Johnson, Inc. 85-03-224		
SCALE: 1"=5'		DRAWN BY JAJ
DATE 3/08/85		REVISED
Trench Log Number One		
5871 Rodeo Rd., Los Angeles, Ca.		DRAWING NUMBER PLATE A-1.2

APPENDIX III

GRADING SPECIFICATIONS

GRADING SPECIFICATIONS - SLAB SUPPORT

1. Prior to commencement of work, a pregrading meeting shall be held. Participants at this meeting shall consist of the contractor, the owner or his representative and the Soils Engineer. This meeting will be held to avoid any misunderstanding of the recommendations set forth in this report which could cause delays in the project.

2. Prior to placement of fill, all vegetation, rubbish and other deleterious material should be disposed of offsite. The proposed construction area should be excavated down to the undisturbed natural soil.

3. The natural ground which is determined to be satisfactory for the support of the filled ground shall then be scarified to a depth of at least six (6) inches and moistened as required. The scarified ground should be compacted to at least 90% of the maximum laboratory density.

4. The fill soils shall consist of materials approved by the project Soils Engineer or his representative. These materials may be obtained from the excavation areas and any other approved sources and by blending soils from one or more source. The material used shall be free from organic vegetable matter and other deleterious substances and shall not contain rocks greater than eight (8) inches in diameter nor of a quantity to make compaction difficult.

5. The approved fill material shall be placed in approximately level layers six (6) inches thick and moistened as required. Each layer shall be thoroughly mixed to attain uniformity of moisture in each layer.

When the moisture content of the fill is 3% or more below the optimum moisture content, as specified by the Soils Engineer, water shall be added and thoroughly mixed in until the moisture content is within 3% of the optimum moisture content.

When the moisture content of the fill is 3% or more above the optimum moisture content as specified by the Soils Engineer, the fill material shall be aerated by scarifying or shall be blended with additional materials and thoroughly mixed until the moisture content is within 3% or less of the optimum moisture content.

Each layer shall be compacted to 90% of the maximum density as determined by ASTM D 1557-70 using approved compaction equipment.

6. Review of the fill placement should be provided by the Soils Engineer or his representative during the progress of grading. In general, density tests will be made at intervals not exceeding two (2) feet of fill height or every 500 cubic yards of fill placed.

7. The silty clay and clayey silt materials can experience a shrinkage of four percent.

8. During the inclement part of the year, or during periods where rain is threatening, all fill that has been spread and awaits compaction, shall be compacted before stopping work for the day or before stopping because of inclement weather. These fills, once compacted, shall have the surfaces sloped to drain to one area where water may be removed.

Work may start again, after the rainy period, once the site has been reviewed by the Soils Engineer and he has given his authorization to resume. Loose materials not compacted prior to the rain, shall be removed and aeriated so that the moisture content of these fills will be within 3% of the optimum moisture content.

Surface materials previously compacted before the rain, shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill if deemed necessary by the Soils Engineer.

APPENDIX IV

LABORATORY TEST RESULTS

LABORATORY RECAPITULATION - TABLE I

FIGURES A-2.1 THROUGH A-2.4

FIGURES A-3.1 THROUGH A-3.2

APPENDIX IV

Laboratory Tests

Moisture and Density Tests

The moisture content and in-place dry density of all undisturbed samples obtained were determined. The test results are presented as part of the logs on Figures A-1.1 through A-1.2.

Shear Tests

Direct single shear tests were performed on representative undisturbed samples to determine their strength characteristics. The desired normal load was applied to the specimen and allowed to come to equilibrium. The rate of deflection on the sample is approximately 0.025 inches per minute. Depending upon the sample location and future site condition, samples may be tested at field moisture. The results are plotted on the Shear Test Diagrams, Figures A-2.1 through A-2.4.

Consolidation

Consolidation tests were performed on undisturbed samples to predict the soils behavior under a specific load. Loads are applied in increasing load increments and the results are recorded. The samples are usually inundated at a designated load to determine the effect of water contacting the bearing soil. The results are plotted on the "Consolidation Pressure Curve", Figures A-3.1 through A-3.2 and the load at which the water is added is noted on the drawing.

LABORATORY RECAPITULATION

Location	Earth Mat'l	In Situ Dry Density (lbs/cu.ft)	In Situ Moisture Content (%)	Max.Dry Density (lbs/cu.ft.)	Optimum Moisture (%)	Sulfates PPM	Cohesion c-(psf)	Angle of Internal Friction 0-(deg.)	EI or % Swell
Sample #1 @ 2'	CL	76.9	27.1						
Sample #2 @ 4'	CL	102.4	17.4				650	26	
Sample #3@7'4"	CL/ML	102.7	21.3						
Sample #4@10'8"	ML	97.9	25.8				1250	18	
Sample #5 @ 2'	CL	93.4	24.4						
Sample #6 @ 3½'	CL	100.8	20.8						
Sample #7 @ 6'	ML	100.5	20.6				1000	18	
Sample #8 @ 8½'	ML	103.6	21.8						
Sample #9 @ 9½'	ML	99.4	25.5				400	29	
Sample #10@10'	CL	98.0	25.0						

G. C. MASTERMAN & ASSOC. INC.
Soils Engineers & Engineering Geologists

CLIENT CHAPMAN/UTIL. M 896

THOMAS GUIDE 42 #-6

TABLE I

LABORATORY RECAPITULATION

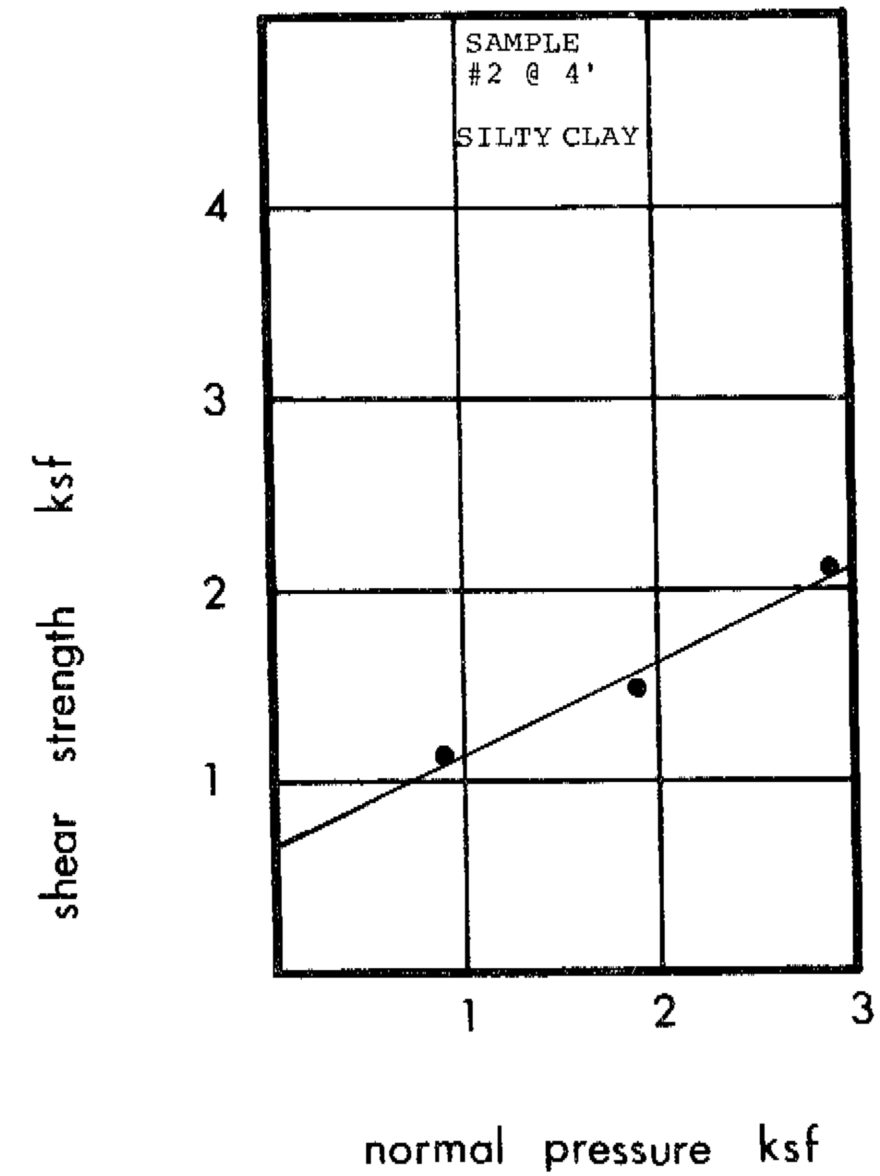
Location	Earth Mat'l	In Situ Dry Density (lbs/cu.ft)	In Situ Moisture Content (%)	Max.Dry Density (lbs/cu.ft.)	Optimum Moisture (%)	Sulfates PPM	Cohesion c-(psf)	Angle of Internal Friction 0-(deg.)	EI or % Swell
Sample #11@2'8"	CL	91.3	22.1						
Sample #12@3'	CL	83.1	24.0						
Sample #13 @ 5'	ML	99.8	17.4						

G. C. MASTERMAN & ASSOC. INC.
Soils Engineers & Engineering Geologists

CLIENT CHAPMAN M 896

THOMAS GUIDE ____________ TABLE ________

SHEAR TEST DIAGRAM



test method:

SATURATED SHEAR

client:

CHAPMAN/UTILITY

M 896

MOISTURE CONTENT:

IN SITU: 21.3

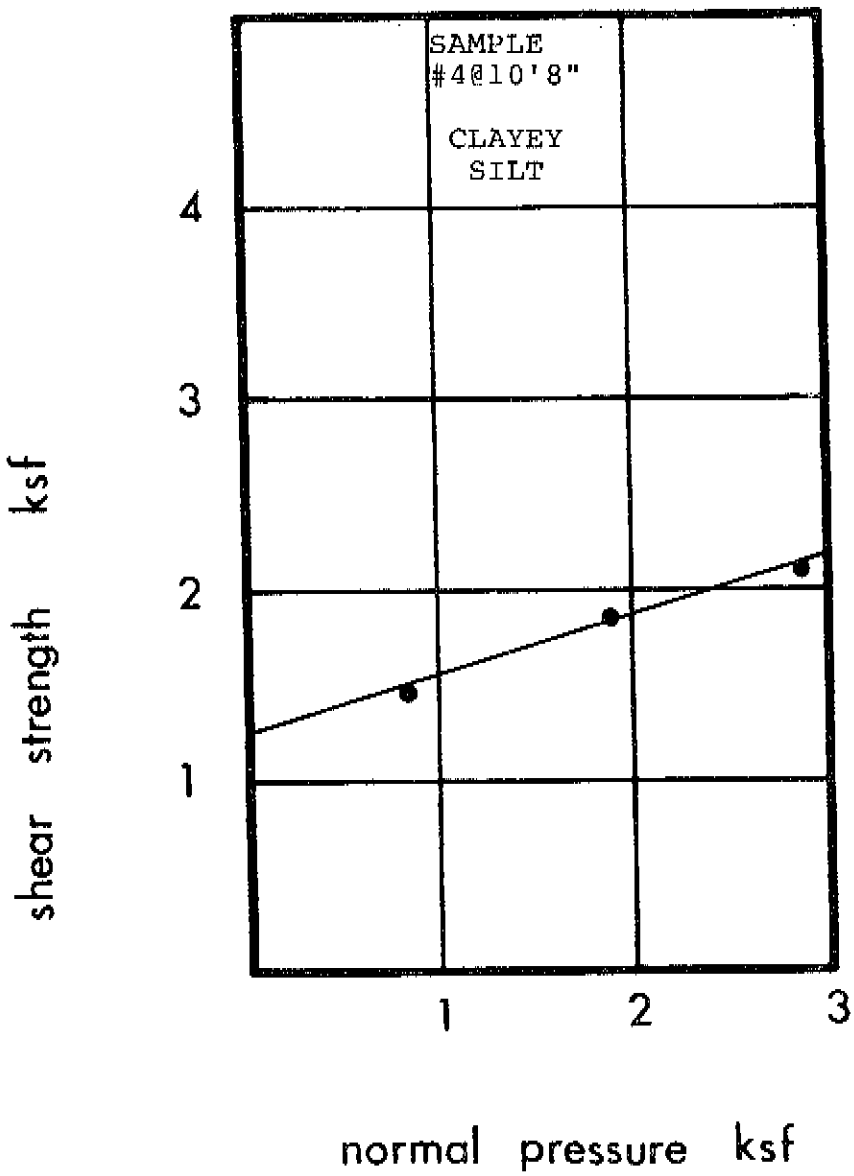
SATURATED: 23.4

G. C. MASTERMAN & ASSOC. INC.

SOILS ENGINEERS &
ENGINEERING GEOLOGISTS

FIGURE A-2.1

SHEAR TEST DIAGRAM



test method:

SATURATED SHEAR

client:

CHAPMAN/UTILITY

M 896

MOISTURE CONTENT:

IN SITU: 25.8

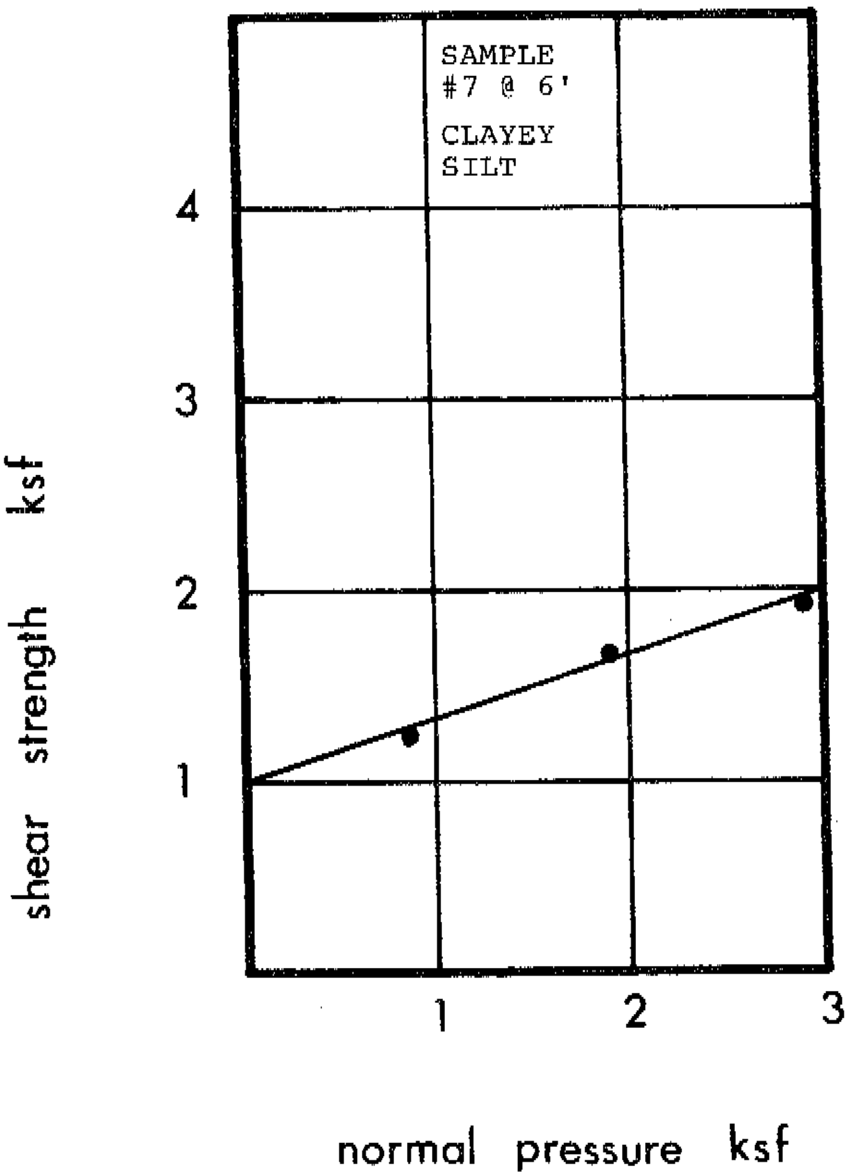
SATURATED: 26.8

G. C. MASTERMAN & ASSOC. INC.

SOILS ENGINEERS &
ENGINEERING GEOLOGISTS

FIGURE A-2.2

SHEAR TEST DIAGRAM



test method:
SATURATED SHEAR

client:
CHAPMAN/UTILITY

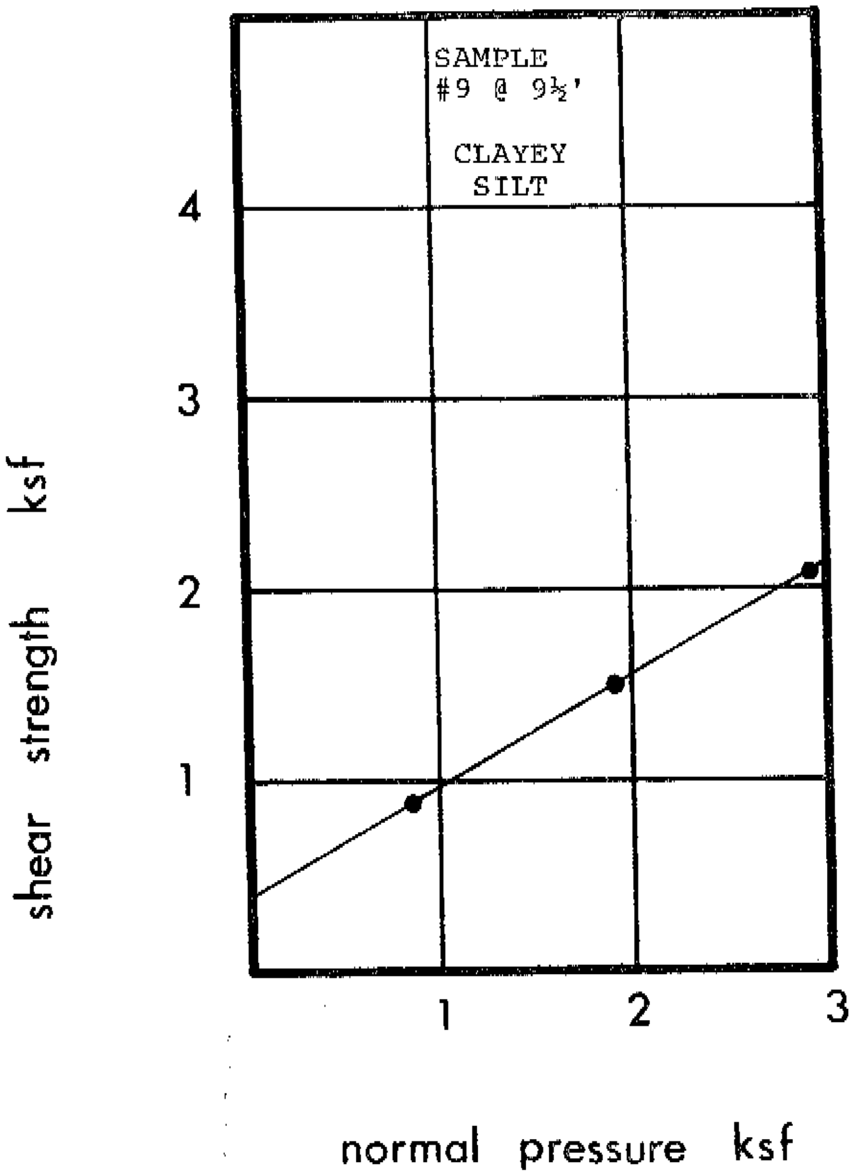
M 896

MOISTURE CONTENT:
IN SITU: 20.6
SATURATED: 22.5

G. C. MASTERMAN & ASSOC. INC.
SOILS ENGINEERS &
ENGINEERING GEOLOGISTS

FIGURE A-2.3

SHEAR TEST DIAGRAM



test method: SATURATED SHEAR

client: CHAPMAN/UTILITY

M 896

MOISTURE CONTENT:

IN SITU: 25.5

SATURATED: 28.0

G. C. MASTERMAN & ASSOC. INC.

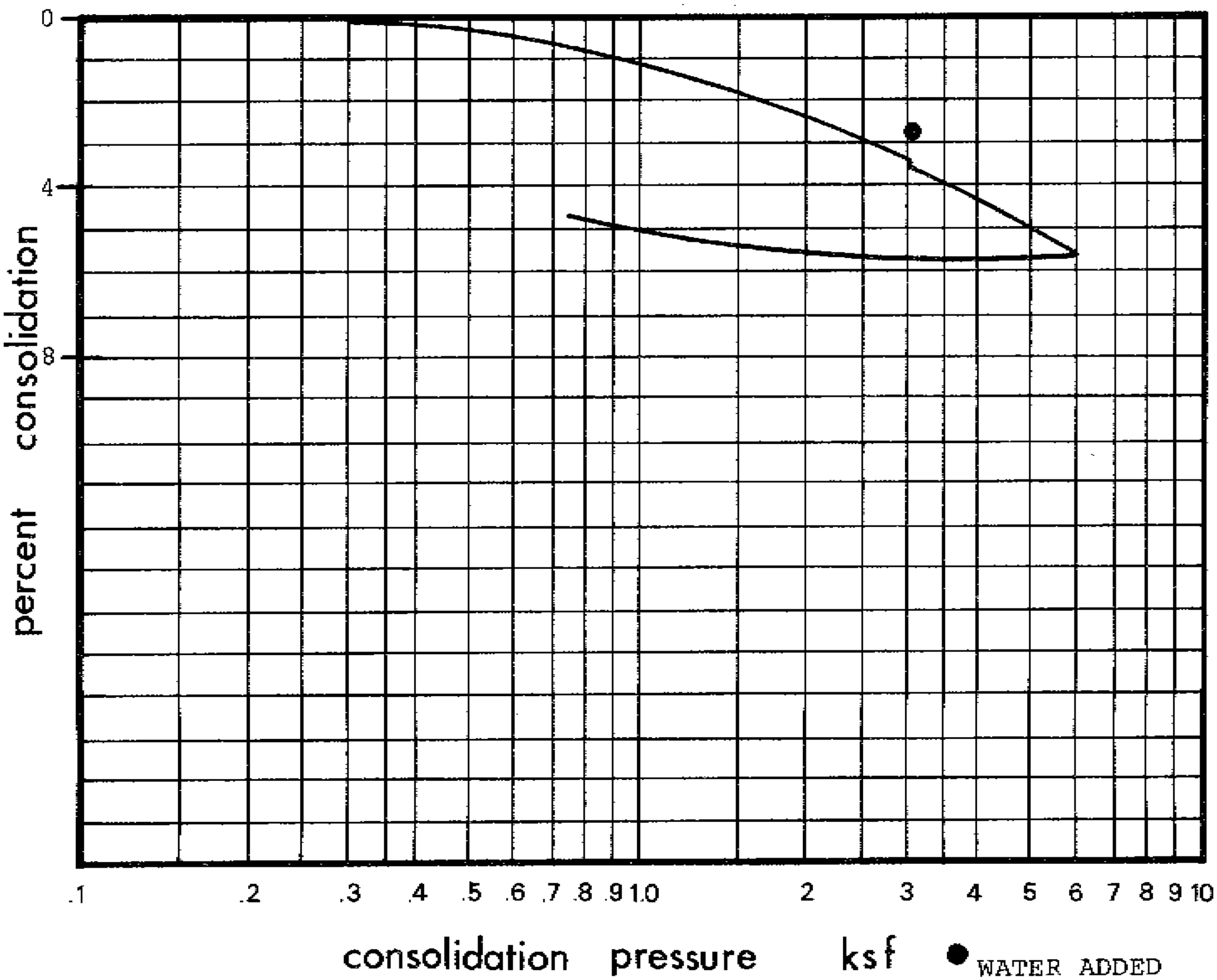
SOILS ENGINEERS &
ENGINEERING GEOLOGISTS

FIGURE A-2.4

CONSOLIDATION TEST SHEET

G.C.Masterman & Assoc. Inc.

SAMPLE #10 @ 10'



client: CHAPMAN/UTILITY

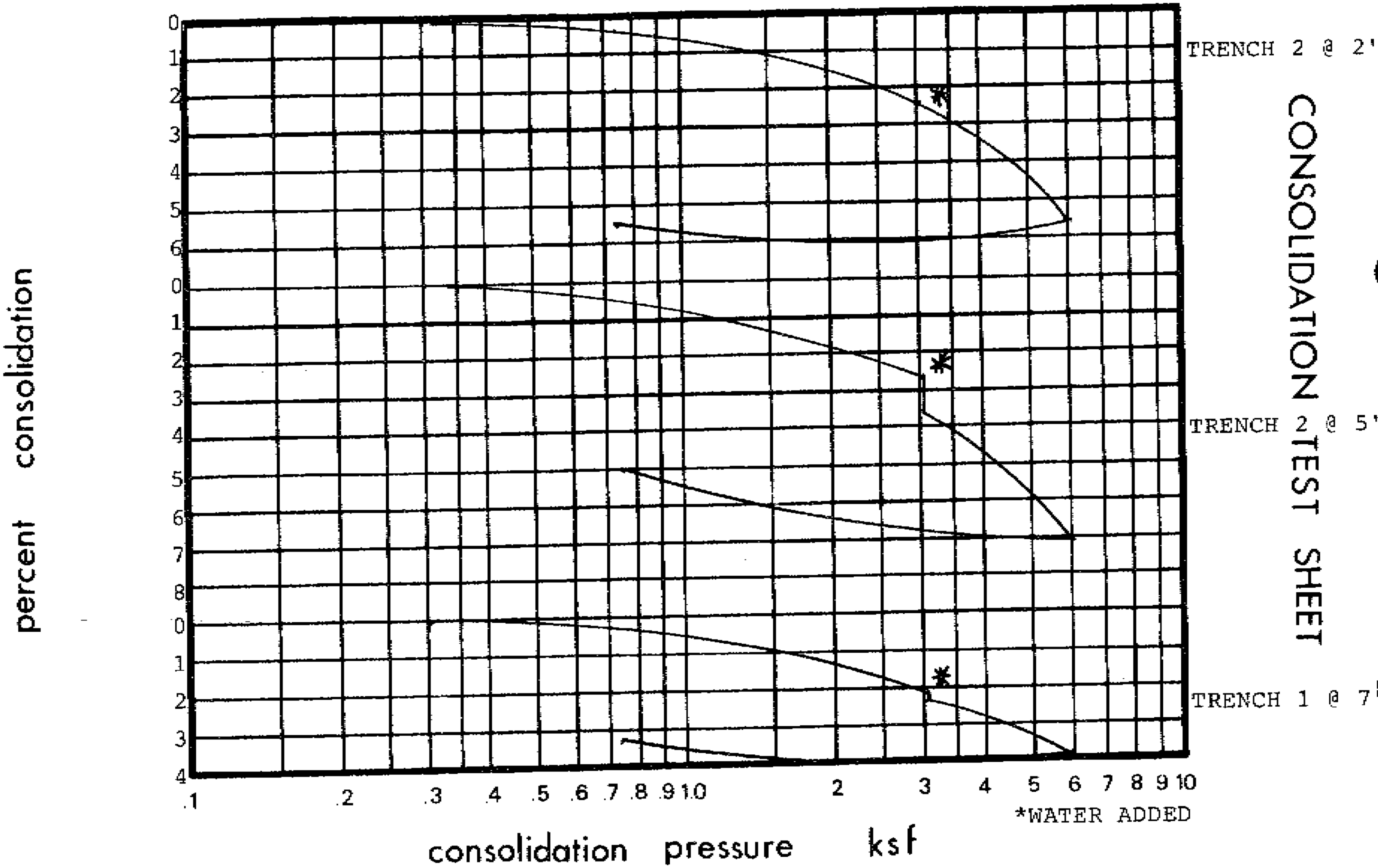
M 896

plate

FIGURE A-3.2

G.C. Masterman & Assoc. Inc.

CONSOLIDATION TEST SHEET



client: CHAPMAN/UTILITY

M 896

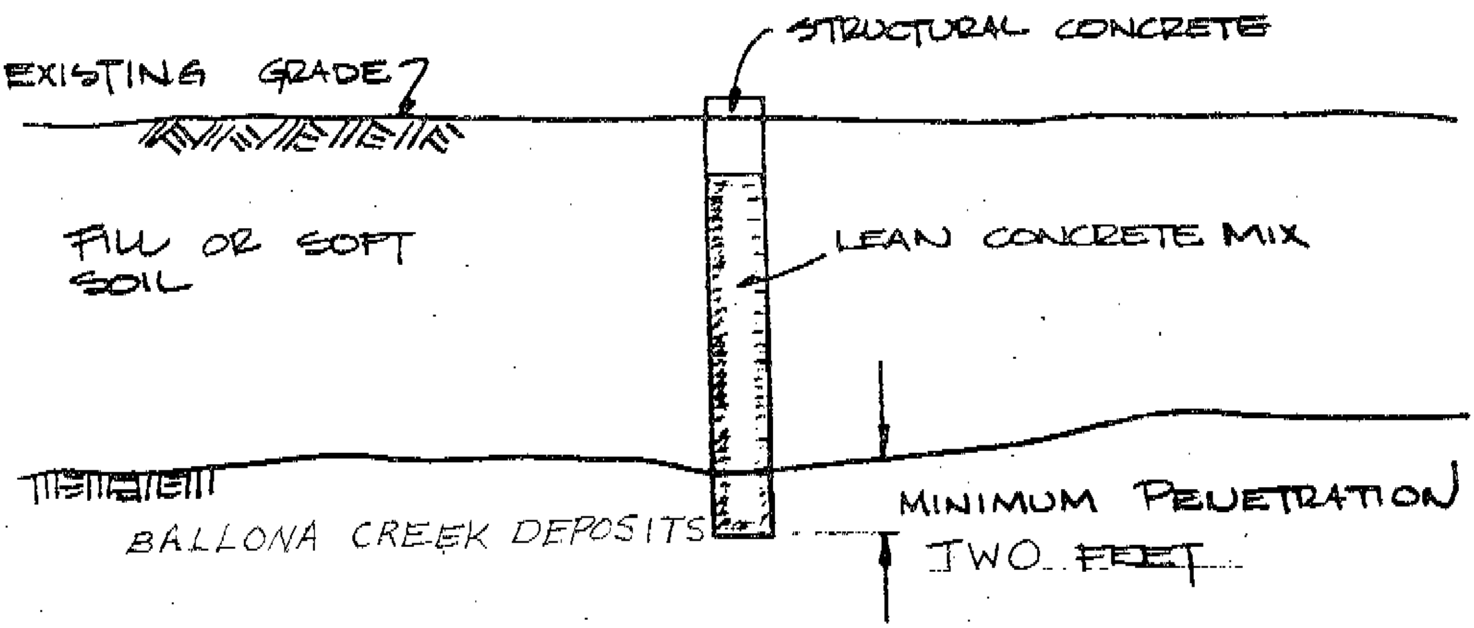
FIGURE A-3.1

APPENDIX V

LEAN CONCRETE BACKFILL DETAIL

G.C. [illegible]ASTERMAN & ASSOC. [illegible]NC.

BY ________ DATE 1/5/85 SUBJECT LEAN CONCRETE BACKFILL SHEET NO. 1 OF 1 JOB NO. M896



APPENDIX VI

BIBLIOGRAPHY

APPENDIX VI

BIBLIOGRAPHY

1. Jeffrey A. Johnson, Inc., Preliminary Geologic Exploration, Alquist-Priolo Special Study Zone, 5871 Rodeo Road, Los Angeles, California, Service # 85-03-224, dated March 27, 1985.

APPENDIX E

FAULT STUDY FOR SITE 1: 8708 OLIN ST., LOS ANGELES, CA

AP-523

STATE OF CALIFORNIA—THE RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF CONSERVATION

DIVISION OF MINES AND GEOLOGY

DIVISION HEADQUARTERS
RESOURCES BUILDING, ROOM 1341
1416 NINTH STREET
SACRAMENTO, CA 95814

District Offices: LOS ANGELES
Junipero Serra Bldg., Rm. 1065
107 South Broadway
90012

SACRAMENTO
Resources Bldg., Rm. 118
1416 Ninth Street
95814

SAN FRANCISCO
Ferry Building
94111

(415) 557-0413

August 26, 1977

Mr. J.W. Cobarrubias
City of Los Angeles
Department of Building & Safety
402, City Hall
Los Angeles, CA 90012

Dear Mr. Cobarrubias:

We are placing on open file the following report, reviewed and approved by the City of Los Angeles in compliance with the Alquist-Priolo Special Studies Zones Act:

Report of Investigation, portions of Lots 289, 290, & 291, Tract 5900, vicinity 8708 Olin Street, Los Angeles, CA (identified as Lot 6, Tract 5900 by City of Los Angeles); by John D. Merrill; July 15, 1977.

This report and other reports submitted by the City of Los Angeles would be more useful to us and others if they contained better documentation of the existing geologic features. Most obvious, is the lack of pictorial trench logs and references consulted. The lack of a location map and the geologic setting also limit the value of this report to others.

Sincerely yours,

EWH

EARL W. HART
Office of the State Geologist
CEG 935

EWH/mkr

cc: A-P file ✓

AP-523

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
402, CITY HALL
LOS ANGELES, CALIF. 90012

R. J. WILLIAMS
GENERAL MANAGER

Calif. Div. of Mines & Geology
RECEIVED
AUG 10 1977
San Francisco, California

August 17, 1977

Mr. Earl Hart
Division of Mines & Geology
Resources Bldg., Room 1341
1416 Ninth Street
Sacramento, CA 95814

Dear Mr. Hart:

Transmitted herewith is a copy of the Geologic-Seismic Report No. 74009, dated July 15, 1977, prepared by John D. Merrill. The report has been prepared for Lot 6 of Tract 5900, pursuant to Chapter 7.5, Division 2 of the Public Resources Code.

The City of Los Angeles has reviewed the report and finds it to be acceptable and in general conformance with the minimum requirements of the Special Studies Zones Act. A copy of the Department letter in review of the report, has been enclosed for your files.

J. W. COBARRUBIAS
Staff Geologist, CEG #35
Grading Division

IOT:mk
485-3435

Attachments: Department letter 9

CITY OF LOS ANGELES

CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
402 CITY HALL
LOS ANGELES, CALIF 90012

TOM BRADLEY
MAYOR

August 17, 1977

Douglas Sefton, Lewis Fontana,
Emery & Susan Lefkovits
864 Granville Avenue
Los Angeles, CA 90049

TRACT: 5900
LOT: 6
LOCATION: 8707 Olin Street

Geologic and Seismic Report No. 74009, dated July 15, 1977, prepared by John D. Merrill.

The above geologic-seismic report concerning the assessed potential seismic conditions at the project location has been reviewed by the Grading Division of the Department of Building and Safety. The property is located within a Fault Area identified by the State of California Special Studies Zones (established under Chapter 7.5, Division 2 of the Public Resources Code, i.e., Alquist-Priolo Act).

According to the report, the property is situated approximately 300 feet to the northeast of the Inglewood Fault Zone. The report concludes that the site is free from active fault rupture or unstable ground. This conclusion is predicated on approximately 900 linear feet of continuous backhoe trenches in areas selected by the project geologist. The trench, however, did not extend over the entire lot. The ground ruptures may still exist in the northeasterly and southwesterly corners of the lot.

On the basis of the findings presented in the report and the subsurface exploration conducted on the site, the report is acceptable with the following conditions:

1. No footings shall be founded in the areas of the northeasterly and southwesterly corners of the lot not previously investigated by the trench.

2. The soils engineer shall certify the exploratory trench backfill, or the fill shall be removed and recompacted under a continuous supervision of the soils engineer.

3. The soils engineer shall inspect the excavations for the footings to determine that they are founded in the recommended strata before calling the Department for footing inspection.

APPROVED:

J. W. COBARRUBIAS
Staff Geologist,
Building and Safety

R. M. OBERLIES
Chief of Grading Division

IOT:mk
485-3435

cc: Tod Kuhn
John D. Merrill
Earl Hart
Seismic File
WLA Inspection

*(Hart)

GRADING JUL 28 1977

AP-523

003181

Report of Seismic Investigation
Portions of Lots 289, 290, & 291, Tract 5900
Vicinity 8708 Olin Street
Los Angeles, California
Project 74009

(213) 881-2063
881-2076

JOHN D. MERRILL C. P. G.
engineering geologists
18432 OXNARD STREET
TARZANA, CALIF. 91356

July 15, 1977

Report of Seismic Investigation
Portions of Lots 289, 290, & 291, Tract 5900
Vicinity 8708 Olin Street
Los Angeles, California

Project 74009

Tod Kuhn
11436 Clarkson Road
Los Angeles, California 90064

Dear Mr. Kuhn:

In accordance with your request, a seismic investigation has been conducted at the above referenced property to determine its suitability for residential development. Subject parcel is located within a Special Studies Zone with respect to the Newport-Inglewood and associated faults, as defined by the Seismic Safety Element of the City of Los Angeles. Because of the location of the site, it was determined that an exploratory trench would be necessary to determine if Holocene deposits have been subjected to ground rupture due to faulting. Accordingly a trench 3.5 feet deep was excavated parallel to the northerly property line. A second trench was excavated nearby to determine the character of deeper earth materials. Geologic data are plotted on a 20 scale sketch map prepared by hand level, tape, and compass.

Geologic Elements:

Subject parcel is a triangle comprising portions of Lots 289, 290, & 291, Tract 5900. It fronts on the east side of Olin Street, about 100 feet west from Corning Street. The Santa Monica Freeway forms the northerly boundary of the property. The lot is nearly level, sloping gently south. Adjacent to the property on the north is a 1 1/2:1 fill slope ascending to the Freeway.

Present land use in the immediate vicinity includes single and multiple family residences. It is proposed to relocate a 2 to 3 unit, two-story apartment building onto the site.

Subject parcel and environs are underlain by older alluvium of late Pleistocene geologic age (map symbol Qoal). These deposits consist of well bedded tan to brown sand and silt, with gravelly horizons, overlain by poorly bedded, hard, brown, silty clay locustrine deposits. The lake or marsh deposits have been weathered, forming a residual soil profile judged to be time equivalent to the Holocene.

Careful examination of trench walls disclosed no evidence of ground rupture of Holocene deposits (residual soil) due to faulting. It is concluded on this basis that there is no fault rupture of Holocene deposits within subject property, and that the structure may be placed on the lot, within the framework of applicable elements of the City Building and Grading Ordinance.

Thank you for this opportunity to be of service. Please call if there are questions regarding this report.

Very truly yours,

Michael D. Powers
Geologist

Reviewed by:

REGISTERED GEOLOGIST
JOHN D. MERRILL
NO. 83
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

John D. Merrill
Engineering Geologist 83

MDP:JDM:cr

JOHN D. MERRILL
ENGINEERING GEOLOGISTS

Project 74009

Logs of Backhoe Trenches

Stations 0 + 00 to 0 + 47, beginning @ Easterly end of trench.

0.0-1.0 ft. (locally thickening to 1.5 feet)

FILL: Sand; silty, with scattered pebbles; yellow, moderately loose, uncompacted, dry, friable, roots.

1.0-2.0 ft. (undulating soil/Qoal contact; locally deepens to 2.5 feet)

RESIDUAL SOIL: Silt, sandy, with scattered pebbles, light gray-brown, dry, moderately soft, weakly cohesive, friable.

2.0-3.0 ft. (trench locally deepens to 3.5 feet)

RESIDUAL SOIL: Silty, clayey, and sandy; brown, very stiff and cohesive, slightly moist, expansive.

Stations 0 + 47 to 0 + 54

0.0-1.0 ft. (locally thickens to 1.5 feet)

FILL: Sand, silty, scattered pebbles, yellow, moderately loose, uncompacted, dry, friable, roots.

1.0-2.0 ft.(@ 0 + 47; lower contact gradually deeper to 2.5 @ 0 + 54.)

RESIDUAL SOIL: Silt, sandy, with scattered pebbles, light gray-brown, dry, weakly cohesive, friable.

2.5-3.0 ft. (trench deepens to 3.5 feet in places)

RESIDUAL SOIL: Silt; clayey to sandy; brown, slightly moist, very stiff and cohesive, expansive.

Station 0 + 54 to 0 + 92

0.0–1.0 ft. (locally thickens to 1.5 feet)

FILL: Sand, silty, with scattered pebbles, dry, loose, uncompacted.

1.0–2.5 ft.

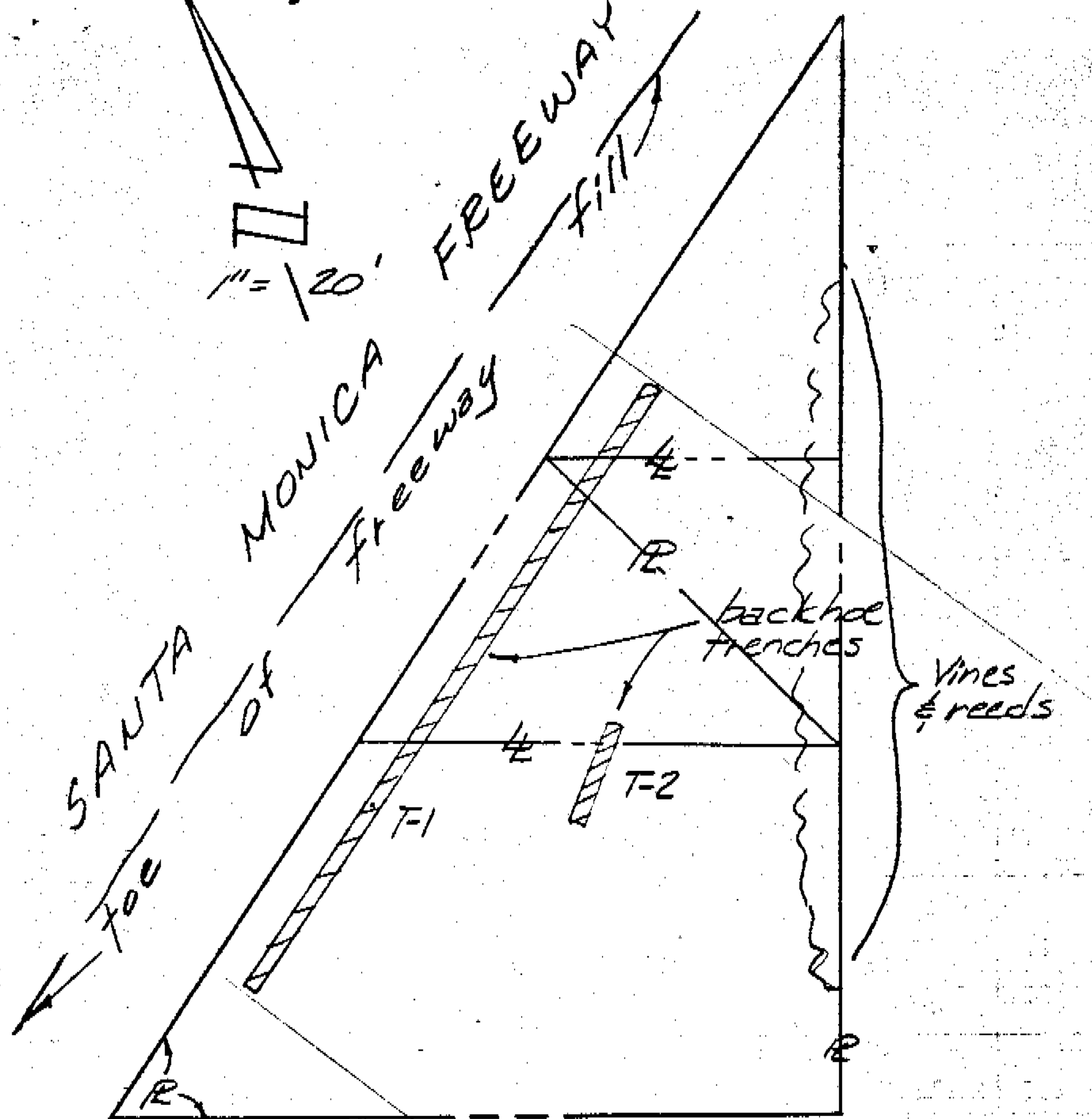
RESIDUAL SOIL: Silt, sandy, with scattered pebbles, light gray-brown, dry, weakly cohesive, friable.

2.5–3.0 ft. (trench locally deepens to 3.5 feet)

RESIDUAL SOIL: Silt, clayey, gray-brown, very stiff and cohesive, slightly moist. No evidence of ground rupture due to faulting.

T - 2

0-3.5 ft.	SOIL PROFILE: Silt, sandy to clayey, scattered pebbles, brown, dry, moderately firm.
3.5-7.0 ft.	OLDER ALLUVIUM (Qoal): Clay; sandy to silty, dark brown, slightly moist, cohesive, stiff, probably lake or marsh deposit.
7.0-12.0 ft.	OLDER ALLUVIUM (Qoal): Sand; silty to clayey, gravelly horizons, brown, well stratified, (horizontal) slightly moist to damp.



ENGINEERING GEOLOGIC SKETCH MAP

8700 Block, Olin St.
Culver City, Ca

JOHN D. MERRILL
Consulting Engineering Geologists
18432 Oxnard Street
Tarzana, Calif. 91356

Project 74009 7-15-77

Note: This map prepared with the aid of hand level, tape & compass. This is not a survey.

APPENDIX F

FAULT STUDY FOR SITE 2: 8707 VENICE BLVD., LOS ANGELES, CA

AP-1286

March 17, 1981

Mr. J. W. Cobarrubias
Staff Geologist
Department of Building & Safety
City of Los Angeles
402, City Hall
Los Angeles, California 90012

Dear Mr. Cobarrubias:

We are placing on open file the following reports, reviewed and approved by the City of Los Angeles in compliance with the Alquist-Priolo Special Studies Zones Act:

✓ Geologic investigation, proposed commercial site, Raisin Office Bldg. (Lot 2, Tract 5500), 8707 Venice Blvd., Los Angeles; by James Fisher; February 16, 1981; with supplement of March 1, 1981.

Geologic/seismic study for lots 78 & 81, Tract 28256 at 12684 and 12651 Olaf Place, Los Angeles; by Baseline Consultants; dated 6/20/78, 9/22/78, 12/28/78, 1/24/79 and 1/6/81.

Sincerely yours,

EWH

EARL W. HART
Office of the State Geologist
CEG 935

EWH/map

cc: A-P file ✓

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
402, CITY HALL
LOS ANGELES, CALIF. 90012

JACK M. FRATT
GENERAL MANAGER

March 6, 1981

Mr. Earl Hart
Division of Mines and Geology
Ferry Building
San Francisco, CA 94111

SUBJECT: Geologic-Seismic Study for Lot 2 of Tract 5500, located at 8707 Venice Blvd.

Transmitted herewith is a copy of the Geologic-Seismic Report dated February 16, 1981, prepared by James Fisher, E.G. 1007.

The report has been prepared pursuant to Chapter 7.5, Division 2 of the Public Resources Code; i.e., Alguist-Priolo Act.

The City of Los Angeles has reviewed the report and finds it to be acceptable and in general conformance with the minimum requirements of the Special Studies Zones Act. A copy of the Department letter in review of the report, has been enclosed for your files.

JOHN O. ROBB
Chief of Grading Division

Ivan O. Tkatch

IVAN O. TKATCH
Engineering Geologist

IOT/vno
485-3435

Attachments: Geologic-Seismic Report
Department Review Letter

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
402, CITY HALL
LOS ANGELES, CALIF. 90012

JACK M. FRATT
GENERAL MANAGER

March 6, 1981

Michael Raisin
1435 So. La Cienega Blvd., #109
Los Angeles, CA 90035

TRACT : 5500
LOT : 2
LOCATION: 8707 Venice Blvd.

Geologic-Seismic Report dated March 1, 1981 and February 16, 1981, prepared by James Fisher.

The above geologic-seismic report concerning the assessed potential seismic conditions at the project location has been reviewed by the Grading Division of the Department of Building and Safety. The property is located within a Fault Area identified by the State of California Special Studies Zones (established under Chapter 7.5, Division 2 of the Public Resources Code, i.e., Alquist-Priolo Act.)

According to the report, no evidence of active fault rupture was found on the site. The report concludes that the site is free from active fault rupture of unstable ground. This conclusion is predicated on the existing published data and physiographic evidence. A test trench excavated to a depth of 14.5 feet did not encounter any bedded material. Therefore, no trenching was used in the seismic evaluation of the site.

On the basis of the findings presented in the report and the subsurface exploration conducted on the site, the report is acceptable with the following conditions:

1. All of the recommendations of the report which are in addition to or more restrictive than those contained herein shall be incorporated into the plans.

2. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

3. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety.

4. Any recommendations prepared by the consulting geologist and/or the soils engineer for correction of geological hazards found during grading shall be submitted to the Department for approval prior to utilization in the field.

5. The consulting geologist shall inspect the excavations for the footings to determine that they are founded in recommended strata and to insure that no footings are placed across a ground rupture associated with active faulting. The geologist shall conduct the examination prior to calling the Department for footing inspection.

6. All roof and pad drainage shall be conducted to the street in an acceptable manner.

JOHN O. ROBB
Chief of Grading Division

Ivan O. Tkatch

IVAN O. TKATCH
Engineering Geologist

IOT/vno
485-3435

cc: James Fisher
Mario Montecalvo
E. Hart
LA Insp.

March 1, 1981 E. Hart

Raisin Investments
1435 South La Cienega Blvd., Suite 109
Los Angeles, California 90035

Subject: Addendum to report entitled, "Geologic Investigation-Proposed Commercial Site, Raisin Office Building, 8707 West Venice Blvd., Los Angeles, California"

Discussions with Mr. Ivan Tkatch, Engineering Geologist with the City of Los Angeles have served to clarify the concerns of the City with regard to development of the subject property.

It was not stated in my earlier report that, in addition to being within the Special Studies Zone, the State of California has (based on the work of others) projected the actual subsurface trace of the Inglewood Fault across a portion of the site as shown on the attached figure. The location of this feature should be regarded as approximate only since, as stated in my report, its presence is obscured in this vicinity by a considerable thickness of Recent alluvium. In fact, the most accurate determination I could make, based on the published data referenced in my report, would place the location of the fault as much as 400 feet northeast of the site.

Regardless of the actual location of the Inglewood Fault, it should be recognized that branch and secondary faults of the Zone probably underlie the site and surrounding area. The conclusions of my report (dated February 16, 1981) with regard to the hazard of surface faulting are still valid however, insofar as the Recent history of the Inglewood Structural Zone indicates that surface faulting has not occurred anywhere along the onshore portion of the Zone.

Should any further questions arise, please do not hesitate to contact me at (714) 833-0843.

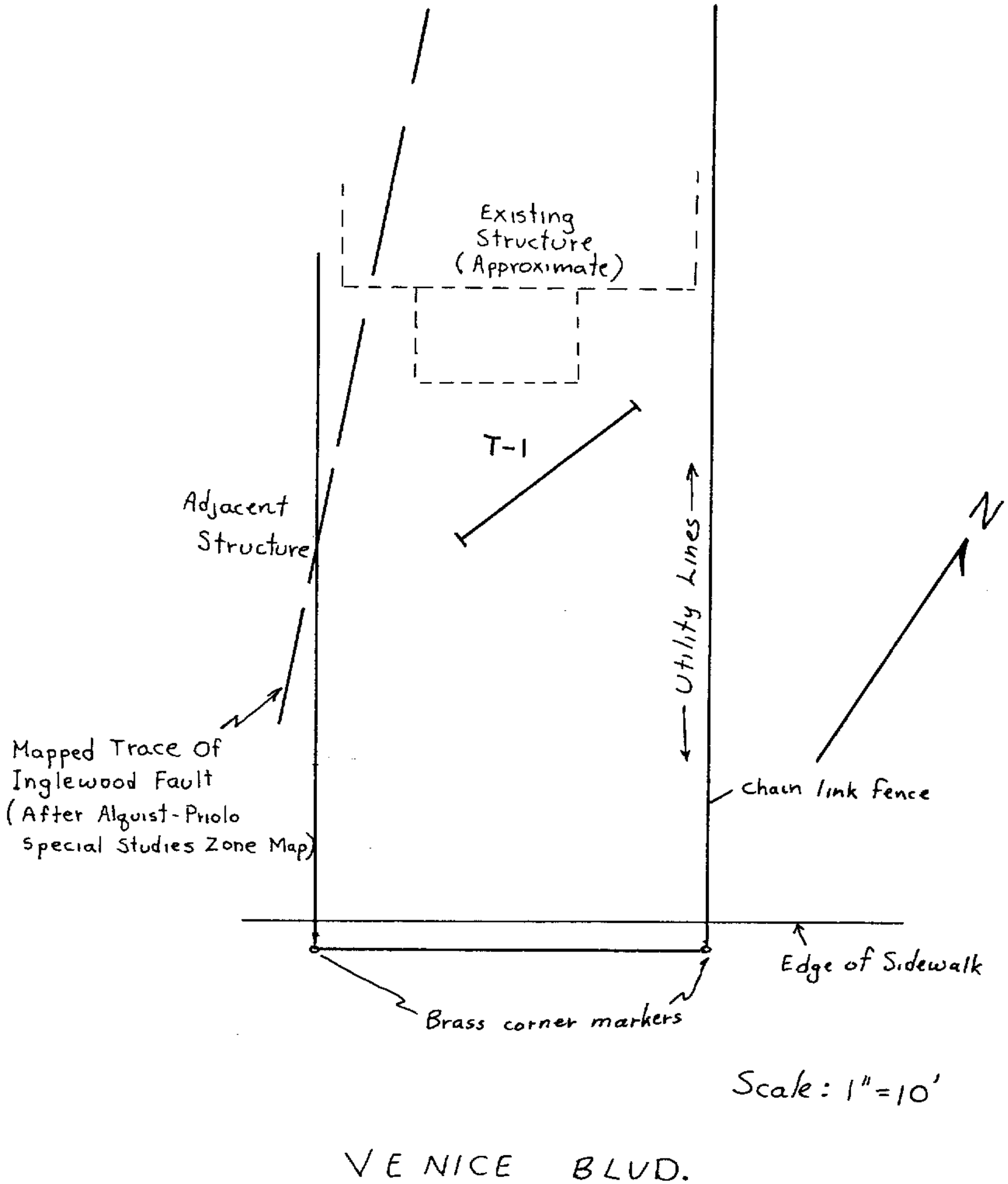
Respectfully submitted,

James E Fisher

James E. Fisher
Engineering Geologist EG 1007

cc: Mario Montecalvo
1405 Harkness Lane
Redondo Beach, California 90278

Raisin / Venice Blvd.
Trench Location



E. UART 038277

GEOLOGIC INVESTIGATION-PROPOSED COMMERCIAL SITE

RAISIN OFFICE BUILDING

8707 WEST VENICE BLVD., LOS ANGELES, CALIFORNIA

February 16, 1981

for

Michael Raisin

James Fisher Engineering Geology 4402 Sea Harbour
Huntington Beach 92649

February 16, 1981

Raisin Investments
1435 South La Cienega Blvd., Suite 109
Los Angeles, 90035

Attention: Mr. Michael Raisin

In accordance with your request and authorization, I have completed a geologic investigation of a site located at 8707 West Venice Blvd. Current plans are to construct a two-story wood frame building with conventional footings at the site. At the time of this investigation, an unoccupied single-story structure was located on the site. This structure is scheduled for demolition and removal.

