APPENDIX E

GEOTECHNICAL REPORT

GEOTECHNICAL ENGINEERING REPORT

THE CALIFORNIA CENTER FOR HEALTH CARE AND BIOMEDICAL TECHNOLOGY
SILVER CREEK VALLEY PLACE
SAN JOSE, CALIFORNIA

Prepared for
The Cirrus Group
9301 North Central Expressway, Suite 300
Dallas, Texas 75231

February 5, 2007

URS

55 South Market Street, Suite 1500
San Jose, California 95113

28649821

URS

February 5, 2007
URS Project 28649821

Mr. Nathan Golik
The Cirrus Group
9301 North Central Expressway, Suite 300
Dallas, Texas 75231

Re: Geotechnical Engineering Report
The California Center for Health Care and Biomedical Technology
San Jose, California

Dear Mr. Golik:

URS is pleased to submit this report presenting the results of our geotechnical investigation performed for the California Center for Health Care and Biomedical Technology. The proposed new hospital and medical office building (MOB) will be located at 5815 Silver Creek Valley Place, near the southeast corner of the intersection of Highway 101 and Silver Creek Valley Road in San Jose, California. The purpose of the investigation was to develop design recommendations regarding foundation support for this facility as well as opinions regarding other geotechnical aspects of site development. This report was performed in conformance with the requirements of the Office of Statewide Health Planning and Development (OSHPD). The required engineering geologic report, prepared by our Certified Engineering Geologist, was presented under separate cover dated December 21, 2006. We understand that the project Structural Engineer requires a ground response report; this report was issued under separate cover dated February 2, 2007.

This report presents our engineering opinions and recommendations regarding the geotechnical factors influencing the design and construction of the proposed hospital, MOB, and linear accelerator. The opinions and recommendations are based upon the results of our field exploration, laboratory testing, existing available information, engineering judgment, and local experience. Peer review for this study was performed by Mr. Michael Larson, Senior Geotechnical Engineer.

We are pleased to be of service to the Cirrus Group on this project. If you have any questions, please contact our office at your convenience.

Sincerely,

REGISTERED PROFESSIONAL ENGINEER ANNE-MARIE MOORE No. 2574 Exp. 6/30/07 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER PAUL J. BODDIE 152 Exp. 7-31-08 GEOTECHNICAL STATE OF CALIFORNIA

Anne-Marie Moore, G.E. 2574
Geotechnical Engineer

Paul J. Boddie, G.E. 152
Geotechnical Group Manager

URS Corporation
55 South Market Street, Suite 1500
San Jose, CA 95113
Tel: 408.297.9585
Fax: 408.297.6962

Section 1 Introduction 1-1

1.1 Purpose 1-1
1.2 Scope 1-1

Section 2 Project Description 2-1

Section 3 Existing Geotechnical Information 3-1

Section 4 Site and Subsurface Conditions 4-1

4.1 Surface Conditions 4-1
4.2 Subsurface Conditions 4-1
4.2.1 Existing Subsurface Information 4-1
4.2.2 Field Exploration 4-1
4.2.3 Laboratory Testing 4-2
4.2.4 Soil Conditions 4-2
4.2.5 Groundwater 4-3

Section 5 Seismic Settlement 5-1

5.1 Liquefaction 5-1
5.2 Seismic Compaction 5-2

Section 6 Discussion 6-1

6.1 General 6-1
6.2 Foundations 6-1
6.3 Seismic Settlement 6-1

Section 7 Geotechnical Recommendations 7-1

7.1 Seismic Data and UBC Recommendations 7-1
7.2 Spread Footing Foundations 7-1
7.3 Mat Foundation 7-2
7.4 Subgrade Modulus 7-2
7.5 Floor Slabs 7-2
7.6 Lateral Earth Pressures 7-3
7.6.1 Static Lateral Earth Pressures 7-3
7.6.2 Wall Drainage 7-3
7.7 Corrosion Potential 7-4
7.8 Resistance to Lateral Loads 7-4
7.9 Light Poles 7-4
7.10 Pavements 7-4
7.11 Earthwork 7-6
7.11.1 Clearing and Stripping 7-6

7.11.2 Excavation 7-6
7.11.3 Subgrade Preparation 7-7
7.11.4 Fill Material 7-7
7.11.5 Fill Placement and Compaction 7-7
7.11.6 Underground Utility Trenches 7-8
7.11.7 Surface Drainage 7-8

Section 8 Construction Considerations 8-1

8.1 Temporary Construction Excavations 8-1
8.2 Construction Dewatering 8-1

Section 9 Limitations 9-1

Section 10 References 10-1

FIGURES

Figure 1 Site and Exploration Plan

APPENDICES

Appendix A Subsurface Data from Previous Investigations
Appendix B Field Exploration & Laboratory Tests for Current Study
Appendix C Seismic Settlement Analyses
Appendix D Guide Specifications for Earthwork

This report presents the results of our geotechnical investigation for the proposed California Center for Health Care and Biomedical Technology to be located in San Jose, California. The project site is an undeveloped parcel located near the southeast corner of the Highway 101 off-ramp and Silver Creek Valley Road as shown on the Location Map inset on the Site and Exploration Plan, Figure 1. Included in this report are the logs of our 15 recent exploratory borings, logs of previous explorations performed at the site by URS' predecessor firm and others, and our geotechnical conclusions and recommendations for design and construction of the proposed hospital, medical office building (MOB), and linear accelerator structure. The general layout of the new facility and the locations of the explorations are shown on Figure 1.

1.1 PURPOSE

The purpose of this geotechnical study was to investigate the soil and groundwater conditions at the site, and to provide recommendations for foundation design, as well as other geotechnical aspects of the site development.

1.2 SCOPE

Our scope of services included the following tasks:

- Review existing available data from our previous work at the site, as well as subsurface data obtained by others
- Geotechnical field investigation, including fifteen exploratory borings
- Characterize the geotechnical conditions
- Perform engineering analysis based on new and existing exploratory data, including:
  - Geotechnical design parameters for shallow foundations;
  - Slab-on-grade support;
  - Assessment of the site liquefaction and seismic compaction potential; and
  - Design of structural pavement section.
- Provide opinions and recommendations regarding:
  - Feasible foundation types;
  - Foundation design capacity, including resistance to lateral loads; and
  - Earthwork, site grading, backfilling, and re-use of on-site soils.

An engineering geologic report, including a discussion of the geologic and tectonic setting and geologic hazards, in compliance with Title 24, was issued under separate cover on December 21, 2006. A report presenting ground response spectra for structural design was issued February 2, 2007.

The tasks we performed above are discussed in the subsequent sections and appendices of this report. Corrosion testing was performed previously by others, so additional corrosion testing was excluded from the current investigation. An environmental site assessment was beyond the scope of this investigation.

We understand that the proposed development will include a two-story hospital building and a three-story MOB, surrounded by at-grade automobile parking and landscaped areas as shown on Figure 1. Plan dimensions of the hospital are nominally about 200 by 400 feet, whereas the MOB will be about 100 to 300 feet in plan. A linear accelerator structure is to adjoin the MOB, with plan dimensions of about 40 feet by 50 feet, although the location has not been finalized.

We understand that the hospital and MOB will be constructed with braced steel frames and have a bay spacing of 30 feet by 30 feet; the braced frame of the hospital will also be buckling restrained. The maximum column load for the hospital is expected to be on the order of 225 kips for dead plus live loads; maximum anticipated column load for the MOB is 300 kips for dead plus live loads. The linear accelerator is expected to have 3-foot-thick walls and be supported on a mat foundation, exerting an estimated uniform pressure of 2,000 pounds per square foot (psf).

We understand that cuts and fills will be minor such that the proposed structures will be positioned near the present site grade. No basements are planned; however, some below grade pit construction is anticipated beneath the buildings. Although finish floor elevation has not yet been determined, we assume that it will be at least one foot above the 100-year flood water level in nearby Coyote Creek, as required by the City of San Jose; this flood water level reportedly ranges from Elevation 203 to 204.5 feet (Nolte memo, 1999). Perimeter at-grade parking is also planned. We understand that exterior light pole foundations are to be designed using the California Building Code (CBC Section 1806) procedure.

URS' predecessor firm, URS Greiner Woodward-Clyde, provided geotechnical design recommendations and observed pile installation for the existing "T" bridge connection to the site (Silver Creek Crossing Bridge). That geotechnical investigation report was dated January 18, 1999, and included six exploratory borings advanced in 1998 to depths ranging from 5 to 86½ feet using both solid flight and rotary wash drilling equipment. In addition, we performed a geologic hazards study for the site and presented a summary of the findings in our report dated July 22, 1998. Prior to that, we had provided geotechnical design and construction services for the existing Silver Creek Valley Road Bridge.

We have reviewed the geotechnical investigation reports prepared by Advance Soil Technology in 1996 and Lowney Associates in 2001 for previously planned commercial development of the site. Pertinent geotechnical information from these reports was used with the data obtained from our current investigation to characterize the site-specific subsurface soil and groundwater conditions.

4.1 SURFACE CONDITIONS

Based on the topographic map provided to us (Nolte and Associates, Inc. dated June 25, 1998), this approximately 10-acre parcel is relatively flat with existing site grades in areas of proposed new construction ranging from about Elevation 203.5 to 205 feet (datum not specified). At the time of our investigation, the site was vacant, unpaved and contained numerous trees at the southern end and occasional tree stumps across the center and north end of the site. Scattered piles of end-dump fill less than 1 to 2 feet in height were also present on the site; however, disking appears to have blended the fill into the topsoil. There was very little surface vegetation at the time of field exploration.

The site slopes gently uphill along the west side toward the Highway 101 embankment. Coyote Creek borders the site to the north and northeast with slopes on the order of 2:1 (horizontal:vertical). Based on the topographic map provided, bottom of channel is at approximately Elevation 181 feet. The parcel is enclosed by chain link, wood, and masonry fencing. Residential development was located adjacent to the site at the southeast corner. Overhead electric and telephone lines cross the northern edge of the property.

4.2 SUBSURFACE CONDITIONS

4.2.1 Existing Subsurface Information

Logs of pertinent borings completed by URS' predecessor firm and logs of borings and cone penetration tests (CPTs) performed by others during previous investigations on or near the site are included in Appendix A. The approximate locations of these previous explorations are shown on Figure 1.

4.2.2 Field Exploration

To supplement available subsurface information, we drilled nine exploratory borings, Borings 1 through 9, on November 11, 2006, to depths of 44 to 45 feet, and four borings, Borings 10 through 13, on December 6, 2006, to depths ranging from 40 to 55 feet. The first nine borings were drilled with a truck-mounted Mobile B53 drill rig, while the remaining four borings were drilled with a truck-mounted Mobile B61 drill rig. All holes were drilled using 8-inch hollow stem augers. Sample penetration resistance recorded for the first nine borings varied considerably from that recorded for the second group of four borings throughout the soil profile. In order to provide a direct comparison of the penetration resistance values obtained with the two rigs, we returned with the Mobile B53 on December 14, 2006 to drill Boring 10A and Boring 13A within about 5 feet of Borings 10 and 13, respectively. The hammer drop was measured to confirm that it met the required 30 inches. Additionally, water was poured into the hollow stem augers prior to driving the sampler so that differential water pressures were minimized. A discussion of our findings is presented in the following sections of this report. The locations of

Borings 1 through 13, 10A, and 13A, are shown on Figure 1. Details regarding our current site investigation are presented in Appendix B.

Figure B-1 presents the Unified Soil Classification System, as well as guidelines summarizing soil consistency and relative density used in preparing the boring logs. Figure B-2 illustrates the notation used for the types of samples and the methods of advancing them. The subsurface conditions encountered in each of the borings are presented on the Logs of Borings in Figures B-3 through B-17.

4.2.3 Laboratory Testing

Laboratory tests were performed to estimate the engineering properties of the soil. The laboratory tests included moisture content, dry density, unconfined compressive strength, Plasticity Index (PI), and grain size distribution. Bulk samples of the near surface soils were collected from four locations across the site for R-value testing. These test results are presented in Appendix B.

4.2.4 Soil Conditions

The proposed hospital building footprint is generally blanketed by 5 to 9 feet of loose sandy silt and silty sand. Laboratory Plasticity Index (PI) tests performed on samples of the surficial soils yielded PIs ranging from non-plastic to 12, indicating low expansion potential. These surficial silts and sands are underlain by medium dense to very dense poorly graded, clayey, and silty sands to a depth of approximately 45 feet in Borings 1 through 7, and to a depth of 40 feet in Boring 12, the maximum depths explored at these locations. In Boring 11, generally dense granular deposits were encountered below the surficial soils to a depth of 53 feet, underlain by very stiff lean clay to a depth of 55 feet, the maximum depth explored during the current investigation. In Boring 13, the granular soils extended to a depth of 33 feet, underlain by very stiff lean clay to the maximum depth explored at 40 feet. Previous borings B-1 and B-2, drilled by URS Greiner Woodward-Clyde in 1998 using rotary wash drilling equipment, encountered similar conditions to depths of 86½ and 26½ feet, respectively.

The surficial soils encountered within the MOB footprint in Boring 6 and Borings 8 through 10, are generally more cohesive, consisting of stiff to very stiff silts and lean clays to depths ranging from 9 to 23 feet. Laboratory tests performed on samples of the surficial soils yielded PIs of 11 and 14, indicating relatively low expansion potential. These cohesive soils are generally underlain by medium dense to very dense poorly graded, clayey, and silty sands to a depth of approximately 47 feet, underlain by very stiff lean clay to a depth of 50 feet, the maximum depth explored within the MOB footprint during this investigation.

Previous investigation of the site by others in 2001 included eight CPTs at locations shown on Figure 1. Each of these CPTs reportedly encountered clay, silt and silty sand to depths of 9 to 13 feet, underlain by dense to very dense granular soil to the maximum depth explored at each CPT location, ranging from 13½ to 20½ feet, where refusal was encountered. Borings performed during the 2001 investigation characterized the surficial

soils as predominantly clayey sand and sandy clay to depths of 12 to 23 feet, underlain by dense to very dense gravels and sands and stiff clay to the maximum depth explored of 40 feet.

The 1996 borings by others generally characterize the soil profile as consisting of "soft clayey and silty sands" and "loose clays" to depths of 10 to 12 feet, underlain by dense sands and gravels to the maximum depth explored of 40 feet.

4.2.5 Groundwater

Free groundwater was encountered at depths ranging from about 25 to 29 feet (approximately Elevation 174.5 to 178.5 feet) during our current investigation. Free groundwater was not measured during our 1998 investigation for the "T" bridge, since the rotary wash method of drilling was used. The June 1998 topographic map provided indicates a water level in Coyote Creek at approximately Elevation 184 feet.

Free groundwater was reportedly encountered at a depth of 22½ feet (Elevation 181 feet) during the 1996 investigation and at depths of 28½ and 29½ feet (Elevation 175 feet) during the 2001 investigation. In addition, according to the 2001 report, the Santa Clara Valley Water District indicated groundwater levels near the site at depths as shallow as 15 feet during periods of prolonged rain. That report also cites past groundwater levels in on-site residential wells infrequently rising to as shallow as 12 to 15 feet below the ground surface.

Because the site is located near Coyote Creek, groundwater elevation likely is influenced by the water level in the creek. Since the recent groundwater level measurements from this investigation were obtained prior to the rainy season, in our opinion, it is reasonable to assume a design groundwater level higher than that measured. Based on the above information and local experience, we believe a design groundwater level at Elevation 184 feet, which assumes a minimum 5 foot rise in the groundwater table during and following the rainy winter months, is reasonable for the site. Please note that fluctuations in the groundwater level could occur due to variations in rainfall and other factors not in evidence at the time measurements were made.

5.1 LIQUEFACTION

As discussed in our December 21, 2006 engineering geologic report, the site is located within the mapped Santa Clara County Liquefaction Hazard Zone and the California Geological Survey Liquefaction Hazard Zone (CGS, 2001) for the Santa Teresa Quadrangle. The site is zoned as an area of "moderate" liquefaction potential on the liquefaction susceptibility map (Witter, et al, 2006) (CGS, 2001). No historic ground failures from either the Loma Prieta earthquake or the 1906 San Francisco earthquake have been recorded near the project site (Knudsen, et al, 2000); however, evidence of liquefaction induced failures from the 1906 San Francisco earthquake, including lateral spreading, differential settlement, sand boils and stream bank slumps, have been recorded along portions of Coyote Creek 3 miles upstream and 8 and 16 miles downstream of the site.

Soil liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total loss of shear strength under cyclic shear stresses associated with earthquake shaking. Three conditions are generally required for liquefaction to occur: (1) a cohesionless soil of loose to medium dense relative density; (2) a saturated condition; and (3) rapid, large strain cyclic loading normally induced by earthquake ground shaking. If the soils below or adjacent to the foundation lose bearing capacity during liquefaction, the result could be catastrophic ground failure. Lateral spreading, ground lurching, surface cracking, and ground surface settlement can also result from liquefaction. Loose, clean, fine sands and silts that are relatively free of clay most commonly experience liquefaction.

Our recent investigation identified a relatively discontinuous zone of medium dense, relatively clean sand generally between depths of 25 to 35 feet below current site grade. We evaluated the liquefaction potential of these deposits for a design earthquake on the Monte Vista-Shannon fault with M_w of 6.8 and peak ground acceleration (PGA) of 0.54g. We assumed a high groundwater level of 20 feet below the existing ground surface (Elevation 184 feet) in the analysis and corrected the measured blow counts in the field for hammer type, sampler size, overburden pressure, rod length, and fines content. On the basis of this analysis, we estimate the potential post-liquefaction settlement could be on the order of ½ to ¾ inch; the results of the analysis are included in Appendix C.

Based on the depth and thickness of these potentially liquefiable deposits, ground surface rupture is not anticipated. Furthermore, as discussed in our engineering geologic report, considering that the project site is relatively flat and there are no geologic "free faces" within 200 feet, the potential for lateral spreading is essentially nil.

As discussed previously in Section 4.2.2 of this report, the penetration resistance varied considerably between borings advanced with Mobile B53 and B61 drill rigs. More specifically, relatively low blow counts were recorded in the sands encountered below a depth of 35 feet in Borings 10 through 13, advanced with the B61. The relatively low penetration resistance indicated for those granular deposits would suggest liquefaction susceptibility; however, since the blow counts do not correlate with those obtained at similar depths in Borings 1 through 9, nor with blow counts obtained during previous

investigations at the site, we believe them to be erroneous and most likely the result of drilling disturbance. Furthermore, the generally high driving resistance recorded during pile installation for the adjacent "T" bridge and Silver Creek Valley Bridge suggest the deposits in the same depth range are dense. Nevertheless, we performed Borings 10A and 13A within about 5 feet of Borings 10 and 13 to further evaluate the relative density of the granular soils in question. The sample penetration resistance recorded in the two subsequent borings correlated well with the values in Borings 1 through 9, as well as the previous explorations. Therefore, we conclude that the granular soils below a depth of approximately 35 feet are generally dense to very dense and not susceptible to liquefaction.

5.2 SEISMIC COMPACTION

The site also has some potential for settlement to occur due to seismic compaction of granular deposits positioned above the groundwater table. The surficial soils within the MOB footprint are predominantly clayey and would not be susceptible to seismic compaction; however, the soils beneath the hospital building location consist primarily of sandy silt, poorly graded sand, and silty sand. CPT logs from the 2001 investigation indicate that the soils encountered to depths of approximately 9 to 13 feet have equivalent Standard Penetration Test (SPT) driving resistances of less than 30 blows per foot, which could make them somewhat susceptible to densification under strong seismic ground shaking.

We evaluated the potential for seismic compaction induced settlement of these shallow deposits for an upper-bound earthquake of M_w of 6.8 and PGA of 0.54g, using the methods developed by Tokimatsu and Seed (1984 and 1987). Our evaluation is based on a generalized soil profile between 8 to 13 feet below existing site grade. This depth interval was selected assuming the overlying deposits would be improved in the manner discussed later in this report, and that the soils below 13 feet have an equivalent SPT driving resistance (based on CPT correlations) exceeding 30 blows per foot. Based on the calculations presented in Appendix C and engineering judgment, we estimate that seismic compaction induced settlement of the unsaturated sands underlying the hospital should not exceed ½-inch. This settlement would be in addition to the estimated liquefaction settlement discussed above.

6.1 GENERAL

The near surface soils encountered across the proposed hospital building footprint and beneath a portion of the MOB footprint are somewhat variable in strength and compressibility, having total unit weights of generally less than 110 pounds per cubic foot and penetration resistance based on SPT blow counts of less than 10 blows per foot. The ability of these shallow soil deposits to support the anticipated building loads without excessive settlement is one of the principal geotechnical considerations at the site and forms the basis for the opinions and recommendations that follow. Of further concern is the potential for seismic compaction and liquefaction settlement to occur within the loose to medium dense sands encountered in several borings and CPTs across the site.

6.2 FOUNDATIONS

Because the subsurface soils within the upper 5 to 9 feet below the present site grade are weak and compressible in their current condition, construction of shallow foundations near the present grade could result in excessive structural settlement for the estimated column loads. However, we believe that shallow foundations are feasible if these soils are overexcavated and recompacted to the requirements for engineered fill. Detailed recommendations regarding limits of overexcavation and requirements for engineered fill are presented in Section 7 of this report.

6.3 SEISMIC SETTLEMENT

The site is located in a mapped liquefaction hazard area and potentially liquefiable soils were encountered in several of the recent borings. In addition, the unsaturated sands encountered above the design groundwater level have some potential for settlement as well following strong seismic shaking. Provided that post-liquefaction and seismic compaction settlement of up to 1 to 1¼ inches is tolerable from a structural standpoint, the buildings can be supported on shallow foundations. Overexcavation and recompaction of the low-density surficial soils as discussed in the preceding section would provide a relatively stiff pad that would to tend to reduce the risk of differential settlement across the building footprint.

7.1 SEISMIC DATA AND UBC RECOMMENDATIONS

The site is located in Seismic Zone 4 and can be classified, from a seismic standpoint, as being a relatively stiff site with soil depth exceeding 200 feet. The site is classified as Soil Profile Type S_D (average shear wave velocity for the upper 100 feet is estimated to be between 600 and 1,200 feet per second) as noted in Table 16A-J of the 2001 California Building Code. The Monte Vista-Shannon fault, which passes about 3 miles from the site, is considered a Type B seismic source in accordance with Table 16A-U and is considered the controlling fault for this site.

Based on the Seismic Source Type and closest distance to the known seismic source described above, the following values are recommended for use in design of the project:

Seismic Zone Factor, Z = 0.4 (Table 16A-I);
Near Source Factor, Na = 1.05 (Table 16A-S);
Near Source Factor, N_v = 1.27 (Table 16A-T);
Seismic Coefficient, $C_a = 0.44\ N_a$ = 0.46 (Table 16A-Q); and
Seismic Coefficient, $C_v = 0.64\ N_v$ = 0.81 (Table 16A-R).

7.2 SPREAD FOOTING FOUNDATIONS

Provided that the building pads for the hospital and MOB are overexcavated and recompacted as discussed in Section 7.11.2 of this report and the following earthwork section of this report, these buildings can be supported on spread footing foundations bearing on engineered fill. Footings should be at least 18 inches wide and should be embedded at least 24 inches below lowest adjacent finished grade.

Footings should be designed for a bearing pressure of 4,500 psf for dead plus live loads, plus a one-third increase for total loads, including wind or seismic. We estimate that total short-term, elastic foundation settlement due to the expected structural loads will be on the order of ½-inch. Time dependent consolidation settlement of the deeper clay soils is not anticipated. In addition to the elastic settlement, we estimate that localized liquefaction and seismic compaction settlements on the order of up to 1 to 1¼ inches could occur at the site. However, the relatively stiff engineered fill pad across the building footprint should reduce the risk of differential settlement beneath the foundations. We estimate that differential settlement should not exceed ¾ to 1 inch between adjacent columns.

Footings located near underground utilities should extend below an imaginary plane inclined at 1:1 (horizontal:vertical), sloping upward and away from the bottom edge of the utility trench. If the bottom of the footing intersects the imaginary plane, the spread footings should be deepened to avoid this zone.

The above recommendations are based on the assumption that a URS representative will examine the bottoms of all footing and pad excavations before reinforcing steel or concrete is placed.

7.3 MAT FOUNDATION

We understand that a mat foundation is currently being considered for support of the linear accelerator structure that is to be located adjacent to the MOB. The linear accelerator structure is expected to exert a uniform dead load foundation pressure of 2,000 psf. Provided that the building pad for the linear accelerator is also overexcavated and replaced with engineered fill as discussed previously, we believe it will be capable of supporting the anticipated load. We estimate that settlement at the center of the mat will be less than 1 inch, with settlement at the corners of approximately ½-inch. This would be in addition to the estimated post-seismic settlements discussed previously.

7.4 SUBGRADE MODULUS

We recommend a modulus of subgrade reaction, K_{v1}, of 200 tons/ft^3 be used for the engineered fill pad beneath buildings. This K_{v1} value is based on published results of 1-foot square plate load tests on medium dense to dense sand and very stiff clay soil, which we believe will approximate the condition of the building pads when earthwork has been completed. In addition, this recommendation is based on the assumption that a concrete slab or pavement is provided at the ground surface to maintain the improved condition. The K_{v1} value should be reduced in proportion to the width of the loaded area for use in finite element computer modeling.

7.5 FLOOR SLABS

We recommend that any slab-on grade floors as well as concrete flatwork around the hospital and MOB building be supported on engineered fill. The engineered fill should consist of a non-expansive fill material of select quality, having a maximum Plasticity Index of 15. The majority of the on site soils are expected to be of select quality. Engineered fill constructed to support new slab-on-grade floors should be compacted to minimum relative compaction of 95 percent in accordance with ASTM Test Method D1557, latest edition.

Moisture will come in contact with the floor slabs due to capillary or moisture vapor migration. In areas where moisture vapor transmission through building floors would be undesirable, or if moisture-susceptible floor coverings are to be used, a moisture barrier should be provided beneath the slab. If strips of moisture-proof membrane are used, they should be overlapped and sealed to achieve watertight integrity. If granular capillary break materials are placed as part of a moisture barrier system, they can be used as part of the recommended engineered fill beneath the slab-on-grade floor. The potential long-term impact of moisture migration should be evaluated, and additional protective measures should be incorporated as needed.

We recommend that exterior concrete flatwork be supported on a minimum of 12 inches of non-expansive engineered fill. The top 6 inches of fill should consist of a granular material such as Class 2 Aggregate Base (Caltrans Specifications, latest edition).

7.6 LATERAL EARTH PRESSURES

We understand that retaining walls could be required for pit excavations beneath the buildings. The following recommendations are applicable for pits excavated within engineered fill beneath buildings only.

7.6.1 Static Lateral Earth Pressures

We recommend that walls which are to be free to deflect at the top (cantilever walls) be designed for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). Walls restrained from movement at the top and retaining granular horizontal backfill should be designed for an "at-rest" equivalent fluid pressure of 55 pcf. These recommendations assume that the walls are drained so that no hydrostatic pressures build up behind the walls. Free groundwater at the site, based on highest historical levels in the area, is on the order of at least 12 feet deep, so any water that accumulates behind walls would most likely be the result of surface water infiltration.

The design values recommended above correspond to the earth pressures imposed by the backfill and adjacent natural ground. Lateral earth pressures for walls that contain positively sloping backfill will be higher than those given above. The Geotechnical Engineer should be consulted regarding specific sloping conditions if they are used.

Permanent surcharge loads adjacent to the retaining walls will result in additional lateral earth pressures on the walls. This additional pressure should be estimated by multiplying the permanent surcharge pressure by a coefficient of lateral pressure of 0.3 for the active condition and 0.5 for the at-rest condition.

We recommend the surcharge effects of traffic be idealized as an additional 2 feet of soil backfill.

