GEOTECHNICAL STUDY FOR THE PROPOSED CITY HALL AND PARK DEVELOPMENT PLAN FOR THE ENVIRONMENTAL IMPACT REPORT (EIR), NEWPORT BEACH, CALIFORNIA

Prepared for:

CITY OF NEWPORT BEACH

3300 Newport Boulevard
Newport Beach, California 92663

Project No. 602184-002

July 6, 2009

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

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To: City of Newport Beach
3300 Newport Boulevard
Newport Beach, California 92663

Attention: Mr. Steven Badum

Subject: Geotechnical Study for the Proposed City Hall and Park Development Plan for the Environmental Impact Report (EIR), Newport Beach, California

Leighton Consulting, Inc. is pleased to submit this report to present the results of our geotechnical exploration for the proposed project. Our services were provided in accordance with our proposal dated February 6, 2009 and your subsequent Notice to Proceed. The report is intended to be used to support the Environmental Impact Report which will be prepared by others. Leighton Consulting prepared a due-diligence geotechnical report in 2008 (Leighton, 2008) for the proposed City Hall.

We understand that a city hall building, a parking structure, a park, and other improvements are planned. We prepared this report based on a schematic site plan showing the preliminary locations of these structures and improvements. Based on the preliminary information, the site is anticipated to be lowered to reach the design grades. A retaining wall is also planned along MacArthur Boulevard along the east side of the proposed parking structure.

Based on the results of our exploration, the site is underlain by Quaternary age terrace deposits over bedrock of Monterey Formation with artificial fill anticipated to be encountered in the southernmost portion of the site. Adverse bedrock structure was observed within the bucket auger boring. Therefore, geologic surcharge should be considered during design of the retaining wall and other temporary shoring systems. The proposed buildings may be supported on conventional spread footings and slab-on-grade foundation systems founded on bedrock or compacted structural fill where a bedrock-artificial fill or bedrock-terrace deposit transition is encountered.

The proposed project is deemed feasible from a geotechnical standpoint. This report presents the findings from our exploration and evaluation of the site. Aspects of the site that may be of significance for design and construction are discussed in this report. In addition, preliminary recommendations have been provided for design, but some additional field exploration and engineering analysis are considered to be necessary before completing the final design.

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further assistance, please call us at your convenience.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Vivian M. Cheng, PE 67879
Project Engineer

Edward L. Burrows, PG, CEG 1750
Director of Geology

Reviewed by:

John E. Haertle, PE, GE 2352
Senior Project Engineer

VMC/ELB/JEH/lr

Distribution: (5) Addressee

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1.0 INTRODUCTION

1.1 Site Description and Proposed Improvements

The site for the proposed city hall and park development plan is approximately 20 acres in size and is located between Avocado Avenue and MacArthur Boulevard in the city of Newport Beach, California. The proposed project site consists of three (3) parcels, referred to as the Northern, Central, and Southern parcels. The Northern parcel (3.24-acres) and the Central parcel (12.82-acres) are currently vacant and are separated by San Miguel Road. The Southern parcel (4.0-acres) is currently occupied by the existing Newport Beach Public Library located at 1000 Avocado Avenue. The library will remain after the proposed project implementation. The locations of the three parcels are shown on Figure 1, Site Location Map. The current site elevations range from approximately El. +130 to +210 feet mean sea level (msl) south of San Miguel Drive and approximately El. +210 to +250 feet msl north of San Miguel Drive. Light vegetation is present within both of the vacant Northern and Central parcels. Some heavy vegetation, bushes and a ravine are present within the northern area of the Central parcel.

We understand that the proposed city hall building and parking structure are planned within the southern portion of the Central parcel. The remaining area of the Central parcel as well as the Northern parcel are planned to be utilized as public park areas, with a portion of the Northern parcel planned as a dog park. A pedestrian bridge is proposed to link the Northern and Central parcels over San Miguel Road. Several other pedestrian bridges and other flatwork and landscape improvements are proposed in the park area of the Central parcel.

Based on our current understanding of the project plan, both the future City Hall building and parking structure will be rectangular in shape with finished floor elevations ranging from approximately El. +144 to +154 feet msl, except for the proposed Emergency Operations Center (EOC) that is planned in the southern region of the Central parcel that will have a finished floor elevation of approximately El. +130 feet msl. As such, significant grading, with cuts up to 20 to 40 feet, will be performed during construction. As the future parking structure will be lower than the adjacent MacArthur Boulevard, the eastern side of the parking structure will act as a retaining wall with a height anticipated to be similar to the height of the proposed cut that will be constructed adjacent to MacArthur Boulevard.

We understand that the project will also include expansion of the Central Library located in the Southern parcel. The addition to the library will be two stories in height located along the northern side of the existing building. The second floor of the addition will include pedestrian access to the proposed City Hall building via an enclosed corridor. The first floor of this addition will include storage space and a mechanical room. The first floor of the addition will be level with the ground/first floor of the existing library.

An access road is also planned to connect the Central Library to the future City Hall site and parking structure. Geotechnical evaluation of the site for this report has been based on the conceptual design sketches that depict the proposed locations of the improvements. Alterations to the preliminary design plans should be provided for our review and use prior to implementing the additional recommended field exploration and geotechnical analyses.

1.2 Purpose and Scope of Exploration

The purpose of our geotechnical exploration was to provide geotechnical recommendations and input for the Environmental Impact Report (EIR) of the proposed project. The exploration was performed in accordance with our proposal dated February 6, 2009 and your subsequent Notice to Proceed. Our current exploration is based on the preliminary design schematic plans provided to us and is anticipated to be used to support the EIR documents. A design-level geotechnical exploration should be performed after the final building locations and grading plans are available.

The scope of this exploration included the following tasks:

- *Site Reconnaissance* – Coordinate with C.W. Driver and LSA to perform a site reconnaissance to locate the proposed boring locations. We also identified any geologic hazards and evaluate access for drilling equipment.
- *Background Review* – Perform a background review of readily available, relevant, geotechnical and geological literature pertinent to the site.
- *Pre-field Exploration Activities* – Contact Underground Service Alert (USA) to locate and mark existing underground utilities prior to our subsurface explorations.
- *Geologic Mapping* – Perform preliminary level surficial geologic mapping at the site to visually identify any exposed geologic contacts along existing slopes.

- *Field Explorations* – Perform subsurface exploration on March 4, 5, 6, 10, 2009. All locations of the borings were determined by the project team during the site reconnaissance. An archeologist was on-site providing full-time monitoring during the course of our exploration. The field exploration consisted of the following:

  – Drill eight (8) hollow-stem auger borings to approximately 37 feet to 80 feet below current ground surface. Groundwater monitoring wells were installed in two (2) of the borings. The borings were logged by a member of our technical staff.

  – Drill one (1) bucket auger boring to approximately 64 feet below current ground surface. The bucket auger boring was downhole logged by a Certified Engineering Geologist.

  – Advance five (5) hand auger borings to approximately 3.5 feet below current ground surface. The borings were logged by a member of our technical staff.

  Relatively undisturbed soil samples were obtained at selected intervals within the hollow-stem and bucket auger borings using a modified-California ring sampler. Standard Penetration Tests (SPT) were conducted at selected intervals within the hollow-stem auger borings. Bulk and grab samples of representative soil types were collected with all borings for geotechnical laboratory testing and agricultural testing.

  The logs of borings of our current exploration and our 2008 exploration are presented in Appendix A. Exploration test locations are shown on Plate 1, Boring Location Map.

- *Laboratory Tests* – Perform laboratory tests on selected soil samples obtained during our field exploration. The laboratory testing program was designed to evaluate the physical and engineering characteristics of the subsurface materials. Laboratory tests performed for this exploration include:

  - In situ moisture content and dry density;
  - Direct shear;
  - Unconfined Compressive Test;
  - Atterberg Limits;
  - Grain Size analyses;
  - Expansion Index;

- R-Value; and
- Corrosion (resistivity, pH, chloride content, and sulfate concentration).

The results of the in situ moisture and density tests are shown on the boring logs in Appendix A. Results of all laboratory tests are presented in Appendix B.

Agricultural tests were also performed on 78 grab samples. The tests were performed by Wallace Laboratory. The results of the agricultural tests are included in Appendix C.

- *Engineering Analysis* – Evaluate and analyze data obtained from our background review, field exploration, preliminary geologic field mapping, and laboratory testing program to develop recommendations for the proposed improvements based on the current available plan.

- *Report Preparation* – Prepare a report summarizing the results of our exploration presenting our findings, conclusions and recommendations for the proposed project.

2.0 GEOLOGIC SETTING

The project site is on the northwestern flank of the northern San Joaquin Hills. The San Joaquin Hills lie within the northern part of the Peninsular Ranges geomorphic province which extends 900 miles southward from the Santa Monica Mountains to the tip of Baja California (Yerkes et al., 1965). Regional tectonic activity has uplifted the San Joaquin Hills into an elongated arched fold (anticlinorium) trending to the northwest from San Juan Capistrano and Huntington Mesa. This anticlinal folding has occurred as this entire section of the southern California coast was uplifted by the San Joaquin Hills blind thrust fault (Grant et al., 1997, 1999, and 2002; Mueller et al., 1998). The San Joaquin Hills expose mainly Tertiary aged marine and non marine sedimentary rocks including thinly bedded shale, siltstone and sandstone of the upper Miocene-age Monterey Formation.

During Quaternary times, the eustatic fluctuations in sea level formed broad wave cut platforms upon which marine terrace sediments were deposited. Due to the continued uplift of the San Joaquin Hills some of these ancient stepped sequences of marine terrace deposits have been elevated above present day sea level. Erosion and grading activity have formed the present day landscape.

3.0 SUBSURFACE AND GROUNDWATER CONDITIONS

3.1 Subsurface Conditions

A portion of the site is underlain by terrace deposits over bedrock. Quaternary terrace deposits at the site consist of varying amounts of sand, silt and clay. In general, the terrace deposits are medium dense to very dense granular soils and stiff to hard cohesive soils. A portion of the site is also underlain by Tertiary age Monterey Formation bedrock which was also encountered beneath the terrace deposits. The bedrock at the site consists of sandstone and siltstone. Bedrock was encountered at depths ranging from 0 to 9 feet below ground surface (bgs) at our exploration locations (approximately El. +161 and +250 feet msl) depending on the location of each exploration. Based on the current project plan for the proposed city hall building and parking structure in the Central parcel, the finish site grade will range from approximately El. +144 to +154 feet msl except where the EOC and library expansion are planned, which will be at approximately +130 feet msl. We anticipate that bedrock will be exposed within the majority of the site after grading. Depending on the final design profile, an artificial fill-bedrock transition may be encountered along the southern portion of the Central parcel.

During our downhole logging within the bucket auger boring that was drilled as part of the recent field exploration, sandstone with thin silt beds or clay beds was observed at various depths. Our measurement of the bedrock structure indicated that the majority of the bedding is dipping in an adverse direction (i.e. unfavorable) out-of-slope along the proposed retaining wall alignment.

Based on our recent geologic mapping at the site, we anticipate that artificial fill exists in the southern portion of the Central parcel. The fill is expected to comprise the slope that descends toward the existing library. The limits and depth of the artificial fill are unknown at this time. We also observed weathered bedrock to be exposed in the southern portion of the Central parcel in an area that appears to have been recently graded to some degree (perhaps as a borrow site). Bedrock was also observed at various locations along the perimeter of the Central parcel on the slope that descends toward MacArthur Boulevard. Weathered bedrock was also observed in the small ravines associated with the main drainage divide that cuts through the Central parcel.

Geologic cross-sections showing the subsurface conditions at the site are included on Plates 2 and 3. The subsurface stratigraphy is based on our observations from the borings, preliminary surficial geologic mapping, and our interpretation of the earth units between soil boring locations. Previous subsurface exploration data (boring and trench

logs) from our 2008 investigation has been revised where appropriate to reflect our current understanding of site geologic conditions.

3.2 Groundwater Conditions

Groundwater was encountered between approximately 45 to 67.2 feet below current ground surface during our exploration (between El. +117.7 and +131 feet msl) depending on the exploration location. The groundwater profile at the site is shown on Plates 2 and 3. In general, the groundwater elevation is higher in the northern region of the site (e.g. 45 feet bgs/El. +131 msl at Boring B-6) and gently slopes down towards the Central Library. Based on our measurements from the two groundwater monitoring wells south of the ravine, the water level has risen since the initial exploration, and has been fairly constant throughout the 3-month period after the field exploration (see below table). Groundwater was measured to be at approximately 46 and 42 feet below ground surface (El. +130 and +140 feet msl) at NB-5 and NB-8, respectively between March 10 and May 13, 2009 as summarized in the following table.

Date	Elevation at Top of Well (feet msl)		Groundwater Level below Top of Well (feet bgs)		Groundwater Elevation (feet msl)	
	NB-5	NB-8	NB-5	NB-8	NB-5	NB-8
March 10, 2009 (during drilling)	+177	+183	52.5	57.2	+124.5	+125.8
March 10, 2009 (after well installation)	+ 177	+ 183	46.2	42.6	+ 130.8	+ 140.4
March 18, 2009	+ 177	+ 183	46.1	42.5	+ 130.9	+ 140.5
March 31, 2009	+ 177	+ 183	46.2	42.6	+ 130.8	+ 140.4
May 13, 2009	+ 177	+ 183	46.2	42.6	+ 130.8	+ 140.4

Groundwater is not anticipated to be encountered during excavation in most of the areas; however, perched water and seepage may occur within the terrace deposits, the contact between terrace deposits and underlying bedrock, and/or within sandstone units on the bedrock. Groundwater may be encountered during excavation of the EOC and near the Central Library area, which has a proposed finished grade at approximately El. +130 feet msl. We recommend that additional monitoring wells be located at the southern end of the Central Parcel to determine the actual depth to groundwater in this area. If groundwater is encountered at a depth that would impact proposed grading then groundwater sampling is recommended to determine possible disposal methods during

and post-construction as necessary. Mitigation methods for groundwater encountered during grading could include a dewatering program. Mitigation methods for long term/post construction groundwater could include design of subterranean structures to resist hydrostatic pressures construction measures to included water stops to "seal off" the affected parts of the structures from groundwater penetration or the construction of a permanent subsurface drainage system, typically consisting of interior and exterior perimeter footing drains and sub-floor laterals that drain to a central sump which is then either pumped or flow by gravity to the storm drain or suitable discharge point. Implementation of appropriate mitigation measures would result in less than significant impacts related to groundwater.

3.3 Percolation Characteristics

A percolation test was performed within boring NB-7. Based on our current understanding of the project, the location was selected by the project team as a possible area for infiltration devices that utilize the upper five feet of the proposed grades. The recommendations in this report should be re-evaluated if the final design grade is significantly different from the above assumptions. Results of the percolation test are included in Appendix D.

The percolation test was performed at a depth of approximately 37 feet below current grade (El. +125 feet msl). Bedrock of the Monterey formation was exposed at the bottom of the percolation test hole. The results of our test indicated that the bedrock at the tested depth has a percolation rate of less than 0.02 gallon per day per square foot (gal/day/sq.ft.). Therefore, an on-site infiltration system may not be feasible. Further percolation tests may be performed after grading to determine if other areas at the site are suitable for an on-site infiltration system.

3.4 Expansion Potential

Based on the laboratory test results, the onsite soils have an Expansion Index ranging from 0 to 29, indicating a very low to low expansion potential in accordance with Table 18-1-B of the California Building Code (CBC, 2007). However, the bedrock onsite includes strata of claystone which may be potentially expansive. Additional Expansion Index tests should be performed to confirm the expansiveness of the claystone. Completion of subsequent design level studies to be prepared when detailed grading and

building plans are available and implementation of the recommendations from these reports would result in less than significant impacts related to expansive soils.

3.5 Slope Stability

Natural slopes are present on the site within the ravine area. Subsurface exploration was not performed within this area for this study. Slope stability and mitigation measures along the natural slope will be presented upon completion of subsequent design level studies. Implementation of the recommendations in these reports would result in less than significant impacts related to natural slope stability.

The majority of the graded slopes along the perimeter of the project site (along Avocado Boulevard and southern area of the Central parcel) will be removed during grading. Therefore no significant slope stability issues are anticipated within the existing graded slopes.

4.0 FAULTING, SEISMICITY AND POTENTIAL HAZARDS

4.1 Alquist-Priolo Earthquake Fault Zone and Nearby Faults

Our review of available in-house literature indicates that no known active faults have been mapped across the site, and the site is not located within an Alquist-Priolo Earthquake Fault Zone (CDMG, 1977). Based on our review, we consider the potential for surface fault rupture at the site to be low.

A list of the historic earthquakes from 1800 to 1999 within 100 miles of the site, based on Cambell and Bozorgnia (1997, Rev.) soft rock attenuation relationship, is included in Appendix E. The computer program EQSearch Version 3.00a was used to generate the list.

The closest fault to the site is the Newport Inglewood (Offshore) fault, located at approximately 2.4 miles from the site. San Joaquin Hills Blind Thrust is located less than 3.5 miles from the site. The San Andres fault is the largest fault in the region and is located approximately 52.7 miles from the site. Both active and potentially active faults found within a 62-mile (100 km) radius from the project site are listed in Appendix E. Descriptions of the Newport-Inglewood fault and San Joaquin Hills blind thrust are provided in the following paragraphs:

Newport-Inglewood Fault - Located approximately 2.4 miles southwest of the subject site, the Newport-Inglewood fault consists of a series of parallel and en-echelon (side-stepping), northwest-trending faults and folds that extend from the southern edge of the Santa Monica Mountains southeast to the offshore area of Newport Beach. This zone has a history of moderate to high seismic activity and has produced numerous earthquakes greater than magnitude 4.0, including the March 11, 1993 magnitude 6.3 Long Beach earthquake (which was actually centered near Newport Beach). At the time of the 1993 earthquake, secondary effects of strong ground shaking including sand boils, ground fissures, and liquefaction were noted in the city of Long Beach as well as in the city of Huntington Beach along Pacific Coast Highway near the Huntington Beach Pier and in the Bolsa Chica area. In addition, subsurface fault displacement of a few inches was documented following the October 21, 1941 earthquake (magnitude 4.9) and the June 18, 1944 earthquake (magnitude 4.5), both of which occurred along the Newport-Inglewood fault in the Dominguez Hills area (Barrows, 1974). Various segments of the Newport-Inglewood fault have been included within the boundaries of an Alquist-Priolo fault rupture hazard zone.

San Joaquin Hills Thrust Fault - Although not exposed at the surface, it is estimated that an upward projection of the dipping fault plane would intersect the ground surface at a location approximately 3.5 miles to the southeast of the subject site. Recent studies by various researchers have suggested that the hilly terrain that characterizes the San Joaquin Hills in central and southern Orange County is the result of late Quaternary folding associated with tectonic uplift along an active thrust fault. Recognition of this potentially seismogenic blind thrust extents the known area of active blind thrust and fault-related folding present in Los Angeles County southward into coastal Orange County (Grant, et. Al., 1999). Recent blind thrust earthquakes, including the 1987 magnitude 5.9 Whittier Narrows and the 1994 magnitude 6.7 Northridge events, have demonstrated the significance of these features with respect to the tectonic setting of southern California. Although the San Joaquin Hills thrust has not seen observed directly at the surface, structural modeling indicates that this fault has a slip rate of approximately 0.5 millimeters per year that yields a recurrence interval of 1,650 to 3,100 years for moderate-sized earthquakes.

4.2 Potential Seismic Hazards

Ground Shaking - The intensity of ground shaking resulting from an earthquake is generally characterized by using the Peak Horizontal Ground Acceleration (PHGA). To take into consideration the impact of regional faults, a probabilistic seismic hazard analysis was performed using the computer program FRISKSP (Blake, 2000) to estimate the PHGA that could occur at the site. This approach accounts for site-specific response characteristics, historical seismicity, and the geological characteristics of the regional faults under consideration. Three attenuation relationships (Abrahamson and Silva, 1997, Bozorgnia et al., 1999, and Sadigh et al., 1997) were used in the analysis. The results of the analyses suggest that the PHGA with a 2 percent probability of exceedance in 50 years (recurrence interval of 2,475 years) is approximately 0.70g. This level of ground motion is considered the Maximum Considered Earthquake (MCE) in accordance with the 2007 California Building Code (CBC). Results of the analyses are included in Appendix E.

Ground shaking is considered a potentially significant impact to the proposed project. Surface fault rupture is not expected to occur because the project site is not located within an Alquist-Priolo Earthquake Fault Zone.

Liquefaction Potential - Liquefaction is the loss of soil strength or stiffness due to a build up of pore-water pressure during severe ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine- to medium-grained, cohesionless soils. Effects of severe liquefaction can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading. The site is not located within a potential liquefaction hazard zone as delineated by the State of California (CDMG, 1998). The site is underlain predominantly by shallow terrace deposits over bedrock. The depth to bedrock at the site ranges from 0 feet to 9 feet below current grade, and no significant amounts of loose granular soils were found within the terrace deposits. At such, we consider the potential of liquefaction at the site to be very low.

Seismically-Induced Settlement - Seismically-induced settlement occurs primarily within loose to moderately dense sandy soil due to a reduction in volume during and shortly after strong ground shaking. The majority of materials underlying the site consist of dense terrace deposits and bedrock. Accordingly, the potential for seismically-induced settlement is low.

Earthquake-Induced Lateral Spreading - Liquefaction may also cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along a gently sloping surface toward an unconfined area. Since the site has a very low liquefaction potential, the potential for lateral spreading to occur at the site is considered very low.

Seismically-Induced Landslides - The site is not located in an area mapped as potentially susceptible to seismically-induced landslides as shown on the Seismic Hazard Zones Map (CDMG, 1998). The site has graded slopes along the perimeter descending to the adjacent streets (Avocado Street, MacArthur Boulevard and San Miguel Road). In addition, there are smaller natural slopes within the central portion of the site related to the east-west trending drainage. However, no significant slopes (greater than 30 feet in height) are located near the site. Therefore the potential of seismically induced landslides at the site is considered low.

Seismically-Induced Flooding - Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of earthquake. The Central parcel contains a ravine area in the northern portion of the parcel which is considered a wetland area; however, this is not considered a water-retaining structure that would retain a significant amount of water. The Big Canyon Reservoir is located approximately one mile east of the subject site. The natural drainage course for the reservoir is to the

northwest towards the Big Canyon golf course. Based on the above, the potential of flooding at the site is considered low.

Seiches and Tsunamis - Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Based on the lack of nearby enclosed water bodies near the site, the seiche risk at the site is considered negligible. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. The lowest finished grade of the proposed project site will be at an elevation of approximately El. +130 feet msl, therefore the tsunami risk at the site is considered low.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed project is feasible from a geotechnical standpoint provided that the recommendations presented in this report are properly incorporated in subsequent phases of planning and preliminary design of the project. It is our understanding that the finish grade (including subterranean project features) will be approximately 20 to 40 feet lower than the current site grade. Where the site is adjacent to MacArthur Boulevard, the eastern side of the proposed parking structure will act as a retaining wall. Shoring will be required to be installed prior to excavation. As adverse bedrock structure was observed within the bucket auger boring, the retaining wall should be designed to include possible geologic surcharge from the bedrock. Additional exploration is recommended in the area of the proposed parking structure retaining wall. In order to provide specific recommendations for this area, implementation of these recommendations would result in less than significant impacts related to adverse bedrock structure. In general, the proposed city hall building, parking structure, library expansion, and structural elements of the park area may be supported on shallow foundations founded on bedrock or properly compacted fill. However, the proposed pedestrian bridges in the park area and the proposed pedestrian bridge crossing over San Miguel Road may require a deepened foundation system depending on the structural requirement.

Recommendations provided herein are for planning and design of the project at this EIR level of evaluation. Additional exploration and relevant engineering analysis should be performed after the building locations and footprints have been selected and preliminary grading plans are available to provide recommendations for final design.

5.1 Site Grading

Based on the currently planned finished floor elevations within the proposed City Hall and associated parking structures, we anticipate that majority of the terrace deposits and artificial fill will be removed during grading and bedrock will be exposed at the excavation bottoms. No significant overexcavation and removal is anticipated where bedrock is exposed. However, due to the variability in the degree of weathering of the bedrock, some remedial overexcavation and recompaction of the bedrock may be required in the areas of shallower cut to develop relatively uniform bearing conditions.

An artificial fill-bedrock transition may be encountered at the southern end of the Central parcel where the library expansion is planned. The subgrade below the planned foundations for buildings and improvements planned in this area should be overexcavated in order to provide uniform support for the buildings. The depth and lateral extent of overexcavation is anticipated to range from 2 to 5 feet based on the available subsurface

data, but will depend on the final building configuration and the actual subsurface profile in this area of the site.

The bedrock formation includes strata of claystone which may be potentially expansive. In areas where such materials are exposed in the subgrade or exist at shallow depth, some additional remedial grading may be warranted to develop relatively uniform support characteristics and reduce the potential for post-construction swell and distortions to the building.

Groundwater is not expected to be encountered during grading. However, perched water or seepage may be encountered. Groundwater may be encountered during excavation of EOC and the subterranean portion of the parking structure. If groundwater is encountered at a depth that would impact proposed grading then groundwater sampling is recommended to determine possible disposal methods during and post-construction as necessary. Mitigation methods for groundwater encountered during grading could include a dewatering program. Mitigation methods for long term/post construction groundwater could include design of subterranean structures to resist hydrostatic pressure and construction measures to "seal off" the affected parts of the structures from groundwater penetration or the construction of a permanent subsurface drainage system consisting of interior and exterior perimeter footing drains and subfloor laterals that collect groundwater and discharge to a central sump.

The onsite soil, free of organic material, cobbles, boulders, debris, and rock no larger than 6 inches in largest dimension, is suitable for use as compacted fill. Import soil, if required, should be evaluated and tested by the geotechnical consultant before delivery to the site. In general, fill material should be low in expansion potential, non-organic, and free of debris or other deleterious materials. As the site is anticipated to be graded 20 to 40 feet lower than the current elevation, export of excavated soil should be anticipated.

5.2 Excavation Stability and Shoring Requirement

The terrace deposits and bedrock at the site should be readily excavated by conventional earth-moving equipment in good working condition. Based on the nature of the on-site materials, excavations can be laid back in accordance with OSHA requirements before personnel are allowed to enter. Shoring will be required where there is space constraint for excavation lay back. It is the contractor's responsibility to ensure the stability of cuts, and the safety of all excavations.

Shoring will be required during excavation for the retaining wall due to the anticipated space constraint for slope lay back. Based on our observation in the bucket auger boring, the bedrock structure includes bedding that dips (slope) toward the general alignment of the proposed retaining wall and/or the eastern wall of the proposed parking structure building. In addition, the bedrock includes thin seams of clay and silt that are lower in strength than the sandstones that typically comprise the bedrock. These clay and silt seams present potential slip surfaces upon which overlying masses of bedrock may slide and impose additional load upon the proposed structure. Therefore, geologic surcharge from the bedrock and possibly the live traffic loading of MacArthur Boulevard will be imposed on the temporary shoring and the permanent retaining wall.

As the magnitude of the loading will be dependent on the dip angle of the bedrock along the entire wall alignment, we recommend additional bucket auger borings be performed along the proposed wall alignment to better evaluate the geologic structure and the presence of silt and clay seams. Design parameters of the temporary shoring and retaining wall will be based on the bedrock strike and dip within all three bucket auger borings and the final configuration of the wall. Shoring systems feasible for the site are expected to include cantilever shoring such as soldier piles and lagging in conjunction with tiebacks in areas when the depth of excavation exceeds 10 to 15 feet.

All temporary excavations should be treated in accordance with the State of California version of OSHA excavation regulations, Construction Safety Orders for Excavation General Requirements. The sides of excavations should be shored or sloped in accordance with OSHA regulations. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V (horizontal:vertical) slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils.

The onsite soils (Terrace Deposits) within the proposed excavation depths generally conform to OSHA soil Type B. The formational bedrock may be classified as Soil Type A but will require careful evaluation by the project Certified Engineering Geologist. The Type A classification is not recommended where adverse (out-of-slope) bedding orientations exist and special, site specific design parameters will be required in those areas. Implementation of these design parameters would result in less than significant impacts to the project

OSHA regulations are applicable in areas with no restriction of surrounding ground deformations. Shoring should be designed for areas with deformation restrictions. The soil type should be verified or revised based on geotechnical observation and testing during construction, as soil classifications may vary over short horizontal distances.

Heavy construction loads, such as those resulting from stockpiles and heavy machinery, should be kept a minimum distance equivalent to the excavation height or 5 feet, whichever is greater, from the excavation unless the excavation is shored and these surcharges are considered in the design of the shoring system.

5.3 2007 California Building Code (CBC) Seismic Coefficients

This site is not located within a designated Alquist-Priolo Earthquake Fault Zone. However, strong ground shaking due to seismic activity is anticipated at the site. The following values are based on the 2007 CBC seismic design method. Additional seismic analyses may be necessary based on structural requirements.

California Building Code (2007) Seismic Parameters	
Site Class	C
Mapped Spectral Acceleration Parameter, S_s	1.783
Mapped Spectral Acceleration Parameter, S_1	0.653
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.3
Spectral Response Acceleration, S_{MS}	1.783
Spectral Response Acceleration, S_{M1}	0.849
Design Spectral Response Acceleration, S_{DS}	1.188
Design Spectral Response Acceleration, S_{D1}	0.566

5.4 Spread Footing Foundations

Upon completion of the grading (cutting) required to establish the proposed building pad elevations, the proposed structures may be supported by a spread footing foundation system. Recommended bearing capacities will be dependant on the final foundation elevation and structural loadings of the buildings. Based on the current project plan, the finish grade will be at approximately 20 to 40 feet below current ground surface. A maximum net allowable soil bearing pressure in the range of 3,000 to 5,000 psf for square pad footings and continuous strip footings can be used for preliminary design. Specific design recommendations can be provided once the final project plan is available.

On a preliminary basis, the footings should have minimum widths of 2 feet and 1.5 feet for isolated square pad and continuous strip footings, respectively, with the top of the

footing embedded at least 18 inches below the lowest adjacent grade. The soil bearing pressure may be increased by one-third for transient loads such as wind and seismic forces.

The post-construction total and differential static settlements will be provided once the grading plan and structural loads are available.

Resistance to lateral loads will be provided by a combination of friction between the soil and foundation interface and passive pressure acting against the vertical portion of the footings. For calculating lateral resistance, a passive pressure of 350 psf per foot of depth to a maximum of 3,500 psf and a frictional coefficient of 0.35 may be used provided the foundations are supported within competent bedrock or structural compacted fill as previously described assuming a drained condition. A passive pressure of 250 psf/ft depth to a maximum of 2,500 psf should be used for a submerged condition. When combining frictional and passive resistance, the passive resistance should be reduced by one-third. No safety factor has been incorporated in the recommended values for frictional and passive resistance. The appropriate load factors should be used by the structural engineer in design.

We understand from the structural engineer that tiedown anchors will be installed on the building foundation to provide uplift resistance to the steel framed building. Based on the preliminary foundation details prepared by ARUP dated December 4, 2008, the unbonded length of the tiedown is 15 feet. The bonded length of the tiedown is not provided on the plan. Assuming a minimum unbonded length of 15 feet and a minimum bonded length of 10 feet into competent bedrock, a unit ultimate uplift resistance of 500 psf can be used. The bonded length should be designed by the structural engineer based on the actual structural loading demand. No factor of safety is incorporated in the above uplift resistance.

5.5 Slab-on-Grade

At-grade floor slabs of the proposed structures may be designed and constructed as a slab-on-grade supported directly on properly compacted fill or competent bedrock. If a bedrock artificial fill transition is encountered, the planned subgrade elevation should be overexcavated at least 3 feet and replaced with properly compacted fill. If bedrock claystone is encountered at the planned subgrade elevation, additional Expansion Index testing should be performed to determine the necessity and/or extent of overexcavation or other floor slab systems (e.g. post-tensioned slab) may be required. The structural

engineer should design the slab and determine the required thickness and reinforcement based on structural load requirements. For preliminary design purposes, a modulus of subgrade reaction of 100 pounds per cubic inch (pci) can be used for design for slabs and grade beams.

5.6 Earth Retaining Structures

The proposed development is expected to require various types of earth retaining structures: free-standing cantilever retaining walls; temporary shoring and below-grade walls for several of the proposed structures. In general, free-standing retaining structures planned at the site should be backfilled with granular, very low expansive soil and be constructed with a backdrain in accordance with the recommendations provided on Figure 2. The backdrain should be sloped at a minimum of one percent toward an approved non-erosive outlet. The following parameters may be used for the preliminary design of conventional retaining structures with soil backfill. These values may not be used to design for retaining wall in which bedrock is present behind the wall due to special considerations with regard to geologic surcharge.

Condition with Level Backfill	Equivalent Fluid Unit Weight (psf/ft) For Compacted Granular Soil Backfill only, not applicable for retaining wall with bedrock behind wall
Active - Static	38
At-Rest	58
Seismic	18 (inverted triangular distribution)
Passive	350 to a maximum of 3,500 psf
Coefficient of Friction	0.35

Unrestrained walls that are free to rotate or deflect may be designed using the active earth pressure. For restrained walls that are fixed against rotation, such as basement wall, the at-rest condition should be used. The lateral passive resistance should be taken into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time. We also recommend using the at-rest pressure for design of walls supporting settlement-sensitive structures, such as adjacent roadways and structures. The above-recommended lateral pressures were based on a soil total unit weight of 120 pounds per cubic foot (pcf). No factor of safety or load factor was applied to the lateral pressure values.

The design parameters stated in the table above are for drained conditions, i.e., no groundwater or other water accumulation behind the wall. In consideration of the encountered depth to groundwater in the area of the site where the finished floor elevations will be approximately El. +130 feet msl, precautions will be required to ensure the proper function of the permanent subsurface drainage system or the design of the below grade walls (and floor slab) should include provisions to resist hydrostatic pressures. In this event, the earth pressures for use in design are recommended to be 82 psf/ft for active earth pressure, 92 psf/ft for at-rest earth pressure and 250 psf/ft to a maximum of 2,500 psf for passive pressure for the portions of the walls that are submerged. On a preliminary basis pending further analysis groundwater data, a high water table at El. +136 feet msl is recommended for design.

If the retaining structures are braced at the top or at specific design intervals and are constructed in a braced excavation, the earth pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 24***H*** psf, where ***H*** is equal to the depth of the retaining structure being supported. Otherwise the retaining structure should be designed using the recommended at-rest pressure.

Backfill for retaining walls should be compacted to a minimum of 90 percent relative compaction based on ASTM Test Method D1557. Relatively light construction equipment should be used to backfill the retaining walls.

Lateral pressures from other surcharge and superimposed loads (for example, from vehicle traffic and adjacent structures) should be added to the above recommended lateral earth pressures if the loads fall within a projected area of an imaginary line extended at an angle of 45 degrees from the wall foundation. Thirty two percent of the surcharge load may be used for unrestrained walls and forty-eight percent of the surcharge may be used for restrained walls.

Foundations for retaining walls may be designed for a maximum net allowable soils bearing pressure of 3,600 psf with a minimum embedment of 18 inches below the lowest adjacent grade.

Lateral pressure on the retaining wall along MacArthur Boulevard will be dependent on the geologic structure of the bedrock. The design lateral pressure will be provided in the final design phase.

5.7 Subterranean Floor Slab Drainage

The subterranean floor slabs planned for the proposed development will be in close proximity to at least the groundwater table encountered at the time of our exploration and during our short term period of observation, and may be periodically submerged. The design of these subterranean slabs should, therefore, be designed to resist hydrostatic uplift or a permanent subfloor drainage system should be included in the design of the slab. A suitable drainage system typically consist of a series of perforated drain pipes located along the interior and exterior sides of the footings as well as piping at regular intervals in both directions below the slab. The interior pipes typically discharge to a central sump which is then drained by either pumping or gravity flow to a suitable drainage outlet.

5.8 Corrosion Protection Measures

Corrosion tests have been performed on composite soil samples obtained from depths of 35 to 45 feet below current site grade. Results of the testing show the onsite soil is severely corrosive to ferrous metals. Sulfate and chloride exposure for concrete is deemed negligible. Protection of steel against corrosion is recommended for metals in contact with the site subsurface soils. Corrosion mitigation may include the need for sacrificial metal, the use of protective coatings and/or cathodic protection. A qualified corrosion engineer should be consulted to provide specific recommendations for corrosion protection.

Because of the limited testing performed and potential variability in chemical contents and resistivity in soils, we recommend that additional chemical and corrosion tests be performed during site grading operations and prior to the placement of concrete and buried metals to confirm the findings and recommendations provided in this report. The underground utilities contractor should be provided the findings in this report and implement the required measures and/or special treatments to mitigate corrosion.

5.9 Surface Drainage

Ponding of water adjacent to structures should be avoided. During and after construction, positive drainage should be provided to direct surface water away from structures towards suitable, non-erosive drainage devices.

5.10 Pavement Design

Based on the design procedures outlined in the current Caltrans Highway Design Manual, and using an R-value of at least 40 for the subgrade and 78 for crushed aggregate base course, the following flexible pavement sections may be used for various Traffic Indices. Additional R-value tests should be performed during grading to confirm if the actual field condition is consistent with the findings herein.

Traffic Index	Asphalt Concrete (inches)	Aggregate Base (inches)
5.0 or less	3.0	4.0
6.0	3.0	6.5
7.0	4.0	7.0
8.0	4.0	9.5
9.0	5.0	10.5
10.0	5.0	13.0

All pavement construction should be performed in accordance with the *Standard Specifications for Public Works Construction*. Field observation and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 6 inches, moisture-conditioned to near optimum moisture content, and recompacted to a minimum of 90 percent relative compaction. Aggregate base should be placed in thin lifts, moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

5.11 Additional Geotechnical Services

The geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. A design level geotechnical investigation should be performed once the building layouts, grading plans and structural loadings are finalized. Our recommendations may be revised, as necessary, based on future plans.

The final grading and foundation plans should implement the recommendations presented in this report and should be reviewed by the project geotechnical consultant. Our recommendations may be revised, as necessary, based on future plans.

5.12 Limitations

The conclusions and recommendations presented in this report have been based upon the generally accepted principles and practices of geotechnical engineering utilized by other competent engineers at this time and place. No other warranty is either express or implied.

The conclusions and recommendations presented in this report have been based upon the subsurface conditions encountered at discrete and widely spaced locations and at specific intervals below the ground surface. Due to the inherent variance in soil conditions, variability may be encountered during construction. Where encountered during construction, such variances should be brought to our attention to determine the impact upon the recommendations presented in this report.

This report has been prepared for the use of our client for the project described in this report. The report may not be used by others without the written consent of our client and our firm.

6.0 REFERENCES

Barrows, A.G., 1974, A Review of the Geology and Earthquake History of the Newport-Inglewood Structural Zone, Southern California: California Division of Mines and Geology, Special Report 114.

Boore, D. M., and Atkinson, G. M., 2008, "Ground-Motion Prediction Equations for the Average Horizontal Component of PGA, PGV, and 5%-Dampted PSA at Spectral Periods between 0.01 s and 10 s", Earthquake Spectra, Volume 24, No. 1, pages 99-138, February 2008; © 2008, Earthquake Engineering Research Institute (EERI).

Bozorgnia, Y., Campbell, K.W., and Niazi, M., 1999, Vertical Ground Motion: Characteristics, Relationship with Horizontal Component, and Building Code Implications, *Proceedings of the SMIP99 Seminar on Utilization of Strong-Motion Data*, September 15, Oakland, pp 23-49.

California Building Code (CBC), 2007.

California Division of Mines and Geology (CDMG), 1997 (Revised 2001), Seismic Hazard Evaluation of the Laguna Beach 7.5-Minute Quadrangle, Orange County, California, Open File Report 97-21.

_____, 1998, State of California Seismic Hazard Zones Map, Laguna Beach Quadrangle, Official Map, released April 15, 1998.

_____, 2000, CD-ROM containing digital images of Official Maps of Alquist-Priolo Earthquake Fault Zones that affect the Southern Region, DMG CD 2000-003 2000.

Campbell, K. W., and Bozorgnia, Y., 2008, "NGA Ground Motion Model for the Geometric Mean Horizontal Component of PGA, PGV, PGD and 5% Damped Linear Elastic Response Spectra for Periods Ranging from 0.01 to 10 s", Earthquake Spectra, Volume 24, No. 1, pages 139-171, February 2008; © 2008, Earthquake Engineering Research Institute (EERI).

Chiou, Brian S.-J., and Youngs, Robert R., 2008, "A NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra", Earthquake Spectra, Volume 24, No. 1, pages 173-215, February 2008; © 2008, Earthquake Engineering Research Institute (EERI).

County of Orange, 2005, Resources and Development Management Department, On-site Sewage Absorption System Guidelines Purpose, Section VIII Seepage Pits Percolation Test Procedures, dated May 23, 2005.

Division of State Architect, Department of General Services, State of California, 2009, Use of the Next Generation Attenuation (NGA) Relations, DSA Bulletin 09-01, Issued January 26, 2009, Effective March 1, 2009, 1 p.

Grant, L. B., Mueller, K. J., Gath, E. M., Cheng, H., Edwards, R. L., Munro, R., Kennedy, G. L., 1999, Late Quaternary Uplift and Earthquake Potential of the San Joaquin Hills, Southern Los Angeles Basin, California: Geological Society of America Geology, Volume 27, No. 11, pp. 1031-1034.

Grant, L.B., Ballenger, L.J., and Runnerstrom, E.E., 2002, Coastal Uplift of the San Joaquin Hills, Southern Los Angeles Basin, California, by a Large Earthquake since A.D. 1635: Bulletin of Seismological Society of America, Volume 92, No. 2, pp. 590-599.

Grant, L.B., Gath, E., Munro, R., and Roquemore, G., 1997, Neotectonics and Earthquake Potential of the San Joaquin Hills, Orange County, California: Seismological Research Letters, Volume 68, No. 2, pp. 315.

Huang, Yin-Nan, Whittaker, Andrew S., and Luco, Nicolas, 2008, "Maximum Spectral Demands in the Near-Fault Region", Earthquake Spectra, Volume 24, No. 1, pages 319-341, February 2008; © 2008, Earthquake Engineering Research Institute (EERI).

Leighton Consulting, Inc., 2008, Due-Diligence Geotechnical Exploration for the Proposed City Hall and Parking Structure, Newport Beach, California, Leighton Project Number 602184-001, dated May 13, 2008.

LeRoy Crandall and Associates, 1990, Report of Preliminary Geotechnical Investigation, Proposed Central Library, Pacific Coast Highway between MacArthur Boulevard and Avocado Avenue, Newport Beach, California, LCA O90052.AEO, dated July 19, 1990.

_____, 1991, Report of Foundation Investigation, Proposed Central Library, Pacific Coast Highway between MacArthur Boulevard and Avocado Avenue, Newport Beach, California, LCA O90052.AB), dated March 28, 1991.

Mueller, K.J., Grant, L.B., and Gath, E.M., 1998, Late Quaternary Growth of the San Joaquin Hills Anticline - A New Source of Blind Thrust Earthquakes in the Los Angeles Basin: Seismological Research Letters, Volume 69, No. 2, pp. 161-162.

Office of Statewide Health Planning and Development, State of California, 2008, Next Generation Attenuation Relations for Use With the 2007 California Building Code, Code Application Notice, File No. 2-1802A.6.2, Effective September 30, 2008, 3 p.

Petersen, Mark D., Frankel, Arthur D., Harmsen, Stephen C., Mueller, Charles S., Haller, Kathleen M., Wheeler, Russell L., Wesson, Robert L., Zeng, Yuehua, Boyd, Oliver S., Perkins, David M., Luco, Nicolas, Field, Edward H., Wills, Chris J., and Rukstales, Kenneth S., 2008, Documentation for the 2008 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open File Report 2008-1128, 61 p.

Public Works Standard, Inc., 2002, Greenbook, Standard Specifications for Public Works Construction: BNI Building News, Anaheim, California, 471 p.

Risk Engineering, Inc., 2009, EZ-FRISK 7.32 Build 001, A Computer Program (Software) To Perform Site-Specific Earthquake Hazard Analysis.

Yerkes, R.F., McCulloh, T.H., Schoellhamer, J.E. and Vedder, J.G., 1965, Geology of the Los Angeles Basin, California -- An Introduction: U. S. Geological Survey Professional Paper 420-A, 57 p.

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH
8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

IIGER06085.0MRP

PROPOSED CITY HALL AND PARK DEVELOPMENT PLAN
Newport Beach, California

SITE LOCATION MAP

Project No.
602184-002

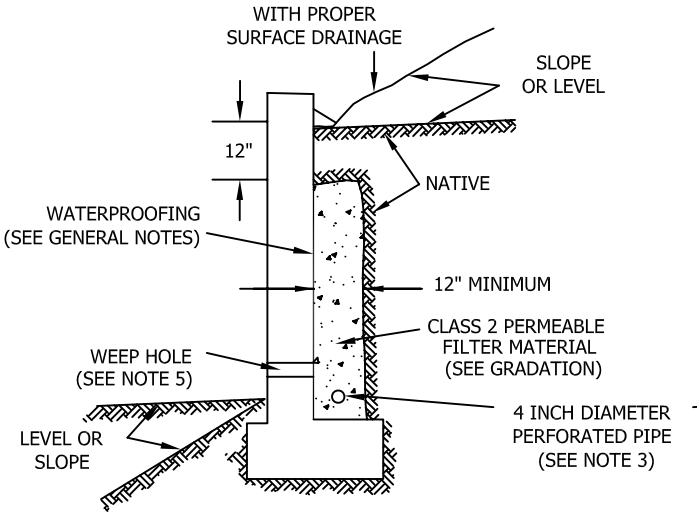
Date
June 2009

Figure 1

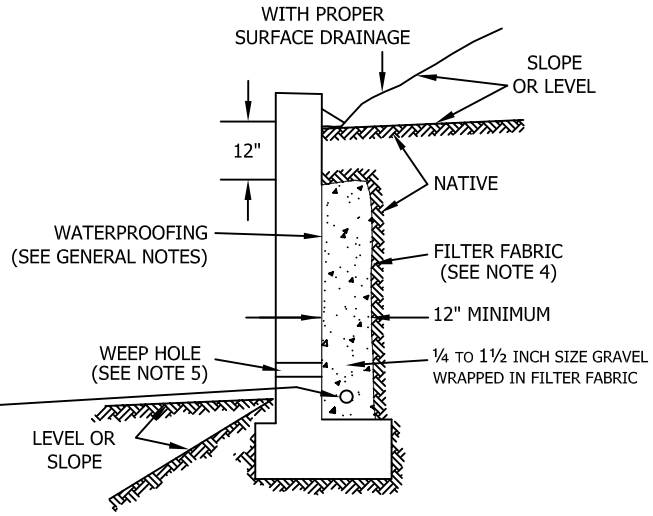
\\GIS\Administration\ArcGISTemplates\NEW_GDT_SiteLocationMap.mxd

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL



OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 6 FEET OR LESS IN HEIGHT

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Leighton

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APPENDIX A

GEOTECHNICAL BORING LOG BA-1

Date 3-5-09 **Sheet** 1 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JAR

Drilling Co. Al-Roy Drilling **Type of Rig** EZ-Bore

Hole Diameter 28" **Drive Weight** **Drop** 30"

Elevation Top of Hole 191' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
190	0			B1					**Terrace Deposits (Qt)** @ 0': Silty SAND (SM), brown, moist, fine to coarse grained sand, vegetation consisting of small bushes and grasses, rodent burrows, trace rock fragments. @ 1.5': Sandy CLAY (CL), reddish brown, moist, fine to medium grained sand, trace rock fragments. @ 3'-4.5': Dark brown sandy CLAY.	RV
185	5			R1	4	121	10		@ 5': Clayey SAND to sandy CLAY (SC-CL), mottled yellow brown to orange brown, moist, fine to medium grained sand, trace rock fragments. @ 7.5': Silty clayey SAND (SM-SC), olive brown to orange brown, moist, fine grained sand.	
180	10			R2	4				**BEDROCK: Monterey Formation (Tm)** @ 9': SANDSTONE, highly weathered, olive brown to orange brown, , heavily fractured, fractures are well healed with manganese. @ 10': Silty clayey SANDSTONE, olive brown, moist, sand is fine grained, clay and manganese development on fracture faces, shell debris in sandy matrix. @ 11': SANDSTONE, light gray, slightly moist, poorly cemented, friable, fine grained, unoxidized, degrades to (SP), becomes weathered and oxidized with depth.	
175	15			R3	4	102	7		@ 15': SANDSTONE, light brown to orange brown, slightly moist, fine grained, weathered, oxidized, poorly cemented, friable, some silt. @ 18': moderately weathered, light brown to orange brown, moderately fractured.	
170	20		@20.3' B:N14E, 21NW @21' B:N82E, 26N	R4 B2	6/9"				@ 20': Silty SANDSTONE, light brown to orange brown, dry, fine grained, weathered, oxidized, poorly cemented, moderately hard to friable. @ 20.3': Thin SILT bed, 1/8" thick within massive SANDSTONE, fine grained sand, well oxidized, moderately fractured, manganese development on fracture faces. @ 22': Large rip-up clast of SANDSTONE and SILTSTONE.	
165	25			R5	6/7"	110	4		@ 24'-27': SANDSTONE, massive, iron concretions, charcoal fragments in matrix. @ 25': SANDSTONE, hard, light gray, fine grained, oxidized along fractures, poorly cemented, friable, thin beds of silty clay, orange brown to reddish brown bedding surfaces, undulating, uneven.	
	30		@27.1' CB:N34E, 19NW	G1 B3					@ 27.1': Thinnly bedded silty CLAY composed of volcanic ash, light gray to orange brown. @ 28': Severly fractured, iron nodules, hard, mottled, uneven.	AL, SA

SAMPLE TYPES:

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

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200	% FINES PASSING
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX		
CR	CORROSION	RV	R VALUE		

GEOTECHNICAL BORING LOG BA-1

Date 3-5-09 **Sheet** 2 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JAR

Drilling Co. Al-Roy Drilling **Type of Rig** EZ-Bore

Hole Diameter 28" **Drive Weight** **Drop** 30"

Elevation Top of Hole 191' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
160	30		@31.1' CB:N19E, 24NW	R6	8	96	16		BEDROCK (Tm): continued. @ 30': Silty clayey SANDSTONE, mottled light olive gray to orange brown, moist, fine grained, moderately hard, well oxidized, weathered, thinnly bedded. @ 30.5': Concretionary bed. @ 31': becomes thinnly bedded silty CLAYSTONE, weathered, oxidized, hard, well cemented along thin beds of volcanic ash, gently dipping.	
			@33.6' B:N5E, 20W						@ 31.1': Thin light gray bed of SAND overlain by reddish brown CLAY bed, well cemented, hard, moist, well developed bedding surface with manganese development.	
155	35		@33.7' B:N15W, 30SW @35' B:N24E, 24NW @37.9' J:N74E, 55N	R7	10	100	5		@ 33.7': SAND bed, light gray, 2"-4" thick between CLAY, undulated. @ 35': Silty sandy CLAY, orange brown to light brown mottled. @ 35'-36': grades to SANDSTONE, erosional/irregular contact, hard, oxidized to unoxidized, dry, fine grained, moderately cemented within unoxidized sand beds, oxidized sand is poorly cemented and friable, moderately fractured and lined with FeO2.	
150	40			R8	10/10"	108	4		@ 37.5': oxidized SANDSTONE, fine grained, dry, poorly cemented, friable. @ 37.9': Fracture out of hole @ 38': Sandstone, fine grained, unoxidized. @ 40': SANDSTONE, hard, light orange brown, dry, fine grained, oxidized, poorly cemented, friable with thin zones of well cemented sand, becomes cross-bedded @ 41'. @ 42': Rip-up clasts composed of clayey SILTSTONE.	DS
									@ 43': Massive SANDSTONE, oxidized, mildly cross-bedded, poorly fractured, hard.	
145	45			R9	10/10"	106	5		@ 45': SANDSTONE, hard, light orange brown, dry, fine grained, oxidized, poorly cemented, some silt.	
140	50		@52' B:N75E, 27N	R10	14				@ 50': SANDSTONE, hard, orange brown, medium grained, oxidized, poorly cemented, becoming moist. @ 52': Thin light gray SAND bed, well cemented, 1/8" thick, offset by fracture by approximately 1/2"-1".	
135	55			R11	14	100	8		@ 55': SANDSTONE, reddish brown, moist, fine grained, poorly cemented, oxidized, friable with fine gravel sized rock fragments.	
	60		@59.5' F:N31E, 70SE						@ 59': Fault, 1/8"-1/4" thick, infilled with clay.	

