LOR GEOTECHNICAL GROUP, INC.
Soil Engineering ▲ Geology ▲ Environmental

PRELIMINARY GEOTECHNICAL INVESTIGATION
TENTATIVE TRACT NO. 20500
VICTORVILLE, CALIFORNIA

PROJECT NO. 33780.1R
DECEMBER 22, 2021
revised MARCH 20, 2023

Prepared For:

Tom Dodson & Associates
P.O. Box 2307
San Bernardino, CA 92406-2307

Attention: Mr. Tom Dodson

December 22, 2021
revised March 20, 2023

Tom Dodson & Associates
P.O. Box 2307
San Bernardino, CA 92406-2307

Project No. 33780.1R

Attention: Mr. Tom Dodson

LOR Geotechnical Group, Inc., is pleased to present this revised report summarizing our geotechnical investigation for the subject project. This report was based upon a scope of services generally outlined in our proposal letter, dated July 8, 2021 and other written and verbal communications with you. In addition, we have updated the report to current standards. The findings, conclusions, and recommendations presented herein reflect a combination of our recent site investigation work and our previous geotechnical investigation of the site conducted in 2006. This revision also contains the requested changes by the city of Victorville in their 1st Submittal Comments dated January 13, 2023.

In summary, it is our opinion that the site can be developed from a geotechnical perspective, provided the recommendations presented in the attached report are incorporated into design and construction. The following executive summary reviews some of the important elements of the project. However, this summary should not be solely relied upon.

The subject site is underlain by unconsolidated alluvial materials. In general, the upper portions of the alluvial soils encountered were in a loose to medium dense state, becoming denser with depth. It is our opinion that existing surficial materials will not provide uniform and/or adequate support for the proposed structures. Thus, we recommend that all structures be founded entirely on an engineered compacted fill mat placed on competent alluvial soils. Based upon our field and laboratory data, we anticipate alluvial removals on the order of 2 to 5 feet deep will be required across much of the planned building areas at the site. However, deeper removals up to 7 feet deep are expected to be necessary within the southwestern portion of the site (areas of trenches T-3 through T-7). The given removal depths are preliminary. The actual depths of removals should be verified during the grading operation by observation and in-place density testing.

Very low to medium expansive soils, moderate R-value quality, and a negligible sulfate content were encountered on the site. However, during site grading it is anticipated that the on-site soils will be mixed and blended. This mixing and blending will aid in reducing the expansion potential of the on-site soils. Therefore, during site rough grading, additional foundation and subgrade soils should be tested to verify their expansion potential, soluble sulfate content, and R-value quality. Infiltration testing of the site soils at the specified depths indicates variable infiltration characteristics for these soils.

Table of Contents

Table of Contents

Table of Contents

Page No.

APPENDICES

INTRODUCTION

During December of 2021, a Preliminary Geotechnical and Infiltration Feasibility Investigation was performed by LOR Geotechnical Group, Inc., for the proposed residential development of Tentative Tract No. 16681, in Victorville, California. The purpose of this investigation was to supplement and confirm the findings, conclusions, and recommendations of our earlier geotechnical investigation for this site (LOR, 2006) and to provide a technical evaluation of the geologic setting of the site as related to geotechnical design recommendations for the proposed development. This revised report updates and incorporates responses to comments prepared by the City of Victorville (2023). The scope of our services included:

- Review of available geotechnical literature, reports, maps, and agency information pertinent to the study area;
- Interpretation of aerial photographs of the site and surrounding area available through Historic Aerials (2023) and Google Earth (2023);
- Geologic field reconnaissance mapping to verify the areal distribution of earth units and significance of surficial features as compiled from documents, literature, and reports reviewed;
- Subsurface field investigation to determine the physical soil conditions pertinent to the proposed development;
- Laboratory testing of selected soil samples obtained during the field investigation;
- Percolation testing via the borehole test method;
- Development of geotechnical recommendations for site grading and foundation design; and
- Preparation of this report summarizing our findings, and providing conclusions and recommendations for site development.

The approximate location of the site is shown on the attached Index Map, Enclosure A-1 within Appendix A.

PROJECT CONSIDERATIONS

To orient our investigation at the site, a map of Tentative Tract No. 20500 (formerly Tentative Tract No. 16681), prepared by Ludwig Engineering, dated August 15, 2022, was

furnished for our use. The proposed lot layout streets, two infiltration basins, open space, and landscape areas are indicated on this plan.

This plan was utilized as a base map for our field investigation and is presented as Enclosure A-2, within Appendix A.

The proposed structures are anticipated to consist of one and two story wood frame and stucco or similar type construction. Conventional foundation systems with light to moderate foundation loads are anticipated with such structures. Excluding removals and over-excavation, site grading will involve minimal cuts and fills.

Geotechnical information presented within our previously prepared preliminary geotechnical investigation report for the property (LOR, 2006) was reviewed and our conclusions and recommendations presented therein were reviewed and modified, as applicable and/or necessary as requested by the city reviewer.

AERIAL PHOTO ANALYSIS

The aerial photographs reviewed consisted of vertical aerial stereoscopic photographs of varying scales. We reviewed imagery available from Google Earth (2023), and from Historic Aerials (2023).

To summarize briefly, the site has remained vacant with no permanent structures noted to be present onsite on the dates that the various photographs were taken. In recent times, numerous dirt roads and trails have been created across the property and there is currently a considerable amount of trash and debris across most areas. No evidence for the presence of faults traversing the site area or mass movement features was noted during our review of the photographs covering the site and nearby vicinity.

EXISTING SITE CONDITIONS

The subject site consists of roughly 60 acres of vacant, desert land in a relatively natural state. The site is generally located south of Seneca Road, north of Begonia Road, east of Cantina Drive, and west of Mesa Linda Street, all of which are generally unimproved dirt roads. The site consists of a relatively planar, dissected alluvial plain with an overall fall from the southwest to the northeast. At the time of our investigation, the site consisted of vacant land, covered by a moderate to heavy growth of annual grasses and weeds plus the above mentioned trash and debris.

Overhead power lines and support towers traverse the northeast corner of the site while vacant, largely natural land is present to the west, north, and east. An existing retail development is present adjacent to the western portion of the south side of the site and vacant land is present south of the southeast portion of the site.

SUBSURFACE FIELD INVESTIGATION

Our recent subsurface field exploration program was conducted on December 2, 2021. The work consisted of advancing a total of 6 exploratory borings (B-6 through B-11) using a truck mounted drill rig equipped with 8-inch diameter hollow stem augers. During our earlier site investigation (LOR, 2006), we advanced 5 exploratory borings (B-1 through B-5) using similar drill rig equipment and excavated 16 exploratory trenches using rubber tire backhoe equipment. The approximate locations of our exploratory borings and trenches are presented on Enclosure A-2, within Appendix A.

The subsurface conditions encountered in the exploratory borings and trenches were logged by geologists from this firm. The borings were drilled to depths of approximately 21 to 50 feet below the existing ground surface while the trenches were excavated to depths ranging from 10 to 15 feet below the existing ground surface. Relatively undisturbed and bulk samples were obtained at a maximum depth interval of 5 feet and returned to our geotechnical laboratory in sealed containers for further testing and evaluation.

A detailed description of the subsurface field exploration program and the boring and trench logs are presented in Appendix B.

LABORATORY TESTING PROGRAM

Selected soil samples obtained during both our current and previous field investigation were subjected to geotechnical laboratory testing to evaluate their physical and engineering properties. The laboratory testing program performed in conjunction with our investigations included moisture content, dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, expansion index, Atterberg limits, and soluble sulfate content. A detailed description of the geotechnical laboratory testing program and the test results are presented in Appendix C.

GEOLOGIC CONDITIONS

Regional Geologic Setting

Tract 16681 is situated in the southeastern portion of a large Geomorphic province in southern California known as the Mojave Desert. The Mojave Desert Geomorphic province is essentially a wedge shaped alluviated plain of comparatively low relief, containing irregularly trending bedrock hills and low mountains.

The underlying bedrock reportedly consists of crystalline, metamorphic, sedimentary and volcanic rocks. Many of these bedrock units are visible at the surface within the numerous small mountain ranges and hills in the area. However, approximately 50 percent of the Mojave Desert province is covered with relatively deep deposits of geologically younger surficial sediments of alluvium.

The Mojave Desert province is bounded on the south and southwest by the San Bernardino Mountains, the San Gabriel Mountains, and the San Andreas fault zone and on the north by the Oarlock fault zone. The eastern boundary of the Mojave Desert Geomorphic province is not distinct, but gradually converges with the Basin and Range Geomorphic province east of Death Valley and into Arizona and Nevada. The province is broken by many internal, major but discontinuous faults, predominately trending to the northwest showing remarkable parallelism with the strike of the San Andreas. Most of these faults have been active within the last 1.6 million years and many are still considered to be active or potentially active.

The closest known active fault to the subject site, as measured from the intersection of Seneca Road and Mesa Linda Street, is the North Frontal fault, located approximately 21.5 kilometers (13.3 miles) to the southeast. A complete listing of the distances to known active faults in relation to the site is given in the Faulting section of this report.

Site Geologic Conditions

The subject site is underlain by alluvial materials which typically consist of silty sands, well graded sands, and poorly graded sands with lesser units of sandy silts, sandy clays, and clayey sands. The alluvial soils were typically dry to damp, tan to light brown, and contained some secondary deposits of calcite and/or calcium carbonate, primarily in the form of stringers, and trace of pinhole porosity, mainly within the upper portions.

Based on our field observations, in-place density determinations, and equivalent Standard Penetration Test (SPT) data, it was noted that the upper 2 to 5 feet of the alluvial soils across the majority of the site are in a loose to medium dense state, becoming medium dense to dense below these depths. However, deeper loose to medium dense alluvial soils were noted to exist within the southwestern portion of the site (area of Trenches T-3 through T-7) where unsuitable materials extends to depths of up to approximately 7 feet. In addition, expansion index testing performed on the lesser clayey units of the alluvium showed that these units have a medium expansion potential. The expansion potential of the sandy and silty soils composing much of the alluvium is expected to be very low.

Neither bedrock nor groundwater was found in any of our exploratory borings or trenches. A detailed description of the subsurface soil conditions as encountered within our exploratory borings and trenches is presented on the Boring and Trench Logs within Appendix B.

Groundwater Hydrology

Groundwater was not encountered in any of our exploratory borings or trenches placed at the site nor was any groundwater seepage observed during our site reconnaissance. Hydrologic information obtained from the Victor Valley Water Company, which provides water service to the site, indicated they have a well under development on the northeast corner of Amethyst Road and Hook Boulevard, approximately one and a half mile northeast of the site. The depth to groundwater (static) in the confined aquifer was 260± feet deep. They did not have a depth to the first groundwater in the unconfined aquifer, but did mention they did not encounter any groundwater in the upper 50 feet of their drilling. They indicated the direction of subsurface flow is generally to the northeast.

The closest groundwater well on the database maintained by the State of California Department of Water Resources (DWR) is located near the intersection of Highways 18 and 395, approximately 1,400 feet to the south. At this location there are three wells listed as 5N5W22E001, 2, and 5. Depth to groundwater measurements in these wells exist from 1918 through 1999 and shows a slow draw down of the region with water at 297 feet in 1918 to 361 feet in 1999. The closest well north of the site of this source is the well 5N5W09001, located approximately 1.4 miles north-northwest of the site. Only one reading was available, that of 259.8 feet in 1989. This data suggests that the current depth to groundwater at the site is on the order of 350 feet.

Surface Runoff

Current surface runoff of precipitation waters across the site is typically from the southwest to the northeast.

Mass Movement

The site lies on a relatively flat surface. The occurrence of mass movement failures such as landslides, rockfalls, or debris flows within such areas is generally not considered common and no evidence of mass movement was observed on the site.

Faulting

No active or potentially active faults are known to exist at the subject site. In addition, the subject site does not lie within a current State of California Earthquake Fault Zone (Hart and Bryant, 1997).

As previously mentioned, the closest known active fault is the North Frontal fault, located approximately 21.5 kilometers (13.3 miles) to the southeast. In addition, other relatively close active faults include the Helendale fault located approximately 25 kilometers (15.5 miles) to the northeast, and the San Andreas fault located approximately 25.5 kilometers (15.8 miles) to the south. The above distances were measured from the intersection of Seneca Road and Mesa Linda Street.

The North Frontal fault zone of the San Bernardino Mountains is a zone consisting of numerous fault segments, many of which have their own names. The primary sense of slip is south dipping thrust. This fault seems to be offset (right-laterally) by the Helendale fault. It is believed that the North Frontal fault zone is capable of producing an earthquake magnitude on the order of 6.0 to 7.1.

The Helendale fault is a right-lateral strike slip fault. As previously mentioned, this fault seems to offset the North Frontal fault. In addition, this fault has been active very recently. It is believed that the Helendale fault is capable of producing an earthquake magnitude on the order of 6.5 to 7.3.

The San Andreas fault is considered to be the major tectonic feature of California, separating the Pacific plate and the North American plate. While estimates vary, the San

Andreas fault is generally thought to have an average slip range on the order of 24 mm/yr and capable of generating large magnitude events on the order of 7.5 or greater.

Current standards of practice included a discussion of all potential earthquake sources within a 100 kilometer (62 mile) radius. However, while there are other large earthquake faults within a 100 kilometer (62 mile) radius of the site, none of these are considered as relevant to the site as the faults described above, due to their greater distance and smaller anticipated magnitudes.

Historical Seismicity

In order to obtain a general perspective of the historical seismicity of the site and surrounding region a search was conducted for seismic events at and around the area within various radii. This search was conducted utilizing the historical seismic search website of the U.S.G.S. (2023). This website conducts a search of a user selected cataloged seismic events database, within a specified radius and selected magnitudes, and then plots the events onto an overlay map of known faults. At the time of our search the data base contained data from January 1, 1932 through March 17, 2023.

In our first search, the general seismicity of the region was analyzed by selecting an epicenter map listing all events of magnitude 4.0 and greater, recorded since 1932, within a 100 kilometer (62 mile) radius of the site, in accordance with guidelines of the California Division of Mines and Geology. This map illustrates the regional seismic history of moderate to large events. As depicted on Enclosure A-2, within Appendix A, the site lies within a relatively active region associated with the San Andreas, North Frontal, and Helendale faults.

In the second search, the micro seismicity of the area lying within a 15 kilometer (9.3 mile) radius of the site was examined by selecting an epicenter map listing events on the order of 1.0 and greater since 1978. In addition, only the “A” events, or most accurate events were selected. Caltech indicates the accuracy of the “A” events to be approximately 1 km. The results of this search is a map that presents the seismic history around the area of the site with much greater detail, not permitted on the larger map. The reason for limiting the events to the last 35 ± years on the detail map is to enhance the accuracy of the map. Events recorded prior the mid 1970s are generally considered to be less accurate due to advancements in technology. As depicted on this map, Enclosure A-3, the North Frontal and the San Andreas faults appear to be the source of numerous events. In addition, a

small cluster of micro-events is located approximately 13 kilometers (8 miles) to the northeast. This activity is believed to be associated with mining activities in that area.

In summary, the historical seismicity of the site entails numerous small to medium magnitude earthquake events occurring around the subject site, predominately associated with the presence of the faults described above. Any future developments at the subject site should anticipate that moderate to large seismic events could occur very near the site.

Secondary Seismic Hazards

Other secondary seismic hazards generally associated with severe ground shaking during an earthquake include liquefaction, seiches and tsunamis, earthquake induced flooding, landsliding and rockfalls, and seismic-induced settlement

Liquefaction: The potential for liquefaction generally occurs during strong ground shaking within granular loose sediments where the groundwater is usually less than 50-feet. As the site is underlain by relatively dense alluvial materials, based on our equivalent Standard Penetration Test (SPT) data, and the depth to current groundwater levels is in excess of 50 feet, the possibility of liquefaction at the site is considered nil.

Seiches/Tsunamis: The potential for the site to be affected by a seiche or tsunamis (earthquake generated wave) is considered nil due to absence of any large bodies of water near the site.

Flooding (Water Storage Facility Failure): There are no large water storage facilities located on or near the site which could possibly rupture during in earthquake and affect the site by flooding.

Seismically-Induced Landsliding: Due to the low relief of the site and surrounding region, the potential for landslides to occur at the site is considered nil.

Rockfalls: No large, exposed, loose or unrooted boulders are present above the site that could affect the integrity of the site.

Seismically-Induced Settlement: Settlement generally occurs within areas of loose, granular soils with relatively low density. Since the site is underlain by relatively dense alluvial materials, the potential for seismically-induced settlement is considered low.

In addition, the earthwork operations during the development of the site will mitigate any near surface loose soil conditions.

SOILS AND SEISMIC DESIGN CRITERIA (California Building Code 2019)

Design requirements for structures can be found within Chapter 16 of the 2019 California Building Code (CBC) based on building type, use and/or occupancy. The classification of use and occupancy of all proposed structures at the site, shall be the responsibility of the building official.

Site Classification

Chapter 20 of the ASCE 7-16 defines six possible site classes for earth materials that underlie any given site. Bedrock is assigned one of three of these six site classes and these are: A, B, or C. Soil is assigned as C, D, E, or F. Per ASCE 7-16, Site Class A and Site Class B shall be measured on-site or estimated by a geotechnical engineer, engineering geologist or seismologist for competent rock with moderate fracturing and weathering. Site Class A and Site Class B shall not be used if more than 10 feet of soil is between the rock surface and bottom of the spread footing or mat foundation. Site Class C can be used for very dense soil and soft rock with Ñ values greater than 50 blows per foot. Site Class D can be used for stiff soil with Ñ values ranging from 15 to 50 blows per foot. Site Class E is for soft clay soils with Ñ values less than 15 blows per foot. Our site investigation, mapping by others, and our experience in the site region indicate that the materials beneath the site are considered Site Class D stiff soils.

CBC Earthquake Design Summary

Earthquake design criteria have been formulated in accordance with the 2019 CBC and ASCE 7-16 for the site based on the results of our investigation to determine the Site Class and an assumed Risk Category II. However, these values should be reviewed and the final design should be performed by a qualified structural engineer familiar with the region. In addition, the building official should confirm the Risk Category utilized in our design (Risk Category II). Our design values are presented within Appendix D.

