RODRIGUEZ
CONSULTING ENGINEERING

May 4, 2024

Project No. RCE- 2440-01

TO: DRP Enterprise
PO Box 4428.
Palm Springs, CA 92263

ATTENTION: Daniel Patneaude

SUBJECT: Soil Investigation Report, Proposed Storage Facility/RV Storage/Warehousing, 55546 Yucca Trail (APN 0594-041-22-0000), Town of Yucca Valley, San Bernardino County, California

In accordance with your authorization, Rodriguez Consulting and Engineering has performed a soil investigation for the subject site (see Figure 1, Site Location Map). The accompanying report presents a summary of our findings, conclusions, recommendations and limitations of our work for construction of the proposed storage facility/RV storage/warehousing.

Scope of Work

- Review soils, seismic, geologic, groundwater data, maps and nearby site reports in our files.
- Perform exploration of the site by means of four 8" diameter borings at readily accessible locations.
- Field engineer (California Registered RCE) for logging of the excavations, sampling of select soils, observation of excavation resistance, record SPT blow counts, and water seepage (if any).
- Perform basic laboratory testing on select soil samples, expected to include moisture, density, expansion index and water soluble sulfates.
- Perform digitized search of known faults within a 50-mile radius of the site.
- Determine California Building Code (CBC) 2022 seismic parameters for the site.
- Consult with project architect/civil engineer.
- Prepare a report of our findings, conclusions and recommendations for site preparation, including overexcavation/removal depth, allowable bearing value, foundation/slab-on-grade depth/thickness/reinforcement recommendations, excavation characteristics of the onsite soils, pavement thickness estimates for parking/driveways, general earthwork and grading specifications, California Building Code (2022) seismic design coefficients and Cal/OSHA soil classification.

Existing Site Condition

The 6.56 acres, relatively flat, vacant site is located on the north of Yucca Trial and west of Wall Street in the Town of Yucca Valley, San Bernardino County, California. Yucca Trial is a paved road with curb. A chain link fence boards the site on the east and block wall on the west side. Existing mobile homes are located on adjacent property to the west, mechanic shop to the east, and vacant lot to the north. Vegetation consists of scattered brushes and Joshua trees on the site.

The approximate locations of the above and other features are shown on Exploratory Boring Location Map, Plate 1. The base map is Preliminary Site Plan prepared by LAMAL KAL of Joshua Tree, California.

Proposed Development

We understand that the site is proposed for storage facility/RV storage/warehousing (total 756 units) associated with fire lane and parking spaces. The structures will be of wood frame construction with concrete floor slab supported on prepared subgrade. Site grading plans are not available for review at this time, however based on the relatively flat topography of the site, modest cut and fill grading is anticipated and no significant cut or fill slopes will be proposed.

Field Work

Four exploratory borings were drilled at the site on April 20, 2024, utilizing a B-63 Mobile Drill Rig. Locations of the exploratory borings were randomly selected at readily accessible locations (see Exploratory Boring Location Map, Plate 1). Standard Penetration Tests (SPT) blow counts were recorded for the earth materials. Relatively undisturbed samples of the soils were also obtained by utilizing California Ring Sampler.

In general, these borings revealed the site surface soils primarily consist of silty sand and sand (USCS "SM" and "SP"). Sand was noticed at the depth of 2 feet. The alluvial soils are dry and medium to very dense. Detailed descriptions of the earth materials encountered are presented in the form of Geotechnical Boring Logs in Appendix B.

Based on Geologic map of the Joshua Tree & Twentynine Palms 15 minute quadrangles, Riverside & San Bernardino Counties, California, the site is underlain with very young alluvial-valley deposits. (See Figure 2).

Laboratory Testing

Basic laboratory tests were performed for select soil samples. The tests consisted primarily of moisture, density and water soluble sulfates. The test results are presented in Appendix C and with Geotechnical Boring Logs in Appendix B.

Groundwater

Seepage or wet soils were not encountered in our exploratory borings to a depth of 25 feet, at the time this work was performed. Groundwater study is not within the scope of this work**.** However, based on California Department of Water Resources, Water Data Library (WDL) Station Map, groundwater data from a State well in the vicinity of the site is tabulated as follows:

Well No.	WSE* (ft)	Date Measured	Distance/Location Relative to Site	Depth of Water Below (ft)
01N05E34P004S	2942.024	10/01/1992	0.15 miles/N	430
	3097.024	03/01/2012		275

* WSE = Water Surface Elevation

Liquefaction

The potential for liquefaction in an area is a function of soil type and depth of groundwater. Poorly consolidated soils combine with groundwater during an earthquake, losing their shear strength and taking on the properties of a heavy liquid. This process, termed liquefaction, can result in the loss of foundation support, ground failure due to lateral spreading, and settlement of affected soils. Three general conditions must be met for liquefaction to occur: (1) strong ground shaking of relatively long duration; (2) loose, or

unconsolidated, recently deposited sediments consisting primarily of silty sand and sand; and (3) water saturated sediments within about 50 feet of the surface.

Because of the depth of groundwater, which is more than 200 feet below the ground surface, the potential of liquefaction at the site is very low. Furthermore, based on the San Bernardino County Land Use Plan, the site is not located in a zone of potential liquefaction (see Figure 3).

Seismicity/Faulting

A computer search of all known Quarternary major faults within 50 miles of the site from USGS Earthquake Hazard Program is presented in Appendix D. Please note that it is probable that not all active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Secondary Seismic Hazards

Ground Rupture

The surface fault rupture occurs along traces of active or potentially active faults. The site is not located within State of California fault hazard zone and no active or potentially active faults are known to exist at the site. The potential for surface fault rupture at the site is therefore considered low.

Landsliding/Lateral Spreading

Considering the flat topography and the absence of significant slopes in the vicinity of the site, the potential for landsliding and lateral spreading is considered low. San Bernardino County Land Use Plan shows that the site is not located in a zone of landslide susceptibility (see Figure 3).

Conclusions

- Any vegetable matter, old foundations, underground structures, old fills, buried utilities, and deleterious materials, etc. would require removal from the proposed building/grading area.

- Overexcavation and recompaction of the surficial soils should be anticipated to provide adequate and uniform support for the proposed structures and settlement sensitive improvements (concrete driveways, hardscape, etc.). All earth materials encountered during our investigation can be excavated with normal grading equipment in good working condition.

- The onsite soils, cleansed of deleterious materials, wood, bricks, debris, etc. and oversize rock (over 6 inches), should be suitable for the compacted fills.

- Based on observation and soil classification, the expansion potential of onsite sandy foundation soils is expected to be very low (EI<20).

- Subsequent to site preparation, the use of shallow spread and/or continuous footing foundations appears feasible for the proposed construction.

- Flooding potential of the site should be determined by the design civil engineer and considered in planning and construction.

- Please note that the site is located approximately 0.25 miles from the Pinto Mountain fault. The site is located in a region of generally high seismicity, as is all of Southern California. During its design life, the site is expected to experience moderate to strong ground motions from earthquakes on regional and/or nearby causative faults.

- There is a 2 percent probability in 50 years (2475 year return period) that site modified peak ground acceleration (PGA_m) at the site will exceed 1.032g (see Appendix D).

- Probability of dynamic settlement of underlying granular earth materials during a moderate earthquake cannot be precluded. This will be partially mitigated by overexcavation and recompaction of the upper foundation soils.