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG BA-1

Date 3-5-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JAR

Drilling Co. Al-Roy Drilling **Type of Rig** EZ-Bore

Hole Diameter 28" **Drive Weight** **Drop** 30"

Elevation Top of Hole 191' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
130	60			R12	12/10"	107	12		BEDROCK (Tm): continued. @ 60': SANDSTONE, light brown to reddish brown, very moist, fine to medium grained, poorly cemented, friable. @ 62': Standing water in boring at time of logging.	Unconfined Compressive Strength
125	65								Total depth of boring: 64'. Groundwater encountered at 62' bgs. Boring was backfilled with soil cuttings.	
120	70									
115	75									
110	80									
105	85									
	90									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG HA-1

Date 3-5-09 **Sheet** 1 **of** 1

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JAR

Drilling Co. **Type of Rig** Hand Auger

Hole Diameter 2.5" **Drive Weight** **Drop** "

Elevation Top of Hole 183' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
180	0			B1				SM	**Terrace Deposits (Qt)** @ 0': Silty SAND, brown, moist, fine grained, small bushes and grasses, rodent burrows.	
									@ 2.5': Silty SAND with trace of clay, brown to orange brown, moist, fine grained.	
									@ 3': Becomes **BEDROCK: Monterey Formation (Tm)**	
175	5								@ 4': Sandy CLAYSTONE, dark brown, moist, fine grained, shell fragments.	
									Total depth of hand-auger boring: 5'. Boring backfilled with soil cuttings.	
	10									
170										
	15									
165										
	20									
160										
	25									
155										
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG HA-2

Date 3-6-09 **Sheet** 1 **of** 1

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** CDL

Drilling Co. **Type of Rig** Hand Auger

Hole Diameter 2.5" **Drive Weight** **Drop** "

Elevation Top of Hole 210' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
210	0			A-1				SM	**Terrace Deposits (Qt)** @ 0': Silty SAND, , brown, moist, fine to medium grained sand. @ 0.5': Silty SAND, brown, moist, fine to medium grained sand. @ 1': CLAY, light gray to light brown, moist, some fine grained sand, some siltstone and claystone fragments.	
				A-2					**BEDROCK: Monterey Formation (Tm)** @ 1.5': CLAYSTONE, light gray to light brown, moist, some fine grained sand, some siltstone fragments. @ 3': Clayey SANDSTONE, light gray, dry, fine grained sand, some claystone fragments.	
				A-3					Total depth of hand-auger boring: 3.5'. Boring backfilled with soil cuttings.	
205	5									
200	10									
195	15									
190	20									
185	25									
180	30									

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

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

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- EI EXPANSION INDEX
- RV R VALUE
- -200 % FINES PASSING
- AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG HA-3

Date 3-6-09 **Sheet** 1 **of** 1

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** CDL

Drilling Co. **Type of Rig** Hand Auger

Hole Diameter 2.5" **Drive Weight** **Drop** "

Elevation Top of Hole 210' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
210	0			A-1 A-2 A-3				CL	**Terrace Deposits (Qt)** @ 0': CLAY with sand, brown mottled with orange and gray, moist, fine grained sand. @ 0.5': same as above. @ 1.5': same as above. @ 3': same as above.	
205	5								Total depth of hand-auger boring: 3.5'. Boring backfilled with soil cuttings.	
200	10									
195	15									
190	20									
185	25									
180	30									

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

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG HA-4

Date 3-6-09 **Sheet** 1 **of** 1

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** CDL

Drilling Co. **Type of Rig** Hand Auger

Hole Diameter 2.5" **Drive Weight** **Drop** "

Elevation Top of Hole 242' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
240	0			A-1				CL	**Terrace Deposits (Qt)** @ 0': CLAY, brown to light brown mottled with orange fine grained sand, moist, plastic, oxidized. @ 0.5': CLAY, brown mottled with orange fine grained sand, moist, oxidized. @ 1.5': same as above.	
				A-2						
				A-3					**BEDROCK: Monterey Formation (Tm)** @ 2': SILTSTONE, light gray to brown, hard, damp to moist, some fine grained sand. @ 3': SILTSTONE, light gray to brown, hard, damp to moist, some fine grained sand. Total depth of hand-auger boring: 3.5'. Boring backfilled with soil cuttings.	
235	5									
230	10									
225	15									
220	20									
215	25									
	30									

SOIL DESCRIPTION

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

SAMPLE TYPES:

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

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200	% FINES PASSING
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX		
CR	CORROSION	RV	R VALUE		

GEOTECHNICAL BORING LOG HA-5

Date 3-6-09 **Sheet** 1 **of** 1

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** CDL

Drilling Co. **Type of Rig** Hand Auger

Hole Diameter 2.5" **Drive Weight** **Drop** "

Elevation Top of Hole 252' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
250	0			A-1				CL	**Terrace Deposits (Qt)** @ 0': CLAY with sand, brown to orange brown, moist, fine grained sand. @ 0.5': same as above.	
				A-2					**BEDROCK: Monterey Formation (Tm)** @ 1.5': SILTSTONE, light gray to light brown, damp, severely weathered and fractured, oxidized with manganese development along fracture surfaces. @ 3': same as above. Total depth of hand-auger boring: 3.5'. Boring backfilled with soil cuttings.	
				A-3						
245	5									
240	10									
235	15									
230	20									
225	25									
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG NB-1

Date 3-4-09 **Sheet** 1 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 168' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								**BEDROCK: Monterey Formation (Tm)**	
									@ 0': Clayey SANDSTONE, brown, moist, loose, fine grained sand.	
165				S1	5 13 22				@ 3': Clayey Gravelly SANDSTONE, brown, moist, dense.	
	5			R1	7 27 50/5.5"	112	8		@ 5': SANDSTONE with Gravel, light brown with orange brown oxidation, slightly moist, dense, fine grained sand, thin silty sand bed.	
160				S2	12 16 14				@ 7.5': SANDSTONE, light brown, slightly moist, very dense, some orange oxidation.	
	10			R2	6 50/6"	104	8		@ 10': SANDSTONE, light brown, slightly moist, very dense, some orange oxidation, thin silty sand bed.	
155										
	15			S3	7 50/6"				@ 15': SANDSTONE, light yellow brown, slightly moist, moderately hard, fine grained sand.	
150				B1						
	20			R3	7 50/5.5"	102	5		@ 20': SANDSTONE, light brown to orange brown, slightly moist, moderately hard, fine to medium grained sand, thin silty sandstone bed.	
145				S4 B2	15 39 50/3"				@ 22.5': SANDSTONE, light brown to orange brown, moderately hard, some claystone clasts.	
	25			R4	3 39 50/2.5"	102	6		@ 25': SANDSTONE, light gray to white, moderately hard, slightly moist, fine grained, thin silty sandstone bed.	
140				B3						
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-1

Date 3-4-09 | Sheet 2 of 3

Project 602184-002 Proposed City Hall - City of Newport Beach | Logged / Sampled By JMP

Drilling Co. Martini Drilling | Type of Rig CME-75

Hole Diameter 6" | Drive Weight 140 lbs Auto-hammer | Drop 30"

Elevation Top of Hole 168' | Location See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R5	50/5.5"	97	6		BEDROCK (Tm): continued. @ 30': SANDSTONE, light brown, slightly moist, fine grained, thin silty sandstone bed.	
135										
	35			S5	50/5"				@ 35': SANDSTONE, light brown to light orange brown, slightly moist, hard.	CR, EI
130				S6	50/4.5"				@ 37.5': SANDSTONE, same as above.	CR, EI
	40			R6	50/3.5"	97	7		@ 40': SANDSTONE, light orange brown, moist, hard, fine grained, thin silty sandstone bed.	
125										
	45			S7	50/6"				@ 45': SANDSTONE, medium brown, moist to very moist, hard, fine to medium grained sand.	
120										
	▽ 50			R7	50/3"	108	17		@ 50': SANDSTONE, medium brown, wet, hard, fine to medium grained, thin silty sandstone bed. @ 50.3': groundwater encountered (8:50am)	
115										
	55			S8	50/5"				@ 55': SANDSTONE, medium brown, wet, hard, fine to medium grained sand.	
110										
	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR | SA SIEVE ANALYSIS | -200 % FINES PASSING
MD MAXIMUM DENSITY | SE SAND EQUIVALENT | AL ATTERBERG LIMITS
CN CONSOLIDATION | EI EXPANSION INDEX
CR CORROSION | RV R VALUE

GEOTECHNICAL BORING LOG NB-1

Date 3-4-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 168' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60			R8	50/1.5"	122	13		BEDROCK (Tm): continued. @ 60': SANDSTONE, medium brown, wet, hard, fine to medium grained sand, thin silty sandstone bed.	
105									@ 64': refusal (9:20am)	
	65								Total depth of boring: 64.0'. Refusal due to difficulty drilling. Groundwater encountered at 50.3' bgs during drilling (8:50am) and tagged at 47.0' bgs (9:25am). Boring backfilled with soil cuttings.	
100										
	70									
95										
	75									
90										
	80									
85										
	85									
80										
	90									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG NB-2

Date 3-4-09 | Sheet 1 of 3

Project 602184-002 Proposed City Hall - City of Newport Beach | Logged / Sampled By JMP

Drilling Co. Martini Drilling | Type of Rig CME-75

Hole Diameter 6" | Drive Weight 140 lbs Auto-hammer | Drop 30"

Elevation Top of Hole 187' | Location See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
185	0								**Terrace Deposits (Qt)** @ 0': Sandy Clayey SILT, brown, moist.	
				S1	2 2 7			ML	@ 3': Sandy Clayey SILT, brown, moist.	
	5			R1	7 11 12	98	15	ML	@ 5': Sandy Clayey SILT, medium brown, moist, fine grained thin clay bed.	
180									**BEDROCK: Monterey Formation (Tm):**	
				S2	4 3 5				@ 7.5': SANDSTONE, light to medium brown, slightly moist, soft, fine grained sand.	
	10			R2	7 13 20	100	8		@ 10': SANDSTONE, medium brown, slightly moist, moderately hard, fine grained, thin silty sandstone bed.	
175										
	15			S3	8 12 20				@ 15': CLAYSTONE and SANDSTONE interbedded, light gray to orange brown, slightly moist, moderately hard.	
170				B1						
	20			R3	18 50/5"	106	6		@ 20': SANDSTONE, light to medium brown, slightly moist, moderately hard, fine grained sand, thin silty sandstone bed.	
165				S4 B2	20 23 42				@ 22.5': SANDSTONE, light to medium brown, slightly moist, moderately hard, fine grained sand.	
	25			S5	14 35 35				@ 25': SANDSTONE, light brown, slightly moist, moderately hard, fine grained sand.	
160				B3						
	30									

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

TYPE OF TESTS:
DS DIRECT SHEAR | SA SIEVE ANALYSIS | -200 % FINES PASSING
MD MAXIMUM DENSITY | SE SAND EQUIVALENT | AL ATTERBERG LIMITS
CN CONSOLIDATION | EI EXPANSION INDEX
CR CORROSION | RV R VALUE

GEOTECHNICAL BORING LOG NB-2

Date 3-4-09 **Sheet** 2 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 187' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R4	15 50/6"	103	3		BEDROCK (Tm): continued. @ 30': SANDSTONE, light yellow brown, slightly moist, moderately hard, fine to medium grained sand, thin silty sandstone bed.	
155										
	35			S6	21 34 40				@ 35': SANDSTONE, same as above.	CR, EI
150				S7	33 50/3"				@ 37.5': SANDSTONE, same as above.	
	40			R5	50/4.5"	102	4		@ 40': SANDSTONE, light gray to light orange brown, slightly moist, moderately hard, fine grained sand.	CR, DS, EI
145										
	45			S8	50/6"				@ 45': SANDSTONE, light gray to orange brown, slightly moist, moderately hard, fine grained.	CR, EI
140										
	50			R6	18 50/6"	84	33		@ 50': SANDSTONE and CLAYSTONE interbedded, orange brown to olive green, slightly moist, moderately hard, fine grained.	
135										
	55			S9	12 50/5"				@ 55': same as above.	
130										
	60									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-2

Date 3-4-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 187' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60			R7	50/5"	98	23		BEDROCK (Tm): continued. SANDSTONE, orange brown, moist to very moist, moderately hard, fine grained sand, thin silty sandstone bed.	
125										
	65			S10	50/3"				@ 65': same as above, increase in moisture to wet.	
120									@ 67.3': Groundwater encountered.	
	70			R8	50/3"	106	22		@ 70': SANDSTONE, same as above, wet, thin silty sandstone bed.	
115										
	75			S11	50/5.5"				@ 75': SANDSTONE wih some interbedded CLAYSTONE, orange brown, wet, moderately hard, fine grained sand.	
110										
	80			R9	28 50/5.5"	88	38		@ 80': CLAYSTONE, light brown to brown, moist, moderately hard.	
105									Total depth of boring: 80.9'. Groundwater encountered at 67.3' bgs during drilling. Boring backfilled with soil cuttings.	
	85									
100										
	90									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-3

Date 3-4-09 **Sheet** 1 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 186' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								**Terrace Deposits (Qt)**	
185									@ 0': Silty SAND, brown, moist.	
				S1	4 8 9			SM	@ 3': Silty SAND, brown, moist.	
	5									
180				R1	7 15 21	116	12	SM	@ 5': Silty SAND, medium brown, slightly moist, medium dense, fine grained sand, thin silty clay bed.	
									BEDROCK: Monterey Formation (Tm)	
				S2	8 4 5				@ 6.5': Silty SANDSTONE, medium brown, slightly moist, medium dense, fine grained sand, thin silty clay bed. @ 7.5': same as above.	
	10									
175				R2	9 11 16	97	7		@ 10': SANDSTONE, orange brown, slightly moist, moderately hard, fine grained sand, thin silty sandstone bed.	
	15									
170				S3	9 17 20				@ 15': SANDSTONE, light to medium brown, slightly moist, medium hard, fine grained sand.	
				B1						
	20									
165				R3	15 26 50/4.5"	92	24		@ 20': CLAYSTONE, light yellow to olive green, slightly moist, hard.	
				S4 B2	32 50/6"				@ 22.5': SILTSTONE and SANDSTONE interbedded, medium brown to orange brown, slightly moist. Archaeo Sample collected.	
	25									
160				S5	32 50/6"				@ 25': SANDSTONE, light yellow brown, moderately hard, slightly moist, fine grained sand.	
				B3						
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

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

GEOTECHNICAL BORING LOG NB-3

Date 3-4-09 **Sheet** 2 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 186' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30								**The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.**	
155				R4	20 50/6"	103	4		BEDROCK (Tm): continued. @ 30': SANDSTONE, light yellow to whte, slightly moist, moderately hard, fine grained sand, thin silty sandstone bed.	
	35			S6	15 19 26				@ 35': SANDSTONE, light brown to orange brown, slightly moist, moderately hard, oxidized, fine grained sand.	CR, EI
150				S7	50/3"				@ 37.5': same as above.	
	40			R5	50/3"	101	4		@ 40': SANDSTONE, light brown to medium brown, slightly moist, hard, fine grained sand, thin silty sandstone bed.	CR, EI
145										
	45			S8	26 50/1"				@ 45': SANDSTONE, light brown to brown to light gray, slightly moist, moderately hard, fine grained sand.	
140										
	50			R6	21 50/4.5"	104	8		@ 50': SANDSTONE, orange brown, slightly moist, moderately hard, fine grained sand, thin silty sandstone bed.	
135										
	55			S9	11 15 17				@ 55': SANDSTONE, orange brown, moist, moderately hard, fine grained sand.	
130										
	60									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-3

Date 3-4-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 186' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
125	60			R7	22 37 50/4.5"	105	16		BEDROCK (Tm): continued. @ 60': SANDSTONE, medium brown, very moist to wet, moderately hard, fine grained sand, thin silty sandstone bed. @ 61.6': Groundwater encountered (11:45am).	
120	65			S10	21 23 32				@ 65': SANDSTONE, same as above, wet.	
115	70			R8	22 31 50/3"	109	18		@ 70': SANDSTONE, same as above, wet, thin silty sandstone bed.	
110	75			S11	20 50/6"				@ 75': SANDSTONE, same as above, wet.	
105	80			R9	50/4"	111	18		@ 80': SANDSTONE, same as above, wet, thin silty sandstone bed. Total depth of boring: 80.4'. Groundwater encountered at 61.6' bgs during drilling (11:45am). Backfill boring with soil cuttings.	
100	85									
	90									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG NB-4

Date 3-6-09 **Sheet** 1 **of** 2

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 177' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
175	0								**BEDROCK: Monterey Formation (Tm)** @ 0': SAND, red brown, moist, fine grained sand.	
				S1	6 8 16			SM	@ 3': SAND with Silt, red brown, slightly moist, medium dense, fine grained sand, micaceous.	
170	5			S2	6 11 13				@ 5': Silty SANDSTONE, red brown, slightly moist, medium dense, fine grained sand.	
				R1	7 21 31	117	9		@ 7.5': Silty SANDSTONE, red brown, slightly moist, medium dense, fine grained sand.	
165	10			S3	3 6 7				@ 10': SANDSTONE with some Clay and Silt, red brown, some zones with less oxidation, slightly moist, dense, fine to medium grained sand.	
160	15			R2	11 18 39	112	16		@ 15': SANDSTONE with Silt, trace Clay, olive gray, zones of orange oxidation staining, moist, dense, fine grained sand.	
				B1						
155	20			S4	6 9 10				@ 20': Silty SANDSTONE, trace Clay, red brown, moist, medium dense, fine grained sand.	
				S5 B2	7 8 13				@ 22.5': Silty SANDSTONE, trace Clay, red brown, moist, medium dense, fine grained sand.	
150	25			R3	14 31 50	122	10		@ 25': SANDSTONE, trace Clay, red brown, moist, medium dense, fine grained sand.	
				B3						
	30									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-4

Date 3-6-09 **Sheet** 2 **of** 2

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 177' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			S6	7 8 8				@ 30': SANDSTONE, trace Clay, red brown, moist, medium dense, fine grained sand.	
145									@ 32': Sandy CLAYSTONE, olive gray, moist, harder drilling.	
	35			R4	12 50/6"	109	9		@ 35': SANDSTONE, poor sample recovery, mostly sluff. SAND, hard drilling.	
140				S7	50/5"				@ 37.5': Refusal, encounter cobbles	
	40								Total depth of boring: 38'. No groundwater encountered. Boring backfilled with soil cuttings.	
135										
	45									
130										
	50									
125										
	55									
120										
	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR	SA SIEVE ANALYSIS	-200 % FINES PASSING		
MD MAXIMUM DENSITY	SE SAND EQUIVALENT	AL ATTERBERG LIMITS		
CN CONSOLIDATION	EI EXPANSION INDEX			
CR CORROSION	RV R VALUE			

GEOTECHNICAL BORING LOG NB/MW-5

Date 3-10-09 **Sheet** 1 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 177' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
175	0							SM	**BEDROCK: Monterey Formation (Tm)** @ 0': Silty SAND, orange brown, slightly moist.	
	5			S1	6 22 25				@ 5': SANDSTONE, orange brown, moist, dense, sand is fine grained.	
170										
	10			R1	23 34 31	114	12		@ 10': SANDSTONE, same as above, thin silty sand bed.	
165										
	15			S2	8 7 7				@ 15': Silty SANDSTONE, orange brown, moist, medium dense, sand is fine grained.	
160										
	20			R2	28 38 40	103	14		@ 20': SANDSTONE, light brown to orange brown, moist, dense, sand is fine grained, black silty sand in sampler shoe.	
155										
	25			S3	9 7 15				@ 25': SANDSTONE, light brown to orange brown, moist, dense, sand is fine grained, some interlayered black silty sand.	
150										
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB/MW-5

Date 3-10-09 **Sheet** 2 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 177' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R3	22 50/6"	104	19		@ 30': Silty SANDSTONE with trace amounts of clay, light brown with patches of blacksand, very moist, dense, sand is fine grained.	
145										
	35			S4	2 2 1				@ 35': Sandy SILTSTONE to silty fine SANDSTONE, dark blue gray, moist, soft/loose, some brown sand.	
140										
	40			R4	13 27 50/3"	109	11		@ 40': SANDSTONE with interbedded CLAYSTONE, medium brown, moist, moderately hard to hard, sand is fine to medium grained.	
135										
	45			S5	15 21 23				@ 45': SANDSTONE, light brown, slightly moist to moist, moderately hard, sand is fine to medium grained.	
130										
	50			R5	16 48 50/3"	107	15		@ 50': SANDSTONE, light brown, moist to very moist, moderately hard to hard, sand is fine to medium grained, thin silty sandstone bed.	
125										
	55			S6	15 33 50/5"				@ 55': SANDSTONE, light brown, very moist, moderately hard to hard, sand is fine to medium grained, sampler is wet.	
120										
	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200	% FINES PASSING
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX		
CR	CORROSION	RV	R VALUE		

GEOTECHNICAL BORING LOG NB/MW-5

Date 3-10-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 177' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60			R6	50/2"	115	13		BEDROCK (Tm): continued. @ 60': SANDSTONE, light brown, very moist, moderately hard to hard, sand is fine to medium grained, sampler is wet.	
115									Total depth of boring: 61'. Refusal due to difficulty drilling. Groundwater encountered at 52.5' bgs during drilling. Groundwater monitoring well installed in boring. See well diagram for details.	
	65									
110										
	70									
105										
	75									
100										
	80									
95										
	85									
90										
	90									

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

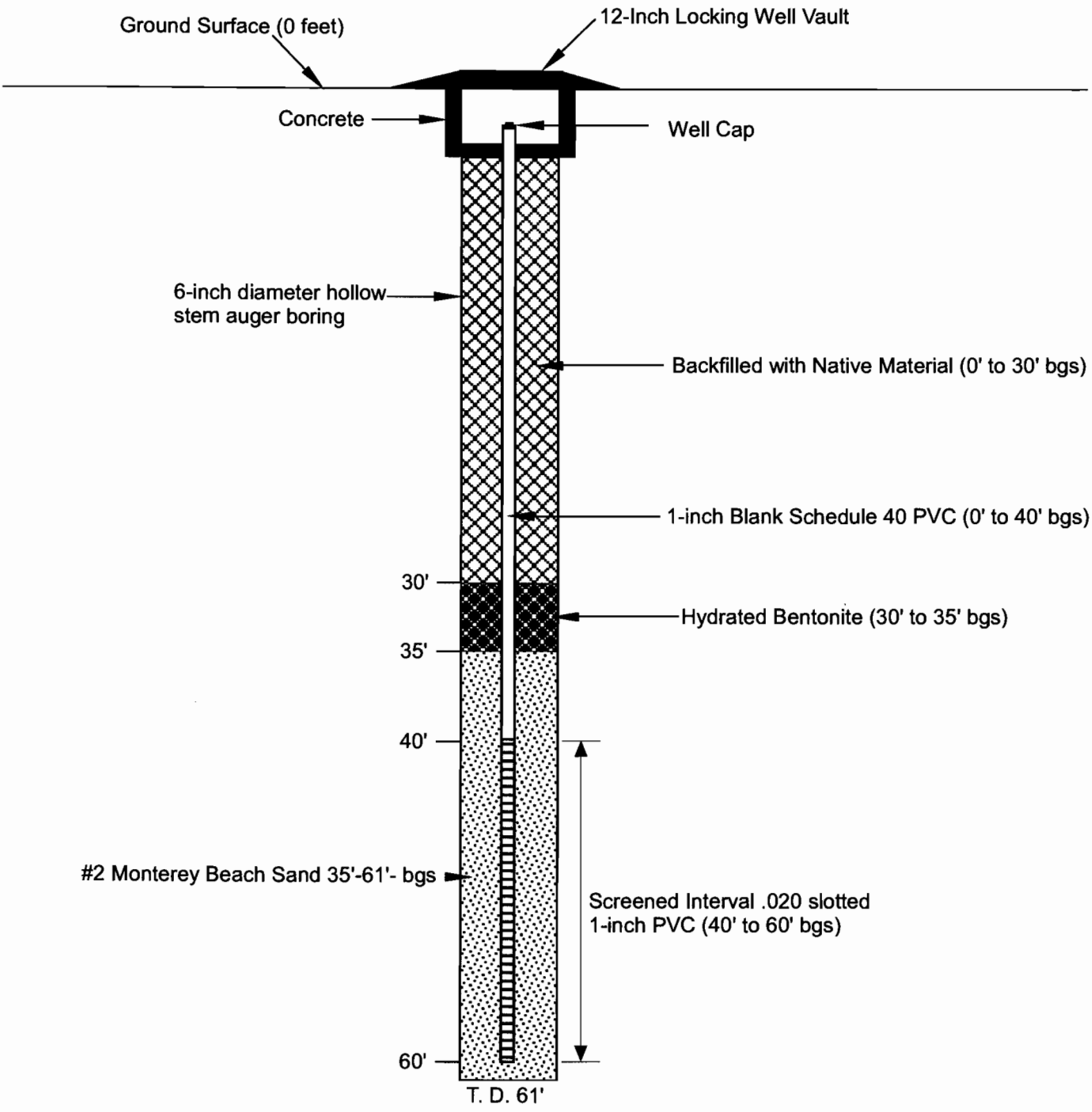
SAMPLE TYPES:

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

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200	% FINES PASSING
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX		
CR	CORROSION	RV	R VALUE		

MW/NB-5



Monitoring Well Construction Diagram, MW/NB-5 Proposed City Hall Newport Beach, California	Leighton Consulting, Inc.	**Proposed City Hall - Newport Beach**
		Not To Scale
		March 2009
		602184-002

GEOTECHNICAL BORING LOG NB-6

Date 3-6-09 **Sheet** 1 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 176' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
175	0							ML	**Terrace Deposits (Qt)** @ 0': SILT, brown, moist.	
				S1	7 8 8				**BEDROCK: Monterey Formation (Tm)** @ 3': SILTSTONE and CLAYSTONE, broken up claystone and siltstone clasts mottled, light orange and light gray, moist, some fine to medium grained sand layers to laminated silt and clay, highly weathered, oxidized, rootlets	
170	5			R1	5 17 30	94	19		@ 5': SILTSTONE and CLAYSTONE, broken up claystone and siltstone clasts mottled, light orange and light gray, moist, some fine to medium grained sand layers to laminated silt and clay, highly weathered, oxidized, rootlets	
				S2	6 30 30				@ 7.5': Sandy SILTSTONE, orange brown, slightly moist, hard, weathered, oxidized, joints (1/8" wide) infilled with brown silt.	
165	10			R2	13 25 50	87	30		@ 10': Sandy Clayey SILTSTONE, gray with orange oxidized layers, slightly moist, hard, weathered, jointed.	
160	15			S3	6 21 18				@ 15': Silty Clayey SANDSTONE, gray with orange oxidized layers, slightly moist, hard, fine grained sand, jointed.	
				B1						
155	20			R3	39 50/4"	99	23		@ 20': Concretionary layer, thin, SANDSTONE, light gray brown, dry, hard, fine grained. (Poor Recovery) @ 20.5' refusal, relocate boring 10 feet north, drill to 20 feet and retake 20 foot sample.	
				S4 B2	15 50/6"				@ 20': Silty CLAYSTONE, olive gray, with orange oxidized layers of fine grained sand, slightly moist, moderately hard, weathered, jointed, laminated. @ 22.5': Same as above, some thin interbeds of sand, fine to coarse grained sand, oxidized.	
150	25			S5	9 13 13				@ 25': Same as above, Clayey SILTSTONE, gray with orange oxidized layers, laminated, some fine grained sand, joints.	
				B3						
	30									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-6

Date 3-6-09 **Sheet** 2 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 176' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R4	50/5.5"	84	25		BEDROCK (Tm): continued.	
145									@ 30': Clayey SILTSTONE, gray and orange oxidized layers, laminated, slightly moist, hard, slightly weathered, trace jointing.	
	35			S6	6 13 26				@ 35': Clayey SILTSTONE, gray and orange oxidized layers, laminated, slightly moist, hard, slightly weathered, trace jointing.	
140									@ 35.5': perched groundwater encountered.	
				S7	50/5"				@ 37.5': Clayey SILTSTONE, gray and orange oxidized layers, laminated, slightly moist, hard, slightly weathered, trace jointing.	
	40			R5	29 50/5"	91	27		@ 40': Sandy SILTSTONE, olive gray, slight moist, hard, some clay, fine grained sand, thinly layered.	
135										
	45			S8	22 20 50/1"				@ 45': Concretionary layer (1" thick) at top of sample. Sandy SILTSTONE with Clay, olive gray with orange oxidation, moist to wet, moderately hard, fine grained. Groundwater encountered.	
130										
	50			R6	18 24 50/4"	86	30		@ 50': Clayey SILTSTONE, olive gray with orange oxidized layers, same as above, wet around sample.	
125										
	55			S9	50/5.5"				@ 55': Clayey SILTSTONE, dark gray, very moist, moderately hard, jointed, joint surfaces lined with orange oxidation, concretionary layer (1/2" thick), wet around sample. Hard drilling.	
120										
	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-6

Date 3-6-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 176' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60			R7	50/5.5"	90	24		BEDROCK (Tm): continued. @ 60': Silty CLAYSTONE, dark gray, very hard, fine grained sand, silicious zones, jointed, wet along some joint surfaces.	
115										
	65			S10	16 50/4"				@ 65': Sandy Clayey SILTSTONE, dark gray, moist, very hard, silicious zones, fine grained sand. @ 66.5': Refusal due to hard drilling.	
110										
									Total depth of boring: 66.5'. Refusal due to difficulty drilling. Groundwater encountered at 45' bgs during drilling. Boring left open for groundwater reading. Groundwater tagged at 31' bgs (4:00pm)	
	70									
105										
	75									
100										
	80									
95										
	85									
90										
	90									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-7

Date 3-6-09 **Sheet** 1 **of** 2

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 162' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								**BEDROCK: Monterey Formation (Tm)**	
									@ 0': Silty SANDSTONE.	
160				S1	3 9 11				@ 3': Silty SANDSTONE, orange red brown, slightly moist, medium dense.	
	5			R1	23 26 42	120	8		@ 5': Silty SANDSTONE, orange red brown, slightly moist, dense.	
155				S2	10 12 10				@ 7.5': Silty SANDSTONE, orange brown, moist, dense, oxidized, fine to medium grained with some coarse grained sand.	
	10			R2	26 39 37	119	8		@ 10': Silty SANDSTONE, orange brown, moist, dense, oxidized, fine to medium grained with some coarse grained sand.	
150										
	15			S3	4 5 6				@ 15': Silty SANDSTONE, orange brown, moist, medium dense, oxidized, fine to medium grained with some coarse grained sand.	
145				B1						
	20			R3	5 11 15	105	4		@ 20': Silty SANDSTONE, orange brown, moist, medium dense, oxidized, fine to medium grained with some coarse grained sand.	
140				S4 B2	3 7 6				@ 22.5': SANDSTONE, light orange brown, slightly moist, medium dense, fine to medium grained sand, some silt.	
	25			S5	3 6 6				@ 25': Silty SANDSTONE, orange brown, slightly moist, medium dense, fine to medium grained sand, some silt.	
135				B3						
	30									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB-7

Date 3-6-09 **Sheet** 2 **of** 2

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** MAW

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 162' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R4	3 14 25	110	7		@ 30': Clayey Silty SANDSTONE, orange brown mottled with gray, moist, medium dense, medium grained sand, some fine to coarse grained sand. well cemented.	
130										
	35			S6	7 23 31				@ 35': SAND with Silt, orange brown, moist, fine grained sand,	
125				S7	13 11 12					
	40								Total depth of boring 39'. No groundwater encountered. Coverted boring to dry well (screen bottom 5'). Well removed and backfilled on 3-7-09.	
120										
	45									
115										
	50									
110										
	55									
105										
	60									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB/MW-8

Date 3-10-09 **Sheet** 1 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 183' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Terrace Deposits (Qt)** @ 0': Sandy CLAY, brown, moist, soft.	
180				S1	8 11 15				**BEDROCK: Monterey Formation (Tm)** @ 3': Silty SANDSTONE, orange brown, slightly moist, medium dense, sand is fine grained.	
	5			R1	14 28 37	114	8		@ 5': SANDSTONE, light brown to orange brown, dense, slightly moist, sand is fine grained, thin silty sand bed.	
175				S2	11 15 15				@ 7.5': SANDSTONE, light brown to orange brown, dense, slightly moist, sand is fine grained, thin silty sand bed.	
	10			R2	8 23 50/5"	106	7		@ 10': SANDSTONE, orange brown, slightly moist, dense, sand is fine grained, thin silty sand bed.	
170									@ 13': slightly more difficult drilling.	
	15			S3	7 13 18				@ 15': CLAYSTONE, light gray to orange brown, slightly moist, moderately hard.	
165				B1						
	20			R3	23 50/5.5"	101	8		@ 20': SANDSTONE, light gray to orange brown, slightly moist, hard, sand is fine grained, thin silty sandstone bed.	
160				S4 B2	9 14 25				@ 22.5': Silty CLAYSTONE, light gray to orange brown, moderately hard, slightly moist.	
	25			R4	10 28 36	86	33		@ 25': CLAYSTONE, light gray to orange brown, slightly moist, moderately hard to hard.	
155				B3						
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG NB/MW-8

Date 3-10-09 **Sheet** 2 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

Elevation Top of Hole 183' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			S5	12 18 21				BEDROCK (Tm): continued. @ 30': Interbedded silty fine SANDSTONE and CLAYSTONE, orange brown to light gray, slightly moist, moderately hard.	
150										
	35			R5	10 28 50/2.5"	101	14		@ 35': Interbedded silty fine SANDSTONE and CLAYSTONE, orange brown to light gray, slightly moist, moderately hard.	
145				S6	21 27 50/5"				@ 37.5': Silty fine SANDSTONE, light gray to light brown, slightly moist, moderately hard to hard, laminated.	
	40			R6	16 50/5"	93	14		@ 40': Silty fine SANDSTONE, light gray to light brown, slightly moist, moderately hard to hard, laminated.	
140										
	45			S7	17 50/4.5"				@ 45': CLAYSTONE, brown, slightly moist, moderately hard, some SANDSTONE, portion of sample is oxidized.	
135										
	50			R7	9 20 50/6"	97	17		@ 50': Interbedded SANDSTONE and CLAYSTONE, light yellow brown to brown, moist, moderately hard to hard.	
130										
	55			S8	50/4"				@ 55': SANDSTONE, light gray to orange brown, very moist, hard, sand is fine grained, some medium grained sand.	
125										
	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG NB/MW-8

Date 3-10-09 **Sheet** 3 **of** 3

Project 602184-002 Proposed City Hall - City of Newport Beach **Logged / Sampled By** JMP

Drilling Co. Martini Drilling **Type of Rig** CME-75

Hole Diameter 6" **Drive Weight** 140 lbs Auto-hammer **Drop** 30"

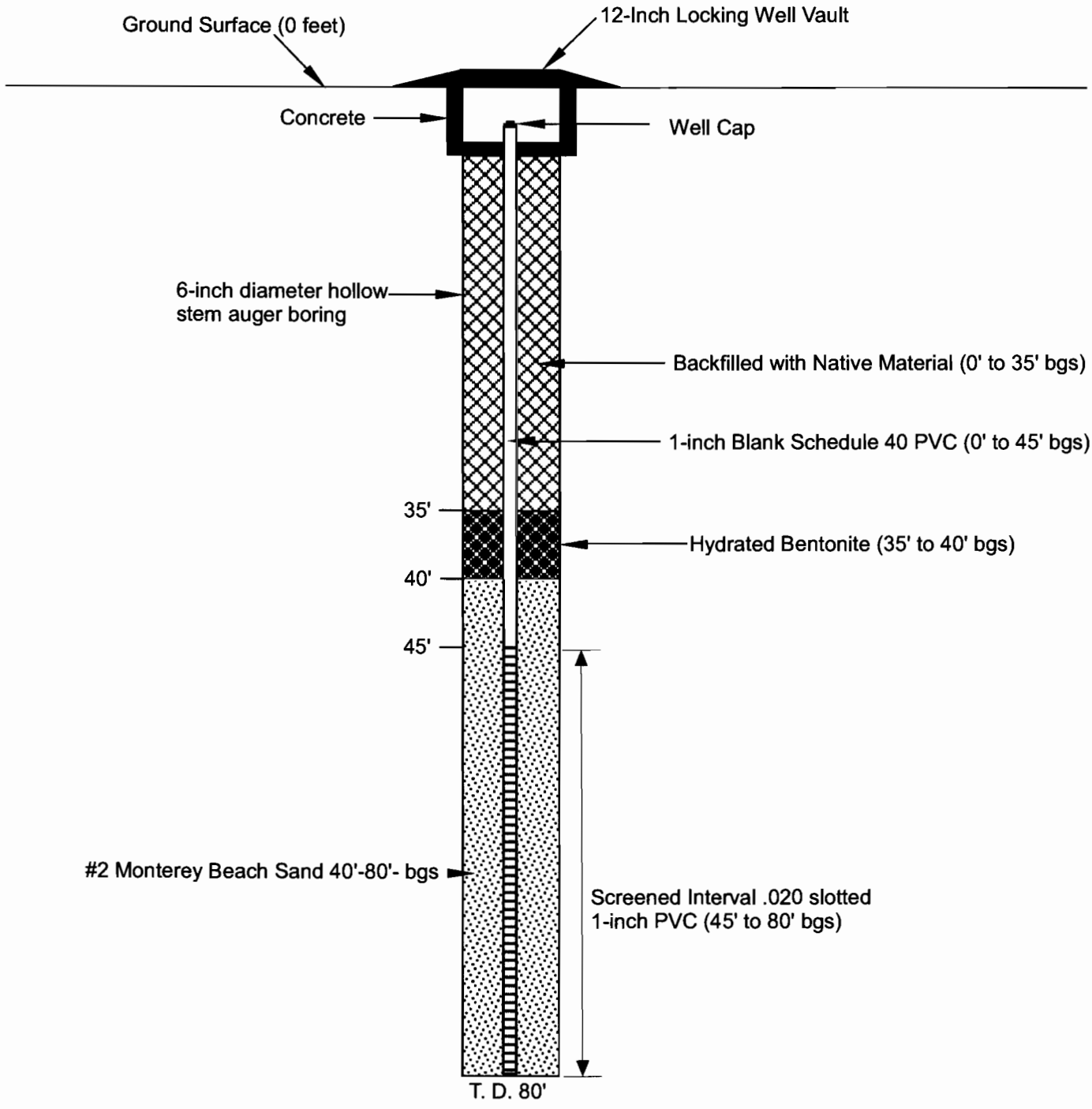
Elevation Top of Hole 183' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60			R8	19 50/3"	100	22		BEDROCK (Tm): continued. @ 60': Silty SANDSTONE, orange brown, highly oxidized, slightly moist to moist, hard, laminated.	
120										
	65			S9	50/6"				@ 65': SANDSTONE, light brown to orange brown, wet, hard, sand is fine to medium grained.	
115										
	70			R9	50/4"	105	21		@ 70': SANDSTONE, light brown to orange brown, wet, hard, sand is fine to medium grained., thin silty sandstone bed.	
110										
	75			S10	50/6"				@ 75': SANDSTONE, light brown to orange brown, wet, hard, sand is fine to medium grained, thin silty sandstone bed.	
105										
	80			R10	50/3"	106	22		@ 80': SANDSTONE, light brown to orange brown, wet, hard, sand is fine to medium grained, thin silty sandstone bed., thin silty sandstone bed.	
									Total depth of boring: 80.3'. Groundwater encountered at 57.2' bgs during drilling. Groundwater monitoring well installed in boring. See well diagram for details.	
100										
	85									
95										
	90									

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

TYPE OF TESTS:
DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

MW/NB-8



Monitoring Well Construction Diagram, MW/NB-8 Proposed City Hall Newport Beach, California	Leighton Consulting, Inc.	**Proposed City Hall - Newport Beach**
		Not To Scale
		March 2009
		602184-002

GEOTECHNICAL BORING LOG B-1

Date 3-27-08 **Sheet** 1 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 179' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								**BEDROCK: Monterey Formation (Tm)**	
									@ 0': Sandy CLAY/Clayey SAND, orange brown, damp, fine grained sand.	
175										
	5			R-1	8 15 27	119	12		@ 5': Sandy CLAY, orange brown, damp, very stiff, fine grained sand.	
170										
	10			R-2	8 9 12	96	3		@ 10': Silty SANDSTONE, light yellow brown, damp, medium dense, fine grained sand.	
165										
	15			S-1	4 21 37				@ 15': Silty SANDSTONE, light yellow brown, damp, dense, fine grained sand, trace of well rounded gravel (pebbles).	
160				Bag-1						
	20			R-3	15 50/5"	101	3		@ 20': SANDSTONE, light yellow brown, damp, hard, fine grained sand, very poorly cemented, friable, breaks down in hand.	DS
155										
	25			S-2	36 50/4"				@ 25': SANDSTONE, light yellow brown, damp, hard, fine grained sand, poorly cemented, friable.	
150										
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG B-1

Date 3-27-08 **Sheet** 2 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 179' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-4	50/6"	101	2		@ 30': SANDSTONE, light yellow brown, damp, very dense, fine grained sand.	
145										
	35			S-3	50/2"				@ 35': SANDSTONE, light yellow brown, damp, very dense, fine grained sand.	
140										
	40			R-5	4 25 39	102	10		@ 40': Silty SANDSTONE, mottled olive grey and yellow to orange brown, damp, hard, fine grained sand, highly fractured, fractures well healed with very fine grained sand with trace clay, moderately cemented, friable, thinly bedded, trace siltstone rock fragments.	
135									Total depth of boring: 41.5 feet No groundwater was encountered during drilling Borehole backfilled with soil cuttings and tamped	
	45									
130										
	50									
125										
	55									
120										
	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG B-2

Date 3-27-08 **Sheet** 1 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 191' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
190	0							CL	**Quaternary Terrace Deposits (Qt)** @ 0': Sandy CLAY, dark brown, damp, fine grained sand.	
185	5			R-1	3 5 8	101	14	SM/SC	@ 5': Silty SAND to Clayey SAND, light to dark brown, damp, loose, fine grained sand.	
180	10			R-2	10 15 22	100	6		**BEDROCK: Monterey Formation (Tm)** @ 10': SANDSTONE, yellow brown, damp, medium dense, fine grained sand, interbedded with sandy siltstone.	DS
				Bag-1						
175	15			R-3	26 35 50	67	27		@ 15': Sandy CLAYSTONE, mottled yellow brown to dark reddish brown, damp, fine to medium grained sand grades to Silty SAND, light yellow brown to red brown sand, damp, very dense, fine grained sand.	
170	20			S-1	20 33 42				@ 20': SANDSTONE, orange brown to light yellow brown, damp, moderately hard, highly weathered, heavily oxidized, very poorly cemented, friable, breaks down in hand, fine grained sand.	
165	25			R-4	6 30 50/5"	103	3		@ 25': SANDSTONE, yellow brown, damp, hard, fine grained sand poorly cemented, friable.	
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200	% FINES PASSING
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX		
CR	CORROSION	RV	R VALUE		

GEOTECHNICAL BORING LOG B-2

Date 3-27-08 **Sheet** 2 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 191' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30								The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
160				S-2	37 50/5"				@ 30': SANDSTONE, light yellow brown, damp, hard, fine grained sand, massive, poorly cemented, friable.	
	35			R-5	50/4"	114	3		@ 35': SANDSTONE, light yellow brown, damp, hard, fine grained sand, massive, poorly cemented, friable.	
155										
	40			S-3	35 50/4"				@ 40': SANDSTONE, light yellow brown, damp, hard, fine grained sand, massive, poorly cemented, friable.	
150										
	45			R-6	50/4"	99	5		@ 45': SANDSTONE, light yellow brown, damp, hard, fine grained sand, massive, poorly cemented, friable.	
145										
	50			S-4	50/5"				@ 50': SANDSTONE, light orange brown, damp, hard, fine grained sand, trace siltstone rock fragments.	
140										
									Total depth of boring: 51.5 feet No groundwater was encountered during drilling Borehole backfilled with soil cuttings and tamped	
	55									
135										
	60									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG B-3

Date 3-27-08 **Sheet** 1 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 187' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								**Quaternary Terrace deposits (Qt)**	
185									@ 0': Sandy CLAY, dark brown, moist, fine grained sand.	
	5			R-1	7 15 31	105	7		@ 5': Silty SAND to Clayey SAND, dark brown, damp, medium dense, fine grained sand.	
180									**BEDROCK: Monterey Formation (Tm)**	
	10			R-2	27 50/6"	105	6		@ 10': Silty SANDSTONE, light orange brown, damp, very dense, fine grained sand, trace clay pods in matrix.	
175										
	15			S-1	20 33 50				@ 15': SANDSTONE, light orange brown, damp, moderately hard, fine grained sand, very poorly cemented, highly weathered, highly oxidized, friable, breaks down in hand.	
170										
	20			R-3	15 16 41	95	19		@ 20': SANDSTONE, light orange brown to olive grey with orange mottling, damp, hard, fine grained sand, poorly cemented, friable, highly fractured, fractures well healed with greyish white, fine grained, sandy clay, some siltstone rock fragments and lenses of greyish white sand.	
165										
	25			S-2	50/6"				@ 25': SANDSTONE, light yellow brown, damp, hard, fine grained sand, poorly cemented, friable.	
160				Bag-1						
	30									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG B-3

Date 3-27-08 **Sheet** 2 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 187' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-4	31 50/1"	102	9		@ 30': SANDSTONE, light yellow brown, damp, hard, fine grained sand, some silt, poorly cemented, friable.	DS
155										
	35			S-3	20 50/6"				@ 35': SANDSTONE, light yellow brown, damp, hard, fine grained sand, trace gravel.	
150										
	40			R-5	11 50/6"	97	10		@ 40': SANDSTONE, light yellow brown, damp, hard, fine grained sand, trace gravel, poorly cemented, friable, iron nodules and concretions.	
145										
	45			S-4	15 12 25				@ 45': SANDSTONE/CLAYSTONE, dark brown with yellow and grey mottling, damp, hard, fine grained sand, thinly bedded, poorly cemented, friable.	
140									@ 50': SANDSTONE/CLAYSTONE, mottled dark brown with yellow and grey, damp, hard, fine grained sand, chaotic assemblage of sandstone and claystone, disrupted bedding, poorly cemented, trace fine gravel.	
	50			R-6	50/4"					
135									Total depth of boring: 50.5 feet No groundwater was encountered during drilling Borehole backfilled with soil cuttings and tamped	
	55									
130										
	60									

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

SAMPLE TYPES:

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

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200 % FINES PASSING	
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX		
CR	CORROSION	RV	R VALUE		

GEOTECHNICAL BORING LOG B-4

Date 3-27-08 **Sheet** 1 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 170' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			Bag-1					**BEDROCK: Monterey Formation (Tm), weathered** @ 0': Sandy CLAYSTONE, dark brown, damp, fine grained sand. **BEDROCK: Monterey Formation (Tm)** @ 1': Clayey Gravelly SANDSTONE, dark brown, damp, hard/dense, fine grained sand, fine gravel.	
165	5			R-1	22 25 32	120	7		@ 5': Clayey Gravelly SANDSTONE, dark brown, damp, hard/dense, fine grained sand, fine gravel. @ 7': Encounter gravel bed.	
160	10			R-2	41 50/5"	101	6		@ 10': Silty SANDSTONE, orange brown, moist, very dense, fine grained sand some siltstone rock fragments.	
155	15			S-1	21 30 35				@ 15': SANDSTONE, light orange brown, damp, moderately hard, fine grained sand, very poorly cemented, friable, breaks down in hand.	
150	20			R-3	13 50/5"	98	6		@ 20': SANDSTONE, orange brown, damp, hard, fine grained sand, fractured, fractures well healed with dark reddish brown clay, poorly cemented, friable.	
				Bag-2						
145	25			S-2	17 28 33				@ 25': SANDSTONE, hard, yellow grey, damp, fine grained sand, poorly cemented, friable.	
140	30									

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

TYPE OF TESTS:
DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG B-4

Date 3-27-08 **Sheet** 2 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 170' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-4	37 50/3"	89	22		@ 30': Clayey SANDSTONE, orange brown, damp, hard, fine grained sand, poorly cemented, friable, contains olive brown siltstone rock fragments.	
135	35			S-3	7 22 22				@ 35': SANDSTONE interbedded with shale, damp, hard, fine grained sand.	
130	40			R-5	9 36 45	90	26		@ 40': SANDTONE, grey brown with yellow motting, damp, hard, fine grained sand, massive to thinly bedded clayey sandy silt, slightly fractured, fractures well healed with dark brown clay, some manganese development along fractures.	
125	45								Total depth of boring: 41.5 feet No groundwater was encountered during drilling Borehole backfilled with soil cuttings and tamped	
120	50									
115	55									
110	60									

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE
-200 % FINES PASSING
AL ATTERBERG LIMITS

GEOTECHNICAL BORING LOG B-5

Date 3-27-08 **Sheet** 1 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 165' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								**BEDROCK: Monterey Formation (Tm)**	
									@0': Sandy CLAYSTONE, dark brown, moist, fine grained sand.	
									@ 1': Sandy CLAYSTONE to Clayey SANDSTONE, dark brown, moist, dense, fine grained sand.	
160	5			R-1	11 20 35	124	11		@ 5': Sandy CLAYSTONE to Clayey SANDSTONE, dark brown, moist, dense, fine grained sand.	
155	10			R-2	9 15 38	82	35		@ 10': SANDSTONE to thinly bedded Clayey SILTSTONE, olive orange brown, damp, hard, fine grained sand, thinly bedded siltstone within massive sandstone, sandstone moderately fractured, fractures well healed with iron oxide.	
150	15			R-3	11 21 50/3"	82	34		@ 15': SANDSTONE to thinly bedded Clayey SILTSTONE, olive orange brown, damp, hard, fine grained sand, alternating thin beds of sandstone and siltstone, highly weathered and oxidized, moderate fracturing, fractures well healed with iron oxide and manganese.	
145	20			S-1	6 7 11				@ 20': SANDSTONE, light orange brown, damp, moderately hard, fine grained sand, trace amount of clay in matrix, poorly cemented, friable, highly oxidized, massive.	
140	25			R-4	6 27 33	108	11		@ 25': SANDSTONE, orange brown, moist, dense, fine grained sand, poorly cemented, highly oxidized, friable, massive.	
135	30								@ 30': SANDSTONE, white grey, damp, hard, fine grained sand, poorly cemented, friable.	

SAMPLE TYPES:

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

TYPE OF TESTS:

DS DIRECT SHEAR SA SIEVE ANALYSIS -200 % FINES PASSING
MD MAXIMUM DENSITY SE SAND EQUIVALENT AL ATTERBERG LIMITS
CN CONSOLIDATION EI EXPANSION INDEX
CR CORROSION RV R VALUE

GEOTECHNICAL BORING LOG B-5

Date 3-27-08 **Sheet** 2 **of** 2

Project 602184-001 Proposed Newport Beach City Hall **Logged / Sampled By** SP

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Auto-Hammer **Drop** 30"

Elevation Top of Hole 165' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			S-2	25 50/6"					
130	35								Total depth of boring: 31 feet No groundwater was encountered during drilling Borehole backfilled with soil cuttings and tamped	
125	40									
120	45									
115	50									
110	55									
105	60									

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

SAMPLE TYPES:

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

TYPE OF TESTS:

- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- EI EXPANSION INDEX
- RV R VALUE
- -200 % FINES PASSING
- AL ATTERBERG LIMITS

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	185'	Trench No.	TS-1
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES: U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
	Quaternary Terrace Deposits (Qt) @0': CLAY with sand, dark brown, moist, stiff, fine grained sand, abundant roots within the upper 2.5 feet. **Tertiary Monterey Formation (Tm)** @3': Silty SANDSTONE, mottled brown, grey and orange brown, moist, fine grained sand, trace amount of clay. @8': Silty SANDSTONE, brown, moist, fine grained sand. @12': SANDSTONE, mottled white and tan brown, damp, fine grained sand, noncohesive, some silt. Total depth: 14.3 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.	Quaternary Terrace Deposits (Qt) Tertiary Monterey Formation (Tm)	CL	Bag-1 @ 5'-6'			

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: Flat TREND: N45W

Log of Trench No. TS-1

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	185'	Trench No.	TS-2
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
	Quaternary Terrace Deposits (Qt) @0': Silty SAND with clay, brown, dry, fine grained sand, abundant roots. @1.3': CLAY, dark brown, moist, some fine grained sand. @2.7': SAND with silt, light brown, moist, fine grained sand. @3': **Tertiary Monterey Formation (Tm)** @7.8': Silty SANDSTONE, mottled red brown and grey, moist, fine to medium grained sand. @8': Encounter well rounded cobbles. @9': SANDSTONE, light yellow, moist, very dense, fine grained sand, massive, thin fractures well healed with brown clay. Total depth: 10.3 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.	Quaternary Terrace Deposits (Qt) Tertiary Monterey Formation (Tm)	SM CL SP	Bag-1 @ 3'-5' Bag-2 @ 9'-10'			MD

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: Flat TREND: N60W

Log of Trench No. TS-2

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	191'	Trench No.	TS-3
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
	Quaternary Terrace Deposits (Qt)	Quaternary Terrace Deposits		Bag-1 @ 0'-2'			
	@0': CLAY, dark brown, moist, some fine grained sand, abundant roots within the upper foot.		CL				
	@2.8': Silty SAND, tan brown mottled with grey brown silty clay, moist, fine grained sand, some fine angular siltstone gravel.		SM	Bag-2 @ 3'-5'			
	@6': Clayey SAND, brown, moist, fine grained sand.		SC				
	Tertiary Monterey Formation (Tm)	Tertiary Monterey Formation (Tm)					
	@8.5': SANDSTONE, tan brown, damp, fine grained sand, non-cohesive.						
	@11': Silty SANDSTONE, brown, moist, fine grained sand.						
	@13': SANDSTONE, white and orange brown, fine grained sand, interbedd with thin beds of siltstone.						
	Total depth: 13.5 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.						