INFILTRATION TESTING AND TEST RESULTS

Borehole percolation tests were conducted at the general locations and depths requested. Test borings were drilled to depths of between approximately 6.5 and 9 feet below the

existing ground surface. Subsequent to drilling, a 3-inch diameter, perforated PVC pipe wrapped in filter fabric was placed within each test hole and 1/2-inch gravel was placed between the outside of the pipe and the hole wall to prevent caving. Test holes were presoaked the same day as excavating and allowed to soak by filling the hole with five gallons of water. The five gallons of water seeped away the same day, therefore, testing took place the same day. After two consecutive 25 minute readings showed that at least 6 inches of water seeped away, testing continued with test periods consisting of 10 minute intervals. The holes were refilled to a height of approximately 4 feet above the bottom of the test hole prior to each test interval.

Testing was terminated after a total of 12 readings were recorded and with the highest and lowest readings within 10 percent of each other for three consecutive readings.

Clear water infiltration test results are summarized in the following table:

Test No.	Depth* (ft)	Infiltration Rate ** (in/hr)
P-1	8.0	0.8
P-2	6.5	6.1
P-3	8.0	6.3
P-4	9.0	3.1

* measured below the existing ground surface
** final reading via the Porchet Method

The results of this testing are presented as Enclosures E-1 through E-4, within Appendix E. The test results indicate highly variable infiltration characteristics for the soils tested.

CONCLUSIONS

General

This investigation provides a broad overview of the geotechnical and geologic factors which are expected to influence future site planning and development. On the basis of our field investigation and testing program, it is the opinion of LOR Geotechnical Group, Inc., that the proposed development is feasible from a geotechnical standpoint, provided the

recommendations presented in this report are incorporated into design and implemented during grading and construction.

The subsurface conditions encountered in our exploratory borings and trenches are indicative of the locations explored. The subsurface conditions presented here are not to be construed as being present the same everywhere on the site. If conditions are encountered during the construction of the project which differ significantly from those presented in this report, this firm should be notified immediately so we may assess any impact to the recommendations provided.

Foundation Support

Based upon the field investigation and test data, it is our opinion that the upper alluvial soils will not, in their present condition, provide uniform and/or adequate support for the proposed structures. Our in-place density and equivalent Standard Penetration Test (SPT) data indicated variable in-situ conditions of the upper alluvial materials, ranging from loose to medium dense states. This condition may cause unacceptable differential and/or overall settlements upon application of the anticipated foundation loads at the site.

To provide adequate support for the proposed residential structures, we recommend that foundations should rest entirely on a compacted fill mat placed over competent alluvium.

Conventional foundation systems, utilizing either individual spread footings and/or continuous wall footings, will provide adequate support for the anticipated downward and lateral loads when utilized in conjunction with the recommended fill mat.

Sulfate Protection

The results of the soluble sulfate tests conducted on selected subgrade soils expected to be encountered at foundation levels indicate that there is a negligible sulfate exposure to concrete elements in contact with the on site soils per the 2019 CBC. Therefore, no specific recommendations are given for concrete elements to be in contact with the onsite soils.

Infiltration

Infiltration testing of the site soils at the specified depths indicates highly variable infiltration characteristics related to different degrees of cementation within the subsurface soils.

Soil Expansiveness

Expansive soils are generally fine-grained, cohesive soils (silts and clays) that tend to swell when they are wetted or to shrink when dried. As noted on the enclosed trench and boring logs and expansion index test results, the site soils are mostly composed of silty sands and sands with a very low expansion potential, which are followed by lesser units of sandy clays/silts with a medium expansion potential. Design guidelines per the Wire Reinforcement Institute and the Post-Tensioning Institute consider that the upper 10 to 15 feet as the high depth of the active zone, which is defined as the greatest depth of moisture content fluctuations where soil expansion can take place. Therefore, based on the different soil layers encountered and their properties and the anticipated site grading, we believe that foundations and slabs at the site should be generally designed for low expansive soils as described in the Foundation Design, Slab-on-Grade, and Exterior Flatwork sections of this report. Careful evaluation of the on-site soils and import fill for their expansion potential should be conducted during the grading operation.

Geologic Mitigations

No special mitigation methods are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

Seismicity

Seismic ground rupture is generally considered most likely to occur along pre-existing active faults. Since no active faults are known to exist at, or project into the site, the probability of ground surface rupture occurring at the site is considered nil.

Due to the site's close proximity to the faults described within, it is reasonable to expect a strong ground motion seismic event to occur during the lifetime of the proposed development on the site. Large earthquakes could occur on other faults in the general area, but because of the lesser anticipated magnitude and/or greater distance, they are considered less significant than the fault described within from a ground motion standpoint.

The effects of ground shaking anticipated at the subject site, should be mitigated by the seismic design requirements and procedures outlined in Chapter 16 of the California Building Code. However, it should be noted that the current building code requires the minimum design to allow a structure to remain standing after a seismic event, in order to

allow for safe evacuation. A structure built to code may still sustain damage which might ultimately result in the demolishing of the structure (Larson and Slosson, 1992).

RECOMMENDATIONS

Geologic Recommendations

No special geologic recommendation methods are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

General Site Grading

It is imperative that no clearing and/or grading operations be performed without the presence of a qualified geotechnical engineer. An on-site, pre-job meeting with the owner/developer, the contractor, the jurisdiction, and the geotechnical engineer should occur prior to all grading related operations. Operations undertaken at the site without the geotechnical engineer present may result in exclusions of affected areas from the final compaction report for the project.

Grading of the subject site should be performed in accordance with the following recommendations as well as applicable portions of the California Building Code, and/or applicable local ordinances.

All areas to be graded should be stripped of significant vegetation and other deleterious materials. Any undocumented fill encountered during grading should be completely removed, cleaned of significant deleterious materials, and may then be reused as compacted fill. It is our recommendation that any existing fills under any proposed flatwork and paved areas be removed and replaced with engineered compacted fill. If this is not done, premature structural distress (settlement) of the flatwork and pavement may occur.

Cavities created by removal of subsurface obstructions should be thoroughly cleaned of loose soil, organic matter and other deleterious materials, shaped to provide access for construction equipment, and backfilled as recommended in the following Engineered Compacted Fill section of this report.

Initial Site Preparation

All upper, loose portions of the alluvial materials should be removed from structural areas and areas to receive engineered compacted fill. Based upon the information obtained

during this investigation, removals on the order of 2 to 5 feet deep will be required across much of the planned building areas at the site in order to expose competent alluvial materials upon which foundations and fills can be placed. However, deeper removals up to 7 feet deep will be required within the southwestern portion of the site (areas of trenches T-3 through T-7). Competent alluvium is defined as damp, relatively dense materials with a relative compaction of at least 85 percent of the maximum dry density (ASTM D 1557).

Preparation of Fill Areas

After conducting the removals discussed above and prior to placing fill, the surfaces of all areas to receive fill should be scarified to a depth of at least 12 inches. The scarified soil should be brought to near optimum moisture content and recompacted to a relative compaction of at least 90 percent (ASTM D 1557).

Preparation of Building Pad Areas

All footings and slabs-on-grade within building pad areas should rest entirely upon at least 24 inches of properly compacted fill material placed over competent alluvium. In areas where the required fill thickness is not accomplished by site rough grading and remedial removals, the footing areas should be further subexcavated to a depth of at least 24 inches below the proposed footing base grade, with the subexcavation extending at least 5 feet beyond the footing lines. Where deeper removals in excess of 5 feet are required, these removals should extend at a 1 horizontal to 1 vertical projection outside of the footing lines at the bottom of the excavation. In addition, pads should be constructed such as the maximum depth of fill to minimum depth of fill below the designated building areas do not exceed a 3 to 1 ratio as measured from the bottom of the footings. The bottom of this excavation should then be scarified to a depth of at least 12 inches, brought to near optimum moisture content, and recompacted to at least 90 percent relative compaction (ASTM D 1557) prior to refilling the excavation to grade as properly compacted fill.

Engineered Compacted Fill

The on-site soils should provide adequate quality fill material, provided they are free from organic matter and other deleterious materials. Unless approved by the geotechnical engineer, rock or similar irreducible material with a maximum dimension greater than 6 inches should not be buried or placed in fills.

Import fill, if required, should be inorganic, non-expansive, granular soils free from rocks or lumps greater than 6 inches in maximum dimension. Sources for import fill should be approved by the geotechnical engineer prior to their use.

Fill should be spread in maximum 8-inch uniform, loose lifts, each lift brought to near optimum moisture content, and compacted to a relative compaction of at least 90 percent in accordance with ASTM D 1557.

Based upon the relative compaction of the near surface soils determined during this investigation and the relative compaction anticipated for compacted fill soil, we estimate a compaction shrinkage factor of approximately 15 percent. Therefore, 1.15 cubic yards of in-place materials would be necessary to yield one cubic yard of properly compacted fill material. In addition, we would anticipate subsidence of approximately 0.15 feet. These values are for estimating purposes only, and are exclusive of losses due to stripping or the removal of subsurface obstructions. These values may vary due to differing conditions within the project boundaries and the limitations of this investigation. Shrinkage should be monitored during construction. If percentages vary, provisions should be made to revise final grades or adjust quantities of borrow or export.

As noted some of the on-site soils have medium potential for expansion. Therefore, during grading and as these potential expansive soils are encountered, it is recommended that mixing of these soils with predominate granular soils be conducted. This mixing can produce soils with very low to low expansive soil potential. These soils could also be placed in non-structural areas. A careful evaluation of on-site and any imported soils for their expansion potential should be conducted during the grading operation.

As a minimum, import fills should have engineering properties similar to the site soils. Import soils should also be very low expansive and should have a negligible sulfate content.

Short-Term Excavations

Following the California Occupational and Safety Health Act (CAL-OSHA) requirements, excavations deeper than 5 feet should be sloped or shored. All excavations and shoring should conform to CAL-OSHA requirements.

Short-term excavation deeper than 5 feet shall conform to Title 8 of the California Code of Regulations, Construction Safety Orders, Section 1504 and 1539 through 1547. Based on

our exploratory borings and trenches, it appears that Type C soil is the predominant type of soil on the project and all short-term excavation should be based on this type of soil. Deviation from the standard short-term slopes are permitted using option 4, Design by a Registered Professional Engineer (Section 1541.1).

Short-term slope construction and maintenance are the responsibility of the contractor and should be a consideration of his methods of operation and the actual soil conditions encountered.

Slope Construction

Preliminary data indicates that cut and fill slopes should be constructed no steeper than 2 horizontal to 1 vertical. Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. A suitable alternative would be to compact the slopes during construction, then roll the final slopes to provide dense, erosion-resistant surfaces.

Slope Protection

Since the native materials are susceptible to erosion by running water, measures should be provided to prevent surface water from flowing over slope faces. Slopes at the project should be planted with a deep rooted ground cover as soon as possible after completion. The use of succulent ground covers such as iceplant or sedum is not recommended. If watering is necessary to sustain plant growth on slopes, then the watering operation should be monitored to assure proper operation of the irrigation system and to prevent over-watering.

Foundation Design

If the site is prepared as recommended, the proposed one- to two-story, residential structures may be safely founded on conventional shallow foundations, either individual spread footings and/or continuous wall footings, bearing entirely on a minimum of 24 inches of engineered compacted fill placed over competent alluvium. All foundations should have a minimum width of 12 inches and should be established a minimum of 18 inches below lowest adjacent grade. The recommended foundation depth of 18 inches is anticipated to counteract the swell potential of expansive soils that exist at depth at the site.

For the minimum width of 12 inches and depth of 18 inches, footings may be designed using a maximum soil bearing pressure of 1,800 pounds per square foot (psf) for dead plus

live loads. Footings at least 15 inches wide, placed at least 18 inches below the lowest adjacent final grade, may be designed for a maximum soil bearing pressure of 2,100 psf for dead plus live loads.

The above values are net pressures; therefore, the weight of the foundations and the backfill over the foundations may be neglected when computing dead loads. The values apply to the maximum edge pressure for foundations subjected to eccentric loads or overturning. The recommended pressures apply for the total of dead plus frequently applied live loads, and incorporate a factor of safety of at least 3.0. The allowable bearing pressures may be increased by one-third for temporary wind or seismic loading.

The resultant of the combined vertical and lateral seismic loads should act within the middle one-third of the footing width. The maximum calculated edge pressure under the toe of foundations subjected to eccentric loads or overturning should not exceed the increased allowable pressure. Foundations should be setback from slopes per the California Building Code.

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against compacted fill, passive earth pressure may be considered to be developed at a rate of 300 pounds per square foot per foot of depth. Base friction may be computed at 0.30 times the normal load. Base friction and passive earth pressure may be combined without reduction. These values are for dead load plus live load and may be increased by one-third for wind or seismic loading.

Because of the presence of expansive soils at depths at the site, footings should be reinforced with a minimum of two # 4 rebars, one near the top and one near the bottom of the footings.

The preceding recommendations to counteract generally low expansive soil activity should be considered minimum and should be revised upon the completion of the site grading. More stringent parameters for design of foundations on expansive soils can be specified by a structural engineer experienced in these matters.

Settlement

Total settlement of individual foundations will vary depending on the width of the foundation and the actual load supported. Maximum settlement of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be on the

order of 0.5 inches. Differential settlements between adjacent footings should be about one-half of the total settlement or 0.25 inches. Settlement of all foundations is expected to occur rapidly, primarily as a result of elastic compression of supporting soils as the loads are applied, and should be essentially completed shortly after initial application of the loads.

Building Area Slab-on-Grade Design

Concrete floor slabs should bear on a minimum of 24 inches of compacted soil over competent alluvium. The compacted soil should have a density of at least 90 percent relative compaction (ASTM D 1557). The final pad surfaces should be rolled to provide smooth, dense surfaces upon which to place the concrete.

Due to the presence of expansive soils at depths at the site, minimum slab reinforcement should consist of # 3 rebars placed at a maximum spacing of 18 inches on center, each way. Unless more stringent parameters are given by the structural engineer, the slab thickness should be a minimum of 4 inches.

Prior to placing concrete, the upper 12-inches of the subgrade soil should be pre-saturated to 2 to 4 percent over optimum moisture content.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor barrier. This barrier may consist of an impermeable membrane. Two inches of sand over the membrane will reduce punctures and aid in obtaining a satisfactory concrete cure. The sand should be moistened just prior to the placing of concrete.

The slabs should be protected from rapid and excessive moisture loss which could result in slab curling. Careful attention should be given to slab curing procedures, as the site area is subject to large temperature extremes, humidity, and strong winds.

These recommendations to counteract generally low expansive soil activity should be considered preliminary and should be revised upon the completion of the site grading. The given parameters are also subject to review of the project structural engineer experienced in expansive soil issues.

Exterior Flatwork

To provide adequate support, exterior flatwork improvements should rest on a minimum of 12 inches of soil compacted to a relative compaction of at least 90 percent (ASTM D 1557).

Due to the presence of expansive soils at depths at the site, sidewalks, patio slabs, and driveways with a minimum dimension greater than 5 feet should be reinforced with # 3 rebars placed at a maximum spacing of 18 inches on center, each way. Reinforcement for curbing should be one continuous # 4 rebar at top and bottom. In addition, it is recommended that sidewalks, patio slabs, curbs, etc., have a thickness of at least 4 inches, with saw cuts every 10 feet or less. Driveways should be at least 6-inch thick, with saw cuts every 15 feet or less.

Flatwork areas should be pre-saturated to 2 to 4 percent over optimum prior to placing concrete.

Flatwork surface should be sloped a minimum of 1 percent away from buildings and slopes, to approved drainage structures.

Again, these recommendations to mitigate generally low expansive soil activity should be considered preliminary and should be revised upon the completion of the site grading.

The given parameters are also subject to review of the project structural engineer experienced in expansive soil issues.

Wall Pressures

The design of footings for retaining walls should be performed in accordance with the recommendations described earlier under Preparation of Foundation Areas and Foundation Design. For design of retaining wall footings, the resultant of the applied loads should act in the middle one-third of the footing, and the maximum edge pressure should not exceed the basic allowable value without increase.

For design of retaining walls unrestrained against movement at the top, we recommend an equivalent fluid density of 45 pounds per cubic foot (pcf) be used. This assumes level backfill consisting of recompacted, non-expansive, soils placed against the structures and

within the back cut slope extending upward from the base of the stem at 35 degrees from the vertical or flatter.

Retaining structures subject to uniform surcharge loads within a horizontal distance behind the structures equal to the structural height should be designed to resist additional lateral loads equal to 0.35 times the surcharge load. Any isolated or line loads from adjacent foundations or vehicular loading will impose additional wall loads and should be considered individually.

As noted before, some clayey, expansive soils are present at the site. Since these materials have a very low permeability, very uncertain behavior, and exert much higher lateral earth pressures on retaining structures, they should not be used as wall backfills.

To avoid over stressing or excessive tilting during placement of backfill behind walls, heavy compaction equipment should not be allowed within the zone delineated by a 45 degree line extending from the base of the wall to the fill surface. The backfill directly behind the walls should be compacted using light equipment such as hand operated vibrating plates and rollers. No material larger than 3 inches in diameter should be placed in direct contact with the wall.

Wall pressures should be verified prior to construction, when the actual backfill materials and conditions have been determined. Recommended pressures are applicable only to level, non-expansive, properly drained backfill (with no additional surcharge loadings). If inclined backfills are proposed, this firm should be contacted to develop appropriate active earth pressure parameters. Toe bearing pressure for non-structural walls on soils, not prepared as described earlier under Preparation of Foundation Areas, should not exceed California Building Code values, (CBC Table 18-1-A).

Preliminary Pavement Design

Testing and design for preliminary on-site pavement was conducted in accordance with the California Highway Design Manual. Based upon our preliminary sampling and testing, and upon traffic indices supplied by the City of Victorville, it appears that the structural sections tabulated below should provide satisfactory pavements for the subject improvements:

Area	T.I.	Design R-value	Preliminary Section
Interior Streets	6.0	30	0.25' AC/0.70' AB
Begonia Road Cantina Drive Mesa Linda Street	8.0	30	0.40' AC/0.90' AB
Seneca Road	10.0	30	0.50' AC/1.20' AB
AC - Asphalt Concrete			
AB - Class 2 Aggregate Base			

The above structural sections are predicated upon 90 percent relative compaction (ASTM D 1557) of all utility trench backfills and 95 percent relative compaction (ASTM D 1557) of the upper 12 inches of street subgrade soils and of any aggregate base utilized. In addition, the aggregate base should meet Caltrans specifications for Class 2 Aggregate Base.

