SCS ENGINEERS

FIELD INVESTIGATION AND SITE DEVELOPMENT FEASIBILITY SUMMARY REPORT

CITY OF SAN JOSE
NINE PAR LANDFILL SITE
2100 LOS ESTEROS ROAD, SAN JOSE, CALIFORNIA

Presented to:

Environmental Services Department
200 East Santa Clara St., 10th Floor
San Jose, California 95113

Presented by:

SCS ENGINEERS
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

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Offices Nationwide
www.scsengineers.com

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1 INTRODUCTION

On behalf of the City of San Jose, SCS Engineers (SCS) has prepared this report summarizing field investigation activities and our evaluation of site redevelopment potential at the City's Nine Par Landfill Site (Nine Par Site) in San Jose, California. The Nine Par Site is part of the buffer lands of the San Jose/Santa Clara Water Pollution Control Plant (WPCP).

2 SITE LOCATION AND DESCRIPTION

The Site is within an approximate 96-acre property owned by the City, and is located at 2100 Los Esteros Boulevard in San Jose, California. The City property is identified as APN 015-38-005 in the Santa Clara County Assessor's Parcel Map. The property is bounded by tidal marshlands and the active Zanker Road Class III Landfill to the north, WPCP sludge drying beds to the east/northeast, Los Esteros Road and the WPCP facility to the south, and Artesian Slough to the west. A Site Location Map is provided in ***Figure 1***. A Site Vicinity Map is provided in ***Figure 2***. A Site Plan is shown in ***Figure 3***.

The City-owned property overlies parts of a larger 166-acre area that was once a municipal waste disposal site operated by the Nine Par Company. The City property is currently vacant and consists of a portion of the former Nine Par Landfill, a tidal marsh area, and the inactive WPCP recycle water filling station. The adjacent Zanker Road Class III Landfill property also occupies 70 acres of the former 166-acre Nine Par Company disposal area.

The City has designated a former waste disposal area within APN 015-38-005 for possible redevelopment. The boundaries of this approximately 41-acre potential redevelopment area are shown in Figures 2 and 3. For purposes of this report, the redevelopment study area shown in Figures 2 and 3 is referenced herein as the Nine Par Site, or Site. No specific Site redevelopment plans or end uses have been identified by the City.

3 SCOPE OF WORK

Our investigation was undertaken to help identify redevelopment opportunities and constraints that may affect a project because of the presence of the landfill, and to evaluate a range of commonly employed mitigation strategies that would allow redevelopment. Our work included:

- Conduct research on historical landfill operations and site conditions, and prepare a report outlining findings, data gaps and preliminary conclusions on site redevelopment potential.

- Conduct field investigations to address the data gaps identified and confirm findings of the preliminary research. Field work was conducted in May and June, 2007.

- Evaluate mitigation strategies for potential landfill settlement, combustible gas protection for site structures, upgrades to the cover and drainage system, waste quality protection, and long-term environmental monitoring and maintenance.

- Prepare updated, order-of-magnitude cost estimates for Site redevelopment options.
- Prepare this report of findings and conclusions.

4 PRELIMINARY EVALUATION – LAND USE STUDY FOR NINE PAR SITE

As part of an earlier phase of this assignment, SCS performed historical document research, interviewed knowledgeable personnel, conducted a Site reconnaissance and prepared a preliminary feasibility report summarizing known Site conditions that may affect possible redevelopment. Details are provided in the SCS report: *Preliminary Feasibility Report, Land Use Study for City of San Jose Nine Par Landfill Site, 2100 Los Esteros Road, San Jose, California*, dated March 2007. Key findings are summarized below.

LANDFILL HISTORY AT NINE PAR SITE

Over the period 1938 until 1977, the Nine Par Company conducted waste disposal activities on what was originally a 166-acre area north of Los Esteros Road and east of Artesian Slough. This 166-acre area now entails two properties: the City-owned 96 acres (the Nine Par Site and other areas within APN 015-38-005); and the adjacent 70-acre property owned by Zanker Resource Management Ltd. (see ***Figure 2***). Zanker Resource Management Ltd. purchased the 70-acre parcel from the Nine Par Company in 1982, and began fully-permitted disposal operations in 1985 at the Zanker Road Class III Landfill. The Zanker Road Landfill is still active.

Our research indicates that most of the waste disposal activities on the City's Nine Par Site took place between 1938 and 1969 or 1970. The Nine Par Company's disposal operations after then appear to have been confined to what is now the Zanker Road Landfill property. However, some minor filling of low spots by Nine Par Company on the City's Nine Par Site likely occurred from the mid-1970's until 1977.

The types and quantities of wastes placed on the Nine Par Site are not well documented, but reportedly consisted of a mix of domestic and municipal wastes, inert debris and possible septic pumpings. Disposal methods at the Nine Par Site were typical of waste industry practice at the time. Initially these methods included feeding raw municipal garbage to agricultural animals and burning the residual waste materials, combined with land filling. Burning reportedly ceased in 1953. Feeding of wastes to farm animals ceased in 1957 in response to health regulations. After that time land disposal was via trench cut and fill methods. Trenches likely extended to the depth of underlying groundwater, near sea level, as evidenced by aerial photos.

There is no engineered cap in place and the Nine Par Site was never formally closed. Random fill soils were placed as cover material, in the early 1980's. The cover soils were placed and compacted without uniform quality control. Based on the most recent topographic map (2004), the elevations of wastes and cover soils at the Nine Par Site range from approximately sea level to elevation 24 feet MSL.

From the late 1970's until the late 1980's and after municipal landfilling activities had ceased, the Nine Par Site was used for disposal of grit from aerator tanks and inert biosolids mixed with

soil that were generated at the adjacent WPCP facility. Filling took place in low spots and slopes on and around the then-inactive landfill. Records or surveys of these disposal activities were not kept by the WPCP. During our June 2007 field investigation, we saw no obvious signs of WPCP-generated wastes.

In November 2003, approximately 1,200 cubic yards of asbestos-containing soil were placed on the Nine Par Site in what is known as the NOA stockpile area (refer to ***Figure 3***). These wastes were placed, covered and surveyed under U.S. EPA oversight.

Since 2005, approximately 250,000 cubic yards of clean soils have been stockpiled on the top deck area of the Nine Par Site. These soils are excavation spoils from City Civic Center and San Jose Airport improvement projects. Stockpile locations have been mapped by the City (refer to ***Figure 3***). We understand that materials delivered to the Nine Par Site from these projects were part of a City Environmental Services Department Soil Management Program. The soils were screened for contaminants per San Francisco Regional Water Quality Control Board (RWQCB) risk-based guidelines.

INITIAL STUDY FINDINGS

Our preliminary evaluation found no technical constraints or extraordinary conditions that would inhibit future Site redevelopment, other than the challenges related to the landfill. A range of potential mitigation strategies was presented to address challenges common to improvements at former landfill sites – settlement, combustible gas migration control, and water quality protection, among other things. However, the initial research was limited and a field investigation was requested to provide more detailed information for project feasibility planning.

5 FIELD INVESTIGATION

A field investigation was undertaken in May and June, 2007, to confirm the findings of the initial study and provide a basis for redevelopment planning, design and cost estimating. Specific objectives were to confirm:

- The extent of waste placement north of Los Esteros Road.
- Depths and types of existing cover over filled areas.
- Refuse depths at select locations, and identify if subsurface liquids are present in the refuse prism.
- Physical and engineering properties of on-Site soil stockpiles.
- Physical properties of Bay Mud Soils underlying the refuse fill.
- Landfill gas (LFG) generation potential at the Nine Par Site. Preliminary screening of combustible gas levels in on-Site refuse fill was conducted.

Investigation work consisted of a geophysical survey; installation of exploratory borings and test pit excavations; laboratory testing of soil samples to determine physical and engineering property of the landfill cover, underlying soils, and stockpiled soils; and testing for combustible gases with field instruments. Geophysical survey, boring and test pit locations are shown in ***Figure 3***.

The work was conducted in accordance with the *Field Investigation Work Plan, City of San Jose Nine Par Landfill Site, 2100 Los Esteros Road, San Jose, California,* prepared by SCS and dated April 6, 2007, and a Site Safety Plan specific to the proposed activities. All field personnel on this assignment had completed 40-hour health and safety (H&S) training in accordance with Federal Occupational Safety and Health Administration (OSHA) / 29 CFR requirements.

PERMITS

The Santa Clara Valley Water District (SCVWD) requires that drilling permits be obtained for any exploratory borings with planned depths greater than 45 feet below ground surface (bgs). Prior to the work, drilling permits were obtained from the SCVWD for deep soil borings designated as B-3 and B-4. San Francisco Bay RWQCB Well Completion Reports for the two borings are included in ***Appendix A***. The original Well Completion Reports are to be sent to the SCVWD and in turn forwarded to the RWQCB. The remaining borings and test pits did not require permits.

UTILITY CLEARANCES AND USA NOTIFICATION

Prior to commencement of field work, SCS marked the Site with white paint and staked each boring and test pit boring with a wooden stake. Underground Service Alert (USA) was subsequently notified regarding the locations of proposed investigation locations.

The City also provided information on the locations of underground recycle water supply lines so they could be avoided during the investigation. Approximate water supply line locations are shown in ***Figure 3.***

Cruz Brothers Locators of Scott's Valley, California was also contracted to perform an additional underground utility survey on Site as an added precaution against encountering underground utilities during investigation activities. Proposed boring locations in the former WPCP Recycle Water filling station were cleared by this survey.

All exploratory borings and test pits were located outside of the limits of the NOA asbestos stockpile location. SCS obtained information on surveyed limits of the stockpile from the City in advance of the field work.

GEOPHYSICAL SURVEY

Between May 22, 2007 and June 1, 2007 JR Associates of San Jose, California under the direction of SCS conducted a geophysical survey (magnetometer and electrical resistivity testing) in order to non-intrusively locate major differences in subsurface characteristics. The objective was to identify the extent of waste placement and/or former refuse trench locations along the southern Site boundary fronting Los Esteros Road, and near the western Site perimeter near the WPCP recycle water filling station.

As a first step, a series of magnetometer lines were placed 10 feet apart, along both sides of and parallel to the existing cyclone fence abutting Los Esteros Road. The lines were placed over both refuse fill north of the fence, and on the compacted earthen access shoulder road south of the fence. Magnetometer lines were also placed on slopes abutting the recycle water filling station. The magnetometer instruments can detect subsurface anomalies (i.e., metals) typically indicative of underlying debris. To prevent instrument interference, the magnetometer lines were placed at least 10 feet from the fence, and away from known underground metal utility pipes.

After completion of the magnetometer survey the data was initially evaluated to help guide the electrical resistivity testing that would be conducted next. This instrumentation was used to measure differences in electrical conductivity of underlying soil and refuse (both laterally and at depth). A series of five profile lines, ranging in length from 125 to 250 feet, were placed along both side of the fence in the area fronting Los Esteros Road. Refer to ***Figure 3*** for survey locations. Results of the survey are graphically presented in ***Figure 4*** as a series of resistivity profiles. JR Associates' complete summary report is included in ***Appendix B.***

EXPLORATORY BORINGS

HEW Drilling Company (HEW) of East Palo Alto, California conducted exploratory boring activities under the direction of SCS on June 5 and 6, 2007. A total of eight borings, designated B-1 through B-8 were drilled using a truck-mounted CME-75 hollow stem auger drill rig equipped with 8-inch diameter hollow stem augers. The borings were drilled to depths between 11.5 and 76.5 feet below ground surface. SCS staff scientist Mr. Ted Sison oversaw this activity. The field soil classification was determined in accordance with the Unified Soil Classification System and consisted of particle size, color, and other distinguishing features of the soil. Boring locations and depths are shown in ***Figure 3***. Boring locations were recorded using portable GPS survey equipment.

During drilling, field personnel logged the test borings and obtained relatively undisturbed samples for visual examination, classification and laboratory testing. Observations were made regarding the thickness and types of existing cover soils and soil stockpiles, characteristics and thickness of the underlying fill, and types of native soils underlying the fill. Complete boring logs are provided in ***Appendix C***.

Soil samples were collected at approximately five-foot intervals to the total depth of each boring. The samples were collected by driving an approximately 3-inch (OD) by 18-inch long Modified California sampler containing 2.5 inch diameter brass or stainless steel sample sleeves in advance of the augers. Selected sleeves were retained for geotechnical laboratory analysis. Select samples were also collected directly from the soil cuttings coming up on the augers. These samples were collected in 5 gallon buckets. A label noting the date of collection, sample number, depth, and project number was affixed to each collected sample. Each sample was then set aside for later delivery to Cooper Testing Laboratory, of Mountain View, California, for analysis.

Borings were installed through the existing cover and/or stockpiled soils, through the refuse materials, and into underlying native soils. For purposes of this report, the "existing cover" refers to the random, non-engineered fill soils placed over the wastes in the early 1980's. In general, the existing cover thickness at the boring locations ranged from 2.5 to 10 feet and

consisted of non-uniform sandy clay and silty clay materials. The underlying refuse thickness in the main part of the landfill varied from 10 to 20 feet. The soil cover and waste thickness were generally lower in the western portion of the Site (closest to Artesian Slough). In general, the waste materials were observed to be highly degraded, with mixed wood, plastic, paper, metal and glass typical of municipal debris. During installation of borings B-4 and B-6, a strong hydrocarbon-like odor and presence of liquid in the waste mass were noted. Liquids were also observed in the waste mass at borings B-2, B-3, B-6, and B-7.

Soil materials encountered below the refuse consisted of fine-grained clayey materials interbedded with sand lenses, typical of Bay Mud deposits. The soil and fill thickness in the former WPCP Recycle Water Filling Station area (boring B-8) ranged to 8 feet below grade.

In the Airport North Concourse and New Civic Center soil stockpile areas (see ***Figure 3***), the soils encountered above the refuse mass consisted of clay, gravelly clay and sandy clay materials, varying in thickness from 18 to 23 feet.

During advancement of the borings, testing for the presence of combustible gas (as methane) was performed using field instruments. Measurements were periodically made at grade at the boring opening. Data was recorded on the boring logs. No combustible gas was detected.

All boreholes extending into or through the refuse prism were backfilled with Portland cement grout up to ground surface. As the grout settled to three to four feet bgs, the boring opening was filled in with soil to grade.

TEST PITS

Sixteen test pits, designated TP-2 through TP-10, TP-10A, and TP 11 through TP-16, were installed in soils in areas inaccessible by drilling equipment. (Test pit TP-1, originally planned for the northwestern area of the Site, was not installed due to difficult equipment access.) Test pits were installed using a backhoe and operator, under the supervision of SCS Staff Engineer, Ms. Heather Grant. Test pit locations are shown in ***Figure 3*** and were surveyed in the field using portable GPS equipment. The test pits were installed to determine the physical characteristics of existing landfill cover and soil stockpiles. We excavated the backhoe test pits to depths between 4 and 12 feet below ground surface. Except in soil stockpile areas, excavations extended until underlying refuse was encountered (or maximum depth of 12 feet below ground surface). Bulk soil samples were obtained for lab analysis of physical and engineering properties; see below. After observations were made and samples obtained, the test pits were backfilled with excavated soils. Test pit logs are provided in ***Appendix D***.

With the exception of TP-2, the existing landfill soil cover thickness observed at TP-7 through TP-14 and TP-16 (in non-soil stockpile areas) ranged from 2 to 11 feet and consisted of a non-uniform mix of silty clay, sandy clay, gravelly clay, clayey sand, silty sand, and gravelly silt materials. There was no soil cover present at TP-2 and exposed debris was evident at this location and elsewhere in the generally low-lying northwestern portion the Nine Par Site.

Materials encountered in the “Various Source” soil stockpile area (TP-3 through TP-6, see ***Figure 3***) consisted of gravelly clay and silty clay. Soils encountered in the “Airport/North Concourse” stockpile area (TP-10A and TP-15) consisted of silty clay materials.

SOIL TESTING

Select discreet and bulk soil samples were collected during boring and test pit installation and tested in the laboratory to determine physical and engineering properties of the landfill cover and underlying soils. Soil testing was performed by Cooper Testing Laboratory of Mountain View.

All samples were handled in accordance with standard chain-of-custody procedures. Soil sample analytical methods and results are summarized in ***Table 1***. Brief descriptions of the various test methods and how soils properties are generally evaluated by engineers are provided in ***Appendix E***. Complete soil lab reports for the Nine Par Site, including consolidation test and compaction test curves, are provided in ***Appendix F***.

FINDINGS OF FIELD INVESTIGATION

Lateral Extent of Waste Placement

Results of the geophysical survey indicate that the limits of waste fill do not extend south of the cyclone fence that runs along the southern Site boundary fronting Los Esteros Road. The depth of the fill and cover material along the southern Site boundary and in the center of the landfill varies from 10 to 20 feet. The resistivity values suggest the fill materials in the geophysical survey area consist predominantly of construction debris such as dirt, aggregate, concrete or asphalt rather than municipal waste. The resistivity data also suggests the fill materials north of the fence may have been excavated out to a depth of 7 to 8 feet and re-deposited 20 feet further (north) into the landfill. We speculate that this may have occurred when Los Esteros Road was realigned in the late 1950's or early 1960's, and materials may have been relocated for the roadbed or adjacent drainage ditches.

The geophysical survey data also suggests that fill underlies the asphalt surface in the WPCP Recycle Water Filling Station area. This was confirmed by observation during installation of Boring B-8, which showed the asphalt was underlain by approximately 3 feet of soil fill, and below that approximately 5 feet of mixed waste including paper, glass, plastic and metal.

Landfill and Existing Cover Profile

Cross sections showing the waste and soil cover profile were prepared based on information obtained from the borings and test pits. These are shown in ***Figure 5*** and in the appended exploration logs. The majority of the Site is covered with low- to medium plasticity soils (non-engineered fill from various sources) and some sands and gravels varying in thickness from 2 to 12 feet. The existing cover is not uniform in thickness nor level of compacted effort. As noted earlier there is some exposed debris in the northwestern area of the Site.

The non-engineered fill cover is underlain by mixed municipal waste fill including a mixture of highly decomposed organic materials, glass, wood, metal, plastic, and construction and miscellaneous debris. The mixed waste layer varies in thickness from 5 to 20 feet. Our exploration did not encounter the biosolids reported in the literature so its whereabouts is unknown. In November 2003, approximately 1,200 cubic yards of asbestos-containing soil were placed on the Nine Par Site in what is known as the NOA stockpile area (refer to ***Figure 3***). Asbestos-containing material requires special handling.

The geophysical profile indicates an undulating bottom of the waste mass. Based on boring logs and review of topographic maps, it appears as though wastes underneath the soil stockpile areas have compressed to elevations below sea level. The waste is underlain by native alluvium consisting of heterogeneous layers of stiff clay and thin interbeds or strata of sands to the maximum depth explored. These are typical of Bay Mud deposits. The soils underlying the waste exhibit a hydraulic conductivity of 3×10^{-8} cm/sec.

Soil Engineering Properties

The existing cover soils (i.e., those placed above wastes at varying thickness and without engineering controls in the early 1980's) exhibit a low plasticity index; laboratory values ranged from non-plastic to 19. Soils with a high plasticity index (approaching or over 20) tend to be expansive clay, those with a lower index (below 10) tend to be silt, and those considered non-plastic tend to have little or no silt or clay. Compaction test results (***Appendix F***) showed the maximum dry densities of the existing cover material samples were relatively consistent, ranging from 116.8 to 120.3. In general, with some re-grading and compaction, the existing cover materials are suitable as a foundation layer component in a prescriptive cap as required by current regulations (CCR Title 27). In a prescriptive cover system, the foundation layer typically is 2 feet thick, and underlies the 1-foot thick low-permeability clay layer, and 1-foot thick vegetative layer

The near-surface soils in the "Various Source " and "Airport/Civic Center" soil stockpile areas (see ***Figure 3***) consist of non-engineered fill that is primarily low to moderately expansive clays (CL) with some areas covered by clayey or sandy gravels. The plasticity indeces of these materials ranged from 11 to 25, and were generally higher in the "Airport/Civic Center" stockpiles. The stockpiled soils have an R-value of less than 5 up to 22 (R-value is a measure of the ability of the material to resist lateral deformation when acted upon by a vertical load; this measure is used for pavement design). Hydraulic conductivity ranged from 1×10^{-4} to 3×10^{-7} cm/sec. Hydraulic conductivity describes the ease with which water can move through soil pore spaces or fractures.

The waste is underlain by stiff clays that exhibit hydraulic conductivity on the order of 3×10^{-8} cm/sec and good shear strength and some lenses of sand. At waste disposal sites, hydraulic conductivities in this range are considered relatively impermeable with respect to liquids containment. The clayey materials extend to at least depths 31.5 feet below the waste mass (the maximum depth explored). Moisture content of the deep soils underlying the waste ranged from 22.8 to 25.1 percent; dry densities ranged from 102.4 to 107.4 pounds per cubic foot. Consolidation tests (***Appendix F***) suggest that surface settlements can be expected from any planned additional soil placement or surcharging.

Groundwater

The long-term static groundwater table at this site was not determined and is assumed to be near or just above sea level. Perched and/or free liquid on particle surfaces was encountered in borings B-1, B-2, B-3, B-5, B-6, and B-7. The depth to water in the borings varied from 8 to 29 feet below the ground surface. It appears there is a wet refuse footprint at the Site. Two borings (B-4 and B-6) encountered liquid impacted with what appeared to be floating hydrocarbons.

Based on field observation, the hydrocarbon-affected liquid in borings B-4 and B-6 appeared to be confined to the waste mass (i.e., not in soils below).

Seismic Considerations

The San Francisco Bay Area is recognized by geologists and seismologists as one of the most active seismic regions in the United States. The significant earthquakes which occur in the Bay Area are generally associated with crust movements along well-defined active fault zones.

Available publications indicate that the Site is between two major active strike-slip faults in the Bay Area (San Andreas and Hayward faults). Distances from the Nine Par Site to the major active faults are as follows:

Fault	Approx. Distance (miles)
San Andreas	14
Hayward	5
Calaveras	7

Ground shaking from fault rupture is considered a hazard for the Nine Par Site and Modified Mercalli Intensity up to "IX" (Violent) can be expected from rupture along the South Hayward and/or San Andreas Faults (ABAG 2003).

Potential seismic hazards for the Site consist of violent ground shaking and seismic induced settlement due to liquefaction/densification of loose sand layers or soft soil (Knudsen and others 2000). On the basis of recent studies, it is reasonable to assume that the Nine Par Site will be subjected to shaking by relatively frequent earthquakes of small magnitude and at least one moderate to severe earthquake during the design life.

Combustible Gas Generation and Migration Control

Methane is a component of refuse decomposition gases and can be explosive or flammable in a confined space environment under certain conditions. Municipal wastes were last placed at the Nine Par Site over 35 years ago. During our field investigation, the waste materials were observed to be highly decomposed. Periodic monitoring of the exploratory boring openings was conducted and no combustible gases were detected. These observations confirm that the rate of waste decomposition and methane generation is long past its peak. However, our testing was limited and we would expect to find methane and other landfill gas constituents in the subsurface fill environment, most likely in isolated pockets at low concentrations and pressures. This is normal at old landfill sites and the presence of methane in the refuse mass does not typically pose a safety hazard.

Improvements to the landfill surface (low-permeability cap, hardscaping or buildings) could promote lateral subsurface gas migration to off-site locations. This would be of concern along the southern Nine Par Site boundary in the direction of the San Jose/Santa Clara WPCP. The rest of the Site is bounded by other landfill areas, sloughs or unoccupied wetlands and potential subsurface gas migration to the north, west, and east is not a safety concern.

There is no perimeter subsurface gas monitoring network currently in place at the Nine Par Site and the extent of off-site landfill gas migration, if any, toward the WPCP is unknown. Our field investigation did show that buried wastes do not extend outside the southern Nine Par Site boundary (into Los Esteros Road). This simplifies any future gas migration assessment if needed. Shallow groundwater, existing drainage swales along the roadway and the compacted subgrade for Los Esteros Road likely serve as barriers to potential subsurface off-site migration in this direction. However, additional field testing would be needed to confirm this assumption.

6 CONCLUSIONS

Other than the fact that the Site is a former landfill, our initial research and field investigation found few technical constraints or extraordinary conditions that would inhibit future site redevelopment for passive (open space, public trails, vehicle parking), commercial or other uses. Challenges associated with developing at old landfills such as settlement, violent ground shaking, water quality protection and subsurface gas control can be overcome with sound engineering controls and dedicated monitoring and maintenance programs. These measures will increase project construction and long-term maintenance costs when compared to similar developments on undisturbed sites.

Based on the data collected during the field and laboratory investigations, our engineering experience in the vicinity of the project site, and our understanding of the anticipated construction, we present the following conclusions:

GENERAL

1. From an engineering standpoint, the Nine Par Site can be developed for passive, recreational, light industrial or commercial use provided the conclusions and recommendations contained in this report are incorporated in the project planning, design and construction.

LANDFILL COVER

2. The existing cover system (cap and drainage) over the waste will require upgrades to comply with current regulatory standards. The stockpiled soil materials (excluding asbestos and biosolid containing materials) covering the waste appear suitable for reuse as landfill cap foundation layer and vegetation layer. The high variability in soil permeability of the fill indicates that some selective grading, increased level of compaction and/or additives (additional clay blending) may be necessary if this stockpiled material is to be used as a low-permeable layer in a prescriptive cover system. The specific cap design (thickness, low-permeability layer requirements) should be based on Site end-use development plans and water quality protection considerations.

3. The existing cover thickness appears to be suitable for use as a foundation layer component in a prescriptive cover system (i.e., minimum 2 feet thick as required under CCR Title 27). However, the existing cover soils are not uniformly compacted or placed and future development will need to consider reworking the soil as engineered fill for

the cap and support under buildings, roadway and parking lots, etc. Re-grading to provide this minimum cover thickness in the northwest portion of the Site will be required.

SETTLEMENT / SITE DEVELOPMENT CONSIDERATIONS

4. The areas with stockpiled soil have surcharged the underlying compressible waste and alluvium. Depending on the final development plans, these previous surcharge stockpile areas vs. non-surcharge areas could create zones of large differential settlement (several feet) and this condition will need to be evaluated during planning for foundations and gravity flow dependent utilities. Foundations and utility connections will need to be designed for large differential settlement.

5. The mixed waste material has compressed over the time since placement. Additional settlement of the waste can be expected from decomposition. Total and differential settlements will depend on the thickness of fill added to the site and foundation loads. For example, the addition of 5 feet of new fill could generate on the order of 2.5 feet of additional settlement from the underlying waste and alluvium.

6. The actual type of foundations for buildings will depend on the type of building construction materials and loading conditions. Because of future anticipated settlement, buildings will likely have to be placed on piles to obtain support from stiff alluvium soils below the waste or on floating slabs that can be mud-jacked level when they experience high differential settlement.

7. Sand layers were encountered in the alluvium under the site. The potential for liquefaction to impact the site is considered “very high” based on literature review.

8. Final design of pavement sections will need to consider the poorly- compacted nature of the surface soils and potential for large differential settlements. Asphaltic concrete pavement structural sections are presented in the recommendation section of this report. The structural sections were recommended using the gravel equivalent method in accordance with Chapter 600 of the California Department of Transportation Highways Design Manual (fourth edition). The specific structural vehicle loadings for a proposed project at the Nine Par Site were not known at the time of this report. (The City did provide estimated vehicle trips for the San Jose Fire Department, showing 3-axle vehicles making 6-10 trips per day). However, for a range of potential projects, typical traffic loadings generally range from a traffic index of 4.0 for parking areas (no more than two commercial trucks per week) to a traffic index of 6.0 for driveway areas (no more than three commercial trucks per day). The subgrade support characteristics of the native soils are typically evaluated by Resistance (R)-value tests. R-value tests performed by Cooper Testing Laboratories reported a range of R-value from 22 to less than 5.

GROUNDWATER AND LANDFILL GAS

9. Groundwater was encountered in some of the test borings at 8 to 29 feet bgs. Any excavation near sea level should anticipate encountering groundwater. Some free water was noted in the mixed waste layer. This condition may be a concern to regulatory agencies and a groundwater monitoring program and possibly a more stringent cap design (like an HDPE membrane liner) could be required. Again, the final cap design should balance water quality protection and Site end-use development plans.

10. Limited testing for the presence of combustible gas was performed via periodic monitoring at select exploratory boring openings. No combustible gases were detected. The potential for landfill gas generation is considered low. Nonetheless combustible gas protection measures will be required by regulation for any structures constructed on-Site.

SEISMIC CONSIDERATIONS

11. The San Jose area is located in UBC Seismic Zone 4. The Nine Par Site is not located in a State of California Alquist Priolo Special Fault Study Zone. The potential for fault rupture is considered low for this Site; however, the potential for ground shaking from nearby fault rupture is likely and can have an intensity up to IX (Modified Mercalli Scale) which is described as "Violent" ground shaking. Current building codes provide standards of design and construction intended to minimize structural damage due to such shaking.

7 RECOMMENDATIONS

Based on the evaluation of the field and laboratory data and our landfill experience in the vicinity of the project, we present the following recommendations for use in the project design and construction. When applying the recommendations for design, the background information, and procedures used, findings, evaluation, and conclusions should be considered. The recommended design consultation and construction monitoring by SCS are integral to the proper application of the recommendations. The following general recommendations are provided to start the planning process. More detailed recommendations should be developed when the grades and type of development are known.

SITE GRADING AND DRAINAGE

We recommend that a conceptual design be initiated that including type of development and updated topography, rough grading plan, cap design and gas and groundwater monitoring network. The purpose the conceptual planning will be to obtain response and input from agencies without incurring the expense of full design.

Earthwork and grading plans will need to account for large amounts of differential settlement that can occur between areas that have been surcharged and those that have not. Landfill design requires at least 2% grades for the cap. Higher gradients may be necessary in area where differential settlement will be an issue. In addition, planning and earthwork should avoid

disturbance of the NOA Stockpile location because of asbestos containing materials. If planning requires grading in this area, the materials will need to be removed by a special asbestos licensed contractor and the closure permit with the EPA will need revision.

To limit differential settlement, some areas of future building construction may need to be surcharged for a period of time (on the order of a year) to allow the waste and alluvium to consolidate to a point considered equivalent to the area under existing surcharge stockpiles.

Gravity drainage features will also need to be designed to accommodate differential settlement. All fill required to bring the site to final grade should be placed as engineered fill and some over-excavation and backfilling should be anticipated in building areas.

LANDFILL CAP

Again, the existing stockpiled soils appear suitable for reuse as landfill cap foundation layer and vegetation/protective layer in a prescriptive cover system. Re-grading and uniform compaction of these materials will be required. The variability in soil permeability of the stockpiled material indicates that some selective grading, or re-working may be necessary if this stockpiled material is to be used as a low-permeable layer in a prescriptive cover system (i.e., minimum permeability requirement of 10-6 cm/sec.). When site development and capping requirements become better defined, it may be prudent to construct a test pad to better evaluate the suitability of "Airport/Civic Center" stockpile materials for this purpose.

Given that the existing cover appears to be suitable for use as foundation material in a final cover system, we estimate that approximately 130,000 to 140,000 bank cubic yards of material will be needed for the low-permeability and protective soil layers of a prescriptive final cover system. Reportedly approximately 250,000 cubic yards of material have already been stockpiled. Thus there appear to be sufficient quantities for capping and for filling to project design grades.

Note: if Nine Par Site redevelopment plans call for significant asphalt coverage, it may be possible to demonstrate that the asphalt layer can serve as an alternate low-permeability layer of the cap system. This would need to be negotiated with the Regional Water Quality Control Board (RWQCB) during the early planning stages.

LANDFILL GAS

The potential for landfill gas generation at the Nine Par Site is considered low. However, for structures proposed to be built on landfills, CCR Title 27 requires that combustible gas protection and monitoring features be incorporated into the building design and construction. Protection measures can include a combination of below-slab impermeable membrane and venting systems, and gas cut-offs for utility trenches and conduit slab penetrations. Specific protection measures would be a function of building and utility design, occupancy, and foundation requirements. CCR Title 27 regulations also require that automatic methane gas sensor systems be installed in the building interiors. These systems can be equipped with communication devices to automatically notify response personnel in the event that elevated methane concentrations are present in building interiors. We recommend any proposed structures be designed in accordance with CCR Title 27 requirements for combustible gas protection and monitoring.

ENVIRONMENTAL AND GEOTECHNICAL EVALUATIONS

More detailed geotechnical study should be performed to evaluate the potential for liquefaction and surface response to earthquake loading. In addition, specific grading recommendation, foundation criteria, corrosion potential and final pavement sections can be developed once the type of development is planned.

The RWQCB has not taken an enforcement role at the City's Nine Par Site and it is unknown if the landfill has affected underlying water quality. (A long-term monitoring program has been implemented at the adjacent Zanker Road Landfill and significant data exists on local water quality. Reportedly, no landfill-related impacts have been identified.[1]) Nine Par Site redevelopment will trigger agency involvement and we recommend that the City plan to implement a groundwater monitoring program. The program will consist of a network of groundwater monitoring wells, water sampling and analytical testing program, with details to be negotiated with the RWQCB.

During our field investigation, hydrocarbon odors and liquids were encountered in Borings B-4 and B-6 and additional evaluation is recommended.

PRELIMINARY PAVEMENT SECTIONS

The upper 8 inches of subgrade beneath the structural section should be scarified, moisture-conditioned as necessary and compacted to at least 95 percent of the maximum dry density for select fill as determined by ASTM Test Method D1557. The following pavement sections are based on an R-value of 5 and a traffic indices ranging from 4.0 to 8.5 for the anticipated pavement areas. ***Table 2*** provides a range of recommendations.

If actual pavement subgrade materials or type and frequency of traffic are significantly different than those identified for this study due to unanticipated grading or soil importing, the pavement section should be re-evaluated for the changed subgrade conditions.

Pavement section design assumes that proper maintenance, such as sealing and repair of localized distress, will be performed on an as-needed basis for longevity and safety. Pavements over landfills require more than normal maintenance to seal cracks.

Pavement materials and construction method should conform to Sections 25, 26, and 39 of the State of California Standard Specification Requirements.

The asphaltic-concrete should be compacted to an average relative compaction of 97 percent, with no single test value being below a relative compaction of 95 percent based on a 50 blow Marshall maximum density.

[1] Reportedly, there has been no historic evidence of a leachate release to groundwater from the Zanker Road Landfill (Einarson Geoscience, 1994). More recent monitoring data (Conor Pacific 2004) showed that volatile organic compounds had not been detected in groundwater wells at the Zanker Road site. One monitoring point for that landfill (designated as piezometer G-6) is located on Zanker property adjacent to and north of the Nine Par Site property line.

The asphalt concrete should comply with Type "B" asphalt concrete as described in Section 39 of the State of California Standard Specification Requirements. We recommend that an asphalt concrete mix design be prepared and approved prior to construction.

TEMPORARY EXCAVATIONS

Temporary cuts and trenches need to be designed for loose fill conditions. It is the responsibility of the contractor to provide safe working conditions with respect to excavation slope stability. Temporary excavations should be constructed in accordance with CAL OSHA requirements. Shoring systems, if used, should be designed by an engineer with experience in designing shoring systems and registered in the State of California.

UTILITY TRENCHES

The type of pipe bedding, flexible connections, the initial backfill and compaction requirements of bedding and initial backfill material should be specified by the Foundation Engineer based on either the manufacturers requirements, or type of pipe, and amount of differential settlement anticipated. Utility trenches should also be designed with cutoff collars to prevent landfill gas from entering the building.

WORKER SAFETY AT LANDFILLS

Trenching, waste excavation and grading work at landfill sites poses potential hazards not normally encountered in standard construction projects. There can potentially be worker exposure to odors, combustible gas and trace LFG constituents, and contact with refuse, hazardous waste, leachate and contaminated water. These hazards are commonly managed at landfill construction projects via a site-specific work health and safety (H&S) program. We recommend such a plan be prepared as part of any proposed improvement work.

The H&S plan should be prepared in accordance with landfill industry guidelines and known site conditions. It should include an assessment of potential hazards, provisions for air quality, combustible gas and dust monitoring, procedures for identifying and handling special wastes or liquids, requirements for protective clothing and equipment, emergency response steps and recordkeeping procedures.

8 REGULATORY CONSIDERATIONS

Regulatory considerations for development on former landfills are outlined in our *Preliminary Feasibility Report* for this project (SCS, March 2007). To summarize, agencies that would likely have jurisdiction over any proposed redevelopment of the Nine Par Site would include: the San Francisco RWQCB; the City of San Jose Department of Building, Planning and Code Enforcement, acting on behalf of the CIWMB; and the Bay Area Air Quality Management District (AQMD). Regulatory agencies are open to and have allowed alternative end uses at other landfill sites. Special permits for improvements are not typically required. However, agency oversight at the Nine Par site will likely intensify as a result of a specific project plan, and each agency may have its own requirements. For example, the above agencies may become involved with approval of local grading and building permit applications.

Agency approvals for landfill redevelopment can also include other requirements such as: site characterization or health risk assessments; upgrades to the landfill cover system as described herein; preparation of a landfill post-closure monitoring and maintenance plan; and implementation of groundwater, leachate, surface water and landfill gas migration monitoring programs. Demonstration of financial assurance mechanisms for a prescribed post-closure monitoring and maintenance period (typically 30 years) may be required, depending on end use plans and revenue streams.

We recommend the agencies be advised of any proposed project redevelopment plans and landfill-specific mitigation measures proposed to be incorporated into the facility design. Conditions of approval can be negotiated based on prudent engineering practice and agency precedence.

Suggested strategies for planning, design and construction are as follows:

- As soon as a specific end use is identified and before any design work begins, the City should seek input from experts in the various technical disciplines to identify project constraints, opportunities and interrelationships. This should include expertise in the fields of civil, geotechnical/foundation, and environmental engineering, architects, and land use and landscape planners.

- Concept-level plans should be presented for approval before detailed design and construction drawings are prepared.

- The need for further site investigation and/or baseline monitoring programs (groundwater and landfill gas) should be determined at an early date so as not to delay subsequent approvals. We suggest meetings with the oversight agencies at the early planning stages to discuss these items.

- Rough grading and soil-surcharging activities commence at the earliest opportunity (i.e., once design grades are finalized) to allow the underlying waste and alluvium to consolidate, and limit long-term settlement. Ideally surcharging would occur at least one year prior to final construction.

9 PRELIMINARY COSTS – LANDFILL SITE DEVELOPMENT

Nine Par Site end uses have not been decided and redevelopment plans are not available. Based on our experience elsewhere and findings of the field investigation, the following landfill-related, incremental order of magnitude construction costs may be expected for a range of site redevelopment options:

- Re-grading and landfill cap placement: $65,000 to 95,000 per acre. This assumes a CCR Title 27 prescriptive soil cap with minimum 2 feet of foundation soils, 1-foot of low-permeability soils, and 1 foot of vegetative/protective soils will be needed and will compliment site development plans. The upper end of the range includes provisions for clay blending, if needed. This estimate excludes the cost of structural fill that may be placed over the cap to meet development project needs.

- NOA Area asbestos removal - $375,000 to $425,000. This assumes the materials would be excavated and hauled off-site to a licensed disposal facility.

- Landfill gas protection for site structures: $6 to $8 per square foot of building footprint.

- Automated combustible gas alarm system for building interior: $10,000 to $25,000 per structure, depending on size and occupancy.

- Landfill gas perimeter monitoring system: $15,000 to $20,000. This assumes 3 monitoring probes would be installed in native soils along Los Esteros Road, to depths up to 10 feet below grade. This cost excludes easements and right-of-way expenses.

- Negotiate waste discharge and monitoring requirements and install a groundwater monitoring system: $65,000 to $100,000. This assumes wells would be installed to the shallow aquifer.

- Incremental costs for building foundation systems $15 to $30 per square foot of building footprint, depending on method employed.

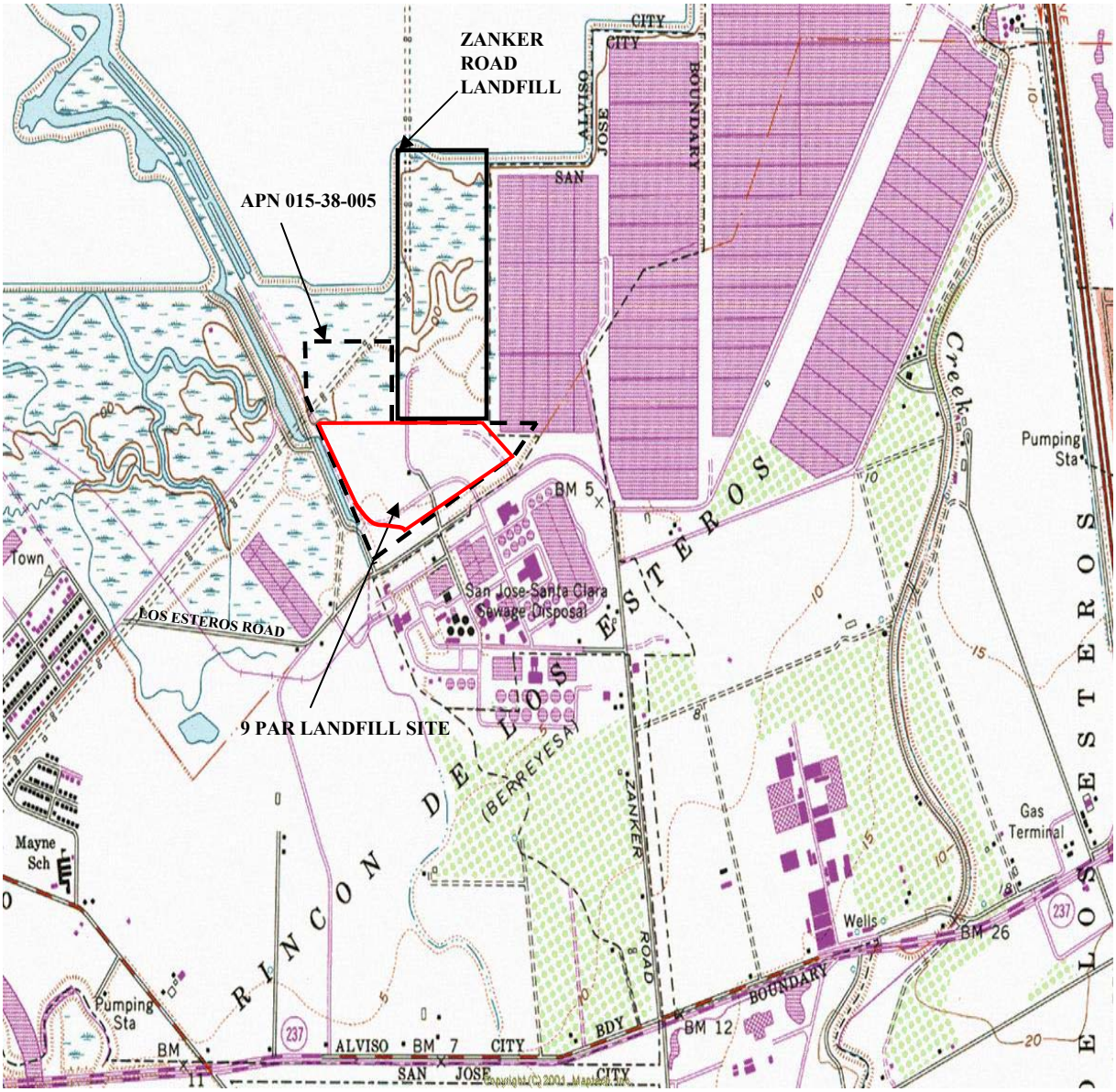
- Flexible connections for water and sanitary sewer utilities: $5,000 each.

- Design and permitting for landfill-related improvements (final grading and cap improvements, post-closure maintenance plan, landfill gas control and monitoring systems, water quality monitoring system, utilities): $400,000 to $525,000. This cost assumes grading and drainage improvements for a 40-acre engineered cap, utility design specific to the landfill, and preparation of a landfill post-closure monitoring plan. This cost excludes standard civil, architectural, structural, landscape and other engineering disciplines associated with development at an undisturbed site.

- Landfill post-closure monitoring and maintenance: $90,000 to $110,000 per year for landfill gas probe monitoring and building sensor calibration, groundwater and surface water monitoring, and settlement inspections. These costs exclude remedial actions, settlement and foundation repairs, landfill cover maintenance and repairs.

These costs are preliminary and exclude land use and CEQA permit considerations, and other site improvements independent of the landfill. Actual costs will vary based on final end use plans, facility design and regulatory considerations.

FIGURES



Adapted from USGS Map, California 7.5 Minute Series, Milpitas, CA (Photo revised 1980) Quadrangle.

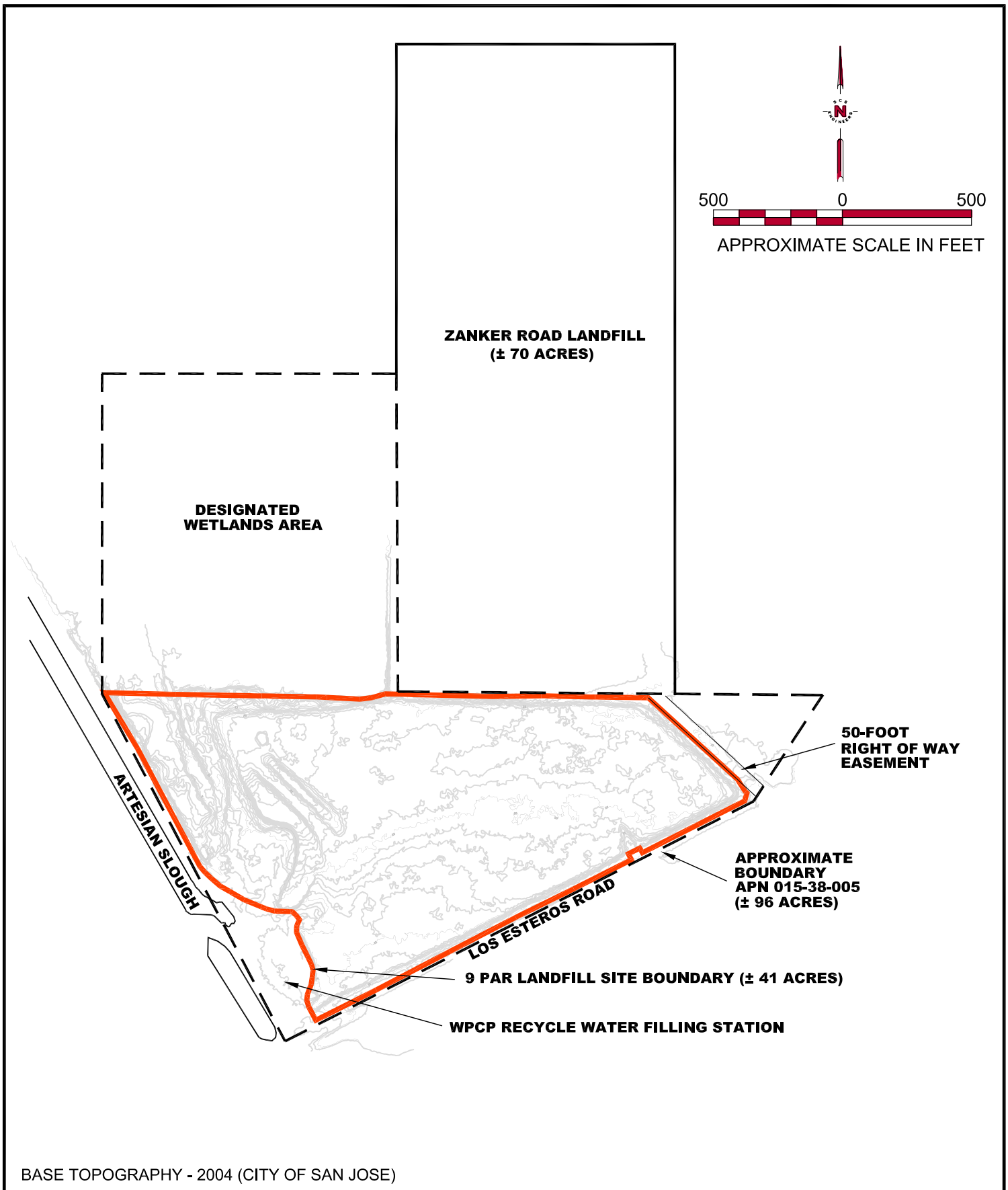
SCS ENGINEERS

6601 Koll Center Parkway,
Suite 140
Pleasanton, CA 94566
Ph: (925) 426-0080
Fax: (925) 426-0707

PROJECT NO: 01206142.00		CHECKED BY: JJM
DESIGNED BY: HLG	SCALE: NTS	APPROVED BY: JJM
DRAWN BY: HLG	DATE: 3/07	FILE:

FIGURE 1

SITE LOCATION
9 PAR LANDFILL SITE
SAN JOSE, CALIFORNIA



BASE TOPOGRAPHY - 2004 (CITY OF SAN JOSE)

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CALIFORNIA 94566
PHONE: (925) 426-0080 FAX.: (925) 426-0707

SITE VICINITY MAP	SCALE: AS SHOWN	FIGURE NO.
9 PAR LANDFILL SITE SAN JOSE, CALIFORNIA	PROJECT NO. 01206142.00 DATE: 4-6-07	2

DESIGNATED WETLANDS AREA

ZANKER ROAD LANDFILL (± 70 ACRES)

4" RECYCLED WATER PIPELINE

50-FOOT RIGHT OF WAY EASEMENT

ARTESIAN SLOUGH

NOA STOCKPILE LOCATION (APPROX.)

AIRPORT-RENZEL SOIL STOCKPILE

LOS ESTEROS ROAD

CYCLONE FENCE

APPROXIMATE BOUNDARY APN 015-38-005 (± 96 ACRES)

16" RECYCLED WATER PIPELINE

6" RECYCLED WATER PIPELINE

WPCP RECYCLE WATER FILLING STATION

A 1

B 1

TP-2, TP-3, TP-4, TP-5, TP-6, TP-7, TP-8, TP-9, TP-10, TP-10A, TP-11, TP-12, TP-13, TP-14, TP-15, TP-16

B-1 (26.5'), B-2 (56.5'), B-3 (41.5'), B-4 (76.5'), B-5 (21.5'), B-6 (21.5'), B-7 (16.5'), B-8 (11.5')

RL-1, RL-2, RL-3, RL-4, RL-5

LEGEND

	SOIL STOCKPILE - VARIOUS SOURCES	B-8 (11.5')	EXPLORATORY BORING (FEET BGS)
	NEW CIVIC CENTER SURPLUS SOIL STOCKPILE	TP-2	TEST PIT LOCATION (APPROXIMATE)
	AIRPORT - NORTH CONCOURSE SURPLUS SOIL STOCKPILE	RL-4	RESISTIVITY LINE (APPROXIMATE)
	MAGNETOMETER SURVEY AREA (2007) (APPROXIMATE)		

200 0 200

APPROXIMATE SCALE IN FEET

BASE MAP PROVIDED BY THE CITY OF SAN JOSE. AERIAL PHOTO PROVIDED BY GOOGLE EARTH.

SCS ENGINEERS
Environmental Consultants & Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

PROJ. NO.	DWN. BY:	ACAD FILE:
01206142.00	TMS	Figure 3.dwg
DSN. BY:	CHK. BY:	APP. BY:

FIGURE TITLE: SITE PLAN SHOWING INVESTIGATION LOCATIONS AND CROSS SECTIONS

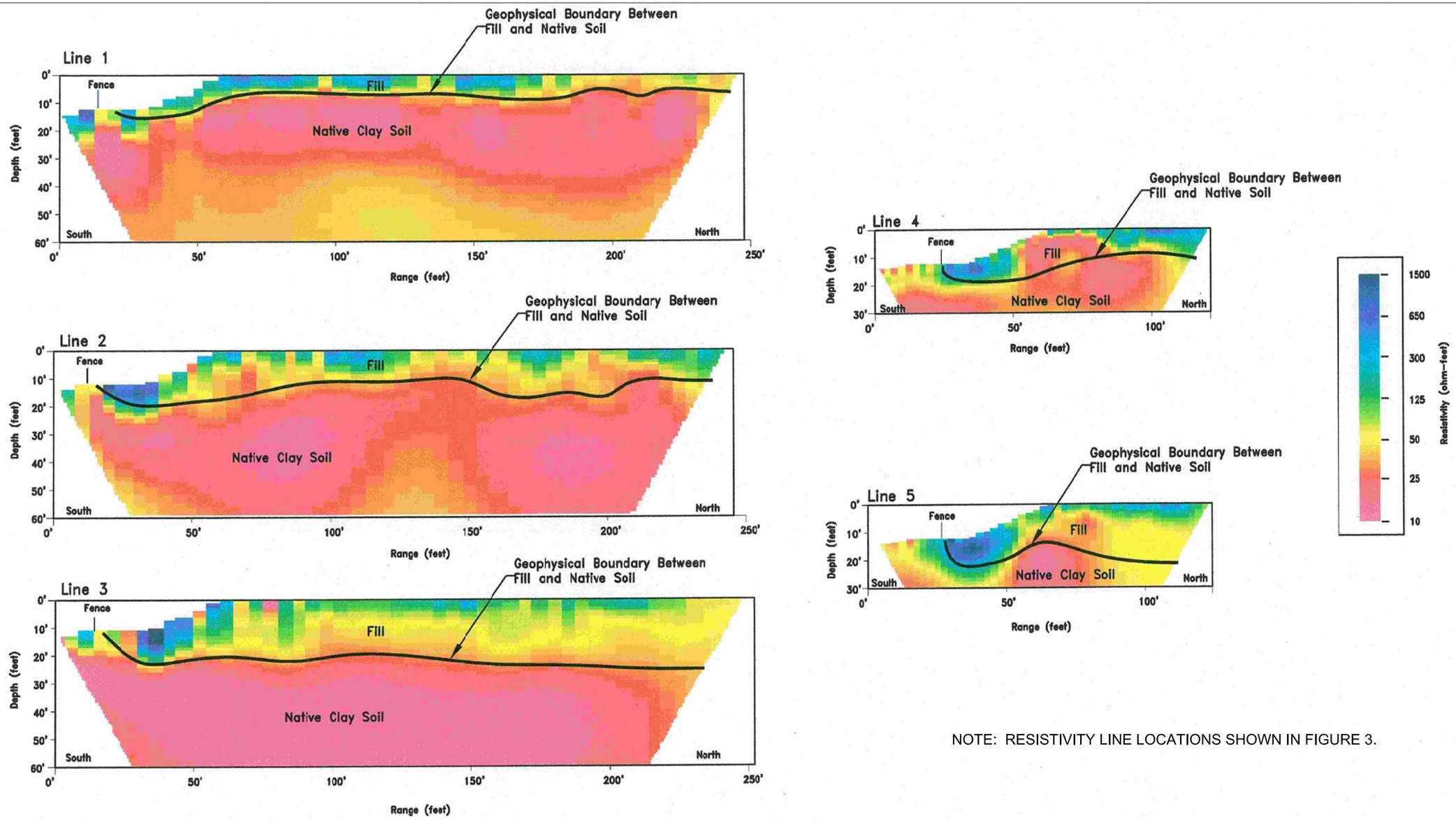
PROJECT TITLE: 9 PAR LANDFILL SITE
SAN JOSE, CALIFORNIA

NO.	REVISION	DATE

9/14/2007

SCALE: AS SHOWN

FIGURE: 3



NOTE: RESISTIVITY LINE LOCATIONS SHOWN IN FIGURE 3.

SOURCE: JR ASSOCIATES, GEOPHYSICAL INVESTIGATION, NINE PAR LANDFILL, 6/2007

SCS ENGINEERS
Environmental Consultants & Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

PROJ. NO.	DWN. BY:	ACAD FILE:
01206142.00	TMS	Figure 4
DSN. BY:	CHK. BY:	APP. BY:
	JJM	JJM

FIGURE TITLE: RESISTIVITY PROFILES

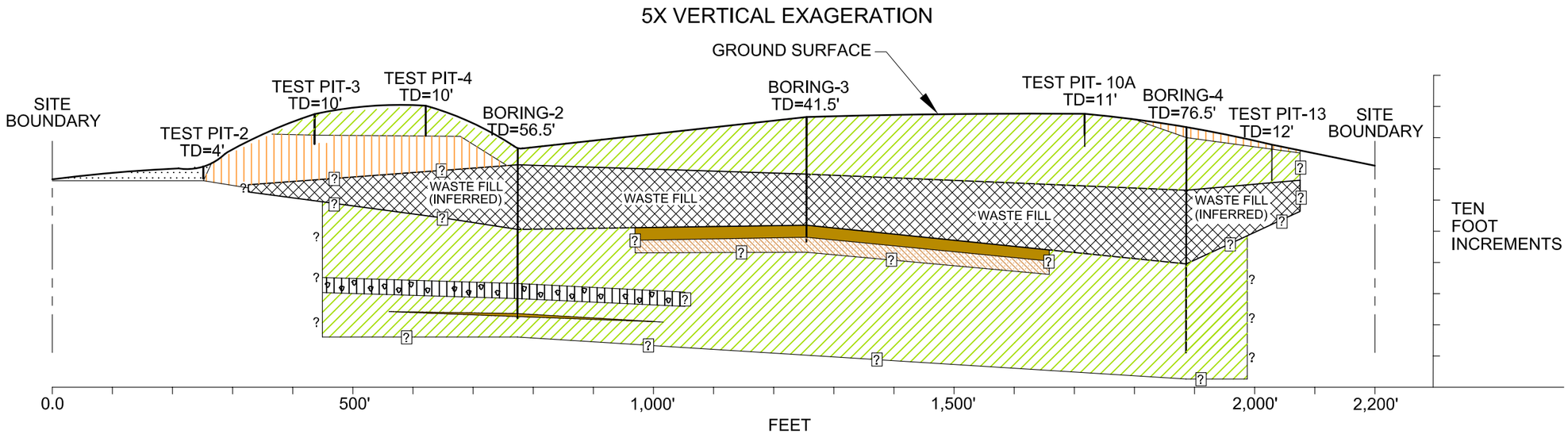
PROJECT TITLE: 9 PAR LANDFILL SITE, SAN JOSE, CALIFORNIA

NO.	REVISION	DATE

9/14/2007

SCALE: AS SHOWN

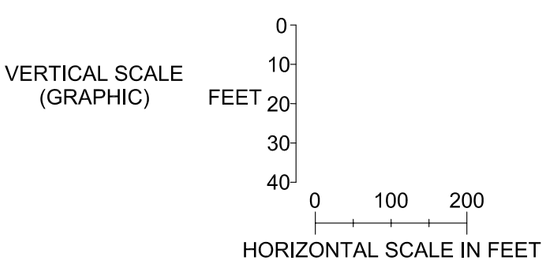
FIGURE: 4



A/1 CROSS SECTION

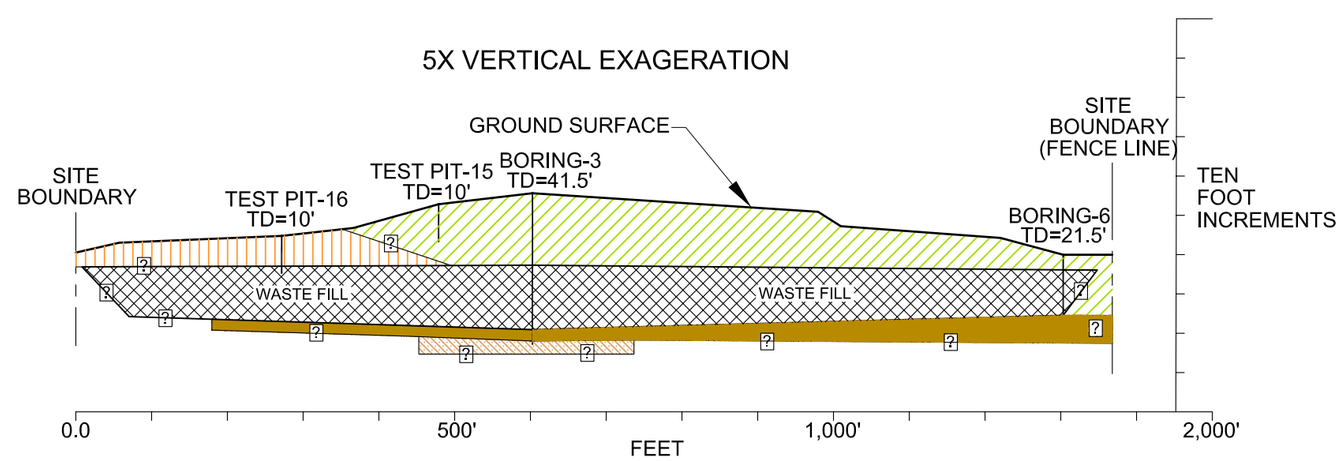
SEE LEGEND FOR SCALE

LEGEND



SOIL CLASSIFICATION (USCS)

- CL
- ML
- WASTE FILL
- SC
- SM
- SW
- PT



B/1 CROSS SECTION

SEE LEGEND FOR SCALE

SCS ENGINEERS
Environmental Consultants & Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

PROJ. NO.	DWN. BY:	ACAD FILE:
01206142.00	TMS	
DSN. BY: T. SISON	CHK. BY:	APP. BY:

CROSS SECTIONS

PROJECT TITLE:

9 PAR LANDFILL SITE
SAN JOSE, CALIFORNIA

NO.	REVISION	DATE

8/13/2007

SCALE: AS SHOWN

FIGURE : 5

TABLES

Table 1. Summary of Soils Laboratory Test Results
Nine Par Landfill Site, 2100 Los Esteros Road, San Jose, California
San Jose, California

Sample ID, Depth	Sample Date	R Value	Permeability	USCS Classification	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Moisture Content	Dry Density	Internal Friction Angle, Φ	Cohesion
			cm/sec					%	pcf	degrees	psf
Existing Soil Cover--											
TP-8, 2'	6/8/2007	NA	NA	NA	**35**	**16**	**19**	NA	NA	NA	NA
TP-10, 2'	6/6/2007	NA	NA	**SM**	NA	NP	NP	NA	NA	NA	NA
TP-12, 2'	6/7/2007	NA	NA	**SC**	**32**	**18**	**14**	NA	NA	NA	NA
TP-14, 2'	6/7/2007	NA	NA	NA	**34**	**19**	**15**	NA	NA	NA	NA
TP-16, 2'	6/7/2007	NA	NA	**SC**	**31**	**20**	**11**	NA	NA	NA	NA
Stockpiled Soils (Potential Cap Materials) --											
B-3, 4'	6/6/2007	NA	NA	**CL**	**47**	**22**	**25**	NA	NA	NA	NA
B-4, 4.5'	6/5/2007	**8**	NA	**CL**	**46**	**24**	**22**	NA	NA	NA	NA
TP-3, 2'	6/6/2007	NA	NA	**GC**	**29**	**18**	**11**	NA	NA	NA	NA
TP-4, 2'	6/6/2007	**22**	**3.0E-07**	**CL**	**30**	**18**	**12**	NA	NA	NA	NA
TP-5, 3'	6/6/2007	**9**	**1.0E-04**	**GC**	**41**	**23**	**18**	NA	NA	NA	NA
TP-6, 2'	6/6/2007	NA	NA	**CL**	**30**	**19**	**11**	NA	NA	NA	NA
TP-15, 2'	6/6/2007	**<5**	**2.0E-07**	**CL**	**36**	**16**	**20**	NA	NA	NA	NA
Bay Mud Soils Underlying Refuse --											
B-2, 31'	6/5/2007	NA	**3.0E-08**	NA	NA	NA	NA	NA	NA	NA	NA
B-2, 46'	6/5/2007	NA	NA	**SM**	NA	NA	NA	NA	NA	NA	NA
B-2, 50.5'	6/5/2007	NA	NA	NA	NA	NA	NA	**25.1**	**102.4**	**28.9**	**150**
B-4, 56'	6/5/2007	NA	**3.0E-08**	NA	NA	NA	NA	NA	NA	NA	NA
B-4, 66'	6/5/2007	NA	NA	**CL**	NA	NA	NA	NA	NA	NA	NA
B-4, 71'	6/5/2007	NA	NA	NA	NA	NA	NA	**22.8**	**107.4**	**24.0**	**280**

Notes:

See Appendix E for descriptions of various soil engineering properties

R-Value analyzed using Caltrans Method 301

Permeability analyzed using ASTM Method 5084

USCS Classification derived from Sieve Analysis analyzed using ASTM Method 422

Liquid Limit, Plastic Limit, and Plasticity Index analyzed using ASTM Method 4318

Moisture Content analyzed using ASTM Method 2216

Dry Density analyzed using ASTM Method 2937

Internal Fricion Angle and Cohesion derived from Direct Shear analyzed using ASTM Method 3080

cm/sec = centimeters per second

pcf = pounds per cubic foot

pfs = pounds per square foot

NA = not analyzed

NP = not plastic

TABLE 2. PAVEMENT SECTION RECOMMENDATIONS

Traffic Index = 4.0 (Parking Stalls)

ALTERNATIVE	AC Thickness, Inches	AB Thickness, Inches	Compacted Subgrade, Inches
Two-layer	2.0	8.5	6

Traffic Index = 4.5 (not more than two 3-axle trucks per week)

ALTERNATIVE	AC Thickness, Inches	AB Thickness, Inches	Compacted Subgrade, Inches
Two-layer	2.5	9.0	6

Traffic Index = 5.0 (not more than two 3-axle trucks per day)

ALTERNATIVE	AC Thickness, Inches	AB Thickness, Inches	Compacted Subgrade, Inches
Two-layer	2.5	11	6

Traffic Index = 5.5 (not more than four 3-axle trucks per day)

ALTERNATIVE	AC Thickness, Inches	AB Thickness, Inches	ASB Thickness, Inches	Compacted Subgrade, Inches
Two-layer	3.0	12.0	--	6
Three Layer	3.0	5.0	7.5	6

Traffic Index = 6.0 (not more than nine 3-axle trucks per day)

ALTERNATIVE	AC Thickness, Inches	AB Thickness, Inches	ASB Thickness, Inches	Compacted Subgrade, Inches
Two-layer	3.0	13.5	--	6
Three-Layer	3.0	6.0	8.5	6

Traffic Index = 8.5 (one hundred 3-axles trucks per day; 10-year design life)

ALTERNATIVE	AC Thickness, Inches	AB Thickness, Inches	ASB Thickness, Inches	Compacted, Subgrade, Inches
Two-layer	4.0	22	--	6
Three Layer	4.0	11	13	6

AC Asphaltic Concrete
AB Aggregate Base compacted to at least 95 percent relative compaction (CAL test 216)
ASB Aggregate Subbase compacted to at least 95 percent relative compaction ASTM D-1557 and R-value >40
Subgrade Subgrade soils compacted to at least 95 percent relative compaction (ASTM D-1557)

Traffic Index is a measure of the number of 18-kip Equivalent Single Axle Load expected in the traffic lane, over the pavement design life.

APPENDIX A

SANTA CLARA VALLEY WATER DISTRICT EXPLORATORY BORING PERMIT (BORINGS B-2 AND B-4)

Santa Clara Valley Water District

5750 Almaden Expressway San Jose, CA 95118-3614

RECEIVED MAY 15 2007 S.C.V.W.D.

APPLICATION TO DRILL EXPLORATORY BORINGS

FC 285 (04-04-07)

Date Issued:	Expiration Date:	District Permit No.:
5-22-07	11-22-07	07E00113

Client (if different from property owner):	Property Owner:	Name of Business/Residence at Site:
SAME	City of San Jose	Non Active 9 Par Landfill
Client's Address:	Property Owner's Address: 200 East Santa Clara St. 10th Floor	Address of Site: 2100 Los Esteros Rd.
City, State, Zip:	City, State, Zip: San Jose, CA 95113	City, State, Zip: San Jose, CA 95002
Telephone No.:	Telephone No.: (408) 535-8550	Assessor's Parcel Number of Site: Book: 015 Page: 38 Parcel: 005

Consulting Company Name:	Drilling Company Name:	
SCS Engineers	HEW	
Address: 6601 Koll Center Pkwy, suite 140	Address: P.O. Box 51182	
City, State, Zip: Pleasanton, CA 94566	City, State, Zip: Palo Alto, CA 94303	C-57/C-61 License No: 604987
Telephone No.: (925) 426-0080	Telephone: (650) 322-2851	
☐ Check if address or phone number has changed.	☐ Check if address or phone number has changed.	

In space at right sketch location of proposed boring(s) in sufficient detail to identify location. In addition to distances to nearest street and intersection, show distances to any existing structures, landmarks or topographic features.

How many borings will be installed on parcel? 2

☐ Proposed borings on SCVWD property/easement*

* See Page 2, Condition F.

Proposed depth of boring(s):

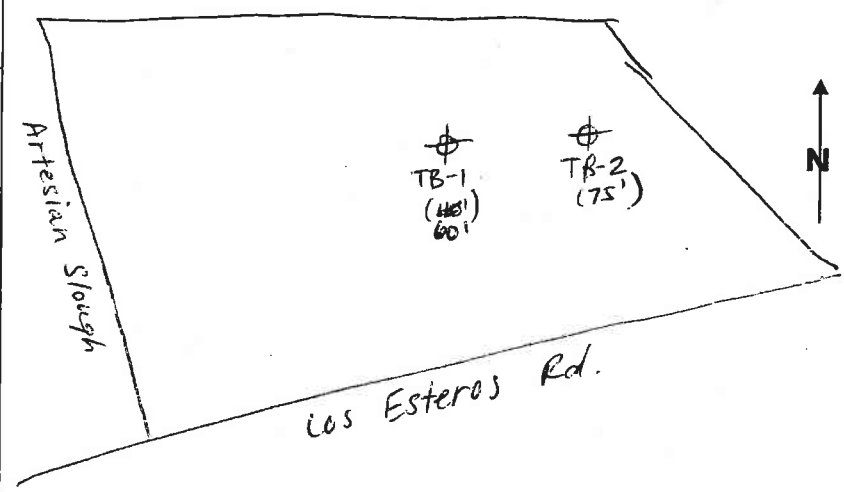
- ☒ 45 to 150 feet
- ☐ 151 to 300 feet
- ☐ Over 300 feet

Type of boring(s):

- ☒ Hollow stem
- ☐ Rotary
- ☐ CPT/Hydropunch
- ☐ Other: _____

NOTE: NO PERMIT IS REQUIRED FOR BORINGS UNDER 45 FEET DEEP

SITE PLAN – PLEASE DRAW ACCURATELY



I understand that all work is to be done in accordance with S.C.V.W.D. Ordinance 90-1, "The District Well Standards," and the conditions of this permit (see page 2). I also certify that the information given above is correct. **NOTE:** All applicable signatues must be present before permit will be processed.

Signature of Property Owner/Agent:	Print/Type Name: Napp Fukuda	Date: 5/8/07
Signature of Client/Agent:	Print/Type Name: Napp Fukuda	Date: 5/8/07
Signature of Driller/Agent: for Henry Wong	Print/Type Name: EVELYN J. WONG for HENRY WONG	Date: 5/10/07
Signature of Consultant:	Print/Type Name: Ted Sison	Date: 5-7-07

IMPORTANT: A minimum 24-hour notice must be given to SCVWD Well Inspection Dept. prior to installing the annular seal. Call (408) 265-2607, Ext. 2660. For weekends, holidays, and after hours call (408) 265-2607, extension 2120.

GENERAL CONDITIONS

A. SCVWD (Telephone 408-265-2607, Ext. 2660) MUST BE NOTIFIED A MINIMUM OF ONE WORKING DAY BEFORE THE EXPLORATORY BORING IS BACKFILLED. An authorized District representative must be on site to witness the sealing operation. This requirement may be waived by an authorized District representative. If the District waives the inspection requirement, the District may request the Permittee(s) to furnish certification under penalty of perjury that the seal was constructed in accordance with the District Well Standards.

B. This Permit is valid only for the purpose specified herein. Boring destruction methods authorized under this Permit may not be changed except by written approval of an authorized District representative, and only if the District believes that such a change will result in equal or superior compliance with the District and State Well Standards (e.g. if the District representative finds that site conditions warrant such a change).

C. This Permit is only valid for the Assessor's Parcel Number indicated on it.

D. This Permit may be voided if it contains incorrect information.

E. Borings shall be sealed within 24 hours following completion of testing or sampling activities. Borings shall not be left in such a condition as to allow for the introduction of surface waters or foreign materials into them. Borings shall be secured such that they do not endanger public health.

F. If any work associated with this Permit will take place on SCVWD property/easement, an encroachment or construction permit must be granted by the District's Community Projects Review Unit (telephone (408) 265-2607, Ext. 2350, 2217, or 2253).

G. The Permittee(s) shall assume entire responsibility for all activities and uses under this Permit and shall indemnify, defend, and hold the District, its officers, agents, and employees free and harmless from any and all expense, cost, and liability in connection with or resulting from the granting or exercise of this Permit including, but not limited to, property damage, personal injury, and wrongful death.

H. Permittees are required to be in full compliance with Cal/OSHA California Labor Code Section 6300.

I. A current C-57 or C-61 Contractors License is required for work associated with this Permit.

J. Permittee, permittee's contractors, consultants or agents shall be responsible to assure that all materials or waters generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statues regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where the work is being completed.

K. The driller and consultant (if applicable) shall have an active copy of their Worker's Compensation Insurance on file with the District.

L. This Permit shall expire if not exercised within 180 calendar days of its approval, unless an extension of the Permit expiration date is granted by an authorized District representative.

M. This Permit shall be kept on-site during all activities associated with it and shall immediately be presented to an authorized District representative upon request.

Permit Approved By:	Date: 5-22-07

PLEASE ALLOW TEN (10) WORKING DAYS TO PROCESS THIS APPLICATION

Santa Clara Valley Water District
5750 ALMADEN EXPRESSWAY
SAN JOSE, CA 95118-3686

2100 Los Esteros Rd., SJ

APN: 01538005
2100 LOS ESTEROS RD
SAN JOSE CA
95002

Well Annotations- 1 Wells Selected

No	Well_nbr	Permit	Consultnum	Status	Easting	Northing
1	06S01W02N001	No Data	No Data	Abandoned	6140586	1983899

PARCELS.SHP
Wells.shp
- Water Supply - Active
- Water Supply - Standby
- Water Supply - Inactive
- Extraction (Env) - Active
- Extraction (Env) - Inactive
- Other - Active
- Other - Inactive
- Abandoned
- Destroyed
- Status Undetermined

COUNTY.SHP

Approximate Scale
250 0 250 500 Feet

o:\arcview\post_gps_check\gpschk.apr

May 22, 2007

APPENDIX B

GEOPHYSICAL INVESTIGATION REPORT (JR ASSOCIATES)

J R ASSOCIATES

Engineering Geophysics
1886 Emory Street
San Jose, CA 95126
(408) 293-7390

GEOPHYSICAL INVESTIGATION OF THE SOUTHERN BOUNDARY OF THE NINE PAR LANDFILL, LOS ESTEROS ROAD SAN JOSE, CALIFORNIA

June 5, 2007

for

SCS Engineers, Incorporated
6601 Koll Center Parkway
Pleasanton, California 94566

by

James Rezowalli
California Registered Geophysicist, GP-921

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I INTRODUCTION

This report presents the results of a geophysical investigation performed at the Nine Par Landfill site in San Jose, California. The investigation was performed for SCS Engineers, Incorporated, by J R Associates. The purpose of the investigation was to map the southern boundary of fill material adjacent to Los Esteros Road. James Rezowalli, Principal Geophysicist, and Robert Wing, Technician, of J R Associates performed the field work in May 2007.

A. Site Conditions

The Nine Par Landfill is off Los Esteros Road in San Jose, California (Drawing 1). SCS Engineers described the site as a former landfill and that it contained soil stock piles from various sources. The landfill's boundary along Los Esteros Road was not clearly defined and there was some question as to whether or not the landfill might have extended into the road. The purpose of our investigation was to look for geophysical anomalies associated with fill material and use the anomalies to map the southern boundary of the landfill.

II METHODOLOGY

We used a combination of magnetics and soil resistivity for the investigation. Magnetics maps anomalies in the earth's magnetic field caused by buried metal. In refuse, the metal is from discarded household items. In construction debris, the metal is usually from reinforcing materials in concrete, either wire mesh or rebar. The magnetic field in a site free of metal is uniform and featureless such as the magnetic field shown on the left side of Drawing 2. The magnetic field in a site with buried metal has numerous anomalies such as the magnetic field shown on the right in Drawing 2. The boundary of the magnetic anomalies is a good indicator of the boundary of fill material containing metal.

A soil resistivity method called dipole-dipole resistivity profiling was used to augment the magnetic results. Resistivity profiling measures a material's ability to conduct electricity. Fill material usually has a different electrical resistivity than the underling native soils. The native clay soils in the area of the Nine Par Landfill have low resistivity values. Organic rich household refuse typically has resistivity values lower than the native clays while construction debris that consists of aggregate, concrete and asphalt, has resitivities much higher than the native soils. By profiling changes in resistivity with depth, we can estimate the depth of fill material. Resistivity profiling also helps map the boundary of fill material that might not contain metal debris.

A. Instrumentation

We used a Geometrics model 858 cesium vapor magnetometer to collect magnetic data at the site. The magnetometer had two sensors and an electronics package. The magnetometer

collected both total field data and vertical gradient data. The magnetometer can discriminate to 0.1 gammas in a total field of 40,000 to 60,000 gammas. Magnetic readings were stored in memory with the time of day, station numbers and line numbers of the readings. The data were downloaded to a computer and contoured.

The resistivity equipment consisted of a Sorensen DCR 600-3B DC power supply, a Fluke 45 digital multimeter and a Keithley KPCI-3116 data acquisition system. The DC power supply was used to inject a current into the ground. The amount of current, typically around 0.5 amps, was measured with the multimeter. The electrical potential field developed by the injected current was measured with the Keithley data acquisition system. The potential field typically ranged from 5 to 500 millivolts. This type of resistivity measurement is sometimes referred to as a four-point method.

B. Field Procedures

The area where magnetic data were collected is shown on Drawing 3. Magnetic data were collected continuously along lines spaced 10 feet apart. At the end of the field day, the magnetic data were downloaded and contoured to look for magnetic anomalies. An anomaly is indicated by a series of concentric magnetic contours.

Resistivity data were collected along five profile lines crossing the area investigated (Drawing 4). Lines 1, 2 and 3 were 250 feet long and lines 4 and 5 were 125 feet long. The profiles were oriented to cross the fill boundary at right angles. Electrodes were planted in the ground along each resistivity line. The electrodes were planted a few inches into the soil at 5 and 10-foot intervals. A measurement began by injecting current between the first and second electrodes of a line. The potential field was simultaneously measured between the next eight consecutive electrodes. This process was repeated several times while alternating the current direction between readings. The current and potential readings were averaged and noted along with the

current and potential electrode locations. For the next readings, the current was injected into the second and third, then between the third and forth and so on until the end of the line was reached.

C. Resistivity Inversion

The averaged current and potential readings along with the location of the current and potential electrodes for each reading were entered into a dipole-dipole resistivity inversion program. The program creates an initial two-dimensional model of the true electrical resistivity of the soil beneath the line based on the observed data. Next, the program predicts what the field data would look like based on the model. The program then adjusts the model iteratively until the predicted data closely matches the observed data.

III RESULTS

A. Magnetic and Resistivity Data

Drawing 4 is a contour map of the magnetic data collected at the Nine Par Landfill. The magnetic data shows numerous magnetic anomalies north of the cyclone fence that runs along the site's southern boundary. These anomalies are caused by buried metal debris in the fill material. There are anomalies beneath the asphalt in the area where the reclaimed water stations are. There are anomalies south of the fence but these anomalies appear to be mostly associated with surface metal and a buried utility pipe. The surface metal included telephone poles, signs and a storm culvert. The magnetic data suggest the fill occurs north of the fence and underlies the asphalt at the refilling stations. The data suggest the fill does not extend south of the cyclone fence that runs along the site's southern boundary with Los Esteros Road.

The results of the dipole-dipole resistivity profiles are shown in Drawing 5. Drawing 5 illustrates changes in soil resistivity with depth along each resistivity profile. The profiles show an electrical resistive fill material overlying native clay soils. The higher resistivity values of the fill material suggest it consists mainly of construction debris such as dirt, aggregate, concrete or asphalt rather than household waste. The depth of the fill material varies from 10 to 20 feet below the surface. The resistivity data indicates the fill material lies north of the fence and ends at the fence line. This is consistent with the magnetic data. The two shorter resistivity lines, which have a little better resolution of the near surface, suggest the soil north of the fence may have been scooped out to a depth of 7 to 8 feet and deposited 20 feet further into the landfill.

B. Summary

The geophysical data consisting of magnetics and dipole resistivity profiles suggest that fill material at the landfill lies north of the cyclone fence that runs along the boundary between the landfill and Los Esteros Road (Drawing 4). There does not appear to be fill on the south side of the cyclone fence. The fill in the area just north of the fence appears to be construction debris or soil stockpiles consisting of dirt, aggregate, concrete debris and/or asphalt debris rather than household refuse. The fill material appears to be between 10 and 20 feet thick. Fill material underlies the asphalt surrounding the recycled water filling stations on the west side of the Nine Par Landfill.

C. Limitations

Magnetic methods locate ferrous objects from the anomalies they produce in the earth's magnetic field. It is possible some ferrous objects will not produce an anomaly. Some possible reasons are that the object is buried too deep, the object is too small, the object is buried under or near another ferrous object or an object is buried near a utility. It is possible there are materials buried at the site that were not detected by the magnetometer.

Many factors contribute to soil resistivity. Each soil type, sand, silt or clay, has a range of resistivity associated with it and there is overlap between the ranges. Trends in the resistivity data should be correlated to other data regarding the site’s geology, hydrology and history before conclusions are made.

IV DRAWINGS

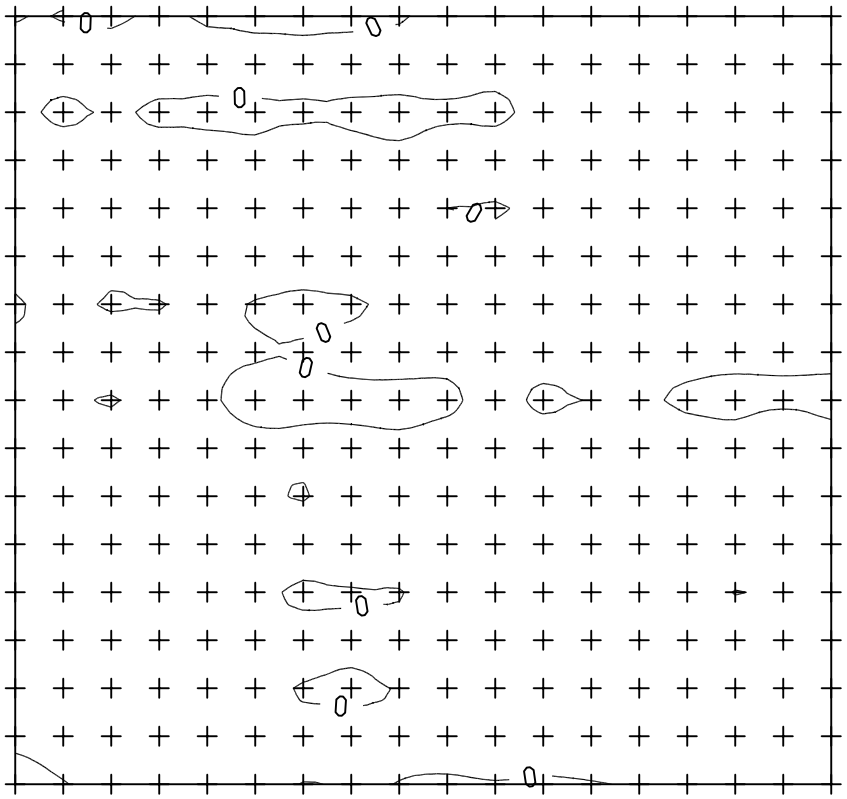
Vicinity Map- Nine Par Landfill
Los Esteros Road
San Jose, California

SCALE:	No Scale		DRAWN BY: J.J.R.
DATE:	6-04-07	JOB NUMBER: 118-013-07	REVISED:

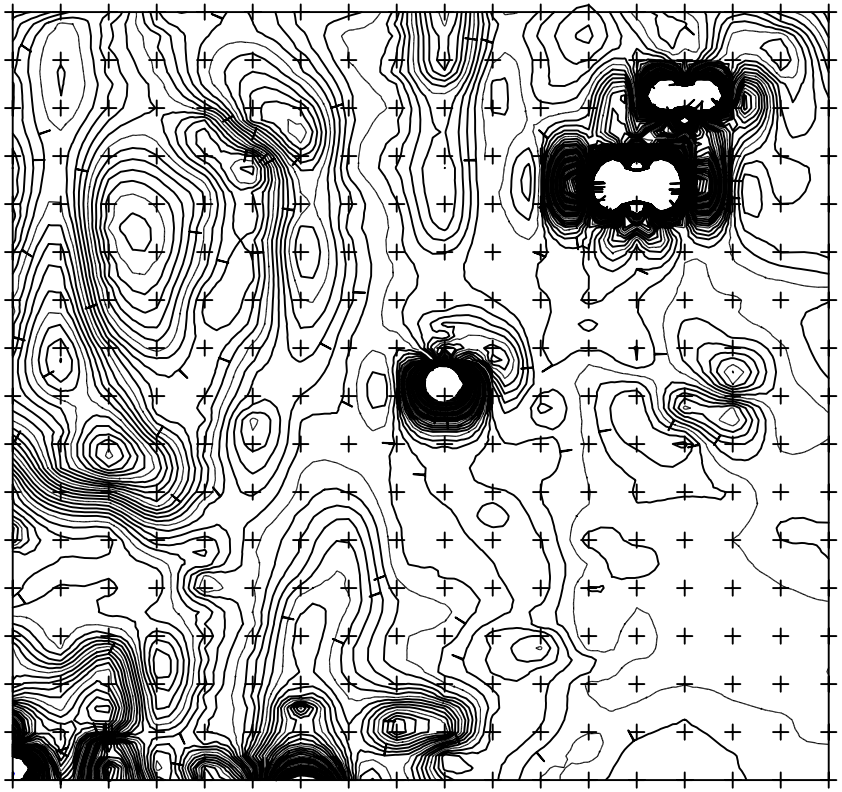
J R ASSOCIATES Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

DRAWING NUMBER:

Clean Site With No Buried Metal



Site With Buried Metal Debris

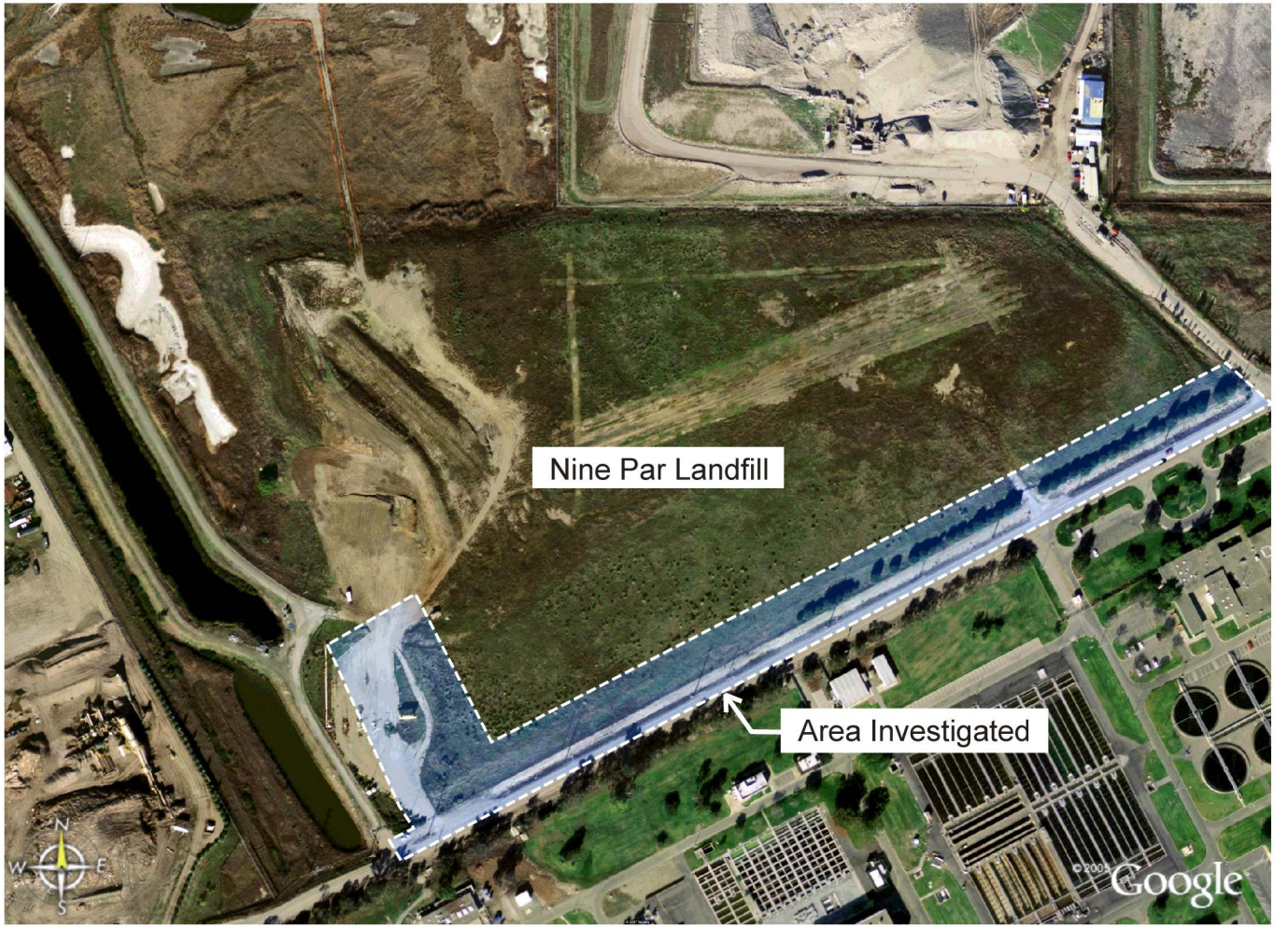


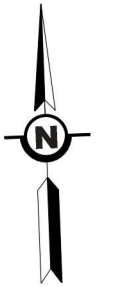
Generic Magnetic Field Examples- Nine Par Landfill
Los Esteros Road
San Jose, California

SCALE: 1" = 40'			DRAWN BY: J.J.R.
DATE: 6-04-07	JOB NUMBER:	118-013-07	REVISED:

J R Associates Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

DRAWING NUMBER: 2



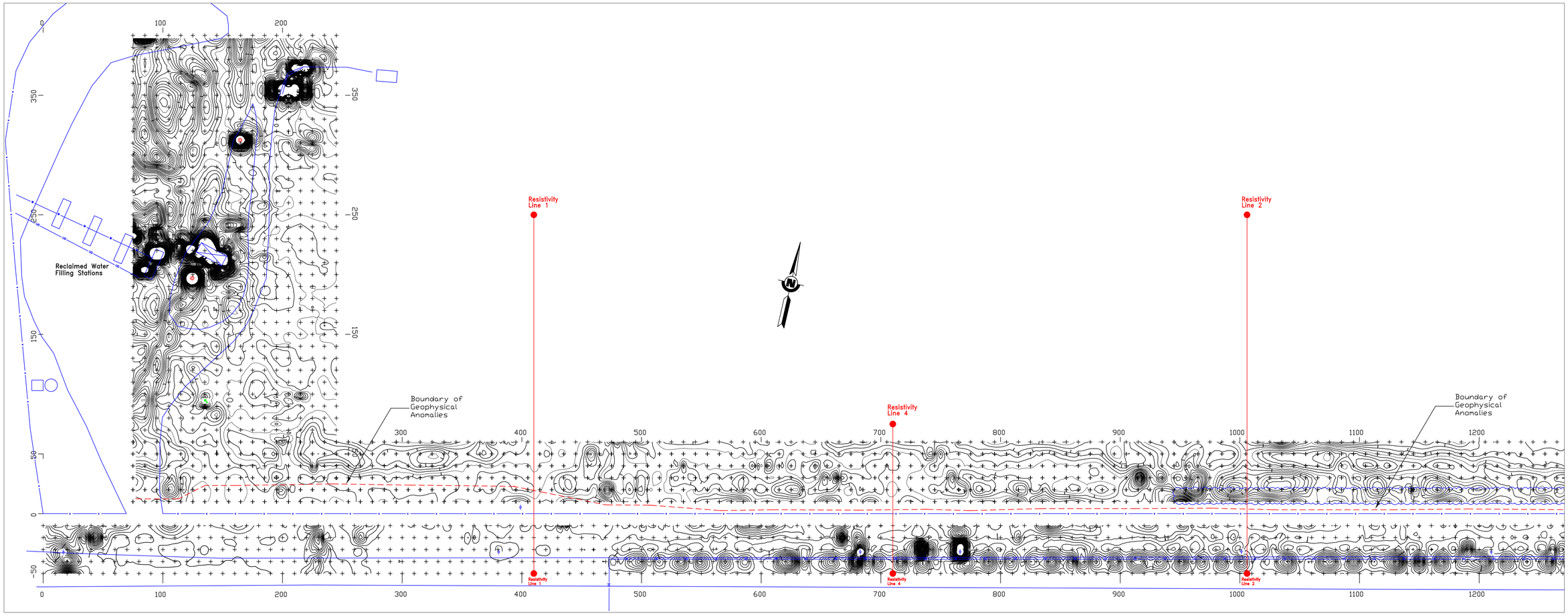


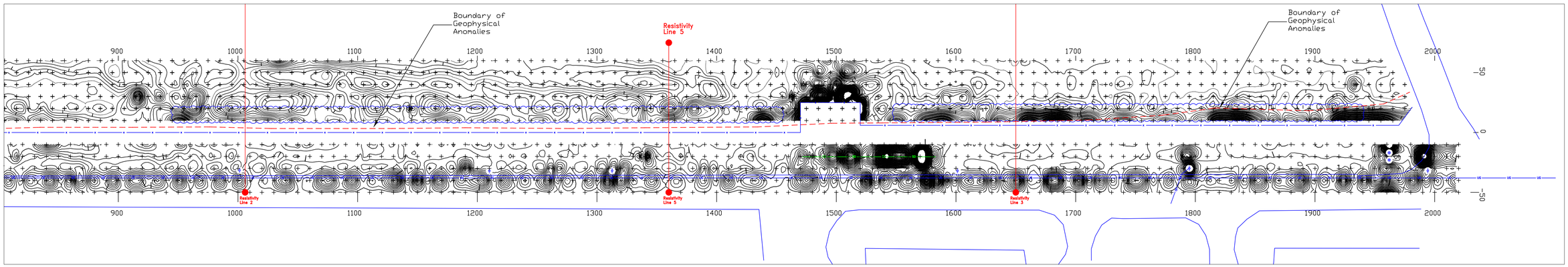
Site Map- Nine Par Landfill
Los Esteros Road
San Jose, California

SCALE:	No Scale		DRAWN BY: J.J.R.
DATE:	6-04-07	JOB NUMBER: 118-013-07	REVISED:

J R ASSOCIATES Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

DRAWING NUMBER:





EXPLANATION:

T	BURIED TELEPHONE	POWER POLE	RESISTIVITY LINE
UG	BURIED PIPE	STREET LIGHT	
E	BURIED ELECTRIC	MANHOLE COVER	
	BURIED GAS	SIGN	
SS	BURIED SEWER	POST	
W	BURIED WATER	VEHICLE	

NOTE: THIS DRAWING SHOWS THE APPROXIMATE LOCATIONS OF UTILITIES FOUND DURING OUR INVESTIGATION. THERE MAY BE ADDITIONAL UTILITIES AND PIPES THAT WERE NOT DETECTED DURING OUR INVESTIGATION AND ARE NOT SHOWN ON THIS DRAWING.

0 40 80 120

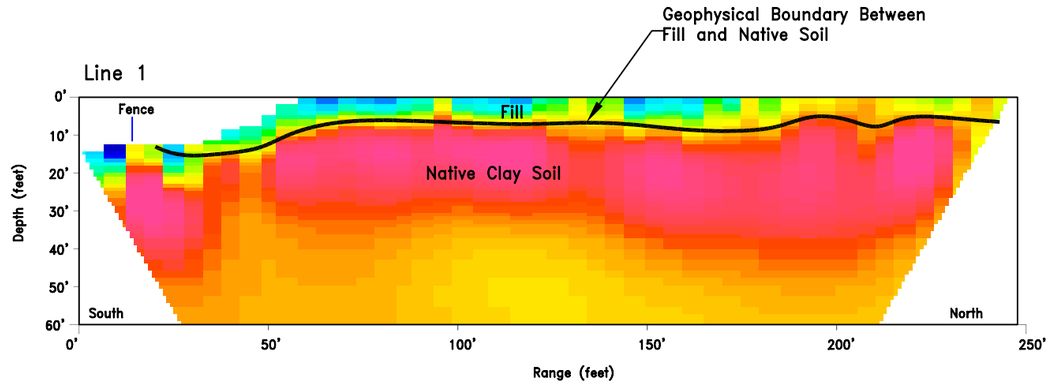
Scale 1" = 40'

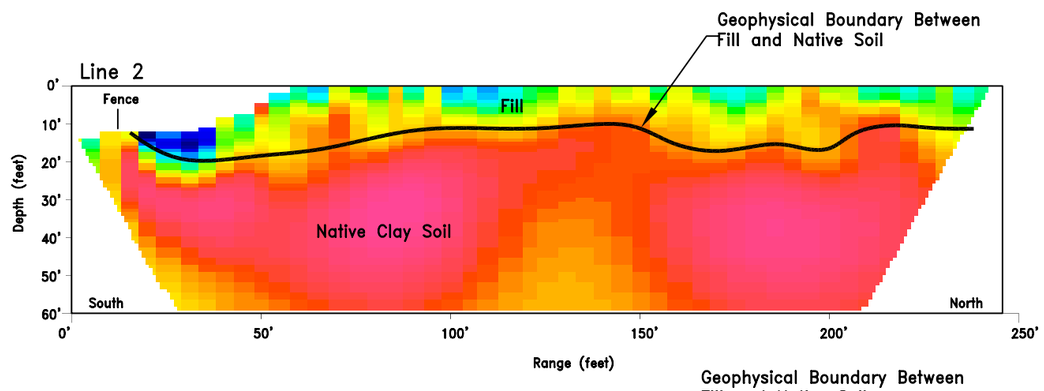
Magnetic Contour Map- Nine Par Land Fill
Los Esteros Road
San Jose, California

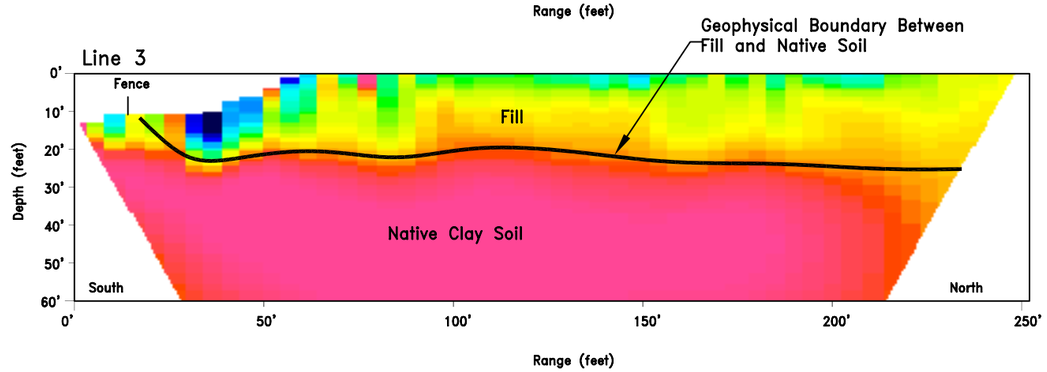
SCALE: 1" = 40'		DRAWN BY:	J.J.R.
DATE: 6-04-07	JOB NUMBER: 018-013-07	REVISED:	

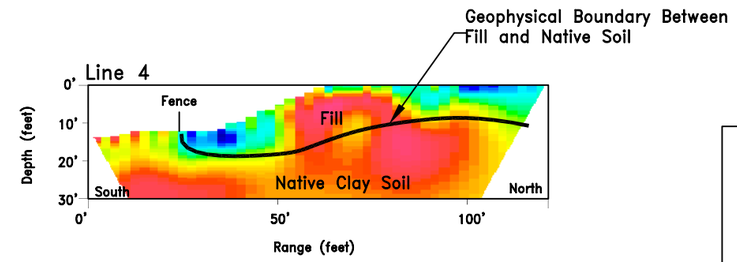
J R Associates Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

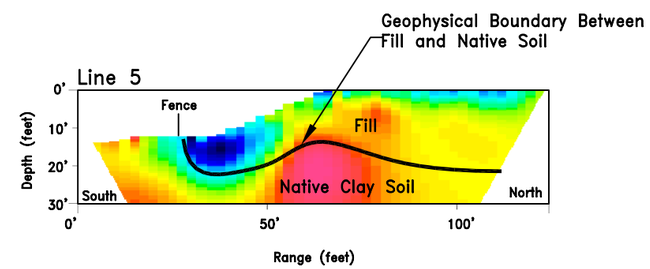
DRAWING NUMBER: 4

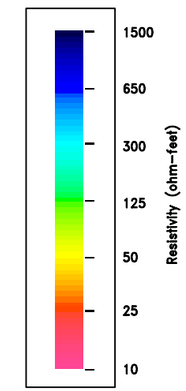












Reisitivy Profiles- Nine Par Landfill
Los Esteros Road
San Jose, California

SCALE: See Diagrams			DRAWN BY: J.J.R.
DATE: 6-04-07	JOB NUMBER:	118-013-07	REVISED:

J R Associates Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

DRAWING NUMBER: 5

APPENDIX C

EXPLORATORY BORING LOGS

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-1

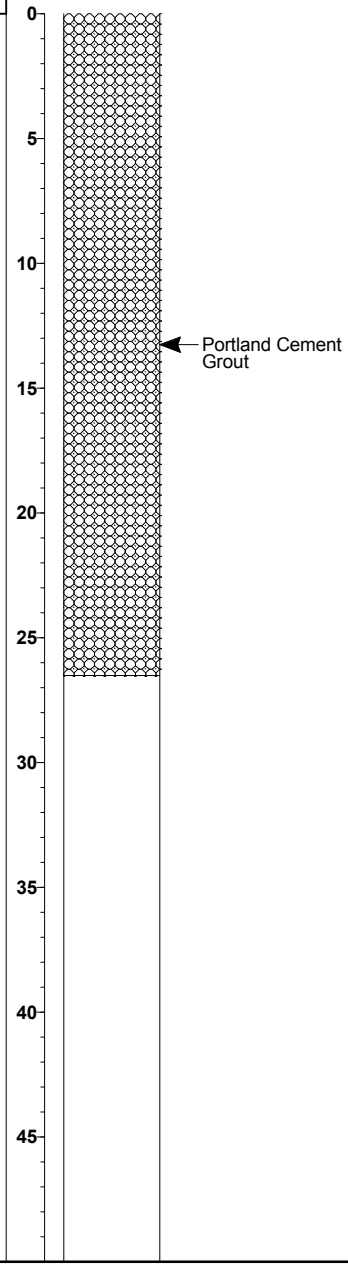
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:
LEL/H2S readings collected at ground surface using Gastech Innova ST.

Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Description
0						Fine sandy clay, few medium to coarse sand and fine gravel, very few coarse sands, brown, moist, no odor.
5	X		12 16 14		CL	Fine sandy clay, very stiff, little silt, very few medium to coarse sands, brown, slightly moist, no odor.
10	X		7 8 8			Waste interface. Soil and mixed waste including glass and metal.
15	X		12 11 7	0.0 LEL/H2S		Poor recovery, mixed waste including carpet, wood, metal, glass, and plastic, moist.
20	X		23 50+			Poor recovery, mixed waste including carpet, wood, metal, glass, and plastic, moist.
						Approximate end of waste.
25	X		10 11 13		CL	Clay,very stiff with medium plasticity, very little very fine sand, dark gray, very moist (bay mud).

Completion Detail



Drilling Company: **HEW Drilling Co. Inc.**
Drilling Method: **Hollow Stem Auger**
Logged By: **T. Sison**
Sampling Method: **Split Spoon and 140 lb Hammer**

Date Started: **6/6/07**
Date Ended: **6/6/07**
Total Depth: **26.5 Feet**
Boring Diameter: **8 inches**

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-2

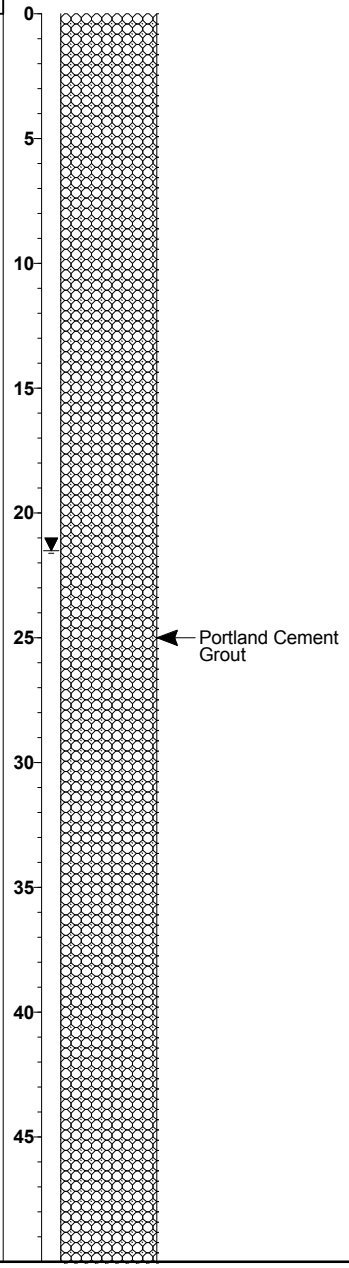
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:
LEL/H2S readings collected at ground surface using Gastech Innova ST.

Depth (meters / feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
0							Very fine sandy clay, some silt, some coarse sand and fine gravel, brown, dry, no odor.
5	X		5 7 11		CL		Fine sandy clay, stiff to very stiff, some medium to coarse sand, very few fine gravels, few roots, dark gray, moist, no odor.
10	X		6 6 6	0.0 LEL/H2S			Mixed waste including wood, glass, canvas, and plastic.
15	X		14 9 8				Mixed waste including wood, glass, canvas, and plastic.
20	X		7 7 10	0.0 LEL/H2S			Mixed waste including wood, glass, canvas, and plastic, further decomposed, wet, black.
25	X		3 4 7				Observed 1968 Fiat advertisement. End of waste, saturated.
30	X ■		3 4 7				Clay, little sand, stiff, light gray with rusty streaks, saturated.
35	X		3 4 7		CL		Clay, some silt, stiff, light gray with rusty streaks, saturated.
40	X		5 11 16				Clay, some silt, stiff, light gray with rusty streaks, saturated.
45	X ■		7 7 10		SM		Sandy silt, stiff, brown, saturated, no odor.
50							

Completion Detail



Drilling Company:	**HEW Drilling Co. Inc.**	Date Started:	**6/5/07**
Drilling Method:	**Hollow Stem Auger**	Date Ended:	**6/5/07**
Logged By:	**T. Sison**	Boring Diameter:	**8 inches**
Sampling Method:	**Split Spoon and 140 lb Hammer**	Depth to Water:	**21.5 Feet**
		Total Depth:	**56.5 Feet**

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

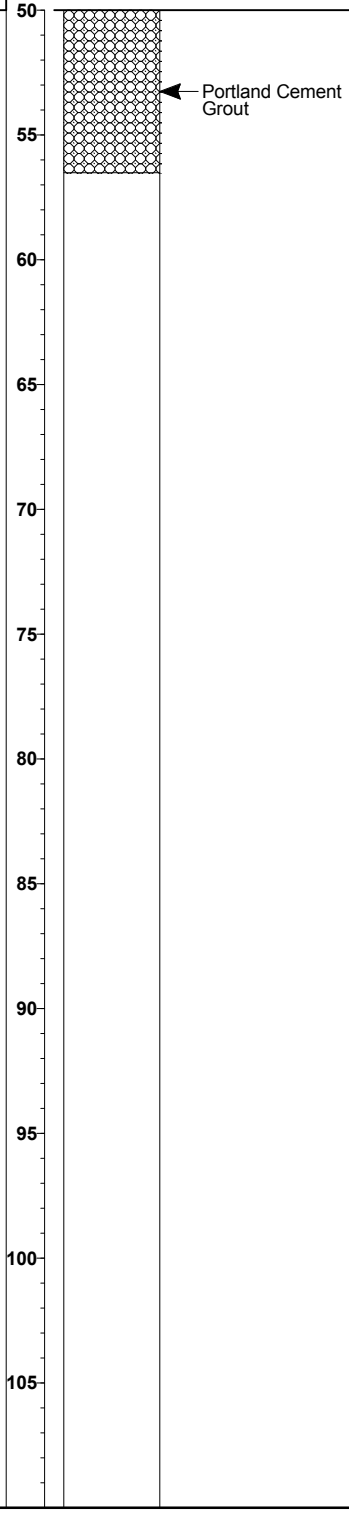
BORING NUMBER: B-2

9 Par Landfill

JOB NUMBER: 01206142.00

Depth (meters)	Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
	50			5 9 15		CL		Fine sandy clay, stiff to very stiff, brown, saturated, no odor.
16								
17	55			8 13 17		SW CL		Fine to medium sand, dense, little clay, saturated, brown, no odor. Fine sandy clay, hard, brown, saturated, no odor.
18	60							
19								
20	65							
21								
22	70							
23	75							
24								
25	80							
26	85							
27								
28	90							
29	95							
30								
31	100							
32	105							
33	110							

Completion Detail



SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-3

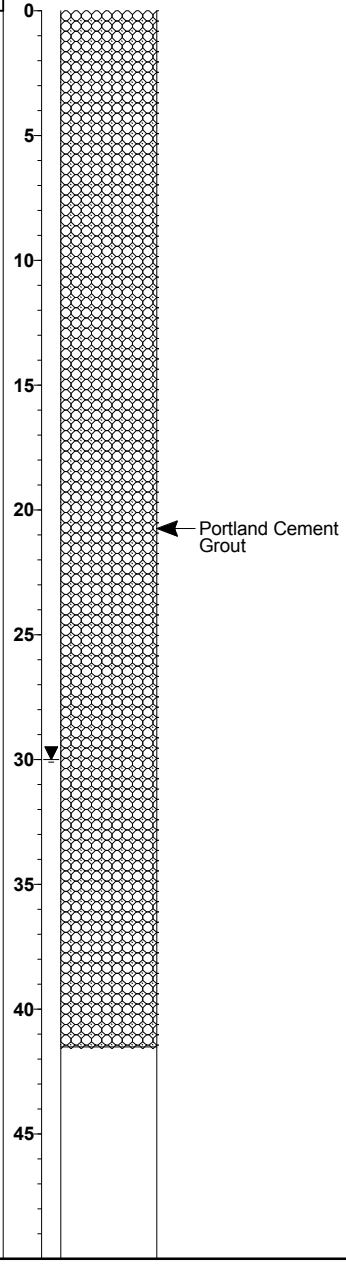
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:
LEL, H2S, and VOC readings collected at ground surface using Gastech Innova ST and MiniRae PID.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
				30 32 35		CL		Fine sandy clay, approximately 60:40, hard, little coarse sand and fine gravel, dark gray, slightly moist, no odor.
				12 15 22				Fine sandy clay, hard, some silt, very few coarse sands, dark brown, slightly moist, no odor.
				8 9 13		CL		Clay, very stiff, little silt, very little fine to coarse sand, dark brown, slightly moist, no odor.
								Approximate interface of waste.
				9 13 13	0.0 LEL/H2S	ML/CL		Very fine sandy silt and clay, stiff, dark brown, slightly moist, no odor. Traces of waste.
				6 8 12				Poor recovery, soil mixed with waste including paper, wood, and plastic.
				36 18 12	0.0 ppm			Mixed waste including paper, wood, metal, and plastic, saturated.
				13 16 26		SW		Fine to medium sand, black, very dense, saturated.
				9 9 18		SC		Clayey fine to medium sand, approximately 70:30, very dense, light to medium brown, saturated.

Completion Detail



Drilling Company:	**HEW Drilling Co. Inc.**	Date Started:	**6/6/07**
Drilling Method:	**Hollow Stem Auger**	Date Ended:	**6/6/07**
Logged By:	**T. Sison**	Boring Diameter:	**8 inches**
Sampling Method:	**Split Spoon and 140 lb Hammer**	Depth to Water:	**30.0 Feet**
		Total Depth:	**41.5 Feet**

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-4

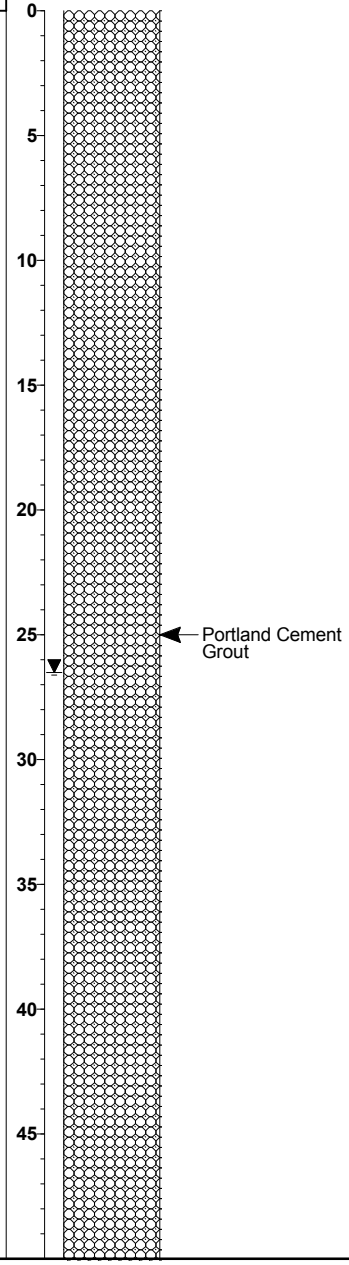
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:
LEL/H2S readings collected at ground surface using Gastech Innova ST.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
0	0					ML		Silt, little clay, light brown, dry, no odor.
1	5	X		15 18 25				Very fine sandy clay, hard, little coarse sand to fine gravel, very few small asphalt pieces, dark gray, dry, no odor. Bulk sample collected.
2		X		15 16 23				
3	10	X		9 11 14		CL		Fine sandy clay, very stiff, some coarse sand and fine gravel, few coarse gravels, greenish-brown, moist, no odor.
4								
5	15	X		11 14 14				Clay, brittle with no plasticity, hard, some very fine sand, some coarse sand and fine gravel, brown, moist, no odor.
6	20	X		5 7 18	0.0 LEL/H2S	SP		4 inch layer of fine sand, dark gray.
7						CL		Clay, stiff, little fine sand, light to medium plasticity, medium to dark gray, moist, no odor. Mixed waste, including plastic and glass debris, wet.
8	25	X		12 6 6				Poor recovery, sandy clay mixed with debris, including glass metal, and plastic, saturated, strong landfill odor.
9	30	X		7 14 50				Mixed waste including glass, plastic, organics, and metal, saturated, strong hydrocarbon like odor.
10								
11	35	X		17 18 20				No recovery, mixed waste including glass, plastic, organics, and metal, saturated, strong hydrocarbon like odor.
12	40	X		20 21 25				Mixed waste including glass, plastic, organics, and metal, saturated, strong hydrocarbon like odor.
13								
14	45	X		7 8 12		CL		Waste ends. Clay, very stiff, some very fine sand, very little medium to coarse sand, light to medium brown, saturated, light hydrocarbon like odor.
15	50							

Completion Detail



Drilling Company:	**HEW Drilling Co. Inc.**	Date Started:	**6/5/07**
Drilling Method:	**Hollow Stem Auger**	Date Ended:	**6/5/07**
Logged By:	**T. Sison**	Boring Diameter:	**8 inches**
Sampling Method:	**Split Spoon and 140 lb Hammer**	Depth to Water:	**26.5 Feet**
		Total Depth:	**76.5 Feet**

STANDARD_LOG 9 PAR LANDFILL.GPJ STD_LOG.GDT 8/17/07

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

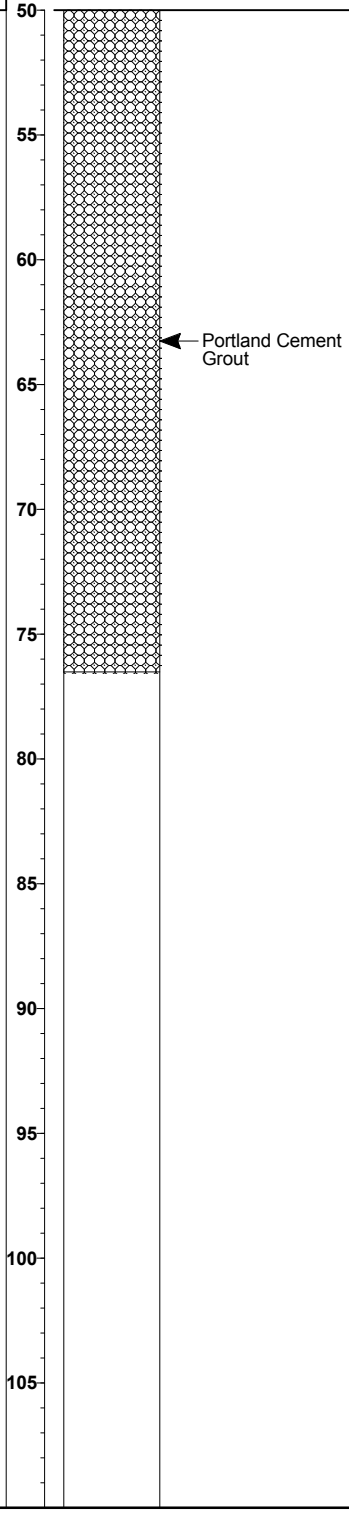
BORING NUMBER: B-4

9 Par Landfill

JOB NUMBER: 01206142.00

Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
50	X		7 11 11				Very fine sandy clay, very stiff, traces of plastic debris, rusty gray and brown, saturated.
55	X ■		5 10 14		CL		Fine to very fine sandy clay, little silt, stiff to very stiff, light to medium brown, saturated.
60	X		8 15 20				Clay, hard, some fine to very fine sand, light to medium brown, saturated.
65	X ■		6 9 9				Fine sandy clay, very stiff, light brown, saturated.
70	X ■		8 15 16		CL		Clay, little fine sand, hard, medium brown, saturated, no odor.
75	X		7 15 15				Fine sandy clay, hard, medium brown, saturated, no odor.

Completion Detail



SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-5

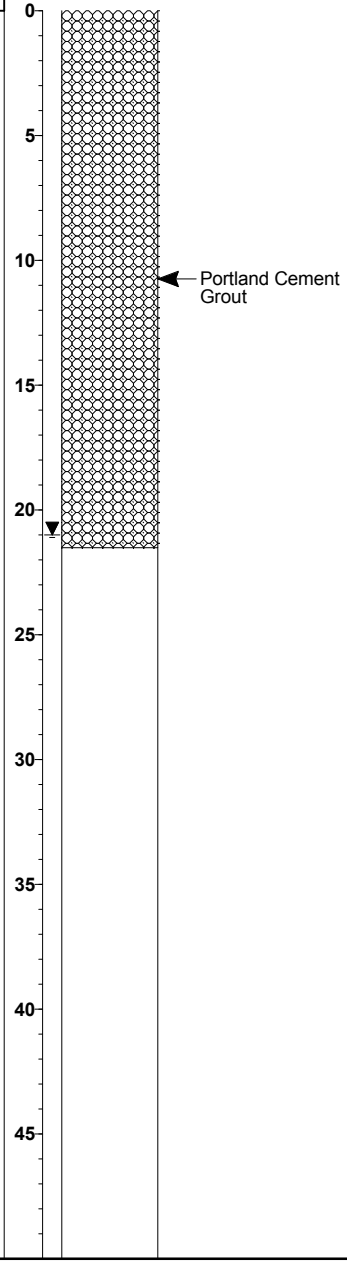
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:

Depth (meters / feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Description
0						Very fine sandy clay, much coarse sand and fine gravel, some coarse gravel, brown, dry to slightly moist, no odor.
1					CL	
5 / 2	X		12 19 23			Fine sandy clay, hard, some coarse sand, few fine gravels, dark brown, moist. Waste begins, including glass and metal.
10 / 3	X		6 9 9		CL	Clay with some fine sand and little debris, very stiff. Mixed waste including paper, plastic, and glass.
15 / 5	X		13 7 13			Mixed waste including paper, plastic, and glass.
20 / 6	X		13 18 18		SW	End of waste. Fine to medium sand, very dense, dark gray, saturated.

Completion Detail



Drilling Company:	**HEW Drilling Co. Inc.**	Date Started:	**6/6/07**
Drilling Method:	**Hollow Stem Auger**	Date Ended:	**6/6/07**
Logged By:	**T. Sison**	Boring Diameter:	**8 inches**
Sampling Method:	**Split Spoon and 140 lb Hammer**	Depth to Water:	**21.0 Feet**
		Total Depth:	**21.5 Feet**

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-6

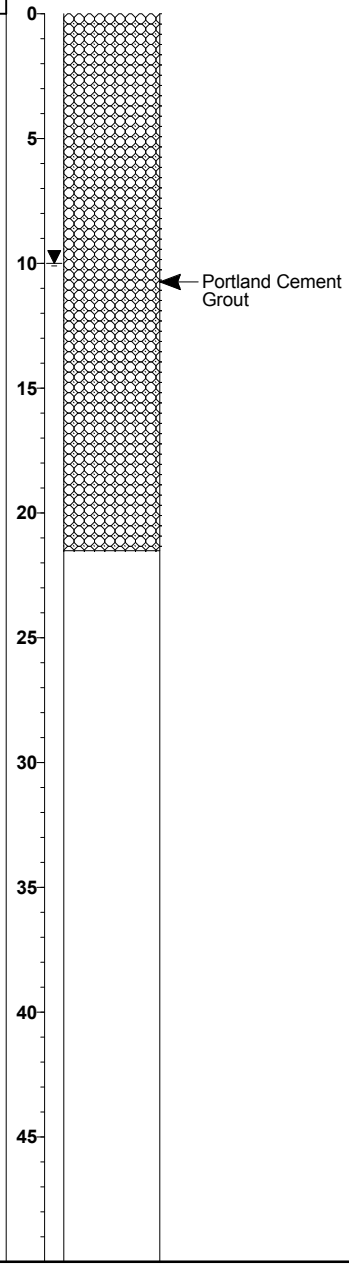
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:
LEL/H2S readings collected at ground surface using Gastech Innova ST. Head space analysis done using MiniRae PID.

Depth (meters / feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
0					CL		Silty clay, very few coarse sands and fine gravels, brown, slightly moist, no odor.
5	X		3 5 5	0.0 LEL/H2S 2.0 ppm (Head Space)			Poor recovery, mixed waste including carpet, wood, plastic, glass, and metal.
10	X		3 5 10	0.0 LEL/H2S 20 ppm (Head Space)			Mixed waste, black, saturated, hydrocarbon like odor.
15	X		6 7 7		SW		Fine to coarse sand, black, saturated.
					CL		Clay, little silt, stiff, low plasticity, brownish-gray, saturated.
20	X						Clay, little silt, stiff, low plasticity, gray and rusty streaked, saturated.

Completion Detail



Drilling Company:	**HEW Drilling Co. Inc.**	Date Started:	**6/6/07**
Drilling Method:	**Hollow Stem Auger**	Date Ended:	**6/6/07**
Logged By:	**T. Sison**	Boring Diameter:	**8 inches**
Sampling Method:	**Split Spoon and 140 lb Hammer**	Depth to Water:	**10.0 Feet**
		Total Depth:	**21.5 Feet**

STANDARD_LOG 9 PAR LANDFILL.GPJ STD_LOG.GDT 8/17/07

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-7

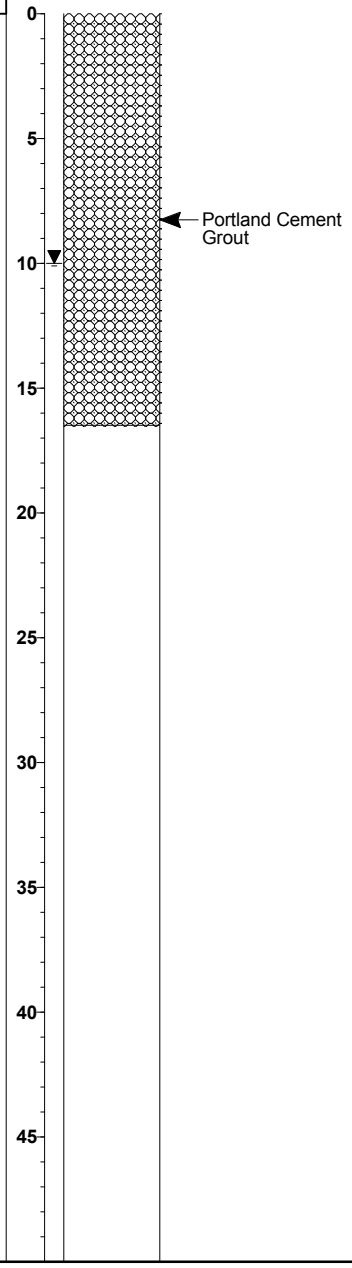
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:

Depth (meters)	Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
0	0					CL		Very fine sandy clay and silt, brown, dry, no odor.
1.5	5	X		4 12 18				Mixed waste, including glass, plastic, and metal, rust-colored, dry.
3.0	10	X		0 1 1				Mixed waste, including glass, plastic, and metal, black, saturated.
4.5	15	X		6 8 12		CL		End of waste. Very fine sandy clay, approximately 25:75, stiff to very stiff, little silt, light brown, very moist.

Completion Detail



Drilling Company:	**HEW Drilling Co. Inc.**	Date Started:	**6/6/07**
Drilling Method:	**Hollow Stem Auger**	Date Ended:	**6/6/07**
Logged By:	**T. Sison**	Boring Diameter:	**8 inches**
Sampling Method:	**Split Spoon and 140 lb Hammer**	Depth to Water:	**10.0 Feet**
		Total Depth:	**16.5 Feet**

STANDARD_LOG 9 PAR LANDFILL.GPJ STD_LOG.GDT 8/17/07

SCS ENGINEERS

BORING LOG

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94568

BORING NUMBER: B-8

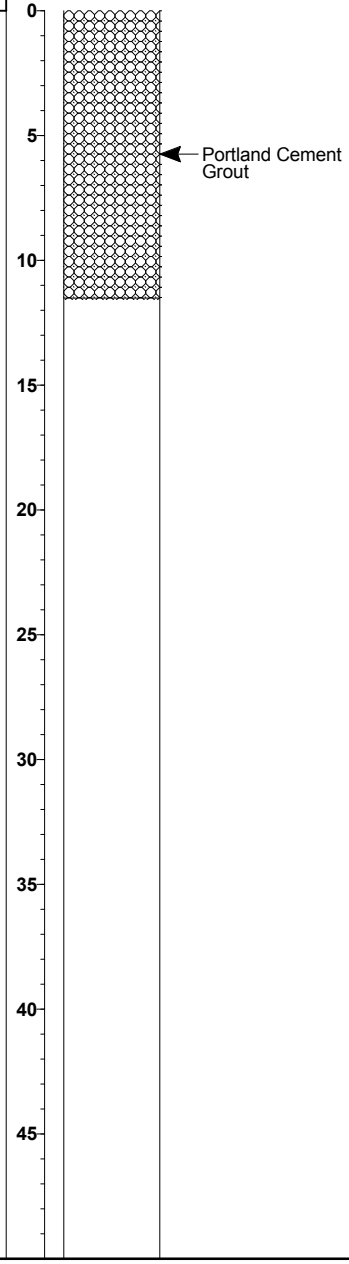
9 Par Landfill
2100 Los Esteros Road
San Jose, California

JOB NUMBER: 01206142.00

REMARKS:

Depth (meters)	Depth (feet)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
0	0					CL		3"-4" asphalt. Fine sandy clay, some coarse sand and fine gravel.
1								Waste begins. Mixed waste, including paper, glass, plastic, and metal.
2	5	X		3 6 6				
								Approximate end of waste.
3	10	X		5 9 12		CL		Clay, stiff to very stiff, some silt, gray, very moist.
4								
5	15							
6	20							
7								
8	25							
9	30							
10								
11	35							
12	40							
13								
14	45							
15	50							

Completion Detail



Drilling Company: **HEW Drilling Co. Inc.**
Drilling Method: **Hollow Stem Auger**
Logged By: **T. Sison**
Sampling Method: **Split Spoon and 140 lb Hammer**

Date Started: **6/6/07**
Date Ended: **6/6/07**
Total Depth: **11.5 Feet**
Boring Diameter: **8 inches**

APPENDIX D

TEST PIT LOGS

GROUND SURFACE

DEPTH (BGS)

– 1.0'	Mixture of glass with soil and bay mud throughout trench, dark brown to black, wet, strong odor. Glass also present on slopes to east at surface. Location of trench marks the eastern boundary of bay mud and glass mixture.
– 2.0'	Same.
– 3.0'	Same.
– 4.0'	Same.
– 5.0'	
– 6.0'	
– 7.0'	
– 8.0'	
– 9.0'	
– 10.0'	
– 11.0'	
– 12.0'	
– 13.0'	
– 14.0'	
– 15.0'	

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6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CALIFORNIA 94566
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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/8/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP-2

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(CL) Silty clay, light brown, dry, no odor.
– 2.0'	(CL) Silty clay, some medium sand and coarse gravel, light brown, dry, no odor.
– 3.0'	(CL) Coarse gravelly clay, some silt, medium brown, dry, no odor.
– 4.0'	(CL) Coarse gravelly clay, some silt, medium brown, dry, no odor.
– 5.0'	(CL) Coarse gravelly clay, some silt, medium brown, dry, no odor.
– 6.0'	(CL) Coarse gravelly clay, some silt, medium brown, dry, no odor.
– 7.0'	(ML) Clayey silt, lots of medium sand and coarse gravel, some debris (i.e. rebar and wood), gray–brown, dry, no odor.
– 8.0'	(ML) Clayey silt, lots of medium sand and coarse gravel, some debris (i.e. rebar and wood), gray–brown, dry, no odor.
– 9.0'	(ML) Clayey silt, lots of medium sand and coarse gravel, some debris (i.e. rebar and wood), gray–brown, dry, no odor.
– 10.0'	(ML) Clayey silt, lots of medium sand and coarse gravel, some debris (i.e. rebar and wood), gray–brown, dry, no odor.
– 11.0'	Total Depth 10.0 Feet.
– 12.0'	
– 13.0'	
– 14.0'	
– 15.0'	

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PLEASANTON, CALIFORNIA 94566
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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP–3

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
1.0'	(CL) Silty clay, light brown, dry, no odor.
2.0'	(CL) Silty clay, some coarse gravel, light brown, slightly moist, no odor.
3.0'	(CL) Silty clay, some coarse gravel, light brown, slightly moist, no odor.
4.0'	(CL) Silty clay, some coarse gravel, light brown, slightly moist, no odor.
5.0'	(CL) Silty clay, some coarse gravel, light brown, slightly moist, no odor.
6.0'	(CL) Silty clay, dark brown, moist, strong waste odor.
7.0'	(CL) Silty clay, dark brown, moist, strong waste odor.
8.0'	(CL) Silty clay, dark brown, moist, strong waste odor.
9.0'	(CL) Silty clay, dark brown, moist, strong waste odor.
10.0'	(CL) Silty clay, dark brown, moist, strong waste odor.
11.0'	Total Depth 10.0 Feet.
12.0'	
13.0'	
14.0'	
15.0'	

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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP-4

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 2.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 3.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 4.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 5.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 6.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 7.0'	(CL) Silty clay, some coarse gravel, dark brown, slightly moist, no odor.
– 8.0'	(CL) Silty clay, some coarse gravel, dark brown, slightly moist, no odor.
– 9.0'	(CL) Silty clay, some coarse gravel and quarry fines, greenish gray, slightly moist, no odor.
– 10.0'	(CL) Silty clay, some coarse gravel and quarry fines, greenish gray, slightly moist, no odor.
– 11.0'	Total Depth 10.0 Feet.
– 12.0'	
– 13.0'	
– 14.0'	
– 15.0'	

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EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP–5

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	2" of aggregate road base at surface.
– 2.0'	(CL) Medium sandy clay, some coarse gravel, brown, dry, no odor.
– 3.0'	(CL) Silty clay, dark brown, slightly moist, no odor.
– 4.0'	(CL) Silty clay, dark brown, slightly moist, no odor.
– 5.0'	(CL) Clay, dark brown, slightly moist, no odor.
– 6.0'	(CL) Clay, dark brown, slightly moist, no odor.
– 7.0'	(CL) Clay, some organic wood debris, dark brown, slightly moist, no odor.
– 8.0'	(CL) Clay, few coarse gravels, dark brown, slightly moist, no odor.
– 9.0'	(CL) Clay, some coarse gravel, dark brown, slightly moist, no odor.
– 10.0'	(CL) Clay, some coarse gravel, dark brown, slightly moist, no odor.
– 11.0'	(CL) Clay, some coarse gravel, dark brown, slightly moist, no odor.
– 12.0'	(CL) Clay, some coarse gravel, dark brown, slightly moist, no odor.
– 13.0'	(CL) Clay, some coarse gravel, dark brown, slightly moist, no odor.
– 14.0'	Total Depth 13.0 Feet.
– 15.0'	

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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP–6

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(ML) Coarse gravelly silt, brown, dry, no odor.
– 2.0'	(CL) Silty clay, some coarse sand and coarse gravel, brown and gray, dry, no odor.
– 3.0'	(CL) Silty clay, very stiff, brown, dry, no odor.
– 4.0'	(CL) Silty clay, some coarse gravel, some brick debris, dark brown, dry, no odor.
– 5.0'	(CL) Sandy clay, black, slightly moist, strong odor.
– 6.0'	(SC) Clayey fine sand, gray, dry, no odor.
– 7.0'	(CL) Silty clay, some gravel, soft, black, moist, strong odor.
– 8.0'	(CL) Silty clay, some gravel, soft, black, moist, strong odor.
– 9.0'	(CL) Silty clay, some coarse gravel, some mixed debris (paper), soft, black, moist, strong odor.
– 10.0'	(CL) Silty clay, some coarse gravel, some mixed debris including glass and paper, soft, black, moist, strong odor.
– 11.0'	(CL) Silty clay, some coarse gravel, some mixed debris including glass, and paper, soft, black, moist, very strong landfill odor.
– 12.0'	Total Depth 11.0 Feet.
– 13.0'	
– 14.0'	
– 15.0'	

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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/7/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP–7

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)

1.0'	(ML) Coarse gravelly silt, some cobbles, light brown, dry, no odor.
2.0'	(CL) Silty clay, some coarse gravel, dark brown, dry, no odor.
3.0'	(CL) Silty clay, some coarse gravel, dark brown, dry, no odor.
4.0'	(CL) Silty clay, some coarse gravel, dark brown to black, dry, no odor.
5.0'	(CL) Medium sandy clay, some coarse gravel, brown, slightly moist, no odor.
6.0'	(CL) Medium sandy clay, some coarse gravel, brown, slightly moist, no odor.
7.0'	(CL) Silty clay, less gravel, dark brown, moist, no odor.
8.0'	(CL) Silty clay, less gravel, dark brown, moist, no odor.
9.0'	(CL) Silty clay, less gravel, dark brown, moist, no odor. Concrete debris at 9 feet.
10.0'	Total Depth 9.0 Feet.
11.0'	
12.0'	
13.0'	
14.0'	
15.0'	

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EXCAVATION DATE: 6/8/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP-8

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)

- 1.0' (CL) Silty clay, some coarse gravel, light brown, dry, no odor.
- 2.0' (CL) Silty clay, some coarse gravel, light brown, dry, no odor.
- 3.0' (CL) Silty clay, dark brown, slightly moist, no odor.
- 4.0' (CL) Silty clay, dark brown, slightly moist, no odor.
- 5.0' (CL) Silty clay, black, wet, strong odor.
- 6.0' (CL) Silty clay, beginning presence of waste, black, wet, strong odor.
- 7.0'
- 8.0'
- 9.0'
- 10.0'
- 11.0'
- 12.0'
- 13.0'
- 14.0'
- 15.0'

Mixed waste at 7.5 feet including paper, wire, metal, rubber, and wood.

Total Depth 7.5 Feet.

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PLEASANTON, CALIFORNIA 94566
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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP-9

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)

1.0'	(CL) Silty clay, little coarse gravel, light brown to gray, dry, no odor.
2.0'	(SC) Clayey fine sand, some coarse gravel, brown, dry, no odor.
3.0'	(CL) Silty clay, some coarse gravel, dark brown, slightly moist, no odor.
4.0'	(CL) Clay, dark brown, slightly moist, no odor.
5.0'	(CL) Clay, some organics including root debris, dark brown, slightly moist, no odor.
6.0'	(CL) Silty clay, some asphalt debris, dark brown, slightly moist, no odor.
	Concrete debris at 6.5 feet.
7.0'	Total Depth 6.5 Feet.
8.0'	
9.0'	
10.0'	
11.0'	
12.0'	
13.0'	
14.0'	
15.0'	

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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP-10

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(CL) Fine sandy clay, some coarse gravel, brown, dry, no odor.
– 2.0'	(CL) Fine sandy clay, some coarse gravel, brown, dry, no odor.
– 3.0'	(CL) Fine sandy clay, some coarse gravel, brown, dry, no odor.
– 4.0'	(CL) Fine sandy clay, some coarse gravel, brown, dry, no odor.
– 5.0'	(CL) Silty clay, stiff, some asphalt debris, dark brown, slightly moist, no odor.
– 6.0'	(CL) Silty clay, stiff, some asphalt debris and PVC piping debris, dark brown, slightly moist, no odor.
– 7.0'	(CL) Silty clay, stiff, some asphalt debris and PVC piping debris, dark brown, slightly moist, no odor.
– 8.0'	(CL) Silty clay, stiff, some asphalt debris and PVC piping debris, dark brown, slightly moist, no odor.
– 9.0'	(CL) Silty clay, stiff, some asphalt debris and PVC piping debris, dark brown, slightly moist, no odor.
– 10.0'	(CL) Silty clay, stiff, some asphalt debris and PVC piping debris, dark brown, slightly moist, no odor.
– 11.0'	(CL) Silty clay, stiff, some asphalt debris and PVC piping debris, dark brown, slightly moist, no odor.
– 12.0'	Total Depth 11.0 Feet.
– 13.0'	
– 14.0'	
– 15.0'	

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CALIFORNIA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/7/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP-10A

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(CL) Silty clay with much coarse gravel, light brown, dry, no odor.
– 2.0'	(CL) Silty clay with much coarse gravel, light brown, dry, no odor.
– 3.0'	(CL) Silty clay with much coarse gravel, light brown, dry, no odor.
– 4.0'	(CL) Silty clay with much coarse gravel, light brown, dry, no odor.
– 5.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 6.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 7.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 8.0'	(CL) Silty clay, some coarse gravel, light brown, dry, no odor.
– 9.0'	(CL) Silty clay, some coarse gravel, brown, slightly moist, no odor.
– 10.0'	(CL) Clay, soft, dark brown, moist, some odor.
– 11.0'	(CL) Clay, soft, dark brown, moist, some odor.
– 12.0'	(CL) Clay, soft, dark brown, moist, some odor.
	Total Depth 12.0 Feet.
– 13.0'	
– 14.0'	
– 15.0'	

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PLEASANTON, CALIFORNIA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/7/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP–11

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 2.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 3.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 4.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 5.0'	(CL) Silty clay, some coarse gravel, brown, slightly moist, no odor.
– 6.0'	(CL) Silty clay, some coarse gravel, brown, slightly moist, no odor.
– 7.0'	(CL) Silty clay, some coarse gravel, brown, slightly moist, no odor.
– 8.0'	(CL) Silty clay, some coarse gravel, brown, slightly moist, no odor.
– 9.0'	(CL) Silty clay, black, moist, some odor.
– 10.0'	(CL) Clay, soft, black, moist, some odor.
– 11.0'	(CL) Clay, soft, black, moist, some odor.
– 12.0'	Total Depth 11.0 Feet.
– 13.0'	
– 14.0'	
– 15.0'	

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PLEASANTON, CALIFORNIA 94566
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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/7/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP–12

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(ML) Coarse gravelly silt, light brown to gray, dry, no odor.
– 2.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 3.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 4.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 5.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 6.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 7.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 8.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 9.0'	(CL) Silty clay, some coarse gravel, very soft, dark brown, moist, no odor.
– 10.0'	(CL) Clay, soft, black, moist, some odor.
– 11.0'	(CL) Clay, soft, black, moist, some odor.
– 12.0'	(CL) Clay, soft, black, moist, some odor.
	Total Depth 12.0 Feet.
– 13.0'	
– 14.0'	
– 15.0'	

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ENVIRONMENTAL CONSULTANTS
6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CALIFORNIA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/7/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP–13

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(ML) Coarse gravelly silt, light brown, dry, no odor.
– 2.0'	(ML) Coarse gravelly silt, light brown, dry, no odor.
– 3.0'	(CL) Silty clay, some coarse gravel, brown, dry, no odor.
– 4.0'	(CL) Silty clay, some coarse gravel, some organic root debris, concrete debris, and plastic, brown, dry, no odor.
– 5.0'	(CL) Silty clay, some coarse gravel, some plastic and wood debris, brown, dry, no odor.
– 6.0'	(CL) Silty clay, less silt, dark brown, moist, no odor.
– 7.0'	(CL) Silty clay, less silt, dark brown, moist, no odor.
– 8.0'	(CL) Silty clay, less silt, dark brown, moist, no odor.
– 9.0'	(CL) Clay, soft, some PVC pipe debris present, black, moist, some odor.
– 10.0'	(CL) Clay, soft, some PVC pipe debris present, black, moist, some odor.
– 11.0'	(CL) Clay, soft, some PVC pipe debris present, black, moist, some odor.
– 12.0'	(CL) Clay, soft, some PVC pipe debris present, black, moist, some odor.
– 13.0'	Total Depth 12.0 Feet.
– 14.0'	
– 15.0'	

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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/8/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP–14

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
– 1.0'	(CL) Silty clay, very little coarse gravel, light brown, dry, no odor.
– 2.0'	(CL) Silty clay, very little coarse gravel, light brown, dry, no odor.
– 3.0'	(CL) Silty clay, very little coarse gravel, light brown, dry, no odor.
– 4.0'	(CL) Silty clay, very little coarse gravel, light brown, dry, no odor.
– 5.0'	(CL) Silty clay, medium to dark brown, slightly moist, no odor.
– 6.0'	(CL) Silty clay, medium to dark brown, slightly moist, no odor.
– 7.0'	(CL) Silty clay, medium to dark brown, slightly moist, no odor.
– 8.0'	(CL) Silty clay, medium to dark brown, slightly moist, no odor.
– 9.0'	(CL) Silty clay, medium to dark brown, slightly moist, no odor.
– 10.0'	(CL) Silty clay, medium to dark brown, slightly moist, strong landfill odor.
– 11.0'	Total Depth 10.0 Feet.
– 12.0'	
– 13.0'	
– 14.0'	
– 15.0'	

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6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CALIFORNIA 94566
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PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:	
EXCAVATION DATE: 6/6/2007	CHK. BY: TMS	APP. BY: J. Miller	

SHEET TITLE: TP–15

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

GROUND SURFACE

DEPTH (BGS)	
1.0'	(ML) Coarse gravelly silt, light brown, dry, no odor.
2.0'	(ML) Coarse gravelly silt, some organic root debris, light brown, dry, no odor.
3.0'	(ML) Coarse gravelly silt, some PVC pipe debris, light brown, dry, no odor.
4.0'	(ML) Coarse gravelly silt, some PVC pipe debris, light brown, dry, no odor.
5.0'	(ML) Coarse gravelly silt, dark brown to black, dry, no odor.
6.0'	(ML) Coarse gravelly silt, brown, dry, no odor.
7.0'	(ML) Coarse gravelly silt, organic root and wood debris, brown, dry, no odor.
8.0'	Waste encountered at 8.0 feet, including paper, plastics, glass bottles, and tires, mixed with sandy silt, reddish brown, slightly moist, slight odor.
9.0'	Waste, including paper, plastics, glass bottles, one hubcap, and tires, mixed with sandy silt, reddish brown, slightly moist, slight odor.
10.0'	Waste, including paper, plastics, glass bottles, and tires, mixed with sandy silt, reddish brown, slightly moist, slight odor.
11.0'	Total Depth 10.0 Feet.
12.0'	
13.0'	
14.0'	
15.0'	

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ENVIRONMENTAL CONSULTANTS
6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CALIFORNIA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01206142.00	LOGGED. BY: HLG	ACAD FILE:
EXCAVATION DATE: 6/7/2007	CHK. BY: TMS	APP. BY: J. Miller

SHEET TITLE: TP-16

PROJECT TITLE: SITE INVESTIGATION
9 PAR LANDFILL
SAN JOSE, CALIFORNIA

SCALE: AS SHOWN

APPENDIX E
DESCRIPTIONS OF SOIL ENGINEERING PROPERTIES

DESCRIPTIONS OF SOIL TESTS AND SOIL ENGINEERING PROPERTIES

R-value

The California R-value is a measure of saturated soil strength, and more specifically it is a measure of the ability of a material to resist lateral deformation when acted upon by a vertical load. The R-value method (CTM 301) of pavement design is a semi-empirical procedure used extensively in California highway design procedures in conjunction with the Traffic Index.

Moisture Content

Moisture content is the quantity of water contained in a soil or rock, on a weight basis. The property is used in a wide range of scientific and technical areas, and is expressed as a ratio, which can range from 0 (completely dry) to the value of the materials' porosity at saturation.

Atterberg Limits

The Atterberg limits are a basic measure of the nature of a fine-grained soil. Depending on the water content of the soil, it may appear in four states: solid, semi-solid, plastic and liquid. In each state the consistency and behavior of a soil is different and thus so are its engineering properties. Thus, the boundary between each state can be defined based on a change in the soil's behavior. The Atterberg limits are used to classify soil and can be used to distinguish between silt and clay, and it can distinguish between different types of silts and clays.

Plasticity Index, Plasticity Limit and Liquid Limit

The plasticity index (PI) is a measure of the plasticity of a soil. The plasticity index is the size of the range of water contents where the soil exhibits plastic properties. The PI is difference between the liquid limit and the plastic limit (PI = LL-PL). Soils with a high PI tend to be expansive clay, those with a lower PI tend to be silt, and those with a PI of 0 (non-plastic) tend to have little or no silt or clay.

Consolidation Test

Consolidation is a process by which soil decrease in volume. It occurs when stress is applied to a soil that causes the soil particles to pack together more tightly, therefore reducing its bulk volume. When this occurs in a soil that is saturated with water, water will be squeezed out of the soil. The magnitude of consolidation can be predicted by many different methods. In the Classical Method, soils are tested to determine their compression index. This can be used to predict the amount of consolidation. When stress is removed from a consolidated soil, the soil will rebound, regaining some of the volume it had lost in the consolidation process. If the stress is reapplied, the soil will consolidate again along a recompression curve, defined by the recompression index. The soil which had its load removed is considered to be *overconsolidated*. This is the case for soils which have previously had glaciers or other formations on them.

Compaction Curves

The modified Proctor compaction test, determine the maximum practically-achievable density of soil and aggregates. The test consists of compacting the soil or aggregate to be tested into a standard mold using a standardized compactive energy at several different levels of moisture content. The **maximum dry density** and **optimum moisture content** is determined from the results of the test. Soil in place is tested for in-place dry bulk density, and the result is divided by the maximum dry density to obtain a *relative compaction* for the soil in place.

Soil Compaction

Compaction is the process of increasing the density of a soil or aggregate by driving out air. For any soil, for a given amount of compactive effort, the density obtained depends on the moisture content. At low moisture contents, the soil particles interfere with each other; addition of some moisture will allow greater bulk densities, with a peak density where this effect begins to be counteracted by the saturation of the soil.

Hydraulic Conductivity

Hydraulic conductivity is a property of soil or rock that describes the ease with which water can move through pore spaces or fractures. It depends on the intrinsic permeability of the material and on the degree of saturation.

Sieve Analysis

A sieve analysis is a practice or procedure used to assess the particle size distribution of a granular material. The size distribution is often of critical importance to the way the material performs and is also used to properly classify the materials.

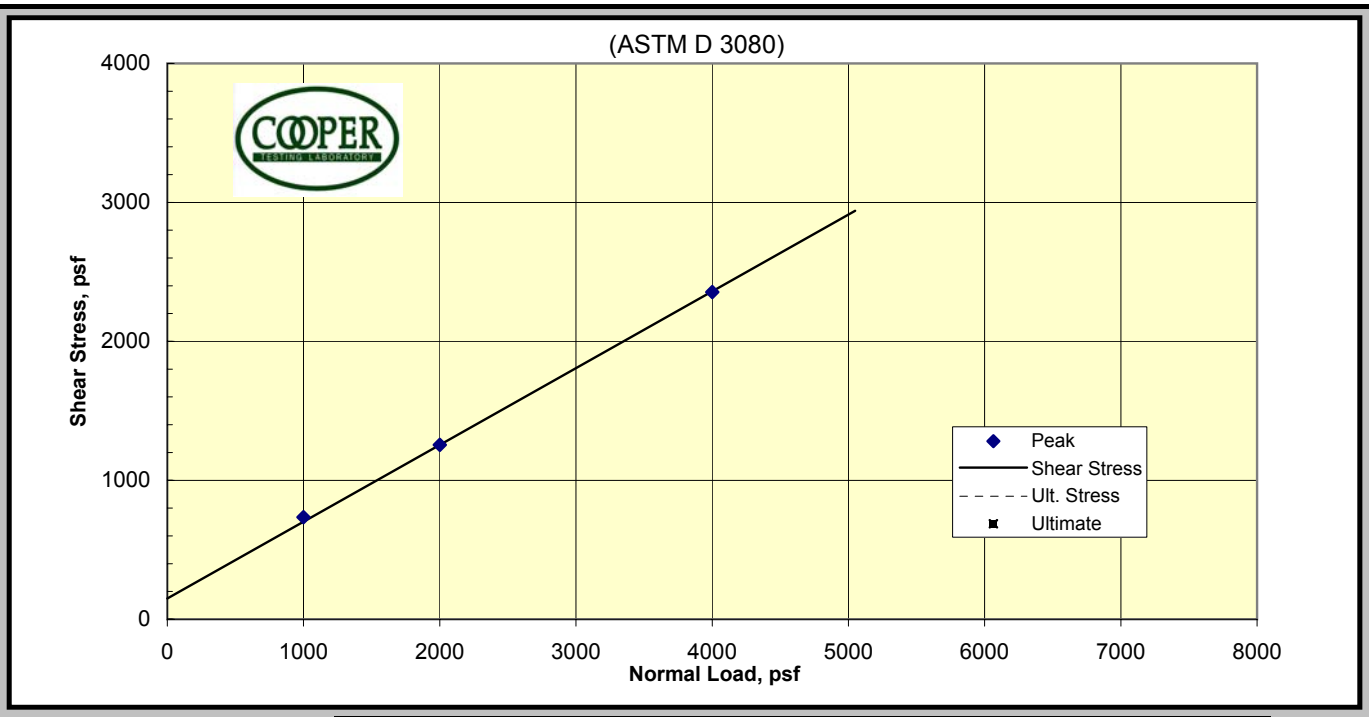
Direct Shear Tests / Internal Friction Angle

A direct shear test is a laboratory test used to find the shear strength parameters of soil. The test is performed on three specimens from a relatively undisturbed soil samples at varying confining stresses to determine the shear strenght parameters, the soil cohesion (c) and the angle of internal friction (commonly *friction angle*) (φ).

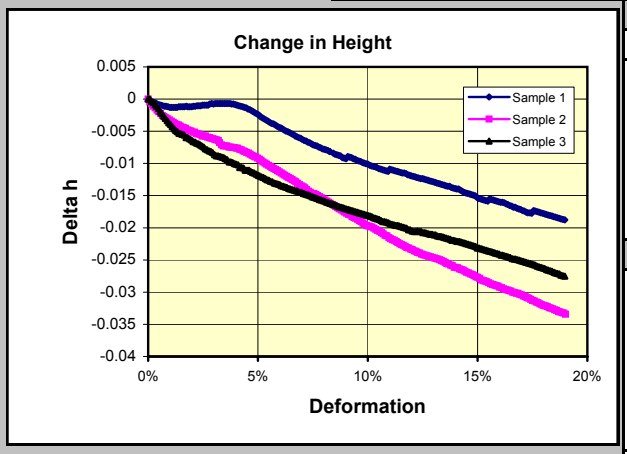
APPENDIX F

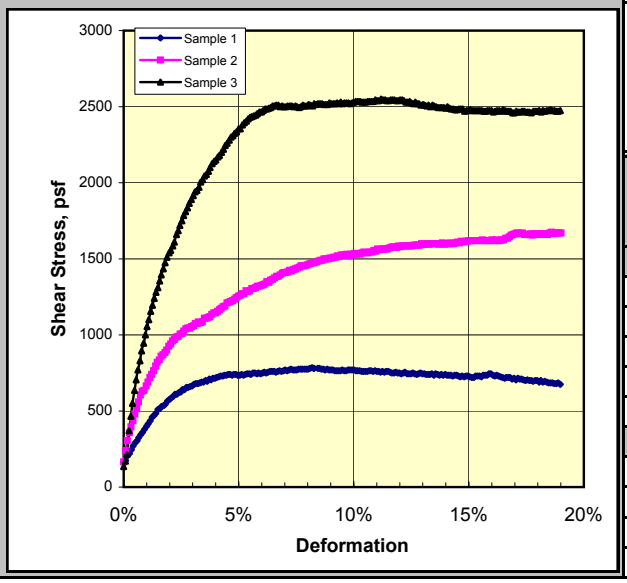
SOILS LABORATORY TEST DATA

Direct Shear



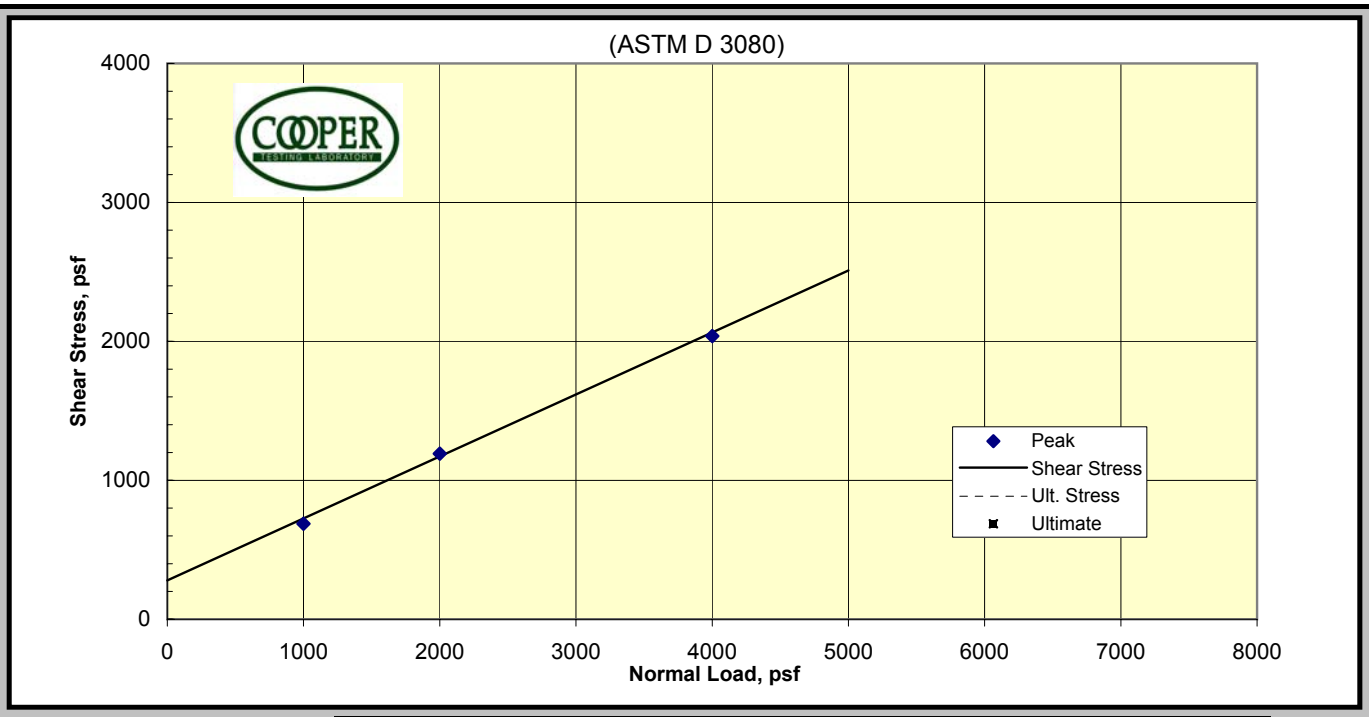
	28.9			
	150			



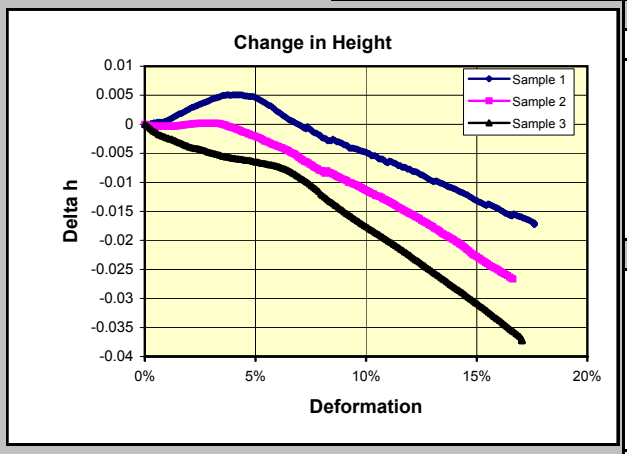


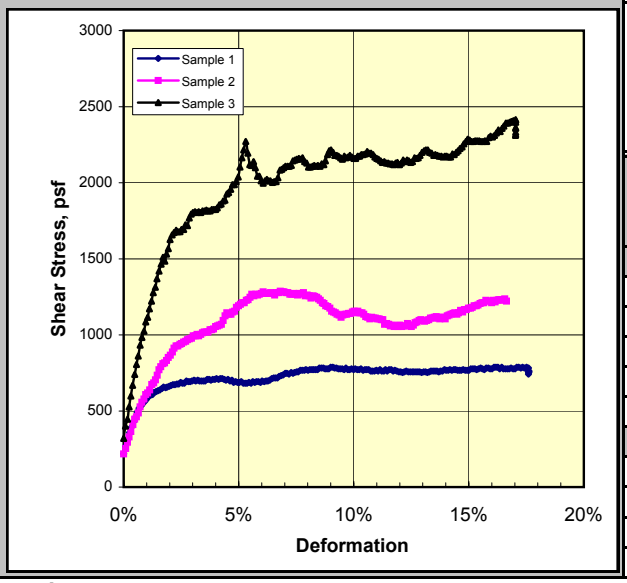
Initial	1	2	3	4
Moisture	24.9%	24.8%	24.7%	
Dry Density, pcf	99.6	100.7	100.3	
Void Ratio	0.7558	0.7356	0.7356	
Saturation	92.2%	94.2%	93.6%	
Diameter, in.	2.42	2.42	2.42	
Height, in.	1.00	1.00	1.00	
Moisture	25.4%	25.3%	24.5%	
Dry Density, pcf	100.1	102.9	104.2	
Void Ratio	0.7358	0.6818	0.6525	
Saturation	93.7%	99.0%	99.2%	
Diameter, in.	2.42	2.42	2.42	
Height, in.	0.99	0.97	0.95	
Normal Stress, psf	1000	2000	4000	
Shear Stress, psf	735	1255	2355	
Deformation	5%	5%	5%	
Ultimate Stress, psf	0	0	0	
Rate in/min.				

Direct Shear



P. Phi (degrees)	24.0	Ult. phi (degrees)	
P. Cohesion (psf)	280	Ult.Cohesion (psf)	





	Sample Data: Initial			
Initial	**1**	**2**	**3**	**4**
Moisture	20.9%	20.7%	20.2%	
Dry Density, pcf	106.8	107.7	108.2	
Void Ratio	0.6071	0.5936	0.5936	
Saturation	94.9%	95.8%	94.1%	
Diameter, in.	2.42	2.424	2.424	
Height, in.	1.00	1.00	1.00	
	Sample Data: At Test			
Moisture	24.0%	22.9%	21.5%	
Dry Density, pcf	104.6	107.4	110.1	
Void Ratio	0.5988	0.5659	0.5385	
Saturation	95.8%	99.1%	99.4%	
Diameter, in.	2.424	2.424	2.424	
Height, in.	0.99	0.98	0.97	
Normal Stress, psf	1000	2000	4000	
Shear Stress, psf	688	1191	2038	
Deformation	5%	5%	5%	
Ultimate Stress, psf	0	0	0	
Rate in/min.	0.0002	0.0002	0.0002	

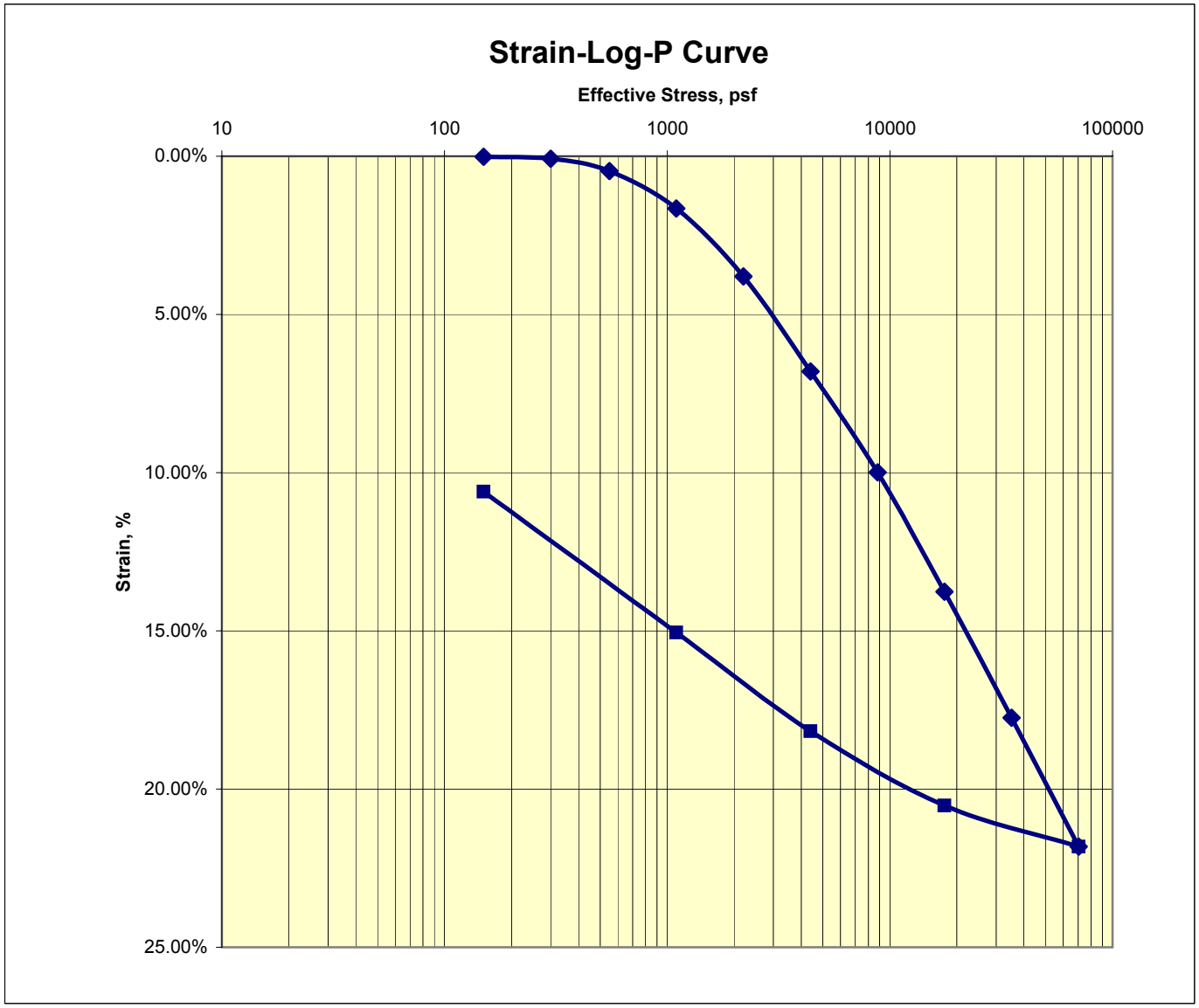
CTL #	363-019	**Date:**	7/3/2007	
Client:	SCS Engineers			
Project Name:				
Project Number:	01206142.00		**Reduced by:**	MD
Sample #	**Boring**	**Sample**	**Depth, ft.**	
1	B4		71	
2	B4		71	
3	B4		71	
4				
	Visual Soil Classification			
1	Brown CLAY Trace Sand			
2	Brown CLAY Trace Sand			
3	Brown CLAY Trace Sand			
4				

Remarks:

Consolidation Test

ASTM D2435

Job No.:		**Boring:**		**Run By:**	MD
Client:		**Sample:**		**Reduced:**	PJ
Project:		**Depth, ft.:**		**Checked:**	PJ/DC
Soil Type:	Brown & Gray CLAY, trace Sand			**Date:**	6/29/2007

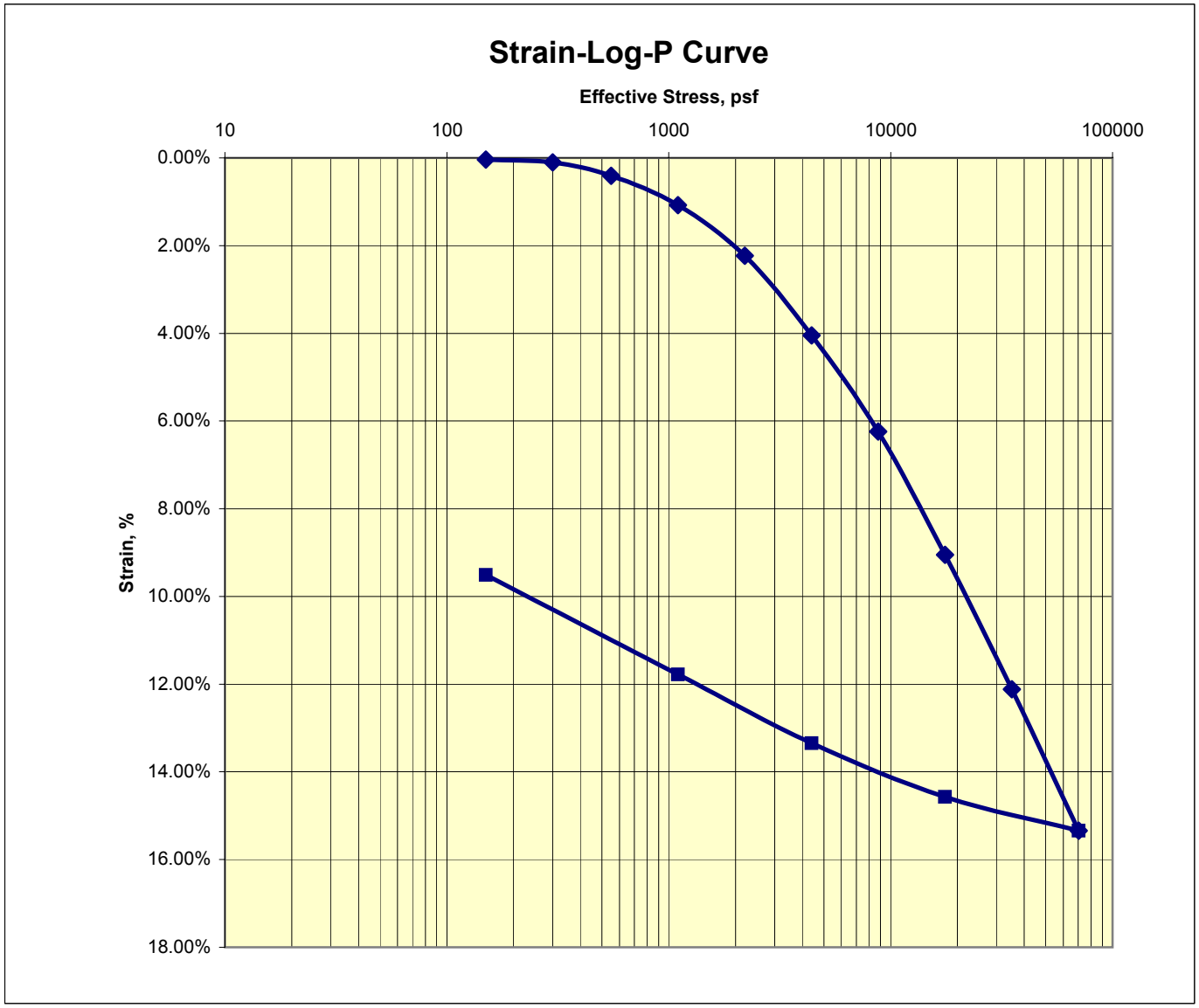


Remarks:

Consolidation Test

ASTM D2435

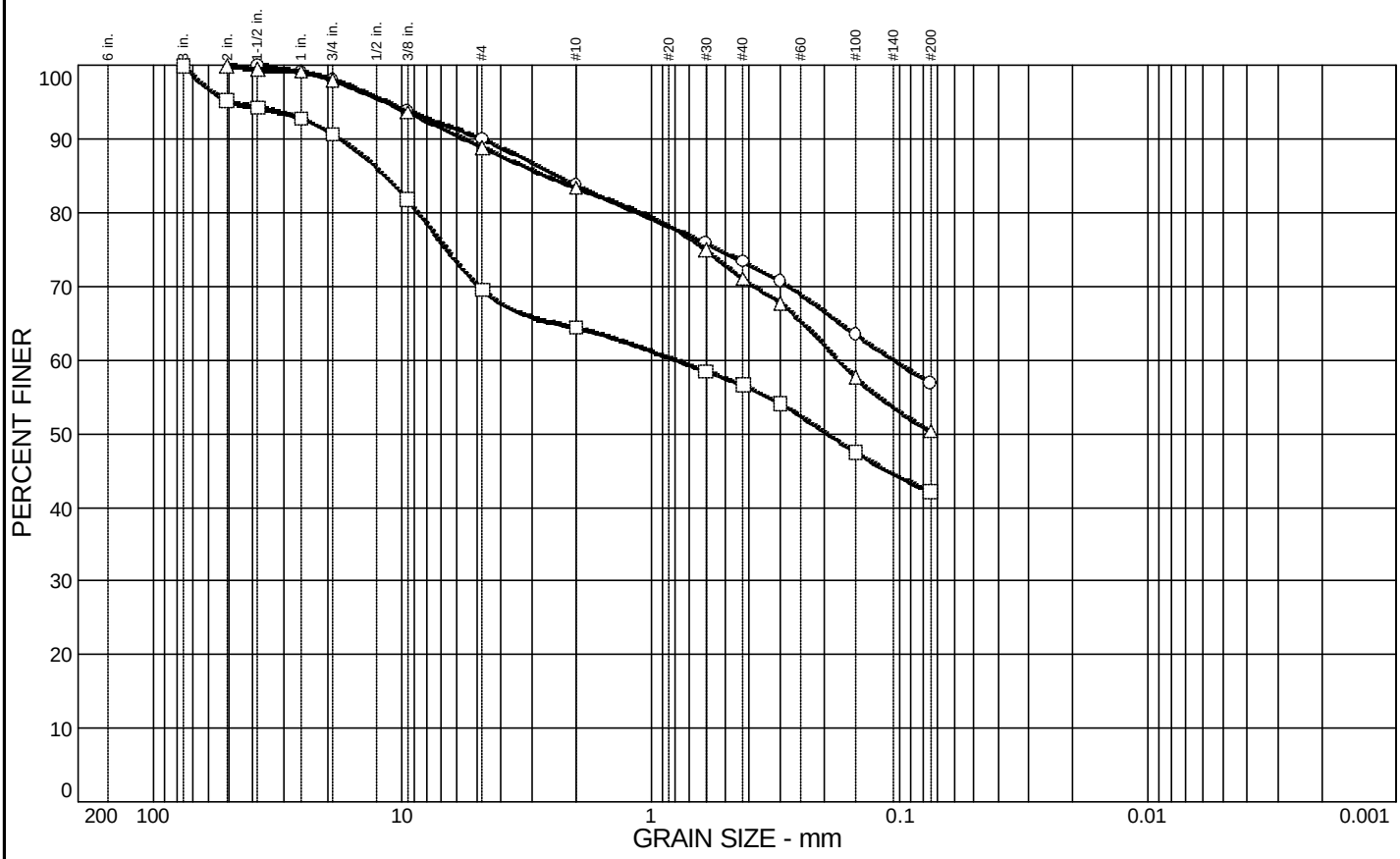
Job No.:	363-019	**Boring:**	B-4	**Run By:**	MD
Client:	SCS Engineers	**Sample:**		**Reduced:**	PJ
Project:	01206142.00	**Depth, ft.:**	56	**Checked:**	PJ/DC
Soil Type:	Brown CLAY w/ Sand (Silty)			**Date:**	6/29/2007



Ass. Gs = 2.7	Initial	Final
Moisture %:	22.7	17.2
Dry Density, pcf:	104.0	115.1
Void Ratio:	0.620	0.465
% Saturation:	98.9	100

Remarks:

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		10.0	33.1	56.9		CL		22	47
□		30.4	27.5	42.1		GC		23	41
△		11.1	38.6	50.3		CL		18	30

SIEVE inches size	PERCENT FINER ○	□	△
3		100.0	
2		95.3	100.0
1.5	100.0	94.3	99.5
1	99.1	92.8	99.2
3/4	98.1	90.7	98.0
3/8	93.9	81.8	93.7
GRAIN SIZE			
D_{60}	0.105	0.792	0.175
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	90.0	69.6	88.9
#10	83.8	64.4	83.4
#30	75.9	58.5	75.0
#40	73.4	56.6	71.0
#50	70.7	54.1	67.7
#100	63.5	47.5	57.7
#200	56.9	42.1	50.3

SOIL DESCRIPTION

○ Dark Gray Sandy Lean CLAY

□ Gray Lean Clayey GRAVEL w/ Sand

△ Light Brown Sandy Lean CLAY

REMARKS:

○

□

△

○ Source: B-3 Elev./Depth: 4'

□ Source: TP-5 Elev./Depth: 3'

△ Source: TP-4 Elev./Depth: 2'

COOPER TESTING LABORATORY

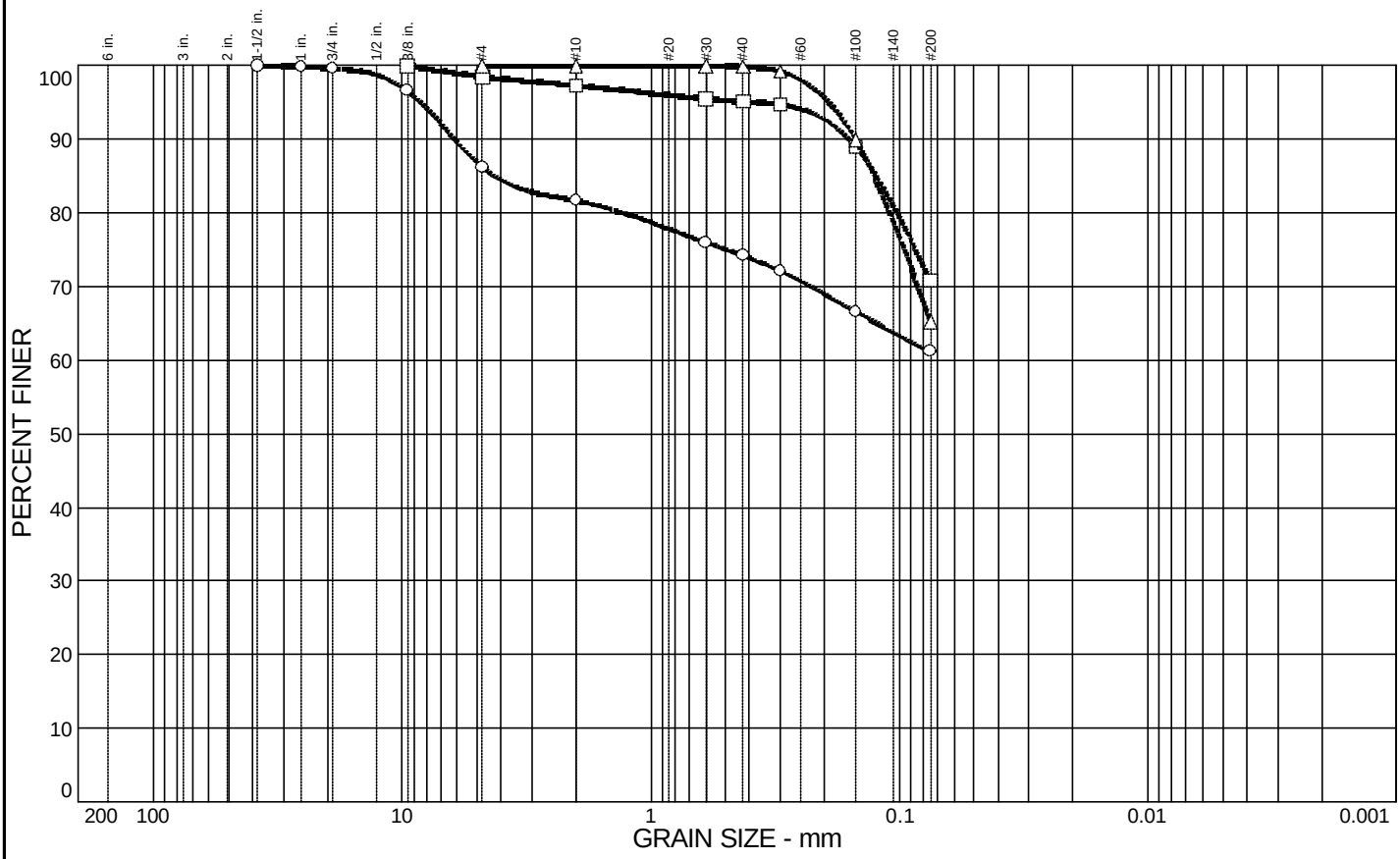
Client: SCS Engineers

Project: 9 Par LF Field Investigation - 01206142.00

Project No.: 363-019

Figure

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		13.8	25.0	61.2		CL		24	46
□		1.5	27.7	70.8					
△			34.8	65.2					

SIEVE inches size	PERCENT FINER ○	□	△
1.5	100.0		
1	99.8		
3/4	99.6		
3/8	96.6	100.0	
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	86.2	98.5	100.0
#10	81.7	97.3	100.0
#30	76.0	95.5	100.0
#40	74.2	95.1	99.8
#50	72.1	94.7	99.2
#100	66.6	89.0	89.9
#200	61.2	70.8	65.2

SOIL DESCRIPTION

○ Dark Gray Sandy Lean CLAY

□ Brown CLAY w/ Sand

△ Brown Sandy SILT

REMARKS:

○

□

△

○ Source: B-4 Elev./Depth: 4.5'

□ Source: B-4 Elev./Depth: 66'

△ Source: B-2 Elev./Depth: 46'

COOPER TESTING LABORATORY

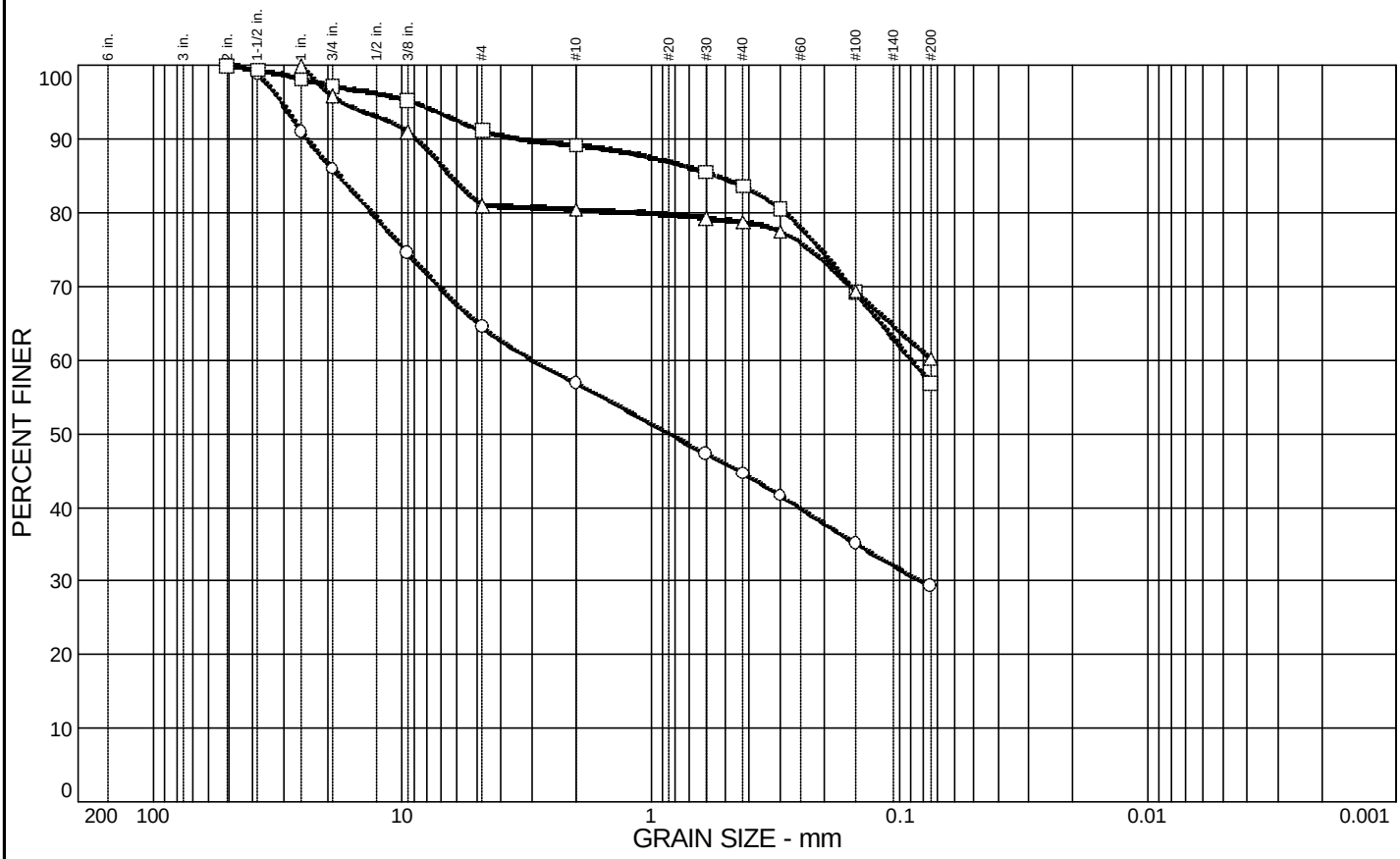
Client: SCS Engineers

Project: 9 Par LF Field Investigation - 01206142.00

Project No.: 363-019

Figure

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		35.5	35.2	29.3		GC		18	29
□		8.8	34.3	56.9		CL		19	30
△		19.0	20.8	60.2		CL		16	36

SIEVE inches size	PERCENT FINER ○	□	△
2	100.0	100.0	
1.5	98.8	99.4	
1	91.0	98.2	100.0
3/4	86.0	97.2	95.9
3/8	74.6	95.3	91.0
	GRAIN SIZE		
D_{60}	2.99	0.0895	
D_{30}	0.0818		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	64.5	91.2	81.0
#10	56.9	89.2	80.4
#30	47.3	85.5	79.3
#40	44.6	83.6	78.7
#50	41.6	80.5	77.5
#100	35.1	69.2	69.4
#200	29.3	56.9	60.2

SOIL DESCRIPTION

○ Brown Lean Clayey GRAVEL w/ Sand

□ Dark Gray Sandy Lean CLAY

△ Brown Sandy Lean CLAY w/ Gravel

REMARKS:

○

□

△

○ Source: TP-3 Elev./Depth: 2'

□ Source: TP-6 Elev./Depth: 2'

△ Source: TP-15 Elev./Depth: 2'

COOPER TESTING LABORATORY

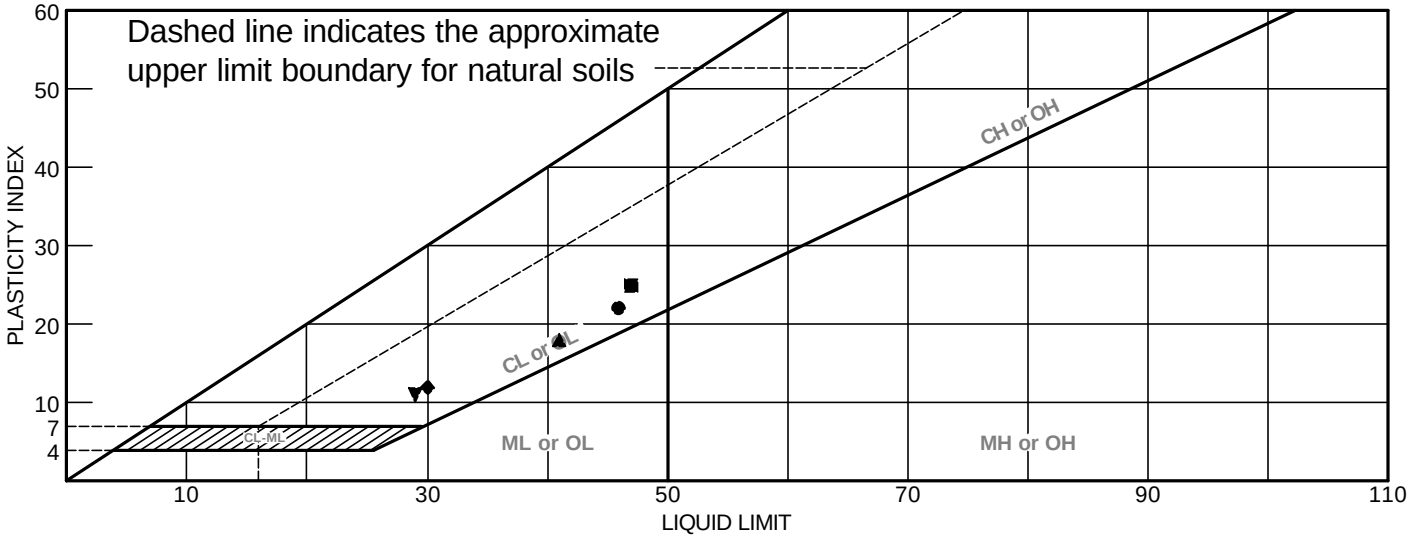
Client: SCS Engineers

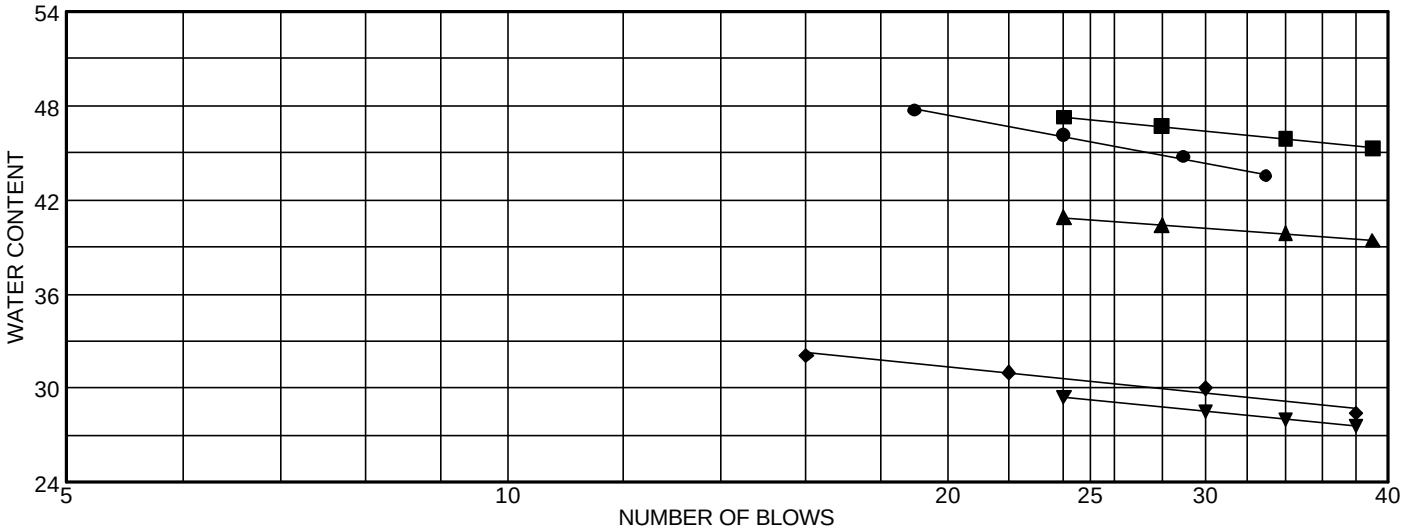
Project: 9 Par LF Field Investigation - 01206142.00

Project No.: 363-019

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Sandy Lean CLAY	46	24	22	74.2	61.2	CL
■	Dark Gray Sandy Lean CLAY	47	22	25	73.4	56.9	CL
▲	Gray Lean Clayey GRAVEL w/ Sand	41	23	18	56.6	42.1	GC
◆	Light Brown Sandy Lean CLAY	30	18	12	71.0	50.3	CL
▼	Brown Lean Clayey GRAVEL w/ Sand	29	18	11	44.6	29.3	GC

Project No. 363-019 **Client:** SCS Engineers

Project: 9 Par LF Field Investigation - 01206142.00

● **Source:** B-4 **Elev./Depth:** 4.5'
■ **Source:** B-3 **Elev./Depth:** 4'
▲ **Source:** TP-5 **Elev./Depth:** 3'
◆ **Source:** TP-4 **Elev./Depth:** 2'
▼ **Source:** TP-3 **Elev./Depth:** 2'

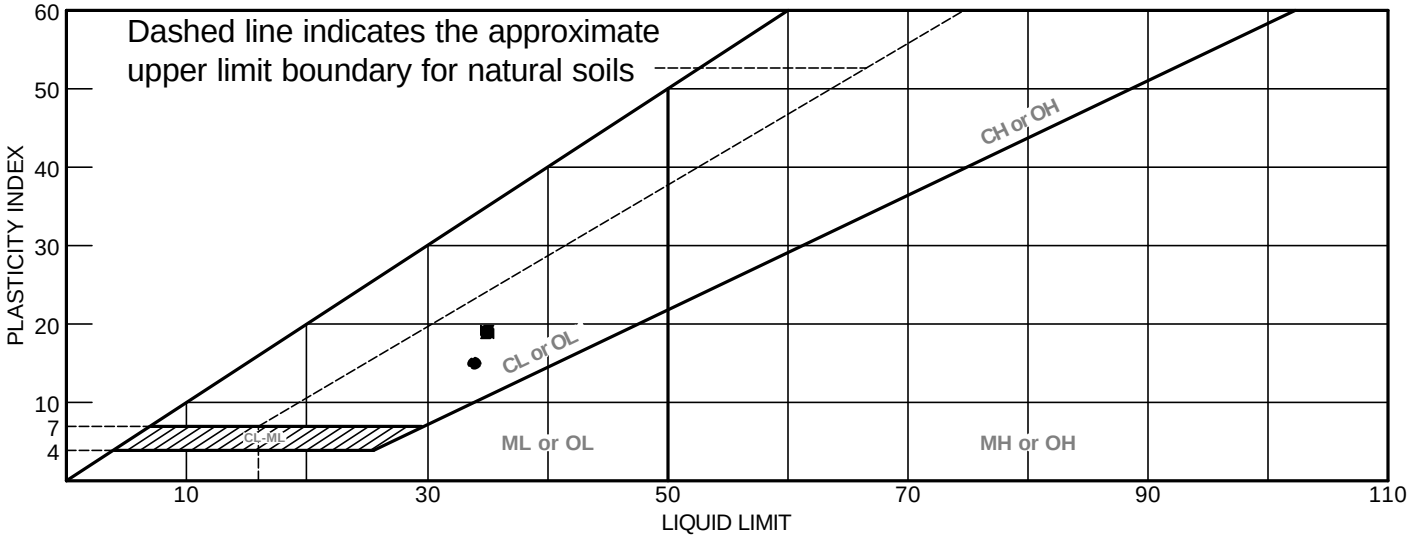
Remarks:
●
■
▲
◆
▼

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown Lean Clayey SAND w/ Gravel	34	19	15			
■	Dark Brown Lean Clayey SAND	35	16	19			

Project No. 363-019 **Client:** SCS Engineers

Project: 9 Par LF Field Investigation - 01206142.00

● **Source:** TP-14 **Elev./Depth:** 2'

■ **Source:** TP-8 **Elev./Depth:** 2'

Remarks:

●

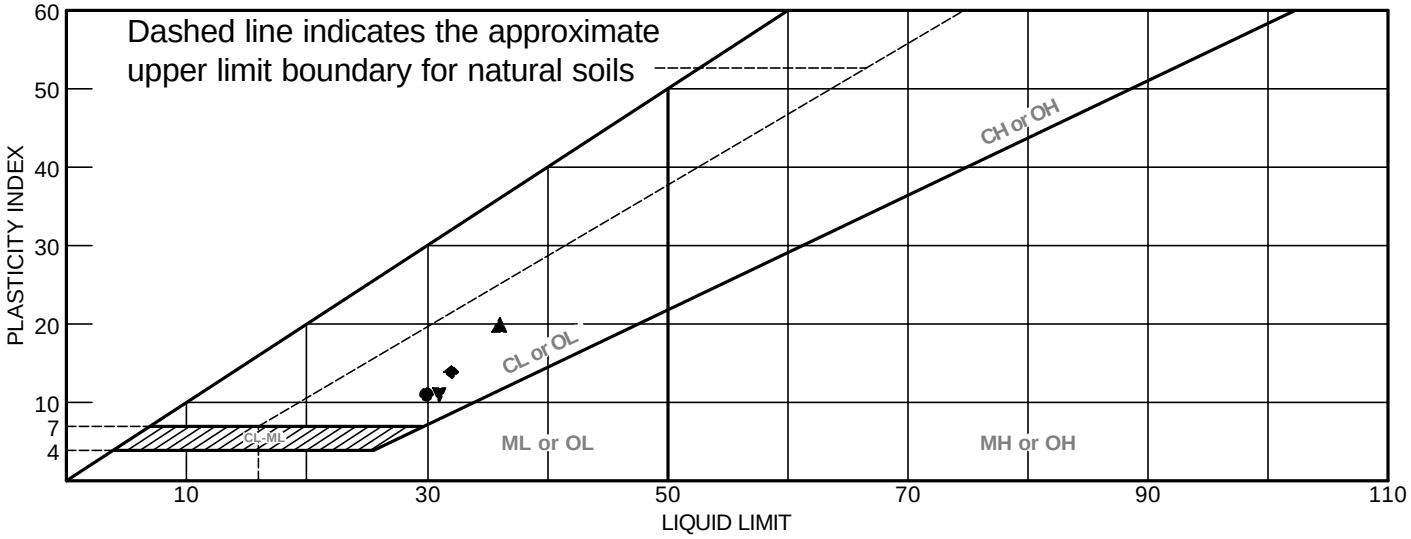
■

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Sandy Lean CLAY	30	19	11	83.6	56.9	CL
■	Brown Silty SAND w/ Gravel		NP	NP			
▲	Brown Sandy Lean CLAY w/ Gravel	36	16	20	78.7	60.2	CL
◆	Dark Brown Lean Clayey SAND w/ Gravel	32	18	14			
▼	Brown Lean Clayey SAND w/ Gravel & organics	31	20	11			

Project No. 363-019 **Client:** SCS Engineers

Project: 9 Par LF Field Investigation - 01206142.00

● **Source:** TP-6 **Elev./Depth:** 2'
■ **Source:** TP-10 **Elev./Depth:** 2'
▲ **Source:** TP-15 **Elev./Depth:** 2'
◆ **Source:** TP12 **Elev./Depth:** 2'
▼ **Source:** TP-16 **Elev./Depth:** 2'

Remarks:

●
■ Could not roll out. Sample slides in bowl. Non-plastic.
▲
◆
▼

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

Hydraulic Conductivity

ASTM D 5084

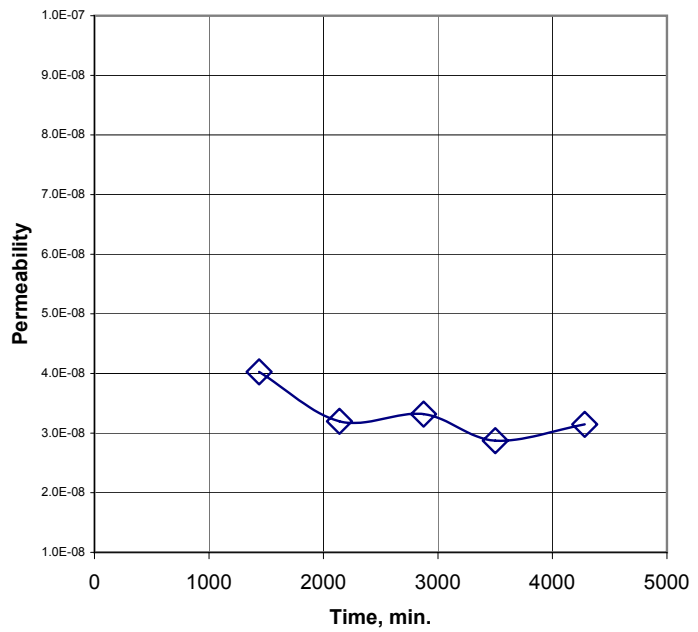
Method C: Falling Head Rising Tailwater

Job No:		**Boring:**		**Date:**	07/03/07
Client:		**Sample:**		**By:**	MD/PJ
Project:		**Depth, ft.:**	31	**Remolded:**	

B: = >0.95

52

Cell:	Bottom	Top	Avg. Sigma3
63.5	59	58	5



Hydraulic Conductivity

ASTM D 5084

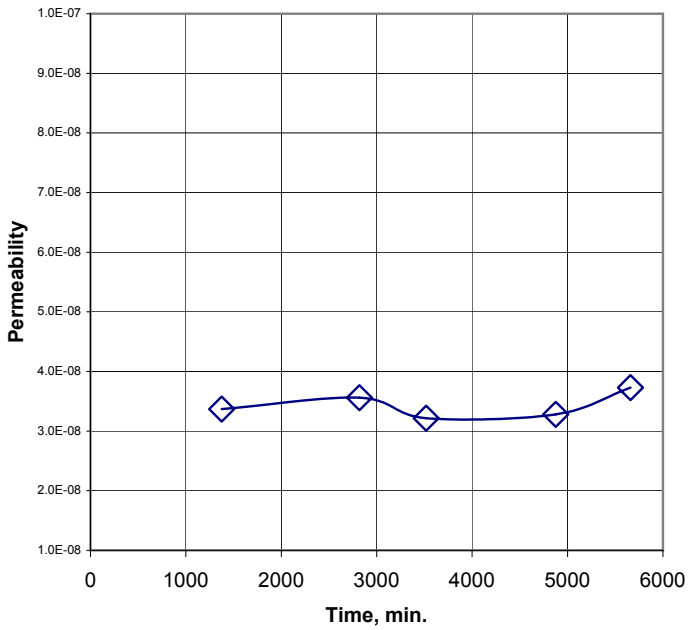
Method C: Falling Head Rising Tailwater

Job No:		**Boring:**		**Date:**	07/03/07
Client:		**Sample:**		**By:**	MD/PJ
Project:		**Depth, ft.:**	56	**Remolded:**	

B: = >0.95

97

Cell:	Bottom	Top	Avg. Sigma3
53.5	49	48	5



Hydraulic Conductivity

ASTM D 5084

Method C: Falling Head Rising Tailwater

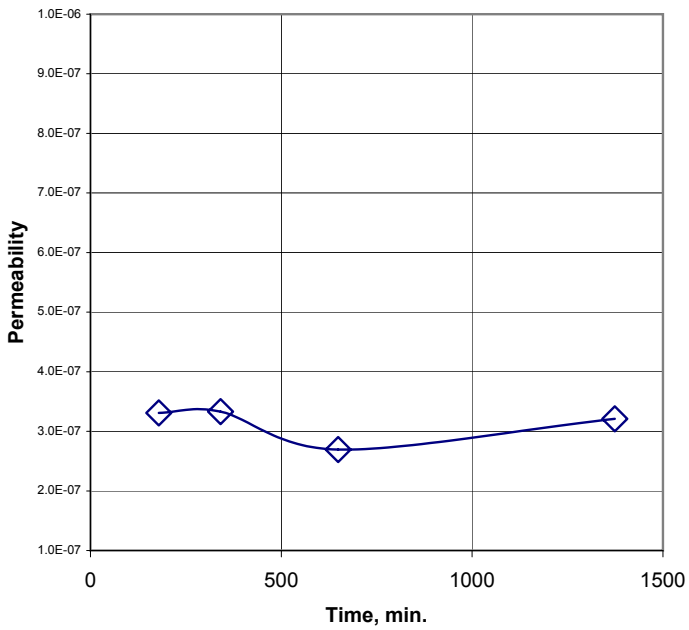
Job No:		**Boring:**		**Date:**	07/03/07
Client:		**Sample:**		**By:**	MD/PJ
Project:		**Depth, ft.:**	2	**Remolded:**	

B: = >0.95

43

Cell:	Bottom	Top	Avg. Sigma3
83.5	79	78	5

Date	Minutes	Head, (in)	K,cm/sec
6/27/2007	0.00	42.69	**Start of Test**
6/27/2007	179.00	40.99	3.3E-07
6/27/2007	341.00	39.49	3.3E-07
6/27/2007	649.00	37.09	2.7E-07
6/28/2007	1374.00	31.99	3.2E-07



Hydraulic Conductivity

ASTM D 5084

Method C: Falling Head Rising Tailwater

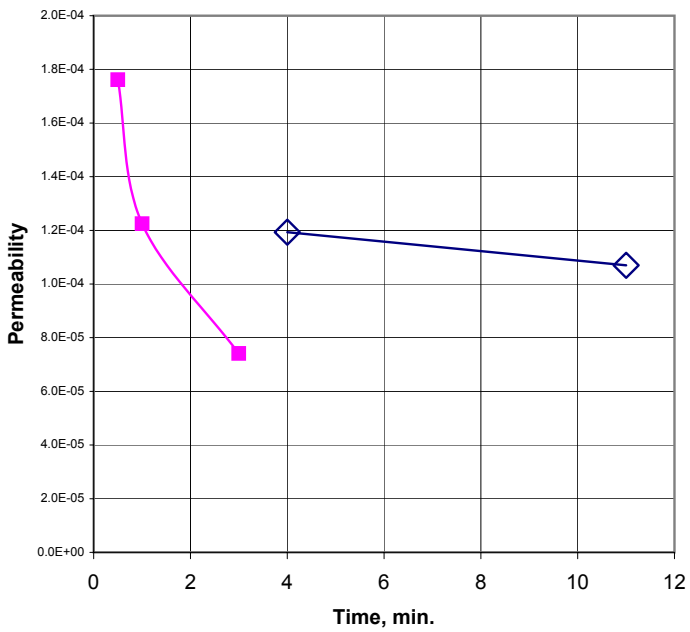
Job No:		**Boring:**		**Date:**	07/03/07
Client:		**Sample:**		**By:**	MD/PJ
Project:		**Depth, ft.:**	3	**Remolded:**	

B: = >0.95

43

Cell:	Bottom	Top	Avg. Sigma3
83.5	79	78	5

Date	Minutes	Head, (in)	K,cm/sec
6/22/2007	0.00	15.00	Start of Test
6/22/2007	4.00	11.20	1.2E-04
6/22/2007	11.00	7.30	1.1E-04
6/26/2007	0.50	40.29	1.8E-04
6/26/2007	1.00	39.39	1.2E-04
6/26/2007	3.00	36.89	7.4E-05



1.E-04 cm/sec

Sample Data:	Initial		Final
Height, in	3.00		2.96
Diameter, in	2.42		2.39
Area, in2	4.60		4.49
Volume in3	13.80		13.28
Total Volume, cc	226.1		217.6
Volume Solids, cc	103.4		103.4
Volume Voids, cc	122.7		114.2
Void Ratio	1.2		1.1
Total Porosity, %	54.3		52.5
Air-Filled Porosity, %	23.7		2.4
Water-Filled Porosity,%	30.5		50.1
Saturation, %	56.3		95.4
Specific Gravity	2.65	Assumed	2.65
Wet Weight, gm	343.0		382.9
Dry Weight, gm	273.9		273.9
Tare, gm	0.00		0.00
Moisture, %	25.2		39.8
Dry Density, pcf	75.6		78.6

Remarks:

Hydraulic Conductivity

ASTM D 5084

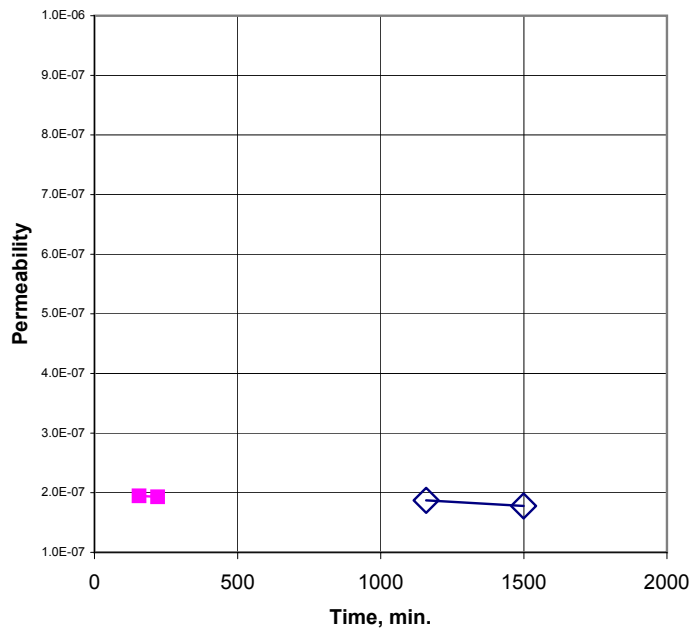
Method C: Falling Head Rising Tailwater

Job No:		**Boring:**		**Date:**	07/13/07
Client:		**Sample:**		**By:**	MD/PJ
Project:		**Depth, ft.:**	2	**Remolded:**	

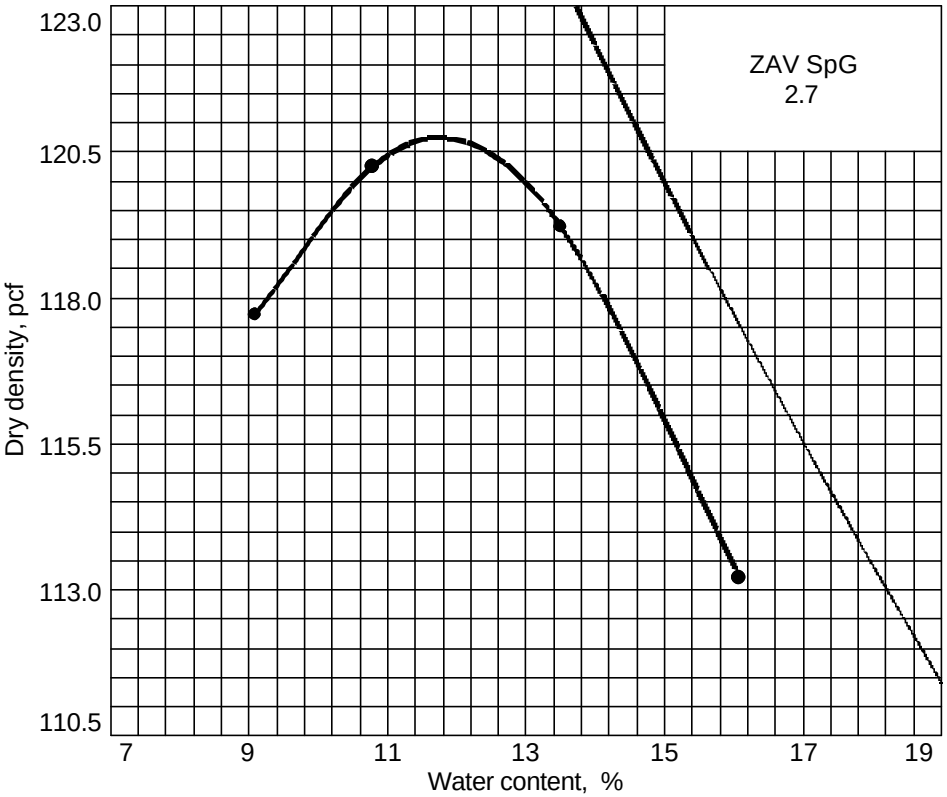
B: = >0.95

52

Cell:	Bottom	Top	Avg. Sigma3
53.5	49	48	5



COMPACTION TEST REPORT



Curve No.

Test Specification:
ASTM D 1557-00 Method B Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM _____ **Sp.G.** 2.7
LL 31 **PI** 11
%>3/8 in. _____ **%<#200** _____
USCS _____ **AASHTO** _____

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.86	8.93	8.80	8.70		
WM	4.42	4.42	4.42	4.42		
WW + T #1	847.30	675.00	764.30	698.60		
WD + T #1	780.20	612.60	679.70	653.60		
TARE #1	157.70	150.50	153.50	158.40		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	10.8	13.5	16.1	9.1		
DRY DENSITY	120.3	119.2	113.2	117.7		

ROCK CORRECTED TEST RESULTS	UNCORRECTED	Material Description
Maximum dry density = 120.8 pcf	120.8 pcf	Brown Lean Clayey SAND w/ Gravel & organics
Optimum moisture = 11.8 %	11.8 %	

Project No. 363-019 **Client:** SCS Engineers
Project: 9 Par LF Field Investigation - 01206142.00

● **Source:** TP-16 **Elev./Depth:** 2'

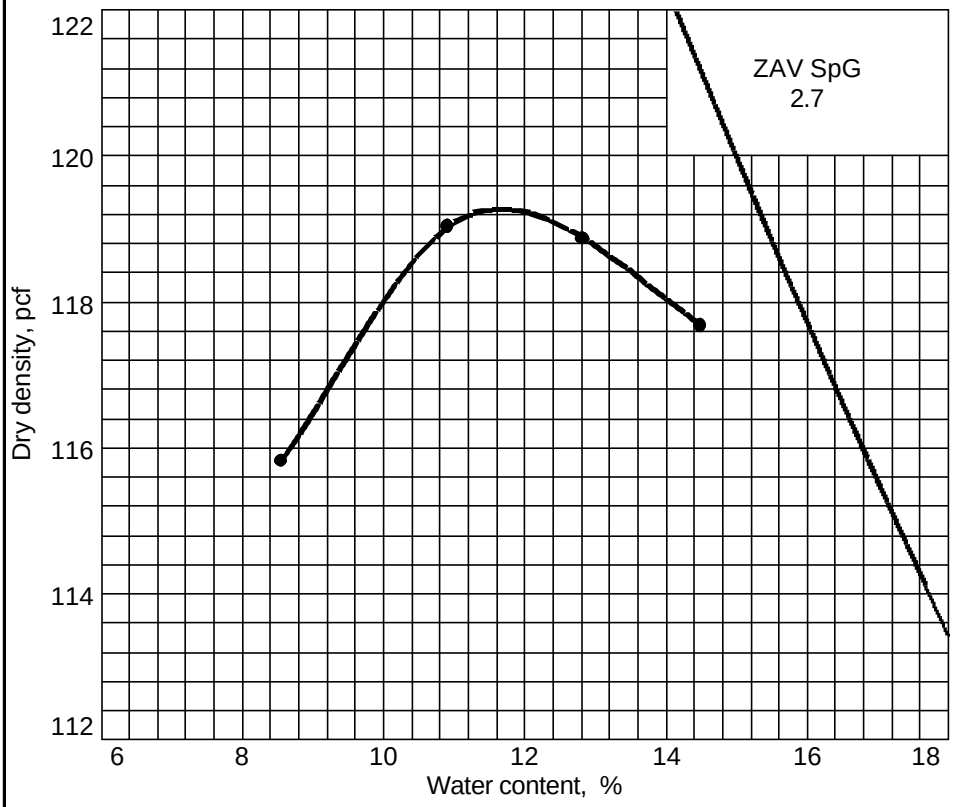
Remarks:

COMPACTION TEST REPORT

COOPER TESTING LABORATORY

Figure

COMPACTION TEST REPORT



Curve No.

Test Specification:
ASTM D 1557-00 Method B Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM _____ **Sp.G.** 2.7
LL 35 **PI** 19
%>3/8 in. _____ **%<#200** _____
USCS _____ **AASHTO** _____

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.82	8.61	8.89	8.91		
WM	4.42	4.42	4.42	4.42		
WW + T #1	566.60	611.20	683.10	635.00		
WD + T #1	518.20	568.90	616.80	566.80		
TARE #1	74.40	73.80	99.70	95.80		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	10.9	8.5	12.8	14.5		
DRY DENSITY	119.0	115.8	118.9	117.7		

ROCK CORRECTED TEST RESULTS	UNCORRECTED	Material Description
Maximum dry density = 119.3 pcf	119.3 pcf	Dark Brown Lean Clayey SAND
Optimum moisture = 11.7 %	11.7 %	

Project No. 363-019 **Client:** SCS Engineers
Project: 9 Par LF Field Investigation - 01206142.00

● **Source:** TP-8 **Elev./Depth:** 2'

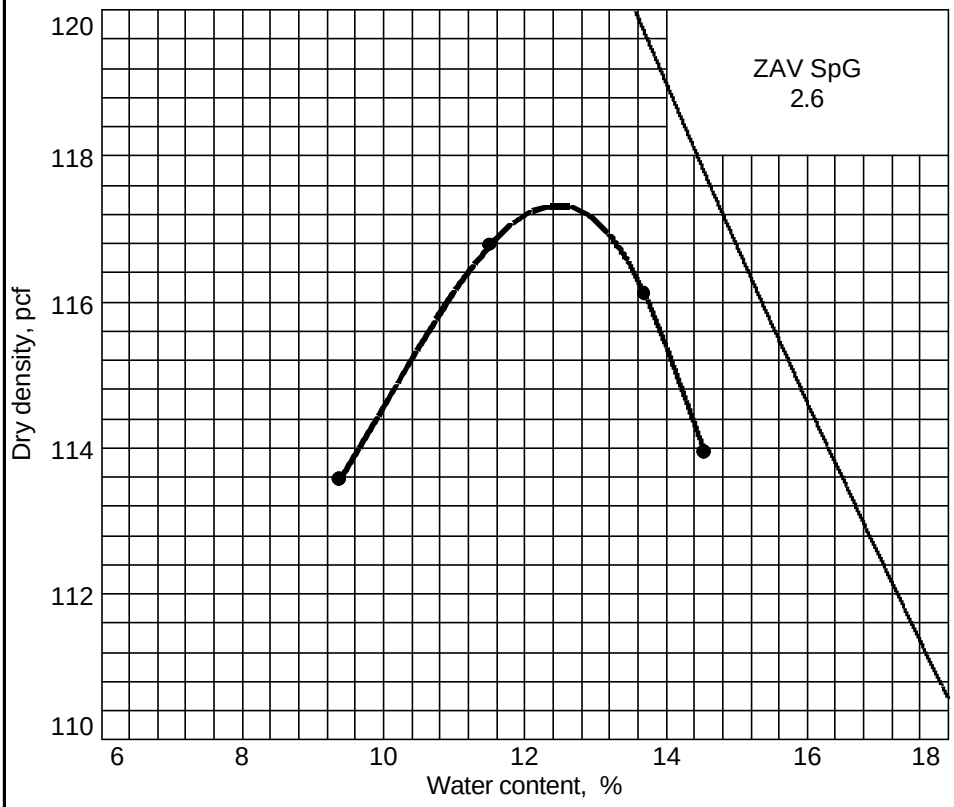
Remarks:

COMPACTION TEST REPORT

COOPER TESTING LABORATORY

Figure

COMPACTION TEST REPORT



Curve No.

Test Specification:
ASTM D 1557-00 Method B Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM _____ **Sp.G.** 2.7
LL 32 **PI** 14
%>3/8 in. _____ **%<#200** _____
USCS _____ **AASHTO** _____

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.76	8.82	8.77	8.56		
WM	4.42	4.42	4.42	4.42		
WW + T #1	753.50	678.00	652.40	606.50		
WD + T #1	685.70	605.30	579.00	563.00		
TARE #1	96.20	74.30	74.20	98.90		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	11.5	13.7	14.5	9.4		
DRY DENSITY	116.8	116.1	113.9	113.6		

ROCK CORRECTED TEST RESULTS	UNCORRECTED	Material Description
Maximum dry density = 117.3 pcf	117.3 pcf	Dark Brown Lean Clayey SAND w/ Gravel
Optimum moisture = 12.5 %	12.5 %	

Project No. 363-019 **Client:** SCS Engineers
Project: 9 Par LF Field Investigation - 01206142.00

● **Source:** TP12 **Elev./Depth:** 2'

Remarks:

COMPACTION TEST REPORT

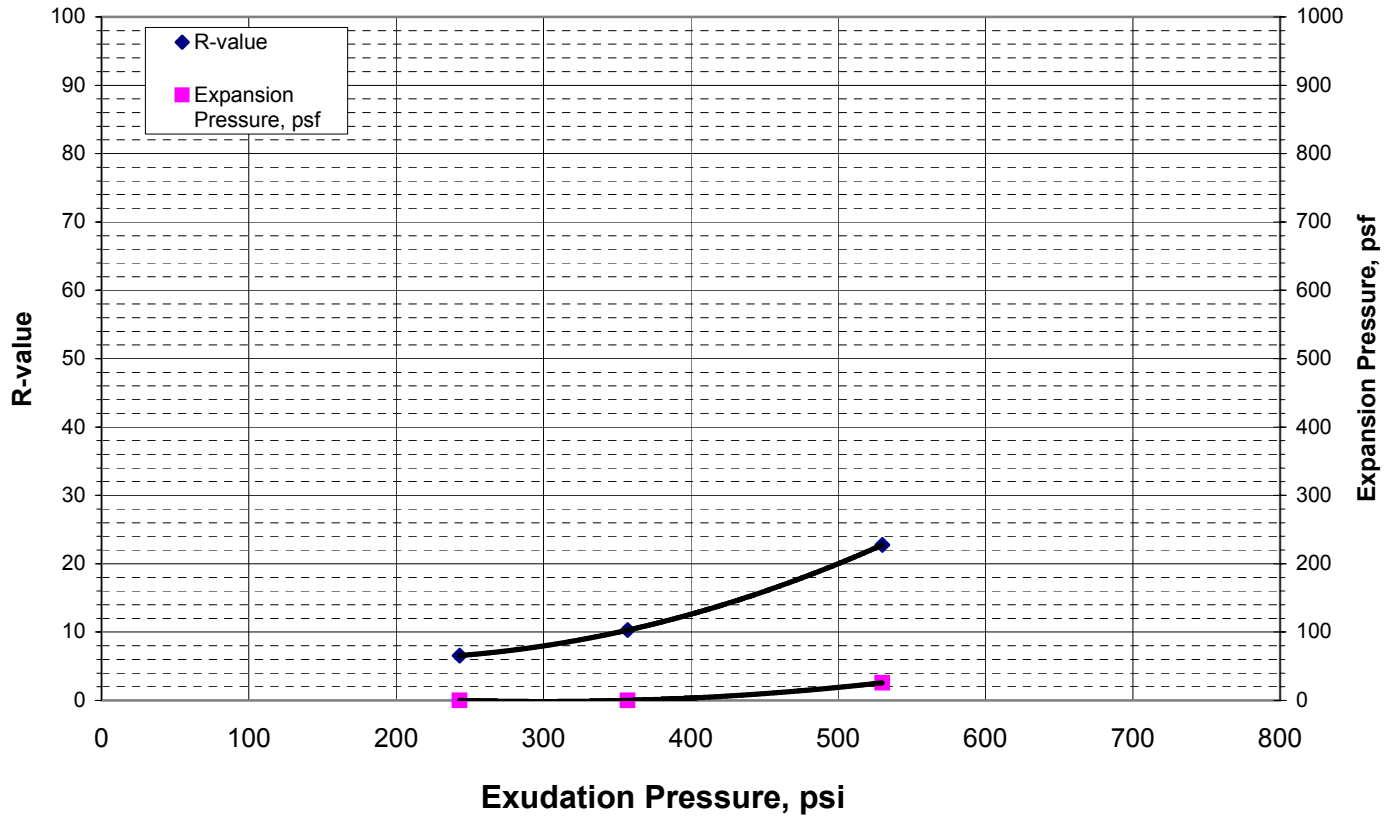
COOPER TESTING LABORATORY

Figure

R-value Test Report (Caltrans 301)

Job No.:		**Date:**	07/03/07
Client:		**Tested**	MD
Project:		**Reduced**	RU
Sample		**Checked**	DC
Soil Type:			

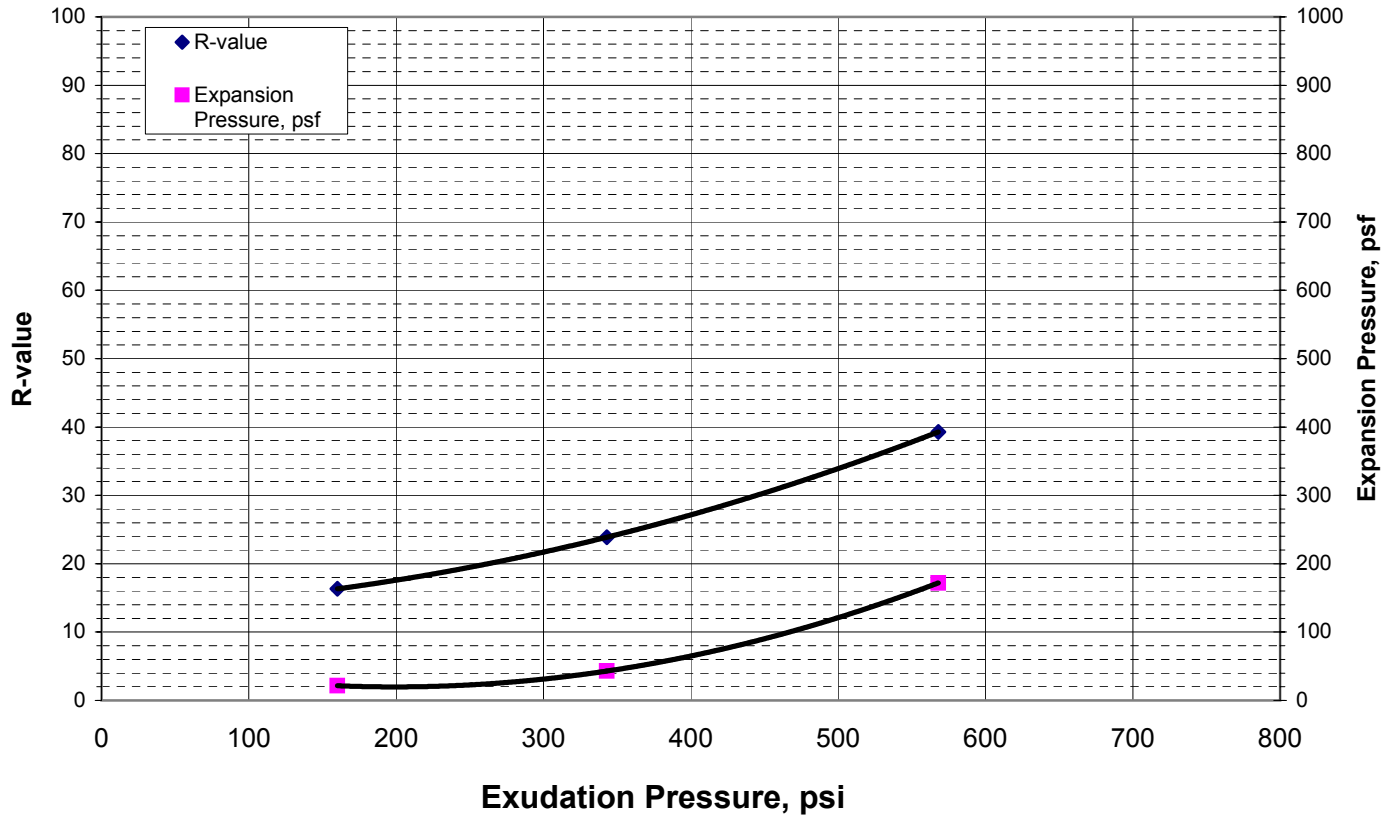
14.5%



R-value Test Report (Caltrans 301)

Job No.:		**Date:**	07/03/07
Client:		**Tested**	MD
Project:		**Reduced**	RU
Sample		**Checked**	DC
Soil Type:			

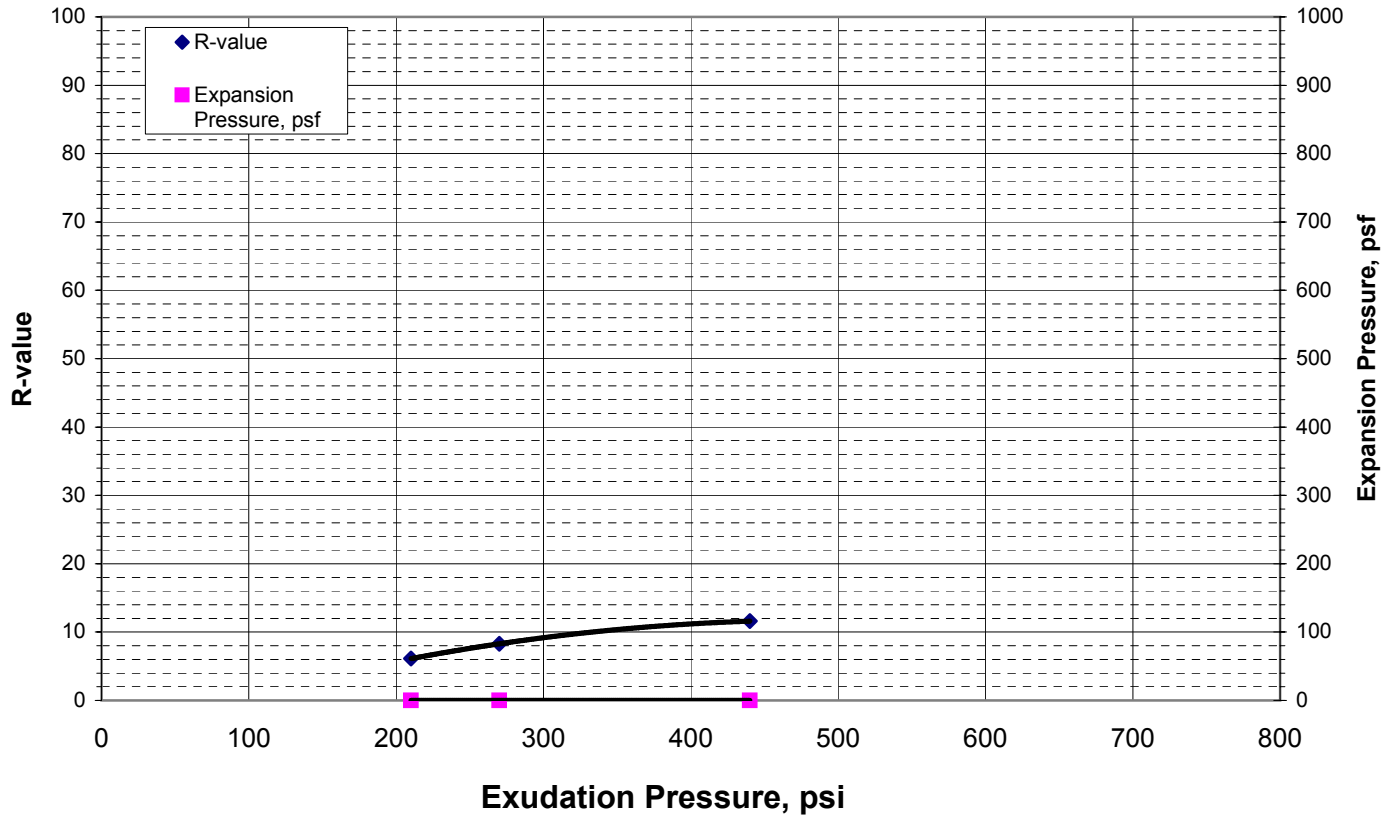
13.1%

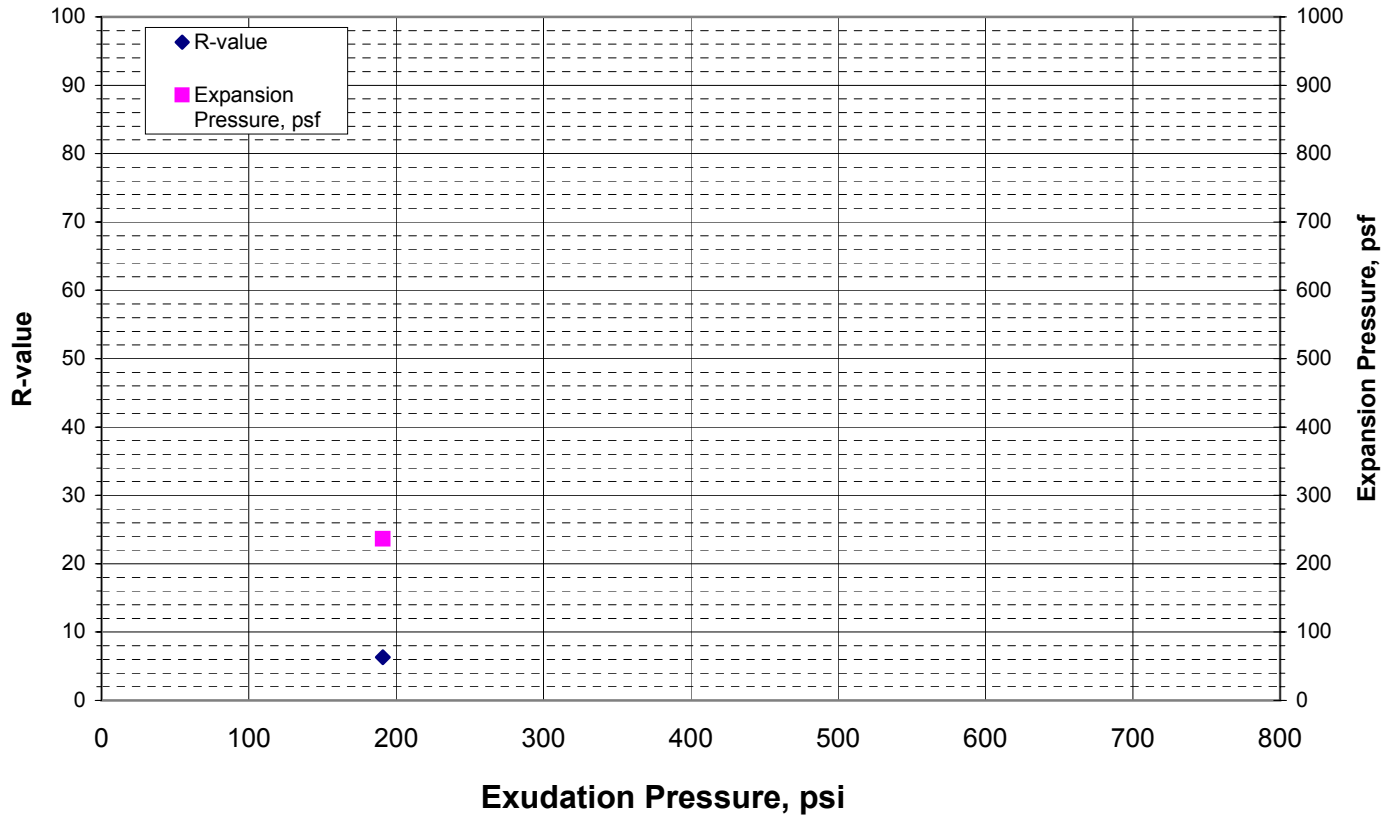


R-value Test Report (Caltrans 301)

Job No.:		**Date:**	07/03/07
Client:		**Tested**	MD
Project:		**Reduced**	RU
Sample		**Checked**	DC
Soil Type:			

16.5%



R-value Test Report (Caltrans 301)

Job No.:		**Date:**	07/03/07	16.7%
Client:		**Tested**	MD	
Project:		**Reduced**	RU	
Sample		**Checked**	DC	
Soil Type: