Appendix F
Geotechnical Reports

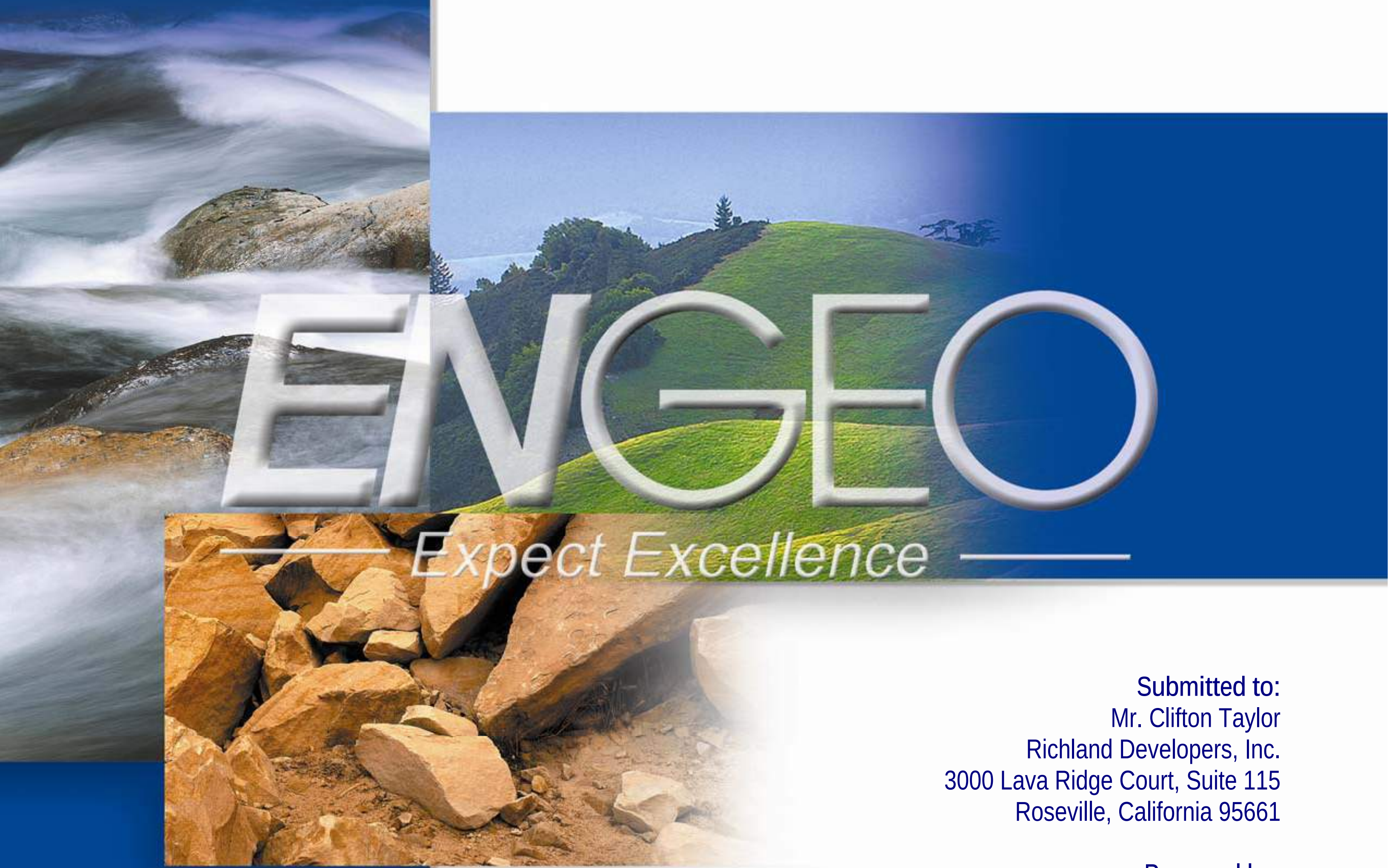
ESA

Appendix F Part 1

ENGEO Geotechnical
Feasibility Report

GEOTECHNICAL FEASIBILITY REPORT

LINCOLN VILLAGE 5
SPECIAL USE DISTRICT B
PLACER COUNTY, CALIFORNIA



Submitted to:
Mr. Clifton Taylor
Richland Developers, Inc.
3000 Lava Ridge Court, Suite 115
Roseville, California 95661

Prepared by:
ENGEO Incorporated

August 19, 2013

Project No:
10354.000.001

Project No.
10354.000.001

August 19, 2013

Mr. Clifton Taylor
Richland Developers, Inc.
3000 Lava Ridge Court, Suite 115
Roseville, CA 95661

Subject: Lincoln Village 5
Special Use District B
Placer County, California

GEOTECHNICAL FEASIBILITY REPORT

Dear Mr. Taylor:

ENGEO prepared this geotechnical feasibility report for Lincoln Village 5 as outlined in our agreement dated June 24, 2013. The site is approximately 1,460 acres and consists of agricultural and rural residential properties. While there are no site-specific development plans at this time, we understand that the site is being considered for mixed-use residential, commercial and retail with associated streets, underground utilities, and landscaping.

This report summarizes our review of previous explorations, available documents, site reconnaissance, conclusions, and preliminary geotechnical recommendations for conceptual project design.

We are pleased to be of service to you on this project and look forward to consulting further with you and your design team. If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Paul Cottingham, CEG
Senior Engineering Geologist

Mark Gilbert, GE
Principal

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

ENGEO prepared this geotechnical feasibility report for conceptual design of Lincoln Village 5 in Lincoln, California. We prepared this report as outlined in our agreement dated June 24, 3013. Richland Developers Inc. authorized ENGEO to conduct the following scope of services:

- Document Review
- Limited Site Reconnaissance
- Data Analysis and Conclusions
- Report Preparation

For our use we received the following:

1. WKA; Preliminary Geotechnical Engineering Report, Moore Ranch, Placer County, dated December 7, 1988.

2. WKA; Preliminary Geotechnical Engineering Report, North Moore Ranch, dated November 22, 2004.

3. Richland Developers; site boundary and aerial photograph, sent via email July 2013.

4. ENGEO; Phase I Environmental Site Assessment, Morse Property, Placer County, dated May 10, 2004.

This report was prepared for the exclusive use of our client and their consultants for conceptual design of this project. In the event that any changes are made in the type of development planned, we must be contacted to review the conclusions and recommendations contained in this report to determine whether modifications are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without our express written consent.

1.2 SITE LOCATION AND DESCRIPTION

Figure 1 displays a Site Vicinity Map. The site is located west of the City of Lincoln, north of Moore Road, south of Nicolaus Road, and west of Nelson Lane. The approximately 1,456-acre site consists of agricultural and rural residential properties. Auburn Ravine and Markham Ravine generally flow toward the east and southeast across the site. The Highway 65 Lincoln Bypass bisects the northeast corner of the site. Figure 2 shows site boundaries.

While there are no site-specific development plans at this time, we understand that the site is being considered for mixed-use residential, commercial and retail development with associated streets, underground utilities, and landscaping.

2.0 FINDINGS

2.1 TOPOGRAPHIC MAP REVIEW

We reviewed historical USGS topographic maps to assist in identifying historic changes that may impact the site from a geotechnical prospective. We describe notable features below.

1893 and 1910 – Generally, the site gently sloped to the west and southwest. Markham Ravine crossed the site in the northern portion and Auburn Ravine crossed near the southeastern corner of the site. In some areas, swales drained toward Markham and Auburn Ravines. South Dowd Road and Nicolaus Road appear as light duty roads.

1941 – Four to five small structures and an unimproved road appeared on the western portion of the site just north of Markham Ravine. Nelson Lane appeared built. A canal extended from Auburn Ravine adjacent to southern boundary of the site.

1953 – A small structure appeared on the site at the corner of Nicolaus Road and South Dowd Road. Two wells appeared in the northern portion of the site.

1973 – The western portion of the site was shown as rectangular ponds (catfish ponds) north of Markham Ravine. Additional ponds are also shown within Markham Ravine which appears to be dammed in multiple locations. Unimproved roads appeared throughout the central portion of the site.

1981 – An irrigation ditch is shown through the middle portion of the site.

1992 – The site appeared relatively unchanged since the 1981 USGS map.

2.2 AERIAL PHOTOGRAPH REVIEW

We reviewed aerial photographs to assist in identifying historic changes that may have impacted the site from a geotechnical prospective. We describe notable features below.

1952 – Portions of the site appeared to be used for grain farming. Structures were located in the northwestern portion of the site north of Markham Ravine. Many developed and undeveloped roads and paths cross the property.

1961 – Portions of the site north and south of Markham Ravine appeared to have been developed into terraced rice fields.

1966 – The central portion of the site appeared to have been graded for terraced rice fields. A pond was visible within Markham Ravine.

1984 – Additional areas of the site appeared to have been graded into terraced rice fields. The western portion of the property north of Markham Ravine appeared to be graded into a series of rectangular catfish ponds. Markham Ravine appeared dammed through the majority of the site.

1993 – The conditions appeared similar to 1984.

2007 – The conditions appeared similar to 1993.

2008 – The rectangular catfish ponds in the northwest portion of the site north of Markham Ravine have been removed.

2012 – The conditions appear similar to 2008.

Key features are identified on our site plan (Figure 2).

2.3 SITE BACKGROUND

As evident in the aerial photographs, we understand the majority of the site has been converted to rice fields. We understand these rice fields were graded to make flat terraced cells. Additionally, in the northwest corner of the site north of Markham Ravine rectangular ponds were constructed in the late 60's or early 70's; these ponds were reportedly used for catfish farming (Reference 4). The ponds were subsequently removed and a large perimeter berm around this area remains.

2.4 GEOLOGY

The site is located in the Great Valley geomorphic province. The Great Valley is an elongate, northwest-trending structural trough bound by the Coast Range on the west and the Sierra Nevada on the east. The Great Valley has been and is presently being filled with sediments primarily derived from the Sierra Nevada.

The site is mapped as Quaternary Upper and Lower Riverbank Formation (Helley, 1985; Wagner, 1987). This formation is a dissected alluvial fan with sediments deposited by ancestral rivers and streams flowing from the western slopes of the Sierra Nevada. This deposit generally consists of semi-consolidated gravels, sands, silts, and minor clay. Additionally, Holocene Alluvium mapped within Markham Ravine and Auburn Ravine is described as unweathered gravel, sand, and silt deposited by present day river or stream systems.

2.5 SEISMICITY

The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone and no known surface expression of active faults is believed to exist within the site. Fault rupture through the site, therefore, is not anticipated.

The site does lie within a seismically active region as California has numerous faults that are considered active. Generally, a fault is considered active if it has ruptured within the Holocene epoch (11,700 years before present). The following table summarizes the distances to mapped, active regional faults and estimated maximum magnitude within approximately 50 miles using the USGS Spatial Query tool based on USGS 2008 National Seismic Hazard Maps.

TABLE 2.5-1
Distances to Known Regional Active Faults

Fault	Distance (miles)	Maximum Magnitude (Hanks)
Great Valley 3, Mysterious Ridge	39	6.9
Great Valley 4a, Trout Creek	41	6.4
Great Valley 4b, Gordon Valley	44	6.6

2.6 SURFACE CONDITIONS

The site has relatively gentle topography and generally drains toward the west and southwest. Based on the 1992 USGS topographic map, site grades range from approximately Elevation 115 feet (Datum: 0 feet = Mean Sea Level) in the eastern portion of the site down to Elevation 95 on the western edge of the site.

We observed the following site features during our reconnaissance:

- The majority of the site was being utilized for rice cultivation.
- Dirt access roads generally trended east-west and north-south in between rice fields.
- Two residences and associated out buildings were located in the western portion of the site north of Markham ravine. One was accessed from South Dowd Road and one from Nicolaus Road.
- 8- to 10-foot high berms were located around the former catfish pond area in the western portion of the site north of Markham Ravine.
- The southeast portion of the site, north of Moore Road and south of Auburn Ravine, appeared to be grazing land covered in grass and weeds.

Rice Fields

Looking north near the intersection of Moore
Road and Fiddyment Road

Please refer to the Site Plan, Figure 2, for more information on site features.

2.7 SUBSURFACE CONDITIONS

We reviewed the previous exploration logs by others from References 1 and 2, which are shown on the Site Plan, Figure 2. The previous explorations performed on the site included 16 borings from 1988 and 20 test pits from 2004. The subsurface conditions were logged as discontinuous layers of silty sand, clayey sand, silty or sandy clay, and minor clean sands. Commonly, a cemented clayey or sandy silt (hardpan) layer was reportedly encountered below 3 feet. Clay layers were encountered at various depths in the upper 8 feet with typical reported thicknesses of 1 to 3 feet. Expansion Index tests on four clay samples indicate high to very high expansion potential.

The previous exploration logs are included in Appendix A.

2.8 GROUNDWATER CONDITIONS

Based on review of groundwater elevation data from the California Department of Water Resources water data library, static groundwater is likely 40 to 55 feet deep at the site. Water in the Markham Ravine pond in the central portion of the site is shown on topographic maps at approximately elevation 100 feet, approximately 5 feet below the adjacent fields.

No groundwater was encountered in the previous borings or test pits, however it was noted that the 1988 borings encountered very moist soil in some locations directly above cemented soil (hard pan). This very moist soil was interpreted as being seasonal perched groundwater.

Based on the 1988 boring data and our experience with this geologic formation, shallow perched water may be present in some areas after prolonged wet weather and near Markham and Auburn Ravines.

Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practice, and other factors.

3.0 PRELIMINARY CONCLUSIONS

Based on our research and site observations, we did not find any significant geotechnical constraints that would preclude development at the site. The primary geotechnical concerns that could affect development include existing fills, potentially expansive soils, and perched groundwater. We summarize our conclusions below.

3.1 EXISTING FILL

In areas of the site used for rice farming, shallow cuts and fills appear to have been made to level the rice fields. Additionally, cuts and fills were made to construct and subsequently remove catfish ponds in the western portion of the site. Filled berms remain surrounding the catfish pond area. The rice fields, catfish ponds, and berms are identified on the Site Plan, Figure 2.

The previous geotechnical reports do not identify or characterize the existing fill. Future geotechnical work should include exploration to characterize the approximate extent and depths of the existing fill.

In future structural areas, the existing fill should be considered non-engineered and will require removal and recompaction prior to constructing improvements. We present fill removal recommendations in Section 4.1.

3.2 EXPANSIVE SOIL

Clay layers were identified in the majority of the previous explorations on the site. The typical reported clay thicknesses are 1 to 3 feet at various depths within the upper 8 feet. Previous laboratory tests show the clay soil exhibits high to very high expansion potential. Expansive soils shrink and swell as a result of seasonal moisture fluctuations or changes in irrigation practices. This can cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. Building damage due to volume changes associated with expansive soils can be reduced through proper compaction, selective grading, and proper foundation design.

3.3 STATIC AND PERCHED GROUNDWATER

It does not appear that the static groundwater level beneath the site will affect the proposed development. However, based on our review of available data and experience with the Riverbank Formation, shallow perched water may be present in some areas after prolonged wet weather and especially near Markham and Auburn Ravines. Perched water at the site may impede grading and underground utility installation activities.

3.4 2010 CBC SEISMIC DESIGN PARAMETERS

For preliminary consideration, we provide the 2010 California Building Code (CBC) seismic parameters in Table 3.4-1 below.

TABLE 3.4-1
2010 CBC Seismic Parameters

Item	Design Value
Site Class	D
0.2 second Spectral response Acceleration, S_s	0.43
1.0 second Spectral response Acceleration, S_1	0.21
Site Coefficient, F_a	1.46
Site Coefficient, F_V	1.99
Maximum considered earthquake spectral response accelerations for short periods, S_{MS}	0.63
Maximum considered earthquake spectral response accelerations for 1-second periods, S_{M1}	0.41

Item	Design Value
Design spectral response acceleration at short periods, S_{DS}	0.42
Design spectral response acceleration at 1-second periods, S_{D1}	0.27
Long-period Transition Period, T_L	12

3.5 GEOLOGIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and ground lurching. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, lateral spreading, landslides, tsunamis, flooding or seiches is considered low to negligible at the site.

3.5.1 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 sands below the groundwater table. Empirical evidence indicates that loose silty sands are also potentially liquefiable. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop. If excess hydrostatic pressures exceed the effective confining stress from the overlying soil, the sand may undergo deformation. If the sand undergoes virtually unlimited deformation without developing significant resistance, it is said to have liquefied, and if the sand consolidates or vents to the surface during and following liquefaction, ground settlement and surface deformation may occur.

The subsurface conditions described in the previous explorations included layers of silty and clayey sand with some minor clean sand. Blow counts indicate sand that is dense to very dense with no static groundwater encountered to the maximum depth explored of about 15 feet. Based on the limited occurrence of sand layers, the relatively high density of the those layers and the relatively deep groundwater, it is our opinion that the risk of liquefaction at the site during an earthquake is likely low to negligible. Future explorations should be performed to confirm the conditions and verify these findings.

3.5.2 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, it is our opinion that ground rupture is unlikely at the subject property.

3.5.3 Ground Shaking

An earthquake of moderate to high magnitude generated within the region could cause considerable ground shaking at the site. To mitigate the shaking effects, all structures should be designed using sound engineering judgment and the current California Building Code (CBC) requirements, as a minimum. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996).

3.6 STORMWATER INFILTRATION

Based on our review of the previous exploration data, silty sand and clayey sand layers are common at various depths at the site. These sand layers are typically dense to very dense and will likely have varying amounts of silt and clay. Considering the relatively high density of the native soils, the sands may have relatively low permeability values for stormwater infiltration. Future field infiltration tests can be performed to further evaluate infiltration rates for conceptual design purposes.

4.0 PRELIMINARY RECOMMENDATIONS

The preliminary recommendations included in this report, along with other sound engineering practices, should be incorporated as a part of planning for the project. Prior to development, we should be retained to provide a design-level geotechnical exploration report areas of proposed development.

4.1 EXISTING FILL MITIGATION

As discussed in Section 3.1, existing non-engineered fills may be associated with rice field grading, former catfish pond areas, and berms. In areas that will have future structural improvements, the existing non-engineered fills will need to be removed to competent native soil, as determined by ENGEO. The rice fields, former catfish pond areas, and berms are shown on the Site Plan, Figure 2. We recommend future geotechnical exploration to further characterize the extent of any fills in future development areas. Preliminary earthwork recommendations to address removal and recompaction of non-engineered fills are presented in Section 4.3.

4.2 EXPANSIVE SOILS

As described is Section 3.2, soils with high to very high expansion potential were encountered at the site.

For preliminary planning purposes, we recommend that all single- or multi-family wood-frame residential buildings be supported on post-tensioned mat foundations bearing on competent native soil or compacted fill. Alternatively, conventional footings with slabs-on-grade can be used if the upper 2 feet of the buildings pads can be constructed with select fill with low expansion potential.

In addition, to reduce expansion potential of engineered fills, we recommend that all potentially expansive soil on site be compacted at a slightly lower relative compaction at a moisture content well over optimum.

Additional exploration should be performed to further evaluate the extent and properties of the expansive soil.

4.3 EARTHWORK

Prior to development, the existing ground surface would need to be cleared of all surface and subsurface deleterious materials including existing building foundations, slabs, buried utility and irrigation lines, pavements, debris, and designated trees, shrubs, and associated roots. We recommend stripping organics, removing any existing fill, scarifying, moisture conditioning and compacting the soil prior to fill placement, following cutting operations, and in areas left at grade. For relatively low expansion potential native or import soil, we recommend compaction of fill to at least 90 percent relative compaction (ASTM D-1557) and compaction of the upper 6 inches of finish pavement subgrade to at least 95 percent relative compaction prior to aggregate base placement. Soil should be compacted at a minimum of 1 percentage point over optimum moisture content.

Where expansive native soil is encountered, we generally recommend that fill be compacted within a range of 87 to 92 percent relative compaction at a moisture content at least 4 percentage points above optimum. Landscape fills can generally be compacted to minimum 85 percent relative compaction.

In general, we anticipate the onsite soil should be suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 6 inches in maximum dimension. Imported fill should meet the above requirements and have a plasticity index less than 12.

4.4 FOUNDATIONS

4.4.1 Residential Buildings

On a preliminary basis, we recommend that the planned single- and multi-family residential structures be supported on post-tensioned (PT) mat foundations bearing on prepared native soil or compacted fill. We anticipate that PT mats will typically be about 10 inches thick and have a thickened edge at least 2 inches greater than the mat thickness. PT mats are generally designed in accordance with the latest edition of the Post-Tensioning Institute's "Design of Post-Tensioned Slabs."

Alternatively, buildings can be supported on conventional footings with slab-on-grade provided the upper 2 feet of the building pad is constructed with select low expansion potential soil. The minimum depth of continuous or isolated spread footings would generally be 12 to 18 inches below lowest adjacent grade, depending on the number of stories. Maximum allowable dead plus live load bearing capacities for this type of footings is usually in the range of 2,500 to 3,500 pounds per square foot (psf). These can be increased by one-third under the short-term effects of wind or seismic loading.

Interior concrete floor slabs-on-grade should have a minimum thickness of 5 inches, be adequately reinforced to resist minor soil movement, and underlain by a minimum of 4 inches of crushed rock. Residential first-floor concrete mats and slabs-on-grade are typically underlain by a vapor retarder in habitable areas, which commonly consists of a Class A vapor retarder per ASTM E 1745-97 "Standard Specification for Plastic Water Vapor Retarders used in Contact with Soil or Granular Fill under Concrete Slabs".

4.4.2 Commercial and Retail Buildings

For typical one to three-story light wood-, steel-frame or concrete tilt-up commercial construction, we anticipate that conventional shallow footings may be used to support continuous perimeter and isolated interior loads on engineered fill. Similar to the residential building pads, the upper 2 feet of the building pad would need to be constructed with select low expansion potential soil. Alternatively, lime treatment of the building pads can be performed where expansive soil is present. The minimum depth of continuous or isolated spread footings would generally be 18 to 24 inches below lowest adjacent grade, depending on the structural loads. Maximum allowable dead plus live load bearing capacities and slab recommendations similar to those noted above for residential buildings would also be applicable.

