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Environmental/Geotechnical/Engineering Services

Preliminary Geotechnical Investigation

Hunt-Wesson Facility
Davis, California

9.14.5.2

This report has been prepared for:

Shea Homes

2580 Shea Center Drive; Livermore, California 94550

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Project No. 1080-25A

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PRELIMINARY GEOTECHNICAL INVESTIGATION
HUNT-WESSON FACILITY
DAVIS, CALIFORNIA

1.0 INTRODUCTION

In this report we present the results of our preliminary geotechnical investigation for the proposed residential development to be located in Davis, California, as shown on the Vicinity Map, Figure 1. The purpose of our investigation was to evaluate the subsurface conditions at the site and to provide preliminary geotechnical recommendations for conceptual planning and design of the proposed development.

1.1 Project Description

The approximately 100-acre site is located at 1111 East Covell Boulevard. It consists of two parcels of roughly equal area. The southern portion of the site is occupied by the former Hunt-Wesson Facility. The northern portion of the site is undeveloped agricultural land. Shea Homes is considering purchasing the entire 100-acre site for residential redevelopment.

Structural loads and grading are yet to be determined; however, we assume that structural loads will be representative for this type of residential construction and that minor cuts and fills will be required to develop the project. Residential streets and underground utilities for water, sanitary sewer, storm water, and other services are also anticipated.

1.2 Scope of Services

Our scope of services was presented in detail in our agreement with you dated November 13, 2001. To accomplish this work, we have provided the following services:

- ▼ Exploration of the subsurface conditions by drilling and logging four exploratory borings and retrieving relatively undisturbed soil samples for observation and laboratory testing.
- ▼ Evaluation of the physical and engineering properties of the subsurface soils by visually classifying the samples and performing various laboratory tests on selected samples.
- ▼ Preliminary engineering analysis to evaluate site earthwork, building foundations, and pavements.
- ▼ Preparation of this preliminary report as a summary of our findings and to present our conclusions and recommendations.

A Phase I environmental site assessment and soil and ground water evaluation report was prepared for the site under separate cover.

2.0 SITE CONDITIONS

2.1 Exploration Program

Subsurface exploration for this project consisted of drilling four exploratory borings using a truck-mounted hollow-stem auger rig. The exploratory borings, designated as EB-1 through EB-4, were drilled on December 20, 2001, to depths ranging from 20 to 44½ feet below existing site grades. The borings were located on the southern half of the site. The northern half of the site was inaccessible to conventional drilling equipment due to current agricultural use and extremely soft soil conditions. Representative samples of the subsurface soils were obtained for laboratory testing and to assist in evaluating preliminary conclusions and recommendations. All exploratory borings were permitted and backfilled in accordance with City of Davis and Yolo County guidelines. The approximate locations of our exploratory borings are shown on the Site Plan, Figure 2. A description of the soils encountered in our borings and details regarding our field investigation are included in Appendix A; the results of our laboratory tests are discussed in Appendix B.

2.2 Surface

We also performed a brief site reconnaissance during our subsurface exploration for the purpose of evaluating the current surface conditions. The site is bounded by vacant agricultural land to the north and to the east, East Covell Boulevard to the south, and the Union Pacific Rail Line right-of-way to the west.

The southern half of the site, comprising approximately 52 acres, is occupied by the former Hunt-Wesson Facility. It is paved primarily with asphalt but contains occasional portland cement concrete pads. The facility consists of two warehouse distribution buildings and support buildings totaling approximately 560,000 square feet. The facility includes various tanks, cooling towers, boilers, scales, a waste disposal system and other related structures. Two railroad spurs enter the site from the west. Based on the information provided and our experience in the area, the site was constructed in 1963 as a cannery; site use prior to 1963 likely was agricultural. USGS topographic information indicates that an old creek or drainage channel at one time crossed this portion of the site in a roughly east to west orientation. The approximate lateral extent of this former channel, based on interpolation from USGS maps, is approximately shown on Figure 2.

The northern half of the 100-acre site is agricultural land that had been recently tilled and planted with row crops at the time of our investigation. The surficial soils in this region can be characterized as primarily dark brown sandy silt.

2.3 Subsurface

Our exploratory borings encountered approximately 6 inches of asphalt concrete underlain by approximately 4 to 6 inches of granular base material, except in Boring EB-3 where approximately 12 inches of granular base was encountered. Below the pavement materials, Boring EB-1 and EB-3 encountered undocumented fills to depths ranging from 3 to 6 feet below existing grade. In Boring EB-2, the fill extended to a depth of approximately 13 feet. The fill can generally be characterized as stiff silty clays and medium dense clayey gravels. Plasticity Index (PI) tests performed on samples of the clayey fill material resulted in PIs of 18 to 35, indicating moderate to high expansion potential. In EB-2, the fill between depths of 6 to 13 feet consisted of loose to medium dense sand. Fill was not encountered in Boring EB-4.

The fill, where encountered, is underlain by native alluvial soils consisting of stiff to very stiff silty clays and clayey silts interbedded with loose to medium dense sand and silty sand layers to the maximum depth explored of 44½ feet. The shallow surficial soils observed on the northern half of the site appeared to be native allurial soils consisting of sandy silts and sandy clays. The upper 12 to 18 inches of the soil is soft and loose due to recent tilling. A more detailed description of the subsurface conditions is presented on the boring logs in Appendix A.

2.4 Ground Water

Free ground water was encountered during drilling in EB-1 at a depth of approximately 32 feet below existing grade. Ground water was not encountered in any of the other borings. It should be noted that the borings may not have been left open for a sufficient period of time to establish equilibrium ground water conditions. All borings were backfilled with cement grout shortly after drilling. Fluctuations in the level of the ground water may occur due to variations in rainfall and other factors not in evidence at the time measurements were made.

3.0 GEOLOGIC HAZARDS

A brief qualitative evaluation of the geologic hazards was made during this investigation. Our comments concerning these hazards are presented below.

3.1 Fault Rupture Hazard

A regional fault map illustrating known active faults relative to the site is presented in Figure 3. The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone (known formerly as a Special Studies Zone). As shown on Figure 3, no known surface expression of active faults is believed to transect the site. Fault rupture through the site, therefore, is not anticipated.

3.2 Ground Shaking

Strong ground shaking can be expected at the site during moderate to severe earthquakes in the general region. This is common to virtually all developments in the San Francisco Bay Area. The "Seismicity" section that follows presents a detailed discussion regarding potential levels of ground shaking.

3.3 Liquefaction

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. Soils most susceptible to liquefaction are clean, loose, saturated, uniformly graded, fine-grained sands. Loose to medium dense layers of sand and silty sand were encountered in Borings EB-1, 2, and 3 at depths ranging from 6 to 13 feet. The layers were generally 2 to 5 feet thick, were not saturated, and were encountered approximately 15 to 20 feet above the ground water level. In addition, these sand layers contained significant amounts of fine-grained material. For these reasons, and based on engineering judgment, the potential for liquefaction is considered to be low during seismic shaking.

3.4 Differential Compaction

If near-surface soils vary in composition both vertically and laterally, strong earthquake shaking can cause non-uniform compaction of the soil strata, resulting in movement of the near-surface soils. Except for the undocumented fill materials, which will likely need to be mitigated, the near surface soils encountered at the site are generally stiff and do not appear to change in thickness or consistency abruptly over short distances; therefore, we judge the probability of differential compaction at the site to be low.

3.5 Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "free" face such as an open body of water, channel, or excavation. In soils this movement is generally due to failure along a weak plane, and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Generally, failure in this mode is analytically unpredictable, since it is difficult to determine where the first tension crack will occur.

There are no creeks or open bodies of water within an appropriate distance from the site for lateral spreading to occur on the site. For this reason, the probability of lateral spreading occurring at the site during a seismic event is low.

4.0 SEISMICITY

4.1 Regional Active Faults

The San Francisco Bay Area is recognized by geologists and seismologists as one of the most seismically active regions in the United States. The significant earthquakes that occur in the Bay Area are generally associated with crustal movement along well-defined, active fault zones of the San Andreas Fault system, which regionally trend in a northwesterly direction. The San Andreas Fault, which generated the great San Francisco earthquake of 1906, passes about 67 miles southwest of the site. The other major active faults in the area are the Hunting Creek/Berryessa Fault and Concord/Green Valley Fault, both located approximately 26 miles west/southwest of the site.

4.2 Future Earthquake Probabilities

Although research on earthquake prediction has greatly increased in recent years, seismologists cannot predict when or where an earthquake will occur. The U.S. Geological Survey's Working Group on California Earthquake Probabilities (1999), referred to as WG99, determined that there is a 70 percent chance (±10%) of at least one magnitude 6.7 or greater earthquake striking the San Francisco Bay region between 2000 and 2030. This result is the most important outcome of WG99's work, because any major earthquake can cause damage throughout the region.

This was dramatically demonstrated when the 1989 Loma Prieta earthquake caused severe damage in Oakland and San Francisco, more than 50 miles from the fault rupture. Although earthquakes can inflict damage at a considerable distance, shaking will be very intense near the fault rupture. Therefore, earthquakes located in urbanized areas of the region have the potential to cause much more damage than the 1989 Loma Prieta earthquake.

5.0 PRELIMINARY CONCLUSIONS AND DEVELOPMENT CONSIDERATIONS

5.1 Conclusions

From a geotechnical engineering viewpoint, in our opinion, the site is suitable for the proposed residential development. The preliminary recommendations that follow are intended to be used for conceptual planning and preliminary design of the project. We recommend that a final geotechnical investigation be performed once conceptual plans have been finalized. Results from our final investigation would be used to confirm our preliminary findings and recommendations for planning.

The primary geotechnical concerns for the proposed development at the site are:

- ▼ The presence of shallow undocumented fill blanketing the southern half of the site,
- ▼ Potential differential settlement of localized deeper undocumented fill,
- ▼ Potential settlement due to loose surface soils blanketing the northern half of the site,
- ▼ The presence of moderately to highly expansive soils, and
- ▼ The abandonment of existing underground tanks and/or utilities.

A brief discussion of these concerns is presented below.

5.2 Shallow Undocumented Fill

As previously discussed, the site is blanketed by undocumented fill on the order of 3 to 6 feet thick. The surficial fill may have been placed during initial grading for the site. The upper fill appears to pinch out near the southern property boundary, and gradually increases in thickness towards the central portion of the site. The fill appears to end near the boundary between the existing facility and the agricultural field. Due to the variable nature of the existing undocumented fill, on a preliminary basis, the upper 2 to 3 feet of fill will likely need to be over-excavated and recompacted prior to placing any new fill or constructing new foundations.

If it is not feasible to rework the existing shallow undocumented fills, then it may be possible to mitigate the potential impacts from fill settlement by supporting buildings on more rigid mat foundations designed to tolerate higher differential settlement. Preliminary foundation recommendations are presented in Section 7.0.

5.3 Differential Settlement of Deeper Undocumented Fill

Six or seven underground storage tanks (USTs) were previously present at the project site. Four USTs reportedly had been removed, but had no documentation regarding the lateral extent and type of backfill use for these excavations. A fifth UST was indicated as present in the vicinity of the fuel oil USTs on a facility blue print (Figure 2). Two 500-gallon diesel USTs were previously present between the two fire water above-ground storage tanks (ASTs). Both of these UST's reportedly had been removed and replaced with the diesel AST observed during our reconnaissance. The USTs were reportedly located approximately beneath the current diesel AST location.

A former drainage channel, as shown on Figure 2, crosses east-west through the facility. The depth and width of the former channel are not known at this time. We estimate that the channel may have been on the order of 10 feet deep based on approximate contours from USGS topographic maps. Based on our aerial photograph review, the channel was likely backfilled prior to or during grading for the facility.

Any existing undocumented deeper fills will likely be variable, potentially loose, and may cause differential settlement of the proposed residential structures and surrounding improvements. Therefore, on a preliminary basis we recommend that any deep fills associated with former USTs and the former drainage channel be excavated and replaced with engineered fill. If the excavated fill material proves suitable, it may be reused as engineered fill. Side slopes of deeper fill excavations in building and pavement areas should be sloped at inclinations no greater than 3:1 (horizontal to vertical) to minimize abrupt variations in fill thickness. This material may then be reworked and replaced as compacted fill in order to provide more uniform support and reduce the potential for differential settlement across these areas.

5.4 Loose Surface Soils

As previously discussed, we observed approximately 12 to 18 inches of loose surface soils across the northern (agricultural) portion site due to current agricultural use. These materials will have a significant potential for settlement and should be adequately compacted in areas where structures and site improvements are planned. Preliminary recommendations addressing this concern are presented in Section 6.1.

5.5 Expansive Soils

As discussed, moderate to highly expansive surficial soils were encountered on the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. If structures are underlain by expansive soils, it is important that foundation systems be capable of tolerating or resisting any potentially damaging soil movements. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering. Preliminary grading and foundation recommendations addressing this concern are presented in Sections 6.0 and 7.0.

5.6 Existing Underground Tanks and Utilities

Based on our experience with similar industrial sites, existing underground utilities, such as water conveyance or storm drain pipes, may be located beneath portions of the site. Existing underground utilities should be properly abandoned in areas that are designated for development. Any existing monitoring wells should also be abandoned in proposed development areas according to county requirements.

Any existing underground storage tanks (USTs) and associated pipelines will need to be excavated, backfilled with either on-site or imported soil, and recompacted in order to mitigate the potential for settlement. Preliminary recommendations are presented in Section 6.2.

6.0 EARTHWORK

6.1 Clearing and Site Preparation

The site should be cleared of all surface and subsurface deleterious materials including any existing foundations, slabs, buried utilities, underground storage tanks, undocumented fill, debris, septic tanks, leach fields, and designated shrubs and associated roots systems. After clearing, any vegetated areas should be stripped to sufficient depth to remove all surface vegetation and topsoil. Any undocumented fills, such as any undocumented tank backfill, should be removed in their entirety and backfilled with compacted fill.

As discussed in Section 5.2, the upper 2 to 3 feet of existing shallow undocumented fill will likely need to be over-excavated and recompacted. This would likely include over-excavating the upper 1 to 2 feet of fill, scarifying and compacting the upper 12 inches of the excavation area, and then replacing as engineered fill. After the site has been properly cleared, stripped, and necessary excavations have been made, the exposed surface soils should be prepared for any structural fill and building foundations.

All on-site soils below the stripped layer are suitable for use as fill at the site, except for deeper fills associated with former underground storage tanks. Fill material in former tank areas should be further evaluated during the final investigation to determine if they are suitable for use as engineered fill. In general, fill material should not contain rocks or lumps larger than 6 inches in greatest dimension, with no more than 15 percent larger than 2½ inches. Imported fill material should be predominantly granular with a Plasticity Index of 15 or less. All fill as well as scarified surface soils in those areas to receive fill or slabs-on-grade should be compacted to at least 90 percent relative compaction as determined by ASTM Test Designation D-1557, latest edition, except for the native expansive clays. The native expansive clays should be compacted to between 87 and 92 percent relative compaction at a moisture content at least 3 percent over optimum.

Fills deeper than 5 feet should be compacted to at least 93 percent for the portion below the upper 5 feet. The upper 6 inches of subgrade in pavement areas and all aggregate base should be compacted to at least 95 percent relative compaction (ASTM D-1557, latest edition). All utility trenches should be compacted to at least 90 percent relative compaction (ASTM D-1557, latest edition) by mechanical means only.

6.2 Abandoned Utilities

Abandoned utilities within the proposed building areas should be removed in their entirety. Utilities within proposed building areas would only be considered for in-place abandonment provided they do not conflict with new improvements, that the ends and all laterals are located and can be completely grouted, and the previous fills associated with the utility do not appear to pose a risk to future structures.

Utilities outside building areas should be removed or abandoned in-place by grouting or plugging the ends with concrete. The fills associated with utilities abandoned in-place could pose some risk of settlement; utilities that are plugged could also pose some risk of future collapse or erosion should they leak or become damaged. The potential risks are relatively low for small diameter pipes (4 inches or less) abandoned in-place and increasingly higher with increasing diameter.

6.3 Reuse of On-site Recycled Materials

If desired to reuse asphalt or portland cement concrete as engineered fill, we recommend that it be ground up and thoroughly mixed with on-site or import soil. In general, recycled asphalt or concrete should be ground down to less than 4 inches in greatest dimension, with no more than 25 percent larger than 2½ inches. Recycled material should be thoroughly mixed with a sufficient amount of soil, such that there is no more than 40 percent by weight of recycled material in the final mix.

We recommend that fill containing recycled asphalt and concrete be used as the backfill for the removal of any existing USTs and/or spread out evenly across the site. Recycled concrete could possibly be used as aggregate base material provided suitable crushing and screening equipment is used to process the concrete. Laboratory tests should be performed on samples recycled aggregate material if it is to be used in pavement areas. Recycled fill containing ground asphalt should not be used within residential lots.

6.4 Wet Weather Conditions

Earthwork contractors should be made aware of the moisture sensitivity of clayey soils and potential compaction difficulties. If construction is undertaken during wet weather conditions, the surficial soils may become saturated, soft, and unworkable. Subgrade stabilization techniques might include the use of engineering fabrics and/or crushed rock or chemical treatment. Therefore, we recommend that consideration be given to construction during summer months.

6.5 Surface Drainage

Positive surface gradients of at least 2 percent should be provided within 5 feet of the buildings to direct surface water away from the foundations and slabs towards suitable discharge facilities. Ponding of surface water should not be allowed on or adjacent to structures, slabs-on-grade, or pavements. Roof runoff should be carried at least 5 feet away from foundations and slabs in closed conduits and directed to suitable discharge facilities.

7.0 FOUNDATIONS

7.1 Mat Foundations

On a preliminary basis, the proposed residential structures may be supported on conventionally reinforced or post-tensioned mat foundations, provided the foundations are constructed on level lots. Conventionally reinforced and post-tensioned mat foundations may be designed in accordance with the 1997 Uniform Building Code (appropriate sections).

We anticipate that mat foundations would likely be on the order of 10 to 12 inches thick. On a preliminary basis, all mats may be designed for an average allowable bearing pressure of 750 pounds per square foot (psf) and 3,000 psf at localized column loads for dead plus live load. Allowable bearing pressures may be increased by one-third for all loads including wind or seismic. All mats should be reinforced as appropriate to provide structural continuity and to permit spanning of local irregularities. Detailed foundation design criteria and settlement estimates should be developed during the final geotechnical investigation. It may be possible to reduce foundation settlement criteria by reworking the near-surface soils, as discussed in Section 5.2.

8.0 PAVEMENTS

8.1 Asphalt Concrete

Although R-value testing was not performed for this investigation, previous experience and engineering judgment indicates that an R-value of 5 would be appropriate for the surficial fill and near-surface clayey soil. Final pavement design should be determined during the final geotechnical investigation and confirmed during construction with additional R-value testing. Using estimated traffic indices for various pavement loading requirements, we developed the following recommended pavement sections using Procedure 608 of the Caltrans Highway Design Manual, as present in Table 1.

Table 1. Preliminary Asphalt Concrete Pavement Design Alternatives
Pavement Components
Design R-Value = 5

Design Traffic Index *	Asphalt Concrete (Inches)	Aggregate Baserock * (Inches)	Total Thickness (Inches)
5.0	3.0	10.0	13.0
	4.0	8.0	12.0
5.5	3.0	12.0	15.0
	4.0	10.0	14.0
6.0	3.5	13.0	16.5
	4.0	12.0	16.0
6.5	4.0	14.0	18.0
	5.0	12.0	17.0
7.0	4.0	16.0	20.0
	5.0	14.0	19.0

*Caltrans Class 2 aggregate base; minimum R-value equal to 78.

The traffic indices used in our pavement design are considered reasonable values for the proposed development and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. The traffic parameters presented in Table 1 were selected based on engineering judgment and not on information furnished to us, such as an equivalent wheel load analysis or a traffic study.

We recommend that additional R-value testing be performed during the final geotechnical investigation. If testing indicates a significantly higher R-value, it may be feasible to reduce pavement sections. Because the native surficial soils at the site are potentially expansive, surface water infiltration beneath pavements could somewhat reduce the pavement design life. Therefore, it would be beneficial to protect at-grade pavements from landscape water infiltration by means of a concrete cutoff wall, subdrains, deepened curbs, redwood header, "Deep-Root Moisture Barrier," or equivalent.

8.2 Asphalt Concrete, Aggregate Base and Subgrade

Asphalt concrete and aggregate base should conform to and be placed in accordance with the requirements of Caltrans Standard Specifications, latest edition, except that ASTM Test Designation D1557 should be used to determine the relative compaction of the aggregate base. Pavement subgrade should be prepared and compacted as described in the "Earthwork" section of this report.

8.3 Exterior Slabs

As previously discussed, the moderately to highly expansive near-surface soils will likely be subjected to volume changes during fluctuations in moisture content. As a result of these volume changes, some vertical movement of exterior slabs and sidewalks should be anticipated. A layer of non-expansive fill could be placed beneath exterior slabs to reduce the potential for heave and shrinkage of the subgrade soils.

Exterior slabs could also be reinforced with reinforcing bars, in lieu of wire mesh, for shrinkage control and to minimize the impact of expansion pressures. Dowels should be provided at all expansion and cold joints. Although sidewalks that are adequately reinforced may still crack, trip hazards requiring replacement of the slabs will be minimized. To minimize the potential for crack formation, No. 4 bars spaced at approximately 18 inches on center in both directions could be used. In additional to the above guidelines, the subgrade soils should be properly moisture conditioned and compacted as discussed in Section 6.0.

9.0 FINAL GEOTECHNICAL INVESTIGATION

We recommend that a detailed geotechnical investigation be performed after conceptual grading plans are finalized. This investigation should include additional exploratory borings, Cone Penetration Tests (CPTs) and/or test pits, and additional laboratory testing to further evaluate the properties of the subsurface soils. Detailed engineering analysis would be performed to provide specific earthwork, foundation, and retaining wall recommendations for the project. Our report would summarize the field and laboratory data and would include detailed recommendations for the building foundation types, depth, and allowable bearing pressures, as well as recommendations for grading, earthwork operations, lateral earth pressures for retaining walls, if any, and final pavement design.

10.0 LIMITATIONS

This report has been prepared for the sole use of Shea Homes, specifically for conceptual planning and preliminary design of the proposed residential development at the Hunt-Wesson Facility in Davis, California. The opinions presented in this report have been formulated in accordance with generally accepted geotechnical engineering practices that exist in the San Francisco Bay Area at the time this report was written. No other warranty, expressed or implied, is made or should be inferred. We are not responsible for the data presented by others.

The opinions, conclusions and recommendations contained in this report are based upon the information obtained from explorations at widely separated locations, site reconnaissance, review of data made available to us, and upon local experience and engineering judgment. The recommendations presented in this report are based on the assumptions that the soil and geologic conditions at or between borings do not deviate substantially from those encountered or extrapolated from the explorations performed. In addition, geotechnical issues may arise that are not apparent at this time.

The geotechnical engineer should be retained to review the final specifications and drawings when they are available, to verify these documents are consistent with the intent of the geotechnical recommendations. The recommendations provided in this report are based on the assumption that we will be retained to provide observation and testing services during the construction phase of the project in order to evaluate compliance with our recommendations. If we are not retained for these services, Lowney Associates cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Lowney Associates' report by others. Furthermore, Lowney Associates will cease to be the Geotechnical-Engineer-of-Record at the time another consultant is retained for follow-up service to this report.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable standards of practice can occur, whether they result from legislation or the broadening of knowledge. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any properties other than that evaluated.

11.0 REFERENCES

11.1 Literature

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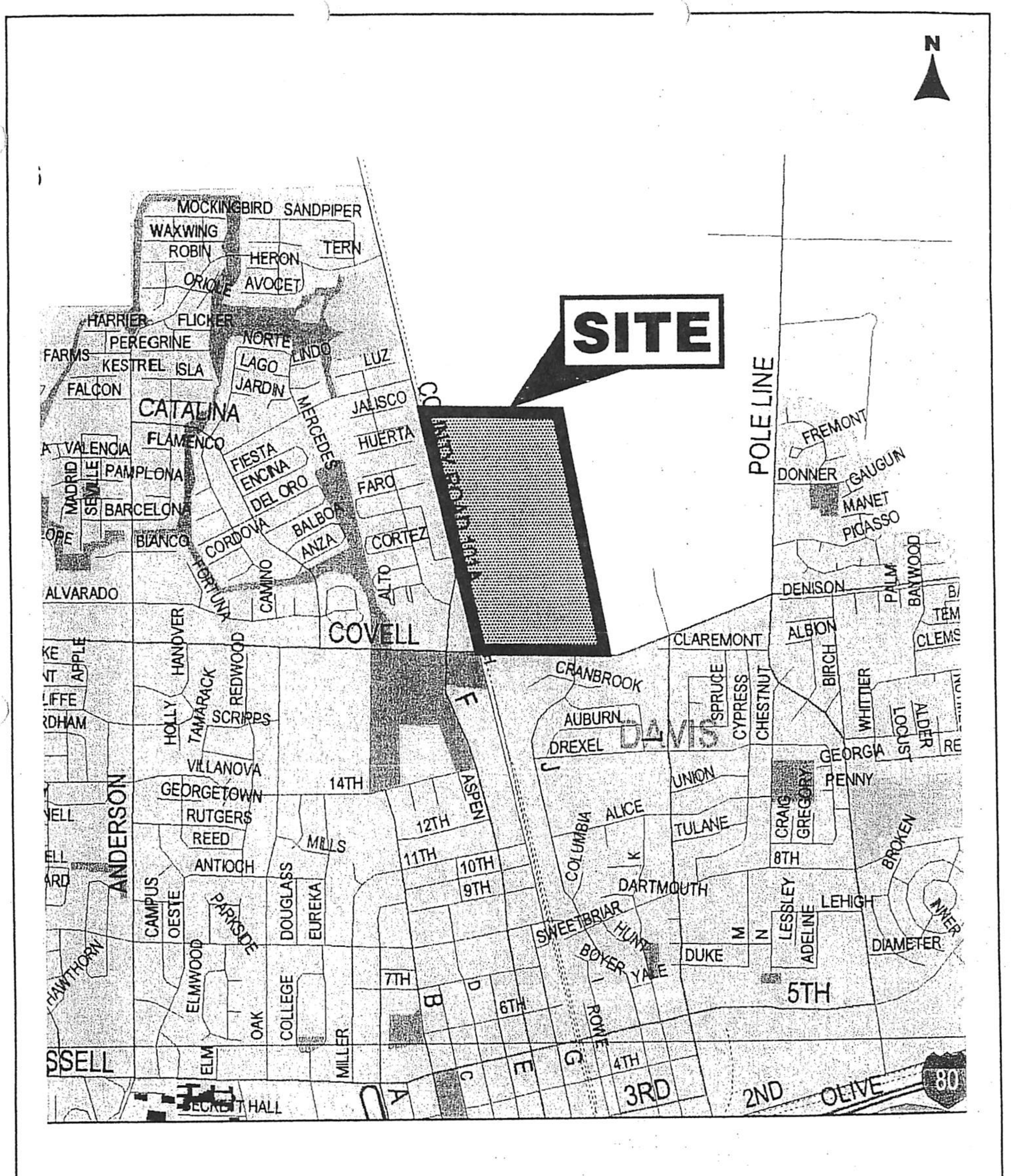

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VICINITY MAP

HUNT-WESSON FACILITY
Davis, California

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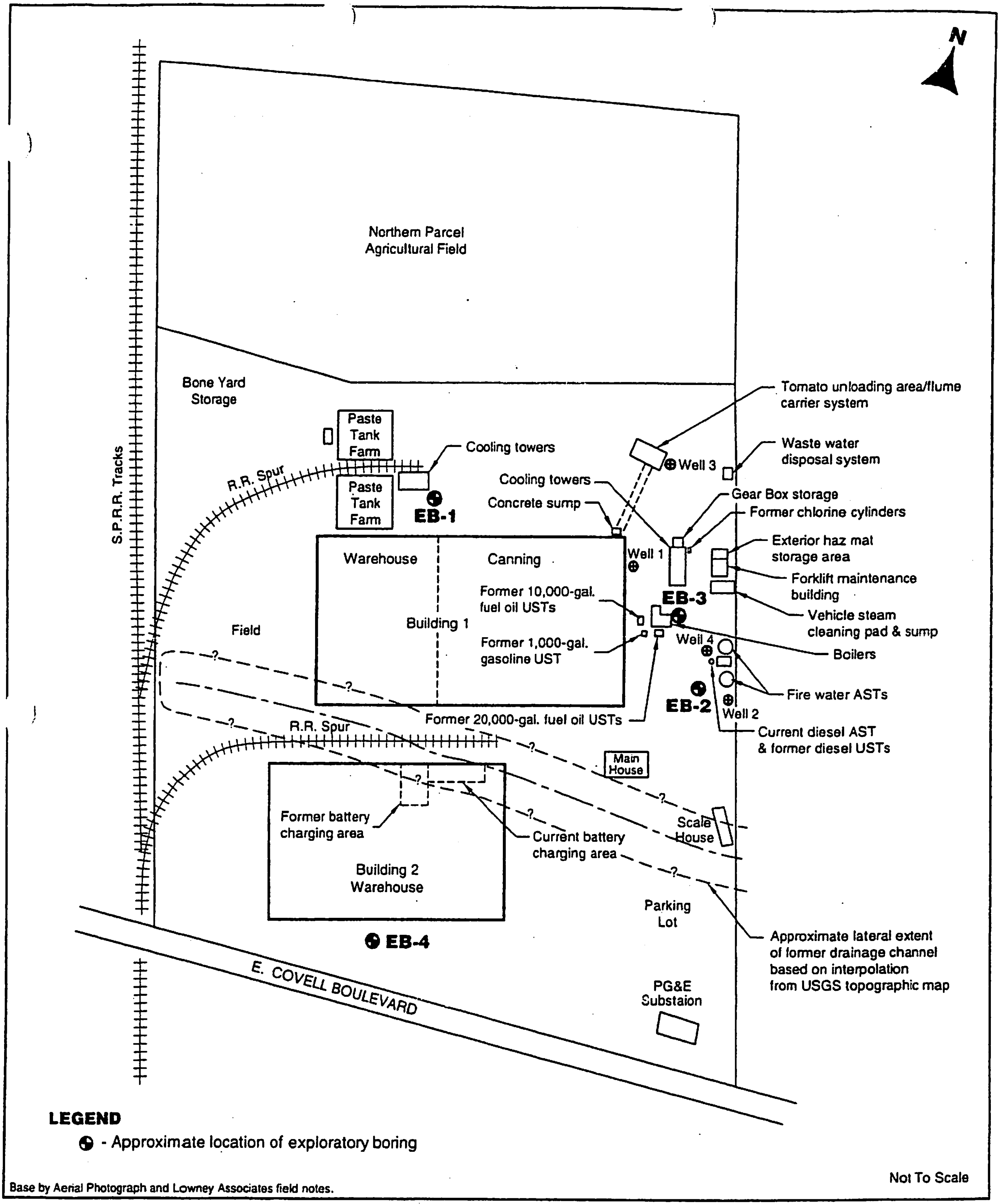
FIGURE 1
1080-25A



SITE PLAN

HUNT-WESSON FACILITY
Davis, California

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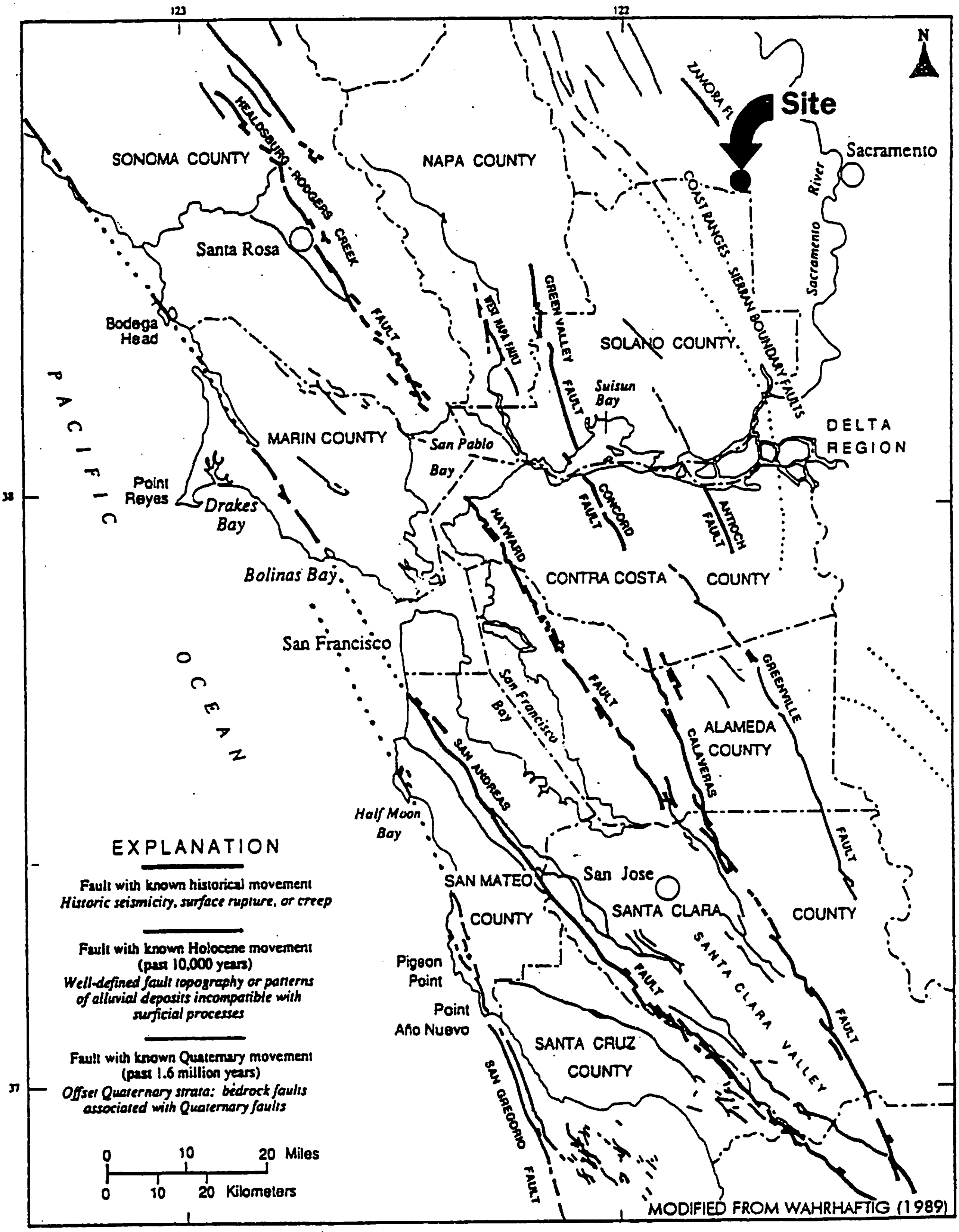
FIGURE 2
1080-25A



REGIONAL FAULT MAP

HUNT - WESSON DAVIS PRELIMINARY GI

Davis, California

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FIGURE 3
1080-25A

APPENDIX A

FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment. Four 7-inch-diameter exploratory borings were drilled on December 20, 2001, to a maximum depth of 44½ feet. The approximate locations of the exploratory borings are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). The logs of the borings, as well as a key to the classification of the soil, are included as part of this appendix.

The locations of borings were approximately determined by pacing from existing site boundaries. Elevations of the borings were not determined. The locations of the borings should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). Two and one-half inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring logs represent the accumulated number of blows required to drive the last 12 inches. The sample intervals are denoted at the appropriate depth on the boring logs and symbolized as shown on Figure A-1.

Field tests included an evaluation of the undrained shear strength of soil samples using a Torvane device, and the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

The attached boring logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

PRIMARY DIVISIONS			SOIL TYPE		SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (Less than 5% Fines)	GW	●	Well graded gravels, gravel–sand mixtures, little or no fines
			GP	○	Poorly graded gravels or gravel–sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	○	Silty gravels, gravel–sand–silt mixtures, plastic fines
			GC	▨	Clayey gravels, gravel–sand–clay mixtures, plastic fines
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (Less than 5% Fines)	SW	⁘	Well graded sands, gravelly sands, little or no fines
			SP	⁘	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM	⁘	Silty sands, sand–silt–mixtures, non–plastic fines
			SC	▨	Clayey sands, sand–clay mixtures, plastic fines
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50 %		ML	▥	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	▨	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	☰	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50 %		MH	▥	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	▨	Inorganic clays of high plasticity, fat clays
			OH	≋	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	⁂	Peat and other highly organic soils

DEFINITION OF TERMS

U.S. STANDARD SIEVE SIZE — CLEAR SQUARE SIEVE OPENINGS

200 40 10 4 3/4" 3" 12"

SILTS AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

- ☒ TERZAGHI SPLIT SPOON STANDARD PENETRATION
- ⧗ MODIFIED CALIFORNIA
- ▯ D & M UNDERWATER SAMPLER
- ■ SHELBY TUBE
- ○ NO RECOVERY

SAMPLERS

SAND AND GRAVEL	BLOWS/FOOT*
VERY LOOSE	0–4
LOOSE	4–10
MEDIUM DENSE	10–30
DENSE	30–50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH+	BLOWS/FOOT*
VERY SOFT	0–1/4	0–2
SOFT	1/4–1/2	2–4
MEDIUM STIFF	1/2–1	4–8
STIFF	1–2	8–16
VERY STIFF	2–4	16–32
HARD	OVER 4	OVER 32

CONSISTENCY

*Number of blows of 140 pound hammer falling 30 inches to drive a 2–inch O.D. (1–3/8 inch I.D.) split spoon (ASTM D–1586).
+Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D–1586), pocket penetrometer, torvane, or visual observation.

KEY TO EXPLORATORY BORING LOGS

Unified Soil Classification System (ASTM D–2487)

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FIGURE A–1

EXPLORATORY BORING: EB-1

Sheet 1 of 2

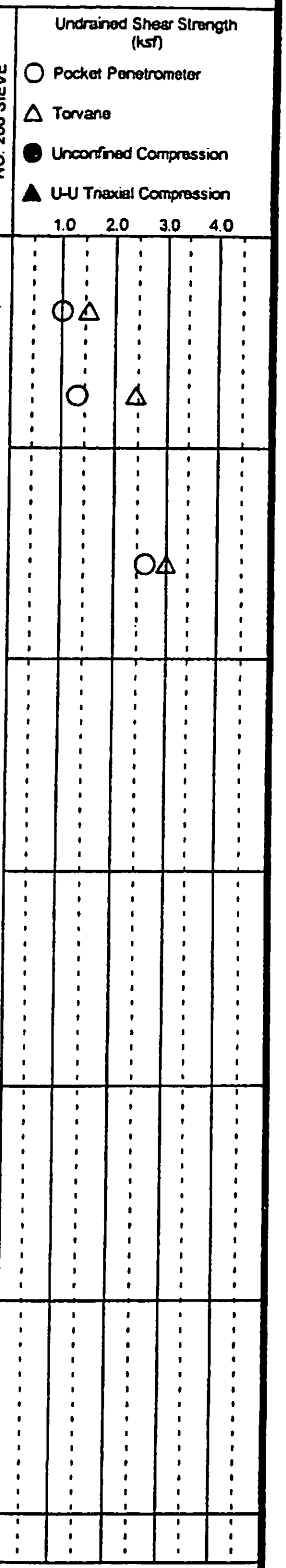
DRILL RIG: MOBILE B-61
BORING TYPE: 7" HOLLOW AUGER
LOGGED BY: CM
START DATE: 12-20-01 FINISH DATE: 12-20-01

PROJECT NO: 1080-25A
PROJECT: HUNT-WESSON
LOCATION: DAVIS, CA
COMPLETION DEPTH: 44.5 FT.

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

SURFACE ELEVATION:

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0		**APHALT CONCRETE (AC)**	AC					
			AGGREGATE BASE (AB)	AB					
	5		**SILTY CLAY (CH) [FILL]** stiff, moist, brown, grey mottles, some rock fragments, brick and concrete fragments Liquid Limit = 60, Plasticity Index = 35 becomes mostly grey, brown mottles, trace coarse sand, occasional debris	CH	20 17		31 16	90 117	
			SILTY SAND (SM) medium dense, moist, light brown, fine grained sand, silty, poorly graded	SM	26		24	106	
	10		**SILTY CLAY (CL)** stiff, moist, brown, trace fine sand	CL	18		27	-	
	15		**SILTY SAND (SM)** medium dense, moist, brown, medium grained sand, well sorted	SM					
	20		**SILTY CLAY (CH)** stiff, moist, black, brown mottles, very plastic	CH	15		31		
	25 30		**SILTY CLAY (CL)** very stiff to hard, moist, brown, small black mottles light grey mottles, small rock fragments	CL	48 55		24		



Continued Next Page

GROUND WATER OBSERVATIONS:

▽: FREE GROUND WATER MEASURED DURING DRILLING AT 32.0 FEET

ORP.GDT 1/7/02 OAK* WRD

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EXPLORATORY BORING: EB-1 Cont'd

Sheet 2 of 2

DRILL RIG: MOBILE B-61
BORING TYPE: 7" HOLLOW AUGER
LOGGED BY: CM
START DATE: 12-20-01 FINISH DATE: 12-20-01

PROJECT NO: 1080-25A
PROJECT: HUNT-WESSON
LOCATION: DAVIS, CA
COMPLETION DEPTH: 44.5 FT.

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

Undrained Shear Strength (ksf)

○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf) 1.0 2.0 3.0 4.0
	30	▨	**SILTY CLAY (CL)** very stiff to hard, moist, brown, small black mottles							
∇		▨	becomes stiff, wet, more grey, calcium carbonate traces	CL	26	⧗	30			
	35	▨								
		░	**SAND (SP)** medium dense, wet, fine grained, poorly graded, trace silt	SP						
		▨	**SILTY CLAY (CL)** very stiff, wet, brown, grey and orange mottles, trace sand and fine gravel	CL	29	⧗				
	40	▨								
		▨	**SILTY CLAY (CH)** stiff, wet, dark brown, very plastic	CH	23	⧗	27			
	45		Bottom of Boring = 44.5 feet							
	50									
	55									
	60									

GROUND WATER OBSERVATIONS:
∇: FREE GROUND WATER MEASURED DURING DRILLING AT 32.0 FEET

ORP.GDT 1/7/02 OAK WRD

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-2

Sheet 1 of 1

DRILL RIG: MOBILE B-61	PROJECT NO: 1080-25A
BORING TYPE: 7" HOLLOW AUGER	PROJECT: HUNT-WESSON
LOGGED BY: CM	LOCATION: DAVIS, CA
START DATE: 12-20-01 FINISH DATE: 12-20-01	COMPLETION DEPTH: 20.0 FT.

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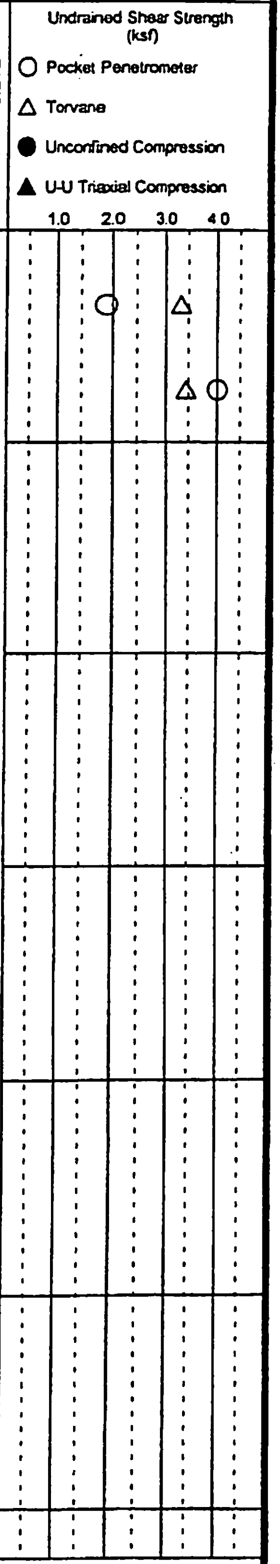
ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION:	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0		**APHALT CONCRETE (AC)**	AC					
			AGGREGATE BASE (AB)	AB					
			SILTY CLAY (CL) [FILL] stiff to very stiff, moist, dark brown, mottled with olive and brown,		18		24	103	
			Liquid Limit = 37, Plasticity Index = 18 moderately plastic, trace to some gravel	CL	28		18	105	
	5								
			SAND (SP) [FILL] loose to medium dense, moist, brown, fine to medium grained becomes interbedded with clayey sand at 8 feet		15		6		3
	10			SP					
			becomes less clayey, fine to medium grained		14		5		
			SILTY SAND (SM) medium dense, moist, olive brown, fine sand						
	15			SM	15		18		
			SILTY CLAY (CL) stiff to very stiff, moist, brown, orange/white mottles, moderate plasticity		14		35		
				CL	29		26		
	20		Bottom of Boring = 20 feet						
	25								
	30								



GROUND WATER OBSERVATIONS:

NO FREE GROUNDWATER ENCOUNTERED

RP.GDT 1/9/02 OAK* WRD

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EXPLORATORY BORING: EB-3

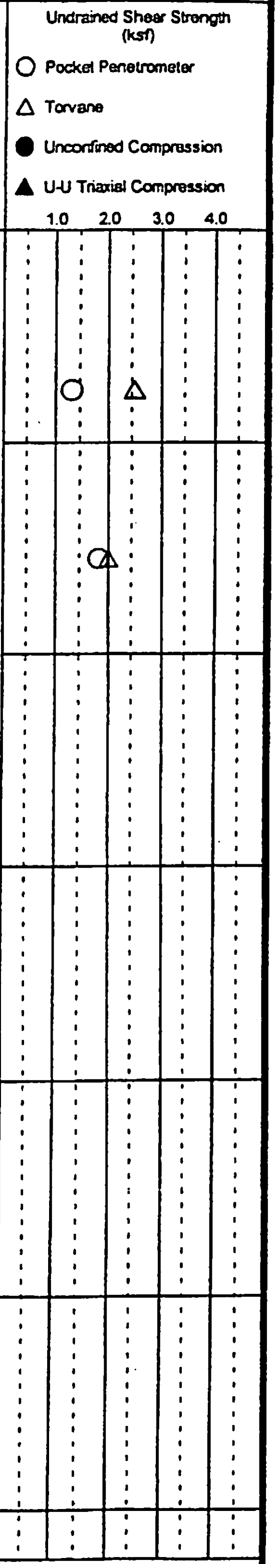
Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" HOLLOW AUGER
LOGGED BY: CM
START DATE: 12-20-01 FINISH DATE: 12-20-01

PROJECT NO: 1080-25A
PROJECT: HUNT-WESSON
LOCATION: DAVIS, CA
COMPLETION DEPTH: 20.0 FT.

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

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION:	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	**AGGREGATE BASE (AB)**	AB				
		CLAYEY GRAVEL (GC) [FILL] medium dense, moist, mottled brown and gray, some sand	GC	26	6		
		becomes loose		9	22	104	
	5	**SILTY CLAY (CL)** medium stiff, moist, dark brown, trace gravel	CL				
		SILTY SAND (SM) loose, moist, brown, rusty-orange mottles, fine-grained sand	SM	7	19	90	
	10	**SANDY SILT (ML)** medium stiff, moist, fine grained sand, trace clay	ML	10	29		
	15						
		SILTY CLAY (CL) stiff, moist, light brown, gray mottles	CL	24	30		
	20	Bottom of Boring = 20 feet					
	25						
	30						



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

RP.GDT 1/7/02 OAK' WRD

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EXPLORATORY BORING: EB-4

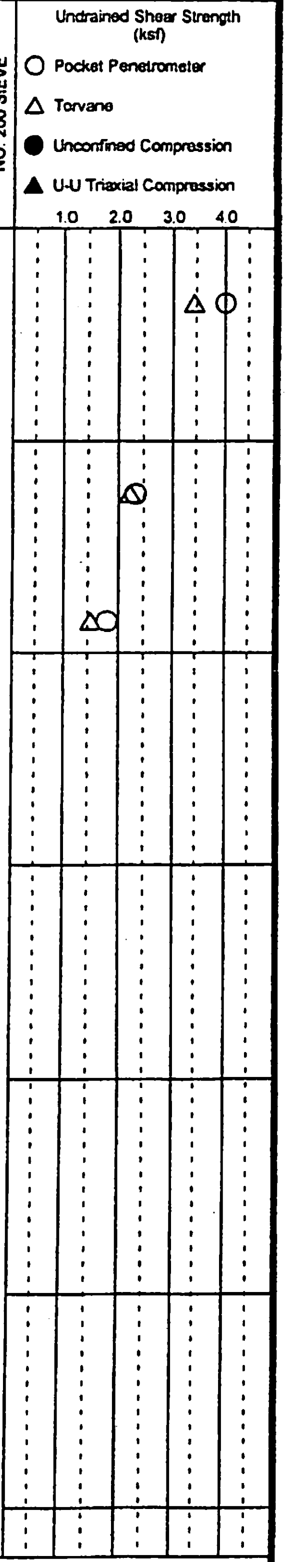
Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" HOLLOW AUGER
LOGGED BY: CM
START DATE: 12-20-01 FINISH DATE: 12-20-01

PROJECT NO: 1080-25A
PROJECT: HUNT-WESSON
LOCATION: DAVIS, CA
COMPLETION DEPTH: 20.0 FT.

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

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION:	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0		**APHALT CONCRETE (AC)**	AC					
			AGGREGATE BASE (AB)	AB					
			SILTY CLAY (CL) very stiff, moist, dark brown, orange mottles	CL	47		19	109	
			increase in siltiness		23				
	5		**CLAYEY SILT (ML)** stiff, moist, light brown, orange mottles, trace fine sand	ML	21		19	91	63
			increase in clay, some white calcite, trace sand		18		23	96	
	10								
			less silt, moist moderately plastic		15		17		
	15								
			SILTY CLAY (CL) very stiff, moist, dark brown, small orange mottles	CL	44		26		
	20		Bottom of Boring = 20 feet						
	25								
	30								



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

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Environmental/Geotechnical/Engineering Services

APPENDIX B

LABORATORY INVESTIGATION

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

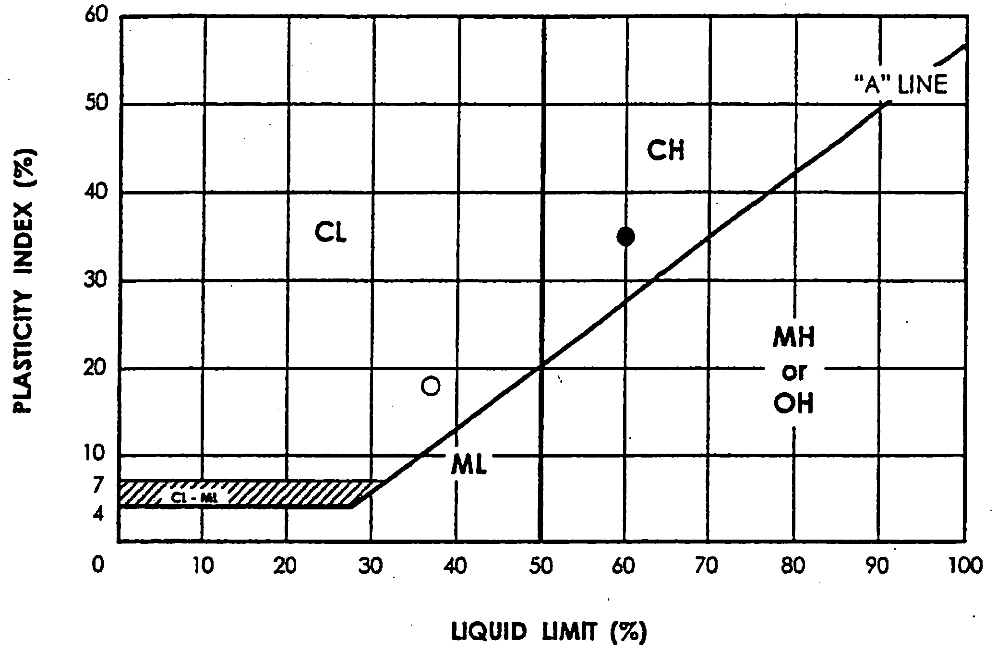
Moisture Content: The natural water content was determined (ASTM D2216) on 24 samples recovered from the borings. These water contents are presented on the boring logs at the appropriate sample depths.

Dry Densities: In place, dry density determinations (ASTM D2937) were performed on 11 samples to measure the unit weight of the subsurface soils. Results of these tests are presented on the boring logs at the appropriate sample depths.

Plasticity Index: Plasticity Index determinations (ASTM D4318) were performed on two samples of the subsurface soils to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are presented on Figure B-1 and on the logs of the borings at the appropriate sample depth.

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

* * * * * * * * * * * * * *



KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	NATURAL WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PASSING #200 SIEVE (%)	UNITED SOIL CLASSIFIC. SYMBOL
●	EB-1	1.5	31	60	25	35	—	CH
○	EB-2	4.0	18	37	19	18	—	CL

PLASTICITY CHART AND DATA
HUNT - WESSON FACILITY
Davis, California

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FIG'

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[illegible]

ConAgra 9,4.5.2

RECEIVED
APR 07 2003
SHEA HOMES

April 2, 2003
1080-25A

Mr. Kevin Peters
SHEA HOMES
2580 Shea Center Drive
Livermore, California 94550

RE: SUPPLEMENTAL GEOTECHNICAL INVESTIGATION FOR CONAGRA (FORMERLY HUNT-WESSON) FACILITY DAVIS, CALIFORNIA

Dear Mr. Peters:

In this letter, we present the results of our supplemental geotechnical investigation for the above referenced project in Davis, California as shown on the Vicinity Map, Figure 1. As you know, we performed a preliminary geotechnical investigation of the southern (paved) portion of the site and prepared a report titled, "Preliminary Geotechnical Investigation, Hunt-Wesson Facility, Davis, California," dated February 12, 2002. The purpose of our supplemental investigation was as follows:

- ✓ Further evaluation of the subsurface conditions at the site, and to provide supplemental geotechnical recommendations for conceptual planning and preliminary design of the residential development.
- ✓ To evaluate the percolation characteristics of the upper soil layers in the northeast corner of the site for preliminary design of a storm water detention basin.
- ✓ To evaluate the characteristics of a possible former drainage channel that reportedly bisected the southern portion of the site.
- ✓ To evaluate the shrinkage characteristics of the surficial soils in the northern portion of the site to aid in estimating grading quantities.
- ✓ To determine existing pavement sections in order to assist in determining the quantity of existing concrete and asphalt pavement that could potentially be recycled.

For our use we received a conceptual site plan showing the proposed location of buildings and roadway configuration, overlaid on existing site topography, prepared by MacKay and Somps, undated but based on aerial survey taken April 3, 2002.

PROJECT DESCRIPTION

The approximately 100-acre site is located at 1111 East Covell Boulevard. It consists of two parcels of roughly equal area. The southern portion of the site is occupied by the ConAgra (formerly Hunt-Wesson) facility. The northern portion of the site is undeveloped agricultural land. Shea Homes is planning to develop the entire 100-acre site for residential redevelopment. The site is bounded by vacant land to the north and to the east, East Covell Boulevard to the south, and the Union Pacific Rail Line right-of-way to the west. The canning facility consists of two warehouse distribution buildings and support buildings totaling approximately 560,000 square feet. The facility includes various tanks, cooling towers, boilers, scales, a waste disposal system and other related structures. Two railroad spurs enter the site from the west. Based on the information provided and our experience in the area, the site was constructed in 1963 as a cannery; site use prior to 1963 likely was agricultural.

SITE CONDITIONS

Field Exploration

Four exploratory borings (EB-1 through EB-4) were originally drilled on the southern portion of the site in December 2001. We performed our supplemental investigation on October 10 and 11, 2002, using conventional truck-mounted auger drilling equipment to investigate, sample, and log the subsurface soils. Four exploratory borings (EB-5 through EB-8) were drilled on the northern (unpaved) portion of the site to depths ranging from 20 to 40 feet. We also drilled 11 shallow borings (CB-1 through CB-11) in the location of the former drainage swale to investigate the lateral extent of any undocumented fill. The approximate locations of the borings for this investigation, as well as our previous investigation, are shown on the Site Plan, Figure 2. Logs of our boring and details regarding our field investigation are included in Appendix A; the results of our laboratory tests are discussed in Appendix B.

Surface Conditions and Topography

We also performed a brief surface reconnaissance during our site exploration. A description of the southern portion of the site was presented in our February 12, 2002 report. Topographic information provided by MacKay and Somps indicates that the southern portion of the site ranges from approximately Elevation 44 feet (datum unknown) near its northwestern corner to approximately Elevation 40 feet at its southwestern corner. Vegetation typically consists of landscaping bushes and trees, which are prevalent in the old parking areas and around the perimeter of the site.

USGS topographic information indicates that an old creek or drainage channel at one time crossed this portion of the site in a roughly east to west orientation. The approximate lateral extent of this former channel, based on interpolation from USGS maps and our shallow borings, is approximately shown on Figure 2.

The northern half of the 100-acre site is agricultural land that had been recently disked at the time of our investigation. Topographic information provided by MacKay and Somps indicates that the site topography of the northern portion ranges from approximately Elevation 42 feet (datum unknown) at the northwestern corner of the open field to approximately Elevation 37 feet at the southeastern corner of the open field. Vegetation generally consists of sparsely scattered low weeds and bushes.

Subsurface

Northern Parcel: Borings EB-5 through EB-8 drilled on the northern parcel encountered native alluvial soils consisting of stiff to very stiff silty or sandy clay with occasional discontinuous layers of loose to medium dense sand or silty sand to the maximum depth explored of 40 feet. The sand layers were encountered at depths ranging from 7 to 14 feet and typically ranged from 2 to 6 feet thick. The exception was EB-7 in the northwestern corner of the open field, which encountered medium dense silty sand at the ground surface to a depth of approximately 8½ feet. A Plasticity Index (PI) test performed on one sample of near-surface clayey soil indicated that the upper silty clay is highly expansive (PI of 51). The upper 12 to 18 inches of surficial soil appeared to be loose or soft due to previous tilling. The subsurface conditions encountered during this investigation were generally consistent with those described in our preliminary geotechnical report dated February 12, 2002.

Southern Parcel: The borings drilled on the southern parcel in the location of the former drainage channel encountered up to approximately 8 feet of fill consisting of medium stiff silty clay. Fill was not encountered in Borings CB-8, 9 and 10, but the surficial soils consisted of silty clay to a depth of approximately 5½ to 13½ feet. Below that, the borings encountered interbedded layers of silt, sand, clay and gravel. Below the existing fill, Borings CB-1 through CB-7 encountered interbedded layers of sandy clay, silty sand and sandy gravel at depths below 5 feet. In Borings CB-8, 9 and 10 the surficial silty clay was underlain by approximately 2 to 5 feet of silty sand, which was underlain by silty clay to a depth of 10 feet. Boring CB-10 encountered silty clay to approximately 13½ feet, underlain by gravelly sand to the bottom of the boring at 16½ feet. A Plasticity Index (PI) test performed on a sample of the fill material from CB-7 resulted in a PI of 20, indicating moderate expansion potential.

Ground Water

Ground water was encountered during drilling in Boring EB-7 at a depth of approximately 25 feet, and in Boring EB-8 at approximately 33 feet. Ground water was previously encountered in EB-1 (December 2001) at a depth of approximately 32 feet below existing grade. Ground water was not encountered in our shallow borings drilled on the southern portion of the site. It should be noted that the borings may not have been left open for a sufficient period of time to establish equilibrium ground water conditions. All borings were backfilled with cement grout shortly after drilling. Fluctuations in the level of the ground water may occur due to variations in rainfall and other factors not in evidence at the time measurements were made.

CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical engineering viewpoint, in our opinion, the site is suitable for the proposed residential development. The preliminary grading, foundation, and pavement recommendations presented in our February 12, 2002, geotechnical report are still considered appropriate for conceptual planning and preliminary design of the project. We recommend that a design-level geotechnical investigation be performed once conceptual plans have been finalized. Results from our design-level investigation would be used to confirm our preliminary findings and recommendations for planning.

As summarized in our report dated February 12, 2002, the primary geotechnical concerns and development considerations for the proposed development are:

- ✓ The presence of shallow undocumented fill blanketing the southern half of the site,
- ✓ Potential differential settlement of localized deeper undocumented fill,
- ✓ Potential settlement due to loose surface soils blanketing the northern half of the site,
- ✓ The presence of moderately to highly expansive soils, and
- ✓ The abandonment of existing underground tanks and/or utilities.

A brief discussion of these concerns was presented in our preliminary report. Based on our supplemental investigation, these concerns are still appropriate for the site. A more detailed discussion regarding the possible former drainage channel is discussed below. Information regarding our percolation study, soil shrinkage evaluation, and pavement thickness evaluation is presented in the following sections of this report.

Differential Settlement of Deeper Undocumented Fill

A former drainage channel, as shown on Figure 2, crosses from east to west through the facility. Based on our supplemental borings CB-1 through CB-8, the depth of the former channel is estimated to be approximately 5 to 9 feet below existing site grades. The width of the channel could not be determined from our borings; however, we estimated the width to be on the order of 15 to 20 feet. Based on our aerial photograph review, the channel was likely backfilled prior to or during grading for the existing facility.

The existing undocumented deeper fills appear to be variable, potentially loose, and may cause differential settlement of the proposed residential structures and surrounding improvements. Therefore, on a preliminary basis we recommend that any deep fills associated with the former drainage channel be excavated and replaced with engineered fill. If the excavated fill material proves suitable, it may be reused as engineered fill. Side slopes of deeper fill excavations in building and pavement areas should be sloped at inclinations no greater than 3:1 (horizontal to vertical) to minimize abrupt variations in fill thickness. This material may then be replaced as compacted fill in order to provide more uniform support and reduce the potential for differential settlement across these areas.

PERCOLATION STUDY

On October 21 and 22, 2002, we conducted an in-situ percolation study at four locations (TP-1 through TP-4) near the northeastern corner of the site, as shown on Figure 2. Test pits were excavated on October 21, 2002, using conventional rubber-tired backhoe equipment to depths ranging from 5 to 8½ feet. At the bottom of each pit, a shallow test hole approximately 12 inches in diameter by approximately 18 inches deep was hand excavated and then filled with water. The test holes were allowed to pre-saturate overnight. The percolation tests were performed on October 22, 2002, by initially clearing any loose sediment and then placing at least 12 inches of water in each test hole. The change in the water level was recorded at 10-minute intervals for the duration of the tests.

The results of percolation tests TP-1 through TP-4 are presented in Table 1. The results indicate that the average rate of percolation at each location varied from approximately 3 to 57 minutes per inch (mpi). Test TP-1 appeared to percolate the fastest due to the more permeable silty sand layer encountered at the bottom of the test pit. The average of the four percolation test locations was approximately 22 mpi. If the results from TP-1 are considered to be a localized condition, the average of the slowest three percolation tests was approximately 28 mpi.

Table 1. Summary of Percolation Test Results

Test Pit No.	Approximate Test Depth (feet)	Approximate Test Elevation (feet)	General Soil Type at Bottom	Average Percolation Rate (mpi)
TP-1	8½	30½	Silty Sand	3
TP-2	6	32	Silty Clay	57
TP-3	7	32	Sandy Clay	18
TP-4	5	34½	Silty Sand	10

SOIL SHRINKAGE EVALUATION

We also performed an evaluation to estimate the magnitude of potential shrinkage associated with the compaction of the near-surface soils. On October 21, 2002, we performed field density tests within the upper 24 inches of soil in the northern parcel using a nuclear density gage. Excavating and re-compacting the near-surface soils will typically densify native materials. The volume change (shrinkage vs. swelling) between in-place soils and re-compacted soils will vary depending on the density prior to compaction and the density after compaction. Based on our review of the field and laboratory data, the estimates for soil shrinkage presented in Table 2 may be considered.

Table 2. Soil Shrinkage Estimates

Location	Depth Below Existing Grade (feet)			
	0 to 1	1 to 2	2 to 5	> 5
Northern Parcel	15 to 25%	5 to 10%	< 5%	Negligible
Southern Parcel	Negligible	Negligible	Negligible	Negligible

These results are based on a total of 11 locations where field density tests were performed. The results are also based on laboratory tests to determine the maximum dry density (ASTM D1557) of representative surficial soils, and in-situ moisture and density tests from our borings. We have assumed that engineered fill will be compacted to a relative compaction of 90 percent at 1 to 2 percent over optimum moisture content. Shrinkage would likely be negligible for soils below a depth of 5 feet. Please note that actual shrinkage experienced during grading may be significantly higher or lower than the values shown above due to variations in local soil conditions or consistency.

PAVEMENT THICKNESS EVALUATION

On October 20, 2002, six concrete cores were performed within the existing warehouse buildings at the locations shown on Figure 2. The thickness of the cores and the underlying granular base materials were measured. In addition, the thickness of any asphalt or concrete pavement encountered in our supplemental borings was also recorded. The results from our pavement cores and borings are presented in Table 3.

Table 3. Existing Concrete and Asphalt Pavement Sections

Location	Slab or Pavement Type	Pavement Thickness (inches)	Base Thickness (inches)
Core #1	PCC*	6	4
Core #2	PCC	6	8
Core #3	PCC	7½	3½
Core #4	Asphalt	5	8
Core #5	PCC	6	--
Core #6	PCC	6	--
CB-1	Asphalt	10	6
CB-2	Asphalt	6	10
CB-3	Asphalt	7	10
CB-4	Asphalt	6	10
CB-5	Asphalt	6	14
CB-6	Asphalt	3	3
CB-7	Asphalt	3	3
CB-8	Asphalt	3	2

*PCC = Portland cement concrete

Please note that most of the southern half of the site is paved. The information presented in Table 3 is valid only at the locations where the pavement was penetrated. Areas such as machinery pads, driveways and roads may contain concrete or pavement sections that differ from the data shown above.

CLOSURE

This letter was prepared for the sole use of Shea Homes for application to the design of the Con Agra parcel in accordance with generally accepted geotechnical engineering practices at this time and location. No warranty is expressed or implied.

We hope this provides the information you need at this time. If you have any questions, please call and we would be glad to discuss them with you.

Very truly yours,

LOWNEY ASSOCIATES

John R. Dye, P.E., G.E.
Senior Project Engineer

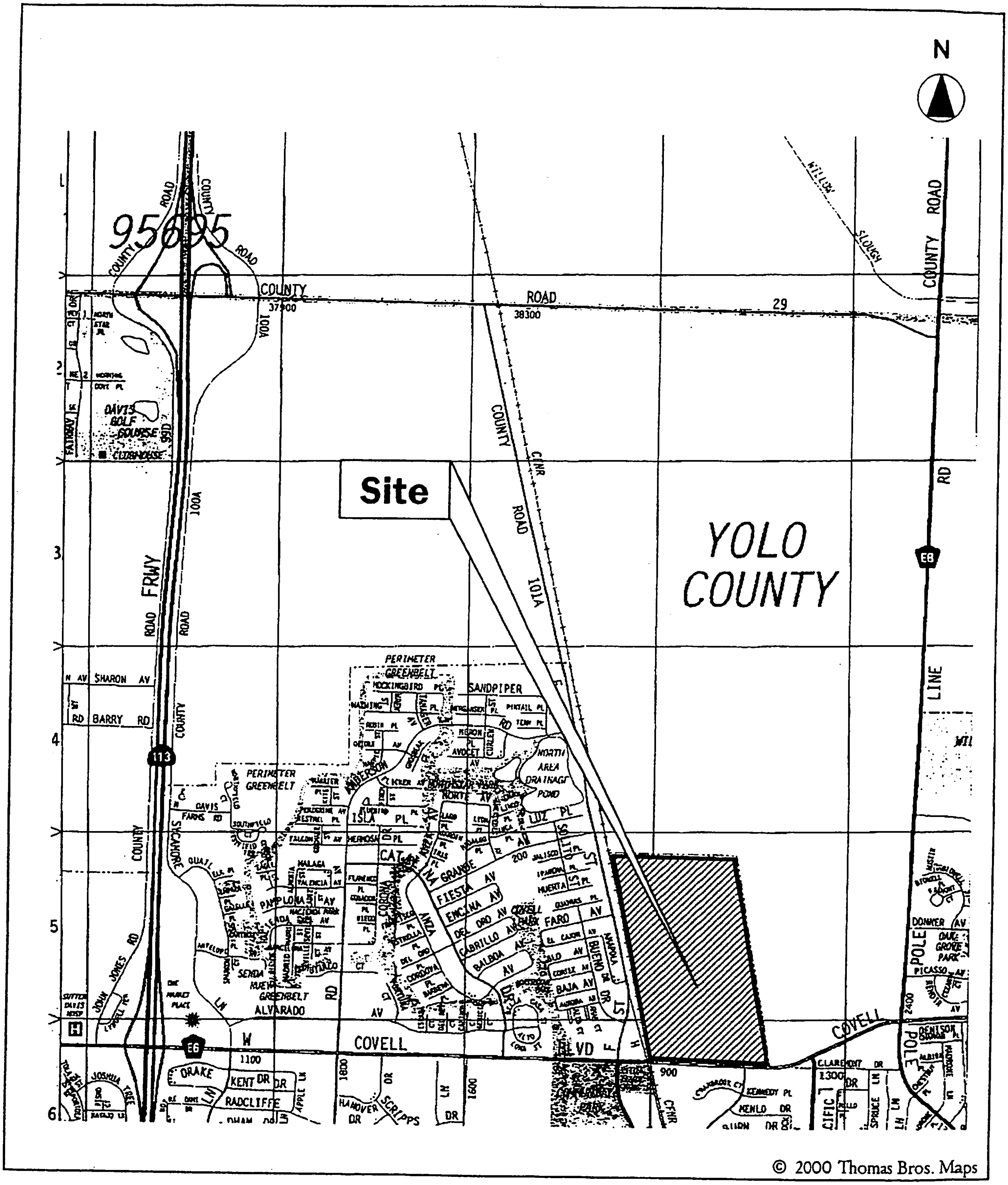
JRD:WRD:jcm

REGISTERED PROFESSIONAL ENGINEER
JOHN R. DYE
No. GE2582
Exp. 12/31/06
GEOTECHNICAL
STATE OF CALIFORNIA

Attachments: Figure 1 – Vicinity Map
Figure 2 – Site Development Plan
Appendix A - Field Investigation
Appendix B - Laboratory Investigation

Copies: Addressee (3)
MacKay & Somps (1)
Attn: Mr. Steve Lichliter

SR P:\PROJECTS\1000\1080-Shea Homes\1080-25A Hunt-Wesson Prelim GI\Report\1080-25A Hunt_Wessson sup gi 040203 ltr Rpt.doc



© 2000 Thomas Bros. Maps

VICINITY MAP

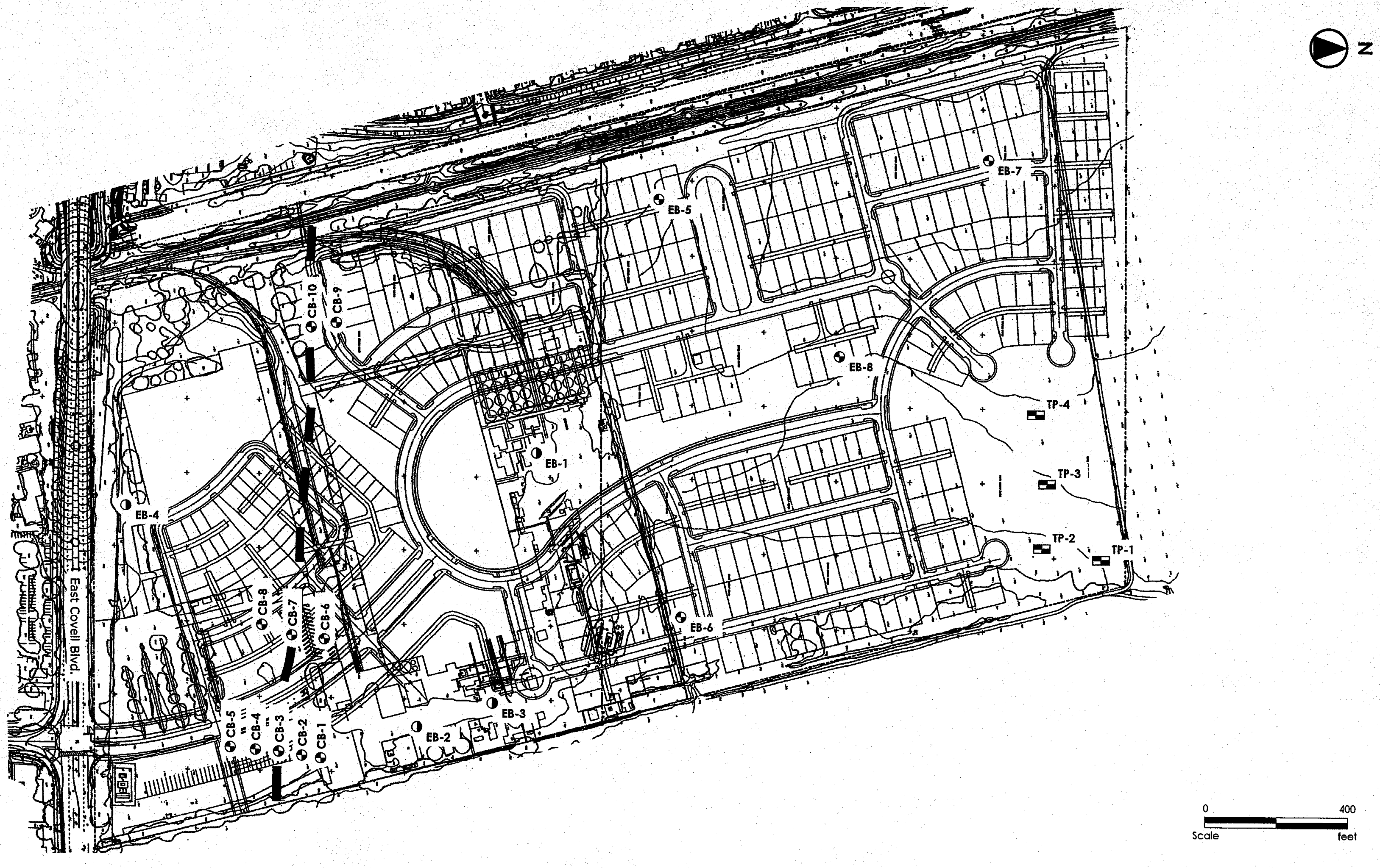
CON AGRA FACILITY

Davis, California

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 1

1080-25A



LEGEND

- ● - Approximate location of exploratory borings for this investigation
- ◑ - Approximate location of exploratory borings for previous investigation (12/01)
- ▨ - Approximate location of percolation test pits
- ▬ - Approximate location of former drainage channel

Base by MacKay and Somps, dated August 30, 2002.

SITE PLAN

CON AGRA FACILITY

Davis, California

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 2

1080-25A

APPENDIX A
FIELD INVESTIGATION

NORTHERN PARCEL

EB-5 through EB-8: The field investigation consisted of a surface reconnaissance and a subsurface exploration program using a conventional truck-mounted drilling equipment. Four 8-inch diameter exploratory borings were drilled on October 10 and 11, 2002, to a maximum depth of 40 feet. The approximate locations of the exploratory borings are shown on the Site Plan, Figure 2. The soils encountered were logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D-2488). The logs of the borings, as well as a key to the classification of the soil, are included as part of this appendix.

TP-1 through TP-4: The field investigation consisted of a surface reconnaissance and a subsurface exploration program using a conventional rubber-tired backhoe equipment. Four exploratory test pits were excavated on October 21, 2002, to a maximum depth of 10 feet. The approximate locations of the test pits are shown on the Site Plan, Figure 2. The soils encountered were logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D-2488). The logs of the test pits, as well as a key to the classification of the soil, are presented below.

Table A-1. Summary of Exploratory Test Pits

Test Pit Number	Depth (feet)	Soil Description
TP-1	0-1	*SILTY CLAY(CL)* - very stiff to hard, dry to slightly moist, dark brown, porous, dessication cracks throughout, some rootlets
	1-3	*SILTY CLAY(CL)* - very stiff, moist, olive brown, trace to some fine sand, very silty
	3-7½	*SANDY SILT/SILTY SAND (ML-SM)* - stiff to very stiff, moist, olive brown, fine sand
	7½-8½	*SILTY CLAY (CL)* - stiff, very moist, light olive gray, rust brown mottles, moderate plasticity, trace to some fine sand
	8½-10	*SILTY SAND (SM)* - very moist, light olive brown, fine to medium sand, occasional coarse sand to ¼ inch (Test Hole)
TP-2	0-1½	*SILTY CLAY (CL)* - very stiff to hard, dry to slightly moist, dark brown, porous, desiccation cracks throughout, some rootlets
	1½-6	*SILTY CLAY WITH SAND (CL)* – very stiff, moist, olive brown, some fine sand and silt, some rootlet holes
	6-7½	*SILTY CLAY (CL)* – stiff, moist, olive brown, rust-brown mottles (Test Hole)

Table A-1. Summary of Exploratory Test Pits
(Continued)

Test Pit Number	Depth (feet)	Soil Description
TP-3	0-2	*SILTY CLAY (CL)* - very stiff to hard, dry to slightly moist, dark brown, porous, desiccation cracks throughout, some rootlets
	2-6	*SILTY CLAY WITH SAND (CL)* - very stiff, moist, olive brown, some fine sand and silt, some rootlet holes
	6-7	*SILTY SAND (SM)* - medium dense to dense, moist, olive brown, fine sand
	7-8½	*SILTY CLAY (CL)* - stiff, most, olive brown, rootlet holes throughout (Test Hole)
TP-4	0-2	*SILTY CLAY (CL)* - very stiff to hard, dry to slightly moist, dark brown, porous, desiccation cracks throughout, some rootlets
	2-3½	*SANDY SILT (ML)* - very stiff, moist olive brown, fine sand, low plasticity
	3½-5	*SILTY SAND (SM)* - medium dense, moist, olive brown, fine sand, trace rootlets
	5-6½	*SANDY SILT (ML)* - stiff, moist, olive brown, fine sand (Test Hole)

SOUTHERN PARCEL

CB-1 through CB-10: The field investigation consisted of a surface reconnaissance and a subsurface exploration program using a conventional truck-mounted drilling equipment. Ten 8-inch diameter exploratory borings were drilled on October 10 and 11, 2002, to a maximum depth of 19 feet. The approximate locations of the exploratory borings are shown on the Site Plan, Figure 2. The soils encountered were logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D-2488). The logs of the borings, as well as a key to the classification of the soil, are included as part of this appendix.

Core #1 through Core #6: Six locations were cored on October 10, 2002, to a maximum depth of 7½ inches using portable concrete diamond coring equipment. The cores were grouted into the slab upon completion.

The locations of borings and test pits were approximately determined by either a hand-held GPS or laser range-finding equipment. Elevations of the borings and test pits were determined by interpolating from topographic plan contours prepared by MacKay and Somps. The location and elevation of the borings and test pits should be considered accurate only to the degree implied by the method used.

All samples were returned to our laboratory for evaluation and representative soil samples were obtained from the borings at selected depths appropriate testing. Two and one half inch I.D. samples were obtained using a Modified California Sampler driven 18 inches into the soil with the 140-pound hammer through a 30-inch free fall (ASTM D-1586). Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs and symbolized as shown on Figure A-1.

Field tests included an evaluation of the undrained shear strength of soil samples using a Torvane device, and/or the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depth.

The attached boring logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

* * * * * * * * *

PRIMARY DIVISIONS			SOIL TYPE		SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (Less than 5% Fines)	GW		Well graded gravels, gravel-sand mixtures, little or no fines
			GP		Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM		Silty gravels, gravel-sand-silt mixtures, plastic fines
			GC		Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (Less than 5% Fines)	SW		Well graded sands, gravelly sands, little or no fines
			SP		Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM		Silty sands, sand-silt-mixtures, non-plastic fines
			SC		Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50 %		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50 %		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT		Peat and other highly organic soils

DEFINITION OF TERMS

U.S. STANDARD SIEVE SIZE: 200 — 40 — 10 — 4

CLEAR SQUARE SIEVE OPENINGS: 3/4" — 3" — 12"

SILTS AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

- ☒ TERZAGHI SPLIT SPOON STANDARD PENETRATION
- ⧗ MODIFIED CALIFORNIA
- ▯ D & M UNDERWATER SAMPLER
- ■ SHELBY TUBE
- ○ NO RECOVERY

SAMPLERS

SAND AND GRAVEL	BLOWS/FOOT*
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH+	BLOWS/FOOT*
VERY SOFT	0-1/4	0-2
SOFT	1/4-1/2	2-4
MEDIUM STIFF	1/2-1	4-8
STIFF	1-2	8-16
VERY STIFF	2-4	16-32
HARD	OVER 4	OVER 32

CONSISTENCY

*Number of blows of 140 pound hammer falling 30 inches to drive a 2-inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).
+Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

KEY TO EXPLORATORY BORING LOGS
Unified Soil Classification System (ASTM D-2487)

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Environmental/Geotechnical/Engineering Services

FIGURE A-1

EXPLORATORY BORING: EB-5

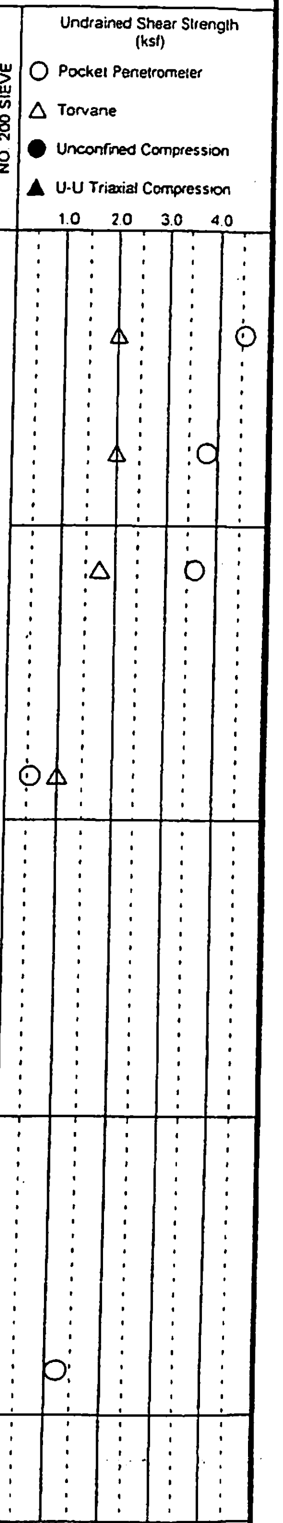
Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 8" HOLLOW STEM
LOGGED BY: WRD
START DATE: 10-10-02 FINISH DATE: 10-10-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 20.0 FT.

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

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION: 41 FT. (+/-)	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO 200 SIEVE
41.0	0	**SILTY CLAY (CL)** very stiff to hard, moist, brown, occasional rootlet holes	CL				
				60	18	91	
		trace fine sand		28	20	98	
	5	becomes stiff, fine sand increases					
		occasional rootlet holes, fine sand decreases		23	18	97	
33.0		**SILTY SAND (SM)** loose, moist, brown, fine sand, occasional dark mottles, interbedded with sandy silt	SM	12	29	92	
	10						
27.5		**POORLY GRADED SAND (SP)** medium dense, moist, brown, fine to medium sand	SP	16	9		8
	15	becomes loose		10	12		
22.3		**SILTY CLAY (CL)** stiff, moist, light olive gray, yellow-orange mottles, occasional small voids	CL	14			
21.0	20	Bottom of Boring = 20 feet					



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP GDT 2/12/03 SR*WRD

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-6

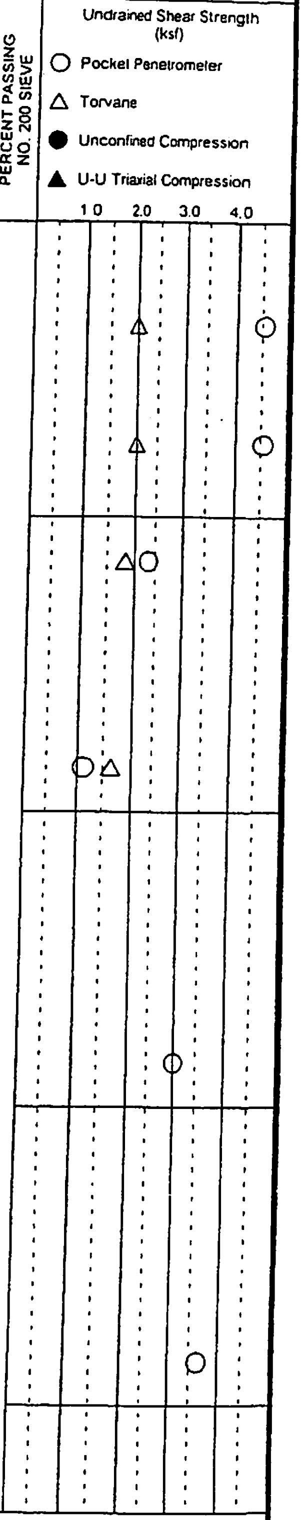
Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 8" HOLLOW STEM
LOGGED BY: WRD
START DATE: 10-10-02 FINISH DATE: 10-10-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 20.0 FT.

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

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
			SURFACE ELEVATION: 38 FT. (+/-)						
37.5	0	▨	**SILTY CLAY (CL)** very stiff to hard, moist, brown, occasional rootlet holes, trace rootlets						
					57		18	101	
			becomes very stiff, lighter brown, some fine sand, rootlet voids	CL	40		15	103	
	5								
			becomes stiff, fine sand increases		20		18	94	
29.5		▨	**SANDY CLAY (CL)** medium stiff, very moist, light brown, rust-brown mottles, some fine sand						
					15		32		
	10			CL					
					5		27		
25.0		▨	**SILTY CLAY (CL)** stiff, very moist, olive brown, dark mottles, very plastic, occasional rootlet holes						
					20				
	15								
				CL					
			rootlet holes decrease, olive brown, gray mottles						
					26				
17.5	20		Bottom of Boring = 20 feet						



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR WRD

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-7

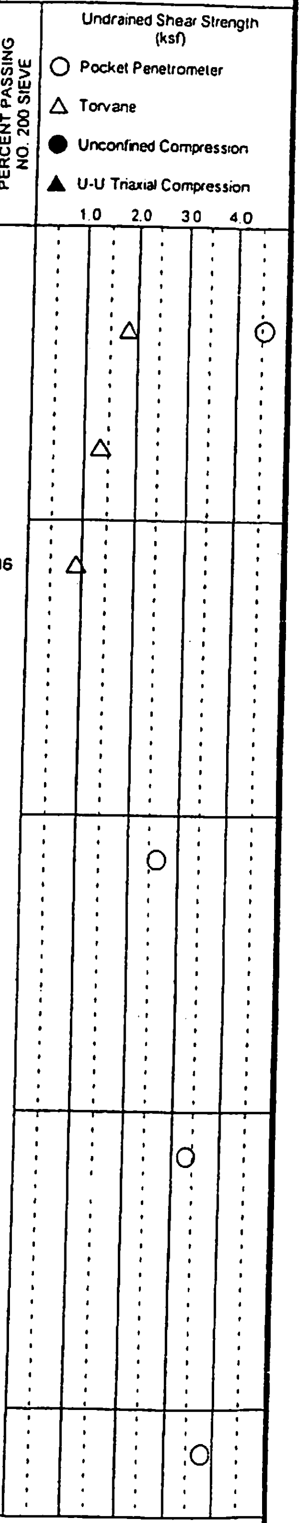
Sheet 1 of 2

DRILL RIG: MOBILE B-61
BORING TYPE: 8" HOLLOW STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 31.5 FT.

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

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION: 42 FT. (+/-)	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
41.5	0	**SILTY SAND (SM)** medium dense, dry, light olive brown, fine sand, silty, trace fine rootlets, occasional rootlet holes					
				22	9	92	
		becomes loose to medium dense					
			SM	17	9	93	
	5	increasing silt, occasional coarse sand to ¼-inch					
				23	10	101	36
				8			
33.0		**SANDY CLAY (CL)** medium stiff, moist, light olive brown, brown mottles, very fine sand					
	10		CL	12	17		
29.0		**SILTY CLAY (CL)** very stiff, moist, olive brown, dark mottles					
	15			36			
			CL				
	20	becomes light olive brown, dark mottles, occasional rootlet voids					
20.5				32			



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GROUND WATER OBSERVATIONS:
∇: FREE GROUND WATER MEASURED DURING DRILLING AT 25.0 FEET

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EXPLORATORY BORING: EB-7 Cont'd

Sheet 2 of 2

DRILL RIG: MOBILE B-61
BORING TYPE: 8" HOLLOW STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 31.5 FT.

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

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf) 1.0 2.0 3.0 4.0
20.5		▨	**SILTY CLAY (CL)** very stiff, moist, olive brown, dark mottles			☒				
	▽ 25	▨	becomes stiff, wet, occasional coarse sand	CL	8	☒				○
		▨	sand decreases		20	☒				
	30	▨			18	☒				
10.0			Bottom of Boring = 31½ feet							
	35									
	40									

GROUND WATER OBSERVATIONS:
▽ : FREE GROUND WATER MEASURED DURING DRILLING AT 25.0 FEET

LA CORP GDT 2/12/03 SR* WRD

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-8

Sheet 1 of 2

DRILL RIG: MOBILE B-61
BORING TYPE: 8" HOLLOW STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 40.0 FT.

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

SURFACE ELEVATION: 40 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
39.5	0	**SILTY CLAY (CH)** hard, slightly moist, dark brown, occasional white mottles, trace rootlets Liquid Limit = 70, Plasticity Index = 51	CH	80	15	109	
		becomes very stiff, occasional rootlet holes		50	14	112	
	5	becomes light brown, white carbonate veins, occasional rootlet holes, trace fine sand		29	13	106	
32.5		**SILTY SAND (SM)** loose to medium dense, slightly moist, brown, poorly graded, fine to medium sand, occasional coarse sand to ¼-inch	SM	13	9		12
29.8	10	**SILTY CLAY (CL)** medium stiff, very moist, light olive brown, rust-colored mottles, very plastic	CL				
27.5		**SILTY CLAY (CL)** stiff, moist, dark olive brown, blocky structure, small dark mottles	CL	26	23		
	15						
		becomes very stiff, light olive brown, dark mottles		30			
18.5	20						

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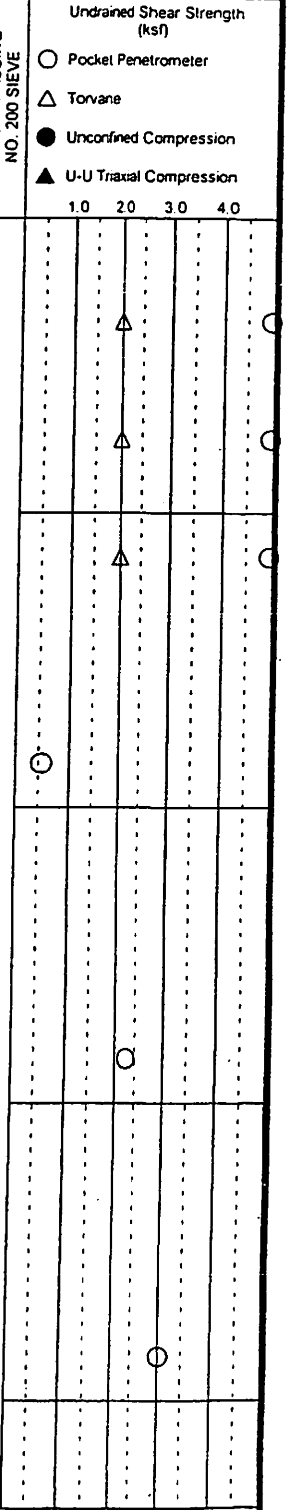


GROUND WATER OBSERVATIONS:
∇: FREE GROUND WATER MEASURED DURING DRILLING AT 29.5 FEET

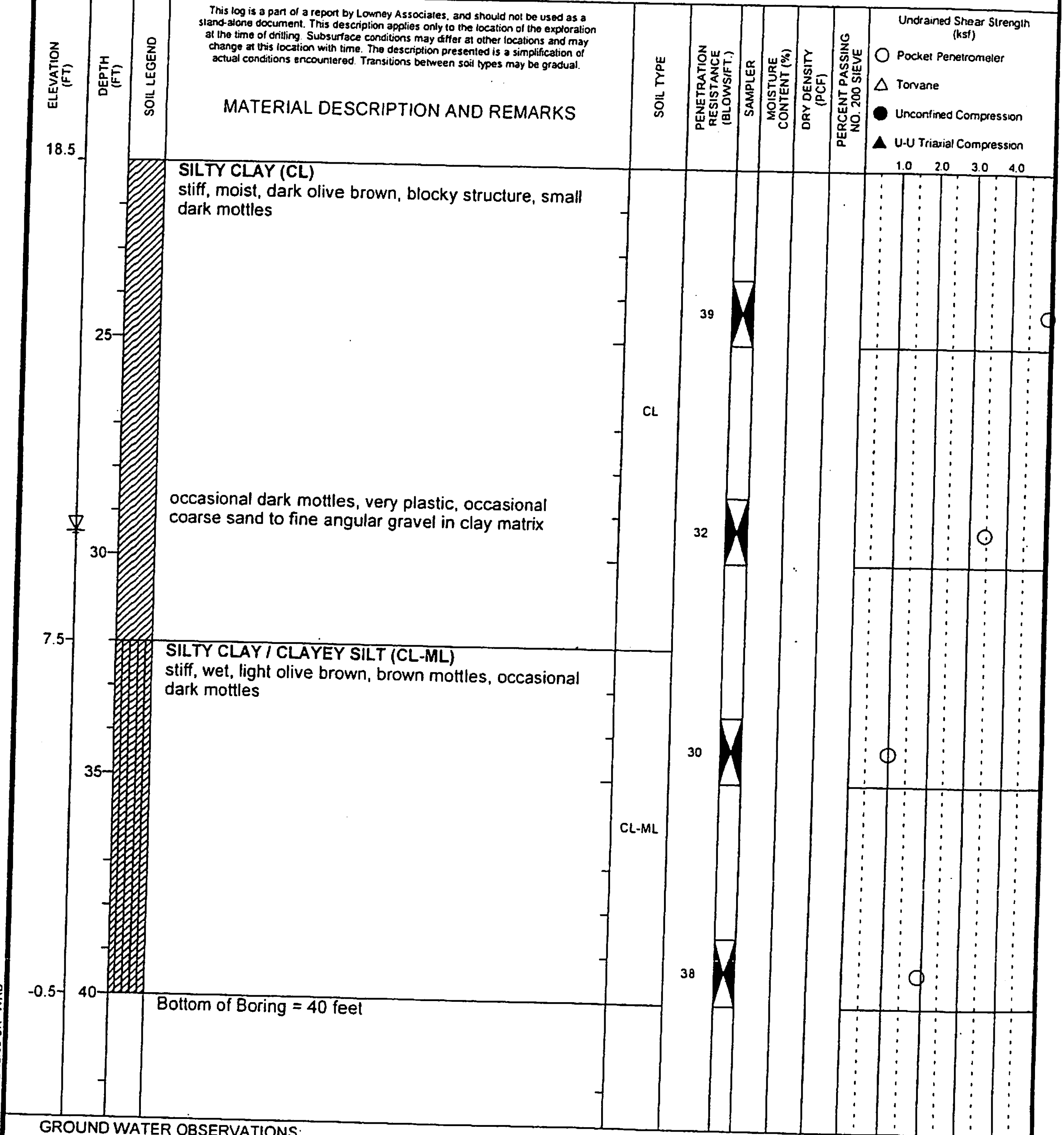
LA CORP.GDT 2/12/03 SR*WRD

EXPLORATORY BORING: EB-8 Cont'd

Sheet 2 of 2

DRILL RIG: MOBILE B-61	PROJECT NO: 1080-25A
BORING TYPE: 8" HOLLOW STEM	PROJECT: CON AGRA FACILITY
LOGGED BY: WRD	LOCATION: DAVIS, CA
START DATE: 10-11-02 FINISH DATE: 10-11-02	COMPLETION DEPTH: 40.0 FT.

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



SILTY CLAY (CL)
stiff, moist, dark olive brown, blocky structure, small dark mottles

occasional dark mottles, very plastic, occasional coarse sand to fine angular gravel in clay matrix

SILTY CLAY / CLAYEY SILT (CL-ML)
stiff, wet, light olive brown, brown mottles, occasional dark mottles

Bottom of Boring = 40 feet

GROUND WATER OBSERVATIONS:

∇: FREE GROUND WATER MEASURED DURING DRILLING AT 29.5 FEET

LA CORP.GDT 2/12/03 SR* WRD

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EXPLORATORY BORING: CB-1

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-10-02 FINISH DATE: 10-10-02

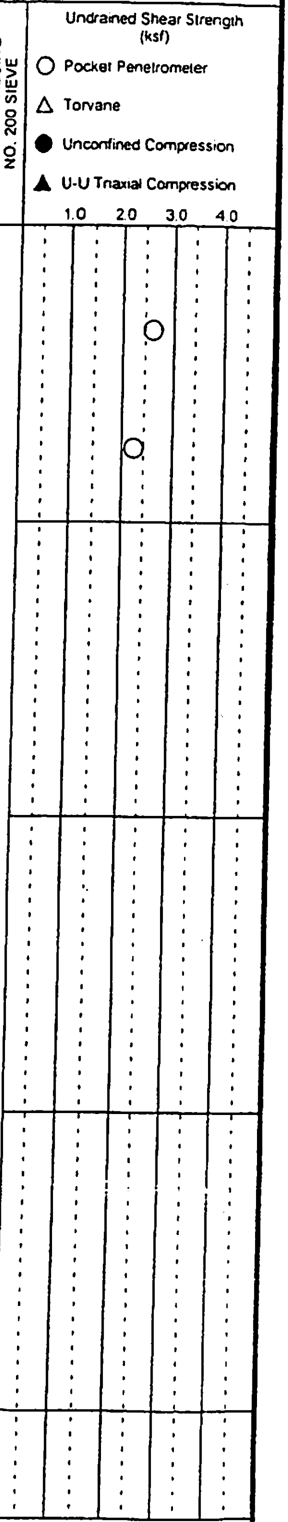
PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 6.5 FT.

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

MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0	**PAVEMENT** asphalt concrete over aggregate base	AC				
41.2			AB				
40.7		**SILTY CLAY (CL) [FILL]** stiff, moist, brown, occasional ½" subround gravel in top sample	CL	20	16	100	
39.3		**SILTY SAND (SM)** loose to medium dense, moist, brown, fine sand, occasional rootlet holes	SM	11	15	91	
	5			12			
35.5		Bottom of Boring = 6½ feet					



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA_CORP.GDT 2/12/03 SR* WRD

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EXPLORATORY BORING: CB-2

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-10-02 FINISH DATE: 10-10-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 9.5 FT.

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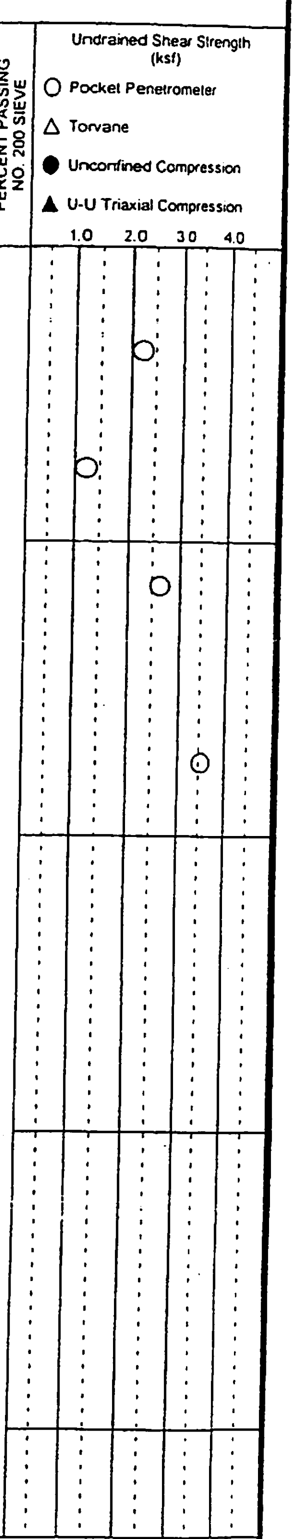
ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION: 42 FT. (+/-)	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0		**PAVEMENT** asphalt concrete over aggregate base	AC					
41.5				AB					
40.7			**SILTY CLAY (CL) [FILL]** stiff, moist, dark olive brown, mixed lighter brown mottles, voids	CL	14		25	98	
39.0			**SILTY CLAY (CH) [FILL]** stiff, very moist, black, trace fine sand, voids	CH	20		23	100	
	5				23		23	99	
35.0			**SILTY CLAY (CL)** very stiff, moist, brown, occasional coarse sand grains, rootlet voids	CL	33		18	105	
32.5	10		Bottom of Boring = 9½ feet						
	15								
	20								



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR*WRD

EXPLORATORY BORING: CB-3

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-10-02 FINISH DATE: 10-10-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 19.0 FT.

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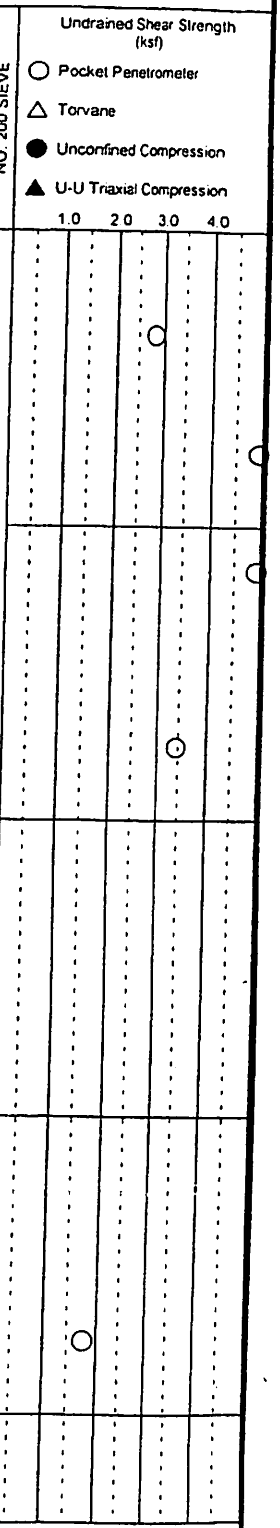
SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0	**PAVEMENT** asphalt concrete over aggregate base	AC				
41.4			AB				
40.6		**SILTY CLAY (CL) [FILL]** very stiff, moist, brown, mottled, dark gray, occasional coarse sand and subround gravel to ¼ inch diameter, voids	CL	28	20	100	
		becomes stiff, moist, brown, trace fine sand		22	16	72	
37.0	5	**SANDY CLAY (CL)** medium stiff, slightly moist, brown, fine sand	CL	13	15	107	
		orange mottles		20	25	105	
32.8	10	**SILTY SAND (SM)** medium dense, slightly moist, orange brown, fine to medium sand, some coarse sand to ½-inch subangular gravel	SM	17			
		becomes medium dense to dense, round and subround gravel to 1" diameter		30			
28.8	15	**SILTY-SANDY GRAVEL (GW)** very dense, moist, brown, well graded, subround gravel to 2" diameter, fine to coarse sand	GW	50-6"			
23.3 23.0	20	**SILTY CLAY (CL)** stiff, moist olive brown, rusty-colored mottles Bottom of Boring = 19 feet	CL	23			



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP GDT 2/12/03 SR• WRD

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Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: CB-4

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-10-02 FINISH DATE: 10-10-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 16.5 FT.

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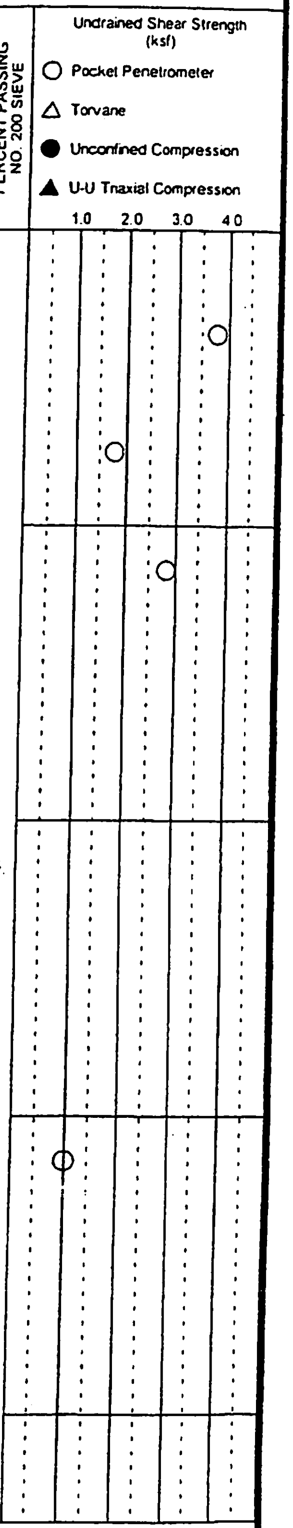
SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0		**PAVEMENT** asphalt concrete over aggregate base	AC					
41.2				AB					
40.7			**SILTY CLAY (CL) [FILL]** very stiff, moist, brown, trace fine sand, mixed blocky texture, gray mottles	CL	32		3		
39.0			**SANDY SILT (ML)** medium stiff to stiff, moist, light brown, fine sand, occasional rootlet holes	ML	12		14		
	5		occasional dark mottles, rootlet holes continue		14		18		
34.0			**SILTY SANDY GRAVEL (GW)** loose, moist, silty, fine to coarse sand, brown, ½-inch subround gravel	GW	5		8		24
28.5			**SILTY CLAY TO CLAYEY SILT (CL-ML)** medium stiff, very moist, brown with reddish-brown mottles, occasional coarse sand grains and fine subround gravel to ¼ inch diameter	CL-ML	13				
25.5			Bottom of Boring = 16½ feet						



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR* WRD

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Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: CB-5

Sheet 1 of 1

DRILL RIG: MOBILE B-61	PROJECT NO: 1080-25A
BORING TYPE: 7" SOLID STEM	PROJECT: CON AGRA FACILITY
LOGGED BY: WRD	LOCATION: DAVIS, CA
START DATE: 10-10-02 FINISH DATE: 10-10-02	COMPLETION DEPTH: 11.5 FT.

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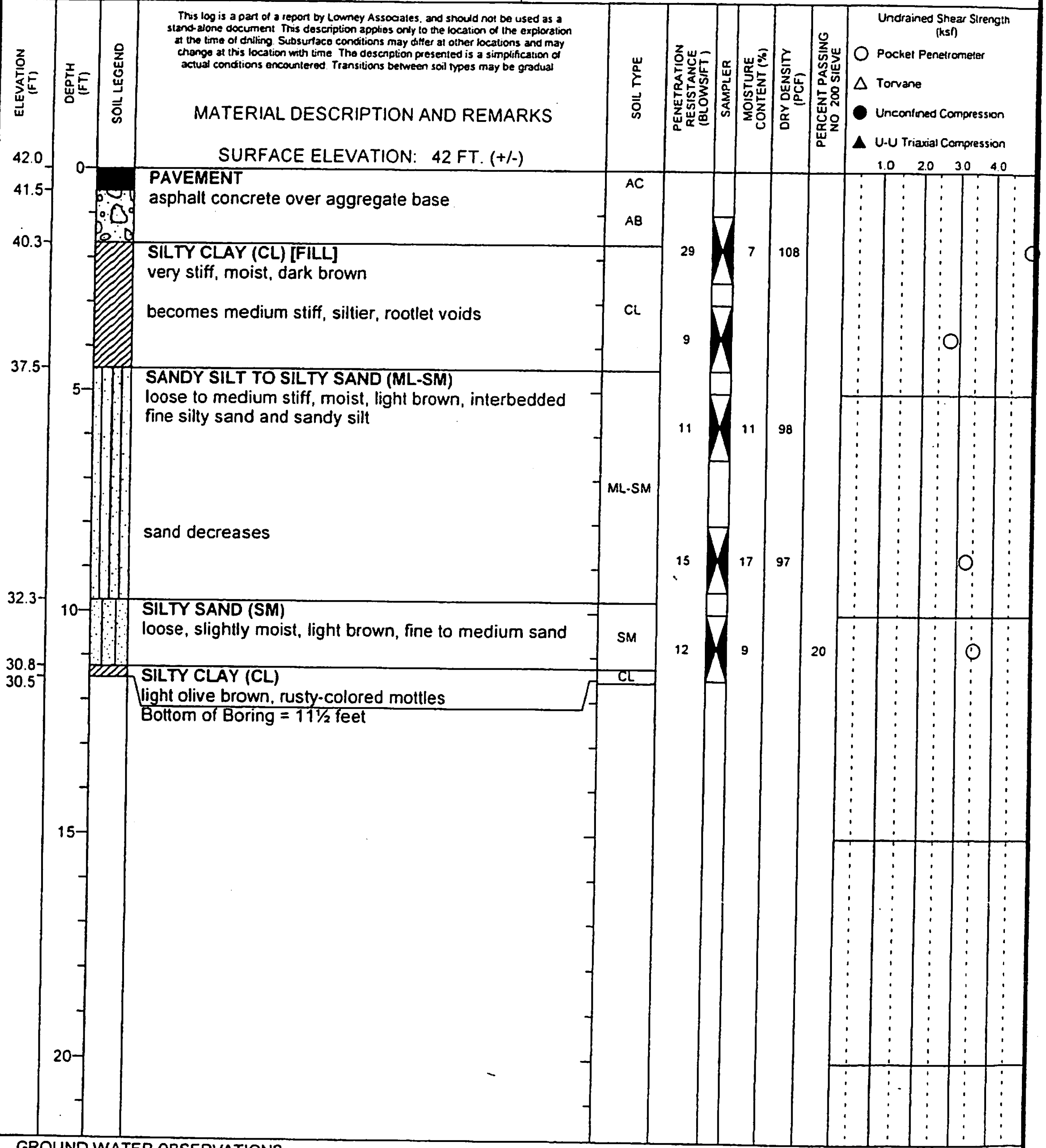

MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	**PAVEMENT** asphalt concrete over aggregate base	AC				
41.5		AB				
40.3	**SILTY CLAY (CL) [FILL]** very stiff, moist, dark brown	CL	29	7	108	
	becomes medium stiff, siltier, rootlet voids		9			
37.5	**SANDY SILT TO SILTY SAND (ML-SM)** loose to medium stiff, moist, light brown, interbedded fine silty sand and sandy silt	ML-SM	11	11	98	
	sand decreases		15	17	97	
32.3	**SILTY SAND (SM)** loose, slightly moist, light brown, fine to medium sand	SM	12	9		20
30.8	**SILTY CLAY (CL)** light olive brown, rusty-colored mottles	CL				
30.5	Bottom of Boring = 11½ feet					

GROUND WATER OBSERVATIONS:

NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR' WRD

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EXPLORATORY BORING: CB-6

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 13.0 FT.

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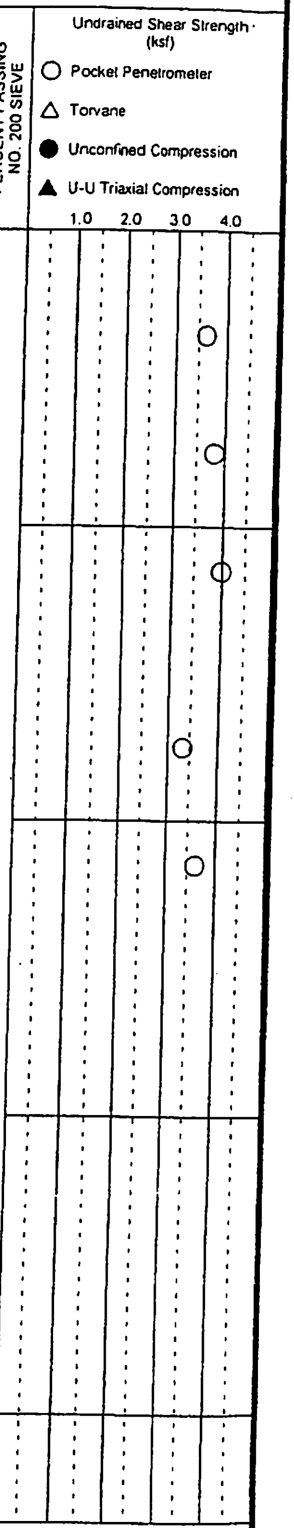
SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0	**PAVEMENT**					
41.8		asphalt concrete over aggregate base	AC				
41.5		**SILTY GRAVELLY CLAY (CL) [FILL]** very stiff, moist, dark brown, some subangular gravel to ½" diameter	AB				
			CL	43	15	114	
		becomes stiff, gravel decreases		19	16	104	
37.0	5	**SILTY SAND (SM)** loose to medium dense, moist, dark brown, fine sand, occasional rootlet holes		18	15	100	
		becomes interbedded sand and clay layers, lighter in color, occasional caliche mottles	SM	22	13	94	38
	10	becomes light brown with rusty-colored mottles, occasional dark mottles, fine sand		19			
				8			
29.0		Bottom of Boring = 13 feet					
	15						
	20						



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP GDT 2/12/03 SR* WRD

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EXPLORATORY BORING: CB-7

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 18.5 FT.

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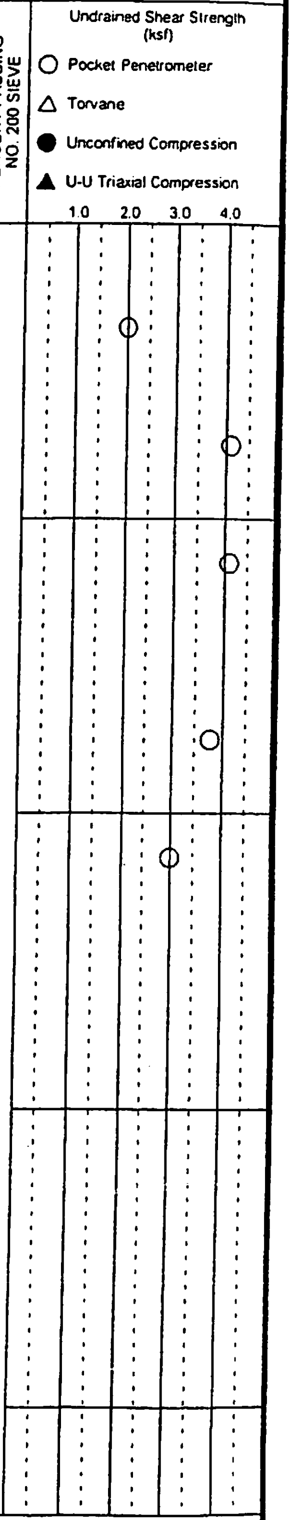
MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0	**PAVEMENT**	AC				
41.8		asphalt concrete over aggregate base	AB				
41.5		**SILTY CLAY (CL) [FILL]** stiff, moist, dark brown, brown mottles, voids, occasional ½" diameter subround gravel in top sample	CL	23	26	91	
		becomes very dark brown to black, occasional black mottles, gravel decreases Liquid Limit = 39, Plasticity Index = 20		28	20	96	
	5	black mottles decrease, lighter brown at bottom of sample		36	19	101	
		becomes light brown					
33.3		**SANDY CLAY (CL)** stiff, moist, light brown, fine sand	CL	26	16	110	
	10	rusty-colored mottles, occasional dark mottles					
		silty, occasional rootlet holes		23			
29.8		**SILTY SAND (SM)** loose to medium dense, moist, fine to coarse sand, occasional ¼-inch subround gravel	SM	20			
				8	6		
	15						
		occasional ½-inch subround gravel, some interbedded clay		19			
23.5		Bottom of Boring = 18½ feet					
	20						



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR*WRD

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Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: CB-8

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 11.5 FT.

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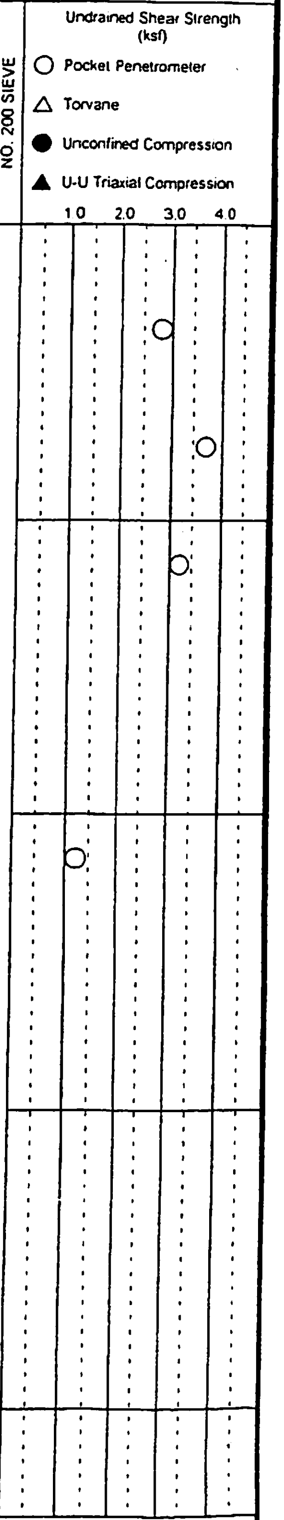
MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 42 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42.0	0		**PAVEMENT**	AC					
41.8			asphalt concrete over aggregate base	AB					
41.6			**SILTY CLAY (CL) [FILL]** stiff, moist, dark brown, moderate to high plasticity	CL	24				
39.5			**SILTY CLAY (CL)** stiff, moist, brown, trace fine sand becomes medium brown, silty, trace fine sand	CL	17				
	5		becomes interbedded sandy-silty clay						
33.3			**SILTY SAND (SM)** medium dense, moist, light brown, dark mottles, rusty-brown mottles, fine sand	SM	15		16		44
31.8	10		**SILTY CLAY (CL)** stiff, very moist, light brown, rusty-brown mottles	CL	15				
30.5			Bottom of Boring = 11½ feet						
	15								
	20								



GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR• WRD

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EXPLORATORY BORING: CB-9

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 11.5 FT.

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Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
44.0	0	▨	SURFACE ELEVATION: 44 FT. (+/-) **SILTY CLAY (CL) [FILL]** very stiff, slightly moist, dark brown, trace rootlets and rootlet holes becomes lighter brown, occasional ¼-inch subround gravel becomes sandy	CL	42 34			
38.5	5	░	**SILTY SAND (SM)** medium dense, moist, light brown, fine sand	SM	16 21	8		25
34.3	10	▨	**SILTY CLAY (CL)** stiff, moist, light olive brown, rusty-brown mottles	CL	19			
32.5			Bottom of Boring = 11½ feet					
	15							
	20							

GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA_CORP.GDT 2/12/03 SR*WRD

EXPLORATORY BORING: CB-10

Sheet 1 of 1

DRILL RIG: MOBILE B-61
BORING TYPE: 7" SOLID STEM
LOGGED BY: WRD
START DATE: 10-11-02 FINISH DATE: 10-11-02

PROJECT NO: 1080-25A
PROJECT: CON AGRA FACILITY
LOCATION: DAVIS, CA
COMPLETION DEPTH: 16.5 FT.

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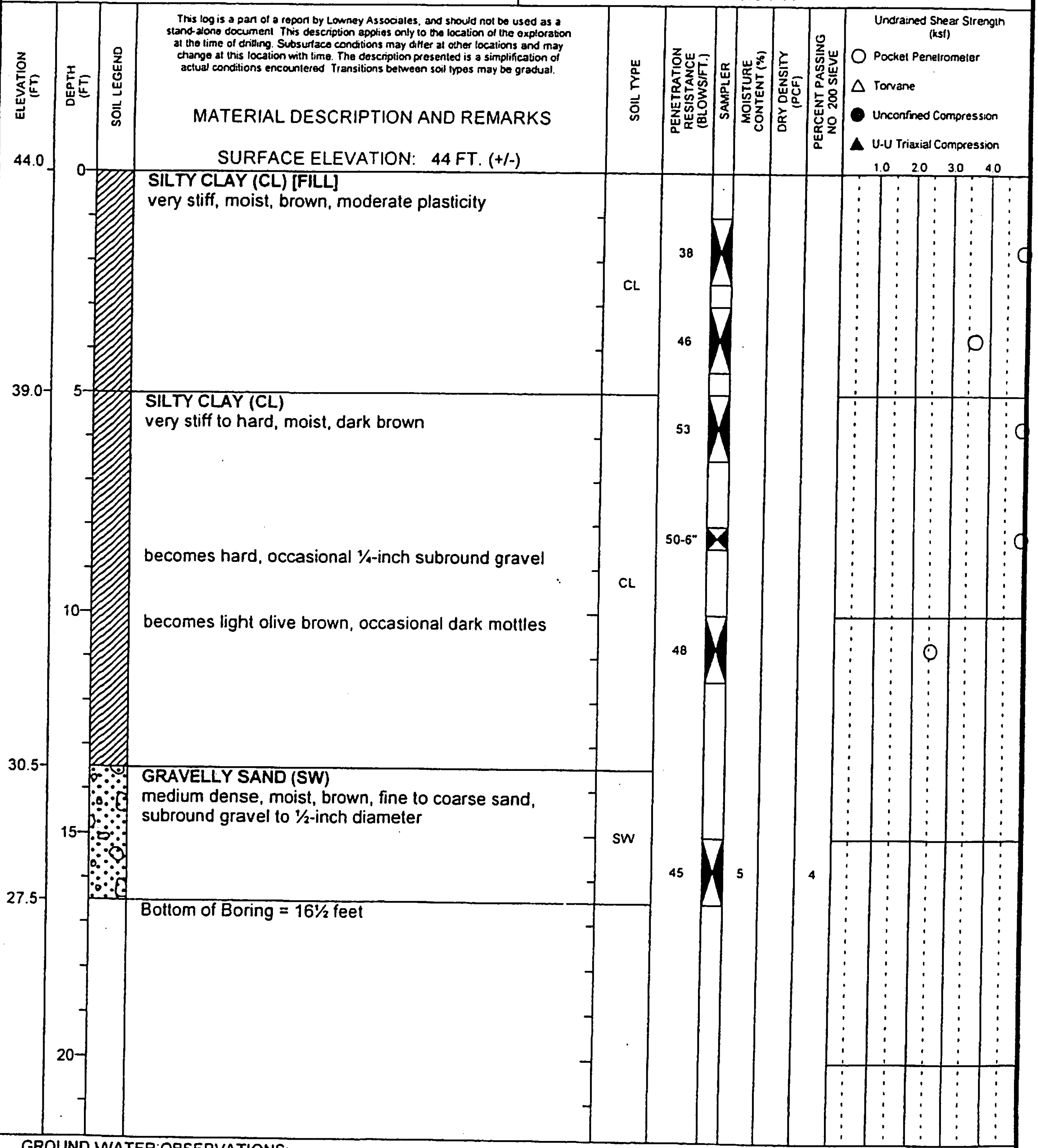

SURFACE ELEVATION: 44 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO 200 SIEVE
44.0	0	**SILTY CLAY (CL) [FILL]** very stiff, moist, brown, moderate plasticity	CL	38			
				46			
39.0	5	**SILTY CLAY (CL)** very stiff to hard, moist, dark brown	CL	53			
		becomes hard, occasional ¼-inch subround gravel		50-6"			
	10	becomes light olive brown, occasional dark mottles		48			
30.5		**GRAVELLY SAND (SW)** medium dense, moist, brown, fine to coarse sand, subround gravel to ½-inch diameter	SW				
	15			45	5		4
27.5		Bottom of Boring = 16½ feet					
	20						

GROUND WATER OBSERVATIONS:
NO FREE GROUNDWATER ENCOUNTERED

LA CORP.GDT 2/12/03 SR* WRD

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APPENDIX B
LABORATORY INVESTIGATION

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

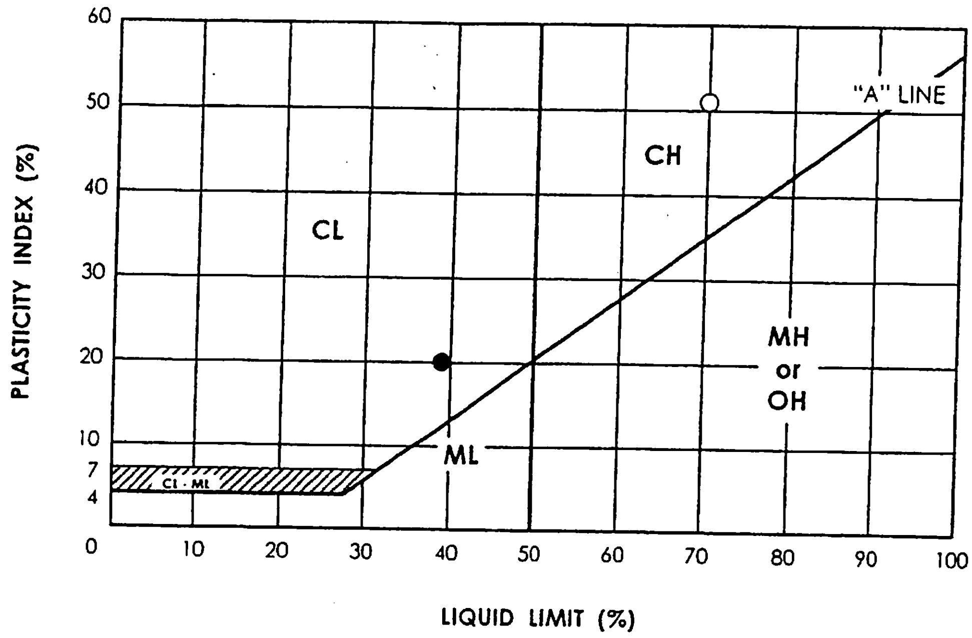
Moisture Content: The natural water content was determined (ASTM D-2216) on 50 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D-2937) were performed on 34 selected samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depth.

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

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

* * * * * * * * *



KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	NATURAL WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PASSING #200 SIEVE (%)	UNITED SOIL CLASSIFIC. SYMBOL
●	CB-7	3	---	39	19	20	----	CL
○	EB-8	1.5	---	70	19	51	----	CH

PLASTICITY CHART AND DATA
CON AGRA FACILITY
Davis, California

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Environmental/Geotechnical/Engineering Services

FIGURE B-1
1080-25A