This investigation has recently been supplemented by the geologic logging of an exploratory trench on the property. The location and log of this trench is presented in Appendix C. The trench was excavated in order to satisfy Item 9 of City of Los Angeles Review Sheet No. 3028, dated 12/19/80 and presented in Appendix D.

The geologic conclusions and recommendations in this report are unchanged from those in my earlier report, prepared with ckc engineering and dated August 22, 1980. The excavation of the exploratory trench has tended to confirm the earlier findings that the site is underlain by a relatively thick layer (estimated to be between 25 and 50 feet thick) of Recent alluvium undisturbed by faulting along the Newport-Inglewood Structural Zone.

I appreciate the opportunity to be of service in this study. Should any questions arise, please do not hesitate to contact my at my office: (714) 833-0843.

Respectfully submitted,

James Fisher

James Fisher
Engineering Geologist, EG 1007

INTRODUCTION

Purpose and Scope

A geologic/seismic evaluation of the site, located as shown on Figure 1, was conducted to determine: 1) the presence and location of any faults subject to potential surface rupture, 2) the recency of activity of any faults so identified, 3) the estimated ground motion parameters suitable for engineering design purposes and 4) the feasibility of proceeding with the project as proposed, including the need for additional geologic/seismic studies.

This evaluation was conducted in accordance with the Alquist-Priolo Geologic Hazard Zones Act (SB520), discussions with the City of LosAngeles Engineering Geologist, and California Division of Mines and Geology Notes 37 and 43, pertaining to geologic and seismic reports.

This report was prepared by the undersigned engineering geologist, who also conducted the geologic/seismic evaluation of the site. This evaluation was based upon tasks that included: 1) a site reconnaissance, 2) an examination of sequential stereoscopic aerial photographs covering the site, taken in 1928, 1937, and 1952, 3) a review of published geologic maps and literature of pertinence to the site and the purpose of this investigation, and 4) geologic logging of an exploratory trench to confirm the thickness of Recent alluvium.

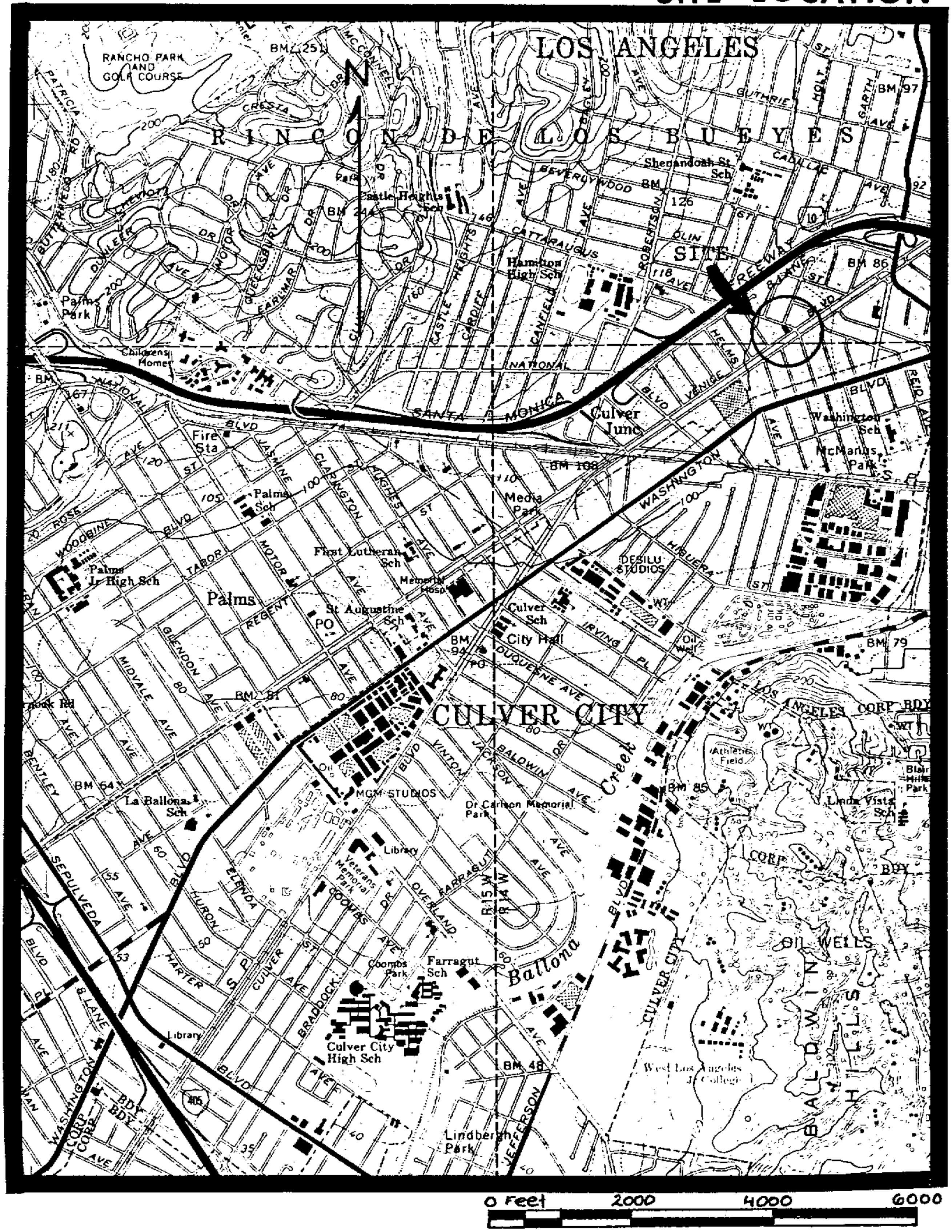
SEISMOTECTONIC FEATURES

Seismotectonic Provinces

The site is located on the margin between two structural blocks of the Los Angeles Basin, in the general area shown on Fig. 2, Seismotectonic Features. The Los Angeles Basin is in the northernmost extension of the Peninsular Ranges Physiographic Province. The tectonics of the Peninsular Ranges appear to be controlled by faults of the San Andreas system.

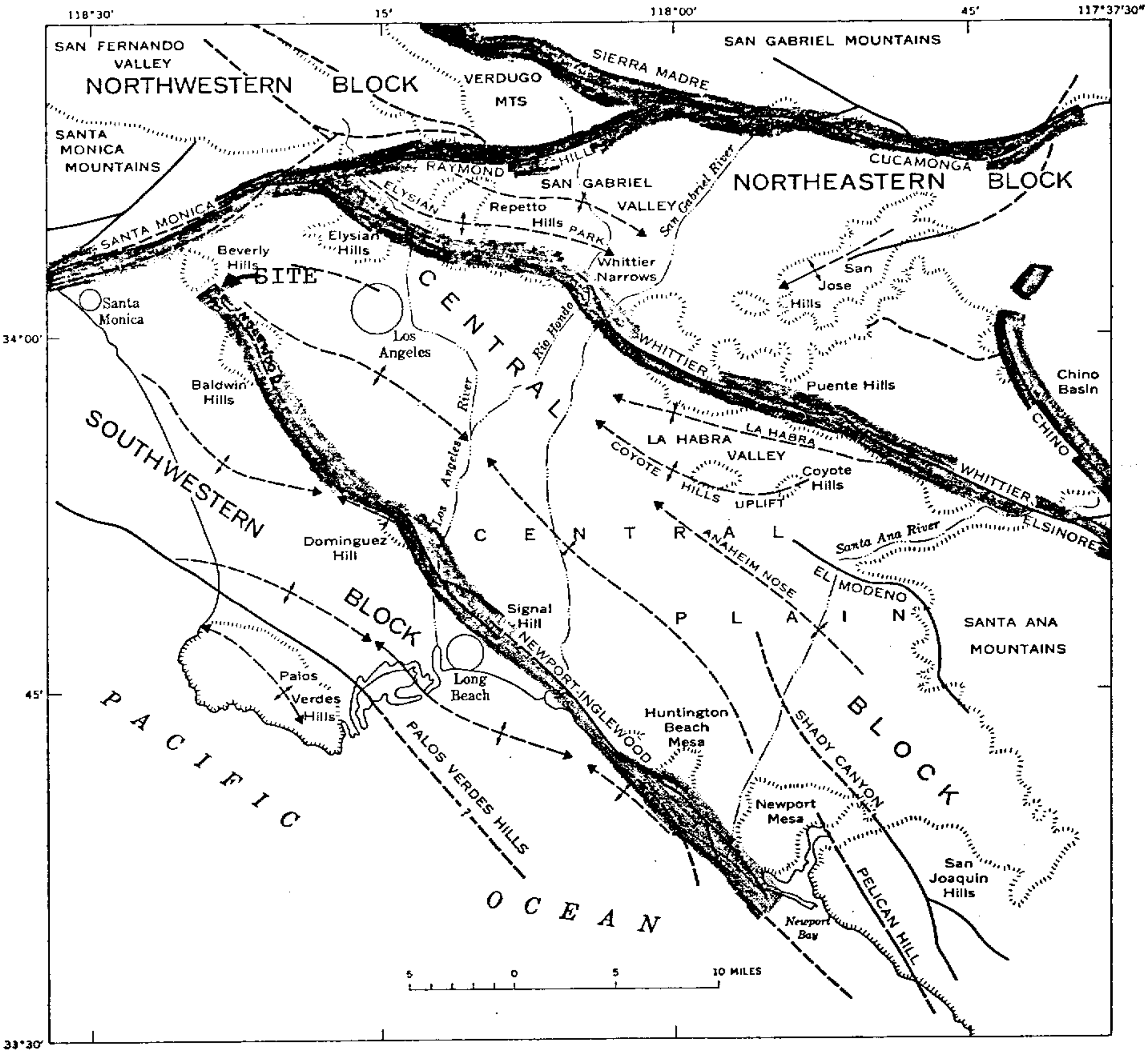
The Central Block of the Los Angeles Basin is apparently underlain by continental type granitoid rocks which are buried beneath Mesozoic, Tertiary, and Recent marine and non-marine sedimentary and volcanic units, which are over 30,000 feet thick at their thickest. A doubly-plunging synclinal trough is the dominant structural feature of the Central Block. This synclinal trough has apparently formed because of continued deformation since the Early Tertiary; this on-going deformation is believed to be an expression of the tectonic forces acting to cause the Pacific

figure 1
SITE LOCATION



Base Map after USGS Beverly Hills
15 Minute Quad, Revised 1972

figure 2
SEISMOTECTONIC FEATURES*



EXPLANATION

WHITTIER ?	←——+——	←——+——	
Fault or fault zone *Dashed where approximately located; queried where doubtful*	Anticline *Dashed where approximately located*	Syncline *Dashed where approximately located*	Boundary of structural block

* After Yerkes, others, 1965

Plate to slide to the northwest past the North American Plate. This deformation is also believed to be expressed by movement along faults bounding the structural blocks of the Los Angeles Basin, but principally by infrequent slip along the San Andreas Fault itself in this portion of California.

The Newport-Inglewood Structural Zone forms the boundary between the Central and Southwestern Blocks of the Los Angeles Basin. Basement rock beneath the Southwestern Block is believed to be Franciscan-type metamorphic rocks as exposed in the Palos Verdes Peninsula and further west on Catalina Island. The Southwestern Block is underlain by earth units similar to those of the Central Block, except that Mesozoic sediments appear to be absent. The earth units over basement rock exceed 20,000 feet thick at their thickest. The dominant structural features of the Southwestern Block are two doubly-plunging anticlines and the Palos Verdes Hills fault.

Local Geologic Conditions

Local geologic conditions in the vicinity of the site, including stratigraphic and structural features, are best understood by reference to Fig. 3, 4, and 5 of this report. Approximately 25 to 50 feet of recent alluvium, consisting of unconsolidated gray-black clayey sand is believed to lie beneath the site. Beneath the recent alluvium, an additional 100 feet of similar clayey sand of Upper Pleistocene age is believed to be present, as shown on Fig. 4 and 5. Approximately 75 feet of Lower Pleistocene, unconsolidated sand and gravel of the San Pedro Formation, known as the Siverado Aquifer, is thought to lie between the above units and consolidated sedimentary rocks (primarily shales and mudstones) of the Pico Formation.

For purposes of determining local earthquake ground response by means of constructing a response spectra (not required for the proposed development), it is estimated that the recent alluvium and Upper Pleistocene soil can be characterized as 'soft to medium', the Lower Pleistocene soils as a 'deep cohesionless soil', and the Pico Formation and subjacent units as 'rock' (Hays, 1980).

The site lies in an area known as the Ballona Gap. The recent alluvium at the site was deposited by Ballona Creek which now is located to the south of the site (refer to Fig. 1) and which has cut through the uplifted Cheviot and Baldwin Hills to form the 'Gap'. The closest and most significant major structural feature to the site is the Inglewood Fault.

The Inglewood Fault is not exposed at this location and evidence for its location could not be seen on the aerial photographs of the site (refer to Appendix A). The Inglewood Fault is known to impede the flow of groundwater across Ballona

figure 3
GEOLOGY

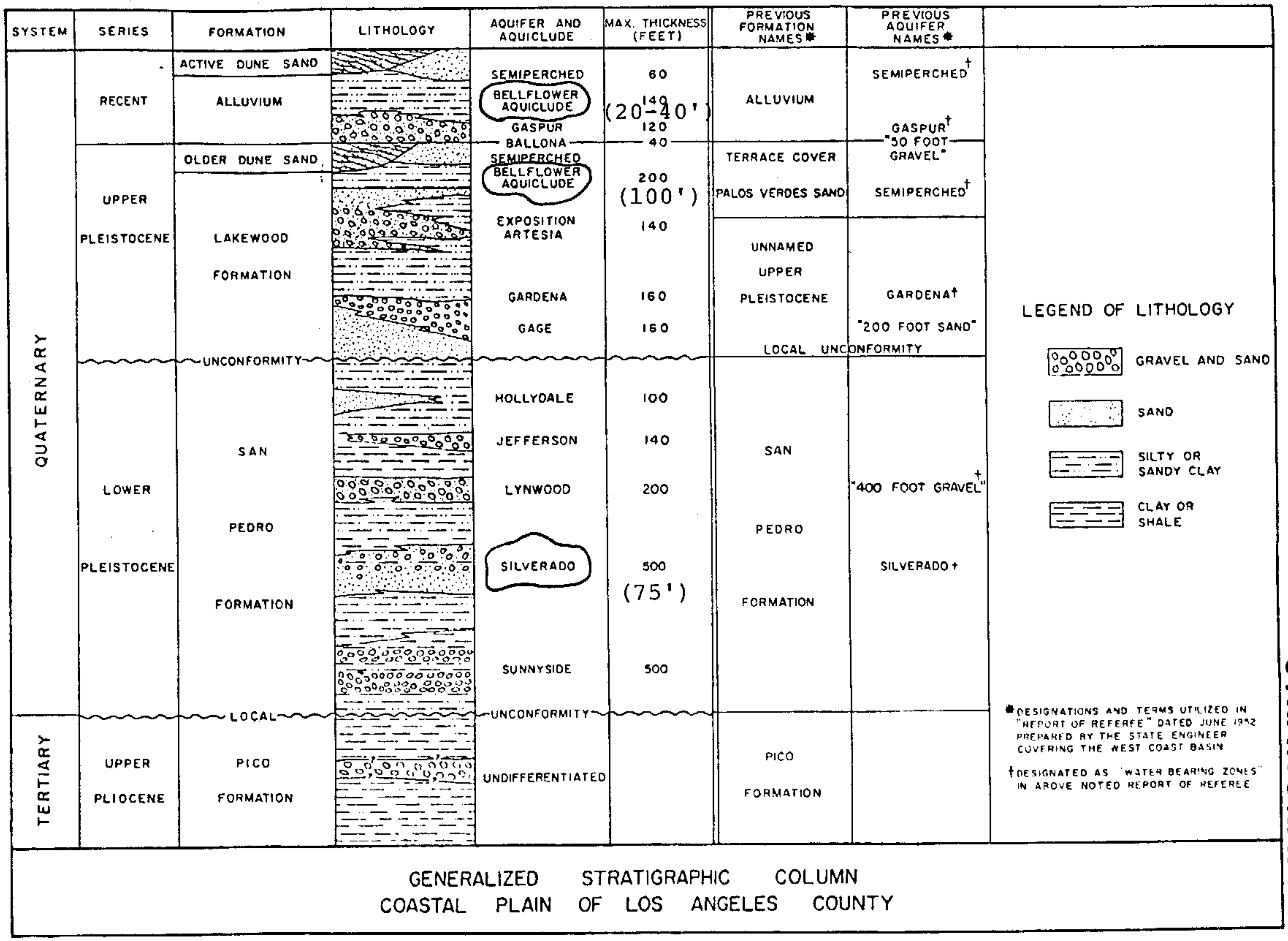
0 Feet 2000 4000 6000

Base Map after Hoots, 1931

Qal	Recent Alluvium
Qm	Upper Pleistocene Marine Deposits

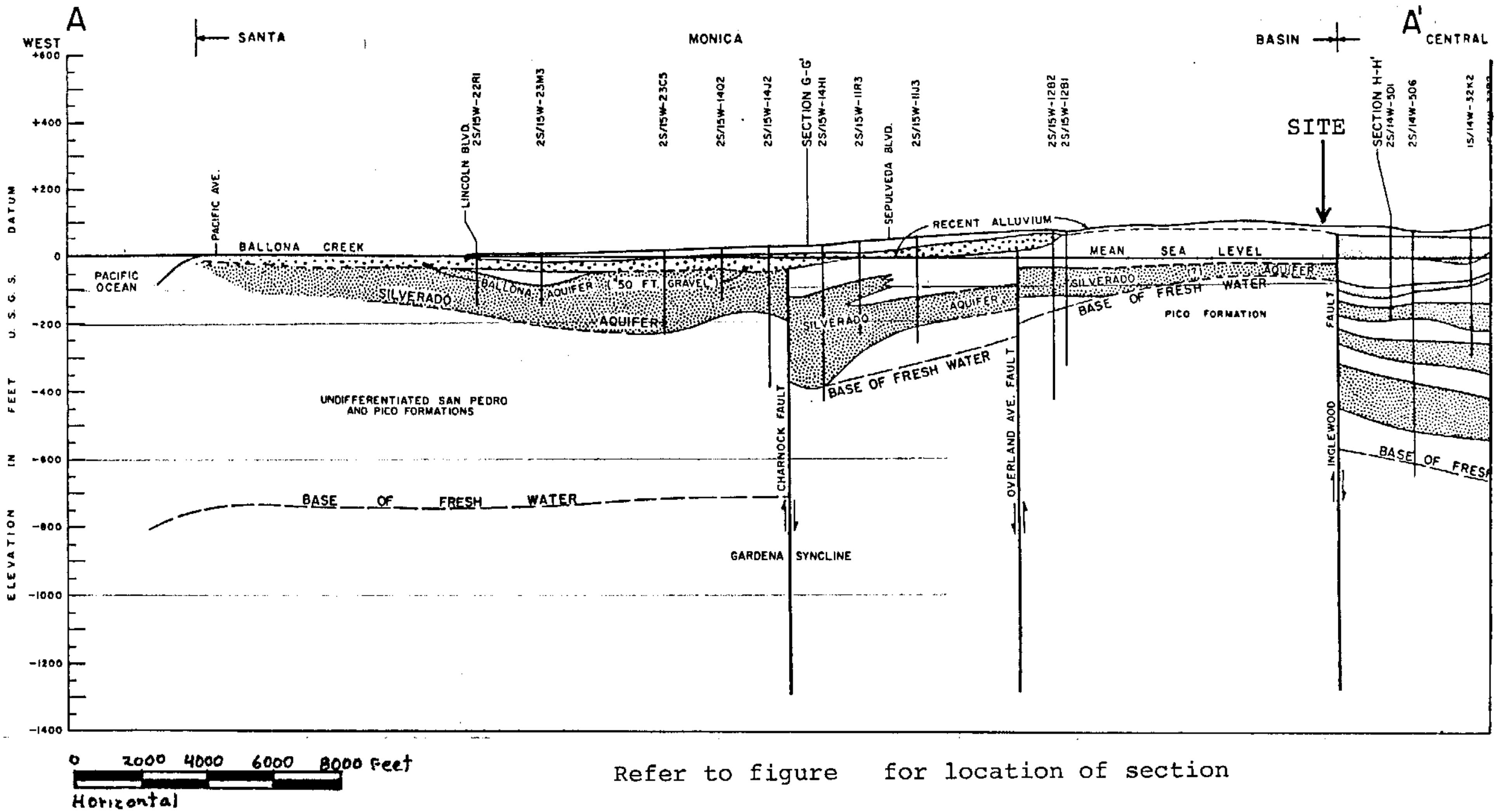
figure 4
STRATIGRAPHY

Quaternary units probably present are circled; est. thickness in parentheses



After Plate 5, Appendix A, DWR BULL. 104, 1961

figure 5
STRUCTURE



Refer to figure for location of section

After Plate 6A, Appendix A, DWR BULL. 104, 1961

Gap (DWR, 1961) through sediments as young as Upper Pleistocene (refer to Fig. 5). Few wells have been drilled in the vicinity of the site and so the location of the fault is not know with precision. It appears to lie approximately 400 feet to the northeast of the site. The Inglewood Fault is a named fault of the Newport-Inglewood Structural Zone, discussed in further detail below.

Faults and Seismicity

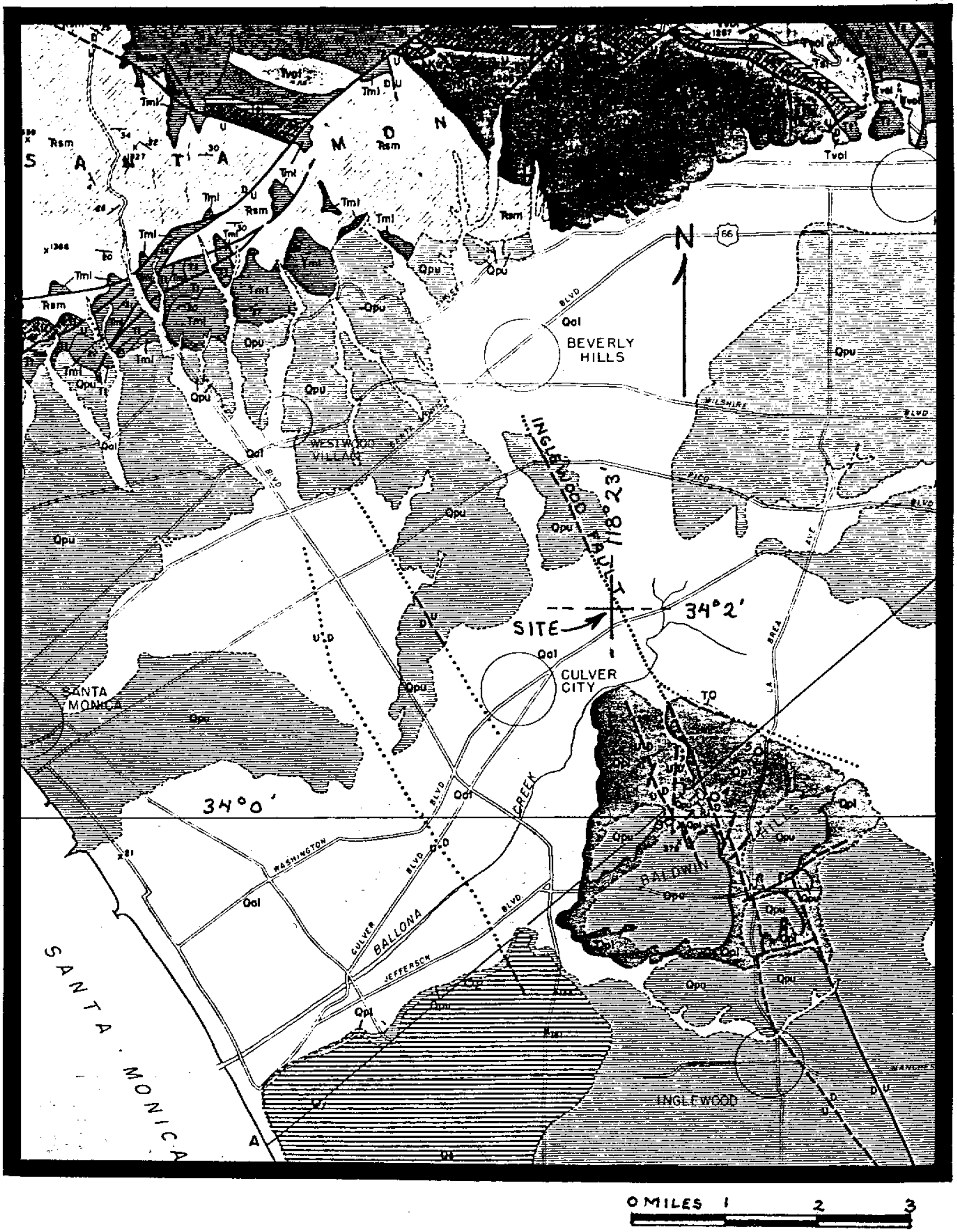
Newport-Inglewood

The subject property lies within the boundary of the Newport-Inglewood Structural Zone (N-I Zone). The N-I Zone is marked by a line of low hills and mesas across the Los Angeles Basin, from the area of the Cheviot Hills near the northern termination of the N-I Zone against the Santa Monica Mountains to the vicinity of Newport Mesa on the south where the fault passes out to sea. The N-I Zone consists of a complex series of faults, including en echelon faults and complexly folded and uplifted strata. The apparent contact of dissimilar basement rocks along the N-I Zone is an indication of the importance this feature has had in the geologic evolution of the Los Angeles Basin. It is thought that the basement rocks are still sliding intermittently past each other in a right-lateral sense along the N-I Zone and that this results in deformation of the overlying basin fill and infrequent destructive earthquakes. Confirmation of the Newport-Inglewood Structural Zone's association with earthquakes has come from the correlation of numerous earthquakes within the N-I Zone at depth. Although the N-I Zone is recognized as an active seismic zone, no historic earthquake associated with the N-I Zone has resulted in ground rupture along a fault. Individual faults identified with the N-I Zone are hence regarded as 'potentially active' (Jennings, 1975) and 'Late Quaternary' (Ziony, et al, 1974). Refer to Fig. 6 and 7 for the location of the site with respect to mapped local faults.

The largest historical earthquakes associated with the N-I Zone are the June 21, 1920 Inglewood Earthquake and the March 10, 1933 Long Beach Earthquake. The Inglewood quake had an estimated Ricther Magnitude of 4.9 and an epicenter approximately one mile west of the city of Inglewood. Although this quake occured prior to the development of modern seismic instrumentation, a shallow focus (close to ground surface) was indicated (Barrows, 1974). Approximately an 11,000 square mile area was affected by this quake, with damage most heavily concentrated close to the epicenter region in the city of Inglewood.

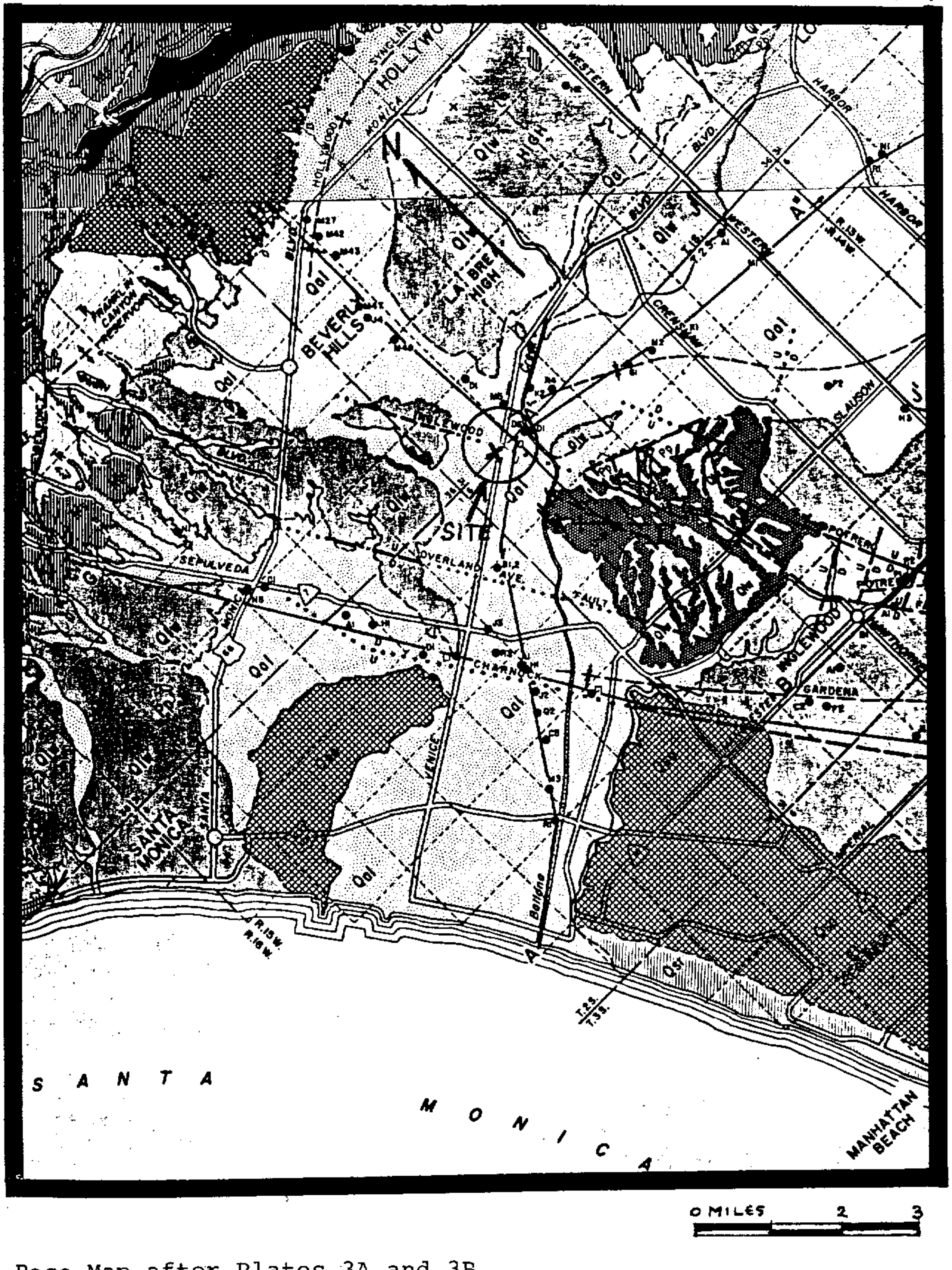
The Long Beach Earthquake of 1933 had a Richter Magnitude of 6.3 and an epicenter located approximately 3.5 miles offshore

figure 6
FAULTS (1)



Base Map after Schoellhamer,others;
CDMG BULL. 170,Chap. II, Cont. 5, Plate 1

figure 7
FAULTS(2)



0 MILES 2 3

Base Map after Plates 3A and 3B,

Appendix A, DWR BULL. 104, 1961

from Newport Beach, California near the southern end of the N-I Zone. The depth of focus was 6 miles. The quake was felt over 100,000 square miles, with a maximum Modified Mercalli Intensity of VII to VIII and locally IX (refer to Appendix B). Damage was extensive in this quake and 120 people were killed. The distribution of the damage appeared to correlate more with the type of construction and the location of loose, unconsolidated soils than with the location of the epicenter region. As stated previously, no surface faulting was associated with this quake, the largest within historic times to be associated with the Newport-Inglewood Zone.

Because of the infrequency of larger quakes and the complicated geologic/seismic setting, the recurrence interval for damaging quakes on the N-I Zone is not known with confidence. A larger scale representation of the recent seismic history in the vicinity of the site is shown on Fig. 8.

Other Fault Zones

Because of its activity and proximity to the site, the Newport-Inglewood Zone is of most importance to any additional development on the site. But the vicinity around the Los Angeles Basin contains other known active and potentially active faults capable of generating earthquakes that would be felt at the site. Listed below are the more important of these faults, together with some of their more important parameters, including the maximum probably earthquake expected to be generated within the next 100 year interval (See Table I, page 14).

GEOLOGIC CONCLUSIONS AND RECOMMENDATIONS

Conclusions

*Based on the results of this investigation, the possibility of surface faulting on the site from future earthquakes is considered to be very low. Development of the subject property as proposed is considered to be feasible and safe from a geologic and seismic standpoint, subject to recommendations listed below.

*No faults are known to cross the property, but the site is located within the seismically active Newport-Inglewood Fault, which is believed to be located approximately 400 feet to the northeast of the site.

*It is possible that the permanent groundwater table lies within 30 to 50 feet of the site. However, because of the apparent clayey nature of near-surface soils, the site is considered to have a very low potential to experience liquefac tion or

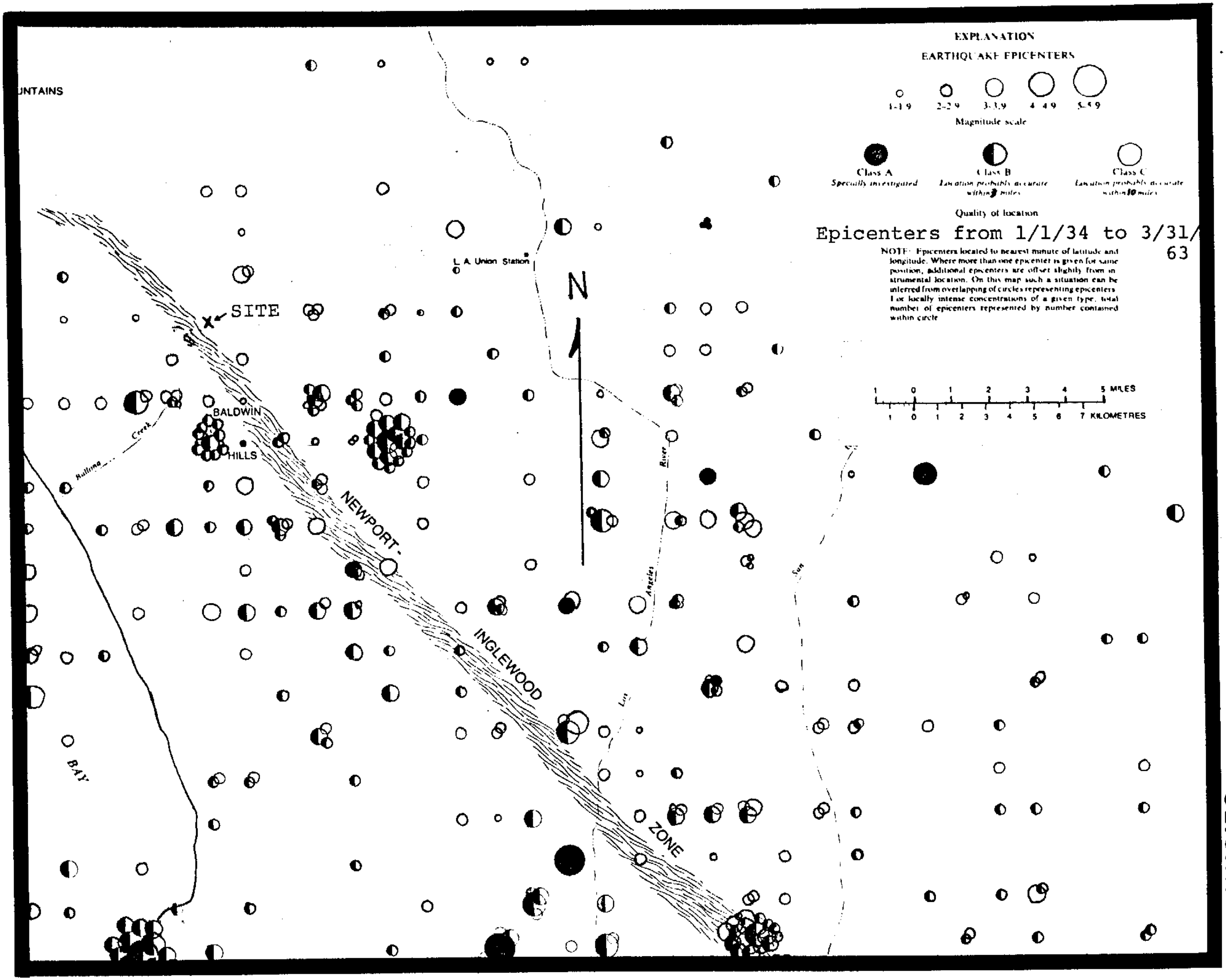


figure 8
SEISMICITY

Base Map after Castle and Yerkes, 1976

seismically induced settlement.

*The highest peak horizontal ground accelerations that could likely be experienced at the site are expected from earthquakes originating on the Newport-Inglewood Zone. Because of the proximity of the site to the N-I Zone, peak ground accelerations experienced will more be a function of local stress drops than the attenuation of shaking with distance. Short duration peaks greater than 1.0 g. are likely in the event of a maximum probably earthquake on the Newport-Inglewood Zone. Shaking is expected to be equivalent to a Modified Mercalli Intensity of IX to X.(See Appendix B)

*The maximum probable earthquake expected at the site from an event originating on the Newport-Inglewood Zone (100 year recurrance interval) is a Richter Magnitude of 6.5.

Recommendations

*Although statistical confidence is low concerning the recurrance intervals of damaging earthquakes on the N-I Zone, the proximity of the site to the Zone warrants a prudent approach to structural design. The proposed structure is a type resistant to earthquakes and a value of 0.35 g. is recommended for use in structural design.

*It is recommended that the structural engineer also consider provisions in Chapter 23 of the Uniforn Building Code, and the recommendations of the Structural Engineers' Association of California in associating which measures to implement to mitigate the potential for strong ground shaking at the site.

*Because a shallow foundation system is planned and near surface soils consist of recent alluvium not old enough to exhibit evidence of faulting, geologic inspections during grading are not recommended.

Thank you for this opportunity to be of service. If you have any additional questions, do not hesitate to call.

Respectfully submitted,

James E. Fisher
Engineering Geologist, EG 1007

DK/JEF/dt

Distribution: (4) Addressee

TABLE I

ADDITIONAL ACTIVE & POTENTIALLY ACTIVE FAULTS OF SIGNIFICANCE TO SITE

	Length	Distance to Site	Type of Fault	Richter Magnitude Maximum Probable Earthquake
San Andreas	440 km	64 km	Right Lateral Strike - Slip	8.0
San Jacinto	440 km	83 km	Right Lateral Strike - Slip	7.0
Sierra Madre	90 km	29 km	Thrust, Reverse	6.5
Malibu-Santa Monica-Raymond Hill	55 km	5 km	Thrust, Reverse	6.0
Channel Islands-Santa Barbara	72+ km	106 km	Reverse	6.5
San Fernando	21 km	29 km	Thrust	6.5
Whittier-Elsinore	230 km	32 km	Right Lateral Strike - Slip	6.5
Palos Verdes Hills	80+ km	18 km	Reverse	6.5

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APPENDIX A

AERIAL PHOTOGRAPHS

Date	Flight	Photo No.	Scale	Agency
1928	300	K50-51	1"=1500'	Fairchild (Whittier College)
1937	4776	11, 12	1"=1200'	(Whittier College)
1952	17979	18-27, 28	1"=1500'	(Whittier College)

Modified Mercalli Scale of Earthquake Intensities

THE MERCALLI INTENSITY SCALE
(As modified by Charles F. Richter in 1956 and rearranged)

If most of these effects are observed	*then the intensity is:*
Earthquake shaking not felt. But people may observe marginal effects of large distance earthquakes without identifying these effects as earthquake-caused. Among them: trees, structures, liquids, bodies of water sway slowly, or doors swing slowly.	*I*
Effect on people: Shaking felt by those at rest, especially if they are indoors and by those on upper floors.	*II*
Effect on people: Felt by most people indoors. Some can estimate duration of shaking. But many may not recognize shaking of building as caused by an earthquake; the shaking is like that caused by the passing of light trucks.	*III*
Other effects: Hanging objects swing. *Structural effects:* Windows or doors rattle. Wooden walls and frames creak.	*IV*
Effect on people: Felt by everyone indoors. Many estimate duration of shaking. But they still may not recognize it as caused by an earthquake. The shaking is like that caused by the passing of heavy trucks, though sometimes, instead, people may feel the sensation of a jolt, as if a heavy ball had struck the walls. *Other effects:* Hanging objects swing. Standing autos rock. Crockery clashes, dishes rattle or glasses clink. *Structural effects:* Doors close, open or swing. Windows rattle.	*V*
Effect on people: Felt by everyone indoors and by most people outdoors. Many now estimate not only the duration of shaking but also its direction and have not doubt as to its cause. Sleepers wakened. *Other effects:* Hanging objects swing. Shutters or pictures move. Pendulum clocks stop, start or change rate. Standing autos rock. Crockery clashes, dishes rattle or glasses clink. Liquids disturbed, some spilled. Small unstable objects displaced or upset. *Structural effects:* Weak plaster and Masonry D* crack. Windows break. Doors close, open or swing.	*VI*
Effect on people: Felt by everyone. Many are frightened and run outdoors. People walk unsteadily. *Other effects:* Small church or school bells ring. Pictures thrown off walls, knicknacks and books off shelves. Dishes or glasses broken. Furniture moved or overturned. Trees, bushes shaken visibly, or heard to rustle. *Structural effects:* Masonry D* damaged; some cracks in Masonry C*. Weak chimneys break at roof line. Plaster, loose bricks, stones, tiles, cornices, unbraced parapets and architectural ornaments fall. Concrete irrigation ditches damaged.	*VII*
Effect on people: Difficult to stand. Shaking noticed by auto drivers. *Other effects:* Waves on ponds, water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Furniture broken. Hanging objects quiver. *Structural effects:* Masonry D* heavily damaged; Masonry C* damaged, partially collapses in some cases; some damage to Masonry B*; none to Masonry A*. Stucco and some masonry walls fall. Chimneys, factory stacks, monuments, towers, elevated tanks twist or fall. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off.	*VIII*
Effect on people: General fright. People thrown to ground. *Other effects:* Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes. Steering of autos affected. Branches broken from trees. *Structural effects:* Masonry D* destroyed; Masonry C* heavily damaged, sometimes with complete collapse; Masonry B* is seriously damaged. General damage to foundations. Frame structures, if not bolted, shifted off foundations. Frames racked. Reservoirs seriously damaged. Underground pipes broken.	*IX*
Effect on people: General panic. *Other effects:* Conspicuous cracks in ground. In areas of soft ground, sand is ejected through holes and piles up into a small crater, and in muddy areas, water fountains are formed. *Structural effects:* Most masonry and frame structures destroyed along with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes and embankments. Railroads bent slightly.	*X*
Effect on people: General panic. *Other effects:* Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. *Structural effects:* General destruction of buildings. Underground pipelines completely out of service. Railroads bent greatly.	*XI*
Effect on people: General panic. *Other effects:* Same as for Intensity X. *Structural effects:* Damage nearly total, the ultimate catastrophe. *Other effects:* Large rock massed displaced. Lines of sight and level distorted. Objects thrown into air.	*XII*

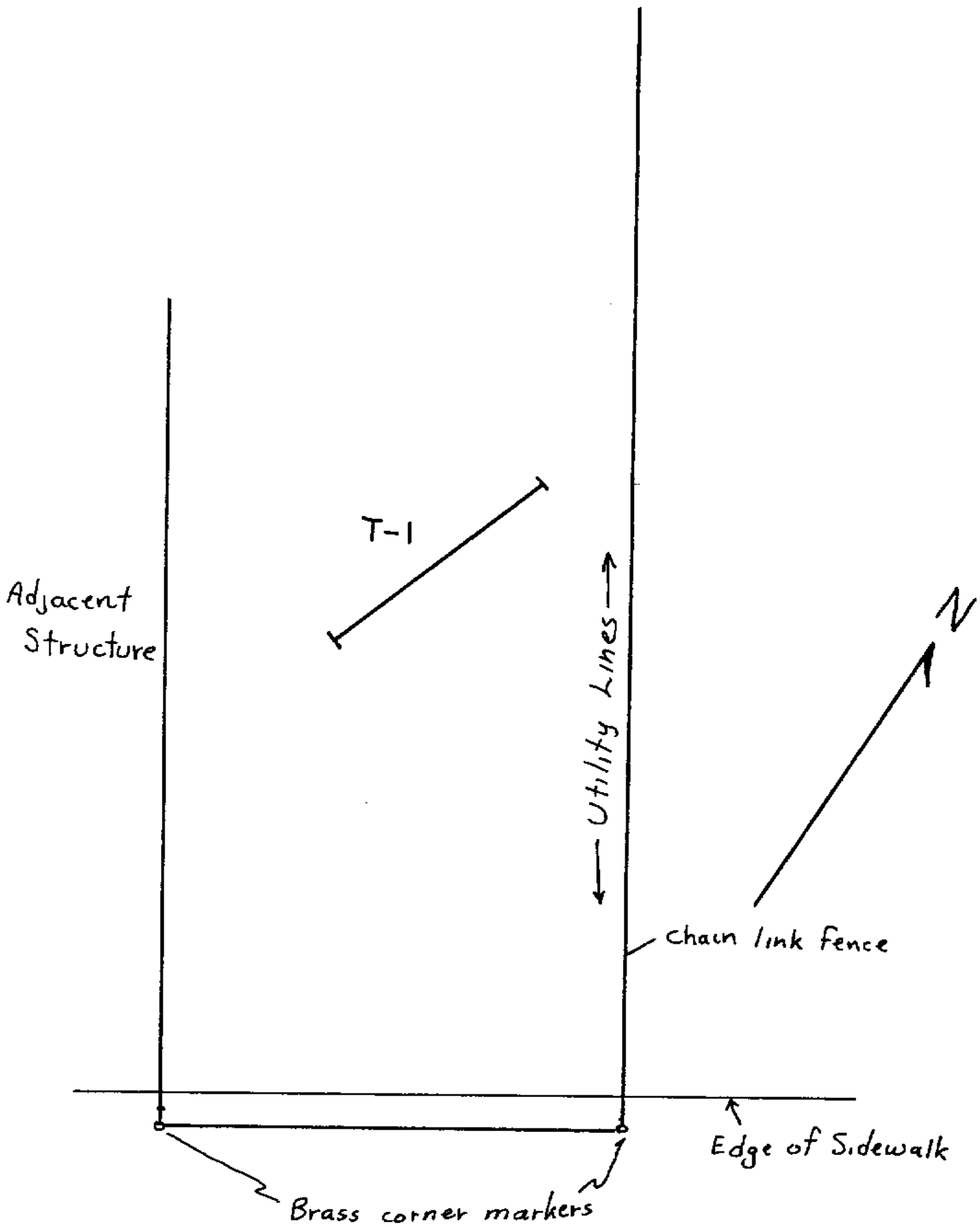
**Masonry A:* Good workmanship and mortar, reinforced designed to resist lateral forces.
Masonry B: Good workmanship and mortar, reinforced.
Masonry C: Good workmanship and mortar, unreinforced.
Masonry D: Poor workmanship and mortar and weak materials like adobe.

From: California Division of Mines and Geology Bulletin 198

APPENDIX C

TRENCH LOG AND LOCATION DIAGRAM

Raisin / Venice Blvd.
Trench Location



Scale: 1" = 10'

VENICE BLVD.

GEOLOGIC TRENCH LOG NO.

Date 2/14/81 Project No. 81001 - 2 Project Name Raisin /Venice Blvd.

Trench No. 1 Equipment Backhoe - 24" Bucket Company

Geologist FISHER Terrain Unit Qal Land Use Residential

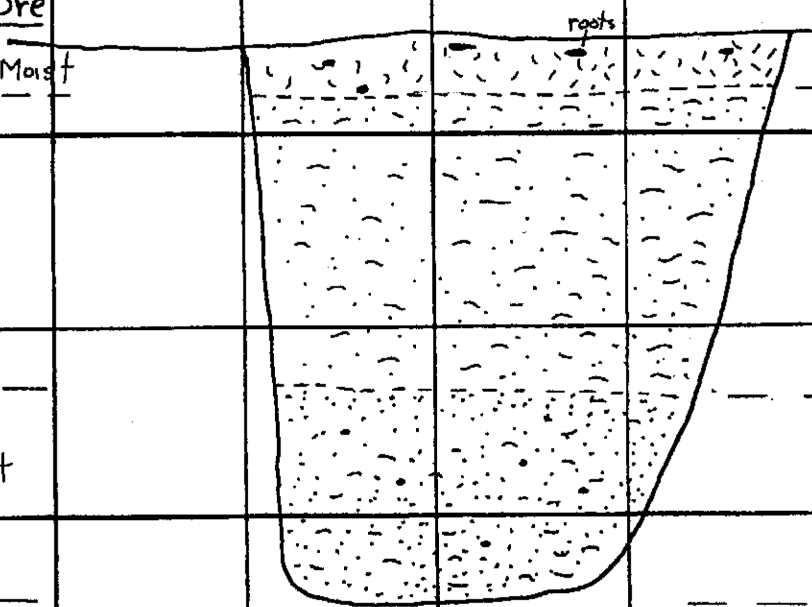
Vegetation Grass, shrubs, trees % Ground Cover

Rippability Easy

Unit	Description	Geologic Attitudes
Qal (to 14.5')	0-18" Dk. Bn., v. moist silt. Roots. Concrete chunks on surface. Loose to med. dense. 18"-9' Med. yellow-bn, v. moist clayey sand, occ. subrnd. slate frags. Stiff. Porous. Moisture decreases below 5'. No structure visible. 9'-14.5' Mottled bn-gy, v. moist clayey sand. Increased sand %, occ. subrnd pebs to 1/4". Firm. No structure - massive	1–12: N/A

Scale: 1" = 5' Trench Wall NW Trench Trend N18E ←

Color	Moisture	Trench	Density	Porosity	USC
Dark Brown (to 18")	Very Moist (to 18")		Loose to Medium Dense (to 18")	Very Porous	ML
Medium Yellow-Brown (18" to 9')	Moist to Very Moist (18" to 9')		Stiff (18" to 9')		CL - SC
Mottled - Medium brown & Gray (9' to T.D.)	Very Moist (9' to T.D.)		firm (9' to T.D.)		
T.D. 14.5'			T.D. 14.5'		



JAMES FISHER ENGINEERING GEOLOGY

APPENDIX G

FAULT STUDY FOR SITE 3: 5800-5810 RODEO RD., LOS ANGELES, CA

STATE OF CALIFORNIA — THE RESOURCES AGENCY
EDMUND G. BROWN JR., Governor

DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
SAN FRANCISCO DISTRICT OFFICE
FERRY BUILDING
SAN FRANCISCO, CA 94111
(Phone 415-557-0633)

AP-1168

June 30, 1980

J.W. Cobarrubias
City of Los Angeles
Dept. of Building & Safety
402, City Hall
Los Angeles, CA 90012

Dear Mr. Cobarrubias:

We are placing on open file the following report, reviewed and approved by the City of Los Angeles in compliance with the Alquist-Priolo Special Studies Zones Act:

> Geologic/seismic study report for Cameo Center, 5800-5810 Rodeo Road, Los Angeles, CA; by Baseline Consultants; April 22, 1980.

Sincerely yours,

EWH

EARL W. HART
Office of the State Geologist
CEG 935

EWH/fnl

cc: A-P file ✓

CITY OF LOS ANGELES

CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
402 CITY HALL
LOS ANGELES, CALIF. 90012

JACK M. FRATT
GENERAL MANAGER

TOM BRADLEY
MAYOR

June 16, 1980

Mr. Earl Hart
Division of Mines and Geology
Ferry Building
San Francisco, CA 94111

SUBJECT: Geologic-Seismic Study for 5800-5810 RODEO ROAD

Transmitted herewith is a copy of the Geologic-Seismic Report No. 519-040, dated April 22, 1980, prepared by Baseline Consultants.

The report has been prepared pursuant to Chapter 7.5, Division 2 of the Public Resources Code; i.e., Alquist-Priolo Act.

The City of Los Angeles has reviewed the report and finds it to be acceptable and in general conformance with the minimum requirements of the Special Studies Zones Act. A copy of the Department letter in review of the report, has been enclosed for your files.

APPROVED:

J. W. COBARRUBIAS
Staff Geologist,
Building and Safety

80 JUN 26 AM 9:06
SAN FRANCISCO D.O.

JOT:mcg
485-3435

GL 16:97

Attachments: Geologic-Seismic Report
Department Review Letter

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
402 CITY HALL
LOS ANGELES, CALIF. 90012

JACK M. FRATT
GENERAL MANAGER

June 9, 1980

L.R.F. Company
3601 Kalsman Dr
Los Angeles, CA 90016

TRACT: PM 740
LOT: PARCEL B
LOCATION: 5800-5810 RODEO ROAD

Geologic-Seismic Report No. 519-040, dated April 22, 1980, prepared by Baseline Consultants.

The above geologic-seismic report concerning the assessed potential seismic conditions at the project location has been reviewed by the Grading Division of the Department of Building and Safety. The property is located within a Fault Area identified by the State of California Special Studies Zones (established under Chapter 7.5, Division 2 of the Public Resources Code, i.e., Alquist-Priolo Act.)

According to the report, the site is located approximately 600 feet easterly of a branch of the Newport-Inglewood fault. The report concludes that the site is free from active fault rupture. This conclusion is predicated on 200 feet of countinuous backhoe trench excavated in area selected by the project geologist Richard P. Cousinean, CEG 321.

On the basis of the findings presented in the report and the subsurface exploration conducted on the site, the report is acceptable with the following conditions:

1. No footings for habitable structures shall be placed in areas easterly of a line drawn in a direction N 38 degrees W through the easterly end of the test trench and westerly of a line drawn in the same direction through the westerly end of the test trench.

JOHN C. ROBB
Chief of Grading Division

Ivan O. Tkatch

Ivan O. Tkatch
Engineering Geologist

IOT:mcg
485-3435

GL 9:92

cc: Baseline
Academy Design Consultants
LA District Office
Seismic File

Baseline Consultants Inc.
SOILS ENGINEERING-ENGINEERING GEOLOGY
15307 MINNESOTA AVE.
PARAMOUNT, CALIF. 90723
(213) 633-8152

01168

April 22, 1980

Project No. 519-040

L.R.F. Company
3601 Kalsman Drive
Los Angeles, California 90016

Subject Reference: Cameo Center
S.W.C. Rodeo Road & La Cienega Boulevard
Los Angeles, California

Gentlemen:

This is to report the results of a geology and seismicity study of the above referenced property. According to the State of California Special Studies Zone Maps, the subject property is within an area suspected to be underlain by traces of an active earthquake fault. In order to determine whether a trace of a fault is present in the near surface soils, an exploratory trench was excavated, 200 feet long, diagonally across the site, and the earth materials encountered were carefully examined and logged. Orientation of the trench was made in order to intercept any suspected trace at nearly right angles to the trench. Plate 2 depicts the location of the trench relative to the property and nearby streets, and a graphic log of the earth materials encountered in the trenches.

GEOGRAPHIC AND GEOLOGIC SETTING

The property is situated some 1500 feet north of the foothills of the Baldwin Hills, at an average elevation of 90 feet above sea level.

Existing commercial development bounds the property on all sides. Plate 1, Vicinity Map, depicts the location of the site relative to surrounding streets, landmarks, and general topography.

As disclosed by the exploratory trenches, the site is immediately underlain by relatively loose fill soils followed by layers of recent alluvium. These deposits are reported to overlie a thick Tertiary sedimentary section and schistose basement rocks at depth.

FAULTS

Major earthquake faults known to exist in southern California are shown on Plate 3. Table One lists faults considered "active", that is, faults which break all formations, including alluvium, have an observable topographic expression, and have undergone movement accompanied by earthquakes during historic time, or have been so designated as active by the State of California, Division of Mines and Geology. Those named faults, which have experienced movement, but do not break all formations and have not had earthquake activity during historic time, but are considered potentially active, are listed on Table Two.

No faults, active or potentially active were observed in the exploratory trench or are known to exist within the subject property. No faults, offset strata, or indications of post ground movement were apparent in the natural earth materials as exposed in the trenches.

A branch of the Newport-Inglewood fault has been inferred to pass some 600 feet west of the site, as shown on Plate 1. No traces of this fault or any other were encountered in the near surface deposits of the subject property.

SEISMICITY

Tables One and Two and Plate 3, attached, have been developed from various sources to show the distance to known active and potentially active faults in southern California considered pertinent to the site. The sources of information include prominent textbooks on geology and seismicity, state and county publications, as well as data disseminated by both public and private agencies involved with earthquake measuring and monitoring. While not all sources agree on all items due to the "state of the art" at the present time, the tables and plates included in this report are believed to present a fair and reasonable evaluation of the available data.

Plotted or estimated epicenters of recorded larger magnitude earthquakes, which have taken place in southern California since 1769, are presented on Plate 3. The epicenter of the March 10, 1933, Long Beach Earthquake was located approximately 40 miles southeast of the site. No surface fault displacement was recognized from this earthquake. The February 9, 1971, San Fernando Earthquake, magnitude 6.4, was centered about 25 miles northerly of the site.

Groundwater

Reference to the soils report prepared by Western Laboratories indicates that groundwater seepage was encountered at 12½ feet below site surface.

SECONDARY SEISMIC HAZARDS

Liquefaction: Ground failure due to liquefaction is considered highly unlikely since the near surface soils appear relatively fine grained and not to be subject to liquefaction even if saturated.

Earthquake Induced Landslides: No existing landslides which could be reactivated by earthquake forces are present on the site. No imminent slides were observed on the subject property or on immediately adjacent properties.

Tsunamis: The site is located in excess of 5 miles from the ocean, at an elevation of 90 feet above sea level, which precludes it from the effects of a seismic sea wave.

Seiches: No inland bodies of water, which would be subject to seiching, are located in the vicinity of the site.

CONCLUSIONS

Because no faults are presently known to exist beneath the site, the probability of ground surface rupture is considered remote. It is concluded that the proposed site development is feasible from the engineering geology point of view. Structural design characteristics shall be in accordance with Earthquake Standards of the Uniform Building Code.

Respectfully submitted,

BASELINE CONSULTANTS

Richard P. Cousineau

Richard P. Cousineau, CEG 321

RPC/jm
cc:

TABLE ONE

Active Faults in Southern California

Fault	Date of Most Recent Activity	Intensity	Closest Point Distance From Site (miles)
Big Pine	1852	(?)	65
Elsinore	1910	6.0 (estimated)	50
Garlock	(?)	(?)	60
Newport/Inglewood	1933	6.3	0.1
Norwalk	1929	4.7 (estimated)	18
San Andreas	1857	8.0 (estimated)	38
San Jacinto	1935	6.8	57
San Fernando	1971	6.5	18
Raymond Hill	(?)	(?)	14
Whittier	(?)	(?)	20
White Wolf	1952	7.7	81

TABLE TWO

Faults Considered Potentially Active in Southern California

Fault	Closest Point Distance From Site (miles)
Malibu Coast	15
Northridge Hills	14
Palos Verdes	11
Santa Monica	3
Sierra Madre	14

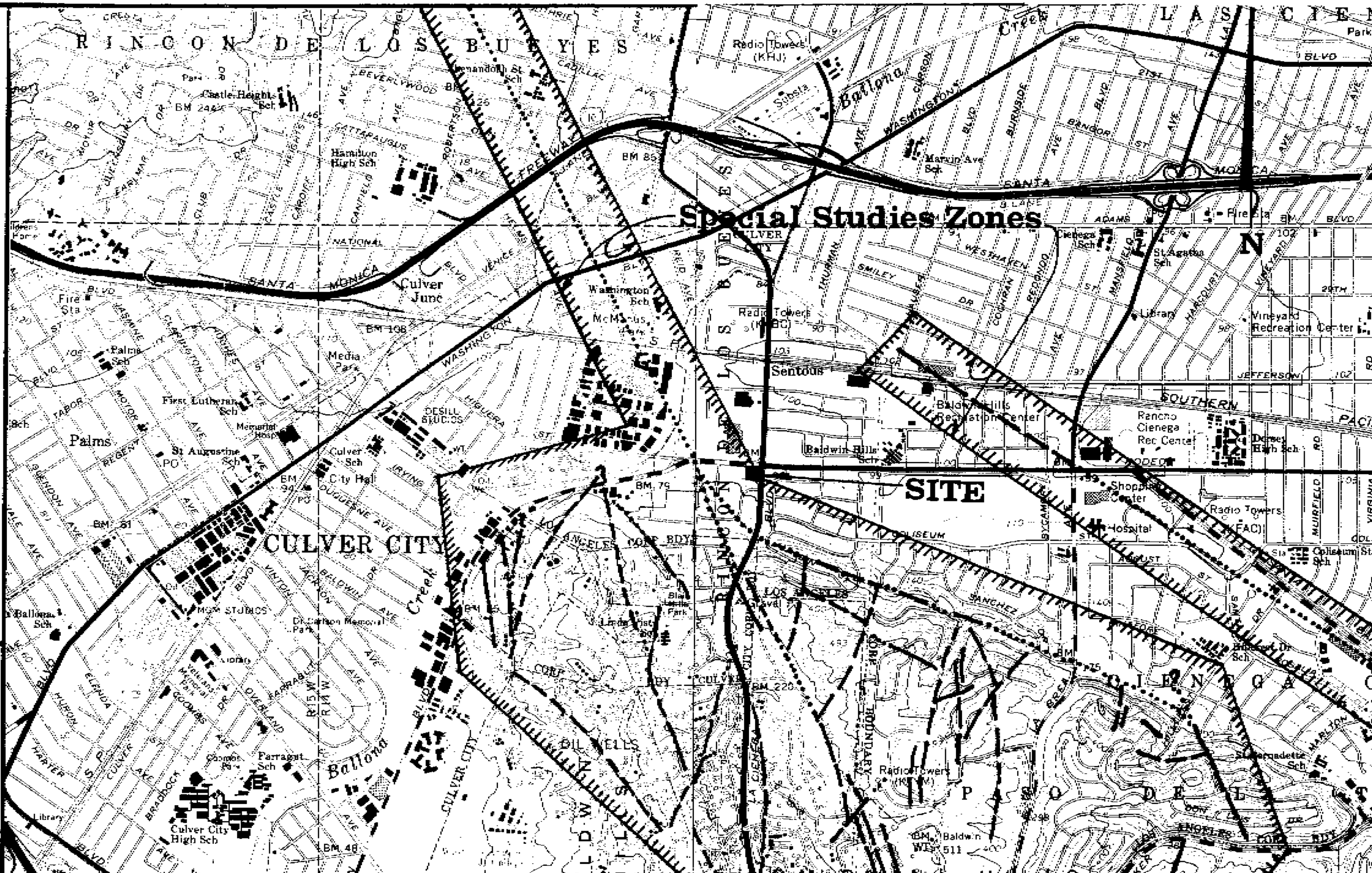
BASELINE CONSULTANTS

L.R.F. Company Property
S.W.C. Rodeo Road and La Cienega Boulevard
Los Angeles, CA.

Proj. No 519-040

Plate 1

VICINITY MAP



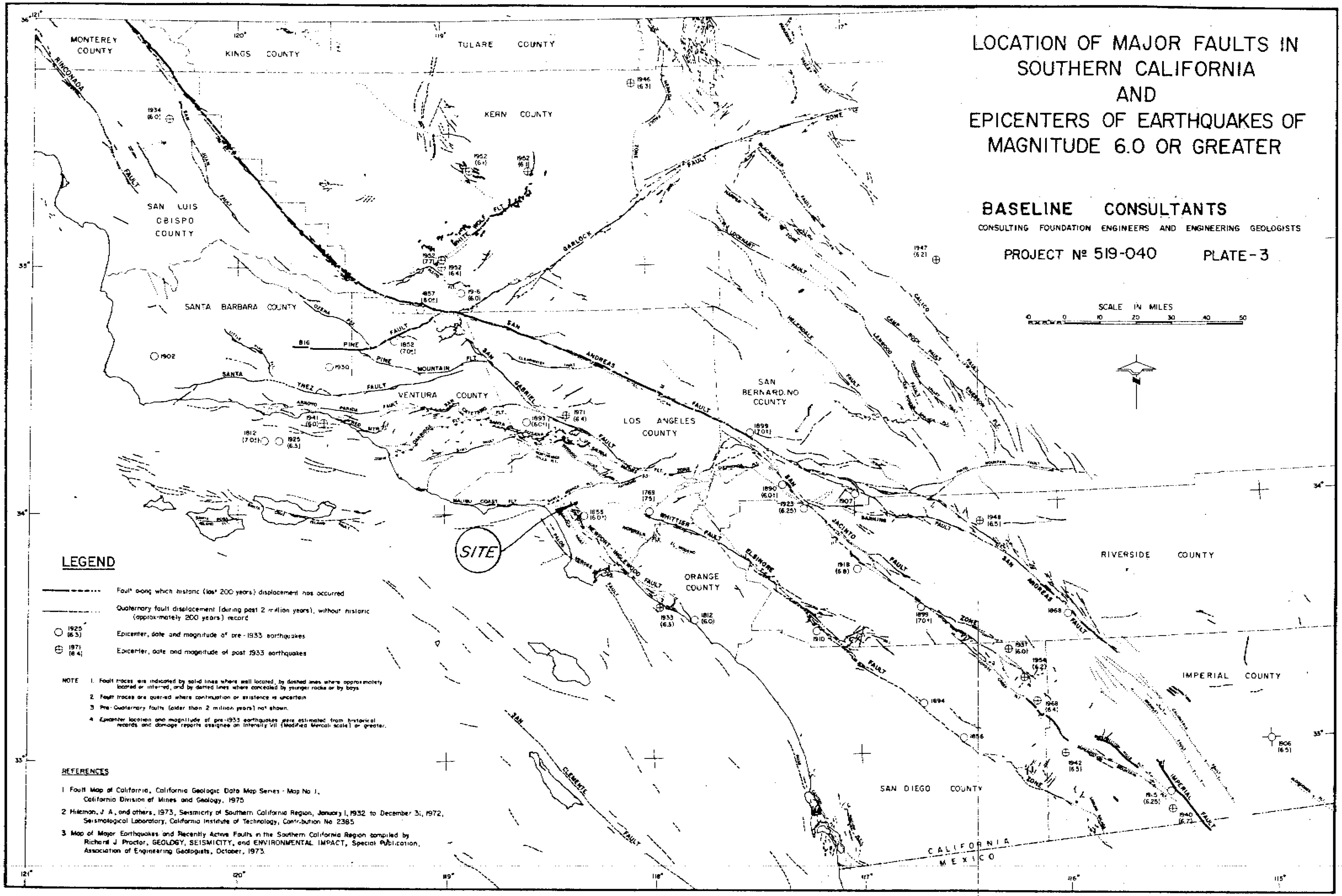
OVERSIZED DOCUMENT HAS BEEN PULLED AND SCANNED WITH THE MAP FILE.

LOCATION OF MAJOR FAULTS IN SOUTHERN CALIFORNIA AND EPICENTERS OF EARTHQUAKES OF MAGNITUDE 6.0 OR GREATER

BASELINE CONSULTANTS

CONSULTING FOUNDATION ENGINEERS AND ENGINEERING GEOLOGISTS

PROJECT Nº 519-040 PLATE-3



LEGEND

Fault along which historic (last 200 years) displacement has occurred

Quaternary fault displacement (during past 2 million years), without historic (approximately 200 years) record

1925 (6.3) Epicenter, date and magnitude of pre-1933 earthquakes

1971 (6.4) Epicenter, date and magnitude of post 1933 earthquakes

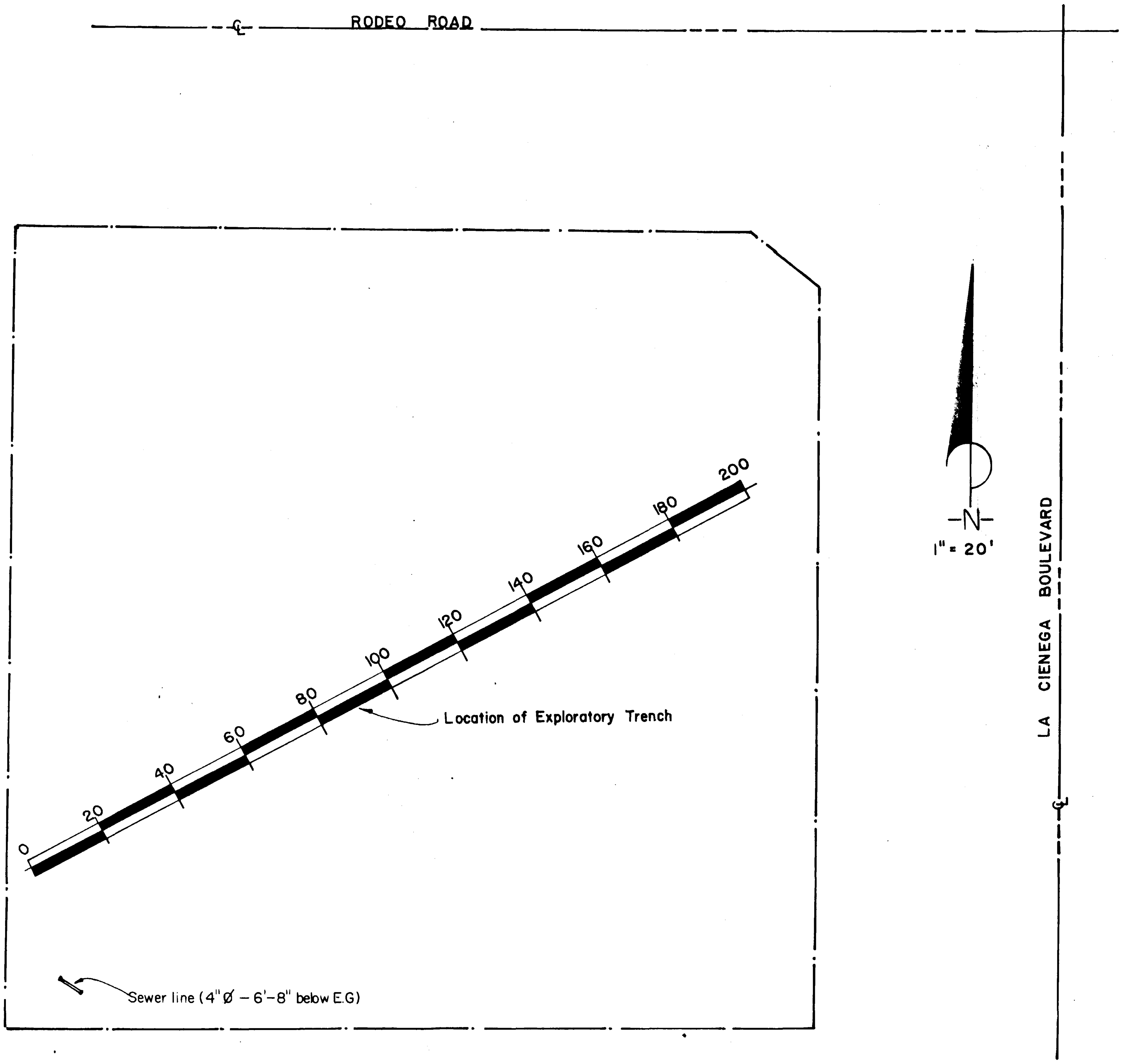
NOTE
1. Fault traces are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by bays.
2. Fault traces are queried where continuation or existence is uncertain.
3. Pre-Quaternary faults (older than 2 million years) not shown.
4. Epicenter location and magnitude of pre-1933 earthquakes were estimated from historical records and damage reports assigned an Intensity VII (Modified Mercalli scale) or greater.

REFERENCES

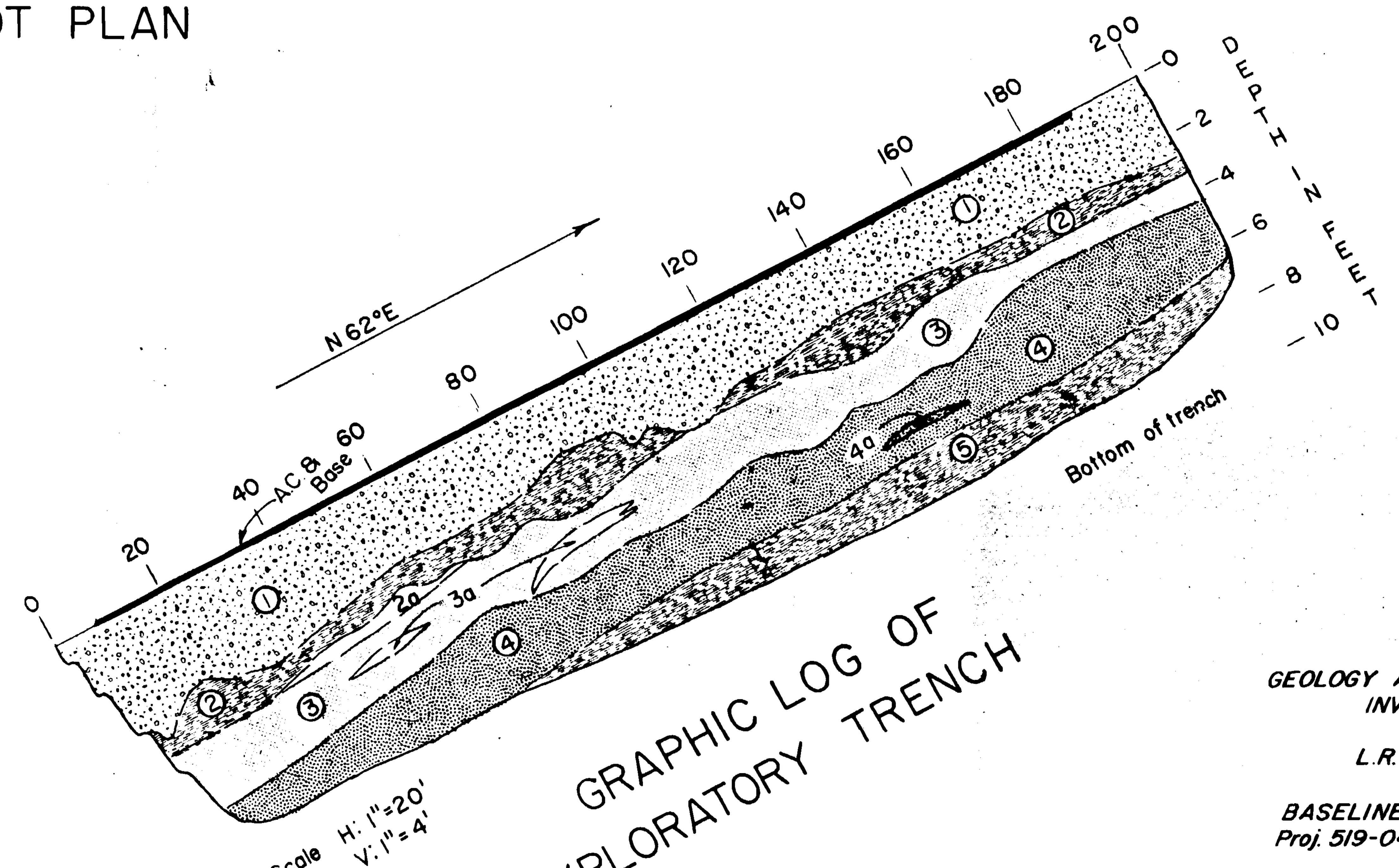
1 Fault Map of California, California Geologic Data Map Series - Map No 1, California Division of Mines and Geology, 1975

2 Hileman, J A, and others, 1973, Seismicity of Southern California Region, January 1, 1932 to December 31, 1972, Seismological Laboratory, California Institute of Technology, Contribution No 2385

3 Map of Major Earthquakes and Recently Active Faults in the Southern California Region compiled by Richard J Proctor, GEOLOGY, SEISMICITY, and ENVIRONMENTAL IMPACT, Special Publication, Association of Engineering Geologists, October, 1973.



PLOT PLAN



GRAPHIC LOG OF EXPLORATORY TRENCH

LEGEND

1 Fill: Brown to dark brown, silty fine to medium sand, with minor debris.
2 Gray, fine to med. sandy, clay.
   a. Red brown, fine sandy, clay.
3 Yellow tan, silty, very fine sand.
   a. Pockets of dark gray, silty clay.
4 Tan, clayey, fine sand.
   a. Pocket-seam of tan, fine to med. sand.
5 Gray to yellow gray, very fine sandy clay.

GEOLOGY AND SEISMICITY INVESTIGATION
FOR
L.R.F. COMPANY
BY
BASELINE CONSULTANTS
Proj. 519-040 Plate-2

APPENDIX H

FAULT STUDY FOR SITE 4: 8761 VENICE BLVD., LOS ANGELES, CA

STATE OF CALIFORNIA — THE RESOURCES AGENCY
EDMUND G. BROWN JR., Governor
DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
SAN FRANCISCO DISTRICT OFFICE
FERRY BUILDING
SAN FRANCISCO, CA 94111
Phone 415-557 0633)
(415) 557-0413

AP-1458

June 17, 1982

Joseph W. Cobarrubias, Geologist
City of Los Angeles
Department of Building & Safety
4th Floor City Hall
Los Angeles, CA 90012

Dear Mr. Cobarrubias:

We are placing on open file the following reports, reviewed and approved by the City of Los Angeles in compliance with the Alquist-Priolo Special Studies Zones Act:

✓ Report on trenching investigation, 8761 Venice Boulevard, Los Angeles, California; by Lockwood-Singh and Associates, May 10, 1982.

Engineering geologic and soils report for proposed three-lot land division on Denivelle Road north of Rhodesia Avenue, Sunland area of Los Angeles, California; by California Geo/Systems, Inc.; March 25, 1981 with supplement of May 5, 1982.

Sincerely yours,

Theodore C. Smith

Theodore C. Smith/CEG1029 for
EARL W. HART
Office of the State Geologist
CEG 935

EWH:lg

cc: A-P file (2)

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
4TH FLOOR CITY HALL
LOS ANGELES, CA 90012

JACK M. FRATT
GENERAL MANAGER

May 27, 1982

Mr. Earl Hart
Division of Mines and Geology
Ferry Building
San FRancisco, CA 94111

SUBJECT: Geologic-Seismic Study for 8761 Venice Boulevard, Los Angeles, CA 90034; Tract 5500; Lot 46

Transmitted herewith is a copy of the Geologic-Seismic Report No. 2513-22.

The report has been prepared pursuant to Chapter 7.5, Division 2 of the Public Resources Code, i.e., Alquist-Priolo Act.

The City of Los Angeles has reviewed the report and finds it to be acceptable and in general conformance with the minimum requirements of the Special Studies Zones Act. A copy of the Department letter in review of the report, has been enclosed for your files.

JOHN D. COLVIN
Chief of Grading Division

Ronald Gutier

RONALD GUTIER
Engineering Geologist

RG:pet
485-2160

Attachments: Geologic-Seismic Report
Department Review Letter

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
4TH FLOOR CITY HALL
LOS ANGELES, CA 90012

JACK M. FRATT
GENERAL MANAGER

May 27, 1982

Michael Raisin
1435 S. La Cienega Blvd.
Los Angeles, CA 90035

TRACT: 5500
LOT: 46
LOCATION: 8761 VENICE BOULEVARD

Geologic-Seismic Report No. 2513-22, dated May 10, 1982, prepared by Lockwood-Singh & Associates.

The above geologic-seismic report concerning the assessed potential seismic conditions at the project location has been reviewed by the Grading Division of the Department of Building and Safety. The property is located within a Fault Area identified by the State of California Special Studies Zones (established under Chapter 7.5, Division 2 of the Public Resources Code, i.e., Alquist-Priolo Act.)

According to the report, no evidence of active fault rupture was found on the site. The report concludes that the site is free from active fault rupture or unstable ground. This conclusion is predicated on the basis of research of records, field investigation, and the logging of 2 trenches on the site. Sketches of trench logs in themselves do not provide sufficient evidence for lack of a fault trace. However, in combination with reference material sufficient supporting evidence for lack of faulting has been provided.

On the basis of the findings presented in the report and the subsurface exploration conducted on the site, the report is acceptable with the following condition:

1. Prior to initiation of construction of any structures, a foundation report shall be submitted to the Department.

JOHN D. COLVIN
Chief of Grading Division

Ronald Gutier

RONALD GUTIER
Engineering Geologist

RG:pet
485-2160

cc: Lockwood-Singh & Assoc.
Division of Mines & Geology
LA District Office

Lockwood-Singh & Associates
A CORPORATION

Consulting Foundation Engineers and Geologists
1944 Cotner Avenue • Los Angeles, California 90025
Telephone: (213) 870-7335; (213) 477-8208

R. BRUCE LOCKWOOD, R.C.G.
AWTAR SINGH, C.E.

Project Ref. 2513-22

May 10, 1982

Michael Raisin
1435 South La Cienega Boulevard, Suite 109
Los Angeles, California 90035

SUBJECT: REPORT OF TRENCHING INVESTIGATION
8761 VENICE BOULEVARD
LOS ANGELES, CALIFORNIA

Dear Mr. Raisin:

In accordance with your request we have performed a subsurface investigation by trenching on the above referenced site located within an Alquist-Priolo Special Studies Zone. The purpose of the investigation was to determine the presence or absence of geologically recent fault activity in the subject area.

It is the professional opinion of the undersigned that this report presents fairly the information requested by you.

Respectfully submitted,

LOCKWOOD-SINGH & ASSOCIATES

Russell G. Harter

Russell G. Harter
CEG 1059

RGH/PS:jmf

INTRODUCTION

This report presents the findings and conclusions of a trenching investigation for possible fault traces at 8761 Venice Boulevard, Los Angeles, California. The Special Studies Zone in this area is demarcated to include the Inglewood Fault, which is the northernmost break in the Newport/Inglewood Fault Zone, a series of en echelon fractures that extend from the area of Newport Beach to the vicinity of Beverly Hills. The Newport/Inglewood Fault Zone is considered to be seismically active and to have a high potential for seismic events. The destructive 1933 Long Beach earthquake resulted from seismic activity near the southern terminus of this fault zone, some 45 miles southeast of the subject site.

No surface breaks have been mapped within or nearby the site boundaries. This investigation was undertaken to determine whether near-surface soils on the site have been cut by faulting.

A portion of the State of California Special Studies Zone Beverly Hills Quadrangle, scale 1"=2000', dated 1976, has been included herein as Plate A-1. The map shows the relation of the site to the inferred Newport/Inglewood Fault Trace, which is located approximately 500 feet northeast of the site.

Exploratory trench locations are plotted on a "Topo-Boundary Survey" of the site, scale: 1"=4', prepared by J.R. Luger Civil Engineering Services, dated May 20, 1981, and included herein as Plate A-2.

FIELD INVESTIGATION

Field investigation included the excavation of two backhoe trenches to depths of 5 to 5-1/2 feet below the ground surface at the locations shown on Plate A-2. During logging, the sides of the trenches were brushed and carefully examined for any evidence of faulting that might have been present. Logs of the trenches are included as Plates B-1 and B-2. The trenches were backfilled following examination and logging.

SITE CONDITIONS

Location and Topography

The subject site is bounded on the south by Venice Boulevard, on the north by an unpaved alley, and on the east and west by existing commercial buildings. The parcel is relatively flat with no discernable topographic features on or nearby the site. The site was previously occupied by a structure that was demolished and removed prior to this investigation.

Ground Water and Drainage

No evidence of near surface ground water was encountered in the trenches or at the surface. Incident rainfall drains by sheet flow to the adjoining street and alley.

GEOLOGIC CONDITIONS

Alluvium

The site is underlain by alluvium of Quaternary geologic age to the depths explored. The alluvium consists of sandy clay containing varying amounts of angular to subrounded rock fragments that range in size from pebbles to small cobbles. The alluvium is brown, firm to stiff in consistency, and was moist to very moist at the time of this investigation. The upper 1-1/2 feet to 2-1/2 feet of alluvium appears disturbed and reworked, from demolition of the old building that occupied the site.

Location of Inglewood Fault

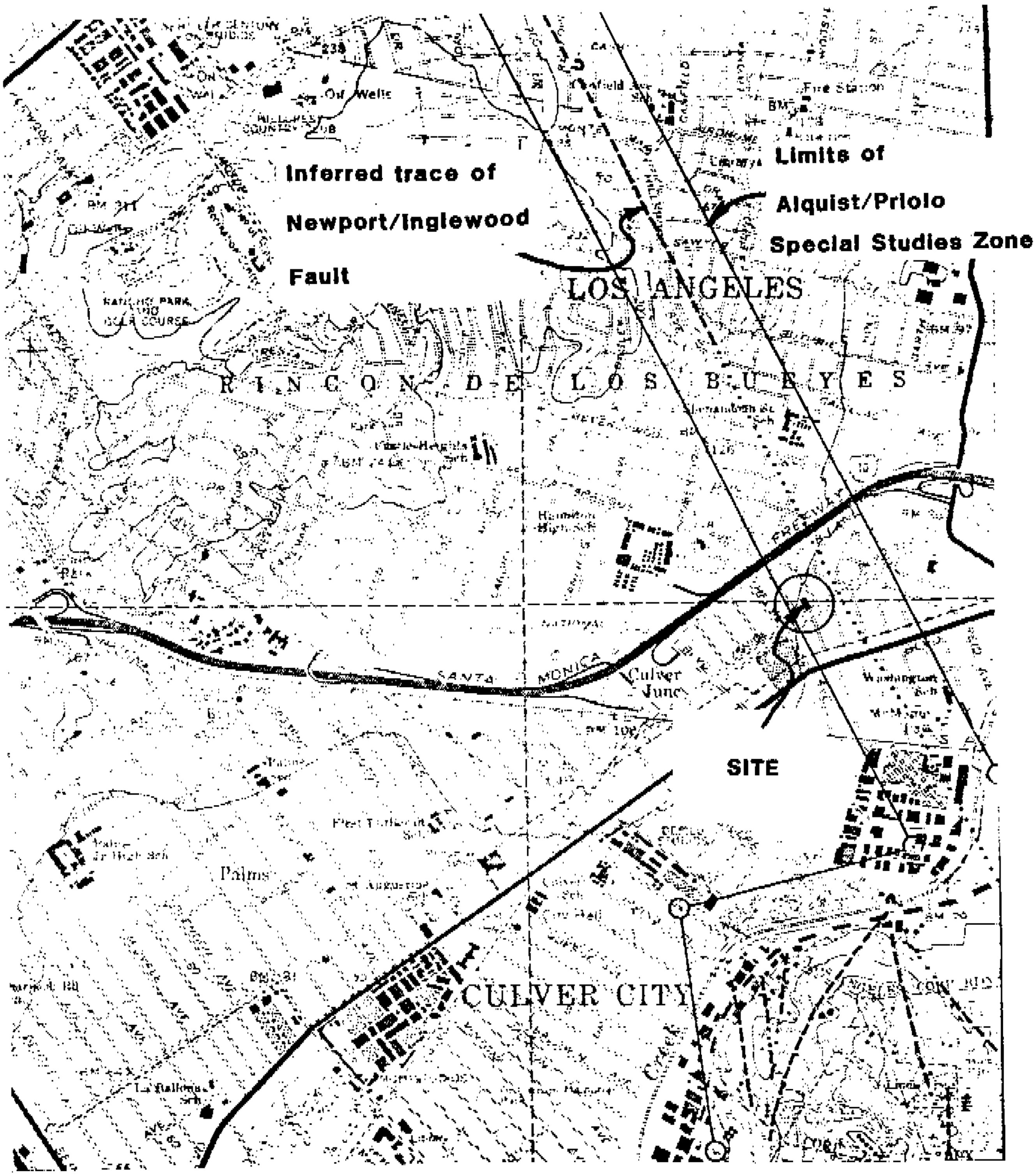
The Inglewood Fault in this general area is known from its tendency to act as a ground water barrier within alluvial sediments. In addition, this alignment fits well with a fault scarp mapped by Poland, et.al. (1959, J.F. Poland; Garrett, A.A.; Sinnott, A. "Geology, Hydrology, and Chemical Character of Ground Waters in the Torrance-Santa Monica Area, California", United States

Geological Survey Water Supply Paper 1461) in Beverly Hills, and the trace of the Inglewood Fault in the Baldwin Hills. The fault location on the Special Studies Zone Map is identical with that shown on the map by Poland, et. al. Based on the available data, it is our professional opinion that the Inglewood Fault is located 300 feet or more northeast of the subject site.

CONCLUSIONS

No faults, joints, or other continuous fractures were found in the soils exposed in the exploratory trenches. It is concluded that no discernable fault traces cross the subject property. The potential for ground rupture or lurching from a tectonically caused seismic event appears to be low.

Based on information from our exploratory trenches, and upon the published literature, it is the professional opinion of the undersigned that the subject site is geologically suitable for the intended structure for human occupancy, although not necessarily suitable for a critical structure such as a high-rise building or hospital without further study.



Portion of Beverly Hills Quadrangle,

Special Studies Zone map, 1976

scale:
1"=2000'

SITE LOCATION MAP

Proj.: RAISIN - Venice Blvd.

No.: 2513-22

Date: May 1982 Plate A1

LOCKWOOD-SINGH & Assoc.

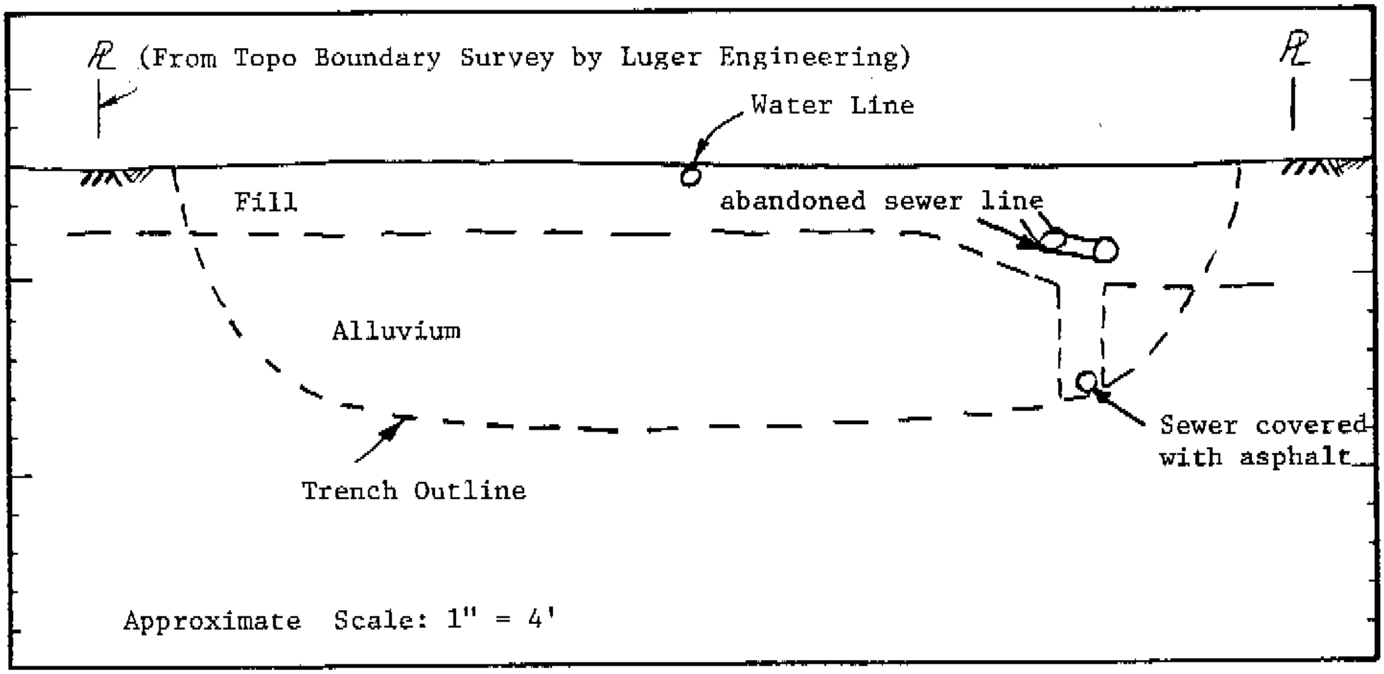
LOG OF TEST PIT

0-1 1/2' FILL
Clay, sandy, with scattered rock fragments. Disturbed by demolition of previous structure.

1 1/2-5 1/2' ALLUVIUM
Clay, sandy, with scattered rock fragments 1/8" to 2" in diameter, brown, moist to very moist, firm to stiff. Massive, no bedding. No evidence of faulting observed.

GEOLOGIC SKETCH

N58°E



EQUIPMENT BACKHOE	TEST PIT No. 1
SURFACE ELEVATION 10' (local datum)	RAISIN - Venice Boulevard
DATE LOGGED 28Apr82 by P S	PROJECT No. 2513-22
LOCKWOOD - SINGH & ASSOC.	PLATE B-1

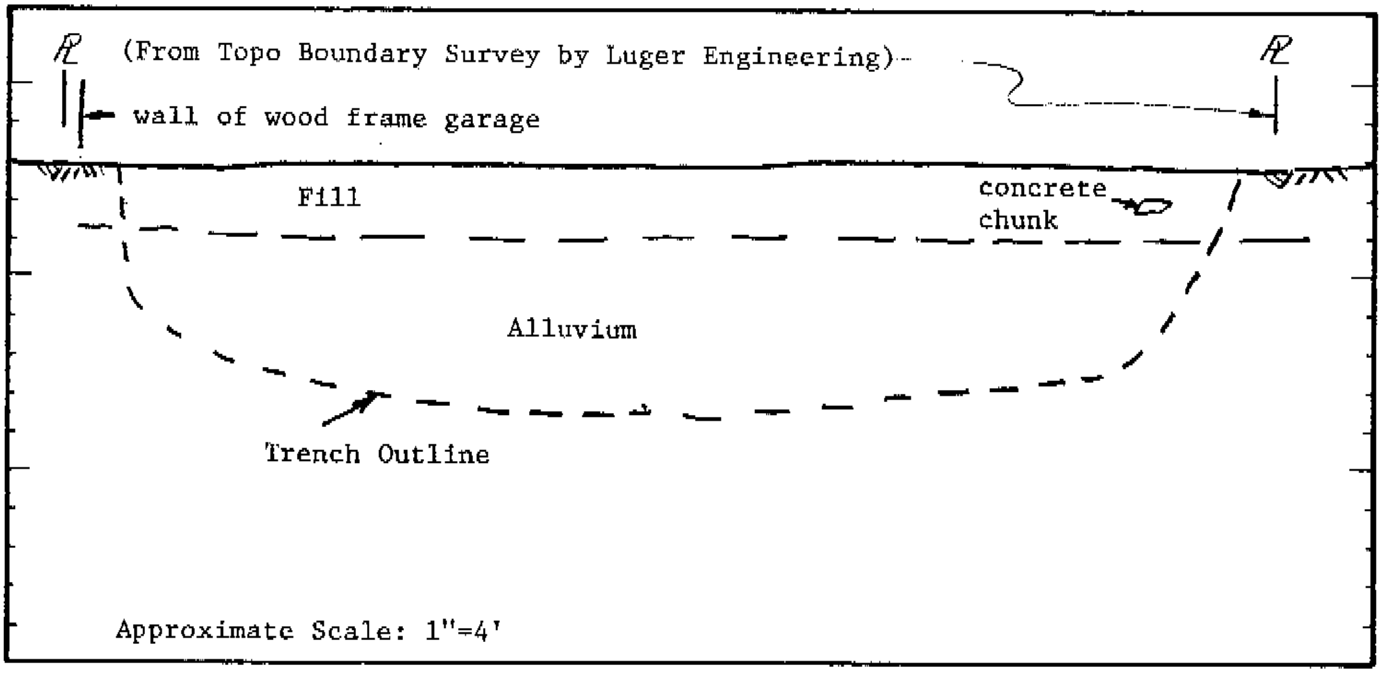
LOG OF TEST PIT

0-1 1/2' FILL
Clay, sandy, with scattered rock fragments. Disturbed by demolition of previous structure.

1 1/2-5' ALLUVIUM
Clay, sandy, with scattered rock fragments 1/8" to 2" in diameter, brown, moist to very moist, firm to stiff. Massive, no bedding. No evidence of faulting observed.

GEOLOGIC SKETCH

N57°E



EQUIPMENT BACKHOE	TEST PIT No. 2
SURFACE ELEVATION 11' (local datum)	RAISIN - Venice Boulevard
DATE LOGGED 28Apr82 by PS	PROJECT No. 2513-22
LOCKWOOD - SINGH & ASSOC.	PLATE B-2

APPENDIX I

FAULT STUDY FOR SITE 5: 6001 JEFFERSON BLVD., LOS ANGELES, CA

STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
BAY AREA REGIONAL OFFICE
380 CIVIC DRIVE, SUITE 100
PLEASANT HILL, CA 94523-1997
PHONE: (415) 646-5920
ATSS 599-5920

October 6, 1989

Mr. Theodore D. Nickerson
Staff Geologist
Department of Building and Safety
411 City Hall
Los Angeles, CA 90012-4869

Dear Mr. Nickerson:

We are placing on open file the following report, reviewed and approved by the City of Los Angeles in compliance with the Alquist-Priolo Special Studies Zones Act:

> Fault hazard investigation, proposed Tentative Tract 45607, storage facility, 6001 Jefferson Blvd. (portion of Lot 14 of Rancho Rincon de Los Bueyes), Los Angeles and Culver City; by Mountain Geology, Inc.; October 1, 1987.

Sincerely,

Earl W. Hart

EARL W. HART, CEG 935
Senior Geologist &
Program Manager

EWH:hrk

cc: A-P file

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
411, CITY HALL
LOS ANGELES, CA 90012-4869

September 26, 1989

Mr. Earl Hart
Calif. Division of Mines and Geology
380 Civic Drive, Suite 100
Pleasant Hill, CA 94523-1997

SUBJECT: Geologic-Seismic Study No. JH 1968g, dated October 1, 1989, prepared by Mountain Geology for a portion of Lot 14 of the Subdivision of the Rancho Rincon De Los Bueyes, located at 6001 Jefferson Blvd.

The above geologic-seismic report concerning the assessed potential seismic conditions at the project location has been reviewed by the Grading Division of the Department of Building and Safety. The property is located within a Fault Area identified by the State of California Special Studies Zones (established under Chapter 7.5, Division 2 of the Public Resources Code, i.e., Alquist-Priolo Act).

According to the report, no evidence of active fault rupture was found on the site. The report concludes that the site is free from active fault rupture or unstable ground. This conclusion is predicated on subsurface data obtained from approximately 390 feet of trench located at approximately a right angle to the inferred trace of the fault.

On the basis of the findings presented in the report and the subsurface exploration conducted on the site, the report is acceptable with the following conditions:

See attached letter.

JAMES D. KAPRIELIAN
Chief of Grading Division

Theodore D. Nickerson

THEODORE D. NICKERSON
Staff Geologist,
Building and Safety
(213) 485-2160

TDN:gas
TGRMG092689A/2GR

Attachments: Geologic-Seismic
Department Review Letter

CITY OF LOS ANGELES

CALIFORNIA

TOM BRADLEY
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
411, CITY HALL
LOS ANGELES, CA 90012-4869

September 26, 1989

Log # 13607
C.D. 6

Sy Goldberg
16633 Ventura Blvd., #1440
Encino, CA 91463

TRACT: Subdivision Southern Portion of Rancho De Los Bueyes
LOT: Portion of 14
LOCATION: 6001 JEFFERSON BLVD.

Geological Report No. JH 1968g, dated, October 1, 1987, prepared by Mountain Geology, Incorporated and Soil Engineering Report No. 26316, dated September 11, 1986, prepared by Chang and Associates, Incorporated.

The above reports concerning seismic trenching of the site have been reviewed by the Grading Division of the Department of Building and Safety. According to the reports, The site will be developed as a storage facility.

The reports are acceptable, provided the following conditions are complied with during site development:

1. No habitable structure shall be constructed east of the seismic trench unless additional trenching is first excavated and an appropriate report submitted to and approved by the Department.

2. Prior to any construction a soil-foundation report giving recommendations for grading and footings shall be submitted to and approved by the Department.

3. Prior to condominium use of the property, a tract map must be filed with and approved by the Department of City Planning.

4. All graded slopes shall be no steeper than 2:1.

5. All recommendations of the report which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

6. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

7. All man-made fill shall be compacted to a minimum of 90 percent relative compaction as required by Code Section 91.7006(d).

8. All existing uncertified fill and/or creep prone soils shall be removed and recompacted under the geotechnical supervision of the soils engineer or wasted from the site.

9. Both the geologist and the soils engineer shall inspect and approve all fill and subdrain placement areas prior to placing fill. Both consultants shall include in their final reports a certification of the adequacy of the foundation material to support the fill without undue settlement and/or consolidation.

10. The design of the subdrainage system required to prevent possible hydrostatic pressure behind retaining walls shall be approved by the Soil Engineer prior to issuance of the building permit. Installation of the subdrainage system shall be inspected and approved by the Soil Engineer.

11. Existing fill shall not be used for support of footings, floor slabs or proposed fill.

JAMES D. KAPRIELIAN
Chief of Grading Division

THEODORE D. NICKERSON
Engineering Geologist

DAVID T. HSU
Geotechnical Engineer

TDN/DTH:gas
TGRSGL092689C/2GR
(213) 485-2160

cc: Mtn. Geo.
Chang
Cook
LA District Office

Mountain Geology, Inc.

CONSULTING ENGINEERING GEOLOGISTS

FAULT HAZARD INVESTIGATION

PROPOSED TENTATIVE TRACT 45607,
PROPOSED STORAGE FACILITY

JEFFERSON BLVD. AND HIGUERA STREET
LOS ANGELES AND CULVER CITY, CALIFORNIA

PREPARED FOR CONDO STORE OF AMERICA

OCTOBER 1, 1987 JH1968g

5154 BARNARD ST. • SIMI VALLEY, CA 93063 • (805) 522-5174

Mountain Geology, Inc.

CONSULTING ENGINEERING GEOLOGISTS

October 1, 1987

Condo Store of America
180 Newport Center,
Suite 265
Newport Beach, CA 92660

SUBJECT: FAULT HAZARD INVESTIGATION, PROPOSED TENTATIVE TRACT 45607, PROPOSED STORAGE FACILITY, SOUTHWEST CORNER OF JEFFERSON BLVD. AND HIGUERA STREET, LOS ANGELES AND CULVER CITY, CALIFORNIA

REFERENCE: SOILS INVESTIGATION REPORT DATED SEPTEMBER 11, 1986 PREPARED BY CHANG AND ASSOCIATES

Gentlemen:

The following report summarizes findings of our fault hazard investigation performed on the subject property. The purpose of this exploration was to evaluate the nature, distribution, geologic structure of the earth materials, and fault hazard potential for the property with respect to future construction of a condominium storage complex.

This report is prepared for the use of the client and authorized agents and should not be considered transferable. Prior to use by others, the site and this report should be reviewed by Mountain Geology. Following review, additional work may be required to update this report.

It is the intent of this report to aid in the design and completion of the described project. Implementation of the advice presented in the "Conclusions and Recommendations" section of this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual conditions will not be discovered during or after construction.

5154 BARNARD ST. • SIMI VALLEY, CA 93063 • (805) 522-5174

PROPOSED DEVELOPMENT

Information concerning the proposed development was provided by the client. In addition, the Tentative Tract Map prepared by C. W. Cook Co. was reviewed prior to field exploration. This information and plan review was the basis for the field exploration.

The proposed development will consist of construction of condominium storage buildings on the site.

Retaining walls will be utilized to support excavated areas as the buildings will be constructed approximately 10 feet below street grade.

Grading will be required for the development of the site and will consist of the removal of approximately 10 feet of earth materials and removal and recompaction of existing fill.

Formal plans have not been prepared and await the conclusions and recommendations of this report.

EXPLORATION

The investigation was conducted during August of 1987 and included the following:

1. Inspection of surficial conditions at the subject site by a registered engineering geologist.
2. Research of City Records and pertinent reports.
3. Excavation of seismic trenches with the aid of a backhoe.
4. Mapping of the earth materials within the subject property.
5. Review of the referenced soil report prepared by Chang and Associates.
6. Review of the State of California Alquist-Priolo Special Studies Zones Maps.

7. Preparation of the diagrams and geotechnical analysis based on the above information.

SITE DESCRIPTION

The subject property consists of a nearly level vacant lot in the Los Angeles Basin, on the boundary line between the City of Los Angeles and the City of Culver City, California. The property is situated on the southwest corner at the intersection of Jefferson Blvd. and Higuera Street, south of Ballona Creek, and north of Baldwin Hills, in a developed industrial and commercial area.

Past grading on the site involved placing a moderate amount of fill on the site adjacent the flood control channel (Ballona Creek) and installation of the many utilities which cross the lot.

The lot is currently being utilized as a construction storage yard.

Commercial and industrial buildings are present on surrounding properties.

Physical relief is on the order of 3 feet.

The lot is free from vegetation with the exception of weeds on the pad area and trees in the parkway.

EARTH MATERIALS

The earth materials encountered are logged and shown herein on the Log of the Test Pit. Earth materials underlying the subject property consist of fill over natural residual soil and alluvium.

Fill

A moderate amount of fill overlies the natural soils on the subject property. The fill consists of mixtures of clay, sand, and gravel which are light to dark brown, slighlty moist, medium dense, and contains fragments of wood, wire, bricks, asphalt, and concrete.

Residual Soil

Natural residual soil overlies the alluvium on the subject property. the soil consists of clayey sand which is very dark brown, slightly moist, and firm.

Alluvium

Natural stream deposits termed "Alluvium" underlie the subject property. The alluvium was encountered consists of silt clay and clayey sand with occassional gravelly layers which are tan to greenish brown, slightly moist, and medium dense to dense.

GEOLOGIC STRUCTURE

The alluvium described is common to this area of the Los Angeles Basin and is consistent with regional trends. Layering within the alluvium is nearly horizontal with occasional scour and fill sedimentary structures.