The above pavement designs were based upon the results of preliminary sampling and testing, and should be verified by additional sampling and testing when the actual subgrade soils are exposed.

Infiltration

Based upon our field investigation and infiltration test data, a clear water absorption rate of 0.8 inches per hour for the proposed eastern basin and a clear water absorption rate of 3.1 inches per hour for the proposed western basin appears applicable. A factor of safety should be applied to each rate as indicated by the San Bernardino County Stormwater Program, Technical Guidance Document for Water Quality Management Plans (WQMP). The design infiltration rates should be adjusted using a factor of safety determined using Worksheet H (2013).

To ensure continued infiltration capability of infiltration areas, a program to maintain each basin should be considered. This program should include periodic removal of accumulated materials, which can slow the infiltration and decrease the water quality. Materials to be removed from the catch basin areas typically consist of litter, dead plant matter, and soil

fines (silts and clays). Proper maintenance of the system is critical. A maintenance program should be prepared and properly executed. At a minimum, the program should be as outlined in the San Bernardino County Stormwater Program, Technical Guidance Document for Water Quality Management Plans (WQMP).

The program should also incorporate the recommendations contained within this report and any other jurisdictional agency requirements.

- Systems should be set back at least 10 feet from foundations or as required by the design engineer.

- Any geotextile filter fabric utilized should consist of such that it prevents soil piping but has greater permeability than the existing soil.

- During site development, care should be taken to not disturb the area(s) proposed for infiltration as changes in the soil structure could occur resulting in a change of the soil infiltration characteristics.

Sulfate Protection

The results of sulfate tests conducted on selected subgrade soils expected to be encountered at foundation levels are presented in Appendix C.

Based on the test results it appears that there is a negligible sulfate exposure to concrete elements in contact with on-site soils. For negligible sulfate exposures, the 2001 CBC does not recommend special design criteria for concrete elements in contact with such materials. Further testing for soluble sulfate content should be conducted at or near the completion of the rough grading to verify the statement above.

Construction Monitoring

Post investigative services are an important and necessary continuation of this investigation. Project plans and specifications should be reviewed by this firm prior to construction to confirm that the intent of the recommendations presented herein have been incorporated into the design. Verification testing for R-value, expansion potential, Atterberg limits (if applicable), and soluble sulfate content should be conducted during the rough grading activities.

During construction, sufficient and timely geotechnical observation and testing should be provided to correlate the findings of this investigation with the actual subsurface conditions exposed during construction. Items requiring observation and testing include, but are not necessarily limited to, the following:

1. Site preparation-stripping and removals.

2. Excavations, including approval of the bottom of excavation prior to backfilling.

3. Scarifying and recompacting prior to fill placement.

4. Subgrade preparation for pavements and slabs-on-grade.

5. Placement of engineered compacted fill and backfill, including approval of fill materials and the performance of sufficient density tests to evaluate the degree of compaction being achieved.

6. Foundation excavations, including footings.

LIMITATIONS

This report contains geotechnical conclusions and recommendations developed solely for use by Tom Dodson & Associates, and their design consultants, for the purposes described earlier. It may not contain sufficient information for other uses or the purposes of other parties. The contents should not be extrapolated to other areas or used for other facilities without consulting LOR Geotechnical Group, Inc.

The recommendations are based on interpretations of the subsurface conditions concluded from information gained from subsurface explorations, and a surficial site reconnaissance.

The interpretations may differ from actual subsurface conditions, which can vary horizontally and vertically across the site. Due to possible subsurface variations, all aspects of field construction addressed in this report should be observed and tested by the project geotechnical consultant.

If parties other than LOR Geotechnical Group, Inc., provide construction monitoring services, they must be notified that they will be required to assume responsibility for the geotechnical phase of the project being completed by concurring with the recommendations provided in this report or by providing alternative recommendations.

The report was prepared using generally accepted geotechnical engineering practices under the direction of a state licensed geotechnical engineer. No warranty, expressed or implied, is made as to conclusions and professional advice included in this report. Any persons using this report for bidding or construction purposes should perform such independent investigations as deemed necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Governmental Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a significant amount of time without a review by LOR Geotechnical Group, Inc., verifying the suitability of the conclusions and recommendations.

CLOSURE

It has been a pleasure to assist you with this project. We look forward to being of further assistance to you as construction begins. Should conditions be encountered during construction that appear to be different than indicated by this report, please contact this office immediately in order that we might evaluate their effect.

Should you have any questions regarding this report, please do not hesitate to contact this office at your convenience.

Respectfully submitted,
LOR Geotechnical Group, Inc.

Robert M. Markoff, CEG
Engineering Geologist

John P. Leuer, GE 2030
President

RMM:JPL:ss

Distribution: Addressee (2) and PDF via email tda@tdaenv.com

REFERENCES

American Society of Civil Engineers, 2016, Minimum Design Load for Buildings and Other Structures, ASCE 7-16.

California Building Standards Commission and International Conference of Building Officials, 2019, California Building Code, 2019 Edition.

California Department of Water Resources, 2021, http://wdl.water.ca.gov/waterdatalibrary/

City of Victorville, 1st Submittal Review Comments, dated January 13, 2023.

CDM Smith, Inc., 2013 Technical Guidance Document for Water Quality Management Plans for the County of San Bernardino Area Wide Stormwater Program, June 7, 2013.

Dibblee, T.W. Jr., 1967, Preliminary Geologic Map of the Victorville Quadrangle, California, U.S. Geological Survey Mineral Investigations Field Studies Map MF-229, Scale 1:62,500.

Google Earth, 2021, Imagery from various years, www.google.com/earth.

Hart, E.W. and W.A. Bryant, 2003, Fault-Rupture Hazard Zones in California, California Dept. of Conservation Division of Mines and Geology Special Publication 42.

Historic Aerials, 2021, Imagery from various years, www.historicaerials.com.

Larson, R., and Slosson, J., 1992, The Role of Seismic Hazard Evaluation in Engineering Reports, in Engineering Geology Practice in Southern California, AEG Special Publication Number 4, pp 191-194.

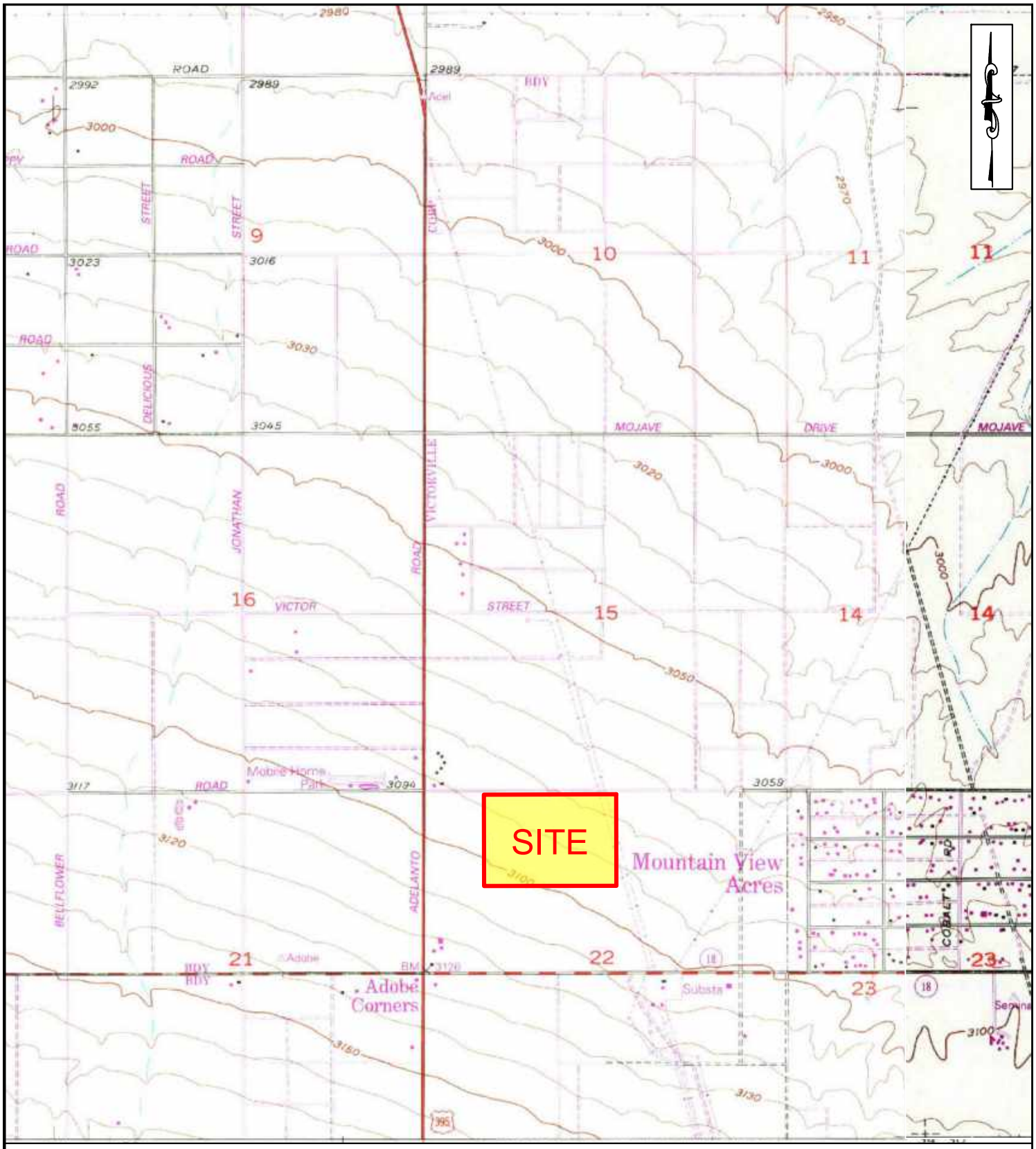
LOR Geotechnical Group, Inc., 2006, Preliminary Geotechnical Investigation, Tract No. 16681, Victorville, California, Project No. 32345.1, dated November 30, 2006.

Ludwig Engineering, 2022, Tentative Tract No. 20500 Grading, dated August 15, 2022.

USGS, 2021, https://earthquake.usgs.gov/earthquakes/map/.

APPENDIX A

Index Map, Site Plan, Regional Geologic Map, and Historical Seismicity Maps



INDEX MAP

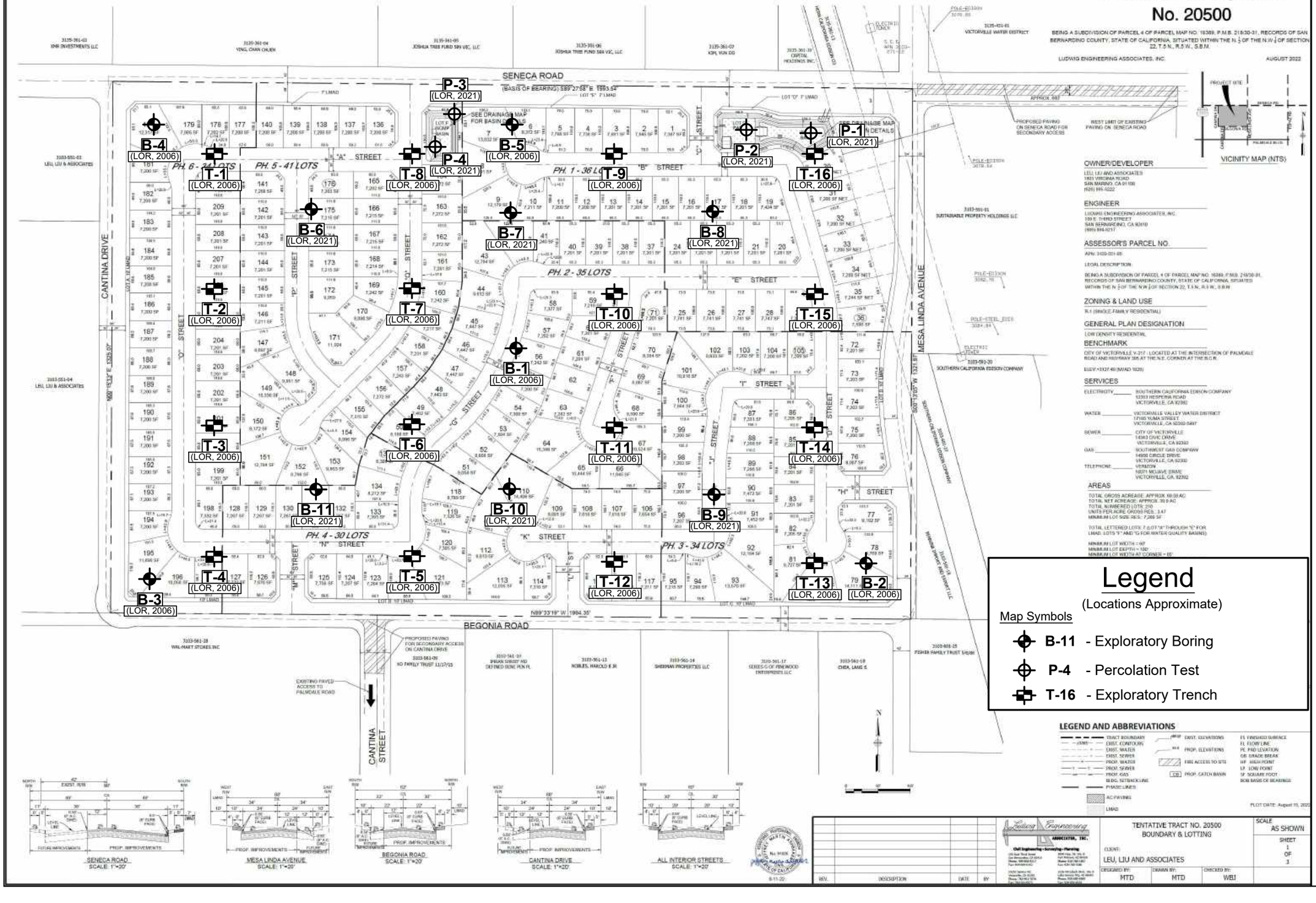
PROJECT:	Tentative Tract No. 20500	**PROJECT NO.:**	33870.1R
CLIENT:	Tom Dodson and Associates	**ENCLOSURE:**	A-1
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	revised March 2023
		SCALE:	1" ≈ 2,000'

IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, CALIFORNIA

TENTATIVE TRACT MAP
No. 20500

BEING A SUBDIVISION OF PARCEL 4 OF PARCEL MAP NO. 16389, P.M.B. 218/30-31, RECORDS OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA, SITUATED WITHIN THE N. ½ OF THE N.W.¼ OF SECTION 22, T.5 N., R.5 W., S.B.M.

LUDWIG ENGINEERING ASSOCIATES, INC. — AUGUST 2022



OWNER/DEVELOPER
LEU, LIU AND ASSOCIATES
1803 VIRGINIA ROAD
SAN MARINO, CA 91108
(626) 995-5222

ENGINEER
LUDWIG ENGINEERING ASSOCIATES, INC.
109 E. THIRD STREET
SAN BERNARDINO, CA 92410
(909) 884-9217

ASSESSOR'S PARCEL NO.
APN: 3103-551-05

LEGAL DESCRIPTION
BEING A SUBDIVISION OF PARCEL 4 OF PARCEL MAP NO. 16389, P.M.B. 218/30-31, RECORDS OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA, SITUATED WITHIN THE N. ½ OF THE N.W.¼ OF SECTION 22, T.5 N., R.5 W., S.B.M.

