APPENDIX E

GEOTECHNICAL STUDY

GEOTECHNICAL ENGINEERING INVESTIGATION
PENSKE TRUCK LEASING FACILITY
HIGHWAY 215 FRONTAGE ROAD
MORENO VALLEY, CALIFORNIA

KA PROJECT NO. 112-21093
OCTOBER 22, 2021

Prepared for:

MR. MIKE BARNS, DIRECTOR OF CONSTRUCTION
PENSKE TRUCK LEASING
1541 W. BELL DEL MAR DRIVE
TEMPE, ARIZONA 85283

Prepared by:

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Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

October 22, 2021 KA Project No. 112-21093

Mr. Mike Barnes, Director of Construction
Penske Truck Leasing
1541 W. Bell Del Mar Drive
Tempe, Arizona 85283 (480) 276-5888
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RE: Geotechnical Engineering Investigation
Proposed Penske Truck Leasing Facility
SEC of Alessandro Blvd. and Highway 215 Frontage Rd.
Moreno Valley, California

Dear Mr. Barnes:

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

JORGE A. PELAYO
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CONSTRUCTION TESTING & INSPECTION

October 22, 2021 KA Project No. 112-21093

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED PENSKE TRUCK LEASING FACILITY
ALESSANDRO BLVD. AND HIGHWAY 215 FRONTAGE RD.
MORENO VALLEY, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Penske Truck Leasing Facility to be located on Alessandro Boulevard and east of Highway 215 Frontage Road, in the City of Moreno Valley, California. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, Engineered Fill, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior flatwork, retaining walls, soil cement reactivity, pavement design, and water infiltration rates.

A site plan showing the approximate boring locations is presented following the text of this report, the attached Site Map, Figure 1. A description of the field investigation, boring logs, and the boring log legend are presented in Appendix A. Appendix A contains a description of the laboratory testing phase of this study; along with the laboratory test results. Appendices B and C contain guides to earthwork and pavement specifications. When conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE

This investigation was conducted to evaluate the soil and groundwater conditions at the subject site, to make geotechnical engineering recommendations for use in design of specific construction elements, and to provide criteria for site preparation and Engineered Fill construction.

Our scope of services was outlined in our proposal dated August 19, 2021 (KA Proposal No. G21100CAC) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- A field investigation consisting of drilling a total of nine (9) borings to depths of approximately 10 to 50 feet below existing site grades for evaluation of the subsurface conditions at the project site.
- Performance of laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Performance of two (2) water infiltration tests at the subject site in order to obtain approximate water infiltration rates for the near surface soil conditions.
- Collection of a bulk sample for laboratory testing of R-value used in our pavement design recommendations.
- Evaluation of the data obtained from the investigation and an engineering analysis to provide recommendations for use in the project design and preparation of construction specifications.
- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

PROPOSED CONSTRUCTION

We have reviewed the Site Plan, prepared by K/G Architects for the proposed development. Building 1 is proposed as a new structure called, "Service Bays," that is a two-story semi-truck drive through building constructed of steel spans on concrete foundations and consisting of 19,158 square feet. Building 2 is proposed as a new single-story structure constructed of conventional wood frame with slab-on-grade floors and consisting of 1,192 square feet. The proposed development will include on-site parking and localized landscaped areas.

The anticipated finished grade elevation for the proposed structure is assumed to be relatively close to the existing site grades. As a result, only minor cuts and fills are anticipated at the site to account for site drainage. In the event these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

SITE LOCATION AND SITE DESCRIPTION

The subject site is roughly rectangular in shape and encompasses approximately 10 acres. The subject site is located on Alessandro Blvd. and east of the Highway 215 Frontage Rd. in the city of Moreno Valley, California, see the attached Vicinity Map, Figure 2. The site is bound to the south by Robertson's Ready Mix, to the west by the existing Highway 215 Frontage Rd., to the north by Alessandro Blvd., and to the east by Alessandro Self Storage (on Day St.).

The site is currently undeveloped and free of any above grade structures. Ground surface at the site consists of exposed soil and localized weed and brush growth. The site topography is relatively flat and level with no major changes in topography at an approximate elevation of 1545 feet above mean sea level. The site currently drains to the west side of the property.

GEOLOGIC SETTING

The subject site is located within the Peninsular Ranges Geomorphic Province (CGS Note 36). The Peninsular Ranges is a series of ranges is separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault. The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada, with granitic rock intruding the older metamorphic rocks. The

Peninsular Ranges extend into lower California and are bound on the east by the Colorado Desert. The Los Angeles Basin and the island group (Santa Catalina, Santa Barbara, and the distinctly terraced San Clemente and San Nicolas islands), together with the surrounding continental shelf (cut by deep submarine fault troughs), are included in this province.

Locally, the site is located in an inactive portion of the San Jacinto River floodplain, and central area of Moreno Valley. The Moreno Valley is bound to the south and west by the Santa Ana Mountains, to the north by the Box Springs Mountains, to the east by the San Jacinto Mountains.

The near-surface deposits in the vicinity of the subject site are indicated to be comprised of recent alluvium (Map Symbol Q) consisting of unconsolidated sands, silt, and clays derived from erosion of local mountain ranges. See the attached Geologic Map (Figure 3) and Boring Logs (Appendix A) for a description of the earth materials encountered during our investigation.

Numerous moderate to large earthquakes have affected the area of the subject site within historic time. Based on the proximity of several dominant active faults and seismogenic structures, as well as the historic seismic record, the area of the subject site is considered subject to relatively high seismicity. The nearest significant active faults are the San Jacinto (8 miles northeast), San Andreas (17 miles northeast), and Elsinore fault zone(s) (16 miles southwest), of the site. The area in consideration shows no mapped faults on-site according to maps prepared by the California Geologic Survey and published by the International Conference of Building Officials (ICBO). No evidence of surface faulting was observed on the property during our reconnaissance.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling a total of eleven (9) borings (B-1 to B-9) to depths of approximately 10 to 50 feet below existing site grade, using a truck-mounted drill rig; in addition, two borings (IT-1 and IT-2) were advanced to a depth of ten feet for the purpose of infiltration testing. A bulk subgrade sample was obtained from the site for laboratory R-Value testing. The approximate boring and bulk sample locations are shown on the attached, Site Map, Figure 1. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsurface soils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory testing program was formulated with emphasis on the evaluation of natural moisture, density, gradation, shear strength, consolidation potential, R-Value, and moisture-density relationships of the materials encountered. In addition, chemical tests were performed to evaluate the corrosivity of the soils to buried concrete and metal. Details of the laboratory test program and results of the laboratory tests are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the surface soils consisted of approximately 6 to 12 inches of very loose silty sand or silty sand/sand. These soils are disturbed, have low strength characteristics and are highly compressible when saturated.

Beneath the loose surface soils, approximately 2 to 3 feet of loose to very dense silty sand or silty sand/sand was encountered. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 13 blows per foot to over 50 blows per 6 inches. Dry densities ranged from 110 to 129 pcf. A representative soil sample consolidated approximately 3¾ percent under a 2 ksf load when saturated. A representative soil sample had an angle of internal friction of 25 degrees.

Below 3 to 4 feet, predominately loose to very dense silty sand, silty sand/sand, silty sand/sandy silt or sand were encountered. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 14 blows per foot to over 50 blows per 6 inches. Dry densities ranged from 94 to 124 pcf. A representative soil sample consolidated approximately 4½ percent under a 2 ksf load when saturated. A representative soil sample had an internal angle of friction of 29 degrees. These soils had similar strength characteristics as the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Groundwater was encountered at a depth of approximately 14 feet below existing site grade in Boring Nos. B6, B7 and B8.

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

SEISMICITY AND LIQUEFACTION POTENTIAL

Seismicity is a general term relating to the abrupt release of accumulated strain energy in the rock materials of the earth's crust in a given geographical area. The recurrence of accumulation and subsequent release of strain have resulted in faults and fault systems. Fault patterns and density reflect relative degrees of regional stress through time, but do not necessarily indicate recent seismic activity; therefore, the degree of seismic risk must be determined or estimated by the seismic record in any given region.

Soil liquefaction is a state of soil particle suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs under saturated conditions in soils such as clean sand in which the strength is purely frictional. However, liquefaction has occurred in soils other than clean sand. Liquefaction usually occurs under vibratory conditions such as those induced by seismic events.

To evaluate the liquefaction potential of the site, the following items were evaluated:

1) Soil type
2) Groundwater depth
3) Relative density
4) Initial confining pressure
5) Intensity and duration of ground shaking

The site is located in an area designated by the County of Riverside Liquefaction Susceptibility Map as having Moderate Liquefaction Potential. Groundwater was encountered at the subject site at a depth of approximately 14 feet below current site grades.

The potential for soil liquefaction during a seismic event was evaluated using the LIQUEFYPRO computer program (version 5.8h) developed by CivilTech Software. For the analysis, a maximum earthquake magnitude of 7.0 was used. A peak horizontal ground surface acceleration of 0.620g was considered conservative and appropriate for the liquefaction analysis. An estimated high groundwater depth of fourteen (14) feet was used for our analysis. The computer analysis indicates that soil conditions encountered at the subject site are not subject to liquefaction under seismic shaking.

The computer analysis indicates that an estimated total and differential seismic induced settlement is not anticipated to exceed ½ inch and ¼ inch, respectively. Accordingly, the liquefaction potential at the site is not considered significant and measures to mitigate the liquefaction induced settlement are not warranted.

FAULT RUPTURE HAZARD ZONES

The Alquist-Priolo Geologic Hazards Zones Act went into effect in March, 1973. Since that time, the Act has been amended 11 times (Hart, 2007). The purpose of the Act, as provided in California Geologic Survey (CGS) Special Publication 42 (SP 42), is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." The Act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994, and at that time, the originally designated "Special Studies Zones" was renamed the "Earthquake Fault Zones." An Earthquake Fault Zones Map has not been prepared for the vicinity of the subject site to date.

SEISMIC HAZARDS ZONES

In 1990, the California State Legislature passed the Seismic Hazard Mapping Act to protect public safety from the effects of strong shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. The Act requires that the State Geologist delineate various seismic hazards zones on Seismic Hazards Zones Maps. Specifically, the maps identify areas where soil liquefaction and earthquake-induced landslides are most likely to occur. A site-specific geotechnical evaluation is required prior to permitting most urban developments within the mapped zones. The Act also requires sellers of real property within the zones to disclose this fact to potential buyers. A Seismic Hazard Zones Map has not been prepared for the vicinity of the subject site to date. Furthermore, the County of Riverside Liquefaction Susceptibility Map has identified the site as having Moderate Liquefaction Potential. It is our opinion that the site is not located in a Liquefaction Hazard Zone based on the absence of shallow groundwater in the upper 50 feet below existing site grades and the relatively dense soils encountered.

OTHER HAZARDS

Rockfall, Landslide, Slope Instability, and Debris Flow: The subject site is relatively flat and level. It is our understanding that there are no significant slopes proposed as part of the proposed development. Provided the recommendations presented in this report are implemented into the design and construction of the anticipated development, rockfalls, landslides, slope instability, and debris flows are not anticipated to pose a hazard to the subject site.

Seiches: Seiches are large waves generated within enclosed bodies of water. The site is not located in close proximity to any lakes or reservoirs. As such, seiches are not anticipated to pose a hazard to the subject site.

Tsunamis: Tsunamis are tidal waves generated by fault displacement or major ground movement. The site is several miles from the ocean. As such, tsunamis are not anticipated to pose a hazard to the subject site.

Hydroconsolidation: The near surface soils encountered at the subject site were found to be medium dense to dense. The underlying native soils were found to be dense to very dense. Provided the recommendations in this report are incorporated into the design and construction of the proposed development, hydroconsolidation is not anticipated to be a significant concern for the subject site.

Expansive Soil

The near-surface silty sand soils encountered at the site have been identified through laboratory testing as having a low expansion potential. Expansive soils have the potential to undergo volume change, or shrinkage and swelling, with changes in soil moisture. As expansive soils dry, the soil shrinks; when moisture is reintroduced into the soil, the soil swells.

SOIL CORROSIVITY

Corrosion tests were performed to evaluate the soil corrosivity to the buried structures. The tests consisted of sulfate content, chloride content, and resistivity and the results of the tests are included as follows:

Parameter	Results	Test Method
Resistivity	1,900 ohms-cm	CA 643
Sulfate	296 ppm	CA 417
Chloride	71 ppm	CA 422
pH	8.0	EPA 9045C

INFILTRATION TESTING

Estimated infiltration rates were determined using the results of open borehole percolation testing performed at the subject site. The percolation testing indicated that the near surface dense silty sand soil was found to have infiltration rates of approximately 0.11 and 0.16 inch per hour in IT-1 and IT-2, respectively. The locations of these infiltration tests are presented on the attached Site Map, Figure 1.

The soil infiltration rates are based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities. A factor of safety should be incorporated into the design of the infiltration system to compensate for these factors as determined appropriate by the designer. In addition, routine maintenance consisting of clearing the system of clogged soils and debris should be expected.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

Administrative Summary

In brief, the subject site and soil conditions, with the exception of the loose surficial soils, appear to be conducive to the development of the project.

To reduce post-construction soil movement and provide uniform support for the buildings and other foundations, overexcavation and recompaction within the proposed building footprint areas should be performed to a minimum depth of at least four (4) feet below existing grades or three (3) feet below the bottom of the proposed foundation bearing grades. In addition, any fill soil present in the building area should be removed and re-placed as compacted Engineered Fill. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The exposed subgrade at the base of the overexcavation should then be scarified, moisture-conditioned as necessary, and compacted. The overexcavation and recompaction should also extend laterally five feet (5') beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

To reduce post-construction soil movement and provide uniform support for the proposed parking and drive areas, overexcavation and recompaction of the near surface soil in the proposed parking area should be performed to a minimum depth of at least twelve (12) inches below existing grades or proposed subgrade, whichever is deeper. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The overexcavation and recompaction should also extend laterally at least three (3) feet beyond edges of the proposed paving limits or to the property boundary. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and compacted to achieve at least 95 percent maximum density based on ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required density or if soil conditions are not stable.

Unless designed by the project structural engineer, concrete slabs-on-grade should be a minimum of five (5) inches thick. It is recommended that the concrete slab be reinforced to reduce crack separation and possible vertical offset at the cracks. We recommend at least No. 3 reinforcing bars placed on 18-inches on centers, be used for this purpose. Thicker floor slabs with increased concrete strength and reinforcement should be designed wherever heavy concentrated loads, heavy equipment, or machinery is anticipated.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. Exterior finish grades should be sloped a minimum of 2 percent away from all interior slab areas to preclude ponding of water adjacent to the structures. All fills required to bring the building pads to grade should be Engineered Fills.

Groundwater Influence on Structures/Construction

During our recent field investigation groundwater was encountered at approximately 14 feet below existing site grade. Therefore, dewatering and/or waterproofing may be required should structures or excavations extend below this depth. If groundwater is encountered, our firm should be consulted prior to dewatering the site. Installation of a standpipe piezometer is suggested prior to construction should groundwater levels be a concern.

In addition to the groundwater level, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Site Preparation

General site clearing should include removal of vegetation; existing utilities; structures including foundations; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for use as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Overexcavation and Recompaction – Building and Foundation Areas

To reduce post-construction soil movement and provide uniform support for the buildings and other foundations, overexcavation and recompaction within the proposed building footprint areas should be performed to a minimum depth of at least four (4) feet below existing grades or three (3) feet below the bottom of the proposed foundation bearing grades, whichever is greater. In addition, any fill soil present in the building area should be removed and re-placed as compacted Engineered Fill. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The exposed subgrade at the base of the overexcavation should then be scarified, moisture-conditioned as necessary, and compacted. The overexcavation and recompaction should also extend laterally five feet (5') beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Overexcavation and Recompaction – Proposed Parking Area

To reduce post-construction soil movement and provide uniform support for the proposed parking and drive areas, overexcavation and recompaction of the near surface soil in the proposed parking area should be performed to a minimum depth of at least twelve (12) inches below existing grades or proposed subgrade, whichever is deeper. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The overexcavation and recompaction should also extend laterally at least three (3) feet beyond edges of the proposed paving limits or to the property boundary. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Any buried structures encountered during construction should be properly removed and the resulting excavations backfilled with Engineered Fill, compacted to a minimum of 95 percent of the maximum dry density based on ASTM Test Method D1557. Excavations, depressions, or soft and pliant areas extending below planned finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures encountered, should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

The upper soils, during wet winter months become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

Engineered Fill

The on-site upper native soils are predominately silty sand and silty sand/sand. These soils will be suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics and debris.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported Fill should consist of a well-graded, slightly cohesive, fine silty sand or sandy silt, with relatively impervious characteristics when compacted. This material should be approved by the Soils Engineer prior to use and should typically possess the following characteristics:

Percent Passing No. 200 Sieve	20 to 50
Plasticity Index	10 maximum
UBC Standard 29-2 Expansion Index	15 maximum

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and compacted to achieve at least 95 percent maximum dry density based on ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required density or if soil conditions are not stable.

Drainage and Landscaping

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. In accordance with Section 1804.4 of the 2019 California Building Code, it is recommended that the ground surface adjacent to foundations be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures, or to an approved alternative means of drainage conveyance. Swales used for conveyance of drainage and located within 10 feet of foundations should be sloped a minimum of 2 percent. Impervious surfaces, such as pavement and exterior concrete flatwork, within 10 feet of building foundations should be sloped a minimum of 2 percent away from the structure. Drainage gradients should be maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

Utility Trench Backfill

Utility trenches should be excavated according to accepted engineering practice following OSHA (Occupational Safety and Health Administration) standards by a Contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the Contractor. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with pipe manufacturer's recommendations.

Sandy soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy and gravelly soils.

The Contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The Contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

Foundations - Conventional

The proposed structures may be supported on a shallow foundation system bearing on a minimum of three (3) feet of Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	2,000 psf
Dead-Plus-Live Load	2,600 psf
Total Load, including wind or seismic loads	3,500 psf

The footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footings should have a minimum width of 15 inches, regardless of load.

The total soil movement is not expected to exceed 1 inch. Differential movement measured across a horizontal distance of 30 feet should be less than ½ inch. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated.

The footing excavations should not be allowed to dry out any time prior to pouring concrete. It is recommended that footings be reinforced by at least one No. 4 reinforcing bar in both top and bottom.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the above value may be used for short duration, wind, or seismic loads.

Floor Slabs and Exterior Flatwork

In areas where moisture-sensitive floor coverings will be utilized, concrete slab-on-grade floors should be underlain by a water vapor retarder. The water vapor retarder should be installed in accordance with accepted engineering practices. The water vapor retarder should consist of a vapor retarder sheeting underlain by a minimum of 3 inches of compacted, clean gravel of ¾-inch maximum size. To aid in concrete curing an optional 2 to 4 inches of granular fill may be placed on top of the vapor retarder. The granular fill should consist of damp clean sand with at least 10 to 30 percent of the sand passing the 100 sieve. The sand should be free of clay, silt, or organic material. Rock dust which is manufactured sand from rock crushing operations is typically suitable for the granular fill. This granular fill material should be compacted.

Unless designed by the project structural engineer, concrete slabs-on-grade should be a minimum of five (5) inches thick. It is recommended that the concrete slab be reinforced to reduce crack separation and possible vertical offset at the cracks. We recommend at least No. 3 reinforcing bars placed on 18-inch centers, be used for this purpose. Thicker floor slabs with increased concrete strength and reinforcement should be designed wherever heavy concentrated loads, heavy equipment, or machinery is anticipated.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. Exterior finish grades should be sloped a minimum of 2 percent away from all interior slab areas to preclude ponding of water adjacent to the structures. All fills required to bring the building pads to grade should be Engineered Fills.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To reduce moisture vapor intrusion, it is recommended that a vapor retarder be installed. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to reduce the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

Lateral Earth Pressures and Retaining Walls

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 44 pounds per square foot per foot of depth. Walls incapable of this deflection or are fully constrained walls against deflection may be designed for an equivalent fluid at-rest pressure of 64 pounds per square foot per foot of depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1 (horizontal to vertical) or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand-operated equipment (“whackers,” vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete, or other suitable backfill to reduce surface drainage into the wall drain system. The aggregate should conform to Class 2 permeable materials graded in accordance with CalTrans Standard Specifications (2018). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel provided they are installed in accordance with the manufacturer’s recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The pipes should be placed no higher than 6 inches above the heel of the wall, in the center line of the drainage blanket and should have a minimum diameter of four inches. Collector pipes may be either slotted or perforated. Slots should be no wider than ⅛ inch in diameter, while perforations should be no more than ¼ inch in diameter. If retaining walls are less than 6 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 4-inch diameter holes (concrete walls) or unmortared head joints (masonry walls) and not be higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to CalTrans Standard Specifications for “edge drains”) should be affixed to the rear wall opening of each weep hole to retard soil piping.

R-Value Test Results and Pavement Design

One bulk soil sample was obtained from the project site for R-Value testing at the location shown on the attached site plan. The sample was tested in accordance with the State of California Materials Manual Test Designation 301. Results of the test are as follows:

Sample	Depth	Description	R-Value at Equilibrium
B7/R1	0-36"	Silty Sand (SM)	55

The test results are moderate and indicate good subgrade support characteristics under dynamic traffic loads. The following table shows the recommended pavement sections for various traffic indices.

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Compacted Subgrade**
4.0	2.0"	4.0"	6.0"
4.5	2.5"	4.0"	6.0"
5.0	2.5"	4.0"	6.0"
5.5	3.0"	4.0"	6.0"
6.0	3.0"	4.0"	6.0"
6.5	3.5"	4.0"	6.0"
7.0	4.0"	4.0"	6.0"
7.5	4.0"	4.0"	6.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 95% compaction based on ASTM Test Method D1557 or CAL 216*

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic and an index of 7.0 may be used for light truck traffic. Following grading operations, it is recommended additional R-Value testing be performed to verify the design R-Value.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

PORTLAND CEMENT PAVEMENT
LIGHT DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
4.5	5.0"	4.0”	12.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	6.0"	4.0"	12.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 95% compaction based on ASTM Test Method D1557 or CAL 216*
****Minimum compressive strength of 3000 psi*

Seismic Parameters – 2019 California Building Code

The Site Class per Section 1613 of the 2019 California Building Code (2019 CBC) and ASCE 7-16, Chapter 20 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2019 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
Site Coefficient F_a	1.000	Table 1613.2.3 (1)
S_s	1.500	Section 1613.2.1
S_{MS}	1.500	Section 1613.2.3
S_{DS}	1.000	Section 1613.2.4
Site Coefficient F_v	1.700	Table 1613.2.3 (2)
S_1	0.600	Section 1613.2.1
S_{M1}	1.020	Section 1613.2.3
S_{D1}	0.670	Section 1613.2.4
T_S	0.670	Section 1613.2

* Based on Equivalent Lateral Force (ELF) Design Procedure being used.

Infiltration Testing

The shallow soil conditions present at the subject site were evaluated by drilling shallow borings in the vicinity of the infiltration test. The borings drilled at the site indicated the subsurface soil conditions consisted of medium dense to dense silty sand.

Infiltration rates were determined using the results of open borehole infiltration testing performed at the subject site. Infiltration testing performed on the near surface silty sand soil indicate infiltration rates of approximately 0.11 to 0.16 inches per hour. Based on the low infiltration rates, the subsurface conditions encountered at the site may not be conducive to infiltration. Detailed results of the percolation test and infiltration rate results are attached in tabular format.

The soil percolation rates are based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities. A factor of safety should be incorporated into the design of the percolation system to compensate for these factors as determined appropriate by the designer. In addition, periodic maintenance consisting of clearing the bottom of the system of clogged soils should be expected.

It is recommended that the location of the infiltration systems not be closer than ten feet (10') as measured laterally from the edge of the adjacent property line, ten feet (10') from the outside edge of any foundation and five (5') from the edge of any right-of way to the outside edges of the infiltration system.

If the infiltration location is within ten feet (10') of the proposed foundation, it is recommended that this infiltration system should be impervious from the finished ground surface to a depth that will achieve a diagonal distance of a minimum of ten feet (10') below the bottom of the closest footing in the project.

Soil Cement Reactivity

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete (or stucco) and the soil. HUD/FHA and CBC have developed criteria for evaluation of sulfate levels and how they relate to cement reactivity with soil and/or water.

One soil sample was obtained from the site and tested in accordance with State of California Materials Manual Test Designation 417. The sulfate concentration detected from the soil sample indicated moderate sulfate exposure value as established by HUD/FHA and CBC. Therefore, it is recommended that concrete in contact with soil utilize Type II Cement and have a minimum compressive strength of 4,000 psi and a water to cement ratio of 0.50.

Electrical resistivity testing of the soil indicates that the onsite soils may have a severe potential for metal loss from electrochemical corrosion process. A qualified corrosion engineer should be consulted regarding the corrosion effects of the onsite soils on underground metal utilities.

Compacted Material Acceptance

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent upon the stability of that material. The Soils Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with an in-situ moisture content significantly less than optimum moisture. This type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction are characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

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Project Engineer
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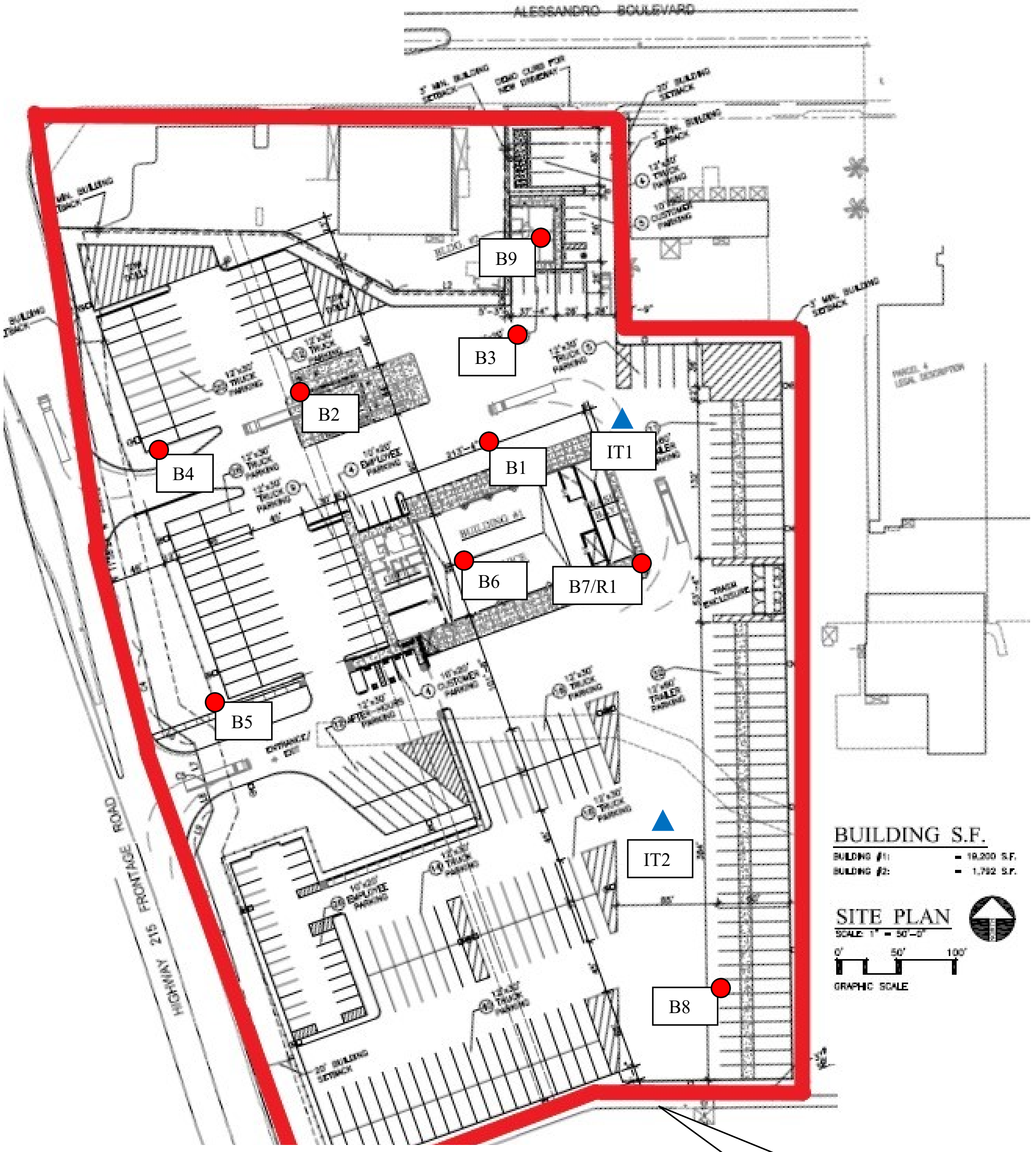


● APPROXIMATE BORING LOCATION

▲ APPROXIMATE INFILTRATION TEST LOCATION

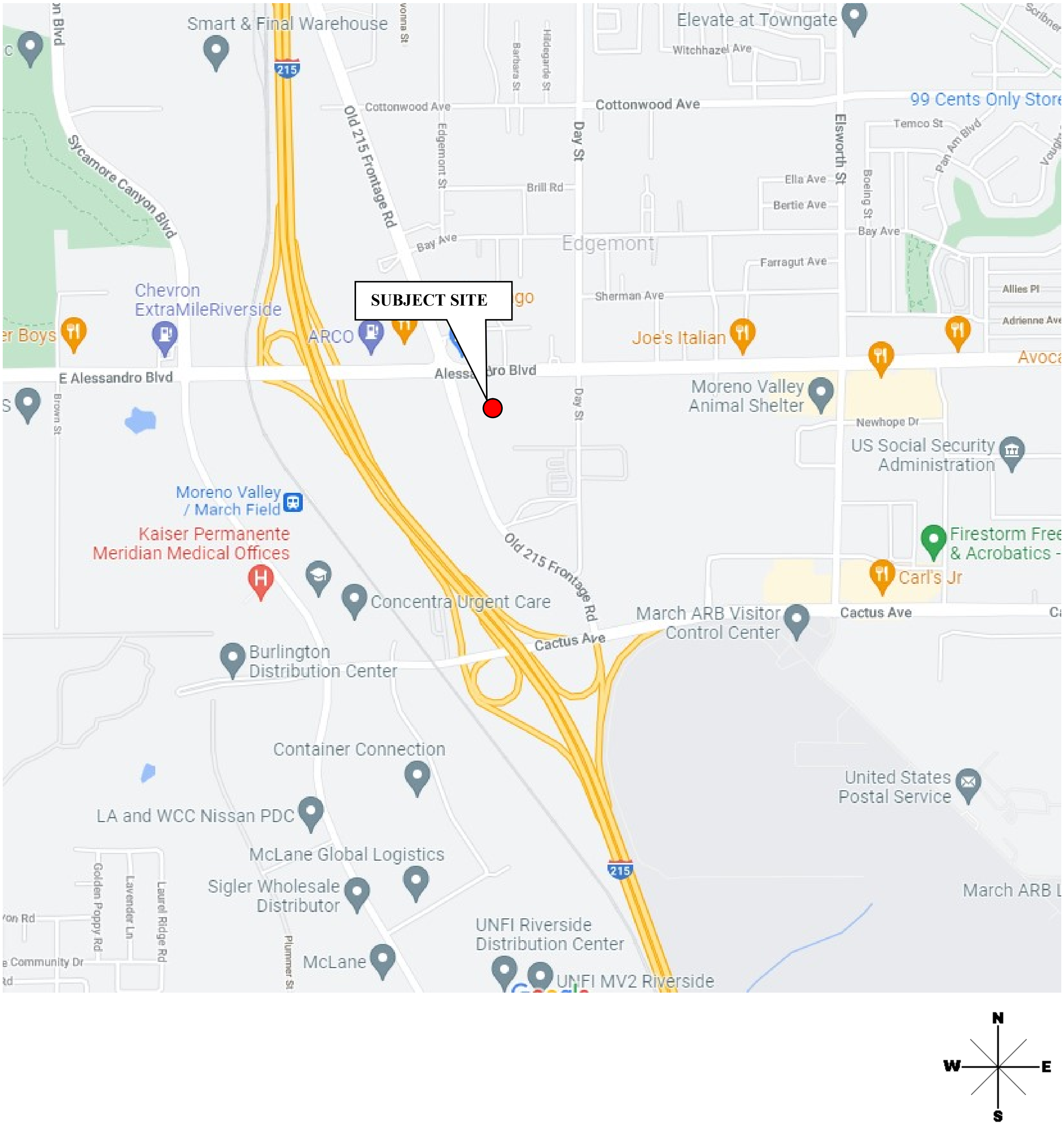
APPROXIMATE SITE BOUNDARY

SITE MAP

PROPOSED PENSKE
TRUCK LEASING FACILITY
MORENO VALLEY, CALIFORNIA

Scale: NTS	**Date:** Oct, 2020
Drawn by: CLT	**Approved by:** JAP
Project No. 112-21093	**Figure No.** 1

Krazan
GEOTECHNICAL ENGINEERING

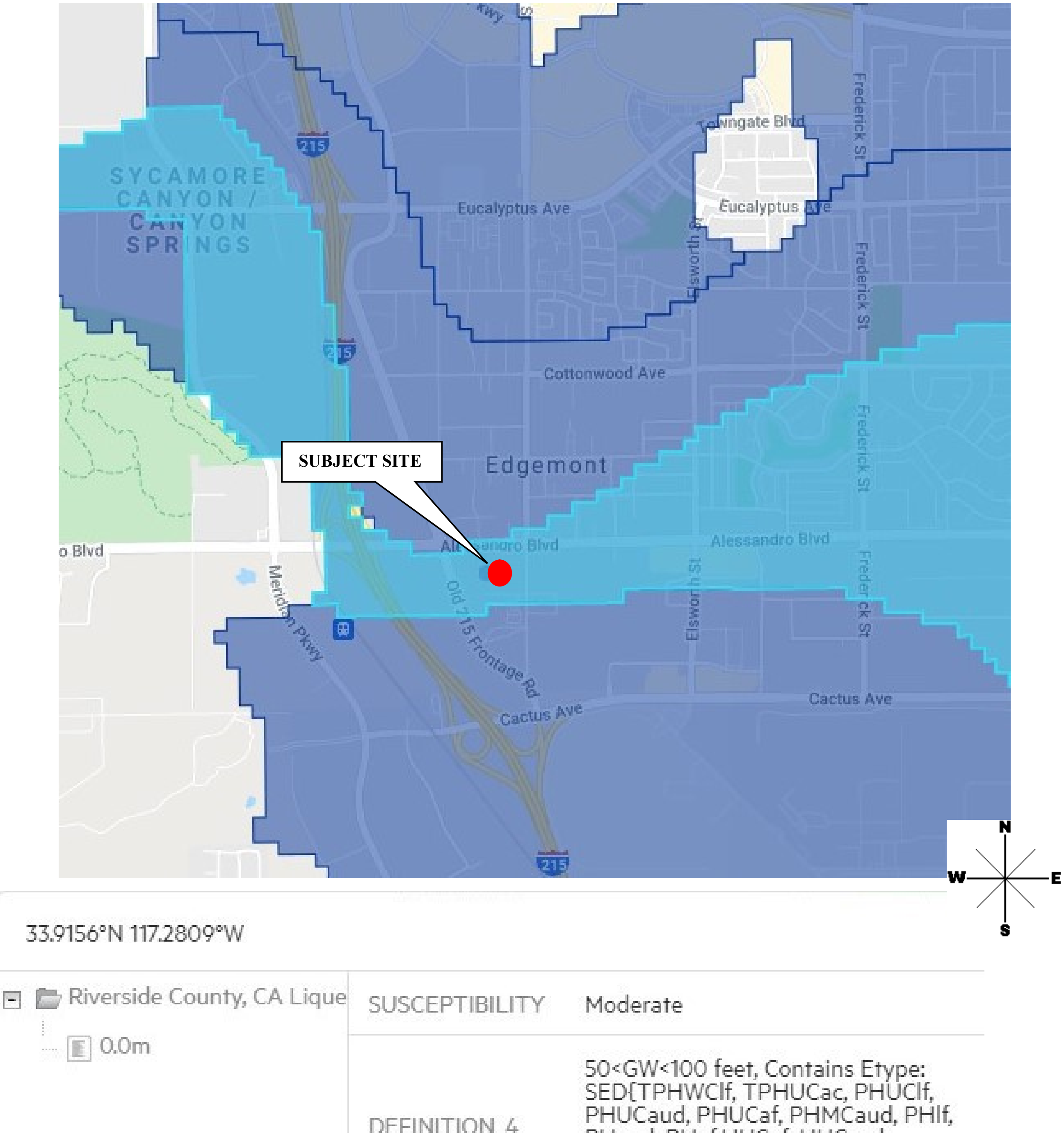


VICINITY MAP

PROPOSED PENSKE
TRUCK LEASING FACILITY
MORENO VALLEY, CALIFORNIA

Scale: NTS	**Date:** Oct, 2021
Drawn by: CLT	**Approved by:** JAP
Project No. 112-21093	**Figure No.** 2

Krazan
GEOTECHNICAL ENGINEERING



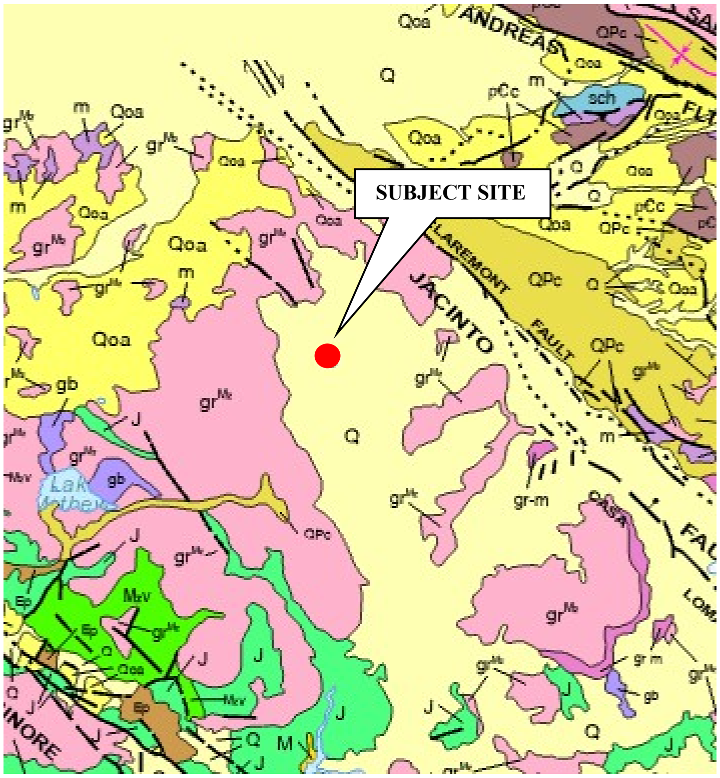
33.9156°N 117.2809°W

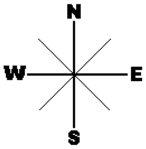
Riverside County, CA Lique
0.0m

SUSCEPTIBILITY	Moderate
DEFINITION 4	50<GW<100 feet, Contains Etype: SED{TPHWClf, TPHUCac, PHUClf, PHUCaud, PHUCaf, PHMCaud, PHlf,

Source: Riverside County GIS Map: Liquefaction

COUNTY OF RIVERSIDE GIS MAP: LIQUEFACTION	**Scale:** NTS	**Date:** Oct, 2021	**Krazan** GEOTECHNICAL ENGINEERING
PROPOSED PENSKE TRUCK LEASING FACILITY MORENO VALLEY, CALIFORNIA	**Drawn by:** CLT	**Approved by:** JAP	
	Project No. 112-21093	**Figure No.** 3	





DESCRIPTION OF MAP UNITS

QUATERNARY DEPOSITS

Qs	Extensive marine and nonmarine sand deposits, generally near the coast or desert playas
Q	Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated
Qls	Selected large landslides
Qg	Glacial till and moraines. Found at high elevations mostly in the Sierra Nevada and Klamath Mountains
Qoa	Older alluvium, lake, playa, and terrace deposits
QPc	Pleistocene and/or Pliocene sandstone, shale, and gravels deposits; mostly loosely consolidated

Source: Department of Conservation: Geologic Map of California, 2010

GEOLOGIC MAP	**Scale:** NTS	**Date:** Oct, 2021	Krazan **GEOTECHNICAL ENGINEERING**
PROPOSED PENSKE TRUCK LEASING FACILITY MORENO VALLEY, CALIFORNIA	**Drawn by:** CLT	**Approved by:** JAP	
	Project No. 112-21093	**Figure No.** 4	

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Nine (9) 8½-inch diameter exploratory borings were advanced. The boring locations are shown on the attached Site Plan, Figure 1.

The soils encountered were logged in the field during the exploration and, with supplementary laboratory test data, are described in accordance with the Unified Soil Classification System.

Modified standard penetration tests and standard penetration tests were performed at selected depths. This test represents the resistance to driving a 2½-inch and 1½-inch diameter split barrel sampler, respectively. The driving energy was provided by a hammer weighing 140 pounds falling 30 inches. Relatively undisturbed soil samples were obtained while performing this test. Bag samples of the disturbed soil were obtained from the auger cuttings. The modified standard penetration tests are identified in the sample type on the boring logs with a full shaded in block. The standard penetration tests are identified in the sample type on the boring logs with one-half of the block shaded. All samples were returned to our Corona laboratory for evaluation.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the foundation soil underlying the site. Test results were used as criteria for determining the engineering suitability of the surface and subsurface materials encountered.

In-situ moisture content, dry density, consolidation, direct shear, and sieve analysis tests were completed for the undisturbed samples representative of the subsurface material. Expansion index and R-Value tests were completed for select bag samples obtained from the auger cuttings. These tests, supplemented by visual observation, comprised the basis for our evaluation of the site material.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

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

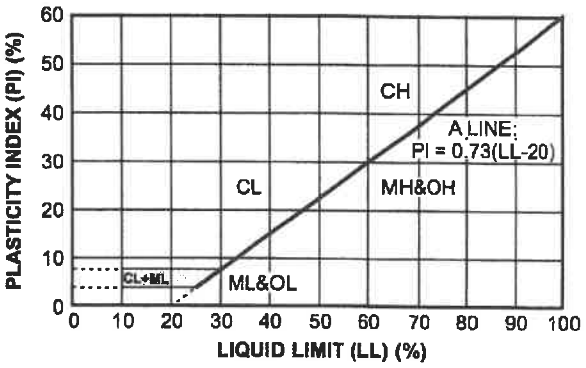
CONSISTENCY CLASSIFICATION

Description	**Blows per Foot**
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.042
Fine-grained	No. 40 to No. 200	0.042 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART



Log of Boring B1

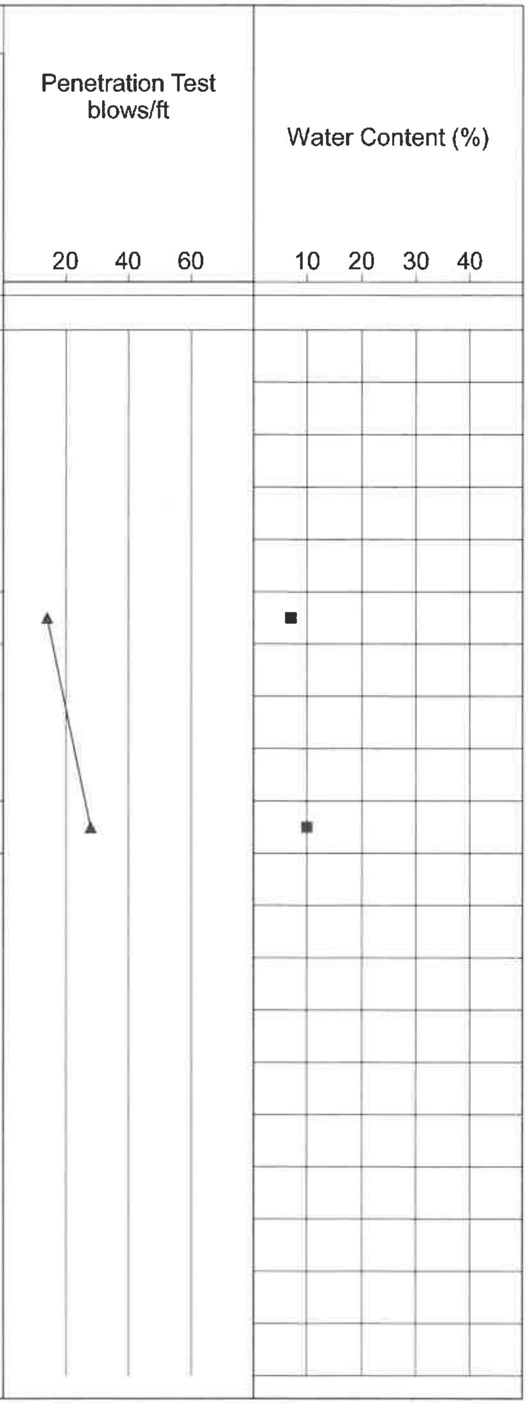
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-1

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> Not Encountered
Initial: N/A
At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Loose below 12 inches Medium dense below 2 feet				
				7.2	◩	14
				10.1	◩	28
10		End of Borehole				
20		Water not encountered Boring backfilled with soil cuttings				



Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Hole Size: 8½ Inches

Krazan and Associates

Driller: Whitcomb Drilling, Inc.
Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B2

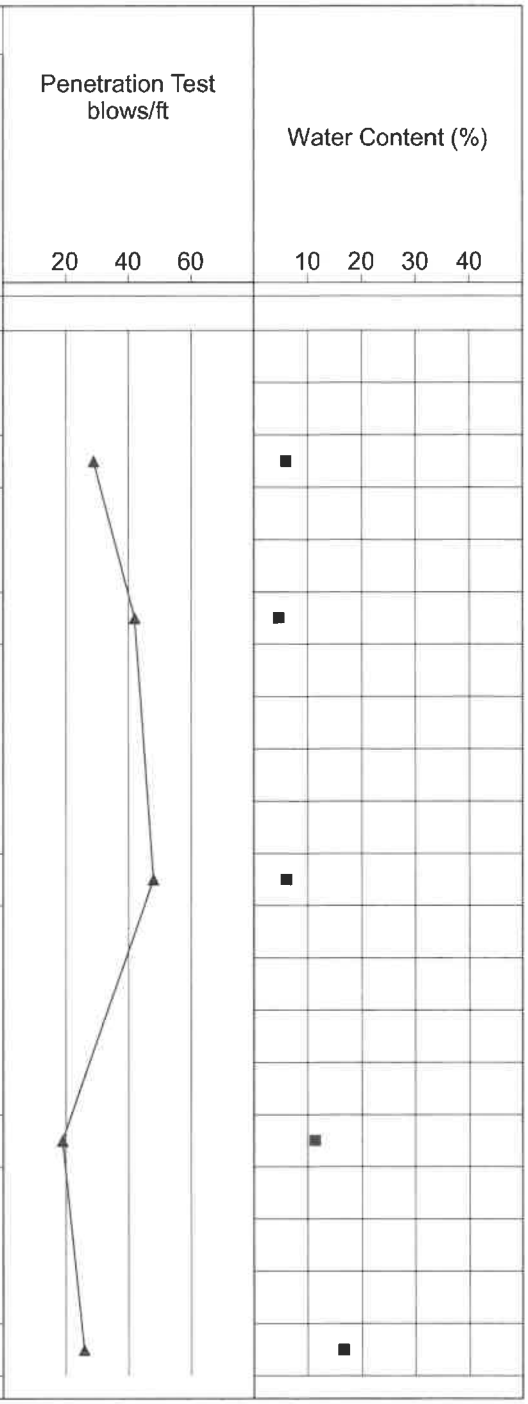
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-2

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> Not Encountered
Initial: N/A
At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Loose below 12 inches				
2		Medium dense below 2 feet	113.6	6.0	■	29
4		Dense and drills firmly below 5 feet	97.2	4.7	■	42
6						
8						
10			106.7	6.1	■	48
12						
14		Medium dense and drills easily below 15 feet		11.4	◩	19
16						
18		Water not encountered Boring backfilled with soil cuttings		16.6	◩	26
20						



Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Hole Size: 8½ Inches

Krazan and Associates

Driller: Whitcomb Drilling, Inc.
Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B3

Project: Penske Truck Leasing

Project No: 112-21093

Client: Penske Truck Leasing

Figure No.: A-3

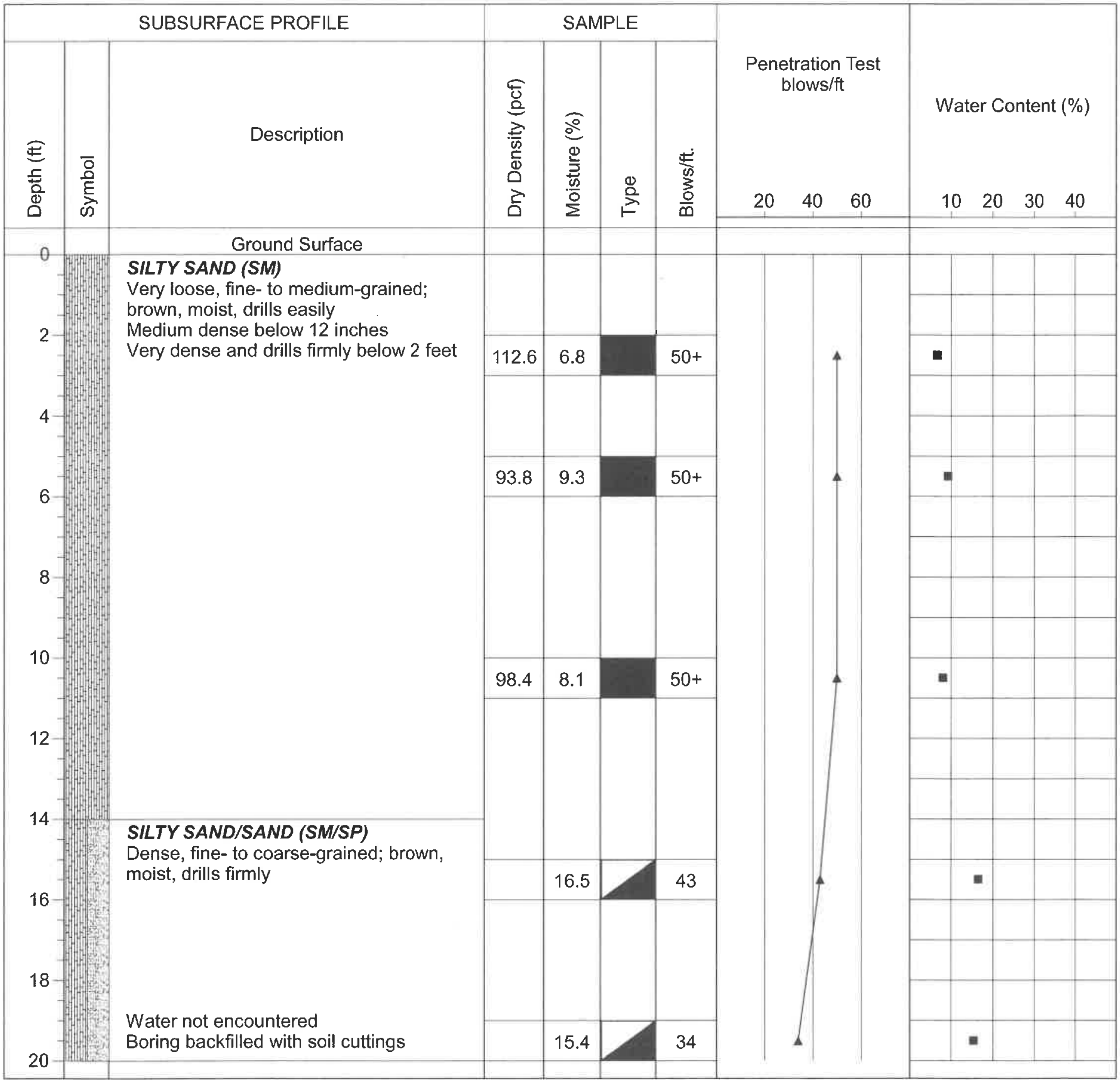
Location: Highway 215 Frontage Road, Moreno Valley, California

Logged By: Angel Menchaca

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A



Depth (ft)	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
	Ground Surface				
0	***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Medium dense below 12 inches Very dense and drills firmly below 2 feet				
		112.6	6.8	■	50+
		93.8	9.3	■	50+
		98.4	8.1	■	50+
14	***SILTY SAND/SAND (SM/SP)*** Dense, fine- to coarse-grained; brown, moist, drills firmly				
			16.5	◪	43
	Water not encountered Boring backfilled with soil cuttings		15.4	◪	34

Drill Method: Hollow Stem

Drill Date: 9-2-21

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: Whitcomb Drilling, Inc.

Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B4

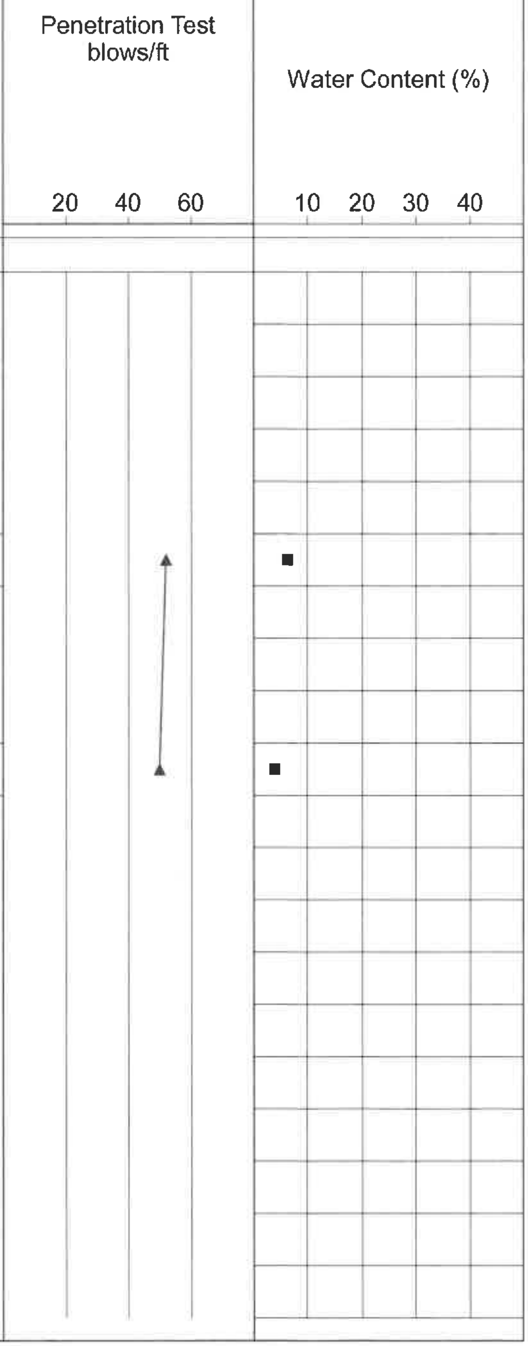
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-4

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> Not Encountered
Initial: N/A
At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Loose below 12 inches Dense and drills firmly below 2 feet				
2	▨					
4	▨					
	▨			6.4	◢	52
6	▨					
8	▨					
	▨	***SILTY SAND/SAND (SM/SP)*** Very dense, fine- to medium-grained; brown, damp, drills firmly				
	▨			3.9	◢	50+
10		End of Borehole				
12						
14						
16						
18						
20		Water not encountered Boring backfilled with soil cuttings				



Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Krazan and Associates
Hole Size: 8½ Inches

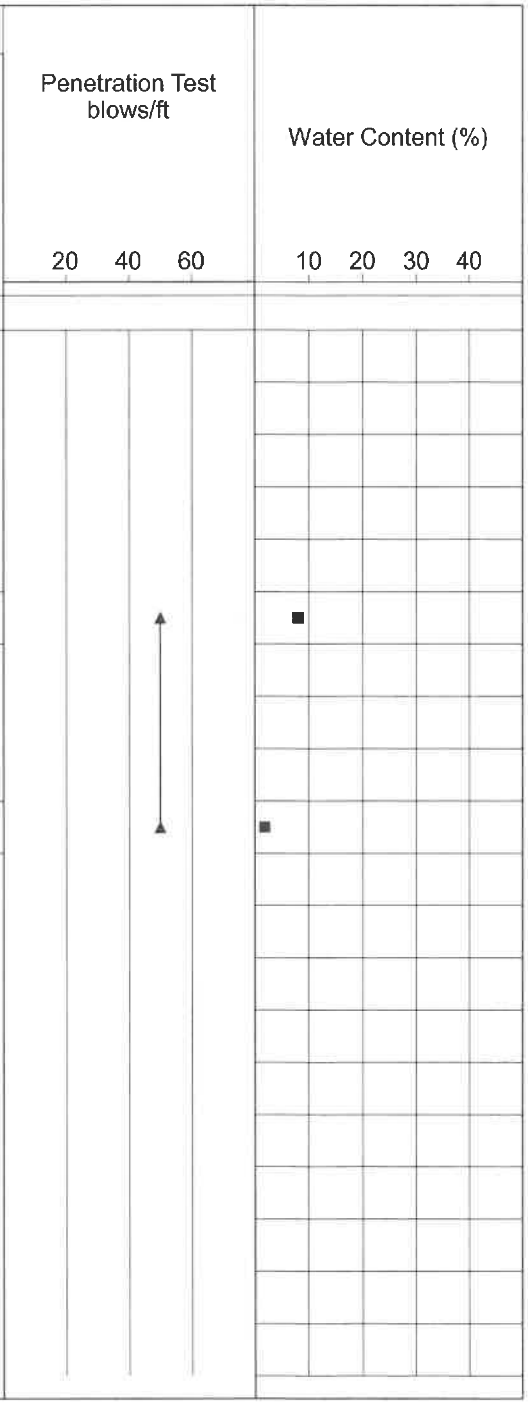
Driller: Whitcomb Drilling, Inc.
Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B5

Project: Penske Truck Leasing
Project No: 112-21093
Client: Penske Truck Leasing
Figure No.: A-5
Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca
Depth to Water> Not Encountered
Initial: N/A
At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SILTY SAND/SAND (SM/SP)*** Very loose, fine- to coarse-grained; brown, moist, drills easily Loose below 12 inches Very dense and drills firmly below 2 feet				
2						
4						
6				8.2	◢	50+
8		***SAND (SP)*** Very dense, fine- to coarse-grained; brown, damp, drills firmly				
10		End of Borehole		1.8	◢	50+
12						
14						
16						
18						
20		Water not encountered Boring backfilled with soil cuttings				



Drill Method: Hollow Stem
Drill Date: 9-2-21
Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches
Driller: Whitcomb Drilling, Inc.
Elevation: 10 Feet
Sheet: 1 of 1

Log of Boring B6

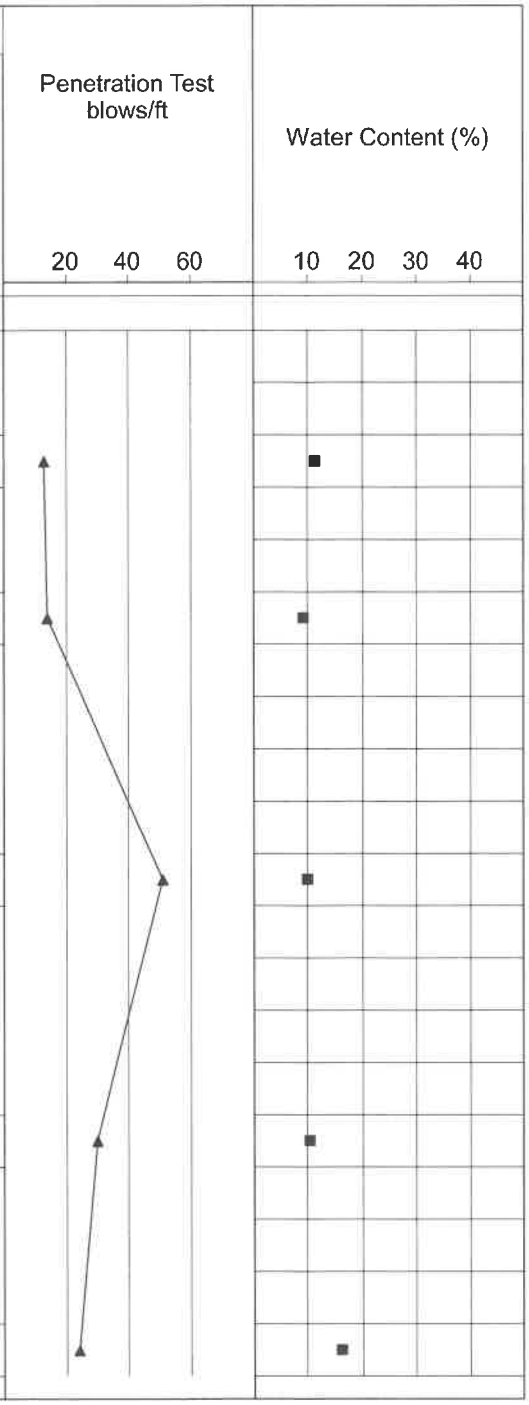
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-6

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> 14 Feet
Initial: 14 Feet
At Completion: 14 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Loose below 12 inches				
2			112.9	11.5	■	13
4						
6			118.8	9.3	■	14
8						
10		Dense and drills firmly below 10 feet	120.0	10.1	■	51
12						
14		Saturated below 14 feet ▽				
16				10.5	◢	30
18		Medium dense below 18 feet				
20		Water encountered at 14 feet Boring backfilled with soil cuttings		16.2	◢	24



Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Hole Size: 8½ Inches

Krazan and Associates

Driller: Whitcomb Drilling, Inc.
Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B7

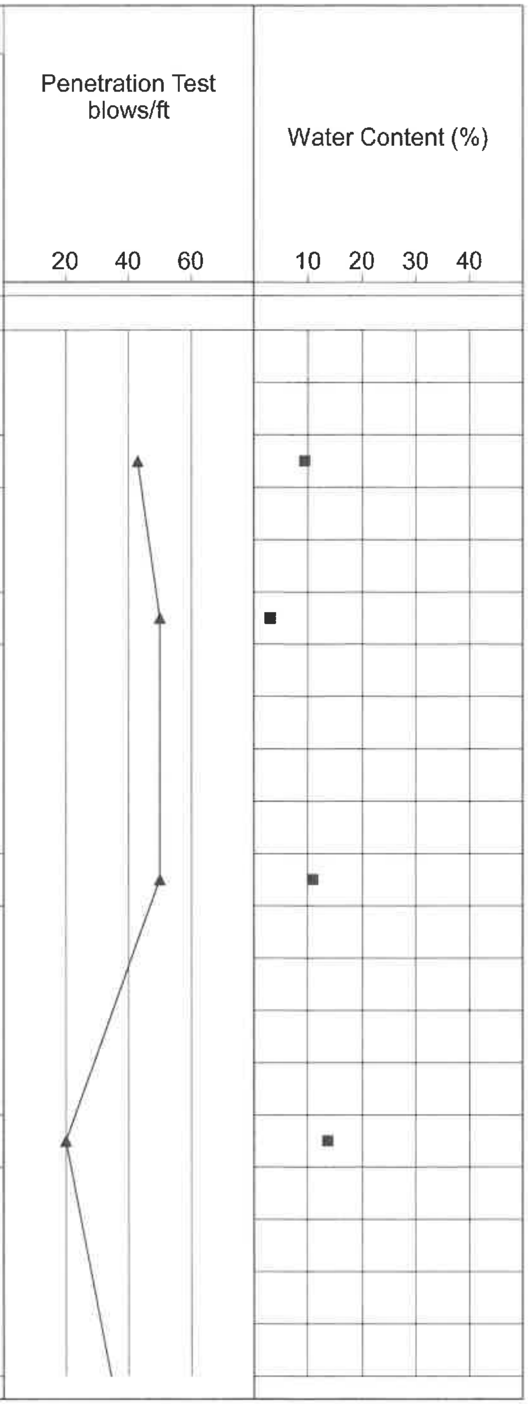
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-7

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> 14 Feet
Initial: 14 Feet
At Completion: 14 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Loose below 12 inches				
2		Dense and drills firmly below 2 feet	129.4	9.5	■	43
4						
6		Very dense below 5½ feet	115.9	3.1	■	50+
8						
10			123.9	11.0	■	50+
12						
14		▽ Medium dense and saturated below 14 feet				
16				13.7	◢	20
18						
20		Dense below 20 feet			◢	



Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Krazan and Associates
Hole Size: 8½ Inches

Driller: Whitcomb Drilling, Inc.
Elevation: 50 Feet

Sheet: 1 of 3

Log of Boring B7

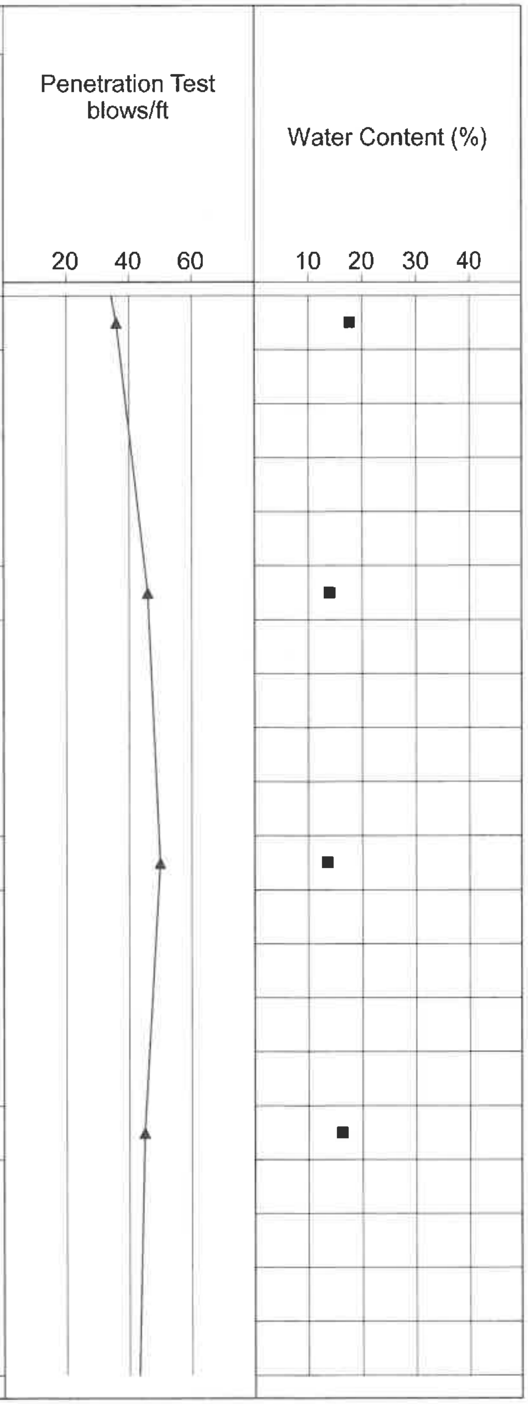
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-7

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> 14 Feet
Initial: 14 Feet
At Completion: 14 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
				17.8	◢	36
22						
24						
		Very dense below 25 feet		14.0	◢	46
26						
28		***SILTY SAND/SAND (SM/SP)*** Very dense, fine- to coarse-grained; brown, saturated, drills firmly				
30				13.6	◢	50+
32						
34		***SILTY SAND (SM)*** Very dense, fine- to coarse-grained; brown, saturated, drills firmly				
				16.2	◢	45
36						
38						
40					◢	



Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Krazan and Associates
Hole Size: 8½ Inches

Driller: Whitcomb Drilling, Inc.
Elevation: 50 Feet

Sheet: 2 of 3

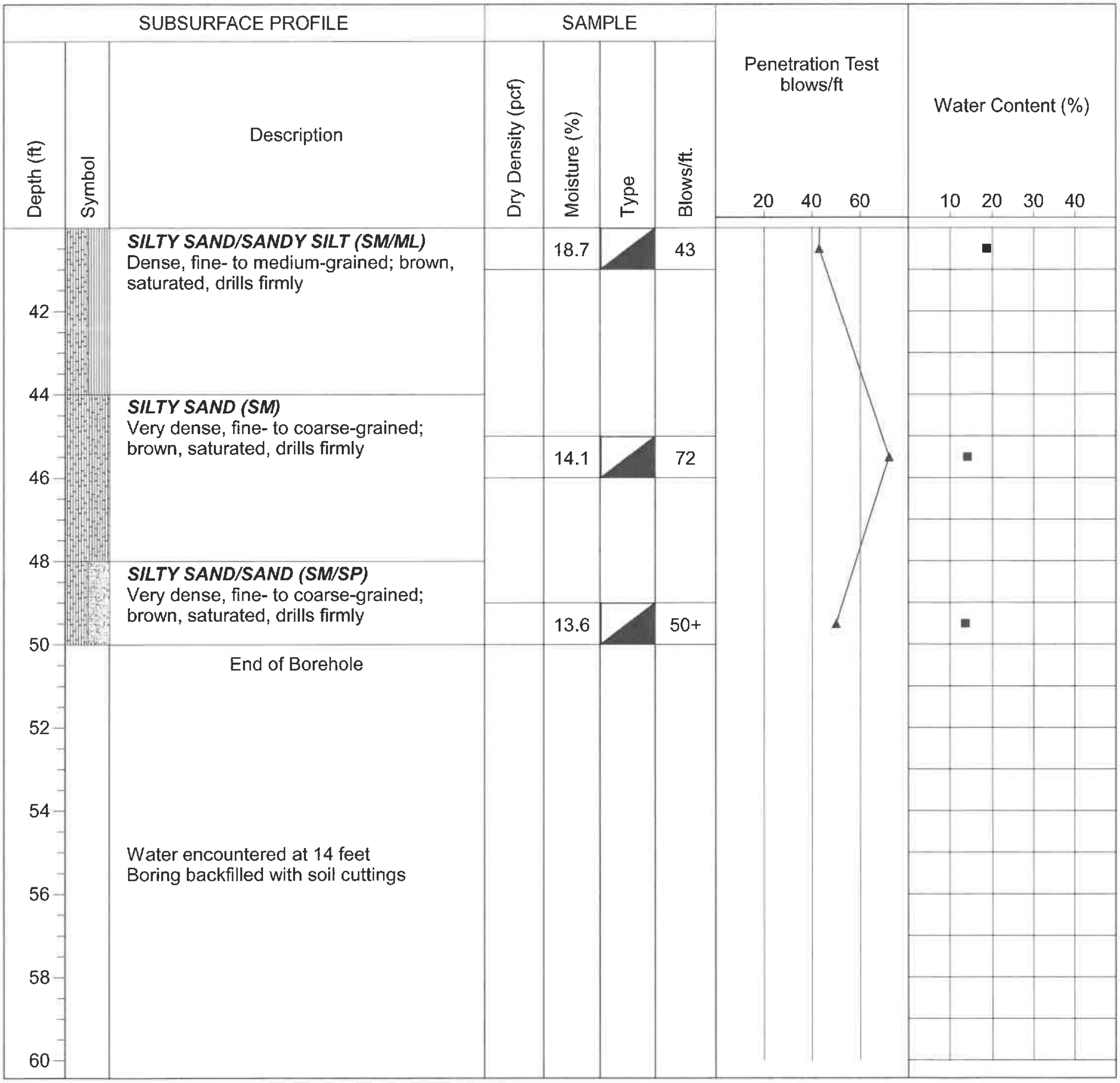
Log of Boring B7

Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-7

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> 14 Feet
Initial: 14 Feet
At Completion: 14 Feet



Depth (ft)	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
	SILTY SAND/SANDY SILT (SM/ML) Dense, fine- to medium-grained; brown, saturated, drills firmly		18.7	◢	43
44	***SILTY SAND (SM)*** Very dense, fine- to coarse-grained; brown, saturated, drills firmly		14.1	◢	72
48	***SILTY SAND/SAND (SM/SP)*** Very dense, fine- to coarse-grained; brown, saturated, drills firmly		13.6	◢	50+
50	End of Borehole				

Water encountered at 14 feet
Boring backfilled with soil cuttings

Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Hole Size: 8½ Inches

Krazan and Associates

Driller: Whitcomb Drilling, Inc.
Elevation: 50 Feet

Sheet: 3 of 3

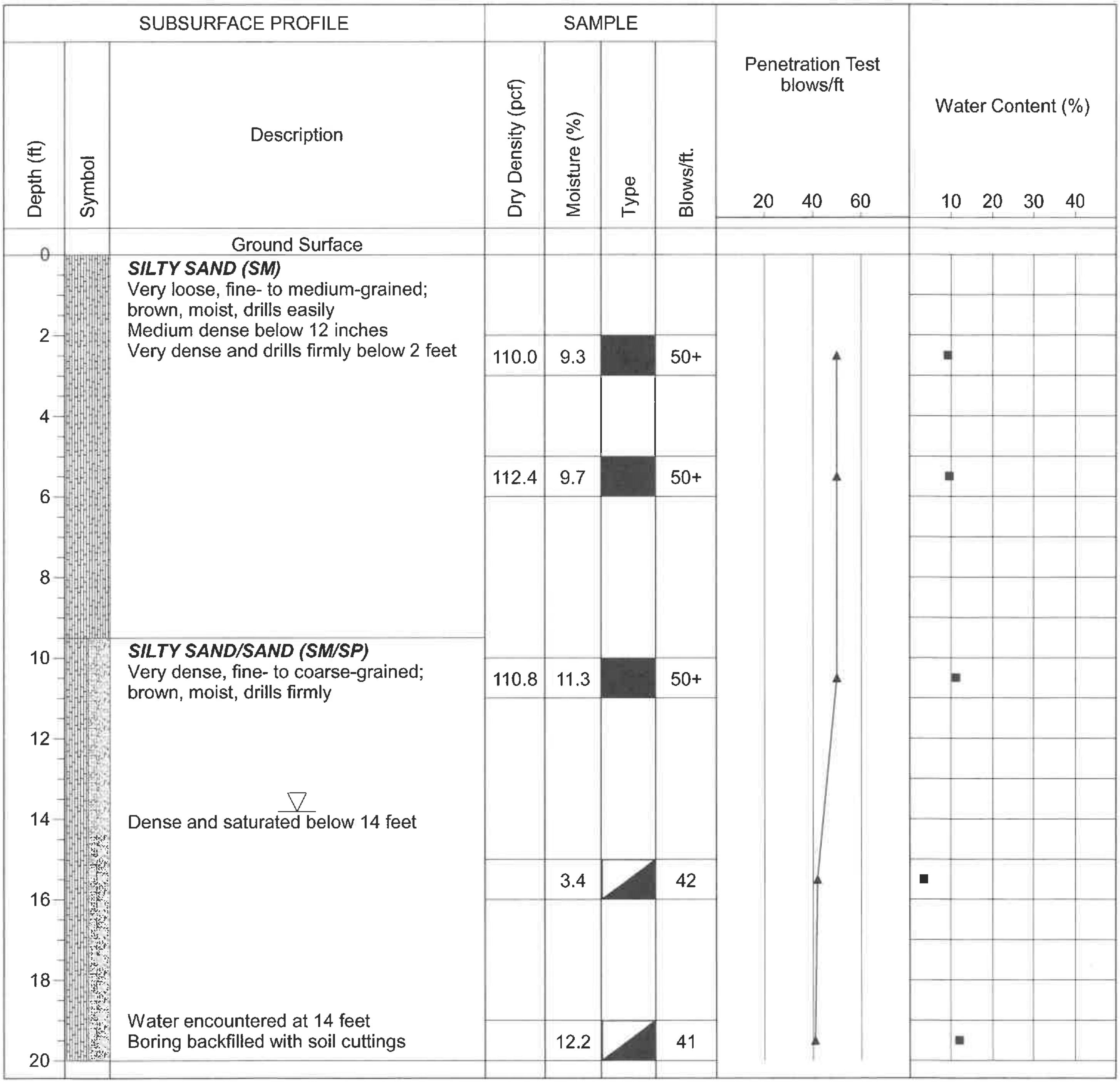
Log of Boring B8

Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-8

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> 14 Feet
Initial: 14 Feet
At Completion: 14 Feet



SILTY SAND (SM)
Very loose, fine- to medium-grained; brown, moist, drills easily
Medium dense below 12 inches
Very dense and drills firmly below 2 feet

SILTY SAND/SAND (SM/SP)
Very dense, fine- to coarse-grained; brown, moist, drills firmly

Dense and saturated below 14 feet

Water encountered at 14 feet
Boring backfilled with soil cuttings

Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
110.0	9.3	■	50+
112.4	9.7	■	50+
110.8	11.3	■	50+
	3.4	◢	42
	12.2	◢	41

Drill Method: Hollow Stem
Drill Date: 9-2-21

Drill Rig: CME 75
Krazan and Associates
Hole Size: 8½ Inches

Driller: Whitcomb Drilling, Inc.
Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B9

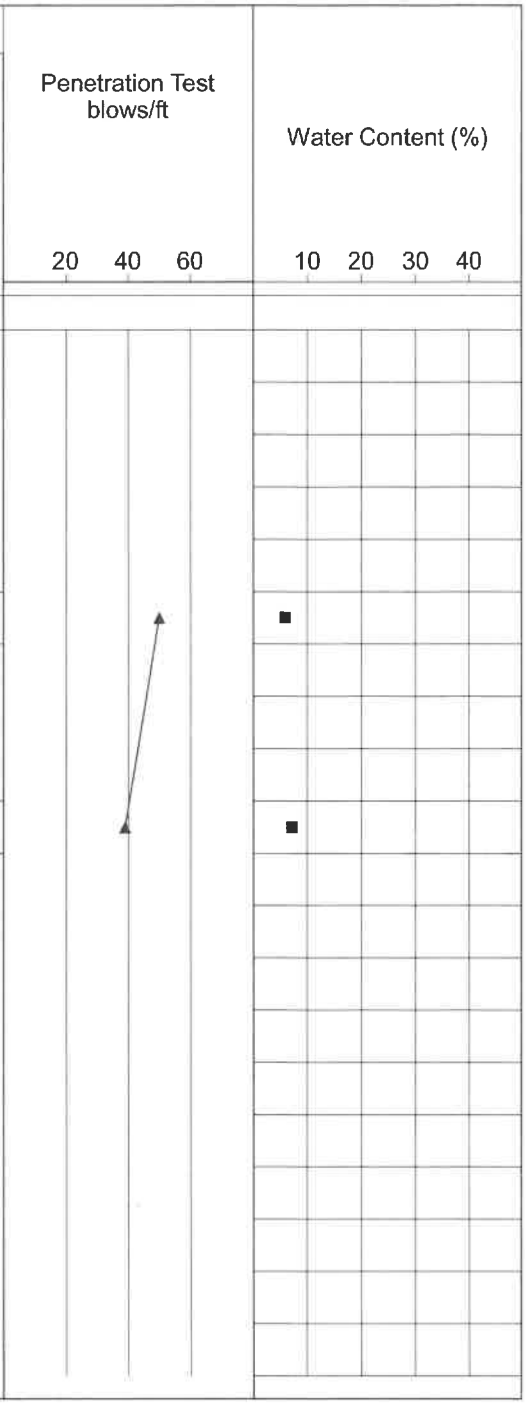
Project: Penske Truck Leasing
Project No: 112-21093

Client: Penske Truck Leasing
Figure No.: A-9

Location: Highway 215 Frontage Road, Moreno Valley, California
Logged By: Angel Menchaca

Depth to Water> Not Encountered
Initial: N/A
At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, moist, drills easily Medium dense below 12 inches Very dense and drills firmly below 2 feet				
5	▨			6.0	◢	50+
9	▨	Dense below 9 feet		7.3	◢	39
10		End of Borehole				
19		Water not encountered Boring backfilled with soil cuttings				



Drill Method: Hollow Stem
Drill Date: 9-2-21

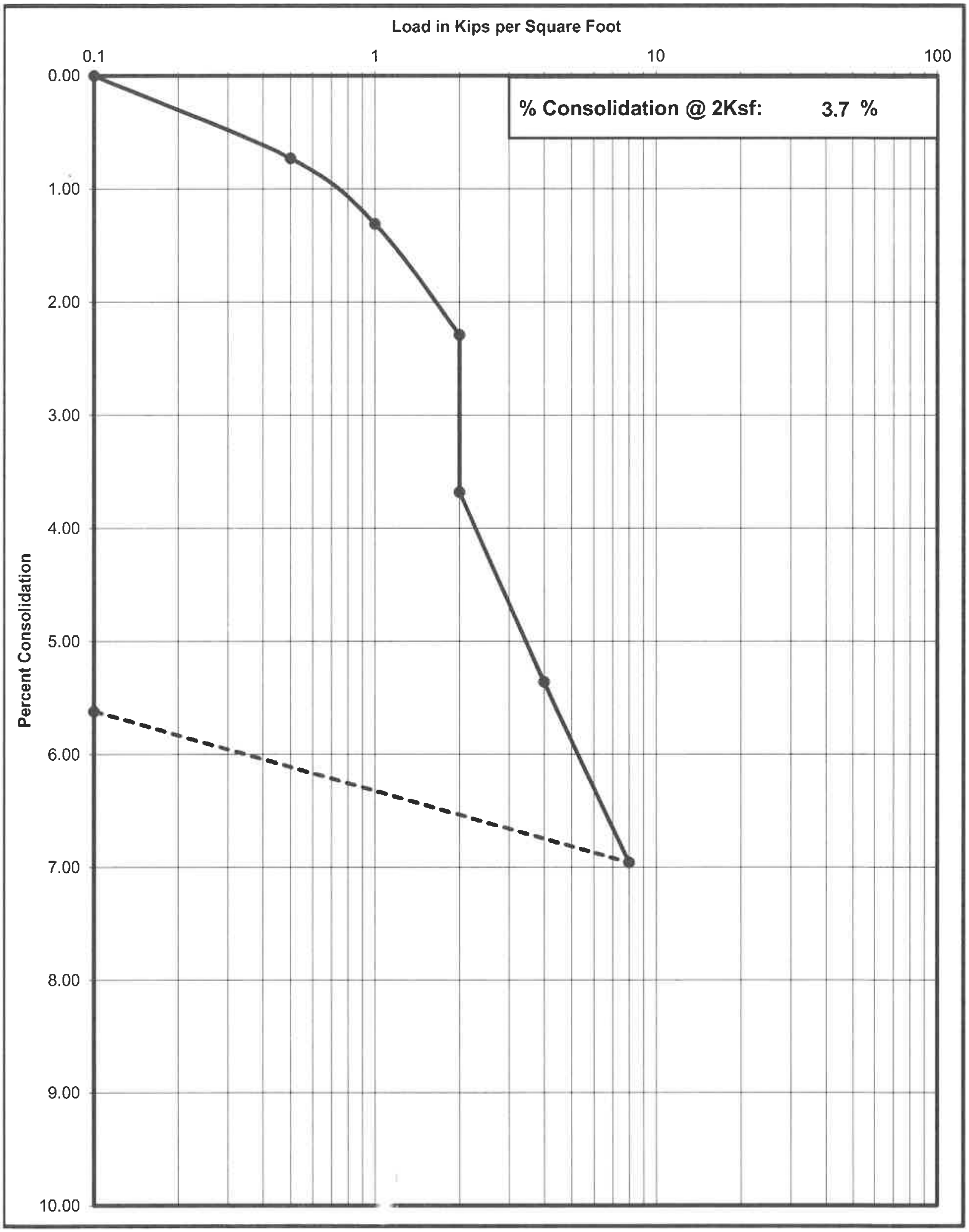
Drill Rig: CME 75
Krazan and Associates
Hole Size: 8½ Inches

Driller: Whitcomb Drilling, Inc.
Elevation: 10 Feet

Sheet: 1 of 1

Consolidation Test

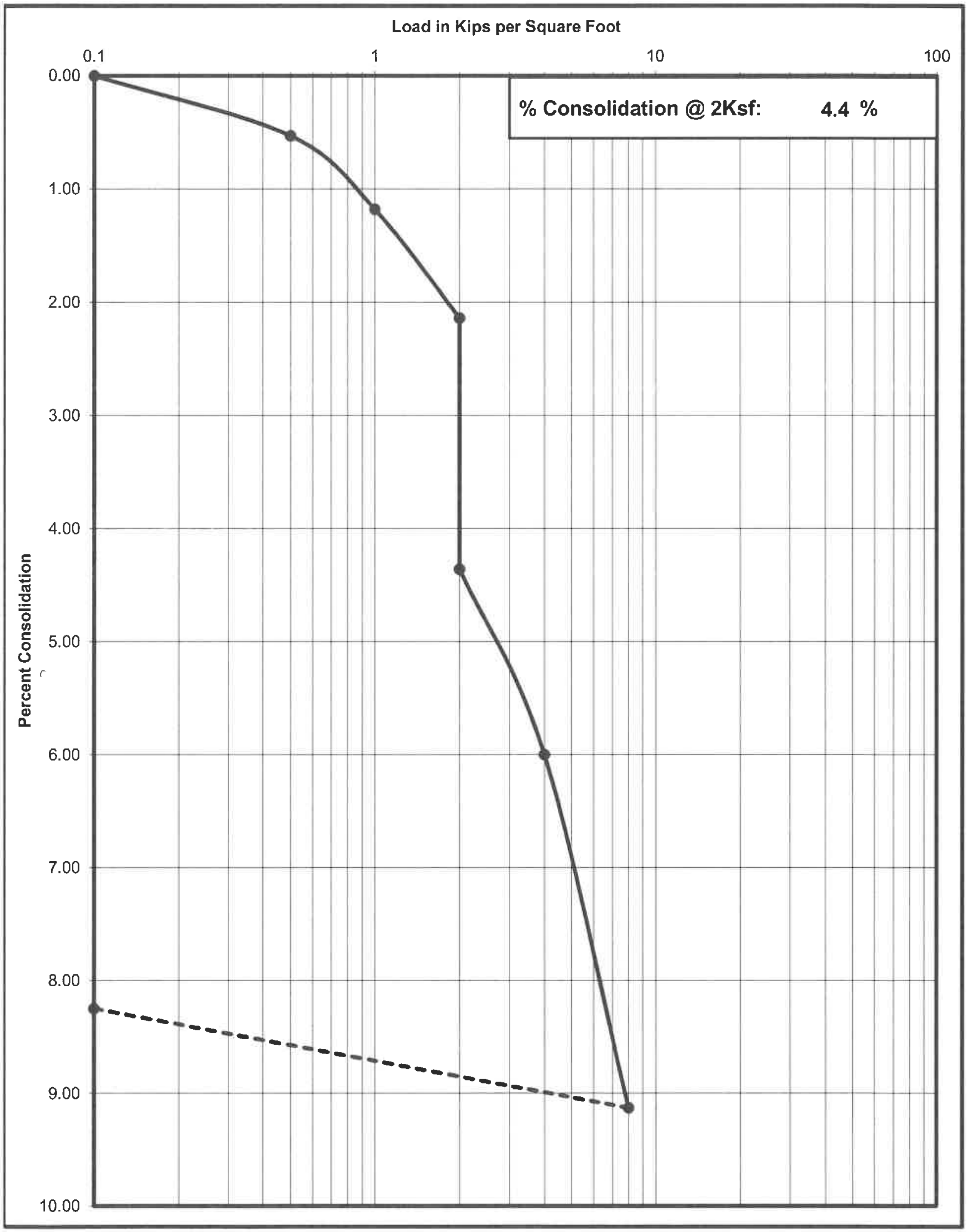
Project No	Boring No. & Depth	Date	Soil Classification
11221093	B-2 @ 2'	10/12/2021	SM



Krazan Testing Laboratory

Consolidation Test

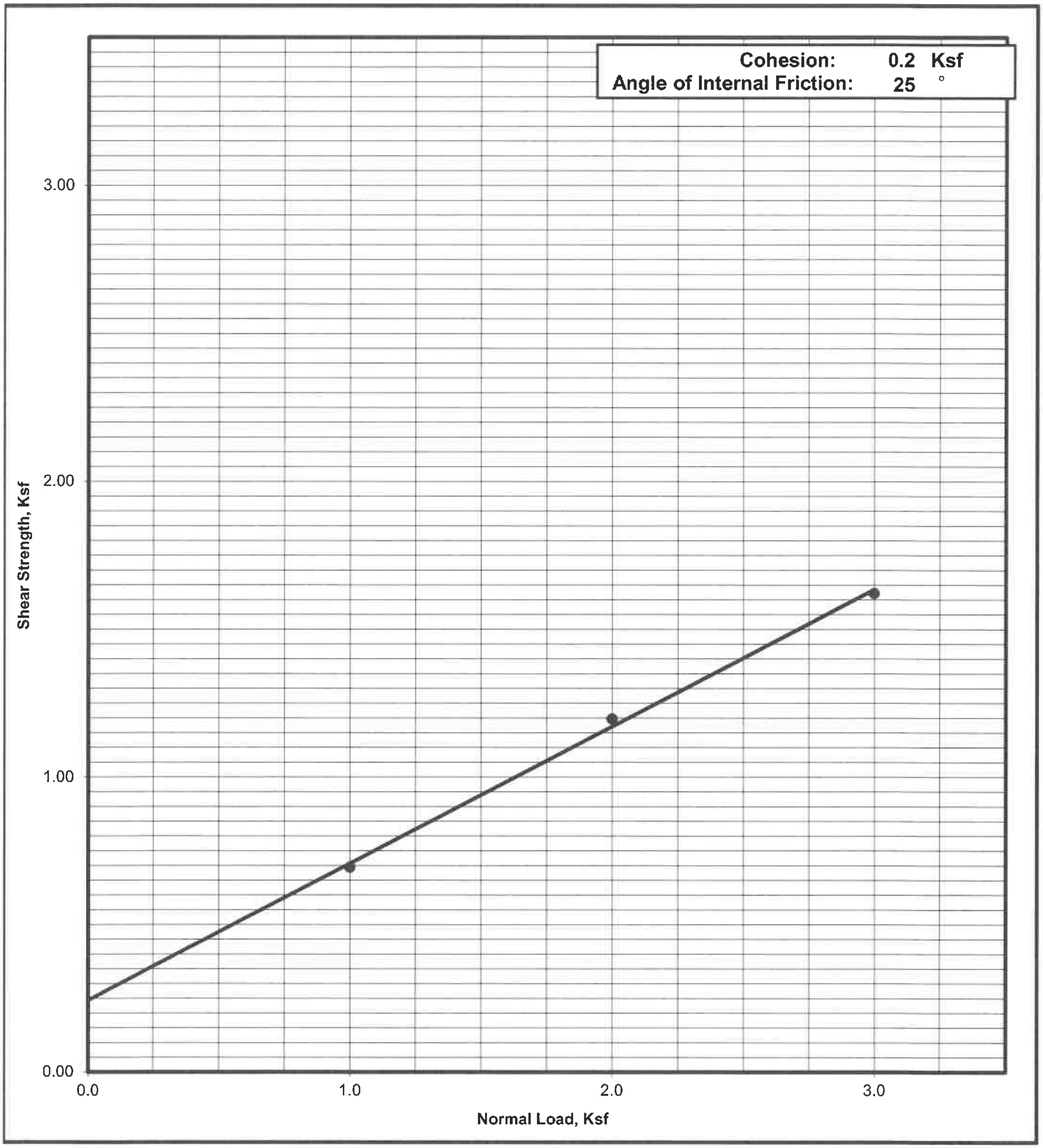
Project No	Boring No. & Depth	Date	Soil Classification
11221093	B-7 @ 5'	10/12/2021	SM



Krazan Testing Laboratory

ASTM D - 3080 / AASHTO T - 236

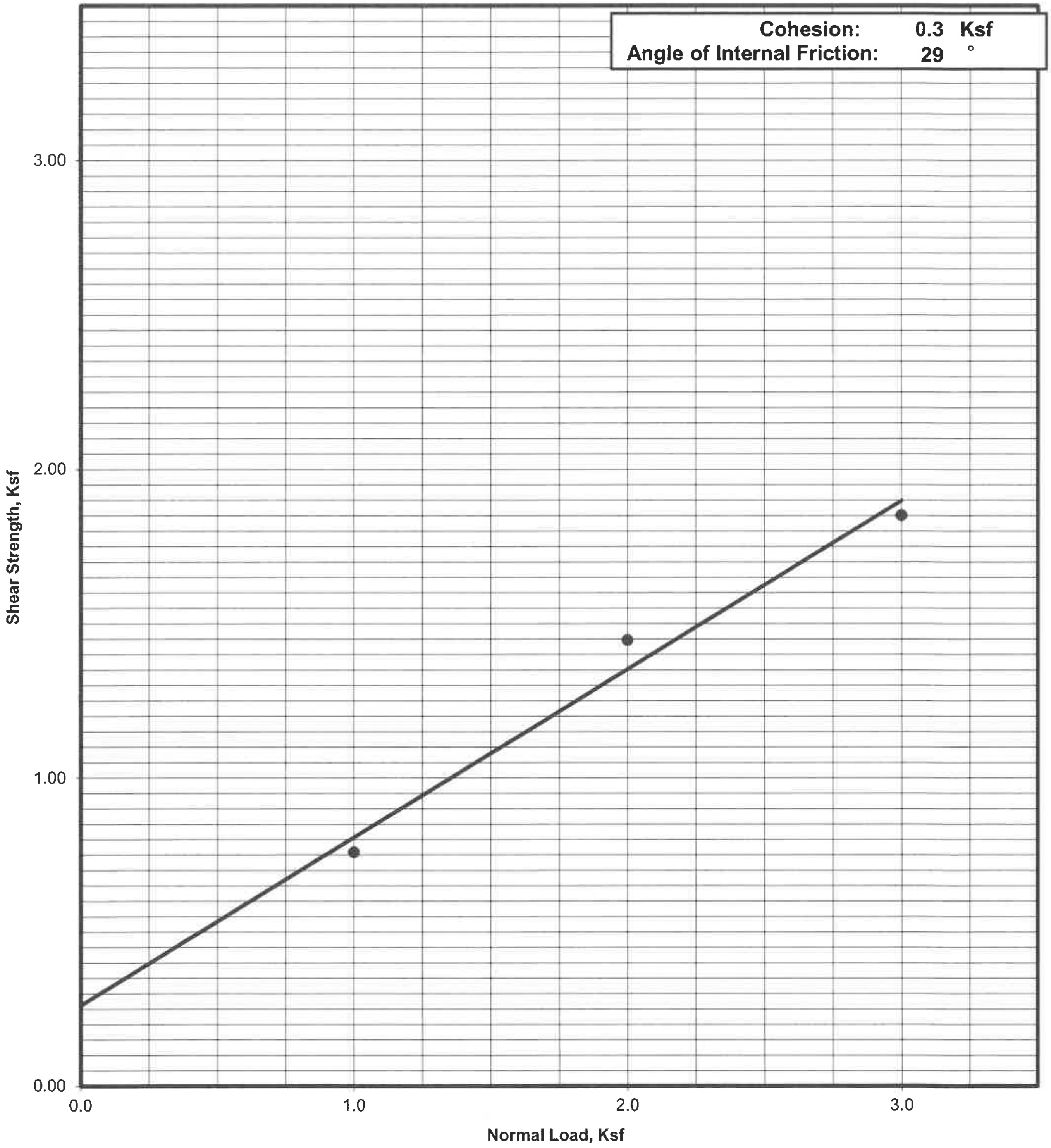
Project Number	Boring No. & Depth	Soil Type	Date
11221093	B-2 @ 2'	SM	10/12/2021



Krazan Testing Laboratory

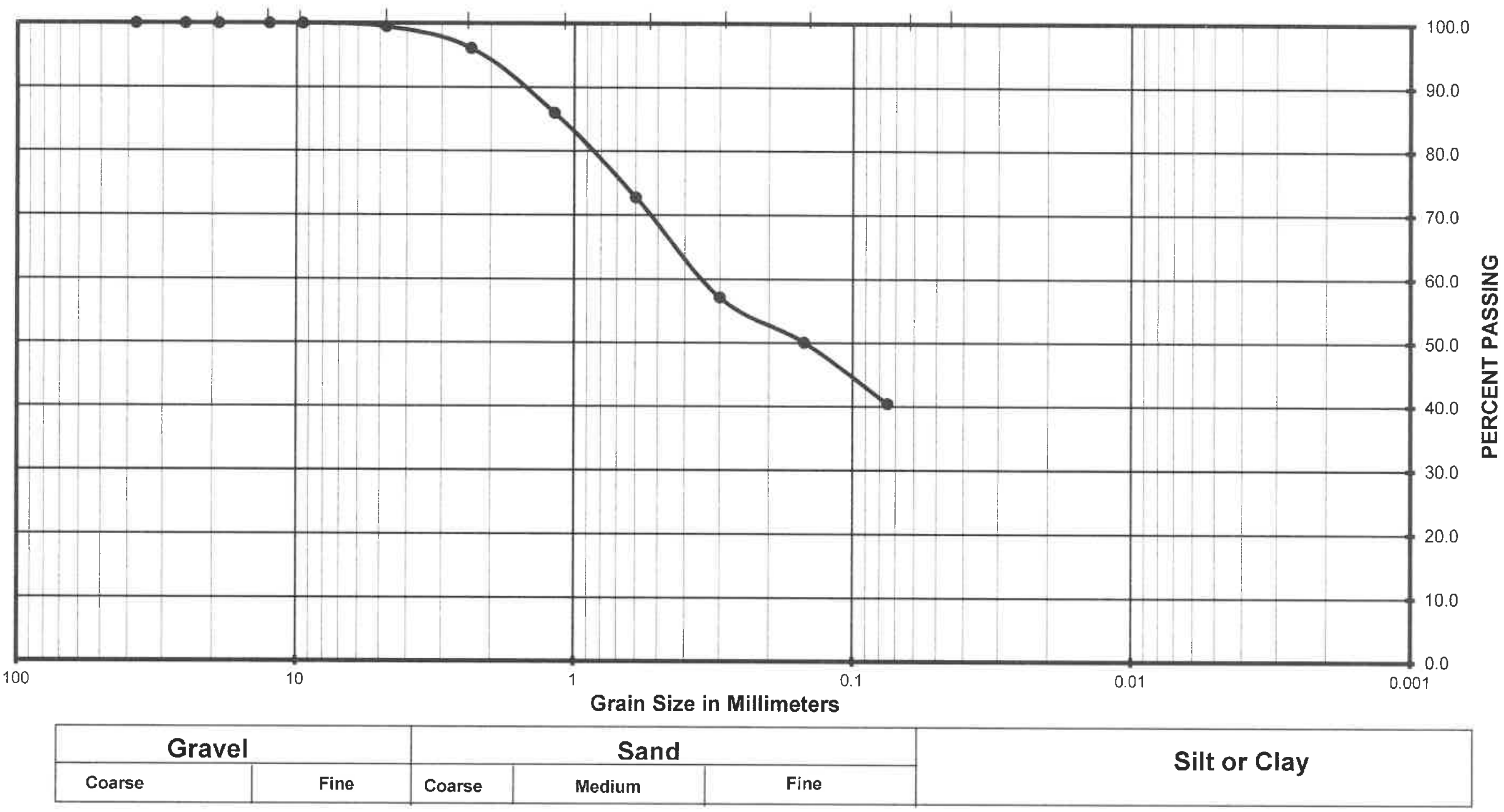
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
11221093	B-7 @ 5'	SM	10/12/2021



Krazan Testing Laboratory

Grain Size Analysis

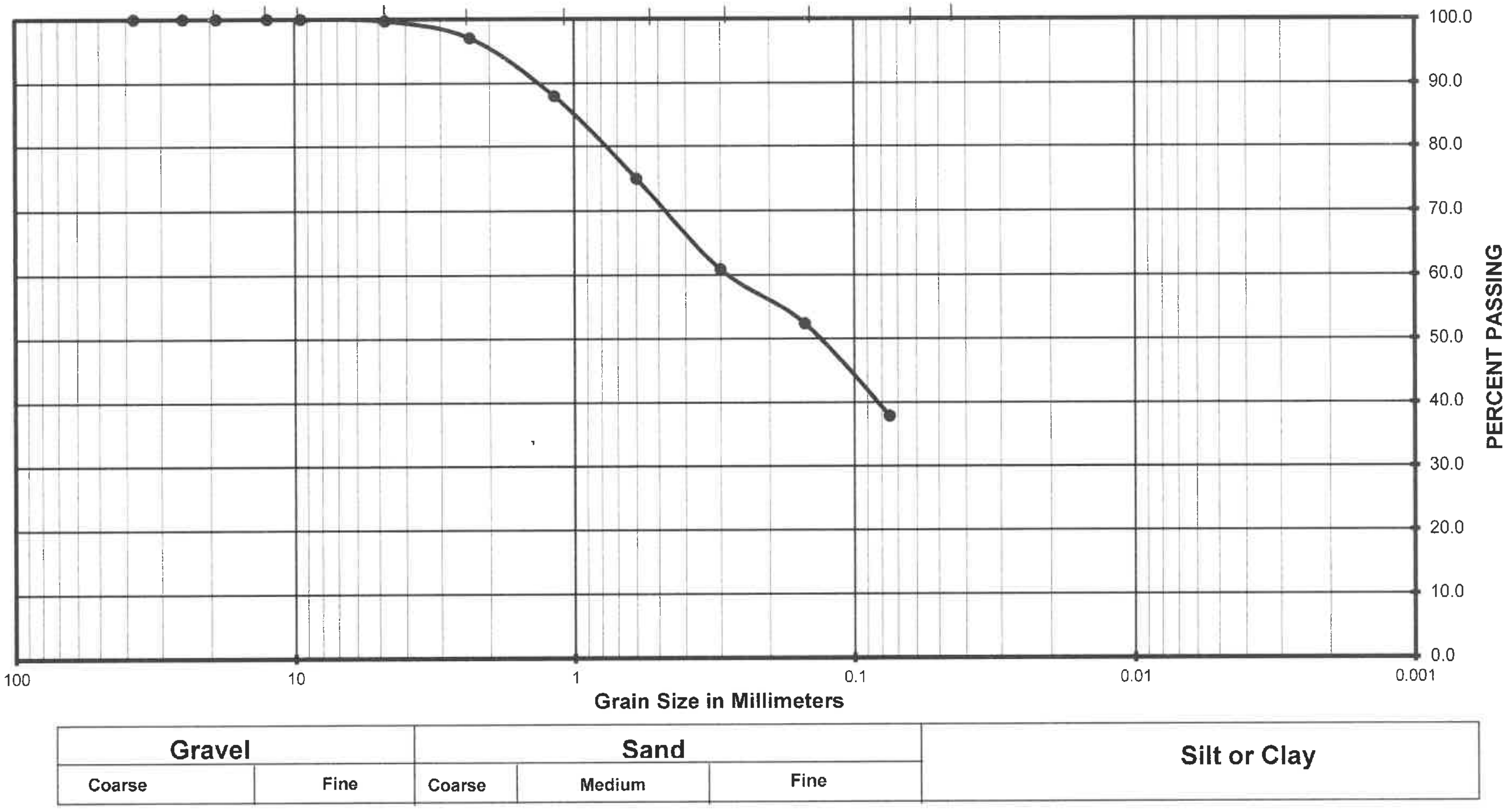


(Unified Soils Classification)

Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 2'

Krazan Testing Laboratory

Grain Size Analysis

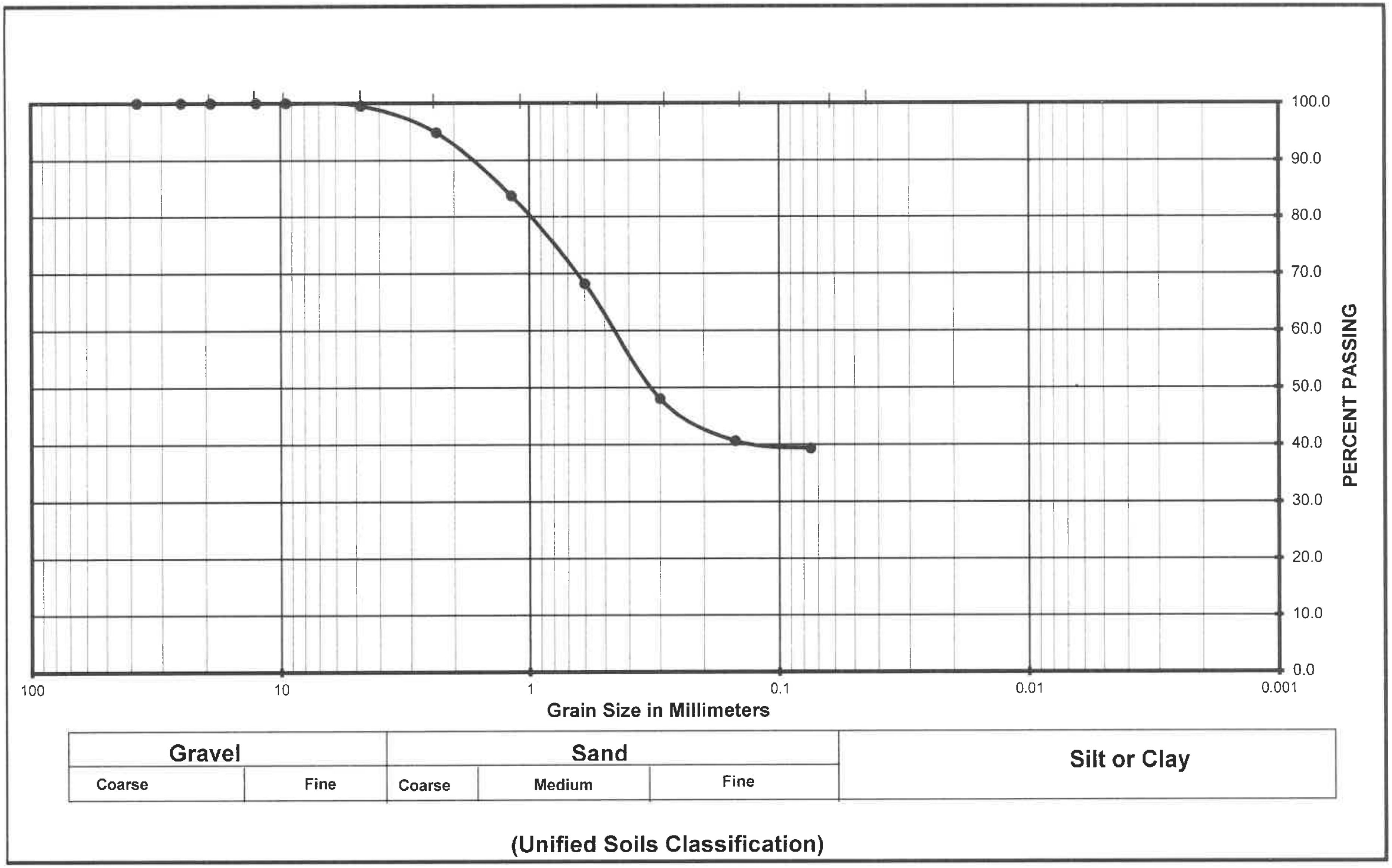


(Unified Soils Classification)

Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 5'

Krazan Testing Laboratory

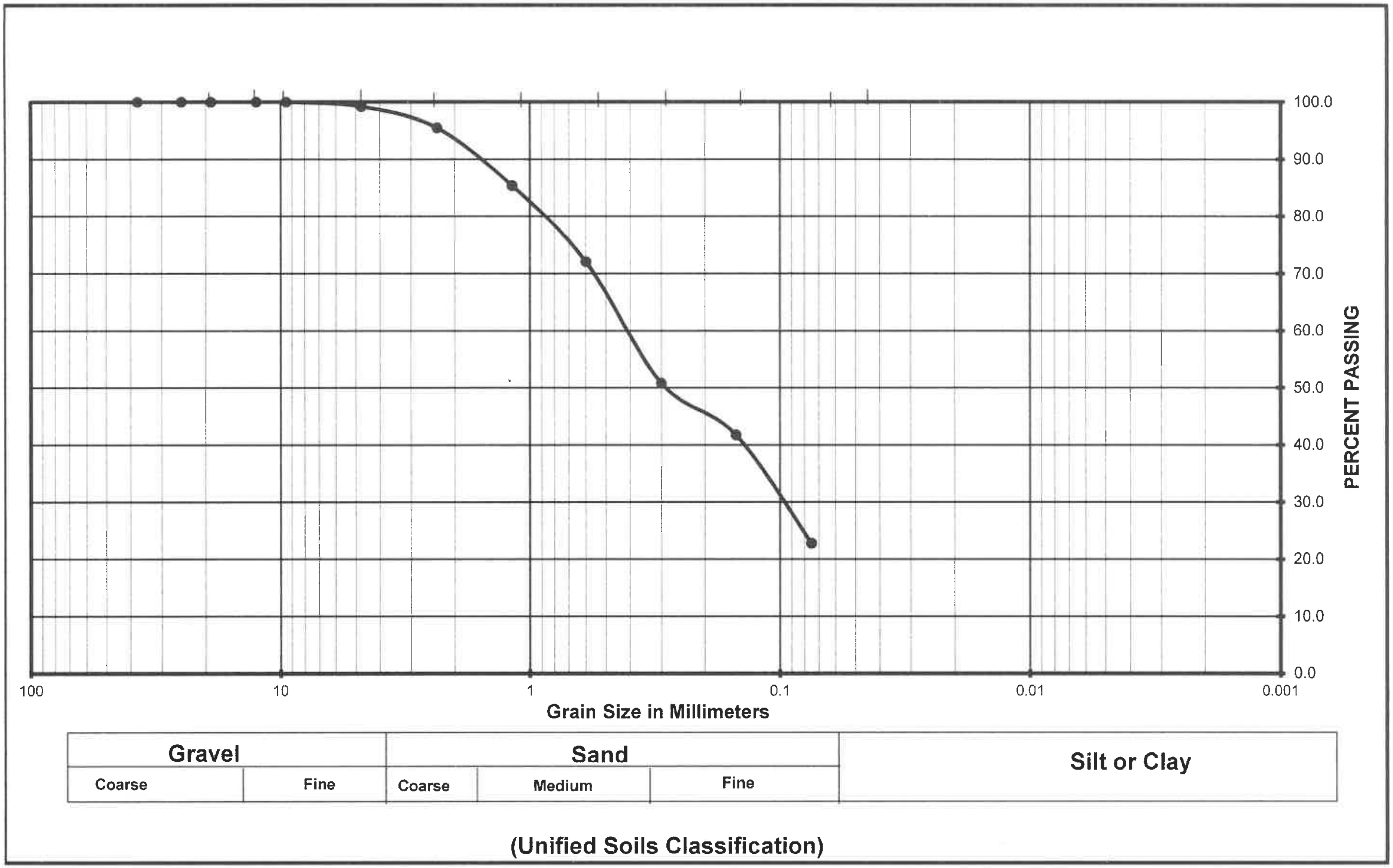
Grain Size Analysis



Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 10'

Krazan Testing Laboratory

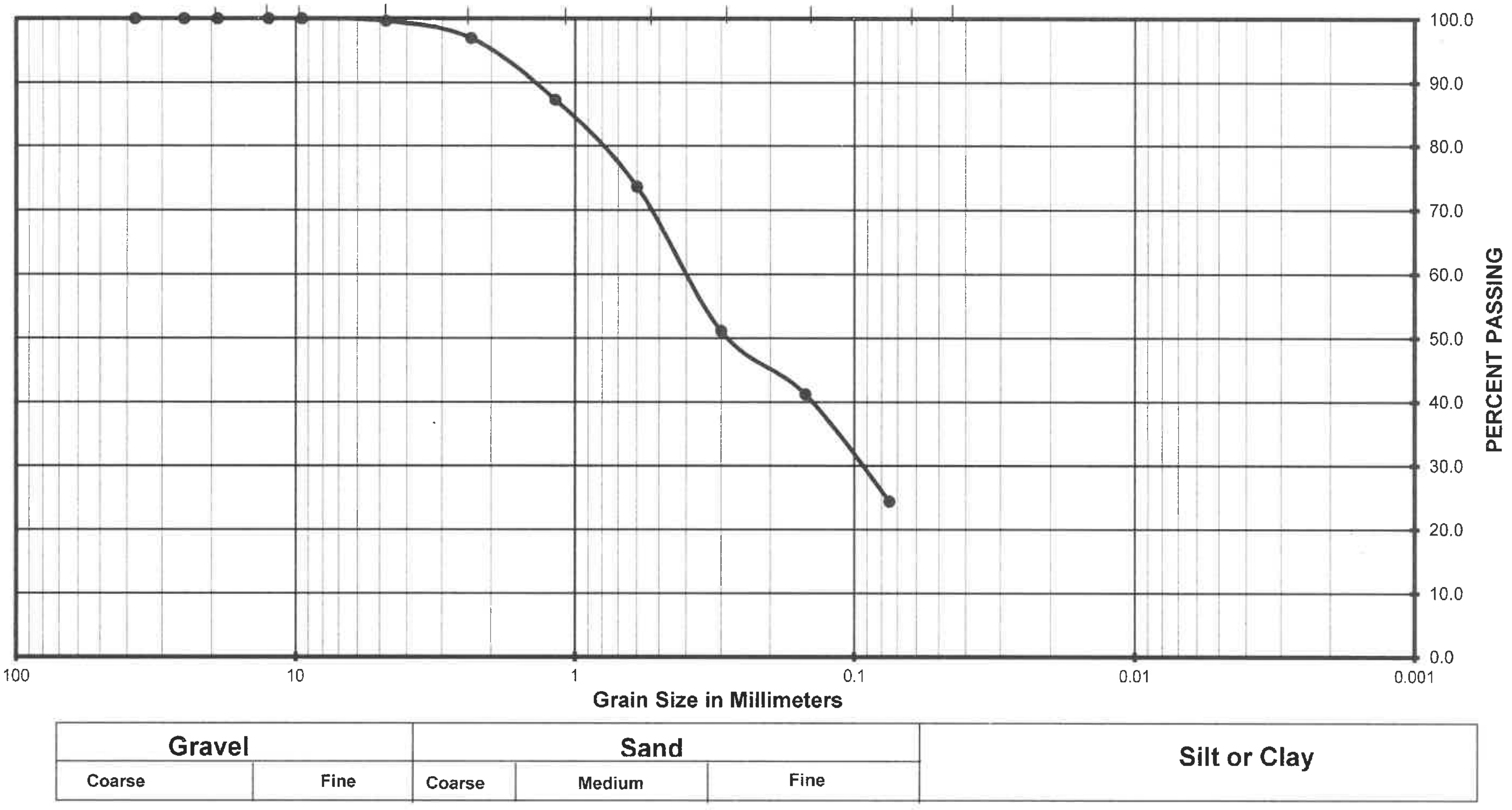
Grain Size Analysis



Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 15'

Krazan Testing Laboratory

Grain Size Analysis

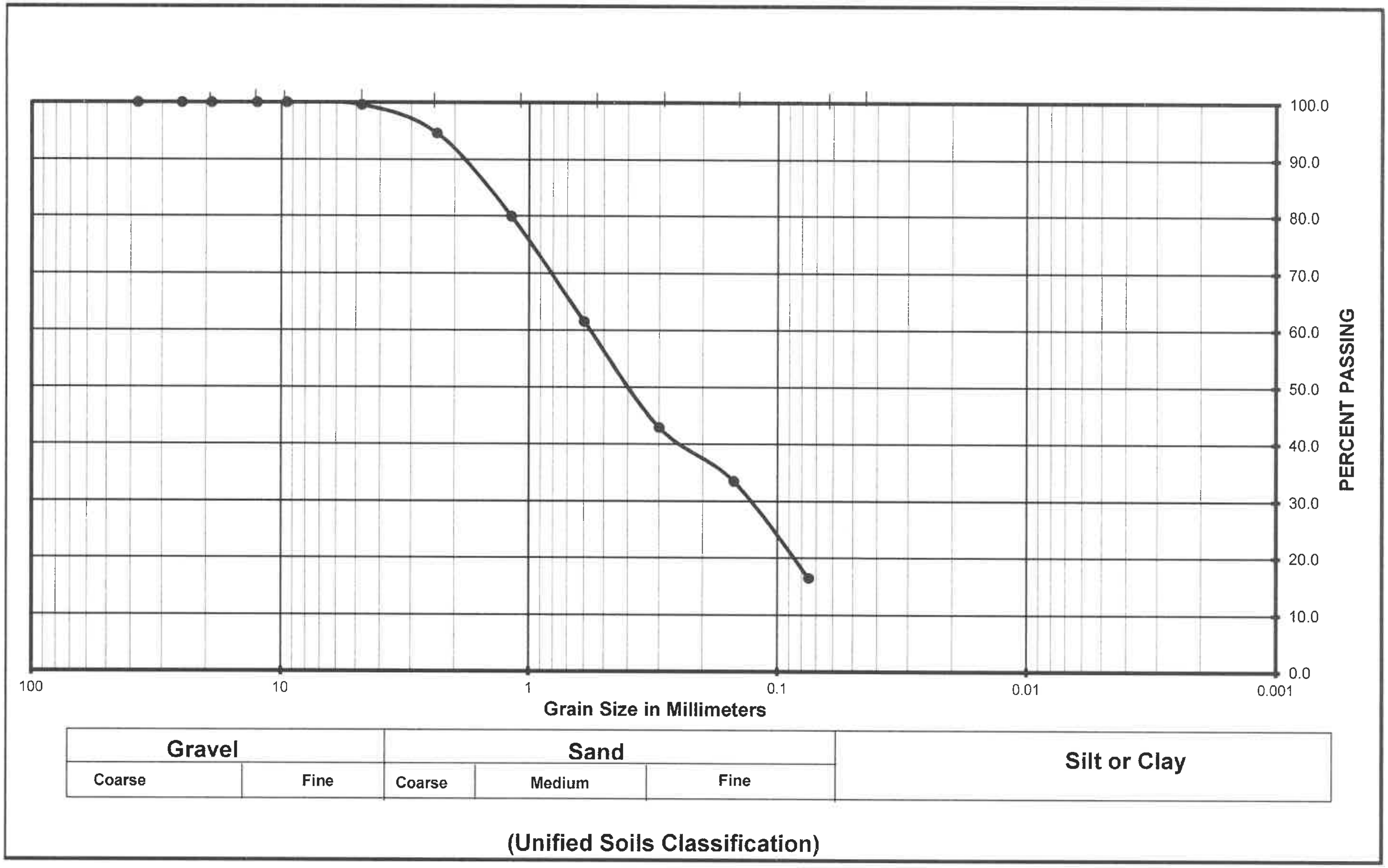


(Unified Soils Classification)

Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 20'

Krazan Testing Laboratory

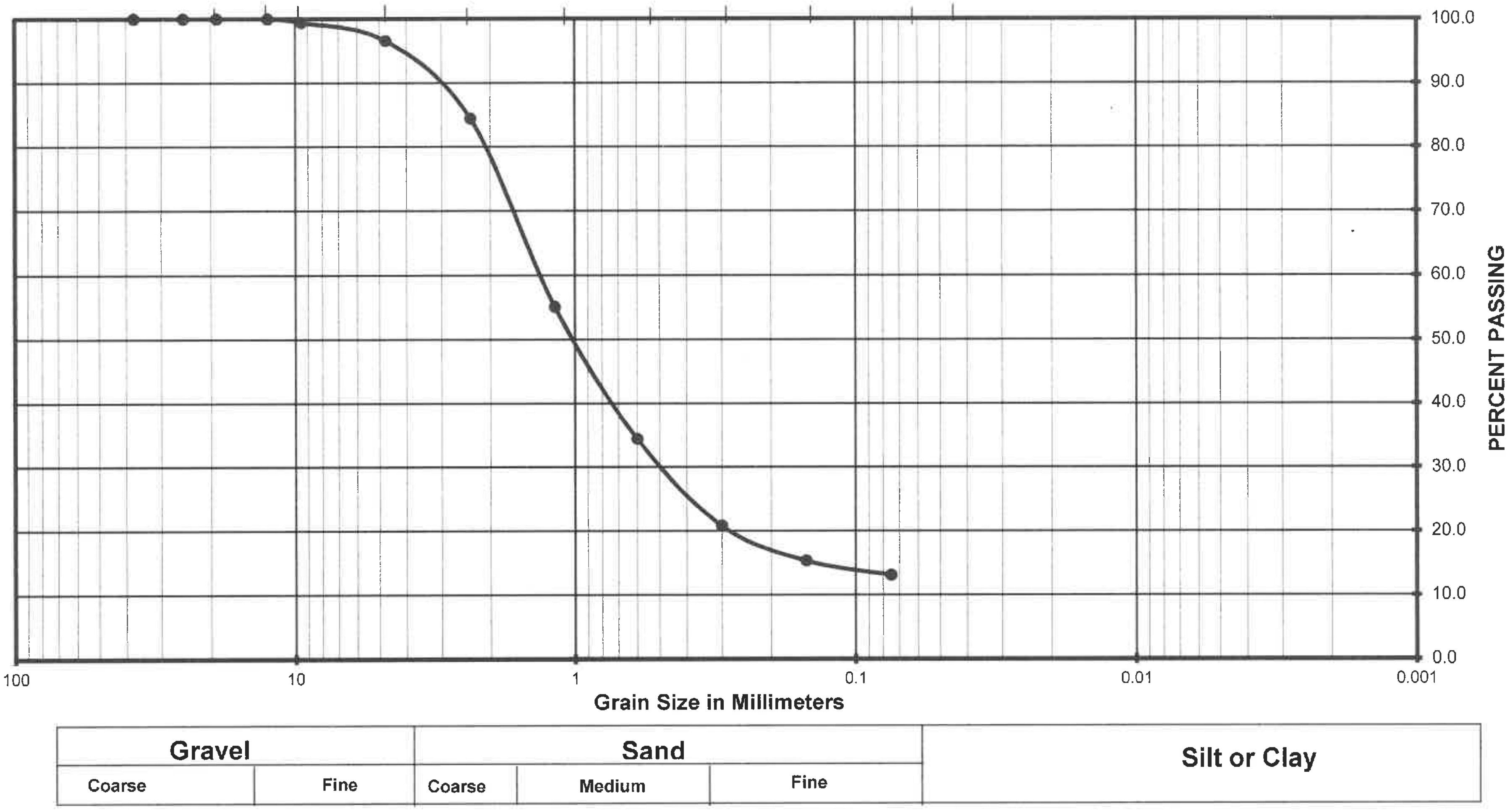
Grain Size Analysis



Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 25'

Krazan Testing Laboratory

Grain Size Analysis

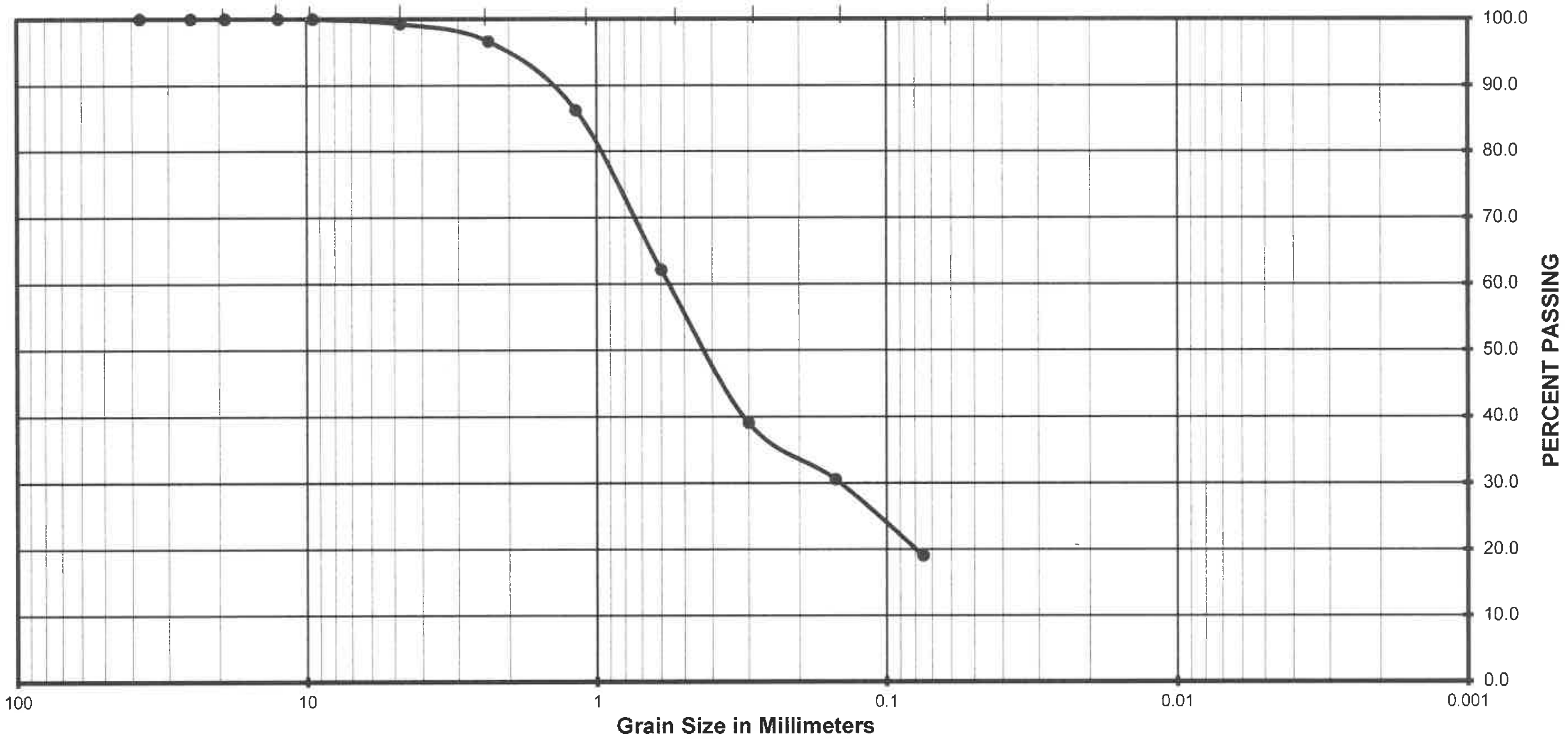


(Unified Soils Classification)

Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM/SP
Sample Number	B-7 @ 30'

Krazan Testing Laboratory

Grain Size Analysis



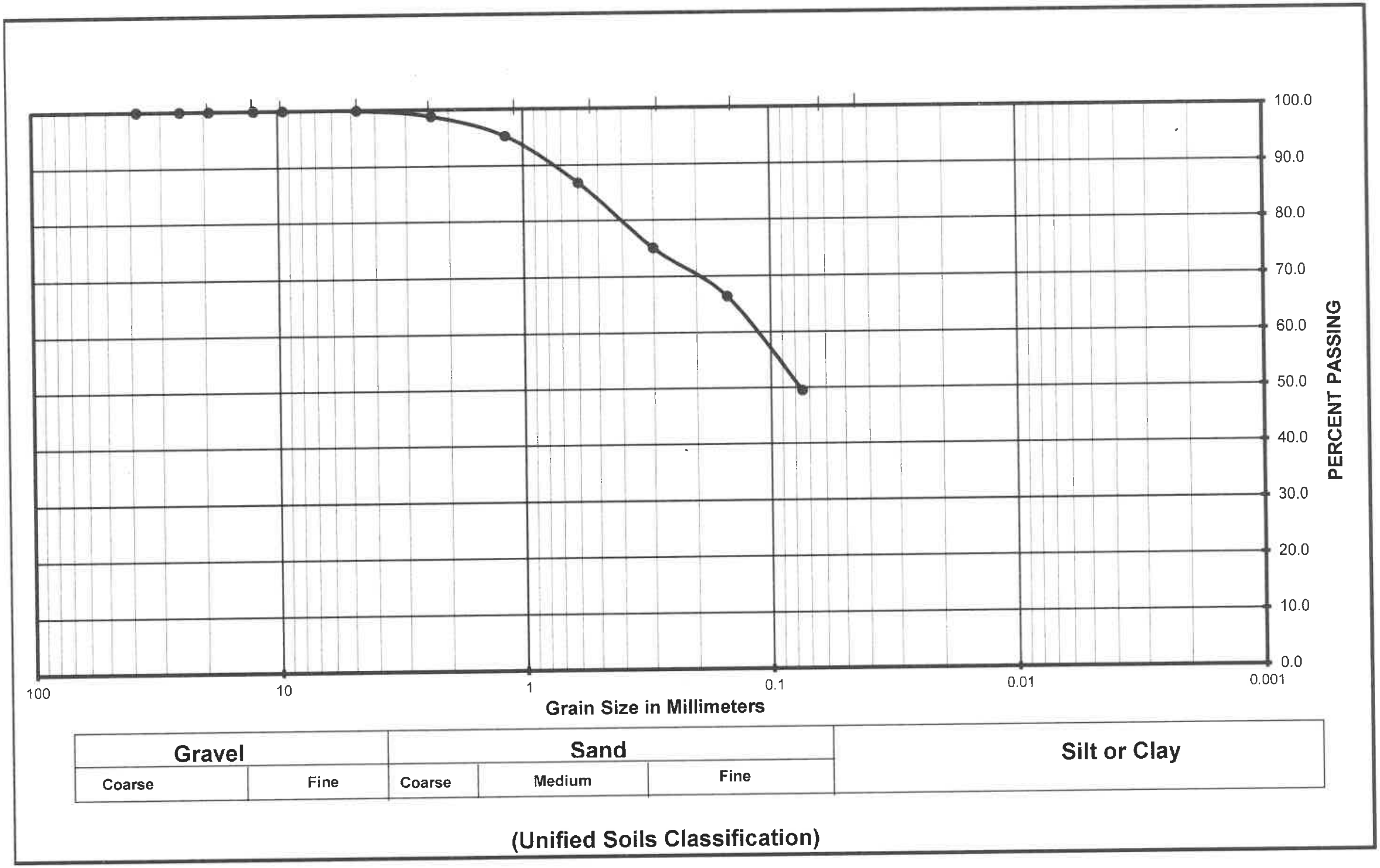
Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 35'

Krazan Testing Laboratory

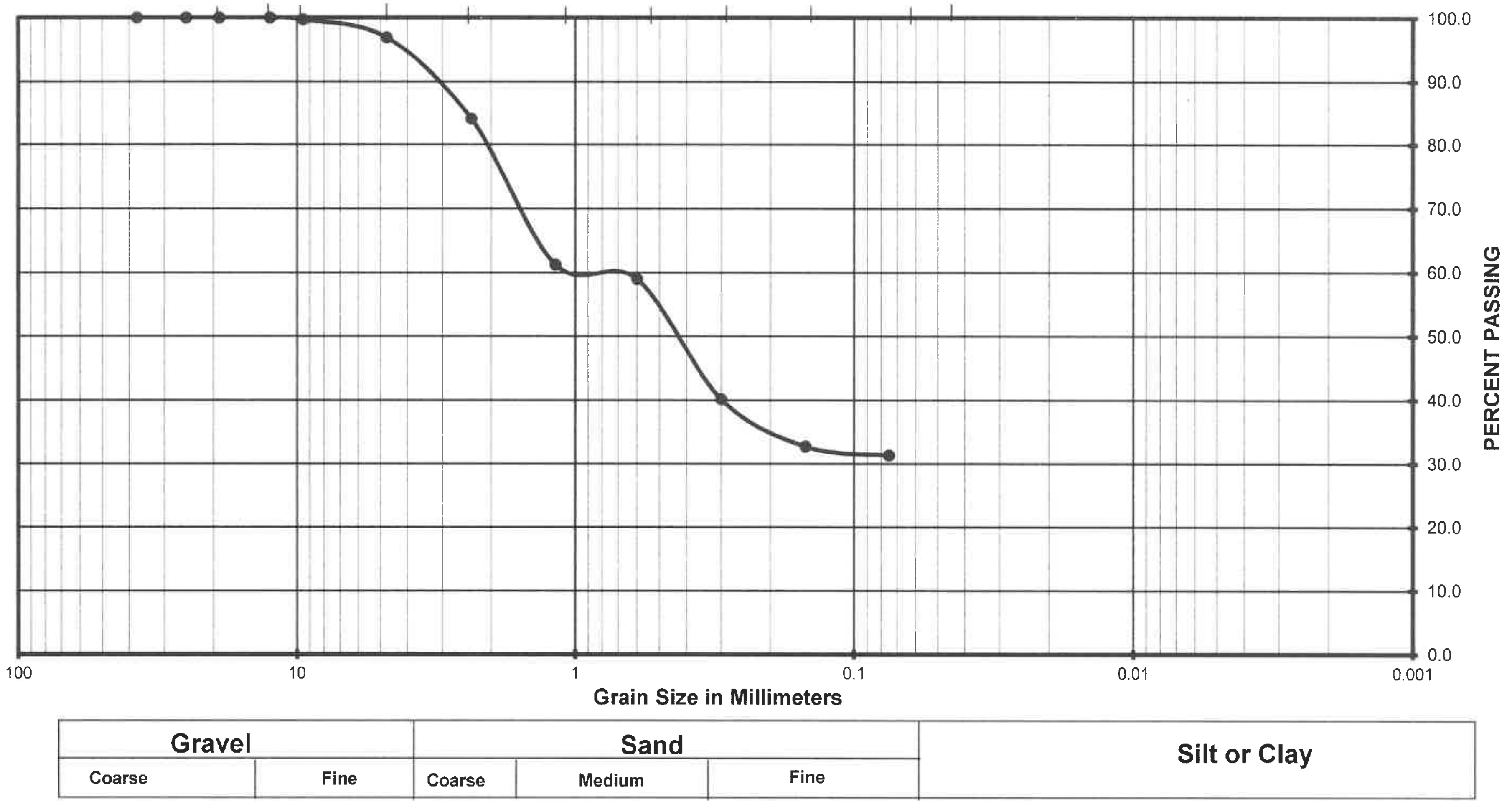
Grain Size Analysis



Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM/ML
Sample Number	B-7 @ 40'

Krazan Testing Laboratory

Grain Size Analysis

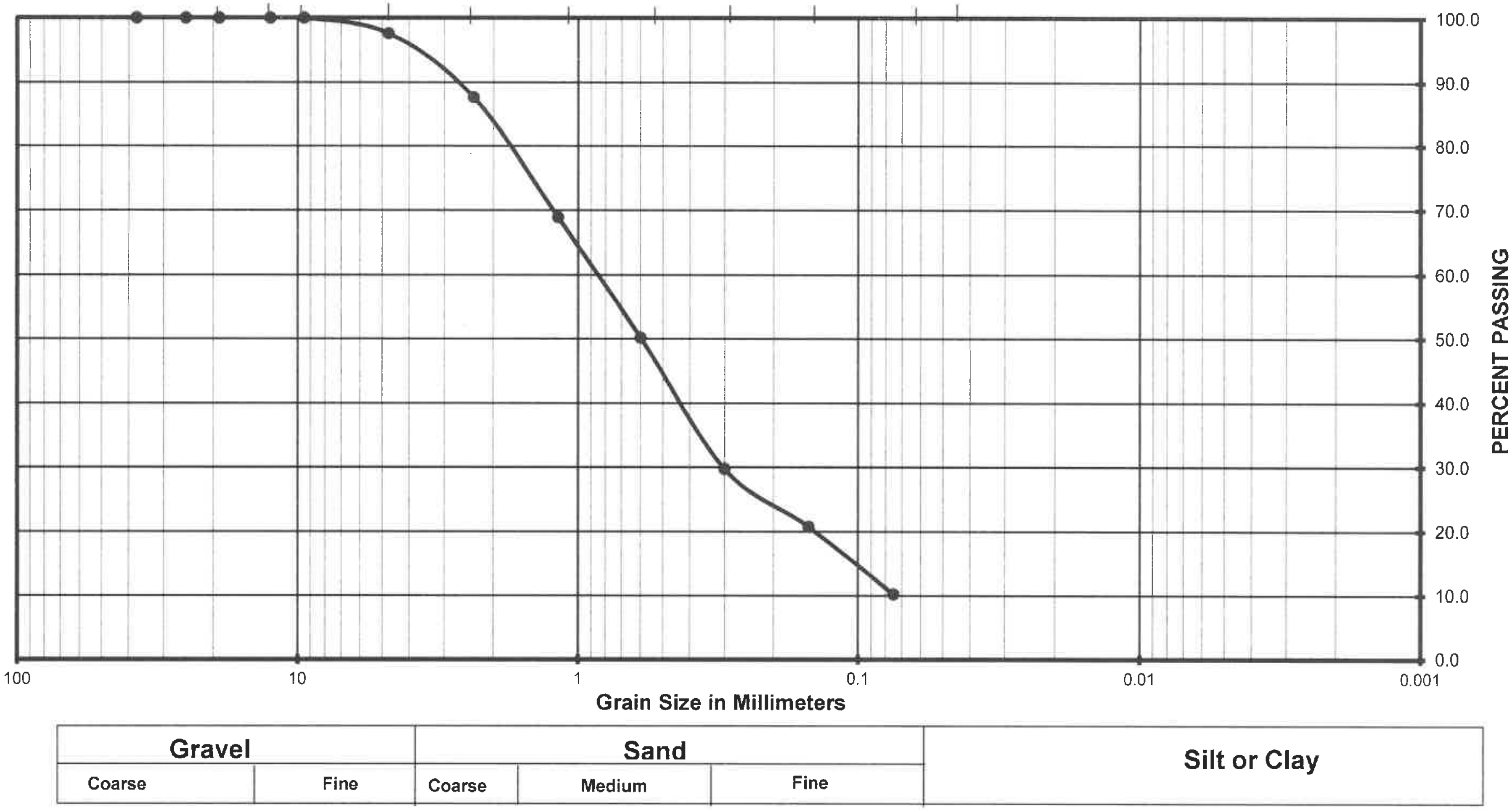


(Unified Soils Classification)

Project Name	Pesnke Moreno Valley
Project Number	11221093
Soil Classification	SM
Sample Number	B-7 @ 45'

Krazan Testing Laboratory

Grain Size Analysis



(Unified Soils Classification)

Project Name	Penske Moreno Valley
Project Number	11221093
Soil Classification	SM-SP
Sample Number	B-7 @ 50'

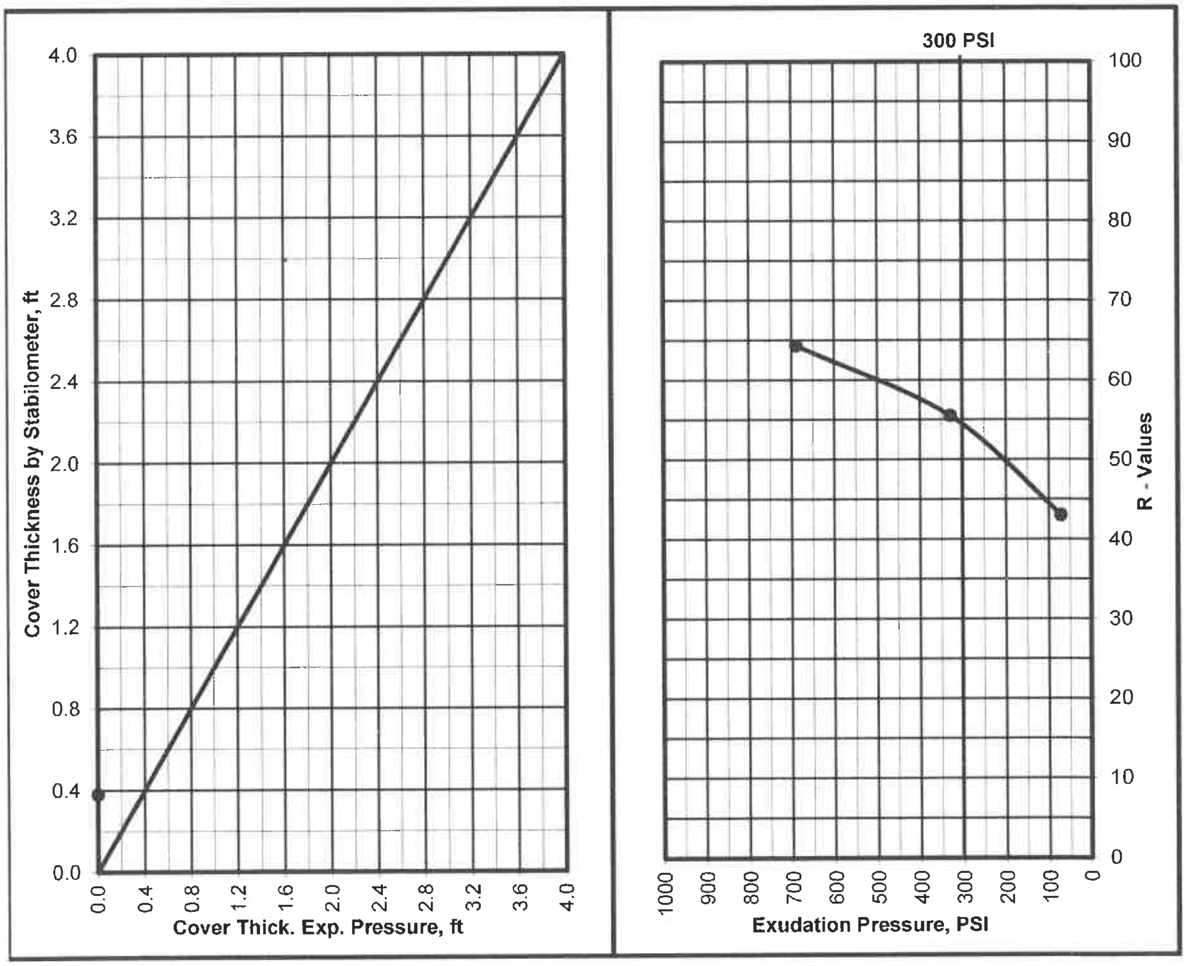
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 11221093
Project Name : Penske Truck Leasing Moreno Valley
Date : 9/1/2021
Sample Location/Curve Number : Bulk Sample
Soil Classification : Silty Sand

TEST	A	B	C
Percent Moisture @ Compaction, %	13.4	14.2	16.0
Dry Density, lbm/cu.ft.	119.7	119.1	118.4
Exudation Pressure, psi	689	330	72
Expansion Pressure, (Dial Reading)	0	0	0
Expansion Pressure, psf	0	0	0
Resistance Value R	64	56	43

R Value at 300 PSI Exudation Pressure	**55**
R Value by Expansion Pressure (TI =): 5	**Expansion Pressure nil**



Krazan Testing Laboratory

ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949)336-6544

DATE: 09/10/2021

Krazan & Associates, Inc.
1100 Olympic Drive, Ste. 103
Corona, CA 92881

P.O. NO: Verbal

LAB NO: C-5219

SPECIFICATION: CTM-643/417/422

MATERIAL: Soil

Project No: 11221093
Project Name: Penske Truck Leasing, Jurupa Valley
Sample ID: B-9 @ 0-5'

ANALYTICAL REPORT

CORROSION SERIES
SUMMARY OF DATA

pH	MIN. RESISTIVITY per CT. 643 ohm-cm	SOLUBLE SULFATES per CT. 417 ppm	SOLUBLE CHLORIDES per CT. 422 ppm
8.0	1,900	296	71

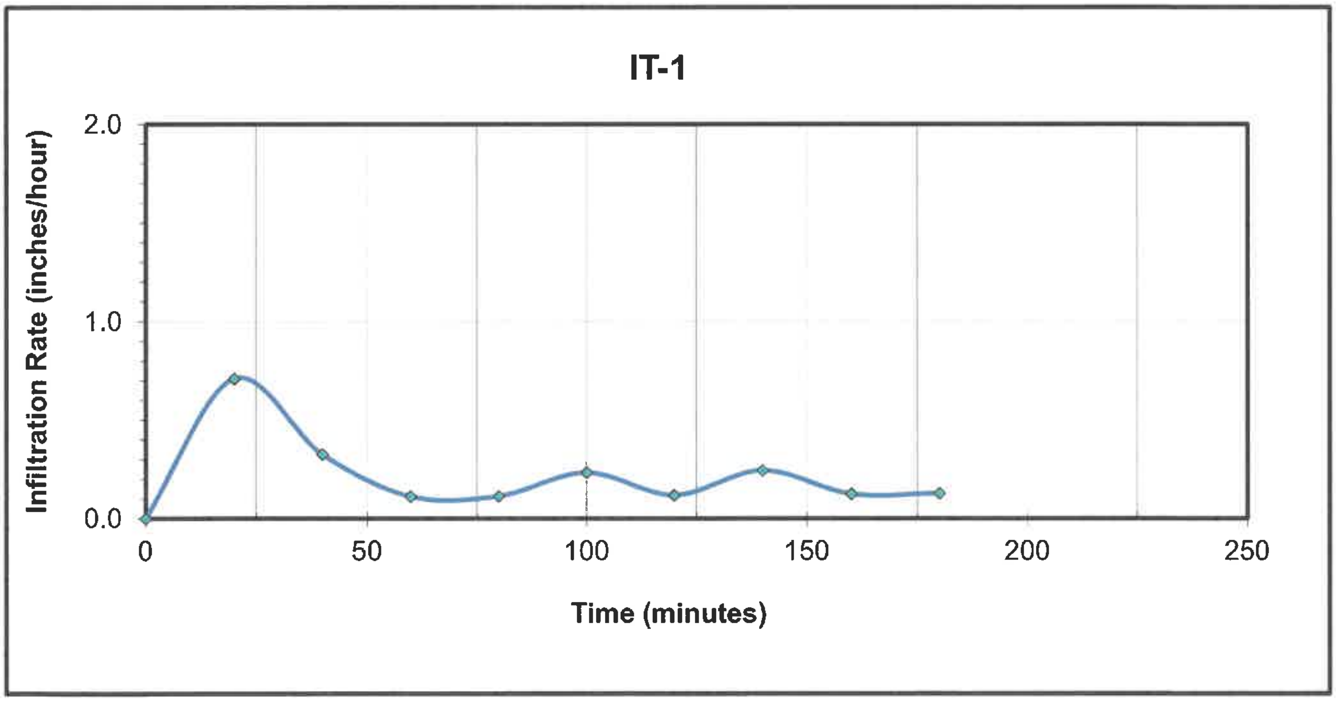
RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	**11221093**			**Date**	**9/13/2021**
Project Name	Penske Truck Leasing Moreno Valley				
Project Address					
Test No:	IT-1	**Total Depth (in.)**	120	**Test Size (in)**	10
Depth To Water	>>50'	**Soil Classification**	SM		

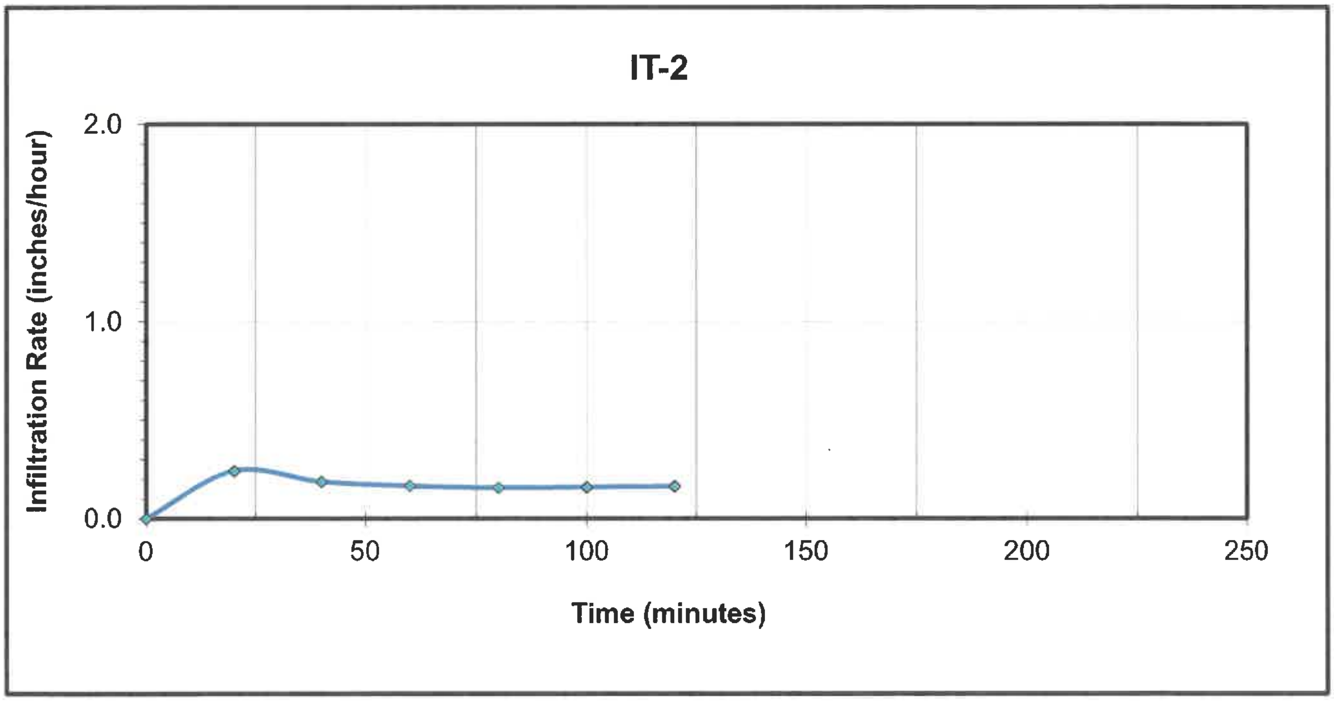
Reading	Elasped Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		45.00	--	--
1	20.00	20.00	45.00	52.00	7.00	0.71
2	40.00	20.00	52.00	55.00	3.00	0.33
3	60.00	20.00	55.00	56.00	1.00	0.11
4	80.00	20.00	56.00	57.00	1.00	0.11
5	100.00	20.00	57.00	59.00	2.00	0.23
6	120.00	20.00	59.00	60.00	1.00	0.12
7	140.00	20.00	60.00	62.00	2.00	0.24
8	160.00	20.00	62.00	63.00	1.00	0.13
9	180.00	20.00	63.00	64.00	1.00	0.13
	Infiltration Rate in Inches per Hour					**0.11**



RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	**11221093**			**Date**	**9/13/2021**
Project Name	Penske Truck Leasing Moreno Valley				
Project Address					
Test No:	IT-2	**Total Depth (in.)**	60	**Test Size (in)**	10
Depth To Water	>>50'	**Soil Classification**	SM		

Reading	Elasped Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		31.00	--	--
1	20.00	20.00	31.00	32.00	1.00	0.24
2	40.00	20.00	32.00	32.75	0.75	0.19
3	60.00	20.00	32.75	33.40	0.65	0.17
4	80.00	20.00	33.40	34.00	0.60	0.16
5	100.00	20.00	34.00	34.60	0.60	0.16
6	120.00	20.00	34.60	35.20	0.60	0.16
	Infiltration Rate in Inches per Hour					**0.16**



APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Soils Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to a density not less than 95 percent relative compaction based on ASTM Test Method D1557 or CAL-216, as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be as determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the Contract documents for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing and the preparations of foundation materials for receiving fill.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Soils Engineer to be deleterious or otherwise unsuitable. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots larger than 1 inch. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavations should not be permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas which are to receive fill materials shall not be permitted.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill, building or slab loads shall be prepared as outlined above, excavated/scarified to a depth of 12 inches, moisture-conditioned as necessary, and compacted to 95 percent relative compaction.

Loose soil areas, areas of uncertified fill, and/or areas of disturbed soils shall be moisture-conditioned as necessary and recompacted to 95 percent relative compaction. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any of the fill material.

EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer.

Both cut and fill areas shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill are as specified.

APPENDIX C

PAVEMENT SPECIFICATIONS

1. **DEFINITIONS** - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term “Standard Specifications”: hereinafter referred to is the 2018 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

2. **SCOPE OF WORK** - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically notes as "Work Not Included."

3. **PREPARATION OF THE SUBGRADE** - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

4. **UNTREATED AGGREGATE BASE** - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, 1½ inches maximum size. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

5. **AGGREGATE SUBBASE** - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class 2 material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

6. ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades, and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning, and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment, and spreading and compacting the mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50 degrees F. The surfacing shall be rolled with a combination steel-wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

7. FOG SEAL COAT - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.