4.5 RETAINING WALLS

We anticipate that retaining walls may be necessary for various portions of the development. Retaining walls should be designed to resist active lateral earth pressures. For preliminary design purposes, retaining walls up to 10 feet tall may be designed using an equivalent fluid pressure of 45 pounds per cubic foot (pcf) for drained, level backfill conditions and a passive resistance based on an equivalent fluid pressure of 300 pcf. Adequate drainage should be provided to prevent the buildup of hydrostatic pressures behind the wall. This drainage should consist of a graded rock drain or composite drainage material. Backfill material should be free of clay and should be compacted to a minimum of 90 percent relative compaction.

We anticipate that retaining walls less than 10 feet tall can likely be supported on shallow footings bearing in competent native soil or engineered fill. Retaining walls greater than 10 feet tall, with sloping backfill, or constructed on sloping ground will require site-specific design recommendations.

4.6 PRELIMINARY PAVEMENT DESIGN

Based on the fine-grained soils encountered and the previous R-value testing, we recommend that preliminary pavement sections be based on an R-value of 5, a typical value for silty and clayey soil. Using a preliminary design R-value of 5, we developed the following flexible pavement sections in accordance with the design methods contained in Topic 630 of Caltrans Highway Design Manual. The design-level report should include R-value testing to verify the appropriate design R-value.

TABLE 4.6-1
Preliminary Flexible Pavement Sections

Traffic Index	Hot Mix Asphalt (inches)	Class 2 Aggregate Base (inches)
5	3	10
6	3½	13
7	4	16
8	4½	19

Where Portland cement concrete pavement sections are needed to resist heavy loads and turning forces, such as in fire lanes or trash enclosures, we recommend a preliminary minimum section of 6 inches of Portland Cement concrete over 6 inches of Caltrans Class 2 Aggregate Base. Concrete for these applications typically has a minimum 28-day compressive strength of 3,500 pounds per square inch and includes minimum control joint spacings in accordance with Portland Cement Association guidelines. The actual concrete thickness will depend on the subsurface conditions and the anticipated loading conditions.

5.0 DESIGN GEOTECHNICAL REPORT

This report presents preliminary geotechnical findings, conclusions, and recommendations intended for preliminary planning purposes only. Design-level geotechnical explorations and assessments should be performed when development plans are finalized. Design-level exploration should be performed to further evaluate the presence of existing fill, expansive soil, perched ground water. Specific recommendations for site grading and the design and construction of foundations and utilities should be included in the design-level report.

6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

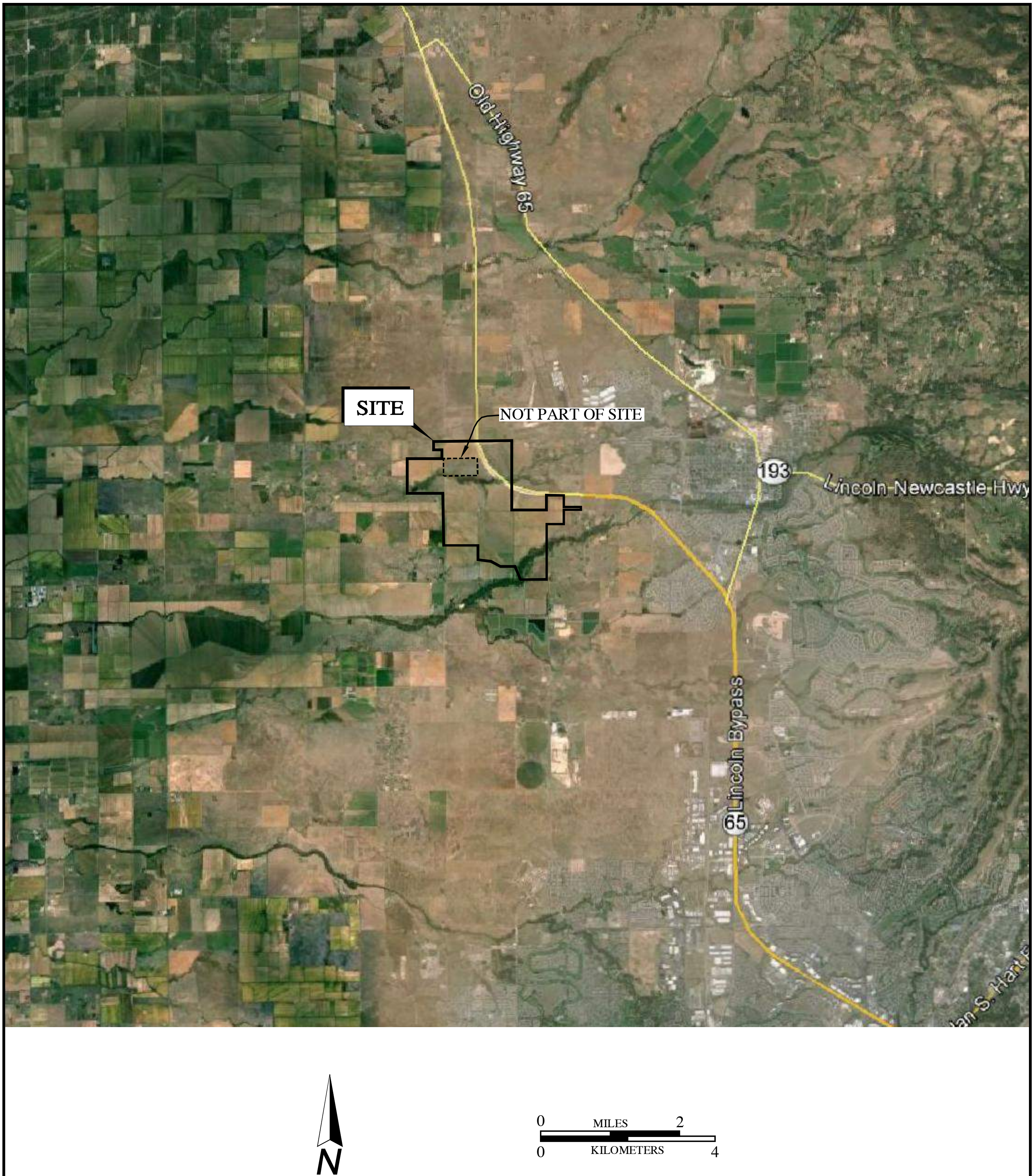
This report presents preliminary geotechnical recommendations for design of the improvements discussed in Section 1.2 for the Lincoln Village 5 Special Use District B project. It is the responsibility of the owner to transmit the information and recommendations of this report to the appropriate organizations or people involved in design of the project, including but not limited to developers, owners, buyers, architects, engineers, and designers. The conclusions and recommendations contained in this report are solely professional opinions and are valid for a period of no more than 2 years from the date of report issuance.

We strived to perform our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty is expressed or implied. There are risks of earth movement and property damages inherent in building on or with earth materials. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field observations, photos, and review of documents available at the time of report preparation. This document must not be subject to unauthorized reuse, that is, reusing without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time.

FIGURES

F
I
G
U
R
E
S

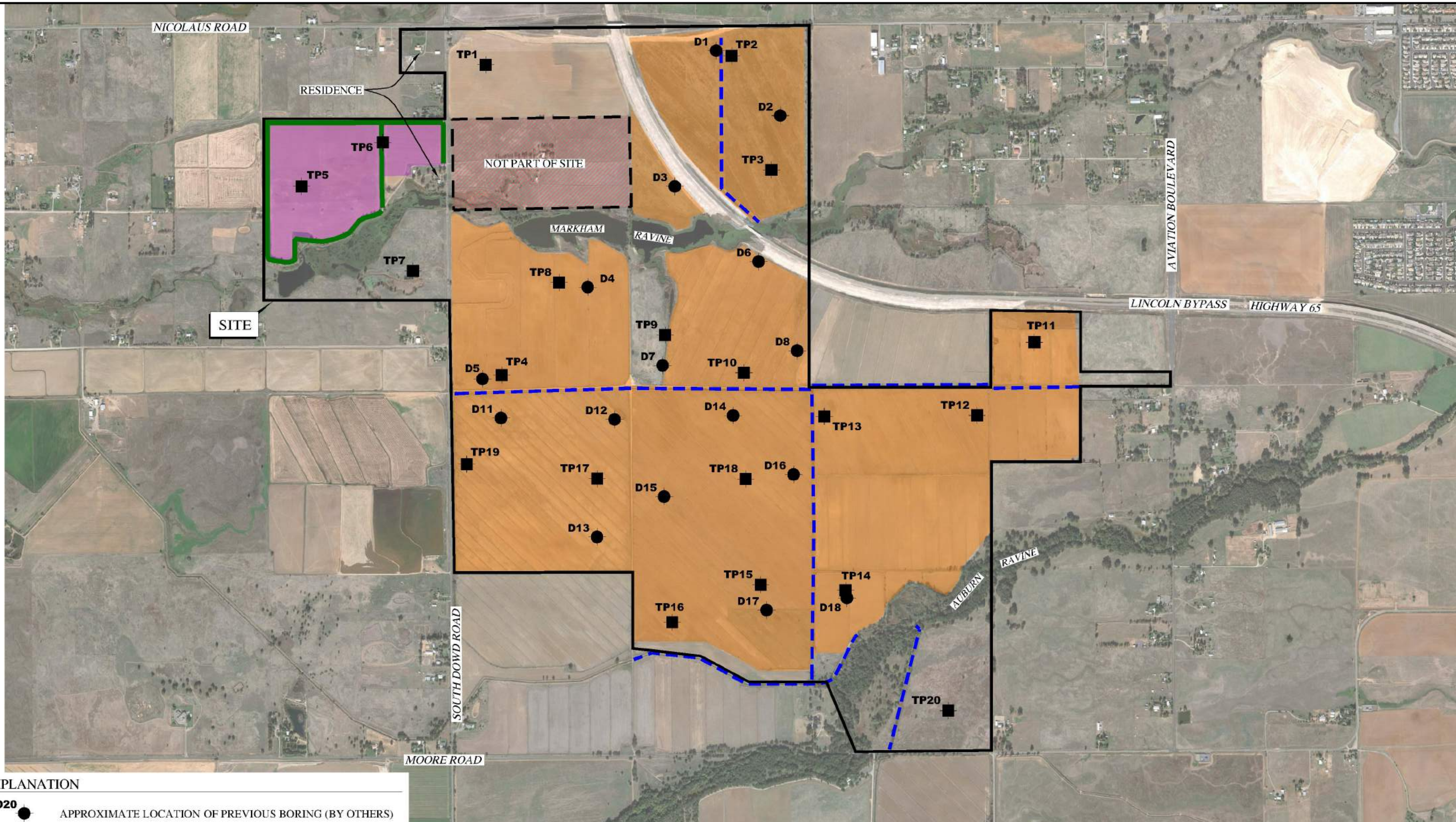


BASE MAP SOURCE: GOOGLE EARTH PRO

ENGEO Expect Excellence	VICINITY MAP LINCOLN VILLAGE 5, SPECIAL USE DISTRICT B PLACER COUNTY, CALIFORNIA	PROJECT NO.: 10354.000.000 SCALE: AS SHOWN DRAWN BY: SRP CHECKED BY: MG	FIGURE NO. 1

G:\Drafting\DRAFTING2_Dwg_10000 to 12999\10354\000\FEASIBILITY-REPORT\10354000000-1-VicMap-0813.dwg Plot Date: 8-02-13 dborde

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

D20 ● APPROXIMATE LOCATION OF PREVIOUS BORING (BY OTHERS)

TP20 ■ APPROXIMATE LOCATION OF PREVIOUS TEST PIT (BY OTHERS)

BERM AROUND FORMER CATFISH PONDS

IRRIGATION CANAL

FORMER CATFISH PONDS

RICE FIELDS

N

0 FEET 1400
0 METERS 700

BASE MAP SOURCE: GOOGLE EARTH PRO, 2011

ENGEO Expect Excellence

SITE PLAN
LINCOLN VILLAGE 5, SPECIAL USE DISTRICT B
PLACER COUNTY, CALIFORNIA

PROJECT NO.: 10354.000.000		FIGURE NO. 2
SCALE: AS SHOWN		
DRAWN BY: SRP	CHECKED BY: MG	

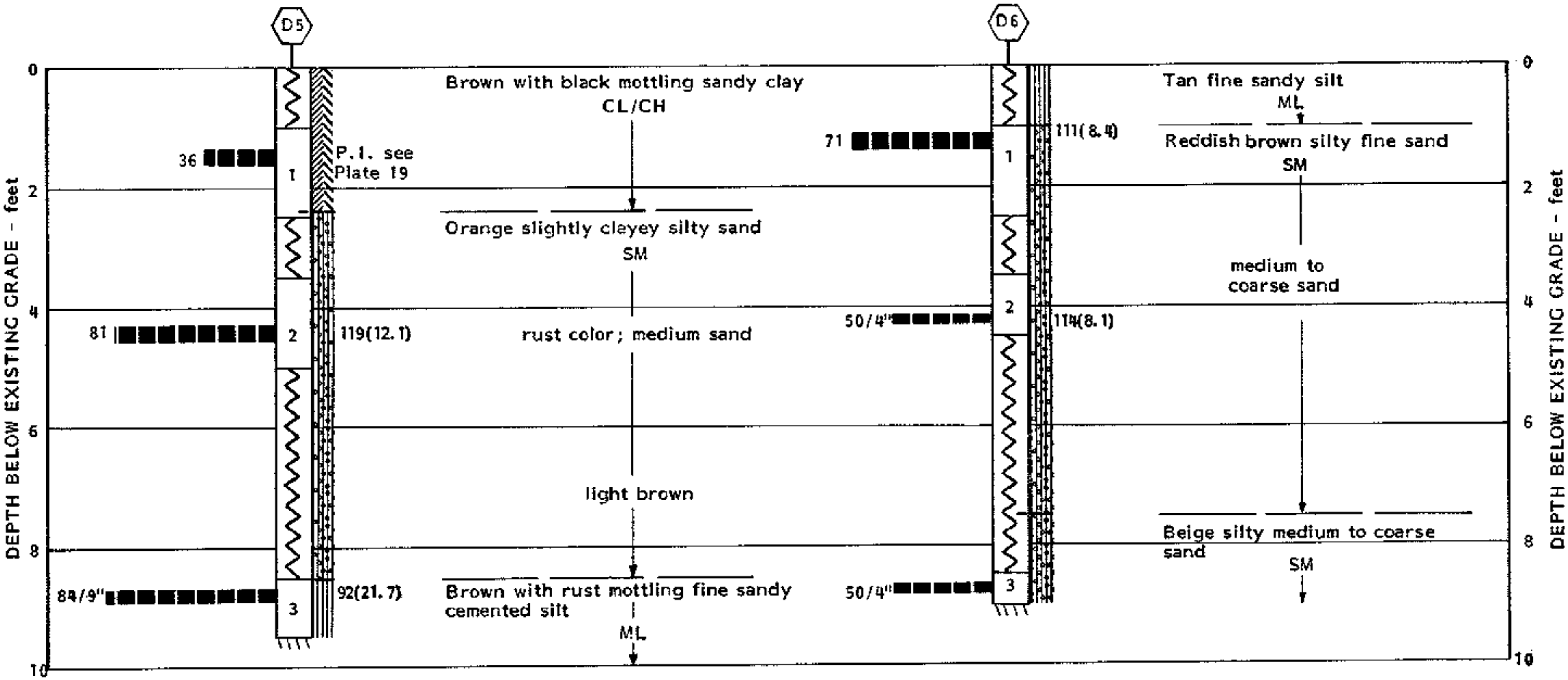
ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg_10000 to 12999\10354\000\FEASIBILITY-REPORT\10354000000-2-SitePlan-0813.dwg Plot Date: 8-08-13 dborde

APPENDIX A

Previous Exploration Logs

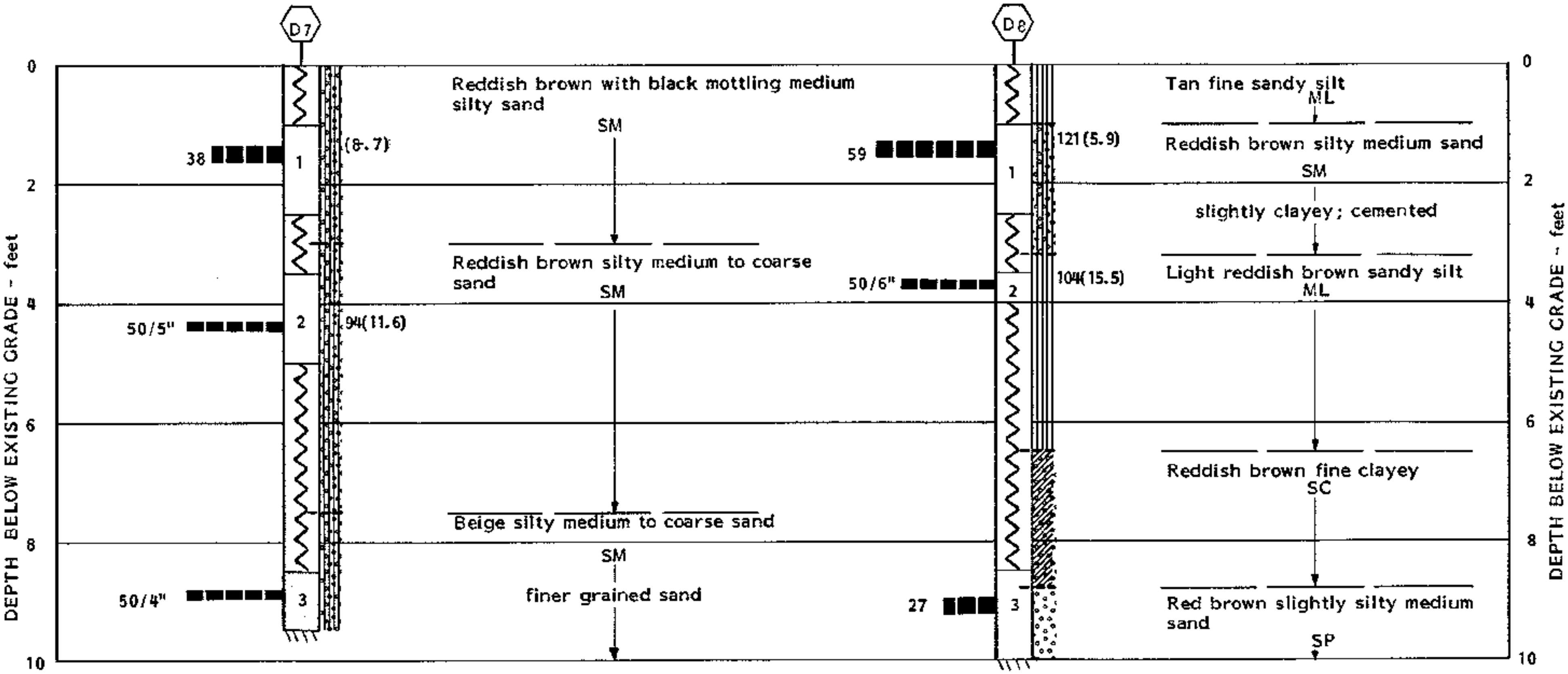
APPENDIX A



NOTES:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 3 and 8, 1988.
2. Free water was not encountered in the borings.
3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

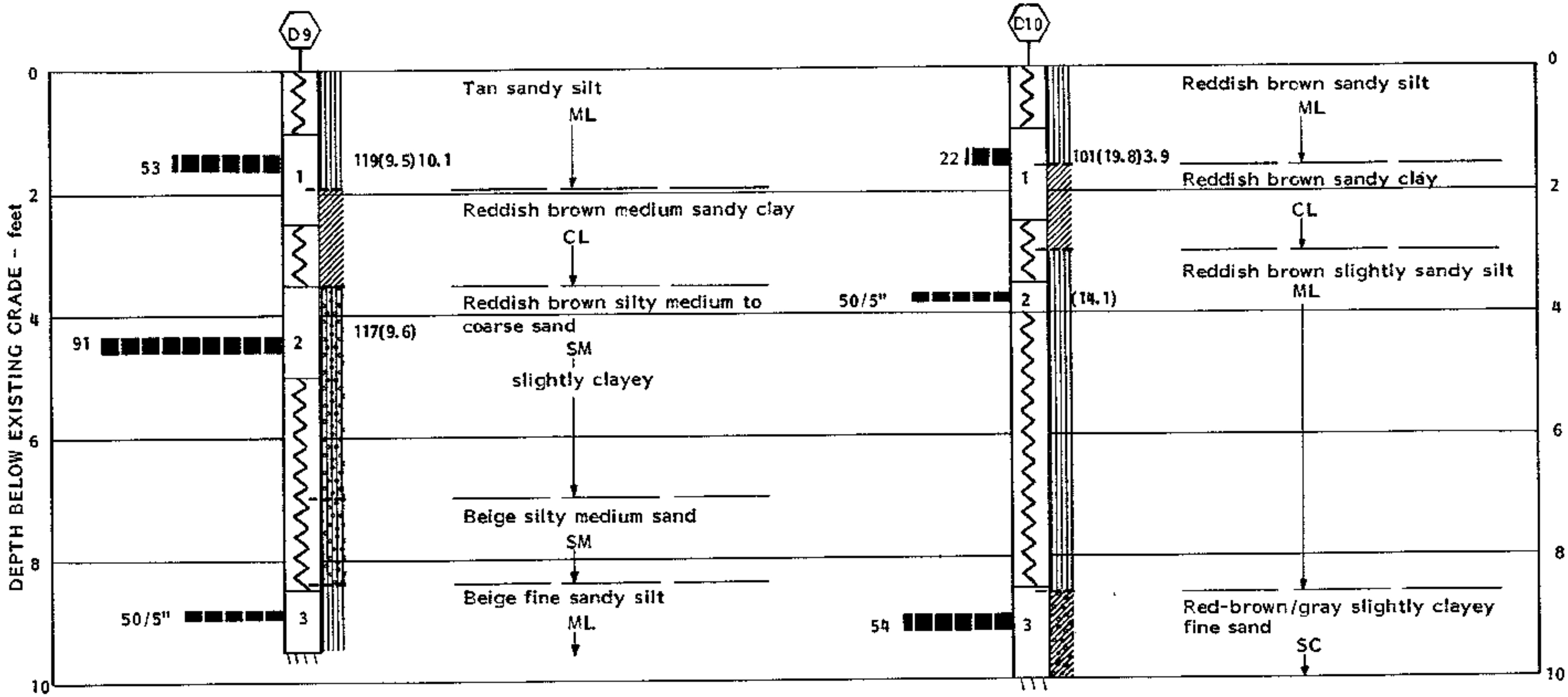
Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WCK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 4



NOTES:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 8, 1988.
2. Free water was not encountered in the borings.
3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

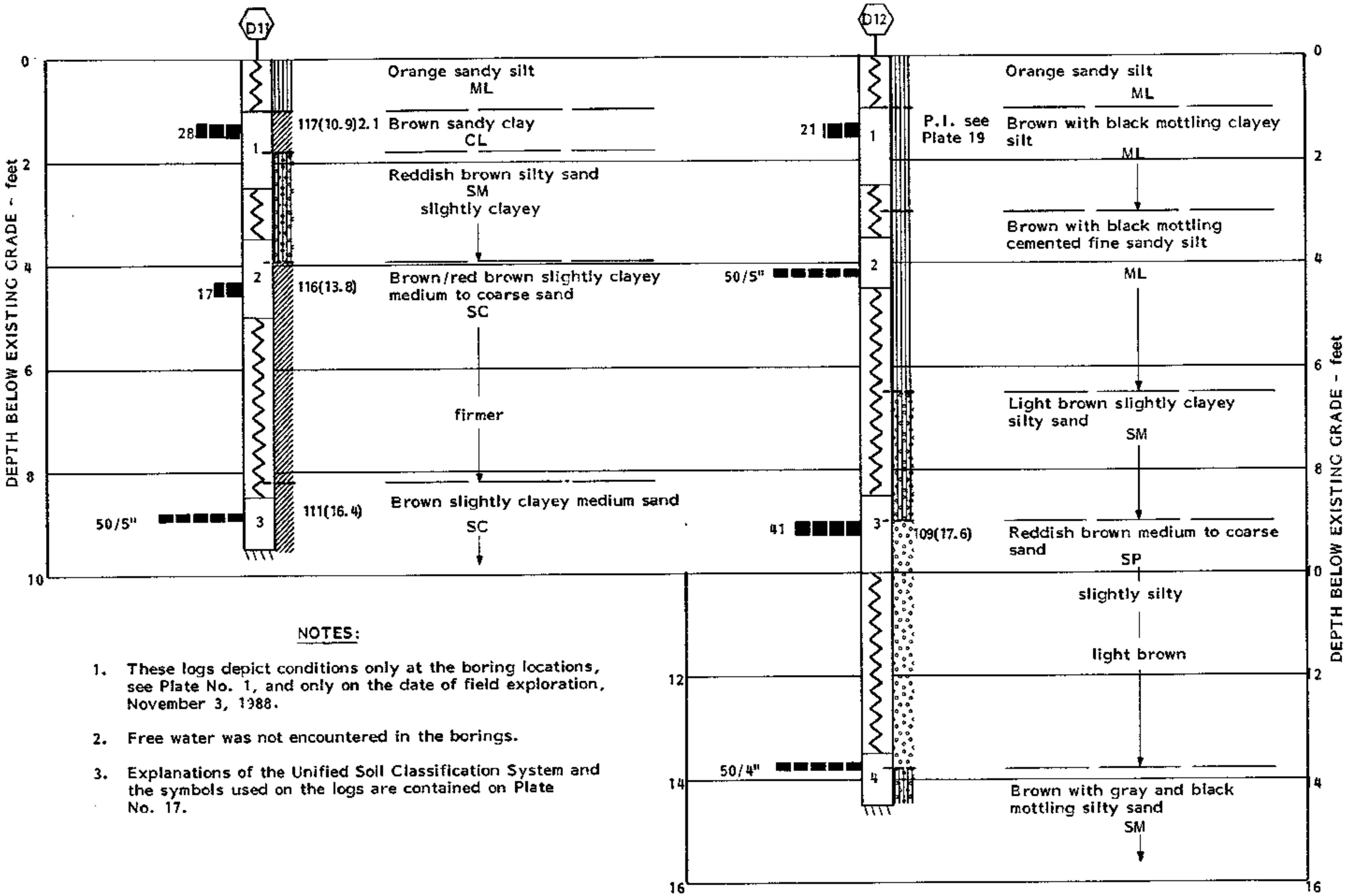
Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WGK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 5



<u>NOTES</u>:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 3 and 8, 1988.
2. Free water was not encountered in the borings.
3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WCK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 6



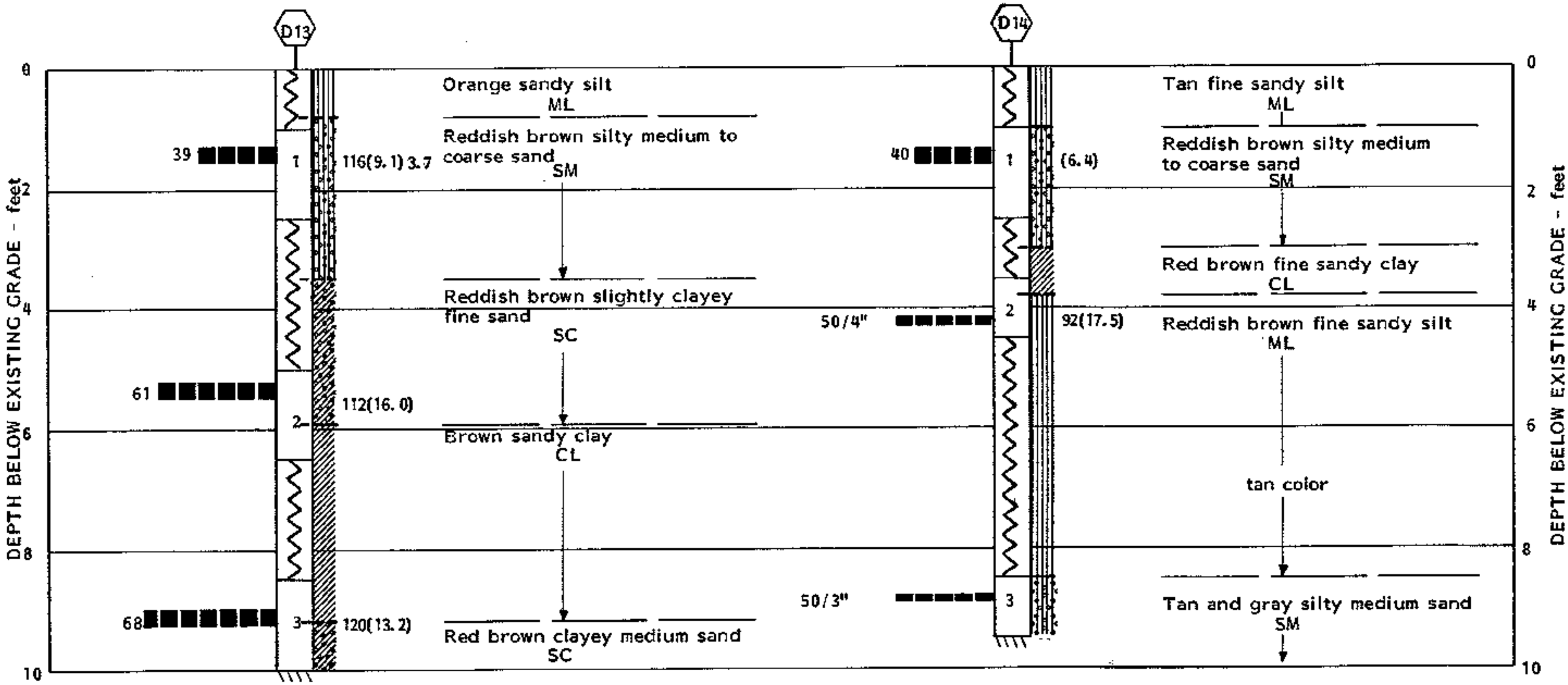
NOTES:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 3, 1988.

2. Free water was not encountered in the borings.

3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

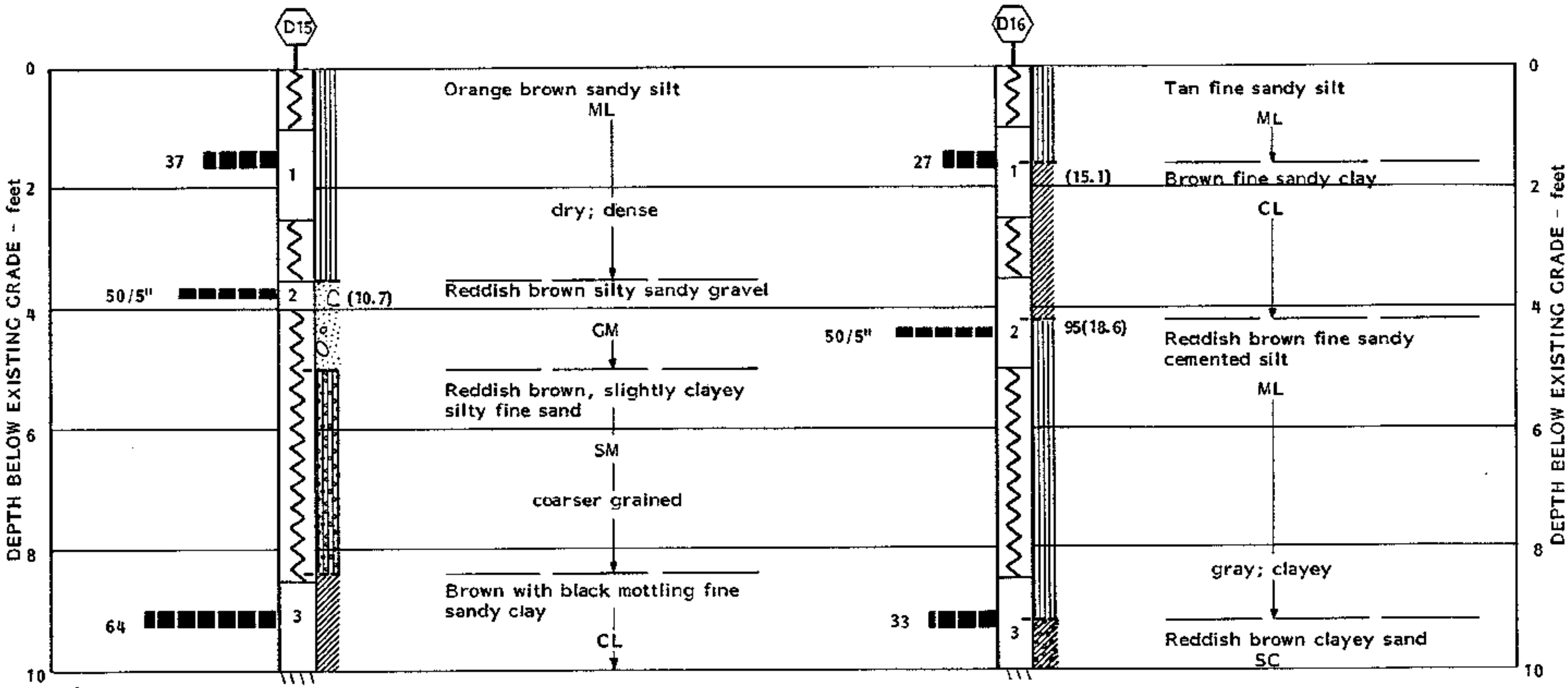
Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WCK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 7



NOTES:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 3 and 8, 1988.
2. Free water was not encountered in the borings.
3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

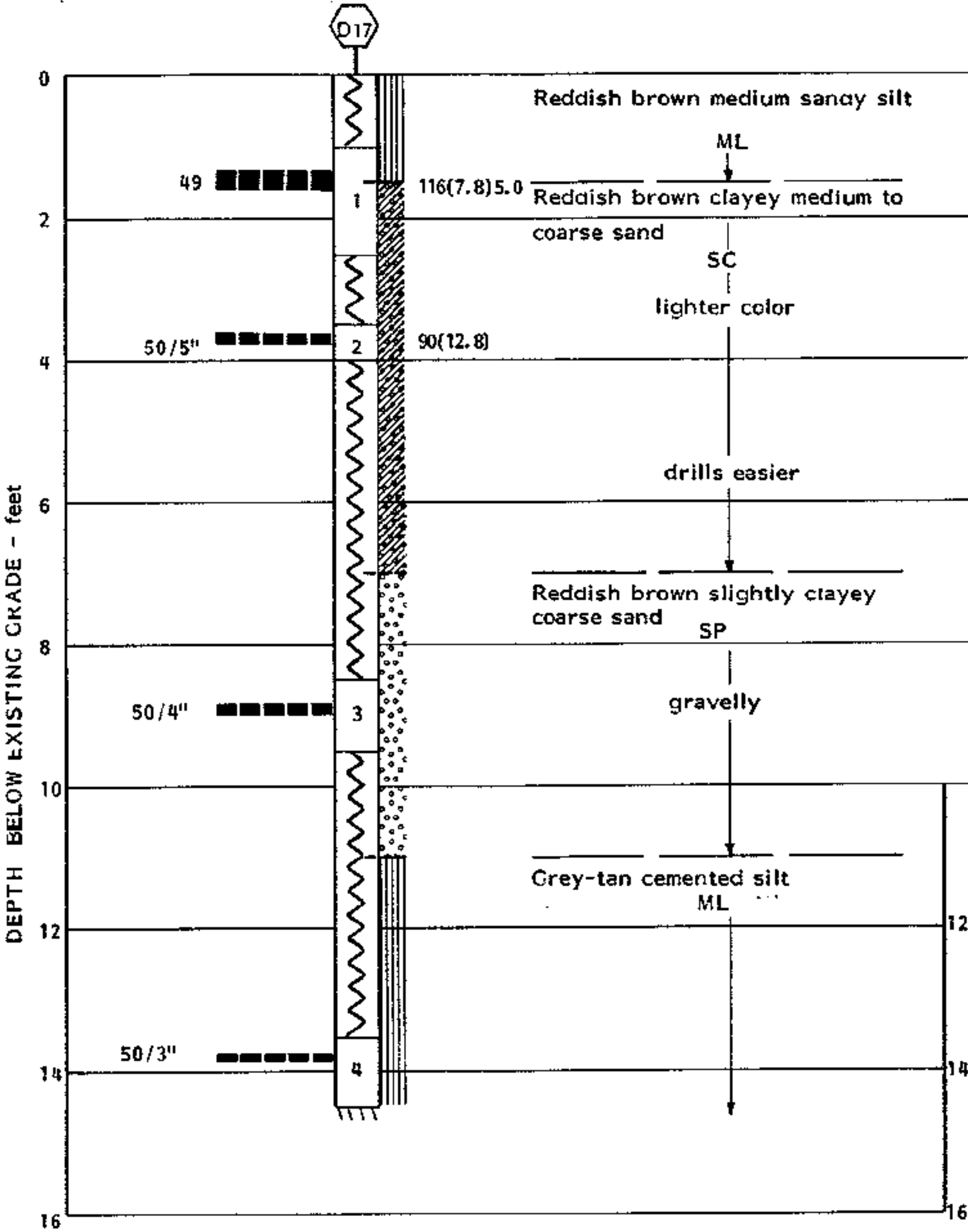
Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WGK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 8

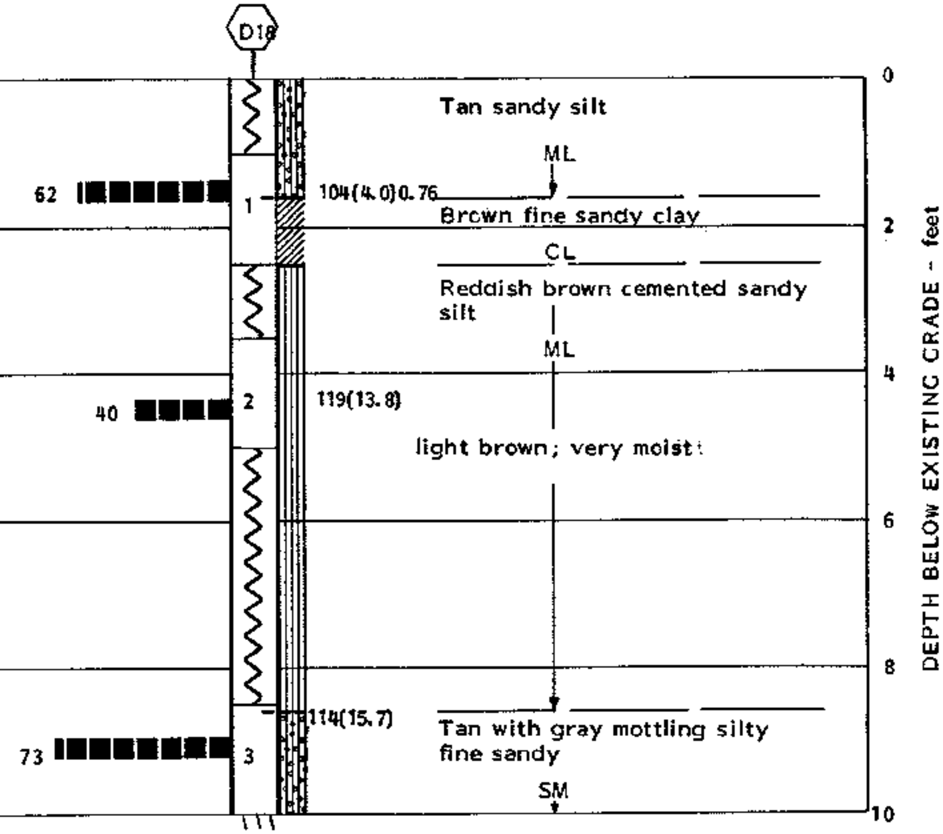


NOTES:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 3 and 8, 1988.
2. Free water was not encountered in the borings.
3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WGK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 9

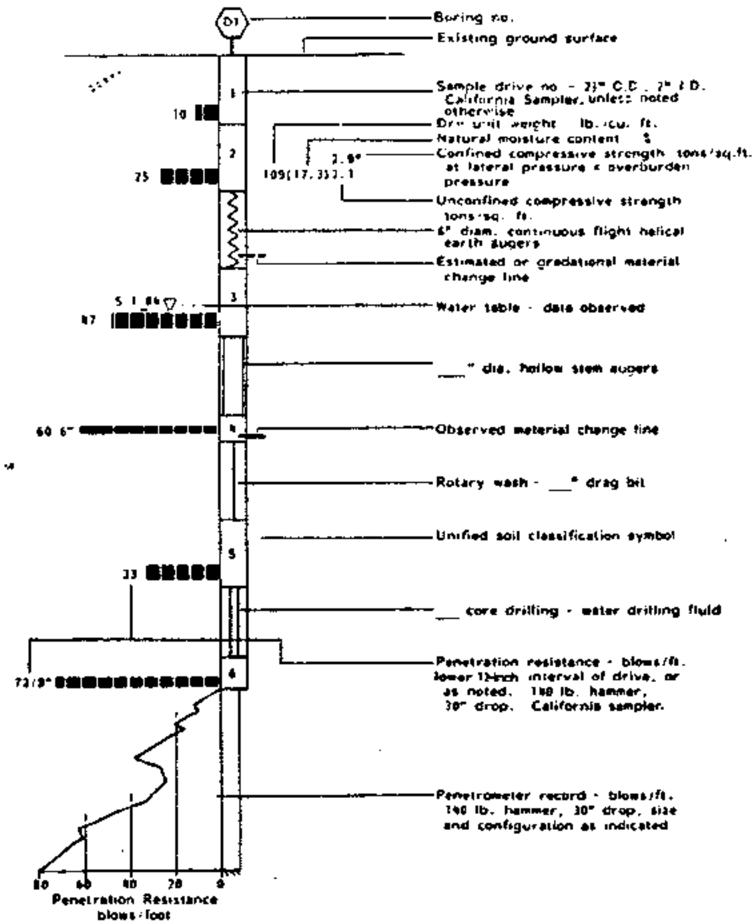




NOTES:

1. These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 3 and 8, 1988.
2. Free water was not encountered in the borings.
3. Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 17.

Wallace/Van Alstine GEOTECHNICAL ENGINEERING	DRAWN BY: WGK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 10



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

UNIFIED SOIL CLASSIFICATION SYSTEM

COHESIVE SOILS		GRANULAR SOILS	
Description	Blows/ft.	Description	Blows/ft.
Very Soft	< 3	Very Loose	< 5
Soft	3 - 5	Loose	5 - 15
Medium (firm)	6 - 10	Medium Dense	16 - 40
Stiff	11 - 20	Dense	41 - 65
Very Stiff	21 - 40	Very Dense	> 65
Hard	> 40		

CONSISTENCY CLASSIFICATION

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

GRAIN SIZE CLASSIFICATION

Wallace-Van Alstine & Kuhl GEOTECHNICAL ENGINEERING	DRAWN BY: WCK CHECKED BY: SLF	MOORE RANCH Placer County, California	PROJECT NO: 88-471 DATE: 12/88 PLATE NO: 17

LOGS OF TEST PITS
Case 580M Backhoe with an 18-inch wide bucket
Excavated on October 7 and 8, 2004
Logged by: J. Myers

Test Pit No. 1

0 to 2'	Light brown to reddish brown, silty fine SAND (SM) Drive sample collected at ½ foot
2' to 6'	Reddish brown, silty fine to coarse SAND (SM) Bulk sample collected from 2 to 4 feet
6' to 8'	Gray-brown, slightly fine sandy, clayey SILT (ML) No free water observed in the test pit. Bottom of test pit at 8 feet.

Test Pit No. 2

0 to 2'	Brown, silty fine to medium sandy CLAY (CL) Bulk sample collected from 0 to 2 feet
2' to 6'	Brown, variably cemented, silty clayey fine to medium SAND (SC) Bulk sample collected from 2 to 4 feet
6' to 8'	Brown to light brown, silty, fine sandy CLAY (CL). No free water observed in the test pit. Bottom of test pit at 8 feet.

Test Pit No. 3

0 to 5'	Brown to grayish brown, slightly silty clayey SAND (SC) Drive sample collected at 1 foot Perched water observed between 4 to 4½ feet
5' to 9½'	Varicolored (reddish brown, light brown), fine sandy SILT (ML) Bulk sample collected at 5 to 7 feet No free water observed in the test pit. Bottom of test pit at 9½ feet.