ZONING & LAND USE
R-1 (SINGLE FAMILY RESIDENTIAL)

GENERAL PLAN DESIGNATION
LOW DENSITY RESIDENTIAL

BENCHMARK
CITY OF VICTORVILLE V-217 : LOCATED AT THE INTERSECTION OF PALMDALE ROAD AND HIGHWAY 395 AT THE N.E. CORNER AT THE B.C.R.
ELEV.=3127.40 (NAVD 1929)

SERVICES
ELECTRICITY _____ SOUTHERN CALIFORNIA EDISON COMPANY
12353 HESPERIA ROAD
VICTORVILLE, CA 92392

WATER _____ VICTORVILLE VALLEY WATER DISTRICT
17185 YUMA STREET
VICTORVILLE, CA 92393-5497

SEWER _____ CITY OF VICTORVILLE
14343 CIVIC DRIVE
VICTORVILLE, CA 92393

GAS _____ SOUTHWEST GAS COMPANY
14998 CIRCLE DRIVE
VICTORVILLE, CA 92392

TELEPHONE _____ VERIZON
16071 MOJAVE DRIVE
VICTORVILLE, CA 92392

AREAS
TOTAL GROSS ACREAGE: APPROX. 69.59 AC
TOTAL NET ACREAGE: APPROX. 39.9 AC
TOTAL NUMBERED LOTS: 210
UNITS PER ACRE (NDDS) RCD.: 3.47
MINIMUM LOT SIZE: RES.: 7,200 SF

TOTAL LETTERED LOTS: 7 (LOT "A" THROUGH "G" FOR LMAD, LOTS "F" AND "G FOR WATER QUALITY BASINS)

MINIMUM LOT WIDTH = 60'
MINIMUM LOT DEPTH = 100'
MINIMUM LOT WIDTH AT CORNER = 65'

Legend
(Locations Approximate)

Map Symbols

- **B-11** - Exploratory Boring
- **P-4** - Percolation Test
- **T-16** - Exploratory Trench

LEGEND AND ABBREVIATIONS
TRACT BOUNDARY — EXIST. CONTOURS — EXIST. WATER — EXIST. SEWER — PROP. WATER — PROP. SEWER — PROP. GAS — BLDG. SETBACK LINE — PHASE LINES — AC PAVING — LMAD
EXIST. ELEVATIONS — PROP. ELEVATIONS — FIRE ACCESS TO SITE — PROP. CATCH BASIN
FF FINISHED SURFACE — FL FLOW LINE — PE PAD ELEVATION — GB GRADE BREAK — HP HIGH POINT — LP LOW POINT — SF SQUARE FOOT — BOB BASIS OF BEARINGS

PLOT DATE: August 19, 2022

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering Associates, Inc. — Civil Engineering • Surveying • Planning

TENTATIVE TRACT NO. 20500
BOUNDARY & LOTTING

CLIENT: LEU, LIU AND ASSOCIATES

SCALE: AS SHOWN
SHEET 1 OF 3

DESIGNED BY:	DRAWN BY:	CHECKED BY:
MTD	MTD	WBJ

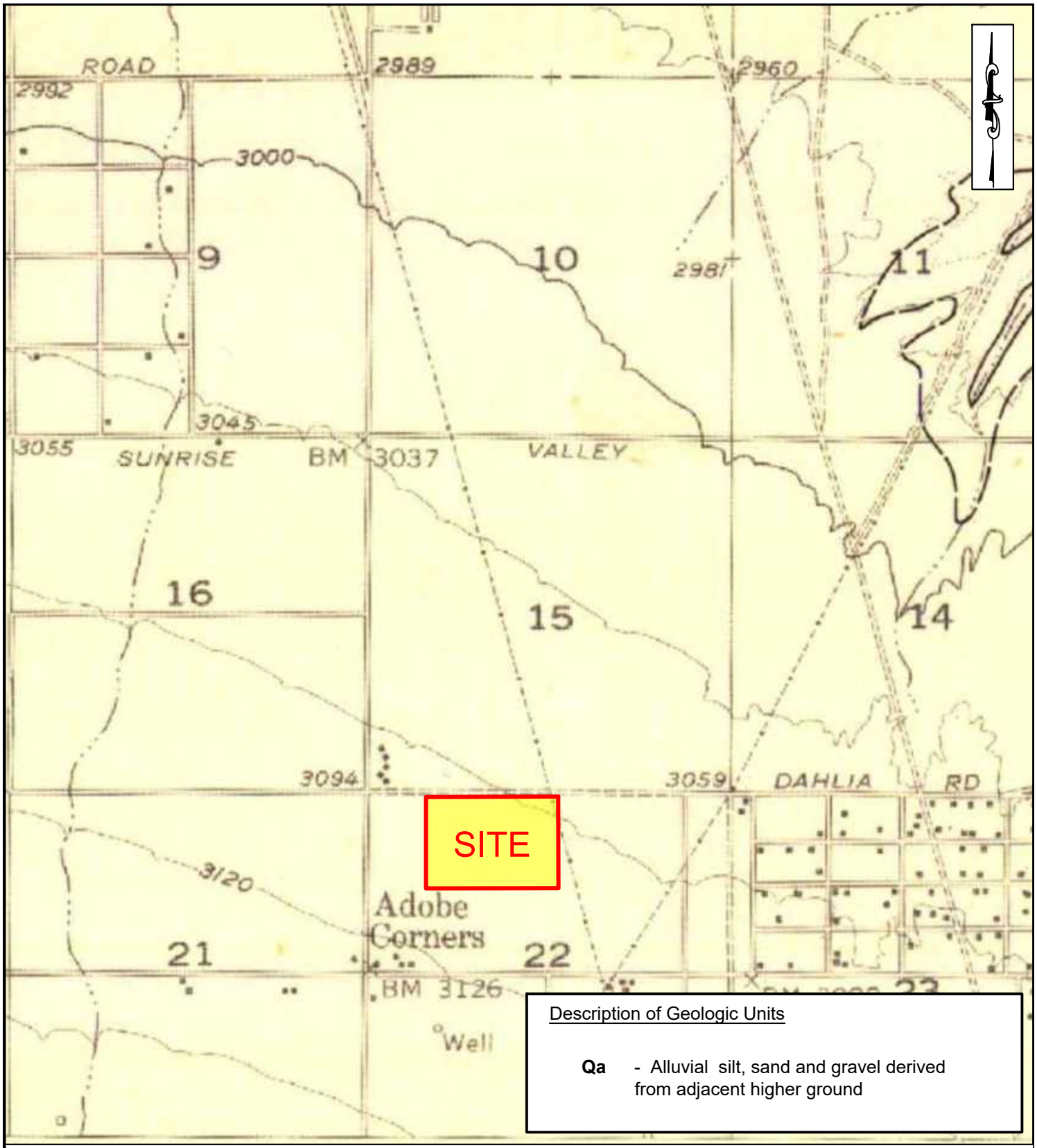
SITE PLAN

PROJECT NO.:	33780.1R
ENCLOSURE:	A-2
DATE:	revised March 2023
SCALE:	1" ≈ 225'

PROJECT: Tentative Tract No. 20500

CLIENT: Tom Dodson and Associates

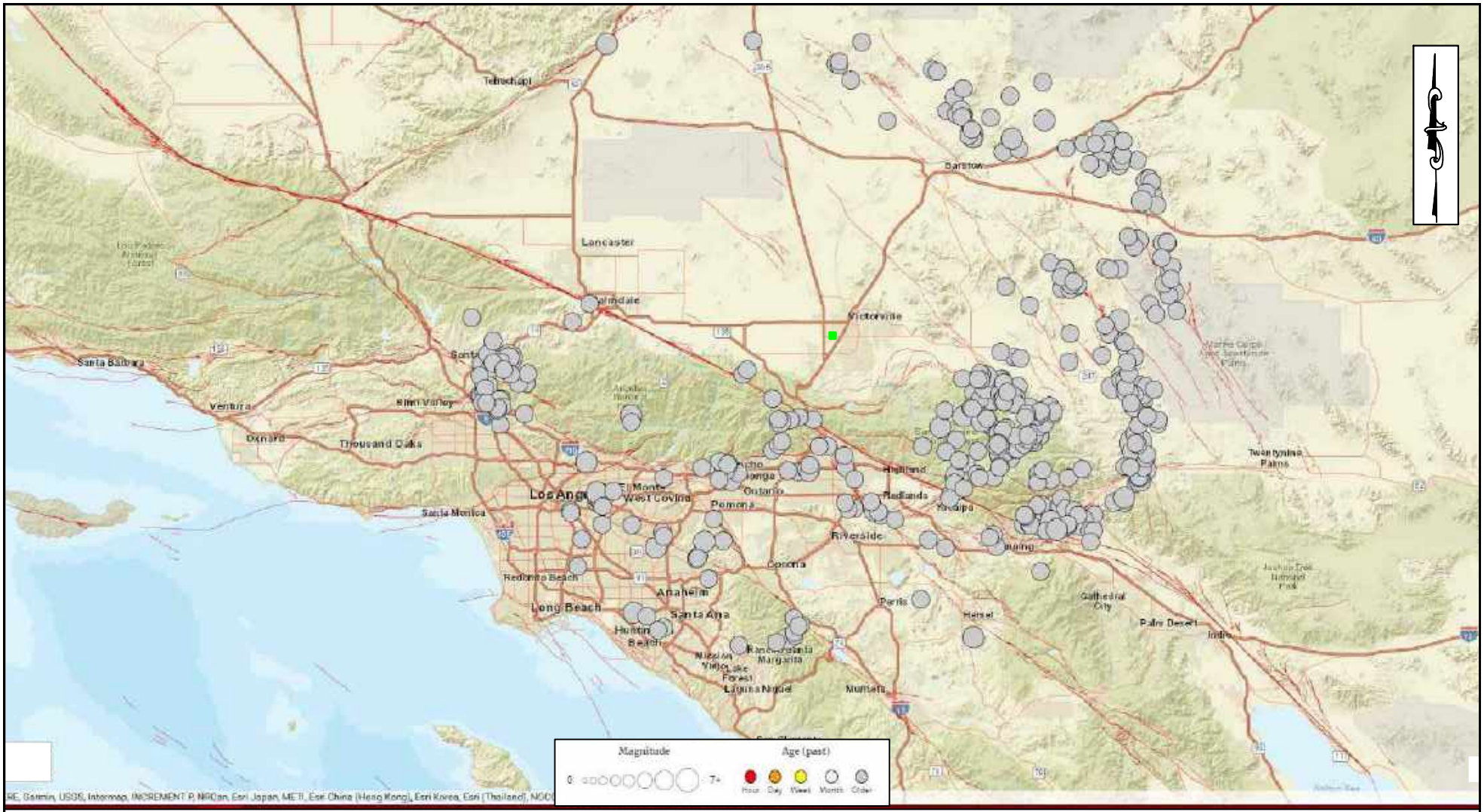
LOR GEOTECHNICAL GROUP, INC.



REGIONAL GEOLOGIC MAP

(Dibblee, 1960)

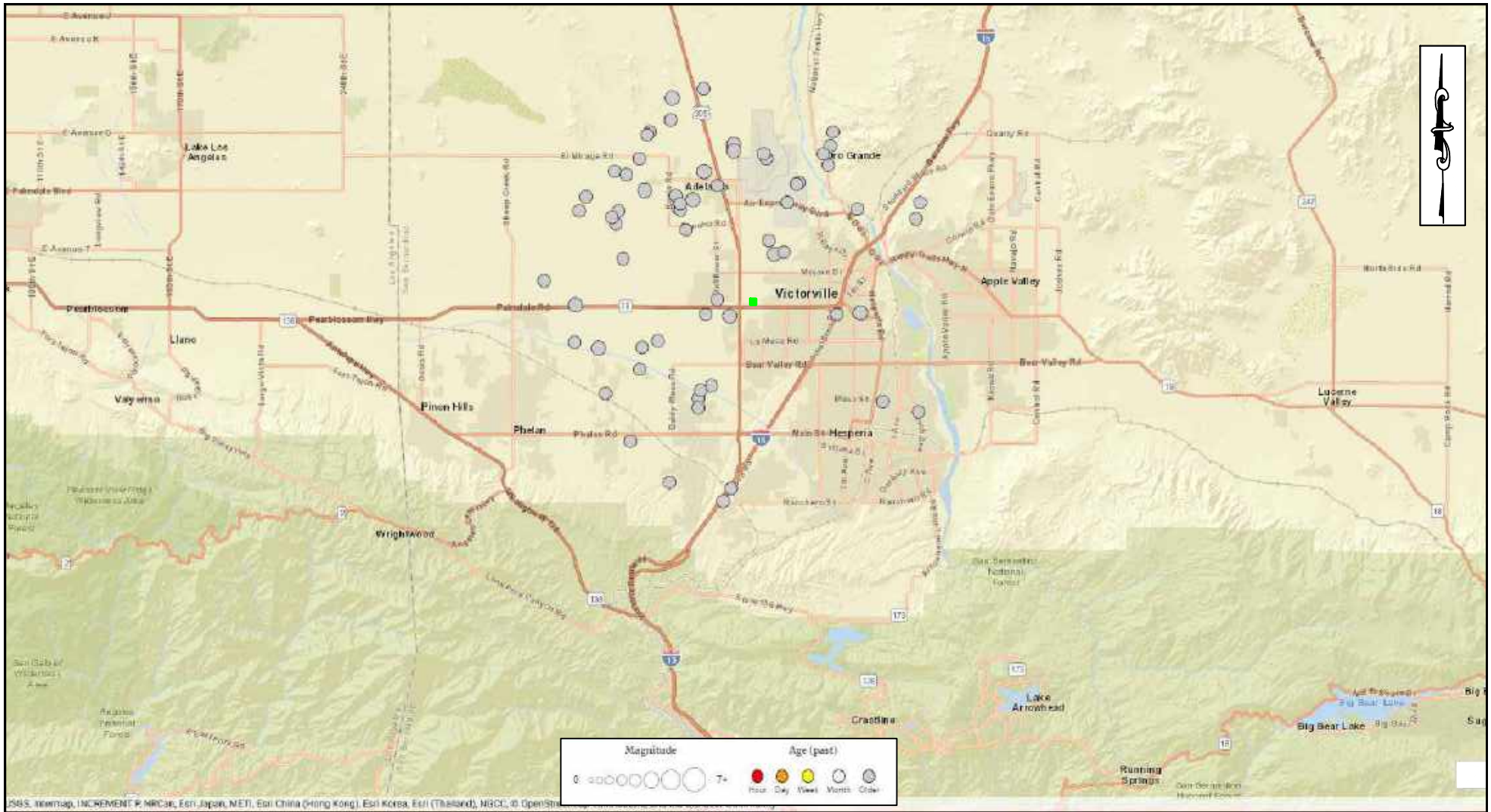
PROJECT:	Tentative Tract No. 20500	**PROJECT NO.:**	33870.1R
CLIENT:	Tom Dodson and Associates	**ENCLOSURE:**	A-3
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	revised March 2023
		SCALE:	1" ≈ 4,000'



U.S. Geologic Survey (2023) real-time earthquake epicenter map. Plotted are 433 epicenters of instrument-recorded events from 01/01/32 to present (03/17/23) of local magnitude greater than M4.0 within a radius of ~62 miles (100 kilometers) of the site. Location accuracy varies. The site is indicated by the green square (■). The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 100km Radius

PROJECT:	Tentative Tract No. 20500	**PROJECT NO.:**	33870.1R
CLIENT:	Tom Dodson and Associates	**ENCLOSURE:**	A-4
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	revised March 2023
		SCALE:	1" ≈ 40km



U.S. Geologic Survey (2023) real-time earthquake epicenter map. Plotted are 65 epicenters of instrument-recorded events from 01/01/78 to present (03/17/23) of local magnitude greater than M1.0 within a radius of ~9.2 miles (15 kilometers) of the site. Location accuracy varies. The site is indicated by the green square (■). The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 15km Radius

PROJECT:	Tentative Tract No. 20500	**PROJECT NO.:**	33870.1R
CLIENT:	Tom Dodson and Associates	**ENCLOSURE:**	A-5
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	revised March 2023
		SCALE:	1" ≈ 10km

APPENDIX B

Field Investigation Program and Boring/Trench Logs

APPENDIX B
FIELD INVESTIGATION

Subsurface Exploration

Our subsurface exploration of the site was conducted initially in 2006 (LOR, 2006) and again in December 2021. Combined, this work consisted of drilling a total of 11 exploratory borings to depths between approximately 21 and 50 feet below the existing ground surface using a Mobile B-61 drill rig. In addition, 16 exploratory trenches excavated using backhoe equipment were logged, sampled, and backfilled during our 2006 site investigation. The approximate locations of the borings and trenches are shown on Enclosure A-2 within Appendix A.

The drilling exploration was conducted using a Mobile B-61 drill rig equipped with 8-inch diameter hollow stem augers. The soils were continuously logged by a geologist from this firm who inspected the site, created detailed logs of the borings, obtained undisturbed, as well as disturbed, soil samples for evaluation and testing, and classified the soils by visual examination in accordance with the Unified Soil Classification System.

Relatively undisturbed samples of the subsoils were obtained at a maximum interval of 5 feet. Samples were recovered by using a California split barrel sampler of 2.50-inch inside diameter and 3.25-inch outside diameter or a Standard Penetration Test (SPT) sampler. The samplers were driven by a 140-pound automatic trip hammer dropped from a height of 30 inches. The number of hammer blows required to drive the sampler into the ground the final 12 inches were recorded and further converted to an equivalent SPT N-values which are included in the boring logs, Enclosures B-1 through B-11.

The undisturbed soil samples were retained in brass sample rings of 2.42 inches in diameter and 1.00 inch in height, and placed in sealed plastic containers. Disturbed soil samples were obtained at selected levels within the borings and placed in sealed containers for transport to our geotechnical laboratory.

Trenches were excavated using a New Holland 75B backhoe equipped with a 24-inch bucket. In-place density tests were taken in accordance with ASTM D 2992-01, the Nuclear Gauge Method. Bulk samples of encountered materials were obtained and returned to our geotechnical laboratory in sealed containers for further testing and evaluation.

All samples obtained were taken to our geotechnical laboratory for storage and testing. Detailed logs of the borings and trenches are presented on the enclosed Boring and Trench Logs, Enclosures B-1 through B-27. A Boring and Trench Log Legend is presented on Enclosure B-i. A Soil Classification Chart is presented as Enclosure B-ii.