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: Flat TREND:N40W

Log of Trench No. TS-3

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	193'	Trench No.	TS-4
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES: U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
	Quaternary Terrace Deposits (Qt) @0': CLAY, dark brown, very moist, some fine grained sand, abundant roots within the upper foot. @1.6': Silty SAND, light grey mottled with orange brown, moist, fine grained sand, oxidized. @5-6': **Tertiary Monterey Formation (Tm)** @6.5': Encounter well rounded cobbles. @9': SANDSTONE, light tan brown, moist, very dense, fine grained sand, thin to thick interbeds of white sandstone. Total depth: 11.5 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.	Quaternary Terrace Deposits Tertiary Monterey Formation (Tm)	CL SM	Bag-1 @ 5'-6'			

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: Flat TREND: N50W

Log of Trench No. TS-4

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	172'	Trench No.	TS-5
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES				
			U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
Contact: N35E 5W	**Tertiary Monterey Formation ™** @0': Silty SANDSTONE, tan white, dry, fine grained sand, abundant roots. @0.4': CLAYSTONE, dark brown, damp, fine grained sand, trace roots, blocky paleosol fracturing. @1.6': Clayey SANDSTONE, dark brown, damp, fine grained sand. @2.5': Gravelly Silty SANDSTONE, brown, moist, medium grained sand, large angular and well rounded gravel. @3.7': Interbedded fine grained, white tan SANDSTONE and oxidized orange brown SILTSTONE, moist. @7.5': Encounter small boulders. @8': SANDSTONE, tan white, damp, fine grained sand, friable, moderately cemented. Total depth: 10.0 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.	Tertiary Monterey Formation (Tm)		Bag-1 @ 5'-6'			

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: 5H:1V TREND: N50E

Log of Trench No. TS-5

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	163'	Trench No.	TS-6
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES				
			U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
	Tertiary Monterey Formation ™ @0': Silty SANDSTONE, brown, dry, fine grained sand, abundant roots. @0.9': Sandy CLAYSTONE, dark brown, dry, fine grained sand. @3': Silty SANDSTONE, tan brown, dry, fine grained sand, well cemented. @8.5': End of well cemented zone. @11': Silty SANDSTONE, moist, fine to medium grained sand. Total depth: 15.0 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.	Tertiary Monterey Formation (Tm)					

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: Flat TREND: N50W

Log of Trench No. TS-6

Project Name:	Newport Beach City Hall	Logged by:	CDL		
Project Number:	602184-001	Elevation:	161'	Trench No.	TS-7
Equipment:	Backhoe with 24-inch bucket	Location:	See Boring Location Map		

GEOLOGIC ATTITUDES	DATE: March 27, 2008 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)	Other Tests
	Tertiary Monterey Formation ™ @0': Silty SANDSTONE, light brown, fine grained sand, dry, abundant roots. @1.5': Silty SANDSTONE, dark brown, moist, fine grained sand, some roots. @2.3': Silty SANDSTONE, light brown, dry, fine grained sand. @3.1': Clayey SANDSTONE, dark brown, moist, fine grained sand. @5': Sandy CLAYSTONE, mottled dark brown and light brown, moist, fine grained sand. @9': Clayey SANDSTONE, brown, moist, fine grained sand. @11': Silty SANDSTONE, brown, moist, fine grained sand. @14': Encounter small boulders, well rounded. Total depth: 16.5 feet, no groundwater was encountered, the test pit was backfilled and the surface compacted by rubber tire equipment.	Tertiary Monterey Formation (Tm)		Bag-1 @ 0'-5' Bag-2 @ 5'-6'			E.I.

GRAPHIC PRESENTATION SCALE: 1" = 5' SURFACE SLOPE: Flat TREND: N55W

Log of Trench No. TS-7

APPENDIX B

LABORATORY RESULTS FROM 2008

Boring No.	B-1	B-1	B-1	B-1	B-2	B-2	B-2	B-2
Sample No.	R-1	R-2	R-4	R-5	R-1	R-3	R-4	R-5
Depth (ft.)	5.0	10.0	30.0	40.0	5.0	15.0	25.0	35.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Brown lean clay (CL)	Olive brown silty sand (SM)	Olive brown silty sand (SM)	Olive brown silty sand (SM)	Brown silty clay (CL-ML)	Brown silty clay (CL-ML)	Light brown silty sand (SM)	Light brown silty sand (SM) / V. LOOSE
Pocket Penetrometer (tons/ft^2)	>4.5	2.75	1.75	4.00	>4.5	2.25	3.50	N/A
Weight Soil + Rings / Tube (g)	1020.78	818.82	1014.47	1077.99	1094.15	883.15	1027.90	1113.06
Weight of Rings / Tube (g)	222.00	222.00	266.40	266.40	266.40	266.40	266.40	266.40
Average Length (in.)	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	232.88	264.22	191.18	183.80	230.46	179.53	172.86	292.84
Dry Wt. of Soil + Cont. (g)	212.30	256.78	187.67	170.41	206.97	149.82	169.27	286.16
Weight of Container (g)	38.87	38.88	38.99	39.02	39.13	39.61	38.35	38.84
Container No.								
Wet Density	132.8	99.2	103.6	112.4	114.6	85.4	105.5	117.3
Moisture Content (%)	**11.9**	**3.4**	**2.4**	**10.2**	**14.0**	**27.0**	**2.7**	**2.7**
Dry Density (pcf)	**118.7**	**95.9**	**101.2**	**102.0**	**100.6**	**67.3**	**102.6**	**114.2**
Degree of Saturation (%)	76.2	12.2	9.6	42.2	55.9	48.4	11.5	15.3

Leighton

MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-001
Client Name: LCI / Irvine
Tested By: S. Felter Date: 04/08/08

Boring No.	B-2	B-3	B-3	B-3	B-3	B-4	B-4	B-4
Sample No.	R-6	R-1	R-2	R-3	R-5	R-1	R-2	R-3
Depth (ft.)	45.0	5.0	10.0	20.0	40.0	5.0	10.0	20.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Olive brown silty sand (SM)	Brown silty sand (SM)	Brown silty sand (SM)	Brownish gray silty sand (SM)	Light brown silty sand (SM)	Brown sandy silt s(ML)	Brown silty sand (SM)	Brown silty sand (SM)
Pocket Penetrometer (tons/ft^2)	1.50	>4.5	>4.5	>4.5	>4.5	>4.5	>4.5	>4.5
Weight Soil + Rings / Tube (g)	1013.17	901.39	1068.70	1084.20	1040.90	1192.67	1035.15	1017.84
Weight of Rings / Tube (g)	266.40	222.00	266.40	266.40	266.40	266.40	266.40	266.40
Average Length (in.)	6.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	282.70	164.65	242.09	215.74	206.60	193.57	202.33	230.69
Dry Wt. of Soil + Cont. (g)	272.15	156.29	231.54	187.35	191.09	183.78	193.39	220.14
Weight of Container (g)	38.81	38.64	38.38	38.86	38.38	39.68	38.50	39.07
Container No.								
Wet Density	103.4	112.9	111.1	113.3	107.3	128.3	106.5	104.1
Moisture Content (%)	**4.5**	**7.1**	**5.5**	**19.1**	**10.2**	**6.8**	**5.8**	**5.8**
Dry Density (pcf)	**99.0**	**105.4**	**105.4**	**95.1**	**97.4**	**120.1**	**100.7**	**98.3**
Degree of Saturation (%)	17.4	32.0	24.6	66.8	37.5	45.5	23.1	22.0

Leighton

MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-001
Client Name: LCI / Irvine
Tested By: S. Felter Date: 04/08/08

Boring No.	B-4	B-4	B-5	B-5	B-5	B-5		
Sample No.	R-4	R-5	R-1	R-2	R-3	R-4		
Depth (ft.)	30.0	40.0	5.0	10.0	15.0	25.0		
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive		
Soil Identification	Brown silt (ML)	Brown silt with sand (ML)s	Brown silty clay (CL-ML)	Olive gray silty clay (CL-ML)	Brown silty clay (CL-ML)	Brown silt with sand (ML)s		
Pocket Penetrometer (tons/ft^2)	>4.5	>4.5	>4.5	>4.5	>4.5	>4.5		
Weight Soil + Rings / Tube (g)	878.71	1084.91	1046.83	889.59	1060.07	1130.15		
Weight of Rings / Tube (g)	222.00	266.40	222.00	222.00	266.40	266.40		
Average Length (in.)	5.00	6.00	5.00	5.00	6.00	6.00		
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416		
Wet. Wt. of Soil + Cont. (g)	208.89	195.64	285.42	168.38	196.01	201.66		
Dry Wt. of Soil + Cont. (g)	178.01	163.08	261.54	134.73	156.48	185.72		
Weight of Container (g)	38.62	39.34	38.58	38.26	38.93	38.13		
Container No.								
Wet Density	109.1	113.4	137.1	110.9	109.9	119.6		
Moisture Content (%)	**22.2**	**26.3**	**10.7**	**34.9**	**33.6**	**10.8**		
Dry Density (pcf)	**89.3**	**89.7**	**123.8**	**82.3**	**82.3**	**108.0**		
Degree of Saturation (%)	67.5	80.9	80.0	89.8	86.5	52.0		

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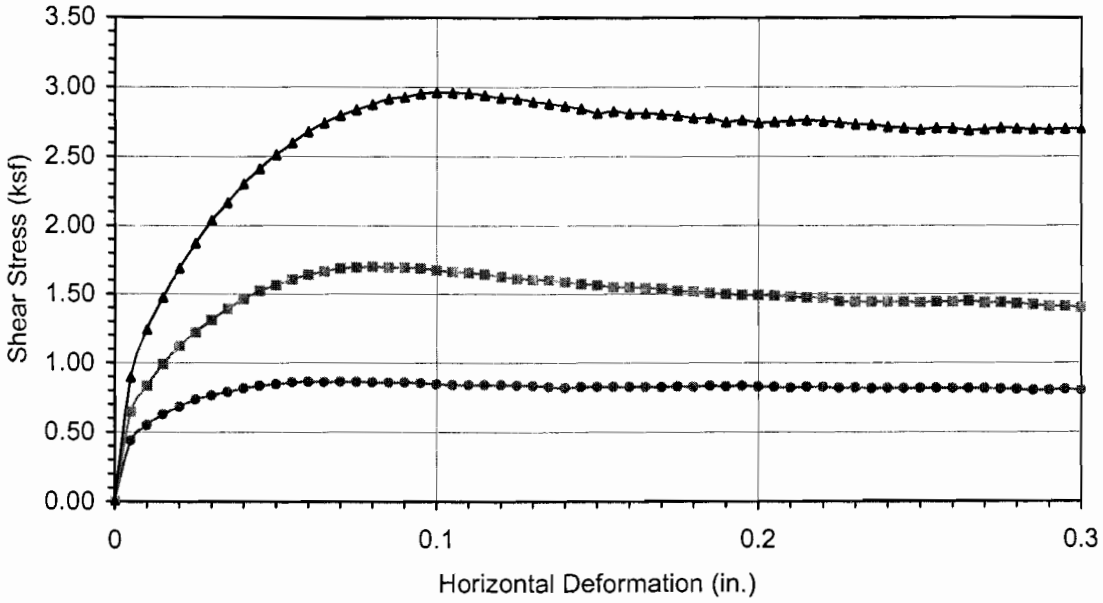
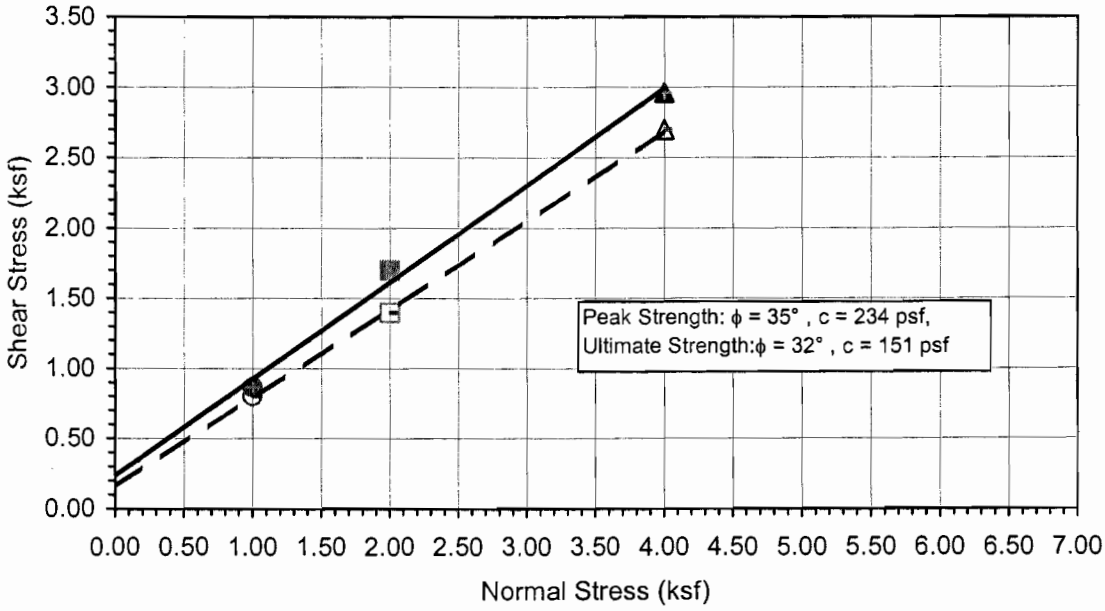
MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-001
Client Name: LCI / Irvine
Tested By: S. Felter Date: 04/08/08





Boring No.	**B-1**
Sample No.	**R-3**
Depth (ft)	**20**
Sample Type:	
Drive	
Soil Identification:	
Yellowish brown silty sand'stone' (SM)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.864	■ 1.699	▲ 2.959
Shear Stress @ End of Test (ksf)	○ 0.801	□ 1.398	△ 2.698
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	3.40	3.40	3.40
Dry Density (pcf)	99.5	101.2	102.3
Saturation (%)	13.3	13.8	14.2
Soil Height Before Shearing (in.)	0.9988	0.9982	0.9964
Final Moisture Content (%)	19.5	20.0	18.3

Leighton

DIRECT SHEAR TEST RESULTS

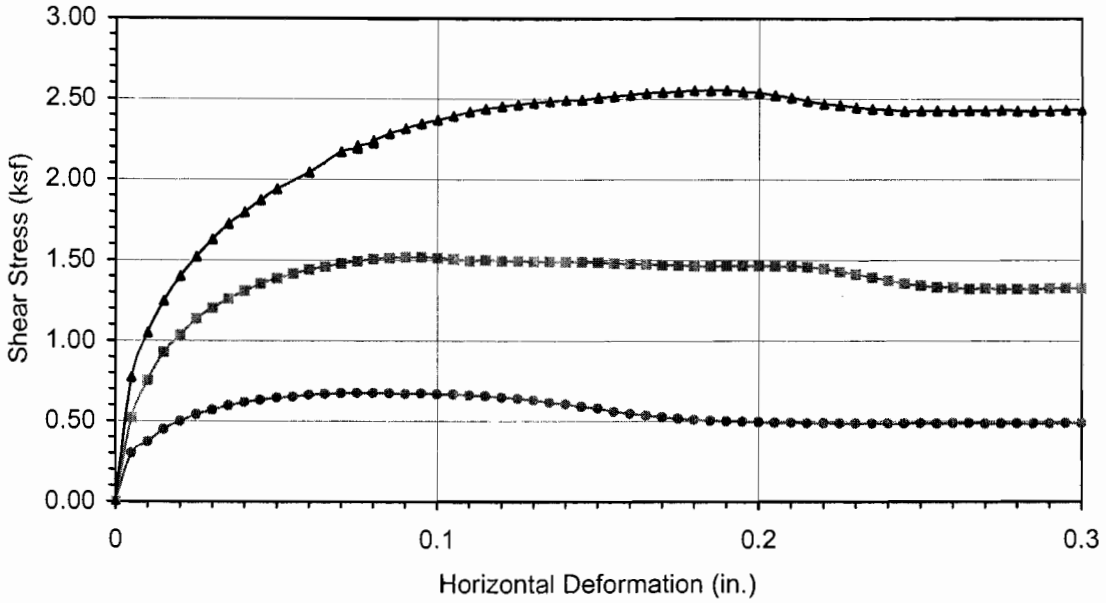
Consolidated Undrained

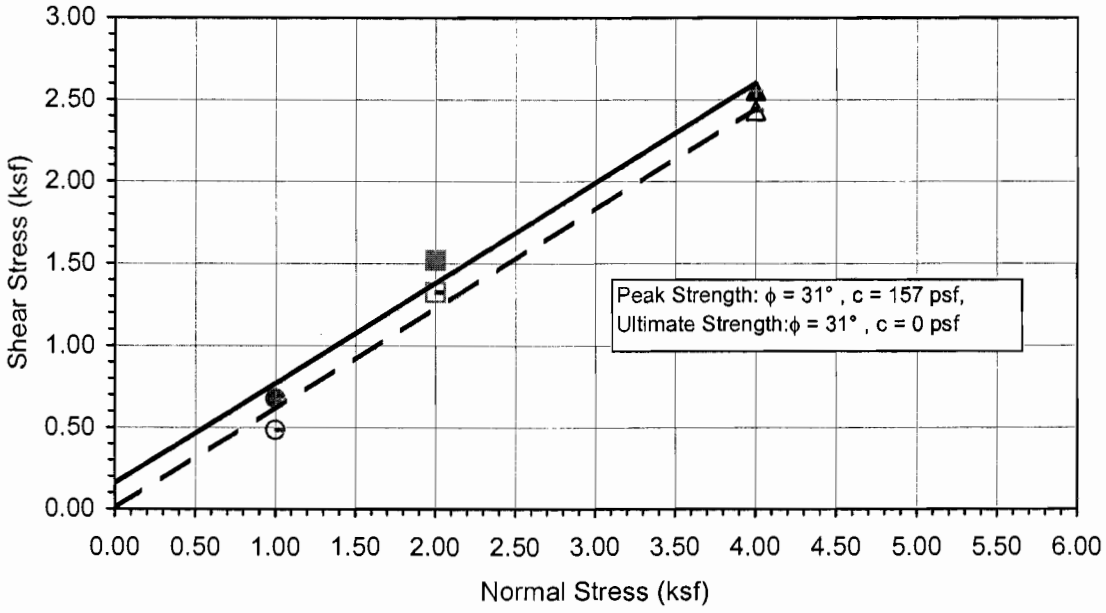
Project No.: 602184-001

Newport Beach City Hall

04-08

DS B-1 R-3.xls





Boring No.	**B-2**
Sample No.	**R-2**
Depth (ft)	**10**
Sample Type: Drive	
Soil Identification: Yellowish brown sandy silt s(ML)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.675	■ 1.518	▲ 2.554
Shear Stress @ End of Test (ksf)	○ 0.484	□ 1.324	△ 2.434
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	6.21	6.21	6.21
Dry Density (pcf)	101.4	99.8	99.6
Saturation (%)	25.4	24.4	24.2
Soil Height Before Shearing (in.)	0.9931	0.9822	0.9842
Final Moisture Content (%)	19.9	20.7	20.9

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DIRECT SHEAR TEST RESULTS

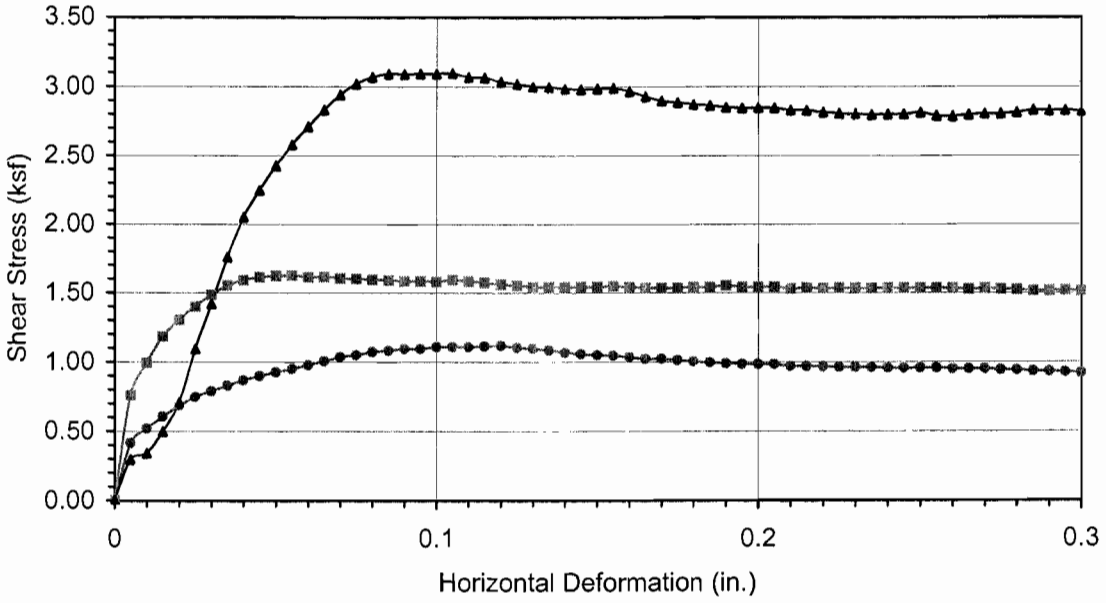
Consolidated Undrained

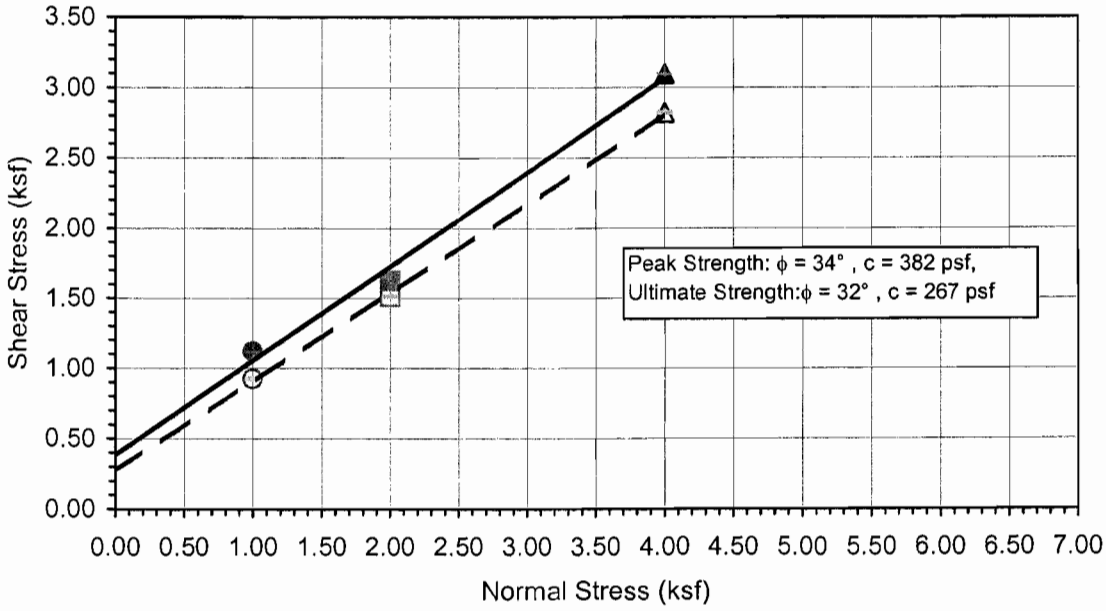
Project No.: 602184-001

Newport Beach City Hall

04-08

DS B-2 R-2.xls





Boring No.	**B-3**
Sample No.	**R-4**
Depth (ft)	**30**
Sample Type:	
Drive	
Soil Identification:	
Yellowish brown silty clay (CL-ML)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.116	■ 1.625	▲ 3.094
Shear Stress @ End of Test (ksf)	○ 0.921	□ 1.512	△ 2.821
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.24	9.24	9.24
Dry Density (pcf)	97.4	102.3	106.7
Saturation (%)	34.2	38.5	43.0
Soil Height Before Shearing (in.)	0.9847	0.9772	0.9734
Final Moisture Content (%)	30.8	27.4	26.9

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DIRECT SHEAR TEST RESULTS

Consolidated Undrained

Project No.: 602184-001

Newport Beach City Hall

04-08

DS B-3 R-4.xls

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Newport Beach City Hall	Tested By:	G. Berdy	Date:	04/10/08
Project No. :	602184-001	Checked By:	LF	Date:	05/19/09
Boring No.:	TS-7	Depth (ft.)	6-7		
Sample No. :	Bag-2				
Soil Identification:	Olive brown sandy lean clay s(CL)				

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

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0280
Wt. Comp. Soil + Mold	(g)	587.10	432.30
Wt. of Mold	(g)	190.30	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	798.10	622.60
Dry Wt. of Soil + Cont.	(g)	725.50	551.00
Wt. of Container	(g)	0.00	190.30
Moisture Content	(%)	10.01	19.85
Wet Density	(pcf)	119.7	126.8
Dry Density	(pcf)	108.8	105.8
Void Ratio		0.549	0.593
Total Porosity		0.355	0.372
Pore Volume	(cc)	73.4	79.2
Degree of Saturation (%) [S_{meas}]		**49.2**	90.4

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

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/10/08	14:10	1.0	0	0.0725
04/10/08	14:20	1.0	10	0.0720
Add Distilled Water to the Specimen				
04/10/08	14:25	1.0	5	0.0845
04/11/08	7:30	1.0	1030	0.1005
04/11/08	8:39	1.0	1099	0.1005

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	29

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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Newport Beach City Hall	Tested By :	G. Berdy	Date:	04/11/08
Project No.:	602184-001	Input By :	J. Ward	Date:	05/19/09
Boring No.:	TS-2	Depth (ft.)	9-10		
Sample No. :	Bag-2				
Soil Identification:	Olive yellow poorly-graded sand with silt (SP-SM)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

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

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3736.0	3794.0	3861.0	3842.0		
Weight of Mold (g)	1885.0	1885.0	1885.0	1885.0		
Net Weight of Soil (g)	1851.0	1909.0	1976.0	1957.0		
Wet Weight of Soil + Cont. (g)	353.00	354.60	374.20	416.50		
Dry Weight of Soil + Cont. (g)	330.70	326.20	337.70	367.70		
Weight of Container (g)	53.90	54.40	54.30	54.20		
Moisture Content (%)	8.06	10.45	12.88	15.57		
Wet Density (pcf)	122.5	126.4	130.8	129.6		
Dry Density (pcf)	113.4	114.4	115.9	112.1		

Maximum Dry Density (pcf) 116.0 **Optimum Moisture Content (%)** 13.0

PROCEDURE USED

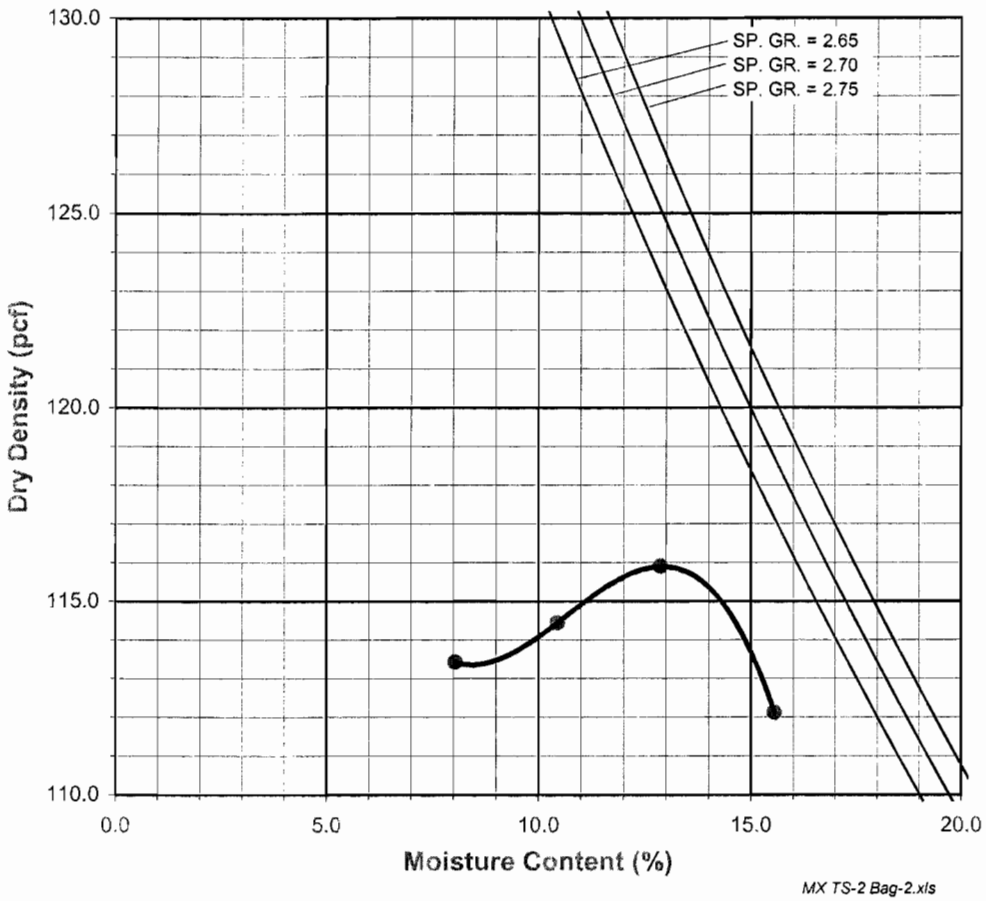
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

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

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

Particle-Size Distribution:
GR:SA:FI

Atterberg Limits:
LL,PL,PI



MX TS-2 Bag-2.xls

LABORATORY RESULTS FROM 2009

Boring No.	BA-1	BA-1	BA-1	BA-1	BA-1	BA-1	BA-1	NB-1
Sample No.	R-1	R-3	R-5	R-6	R-7	R-9	R-11	R-1
Depth (ft.)	5.0	15.0	25.0	30.0	35.0	45.0	55.0	5.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Brown silty sand (SM)	Orange brown silty sand (SM)	Grayish white silty sand (SM)	Grayish brown lean clay with sand & grayish white silty sand (CL)s & (SM)	Grayish white silty sand (SM)	Light brown silty sand (SM)	Brown silty sand (SM)	Orange brown silty sand (SM)
Pocket Penetrometer (tons/ft^2)	>4.50	>4.50	3.75	>4.50	2.00	3.75	1.25	>4.50
Weight Soil + Rings / Tube (g)	1228.25	1059.51	1092.99	1066.37	850.11	1067.83	875.15	1139.42
Weight of Rings / Tube (g)	266.40	266.40	266.40	266.40	222.00	266.40	222.00	266.40
Average Length (in.)	6.00	6.00	6.00	6.00	5.00	6.00	5.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	221.41	198.02	193.46	191.73	222.73	193.06	167.01	183.75
Dry Wt. of Soil + Cont. (g)	204.90	187.22	187.57	170.84	214.27	186.04	157.31	173.65
Weight of Container (g)	38.71	38.93	38.61	38.93	38.74	38.81	39.31	39.31
Container No.								
Wet Density	133.2	109.8	114.5	110.8	104.4	111.0	108.5	120.9
Moisture Content (%)	**10**	**7**	**4**	**16**	**5**	**5**	**8**	**8**
Dry Density (pcf)	**121**	**102**	**110**	**96**	**100**	**106**	**100**	**112**
Degree of Saturation (%)	68.6	30.4	20.1	56.1	18.8	21.8	32.6	40.7

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/25/09

Boring No.	NB-1	NB-1	NB-1	NB-1	NB-1	NB-1	NB-1	NB-2
Sample No.	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-1
Depth (ft.)	10.0	20.0	25.0	30.0	40.0	50.0	60.0	5.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Orange brown silty sand (SM)	Olive brown silty sand (SM)	Grayish white silty sand (SM)	Light brown silty sand (SM)	Orange brown silty sand (SM)	Brown silty sand (SM)	Brownish white (SM)g	Brown lean clay (CL)
Pocket Penetrometer (tons/ft^2)	>4.50	3.50	2.75	3.00	2.75	>4.50	>4.50	3.00
Weight Soil + Rings / Tube (g)	897.44	1043.55	1045.91	840.47	846.27	978.58	1053.97	900.08
Weight of Rings / Tube (g)	222.00	266.40	266.40	222.00	222.00	222.00	222.00	222.00
Average Length (in.)	5.00	6.00	6.00	5.00	5.00	5.00	5.00	5.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	297.07	175.01	172.69	254.83	256.80	314.07	339.00	264.22
Dry Wt. of Soil + Cont. (g)	277.13	168.14	165.16	242.50	242.92	274.69	304.65	234.91
Weight of Container (g)	38.93	39.11	38.61	38.81	38.74	39.02	39.72	38.86
Container No.								
Wet Density	112.3	107.6	108.0	102.8	103.8	125.7	138.3	112.7
Moisture Content (%)	**8**	**5**	**6**	**6**	**7**	**17**	**13**	**15**
Dry Density (pcf)	**104**	**102**	**102**	**97**	**97**	**108**	**122**	**98**
Degree of Saturation (%)	36.0	22.1	24.6	22.1	25.0	79.9	92.8	56.1

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/25/09

Boring No.	NB-2	NB-2	NB-2	NB-2	NB-2	NB-2	NB-2	NB-3
Sample No.	R-2	R-3	R-4	R-6	R-7	R-8	R-9	R-1
Depth (ft.)	10.0	20.0	30.0	50.0	60.0	70.0	80.0	5.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Brown silty sand (SM)	Orange brown silty sand (SM)	Grayish white silty sand (SM)	Olive brown silty clay (CL-ML)	Brown silty sand (SM)	Olive gray silty sand (SM)	Brown lean clay (CL)	Brown silty clay (CL-ML)
Pocket Penetrometer (tons/ft^2)	>4.50	>4.50	3.50	>4.50	2.75	0.75	>4.50	>4.50
Weight Soil + Rings / Tube (g)	1049.11	1084.32	861.18	1073.37	951.70	997.67	1142.24	1199.27
Weight of Rings / Tube (g)	266.40	266.40	222.00	266.40	222.00	222.00	266.40	266.40
Average Length (in.)	6.00	6.00	5.00	6.00	5.00	5.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	197.52	169.62	176.99	179.70	309.60	317.23	213.15	297.09
Dry Wt. of Soil + Cont. (g)	185.69	161.71	172.65	145.23	258.71	267.72	165.56	269.93
Weight of Container (g)	39.21	38.24	39.26	39.31	39.13	39.33	39.10	38.26
Container No.								
Wet Density	108.4	113.3	106.2	111.8	121.3	128.9	121.3	129.2
Moisture Content (%)	**8**	**6**	**3**	**33**	**23**	**22**	**38**	**12**
Dry Density (pcf)	**100**	**106**	**103**	**84**	**98**	**106**	**88**	**116**
Degree of Saturation (%)	32.0	29.7	13.8	88.0	87.9	99.0	111.3	69.2

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/25/09

Boring No.	NB-3	NB-3	NB-3	NB-3	NB-3	NB-3	NB-3	NB-3
Sample No.	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9
Depth (ft.)	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Light brown silty sand (SM)	Grayish brown silty clay (CL-ML)	Light gray silty sand (SM)	Grayish brown silty sand (SM)	Orange brown silty sand (SM)	Brown silty sand (SM)	Orange brown silty sand (SM)	Brown silty sand (SM)
Pocket Penetrometer (tons/ft^2)	2.50	>4.50	3.75	1.75	>4.50	>4.50	3.00	3.00
Weight Soil + Rings / Tube (g)	1015.76	1092.55	1043.80	1022.43	1080.05	1151.26	1195.21	1211.47
Weight of Rings / Tube (g)	266.40	266.40	266.40	266.40	266.40	266.40	266.40	266.40
Average Length (in.)	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	181.60	204.42	177.21	180.33	192.19	187.34	197.35	200.83
Dry Wt. of Soil + Cont. (g)	172.11	172.01	171.65	175.35	180.85	166.61	173.52	176.38
Weight of Container (g)	39.16	39.27	39.34	38.97	39.38	38.71	38.93	39.22
Container No.								
Wet Density	103.8	114.4	107.7	104.7	112.7	122.5	128.6	130.9
Moisture Content (%)	**7**	**24**	**4**	**4**	**8**	**16**	**18**	**18**
Dry Density (pcf)	**97**	**92**	**103**	**101**	**104**	**105**	**109**	**111**
Degree of Saturation (%)	26.0	79.1	18.0	14.7	35.1	73.1	88.1	93.0

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/25/09

Boring No.	NB-4	NB-4	NB-4	NB-4	NB-5	NB-5	NB-5	NB-5
Sample No.	R-1	R-2	R-3	R-4	R-1	R-2	R-3	R-4
Depth (ft.)	7.5	15.0	25.0	35.0	10.0	20.0	30.0	40.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Brown silty sand (SM)	Grayish brown silty sand (SM)	Light brown silty sand (SM)	Light brown silty sand (SM)	Brown silty sand (SM)	Brown silty sand (SM)	Brown silty sand (SM)	Brown silty sand (SM)
Pocket Penetrometer (tons/ft^2)	>4.50	4.00	4.25	2.25	>4.50	2.75	2.00	>4.50
Weight Soil + Rings / Tube (g)	1189.03	1203.97	1030.24	937.07	1189.31	934.55	1160.48	952.13
Weight of Rings / Tube (g)	266.40	266.40	222.00	222.00	266.40	222.00	266.40	222.00
Average Length (in.)	6.00	6.00	5.00	5.00	6.00	5.00	6.00	5.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	228.46	196.00	310.41	315.02	201.72	200.65	193.82	169.90
Dry Wt. of Soil + Cont. (g)	213.13	173.94	284.83	291.19	184.36	180.25	168.74	156.92
Weight of Container (g)	39.11	38.26	39.16	39.10	39.72	39.02	38.86	39.21
Container No.								
Wet Density	127.8	129.8	134.3	118.8	127.8	118.4	123.8	121.3
Moisture Content (%)	**9**	**16**	**10**	**9**	**12**	**14**	**19**	**11**
Dry Density (pcf)	**117**	**112**	**122**	**109**	**114**	**103**	**104**	**109**
Degree of Saturation (%)	54.6	86.2	72.9	46.2	67.9	62.0	83.5	54.9

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall

Project No.: 602184-002

Client Name: LCI / Irvine

Tested By: S. Felter Date: 03/26/09

Boring No.	NB-5	NB-5	NB-6	NB-6	NB-6	NB-6	NB-6	NB-6
Sample No.	R-5	R-6	R-1	R-2	R-3	R-4	R-5	R-6
Depth (ft.)	50.0	60.0	5.0	10.0	20.0	30.0	40.0	50.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Brown silty sand (SM)	Brown silty sand'stone' (SM)	Brown lean clay (CL) with organic material	Olive gray lean clay'stone' (CL)	Olive gray lean clay'stone' (CL), disturbed	Olive gray lean clay'stone' (CL)	Olive brown lean clay (CL)	Grayish brown lean clay (CL)
Pocket Penetrometer (tons/ft^2)	3.75	2.00	>4.50	>4.50	N/A	>4.50	>4.50	4.00
Weight Soil + Rings / Tube (g)	1159.21	1001.44	895.42	903.89	765.87	1027.62	1102.96	896.17
Weight of Rings / Tube (g)	266.40	222.00	222.00	222.00	177.60	266.40	266.40	222.00
Average Length (in.)	6.00	5.00	5.00	5.00	4.00	6.00	6.00	5.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	193.01	339.59	281.99	326.09	228.58	182.75	184.08	305.34
Dry Wt. of Soil + Cont. (g)	172.51	305.85	243.71	260.30	192.90	153.95	153.44	243.82
Weight of Container (g)	38.24	39.26	39.33	39.13	39.31	38.35	39.56	38.83
Container No.								
Wet Density	123.6	129.5	111.9	113.3	122.2	105.4	115.9	112.0
Moisture Content (%)	**15**	**13**	**19**	**30**	**23**	**25**	**27**	**30**
Dry Density (pcf)	**107**	**115**	**94**	**87**	**99**	**84**	**91**	**86**
Degree of Saturation (%)	72.2	73.3	64.2	86.4	89.6	67.5	85.8	84.8

Leighton

MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/26/09

Boring No.	NB-6	NB-7	NB-7	NB-7	NB-7	NB-8	NB-8	NB-8
Sample No.	R-7	R-1	R-2	R-3	R-4	R-1	R-2	R-3
Depth (ft.)	60.0	5.0	10.0	20.0	30.0	5.0	10.0	20.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Dark grayish brown lean clay'stone' (CL)	Orange brown silty sand (SM)	Orange brown silty sand (SM)	Brown silty sand (SM)	Grayish brown silty sand (SM)	Brown silty sand (SM)	Brown silty sand (SM)	Yellowish brown silty sand (SM)
Pocket Penetrometer (tons/ft^2)	>4.50	>4.50	>4.50	3.50	>4.50	>4.50	>4.50	>4.50
Weight Soil + Rings / Tube (g)	1074.47	1203.14	1196.66	1056.60	1120.59	1148.89	1080.26	1055.99
Weight of Rings / Tube (g)	266.40	266.40	266.40	266.40	266.40	266.40	266.40	266.40
Average Length (in.)	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	202.53	215.82	202.29	181.98	199.65	195.68	176.34	195.75
Dry Wt. of Soil + Cont. (g)	170.97	202.54	190.13	176.16	188.65	184.66	167.70	184.17
Weight of Container (g)	39.22	38.60	38.73	39.13	39.09	38.69	38.87	38.84
Container No.								
Wet Density	111.9	129.7	128.8	109.4	118.3	122.2	112.7	109.4
Moisture Content (%)	**24**	**8**	**8**	**4**	**7**	**8**	**7**	**8**
Dry Density (pcf)	**90**	**120**	**119**	**105**	**110**	**114**	**106**	**101**
Degree of Saturation (%)	74.6	54.1	52.5	18.9	37.5	42.2	30.4	32.4

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/26/09

Boring No.	NB-8	NB-8	NB-8	NB-8	NB-8	NB-8	NB-8	
Sample No.	R-4	R-5	R-6	R-7	R-8	R-9	R-10	
Depth (ft.)	25.0	35.0	40.0	50.0	60.0	70.0	80.0	
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	
Soil Identification	White, gray and brown mottled lean clay (CL)	Grayish brown silty sand (SM)	Grayish brown silty sand (SM)	Top: Orange (SM); Bot: Brown (CL)	Orange brown silty sand (SM)	Grayish brown silty sand (SM)	Orange brown silty sand (SM)	
Pocket Penetrometer (tons/ft^2)	>4.50	>4.50	3.50	3.50	>4.50	2.75	2.00	
Weight Soil + Rings / Tube (g)	1086.37	1097.32	1034.21	1092.72	1145.60	986.34	1002.88	
Weight of Rings / Tube (g)	266.40	266.40	266.40	266.40	266.40	222.00	222.00	
Average Length (in.)	6.00	6.00	6.00	6.00	6.00	5.00	5.00	
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	
Wet. Wt. of Soil + Cont. (g)	183.64	192.99	173.62	201.34	200.53	311.83	252.00	
Dry Wt. of Soil + Cont. (g)	148.11	174.00	156.83	177.32	171.33	264.96	213.54	
Weight of Container (g)	39.42	39.13	38.84	39.27	39.34	38.97	39.38	
Container No.								
Wet Density	113.6	115.1	106.3	114.4	121.8	127.0	129.8	
Moisture Content (%)	**33**	**14**	**14**	**17**	**22**	**21**	**22**	
Dry Density (pcf)	**86**	**101**	**93**	**97**	**100**	**105**	**106**	
Degree of Saturation (%)	91.0	56.7	47.4	64.4	86.5	93.0	101.8	

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Newport Beach City Hall
Project No.: 602184-002
Client Name: LCI / Irvine
Tested By: S. Felter Date: 03/26/09

Leighton

ATTERBERG LIMITS

ASTM D 4318

Project Name:	Newport Beach City Hall	Tested By:	A. Santos	Date:	03/24/09
Project No. :	602184-002	Input By:	J. Ward	Date:	03/31/09
Boring No.:	BA-1	Checked By:	J. Ward		
Sample No.:	Grab	Depth (ft.)	27.0		
Soil Identification:	Olive fat clay with sand (CH)s				

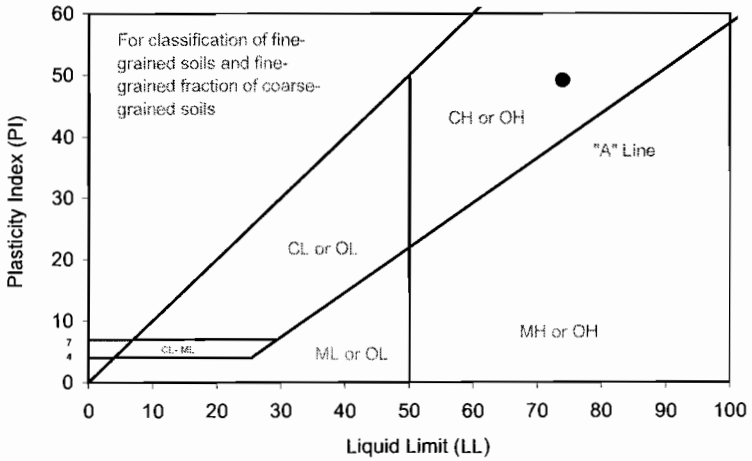
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	24	15	
Wet Wt. of Soil + Cont. (g)	9.81	9.45	18.90	21.34	21.19	
Dry Wt. of Soil + Cont. (g)	8.07	7.78	11.49	12.66	12.34	
Wt. of Container (g)	1.06	1.04	1.06	1.02	1.03	
Moisture Content (%) [Wn]	24.82	24.78	71.05	74.57	78.25	

Liquid Limit	**74**
Plastic Limit	**25**
Plasticity Index	**49**
Classification	**CH**

PI at "A" - Line = 0.73(LL-20) 39.42

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.12}$



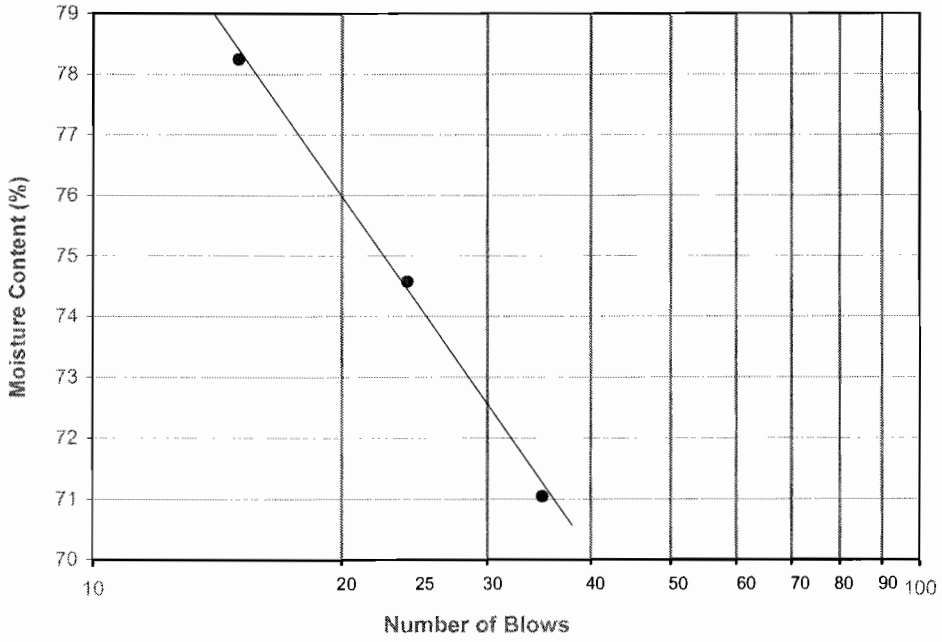
PROCEDURES USED

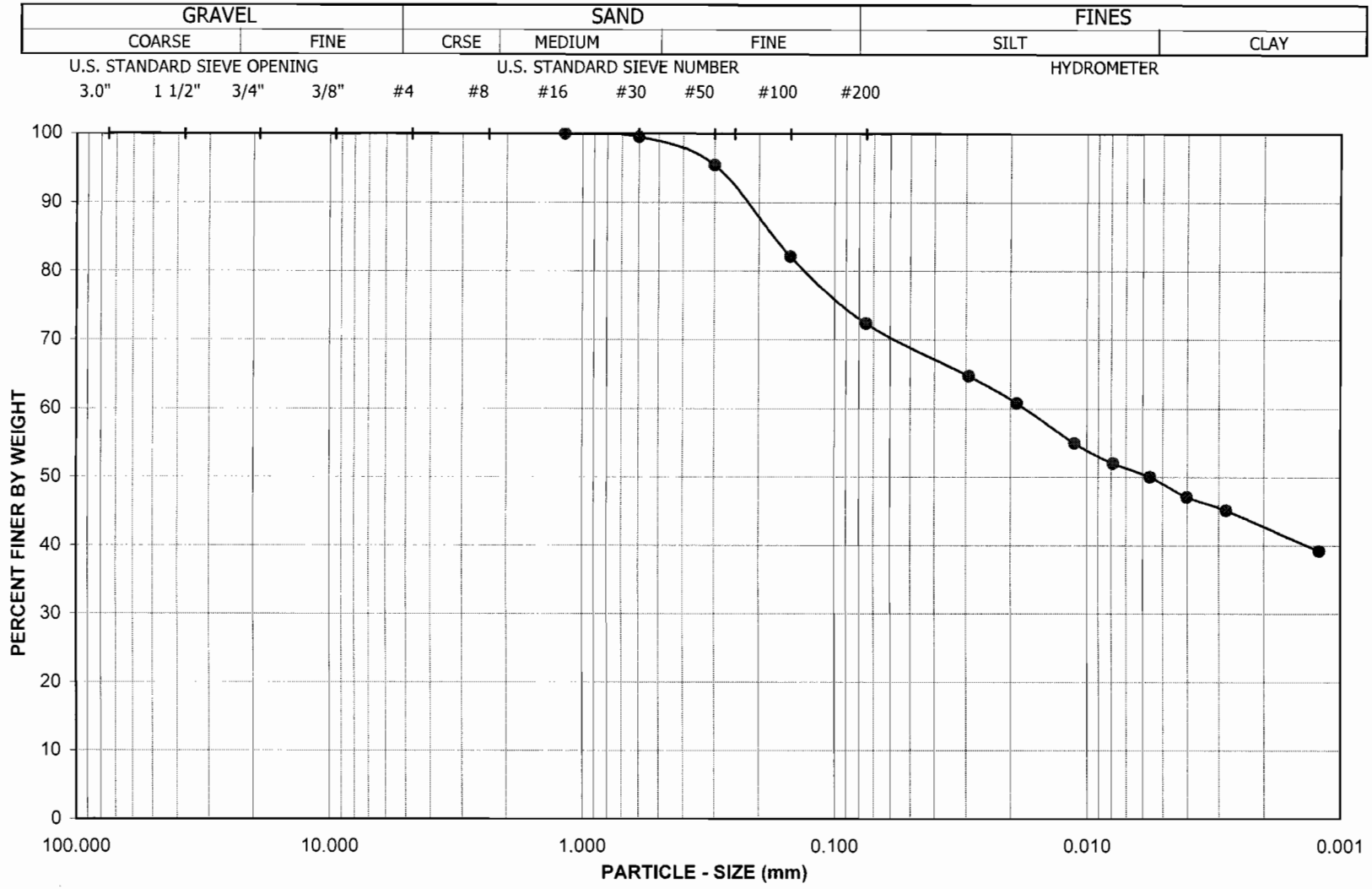
☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test





Project Name: Newport Beach City Hall

Project No.: 602184-002

Exploration No.: BA-1 Sample No.: Grab

Depth (feet) : 27.0 Soil Type : (CH)s

Soil Identification: Olive fat clay with sand (CH)s

GR:SA:FI : (%) 0 : 28 : 72

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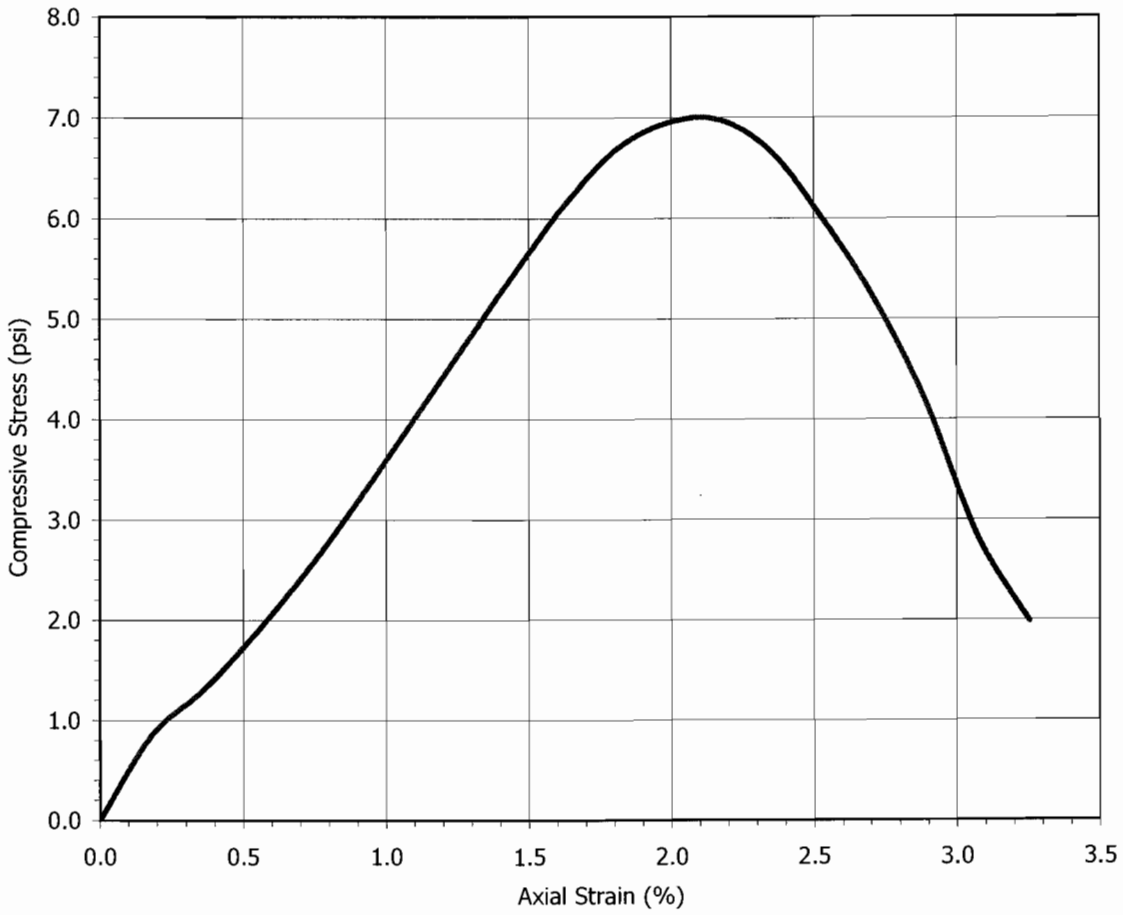
PARTICLE - SIZE DISTRIBUTION ASTM D 422