7.6.2 Wall Drainage

To prevent a buildup of hydrostatic pressures, subsurface drainage should be installed behind all below grade walls. A perforated drain pipe encased in granular filter material should be placed behind the wall near its base. The drain pipe should be connected to a free draining outlet or sump pump. To intercept seepage and provide a path for water to reach the subsurface drain, a continuous layer of granular filter material, at least 18 inches thick, should be placed along the back of the wall, up to a depth of 24 inches below the ground surface. A 24-inch-thick layer of impervious soil should be placed over the top of the filter material to minimize the amount of surface infiltration. Except for the layer of granular filter material, backfill behind retaining walls should consist of fill material meeting the requirements for general fill described in the Earthwork section of this report. Granular filter material to be used behind retaining walls should conform to the requirements of Class 2 Permeable Material, Section 68 of the State of California, Department of Transportation, Standard Specifications (latest edition).

As an alternative to the filter material (Class 2 permeable), a prefabricated, synthetic multi-layer drainage material (such as Miradrain 6000 or equivalent) could be used behind the walls. If such a synthetic drain system is used, it should be continuous from the drain pipe to within 24 inches of the ground surface, and capped with compacted impervious soils.

7.7 CORROSION POTENTIAL

Both in-situ and laboratory testing was reportedly performed for the 2001 investigation by others, to evaluate the corrosion potential of the on-site soils. Those test results indicate that the surficial soils (between depths of 1.5 and 7 feet) have mild corrosion potential based on field and laboratory resistivity tests, and negligible corrosion potential with regard to sulfate ion concentration. In addition, the soils reportedly have a pH ranging from 7.0 to 7.8, which is considered relatively passive from a corrosion standpoint. The 2001 study concludes that the corrosion potential to buried metallic improvements may be characterized as mildly corrosive, and that the sulfate exposure to portland cement concrete (PCC) may be considered negligible for the native soils.

7.8 RESISTANCE TO LATERAL LOADS

Resistance to transient lateral loads from wind or earthquakes can be developed by friction between the bottom of the footings or mat and the soil and the passive resistance on the front face of the footings. An ultimate coefficient of friction of 0.35 should be used between the bottoms of the footings or mat and underlying soil provided the foundations are cast neat against the engineered fill. Ultimate passive resistance of the soil may be estimated using an equivalent fluid weight of 350 pounds per cubic foot against the footings. The upper 1-foot of embedment should be neglected for resistance for foundations located adjacent to unpaved or landscaped areas. The recommended values presented above are ultimate values, and should be used with an appropriate factor of safety.

7.9 LIGHT POLES

We understand that foundations for exterior lights will be designed in accordance with CBC Section 1806. Based on the subsurface conditions encountered at the site, we recommend that lateral resistance be determined based on an equivalent fluid pressure of 150 pcf in accordance with Table 18A-I-A of the CBC. This value can be doubled provided that up to ½-inch lateral deflection at the ground surface is tolerable under short-term loading conditions.

7.10 PAVEMENTS

The near surface native soils across the site consist primarily of low plasticity, fine-grained silts and clays and non-plastic fine sands. Laboratory tests performed during this investigation indicate R-values of 14 and 31. Laboratory tests performed during

previous investigations by others indicated R-values of 26 and 63. The following recommended structural pavement sections are based on an average subgrade R-value of 25.

Traffic Type	Recommended Pavement Section (inches)		
	Portland Cement Concrete	Asphalt Concrete	Class 2 Aggregate Base
Automobile Traffic and Parking Lot Thoroughfares	-	3	7
Truck Access and Parking	-	4	10
Truck Access and Parking	7	-	6

All pavement sections should be constructed in accordance with Caltrans Standard Specifications, latest edition, except that the relative compaction should be based on ASTM Test Designation D1557. In particular, the asphalt concrete pavements should conform to Caltrans Section 39, the PCC pavements should conform to Sections 40 and 90, and the Class 2 Aggregate Base should conform to Section 26 of Caltrans Standard Specifications. The top six inches of the pavement subgrade should be compacted to at least 95 percent relative compaction. Additionally, all aggregate base should be compacted to at least 95 percent relative compaction. These pavement sections are based on a 20-year design life.

Additional recommendations for PCC pavement are as follows:

- Concrete should have a minimum modulus of rupture of at least 550 pounds per square inch (equivalent to a compressive strength of 3,700 psi) before the pavement is subjected to traffic.
- Provide expansion joints between buildings and pavements; the Contractor should provide a shop drawing indicating the proposed joint material.
- Provide weakened plane contraction joints at maximum 12-foot grid spacing by either saw cutting to a minimum depth of 3 inches or installing preformed material full depth; the purpose of these joints is to relieve tensile stresses, thereby minimizing the potential for volunteer cracking elsewhere in the pavement.
  - Saw cut width should be the minimum possible and less than 1/4 inch.
  - Saw cut should occur within time period specified in Caltrans Specification Section 40-1.08B (1). Timing of the saw cutting is of the utmost importance, since it is necessary to saw the joint before volunteer cracking occurs. Typically, this is within 12 to 24 hours after concrete placement.
  - All joints should be sealed with joint filler in accordance with Caltrans Section 40-1.08B (1).

- Length of given panel should not exceed its width by more than 25 percent.
- Provide 6X6-W1.5XW1.5 welded wire mesh or No. 4 bars at 18 inches on center.
  - Place in middle of slab.
  - Do not place across joints.

A representative of URS should be retained during construction to review the material placement and construction procedures used.

7.11 EARTHWORK

All site preparation and earthwork should be done under the observation of a representative of URS and in accordance with the recommendations presented below. Suggested guide specifications for earthwork are presented as Appendix D.

7.11.1 Clearing and Stripping

Areas to be graded should be stripped and cleared of grass, trees, root systems, and debris. The required stripping depth to remove organic material is difficult to estimate since disking has been performed at the site. For estimating purposes, a minimum stripping depth of 6 inches should be assumed; however, if appreciable organic material is still present below a depth of 6 inches, additional stripping could be required. A URS representative should review the final depths of stripping and clearing during the site preparation. The stripped soil materials could be stockpiles for reuse in landscaping areas, but should not be used as compacted fill or blended with other materials, unless otherwise approved by a representative of URS.

Any existing buried manmade items should be removed in their entirety. In addition, any groundwater wells discovered during site preparation should be abandoned in accordance with Santa Clara Valley Water District guidelines.

After the site has been properly prepared, our field representative should review the conditions before any further earthwork is performed.

7.11.2 Excavation

Prior to building construction, we recommend that the footprints of the hospital, MOB and linear accelerator buildings be overexcavated and recompacted to provide well-compacted, uniform engineered fill pads for foundation support. For estimating purposes, overexcavation to a depth of 7 feet should be assumed for the proposed hospital; because of the somewhat stronger soil conditions in the southern portion of the site, the depth of overexcavation can be reduced to 5 feet for the MOB and linear accelerator buildings. The limits of overexcavation should extend at least 10 feet beyond the outside edge of perimeter footing. A representative of URS should be on site during grading to confirm the depth of required overexcavation.

All excavations should be performed to the lines and grades presented in the project plans and specifications. If unsuitable materials are encountered during excavations, this material should be removed in its entirety and replaced with well compacted engineered fill. Our field representative should review the final excavation depths and lateral dimensions during construction.

7.11.3 Subgrade Preparation

In areas to receive new fill, the exposed surface soils should be scarified to a minimum depth of 6 inches, moisture conditioned and recompacted. A minimum relative compaction of 95 percent should be attained in the subgrade.

Within the overexcavated building footprint, the bottom of the excavation should be compacted using heavy vibratory equipment capable of exerting a minimum centrifugal force of 60,000 pounds per square inch for a minimum of six passes and a minimum 6-inch overlap. The intent of using heavy vibratory compaction equipment on the exposed subgrade is to achieve additional densification to a depth of at least 1 foot.

7.11.4 Fill Materials

All general fill material should be a soil or soil-rock mixture that is free of organic matter and other deleterious substances. It should not contain rocks or lumps over 6 inches in the greatest dimension, and not more than 15 percent larger than 2½ inches. The native soils have a relatively low expansion potential and should be acceptable for use as engineered fill.

If import fill material is required, it should be a low plasticity, non-expansive soil or soil-rock mixture having a plasticity index not greater than 15. A URS representative should approve any fill that is imported for use as engineered fill.

7.11.5 Fill Placement and Compaction

Fill material should be spread in uniform lifts not exceeding 8 inches in uncompacted thickness where heavy equipment is used, and not more than 4 inches where light, hand-operated compactors are used. Before compaction begins, the fill should be brought to a moisture content that will permit proper compaction by either aerating the material if it is too wet, or spraying the material with water if it is too dry. Each lift should be thoroughly mixed before compaction to provide a uniform distribution of water content. To prevent drying of the subgrade soils, placement of fill should start immediately after the surface preparation and should proceed in a continuous operation until the site is brought to grade.

All fill material beneath foundations and slab-on-grade floors should be compacted to a minimum relative compaction of 95 percent. The native clays should be compacted at a moisture content between optimum and 2 percent above the optimum moisture content; the non-plastic silts and fine sands should be compacted at a moisture content near optimum.

Laboratory compaction curve data obtained for a sample of silty clay (CL-ML) surficial soil during construction of the adjacent access road indicated a maximum dry unit weight of 125 pounds per cubic foot at an optimum moisture content of about 11 percent. A copy of this compaction curve is included in Appendix A. Dry densities of the soils encountered in our borings within the zone of overexcavation generally range from 83 to 98 pounds per cubic foot, with an average of approximately 92 pounds per cubic foot. Based on these dry unit weights, in our opinion, shrinkage on the order of 20 to 25 percent would be reasonable to assume for estimating purposes.

7.11.6 Underground Utility Trenches

For purposes of this section of the report, bedding is defined as material placed in a trench up to 1-foot above a utility pipe and backfill is all material placed in the trench above the bedding.

Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand proposed for use in bedding should be tested in our laboratory to verify its suitability and to measure its compaction characteristics. Sand bedding should be compacted by mechanical means to achieve at least 95 percent relative compaction based on ASTM D1557.

Approved, on-site, inorganic soil, or imported material may be used as utility trench backfill. Proper compaction of trench backfill will be necessary under and adjacent to structural fill, building foundations, concrete slabs and vehicle pavements. In these areas, backfill should be conditioned with water (or allowed to dry) to produce a soil-water content ranging between optimum and 2 percent above the laboratory optimum moisture content. All backfill should be placed in horizontal layers not exceeding 6 inches in thickness (before compaction). Each layer should be compacted to a minimum relatively compaction of 90 percent based on ASTM D1557. The upper 6 inches of pavement subgrade should be compacted to 95 percent relative compaction based on ASTM D1557.

Where any trench crosses the perimeter foundation line, the trench should be backfilled with compacted lean clay for a horizontal distance of at least 2 feet on either side of the foundation. The purpose of the clay backfill is to minimize the potential for water entry beneath the building.

7.11.7 Surface Drainage

Surface drainage gradients should be planned to prevent ponding and to promote drainage of surface water away from building foundations, slabs, edges of pavements and sidewalks, and towards suitable collection and discharge facilities.

Water seepage or the spread of extensive root systems into the soil subgrade of foundations, slabs, or pavements, could cause differential movements and consequent distress in these structural elements. This potential risk should be given due consideration in the design and construction of landscaping.

8.1 TEMPORARY CONSTRUCTION EXCAVATIONS

Safety standards set by OSHA limit the height of unshored vertical excavations to 5 feet if construction personnel will be working in the excavations. The latest (1989) set of guidelines published by OSHA classify soils in detail as either Type A, B, or C. In general, Type A soils are stronger, Type B soils are intermediate, and Type C soils are weaker. Based on the soil type, depth, duration the excavation is open, and sequence of soils exposed in excavation, OSHA recommends maximum allowable slopes. For example, for excavations in homogeneous soils 20 feet or less in depth, they state that maximum allowable slopes (horizontal to vertical) should be ¾ to 1, 1 to 1, and 1½ to 1 for Types A, B and C soils, respectively. The soils encountered in the upper 5 to 7 feet at the site generally correspond to OSHA Types A and B at the MOB and Types B and C at the hospital. On this basis, we recommend temporary slopes in soils be cut at a slope no steeper than 1 to 1 (horizontal to vertical) in the vicinity of the MOB and 1½ to 1 in the vicinity of the hospital.

We recommend that URS be retained to review the conditions as they are exposed during construction. Additional recommendations could be provided at that time regarding the advisability of different temporary slope inclinations in particular areas.

8.2 CONSTRUCTION DEWATERING

Groundwater was encountered at depths in excess of 25 feet below the existing ground surface at the time of drilling for the current study. Historic readings in nearby residential wells indicate groundwater levels in the range of 12 to 15 feet below grade. Since the excavations are anticipated to extend no deeper than 7 feet below the present grade, it is unlikely that groundwater would be encountered during construction. However, depending on the time of year, it is conceivable free water might accumulate in the excavation during rainy periods. Based on the type of soils encountered, it is anticipated that water could be removed by sump pumping

The opinions, conclusions and recommendations contained in this report for the proposed California Center for Health Care and Biomedical Technology are based upon the information obtained from explorations made at widely spaced locations. They are also based upon existing information, local experience and engineering judgment. The locations of the recent borings were determined by tape measurements from existing site features. The elevations of the borings were approximated based on available topographic information.

If any variations or undesirable soil conditions are encountered during construction, or if the proposed construction will differ from that proposed at the present time, URS should be notified so that supplementary recommendations can be provided, if necessary. Our representative should review the foundation and grading plans, and the specifications, prior to bidding and construction. The recommendations presented in this report are predicated on the assumption that all earthwork, grading, foundation construction and paving operations will be performed under the observation of a URS representative.

The recommendations presented in this report were developed with the standard of care commonly used in this profession. No other warranties are included, either express or implied, as to the professional advice included in this report. Environmental studies were beyond the scope of services.

Advance Soil Technology, 1996, Soil and Foundation Investigation, Proposed Commercial Development, Silver Creek Valley Road and Highway 101, San Jose, California.

California Geological Survey, 2001, Seismic hazard zones, San Jose East Quadrangle, gmw.consrv.ca.gov/shmp/index.htm

Knudsen, K.L., Sowers, J.M., Witter, R.C., Wentworth, C.M. and Helley, E.J., 2000, Preliminary maps of Quaternary deposits and liquefaction susceptibility, nine-count San Francisco Bay region: A digital database, U.S. Geological Survey, Open-File Report 00-44, 60 p.

Lowney Associates, 2001, Preliminary Geotechnical Investigation, Silver Creek Valley Place, San Jose, California.

Santa Clara County Geologic Hazard Zones, 2002, map sheet 37, www.sccplanning.org

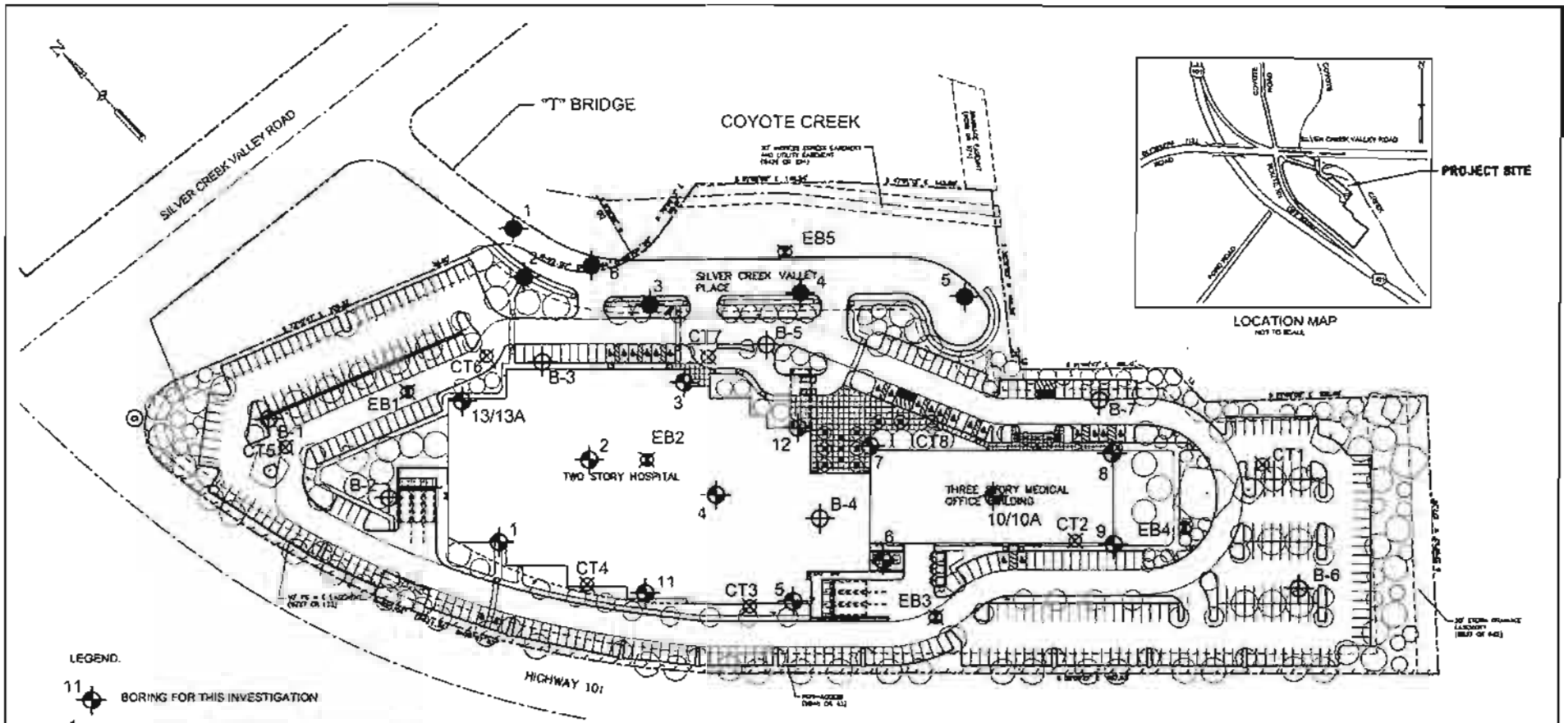
Santa Clara Valley Water District Flood Hazard maps, www.scvwd.dst.ca.us

Tokimatsu, K., and H.B. Seed, (1987), " Evaluation of settlements in sands due to earthquake shaking, " ASCE Journal of Geotechnical Engineering, Volume 113 No. 8.

URS, 2006, Engineering Geologic Report, The California Center for Health Care and Biomedical Technology, Silver Creek Valley Place, San Jose, California.

Witter, R.C., Knudsen, K.L., Sowers, J.M., Wentworth, C.M., Koehler, R.D., and Randolph, C.E., 2006, Maps of Quaternary deposits and liquefaction susceptibility in the central San Francisco Bay region, California, in cooperation with the California Geological Survey: A digital database, U.S. Geological Survey, Open-File Report 2006-1037.

Woodward-Clyde Consultants, 1988, Geotechnical Investigation, Fontanoso Avenue Bridge, San Jose, California.



URS

California Center for Health Care and Biomedical Technology

SITE AND EXPLORATION PLAN

SEE SCALE

Figure 1

January 25, 2007

11/2/08 JGLOG94 63063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring LEGEND

Date Drilled:
Type of Boring: (as noted)
Hammer/drop: (as noted)

Remarks:

Surface Elevation: 200.0 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
				Arrow denotes bottom of fill layer FILL				
				2 inch inside diameter Modified California sample				
5				2 inch outside diameter Standard Split Spoon sample (Standard Penetration Test)				
				3 inch outside diameter Shelby tube sample				
10		350 psi		Hydraulic Pressure required to push Shelby tube sampler				
		29		Blow count with 140-lb hammer falling 30 inches for 12 inches of penetration				
15		50/ 5"		Blow count with 140-lb hammer falling 30 inches for 5 inches of penetration				
				Groundwater level at time of drilling				
				Groundwater at a time after drilling (as specified)				
20				**KEY TO LABORATORY TESTS** PP = Pocket Penetrometer reading in tons per square foot (tsf) LL = Liquid Limit (%) PI = Plasticity Index (%) NOTE: PI = LL - (Plastic Limit (%)) +#4 = Percentage of material retained on #4 sieve -#200 = Percentage of material passing #200 sieve				PP=3.0tsf LL=42 PI=21 +#4=13% -#200=10%
25								
30								
35								

11/6/06 JGLOG84 63063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring 1

Date Drilled: 7/16/98
Type of Boring: 4-7/8 inch Rotary Wash
Hammer/drop: 140lb/30in

Remarks:

Surface Elevation: 204.5 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
				6 inches Asphalt Concrete over 6 inches Aggregate Base				
	1	48		Gravelly lean CLAY (CL) Damp, brown gray, coarse gravels				
				Poorly graded SAND (SP-SC) with clay and gravel Dense, moist, dark gray-brown				
5	2	29			9	123		+#4=37% -#200=7%
10	3	23						
				Silty SAND (SM) Damp, dark brown, coarse sand				
				Clayey SAND (SC) Medium dense, moist, brown, with gravel lenses, gravel to 2 inches				
15	4	18			9	94		+#4=0 -#200=23%
				With dense gravels				
20	5	39		Poorly graded SAND to GRAVEL (SP-GP) Dense, moist, gray brown				
				Less gravels				
25	6	54						
30	7	73						
35								

11/8/06 JGLOG94 63063

Project: SILVER CREEK CROSSING | **Log of Boring 1** Continued

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
	8	52						
				Lean CLAY (CL) with sand Medium, moist, brown				
40	9	13			24	101	530	
				Increase in sand				
45	10	19		Clayey SAND (SC) Medium dense, moist, dark brown	24	94		+#4=0 -#200=23%
				With occasional gravel Layers with fines Increase in fines				
50	11	3		Lean CLAY (CL) Medium, moist, brownish gray				
55	12	24			28	95		
				Silty SAND (SM) Medium, dense, moist, dark brown				
60	13	9		Lean CLAY (CL) Medium to stiff, moist, gray and olive brown mottled				
65	14	25		Sandy lean CLAY (CL) with gravel Medium, moist, gray	15	120	1120	
				Poorly graded SAND (SP) with gravel Very dense, moist, brownish gray				
70	15	59						

11/8/06 JGLOG94 63063

Project: SILVER CREEK CROSSING | **Log of Boring 1** Continued

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
75	16	59						
80	17	55						
85	18	62						
				BOTTOM OF BORING AT 86-1/2 FEET				
90								
95								
100								
105								
110								

118

11/8/05 J:\LOG54 63063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring 2

Date Drilled: 7/17/98
Type of Boring: 4-7/8 inch Rotary Wash
Hammer/drop: 140lb/30in

Remarks:
Surface Elevation: 203.0 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
	1	15		**Sandy silty CLAY (CL-ML)** Dry, light brown	7	99		LL=25 PI=5
					8	103	3850	
5	2	7						
				Silty SAND (SM) Dry, brown				
				Sandy lean CLAY (CL) Medium, moist, brown				
10	3	12						
				Poorly graded GRAVEL to SAND (GP-SP) Dense, moist, brownish gray				
15	4	29						
20	5	51						
25	6	46						
				BOTTOM OF BORING AT 26-1/2 FEET				
30								
35								

11/6/06 JGLOG34 63063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring 3

Date Drilled: 7/16/98
Type of Boring: 6 inch Auger
Hammer/drop: 140lb/30in

Remarks:

Surface Elevation: 202.6 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
	1	4		Lean CLAY (CL) to Silty CLAY (CL-ML) Stiff, moist, dark brown	13	103		
	2	7		Grades to Clayey Sand (SC) with gravel				
5				BOTTOM OF BORING AT 5 FEET				
10								
15								
20								
25								
30								
35								

11/8/08 JGLOG94 63063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring 4

Date Drilled: 7/16/98
Type of Boring: 6 inch Auger
Hammer/drop: 140lb/30in

Remarks:

Surface Elevation: 203.1 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
	1	5		Lean CLAY (CL) with gravel Moist, brown Medium, dry	11	86	1300	
	2	17		Poorly graded SAND (SP) with gravel Medium dense, damp, brown				
5				BOTTOM OF BORING AT 5 FEET				
10								
15								
20								
25								
30								
35								

11/2/98 JGLOG94 83063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring 5

Date Drilled: 7/16/98
Type of Boring: 6 inch Auger
Hammer/drop: 140lb/30in

Remarks:

Surface Elevation: 203.0 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
	1	4		Lean CLAY (CL) with gravel Medium, dry, brown	7	97	2520	
	2	7						
5				Poorly graded SAND (SP) with gravel Dark gray				
				BOTTOM OF BORING AT 5 FEET				
10								
15								
20								
25								
30								
35								

11/8/06 JCL0G94 63063

Project: SILVER CREEK CROSSING
Location: San Jose, California

Log of Boring 6

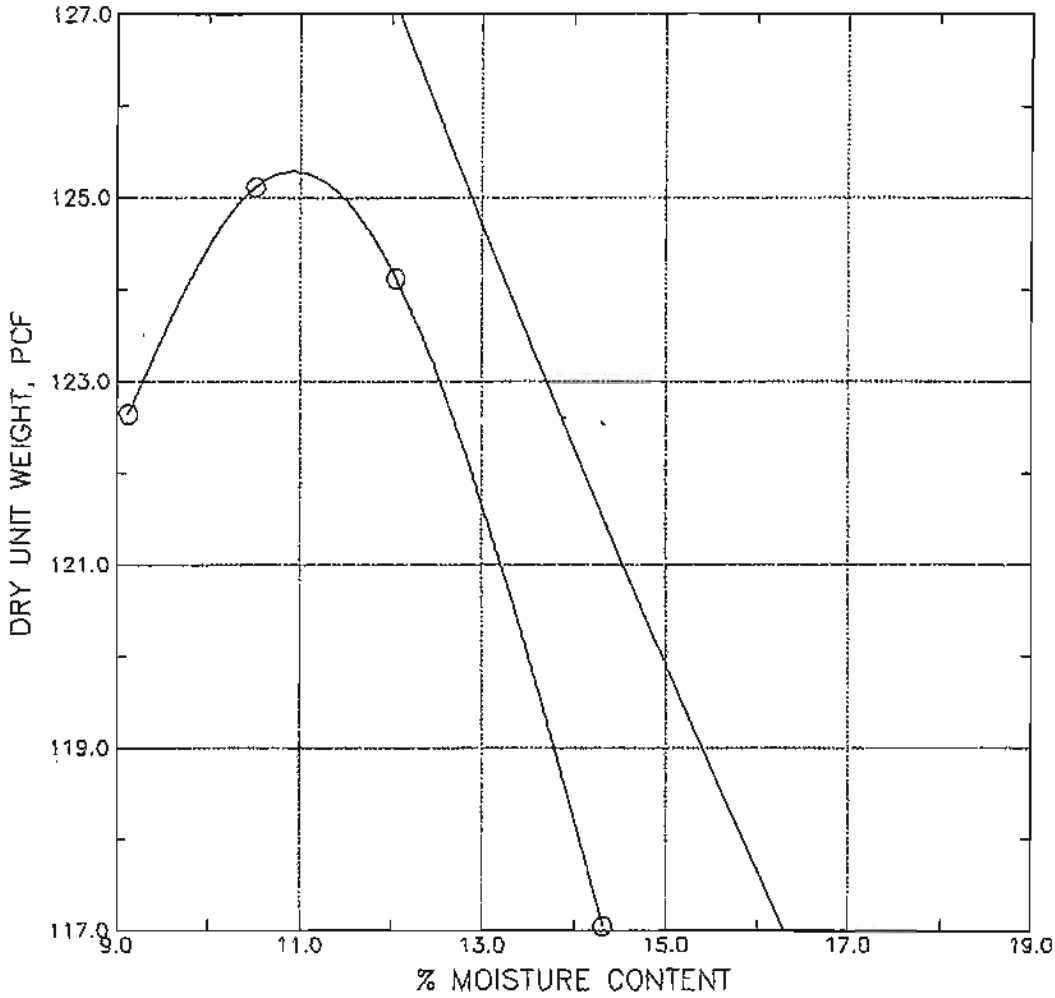
Date Drilled: 7/17/98
Type of Boring: 4-7/8 Inch Rotary Wash
Hammer/drop: 140lb/30in

Remarks:
Surface Elevation: 202.8 feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
	1	9		Lean CLAY (CL) Medium, dry, brown				
5	2	9		Poorly graded SAND (SP) with gravel Gray Silty clayey SAND (SC-SM) Loose, dry, brown	6	96	1340	
10	3	13		Silty SAND (SM) Medium dense, brown				
				Poorly graded SAND (SP) with gravel Very dense, dark brown				
15	4	58						
20	5	58						
25	6	55						
				BOTTOM OF BORING AT 26-1/2 FEET				
30								
35								

	Boring No. : N/A Sample No. : 1 Tested by : JP Filename : SC-01	Project : SILVER CREEK Project No. : 28649496.00004 Location : Staging Area Date: Fri Aug 22 2003

COMPACTION



Sample Description	: Reddish brown Silty CLAY (CL-ML)
Compaction Test Designation	: ASTM D1557-A
Maximum Dry Density	: 125.3 PCF
Optimum Moisture Content	: 10.9 %

Figure 1

EXPLORATORY BORING: EB-1

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-1B
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 40.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 203 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
203	0	CLAYEY SAND (SC) medium dense, moist, brown, fine to medium grained	SC	24		8	98	
		loose to medium dense		12		6	92	
	5	medium dense		17		5	96	21 32
				14		5	95	
	10							
191.0		SANDY GRAVEL (GP) dense, dry, gray-brown, fine and coarse, fine and medium grained sands, trace cobbles	GP	22				
	15			44		2		5
		very dense		60		4		
	20							
				45				
	25							
				57		10		
173.0	30							

Continued Next Page

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 29.0 FEET
▼: FREE GROUND WATER MEASURED FOLLOWING DRILLING AT 29.5 FEET

Northing: 1,918,449
Easting: 6,185,650

LA CORP.GDT 4/16/01 MV: GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-1 Cont'd

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-1B
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 40.0 FT.