Test Pit No. 4

0 to 1'	Brown to dark brown, slightly silty medium sandy CLAY (CL)
1' to 8'	Brown to red-brown, clayey, silty fine to medium sand (SM). Bulk sample collected from 1 to 2½ feet No free water observed in the test pit. Bottom of test pit at 8 feet.

LOGS OF TEST PITS (CONT'D)

Test Pit No. 5

0 to 1'	Brown, silty fine clayey SAND (SC) Drive sample collected at 1 foot
1' to 7½'	Varicolored (brown, red, gray), sandy CLAY (CL) Bulk sample collected from 2 to 4 feet. No free water observed in the test pit. Bottom of test pit at 7½ feet.

Test Pit No. 6

0 to 1'	Brown, fine sandy SILT (ML)
1' to 2½'	Brown, clayey silty medium to coarse SAND (SM)
2½' to 4½'	Brown to grayish brown, silty CLAY (CH) Bulk sample collected from 2½ to 4 feet.
4' to 9'	Brown to grayish brown, silty fine SAND (SM) with trace clay No free water observed in the test pit. Bottom of test pit at 9 feet.

Test Pit No. 7

0 to 1'	Brown, fine sandy SILT (ML)
1' to 3'	Brown to reddish brown, variably cemented, clayey sandy SILT (ML) Bulk sample collected from 1 to 2 feet.
3' to 9'	Grayish brown, clayey silty medium to coarse SAND (SM) No free water observed in the test pit. Bottom of test pit at 9 feet.

Test Pit No. 8

0 to 1'	Brown to dark brown, slightly silty fine to medium sandy CLAY (CL) with organics
1' to 5'	Reddish brown to dark brown, silty clayey fine to medium SAND (SC) Drive sample collected at 1½ feet
5' to 8½'	Reddish brown to light brown, silty SAND (SM) Bulk sample collected from 5 to 7 feet. Perched water observed between 6 to 7 feet Bottom of test pit at 8½ feet.

LOGS OF TEST PITS (CONT'D)

Test Pit No. 9

0 to 1'	Brown, clayey silty medium SAND (SM)
1' to 5'	Brown, silty fine to medium CLAY (CL)
	Bulk sample collected from 2 to 3½ feet
5' to 9'	Reddish brown, silty fine SAND (SM)
	No free water observed in the test pit.
	Bottom of test pit at 9 feet.

Test Pit No. 10

0 to 2½'	Brown to dark brown, slightly silty medium sandy CLAY (CL)
2½' to 6'	Brown, variably cemented, clayey silty fine to medium SAND (SM)
	Bulk sample collected from 3 to 5 feet
6' to 8½'	Brown to reddish brown, clayey silty fine to medium SAND (SM)
	No free water observed in the test pit.
	Bottom of test pit at 8½ feet.

Test Pit No. 11

0 to ½'	Dark brown, silty, medium sandy CLAY (CL)
½' to 1½'	Reddish brown to brown, clayey silty fine to medium SAND (SM)
1½' to 7½'	Reddish brown to brown, silty CLAY (CH)
	Drive sample collected at 2 feet
	Bulk sample collected from 3½ to 5½ feet
	No free water observed in the test pit.
	Bottom of test pit at 7½ feet.

Test Pit No. 12

0 to 1'	Dark brown, silty medium sandy CLAY (CL)
1' to 4½'	Brown to reddish brown, clayey silty medium to coarse sand (SM)
	Perched water observed between 3½ to 4½ feet
	Bulk sample collected from 1 to 3 feet
4½' to 5½'	Brown, variably cemented, clayey fine to medium sandy SILT (ML)
5½' to 7½'	Brown to light brown, well-cemented, clayey silty fine SAND (SM)
	No free water observed in the test pit.
	Bottom of test pit at 7½ feet.

LOGS OF TEST PITS (CONT'D)

Test Pit No. 13

0 to 1'	Light brown to brown, slightly clayey silty fine SAND (SM)
1' to 2'	Reddish brown to dark brown, sandy silty CLAY (CL) Bulk sample collected from 1 to 2 feet
2' to 7'	Brown to reddish brown, variably cemented, silty clayey fine to medium SAND (SM) Decrease in cementation below 7 feet No free water observed in the test pit. Bottom of test pit at 7 feet.

Test Pit No. 14

0 to 4'	Brown, silty clayey fine to medium SAND (SC) Drive sample collected at 2 feet
4' to 7'	Brown to reddish brown, silty clayey medium to coarse SAND (SC) with trace gravel Perched water observed between 6 to 7 feet
7' to 8½'	Brown, clayey silty fine to medium SAND (SM) Bottom of test pit at 8½ feet.

Test Pit No. 15

0 to 2'	Light brown to brown, slightly clayey silty fine SAND (SM)
2' to 3½'	Reddish brown to brown, variably cemented, clayey sandy SILT (ML)
3½' to 9½'	Varicolored (red, brown, gray), clayey silty fine SAND (SM) Perched water observed between 7 to 8 feet Bottom of test pit at 9½ feet.

Test Pit No. 16

0 to 1½'	Light brown to brown, slightly clayey sandy SILT (ML) Drive sample collected at 1 foot
1½' to 5'	Brown, silty fine to medium sandy CLAY (CL)
5' to 8'	Brown to light brown, slightly clayey silty fine SAND (SM)
8' to 9'	Brown to reddish brown, silty medium to coarse SAND (SM) with well-rounded gravel No free water observed in the test pit. Bottom of test pit at 9 feet.

LOGS OF TEST PITS (CONT'D)

Test Pit No. 17

0 to 3'	Brown, fine sandy silty CLAY (CL) Bulk sample collected from 0 to 3 feet
3' to 5'	Mottled brown and dark brown, variably cemented, clayey silty fine to medium SAND (SM) Bulk sample collected from 3 to 5 feet.
5' to 8½'	Brown to reddish brown, clayey SILT/silty CLAY (ML/CL) with trace fine sand No free water observed in the test pit. Bottom of test pit at 8½ feet.

Test Pit No. 18

0 to 3'	Light brown to brown, fine sandy SILT (ML) Drive sample collected at 1½ feet Bulk sample collected from 1½ to 2½ feet
3' to 6'	Brown to reddish brown, slightly silty fine SAND (SM)
6' to 7'	Gray to brown, slightly sandy silty CLAY (CL)
7' to 8½'	Brown to dark brown, well-cemented, sandy CLAY (CL) No free water observed in the test pit. Bottom of test pit at 8½ feet.

Test Pit No. 19

0 to 4½'	Brown, silty fine to medium sandy CLAY (SC) Bulk sample collected from 3 to 4½ feet
4½' to 5½'	Brown, variably cemented, clayey fine sandy SILT (ML) Bulk sample collected from 4½ to 5½ feet
5½' to 9'	Brown, slightly silty, clayey fine SAND (SC) No free water observed in the test pit. Bottom of test pit at 9 feet.

Test Pit No. 20

0 to 1½'	Light brown to brown, clayey silty fine to medium SAND (SM)
1½' to 8'	Brown to dark brown, silty fine to medium sandy CLAY (CL) Drive sample collected at 1½ feet Bulk samples collected from 1½ to 3 feet and 3 to 5 feet
8' to 9'	Brown, clayey silty fine SAND (SM) with few subrounded gravel No free water observed in the test pit. Bottom of test pit at 9 feet.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		SYMBOL	CODE	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of soil > no. 200 sieve size)	GRAVELS (More than 50% of coarse fraction > no. 4 sieve size)	GW		Well graded gravels or gravel - sand mixtures, little or no fines
		GP		Poorly graded gravels or gravel - sand mixtures, little or no fines
		GM		Silty gravels, gravel - sand - silt mixtures
		GC		Clayey gravels, gravel - sand - clay mixtures
	SANDS (50% or more of coarse fraction < no. 4 sieve size)	SW		Well graded sands or gravelly sands, little or no fines
		SP		Poorly graded sands or gravelly sands, little or no fines
		SM		Silty sands, sand - silt mixtures
		SC		Clayey sands, sand - clay mixtures
FINE GRAINED SOILS (50% or more of soil < no. 200 sieve size)	SILTS & CLAYS LL < 50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL		Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL ≥ 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 silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils
ROCK		RX		Rocks, weathered to fresh

OTHER SYMBOLS

= Drive Sample: 2-1/2" O.D. Modified California sampler

= Drive Sample: no recovery

= Initial Water Level

= Final Water Level

= Estimated or gradational material change line

= Observed material change line

<u>Laboratory Tests</u>

PI = Plasticity Index

EI = Expansion Index

UCC = Unconfined Compression Test

TR = Triaxial Compression Test

GR = Gradational Analysis (Sieve)

K = Permeability Test

GRAIN SIZE CLASSIFICATION

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

WALLACE • KUHL & ASSOCIATES, INC.
GEOTECHNICAL ENGINEERING
GEOLOGIC & ENVIRONMENTAL SERVICES

UNIFIED SOIL CLASSIFICATION SYSTEM

NORTH MOORE RANCH

Lincoln, California

WKA NO: 6251.01

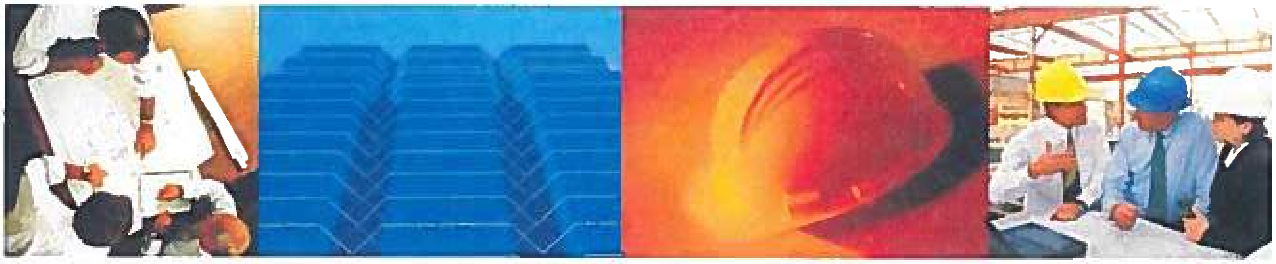
DATE: 11/04

PLATE NO: 8

Appendix F Part 2

MatriScope Geotechnical Feasibility Report for 3440 Moore Road

ESA



GEOTECHNICAL ENGINEERING INVESTIGATION REPORT

FOR

PROPOSED MOORE ROAD PROPERTY SITE DEVELOPMENT

3440 MOORE ROAD

LINCOLN, CALIFORNIA

PREPARED FOR

Mr. Ron Smith
Praxis Properties LLC
5701 Lonetree Boulevard, Suite 102
Rockin, CA 95765

By

Mr. Ying-Chi Liao, P.E., G.E.
Senior Engineering Manager
MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, California 95811

MEL File No. 2450
January 23, 2015

MatriScope
Engineering Laboratories, Inc.

MatriScope
Engineering Laboratories, Inc.

January 23, 2015 MEL File No. 2450

Mr. Ron Smith
Praxis Properties LLC
5701 Lonetree Boulevard, Suite 102
Rocklin, CA 95765

Subject: **Geotechnical Engineering Investigation Report**
Proposed Moore Road Property Site Development
3440 Moore Road
Lincoln, CA

Dear Mr. Smith:

In accordance with your authorization, MatriScope Engineering Laboratories, Inc. (MatriScope) has performed a geotechnical engineering investigation for the proposed Moore Road Property Site Development project located at 3440 Moore Road, Lincoln, California. The purpose of our investigation was to explore and evaluate the subsurface conditions at various locations at the site in order to develop geotechnical engineering recommendations for use in project design and construction.

The attached report presents the results of our data review, field investigation, laboratory testing, and engineering analysis. Based on our investigation, it is our professional opinion the proposed project may be constructed at the subject site provided the recommendations contained in the attached report are implemented into project design and construction.

Recommendations provided herein are contingent on the provisions outlined in the ADDITIONAL SERVICES and LIMITATIONS sections of this report. The project Client and Owner should become familiar with these provisions in order to assess further involvement by MatriScope and other potential impacts to the proposed project.

Thank you for the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned at (916) 375-6700.

Respectfully Submitted,
MatriScope Engineering Laboratories, Inc.

Ying-Chi Liao

Ying-Chi Liao, P.E., G.E.
Senior Engineering Manager

REGISTERED PROFESSIONAL ENGINEER
YING-CHI LIAO
GE 2154
Exp. 3/31/2016
GEOTECHNICAL
STATE OF CALIFORNIA

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION REPORT

PROPOSED MOORE ROAD PROPERTY SITE DEVELOPMENT

3440 MOORE ROAD

LINCOLN, CA

1. INTRODUCTION

1.1 GENERAL

The project site is located northeast of the intersection of Moore Road and Fiddyment Road in the Lincoln area of California. This report contains the results of our geotechnical engineering investigation for the proposed site development. The site location relative to the vicinity of the site is shown on Plate 1.

This report includes recommendations related to the geotechnical aspects of project design and construction. Conclusions and recommendations presented in this report are based on the subsurface conditions encountered at the locations of our field exploration and the provisions and requirements outlined in the ADDITIONAL SERVICES and LIMITATIONS sections of this report. Recommendations presented herein should not be extrapolated to other areas or used for other projects without prior review by MatriScope Engineering Laboratories, Inc. (MatriScope).

1.2 PROPOSED CONSTRUCTION

Based on the preliminary information provided to us by Frayji Design Group, the site will be developed for a new residential community with asphalt concrete parking and associated improvements. A lake/detention-retention pond is planned as well. Plate 2 shows the preliminary development plan. We understand that the existing structures at the site will be demolished.

1.3 PURPOSE AND SCOPE OF SERVICES

Our field investigation was performed to explore and evaluate subsurface conditions at various locations at the site in order to develop recommendations related to the geotechnical aspects of project design and construction.

Our scope of services was outlined in our proposal dated November 7, 2014. This report summarizes the results of our services including:

- A description of the proposed project
- A description of the site surface, subsurface and groundwater conditions observed during our field investigation
- Recommendations related to the geotechnical aspects of:
  - Site preparation and earthwork construction
  - Temporary excavations and trench backfill
  - 2013 California Building Code (CBC) seismic site coefficients for use in structural analysis
  - Shallow footing design and construction
  - Concrete slab-on-grade/sidewalk/flatwork
  - Asphalt concrete pavements
  - Moisture Protection
- An appendix which includes a summary of our field investigation and laboratory testing programs

2. SITE REVIEW

2.1 RECONNAISSANCE

An initial site reconnaissance was performed on December 23, 2014 to observe surface conditions that may affect the geotechnical aspects of the project and to note areas of obvious geotechnical concerns.

2.2 SUBSURFACE EXPLORATION

A subsurface exploration at the site was performed to investigate and sample soils beneath the site. Fifteen (15) exploratory borings (B1 to B15) were advanced to depths varying from 11 to 16.5 feet below the existing ground surface on December 29, 2014. The borings were drilled with a track-mounted drill rig equipped with hollow stem augers. Approximate locations of the exploratory borings are shown on Plate 2.

Borings were located in the field by visual sighting and/or pacing from existing site features. Therefore, the location of borings shown on Plate 2 should be considered approximate and may vary from that indicated on the plate. After completion of drilling, the bore holes were backfilled with soil cuttings generated during drilling. The obtained soil samples were sealed and transported to our Sacramento laboratory for visual examination and testing.

3. SITE CONDITIONS

3.1 SURFACE CONDITIONS

The site consists of one rectangular shaped parcel (approximately 90 acres in size) located northeast of the intersection of Fiddyment Road and Moore Road. The site is mainly vacant. The exception is a residence sits at the southwestern corner of the site. Trees are scattered within the site. Auburn Ravine goes through the northwestern corner of the site. Wetland, ephemeral drainage, swales and ponding water was observed overall the site as shown on Plate 3.

3.2 SUBSURFACE CONDITIONS

Subsurface soils encountered in our borings consist of approximately 1 to 2 feet of loose clayey sand and medium stiff clay. Underlying the top loose soils is dense clayey sand and stiff clay followed by decomposed granite to the maximum explored depths of 11 to 16.5 feet below the existing ground surface.

3.3 GROUNDWATER

At the time of our field investigation, water was encountered in Boring Nos. 5, 6 and 10 at the depth of approximately 4, 4 and 8 feet below the existing ground surface, respectively. It is our opinion that the (perched) water encountered was surface water trapped beneath the ground surface and in between impermeable layers of soil. As discussed in the above Surface Conditions Section, wetland, ephemeral drainage, swales and ponding water was observed overall the site as shown on Plate 3.

Based on the historical groundwater level data dating back to 1957 for a groundwater monitoring well (Station 388693N1213503W001, Department of Water Resources) located in neighboring property immediately to the west, the groundwater is at a depth of approximately 50 to 75 feet below the existing ground surface. The well location is as shown on Plate 4.

It should be noted that groundwater and soil moisture conditions within the area will vary depending on rainfall, irrigation practices, and/or runoff conditions not apparent at the time of our field investigation. It is common that the groundwater elevation will change seasonally.

A discussion of the field investigation and laboratory testing programs is presented in Appendix A of this report. Detailed descriptions of the subsurface conditions encountered during our field investigation are presented on the Logs of Borings Plates A-2 to A-16 of the appendix.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

Based on our investigation, it is our professional opinion the proposed project may be constructed at the subject site provided the recommendations contained in the attached report are implemented into project design and construction.

4.2 EXPANSIVE SOILS

Based on visual examination of soil samples obtained at the subject site and four Expansion Index test results (EI value of 0 to 31), the site soils are not considered as having significant expansion potential.

4.3 SOIL CORROSIVITY

Laboratory tests were performed for soil corrosivity parameters (minimum resistivity, pH, chloride and sulfate) on selected soil samples obtained from the site. Based on the test results, soils are not considered to have high corrosive potential to buried metallic improvements and concrete structures. Therefore, Type II cement may be used. A detailed discussion on soil corrosivity is included in the Appendix of this report.

We have provided the above preliminary corrosion test results. These test results are only indicator parameters of potential soil corrosivity for the sample tested. Other soils found on the site may be more, less, or of a similar corrosive nature. All underground utility lines should be corrosion-protected per recommendations of a corrosion engineer, if required.

4.4 SITE PREPARATION

4.4.1 Stripping and Grubbing

Prior to general site grading, existing vegetation, organic topsoil, and any debris should be stripped and disposed of outside the construction limits. MatriScope recommends the topsoil (less any debris) to be stripped and be stockpiled and reused for landscape purposes; however, this material should not be incorporated into any engineered fill.

4.4.2 Demolition

Should any existing structures and utility lines within the area of construction be encountered, they should be removed and disposed of off-site. Existing utility pipelines that extend beyond the limits of the proposed construction and that are to be abandoned in-place should be plugged with cement grout to prevent migration of soil and/or water. Tree removal should include the root system and all surface roots larger than ½-inch in diameter.

All excavations resulting from removal of these items should be cleaned of loose or disturbed material (including all previously-placed backfill) and dish-shaped (with sides sloped 3 (h): 1(v) or flatter) to permit access for compaction equipment.

4.4.3 Removal, Scarification and Compaction

Preparation of the subgrade exposed by excavation and requirements for engineered fill should be in accordance with recommendations provided below (see ENGINEERED FILL section of this report). The bottom of removal areas should be observed and approved by the geotechnical engineer or his representative prior to scarification and compaction.

Following site stripping and any required grubbing and removal, we recommend the loose/soft soils in the proposed building pads; driveway and parking areas should be over-excavated to expose the competent soils. The grading plan is not available at the time of this report preparation. In general, we recommend that the upper 24 inches below the existing ground surface in the building pads and sidewalks/flatwork/roadway pavement areas should be over-excavated except for the proposed cut areas where the design subgrade elevation is at least 2 feet lower than the existing ground surface or where the competent subgrade soils (such as decomposed granite) was encountered within the upper 2 feet of the existing ground surface during construction.

However, the actual depth of soft/loose soils may exceed the aforementioned depths and should be determined by the project Geotechnical Engineer or his representatives during construction. The exposed excavation bottom should be scarified to at least 8 inches, uniformly moisture-conditioned and compacted as required in the ENGINEERED FILL section prior to subsequent engineered fill placement. The removal, scarification and re-compaction of soil should extend at least 5 feet and 2 feet horizontally beyond the building footprint and outer edges of concrete sidewalks/flatwork/roadway pavement areas, respectively.

4.5 TEMPORARY EXCAVATION

4.5.1 General

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing the information below solely as a service to our client. Under no circumstances should the information provided be interpreted to mean that MatriScope is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

4.5.2 Excavations and Slopes

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

4.6 ENGINEERED FILL

4.6.1 Materials

All engineered fill soils (on-site and imported soils) should be nearly-free of organic, rubble, rubbish, deleterious debris or contaminated materials, and less than 3 inches in maximum dimension.

<u>On-Site Soils</u>
In general, near-surface on-site soils similar to those encountered in our borings may be used in engineered fills provided they are free of deleterious debris, organics, and fat clay and

adequately moisture-conditioned during placement as recommended in the "Compaction Criteria" section. It should be noticed that perched water, wetland, ephemeral drainage, swales and ponding water was encountered during our field exploration. Extra efforts may be necessary to reduce the high moisture content of the onsite soils in order to achieve appropriate compaction.

Imported Soils

All imported fill materials to be used for engineered fill should be sampled and tested by the project Geotechnical Engineer prior to being transported to the site. As a minimum, all imported fill should be granular with a 3-inch maximum particle size, a Plasticity Index less than 15, Expansion Index of less than 20, and less than 30 percent passing the number 200 U.S. sieve; essentially non-plastic (non-expansive). Imported gravel fill should be, as a minimum, washed gravel, free from vegetation and debris, with a 1-inch maximum particle size and less than 5 percent passing the number 200 U.S. sieve.

4.6.2 Compaction Criteria

Engineered fill should be uniformly moisture-conditioned to approximately 1 to 3 percent above the optimum moisture content, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 90 percent relative compaction as determined by the current ASTM (American Society for Testing and Materials) Test Method D1557. The upper 12 inches of subgrade in the pavement areas and aggregate base materials should be compacted to a minimum of 95 percent relative compaction.

In landscape areas, 85 percent relative compaction of the subgrade should be considered acceptable. The reduced compaction criteria should be limited to areas beyond five feet of structural improvements, and should not include hardscape areas such as sidewalks and other paved areas.

Should site grading be performed during or subsequent to wet weather, near-surface site soils may be significantly above the optimum moisture content. Disking to aerate, chemical treatment, replacement with drier material, stabilization with a geotextile fabric or grid, or other methods may be required to reduce excessive soil moisture and facilitate earthwork operations.

4.6.3 Volume Change

The volume of the on-site soils may change (increase or decrease) when they are excavated and re-compacted. Based on the limited soil density testing and assumed average of 92 percent relative compaction (per ASTM D1557), the estimated volume decrease (shrinkage) for the site soils encountered will be approximately 15 to 24 percent.

The volume change factors should be used for estimating quantities only. Our estimate does not consider volume changes due to stripping of organics, over-compaction, topographic relief not reflected on the site map, or grade/survey tolerances. A contingency plan should be developed to raise or lower portions of the site to accommodate changes in estimated quantities.

4.7 TRENCH PREPARATION AND BACKFILL

4.7.1 Subgrade Preparation

Prior to placement of bedding, the exposed subgrade at the bottom of trench excavations should be examined to detect soft, loose, or unstable areas. Loose materials at trench bottoms resulting from excavation disturbance should be removed to firm material. If soft or unstable areas are encountered, these areas should be over-excavated to a depth of at least 2 feet or to a firm base and be replaced with additional bedding material. Where excavations cross the existing trench backfill materials, the need for and extent of over-excavation or stabilization measures should be evaluated by the Geotechnical Engineer on a case-by-case basis.

4.7.2 Backfill Materials

Pipe zone backfill (i.e., material beneath and in the immediate vicinity of the pipe) should consist of clean washed sand and/or crushed rock. If crushed rock is used for pipe zone backfill, we recommend it should have a maximum particle size less 1 inch and have less than 5 percent passing No. 200 U.S. sieve. Where crushed rock is used, the material should be completely surrounded by a non-woven filter fabric such as Mirafi 140N or equivalent. Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local codes and/or bedding requirements for specific types of pipes. We recommend the project Civil Engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of native soil and approved imported fill material that meets the requirements provided above for engineered fill.

4.7.3 Compaction Criteria

All trench backfill should be placed and compacted in accordance with recommendations provided above for engineered fill. Mechanical compaction is recommended; ponding or jetting should not be allowed, especially in areas supporting structural loads or beneath concrete slabs supported-on-grade, pavements, or other improvements.

4.8 SHALLOW FOOTINGS

4.8.1 Allowable Bearing Pressures

We recommend shallow footings constructed of reinforced concrete be used for support of the proposed buildings. Footings should be founded on newly constructed engineered fills as recommended in the SITE PREPARATION section of this report or undisturbed competent on-site soils. Footings should be a minimum of 12 inches wide and embedded a minimum of 24 inches below the lowest final adjacent subgrade. The structural engineer should evaluate the need for reinforcement of footings based on the anticipated loads. As a minimum, continuous footings should be reinforced with a minimum of four No. 4 reinforcing bars, placed two each near the top and bottom, to provide structural continuity and allow the footings to span isolated soil irregularities.

An allowable bearing pressure of 3,000 pounds per square foot (psf) may be used for shallow footings with the above minimum dimensions. The allowable bearing pressure provided above is a net value; therefore, the weight of the foundation (which extends below grade) may be neglected when computing dead loads. The allowable bearing pressure applies to dead plus live loads may be increased by 1/3 for short-term loading due to wind or seismic forces.

4.8.2 Estimated Settlements

Total settlement of an individual footing will vary depending on the plan dimensions of the footing and the actual load supported. Based on anticipated footing dimensions and loads, we estimate maximum settlement of footings designed and constructed in accordance with the preceding recommendations to be on the order of 3/4 inch. Differential settlement between similarly loaded, adjacent footings is expected to be less than 1/2 inch. Settlement of all footings is expected to occur rapidly and should be essentially complete shortly after initial application of the loads.

4.8.3 Lateral Resistance

Resistance to lateral loads (including those due to wind or seismic forces) may be provided by frictional resistance between the bottom of concrete footings and the underlying soils, lean concrete, or rock, and by passive soil pressure against the sides of the footings. A coefficient of friction of 0.35 may be used between cast-in-place concrete footings and the underlying soil. Additional allowable passive pressure available in engineered fill or undisturbed native soil may be taken as equivalent to the pressure exerted by a fluid weighing 350 pounds per cubic foot (pcf). These two modes of resistance should not be added unless the frictional component is reduced by 50 percent, since full mobilization of the passive resistance requires some horizontal movement, which significantly diminishes the frictional resistance.

4.8.4 Construction Considerations

Prior to placing steel or concrete, footing excavations should be cleaned of all debris, loose or soft soil, and water. All footing excavations should be observed by the project Geotechnical

Engineer or his representatives just prior to placing steel or concrete to verify the recommendations contained herein are implemented during construction.

4.9 2013 CALIFORNIA BUILDING CODE SEISMIC DESIGN PARAMETERS

Structures should be designed for lateral force requirements as set forth in Chapter 16 of the 2013 California Building Code (CBC). We recommend the following parameters:

Table 1
2013 CBC Seismic Design Parameters

Seismic Design Parameter	Symbol	Recommended Value
Mapped Spectral Acceleration at Short Period	Ss	0.511g
Mapped Spectral Acceleration at 1-Second Period	S_1	0.253g
Site Class	A-F	D
Site Coefficient at Short Period	Fa	1.391
Site Coefficient at 1-Second Period	Fv	1.895
Spectral Response Accelerations	SMs	0.711g
	SM_1	0.479g
Design Spectral Response Accelerations	SDs	0.474g
	SD_1	0.319g
Long-period Transition Period	T_L	12 seconds
MCE_G Peak Ground Acceleration Adjusted for Site Class Effects	PGA_M	0.249g
Site coordinates: Latitude 38.8721 degrees North Longitude 121.3467 degrees West		

4.10 CONCRETE SLABS-ON-GRADE

Conventional concrete slab-on-grade floors are suitable for building pads provided excavations and subgrades are prepared as recommended in section titled SITE PREPARATION. Slab thickness and reinforcement should be determined by the structural engineer based on the anticipated loading. However, slabs should be at least 4 inches thick and reinforced with No. 3 reinforcing bars on 18 inches or No. 4 bars on 24 inches center-to-center spacing each way, placed at mid-slab depth. Proper and consistent location of the reinforcement at mid-slab is essential to its performance. The risk of uncontrolled shrinkage cracking is increased if the reinforcement in not properly located within the slab.

4.10.1 Subgrade Preparation

Prior to constructing interior concrete slabs-on-grade, surficial soils should be processed as recommended in the SITE PREPARATION and ENGINEERED FILL sections of this report. Scarification and compaction may not be required if concrete slabs are to be placed directly on undisturbed engineered fill compacted during site preparation, or within earthwork cut areas consisting of competent soils and if approved by the project Geotechnical Engineer or his representatives during construction.

4.10.2 Rock Capillary Break

In order to provide enhanced subgrade support, we recommend the compacted subgrade be overlain with a minimum 4-inch thickness of compacted crushed rock. If this layer is desired to also serve as a capillary break, there should be less than 5 percent by weight passing the No. 4 sieve size. A capillary break may reduce the potential for soil moisture migrating upwards toward the slab.

4.10.3 Construction Considerations

Subsurface moisture and moisture vapor naturally migrate upward through the soil and, where the soil is covered by a building or pavement, this subsurface moisture will collect. To reduce the impact of this subsurface moisture and the potential impact of introduced moisture (such as landscape irrigation or plumbing leaks) the current industry standard is to place a vapor retarder on the compacted crushed rock layer (described above). This membrane typically consists of visquene or polyvinyl plastic sheeting at least ten (10) mil in thickness. The plastic sheet membrane should meet or exceed the minimum specifications for plastic water vapor retarders as outlined in ASTM E1745.

It should be noted that although capillary break and vapor barrier systems are currently the industry standard, this system may not be completely effective in preventing floor slab moisture problems. These systems will not "moisture proof" the floor slab nor will it assure floor slab moisture transmission rates will meet floor-covering manufacturer standards. The design and construction of such systems are dependent on the proposed use and design of the proposed building and all elements of building design and function should be considered in the slab-on-grade floor design. Building design and construction may have a greater role in perceived moisture problems since sealed buildings/rooms or inadequate ventilation may result in excessive moisture in a building and affect indoor air quality.

Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling in the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of concrete. We recommend that all concrete placement and curing operations be performed in accordance with the current edition of American Concrete Institute (ACI) Manual.

4.11 CONCRETE SIDEWALKS AND FLATWORK

Concrete sidewalks and flatwork should be a minimum of 4 inches thick. Prior to constructing interior concrete slabs-on-grade, surficial soils should be processed as recommended in the SITE PREPARATION and ENGINEERED FILL sections of this report. Scarification and compaction may not be required if exterior slabs are to be placed directly on undisturbed engineered fill compacted during site preparation, or within earthwork cut areas consisting of competent soils and if approved by the project Geotechnical Engineer or his representatives during construction.

4.12 ASPHALT CONCRETE PAVEMENTS

Resistance value (R-value) tests were performed on three (3) samples in accordance with ASTM Test Method D 2488. Result of the test indicates the site soils have an R-value of 13 to 61. A design R-value of 10 was used in the design to account for the variance of subgrade materials which may be encountered during construction. All pavement subgrades should be prepared as recommended in the SITE PREPARATION and ENGINEERED FILL sections of this report. Aggregate bases (AB) should be compacted to a minimum of 95 percent relative compaction in accordance with ASTM D1557.

Asphalt concrete pavement structural sections presented in the Table 2 below are based on the above R-value and current Caltrans design procedures. Traffic indexes should be reviewed by the project Owner, Architect, and/or Civil Engineer to evaluate their suitability for this project. Changes in the actual traffic indexes will affect the corresponding pavement sections.

Table 2
Recommended Asphalt Concrete Pavement Sections

Assumed Traffic Index	Asphalt Concrete (inch)	Caltrans Class 2 Aggregate Base (inch)
4	3	6
5	3	9
6	4	11
7	4	15
8	5	16

Asphalt paving materials, placement methods and compaction should meet the current Caltrans specifications for asphalt concrete. The above pavement recommendations should be incorporated into project plans and specifications by the project engineer. These recommendations are not intended to be used as a specification for construction. Adequate drainage should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

Unstable Subgrade

In the event unstable (pumping) subgrade is encountered within planned pavement areas, we recommend a heavy, rubber-tired vehicle (typically a loaded water truck) be used to test the load/deflection characteristics of the finished subgrade materials. We recommend this vehicle have a minimum rear axle load (at the time of testing) of 16,000 pounds with tires inflated to at least 65 pounds per square inch pressure.

If the tested surface shows a visible deflection extending more than 6 inches from the wheel track at the time of loading, or a visible crack remains after loading, corrective measures should be implemented. Such measures could include disking to aerate, chemical treatment, replacement with drier material, or other methods. We recommend MatriScope be retained to assist in developing which method (or methods) would be applicable for this project.

Variations in Subgrade Materials

Pavement sections provided above are based on the soil conditions encountered during our field investigation, our assumptions regarding final site grades, and limited laboratory testing. In the event actual pavement subgrade materials are significantly different than those tested for this investigation, we recommend representative subgrade samples be obtained and additional R-value tests performed. Should the results of these tests indicate a significant difference, the design pavement section(s) provided above may need to be revised.

4.13 MOISTURE PROTECTION

The performance of foundation, slab and pavement depends greatly on how well runoff waters drain from these structural elements. This drainage should be maintained both during construction and over the entire life of the project. The ground surface around structures should be graded so that water flows rapidly away from structures and slopes without ponding. The surface gradient needed to do this depends on the landscaping type. In general, pavement and lawns within five feet of buildings should slope away at gradients of at least two percent. Densely vegetated areas should have minimum gradients of 5 percent away from buildings in the first five feet if it is practical to do so. Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

Planters should be built so that water exiting from them will not seep into the foundation, beneath slabs or pavement areas. In general, the elevation of exterior grades should not be higher than the elevation of the subgrade beneath the slab and pavement to help prevent water intrusion beneath slabs and pavements. In any event, maintenance personnel should be instructed to limit irrigation to the minimum actually necessary to properly sustain landscaping plants. Should excessive irrigation, waterline breaks, or unusually high rainfall occur, saturated zones and "perched" groundwater may develop. Consequently, the site should be graded so that water drains away readily without saturating the structural elements or landscaped areas. Potential sources of water, such as water pipes, drains, swimming pools, garden ponds, and the like, should be frequently examined for signs of leakage or damage. Any such leakage or damage should be promptly repaired.

We recommend that the upper 12 inches of subgrade beneath the utility trenches should be backfilled with compacted non-pervious fill material. Special care should be taken during installation of sub-floor water and sewer lines to reduce the possibility of leaks.

5. ADDITIONAL SERVICES

5.1 PLANS AND SPECIFICATIONS REVIEW

We recommend that the ninety-five (95) percent complete plans and specifications should be reviewed by MatriScope in order to assure that our earthwork and foundation recommendations have been properly interpreted and implemented during design. In the event MatriScope is not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

5.2 CONSTRUCTION OBSERVATION AND TESTING

All earthworks during construction should be monitored by representatives from MatriScope, including site preparation, placement of all engineered fill, trench backfill and wall backfill, construction of slab and roadway subgrade, and all footing excavations. It is essential that the finished subgrade and footing excavation in all areas to receive engineered fill or to be used for the future support of structures, concrete slabs-on-grade or pavement sections be observed and approved by the Project Geotechnical Engineer or his representatives from MatriScope prior to placement of engineered fill or concrete pouring for building pad and slab-on-grade.

The purpose of these services would be to provide MatriScope the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

6. LIMITATIONS

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during construction which differ from those described herein, we should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction, including the proposed loads or structural locations, changes from that described in this report, our recommendations should also be reviewed.

We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty is expressed or implied. The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be conducted by MatriScope or other qualified geotechnical professionals during the construction phase in order to evaluate compliance with our recommendations. Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the author of this report, are only mentioned in the given standard; they are not incorporated into it or "included by reference", as that latter term is used relative to contracts or other matters of law.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify MatriScope of such intended use. Based on the intended use of the report, MatriScope may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release MatriScope from any liability resulting from the use of this report by any unauthorized party.

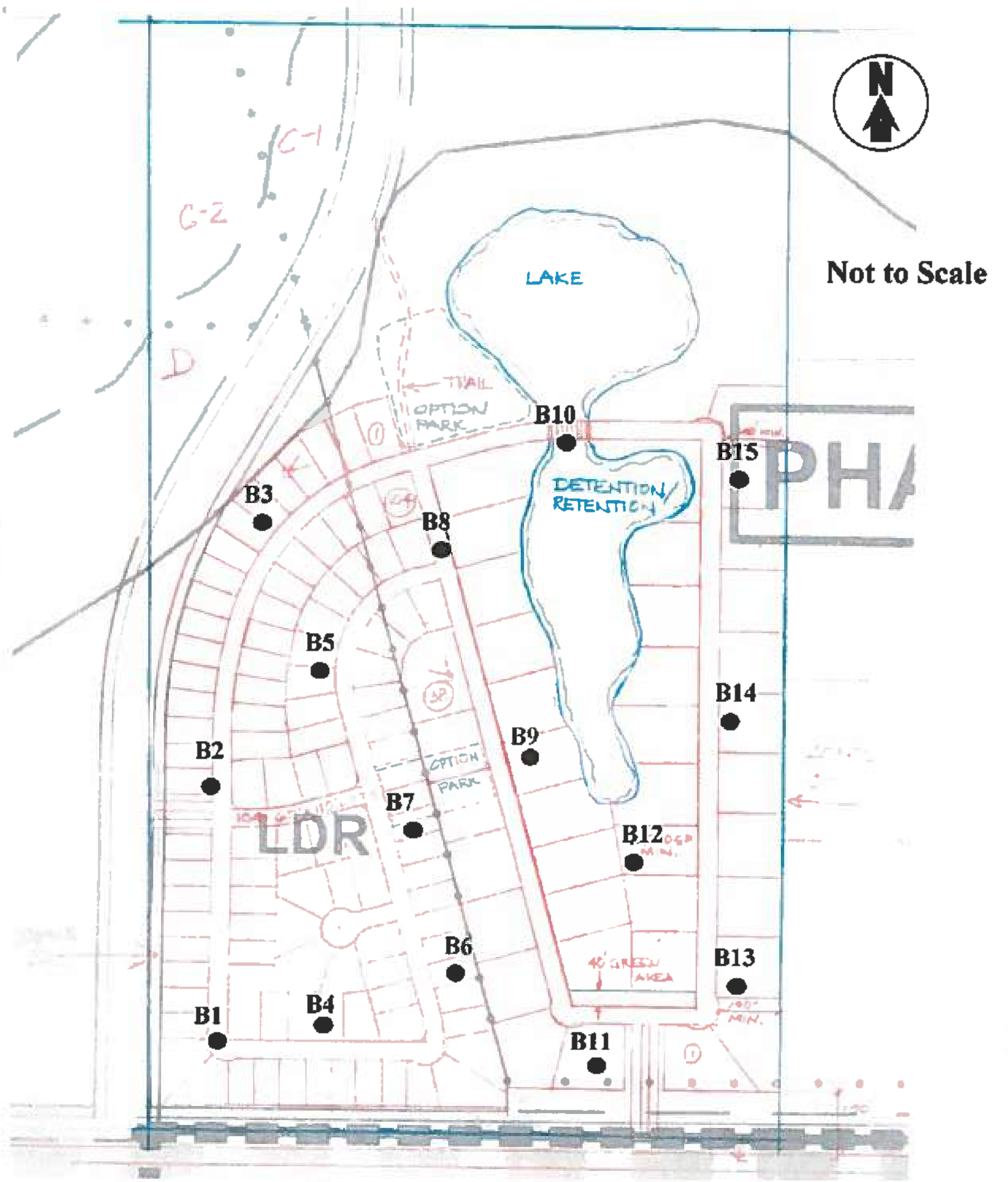
Site Vicinity Map

MatriScope Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702
www.matriscope.com

Proposal No.:	2450
Project Name:	Moore Road Property Site Development
Location:	3440 Moore Road, Lincoln, CA
Date:	1/23/2015

Plate 1



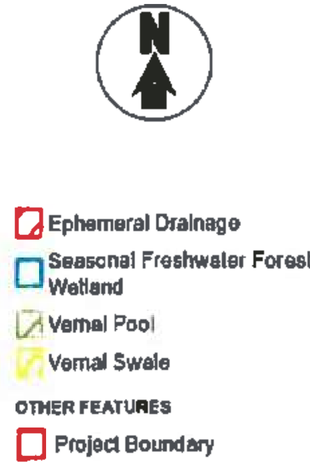
Moore Road

Legend:

● **B1** Approximate Boring Location

Boring Location Map

MatriScope Engineering Laboratories, Inc.	601 Bercut Drive Sacramento, CA 95811 Phone: (916) 375-6700 Fax: (916) 447-6702 www.matriscope.com	Project No.	2450	**Plate 2**
		Project Name	Moore Road Property Site Development	
		Location	3440 Moore Road, Lincoln, CA	
		Date	1/23/2015	



Wetland Delineation Map

(by Cardno Entrix, 5/29/2014)

MatriScope Engineering Laboratories, Inc.	601 Bercut Drive Sacramento, CA 95811 Phone (916) 375-6700 Fax (916) 447-6702 www.matriscope.com	Project No.	2450	Plate 3
		Project Name	Moore Road Property Site Development	
		Location	3440 Moore Road, Lincoln, CA	
		Date	1/23/2015	

Moore Road

Water Monitoring Well Location Map

MatriScope Engineering Laboratories, Inc.	601 Bercut Drive Sacramento, CA 95811 Phone: (916) 375-6700 Fax: (916) 447-6702 www.matriscope.com	Proposal No.:	2450	Plate 4
		Project Name:	Moore Road Property Site Development	
		Location:	3440 Moore Road, Lincoln, CA	
		Date:	1/23/2015	

APPENDIX A

FIELD INVESTIGATION AND LABORATORY TESTING

FIELD INVESTIGATION

General

The subsurface conditions at the site were explored on December 29, 2014 by drilling fifteen (15) borings to a maximum depth of 16.5 feet below existing ground surface. Borings were drilled using a truck-mounted CME drill rig equipped with 6-inch-diameter hollow stem augers. The locations of borings performed for this investigation are shown on Plate 2 of the report.

Borings were located in the field by visual sighting and/or pacing from existing site features. Therefore, the location of borings shown on Plate 2 should be considered approximate and may vary from that indicated on the plate. After completion of drilling, the bore holes were backfilled with soil cutting generated during drilling.

Our representative maintained logs of the borings, visually classified soils encountered according to the Unified Soil Classification System (see Plate A1), and obtained relatively undisturbed and bulk samples of the subsurface materials. Logs of Borings are presented on Plates A-2 to A-16.

Sampling Procedures

Soil samples were obtained from the borings using a Modified California Sampler driven 18 inches (unless otherwise noted) into undisturbed soil using a 30-inch drop of a 140-pound hammer. Blow counts were recorded at 6-inch intervals for each sample attempt and are reported on the logs in terms of blows-per-foot for the last foot of penetration. Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance, and returned to our Sacramento laboratory for further examination and testing.

LABORATORY TESTING

General

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils which may affect the geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below.

Moisture Content and Dry Unit Weight

Moisture content and dry unit weight tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading; soil overburden, and active and passive earth pressures; and relative soil strength and compressibility. Moisture content was evaluated in general accordance with ASTM Test Method D2216; dry unit weight was evaluated using procedures similar to ASTM Test Method D2937. Results of these tests are presented on the logs of Borings.

Atterberg Limits

Atterberg Limits (Liquid Limit and Plasticity Limit) tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Tests were performed in general accordance with ASTM Test Method D4318. Results of these tests are presented on the log of Borings and summarized in Table A1 below. The laboratory test reports are attached.

Table A1
Summary of Atterberg Limits Test Results

Boring No.	Sample Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
B3	0-4	23	16	7
B4	0-4	24	14	10
B9	0-4	28	14	14
B11	0-4	27	14	13

Expansion Index

Expansion index (EI) tests were performed on two remolded, near surface soil sample considered representative of the anticipated floor slab subgrade. Test procedures were in general accordance with ASTM Test Method D4829. Test results are presented in the summary Table A2 and on the log of Borings.

Table A2
Summary Expansion Index Test Result

Boring No.	Sample Depth (feet)	Expansion Index
B3	0-4	2
B4	0-4	1
B9	0-4	0
B11	0-4	31

R-Value

Resistance value (R-value) tests were performed on bulk soil samples obtained from the site to evaluate pavement support characteristics of the near-surface site soils. Test procedures were in general accordance with ASTM Test Method D2488. Test results of R-value are shown in Table A3.

Table A3
R-Value Test Result Summary

Boring No.	Sample Depth (feet)	R-Value
B2	0-4	25
B8	0-4	61
B13	0-4	13

Compaction

Compaction tests were performed on near-surface bulk soil samples to determine maximum dry density and optimum moisture content for use in evaluation of field soil compaction compliance during earthwork construction. Test procedures were in general accordance with ASTM Test Method D1557. Results of this test are presented in Table A4. The laboratory test report is attached.

Table A4
Compaction Test Results

Boring No.	Sample Depth (feet)	Maximum Dry Density (pcf)	Optimum Moisture (%)
B4	0-4	130.3	9.4
B3	0-4	129.7	9.0
B12	0-4	124.1	11.1
B15	0-4	130.1	9.5

Soil Corrosivity

Three (3) soil samples were subjected to chemical analysis for the purpose of corrosion assessment. The tests were performed in general accordance with California Test Methods 643, 422, and 417 for pH and minimum resistivity, soluble chlorides, and soluble sulfates, respectively. The test results are presented in Table A5. The laboratory test reports are attached in this appendix.

Table A5
Corrosivity Test Results

Boring No.	Sample Depth (feet)	pH	Minimum Resistivity (Ohm-Cm)	Water Soluble Chlorides (ppm)	Water Soluble Sulfates (ppm)
B5	0-4	6.62	2,570	12.9	2.9
B6	0-4	6.77	2,680	17.7	11.1
B15	0-4	5.88	4,290	13.2	3.0

The 2003 California Department of Transportation (Caltrans) Corrosion Guidelines considers a site to be corrosive if water-soluble chloride content is 500 ppm or greater, sulfate concentration is 2,000 ppm or greater, or pH is 5.5 or less. The soil resistivity serves as an indicator parameter for possible presence of soluble salts. A minimum soil resistivity value less than 1,000 ohm-cm indicates the possible presence of higher quantities of soluble salts and a higher corrosion potential.

We have provided the above preliminary corrosion test results. These test results are only indicator parameters of potential soil corrosivity for the sample tested. Other soils found on the site may be more, less, or of a similar corrosive nature.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Plate A-1	Unified Soil Classification System
Plates A-2 to A-16	Log of Boring B-1 to B-15

Atterberg Limits Test Reports
Resistance Value (R-Value) Test Reports
Compaction Test Reports
Corrosivity Test Summary Reports

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT 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 GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

MatriScope
Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE

A-1

LOG OF BORING

PROJECT Moore Road Proprty Site Development	**SHEET NO.** 1 of 1	**HOLE NUMBER** B1	
SITE 3440 Moore Road, Lincoln, CA	**PROJECT NUMBER** 2450	**LOGGED BY** Steve	**CHECKED BY** YL
STARTED 12/29/14	**COMPLETED** 12/29/14	**DRILLER** Taber Drilling	**BORING DIA.** 6"
TOTAL DEPTH 16.5 ft.	**DRILL METHOD** Hollow Stem Auger	**DRILL EQUIPMENT** CME 55 Track	**GROUND ELEV.**
DEPTH/ELEV. GROUND WATER N/A / na	**SAMPLE TYPE** Modified California Sampler	**NOTES**	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY (CL), brown, sandy, moist, stiff
MC-1-1	16	8	114					
MC-1-2	56	7	122		5			very stiff
								CLAYEY SAND (SC), brown, moist, very dense
MC-1-3	64				10			
MC-1-4	42				15			
								Boring Was Ended at 16.5 Feet. No Groundwater Was Encountered.
					20			

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A2

LOG OF BORING

PROJECT Moore Road Proprty Site Development	**SHEET NO.** 1 of 1	**HOLE NUMBER** B2	
SITE 3440 Moore Road, Lincoln, CA	**PROJECT NUMBER** 2450	**LOGGED BY** Steve	**CHECKED BY** YL
STARTED 12/29/14	**COMPLETED** 12/29/14	**DRILLER** Taber Drilling	**BORING DIA.** 6"
TOTAL DEPTH 16.0 ft.	**DRILL METHOD** Hollow Stem Auger	**DRILL EQUIPMENT** CME 55 Track	**GROUND ELEV.**
DEPTH/ELEV. GROUND WATER N/A / nd	**SAMPLE TYPE** Modified California Sampler	**NOTES**	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY (CL), brown, sandy, moist, stiff
MC-2-1	50/4"	11						very stiff
MC-2-2	50/3"	10	109		5			
MC-2-3	69				10			
								DECOMPOSED GRANITE SAND (SP), brown, poorly graded, fine to coarse grained, with clay, moist, very dense
MC-2-4	50/6"				15			
								Boring Was Ended at 16 Feet. No Groundwater Was Encountered.
					20			

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A3

LOG OF BORING

PROJECT Moore Road Proprty Site Development	**SHEET NO.** 1 of 1	**HOLE NUMBER** B3	
SITE 3440 Moore Road, Lincoln, CA	**PROJECT NUMBER** 2450	**LOGGED BY** Steve	**CHECKED BY** YL
STARTED 12/29/14	**COMPLETED** 12/29/14	**DRILLER** Taber Drilling	**BORING DIA.** 6"
TOTAL DEPTH 16.5 ft.	**DRILL METHOD** Hollow Stem Auger	**DRILL EQUIPMENT** CME 55 Track	**GROUND ELEV.**
DEPTH/ELEV. GROUND WATER N/A / na	**SAMPLE TYPE** Modified California Sampler	**NOTES**	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	DESCRIPTION AND CLASSIFICATION
					0	SILTY CLAY (CL-ML), brown, low plasticity, with sand, moist, stiff EI=2, PI=7
MC-3-1	16	16	119		2.5	
MC-3-2	35				5	very stiff
MC-3-3	41	9	108		10	DECOMPOSED GRANITE SAND (SP), brown, poorly graded, fine to coarse grained, with clay, moist, dense
MC-3-4	96/10"				15	very dense
					16.5	Boring Was Ended at 16.5 Feet. No Groundwater Was Encountered.

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/2/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A4

LOG OF BORING

PROJECT	SHEET NO.	HOLE NUMBER
Moore Road Proprty Site Development	1 of 1	B4

SITE		PROJECT NUMBER	LOGGED BY	CHECKED BY
3440 Moore Road, Lincoln, CA		2450	Steve	YL
STARTED	**COMPLETED**	**DRILLER**	**BORING DIA.**	**TOTAL DEPTH**
12/29/14	12/29/14	Taber Drilling	6"	11.5 ft.
DRILL METHOD		**DRILL EQUIPMENT**	**GROUND ELEV.**	**DEPTH/ELEV. GROUND WATER**
Hollow Stem Auger		CME 55 Track		N/A / na
SAMPLE TYPE		**NOTES**		
Modified California Sampler				

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY (CL), brown, moist, stiff EI=1, PI=10
MC-4-1	50/3"	11	118					very stiff
MC-4-2	50/5"				5			
								CLAYEY SAND (SC), brown, moist, dense
MC-4-3	36				10			
								Boring Was Ended at 11.5 Feet. No Groundwater Was Encountered.
					15			
					20			

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/2/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A5

LOG OF BORING

PROJECT: Moore Road Proprty Site Development	SHEET NO.: 1 of 1	HOLE NUMBER: B5	
SITE: 3440 Moore Road, Lincoln, CA	PROJECT NUMBER: 2450	LOGGED BY: Steve	CHECKED BY: YL
STARTED: 12/29/14	COMPLETED: 12/29/14	DRILLER: Taber Drilling	BORING DIA.: 6"
TOTAL DEPTH: 16.5 ft.	DRILL METHOD: Hollow Stem Auger	DRILL EQUIPMENT: CME 55 Track	GROUND ELEV.:
DEPTH/ELEV. GROUND WATER: N/A / na	SAMPLE TYPE: Modified California Sampler	NOTES:	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	DESCRIPTION AND CLASSIFICATION
					0	LEAN CLAY (CL), brown, sandy, very moist, stiff
MC-5-1	54	14	117			
						perched water
MC-5-2	50/6"	14	118		5	very stiff
					10	
MC-5-3	37					DECOMPOSED GRANITE CLAYEY SAND (SC), brown, moist, very dense
					15	
MC-5-4	83/11"					
						Boring Was Ended at 16.5 Feet. Perched Water Was Encountered at 4 Feet.
					20	

LOG OF BORING 2450 MOORE ROAD GPJ MATRISCP.GDT 1/23/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A6

LOG OF BORING

PROJECT	SHEET NO.	HOLE NUMBER
Moore Road Proprty Site Development	1 of 1	B6

SITE		PROJECT NUMBER	LOGGED BY	CHECKED BY
3440 Moore Road, Lincoln, CA		2450	Steve	YL
STARTED	**COMPLETED**	**DRILLER**	**BORING DIA.**	**TOTAL DEPTH**
12/29/14	12/29/14	Taber Drilling	6"	11.0 ft.
DRILL METHOD		**DRILL EQUIPMENT**	**GROUND ELEV.**	**DEPTH/ELEV. GROUND WATER**
Hollow Stem Auger		CME 55 Track		N/A / na
SAMPLE TYPE		**NOTES**		
Modified California Sampler				

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY (CL), brown, sandy, moist, stiff
MC-6-1	49	12	124				X	
								perched water
MC-6-2	100/10"				5		X	very stiff
MC-6-3	50/5"	22	104		10		X	
								Boring Was Ended at 11 Feet. Perched Water Was Encountered at 4 Feet.
					15			
					20			

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A7

LOG OF BORING

PROJECT	SHEET NO.	HOLE NUMBER
Moore Road Proprty Site Development	1 of 1	B7

SITE	PROJECT NUMBER	LOGGED BY	CHECKED BY
3440 Moore Road, Lincoln, CA	2450	Steve	YL

STARTED	COMPLETED	DRILLER	BORING DIA.	TOTAL DEPTH
12/29/14	12/29/14	Taber Drilling	6"	11.0 ft.

DRILL METHOD	DRILL EQUIPMENT	GROUND ELEV.	DEPTH/ELEV. GROUND WATER
Hollow Stem Auger	CME 55 Track		N/A / na

SAMPLE TYPE	NOTES
Modified California Sampler	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
								LEAN CLAY (CL), brown, wet, soft
MC-7-1	50/3"	12	112					moist, very stiff
					5			
MC-7-2	75/10"							
MC-7-3	50/6"				10			light brown
								Boring Was Ended at 11 Feet. No Groundwater Was Encountered.
					15			
					20			

MatriScope Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A8

LOG OF BORING

PROJECT	SHEET NO.	HOLE NUMBER
Moore Road Proprty Site Development	1 of 1	B8

SITE		PROJECT NUMBER	LOGGED BY	CHECKED BY
3440 Moore Road, Lincoln, CA		2450	Steve	YL
STARTED	**COMPLETED**	**DRILLER**	**BORING DIA.**	**TOTAL DEPTH**
12/29/14	12/29/14	Taber Drilling	6"	16.5 ft.
DRILL METHOD		**DRILL EQUIPMENT**	**GROUND ELEV.**	**DEPTH/ELEV. GROUND WATER**
Hollow Stem Auger		CME 55 Track		N/A / na
SAMPLE TYPE		**NOTES**		
Modified California Sampler				

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY (CL), brown, sandy, moist, medium stiff
MC-8-1	11	13	116				X	
MC-8-2	17	13	115		5		X	
					8			CLAYEY SAND (SC), gray, moist, dense
MC-8-3	34				10		X	
MC-8-4	95				15		X	DECOMPOSED GRANITE CLAYEY SAND (SC), brown, with gravel, moist, very dense
					16.5			Boring Was Ended at 16.5 Feet. No Groundwater Was Encountered.
					20			

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/23/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE
A9

LOG OF BORING

PROJECT	SHEET NO.	HOLE NUMBER
Moore Road Proprty Site Development	1 of 1	B9

SITE	PROJECT NUMBER	LOGGED BY	CHECKED BY
3440 Moore Road, Lincoln, CA	2450	Steve	YL

STARTED	COMPLETED	DRILLER	BORING DIA.	TOTAL DEPTH
12/29/14	12/29/14	Taber Drilling	6"	16.5 ft.

DRILL METHOD	DRILL EQUIPMENT	GROUND ELEV.	DEPTH/ELEV. GROUND WATER
Hollow Stem Auger	CME 55 Track		N/A / na

SAMPLE TYPE	NOTES
Modified California Sampler	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY (CL), brown, sandy, moist, medium stiff EI=0, PI=14
MC-9-1	17	13	118					
MC-9-2	28				5			stiff
					8			CLAYEY SAND (SC), gray, moist, very dense
MC-9-3	50/4"	16	102		10			
					13			DECOMPOSED GRANITE CLAYEY SAND (SC), brown, with gravel, moist, very dense
MC-9-4	73				15			
					16.5			Boring Was Ended at 16.5 Feet. No Groundwater Was Encountered.
					20			

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/23/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A10

LOG OF BORING

PROJECT Moore Road Proprty Site Development	SHEET NO. 1 of 1	HOLE NUMBER B10	
SITE 3440 Moore Road, Lincoln, CA	PROJECT NUMBER 2450	LOGGED BY Steve	CHECKED BY YL
STARTED 12/29/14	COMPLETED 12/29/14	DRILLER Taber Drilling	BORING DIA. 6"
TOTAL DEPTH 15.0 ft.	DRILL METHOD Hollow Stem Auger	DRILL EQUIPMENT CME 55 Track	GROUND ELEV.
DEPTH/ELEV. GROUND WATER N/A / na	SAMPLE TYPE Modified California Sampler	NOTES	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	DESCRIPTION AND CLASSIFICATION
					0	CLAYEY SAND (SC), brown, moist, loose to medium dense
MC-10-1	5	14	108			medium dense
MC-10-2	16	10	117		5	
						perched water
						SAND (SP), brown, poorly graded, with clay and gravel, very moist, dense
MC-10-3	42				10	
						caving, unable to sample
					15	Boring Was Ended at 15 Feet. Perched Water Was Encountered at 8 Feet.
					20	

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/23/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE
A11

LOG OF BORING

PROJECT	SHEET NO.	HOLE NUMBER
Moore Road Proprty Site Development	1 of 1	B11

SITE	PROJECT NUMBER	LOGGED BY	CHECKED BY
3440 Moore Road, Lincoln, CA	2450	Steve	YL

STARTED	COMPLETED	DRILLER	BORING DIA.	TOTAL DEPTH
12/29/14	12/29/14	Taber Drilling	6"	11.5 ft.

DRILL METHOD	DRILL EQUIPMENT	GROUND ELEV.	DEPTH/ELEV. GROUND WATER
Hollow Stem Auger	CME 55 Track		N/A / na

SAMPLE TYPE	NOTES
Modified California Sampler	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
								LEAN CLAY (CL), brown, sandy, moist, medium stiff EI=31, PI=13
MC-11-1	55	15	105					very stiff
MC-11-2	63				5			
MC-11-3	94/9"				10			
								Boring Was Ended at 11.5 Feet. No Groundwater Was Encountered.
					15			
					20			

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/23/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A12

LOG OF BORING

PROJECT: Moore Road Proprty Site Development	SHEET NO.: 1 of 1	HOLE NUMBER: B12	
SITE: 3440 Moore Road, Lincoln, CA	PROJECT NUMBER: 2450	LOGGED BY: Steve	CHECKED BY: YL
STARTED: 12/29/14 — COMPLETED: 12/29/14	DRILLER: Taber Drilling	BORING DIA.: 6"	TOTAL DEPTH: 11.0 ft.
DRILL METHOD: Hollow Stem Auger	DRILL EQUIPMENT: CME 55 Track	GROUND ELEV.:	DEPTH/ELEV. GROUND WATER: N/A / na
SAMPLE TYPE: Modified California Sampler	NOTES:		

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
								LEAN CLAY (CL), brown, moist, stiff
MC-12-1	50/3"							very stiff
MC-12-2	99/10"	14			5			
MC-12-3	50/6"				10			light brown
								Boring Was Ended at 11 Feet. No Groundwater Was Encountered.
					15			
					20			

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A13

LOG OF BORING

PROJECT Moore Road Proprty Site Development	SHEET NO. 1 of 1	HOLE NUMBER B13	
SITE 3440 Moore Road, Lincoln, CA	PROJECT NUMBER 2450	LOGGED BY Steve	CHECKED BY YL
STARTED 12/29/14	COMPLETED 12/29/14	DRILLER Taber Drilling	BORING DIA. 6"
TOTAL DEPTH 11.5 ft.	DRILL METHOD Hollow Stem Auger	DRILL EQUIPMENT CME 55 Track	GROUND ELEV.
DEPTH/ELEV. GROUND WATER N/A / na	SAMPLE TYPE Modified California Sampler	NOTES	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	DESCRIPTION AND CLASSIFICATION
								LEAN CLAY (CL), light brown, moist, medium stiff
MC-13-1	50/4"	10	110					very stiff
MC-13-2	50/6"				5			brown, sandy
					10			
MC-13-3	99/9"							
								Boring Was Ended at 11.5 Feet. No Groundwater Was Encountered.
					15			
					20			

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE

A14

LOG OF BORING 2450 MOORE ROAD GPJ MATRISCP.GDT 1/23/15

LOG OF BORING

PROJECT: Moore Road Proprty Site Development	SHEET NO.: 1 of 1	HOLE NUMBER: B14	
SITE: 3440 Moore Road, Lincoln, CA	PROJECT NUMBER: 2450	LOGGED BY: Steve	CHECKED BY: YL
STARTED: 12/29/14	COMPLETED: 12/29/14	DRILLER: Taber Drilling	BORING DIA.: 6"
TOTAL DEPTH: 11.5 ft.	DRILL METHOD: Hollow Stem Auger	DRILL EQUIPMENT: CME 55 Track	GROUND ELEV.:
DEPTH/ELEV. GROUND WATER: N/A / na	SAMPLE TYPE: Modified California Sampler	NOTES:	

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	DESCRIPTION AND CLASSIFICATION
					0	LEAN CLAY (CL), reddish brown, moist, stiff
MC-14-1	50/2"					very stiff
MC-14-2	50/3"	12	107		5	
					10	
MC-14-3	49					CLAYEY SAND (SC), brown/gray, moist, dense
						Boring Was Ended at 11.5 Feet. No Groundwater Was Encountered.
					15	
					20	

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A15

LOG OF BORING

SITE: 3440 Moore Road, Lincoln, CA	PROJECT: Moore Road Proprty Site Development	SHEET NO.: 1 of 1	HOLE NUMBER: B15
STARTED: 12/29/14 / COMPLETED: 12/29/14	PROJECT NUMBER: 2450	LOGGED BY: Steve	CHECKED BY: YL
DRILL METHOD: Hollow Stem Auger	DRILLER: Taber Drilling	BORING DIA.: 6"	TOTAL DEPTH: 16.5 ft.
SAMPLE TYPE: Modified California Sampler	DRILL EQUIPMENT: CME 55 Track	GROUND ELEV.:	DEPTH/ELEV. GROUND WATER: N/A / na
	NOTES:		

SAMPLE NUMBER	BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	DESCRIPTION AND CLASSIFICATION
					0	CLAYEY SAND (SC), brown, moist, medium dense
MC-15-1	15	15	114			
MC-15-2	26	14	120		5	dense
MC-15-3	70				10	DECOMPOSED GRANITE CLAYEY SAND (SC), olive brown, with gravel, moist, very dense
MC-15-4	83/11"				15	light brown
						Boring Was Ended at 16.5 Feet. No Groundwater Was Encountered.
					20	

LOG OF BORING 2450 MOORE ROAD.GPJ MATRISCP.GDT 1/23/15

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Phone: (916) 375-6700
Fax: (916) 447-6702

PLATE A16

MatriScope
Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com

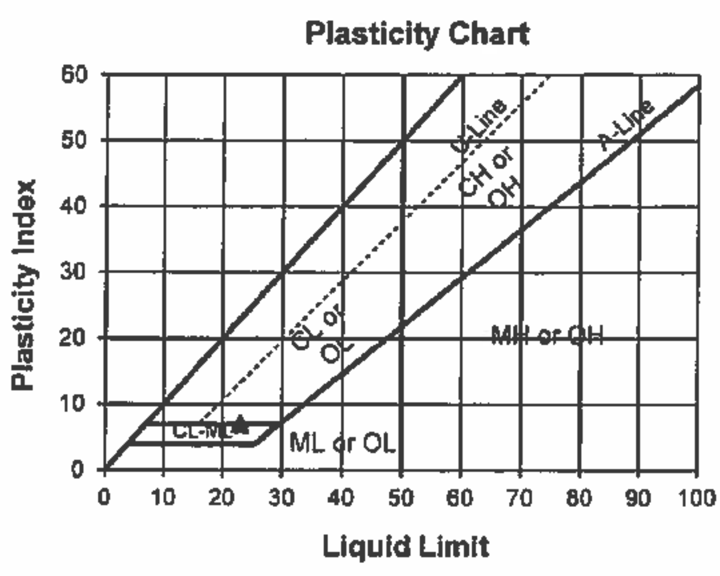
LIQUID AND PLASTIC LIMITS AND PLASTICITY INDEX OF SOILS (ASTM D4318)

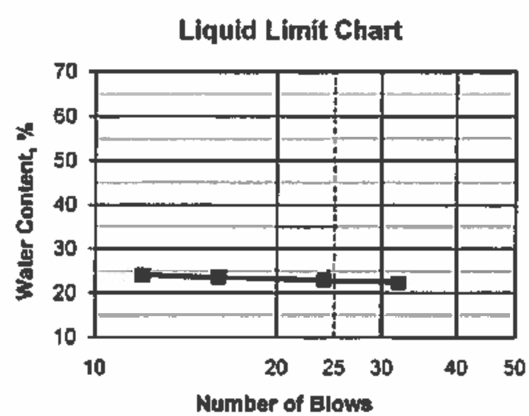
Project	DSA File No.	DSA/LEA No.	DSA App. No.	Job No.	Date
Moore Road Property Site Development				2450	01/23/15

Address	Lab ID	Total Wt. *(g)*	Retained #4 *(g)*	Retained #40 *(g)*	Retained #200 *(g)*
3440 Moore Road, Lincoln, CA	14872				

Material Description	Sampling Location	Rec'd Date	Retained #4 *(%)*	Retained #40 *(%)*	Retained #200 *(%)*
Brown Silty Clay	B3 at 0-4"	12/29/14			

	Plastic Limit		Liquid Limit			
A. Run Number	1	2	A	B	C	D
B. Tare Number	dj3	f4	a	t2	n1	f
C. Wt. of Wet Soil + Tare *(g)*	20.9	20.7	35.7	35.8	35.5	35.4
D. Wt. of Dry Soil + Tare *(g)*	20.1	19.9	33.1	33.2	33.1	33.0
E. Wt. of Tare *(g)*	15.0	15.1	22.5	22.4	22.3	22.2
F. Wt. of Water *(g)*	0.8	0.8	2.6	2.5	2.5	2.4
G. Wt. of Dry Soil *(g)*	5.0	4.8	10.7	10.8	10.8	10.8
H. Moisture (%)	**15.9**	**15.9**	24.0	23.5	22.9	22.3
I. Number of Blows			12	16	24	32





Liquid And Plastic Limits		Unified Soil Classification
LL.	23	CL-ML
PL.	16	
PI.	7	

Remarks	

Technician	Sousan	Professional Engineer	Ying-Chi Liao

Rev. 05/20/09

MatriScope
Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com

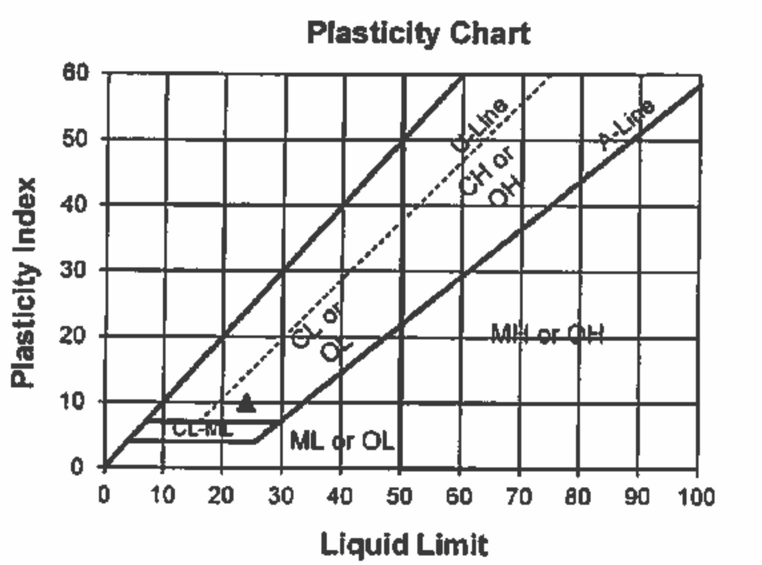
LIQUID AND PLASTIC LIMITS AND PLASTICITY INDEX OF SOILS (ASTM D4318)

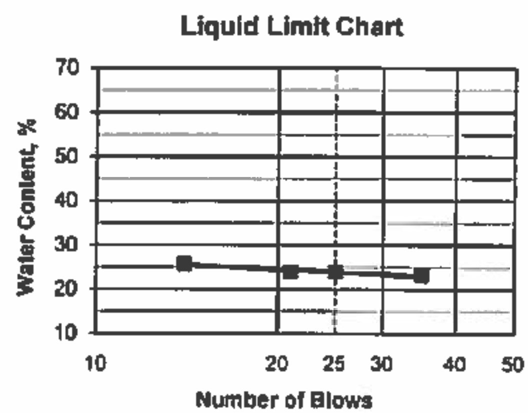
Project	DSA File No.	DSA/LEA No.	DSA App. No.	Job No.	Date
Moore Road Property Site Development				2450	01/23/15

Address	Lab ID.	Total Wt. *(g)*	Retained #4 *(g)*	Retained #40 *(g)*	Retained #200 *(g)*
3440 Moore Road, Lincoln, CA	14877				

Material Description	Sampling Location	Rec'd Date	Retained #4 *(%)*	Retained #40 *(%)*	Retained #200 *(%)*
Brown Lean Clay	B4 at 0-4'	12/29/14			

	Plastic Limit		Liquid Limit			
A. Run Number	1	2	A	B	C	D
B. Tare Number	a1	dj4	p10	z10	30	b9
C. Wt. of Wet Soil + Tare *(g)*	21.1	21.8	32.9	32.0	34.9	33.9
D. Wt. of Dry Soil + Tare *(g)*	20.4	21.0	30.5	30.0	32.5	31.7
E. Wt. of Tare *(g)*	15.6	15.1	21.1	21.6	22.1	22.2
F. Wt. of Water *(g)*	0.7	0.9	2.4	2.0	2.5	2.2
G. Wt. of Dry Soil *(g)*	4.9	5.9	9.4	8.4	10.4	9.5
H. Moisture (%)	14.2	14.5	25.7	24.0	23.9	23.2
I. Number of Blows			14	21	25	35





Liquid And Plastic Limits		Unified Soil Classification
LL.	24	CL
PL.	14	
PI.	10	

Remarks	

Technician	Sousan	Professional Engineer	Ying-Chi Liao

MatriScope
Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com

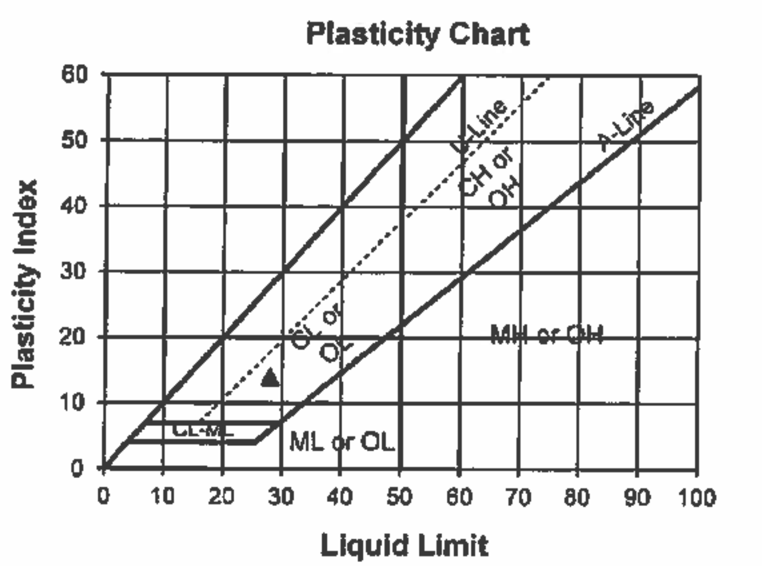
LIQUID AND PLASTIC LIMITS AND PLASTICITY INDEX OF SOILS (ASTM D4318)

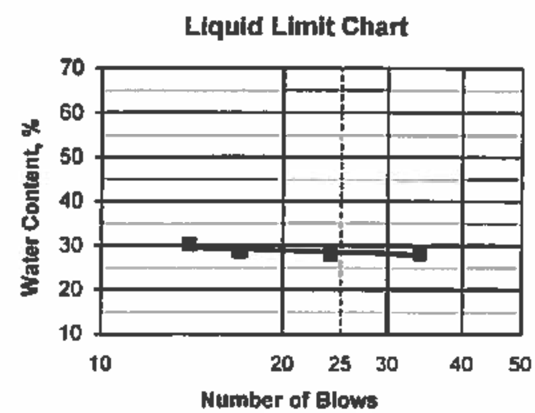
Project	DSA File No	DSA/LEA No.	DSA App. No.	Job No.	Date
Moore Road Property Site Development				2450	01/23/15

Address	Lab ID.	Total Wt. (g)	Retained #4 (g)	Retained #40 (g)	Retained #200 (g)
3440 Moore Road, Lincoln, CA	14899				

Material Description	Sampling Location	Rec'd Date	Retained #4 (%)	Retained #40 (%)	Retained #200 (%)
Brown Lean Sandy Clay	B9 at 0-4'	12/29/14			

	Plastic Limit		Liquid Limit			
A. Run Number	1	2	A	B	C	D
B. Tare Number	e1	i1	n2	kc	14	io
C. Wt. of Wet Soil + Tare (g)	19.8	19.9	34.9	32.3	33.3	31.6
D. Wt. of Dry Soil + Tare (g)	19.2	19.3	32.0	30.0	30.6	29.5
E. Wt. of Tare (g)	15.6	15.5	22.3	22.2	21.1	22.2
F. Wt. of Water (g)	0.5	0.6	2.9	2.3	2.7	2.1
G. Wt. of Dry Soil (g)	3.6	3.9	9.7	7.9	9.5	7.3
H. Moisture (%)	14.6	14.2	30.2	28.7	28.0	28.4
I. Number of Blows			14	17	24	34





Liquid And Plastic Limits		Unified Soil Classification
LL.	28	CL
PL.	14	
PI.	14	

Remarks	

Technician	Sousan	Professional Engineer	Ying-Chi Liao

MatriScope
Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com

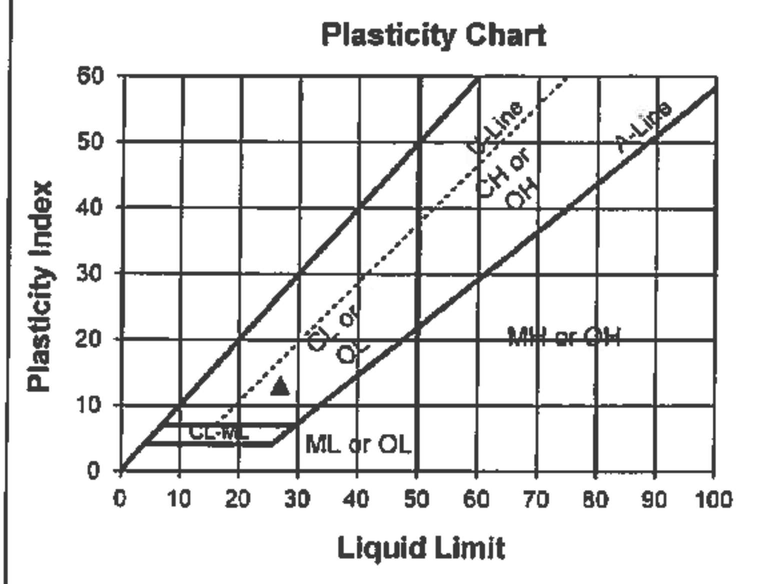
LIQUID AND PLASTIC LIMITS AND PLASTICITY INDEX OF SOILS (ASTM D4318)

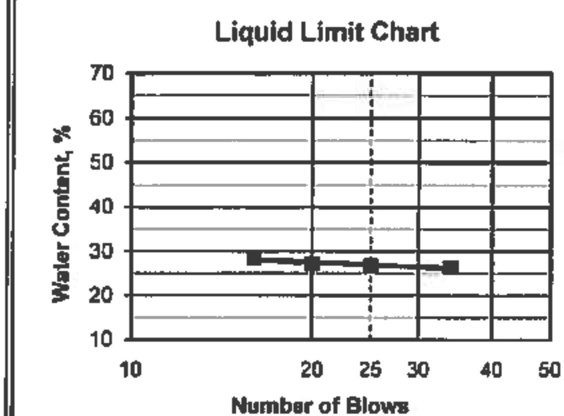
Project	DSA File No	DSA/LEA No.	DSA App. No.	Job No.	Date
Moore Road Property Site Development				2450	01/23/15

Address	Lab ID	Total Wt. (g)	Retained #4 (g)	Retained #40 (g)	Retained #200 (g)
3440 Moore Road, Lincoln, CA	14908				

Material Description	Sampling Location	Rec'd Date	Retained #4 (%)	Retained #40 (%)	Retained #200 (%)
Brown Lean Sandy Clay	B11 at 0-4'	12/29/14			

	Plastic Limit		Liquid Limit			
A. Run Number	1	2	A	B	C	D
B. Tare Number	I1	cc	s2	t1	c30	r2
C. Wt. of Wet Soil + Tare (g)	21.2	19.4	34.9	32.1	35.5	33.9
D. Wt. of Dry Soil + Tare (g)	20.5	18.8	32.1	30.0	32.7	31.5
E. Wt. of Tare (g)	15.5	15.2	22.4	22.3	22.1	22.3
F. Wt. of Water (g)	0.7	0.5	2.8	2.1	2.8	2.4
G. Wt. of Dry Soil (g)	5.0	3.7	9.7	7.7	10.6	9.2
H. Moisture (%)	13.9	14.2	28.4	27.2	26.7	26.4
I. Number of Blows			16	20	25	34





Liquid And Plastic Limits		Unified Soil Classification
LL.	27	CL
PL.	14	
PI.	13	

Remarks	

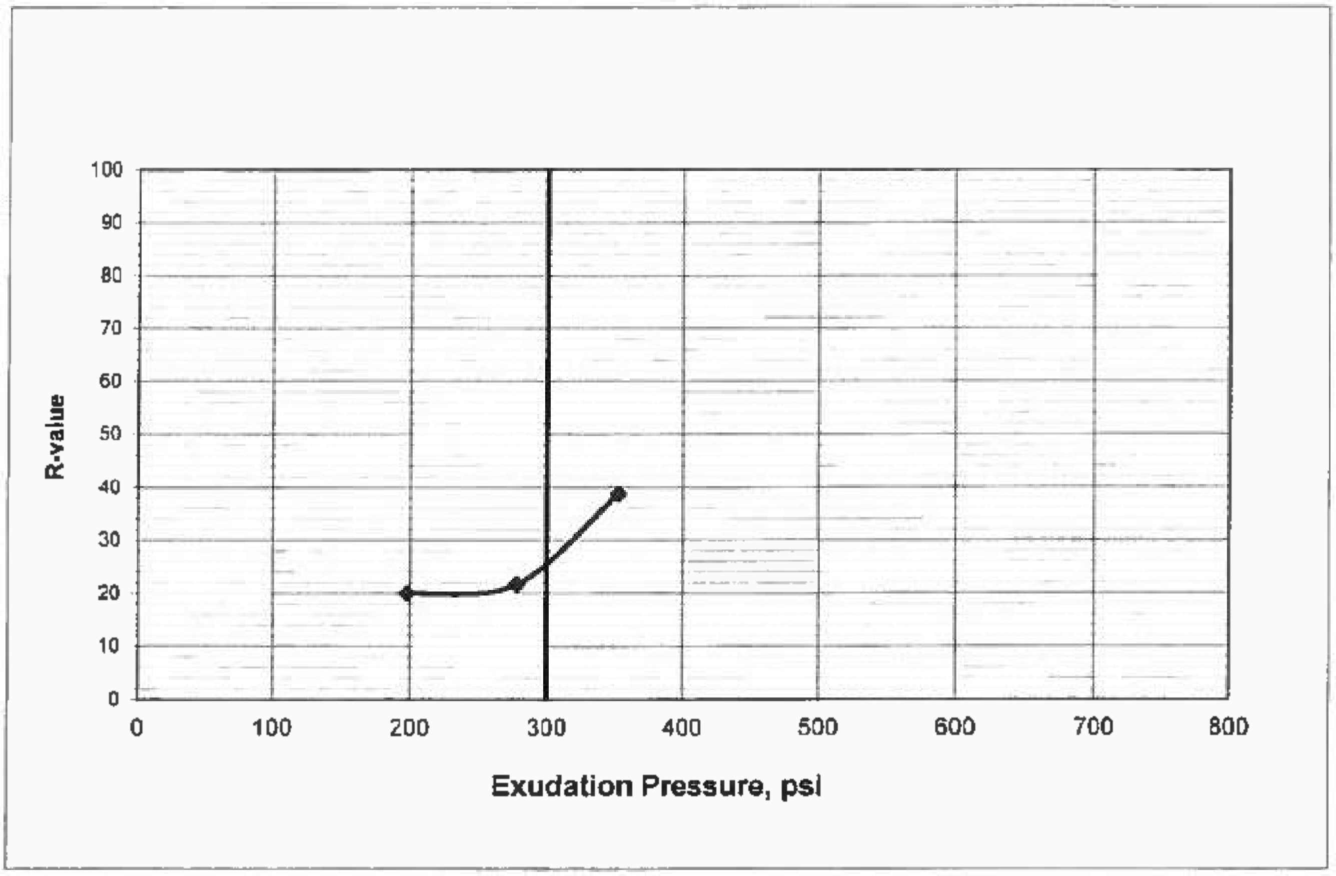
Technician	Sousan	Professional Engineer	Ying-Chi Liao

Rev. 05/20/09

MatriScope
Engineering Laboratories, Inc

R-value Test Report
(ASTM D2844 / CTM 301)

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com



Job No.:	2450	**Date:**	01/23/15
Client:	Praxis Properties LLC	**Tested:**	S Lee
Project:	Moore Road Property Site Development	**Reduced:**	
Sample:	14867; B2 at 0-4'	**Checked:**	YL
Soil Type:	Brown Lean Sandy Clay		

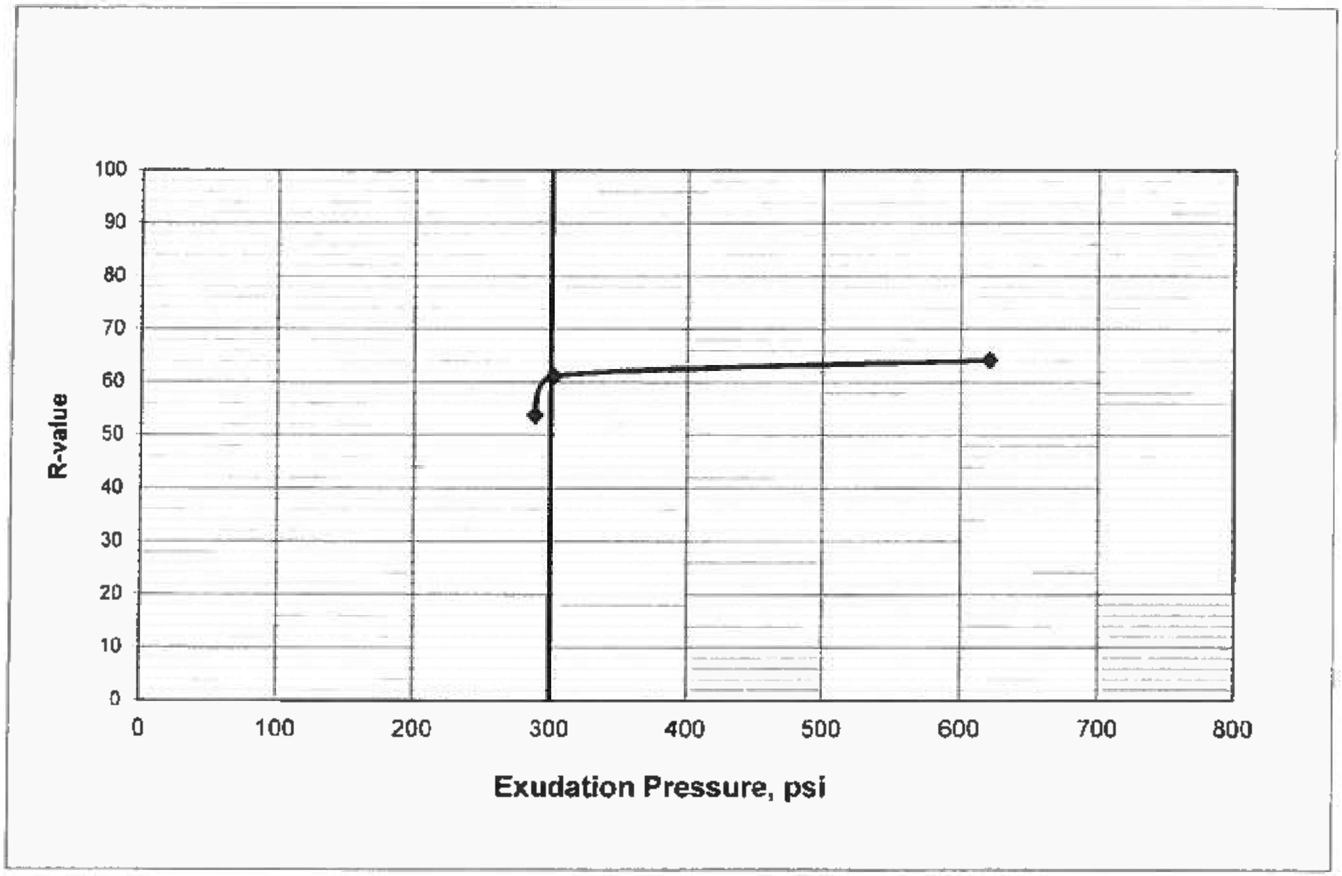
Initial Moisture,	9.5%	
R-value by Stabilometer	25	
Expansion Pressure		psf

Specimen Number	A	B	C	D
Exudation Pressure, psi	352	278	198	
Prepared Weight, grams	1230	1230	1230	
Final Water Added, grams/cc	50	60	70	
Weight of Soil & Mold, grams	2902.5	3056.3	3029.9	
Weight of Mold, grams	1816.7	1955.9	1960.4	
Height After Compaction, in.	2.4	2.46	2.42	
Moisture Content, %	14.0	14.8	15.7	
Dry Density, pcf	120.2	117.9	115.6	
Expansion Pressure, psf	238.2	77.9	77.9	
Stabilometer @ 1000				
Stabilometer @ 2000	78.8	110.3	107.6	
Turns Displacement	3.67	3.95	4.59	
R-value	39	22	20	

Remarks:

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com

R-value Test Report
(ASTM D2844 / CTM 301)



Job No.:	2450	Date:	01/23/15
Client:	Praxis Properties LLC	Tested:	S Lee
Project:	Moore Road Property Site Development	Reduced:	
Sample:	14894; B8 at 0-4'	Checked:	YL
Soil Type:	Brown Sandy Clay		

Initial Moisture, 7.9%

R-value by Stabilometer 61

Expansion Pressure psf

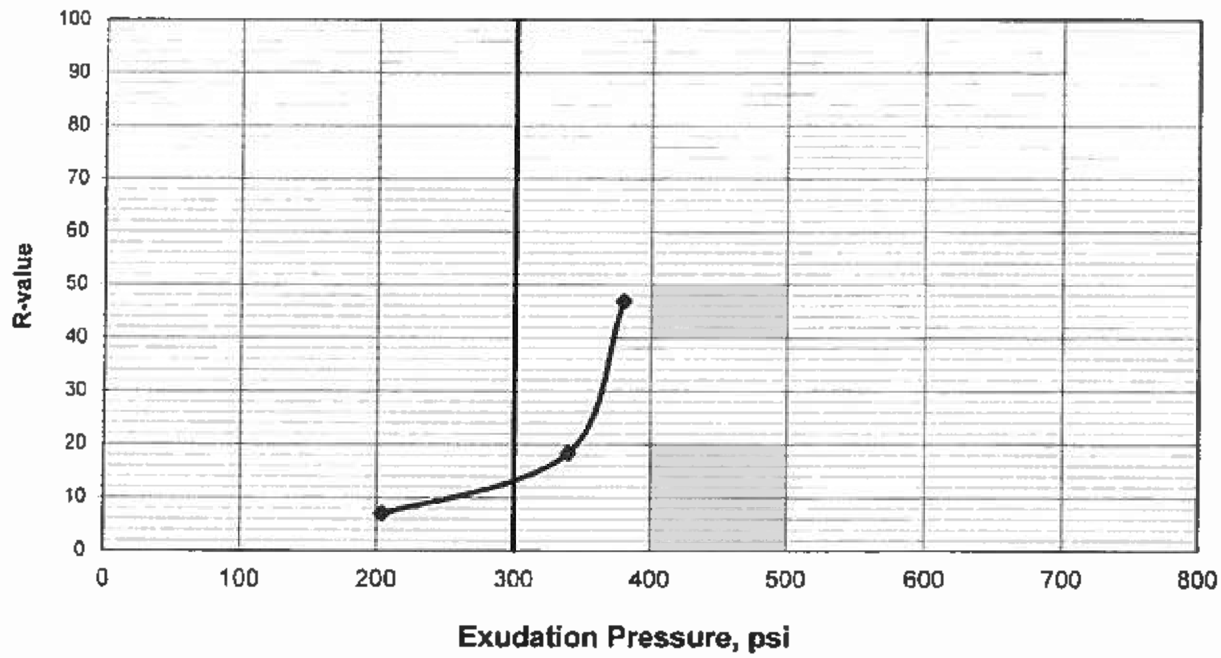
Specimen Number	A	B	C	D
Exudation Pressure, psi	621	302	288	
Prepared Weight, grams	1220	1220	1220	
Final Water Added, grams/cc	20	30	40	
Weight of Soil & Mold, grams	3056.9	3043.9	2882.6	
Weight of Mold, grams	1960.5	1956	1816.8	
Height After Compaction, in.	2.48	2.48	2.35	
Moisture Content, %	9.7	10.6	11.4	
Dry Density, pcf	122.1	120.1	123.2	
Expansion Pressure, psf	472.0	294.4	151.6	
Stabilometer @ 1000				
Stabilometer @ 2000	37	40.9	49	
Turns Displacement	4.55	4.53	4.16	
R-value	64	61	54	

Remarks:

MatriScope
Engineering Laboratories, Inc.

R-value Test Report
(ASTM D2844 / CTM 301)

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 Fax: 916-447-6702
www.matriscope.com



Job No.:	2450	Date:	01/23/15	Initial Moisture,	10.5%
Client:	Praxis Properties LLC	Tested:	S Lee	R-value by Stabilometer	13
Project:	Moore Road Property Site Development	Reduced:			
Sample:	14916, B13 at 0-4'	Checked:	YL	Expansion Pressure	psf
Soil Type:	Brown Lean Clay				

Specimen Number	A	B	C	D
Exudation Pressure, psi	380	340	204	
Prepared Weight, grams	1260	1260	1260	
Final Water Added, grams/cc	0	10	20	
Weight of Soil & Mold, grams	3004.5	2971.3	2966.2	
Weight of Mold, grams	1882	1855.7	1960.3	
Height After Compaction, in.	2.42	2.44	2.4	
Moisture Content, %	10.5	11.4	12.3	
Dry Density, pcf	127.1	124.3	113.1	
Expansion Pressure, psf	233.8	52.0	30.3	
Stabilometer @ 1000				
Stabilometer @ 2000	66.7	115.9	140.7	
Turns Displacement	3.63	4.05	4.42	
R-value	47	18	7	

Remarks:

MatriScope
Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 fax: 916-447-6702
www.matriscope.com

COMPACTION CHARACTERISTICS OF SOIL
(ASTM D1557)

LABORATORY COMPACTION TEST

JOB NO.	LAB ID.	DSA/LEA NO.	DSA FILE NO.	DSA APPLICATION NO.	REPORT DATE
2450	14877				1/23/2015

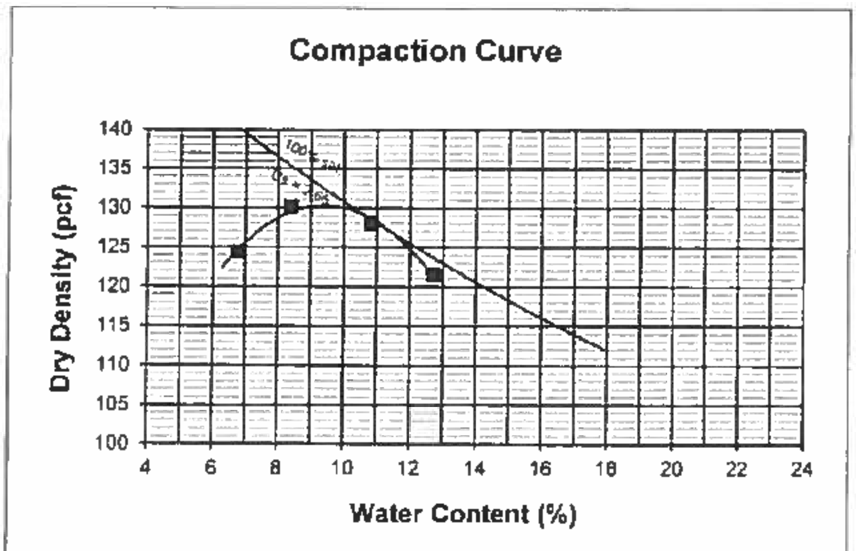
PROJECT	MATERIAL DESCRIPTION
Moore Road Property Site Development	Brown Lean Clay

ADDRESS	PROCEDURE	SIEVE_Oversize	OVERSIZE < 5 %
3440 Moore Road, Lincoln, CA	A	#4	Yes

TOTAL WT. (g) USED IN PROCESSING	WT. (g) Oversize	DRY (g) Oversize	DRY (g) Finer	TOTAL % Oversize	TOTAL % Finer	SG_Oversize

SAMPLING LOCATION	SAMPLE DATE	DIA. OF MOLD (in.)	LAYERS	BLOWS / LAYER	HAND TAMPER / MECHANICAL TAMPER
B4 at 0-4'	12/29/14	4	5	25	MECHANICAL TAMPER ✓

A. WATER ADDED (CC)	50	100	150	200	Finer	Oversize
B. MOLD NUMBER						
C. WT. OF WET SOIL + MOLD (gm)	4008.0	4132.5	4144.2	4070.6		
D. WT. OF MOLD (gm)	2002.1	2002.1	2002.1	2002.1		
E. WT. OF WET SOIL (gm)	2005.9	2130.4	2142.1	2068.5		
F. VOLUME OF MOLD (ft^3)	0.033	0.033	0.033	0.033		
G. WET DENSITY (pcf)	132.8	141.1	141.8	137.0		
H. CONTAINER NO.	n9	ap	l3	g4		
I. WT. OF WET SOIL + TARE (gm)	847.6	861.4	860.4	777.5		
J. WT. OF DRY SOIL + TARE (gm)	811.9	816.6	803.6	721.6		
K. WT. OF TARE (gm)	285.0	282.3	279.5	282.0		
L. WT. LOSS (gm)	35.7	44.8	56.8	55.9		
M. WT. OF DRY SOIL (gm)	526.9	534.3	524.1	439.6		
N. MOISTURE (%)	6.8	8.4	10.8	12.7		
O. DRY DENSITY (pcf)	124.4	130.2	128.0	121.5		



TEST RESULTS	
OPTIMUM WATER CONTENT %	9.4
MAXIMUM DRY DENSITY pcf	130.3

ROCK CORRECTED TEST RESULTS	
OPTIMUM WATER CONTENT %	
MAXIMUM DRY DENSITY pcf	

REMARKS:

Technician	Soussan	Professional Engineer	Ying-Chi Liao

MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 fax: 916-447-5702
www.matriscope.com

COMPACTION CHARACTERISTICS OF SOIL (ASTM D1557)

LABORATORY COMPACTION TEST

JOB NO.	LAB ID.	DSA/LEA NO.	DSA FILE NO.	DSA APPLICATION NO.	REPORT DATE
2450	14881				1/23/2015

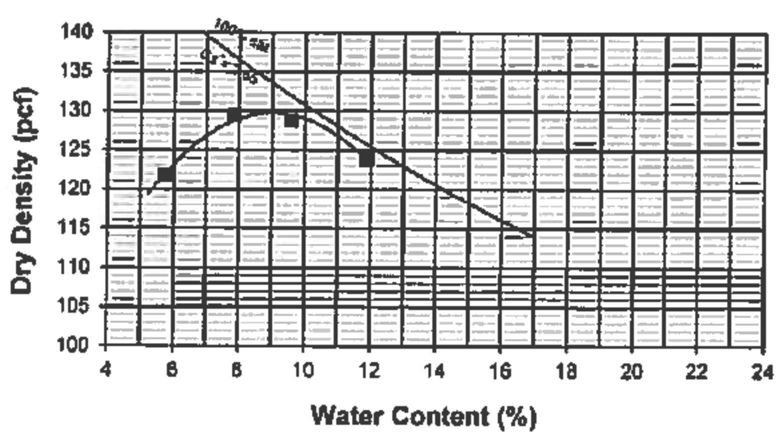
PROJECT	MATERIAL DESCRIPTION
Moore Road Property Site Development	Brown Sandy Clay

ADDRESS	PROCEDURE	SIEVE_Oversize	OVERSIZE < 5 %
3440 Moore Road, Lincoln, CA	A	#4	Yes

TOTAL WT. (g) USED IN PROCESSING	WT. (g) Oversize	DRY (g) Oversize	DRY (g) Finer	TOTAL % Oversize	TOTAL % Finer	SG_Oversize

SAMPLING LOCATION	SAMPLE DATE	DIA. OF MOLD (in.)	LAYERS	BLOWS / LAYER	HAND TAMPER ☐ / MECHANICAL TAMPER ☑
B5 at 0-4'	12/29/14	4	5	25	

A. WATER ADDED (CC)	0	50	100	150	Finer	Oversize
B. MOLD NUMBER						
C. WT. OF WET SOIL + MOLD (gm)	3945.7	4111.7	4133.0	4094.9		
D. WT. OF MOLD (gm)	2002.1	2002.1	2002.1	2002.1		
E. WT. OF WET SOIL (gm)	1943.6	2109.6	2130.9	2092.8		
F. VOLUME OF MOLD (ft^3)	0.033	0.033	0.033	0.033		
G. WET DENSITY (pcf)	128.7	139.7	141.1	138.6		
H. CONTAINER NO.	21	18	56	p60		
I. WT. OF WET SOIL + TARE (gm)	1157.3	783.5	779.5	905.2		
J. WT. OF DRY SOIL + TARE (gm)	1106.6	742.6	730.7	839.0		
K. WT. OF TARE (gm)	222.5	221.8	221.3	281.6		
L. WT. LOSS (gm)	50.7	40.9	48.8	66.2		
M. WT. OF DRY SOIL (gm)	884.1	520.8	509.4	557.4		
N. MOISTURE (%)	5.7	7.9	9.6	11.9		
O. DRY DENSITY (pcf)	121.7	129.5	128.8	123.9		



TEST RESULTS	
OPTIMUM WATER CONTENT %	9.0
MAXIMUM DRY DENSITY pcf	129.7

ROCK CORRECTED TEST RESULTS	
OPTIMUM WATER CONTENT %	
MAXIMUM DRY DENSITY pcf	

REMARKS:

Technician	Steven Lee	Professional Engineer	Ying-Chi Liao

MatriScope Engineering Laboratories, Inc.

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 fax: 916-447-6702
www.matriscope.com

COMPACTION CHARACTERISTICS OF SOIL (ASTM D1557)

LABORATORY COMPACTION TEST

JOB NO.	LAB ID.	DSA/LEA NO.	DSA FILE NO.	DSA APPLICATION NO.	REPORT DATE
2450	14912				1/23/2015

PROJECT	MATERIAL DESCRIPTION
Moore Road Property Site Development	Brown Lean Clay

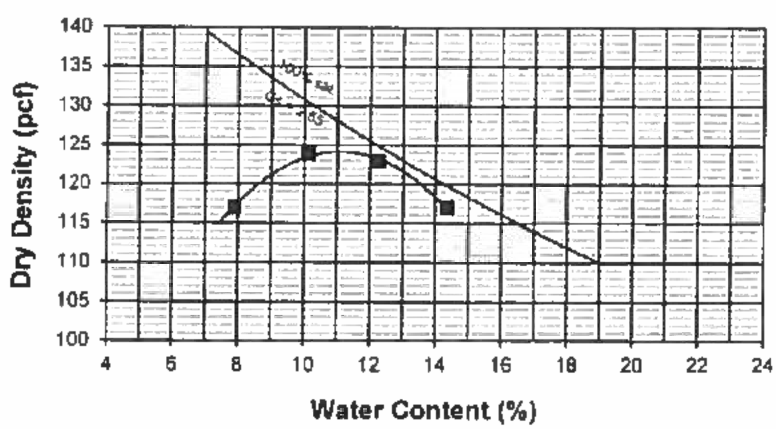
ADDRESS	PROCEDURE	SIEVE_Oversize	OVERSIZE < 5 %
3440 Moore Road, Lincoln, CA	A	#4	Yes

TOTAL WT. (g) USED IN PROCESSING	WT. (g) Oversize	DRY (g) Oversize	DRY (g) Finer	TOTAL % Oversize	TOTAL % Finer	SG_Oversize

SAMPLING LOCATION	SAMPLE DATE	DIA. OF MOLD (in.)	LAYERS	BLOWS / LAYER	HAND TAMPER	MECHANICAL TAMPER
B12 at 0-4'	12/29/14	4	5	25	☐	☑

A. WATER ADDED (CC)	-50	0	50	100	Finer	Oversize
B. MOLD NUMBER						
C. WT. OF WET SOIL + MOLD (gm)	3909.6	4061.1	4085.4	4021.8		
D. WT. OF MOLD (gm)	2002.1	2002.1	2002.1	2002.1		
E. WT. OF WET SOIL (gm)	1907.5	2059.0	2083.3	2019.7		
F. VOLUME OF MOLD (ft^3)	0.033	0.033	0.033	0.033		
G. WET DENSITY (pcf)	126.3	136.3	137.9	133.7		
H. CONTAINER NO.	n4	n5	12	n9		
I. WT. OF WET SOIL + TARE (gm)	1037.9	924.3	809.5	890.3		
J. WT. OF DRY SOIL + TARE (gm)	983.7	866.9	745.2	814.4		
K. WT. OF TARE (gm)	296.6	300.0	220.1	284.8		
L. WT. LOSS (gm)	54.2	57.4	64.3	75.9		
M. WT. OF DRY SOIL (gm)	687.1	566.9	525.1	529.6		
N. MOISTURE (%)	7.9	10.1	12.2	14.3		
O. DRY DENSITY (pcf)	117.1	123.8	122.9	117.0		

Compaction Curve



TEST RESULTS	
OPTIMUM WATER CONTENT %	11.1
MAXIMUM DRY DENSITY pcf	124.1

ROCK CORRECTED TEST RESULTS	
OPTIMUM WATER CONTENT %	
MAXIMUM DRY DENSITY pcf	

REMARKS:

Technician	Steven Lee	Professional Engineer	Ying-Chi Liao

MatriScope Engineering Laboratories, Inc.

COMPACTION CHARACTERISTICS OF SOIL (ASTM D1557)

601 Bercut Drive
Sacramento, CA 95811
Ph: 916-375-6700 fax: 916-447-6702
www.matriscope.com

LABORATORY COMPACTION TEST

JOB NO.	LAB ID.	DSA/LEA NO.	DSA FILE NO.	DSA APPLICATION NO.	REPORT DATE
2450	14924				1/23/2015

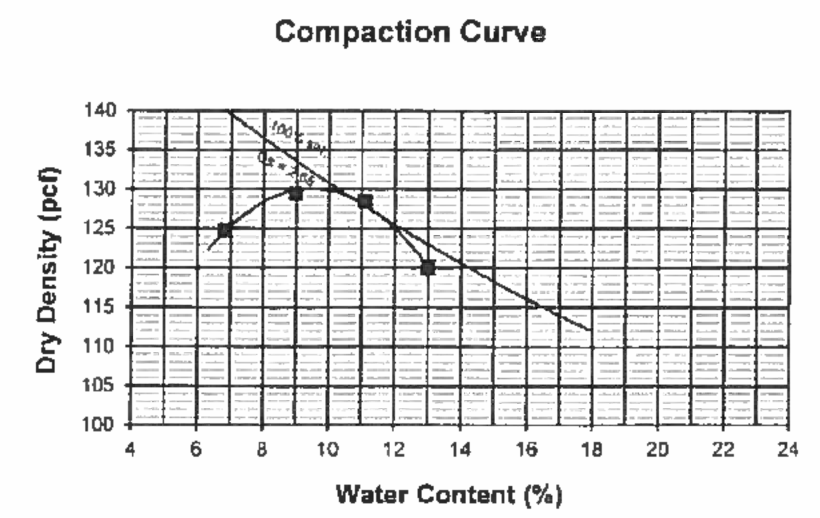
PROJECT	MATERIAL DESCRIPTION
Moore Road Property Site Development	Brown Clayey Sand

ADDRESS	PROCEDURE	SIEVE_Oversize	OVERSIZE < 5 %
3440 Moore Road, Lincoln, CA	A	#4	Yes

TOTAL WT. (g) USED IN PROCESSING	WT. (g) Oversize	DRY (g) Oversize	DRY (g) Finer	TOTAL % Oversize	TOTAL % Finer	SG_Oversize

SAMPLING LOCATION	SAMPLE DATE	DIA. OF MOLD (in.)	LAYERS	BLOWS / LAYER	HAND TAMPER / MECHANICAL TAMPER
B15 at 0-4'	12/29/14	4	5	25	☐ HAND TAMPER ☑ MECHANICAL TAMPER

A. WATER ADDED (CC)	0	50	100	150	Finer	Oversize
B. MOLD NUMBER						
C. WT. OF WET SOIL + MOLD (gm)	4015.2	4132.8	4156.8	4049.9		
D. WT. OF MOLD (gm)	2002.1	2002.1	2002.1	2002.1		
E. WT. OF WET SOIL (gm)	2013.1	2130.7	2154.7	2047.8		
F. VOLUME OF MOLD (ft^3)	0.033	0.033	0.033	0.033		
G. WET DENSITY (pcf)	133.3	141.1	142.7	135.6		
H. CONTAINER NO.	12	x	p60	n4		
I. WT. OF WET SOIL + TARE (gm)	704.6	741.0	859.5	731.1		
J. WT. OF DRY SOIL + TARE (gm)	673.6	704.3	801.8	681.1		
K. WT. OF TARE (gm)	220.0	295.4	281.8	296.7		
L. WT. LOSS (gm)	31.0	36.7	57.7	50.0		
M. WT. OF DRY SOIL (gm)	453.6	408.9	520.0	384.4		
N. MOISTURE (%)	6.8	9.0	11.1	13.0		
O. DRY DENSITY (pcf)	124.8	129.5	128.4	120.0		



TEST RESULTS	
OPTIMUM WATER CONTENT %	9.5
MAXIMUM DRY DENSITY pcf	130.1

ROCK CORRECTED TEST RESULTS	
OPTIMUM WATER CONTENT %	
MAXIMUM DRY DENSITY pcf	

REMARKS:

Technician	Soussan	Professional Engineer	Ying-Chi Liao

Sunland Analytical
11353 Pyrites Way
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 01/09/15
Date Submitted 01/06/15

To: Steve Lee
MatriScope, Inc.
601 Bercut
Sacramento, CA, 95811

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : 2450-MOORE ROAD Site ID: B5-2
Thank you for your business.

* For future reference to this analysis please use SUN # 68546 - 142380

EVALUATION FOR SOIL CORROSION

Soil pH	6.62		
Minimum Resistivity	2.57	ohm-cm (x1000)	
Chloride	12.9 ppm	0.0013	%
Sulfate-S	2.9 ppm	0.0003	%

METHODS:
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

Sunland Analytical

11353 Pyrites Way
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 01/09/15
Date Submitted 01/06/15

To: Steve Lee
MatriScope, Inc.
601 Bercut
Sacramento, CA, 95811

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : 2450-MOORE ROAD Site ID: B6-2
Thank you for your business.

* For future reference to this analysis please use SUN # 68546 - 142381

EVALUATION FOR SOIL CORROSION

Soil pH	6.77	
Minimum Resistivity	2.68	ohm-cm (x1000)
Chloride	17.7 ppm	0.0018 %
Sulfate-S	11.1 ppm	0.0011 %

METHODS:
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

Sunland Analytical
11353 Pyrites Way
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 01/09/15
Date Submitted 01/06/15

To: Steve Lee
MatriScope, Inc.
601 Bercut
Sacramento, CA, 95811

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : 2450-MOORE ROAD Site ID: B15-2
Thank you for your business.

* For future reference to this analysis please use SUN # 68546 - 142382

EVALUATION FOR SOIL CORROSION

Soil pH	6.71		
Minimum Resistivity	4.29	ohm-cm (x1000)	
Chloride	13.2 ppm	0.0013	%
Sulfate-S	3.0 ppm	0.0003	%

METHODS:
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422