CONSISTENCY OF SOIL

SANDS

SPT BLOWS	CONSISTENCY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
Over 50	Very Dense

COHESIVE SOILS

SPT BLOWS	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium
8-15	Stiff
15-30	Very Stiff
30-60	Hard
Over 60	Very Hard

SAMPLE KEY

Symbol	Description
	INDICATES CALIFORNIA SPLIT SPOON SOIL SAMPLE INDICATES BULK SAMPLE INDICATES SAND CONE OR NUCLEAR DENSITY TEST INDICATES STANDARD PENETRATION TEST (SPT) SOIL SAMPLE

TYPES OF LABORATORY TESTS

1	Atterberg Limits
2	Consolidation
3	Direct Shear (undisturbed or remolded)
4	Expansion Index
5	Hydrometer
6	Organic Content
7	Proctor (4", 6", or Cal216)
8	R-value
9	Sand Equivalent
10	Sieve Analysis
11	Soluble Sulfate Content
12	Swell
13	Wash 200 Sieve

BORING LOG LEGEND

PROJECT: Tentative Tract No. 20500	**PROJECT NO.:** 33780.1R
CLIENT: Tom Dodson & Associates	**ENCLOSURE:** B-i
LOR GEOTECHNICAL GROUP, INC.	**DATE:** Revised March 2023

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	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
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	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
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	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
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE	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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

PARTICLE SIZE LIMITS

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
12"	3"	3/4"	No . 4	No. 10	No. 40	200	

(U.S. STANDARD SIEVE SIZE)

SOIL CLASSIFICATION CHART

PROJECT:	Tentative Tract No. 20500	**PROJECT NO.:**	33780.1R
CLIENT:	Tom Dodson & Associates	**ENCLOSURE:**	B-ii
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	Revised March 2023

LOG OF BORING B-1

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	29		2.4		118.3	■		SM	@ 0 feet ALLUVIUM: SILTY SAND with trace gravel to 1/2", approximately 25% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 15% silty fines, light brown, dry, loose.
5	29-5"		2.5		107.4	■			@ 2 feet, SILTY SAND, approximately 10% coarse grained sand, 25% medium grained sand, 50% fine grained sand, 15% silty fines, light reddish brown, dry, trace pinhole porosity.
10	29-5"		3.6		118.2	■			@ 10 feet, becomes slightly finer grained.
15	29-5"		7.4		104.2	■		SW	@ 15 feet, WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, reddish brown, dry.
20	29-6"		5.8		104.4	■		SP	@ 20 feet, POORLY GRADED SAND, approximately 10% coarse grained sand, 35% medium grained sand, 50% fine grained sand, 5% silty fines, tan, dry.
25	53-11"		2.3		115.5	■		SP SM	@ 25 feet, POORLY GRADED SAND with silt, approximately 10% coarse grained sand, 35% medium grained sand, 45% fine grained sand, 10% silty fines, tan, dry.
30	49		1.4		110.7	■		SW	@ 30 feet, WELL GRADED SAND, approximately 25% coarse grained sand, 35% medium grained sand, 35% fine grained sand, 5% silty fines, tan, dry.
35	47		1.7		111.2	■		SP	@ 35 feet, POORLY GRADED SAND, approximately 5% coarse grained sand, 30% medium grained sand, 60% fine grained sand, 5% silty fines, grayish brown, dry.
40	49-11"		1.2		108.2	■			
45	29-5"		4.1			■		ML	@ 45 feet, SANDY SILT, approximately 20% fine grained sand, 80% silty fines, gray, dry, trace secondary calcite.
50	29-4"					■			@ 50 feet, no recovery.
55									END OF BORING No fill No groundwater No bedrock

TEST DATA

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	Liu, David	**ELEVATION:**	3090
		DATE DRILLED:	November 1, 2006
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	CME 55
		HOLE DIA.: 8"	**ENCLOSURE:** B-1

LOG OF BORING B-2

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0								SM	@ 0 feet ALLUVIUM: SILTY SAND with trace gravel to 1/2", approximately 20% coarse grained sand, 25% medium grained sand, 40% fine grained sand, 15% silty fines, light tan, dry, loose.
	11	13	1.5		116.5			SW SM	@ 2 feet, WELL GRADED SAND with silt, approximately 30% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 10% silty fines, light reddish brown, dry.
5	14		2.2		113.2				@ 5 feet, becomes slightly coarser grained, trace gravel to 1/2".
	26		5.6					SC	@ 7 feet, CLAYEY SAND, approximately 20% coarse grained sand, 25% medium grained sand, 30% fine grained sand, 25% clayey fines of low plasticity, reddish brown, damp.
10	37		3.9		115.7			SW	@ 10 feet, WELL GRADED SAND, approximately 10% gravel to /12", 25% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 5% silty fines, brown, dry.
15	29-6"		3.7		113.4			SP SM	@ 15 feet, POORLY GRADED SAND with silt, approximately 5% coarse grained sand, 15% medium grained sand, 70% fine grained sand, 10% silty fines, light reddish brown, dry.
20	29-6"		4.1		116.9			SM	@ 20 feet, SILTY SAND, approximately 15% coarse grained sand, 25% medium grained sand, 40% fine grained sand, 20% silty fines, light brown, dry, some secondary calcite.
25	29-5"		2.5		113.5				END OF BORING No fill No groundwater No bedrock
30									

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	Liu, David	**ELEVATION:**	3094
		DATE DRILLED:	November 1, 2006
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	CME 55
		HOLE DIA.: 8"	**ENCLOSURE:** B-2

LOG OF BORING B-3

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0								SM	@ 0 feet ALLUVIUM: SILTY SAND, approximately 5% gravel to 1/2", 20% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 15% silty fines, light brown, dry, loose.
	14		1.5		119.0			SW SM	@ 2 feet, WELL GRADED SAND with silt, approximately 20% coarse grained sand, 30% medium grained sand, 40% fine grained sand, 10% silty fines, light brown, dry.
5	11		1.1					SW	@ 5 feet, WELL GRADED SAND, approximately 25% coarse grained sand, 30% medium grained sand, 40% fine grained sand, 5% silty fines, light brown, dry, rings disturbed.
	24		2.2		117.5			SW SM	@ 7 feet WELL GRADED SAND with silt, trace gravel to 1/2", approximately 25% coarse grained sand, 30% medium grained sand, 40% fine grained sand, 5% silty fines, light red, brown, dry.
10	24		4.0		116.5			SW	@ 10 feet WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, light reddish brown, dry.
15	45		1.3		113.8				@ 15 feet, becomes slightly finer grained.
20	29-6"		1.5		120.1				
25	29-5"		3.6		116.5			ML	@ 25 feet, SANDY SILT, approximately 10% medium grained sand, 30% fine grained sand, 60% silty fines, tan, dry, trace pinhole porosity.
30									END OF BORING No fill No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	Liu, David	**ELEVATION:**	3103
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	November 1, 2006
		EQUIPMENT:	CME 55
		HOLE DIA.: 8"	**ENCLOSURE:** B-3

LOG OF BORING B-4

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0		9, 10						SM	@ 0 feet ALLUVIUM: SILTY SAND, approximately 5% gravel, 10% coarse grained sand, 40% medium grained sand, 30% fine grained sand, 15% silty fines, light brown, dry, loose.
	11		1.4					SW SM	@ 2 feet, WELL GRADED SAND with silt, approximately 5% gravel to 1/2", 20% coarse grained sand, 25% medium grained sand, 40% fine grained sand, 10% silty fines, light brown, dry.
5	12		1.2		111.5				
	29-6"		8.3		123.7			SM	@ 7 feet, SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 20% silty fines with trace clay, reddish brown, dry, trace thin calcite stringers.
10	49		6.9		113.9			ML	@ 10 feet, SANDY SILT, approximately 25% fine grained sand, 75% silty fines, white, dry, heavy calcification, some pinhole porosity.
15	29-6"		10.9		97.7				
20	29-6"								@ 20 feet, no recovery.
25	45		1.1		113.7			SW	@ 25 feet, WELL GRADED SAND with gravel, approximately 15% gravel to 1/2", 25% coarse grained sand, 25% medium grained sand, 30% fine grained sand, 5% silty fines, tan, dry.
30									END OF BORING No fill No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	Liu, David	**ELEVATION:**	3090
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	November 1, 2006
		EQUIPMENT:	CME 55
		HOLE DIA.: 8"	**ENCLOSURE:** B-4

LOG OF BORING B-5

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	16		2.2		118.7	■		SM	@ 0 feet ALLUVIUM: SILTY SAND, approximately 5% gravel to 1/2", 20% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 15% silty fines, light brown, dry, loose.
5	12		2.0		111.8	■		SW	@ 5 feet, WELL GRADED SAND, approximately 5% gravel to 1/2", 25% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, brown, dry.
	36		12.5		121.4	■		SC	@ 7 feet, CLAYEY SAND, approximately 15% coarse grained sand, 25% medium grained sand, 40% fine grained sand, 20% clayey fines of low plasticity, mottled gray-reddish brown, damp.
10	22		18.3		109.2	■			@ 10 feet, becomes reddish brown.
15	41		6.1		129.2	■		SW SM	@ 15 feet, WELL GRADED SAND with silt, approximately 10% gravel to 1/2", 20% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 10% silty fines, reddish brown, moist.
20	7		12.8		111.8	■		SM	@ 20 feet, SILTY SAND, approximately 5% coarse grained sand, 15% medium grained sand, 65% fine grained sand, 15% silty fines, light reddish brown, damp.
25	56-11"		2.4		181.6	■		ML	@ 25 feet, SANDY SILT, approximately 10% medium grained sand, 25% fine grained sand, 65% silty fines, brown, damp.
30	26		1.7		102.4	■		SP	@ 30 feet, POORLY GRADED SAND, approximately 10% coarse grained sand, 25% medium grained sand, 60% fine grained sand, 5% silty fines, gray-tan, dry.
35									END OF BORING
40									No fill No groundwater No bedrock
45									

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	Liu, David	**ELEVATION:**	3083
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	November 1, 2006
		EQUIPMENT:	CME 55
		HOLE DIA.: 8"	**ENCLOSURE:** B-5

LOG OF BORING B-6

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	9	7, 10 ,11	0.8					SM	@ 0 feet, ALLUVIUM: SILTY SAND, approximately 10% fine gravel, 15% coarse grained sand, 20% medium grained sand, 35% fine grained sand, 20% silty fines, light brown, damp, loose to medium dense. @ 2 feet, rings disturbed
5	15		0.8					SW	@ 5 feet, WELL GRADED SAND, approximately 10% fine gravel, 25% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 5% silty fines, light brown, damp, medium dense, rings disturbed.
	62		4.2		114.1			SM	@ 7 feet, SILTY SAND, approximately 10% medium grained sand, 50% fine grained sand, 40% silt with clay, brown to reddish-brown, damp, dense to very dense.
10	60		5.0		113.6				@ 10 feet, grayish-brown with local off-white calcium carbonate lenses.
15	62		1.3		121.8			SW	@ 14± feet, WELL GRADED SAND, approximately 5% fine gravel, 20% coarse grained sand, 35% medium grained sand, 35% fine grained sand, 5% silty fines, light brown, damp, dense.
20	64		2.1		116.5				@ 20 feet, includes local fine grained (SP) layers.
25	49		7.3		126.5			SC	@ 24± feet, CLAYEY SAND, approximately 5% medium grained sand, 50% fine grained sand, 45% clay and silt, reddish-brown, moist dense.
									END OF BORING @ 26.5' No fill No groundwater No bedrock

TEST DATA

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1
CLIENT:	Tom Dodson & Associates	**ELEVATION:**	--
		DATE DRILLED:	December 2, 2021
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-6

LOG OF BORING B-7

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	23		1.1		116.3			SM	@ 0 feet, ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 10% coarse grained sand, 20% medium grained sand, 35% fine grained sand, 30% silty fines, brown, damp, medium dense.
5	36		1.7		108.4				@ 5 feet, sandier but includes trace amounts of clay.
		4, 10, 11						CL	@ 8 feet, SANDY CLAY, approximately 5% medium grained sand, 20% fine grained sand, 75% clay and silt, light reddish-brown, mottled with abundant off-white calcium stringers, damp, stiff.
10	36		4.4		106.2				
15	68 for 11"		0.7					SM	@ 14± feet, SILTY SAND, approximately 20% coarse grained sand, 35% medium grained sand, 25% fine grained sand, 20% silty fines, grayish-brown, dry to damp, dense. @ 15 feet, rings disturbed.
								SP	@ 18± feet, POORLY GRADED SAND, approximately 5% coarse grained sand, 25% medium grained sand, 65% fine grained sand, 5% silty fines, grayish-brown, dry, dense.
20	60		0.8		113.7				END OF BORING @ 21.5'

No fill
No groundwater
No bedrock

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1
CLIENT:	Tom Dodson & Associates	**ELEVATION:**	--
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	December 2, 2021
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-7

LOG OF BORING B-8

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	15	13	0.9					SM	@ 0 feet, ALLUVIUM: SILTY SAND, approximately 10% fine gravel, 15% coarse grained sand, 25% medium grained sand, 30% fine grained sand, 20% silty fines, light brown, damp, medium dense.
									@ 2 feet, rings disturbed.
									below 3.5± feet, sandier.
5	25		1.8		112.6				
10	48		2.5		112.4				@ 10 feet, fine grained (only 5% medium to coarse grained sand) and dense to very dense, slightly reddish-brown.
15	57		3.6		124.7				@ 15 feet, fine grained, dense to very dense, trace of clay.
20	63		2.8		119.6				
									END OF BORING @ 21.5'
									No fill No groundwater No bedrock

TEST DATA

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1	
CLIENT:	Tom Dodson & Associates	**ELEVATION:**	--	
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	December 2, 2021	
		EQUIPMENT:	Mobile B-61	
		HOLE DIA.: 8"	**ENCLOSURE:**	B-8

LOG OF BORING B-9

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
			TEST DATA						
0	26	7, 10, 11	1.3		115.9			SM	@ 0 feet, ALLUVIUM: SLTY SAND, approximately 5% fine gravel, 10% coarse grained sand, 25% medium grained sand, 40% fine grained sand, 20% silty fines, brown, damp, medium dense.
5	25		0.8						@ 5 feet, similar conditions, rings disturbed.
10	68 for 10"		2.4		111.8				@ 10 feet, coarser grained, very dense.
15	76		2.1		111.2				@ 15 feet, fine grained, approximately 80% fine grained sand, 20% silty fines, yellowish-brown in color.
20	61		2.3		121.0				@ 20 feet, slightly sandier.
									END OF BORING @ 21.5' No fill No groundwater No bedrock

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1
CLIENT:	Tom Dodson & Associates	**ELEVATION:**	--
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	December 2, 2021
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-9

LOG OF BORING B-10

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	27		2.4		112.4			SM	@ 0 feet, ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 15% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 20% silty fines, light brown, damp, medium dense.
5	27		0.8						@ 5 feet, slightly sandier (~15% silty fines), rings disturbed.
10	55		3.4		100.2				@ 10 feet, light reddish-brown and finer grained, approixmately 5% medium grained sand, 55% fine grained sand, 40% silty fines, includes minor calcium carbonate as stringers.
15	51		0.8		110.4				@ 15 feet, yellowish-brown, slightly sandier, no calcium carbonate.
20	74		3.2		126.9				@ 20 feet, increase in silt, very dense.
									END OF BORING @ 21'

No fill
No groundwater
No bedrock

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1
CLIENT:	Tom Dodson & Associates	**ELEVATION:**	--
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	December 2, 2021
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-10

LOG OF BORING B-11

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	20	11, 13	0.6					SM	@ 0 feet, ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 10% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 20% silty fines, light brown, damp, loose to medium dense. @ 2 feet, rings disturbed.
5	33		0.9						@ 5 feet, similar to above sample but more dense, rings disturbed.
10	54		4.1		121.2				@ 10 feet, includes traces of clay and calcium carbonate, dense to very dense.
15	78		1.3		119.2				@ 15 feet, sandy, weakly cemented but dense.
20	77		2.6		118.3				END OF BORING @ 21' No fill No groundwater No bedrock

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1
CLIENT:	Tom Dodson & Associates	**ELEVATION:**	--
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	December 2, 2021
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-11

LOG OF TRENCH T-1

DEPTH IN FEET	LABORATORY TESTS	ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	11		0.6				SM	@ 0 feet, TOPSOIL: SILTY SAND, approximately 5% coarse grained sand, 10% medium grained sand, 50% fine grained sand, 35% silty fines, brown, dry, loose, porous.
			2.2	104.9			SM	@ 1.5 feet ALLUVIUM: SILTY SAND, approximately 5% coarse grained sand, 15% medium grained sand, 60% fine grained sand, 30% silty fines, brown, dry, loose.
	7							@ 3 feet, damp.
	13		1.9	106.2				@ 4 feet fines content decreases to approximately 20%.
5							SP	@ 4.5 feet, POORLY GRADED SAND with silt, approximately 10% coarse grained sand, 20% medium grained sand, 60% fine grained sand, 10% silty fines, tan, damp, caving.
							SM	@ 8.5 feet SILTY SAND, approximately 60% fine grained sand, 40% silty fines, tan, dry, very dense.
							ML	@ 9 feet, SANDY SILT, approximately 35% fine grained sand, 65% silty fines, brown, damp, dense.
10							SM	@ 10 feet SILTY SAND, approximately 60% fine grained sand, 40% silty fines, dense.
								END OF TRENCH DUE TO SLOW PROGRESS No fill Caving at 4.5 feet No groundwater No bedrock
15								

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3090
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-12

LOG OF TRENCH T-2

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0								SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 15% medium grained sand, 55% fine grained sand, 30% silty fines, brown, dry, loose.
				1.7	118.1			SM	@ 1.5 feet ALLUVIUM: SILTY SAND, approximately 2% gravel, 8% coarse grained sand, 20% medium grained sand, 50% fine grained sand, 20% silty fines, brown, dry, loose. @ 3 feet, becomes coarser grained with approximately 5% fine gravel, 10% coarse grained sand, 20% medium grained sand, 50% fine grained sand, 15% silty fines, tan.
5				2.2	121.8				
10	1, 4, 7							CL	@ 9 feet becomes finer grained to a SANDY LEAN CLAY, approximately 30% fine grained sand, 70% clayey fines, reddish brown, damp, dense. @ 10.5 feet, high percentage of caliche. @ 12 feet, very high percentage of caliche material turns white.
15									END OF TRENCH No fill No caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3090
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-13

LOG OF TRENCH T-3

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
									TEST DATA
0				0.4				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 65% fine grained sand, 35% silty fines, brown, dry, loose.
								SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 5% medium grained sand, 55% fine grained sand, 40% silty fines, brown, dry, loose.
	13			3.9	100.2				
				6.2	105.6				
5									@ 6 feet, gradually becomes coarser grained with approximately 5% fine grained gravel, 10% coarse grained sand, 20% medium grained sand, 35% fine grained sand, 30% silty fines.
								ML	@ 8 feet SANDY SILT with a high percentage of secondary calcite, approximately 30% fine grained sand, 70% silty fines and calcite light tan.
10								SM	@ 10 feet SILTY SAND, fine grained sand with approximately 60% fine grained sand, 40% silty fines, tan, dense.
								ML	@ 12 feet, SANDY SILT with high percentage of calcite with approximately 30% fine grained sand, 70% silty fines, brown, damp, pinhole porosity.
								SM	@ 14 feet SILTY SAND, approximately 70% fine grained sand, 30% silty fines, tan, damp.
15									END OF TRENCH No fill No caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3098
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-14

LOG OF TRENCH T-4

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
									TEST DATA
0								SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 2% medium grained sand, 70% fine grained sand, 28% silty fines, brown, dry, loose.
								SM	@ 1 foot, ALLUVIUM: SILTY SAND, approximately 5% medium grained sand, 65% fine grained sand, 30% silty fines, brown, dry, loose.
				2.6	104.8				
5				2.7	107.8				
								ML	@ 9 feet SANDY SILT, approximately 30% fine grained sand, 70% silty fines, brown, slight porosity, slight amount of calcite.
10								SM	@ 12 feet SILTY SAND, approximately 10% coarse grained sand, 20% medium grained sand, 40% fine grained sand, 30% silty fines, tan, damp, dense.
15									END OF TRENCH No fill No caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3101
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-15