FAULTING AND SEISMIC CONSIDERATIONS

The subject property is located near the west-central portion of the Los Angeles Basin which is bounded on the north by the Transverse Ranges Geomorphic Provience and the south by the Peninsular Ranges (Figure 1).

The Peninsular Ranges is dominated by Northwest-Southwest trending strike slip faults of which many have been classified as being active or potentially active.

Of concern to the subject property is the proximity of the Newport Inglewood Fault Zone which was active in 1933 (Long Beach Earthquake).

The subject property is located within an Alquist-Priolo Special Studies Zone as shown on Figure 2. Surface traces of potentially active to active fault splays of the Newport-Inglewood Fault have been mapped east and west of the subject property.

Trenches excavated across the the subject property reveals that the site is free of faults which have ruptured or effected the upper ten feet of alluvial soils.

However, the site experienced strong to very strong ground motion during past seismic events as other properties in the Los Angeles Basin.

SIGNIFICANT FAULTS

Significant faults in the Southern California which have or could affect the subject property include:

The Newport Inglewood Fault, The San Andreas Fault, The San Fernando Segment of the Sierra Madre Fault Zone, the San Gabriel Fault, and the Malibu Coast/Santa Monica/Hollywood Fault, and the Whittier Fault (refer to Figure 3).

The Newport Inglewood, the San Andreas, the San Fernando Segment of the Sierra Madre Fault Zone, and the Whittier Fault are all active faults in the Southern California and Los Angeles Area which have and may be associated with earthquakes which resulted in moderate to strong ground shaking at the subject property and could cause future strong ground shaking at the site.

The San Gabriel Fault and the Malibu Coast/Hollywood Fault are fault Zones which have been classified as being potentially Active and could cause low to moderate ground shaking at the subject property.

The distances to these faults their maximum credible earthquakes, and Estimated Peak and Repeatable Ground Accelerations are summerized on Table 1.

TABLE 1

SIGNIFICANT FAULTS WHICH COULD AFFECT THE SITE

Fault	Minimum Distance From Site (Miles)	Maximum Credible Magnitude* (Richter)	Maximum Credible Bedrock Acceleration (Gravity)
San Anderas (Active)	42	8.25	.17g
San Gabriel (Potentially Active)	35	7.40	.15g
San Fernando Segment of Sierra Madre (Active)	20	6.70	.17g
Malibu/Santa Monica/Hollywood (Potentially Active)	8	7.5	.47g
Newport Inglewood (Active)	500 yards	7.5	>.70g
Whittier Fault (Active)	20	6.1	.15g

*The maximum credible earthquake for a particular fault is the largest magnitude event that appears capable of occuring under the presently known Tectonic Framework.

A paper by Pleossel and Slosson (1974) presents important design criteria for structures subject to high ground acceleration from earthquakes. Based upon historic accelerograms, repeatable high ground accelerations average 65% of the peak ground acceleration. Assuming the Newport-Inglewood Fault causes an earthquake, the repeatable high ground acceleration at the subject property would be approxomately .65s. The probability of such an event occurring on the fault 500 yards away from the site is very low to low within the next 100 years.

The San Andreas Fault is a major northwest-southeast trending strike-slip fault 42 miles north of the property which is expected to produce an 8.0 to 8.25 magnitude earthquake within the next 30 years. The event is overdue and will cause maximum ground accelerations of .17g at the site and repeatable high ground accelerations of .11g.

The San Fernando Fault is a eastwest-trending thrust fault located 20 miles to the north of the subject property. This fault is classified as active and capable of producing an earthquake of magnitude 6.7 on the Richter Scale. Should such an event occur, maximum bedrock accelerations would be on the order of .17g with repeatable high ground accelerations of .11g.

The probability of such an event occuring within the expected lifetime of the developmemt is low as it was active during 1971 and has a recurrence interval greater than 100 years.

The Whittier Fault is a northwest-trending fault, 25 miles east of the site which produced a 6.1 magnitude earthquake on October 1, 1987. Estimated bedrock accelerations are .15g with repeatable high ground accelerations of .09g.

The probalility of another event occuring on the Whittier Fault within the next 100 years is very low.

The San Gabriel Fault 35 miles north of the site and the Malibu/Santa Monica/Hollywood Fault 8 miles north of the site are east-west to northwest-trending faults which have been mapped and described as potenially active on the "State of California Fault Map", prepared by the California Division of Mines and Geology, 1975. As classified by the State Geologist, the fault is considered potentially active, based upon the following description:

> "Quaternary Fault displacement (during past 2 million years), without historic (approximately 200 years) record. Recognized by scarps in alluvium, terraces, of other Quarternary units; off-set stream courses; alignment of sag depressions, fault troughs, and fault saddles; marked linear steep mountain fronts (associated with an adjacent concealed fault trace). Includes concealed fault-controlled groundwater barriers in

Quaternary sediments as indicated by well data.

(Note: Where local evidence indicates that a fault has moved during Quaternary time, the entire length of the fault is shown as Quaternary unless contrary evidence is available.)"

Of these potentially active faults, the Malibu/Santa Monica/Hollywood Fault is potentially the most damaging as the closest trace is approximately 8 miles north of the site. This fault has no history of seismic activity (active within the past 200 years), but does meet criteria to qualify as a potentially active fault. Relating one-half of the total fault length (55) of 27 miles to earthquake magnitueds yields a maximum probable earthquake magnitude of 7.1 on the Richter scale. Should this event occur, the maximum bedrock acceleration would be approximately .42 and repeatable ground accelerations of .27g. The probability of such an event occuring on this fault 8 miles away from the site is very low.

HISTORIC EARTHQUAKES THAT HAVE AFFECTED THE SITE

Historic fault breakes in Southern California are shown on Plate 3. Historic earthquakes in Southern California since 1912 are plotted on Plate 4. Historic earthquakes that have affected the site are summerized in Table 2. Earthquakes prior to the 1933 Long Beach earthquake have been assigned approximate Richter magnitudes and are based upon historical accounts.

TABLE 2

HISTORIC EARTHQUAKES THAT HAVE AFFECTED THE SITE

Date	Fault or Location	Richter Magnitude	Distance (Miles)	Estimated Peak Ground Acceleration (Gravety)
1857	San Andreas	8.0 *	13 1/2	.37
1933	Long Beach	6.3	4	.48
1971	San Fernando	6.4	8 1/2	.32
1987	Whittier	6.1	25	.15

* Estimated

Note: Richter magnitudes are estimated prior to 1933 and are based on historical accounts.

MAXIMUM PROBABLE EARTHQUAKE

The maximum probable earthquakes which could effect the site within the next 100 years are 8.25 event on the San Andreas which could result in .11g repeatable ground accelerations on site and a 6.0 event on the Newport-Inglewood Fault which could result in .6g ground accelerations. Of these two events the San Andreas can be expected, while the likelyhood of a Newport-Inglewood event 500 yards from the site are very low to low.

SEISMIC HAZARDS

The principle seismic hazard to the proposed development is moderate to strong ground shaking associated with the anticipated 8.0 to 8.25 magnitude earthquake associated with the San Andreas Fault.

The potential for ground lurching and amplification is low as the site is underlain by dense alluvial soils near surface grade.

The potential for liquefaction is low as the water table is on the order of 30 feet deep and the soils are cohesive.

Risk of damage by faulting is no greater on the site than for other properties in this vicinity. Secondary effects such as earthquake induced landsliding, rupture and liquefaction, tsunami, and flooding are not likely to occur.

CONCLUSIONS AND RECOMMENDATIONS

General Findings

Based upon our exploration and experience with similar projects, the proposed development is free from ground rupture due to a seismic event associated with the Newport-Inglewood Fault. Test trenches excavated across the building site did not encounter fault splays which offset recent geologic materials.

The subject property will be subject to strong ground shaking during anticipated seismic events associated with active faults in the Southern California Area.

Secondary effects such as landsliding, liquifaction, or ground rupture should not adversely effect the subject property during future seismic events.

The geologist should be present during grading to observe the excavations.

All excavations shall be stabilized within 30 days of initial excavation. Water should not be allowed to pond near the top of the excavation, nor to flow toward it. No vehicular surcharge should be allowed within 3 ft. of the top of cut.

This report was prepared on the basis of the furnished preliminary development plans furnished. Formal plans should be reviewed by Mountain Geology Inc. Should the plans differ substantially from the preliminary set, additional geotechnical work may be required.

Please advise the undersigned at least 24 hours prior to any required site visit. The approved plans and permits should be on the job site and available to the project consultant.

LIMITATIONS

The conclusions and recommendations contained within this report are based on the findings and field observations of the test trenches locations. Recommendations are based on the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the individual trenches placed on the subject property.

If conditions encountered during construction appear to differ from those disclosed, this office should be notified, so as to consider the need for modifications. In this way, any required supplemental recommendations can be made with a minimum delay to the project.

The approximate location of trenches were determined by tape measurement and interpolation between contours on the supplied map. The locations and elevations should be considered accurate only to the degree implied by the method used.

The Engineering Geologist have prepared this report in accordance with generally accepted engineering practices and make no other warranties either expressed or implied as to the professional advice provided under the terms of the agreement and included in this report.

EXPLANATION

Please avoid misunderstandings or misinterpretation of this report by calling the project consultant with any questions you may have.

Respectfully submitted,

Jeffrey W. Holt
EG 1200 exp 6-1990
Engineering Geologist
Mountain Geology Inc.

Enclosures: Geologic map
Vicinity / Regional Map

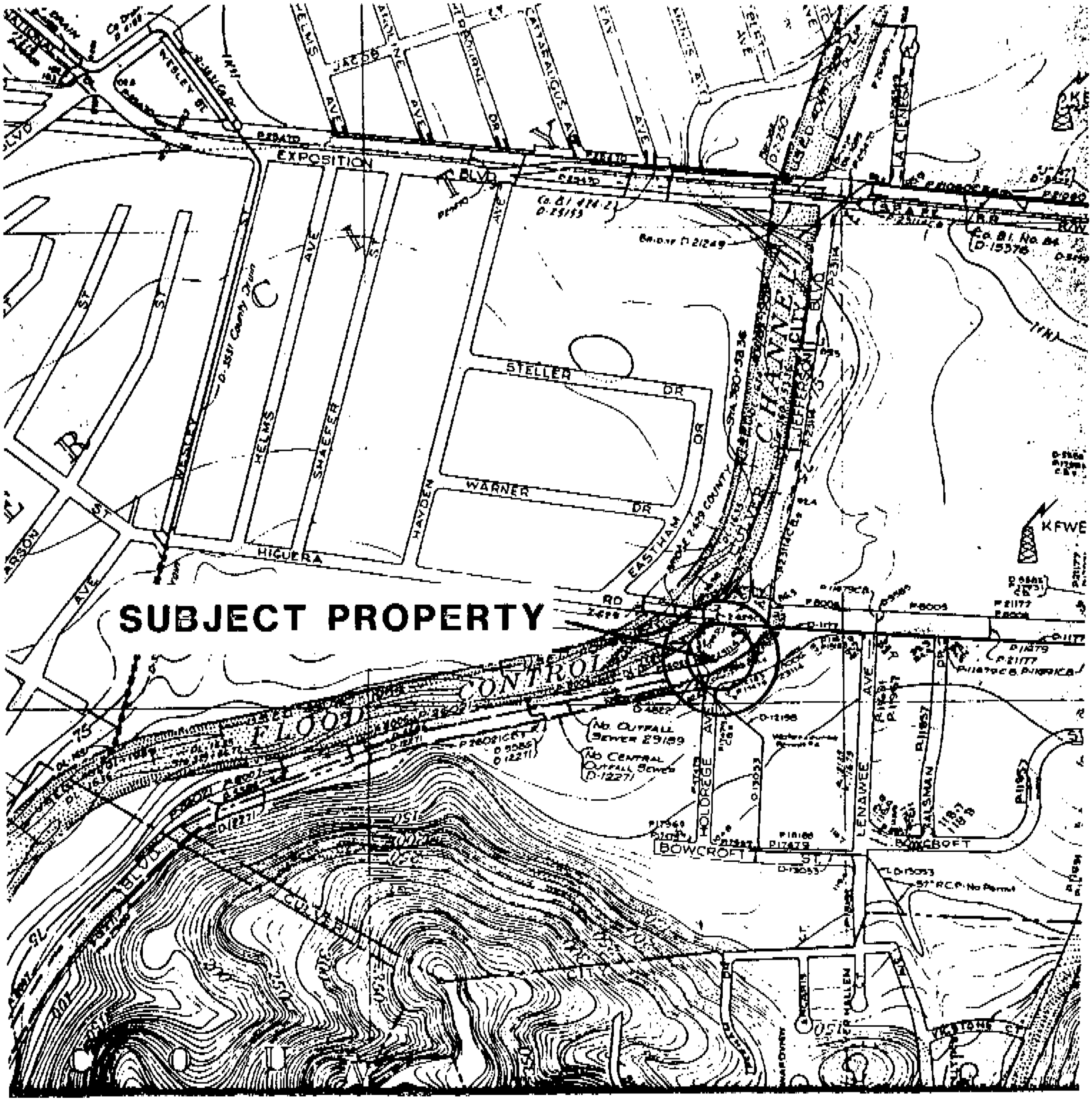
Log of Test Trenches

xc: (2) Addressee
(6) C. W. Cook Co.

MOUNTAIN GEOLOGY, INC.

CONSULTING ENGINEERING GEOLOGISTS
2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

VICINITY MAP



MOUNTAIN GEOLOGY, INC.

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2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

LOS ANGELES REGIONAL MAP

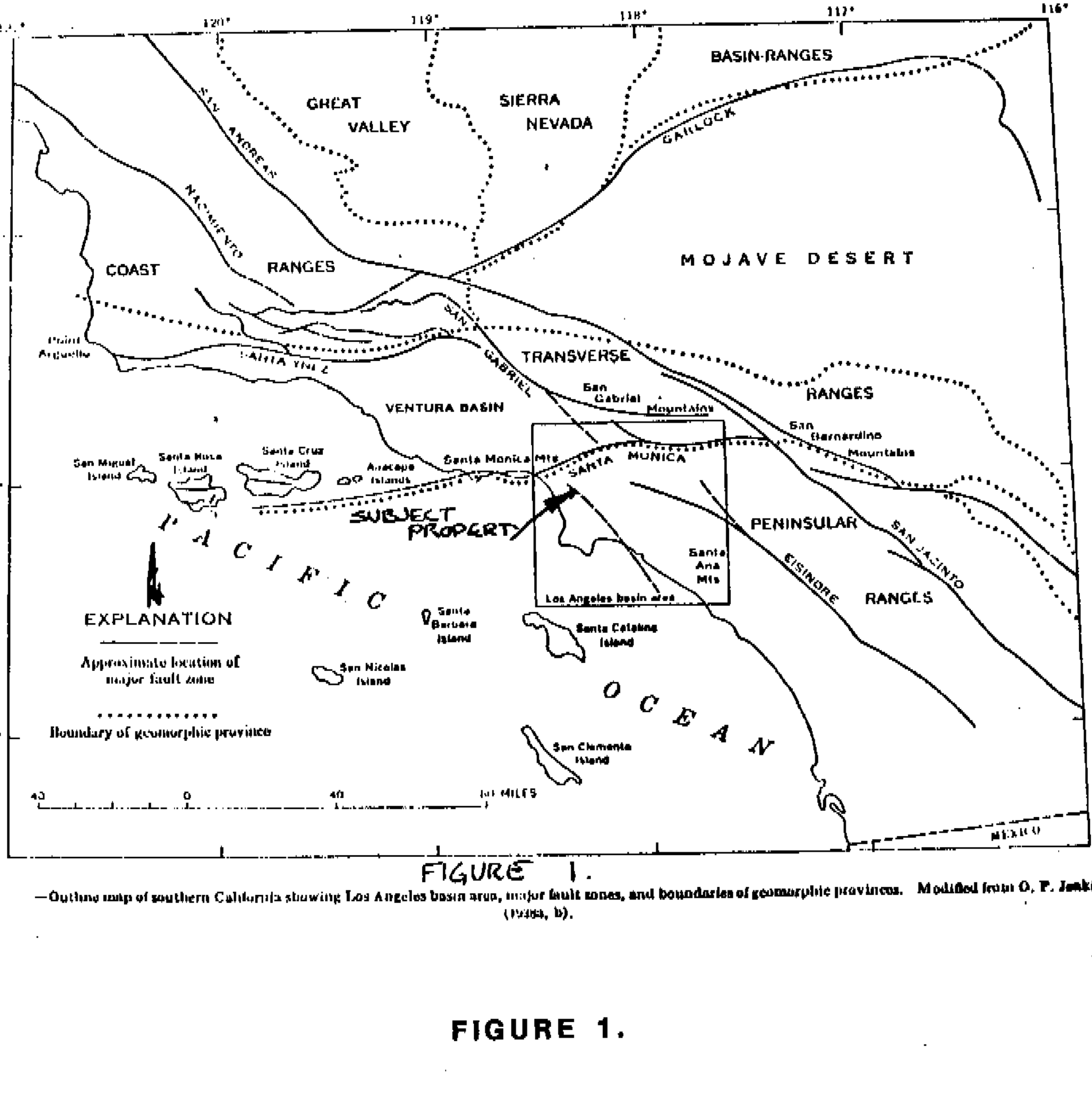


FIGURE 1.

—Outline map of southern California showing Los Angeles basin area, major fault zones, and boundaries of geomorphic provinces. Modified from O. P. Jenkins (1938a, b).

FIGURE 1.

MOUNTAIN GEOLOGY, INC.

CONSULTING ENGINEERING GEOLOGISTS
2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

ALQUIST-PRIOLO SPECIAL STUDIES ZONE

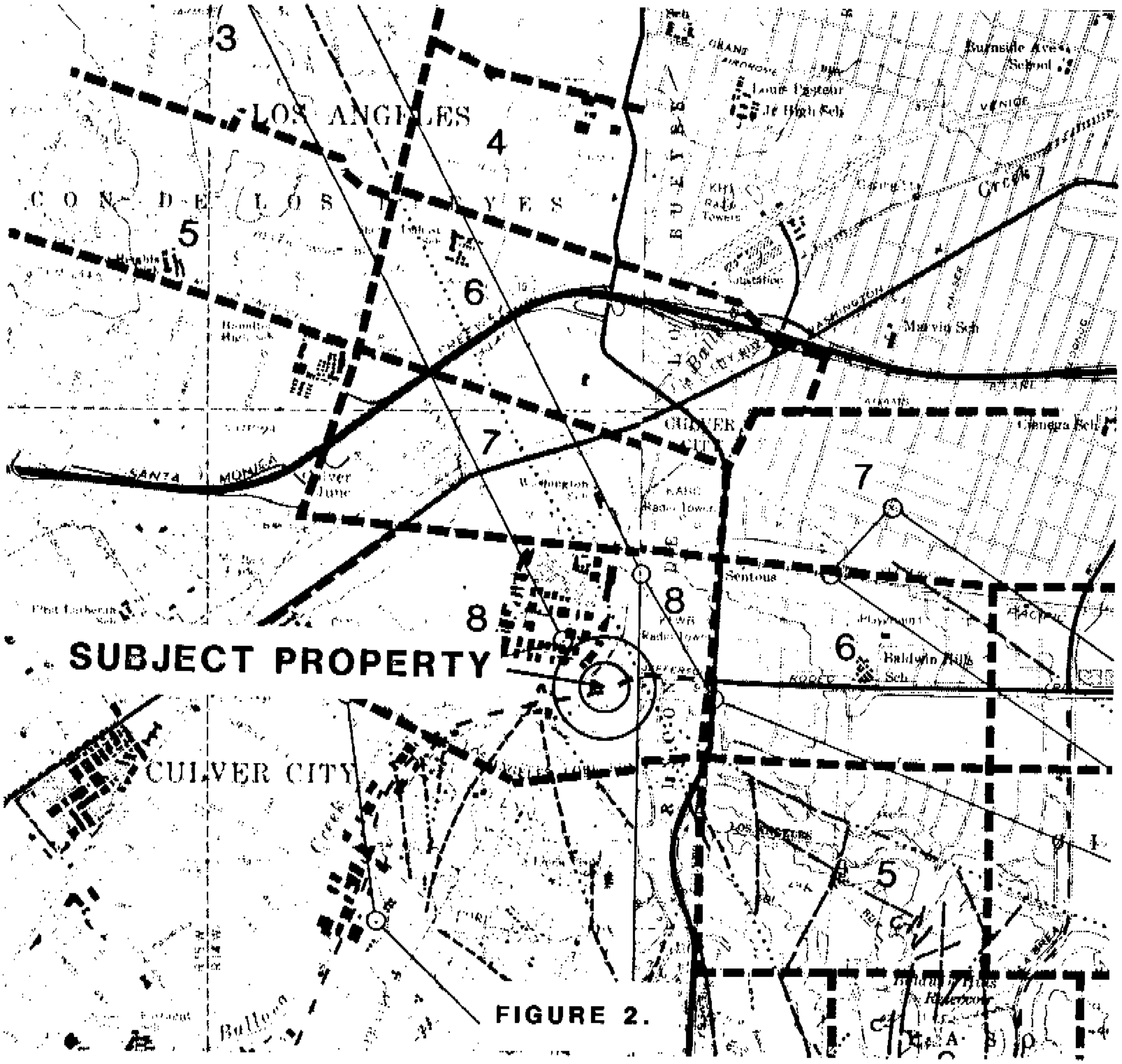


FIGURE 2.

MOUNTAIN GEOLOGY, INC.
Mountain Geology, Inc.
CONSULTING ENGINEERING GEOLOGISTS
2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

SIGNIFICANT FAULTS IN SO. CA. AREA

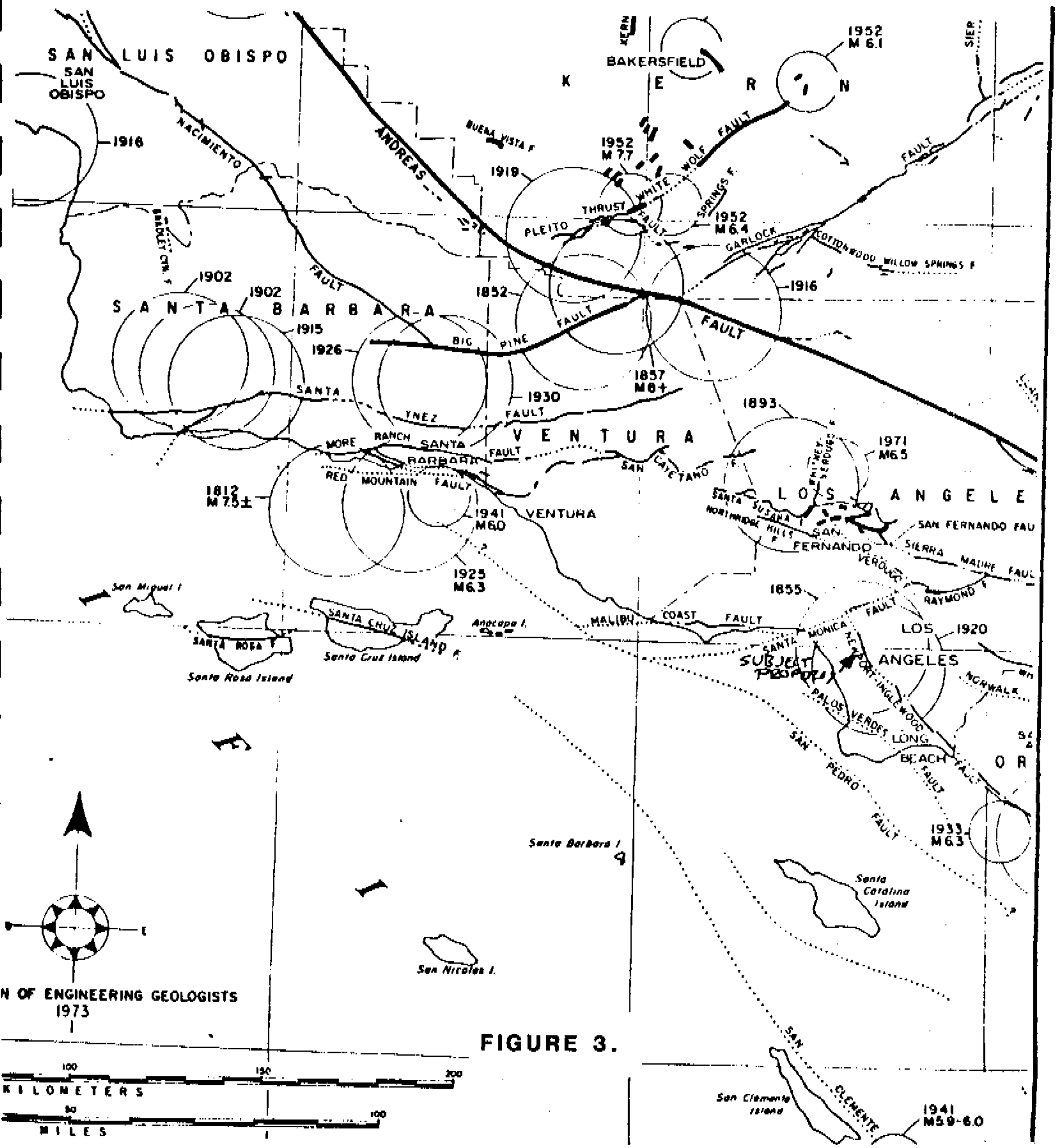


FIGURE 3.

MOUNTAIN GEOLOGY, INC.

CONSULTING ENGINEERING GEOLOGISTS
2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

HISTORIC FAULT BREAKS

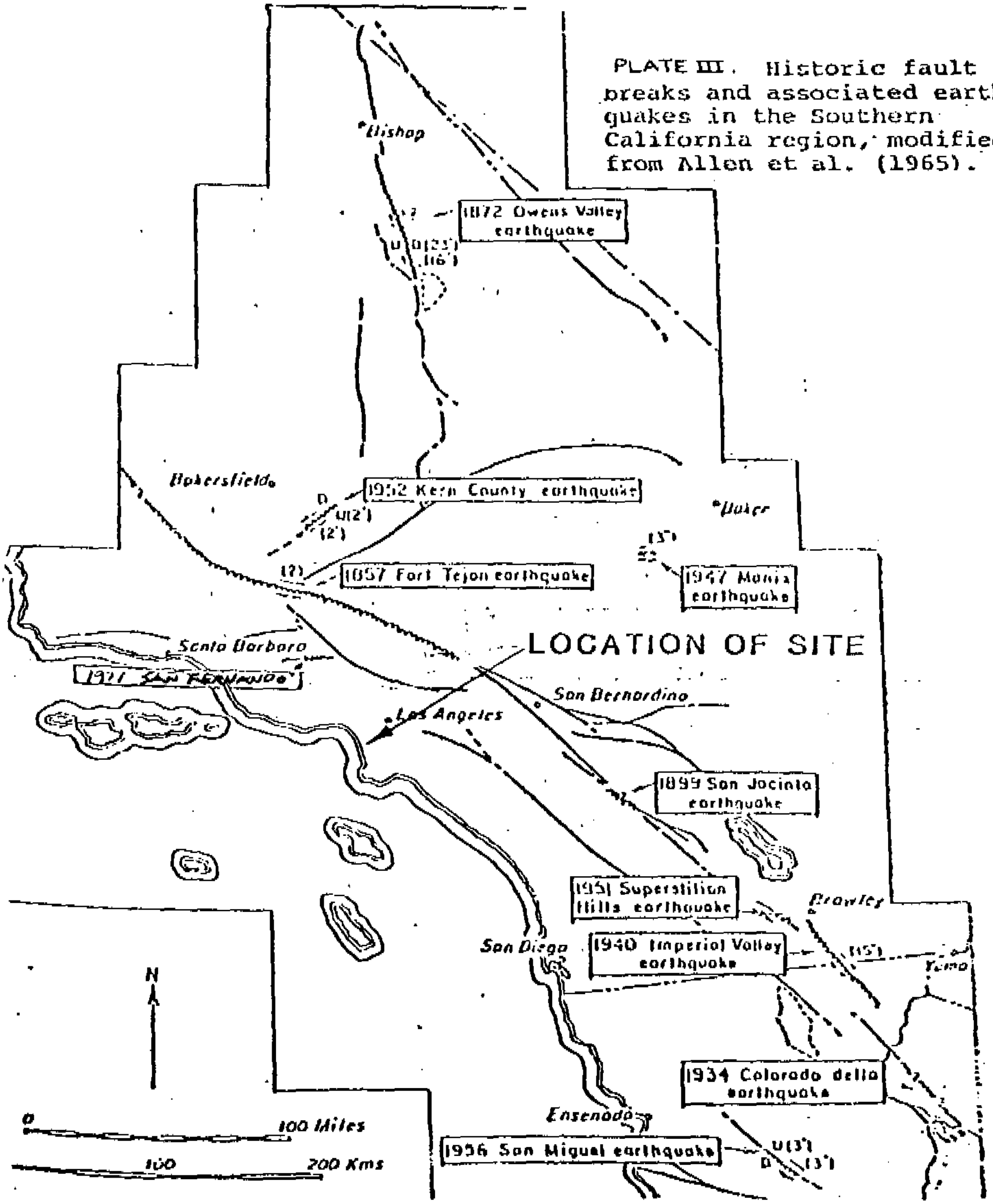
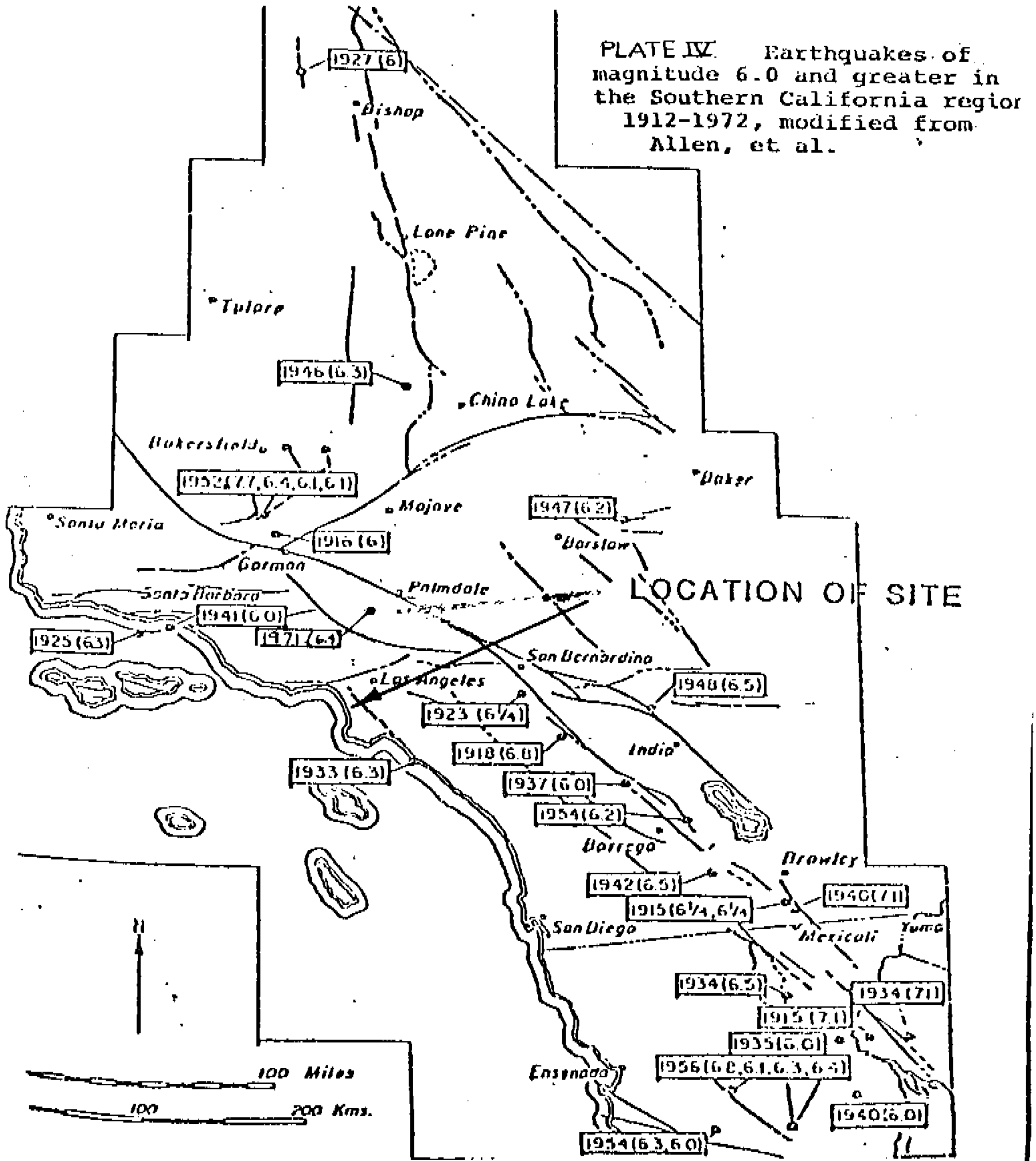


PLATE III. Historic fault breaks and associated earth quakes in the Southern California region, modified from Allen et al. (1965).

MOUNTAIN GEOLOGY, INC.
CONSULTING ENGINEERING GEOLOGISTS
2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

EARTHQUAKES OF MAGNITUDE 6.0 AND GREATER

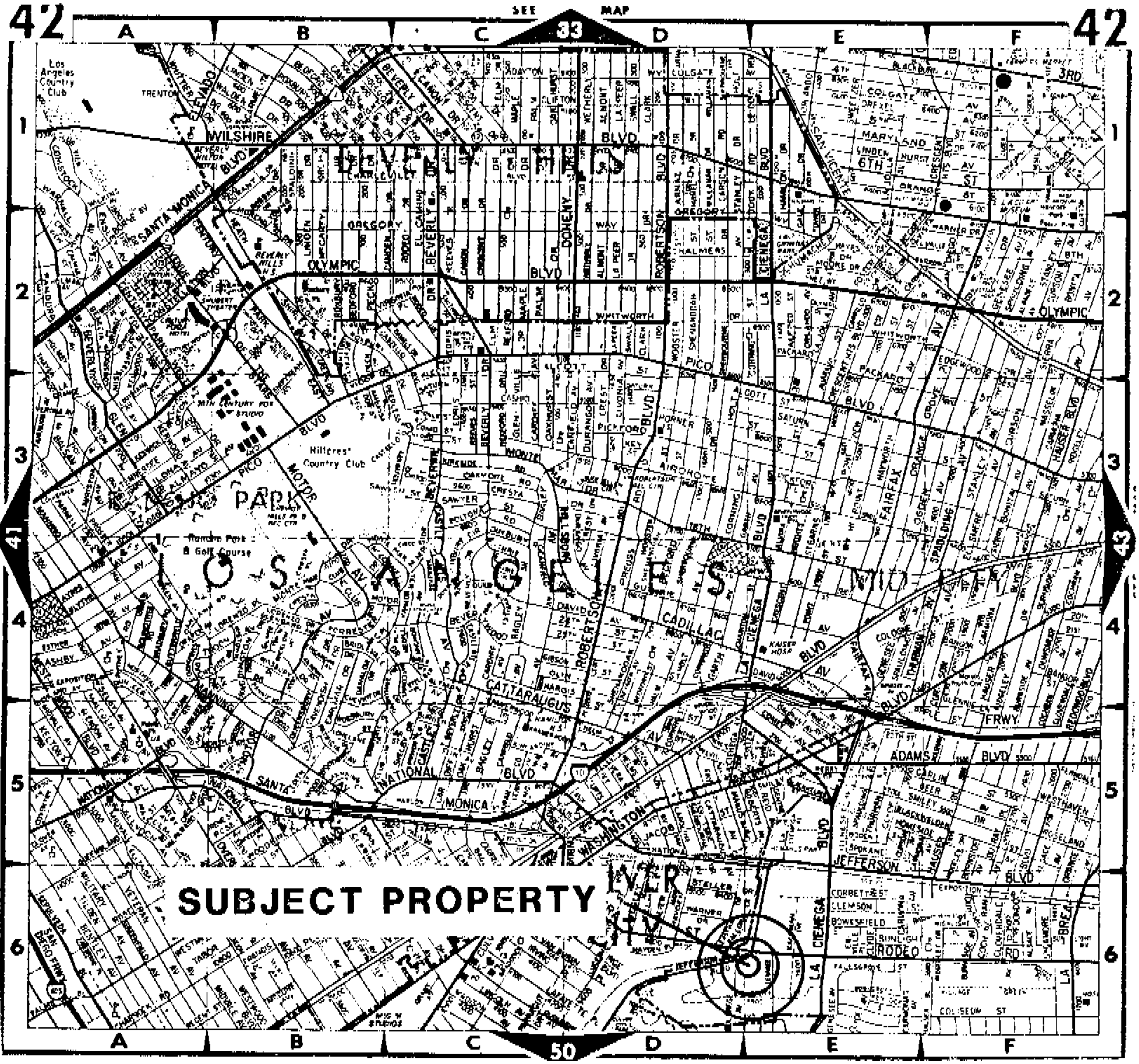
PLATE IV. Earthquakes of magnitude 6.0 and greater in the Southern California region 1912-1972, modified from Allen, et al.



MOUNTAIN GEOLOGY, INC.

CONSULTING ENGINEERING GEOLOGISTS
2116 LATHAM STREET
SIMI VALLEY, CA 93065
(805) 522-5174

VICINITY MAP



LOG OF TEST TRENCH NUMBER 1

CLIENT--U.S. CONDO STORE OF AMERICA	JWH--1968
JOB LOCATION--JEFFERSON BLVD., N OF HOLDREGE AVE., CULVER CITY	DATE--8/87
DRAFTED BY--JEFFREY W. HOLT	CONSULTANT--JWH
TEST PIT EXCAVATION BY--D.E. EDDINGS	METHOD--BACKHOE
DOWNHOLE OBSERVATION BY--JEFFREY W. HOLT	SHORING--NONE

SURFACE CONDITIONS--WESTERN MOST 50' OF TRENCH

DEPTH -(ft.)-	EARTH MATERIAL	DESCRIPTION
UNIT 1	FILL	CLAYEY SAND WITH GRAVEL OCCASIONAL CONCRETE AND ASPHALT FRAGMENTS, MOTTLED LIGHT AND DARK BROWN, SLIGHTLY MOIST, MEDIUM DENSE.
UNIT 2	FILL	SILTY SAND WITH GRAVEL, MOTTLED LIGHT BROWN TO MEDIUM BROWN, SLIGHTLY MOIST, MEDIUM DENSE, OCCASIONAL WIRE, CONCRETE FRAGMENTS AND ASPHALT FRAGMENTS.
UNIT 3		SAND, MEDIUM BROWN, VERY COARSE GRAINED, SLIGHTLY MOIST, LOOSE TO MEDIUM DENSE.
UNIT 4	NATURAL RESIDUAL SOIL	CLAYEY SAND, VERY DARK BROWN, SLIGHTLY MOIST, AND FIRM.
UNIT 5	FILL	DISTURBED SOIL WITH OCCASIONAL BRICKS AND WIRE, DARK BROWN, SLIGHTLY MOIST, MEDIUM DENSE.
UNIT 6	NATURAL RESIDUAL SOIL	CLAYEY SAND, VERY DARK BROWN, SLIGHTLY MOIST, AND FIRM, WITH

		OCCASIONAL COBBLES AND PEBBLES.
UNIT 7	OLDER ALLUVIAL TERRACE	SILTY CLAY, TAN, SLIGHTLY MOIST, MEDIUM DENSE, FIRM TO STIFF, SLIGHTLY POROUS.
		NO FAULTS WERE OBSERVED, CONTACT BETWEEN UNIT #6 AND 7 IS HORIZONTAL, WESTERN PORTION OF TEST TRENCH IS 60' LONG END @ 11' ON EAST AND 10' WEST

NO GROUNDWATER
NO CAVING
NO FILL

ATTITUDES
- Bedding
- Jointing
- Shear

B&S B-17 (R6/85)

City of Los Angeles
DEPARTMENT OF BUILDING AND SAFETY
Grading Division

Dm 126-173

District 10 A | Log No. 10159

ADDRESS APPROVED | Signature/Date

APPLICATION FOR REVIEW OF TECHNICAL REPORTS AND IMPORT-EXPORT ROUTES

INSTRUCTIONS

A. Address all communications to the Grading Division, Department of Building and Safety, Room 460A, City Hall, Los Angeles, California 90012-4869. Phone (Area Code 213) 485-3435.
B. Obtain address approval from the Department of Public Works prior to submittal.
C. Submit 2 copies (4 for fault study zone) of reports and 3 copies of application with items (1) through (10) completed.
D. Check should be made to the Department of Building and Safety.

Note: Please Print

(1) LEGAL DESCRIPTION
Tract SUB. OF SOUTHERN PORTION RANCHO RINCON DE LOS BUEYES
Blk ______ Lots POR. 14

(2) PROJECT ADDRESS 6001 JEFFERSON BLVD

(3) OWNER SEYMOUR S. GOLDBERG
Address 16633 VENTURA BLVD. F 1440
City ENCINO, CA. Zip 91436
Phone (Daytime) (714) 543 8352

(4) APPLICANT SALEM ENGINEERING
Address 1215 E. CHAPMAN #2
City ORANGE CA
Phone (Daytime) 714 633 7261 Zip 92672

(5) Report(s) Prepared by MOUNTAIN GEOLOGY INC., CHANG & ASSOC.

(6) Report Date(s) 10/1/87, 9/11/86

(7) Status of project: ☑ Proposed ☐ Under Construction ☐ Storm Damage

(8) Previous site reports? N If yes, give date(s) of report(s) and name of company(s) who prepared report(s).

(9) Previous Department actions? ____ If yes, please give dates and attach a copy to expedite processing.
Dates BUILDING PLANS ARE IN PLAN CHECK

(10) Signature of applicant [signature] Position ENG. FOR SALEM

(DEPARTMENT USE ONLY)

REVIEW REQUESTED & PROCESSING	FEES	REVIEW REQUESTED & PROCESSING	FEE
☐ Foundation Investigation		☐ Seismology report per 91.2305(d)	
☐ Soils Engineering		☐ Environmental Assessment	
☐ Geology		☐ Import-Export Route	
☑ Combined Soils Engr. & Geol.	276	☐ Division of Land	
☐ Supplemental		Sub-total	276
☐ Combined Supplemental		One-Stop Surcharge	5
		TOTAL FEE	281.

THE REPORT IS ☐ APPROVED WITH CONDITIONS ☒ NOT APPROVED

DEPARTMENT ACTION BY: [signature] 3/23/89 [signature] 3-23-89
For Geology — Date — For Soils & Foundation — Date

☐ Conditions of Approval ☒ Reasons for Non-Approval ☐ See Attached letter ☐ Supplemental Sheet ____ Attached

THE REPORTS SUBMITTED (1 COPY EACH) ARE UNSTAPLED XEROX COPIES OF 11X8½ PAGES ONLY. SEISMIC TRENCH LOGS AND GEOLOGIC MAP ARE MISSING.

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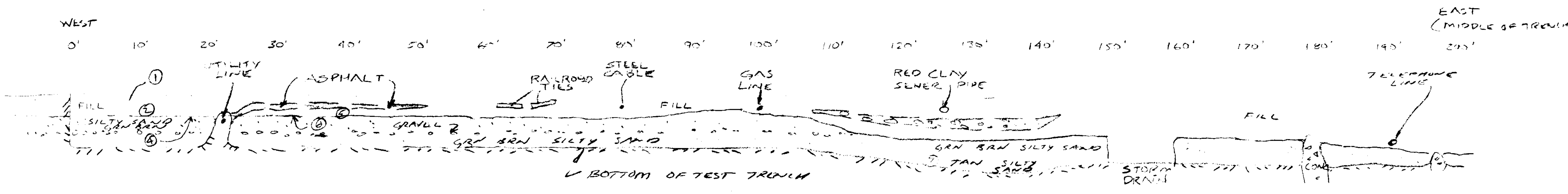
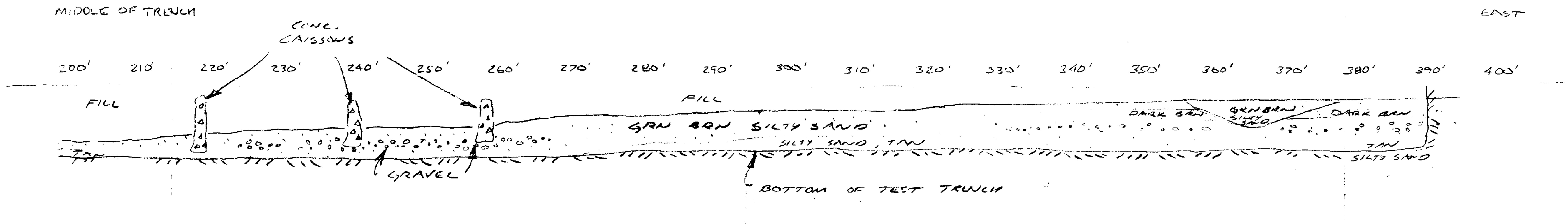
☐ VN
☐ WLA
☐ SP/WLA

☒ LA Inspection
☐ VN
☐ WLA
☐ SP/WLA
☐ BM
☐ BI





SEISMIC TRENCH LOGGED BY
JEFFREY W. HOLT CEG 1200

JH1968 Oct., '87

TENTATIVE TRACT NO. 45607

IN THE CITY OF CULVER CITY
AND THE CITY OF LOS ANGELES
COUNTY OF LOS ANGELES
STATE OF CALIFORNIA

GEOLOGIC MAP

▭ LOCATION OF TEST TRENCH

FOR COMMERCIAL CONDOMINIUM PURPOSES

BEING A SUBDIVISION OF A PORTION OF LOT 14 OF THE SUBDIVISION OF THE SOUTHERN PORTION OF THE RANCHO RINCON DE LOS BUEYES, PER MAP RECORDED IN BOOK 53, PAGE 25 OF MISCELLANEOUS RECORDS OF LOS ANGELES COUNTY.

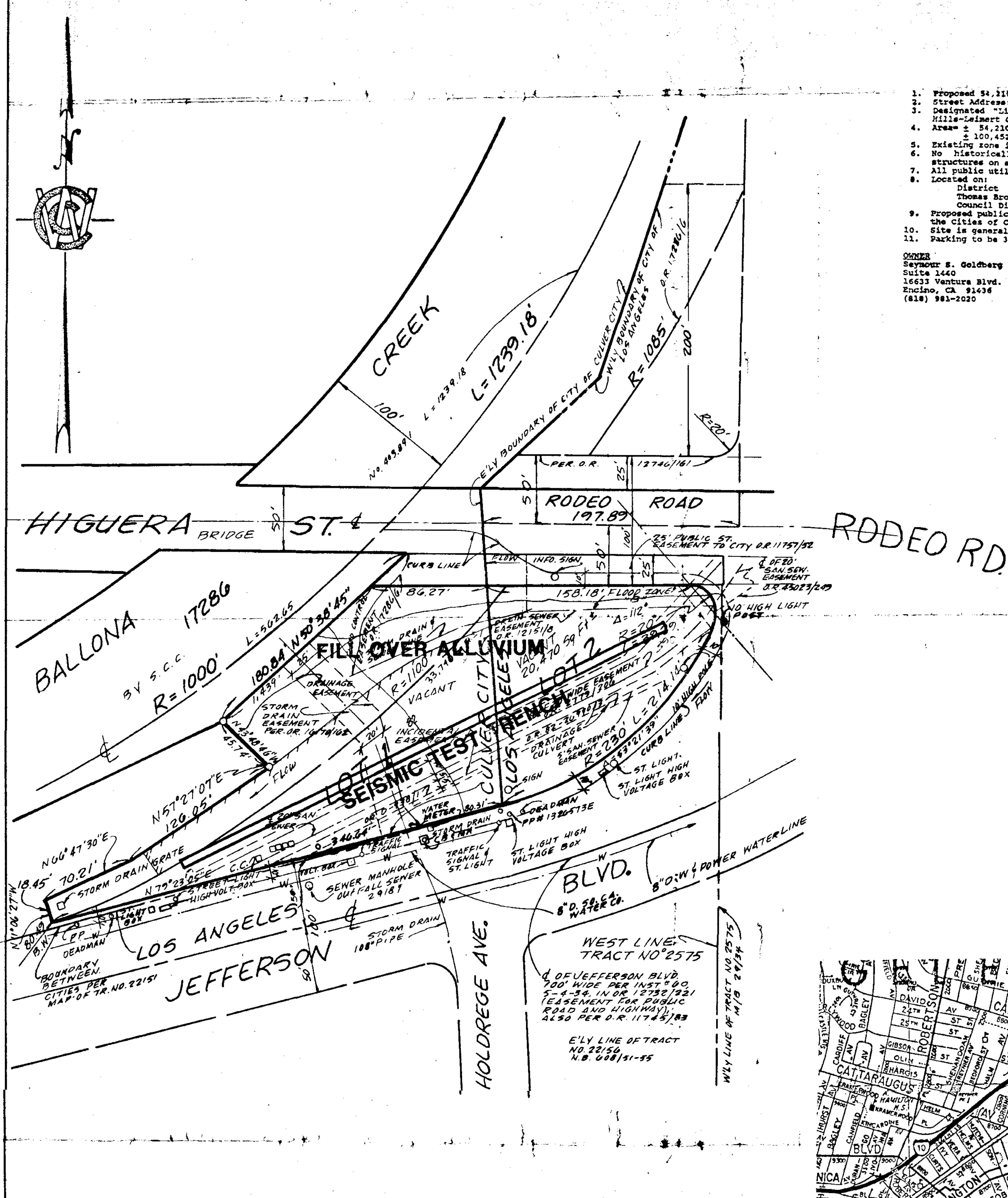
NOTE: THIS SAME TENTATIVE TRACT MAP WAS ALSO FILED IN THE CITY OF CULVER CITY.

"GENERAL MAP NOTES"

1. Proposed 54,210 sq.ft. Commercial Condominium Development.
2. Street Address: 6001 West Jefferson Boulevard
3. Designated "Limited Industry" on the West Adams-Baldwin Hills-Leimert Community Plan.
4. Area= ± 54,210 Sq. Ft. (1.24 Ac.) Net.
   ± 100,452 Sq. Ft. (3.20 Ac.) Gross.
5. Existing zone is C2-1 and M-1, No Change Proposed.
6. No historically significant trees (including oak) or structures on site.
7. All public utilities in and available.
8. Located on:
   District Map No. 117B169
   Thomas Bros. Guide 42-D, E-6
   Council District 6
9. Proposed public improvements will be per the requirements of the Cities of Culver City and Los Angeles.
10. Site is generally flat.
11. Parking to be 31 spaces.

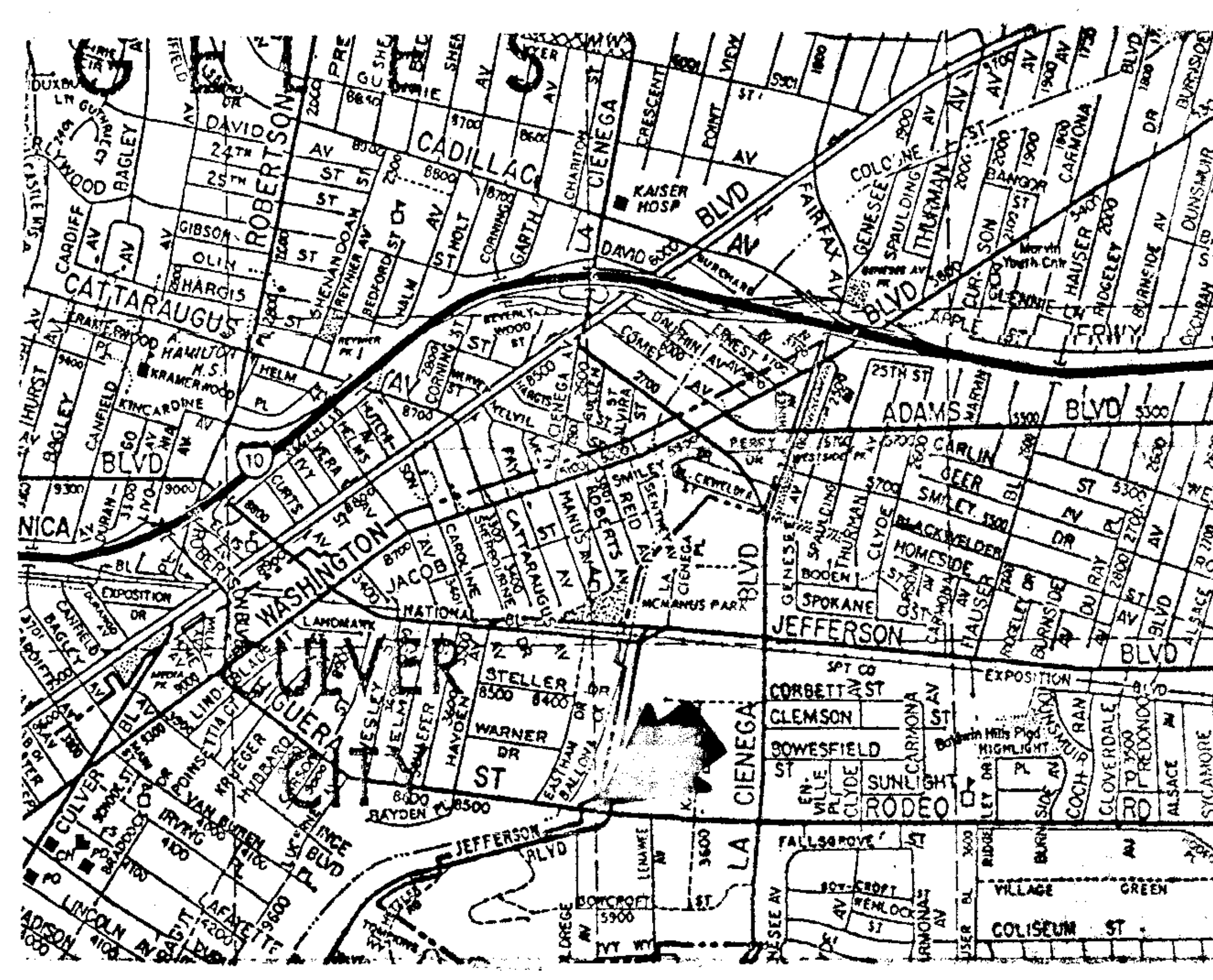
OWNER
Seymour S. Goldberg
Suite 1440
16633 Ventura Blvd.
Encino, CA 91436
(818) 981-2020

SUBDIVIDER
Condo Store of America, Inc.
Suite 265
180 Newport Center Drive
Newport Beach, CA 92660
(714) 759-8008
Attn: J. Harkins



· LEGEND ·
———— INDICATES BOUNDARY OF PROPOSED SUBDIVISION.