This log is a part of a report by Lowney Associates and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf) ○ Pocket Penetrometer △ Torvane ● Unconfined Compression ▲ U-U Triaxial Compression (1.0, 2.0, 3.0, 4.0)
173	30		SANDY GRAVEL (GP) dense, dry, gray-brown, fine and coarse, fine and medium grained sands, trace cobbles	GP	28	X				
	35									
165.0			SILTY CLAY (CL) stiff, wet, light brown, trace fine sand, trace fine gravel, moderate plasticity	CL	23	X	21	109		△
163.0	40		Bottom of Boring at 40 feet							
	45									
	50									
	55									
	60									

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 29.0 FEET
▼: FREE GROUND WATER MEASURED FOLLOWING DRILLING AT 29.5 FEET

Northing: 1,918,449
Easting: 6,185,650

LA CORP.GDT 4/16/01 LNY GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-2

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-1B
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 40.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS (SURFACE ELEVATION: 203 FT. (+/-))	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
203	0	CLAYEY SAND (SC) medium dense, moist, brown, fine to medium, trace fine gravel	SC	24	X	5	92	
				20	X	3		
	5			30	X			
				19	X	4	92	
	10							
191.0		SANDY GRAVEL (GP) dense, dry, gray-brown, fine and coarse, fine and medium grained sands, trace cobbles		44	X	2		
	15							
				34	X			
	20		GP					
				41	X	7		
	25							
		very dense		50	X			
173.0	30							

Continued Next Page

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 29.0 FEET
▼: FREE GROUND WATER MEASURED FOLLOWING DRILLING AT 29.0 FEET

Northing: 1,918,220
Easting: 6,185,801

LA COMP SDT 4/16/01 MV GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-2 Cont'd

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-18
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 40.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf) ○ Pocket Penetrometer △ Torvane ● Unconfined Compression ▲ U-U Triaxial Compression (1.0 2.0 3.0 4.0)
173	30		SANDY GRAVEL (GP) dense, dry, gray-brown, fine and coarse, fine and medium grained sands, trace cobbles wet	GP	34	X	12			
	35				56	X				
163.5 / 163.0	40		SILTY CLAY (CL) stiff, wet, light brown to tan, with sand and trace gravel, moderate plasticity Bottom of Boring at 40 feet	CL						
	45									
	50									
	55									
	60									

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 29.0 FEET
▼: FREE GROUND WATER MEASURED FOLLOWING DRILLING AT 29.0 FEET

Northing: 1,918,220
Easting: 6,185,801

LA CORP GDT 4/18/01 MV GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-3

Sheet 1 of 1

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-18
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 10.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of this exploration at the time of boiling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
203	0		SURFACE ELEVATION: 203 FT. (+/-)						
			SANDY CLAY (CL) very stiff to hard, moist, brown, with trace fine sand, low plasticity		25		11	79	
					51		10	107	
	5		Plasticity Index = 15, Liquid Limit = 34	CL					
					37		7	102	
					63		7	115	
193.0	10		Bottom of Boring at 10 feet						
	15								
	20								
	25								
	30								

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ UU Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:

Northing: 1,917,914
Easting: 6,185,933

LA CORP.GDT 4/18/01 MV:GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-4

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-1B
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 40.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION: 203 FT. (+/-)						
203	0	SILTY CLAY (CL), hard, moist, brown to light brown, with some fine grained sand, low plasticity	CL	56		9	107	
				30		9	87	
	5			42		8	107	
				25		7	102	75
	10							
		trace fine gravel		33		9		
	15							
				87		7	114	
	20							
180.0		SANDY GRAVEL (GP) dense, moist, gray-brown, fine to coarse, fine to medium grained sand	GP	73				
	25							
		dense		48		10		
173.0	30							

Unconfined Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression; 1.0, 2.0, 3.0, 4.0

Continued Next Page

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 28.5 FEET.

Northing: 1,937,837
Easting: 6,186,183

LA CORP.GDT 4/18/01 MV GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-4 Cont'd

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-18
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 40.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
173	30		SANDY GRAVEL (GP) dense, moist, gray-brown, fine to coarse, fine to medium grained sand	GP					
171.0			GRAVELLY SAND (SP) dense, wet, gray-brown, fine gravel						
					42	X			
	35			SP					
					38	X	28		
163.0	40		Bottom of Boring at 40 feet						
	45								
	50								
	55								
	60								

Undrained Shear Strength (tsf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 28.5 FEET

Northing: 1,917,837
Easting: 6,186,183

LA COMP GDT 4/18/01 MVT GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-5

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: GEI
START DATE: 1-18-01 FINISH DATE: 1-18-01

PROJECT NO: 1369-1B
PROJECT: SILVER CREEK VALLEY PLACE
LOCATION: SAN JOSE, CA
COMPLETION DEPTH: 30.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION: 203 FT. (+/-)						
203	0	SANDY CLAY (CL) hard, moist, brown, fine sand, low plasticity	CL	19		7	102	
		trace fine gravel		21		6		
198.0	5	CLAYEY SAND WITH GRAVEL (SC) medium dense, moist, gray-brown, fine to coarse, fine to coarse gravel	SC	26		8	106	
		less clayey (SM-SP)		14		3		6
	10							
190.5		SANDY GRAVEL (GP) dense, dry, gray-brown, fine and coarse, fine and medium grained sands, trace cobbles	GP	39				
	15							
		very dense		85		5		
	20							
		dense		33				
	25							
				32		10		
173.0	30	Bottom of Boring at 30 feet						

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ UU Triaxial Compression
1.0 2.0 3.0 4.0

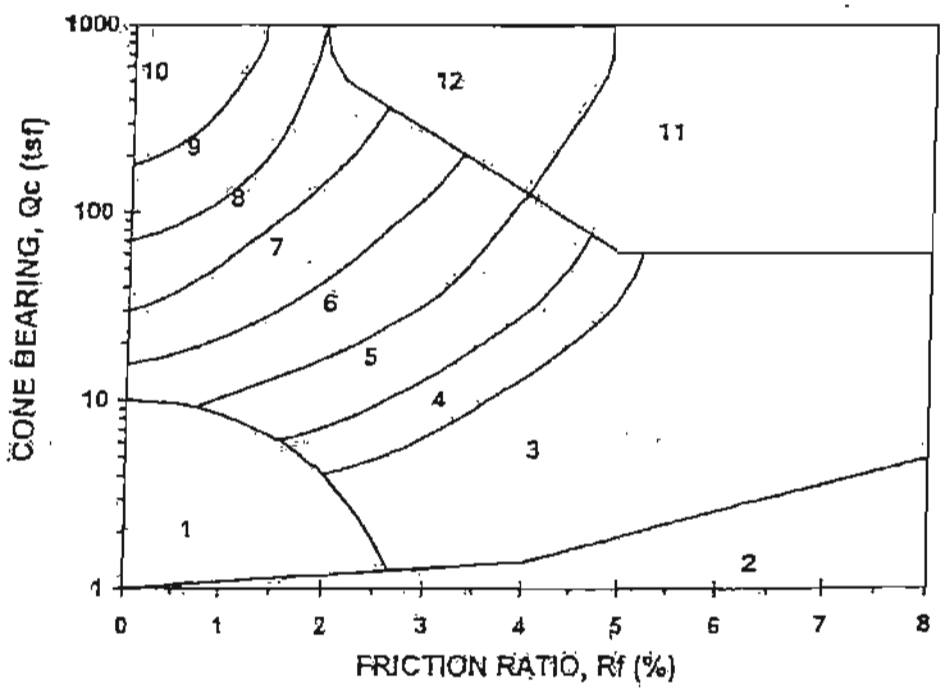
GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 29.0 FEET.

Northing: 1,918,304
Easting: 6,186,036

LA CORP.GDT 4/16/01 AV GEI

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

SIMPLIFIED SOIL BEHAVIOR TYPE CLASSIFICATION FOR STANDARD ELECTRONIC CONE PENETROMETER



ZONE	Qc/N[1]	Su Factor (Nk)[2]	SOIL BEHAVIOR TYPE[1]
1	2	15 (10 for Qc <= 9 tsf)	Sensitive Fine Grained
2	1	15 (10 for Qc <= 9 tsf)	Organic Material
3	1	15 (10 for Qc <= 9 tsf)	CLAY
4	1.5	15	Silty CLAY to CLAY
5	2	15	Clayey SILT to Silty CLAY
6	2.5	15	Sandy SILT to Clayey SILT
7	3	—	Silty SAND to Sandy SILT
8	4	—	SAND to Silty SAND
9	5	—	SAND
10	6	—	Gravelly SAND to SAND
11	1	15	Very Stiff Fine Grained (*)
12	2	—	SAND to Clayey SAND (*)

(*) Overconsolidated or Cemented

Qc = Tip Bearing
Fs = Sleeve Friction
Rf = Fs/Qc*100 = Friction Ratio

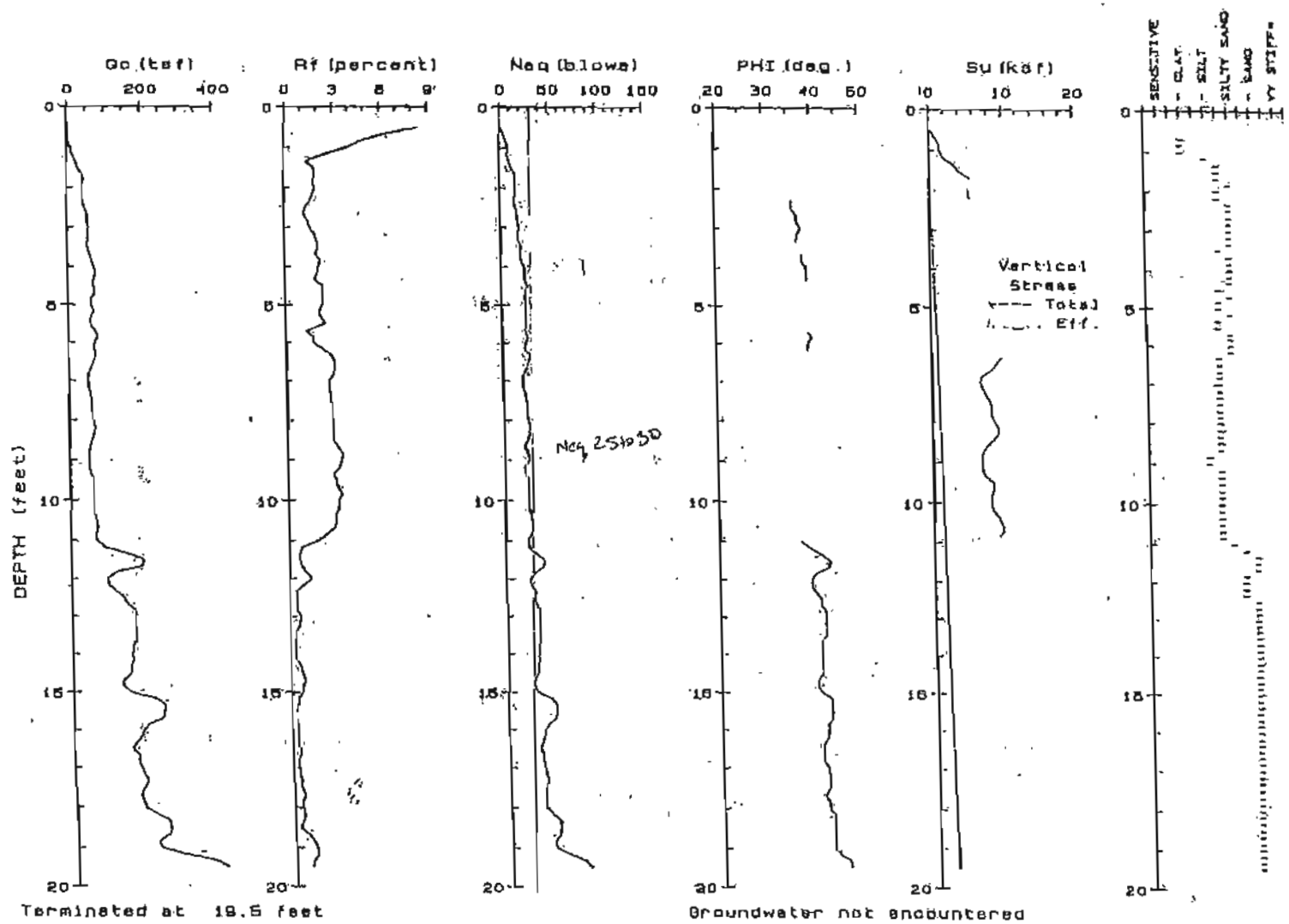
References: [1]Robertson, 1986, Olsen, 1988
[2]Bonaparte & Mitchell, 1979 (young bay mud Qc <= 9)
[2]Estimated from local experience (fine grained soils Qc > 9)

Note: Testing performed in accordance with ASTM D3441

KEY TO CONE PENETROMETER TESTS

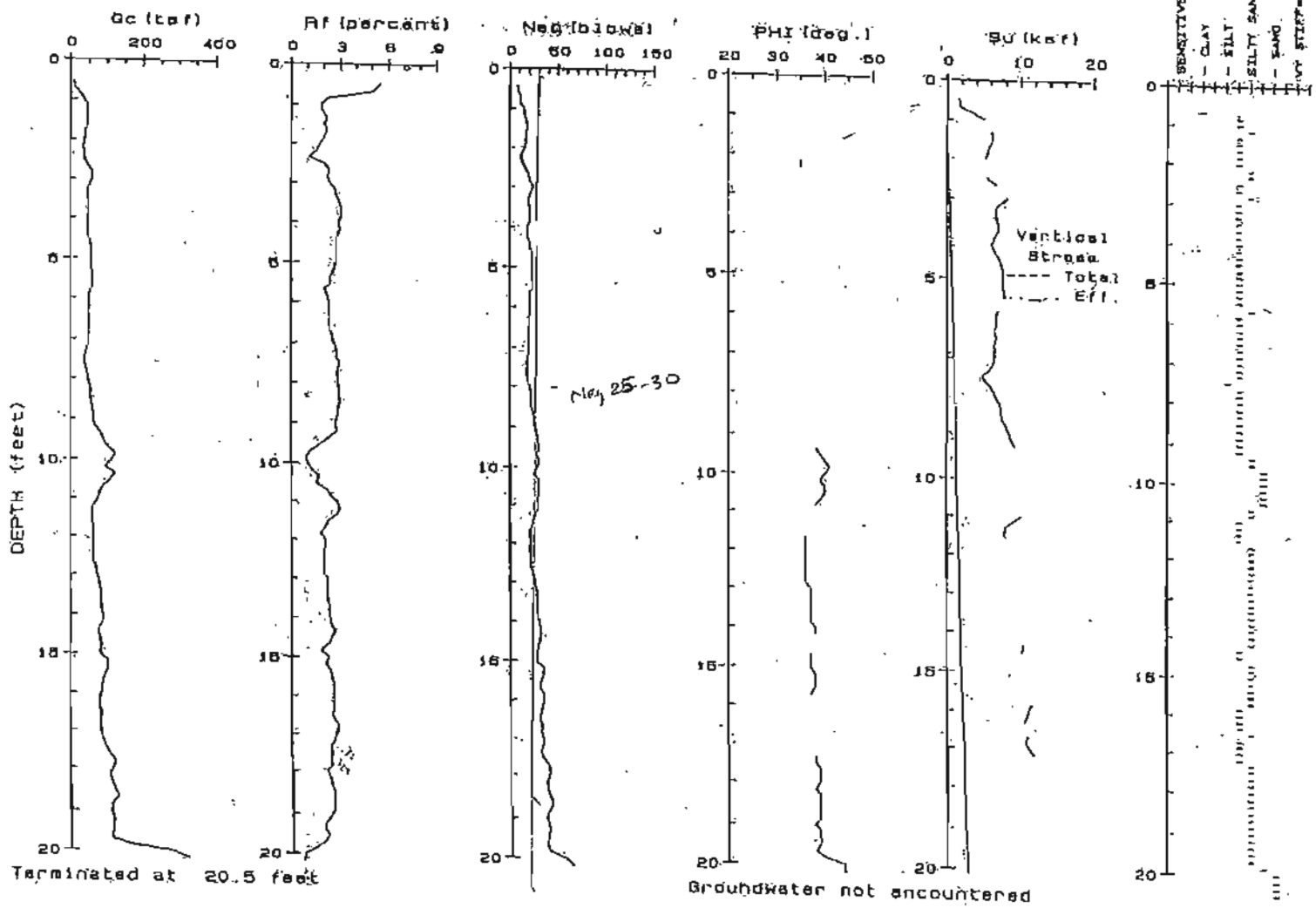
LOVNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

APPENDIX A



CONE PENETRATION TEST LOG - CPT-1

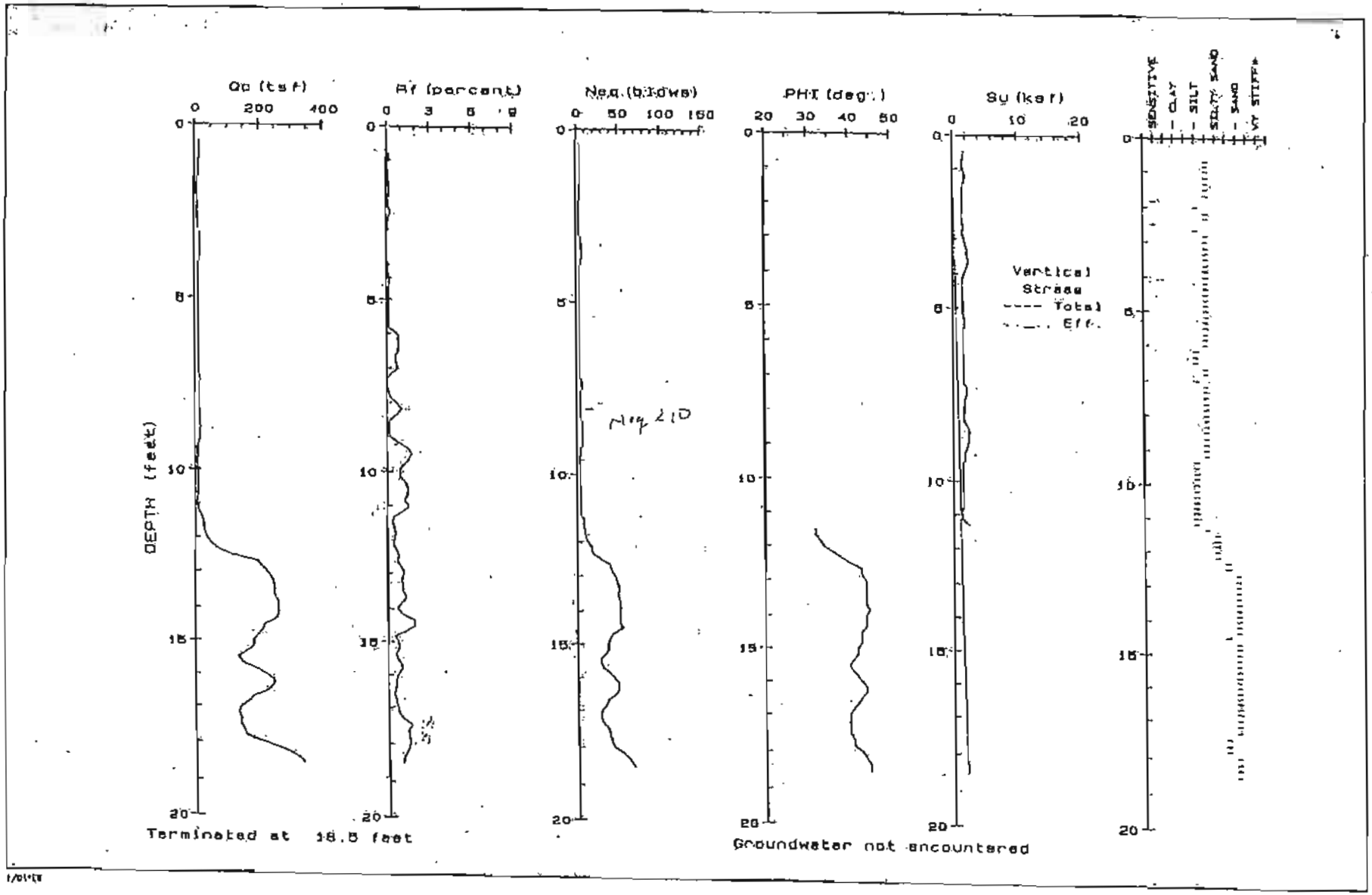
LOVNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services



CONE PENETRATION TEST LOG - CPT-2

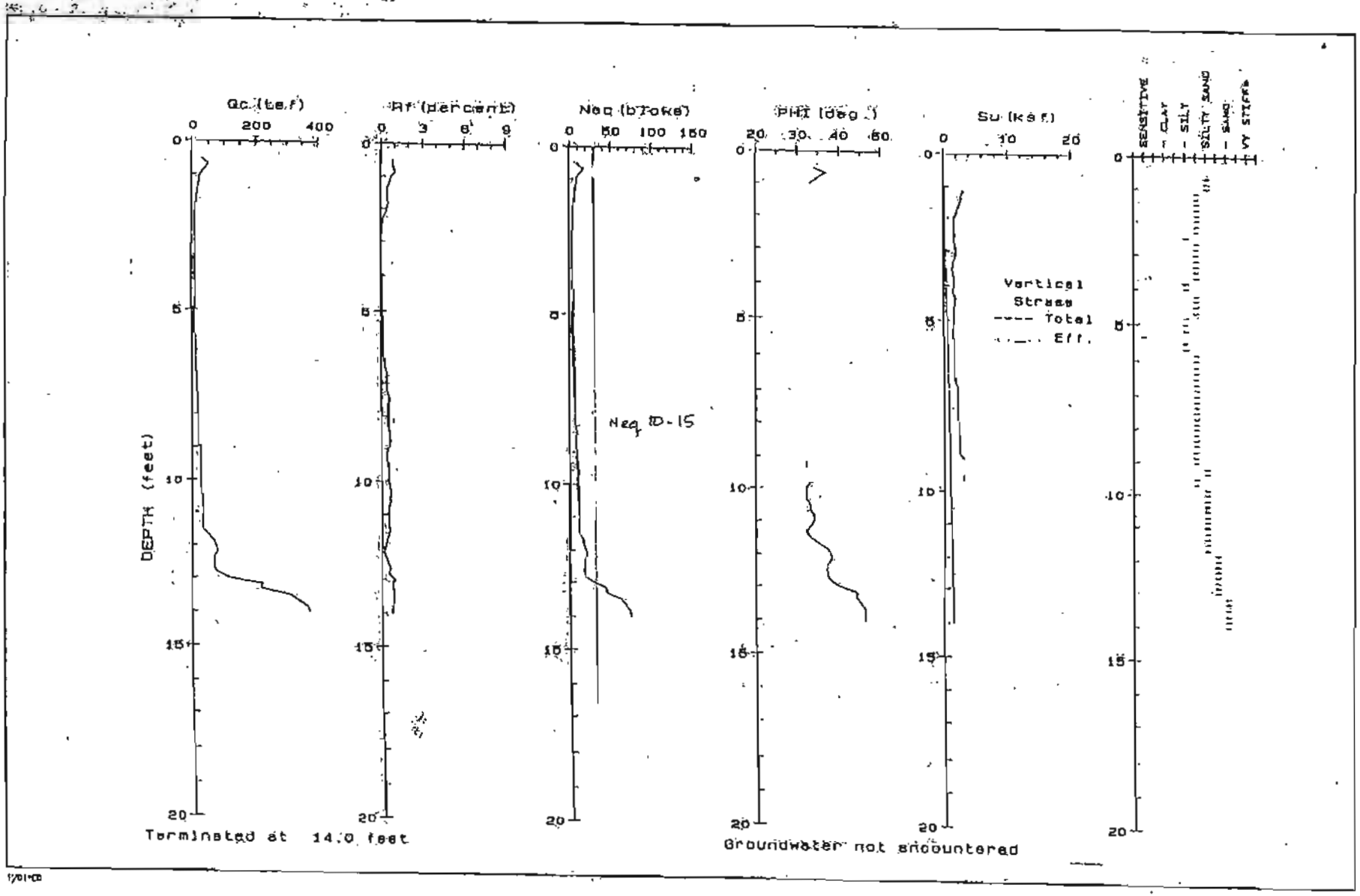
LOVNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

CPT-2
1389-1B



CONE PENETRATION TEST LOG – CPT-3

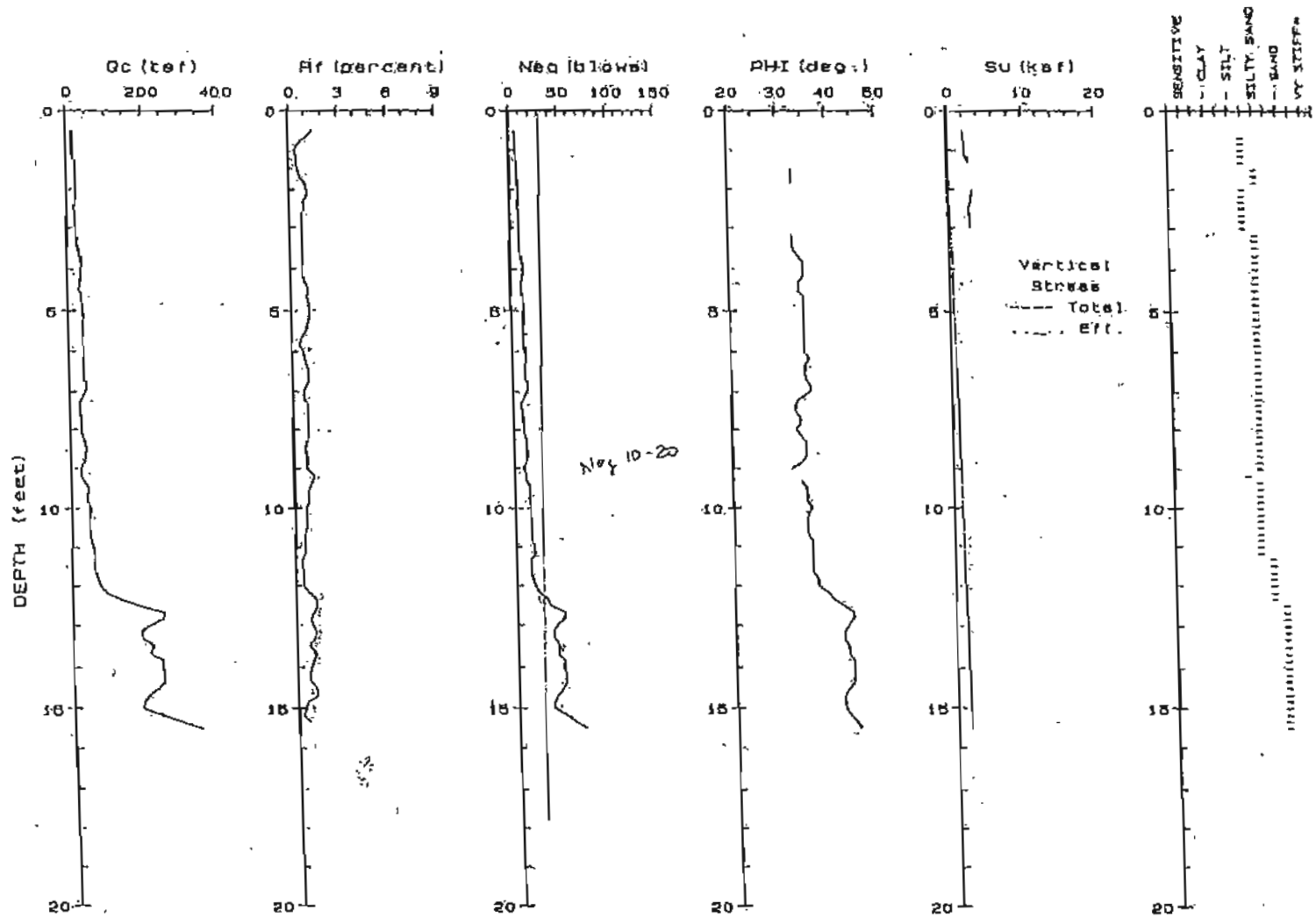
LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services