Mar-09

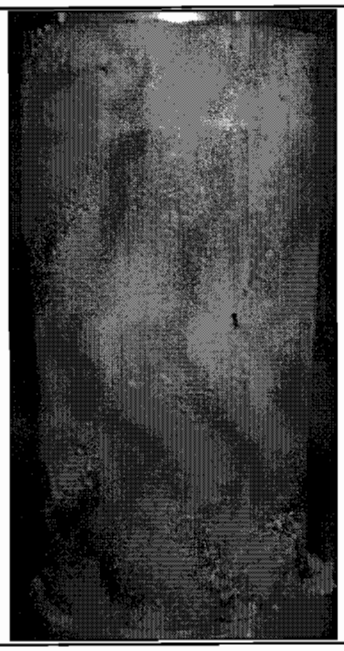


Boring No.:	BA-1
Sample No.:	R-12
Depth (ft):	60
Soil Type:	Drive
Sample Description:	Olive brown poorly-graded sand with silt (SP-SM)

Sample Diameter (in.)	2.416
Sample Height (in.)	5.533
Initial Moisture Content (%)	12.37
Dry Density (pcf)	107.2
Specific Gravity (assumed)	2.70
Saturation (%)	58.4
Rate of Deformation (in/min)	0.0120
Height / Diameter Ratio	2.29

At Failure

Compressive Strength (psi)	**6.98**
Axial Strain (%)	2.17



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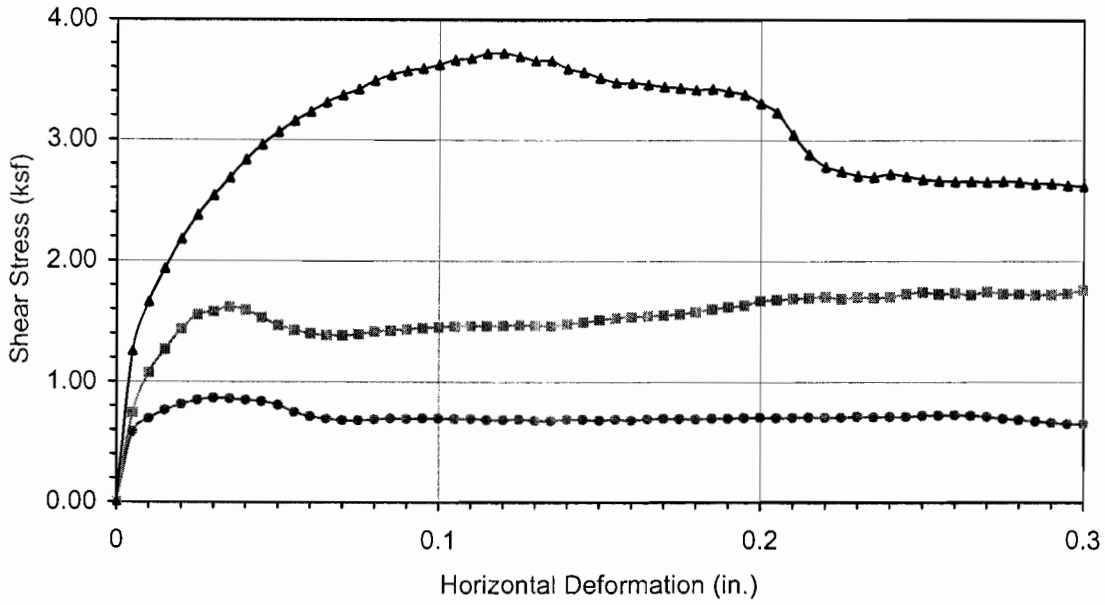
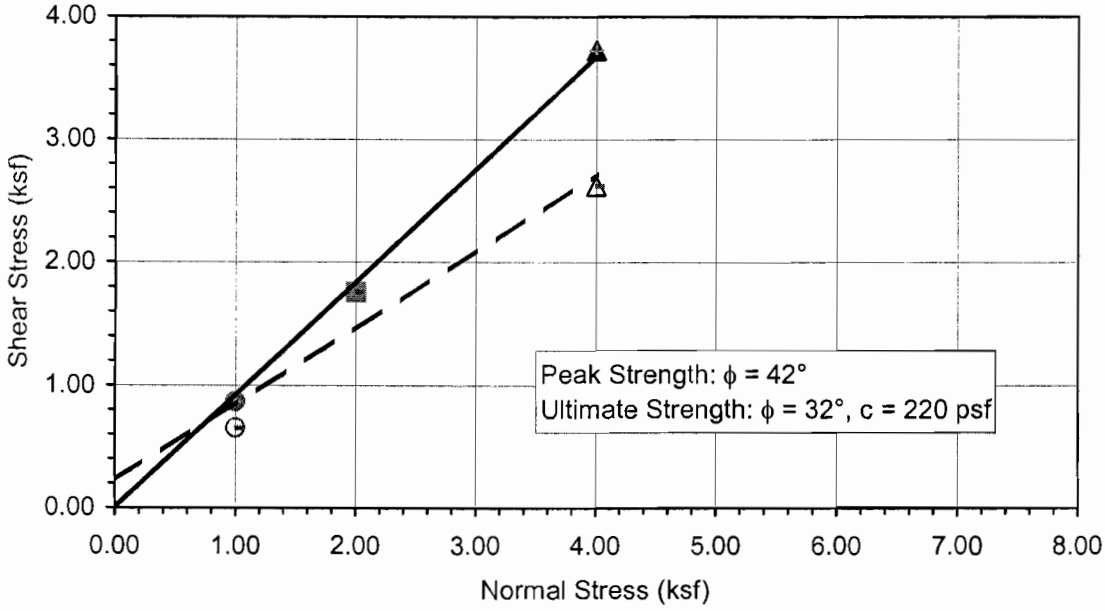
Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Project No.: **602184-002**

Newport Beach City Hall

03/27/09





Boring No.	**BA-1**
Sample No.	**R-8**
Depth (ft)	**40**
Sample Type:	
Drive	
Soil Identification:	
Pale yellow silty sand'stone' (SM)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.865	■ 1.757	▲ 3.722
Shear Stress @ End of Test (ksf)	○ 0.651	□ 1.757	△ 2.619
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	4.12	4.12	4.12
Dry Density (pcf)	108.4	112.7	113.3
Saturation (%)	20.1	22.4	22.8
Soil Height Before Shearing (in.)	0.9926	0.9927	0.9859
Final Moisture Content (%)	19.5	17.5	18.5

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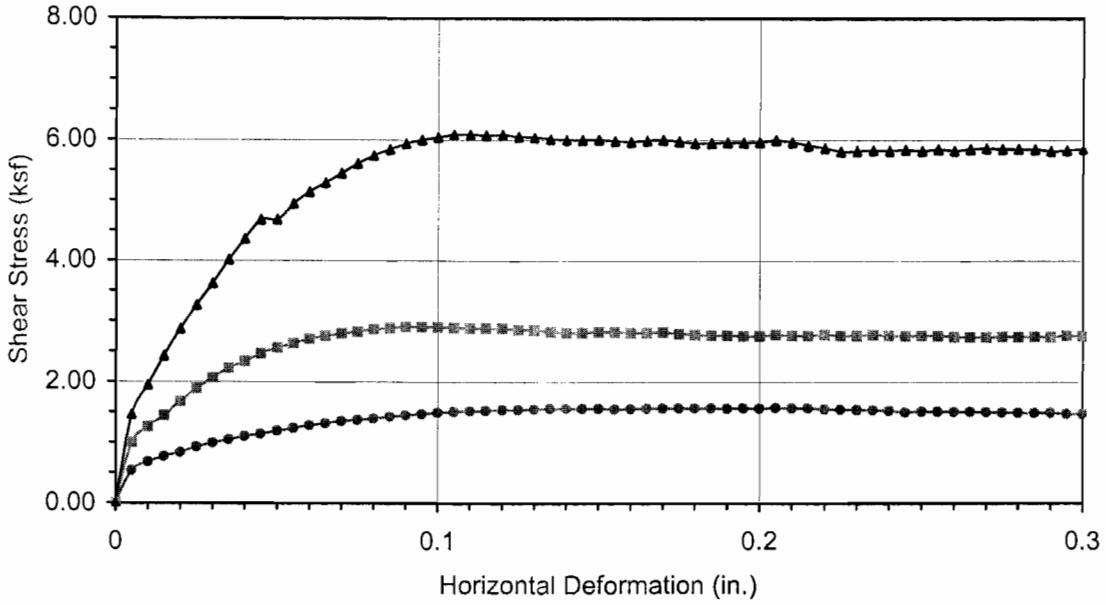
DIRECT SHEAR TEST RESULTS

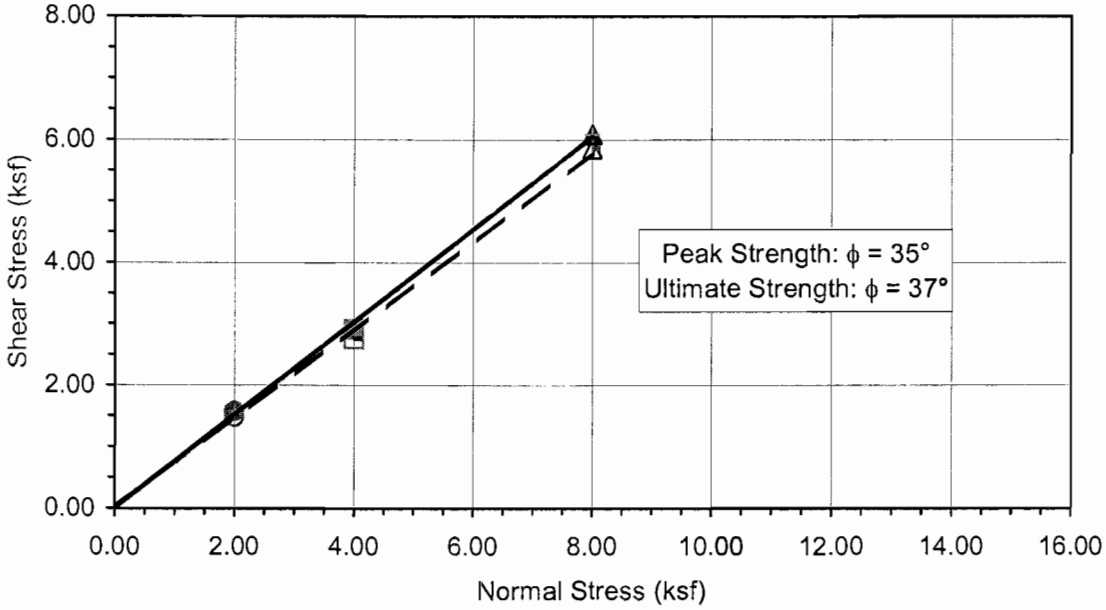
Consolidated Undrained

Project No.: 602184-002

Newport Beach City Hall

03-09





Boring No.	**NB-2**
Sample No.	**R-5**
Depth (ft)	**40**
Sample Type:	
Drive	
Soil Identification:	
Pale yellow silty sand (SM)	

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.569	■ 2.905	▲ 6.083
Shear Stress @ End of Test (ksf)	○ 1.474	□ 2.751	△ 5.851
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	3.73	3.73	3.73
Dry Density (pcf)	102.2	105.4	105.9
Saturation (%)	15.5	16.8	17.0
Soil Height Before Shearing (in.)	0.9843	0.9713	0.9561
Final Moisture Content (%)	20.0	18.2	16.9

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DIRECT SHEAR TEST RESULTS

Consolidated Undrained

Project No.: 602184-002

Newport Beach City Hall

03-09

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Newport Beach City Hall	Tested By:	G. Berdy	Date:	03/31/09
Project No. :	602184-002	Checked By:	J. Ward	Date:	04/01/09
Boring No.:	Combination of NB-1 (S-5, R-6), NB-2 (R-5, S-6, S-8) & NB-3 (R-5, S-6)	Depth (ft.)	35-45		
Sample No. :					
Soil Identification:	Yellow silty sand (SM)				

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

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	0.9995
Wt. Comp. Soil + Mold	(g)	560.10	401.40
Wt. of Mold	(g)	181.20	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	769.00	582.60
Dry Wt. of Soil + Cont.	(g)	689.70	521.00
Wt. of Container	(g)	0.00	181.20
Moisture Content	(%)	11.50	18.13
Wet Density	(pcf)	114.3	121.1
Dry Density	(pcf)	102.5	102.5
Void Ratio		0.645	0.644
Total Porosity		0.392	0.392
Pore Volume	(cc)	81.1	81.0
Degree of Saturation (%) [S_{meas}]		**48.2**	76.0

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

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
03/31/09	9:53	1.0	0	0.1545
03/31/09	10:03	1.0	10	0.1540
Add Distilled Water to the Specimen				
03/31/09	10:15	1.0	12	0.1540
04/01/09	7:10	1.0	1267	0.1540
04/01/09	8:11	1.0	1328	0.1540

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	0

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R-VALUE TEST RESULTS

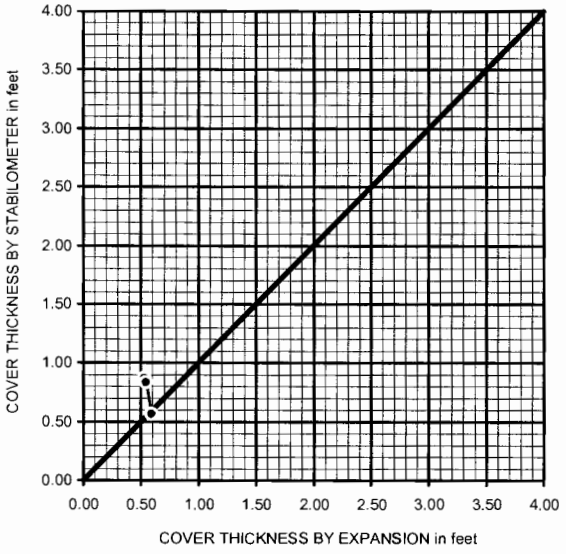
DOT CA 301

PROJECT NAME:	Newport Beach City Hall	PROJECT NUMBER:	602184-002
SAMPLE NUMBER:	BB-1	SAMPLE LOCATION:	BA-1 @ 0-5'
SAMPLE DESCRIPTION:	Brown silty sand (SM)	TECHNICIAN:	S. Felter
		DATE COMPLETED	3/25/2009

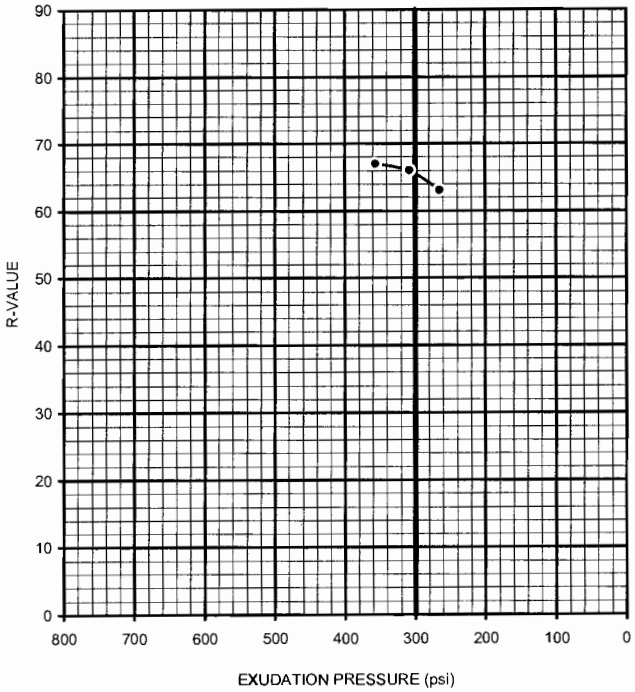
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	10.9	11.0	11.2
HEIGHT OF SAMPLE, Inches	2.43	2.58	2.51
DRY DENSITY, pcf	120.5	119.7	119.8
COMPACTOR PRESSURE, psi	275	250	175
EXUDATION PRESSURE, psi	356	307	264
EXPANSION, Inches x 10exp-4	26	25	17
STABILITY Ph 2,000 lbs (160 psi)	35	38	42
TURNS DISPLACEMENT	4.26	4.06	4.11
R-VALUE UNCORRECTED	68	66	63
R-VALUE CORRECTED	67	66	63

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.53	0.54	0.59
EXPANSION PRESSURE THICKNESS, ft.	0.87	0.83	0.57

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	63
R-VALUE BY EXUDATION:	66
EQUILIBRIUM R-VALUE:	63

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SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

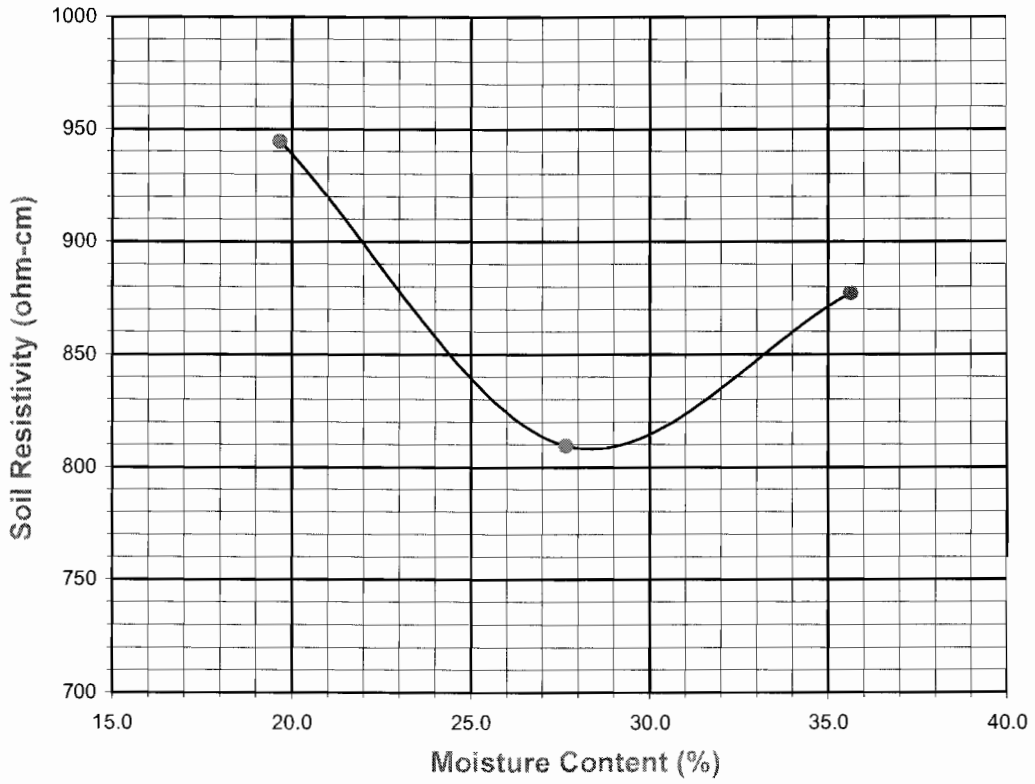
Project Name: Newport Beach City Hall
Project No. : 602184-002
Boring No.: Combination of NB-1 (S-5, R-6), NB-2 (R-5, S-6, S-8) & NB-3 (R-5, S-6)
Sample No. :
Soil Identification: Yellow silty sand (SM)

Tested By : V. Juliano Date: 03/31/09
Data Input By: J. Ward Date: 04/01/09
Depth (ft.) : 35-45

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	200	19.67	140	944
2	300	27.65	120	810
3	400	35.63	130	877
4				
5				

Moisture Content (%) (MCi)	3.72
Wet Wt. of Soil + Cont. (g)	213.30
Dry Wt. of Soil + Cont. (g)	208.30
Wt. of Container (g)	73.80
Container No.	
Initial Soil Wt. (g) (Wt)	1300.00
Box Constant	6.746
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
808	**28.4**	**47**	**457**	**7.75**	**19.9**



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TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Newport Beach City Hall Tested By : V. Juliano Date: 03/30/09

Project No. : 602184-002 Data Input By: J. Ward Date: 04/01/09

Boring No.	Combination of NB-1 (S-5, R-6), NB-2 (R-5, S-6, S-8) & NB-3 (R-5, S-6)			
Sample No.				
Sample Depth (ft)	35-45			
Soil Identification:	Yellow silty sand (SM)			
Wet Weight of Soil + Container (g)	213.30			
Dry Weight of Soil + Container (g)	208.30			
Weight of Container (g)	73.80			
Moisture Content (%)	3.72			
Weight of Soaked Soil (g)	100.40			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	6			
Crucible No.	15			
Furnace Temperature (°C)	840			
Time In / Time Out	7:20 / 8:05			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	20.3158			
Wt. of Crucible (g)	20.3147			
Wt. of Residue (g) (A)	0.0011			
PPM of Sulfate (A) x 41150	45.27			
PPM of Sulfate, Dry Weight Basis	**47**			

CHLORIDE CONTENT, DOT California Test 422

ml of Chloride Soln. For Titration (B)	30			
ml of AgNO3 Soln. Used in Titration (C)	4.6			
PPM of Chloride (C -0.2) * 100 * 30 / B	440			
PPM of Chloride, Dry Wt. Basis	**457**			

pH TEST, DOT California Test 532/643

pH Value	**7.75**			
Temperature °C	19.9			

APPENDIX C

WALLACE LABORATORIES
365 Coral Circle
El Segundo, CA 90245
phone (310) 615-0116 fax (310) 640-6863

March 19, 2009

Vivian Cheng, vcheng@leightongroup.com
Leighton Consulting, Inc.
17781 Cowan
Irvine, CA 92614

RE: Newport Beach City Hall & Park, Project No. 602184-002

Dear Vivian,

Attached are the soil reports for 78 soil sample for the Newport Beach City Hall & Park, Project No. 602184-002 containing agronomic soil suitability data. The soils were evaluated for:

- Acidity/alkalinity and pH values
- Salinity including soluble concentrations of:
  calcium, magnesium, sodium, potassium, chloride, nitrate, phosphorus, sulfate and boron
- Sodicity including total available sodium and sodium adsorption ratio
- Fertility:
  nitrogen, phosphorus, potassium, iron, manganese, zinc, copper, boron, calcium, magnesium, sulfur, molybdenum and nickel
- Non-essential trace metals include:
  aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, mercury, selenium, silver, sodium, strontium, tin, titanium, vanadium,
- Soil organic matter determined by total organic carbon and total nitrogen
- Soil texture including the concentrations of gravel, sand, silt and clay
- Percent soil moisture

The more select soils are those which have salinity below 3.0 millimho/cm, which are not gravelly, which are non sand and not clay. The target soil texture is sandy loam but the following list includes loamy sands, loam and sandy clay loam. The average pH is 7.65. The average salinity is 0.84 millimho/cm. The average soil organic matter is 0.63%. The average concentration of chloride is 125 parts per million in the saturation extract. The average concentration of sodium is 369 parts per million. The average concentration of magnesium is 520 parts per million. On average phosphorus, nitrogen, potassium and sulfur are low. The micronutrients are sufficient.

Approved select soils

Ba-1 0.5'	NB-1 18"	NB-4 22.5'
Ba-1 1.5'	NB-1 3'	NB-4 30'
Ba-1 3'	NB-1 30'	NB-4 37.5'
HA-1 6"	NB-2 6"	NB-6 37.5'
HA-1 18"	NB-2 18"	NB-7 0.5'
HA-1 36"	NB-3 6"	NB-7 1.5'
HA-2 6"	NB-4 0.5'	NB-7 3'
HA-2 18"	NB-4 1.5'	NB-8 0.5'
HA-2 36"	NB-4 3'	NB-8 1.5'
HA-3 36"	NB-4 7.5'	NB-8 3'
NB-1 6"	NB-4 15'	

The following soils have unsuitable properties including soil textures which are sand or gravelly, have salinity in excess of 3.0 millimho/cm. The average pH is 7.25. The average salinity is 4.27 millimho/cm. The average soil organic matter is 0.40%. The average concentration of chloride is 1,258 parts per million in the saturation extract. The average concentration of sodium is 838 parts per million. The average concentration of magnesium is 849 parts per million. On average phosphorus, nitrogen, and potassium are low. The micronutrients are sufficient.

Unsuitable soils

Ba-1 7.5'	HA-5 36"	NB-3 3'	NB-7 7.5'
Ba-1 15'	NB-1 7.5'	NB-3 7.5'	NB-7 15'
Ba-1 22.5'	NB-1 15'	NB-3 15'	NB-7 22.5'
Ba-1 30'	NB-1 22.5'	NB-3 22.5'	NB-7 30'
Ba-1 37.5'	NB-1 37.5'	NB-3 37.5'	NB-7 37.5'
HA-3 6"	NB-2 3'	NB-6 0.5'	NB-8 7.5'
HA-3 18"	NB-2 7.5'	NB-6 1.5'	NB-8 15'
HA-4 6"	NB-2 15'	NB-6 3'	NB-8 22.5'
HA-4 18"	NB-2 22.5'	NB-6 7.5'	NB-8 30'
HA-4 36"	NB-2 30'	NB-6 15'	NB-8 37.5'
HA-5 6"	NB-2 37.5'	NB-6 22.5'	
HA-5 18"	NB-3 18"	NB-6 30'	

It is recommended that the select soils be harvested for finish grade of landscape planter soils at least 1 foot deep and hopefully at least 2 feet deep.

Summary of soil properties

description	target	average of all	maximum of all	minimum of all	average of select	maximum of select	minimum of select	average of non-select	maximum of non-select	minimum on non-select
pH	6.5-7.9	7.41	8.76	5.78	7.65	8.76	6.50	7.25	8.60	5.78
salinity	0.5-3	2.87	9.78	0.28	0.84	2.71	0.28	4.27	9.78	0.48
organic matter	3% - 5%	0.49%	2.53%	0.01%	0.63%	1.88%	0.07%	0.40%	2.53%	0.01%
sodium	<200	646	1,730	41	369	1,180	41	838	1,730	256
SAR	<4	9.5	20.2	1.6	6.6	18.6	1.6	11.6	20.2	3.0
chloride	<150	793	2,754	2	125	843	5	1,258	2,754	2
nitrate	10-30	9	79	1	4	17	1	12	79	2
phosphorus	8-20	3.8	14.3	0.4	2.8	10.4	0.6	4.5	14.3	0.4
potassium	60-180	56	241	11	58	241	21	55	230	11
iron	4-15	5.23	39.06	0.46	8.04	39.06	1.05	3.27	15.90	0.46
manganese	0.6-3	1.28	10.54	0.05	2.12	10.54	0.16	0.69	5.45	0.05
zinc	1-3	0.88	5.91	0.02	0.97	3.81	0.03	0.82	5.91	0.02
copper	0.2-3	1.42	12.21	0.10	1.45	9.54	0.10	1.39	12.21	0.10
boron	0.2-0.5	0.15	0.56	0.01	0.14	0.53	0.02	0.16	0.56	0.01
magnesium	25-100	714	1,965	66	520	1,150	66	849	1,965	202
sulfur	25-100	46	243	3	21	187	3	64	243	4

Recommendations

These recommendations are preliminary and need to be verified prior to soil preparation after the soils are in place. Stockpiled soils can also be analyzed to verify their suitability. Also verify that amended soils are suitable prior to planting.

CLEANUP Clean up construction debris, trash and masonry material. Remove soil high in gravel, i.e. where gravel is over 20% such as in planters in parking lot cutouts and near the footings of walls.

RIPPING Haul roads, access roads and staging areas from storage and parking need to be deeply ripped. Other areas where the soil is not readily rototillable also need to be ripped. Cross-rip the soil on 12-inch centers to a minimum depth of 24 inches if more highly compacted. Final soil compaction should not exceed 80%. In areas of existing trees or shrubs, care is needed to avoid damaging existing roots.

TILLAGE After approximate finished grade has been established, rototill the soil as deep as practical but at least 6 inches. Reduce soil clods to a maximum diameter of 1 inch in the top 6 inches. Do not till muddy soils, they are not friable. Optimum moisture content is partially damp. The moisture content should not be so great that excessive compaction will occur, nor so dry that clods will not break readily. Remove rocks, gravel,

debris and clods larger than 1 inch in diameter from the top 6 inches. Lower the gravel content to a maximum of 20% if high.

APPLICATION OF AMENDMENTS AND FERTILIZERS.

Uniformly broadcast the following materials.
The rates are per 1,000 square feet:

Ammonium sulfate (21-0-0) – 5 pounds
Potassium sulfate (0-0-50) – 8 pounds
Triple superphosphate (0-45-0) – 4 pounds
Gypsum – 50 pounds
Organic amendment – 3 cubic yards, sufficient for 3% to 6% soil organic matter

Homogeneously incorporate the above materials into the soil to a depth of six inches. The final soil organic matter should be in the range of 3% to 6%. The soil organic matter needs to be stable in order to avoid excessive decomposition. Fine rake the soils after soil preparation and remove gravel larger than 3/8 inches in diameter from the top several inches.

After the preparation of the soil, test the quality of the amended soil for suitability prior to seeding and planting.

PRELEACHING Leach the soil prior to planting if high in salinity and/or sodicity. Lower soil salinity where greater than 3 millimho/cm measured in the saturation extract. Lower sodium to less than 300 parts per million and reduce the sodium adsorption ratio to less than 4. Additional gypsum will be needed during maintenance. Additional soil tests will be desirable to show how well the sodium, magnesium and alkalinity are being leached.

TRANSPLANTING Prepare planting pits normally twice as wide as the rootballs. The walls and bottom of the planting pits should not have compacted soil except under the rootball. If necessary, loosen glazed soil by scarifying the soil surface.

AUGERED HOLE For boxed trees 24 inches and larger, auger a hole in a corner of the planting pit at 12 inches in diameter and extending at least six feet deep from the base of the planting pit if beneficial to increase the rate of water percolation.

BACKFILL MIX Blend the following materials into clean excavated soil or leached soil. Remove debris, rocks and foreign material. Soil clods should not exceed 1 inch in diameter. Remove rocks, gravel, debris and clods larger than 1 inch in diameter. Excessive gravel should not be present. The general maximum is 20%. Rates are per cubic yard:

Ammonium sulfate (21-0-0) – 1/4 pound
Potassium sulfate (0-0-50) – 1/3 pound
Triple superphosphate (0-45-0) – 1/4 pound
Gypsum – 2 pounds
Organic amendment – 15% by volume, sufficient for 3% to 6% soil organic matter

Backfill the transplant with the prepared soil and augered hole if used. The root flare needs to be slightly above grade. If a basin is used, it should be used temporarily. Standing water at the base of the trunk is undesirable. Fill augered holes if used with amended soil.

PLANTERS Rip the base soil in the planters before filling the planters to avoid a sharp soil interface.

ORGANIC AMENDMENT

1. Humus material shall have an ash content of no less than 6% and no more than 20%.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm @ 25° C. (ECe less than 10) on a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 parts per million.
5. Silicon content (acid-insoluble ash) shall be less than 50%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
9. Sludge-based materials are not acceptable.
10. Carbon:nitrogen ratio is less than 25:1.
11. The compost shall be aerobic without malodorous presence of decomposition products.
12. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen.

Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20	copper	150	selenium	30
cadmium	15	lead	100	silver	10
chromium	100	mercury	10	vanadium	200
cobalt	50	molybdenum	20	zinc	200
		nickel	100		

Higher amounts of salinity or boron may be present if the soils are to be preleached to reduce the excess or if the plant species will tolerate the salinity and/or boron.

Sincerely,

Garn A. Wallace, Ph. D.
GAW:n

WALLACE LABS	SOILS REPORT	Print Date	Mar. 18, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA	**** high, ***** very high				

extractable - mg/kg soil	Sample ID Number	09-77-09		09-77-10		09-77-11		09-77-12	
Interpretation of data		Ba-1 0.5'		Ba-1 1.5'		Ba-1 3'		Ba-1 7.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	8.41	***	2.24	*	2.51	*	2.33	*
0-60 60 -120 121-180	potassium	121.85	****	47.74	**	50.29	**	22.75	*
0 - 4 4 - 10 over 10	iron	8.73	***	11.18	****	5.36	***	0.89	*
0- 0.5 0.6- 1 over 1	manganese	2.15	****	0.92	***	0.64	***	0.05	*
0 - 1 1 - 1.5 over 1.5	zinc	3.81	****	0.58	**	1.68	****	n d	*
0- 0.2 0.3- 0.5 over 0.5	copper	1.16	****	0.73	****	0.89	****	0.14	*
0- 0.2 0.2- 0.5 over 1	boron	n d	*	0.11	**	0.14	**	0.09	*
ratio of calcium to magnesium	calcium	448.40	****	375.70	***	389.98	***	437.71	****
needs to be more than 2 or 3	magnesium	66.31	***	590.91	*****	397.30	*****	548.02	*****
should be less than potassium	sodium	40.83	*	583.12	*****	451.51	*****	899.96	*****
	sulfur	6.61	*	32.49	**	25.30	**	59.30	**
	molybdenum	0.02	**	n d	*	n d	*	0.09	***
	nickel	0.24	*	0.55	*	0.35	*	0.06	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.11	*	0.17	*	0.13	*	0.02	*
The degree of toxicity	barium	0.77	*	0.48	*	0.54	*	0.17	*
depends upon the pH of	cadmium	0.11	*	0.09	*	0.09	*	0.02	*
the soil, soil texture,	chromium	0.05	*	n d	*	0.01	*	n d	*
organic matter, and the	cobalt	0.03	*	0.03	*	0.03	*	0.04	*
concentrations of the	lead	0.77	*	0.76	*	0.63	*	0.19	*
individual elements as	lithium	0.22	*	0.20	*	0.21	*	0.26	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	n d	*	0.07	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	2.38	*	3.08	*	3.05	*	4.81	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.21	*	0.26	*	0.28	*	0.46	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	7.53	****	6.99	***	7.30	***	7.26	***
The ECe is a measure of	ECe (milli-	0.82	***	1.66	***	2.24	****	5.24	*****
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	32.9	1.6	24.1	1.2	29.6	1.5	50.0	2.5
2-4 affects some plants,	magnesium	15.3	1.3	15.5	1.3	21.2	1.8	54.9	4.5
> 4 affects many plants.	sodium	75.9	3.3	261.0	11.3	349.4	15.2	831.9	36.2
	potassium	11.7	0.3	2.2	0.1	2.6	0.1	2.3	0.1
	cation sum		6.5		13.9		18.5		43.3
problems over 150 ppm	chloride	75	2.1	321	9.0	442	12.4	1,341	37.8
	nitrate as N	12	0.9	7	0.5	9	0.6	12	0.9
	phosphorus as P	0.8	0.0	0.1	0.0	0.0	0.0	0.5	0.0
toxic over 800	sulfate as S	18.8	1.2	42.0	2.6	57.1	3.6	134.0	8.4
	anion sum		4.2		12.2		16.6		47.0
toxic over 1 for many plants	boron as B	0.09	*	0.20	**	0.22	**	0.18	*
increasing problems start at 6	SAR	2.7	**	10.2	*****	12.0	*****	19.3	*****
est. gypsum requirement-lbs./1,000 square feet		7		102		78		155	
	infiltration rate inches/hour	fair/slow		slow		slow		slow	
	soil texture	loamy sand	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy loam	gravel > 2 mm
	sand	78.7%	2.3%	52.1%	0.0%	56.5%	0.2%	64.8%	0.0%
	silt	12.9%		20.3%		18.1%		17.2%	
	clay	8.5%		27.6%		25.4%		17.9%	
	lime (calcium carbonate)	no		no		no		no	
	Total nitrogen	0.055%		0.053%		0.040%		0.003%	
	Total organic carbon	0.559%		0.468%		0.433%		0.033%	
	carbon:nitrogen ratio	10.2		8.9		10.7		11.4	
	organic matter based on carbon	1.12%		0.94%		0.87%		0.07%	
	moisture content of soil	6.7%		13.5%		9.7%		8.5%	
	half saturation percentage	14.7%		28.2%		24.6%		19.5%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 18, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil	Sample ID Number	09-77-13		09-77-14		09-77-15		09-77-16	
Interpretation of data		Ba-1 15'		Ba-1 22.5'		Ba-1 30'		Ba-1 37.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	4.35	**	7.60	**	14.28	****	4.08	**
0-60 60 -120 121-180	potassium	33.03	**	22.71	*	41.67	**	21.39	*
0 - 4 4 - 10 over 10	iron	2.22	*	6.90	***	5.45	***	4.29	***
0- 0.5 0.6- 1 over 1	manganese	0.25	*	0.88	***	1.09	****	0.76	***
0 - 1 1 - 1.5 over 1.5	zinc	0.10	*	0.05	*	1.43	***	0.40	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.28	**	0.16	*	0.63	****	0.10	*
0- 0.2 0.2- 0.5 over 1	boron	0.02	*	n d	*	0.07	*	0.03	*
ratio of calcium to magnesium	calcium	464.79	****	210.87	***	511.51	****	218.42	***
needs to be more than 2 or 3	magnesium	628.53	*****	288.28	*****	915.32	*****	310.59	*****
should be less than potassium	sodium	992.38	*****	483.62	*****	1,079.92	*****	384.49	*****
	sulfur	59.62	**	27.14	**	61.79	**	20.34	*
	molybdenum	0.06	***	0.14	****	0.37	****	0.05	***
	nickel	0.20	*	0.16	*	0.69	*	0.13	*
The following trace	aluminum	n d	*	0.04	*	n d	*	n d	*
elements may be toxic	arsenic	0.03	*	0.06	*	n d	*	0.03	*
The degree of toxicity	barium	n d	*	0.14	*	n d	*	0.01	*
depends upon the pH of	cadmium	0.04	*	0.01	*	0.30	*	0.27	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*	n d	*
organic matter, and the	cobalt	0.17	*	0.08	*	0.08	*	0.04	*
concentrations of the	lead	0.19	*	0.04	*	0.17	*	0.05	*
individual elements as	lithium	0.33	*	0.12	*	0.31	*	0.12	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	0.17	*	0.03	*	n d	*	0.29	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	4.30	*	1.96	*	3.61	*	1.30	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.29	*	0.19	*	0.26	*	0.13	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	6.30	***	5.91	**	6.19	***	7.11	***
The ECe is a measure of	ECe (milli-	4.67	*****	3.68	****	6.54	*****	3.99	****
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	50.8	2.5	41.7	2.1	88.3	4.4	55.0	2.8
2-4 affects some plants,	magnesium	62.1	5.1	50.8	4.2	146.4	12.1	79.8	6.6
> 4 affects many plants.	sodium	690.9	30.0	546.2	23.7	878.7	38.2	565.1	24.6
	potassium	2.2	0.1	5.9	0.2	4.3	0.1	5.2	0.1
	cation sum		37.8		30.2		54.8		34.0
problems over 150 ppm	chloride	1,217	34.3	958	27.0	1,802	50.8	1,058	29.8
	nitrate as N	11	0.8	9	0.6	14	1.0	10	0.7
	phosphorus as P	0.4	0.0	0.6	0.0	0.5	0.0	0.3	0.0
toxic over 800	sulfate as S	70.8	4.4	50.6	3.2	86.7	5.4	43.8	2.7
	anion sum		39.5		30.8		57.2		33.2
toxic over 1 for many plants	boron as B	0.23	**	0.10	*	0.14	*	0.03	*
increasing problems start at 6	SAR	15.4	*****	13.4	*****	13.3	*****	11.4	*****
est. gypsum requirement-lbs./1,000 square feet		172		83		189		66	
infiltration rate inches/hour		slow		slow/fair		slow/fair		fair	
soil texture		sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm	sandy loam	gravel > 2 mm	sand	gravel > 2 mm
sand		75.9%	0.0%	86.4%	0.0%	67.0%	6.5%	88.5%	0.4%
silt		6.7%		6.8%		16.1%		6.1%	
clay		17.4%		6.8%		16.9%		5.4%	
lime (calcium carbonate)		no		no		no		no	
Total nitrogen		0.001%		0.001%		0.004%		0.000%	
Total organic carbon		0.026%		0.005%		0.024%		0.005%	
carbon:nitrogen ratio		29.5		3.8		5.6		47.0	
organic matter based on carbon		0.05%		0.01%		0.05%		0.01%	
moisture content of soil		10.8%		4.6%		16.3%		4.9%	
half saturation percentage		24.5%		18.2%		28.9%		17.8%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 14, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA	**** high, ***** very high				

extractable - mg/kg soil	Sample ID Number	09-72-24		09-72-25		09-72-26	
Interpretation of data		HA-1 6"		HA-1 18"		HA-1 36"	
low medium high	elements		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	1.12	*	0.77	*	2.09	*
0-60 60 -120 121-180	potassium	43.86	**	34.01	**	34.51	**
0 - 4 4 - 10 over 10	iron	3.79	**	2.89	**	4.39	***
0- 0.5 0.6- 1 over 1	manganese	0.66	***	0.53	**	0.81	***
0 - 1 1 - 1.5 over 1.5	zinc	0.68	**	0.40	*	1.11	***
0- 0.2 0.3- 0.5 over 0.5	copper	1.19	****	0.58	****	1.04	****
0- 0.2 0.2- 0.5 over 1	boron	0.06	*	0.05	*	0.03	*
ratio of calcium to magnesium	calcium	411.18	****	413.84	****	388.22	***
needs to be more than 2 or 3	magnesium	450.70	*****	409.61	*****	851.86	*****
should be less than potassium	sodium	42.26	*	74.10	**	477.29	*****
	sulfur	3.90	*	3.09	*	7.67	*
	molybdenum	0.04	***	0.05	***	0.05	***
	nickel	0.49	*	0.23	*	0.66	*
The following trace	aluminum	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.08	*	0.05	*	0.17	*
The degree of toxicity	barium	2.78	*	2.27	*	1.44	*
depends upon the pH of	cadmium	0.19	*	0.04	*	0.08	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*
organic matter, and the	cobalt	0.03	*	0.02	*	0.04	*
concentrations of the	lead	1.32	**	0.43	*	0.77	*
individual elements as	lithium	0.20	*	0.22	*	0.22	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	0.22	*
The pH optimum depends	silver	n d	*	n d	*	n d	*
upon soil organic	strontium	2.56	*	3.11	*	2.86	*
matter and clay content-	tin	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.58	*	0.39	*	0.47	*
under 5.2 is too acidic							
6.5 to 7 is ideal	Saturation Extract						
over 9 is too alkaline	pH value	7.51	****	7.63	****	7.34	***
The ECe is a measure of	ECe (milli-	0.48	**	0.32	*	0.28	*
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	16.8	0.8	9.0	0.5	11.7	0.6
2-4 affects some plants,	magnesium	13.8	1.1	6.6	0.5	15.0	1.2
> 4 affects many plants.	sodium	58.4	2.5	48.0	2.1	50.9	2.2
	potassium	3.7	0.1	2.5	0.1	7.9	0.2
	cation sum		4.6		3.1		4.2
problems over 150 ppm	chloride	44	1.2	15	0.4	16	0.5
	nitrate as N	3	0.2	2	0.1	3	0.2
	phosphorus as P	0.3	0.0	0.2	0.0	0.6	0.0
toxic over 800	sulfate as S	12.4	0.8	10.1	0.6	10.9	0.7
	anion sum		2.3		1.2		1.4
toxic over 1 for many plants	boron as B	0.01	*	0.10	*	0.05	*
increasing problems start at 6	SAR	2.6	**	3.0	**	2.3	**
est. gypsum requirement-lbs./1,000 square feet		9		14		86	
infiltration rate inches/hour		slow		slow		slow	
soil texture		sandy clay loam	gravel > 2 mm	sandy loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm
sand		67.2%	0.1%	78.6%	1.3%	57.6%	1.4%
silt		12.5%		7.6%		12.4%	
clay		20.3%		13.8%		30.0%	
lime (calcium carbonate)		no		no		no	
Total nitrogen		0.031%		0.017%		0.060%	
Total organic carbon		0.302%		0.154%		0.504%	
carbon:nitrogen ratio		9.8		8.9		8.5	
organic matter based on carbon		0.60%		0.31%		1.01%	
moisture content of soil		13.8%		12.8%		13.4%	
half saturation percentage		18.1%		19.0%		30.6%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-026			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-75-25 HA-2 6"	graphic	09-75-26 HA-2 18"	graphic	09-75-27 HA-2 36"	graphic
0 - 7 8-15 over 15	phosphorus	1.37	*	2.09	*	2.66	*
0-60 60 -120 121-180	potassium	37.67	**	45.21	**	29.23	*
0 - 4 4 - 10 over 10	iron	2.00	*	1.05	*	1.53	*
0- 0.5 0.6- 1 over 1	manganese	0.51	**	0.60	**	0.37	**
0 - 1 1 - 1.5 over 1.5	zinc	0.83	**	1.95	****	0.73	**
0- 0.2 0.3- 0.5 over 0.5	copper	0.78	****	1.44	****	0.49	***
0- 0.2 0.2- 0.5 over 1	boron	0.22	***	0.22	***	0.09	*
ratio of calcium to magnesium	calcium	366.23	***	335.42	***	296.66	***
needs to be more than 2 or 3	magnesium	569.94	*****	791.62	*****	533.94	*****
should be less than potassium	sodium	467.65	*****	442.73	*****	311.90	****
	sulfur	5.97	*	10.61	*	11.64	*
	molybdenum	0.07	***	0.35	****	0.26	****
	nickel	0.33	*	0.16	*	0.10	*
The following trace	aluminum	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.02	*	0.02	*	0.07	*
The degree of toxicity	barium	2.08	*	0.77	*	0.67	*
depends upon the pH of	cadmium	0.47	*	1.68	**	0.66	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*
organic matter, and the	cobalt	0.05	*	0.06	*	0.05	*
concentrations of the	lead	0.87	*	0.08	*	0.28	*
individual elements as	lithium	0.18	*	0.20	*	0.16	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*
	selenium	0.19	*	0.24	*	n d	*
The pH optimum depends	silver	n d	*	n d	*	n d	*
upon soil organic	strontium	2.42	*	1.17	*	1.23	*
matter and clay content-	tin	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.57	*	0.29	*	0.29	*
under 5.2 is too acidic							
6.5 to 7 is ideal	Saturation Extract						
over 9 is too alkaline	pH value	8.27	****	8.32	****	8.25	****
The ECe is a measure of	ECe (milli-mho/cm)	0.44	**	0.49	**	0.68	**
the soil salinity:			millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	8.8	0.4	9.5	0.5	15.7	0.8
2-4 affects some plants,	magnesium	4.6	0.4	4.3	0.4	7.8	0.6
> 4 affects many plants.	sodium	86.5	3.8	97.0	4.2	118.8	5.2
	potassium	4.8	0.1	1.9	0.0	2.1	0.1
	cation sum		4.7		5.1		6.6
problems over 150 ppm	chloride	7	0.2	8	0.2	34	0.9
	nitrate as N	2	0.1	2	0.2	17	1.2
	phosphorus as P	0.2	0.0	0.4	0.0	0.3	0.0
toxic over 800	sulfate as S	12.4	0.8	21.8	1.4	29.4	1.8
	anion sum		1.1		1.8		4.0
toxic over 1 for many plants	boron as B	0.12	*	0.22	**	0.12	*
increasing problems start at 6	SAR	5.9	***	6.5	****	6.1	****
est. gypsum requirement-lbs./1,000 square feet		82		79		55	
infiltration rate inches/hour		very slow		very slow		slow	
soil texture		sandy loam	gravel > 2 mm	sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm
sand		65.7%	0.9%	66.3%	16.2%	78.4%	12.8%
silt		18.2%		21.0%		14.9%	
clay		16.1%		12.7%		6.7%	
lime (calcium carbonate)		no		no		no	
Total nitrogen		0.030%		0.018%		0.013%	
Total organic carbon		0.311%		0.152%		0.067%	
carbon:nitrogen ratio		10.4		8.3		5.2	
organic matter based on carbon		0.62%		0.30%		0.13%	
moisture content of soil		12.8%		13.1%		7.0%	
half saturation percentage		22.3%		26.1%		19.5%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 18, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-77-17 HA-3 6"	graphic	09-77-18 HA-3 18"	graphic	09-77-19 HA-3 36"	graphic
	elements						
0 - 7 8-15 over 15	phosphorus	2.10	*	2.40	*	3.69	**
0-60 60 -120 121-180	potassium	109.28	***	149.54	****	155.82	****
0 - 4 4 - 10 over 10	iron	2.39	*	1.49	*	1.38	*
0- 0.5 0.6- 1 over 1	manganese	0.29	*	0.19	*	0.16	*
0 - 1 1 - 1.5 over 1.5	zinc	0.72	**	0.64	**	0.97	**
0- 0.2 0.3- 0.5 over 0.5	copper	3.01	*****	2.46	****	2.01	****
0- 0.2 0.2- 0.5 over 1	boron	0.09	*	0.36	***	0.41	***
ratio of calcium to magnesium	calcium	297.02	***	308.96	***	252.74	***
needs to be more than 2 or 3	magnesium	1,103.92	*****	1,265.60	*****	1,132.10	*****
should be less than potassium	sodium	557.74	*****	1,270.78	*****	1,108.88	*****
	sulfur	4.28	*	10.67	*	32.83	**
	molybdenum	1.00	*****	3.81	*****	6.01	*****
	nickel	0.31	*	0.10	*	0.11	*
The following trace	aluminum	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.07	*	0.07	*	0.03	*
The degree of toxicity	barium	1.02	*	0.63	*	0.22	*
depends upon the pH of	cadmium	1.57	**	0.27	*	0.39	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*
organic matter, and the	cobalt	0.05	*	0.06	*	0.04	*
concentrations of the	lead	0.40	*	0.40	*	0.44	*
individual elements as	lithium	0.17	*	0.18	*	0.15	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*
	selenium	n d	*	0.15	*	0.20	*
The pH optimum depends	silver	n d	*	n d	*	n d	*
upon soil organic	strontium	1.68	*	2.67	*	2.05	*
matter and clay content-	tin	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.52	*	0.56	*	0.48	*
under 5.2 is too acidic							
6.5 to 7 is ideal	**Saturation Extract**						
over 9 is too alkaline	pH value	7.85	****	8.46	****	8.23	****
The ECe is a measure of	ECe (milli-	0.61	**	0.68	**	1.14	***
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	9.7	0.5	8.2	0.4	10.9	0.5
2-4 affects some plants,	magnesium	7.6	0.6	4.7	0.4	6.8	0.6
> 4 affects many plants.	sodium	95.4	4.1	133.7	5.8	198.7	8.6
	potassium	2.2	0.1	3.5	0.1	2.6	0.1
	cation sum		5.3		6.7		9.8
problems over 150 ppm	chloride	45	1.3	39	1.1	128	3.6
	nitrate as N	5	0.4	4	0.3	3	0.2
	phosphorus as P	0.3	0.0	0.4	0.0	0.3	0.0
toxic over 800	sulfate as S	8.5	0.5	16.4	1.0	38.2	2.4
	anion sum		2.2		2.4		6.2
toxic over 1 for many plants	boron as B	0.12	*	0.49	***	0.38	**
increasing problems start at 6	SAR	5.6	***	9.2	*****	11.7	*****
est. gypsum requirement-lbs./1,000 square feet		101		224		195	
	infiltration rate inches/hour	slow		very slow		slow	
	soil texture	gravelly clay loam	gravel > 2 mm	gravelly clay loam	gravel > 2 mm	loam	gravel > 2 mm
	sand	33.0%	35.4%	29.8%	21.1%	42.5%	16.6%
	silt	38.7%		37.2%		32.5%	
	clay	28.2%		32.9%		25.0%	
	lime (calcium carbonate)	yes		yes		yes	
	Total nitrogen	0.078%		0.062%		0.044%	
	Total organic carbon	0.354%		0.196%		0.134%	
	carbon:nitrogen ratio	4.6		3.2		3.0	
	organic matter based on carbon	0.71%		0.39%		0.27%	
	moisture content of soil	26.4%		30.9%		26.5%	
	half saturation percentage	39.1%		48.6%		45.1%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 18, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil	Sample ID Number	09-77-20		09-77-21		09-77-22	
Interpretation of data		HA-4 6"		HA-4 18"		HA-4 36"	
low medium high	elements		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	1.41	*	6.73	**	4.65	**
0-60 60 -120 121-180	potassium	29.46	*	36.85	**	52.70	**
0 - 4 4 - 10 over 10	iron	1.21	*	1.49	*	1.39	*
0- 0.5 0.6- 1 over 1	manganese	0.10	*	0.10	*	0.18	*
0 - 1 1 - 1.5 over 1.5	zinc	0.08	*	0.62	**	0.41	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.91	****	1.32	****	3.94	*****
0- 0.2 0.2- 0.5 over 1	boron	0.50	****	0.56	****	0.33	***
ratio of calcium to magnesium	calcium	420.94	****	540.73	****	824.58	*****
needs to be more than 2 or 3	magnesium	1,514.23	*****	1,964.73	*****	1,815.19	*****
should be less than potassium	sodium	1,194.97	*****	1,704.56	*****	1,721.48	*****
	sulfur	7.03	*	186.69	***	141.25	***
	molybdenum	0.20	****	0.89	****	1.01	*****
	nickel	0.19	*	0.17	*	0.38	*
The following trace	aluminum	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.09	*	0.05	*	n d	*
The degree of toxicity	barium	0.86	*	0.14	*	0.02	*
depends upon the pH of	cadmium	0.28	*	0.19	*	0.18	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*
organic matter, and the	cobalt	0.06	*	0.04	*	0.06	*
concentrations of the	lead	0.22	*	0.38	*	0.42	*
individual elements as	lithium	0.22	*	0.30	*	0.46	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*
	selenium	0.03	*	0.19	*	0.24	*
The pH optimum depends	silver	n d	*	n d	*	n d	*
upon soil organic	strontium	4.22	*	5.28	**	6.06	**
matter and clay content-	tin	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.89	*	0.82	*	0.45	*
under 5.2 is too acidic							
6.5 to 7 is ideal	Saturation Extract						
over 9 is too alkaline	pH value	8.14	****	7.13	***	6.39	***
The ECe is a measure of	ECe (milli-	0.80	***	7.75	*****	9.78	*****
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	13.6	0.7	200.0	10.0	282.4	14.1
2-4 affects some plants,	magnesium	5.2	0.4	201.3	16.6	299.1	24.7
> 4 affects many plants.	sodium	146.4	6.4	1,006.8	43.8	1,039.9	45.2
	potassium	2.4	0.1	2.8	0.1	3.1	0.1
	cation sum		7.5		70.5		84.1
problems over 150 ppm	chloride	82	2.3	2,111	59.5	2,706	76.2
	nitrate as N	3	0.2	17	1.2	29	2.0
	phosphorus as P	0.4	0.0	0.5	0.0	0.6	0.0
toxic over 800	sulfate as S	17.2	1.1	194.9	12.2	134.0	8.4
	anion sum		3.6		72.9		86.7
toxic over 1 for many plants	boron as B	0.56	***	0.93	****	0.68	***
increasing problems start at 6	SAR	8.6	****	12.0	*****	10.3	*****
est. gypsum requirement-lbs./1,000 square feet		213		303		305	
infiltration rate inches/hour		very slow		slow/fair		slow/fair	
soil texture		clay	gravel > 2 mm	clay loam	gravel > 2 mm	clay loam	gravel > 2 mm
sand		36.6%	0.0%	33.5%	13.7%	37.0%	8.4%
silt		20.3%		33.8%		33.5%	
clay		43.1%		32.7%		29.5%	
lime (calcium carbonate)		no		no		no	
Total nitrogen		0.036%		0.021%		0.027%	
Total organic carbon		0.295%		0.130%		0.195%	
carbon:nitrogen ratio		8.3		6.2		7.3	
organic matter based on carbon		0.59%		0.26%		0.39%	
moisture content of soil		29.4%		26.9%		30.7%	
half saturation percentage		50.4%		46.2%		46.0%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 14, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA	**** high, ***** very high				

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-72-01 NB-1 6"	graphic	09-72-02 NB-1 18"	graphic	09-72-03 NB-1 3'	graphic	09-72-04 NB-1 7.5'	graphic
	elements								
0 - 7 8-15 over 15	phosphorus	1.56	*	1.46	*	1.20	*	3.92	**
0-60 60 -120 121-180	potassium	55.14	**	45.51	**	41.32	**	17.88	*
0 - 4 4 - 10 over 10	iron	9.41	***	9.12	***	2.38	*	3.24	**
0- 0.5 0.6- 1 over 1	manganese	3.98	****	5.36	****	0.79	***	0.19	*
0 - 1 1 - 1.5 over 1.5	zinc	0.69	**	0.43	*	0.32	*	0.16	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.56	****	0.60	****	0.33	***	0.36	***
0- 0.2 0.2- 0.5 over 1	boron	0.12	**	0.10	*	0.53	****	0.08	*
ratio of calcium to magnesium	calcium	406.94	****	417.16	****	355.76	***	341.61	***
needs to be more than 2 or 3	magnesium	488.28	*****	520.67	*****	935.71	*****	363.69	*****
should be less than potassium	sodium	516.63	*****	521.36	*****	1,179.55	*****	683.19	*****
	sulfur	12.96	*	13.02	*	62.53	**	32.27	**
	molybdenum	n d	*	0.02	***	0.02	**	0.06	***
	nickel	0.71	*	0.95	*	0.13	*	0.02	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.07	*	0.10	*	0.08	*	n d	*
The degree of toxicity	barium	1.66	*	2.11	*	0.87	*	0.25	*
depends upon the pH of	cadmium	0.07	*	0.08	*	0.09	*	0.03	*
the soil, soil texture,	chromium	0.01	*	0.02	*	n d	*	n d	*
organic matter, and the	cobalt	0.07	*	0.07	*	0.05	*	0.04	*
concentrations of the	lead	0.96	*	0.86	*	0.50	*	0.14	*
individual elements as	lithium	0.21	*	0.23	*	0.21	*	0.16	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	0.19	*	0.11	*	0.40	*	0.32	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	3.81	*	3.97	*	4.16	*	3.03	*
matter and clay content-	tin	0.02	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.22	*	0.19	*	0.92	*	0.24	*
under 5.2 is too acidic									
6.5 to 7 is ideal	**Saturation Extract**								
over 9 is too alkaline	pH value	6.90	***	6.73	***	7.71	****	7.10	***
The ECe is a measure of	ECe (milli-mho/cm)	0.80	***	0.84	***	2.71	****	4.45	*****
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	9.6	0.5	10.1	0.5	21.7	1.1	39.5	2.0
2-4 affects some plants,	magnesium	4.7	0.4	5.0	0.4	18.1	1.5	35.9	3.0
> 4 affects many plants.	sodium	141.3	6.1	149.3	6.5	483.7	21.0	729.4	31.7
	potassium	2.8	0.1	2.3	0.1	7.3	0.2	3.1	0.1
	cation sum		7.1		7.5		23.8		36.7
problems over 150 ppm	chloride	169	4.7	186	5.2	843	23.7	1,561	44.0
	nitrate as N	3	0.2	3	0.2	5	0.4	10	0.7
	phosphorus as P	0.1	0.0	0.1	0.0	0.4	0.0	0.4	0.0
toxic over 800	sulfate as S	19.4	1.2	23.0	1.4	72.9	4.6	80.6	5.0
	anion sum		6.1		6.9		28.7		49.8
toxic over 1 for many plants	boron as B	0.23	**	0.17	*	0.40	**	0.12	*
increasing problems start at 6	SAR	9.4	*****	9.6	*****	18.6	*****	20.2	*****
est. gypsum requirement-lbs./1,000 square feet		90		91		206		117	
	infiltration rate inches/hour	very slow		very slow		slow		very slow	
	soil texture	sandy clay loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy loam	gravel > 2 mm
	sand	63.0%	0.7%	60.8%	0.0%	62.9%	18.3%	79.0%	5.1%
	silt	16.5%		17.4%		11.4%		10.7%	
	clay	20.6%		21.8%		25.7%		10.3%	
	lime (calcium carbonate)	no		no		no		no	
	Total nitrogen	0.041%		0.036%		0.012%		0.000%	
	Total organic carbon	0.391%		0.355%		0.200%		0.026%	
	carbon:nitrogen ratio	9.4		9.8		16.7		NA	
	organic matter based on carbon	0.78%		0.71%		0.40%		0.05%	
	moisture content of soil	11.5%		11.9%		12.4%		7.0%	
	half saturation percentage	24.7%		25.5%		34.2%		18.5%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS
365 Coral Circle
El Segundo, CA 90245
(310) 615-0116

SOILS REPORT

Print Date Mar. 14, 2009 Receive Date 3-12-09
Location Newport Beach City Hall & Park, Project No. 602184-002
Requester Vivian Cheng, Leighton Consulting Inc.
graphic interpretation: * very low, ** low, *** moderate, **** high, ***** very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil
Interpretation of data
low medium high

Sample ID Number	09-72-05		09-72-06		09-72-07		09-72-08	
	NB-1 15'		NB-1 22.5'		NB-1 30'		NB-1 37.5'	
elements		graphic		graphic		graphic		graphic
phosphorus	2.07	*	10.90	***	10.38	***	1.55	*
potassium	17.14	*	35.85	**	32.58	**	12.15	*
iron	1.59	*	3.25	**	6.26	***	3.46	**
manganese	0.11	*	0.16	*	1.18	****	0.22	*
zinc	0.23	*	0.63	**	2.72	****	0.25	*
copper	0.16	*	0.67	****	6.08	*****	0.13	*
boron	0.10	**	0.16	**	0.13	**	0.08	*
calcium	209.02	***	449.68	****	360.34	***	154.96	**
magnesium	240.41	*****	769.86	*****	565.65	*****	224.81	*****
sodium	533.21	*****	854.29	*****	579.66	*****	340.06	****
sulfur	36.40	**	55.52	**	23.32	*	32.10	**
molybdenum	0.08	***	1.13	*****	1.31	*****	0.62	****
nickel	0.03	*	0.04	*	0.08	*	n d	*
aluminum	n d	*	n d	*	n d	*	n d	*
arsenic	n d	*	0.03	*	n d	*	n d	*
barium	0.35	*	0.14	*	0.26	*	0.17	*
cadmium	0.15	*	0.84	*	0.56	*	0.19	*
chromium	n d	*	n d	*	n d	*	0.01	*
cobalt	0.02	*	0.02	*	0.06	*	n d	*
lead	0.18	*	0.14	*	0.57	*	0.02	*
lithium	0.10	*	0.25	*	0.19	*	0.08	*
mercury	n d	*	n d	*	n d	*	n d	*
selenium	0.08	*	0.16	*	0.17	*	0.06	*
silver	n d	*	n d	*	n d	*	n d	*
strontium	1.57	*	2.54	*	1.92	*	0.77	*
tin	n d	*	n d	*	n d	*	n d	*
vanadium	0.19	*	0.26	*	0.20	*	0.05	*
Saturation Extract								
pH value	7.54	****	7.37	***	7.96	****	7.90	****
ECe (milli-mho/cm)	5.57	*****	3.46	****	1.60	***	4.07	*****
		millieq/l		millieq/l		millieq/l		millieq/l
calcium	70.9	3.5	33.0	1.6	9.3	0.5	61.6	3.1
magnesium	86.7	7.2	45.8	3.8	9.7	0.8	99.5	8.2
sodium	862.4	37.5	584.1	25.4	276.3	12.0	597.4	26.0
potassium	2.7	0.1	4.9	0.1	2.2	0.1	3.7	0.1
cation sum		48.3		31.0		13.3		37.4
chloride	2,069	58.3	1,160	32.7	348	9.8	1,461	41.2
nitrate as N	13	0.9	8	0.6	4	0.3	13	0.9
phosphorus as P	0.5	0.0	1.3	0.0	2.2	0.1	0.3	0.0
sulfate as S	89.2	5.6	91.3	5.7	55.0	3.4	76.7	4.8
anion sum		64.8		39.0		13.6		46.9
boron as B	0.06	*	0.15	*	0.11	*	0.05	*
SAR	16.2	*****	15.4	*****	15.1	*****	10.9	*****
est. gypsum requirement-lbs./1,000 square feet	91		149		101		58	
infiltration rate inches/hour	slow/fair		slow/fair		slow		fair/slow	
soil texture	loamy sand	gravel > 2 mm	sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm	sand	gravel > 2 mm
sand	79.8%	0.5%	71.1%	1.0%	78.1%	0.5%	87.5%	1.2%
silt	13.4%		15.2%		14.6%		9.9%	
clay	6.9%		13.7%		7.3%		2.6%	
lime (calcium carbonate)	no		no		no		no	
Total nitrogen	0.021%		0.008%		0.011%		0.000%	
Total organic carbon	0.814%		0.041%		0.045%		1.264%	
carbon:nitrogen ratio	38.7		5.4		4.1		NA	
organic matter based on carbon	1.63%		0.08%		0.09%		2.53%	
moisture content of soil	6.4%		15.8%		12.8%		6.3%	
half saturation percentage	16.0%		28.3%		22.5%		16.4%	

The following trace elements may be toxic. The degree of toxicity depends upon the pH of the soil, soil texture, and organic matter, and the concentrations of the individual elements as well as to their interactions.

The pH optimum depends upon soil organic matter and clay content- for clay and loam soils: under 5.2 is too acidic; 6.5 to 7 is ideal; over 9 is too alkaline

The ECe is a measure of the soil salinity: 1-2 affects a few plants; 2-4 affects some plants; > 4 affects many plants.

problems over 150 ppm

toxic over 800

toxic over 1 for many plants

increasing problems start at 6

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 14, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil	Sample ID Number	09-72-09		09-72-10		09-72-11		09-72-12	
Interpretation of data		NB-2 6"		NB-2 18"		NB-2 3'		NB-2 7.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	7.74	**	7.05	**	5.07	**	3.99	**
0-60 60 -120 121-180	potassium	58.95	**	51.85	**	26.41	*	11.17	*
0 - 4 4 - 10 over 10	iron	24.05	*****	14.17	****	3.78	**	7.64	***
0- 0.5 0.6- 1 over 1	manganese	4.26	****	4.43	****	0.65	***	0.20	*
0 - 1 1 - 1.5 over 1.5	zinc	1.72	****	1.25	***	0.36	*	0.17	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.86	****	0.77	****	0.47	***	0.15	*
0- 0.2 0.2- 0.5 over 1	boron	0.02	*	0.08	*	0.18	**	0.02	*
ratio of calcium to magnesium	calcium	479.85	****	459.52	****	417.08	****	243.15	***
needs to be more than 2 or 3	magnesium	351.85	*****	562.26	*****	830.99	*****	273.95	*****
should be less than potassium	sodium	195.30	***	478.71	*****	1,274.77	*****	592.21	*****
	sulfur	8.02	*	14.48	*	79.52	**	29.08	**
	molybdenum	0.06	***	0.06	***	0.06	***	0.01	**
	nickel	0.89	*	1.44	**	0.18	*	0.04	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.16	*	0.17	*	0.02	*	0.02	*
The degree of toxicity	barium	3.08	**	1.23	*	0.20	*	0.05	*
depends upon the pH of	cadmium	0.12	*	0.10	*	0.05	*	0.02	*
the soil, soil texture,	chromium	0.04	*	0.02	*	n d	*	n d	*
organic matter, and the	cobalt	0.08	*	0.09	*	0.04	*	0.04	*
concentrations of the	lead	2.75	**	1.55	**	0.51	*	0.14	*
individual elements as	lithium	0.25	*	0.25	*	0.24	*	0.15	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	0.19	*	0.41	*	0.03	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	3.55	*	3.43	*	3.51	*	2.17	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.10	*	0.12	*	0.66	*	0.22	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	6.86	***	6.50	***	6.62	***	6.68	***
The ECe is a measure of	ECe (milli-mho/cm)	0.71	**	0.81	***	6.72	*****	4.65	*****
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	13.3	0.7	10.8	0.5	81.9	4.1	41.5	2.1
2-4 affects some plants,	magnesium	18.1	1.5	14.1	1.2	115.3	9.5	65.9	5.5
> 4 affects many plants.	sodium	112.2	4.9	138.1	6.0	1,004.0	43.7	726.8	31.6
	potassium	13.2	0.3	6.9	0.2	2.6	0.1	4.8	0.1
	cation sum		7.4		7.9		57.3		39.2
problems over 150 ppm	chloride	116	3.3	143	4.0	2,375	66.9	1,662	46.8
	nitrate as N	3	0.2	3	0.2	15	1.1	10	0.7
	phosphorus as P	1.0	0.0	0.6	0.0	0.6	0.0	0.8	0.0
toxic over 800	sulfate as S	20.1	1.3	24.2	1.5	139.6	8.7	73.1	4.6
	anion sum		4.7		5.8		76.8		52.1
toxic over 1 for many plants	boron as B	0.09	*	0.11	*	0.22	**	0.07	*
increasing problems start at 6	SAR	4.7	***	6.5	****	16.8	*****	16.3	*****
est. gypsum requirement-lbs./1,000 square feet		34		84		221		101	
	infiltration rate inches/hour	very slow		very slow		slow		slow/fair	
	soil texture	sandy loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm	loam	gravel > 2 mm	sand	gravel > 2 mm
	sand	56.5%	0.0%	50.7%	0.0%	41.7%	2.5%	90.6%	0.0%
	silt	28.8%		26.4%		36.8%		5.2%	
	clay	14.7%		22.8%		21.6%		4.2%	
	lime (calcium carbonate)	no		no		no		no	
	Total nitrogen	0.051%		0.052%		0.014%		0.000%	
	Total organic carbon	0.567%		0.571%		0.161%		0.022%	
	carbon:nitrogen ratio	11.2		10.9		11.3		NA	
	organic matter based on carbon	1.13%		1.14%		0.32%		0.04%	
	moisture content of soil	14.4%		16.2%		14.4%		4.1%	
	half saturation percentage	16.3%		25.4%		27.1%		18.4%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 14, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA	**** high, ***** very high				

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-72-13 NB-2 15'	graphic	09-72-14 NB-2 22.5'	graphic	09-72-15 NB-2 30'	graphic	09-72-16 NB-2 37.5'	graphic
0 - 7 8-15 over 15	phosphorus	13.91	****	1.82	*	1.79	*	0.94	*
0-60 60 -120 121-180	potassium	37.32	**	21.76	*	13.57	*	12.89	*
0 - 4 4 - 10 over 10	iron	7.77	***	1.98	*	1.94	*	3.35	**
0- 0.5 0.6- 1 over 1	manganese	0.71	***	0.29	*	0.52	**	0.20	*
0 - 1 1 - 1.5 over 1.5	zinc	0.51	**	0.22	*	1.09	***	0.11	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.61	****	0.15	*	4.11	*****	0.11	*
0- 0.2 0.2- 0.5 over 1	boron	0.02	*	0.03	*	0.01	*	0.05	*
ratio of calcium to magnesium	calcium	463.69	****	152.22	**	97.55	*	134.59	**
needs to be more than 2 or 3	magnesium	1,001.22	*****	361.81	*****	240.63	*****	237.21	*****
should be less than potassium	sodium	1,027.71	*****	372.91	*****	257.70	****	256.40	****
	sulfur	51.33	**	23.88	*	14.94	*	15.04	*
	molybdenum	0.18	****	0.04	***	0.04	***	0.05	***
	nickel	0.40	*	0.11	*	n d	*	0.02	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.02	*	n d	*	0.02	*	n d	*
The degree of toxicity	barium	0.09	*	0.07	*	0.09	*	0.08	*
depends upon the pH of	cadmium	0.10	*	0.77	*	0.04	*	0.01	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*	0.01	*
organic matter, and the	cobalt	0.06	*	0.02	*	0.04	*	0.01	*
concentrations of the	lead	0.26	*	0.09	*	0.38	*	0.03	*
individual elements as	lithium	0.29	*	0.12	*	0.06	*	0.08	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	0.19	*	0.11	*	n d	*	n d	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	4.31	*	1.34	*	0.76	*	0.64	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.31	*	0.18	*	0.04	*	0.03	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	5.78	**	6.78	***	7.39	***	7.60	****
The ECe is a measure of	ECe (milli-mho/cm)	7.08	*****	3.78	****	3.63	****	3.69	****
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	84.5	4.2	35.7	1.8	35.3	1.8	51.0	2.5
2-4 affects some plants,	magnesium	183.3	15.1	83.4	6.9	92.0	7.6	98.4	8.1
> 4 affects many plants.	sodium	973.3	42.3	561.0	24.4	531.6	23.1	474.4	20.6
	potassium	3.8	0.1	4.8	0.1	4.8	0.1	4.8	0.1
	cation sum		61.8		33.2		32.6		31.4
problems over 150 ppm	chloride	2,670	75.2	1,346	37.9	1,313	37.0	1,324	37.3
	nitrate as N	16	1.1	9	0.7	9	0.6	9	0.7
	phosphorus as P	0.7	0.0	0.4	0.0	0.2	0.0	0.3	0.0
toxic over 800	sulfate as S	105.6	6.6	57.0	3.6	44.6	2.8	42.5	2.7
	anion sum		83.0		42.2		40.4		40.6
toxic over 1 for many plants	boron as B	0.08	*	0.07	*	0.03	*	0.01	*
increasing problems start at 6	SAR	13.6	*****	11.7	*****	10.7	*****	8.9	****
est. gypsum requirement-lbs./1,000 square feet		180		64		44		44	
infilrration rate inches/hour		fair/slow		fair/slow		fair		fair	
soil texture		sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm	sand	gravel > 2 mm	sand	gravel > 2 mm
sand		66.3%	3.2%	86.5%	3.0%	90.5%	0.0%	89.6%	0.5%
silt		17.7%		8.1%		7.0%		7.4%	
clay		16.0%		5.5%		2.5%		3.0%	
lime (calcium carbonate)		no		no		no		no	
Total nitrogen		0.010%		0.003%		0.000%		0.000%	
Total organic carbon		0.035%		0.041%		0.465%		0.537%	
carbon:nitrogen ratio		3.4		12.0		NA		NA	
organic matter based on carbon		0.07%		0.08%		0.93%		1.07%	
moisture content of soil		12.3%		4.2%		3.1%		4.0%	
half saturation percentage		23.7%		16.5%		14.5%		15.2%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 14, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
	**** high, ***** very high				

ammonium bicarbonate/DTPA

extractable - mg/kg soil
Interpretation of data
low medium high

Sample ID Number	09-72-17		09-72-18		09-72-19		09-72-20	
	NB-3 6"		NB-3 18"		NB-3 3'		NB-3 7.5'	
elements		graphic		graphic		graphic		graphic
phosphorus	2.06	*	1.58	*	1.51	*	3.50	**
potassium	87.67	***	36.73	**	24.34	*	18.89	*
iron	13.15	****	3.59	**	3.08	**	2.73	**
manganese	4.90	****	1.49	****	0.47	**	0.17	*
zinc	1.13	***	0.31	*	0.27	*	0.20	*
copper	0.93	****	0.50	****	0.31	***	0.22	**
boron	0.02	*	0.27	***	0.13	**	0.06	*
calcium	393.57	***	375.00	***	304.77	***	314.72	***
magnesium	491.42	*****	642.69	*****	563.15	*****	588.99	*****
sodium	258.77	****	906.82	*****	801.33	*****	981.27	*****
sulfur	9.17	*	68.74	**	66.61	**	68.39	**
molybdenum	0.07	***	0.04	***	0.01	**	0.28	****
nickel	0.83	*	0.27	*	0.10	*	0.06	*
aluminum	n d	*	n d	*	n d	*	n d	*
arsenic	0.11	*	0.06	*	0.04	*	0.02	*
barium	1.60	*	0.40	*	0.59	*	0.07	*
cadmium	0.12	*	0.08	*	0.07	*	0.05	*
chromium	0.02	*	n d	*	n d	*	n d	*
cobalt	0.08	*	0.03	*	0.04	*	0.02	*
lead	1.15	**	0.39	*	0.50	*	0.25	*
lithium	0.21	*	0.22	*	0.17	*	0.20	*
mercury	n d	*	n d	*	n d	*	n d	*
selenium	n d	*	0.19	*	n d	*	0.22	*
silver	n d	*	n d	*	n d	*	n d	*
strontium	2.78	*	2.95	*	2.92	*	2.87	*
tin	n d	*	n d	*	n d	*	n d	*
vanadium	0.20	*	0.68	*	0.66	*	0.41	*
Saturation Extract								
pH value	7.30	***	7.24	***	7.09	***	6.68	***
ECe (milli-mho/cm)	0.72	**	3.72	****	5.30	*****	7.74	*****
		millieq/l		millieq/l		millieq/l		millieq/l
calcium	10.5	0.5	39.5	2.0	66.9	3.3	108.6	5.4
magnesium	12.9	1.1	47.0	3.9	86.0	7.1	156.1	12.9
sodium	116.0	5.0	614.4	26.7	808.4	35.1	1,111.0	48.3
potassium	5.1	0.1	4.0	0.1	1.6	0.0	4.3	0.1
cation sum		6.8		32.7		45.6		66.7
chloride	118	3.3	1,190	33.5	1,732	48.8	2,754	77.6
nitrate as N	3	0.2	10	0.7	13	0.9	19	1.3
phosphorus as P	0.1	0.0	0.2	0.0	0.4	0.0	0.7	0.0
sulfate as S	20.9	1.3	105.5	6.6	151.2	9.4	147.9	9.2
anion sum		4.8		40.9		59.2		88.2
boron as B	0.04	*	0.38	**	0.22	**	0.17	*
SAR	5.7	***	15.6	*****	15.4	*****	16.0	*****
est. gypsum requirement-lbs./1,000 square feet	46		157		139		169	
infiltration rate inches/hour	very slow		slow		slow		slow	
soil texture	loamy sand	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy loam	gravel > 2 mm	sandy loam	gravel > 2 mm
sand	85.5%	1.3%	58.0%	5.8%	54.4%	2.3%	63.8%	2.4%
silt	2.8%		17.2%		31.7%		20.5%	
clay	11.6%		24.8%		13.9%		15.8%	
lime (calcium carbonate)	no		no		no		no	
Total nitrogen	0.057%		0.017%		0.009%		0.000%	
Total organic carbon	0.648%		0.170%		0.085%		0.036%	
carbon:nitrogen ratio	11.4		10.1		9.4		NA	
organic matter based on carbon	1.30%		0.34%		0.17%		0.07%	
moisture content of soil	11.2%		10.5%		9.6%		9.2%	
half saturation percentage	18.6%		27.4%		20.0%		18.7%	

The following trace elements may be toxic. The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions.

The pH optimum depends upon soil organic matter and clay content-for clay and loam soils: under 5.2 is too acidic, 6.5 to 7 is ideal, over 9 is too alkaline

The ECe is a measure of the soil salinity: 1-2 affects a few plants, 2-4 affects some plants, > 4 affects many plants.

problems over 150 ppm

toxic over 800

toxic over 1 for many plants

increasing problems start at 6

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 14, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
		**** high, ***** very high			

ammonium bicarbonate/DTPA

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-72-21 NB-3 15'	graphic	09-72-22 NB-3 22.5'	graphic	09-72-23 NB-3 37.5'	graphic
0 - 7 8-15 over 15	phosphorus	2.99	*	6.49	**	1.74	*
0-60 60 -120 121-180	potassium	14.02	*	43.89	**	16.19	*
0 - 4 4 - 10 over 10	iron	1.69	*	3.58	**	4.80	***
0- 0.5 0.6- 1 over 1	manganese	0.26	*	0.28	*	0.32	**
0 - 1 1 - 1.5 over 1.5	zinc	0.11	*	2.04	****	0.54	**
0- 0.2 0.3- 0.5 over 0.5	copper	0.12	*	0.53	****	0.11	*
0- 0.2 0.2- 0.5 over 1	boron	n d	*	0.07	*	0.04	*
ratio of calcium to magnesium	calcium	254.37	***	289.45	***	190.71	***
needs to be more than 2 or 3	magnesium	392.99	*****	920.32	*****	201.89	*****
should be less than potassium	sodium	472.40	*****	1,034.84	*****	258.06	****
	sulfur	28.17	**	80.33	**	25.46	**
	molybdenum	0.10	****	0.34	****	0.17	****
	nickel	0.09	*	0.07	*	0.04	*
The following trace	aluminum	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.02	*	n d	*	n d	*
The degree of toxicity	barium	0.10	*	0.10	*	0.17	*
depends upon the pH of	cadmium	0.29	*	1.35	**	0.12	*
the soil, soil texture,	chromium	n d	*	n d	*	0.02	*
organic matter, and the	cobalt	0.02	*	0.03	*	0.03	*
concentrations of the	lead	0.05	*	0.12	*	0.05	*
individual elements as	lithium	0.15	*	0.18	*	0.10	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*
	selenium	0.01	*	0.29	*	n d	*
The pH optimum depends	silver	n d	*	n d	*	n d	*
upon soil organic	strontium	1.76	*	1.66	*	0.57	*
matter and clay content-	tin	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.27	*	0.26	*	0.05	*
under 5.2 is too acidic							
6.5 to 7 is ideal	Saturation Extract						
over 9 is too alkaline	pH value	6.92	***	6.97	***	7.66	****
The ECe is a measure of	ECe (milli-mho/cm)	3.80	****	7.80	*****	3.57	****
the soil salinity:			millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	50.4	2.5	134.3	6.7	78.5	3.9
2-4 affects some plants,	magnesium	66.0	5.5	217.4	18.0	97.9	8.1
> 4 affects many plants.	sodium	591.4	25.7	1,000.5	43.5	482.5	21.0
	potassium	1.9	0.0	3.4	0.1	5.7	0.1
	cation sum		33.7		68.3		33.1
problems over 150 ppm	chloride	1,221	34.4	2,478	69.8	1,150	32.4
	nitrate as N	10	0.7	22	1.6	9	0.6
	phosphorus as P	0.6	0.0	0.6	0.0	0.2	0.0
toxic over 800	sulfate as S	66.7	4.2	123.5	7.7	59.9	3.7
	anion sum		39.3		79.1		36.8
toxic over 1 for many plants	boron as B	0.01	*	0.02	*	0.06	*
increasing problems start at 6	SAR	12.9	*****	12.4	*****	8.6	****
est. gypsum requirement-lbs./1,000 square feet		81		181		44	
infiltration rate inches/hour		slow/fair		slow/fair		fair	
soil texture		sand	gravel > 2 mm	sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm
sand		88.5%	0.7%	66.3%	0.9%	84.5%	0.0%
silt		4.8%		19.4%		12.6%	
clay		6.7%		14.3%		2.9%	
lime (calcium carbonate)		no		no		no	
Total nitrogen		0.004%		0.006%		0.017%	
Total organic carbon		0.014%		0.313%		0.159%	
carbon:nitrogen ratio		3.6		51.9		9.3	
organic matter based on carbon		0.03%		0.63%		0.32%	
moisture content of soil		4.7%		14.6%		3.6%	
half saturation percentage		16.0%		28.9%		15.4%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA	**** high, ***** very high				

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-75-01 NB-4 0.5'	graphic	09-75-02 NB-4 1.5'	graphic	09-75-03 NB-4 3'	graphic	09-75-04 NB-4 7.5'	graphic
	elements								
0 - 7 8-15 over 15	**phosphorus**	2.30	*	0.85	*	0.75	*	1.86	*
0-60 60 -120 121-180	**potassium**	89.28	***	43.86	**	30.62	**	36.08	**
0 - 4 4 - 10 over 10	**iron**	5.09	***	2.70	**	1.33	*	1.49	*
0- 0.5 0.6- 1 over 1	**manganese**	0.97	***	0.25	*	0.23	*	0.61	***
0 - 1 1 - 1.5 over 1.5	**zinc**	1.97	****	0.08	*	n d	*	1.96	****
0- 0.2 0.3- 0.5 over 0.5	**copper**	1.29	****	0.25	**	0.10	*	9.54	*****
0- 0.2 0.2- 0.5 over 1	**boron**	0.11	**	0.10	**	0.13	**	0.07	*
ratio of calcium to magnesium	**calcium**	418.02	****	433.40	****	449.35	****	407.19	****
needs to be more than 2 or 3	**magnesium**	285.60	*****	241.36	*****	384.43	*****	660.33	*****
should be less than potassium	**sodium**	49.04	*	54.95	**	124.69	***	294.16	****
	sulfur	7.74	*	4.37	*	8.19	*	8.35	*
	molybdenum	0.02	**	n d	*	0.05	***	0.07	***
	nickel	0.48	*	0.11	*	0.06	*	0.10	*
The following trace	**aluminum**	n d	*	n d	*	n d	*	n d	*
elements may be toxic	**arsenic**	0.06	*	0.03	*	n d	*	0.05	*
The degree of toxicity	**barium**	2.28	*	2.90	*	5.02	**	1.65	*
depends upon the pH of	**cadmium**	0.47	*	0.05	*	0.02	*	0.77	*
the soil, soil texture,	**chromium**	n d	*	n d	*	n d	*	n d	*
organic matter, and the	**cobalt**	0.06	*	0.03	*	0.05	*	0.05	*
concentrations of the	**lead**	1.41	**	0.13	*	n d	*	0.56	*
individual elements as	**lithium**	0.21	*	0.22	*	0.23	*	0.20	*
well as to their interactions.	**mercury**	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	n d	*	n d	*
The pH optimum depends	**silver**	n d	*	n d	*	n d	*	n d	*
upon soil organic	**strontium**	1.52	*	3.06	*	5.37	**	4.16	*
matter and clay content-	**tin**	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	**vanadium**	0.26	*	0.20	*	0.24	*	0.35	*
under 5.2 is too acidic									
6.5 to 7 is ideal	**Saturation Extract**								
over 9 is too alkaline	**pH value**	7.09	***	7.76	****	8.00	****	7.92	****
The ECe is a measure of	**ECe (milli-mho/cm)**	0.40	**	0.30	*	0.42	**	0.50	**
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	**calcium**	23.5	1.2	13.7	0.7	10.3	0.5	7.4	0.4
2-4 affects some plants,	**magnesium**	10.7	0.9	7.3	0.6	6.6	0.5	4.5	0.4
> 4 affects many plants.	**sodium**	36.4	1.6	37.8	1.6	68.5	3.0	93.8	4.1
	potassium	6.0	0.2	3.4	0.1	2.2	0.1	1.8	0.0
	cation sum		3.8		3.0		4.1		4.9
problems over 150 ppm	**chloride**	8	0.2	5	0.1	16	0.4	29	0.8
	nitrate as N	4	0.3	1	0.1	3	0.2	3	0.2
	phosphorus as P	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0
toxic over 800	**sulfate as S**	16.1	1.0	10.4	0.7	19.4	1.2	22.0	1.4
	anion sum		1.5		0.9		1.9		2.4
toxic over 1 for many plants	**boron as B**	0.08	*	0.09	*	0.11	*	0.20	*
increasing problems start at 6	**SAR**	1.6	**	2.1	**	4.1	***	6.7	****
est. gypsum requirement-lbs./1,000 square feet		9		9		22		53	
	infiltration rate inches/hour	slow/fair		slow		slow		slow	
	soil texture	sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm	loamy sand	gravel > 2 mm	sandy loam	gravel > 2 mm
	sand	77.2%	12.8%	78.1%	0.2%	84.0%	2.5%	77.0%	7.4%
	silt	12.6%		14.9%		13.0%		16.0%	
	clay	10.2%		7.0%		3.0%		7.0%	
	lime (calcium carbonate)	no		no		no		no	
	Total nitrogen	0.121%		0.024%		0.014%		0.000%	
	Total organic carbon	0.939%		0.172%		0.054%		0.036%	
	carbon:nitrogen ratio	7.8		7.3		3.8		NA	
	organic matter based on carbon	1.88%		0.34%		0.11%		0.07%	
	moisture content of soil	7.5%		8.4%		12.6%		12.7%	
	half saturation percentage	19.6%		15.5%		19.7%		21.9%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-006			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
	**** high, ***** very high				

ammonium bicarbonate/DTPA

extractable - mg/kg soil	Sample ID Number	09-75-05		09-75-06		09-75-07		09-75-08	
Interpretation of data		NB-4 15'		NB-4 22.5'		NB-4 30'		NB-4 37.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	3.74	**	2.07	*	1.11	*	3.91	**
0-60 60 -120 121-180	potassium	49.52	**	30.40	**	28.77	*	21.46	*
0 - 4 4 - 10 over 10	iron	13.62	****	3.10	**	2.01	*	10.06	****
0- 0.5 0.6- 1 over 1	manganese	10.54	*****	0.21	*	3.02	****	4.99	****
0 - 1 1 - 1.5 over 1.5	zinc	0.20	*	n d	*	0.07	*	0.25	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.71	****	0.20	**	0.50	****	1.65	****
0- 0.2 0.2- 0.5 over 1	boron	0.11	**	0.09	*	0.12	**	0.16	**
ratio of calcium to magnesium	calcium	412.46	****	453.58	****	446.07	****	478.21	****
needs to be more than 2 or 3	magnesium	419.28	*****	494.57	*****	519.75	*****	303.99	*****
should be less than potassium	sodium	210.54	****	241.53	****	286.70	****	149.10	***
	sulfur	12.20	*	10.52	*	33.01	**	17.16	*
	molybdenum	0.05	***	n d	*	n d	*	n d	*
	nickel	0.28	*	0.03	*	0.25	*	0.22	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.07	*	0.03	*	0.01	*	n d	*
The degree of toxicity	barium	2.71	*	0.93	*	0.57	*	1.35	*
depends upon the pH of	cadmium	0.09	*	0.03	*	0.16	*	0.14	*
the soil, soil texture,	chromium	0.04	*	n d	*	n d	*	0.05	*
organic matter, and the	cobalt	0.14	*	0.04	*	0.08	*	0.11	*
concentrations of the	lead	0.17	*	0.06	*	0.08	*	0.04	*
individual elements as	lithium	0.21	*	0.23	*	0.22	*	0.23	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	n d	*	n d	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	4.32	*	4.39	*	3.75	*	1.77	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.64	*	0.24	*	0.54	*	0.23	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	8.05	****	7.87	****	8.02	****	8.76	****
The ECe is a measure of	ECe (milli-	0.48	**	0.65	**	1.00	***	0.84	***
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	7.4	0.4	9.5	0.5	20.6	1.0	21.6	1.1
2-4 affects some plants,	magnesium	4.9	0.4	5.7	0.5	15.3	1.3	15.9	1.3
> 4 affects many plants.	sodium	87.4	3.8	114.5	5.0	159.9	7.0	136.7	5.9
	potassium	3.4	0.1	5.6	0.1	3.5	0.1	3.9	0.1
	cation sum		4.7		6.1		9.3		8.4
problems over 150 ppm	chloride	17	0.5	74	2.1	123	3.5	84	2.4
	nitrate as N	2	0.1	4	0.3	2	0.1	2	0.1
	phosphorus as P	0.2	0.0	0.4	0.0	0.0	0.0	0.1	0.0
toxic over 800	sulfate as S	27.6	1.7	25.3	1.6	62.1	3.9	41.0	2.6
	anion sum		2.3		4.0		7.5		5.1
toxic over 1 for many plants	boron as B	0.15	*	0.17	*	0.18	*	0.15	*
increasing problems start at 6	SAR	6.1	****	7.3	****	6.5	****	5.4	***
est. gypsum requirement-lbs./1,000 square feet		37		43		51		26	
infiltration rate inches/hour		slow		slow		slow/fair		fair/slow	
soil texture		loamy sand	gravel > 2 mm	sandy loam	gravel > 2 mm	loamy sand	gravel > 2 mm	sandy loam	gravel > 2 mm
sand		82.0%	5.3%	78.3%	8.7%	82.8%	0.7%	NA	NA
silt		8.5%		10.7%		10.4%		NA	
clay		9.5%		11.0%		6.8%		NA	
lime (calcium carbonate)		no		no		no		yes	
Total nitrogen		0.034%		0.026%		0.036%		0.032%	
Total organic carbon		0.118%		0.059%		0.092%		0.362%	
carbon:nitrogen ratio		3.4		2.3		2.6		11.4	
organic matter based on carbon		0.24%		0.12%		0.18%		0.72%	
moisture content of soil		12.8%		11.8%		16.5%		8.8%	
half saturation percentage		25.3%		24.0%		26.9%		19.0%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-010			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA	**** high, ***** very high				

extractable - mg/kg soil	Sample ID Number	09-75-09		09-75-10		09-75-11		09-75-12	
Interpretation of data		NB-6 0.5'		NB-6 1.5'		NB-6 3'		NB-6 7.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	3.20	**	2.95	*	3.68	**	2.09	*
0-60 60 -120 121-180	potassium	108.36	***	101.48	***	124.02	****	60.28	***
0 - 4 4 - 10 over 10	iron	1.64	*	1.60	*	1.47	*	15.90	*****
0- 0.5 0.6- 1 over 1	manganese	0.42	**	0.33	**	0.24	*	5.45	****
0 - 1 1 - 1.5 over 1.5	zinc	1.33	***	1.34	***	1.06	***	0.28	*
0- 0.2 0.3- 0.5 over 0.5	copper	1.51	****	1.45	****	2.29	****	1.06	****
0- 0.2 0.2- 0.5 over 1	boron	0.13	**	0.14	**	0.23	***	0.15	**
ratio of calcium to magnesium	calcium	413.06	****	410.09	****	372.23	***	267.14	***
needs to be more than 2 or 3	magnesium	982.89	*****	1,006.40	*****	1,256.47	*****	483.20	*****
should be less than potassium	sodium	285.31	****	319.95	****	1,097.87	*****	316.13	****
	sulfur	10.18	*	16.36	*	8.89	*	21.56	*
	molybdenum	0.07	***	0.10	***	1.70	*****	0.50	****
	nickel	0.55	*	0.50	*	0.12	*	0.33	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.04	*	0.11	*	n d	*	0.01	*
The degree of toxicity	barium	1.37	*	1.43	*	0.78	*	0.53	*
depends upon the pH of	cadmium	1.40	**	1.60	**	1.14	**	0.24	*
the soil, soil texture,	chromium	n d	*	n d	*	n d	*	0.02	*
organic matter, and the	cobalt	0.07	*	0.03	*	0.05	*	0.05	*
concentrations of the	lead	0.47	*	0.53	*	0.39	*	0.18	*
individual elements as	lithium	0.21	*	0.22	*	0.21	*	0.15	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	0.13	*	0.16	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	2.09	*	2.15	*	2.56	*	1.34	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.53	*	0.52	*	0.53	*	0.39	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	7.91	****	7.90	****	8.31	****	8.60	****
The ECe is a measure of	ECe (milli-	0.55	**	0.50	**	0.48	**	1.06	***
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	23.2	1.2	20.7	1.0	5.7	0.3	23.2	1.2
2-4 affects some plants,	magnesium	14.4	1.2	10.4	0.9	3.6	0.3	15.8	1.3
> 4 affects many plants.	sodium	74.6	3.2	69.9	3.0	101.1	4.4	185.8	8.1
	potassium	2.8	0.1	2.1	0.1	2.1	0.1	2.6	0.1
	cation sum		5.7		5.0		5.0		10.6
problems over 150 ppm	chloride	45	1.3	21	0.6	2	0.1	101	2.8
	nitrate as N	4	0.3	4	0.3	2	0.1	2	0.2
	phosphorus as P	0.3	0.0	0.2	0.0	0.5	0.0	0.1	0.0
toxic over 800	sulfate as S	23.5	1.5	20.9	1.3	15.9	1.0	55.0	3.4
	anion sum		3.0		2.2		1.2		6.4
toxic over 1 for many plants	boron as B	0.08	*	0.10	*	0.30	**	0.12	*
increasing problems start at 6	SAR	3.0	**	3.1	***	8.2	****	7.3	****
est. gypsum requirement-lbs./1,000 square feet		54		60		194		56	
infiltration rate inches/hour		slow/fair		slow/fair		slow		slow/fair	
soil texture		gravelly sandy clay loam	gravel > 2 mm	gravelly sandy clay loam	gravel > 2 mm	gravelly loam	gravel > 2 mm	gravelly sandy loam	gravel > 2 mm
sand		49.9%	20.0%	46.8%	20.9%	43.9%	38.5%	62.4%	61.4%
silt		25.6%		26.5%		32.9%		22.4%	
clay		24.5%		26.6%		23.1%		15.2%	
lime (calcium carbonate)		low		low		low		yes	
Total nitrogen		0.097%		0.103%		0.037%		0.033%	
Total organic carbon		0.892%		0.865%		0.231%		0.190%	
carbon:nitrogen ratio		9.2		8.4		6.2		5.7	
organic matter based on carbon		1.78%		1.73%		0.46%		0.38%	
moisture content of soil		18.8%		19.8%		24.0%		6.9%	
half saturation percentage		31.0%		32.3%		42.4%		20.1%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-014			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil	Sample ID Number	09-75-13		09-75-14		09-75-15		09-75-16	
Interpretation of data		NB-6 15'		NB-6 22.5'		NB-6 30'		NB-6 37.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	0.74	*	0.38	*	1.76	*	1.03	*
0-60 60 -120 121-180	potassium	141.84	****	150.52	****	230.18	*****	240.72	*****
0 - 4 4 - 10 over 10	iron	1.34	*	1.65	*	3.74	**	4.12	***
0- 0.5 0.6- 1 over 1	manganese	0.48	**	0.83	***	4.45	****	1.62	****
0 - 1 1 - 1.5 over 1.5	zinc	0.46	*	0.30	*	1.67	****	0.85	**
0- 0.2 0.3- 0.5 over 0.5	copper	2.18	****	2.24	****	7.25	*****	4.85	*****
0- 0.2 0.2- 0.5 over 1	boron	0.19	**	0.33	***	0.18	**	0.30	***
ratio of calcium to magnesium	calcium	396.90	***	412.36	****	409.79	****	309.38	***
needs to be more than 2 or 3	magnesium	1,314.31	*****	1,054.85	*****	1,538.95	*****	1,150.42	*****
should be less than potassium	sodium	738.12	*****	626.35	*****	718.37	*****	803.83	*****
	sulfur	27.46	**	16.97	*	30.39	**	187.39	***
	molybdenum	1.25	*****	3.69	*****	2.11	*****	4.23	*****
	nickel	0.09	*	0.13	*	0.44	*	0.39	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.06	*	n d	*	n d	*	0.05	*
The degree of toxicity	barium	0.72	*	0.26	*	0.29	*	0.12	*
depends upon the pH of	cadmium	0.62	*	0.18	*	0.30	*	1.81	**
the soil, soil texture,	chromium	n d	*	n d	*	0.02	*	n d	*
organic matter, and the	cobalt	0.05	*	0.06	*	0.12	*	0.08	*
concentrations of the	lead	0.21	*	0.18	*	0.98	*	0.52	*
individual elements as	lithium	0.23	*	0.24	*	0.26	*	0.21	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	0.03	*	0.12	*	0.15	*	0.27	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	2.84	*	2.06	*	2.52	*	1.61	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.40	*	0.19	*	0.23	*	0.38	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	8.13	****	8.15	****	8.12	****	7.90	****
The ECe is a measure of	ECe (milli-	1.21	***	0.62	**	0.71	**	1.76	***
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	30.2	1.5	11.1	0.6	14.1	0.7	74.8	3.7
2-4 affects some plants,	magnesium	22.6	1.9	6.2	0.5	8.8	0.7	40.8	3.4
> 4 affects many plants.	sodium	176.6	7.7	109.6	4.8	118.4	5.1	247.9	10.8
	potassium	3.0	0.1	3.1	0.1	4.3	0.1	6 4	0.2
	cation sum		11.1		5.9		6.7		18.1
problems over 150 ppm	chloride	247	6.9	55	1.5	62	1.7	133	3.8
	nitrate as N	3	0.2	2	0.1	2	0.1	2	0.2
	phosphorus as P	0.1	0.0	0.2	0.0	0.2	0.0	0.1	0.0
toxic over 800	sulfate as S	39.0	2.4	23.1	1.4	32.1	2.0	201.0	12.6
	anion sum		9.6		3.1		3.9		16.5
toxic over 1 for many plants	boron as B	0.16	*	0.22	**	0.19	*	0.25	**
increasing problems start at 6	SAR	5.9	***	6.5	****	6.1	****	5.7	***
est. gypsum requirement-lbs./1,000 square feet		134		113		132		143	
infiltration rate inches/hour		slow/fair		slow		slow/fair		fair/slow	
soil texture		gravelly loam	gravel > 2 mm	gravelly loam	gravel > 2 mm	clay loam	gravel > 2 mm	loam	gravel > 2 mm
sand		40.4%	46.5%	46.4%	28.7%	30.2%	14.8%	43.8%	4.5%
silt		36.8%		34.4%		34.1%		35.7%	
clay		22.8%		19.2%		35.7%		20.4%	
lime (calcium carbonate)		yes		yes		yes		yes	
Total nitrogen		0.079%		0.030%		0.056%		0.048%	
Total organic carbon		0.172%		0.105%		0.247%		0.185%	
carbon:nitrogen ratio		2.2		3.5		4.4		3.8	
organic matter based on carbon		0.34%		0.21%		0.49%		0.37%	
moisture content of soil		26.3%		21.4%		24.7%		30.7%	
half saturation percentage		43.3%		38.1%		49.3%		40.8%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-018			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-75-17 NB-7 0.5'	graphic	09-75-18 NB-7 1.5'	graphic	09-75-19 NB-7 3'	graphic	09-75-20 NB-7 7.5'	graphic
0 - 7 8-15 over 15	phosphorus	2.45	*	5.14	**	0.58	*	2.54	*
0-60 60 -120 121-180	potassium	86.05	***	53.72	**	31.36	**	32.91	**
0 - 4 4 - 10 over 10	iron	20.92	*****	39.06	*****	3.00	**	2.35	*
0- 0.5 0.6- 1 over 1	manganese	1.84	****	4.60	****	1.00	***	0.28	*
0 - 1 1 - 1.5 over 1.5	zinc	0.41	*	n d	*	0.03	*	0.02	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.62	****	0.52	****	0.45	***	0.35	***
0- 0.2 0.2- 0.5 over 1	boron	0.06	*	0.03	*	0.43	***	0.13	**
ratio of calcium to magnesium	calcium	378.49	***	288.10	***	334.27	***	314.24	***
needs to be more than 2 or 3	magnesium	254.98	*****	147.97	****	722.54	*****	510.83	*****
should be less than potassium	sodium	65.79	**	161.83	***	955.67	*****	900.38	*****
	sulfur	6.44	*	4.58	*	52.86	**	54.96	**
	molybdenum	0.02	**	n d	*	n d	*	0.01	**
	nickel	0.68	*	0.61	*	0.26	*	0.11	*
The following trace	aluminum	n d	*	0.39	*	n d	*	n d	*
elements may be toxic	arsenic	0.14	*	0.13	*	0.07	*	n d	*
The degree of toxicity	barium	1.64	*	1.14	*	0.46	*	0.07	*
depends upon the pH of	cadmium	0.10	*	0.07	*	0.07	*	0.03	*
the soil, soil texture,	chromium	0.05	*	0.10	*	0.01	*	n d	*
organic matter, and the	cobalt	0.03	*	0.04	*	0.07	*	0.08	*
concentrations of the	lead	0.69	*	0.10	*	0.20	*	0.14	*
individual elements as	lithium	0.19	*	0.15	*	0.19	*	0.18	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	0.18	*	0.01	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	2.94	*	2.71	*	4.03	*	3.19	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.08	*	0.13	*	0.73	*	0.42	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	6.78	***	7.11	***	8.06	****	7.45	***
The ECe is a measure of	ECe (milli-mho/cm)	0.31	*	0.55	**	1.75	***	5.43	*****
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	9.4	0.5	8.3	0.4	15.1	0.8	60.9	3.0
2-4 affects some plants,	magnesium	5.5	0.5	5.0	0.4	10.0	0.8	65.1	5.4
> 4 affects many plants.	sodium	47.2	2.1	91.8	4.0	318.0	13.8	828.2	36.0
	potassium	5.7	0.1	4.7	0.1	3.4	0.1	3.8	0.1
	cation sum		3.1		4.9		15.5		44.5
problems over 150 ppm	chloride	11	0.3	60	1.7	394	11.1	1,699	47.9
	nitrate as N	5	0.3	3	0.2	4	0.3	10	0.7
	phosphorus as P	0.1	0.0	0.1	0.0	0.2	0.0	0.5	0.0
toxic over 800	sulfate as S	9.3	0.6	17.3	1.1	53.4	3.3	112.8	7.1
	anion sum		1.2		3.0		14.7		55.6
toxic over 1 for many plants	boron as B	0.08	*	0.16	*	0.37	**	0.25	**
increasing problems start at 6	SAR	3.0	***	6.2	****	15.6	*****	17.6	*****
est. gypsum requirement-lbs./1,000 square feet		11		28		166		155	
infiltration rate inches/hour		very slow		slow		slow		slow	
soil texture		sandy loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy clay loam	gravel > 2 mm	sandy loam	gravel > 2 mm
sand		64.2%	0.0%	66.3%	1.0%	54.2%	0.0%	69.8%	1.1%
silt		25.6%		27.1%		21.9%		19.3%	
clay		10.1%		6.6%		23.9%		10.8%	
lime (calcium carbonate)		no		no		no		no	
Total nitrogen		0.073%		0.095%		0.031%		0.019%	
Total organic carbon		0.380%		0.357%		0.182%		0.069%	
carbon:nitrogen ratio		5.2		3.8		5.8		3.6	
organic matter based on carbon		0.76%		0.71%		0.36%		0.14%	
moisture content of soil		9.7%		9.6%		9.5%		7.8%	
half saturation percentage		14.2%		15.9%		33.4%		20.6%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	March 16, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-022			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil	Sample ID Number	09-75-21		09-75-22		09-75-23		09-75-24	
Interpretation of data		NB-7 15'		NB-7 22.5'		NB-7 30'		NB-7 37.5'	
low medium high	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	6.11	**	4.57	**	3.36	**	3.33	**
0-60 60 -120 121-180	potassium	23.59	*	23.60	*	35.69	**	32.95	**
0 - 4 4 - 10 over 10	iron	4.47	***	3.50	**	4.36	***	4.48	***
0- 0.5 0.6- 1 over 1	manganese	0.29	*	0.56	**	3.00	****	1.37	****
0 - 1 1 - 1.5 over 1.5	zinc	0.04	*	0.08	*	2.22	****	1.61	****
0- 0.2 0.3- 0.5 over 0.5	copper	0.28	**	0.74	****	12.21	*****	0.81	****
0- 0.2 0.2- 0.5 over 1	boron	0.07	*	0.08	*	0.15	**	0.21	***
ratio of calcium to magnesium	calcium	306.79	***	253.41	***	282.06	***	291.59	***
needs to be more than 2 or 3	magnesium	375.40	*****	348.07	*****	562.47	*****	912.11	*****
should be less than potassium	sodium	613.41	*****	476.11	*****	528.50	*****	568.13	*****
	sulfur	35.90	**	30.77	**	69.61	**	115.46	**
	molybdenum	n d	*	n d	*	n d	*	0.54	****
	nickel	0.09	*	0.10	*	0.20	*	0.28	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.02	*	0.02	*	0.02	*	0.57	**
The degree of toxicity	barium	n d	*	0.08	*	0.25	*	0.10	*
depends upon the pH of	cadmium	0.03	*	0.06	*	0.22	*	0.14	*
the soil, soil texture,	chromium	n d	*	n d	*	0.01	*	0.02	*
organic matter, and the	cobalt	0.08	*	0.04	*	0.06	*	0 07	*
concentrations of the	lead	0.10	*	n d	*	0.78	*	0.25	*
individual elements as	lithium	0.17	*	0.14	*	0.15	*	0.15	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	0.16	*	0.13	*	0.10	*	0.01	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	2.33	*	1.66	*	1.20	*	0.78	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.31	*	0.29	*	0.34	*	0.23	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 9 is too alkaline	pH value	6.98	***	7.34	***	7.74	****	8.06	****
The ECe is a measure of	ECe (milli-	4.81	*****	4.70	*****	6.51	*****	2.58	****
the soil salinity:	mho/cm)		millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	67.6	3.4	80.1	4.0	247.0	12.3	93.5	4.7
2-4 affects some plants,	magnesium	80.3	6.6	95.1	7.9	221.2	18.3	56.4	4.7
> 4 affects many plants.	sodium	729.7	31.7	671.3	29.2	747.8	32.5	339.2	14.7
	potassium	4.3	0.1	3.5	0.1	5.0	0.1	3.2	0.1
	cation sum		41.8		41.1		63.3		24.2
problems over 150 ppm	chloride	1,538	43.3	1,477	41.6	2,129	60.0	481	13.6
	nitrate as N	10	0.7	9	0.7	17	1.2	5	0.3
	phosphorus as P	0.8	0.0	1.0	0.0	0.5	0.0	0.0	0.0
toxic over 800	sulfate as S	74.7	4.7	70.5	4.4	138.1	8.6	157.4	9.8
	anion sum		48.8		46.7		69.8		23.7
toxic over 1 for many plants	boron as B	0.10	*	0.09	*	0.09	*	0.10	*
increasing problems start at 6	SAR	14.2	*****	12.0	*****	8.3	****	6.8	****
est. gypsum requirement-lbs./1,000 square feet		105		82		92		102	
infiltration rate inches/hour		slow/fair		slow/fair		fair/slow		fair/slow	
soil texture		loamy sand	gravel > 2 mm	sand	gravel > 2 mm	loamy sand	gravel > 2 mm	gravelly loam	gravel > 2 mm
sand		85.4%	0.0%	89.2%	0.0%	86.5%	1.9%	48.7%	22.4%
silt		8.7%		6.3%		4.3%		40.2%	
clay		5.9%		4.5%		9.2%		11.1%	
lime (calcium carbonate)		no		no		no		yes	
Total nitrogen		0.014%		0.017%		0.022%		0.020%	
Total organic carbon		0.035%		0.058%		0.115%		0.108%	
carbon:nitrogen ratio		2.5		3.5		5.3		5.4	
organic matter based on carbon		0.07%		0.12%		0.23%		0.22%	
moisture content of soil		4.6%		6.0%		8.8%		19.8%	
half saturation percentage		16.9%		16.9%		21.1%		33.3%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 18, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
	**** high, ***** very high				

ammonium bicarbonate/DTPA												
extractable - mg/kg soil	Sample ID Number	09-77-01			09-77-02			09-77-03			09-77-04		
Interpretation of data		NB-8 0.5'			NB-8 1.5'			NB-8 3'			NB-8 7.5'		
low medium high	elements		graphic			graphic			graphic			graphic	
0 - 7 8-15 over 15	phosphorus	1.87	*		1.84	*		2.10	*		5.60	**	
0-60 60 -120 121-180	potassium	42.47	**		41.71	**		46.06	**		22.58	*	
0 - 4 4 - 10 over 10	iron	10.40	****		7.10	***		12.51	****		4.85	***	
0- 0.5 0.6- 1 over 1	manganese	1.92	****		1.51	****		2.45	****		0.18	*	
0 - 1 1 - 1.5 over 1.5	zinc	0.43	*		0.42	*		0.37	*		0.04	*	
0- 0.2 0.3- 0.5 over 0.5	copper	2.04	****		1.04	****		2.21	****		0.18	*	
0- 0.2 0.2- 0.5 over 1	boron	0.15	**		0.11	**		0.12	**		0.10	*	
ratio of calcium to magnesium	calcium	310.16	***		367.42	***		324.77	***		339.15	***	
needs to be more than 2 or 3	magnesium	353.21	*****		654.94	*****		330.59	*****		378.12	*****	
should be less than potassium	sodium	115.89	***		405.71	*****		152.06	***		627.87	*****	
	sulfur	8.11	*		10.58	*		7.67	*		53.24	**	
	molybdenum	0.13	****		0.07	***		0.05	***		0.37	****	
	nickel	0.31	*		0.72	*		0.25	*		0.09	*	
The following trace	aluminum	nd	*		nd	*		nd	*		nd	*	
elements may be toxic	arsenic	0.13	*		0.21	*		0.11	*		nd	*	
The degree of toxicity	barium	1.04	*		1.27	*		1.08	*		0.16	*	
depends upon the pH of	cadmium	0.07	*		0.06	*		0.05	*		0.04	*	
the soil, soil texture,	chromium	nd	*		nd	*		nd	*		nd	*	
organic matter, and the	cobalt	0.04	*		0.03	*		0.04	*		0.04	*	
concentrations of the	lead	1.50	**		0.75	*		1.12	**		0.07	*	
individual elements as	lithium	0.17	*		0.21	*		0.18	*		0.23	*	
well as to their interactions.	mercury	nd	*		nd	*		nd	*		nd	*	
	selenium	nd	*		0.07	*		nd	*		0.06	*	
The pH optimum depends	silver	nd	*		nd	*		nd	*		nd	*	
upon soil organic	strontium	2.79	*		2.85	*		2.83	*		2.52	*	
matter and clay content-	tin	nd	*		nd	*		nd	*		nd	*	
for clay and loam soils:	vanadium	0.58	*		0.42	*		0.63	*		0.34	*	
under 5.2 is too acidic													
6.5 to 7 is ideal	Saturation Extract												
over 9 is too alkaline	pH value	8.02	****		7.90	****		8.11	****		7.34	***	
The ECe is a measure of	ECe (milli-	0.46	**		0.37	*		0.44	**		4.37	*****	
the soil salinity:	mho/cm)			millieq/l			millieq/l			millieq/l			millieq/l
1-2 affects a few plants	calcium	18.4		0.9	10.5		0.5	23.7		1.2	60.6		3.0
2-4 affects some plants,	magnesium	9.5		0.8	4.5		0.4	9.4		0.8	60.6		5.0
> 4 affects many plants.	sodium	58.3		2.5	62.6		2.7	69.2		3.0	633.2		27.5
	potassium	2.5		0.1	4.2		0.1	5.5		0.1	3.8		0.1
	eation sum			4.3			3.7			5.1			35.7
problems over 150 ppm	chloride	13		0.4	16		0.4	17		0.5	1,034		29.1
	nitrate as N	2		0.2	4		0.3	3		0.2	8		0.6
	phosphorus as P	0.1		0.0	0.1		0.0	0.6		0.0	2.0		0.1
toxic over 800	sulfate as S	23.4		1.5	11.0		0.7	10.1		0.6	91.5		5.7
	anion sum			2.0			1.4			1.4			35.5
toxic over 1 for many plants	boron as B	0.08	*		0.25	**		0.11	*		0.27	**	
increasing problems start at 6	SAR	2.7	**		4.1	***		3.0	***		13.8	*****	
est. gypsum requirement-lbs./1,000 square feet		20			72			26			108		
infiltration rate inches/hour		slow			very slow			slow			slow/fair		
soil texture		sandy loam	gravel > 2 mm		sandy clay loam	gravel > 2 mm		sandy loam	gravel > 2 mm		loamy sand	gravel > 2 mm	
sand		57.6%	3.5%		57.5%	0.7%		54.2%	3.5%		83.8%	0.0%	
silt		24.0%			16.9%			27.1%			7.1%		
clay		18.5%			25.6%			18.7%			9.1%		
lime (calcium carbonate)		yes			yes			yes			no		
Total nitrogen		0.073%			0.062%			0.044%			0.000%		
Total organic carbon		0.422%			0.405%			0.452%			0.041%		
carbon:nitrogen ratio		5.8			6.5			10.2			NA		
organic matter based on carbon		0.84%			0.81%			0.90%			0.08%		
moisture content of soil		11.6%			13.6%			11.8%			6.4%		
half saturation percentage		19.2%			23.8%			19.4%			20.4%		

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste/extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

WALLACE LABS	SOILS REPORT	Print Date	Mar. 18, 2009	Receive Date	3-12-09
365 Coral Circle	Location	Newport Beach City Hall & Park, Project No. 602184-002			
El Segundo, CA 90245	Requester	Vivian Cheng, Leighton Consulting Inc.			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				

ammonium bicarbonate/DTPA — **** high, ***** very high

extractable - mg/kg soil Interpretation of data low medium high	Sample ID Number	09-77-05 NB-8 15'	graphic	09-77-06 NB-8 22.5'	graphic	09-77-07 NB-8 30'	graphic	09-77-08 NB-8 37.5'	graphic
	elements								
0 - 7 8-15 over 15	phosphorus	8.73	***	8.32	***	13.59	****	8.40	***
0-60 60 -120 121-180	potassium	90.62	***	110.57	***	133.47	****	68.25	***
0 - 4 4 - 10 over 10	iron	4.46	***	2.05	*	2.66	**	2.60	**
0- 0.5 0.6- 1 over 1	manganese	1.30	****	0.85	***	0.35	**	0.18	*
0 - 1 1 - 1.5 over 1.5	zinc	0.67	**	2.73	****	5.91	****	0.04	*
0- 0.2 0.3- 0.5 over 0.5	copper	0.89	****	0.73	****	1.50	****	2.04	****
0- 0.2 0.2- 0.5 over 1	boron	0.14	**	0.19	**	0.23	***	0.12	**
ratio of calcium to magnesium	calcium	685.25	*****	720.36	*****	604.35	*****	450.37	****
needs to be more than 2 or 3	magnesium	1,931.32	*****	1,886.10	*****	1,490.35	*****	553.79	*****
should be less than potassium	sodium	1,677.85	*****	1,730.18	*****	1,450.04	*****	689.29	*****
	sulfur	196.13	***	242.79	***	222.03	***	103.02	**
	molybdenum	0.44	****	0.89	****	1.44	*****	0.10	****
	nickel	1.07	**	1.65	**	0.61	*	0.26	*
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	n d	*	n d	*	0.03	*	n d	*
The degree of toxicity	barium	n d	*	n d	*	n d	*	0.03	*
depends upon the pH of	cadmium	0.25	*	1.48	**	3.01	***	0.46	*
the soil, soil texture,	chromium	n d	*	0.26	*	n d	*	n d	*
organic matter, and the	cobalt	0.20	*	0.06	*	0.06	*	0.02	*
concentrations of the	lead	0.17	*	0.07	*	0.24	*	0.15	*
individual elements as	lithium	0.49	*	0.65	*	0.44	*	0.27	*
well as to their interactions.	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	0.09	*	0.03	*	0.46	*	0.24	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	4.49	*	3.51	*	2.54	*	1.29	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.07	*	0.09	*	0.32	*	0.25	*
under 5.2 is too acidic									
6.5 to 7 is ideal	**Saturation Extract**								
over 9 is too alkaline	pH value	5.95	**	6.16	***	6.45	***	6.46	***
The ECe is a measure of	ECe (milli-mho/cm)	6.78	*****	6.86	*****	6.70	*****	6.30	*****
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	117.0	5.8	140.3	7.0	155.1	7.8	191.2	9.6
2-4 affects some plants,	magnesium	165.0	13.6	182.2	15.1	180.3	14.9	197.7	16.3
> 4 affects many plants.	sodium	899.8	39.1	909.1	39.5	822.2	35.7	724.4	31.5
	potassium	6.5	0.2	7.4	0.2	8.0	0.2	5.8	0.1
	cation sum		58.8		61.8		58.6		57.5
problems over 150 ppm	chloride	1,769	49.8	1,808	50.9	1,657	46.7	1,625	45.8
	nitrate as N	79	5.7	15	1.1	15	1.0	14	1.0
	phosphorus as P	0.4	0.0	0.2	0.0	0.3	0.0	1.0	0.0
toxic over 800	sulfate as S	168.5	10.5	199.8	12.5	190.9	11.9	176.3	11.0
	anion sum		66.0		64.5		59.7		57.9
toxic over 1 for many plants	boron as B	0.25	**	0.24	**	0.26	**	0.32	**
increasing problems start at 6	SAR	12.6	*****	11.9	*****	10.6	*****	8.8	****
est. gypsum requirement-lbs./1,000 square feet		298		307		256		119	
infiltration rate inches/hour		slow		slow/fair		fair/slow		fair	
soil texture		clay loam	gravel > 2 mm	clay loam	gravel > 2 mm	clay loam	gravel > 2 mm	sandy loam	gravel > 2 mm
sand		30.5%	12.5%	32.3%	11.1%	32.7%	10.5%	76.2%	0.0%
silt		36.5%		34.4%		35.2%		14.4%	
clay		33.0%		33.3%		32.1%		9.4%	
lime (calcium carbonate)		no		no		no		no	
Total nitrogen		0.016%		0.015%		0.013%		0.009%	
Total organic carbon		0.069%		0.053%		0.040%		0.054%	
carbon:nitrogen ratio		4.2		3.5		3.2		6.2	
organic matter based on carbon		0.14%		0.11%		0.08%		0.11%	
moisture content of soil		26.3%		27.3%		24.7%		15.5%	
half saturation percentage		47.6%		50.9%		46.8%		23.6%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste/extract. nd means not detected.

Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

APPENDIX D

Percolation Data Sheet

Boring ID:	P-1					
Reading No.	Time Interval (min)	Total Depth of Hole (feet)	Initial water level from top (feet)	Final water level from top (feet)	Δ water level (feet)	Percolation Rate (gal/sq.ft/day)
1	30	8	1.75	3	1.25	2.67
2	30	8	1.75	3	1.25	2.67
3	30	8	1.71	3.00	1.29	2.74
4	30	8	1.75	3.07	1.32	2.83
5	30	8	1.8	3.27	1.47	3.23
6	30	8	1.71	3.12	1.41	3.03
7	30	8	1.75	3.17	1.42	3.08
8	30	8	1.71	3.17	1.46	3.15
9	30	8	1.76	3.23	1.47	3.20
10	30	8	1.74	3.22	1.48	3.22
11	30	8	1.75	3.21	1.46	3.17
12	30	8	1.77	3.26	1.49	3.26
					Average Rate:	3.0

Boring ID:	P-2					
Reading No.	Time Interval (min)	Total Depth of Hole (feet)	Initial water level from top (feet)	Final water level from top (feet)	Δ water level (feet)	Percolation Rate (gal/sq.ft/day)
1	30	8.5	2.21	2.41	0.20	0.39
2	30	8.5	2.21	2.37	0.16	0.31
3	30	8.5	2.21	2.38	0.17	0.33
4	30	8.5	2.25	2.42	0.17	0.33
5	30	8.5	2.21	2.37	0.16	0.31
6	30	8.5	2.21	2.39	0.18	0.35
7	30	8.5	2.16	2.37	0.21	0.40
8	30	8.5	2.11	2.37	0.26	0.50
9	30	8.5	2.19	2.38	0.19	0.37
10	30	8.5	2.23	2.42	0.19	0.37
11	30	8.5	2.21	2.41	0.20	0.39
12	30	8.5	2.21	2.41	0.20	0.39
					Average Rate:	0.4

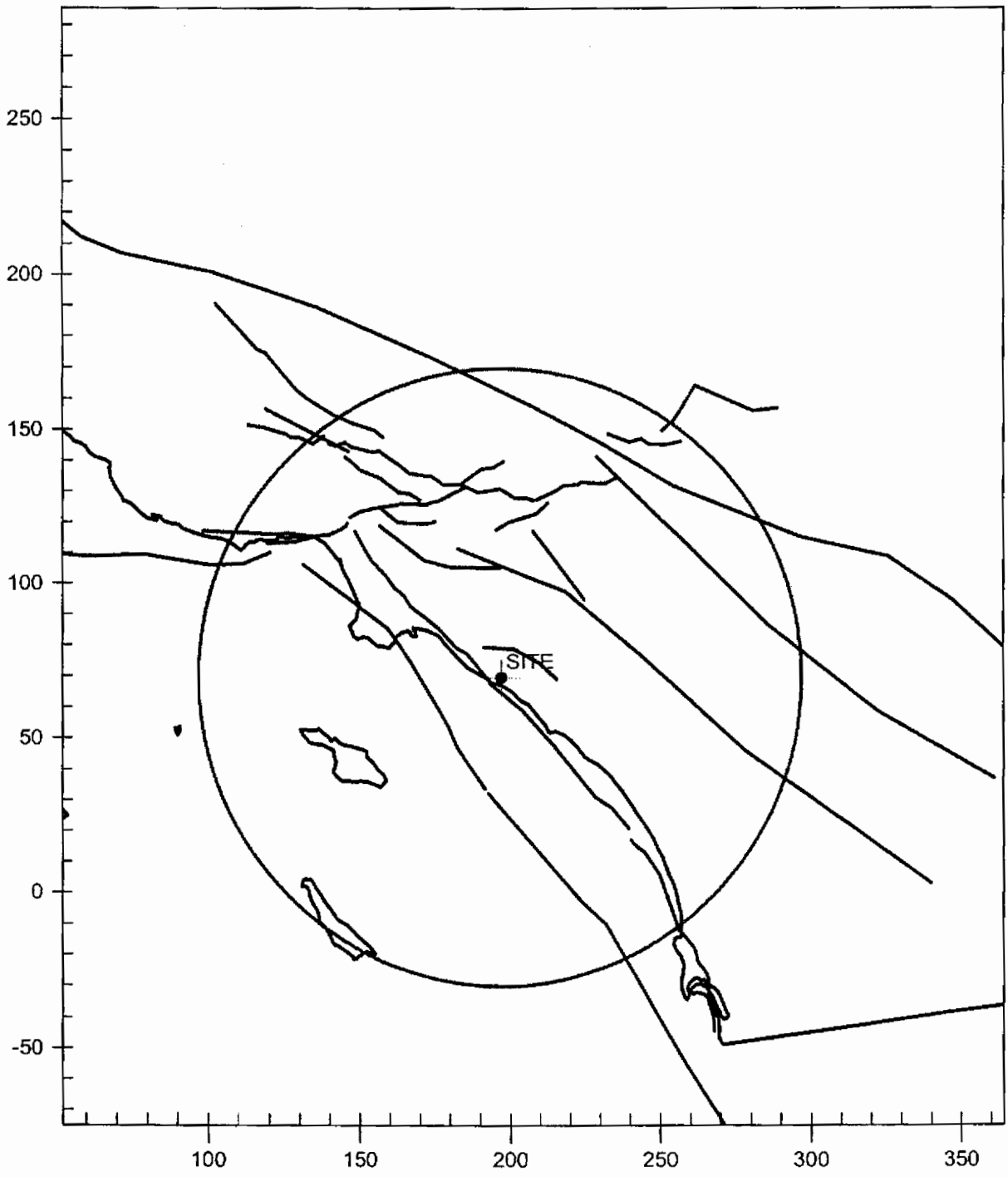
Boring ID:	P-3					
Reading No.	Time Interval (min)	Total Depth of Hole (feet)	Initial water level from top (feet)	Final water level from top (feet)	Δ water level (feet)	Percolation Rate (gal/sq.ft/day)
1	30	5.2	1.08	2.15	1.07	3.58
2	30	5.2	1.04	2.25	1.21	4.08
3	30	5.2	1.08	2.25	1.17	3.97
4	30	5.2	1.04	2.75	1.71	6.21
5	30	5.2	1.04	2.76	1.72	6.25
6	30	5.2	1.04	2.78	1.74	6.35
7	30	5.2	1.04	2.77	1.73	6.30
8	30	5.2	1.04	2.78	1.74	6.35
9	30	5.2	1.04	2.77	1.73	6.30
10	30	5.2	1.04	2.77	1.73	6.30
11	30	5.2	1.04	2.77	1.73	6.30
12	30	5.2	1.04	2.76	1.72	6.25
					Average Rate:	5.7

Boring ID:	P-4					
Reading No.	Time Interval (min)	Total Depth of Hole (feet)	Initial water level from top (feet)	Final water level from top (feet)	Δ water level (feet)	Percolation Rate (gal/sq.ft/day)
1	30	7.3	2.00	2.8	0.80	1.96
2	30	7.3	2.00	2.74	0.74	1.80
3	30	7.3	2.00	2.72	0.72	1.75
4	30	7.3	2.00	2.71	0.71	1.72
5	30	7.3	1.85	2.62	0.77	1.82
6	30	7.3	1.94	2.68	0.74	1.78
7	30	7.3	1.95	2.68	0.73	1.76
8	30	7.3	1.91	2.63	0.72	1.72
					Average Rate:	1.8

APPENDIX E

CALIFORNIA FAULT MAP

Newport Beach City Hall



CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

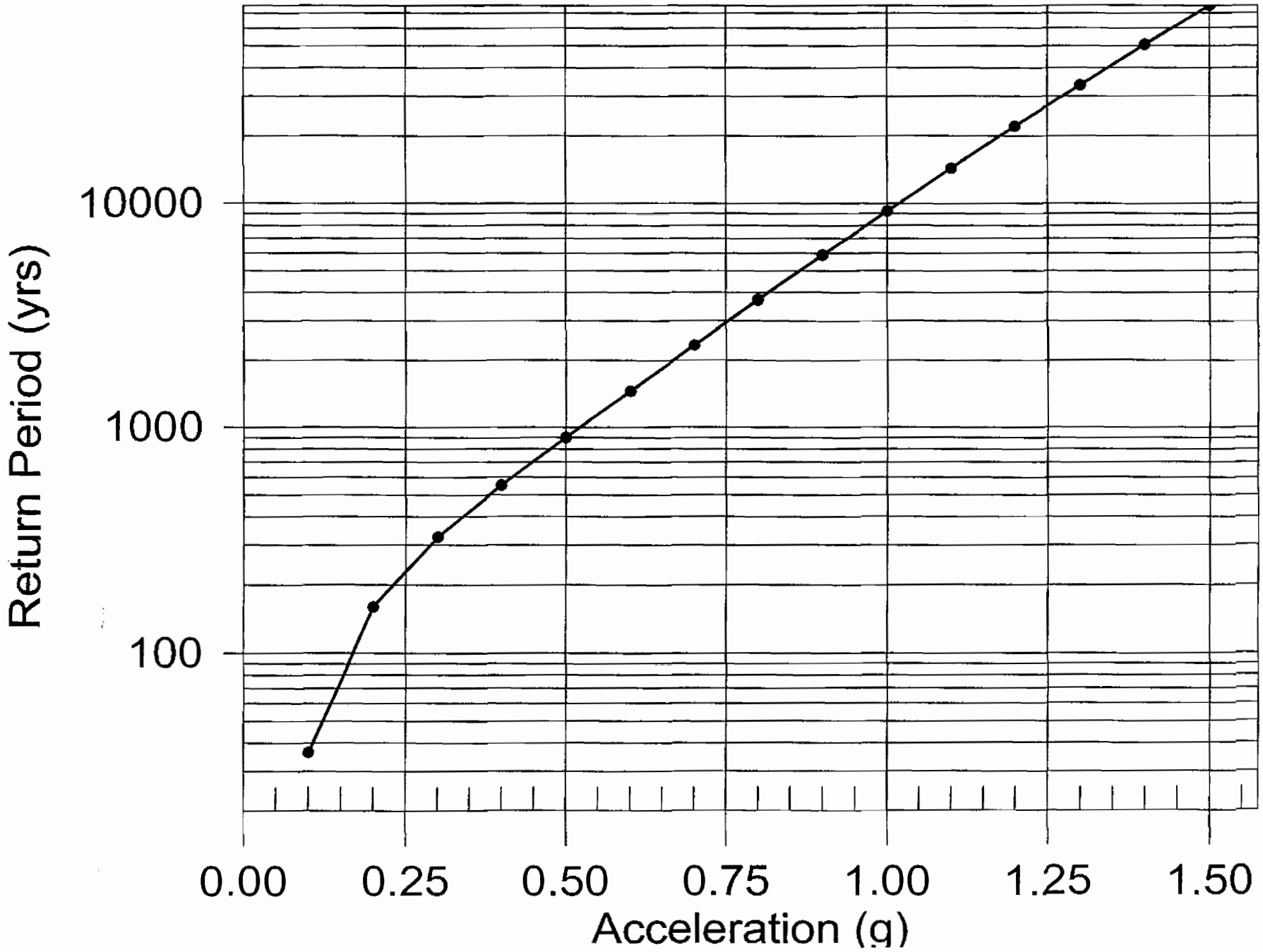
NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO
1	NEWPORT-INGLEWOOD (Offshore)	3.8	3.8	3.8	3.8	3.8	4.0 km
2	NEWPORT-INGLEWOOD (L.A.Basin)	4.8	4.8	4.8	4.8	5.5	5.6 km
3	SAN JOAQUIN HILLS	9.4	0.0	5.5	5.5	0.0	5.5 km
4	PALOS VERDES	23.3	23.3	23.3	23.3	23.3	23.3 km
5	WHITTIER	33.8	33.8	33.8	33.8	34.1	34.1 km
6	ELSINORE (GLEN IVY)	35.1	35.1	35.1	35.1	35.1	35.1 km
7	PUENTE HILLS BLIND THRUST	35.6	35.6	36.0	36.0	36.6	37.0 km
8	CHINO-CENTRAL AVE. (Elsinore)	37.4	30.5	34.0	34.0	31.1	34.1 km
9	CORONADO BANK	37.9	37.9	37.9	37.9	38.7	38.7 km
10	SAN JOSE	48.1	48.1	48.1	48.1	48.9	48.9 km
11	ELSINORE (TEMECULA)	48.8	48.8	48.8	48.8	49.5	49.6 km
12	UPPER ELYSIAN PARK BLIND THRUST	55.4	55.4	55.5	55.5	56.3	56.4 km
13	SIERRA MADRE	58.6	58.6	58.6	58.6	59.5	59.5 km
14	CUCAMONGA	59.2	59.2	59.2	59.2	60.5	60.5 km
15	RAYMOND	61.2	61.2	61.2	61.2	61.5	61.5 km
16	VERDUGO	63.8	63.8	63.8	63.8	65.2	65.2 km
17	CLAMSHELL-SAWPIT	64.6	64.6	64.6	64.6	65.7	65.7 km
18	HOLLYWOOD	65.9	65.9	65.9	65.9	66.7	66.7 km
19	ROSE CANYON	68.1	68.1	68.1	68.1	69.2	69.2 km
20	SANTA MONICA	71.5	71.5	71.5	71.5	71.8	71.8 km
21	SAN JACINTO-SAN BERNARDINO	74.0	74.0	74.0	74.0	74.0	74.0 km
22	SAN JACINTO-SAN JACINTO VALLEY	74.8	74.8	74.8	74.8	74.9	74.9 km
23	MALIBU COAST	77.1	77.1	77.1	77.1	78.2	78.2 km
24	SAN ANDREAS - SB-Coach. M-2b	82.8	82.8	82.8	82.8	82.8	82.8 km
25	SAN ANDREAS - Whole M-1a	82.8	82.8	82.8	82.8	82.8	83.0 km
26	SAN ANDREAS - San Bernardino M-1	82.8	82.8	82.8	82.8	82.8	82.8 km
27	SAN ANDREAS - SB-Coach. M-1b-2	82.8	82.8	82.8	82.8	82.8	82.8 km
28	SAN ANDREAS - Mojave M-1c-3	83.5	83.5	83.5	83.5	83.6	83.6 km
29	SAN ANDREAS - 1857 Rupture M-2a	83.5	83.5	83.5	83.5	83.6	83.6 km
30	SAN ANDREAS - Cho-Moj M-1b-1	83.5	83.5	83.5	83.5	83.6	83.6 km
31	ELSINORE (JULIAN)	83.7	83.7	83.7	83.7	84.7	84.7 km
32	SIERRA MADRE (San Fernando)	84.2	84.2	84.2	84.2	85.3	85.3 km
33	CLEGHORN	87.0	87.0	87.0	87.0	87.1	87.1 km
34	ANACAPA-DUME	86.9	86.9	86.9	86.9	88.2	88.2 km
35	SAN GABRIEL	87.6	87.6	87.6	87.6	88.6	88.6 km
36	NORTHRIDGE (E. Oak Ridge)	89.6	82.8	85.2	85.2	84.1	86.3 km
37	SAN JACINTO-ANZA	89.8	89.8	89.8	89.8	90.5	90.5 km
38	NORTH FRONTAL FAULT ZONE (West)	96.8	94.0	94.9	94.9	95.2	96.0 km
39	SANTA SUSANA	98.4	98.4	98.4	98.4	99.1	99.1 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.

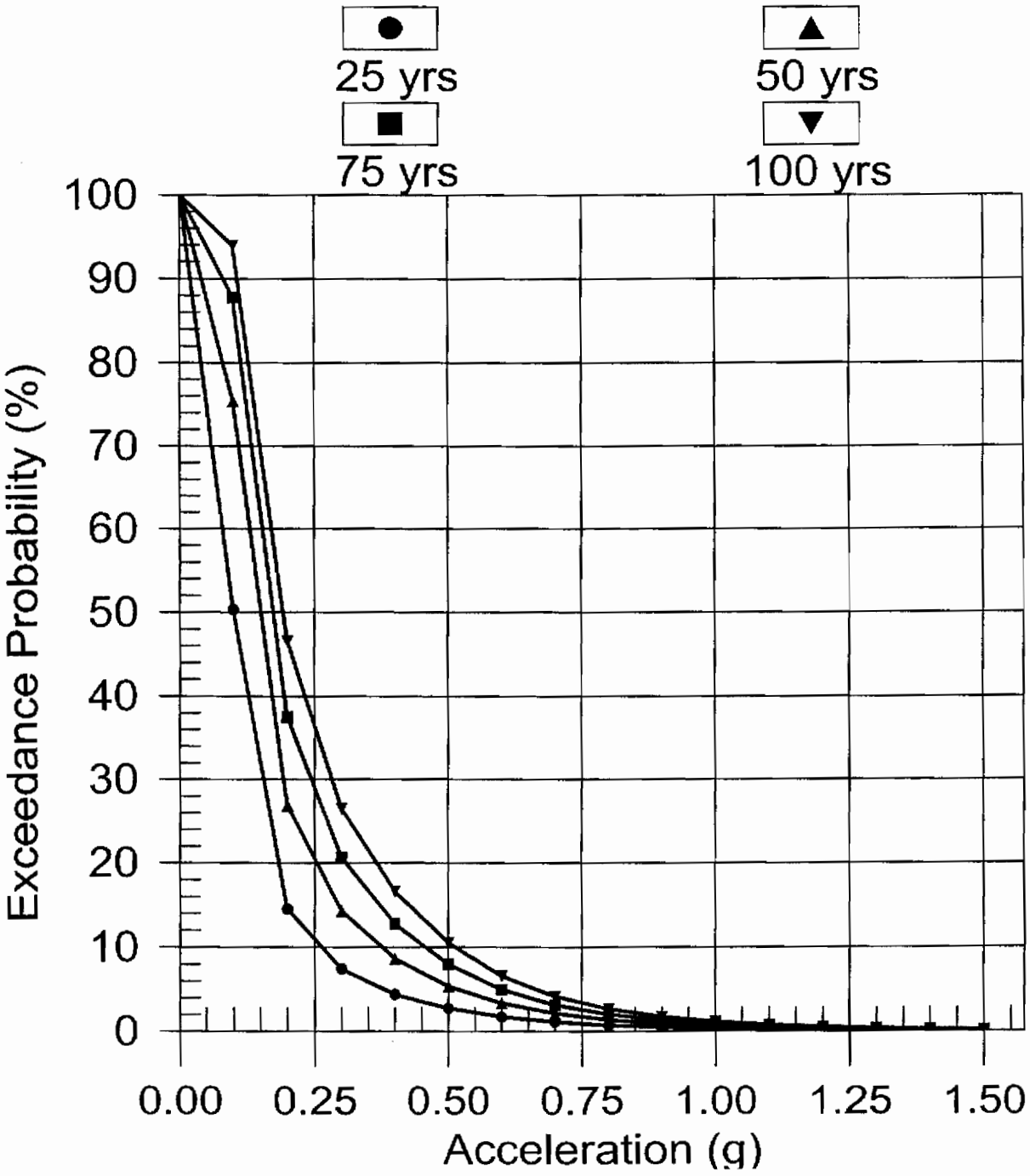
RETURN PERIOD vs. ACCELERATION

BOZ. ET AL.(1999)HOR PS COR



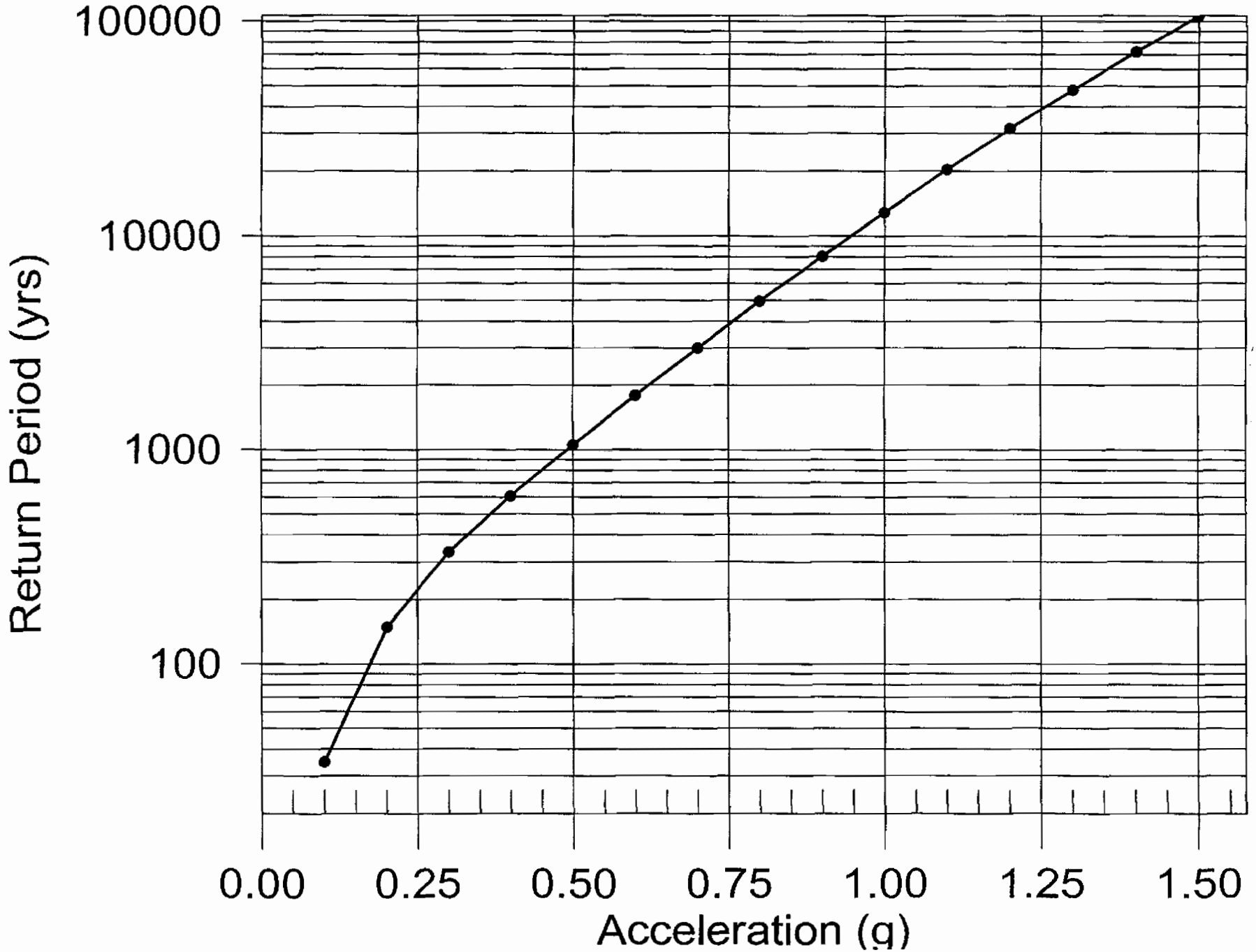
PROBABILITY OF EXCEEDANCE

BOZ. ET AL.(1999)HOR PS COR



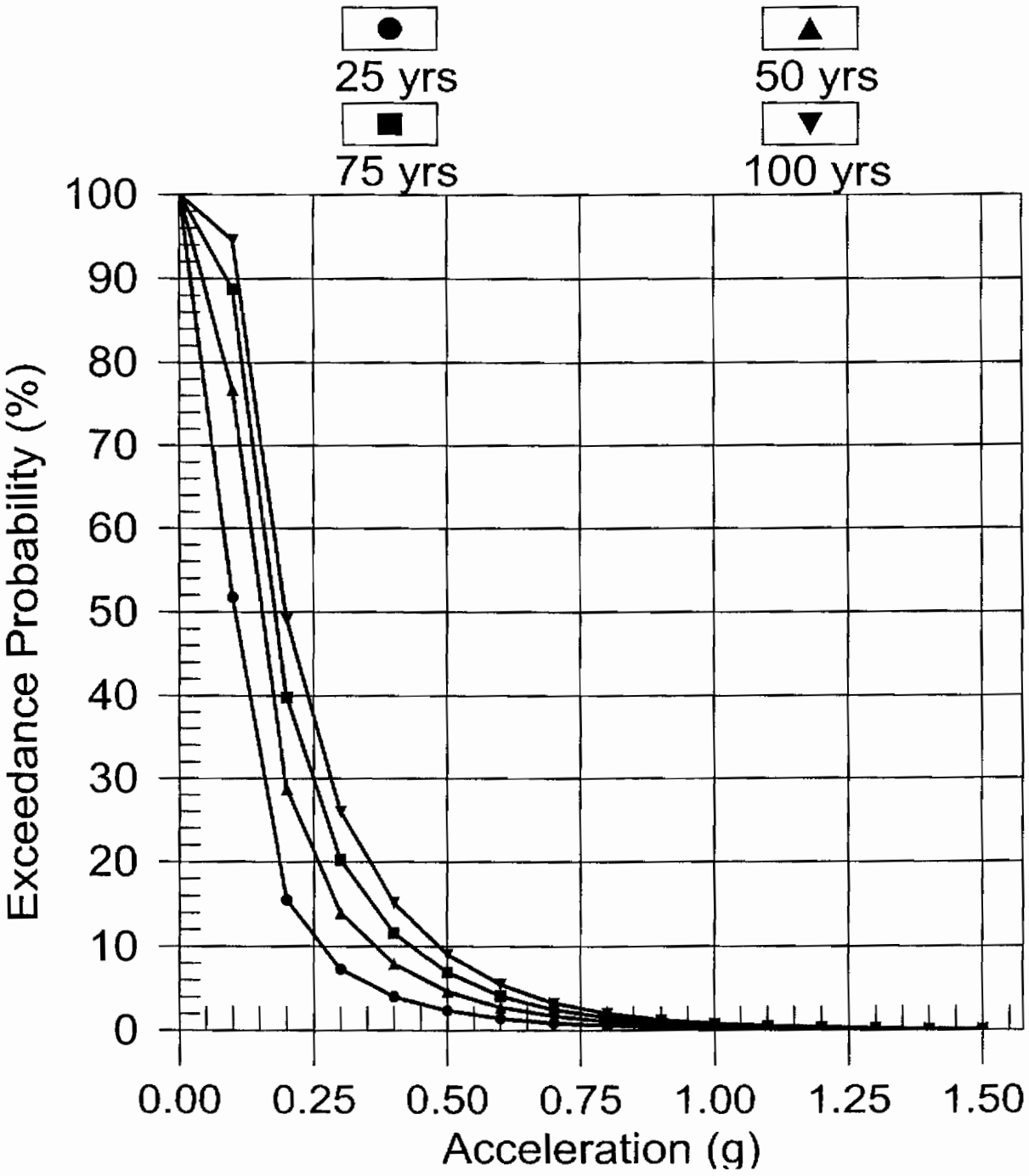
RETURN PERIOD vs. ACCELERATION

SADIGH ET AL. (1997) DEEP SOIL



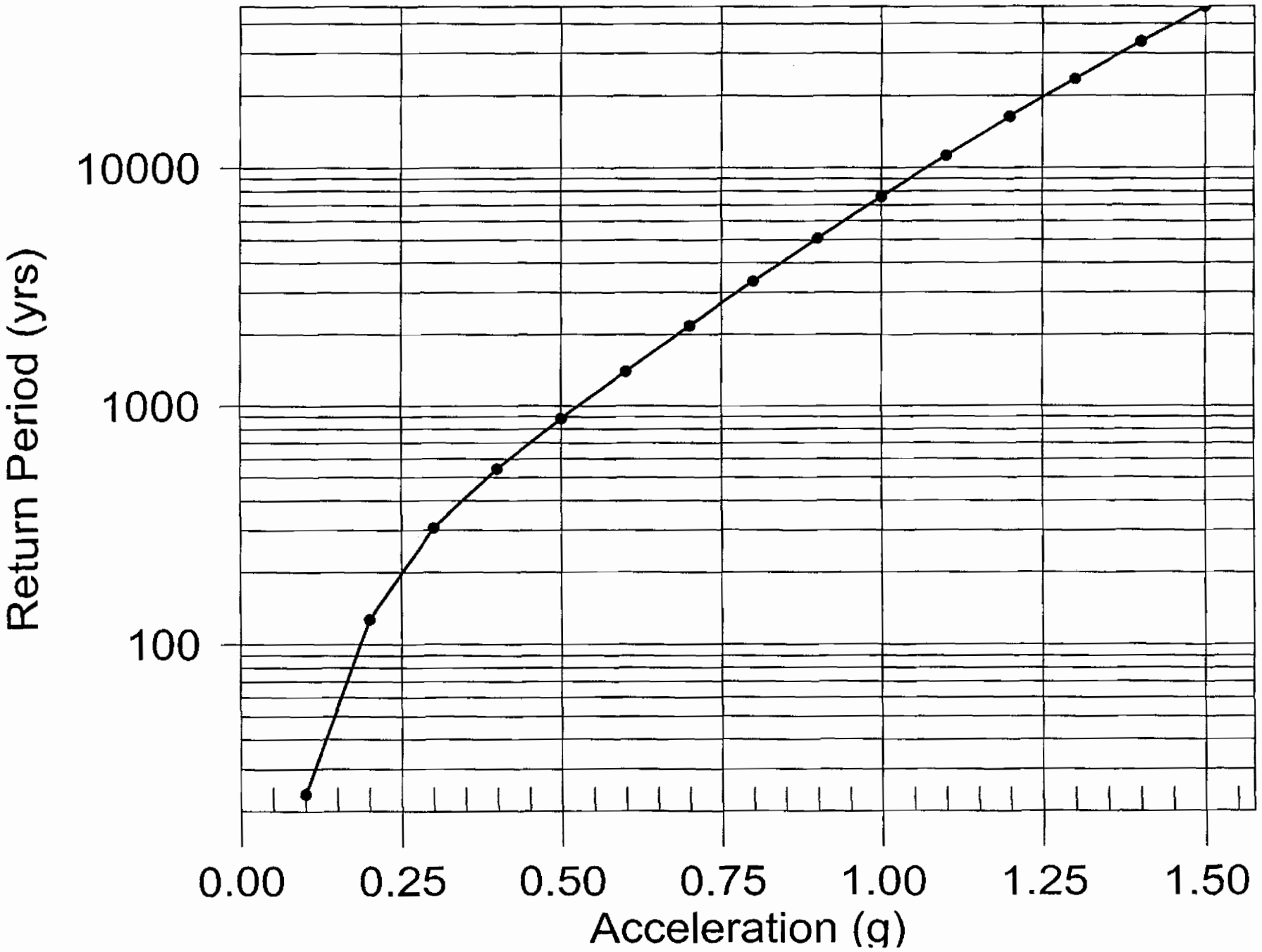
PROBABILITY OF EXCEEDANCE

SADIGH ET AL. (1997) DEEP SOIL



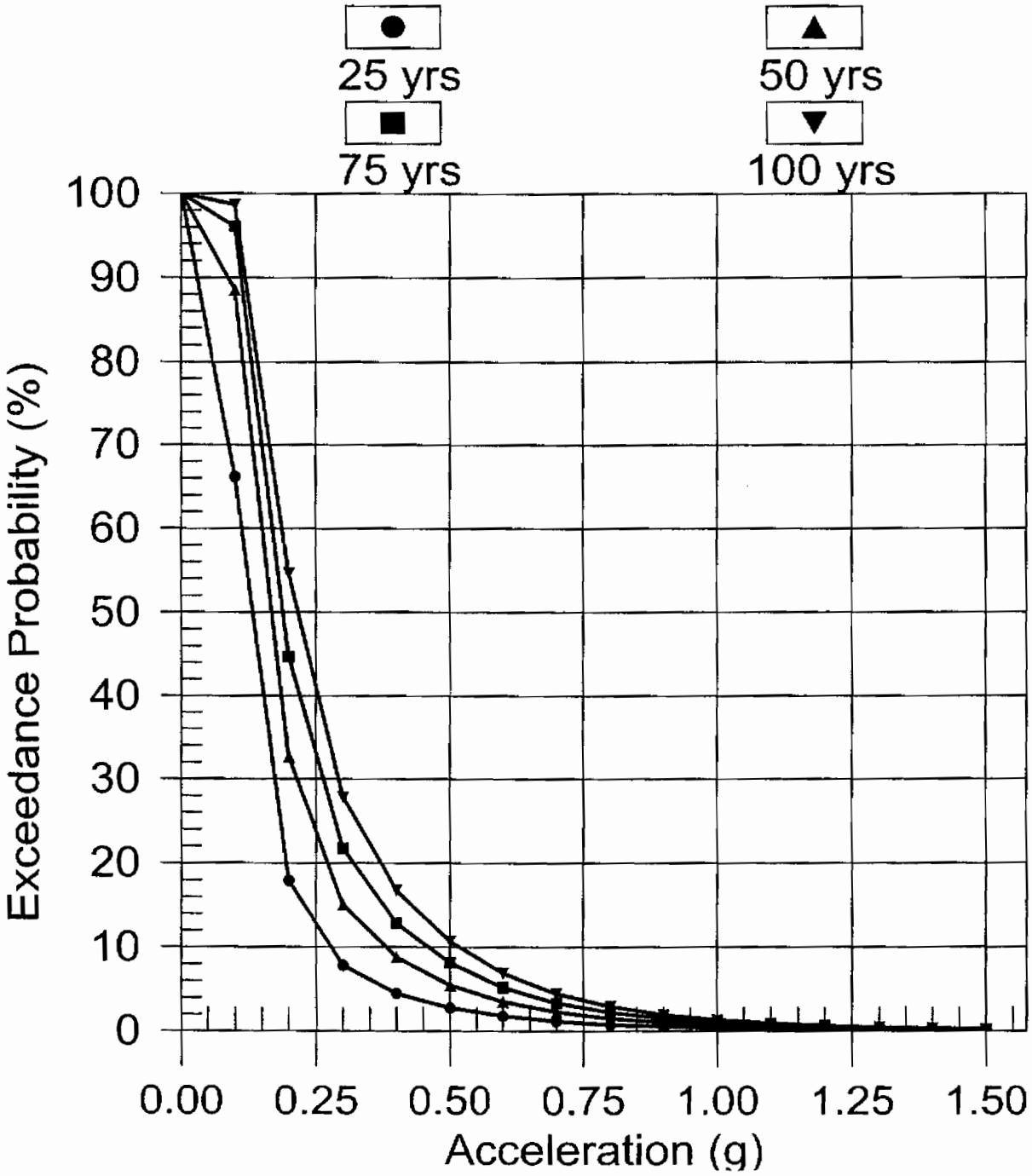
RETURN PERIOD vs. ACCELERATION

ABRAHAMSON & SILVA (1997) SOIL



PROBABILITY OF EXCEEDANCE

ABRAHAMSON & SILVA (1997) SOIL



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*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 602184002

DATE: 07-06-2009

JOB NAME: City of NP City Hall

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE: 4.00
   MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
   SITE LATITUDE: 33.6067
   SITE LONGITUDE: 117.8730

SEARCH DATES:
           START DATE: 1800
           END DATE: 1999

SEARCH RADIUS:
           100.0 mi
           160.9 km

ATTENUATION RELATION: 25) Campbell & Bozorgnia (1997 Rev.) - Soft Rock
   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: 1   Campbell SHR: 0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 3.0

EARTHQUAKE SEARCH RESULTS

Page 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]
GSP	33.6200	117.9000	04/07/1989	200730.2	13.0	4.50	0.182	VIII	1.8(2.9)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.420	X	5.4(8.8)
DMG	33.5450	117.8070	10/27/1969	1316 2.3	6.5	4.50	0.099	VII	5.7(9.2)
MGI	33.7000	117.9000	07/08/1902	945 0.0	0.0	4.00	0.058	VI	6.6(10.7)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.147	VIII	6.7(10.8)
DMG	33.5670	117.9830	07/07/1937	1112 0.0	0.0	4.00	0.055	VI	6.9(11.1)
DMG	33.5670	117.9830	04/17/1934	1833 0.0	0.0	4.00	0.055	VI	6.9(11.1)
DMG	33.6590	117.9810	10/20/1961	20 714.5	6.1	4.00	0.053	VI	7.2(11.6)
DMG	33.6650	117.9790	10/20/1961	214240.7	7.2	4.00	0.052	VI	7.3(11.7)
DMG	33.6000	118.0000	03/11/1933	217 0.0	0.0	4.50	0.077	VII	7.3(11.8)
DMG	33.6000	118.0000	03/11/1933	231 0.0	0.0	4.40	0.071	VI	7.3(11.8)
DMG	33.6540	117.9940	10/20/1961	194950.5	4.6	4.30	0.062	VI	7.7(12.4)
DMG	33.6000	118.0170	12/25/1935	1715 0.0	0.0	4.50	0.066	VI	8.3(13.3)
DMG	33.6170	118.0170	03/15/1933	111332.0	0.0	4.90	0.090	VII	8.3(13.4)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.106	VII	8.3(13.4)
DMG	33.6170	118.0170	10/02/1933	1326 1.0	0.0	4.00	0.045	VI	8.3(13.4)
DMG	33.6800	117.9930	11/20/1961	85334.7	4.4	4.00	0.043	VI	8.6(13.8)
DMG	33.6710	118.0120	10/20/1961	223534.2	5.6	4.10	0.043	VI	9.1(14.7)
DMG	33.6170	118.0330	05/21/1938	944 0.0	0.0	4.00	0.039	V	9.2(14.8)
DMG	33.5610	118.0580	01/15/1937	183547.0	10.0	4.00	0.031	V	11.1(17.9)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.098	VII	11.5(18.4)
DMG	33.6830	118.0500	03/11/1933	1250 0.0	0.0	4.40	0.040	V	11.5(18.4)
DMG	33.7670	117.8170	08/22/1936	521 0.0	0.0	4.00	0.029	V	11.5(18.5)
DMG	33.7500	118.0000	11/16/1934	2126 0.0	0.0	4.00	0.027	V	12.3(19.8)
DMG	33.7000	118.0670	07/20/1940	4 113.0	0.0	4.00	0.025	V	12.9(20.7)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.060	VI	12.9(20.7)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.060	VI	12.9(20.7)
DMG	33.7000	118.0670	02/08/1940	165617.0	0.0	4.00	0.025	V	12.9(20.7)
PAS	33.5080	118.0710	11/20/1988	53928.7	6.0	4.50	0.035	V	13.3(21.4)
MGI	33.8000	117.9000	05/22/1902	740 0.0	0.0	4.30	0.030	V	13.4(21.6)
MGI	33.8000	117.8000	11/04/1926	2238 0.0	0.0	4.60	0.036	V	14.0(22.5)
MGI	33.8000	117.8000	11/10/1926	1723 0.0	0.0	4.60	0.036	V	14.0(22.5)
MGI	33.8000	117.8000	05/19/1917	719 0.0	0.0	4.00	0.022	IV	14.0(22.5)
MGI	33.8000	117.8000	11/07/1926	1948 0.0	0.0	4.60	0.036	V	14.0(22.5)
MGI	33.8000	117.8000	05/20/1917	945 0.0	0.0	4.00	0.022	IV	14.0(22.5)
MGI	33.8000	117.8000	11/09/1926	1535 0.0	0.0	4.60	0.036	V	14.0(22.5)
MGI	33.8000	117.8000	05/19/1917	635 0.0	0.0	4.00	0.022	IV	14.0(22.5)
DMG	33.6170	118.1170	01/20/1934	2117 0.0	0.0	4.50	0.033	V	14.0(22.6)
PAS	33.4710	118.0610	02/27/1984	101815.0	6.0	4.00	0.021	IV	14.3(23.0)
DMG	33.5170	118.1000	03/22/1941	82240.0	0.0	4.00	0.021	IV	14.4(23.3)
DMG	33.8000	118.0000	10/21/1913	938 0.0	0.0	4.00	0.019	IV	15.2(24.5)
DMG	33.7500	118.0830	03/12/1933	616 0.0	0.0	4.60	0.030	V	15.6(25.1)
DMG	33.7500	118.0830	04/02/1933	8 0 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	448 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	15 2 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/13/1933	432 0.0	0.0	4.70	0.033	V	15.6(25.1)
DMG	33.7500	118.0830	03/18/1933	2052 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	2128 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1357 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	6 1 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/21/1933	326 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/13/1933	343 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	835 0.0	0.0	4.20	0.022	IV	15.6(25.1)

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	33.7500	118.0830	03/25/1933	1346 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/13/1933	617 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	1738 0.0	0.0	4.50	0.028	V	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	1825 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	216 0.0	0.0	4.80	0.036	V	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	740 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/16/1933	1529 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1147 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	1651 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	034 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	252 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	546 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	258 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/23/1933	840 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	3 5 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	3 9 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	311 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/31/1933	1049 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	336 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	339 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	347 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	2354 0.0	0.0	4.50	0.028	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	439 0.0	0.0	4.90	0.039	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	440 0.0	0.0	4.70	0.033	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	8 8 0.0	0.0	4.50	0.028	V	15.6(25.1)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.054	VI	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	515 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	513 0.0	0.0	4.70	0.033	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	259 0.0	0.0	4.60	0.030	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	2 4 0.0	0.0	4.90	0.039	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	2 5 0.0	0.0	4.30	0.024	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.042	VI	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.042	VI	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	211 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/15/1933	540 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	635 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/16/1933	1456 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	751 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/16/1933	1530 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/12/1933	027 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	832 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	837 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/20/1933	1358 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.045	VI	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	911 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/23/1933	1831 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1025 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1045 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	11 0 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/30/1933	1225 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1129 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1138 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1141 0.0	0.0	4.20	0.022	IV	15.6(25.1)

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	33.7500	118.0830	04/02/1933	1536 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1547 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.045	VI	15.6(25.1)
DMG	33.7500	118.0830	03/17/1933	1651 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1956 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/13/1933	1532 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	524 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/14/1933	036 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	227 0.0	0.0	4.60	0.030	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1653 0.0	0.0	4.80	0.036	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	1944 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	23 5 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	22 0 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	2231 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	222 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/13/1933	1929 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/14/1933	1219 0.0	0.0	4.50	0.028	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	759 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/15/1933	2 8 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/15/1933	432 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	257 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	521 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	611 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	436 0.0	0.0	4.60	0.030	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	926 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	2240 0.0	0.0	4.40	0.026	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	555 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	618 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	04/01/1933	642 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/14/1933	2242 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	210 0.0	0.0	4.60	0.030	V	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	2232 0.0	0.0	4.10	0.020	IV	15.6(25.1)
DMG	33.7500	118.0830	03/19/1933	2123 0.0	0.0	4.20	0.022	IV	15.6(25.1)
DMG	33.7500	118.0830	03/11/1933	553 0.0	0.0	4.00	0.019	IV	15.6(25.1)
DMG	33.7330	118.1000	03/11/1933	15 9 0.0	0.0	4.40	0.026	V	15.7(25.2)
DMG	33.7330	118.1000	03/11/1933	1350 0.0	0.0	4.40	0.026	V	15.7(25.2)
DMG	33.7330	118.1000	03/11/1933	1447 0.0	0.0	4.40	0.026	V	15.7(25.2)
DMG	33.7670	118.1170	11/04/1939	2141 0.0	0.0	4.00	0.015	IV	17.9(28.7)
DMG	33.7500	118.1330	03/11/1933	11 4 0.0	0.0	4.60	0.025	V	17.9(28.8)
DMG	33.8540	117.7520	10/04/1961	22131.6	4.3	4.10	0.016	IV	18.4(29.7)
DMG	33.6300	118.2000	09/13/1929	132338.2	0.0	4.00	0.014	IV	18.9(30.4)
DMG	33.6330	118.2000	11/01/1940	20 046.0	0.0	4.00	0.014	IV	18.9(30.4)
DMG	33.6820	117.5530	07/05/1938	18 655.7	10.0	4.50	0.021	IV	19.1(30.8)
DMG	33.7830	118.1330	01/13/1940	749 7.0	0.0	4.00	0.014	III	19.3(31.0)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.042	VI	19.3(31.0)
DMG	33.7830	118.1330	11/20/1933	1032 0.0	0.0	4.00	0.014	III	19.3(31.0)
DMG	33.7500	118.1670	05/16/1933	205855.0	0.0	4.00	0.013	III	19.6(31.5)
PAS	33.5380	118.2070	05/25/1982	134430.3	13.7	4.10	0.014	IV	19.8(31.8)
DMG	33.7500	118.1830	08/04/1933	41748.0	0.0	4.00	0.013	III	20.4(32.8)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.028	V	20.6(33.1)
DMG	33.8000	117.6000	09/16/1903	1210 0.0	0.0	4.00	0.012	III	20.6(33.1)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.038	V	21.8(35.0)
DMG	33.7170	117.5170	06/19/1935	1117 0.0	0.0	4.00	0.011	III	21.8(35.1)

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	33.7170	117.5070	08/06/1938	22 056.0	10.0	4.00	0.011	III	22.4(36.0)
DMG	33.7830	118.2000	12/27/1939	192849.0	0.0	4.70	0.019	IV	22.4(36.0)
DMG	33.5000	118.2500	06/18/1920	10 8 0.0	0.0	4.50	0.016	IV	22.9(36.9)
DMG	33.3670	118.1500	04/16/1942	72833.0	0.0	4.00	0.010	III	23.0(37.0)
DMG	33.7250	117.4980	01/03/1956	02548.9	13.7	4.70	0.018	IV	23.0(37.1)
DMG	33.9000	118.1000	07/08/1929	1646 6.7	13.0	4.70	0.017	IV	24.1(38.7)
DMG	33.7590	118.2530	08/31/1938	31814.2	10.0	4.50	0.014	IV	24.2(39.0)
DMG	33.8170	118.2170	10/22/1941	65718.5	0.0	4.90	0.019	IV	24.5(39.5)
DMG	33.7480	117.4790	06/22/1971	104119.0	8.0	4.20	0.011	III	24.6(39.7)
PAS	33.9650	117.8860	01/01/1976	172012.9	6.2	4.20	0.011	III	24.7(39.8)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.029	V	24.8(40.0)
DMG	33.7330	117.4670	10/26/1954	162226.0	0.0	4.10	0.010	III	24.9(40.1)
GSP	33.9510	117.7090	01/05/1998	181406.5	11.0	4.30	0.011	III	25.6(41.1)
DMG	33.8670	118.2000	11/13/1933	2128 0.0	0.0	4.00	0.009	III	26.0(41.8)
DMG	33.8670	118.2170	06/19/1944	0 333.0	0.0	4.50	0.012	III	26.7(43.0)
DMG	33.8670	118.2170	06/19/1944	3 6 7.0	0.0	4.40	0.011	III	26.7(43.0)
DMG	33.9670	118.0500	01/30/1941	13446.9	0.0	4.10	0.009	III	26.9(43.2)
DMG	33.5430	118.3400	09/14/1963	35116.2	2.2	4.20	0.009	III	27.2(43.8)
DMG	33.9960	117.9750	06/15/1967	458 5.5	10.0	4.10	0.009	III	27.5(44.3)
MGI	33.9000	118.2000	10/08/1927	1914 0.0	0.0	4.60	0.013	III	27.6(44.4)
MGI	33.8000	118.3000	12/31/1928	1045 0.0	0.0	4.00	0.008	II	27.9(44.9)
DMG	33.8000	118.3000	11/03/1931	16 5 0.0	0.0	4.00	0.008	II	27.9(44.9)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.039	V	27.9(45.0)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.017	IV	27.9(45.0)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.017	IV	27.9(45.0)
DMG	33.9500	118.1330	10/25/1933	7 046.0	0.0	4.30	0.010	III	28.0(45.1)
MGI	34.0000	118.0000	05/05/1929	735 0.0	0.0	4.00	0.008	II	28.1(45.2)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.017	IV	28.1(45.2)
MGI	34.0000	118.0000	05/05/1929	1 7 0.0	0.0	4.60	0.012	III	28.1(45.2)
DMG	33.8500	118.2670	03/11/1933	629 0.0	0.0	4.40	0.010	III	28.2(45.3)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.017	IV	28.2(45.3)
PAS	34.0060	117.7390	02/18/1989	717 4.8	3.3	4.30	0.009	III	28.6(46.1)
MGI	34.0000	117.7000	12/03/1929	9 5 0.0	0.0	4.00	0.007	II	28.9(46.5)
DMG	33.9500	117.5830	04/11/1941	12024.0	0.0	4.00	0.007	II	29.0(46.6)
DMG	33.9390	118.2050	01/11/1950	214135.0	0.4	4.10	0.008	II	29.8(48.0)
DMG	33.6330	118.4000	10/17/1934	938 0.0	0.0	4.00	0.007	II	30.4(48.8)
DMG	33.6630	118.4130	01/08/1967	738 5.3	17.7	4.00	0.006	II	31.3(50.3)
DMG	33.8330	117.4000	06/05/1940	82727.0	0.0	4.00	0.006	II	31.3(50.4)
DMG	33.8830	118.3170	03/11/1933	1457 0.0	0.0	4.90	0.013	III	31.8(51.2)
PAS	34.0500	118.0870	10/01/1987	155953.5	10.4	4.00	0.006	II	33.0(53.1)
MGI	34.0000	118.2000	06/26/1917	2115 0.0	0.0	4.60	0.010	III	33.0(53.1)
MGI	34.0000	118.2000	02/13/1917	13 5 0.0	0.0	4.60	0.010	III	33.0(53.1)
MGI	34.0000	118.2000	06/26/1917	2130 0.0	0.0	4.60	0.010	III	33.0(53.1)
MGI	34.0000	118.2000	06/26/1917	2120 0.0	0.0	4.60	0.010	III	33.0(53.1)
MGI	34.0000	118.2000	06/26/1917	424 0.0	0.0	4.00	0.006	II	33.0(53.1)
PAS	34.0520	118.0900	10/01/1987	151231.8	10.8	4.70	0.010	III	33.2(53.4)
PAS	34.0490	118.1010	10/01/1987	144541.5	13.6	4.70	0.010	III	33.2(53.5)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.027	V	33.5(53.9)
GSP	34.0200	118.1800	06/12/1989	172225.5	16.0	4.10	0.006	II	33.5(54.0)
DMG	33.7830	118.4170	11/02/1940	25826.0	0.0	4.00	0.006	II	33.5(54.0)
DMG	33.7830	118.4170	10/12/1940	024 0.0	0.0	4.00	0.006	II	33.5(54.0)
DMG	33.7830	118.4170	11/01/1940	725 3.0	0.0	4.00	0.006	II	33.5(54.0)
DMG	33.7830	118.4170	10/14/1940	205111.0	0.0	4.00	0.006	II	33.5(54.0)

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]
PAS	34.0600	118.1000	10/01/1987	1449 5.9	11.7	4.70	0.010	III	33.9(54.5)
PAS	34.0770	118.0470	02/11/1988	152555.7	12.5	4.70	0.010	III	34.0(54.7)
GSP	34.0300	118.1800	06/12/1989	165718.4	16.0	4.40	0.008	II	34.1(54.9)
DMG	33.6320	118.4670	01/08/1967	73730.4	11.4	4.00	0.006	II	34.2(55.0)
DMG	34.1000	117.8000	03/31/1931	2033 0.0	0.0	4.00	0.006	II	34.3(55.2)
DMG	34.0000	117.5000	07/03/1908	1255 0.0	0.0	4.00	0.006	II	34.6(55.6)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.061	VI	34.6(55.6)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.016	IV	34.7(55.8)
PAS	34.0760	118.0900	10/01/1987	1448 3.1	11.7	4.10	0.006	II	34.7(55.9)
T-A	34.0000	118.2500	05/02/1856	810 0.0	0.0	4.30	0.007	II	34.7(55.9)
T-A	34.0000	118.2500	09/23/1827	0 0 0.0	0.0	5.00	0.012	III	34.7(55.9)
T-A	34.0000	118.2500	01/17/1857	1 0 0.0	0.0	4.30	0.007	II	34.7(55.9)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.012	III	34.7(55.9)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.012	III	34.7(55.9)
T-A	34.0000	118.2500	03/21/1880	1425 0.0	0.0	4.30	0.007	II	34.7(55.9)
T-A	34.0000	118.2500	05/04/1857	6 0 0.0	0.0	4.30	0.007	II	34.7(55.9)
MGI	34.1000	118.0000	01/27/1930	2026 0.0	0.0	4.60	0.009	III	34.8(56.0)
DMG	33.7670	118.4500	10/11/1940	55712.3	0.0	4.70	0.010	III	34.9(56.2)
DMG	33.9830	118.3000	02/11/1940	192410.0	0.0	4.00	0.005	II	35.7(57.5)
DMG	34.1000	117.6830	01/18/1934	214 0.0	0.0	4.00	0.005	II	35.8(57.5)
DMG	34.1000	117.6830	01/09/1934	1410 0.0	0.0	4.50	0.008	II	35.8(57.5)
GSP	34.1100	117.7200	04/17/1990	223227.2	4.0	4.60	0.008	III	35.8(57.7)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.032	V	36.5(58.7)
MGI	34.0000	118.3000	06/30/1920	350 0.0	0.0	4.00	0.005	II	36.6(58.8)
MGI	34.0000	118.3000	06/22/1920	2035 0.0	0.0	4.00	0.005	II	36.6(58.8)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.014	IV	36.6(58.8)
DMG	33.7700	118.4800	04/24/1931	182754.8	0.0	4.40	0.007	II	36.6(59.0)
DMG	33.9330	117.3670	10/24/1943	02921.0	0.0	4.00	0.005	II	36.8(59.1)
GSP	34.1300	117.7000	03/01/1990	003457.1	4.0	4.00	0.005	II	37.5(60.3)
T-A	34.0000	117.4200	09/10/1920	1415 0.0	0.0	4.30	0.006	II	37.6(60.5)
T-A	34.0000	117.4200	04/12/1888	1315 0.0	0.0	4.30	0.006	II	37.6(60.5)
PAS	34.1360	117.7090	06/26/1988	15 458.5	7.9	4.60	0.008	II	37.7(60.7)
DMG	33.9030	118.4310	11/29/1938	192115.8	10.0	4.00	0.005	II	38.0(61.2)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.012	III	38.1(61.4)
GSP	34.1400	117.6900	03/02/1990	172625.4	6.0	4.60	0.008	II	38.3(61.6)
MGI	34.0000	117.4000	05/22/1907	652 0.0	0.0	4.60	0.008	II	38.4(61.8)
MGI	33.8000	118.5000	06/18/1915	15 5 0.0	0.0	4.00	0.005	II	38.4(61.8)
GSP	34.1500	117.7200	03/01/1990	032303.0	11.0	4.70	0.008	III	38.5(62.0)
MGI	34.1000	118.2000	05/02/1916	1432 0.0	0.0	4.00	0.005	II	38.9(62.6)
MGI	34.1000	118.2000	01/27/1860	830 0.0	0.0	4.30	0.006	II	38.9(62.6)
MGI	34.1000	118.2000	04/21/1921	1538 0.0	0.0	4.00	0.005	II	38.9(62.6)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.010	III	39.5(63.6)
PAS	33.0330	117.9440	02/22/1983	21830.4	10.0	4.30	0.006	II	39.8(64.1)
PAS	34.1490	118.1350	12/03/1988	113826.4	13.3	4.90	0.009	III	40.3(64.9)
DMG	33.7380	117.1870	04/27/1962	91232.1	5.7	4.10	0.005	II	40.4(65.1)
MGI	34.0000	118.4000	10/01/1930	040 0.0	0.0	4.60	0.007	II	40.6(65.4)
MGI	34.0000	118.4000	02/22/1920	1610 0.0	0.0	4.60	0.007	II	40.6(65.4)
MGI	34.0000	118.4000	02/07/1927	429 0.0	0.0	4.60	0.007	II	40.6(65.4)
MGI	34.0000	118.4000	01/29/1927	2324 0.0	0.0	4.00	0.004	I	40.6(65.4)
USG	33.0170	117.8170	07/14/1986	11112.6	10.0	4.12	0.005	II	40.8(65.7)
USG	33.0170	117.8170	07/16/1986	1247 3.7	10.0	4.11	0.005	II	40.8(65.7)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.014	IV	41.0(66.0)
DMG	34.2000	117.9000	07/13/1935	105416.5	0.0	4.70	0.007	II	41.0(66.0)

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]
DMG	34.1270	117.5210	12/27/1938	10 928.6	10.0	4.00	0.004	I	41.2(66.3)
DMG	34.0000	118.4170	12/07/1938	338 0.0	0.0	4.00	0.004	I	41.4(66.6)
MGI	34.2000	118.0000	01/09/1921	530 0.0	0.0	4.60	0.007	II	41.6(66.9)
DMG	34.1160	117.4750	06/28/1960	20 048.0	12.0	4.10	0.004	I	41.9(67.5)
MGI	34.1000	118.3000	07/16/1920	2022 0.0	0.0	4.60	0.007	II	41.9(67.5)
MGI	34.1000	118.3000	07/16/1920	2127 0.0	0.0	4.60	0.007	II	41.9(67.5)
MGI	34.1000	118.3000	07/26/1920	1215 0.0	0.0	4.00	0.004	I	41.9(67.5)
MGI	34.1000	118.3000	07/16/1920	2130 0.0	0.0	4.60	0.007	II	41.9(67.5)
DMG	34.0330	117.3500	04/18/1940	184343.9	0.0	4.40	0.006	II	42.0(67.6)
DMG	34.1400	117.5150	01/01/1965	8 418.0	5.9	4.40	0.006	II	42.2(67.8)
DMG	34.1240	117.4800	05/15/1955	17 326.0	7.6	4.00	0.004	I	42.2(68.0)
T-A	34.1700	118.1700	03/07/1888	1554 0.0	0.0	4.30	0.005	II	42.5(68.3)
PAS	32.9900	117.8490	07/13/1986	14 133.0	12.0	4.60	0.006	II	42.6(68.6)
PAS	32.9860	117.8440	10/01/1986	201218.6	6.0	4.00	0.004	I	42.9(69.0)
GSP	32.9850	117.8180	06/21/1995	211736.2	6.0	4.30	0.005	II	43.0(69.3)
DMG	34.1830	117.5830	10/03/1948	24628.0	0.0	4.00	0.004	I	43.1(69.4)
DMG	34.1120	117.4260	03/19/1937	12338.4	10.0	4.00	0.004	I	43.3(69.7)
DMG	34.1670	117.5330	03/01/1948	81213.0	0.0	4.70	0.007	II	43.3(69.7)
DMG	34.0000	117.2830	11/07/1939	1852 8.4	0.0	4.70	0.007	II	43.4(69.8)
DMG	34.0330	117.3170	09/03/1935	647 0.0	0.0	4.50	0.006	II	43.4(69.8)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.019	IV	43.6(70.2)
DMG	33.9960	117.2700	02/17/1952	123658.3	16.0	4.50	0.006	II	43.8(70.5)
PAS	34.1350	117.4480	01/08/1983	71930.4	4.6	4.10	0.004	I	43.9(70.6)
PAS	32.9710	117.8700	07/13/1986	1347 8.2	6.0	5.30	0.011	III	43.9(70.6)
DMG	34.1830	117.5480	09/01/1937	163533.5	10.0	4.50	0.006	II	43.9(70.7)
GSP	32.9700	117.8100	04/04/1990	085439.3	6.0	4.00	0.004	I	44.1(71.0)
PAS	32.9700	117.8030	07/14/1986	03246.2	10.0	4.00	0.004	I	44.1(71.0)
DMG	34.1320	117.4260	04/15/1965	20 833.3	5.5	4.50	0.006	II	44.4(71.5)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.022	IV	44.9(72.2)
DMG	34.0000	117.2500	11/01/1932	445 0.0	0.0	4.00	0.004	I	44.9(72.2)
DMG	33.7000	117.1000	06/11/1902	245 0.0	0.0	4.50	0.005	II	44.9(72.2)
GSP	34.2500	117.9900	06/28/1991	170055.5	9.0	4.30	0.005	II	44.9(72.3)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.008	III	45.1(72.5)
MGI	34.0000	118.5000	03/08/1918	1230 0.0	0.0	4.00	0.004	I	45.1(72.5)
DMG	34.0000	118.5000	06/22/1920	248 0.0	0.0	4.90	0.007	II	45.1(72.5)
MGI	34.0000	118.5000	06/23/1920	1220 0.0	0.0	4.00	0.004	I	45.1(72.5)
DMG	34.0000	118.5000	11/08/1914	1140 0.0	0.0	4.50	0.005	II	45.1(72.5)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.008	III	45.1(72.5)
DMG	34.0000	118.5000	03/06/1918	1820 0.0	0.0	4.00	0.004	I	45.1(72.5)
PAS	32.9450	117.8310	07/29/1986	81741.8	10.0	4.10	0.004	I	45.7(73.6)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.011	III	45.8(73.8)
PAS	32.9450	117.8060	09/07/1984	11 313.4	6.0	4.30	0.004	I	45.8(73.8)
PAS	34.0230	117.2450	10/02/1985	234412.4	15.2	4.80	0.007	II	46.1(74.2)
DMG	34.2110	117.5300	09/01/1937	1348 8.2	10.0	4.50	0.005	II	46.1(74.2)
PAS	34.2110	117.5300	10/19/1979	122237.8	4.9	4.10	0.004	I	46.1(74.2)
USG	34.1390	117.3860	02/21/1987	231530.1	2.6	4.07	0.004	I	46.1(74.3)
DMG	34.2000	117.5000	06/14/1892	1325 0.0	0.0	4.90	0.007	II	46.2(74.4)
PAS	32.9470	117.7360	01/15/1989	153955.2	6.0	4.20	0.004	I	46.2(74.4)
PAS	32.9330	117.8410	07/29/1986	81741.6	10.0	4.30	0.004	I	46.5(74.9)
DMG	34.1180	117.3410	09/22/1951	82239.1	11.9	4.30	0.004	I	46.6(75.1)
T-A	33.5000	117.0700	12/29/1880	7 0 0.0	0.0	4.30	0.004	I	46.8(75.3)
GSP	34.0240	117.2300	03/11/1998	121851.8	14.0	4.50	0.005	II	46.8(75.3)
DMG	34.1270	117.3380	02/23/1936	222042.7	10.0	4.50	0.005	II	47.2(76.0)

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	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.010	III	47.3(76.2)
DMG	34.1000	117.3000	02/16/1931	1327 0.0	0.0	4.00	0.003	I	47.3(76.2)
MGI	34.1000	117.3000	12/27/1901	11 0 0.0	0.0	4.60	0.005	II	47.3(76.2)
MGI	34.1000	117.3000	11/22/1911	257 0.0	0.0	4.00	0.003	I	47.3(76.2)
DMG	34.0430	117.2280	04/03/1939	25044.7	10.0	4.00	0.003	I	47.7(76.8)
DMG	34.1400	117.3390	02/26/1936	93327.6	10.0	4.00	0.003	I	47.9(77.1)
DMG	34.2170	117.4670	03/25/1941	234341.0	0.0	4.00	0.003	I	48.1(77.5)
PAS	33.9190	118.6270	01/19/1989	65328.8	11.9	5.00	0.007	II	48.3(77.8)
T-A	34.0800	117.2500	10/07/1869	0 0 0.0	0.0	4.30	0.004	I	48.4(77.9)
GSP	34.1900	117.3900	12/28/1989	094108.1	15.0	4.50	0.005	II	48.9(78.6)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.011	III	49.1(79.0)
GSP	34.1680	117.3370	06/28/1997	214525.1	9.0	4.20	0.004	I	49.5(79.6)
DMG	33.9500	118.6320	08/31/1930	04036.0	0.0	5.20	0.008	III	49.6(79.8)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.010	III	49.6(79.8)
DMG	34.2670	117.5180	09/12/1970	141011.2	8.0	4.10	0.003	I	49.9(80.3)
DMG	34.2810	117.5520	09/13/1970	44748.6	8.0	4.40	0.004	I	50.1(80.5)
T-A	34.1700	117.3200	12/02/1859	2210 0.0	0.0	4.30	0.004	I	50.2(80.7)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.015	IV	50.4(81.0)
DMG	33.5000	117.0000	08/08/1925	1013 0.0	0.0	4.50	0.004	I	50.8(81.7)
PAS	33.9330	118.6690	10/17/1979	205237.3	5.5	4.20	0.003	I	50.9(82.0)
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.007	II	51.1(82.3)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.028	V	51.1(82.3)
DMG	34.3040	117.5700	05/05/1969	16 2 9.6	8.8	4.40	0.004	I	51.2(82.4)
MGI	34.1000	117.2000	04/23/1923	2113 0.0	0.0	4.00	0.003	I	51.5(82.8)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.020	IV	51.9(83.5)
PAS	33.9440	118.6810	01/01/1979	231438.9	11.3	5.00	0.006	II	51.9(83.5)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.021	IV	52.4(84.4)
MGI	34.2000	117.3000	04/13/1913	1045 0.0	0.0	4.00	0.003	I	52.5(84.5)
DMG	33.0000	117.3000	11/22/1800	2130 0.0	0.0	6.50	0.021	IV	53.4(85.9)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.030	V	54.2(87.3)
GSP	34.3740	117.6490	08/20/1998	234958.4	9.0	4.40	0.004	I	54.5(87.7)
DMG	33.2670	117.0170	06/07/1935	1633 0.0	0.0	4.00	0.003	I	54.6(87.9)
DMG	34.4000	117.8000	02/24/1946	6 752.0	0.0	4.10	0.003	I	54.9(88.4)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.006	II	54.9(88.4)
DMG	34.0170	117.0500	02/19/1940	12 655.7	0.0	4.60	0.004	I	55.1(88.6)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.007	II	55.2(88.8)
DMG	33.5000	116.9170	11/04/1935	355 0.0	0.0	4.50	0.004	I	55.5(89.3)
DMG	32.8670	118.2500	02/13/1952	151337.0	0.0	4.70	0.005	II	55.5(89.3)
GSP	34.2150	118.5100	01/19/1994	140914.8	17.0	4.50	0.004	I	55.6(89.5)
DMG	32.8000	117.8330	01/24/1942	214148.0	0.0	4.00	0.003	-	55.7(89.7)
GSP	34.2450	118.4710	01/18/1994	155144.9	12.0	4.00	0.003	-	55.8(89.8)
GSP	34.2930	118.3890	12/06/1994	034834.5	9.0	4.50	0.004	I	55.8(89.9)
DMG	34.2680	118.4450	08/30/1964	225737.1	15.4	4.00	0.003	-	56.2(90.4)
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.022	IV	56.6(91.0)
DMG	34.3350	118.3310	02/09/1971	155820.7	14.2	4.80	0.005	II	56.7(91.3)
DMG	32.8500	117.4830	02/23/1943	92112.0	0.0	4.00	0.002	-	56.9(91.6)
DMG	34.0000	117.0000	06/30/1923	022 0.0	0.0	4.50	0.004	I	57.0(91.7)
DMG	34.3390	118.3320	02/09/1971	141612.9	11.1	4.10	0.003	I	57.0(91.7)
GSP	34.3120	118.3930	05/25/1994	125657.1	7.0	4.40	0.003	I	57.1(91.9)
DMG	33.4540	116.8980	07/29/1936	142252.8	10.0	4.00	0.002	-	57.1(91.9)
GSP	34.3110	118.3980	06/15/1994	055948.6	7.0	4.20	0.003	I	57.2(92.0)
DMG	33.4560	116.8960	06/16/1938	55916.9	10.0	4.00	0.002	-	57.2(92.0)
GSB	34.2990	118.4280	01/23/1994	085508.7	6.0	4.20	0.003	I	57.4(92.4)

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]
MGI	33.8000	116.9000	12/18/1920	1726 0.0	0.0	4.00	0.002	-	57.5(92.5)
MGI	33.8000	116.9000	06/14/1918	1024 0.0	0.0	4.00	0.002	-	57.5(92.5)
MGI	33.8000	116.9000	04/23/1918	1415 0.0	0.0	4.00	0.002	-	57.5(92.5)
MGI	33.8000	116.9000	04/29/1918	2 0 0.0	0.0	4.00	0.002	-	57.5(92.5)
MGI	33.2000	117.0000	07/20/1923	7 0 0.0	0.0	4.00	0.002	-	57.6(92.7)
DMG	34.3610	118.3060	02/09/1971	141021.5	5.0	4.70	0.004	I	57.7(92.8)
GSP	34.2990	118.4390	02/03/1994	162335.4	8.0	4.20	0.003	I	57.8(92.9)
GSP	34.2870	118.4660	01/19/1994	071406.2	11.0	4.00	0.002	-	58.0(93.3)
DMG	34.3700	118.3020	02/10/1971	31212.0	0.8	4.00	0.002	-	58.1(93.6)
GSP	34.2920	118.4660	01/19/1994	144635.2	6.0	4.00	0.002	-	58.2(93.7)
GSP	34.2970	118.4580	01/21/1994	185344.6	7.0	4.30	0.003	I	58.3(93.7)
GSP	34.3010	118.4520	01/21/1994	185244.2	7.0	4.30	0.003	I	58.3(93.8)
DMG	34.3680	118.3140	04/25/1971	1448 6.5	-2.0	4.00	0.002	-	58.3(93.8)
DMG	34.2960	118.4640	03/30/1971	85443.3	2.6	4.10	0.003	-	58.4(94.0)
GSP	34.2910	118.4760	02/06/1994	131926.9	11.0	4.10	0.003	-	58.5(94.2)
PAS	32.7590	117.9060	10/18/1976	172753.1	13.8	4.20	0.003	I	58.6(94.2)
GSB	34.3000	118.4660	01/21/1994	183915.3	10.0	4.70	0.004	I	58.7(94.4)
GSP	34.2280	118.5730	01/17/1994	175608.2	19.0	4.60	0.004	I	58.7(94.5)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.006	II	58.7(94.5)
GSP	34.2610	118.5340	01/17/1994	123939.8	14.0	4.50	0.004	I	58.9(94.9)
GSP	34.3110	118.4560	01/17/1994	193534.3	2.0	4.00	0.002	-	59.0(94.9)
GSP	34.2540	118.5450	01/17/1994	130627.9	0.0	4.60	0.004	I	59.0(94.9)
PAS	32.7560	117.9880	01/12/1975	212214.8	15.3	4.80	0.004	I	59.1(95.1)
GSP	34.3040	118.4730	01/17/1994	150703.2	2.0	4.20	0.003	I	59.1(95.2)
GSP	34.3170	118.4550	01/17/1994	132644.7	2.0	4.70	0.004	I	59.3(95.4)
DMG	34.2730	118.5320	06/21/1971	16 1 8.5	4.1	4.00	0.002	-	59.5(95.8)
GSB	34.3100	118.4740	01/21/1994	184228.8	7.0	4.20	0.003	I	59.5(95.8)
GSP	34.2180	118.6070	01/18/1994	113509.9	12.0	4.20	0.003	I	59.6(95.9)
DMG	34.2860	118.5150	03/31/1971	145222.5	2.1	4.60	0.004	I	59.6(95.9)
GSP	34.3310	118.4420	01/17/1994	141430.3	1.0	4.50	0.003	I	59.7(96.0)
PAS	33.7010	116.8370	08/22/1979	2 136.3	5.0	4.10	0.002	-	59.9(96.4)
DMG	34.2840	118.5280	04/02/1971	54025.0	3.0	4.00	0.002	-	59.9(96.5)
DMG	34.3570	118.4060	02/09/1971	141950.2	11.8	4.00	0.002	-	60.1(96.7)
GSP	34.1920	117.0950	04/06/1994	190104.1	7.0	4.80	0.004	I	60.2(96.8)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.011	III	60.3(97.1)
GSP	34.0850	116.9890	06/30/1992	214900.3	3.0	4.40	0.003	I	60.5(97.4)
GSP	34.0970	116.9960	12/05/1997	170438.9	4.0	4.10	0.002	-	60.6(97.5)
GSP	34.2740	118.5630	01/27/1994	171958.8	14.0	4.60	0.004	I	60.7(97.7)
DMG	34.2650	118.5770	04/15/1971	111432.0	4.2	4.20	0.003	I	60.8(97.8)
DMG	34.3870	118.3640	02/09/1971	143917.8	-1.6	4.00	0.002	-	60.8(97.8)
GSP	34.2690	118.5760	01/17/1994	125546.8	16.0	4.10	0.002	-	60.9(98.0)
DMG	32.8170	118.3500	12/26/1951	04654.0	0.0	5.90	0.010	III	61.1(98.3)
GSG	34.3340	118.4840	01/17/1994	223152.1	10.0	4.20	0.003	-	61.2(98.5)
DMG	34.4110	118.3290	02/10/1971	5 636.0	4.7	4.30	0.003	I	61.4(98.7)
DMG	34.3960	118.3660	02/10/1971	173855.1	6.2	4.20	0.003	-	61.4(98.8)
DMG	34.3530	118.4560	03/07/1971	13340.5	3.3	4.50	0.003	I	61.4(98.8)
GSP	34.1200	116.9980	06/29/1992	144126.0	4.0	4.40	0.003	I	61.4(98.8)
DMG	32.7170	117.8330	11/06/1950	205546.0	0.0	4.40	0.003	I	61.5(98.9)
PAS	32.7140	117.9100	10/18/1976	172652.6	15.1	4.20	0.003	-	61.7(99.2)
DMG	32.7500	118.2000	06/25/1939	149 0.0	0.0	4.50	0.003	I	62.1(99.9)
DMG	33.9680	116.8820	06/27/1959	162211.1	13.8	4.00	0.002	-	62.1(99.9)
DMG	34.3560	118.4740	03/25/1971	2254 9.9	4.6	4.20	0.003	-	62.1(100.0)
MGI	33.5000	116.8000	05/31/1917	435 0.0	0.0	4.00	0.002	-	62.2(100.1)

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]
MGI	33.5000	116.8000	03/30/1918	16 5 0.0	0.0	4.60	0.004	I	62.2(100.1)
MGI	33.5000	116.8000	06/02/1917	435 0.0	0.0	4.00	0.002	-	62.2(100.1)
MGI	33.5000	116.8000	11/26/1916	17 5 0.0	0.0	4.00	0.002	-	62.2(100.1)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.006	II	62.2(100.1)
GSP	34.3570	118.4800	02/25/1994	125912.6	1.0	4.10	0.002	-	62.4(100.4)
GSP	34.2780	118.6110	01/29/1994	121656.4	2.0	4.30	0.003	I	62.7(100.9)
DMG	34.3920	118.4270	02/21/1971	71511.7	7.2	4.50	0.003	I	62.8(101.1)
DMG	34.3610	118.4870	02/10/1971	143526.7	4.4	4.20	0.002	-	62.8(101.1)
GSP	34.1800	117.0200	12/04/1991	081703.5	11.0	4.00	0.002	-	62.9(101.2)
GSB	34.3190	118.5580	01/18/1994	132444.1	1.0	4.50	0.003	I	62.9(101.2)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.005	II	62.9(101.3)
DMG	34.3990	118.4190	02/10/1971	134953.7	9.7	4.30	0.003	I	63.0(101.4)
PAS	34.3800	118.4590	08/12/1977	21926.1	9.5	4.50	0.003	I	63.1(101.5)
DMG	34.1000	118.8000	05/10/1911	1340 0.0	0.0	4.00	0.002	-	63.1(101.6)
DMG	34.3840	118.4550	02/10/1971	113134.6	6.0	4.20	0.002	-	63.2(101.6)
DMG	34.4110	118.4010	02/09/1971	14 154.0	8.0	4.20	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 150.0	8.0	4.50	0.003	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 439.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 444.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 140.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.009	III	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 541.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.006	II	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 838.0	8.0	4.50	0.003	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 8 7.0	8.0	4.20	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 159.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 4 7.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 133.0	8.0	4.20	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 446.0	8.0	4.20	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 853.0	8.0	4.60	0.003	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 434.0	8.0	4.20	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 550.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 745.0	8.0	4.50	0.003	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 730.0	8.0	4.00	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 231.0	8.0	4.70	0.004	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.015	IV	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.009	III	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 2 3.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 346.0	8.0	4.10	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 325.0	8.0	4.40	0.003	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 230.0	8.0	4.30	0.003	I	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 8 4.0	8.0	4.00	0.002	-	63.2(101.7)
DMG	34.4110	118.4010	02/09/1971	14 710.0	8.0	4.00	0.002	-	63.2(101.7)
DMG	33.9500	116.8500	09/28/1946	719 9.0	0.0	5.00	0.005	II	63.3(101.9)
DMG	33.0380	118.7340	09/13/1937	221439.5	10.0	4.00	0.002	-	63.3(101.9)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.011	III	63.4(102.1)
DMG	34.3970	118.4390	02/21/1971	55052.6	6.9	4.70	0.004	I	63.5(102.1)
GSB	34.2850	118.6240	01/17/1994	135602.4	19.0	4.70	0.004	I	63.6(102.3)
DMG	33.4880	116.7770	06/12/1959	11 313.0	5.7	4.00	0.002	-	63.6(102.3)
DMG	34.4310	118.3690	08/14/1974	144555.2	8.2	4.20	0.002	-	63.6(102.3)
USG	32.7700	118.3340	06/16/1985	1027 0.7	5.0	4.14	0.002	-	63.6(102.4)
DMG	32.7180	118.1720	04/28/1938	6 728.0	10.0	4.50	0.003	I	63.7(102.6)
GSP	34.3740	118.4950	01/28/1994	200953.4	0.0	4.20	0.002	-	63.8(102.7)

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]
PAS	34.1510	116.9720	11/20/1978	655 9.5	6.1	4.30	0.003	I	63.9(102.8)
DMG	34.1670	116.9830	10/16/1951	1241 5.0	0.0	4.00	0.002	-	64.0(103.0)
GSB	34.3450	118.5520	01/24/1994	041518.8	6.0	4.80	0.004	I	64.1(103.2)
DMG	34.1330	116.9500	06/10/1938	1440 0.0	0.0	4.00	0.002	-	64.2(103.3)
DMG	34.4330	118.3980	02/09/1971	144017.4	-2.0	4.10	0.002	-	64.5(103.8)
DMG	34.4260	118.4140	02/10/1971	518 7.2	5.8	4.50	0.003	I	64.5(103.8)
DMG	34.4280	118.4130	04/01/1971	15 3 3.6	8.0	4.10	0.002	-	64.6(103.9)
DMG	34.3990	118.4730	03/09/1974	05431.9	24.4	4.70	0.004	I	64.6(103.9)
DMG	33.6500	116.7500	09/05/1950	191956.0	0.0	4.80	0.004	I	64.6(104.0)
GSP	34.1210	116.9280	08/16/1998	133440.2	6.0	4.70	0.004	I	64.8(104.2)
GSP	34.1120	116.9200	10/01/1998	181816.0	4.0	4.70	0.004	I	64.8(104.3)
DMG	32.6800	118.0770	10/28/1973	22 0 2.7	8.0	4.50	0.003	I	65.1(104.7)
GSP	33.6500	116.7400	12/02/1989	231647.8	14.0	4.20	0.002	-	65.2(104.9)
GSP	32.6810	118.1090	06/20/1997	043540.5	6.0	4.70	0.004	I	65.4(105.2)
GSP	32.6850	118.1380	06/20/1997	053855.0	6.0	4.20	0.002	-	65.5(105.3)
DMG	33.0000	117.0000	03/03/1906	2025 0.0	0.0	4.50	0.003	I	65.5(105.4)
MGI	33.0000	117.0000	12/29/1914	10 0 0.0	0.0	4.00	0.002	-	65.5(105.4)
MGI	33.0000	117.0000	09/21/1856	730 0.0	0.0	5.00	0.004	I	65.5(105.4)
GSB	34.3600	118.5710	01/19/1994	044048.0	2.0	4.50	0.003	I	65.6(105.5)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.004	I	65.7(105.7)
PAS	33.6300	119.0200	10/23/1981	172816.9	12.0	4.60	0.003	I	66.0(106.2)
GSB	34.3330	118.6230	01/18/1994	072356.0	14.0	4.30	0.002	-	66.0(106.2)
DMG	34.1000	116.8830	10/24/1935	1451 0.0	0.0	4.50	0.003	I	66.2(106.5)
DMG	34.1000	116.8830	10/24/1935	1452 0.0	0.0	4.50	0.003	I	66.2(106.5)
DMG	34.1000	116.8830	10/24/1935	1527 0.0	0.0	4.00	0.002	-	66.2(106.5)
GSP	34.3790	118.5610	01/18/1994	152346.9	7.0	4.80	0.004	I	66.3(106.7)
DMG	34.4460	118.4360	02/10/1971	185441.7	8.1	4.20	0.002	-	66.3(106.7)
GSP	34.3790	118.5630	01/18/1994	003935.0	7.0	4.40	0.003	I	66.4(106.8)
GSP	33.6320	116.7190	07/19/1999	220927.5	14.0	4.20	0.002	-	66.4(106.8)
DMG	33.9670	116.8000	09/07/1945	153424.0	0.0	4.30	0.002	-	66.4(106.9)
PAS	34.1980	116.9590	04/01/1978	105227.4	8.0	4.00	0.002	-	66.4(106.9)
PAS	34.4630	118.4090	09/24/1977	212824.3	5.0	4.20	0.002	-	66.6(107.2)
DMG	34.4570	118.4270	02/09/1971	161926.5	-1.0	4.20	0.002	-	66.7(107.4)
DMG	34.3440	118.6360	02/09/1971	143436.1	-2.0	4.90	0.004	I	67.1(107.9)
GSP	34.0490	118.9150	02/19/1995	212418.1	15.0	4.30	0.002	-	67.1(108.0)
GSP	34.3620	118.6150	03/20/1996	073759.8	13.0	4.10	0.002	-	67.3(108.2)
GSP	34.1780	116.9220	06/28/1992	170131.9	13.0	4.70	0.003	I	67.3(108.3)
GSB	34.3580	118.6220	01/18/1994	040126.8	1.0	4.50	0.003	I	67.3(108.3)
DMG	34.1800	116.9200	01/16/1930	02433.9	0.0	5.20	0.005	II	67.5(108.5)
DMG	34.1800	116.9200	01/16/1930	034 3.6	0.0	5.10	0.005	II	67.5(108.5)
DMG	34.5650	118.1130	02/28/1969	45612.4	5.3	4.30	0.002	-	67.6(108.7)
GSP	34.3590	118.6290	01/24/1994	055024.3	12.0	4.30	0.002	-	67.6(108.8)
GSP	34.3630	118.6270	01/24/1994	055421.1	10.0	4.20	0.002	-	67.7(109.0)
GSG	34.4080	118.5590	01/17/1994	200205.4	0.0	4.00	0.002	-	67.8(109.2)
DMG	33.9170	116.7500	01/25/1933	1444 0.0	0.0	4.00	0.002	-	67.9(109.3)
DMG	33.9760	116.7750	10/17/1965	94519.0	17.0	4.90	0.004	I	68.0(109.4)
PAS	34.3470	118.6560	04/08/1976	152138.1	14.5	4.60	0.003	I	68.0(109.4)
DMG	33.4830	116.7000	12/28/1948	125341.0	0.0	4.00	0.002	-	68.0(109.5)
PAS	33.6370	119.0560	10/23/1981	191552.5	6.3	4.60	0.003	I	68.0(109.5)
GSP	34.3740	118.6220	01/17/1994	155410.8	12.0	4.80	0.004	I	68.2(109.7)
GSB	34.3430	118.6660	01/17/1994	234925.4	8.0	4.30	0.002	-	68.2(109.7)
DMG	33.9730	116.7690	06/10/1944	111531.9	10.0	4.00	0.002	-	68.2(109.8)
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.005	I	68.2(109.8)

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	32.6250	118.0090	07/11/1981	215029.4	5.0	4.30	0.002	-	68.2(109.8)
DMG	33.9330	116.7500	08/06/1938	228 0.0	0.0	4.00	0.002	-	68.3(109.9)
DMG	33.9330	116.7500	10/28/1944	183016.0	0.0	4.40	0.003	-	68.3(109.9)
GSP	34.3680	118.6370	01/17/1994	194353.4	13.0	4.10	0.002	-	68.4(110.0)
GSG	34.3040	118.7220	01/17/1994	221922.3	10.0	4.00	0.002	-	68.4(110.1)
DMG	34.3800	118.6230	10/29/1936	223536.1	10.0	4.00	0.002	-	68.5(110.2)
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.007	II	68.5(110.3)
GSP	32.9750	118.7910	03/04/1992	190627.0	6.0	4.20	0.002	-	68.6(110.4)
DMG	33.8000	116.7000	08/11/1911	1820 0.0	0.0	4.00	0.002	-	68.7(110.5)
DMG	33.8000	116.7000	08/11/1911	2340 0.0	0.0	4.50	0.003	I	68.7(110.5)
DMG	34.0290	116.7870	04/30/1954	03623.9	11.1	4.20	0.002	-	68.8(110.7)
DMG	34.0170	118.9670	04/16/1948	222624.0	0.0	4.70	0.003	I	68.9(110.8)
PAS	33.4200	116.6980	06/05/1978	16 3 3.9	11.9	4.40	0.003	-	68.9(110.8)
GSP	34.3970	118.6090	07/22/1999	095724.0	11.0	4.00	0.002	-	68.9(110.9)
GSP	34.1410	116.8570	09/19/1997	223714.5	10.0	4.10	0.002	-	68.9(110.9)
GSP	34.3040	118.7370	01/19/1994	091310.9	13.0	4.10	0.002	-	69.0(111.1)
DMG	34.2670	116.9670	08/29/1943	51630.0	0.0	4.00	0.002	-	69.1(111.2)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.006	II	69.1(111.2)
DMG	34.2670	116.9670	08/29/1943	35754.0	0.0	4.00	0.002	-	69.1(111.2)
MGI	34.2000	116.9000	10/10/1915	5 6 0.0	0.0	4.00	0.002	-	69.2(111.3)
DMG	34.0140	116.7710	06/10/1944	111150.5	10.0	4.50	0.003	I	69.2(111.3)
GSP	34.3770	118.6490	04/27/1997	110928.4	15.0	4.80	0.003	I	69.3(111.5)
DMG	33.4500	116.6830	04/25/1955	25515.0	0.0	4.00	0.002	-	69.3(111.6)
PAS	33.5580	116.6670	06/15/1982	234921.3	12.2	4.80	0.003	I	69.4(111.8)
DMG	33.9500	116.7330	04/26/1942	151023.0	0.0	4.00	0.002	-	69.6(112.0)
GSP	32.6260	118.1510	06/20/1997	080413.6	6.0	4.60	0.003	I	69.6(112.0)
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.004	I	69.7(112.2)
PAS	34.0540	118.9640	04/13/1982	11 212.2	16.6	4.00	0.002	-	69.8(112.3)
GSP	34.1630	116.8550	06/28/1992	144321.0	6.0	5.30	0.005	II	69.9(112.4)
PAS	34.0160	118.9880	10/26/1984	172043.5	13.3	4.60	0.003	I	69.9(112.5)
DMG	34.0000	119.0000	09/24/1827	4 0 0.0	0.0	7.00	0.020	IV	70.1(112.9)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.007	II	70.1(112.9)
GSP	34.3540	118.7040	05/01/1996	194956.4	14.0	4.10	0.002	-	70.2(112.9)
DMG	34.1000	116.8000	10/24/1935	1448 7.6	0.0	5.10	0.004	I	70.3(113.2)
DMG	33.9170	116.7000	11/17/1943	112841.0	0.0	4.50	0.003	I	70.7(113.7)
GSP	34.1950	116.8620	08/17/1992	204152.1	11.0	5.30	0.005	II	70.8(113.9)
DMG	34.3330	117.0000	02/27/1942	1 853.0	0.0	4.00	0.002	-	70.8(113.9)
DMG	32.5830	117.8000	04/19/1939	741 0.0	0.0	4.50	0.003	I	70.8(113.9)
DMG	33.6040	119.1050	03/25/1956	332 2.3	8.2	4.20	0.002	-	70.8(114.0)
DMG	33.9760	116.7210	06/12/1944	104534.7	10.0	5.10	0.004	I	70.8(114.0)
GSP	34.1980	116.8620	08/18/1992	094640.7	12.0	4.20	0.002	-	70.9(114.1)
GSP	34.3650	118.7080	01/19/1994	044314.5	12.0	4.10	0.002	-	70.9(114.1)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.004	I	70.9(114.1)
GSP	34.2560	116.9120	06/28/1992	170557.5	8.0	4.60	0.003	I	71.0(114.2)
PAS	34.2460	116.9010	06/29/1979	55320.5	5.7	4.60	0.003	I	71.1(114.3)
DMG	34.4850	118.5210	07/16/1965	74622.4	15.1	4.00	0.002	-	71.1(114.4)
MGI	33.1000	116.8000	06/22/1918	557 0.0	0.0	4.00	0.002	-	71.1(114.4)
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.005	II	71.1(114.5)
PAS	34.2430	116.8960	06/30/1979	03411.6	5.8	4.90	0.004	I	71.2(114.5)
GSP	34.1630	116.8270	06/28/1992	150451.5	12.0	4.40	0.002	-	71.2(114.6)
PAS	34.2490	116.9000	06/30/1979	7 353.0	5.6	4.50	0.003	-	71.2(114.6)
PAS	33.9760	116.7130	08/06/1984	81436.6	14.2	4.30	0.002	-	71.3(114.7)
PAS	33.6710	119.1110	09/04/1981	155050.3	5.0	5.30	0.005	II	71.3(114.7)

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]
MGI	32.8000	117.1000	05/25/1803	0 0 0.0	0.0	5.00	0.004	I	71.4(114.9)
DMG	33.4300	119.0960	10/31/1969	103929.0	7.3	4.80	0.003	I	71.4(115.0)
DMG	33.5330	116.6330	09/21/1942	7 754.0	0.0	4.00	0.002	-	71.5(115.1)
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.006	II	71.7(115.4)
DMG	33.9940	116.7120	06/12/1944	111636.0	10.0	5.30	0.005	II	71.8(115.5)
DMG	33.5080	116.6310	08/11/1967	05711.4	10.7	4.10	0.002	-	71.8(115.5)
DMG	33.9810	116.7020	06/12/1944	222119.5	10.0	4.20	0.002	-	72.0(115.8)
DMG	33.4670	116.6330	02/20/1934	1035 0.0	0.0	4.00	0.002	-	72.0(115.9)
GSP	33.0700	116.8000	12/04/1991	071057.5	15.0	4.20	0.002	-	72.1(116.1)
DMG	33.2000	116.7200	05/12/1930	172548.5	0.0	4.20	0.002	-	72.1(116.1)
DMG	34.0000	116.7000	08/25/1944	73025.0	0.0	4.20	0.002	-	72.6(116.8)
GSN	34.2030	116.8270	06/28/1992	150530.7	5.0	6.70	0.015	IV	72.7(117.0)
GSP	34.2250	116.8440	07/09/1992	023435.0	0.0	4.10	0.002	-	72.8(117.1)
DMG	33.9900	119.0580	05/29/1955	164335.4	17.4	4.10	0.002	-	73.0(117.4)
GSP	34.2320	116.8460	07/10/1992	012940.0	0.0	4.20	0.002	-	73.0(117.4)
PAS	33.9790	116.6810	12/16/1988	553 5.0	8.1	4.80	0.003	I	73.1(117.6)
GSP	34.5000	118.5600	07/05/1991	174157.1	11.0	4.10	0.002	-	73.1(117.7)
GSP	34.1830	116.8020	06/28/1992	192637.6	1.0	4.00	0.002	-	73.1(117.7)
DMG	33.2000	116.7000	01/01/1920	235 0.0	0.0	5.00	0.004	I	73.2(117.8)
DMG	33.3390	119.1040	10/24/1969	202642.5	-1.8	4.70	0.003	I	73.3(117.9)
DMG	34.3200	116.9250	04/18/1968	174213.4	4.7	4.00	0.002	-	73.3(118.0)
DMG	34.1170	116.7500	08/22/1942	125913.0	0.0	4.00	0.002	-	73.4(118.1)
MGI	34.3000	116.9000	12/01/1915	14 5 0.0	0.0	4.00	0.002	-	73.5(118.2)
PAS	32.6270	117.3770	06/29/1983	8 836.4	5.0	4.60	0.003	I	73.5(118.2)
GSP	34.2390	116.8370	07/09/1992	014357.6	0.0	5.30	0.005	II	73.7(118.6)
MGI	32.7000	117.2000	04/19/1906	028 0.0	0.0	4.30	0.002	-	73.7(118.6)
MGI	32.7000	117.2000	09/08/1915	742 0.0	0.0	4.00	0.002	-	73.7(118.6)
MGI	32.7000	117.2000	05/20/1920	1330 0.0	0.0	4.00	0.002	-	73.7(118.6)
DMG	32.7000	117.2000	05/27/1862	20 0 0.0	0.0	5.90	0.008	II	73.7(118.6)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.008	II	73.8(118.7)
DMG	33.9590	116.6510	09/23/1949	214440.1	12.2	4.00	0.002	-	74.2(119.4)
DMG	33.8000	116.6000	09/10/1931	436 0.0	0.0	4.00	0.002	-	74.3(119.6)
DMG	33.5060	116.5850	05/21/1967	144234.4	19.4	4.70	0.003	I	74.4(119.8)
GSP	34.1300	116.7340	06/30/1992	212254.4	12.0	4.80	0.003	I	74.6(120.1)
DMG	34.3370	116.9090	11/30/1962	2351 5.5	7.0	4.30	0.002	-	74.8(120.3)
GSP	34.2370	116.8110	06/28/1992	125730.8	10.0	4.00	0.002	-	74.8(120.4)
DMG	33.4670	116.5830	03/26/1937	2124 0.0	0.0	4.00	0.002	-	74.9(120.5)
DMG	33.4670	116.5830	03/27/1937	528 0.0	0.0	4.00	0.002	-	74.9(120.5)
DMG	33.4670	116.5830	03/27/1937	742 0.0	0.0	4.50	0.002	-	74.9(120.5)
DMG	33.4670	116.5830	01/04/1938	029 0.0	0.0	4.50	0.002	-	74.9(120.5)
DMG	34.3120	116.8790	01/31/1972	155 4.2	8.0	4.00	0.002	-	74.9(120.5)
PAS	33.9890	116.6490	07/17/1986	203515.0	6.2	4.00	0.002	-	75.0(120.7)
PAS	33.9910	116.6490	07/17/1986	215445.2	7.4	4.40	0.002	-	75.1(120.8)
DMG	34.3240	116.8850	12/01/1962	03548.8	9.6	4.30	0.002	-	75.2(121.0)
DMG	34.2290	116.7950	05/11/1956	163050.5	13.3	4.70	0.003	I	75.2(121.1)
GSP	34.3400	116.9000	11/27/1992	160057.5	1.0	5.30	0.005	I	75.3(121.1)
GSP	34.3620	116.9230	12/07/1992	033331.5	1.0	4.00	0.002	-	75.3(121.3)
DMG	33.5830	119.1830	02/10/1952	135055.0	0.0	4.00	0.002	-	75.4(121.3)
DMG	32.5290	118.0820	05/26/1973	234633.3	8.0	4.30	0.002	-	75.4(121.3)
DMG	34.1000	116.7000	02/07/1889	520 0.0	0.0	5.30	0.005	I	75.4(121.3)
DMG	33.5340	116.5610	09/23/1956	112441.9	12.2	4.30	0.002	-	75.6(121.7)
PAS	34.0310	116.6570	07/08/1986	92412.8	6.0	4.40	0.002	-	75.7(121.7)
DMG	34.3250	116.8750	12/02/1962	04138.4	6.7	4.40	0.002	-	75.7(121.8)

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	34.3330	116.8830	10/14/1943	142844.0	0.0	4.50	0.002	-	75.7(121.8)
GSP	34.3610	116.9130	12/04/1992	125942.1	0.0	4.20	0.002	-	75.7(121.8)
PAS	33.5200	116.5580	08/02/1975	014 7.7	13.4	4.70	0.003	I	75.9(122.1)
GSP	34.2190	116.7710	07/21/1992	211029.0	1.0	4.10	0.002	-	76.0(122.3)
DMG	34.3250	116.8650	10/29/1962	24253.9	8.6	4.80	0.003	I	76.1(122.5)
GSP	34.2070	116.7570	06/28/1992	161719.2	3.0	4.20	0.002	-	76.2(122.6)
GSP	34.2110	116.7600	06/28/1992	152429.3	6.0	4.50	0.002	-	76.2(122.6)
GSP	34.3640	116.9040	11/27/1992	183225.0	1.0	4.10	0.002	-	76.2(122.7)
PAS	33.9670	116.6170	07/08/1986	155526.2	6.0	4.00	0.002	-	76.2(122.7)
PAS	33.9670	116.6170	07/08/1986	102240.6	6.0	4.40	0.002	-	76.2(122.7)
GSP	34.3770	116.9180	12/04/1992	052511.2	2.0	4.80	0.003	I	76.3(122.7)
DMG	33.4170	116.5670	12/22/1950	2 536.0	0.0	4.00	0.002	-	76.3(122.8)
T-A	32.6700	117.1700	04/15/1865	840 0.0	0.0	4.30	0.002	-	76.4(122.9)
T-A	32.6700	117.1700	05/24/1865	0 0 0.0	0.0	5.00	0.003	I	76.4(122.9)
T-A	32.6700	117.1700	12/00/1856	0 0 0.0	0.0	5.00	0.003	I	76.4(122.9)
T-A	32.6700	117.1700	01/25/1863	1020 0.0	0.0	4.30	0.002	-	76.4(122.9)
T-A	32.6700	117.1700	10/21/1862	0 0 0.0	0.0	5.00	0.003	I	76.4(122.9)
PAS	32.6790	117.1510	06/18/1985	32228.7	5.7	4.00	0.002	-	76.4(123.0)
DMG	34.4330	116.9830	04/18/1945	458 2.0	0.0	4.30	0.002	-	76.5(123.1)
DMG	33.4000	116.5670	02/04/1953	43616.0	0.0	4.30	0.002	-	76.5(123.2)
GSP	34.3200	116.8500	10/27/1998	154017.1	4.0	4.10	0.002	-	76.5(123.2)
DMG	34.3070	116.8350	08/28/1950	194526.4	11.7	4.20	0.002	-	76.6(123.3)
GSP	34.3690	116.8970	12/04/1992	020857.5	3.0	5.30	0.004	I	76.8(123.5)
GSP	34.3220	116.8460	09/20/1999	070249.2	2.0	4.20	0.002	-	76.8(123.6)
GSP	34.3230	116.8440	10/27/1998	010840.7	5.0	4.90	0.003	I	76.9(123.8)
PAS	33.9060	119.1660	05/23/1978	91650.8	6.0	4.00	0.002	-	77.0(124.0)
DMG	34.3500	116.8670	10/15/1943	1650 1.0	0.0	4.50	0.002	-	77.1(124.1)
DMG	34.2500	116.7700	03/16/1956	203344.3	0.8	4.00	0.002	-	77.2(124.3)
DMG	34.4000	116.9170	02/01/1942	16 334.0	0.0	4.50	0.002	-	77.4(124.6)
DMG	34.4000	116.9170	02/01/1942	151828.0	0.0	4.50	0.002	-	77.4(124.6)
DMG	34.4000	116.9170	01/25/1942	215133.0	0.0	4.00	0.002	-	77.4(124.6)
DMG	34.4000	116.9170	02/01/1942	151555.0	0.0	4.00	0.002	-	77.4(124.6)
DMG	34.5290	118.6440	02/07/1956	21656.5	16.0	4.20	0.002	-	77.5(124.6)
DMG	33.8980	116.5690	11/17/1964	145228.2	10.3	4.00	0.002	-	77.5(124.7)
GSP	34.3700	116.8800	11/29/1992	142120.5	3.0	4.00	0.002	-	77.5(124.7)
PAS	33.9980	116.6060	07/08/1986	92044.5	11.7	5.60	0.006	II	77.5(124.8)
GSP	34.2980	116.8040	07/05/1992	200303.1	3.0	4.00	0.002	-	77.6(124.9)
GSP	34.2730	116.7740	08/24/1992	135146.0	1.0	4.30	0.002	-	78.0(125.5)
PAS	34.3220	116.8150	08/29/1985	759 8.7	6.1	4.10	0.002	-	78.2(125.8)
PAS	33.9530	116.5720	10/15/1986	22847.8	8.7	4.70	0.003	-	78.4(126.2)
DMG	34.4170	118.8330	06/01/1946	11 631.0	0.0	4.10	0.002	-	78.4(126.2)
DMG	34.2640	116.7550	03/16/1956	203613.6	3.3	4.00	0.001	-	78.5(126.3)
GSP	34.1110	116.6460	06/28/1992	140928.8	7.0	4.10	0.002	-	78.5(126.3)
MGI	33.2000	116.6000	10/12/1920	1748 0.0	0.0	5.30	0.004	I	78.6(126.4)
DMG	34.2990	116.7840	03/18/1956	24217.3	6.3	4.40	0.002	-	78.6(126.4)
PAS	33.5010	116.5130	02/25/1980	104738.5	13.6	5.50	0.005	II	78.6(126.5)
DMG	34.3170	116.8000	08/12/1950	21717.0	0.0	4.30	0.002	-	78.6(126.5)
PAS	33.4840	116.5130	08/11/1976	152455.5	15.4	4.30	0.002	-	78.7(126.7)
DMG	33.2910	119.1930	10/24/1969	82912.1	10.0	5.10	0.004	I	79.1(127.3)
PAS	33.9870	116.5690	07/09/1986	01232.1	6.0	4.40	0.002	-	79.3(127.6)
DMG	33.5000	116.5000	09/30/1916	211 0.0	0.0	5.00	0.003	I	79.3(127.7)
DMG	33.4830	116.5000	02/15/1951	104759.0	0.0	4.80	0.003	I	79.5(127.9)
DMG	33.4830	116.5000	02/15/1951	104957.0	0.0	4.80	0.003	I	79.5(127.9)

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	33.1000	116.6330	02/08/1952	174028.0	0.0	4.00	0.001	-	79.6(128.1)
GSP	34.2500	116.7190	06/29/1992	164141.9	1.0	4.90	0.003	I	79.6(128.2)
DMG	34.5860	118.6130	02/07/1956	31638.6	2.6	4.60	0.002	-	79.8(128.4)
DMG	34.3060	116.7590	03/16/1956	202933.6	1.3	4.80	0.003	I	80.0(128.8)
GSP	34.2750	116.7300	07/01/1992	204617.8	1.0	4.20	0.002	-	80.1(128.9)
PAS	32.6150	117.1520	10/29/1986	23815.3	14.6	4.10	0.002	-	80.2(129.0)
GSP	34.2810	116.7310	07/01/1992	205356.8	1.0	4.00	0.001	-	80.3(129.2)
DMG	33.5000	116.4830	02/23/1941	183614.0	0.0	4.50	0.002	-	80.3(129.2)
DMG	33.4000	116.5000	10/11/1918	4 0 0.0	0.0	4.00	0.001	-	80.3(129.3)
DMG	33.4200	116.4900	03/29/1937	17 316.8	10.0	4.00	0.001	-	80.6(129.8)
DMG	33.1500	116.5830	12/02/1935	319 0.0	0.0	4.00	0.001	-	80.8(130.0)
DMG	34.0650	116.5740	08/26/1959	53250.2	16.7	4.30	0.002	-	80.9(130.2)
DMG	34.4170	116.8500	02/11/1932	231120.0	0.0	4.00	0.001	-	81.0(130.3)
MGI	33.1000	116.6000	02/05/1922	1915 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	08/10/1921	19 6 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	05/11/1915	1145 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	02/16/1915	1330 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	03/04/1915	1250 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	05/28/1917	1017 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	08/10/1921	2151 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	02/09/1920	220 0.0	0.0	4.00	0.001	-	81.3(130.9)
MGI	33.1000	116.6000	08/19/1917	710 0.0	0.0	4.00	0.001	-	81.3(130.9)
GSP	34.2740	116.6920	07/01/1992	170715.1	4.0	4.20	0.002	-	81.8(131.7)
DMG	34.3360	116.7420	03/16/1956	233456.4	1.7	4.40	0.002	-	82.0(132.0)
T-A	34.4200	118.9200	03/29/1917	8 6 0.0	0.0	4.30	0.002	-	82.1(132.1)
GSP	33.5100	116.4500	02/18/1990	155259.9	9.0	4.10	0.001	-	82.1(132.2)
DMG	34.4360	116.8340	07/14/1973	8 020.1	8.0	4.80	0.003	-	82.5(132.8)
PAS	33.4830	116.4380	07/02/1988	02658.2	12.6	4.00	0.001	-	83.0(133.6)
DMG	32.8000	116.8000	10/23/1894	23 3 0.0	0.0	5.70	0.005	II	83.3(134.1)
MGI	32.8000	116.8000	08/14/1927	1448 0.0	0.0	4.60	0.002	-	83.3(134.1)
DMG	33.5010	116.4290	02/23/1971	0 739.2	8.0	4.20	0.002	-	83.4(134.2)
DMG	33.4670	116.4330	05/12/1939	1925 2.2	0.0	4.50	0.002	-	83.4(134.3)
PAS	33.4580	116.4340	02/12/1979	44842.3	3.9	4.20	0.002	-	83.5(134.3)
DMG	34.0170	116.5000	07/25/1947	51752.0	0.0	4.30	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/26/1947	23 425.0	0.0	4.50	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/26/1947	24941.0	0.0	5.10	0.003	I	83.7(134.7)
DMG	34.0170	116.5000	07/26/1947	12415.0	0.0	4.20	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/25/1947	04631.0	0.0	5.00	0.003	I	83.7(134.7)
DMG	34.0170	116.5000	07/25/1947	61949.0	0.0	5.20	0.004	I	83.7(134.7)
DMG	34.0170	116.5000	07/25/1947	15647.0	0.0	4.60	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/25/1947	75730.0	0.0	4.20	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/24/1947	225341.0	0.0	4.30	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/24/1947	221046.0	0.0	5.50	0.005	I	83.7(134.7)
DMG	34.0170	116.5000	08/01/1947	17 137.0	0.0	4.10	0.001	-	83.7(134.7)
DMG	34.0170	116.5000	07/24/1947	225426.0	0.0	4.90	0.003	I	83.7(134.7)
DMG	34.0170	116.5000	07/30/1947	52217.0	0.0	4.20	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	08/08/1947	64745.0	0.0	4.00	0.001	-	83.7(134.7)
DMG	34.0170	116.5000	07/25/1947	161453.0	0.0	4.50	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/29/1947	163615.0	0.0	4.20	0.002	-	83.7(134.7)
DMG	34.0170	116.5000	07/26/1947	231351.0	0.0	4.10	0.001	-	83.7(134.7)
DMG	33.3680	116.4440	03/25/1937	232026.7	10.0	4.00	0.001	-	83.9(135.0)
DMG	33.4260	116.4210	03/25/1937	20 4 8.3	10.0	4.00	0.001	-	84.5(136.0)
MGI	33.0000	116.6000	06/11/1917	354 0.0	0.0	4.00	0.001	-	84.6(136.1)

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	33.8800	116.4370	04/17/1959	1619 0.2	22.2	4.20	0.002	-	84.6(136.1)
DMG	33.1670	116.5000	06/23/1932	22552.7	0.0	4.00	0.001	-	84.8(136.4)
DMG	33.1670	116.5000	06/23/1932	23037.1	0.0	4.00	0.001	-	84.8(136.4)
DMG	33.4170	116.4170	01/02/1943	141118.0	0.0	4.50	0.002	-	84.8(136.5)
DMG	34.1180	119.2200	03/18/1957	185628.0	13.8	4.70	0.002	-	84.9(136.6)
DMG	33.3330	116.4330	02/12/1954	94428.0	0.0	4.50	0.002	-	85.1(136.9)
DMG	33.1100	116.5230	01/24/1957	205449.9	3.9	4.60	0.002	-	85.1(136.9)
DMG	34.0000	116.4670	12/06/1948	246 8.0	0.0	4.30	0.002	-	85.1(137.0)
DMG	34.0000	116.4670	12/05/1948	05057.0	0.0	4.40	0.002	-	85.1(137.0)
PAS	34.3780	119.0350	04/03/1985	4 449.8	27.9	4.00	0.001	-	85.2(137.1)
DMG	34.4500	116.7830	05/22/1942	151829.0	0.0	4.00	0.001	-	85.3(137.3)
DMG	33.9670	116.4500	12/11/1948	161220.0	0.0	4.50	0.002	-	85.4(137.4)
PAS	33.1380	116.5010	10/10/1984	212258.9	11.6	4.50	0.002	-	85.5(137.5)
DMG	32.5000	118.5500	02/24/1948	81510.0	0.0	5.30	0.004	I	85.9(138.2)
DMG	33.9670	116.4330	12/05/1948	04235.0	0.0	4.60	0.002	-	86.3(138.9)
MGI	34.2000	119.2000	06/16/1914	1052 0.0	0.0	4.60	0.002	-	86.4(139.0)
DMG	33.1670	116.4670	08/01/1960	193930.0	0.0	4.20	0.001	-	86.6(139.3)
DMG	33.9630	116.4250	01/13/1950	5 719.4	5.9	4.10	0.001	-	86.7(139.5)
DMG	34.0830	116.4670	01/26/1934	1844 0.0	0.0	4.00	0.001	-	87.1(140.1)
DMG	34.0830	116.4670	03/01/1942	104631.0	0.0	4.00	0.001	-	87.1(140.1)
PAS	33.4600	116.3700	09/07/1984	175730.3	15.2	4.10	0.001	-	87.1(140.2)
DMG	33.9330	116.4000	12/10/1948	204257.0	0.0	4.40	0.002	-	87.5(140.8)
DMG	34.4830	118.9830	09/04/1942	63433.0	0.0	4.50	0.002	-	87.7(141.1)
DMG	34.4830	118.9830	09/03/1942	14 6 1.0	0.0	4.50	0.002	-	87.7(141.1)
GSP	33.9450	116.3990	07/05/1992	054938.2	3.0	4.00	0.001	-	87.8(141.2)
PAS	34.0220	116.4260	08/14/1975	8 849.8	10.9	4.00	0.001	-	87.8(141.3)
DMG	33.2670	116.4000	06/06/1940	2321 4.0	0.0	4.00	0.001	-	88.0(141.7)
DMG	34.0500	116.4330	02/08/1938	739 0.0	0.0	4.00	0.001	-	88.1(141.7)
DMG	34.4050	116.6670	07/02/1955	162938.5	10.0	4.20	0.001	-	88.3(142.1)
PAS	33.9850	116.4020	02/15/1985	232626.6	2.3	4.00	0.001	-	88.3(142.2)
DMG	33.9330	116.3830	12/04/1948	234317.0	0.0	6.50	0.009	III	88.4(142.3)
DMG	34.0670	116.4320	12/04/1957	25144.0	3.7	4.30	0.002	-	88.5(142.5)
GSP	33.3990	116.3540	07/26/1997	031456.0	11.0	4.80	0.002	-	88.6(142.6)
GSP	33.9460	116.3790	04/24/1992	123605.7	10.0	4.10	0.001	-	88.9(143.0)
GSP	34.1520	116.4680	06/28/1992	224822.9	11.0	4.10	0.001	-	88.9(143.1)
DMG	33.4000	119.4000	07/24/1947	1654 2.0	0.0	4.30	0.002	-	89.1(143.3)
DMG	33.1000	116.4500	11/23/1953	1339 7.0	0.0	4.30	0.002	-	89.2(143.6)
DMG	33.1670	116.4170	12/05/1939	173352.0	0.0	4.00	0.001	-	89.3(143.6)
DMG	33.1670	116.4170	10/14/1935	1550 0.0	0.0	4.00	0.001	-	89.3(143.6)
DMG	33.1670	116.4170	07/10/1938	18 6 0.0	0.0	4.00	0.001	-	89.3(143.6)
DMG	33.9330	116.3670	12/05/1948	0 721.0	0.0	4.90	0.002	-	89.3(143.7)
PAS	34.4010	116.6410	02/10/1975	125117.6	8.0	4.40	0.002	-	89.3(143.8)
GSP	34.0890	116.4260	06/28/1992	143906.9	0.0	4.30	0.002	-	89.4(143.9)
GSP	34.0950	116.4270	06/28/1992	211316.5	3.0	4.60	0.002	-	89.5(144.0)
DMG	33.0970	116.4440	08/18/1959	215221.3	17.3	4.30	0.002	-	89.6(144.2)
DMG	34.0000	116.3830	05/05/1944	134715.0	0.0	4.00	0.001	-	89.7(144.3)
DMG	33.3430	116.3460	04/28/1969	232042.9	20.0	5.80	0.005	II	89.8(144.5)
PAS	34.3820	116.6130	06/11/1984	222110.4	1.8	4.00	0.001	-	89.8(144.5)
GSP	34.0960	116.4170	07/18/1992	000611.2	2.0	4.00	0.001	-	90.1(144.9)
GSP	34.0920	116.4140	12/21/1992	114402.9	3.0	4.00	0.001	-	90.1(145.0)
DMG	33.9330	116.3500	12/05/1948	04032.0	0.0	4.40	0.002	-	90.3(145.3)
DMG	34.6000	118.9000	05/18/1940	91512.0	0.0	4.00	0.001	-	90.3(145.3)
GSP	34.1390	116.4310	06/28/1992	123640.6	10.0	5.10	0.003	I	90.5(145.6)

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]
DMG	34.7000	117.0000	07/16/1916	1230 0.0	0.0	4.00	0.001	-	90.5(145.6)
DMG	34.7000	117.0000	07/16/1916	1150 0.0	0.0	4.50	0.002	-	90.5(145.6)
GSP	34.6000	116.8400	06/04/1989	213358.1	2.0	4.50	0.002	-	90.5(145.6)
DMG	33.1170	116.4170	06/04/1940	103656.0	0.0	4.00	0.001	-	90.5(145.7)
DMG	33.1170	116.4170	10/21/1940	64933.0	0.0	4.50	0.002	-	90.5(145.7)
DMG	33.2830	116.3500	04/13/1949	75336.0	0.0	4.10	0.001	-	90.5(145.7)
GSP	34.0300	116.3790	06/28/1992	160115.2	1.0	4.10	0.001	-	90.5(145.7)
GSP	34.1120	116.4150	07/28/1992	182703.9	0.0	4.60	0.002	-	90.6(145.8)
GSP	34.0880	116.4020	08/15/1992	082414.7	0.0	4.80	0.002	-	90.7(145.9)
DMG	33.1830	116.3830	10/14/1949	02925.0	0.0	4.10	0.001	-	90.7(146.0)
PAS	34.5410	118.9890	06/12/1984	02752.4	11.7	4.10	0.001	-	90.7(146.0)
GSP	34.1110	116.4100	06/28/1992	135045.7	0.0	4.90	0.002	-	90.8(146.1)
GSP	33.9400	116.3410	05/04/1992	011602.6	6.0	4.00	0.001	-	90.9(146.3)
DMG	34.0170	116.3670	06/06/1940	235637.2	0.0	4.40	0.002	-	90.9(146.3)
DMG	33.9580	116.3460	01/08/1952	63427.4	11.4	4.40	0.002	-	90.9(146.3)
GSP	34.0040	116.3610	06/30/1992	143811.6	0.0	4.80	0.002	-	91.0(146.4)
GSP	34.1080	116.4040	06/29/1992	141338.8	9.0	5.40	0.004	I	91.1(146.5)
GSP	34.1060	116.4020	06/29/1992	140837.7	11.0	4.90	0.002	-	91.1(146.6)
GSP	33.9510	116.3380	05/18/1992	154418.0	7.0	4.90	0.002	-	91.2(146.8)
GSP	34.0690	116.3820	07/07/1992	082103.1	3.0	4.00	0.001	-	91.3(146.9)
DMG	34.6670	118.8330	01/24/1950	215659.0	0.0	4.00	0.001	-	91.5(147.2)
GSP	34.0610	116.3740	08/11/1992	061117.3	0.0	4.30	0.001	-	91.5(147.3)
GSP	34.0570	116.3710	06/28/1992	160953.9	3.0	4.10	0.001	-	91.6(147.4)
GSP	33.1100	116.4000	04/01/1984	071702.3	11.0	4.00	0.001	-	91.6(147.4)
GSP	33.9470	116.3300	09/09/1992	125045.1	5.0	4.30	0.001	-	91.6(147.4)
GSP	34.0340	116.3600	05/14/1999	105235.2	1.0	4.20	0.001	-	91.7(147.5)
DMG	33.4000	116.3000	02/09/1890	12 6 0.0	0.0	6.30	0.007	II	91.7(147.5)
DMG	33.9850	116.3400	02/01/1957	75215.4	11.0	4.60	0.002	-	91.8(147.7)
GSP	34.1990	116.4390	09/05/1995	202718.4	0.0	4.40	0.002	-	91.8(147.7)
GSP	34.0820	116.3780	07/06/1992	194137.9	3.0	4.40	0.002	-	91.8(147.7)
GSG	33.9430	116.3250	04/23/1992	052316.2	5.0	4.00	0.001	-	91.8(147.8)
GSP	34.1270	116.3970	06/30/1992	000608.5	2.0	4.30	0.001	-	91.9(147.9)
GSP	34.0970	116.3820	07/01/1992	070149.2	0.0	4.30	0.001	-	91.9(148.0)
GSP	34.0620	116.3660	05/14/1999	075403.2	1.0	4.90	0.002	-	92.0(148.0)
GSN	34.2010	116.4360	06/28/1992	115734.1	1.0	7.60	0.021	IV	92.0(148.1)
GSP	34.1020	116.3830	08/04/1992	190612.3	0.0	4.00	0.001	-	92.0(148.1)
GSP	34.1980	116.4320	07/20/1992	040822.6	0.0	4.10	0.001	-	92.1(148.2)
DMG	33.7830	116.2830	03/04/1937	16 4 0.0	0.0	4.00	0.001	-	92.1(148.3)
GSP	34.3410	116.5290	06/28/1992	124053.5	6.0	5.20	0.003	I	92.2(148.3)
PAS	34.3020	116.4990	03/31/1979	016 8.6	0.1	4.20	0.001	-	92.2(148.3)
DMG	33.2910	116.3170	03/19/1966	142156.0	10.9	4.00	0.001	-	92.2(148.5)
GSP	34.0640	116.3610	09/15/1992	084711.3	9.0	5.20	0.003	I	92.3(148.5)
MGI	32.7000	116.7000	03/21/1918	2325 0.0	0.0	4.00	0.001	-	92.3(148.5)
GSP	33.9430	116.3150	05/06/1992	023843.3	7.0	4.50	0.002	-	92.4(148.7)
GSP	34.1620	116.4050	06/28/1992	132605.1	6.0	4.90	0.002	-	92.5(148.8)
GSP	34.0580	116.3550	06/28/1992	221312.0	7.0	4.00	0.001	-	92.5(148.8)
GSP	33.9570	116.3170	04/23/1992	022529.9	11.0	4.60	0.002	-	92.5(148.9)
GSP	34.1710	116.4090	06/30/1992	151905.0	0.0	4.00	0.001	-	92.5(148.9)
GSP	34.0920	116.3690	07/06/1992	120059.2	1.0	4.50	0.002	-	92.5(148.9)
GSP	33.9610	116.3180	04/23/1992	045023.0	12.0	6.10	0.006	II	92.5(148.9)
DMG	33.3150	116.3050	04/09/1968	1831 3.8	12.6	4.70	0.002	-	92.5(148.9)
DMG	33.3330	116.3000	08/06/1933	332 0.0	0.0	4.70	0.002	-	92.5(148.9)
DMG	33.3330	116.3000	08/05/1933	2331 0.0	0.0	4.40	0.002	-	92.5(148.9)

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	34.1500	119.3500	08/22/1950	224758.0	0.0	4.20	0.001	-	92.6(149.0)
GSP	33.9530	116.3140	11/27/1996	014243.8	6.0	4.10	0.001	-	92.6(149.0)
GSP	33.9510	116.3110	04/26/1992	062608.0	0.0	4.20	0.001	-	92.7(149.2)
PDP	33.9370	116.3060	07/25/1992	043160.0	5.0	4.90	0.002	-	92.8(149.3)
GSP	34.2390	116.4430	06/29/1992	030156.4	7.0	4.40	0.002	-	92.8(149.4)
DMG	33.0020	116.4360	07/02/1957	65638.5	12.8	4.10	0.001	-	92.8(149.4)
GSP	33.9330	116.3020	04/27/1992	031119.3	0.0	4.20	0.001	-	92.9(149.6)
GSP	33.9420	116.3040	05/04/1992	161949.7	12.0	4.80	0.002	-	93.0(149.6)
DMG	33.3000	116.3000	01/04/1940	8 711.0	0.0	4.00	0.001	-	93.1(149.7)
DMG	33.0000	116.4330	06/04/1940	1035 8.3	0.0	5.10	0.003	I	93.1(149.7)
GSG	34.0120	116.3250	04/23/1992	051009.4	3.0	4.60	0.002	-	93.1(149.8)
GSP	33.9050	116.2880	05/07/1995	110333.0	10.0	4.80	0.002	-	93.3(150.1)
DMG	34.0000	116.3170	06/06/1940	222115.1	0.0	4.30	0.001	-	93.3(150.2)
GSP	34.0500	116.3350	04/26/1992	172138.0	0.0	4.30	0.001	-	93.4(150.3)
GSP	34.0120	116.3190	11/20/1994	043143.5	6.0	4.20	0.001	-	93.4(150.4)
GSP	33.9020	116.2840	07/24/1992	181436.2	9.0	5.00	0.003	-	93.5(150.4)
DMG	33.6670	119.5000	11/30/1939	64251.0	0.0	4.00	0.001	-	93.6(150.7)
GSP	34.0290	116.3210	08/21/1993	014638.4	9.0	5.00	0.003	-	93.7(150.8)
GSP	34.2450	116.4290	07/08/1993	225744.9	2.0	4.00	0.001	-	93.7(150.8)
MGI	33.7500	116.2500	11/19/1917	1730 0.0	0.0	4.00	0.001	-	93.8(150.9)
DMG	33.4080	116.2610	03/25/1937	1649 1.8	10.0	6.00	0.006	II	93.8(151.0)
PAS	34.2570	116.4350	07/13/1979	226 3.5	5.0	4.00	0.001	-	93.8(151.0)
DMG	33.2670	119.4500	11/18/1947	2159 3.0	0.0	5.00	0.003	-	93.8(151.0)
DMG	34.0670	116.3330	05/18/1940	72132.7	0.0	5.00	0.003	-	93.9(151.0)
DMG	34.0670	116.3330	05/18/1940	55120.2	0.0	5.20	0.003	I	93.9(151.0)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.004	I	93.9(151.2)
DMG	34.0330	116.3170	06/11/1940	195118.1	0.0	4.40	0.002	-	94.0(151.2)
GSG	34.1570	116.3730	06/29/1992	103657.8	5.0	4.00	0.001	-	94.0(151.3)
DMG	33.1210	116.3490	05/25/1971	10 252.9	8.0	4.10	0.001	-	94.1(151.4)
GSP	33.8760	116.2670	06/29/1992	160142.8	1.0	5.20	0.003	I	94.1(151.4)
GSP	34.2940	116.4530	06/28/1992	173121.5	6.0	4.10	0.001	-	94.2(151.5)
DMG	34.5000	119.1170	11/17/1954	23 351.0	0.0	4.40	0.002	-	94.2(151.5)
DMG	34.0830	116.3330	06/02/1940	61310.2	0.0	4.50	0.002	-	94.2(151.6)
DMG	34.0830	116.3330	06/01/1940	527 1.2	0.0	4.70	0.002	-	94.2(151.6)
GSP	34.3010	116.4520	09/28/1997	155723.0	7.0	4.40	0.002	-	94.4(152.0)
DMG	34.1000	116.3330	06/01/1940	65428.0	0.0	4.30	0.001	-	94.6(152.3)
MGI	34.3000	119.3000	05/01/1904	1830 0.0	0.0	4.60	0.002	-	94.7(152.4)
MGI	34.3000	119.3000	09/28/1926	1749 0.0	0.0	4.00	0.001	-	94.7(152.4)
MGI	34.3000	119.3000	05/15/1927	1120 0.0	0.0	4.00	0.001	-	94.7(152.4)
PAS	34.4220	116.5420	07/18/1985	14 525.8	6.0	4.20	0.001	-	94.7(152.4)
DMG	34.0670	116.3170	05/18/1940	6 430.6	0.0	4.60	0.002	-	94.7(152.4)
GSP	33.9900	116.2870	05/02/1992	124641.4	4.0	4.10	0.001	-	94.8(152.5)
DMG	33.2000	116.3000	05/12/1930	414 0.0	0.0	4.00	0.001	-	94.9(152.7)
GSP	33.9910	116.2840	04/23/1992	185603.0	3.0	4.40	0.002	-	94.9(152.8)
GSP	34.3320	116.4620	07/01/1992	074029.9	9.0	5.40	0.003	I	95.1(153.0)
GSP	34.3420	116.4670	07/07/1992	220928.3	2.0	4.40	0.002	-	95.2(153.2)
GSP	34.3130	116.4440	07/02/1992	001622.4	6.0	4.00	0.001	-	95.3(153.3)
PAS	34.3090	116.4400	03/15/1979	201749.9	2.0	4.90	0.002	-	95.3(153.4)
GSP	33.9920	116.2740	08/07/1994	151026.0	7.0	4.00	0.001	-	95.5(153.7)
DMG	33.9860	119.4750	08/06/1973	232917.0	16.9	5.00	0.002	-	95.6(153.8)
DMG	33.9170	116.2500	08/15/1946	19 1 8.0	0.0	4.00	0.001	-	95.6(153.8)
DMG	33.0380	116.3610	02/26/1957	211652.2	0.0	4.10	0.001	-	95.7(153.9)
GSP	34.1750	116.3500	06/11/1992	002419.2	0.0	4.30	0.001	-	95.7(154.0)

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]
PAS	34.3270	116.4450	03/15/1979	21 716.5	2.5	5.20	0.003	I	95.7(154.0)
DMG	33.9170	119.5000	08/26/1954	1348 3.0	0.0	4.80	0.002	-	95.8(154.2)
GSP	34.2680	116.4020	06/16/1994	162427.5	3.0	5.00	0.002	-	95.8(154.2)
PAS	34.3300	116.4430	03/15/1979	23 758.2	2.8	4.80	0.002	-	95.9(154.3)
GSP	34.2720	116.4030	12/11/1992	013834.2	2.0	4.10	0.001	-	95.9(154.4)
DMG	34.0830	116.3000	05/18/1940	5 358.5	0.0	5.40	0.003	I	96.0(154.5)
PAS	34.3480	116.4530	03/15/1979	213425.6	1.5	4.50	0.002	-	96.1(154.6)
DMG	33.2350	116.2660	04/09/1968	93833.0	5.2	4.00	0.001	-	96.1(154.6)
GSG	33.9820	116.2600	05/12/1992	023111.0	6.0	4.00	0.001	-	96.1(154.7)
T-A	32.2500	117.5000	01/13/1877	20 0 0.0	0.0	5.00	0.002	-	96.1(154.7)
DMG	34.3000	116.4170	08/07/1942	15314.0	0.0	4.00	0.001	-	96.1(154.7)
DMG	34.3000	116.4170	08/07/1942	12358.0	0.0	4.00	0.001	-	96.1(154.7)
DMG	34.3000	116.4170	08/07/1942	11533.0	0.0	4.50	0.002	-	96.1(154.7)
DMG	33.3330	116.2360	10/05/1962	1529 2.6	13.9	4.10	0.001	-	96.2(154.7)
DMG	34.0500	116.2830	08/01/1940	193140.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	06/14/1940	215850.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/19/1940	193941.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	06/01/1940	55646.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/27/1940	32727.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	06/24/1940	163936.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/22/1940	63137.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/19/1940	226 2.0	0.0	4.50	0.002	-	96.2(154.8)
DMG	34.0500	116.2830	08/04/1940	181520.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/22/1940	1410 5.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/19/1940	22730.0	0.0	4.50	0.002	-	96.2(154.8)
DMG	34.0500	116.2830	05/19/1940	35145.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	06/08/1940	171032.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	34.0500	116.2830	05/18/1940	134719.0	0.0	4.50	0.002	-	96.2(154.8)
DMG	34.0500	116.2830	06/06/1940	234849.0	0.0	4.00	0.001	-	96.2(154.8)
DMG	33.1500	119.4500	01/05/1940	62052.0	0.0	4.00	0.001	-	96.2(154.9)
DMG	33.1500	119.4500	06/17/1934	243 0.0	0.0	4.00	0.001	-	96.2(154.9)
DMG	33.2790	116.2490	01/07/1966	191023.0	-1.7	4.00	0.001	-	96.3(154.9)
DMG	34.3810	116.4740	01/06/1964	234712.8	12.3	4.50	0.002	-	96.3(154.9)
DMG	33.3330	116.2330	06/09/1942	5 633.0	0.0	4.00	0.001	-	96.3(155.0)
MGI	33.7000	116.2000	08/12/1917	11 0 0.0	0.0	4.00	0.001	-	96.4(155.1)
PAS	34.2300	116.3630	03/18/1979	2253 2.7	3.4	4.20	0.001	-	96.6(155.5)
DMG	32.9670	116.3830	10/31/1942	15 758.0	0.0	4.00	0.001	-	96.7(155.6)
DMG	33.7830	116.2000	10/31/1943	131210.0	0.0	4.50	0.002	-	96.9(155.9)
GSP	34.3770	116.4580	08/08/1992	153743.3	2.0	4.40	0.001	-	96.9(155.9)
DMG	33.3100	116.2240	05/22/1968	132655.4	7.5	4.40	0.001	-	97.2(156.4)
MGI	34.0000	119.5000	05/03/1926	1353 0.0	0.0	4.30	0.001	-	97.2(156.4)
DMG	34.0000	119.5000	03/19/1905	440 0.0	0.0	4.00	0.001	-	97.2(156.4)
DMG	34.0000	119.5000	02/18/1926	1818 0.0	0.0	5.00	0.002	-	97.2(156.4)
GSP	34.3830	116.4520	07/02/1992	051632.2	0.0	4.00	0.001	-	97.4(156.8)
GSG	34.4880	116.5400	06/29/1992	015808.8	5.0	4.10	0.001	-	97.6(157.0)
GSP	34.4050	116.4640	02/15/1993	075933.2	5.0	4.20	0.001	-	97.7(157.2)
PAS	34.3290	116.3980	03/16/1979	173659.1	5.0	4.00	0.001	-	98.1(157.8)
DMG	33.0530	116.3060	04/02/1967	201538.6	1.0	4.30	0.001	-	98.1(157.9)
GSP	34.4140	116.4610	06/28/1992	131050.5	10.0	4.80	0.002	-	98.2(158.0)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.012	III	98.2(158.0)
DMG	34.6170	119.0830	02/26/1950	0 622.0	0.0	4.70	0.002	-	98.2(158.1)
DMG	34.2330	116.3330	05/11/1947	5 620.0	0.0	4.90	0.002	-	98.3(158.1)
DMG	34.6830	119.0000	04/06/1943	223624.0	0.0	4.00	0.001	-	98.3(158.2)

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]
MGI	34.4000	119.3000	08/12/1925	1845 0.0	0.0	4.00	0.001	-	98.3(158.3)
DMG	33.2000	116.2330	04/05/1942	92039.0	0.0	4.00	0.001	-	98.6(158.7)
GSP	34.6020	116.6350	10/02/1992	071957.4	3.0	4.30	0.001	-	98.6(158.7)
DMG	33.3490	116.1880	05/19/1969	144033.0	8.6	4.50	0.002	-	98.7(158.8)
DMG	34.5780	116.6030	06/01/1937	154144.3	10.0	4.00	0.001	-	98.8(159.1)
GSP	34.5950	116.6220	06/28/1992	163210.2	0.0	4.40	0.001	-	98.8(159.1)
DMG	34.7170	118.9670	06/11/1935	1810 0.0	0.0	4.00	0.001	-	98.9(159.2)
GSP	34.4570	116.4760	07/06/1992	180636.3	0.0	4.30	0.001	-	99.2(159.6)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.003	I	99.2(159.7)
GSP	34.4560	116.4690	08/31/1992	092540.6	11.0	4.30	0.001	-	99.5(160.1)
DMG	34.4000	116.4170	11/10/1947	22255.0	0.0	4.50	0.002	-	99.7(160.5)
GSP	34.6440	116.6560	06/30/1992	172629.7	0.0	4.30	0.001	-	99.8(160.7)
DMG	33.2830	116.1830	03/19/1954	95429.0	0.0	6.20	0.006	II	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	102610.0	0.0	4.00	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	04/04/1954	42920.0	0.0	4.10	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/20/1954	6 353.0	0.0	4.30	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/23/1954	41450.0	0.0	5.10	0.002	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	102117.0	0.0	5.50	0.003	I	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	95556.0	0.0	5.00	0.002	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	957 7.0	0.0	4.60	0.002	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	95748.0	0.0	4.00	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	10 139.0	0.0	4.20	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	101522.0	0.0	4.50	0.002	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	101957.0	0.0	4.50	0.002	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	14 057.0	0.0	4.10	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	10/26/1944	225410.0	0.0	4.20	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	13 8 4.0	0.0	4.30	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/19/1954	143750.0	0.0	4.00	0.001	-	99.9(160.8)
DMG	33.2830	116.1830	03/20/1954	41919.0	0.0	4.90	0.002	-	99.9(160.8)
GSP	34.6430	116.6530	06/30/1992	200025.4	0.0	4.30	0.001	-	99.9(160.8)

****

-END OF SEARCH- 984 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 1.8 MILES (2.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.6

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.420 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 3.944
b-value= 0.818
beta-value= 1.884

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	984	4.94472
4.5	374	1.87940
5.0	137	0.68844
5.5	47	0.23618
6.0	25	0.12563
6.5	11	0.05528
7.0	5	0.02513
7.5	1	0.00503

PLATE 1

Leighton

BORING LOCATION MAP

PROPOSED CITY HALL AND PARKING STRUCTURE
CITY OF NEWPORT BEACH, CALIFORNIA

Proj: 602184-002	Eng/Geol: VMC/ELB
Scale: 1"=80'	Date: 5/09

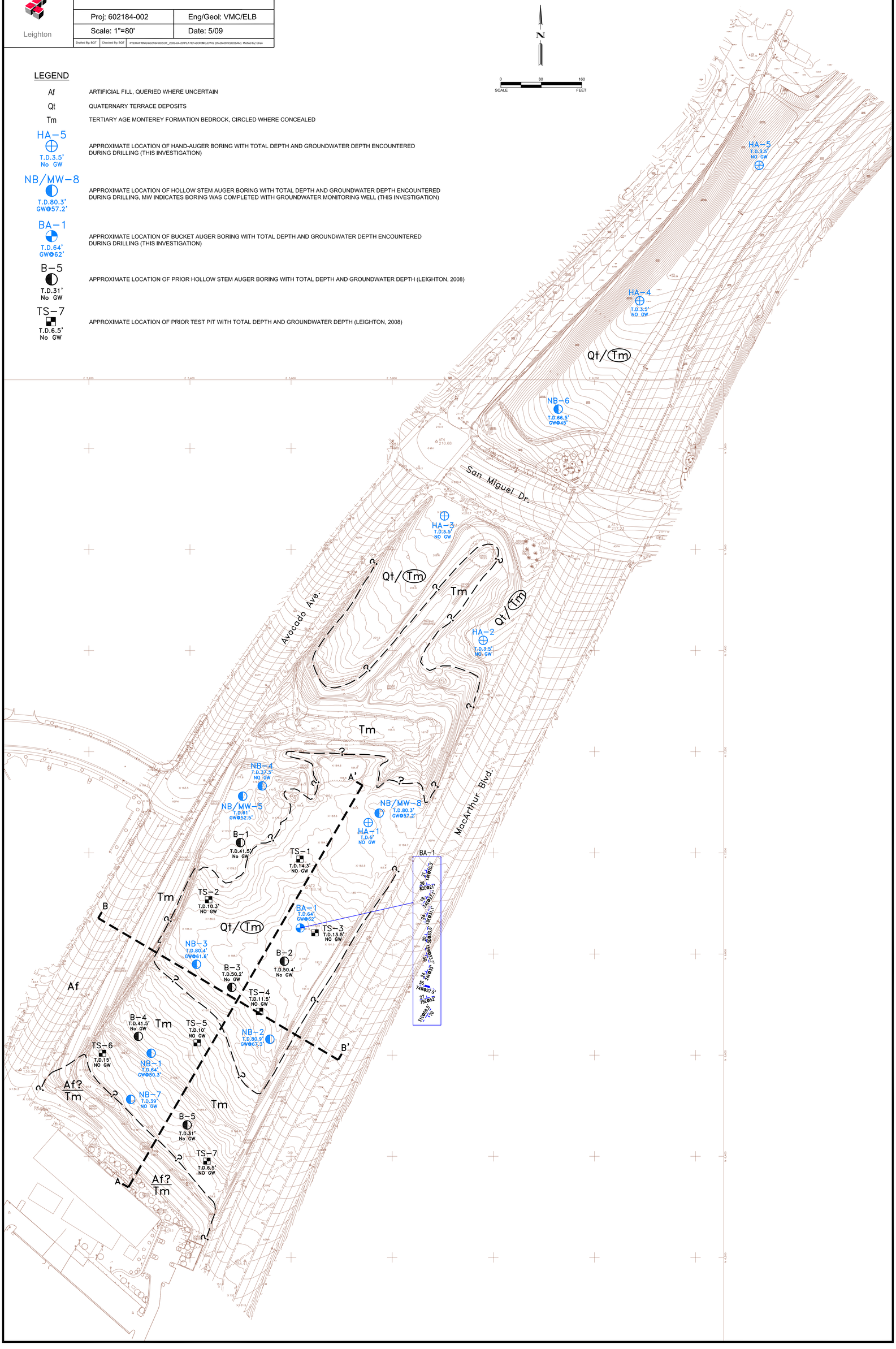
Drafted By: BGT | Checked By: BGT | P:\DRAFTING\602184\002\OF_2009-04-20\PLATE1-BORING.DWG 05-25-09 9:26:08 AM\ Plotted by: bran

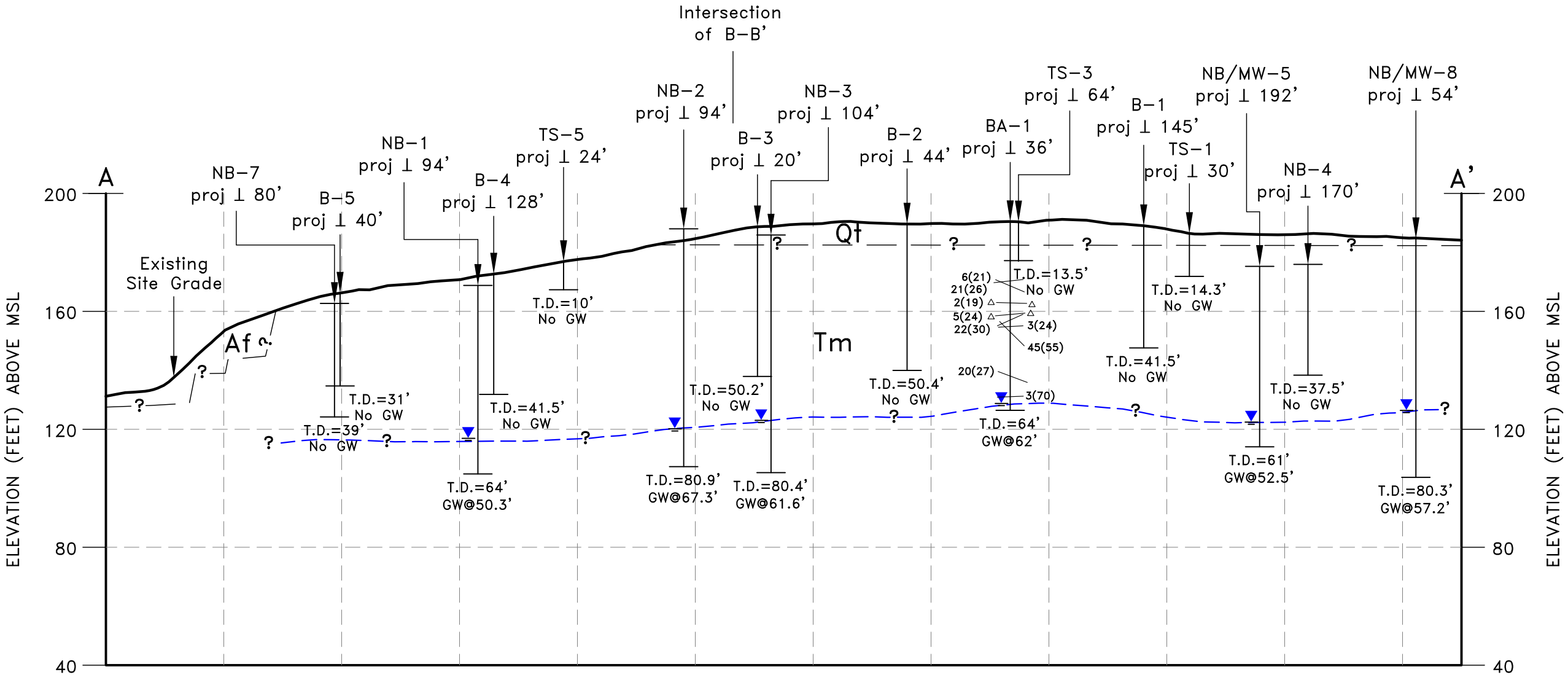
N

0 80 160
SCALE FEET

LEGEND

Af	ARTIFICIAL FILL, QUERIED WHERE UNCERTAIN
Qt	QUATERNARY TERRACE DEPOSITS
Tm	TERTIARY AGE MONTEREY FORMATION BEDROCK, CIRCLED WHERE CONCEALED
HA–5 T.D.3.5' No GW	APPROXIMATE LOCATION OF HAND-AUGER BORING WITH TOTAL DEPTH AND GROUNDWATER DEPTH ENCOUNTERED DURING DRILLING (THIS INVESTIGATION)
NB/MW–8 T.D.80.3' GW@57.2'	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING WITH TOTAL DEPTH AND GROUNDWATER DEPTH ENCOUNTERED DURING DRILLING, MW INDICATES BORING WAS COMPLETED WITH GROUNDWATER MONITORING WELL (THIS INVESTIGATION)
BA–1 T.D.64' GW@62'	APPROXIMATE LOCATION OF BUCKET AUGER BORING WITH TOTAL DEPTH AND GROUNDWATER DEPTH ENCOUNTERED DURING DRILLING (THIS INVESTIGATION)
B–5 T.D.31' No GW	APPROXIMATE LOCATION OF PRIOR HOLLOW STEM AUGER BORING WITH TOTAL DEPTH AND GROUNDWATER DEPTH (LEIGHTON, 2008)
TS–7 T.D.6.5' No GW	APPROXIMATE LOCATION OF PRIOR TEST PIT WITH TOTAL DEPTH AND GROUNDWATER DEPTH (LEIGHTON, 2008)





N30°E

LEGEND

NB/MW-8	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING SHOWING TOTAL DEPTH AND DEPTH TO GROUNDWATER ENCOUNTERED DURING DRILLING, MW INDICATES BORING COMPLETED WITH GROUNDWATER MONITORING WELL INSTALLED, (CURRENT INVESTIGATION)
B-5	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING SHOWING TOTAL DEPTH AND DEPTH TO GROUNDWATER ENCOUNTERED DURING DRILLING (LEIGHTON, 2008)
TS-5	APPROXIMATE LOCATION OF TEST PIT SHOWING TOTAL DEPTH (LEIGHTON, 2008)
Af	ARTIFICIAL FILL, QUERIED WHERE UNCERTAIN
Qt	QUATERNARY TERRACE DEPOSITS
Tm	TERTIARY AGE MONTEREY FORMATION-BEDROCK
—?— —	APPROXIMATE LOCATION OF GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN
– –?– – –	APPROXIMATE LOCATION OF GROUNDWATER SURFACE ENCOUNTERED DURING DRILLING, QUERIED WHERE UNCERTAIN

Plate 2

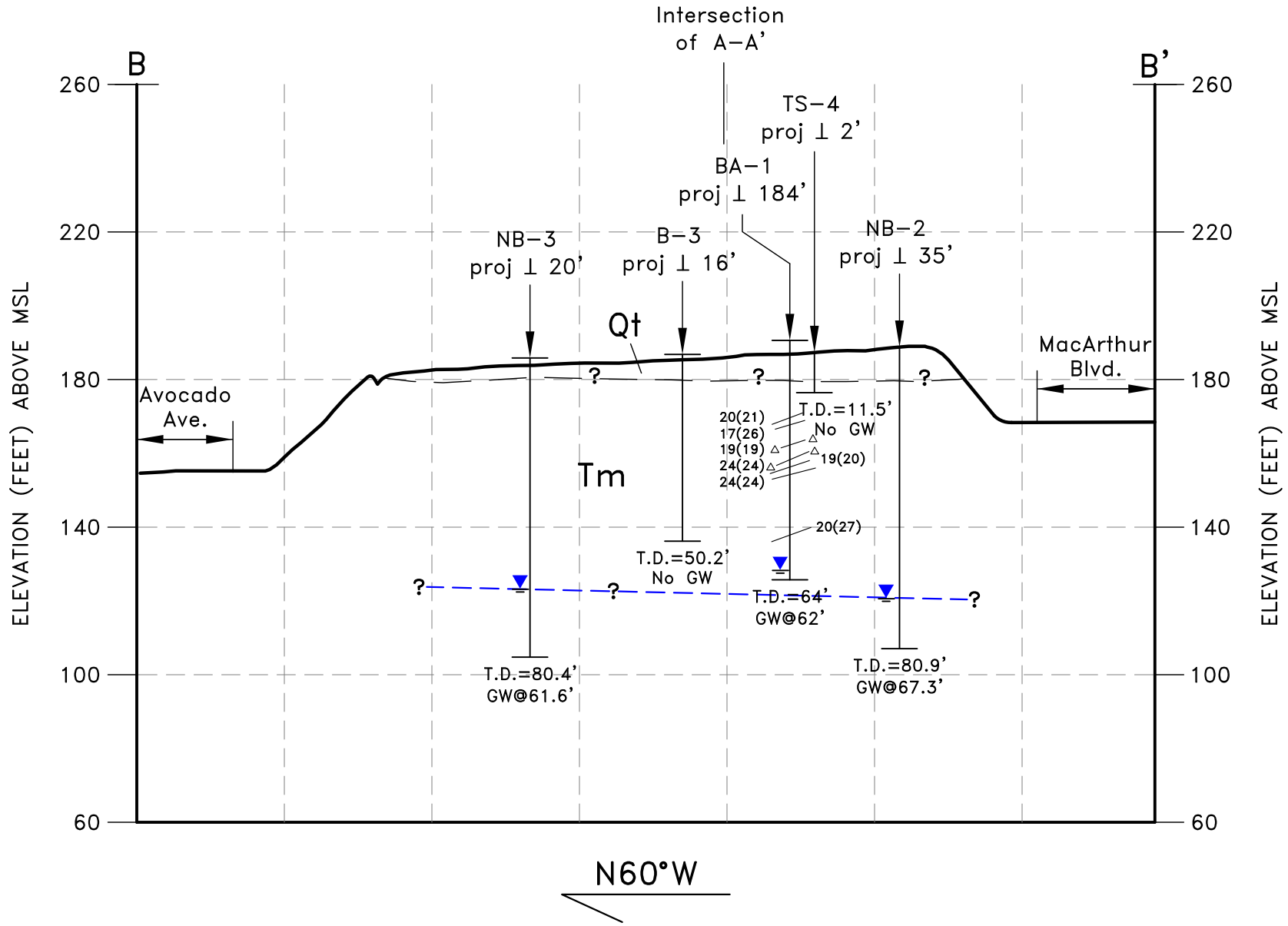
GEOLOGIC CROSS-SECTION A-A'

PROPOSED NEWPORT BEACH CITY HALL
NEWPORT BEACH, CALIFORNIA

Proj: 602184-002	Scale: V:1"=40' H:1"=80'	Date: 5/09
Eng./Geol. VMC/ELB	Drafted By: VMN	CP By: BQT

P:\DRAFTING\602184\002\OF_2009-04-20\PLATE2-CROSS-SECT.DWG (05-26-09 9:27:02AM) Plotted by: btran

Leighton



SEE LEGEND ON PLATE 2

Plate 3

GEOLOGIC CROSS–SECTION B–B'
PROPOSED NEWPORT BEACH CITY HALL
NEWPORT BEACH, CALIFORNIA

Proj: 602184–002	Scale: V:1"=40' H:1"=80'	Date: 5/09	
Eng./Geol. VMC/ELB	Drafted By: VMN	CP By: BQT	

P:\DRAFTING\602184\002\OF_2009-04-20\PLATE3-CROSS-SECT.DWG (05-26-09 9:27:36AM) Plotted by: btran

Leighton