- Based on San Bernardino County Land Use Plan, Geologic Hazard Overlays, the site is not located within a zone of potential liquefaction (Figure 3).

Recommendations

Site Preparation/Overexcavation

Grading and backfills should be performed in accordance with the Town of Yucca Valley Grading Ordinance and attached General Earthwork and Grading Specifications (Appendix E), except as modified in the text of this report. Undocumented fills, trash, vegetation, trees, roots, underground/basement structures, old foundations, leach fields, seepage pits, septic tanks and any deleterious material associated with previous use of the site should be traced and removed offsite. Suitable soils (free from deleterious materials) may be used for compacted fills.

After site clearance, as described above, building pad, including at least five (5) feet outside building lines in plan (including any canopies and extended foundations) should be overexcavated to a depth of at least 5 feet below existing or proposed grade, whichever is deeper. The excavated bottom should be cleaned from any roots, soft spots, old foundations, pipes, seepage pits and deleterious materials, etc. As a result, deeper excavations should not be precluded and this should be determined by observations and testing of excavated bottoms during grading.

After cleaning of the excavated bottom, the exposed surfaces should be further scarified to a depth of at least 6-inches, thoroughly watered and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557-12 Test Method, prior to placement of fill. All structural fills should be free of oversize material (over 6 inches), placed on underlying competent soil and compacted to at least 90 percent of the maximum dry density utilizing heavy compaction equipment.

The purpose of the above recommendations is to provide at least 3.5 feet of engineered compacted fill mat below the foundation bottoms.

Hardscape Driveway Areas

The upper at least 12 inches of subgrade soils under hardscape and driveway areas should be scarified, watered to two percent above optimum and compacted to at least 90 percent relative compaction.

Compacted Fills/Imported Soils

Any soil to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to its placement. All onsite soils to be used as fill should be cleansed of any roots or other deleterious materials. Cobbles larger than 3 inches in diameter should not be placed in the vicinity of foundations and utility lines. All fills should be placed in 6 to 8 inch loose lifts, thoroughly watered, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM 1557-12 Test Method.

Any imported soils should be sandy (preferably (USCS “SM” or “SW” and very low in expansion potential, EI<20) and approved by the soil engineer. The soil engineer or his representative should observe the placement of fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Foundation Design/Footings

Following site preparation, the use of shallow spread footings is feasible. An allowable bearing value of 1800 psf is recommended. This bearing pressure has been established based on the assumption that the footings will be embedded at least 18-inches below lowest adjacent firm grade and into compacted soil mat, and measure at least 15-inches in width. Isolated column footings should be at least 24 inches wide and embedded at least 24 inches below lowest adjacent firm grade.

The above bearing value may be increased by one third for temporary (wind or seismic) loads. We recommend reinforcement should be at least two No. 5 bars at top and two at the bottom of footings. Conventional foundation should be in accordance with current California Building Code (CBC) 2022, with design by a qualified structural engineer. Please note that foundation design is under the purview of the structural engineer and structural engineer may have more restrictive requirements which may govern.

Lateral Resistance

Lateral loads may be resisted by friction provided by the soil on the base of the foundation and by passive earth pressure. A coefficient of friction of 0.35 of dead load may be used. An allowable passive earth pressure of 250 psf per foot of depth to a maximum value of 2,500 psf may be used to establish lateral bearing resistance for footings. When combining passive and friction for lateral resistance, the passive component should be reduced by one third.

Settlement

Provided the grading and construction are performed in accordance with the recommendations presented in this report and that the project geotechnical consultant will observe or test the earth material conditions in the footing excavations, total and differential settlement of the footings will be less than approximately 1 inch and ½ inch over 30 feet.

Slab-On-Grade

Slab-on-grade should be at least 4 inches thick and should be reinforced with at least No. 3 bars at 18-inches on-center both ways, properly centered in mid-thickness of slab (structural recommendations govern). Where moisture intrusion is objectionable, slabs-on-grade should be underlain with at least 10-mil Visqueen moisture barrier. The moisture barrier should be underlain by two inches of rolled clean sand.

Concrete Joints

The joints spacing for concrete slabs should be determined by the project architect. Joints should be laid out to form approximately square panels (equal transverse and longitudinal joint spacing). Rectangular panels, with the long dimension no more than one-and-one-half times the short, may be used when square panels are not feasible. The depth of longitudinal and transverse joints should be one-fourth the depth of the slab thickness.

Joint layout should be adjusted so that the joints will line up with the corners of structures, small foundations and other built-in structures. Acute angles or small pieces of slab curves as a result of joints layout should not be permitted.

Concrete Curing

Fresh concrete should be cured by protecting it against loss of moisture, rapid temperature change and mechanical injury for at least 3 days after placement. Moist curing, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used. After finishing operations have been completed, the entire surface of the newly place concrete should be covered by whatever curing medium is applicable to local conditions and approved by the engineer. The edges of concrete slabs exposed by the removal of forms should be protected immediately to provide these surfaces with continuous curing treatment equal to the method selected for curing the slab surfaces. The

contractor should have at hand, and ready to install before actual placement begins, the equipment needed for adequate curing of the concrete.

In hot or windy weather (80°F or 15 mph), the contractor must take appropriate curing precautions after the placement of concrete. The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended. We recommend that a slipsheet (or equivalent) be utilized if grouted tiles or other crack sensitive flooring is planned directly on concrete slabs. The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking.

Special Considerations/Excess Soils from Foundation Excavations

Excess soils generated from foundation excavations should not be placed on slabs and driveways subgrade without proper moisture and compaction. Slab subgrade should be verified to contain 1.2 times the soil optimum moisture content to a depth of 6 inches prior to placement of slab building materials. Moisture content must be tested in the field by the soil engineer.

Seismic Considerations

The site is located approximately 0.25 miles from the Pinto Mountain fault. Moderate to severe ground shaking can be expected at the site and there is a 2 percent probability in 50 years (2475 year return period) that site modified peak ground acceleration (PGA_m) at the site will exceed 1.032g. The site soil profile is Class D. The structural engineer should consider City/County local codes, California Building Code (CBC) 2022 seismic data presented in this report (Appendix D), the latest requirements of the Structural Engineers Association, and any other pertinent data in selecting design parameters.

Expansion Index/Soluble Sulfates

Based on observation and soil classification, the expansion potential of the onsite sandy soils is anticipated to be very low (EI<20). The results of soluble sulfate tests on a select soil sample, performed by Enviro - Chem of Pomona, California, indicate negligible sulfate exposure (less than 0.1 percent water soluble sulfates by weight). Therefore, there is no restriction on cement type. The laboratory test results are presented in Appendix C. Concrete mix and slump should be in accordance with ACI guidelines. If critical, these should be further verified by your structural and/or a corrosion engineer.

Surface Drainage/Groundwater

The surface of the site should be graded to provide positive drainage away, at least 2%, from structures and foundations. Drainage should be directed to established swales and then to appropriate drainage structures to minimize the possibility of erosion. Surface drainage must be directed and maintained away from the foundations. Water, either natural or by irrigation, should not be permitted to pond or saturate the surface soils.

Groundwater was not encountered to a maximum explored depth of 25 feet during our subsurface investigation. However, the potential for rain or irrigation water moving along sandy soils and locally seeping through from adjacent or higher areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We therefore recommend that landscape irrigation be kept to the minimum necessary to maintain plant vigor and that any leaking pipes/sprinklers, etc. should be promptly repaired. The depth to the groundwater may fluctuate with seasonal changes and from one year to the next. Subdrains, horizontal drains or other devices may be recommended for graded areas that exhibit seepage, groundwater, past evidence for shallow water, or areas with a potential for future nuisance shallow water conditions.

Cal/OSHA Classification/Trench Excavations/Backfills

In general Cal/OSHA classification of onsite soils appears to be Type C.

Temporary trench excavations deeper than 5 feet should be shored or sloped at 1.5:1 or flatter in compliance with Cal/OSHA requirements:

a.) The shoring should be designed by a qualified engineer experienced in the shoring design.

b.) The tops of any temporary unshored excavations should be barricaded to prevent vehicle and storage loads within a 1:1 line projected upward from the bottom of the excavation or a minimum of 5 feet, whichever is greater. If the temporary construction embankments, including shored excavations, are to be maintained during the rainy season, berms are suggested along the tops of the excavations where necessary to prevent runoff from entering the excavation and eroding the slope faces.

c.) The soils exposed in the excavations should be inspected during excavation by the soils engineer so that modifications can be made if variations in the soil conditions occur.

d.) All unshored excavations should be stabilized within 30 days of initial excavation.

Tentative Pavement Design

Based on classification, the tentative minimum pavement design may consist of the following:

Location	TI	Estimated R-Value	Recommended Tentative Pavement Thickness
Driveways	5.0-5.5	40+	3” AC over 6” AB/Class II
Parking Areas	4.5-5.0	40+	3” AC over 4” AB/Class II
PCC Pavement			5” PCC over Native Soils

The upper at least 12 inches of subgrade should be scarified, cleaned of roots, deleterious material, etc. and then watered, as necessary, and compacted to at least 95 percent relative compaction per maximum dry density determined by ASTM D1557-12. Imported base (Class II) should also be compacted to at least 95 percent relative compaction. All subgrade and base must be firm and unyielding without “pumping” conditions prior to placement of asphalt concrete or PCC pavement.

Final pavement design recommendations may be based on laboratory testing of representative pavement subgrade soils upon the completion of rough grading.

Foundation Plan Review/Additional Observations and Testing

The recommendations provided in this report are based on preliminary design information and subsurface conditions as interpreted from limited exploratory work. Our conclusions and recommendations should also be reviewed and verified during grading and construction and revised if necessary.

Rodriguez Consulting and Engineering., Inc. should review the foundation plans and observe and/or test at the following stages of construction:

- During all overexcavations and fill placement.
- Following footing excavation and prior to placement of footing materials.
- During wetting of slab subgrade (1.2X optimum to a depth of at least 6”) and prior to placement of slab materials.
- During all trench and walls backfills.
- During subgrade preparation/compaction, prior to paving.
- When any unusual conditions are encountered.

Final Compaction Report

A final report of compaction should be prepared subsequent to the completion of rough grading. The report should include a summary of work performed, laboratory test results and the results, locations and elevations of the field density tests performed during grading.

Limitation of Investigation

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the project site; however, soil conditions can vary significantly. As in most projects, conditions revealed during grading may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

This report was prepared for the client based on client's needs, directions and requirements at the time. This report is not authorized for use by and is not to be relied upon by any party except the client with whom Rodriguez Consulting and Engineering contracted for the work. Use of, or reliance on, this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Rodriguez Consulting and Engineering from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Rodriguez Consulting and Engineering.

Closure

If you should have any questions or concerns regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

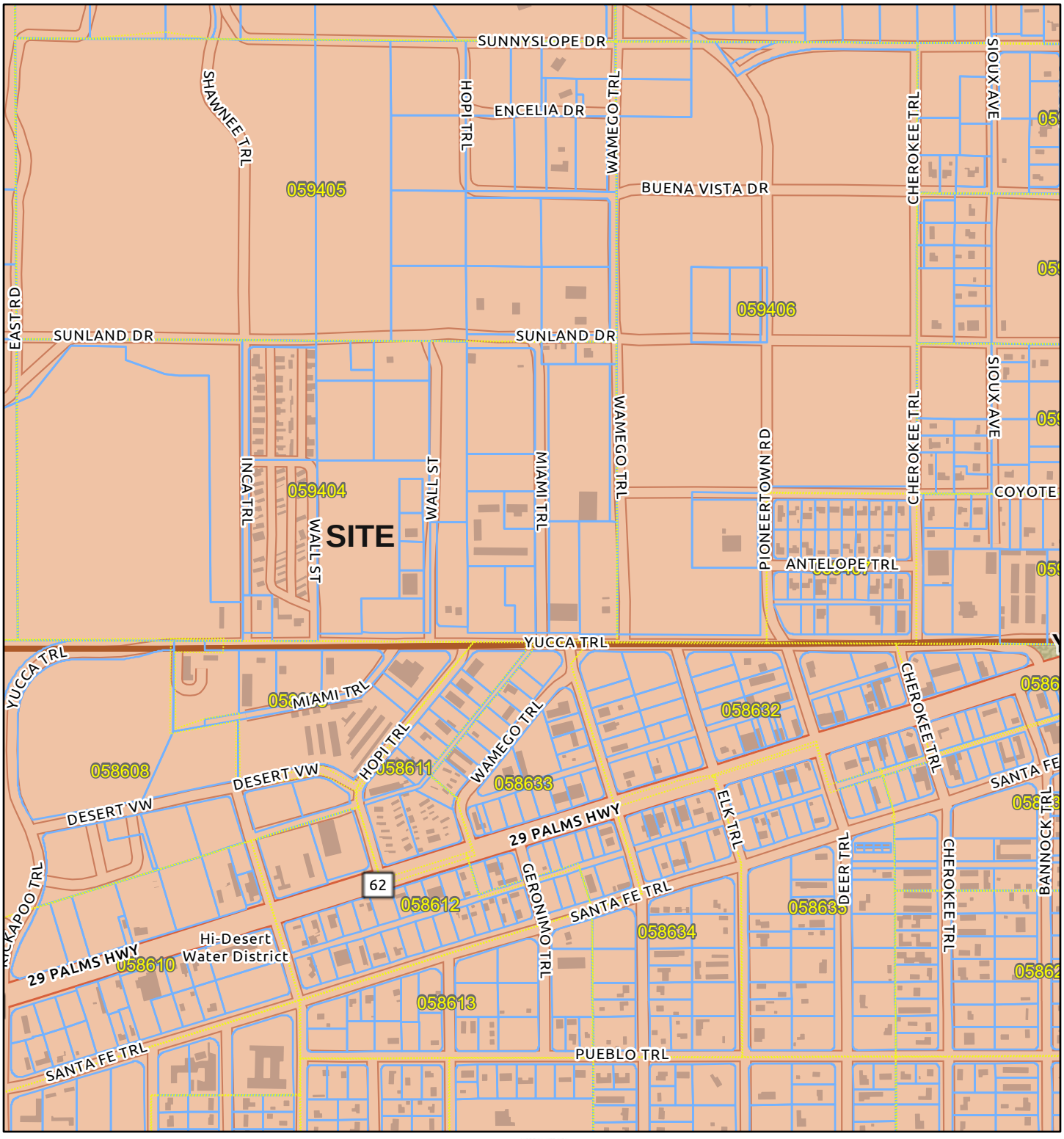
Very truly yours,
Rodriguez Consulting and Engineering

Gene K. Luu, PE 53417
Project Engineer

Attachments:

Figure 1	Site Location Map
Figure 2	Geologic Map
Figure 3	San Bernardino County Land Use Plan
Figure 4	U.S. Geological Survey Quaternary Faults Map
Plate 1	Exploratory Boring Location Map
Appendix A	References
Appendix B	Geotechnical Boring Logs
Appendix C	Laboratory Test Results
Appendix D	USGS National Seismic Hazard Maps and CBC (2022) Seismic Parameters
Appendix E	General Earthwork and Grading Specifications

Site Location Map



Assessor Page Index

Parcels

City Limits

Townships

N

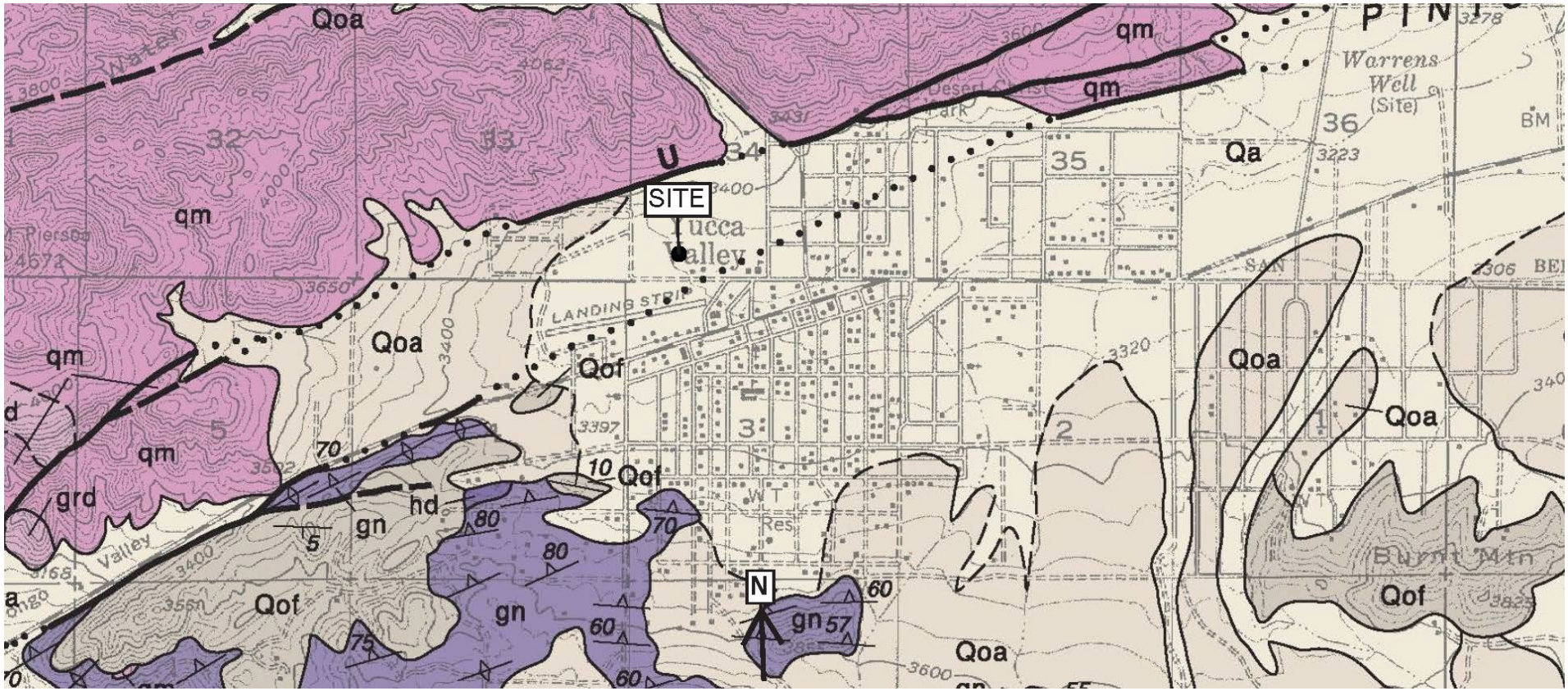
W E

S

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Figure 1



Base Map: USGS Geologic map Of the Joshua Tree & Twentynine Palms 15 Minute Quadrangles, Riverside & San Bernardino Counties, California.

LEGEND:

Qa: Alluvial sand and gravel (Holocene) of valley areas and stream washes; mostly loose sand in stream washes. Contains some fine sand, silt, and clay in Valley areas.

55546 Yucca Trail **Yucca Valley, California**	**Rodriguez Consulting and Engineering** **Project No.: RCE-2440-01** **Date: May 4, 2024** **Figure: 2**

See FI21 C

SITE

T1N
T1S

R5E R6E

T1N
T1S

TWENTYNINE PALMS HWY

Yucca Valley
(Park, Museum
and Library)

YUCCA VALLEY

Morongo Valley

Burnt Mountain
(elev. 3,793')

JOSHUA TREE

NATIONAL MONUMENT

Canyon

Rock

Black

Canyon

Long

Little San Bernardino Mountains

T1S
T2S

R5E R6E

T1S
T2S

RIVERSIDE COUNTY

See FI28 C

See FI30 C

Z:\ProjectWork\Files\GenPlan\GeoMaps\Geo_Detail2.mxd
Plot Date: 05/30/2007, 11:57 AM

Generalized Landslide Susceptibility

- Low to moderate
- Moderate to high
- Mapped, Existing Landslide
- Rockfall/Debris-Flow Hazard Area (Forest Falls Only)

Map data originally compiled on 1:48,000 scale mosaicked maps photo-reduced from 7-1/2 minute USGS quads by D.M. Morton, U.S. Geological Survey, 1974 and by S.S. Tan, State Division of Mines and Geology, 1989.

Positional accuracy of map data is at best plus or minus 150 feet.

San Bernardino County Land Use Plan
GENERAL PLAN
Geologic Hazard Overlays

SCALE 1:14,400

1,250 625 0 1,250 2,500 3,750 5,000 Feet

0.5 0.25 0 0.5 1 Miles

Generalized Liquefaction Susceptibility

- Low
- Medium
- High

Map data originally compiled on 1:48,000 scale mosaicked maps photo-reduced from 7-1/2 minute USGS quads by J.E. Matti and S.E. Carson, 1986.

Positional accuracy of map data is at best plus or minus 150 feet.

Earthquake Fault Zones

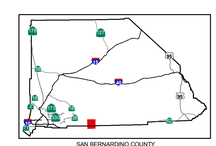
- Earthquake Fault Zone Boundary
- County Designated Fault Zones
- Cities

Map data compiled on 7-1/2 and 15-minute USGS quadrangle maps by the State of California, Division of Mines and Geology, 1987.

Positional accuracy of map data is at best plus or minus 150 feet.

NOTICE:
Effective January 1, 1994, the name "Special Studies Zones" has been changed to "Earthquake Fault Zones" and Chap. 7.5, Div. 2, of the Public Resources Code has been renamed the "Alquist-Priolo Earthquake Fault Zoning Act."

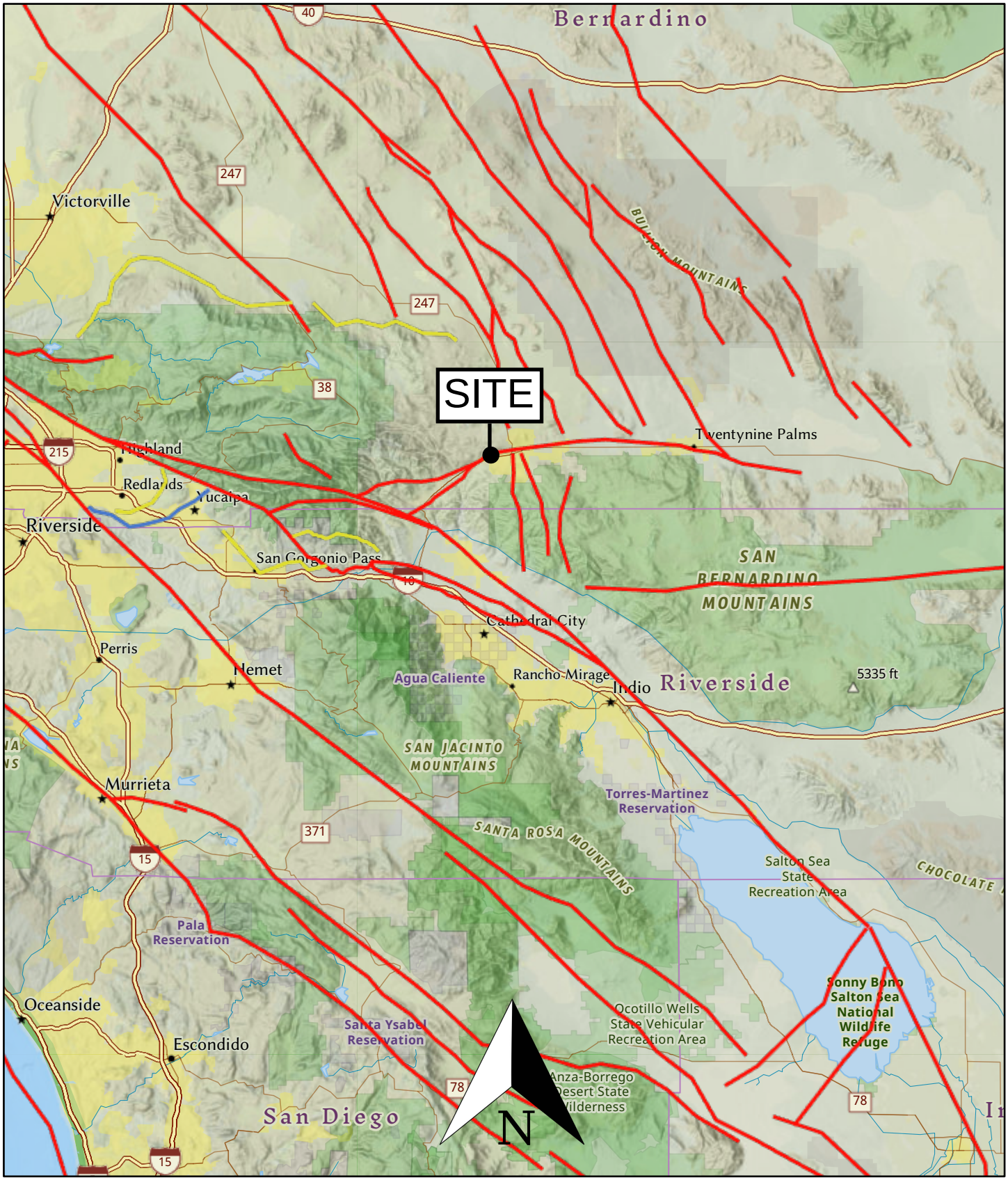
Figure 3



SAN BERNARDINO COUNTY
MAP LOCATION

FI29 C
Yucca Valley South

U.S. Geological Survey Quaternary Faults



5/3/2024, 12:49:13 PM

1:1,155,581

0 5 10 20 mi

0 12.5 25 50 km

NSHM 2023 Fault Sources

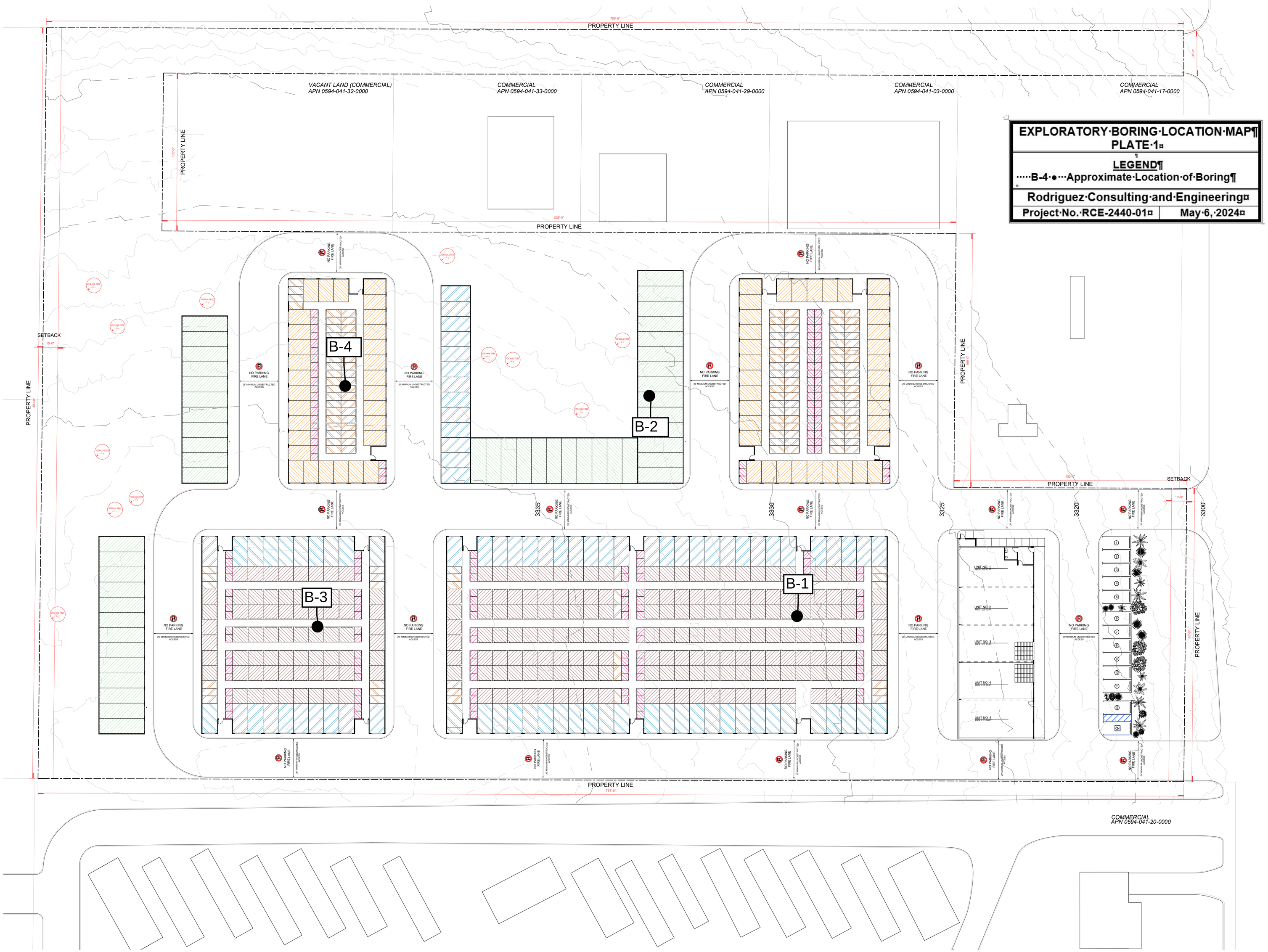
- Strike Slip
- Thrust
- Normal
- Proxy

Figure 4

Esri, CGIAR, USGS, Sources: Esri, USGS, USGS, UC Riverside, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS

USGS

Sources: Esri, USGS | Esri, CGIAR, USGS | UC Riverside, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management,



EXPLORATORY·BORING·LOCATION·MAP¶
PLATE·1¤

LEGEND¶

·····B-4·●···Approximate·Location·of·Boring¶

Rodriguez·Consulting·and·Engineering¤

Project·No.·RCE-2440-01¤	May·6,·2024¤

REVISIONS

ISSUE	DATE	DESCRIPTION		

VICINITY MAP

LEGEND

- FENCE
- BLOCK WALL
- PROPOSED RIGHT OF WAY
- INDICATES CENTERLINE
- INDICATES PROPERTY BORDER
- INDICATES EXISTING COUNTOURS — 3705' —
- SIDEWALK
- ACCESSIBLE ROUTE
- JOSHUA TREE

- 5X5 STORAGE UNIT (169 TOTAL)
- 5X10 STORAGE UNIT (148 TOTAL)
- 10X10 STORAGE UNIT (239 TOTAL)
- 10X15 STORAGE UNIT (66 TOTAL)
- 10X20 STORAGE UNIT (85 TOTAL)
- 10X30 STORAGE UNIT (49 TOTAL)

0 1 2 4
0 25 50 SCALE BAR 1:25 100

LEGAL

LOT 07 APN APN 0594-041-22-0000
ACCESSORS MAP Bk. 0594
SAN BERNARDINO COUNTY, CA

EXISTING AND PROPOSED DESIGNATION

OTIC

EXISTING AND PROPOSED GENERAL PLAN DESIGNATION

OTIC: INDUSTRIAL/COMMERCIAL

SPECIFIC PLAN IDENTIFICATION AND LAND USE DESIGNATION

NOT APPLICABLE

EXISTING LAND USE

0594-041-22-0000: VACANT

PROPOSED LAND USE

0594-041-22-0000: STORAGE FACILITY/RV STORAGE/ WAREHOUSING

Total gross area: 281,787 SQ. FT.
Total net area: 275,230 SQ. FT.

APPROXIMATE EARTHWORK QUANTITIES

Cut:
Fill:

UTILITY PROVIDERS

WATER
HIGH DESERT WATER DISTRICT
55439 Twentynine Palms Highway, Yucca Valley, CA
(760) 365-8333

ELECTRICITY
SOUTHERN CALIFORNIA EDISON
6999 Old Woman Springs Rd, Yucca Valley, CA 92284
(800) 655-4555

TELEPHONE
VERIZON CALIFORNIA
295 N Sunris Way, Palm Springs, CA 92262
(760) 778-3610

TV CABLE
TIME WARNER CABLE
73181 Mediterranean Rd, Palm Desert, CA 92211
(760) 674-5404

WASTE DISPOSAL
BURRTEC
4878 Newton Ln, Yucca Valley, CA 92284
(760) 365-2015

SEWAGE
SEPTIC SYSTEM OR PACKAGE WASTEWATER TREATMENT PLANT

STAFFING

1 SUPERVISING ATTENDANT
ON SITE DAILY FROM 9AM-5PM REQUIRING
1 PARKING SPACE

PARKING

25 - 9'X19' PARKING SPACES
1 - ACCESSIBLE SPACE
6 - BICYCLE SPACES
1 - LOADING SPACE

PROPERTY OWNER & APPLICANT

54934 29 PALMS HWY, YUCCA VALLEY CA 92284
(760) 880-6436
lafountaine@evoquemodern.com

REPRESENTATIVE

MATTHEW ARCHER STEPHENSON

63177 GOLDEN ST, JOSHUA TREE, CA 92252
(442) 205-7932
archer@lamalkal.com

DESIGN AND DRAWINGS

LAMAL KAL
MATTHEW ARCHER STEPHENSON

63177 GOLDEN ST, JOSHUA TREE, CA 92252
(442) 205-7932
archer@lamalkal.com

TOWN OF YUCCA VALLEY

PRELIMINARY SITE PLAN

YUCCA STORAGE

55546 YUCCA TRAIL, YUCCA VALLEY, CA 92284

SHEET
1

APPENDIX A

REFERENCES

Geologic map of the Joshua Tree & Twentynine 15 minute quadrangles, Riveerside & San Bernardino Counties, California, by Dibblee, Jr. 2008.

San Bernardino County Land Use Plan, General Plan, Geologic Hazard Overlays.

U.S. Geological Survey Quaternary Faults Map

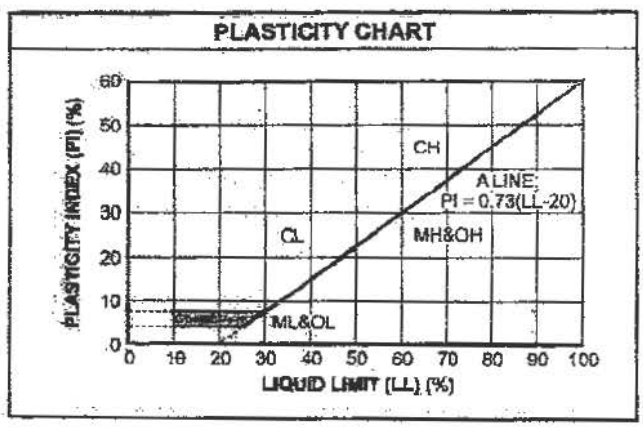
California Department of Water Resources, Water Data Library (WDL) Station Map

APPENDIX B

UNIFIED SOIL CLASSIFICATION SYSTEM

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)				FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	**SILTS AND CLAYS** Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures			OL	Organic silts and organic silty clays of low plasticity
		GC	Clayey gravels, gravel-sand-clay mixtures	**SILTS AND CLAYS** Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines			CH	Inorganic clays of high plasticity, fat clays
		SP	Poorly graded sands, gravelly sands, little or no fines			OH	Organic clays of medium to high plasticity, organic silts
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures	**HIGHLY ORGANIC SOILS**		PT	Peat and other highly organic soils
		SC	Clayey sands, sand-clay mixtures				

CLASSIFICATION CHART



GRAIN SIZE CHART

Classification		RANGE OF GRAIN SIZES	
		U.S Standard Sieve Size	Grain Size in Millimeters
Boulder Size		Above 12"	> 300 mm
Cobbles		3" – 12"	80 – 300 mm
Gravel	Coarse	3" – ¾"	20 – 80 mm
	Fine	¾" – No. 4	4.75 – 20 mm
Sand	Coarse	No. 4 – No. 10	2 – 4.75 mm
	Medium	No. 10 – No. 40	0.425 – 2 mm
	Fine	No. 40 – No. 200	0.075 – 0.425 mm
Silt & Clay		< No. 200	< 0.075 mm

SPT Sample	Bag Sample	NR No Recovery	Classification in accordance with ASTM D2487 Description and visual observation in accordance with ASTM D2488 All Sieve Sizes shown are US Standard 10 Blows for no apparent displacement 50 Blows for less than 6 inches advancement 100 Blows for 6 to 18 inches advancement
Ring Sample	Seepage		

GEOTECHNICAL BORING LOGS

Drill Hole No. B-1

Date: 4/20/24 **Project No.** RCE-2440-01

Drilling Company: One-Way Drilling **Type of Rig:** Mobile Drill Rig B-63

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: JR SAMPLED BY: JR
1						SM	**SILTY SAND:** Light brown, fine to medium grained, medium dense, dry
2							
3			9/9/12	89.2	3.4	SP	**SAND:** Light brown, medium to coarse grained, medium dense, dry
4							
5							
6			13/18/18	92.1	2.2		medium to coarse grained, dense, dry
7							
8							
9							
10							
11			18/20/21				medium to coarse grained, dense, dry
12							
13							
14							
15							
16			23/25/32				medium to coarse grained, very dense, dry
17							
18							
19							
20							
21			39/50/6”				medium to coarse grained, very dense, dry
22							
23							
24							
25			50/6”				Total depth is 25’ No Caving, No Groundwater

GEOTECHNICAL BORING LOGS

Drill Hole No. B-2

Date: 4/20/24 **Project No.** RCE-2440-01

Drilling Company: One-Way Drilling **Type of Rig:** Mobile Drill Rig B-63

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: JR SAMPLED BY: JR
1						**SM**	**SILTY SAND:** Light brown, fine to medium grained, medium dense, dry
2							
3			10/12/15	90.7	3.9	**SP**	**SAND:** Light brown, medium to coarse grained, medium dense, dry
4							
5							
6			09/11/6	93.4	2.0		medium to coarse grained, medium dense, dry
7							
8							
9							
10							
11			15/15/15				medium to coarse grained, dense, dry
12							
13							
14							
15							
16			17/39/30				medium to coarse grained, very dense, dry
17							
18							
19							
20							
21			20/40/45				medium to coarse grained, very dense, dry
22							
23							
24							
25			50/1"				Total depth is 25' No Caving, No Groundwater

GEOTECHNICAL BORING LOGS

Drill Hole No. B-3

Date: 4/20/24 **Project No.** RCE-2440-01

Drilling Company: One-Way Drilling **Type of Rig:** Mobile Drill Rig B-63

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: JR SAMPLED BY: JR
1						**SM**	**SILTY SAND:** Light brown, fine to medium grained, medium dense, dry
2							
3			8/8/15	87.6	2.5	**SP**	**SAND:** Light brown, medium to coarse grained, medium dense, dry
4							
5							
6			10/18/19	90.8	3.1		medium to coarse grained, dense, dry
7							
8							
9							
10							
11			17/23/25				medium to coarse grained, dense, dry
12							
13							
14							
15							
16			20//27/31				medium to coarse grained, very dense, dry
17							
18							
19							
20							
21			47/49//50				medium to coarse grained, very dense, dry
22							
23							
24							
25			50/5”				Total depth is 25’ No Caving, No Groundwater

GEOTECHNICAL BORING LOGS

Drill Hole No. B-4

Date: 4/20/24 **Project No.** RCE-2440-01

Drilling Company: One-Way Drilling **Type of Rig:** Mobile Drill Rig B-63

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: JR SAMPLED BY: JR
1						SM	**SILTY SAND:** Light brown, fine to medium grained, medium dense, dry
2							
3			7/8/13	89.2	2.2	SP	**SAND:** Light brown, medium to coarse grained, medium dense, dry
4							
5							
6			9/16/18	92.2	1.6		medium to coarse grained, dense, dry
7							
8							
9							
10							
11			17/20/21				medium to coarse grained, dense, dry
12							
13							
14							
15							
16			20/26/30				medium to coarse grained, very dense, dry
17							
18							
19							
20							
21			29/38/45				medium to coarse grained, very dense, dry
22							
23							
24							
25			50/6"				Total depth is 25' No Caving, No Groundwater

APPENDIX C

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Rodriguez Consulting & Engineering**
17405 Tullock St.
Bloomington, CA 92316
Tel: (909) 258-0358
E-Mail: RodriguezConsultingEngineering@Yahoo.com

PROJECT: **RCE 2440-01**
MATRIX: SOIL
SAMPLING DATE: 04/20/23
REPORT TO: MR. EDMUND RODRIGUEZ
DATE RECEIVED: 04/24/24
DATE ANALYZED: 05/03/24
DATE REPORTED: 05/03/24

SAMPLE I.D.: **B1 @ 2ft**
LAB I.D.: 24104-04

PARAMETER	SAMPLE RESULT	UNIT	PQL	DF	TEST METHOD
SULFATE	14.1	mg/Kg	1	1	EPA 9038

COMMENTS
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = DF X PQL
mg/Kg = MILLIGRAM PER KILOGRAM = PPM

DATA REVIEWED AND APPROVED BY: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

APPENDIX D

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
0.25	Pinto Mtn	CA	2.5	90	V	strike slip	0	16	74
2.29	Burnt Mtn	CA	0.6	67	W	strike slip	0	16	21
3.28	Eureka Peak	CA	0.6	90	V	strike slip	0	15	19
3.67	Landers	CA	0.6	90	V	strike slip	0	15	95
13.21	Johnson Valley (No)	CA	0.6	90	V	strike slip	0	16	35
13.23	So Emerson-Copper Mtn	CA	0.6	90	V	strike slip	0	14	54
13.67	North Frontal (East)	CA	0.5	41	S	thrust	0	16	27
16.56	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14	136
16.56	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0.1	13	479
16.56	S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13	390
16.56	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	512
16.56	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13	101
16.56	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12	206
16.56	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	548
16.56	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14	380
16.56	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	449

16.56	S. San Andreas;SM+NSB+SSB+BG	CA	n/a	81		strike slip	0	13	234
16.56	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14	442
16.56	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14	271
16.56	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13	340
16.56	S. San Andreas;BB+NM+SM+NSB+SSB+BG	CA	n/a	84		strike slip	0	14	321
16.56	S. San Andreas;SSB+BG+CO	CA	n/a	77		strike slip	0.2	12	170
16.56	S. San Andreas;BG	CA	n/a	58		strike slip	0	13	56
16.56	S. San Andreas;BG+CO	CA	n/a	72		strike slip	0.3	12	125
16.56	S. San Andreas;SM+NSB+SSB+BG+CO	CA	n/a	83		strike slip	0.1	13	303
16.89	Calico-Hidalgo	CA	1.8	90	V	strike slip	0	14	117
19.16	Lenwood-Lockhart-Old Woman Springs	CA	0.9	90	V	strike slip	0	13	145
22.15	Pisgah-Bullion Mtn-Mesquite Lk	CA	0.8	90	V	strike slip	0	13	88
23.89	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	322
23.89	S. San Andreas;BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	263
23.89	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	176
23.89	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	384
23.89	S. San Andreas;SSB	CA	16	90	V	strike slip	0	13	43
23.89	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	213
23.89	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0.1	13	421
23.89	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13	79

25.07	Helendale-So Lockhart	CA	0.6	90	V	strike slip	0	13	114
25.83	S. San Andreas;CO	CA	20	90	V	strike slip	0.6	11	69
28.53	North Frontal (West)	CA	1	49	S	reverse	0	16	50
35.46	San Jacinto;SJV	CA	18	90	V	strike slip	0	16	43
35.46	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16	88
36.98	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	196
36.98	San Jacinto;A	CA	9	90	V	strike slip	0	17	71
36.98	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16	134
36.98	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17	181
36.98	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16	181
36.98	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	215
36.98	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	241
36.98	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17	89
36.98	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17	136
36.98	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16	136
36.98	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	170
36.98	San Jacinto;A+C	CA	n/a	90	V	strike slip	0	17	118
36.98	San Jacinto;A+CC	CA	n/a	90	V	strike slip	0	16	118
36.98	San Jacinto;A+CC+B	CA	n/a	90	V	strike slip	0.1	15	152
36.98	San Jacinto;A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	178

43.70	San Jacinto;C	CA	14	90	V	strike slip	0	17	47
44.18	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13	35
44.18	S. San Andreas;BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14	220
44.18	S. San Andreas;SM+NSB	CA	n/a	90	V	strike slip	0	13	133
44.18	S. San Andreas;NM+SM+NSB	CA	n/a	90	V	strike slip	0	13	170
44.18	S. San Andreas;CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14	341
44.18	S. San Andreas;CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14	279
44.18	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0.1	13	377
44.49	Cleghorn	CA	3	90	V	strike slip	0	16	25
45.30	San Jacinto;CC+B+SM	CA	n/a	90	V	strike slip	0.2	14	103
45.30	San Jacinto;CC+B	CA	n/a	90	V	strike slip	0.2	14	77
45.30	San Jacinto;CC	CA	4	90	V	strike slip	0	16	43
45.61	San Jacinto;SBV	CA	6	90	V	strike slip	0	16	45

2022 CBC – SEISMIC PARAMETERS		
Site Coordinates	**Latitude**	**Longitude**
	34.1220	**-116.4525**
Mapped Spectral Response Acceleration	**S_s = 2.202**	**S_1 = 0.788**
Site Coefficients (Class "D")	**F_a = 1.00**	**F_v = 1.7**
Maximum Considered Earthquake (MCE) Spectral Response Acceleration	**S_{MS} = 2.202**	**S_{M1} = 1.3396**
Design Spectral Response Acceleration Parameters	**S_{DS} = 1.468**	**S_{D1} = 0.893**
Seismic Design Category	**E**	
Peak Ground Acceleration (PGA)	**0.939g**	
Site Amplification factor at PGA (FPGA)	**1.1**	
Site Modified Peak Ground Acceleration (PGA_m)	**1.032**	

References:

- Earthquake.usgs.gov/research/hazmaps/design
- 2022 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Section 1613, Earthquake Loads

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL INTENT

These specifications present general procedures and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installations of subdrains, and excavations. The recommendations contained in the geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications or the recommendations of the geotechnical report.

2.0 EARTHWORK OBSERVATIONS AND TESTING

Prior to the commencement of grading, a qualified geotechnical consultant (soils engineer and engineering geologist, and their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the consultant provide adequate testing and observations so that he may determine that the work was accomplished as specified. It shall be the responsibility of the contractor to assist the consultant and keep him apprised of work schedules and changes so that he may schedule his personnel accordingly.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and approved grading plans. If, in the opinion of the consultant, unsatisfactory conditions, such as questionable soil, poor moisture conditions, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the consultant will be empowered to reject the work and recommend that construction be stopped until the unsatisfactory conditions are rectified.

Maximum dry density tests used to determine the degree of compaction will be performed in accordance with the American Society of Testing and Materials, test method ASTM D1557-09.

3.0 PREPARATION OF AREAS TO BE FILLED

3.1 Clearing and Grubbing

All brush, vegetation, and debris shall be removed or piled and otherwise disposed of.

3.2 Processing

The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of 6 inches. Existing ground which is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3.3 Overexcavation

Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such depth that surface processing cannot adequately improve the condition, shall be overexcavated down to firm ground, approved by the consultant.

3.4 Moisture Conditioning

Overexcavated and processed soils shall be watered, dried-back, blended, and/or mixed, as required to attain a uniform moisture content near optimum.

3.5 Recompaction

Overexcavation and processed soils which have been properly mixed and moisture-conditioned shall be recompacted to a minimum relative compaction of 90 percent.

3.6 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal : vertical), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide, shall be at least 2 feet deep, shall expose firm materials, and shall be approved by the consultant. Other benches shall be excavated in firm materials for a minimum width of 4 feet. Ground sloping flatter than 5:1 (horizontal : vertical) shall be benched or otherwise overexcavated when considered necessary by the consultant.

3.7 Approval

All areas to receive fill, including processed areas, removal areas and toe-of-fill benches shall be approved by the consultant prior to fill placement.

4.0 FILL MATERIAL

4.1 General

Material to be placed as fill shall be free of organic matter and other deleterious substances, and shall be approved by the consultant. Soils of poor gradation, expansion, or strength characteristics shall be placed in areas designated by consultant or shall be mixed with other soils to serve as satisfactory fill material.

4.2 Oversize

Oversize materials defined as rock, or other irreducible material with maximum dimension greater than 12 inches, shall not be buried or placed in fills, unless the location, materials, and disposal methods are specifically approved by the consultant. Oversize disposal operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the consultant.

4.3 Import

If importing of fill material is required for grading, the import material shall meet the requirements of Section 4.1.

5.0 FILL PLACEMENT and COMPACTION

5.1 Fill Lifts

Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

5.2 Fill Moisture

Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture conditioning and mixing of fill layers shall continue until the fill material is at a uniform moisture content at or near optimum.

5.3 Compaction of Fill

After each layer has been evenly spread, moisture-conditioned, and mixed, it shall be uniformly compacted to not less than 90 percent of maximum dry density. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

5.4 Fill Slopes

Compacting of slopes shall be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot

rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90 percent.

5.5 Compaction Testing

Field-tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, the tests will be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of embankment.

6.0 SUBDRAIN INSTALLATION

Subdrain systems, if required, shall be installed in approved ground to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the approval of the consultant. The consultant, however, may recommend and upon approval, direct changes in subdrain line, grade or material. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to commencement of filling over the subdrain.

7.0 EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the consultant, further excavation or overexcavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes shall be performed. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.

8.0 TRENCH BACKFILLS

Trench excavations for utility pipes shall be backfilled under engineering supervision.

After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformly jetted into place before the controlled backfill is placed over the sand.

The onsite materials, or other soils approved by the soil engineer, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

The controlled backfill shall be compacted to at least 90 percent of the maximum dry density as determined by the ASTM D1557-09 test method.

Field density tests and inspection of the backfill procedures shall be made by the soil engineer during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the soil engineer to enable sampling and testing.