CONE PENETRATION TEST LOG – CPT-4

LOVNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

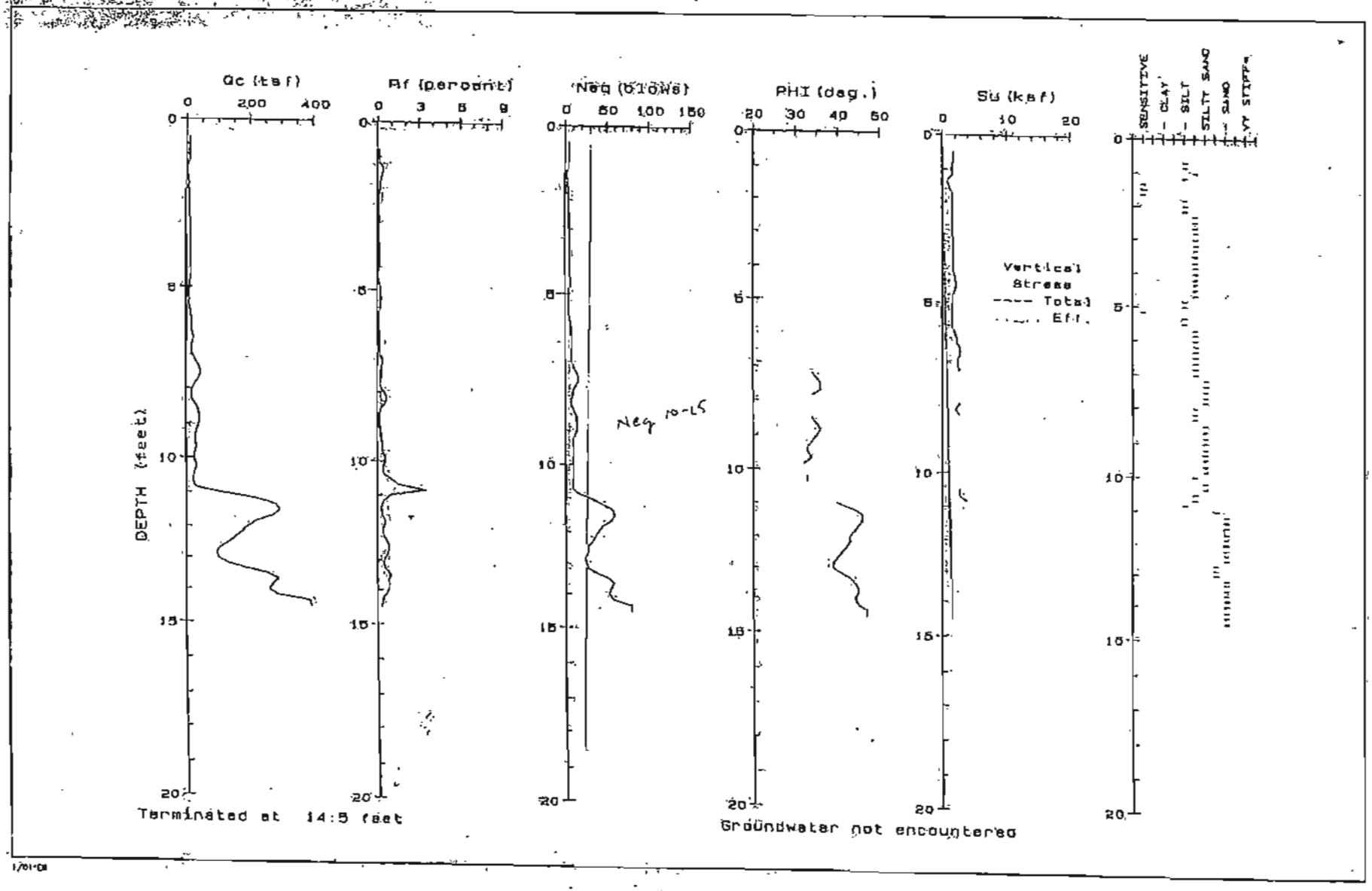
CPT-4
1369-1B



CONE PENETRATION TEST LOG – CPT–5

LOVNEY ASSOCIATES

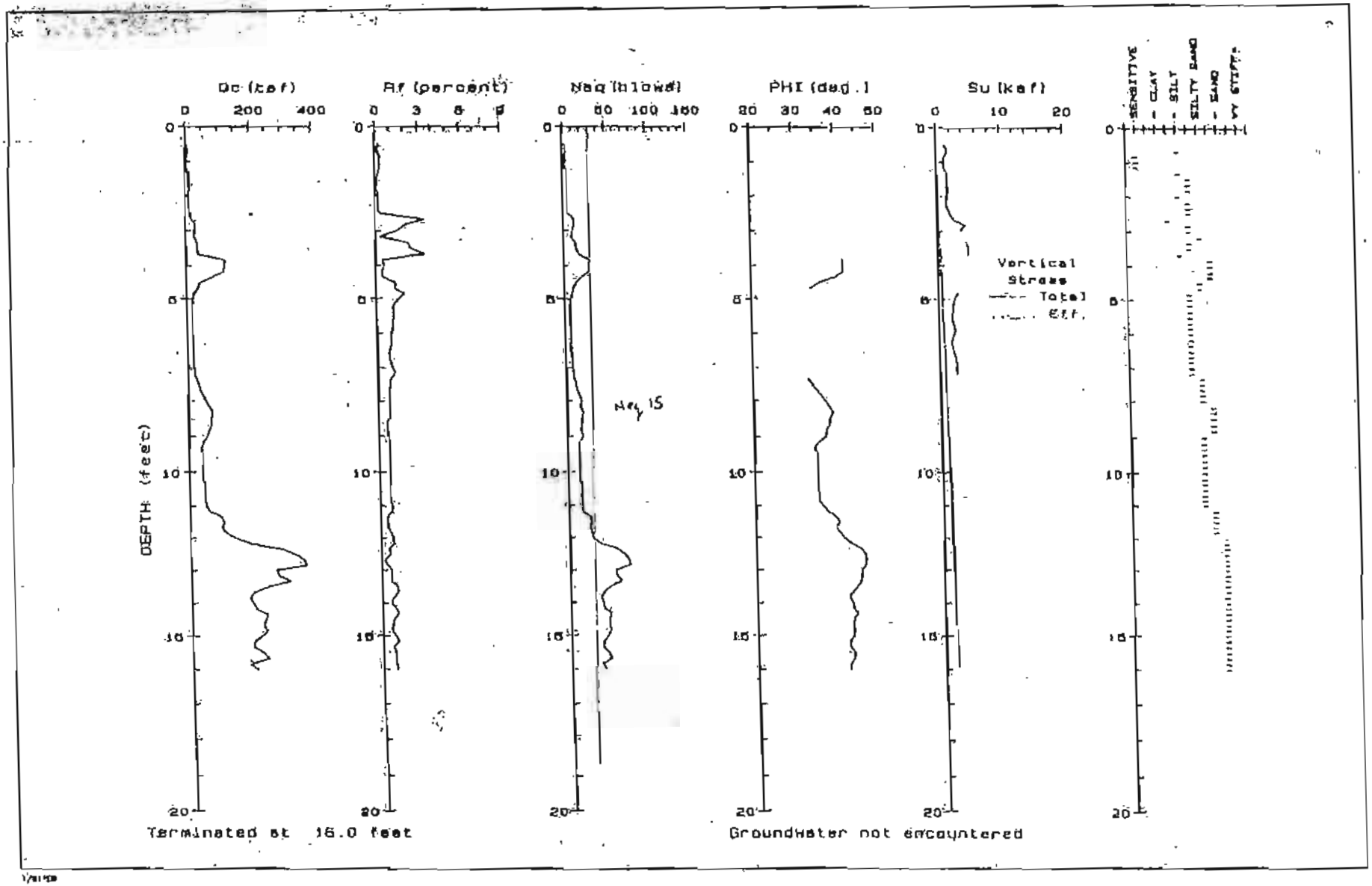
CPT



CONE PENETRATION TEST LOG - CPT-6

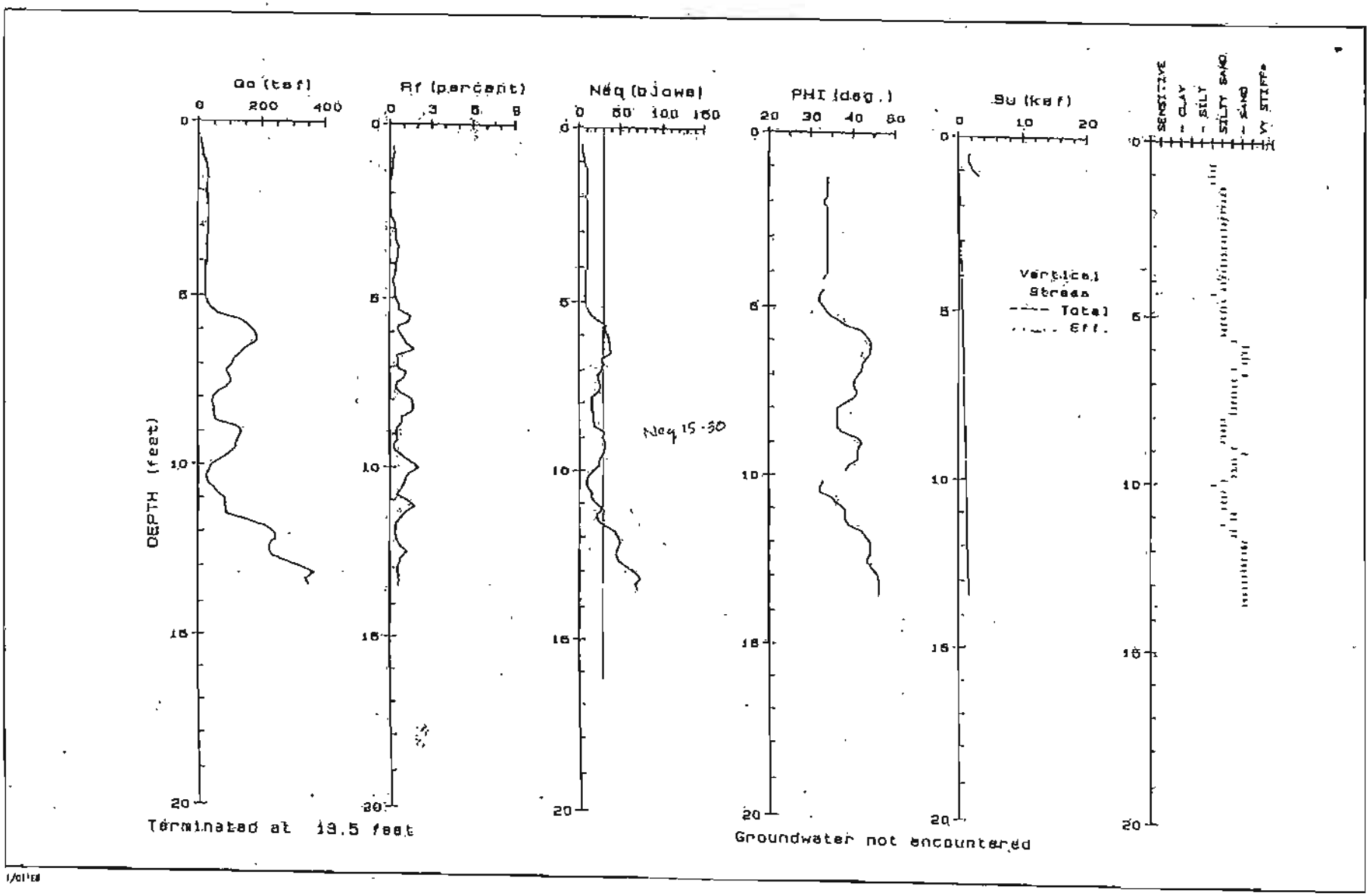
LOVNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

CPT-6
1369-1D



CONE PENETRATION TEST LOG - CPT-7

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services



CONE PENETRATION TEST LOG - CPT-8

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

CPT-8
1369-19

APPENDIX B

LABORATORY PROGRAM

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site and to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 32 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 18 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soils to measure the range of water contents over which the soil exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are presented on the Plasticity Chart of this appendix and on the log of the boring at the appropriate sample depth.

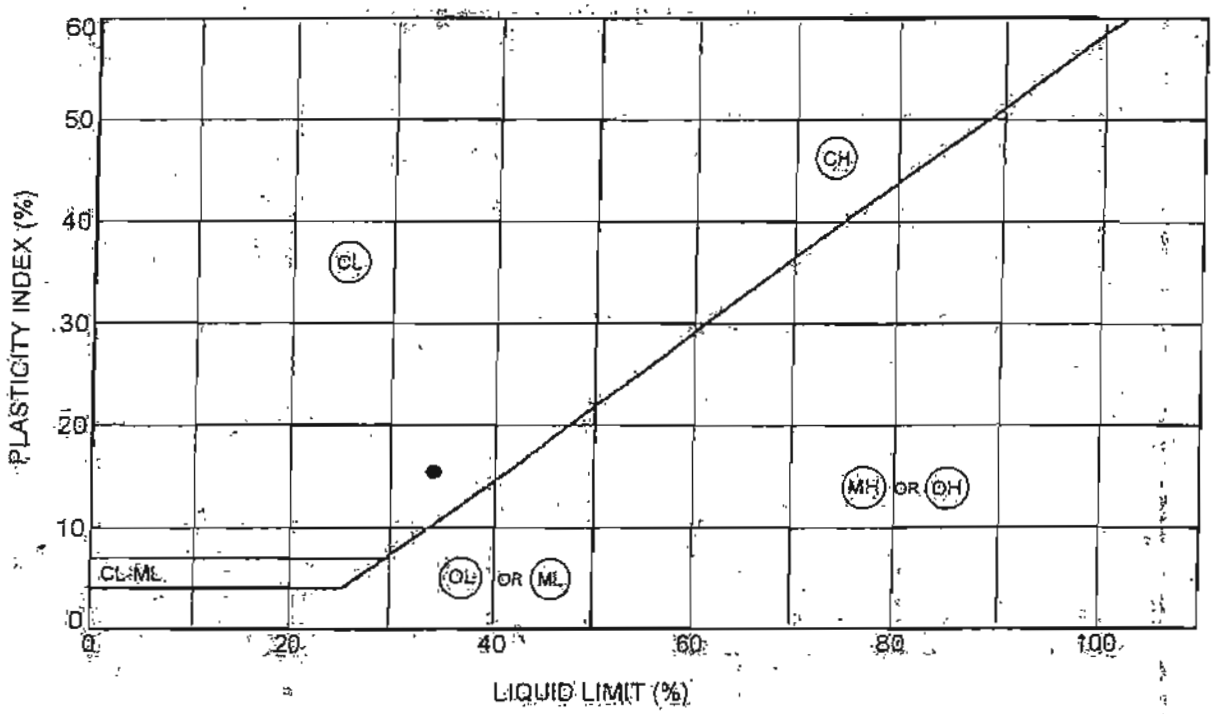
Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on 3 samples of subsurface soil to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Sieve and Hydrometer Analyses: Gradation and washed sieve analyses (ASTM D422 and D2217) were performed on 2 samples of the subsurface soils to aid in soil classification. Results of these tests are included in this appendix.

R-Values: R-value (resistance) tests (California Test Method No. 301) were performed on 2 samples of surface soils from the site to provide data for pavement thickness design. The tests indicated R-values of 26 and 63 at an exudation pressure of 300 pounds per square inch. The results of the tests are presented in Table B-1 on the following page.

Table B-1. Results of R-Value Tests

Sample	Description of Material	Water Content (%)	Dry Density (pcf)	Exudation Pressure (psi)	"R" value	Expansion Pressure (psf)
Bulk #4	Brown, clayey	20.9	101.5	156	1	65
(near EB-4)	sand	15.9	112.0	277	23	224
		15.1	113.0	369	33	258
Bulk #2	Brown, silty	14.6	112.1	167	21	0
(near EB-2)	sand	12.4	115.7	258	60	138
		11.9	118.3	744	68	275



Symbol	Boring No.	Depth (ft.)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing No. 200 Sieve	Unified Soil Classification Description
●	EB-3	4.5	10	34	19	15		SILTY CLAY (CL)

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

PLASTICITY CHART AND DATA

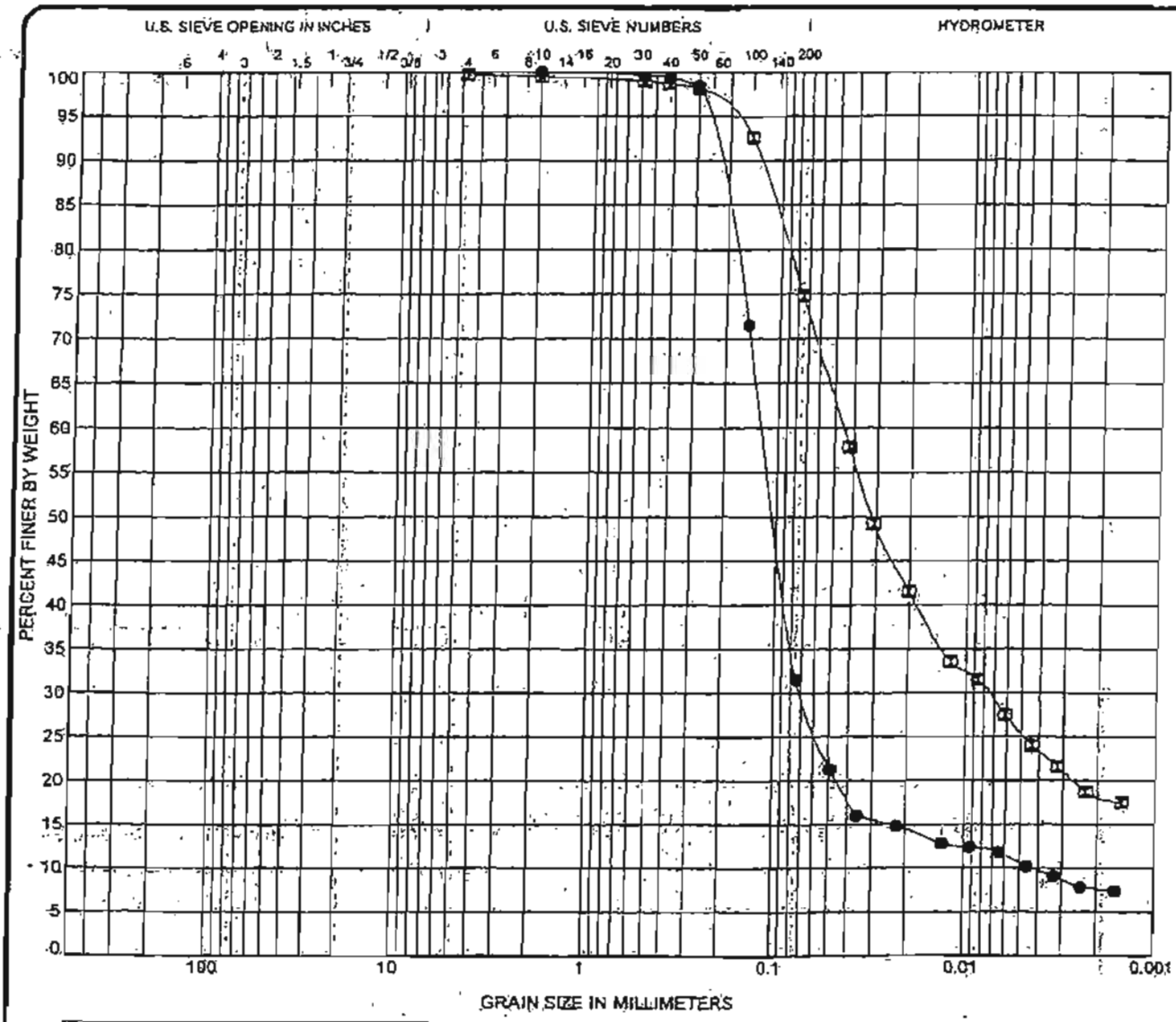
Project: SILVER CREEK VALLEY PLACE

Location: SAN JOSE, CA

Project No.: 1369-1B

FIGURE B-1

LA CORP.GDT 4/11/01 MV GEI



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● EB-1	6.5	SILTY SAND (SM)				9.31	28.38
⊡ EB-4	9.0	SILT WITH SAND (ML)					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● EB-1	6.5	2	0.123	0.07	0.004	0.0	68.5	20.9	10.6
⊡ EB-4	9.0	4.75	0.045	0.008		0.0	24.9	49.4	25.4

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

GRAIN SIZE DISTRIBUTION

Project: SILVER CREEK VALLEY PLACE
Location: SAN JOSE, CA
Project No.: 1369-1B

LA CORP 001 4/18/01 MV GEI

Date Drilled : 8/14/96	Logged By : MM	Boring No. B-1						
DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisteance (Blows/Foot)	Direct Shear "0" Degree	Direct Shear "C" Cohesion
Light brown silty clay with gravel, dry,loose.								
Light brown sand with clay binder, dry, soft SC		5	1-1	86.3	7.3	5		
Tan brown clayey silty sand, dry, soft SC		10	1-2	85.1	7.6	7		
Light brown gravelly silty clay, dry, stiff, CL								
Gravelly silty sand, dry, dense, GM		15	1-3	119.9	3.6	53		
Rock fragments, sandstone, Gravel, 1.5" round								
Brown gravelly sand with rock fragments, dry, dense GW		20	1-4	111.3	3.3	76		
Gray sand, moist, hard, Mottled brown gray sand with gravel, wet, dense		25	1-5	117.5	8.3	49		
		30						
Brownish gray gravel and sand, moist, dense,		35	1-6	No Sample		12		

EXPLORATION BORING LOG

PROPOSED RETAIL DEVELOPMENT

SAN JOSE, CALIFORNIA

Project No 96519-S Figure: 4

ADVANCE SOIL TECHNOLOGY, INC.

SARATOGA CALIFORNIA

Date Drilled : 8/14/96	Logged By : MM				Boring NoB-1 Cont.			
							Direct Shear	
DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resistance (Blows/Foot)	"0" Degree	"C" Cohesion
Mottled brown gray to brown gravelly sand, moist, dense								
		40	No sample was retrieved					
Exploratory boring terminated at 40 feet								
		30						

EXPLORATION BORING LOG	ADVANCE SOIL TECHNOLOGY, INC.
PROPOSED RETAIL DEVELOPMENT SAN JOSE, CALIFORNIA	SARATOGA CALIFORNIA
Project No 96519-S Figure: 5	

Date Drilled : 8/14/96	Logged By : MM				Boring No. B-2			
							Direct Shear	
DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisteance (Blows/Foot)	"Ø" Degree	"C" Cohesion
Light brown silty clay, minor gravel, dry, loose,								
Light brown silty clay, dry, soft, CL								
	■	5	2-1	80.5	7.4	4	* PPT=0.8 tsf	
Brown silty sand with clay binder, dry, soft SM	■	10	2-2	77.1	8.3	7		
Gravelly silty sand, dry, dense								
Grayish brown sand with gravel, rock fragments, moist, dense	■	15	2-3	98.7	13.4	19		
		20						
Exploratory boring terminated at 20 feet								
		25						
Note: PP=Pocket Penetrometer Strength								
		30						

EXPLORATION BORING LOG

PROPOSED RETAIL DEVELOPMENT

SAN JOSE, CALIFORNIA

Project No 96519-S | Figure: 6

ADVANCE SOIL TECHNOLOGY, INC.

SARATOGA CALIFORNIA

Date Drilled : 8/14/96	Logged By : MM	Boring No. B-3						
DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisteance (Blows/Foot)	Direct Shear "ø" Degree	Direct Shear "C" Cohesion
Light brown silty clay, dry, loose C: CL								
Light brown silty sand with gravel, damp, dense SC		5	3-1	112.1	4.5	7	* PPT=2.5 tsf	
Sand with small gravels, damp, firm SW		10	3-2	99.6	5.3	12		
Gravelly silty sand, dry, dense SM		15	3-3	112.5	3.1	35		
Larger size gravel, moist, hard		20	3-4	128.9	4.1	60		
Exploratory boring terminated at 20 feet		25						
Note: PP=Pocket Penetrometer Strength		30						

EXPLORATION BORING LOG	ADVANCE SOIL TECHNOLOGY, INC.
PROPOSED RETAIL DEVELOPMENT SAN JOSE, CALIFORNIA	SARATOGA CALIFORNIA
Project No 96519-S Figure: 7	

Date Drilled : 8/14/96	Logged By : MM	Boring No. B-4

DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisteance (Blows/Foot)	Direct Shear "Ø" Degree	Direct Shear "C" Cohesion
Light brown silty clay with organics. dry, loose, CL								
Light brown silty sand with gravel, damp, dense SC	■	5	4-1	108.3	3.6	9	* PPT=2.0 tsf	
Sand with small gravel, moist, firm SW	■	10	4-2	91.2	5.2	12		
Light brown silty sandy gravel with clay binder, damp, dense, GC								
Mottled brown grayish sand with gravel, damp, dense SC	■	15	4-3	116.8	2.8	40		
Sand and gravel with clay binder, damp, firm	■	20	4-4	114.2	5.7	44		
Exploratory boring terminated at 20 feet		25						
Note: PP=Pocket Penetrometer Strength		30						

EXPLORATION BORING LOG

PROPOSED RETAIL DEVELOPMENT

SAN JOSE, CALIFORNIA

Project No 96519-S | Figure: 8

ADVANCE SOIL TECHNOLOGY, INC.

SARATOGA CALIFORNIA

Date Drilled : 8/14/96	Logged By : MM	Boring No. B-5

DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisleance (Blows/Foot)	Direct Shear "Ø" Degree	Direct Shear "C" Cohesion
Light brown silty clay, dry, loose CL								
Light brown gravelly silty sand, moist, dense SC		5						
		10						
Light brown silty sandy gravel with clay binder, damp, dense, GC								
		15						
Sand and gravel with clay binder, damp, firm		20						
Exploratory boring terminated at 20 feet								
		25						
		30						

EXPLORATION BORING LOG

PROPOSED RETAIL DEVELOPMENT

SAN JOSE, CALIFORNIA

Project No 96519-S | Figure: 9

ADVANCE SOIL TECHNOLOGY, INC.

SARATOGA CALIFORNIA

Date Drilled : 8/14/96	Logged By : MM				Boring No. B-6			
DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisteance (Blows/Foot)	Direct Shear "Ø" Degree	Direct Shear "C" Cohesion
Brown silty clay with some sand, dry, loose, CL								
Sandy silty gravel with clay binder, dry, soft SC		5	6-1	100.7	6.7	18	*PPT=1.5 tsf	
		10	6-2	107.6	2.1	35		
Light brown silty sandy gravel with clay binder, damp, dense, GC		15	6-3	99.9	2.2	28		
Sand and gravel with clay binder, damp, dense, GC		20	6-4	114.2	6.9	32		
Mottled brown sandy gravel, wet, dense GP		25	6-5	123.4	11.5	46		
Exploratory boring terminated at 25 feet		30						
* Note: PPT= Pocket Penetrometer Strength								

EXPLORATION BORING LOG

PROPOSED RETAIL DEVELOPMENT

SAN JOSE, CALIFORNIA

Project No 96519-S | Figure: 10

ADVANCE SOIL TECHNOLOGY, INC.

SARATOGA CALIFORNIA

Date Drilled : 8/14/96	Logged By : MM				Boring No. B-7			
DESCRIPTION	Sample	Depth (feet)	Sample No.	Dry Density (p.c.f)	Water Content %	Penetration Resisteance (Blows/Foot)	Direct Shear "Ø" Degree	Direct Shear "C" Cohesion
Light brown silty clay with organics, dry, loose, CL								
Brown sandy silty gravel with clay binder, dry, soft SC		5	7-1	93.2	6.8	15		
Tan clayey silty sand, dry to moist, firm,								
More gravel, rock fragments		10	7-2	120.3	3.9	31		
Light brown silty sandy gravel with clay binder, damp, dense, GC								
		15	7-3	124.8	2.6	27		
Sand and gravel with clay binder, damp, dense, SC		20	7-4	130.3	6.5	41		
Mottled brown sandy gravel, wet, dense GP		25						
Exploratory boring terminated at 25 feet								
		30						
* Note: PPT= Pocket Penetrometer Strength								

EXPLORATION BORING LOG	ADVANCE SOIL TECHNOLOGY, INC.
PROPOSED RETAIL DEVELOPMENT SAN JOSE, CALIFORNIA	SARATOGA CALIFORNIA
Project No 96519-S Figure: 11	

TABLE I

SUMMARY OF MOISTURE, DENSITY, UNCONFINED COMPRESSION AND DIRECT SHEAR TESTING

Sample No.	Depth Ft.	In-Place Conditions Moisture Content % Dry Wt.	In-Place Conditions Dry Density p.c.f.	Unconfined Compressive Strength k.s.f.	Direct Shear Testing Angle of Internal Friction Degrees	Direct Shear Testing Unit Cohesion p.s.f.
1-1	3	7.3	86.3			
1-2	8	7.6	85.1			
1-3	13	3.6	119.9			
1-4	18	3.3	111.3			
1-5	25	8.3	117.5			
1-6	35	No.	SAMPLE			
2-1	5	7.4	80.5			
2-2	10	8.3	77.1			
2-3	15	13.4	98.7			
3-1	3	4.5	112.1			
3-2	8	5.3	99.6			
3-3	13	3.1	112.5			
3-4	18	4.1	128.9			
4-1	4	3.6	108.3			
4-2	9	5.2	91.2			
4-3	14	2.8	116.8			
4-4	19	5.7	114.2			
6-1	4	6.7	100.7			
6-2	9	2.1	107.6			
6-3	15	2.2	99.9			
6-4	20	6.9	114.2			
6-5	25	11.5	123.4			

TABLE I

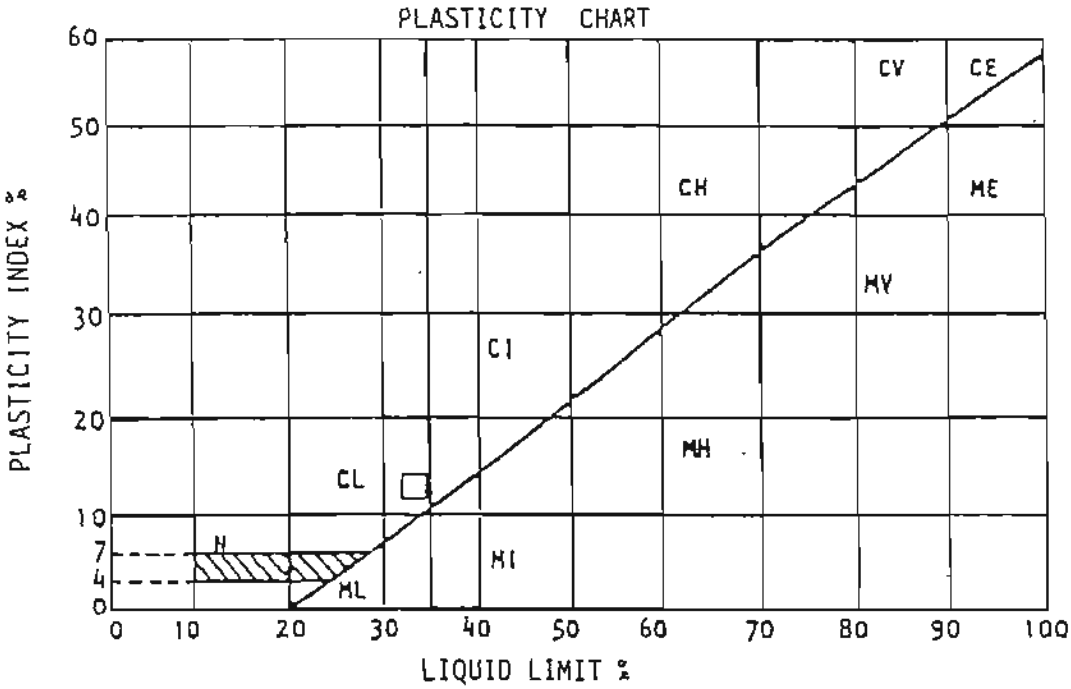
SUMMARY OF MOISTURE, DENSITY,
UNCONFINED COMPRESSION AND DIRECT SHEAR TESTING

Sample No.	Depth Ft.	In-Place Conditions Moisture Content % Dry Wt.	In-Place Conditions Dry Density p.c.f.	Unconfined Compressive Strength k.s.f.	Direct Shear Testing Angle of Internal Friction Degrees	Direct Shear Testing Unit Cohesion p.s.f.
7-1	5	6.8	93.2			
7-2	10	3.9	120.3			
7-3	15	2.6	124.8			
7-4	20	6.5	130.3			

PLASTICITY DATA

Key Symbol	Hole No.	Depth Ft.	Liquid Limit %	Plasticity Index %	Unified Soil Classification Symbol*
□	Bag "A"	0-2	34	12	CL-CI

PLASTICITY CHART



File:96519-S	PLASTICITY INDEX
Figure: 12	ADVANCE SOIL TECHNOLOGY, INC.
Date: 96	Contamination, Monitoring Well, Soil, Foundation & Geological Services 12340 S. Saratoga-Sunnyvale Rd., Unit 4, Saratoga, CA 95070 (408) 446-0809

FIELD EXPLORATION PROGRAM

We performed fifteen (15) exploratory borings (B1 through B13, B10A and B13A) between November 16 and December 14, 2006 for this investigation at the locations shown on the Site and Boring Location Plan, Figure 1. The borings were performed using truck-mounted hollow stem drilling equipment. The explorations were made under the supervision of a representative of URS. When completed, the holes were backfilled with cement grout in accordance with Santa Clara Valley Water District requirements.

Drive samples were taken with a modified California sampler (2-inch Inside Diameter, 2½ inch Outside Diameter) and a Standard Penetration "split-spoon" sampler (1⅜ inch Inside Diameter, 2-inch Outside Diameter). The samplers were driven into the soil with a 140-pound hammer free-falling 30 inches. Typically, the samplers were driven 18 inches through soil, and the blow count was recorded for the final 12 inches. When very dense or hard materials were encountered and the blow count exceeded 50 blows per 6 inches, the driller indicated that refusal was met. The amount of penetration was then recorded along with the blow count. Pocket penetrometer tests in the cohesive soils were also performed at the time of sample recovery.

Preliminary soils classifications were made in the field in accordance with the Unified Soil Classification System, as shown on Figure B-1, and were verified by further examination of the samples in the laboratory and by testing. Figure B-2 presents a Log of Boring Legend. Logs of the borings were prepared based on the field and laboratory test data and are presented in Figures B-3 through B-17.

LABORATORY TESTING

Relatively undisturbed soil samples were carefully packaged in the field and sealed to prevent moisture loss. The samples were then transported to our San Jose laboratory for examination and testing. Laboratory tests were performed on selected samples as an aid in classifying the soils and to evaluate the physical properties of the soils. Detailed descriptions of the laboratory tests are presented below under the appropriate test headings. Test results are presented in the figures that follow.

Moisture Content and Dry Density

Moisture content and dry density determinations were made on selected samples. The samples were first trimmed to obtain volume and wet weight, and then were dried in accordance with ASTM D2216 and D2937. After drying, the weight of each sample was measured, and moisture content and dry density were calculated. The results of the individual tests are presented on the individual boring logs.

Unconfined Compressive Strength

The unconfined compressive strength was estimated for selected samples. These tests were performed in accordance with ASTM D2166. The axial load applied was measured with a load cell at an axial strain rate of 1.0 percent per minute. Loading was continued

until the axial load reached a peak value. The results of these tests are shown on the individual boring logs.

Grain Size Distribution

Grain size analyses were performed on selected samples to evaluate the proportion of gravel, sand, and fine materials. A representative soil sample was dried, weighed, and tested in general accordance with ASTM D422. The test results are presented in Figures B-18 through B-20.

Plasticity Index

The plasticity characteristics of the native soil were determined for selected samples by performing Liquid Limit and Plastic Limit tests generally in accordance with ASTM test method D4318. The results of the test are presented on Figure B-21.

R-Value

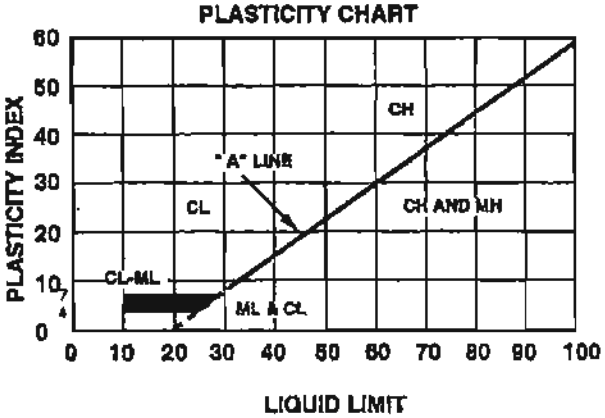
Two R-Value tests were performed on samples representative of the near surface soils. The tests were performed in accordance with the Caltrans Test Designation 301. The test results are presented on Figures B-22 and B-23.

SAMPLE CLASSIFICATION CHART

UNIFIED SOIL CLASSIFICATION SCHEME

MAJOR DIVISIONS		SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOIL (More than 1/2 of soil >no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
		GP	Poorly graded gravel or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SAND (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOIL (More than 1/2 of soil <no. 200 sieve size)	SILTS & CLAYS Liquid Limit < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey, fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

PLASTICITY CHART



GRAIN SIZE CLASSIFICATION

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
coarse (c)	3" to 3/4"	76.2 to 19.1
fine (f)	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
coarse (c)	No. 4 to No. 10	4.76 to 2.00
medium (m)	No. 10 to No. 40	2.00 to 0.420
fine (f)	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

MOISTURE CONTENT

DRY	-No sign of water and soil dry to touch
MOIST	-Signs of water and soil is relatively dry to touch
WET	-Signs of water and soil definitely wet to touch; granular soil exhibits some free water when densified

SOIL CONSISTENCY/RELATIVE DENSITY

SILT, SAND AND GRAVEL	BLOWS/FT	SILT OR CLAY	UNCONFINED COMPRESSIVE STRENGTH (psf)	THUMB PENETRATION
Very loose	<4	Very Soft	< 500	Very easily - inches
Loose	5-10	Soft	500 - 1000	Easily - inches
Medium Dense	11-30	Medium (firm)	1000 - 2000	Moderate effort - inches
Dense	31-50	Stiff	2000 - 4000	Indented easily
Very Dense	>50	Very Stiff	4000 - 8000	Indented by nail
		Hard	> 8000	Difficult by nail

CLASSIFICATION MODIFIERS

TRACE	0 - 12%
SOME	12 - 30%

± MODIFIERS

URS

Figure B - 1

2/5/07 JGLOG94 98216

Project: CA CENTER FOR HEALTH CARE
Location: San Jose, California

Log of Boring LEGEND

Date Drilled:
Type of Boring: (as noted)
Hammer/drop: (as noted)

Remarks:
Surface Elevation: feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
				Arrow denotes bottom of fill layer FILL				
5				2 inch inside diameter Modified California sample				
10				2 inch outside diameter Standard Split Spoon sample (Standard Penetration Test)				
				3 inch outside diameter Shelby tube sample				
15		350 psi		Hydraulic Pressure required to push Shelby tube sampler				
20		29		Blow count with 140-lb hammer falling 30 inches for 12 inches of penetration				
25		50/ 5"		Blow count with 140-lb hammer falling 30 inches for 5 inches of penetration				
				Groundwater level at time of drilling				
30				Groundwater at a time after drilling (as specified)				
35				**KEY TO LABORATORY TESTS**				
				PP = Pocket Penetrometer reading in tons per square foot (tsf)				PP = 3.0tsf
				LL = Liquid Limit (%) PI = Plasticity Index (%) NOTE: PI = LL - (Plastic Limit (%))				LL = 42 PI = 21
40				+ #4 = Percentage of material retained on #4 sieve -#200 = Percentage of material passing #200 sieve				+ #4 = 13% -#200 = 10%
45								

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: NW Corner of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 204.7 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/16/06 DATE FINISHED: 11/16/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 45.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 29.1 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	45'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 1

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	SAMPLES: DEPTH (feet)	NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown, fine sand, trace organics							1		95	14	8	93		
		Silty SAND (SM) Loose, moist, brown, root material, fine sand														
		Silt (ML)				1.9			2		100	9	6 10	92 95	650	+#4=0% -#200=15%
5		Medium dense, medium sand	-200-					5								
									3		100	16	8	95		
						1.5			4		80	13	8	92	460	
		Poorly graded SAND (SP) with gravel Dense, moist, light brown, fine gravel	-195-													
10		**Silty SAND (SM)** Dense, moist, brown						10	5		95	40				
		Poorly graded SAND (SP/GP) with gravel Dense, moist, brown, medium to coarse sand, subrounded gravel														
15		Hard drilling	-190-					15	6		95	46	3	116		+#4=53% -#200=5%
		Very dense														
20			-185-					20	7		40	50/5"				
		Gravel to 2 inches with some clay binder														
		Dense, wet, yellowish brown, fine gravel up to 1/4 to 1/2 inch							8		75	68				
25		**Poorly graded SAND (SP-SM) with silt and gravel** Dense, wet, yellowish brown, fine gravel, trace clay binder	-180-					25								

URS

PROJECT NO. 28649821

Figure: B-3

2/6/07 JG048 98215

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 1
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
									9		90	41	11	130		+#4=44% -#200=8%
30		Gravel to 1 inch	175					30								
		Very dense, gravel to 1-1/2 inch							10		0	50/3"				
35			170					35								
									11		60	50/6"				
40		Poorly graded SAND (SP-SM) with silt Very dense, wet, brown to light yellowish brown, medium to coarse sand	165					40								
		With fine gravel							12		50	73				
45		BOTTOM OF BORING AT 45 FEET	160					45								
50			155					50								
55			150					55								
60			145					60								
			140													

URS

PROJECT NO. 28649821

Figure: B-3

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Center of Western Half of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 203.7 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/16/06 DATE FINISHED: 11/16/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 44.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 25.3 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	44'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 2

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE,%	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown							1		95	11	7			
		Silty SAND (SM) Loose, moist, light yellowish brown	200						2		90	7	7	92		
5		Medium dense with lenses of medium to stiff Silt (ML)				1.6		5	3		95	18	5	98	900	
		Fine gravel	195			2.0			4		96	20	4	104	2380	
10		Dense						10	5		95	43				
		Gravel to 1 inch	190						6		70	49				
15		Gravel to 2 inches						15								
		Clayey SAND (SC) with gravel Very dense, moist, yellowish brown, fine gravel, subangular to subrounded	185						7		70	50/5"				
20		Gravel up to 1-1/2 inches						20								
		Dense, with black and orange mottles	180						8		90	41				
25							▽	25								

URS

PROJECT NO. 28649821

Figure: B-4

2/5/07 JG049 9821E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 2
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Very dense, wet, brown to dark brown	175													
30								30	9		90	70				
			170						10		70	50/5"				
35		Clayey GRAVEL (GC) Very dense, wet, black to brown						35								
			165						11		30	50/5.5"				
40		Poorly graded SAND (SP) with gravel Very dense, wet, brown to black, sand medium to coarse, subrounded gravel						40								
			160						12		30	50/6"				
45		BOTTOM OF BORING AT 44 FEET						45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-4

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Center of Northern Side of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 203.7 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/16/06 DATE FINISHED: 11/16/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 45.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.1 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	45'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 3

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Silty SAND (SM) Loose, dry to moist, brown														
		Fine gravel				2.2			1		95	9	6 6	63 97	1240	Non-plastic +#4=0% -#200=42% -5micr =11%
			200						2		90	11	3			
5		Black to brown						5	3		95	11	5			
		Moist, gravel to 1-1/2 inches							4		85	11	9			
		No gravel	195						5		95	13	3			
		Poorly graded SAND (SP) with gravel Medium dense, dry, black to brown														
10								10								
		Very dense	190						6		20	54				
15								15								
			185						7		60	50/6"				
20								20								
		Fine subrounded gravel	180						8		30	50/5"				
25		Gravel to 1 inch						25								
		Clayey SAND (SC) with gravel Dense, wet, yellowish brown					▽									

URS

PROJECT NO. 28649821

Figure: B-5

2/5/07 JG048 9821E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 3
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30			175					30	9		40	43				
		Very dense, gravel to 1 inch														
			170						10		40	62				
35								35								
		Fine gravel														
			165						11		65	50/6"				
40								40								
		Strong red mottling														
			160						12		0	62				
45		BOTTOM OF BORING AT 45 FEET						45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-5

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Center of Eastern Half of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 203.7 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/16/06 DATE FINISHED: 11/16/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 44.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.5 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	44'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 4

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown				1.6			1		95	6	4	89	610	
		Poorly graded SAND (SP-SM) with silt Loose, moist, brown, with Silt (ML) lenses	200			0.8			2		95	12	5			
5								5	3		95	9	7	86	550	
		SILT (ML) Stiff, moist, brown, some fine sand				2.9			4		90	17	17	97	1180	
		Poorly graded SAND (SP) Medium dense, moist, black to brown, fine sand	195													
10		Brown						10	5		90	30				
		Subangular to subrounded gravel to 1-1/2 inches	190						6		90	36				
15								15								
		Clayey GRAVEL (GC) Dense, moist, brown														
		Clayey SAND (SC) with gravel Very dense, moist, brown, gravel to 2 inches	185						7		80	69				
20								20								
		Medium dense to dense, gravel up to 1 inch														
		Strong red speckles	180						8		70	37				
25								25								

URS

PROJECT NO. 28649821

Figure: B-6

2/5/07 JG048 9621E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 4
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Wet	175						9		80	33				+#4=42% -#200=14% -5micr =6%
30								30								
		Dense, fine gravel (1/2 inch)	170						10		75	57				
35								35								
		Very dense, hard drilling	165						11		60	50/6"				
40								40								
			180						12		80	50/0"				
45		BOTTOM OF BORING AT 44 FEET						45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-6

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: 80 feet West of Southern Corner of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 203.6 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/17/06 DATE FINISHED: 11/17/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS: BORING: 45.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.6 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	45'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 5

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown				1.1			1		95	8	6	93	620	
		SILT (ML) Medium, moist, brown	200			2.8			2		95	11	14	86	1640	
5								5	3		95	9				
			195			2.5			4		80	10	18	101	1890	
10		Silty SAND (SM) Very dense, moist, brown, fine sand						10	5		70	50/4"				
		Poorly graded SAND (SP/GP) with gravel Very dense, moist, light yellowish brown, fine to medium sand, subrounded gravel to 2 inches	190						6		70	50/6"				
15								15								
		Coarse sand, gravel up to 1/4 inch	185						7		70	35				
20								20								
		Clayey SAND (SC/GC) with gravel Dense, moist, brown, gravel up to 1/2 inch, medium to coarse sand	180						8		85	53				
25								25								

URS

PROJECT NO. 28649821

Figure: B-7

2/5/07 JG048 98215

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 5
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Wet	175													
30								30	9		65	34				
		Black to brown	170													
35								35	10		50	90/11"				
			165													
40								40	11		25	50/8"				
		Red and black gravel	160													
45								45	12		40	50/3"				
		BOTTOM OF BORING AT 45 FEET														
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-7

2/5/07 JG048 9821C

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Southern Corner of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 203.7 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/17/06 DATE FINISHED: 11/17/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 44.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 29.2 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	44'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 6

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown, with lenses of Silt (ML)				1.6			1		95	5	8	87	700	
			200													
5						3.5		5	2		95	9	18	95	2100	
			195			2.5			3		95	8	14	97	1500	
10								10								
		Poorly graded SAND (SP/GP) with gravel Medium dense, moist, yellowish brown, subangular to subrounded gravel to 1 inch, fine to medium sand														
			190						4		90	35				
15								15								
		Very dense, gravel to 1-1/2 inches														
		Black mottling	185						5		90	61				
20								20								
		Clayey SAND (SC/GC) with gravel Dense, moist, brown, gravel up to 1 inch														
			180						6		75	62				
25								25								
		Poorly graded SAND (SP) with gravel Medium dense, moist, brown, medium to coarse sand, trace clay														

URS

PROJECT NO. 28649821

Figure: B-8

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 6
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30			175					30	7		85	33				+#4=12% -#200=6%
		Clayey SAND (SC/GC) with gravel Dense, wet, brown to black, gravel to 1/2 inch, fine to coarse sand														
			170						8		65	60				
35								35								
		Very dense, fine gravel, little to no clay binder	165						9		50	50/6"				
40								40								
			160						10		50	50/5"				
45		BOTTOM OF BORING AT 44 FEET						45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-8

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Northern Corner of 3-Story MOB			GROUND SURFACE ELEVATION (ft): 204.2 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/17/06 DATE FINISHED: 11/17/06
DRILLING EQUIPMENT	Mobile 853		COMPLETION DEPTHS BORING: 45.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 Inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.8 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	45'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 7

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown				1.6			1		95	6	7	92	270	
						2.4			2		85	9	12	95	890	
			200					5								
5		Poorly graded SAND (SP) with gravel Medium dense, moist, brown, some gravel							3		40	29				
		SILT (ML) with sand Medium, moist, brown														
		Silty SAND (SM) Medium dense, moist, brown, trace gravel to 1 inch							4		80	21	11	99		+#4=1% -#200=32%
			195													
10								10	5		80	20				
		Grades to Well-graded Gravel (GW) with sand, very dense, gravel to 1-1/2 inches, multicolored Black to brown, multicolored gravel	190						6		75	50/ 6"	3			+#4=54% -#200=4%
15								15								
		Gravel to 2 inches														
		Clayey SAND (SC/GC) with gravel Very dense, moist, brown with white speckling	185						7		60	50/ 5.5"				
20								20								
		Orange with strong red speckling														
			180						8		30	50/ 5.5"				
25								25								

URS

PROJECT NO. 28649821

Figure: B-9

2/9/07 J0049 9821E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 7
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Wet	175					30	9		65	62				
30																
		Clayey GRAVEL (GC) with sand Dense, moist, brown, fine subrounded gravel	170					35	10		50	57				
35																
		Clayey SAND (SC/GC) with gravel Very dense, moist, brown to black, fine gravel, medium to coarse sand	165					40	11		50	50/6"				
40																
		Poorly graded SAND (SP/GP) with gravel Very dense, moist, brown to black	160					45	12		50	88				
45		BOTTOM OF BORING AT 45 FEET														
			155					50								
50																
			150					55								
55																
			145					60								
60																
			140													

URS

PROJECT NO. 28649821

Figure: B-9

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Eastern Corner of Proposed 3-Story MOB			GROUND SURFACE ELEVATION (ft): 203.5 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/17/06 DATE FINISHED: 11/17/06
DRILLING EQUIPMENT	Mobile 853		COMPLETION DEPTHS BORING: 44.5 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.9' COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	44.5'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 8

(Sheet 1 of 2)

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
	SILT (ML) with sand Stiff, moist, brown						1		95	15	10	95	2980	
		200			4.2									
5							2		96	18	11	108	2480	
		195			2.3									
							3		95	68				
10	Poorly graded SAND (SP/GP) with gravel Very dense, moist, brown, subrounded gravel to 1-1/2 inches													
	Black to brown, strong red and white speckling	190					4		90	74				
15														
	Clayey SAND (SC/GC) with gravel Very dense, moist, brown with black speckling, gravel up to 1-1/2 inches	185					5		50	50/ 6"				
20														
	Dense	180					6		80	57				
25														

URS

PROJECT NO. 28649821

Figure: B-10

2/8/07 JG048 98215

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 8
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30		Very dense, brown to light brown, fine gravel up to 1/4 inch	175					30	7		80	79				
		Brown to black	170						8		75	71				
35								35								
			165						9		0	50/6"				
40		Poorly graded SAND (SP) with gravel Very dense, wet, brown to black, medium to coarse sand, fine rounded gravel to 1/2 inch diameter						40								
			160						10		25	50/5"				
45		BOTTOM OF BORING AT 44-1/2 FEET						45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-10

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Southern Corner of Proposed 3-Story MOB			GROUND SURFACE ELEVATION (ft): 202.5 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 11/16/06 DATE FINISHED: 11/16/06
DRILLING EQUIPMENT	Mobile 863		COMPLETION DEPTHS BORING: 44.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.5 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY PB/MS

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	45'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 9

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Lean CLAY (CL) with sand Very stiff, moist, brown, fine sand				2.0			1		95	20	11	102	5700	LL = 35 PI = 14
			200			4.0			2		95	18	14	107	5320	
5		Stiff, with increasing sand and some gravel						5								
			195			4.3			3		90	23	9	113	1300	
10		Lean CLAY (CL) Medium, moist, brown						10								
			190													
		SILT (ML) Hard, moist, light brown				3.3			4		80	64	8	123	19490	
15		With gravel to 1 inch						15								
			185						5		85	87	10	123		
20								20								
			180													
		Clayey SAND (SC/GC) with gravel Dense, moist, brown with black speckling, subangular to subrounded gravel to 1-1/2 inches, fine to medium sand							6		75	54				
25								25								
			175													

URS

PROJECT NO. 28649821

Figure: B-11

2/8/07 JG048 9821E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 9
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Wet														
30			170					30	7		65	62				
		Poorly graded SAND (SP) with gravel Dense to very dense, wet, black to brown, fine to medium sand							8		70	63				
35								35								
		Clayey SAND (SC) with gravel Dense, wet, brown to black, fine gravel	165													
		Very dense							9		65	83/11"				
40			160					40								
									10		25	50/6"				
45		BOTTOM OF BORING AT 44 FEET						45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-11

2/8/07 JGLOG94 9821E

Project: CA CENTER FOR HEALTH CARE Location: San Jose, California	Log of Boring LEGEND

Date Drilled:
Type of Boring: (as noted)
Hammer/drop: (as noted)

Remarks:

Surface Elevation: feet (approx.)

Depth, Feet	Samples	Blows/Ft	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Unconfined Compressive Strength, psf	Other Tests/ Remarks
				Arrow denotes bottom of fill layer FILL				
5				← 2 inch inside diameter Modified California sample				
				← 2 inch outside diameter Standard Split Spoon sample (Standard Penetration Test)				
10								
				← 3 inch outside diameter Shelby tube sample				
15								
		350 psi		← Hydraulic Pressure required to push Shelby tube sampler				
20		29		← Blow count with 140-lb hammer falling 30 inches for 12 inches of penetration				
25		50/ 5"		← Blow count with 140-lb hammer falling 30 inches for 5 inches of penetration				
				Groundwater level at time of drilling				
30								
				Groundwater at a time after drilling (as specified)				
35				**KEY TO LABORATORY TESTS** PP = Pocket Penetrometer reading in tons per square foot (tsf)				PP = 3.0tsf
				LL = Liquid Limit (%) PI = Plasticity Index (%) NOTE: PI = LL - (Plastic Limit [%])				LL = 42 PI = 21
40				+#4 = Percentage of material retained on #4 sieve -#200 = Percentage of material passing #200 sieve				+#4 = 13% -#200 = 10%
45								

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: Center of Proposed 3-Story MOD			GROUND SURFACE ELEVATION (ft): 203.5 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER David	DATE STARTED: 12/6/06 DATE FINISHED: 12/6/06
DRILLING EQUIPMENT	Mobile B61		COMPLETION DEPTHS BORING: 50.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 28 ▽ COMPL.: N/A ▽ 24 hr.: N/A ▽
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY P.Boddie

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	50'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 10

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Lean CLAY (CL) Stiff, moist, light brown							1		90	10	10 10	85 96		LL=32 PI=11
			200			2.4			2		85	11	13	94	3240	
5		Very stiff				3.0		5	3		50	12	15	105	4940	
		SILT (ML) Medium to stiff, moist, brown				2.5			4		70	8	13	99	1440	
			195													
10		Silty SAND (SM) Medium dense, moist, brown						10	5		80	32	5	116		
		Poorly graded SAND (SP) with gravel Medium dense, moist, light yellowish brown	190						6		25	29				
15								15								
		Silty SAND (SM)	185						7		50	12				
20		Gravel to 1/2 inch						20								
		Clayey SAND (SC) with gravel Medium dense, moist, brown with black speckling, fine gravel	180						8		75	25				
25		Wet						25								

URS

PROJECT NO. 28649821

Figure: B-12

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 10
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30			175					30	9		65	29				
		Well-graded SAND [SW] with gravel Dense, wet, brown														
			170						10		35	*14				#-Refer to Boring 10A for supplemental sampler penetration values
35								35								
			165						11		50	*33				
40								40								
			160						12		70	*23				
45								45								
		Lean CLAY (CL) Very stiff, wet, light gray with orange mottling	155						13		90	91				
50		BOTTOM OF BORING AT 50 FEET						50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-12

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: 5 feet South of Boring 10			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 12/14/06 DATE FINISHED: 12/14/06
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 44.5 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: N/A COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY AM.Moore CHECKED BY P.Boddie

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	44.5'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 10A

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Silty CLAY (CL-ML) Stiff, moist, light														
5								5								
		SILT (ML) with sand Medium, moist, reddish brown, fine sand							1		95	9				
10		driller notes gravel						10								
15								15								
20								20								
		Grayish brown Clayey Gravel (GC) with coarse sand, moist, gravel to 1 inch, dense, moist							2		60	45				
25								25								

URS

PROJECT NO. 28649821

Figure: B-16

2/5/07 JG048 86218

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 10A
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30		Brown Clayey coarse Sand (SC) with gravel, very dense, wet						30	3		86	68				
35								35	4		60	52				
		Poorly graded SAND (SP) with gravel Very dense, wet, black, medium to coarse sand, fine gravel														
40								40	5		50	89/9"				Hollow Stem Auger filled with water prior to sampling
		Trace clay							6			49				
45		BOTTOM OF BORING AT 44-1/2 FEET Groundwater level not measured						45								
50								50								
55								55								
60								60								

URS

PROJECT NO. 28649821

Figure: B-16

2/5/07 JG048 9821E

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: SW Side of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 204 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER David	DATE STARTED: 12/6/06 DATE FINISHED: 12/6/06
DRILLING EQUIPMENT	Mobile B61		COMPLETION DEPTHS BORING: 55.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27 ▽ COMPL.: N/A ▽ 24 hr.: N/A ▽
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY P.Boddie

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	56'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 11

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Very loose, moist, light brown, fine roots							1		90	4	5	91		
		Silty SAND (SM) Very loose, moist, brown	200						2		80	4	10	86		
5								5	3		80	4				
		SILT (ML) Stiff, moist, light brown				1.8			4		90	8	7	89	1160	
		Silty SAND (SM) Loose, moist, brown, trace fine gravel	195													
10								10	5		90	7	5	90		
		Poorly graded SAND (SP/GP) with gravel Dense, moist, light yellow, gravel to 1 inch, trace silt	190						6		95	45				
15								15								
		Very dense	185						7		95	88 /9"				
20		Gravel to 1-1/2 inches						20								
		Clayey SAND (SC) with gravel Medium dense, moist, brown with strong black to orange staining	180						8		85	32				
25							▽	25								

URS

PROJECT NO. 28649821

Figure: B-13

2/6/07 JG049 38216

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 11
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30			175					30	9		80	21				
		Poorly graded GRAVEL (GP) with sand Very dense, moist, light brown, gravel to 2 inches														
		Poorly graded SAND (SP-SM) with silt Dense, moist, brown, trace fine gravel	170						10		70	*18	22			#-Refer to Boring 10A & 13A for supplemental sampler penetration values +#4=10% -#200=11%
35								35								
		Well-graded SAND (SW) with gravel Dense, wet, dark brown	165						11		60	*7				
40								40								
			160						12		0	40				
45								45	13		60	45				
			155													
50								50	14		40	31				
		Lean CLAY (CL) Very stiff, moist, light gray	150						15		55	21				
55		BOTTOM OF BORING AT 56 FEET						55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: 8-13

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: East Side of Proposed 2-Story Hospital			GROUND SURFACE ELEVATION (ft): 204 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER David	DATE STARTED: 12/6/06 DATE FINISHED: 12/6/06
DRILLING EQUIPMENT	Mobile B61		COMPLETION DEPTHS BORING: 40.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27.6 COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY P.Boddie

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	40'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 12

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Sandy SILT (ML) Loose, moist, brown							1		80	7	10			
			200						2		80	5	13	93		
5		**Poorly graded SAND (SP) with gravel** Medium dense, moist, light brown, fine gravel						5	3		50	18				
		Cobbles to 3-1/2 inches							4		0	17				
			195													
10		**Poorly graded SAND (SP/GP) with gravel** Medium dense, dry, brown, gravel to 1-1/2 inches						10	5		0	18				
			190						6		25	30				
15		Dense, light brown						15								
			185						7		55	45				
20		**Silty SAND (SM) with gravel** Dense, moist, light brown with orange mottling						20								
			180						8		80	37				
25								25								

URS

PROJECT NO. 28649821

Figure: B-14

2/5/07 JG048 8821E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 12
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30		Yellowish brown	175					30	9		90	32	7			+#4=48% -#200=10%
35			170					35	10		85	*21				#-Refer to Boring 10A & 13A for supplamental sampler penetration values
			165						11		60	33				
40		BOTTOM OF BORING AT 40 FEET						40								
45			160					45								
50			155					50								
55			150					55								
60			145					60								
			140													

URS

PROJECT NO. 28649821

Figure: B-14

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: North Corner of Proposed 3-Story Hospital			GROUND SURFACE ELEVATION (ft): 203.5 TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER David	DATE STARTED: 12/6/06 DATE FINISHED: 12/6/06
DRILLING EQUIPMENT	Mobile B61		COMPLETION DEPTHS BORING: 40.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 27 ▽ COMPL.: N/A ▽ 24 hr.: N/A ▽
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY M.Thummaluru CHECKED BY P.Boddie

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	40'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 13

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Silty SAND (SM) Very loose, moist, brown, with Silt (ML) lenses							1		90	4	7	91		
			200						2		20	5				
5								5	3		60	4	12	90		
		Loose, trace gravel							4		75	8	6			#200 Wash +#4 = 0 -#200 = 17%
			195													
10								10	5		80	5	14	90		
		Poorly graded SAND (SP) with gravel Medium dense, moist, light brown	190						6		80	27				
15								15								
			185						7		70	32				
20								20								
		Clayey SAND (SC) with gravel Medium dense, moist, light brown with orange to black speckling	180						8		75	29				
25								25								

URS

PROJECT NO. 28649821

Figure: B-15

2/5/07 JG048 5621E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 13
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30			175					30	9		75	*28				#-Refer to Boring 13A for supplemental sampler penetration values
		Lean CLAY (CL) Stiff, wet, yellowish brown	170						10		95	11				
35								35								
			165						11		10	8				
40		BOTTOM OF BORING AT 40 FEET						40								
			160													
45								45								
			155													
50								50								
			150													
55								55								
			145													
60								60								
			140													

URS

PROJECT NO. 28649821

Figure: B-15

2/5/07 JG049 9821E

CA CENTER FOR HEALTH CARE; San Jose, California

BORING LOCATION: 5 feet North of Boring 13			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Exploration Geoservices, Inc.	DRILLER Jason	DATE STARTED: 12/14/08 DATE FINISHED: 12/14/08
DRILLING EQUIPMENT	Mobile B53		COMPLETION DEPTHS BORING: 35.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Hollow Stem Auger	DRILL BIT 8 inch	HAMMER/ DROP 140lb/30in
SIZE AND TYPE OF CASING	N/A		NUMBER OF SAMPLES DIST: UNDIST:
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: N/A COMPL.: N/A 24 hr.: N/A
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY AM.Moore CHECKED BY P.Boddis

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Cement	0	35'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF BORING 13A

(Sheet 1 of 2)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	POCKET TV (psf)	STRAIN AT FAILURE, %	WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	TYPE	RECOVERY (%)	BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
		Silty SAND (SM) Loose, moist, brown, fine sand														
5								5								
									1		90	14	13	87		
10								10								
		Clayey SAND (SC) with gravel														
15		Gravel to 2 inches						15								
20		Hard drilling, gravel to 3 inches						20								
		Dense, moist, with medium sand							2		70	53				Verified hammer drop 30 inches
25								25								

URS

PROJECT NO. 28649821

Figure: B-17

7/5/07 3G048 8821E

CA CENTER FOR HEALTH CARE
San Jose, California

LOG OF BORING 13A
Continued- Sheet 2 of 2

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	FIELD TESTS: POCKET PEN (tsf)	FIELD TESTS: POCKET TV (psf)	FIELD TESTS: STRAIN AT FAILURE, %	FIELD TESTS: WATER LEVEL	DEPTH (feet)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY (%)	SAMPLES: BLOWS /foot	INDEX PROPERTIES: MOISTURE CONTENT (%)	INDEX PROPERTIES: DRY DENSITY (pcf)	INDEX PROPERTIES: UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
30		Wet						30	3		70	38	11			+#4=33% -#200=14%
		Lean CLAY (CL) with sand Stiff, gray-brown with red and black mottling				10.0							24	103	2080	
35								35	4		70	24				
		BOTTOM OF BORING AT 35 FEET Groundwater level not measured														
40								40								
45								45								
50								50								
55								55								
60								60								

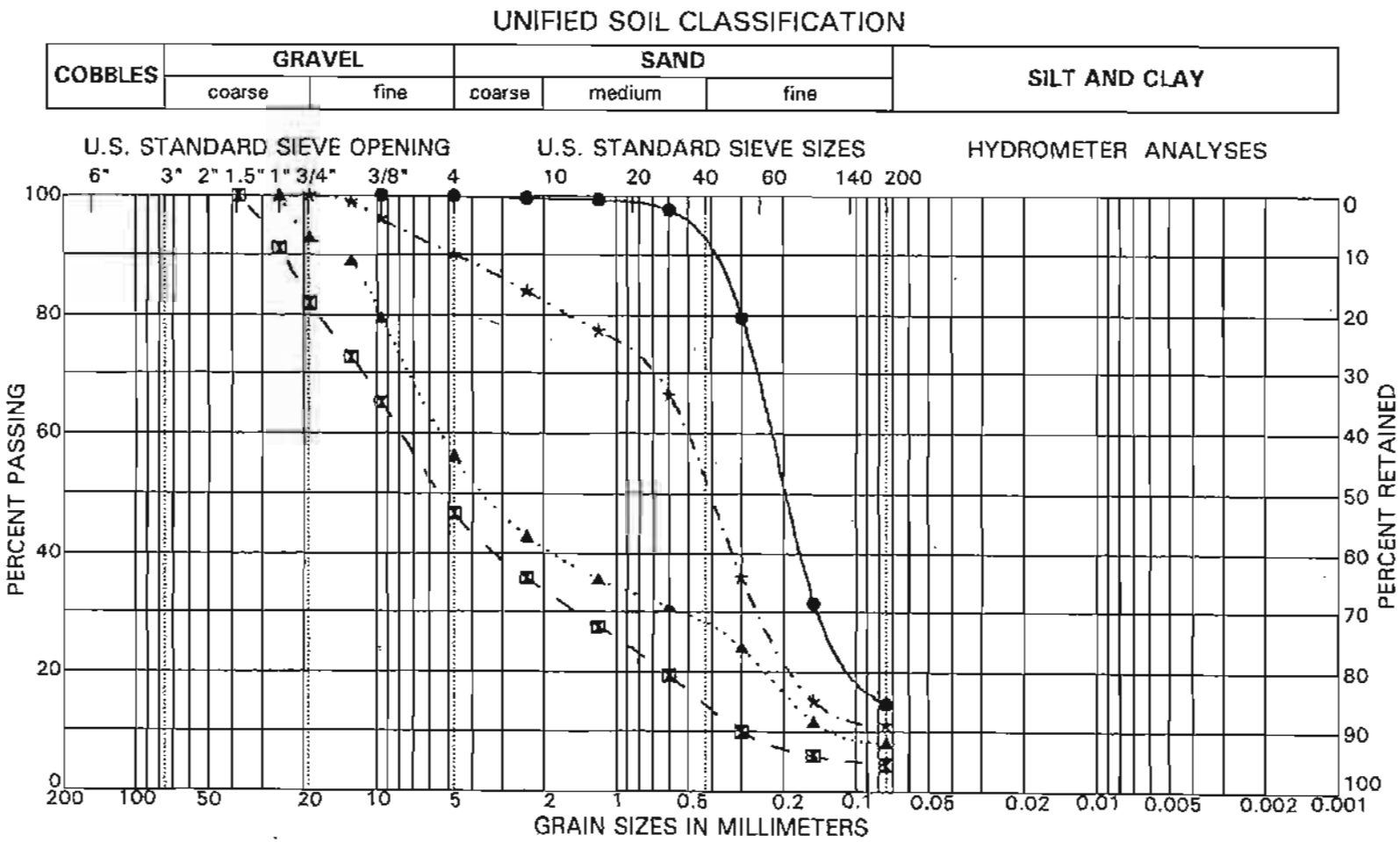
URS

PROJECT NO. 28649821

Figure: B-17

Project : CA CENTER FOR HEALTH CARE
Project No. 28649821

GRAIN SIZE DISTRIBUTION CURVES



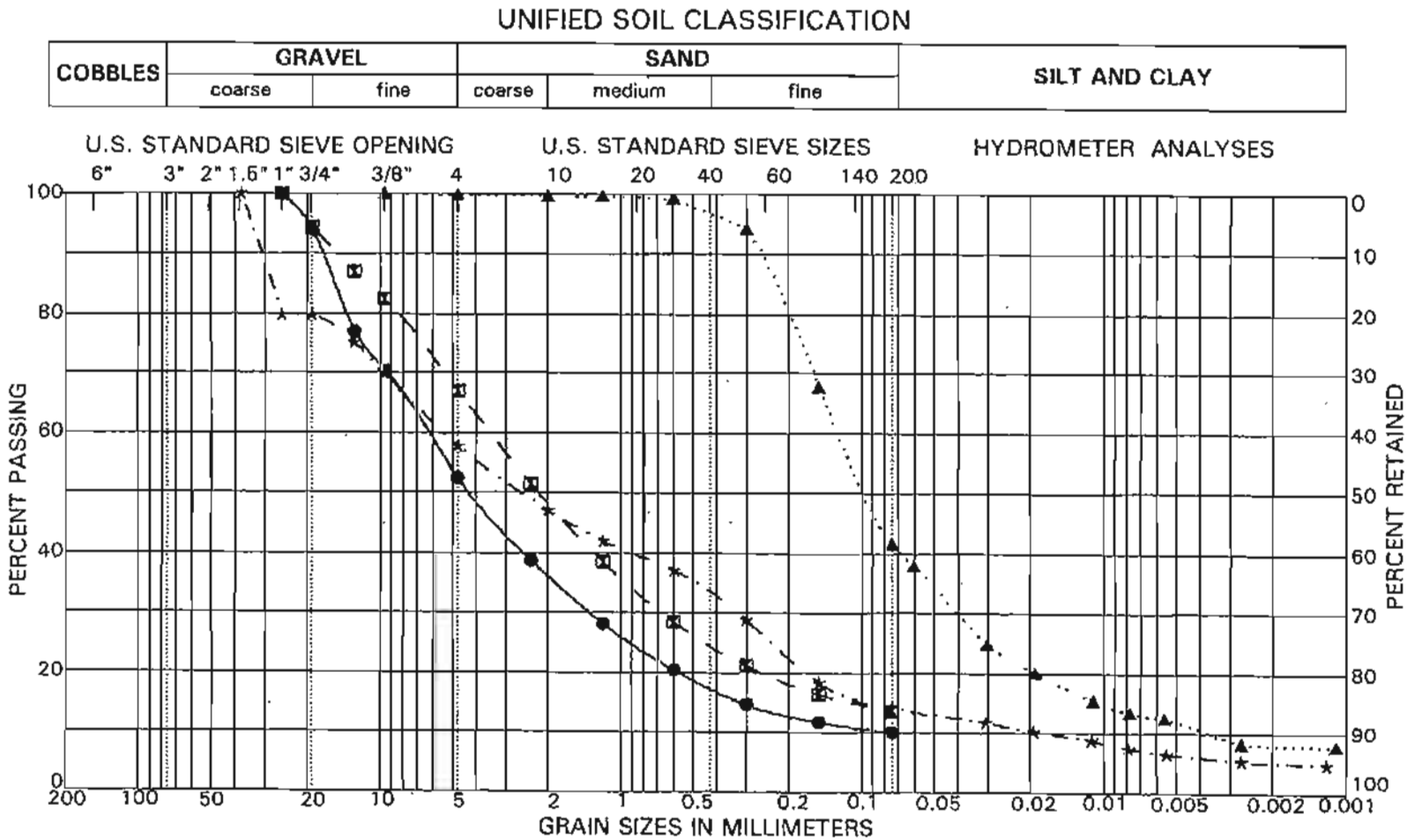
Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
1	2	4	●			Silty SAND (SM)
1	6	14	⊠			Poorly graded GRAVEL (GP) with sand
1	9	28	▲			Poorly graded SAND (SP-SM) with silt and gravel
11	10	34	★			Well-graded SAND (SW-SM) with silt

Fig. B-18

URS

Project : CA CENTER FOR HEALTH CARE
Project No. 28649821

GRAIN SIZE DISTRIBUTION CURVES



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
12	9	29	●			Poorly graded GRAVEL (GP-GC) with clay and sand
13A	3	29	⊠			Clayey SAND (SC) with gravel
3	1	2	▲			Silty SAND (SM)
4	9	29	★			Silty SAND (SM) with gravel

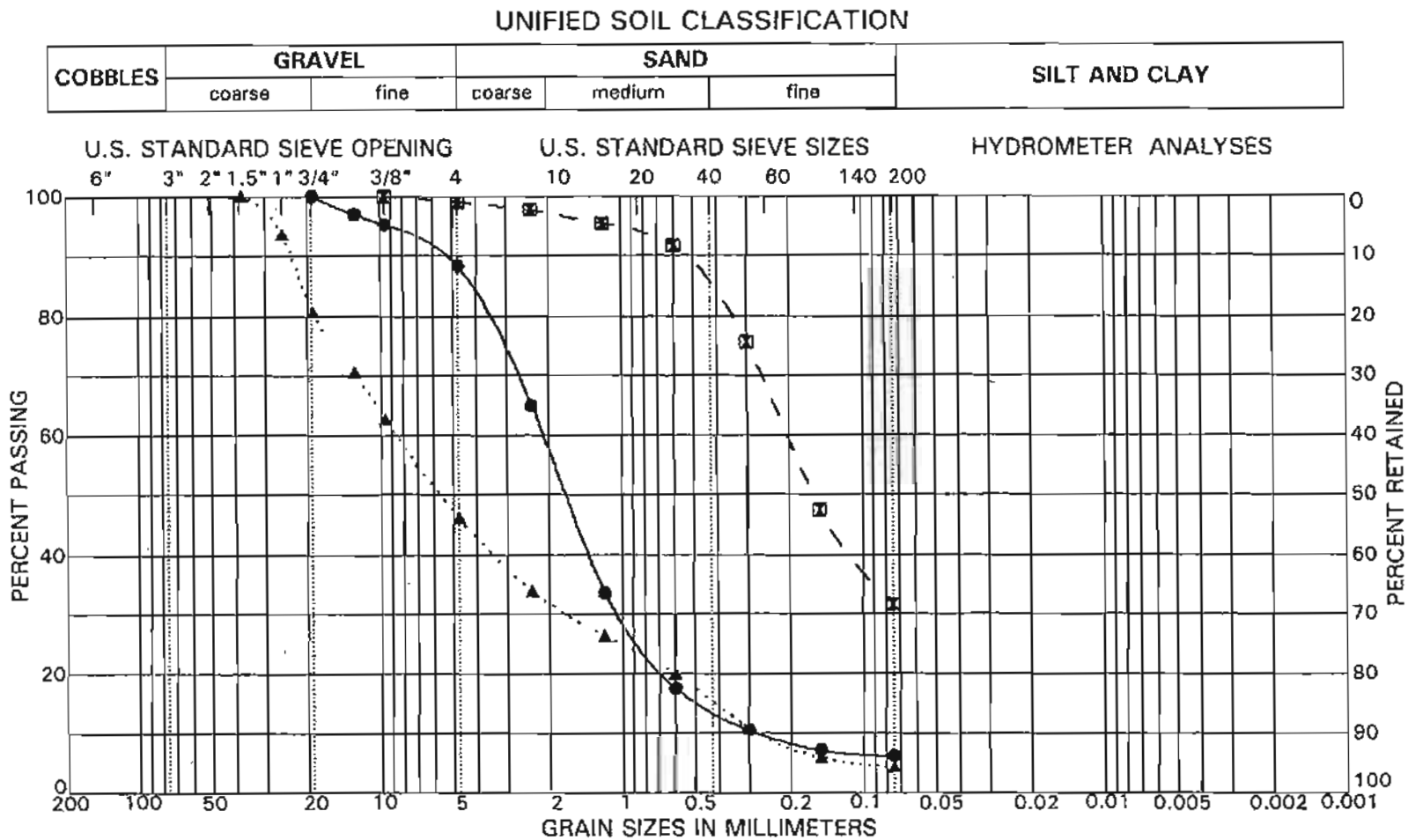
Fig. B-19

URS

2/8/07 JSieve 9821E

Project : CA CENTER FOR HEALTH CARE
Project No. 28649821

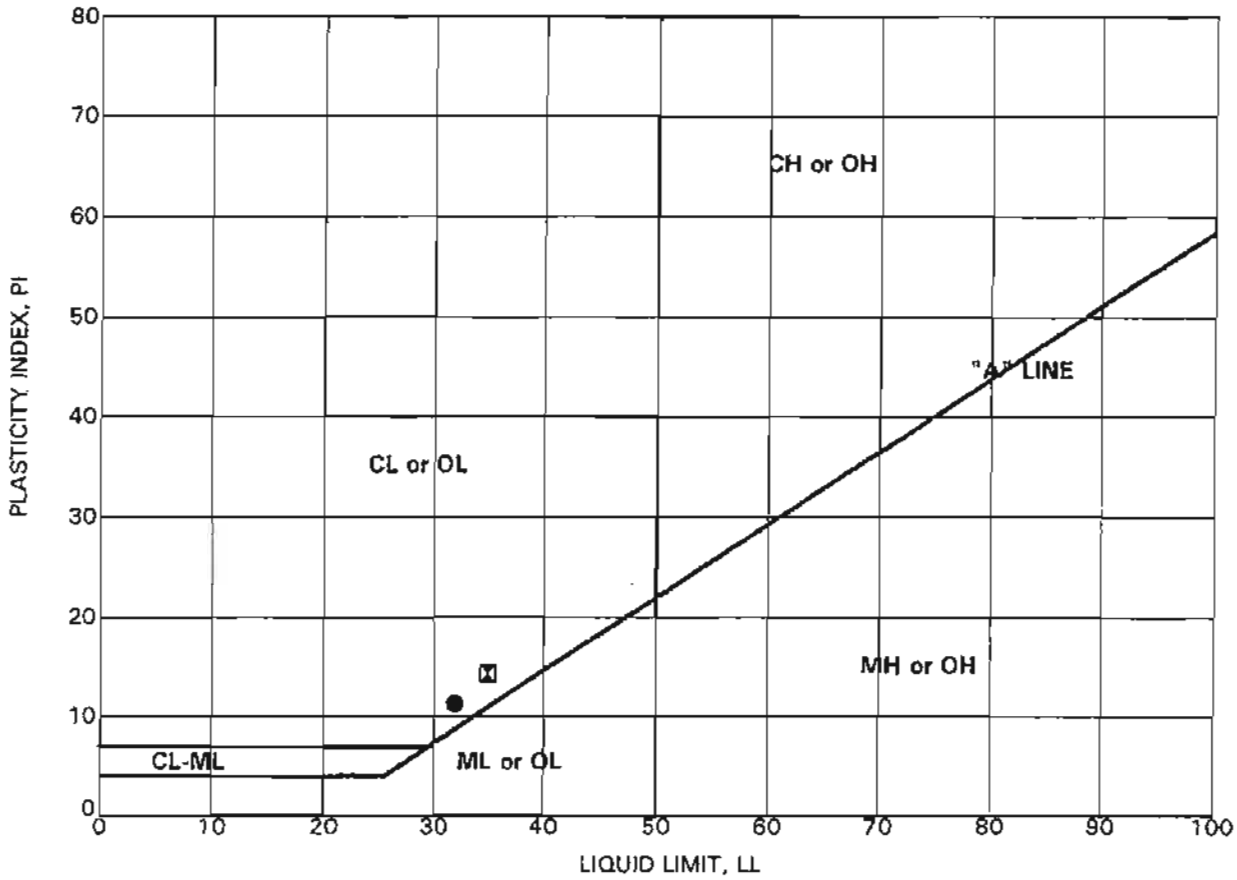
GRAIN SIZE DISTRIBUTION CURVES



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
6	7	29	●			Well-graded SAND (SW-SM) with silt
7	4	8	⊠			Silty SAND (SM)
7	6	14	▲			Well-graded GRAVEL (GW) with sand

Fig. B-20

URS



Boring Number	Sample Number	Depth (feet)	Test Symbol	Moisture Content (%)	LL	PL	PI	Description
10	1	1	●	10	32	21	11	Lean CLAY (CL)
9	1	2	⊠	11	35	21	14	Lean CLAY (CL)

Project: CA CENTER FOR HEALTH CARE
Project Number: 28649821

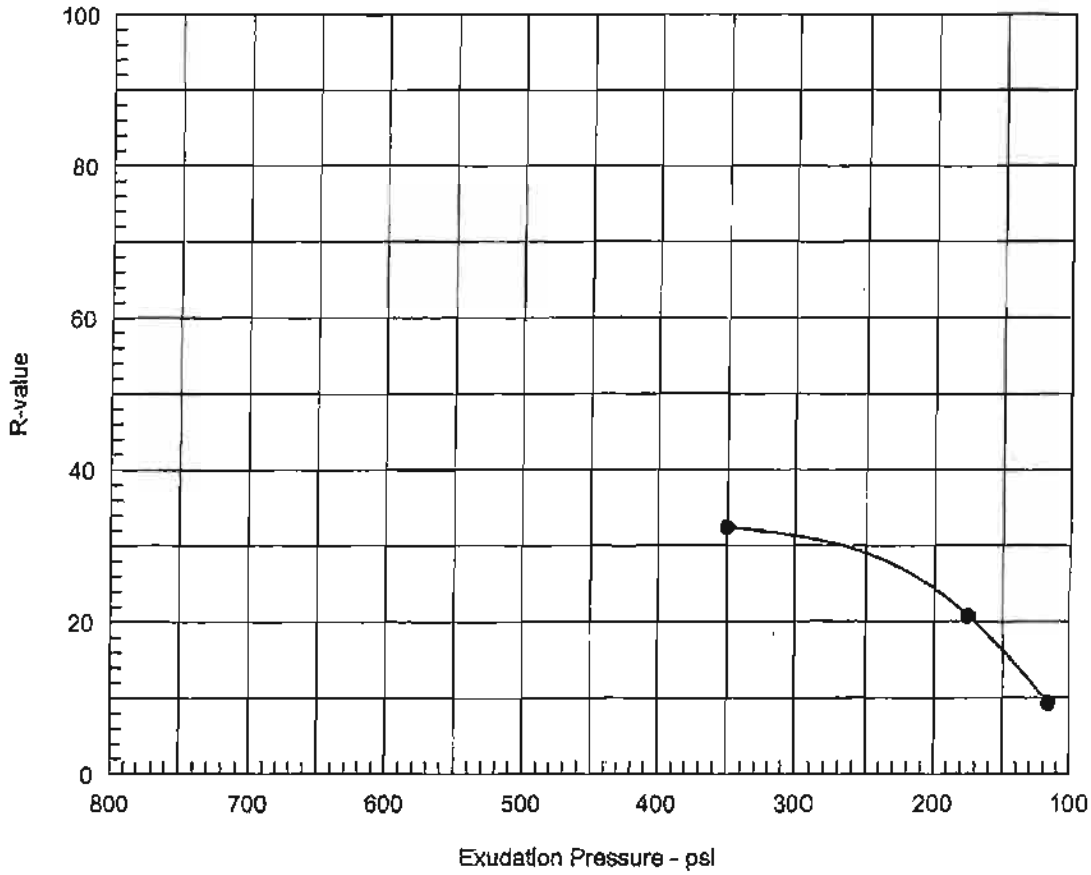
PLASTICITY CHART

Figure B-21

2/5/07 JATTH 98219

URS

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	35	118.4	13.6	0.00	132	2.49	116	9	9
2	145	123.1	11.9	0.00	81	2.39	350	35	32
3	70	120.0	12.7	0.00	106	2.52	175	21	21

Test Results	Material Description
R-value at 300 psi exudation pressure = 31	North End - Gray brown gravelly clayey sandy silt

Project No.: 28649821.00002
Project: Silver Creek Medical
Source of Sample: 12-22-06
Sample Number: 1
Date: 1/3/2007

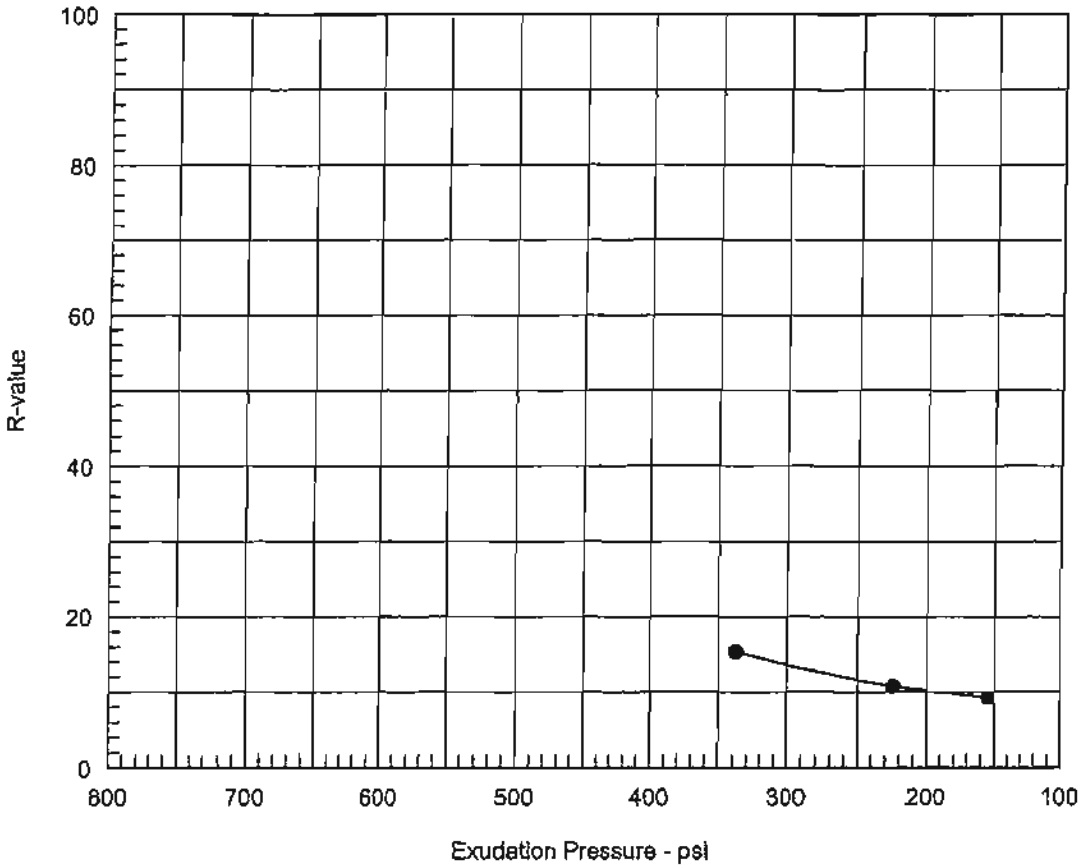
Tested by:
Checked by:
Remarks:

R-VALUE TEST REPORT

SIGNET TESTING LABS, INC.

Figure B-22

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	50	107.3	18.8	0.00	136	2.68	154	8	9
2	95	108.7	18.0	0.61	124	2.60	337	14	15
3	65	107.8	18.4	0.24	132	2.67	224	10	11

Test Results	Material Description
R-value at 300 psi exudation pressure = 14	South End - Dark brown silty clay

Project No.: 28649821.00002
Project: Silver Creek Medical
Source of Sample: 12-22-06
Sample Number: 3
Date: 1/3/2007

Tested by:
Checked by:
Remarks:

R-VALUE TEST REPORT

SIGNET TESTING LABS, INC.

Figure B-23

LIQUEFACTION ANALYSIS

Project: CA Center for Health Care
Project No: 2[illegible]
Boring No: B1

PGA = 0.54
M_w = 6.8
SPT using EQ = 11.2 %
Sampler: Spoons, Cor. Factor
SS: S 1
Hammer: M 0.8
Calibrate: C 0.7
M_w, Weighted Average Correction = 0.75

Note: F.S. [illegible] 1 is set to be equal to 2

Layer Number	Soil Type (USCS)	γ_m pcf	At Bottom of Layer: Depth ft	Depth m	At Center of Layer: Depth ft	Depth m	σ_v psf	u psf	σ'_v psf	r_d	EQ CSR	N raw	Sampler	N SPT	Fines Content %	N_{meas} FC= 5%	C_N EQ	C_R	C_B	C_S	C_E	$N_{1,60,cs}$ Sampling EQ	$CSR_{7.5}$ Sampling EQ	Magnitude Scaling Factor K_M NCEER Lower	Upper	Middle	Overburden Correction K_σ	Above GW?	$N_{1,60,cs}$ NCEER	Liquefy? NCEER	F.S.#1.2
1	ML	100	[illegible]	0.61	1	0.30	100	0	100	1.000	0.361	14	M	11.2	[illegible]	[illegible]	2.00	1.16	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.38	[illegible]	1.000	Y	2.00	N	1.2
2	SM	101	8.5	2.59	9.5	1.80	928	0	928	[illegible]	0.347	13	M	10.4	13	13.4	2.00	1.16	1.00	0.75	[illegible]	[illegible]	0.257	1.25	1.38	[illegible]	1.000	Y	2.00	N	[illegible]
3	SM	106	10.5	3.20	9.5	2.90	992	0	992	[illegible]	0.344	16	M	12.8	5	12.8	1.48	1.16	1.00	0.75	[illegible]	[illegible]	[illegible]	1.25	1.38	[illegible]	1.000	Y	2.00	N	1.2
4	SM	102	12.0	3.66	11.3	3.43	1,143	0	1,143	0.970	0.343	40	M	32	20	38.2	1.36	1.16	1.00	0.75	[illegible]	[illegible]	[illegible]	1.25	1.38	[illegible]	1.000	Y	2.00	N	1.2
5	SP	115	21.0	6.40	16.5	5.03	1,751	0	1,751	[illegible]	0.339	46	M	36.8	5	38.8	1.10	1.16	1.00	0.75	[illegible]	[illegible]	[illegible]	1.25	1.38	[illegible]	1.000	Y	2.00	N	[illegible]
6	SP	116	26.0	7.92	23.0	7.01	2,518	0	2,518	[illegible]	0.333	98	M	78.4	6	82.5	0.87	1.16	1.00	0.75	[illegible]	[illegible]	[illegible]	1.25	1.38	[illegible]	0.974	N	[illegible]	N	1.2
7	SP-SM	144	30.0	9.14	27.5	8.38	2,930	0	2,930	0.932	0.327	41	M	32.8	8	33.3	0.85	1.16	1.00	0.75	[illegible]	[illegible]	[illegible]	1.25	1.38	[illegible]	0.950	N	[illegible]	Liquefy	1.2
8	SP-SM	135	40.5	12.34	35.3	10.74	4,280	380	3,899	0.890	0.343	75	M	60	8	61.1	0.74	1.16	1.00	0.75	[illegible]	[illegible]	[illegible]	1.25	1.38	[illegible]	0.898	N	[illegible]	N	1.2
9	SP-SM	155	45.0	13.72	42.4	13.03	5,289	858	4,441	0.836	[illegible]	73	M	58.4	12	81.8	0.69	1.16	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.38	[illegible]	0.872	N	[illegible]	N	1.2

Layer Number	Depth to Bot. Layer ft	Thickness ft	σ_v psf	u psf	σ'_v psf	r_d	[illegible]	Liquefy? NCEER	τ_{av} psf	$CSR_{eq,s}$ τ_{av}/σ'_v	[illegible]	Volumetric Strain** %	[illegible]	Settl. in
1	2.0	2.0	100	0	100	1.000	[illegible]	N	35.1	0.351	[illegible]	0.0	[illegible]	0.00
2	8.5	6.5	528	0	528	0.990	[illegible]	N	183.5	0.347	[illegible]	0.0	[illegible]	0.00
3	10.5	2.0	992	0	992	0.960	[illegible]	N	330.8	0.344	[illegible]	0.0	[illegible]	0.00
4	12.0	1.5	1,143	0	1,143	0.970	[illegible]	N	391.8	0.343	[illegible]	0.0	[illegible]	0.00
5	21.0	9.0	1,751	0	1,751	0.906	[illegible]	N	593.1	0.339	[illegible]	0.0	[illegible]	0.00
6	30.0	9.0	2,930	0	2,930	0.832	[illegible]	Liquef	958.8	0.327	[illegible]	0.2	[illegible]	0.16
7	40.5	10.5	4,280	380	3,899	0.869	[illegible]	N	1337.5	0.343	[illegible]	0.0	[illegible]	0.00
8	45.0	4.5	5,289	850	4,441	0.836	[illegible]	N	1626.7	0.346	[illegible]	0.0	[illegible]	0.00

Total Settlement (inch) = 0.16

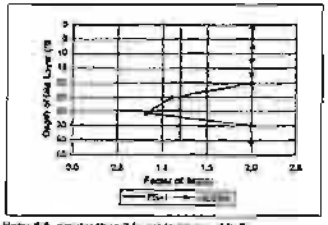
* Note: [illegible] CSR_{eq} is not used to compute F_{liq} (see Table Dan 30). Accordingly, in NCEER 1997 [illegible] F_{liq} [illegible]
** Note: [illegible] Ishihara and Yoshimine, 1992 [illegible]
See figure 4.10 [illegible] Geotechnical Engineering, 3rd Edition

LIQUEFACTION ANALYSIS

Project: CA Center for Health Care
Project No.: 280A8621
Boring No.: B4

PGA = 0.64
M_w = 6.0
GWT during ED: 20.0 ft

Sampler	Symbol	Corr. Factor
SPT	S	1
Mod.Cal	M	0.8
California	C	0.7
Mag Weighting Factor(Liquefaction)		0.75



Note: F.S. greater than 2 is set to be equal to 2

Layer Number	Soil Type	N_{60}	At Bottom of Layer: Depth (ft)		At Center of Layer: Depth (ft)		γ_d (pcf)	γ_m (pcf)	σ_v (psf)	σ'_v (psf)	r_d	$CSR_{7.5}$	K_{sigma}	C_N	$N_{1(60)}$	$N_{1(60)cs}$	C_R	C_S	C_B	C_E	C_D	C_N	$CRR_{7.5}$	$CSR_{7.5}$	Magnitude Scaling Factor K_M Lower	Upper	Middle	Overburden Correction K_σ	Seismic GWT	Liquefy?	F.S.
1	ML	33	2.5	2.75	1.25	2.58	110	0	110	0.999	0.999	6	M	4.8	33	10.6	0.75	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	1.000	Y	[illegible]	N	1.2
2	SP-SM	40	5.5	5.25	4.5	5.25	100	0	100	[illegible]	[illegible]	10	M	9	9	9.8	0.85	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	1.000	Y	[illegible]	N	1.2
3	ML	110	8.5	8.25	8.5	8.25	100	0	100	[illegible]	[illegible]	11	M	13.5	30	31.2	1.00	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	1.000	Y	[illegible]	N	1.2
4	SP	110	10.5	10.25	10.5	10.25	120	0	120	[illegible]	[illegible]	30	M	24	9	24.2	1.20	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	1.000	Y	[illegible]	N	1.2
5	SC	118	13.5	13.25	13.5	13.25	127	0	127	[illegible]	[illegible]	30	M	30.6	15	33.1	1.30	1.15	1.00	0.75	1.00	[illegible]	0.458	1.25	1.35	[illegible]	1.000	Y	[illegible]	N	1.2
6	SC	122	15.5	15.25	15.5	15.25	130	0	130	0.996	[illegible]	29	M	28.2	15	30.6	0.87	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	0.991	N	[illegible]	N	1.2
7	SC	120	18.5	18.25	18.5	18.25	135	0	135	0.991	[illegible]	30	M	28.6	15	30.8	0.85	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	0.988	N	[illegible]	N	1.2
8	SC	120	20.5	20.25	20.5	20.25	140	0	140	0.987	0.977	33	M	28.4	15	30.6	0.80	1.15	1.00	0.75	1.00	[illegible]	0.228	1.25	1.35	[illegible]	0.985	N	[illegible]	N	1.2
9	SC	114	23.5	23.25	23.5	23.25	145	455	3.341	0.961	[illegible]	47	M	18.8	15	20.2	0.77	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	[illegible]	N	[illegible]	N	1.2
10	SC	106	25.5	25.25	25.5	25.25	150	511	3.691	0.941	[illegible]	50	M	16	15	18.2	0.73	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.25	1.35	[illegible]	[illegible]	N	[illegible]	N	1.2

Layer Number	Depth to Bot. Layer (ft)	Thickness (ft)	γ_d (pcf)	γ_m (pcf)	σ_v (psf)	r_d	$CSR_{7.5}$	Liquefy? NCEER	$N_{1(60)cs}$	$CRR_{7.5}$	Volumetric Strain** ε_v (%)	Settl. (in)
1	2.5	2.5	110	0	138	[illegible]	[illegible]	N	45.6	[illegible]	0.0	0.00
2	7.5	5.0	100	0	425	[illegible]	[illegible]	N	19.3	[illegible]	0.0	0.00
3	9.5	2.0	100	0	525	[illegible]	[illegible]	N	17.6	0.341	0.0	0.00
4	12.5	3.0	120	0	675	[illegible]	[illegible]	N	24.1	0.341	0.0	0.00
5	15.5	3.0	127	0	825	[illegible]	[illegible]	N	33.1	0.330	0.0	0.00
6	18.5	3.0	130	0	975	[illegible]	[illegible]	N	30.6	[illegible]	0.0	0.00
7	21.5	3.0	135	0	1,125	0.941	[illegible]	Liquef	30.8	0.101	0.1	0.00
8	24.5	3.0	140	205	1,275	0.911	[illegible]	Liquef	30.6	[illegible]	0.1	0.00
9	27.5	3.0	145	455	1,425	0.881	[illegible]	N	20.2	[illegible]	0.0	0.00
10	34.0	7.0	150	511	1,661	0.841	[illegible]	N	18.2	0.304	0.0	0.00

Total Settlement (inch) = 0.07

* Note: The equation used to obtain $CRR_{7.5}$ is not valid for corrected $(N_1)_{60}$ higher than 36. According to NCEER 1997, the soil layer with corrected $(N_1)_{60}$ higher than 36 blows per foot is unlikely to be susceptible to liquefaction.

** Note: These values were obtained from a chart for estimation of volumetric strain in saturated sands based on a cyclic stress ratio and standard penetration resistance (Tokimatsu and Seed, 1987).

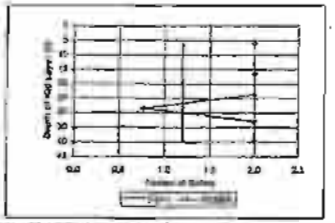
See figure 4.33 from "Geotechnical Earthquake Engineering" by K. Kramer.

LIQUEFACTION ANALYSIS

Project: CA Center for Health Care
Project No.: 25040821
Boring No.: B6

PGA = 0.64
M_w = 6.0
GWT during EQ: 20.0 ft

Sampler	Symbol	Corr. Factor
SPT	S	1
Hand Cal	H	0.8
California	C	0.7
Map Weighing		0.75



Note: F.S. greater than 2 is set to be equal to 2

Layer Number	Soil Type (USCS)	γ_w pcf	At Bottom of Layer Depth ft	Depth m	At Center of Layer Depth ft	Depth m	σ_v psf	u psf	σ'_v psf	r_d	EQ CSR*
1	ML	104	12.0	3.66	6	1.83	624	0	624	0.996	0.347
2	SP	116	21.0	6.40	16.5	5.03	1,756	0	1,756	0.995	0.339
3	SC	116	26.0	7.92	23.5	7.16	2,573	0	2,573	0.947	0.332
4	SP	116	31.0	9.45	28.5	8.69	3,156	0	3,156	0.928	0.326
5	SC	116	36.0	10.97	33.0	10.06	3,889	250	3,439	0.904	0.340
6	SC	116	44.0	13.41	39.5	12.04	4,456	855	3,601	0.895	[illegible]

Layer Number	N raw	Sampler	N SPT	Fines Content %	N $_{60}$ FC < 5%	C_N EQ	C_E	C_B	C_{RS}	C_R	N $_{1,60}$ Rucking EQ	CRR $_{7.5,1}$ Critical
1	6	H	8.4	55	12.7	1.64	1.16	1.00	0.75	1.00	[illegible]	0.220
2	33	H	28	6	29.9	1.09	1.16	1.00	0.75	1.00	[illegible]	0.135
3	62	H	41.6	15	48.1	0.81	1.16	1.00	0.75	1.00	[illegible]	[illegible]
4	33	H	28.4	5	28.4	0.82	1.16	1.00	0.75	1.00	[illegible]	[illegible]
5	50	H	48	15	52.9	0.78	1.16	1.00	0.75	1.00	[illegible]	0.456
6	60	S	55	15	61.6	0.75	1.16	1.00	0.75	1.00	[illegible]	[illegible]

Layer Number	Magnitude Scaling Factor NCEER K_M Lower	Upper	Middle	Overburden Correction K_σ	Above GWT	[illegible] NCEER	Liquefy ? NCEER	F.S.<1.2
1	1.25	1.38	[illegible]	1.000	Y	[illegible]	N	1.2
2	1.25	1.38	[illegible]	1.000	Y	[illegible]	N	1.2
3	1.25	1.38	[illegible]	0.970	N	>2.00	N	1.2
4	1.25	1.38	[illegible]	0.937	N	0.78	Liquef.	1.2
5	1.25	1.38	[illegible]	0.922	N	>2.00	N	1.2
6	1.25	1.38	[illegible]	0.903	N	[illegible]	N	1.2

Layer Number	Depth to Bot. Layer ft	Thickness ft	σ_v psf	u psf	σ'_v psf	r_d	CSR	Liquefy ? NCEER	τ_{av} psf	$CSR_{M=7.5}$	$CSR^*_{M=7.5}$	Volumetric Strain** %	Settl. in
1	12.0	12.0	624	0	624	0.996	[illegible]	N	216.4	0.347	[illegible]	0.0	0.00
2	21.0	9.0	1,756	0	1,756	0.995	[illegible]	N	595.2	0.339	[illegible]	0.0	0.00
3	26.0	5.0	2,573	0	2,573	0.947	[illegible]	N	655.1	0.332	[illegible]	0.0	0.00
4	31.0	5.0	3,156	0	3,156	0.928	[illegible]	Liquef	1028.4	0.326	[illegible]	1.3	0.78
5	36.0	4.0	3,889	250	3,439	0.904	[illegible]	N	1170.2	0.340	[illegible]	0.0	0.00
6	44.0	8.0	4,456	855	3,601	0.895	[illegible]	N	1337.5	[illegible]	[illegible]	0.0	0.00

Total Settlement (mm) = 6.35

* [illegible] $CSR_{M=7.5}$ is revised for corrected [illegible] from Seed. According to [illegible] layer with corrected [illegible] more than 30 does not lead to liquefaction or significant magnitude of settlement.

** [illegible] were derived from a chart for estimation of [illegible] Seed and Idriss [illegible] 1982.

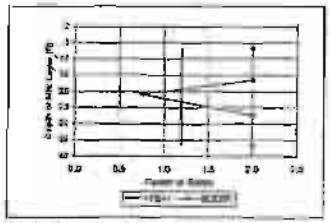
Reference: 5.31 from "Geotechnical Earthquake Engineering" by S. Kramer.

LIQUEFACTION ANALYSIS

Project: CA Center for Health Care
Project No.: 28649021
Boring No.: B13

PGA = 0.54
M_w = 6.8
GWT during EQ: 15 ft

Sampler	Symbol	Corr. Factor
SPT	S	1
Mod.Cal	M	0.8
California	C	0.7
Mod. Wagner Factors(C_{BR})		0.75



Note: F.S. greater than 2 is set to be equal to 2

Layer Number	Soil Type (USCS)	γ_m pcf	Depth ft	Depth m	σ_{vo} psf	σ'_{vo} psf	C_N	Q	r_d	Blows	Sampler	N SPT	Fines Content %	N_{60} FC< 5%	C_{60} EQ	C_b	C_R	C_S	C_E	$(N_1)_{60}$ during EQ	$(N_1)_{60}$ Lower	K_σ Lower	K_σ Upper	K_σ Middle	K_σ	Above GWT	T_{15} NCEER	Liquefy ? NCEER	F.S=1.2
1	SM	110	1.5	0.46	165	165	1.7	8	0.99	4	M	3.2	22	7.4	1.77	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.26	1.38	[illegible]	1.000	Y	>2.00	N	1.2
2	SP	110	10.5	3.04	1,155	1,155	1.1	5	0.93	11	M	21.6	3	21.6	1.11	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.26	1.38	[illegible]	1.000	Y	>2.00	N	1.2
3	SP	110	20.5	6.13	2,255	2,255	0.8	3	0.87	22	M	35.6	3	25.6	0.84	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.26	1.38	[illegible]	0.946	N	[illegible]	[illegible]	1.2
4	SC	120	25.5	10.36	3,060	2,060	0.7	3	0.81	30	S	30	15	40.2	0.66	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.26	1.38	[illegible]	0.865	N	[illegible]	N	1.2
5	SC	110	40.0	12.19	3,600	2,600	0.6	2	0.68	31	M	19.2	65	25.0	0.73	1.15	1.00	0.75	1.00	[illegible]	[illegible]	1.26	1.38	[illegible]	0.818	N	[illegible]	N	1.2

Layer Number	Depth to Bot. Layer ft	Thickness ft	σ_{vo} psf	u psf	σ'_{vo} psf	r_d	CSR	Liquefy ? CSR	γ_{eq} pcf	$\Delta\sigma_{vo}$ psf/σ'_{vo}	Settlement in	Sum in
1	10.5	10.5	875	0	875	0.98	[illegible]	N	[illegible]	0.48	0.00	0.00
2	20.5	10.0	1,700	0	1,700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00	0.00
3	25.0	4.5	[illegible]	31	[illegible]	[illegible]	[illegible]	Liquef.	[illegible]	[illegible]	0.35	0.35
4	30.0	10.0	[illegible]	31	[illegible]	[illegible]	[illegible]	N	[illegible]	[illegible]	0.00	0.00
5	40.0	10.0	[illegible]	98	[illegible]	[illegible]	[illegible]	[illegible]	125.0	[illegible]	[illegible]	0.00

Total Settlement (cm) = 0.37

* Note: The equation used to calculate $CRR_{7.5}$ is not valid for corrected $(N_1)_{60}$ higher than 30. According to NCEER 1997, the soil layer with corrected $(N_1)_{60}$ higher than 30 blows per foot is unlikely or inappropriate to liquefaction.
** Note: These values were obtained from a chart for estimation of volumetric strain in saturated sands based on a cyclic stress ratio and standard penetration resistance (Tokimatsu and Seed, 1987).
See figure 8.43 from "Geotechnical Earthquake Engineering" by S. Kramer.

URS

Job CCHC - Hospital Building	Project No. 28649881	Page ___ of ___	
Description Estimate Settlement of	Computed by A.M. MOORE	Sheet 1 of 4	Date 1/18/07
Unsaturated Sand During Earthquake	Checked by P. Boddie		Date 1/26/07

Reference

1. References: "Evaluation of Settlements in Sands Due to Earthquake Shaking," ASCE Journal of Geotechnical Engineering, August 1987, Volume 113 No 8, by Kohji Tokimatsu and H. Bolton Seed.
2. "Ground Motions and Soil Liquefaction During Earthquakes", Earthquake Engineering Research Institute, 1982, H. Bolton Seed and I.M. Idriss.

Subsurface Exploration and Conditions

Borings 4, 6, 7, 10, 11, 12, 13 (URS 2006) encountered loose to medium dense sands and silty sands above design GWT at 20 feet.

CPTs 1 through 8 (Lowney 2001); $N_{eq} \leq 30$ bpf generally to depth of 9 to 13 feet. Below 9 to 13 ft, $N_{eq} \geq 30$ bpf.

Boring EB1 - EB5 (Lowney 2001), typically characterize upper 12 ft of profile as clayey sand, except EB-5 which is called SP-SM @ 10' w/ N_{meas} = 14 bpf

Liquefaction Analysis includes soils below 20 feet BGS. Since we recommended building pad be overexcavated to 7' with an additional 1 ft of subgrade compaction, assume potential seismic settlements in upper 8 feet of profile will be mitigated. In addition, based on insitu testing with CPT, the soil profile below 13 feet has $N_{eq} > 30$ so also not considered subject to seismic settlement.

Therefore, considers soil profile between 8 and 13 feet as potentially subject to seismic settlement.

Look at seismic settlement for CT 3 — N_{eq} = 10 for 8 to 12 feet - worst case
CT 4 — N_{eq} = 10 from 8 to 10, N_{eq} = 15 from 10 to 13

URS

Job CCMC	Project No. 28649821	Page ___ of ___	
Description Unsat. Soil Settlement	Computed by A. M. Moore	Sheet 2 of 4	Date 1-18-07
	Checked by P. Boothe		Date 1/26/07

Reference

Evaluate Settlement at CT3 $N_{eq} = 10 = N_{160}$, Thickness = 4 ft

Estimate σ_o' at center of layer at 10' = (10 ft)(125 pcf) = 1250 psf (engineered fill)

$\sigma_m' = 0.65\,\sigma_o' = (1250)(0.65) = 813$ psf

From reference 1 compute $G_{max} = 20\,(N_{160})^{1/3} \cdot (\sigma_m')^{1/2} \cdot 1000$

$= 20(10)^{1/3} \cdot (813)^{1/2} \cdot 1000$

$= 122765$ psf $= 1.23 \times 10^6$ psf

$$\gamma_{eff}\left(\frac{G_{eff}}{G_{max}}\right) = \frac{0.65\,(a_{max})(\sigma_o)(r_d)}{g\,(G_{max})}$$; $r_d \sim 0.98$ @ 10 ft from attached Figure 4c (Ref. #2)

Use $a_{max} = 0.54g$ for 6.8 event on Monk Vista Shannon Fault

$$\therefore = \frac{0.65\,(0.54g)(1250)(0.98)}{g\,(1.23 \times 10^6)} = 3.50 \times 10^{-4}$$

Determine γ_{eff} from attached Figure A-3 for $\sigma_m' = 813$ psf $= 0.4$ tsf

$\gamma_{eff} \sim 2.5 \times 10^{-3} = 2.5 \times 10^{-1}$ %

Determine Volumetric Strain from Figure A-4 for $N_1 = 10$, $\gamma_{eff} = 2.5 \times 10^{-1}$ %

$\epsilon_c = .6 \times 10^{-1}$ % $= 6 \times 10^{-3}$

Now correct this strain for Earthquake Magnitude of 6.8
From Figure A-5, use correction factor of 0.85

so $\epsilon_c = (6 \times 10^{-3})(0.85)$

Then double ϵ_c to account for multidirectional effects

$\therefore$ Settlement in CPT3 $= 2 \cdot (4\text{ ft})(12\text{ in/ft})(6 \times 10^{-3})(0.85) = 0.49$ in

say 1/2 inch

URS

Job: CCHC | Project No. 28649821 | Page ___ of ___
Sheet 3 of 4
Description: Unsat Soil Settlement | Computed by: A.M. Moore | Date: 1-18-07
Checked by: P. Bodbie | Date: 1/27/07
Reference

Evaluate Settlement in CT4, 2 layers

Layer 1 8-10 ft ; Layer 2 10-13 ft
$N_1 = 10$ $N_1 = 15$

Layer 1: $\sigma_o' = 9(125) = 1125$ psf ; $\sigma_m' = 0.65(1125) = 730$ psf $= 0.37$ tsf

$$G_{max} = 20(N_{eq})^{1/3} \cdot (\sigma_m')^{1/2} \cdot 1000 = 1.16 \times 10^6 \text{ psf}$$

$$\gamma_{eff}\left(\frac{G_{eff}}{G_{max}}\right) = \frac{0.65(0.54g)(1125)(0.98)}{g\ 1.16\times10^6} = 3.3\times10^{-4}$$

Determine γ_{eff} from A-3

$$\gamma_{eff} = 2.6\times10^{-3}$$

Determine ϵ_c from A-4 for $N_1 = 10$, $\gamma_{eff} = 2.6\times10^{-1}$ %

$$\epsilon_c \sim 6\times10^{-1}\ \%$$

Correct for May 6.8 EQ and double for multidirectional effects

$$\therefore \rho_{①} = 2(2\text{ft})(12\text{in/ft})(6\times10^{-3})(0.85) = \underline{0.25\text{ in}}$$

Layer 2: $\sigma_o' = 11.5(125) = 1440$ psf ; $\sigma_m' = 0.65(1440) = 935$ psf $= 0.47$ tsf

$$G_{max} = 20(15)^{1/3} \cdot (935)^{1/2} \cdot 1000 = 1.51\times10^6 \text{ psf}$$

$$\gamma_{eff}\left(\frac{G_{eff}}{G_{max}}\right) = \frac{(0.65)(0.54)(1440)(0.98)}{1.51\times10^6} = 3.3\times10^{-4}$$

Determine γ_{eff} from A-3

$$\gamma_{eff} = 1.3\times10^{-3}$$

Determine ϵ_c from A-4 for $N_{eq} = 15$, $\gamma_{eff} = 1.3\times10^{-3} = 1.3\times10^{-1}$ %

$$\epsilon_c \sim 2\times10^{-1}\ \%$$

Correct for May 6.8 EQ and double

$$\therefore \rho_{②} = (2)(3\text{ft})(12\text{in/ft})(2\times10^{-3})(0.85) = 0.12\text{ in}$$

URS

Job CCHL	Project No. 28649821	Page ___ of ___	Sheet 4 of 4
Description Unsat. Sand Settlement	Computed by A.M. Moore	Date 1-18-07	
	Checked by P. Boddie	Date 1/26/07	

Reference

Total settlement CT4 8-13 ft

$0.25 + 0.12 = 0.37$ in $< 1/2$"

⇒ ∴ Estimate seismic settlement of unsaturated sands from 8-13 feet BGS of $< 1/2$ inch

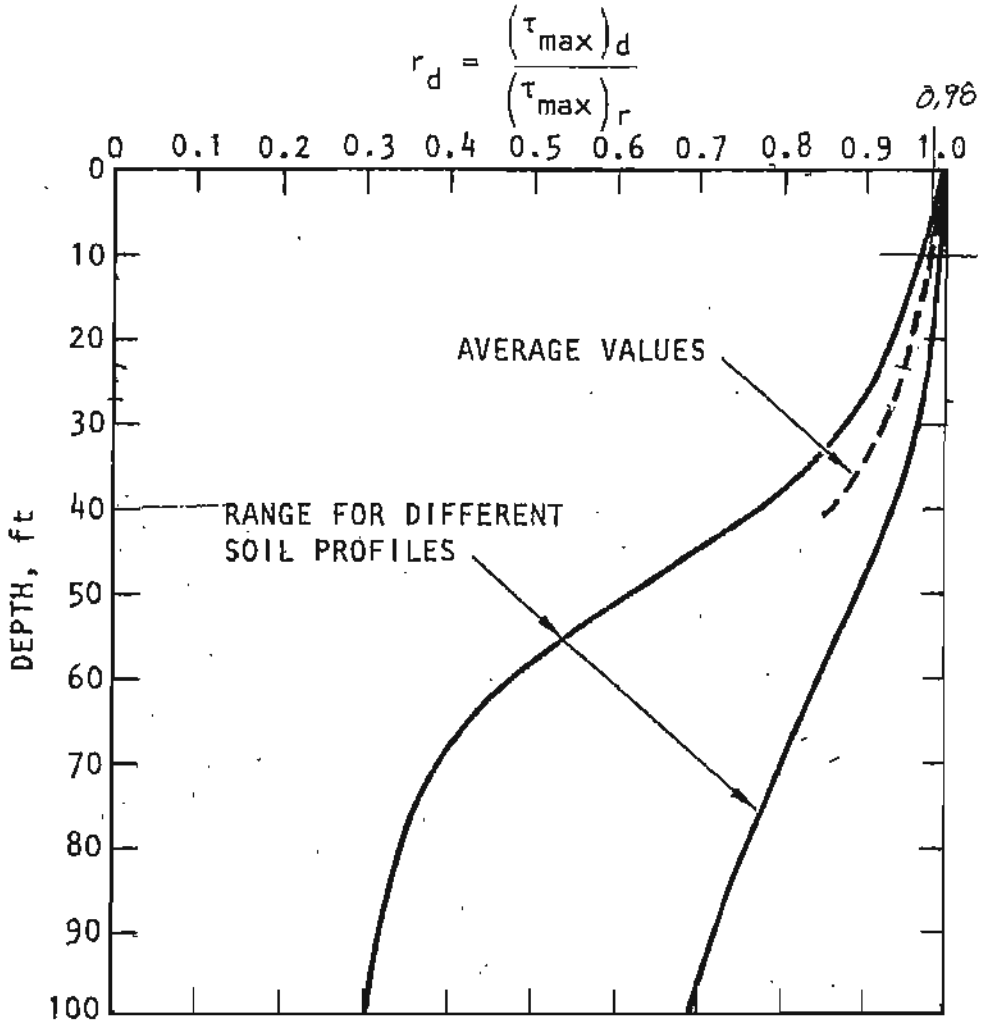


Figure 40. Range of values of r_d for different soil profiles.

where r_d is a stress reduction coefficient with a value less than 1. The variations of $(\tau_{max})_r$ and $(\tau_{max})_d$ will typically have the form shown in Fig. 39(b) and, in any given deposit, the value of r_d will decrease from a value of 1 at the ground surface to much lower values at large depths, as shown in Fig. 39(c).

Computations of the value of r_d for a wide variety of earthquake motions and soil conditions having sand in the upper 50 ft. have shown that r_d generally falls within the range of values shown in Fig. 40. It may be seen that in the upper 30 or 40 ft., the scatter of the results is not great and, for any of the deposits, the error involved in using the average values shown by the dashed line would generally be less than about 5%. Thus

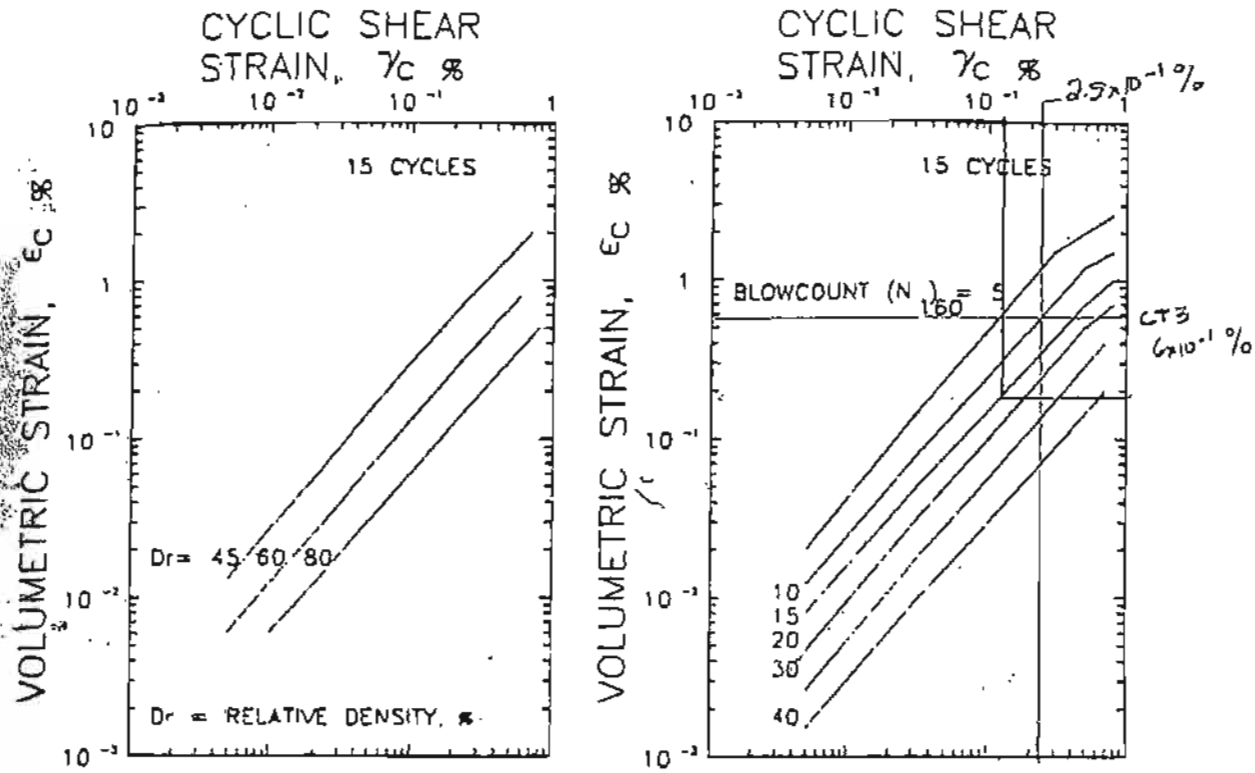


Figure A-4: Relationships Between Volumetric Strain (ϵ_c) and Effective Induced Shear Strain (γ_c) for Dry Sand and Earthquake Magnitude M = 7.5.
(After Tokimatsu and Seed, 1984)

use 0.85
for Mw = 6.8

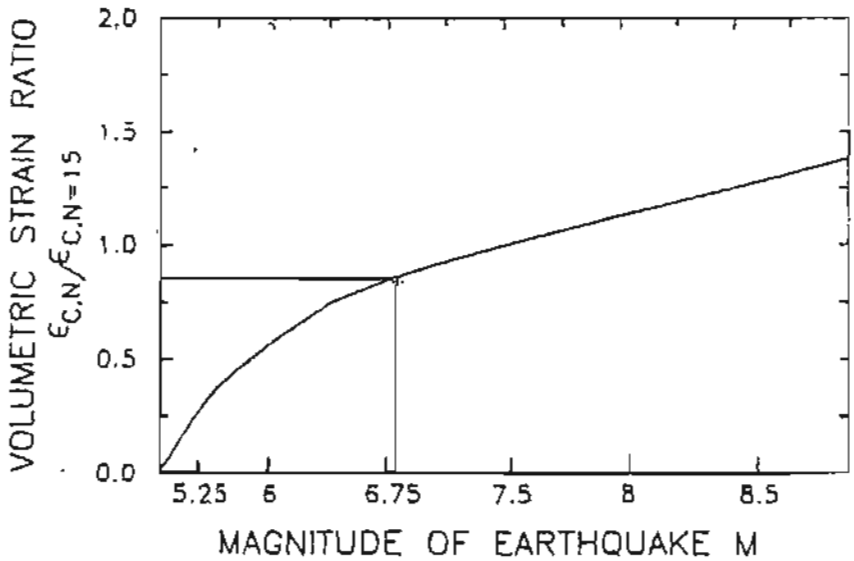


Figure A-5: Relationship Between Volumetric Strain Ratio and Number of Cycles (Earthquake Magnitude) for Dry Sands.
(After Tokimatsu and Seed, 1984)

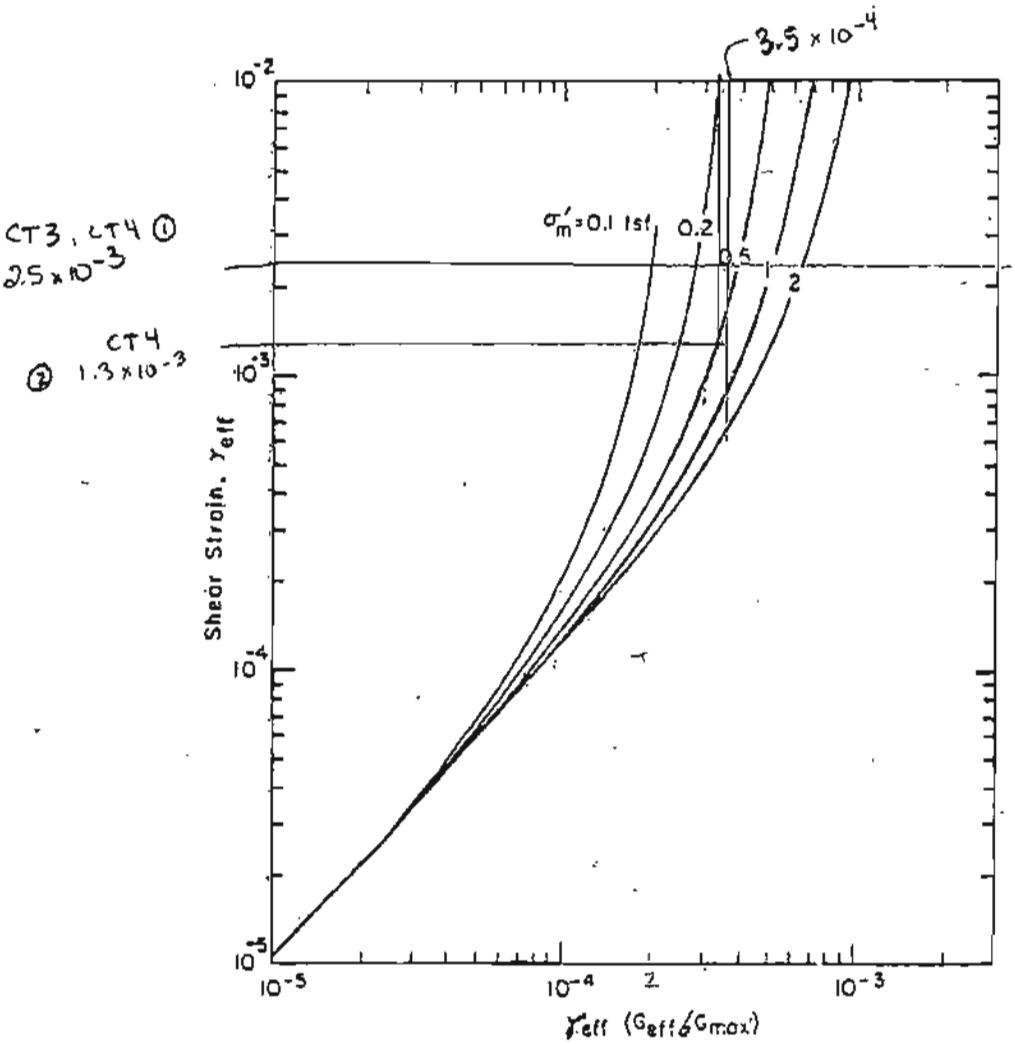


Figure A-3: Plot for Determination of Effective Induced Cyclic Shear Strain in Clean Sand Deposits for M = 7.5 Earthquakes. (Tokimatsu and Seed, 1984)

The following Guide Specifications for Earthwork, Section 02200, incorporates geotechnical input in general conformance with CSI format. The Architect, Structural Engineer and Civil Engineer should thoroughly review the section to confirm its applicability to The California Center for Health Care and Biomedical Technology and make any necessary revisions.

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General Conditions and Division 1 - Specification sections, apply to work of this section.

1.1 SUMMARY

Section Includes

Earthwork as shown on the drawings for the following:

- General Site grading, cut, fill and finish.
- Excavation and backfill for structure construction.
- Preparation of subgrade for concrete flatwork, ramps and pavements.
- Distribution of stockpiled topsoil.
- Structural fills for foundation support.
- Utility line trenching and backfilling within building lines.

Related Sections

Subsurface Information: Section 02010

Site Clearing: Section 02230.

Trenching: Section 02321.

Foundation Drainage Piping: Section 02635.

Sewerage and Drainage Piping: Section 02513.

Asphalt Concrete Paving: Section 2745

Portland Cement Concrete Paving: Section 02753

Concrete, Lean Concrete, and Controlled Density Fill: Division 3 sections.

Excavation and Backfilling for Mechanical and Electrical Work: Divisions 15 and 16 sections.

1.2 DEFINITIONS

Excavation

Consists of removal of material encountered to subgrade elevations indicated, and subsequent disposal of unsuitable materials removed.

Unauthorized Excavation

Consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.

Subgrade

Undisturbed earth or the compacted soil layer immediately below engineered fill, granular base, drainage fill, or topsoil materials.

Structure

Buildings, foundations, slabs, tanks, curbs, or other manmade stationary features occurring above or below ground surface.

1.3 SUBMITTALS

Test Reports-Excavating, Filling and Grading

The Owner's Geotechnical Engineer will perform the following tests, with a copy to the Contractor:

- Field density reports for fills and backfills.
- Testing reports on borrow material, including mechanical analysis, moisture-density curve and plasticity index.
- Verification of each footing subgrade.
- One optimum moisture-maximum density curve for each type of soil encountered.

1.4 QUALITY ASSURANCE

Codes and Standards

Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

Geotechnical Services

The Geotechnical Engineer will be the Owner's representative to observe the grading operations both during preparation of the site and the compaction of engineered fill. The Geotechnical Engineer will make visits to the site to become familiar with the progress and quality of the work. Field observations and tests will be made to enable the Geotechnical Engineer to form opinions regarding the adequacy of the site preparation, the acceptability of fill materials and the extent to which the earthwork construction and the relative compaction comply with the specification requirements.

1.5 PROJECT/SITE CONDITIONS

Site Information

Soil Investigation and test reports are available for examination as set forth in Section 2010.

Additional test borings and other exploratory operations may be made by the Contractor at no cost to the Owner.

Existing Utilities

Locate existing underground utilities in the areas of work as specified in Section 01105. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with Owner and utility companies in keeping utilities in operation. Repair damaged utilities to satisfaction of utility owner.

Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.

Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

Use of Explosives

The use of explosives is not permitted.

Protection of Persons and Property

Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

Cleaning

Excavator is required to maintain adjacent streets free of dirt accumulation arising out of work of this section. Use suitable means of cleaning equipment, streets or both and to meet requirements of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

Soil materials, whether from sources on or off site, must be approved by the Geotechnical Engineer as suitable for intended use and specifically for required location or purpose.

General Fill

General fill material shall be a soil or soil-rock mixture which is free of organic matter or other deleterious substances. The fill material shall not contain rocks or lumps over 6" in greatest dimension and not more than 15% larger than 2-1/2". Materials from the site, if free of organic matter or other deleterious substances, are suitable for use in general fills and where select material is required.

Select Material

In addition to the above requirements for general fill materials, select material shall be a low plasticity, non-expansive soil or soil-rock material having a plasticity index not greater than 15.

Imported Material

All imported fill material shall meet the requirements of select material. The Contractor shall give at least 4 days notice prior to using imported material to enable the Geotechnical Engineer to sample and test the material.

Granular Fill

Granular fill for use in capillary break/moisture barrier beneath building floor slabs and other areas designated on Drawings shall be:

- Sand in accordance with ASTM C33;
- Gravel or crushed stone conforming to Gradation 57 in accordance with ASTM C33.

Aggregate Base

Aggregate base for use beneath pavements, steps and walks shall conform to the requirements of Class 2 aggregate base, 3/4" maximum size as defined in section 26 of the Caltrans Standard Specifications, latest edition.

PART 3 - EXECUTION

3.1 EXCAVATION

Excavation Classification

All excavation is to be considered as "unclassified".

Unauthorized Excavation

Backfill and compact unauthorized excavations as specified for authorized excavation of same classification, unless otherwise directed by Architect.

Under footings and slabs, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering.. required top elevation. Controlled density fill or lean concrete fill may be used to bring elevations to proper grades, when acceptable to the Geotechnical Engineer.

Additional Excavation

When excavation has reached required subgrade elevations, notify the Geotechnical Engineer who will make an observation of conditions.

If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Geotechnical Engineer.

Removal of unsuitable material and its replacement, as directed, will be paid on the basis of contract conditions relative to changes in the work.

Stability of Excavations

Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

Dewatering

Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding areas.

Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, and soil changes detrimental to stability of subgrades and foundations.

Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

Provide dewatering system if ground water is less than two feet below bottom of spread footing.

Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure.

Do not use foundation trench excavations as temporary drainage ditches.

Cold Weather Protection

Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.

Excavated Material Storage

Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

Locate and retain soil materials away from edge of excavations.

3.2 EXCAVATION FOR STRUCTURES

Conform to elevations and dimensions shown within a tolerance of ±0.10'; the final lateral extent of excavation for engineered fill construction, and controlled density fill or lean concrete placement shall be approved by the Geotechnical Engineer.

Foundations

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.

Replacement Zone

Remove existing materials from all areas of the building footprints to the depths indicated on the Drawings and to a point at least 5' beyond the building line.

Excavated material may be cleaned to remove trash, debris, organic materials and rocks over 3" in any dimension and used for backfill or disposed of off-site at Contractor's option.

Underground Tanks, Basins and Mechanical or Electrical Structures

Conform to elevations and dimensions indicated within a tolerance of ±0.10' plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations intended for bearing surface.

Excavation for Pavements

Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

Leave subgrades at elevations required for subgrade preparation, paving and base courses shown on drawings.

3.3 EXCAVATION FOR TRENCHES (UTILITIES WITHIN BUILDING LINES)

Excavate trenches to uniform width, sufficiently wide to provide ample working room but not less than 9" on either side of pipe or conduit.

Excavate trenches to depth indicated or required. Carry the depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond the building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freezeing.

For pipes or conduit less then 6" in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

For pipes and equipment 6" or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90° (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads and ensure continuous bearing of pipe barrel on bearing surface.

3.4 BACKFILL AND FILL

Ground Surface Preparation

Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to overexcavation or placement of engineered fill.

When existing ground surface has a relative compaction less than that specified under "Compaction" for the particular area classification, scarify, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

Placement and Backfill

Place acceptable soil material in layers to required subgrade elevations for each classification listed below, using specified materials.

- In over-excavation and replacement zone beneath foundations, use satisfactory select quality onsite material or imported borrow.
- In areas not subject to structural loads, provide unclassified backfill around structures beyond 5' from foundation wall and for embankments and landscape areas with top 6" being topsoil stockpiled on site.
- For foundation wall backfill, use select quality on-site fill within 5' from wall.
- Under walks, steps and pavements, use aggregate base material, for upper 4" to 8" and select quality backfill or imported borrow material where additional fill is required.

Backfill trenches with concrete where trench excavations pass within 18" of column or wall pile cap and which are carried below bottom of such pile cap. Place concrete to level of bottom of adjacent pile cap.

Do not backfill trenches until tests and inspections have been made and work has been approved. Use care in backfilling to avoid damage or displacement of pipe systems.

Provide a 4" thick concrete base slab support for piping or conduit less than 2' -6" below surface of roadways. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) on concrete prior to backfilling or placement of roadway subbase.

Backfill excavations as promptly as work permits, but not until completion of the following:

- Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, perimeter insulation, and basement and first floor slabs unless foundations are braced to prevent damage and movement.
- Inspection, testing, approval, and recording locations of underground utilities.
- Removal of concrete forms, temporary shoring, trash and debris.

Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage or maximum dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

3.5 COMPACTION

Control soils and fill compaction during construction, providing minimum percentage of density specified for each area classification. Correct improperly compacted areas or lifts as directed by the Architect if soil density tests indicate inadequate compaction.

Relative Compaction Requirements

Compact soil to not less than the following percentage of maximum dry density determined in accordance with ASTM D1557.

- Engineered Fills: Compact top 12 to 18 inches of subgrade in building areas using heavy vibratory equipment and each layer of backfill or fill material to 95% of maximum dry density.
- Retaining Wall Backfill: Compact each layer of backfill material to 90% of maximum dry density.
- Exterior Slabs, Steps, Walkways, Pavements: Compact top 6" of subgrade and each layer of backfill and aggregate base material to 95% of maximum dry density.

- Unpaved Areas: Compact top 6" of subgrade and each layer of backfill or fill material at 90% or relative density.

Moisture Control: Where subgrade or layer or soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer or soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

Maintain moisture content of fill or backfill material to within optimum as determined by ASTM D1557, as follows.

- Over-Excavation Replacement Zone: ..... 0 to +2%
- Structural Fill Under Footings: ..... 0 to +2%
- Exterior and Interior Slabs on Grade: ..... 0 to +2%
- Pavements: ..... -2 to +2%
- Non-Structural Areas: ..... -3 to +3%

3.6 GRADING

Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between such points and existing grades.

Round top and bottom of slopes and feather into undisturbed natural terrain. Avoid abrupt grade changes making smooth transitions from slopes to more level areas.

Grading Outside Building Lines

Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and within 0.10' of required sub or finish grade elevations. Make minor modifications as may be necessary to provide adequate drainage.

Spread stockpiled topsoil and compact to minimum 6" depth at all areas not designated for walks, paving or structures.

Grading Surface or Fill under Concrete Flatwork

Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.5" when tested with a 10' straightedge.

Compaction

After grading, compact subgrade surfaces to the depth and relative compaction requirements for each area of classification.

3.7 FIELD QUALITY CONTROL

The Owner's Geotechnical Engineer will:

Sample and test fill material submitted by Contractor.

Observe and report on site preparation, excavation, placement and compaction of fill, backfill, controlled density fill or lean concrete. Such observations will include all tests deemed necessary to ascertain if the work is in compliance with specifications.

Approve methods of compaction.

Issue final report to Owner on grading, excavation and compaction work.

The Contractor Shall:

Furnish access to site and facilities for observations and testing.

Furnish and install shoring or bracing, as required by local codes and ordinances, to provide safe access to areas for Geotechnical Engineer.

Notify the Geotechnical Engineer 48 hours prior to any fill or backfill operations.

Pay costs for additional compaction, observations and tests due to non-compliance with Contract Documents based on reports of geotechnical testing and observations.

3.8 EROSION CONTROL

Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

3.9 MAINTENANCE

Protection of Graded Areas

Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerance.

Reconditioning Compacted Areas

Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, re-shape, and compact to required density prior to further construction.

Settling

Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS

Remove excess excavated materials, trash, debris and waste materials and dispose of it off the Owner's property.

END OF SECTION 02200