GRAPHIC SCALE
0 10 20 40 60 100 180
1"=60'



VICINITY MAP
(NO SCALE)

MOUNTAIN GEOLOGY, INC. OCTOBER, 1987 JH1968

C.W. COOK Co. Incorporated, Est. 1911
Land Planners • Land Surveyors • Civil Engineers
Westside Towers • 11835 W. Olympic Blvd., Suite 375

Scale	1"=60'
Drawn by	R.A.W.
Checked by	F.C.
Date	

Sunset Avenue Project

C3 – Geotechnical Engineering Study Proposed Multi-Family Residential, Advanced Geotechnical Services, Inc., February 13, 2004.

advanced geotechnical services, inc.

February 13, 2004
Client Number 3283
Report Number 6477

Ms. Charlotte D. Bjorlin
RAD Management, LLC
615 Hampton Drive, Suite A107
Venice, CA 90291

Geotechnical Engineering Study
Proposed Multi-Residential
100 Sunset Avenue, Venice, California

In accordance with our revised proposal dated February 3, 2004, and your authorization, Advanced Geotechnical Services, Inc., has prepared this geotechnical engineering study report for the proposed multi-residential project at the subject site. This report presents the results of our data research, subsurface exploration, laboratory testing, and our professional opinions regarding the geotechnical engineering factors that may affect the proposed development.

Based on the results of our geotechnical study, it is our opinion that the site is suitable for construction of the proposed development, provided recommendations of this report are properly incorporated in the design and implemented during construction.

This opportunity to be of service is sincerely appreciated. This report should be read from cover to cover to understand its limitations and to avoid taking a recommendation out-of-context. If you have any questions or if we may be of any further assistance, please do not hesitate to call. We look forward to being of continued service.

Respectfully submitted,
Advanced Geotechnical Services, Inc.

Kenneth J. Palos
President

Don Villafana, RCE 37354
Principal Engineer

Dan Daneshfar
Staff Engineer

REGISTERED PROFESSIONAL ENGINEER
DONALD E. VILLAFANA
No. 37354
EXP 6-04
CIVIL
STATE OF CALIFORNIA

Enclosure: Report Number 6477

cc: (5) Addressee (1) File

5251 Verdugo Way, Suite L, Camarillo, CA 93012
800.500.3318 805.6162 f 805.388.6167
agssoil@mindspring.com

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Introduction

This geotechnical engineering study report has been prepared for the proposed multi-residential project at the subject site. The purposes of this study, in addition to evaluating the seismicity of the site, are to (1) identify on-site soil conditions that may affect the proposed project, and (2) provide geotechnical recommendations for site preparation, temporary excavations, foundation design, slabs-on-grade, retaining wall design, and drainage recommendations. This report presents the findings of our data review, subsurface exploration, laboratory testing, engineering analyses and evaluations, and our conclusions and recommendations.

Figures referenced in this report follow the main text. Appendices are attached following the main report. Appendix A includes logs, Appendix B includes laboratory test results, Appendix C includes the results of the seismicity study, and Appendix D includes the results of the liquefaction study. The citations of references used in this study and mentioned within this report are included in Appendix E.

Site Description and Proposed Development

The proposed development is located at 100 Sunset Avenue in the city of Venice, California. The topography of the subject site is relatively level. At the time of our field program, the site was being used as a MTA Transit parking lot. Several buildings are currently located on the site.

We understand that the proposed development includes several 3-story residential buildings with one level of underground parking. The remaining site will be landscaped or paved. Maximum loads are not known at this time. The existing structures and pavement will be demolished.

Site grading is expected to consist of excavation and backfill for the structure and related new utilities, and a cut and fill operation to establish grade for the building pad and site drainage. Permanent cut depths are expected to be minimum.

Scope of Services

This geotechnical engineering study included:

a. Site observation and review of geotechnical and geologic data of the general study area. A site location map is shown in Figure 1.

b. Coring the existing concrete paving, drilling, sampling, and logging of 5 borings to a maximum depth of 51.5 feet for foundation evaluation. Also a Cone Penetration Test (CPT), which was originally planned to a depth of 50 feet, was probed to a depth of about 37 feet due to cone refusal on a rock layer. Borings were located in the field using a tape measure and approximate reference points. Thus, the actual boring locations may deviate slightly from the locations in Figure 2. The logs are included in Appendix A, along with a general description of the field operations.

c. Laboratory testing of selected samples to determine the engineering properties of on-site soils. The results of laboratory testing are presented in Appendix B and on the boring logs in

Appendix A. Soil samples will be *discarded* 30 days after the date of this report, unless this office receives a specific request and fee to retain the samples for a longer period of time.

d. Research of historical earthquake events and determination of seismic parameters for potential on-site ground motion.

e. Engineering analysis of the data and information obtained from our field study, laboratory testing, and literature review.

f. Development of geotechnical recommendations for site preparation and grading, and geotechnical design criteria for building foundations, slab-on-grade construction, underground utility trenches, temporary excavations, retaining walls, pavement section, and drainage.

g. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects of the project site.

The scope of this geotechnical study did not include environmental issues or soil corrosivity.

Earth Materials and Subsurface Conditions

Alluvium
Alluvium was encountered in the exploratory borings to the maximum depth explored of about 51.5 feet. This material ranged from silty sand, sand, clay, sandy clay and clayey sand with gravel. The measured dry densities of this material were between 94 pcf and 122 pcf, and measured moisture contents were between 1.6% and 15.3%.

Soil Parameters
A compaction curve was developed in this study for a sample of silty sand. The maximum dry density was 114.5 pcf at an optimum moisture content of 9.0%.

The undrained shear strengths of cohesive soil samples were estimated with a hand penetrometer. A direct shear test was used to measure the peak and ultimate shear strength of soil in terms of a cohesion and friction angle. A direct shear test was performed on a remolded sample to evaluate the shear strength properties of a fill compacted to 90% relative compaction. The ultimate cohesion the ultimate friction angle of the samples tested are shown below.

Boring	Depth, Ft	Soil Description	Ultimate Cohesion, psf	Ultimate Friction Angle, degrees
B-2	2.5	BROWN SAND (REMOLDED)	140	30
B-1	15	DARK YELLOWISH-BROWN SILTY SAND TO W/GRAVEL	170	37

Consolidation tests were performed on a sample remolded to a relative compaction of 90% and on undisturbed samples. The purpose of performing consolidation tests is to determine the compressibility characteristics and to determine if the soils would experience hydroconsolidation, which is a decrease in volume (collapse) when subjected to water at a constant load or swell (expand) when exposed to water at a constant load. The consolidation test results showed a variable tendency to hydroconsolidate. The potential for hydroconsolidation tends to increase with a decrease in degree of saturation, a decrease in dry density, and an increase in fine content for sands to silty sands (clay content less than about 10%). Based on our experience, the potential for hydroconsolidation is usually small when the degree of saturation exceeds about 60% for moderately dense soils, but as the degree of saturation decreases below 60%, the potential for hydroconsolidation may increase. The degree of saturation of the soil ranged from 3% to 99%, with an average of 51%.

The potential of the soil to swell or expand increases with an increase in soil density, a decrease in initial moisture content (low percent saturation), an increase in clay content, and an increase in the activity of the clay content. Expansive soils change in volume (shrink or swell) due to changes in the soil moisture content. In addition to swell potential of the soil, the amount of volume change depends on (1) the availability of water, (2) the restraining pressure, and (3) time. The expansion index, the initial moisture content, the initial dry density, and the final moisture content for each specimen used to perform the expansion index test are given below. The risk of soil expansion increases with an increase in expansion index.

Boring	Depth, Ft	Soil Description	Initial Moisture Content, %	Final Moisture Content, %	Initial Dry Density, pcf	Expansion Index
B-2	0-5	DARK YELLOWISH-BROWN SAND	8.6	13.8	109.6	0

The risk of corrosion of construction materials relates to the potential for soil-induced chemical reaction. The rate of deterioration depends on soil resistivity, texture, acidity, and chemical concentration. To provide a basis for a preliminary corrosion evaluation one sample of the surficial soil was analyzed. The results of these tests are summarized below. Sulfate and chloride concentrations are expressed in ppm on a dry weight basis.

Boring	Depth, Ft	Description	pH	Chloride, ppm	Sulfate, ppm	Resistivity, ohm-cm
B-1	0-5	BROWN SAND	10.0	36.7	248	4115

Groundwater
At the time of our field exploration, groundwater was encountered at about 26.5 feet below the existing ground surface at the location of boring B-1. Groundwater was not encountered at the other boring locations. Groundwater elevations are dependent on seasonal precipitation, irrigation, land use, climatic conditions, among other factors, and as a result fluctuate. Therefore, water levels at the time of construction and during the life of the facility may vary from the observations or conditions at the time of our field exploration.

Overview
For a detailed description of the subsurface conditions encountered in the exploratory borings, refer to the Boring Logs presented in Appendix A.

Faulting and Seismicity

Faulting
The faulting and seismicity study indicated that the site is not located within any of the mapped Alquist-Priolo Special Studies Zones and no fault trace of any known active or potentially active fault passes through the site. However, the site, as all of the Southern California areas, is located within a seismically active region and will experience slight to very intense ground shaking as the result of movement along various active faults in the region.

The Alquist-Priolo Special Studies Zones Act was signed into law on December 22, 1972, and went into effect in March of 1973. The purpose of this Act is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture. The development permits for development projects within the special study zones will be withheld by the city or county until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting.

Seismicity Study
The faulting study indicated that thirty-four (34) fault systems are found within a search radius of 50 miles from the site. The fault systems, which are near the site and may significantly affect the stability of the site, is Santa Monica which is located about 4.2 miles from the site.

The peak ground accelerations for a 50-year exposure and 10% exceedance is approximately 0.56g.

Seismic Design Criteria
If the structural design is based on UBC dynamic lateral-force procedures, we recommend that a horizontal ground acceleration given earlier for the computed peak acceleration corresponding to a 50-year exposure and 10% exceedance be used with the normalized response spectrum for a soil type S_D. Structural design based on the UBC (1997 Uniform Building Code) static-force procedure calls for the following seismic parameters.

Seismic Zone Factor, Z	Soil Profile Type	Seismic Source Type	Near-Source Factor, N_a	Near-Source Factor, N_v
0.4	S_D	B	1.0	1.2

Conformance to the above criteria for seismic excitation does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive.

Earthquake Effects
The intensity of ground shaking during an earthquake can result in a number of phenomena classified as ground failure, which include ground rupture due to faulting, landslides, seiches, tsunamis, liquefaction, lurching, and seismically induced settlement. Descriptions of each of these phenomenon and an assessment of each, as it affects the proposed site, are included in the following paragraphs.

Shallow Ground Rupture
Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects that earth surface. Where associated with reverse faults, such ruptures rarely occur as single breaks or confined to a narrow zone. More commonly, ground rupture associated with reverse faulting is characterized by relatively short segments of faulting that occur over a broad area of the upper plate. In some cases, particularly in unconsolidated alluvial sediments, *ground ruptures* can develop from a number of causes not necessarily related directly to surface rupture of the causative fault. The secondary processes may include ground shaking, seismic settlement, landslides, and liquefaction.

Since there are no known active or potentially active faults passing through the site, the potential of on-site ground rupture or cracking due to shaking from local seismic events is not considered a significant hazard, although it is a possibility at any site. The potential for ground rupture due to other causes is discussed below.

Landsliding
Landslides are slope failures that occur where the horizontal seismic forces act to induce soil failure. As the site is relatively flat, on-site earthquake-induced landsliding is not a hazard.

Ground Lurching
Ground lurching is defined as earthquake motion at right angles to a cliff or bluff, or more commonly to a stream bank or artificial embankment that results in yielding of material in the direction in which it is unsupported. The initial effect is to

produce a series of more or less parallel cracks separating the ground into rough blocks. These cracks are generally parallel with the top of the slope or embankment. The topography of the site does not lend itself to this type of lurching.

Lurching is also sometimes used to describe undulating surface waves in the soil that have some similarities to ground oscillation mentioned below in the section on *Liquefaction*, but generally occurs in soft, saturated, fine-grained soils during seismic excitation. When this phenomena occurs adjacent to bodies of water, lurching can continue for a short time after the seismic shaking stops. The soil conditions at this site are not typical of those associated with lurching, and we do not consider this type of lurching to be a risk at this site.

Seiches and Tsunamis

Seiches are an oscillation of the surface of an inland body of water that varies in period from a few minutes to several hours. Seismic excitations can induce such oscillations. Tsunamis are large sea waves produced by submarine earthquakes or volcanic eruptions.

A Description of Liquefaction

The shear strength of soils is governed by effective stresses, which are equal to the total stresses minus the pore water pressures. In saturated, cohesionless soils, such as sands, pore water pressures tend to increase with cyclic loading, such as that caused by earthquakes. Liquefaction describes a phenomena in which cyclic stresses produced by ground shaking induce excess pore water pressures in cohesionless soils about equal to the total stresses, resulting in near zero shear strength in the soil when the soil behaves as a viscous fluid. Liquefied soils may thereby acquire a high degree of mobility leading to damaging deformations. Liquefaction susceptibility under a given earthquake is related to the gradation and relative density characteristics of the soil, the in-situ stresses prior to ground motion, and the depth to the water table, as well as other factors.

As a general rule, a site is susceptible to liquefaction if it meets the following four conditions:

a. A potential to be affected by seismic activity.

b. Cohesionless soils present on site. These soils typically classify as sand (SP) and (SW), silt (ML), silty sand (SM), and sandy silt (ML). Fine-grained soils, however, with less than 15% of clay sized particles, with liquid limits less than 35, and moisture contents greater than 90% of the liquid limit may be susceptible to severe strength loss.

c. Groundwater exists within 50 feet of the ground surface or a likelihood that groundwater will rise to within 50 feet of the ground surface. This includes a perched water table of significant extent.

d. Soil relative densities are less than about 70%.

Liquefaction related or liquefaction-induced phenomena include *lateral spreading*, *ground oscillation*, *flow failure*, *reduction of bearing strength*, *ground fissuring*, and *sand boils*. *Lateral spreading* is the lateral movement of stiff, surficial blocks of sediments as a result of a subsurface layer liquefying. The lateral movements can cause ground fissures or extensional, open cracks at the surface as the blocks move toward a slope face, such as a stream bank or in the direction of a gentle slope. When the shaking stops, these isolated blocks of sediments come to rest in a place different from their original location and may be tilted.

Ground oscillation occurs when liquefaction occurs at depth but the slopes are too gentle to permit lateral displacement. In this case, individual blocks may separate and oscillate on a liquefied layer. Sand boils and fissures are often associated with this phenomenon.

Flow failure, a more catastrophic mode of ground failure than either lateral spreading or ground oscillation, involves large masses of liquefied sediment or blocks of intact material riding on a liquefied layer moving at high speeds over large distances. Generally flow failures are associated with ground slopes steeper than those associated with either lateral spreading or ground oscillation.

Bearing strength decreases with a decrease in effective stress. *Loss of bearing strength* occurs when the effective stresses are reduced due to the cyclic loading caused by an earthquake. Even if the soil does not liquefy, the bearing of the soil may be reduced below its value either prior to or after the earthquake. If the bearing strength is sufficiently reduced, structures supported on the sediments can settle, tilt, or even float upward in the case of lightly loaded structures such as gas pipelines.

Ground fissuring and *sand boils* are surface manifestations associated with liquefaction and lateral spreading, ground oscillation, and flow failure. As apparent from the above descriptions, the likelihood of ground fissures developing is high when lateral spreading, ground oscillations, and flow failure occurs. Sand boils occur when the high pore water pressures are relieved by drainage to the surface along weak spots that may have been created by fissuring. As the water flows to the surface it can carry sediments, and if the pore water pressures are high enough create a gusher (sand boil) at the point of exit.

Evaluation of Liquefaction Potential

Since the results of our field exploration and laboratory testing programs indicate that the subject site meets all the above-mentioned conditions for being susceptible for liquefaction, we performed a liquefaction analysis to further evaluate the potential and extent of possible liquefaction at this site. The results of this analysis along with other geologic information about the area were then used to evaluate the different liquefaction-induced phenomena mentioned above.

The Liquefy2 (Blake) method was used with an earthquake magnitude of 7.5 (the weighted magnitude used to generate seismic risk) and a site acceleration of 0.39g (the computed site peak acceleration for a 50-year exposure and 10% exceedance) to perform the liquefaction evaluation. Blow counts used for the liquefaction evaluation were based on correlations with the cone penetrometer data, and the blow counts measured with the driven samplers were used to corroborate the results from the correlations. A comparison of the blow counts from the California sampler are compared in Appendix A with the SPT obtained from a correlation with the cone penetrometer data. Blow counts using a modified California sampler are adjusted to equivalent blows of a standard penetration test sampler (Picornell and del Monte, 1988; Lowe and Zaccheo, 1991). A multiplier of 2/3 was used to convert blows from the California sampler to an equivalent SPT value, although in clayey soils a slightly higher value could be justified. The blow count comparisons shown in Appendix A are not perfect, but provide some confidence in the SPT-blow counts deduced from the cone penetrometer data. In some cases the measured blow counts were less than inferred from the cone penetrometer results. When below the groundwater level, this difference is likely due to the water pressures inside the boring (hollow-stem auger) being less than that in the surrounding ground.

The boring log (B-1) was in general agreement with the stratification interpreted from the cone penetrometer results, but because of the five-foot sampling interval, the thickness of the layers shown on the boring logs may deviate from the thickness revealed by the cone data that provides a continuous record.

Groundwater was encountered at 26.5 feet in boring B-1. The CDGM seismic hazard report indicated a historically highest groundwater of approximately 10 feet (see Figure 3). Although the groundwater was encountered in Boring B-1 at a depth of 26.5 feet, a groundwater depth of 10 feet was assumed in liquefaction evaluation.

The results of liquefaction analysis, using the results from the cone penetrometer probes, are shown in Appendix D. When the computed factors of safety against liquefaction are less than 1.25, the site is considered to be susceptible to liquefaction. When the blow counts, corrected for overburden pressure, energy, rod length, borehole diameter, and sampling method, exceed 30, the soils are not considered susceptible to liquefaction. The analysis indicates that several thin layers (about 6 inches to one foot) at depths of 21.5 to 22.5, 30 to 30.5 feet would be subject to liquefaction during the assumed earthquake event.

Since the soils at the site may liquefy, further analyses were performed to evaluate the potential and extent of *lateral spreading*, *ground oscillation*, *flow failure*, *reduction of bearing strength*, and surface manifestations of *sand boils* and *ground fissuring*.

An evaluation of lateral spreading was made with the procedure described by Bartlett and Youd (1995). The results of this analysis show that lateral spreading is unlikely.

An evaluation of the potential of ground damage due to ground fissuring, ground oscillation, and sand boils occurring was made using the procedure of Ishihara (1985). This procedure is only valid for sites not susceptible to ground oscillation or lateral spread and is more of a qualitative than quantitative measure. This analysis showed, however, that the potential for ground damage is unlikely.

Since the site is relatively flat, the risk due to flow failure is considered unlikely. Any reduced bearing strength of the soils below the groundwater level is not expected to have a high risk on the structure, since the soil between the footings and the liquefied zone should provide an adequate bridge.

Settlement Due to Seismic Shaking

Granular soils, in particular, are susceptible to settlement during seismic shaking, whether the soils liquefy or not. Site processing, involving removal and recompaction of any shallow on-site soils that are loose and subject to seismically induced settlement, should effectively limit the potential for seismically induced settlement in these materials. The potential for earthquake-induced settlement, however, exists for deeper granular soils both above and below the groundwater level and was evaluated for the seismic event used to evaluate potential liquefaction, using the procedures of Tokimatsu and Seed (1987). This procedure is for relatively clean sands. Therefore, the blow counts, as in the liquefaction study, were adjusted for the fine content (Youd and Idriss, 1997). We computed a potential for earthquake-induced settlement of about 0.1 inch in the soils above the groundwater level and about 0.2 inches in the soils below the groundwater level and to a depth of 50 feet under multi-directional earthquake shaking.

Differential settlements due to seismic shaking are difficult to predict. An analysis of settlement data by Pease and O'Rourke (1997) show that settlement in the marina area of San Francisco during the Loma Prieta earthquake tended to increase with an increase in the thickness of submerged hydraulic fill. In areas where the hydraulic fill thickness was fairly uniform differential settlements were about one-half the maximum settlement. These differential settlements, however, typically occur over lateral distances of 150 feet or more. Although seismically induced settlement data are limited, estimates equal to be about two-thirds the total settlement appear reasonable (California Department of Conservation, 1997). In this case, differential settlements are estimated to be about 0.15 inches. Potential settlements of this order are probably of no concern structurally. Nevertheless, your structural engineer should evaluate the consequences of such settlement to the proposed structure.

Conclusions and Recommendations

Conclusions and Design Requirements
Based on the findings of our data review, subsurface exploration, laboratory testing, field testing, and engineering analysis, and within the scope of this study, the proposed development is feasible from a geotechnical engineering viewpoint, provided the recommendations in this report are incorporated into the building plans and implemented during construction. The following paragraphs discuss conditions that should be anticipated and provides specific mitigation during the design and construction phase of improvements.

Faults/Seismicity
Although no known active faults traverse through the subject site, like most of Southern California, the site lies within a seismically active area. Earthquake resistant structural design is recommended. Designing structures to be earthquake-proof is generally considered to be impractical, especially for private projects, due to cost limitations. Significant damage to structures may be unavoidable during large earthquakes. Structural design based on the 1997 UBC (Uniform Building Code) static-force procedure calls for the seismic parameters given previously in the section *Seismic Design Criteria*. These minimum code values are intended to protect life and may not provide an acceptable level of protection against significant cosmetic damage and serious economic loss. A significantly higher than code lateral design parameter (Z coefficient) would be necessary to further reduce potential economic loss during a major seismic event. Structural engineers, however, often regard higher than code values as impractical for use in structural design. The structural engineer and project owner must decide what level of risk is acceptable and to assign appropriate seismic values for use in structural design.

The site is subject to liquefaction and seismically induced settlement, as mentioned previously. Evaluations of building performance by Tokimatsu, Midorikawa, Tamura, Kuwayama, and Abe (1991) show that larger settlements occur to corner buildings, in buildings without adjacent structures on one or both sides, in buildings surrounded by lightweight structures, and in areas with greater separation between buildings. These results show the favorable impact of the confining effect of the whole building and adjacent structures in reducing the level of settlement. Buildings supported on continuous and mat foundations experienced less damage to the superstructure than buildings supported on individual footings without tie beams or with beams of low rigidity. Foundation or structural design measures, such as the use of continuous footings, mat foundations, structural slabs or deep foundations are mitigation measures. Other methods implemented alone or in conjunction with structural design measures, used to mitigate the potential for liquefaction and related phenomena include vibro-replacement, vibro-compaction, compaction piles, chemical or compaction grouting, and dynamic compaction. These ground improvement mitigation methods, however, may not be cost-effective solutions. The owners may wish to accept the potential risk of liquefaction and associated damage and use shallow continuous footings and slab-on-grade with proper site preparation for foundation support, provided the structural engineer can show that the anticipated differential settlement, as discussed below, will not cause a structural collapse. The risk of damage to the proposed structure due to a large earthquake cannot be totally eliminated, and obtaining appropriate insurance as a mitigation measure is strongly recommended.

Hazardous Materials
Advanced Geotechnical Services, Inc., has not been retained to provide any type of environmental assessment of the subject property, or to provide recommendations with respect to any contamination that might be present. An environmental consultant familiar with site characterization and current regulations should address the potential for future environmental concerns at the property.

Foundation Type

With proper site preparation, conventional shallow wall footings can be used for foundation support of walls, and spread footings can be used to support individual columns. Foundations for each structure should be totally founded in structural fill with a uniform thickness and a minimum thickness of 3 feet below the footings.

Removal Depths/ Expansion Potential

Our exploration indicated that the strength and compressibility of the upper soils are variable, based on visual observations and on measured moisture and dry density variations. In our opinion, these near-surface soils are not suitable in their present condition for the support of structures or other improvements, without the potential for detrimental foundation movements occurring. Furthermore, some of the surficial soils are susceptible to hydroconsolidation. Therefore, to mitigate these geotechnical hazards of the surficial soils, the upper soils will require removal and recompaction prior to construction of the improvements. Recommendations for minimum removal depths are given below in the section *Site Preparation*. Greater removal depths, however, may be required if the soils are wetter during construction than they were at the time of excavating the soil borings.

Exploratory Excavations

The locations and dimensions of excavations completed during site exploration should be noted relative to the future grading/building plans. Although boring backfill was tamped during placement, these materials are essentially uncompacted.

Settlement/Hydroconsolidation

In addition to the settlement due to seismic shaking, settlement will result from (1) the anticipated live and dead loads of the structure (2) the settlement of the fill and underlying soils due to the weight of the fill, and (3) swell or hydroconsolidation if moisture changes occur within the supporting soils. Settlement is expected to be less than 0.30 inches for a 30-inch wide wall footing with the anticipated live and dead loads and designed in accordance with the recommendations in this report. Additional foundation movement due to the weight of the fill and swell/hydroconsolidation is expected to be about 0.3 inches. The amount of differential movement due to these causes, including seismically induced and liquefaction, is expected to be about 0.50 inches.

The following additional geotechnical recommendations for site preparation, foundation and retaining wall design, slabs-on-grade, and drainage should be incorporated into final design and construction practice. All such work and design should be in conformance with local governmental regulations or the recommendations contained herein, whichever is more restrictive.

Drainage

All surface runoff must be carefully controlled and must remain a crucial element of site maintenance. Proper drainage and irrigation are important to reduce the potential for damaging ground/foundation movements due to hydroconsolidation and soil expansion or shrinkage. Final grading shall provide a positive drainage away from footings in compliance with the local jurisdiction's grading requirements or a minimum gradient of three%, whichever is greater, for a distance of at least 6 feet away from the structure for soil covered areas to reduce the risk of water ponding adjacent to the foundation. For areas abutting the structure covered with concrete for a distance of at least 6 feet away from the structure, a minimum gradient of 0.5% is acceptable. All pad drainage shall be collected and diverted away from proposed buildings in non-erosive devices. Gutters and roof drains should be provided, properly maintained, and discharge directly into glue-joined, watertight subsurface piping. A drainage system consisting of area drains, catch basins, and connecting lines should be provided to capture landscape/hardscape sheet flow discharge water. All drainage piping should be watertight and discharge directly to the street or storm drain.

In the case of basement walls or building walls retaining landscaping areas, a water proofing system should be used on the wall and joints, and a Miradrain drainage panel, or similar, should be placed over the water proofing. A perforated subdrain pipe of schedule 40 or better should be installed at the base of the wall below the floor slab and drained to the storm drain or curb. *Accordion* type pipe is not acceptable. Basement floors or floors below exterior grade should be water proofed. Your project architect or civil engineer should provide detailed specifications for all waterproofing.

All underground plumbing fixtures should be absolutely leak free. As part of the maintenance program, utility lines should be checked for leaks for early detection of water infiltrating the soils that could cause detrimental soil movements. Detected leaks should be promptly repaired. Proper drainage shall also be provided away from the building footings during construction. This is especially important when construction takes place during the rainy season.

Seepage of surface irrigation water or the spread of extensive root systems into the subgrade of footings, slabs, or pavements can cause differential movements and consequent distress in these structural elements. Trees and large shrubbery should not be planted so that roots grow under foundations and flatwork when they reach maturity. Landscaping planters immediately adjacent to structures or paved areas should not be used due to the potential for surface irrigation water to infiltrate either the foundation's subgrade or the pavement's subgrade and base course. Either drains to collect and transmit excess irrigation water to drainage structures, or impervious, above-grade or below-grade planter boxes with solid bottoms and a drainage pipe away from the structure should be used for plantings adjacent to structures. Where landscaping is planned adjacent to pavements, either a cut-off wall should be provided along the edge of the pavement or slab that extends at least 12 inches below the subgrade soil or the area should be lined with a ten-mil (or thicker) plastic moisture barrier. The walls of the moisture barrier should be near vertical and the area should be marked with warning tape to reduce the likelihood of the lining being torn by future digging. Seams of the moisture barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete. Landscaping should be planned with consideration for these potential problems.

Drainage systems should be well maintained, and care should be taken to not over or under irrigate the site. Landscape watering should be held to a minimum while maintaining a uniformly moist condition without allowing the soil to dry out. During extreme hot and dry periods, adequate watering may be necessary to keep soil from separating or pulling back from the foundations. Cracks in paved surfaces should be sealed to limit infiltration of surface waters.

Corrosion Protection

Corrosion of concrete due to sulfate attack is anticipated when the concentration of water-soluble sulfates is in excess of 1000 ppm in the near-surface soils. Concrete specifications should conform, as a minimum, to UBC requirements (Section 19, Table 19-A-4) for concrete exposed to sulfate.

If piping or concrete are placed in contact with deeper soils or structural fill using deeper soils, additional tests should be performed also to evaluate their corrosion potential. A detailed study of soil corrosivity was beyond the scope of this study. A corrosion engineer can be consulted to provide a more detailed evaluation of corrosion potential, including the corrosion potential of soils to metal objects and to other potential sources, such as stray currents and groundwater.

Plan Review

At this time, Advanced Geotechnical Services, Inc., has not been provided with a detailed plan of the proposed grading or the foundation. When these plans become available, they should be reviewed by our office prior to submittal to regulatory agencies for approval. Additional analysis may be required at that time depending on specific details of the proposed grading. Approval by this office will be indicated by manual signature and date once our recommendations have been incorporated into the design or shown as notes on the plan.

Additional Recommendations

The following additional geotechnical recommendations for site preparation, foundation and retaining wall design, and slabs-on-grade should be incorporated into final design and construction practice. If the anticipated differential settlements are found by your structural engineer to be unacceptable, mitigation for liquefaction and seismically induced differential settlements will be required, and some of the following recommendations may need to be modified. All such work and design should be in conformance with local governmental regulations or the recommendations contained herein, whichever are more restrictive.

Site Preparation

Building pads should be prepared so that each structure is totally founded in structural fill with a relatively uniform thickness. General guidelines are presented below to provide a basis for quality control during site grading. We recommend that all structural fills be placed and compacted with engineering control under continuous observation and testing by the Geotechnical Engineer and in accordance with the following requirements.

a. Remove all asphalt, concrete, vegetation, loose soil, and other deleterious materials prior to fill placement. The general depth of stripping should be sufficiently deep to remove the root systems and organic topsoils. A careful search shall be made for subsurface trash, abandoned masonry, abandoned tanks and septic systems, and other debris (including uncertified fill) during grading. All such materials, which are not acceptable fill material, shall be removed prior to fill placement. The removal of trees and large shrubs should include complete removal of their root structures.

b. In areas to receive fill or to support slab-on-grade construction, the existing soil to a depth (D_{er}) of 8 feet below the existing grade or a minimum of 8 feet (D_{rs}) below the bottom of the proposed slab, whichever is deeper, should be removed and recompacted as structural fill in the proposed construction areas. Furthermore, at footing locations (including those for retaining walls), the existing soil to a depth of 1.5-footing widths for square footings and 2.0-footing widths for continuous footings below the bottom of the proposed footings (D_{rf}) should be removed and recompacted as structural fill. The maximum depth of recompaction below footings (D_{rf}) for buildings and retaining walls can be limited to 6 feet. The maximum depth of recompaction below footings (D_{rf}) for garden walls or perimeter sound walls, however, can be limited to one foot. In parking areas, driveways, and flatwork areas, a minimum of 12 inches below either existing grade or the structural section, whichever is deeper, should be over-excavated and recompacted. A schematic showing removal depths is included for clarification in Figure 4 for building areas and in Figure 5 for slab-on-grade, flatwork, and pavement areas. During construction where footings are in close proximity, over-excavating the entire structural area may be desirable and less costly.

c. The exposed bottom of removal areas should be scarified, mixed, and moisture conditioned to a minimum depth of 8 inches. This thickness of scarification is included in the thickness of removal and recompaction mentioned above, unless the bottom is unstable and requires stabilization as discussed below. The scarified soil should be moisture conditioned to at least 2% but no more than 5% above optimum and compacted to a minimum 90% of the laboratory maximum dry density as determined by ASTM D1557 for soils with more than 15% fines and a minimum relative compaction of 95% for soils with 15% or less fines. Additional lifts should not be placed until the present lift has been tested and shown to meet the compaction requirements.

d. To reduce the risk of differential foundation movements, we recommend that all footings be supported on structural fill, and that the thickness of structural fill beneath the footings and slab area each be relatively uniform.

e. The removals can be limited to the proposed building, pavement, and fill areas but should extend a distance (L_h) not less than 10 feet outside the slab-on-grade areas or fill limits, and 5 feet outside pavement areas, except in situations where a physical constraint, such as a property line or adjacent structure, would prevent such removals from being made. Removal limits for footings of buildings or accessory structures (e.g., garden walls) need only extend beyond the hardscape footprint a distance equal to the removal depth below the footing. A careful search shall be made for deeper loose soil spots during grading operations. If encountered, these loose spots should be properly removed to the firm underlying soil and properly backfilled and compacted as directed by a representative of the Project Geotechnical Engineer. If the excavation to remove existing subsurface structures, pipelines, and loose fill soils extends below the minimum recommended depth of over-excavation, we recommend that all subsurface structures, utility lines, and uncontrolled fill extending below the over-excavation depth be removed to expose undisturbed, native soils across the entire building pad.

f. The lateral limits and the depths of the removals should be shown by the civil engineer on the grading plans.

g. Due to the high moisture content, shallow groundwater, and high compressibility of the on-site native soil, additional stabilization of the removal bottom may be required. Acceptable stabilization methods include using (1) float rock worked into the soft soils and covered with a filter fabric, (2) geofabric, such as Mirafi Fabric 600X, with a 24-inch-wide overlap, or (3) a combination. Some compaction effort should be used when working thin lifts of float rock into the excavation bottom. A 12- to 24-inch thick zone may be required to adequately bridge an unstable bottom when using geofabric, and this zone is not to be included in the required thickness of fill beneath either slabs or footings unless it meets the compaction requirements. Another alternative is to stabilize the bottom by drying out the soils with the use of either lime or cement additives (about 5% by weight), moisture conditioning, mixing, and compacting to a minimum relative compaction of 90%.

h. All fill materials should be placed in controlled, horizontal layers not exceeding 6 to 8 inches thick and moisture conditioned to at least 2% but no more than 5% above optimum. Fill materials with more than 15% fines should be compacted to a minimum 90% of the laboratory maximum dry density, as determined by ASTM D1557, and fill materials with 15% or less fines should be compacted to a minimum relative compaction of 95%. If either the moisture content or relative compaction does not meet these criteria, the Contractor should rework the fill until it does meet the criteria. If the fill materials pump (flex) under the weight of construction equipment, difficulties in obtaining the required minimum compaction may be experienced. Therefore, if soil pumping occurs, it may be necessary to control the moisture content to a closer tolerance (e.g., 2% to 3% above optimum).

i. If construction delays or the weather result in the surface of the fill drying, the surface should be scarified and moisture conditioned before the next layer of fill is added. Each new layer of fill should be placed on a rough surface so planes of weakness are not created in the fill.

j. The soils beneath slabs and footings, however, should be moisture conditioned to at least 3% but no more than 5% above optimum moisture content to a depth of 24 inches below the lowest adjacent, final grade. During foundation construction, including any concrete flatwork, construction sequences should be scheduled to reduce the time interval between subgrade preparation and concrete placement to avoid drying and cracking of the subgrade or the surface should be covered or periodically wetted to prevent drying and cracking.

k. Subgrade for the support of pavement sections should be moisture conditioned, as required, to obtain a moisture content at least 2% but no more than 4% above optimum, and recompacted to at least 95% of the maximum dry density to a depth of at least 12 inches.

l. The excavated site soils, cleaned of deleterious material, can be re-used for fill. Rock larger than 6 inches should not be buried or placed in compacted fill. Rock fragments less than 6 inches may be used provided the fragments are not placed in concentrated pockets or within 3 feet of final grade, and a sufficient percentage of finer grained material surrounds and infiltrates the rock voids. Furthermore, the placement of any rock must be under the continuous observation of the Geotechnical Engineer.

m. Each layer of fill under the building area within the upper 24 inches of the finished pad grade should be of similar composition to provide a relatively uniform expansion index beneath the building. Selective grading should be performed to either place the more expansive soils in the deeper portion of the fill or to mix the more expansive soils with less expansive soils.

n. Representative samples of material to be used as compacted fill should be analyzed in the laboratory by the Geotechnical Engineer to determine the physical properties of the materials. If any materials other than that previously tested is encountered during grading, the appropriate analysis of this material should be conducted by the Geotechnical Engineer as soon as practicable. The Geotechnical Engineer or their representative prior to placement should approve any soil imported from off-site sources. Imported material should preferably have less than 15% by weight passing the number 200 sieve, a maximum plasticity index of 10, and a liquid limit less than 25.

o. The grading contractor has the ultimate responsibility to achieve uniform compaction in accordance with the geotechnical report and grading specifications.

p. All grading work shall be observed and tested by the Project Geotechnical Engineer or their representative to confirm proper site preparation, excavation, scarification, compaction of on-site soil, selection of satisfactory fill materials, and placement and compaction of fill. All removal areas and footing excavations shall be observed by the representative of the Project Geotechnical Engineer before any fill or steel is placed.

Utility Trench Backfill

The on-site soils are suitable for backfill of utility trenches from one foot above the top of the pipe to the surface, provided the material is free of organic matter and deleterious substances. The natural soils should provide a firm foundation for site utilities, but any soft or unstable material encountered at pipe invert should be removed and replaced with an adequate bedding material.

The site Civil Engineer in accordance with manufacturer's requirements should specify the type of bedding materials. If the on-site soils are not compatible with the pipe manufacturer's requirements, suitable nonexpansive, granular soils may need to be imported for bedding or shading of utilities. Jetting of bedding materials should not be permitted unless appropriate drainage is provided and the bedding has a sand equivalent greater than 50.

Trench backfill should be placed in 8-inch lifts, moisture conditioned to at least 2% but no more than 5% above the optimum moisture content, and compacted to at least 90% of the maximum density as determined by ASTM D1557, with the exception of the one foot below subgrade in areas to be paved, which should be compacted to 95% of the maximum dry density. If the contractor can demonstrate minimum compaction requirements can be achieved with thicker lifts, the acceptable lift thickness may be increased. Jetting of trench backfill is not acceptable to compact the backfill.

Major underground utilities shall not cross beneath buildings unless specifically approved by the Project Civil Engineer and respective utility company. If approved, trenches crossing building areas shall be backfilled with a select gravelly sand compacted to 95% relative compaction and at a moisture content at least 2% but no more than 4% above optimum moisture.

Temporary Excavations

Temporary excavations of 5 feet or less in height in on-site soils may not require any special shoring. Vertical excavations more than 5 feet deep, if necessary, will, however, require conventional shoring per CAL/OSHA Regulations, or the excavation may be laid back with a 1(H):1(V) gradient. Excavations should not be allowed to become soaked with water or to dry out. Surcharge loads should not be permitted within a horizontal distance equal to the height of the excavation from the top of the excavation, unless the excavation is properly shored. Excavations that might extend below an imaginary plane inclined at 45 degrees below the edge of an existing foundation should be properly shored to maintain foundation support of the existing structure.

In areas where sloped excavations are not feasible, shoring systems should be used. Shoring systems may consist of typical trench shores or cantilever or braced piling system. Metal, plywood, or timber sheeting should be used between piles or brace locations to provide lateral support, preventing sloughing of loose or soft soils or loss of adjacent existing improvements. Shoring or bracing should be in conformance with OSHA regulations. The contractor should be responsible for the design and implementation of shoring systems and safe working conditions, but as an aid in the design of the system, the lateral earth pressures include in Figure 6 may be used to design temporary shoring. Surcharge loads (e.g., construction equipment, soil stockpile, traffic) should not be permitted within a horizontal distance equal to the height of the excavation from the top of the excavation, unless the excavation is properly shored to account for the surcharge loads. Excavations that might extend below an imaginary plane inclined at 45 degrees below the edge of an existing foundation (including poles) should be properly shored to maintain foundation support of the existing structure.

Shallow Foundations

The following foundation recommendations may be used for structures supported by shallow footings, subject to the guidelines mentioned earlier in the section *Site Preparation* and the settlement criterion given earlier.

a. Exterior footings should have a minimum embedment depth (D_e) of 24 inches, and interior footings should have a minimum embedment depth (D_i) of 24 inches. These depths are below the lowest adjacent, final grade. Where located adjacent to utility trenches, footings should extend below a one-to-one plane projected upward from the inside bottom of the trench.

b. Continuous footings should have a minimum width of 12 inches. Isolated or spread footings should have a minimum width of 24 inches.

c. An allowable net vertical soil bearing pressure of 2000 psf, including dead and live loads, may be used for footings founded on compacted fill at the minimum required embedment depths, provided the footing width equals or exceeds the recommended minimum.

d. The above bearing value may be increased by 400 psf for each additional foot of width or 400 psf for each additional foot of embedment above the minimum to a maximum allowable bearing capacity of 3000 psf. The bearing capacity can be increased by one-third (⅓) when considering short duration wind or seismic loads.

e. Footings should be reinforced. Structural details of the footings, such as footing thickness, concrete strength, and amount of reinforcement, should be established by your structural engineer and, as a minimum, be in accordance with requirements of an expansion index category of very low (0-20). If the soil type encountered during grading differs from the specimen tested during this study, expansion index tests should be performed at the time of grading to confirm the conditions on which these recommendations are based.

f. For design, resistance to lateral loads can be assumed to be provided by friction along the base of the foundation and by passive earth pressures on the side of the footing. An allowable friction coefficient of 0.3 may be used with the vertical dead loads, and an allowable lateral passive pressure of 250 psf per foot of depth, with a maximum of 2500 psf, can be utilized for the sides of footings poured against recompacted soil to resist lateral loads. These allowable values can be increased by a factor of 1.5 to convert from allowable to ultimate values.

g. Prior to placing concrete in the footing excavations, an observation should be made by the representative of the Project Geotechnical Engineer to confirm that the footing excavations are free of loose and disturbed soils and are embedded in the recommended earth materials.

Slab-On-Grade

If earthwork operations are conducted such that the construction sequence is not continuous or if construction operations disturb the surface soils, we recommend that the exposed subgrade to support concrete slabs be tested to verify adequate compaction and moisture conditions. If adequate compaction and moisture conditions are not demonstrated, the disturbed subgrade should be over-excavated, scarified, and recompacted in accordance with the guidelines in *Site Preparation*.

We recommend that concrete slabs be reinforced. The structural details, such as (1) slab thickness, (2) concrete strength, (3) type, amount, and placement of reinforcing, (4) structural connection between slab and footings, and (5) joint spacing, should be established by your structural engineer and, as a minimum, be in accordance with the requirements of an expansion index category of very low (0-20).

We recommend that a ten-mil (or thicker) plastic vapor barrier be used under floor slabs in moisture sensitive areas. The placement of the vapor barrier should be selected by either your civil engineer or structural engineer giving consideration to the factors discussed in ASTM E1643. In those areas where a moisture barrier is not used, a 4-inch thick sand layer should be placed beneath the slab. The sand should be classified as a *clean sand* (with less than 5% fines in accordance with ASTM D2488). Seams of the vapor barrier should be overlapped and sealed.

Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete.

Cracking of concrete flatwork can occur and is relatively common. Reinforcement and crack control joints are intended to reduce the risk of concrete slab cracking. If cracks develop in concrete slabs during construction (for example, due to shrinkage), your structural engineer should evaluate the integrity of the slab. Also, concrete slabs are generally not perfectly level, but they should be within tolerances included in the project specifications.

Tile flooring can crack, reflecting cracks in the underlying concrete slab. Therefore, if tile flooring is used, the slab designer should consider additional steel reinforcement, above minimum requirements, in the design of concrete slab-on-grade where tile will be installed. Furthermore, the tile installer should consider installation methods, such as using a vinyl crack isolation membrane between the tile and concrete slab, to reduce the potential for tile cracking.

Retaining Wall Design Criteria
Foundations for retaining walls can be designed in accordance with the sections, *Site Preparation* and *Shallow Foundations*.

The earth pressure behind any buried wall depends on the allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, any hydrostatic pressures, and compaction effort. The following equivalent fluid pressures are recommended for vertical walls with no hydrostatic pressure, no surcharge, no seismic effects, and a backfill slope with a gradient less (flatter) than 5(H):1(V).

Wall Movement	Equivalent Fluid Unit Weight, pcf			
	Clean Sand or Gravel Backfill (GW, GP, SW, SP)	Silty Gravel Backfill (GM, GM-GP, SM-SP)	Clayey Sand, Clayey Gravel Backfill (SC, SG)	Silts, Clays, Silty Fine Sand Backfill (CL, ML, SM)
Free to Deflect	30	40	45	55
Restrained	45	60	70	80

In areas where the backslopes are steeper than 5(H):1(V), the equivalent unit weights in the above table should be increased by 13 pcf for gradients of 2(H):1(V) and 30 pcf for gradients of 1.5(H):1(V).

The above values are applicable for backfill placed between the wall stem and an imaginary plane rising at a 45-degree angle from below the edge (heel) of the wall footing. If the on-site soil is used as backfill within this zone, the equivalent fluid unit weight associated with a soil classification of SM should be used.

The surcharging effect of anticipated adjacent loads on the wall backfill due to traffic, footings, or other loads, should be included in the wall design. The magnitude of lateral load due to surcharging depends on the magnitude of the surcharge, the size of the surcharge loaded area, the distance of the surcharge from the wall, and the restraint of the wall. We can provide assistance in evaluating the effects of surcharge loading and seismic loading, if desired, once details are known and provided.

Except for the upper 2 feet, the soil immediately adjacent to backfilled retaining walls should be free-draining filter material (such as Caltrans Class 2 permeable material) with a minimum horizontal distance of 2 feet. Weep holes and/or drainpipes, as appropriate, should be installed at the base of these walls. In lieu of filter material, crushed stone protected from clogging with the use of synthetic fabric between the natural soil and the gravel may be used. Subdrain pipe material should consist of a minimum 4-inch-diameter perforated PVC pipe meeting ASTM D2729 or better. *Accordion* or similar type pipe is not acceptable for subdrain pipe. The top 2 feet should be backfilled with less permeable compacted fill to reduce infiltration. Figure 7 shows typical drainage details for retaining walls. Waterproofing exterior retaining walls should be considered to mitigate the potential for efflorescence on the face of the walls.

During grading and backfilling operations adjacent to any wall, heavy equipment should not be allowed to operate within 5 feet laterally of the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand-operated equipment should be used to compact the backfill soils.

The retaining wall backfill should be benched into the backcut where the backcut is sloped less than (flatter) 0.75(H):1.0(V).

Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal 1 to 2% deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The spacing between the wall and deck will require periodic caulking to prevent water intrusion into the retaining wall backfill.

Observations and Testing

Prior to the start of site preparation and/or construction, we recommend that a meeting be held with the contractor to discuss the project. We recommend that Advanced Geotechnical Services, Inc., be retained to perform the following tasks prior to and/or during construction.

a. Review grading, foundation, and drainage plans to verify that the recommendations contained in this report have been properly interpreted and are incorporated into the project specifications. If we are not accorded the opportunity to review these documents, we can take no responsibility for misinterpretation of our conclusions and recommendations.

b. Observe and advise during all grading activities, including site preparation, foundation and retaining wall excavation, and placement of fill, to confirm that suitable fill soils are placed upon competent material and to allow design changes if subsurface conditions differ from those anticipated prior to the start of construction.

c. Observe the installation of all drainage devices.

d. Test all fill placed for engineering purposes to confirm that suitable fill materials are used and properly compacted.

Limits and Liability

All building sites are subject to elements of risk that cannot be wholly identified and/or entirely eliminated. Building sites are subject to many detrimental geotechnical hazards, including but not limited to the effects of water infiltration, erosion, concentrated drainage, total settlement, differential settlement, expansive soil movement, seismic shaking, fault rupture, landsliding, and slope creep. The risks from these hazards can be reduced by employing subsurface exploration, laboratory testing, analyses, and experienced geotechnical judgment. Many geotechnical hazards, however, are highly dependent on the property owner properly maintaining the site, drainage facilities, and slope and by correcting any deficiencies found during occupancy of the property. Even with a thorough subsurface exploration and testing program, significant variability between test locations and between sample intervals may exist. Ultimately, geotechnical recommendations are based on the experience and judgment of the geotechnical professionals in evaluating the available data from site observations, subsurface exploration, and laboratory tests. Latent defects can be concealed by earth materials, deposition, geologic history, and existing improvements. If such defects are present, they are beyond the evaluation of the geotechnical professionals. No warranty, expressed or implied, is made or intended in connection with this report, by furnishing of this report, or by any other oral or written statement. Owners and developers are responsible for retaining appropriate design professionals and qualified contractors in developing their property and for properly maintaining the property. Retaining the services of a geotechnical consultant should not be construed to relieve the owner, developer, or contractors of their responsibilities or liabilities.

The analysis and recommendations submitted in this report are based in part on our subsurface exploration, laboratory testing, site observations, and provided data on geology and the proposed site development. Our descriptions and the boring logs may show distinctions between fill and native soils, between native (e.g., alluvium, colluvium, slopewash) and bedrock formation, and between soil type (e.g., sands and silty sands). Such distinctions were based on geologic information, grading plans when available, intermittent recovered soil/bedrock samples, and judgment. Delineations between these categories of materials may not be perfect and may be subject to change as more information becomes available. For example, judgments may be clouded when recovered samples are intermittent and small in comparison to the volume of soil under study, and macrostructure that would aid the identification process are not as apparent as they would be when the borehole is geologically downhole logged by entering the excavation. When the age of the fill is old, the difference between the structure of the fill and native may be less pronounced, or the degree of bedrock formation weathering sometimes makes it difficult to distinguish between overlying alluvium, colluvium, or slopewash and bedrock formation. In general, our recommendations are based more on the properties of the materials than on the category of the material type such as fill, alluvium, colluvium, slopewash, or bedrock formation. Furthermore, the actual stratigraphy may be more variable than shown on the logs.

This report is not intended for use as a bid document. Any person using this report for bidding or construction purposes should perform such independent investigation as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered. The nature and extent of variations in subsurface conditions may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Although this report may comment or discuss construction techniques or procedures for the design engineer's guidance, this report should not be interpreted to prescribe or dictate construction procedures or to relieve the contractor in any way of their responsibility for the construction.

Please be aware that the contract fee for our services to prepare this report does not include additional work that may be required, such as grading observation and testing, footing observations, plan review, or responses to governmental (regulatory) plan reviews associated with you obtaining a building permit. Where additional services are requested or required, you will be billed for any equipment costs and on an hourly basis for consultation or analysis.

The geotechnical engineer's actual scope of work during construction is very limited and does not assume the day-to-day physical direction of the work, minute examination of the elements, or responsibility for the safety of the contractor's workers. Our scope of services during construction consists of taking soil tests and making visual observations, sometimes on only an intermittent basis, relating to earthwork or foundation excavations for the project. We do not guarantee the contractor's performance, but rather look for general conformance to the intent of the plans and geotechnical report. Any discrepancy noted by us regarding earthwork or foundations will be referred to the owner, project engineer, architect, or contractor for action.

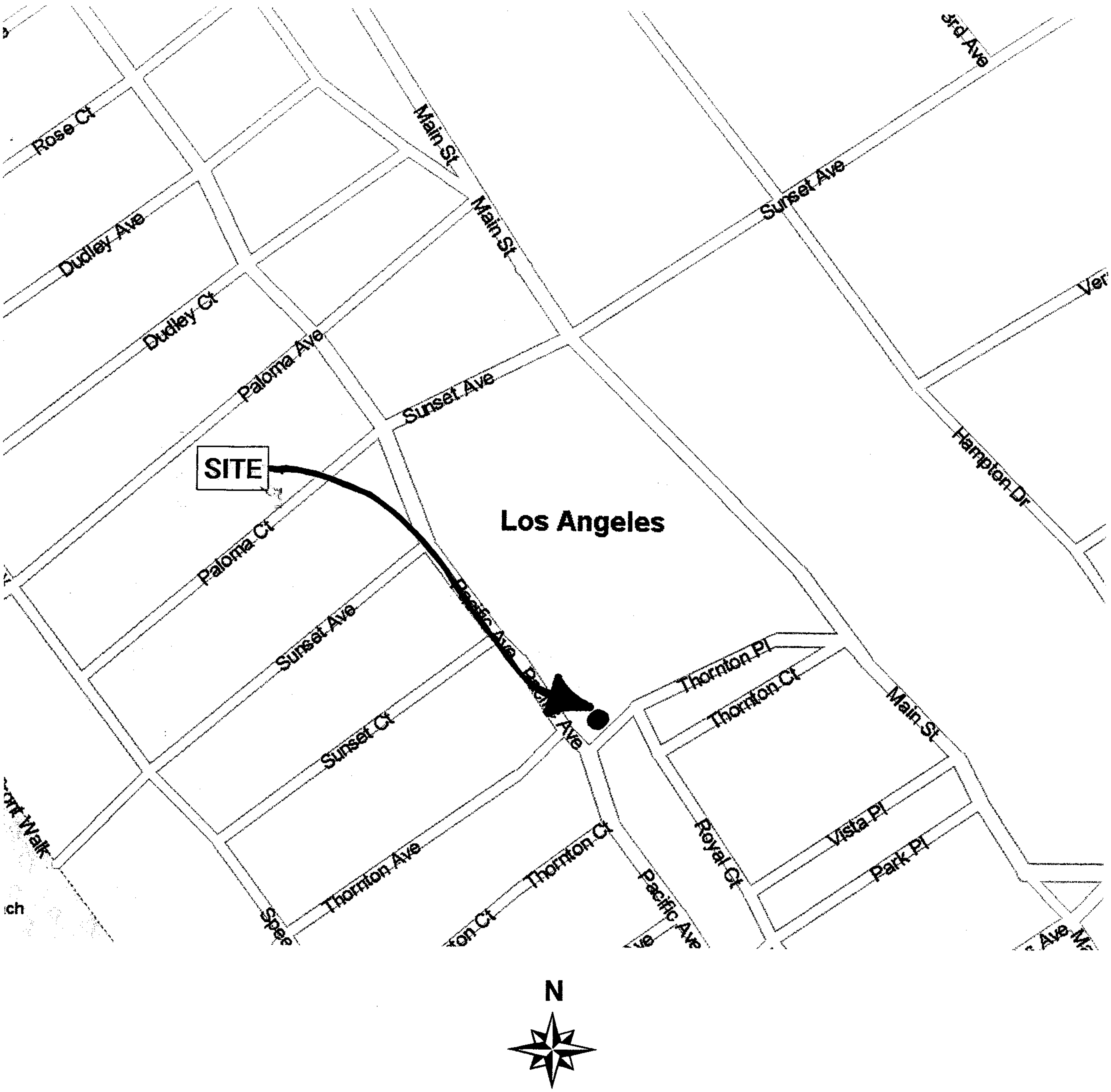
This report is issued with the understanding that it is the responsibility of the Owner, or of their representative, to ensure that the information and recommendations contained herein are called to the attention of the Architect and Engineers for the project and incorporated into the plan and that the necessary steps are taken to see that the Contractor carry out such recommendations in the field. Advanced Geotechnical Services, Inc., has prepared this report for the exclusive use of the Client and authorized agents, and this report should not be considered transferable. We do recommend, however, that the report be given to future property owners for the sole purpose of disclosing the report findings.

Findings of this report are valid as of the date of issuance. Changes in conditions of a property may occur with the passage of time whether attributable to natural processes or works of man on this or adjacent properties. Furthermore, changes in applicable or appropriate standards occur due, for example, to legislation and broadening of knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to our review and remains valid for a maximum period of one year, unless we issue a written opinion of its continued applicability thereafter.

In the event that any changes in the nature and design (including structural loadings different from those anticipated), or other improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report may be subject to review by controlling agencies, and any modifications they deem necessary should be made a part thereof, subject to our technical acceptance of such modifications. All submissions of this report should be in its entirety. Under no circumstances should this report be summarized and synthesized to be quoted out of context for any purpose.

Test findings and statements of professional opinion do not constitute a guarantee or warranty, and no warranties, either expressed or implied, are made as to the professional advice provided under the terms of this agreement. We have strived, however, to provide our services in accordance with generally accepted geotechnical engineering practices in this community at this time.



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Site Location Map

Client Number	3283	Figure	1
Report Number	6477		

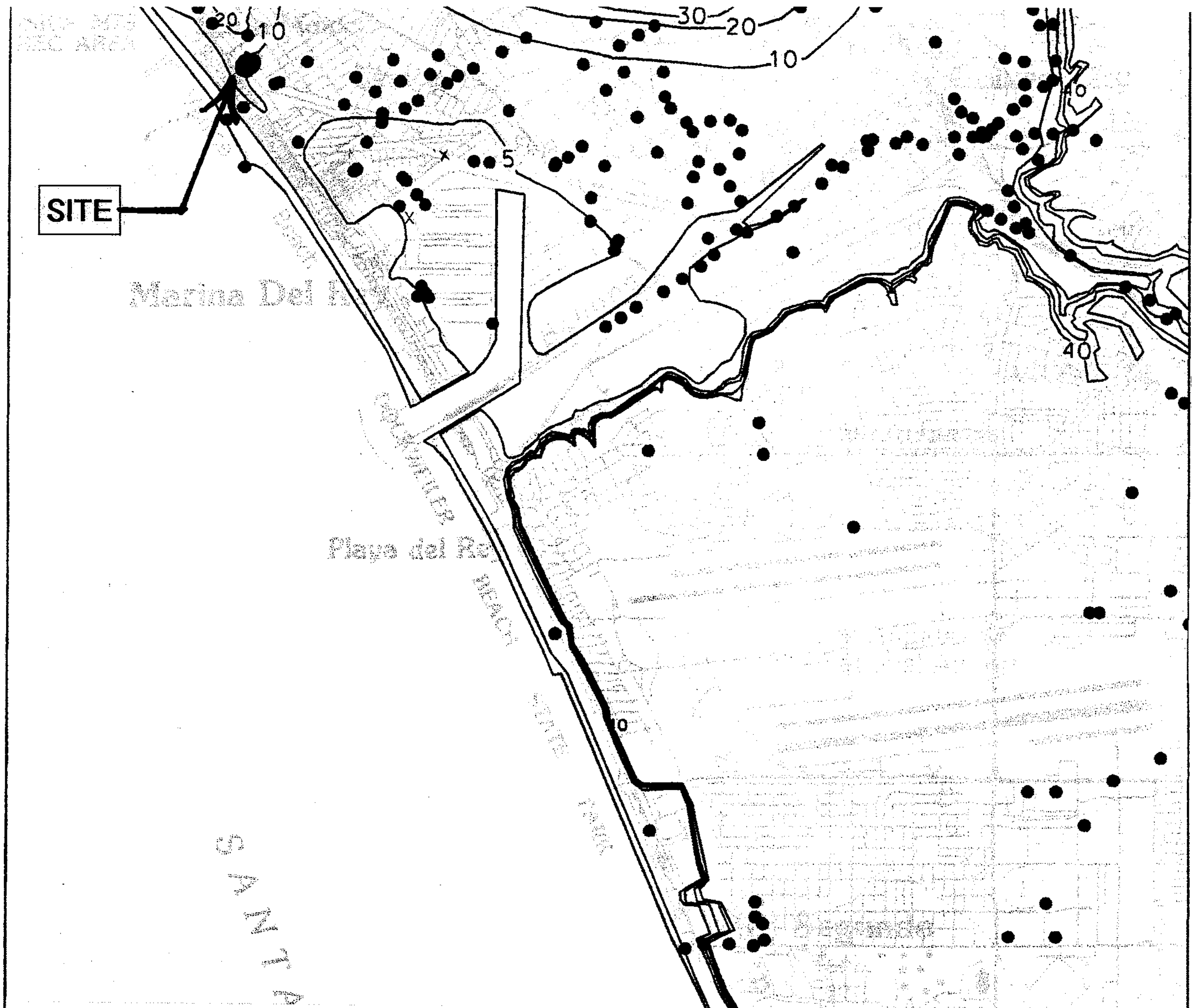

Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Venice Quadrangle.

● Borehole Site

30 Depth to ground water in feet

X Site of historical earthquake-generated liquefaction. See "Areas of Past Liquefaction" discussion in text.

ONE MILE

SCALE

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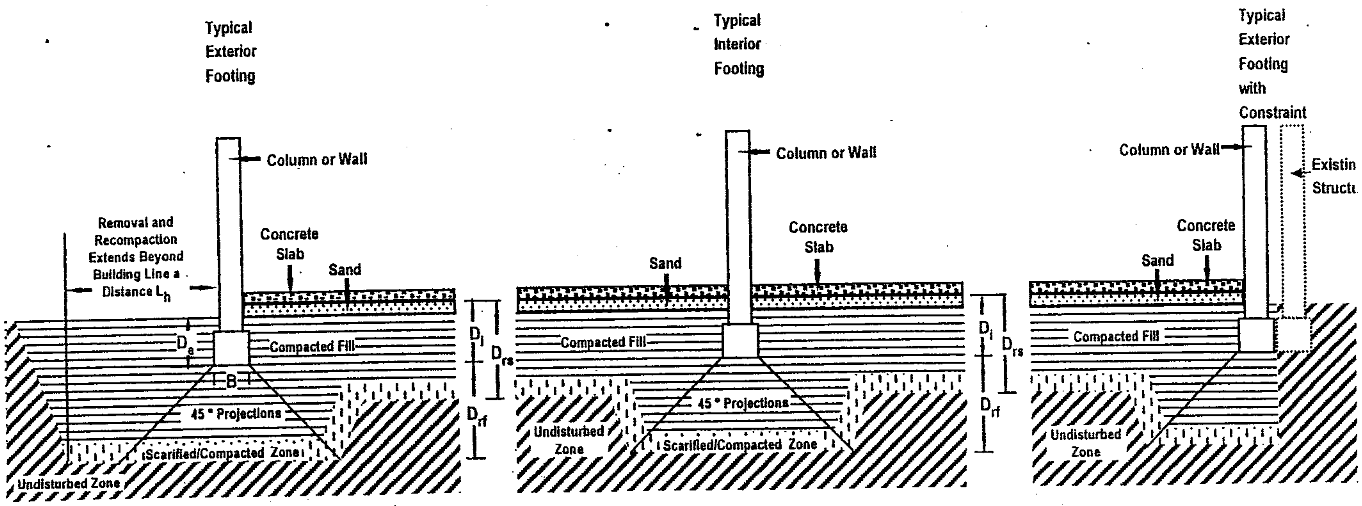
CDMG Historic Groundwater Table

Client Number	3283	
Report Number	6477	Figure 3



Notes
B= Footing Width
See Text for Definitions of Other Parameters
Drawing Not to Scale

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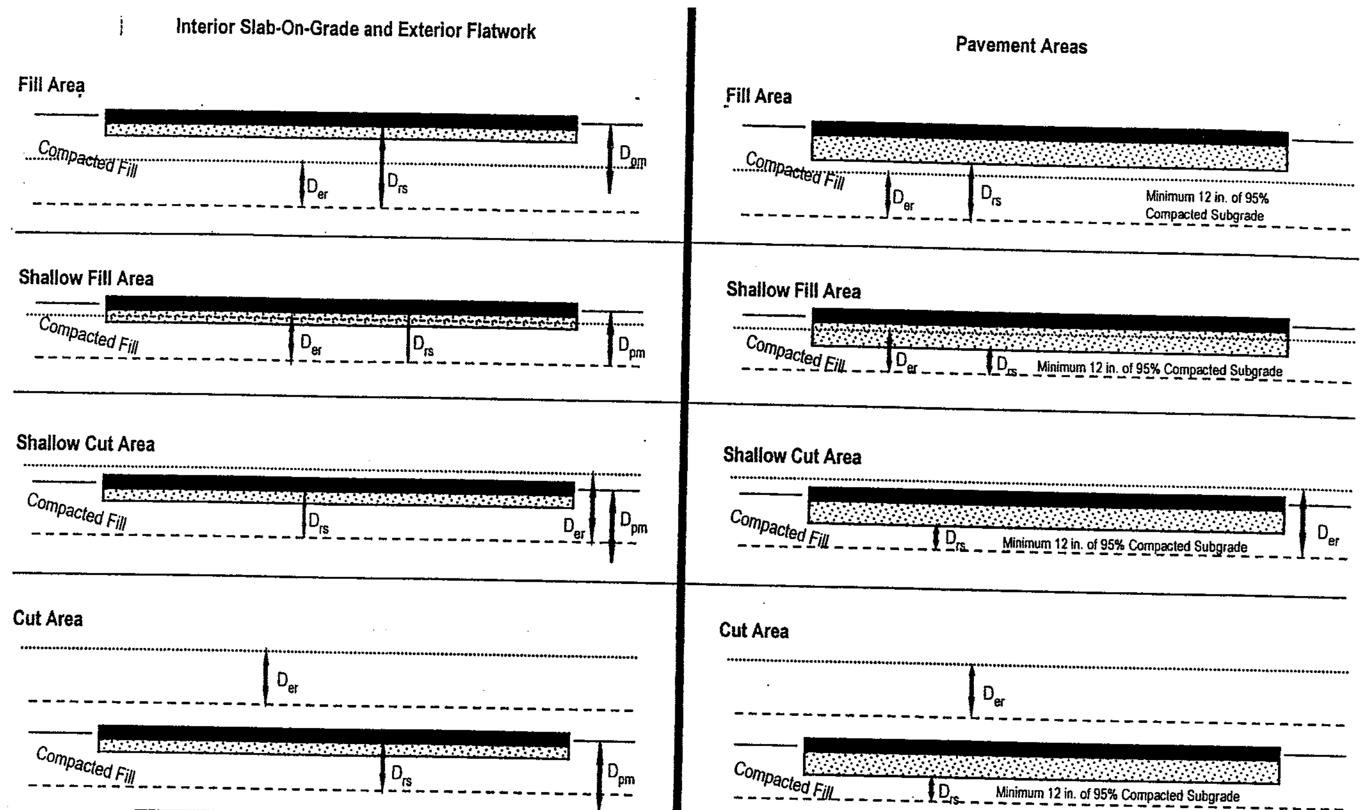
Removal Depths
Building Area

Client Number	3283	
Report Number	6477	Figure 4



Legend

Symbol	Description	Symbol	Description	Symbol	Description
———	Final Grade	(solid black bar)	Slab or Pavement	D_{er}	Minimum Removal Depth Below Exisitng Grade
....	Existing Grade	(stippled bar)	Sand or Base	D_{rs}	Minimum Removal Depth Below Slab or Structural Section
- - - - - - - -	Removal Depth, Greater of D_{er} or D_{rs}, Corresponds to Bottom of Scarified Zone			D_{pm}	Depth of Premoistening Zone

Note: Minimum removal depths [D_{er}, D_{rs}] may differ for interior slabs, exterior flatwork, and pavement areas. See *Site Preparation* section of report for details.

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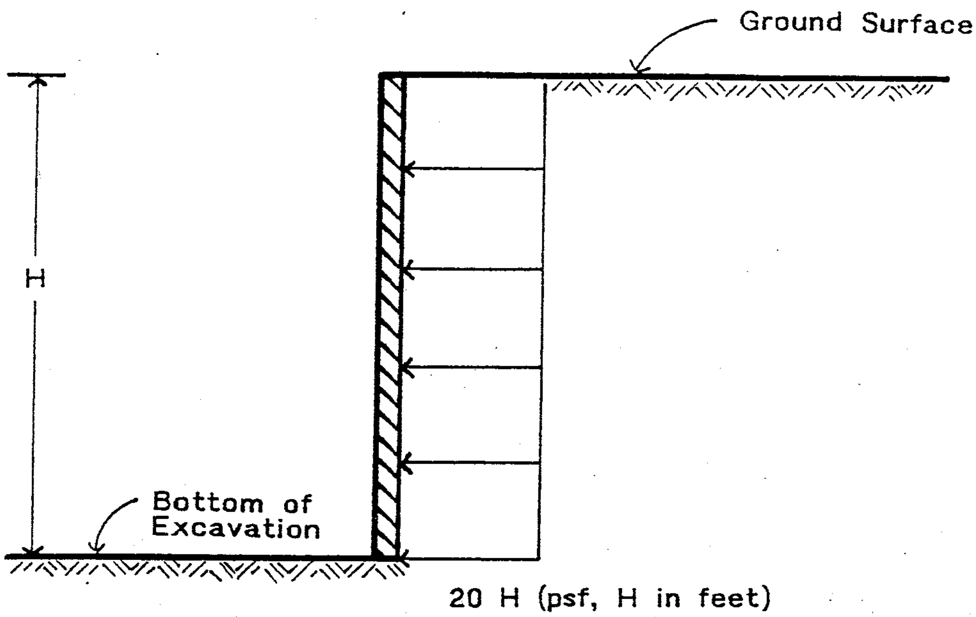
Removal Depth Examples for Interior Slab-On Grade, Flatwork, and Pavements

Client Number	3283	Figure 5
Report Number	6477	



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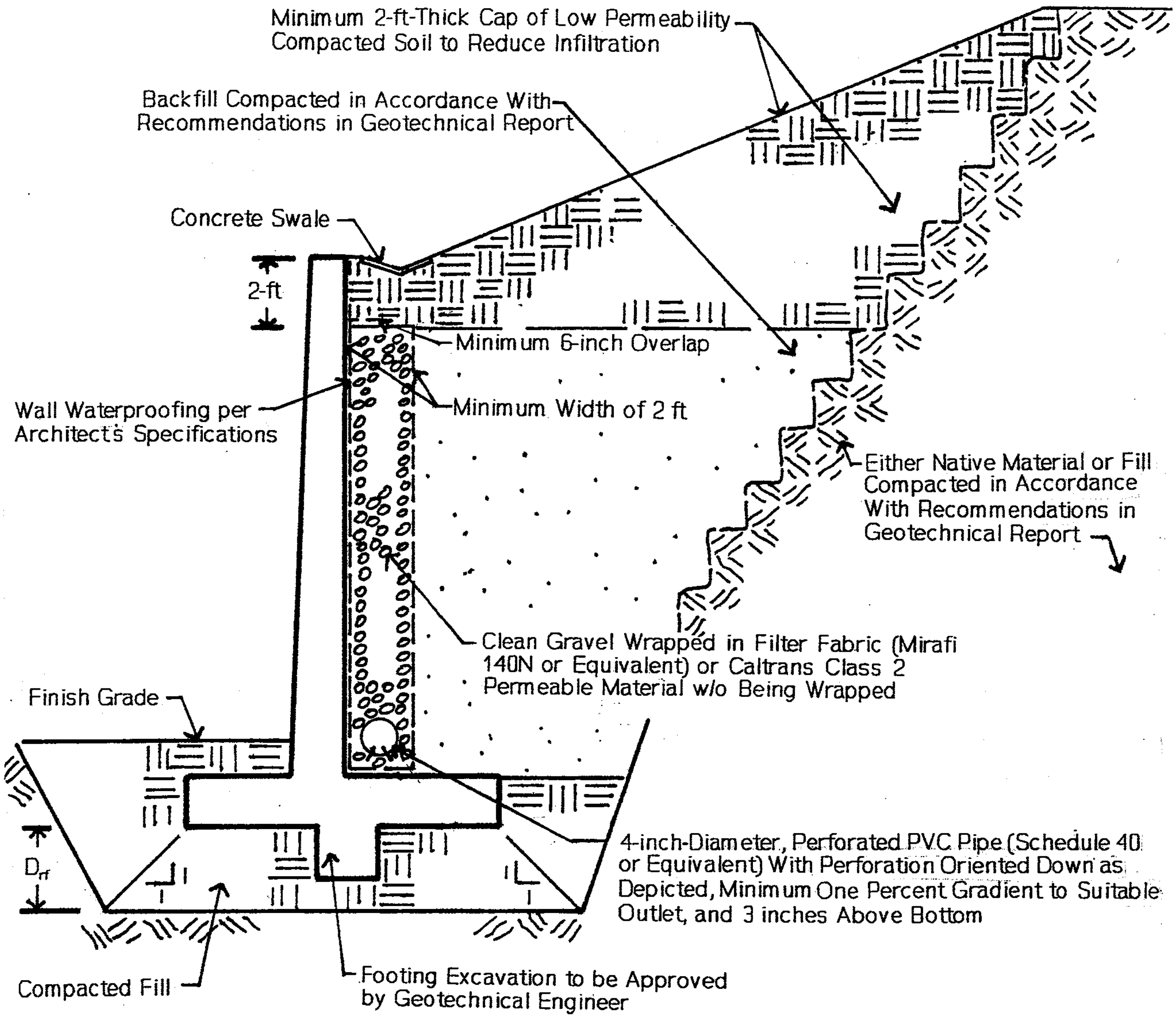
Lateral Pressures for Temporary Excavations

Client Number	3283	
Report Number	6477	Figure 6



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Typical Retaining Wall Drainage Detail

Client Number	3283	
Report Number	6477	Figure 7

Appendix A

Field Exploration and Boring Logs

Appendix A
Field Exploration and Boring Logs

The field exploration included a site reconnaissance and subsurface exploration. During the site reconnaissance, the surface site conditions were noted, and the approximate locations of any exploration points were determined. The following descriptions of exploration methods are generic and may include methods not used on this project. Reference to the boring logs can be made to determine which methods are applicable to this project, and any differences between what is described below and actually occurred is described on the boring logs or in the main body of the report.

The test borings were advanced by either hand digging, digging with a backhoe, or drilling. In the case of drilling, a truck-mounted rotary drilling rig with a hollow-stem auger or bucket was used to advance the borings. When we expect to encounter shallow groundwater, a wet rotary drilling operation will be used. The method actually used is noted on the boring logs. For geologic studies when the need for visual examination of the bedding and other stratigraphic features is needed along with engineering data, the larger bucket augers are used to allow a geologist to enter the excavation for visually logging the hole. When geologically logging borings and trenches, the sides are scraped prior to logging. A prefix B is used to designate a boring made with a drilling rig. When hand dug, the boring numbers have a prefix HB. When a backhoe was used, prefixes TP (test pit) or T (trench) are used. The difference between a trench and test pit being the length of the exploration; a trench being a long narrow exploration, most commonly used for fault studies. In each case, the soils were logged by technical personnel from our office and visually classified in the field in general accordance with the Unified Soil Classification system. The field descriptions have been modified as appropriate to reflect laboratory results.

Relatively undisturbed samples of the subsurface materials were obtained at appropriate intervals in the borings using a steel drive sampler (2.5-inches inside diameter, 3-inches outside diameter) lined with brass, one-inch high sample rings with a diameter of 2.4 inches. This is referred to as a modified California sampler. The boring may be advanced by drilling with a hollow-stem auger or with a wet rotary operation. If below the groundwater, the hollow-stem is filled with water or drilling mud to counteract the fluid pressure of the groundwater. The sampler was usually driven into the bottom of the borehole with successive drops of a 140-pound safety hammer connected to the sampler with either A or AW rod and falling 30 inches. An automatic hammer is usually used when drilling with a CME dill rig, and a Safe-T-Driver is used when drilling with a Mobile drill rig. When above the groundwater level, a downhole Safe-T-Driver is usually used. Studies have shown that hammer efficiencies of the automatic hammer is over 90% (Goble Rausche Likins and Associates, 1998; Riggs, Schmidt, and Rassieur, 1983; Riggs, Mathes, and Rassieur, 1984) while that of the Safe-T-Driver is about 70% (Kovacs, Evans, and Griffith, 1975; Kovacs, Griffith, and Evans, 1978), based on impact velocities. When a bucket auger is used to advance the boring, the driving weights change with depth, depending on the weight characteristics of the telescoping kelley bar, but the height of fall is usually 18 inches. Sampler driving resistance, expressed as blows per 6 inches of penetration, is presented on the boring logs at the respective sampling depths. When the borings or trenches are excavated with a backhoe, the sampler is pushed into the soil with the force of the backhoe. A hand sampler is used when the borings or trenches are advanced by hand digging or in some cases when a backhoe is used to make the excavation. This hand sampler is similar to the conventional California sampler, but lighter weight. An approximately 8-pound hammer falling about 18 inches is used to drive the hand sampler about 6 inches into the bottom of the exploration. The type of sampler used is noted on the boring logs. In some cases the hammer weight and falling distance deviate from those given above. The actual conditions are shown on the boring logs and supersede the conditions given above.

Ring samples were retained in close-fitting, moisture tight containers for transport to our laboratory for testing. Bulk samples, which were collected from cuttings, were placed in bags and transported to our laboratory for testing.

When noted on the boring logs, standard penetration test (SPT) samples were obtained using either a 20-inch or a 32-inch long split-barrel sampler with a 2-inch outside diameter and a 1.375-inch inside diameter when liners are used (1.5-inch inside diameter without liners). Unless noted otherwise, liners are used. This sampler is driven into the soil with successive drops of a 140-lb, safety hammer falling 30 inches. The blows are recorded for each 6 inches of penetration for a total penetration of 18 or 24 inches. The sum of the number of blows for the last 12 inches of an 18-inch penetration or the middle 12 inches of a 24-inch penetration is referred to as the *N* value.

Elevations of the ground surface, if shown on the logs, were determined at the boring locations using a topographic map or determined by using a temporary bench mark shown on the site plan.

Logs, which are presented on Plates at the end of this Appendix, include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and drilling information. Keys to soil and bedrock symbols and terms are included on Plates A-1 and A-2.

Each boring or trench, unless noted otherwise, was backfilled with cuttings at the completion of the logging and sampling. The backfill, however, may settle with time, and it is the responsibility of our client to ensure that such settlement does not become a liability.

On some projects, cone penetrometer tests (CPT) are performed, primarily to provide a basis for evaluating liquefaction potential. Cone penetrometer tests are performed with a truck-mounted cone, by advancing a 10-cm^2 cone with a conical tip into the soil at a rate of 2 cm/sec. The tip resistance and frictional resistance along a sleeve above the tip are measured and recorded. Both a tabulated and graphical presentation of the results are included in this appendix if CPT were performed on this project. The software used to interpret the CPT data is CPTINT version 5.0 (Campanella, 1993). The correlation between CPT data and blow counts (N_{60}-values) is described by Robertson and Campanella (1989).

Major Divisions			USCS Group Symbols	Typical Names
Coarse-Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels (More than half of coarse fraction is larger than No. 4 sieve)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand, clay mixtures
	Sands (More than half of coarse fraction is smaller than No. 4 sieve)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sand, little or no fines
			SP	Poorly graded sands, gravelly sands little or no fines
		Sands and fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts and Clays Liquid Limit < 50		ML	Silts and very fine sands, rock-flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low or medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit > 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		Pt	Peat and other highly organic soils

Legend of Laboratory Tests

G - Grain Size
A - Atterberg Limits
P - Compaction
S - Swell/Expansion
C - Consolidation
DS - Direct Shear
U - Unconfined
T - Triaxial
PP - Pocket Penetrometer
CH - Chemical

Sampler Type

Modified California
Hand Sampler
SPT
Shelby Tube
Rock Core
Bulk
No Recovery

Terms used in this report for describing soils according to their texture or grain size distributions are generally in accordance with the Unified Soil Classification System.

Terms Describing Density and Consistency

Coarse Grained soils (major portion retained on No. 200 sieve) include (1) clean gravels, (2) silty or clayey gravels, and (3) silty, clayey, or gravelly sands. Relative density is related to SPT blow count corrected for overburden pressure or drive energy.

Density		SPT *N* Value Blows/Ft	Relative Density %
Very Loose	vl	0 to 4	0 to 15
Loose	l	4 to 10	15 to 35
Medium Dense	md	10 to 30	35 to 65
Dense	d	30 to 50	65 to 85
Very Dense	vd	> 50	85 to 100

Fine Grained soils (major portions passing No. 200 sieve) inlcude (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shear strength as indicated by penetrometer readings, direct shear, or SPT blow count.

Consistency	Shear Strength, ksf	SPT *N* Value
Very Soft	< 0.25	0 to 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	8 to 16
Very Stiff	2.00 to 4.00	16 to 32
Hard	> 4.00	> 32

Terms Characterizing Soil Structure

Slickensided	Having inclined planes of weakness that are slick and glossy in appearance.
Fissured	Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated	Composed of thin layers of varying color and texture.
Interbedded	Composed of alternate layers of different soil types.
Calcareous	Containing appreciable quantities of calcium carbonate.
Well Graded	Having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly Graded	Predominately one grain size, or having a range of grain sizes with some intermediate sizes missing.
Porous	Having visibly apparent void spaces through which water, air, or light may pass.

Soil Moisture

From low to high, the moisture content is indicated by:

Dry	D
Slightly Moist	Sl M
Moist (near optimum for compaction)	M
Very Moist	V M
Wet	W

Size Proportions

Designation	Percent by Weight
Trace	< 5
Few	5 to 10
Little	15 to 25
Some	30 to 45

Grain Size Distribution

Clay | Silt | Sand (Fine, Medium, Coarse) | Gravel (Fine, Coarse)

Sieve Size Number: 200, 40, 10, 4, 3/4", 2", 3"

Particle Diameter in Millimeters: 0.005, 0.01, 0.05, 0.1, 0.5, 1.0, 5.0, 10.0, 50, 100

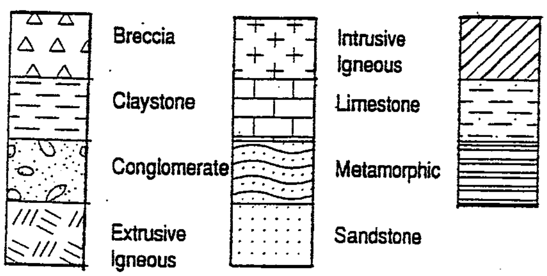
Degree of Weathering
Diagnostic Feature

Descriptive Term	Discoloration Extent	Fracture Condition	Surface Characteristics	Original Texture	Grain Boundary Condition
Unweathered	None	Closed or discolored	Unchanged	Preserved	Tight
Slightly Weathered	Less 20% of fracture spacing on both sides of fracture	Discolored, may contain thin filling	Partial discoloration	Preserved	Tight
Moderately Weathered	Greater than 20% of fracture spacing on both sides of fracture	Discolored, may contain thick filling, cemented rock	Partial to complete discoloration, not friable except poorly cemented rocks	Preserved	Partial Opening
Highly Weathered	Throughout		Friable and possibly pitted	Mainly Preserved	Partial Separation
Completely Weathered	Throughout		Resembles a soil	Partly Preserved	Complete Separation

Discontinuity Spacing

Description for Structural Feature: Bedding, Foliation, or Flow Banding	Spacing		Description for Joints, Faults, or Other Fractures
Very Thickly (Bedded, Foliated, or Banded)	More than 2 m	More than 6 ft	Very Widely (Fractured or Jointed)
Thickly	60 cm to 2 m	2 to 6 ft	Widely
Moderately	20 to 60 cm	8 to 24 in.	Medium
Thinly	60 to 200 mm	2.5 to 8 in.	Closely
Very Thinly	20 to 60 mm	0.75 to 2.5 in.	Very Closely
Description for Microstructural Features: Bedding, Foliation, or Cleavage			
Intensely (Laminated, Foliated, or Cleaved)	6 to 20 mm	0.25 to 0.75 in.	Extremely Close
Very Intensely	< 6 mm	< 0.25 in.	

Graphic Symbols - Bedrock



Rock Hardness

Classification	Field Test
Very Weak	Can be dug by hand and crushed with fingers.
Weak	Friable, can be gouged deeply with a knife and will crumble readily under light hammer blows.
Moderately Strong	Can be peeled with a knife. Material crumbles under firm blows with the sharp end of a geologic pick.
Strong	Cannot be scaped or peeled with a knife point. Hand held specimen breaks with firm blows of the pick.
Very Strong	Difficult to scratch with knife point. Cannot break hand held specimen.

Separation of Fracture Walls

Description	Separation of Walls, mm
Closed	0
Very Narrow	0 to 0.1
Narrow	0.1 to 1.0
Wide	1.0 to 5.0
Very Wide	> 5.0

Fracture Filling

Description	Definition
Clean	No fracture filling material
Stained	Discoloration of rock only. No recognizable filling material.
Filled	Fracture filled with recognizable filling material.

Surface Roughness

Description	Classification
Smooth	Appears smooth and is essentially smooth to the touch. May be slickensided.
Slightly Rough	Asperities on the fracture surfaces are visible and can be distinctly felt.
Medium Rough	Asperites are clearly visible and fracture surface feels abrasive to the touch.
Rough	Large angular asperites can be seen. Some ridge and high-side angle steps evident.
Very Rough	Near vertical steps and ridges occur on the fracture surface.

Where slickensides are observed, the direction of the slickensides should be recorded after the standard discontinuity surface description.

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Boring Log B-1

Sheet 1 of 2

Project: RAD Sunset | Client No.: 3283 | Date Drilled: 2/6/04

Comment: CME 75 with Safe T Hammer and Down Hole Hammer

Drilling Company/Driller: Valley Well/Steve | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30" | Hole Diameter (in.): 6"

Elevation: ____ ft | Depth to Water: 26.5 ft After ____ hrs on ____ | Logged By: JB

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Blows/6"	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0		Concrete parking area (0-8")					
		Grayish brown SAND; fine to medium grained; slightly moist; very dense.					
	14 18 20			111.5	2.3	4.1	
5	4 11 10			98.8	1.7		
	2 4 6			94.3	2.7		
		@ 7ft. grades loose to medium dense.					
	3 8 10			97.6	3.6	1.8	
10	3 6 8	Grayish brown clayey SILT; slightly moist; firm.		99.1	1.7		
15	7 18 21	Yellowish brown silty SAND; with gravels; moist; very dense.		121.6	9.8	15.8	
20	9 13 12	Olive SAND; fine to medium grained; with gravel; moist; dense.		106.0	7.5		
25	8 27 25	@ 25ft. grades fine to coarse grained; with gravels; wet; very dense. ▼		122.0	14.1	4.0	

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Boring Log B-1

Project: RAD Sunset | Client No.: 3283 | Date Drilled: 2/6/04

Comment: CME 75 with Safe T Hammer and Down Hole Hammer

Drilling Company/Driller: Valley Well/Steve | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30" | Hole Diameter (in.): 6"

Elevation ____ ft | Depth to Water 26.5 ft After ____ hrs on ____ | Logged By JB

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
	X	6 14 28		Olive SAND; fine to medium grained; wet; very dense.				3.3	
35	X	5 18 35							
40	X	10 23 38		@ 40 ft. grades with silt.				9.4	
45	X	13 50							
50	X	22 50-5"						3.4	
				Total Depth = 51.5 ft. Groundwater at 26.5 ft. Backfilled 2/6/04					
55									

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Boring Log B-2

Sheet 1 of 1

Project: RAD Sunset | Client No.: 3283 | Date Drilled: 2/6/04

Comment: CME 75 with Safe T Hammer and Down Hole Hammer

Drilling Company/Driller: Valley Well/Steve | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30" | Hole Diameter (in.): 6"

Elevation ____ ft | Depth to Water ____ ft After ____ hrs on ____ | Logged By: JB

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				Concrete parking area (0-8")					
				Brown SAND; fine to medium grained; slightly moist; very dense.					
		8 19 25				105.4	2.4	5.1	E.I. = 0
5		3 5 6		grades loose to medium dense.		99.8	1.6		
		2 5 5				99.5	1.7		
		2 4 7				96.9	2.6		
10		2 4 7				101.2	2.6		
15		3 6 7				97.9	2.6		
20		8 20 28		Yellowish brown CLAY; with sand and gravels; moist; hard.		120.4	12.7		
				Total Depth = 21.5 ft. No groundwater Backfilled 2/6/04					
25									

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Boring Log B-3

Sheet 1 of 1

Project: RAD Sunset | Client No.: 3283 | Date Drilled: 2/6/04

Comment: CME 75 with Safe T Hammer and Down Hole Hammer

Drilling Company/Driller: Valley Well/Steve | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30" | Hole Diameter (in.): 6"

Elevation ______ ft | Depth to Water ______ ft After ______ hrs on ______ | Logged By: JB

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0				Concrete parking area (0-8")					
				Olive brown SAND; fine to medium grained; slightly moist; dense.					
	X	6 11 11				103.8	0.8		
5	X	2 4 9				94.0	0.9		
	X	2 6 5				119.4	3.1		
	X	Push/2 11		Dark yellowish brown sandy CLAY; very moist; firm.		119.0	15.3		
10									
15	X	2 14 17		Strong brown clayay SAND; fine to coarse grained; with gravel; slightly moist; very dense.		110.4	7.9		
20	X	14 25 26		@ 20 ft. grades less clay content.		109.1	4.7		
				Total Depth = 21.5 ft. No groundwater Backfilled 2/6/04					
25									

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Boring Log B-4

Sheet 1 of 1

Project: RAD Sunset | Client No.: 3283 | Date Drilled: 2/6/04

Comment: CME 75 with Safe T Hammer and Down Hole Hammer

Drilling Company/Driller: Valley Well/Steve | Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 | Average Drop (in.): 30" | Hole Diameter (in.): 6"

Elevation ____ ft | Depth to Water ____ ft After ____ hrs on ____ | Logged By: JB

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0				Concrete parking area (0-8")					
				Olive brown SAND; fine to medium grained; slightly moist; medium dense.					
	X	6 10 10				99.1	2.5		
5	X	2 2 2		@ 5 ft. grades loose; with clay pockets.		116.3	11.7		
	X	5 11 11		Yellowish brown sandy CLAY; moist; firm.		117.9	14.3		
10	X	3 15 22				119.6	12.9		
15	X	2 12 15		Yellowish brown SAND; fine to coarse grained; slightly moist; medium dense to dense.		106.2	5.0		
20	X	13 35 35		@ 20 ft. grades with gravels.		119.9	5.9		
				Total Depth = 21.5 ft. No groundwater Backfilled 2/6/04					
25									

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Boring Log B-5

Sheet 1 of 1

Project: RAD Sunset Client No.: 3283 Date Drilled: 2/6/04

Comment: CME 75 with Safe T Hammer and Down Hole Hammer

Drilling Company/Driller: Valley Well/Steve Equipment: Hollow Stem Auger

Driving Weight (lbs): 140 Average Drop (in.): 30" Hole Diameter (in.): 6"

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By: JB

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0				Concrete parking area (0-8")					
				Grayish brown SAND; fine to medium grained; with trace gravels; slightly moist; dense.					
	X	7 14 18				108.2	3.3		
5	X	7 16 16				112.7	3.2		
	X	8 10 11				100.1	2.5		
10	X	2 7 10				100.2	2.6		
15	X	3 10 10		Dark brown sandy CLAY; moist; very firm.		111.3	12.6		
20	X	6 10 12		Light yellowish brown SAND; with gravels; slightly moist; dense.		105.0	5.6		
				Total Depth = 21.5 ft. No groundwater Backfilled 2/6/04					
25									

CPT INTERPRETATIONS

SOUNDING : CPT-01 | *PROJECT No.: 3283*
PROJECT : Rad Sunset | CONE/RIG : DSG786
DATE/TIME: 2/6/2004 8:11

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	725.91	1.19	SAND	100	100	100		
.300	.98	629.46	1.67	SAND	100	100	100		
.450	1.48	425.17	1.71	SAND to SILTY SAND	100	100	100		
.600	1.97	386.94	1.70	SAND to SILTY SAND	93	100	100		
.750	2.46	306.77	1.50	SAND to SILTY SAND	77	100	100		
.900	2.95	225.57	1.46	SAND to SILTY SAND	56	90	100		
1.050	3.44	190.04	1.35	SAND to SILTY SAND	48	76	95		49.5
1.200	3.94	169.55	1.23	SAND to SILTY SAND	42	68	91		48.5
1.350	4.43	121.28	1.48	SAND to SILTY SAND	30	48	82		47.0
1.500	4.92	90.09	1.48	SILTY SAND to SANDY SILT	30	48	73		45.5
1.650	5.41	75.72	1.46	SILTY SAND to SANDY SILT	25	40	68		44.0
1.800	5.91	62.25	1.54	SILTY SAND to SANDY SILT	21	33	63		43.0
1.950	6.40	53.21	1.51	SILTY SAND to SANDY SILT	18	28	58		42.0
2.100	6.89	53.33	1.48	SILTY SAND to SANDY SILT	18	27	58		41.5
2.250	7.38	49.02	.93	SILTY SAND to SANDY SILT	16	24	56		40.5
2.400	7.87	51.62	1.32	SILTY SAND to SANDY SILT	17	25	57		40.0
2.550	8.37	77.99	1.39	SILTY SAND to SANDY SILT	26	36	69		42.5
2.700	8.86	82.71	1.42	SILTY SAND to SANDY SILT	28	37	70		42.5
2.850	9.35	94.94	1.29	SAND to SILTY SAND	24	31	73		42.5
3.000	9.84	71.86	1.53	SILTY SAND to SANDY SILT	24	31	64		41.0
3.150	10.33	75.18	1.60	SILTY SAND to SANDY SILT	25	31	65		41.0
3.300	10.83	33.46	2.44	SANDY SILT to CLAYEY SILT	13	16		2.2	
3.450	11.32	10.54	.70	SANDY SILT to CLAYEY SILT	4	5		1.0	
3.600	11.81	17.38	.35	SANDY SILT to CLAYEY SILT	7	8		1.7	
3.750	12.30	29.01	2.08	SANDY SILT to CLAYEY SILT	12	13		1.9	
3.900	12.80	48.17	3.26	CLAYEY SILT to SILTY CLAY	24	27		3.2	
4.050	13.29	67.06	5.64	*VERY STIFF FINE GRAINED	67	74			
4.200	13.78	64.15	5.36	*VERY STIFF FINE GRAINED	64	69			
4.350	14.27	63.52	5.33	CLAY	64	67		3.7	
4.500	14.76	52.04	6.20	CLAY	52	54		3.0	
4.650	15.26	69.66	5.11	*VERY STIFF FINE GRAINED	70	72			
4.800	15.75	117.16	2.45	SILTY SAND to SANDY SILT	39	39	72		41.5
4.950	16.24	101.97	1.95	SILTY SAND to SANDY SILT	34	34	67		40.0
5.100	16.73	101.25	1.65	SILTY SAND to SANDY SILT	34	33	67		39.5
5.250	17.22	126.43	1.51	SAND to SILTY SAND	32	30	73		41.0
5.400	17.72	175.49	1.43	SAND to SILTY SAND	44	42	82		42.5
5.550	18.21	179.64	1.68	SAND to SILTY SAND	45	42	82		42.5
5.700	18.70	151.31	1.58	SAND to SILTY SAND	38	35	77		42.0
5.850	19.19	141.23	1.48	SAND to SILTY SAND	35	32	74		41.0
6.000	19.69	141.00	1.28	SAND to SILTY SAND	35	32	74		41.0
6.150	20.18	147.14	1.38	SAND to SILTY SAND	37	33	75		41.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 125 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-01

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	164.64	1.24	SAND to SILTY SAND	41	36	78		42.0
6.450	21.16	148.17	1.39	SAND to SILTY SAND	37	32	74		41.0
6.600	21.65	119.34	1.41	SAND to SILTY SAND	30	26	68		39.5
6.750	22.15	120.99	1.15	SAND to SILTY SAND	30	26	68		39.5
6.900	22.64	166.01	1.43	SAND to SILTY SAND	42	35	77		41.0
7.050	23.13	281.85	1.08	SAND	56	47	91		43.5
7.200	23.62	307.77	.64	SAND	62	51	94		44.0
7.350	24.11	337.86	.90	SAND	68	55	96		44.0
7.500	24.61	404.82	.83	SAND	81	65	100		45.0
7.650	25.10	415.96	.87	SAND	83	66	100		45.0
7.800	25.59	334.33	.54	GRAVELLY SAND to SAND	56	44	95		44.0
7.950	26.08	374.04	1.37	SAND	75	59	98		44.0
8.100	26.57	450.93	.73	GRAVELLY SAND to SAND	75	59	100		45.0
8.250	27.07	447.15	.70	GRAVELLY SAND to SAND	75	58	100		45.0
8.400	27.56	359.93	.47	GRAVELLY SAND to SAND	60	46	96		44.0
8.550	28.05	342.29	.53	GRAVELLY SAND to SAND	57	44	95		44.0
8.700	28.54	348.05	.67	SAND	70	53	95		44.0
8.850	29.04	334.11	.42	GRAVELLY SAND to SAND	56	42	94		43.5
9.000	29.53	309.99	.27	GRAVELLY SAND to SAND	52	39	91		43.0
9.150	30.02	255.19	.11	GRAVELLY SAND to SAND	43	32	86		42.5
9.300	30.51	85.15	1.11	SAND to SILTY SAND	21	16	54		37.0
9.450	31.00	222.13	.61	SAND	44	33	82		41.5
9.600	31.50	425.46	.81	SAND	85	63	100		44.5
9.750	31.99	642.15	1.57	SAND	100	95	100		
9.900	32.48	549.78	.83	GRAVELLY SAND to SAND	92	68	100		
10.050	32.97	632.40	.86	GRAVELLY SAND to SAND	100	78	100		
10.200	33.46	629.11	.86	GRAVELLY SAND to SAND	100	77	100		
10.350	33.96	400.84	1.72	SAND to SILTY SAND	100	73	98		44.0
10.500	34.45	416.18	.89	SAND	83	61	99		44.0
10.650	34.94	433.85	.84	SAND	87	63	100		44.0
10.800	35.43	491.22	1.21	SAND	98	71	100		44.5
10.950	35.93	550.95	1.19	SAND	100	79	100		
11.100	36.42	592.99	1.28	SAND	100	85	100		
11.250	36.91	626.52	1.16	SAND	100	89	100		

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 125 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

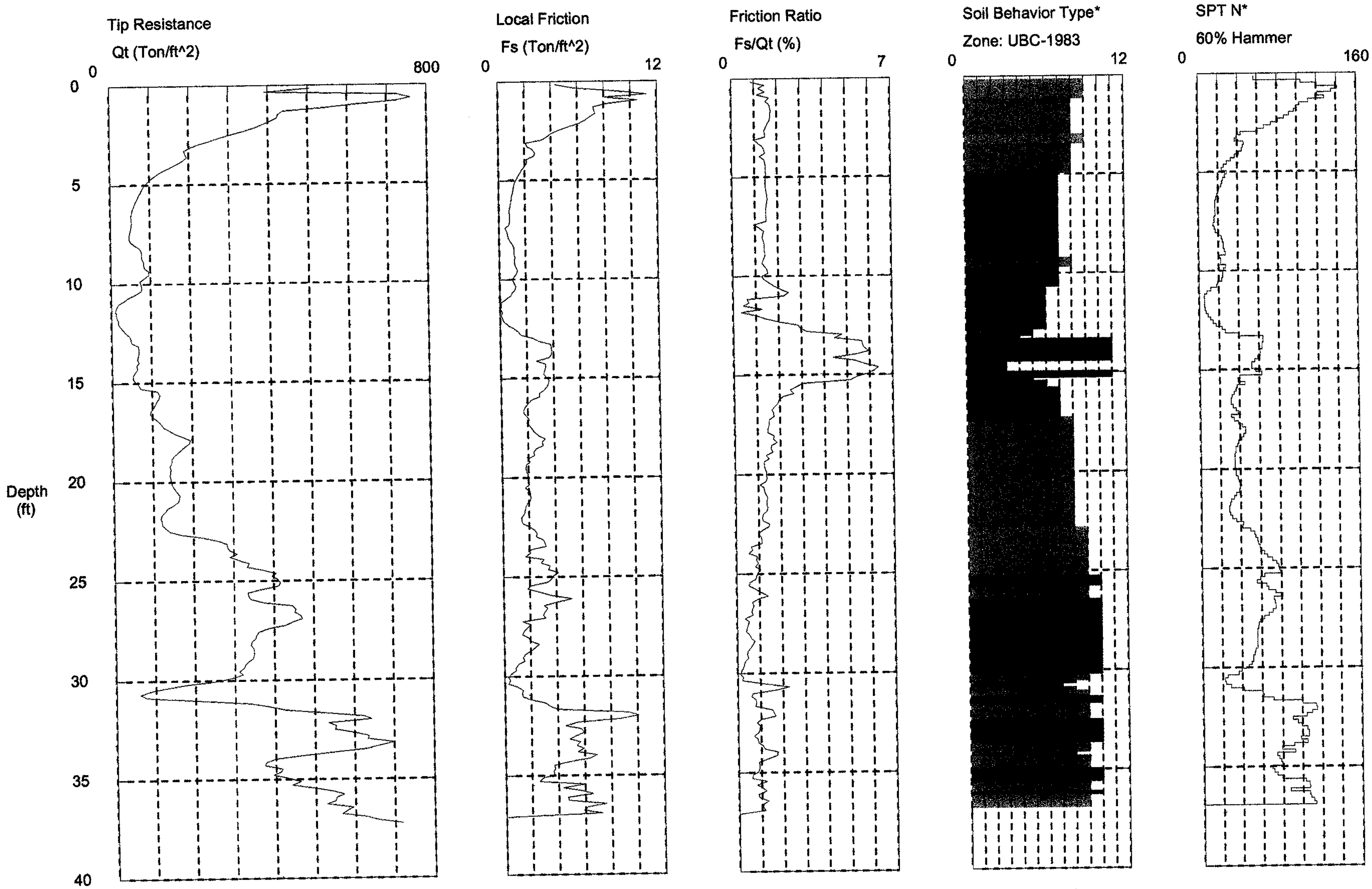
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

Advanced Geotechnical Services

Operator: Victor / Ian
Sounding: CPT-01
Cone Used: DSG786

CPT Date/Time: 2/6/2004 8:11
Location: RAD Sunset
Job Number: 3283



Maximum Depth = 37.24 feet

Depth Increment = 0.164 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Appendix B

Laboratory Testing

Appendix B
Laboratory Testing

A laboratory test program is designed for each project to evaluate the physical and mechanical properties of the soil and bedrock materials encountered at the site during our field exploration program. Laboratory tests were conducted on representative samples for the purpose of classification and determining their properties for use in analyses and evaluations. The most common laboratory tests include moisture-density, Atterberg limits, grain-size analyses (sieve and hydrometer analyses), sand equivalent, direct shear, consolidation, compaction, expansion index, and *R*-values. The following descriptions of test methods are generic and may include methods not used on this project. Reference to the boring logs and test results on Plates attached to this appendix will show which tests were performed for this project.

Classification Tests

Classification testing is performed to identify differences in material behavior and to correlate the results with shear strength and volume change characteristics of the materials. Classification testing includes unit weight (e.g., dry density), moisture content, Atterberg limits, grain size analyses (sieve and hydrometer), and sand equivalent.

Moisture-Density Test

Site soils were classified in the laboratory in accordance with the Unified Soil Classification System. Moisture contents are performed in general accordance with ASTM Test Designation D2216-98. The dry density of selected driven ring samples was obtained by trimming the end of the sample to obtain a smooth, flat face. The trimmed sample was measured to obtain volume and wet weight, extruded, and visually classified. The samples were dried in an oven maintained at approximately 110 degrees Celsius. After drying, each sample was weighed, and the moisture content and dry density were calculated. Field moisture contents and dry unit weights were determined for the ring samples obtained in the field. Field moisture contents and dry unit weights are shown on the boring logs in Appendix A.

Atterberg Limits

Atterberg Limits were performed in general accordance with ASTM Test Designation D4318-00. If this test was performed, the results are presented on the boring logs in Appendix A.

Sieve Analysis

Sieve analysis tests were conducted on the on-site soils in general accordance with sieve analysis test procedure from ASTM Test Designation D-422-63 (98). This method covers the quantitative determination of the distribution of particle sizes in soils. If this test was performed, the results are presented on Plates attached to this appendix.

Hydrometer Test

Hydrometer tests were performed in general accordance with ASTM Test Designation D422-63 (98). If this test was performed, the results are presented on Plates attached to this appendix.

Sand Equivalent

Sand equivalent is the ratio of sand-size particles to clay-size particles, expressed as a percent. Sand equivalent tests were performed in general accordance with ASTM Test Designation D2419-95. When these tests are performed, the results are included on the boring logs in Appendix.

Shear Tests
Direct shear tests were performed in general accordance with ASTM D3080-98 to determine the shear strength parameters of undisturbed on-site soils or remolded soil specimens. The samples are usually tested in an artificially saturated condition. This is accomplished by soaking the specimens in a confined container for a period of one or 2 days, depending on the permeability of the material. The specimen, 1-inch high and 2.4-inch-diameter, is placed in the shear device, and a vertical stress is applied to the specimen. The specimen is allowed to reach an equilibrium state (swell or consolidate). The specimen is then sheared under a constant rate of deformation. The rate of deformation for a slow test, sufficiently slow to allow drainage, is selected from computed or measured consolidation rates to allow full drainage (full dissipation of any tendency for pore water pressure changes) during shear. The process usually is repeated for 3 specimens, each under different vertical stresses. The results from the 3 tests are plotted on a diagram of shear stress and normal (vertical) stress at failure, and linear approximations are drawn of the failure curves to determine the angle of internal friction and cohesion.

Residual shear resistance is obtained by cycling the specimen between deformations of about 7% of the specimen diameter until an equilibrium shear stress is reached.

If this test was performed, the results are presented on Plates attached to this appendix.

Consolidation Test
Consolidation tests were performed in general accordance with ASTM D2435-96 on selected samples to evaluate the load-deformation characteristics of the soils. The tests were performed primarily on material that would be most susceptible to consolidation under anticipated foundation loading. The soil specimen, contained in a 2.4-inch-diameter, 1.0-inch-high sampling ring, is placed in a loading frame under a seating pressure of 0.1 ksf. Vertical loads are applied to the samples in several geometric increments, and the resulting deformations were recorded at selected time intervals. When the pressure reaches a preselected effective overburden pressure (often 2 ksf) and the specimen has consolidated under that pressure, the laboratory technician adds water to the test cell and records the vertical movement. After the specimen reaches equilibrium with the addition of water, the technician continues the loading process, usually up to a pressure of about 8 ksf. The specimen is then unloaded in increments, and the test is dismantled. The results of the test are presented in terms of percent volume change versus applied vertical stress. If this test was performed, the results are presented on Plates attached to this appendix.

Compaction Test
Compaction tests provide information on the relationship between moisture content and dry density of the soil compacted in a given manner. The maximum density is obtained for a given compaction effort at an optimum moisture content. Specifications for earthwork are in terms of the unit weight (or dry density) expressed as a percentage of the maximum density, and the moisture content compared to the optimum moisture content. Compaction tests were performed in general accordance with ASTM Test Designation D1557-00 to determine the maximum dry densities and optimum moisture contents of the on-site soils. If this test was performed, the results are presented on Plates attached to this appendix.

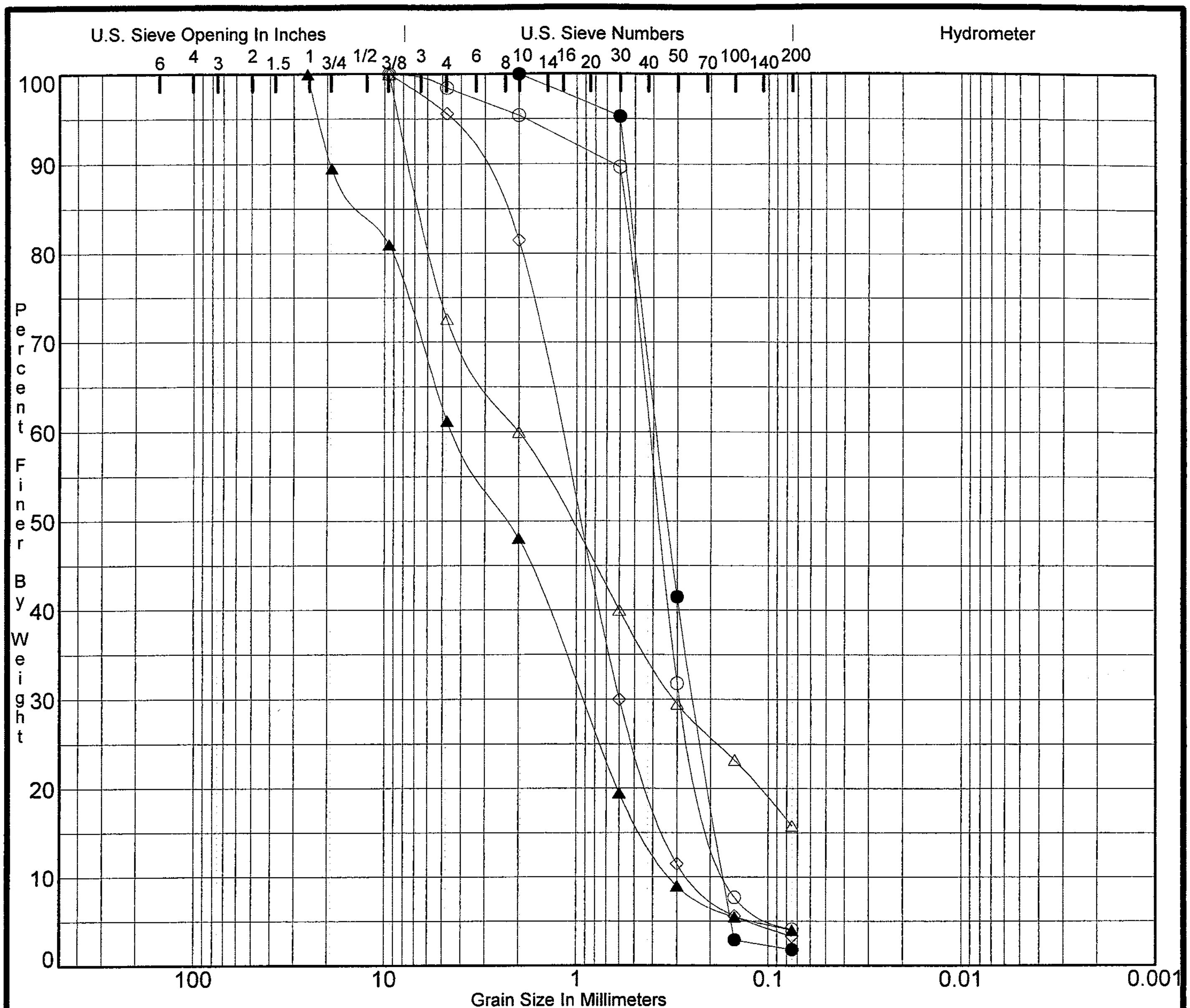
Expansion Index Test
The expansion index test provides an assessment of the potential for expansion or heave that could be detrimental to foundation or slab performance. Expansion Index tests are performed on shallow on-site soils in general accordance with expansion test procedures in ASTM D4829-95. In this test, a specimen is compacted at a degree of saturation between 45 and 55 percent in a 4.01-inch-diameter, 1.0-inch-high ring. The specimen is subjected to a seating pressure of 144 psf, water is added to the test cell, and swell is monitored until the expansion stops. The volume of swell is converted to an expansion index. Any test results are summarized on the boring logs in Appendix A.

R-Value Test

R-Value tests are performed on shallow on-site soils for use in pavement design. These tests were performed in general accordance with either ASTM D2844-01 California Test Method 301. If this test were performed, the results are summarized on the boring logs in Appendix A.

Sample Remolding

In some cases remolded samples are used when performing direct shear tests and consolidation tests. Samples are remolded to a specified moisture and density by compacting the soil in a 2.42-inch-diameter sample ring. The specified moisture content is either at optimum or a few percentage points above optimum. The specified dry density is usually at a relative compaction of 90%. The required moisture is added to and mixed with dry soil, providing a homogeneous mixture. A 2.42-inch-diameter ring is placed in a 6-inch-diameter compaction mold, and soil is placed in the mold to above the ring. The soil is then compacted with a 5.5-pound hammer with a free-fall drop of 12 inches. The sample is trimmed, and the dry density is determined. If the dry density deviates more than about one pound per cubic foot from the specified dry density, the process is repeated with the number of blows altered to better achieve the specified dry density.



Cobbles	Gravel		Sand			Silt Or Clay
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	MC%	LL	PL	PI	Cc	Cu
○	B-1	2.5	Grayish brown SAND					1.20	2.6
●	B-1	8.0	Brown SAND					0.92	2.2
△	B-1	15.0	Dark yellowish brown silty SAND with Gravel						
▲	B-1	25.0	Brown gravelly SAND					0.62	13.7
◇	B-1	30.0	Grayish brown SAND					1.18	4.8

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt / %Clay
○	B-1	2.5	9.50	0.42	0.285	0.1603	1.5	94.4	4.1
●	B-1	8.0	2.00	0.38	0.244	0.1704	0.0	98.2	1.8
△	B-1	15.0	9.50	2.00	0.310		27.4	56.8	15.8
▲	B-1	25.0	25.40	4.39	0.934	0.3205	38.8	57.2	4.0
◇	B-1	30.0	9.50	1.21	0.600	0.2515	4.4	92.3	3.3

Project: RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice

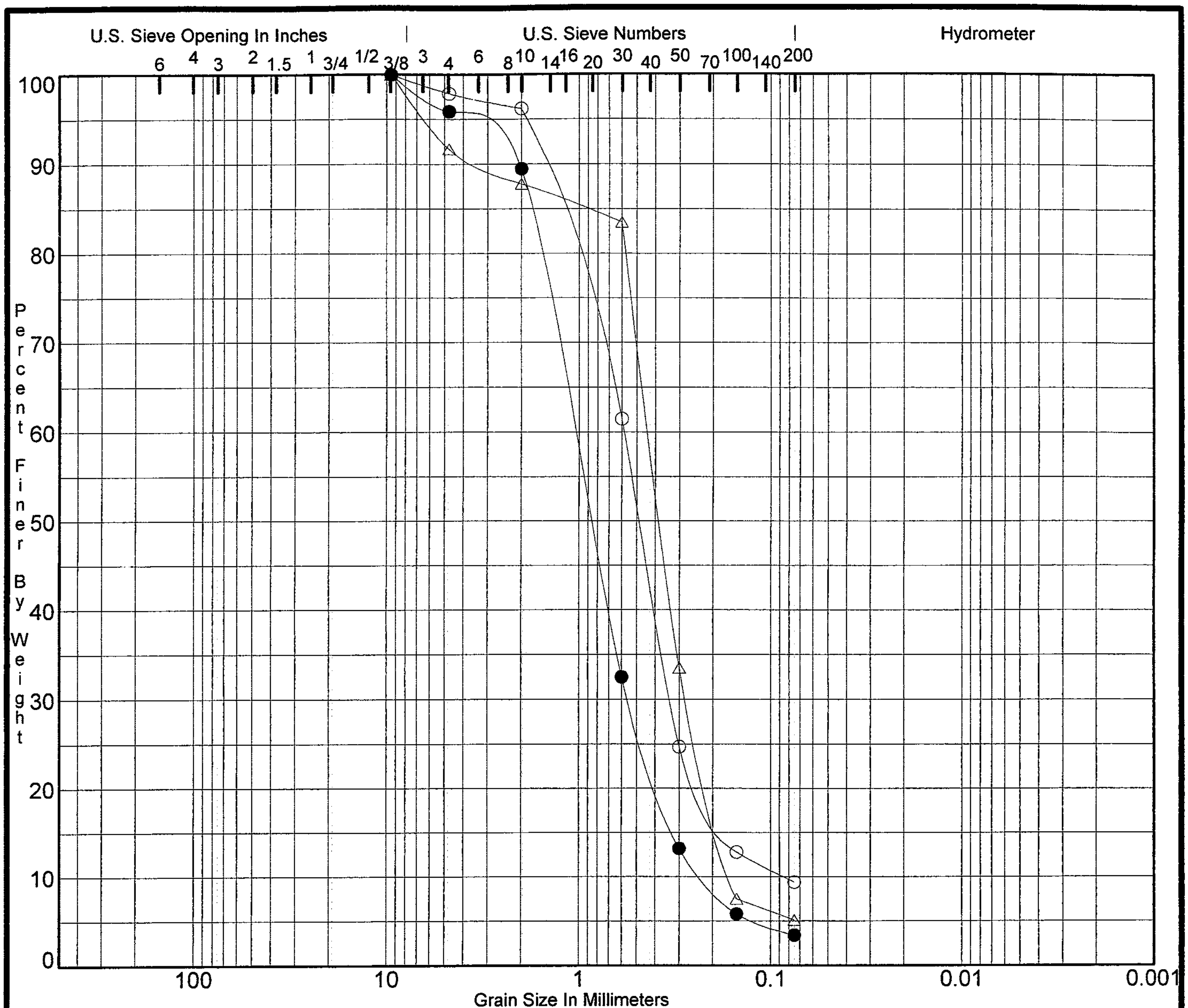
Client No. 3283

Date 2/13/04

Gradation Curves

Advanced Geotechnical Services, Inc.

Plate B-1



Cobbles	Gravel		Sand			Silt Or Clay
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
○	B-1	40.0	**Grayish brown silty SAND**					**2.22**	**6.9**
●	B-1	50.0	**Grayish brown SAND**					**1.26**	**4.8**
△	B-2	2.5	**Brown SAND**					**1.08**	**2.7**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
○	B-1	40.0	9.50	0.58	0.331	0.0848	2.1	88.5	9.4	
●	B-1	50.0	9.50	1.07	0.548	0.2223	4.1	92.5	3.4	
△	B-2	2.5	9.50	0.43	0.273	0.1603	8.3	86.6	5.1	

Project **RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice**

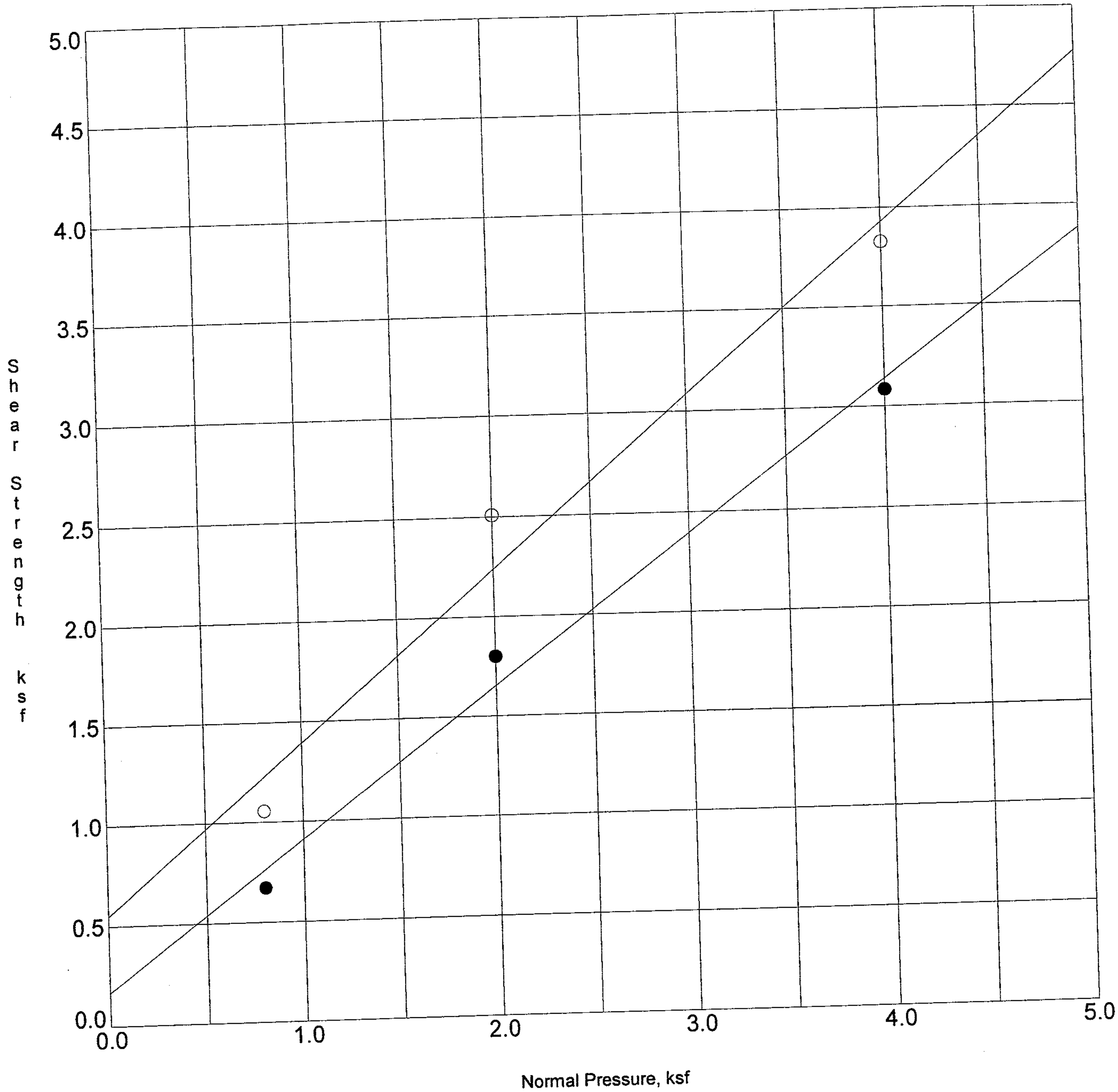
Client No. **3283**

Date **2/13/04**

Gradation Curves

Advanced Geotechnical Services, Inc.

Plate B-2



○ - Peak Shear ● - Ultimate Shear - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-1	15.0	Dark yellowish brown silty SAND with Gravel	113.9	14.3	0.55	40
●	B-1	15.0		113.9	16.7	0.17	37

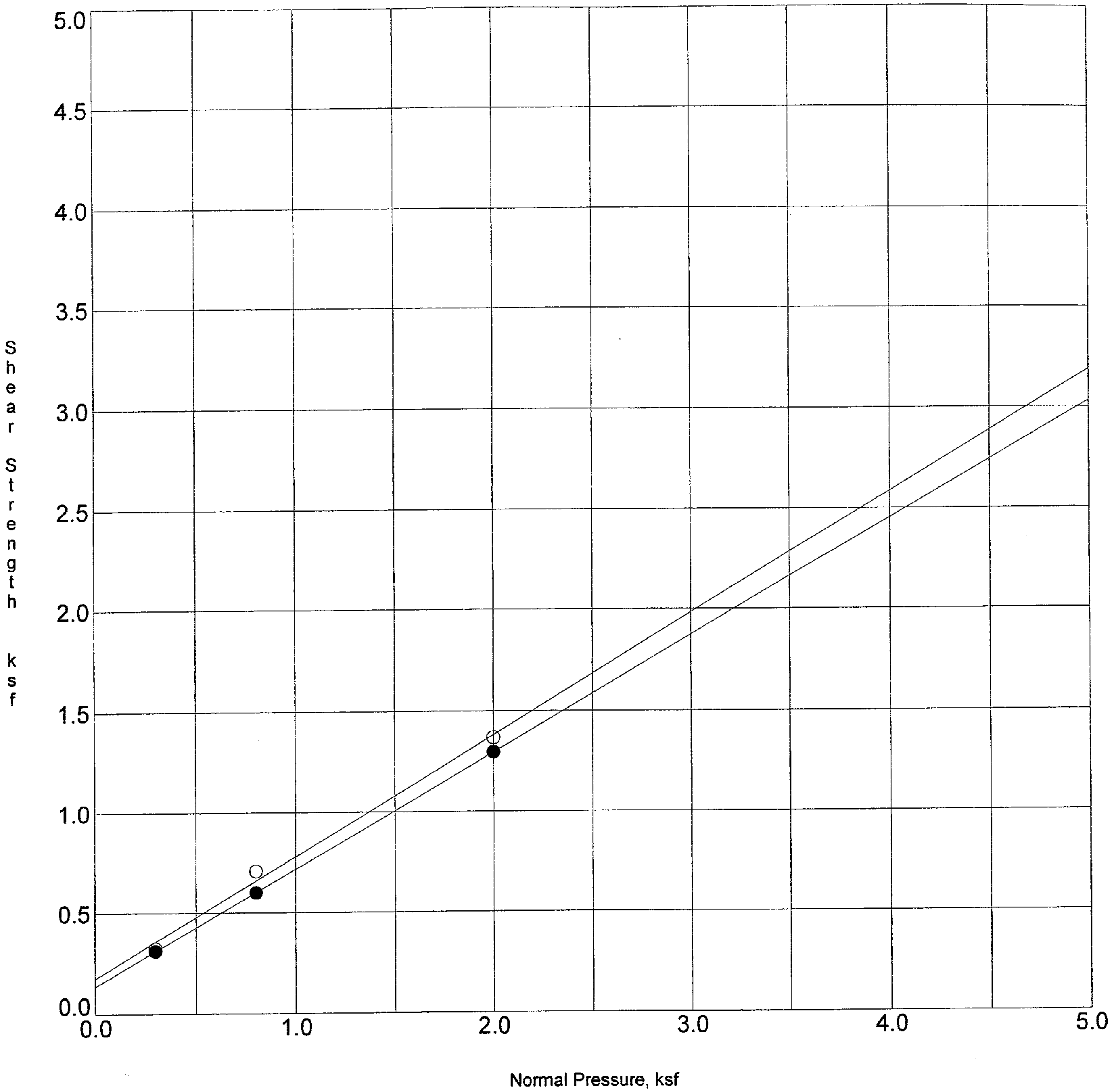
Project: RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice

Client No. 3283
Date 2/13/04

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 3



○ - Peak Shear ● - Ultimate Shear - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-2	2.5	Brown SAND	101.8	12.2	0.18	31
●	B-2	2.5	(Remolded)	101.8	15.5	0.14	30

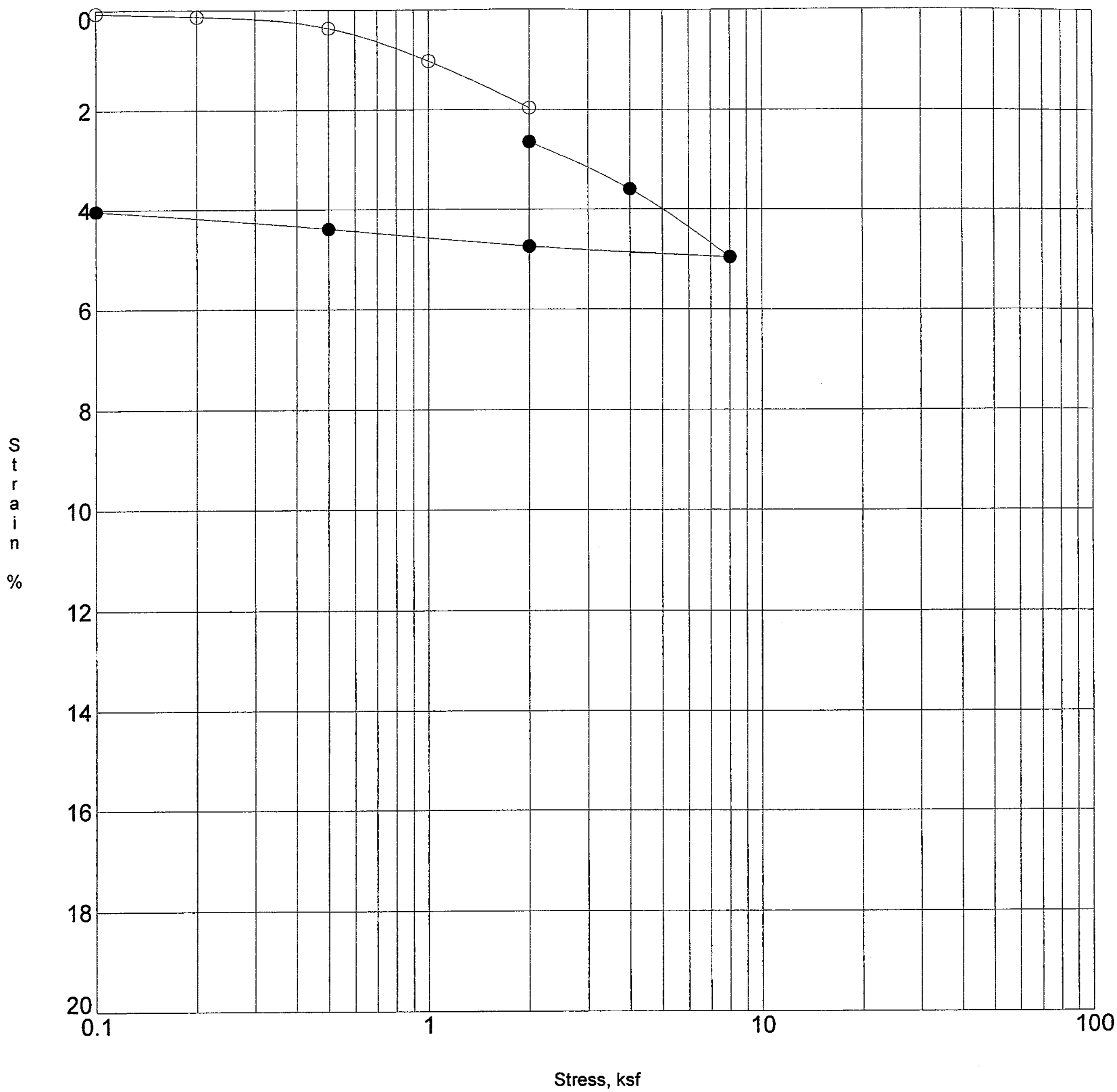
Project RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice

Client No. 3283
Date 2/13/04

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 4



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-1	15.0	Dark yellowish brown silty SAND with Gravel	115.9	11.4
●	B-1	15.0		120.7	15.0

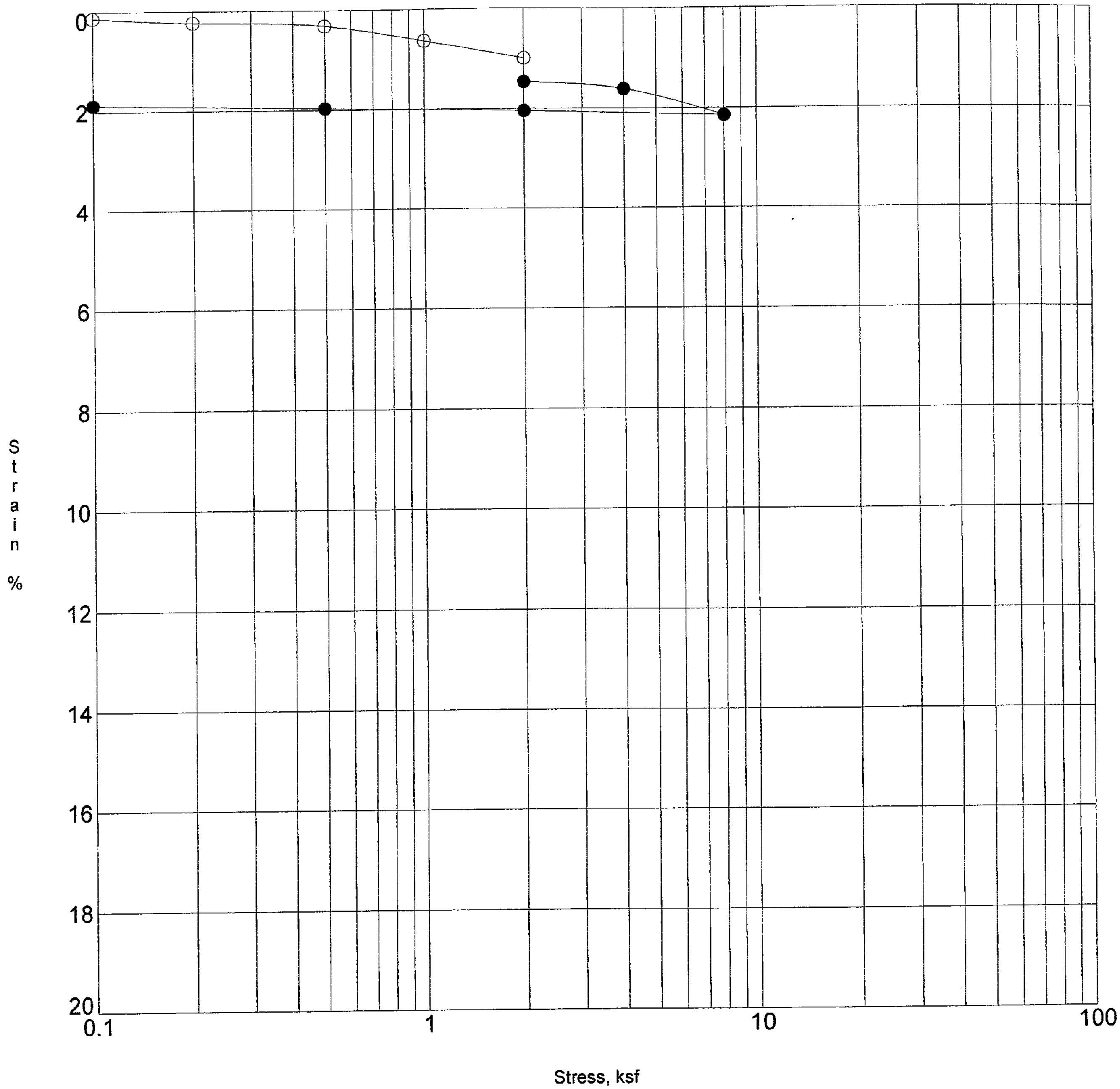
Project **RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice**

Client No. **3283**
Date **2/13/04**

Consolidation Test

ags **Advanced Geotechnical Services, Inc.**

Plate B- 5



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-2	2.5	**Brown SAND**	101.8	12.2
●	B-2	2.5	**(Remolded)**	103.7	17.1

Project **RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice**

Client No. **3283**
Date **2/13/04**

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 6

Job No. 3283 Date 2/13/04

Project RAD Sunset - NWC Thornton Pl. and Pacific Ave., Venice

Source of Material B-2 2.5

Description of Material Brown SAND

Test Method 1557A

Test Results

Maximum Dry Density **114.5 pcf**

Optimum Water Content **9.0 %**

Atterberg Limits

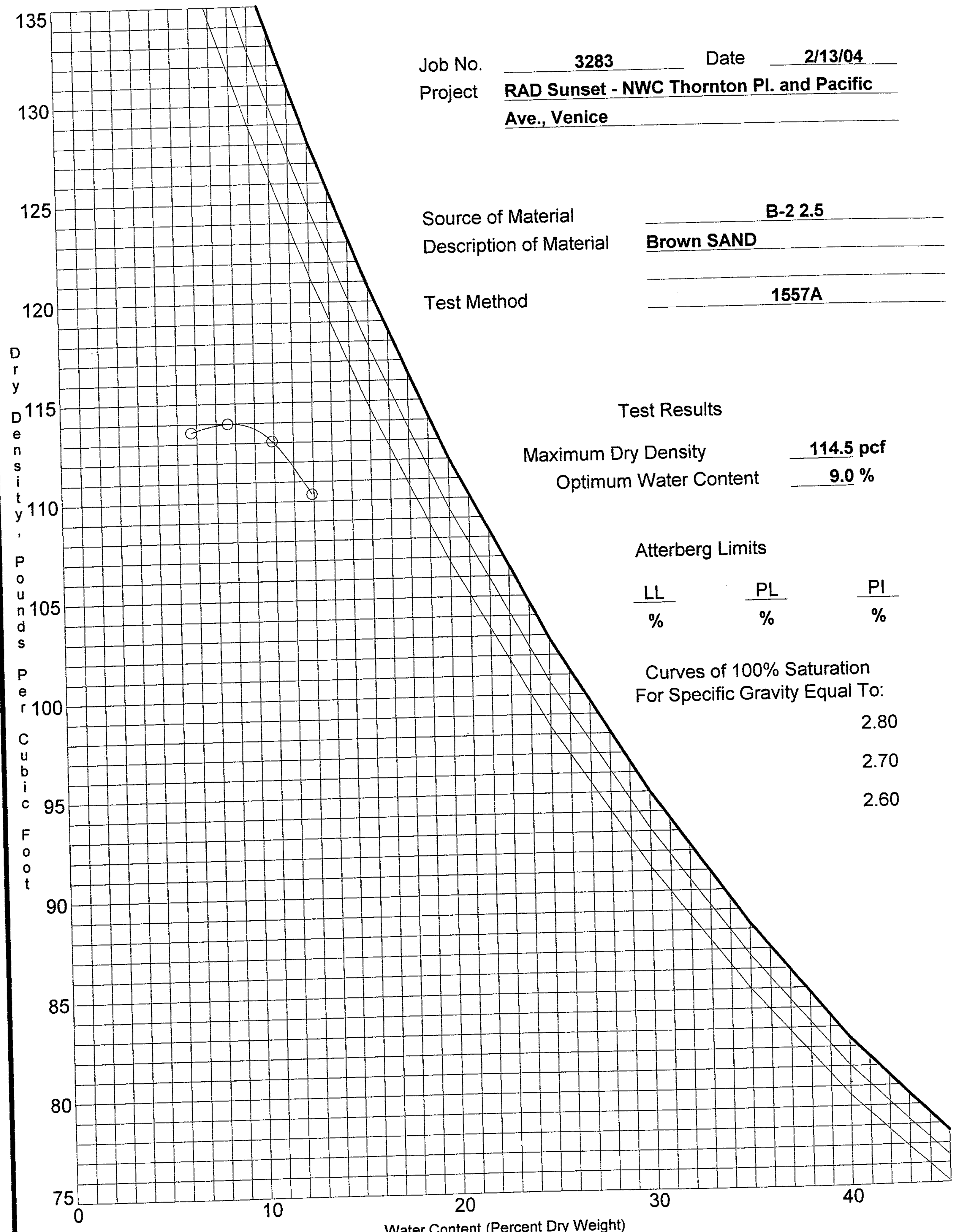
LL	PL	PI
%	%	%

Curves of 100% Saturation
For Specific Gravity Equal To:

2.80

2.70

2.60



Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 7

Appendix C

Seismicity Study

Seismicity Study

An evaluation of the seismicity of the site was made using a computer database of faults and related seismic data. Each of these programs is briefly described below, and the output is included in this appendix.

EQFAULT
The program EQFAULT (Blake, 2000b) estimates the peak horizontal ground acceleration at a specified site using a database of up to 150 digitized California faults and specified attenuation relationships. *Maximum credible* and *maximum probable* earthquakes are assigned to each fault. If a fault is found within a user-selected radius, the closest distance between the site and digitized fault is computed and then the specified attenuation relationship is used to compute the peak ground acceleration or the repeatable high ground acceleration (RGHA). Modified Mercalli intensities are also computed for the site for each fault. The output consist of a map showing the locations of the faults and a tabulation of the magnitude, acceleration, and site intensities for both the maximum credible and maximum probable event for each fault as well as the distance between the fault and the site. The results of EQFAULT is a deterministic analysis of the seismicity of the site.

FRISK
The program FRISKSP (Blake, 1998a) estimates the probabilistic seismic hazard at a site using faults within a specified distance from the site. As with the other 2 programs, the user selects attenuation relations and then the specified attenuation relationships are used to compute the peak ground acceleration or the repeatable high ground acceleration (RGHA), and when the option is exercised uniform hazard spectra are generated. FRISKSP models earthquake sources as three-dimensional surfaces and evaluates the site-specified probabilities of exceedance of given peak horizontal acceleration levels for each source. The underlying assumption is that moderate to large earthquakes occur on Quaternary faults and that the occurrence rate of earthquakes on each fault is proportional to the Quaternary fault-slip-rate. The length of rupture of the fault as a function of earthquake magnitude is accounted for, and ground motion estimates are made for the closest distance between the site and fault rupture zone. The program accounts for uncertainty in the earthquake magnitude, the rupture area, the location of the rupture zone on the fault, the maximum possible magnitude of earthquakes, and the acceleration at the site given the magnitude of earthquake and the distance between the rupture zone and site. The probability distribution functions used are a characteristic earthquake distribution that can be used to model a step-truncated exponential distribution for earthquake magnitude, a lognormal distribution for rupture area given a magnitude, a uniform distribution for rupture location on the faults, and a lognormal distribution for site acceleration given the magnitude of the earthquake and distance between the rupture zone and site. The expected numbers from all sources are summed to obtain the average annual expected number of occurrences of an acceleration greater than each of the requested values.

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***********************
*                     *
*    U B C S E I S    *
*                     *
*    Version  1.00    *
*                     *
***********************
```

COMPUTATION OF 1997
UNIFORM BUILDING CODE
SEISMIC DESIGN PARAMETERS

JOB NUMBER: 3283 DATE: 02-12-2004

JOB NAME: Rad

FAULT-DATA-FILE NAME: CDMGUBCR.DAT

SITE COORDINATES:
SITE LATITUDE: 33.9939
SITE LONGITUDE: 118.4764

UBC SEISMIC ZONE: 0.4

UBC SOIL PROFILE TYPE: SD

NEAREST TYPE A FAULT:
NAME: CUCAMONGA
DISTANCE: 68.9 km

NEAREST TYPE B FAULT:
NAME: SANTA MONICA
DISTANCE: 5.3 km

NEAREST TYPE C FAULT:
NAME:
DISTANCE: 99999.0 km

SELECTED UBC SEISMIC COEFFICIENTS:
Na: 1.0
Nv: 1.2
Ca: 0.44
Cv: 0.76
Ts: 0.691
To: 0.138

```
*******************************************************************
* CAUTION:  The digitized data points used to model faults are    *
*           limited in number and have been digitized from small- *
*           scale maps (e.g., 1:750,000 scale).  Consequently,    *
*           the estimated fault-site-distances may be in error by *
*           several kilometers.  Therefore, it is important that  *
*           the distances be carefully checked for accuracy and   *
*           adjusted as needed, before they are used in design.   *
*******************************************************************
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SUMMARY OF FAULT PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)

SANTA MONICA	5.3	B	6.6	1.00	DS
MALIBU COAST	6.6	B	6.7	0.30	DS
PALOS VERDES	7.1	B	7.1	3.00	SS
NEWPORT-INGLEWOOD (L.A.Basin)	8.5	B	6.9	1.00	SS
HOLLYWOOD	11.8	B	6.5	1.00	DS
ANACAPA-DUME	20.1	B	7.3	3.00	DS
RAYMOND	27.4	B	6.5	0.50	DS
VERDUGO	27.4	B	6.7	0.50	DS
SIERRA MADRE (San Fernando)	33.4	B	6.7	2.00	DS
SIERRA MADRE (Central)	33.6	B	7.0	3.00	DS
SANTA SUSANA	34.8	B	6.6	5.00	DS
SAN GABRIEL	40.3	B	7.0	1.00	SS
ELSINORE-WHITTIER	42.3	B	6.8	2.50	SS
HOLSER	43.6	B	6.5	0.40	DS
SIMI-SANTA ROSA	44.3	B	6.7	1.00	DS
OAK RIDGE (Onshore)	46.8	B	6.9	4.00	DS
CLAMSHELL-SAWPIT	47.8	B	6.5	0.50	DS
SAN JOSE	54.2	B	6.5	0.50	DS
SAN CAYETANO	55.8	B	6.8	6.00	DS
CHINO-CENTRAL AVE. (Elsinore)	63.6	B	6.7	1.00	DS
NEWPORT-INGLEWOOD (Offshore)	68.5	B	6.9	1.50	SS
CUCAMONGA	68.9	A	7.0	5.00	DS
SAN ANDREAS - 1857 Rupture	70.3	A	7.8	34.00	SS
VENTURA - PITAS POINT	72.7	B	6.8	1.00	DS
SANTA YNEZ (East)	75.2	B	7.0	2.00	SS
ELSINORE-GLEN IVY	78.9	B	6.8	5.00	SS
M.RIDGE-ARROYO PARIDA-SANTA ANA	82.7	B	6.7	0.40	DS
RED MOUNTAIN	86.9	B	6.8	2.00	DS
SAN JACINTO-SAN BERNARDINO	93.5	B	6.7	12.00	SS
SAN ANDREAS - Southern	94.2	A	7.4	24.00	SS
CORONADO BANK	95.2	B	7.4	3.00	SS
SANTA CRUZ ISLAND	95.8	B	6.8	1.00	DS
CLEGHORN	99.7	B	6.5	3.00	SS
GARLOCK (West)	101.1	A	7.1	6.00	SS
PLEITO THRUST	101.8	B	6.8	2.00	DS
BIG PINE	103.1	B	6.7	0.80	SS
ELSINORE-TEMECULA	111.1	B	6.8	5.00	SS
SAN JACINTO-SAN JACINTO VALLEY	114.3	B	6.9	12.00	SS
NORTH FRONTAL FAULT ZONE (West)	115.6	B	7.0	1.00	DS
SANTA YNEZ (West)	119.8	B	6.9	2.00	SS
WHITE WOLF	128.1	B	7.2	2.00	DS
SANTA ROSA ISLAND	131.9	B	6.9	1.00	DS
ROSE CANYON	136.5	B	6.9	1.50	SS
HELENDALE - S. LOCKHARDT	138.0	B	7.1	0.60	SS
SAN JACINTO-ANZA	146.5	A	7.2	12.00	SS
GARLOCK (East)	149.6	A	7.3	7.00	SS

SUMMARY OF FAULT PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
LENWOOD-LOCKHART-OLD WOMAN SPRGS	149.9	B	7.3	0.60	SS
ELSINORE-JULIAN	151.4	A	7.1	5.00	SS
NORTH FRONTAL FAULT ZONE (East)	156.4	B	6.7	0.50	DS
PINTO MOUNTAIN	161.8	B	7.0	2.50	SS
LOS ALAMOS-W. BASELINE	162.7	B	6.8	0.70	DS
GRAVEL HILLS - HARPER LAKE	168.0	B	6.9	0.60	SS
LANDERS	174.4	B	7.3	0.60	SS
JOHNSON VALLEY (Northern)	175.6	B	6.7	0.60	SS
So. SIERRA NEVADA	176.7	B	7.1	0.10	DS
BLACKWATER	176.7	B	6.9	0.60	SS
LIONS HEAD	180.0	B	6.6	0.02	DS

CALICO - HIDALGO	181.5	B	7.1	0.60	SS
SAN JUAN	187.6	B	7.0	1.00	SS
SAN LUIS RANGE (S. Margin)	188.2	B	7.0	0.20	DS
EMERSON So. - COPPER MTN.	188.5	B	6.9	0.60	SS
SAN JACINTO-COYOTE CREEK	191.0	B	6.8	4.00	SS
BURNT MTN.	191.3	B	6.5	0.60	SS
EUREKA PEAK	192.5	B	6.5	0.60	SS
LITTLE LAKE	195.0	B	6.7	0.70	SS
EARTHQUAKE VALLEY	196.7	B	6.5	2.00	SS
CASMALIA (Orcutt Frontal Fault)	197.3	B	6.5	0.25	DS
PISGAH-BULLION MTN.-MESQUITE LK	205.2	B	7.1	0.60	SS
TANK CANYON	215.2	B	6.5	1.00	DS
LOS OSOS	217.7	B	6.8	0.50	DS
ELSINORE-COYOTE MOUNTAIN	226.0	B	6.8	4.00	SS
HOSGRI	226.0	B	7.3	2.50	SS
SAN JACINTO - BORREGO	228.2	B	6.6	4.00	SS
PANAMINT VALLEY	229.9	B	7.2	2.50	SS
OWL LAKE	232.1	B	6.5	2.00	SS
RINCONADA	237.6	B	7.3	1.00	SS
OWENS VALLEY	248.4	B	7.6	1.50	SS
SUPERSTITION MTN. (San Jacinto)	260.5	B	6.6	5.00	SS
DEATH VALLEY (South)	261.3	B	6.9	4.00	SS
ELMORE RANCH	264.4	B	6.6	1.00	SS
BRAWLEY SEISMIC ZONE	265.3	B	6.5	25.00	SS
SUPERSTITION HILLS (San Jacinto)	266.6	B	6.6	4.00	SS
DEATH VALLEY (Graben)	276.2	B	6.9	4.00	DS
ELSINORE-LAGUNA SALADA	277.7	B	7.0	3.50	SS
INDEPENDENCE	281.1	B	6.9	0.20	DS
HUNTER MTN. - SALINE VALLEY	292.1	B	7.0	2.50	SS
IMPERIAL	293.6	A	7.0	20.00	SS
SAN ANDREAS (Creeping)	294.6	B	5.0	34.00	SS
DEATH VALLEY (Northern)	319.8	A	7.2	5.00	SS
BIRCH CREEK	331.9	B	6.5	0.70	DS
WHITE MOUNTAINS	340.5	B	7.1	1.00	SS
ROUND VALLEY (E. of S.N.Mtns.)	361.9	B	6.8	1.00	DS

SUMMARY OF FAULT PARAMETERS

Page 3

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
DEEP SPRINGS	362.0	B	6.6	0.80	DS
FISH SLOUGH	374.3	B	6.6	0.20	DS
DEATH VALLEY (N. of Cucamongo)	376.5	A	7.0	5.00	SS
ORTIGALITA	380.3	B	6.9	1.00	SS
CALAVERAS (So.of Calaveras Res)	384.3	B	6.2	15.00	SS
MONTEREY BAY - TULARCITOS	385.6	B	7.1	0.50	DS
HILTON CREEK	386.3	B	6.7	2.50	DS
PALO COLORADO - SUR	386.5	B	7.0	3.00	SS
QUIEN SABE	397.8	B	6.5	1.00	SS
HARTLEY SPRINGS	407.6	B	6.6	0.50	DS
ZAYANTE-VERGELES	415.6	B	6.8	0.10	SS
SAN ANDREAS (1906)	420.7	A	7.9	24.00	SS
SARGENT	421.1	B	6.8	3.00	SS
MONO LAKE	442.0	B	6.6	2.50	DS
SAN GREGORIO	460.6	A	7.3	5.00	SS
MONTE VISTA - SHANNON	470.9	B	6.5	0.40	DS
HAYWARD (SE Extension)	471.6	B	6.5	3.00	SS
ROBINSON CREEK	472.0	B	6.5	0.50	DS
GREENVILLE	472.4	B	6.9	2.00	SS
CALAVERAS (No.of Calaveras Res)	491.5	B	6.8	6.00	SS
HAYWARD (Total Length)	491.5	A	7.1	9.00	SS
ANTELOPE VALLEY	510.5	B	6.7	0.80	DS

GENOA	533.3	B	6.9	1.00	DS
CONCORD - GREEN VALLEY	539.9	B	6.9	6.00	SS
RODGERS CREEK	578.0	A	7.0	9.00	SS
WEST NAPA	579.4	B	6.5	1.00	SS
POINT REYES	595.2	B	6.8	0.30	DS
HUNTING CREEK - BERRYESSA	603.0	B	6.9	6.00	SS
MAACAMA (South)	640.8	B	6.9	9.00	SS
COLLAYOMI	658.3	B	6.5	0.60	SS
BARTLETT SPRINGS	663.0	A	7.1	6.00	SS
MAACAMA (Central)	682.2	A	7.1	9.00	SS
MAACAMA (North)	742.0	A	7.1	9.00	SS
ROUND VALLEY (N. S.F.Bay)	749.6	B	6.8	6.00	SS
BATTLE CREEK	781.9	B	6.5	0.50	DS
LAKE MOUNTAIN	807.7	B	6.7	6.00	SS
GARBERVILLE-BRICELAND	823.9	B	6.9	9.00	SS
MENDOCINO FAULT ZONE	878.9	A	7.4	35.00	DS
LITTLE SALMON (Onshore)	887.3	A	7.0	5.00	DS
MAD RIVER	891.1	B	7.1	0.70	DS
CASCADIA SUBDUCTION ZONE	891.7	A	8.3	35.00	DS
McKINLEYVILLE	901.3	B	7.0	0.60	DS
TRINIDAD	903.1	B	7.3	2.50	DS
FICKLE HILL	903.1	B	6.9	0.60	DS
TABLE BLUFF	907.5	B	7.0	0.60	DS
LITTLE SALMON (Offshore)	921.0	B	7.1	1.00	DS

SUMMARY OF FAULT PARAMETERS

Page 4

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
BIG LAGOON - BALD MTN.FLT.ZONE	940.2	B	7.3	0.50	DS

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*                     *
*    E Q F A U L T    *
*                     *
*    Version 3.00     *
*                     *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 3283

DATE: 02-12-2004

JOB NAME: Rad

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 33.9939
SITE LONGITUDE: 118.4764

SEARCH RADIUS: 50 mi

ATTENUATION RELATION: 10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km   Campbell SSR: 0   Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD. MERC.
SANTA MONICA	4.2(6.8)	6.6	0.528	X
PALOS VERDES	4.7(7.5)	7.1	0.414	X
MALIBU COAST	4.7(7.6)	6.7	0.515	X
NEWPORT-INGLEWOOD (L.A.Basin)	6.8(11.0)	6.9	0.318	IX
HOLLYWOOD	7.9(12.7)	6.4	0.316	IX
COMPTON THRUST	8.8(14.1)	6.8	0.360	IX
ANACAPA-DUME	13.4(21.5)	7.3	0.333	IX
ELYSIAN PARK THRUST	15.6(25.1)	6.7	0.203	VIII
NORTHRIDGE (E. Oak Ridge)	16.2(26.0)	6.9	0.223	IX
RAYMOND	17.3(27.9)	6.5	0.160	VIII
VERDUGO	19.0(30.6)	6.7	0.166	VIII
SIERRA MADRE (San Fernando)	22.9(36.8)	6.7	0.138	VIII
SIERRA MADRE	22.9(36.8)	7.0	0.168	VIII
SANTA SUSANA	23.2(37.3)	6.6	0.127	VIII
SAN GABRIEL	25.1(40.4)	7.0	0.109	VII
WHITTIER	26.3(42.4)	6.8	0.090	VII
HOLSER	27.6(44.4)	6.5	0.100	VII
SIMI-SANTA ROSA	28.2(45.4)	6.7	0.111	VII
OAK RIDGE (Onshore)	29.5(47.4)	6.9	0.122	VII
CLAMSHELL-SAWPIT	30.0(48.2)	6.5	0.092	VII
SAN JOSE	34.1(54.9)	6.5	0.080	VII
SAN CAYETANO	35.8(57.6)	6.8	0.093	VII
CHINO-CENTRAL AVE. (Elsinore)	39.4(63.4)	6.7	0.079	VII
NEWPORT-INGLEWOOD (Offshore)	42.6(68.5)	6.9	0.059	VI
CUCAMONGA	43.2(69.6)	7.0	0.087	VII
SAN ANDREAS - 1857 Rupture	43.7(70.4)	7.8	0.108	VII
SAN ANDREAS - Mojave	43.7(70.4)	7.1	0.066	VI
OAK RIDGE(Blind Thrust Offshore)	43.8(70.5)	6.9	0.081	VII
CHANNEL IS. THRUST (Eastern)	45.4(73.0)	7.4	0.111	VII
VENTURA - PITAS POINT	45.5(73.2)	6.8	0.072	VII
SANTA YNEZ (East)	47.1(75.8)	7.0	0.057	VI
SAN ANDREAS - Carrizo	48.9(78.7)	7.2	0.063	VI
ELSINORE-GLEN IVY	49.1(79.0)	6.8	0.047	VI
MONTALVO-OAK RIDGE TREND	49.2(79.2)	6.6	0.059	VI

-END OF SEARCH- 34 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE SANTA MONICA FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 4.2 MILES (6.8 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5277 g

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*******************************************
*                                         *
*         FRISKSP - IBM-PC VERSION        *
*                                         *
*  Modified from *FRISK* (McGuire 1978)   *
*   To Perform Probabilistic Earthquake   *
*  Hazard Analyses Using Multiple Forms   *
* of Ground-Motion-Attenuation Relations  *
*                                         *
*   Modifications by:  Thomas F. Blake    *
*             - 1988-2000 -               *
*                                         *
*              VERSION 4.00               *
*            (Visual Fortran)             *
*******************************************


TITLE: Rad

IPR_FILE
 0

IPLOT
 0

SITE CONDITION
 0.00

BASEMENT     DEPTH (km)
 5.00

RHGA FACTOR     RHGA DIST (km)
    1.000           0.000

NFLT  NSITE   NPROB   NATT    LCD
22     1       2       6       1

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C
10       C11       C12       C13       C14
  1  -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340    0.0
000   0.3430    0.3510    0.0000   -0.1230
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       P
ER     DSMIN      SIGA    IRELAF      ICHK
  1  -0.1380   -0.2890    1.0000    0.0000    0.0000    0.0000    1.0000    0.0000    0.0000    0.0
000   3.0000    0.4650     38          0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C
10       C11       C12       C13       C14
  2  -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340    0.0
000   0.3430    0.3510    0.0000   -0.1230
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       P
ER     DSMIN      SIGA    IRELAF      ICHK
  2  -0.1380   -0.2890    1.0000    0.0000    0.0000    0.0000    0.0000    1.0000    0.0000    0.0
000   3.0000    0.4650     38          0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C
10       C11       C12       C13       C14
  3  -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340    0.0
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 000    0.3430    0.3510    0.0000   -0.1230
 ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23         P
 ER      DSMIN      SIGA    IRELAF      ICHK
   3   -0.1380   -0.2890    1.0000    0.0000    0.0000    0.0000    1.0000    0.0000    0.0000       0.0
 000    3.0000    0.4650        38         0

 ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9         C
 10        C11       C12       C13       C14
   4   -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340       0.0
 000    0.3430    0.3510    0.0000   -0.1230
 ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23         P
 ER      DSMIN      SIGA    IRELAF      ICHK
   4   -0.1380   -0.2890    1.0000    0.0000    0.0000    0.0000    0.0000    1.0000    0.0000       0.0
 000    3.0000    0.4650        38         0

 ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9         C
 10        C11       C12       C13       C14
   5   -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340       0.0
 000    0.3430    0.3510    0.0000   -0.1230
 ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23         P
 ER      DSMIN      SIGA    IRELAF      ICHK
   5   -0.1380   -0.2890    1.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000       0.0
 000    3.0000    0.4650        38         0

 ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9         C
 10        C11       C12       C13       C14
   6   -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340       0.0
 000    0.3430    0.3510    0.0000   -0.1230
 ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23         P
 ER      DSMIN      SIGA    IRELAF      ICHK
   6   -0.1380   -0.2890    1.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000       0.0
 000    3.0000    0.4650        38         0

  PROBLEM DATA:

  BOZ. ET AL.(1999)HOR HS COR 1     AMPLITUDES:
      15        0.100     0.200     0.300     0.400     0.500     0.600     0.700     0.800     0.900     1.00
 0
                1.100     1.200     1.300     1.400     1.500

       MAGNITUDE WEIGHTING FACTORS:      MWF:    0     MWF MAGNITUDE:       0.00

  BOZ. ET AL.(1999)HOR HS COR 2     AMPLITUDES:
      15        0.100     0.200     0.300     0.400     0.500     0.600     0.700     0.800     0.900     1.00
 0
                1.100     1.200     1.300     1.400     1.500

       MAGNITUDE WEIGHTING FACTORS:      MWF:    2     MWF MAGNITUDE:       7.50

  RISKS SPECIFIED:
    5     0.013900  0.010000  0.005000  0.002105  0.001000

  SITE COORDINATES:
    1    -118.4764    33.9939


  FAULT INFORMATION:

  ---------------------------------------------------------------------------

  FAULT  1

  FAULT NAME:  SANTA MONICA


  NFP    NRL   ATTENUATION CODES:
   3     10       2  4

  AMMIN   AMSTEP  IRATE     RATE   BETA    ECTR    ECDP    COEF
  5.000   0.1000      1   1.0000  2.072   1.400   2.000   1.000
```

```
 NMAX AMMAX  PMAX
  1    6.60  1.00


   dmchar ampchar dmpchar
     0.50    6.10    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.364E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX    AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
      1  6.6000  1.0000   0.00597   0.00308   0.00289


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.4085   34.0814
  2    -118.5244   34.0263
  3    -118.6855   33.9896

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       3.4000   12.6000

 Computed Total Fault Area = 0.36E+03

 -----------------------------------------------------------------------------

 FAULT  2

 FAULT NAME:  MALIBU COAST


 NFP     NRL   ATTENUATION CODES:
  4      10       2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.3000  2.072  1.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  0.3000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.481E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX    AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00174   0.00100   0.00074


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
```

```
 1    -118.5333   34.0299
 2    -118.6339   34.0412
 3    -118.6666   34.0387
 4    -118.9332   34.0513

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        3.4000   12.6000

Computed Total Fault Area = 0.48E+03

----------------------------------------------------------------------------

FAULT  3

FAULT NAME:  PALOS VERDES


NFP     NRL   ATTENUATION CODES:
 4      10       1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.030  4.800  2.000  1.000

NMAX AMMAX  PMAX
 1    7.10  1.00


  dmchar ampchar dmpchar
    0.50    6.60    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.125E+14
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX    AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
     1  7.1000  1.0000   0.02038    0.01553    0.00485


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.9388   33.2825
 2    -118.1977   33.6571
 3    -118.2758   33.7560
 4    -118.5568   33.9720

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        0.0000   13.0000

Computed Total Fault Area = 0.13E+04

----------------------------------------------------------------------------

FAULT  4

FAULT NAME:  NEWPORT-INGLEWOOD (L.A.Basin)


NFP     NRL   ATTENUATION CODES:
 5      10       1  3
```

```
AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  3.200  2.000  1.000

NMAX AMMAX  PMAX
 1    6.90  1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.832E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.9000  1.0000   0.00664   0.00449   0.00215


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.3723   34.0337
 2    -118.1862   33.8073
 3    -118.1510   33.7822
 4    -118.1208   33.7746
 5    -117.9246   33.6061

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        0.0000   13.0000

Computed Total Fault Area = 0.83E+03

------------------------------------------------------------------------------

FAULT  5

FAULT NAME:  HOLLYWOOD


NFP    NRL   ATTENUATION CODES:
 4     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  0.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.40  1.00


  dmchar ampchar dmpchar
    0.50    5.90    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.238E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.4000  1.0000   0.00575   0.00229   0.00346
```

```
IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2302   34.1192
 2    -118.3170   34.1104
 3    -118.3723   34.0991
 4    -118.4063   34.0827

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       4.8000   13.2000

Computed Total Fault Area = 0.25E+03

----------------------------------------------------------------------------

FAULT  6

FAULT NAME:  COMPTON THRUST


NFP    NRL   ATTENUATION CODES:
 2     10       5  6

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.5000  2.072  1.900  2.000  0.500

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
    0.50    6.30    1.00

Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area    - cm**2
0.585E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.8000  1.0000  0.00935   0.00585   0.00349


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.0582   33.6908
 2    -118.4060   33.8831

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    5.0000
 2       0.0000    5.1000
 3      14.1000   10.1000

Computed Total Fault Area = 0.58E+03

----------------------------------------------------------------------------

FAULT  7
```

```
FAULT NAME:  ANACAPA-DUME

NFP    NRL   ATTENUATION CODES:
 6     10      2  4

AMMIN   AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000   0.1000      1   3.0000   2.072   3.700   2.000   1.000

NMAX AMMAX  PMAX
 1    7.30  1.00

  dmchar ampchar dmpchar
    0.50    6.80    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.210E+14
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
     1  7.3000  1.0000    0.02430    0.02021    0.00409


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA       B_RA    SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1     -118.6945    33.9849
 2     -118.7913    33.9530
 3     -118.9120    33.9508
 4     -119.1410    33.9838
 5     -119.3403    33.9792
 6     -119.4963    33.9883

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2       19.8000   19.8000

Computed Total Fault Area = 0.20E+04

-----------------------------------------------------------------------------

FAULT  8

FAULT NAME:  ELYSIAN PARK THRUST

NFP    NRL   ATTENUATION CODES:
 2     10      5  6

AMMIN   AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000   0.1000      1   1.5000   2.072   1.700   2.000   0.500

NMAX AMMAX  PMAX
 1    6.70  1.00

  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area    - cm**2
```

```
 0.510E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.01006   0.00576   0.00430


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -117.9173   33.8473
  2    -118.2277   34.0169

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    9.9900
  2        0.0000   10.0000
  3       14.1000   15.1000

 Computed Total Fault Area = 0.51E+03

 -----------------------------------------------------------------------------

 FAULT  9

 FAULT NAME:  VERDUGO


 NFP    NRL   ATTENUATION CODES:
  7     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.5000  2.072  1.400  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.522E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00315   0.00180   0.00135


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.1536   34.1313
  2    -118.1865   34.1496
  3    -118.2285   34.1551
  4    -118.2907   34.1971
  5    -118.3657   34.2227
  6    -118.4077   34.2538
  7    -118.4206   34.2612

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
```

```
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.52E+03

-----------------------------------------------------------------------------

FAULT 10

FAULT NAME:  RAYMOND


NFP    NRL   ATTENUATION CODES:
 4     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  1.000  2.000  1.000

NMAX AMMAX  PMAX
 1    6.50  1.00


  dmchar ampchar dmpchar
    0.50    6.00    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.273E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1  6.5000  1.0000   0.00259   0.00118   0.00140


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1     -118.0051   34.1670
 2     -118.0579   34.1444
 3     -118.1258   34.1293
 4     -118.2227   34.1217

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.26E+03

-----------------------------------------------------------------------------

FAULT 11

FAULT NAME:  NORTHRIDGE (E. Oak Ridge)


NFP    NRL   ATTENUATION CODES:
 2     10       5  6

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.5000  2.072  1.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.90  1.00
```

```
 dmchar ampchar dmpchar
   0.50    6.40    1.00

Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area     - cm**2
0.682E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.9000  1.0000   0.00891   0.00602   0.00288


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA     B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7027   34.4057
 2    -118.4078   34.2781

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    4.9900
 2       0.0000    5.0000
 3      16.3000   19.7000

Computed Total Fault Area = 0.67E+03

------------------------------------------------------------------------------

FAULT 12

FAULT NAME:  SIERRA MADRE (San Fernando)


NFP    NRL   ATTENUATION CODES:
 8     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  2.0000  2.072  0.900  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


 dmchar ampchar dmpchar
   0.50    6.20    1.00

Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.324E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00781   0.00447   0.00334


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA     B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2940   34.2782
 2    -118.2951   34.2782
 3    -118.3196   34.2745
 4    -118.3956   34.2905
```

```
 5    -118.4189   34.3039
 6    -118.4520   34.2940
 7    -118.4778   34.3027
 8    -118.4790   34.3027

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2       12.7000   12.7000

Computed Total Fault Area = 0.33E+03

----------------------------------------------------------------------------

FAULT 13

FAULT NAME:  SIERRA MADRE


NFP     NRL   ATTENUATION CODES:
12      10       2  4

AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1   3.0000   2.072   2.800   2.000   1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.103E+14
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX    AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000   0.02034    0.01469    0.00565


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.7397   34.1231
 2    -117.7691   34.1317
 3    -117.8176   34.1323
 4    -117.8807   34.1470
 5    -117.9402   34.1501
 6    -118.0027   34.1752
 7    -118.0683   34.1758
 8    -118.1118   34.2010
 9    -118.1492   34.2028
10    -118.2461   34.2279
11    -118.2896   34.2751
12    -118.2960   34.2751

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2       12.7000   12.7000

Computed Total Fault Area = 0.11E+04

----------------------------------------------------------------------------
```

```
FAULT 14

FAULT NAME:  SANTA SUSANA

NFP     NRL    ATTENUATION CODES:
 8      10        2  4

AMMIN    AMSTEP  IRATE     RATE   BETA    ECTR    ECDP    COEF
5.000    0.1000      1  5.0000  2.072   1.300   2.000   1.000

NMAX AMMAX   PMAX
 1     6.60  1.00


  dmchar ampchar dmpchar
    0.50    6.10    1.00

 Slip Rate (  5.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.432E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.6000  1.0000   0.03249    0.01677    0.01573


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240

 FAULT SEGMENT COORDINATES
  1     -118.4950    34.3242
  2     -118.4955    34.3242
  3     -118.5340    34.3030
  4     -118.5811    34.3204
  5     -118.6163    34.3229
  6     -118.6339    34.3330
  7     -118.7081    34.3506
  8     -118.7672    34.3594

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1         0.0000     0.0000
  2         9.2000    13.1000

 Computed Total Fault Area = 0.41E+03

 ----------------------------------------------------------------------------

 FAULT 15

 FAULT NAME:  SAN GABRIEL


 NFP     NRL    ATTENUATION CODES:
 10      10        1  3

 AMMIN    AMSTEP  IRATE     RATE   BETA    ECTR    ECDP    COEF
 5.000    0.1000      1  1.0000  2.072   3.600   2.000   1.000

 NMAX AMMAX   PMAX
  1     7.00  1.00


   dmchar ampchar dmpchar
     0.50    6.50    1.00
```

```
 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.936E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.0000  1.0000   0.00616   0.00445   0.00171


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1     -118.2802    34.3179
  2     -118.3118    34.3394
  3     -118.3904    34.3598
  4     -118.4577    34.3853
  5     -118.5587    34.4363
  6     -118.5975    34.4649
  7     -118.6873    34.5536
  8     -118.7026    34.5700
  9     -118.7312    34.5792
 10     -118.8761    34.7139

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        0.0000   13.0000

 Computed Total Fault Area = 0.94E+03

 -----------------------------------------------------------------------------

 FAULT 16

 FAULT NAME:  WHITTIER


 NFP    NRL   ATTENUATION CODES:
  2     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  2.5000  2.072  1.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.80  1.00


   dmchar ampchar dmpchar
     0.50     6.30    1.00

 Slip Rate (  2.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.555E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000   0.01355   0.00848   0.00506


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
```

```
FAULT SEGMENT COORDINATES
 1    -118.0180   33.9860
 2    -117.6370   33.8540

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1         0.0000    0.0000
 2         0.0000   15.0000

Computed Total Fault Area = 0.57E+03

-----------------------------------------------------------------------------

FAULT 17

FAULT NAME:  SIMI-SANTA ROSA


NFP    NRL   ATTENUATION CODES:
 5     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  1.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.450E+13
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00543   0.00311   0.00232


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7982   34.2901
 2    -118.9084   34.2578
 3    -118.9364   34.2615
 4    -118.9680   34.2615
 5    -119.1147   34.2261

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1         0.0000    1.0000
 2         0.0000    1.1000
 3         7.5000   14.0000

Computed Total Fault Area = 0.45E+03

-----------------------------------------------------------------------------

FAULT 18

FAULT NAME:  HOLSER


NFP    NRL   ATTENUATION CODES:
```

```
 5      10       2  4

AMMIN    AMSTEP  IRATE     RATE   BETA    ECTR    ECDP    COEF
5.000    0.1000       1  0.4000  2.072   1.000   2.000   1.000

NMAX AMMAX  PMAX
 1    6.50  1.00


  dmchar ampchar dmpchar
    0.50    6.00    1.00

Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.280E+13
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1  6.5000   1.0000   0.00212    0.00097    0.00115


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240

FAULT SEGMENT COORDINATES
 1     -118.7533    34.4386
 2     -118.7345    34.4386
 3     -118.6741    34.4499
 4     -118.6427    34.4487
 5     -118.5483    34.4172

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000     0.0000
 2        5.9000    12.7000

Computed Total Fault Area = 0.26E+03
-----------------------------------------------------------------------------

FAULT 19

FAULT NAME:  CLAMSHELL-SAWPIT


NFP    NRL   ATTENUATION CODES:
 4      10       2  4

AMMIN    AMSTEP  IRATE     RATE   BETA    ECTR    ECDP    COEF
5.000    0.1000       1  0.5000  2.072   0.800   2.000   1.000

NMAX AMMAX  PMAX
 1    6.50  1.00


  dmchar ampchar dmpchar
    0.50    6.00    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.288E+13
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1  6.5000   1.0000   0.00273    0.00125    0.00148
```

```
IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.8458    34.2402
 2    -117.8844    34.2218
 3    -117.9279    34.2181
 4    -117.9990    34.1777

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000     0.0000
 2      12.7000    12.7000

Computed Total Fault Area = 0.30E+03

------------------------------------------------------------------------------

FAULT 20

FAULT NAME:  OAK RIDGE (Onshore)


NFP    NRL   ATTENUATION CODES:
 9     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  4.0000  2.072  2.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.90  1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00

Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.700E+13
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.9000  1.0000   0.02235   0.01511   0.00723


IND_RL
    2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.2050    34.2481
 2    -119.1582    34.2630
 3    -119.0974    34.3165
 4    -119.0402    34.3522
 5    -118.9589    34.3631
 6    -118.8805    34.3813
 7    -118.8104    34.3850
 8    -118.7742    34.4013
 9    -118.7227    34.3978

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000     1.0000
 2       0.0000     1.1000
```

```
 3        5.9000   13.7000

Computed Total Fault Area = 0.68E+03

----------------------------------------------------------------------------

FAULT 21

FAULT NAME:  SAN JOSE


NFP    NRL   ATTENUATION CODES:
 4     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  1.100  2.000  1.000

NMAX AMMAX  PMAX
 1    6.50  1.00


  dmchar ampchar dmpchar
    0.50    6.00    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.286E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.5000  1.0000   0.00271   0.00124   0.00147


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1     -117.6901   34.1141
 2     -117.7305   34.0846
 3     -117.8384   34.0601
 4     -117.8789   34.0393

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        3.4000   12.6000

Computed Total Fault Area = 0.25E+03

----------------------------------------------------------------------------

FAULT 22

FAULT NAME:  SAN CAYETANO


NFP    NRL   ATTENUATION CODES:
 9     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  6.0000  2.072  2.200  2.000  1.000

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
```

```
      0.50     6.30     1.00

 Slip Rate (  6.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.660E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000   0.03867   0.02422   0.01445


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1     -118.7621    34.4361
  2     -118.8313    34.4047
  3     -118.9130    34.4172
  4     -118.9281    34.4587
  5     -118.9382    34.4612
  6     -118.9835    34.4348
  7     -119.0690    34.4361
  8     -119.1067    34.4386
  9     -119.1708    34.4625

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000     0.0000
  2        7.5000    13.0000

 Computed Total Fault Area = 0.60E+03


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 SITE 1 COORDINATES: -118.4764  33.9939

 BOZ. ET AL.(1999)HOR HS COR 1
      AMPLITUDES (g):      0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.80
00E+000.9000E+000.1000E+01
      LN (AMPLITUDE):        -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0
.22      -0.11       0.00
   FAULT    1 E(NO/YR)      0.5695E-020.4617E-020.3400E-020.2358E-020.1571E-020.1022E-020.6569E-030.42
05E-030.2694E-030.1734E-03
   FAULT    2 E(NO/YR)      0.1242E-020.7249E-030.4238E-030.2472E-030.1443E-030.8463E-040.5008E-040.29
95E-040.1814E-040.1112E-04
   FAULT    3 E(NO/YR)      0.7203E-020.3600E-020.1919E-020.1039E-020.5657E-030.3106E-030.1725E-030.97
10E-040.5548E-040.3220E-04
   FAULT    4 E(NO/YR)      0.2623E-020.1053E-020.4427E-030.1897E-030.8326E-040.3761E-040.1752E-040.84
24E-050.4172E-050.2126E-05
   FAULT    5 E(NO/YR)      0.4728E-020.2507E-020.1129E-020.4858E-030.2101E-030.9305E-040.4249E-040.20
03E-040.9744E-050.4882E-05
   FAULT    6 E(NO/YR)      0.2667E-020.1183E-020.5300E-030.2396E-030.1105E-030.5231E-040.2547E-040.12
76E-040.6567E-050.3469E-05
   FAULT    7 E(NO/YR)      0.5366E-020.1790E-020.7101E-030.2969E-030.1289E-030.5806E-040.2708E-040.13
06E-040.6503E-050.3332E-05
   FAULT    8 E(NO/YR)      0.2031E-020.5317E-030.1372E-030.3780E-040.1132E-040.3675E-050.1283E-050.47
76E-060.1882E-060.7795E-07
   FAULT    9 E(NO/YR)      0.1394E-020.3348E-030.7645E-040.1870E-040.5027E-050.1480E-050.4729E-060.16
24E-060.5945E-070.2301E-07
   FAULT   10 E(NO/YR)      0.1134E-020.2289E-030.4536E-040.1001E-040.2484E-050.6866E-060.2082E-060.68
41E-070.2410E-070.9017E-08
   FAULT   11 E(NO/YR)      0.3942E-020.1237E-020.3807E-030.1198E-030.3973E-040.1400E-040.5235E-050.20
66E-050.8563E-060.3710E-06
   FAULT   12 E(NO/YR)      0.2665E-020.4574E-030.8000E-040.1591E-040.3619E-050.9265E-060.2626E-060.81
23E-070.2708E-070.9640E-08
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  FAULT  13 E(NO/YR)      0.5166E-020.1125E-020.2483E-030.5974E-040.1591E-040.4658E-050.1484E-050.50
86E-060.1860E-060.7194E-07
  FAULT  14 E(NO/YR)      0.9948E-020.1408E-020.2127E-030.3791E-040.7906E-050.1885E-050.5029E-060.14
76E-060.4698E-070.1604E-07
  FAULT  15 E(NO/YR)      0.6441E-030.5963E-040.6821E-050.9907E-060.1758E-060.3667E-070.8734E-080.23
22E-080.6770E-090.2136E-09
  FAULT  16 E(NO/YR)      0.1011E-020.5533E-040.4476E-050.5057E-060.7375E-070.1311E-070.2726E-080.64
42E-090.1690E-090.4822E-10
  FAULT  17 E(NO/YR)      0.1026E-020.1007E-030.1185E-040.1754E-050.3158E-060.6669E-070.1605E-070.43
05E-080.1266E-080.4024E-09
  FAULT  18 E(NO/YR)      0.4323E-030.3514E-040.3581E-050.4749E-060.7821E-070.1533E-070.3458E-080.87
67E-090.2451E-090.7443E-10
  FAULT  19 E(NO/YR)      0.4404E-030.2952E-040.2642E-050.3182E-060.4856E-070.8935E-080.1911E-080.46
22E-090.1239E-090.3621E-10
  FAULT  20 E(NO/YR)      0.3744E-020.4306E-030.5739E-040.9354E-050.1820E-050.4101E-060.1044E-060.29
41E-070.9030E-080.2986E-08
  FAULT  21 E(NO/YR)      0.2785E-030.1280E-040.8966E-060.9029E-070.1197E-070.1962E-080.3801E-090.84
36E-100.2086E-100.5498E-11
  FAULT  22 E(NO/YR)      0.4079E-020.2691E-030.2426E-040.2954E-050.4557E-060.8470E-070.1828E-070.44
62E-080.1206E-080.3544E-09
  TOTAL     E(NO/YR)      0.6746E-010.2179E-010.9846E-020.5172E-020.2903E-020.1686E-020.1002E-020.60
54E-030.3715E-030.2311E-03
  TOTAL RISK              0.6524E-010.2155E-010.9798E-020.5159E-020.2899E-020.1685E-020.1001E-020.60
52E-030.3714E-030.2311E-03

     AMPLITUDES (g):      0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
    LN (AMPLITUDE):          0.10       0.18       0.26       0.34       0.41
  FAULT   1 E(NO/YR)      0.1123E-030.7326E-040.4818E-040.3196E-040.2138E-04
  FAULT   2 E(NO/YR)      0.6909E-050.4347E-050.2769E-050.1784E-050.1163E-05
  FAULT   3 E(NO/YR)      0.1897E-040.1135E-040.6894E-050.4245E-050.2649E-05
  FAULT   4 E(NO/YR)      0.1112E-050.5959E-060.3268E-060.1830E-060.1045E-06
  FAULT   5 E(NO/YR)      0.2515E-050.1329E-050.7195E-060.3982E-060.2249E-06
  FAULT   6 E(NO/YR)      0.1878E-050.1039E-050.5876E-060.3388E-060.1989E-06
  FAULT   7 E(NO/YR)      0.1754E-050.9465E-060.5226E-060.2947E-060.1694E-06
  FAULT   8 E(NO/YR)      0.3376E-070.1522E-070.7110E-080.3431E-080.1705E-08
  FAULT   9 E(NO/YR)      0.9360E-080.3979E-080.1760E-080.8065E-090.3818E-09
  FAULT  10 E(NO/YR)      0.3559E-080.1472E-080.6353E-090.2847E-090.1320E-09
  FAULT  11 E(NO/YR)      0.1673E-060.7821E-070.3778E-070.1880E-070.9611E-08
  FAULT  12 E(NO/YR)      0.3633E-080.1440E-080.5970E-090.2576E-090.1153E-09
  FAULT  13 E(NO/YR)      0.2926E-070.1244E-070.5504E-080.2524E-080.1195E-08
  FAULT  14 E(NO/YR)      0.5823E-080.2231E-080.8958E-090.3749E-090.1623E-09
  FAULT  15 E(NO/YR)      0.7214E-100.2579E-100.9593E-110.3646E-110.1321E-11
  FAULT  16 E(NO/YR)      0.1440E-100.4371E-110.1098E-110.1865E-120.0000E+00
  FAULT  17 E(NO/YR)      0.1368E-090.4927E-100.1853E-100.7127E-110.2685E-11
  FAULT  18 E(NO/YR)      0.2425E-100.8293E-110.2874E-110.9603E-120.2477E-12
  FAULT  19 E(NO/YR)      0.1127E-100.3572E-110.1089E-110.2414E-120.0000E+00
  FAULT  20 E(NO/YR)      0.1053E-080.3926E-090.1535E-090.6244E-100.2586E-10
  FAULT  21 E(NO/YR)      0.1424E-110.2406E-120.0000E+000.0000E+000.0000E+00
  FAULT  22 E(NO/YR)      0.1114E-090.3555E-100.1101E-100.2865E-110.0000E+00
  TOTAL     E(NO/YR)      0.1457E-030.9298E-040.6005E-040.3923E-040.2590E-04
  TOTAL RISK              0.1457E-030.9298E-040.6005E-040.3923E-040.2590E-04

    SPECIFIED RISKS:         0.013900  0.010000  0.005000  0.002105  0.001000
    ESTIMATED LN AMP.  :     -1.384    -1.214    -0.904    -0.586    -0.356
     ESTIMATED AMP. (g):     0.25062   0.29686   0.40487   0.55674   0.70021

 BOZ. ET AL.(1999)HOR HS COR 2
     AMPLITUDES (g):      0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.80
00E+000.9000E+000.1000E+01
     LN (AMPLITUDE):         -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0
.22     -0.11       0.00
  FAULT   1 E(NO/YR)      0.4328E-020.2754E-020.1625E-020.8878E-030.4688E-030.2459E-030.1299E-030.69
57E-040.3790E-040.2102E-04
  FAULT   2 E(NO/YR)      0.7872E-030.3858E-030.1863E-030.8918E-040.4309E-040.2123E-040.1071E-040.55
35E-050.2932E-050.1590E-05
  FAULT   3 E(NO/YR)      0.4348E-020.2047E-020.1033E-020.5139E-030.2545E-030.1272E-030.6467E-040.33
55E-040.1778E-040.9624E-05
  FAULT   4 E(NO/YR)      0.1506E-020.5228E-030.1793E-030.6286E-040.2305E-040.8892E-050.3605E-050.15
31E-050.6788E-060.3127E-06
  FAULT   5 E(NO/YR)      0.2820E-020.8415E-030.2267E-030.6403E-040.1952E-040.6427E-050.2271E-050.85
43E-060.3397E-060.1419E-06
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   FAULT    6 E(NO/YR)     0.1524E-020.5634E-030.1999E-030.7244E-040.2744E-040.1092E-040.4564E-050.19
94E-050.9080E-060.4290E-06
   FAULT    7 E(NO/YR)     0.3268E-020.1206E-020.4562E-030.1782E-030.7250E-040.3080E-040.1365E-040.62
88E-050.3004E-050.1484E-05
   FAULT    8 E(NO/YR)     0.1003E-020.1582E-030.2692E-040.5364E-050.1236E-050.3223E-060.9320E-070.29
41E-070.1000E-070.3630E-08
   FAULT    9 E(NO/YR)     0.6510E-030.8761E-040.1263E-040.2179E-050.4433E-060.1036E-060.2720E-070.78
72E-080.2475E-080.8361E-09
   FAULT   10 E(NO/YR)     0.4254E-030.3799E-040.4221E-050.6038E-060.1062E-060.2207E-070.5244E-080.13
93E-080.4061E-090.1282E-09
   FAULT   11 E(NO/YR)     0.2142E-020.5233E-030.1190E-030.2926E-040.7941E-050.2366E-050.7660E-060.26
66E-060.9886E-070.3875E-07
   FAULT   12 E(NO/YR)     0.1096E-020.9729E-040.1055E-040.1469E-050.2521E-060.5115E-070.1190E-070.30
97E-080.8866E-090.2751E-09
   FAULT   13 E(NO/YR)     0.2884E-020.4601E-030.7665E-040.1485E-040.3327E-050.8443E-060.2380E-060.73
36E-070.2441E-070.8675E-08
   FAULT   14 E(NO/YR)     0.3463E-020.2212E-030.1939E-040.2313E-050.3512E-060.6444E-070.1376E-070.33
24E-080.8900E-090.2591E-09
   FAULT   15 E(NO/YR)     0.3029E-030.1787E-040.1502E-050.1742E-060.2589E-070.4668E-080.9820E-090.23
43E-090.6199E-100.1784E-10
   FAULT   16 E(NO/YR)     0.3109E-030.8710E-050.4591E-060.3796E-070.4329E-080.6279E-090.1094E-090.21
75E-100.4583E-110.8450E-12
   FAULT   17 E(NO/YR)     0.3427E-030.1612E-040.1163E-050.1204E-060.1636E-070.2738E-080.5406E-090.12
19E-090.3056E-100.8278E-11
   FAULT   18 E(NO/YR)     0.9942E-040.3046E-050.1659E-060.1394E-070.1604E-080.2340E-090.4095E-100.82
25E-110.1787E-110.3515E-12
   FAULT   19 E(NO/YR)     0.9185E-040.2273E-050.1083E-060.8248E-080.8785E-090.1201E-090.1981E-100.36
49E-110.6410E-120.0000E+00
   FAULT   20 E(NO/YR)     0.1657E-020.1140E-030.1060E-040.1324E-050.2090E-060.3962E-070.8702E-080.21
56E-080.5908E-090.1757E-09
   FAULT   21 E(NO/YR)     0.4715E-040.7802E-060.2894E-070.1840E-080.1700E-090.2054E-100.2901E-110.36
85E-120.0000E+000.0000E+00
   FAULT   22 E(NO/YR)     0.1334E-020.4507E-040.2641E-050.2348E-060.2830E-070.4291E-080.7779E-090.16
22E-090.3713E-100.8621E-11
   TOTAL      E(NO/YR)     0.3443E-010.1011E-010.4193E-020.1926E-020.9229E-030.4552E-030.2305E-030.11
97E-030.6368E-040.3465E-04
   TOTAL RISK              0.3384E-010.1006E-010.4184E-020.1924E-020.9225E-030.4551E-030.2305E-030.11
97E-030.6368E-040.3465E-04

      AMPLITUDES (g):      0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
     LN (AMPLITUDE):          0.10       0.18       0.26       0.34       0.41
   FAULT    1 E(NO/YR)     0.1187E-040.6827E-050.3993E-050.2374E-050.1434E-05
   FAULT    2 E(NO/YR)     0.8818E-060.4993E-060.2882E-060.1695E-060.1013E-06
   FAULT    3 E(NO/YR)     0.5319E-050.2999E-050.1723E-050.1008E-050.5991E-06
   FAULT    4 E(NO/YR)     0.1492E-060.7350E-070.3727E-070.1941E-070.1036E-07
   FAULT    5 E(NO/YR)     0.6195E-070.2813E-070.1323E-070.6422E-080.3210E-08
   FAULT    6 E(NO/YR)     0.2097E-060.1057E-060.5475E-070.2910E-070.1584E-07
   FAULT    7 E(NO/YR)     0.7552E-060.3951E-060.2120E-060.1165E-060.6534E-07
   FAULT    8 E(NO/YR)     0.1394E-080.5624E-090.2371E-090.1039E-090.4715E-10
   FAULT    9 E(NO/YR)     0.3005E-090.1141E-090.4529E-100.1878E-100.8045E-11
   FAULT   10 E(NO/YR)     0.4326E-100.1543E-100.5725E-110.2143E-110.8279E-12
   FAULT   11 E(NO/YR)     0.1595E-070.6862E-080.3069E-080.1422E-080.6801E-09
   FAULT   12 E(NO/YR)     0.9125E-100.3189E-100.1133E-100.4428E-110.1464E-11
   FAULT   13 E(NO/YR)     0.3267E-080.1294E-080.5365E-090.2314E-090.1032E-09
   FAULT   14 E(NO/YR)     0.8043E-100.2566E-100.7391E-110.2287E-110.0000E+00
   FAULT   15 E(NO/YR)     0.5457E-110.1720E-110.4898E-120.6841E-130.0000E+00
   FAULT   16 E(NO/YR)     0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT   17 E(NO/YR)     0.2279E-110.5456E-120.0000E+000.0000E+000.0000E+00
   FAULT   18 E(NO/YR)     0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT   19 E(NO/YR)     0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT   20 E(NO/YR)     0.5594E-100.1856E-100.6319E-110.1855E-110.2593E-12
   FAULT   21 E(NO/YR)     0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT   22 E(NO/YR)     0.1782E-110.0000E+000.0000E+000.0000E+000.0000E+00
   TOTAL      E(NO/YR)     0.1927E-040.1094E-040.6326E-050.3724E-050.2230E-05
   TOTAL RISK              0.1927E-040.1094E-040.6326E-050.3724E-050.2230E-05

     SPECIFIED RISKS:         0.013900   0.010000   0.005000   0.002105   0.001000
     ESTIMATED LN AMP.  :      -1.794     -1.607     -1.286     -0.950     -0.718
      ESTIMATED AMP. (g):     0.16629    0.20058    0.27630    0.38693    0.48791
```

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO	
1	SANTA MONICA	5.3	5.3	6.8	5.3	5.6	5.7	km
2	MALIBU COAST	6.6	6.6	7.6	6.6	7.7	7.8	km
3	PALOS VERDES	6.8	6.8	7.5	6.8	6.8	7.2	km
4	NEWPORT-INGLEWOOD (L.A.Basin)	10.6	10.6	11.0	10.6	10.8	10.9	km
5	HOLLYWOOD	11.8	11.8	12.7	11.8	12.9	13.0	km
6	COMPTON THRUST	13.9	12.2	14.1	14.1	13.3	15.1	km
7	ANACAPA-DUME	20.1	20.1	21.5	20.1	21.4	21.4	km
8	ELYSIAN PARK THRUST	23.1	23.1	25.1	25.1	24.6	26.6	km
9	VERDUGO	27.4	27.4	30.6	27.4	28.2	28.2	km
10	RAYMOND	27.4	27.4	27.9	27.4	28.5	28.5	km
11	NORTHRIDGE (E. Oak Ridge)	32.2	17.2	26.0	26.0	18.5	26.4	km
12	SIERRA MADRE (San Fernando)	33.4	33.4	36.8	33.4	34.3	34.4	km
13	SIERRA MADRE	33.6	33.6	36.8	33.6	34.7	34.7	km
14	SANTA SUSANA	34.8	34.8	37.3	34.8	35.8	35.8	km
15	SAN GABRIEL	40.3	40.3	40.4	40.3	40.6	40.6	km
16	WHITTIER	42.3	42.3	42.4	42.3	43.3	43.3	km
17	SIMI-SANTA ROSA	44.3	44.3	45.4	44.3	45.2	45.2	km
18	HOLSER	47.5	42.5	44.4	44.4	43.5	45.1	km
19	CLAMSHELL-SAWPIT	48.5	47.8	48.2	48.2	48.9	49.3	km
20	OAK RIDGE (Onshore)	50.3	45.4	47.4	47.4	46.4	48.1	km
21	SAN JOSE	55.3	53.9	54.9	54.9	55.0	55.9	km
22	SAN CAYETANO	55.8	55.8	57.6	55.8	56.3	56.3	km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

Appendix D

Liquefaction Evaluation

Liquefaction Analysis

Simplified methods of liquefaction analyses compute a shear stress profile induced during an earthquake based on curves developed from site response analyses using one-dimensional wave propagation for representative conditions. These shear stresses are then compared with the shear stress required to cause liquefaction that have been correlated to standard penetration test blow counts (SPT) or to cone penetrometer resistances. The method used to perform this analysis with SPT data (correlated to CPT data and corroborated by comparisons with sampler driving resistances) is based on the procedures resulting from the workshop convened in January 1996 by the National Center for Earthquake Engineering Research (NCEER) (Youd and Idriss, 1997), and the method by Robertson and Wride (1997) is used with CPT data.

Soil input parameters to the program include either SPT values or cone penetrometer tip resistance, soil unit weights, the depth to groundwater, and the designation of whether or not the soil is susceptible to liquefaction. Seismic input for the design level earthquake includes the maximum ground acceleration and the magnitude of the seismic event. The results of the analyses using a simplified method of analysis follow this appendix.

In our use of the CPT data, we use I_c to estimate percent fines and to help categorize the material type. With respect to percent fines, we find that the percent fines estimated in this way tend to underestimate the actual percent fines. Profiles of the percent fines computed from a correlation with I_c (Robertson and Wride, 1997) and a soil characterization number (SCN) (Olsen and Mitchell, 1995) are included within this report along with results measured on recovered samples from the subject site. Often the stratigraphy is highly interbedded with large changes in percent fines over small distances. This makes it difficult to compare results deduced from the cone with those of recovered samples, since samples a few feet apart horizontally and several inches apart in elevations could have significantly difference amounts of fines. To reduce the impact of these differences we have compared only data where the cone data indicates relatively thick layers of uniform material. We will refer to this as better quality data since it would be less affected by variations in stratification. A plot of the percent fines estimated from the CPT data with that from recovered samples for this better quality data, taken from several locations, shows the tendency for the percent fines to be underestimated by that estimated form the CPT (I_c). Thus, the adjustments to the blow counts deduced from the CPT data for fine contents would tend to be underestimated. This would be a conservative impact.

When the stratigraphy is highly interbedded, such as those on the Oxnard Plain and in the surrounding alluvial valleys, it is not economically feasible to perform grain-size analyses and Atterberg Limits of each thin layer and to strictly comply with the literal wording contained in the SCEC guidelines. Some discretion should be given to the geotechnical engineer in characterizing the site, although a reasonable amount of data should be used in the site characterization process. Some reliance on indirect methods, such as correlations with CPT data, should be allowed, if supported by other site-specific and regional data. It is for this reason that sampling is done in association with CPT probes and some grain-size analyses are performed to compliment the visual classifications.

Soils with a clay content of more than 15% are taken as nonliquefiable, and based on the Chinese Criteria, clayey soils with liquid limits greater than 35% are not susceptible to severe strength loss due to seismic shaking. We maintain a database of laboratory test results that we can correlate various soil parameters. We use correlations between percent fines and liquid limit, for example, that show when the percent fines exceed 50% the liquid limit exceeds 35% for the soils we typically encounter in this region. Thus, clayey soils in this area are generally considered not to be susceptible to severe strength loss due to seismic shaking.

With respect to categorizing the material type, we use a value of 2.6 for I_c and a friction ratio of greater than 0.01 to distinguish clays that would not be susceptible to liquefaction, but this in itself is not the sole criterion. A categorization of the soil type is made following an interpretation by Robertson and Campanella (1989). In the spreadsheet analysis a check is made to determine if I_c exceeds 2.6 and the friction ratio of greater than 0.01 and if the Robertson and Campanella interpretation indicates clay. If these requirements are met, the soil is taken as nonliquefiable. In addition, we visually scan the data to evaluate if the site characterization (nonliquefiable versus liquefiable) that results from this procedure is reasonable and consistent with other data (e.g., boring log, cone tip resistance variations, grain-size results, Atterberg limits).

As with any site characterization, differences of opinion may exist between 2 professionals looking at the same data. Nevertheless, we are of the opinion that procedures that we apply serve the intent of the SCEC guidelines.

Since the simplified methods use generic or typical site response analyses that may or may not be representative of this site, additional analyses are sometimes performed using a one-dimensional wave propagation program (SHAKE, Schnabel, Lysmer, and Seed, 1972) to excite the column of soil using an earthquake record from the 1971 San Fernando Valley earthquake recorded on a bedrock outcrop at Castaic and scaled to a maximum acceleration of the design event. This motion is input at the level of the bedrock. The maximum computed shear stress is used with the method of Seed, Tokimatsu, Harder, and Chung (1985) to evaluate the liquefaction potential. A summary of the maximum shear stresses obtained from the SHAKE analyses and the resulting liquefaction evaluations are included at the end of this appendix along with the input and output files for the SHAKE analyses, if this analysis was performed for this project.

CPT INTERPRETATIONS

SOUNDING : CPT-01
PROJECT : Rad Sunset
DATE/TIME: 2/6/2004 8:11

PROJECT No. : 3283
CONE/RIG : DSG786

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	725.91	1.19	SAND	100	100	100		
.300	.98	629.46	1.67	SAND	100	100	100		
.450	1.48	425.17	1.71	SAND to SILTY SAND	100	100	100		
.600	1.97	386.94	1.70	SAND to SILTY SAND	97	100	100		
.750	2.46	306.77	1.50	SAND to SILTY SAND	77	100	100		
.900	2.95	225.57	1.46	SAND to SILTY SAND	56	90	100		
1.050	3.44	190.04	1.35	SAND to SILTY SAND	48	76	95		49.5
1.200	3.94	169.55	1.23	SAND to SILTY SAND	42	68	91		48.5
1.350	4.43	121.28	1.48	SAND to SILTY SAND	30	48	82		47.0
1.500	4.92	90.09	1.48	SILTY SAND to SANDY SILT	30	48	75		45.5
1.650	5.41	75.72	1.46	SILTY SAND to SANDY SILT	25	40	68		44.0
1.800	5.91	62.25	1.54	SILTY SAND to SANDY SILT	21	33	63		43.0
1.950	6.40	53.21	1.51	SILTY SAND to SANDY SILT	18	28	58		42.0
2.100	6.89	53.33	1.48	SILTY SAND to SANDY SILT	18	27	58		41.5
2.250	7.38	49.02	.93	SILTY SAND to SANDY SILT	16	24	56		40.5
2.400	7.87	51.62	1.32	SILTY SAND to SANDY SILT	17	25	57		40.0
2.550	8.37	77.99	1.39	SILTY SAND to SANDY SILT	26	36	69		42.5
2.700	8.86	82.71	1.42	SILTY SAND to SANDY SILT	28	37	70		42.5
2.850	9.35	94.94	1.29	SAND to SILTY SAND	24	31	73		42.5
3.000	9.84	71.86	1.53	SILTY SAND to SANDY SILT	24	31	64		41.0
3.150	10.33	75.18	1.60	SILTY SAND to SANDY SILT	25	31	65		41.0
3.300	10.83	33.46	2.44	SANDY SILT to CLAYEY SILT	13	16		2.2	
3.450	11.32	10.54	.70	SANDY SILT to CLAYEY SILT	4	5		1.0	
3.600	11.81	17.38	.35	SANDY SILT to CLAYEY SILT	7	8		1.7	
3.750	12.30	29.01	2.08	SANDY SILT to CLAYEY SILT	12	13		1.9	
3.900	12.80	48.17	3.26	CLAYEY SILT to SILTY CLAY	24	27		3.2	
4.050	13.29	67.06	5.64	*VERY STIFF FINE GRAINED	67	74			
4.200	13.78	64.15	5.96	*VERY STIFF FINE GRAINED	64	69			
4.350	14.27	63.52	5.33	CLAY	64	67		3.7	
4.500	14.76	52.04	6.20	CLAY	52	54		3.0	
4.650	15.26	69.66	5.11	*VERY STIFF FINE GRAINED	70	71			
4.800	15.75	117.16	2.45	SILTY SAND to SANDY SILT	39	39	72		41.5
4.950	16.24	101.97	1.95	SILTY SAND to SANDY SILT	34	34	67		40.0
5.100	16.73	101.25	1.65	SILTY SAND to SANDY SILT	34	33	67		39.5
5.250	17.22	126.43	1.51	SAND to SILTY SAND	32	30	73		41.0
5.400	17.72	175.49	1.43	SAND to SILTY SAND	44	42	82		42.5
5.550	18.21	179.64	1.68	SAND to SILTY SAND	45	42	82		42.5
5.700	18.70	151.31	1.58	SAND to SILTY SAND	38	35	77		42.0
5.850	19.19	141.23	1.48	SAND to SILTY SAND	35	32	74		41.0
6.000	19.69	141.00	1.28	SAND to SILTY SAND	35	32	74		41.0
6.150	20.18	147.14	1.38	SAND to SILTY SAND	37	33	75		41.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 125 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-01

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	164.64	1.24	SAND to SILTY SAND	41	36	78		42.0
6.450	21.16	148.17	1.39	SAND to SILTY SAND	37	32	74		41.0
6.600	21.65	119.34	1.41	SAND to SILTY SAND	30	26	68		39.5
6.750	22.15	120.99	1.15	SAND to SILTY SAND	30	26	68		39.5
6.900	22.64	166.01	1.43	SAND to SILTY SAND	42	35	77		41.0
7.050	23.13	281.85	1.08	SAND	56	47	91		43.5
7.200	23.62	307.77	.64	SAND	62	51	94		44.0
7.350	24.11	337.86	.90	SAND	68	55	96		44.0
7.500	24.61	404.82	.83	SAND	81	65	100		45.0
7.650	25.10	415.96	.87	SAND	83	66	100		45.0
7.800	25.59	334.33	.54	GRAVELLY SAND to SAND	56	44	95		44.0
7.950	26.08	374.04	1.37	SAND	75	59	98		44.0
8.100	26.57	450.93	.73	GRAVELLY SAND to SAND	75	59	100		45.0
8.250	27.07	447.15	.70	GRAVELLY SAND to SAND	75	58	100		45.0
8.400	27.56	359.93	.47	GRAVELLY SAND to SAND	60	46	96		44.0
8.550	28.05	342.29	.53	GRAVELLY SAND to SAND	57	44	95		44.0
8.700	28.54	348.05	.67	SAND	70	53	95		44.0
8.850	29.04	334.11	.42	GRAVELLY SAND to SAND	56	42	94		43.5
9.000	29.53	309.99	.27	GRAVELLY SAND to SAND	52	39	91		43.0
9.150	30.02	255.19	.11	GRAVELLY SAND to SAND	43	32	86		42.5
9.300	30.51	185.15	1.11	SAND to SILTY SAND	21	16	54		37.0
9.450	31.00	222.13	.61	SAND	44	33	82		41.5
9.600	31.50	425.46	.81	SAND	85	63	100		44.5
9.750	31.99	642.15	1.57	SAND	100	95	100		
9.900	32.48	549.78	.83	GRAVELLY SAND to SAND	92	68	100		
10.050	32.97	632.40	.86	GRAVELLY SAND to SAND	100	78	100		
10.200	33.46	629.11	.86	GRAVELLY SAND to SAND	100	77	100		
10.350	33.96	400.84	1.72	SAND to SILTY SAND	100	73	98		44.0
10.500	34.45	416.18	.89	SAND	83	61	99		44.0
10.650	34.94	433.85	.84	SAND	87	63	100		44.0
10.800	35.43	491.22	1.21	SAND	98	71	100		44.5
10.950	35.93	550.95	1.19	SAND	100	79	100		
11.100	36.42	592.99	1.28	SAND	100	86	100		
11.250	36.91	626.52	1.16	SAND	100	89	100		

$N_{Avg} = 30$
#200 = 3
$D_{50} = 0.4$

$N_{Avg} = 21$
#200 = 3
$D_{50} = 0.4$

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 125 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

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*                          *
*      L I Q U E F Y 2     *
*                          *
*       Version 1.50       *
*                          *
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EMPIRICAL PREDICTION OF
EARTHQUAKE-INDUCED LIQUEFACTION POTENTIAL

JOB NUMBER: 3283 DATE: 02-13-2004

JOB NAME: RAD

SOIL-PROFILE NAME: 3283CP-1.LDW

BORING GROUNDWATER DEPTH: 10.00 ft

CALCULATION GROUNDWATER DEPTH: 10.00 ft

DESIGN EARTHQUAKE MAGNITUDE: 7.50 Mw

SITE PEAK GROUND ACCELERATION: 0.390 g

BOREHOLE DIAMETER CORRECTION FACTOR: 1.00

SAMPLER SIZE CORRECTION FACTOR: 1.00

N60 HAMMER CORRECTION FACTOR: 1.00

MAGNITUDE SCALING FACTOR METHOD: Idriss (1997, in press)

Magnitude Scaling Factor: 1.000

rd-CORRECTION METHOD: Seed and Idriss (1971)

FIELD SPT N-VALUES ARE CORRECTED FOR THE LENGTH OF THE DRIVE RODS.

NCEER [1997] Method LIQUEFACTION ANALYSIS SUMMARY PAGE 1

File Name: 3283CP-1.OUT

SOIL	CALC. DEPTH	TOTAL STRESS	EFF. STRESS	FIELD N	FC DELTA	C	CORR. (N1)60	LIQUE. RESIST	r	INDUC. STRESS	LIQUE. SAFETY

Thickness (in)	NO.	(ft)	(tsf)	(tsf)	(B/ft)	N1_60	N	(B/ft)	RATIO	d	RATIO	FACTOR	Strain (%)	Settlement (in)
	1	0.25	0.015	0.015	20	~	*	*	*	*	*	**		
	1	0.75	0.045	0.045	20	~	*	*	*	*	*	**		
	1	1.25	0.075	0.075	20	~	*	*	*	*	*	**		
	1	1.75	0.105	0.105	20	~	*	*	*	*	*	**		
	1	2.25	0.135	0.135	20	~	*	*	*	*	*	**		
	1	2.75	0.165	0.165	20	~	*	*	*	*	*	**		
	1	3.25	0.195	0.195	20	~	*	*	*	*	*	**		
	1	3.75	0.225	0.225	20	~	*	*	*	*	*	**		
	1	4.25	0.255	0.255	20	~	*	*	*	*	*	**		
	1	4.75	0.285	0.285	20	~	*	*	*	*	*	**		
	1	5.25	0.315	0.315	20	~	*	*	*	*	*	**		
	1	5.75	0.345	0.345	20	~	*	*	*	*	*	**		
	1	6.25	0.375	0.375	20	~	*	*	*	*	*	**		
	1	6.75	0.405	0.405	20	~	*	*	*	*	*	**		
	1	7.25	0.435	0.435	20	~	*	*	*	*	*	**		
	1	7.75	0.465	0.465	20	~	*	*	*	*	*	**		
	1	8.25	0.495	0.495	20	~	*	*	*	*	*	**		
	1	8.75	0.525	0.525	20	~	*	*	*	*	*	**		
	1	9.25	0.555	0.555	20	~	*	*	*	*	*	**		
	1	9.75	0.585	0.585	20	~	*	*	*	*	*	**		
	2	10.25	0.615	0.607	16	~	~	~	~	~	~	~~		
	2	10.75	0.645	0.622	16	~	~	~	~	~	~	~~		
	2	11.25	0.675	0.636	16	~	~	~	~	~	~	~~		
	2	11.75	0.705	0.650	16	~	~	~	~	~	~	~~		
	2	12.25	0.735	0.665	16	~	~	~	~	~	~	~~		
	2	12.75	0.765	0.679	16	~	~	~	~	~	~	~~		
	2	13.25	0.795	0.694	16	~	~	~	~	~	~	~~		
	2	13.75	0.825	0.708	16	~	~	~	~	~	~	~~		
	2	14.25	0.855	0.722	16	~	~	~	~	~	~	~~		
	2	14.75	0.885	0.737	16	~	~	~	~	~	~	~~		
	2	15.25	0.915	0.751	16	~	~	~	~	~	~	~~		
	2	15.75	0.945	0.766	16	~	~	~	~	~	~	~~		
	2	16.25	0.975	0.780	16	~	~	~	~	~	~	~~		
	2	16.75	1.005	0.794	16	~	~	~	~	~	~	~~		
	2	17.25	1.035	0.809	16	~	~	~	~	~	~	~~		
	2	17.75	1.065	0.823	16	~	~	~	~	~	~	~~		
	2	18.25	1.095	0.838	16	~	~	~	~	~	~	~~		
	2	18.75	1.125	0.852	16	~	~	~	~	~	~	~~		
	2	19.25	1.155	0.866	16	~	~	~	~	~	~	~~		
	2	19.75	1.185	0.881	16	~	~	~	~	~	~	~~		
	2	20.25	1.215	0.895	16	~	~	~	~	~	~	~~		
	2	20.75	1.245	0.910	16	~	~	~	~	~	~	~~		
	2	21.25	1.275	0.924	16	~	~	~	~	~	~	~~		

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	SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR		
12"	3	21.75	1.305	0.938	30	0.04	1.084	29.1	0.394	0.952	0.336	1.17	0.8%	0.096"
	3	22.25	1.335	0.953	30	0.04	1.084	29.1	0.394	0.951	0.338	1.17		
	4	22.75	1.365	0.967	22	~	~	~	~	~	~	~~		
	4	23.25	1.395	0.982	22	~	~	~	~	~	~	~~		
	4	23.75	1.425	0.996	22	~	~	~	~	~	~	~~		
	4	24.25	1.455	1.010	22	~	~	~	~	~	~	~~		
	4	24.75	1.485	1.025	22	~	~	~	~	~	~	~~		
	4	25.25	1.515	1.039	22	~	~	~	~	~	~	~~		
	4	25.75	1.545	1.054	22	~	~	~	~	~	~	~~		
	4	26.25	1.575	1.068	22	~	~	~	~	~	~	~~		

Thickness(in)													Strain(%)	Settlement(in)
	4	26.75	1.605	1.082	22	~	~	~	~	~	~	~~		
	4	27.25	1.635	1.097	22	~	~	~	~	~	~	~~		
	4	27.75	1.665	1.111	22	~	~	~	~	~	~	~~		
	4	28.25	1.695	1.126	22	~	~	~	~	~	~	~~		
	4	28.75	1.725	1.140	22	~	~	~	~	~	~	~~		
	4	29.25	1.755	1.154	22	~	~	~	~	~	~	~~		
	4	29.75	1.785	1.169	22	~	~	~	~	~	~	~~		
6"	5	30.25	1.815	1.183	21	0.03	1.006	20.2	0.220	0.920	0.358	0.61	1.6%	0.096
	6	30.75	1.845	1.198	24	~	~	~	~	~	~	~~		
	6	31.25	1.875	1.212	24	~	~	~	~	~	~	~~		
	6	31.75	1.905	1.226	24	~	~	~	~	~	~	~~		
	6	32.25	1.935	1.241	24	~	~	~	~	~	~	~~		
	6	32.75	1.965	1.255	24	~	~	~	~	~	~	~~		
	6	33.25	1.995	1.270	24	~	~	~	~	~	~	~~		
	6	33.75	2.025	1.284	24	~	~	~	~	~	~	~~		
	6	34.25	2.055	1.298	24	~	~	~	~	~	~	~~		
	6	34.75	2.085	1.313	24	~	~	~	~	~	~	~~		
	6	35.25	2.115	1.327	24	~	~	~	~	~	~	~~		
	6	35.75	2.145	1.342	24	~	~	~	~	~	~	~~		
	6	36.25	2.175	1.356	24	~	~	~	~	~	~	~~		
	6	36.75	2.205	1.370	24	~	~	~	~	~	~	~~		
	6	37.25	2.235	1.385	24	~	~	~	~	~	~	~~		
	6	37.75	2.265	1.399	24	~	~	~	~	~	~	~~		
	6	38.25	2.295	1.414	24	~	~	~	~	~	~	~~		
	6	38.75	2.325	1.428	24	~	~	~	~	~	~	~~		
	6	39.25	2.355	1.442	24	~	~	~	~	~	~	~~		
	6	39.75	2.385	1.457	24	~	~	~	~	~	~	~~		
	6	40.25	2.415	1.471	24	~	~	~	~	~	~	~~		
	6	40.75	2.445	1.486	24	~	~	~	~	~	~	~~		
	6	41.25	2.475	1.500	24	~	~	~	~	~	~	~~		
	6	41.75	2.505	1.514	24	~	~	~	~	~	~	~~		
	6	42.25	2.535	1.529	24	~	~	~	~	~	~	~~		
	6	42.75	2.565	1.543	24	~	~	~	~	~	~	~~		
	6	43.25	2.595	1.558	24	~	~	~	~	~	~	~~		

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SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
6	43.75	2.625	1.572	24	~	~	~	~	~	~	~~
6	44.25	2.655	1.586	24	~	~	~	~	~	~	~~
6	44.75	2.685	1.601	24	~	~	~	~	~	~	~~
6	45.25	2.715	1.615	24	~	~	~	~	~	~	~~
6	45.75	2.745	1.630	24	~	~	~	~	~	~	~~
6	46.25	2.775	1.644	24	~	~	~	~	~	~	~~
6	46.75	2.805	1.658	24	~	~	~	~	~	~	~~
6	47.25	2.835	1.673	24	~	~	~	~	~	~	~~
6	47.75	2.865	1.687	24	~	~	~	~	~	~	~~
6	48.25	2.895	1.702	24	~	~	~	~	~	~	~~
6	48.75	2.925	1.716	24	~	~	~	~	~	~	~~
6	49.25	2.955	1.730	24	~	~	~	~	~	~	~~
6	49.75	2.985	1.745	24	~	~	~	~	~	~	~~
6	50.25	3.015	1.759	24	~	~	~	~	~	~	~~
6	50.75	3.045	1.774	24	~	~	~	~	~	~	~~
6	51.25	3.075	1.788	24	~	~	~	~	~	~	~~

Total Settlement 0.20"

Differential settlement 0.1"

Appendix E

References

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The following list includes the citations of references referred to in this report.

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