



February 16, 2024

Project No. 24031

Mr. Daniel Patneaude
DRP Enterprises, LLC
PO Box 4428
Palm Springs, CA 92263

Subject: Preliminary Geotechnical Engineering Report
Proposed Industrial Building
APN: 648-110-013, Thousand Palms, County of Riverside,
California

Dear Mr. Patneaude:

In accordance with your request and authorization, we are presenting the results of our geotechnical investigation for the proposed industrial building located at APN: 648-110-013, Thousand Palms, County of Riverside, California. The purpose of this investigation has been to evaluate the subsurface conditions at the site and to provide geotechnical engineering recommendations for the proposed construction.

Based on our findings, the proposed project is geotechnically feasible, provided that the recommendations in this report are incorporated into the design and are implemented during construction of the project. This report was prepared in accordance with the requirements of the 2022 California Building Code and the County of Riverside requirement.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned at (657) 888-4608 or info@ntsgeo.com.

Respectfully submitted,
NTS GEOTECHNICAL, INC.

A handwritten signature in black ink, appearing to read "Nadim Sunna".

Nadim Sunna, M.Sc., P.E., G.E. 3172
Principal Engineer



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Plate 1 – Location Map

Plate 2 – Geotechnical Map

Appendix A – Field Exploration

Appendix B – Geotechnical Laboratory Test Result

INTRODUCTION

This report presents the results of our geotechnical engineering evaluation performed for the proposed industrial building located at APN: 648-110-013, Thousand Palms, County of Riverside, California. See (Plate 1, Location Map). The purpose of this study has been to evaluate the subsurface conditions at the site and to provide geotechnical recommendations related to the design and construction of the proposed buildings.

SITE AND PROJECT DESCRIPTION

The project site is located at APN: 648-110-013, Thousand Palms, County of Riverside, California. The lot is bound by vacant lots to the north, east, south, and west. There is a dirt road on the western end of the property leading to Rio del Sol. The site is currently vacant with native plants. Where the proposed building is planned, the site elevation has a difference of about 7 feet from the northeast corner to the southwest corner of the building pad. The building pad is planned to receive a cut of about 3 feet on the northeast and a fill of about 5 feet on the southwest. Where the leachlines are planned the difference in elevation is about 2 feet from northeast to southwest over a distance is about 80 feet, which is approximately 2.5% slope.

It is our understanding that the proposed project will consist construction of one-story industrial building.

SCOPE OF WORK

As part of the preparation of this report, we have performed the following tasks:

Background Review

We reviewed readily available background data including in-house geologic maps, topographic maps, and aerial photographs relevant to the subject site in preparation of this report. The list of documents reviewed is presented in the "References" section of this report.

Field Exploration

The subsurface conditions were evaluated on January 17, 2024, by advancing two (2) 8-inch diameter, hollow-stem-auger borings. The borings were advanced to depths ranging from 10 and 15 feet below the existing grade and four percolation holes drilled to a depth of 4 feet below the existing grade. The approximate locations of the borings and percolation holes are shown on Plate 2, Geotechnical Map. Detailed exploration information of soils borings is presented in Appendix A, Field Exploration.

Geotechnical Laboratory Testing

Laboratory testing was performed on selected samples obtained from the boring in order to aid in the soil classification and to evaluate the engineering properties of the foundation soils. The following tests were performed in general accordance with ASTM standards:

- In-situ moisture and density
- Grain Size Analysis
- Direct shear
- Consolidation

Laboratory test results are presented within Appendix B of this report.

GEOLOGIC FINDINGS

Regional Geologic Setting

According to the Dibblee geologic map, the project site is underlain by alluvial deposits (Qa) consisting of gravel, sand, and clay.

Subsurface Materials

Earth materials encountered during our subsurface investigation consist of alluvium (Qa) extending to the total depth of the exploration. In general, the alluvium consists of tan to brown, dry to damp, loose to dense, sand.

Groundwater

Groundwater was not observed during our exploration. Based on our review of nearby well data (Well No. 338195N1163903W001), we note that the shallowest groundwater elevation was approximately 60 feet MSL. The current approximately elevation of the subject site is 425 feet MSL, which places the groundwater at a depth greater than 360 feet below the existing ground surface. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations, or activities by humans at this site and nearby sites. Based on the above findings, groundwater is unlikely to impact the proposed development.

GEOLOGIC HAZARDS

Faulting and Seismicity

The site is not located within an Alquist-Priolo Earthquake Fault Zone, and no known active faults are shown on the reviewed geologic maps crossing the site, however, the site is located in the seismically active region of Southern California. The nearest known active fault is the San Andreas fault system, which is located approximately 0.6 miles from the site.

Given the proximity of the site to these and numerous other active and potentially active faults, the site will likely be subject to earthquake ground motions in the future. A site PGAM of 1.185g was calculated for the site in conformance with the 2022 CBC. This PGAM is primarily dominated by earthquakes with a mean magnitude of 7.52 at a mean distance of 2.69 km from the site using the USGS 2014 Interactive Deaggregation website.

Liquefaction and Seismic Settlement

Liquefaction occurs when the pore pressures generated within a soil mass approach the effective overburden pressure. Liquefaction of soils may be caused by cyclic loading such as that imposed by ground shaking during earthquakes. The increase in pore pressure results in a loss of strength, and the soil then can undergo both horizontal and vertical movements, depending on the site conditions. Other phenomena associated with soil liquefaction include sand boils, ground oscillation, and loss of foundation bearing capacity. Liquefaction is generally known to occur in loose, saturated, relatively clean, fine-grained cohesionless soils at depths shallower than approximately 50 feet. Factors to consider in the evaluation of soil liquefaction potential include groundwater conditions, soil type, grain size distribution, relative density, degree of saturation, and both the intensity and duration of ground motion.

Based on our review of the County of Riverside Map My County website, the site is located within a moderate liquefaction potential, however, based on the lack of shallow groundwater and dense nature of the underlying soils, the potential for liquefaction is deemed low.

Landslides

Based on our review of the referenced geologic maps, literature, topographic maps, aerial photographs, and our subsurface evaluation, no landslides or related features underlie or are adjacent to the subject site. Due to the relatively level nature of the site and surrounding areas, the potential for landslides at the project site is considered negligible.

Flooding

The Federal Emergency Management Agency (FEMA) has prepared flood insurance rate maps (FIRMs) for use in administering the National Flood Insurance Program. Based on our review of the FEMA flood map, the site is located in a flood zone Without Base Flood Elevation (Zone AO). Therefore, the potential for flooding to impact the proposed development should be evaluated by the project designer.

Tsunami and Seiches

Tsunamis are waves generated by massive landslides near or under sea water. The site is not located on any State of California Tsunami Inundation Map for Emergency Planning. The potential for the site to be adversely impacted by earthquake-induced tsunamis is considered to be negligible because the site is located several miles inland from the Pacific Ocean shore, at an elevation exceeding the maximum height of potential tsunami inundation.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. The potential for the site to be adversely impacted by earthquake-induced seiches is considered to be negligible due to the lack of any significant enclosed bodies of water located in the vicinity of the site.

GEOTECHNICAL ENGINEERING FINDINGS

Expansive Soil

Based on our evaluation and experience with similar material types, the soils encountered near the ground surface at the site exhibit a very low expansion potential.

Excavation Characteristics

The majority of the soil materials underlying the site can be excavated with excavators and other conventional grading equipment.

GEOTECHNICAL ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results of our field exploration and engineering analyses, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided that the recommendations in this report are incorporated into the design plans and are implemented during construction.

Based on the geologic and geotechnical findings, the following is a summary of our conclusions:

- The upper 3 feet of the site soils is considered loose and compressible and will require remedial grading to support new fill, slab-on-grade, and new foundation.
- There are no known active faults crossing the subject site. The site seismicity is typical for the Thousand Palms area. Structure design should be in accordance with the current 2022 CBC.
- The potential for liquefaction to impact the proposed development is considered low.
- The proposed structures may be supported on a shallow foundation system embedded into competent firm and unyielding engineered fill.

The actual conditions of the near-surface supporting material across the site may vary. The nature and extent of variations of the surface and subsurface conditions between the exploratory excavations may not become evident until construction. If variations of the material become evident during construction of the proposed development, NTS should be notified so that the project Geotechnical Consultant can reevaluate the characteristics of the material and the conclusions and recommendations of this report, and, if needed, revise the conclusions and recommendations presented herein.

Our geotechnical engineering analyses performed for this report were based on the earth materials encountered during the subsurface exploration for the site. If the design substantially changes, then our geotechnical engineering recommendations would be subject to revision based on our evaluation of the changes. The following sections present our conclusions and recommendations pertaining to the engineering design for this project.

Site Preparation

Site preparation should begin with the removal of utility lines, asphalt, concrete, vegetation, and other deleterious debris from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the outside edges of the proposed excavation and fill areas. We recommend that unsuitable materials such as organic matter or oversized material be selectively removed and disposed offsite. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed at a legal dump site away from the project area.

Remedial Grading

Remedial grading will serve to create a firm and workable platform for construction of new building pad and improvements. Due to the potential of disturbance during construction and presence of loose/compressible soils, we recommend that the existing grade be removed to a depth 3 feet below the existing grade.

It should be noted that the recommendations provided herein are based on our subsurface exploration and knowledge of the on-site geology. Actual removals may vary in configuration and volume based on observations of geologic materials and conditions encountered during grading. The bottom of all corrective grading removals should be observed by a representative of NTS to verify the suitability of in-place soil prior to performing scarification and recompaction. Corrective grading recommendations are outlined below.

Building Pad

We understand that the building pad is anticipated to receive about 3 feet of cut and approximately 5 feet of fill on the other side. On this basis, we recommend that the cut portion be overexcavated to a depth of 3 feet below the proposed foundation and recompacted to achieve a uniform blanket of engineered fill and in order to minimize differential settlement.

For the fill portion, we recommend that the existing grade be overexcavated to a depth of 3 feet below the existing grade and recompacted to achieve a uniform blanket of engineered fill prior to placement of new fill.

Materials for Fill

On-site soils with an organic content of less than 3 percent by volume (or 1 percent by weight) are suitable for use as fill. Soil material to be used as fill should not contain contaminated materials, rocks, or lumps over 6 inches in largest dimension, and not more than 40 percent larger than $\frac{3}{4}$ inch. Utility trench backfill material should not contain rocks or lumps over 3 inches in largest dimension. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or may be disposed offsite.

Any imported fill material should consist of granular soil having a "very low" expansion potential (that is, expansion index of 20 or less). Import material should also have low corrosion potential (that is, chloride content less than 500 parts per million [ppm], soluble sulfate content of less than 0.1 percent, and pH of 5.5 or higher). Materials to be used as fill should be evaluated by a representative of NTS prior to importing or filling.

Compacted Fill

Prior to placement of compacted fill, the contractor should request an evaluation of the exposed excavation bottom by NTS. Unless otherwise recommended, the exposed ground surface should then be scarified to a depth of at least 8 inches and watered or dried, as needed, to achieve generally consistent moisture contents near optimum moisture content. The scarified materials should then be compacted to 90 percent relative compaction in accordance with the latest version of ASTM Test Method D1557.

Compacted fill should be placed in horizontal lifts of approximately 6 to 8 inches in loose thickness. Prior to compaction, each lift should be watered or dried as needed to achieve near optimum moisture condition, mixed, and then compacted by mechanical methods to a relative compaction of 90 percent. Successive lifts should be treated in a like manner until the desired finished grades are achieved.

Personnel from NTS should observe the excavations so that any necessary modifications based on variations in the encountered soil conditions can be made. All applicable safety requirements and regulations, including CalOSHA requirements, should be met.

Temporary Excavations

Temporary excavations for the demolishing, earthwork, footing and utility trench are expected. We anticipate that unsurcharged excavations with vertical side slopes less than 3 feet high will generally be stable; however, sloughing of cohesionless sandy materials encountered at the site should be expected.

Where the space is available, temporary, unsurcharged excavation sides over 3 feet in height should be sloped no steeper than an inclination of 1.5H:1V (horizontal:vertical). Where sloped excavations are created, the tops of the slopes should be barricaded so that vehicles and storage loads do not encroach within 10 feet of the top of the excavated slopes. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes. NTS should be advised of such heavy vehicle loadings so that specific setback requirements can be established. If the temporary construction slopes are to be maintained during the rainy season, berms are recommended to be graded along the tops of the slopes in order to prevent runoff water from entering the excavation and eroding the slope faces. Where space for sloped excavations is not available, temporary shoring may be utilized.

Personnel from NTS should observe the excavation so that any necessary modifications based on variations in the encountered soil conditions can be made. All applicable safety requirements and regulations, including CalOSHA requirements, should be met.

Seismic Design

Our recommendations for seismic design parameters have been developed in accordance with 2022 CBC and ASCE 7-16 (ASCE, 2016) standards. The applicable site class is D based on the results of our field investigation. The table presents the seismic design parameters for the site that are obtained from USGS Design Ground Motions website, and are based on the ASCE 7-16 and 2022 California Building Code, and the site coordinates of N33.8376802° and W116.4035075°.

CBC 2022 Seismic Design Parameters

Design Parameters	Value
Mapped Spectral Acceleration Parameter at Period of 0.2-Second, S_s	2.295
Mapped Spectral Acceleration Parameter at Period 1-Second, S_1	0.976
Site Coefficient, F_a	1.2
Site Coefficient, F_v	1.7
Adjusted MCER1 Spectral Response Acceleration Parameter at Short Period, S_{MS}	2.754
1-Second Period Adjusted MCER1 Spectral Response Acceleration Parameter, S_{M1}	1.659
Short Period Design Spectral Response Acceleration Parameter, S_{DS}	1.836
1-Second Period Design Spectral Response Acceleration Parameter, S_{D1}	1.106
Peak Ground Acceleration, PGA	0.987
Peak Ground Acceleration, PGAM *	1.185
*Risk-targeted maximum considered earthquake	

It should be recognized that much of southern California is subject to some level of damaging ground shaking as a result of movement along the major active (and potentially active) fault zones that characterize this region. Design utilizing the 2022 CBC is not meant to completely protect against damage or loss of function. Therefore, the preceding parameters should be considered as minimum design criteria.

Foundation Design and Construction

A shallow foundation system may be used for support of the proposed building, provided that all the footings are placed on competent firm and unyielding engineered fill. Our geotechnical foundation design parameters are presented in the table below:

Foundation Design Parameters

Bearing Material	Competent engineered fill
Minimum Footing Size	- Width: 12 inches - Depth: 18 inches below the lowest adjacent soil grade
Allowable Bearing Capacity	2,500 psf for the minimum footing size given above. - The above value may be increased by 1/3 for temporary loads such as wind or earthquake.
Settlement	Total static settlement of 1 inch with differential settlement estimated to be approximately ½ inch over a span of 30 feet.
Allowable Lateral Passive Resistance	275 pcf (equivalent fluid pressure)
Allowable Coefficient of Friction	0.35

Slab-On-Grade Design and Construction

The slab-on-grade should be designed and constructed with the minimum recommendations presented below, however, final design of the slab should be determined by the project structural engineer.

Minimum Slab Thickness: Minimum slab thickness is recommended to be 5 inches from a geotechnical standpoint. Final thickness per structural engineer.

Minimum Slab Reinforcement: Minimum slab reinforcement shall not be less than No. 4 bars placed at 18 inches on center. Welded wire mesh is not recommended. Care should be taken to position the reinforcement bars in the center of the slab.

Slab Subgrade:

- The upper 24 inches of the slab subgrade should be moisture conditioned to near optimum moisture content and compacted to a minimum relative compaction of compacted to 90 percent relative compaction in accordance with the latest version of ASTM D1557.
- A moisture vapor retarder below the slab-on-grade should be placed in accordance with the “Moisture Vapor Retarder” section below.

Moisture Vapor Retarder

A vapor retarder, such as a 10-mil-thick moisture vapor retarder that meets the requirements of ASTM E1745 Class C (Stego Wrap or equivalent) should be placed directly over the prepared soil subgrade to provide protection against vapor transmission through concrete floor slabs that are anticipated to receive carpet, tile or other moisture sensitive coverings. The use of moisture vapor retarder should be determined by the project architect. At minimum, the vapor retarder should be installed as follows:

- Per the manufacture's specifications as well as with the applicable recognized installation procedures such as ASTM E1643;
- Joints between the sheets and the openings for utility piping should be lapped and taped. If the barrier is not continuously placed across footings/ribs, the barrier should at minimum be lapped into the side of the footing/rib trenches down to the bottom of the trench; and,
- Punctures in the vapor retarder should be repaired prior to concrete placement.

It should be noted that the moisture retarder is intended only to reduce moisture vapor transmissions from the soil beneath the concrete and is consistent with the current standard of the industry in the building construction in Southern California. It is not intended to provide a "waterproof" or "vapor proof" barrier or reduce vapor transmission from sources above the retarder (i.e., concrete). The evaluation of water vapor from any source and its effect on any aspect of the proposed building space above the slab (i.e., floor covering applicability, mold growth, etc.) is beyond our purview and the scope of this report.

Drainage Control

The control of surface water is essential to the satisfactory performance of the building and site improvements. Surface water should be controlled so that conditions of uniform moisture are maintained beneath the improvements, even during periods of heavy rainfall. The following recommendations are considered minimal:

- Ponding and areas of low flow gradients should be avoided.
- If bare soil within 5 feet of the structure is not avoidable, then a gradient of 5 percent or more should be provided sloping away from the improvement. Corresponding paved surfaces should be provided with a gradient of at least 2 percent.
- The remainder of the unpaved areas should be provided with a drainage gradient of at least 2 percent.
- Positive drainage devices, such as graded swales, paved ditches, and/or catch basins should be employed to accumulate and to convey water to appropriate discharge points.

- Concrete walks and flatwork should not obstruct the free flow of surface water.
- Brick flatwork should be sealed by mortar or be placed over an impermeable membrane.
- Area drains should be recessed below grade to allow free flow of water into the basin.
- Enclosed raised planters should be sealed at the bottom and provided with an ample flow gradient to a drainage device. Recessed planters and landscaped areas should be provided with area inlet and subsurface drain pipes.
- Planters should not be located adjacent to the structures wherever possible. If planters are to be located adjacent to the structures, the planters should be positively sealed, should incorporate a subdrain, and should be provided with free discharge capacity to a drainage device.
- Planting areas at grade should be provided with positive drainage. Wherever possible, the grade of exposed soil areas should be established above adjacent paved grades. Drainage devices and curbing should be provided to prevent runoff from adjacent pavement or walks into planted areas.
- Gutter and downspout systems should be provided to capture discharge from roof areas. The accumulated roof water should be conveyed to off-site disposal areas by a pipe or concrete swale system.
- Landscape watering should be performed judiciously to preclude either soaking or desiccation of soils. The watering should be such that it just sustains plant growth without excessive watering. Sprinkler systems should be checked.

Review, Observation, and Testing

The recommendations presented in this report are contingent upon review of final plans and specifications for the project by NTS. NTS Geotechnical, Inc. should review and verify in writing the compliance of the final grading plan and the final foundation plans with the recommendations presented in this report.

It is recommended that NTS be retained to provide continuous Geotechnical Consulting services during the earthwork operations (i.e., rough grading, subgrade preparation for slabs-on-grade, finish grading, etc.) and foundation installation process. This is to observe compliance with the design concepts, specifications and recommendations and to allow for design changes in the event that subsurface conditions differ from those anticipated during our subsurface investigation.

LIMITATIONS

All parties reviewing or utilizing this report should recognize that the findings, conclusions, and recommendations presented represent the results of our professional geological and geotechnical engineering efforts and judgments. Due to the inexact nature of the state of the art of these professions and the possible occurrence of undetected variables in subsurface conditions, we cannot guarantee that the conditions actually encountered during grading and site construction will be identical to those observed, sampled, and interpreted during our study, or that there are no unknown subsurface conditions which could have an adverse effect on the use of the property. We have exercised a degree of care comparable to the standard of practice presently maintained by other professionals in the fields of geotechnical engineering and engineering geology, and believe that our findings present a reasonably representative description of geotechnical conditions and their probable influence on the grading and use of the property.

Our conclusions and recommendations are based on the assumption that our firm will act as the geotechnical engineer of record during construction and grading of the project to observe the actual conditions exposed, to verify our design concepts and the grading contractor's general compliance with the project geotechnical specifications, and to provide our revised conclusions and recommendations should subsurface conditions differ significantly from those used as the basis for our conclusions and recommendations presented in this report. Since our conclusions and recommendations are based on a limited amount of current and previous geotechnical exploration and analysis, all parties should recognize the need for possible revisions to our conclusions and recommendations during grading of the project.

It should be further noted that the recommendations presented herein are intended solely to minimize the effects of post-construction soil movements. Consequently, minor cracking and/or distortion of all on-site improvements should be anticipated.

This report has not been prepared for the use by other parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

REFERENCES

California Department of Conservation, Division of Mines and Geology, 1974, Special Studies Zone for the Cathedral City Quadrangle, Riverside County, California.

Coduto, Donald P., 1994, Foundation Design: Principles and Practices: Prentice-Hall, Inc, Englewood Cliffs, New Jersey.

Dibblee, T.W., and Minch, J.A., Geologic map of the Thousand Palms & Lost Horse Mountain 15-minute quadrangles, Riverside County, California, Dibblee Foundation Map DF-372, dated 208.

Naval Facilities Engineering Command, 1986, NAVFAC Design Manual.



LOCATION MAP

NTS
GEOTECHNICAL

Date: February 5, 2024

Project No.: 24031

Plate
1

APPENDIX A

Field Exploration

Appendix A

Field Exploration

The subsurface exploration program for the proposed project consisted of advancing two (2) 8-inch-diameter, hollow-stem-auger drill rig borings at the subject site. The borings were advanced to depths ranging from 10 to 15 feet below the existing grade. The logs are presented within Appendix A.

The Boring Logs are presented as Figures A-2 to A-3. The Boring Logs describe the earth materials encountered, samples obtained, and show the field and laboratory tests performed. The log also shows the boring number, drilling date, and the name of the logger and drilling subcontractor. The borings were logged by an engineer using the Unified Soil Classification System. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual. Drive and bulk samples of representative earth materials were obtained from the borings.

Disturbed samples were obtained using a Standard Penetration Sampler (SPT). This sampler consists of a 2-inch O.D., 1.4-inch I.D. split barrel shaft that is advanced into the soil at the bottom of the drilled hole a total of 18 inches. The number of blows required to drive the sampler 18 inches is presented on the boring logs. Soil samples obtained by the SPT were retained in plastic bags. A California modified sampler was used to obtain drive samples of the soil encountered. This sampler consists of a 3-inch outside diameter (O.D.), 2.4-inch inside diameter (I.D.) split barrel shaft that was driven a total of 12-inches into the soil at the bottom of the boring by a safety hammer weighing 140 pounds at a drop height of approximately 30 inches. The soil was retained in brass rings for laboratory testing. Additional soil from each drive remaining in the cutting shoe was usually discarded after visually classifying the soil. The number of blows required to drive the sampler 18 inches is presented on the boring logs.

Upon completion of the borings, the boreholes were backfilled with soil from the cuttings.

Project: **APN 648-110-013**
 Project Location: **APN 648-110-013,
 Thousand Palms**
 Project Number: **24031**



Key to Log of Boring Sheet 1 of 1

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9

COLUMN DESCRIPTIONS

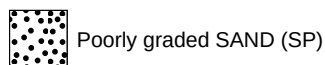
- | | |
|--|---|
| <p>1 Depth (feet): Depth in feet below the ground surface.</p> <p>2 Sample Type: Type of soil sample collected at the depth interval shown.</p> <p>3 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.</p> <p>4 Material Type: Type of material encountered.</p> <p>5 Graphic Log: Graphic depiction of the subsurface material encountered.</p> | <p>6 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.</p> <p>7 Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.</p> <p>8 Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.</p> <p>9 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|--|---|

FIELD AND LABORATORY TEST ABBREVIATIONS

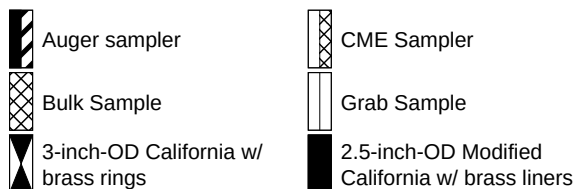
CHEM: Chemical tests to assess corrosivity
 COMP: Compaction test
 CONS: One-dimensional consolidation test
 LL: Liquid Limit, percent

PI: Plasticity Index, percent
 SA: Sieve analysis (percent passing No. 200 Sieve)
 UC: Unconfined compressive strength test, Qu, in ksf
 WA: Wash sieve (percent passing No. 200 Sieve)

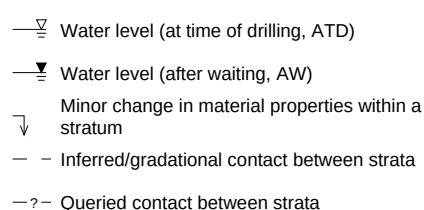
MATERIAL GRAPHIC SYMBOLS



TYPICAL SAMPLER GRAPHIC SYMBOLS



OTHER GRAPHIC SYMBOLS



GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Figure A-1

Project: APN 648-110-013		Log of Boring B-1 Sheet 1 of 1
Project Location: APN 648-110-013, Thousand Palms		
Project Number: 24031		

Date(s) Drilled 1/17/2023	Logged By IJV	Checked By NS
Drilling Method Hollow Stem Auger	Drill Bit Size/Type 8"	Total Depth of Borehole 15 feet
Drill Rig Type CME 75	Drilling Contractor OWD	Approximate Surface Elevation N/A
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) Modified California, SPT	Hammer Data 140-lb Autohammer
Borehole Backfill Native	Location APN 648-110-013, Thousand Palms	

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
0			SP		ALLUVIUM (Qa): SAND, tan to brown, fine to coarse-grained sand, some pebbles, loose, dry	2	107	
5		4	SP		SAND to SILTY SAND, tan to brown, few pebbles, loose			
10		50/6"	SP		dense, dry	2	85	
15		16	SP		some pebbles, few cobbles, medium dense			
					Total Depth = 15 feet Groundwater not encountered Backfilled with native			
20								
25								
30								

Figure A-2

Project: APN 648-110-013		Log of Boring B-2 Sheet 1 of 1
Project Location: APN 648-110-013, Thousand Palms		
Project Number: 24031		

Date(s) Drilled 1/17/2023	Logged By IJV	Checked By NS
Drilling Method Hollow Stem Auger	Drill Bit Size/Type 8"	Total Depth of Borehole 10 feet
Drill Rig Type CME 75	Drilling Contractor OWD	Approximate Surface Elevation N/A
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) Modified California, SPT	Hammer Data 140-lb Autohammer
Borehole Backfill Native	Location APN 648-110-013, Thousand Palms	

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
0			SP		ALLUVIUM (Qa): SAND, tan to brown, fine to coarse-grained sand, few cobbles, medium dense			
10		10						
5		15	SP		SAND to SILTY SAND, tan to brown, medium dense, damp	5	98	
10		15	SP		medium dense Total Depth = 10 feet Groundwater not encountered Backfilled with native			
15								
20								
25								
30								

Figure A-3

APPENDIX B

Laboratory Testing Data

Appendix B

Geotechnical Laboratory Testing

Laboratory Moisture Content and Density Tests

The moisture content and dry densities of selected driven samples obtained from the exploratory boring was evaluated in general accordance with the latest version of ASTM D 2937. The test results are presented on the log of the exploratory boring in Appendix A.

No. 200 Wash Sieve

The number of fines passing the No. 200 sieve was evaluated by the wash sieve. The test procedure was in general accordance with ASTM D 1140. The results are attached to this Appendix B.

Boring No.	Depth (ft)	Fines Passing No. 200, %
B-1	5	7.0
B-2	2	5.0

Direct Shear Tests

Direct shear tests were performed on selected remolded and relatively undisturbed soil samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the materials. The samples were inundated during shearing to represent adverse field conditions. Direct shear test results are attached to Appendix B.

Consolidation Test

Consolidation tests was performed on a selected driven soil sample in general accordance with the latest version of ASTM D2435. The sample was inundated during testing to represent adverse field conditions. The percent consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. Consolidation testing results are attached to this Appendix B.

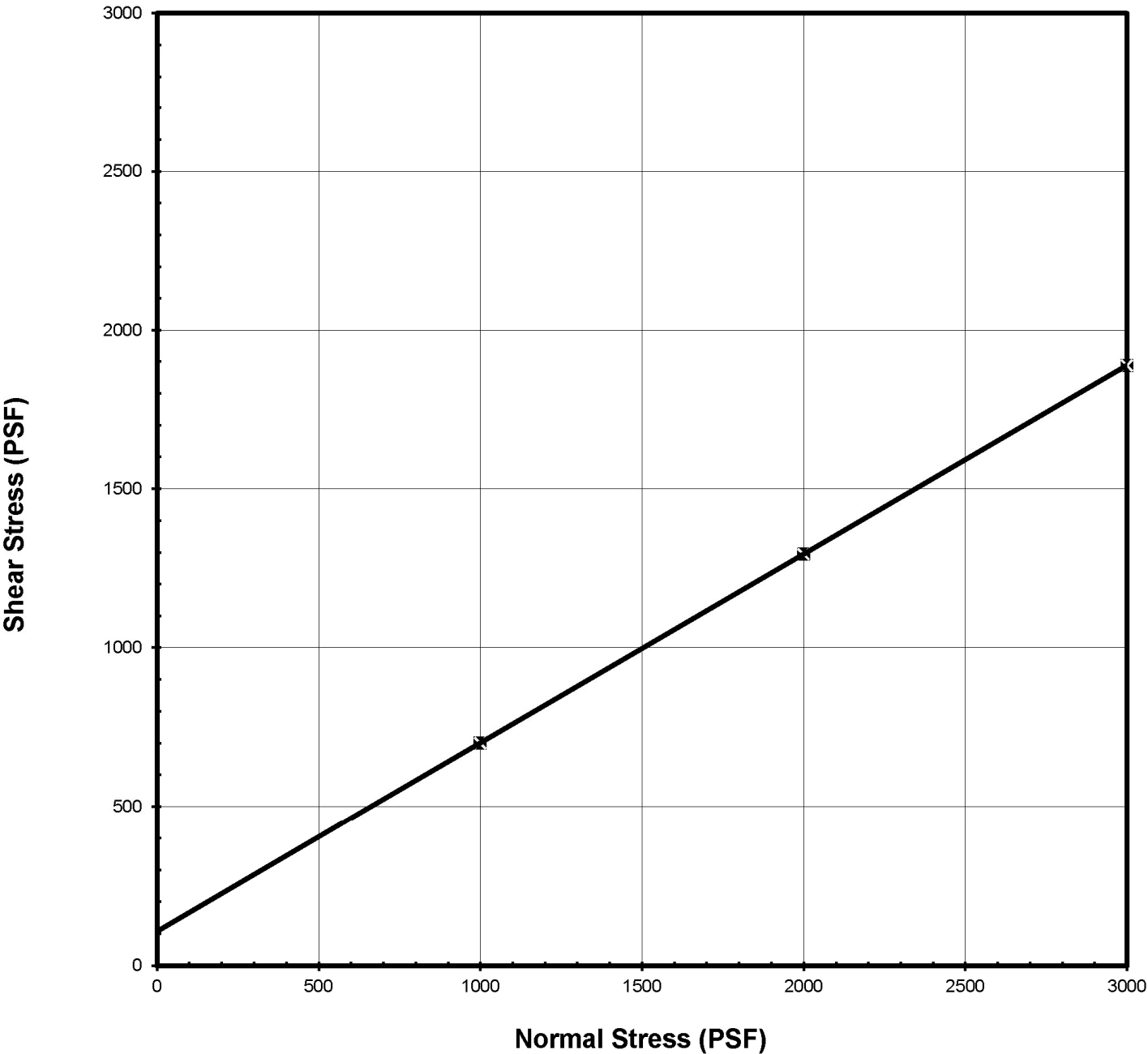
Direct Shear Test Diagram (D-3080)

PLATE: S-1

P.N. 24031

Sample Description	Sample Identification	Test Type	Sample Test State	Number of Passes
Qa	B-1 @ 2.0'	Ultimate	Saturated	1

Soil Dry Density (PCF)	107	Shear Strength Values:	
Soil Moisture Content (%)	20.5	Phi (Degrees)	30.7
Soil Saturation (%)	99.6	Cohesion (PSF)	107.7



Consolidation Pressure Curve (D-2435)

Sample Identification	Sample Description
B-2 @ 5.0'	Qa

PLATE: C-1
P.N. 24031