LOG OF TRENCH T-5

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
									TEST DATA
0				1.1				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% medium grained sand, 70% fine grained sand, 25% silty fines, brown, dry, loose.
				2.0	111.9			SM	@ 1.5 feet ALLUVIUM: SILTY SAND, approximately 15% medium grained sand, 55% fine grained sand, 30% silty fines, brown, dry, loose.
	13			2.6	109.3				@ 4 feet fines content decreases to approximately 20%.
5									@ 5 feet, slight amount of calcite.
								SP SM	@ 6 feet POORLY GRADED SAND with silt, approximately 10% coarse grained sand, 20% medium grained sand, 60% fine grained sand, 10% silty fines, tan.
								SM	@ 9 feet, slightly siltier to a SILTY SAND, approximately 10% coarse grained sand, 20% medium grained sand, 50% fine grained sand, 20% silty fines, damp, dense.
10									END OF TRENCH DUE TO SLOW PROGRESS No fill No caving No groundwater No bedrock
15									

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3099
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-16

LOG OF TRENCH T-6

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	9, 10			1.1				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% medium grained sand, 65% fine grained sand, 30% silty fines, brown, dry, loose.
				2.6	109.7			SM	@ 1.5 feet ALLUVIUM: SILTY SAND, approximately 5% coarse grained sand, 25% medium grained sand, 40% fine grained sand, 30% silty fines, brown, dry, loose.
5				1.7	101.2			SM SP	@ 4.5 feet, POORLY GRADED SAND with silt, becomes much coarser grained, approximately 10% coarse grained sand, 20% medium grained sand, 55% fine grained sand, 15% silty fines, brown.
								SM	@ 7 feet SILTY SAND, moderately dense, slight amount of gravel, occasional cobbles.
10									@ 9 feet may have slight trace of clay within silt, color turns to a reddish brown, gradually becomes finer grained.
									END OF TRENCH DUE TO SLOW PROGRESS No fill No caving No groundwater No bedrock
15									

TEST DATA

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3090
		DATE EXCAVATED:	October 30, 2006
LOR GEOTECHNICAL GROUP INC.		**EQUIPMENT:**	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-17

LOG OF TRENCH T-7

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
									TEST DATA
0								SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% medium grained sand, 70% fine grained sand, 25% silty fines, brown, dry, loose.
				2.9	104.9			SM	@ 1.5 feet ALLUVIUM: SILTY SAND, approximately 5% medium grained sand, 65% fine grained sand, 30% silty fines, brown, dry, loose.
				1.9	110.7				@ 4.5 feet becomes slightly finer grained with approximately 60% fine grained sand, 40% silty fines, slight amount of caliche.
5									
								SP SM	@ 8 feet POORLY GRADED SAND with silt, approximately 5% very fine gravel, 10% coarse grained sand, 20% medium grained sand, 55% fine grained sand, 10% silty fines, brown to tan, damp, slight caving, and moderately dense.
								ML	@ 9 feet SANDY SILT, approximately 5% medium grained sand, 30% fine grained sand, 65% silty fines, dark brown, damp, hard.
10									@ 11 feet some secondary calcite noted.
									END OF TRENCH DUE TO SLOW PROGRESS No fill Caving at 8 feet No groundwater No bedrock
15									

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3090
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-18

LOG OF TRENCH T-8

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0								SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 2% gravel, 8% coarse grained sand, 15% medium grained sand, 50% fine grained sand, 25% silty fines, tan, dry, loose, porous, caving.
								SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 10% medium grained sand, 50% fine grained sand, 40% silty fines, brown, dry, loose, trace of calcite.
				1.9	111.7				
5				4.2	108.3				@ 4.5 feet becomes coarser grained with approximately 5% coarse grained sand, 20% medium grained sand, 55% fine grained sand, 20% silty fines, brown, moderately dense.
									@ 6 feet becomes dense.
								ML	@ 9 feet becomes finer grained to a SANDY SILT, approximately 30% fine grained sand, 70% silty fines, brown, damp, dense.
10								SP SM	@ 10 feet POORLY GRADED SAND with silt, approximately 5% fine gravel, 10% coarse grained sand, 20% medium grained sand, 55% fine grained sand, 10% silty fines, has a high percentage of calcite.
									END OF TRENCH
									No fill Caving at 0 feet No groundwater No bedrock
15									

TEST DATA

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3080
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-19

LOG OF TRENCH T-9

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	11			0.6				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% medium grained sand, 65% fine grained sand, 30% silty fines, brown, dry, loose.
	9, 10							SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 5% gravel, 5% coarse grained sand, 25% medium grained sand, 45% fine grained sand, 20% silty fines, brown, dry, loose.
				1.6	110.1				
				2.4	110.2				
5									@ 5 feet becomes slightly coarser grained with approximately 10% coarse grained sand, 20% medium grained sand, 55% fine grained sand, 15% silty fines, tan, damp, slight caving.
								SP SM	@ 7 feet POORLY GRADED SAND with silt, approximately 10% silty fines.
									@ 9 feet moderately dense.
10								ML	@ 10 feet SANDY SILT, approximately 5% coarse grained sand, 10% medium grained sand, 25% fine grained sand, 60% silty fines, trace of clay, reddish brown to gray, damp.
									END OF TRENCH DUE TO SLOW PROGRESS No fill Caving at 5 feet No groundwater No bedrock
15									

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3080
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-20

LOG OF TRENCH T-10

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
									TEST DATA
0				0.6				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 30% silty fines, brown, dry, loose.
								SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 5% gravel, 20% coarse grained sand, 30% medium grained sand, 25% fine grained sand, 20% silty fines, brown, dry, loose to medium dense, massive, becomes sandier with increase in depth.
				1.4	111.8				
	7							SP	@ 4 +/- feet POORLY GRADED SAND, approximately 5% gravel, 20% coarse grained sand, 40% medium grained sand, 30% fine grained sand, 5% silty fines, brown, dry, medium dense, subject to caving.
5	13			2.4	103.2				
								CL	@ 8 +/- feet SANDY LEAN CLAY, approximately 35% fine grained sand, 65% silt and clay, brown, moist, non-porous, stiff.
10									Below 11 +/- feet, minor calcium carbonate, occasional sand layers.
									END OF TRENCH DUE TO CAVING
15									No fill Heavy caving at 4 feet No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3084
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-21

LOG OF TRENCH T-11

DEPTH IN FEET	LABORATORY TESTS	ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0			0.6				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 25% silty fines, brown, dry, loose.
			2.4	108.2			SM	@ 1 +/- foot, ALLUVIUM: SILTY SAND, approximately 5% gravel, 10% coarse grained sand, 20% medium grained sand, 30% fine grained sand, 35% silty fines, brown, dry, loose to medium dense, non-porous, weakly cemented.
5			2.1	110.2				
	1, 4, 7						CL	@ 7.5 feet SANDY LEAN CLAY, approximately 40% fine grained sand, 60% silt and clay, brown, moist, non-porous, dense.
10							SM	@ 11 +/- feet SILTY SAND, approximately 15% medium grained sand, 50% fine grained sand, 35% silty fines, brown to grayish brown, damp, non-porous, medium dense to dense.
								@ 13 +/- feet minor calcium carbonate.
15								END OF TRENCH No fill No caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3092
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-22

LOG OF TRENCH T-12

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0				0.5				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% gravel 15% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 20% silty fines, brown, dry, loose, trace of organics.
								SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 5% gravel, 15% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 20% silty fines, brown, dry, loose to medium dense.
				1.4	107.9			SW SM	@ 2.5 feet WELL GRADED SAND with silt, approximately 10% fine gravel, 25% coarse grained sand, 30% medium grained sand, 25% fine grained sand, 10% silty fines, brown, dry, medium dense, subject to caving.
5				4.5	117.3			SC	@ 5 feet CLAYEY SAND, approximately 85% fine grained sand, 15% silt and clay, brown, moist, non-porous, dense.
									Below 8 +/- feet becomes sandier.
								SM	@ 9 +/- feet SILTY SAND, approximately 60% fine grained sand, 40% silty fines, brown to grayish brown, damp, weakly cemented, dense, becomes sandier with increase in depth.
10									Below 12 feet minor calcium carbonate.
15									END OF TRENCH No fill No caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3095
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-23

LOG OF TRENCH T-13

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	11			1.7				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 10% coarse grained sand, 20% medium grained sand, 35% fine grained sand, 35% silty fines, brown, dry, loose, minor organics.
	8, 9, 10							SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 10% coarse grained sand, 20% medium grained sand, 30% fine grained sand, 40% silty fines, brown, dry, loose to medium dense, non-porous.
	13			3.1	100.2				
	13			5.3	113.9				
5									Below 5 feet contains minor calcium carbonate.
								SC	@ 7 +/- feet CLAYEY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 40% fine grained sand, 15% silty fines, brown, damp, dense.
10								SM	@ 10 feet SILTY SAND, approximately 5% medium grained sand, 60% fine grained sand, 35% silty fines, off white to light grayish brown, damp, non-porous, dense to very dense.
									Below 13 feet sandier, approximately 80% fine grained sand, 20% fines.
15									END OF TRENCH No fill No caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3095
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-24

LOG OF TRENCH T-14

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0				1.7				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% gravel, 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 20% silty fines, brown, dry, loose.
								SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 5% gravel, 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 20% silty fines, brown, dry, loose to medium dense, non-porous.
				6.0	99.7				
5				2.4	117.0				Below 5 feet contains trace to minor amounts of clay.
									@ 7 feet minor calcium carbonate.
								SW	@ 8 feet WELL GRADED SAND, approximately 10% gravel, 20% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, brown, moist, dense, weakly cemented.
10								SM	@ 9.5 feet SILTY SAND, approximately 10% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 30% silty fines, brown, moist, non-porous, dense.
									Below 11 feet becomes finer grained, local calcium carbonate, occasional thin off-white sand layers.
15									END OF TRENCH
									No fill No caving No groundwater No bedrock

TEST DATA

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3090
		DATE EXCAVATED:	October 30, 2006
LOR GEOTECHNICAL GROUP INC.		**EQUIPMENT:**	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-25

LOG OF TRENCH T-15

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0				0.9				SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 25% silty fines, brown, dry, loose.
				2.2	103.8			SM	@ 1 foot ALLUVIUM: SILTY SAND, approximately 10% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 25% silty fines, brown, dry, loose to medium dense, non-porous.
				1.7	112.4				
5								SW	@ 5 feet WELL GRADED SAND with gravel, approximately 15% fine gravel, 20% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 5% silty fines, brown, damp, medium dense.
								CL	@ 7.5 feet SANDY LEAN CLAY, approximately 10% medium grained sand, 25% fine grained sand, 65% silt and clay, brown, most, non-porous, dense, blocky soil structure.
10									END OF TRENCH No fill No caving No groundwater No bedrock
15									

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3085
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-26

LOG OF TRENCH T-16

DEPTH IN FEET	LABORATORY TESTS		ESTIMATED COMPACTION (%)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0								SM	@ 0 feet TOPSOIL: SILTY SAND, approximately 5% gravel, 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 20% silty fines, brown, dry, loose.
								SM	@ 1 +/- foot ALLUVIUM: SILTY SAND, approximately 10% gravel, 20% coarse grained sand, 25% medium grained sand, 25% fine grained sand, 20% silty fines, brown, dry, loose to medium dense, non-porous, becomes sandier with increase in depth.
	13			2.0	109.3				
5								SP SM	@ 4.5 +/- feet POORLY GRADED SAND with silt and gravel, increase in gravel, approximately 30% fine gravel, 20% coarse grained sand and medium grained sand, 40% fine grained sand, 10% fines.
	13			1.2	115.3				
								SM	@ 6 feet becomes finer grained, SILTY SAND, approximately 25% medium grained sand, 40% fine grained sand, 35% silty fines, darker brown, moist.
10									@ 9 +/- feet sandier with trace of clay, weakly cemented, moist.
									From 11.5 to 12.5 feet minor calcium carbonate.
15									END OF TRENCH No fill Moderate caving No groundwater No bedrock

PROJECT:	Tract No. 16681, 60 Acres	**PROJECT NO.:**	32345.1
CLIENT:	David Liu	**ELEVATION:**	3081
LOR GEOTECHNICAL GROUP INC.		**DATE EXCAVATED:**	October 30, 2006
		EQUIPMENT:	New Holland 75B
		BUCKET WD.: 24"	**ENCLOSURE:** B-27

APPENDIX C

Laboratory Testing Program and Test Results

APPENDIX C
LABORATORY TESTING

General

Selected soil samples obtained from the borings and trenches were tested in our geotechnical laboratory to evaluate the physical properties of the soils affecting foundation design and construction procedures. The laboratory testing program performed in conjunction with our investigation included moisture content, dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, expansion index, consolidation, and soluble sulfate content. Descriptions of the laboratory tests are presented in the following paragraphs:

Moisture Density Tests

The moisture content and dry density information provides an indirect measure of soil consistency for each stratum, and can also provide a correlation between soils on this site. The dry unit weight and field moisture content were determined for selected undisturbed samples, in accordance with ASTM D 2921 and ASTM D 2216, respectively, and the results are shown on the boring and trench logs, Enclosures B-1 through B-27 for convenient correlation with the soil profile.

Laboratory Compaction

Selected soil samples were tested in the laboratory to determine compaction characteristics using the ASTM D 1557-02 compaction test method. The results are presented in the following table:

LABORATORY COMPACTION				
Boring/ Trench Number	**Sample Depth (feet)**	**Soil Description** (U.S.C.S.)	**Maximum Dry Density (pcf)**	**Optimum Moisture Content (percent)**
T-1	3	(SM) Silty Sand	134.5	8.0
T-2	12	(CL) Sandy Lean Clay	119.0	13.0
T-10	4-6	(SP) Poorly Graded Sand	122.5	9.5
T-11	8-10	(CL) Sandy Lean Clay	121.5	13.0
B-6	2-5	(SM) Silty Sand	132.0	5.0
B-9	3-6	(SM) Silty Sand	133.0	7.5

Direct Shear Tests

Shear tests are performed with a direct shear machine at a constant rate-of-strain (usually 0.04 inches/minute). The machine is designed to test a sample partially extruded from a sample ring in single shear. Samples are tested at varying normal loads in order to evaluate the shear strength parameters, angle of internal friction and cohesion. Samples are tested in a remolded state (90% relative compaction per ASTM 1557) and soaked, to represent the worst case conditions expected in the field.

The results of the shear tests are presented in the following table:

DIRECT SHEAR TESTS				
Trench Number	**Sample Depth (feet)**	**Soil Description** (U.S.C.S.)	**Angle of Internal Friction (degrees)**	**Cohesion (psf)**
T-1	3	(SM) Silty Sand	28	200
T-10	4-6	(SP) Poorly Graded Sand	30	50

Sieve Analysis

A quantitative determination of the grain size distribution was performed for selected samples in accordance with the ASTM D 422 laboratory test procedure. The determination is performed by passing the soil through a series of sieves, and recording the weights of retained particles on each screen. The results of the sieve analyses are presented graphically on Enclosure C-1.

Sand Equivalent

The sand equivalent of selected soils were evaluated using the California Sand Equivalent Test Method, Caltrans Number 217. The results of the sand equivalent tests are presented with the grain size distribution analyses on Enclosure C-1.

R-Value Test

Soil samples were obtained at probable pavement subgrade level and sieve analysis and sand equivalent tests were conducted. Based on these indicator tests, a selected soil sample was tested to determine its R-value using the California R-Value Test Method,

Caltrans Number 301. The results of the sieve analysis, sand equivalent, and R-value tests are presented on Enclosure C-1.

Percent Passing No. 200 Sieve Tests

A quantitative determination of the percentage of soil passing the No. 200 sieve was performed for selected samples. The results indicate the percentage of fines in the soil. The results are presented in the following table:

PERCENT PASSING NO. 200 SIEVE TESTS			
Boring/ Trench Number	**Sample Depth (feet)**	**Soil Description** (U.S.C.S.)	**Percent by Weight Passing No. 200 Sieve (%)**
T-1	4	(SM) Silty Sand	18
T-3	2	(SM) Silty Sand	38
T-5	4	(SM) Silty Sand	18
T-10	5	(SP) Poorly Graded Sand	3
T-12	3	(SW-SM) Well Graded Sand with silt	7
T-12	5	(SC) Clayey Sand	17
T-13	2	(SM) Silty Sand	40
T-13	4	(SM Silty Sand	35
T-16	3	(SM) Silty Sand	17
T-16	5	(SP-SM) Poorly Graded Sand with silt	6
B-8	4-7	(SM) Silty Sand	19
B-11	2-5	(SM) Silty Sand	20

Expansion Index Tests

Remolded samples are tested to determine their expansion potential in accordance with the Expansion Index (EI) test. The test is performed in accordance with the Uniform Building Code Standard 18-2. The test results are presented in the following table:

EXPANSION INDEX TESTS				
Boring/ Trench Number	**Sample Depth (feet)**	**Soil Description** (U.S.C.S.)	**Expansion Index (EI)**	**Expansion Potential**
T-2	12	(CL) Sandy Lean Clay	58	Medium
T-11	8-10	(CL) Sandy Lean Clay	68	Medium
B-7	9-12	(CL) Sandy Lean Clay	75	Medium

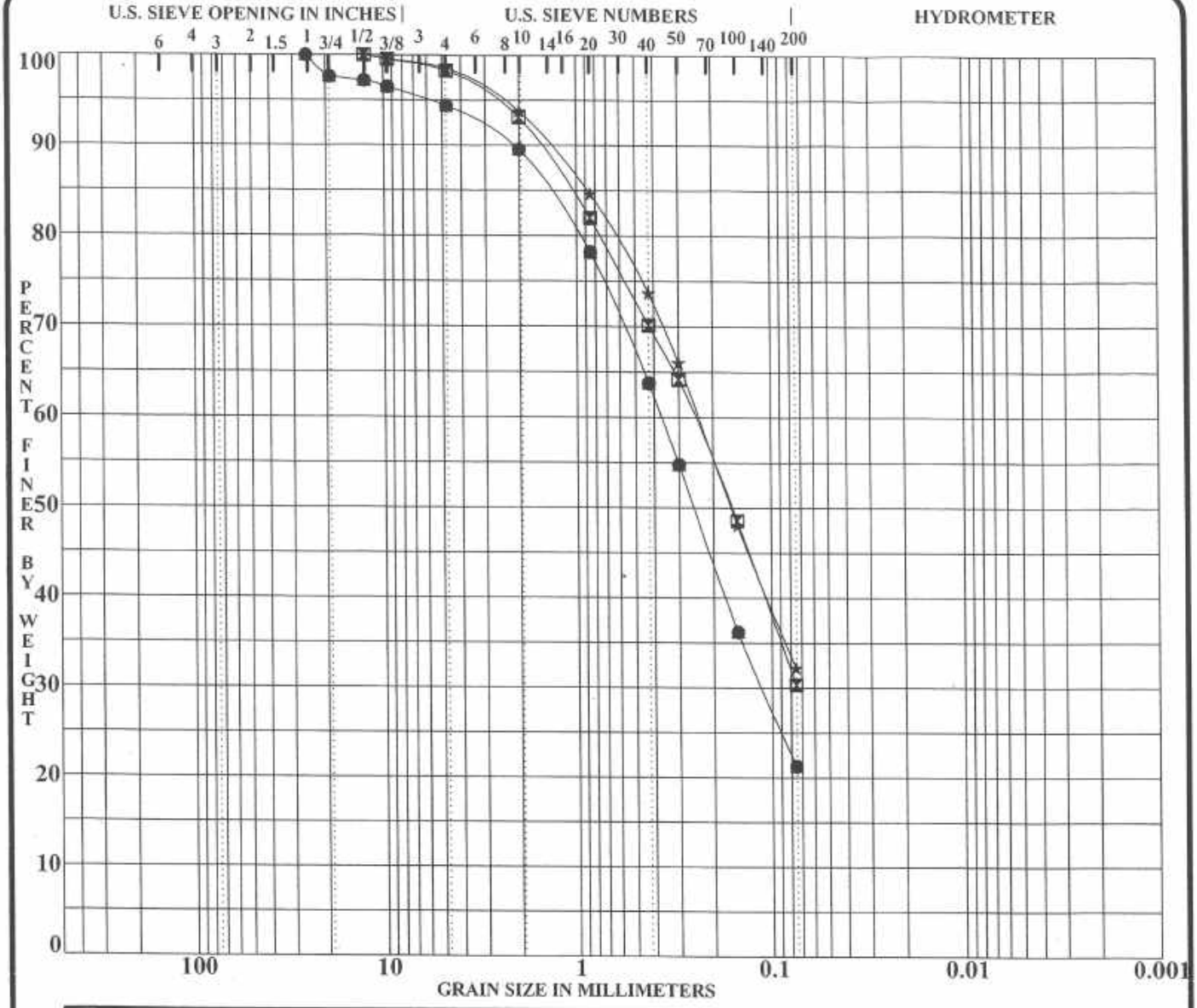
Atterberg Limit Tests

Soil samples with low expansion potential are tested to determine their plasticity limits in accordance with the ASTM D-4318-95 laboratory test procedure. The test results are presented on Enclosure C-2.

Soluble Sulfate Content Tests

The soluble sulfate content of selected subgrade soils were evaluated. The concentration of soluble sulfates in the soils was determined by measuring the optical density of a barium sulfate precipitate. The precipitate results from a reaction of barium chloride with water extractions from the soil samples. The measured optical density is correlated with readings on precipitates of known sulfate concentrations. The test results are presented on the following table:

SOLUBLE SULFATE CONTENT TESTS			
Boring/ Trench Number	**Sample Depth (feet)**	**Soil Description** (U.S.C.S.)	**Sulfate Content (% by weight)**
T-1	0	(SM) Silty Sand	<0.005
T-9	0	(SM) Silty Sand	<0.005
T-13	0	(SM) Silty Sand	<0.005
B-6	2-5	(SM) Silty Sand	<0.005
B-7	9-12	(CL) Sandy Lean Clay	0.02
B-9	3-6	(SM) Silty Sand	<0.005
B-11	2-5	(SM) Silty Sand	<0.005



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	SE	RV			Cc	Cu
● B-04	@ 0 - 3 ft	(SM) Silty Sand	23	-				
⊠ T-06	@ 1 - 3 ft	(SM) Silty Sand	15	-				
▲ T-09	@ 1 - 3 ft	(SM) Silty Sand	23	-				
★ T-13	@ 1 - 3 ft	(SM) Silty Sand	15	31				

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-04	@ 0 - 3 ft	25.40	0.37	0.113		5.6	73.1	21.3	
⊠ T-06	@ 1 - 3 ft	12.50	0.25			1.7	68.0	30.3	
▲ T-09	@ 1 - 3 ft	25.40	0.37	0.113		5.6	73.1	21.3	
★ T-13	@ 1 - 3 ft	12.50	0.24			1.4	66.3	32.2	

PROJECT *Tract No. 16681, 60 Acres - Victorville, CA*

PROJECT NO. *32345.1*

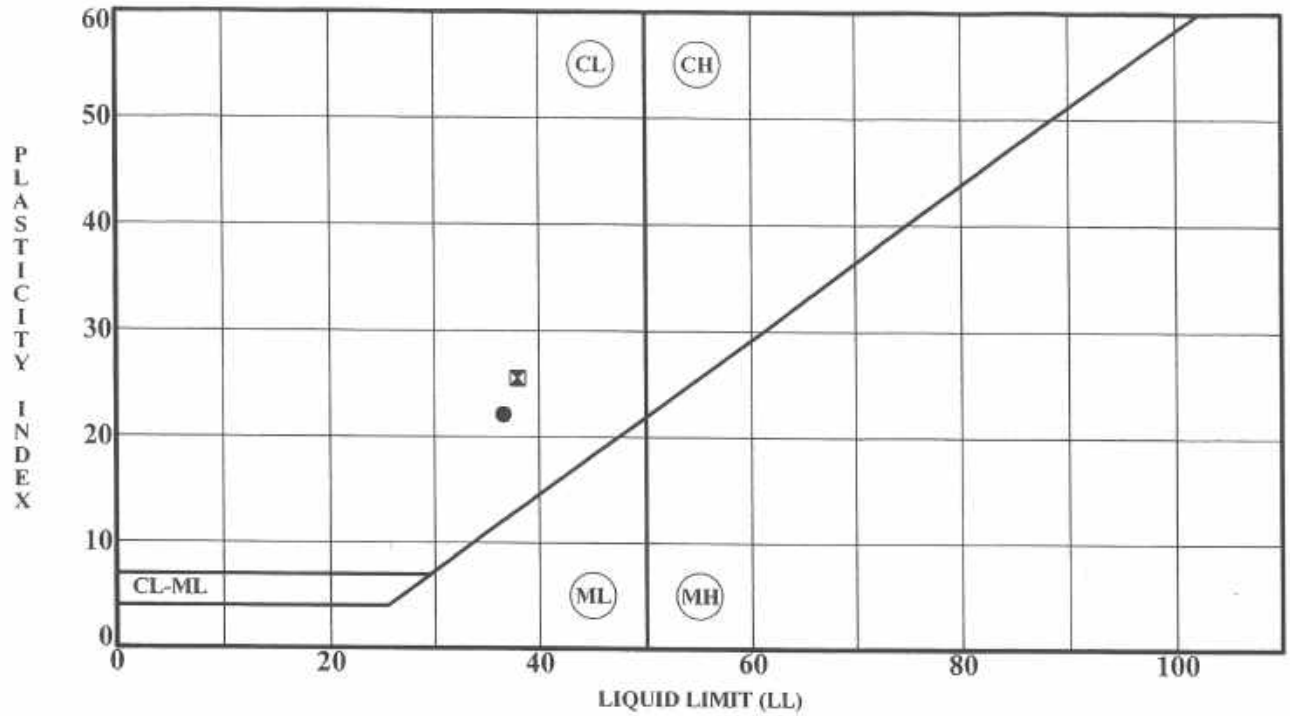
DATE *11/29/06*

GRADATION CURVES

LOR Geotechnical Group Inc.

Riverside, CA

Enclosure C-1



Specimen Identification		LL	PL	PI	Fines	Classification
●	T-02 @ 12 ft	37	15	22		(CL) Sandy Lean Clay
⊠	T-11 @ 8 - 10 ft	38	12	26		(CL) Sandy Lean Clay

PROJECT *Tract No. 16681, 60 Acres - Victorville, CA*

PROJECT NO. *32345.1*

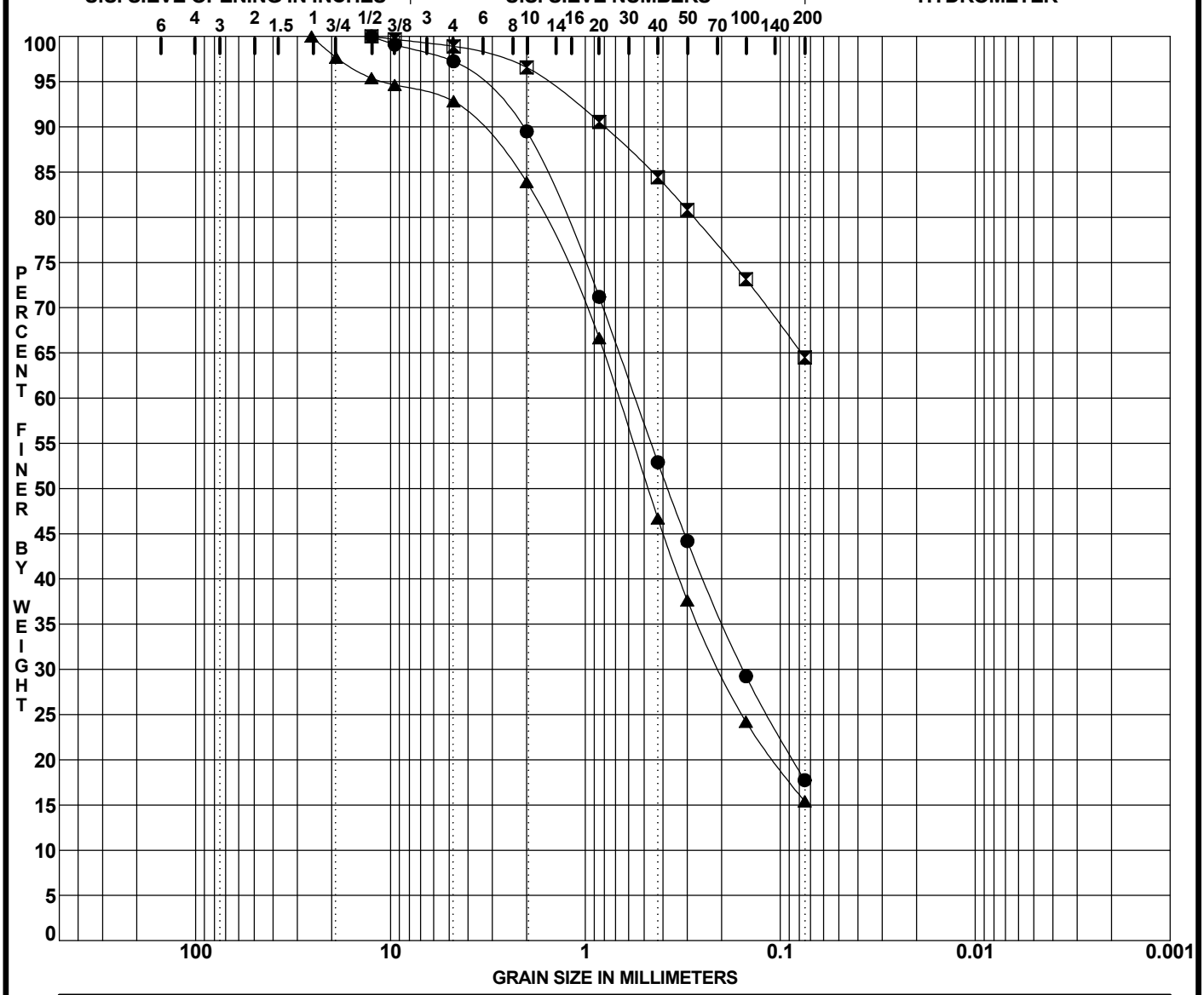
DATE *11/29/06*

ATTERBERG LIMITS' RESULTS

LOR Geotechnical Group Inc.

Riverside, CA

Enclosure C-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Soil Classification	SE	RV	PL	PI	Cc	Cu
●	B-06	@ 2-5'	(SM) Silty Sand	--	--				
⊠	B-07	@ 9-12'	(SC) Clayey Sand	--	--				
▲	B-09	@ 3-6'	(SM) Silty Sand	--	--				

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-06	@ 2-5'	12.50	0.56	0.155		2.7	79.5	17.7	
⊠	B-07	@ 9-12'	12.50				1.1	34.4	64.5	
▲	B-09	@ 3-6'	25.40	0.67	0.202		7.2	77.4	15.4	

PROJECT:	Tentative Tract No. 16681	**PROJECT NO.:**	33780.1
CLIENT:	Tom Dodson & Associates	**DATE:**	December 2021

GRADATION CURVES

LOR GEOTECHNICAL GROUP, INC.

ENCLOSURE: C-3

APPENDIX D

Seismic Design Spectra

Project: Tentative Tract No. 16681
Project Number: 33780.1
Client: Tom Dodson & Associates
Site Lat/Long: 34.5123/-117.3941
Controlling Seismic Source: North Frontal

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.141
S_{D1}/S_{DS}	T_S	0.704
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	0.5833*
Equation 11.4-2 - F_V*S_1	S_{M1}	0.8749*

REFERENCE	NOTATION	VALUE
Fv (Table 11.4-2)[Used for General Spectrum]	F_v	1.8
Design Maps	S_s	1.237
Design Maps	S_1	0.481
Equation 11.4-1 - F_A*S_S	S_{MS}	1.2434*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	0.829*
Design Maps	PGA	0.5
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - $F_{PGA}*PGA$	PGA_M	0.55*
Section 21.5.3	80% of PGA_M	0.440
Design Maps	C_{RS}	0.935
Design Maps	C_{R1}	0.917

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=C_{RS}	C_{RS}	0.935
Cr - At Periods >=1.0, Cr=C_{R1}	C_{R1}	0.917

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete

Period	Cr
0.200	0.935
0.300	0.933
0.400	0.931
0.500	0.928
0.600	0.926
0.680	0.924
1.000	0.917

* **Code based design value**. See accompanying data for Site Specific Design values.

Mapped values from https://seismicmaps.org/

PROBABILISTIC SPECTRA[1]
2% in 50 year Exceedence

Project No: 33780.1

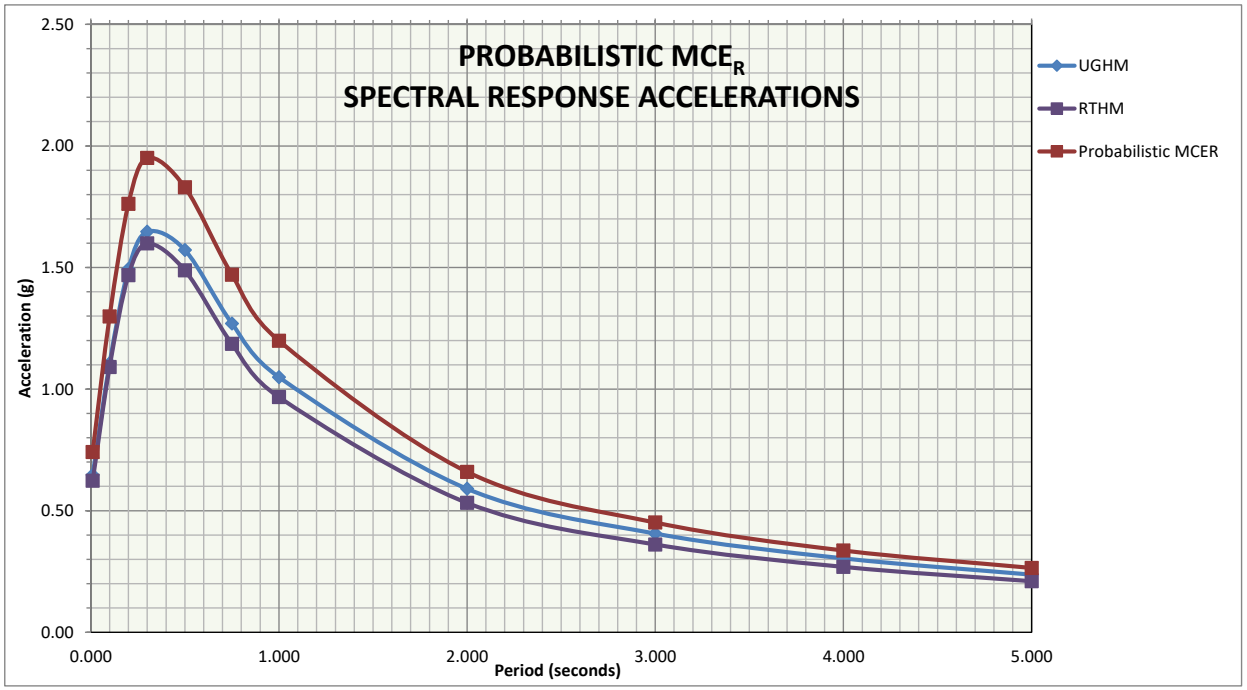
Period	UGHM	RTHM	Max Directional Scale Factor[2]	Probabilistic MCE
0.010	0.647	0.623	1.19	0.741
0.100	1.106	1.091	1.19	1.298
0.200	1.494	1.468	1.20	1.762
0.300	1.647	1.599	1.22	1.951
0.500	1.572	1.488	1.23	1.830
0.750	1.270	1.186	1.24	1.471
1.000	1.049	0.967	1.24	1.199
2.000	0.590	0.532	1.24	0.660
3.000	0.406	0.361	1.25	0.451
4.000	0.304	0.269	1.25	0.336
5.000	0.237	0.210	1.26	0.265

Probabilistic PGA: 0.647

Is Probabilistic $Sa_{(max)}$<1.2F_a? NO

[1] Data Sources:
https://earthquake.usgs.gov/hazards/interactive/
https://earthquake.usgs.gov/designmaps/rtgm/

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations[1]

Controlling Source: North Frontal

Is Probabilistic $Sa_{(max)}$<1.2Fa? NO

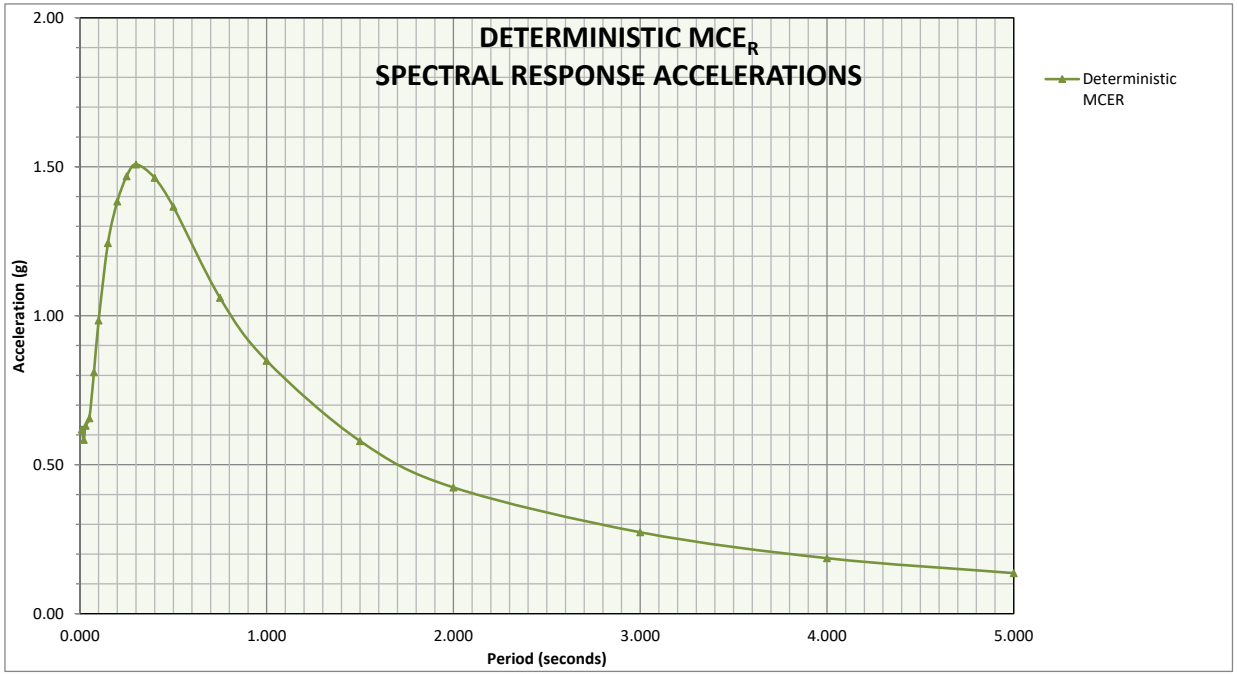
Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor[2]	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.421	1.19	0.500	0.618
0.020	0.397	1.19	0.472	0.583
0.030	0.429	1.19	0.511	0.631
0.050	0.446	1.19	0.531	0.656
0.075	0.551	1.19	0.656	0.810
0.100	0.670	1.19	0.797	0.984
0.150	0.839	1.20	1.007	1.244
0.200	0.933	1.20	1.120	1.383
0.250	0.982	1.21	1.189	1.468
0.300	1.001	1.22	1.221	1.508
0.400	0.963	1.23	1.185	1.463
0.500	0.899	1.23	1.106	1.366
0.750	0.692	1.24	0.858	1.060
1.000	0.554	1.24	0.687	0.849
1.500	0.378	1.24	0.469	0.579
2.000	0.277	1.24	0.343	0.424
3.000	0.177	1.25	0.221	0.273
4.000	0.121	1.25	0.151	0.186
5.000	0.087	1.26	0.110	0.136

Project No: 33780.1

Is Determinstic $Sa_{(max)}$<1.5*Fa?	YES
Section 21.2.2 Scaling Factor:	1.235
Deterministic PGA:	~~0.421~~
Is Deterministic PGA >=F_{PGA}*0.5?	NO
Deterministic PGA:	0.550

[1] NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	0.741	0.618	0.618	0.412
0.100	1.298	0.984	0.984	0.656
0.200	1.762	1.383	1.383	0.922
0.300	1.951	1.508	1.508	1.005
0.500	1.830	1.366	1.366	0.911
0.750	1.471	1.060	1.060	0.707
1.000	1.199	0.849	0.849	0.566
2.000	0.660	0.424	0.424	0.282
3.000	0.451	0.273	0.273	0.182
4.000	0.336	0.186	0.186	0.124
5.000	0.265	0.136	0.136	0.093

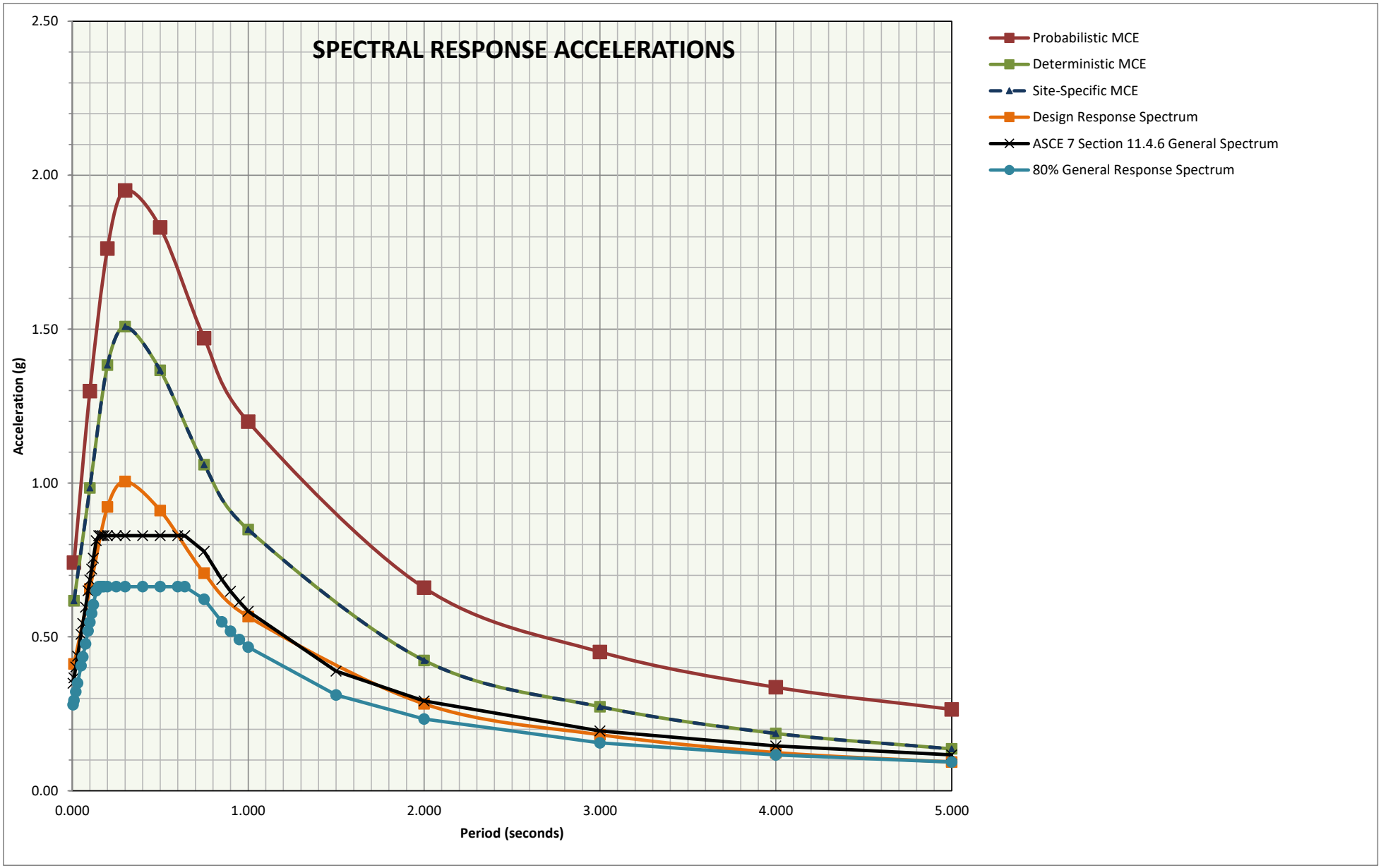
ASCE 7-16: Section 21.4
Site Specific

	Calculated Value	Design Value
SDS:	0.905	0.905
SD1:	0.566	0.566
SMS:	1.357	1.357
SM1:	0.849	0.849
Site Specific PGAm:	0.550	0.550
Site Class:	D measured	

Seismic Design Category - Short* D
Seismic Design Category - 1s* D
* Risk Categories I, II, or III

Period	ASCE 7 SECTION 11.4.6 General Spectrum	80% General Response Spectrum
0.005	0.349	0.279
0.010	0.367	0.294
0.020	0.402	0.322
0.030	0.438	0.350
0.050	0.508	0.407
0.060	0.544	0.435
0.075	0.597	0.477
0.090	0.650	0.520
0.100	0.685	0.548
0.110	0.720	0.576
0.120	0.756	0.605
0.136	0.812	0.650
0.150	0.829	0.663
0.160	0.829	0.663
0.170	0.829	0.663
0.180	0.829	0.663
0.200	0.829	0.663
0.250	0.829	0.663
0.300	0.829	0.663
0.400	0.829	0.663
0.500	0.829	0.663
0.600	0.829	0.663
0.640	0.829	0.663
0.750	0.778	0.622
0.850	0.686	0.549
0.900	0.648	0.518
0.950	0.614	0.491
1.000	0.583	0.467
1.500	0.389	0.311
2.000	0.292	0.233
3.000	0.194	0.156
4.000	0.146	0.117
5.000	0.117	0.093

Project No: 33780.1



Project No: 33780.1

LOR GEOTECHNICAL GROUP, INC.

APPENDIX E

Infiltration Test Results

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project:	Tentative Tract No. 16681	Test Date:	December 2, 2021
Project No.:	33780.1	Test Hole No.:	P-1
Soil Classificaiton:	(SM) Silty sand	Effective Hole Dia.*:	4.8 in.
Depth of Test Hole:	8.0 ft.	Date Excavated:	December 2, 2021
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	8:07 AM	8:32 AM	25	0.42	0.42	45.00	79.00	96.00	96.00	34.00	34.00	0.7
2	8:32 AM	8:57 AM	25	0.42	0.83	48.00	74.00	96.00	96.00	26.00	35.00	1.0
3	8:57 AM	9:07 AM	10	0.17	1.00	54.00	58.00	96.00	96.00	4.00	40.00	2.5
4	9:07 AM	9:17 AM	10	0.17	1.17	46.00	52.00	96.00	96.00	6.00	47.00	1.7
5	9:17 AM	9:27 AM	10	0.17	1.33	48.00	54.50	96.00	96.00	6.50	44.75	1.5
6	9:27 AM	9:37 AM	10	0.17	1.50	54.00	58.00	96.00	96.00	4.00	40.00	2.5
7	9:37 AM	9:47 AM	10	0.17	1.67	48.00	54.00	96.00	96.00	6.00	45.00	1.7
8	9:47 AM	9:57 AM	10	0.17	1.83	49.00	56.00	96.00	96.00	7.00	43.50	1.4
9	9:57 AM	10:07 AM	10	0.17	2.00	48.00	53.50	96.00	96.00	5.50	45.25	1.8
10	10:07 AM	10:17 AM	10	0.17	2.17	48.00	53.00	96.00	96.00	5.00	45.50	2.0
11	10:17 AM	10:27 AM	10	0.17	2.33	48.00	53.00	96.00	96.00	5.00	45.50	2.0
12	10:27 AM	10:37 AM	10	0.17	2.50	48.00	53.00	96.00	96.00	5.00	45.50	2.0

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	48.00	
H_f	43.00	
ΔH	5.00	
H_{avg}	45.50	
I_t	**0.77**	in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project:	Tentative Tract No. 16681	Test Date:	December 2, 2021
Project No.:	33780.1	Test Hole No.:	P-2
Soil Classificaiton:	(SM) Silty sand	Effective Hole Dia.*:	4.8 in.
Depth of Test Hole:	6.5 ft.	Date Excavated:	December 2, 2021
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	8:05 AM	8:30 AM	25	0.42	0.42	26.00	78.00	78.00	78.00	52.00	26.00	0.5
2	8:30 AM	8:55 AM	25	0.42	0.83	24.00	74.00	78.00	78.00	50.00	29.00	0.5
3	8:55 AM	9:05 AM	10	0.17	1.00	22.00	60.00	78.00	78.00	38.00	37.00	0.3
4	9:05 AM	9:15 AM	10	0.17	1.17	24.00	63.00	78.00	78.00	39.00	34.50	0.3
5	9:15 AM	9:25 AM	10	0.17	1.33	24.00	59.00	78.00	78.00	35.00	36.50	0.3
6	9:25 AM	9:35 AM	10	0.17	1.50	28.00	62.00	78.00	78.00	34.00	33.00	0.3
7	9:35 AM	9:45 AM	10	0.17	1.67	24.00	58.00	78.00	78.00	34.00	37.00	0.3
8	9:45 AM	9:55 AM	10	0.17	1.83	24.00	58.00	78.00	78.00	34.00	37.00	0.3
9	9:55 AM	10:05 AM	10	0.17	2.00	24.00	58.00	78.00	78.00	34.00	37.00	0.3
10	10:05 AM	10:15 AM	10	0.17	2.17	24.00	57.50	78.00	78.00	33.50	37.25	0.3
11	10:15 AM	10:25 AM	10	0.17	2.33	24.00	57.00	78.00	78.00	33.00	37.50	0.3
12	10:25 AM	10:35 AM	10	0.17	2.50	24.00	57.00	78.00	78.00	33.00	37.50	0.3

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	54.00	
H_f	21.00	
ΔH	33.00	
H_{avg}	37.50	
I_t	**6.14**	in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project:	Tentative Tract No. 16681	Test Date:	December 2, 2021
Project No.:	33780.1	Test Hole No.:	P-3
Soil Classificaiton:	(SM) Silty sand	Effective Hole Dia.*:	4.8 in.
Depth of Test Hole:	8.0 ft.	Date Excavated:	December 2, 2021
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	10:23 AM	10:48 AM	25	0.42	0.42	48.00	85.00	96.00	96.00	37.00	29.50	0.7
2	10:48 AM	11:13 AM	25	0.42	0.83	48.00	86.00	96.00	96.00	38.00	29.00	0.7
3	11:13 AM	11:23 AM	10	0.17	1.00	48.00	79.00	96.00	96.00	31.00	32.50	0.3
4	11:23 AM	11:33 AM	10	0.17	1.17	48.00	80.00	96.00	96.00	32.00	32.00	0.3
5	11:33 AM	11:43 AM	10	0.17	1.33	47.00	79.00	96.00	96.00	32.00	33.00	0.3
6	11:43 AM	11:53 AM	10	0.17	1.50	48.00	79.00	96.00	96.00	31.00	32.50	0.3
7	11:53 AM	12:03 PM	10	0.17	1.67	48.00	79.00	96.00	96.00	31.00	32.50	0.3
8	12:03 PM	12:13 PM	10	0.17	1.83	49.00	79.00	96.00	96.00	30.00	32.00	0.3
9	12:13 PM	12:23 PM	10	0.17	2.00	48.00	78.50	96.00	96.00	30.50	32.75	0.3
10	12:23 PM	12:33 PM	10	0.17	2.17	48.00	78.00	96.00	96.00	30.00	33.00	0.3
11	12:33 PM	12:43 PM	10	0.17	2.33	48.00	78.00	96.00	96.00	30.00	33.00	0.3
12	12:43 PM	12:53 PM	10	0.17	2.50	48.00	78.00	96.00	96.00	30.00	33.00	0.3

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	48.00	
H_f	18.00	
ΔH	30.00	
H_{avg}	33.00	
I_t	**6.32**	in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project:	Tentative Tract No. 16681	Test Date:	December 2, 2021
Project No.:	33780.1	Test Hole No.:	P-4
Soil Classificaiton:	(SM) Silty sand	Effective Hole Dia.*:	4.8 in.
Depth of Test Hole:	9.0 ft.	Date Excavated:	December 2, 2021
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	10:25 AM	10:50 AM	25	0.42	0.42	52.00	87.00	108.00	108.00	35.00	38.50	0.7
2	10:50 AM	11:15 AM	25	0.42	0.83	50.00	85.00	108.00	108.00	35.00	40.50	0.7
3	11:15 AM	11:25 AM	10	0.17	1.00	54.00	75.00	108.00	108.00	21.00	43.50	0.5
4	11:25 AM	11:35 AM	10	0.17	1.17	54.00	74.00	108.00	108.00	20.00	44.00	0.5
5	11:35 AM	11:45 AM	10	0.17	1.33	54.00	74.00	108.00	108.00	20.00	44.00	0.5
6	11:45 AM	11:55 AM	10	0.17	1.50	54.00	73.50	108.00	108.00	19.50	44.25	0.5
7	11:55 AM	12:05 PM	10	0.17	1.67	53.00	73.00	108.00	108.00	20.00	45.00	0.5
8	12:05 PM	12:15 PM	10	0.17	1.83	54.00	74.00	108.00	108.00	20.00	44.00	0.5
9	12:15 PM	12:25 PM	10	0.17	2.00	54.00	74.00	108.00	108.00	20.00	44.00	0.5
10	12:25 PM	12:35 PM	10	0.17	2.17	52.00	72.00	108.00	108.00	20.00	46.00	0.5
11	12:35 PM	12:45 PM	10	0.17	2.33	54.00	73.50	108.00	108.00	19.50	44.25	0.5
12	12:45 PM	12:55 PM	10	0.17	2.50	54.00	73.50	108.00	108.00	19.50	44.25	0.5

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	54.00	
H_f	34.50	
ΔH	19.50	
H_{avg}	44.25	
I_t	**3.09**	in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing