Appendix E

Geotechnical Report by Krazan & Associates, Inc.

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED IN-N-OUT BURGER RESTAURANT
3600 PECK ROAD
EL MONTE, CALIFORNIA

PROJECT NO. 112-23055
JULY 28, 2023

PREPARED FOR:

IN-N-OUT BURGER, A CALIFORNIA CORPORATION
13502 HAMBURGER LANE
BALDWIN PARK, CA 91706

ATTENTION: MR. TODD SMITH

PREPARED BY:

KRAZAN & ASSOCIATES, INC.
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Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

July 28, 2023 KA Project No. 112-23055

Mr. Todd Smith
Development Manager
In-N-Out Burger, a California Corporation
13502 Hamburger Lane
Baldwin Park, Ca 91706

RE: **GEOTECHNICAL ENGINEERING INVESTIGATION**
Proposed In-N-Out Burger Restaurant
3600 Peck Road
El Monte, California

Dear Mr. Smith:

In accordance with your request and authorization, we have completed our Geotechnical Engineering Investigation for the above-referenced site. This report summarizes the results of our field investigation, laboratory testing and engineering analyses. Based on the data obtained, our understanding of the proposed project and our engineering analyses, it is our opinion that it is feasible to develop the site as planned.

As noted in our report, Krazan & Associates should be retained to review project plans and specifications prior to the start of construction, and to observe and test earthwork and foundation construction. Observation and testing services should also be performed by our field staff during construction activities will allow us to compare conditions exposed during construction with those encountered during our investigation and to present supplemental recommendations if warranted by different site conditions.

If you have any questions regarding the information or recommendations presented in our report, or if we may be of further assistance, please contact our office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Jorge A Pelayo

Jorge A. Pelayo, MS, PE
Project Engineer
RCE No. 91269

JAP

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INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed development that will include construction of an approximately 3,860 square foot In-N-Out Burger Restaurant. It is anticipated that the proposed construction will include a drive-thru area, patio area, trash enclosure, associated parking and drive areas, and localized landscaped areas. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, grading, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior concrete flatwork, retaining walls, soil corrosivity, and pavement design.

A Vicinity Map showing the location of the site is presented on Figure 2. A Site Plan showing the approximate boring locations is presented on Figure 1. Descriptions of the field and laboratory investigations, boring log legend and boring logs 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 guide specifications for earthwork and flexible pavements, respectively. If 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 OF SERVICES

This geotechnical investigation was conducted to evaluate subsurface soil and groundwater conditions at the project site. Engineering analysis of the field and laboratory data was performed for the purpose of developing and providing geotechnical recommendations for use in the design and construction of the earthwork, foundation and pavement aspects of the project.

Our scope of services was outlined in our proposal dated April 27, 2022 (KA Proposal No. G23039CAC) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- Review of selected published geologic maps, reports and literature pertinent to the site and surrounding area.

- A field investigation consisting of drilling six (6) borings to depths ranging from approximately ten (10) to fifty (50) feet below the existing ground surface for evaluation of the subsurface conditions at the project site.
- Performance of two (2) infiltration tests at the subject site in order to determine an estimated infiltration rate for the near surface soil.
- Performance of laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.
- Evaluation of the data obtained from the investigation and engineering analyses of the data with respect to the geotechnical aspects of structural design, site grading and paving.
- Preparation of this report summarizing the findings, results, conclusions and recommendations of our investigation.

Environmental services, such as a chemical analysis of soil and groundwater for possible environmental contaminates, were not in our scope of services.

PROPOSED CONSTRUCTION

Based on our review of the site plan and our discussions with the project representative, we understand that the proposed development will include construction of an approximately 3,860 square foot In-N-Out Burger Restaurant. The proposed restaurant will be of wood frame/stucco construction with a slab-on-grade floor. The proposed development will include a drive-thru area, patio area, trash enclosure, associated parking and drive areas, and localized landscaped areas. It is anticipated that the proposed structure will be supported on a shallow foundation system and slab-on-grade floors.

In the event these structural or grading details are inconsistent with the final design criteria, we should be notified so that we can evaluate the potential impacts of the changes on the recommendations presented in this report and provide an updated report as necessary.

SITE LOCATION, SITE HISTORY, AND SITE DESCRIPTION

The site is a roughly a rectangular shaped parcel located at the physical address of 3600 Peck Road in the city of El Monte, Los Angeles County, California.

Site history was obtained by reviewing historical aerial photographs taken in 1948, 1952, 1963, 1972, 1980, 1990, 2000, 2010, and 2018. Review of the 1948 to 1980 aerial photographs indicate that the project site consisted of a rural residence, scattered trees, and vacant land.

Review of the 1963 aerial photograph indicates that the project site conditions appeared to be relatively similar to that noted in the 1952 aerial photograph. Surrounding land was developed with residential houses, parking lots, and buildings.

Review of the 1972 aerial photograph indicate that the project site was developed with a building and parking lot in the northeast region of the site where the rural residence had been located. Another building was constructed south of the project site.

Review of the 1987 through 2000 aerial photographs indicate that the western region of the site was developed with a building and parking lot. A swimming pool or pond appeared to be located in the central region of the building. Trees were located in the northeast region of the site.

Review of the 1990 and 2018 aerial photographs indicate that the project site conditions appeared to be similar of what is presently at the site, a commercial building.

Presently, the site is occupied by an active Big 5 Sporting Goods store, surrounding parking lot, and localized landscaping areas. The subject site is bound to the south and west by the existing commercial development, to the east and north by Peck Road and commercial developments beyond. Ground cover at the site consists of asphalt pavements and localized landscape areas. The site is relatively flat and level, with no major changes in elevation.

GEOLOGIC SETTING

The subject site is located within the Peninsular Ranges Geomorphic Province (CGS Note 36). 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.

The subject site is located within the north portion of the Central Basin of the Los Angeles Coastal Plain. The Los Angeles Coastal Plain is situated between the Santa Monica Mountains to the northwest, the San Gabriel Mountains to the northeast, the Santa Ana Mountains to the southeast, and the Pacific Ocean to the west and south.

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 5) and Boring Logs (Appendix A) for a description of the earth materials encountered during our investigation.

The site is located in a seismically active area of Southern California. The nearest significant active fault is the Elysian Park (Upper) Fault Zone is located approximately 4.4 miles away from 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.

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.

The subject site is located on the State of California, Earthquake Zones of Required Investigation Map, El Monte. The subject site is located in an area designated by the State of California as a Liquefaction Hazard Zone.

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 geographic 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 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 soils within the project site consist of loose to medium dense silty sand and sandy clay. Free groundwater was not encountered during our exploratory drilling. However, based on a review of the Seismic Hazard Evaluation Report for the South Gate Quadrangle, historic high groundwater depths for the vicinity of the subject site are estimated to be at a depth on the order of eight (8) feet below ground surface.

The potential for soil liquefaction during a seismic event was evaluated using the LIQUEFYPRO computer program (version 5.9d) developed by CivilTech Software. For the analysis, a maximum earthquake magnitude of 6.9 was used. A peak horizontal ground surface acceleration of 0.86g was considered conservative and appropriate for the liquefaction analysis. An estimated high groundwater depth of 10 feet was used for our analysis. The soils above this depth can be considered non-liquefiable due to the absence of groundwater. Our analysis indicates the silty sand layers between depths of approximately 10 to 15 feet and 20 to 25 feet at the project may be susceptible to liquefaction during a design level seismic event.

The computer analysis indicates that an estimated total and differential seismic induced settlement is not anticipated to exceed 2.69 inches and 1.78 inches, respectively. Based on our findings, it is our opinion that the potential for seismic-induced soil liquefaction within the project site is moderate to high. Therefore, measures to mitigate liquefaction potential are included in this report should the estimated seismic settlements exceed allowable values.

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."

Review of the Earthquake Zones of Required Investigation (EQZApp) prepared by the CGS for the El Monte Quadrangle indicates that no earthquake fault zones are located on or projected to cross the vicinity of the subject site. The nearest zoned fault is a portion of the Elysian Park (Upper) Fault Zone, located approximately 4.4 mile from the subject site.

COUNTY OF LOS ANGELES BUILDING CODE

It is the finding of this firm that the proposed project will be safe from geotechnical hazards (i.e. landslide, settlement or slippage) and will not adversely affect adjacent properties, in compliance with Section 111 of the Los Angeles County Building Code, provided our recommendations are incorporated into the design and properly implemented during construction.

SLOPE STABILITY

According to the Los Angeles County Safety Element) Leighton, 1990), the site is not located within and area identified as having a potential for slope instability. Additionally, the site is not within and area identified as having a potential for seismic slope instability (CDMG, 1999). There are no know landslides near the site, nor is the site located in the path of any known or potential landslides. As such, the potential for slope stability hazards to adversely affect the proposed development is considered low.

OTHER HAZARDS

Rockfall, Landslide, Slope Instability, 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 approximately 11 miles from the ocean at a ground surface elevation of 92 feet above mean sea level. 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 stiff to very stiff. Provided remedial grading recommendations presented in this report are incorporated in the design and construction, hydroconsolidation is not anticipated to be a significant concern for the subject site.

SITE COEFFICIENT

The Site Class per Section 1613 of the 2022 California Building Code (2022 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 2022 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	1.820	Section 1613.2.1
S_{MS}	1.820	Section 1613.2.3
S_{DS}	1.214	Section 1613.2.4
Site Coefficient F_v	1.700	Table 1613.2.3 (2)
S_1	0.661	Section 1613.2.1
S_{M1}	1.124	Section 1613.2.3
S_{D1}	0.749	Section 1613.2.4
T_S	0.617	Section 1613.2
PGA_M	0.859	Figure 22.7

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

The seismic hazard most likely to impact the site is ground shaking due to a large earthquake on one of the major active regional faults. Because of the proximity to the subject site to major active earthquake faults in southern California, and in light of the maximum probable events for these faults, it appears that a maximum probable event along these fault zones could produce a peak horizontal acceleration of approximately 0.859 when uncertainty is used. With respect to this hazard, the site is comparable to others in this general area within similar geologic settings.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling six (6) borings using a truck-mounted drill rig to depths ranging from approximately ten (10) feet to fifty (50) feet below existing site grades. Bulk subgrade soil samples were also obtained for laboratory testing. The approximate boring and bulk sample locations are shown on the Site Plan, Figure 2. These approximate boring and sample locations were estimated in the field based on pacing and measuring from the limits of existing site features. 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 in-situ moisture and density, gradation, R-Value, maximum dry density, resistivity, pH value, sulfate- and chloride-contents of the materials encountered. Details of the laboratory-testing program are discussed in Appendix A. The results of the laboratory tests are presented on the boring logs or on the test reports, which are also included 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. Ground cover at the site consisted of approximately 3 to 4 inches of asphalt pavement underlain by approximately 6 to 7 inches of discernable aggregate base material.

Approximately 3 to 6 feet of fill material was encountered within the borings drilled at the site. The fill material predominately consisted of sandy clay (CL). The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Limited testing was performed on the fill soils during the time of our field and laboratory observations. Preliminary testing indicates the fill material had varying strength characteristics ranging from loosely placed to compacted.

Below the fill material, medium dense silty sand was encountered from a depth of approximately 3 feet below site grades to a depth of approximately 20 feet below grades. Below the silty sand, interbedded layers of dense to very dense gravelly sands and poorly-graded sands were encountered from a depth of approximately 19 feet below grades to the maximum depth explored, 50 feet below current site grades. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 12 to 51 blows per foot. Dry densities ranged from 100 to 118 pcf. Representative soil samples consolidated approximately 1.2 to 2.3 percent under a 2 ksf load when saturated. A representative soil sample had an angle of internal friction of 29 with a cohesion value of 200 psf.

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

EXPANSION POTENTIAL

The near-surface clayey soils encountered at the site have been identified through laboratory testing as having a moderate expansion potential. The clay soil present at the subject site generally possess expansion potentials in excess of 20 and therefore should be considered expansive. 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.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Groundwater was not encountered during the site visit to the subject site. Based on a review of the Seismic Hazard Evaluation Report for the El Monte Quadrangle, historic high groundwater depths for the vicinity of the subject site are estimated to be at a depth on the order of ten (10) feet below ground surface. See the attached Figure 4, Historical Groundwater Map.

It should be recognized that water table elevation might fluctuate with time. The depth to groundwater can be expected to fluctuate both seasonally and from year to year. Fluctuations in the groundwater level may occur due to variations in precipitation, irrigation practices at the site and in the surrounding areas, climatic conditions, flow in adjacent or nearby canals, pumping from wells and possibly as the result of other factors that were not evident at the time of our investigation. Therefore, water level observations at the time of our 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. Long-term monitoring in observation wells, sealed from the influence of surface water, is often required to more accurately define the potential range of groundwater conditions on a site.

SOIL CORROSIVITY

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

Parameter	Results	Test Method
Sulfate	106 ppm	CA 417
Min Resistivity	6,400 ohm-cm	CA 643
Chloride	11 ppm	CA 422
pH Value	7.6	EPA 9045C

INFILTRATION TESTING

The shallow soil conditions present at the subject site were evaluated by drilling shallow borings at the subject site to facilitate infiltration testing. The borings drilled at the site indicated the subsurface soil conditions consisted of medium dense silty sand. Infiltration testing has been performed using the Borehole Percolation Testing Procedures described in the County of Los Angeles Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration. A total for two (2) infiltration tests were performed at the subject site.

Prior to infiltration testing, the borehole was pre-soaked using clean water. Following presaturation and draining, the borehole was refilled and measured at 30-minute increments. The water level at each interval were measured using a water level indicator. The depth of the borehole was measured to verify the overall depth below site grades following each reading.

The estimated infiltration rate was determined using the results of open Borehole Percolation Testing Procedures at two (2) locations at the subject site. The following reduction factors are recommended and have been utilized in determining the recommended design infiltration rate:

- RFt = Boring Percolation Procedure = 2
- RFv = Variability, Tests, Thoroughness =2
- RFs = Long Term Siltation, Plugging, and Maintenance =2
- Total Reduction Factor = 6

The average infiltration rates at the end of the tests indicated a factored infiltration rate of approximately 0.34 and 0.43 inch per hour at a depth of approximately 10 feet below current site grades. Detailed results of the infiltration testing are included as an attachment to this report. 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 and siltation.

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 existing development and fill material, appears to be conducive to the development of the project.

Approximately 3 to 6 feet of fill material was encountered within the borings drilled at the site. The fill material predominately consisted of sand clay. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. A swimming pool or pond was previously located in the western region of the site and has been backfilled with undocumented fill of unknown depth. Thicker fill may be present at the location of the previous pool or pond. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates that the fill material had varying strength characteristics ranging from loosely placed to compacted. It is recommended fill soils be excavated and recompacted. The fill material should be moisture-conditioned as necessary and recompacted to a minimum of 95 percent of maximum density based on ASTM Test Method D1557. Prior to fill placement Krazan & Associates, Inc. should inspect the bottom of the excavation to verify no additional removal will be required.

A building and asphalt pavements are located within the project site vicinity. Any surface or buried structures encountered during construction should be properly removed and/or relocated. It is suspected that demolition activities of the existing structures will disturb the near surface soils. Areas disturbed by demolition activities should be excavated to firm native ground. The resulting excavations should be backfilled with Engineered Fill. 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 should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

To reduce post-construction soil movement, removal of the compressible soils, and provide uniform support for the buildings and other foundations, overexcavation and recompaction within the proposed building footprint and other foundation areas should be performed to a minimum depth of at least four (4) feet below the bottom of the proposed foundation bearing grades. In addition, the 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.

Based on our soil liquefaction analysis, an estimated total seismic-induced settlement of 2.69 inches could occur at the site during a design level seismic event. Differential settlement caused by a seismic event is estimated to be up to approximately 1.76 inch over a horizontal distance of 100 feet. The seismic settlements would develop if liquefaction of underlying subsurface soils were to occur during a seismic event. If these potential movements are not tolerable, then mitigation measures are recommended to reduce structural damage due to soil liquefaction. Recommendations for utilizing mat foundations are provided in this report.

As an alternative to implementing ground improvement measures to mitigate the settlement associated with the liquefiable soils, the proposed building could be supported on a deep foundation system. Based on the soil and groundwater conditions at the project site, the installation of driven precast concrete piles or concrete augercast piles are considered appropriate. The principal drawback to precast concrete piles is the inflexibility in length adjustments during construction. This can be overcome by use of an adequate indicator pile installation program and/or pile load tests. If this option is utilized, over-excavation of the upper soils will not be required. Recommendations for deep foundations will be provided upon request.

Besides mitigating the potential for seismic settlement, it is recommended that the upper 24 inches of soil supporting lightly loaded foundations (less than 1,000 psf) and slab-on-grade areas consist of Non-Expansive Engineered Fill. The intent is to support the lightly loaded foundations and slab areas with 24 inches of non-expansive fill. The footings should have a minimum depth of 15 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. The footing should have a minimum width of 12 inches, regardless of load. Ultimate design of foundations and reinforcement should be performed by the project Structural Engineer.

After completion of the recommended site preparation, the site should be suitable for shallow footing support. The proposed structure footings may be designed utilizing an allowable bearing pressure of 2,400 psf for dead-plus-live loads. Footings should have a minimum embedment of 18 inches.

To reduce post-construction soil movement and provide uniform support for the proposed parking and drive area, 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-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.

The total static soil movement is not expected to exceed 1 inch. Differential static movement measured across a horizontal distance of 30 feet should be less than ½ inch. The total seismic-induced settlement is not expected to exceed 2.69 inches. Differential settlement caused by a seismic event is estimated to be less than 1.78 inches. The anticipated differential seismic settlement is estimated over a distance of 100 feet.

GROUNDWATER INFLUENCE ON STRUCTURES/CONSTRUCTION

Based on our findings and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations and pavements for the project. However, 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.

SEISMIC CONSIDERATIONS

Ground Shaking

Although ground rupture is not considered to be a major concern at the subject site, the site will likely be subject to at least one moderate to severe earthquake and associated seismic shaking during its lifetime, as well as periodic slight to moderate earthquakes. Some degree of structural damage due to stronger seismic shaking should be expected at the site, but the risk can be reduced through adherence to seismic design codes.

Seismic Induced Settlement

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on site subsurface conditions and the moderate to high seismicity of the region, any loose fill materials at the site could be vulnerable to this potential hazard. However, this hazard can be mitigated by following the design and construction recommendations of the Geotechnical Engineering Investigation Report.

The estimated seismic settlement was determined at the subject site using the settlement analysis method by Tokimatsu, Seed, and Bolton (1987). The total seismic-induced settlement is not expected to exceed 2.69 inches. Differential settlement caused by a seismic event should be less than 1.78 inch. The anticipated differential seismic settlement is estimated over a distance of 100 feet.

EARTHWORK

Site Preparation – Clearing and Stripping

General site clearing should include removal of vegetation and existing utilities, structures (footings and slabs); existing pavements; 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 reuse as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

An abandoned building and asphalt pavements are located within the project site vicinity. A building was previously located in the western region of the site. A swimming pool or pond was previously located within the footprint of the demolished building. Any surface or buried structures encountered during construction should be properly removed and/or relocated. It is suspected that demolition activities of the existing structures will disturb the near surface soils. Areas disturbed by demolition activities should be excavated to firm native ground. The resulting excavations should be backfilled with Engineered Fill. 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 should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

Any excavations that result from clearing operations should be backfilled with Engineered Fill. Krazan & Associates' field staff should be present during site clearing operations to enable us to locate areas where depressions or disturbed soils are present and to allow our staff to observe and test the backfill as it is placed. If site clearing and backfilling operations occur without appropriate observation and testing by a qualified geotechnical consultant, there may be the need to over-excavate the building area to identify uncontrolled fills prior to mass grading of the building pad.

Approximately 3 to 6 feet of fill material was encountered within the borings drilled at the site. The fill material predominately consisted of sand clay. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. A swimming pool or pond was previously located in the western region of the site and has been backfilled with undocumented fill of unknown depth. Thicker fill may be present at the location of the previous pool or pond. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates that the fill material had varying strength characteristics ranging from loosely placed to compacted. It is recommended fill soils be excavated and recompacted. The fill material should be moisture-conditioned as necessary and recompacted to a minimum of 95 percent of maximum density based on ASTM Test Method D1557. Prior to fill placement Krazan & Associates, Inc. should inspect the bottom of the excavation to verify no additional removal will be required.

As with site clearing operations, any buried structures encountered during construction should be properly removed and backfilled. The resulting excavations should be backfilled with Engineered Fill.

Overexcavation and Recompaction

To reduce post-construction soil movement, removal of the compressible soils, and provide uniform support for the buildings and other foundations, overexcavation and recompaction within the proposed building footprint and other foundation areas should be performed to a minimum depth of at least four (4) feet below the bottom of the proposed foundation bearing grades. In addition, the 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.

Based on our soil liquefaction analysis, an estimated total seismic-induced settlement of 2.69 inches could occur at the site during a design level seismic event. Differential settlement caused by a seismic event is estimated to be up to approximately 1.76 inch over a horizontal distance of 100 feet. The seismic settlements would develop if liquefaction of underlying subsurface soils were to occur during a seismic event. If these potential movements are not tolerable, then mitigation measures are recommended to reduce structural damage due to soil liquefaction. Recommendations for utilizing mat foundations are provided in this report.

To reduce post-construction soil movement and provide uniform support for the proposed parking and drive area, 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.

EXPANSIVE SOIL MITIGATION

When concrete slabs-on-grade and shallow foundations are placed on expansive soils that have been allowed to lose moisture, the soil is likely to swell as water re-enters the soil structure. Conversely, when slabs and foundations are constructed on moist to wet soils that are allowed to lose moisture, the soil will shrink, as the moisture is lost. This can result in distress to structures founded on these soils, and in particular, lightly loaded concrete slabs. Thus, it is very important that clayey soils within at least the upper 24 inches of the subgrade in the building pad areas be replaced with non-expansive fill. Based on the expansion potential of the soils encountered at the subject site, we recommend that exterior concrete flatwork surrounding the buildings be supported by a minimum 24-inch thick layer of non-expansive fill. Based on the soil conditions encountered at the boring locations it is anticipated that this will require the use of imported select fill soil. Additional investigation may be performed following preparation of final grading plans and building locations in order to evaluate the expansion potential of the near surface soil at each building location.

Engineered Fill

The organic-free, on-site, fill soils are predominately clays. The clayey soils will not be suitable for reuse as non-expansive Engineered Fill within the upper 24 inches. However, the clayey soils will be suitable for reuse for fill placement within the upper 24 inches of lightly loaded foundations, slab-on-grade, and exterior flatwork areas, provided they are lime-treated. The preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be above optimum moisture-condition during mixing operations. Additional testing is recommended to determine the appropriate application rate of lime prior to placement. These clayey soils will be suitable for reuse as General Engineered Fill, provided they are cleansed of excessive organics, debris, and moisture-conditioned to at least 2 percent above optimum moisture. It is recommended that additional testing be performed on the on-site soils and fill material to evaluate the physical and index properties prior to reuse as Engineered Fill. 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.

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 Non-Expansive 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 of 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.

FILL PLACEMENT

Prior to placement of fill soils, the upper 6 inches of native soils should be scarified, moisture-conditioned to at least optimum moisture content, and recompacted to a minimum of 90 percent of the maximum dry density based on ASTM D1557 Test Method.

The upper soils, during wet winter months, may 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.

Foundations - Conventional

The proposed structures may be supported on a shallow foundation system bearing on a minimum of four (4) 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	1,800 psf
Dead-Plus-Live Load	2,400 psf
Total Load, including wind or seismic loads	3,200 psf

The footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Minimum footing widths should be 15 inches for continuous footings and 24 inches for isolated footings. The footing excavations should not be allowed to dry out any time prior to pouring concrete.

It is recommended that the foundation for the proposed structure be placed entirely within compacted fill materials or entirely within alluvium or bedrock. Footings shall not transition from one bearing material to another. It is recommended that all foundations contain steel reinforcement of at least four (4) number four (#4) bars, two (2) top and two (2) bottom. Final foundations designs should be determined by the project structural engineer.

It is recommended that all foundations be set back a minimum of five (5) feet from the top of all adjacent slopes or deepened to maintain at least five (5) feet between the bottom of the footing and the slope face.

Additionally, all footing set back criteria, should conform to 2022 CBC Section 1805.3.2 and Figure 1805.3.1. It is recommended that all footings be cleared of all loose soil and construction debris prior to pouring concrete.

The total static soil movement is not expected to exceed 1 inch. Differential static movement measured across a horizontal distance of 30 feet should be less than ½ inch. The total seismic-induced settlement is not expected to exceed 2.69 inches. Differential settlement caused by a seismic event is estimated to be less than 1.78 inch. The anticipated differential seismic settlement is estimated over a distance of 100 feet.

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.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.25 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 200 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. All of the above earth pressures are unfactored and are, therefore, not inclusive of factors of safety.

Settlement

The total static soil movement is not expected to exceed 1 inch. Differential static movement measured across a horizontal distance of 30 feet should be less than ½ inch. The total seismic-induced settlement is not expected to exceed 2.69 inches. Differential settlement caused by a seismic event is estimated to be less than 1.78 inch. The anticipated differential seismic settlement is estimated over a distance of 100 feet.

Lateral Load Resistance

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.25 acting between the base of foundations and the supporting subgrade. Where a vapor barrier material is used below concrete slabs-on-grade, a coefficient of friction should be provided by the vapor barrier manufacturer. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 200 pounds per cubic foot acting against the appropriate vertical footing faces. Where equivalent fluid pressure against the sides of the footings or embedded slab edge are to be used, the footing or slab edge must be cast directly against undisturbed soils or the soils surrounding the structure must be recompacted to the requirements for Engineered Fill presented above. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A one-third increase in the value above may be used for short duration, wind, or seismic loads.

Structural Mat Foundations

The proposed structures may be supported on a thick mat foundation system, bearing on a minimum of four (4) feet of Engineered Fill. The mat foundations may be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Soil Bearing Capacity
Dead Load Only	1,000 psf
Dead-Plus-Live Load	1,350 psf
Total Load, including wind or seismic loads	1,800 psf

The total settlement of the mat is not expected to exceed 1 inch. The differential movement should be less than 1 inch. The mat should have a minimum thickness of 12 inches. Reinforcement of the mat should be designed by the project's Structural Engineer.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.25 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 200 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.

The potential for structural damage as a result of differential settlement due to the potential effects of soil consolidation associated with applied structural loads can be reduced by supporting the building or equipment on a very stiff structural mat-slab foundation. Structural mat foundations should be designed to distribute the building loads uniformly onto the supporting subgrade. By designing a relatively stiff mat, the settlement of the structure will be relatively uniform. The foundation should be designed to be sufficiently rigid to prevent the introduction of excess stresses in the superstructure above the foundation.

The use of a sufficiently stiff to rigid structural mat-slab foundation will mitigate abrupt differential settlement but will not negate building settlement (total settlement). Where both total and differential settlements of the structure are to be fully mitigated a deep foundation system or extensive ground improvement would be required.

Support of structures with a mat-slab foundation is a method used to aid in controlling differential settlement of structures over weak soils. The foundation distributes high point loads and line loads over a much broader area resulting in significantly reduced stresses and a more uniform loading condition over the building area. This reduces the differential settlement of walls and columns that would be expected when supported by dissimilarly loaded footings and footings of differing sizes, and can result in less total settlement of the superstructure when supported by the structural slab. The slab also provides increase confinement for sands below the surface reducing the potential for abrupt loss of support of foundation elements due to sand boils where shallow liquefiable sands are present.

The slab foundation should be designed to resist both bending and punching shear associated with the structural loads and design live loads. With the potential for arching or bending of the slab foundation to occur as a result of differential settlement, we recommend that the slab be designed to span over localized areas of settlement and to act as a cantilevered beam to support the perimeter of the building should localized settlement occur in areas of the perimeter.

For preliminary purposes, an allowable bearing pressure of 1,000 pounds per square foot may be used for design of the slab. For preliminary modeling purposes a vertical modulus of subgrade reaction (Kv1), also referred to as a soil spring, of 30 pounds per square inch per inch may be used for long term conditions. An increased modulus of 40 pounds per square inch per inch may be used for short term loading to evaluate punching shear at columns and walls. The slab design should ultimately limit slab bending or arching in the lightly loaded mid-slab areas between load bearing columns and walls. Based on the preliminary nature of the project design and a lack of formal design documents, these values should be considered preliminary and should be reevaluated during final design. The values should be reevaluated in order to determine soil support values appropriate for the actual design conditions.

FLOOR SLABS AND EXTERIOR FLATWORK

The interior slabs on grade should be designed at least five inches (5") in thickness. It is recommended that the slabs be reinforced with at least number three (#3) bars, eighteen inches (18") on center in both directions.

Exterior slabs-on-grade should be designed at least five inches (5") in thickness. It is recommended that the slabs should be reinforced with at least number three (#3) bars, eighteen inches (18") on center in both directions. Exterior floors should be poured separately in order to act independently of the walls and foundation system. All fills required to bring the building pads to grade should be Engineered Fills.

It is recommended that the slabs be underlain by six (6) inches of compacted aggregate base with a minimum 15 mil polyolefin membrane vapor barrier (i.e. Stego Wrap or equivalent) placed with two inches (2") of clean sand on top of the vapor barrier.

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 minimize moisture vapor intrusion, it is recommended that a vapor barrier be installed in accordance with ASTM guidelines. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize 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.

RETAINING WALLS

For retaining walls with level ground surface behind the walls, we recommend that retaining walls capable of deflecting a minimum of 0.1 percent of its height at the top be designed using an equivalent fluid active pressure of 42 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 62 pounds per square foot per foot of depth. This is anticipated to apply to the loading dock walls. A passive lateral pressure of 200 pounds per square foot may be used to calculate sliding resistance. If walls are to be constructed above descending slopes, our office should be contacted to discuss further reduction in allowable passive pressures for resistance of lateral forces, and for overall retaining wall foundation design.

The surcharge effect from loads adjacent to the walls should be included in the wall design. The surcharge load for walls capable of deflecting (cantilever walls), we recommend applying a uniform surcharge pressure equal to one-third of the applied load over the full height of the wall. Where walls are restrained the surcharge load should be based on one-half of the applied load above the wall, also distributed over the full height of the wall. For other surcharges, such as from adjacent foundations, point loads or line loads, Krazan & Associates should be consulted.

Expansive soils should not be used for backfill against walls. The zone of non-expansive backfill material should extend from the bottom of each retaining wall laterally back a distance equal to the height of the wall, to a maximum of five (5) feet.

The active and at-rest earth pressures do not include hydrostatic pressures. To reduce the build-up of hydrostatic pressures, drainage should be provided behind the retaining walls. Wall drain should consist of a minimum 12-inch wide zone of drainage material, such as ¾-inch by ½-inch drain rock wrapped in a non-woven polypropylene geotextile filter fabric such as Mirafi 140N or equivalent. Alternatively, drainage may be provided by the placement of a commercially produced composite drainage blanket, such as Miradrain, extending continuously up from the base of the wall. The drainage material should extend from the base of the wall to finished subgrade in paved areas and to within about 12 inches below the top of the wall in landscape areas. In landscape areas the top 12 inches should be backfilled with compacted native soil. A 4-inch minimum diameter, perforated, Schedule 40 PVC drain pipe should be placed with holes facing down in the lower portion of the wall drainage material, surrounded with drain rock wrapped in filter fabric. A solid drainpipe leading to a suitable discharge point should provide drainage outlet. As an alternative, weep holes may be used to provide drainage. If weep holes are used, the weep holes should be 3 inches in diameter and spaced about 8 feet on centers. The backside of the weep holes should be covered with a corrosion-resistant mesh to prevent loss of backfill and/or drainage material.

TEMPORARY EXCAVATION STABILITY

All excavations should comply with the current requirements of Occupational Safety and Health Administration (OSHA). All cuts greater than 5 feet in depth should be sloped or shored. Temporary excavations should be sloped at 1:1 (horizontal to vertical) or flatter, up to a maximum depth of 10 feet, and at 2:1 (horizontal to vertical) for cuts greater than 10 feet. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within five feet of the top (edge) of the excavation. Where sloped excavations are not feasible due to site constraints, the excavations may require shoring. The design of the shoring system is normally the responsibility of the contractor or shoring designer, and therefore, is outside the scope of this report. The design of the temporary shoring should take into account lateral pressures exerted by the adjacent soil, and, where anticipated, surcharge loads due to adjacent buildings and any construction equipment or traffic expected to operate alongside the excavation.

The excavation/shoring recommendations provided herein are based on soil characteristics derived from our test borings within the area. Variations in soil conditions will likely be encountered during the excavations. Krazan & Associates, Inc. should be afforded the opportunity to provide field review to evaluate the actual conditions and account for field condition variations, not otherwise anticipated in the preparation of this recommendation.

Local building codes may restrict vertical cuts or shoring types used during construction. This may include limitations adjacent to existing improvements or public right of ways.

UTILITY TRENCH LOCATION, CONSTRUCTION AND BACKFILL

To maintain the desired support for existing or new foundations, new utility trenches should be located such that the base of the trench excavation is located above an imaginary plane having an inclination of 1.0 horizontal to 1.0 vertical, extending downward from the bottom edge of the adjacent footing.

Utility trenches should be excavated according to accepted engineering practices following OSHA 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 kept to a minimum; 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. For purposes of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe; bedding and shading (also referred to as initial backfill) is all material placed in a trench below the backfill. With the exception of specific requirements of the local utility companies or building department, pipe bedding and shading should consist of clean medium-grained sand. The sand should be placed in a damp state and should be compacted by mechanical means prior to the placement of backfill soils. Above the pipe zone, underground utility trenches may be backfilled with either free-draining sand, on-site soil or imported soil. The trench backfill should be compacted to at least 95 percent relative compaction.

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 solely used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent on the moisture-content and the stability of that material. The Geotechnical Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be too dry or excessively wet, 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 in-situ moisture-content significantly less than optimum moisture. Where expansive soils are present, heaving of the soils may occur with the introduction of water. Where the material is a lean clay or silt, this type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

SURFACE 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 of the 2022 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.

Slots or weep holes should be placed in drop inlets or other surface drainage devices in pavement areas to allow free drainage of adjoining base course materials. Cutoff walls should be installed at pavement edges adjacent to vehicular traffic areas; these walls should extend to a minimum depth of 12 inches below pavement subgrades to limit the amount of seepage water that can infiltrate the pavements. Where cutoff walls are undesirable subgrade drains can be constructed to transport excess water away from planters to drainage interceptors. If cutoff walls can be successfully used at the site, construction of subgrade drains is considered unnecessary.

PAVEMENT DESIGN

Based on the established standard practice of designing flexible pavements in accordance with State of California Department of Transportation (Caltrans) for projects within California, we have developed pavement sections in accordance with the procedure presented in Caltrans Standard Test Method 301. This pavement design procedure is based on the volume of traffic (Traffic Index) and the soil resistance "R" value (R-Value).

Asphalt Concrete (Flexible) Pavements

One (1) near-surface soil sample was obtained from the soil borings at the project site for laboratory R-Value testing. The sample was tested in accordance with California Test 301. Results of the test are as follows:

R-VALUE TEST RESULTS			
Sample Number	**Sample Depth (ft)**	**Description**	**R-Value at Equilibrium**
RV #1	0-5'	Silty Sand (SM)	37

The Civil Engineer should consult with the client to confirm the truck count prior to assigning the Traffic Index and selecting the pavement sections for incorporation into the project plans.

Based on our understanding of the project specifications, a Traffic Index of 5.5 has been used for design of pavements for automobile parking lots and drive lanes.

Based on a review of the boring logs and the R-Value data presented above, the near surface soil of the site consists of silty sand with an R-Value of 37. If site grading exposes soil other than that assumed, we should perform additional tests to confirm or revise the recommended pavement sections for actual field conditions. The following table shows the recommended pavement section for a Traffic Index of 5.5.

ASPHALT CONCRETE (FLEXIBLE) PAVEMENTS Subgrade R-Value = 60				
Traffic / Pavement Designation	**Traffic Index**	**Asphalt Concrete (inches)**	**Class 2 Aggregate Base (inches)**	**Depth of Compacted Subgrade (in)**
STANDARD DUTY	**5.5**	4.0	4.0	12.0

We recommend that the subgrade soil be prepared as discussed in this report. The compacted subgrade should be non-yielding when proof-rolled with a loaded ten-wheel truck, such as a water truck or dump truck, prior to pavement construction. Subgrade preparation should extend a minimum of 2 feet laterally behind the edge of pavement or back of curbs.

Pavement areas should be sloped and drainage gradients maintained to carry all surface water off the site. A cross slope of 2 percent is recommended in asphalt concrete pavement areas to provide good surface drainage and to reduce the potential for water to penetrate into the pavement structure.

Unless otherwise required by local jurisdictions, paving materials should comply with the materials specifications presented in the Caltrans Standard Specifications Section. Class 2 aggregate should comply with the materials requirements for Class 2 base found in Section 26.

The mineral aggregate shall be Type B, ½-inch or ¾-inch maximum, medium grading, for the wearing course and ¾-inch maximum, medium grading for the base course, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The asphalt concrete materials should comply with and be placed in accordance with the specifications presented in Section 39 of the Caltrans Standard Specifications, latest edition. Asphalt concrete should be compacted to a minimum of 96 percent of the maximum laboratory compacted (kneading compactor) unit weight.

ASTM Test procedures and should be used to assess the percent relative compaction of soils, aggregate base and asphalt concrete. Aggregate base and subbase, and the upper 12 inches of subgrade should be compacted to at least 95 percent based on the Modified Proctor maximum compacted unit weight obtained in accordance with ASTM Test Method D1557. Compacted aggregate base should also be stable and unyielding when proof-rolled with a loaded ten-wheel water truck or dump truck.

Portland Cement Concrete (Rigid) Pavement

A six-inch layer of compacted Class 2 Aggregate Base should be placed over the prepared subgrade prior to placement of the concrete. Based on soil conditions and project specifications, we recommend that the rigid pavement be a minimum of five (5) inches thick. The final rigid pavement design and section should be determined by the project Structural Engineer.

RIGID PAVEMENT			
Traffic/Pavement Designation	**Portland Cement Concrete (inches)**	**Class 2 Aggregate Base (inches)**	**Compacted Subgrade (inches)**
Standard Duty	5.0	6.5	12.0

Prior to the construction of any rigid pavement, we recommend that concrete mix histories with flexural strength data be obtained from the proposed supplier. In the absence of flexural strength history, we recommend that laboratory trial batching and testing be performed to allow for confirmation that the proposed concrete mix is capable of producing the required flexural strength.

The concrete pavements should be designed with both longitudinal and transverse joints. The saw-cut or formed joints should extend to a minimum depth on one-fourth of the pavement thickness plus ¼ inch. Joint spacing should not exceed 15 feet. Steel reinforcement of all rigid pavements is recommended to keep the joints tight and to control temperature cracking.

Keyed joints are recommended at all construction joints to transfer loads across the joints. Joints should be reinforced with a minimum of ½ inch diameter by 48-inch long deformed reinforcing steel placed at mid-slab depth on 18-inch center-to-center spacing to keep the joints tight for load transfer. The joints should be filled with a flexible sealer. Expansion joints should be constructed only where the pavements abut structures or fixed objects.

Smooth bar dowels, with a diameter of d/8, where d equals the thickness of the concrete, at least 14 inches in length, placed at a spacing of 12 inches on centers, may also be considered for construction joints to transfer loads across the joints. The dowels should be centered across the joints with one side of the dowel lubricated to reduce the bond strength between the dowel and the concrete and fitted with a plastic cap to allow for bar expansion.

INFILTRATION TESTING

The shallow soil conditions present at the subject site were evaluated by drilling a total of two (2) shallow borings in the vicinity of the infiltration test. The borings drilled at the site indicated the subsurface soil conditions consisted of medium dense silty sand. The proposed infiltration system is understood to be located in landscaped areas or the proposed drive and parking areas. The proposed infiltration system is expected to be located a minimum of ten (10) feet from any proposed foundation elements. Based on the location of the proposed infiltration system, adverse impact to adjacent structures and proposed improvements is not anticipated.

In order to perform the infiltration tests, borings were drilled to depths on the order of seven feet below site grades. Infiltration testing has been performed at each of the boring locations. Infiltration testing has been performed using the Borehole Percolation Testing Procedures described in the County of Los Angeles Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration. A total of two (2) infiltration tests were performed at the subject site. All two (2) tests were performed at a depth of approximately 10 feet below site grades.

Infiltration testing was performed using casing screened to a level of approximately two feet above the anticipated invert depth. Infiltration testing has been performed using the Borehole Percolation Testing Procedures described in the County of Los Angeles Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration.

Prior to infiltration testing, the borehole was pre-soaked using clean water. Following presaturation and draining, the borehole was refilled and measured at 30-minute increments. The water level at each interval was measured using a water level indicator. The depth of the borehole was measured to verify the overall depth below site grades following each reading.

The estimated infiltration rate was determined using the results of open Borehole Percolation Testing Procedures at two (2) locations at the subject site. The following reduction factors are recommended and have been utilized in determining the recommended design infiltration rate:

- RFt = Boring Percolation Procedure = 2
- RFv = Variability, Tests, Thoroughness = 2
- RFs = Long Term Siltation, Plugging, and Maintenance = 2
- Total Reduction Factor = 6

The average infiltration rates at the end of the tests indicated a factored infiltration rate of approximately 0.34 and 0.43 inch per hour at a depth of approximately 10 feet below current site grades. Detailed results of the infiltration testing are included as an attachment to this report. 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 and siltation.

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’) from 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 CORROSIVITY

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. ACI 318-19 has developed a 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 concentrations detected from these soil samples were 127 ppm, which classifies this material as Class S0 based on the ACI 318-19, Table 19.3.1.1. Therefore, no specific recommendations for concrete mixes are warranted relative to sulfate concentrations in the soil.

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

ADDITIONAL SERVICES

Krazan & Associates should be retained to review your final foundation and grading plans, and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings with respect to the recommendations presented in this report prior to the start of construction.

Variations in soil types and conditions are possible and may be encountered during construction. In order to permit correlation between the soil data obtained during this investigation and the actual soil conditions encountered during construction, a representative of Krazan & Associates, Inc. should be present at the site during the earthwork and foundation construction activities to confirm that actual subsurface conditions are consistent with those contemplated in our development of this report. This will allow us the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to expedite supplemental recommendations if warranted by the exposed conditions. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

All earthworks should be performed in accordance with the recommendations presented in this report, or as recommended by Krazan & Associates during construction. Krazan & Associates should be notified at least five working days prior to the start of construction and at least two days prior to when observation and testing services are needed. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

The review of plans and specifications, and the observation and testing of earthwork related construction activities by Krazan & Associates are important elements of our services if we are to remain in the role of Geotechnical Engineer-Of-Record. If Krazan & Associates is not retained for these services, the client and the consultants providing these services will be assuming our responsibility for any potential claims that may arise during or after construction.

LIMITATIONS

Geotechnical 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 appropriate and current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Geotechnical Engineering, physical changes in the site due to site clearing or grading activities, new agency regulations, or possible changes in the proposed structure or development after issuance of this report will result in the need for professional review of this report. Updating or revisions to the recommendations report, and possibly additional study of the site may be required at that time. 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 two years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is 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. The logs of the exploratory borings do not provide a warranty as to the conditions that may exist beneath the entire site. The extent and nature of subsurface soil and groundwater variations may not become evident until construction begins. It is possible that variations in soil conditions and depth to groundwater could exist beyond the points of exploration that may require additional studies, consultation, and possible design revisions. If conditions are encountered in the field during construction, which differ from those described in this report, our firm should be contacted immediately to provide any necessary revisions to these recommendations.

This report presents the results of our Geotechnical Engineering Investigation, which was conducted for the purpose of evaluating the soil conditions in terms of foundation and retaining wall design, and grading and paving of the site. This report does not include reporting of any services related to environmental studies conducted to assessment the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere, or the presence of wetlands. Any 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 professional judgment regarding the presence of potentially hazardous or toxic substances. Conversely, the absence of statements in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, does not constitute our rendering professional judgment regarding the absence of potentially hazardous or toxics substances.

The conclusions of this report are based on the information provided regarding the proposed construction. We emphasize that this report is valid for the project as described in the text of this report and it should not be used for any other sites or projects. The geotechnical engineering information presented herein is based upon our understanding of the proposed project and professional interpretation of the data obtained in our studies of the site. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. The Geotechnical Engineer should be notified of any changes to the proposed project so the recommendations may be reviewed and re-evaluated. The work conducted through the course of this investigation, including the preparation of this report, has been performed in accordance with the generally accepted standards of geotechnical engineering practice, which existed in geographic area of the project at the time the report was written. No other warranty, express or implied, is made. This report is issued with the understanding that the owner chooses the risk they wish to bear by the expenditures involved with the construction alternatives and scheduling that are chosen. 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.

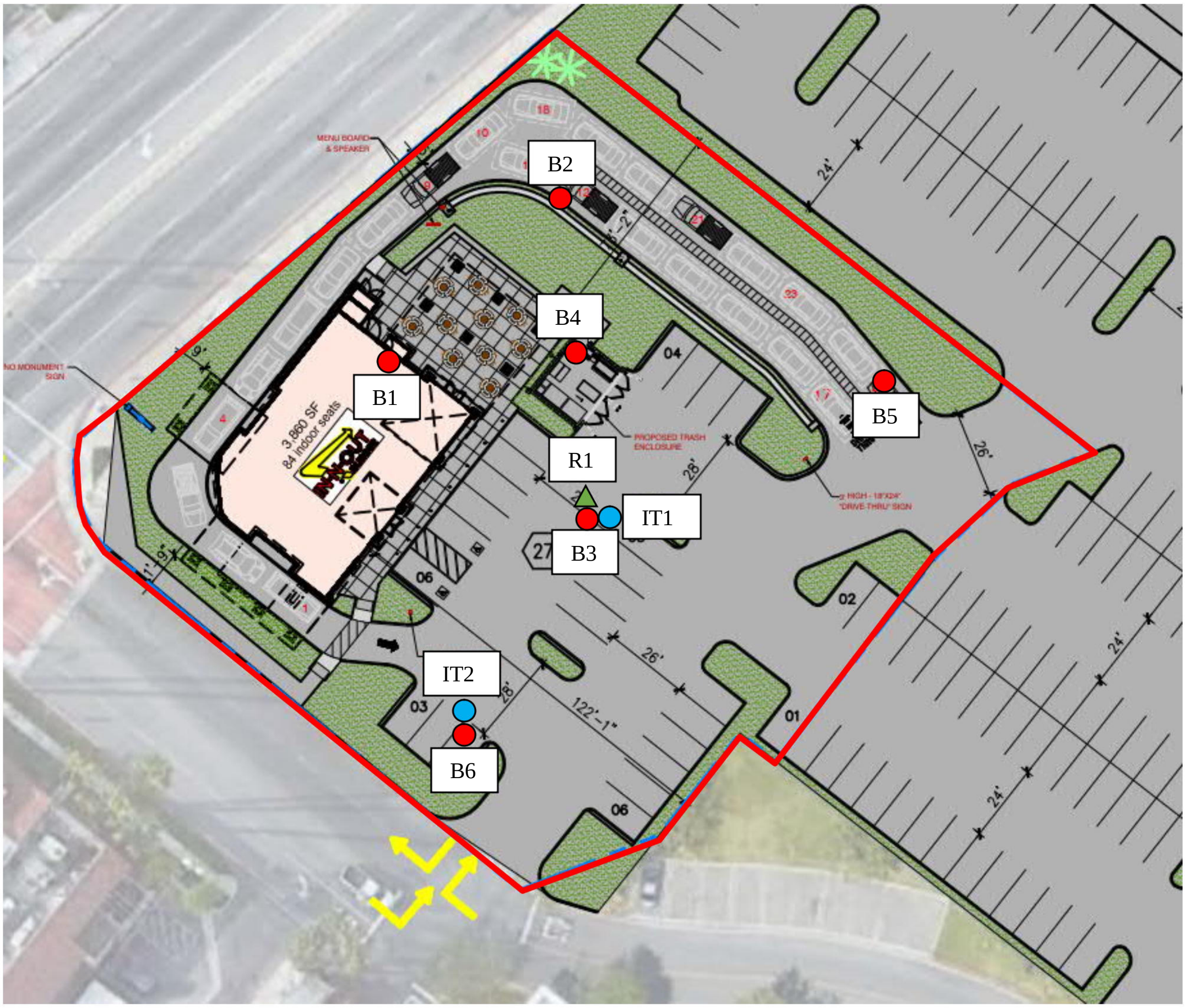
Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Jorge A Pelayo

REGISTERED PROFESSIONAL ENGINEER
JORGE A. PELAYO
91269
CIVIL
STATE OF CALIFORNIA

Jorge A. Pelayo, MS, PE
Project Engineer
RCE No. 91269

Figures



🔴 APPROXIMATE BORING LOCATION

▲ APPROXIMATE R-VALUE LOCATION

🔵 APPROXIMATE INFILTRATION TEST LOCATION

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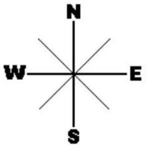
SITE MAP	**Scale:** NTS	**Date:** Jul., 2022	Krazan GEOTECHNICAL ENGINEERING
PROPOSED IN-N-OUT BURGER RESTAURANT **3600 PECK ROAD** **EL MONTE, CALIFORNIA**	**Drawn by:** OS	**Approved by:** JP	
	Project No. 112-23055	**Figure No.** 1	

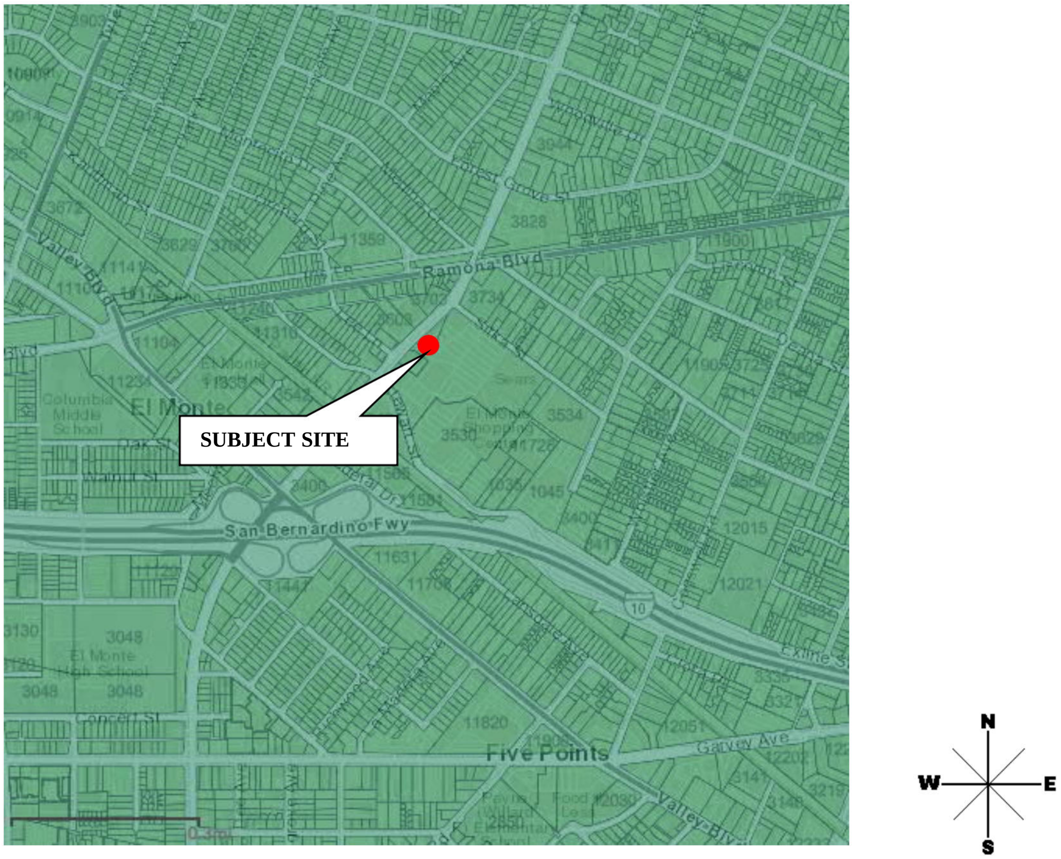


VICINITY MAP

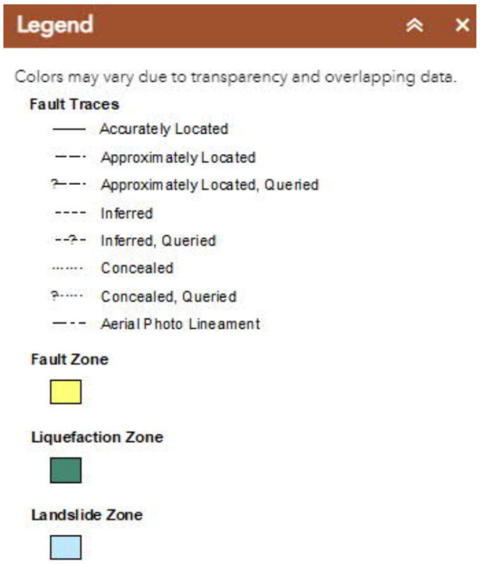
PROPOSED IN-N-OUT BURGER RESTAURANT
3600 PECK ROAD
EL MONTE, CALIFORNIA

Scale: As Shown	**Date:** Jul., 2022
Drawn by: OS	**Approved by:** JP
Project No. 112-23055	**Figure No.** 2

Krazan
GEOTECHNICAL ENGINEERING



SUBJECT SITE



Colors may vary due to transparency and overlapping data.

Fault Traces

- —— Accurately Located
- — — Approximately Located
- ?— — Approximately Located, Queried
- - - - Inferred
- - -?- Inferred, Queried
- ······ Concealed
- ?····· Concealed, Queried
- — - - Aerial Photo Lineament

Fault Zone

🟨

Liquefaction Zone

🟩

Landslide Zone

🟦

Source: State of California Earthquake Zones of Required Investigation Map, El Monte Quadrangle

EARTHQUAKE ZONES OF REQUIRED INVESTIGATION MAP	**Scale:** As Shown	**Date:** Jul., 2022	Krazan **GEOTECHNICAL ENGINEERING**
PROPOSED IN-N-OUT BURGER RESTAURANT **3600 PECK ROAD** **EL MONTE, CALIFORNIA**	**Drawn by:** OS	**Approved by:** JP	
	Project No. 112-23055	**Figure No.** 3	

Source: State of California Seismic Hazards Report, El Monte Quadrangle

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W E
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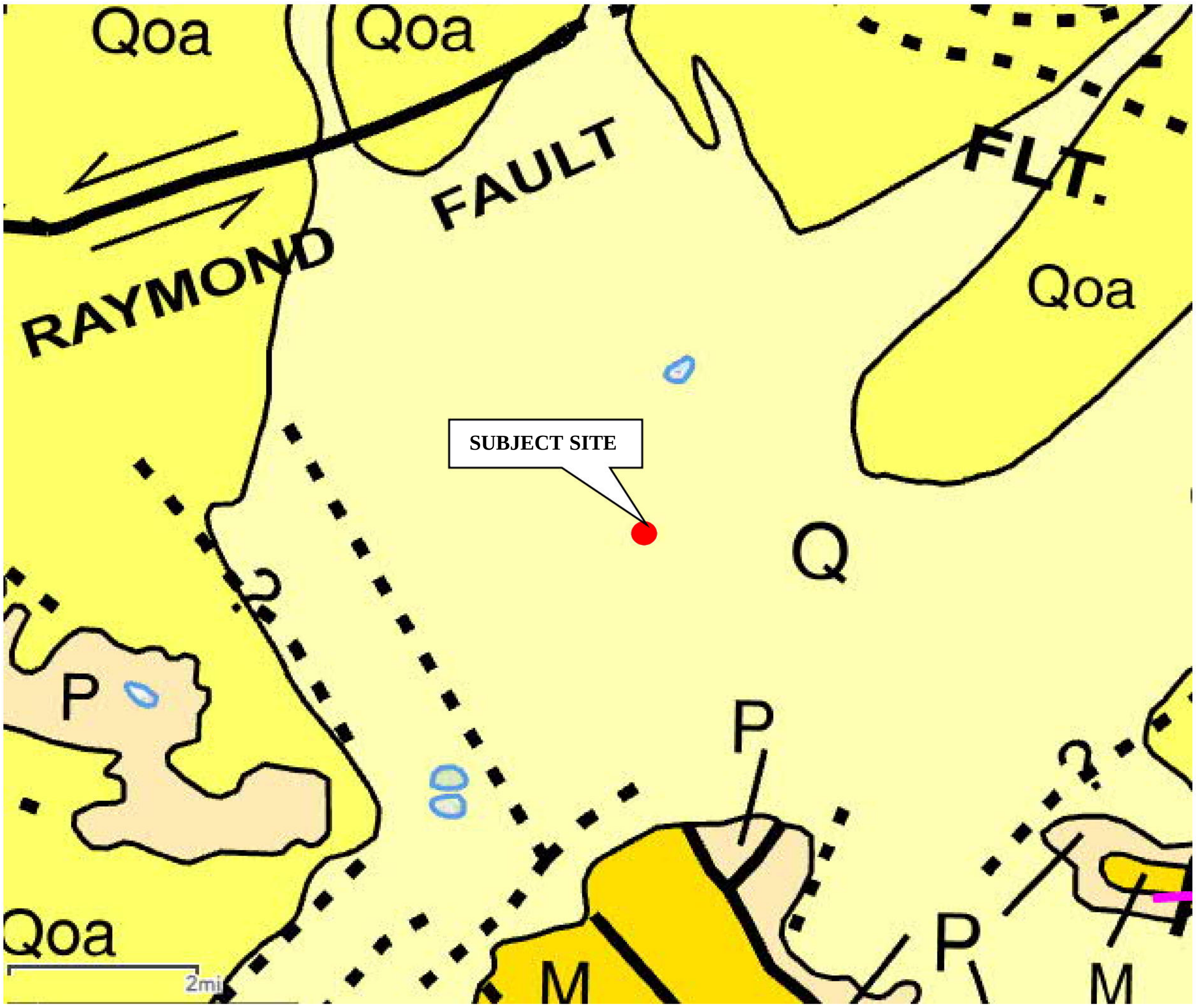
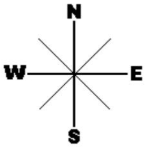
HISTORICAL GROUNDWATER MAP	**Scale:** NTS	**Date:** Jul., 2022	**Krazan** **GEOTECHNICAL ENGINEERING**
PROPOSED IN-N-OUT BURGER RESTAURANT **3600 PECK ROAD** **EL MONTE, CALIFORNIA**	**Drawn by:** OS	**Approved by:** JP	
	Project No. 112-23055	**Figure No.** 4	



Generalized Rock Types: Q

General Lithology	marine and nonmarine (continental) sedimentary rocks
Age	Pleistocene-Holocene
Description	Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated. Mostly nonmarine, but includes marine deposits near the coast.



Source: CGS Geologic Map of California, 2015

GEOLOGIC MAP

PROPOSED IN-N-OUT BURGER RESTAURANT
3600 PECK ROAD
EL MONTE, CALIFORNIA

Scale: As Shown
Date: Jul., 2022
Drawn by: OS
Approved by: JP
Project No. 112-23055
Figure No. 5

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Log of Borings
&
Laboratory Testing

Appendix A

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

Our field investigation consisted of a surface reconnaissance and a subsurface exploration program consisted of drilling, logging and sampling a total of six (6) borings. The depth of exploration was approximately 10 to 50 feet below the existing site surface.

A member of our staff visually classified the soils in the field as the drilling progressed and recorded a continuous log of each boring. Visual classification of the soils encountered in our exploratory borings was made in general accordance with the Unified Soil Classification System (ASTM D2487). A key for the classification of the soil and the boring logs are presented in this Appendix.

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 subsoils. Samples were obtained from the borings by driving either a 2.5-inch inside diameter Modified California tube sampler fitted with brass sleeves or a 2-inch outside diameter, 1-3/8-inch inside diameter Standard Penetration ("split-spoon") test (SPT) sampler without sleeves. Soil samples were retained for possible laboratory testing. The samplers were driven up to a depth of 18 inches into the underlying soil using a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler was recorded for each 6-inch penetration interval and the number of blows required to drive the sampler the last 12 inches are shown as blows per foot on the boring logs.

The approximate locations of our borings and bulk samples are shown on the Site Plan, Figure 2. These approximate locations were estimated in the field based on pacing and measuring from the limits of existing site features.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the soil underlying the site. The laboratory-testing program was formulated with emphasis on the evaluation of in-situ moisture, density, gradation, shear strength, consolidation potential, and R-Value of the materials encountered. In addition, chemical tests were performed to evaluate the soil/cement reactivity and corrosivity. Test results were used in our engineering analysis with respect to site and building pad preparation through mass grading activities, foundation and retaining wall design recommendations, pavement section design, evaluation of the materials as possible fill materials and for possible exclusion of some soils from use at the structures as fill or backfill.

Select laboratory test results are presented on the boring logs, with graphic or tabulated results of selected tests included in this Appendix. The laboratory test data, along with the field observations, was used to prepare the final boring logs presented in the Appendix.

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

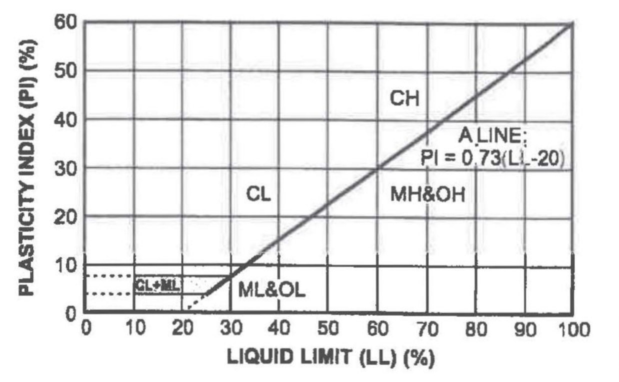
CONSISTENCY CLASSIFICATION

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



■ California Modified Split Spoon Sampler

◪ Standard Penetration Split Spoon Sampler

Log of Boring B1

Project: INO El Monte

Project No: 112-23055

Client: In-N-Out Burger, a California Corporation

Figure No.: A-1

Location: 1600 Peck Road, El Monte, CA

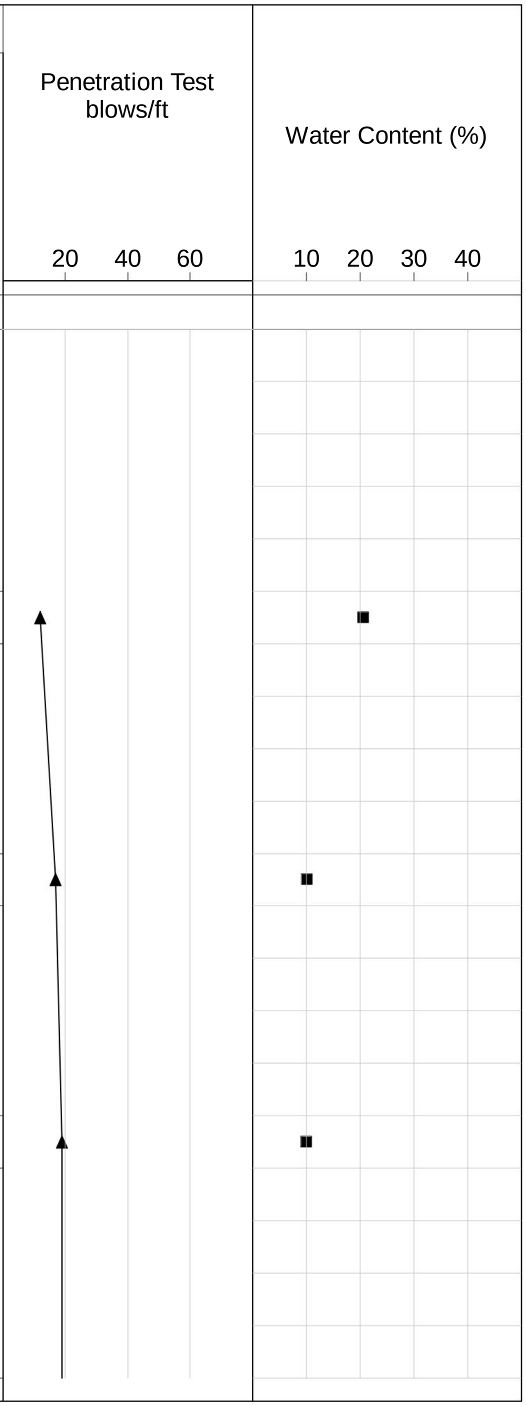
Logged By: Gabriel Ramirez

Depth to Water> Not encoutered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		ASPHALT PAVING = 3.5 INCHES BASE = 6.0 INCHES				
	▨	***FILL; SANDY CLAY (CL)*** Stiff; dark brown, moist, drills easily				
			100.2	20.7	■	12
6	▥	***SILTY SAND (SM)*** Medium dense, fine-grained; dark brown, moist, drills easily				
10			111.7	10.2	■	17
				10.1	◪	19
	░					
20					◪	



Drill Method: Hollow Stem

Drill Date: 6-5-23

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8 Inches

Driller: One Way Drilling

Elevation: 50 Feet

Sheet: 1 of 3

Log of Boring B1

Project: INO El Monte

Project No: 112-23055

Client: In-N-Out Burger, a California Corporation

Figure No.: A-1

Location: 1600 Peck Road, El Monte, CA

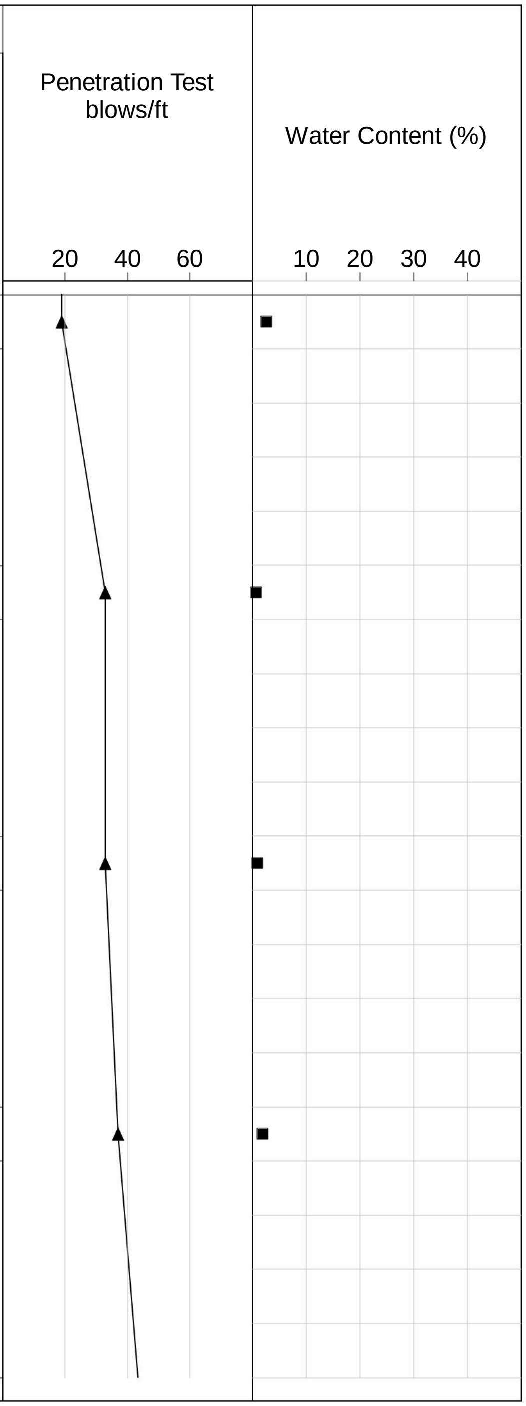
Logged By: Gabriel Ramirez

Depth to Water> Not encoutered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
	▨	***POORLY-GRADED SAND (SP)*** Medium dense, medium to fine-grained; light brown, damp, drills easily		2.7	◢	19
22	▨					
	▨	***GRAVELLY SAND (SP)*** Dense, Coarse to medium-grained; light brown, damp, drills firmly				
24	▨					
	▨			0.8	◢	33
26	▨					
28	▨					
30	▨					
	▨			1.0	◢	33
32	▨					
34	▨					
	▨			2.0	◢	37
36	▨					
38	▨					
40	▨					
					◢	



Drill Method: Hollow Stem

Drill Date: 6-5-23

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8 Inches

Driller: One Way Drilling

Elevation: 50 Feet

Sheet: 2 of 3

Log of Boring B1

Project: INO El Monte

Project No: 112-23055

Client: In-N-Out Burger, a California Corporation

Figure No.: A-1

Location: 1600 Peck Road, El Monte, CA

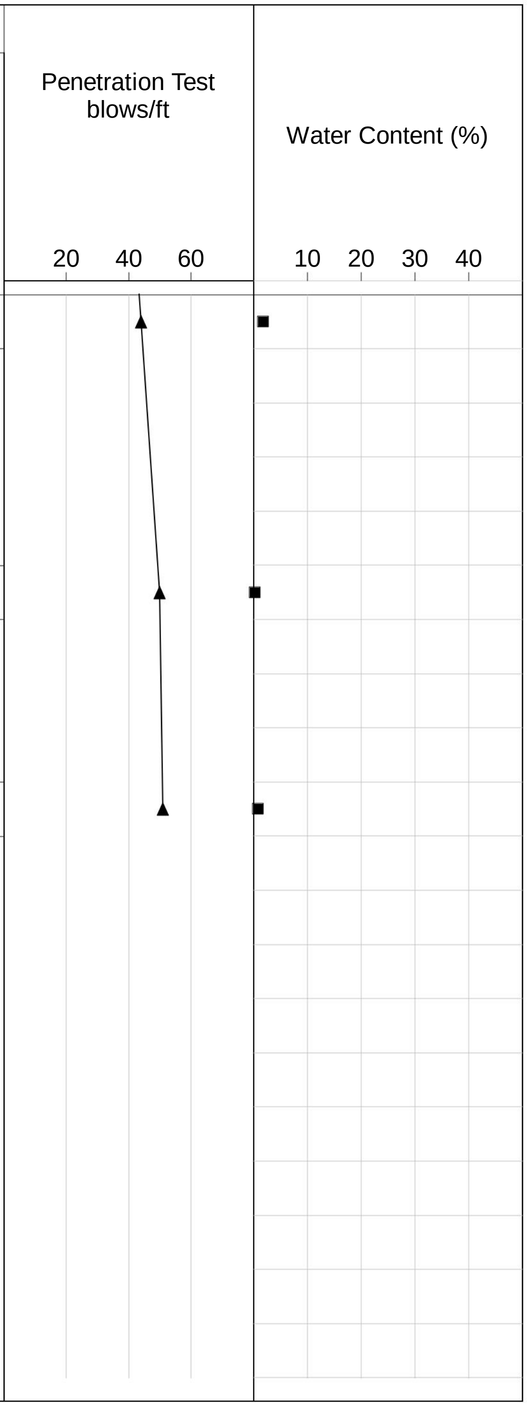
Logged By: Gabriel Ramirez

Depth to Water> Not encoutered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
	▨	***POORLY-GRADED SAND (SP)*** Dense, medium-grained; light brown, damp, drills firmly		1.6	◢	44
42	▨					
44	▨	***GRAVELLY SAND (SP)*** Very dense, medium to fine-grained; light brown, damp, drills firmly				
	▨			0.3	◢	50
46	▨					
48	▨					
	▨			0.9	◢	51
50		End of Borehole Water not encountered Backfilled with soil cuttings				
52						
54						
56						
58						
60						



Drill Method: Hollow Stem

Drill Rig: CME 75

Driller: One Way Drilling

Krazan and Associates

Drill Date: 6-5-23

Hole Size: 8 Inches

Elevation: 50 Feet

Sheet: 3 of 3

Log of Boring B2

Project: INO El Monte
Project No: 112-23055

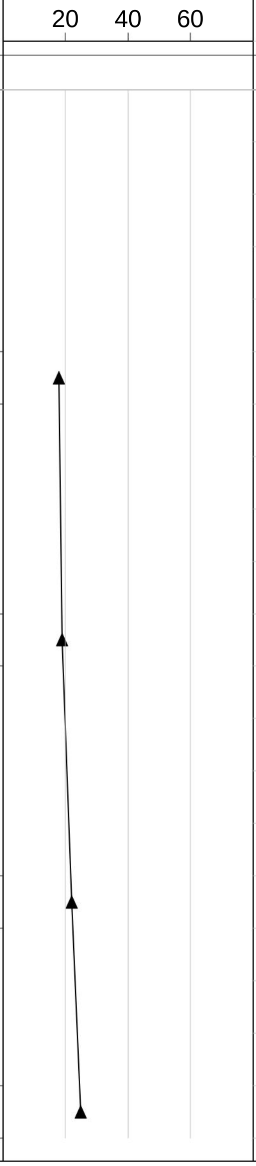
Client: In-N-Out Burger, a California Corporation
Figure No.: A-2

Location: 1600 Peck Road, El Monte, CA
Logged By: Gabriel Ramirez

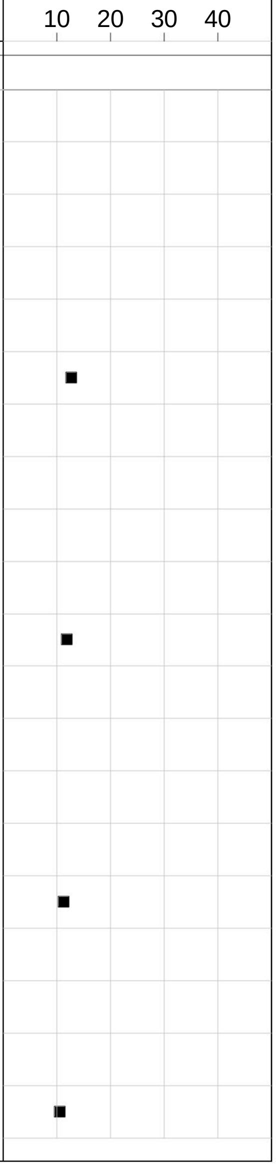
Depth to Water> Not encoutered
Initial: N/A
At Completion: N/A

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		ASPHALT PAVING = 4.0 INCHES BASE = 6.0 INCHES				
2	▨	***FILL; SANDY CLAY (CL)*** Stiff; dark brown, moist, drills easily				
4	▥	***SILTY SAND (SM)*** Medium dense, fine-grained; dark brown, moist, drills easily				
6	▥		104.6	12.8	■	18
10	▥		113.5	12.0	■	19
16	▥			11.4	◪	22
18	▥	Water not encountered Backfilled with soil cuttings		10.7	◪	25
20						

Penetration Test blows/ft



Water Content (%)



Drill Method: Hollow Stem
Drill Date: 6-5-23

Drill Rig: CME 75
Hole Size: 8 Inches

Driller: One Way Drilling
Elevation: 20 Feet

Krazan and Associates

Sheet: 1 of 1

Log of Boring B3

Project: INO El Monte

Project No: 112-23055

Client: In-N-Out Burger, a California Corporation

Figure No.: A-3

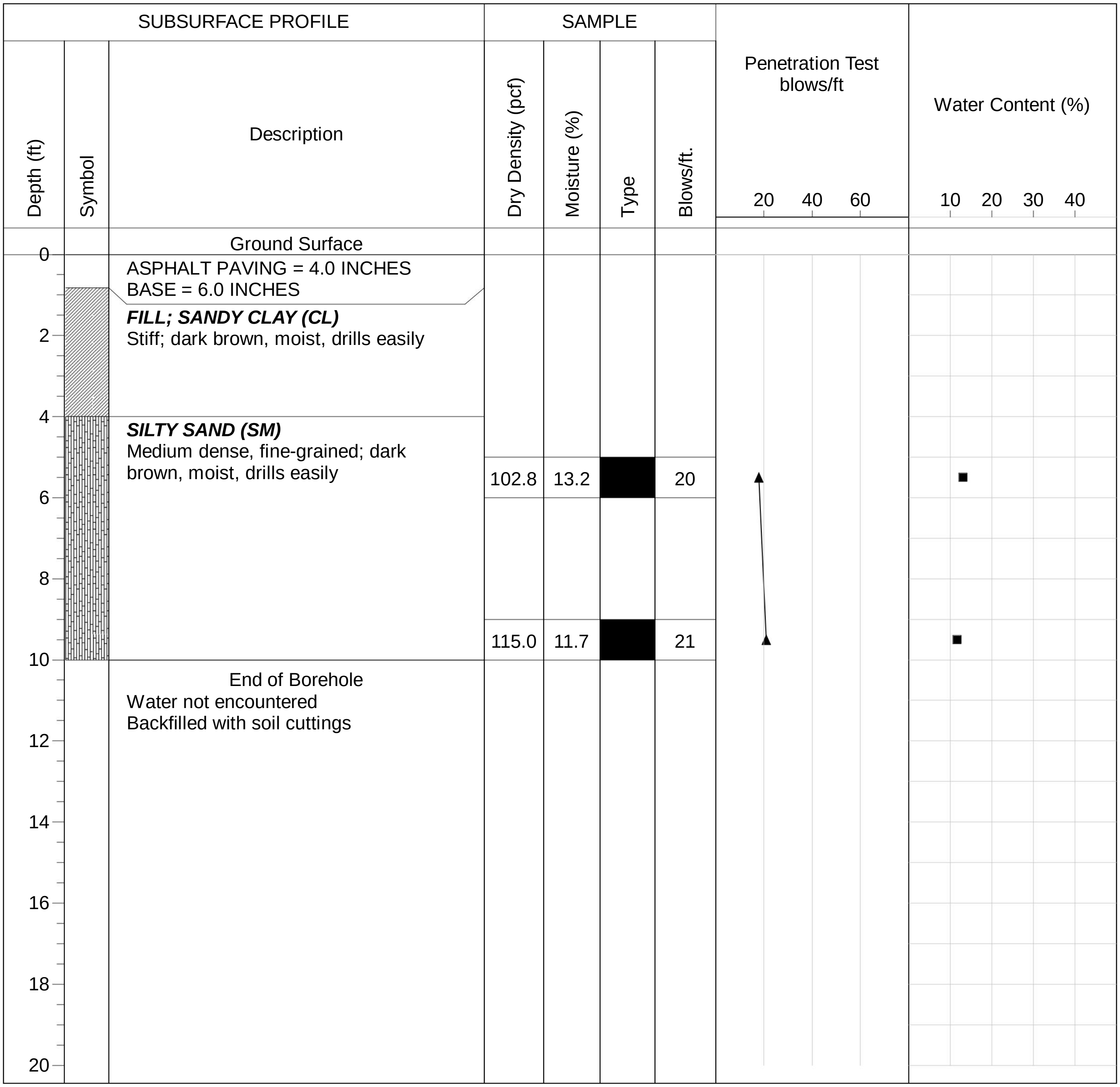
Location: 1600 Peck Road, El Monte, CA

Logged By: Gabriel Ramirez

Depth to Water> Not encoutered

Initial: N/A

At Completion: N/A



Depth (ft)	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0	Ground Surface				
0	ASPHALT PAVING = 4.0 INCHES BASE = 6.0 INCHES				
	FILL; SANDY CLAY (CL) Stiff; dark brown, moist, drills easily				
4	***SILTY SAND (SM)*** Medium dense, fine-grained; dark brown, moist, drills easily				
		102.8	13.2	■	20
		115.0	11.7	■	21
10	End of Borehole Water not encountered Backfilled with soil cuttings				

Drill Method: Hollow Stem

Drill Date: 6-5-23

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8 Inches

Driller: One Way Drilling

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B4

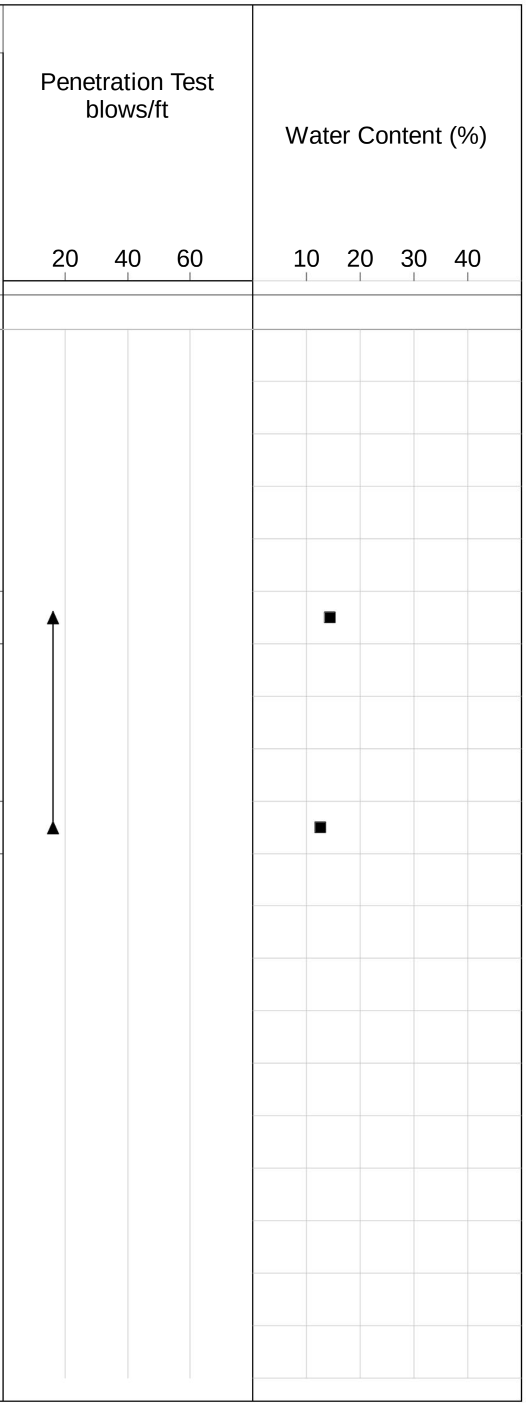
Project: INO El Monte
Project No: 112-23055

Client: In-N-Out Burger, a California Corporation
Figure No.: A-4

Location: 1600 Peck Road, El Monte, CA
Logged By: Gabriel Ramirez

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

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		ASPHALT PAVING = 4.0 INCHES BASE = 7.0 INCHES				
1–3.5	▨	***FILL; SANDY CLAY (CL)*** Stiff; dark brown, moist, drills easily				
3.5–10	▥	***SILTY SAND (SM)*** Medium dense, fine-grained; dark brown, moist, drills easily				
5–6			103.8	14.5	■	16
9–10			114.2	12.7	■	18
10		End of Borehole Water not encountered Backfilled with soil cuttings				



Drill Method: Hollow Stem
Drill Date: 6-5-23

Drill Rig: CME 75
Hole Size: 8 Inches

Krazan and Associates

Driller: One Way Drilling
Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B5

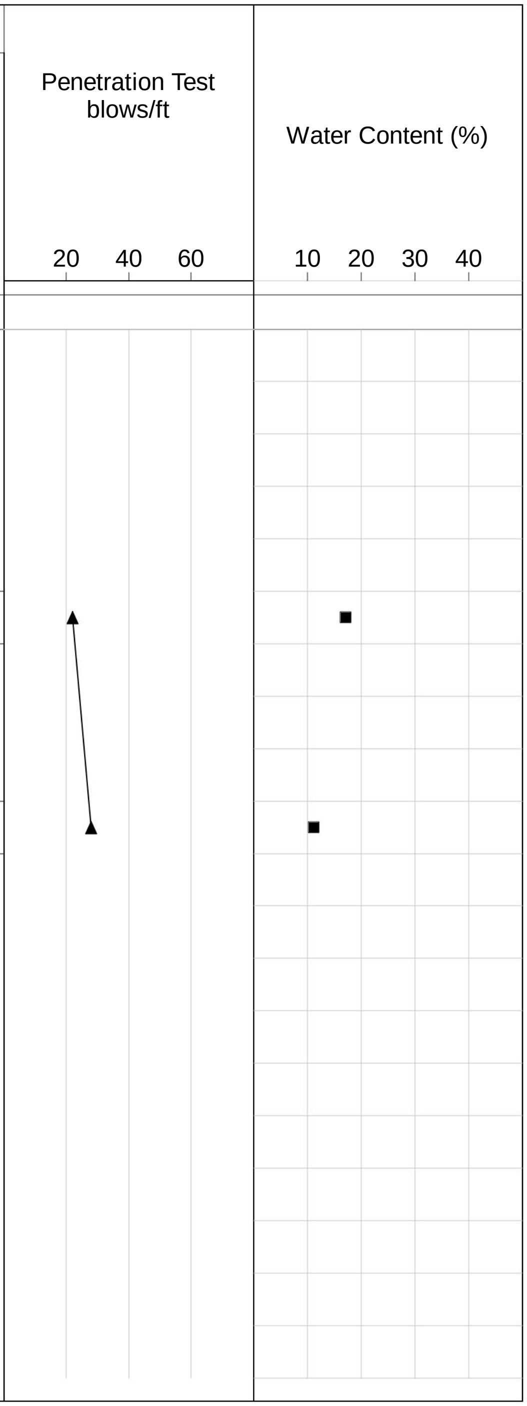
Project: INO El Monte
Project No: 112-23055

Client: In-N-Out Burger, a California Corporation
Figure No.: A-5

Location: 1600 Peck Road, El Monte, CA
Logged By: Gabriel Ramirez

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

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		ASPHALT PAVING = 3.0 INCHES BASE = 5.0 INCHES				
2	▨	***FILL; SANDY CLAY (CL)*** Stiff; dark brown, moist, drills easily				
4	▥	***SILTY SAND (SM)*** Medium dense, fine-grained; dark brown, moist, drills easily				
6	▥		105.7	17.2	■	22
8	▥					
10	▥		118.9	11.2	■	28
12		End of Borehole Water not encountered Backfilled with soil cuttings				
14						
16						
18						
20						



Drill Method: Hollow Stem
Drill Rig: CME 75
Driller: One Way Drilling

Krazan and Associates

Drill Date: 6-5-23
Hole Size: 8 Inches
Elevation: 10 Feet
Sheet: 1 of 1

Log of Boring B6

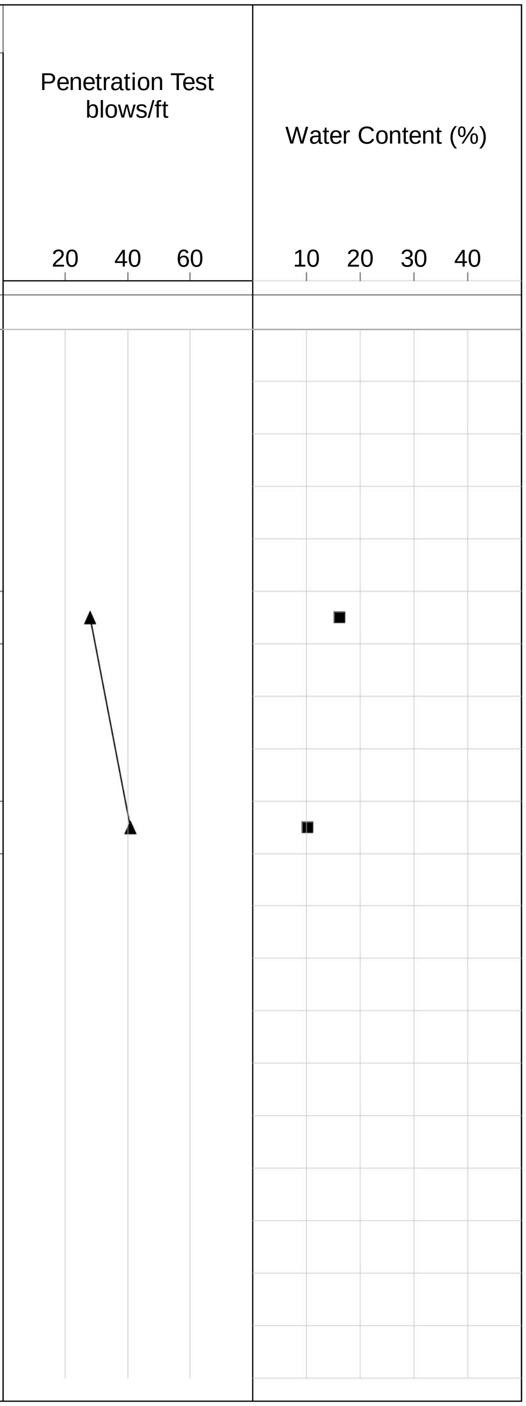
Project: INO El Monte
Project No: 112-23055

Client: In-N-Out Burger, a California Corporation
Figure No.: A-6

Location: 1600 Peck Road, El Monte, CA
Logged By: Gabriel Ramirez

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

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		ASPHALT PAVING = 3.0 INCHES BASE = 5.0 INCHES				
2	▨	***FILL; SANDY CLAY (CL)*** Stiff; dark brown, moist, drills easily				
4	▥	***SILTY SAND (SM)*** Medium dense, fine-grained; dark brown, moist, drills easily				
6	▥		106.9	16.2	■	28
8	▥	Dense below 9 feet	117.5	10.3	■	41
10		End of Borehole Water not encountered Backfilled with soil cuttings				
12						
14						
16						
18						
20						



Drill Method: Hollow Stem
Drill Date: 6-5-23

Drill Rig: CME 75
Hole Size: 8 Inches

Krazan and Associates

Driller: One Way Drilling
Elevation: 10 Feet

Sheet: 1 of 1

Sieve Analysis

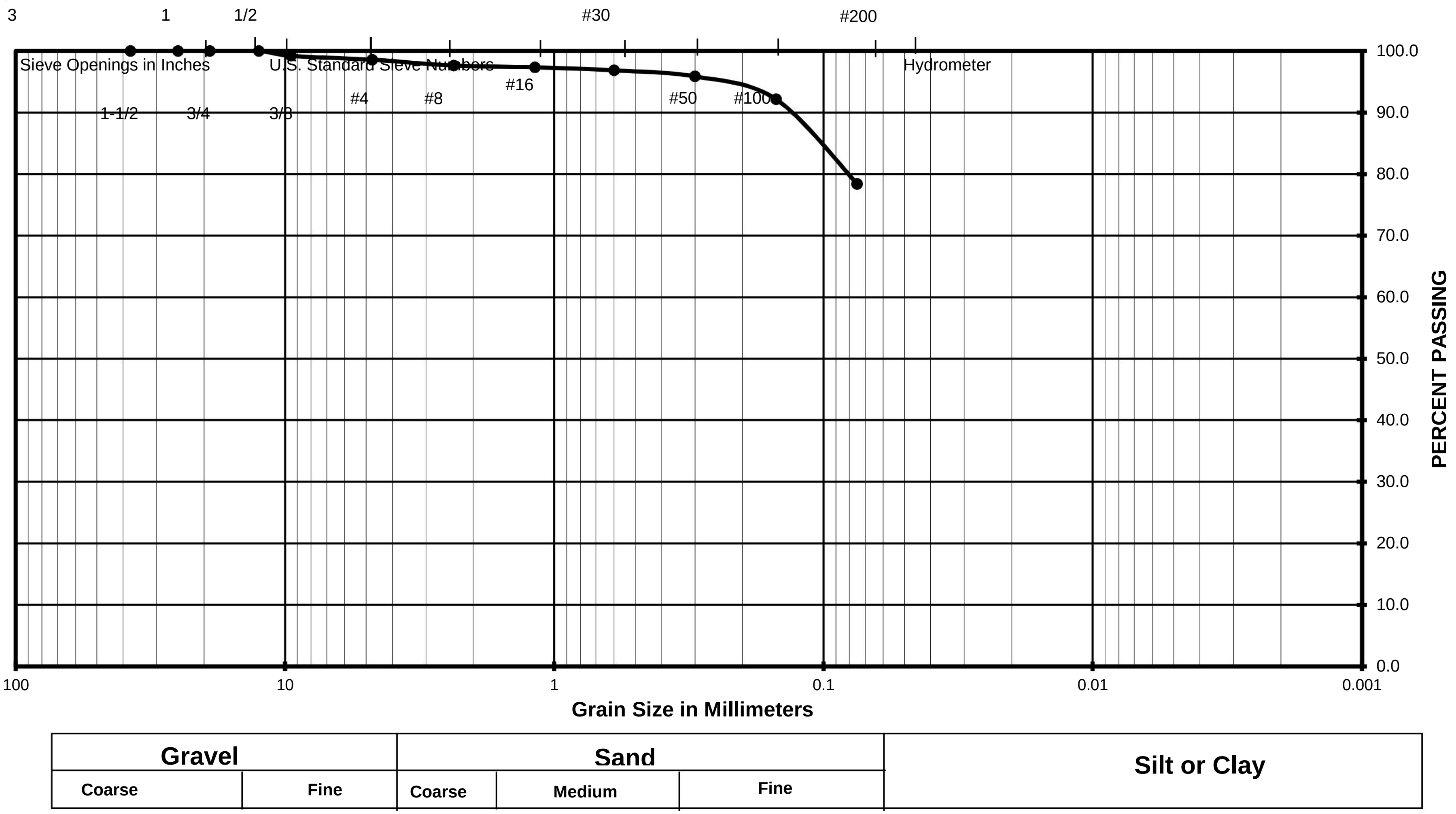
Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 5'
Soil Classification : CL

Wet Weight	:	599.50
Dry Weight	:	599.50
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	4.7	0.8	0.8	99.2
#4	4.75	3.8	0.6	1.4	98.6
#8	2.36	5.6	0.9	2.4	97.6
#16	1.18	1.8	0.3	2.7	97.3
#30	0.60	3.0	0.5	3.2	96.8
#50	0.30	5.9	1.0	4.1	95.9
#100	0.15	22.2	3.7	7.8	92.2
#200	0.08	82.4	13.7	21.6	78.4

Krazan Testing Laboratory

Grain Size Analysis



(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	CL
Sample Number	B-1 @ 5'

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Sieve Analysis

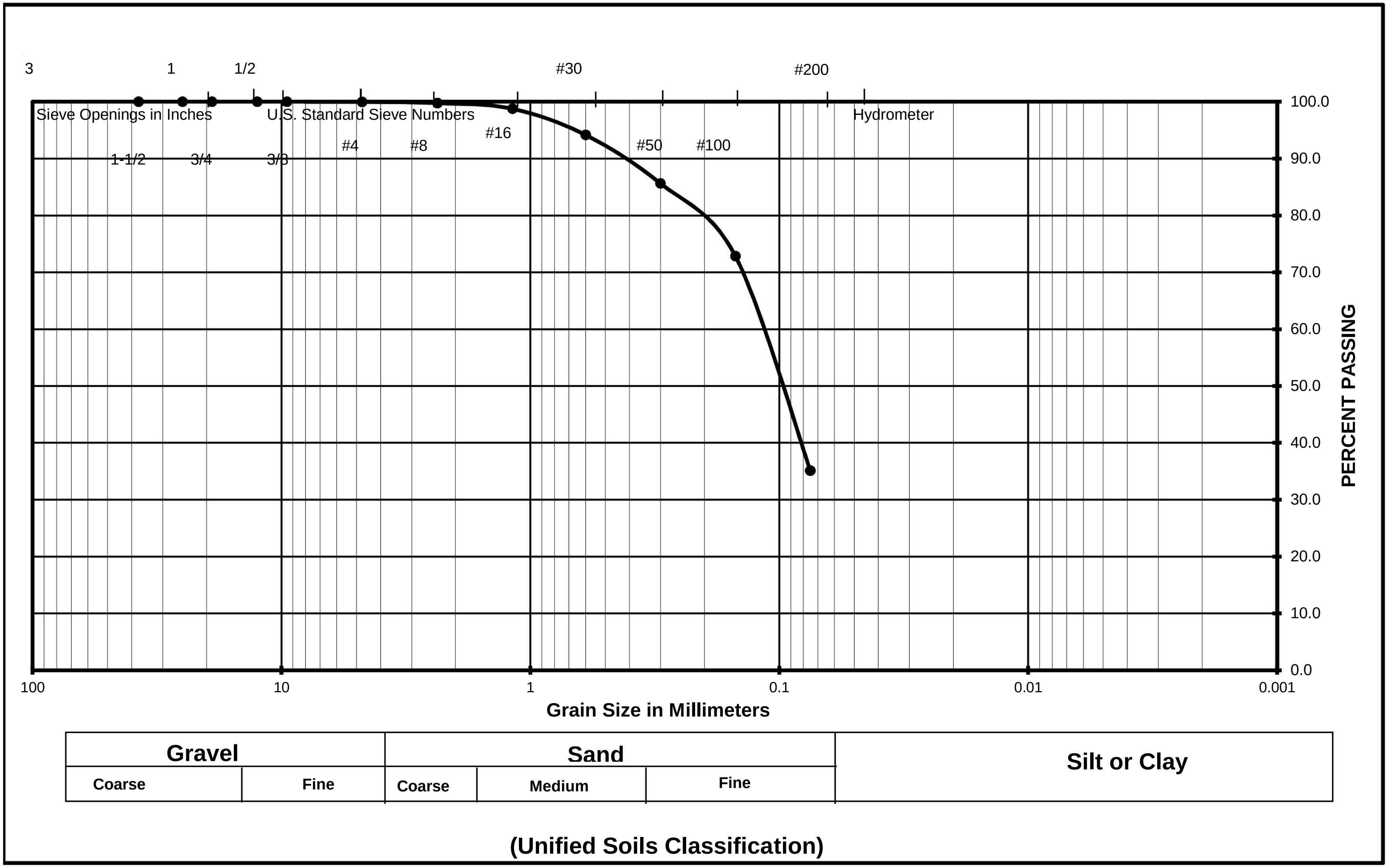
Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 10'
Soil Classification : SM

Wet Weight :	534.10
Dry Weight :	534.10
Moisture Content :	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.2	0.0	0.0	100.0
#8	2.36	1.1	0.2	0.2	99.8
#16	1.18	5.3	1.0	1.2	98.8
#30	0.60	24.6	4.6	5.8	94.2
#50	0.30	45.6	8.5	14.4	85.6
#100	0.15	68.3	12.8	27.2	72.8
#200	0.08	201.5	37.7	64.9	35.1

Krazan Testing Laboratory

Grain Size Analysis



Project Name	INO El Monte
Project Number	11223055
Soil Classification	SM
Sample Number	B-1 @ 10'

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Sieve Analysis

Project Number : 11223055

Project Name : INO El Monte

Date : 7/25/2023

Sample Location : B-1 @ 15'

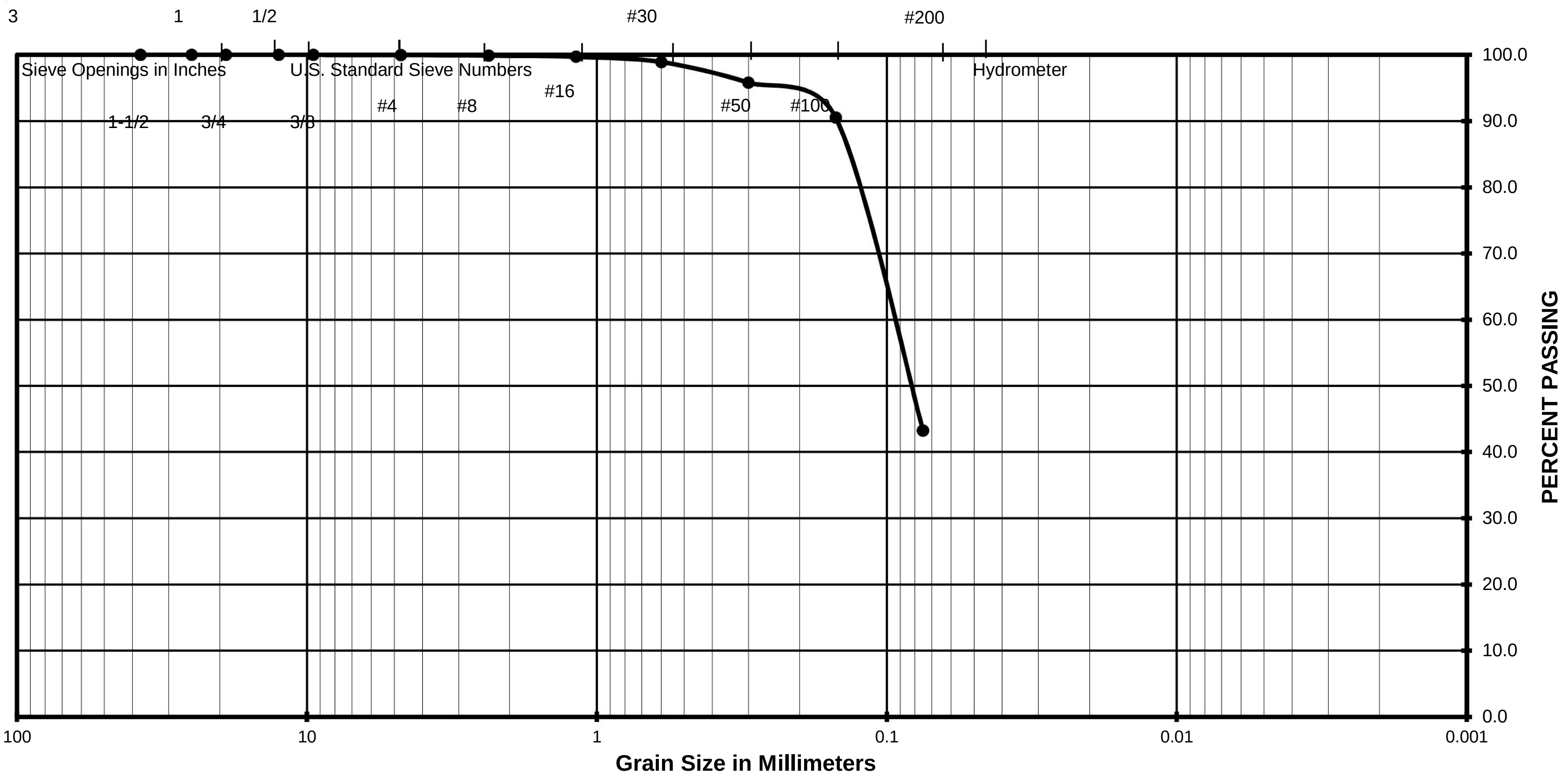
Soil Classification : SM

Wet Weight	:	432.30
Dry Weight	:	432.20
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.1	0.0	0.0	100.0
#8	2.36	0.4	0.1	0.1	99.9
#16	1.18	0.8	0.2	0.3	99.7
#30	0.60	3.4	0.8	1.1	98.9
#50	0.30	13.5	3.1	4.2	95.8
#100	0.15	22.8	5.3	9.5	90.5
#200	0.08	204.3	47.3	56.8	43.2

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SM
Sample Number	B-1 @ 15'

Krazan Testing Laboratory

Sieve Analysis

Project Number : 11223055

Project Name : INO El Monte

Date : 7/25/2023

Sample Location : B-1 @ 20'

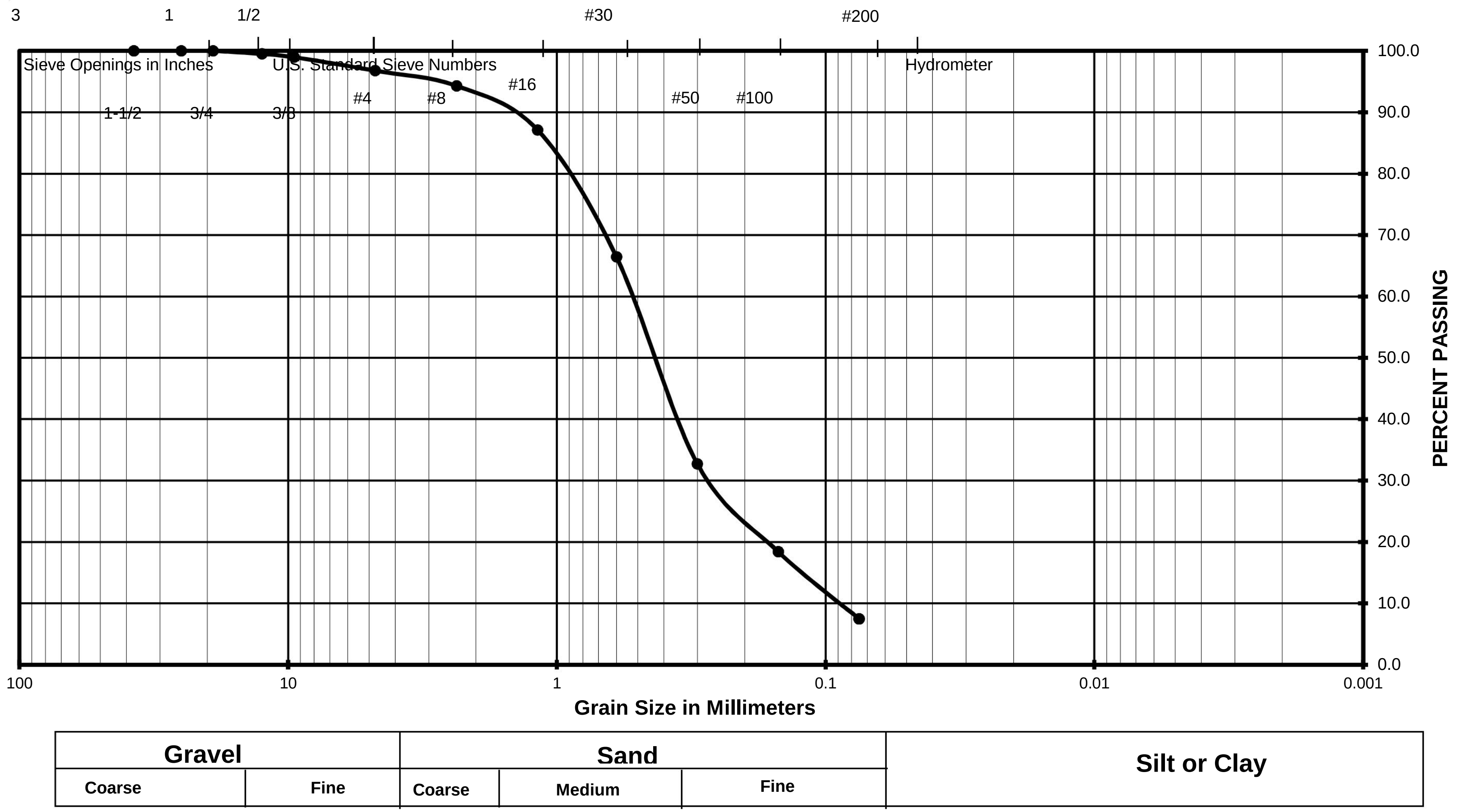
Soil Classification : SP

Wet Weight	:	502.70
Dry Weight	:	502.70
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	2.5	0.5	0.5	99.5
3/8"	9.50	2.7	0.5	1.0	99.0
#4	4.75	11.0	2.2	3.2	96.8
#8	2.36	12.5	2.5	5.7	94.3
#16	1.18	36.1	7.2	12.9	87.1
#30	0.60	104.0	20.7	33.6	66.4
#50	0.30	169.5	33.7	67.3	32.7
#100	0.15	71.9	14.3	81.6	18.4
#200	0.08	54.9	10.9	92.5	7.5

Krazan Testing Laboratory

Grain Size Analysis



(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SP
Sample Number	B-1 @ 20'

Krazan Testing Laboratory

Sieve Analysis

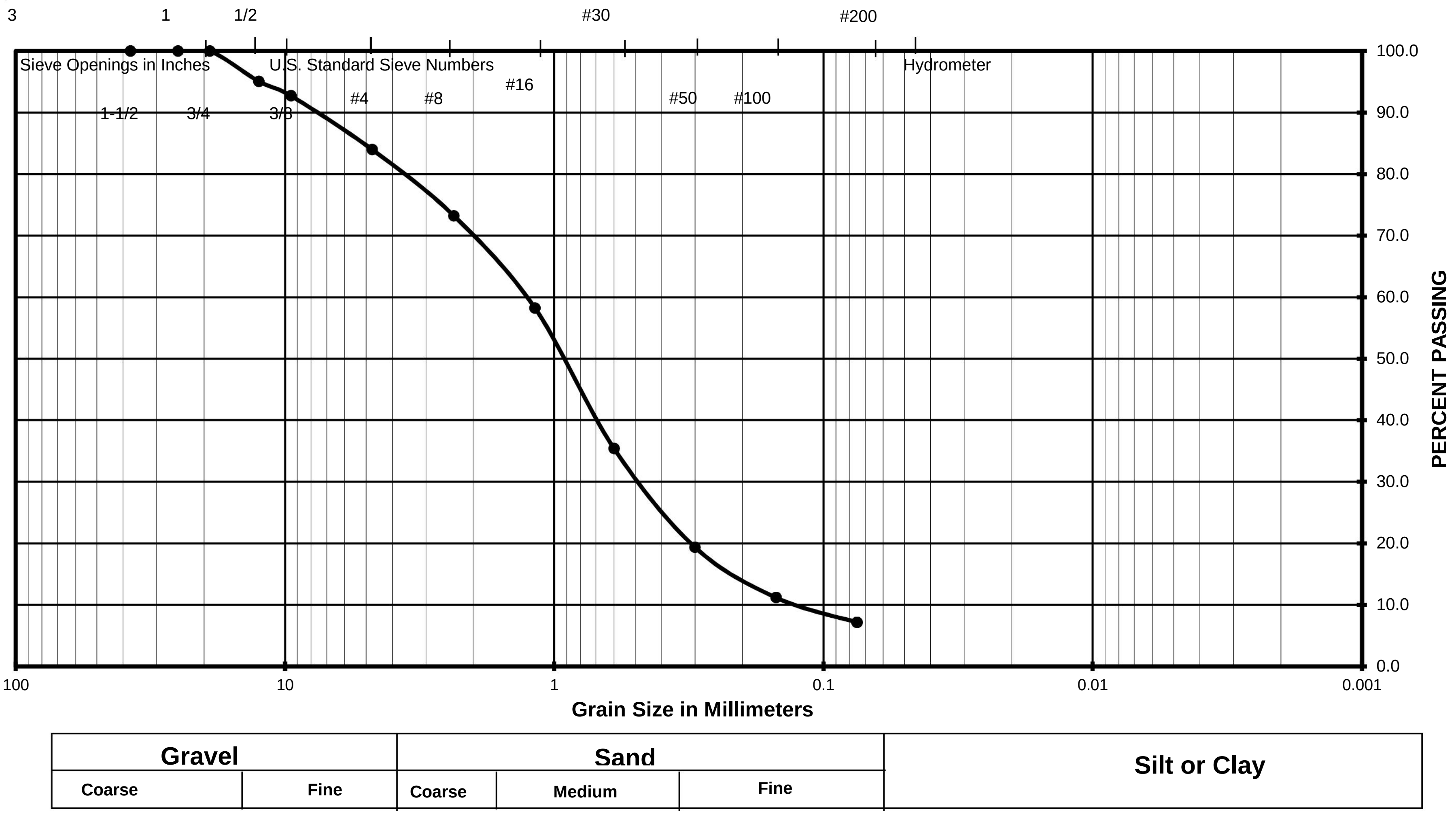
Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 25'
Soil Classification : SP

Wet Weight	:	543.50
Dry Weight	:	543.50
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	26.9	4.9	4.9	95.1
3/8"	9.50	12.7	2.3	7.3	92.7
#4	4.75	47.4	8.7	16.0	84.0
#8	2.36	58.5	10.8	26.8	73.2
#16	1.18	81.5	15.0	41.8	58.2
#30	0.60	124.0	22.8	64.6	35.4
#50	0.30	87.3	16.1	80.6	19.4
#100	0.15	44.5	8.2	88.8	11.2
#200	0.08	21.8	4.0	92.8	7.2

Krazan Testing Laboratory

Grain Size Analysis



(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SP
Sample Number	B-1 @ 25'

Krazan Testing Laboratory

Sieve Analysis

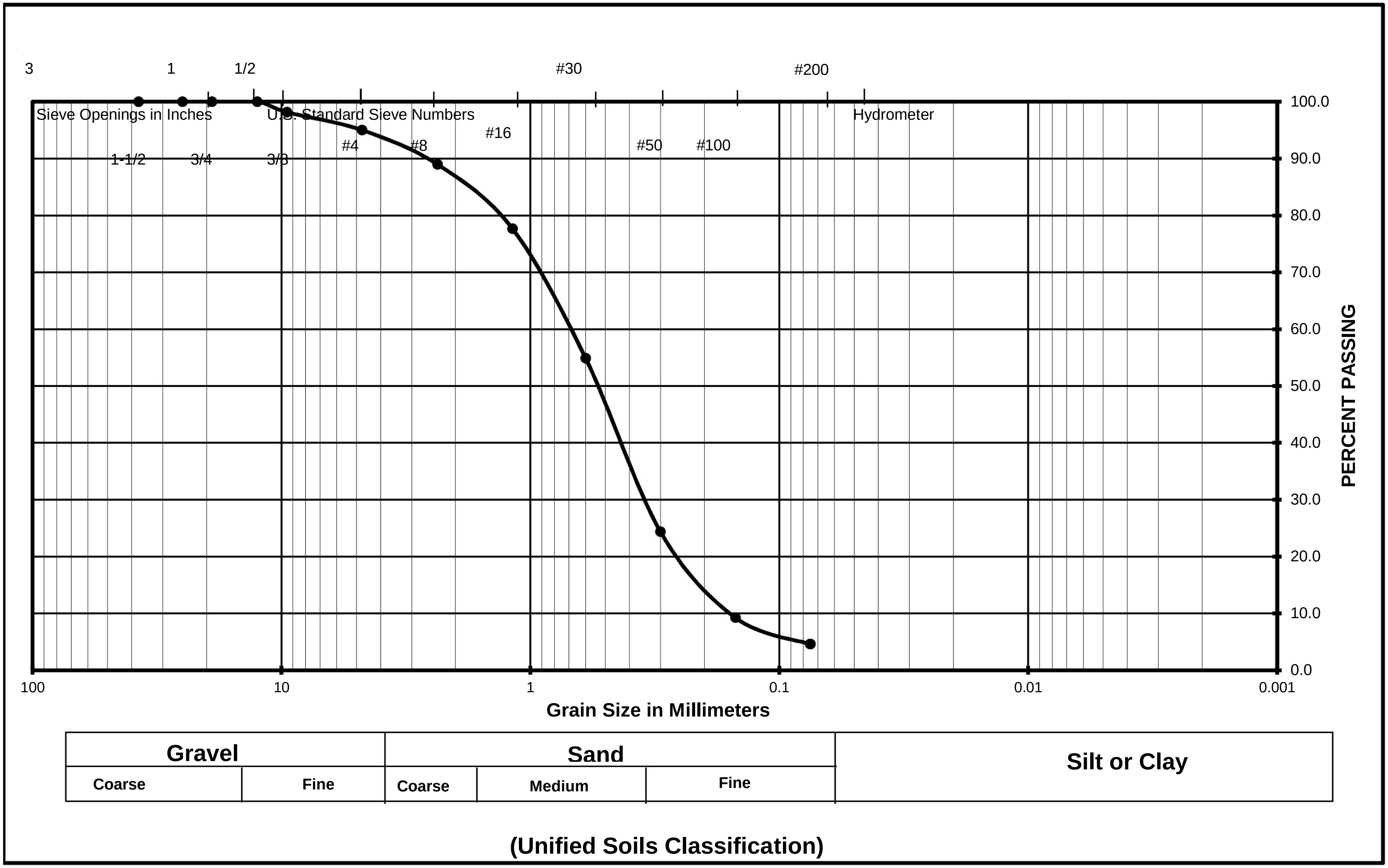
Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 30'
Soil Classification : SM w/ GRAVEL

Wet Weight	:	385.10
Dry Weight	:	385.10
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	7.1	1.8	1.8	98.2
#4	4.75	12.1	3.1	5.0	95.0
#8	2.36	23.3	6.1	11.0	89.0
#16	1.18	43.5	11.3	22.3	77.7
#30	0.60	87.7	22.8	45.1	54.9
#50	0.30	117.6	30.5	75.6	24.4
#100	0.15	58.2	15.1	90.8	9.2
#200	0.08	17.9	4.6	95.4	4.6

Krazan Testing Laboratory

Grain Size Analysis



Project Name	INO El Monte
Project Number	11223055
Soil Classification	SM w/ GRAVEL
Sample Number	B-1 @ 30'

Krazan Testing Laboratory

Sieve Analysis

Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 35'
Soil Classification : SP

Wet Weight	:	522.60
Dry Weight	:	522.60
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00	13.0	2.5	2.5	97.5
1/2"	12.50	76.2	14.6	17.1	82.9
3/8"	9.50	41.6	8.0	25.0	75.0
#4	4.75	61.9	11.8	36.9	63.1
#8	2.36	41.5	7.9	44.8	55.2
#16	1.18	54.2	10.4	55.2	44.8
#30	0.60	74.7	14.3	69.5	30.5
#50	0.30	71.1	13.6	83.1	16.9
#100	0.15	24.8	4.7	87.8	12.2
#200	0.08	29.7	5.7	93.5	6.5

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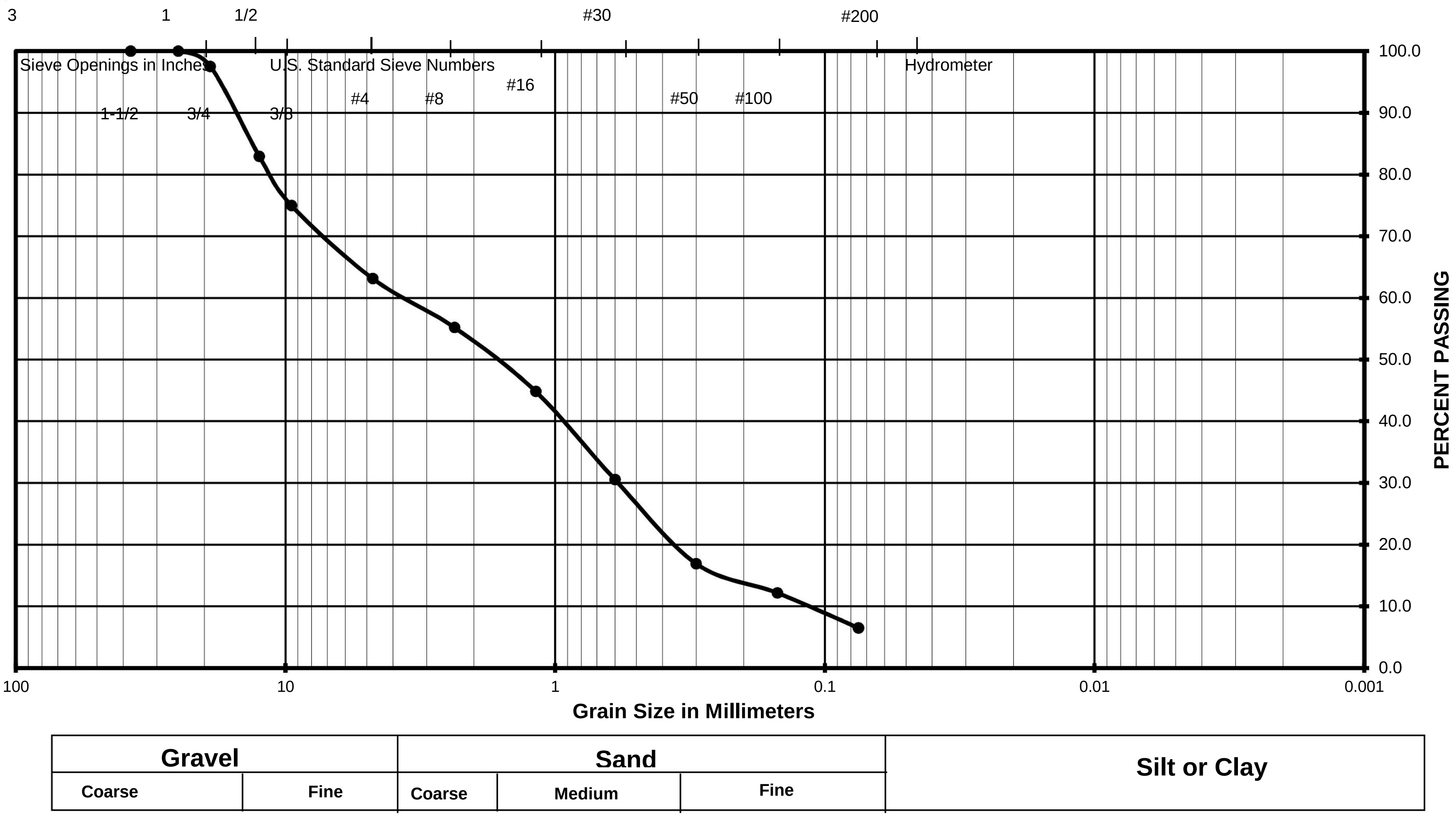
Grain Size Analysis



(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SP
Sample Number	B-1 @ 35'

Krazan Testing Laboratory

Sieve Analysis

Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 40'
Soil Classification : SP

Wet Weight	:	562.40
Dry Weight	:	562.40
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	1.0	0.2	0.2	99.8
#8	2.36	3.3	0.6	0.8	99.2
#16	1.18	11.0	2.0	2.7	97.3
#30	0.60	75.8	13.5	16.2	83.8
#50	0.30	228.7	40.7	56.9	43.1
#100	0.15	151.3	26.9	83.8	16.2
#200	0.08	47.9	8.5	92.3	7.7

Krazan Testing Laboratory

Grain Size Analysis

(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SP
Sample Number	B-1 @ 40'

Krazan Testing Laboratory

Sieve Analysis

Project Number : 11223055
Project Name : INO El Monte
Date : 7/25/2023
Sample Location : B-1 @ 45'
Soil Classification : SP

Wet Weight :	291.20
Dry Weight :	291.20
Moisture Content :	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00	36.8	12.6	12.6	87.4
3/4"	19.00	0.1	0.0	12.7	87.3
1/2"	12.50	24.6	8.4	21.1	78.9
3/8"	9.50	3.0	1.0	22.1	77.9
#4	4.75	14.7	5.0	27.2	72.8
#8	2.36	16.4	5.6	32.8	67.2
#16	1.18	29.7	10.2	43.0	57.0
#30	0.60	50.4	17.3	60.3	39.7
#50	0.30	63.2	21.7	82.0	18.0
#100	0.15	23.3	8.0	90.0	10.0
#200	0.08	10.4	3.6	93.6	6.4

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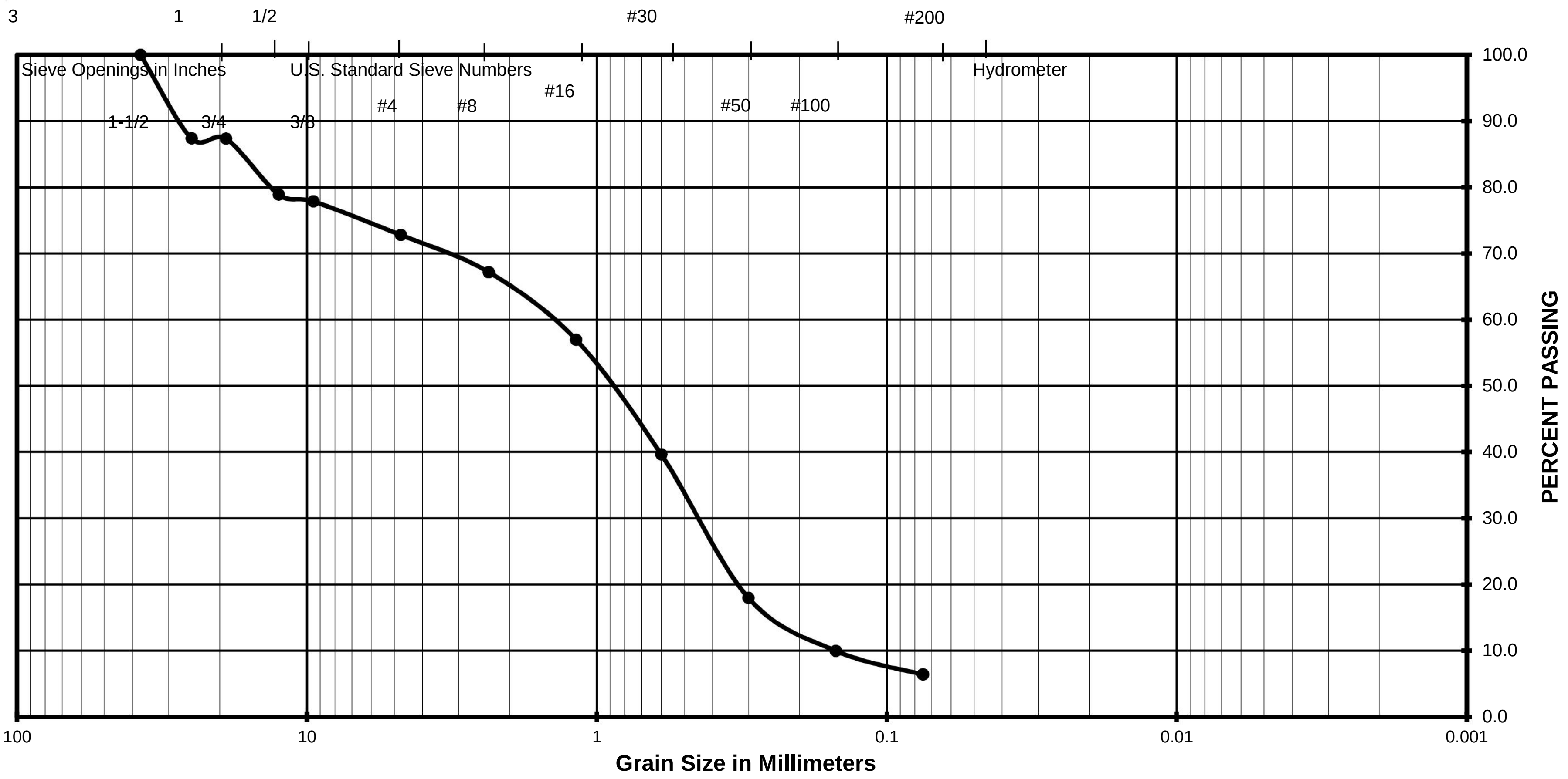
Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SP
Sample Number	B-1 @ 45'

Krazan Testing Laboratory

Sieve Analysis

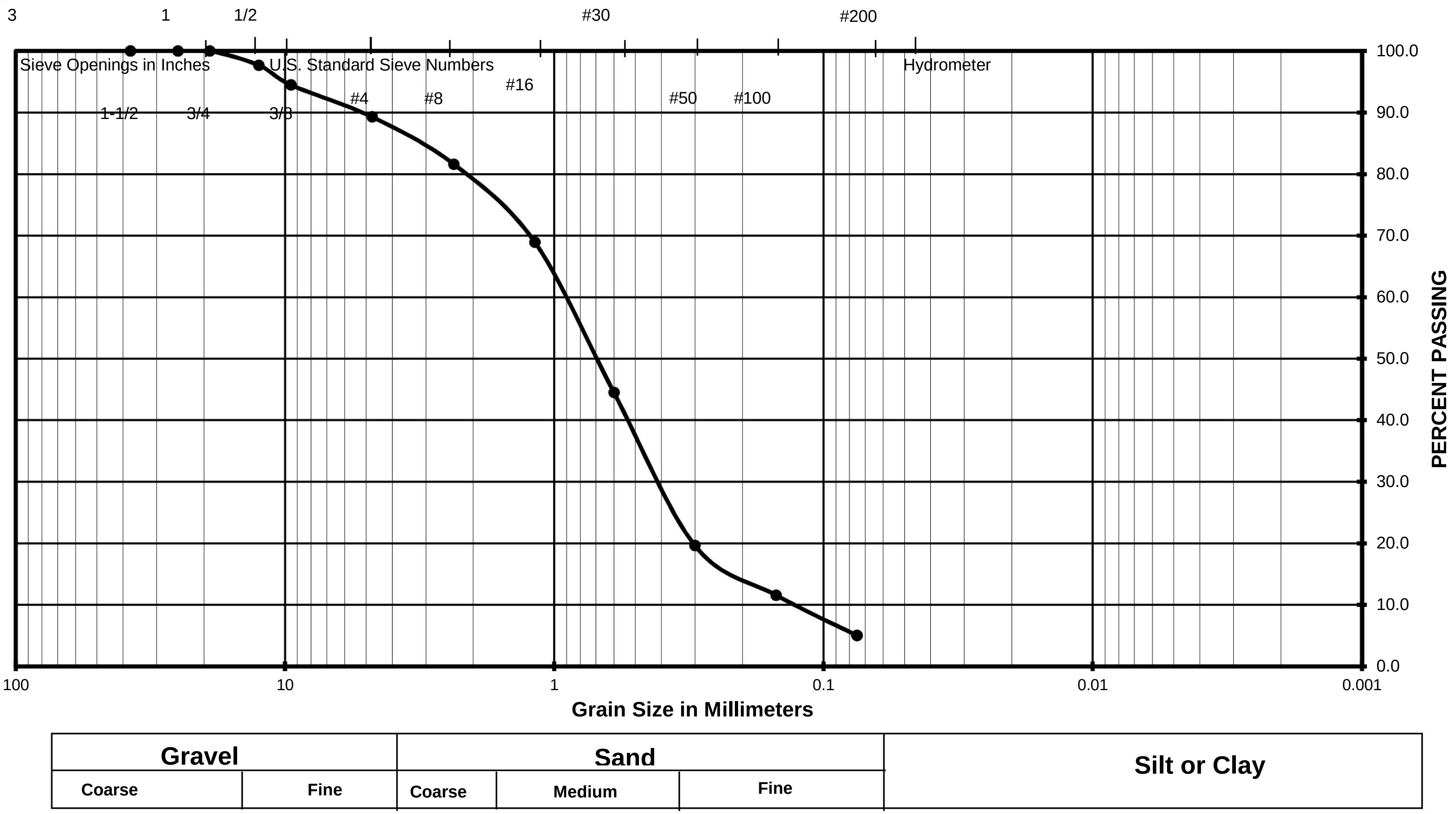
Project Number	: 11223055
Project Name	: INO El Monte
Date	: 7/25/2023
Sample Location	: B-1 @ 50'
Soil Classification	: SP

Wet Weight	:	466.80
Dry Weight	:	466.80
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	10.8	2.3	2.3	97.7
3/8"	9.50	15.0	3.2	5.5	94.5
#4	4.75	24.2	5.2	10.7	89.3
#8	2.36	35.9	7.7	18.4	81.6
#16	1.18	59.2	12.7	31.1	68.9
#30	0.60	114.0	24.4	55.5	44.5
#50	0.30	116.1	24.9	80.4	19.6
#100	0.15	37.6	8.1	88.4	11.6
#200	0.08	30.6	6.6	95.0	5.0

Krazan Testing Laboratory

Grain Size Analysis



(Unified Soils Classification)

Project Name	INO El Monte
Project Number	11223055
Soil Classification	SP
Sample Number	B-1 @ 50'

Krazan Testing Laboratory

Direct Shear of Consolidated, Drained Soils

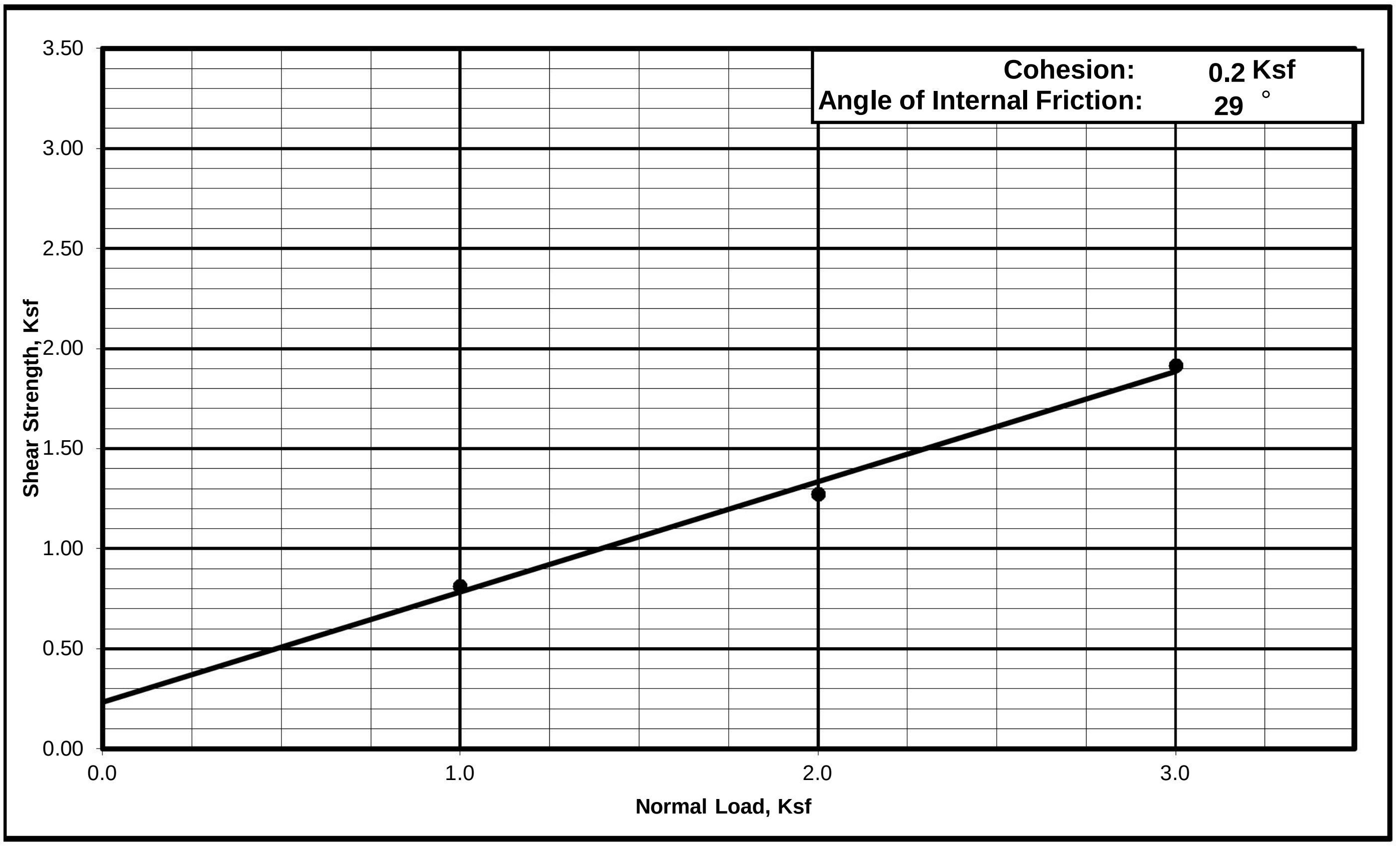
ASTM D - 3080 / AASHTO T - 236

Project Number : 11223055
Project Name : INO El Monte
Date : 7/26/2023
Sample Location : B-2 @ 5'
Soil Classification : SM
Sample Surface Area : 0.0289

STRESS DISPLACEMENT DATA

Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	32	60.9	90.3
0.060	44.2	89.2	128.4
0.090	50.4	96.2	146.8
0.120	57	101.4	163.8
0.150	59.7	108.3	168.3
0.180	60.7	113.8	172.3
0.210	71.5	106.8	170
0.240	70		
0.270			
0.300			
0.330			
0.360			

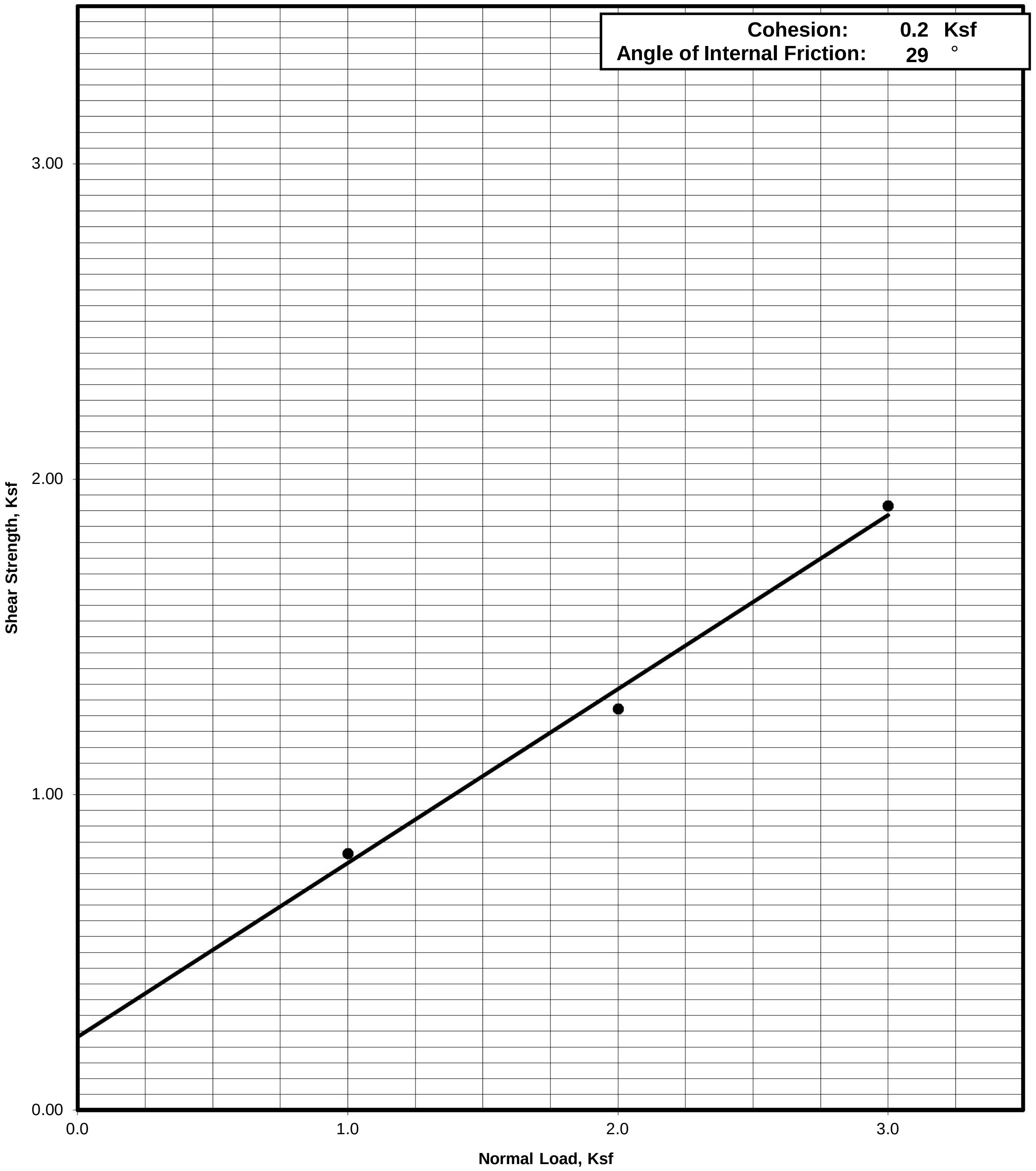
Normal Load psf	Shear force lbs	Shear Stress psf
1000	23.5	814
2000	36.8	1273
3000	55.4	1917



Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
11223055	B-2 @ 5'	SM	7/26/2023



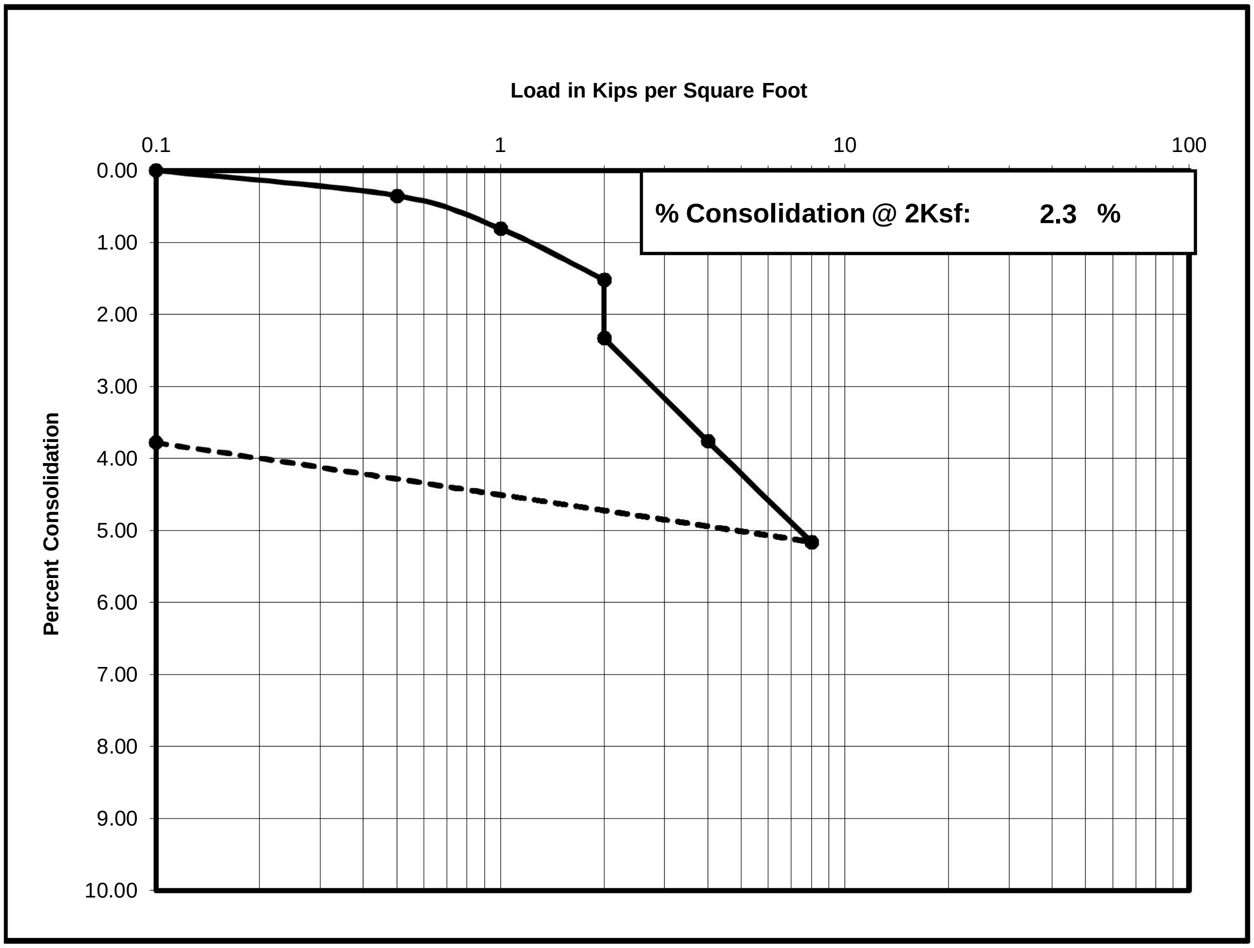
Krazan Testing Laboratory

One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number : 11223055
Project Name : INO El Monte
Date : 7/26/2023
Sample Location : B-2 @ 5'
Soil Classification : SM
Sample Condition : Undisturbed

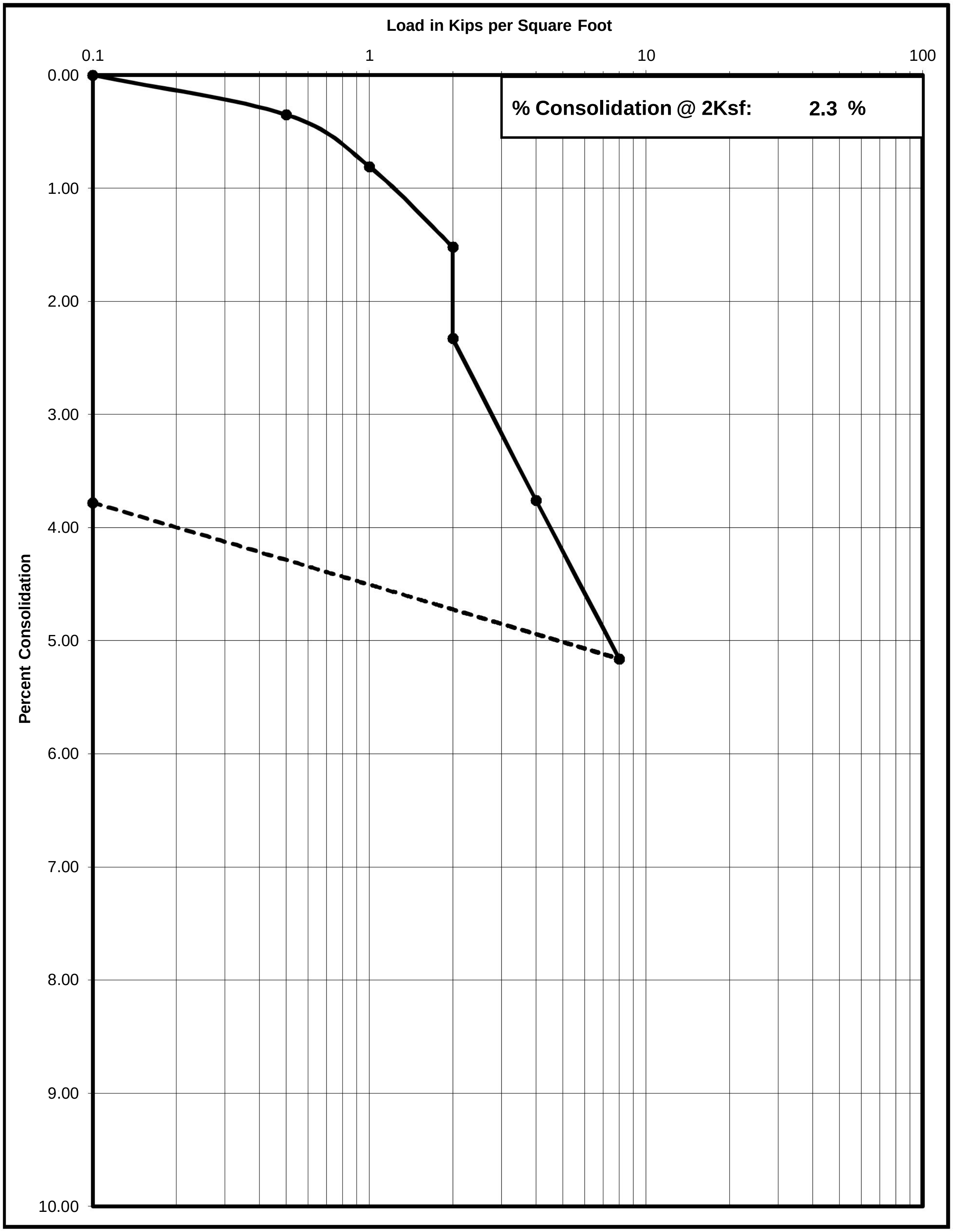
LOAD (ksf)	Reading	% Consolidation
0.1	0.0001	--
0.5	0.0035	0.35
1	0.0081	0.81
2	0.0152	1.52
Satur.	0.0233	2.33
4	0.0376	3.76
8	0.0516	5.16
0.1	0.0378	3.78



Krazan Testing Laboratory

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11223055	B-2 @ 5'	7/26/2023	SM



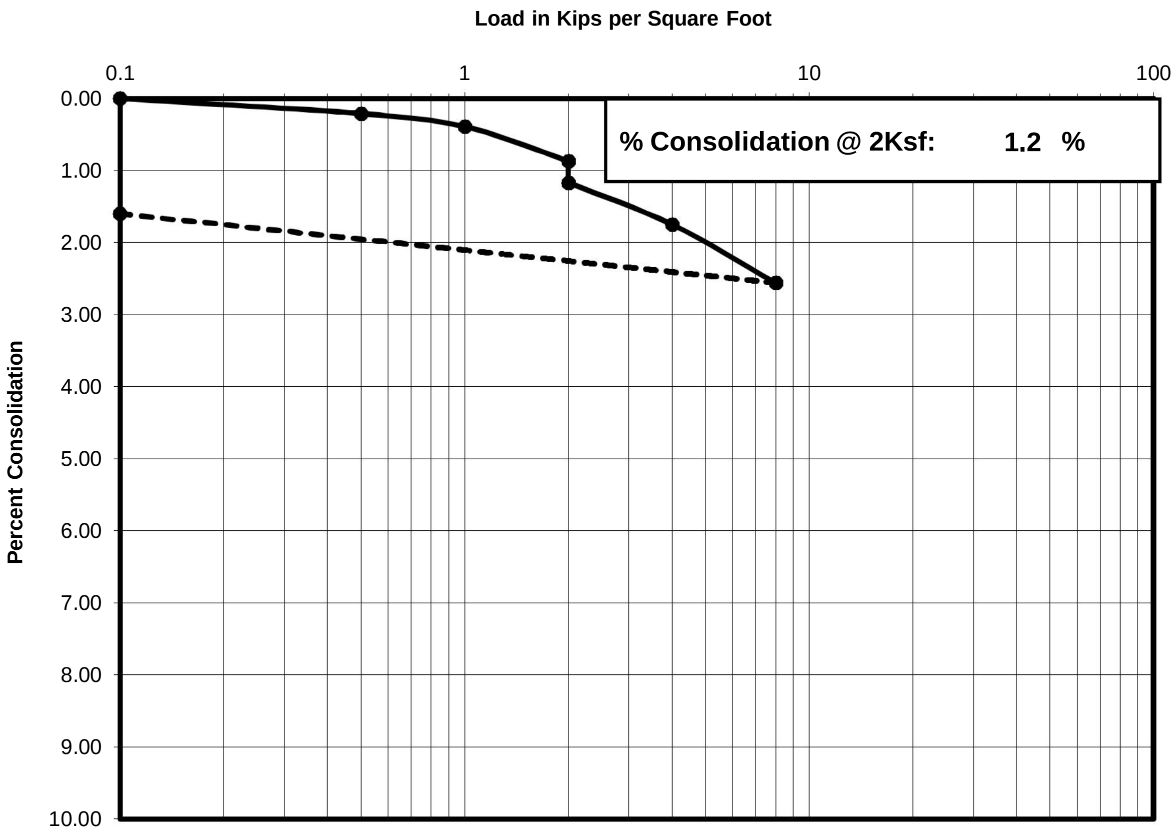
Krazan Testing Laboratory

One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number	: 11223055
Project Name	: INO El Monte
Date	: 7/26/2023
Sample Location	: B-2 @ 10'
Soil Classification	: SM
Sample Condition	: Undisturbed

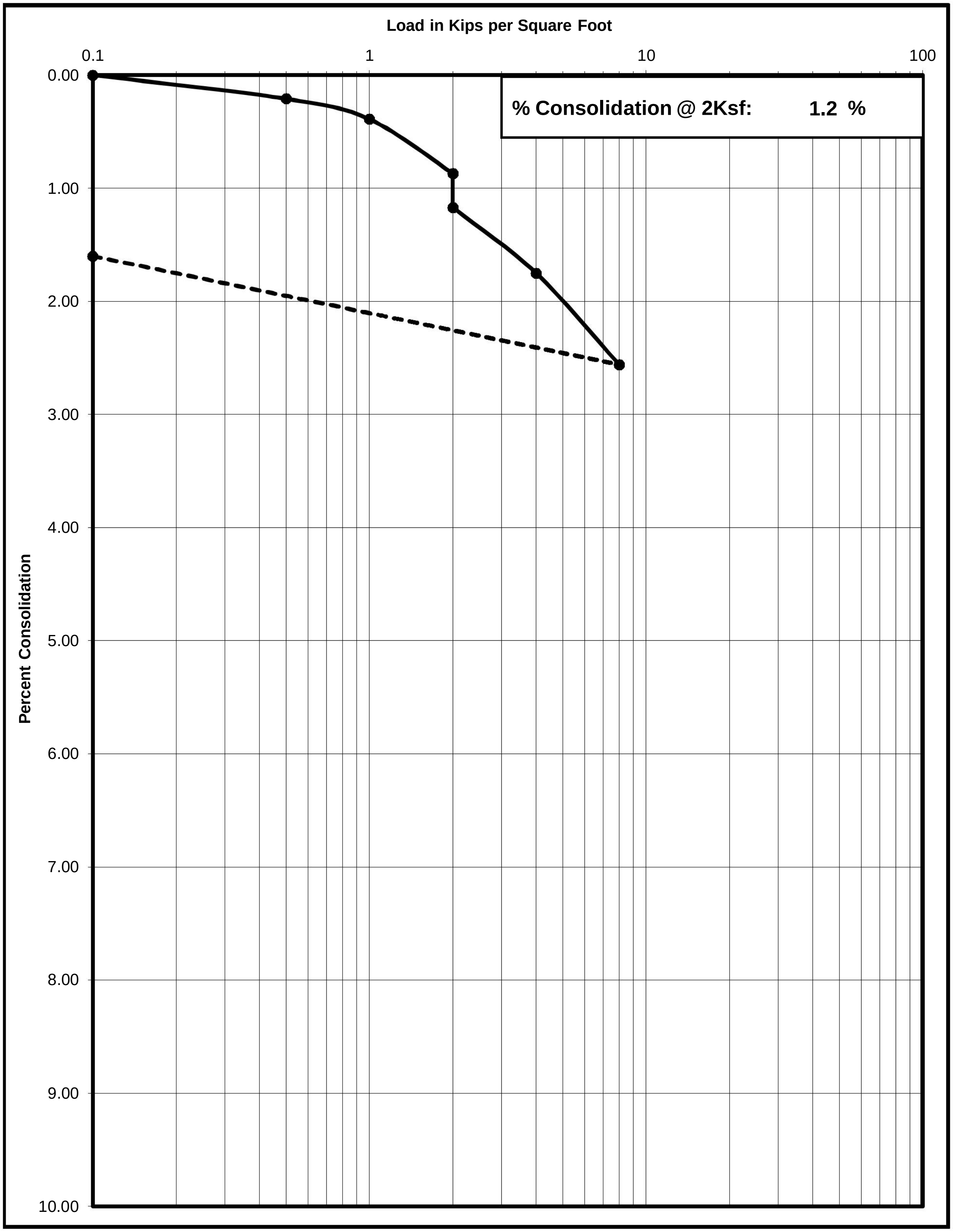
LOAD (ksf)	Reading	% Consolidation
0.1	0.0006	--
0.5	0.0021	0.21
1	0.0039	0.39
2	0.0087	0.87
Satur.	0.0117	1.17
4	0.0175	1.75
8	0.0256	2.56
0.1	0.016	1.60



Krazan Testing Laboratory

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11223055	B-2 @ 10'	7/26/2023	SM



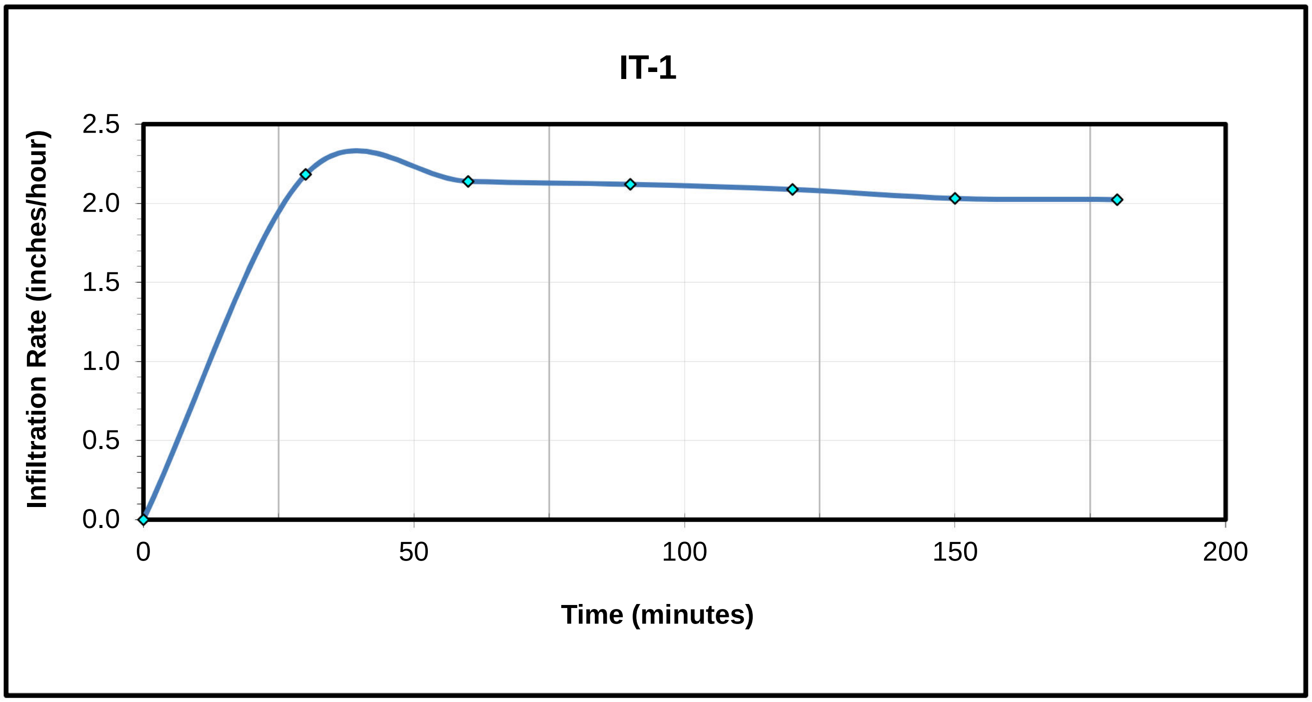
Krazan Testing Laboratory

RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	**112-23055**			**Date**	**7/26/2023**
Project Name	INO El Monte				
Project Address	3600 Peck Road, El Monte, California				
Test No:	IT-1	**Total Depth (in.)**	120	**Test Size (in)**	8
Depth To Water	>50'	**Soil Classification**	SP		

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		20.00	--	--
1	30.00	30.00	10.00	58.00	48.00	2.18
2	60.00	30.00	58.00	85.00	27.00	2.14
3	90.00	30.00	85.00	100.50	15.50	2.12
4	120.00	30.00	100.50	109.40	8.90	2.09
5 (Refill)	150.00	30.00	32.10	68.50	36.40	2.03
6	180.00	30.00	68.50	90.10	21.60	2.02

	Unfactored Infiltration Rate in Inches per Hour	**2.05**
	Reduction Factor (RF) = RFt + RFv + RFs [2+2+2]	**6**
	Factored Infiltration Rate in Inches per Hour	**0.34**

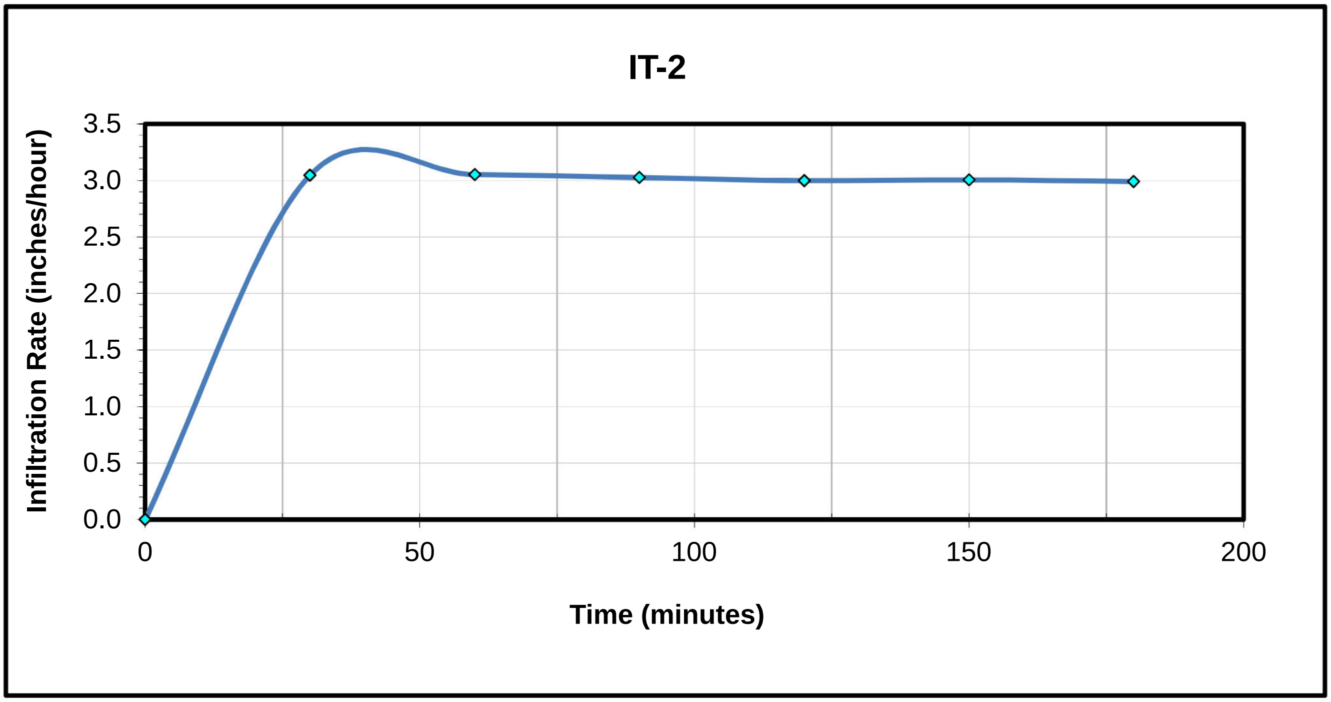


RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	**112-23055**				**Date**	**7/26/2023**
Project Name	INO El Monte					
Project Address	3600 Peck Road, El Monte, California					
Test No:	IT-2	**Total Depth (in.)**		120	**Test Size (in)**	8
Depth To Water	>50'	**Soil Classification**		SP		

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		15.00	--	--
1	30.00	30.00	15.00	74.00	59.00	3.05
2	60.00	30.00	74.00	100.50	26.50	3.05
3	90.00	30.00	100.50	112.30	11.80	3.03
4 (Refill)	120.00	30.00	12.50	72.20	59.70	3.00
5	150.00	30.00	72.20	99.40	27.20	3.01
6	180.00	30.00	99.40	111.70	12.30	2.99

	Unfactored Infiltration Rate in Inches per Hour	**3.00**
	Reduction Factor (RF) = RFt + RFv + RFs [2+2+3]	**7**
	Factored Infiltration Rate in Inches per Hour	**0.43**



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

DATE: 5/19/2023

Krazan & Associates, Inc.
1100 Olympic Drive, Ste. 103
Corona, CA 92888

P.O. NO.: Verbal

LAB NO.: C-7053

SPECIFICATION: CTM-643/417/422

MATERIAL: Soil

Project No.: 11223055
Project: El Monte, CA
Sample ID: B-1 @ 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
7.6	6,400	106	11

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

ANAHEIM TEST LAB, INC

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

TO:

Krazan & Associates, Inc.
1100 Olympic Drive, Ste. 103
Corona, CA 92888

DATE: 5/22/2023

P.O. NO.: Verbal

LAB NO.: C-7053

SPECIFICATION: CA 301

MATERIAL: Brown, Clayey Silt w. F. Gravel

Project No.: 11223055
Project: El Monte, CA
Sample ID: B-2 @ 0-3'

ANALYTICAL REPORT

"R" VALUE

BY EXUDATION	BY EXPANSION
53	37

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

"R" VALUE CA 301

Client: Krazan & Associates, Inc. **ATL No.:** C 7053 **Date:** 5/22/2023

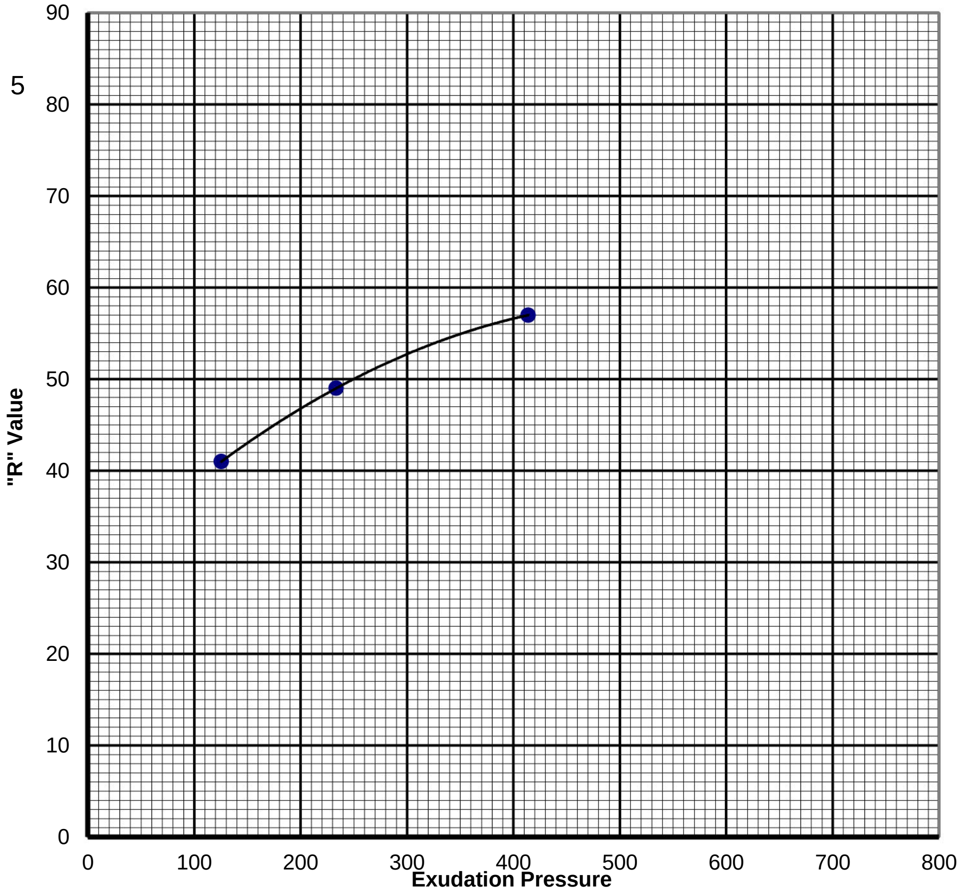
Client Reference No.: 11223055

Sample: B-2 @ 0-3' **Soil Type:** Brown, Clayey Silt w. F. Gravel

TEST SPECIMEN		A	B	C	D
Compactor Air Pressure	psi	330	150	300	
Initial Moisture Content	%	10.3	10.3	10.3	
Moisture at Compaction	%	14.0	15.3	14.7	
Briquette Height	in.	2.46	2.54	2.49	
Dry Density	pcf	114.5	111.9	113.2	
EXUDATION PRESSURE	psi	414	125	233	
EXPANSION PRESSURE	psf	212	108	160	
Ph at 1000 pounds	psi	23	32	28	
Ph at 2000 pounds	psi	45	62	53	
Displacement	turns	4.88	5.61	5.21	
"R" Value		57	41	49	
CORRECTED "R" VALUE		57	41	49	

Final "R" Value	
BY EXUDATION: @ 300 psi	**53**
BY EXPANSION: TI = 5.0	**37**

5



Appendix B

General Earthwork Specifications

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 earthworks in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Incorporated, hereinafter referred to as the Geotechnical Engineer and/or Testing Agency. Attainment of design grades, when achieved, shall be certified by the project Civil Engineer. Both the Geotechnical 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 adjustments until all work is deemed satisfactory as determined by both the Geotechnical Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Geotechnical Engineer, Civil Engineer, or project Architect.

No earthwork shall be performed without the physical presence or approval of the Geotechnical Engineer. The Contractor shall notify the Geotechnical 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 the minimum relative compaction of 95 percent. Soil moisture-content requirements presented in the Geotechnical Engineer’s report shall also be complied with. The maximum laboratory compacted dry unit weight of each soil placed as fill shall be determined in accordance with ASTM Test Method D1557-00 (Modified Proctor). The optimum moisture-content shall also be determined in accordance with this test method. The terms “relative compaction” and “compaction” are defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density as determined by ASTM Test Method D1557-00, expressed as a percentage as specified in the technical portion of the Geotechnical Engineer's report. The location and frequency of field density tests shall be as determined by the Geotechnical Engineer. The results of these tests and compliance with these specifications shall be the basis upon which the Geotechnical Engineer will judge satisfactory completion of work.

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 Geotechnical Engineering Investigation report.

The Contractor shall make his own interpretation of the data contained in the Geotechnical Engineering Investigation report and the Contractor shall not be relieved of liability under the Contract 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 wind-blown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing, over-excavation of the proposed building pad areas, preparation of foundation materials for receiving fill, construction of Engineered Fill including the placement of non-expansive fill where recommended by the Geotechnical Engineer.

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 Geotechnical Engineer to be deleterious. Site stripping to remove organic materials and organic-laden soils in landscaped areas shall extend to a minimum depth of 2 inches or until all organic-laden soil with organic matter in excess of 3 percent of the soils by volume are removed. 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 that would permit removal of all roots greater than 1 inch in diameter. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavation should not be permitted until all exposed surfaces have been inspected and the Geotechnical Engineer is present for the proper control of backfill placement and compaction. Burning in areas that are to receive fill materials shall not be permitted.

Excavations required to achieve design grades, depressions, soft or pliant areas, or areas disturbed by demolition activities extending below planned finished subgrade levels should be excavated down to firm, undisturbed soil and backfilled with Engineered Fill. The resulting excavations should be backfilled with Engineered Fill.

EXCAVATION: Following clearing and grubbing operations, the proposed building pad area shall be over-excavated to a depth of at least five feet below existing grades or three feet below the planned foundation bottom levels, whichever is deeper, and the remaining areas of the building and adjoining exterior concrete flatwork or pavements at the building perimeter shall be over-excavated to a depth of at least one foot below existing grade. The areas of over-excavation and recompaction beneath footings and slabs shall extend out laterally a minimum of five feet beyond the perimeter of these elements.

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**.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill or to support structures directly, shall be scarified to a depth of 8 inches, moisture-conditioned as necessary and compacted in accordance with the **TECHNICAL REQUIREMENTS**, above.

Loose soil areas and/or areas of disturbed soil shall be should be excavated down to firm, undisturbed soil, moisture-conditioned as necessary and backfilled with Engineered Fill. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas that are to receive fill materials shall be approved by the Geotechnical Engineer prior to the placement of any of the fill material.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Geotechnical Engineer. Material from the required site excavation may be utilized for construction of site fills, with the limitations of their use presented in the Geotechnical Engineer's report, provided the Geotechnical Engineer gives prior approval. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Geotechnical Engineer, and shall comply with the requirements for non-expansive fill, aggregate base or aggregate subbase as applicable for its proposed used on the site as presented in the Geotechnical Engineer's report.

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. Fill materials should be placed and compacted in horizontal lifts, each not exceeding 8 inches in uncompacted thickness. Due to equipment limitations, thinner lifts may be necessary to achieve the recommended level of compaction. Compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Geotechnical Engineer. Additional lifts should not be placed if the previous lift did not meet the required dry density (relative compaction) or if soil conditions are not stable. The compacted subgrade in pavement areas should be non-yielding when proof-rolled with a loaded ten-wheel truck, such as a water truck or dump truck, prior to pavement construction.

Both cut and fill shall be surface-compacted to the satisfaction of the Geotechnical 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 Geotechnical Engineer indicates that the moisture-content and density of previously placed fill is as specified.

Appendix C

General Paving Specifications

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 95 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.

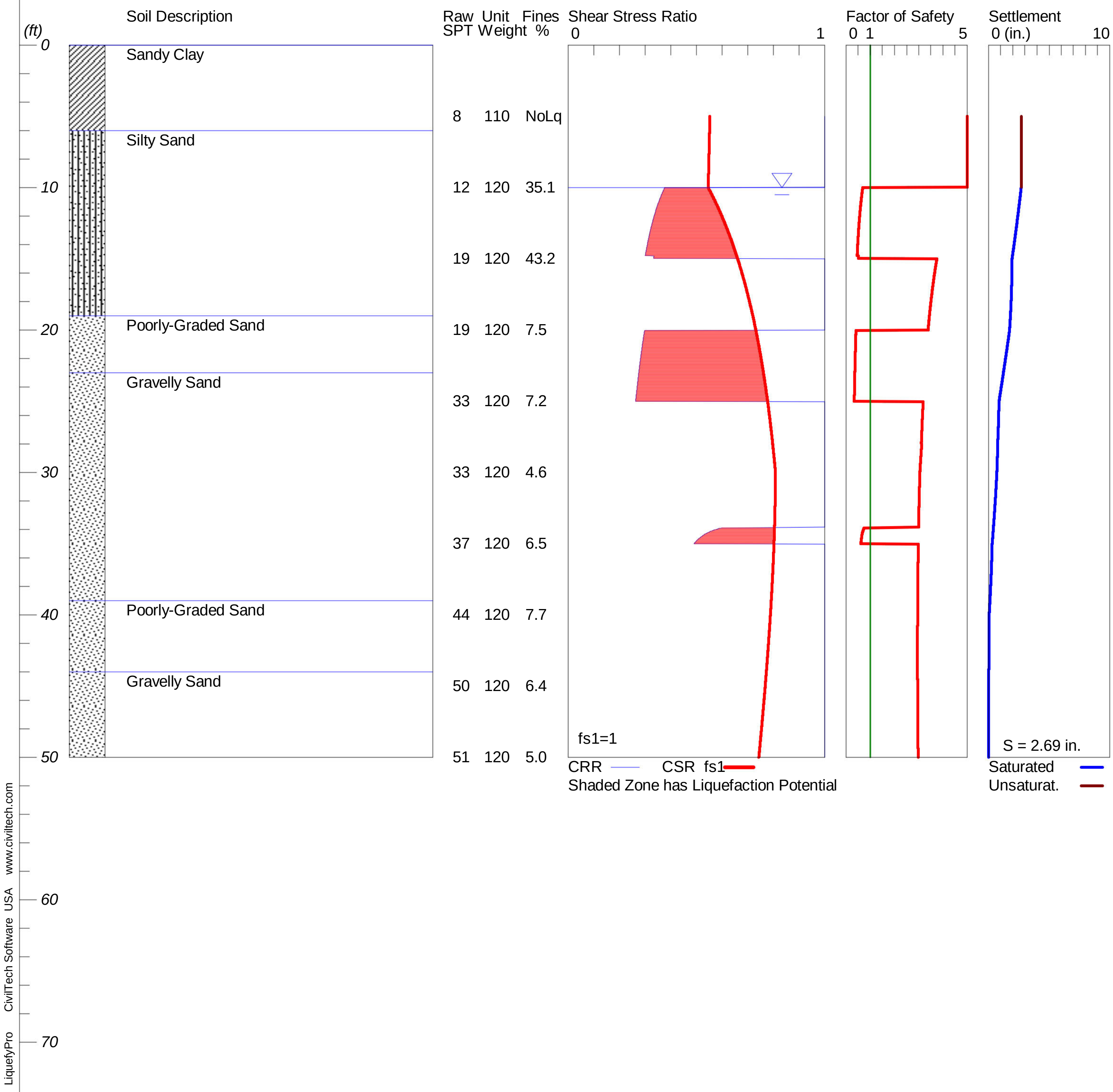
Appendix D

LIQUEFACTION ANALYSIS

INO El Monte

Hole No.=B-1   Water Depth=10 ft

Magnitude=6.9
Acceleration=0.86g



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    *******************************************************************************************************
                                          LIQUEFACTION ANALYSIS SUMMARY
                                         Copyright by CivilTech Software
                                            www.civiltechsoftware.com
    *******************************************************************************************************
        Font: Courier New, Regular, Size 8 is recommended for this report.
        Licensed to ,   7/26/2023       4:23:13 PM

        Input File Name: UNTITLED
        Title:  INO El Monte
        Subtitle:  112-23055

        Surface Elev.=
        Hole No.=B-1
        Depth of Hole= 50.00 ft
        Water Table during Earthquake= 10.00 ft
        Water Table during In-Situ Testing= 50.00 ft
        Max. Acceleration= 0.86 g
        Earthquake Magnitude= 6.90

 Input Data:
        Surface Elev.=
        Hole No.=B-1
        Depth of Hole=50.00 ft
        Water Table during Earthquake= 10.00 ft
        Water Table during In-Situ Testing= 50.00 ft
        Max. Acceleration=0.86 g
        Earthquake Magnitude=6.90
        No-Liquefiable Soils:   CL, OL are Non-Liq. Soil

        1. SPT or BPT Calculation.
        2. Settlement Analysis Method: Tokimatsu/Seed
        3. Fines Correction for Liquefaction: Idriss/Seed
        4. Fine Correction for Settlement: During Liquefaction*
        5. Settlement Calculation in: All zones*
        6. Hammer Energy Ratio,                                   Ce = 1.25
        7. Borehole Diameter,                                         Cb= 1
        8. Sampling Method,                                          Cs= 1
        9. User request factor of safety (apply to CSR) ,   User= 1
           Plot one CSR curve (fs1=1)
        10. Use Curve Smoothing: No
        * Recommended Options

        In-Situ Test Data:
        Depth   SPT     gamma   Fines
        ft              pcf     %
        ____________________________________
        5.00    8.00    110.00  NoLiq
        10.00   12.00   120.00  35.10
        15.00   19.00   120.00  43.20
        20.00   19.00   120.00  7.50
        25.00   33.00   120.00  7.20
        30.00   33.00   120.00  4.60
        35.00   37.00   120.00  6.50
        40.00   44.00   120.00  7.70
        45.00   50.00   120.00  6.40
        50.00   51.00   120.00  5.00
        ____________________________________

Output Results:
        Settlement of Saturated Sands=2.69 in.
        Settlement of Unsaturated Sands=0.00 in.
        Total Settlement of Saturated and Unsaturated Sands=2.69 in.
        Differential Settlement=1.346 to 1.776 in.

        Depth   CRRm    CSRfs   F.S.    S_sat.  S_dry   S_all
        ft                              in.     in.     in.
        _______________________________________________________
        5.00    2.00    0.55    5.00    2.69    0.00    2.69
        5.05    2.00    0.55    5.00    2.69    0.00    2.69
        5.10    2.00    0.55    5.00    2.69    0.00    2.69
```

```
5.15    2.00    0.55    5.00    2.69    0.00    2.69
5.20    2.00    0.55    5.00    2.69    0.00    2.69
5.25    2.00    0.55    5.00    2.69    0.00    2.69
5.30    2.00    0.55    5.00    2.69    0.00    2.69
5.35    2.00    0.55    5.00    2.69    0.00    2.69
5.40    2.00    0.55    5.00    2.69    0.00    2.69
5.45    2.00    0.55    5.00    2.69    0.00    2.69
5.50    2.00    0.55    5.00    2.69    0.00    2.69
5.55    2.00    0.55    5.00    2.69    0.00    2.69
5.60    2.00    0.55    5.00    2.69    0.00    2.69
5.65    2.00    0.55    5.00    2.69    0.00    2.69
5.70    2.00    0.55    5.00    2.69    0.00    2.69
5.75    2.00    0.55    5.00    2.69    0.00    2.69
5.80    2.00    0.55    5.00    2.69    0.00    2.69
5.85    2.00    0.55    5.00    2.69    0.00    2.69
5.90    2.00    0.55    5.00    2.69    0.00    2.69
5.95    2.00    0.55    5.00    2.69    0.00    2.69
6.00    2.00    0.55    5.00    2.69    0.00    2.69
6.05    2.00    0.55    5.00    2.69    0.00    2.69
6.10    2.00    0.55    5.00    2.69    0.00    2.69
6.15    2.00    0.55    5.00    2.69    0.00    2.69
6.20    2.00    0.55    5.00    2.69    0.00    2.69
6.25    2.00    0.55    5.00    2.69    0.00    2.69
6.30    2.00    0.55    5.00    2.69    0.00    2.69
6.35    2.00    0.55    5.00    2.69    0.00    2.69
6.40    2.00    0.55    5.00    2.69    0.00    2.69
6.45    2.00    0.55    5.00    2.69    0.00    2.69
6.50    2.00    0.55    5.00    2.69    0.00    2.69
6.55    2.00    0.55    5.00    2.69    0.00    2.69
6.60    2.00    0.55    5.00    2.69    0.00    2.69
6.65    2.00    0.55    5.00    2.69    0.00    2.69
6.70    2.00    0.55    5.00    2.69    0.00    2.69
6.75    2.00    0.55    5.00    2.69    0.00    2.69
6.80    2.00    0.55    5.00    2.69    0.00    2.69
6.85    2.00    0.55    5.00    2.69    0.00    2.69
6.90    2.00    0.55    5.00    2.69    0.00    2.69
6.95    2.00    0.55    5.00    2.69    0.00    2.69
7.00    2.00    0.55    5.00    2.69    0.00    2.69
7.05    2.00    0.55    5.00    2.69    0.00    2.69
7.10    2.00    0.55    5.00    2.69    0.00    2.69
7.15    2.00    0.55    5.00    2.69    0.00    2.69
7.20    2.00    0.55    5.00    2.69    0.00    2.69
7.25    2.00    0.55    5.00    2.69    0.00    2.69
7.30    2.00    0.55    5.00    2.69    0.00    2.69
7.35    2.00    0.55    5.00    2.69    0.00    2.69
7.40    2.00    0.55    5.00    2.69    0.00    2.69
7.45    2.00    0.55    5.00    2.69    0.00    2.69
7.50    2.00    0.55    5.00    2.69    0.00    2.69
7.55    2.00    0.55    5.00    2.69    0.00    2.69
7.60    2.00    0.55    5.00    2.69    0.00    2.69
7.65    2.00    0.55    5.00    2.69    0.00    2.69
7.70    2.00    0.55    5.00    2.69    0.00    2.69
7.75    2.00    0.55    5.00    2.69    0.00    2.69
7.80    2.00    0.55    5.00    2.69    0.00    2.69
7.85    2.00    0.55    5.00    2.69    0.00    2.69
7.90    2.00    0.55    5.00    2.69    0.00    2.69
7.95    2.00    0.55    5.00    2.69    0.00    2.69
8.00    2.00    0.55    5.00    2.69    0.00    2.69
8.05    2.00    0.55    5.00    2.69    0.00    2.69
8.10    2.00    0.55    5.00    2.69    0.00    2.69
8.15    2.00    0.55    5.00    2.69    0.00    2.69
8.20    2.00    0.55    5.00    2.69    0.00    2.69
8.25    2.00    0.55    5.00    2.69    0.00    2.69
8.30    2.00    0.55    5.00    2.69    0.00    2.69
8.35    2.00    0.55    5.00    2.69    0.00    2.69
8.40    2.00    0.55    5.00    2.69    0.00    2.69
8.45    2.00    0.55    5.00    2.69    0.00    2.69
8.50    2.00    0.55    5.00    2.69    0.00    2.69
8.55    2.00    0.55    5.00    2.69    0.00    2.69
8.60    2.00    0.55    5.00    2.69    0.00    2.69
8.65    2.00    0.55    5.00    2.69    0.00    2.69
```

```
8.70    2.00    0.55    5.00    2.69    0.00    2.69
8.75    2.00    0.55    5.00    2.69    0.00    2.69
8.80    2.00    0.55    5.00    2.69    0.00    2.69
8.85    2.00    0.55    5.00    2.69    0.00    2.69
8.90    2.00    0.55    5.00    2.69    0.00    2.69
8.95    2.00    0.55    5.00    2.69    0.00    2.69
9.00    2.00    0.55    5.00    2.69    0.00    2.69
9.05    2.00    0.55    5.00    2.69    0.00    2.69
9.10    2.00    0.55    5.00    2.69    0.00    2.69
9.15    2.00    0.55    5.00    2.69    0.00    2.69
9.20    2.00    0.55    5.00    2.69    0.00    2.69
9.25    2.00    0.55    5.00    2.69    0.00    2.69
9.30    2.00    0.55    5.00    2.69    0.00    2.69
9.35    2.00    0.55    5.00    2.69    0.00    2.69
9.40    2.00    0.55    5.00    2.69    0.00    2.69
9.45    2.00    0.55    5.00    2.69    0.00    2.69
9.50    2.00    0.55    5.00    2.69    0.00    2.69
9.55    2.00    0.55    5.00    2.69    0.00    2.69
9.60    2.00    0.55    5.00    2.69    0.00    2.69
9.65    2.00    0.55    5.00    2.69    0.00    2.69
9.70    2.00    0.55    5.00    2.69    0.00    2.69
9.75    2.00    0.55    5.00    2.69    0.00    2.69
9.80    2.00    0.55    5.00    2.69    0.00    2.69
9.85    2.00    0.55    5.00    2.69    0.00    2.69
9.90    2.00    0.55    5.00    2.69    0.00    2.69
9.95    2.00    0.55    5.00    2.69    0.00    2.69
10.00   0.38    0.55    0.69*   2.69    0.00    2.69
10.05   0.37    0.55    0.68*   2.68    0.00    2.68
10.10   0.37    0.55    0.68*   2.68    0.00    2.68
10.15   0.37    0.55    0.68*   2.67    0.00    2.67
10.20   0.37    0.55    0.67*   2.66    0.00    2.66
10.25   0.37    0.55    0.67*   2.66    0.00    2.66
10.30   0.37    0.55    0.66*   2.65    0.00    2.65
10.35   0.37    0.56    0.66*   2.64    0.00    2.64
10.40   0.37    0.56    0.66*   2.64    0.00    2.64
10.45   0.36    0.56    0.65*   2.63    0.00    2.63
10.50   0.36    0.56    0.65*   2.62    0.00    2.62
10.55   0.36    0.56    0.65*   2.62    0.00    2.62
10.60   0.36    0.56    0.64*   2.61    0.00    2.61
10.65   0.36    0.56    0.64*   2.60    0.00    2.60
10.70   0.36    0.57    0.63*   2.60    0.00    2.60
10.75   0.36    0.57    0.63*   2.59    0.00    2.59
10.80   0.36    0.57    0.63*   2.58    0.00    2.58
10.85   0.36    0.57    0.62*   2.57    0.00    2.57
10.90   0.35    0.57    0.62*   2.57    0.00    2.57
10.95   0.35    0.57    0.62*   2.56    0.00    2.56
11.00   0.35    0.57    0.61*   2.55    0.00    2.55
11.05   0.35    0.58    0.61*   2.55    0.00    2.55
11.10   0.35    0.58    0.61*   2.54    0.00    2.54
11.15   0.35    0.58    0.61*   2.53    0.00    2.53
11.20   0.35    0.58    0.60*   2.53    0.00    2.53
11.25   0.35    0.58    0.60*   2.52    0.00    2.52
11.30   0.35    0.58    0.60*   2.51    0.00    2.51
11.35   0.35    0.58    0.59*   2.50    0.00    2.50
11.40   0.35    0.58    0.59*   2.50    0.00    2.50
11.45   0.34    0.59    0.59*   2.49    0.00    2.49
11.50   0.34    0.59    0.58*   2.48    0.00    2.48
11.55   0.34    0.59    0.58*   2.47    0.00    2.47
11.60   0.34    0.59    0.58*   2.47    0.00    2.47
11.65   0.34    0.59    0.58*   2.46    0.00    2.46
11.70   0.34    0.59    0.57*   2.45    0.00    2.45
11.75   0.34    0.59    0.57*   2.45    0.00    2.45
11.80   0.34    0.59    0.57*   2.44    0.00    2.44
11.85   0.34    0.60    0.57*   2.43    0.00    2.43
11.90   0.34    0.60    0.56*   2.42    0.00    2.42
11.95   0.34    0.60    0.56*   2.42    0.00    2.42
12.00   0.33    0.60    0.56*   2.41    0.00    2.41
12.05   0.33    0.60    0.56*   2.40    0.00    2.40
12.10   0.33    0.60    0.55*   2.39    0.00    2.39
12.15   0.33    0.60    0.55*   2.39    0.00    2.39
12.20   0.33    0.60    0.55*   2.38    0.00    2.38
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12.25   0.33    0.61    0.55*   2.37    0.00    2.37
12.30   0.33    0.61    0.54*   2.36    0.00    2.36
12.35   0.33    0.61    0.54*   2.36    0.00    2.36
12.40   0.33    0.61    0.54*   2.35    0.00    2.35
12.45   0.33    0.61    0.54*   2.34    0.00    2.34
12.50   0.33    0.61    0.54*   2.33    0.00    2.33
12.55   0.33    0.61    0.53*   2.33    0.00    2.33
12.60   0.33    0.61    0.53*   2.32    0.00    2.32
12.65   0.33    0.61    0.53*   2.31    0.00    2.31
12.70   0.32    0.62    0.53*   2.30    0.00    2.30
12.75   0.32    0.62    0.53*   2.30    0.00    2.30
12.80   0.32    0.62    0.52*   2.29    0.00    2.29
12.85   0.32    0.62    0.52*   2.28    0.00    2.28
12.90   0.32    0.62    0.52*   2.27    0.00    2.27
12.95   0.32    0.62    0.52*   2.26    0.00    2.26
13.00   0.32    0.62    0.52*   2.26    0.00    2.26
13.05   0.32    0.62    0.51*   2.25    0.00    2.25
13.10   0.32    0.62    0.51*   2.24    0.00    2.24
13.15   0.32    0.62    0.51*   2.23    0.00    2.23
13.20   0.32    0.63    0.51*   2.23    0.00    2.23
13.25   0.32    0.63    0.51*   2.22    0.00    2.22
13.30   0.32    0.63    0.50*   2.21    0.00    2.21
13.35   0.32    0.63    0.50*   2.20    0.00    2.20
13.40   0.32    0.63    0.50*   2.19    0.00    2.19
13.45   0.31    0.63    0.50*   2.19    0.00    2.19
13.50   0.31    0.63    0.50*   2.18    0.00    2.18
13.55   0.31    0.63    0.50*   2.17    0.00    2.17
13.60   0.31    0.63    0.49*   2.16    0.00    2.16
13.65   0.31    0.64    0.49*   2.16    0.00    2.16
13.70   0.31    0.64    0.49*   2.15    0.00    2.15
13.75   0.31    0.64    0.49*   2.14    0.00    2.14
13.80   0.31    0.64    0.49*   2.13    0.00    2.13
13.85   0.31    0.64    0.49*   2.12    0.00    2.12
13.90   0.31    0.64    0.48*   2.12    0.00    2.12
13.95   0.31    0.64    0.48*   2.11    0.00    2.11
14.00   0.31    0.64    0.48*   2.10    0.00    2.10
14.05   0.31    0.64    0.48*   2.09    0.00    2.09
14.10   0.31    0.64    0.48*   2.08    0.00    2.08
14.15   0.31    0.65    0.48*   2.08    0.00    2.08
14.20   0.31    0.65    0.47*   2.07    0.00    2.07
14.25   0.31    0.65    0.47*   2.06    0.00    2.06
14.30   0.31    0.65    0.47*   2.05    0.00    2.05
14.35   0.30    0.65    0.47*   2.04    0.00    2.04
14.40   0.30    0.65    0.47*   2.04    0.00    2.04
14.45   0.30    0.65    0.47*   2.03    0.00    2.03
14.50   0.30    0.65    0.47*   2.02    0.00    2.02
14.55   0.30    0.65    0.46*   2.01    0.00    2.01
14.60   0.30    0.65    0.46*   2.00    0.00    2.00
14.65   0.30    0.65    0.46*   1.99    0.00    1.99
14.70   0.30    0.66    0.46*   1.99    0.00    1.99
14.75   0.30    0.66    0.46*   1.98    0.00    1.98
14.80   0.33    0.66    0.51*   1.97    0.00    1.97
14.85   0.33    0.66    0.51*   1.96    0.00    1.96
14.90   0.33    0.66    0.51*   1.96    0.00    1.96
14.95   0.33    0.66    0.50*   1.95    0.00    1.95
15.00   2.48    0.66    3.75    1.94    0.00    1.94
15.05   2.48    0.66    3.74    1.94    0.00    1.94
15.10   2.48    0.66    3.74    1.94    0.00    1.94
15.15   2.48    0.66    3.73    1.94    0.00    1.94
15.20   2.48    0.66    3.73    1.94    0.00    1.94
15.25   2.48    0.67    3.72    1.94    0.00    1.94
15.30   2.48    0.67    3.72    1.94    0.00    1.94
15.35   2.48    0.67    3.71    1.93    0.00    1.93
15.40   2.48    0.67    3.71    1.93    0.00    1.93
15.45   2.48    0.67    3.70    1.93    0.00    1.93
15.50   2.48    0.67    3.70    1.93    0.00    1.93
15.55   2.48    0.67    3.69    1.93    0.00    1.93
15.60   2.48    0.67    3.69    1.93    0.00    1.93
15.65   2.48    0.67    3.68    1.93    0.00    1.93
15.70   2.48    0.67    3.68    1.93    0.00    1.93
15.75   2.48    0.67    3.68    1.93    0.00    1.93
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15.80   2.48    0.67    3.67    1.93    0.00    1.93
15.85   2.48    0.68    3.67    1.92    0.00    1.92
15.90   2.48    0.68    3.66    1.92    0.00    1.92
15.95   2.48    0.68    3.66    1.92    0.00    1.92
16.00   2.48    0.68    3.65    1.92    0.00    1.92
16.05   2.48    0.68    3.65    1.92    0.00    1.92
16.10   2.48    0.68    3.64    1.92    0.00    1.92
16.15   2.48    0.68    3.64    1.92    0.00    1.92
16.20   2.48    0.68    3.64    1.92    0.00    1.92
16.25   2.48    0.68    3.63    1.92    0.00    1.92
16.30   2.48    0.68    3.63    1.91    0.00    1.91
16.35   2.48    0.68    3.62    1.91    0.00    1.91
16.40   2.48    0.68    3.62    1.91    0.00    1.91
16.45   2.48    0.68    3.62    1.91    0.00    1.91
16.50   2.48    0.69    3.61    1.91    0.00    1.91
16.55   2.48    0.69    3.61    1.91    0.00    1.91
16.60   2.48    0.69    3.60    1.91    0.00    1.91
16.65   2.48    0.69    3.60    1.91    0.00    1.91
16.70   2.48    0.69    3.60    1.91    0.00    1.91
16.75   2.48    0.69    3.59    1.90    0.00    1.90
16.80   2.48    0.69    3.59    1.90    0.00    1.90
16.85   2.48    0.69    3.58    1.90    0.00    1.90
16.90   2.48    0.69    3.58    1.90    0.00    1.90
16.95   2.48    0.69    3.58    1.90    0.00    1.90
17.00   2.48    0.69    3.57    1.90    0.00    1.90
17.05   2.48    0.69    3.57    1.90    0.00    1.90
17.10   2.48    0.69    3.56    1.89    0.00    1.89
17.15   2.48    0.70    3.56    1.89    0.00    1.89
17.20   2.48    0.70    3.56    1.89    0.00    1.89
17.25   2.48    0.70    3.55    1.89    0.00    1.89
17.30   2.48    0.70    3.55    1.89    0.00    1.89
17.35   2.48    0.70    3.55    1.89    0.00    1.89
17.40   2.48    0.70    3.54    1.88    0.00    1.88
17.45   2.48    0.70    3.54    1.88    0.00    1.88
17.50   2.48    0.70    3.54    1.88    0.00    1.88
17.55   2.48    0.70    3.53    1.88    0.00    1.88
17.60   2.48    0.70    3.53    1.88    0.00    1.88
17.65   2.48    0.70    3.53    1.88    0.00    1.88
17.70   2.48    0.70    3.52    1.87    0.00    1.87
17.75   2.48    0.70    3.52    1.87    0.00    1.87
17.80   2.48    0.70    3.52    1.87    0.00    1.87
17.85   2.48    0.70    3.51    1.87    0.00    1.87
17.90   2.48    0.71    3.51    1.86    0.00    1.86
17.95   2.48    0.71    3.50    1.86    0.00    1.86
18.00   2.48    0.71    3.50    1.86    0.00    1.86
18.05   2.48    0.71    3.50    1.86    0.00    1.86
18.10   2.48    0.71    3.50    1.85    0.00    1.85
18.15   2.48    0.71    3.49    1.85    0.00    1.85
18.20   2.48    0.71    3.49    1.85    0.00    1.85
18.25   2.48    0.71    3.49    1.85    0.00    1.85
18.30   2.48    0.71    3.48    1.84    0.00    1.84
18.35   2.48    0.71    3.48    1.84    0.00    1.84
18.40   2.48    0.71    3.48    1.84    0.00    1.84
18.45   2.48    0.71    3.47    1.84    0.00    1.84
18.50   2.48    0.71    3.47    1.83    0.00    1.83
18.55   2.48    0.71    3.47    1.83    0.00    1.83
18.60   2.48    0.71    3.46    1.83    0.00    1.83
18.65   2.48    0.72    3.46    1.82    0.00    1.82
18.70   2.48    0.72    3.46    1.82    0.00    1.82
18.75   2.48    0.72    3.45    1.82    0.00    1.82
18.80   2.48    0.72    3.45    1.81    0.00    1.81
18.85   2.48    0.72    3.45    1.81    0.00    1.81
18.90   2.48    0.72    3.45    1.81    0.00    1.81
18.95   2.48    0.72    3.44    1.81    0.00    1.81
19.00   2.48    0.72    3.44    1.80    0.00    1.80
19.05   2.48    0.72    3.44    1.80    0.00    1.80
19.10   2.48    0.72    3.43    1.80    0.00    1.80
19.15   2.48    0.72    3.43    1.79    0.00    1.79
19.20   2.48    0.72    3.43    1.79    0.00    1.79
19.25   2.48    0.72    3.42    1.79    0.00    1.79
19.30   2.48    0.72    3.42    1.78    0.00    1.78
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19.35   2.48    0.72    3.42    1.78    0.00    1.78
19.40   2.48    0.72    3.42    1.78    0.00    1.78
19.45   2.48    0.73    3.41    1.77    0.00    1.77
19.50   2.48    0.73    3.41    1.77    0.00    1.77
19.55   2.48    0.73    3.41    1.77    0.00    1.77
19.60   2.48    0.73    3.41    1.76    0.00    1.76
19.65   2.48    0.73    3.40    1.76    0.00    1.76
19.70   2.48    0.73    3.40    1.75    0.00    1.75
19.75   2.48    0.73    3.40    1.75    0.00    1.75
19.80   2.48    0.73    3.39    1.75    0.00    1.75
19.85   2.48    0.73    3.39    1.74    0.00    1.74
19.90   2.48    0.73    3.39    1.74    0.00    1.74
19.95   2.48    0.73    3.39    1.74    0.00    1.74
20.00   2.48    0.73    3.38    1.73    0.00    1.73
20.05   0.30    0.73    0.41*   1.73    0.00    1.73
20.10   0.30    0.73    0.41*   1.72    0.00    1.72
20.15   0.30    0.73    0.40*   1.71    0.00    1.71
20.20   0.30    0.73    0.40*   1.70    0.00    1.70
20.25   0.30    0.73    0.40*   1.70    0.00    1.70
20.30   0.30    0.73    0.40*   1.69    0.00    1.69
20.35   0.30    0.74    0.40*   1.68    0.00    1.68
20.40   0.29    0.74    0.40*   1.67    0.00    1.67
20.45   0.29    0.74    0.40*   1.66    0.00    1.66
20.50   0.29    0.74    0.40*   1.65    0.00    1.65
20.55   0.29    0.74    0.40*   1.65    0.00    1.65
20.60   0.29    0.74    0.40*   1.64    0.00    1.64
20.65   0.29    0.74    0.40*   1.63    0.00    1.63
20.70   0.29    0.74    0.40*   1.62    0.00    1.62
20.75   0.29    0.74    0.39*   1.61    0.00    1.61
20.80   0.29    0.74    0.39*   1.60    0.00    1.60
20.85   0.29    0.74    0.39*   1.60    0.00    1.60
20.90   0.29    0.74    0.39*   1.59    0.00    1.59
20.95   0.29    0.74    0.39*   1.58    0.00    1.58
21.00   0.29    0.74    0.39*   1.57    0.00    1.57
21.05   0.29    0.74    0.39*   1.56    0.00    1.56
21.10   0.29    0.74    0.39*   1.55    0.00    1.55
21.15   0.29    0.74    0.39*   1.55    0.00    1.55
21.20   0.29    0.74    0.39*   1.54    0.00    1.54
21.25   0.29    0.74    0.39*   1.53    0.00    1.53
21.30   0.29    0.75    0.39*   1.52    0.00    1.52
21.35   0.29    0.75    0.38*   1.51    0.00    1.51
21.40   0.29    0.75    0.38*   1.50    0.00    1.50
21.45   0.29    0.75    0.38*   1.49    0.00    1.49
21.50   0.29    0.75    0.38*   1.49    0.00    1.49
21.55   0.29    0.75    0.38*   1.48    0.00    1.48
21.60   0.29    0.75    0.38*   1.47    0.00    1.47
21.65   0.28    0.75    0.38*   1.46    0.00    1.46
21.70   0.28    0.75    0.38*   1.45    0.00    1.45
21.75   0.28    0.75    0.38*   1.44    0.00    1.44
21.80   0.28    0.75    0.38*   1.43    0.00    1.43
21.85   0.28    0.75    0.38*   1.43    0.00    1.43
21.90   0.28    0.75    0.38*   1.42    0.00    1.42
21.95   0.28    0.75    0.38*   1.41    0.00    1.41
22.00   0.28    0.75    0.38*   1.40    0.00    1.40
22.05   0.28    0.75    0.37*   1.39    0.00    1.39
22.10   0.28    0.75    0.37*   1.38    0.00    1.38
22.15   0.28    0.75    0.37*   1.37    0.00    1.37
22.20   0.28    0.75    0.37*   1.37    0.00    1.37
22.25   0.28    0.75    0.37*   1.36    0.00    1.36
22.30   0.28    0.75    0.37*   1.35    0.00    1.35
22.35   0.28    0.76    0.37*   1.34    0.00    1.34
22.40   0.28    0.76    0.37*   1.33    0.00    1.33
22.45   0.28    0.76    0.37*   1.32    0.00    1.32
22.50   0.28    0.76    0.37*   1.31    0.00    1.31
22.55   0.28    0.76    0.37*   1.30    0.00    1.30
22.60   0.28    0.76    0.37*   1.30    0.00    1.30
22.65   0.28    0.76    0.37*   1.29    0.00    1.29
22.70   0.28    0.76    0.37*   1.28    0.00    1.28
22.75   0.28    0.76    0.36*   1.27    0.00    1.27
22.80   0.28    0.76    0.36*   1.26    0.00    1.26
22.85   0.28    0.76    0.36*   1.25    0.00    1.25
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22.90   0.28    0.76    0.36*   1.24    0.00    1.24
22.95   0.28    0.76    0.36*   1.23    0.00    1.23
23.00   0.28    0.76    0.36*   1.23    0.00    1.23
23.05   0.27    0.76    0.36*   1.22    0.00    1.22
23.10   0.27    0.76    0.36*   1.21    0.00    1.21
23.15   0.27    0.76    0.36*   1.20    0.00    1.20
23.20   0.27    0.76    0.36*   1.19    0.00    1.19
23.25   0.27    0.76    0.36*   1.18    0.00    1.18
23.30   0.27    0.76    0.36*   1.17    0.00    1.17
23.35   0.27    0.76    0.36*   1.16    0.00    1.16
23.40   0.27    0.76    0.36*   1.15    0.00    1.15
23.45   0.27    0.77    0.36*   1.15    0.00    1.15
23.50   0.27    0.77    0.36*   1.14    0.00    1.14
23.55   0.27    0.77    0.35*   1.13    0.00    1.13
23.60   0.27    0.77    0.35*   1.12    0.00    1.12
23.65   0.27    0.77    0.35*   1.11    0.00    1.11
23.70   0.27    0.77    0.35*   1.10    0.00    1.10
23.75   0.27    0.77    0.35*   1.09    0.00    1.09
23.80   0.27    0.77    0.35*   1.08    0.00    1.08
23.85   0.27    0.77    0.35*   1.07    0.00    1.07
23.90   0.27    0.77    0.35*   1.07    0.00    1.07
23.95   0.27    0.77    0.35*   1.06    0.00    1.06
24.00   0.27    0.77    0.35*   1.05    0.00    1.05
24.05   0.27    0.77    0.35*   1.04    0.00    1.04
24.10   0.27    0.77    0.35*   1.03    0.00    1.03
24.15   0.27    0.77    0.35*   1.02    0.00    1.02
24.20   0.27    0.77    0.35*   1.01    0.00    1.01
24.25   0.27    0.77    0.35*   1.00    0.00    1.00
24.30   0.27    0.77    0.35*   0.99    0.00    0.99
24.35   0.27    0.77    0.35*   0.98    0.00    0.98
24.40   0.27    0.77    0.34*   0.98    0.00    0.98
24.45   0.27    0.77    0.34*   0.97    0.00    0.97
24.50   0.27    0.77    0.34*   0.96    0.00    0.96
24.55   0.27    0.77    0.34*   0.95    0.00    0.95
24.60   0.27    0.77    0.34*   0.94    0.00    0.94
24.65   0.27    0.77    0.34*   0.93    0.00    0.93
24.70   0.26    0.78    0.34*   0.92    0.00    0.92
24.75   0.26    0.78    0.34*   0.91    0.00    0.91
24.80   0.26    0.78    0.34*   0.90    0.00    0.90
24.85   0.26    0.78    0.34*   0.89    0.00    0.89
24.90   0.26    0.78    0.34*   0.88    0.00    0.88
24.95   0.26    0.78    0.34*   0.88    0.00    0.88
25.00   0.26    0.78    0.34*   0.87    0.00    0.87
25.05   2.48    0.78    3.18    0.86    0.00    0.86
25.10   2.48    0.78    3.18    0.86    0.00    0.86
25.15   2.48    0.78    3.18    0.85    0.00    0.85
25.20   2.48    0.78    3.18    0.85    0.00    0.85
25.25   2.48    0.78    3.18    0.85    0.00    0.85
25.30   2.48    0.78    3.18    0.85    0.00    0.85
25.35   2.48    0.78    3.17    0.85    0.00    0.85
25.40   2.48    0.78    3.17    0.85    0.00    0.85
25.45   2.48    0.78    3.17    0.85    0.00    0.85
25.50   2.48    0.78    3.17    0.85    0.00    0.85
25.55   2.48    0.78    3.17    0.85    0.00    0.85
25.60   2.48    0.78    3.17    0.84    0.00    0.84
25.65   2.48    0.78    3.16    0.84    0.00    0.84
25.70   2.48    0.78    3.16    0.84    0.00    0.84
25.75   2.48    0.78    3.16    0.84    0.00    0.84
25.80   2.48    0.78    3.16    0.84    0.00    0.84
25.85   2.48    0.78    3.16    0.84    0.00    0.84
25.90   2.48    0.78    3.16    0.84    0.00    0.84
25.95   2.48    0.78    3.16    0.84    0.00    0.84
26.00   2.48    0.78    3.16    0.83    0.00    0.83
26.05   2.48    0.78    3.15    0.83    0.00    0.83
26.10   2.48    0.79    3.15    0.83    0.00    0.83
26.15   2.48    0.79    3.15    0.83    0.00    0.83
26.20   2.48    0.79    3.15    0.83    0.00    0.83
26.25   2.48    0.79    3.15    0.83    0.00    0.83
26.30   2.48    0.79    3.15    0.82    0.00    0.82
26.35   2.48    0.79    3.15    0.82    0.00    0.82
26.40   2.48    0.79    3.14    0.82    0.00    0.82
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26.45	2.48	0.79	3.14	0.82	0.00	0.82
26.50	2.48	0.79	3.14	0.82	0.00	0.82
26.55	2.48	0.79	3.14	0.82	0.00	0.82
26.60	2.48	0.79	3.14	0.81	0.00	0.81
26.65	2.48	0.79	3.14	0.81	0.00	0.81
26.70	2.48	0.79	3.14	0.81	0.00	0.81
26.75	2.48	0.79	3.14	0.81	0.00	0.81
26.80	2.48	0.79	3.13	0.81	0.00	0.81
26.85	2.48	0.79	3.13	0.80	0.00	0.80
26.90	2.48	0.79	3.13	0.80	0.00	0.80
26.95	2.48	0.79	3.13	0.80	0.00	0.80
27.00	2.48	0.79	3.13	0.80	0.00	0.80
27.05	2.48	0.79	3.13	0.79	0.00	0.79
27.10	2.48	0.79	3.13	0.79	0.00	0.79
27.15	2.48	0.79	3.13	0.79	0.00	0.79
27.20	2.48	0.79	3.12	0.79	0.00	0.79
27.25	2.48	0.79	3.12	0.79	0.00	0.79
27.30	2.48	0.79	3.12	0.78	0.00	0.78
27.35	2.48	0.79	3.12	0.78	0.00	0.78
27.40	2.48	0.79	3.12	0.78	0.00	0.78
27.45	2.48	0.79	3.12	0.78	0.00	0.78
27.50	2.48	0.79	3.12	0.77	0.00	0.77
27.55	2.48	0.79	3.12	0.77	0.00	0.77
27.60	2.48	0.79	3.11	0.77	0.00	0.77
27.65	2.48	0.80	3.11	0.77	0.00	0.77
27.70	2.48	0.80	3.11	0.76	0.00	0.76
27.75	2.48	0.80	3.11	0.76	0.00	0.76
27.80	2.48	0.80	3.11	0.76	0.00	0.76
27.85	2.48	0.80	3.11	0.75	0.00	0.75
27.90	2.48	0.80	3.11	0.75	0.00	0.75
27.95	2.48	0.80	3.11	0.75	0.00	0.75
28.00	2.49	0.80	3.12	0.75	0.00	0.75
28.05	2.49	0.80	3.12	0.75	0.00	0.75
28.10	2.49	0.80	3.12	0.75	0.00	0.75
28.15	2.49	0.80	3.12	0.75	0.00	0.75
28.20	2.49	0.80	3.12	0.74	0.00	0.74
28.25	2.49	0.80	3.11	0.74	0.00	0.74
28.30	2.49	0.80	3.11	0.74	0.00	0.74
28.35	2.48	0.80	3.11	0.74	0.00	0.74
28.40	2.48	0.80	3.11	0.74	0.00	0.74
28.45	2.48	0.80	3.11	0.74	0.00	0.74
28.50	2.48	0.80	3.10	0.74	0.00	0.74
28.55	2.48	0.80	3.10	0.74	0.00	0.74
28.60	2.48	0.80	3.10	0.73	0.00	0.73
28.65	2.48	0.80	3.10	0.73	0.00	0.73
28.70	2.48	0.80	3.10	0.73	0.00	0.73
28.75	2.48	0.80	3.09	0.73	0.00	0.73
28.80	2.48	0.80	3.09	0.73	0.00	0.73
28.85	2.48	0.80	3.09	0.73	0.00	0.73
28.90	2.48	0.80	3.09	0.73	0.00	0.73
28.95	2.48	0.80	3.09	0.72	0.00	0.72
29.00	2.48	0.80	3.08	0.72	0.00	0.72
29.05	2.47	0.80	3.08	0.72	0.00	0.72
29.10	2.47	0.80	3.08	0.72	0.00	0.72
29.15	2.47	0.80	3.08	0.72	0.00	0.72
29.20	2.47	0.80	3.08	0.72	0.00	0.72
29.25	2.47	0.80	3.07	0.71	0.00	0.71
29.30	2.47	0.80	3.07	0.71	0.00	0.71
29.35	2.47	0.80	3.07	0.71	0.00	0.71
29.40	2.47	0.80	3.07	0.71	0.00	0.71
29.45	2.47	0.81	3.07	0.71	0.00	0.71
29.50	2.47	0.81	3.06	0.70	0.00	0.70
29.55	2.47	0.81	3.06	0.70	0.00	0.70
29.60	2.47	0.81	3.06	0.70	0.00	0.70
29.65	2.47	0.81	3.06	0.70	0.00	0.70
29.70	2.47	0.81	3.06	0.70	0.00	0.70
29.75	2.46	0.81	3.06	0.69	0.00	0.69
29.80	2.46	0.81	3.05	0.69	0.00	0.69
29.85	2.46	0.81	3.05	0.69	0.00	0.69
29.90	2.46	0.81	3.05	0.69	0.00	0.69
29.95	2.46	0.81	3.05	0.68	0.00	0.68

30.00	2.46	0.81	3.05	0.68	0.00	0.68
30.05	2.46	0.81	3.05	0.68	0.00	0.68
30.10	2.46	0.81	3.04	0.68	0.00	0.68
30.15	2.46	0.81	3.04	0.67	0.00	0.67
30.20	2.46	0.81	3.04	0.67	0.00	0.67
30.25	2.46	0.81	3.04	0.67	0.00	0.67
30.30	2.46	0.81	3.04	0.67	0.00	0.67
30.35	2.46	0.81	3.04	0.66	0.00	0.66
30.40	2.46	0.81	3.04	0.66	0.00	0.66
30.45	2.45	0.81	3.04	0.66	0.00	0.66
30.50	2.45	0.81	3.04	0.65	0.00	0.65
30.55	2.45	0.81	3.04	0.65	0.00	0.65
30.60	2.45	0.81	3.04	0.65	0.00	0.65
30.65	2.45	0.81	3.04	0.64	0.00	0.64
30.70	2.45	0.81	3.03	0.64	0.00	0.64
30.75	2.45	0.81	3.03	0.64	0.00	0.64
30.80	2.45	0.81	3.03	0.63	0.00	0.63
30.85	2.45	0.81	3.03	0.63	0.00	0.63
30.90	2.45	0.81	3.03	0.63	0.00	0.63
30.95	2.45	0.81	3.03	0.62	0.00	0.62
31.00	2.45	0.81	3.03	0.62	0.00	0.62
31.05	2.45	0.81	3.03	0.62	0.00	0.62
31.10	2.45	0.81	3.03	0.61	0.00	0.61
31.15	2.44	0.81	3.03	0.61	0.00	0.61
31.20	2.44	0.81	3.03	0.61	0.00	0.61
31.25	2.44	0.81	3.03	0.60	0.00	0.60
31.30	2.44	0.81	3.03	0.60	0.00	0.60
31.35	2.44	0.81	3.02	0.60	0.00	0.60
31.40	2.44	0.81	3.02	0.59	0.00	0.59
31.45	2.44	0.81	3.02	0.59	0.00	0.59
31.50	2.44	0.81	3.02	0.59	0.00	0.59
31.55	2.44	0.81	3.02	0.58	0.00	0.58
31.60	2.44	0.81	3.02	0.58	0.00	0.58
31.65	2.44	0.81	3.02	0.58	0.00	0.58
31.70	2.44	0.81	3.02	0.57	0.00	0.57
31.75	2.44	0.81	3.02	0.57	0.00	0.57
31.80	2.44	0.81	3.02	0.57	0.00	0.57
31.85	2.43	0.81	3.02	0.56	0.00	0.56
31.90	2.43	0.81	3.02	0.56	0.00	0.56
31.95	2.43	0.81	3.02	0.55	0.00	0.55
32.00	2.43	0.81	3.02	0.55	0.00	0.55
32.05	2.43	0.81	3.01	0.55	0.00	0.55
32.10	2.43	0.81	3.01	0.54	0.00	0.54
32.15	2.43	0.81	3.01	0.54	0.00	0.54
32.20	2.43	0.81	3.01	0.54	0.00	0.54
32.25	2.43	0.81	3.01	0.53	0.00	0.53
32.30	2.43	0.81	3.01	0.53	0.00	0.53
32.35	2.43	0.81	3.01	0.52	0.00	0.52
32.40	2.43	0.81	3.01	0.52	0.00	0.52
32.45	2.43	0.81	3.01	0.52	0.00	0.52
32.50	2.43	0.81	3.01	0.51	0.00	0.51
32.55	2.43	0.81	3.01	0.51	0.00	0.51
32.60	2.42	0.81	3.01	0.51	0.00	0.51
32.65	2.42	0.81	3.01	0.50	0.00	0.50
32.70	2.42	0.81	3.01	0.50	0.00	0.50
32.75	2.42	0.81	3.01	0.49	0.00	0.49
32.80	2.42	0.81	3.00	0.49	0.00	0.49
32.85	2.42	0.81	3.00	0.49	0.00	0.49
32.90	2.42	0.81	3.00	0.48	0.00	0.48
32.95	2.42	0.81	3.00	0.48	0.00	0.48
33.00	2.42	0.81	3.00	0.47	0.00	0.47
33.05	2.42	0.81	3.00	0.47	0.00	0.47
33.10	2.42	0.81	3.00	0.46	0.00	0.46
33.15	2.42	0.81	3.00	0.46	0.00	0.46
33.20	2.42	0.81	3.00	0.46	0.00	0.46
33.25	2.42	0.81	3.00	0.45	0.00	0.45
33.30	2.42	0.81	3.00	0.45	0.00	0.45
33.35	2.41	0.81	3.00	0.44	0.00	0.44
33.40	2.41	0.81	3.00	0.44	0.00	0.44
33.45	2.41	0.81	3.00	0.44	0.00	0.44
33.50	2.41	0.81	3.00	0.43	0.00	0.43

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33.55   2.41    0.80    3.00    0.43    0.00    0.43
33.60   2.41    0.80    3.00    0.42    0.00    0.42
33.65   2.41    0.80    2.99    0.42    0.00    0.42
33.70   2.41    0.80    2.99    0.41    0.00    0.41
33.75   2.41    0.80    2.99    0.41    0.00    0.41
33.80   2.41    0.80    2.99    0.41    0.00    0.41
33.85   2.41    0.80    2.99    0.40    0.00    0.40
33.90   0.60    0.80    0.74*   0.40    0.00    0.40
33.95   0.59    0.80    0.73*   0.39    0.00    0.39
34.00   0.58    0.80    0.72*   0.39    0.00    0.39
34.05   0.57    0.80    0.71*   0.38    0.00    0.38
34.10   0.56    0.80    0.70*   0.38    0.00    0.38
34.15   0.55    0.80    0.69*   0.37    0.00    0.37
34.20   0.55    0.80    0.68*   0.37    0.00    0.37
34.25   0.54    0.80    0.67*   0.37    0.00    0.37
34.30   0.54    0.80    0.67*   0.36    0.00    0.36
34.35   0.53    0.80    0.66*   0.36    0.00    0.36
34.40   0.53    0.80    0.66*   0.35    0.00    0.35
34.45   0.52    0.80    0.65*   0.35    0.00    0.35
34.50   0.52    0.80    0.65*   0.34    0.00    0.34
34.55   0.52    0.80    0.64*   0.34    0.00    0.34
34.60   0.51    0.80    0.64*   0.33    0.00    0.33
34.65   0.51    0.80    0.63*   0.33    0.00    0.33
34.70   0.51    0.80    0.63*   0.32    0.00    0.32
34.75   0.50    0.80    0.63*   0.32    0.00    0.32
34.80   0.50    0.80    0.62*   0.32    0.00    0.32
34.85   0.50    0.80    0.62*   0.31    0.00    0.31
34.90   0.50    0.80    0.62*   0.31    0.00    0.31
34.95   0.49    0.80    0.61*   0.30    0.00    0.30
35.00   0.49    0.80    0.61*   0.30    0.00    0.30
35.05   2.39    0.80    2.98    0.29    0.00    0.29
35.10   2.39    0.80    2.98    0.29    0.00    0.29
35.15   2.39    0.80    2.98    0.29    0.00    0.29
35.20   2.39    0.80    2.98    0.29    0.00    0.29
35.25   2.39    0.80    2.98    0.29    0.00    0.29
35.30   2.39    0.80    2.98    0.28    0.00    0.28
35.35   2.39    0.80    2.98    0.28    0.00    0.28
35.40   2.39    0.80    2.98    0.28    0.00    0.28
35.45   2.39    0.80    2.98    0.28    0.00    0.28
35.50   2.39    0.80    2.98    0.28    0.00    0.28
35.55   2.38    0.80    2.98    0.28    0.00    0.28
35.60   2.38    0.80    2.98    0.28    0.00    0.28
35.65   2.38    0.80    2.98    0.27    0.00    0.27
35.70   2.38    0.80    2.98    0.27    0.00    0.27
35.75   2.38    0.80    2.98    0.27    0.00    0.27
35.80   2.38    0.80    2.97    0.27    0.00    0.27
35.85   2.38    0.80    2.97    0.27    0.00    0.27
35.90   2.38    0.80    2.97    0.27    0.00    0.27
35.95   2.38    0.80    2.97    0.27    0.00    0.27
36.00   2.38    0.80    2.97    0.26    0.00    0.26
36.05   2.38    0.80    2.97    0.26    0.00    0.26
36.10   2.38    0.80    2.97    0.26    0.00    0.26
36.15   2.38    0.80    2.97    0.26    0.00    0.26
36.20   2.38    0.80    2.97    0.26    0.00    0.26
36.25   2.38    0.80    2.97    0.25    0.00    0.25
36.30   2.37    0.80    2.97    0.25    0.00    0.25
36.35   2.37    0.80    2.97    0.25    0.00    0.25
36.40   2.37    0.80    2.97    0.25    0.00    0.25
36.45   2.37    0.80    2.97    0.25    0.00    0.25
36.50   2.37    0.80    2.97    0.24    0.00    0.24
36.55   2.37    0.80    2.97    0.24    0.00    0.24
36.60   2.37    0.80    2.97    0.24    0.00    0.24
36.65   2.37    0.80    2.97    0.24    0.00    0.24
36.70   2.37    0.80    2.97    0.24    0.00    0.24
36.75   2.37    0.80    2.97    0.23    0.00    0.23
36.80   2.37    0.80    2.97    0.23    0.00    0.23
36.85   2.37    0.80    2.97    0.23    0.00    0.23
36.90   2.37    0.80    2.97    0.23    0.00    0.23
36.95   2.37    0.80    2.97    0.23    0.00    0.23
37.00   2.37    0.80    2.97    0.22    0.00    0.22
37.05   2.37    0.80    2.97    0.22    0.00    0.22
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37.10	2.36	0.80	2.97	0.22	0.00	0.22
37.15	2.36	0.80	2.97	0.22	0.00	0.22
37.20	2.36	0.80	2.96	0.21	0.00	0.21
37.25	2.36	0.80	2.96	0.21	0.00	0.21
37.30	2.36	0.80	2.96	0.21	0.00	0.21
37.35	2.36	0.80	2.96	0.21	0.00	0.21
37.40	2.36	0.80	2.96	0.20	0.00	0.20
37.45	2.36	0.80	2.96	0.20	0.00	0.20
37.50	2.36	0.80	2.96	0.20	0.00	0.20
37.55	2.36	0.80	2.96	0.20	0.00	0.20
37.60	2.36	0.80	2.96	0.19	0.00	0.19
37.65	2.36	0.80	2.96	0.19	0.00	0.19
37.70	2.36	0.80	2.96	0.19	0.00	0.19
37.75	2.36	0.80	2.96	0.19	0.00	0.19
37.80	2.36	0.80	2.96	0.18	0.00	0.18
37.85	2.35	0.80	2.96	0.18	0.00	0.18
37.90	2.35	0.80	2.96	0.18	0.00	0.18
37.95	2.35	0.79	2.96	0.18	0.00	0.18
38.00	2.35	0.79	2.96	0.17	0.00	0.17
38.05	2.35	0.79	2.96	0.17	0.00	0.17
38.10	2.35	0.79	2.96	0.17	0.00	0.17
38.15	2.35	0.79	2.96	0.16	0.00	0.16
38.20	2.35	0.79	2.96	0.16	0.00	0.16
38.25	2.35	0.79	2.96	0.16	0.00	0.16
38.30	2.35	0.79	2.96	0.16	0.00	0.16
38.35	2.35	0.79	2.96	0.15	0.00	0.15
38.40	2.35	0.79	2.96	0.15	0.00	0.15
38.45	2.35	0.79	2.96	0.15	0.00	0.15
38.50	2.35	0.79	2.96	0.14	0.00	0.14
38.55	2.35	0.79	2.96	0.14	0.00	0.14
38.60	2.35	0.79	2.96	0.14	0.00	0.14
38.65	2.34	0.79	2.96	0.13	0.00	0.13
38.70	2.34	0.79	2.96	0.13	0.00	0.13
38.75	2.34	0.79	2.96	0.13	0.00	0.13
38.80	2.34	0.79	2.96	0.13	0.00	0.13
38.85	2.34	0.79	2.96	0.12	0.00	0.12
38.90	2.34	0.79	2.96	0.12	0.00	0.12
38.95	2.34	0.79	2.96	0.12	0.00	0.12
39.00	2.34	0.79	2.96	0.11	0.00	0.11
39.05	2.34	0.79	2.96	0.11	0.00	0.11
39.10	2.34	0.79	2.96	0.11	0.00	0.11
39.15	2.34	0.79	2.96	0.10	0.00	0.10
39.20	2.34	0.79	2.96	0.10	0.00	0.10
39.25	2.34	0.79	2.96	0.10	0.00	0.10
39.30	2.34	0.79	2.95	0.09	0.00	0.09
39.35	2.34	0.79	2.95	0.09	0.00	0.09
39.40	2.34	0.79	2.95	0.09	0.00	0.09
39.45	2.33	0.79	2.95	0.08	0.00	0.08
39.50	2.33	0.79	2.95	0.08	0.00	0.08
39.55	2.33	0.79	2.95	0.08	0.00	0.08
39.60	2.33	0.79	2.95	0.07	0.00	0.07
39.65	2.33	0.79	2.95	0.07	0.00	0.07
39.70	2.33	0.79	2.95	0.07	0.00	0.07
39.75	2.33	0.79	2.95	0.06	0.00	0.06
39.80	2.33	0.79	2.95	0.06	0.00	0.06
39.85	2.33	0.79	2.95	0.06	0.00	0.06
39.90	2.33	0.79	2.95	0.05	0.00	0.05
39.95	2.33	0.79	2.95	0.05	0.00	0.05
40.00	2.33	0.79	2.95	0.05	0.00	0.05
40.05	2.33	0.79	2.95	0.04	0.00	0.04
40.10	2.33	0.79	2.95	0.04	0.00	0.04
40.15	2.33	0.79	2.95	0.04	0.00	0.04
40.20	2.33	0.79	2.95	0.04	0.00	0.04
40.25	2.32	0.79	2.95	0.04	0.00	0.04
40.30	2.32	0.79	2.95	0.04	0.00	0.04
40.35	2.32	0.79	2.95	0.04	0.00	0.04
40.40	2.32	0.79	2.95	0.04	0.00	0.04
40.45	2.32	0.79	2.95	0.04	0.00	0.04
40.50	2.32	0.79	2.95	0.04	0.00	0.04
40.55	2.32	0.79	2.95	0.04	0.00	0.04
40.60	2.32	0.79	2.95	0.04	0.00	0.04

40.65	2.32	0.79	2.95	0.04	0.00	0.04
40.70	2.32	0.79	2.95	0.04	0.00	0.04
40.75	2.32	0.79	2.95	0.04	0.00	0.04
40.80	2.32	0.79	2.95	0.04	0.00	0.04
40.85	2.32	0.79	2.95	0.04	0.00	0.04
40.90	2.32	0.79	2.95	0.04	0.00	0.04
40.95	2.32	0.78	2.95	0.04	0.00	0.04
41.00	2.32	0.78	2.95	0.04	0.00	0.04
41.05	2.31	0.78	2.95	0.04	0.00	0.04
41.10	2.31	0.78	2.95	0.04	0.00	0.04
41.15	2.31	0.78	2.95	0.04	0.00	0.04
41.20	2.31	0.78	2.95	0.04	0.00	0.04
41.25	2.31	0.78	2.95	0.04	0.00	0.04
41.30	2.31	0.78	2.95	0.04	0.00	0.04
41.35	2.31	0.78	2.95	0.04	0.00	0.04
41.40	2.31	0.78	2.95	0.04	0.00	0.04
41.45	2.31	0.78	2.95	0.04	0.00	0.04
41.50	2.31	0.78	2.95	0.04	0.00	0.04
41.55	2.31	0.78	2.95	0.04	0.00	0.04
41.60	2.31	0.78	2.95	0.04	0.00	0.04
41.65	2.31	0.78	2.95	0.04	0.00	0.04
41.70	2.31	0.78	2.95	0.04	0.00	0.04
41.75	2.31	0.78	2.95	0.04	0.00	0.04
41.80	2.31	0.78	2.95	0.04	0.00	0.04
41.85	2.30	0.78	2.95	0.04	0.00	0.04
41.90	2.30	0.78	2.95	0.04	0.00	0.04
41.95	2.30	0.78	2.95	0.04	0.00	0.04
42.00	2.30	0.78	2.95	0.04	0.00	0.04
42.05	2.30	0.78	2.95	0.04	0.00	0.04
42.10	2.30	0.78	2.95	0.04	0.00	0.04
42.15	2.30	0.78	2.95	0.04	0.00	0.04
42.20	2.30	0.78	2.95	0.04	0.00	0.04
42.25	2.30	0.78	2.95	0.04	0.00	0.04
42.30	2.30	0.78	2.95	0.04	0.00	0.04
42.35	2.30	0.78	2.95	0.04	0.00	0.04
42.40	2.30	0.78	2.95	0.04	0.00	0.04
42.45	2.30	0.78	2.95	0.04	0.00	0.04
42.50	2.30	0.78	2.95	0.04	0.00	0.04
42.55	2.30	0.78	2.95	0.04	0.00	0.04
42.60	2.30	0.78	2.95	0.04	0.00	0.04
42.65	2.30	0.78	2.95	0.04	0.00	0.04
42.70	2.29	0.78	2.95	0.03	0.00	0.03
42.75	2.29	0.78	2.95	0.03	0.00	0.03
42.80	2.29	0.78	2.95	0.03	0.00	0.03
42.85	2.29	0.78	2.95	0.03	0.00	0.03
42.90	2.29	0.78	2.95	0.03	0.00	0.03
42.95	2.29	0.78	2.95	0.03	0.00	0.03
43.00	2.29	0.78	2.95	0.03	0.00	0.03
43.05	2.29	0.78	2.95	0.03	0.00	0.03
43.10	2.29	0.78	2.95	0.03	0.00	0.03
43.15	2.29	0.78	2.95	0.03	0.00	0.03
43.20	2.29	0.78	2.95	0.03	0.00	0.03
43.25	2.29	0.78	2.95	0.03	0.00	0.03
43.30	2.29	0.78	2.95	0.03	0.00	0.03
43.35	2.29	0.78	2.95	0.03	0.00	0.03
43.40	2.29	0.78	2.95	0.03	0.00	0.03
43.45	2.29	0.77	2.95	0.02	0.00	0.02
43.50	2.28	0.77	2.95	0.02	0.00	0.02
43.55	2.28	0.77	2.95	0.02	0.00	0.02
43.60	2.28	0.77	2.95	0.02	0.00	0.02
43.65	2.28	0.77	2.95	0.02	0.00	0.02
43.70	2.28	0.77	2.95	0.02	0.00	0.02
43.75	2.28	0.77	2.95	0.02	0.00	0.02
43.80	2.28	0.77	2.95	0.02	0.00	0.02
43.85	2.28	0.77	2.95	0.02	0.00	0.02
43.90	2.28	0.77	2.95	0.02	0.00	0.02
43.95	2.28	0.77	2.95	0.02	0.00	0.02
44.00	2.28	0.77	2.95	0.02	0.00	0.02
44.05	2.28	0.77	2.95	0.02	0.00	0.02
44.10	2.28	0.77	2.95	0.02	0.00	0.02
44.15	2.28	0.77	2.95	0.01	0.00	0.01

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44.20   2.28    0.77    2.95    0.01    0.00    0.01
44.25   2.28    0.77    2.95    0.01    0.00    0.01
44.30   2.28    0.77    2.95    0.01    0.00    0.01
44.35   2.27    0.77    2.95    0.01    0.00    0.01
44.40   2.27    0.77    2.95    0.01    0.00    0.01
44.45   2.27    0.77    2.95    0.01    0.00    0.01
44.50   2.27    0.77    2.95    0.01    0.00    0.01
44.55   2.27    0.77    2.95    0.01    0.00    0.01
44.60   2.27    0.77    2.95    0.01    0.00    0.01
44.65   2.27    0.77    2.95    0.01    0.00    0.01
44.70   2.27    0.77    2.95    0.01    0.00    0.01
44.75   2.27    0.77    2.95    0.00    0.00    0.00
44.80   2.27    0.77    2.95    0.00    0.00    0.00
44.85   2.27    0.77    2.95    0.00    0.00    0.00
44.90   2.27    0.77    2.95    0.00    0.00    0.00
44.95   2.27    0.77    2.95    0.00    0.00    0.00
45.00   2.27    0.77    2.95    0.00    0.00    0.00
45.05   2.27    0.77    2.95    0.00    0.00    0.00
45.10   2.27    0.77    2.95    0.00    0.00    0.00
45.15   2.27    0.77    2.95    0.00    0.00    0.00
45.20   2.26    0.77    2.95    0.00    0.00    0.00
45.25   2.26    0.77    2.95    0.00    0.00    0.00
45.30   2.26    0.77    2.95    0.00    0.00    0.00
45.35   2.26    0.77    2.95    0.00    0.00    0.00
45.40   2.26    0.77    2.95    0.00    0.00    0.00
45.45   2.26    0.77    2.95    0.00    0.00    0.00
45.50   2.26    0.77    2.95    0.00    0.00    0.00
45.55   2.26    0.77    2.95    0.00    0.00    0.00
45.60   2.26    0.77    2.95    0.00    0.00    0.00
45.65   2.26    0.77    2.95    0.00    0.00    0.00
45.70   2.26    0.76    2.95    0.00    0.00    0.00
45.75   2.26    0.76    2.95    0.00    0.00    0.00
45.80   2.26    0.76    2.95    0.00    0.00    0.00
45.85   2.26    0.76    2.95    0.00    0.00    0.00
45.90   2.26    0.76    2.95    0.00    0.00    0.00
45.95   2.26    0.76    2.95    0.00    0.00    0.00
46.00   2.26    0.76    2.95    0.00    0.00    0.00
46.05   2.26    0.76    2.95    0.00    0.00    0.00
46.10   2.25    0.76    2.96    0.00    0.00    0.00
46.15   2.25    0.76    2.96    0.00    0.00    0.00
46.20   2.25    0.76    2.96    0.00    0.00    0.00
46.25   2.25    0.76    2.96    0.00    0.00    0.00
46.30   2.25    0.76    2.96    0.00    0.00    0.00
46.35   2.25    0.76    2.96    0.00    0.00    0.00
46.40   2.25    0.76    2.96    0.00    0.00    0.00
46.45   2.25    0.76    2.96    0.00    0.00    0.00
46.50   2.25    0.76    2.96    0.00    0.00    0.00
46.55   2.25    0.76    2.96    0.00    0.00    0.00
46.60   2.25    0.76    2.96    0.00    0.00    0.00
46.65   2.25    0.76    2.96    0.00    0.00    0.00
46.70   2.25    0.76    2.96    0.00    0.00    0.00
46.75   2.25    0.76    2.96    0.00    0.00    0.00
46.80   2.25    0.76    2.96    0.00    0.00    0.00
46.85   2.25    0.76    2.96    0.00    0.00    0.00
46.90   2.25    0.76    2.96    0.00    0.00    0.00
46.95   2.24    0.76    2.96    0.00    0.00    0.00
47.00   2.24    0.76    2.96    0.00    0.00    0.00
47.05   2.24    0.76    2.96    0.00    0.00    0.00
47.10   2.24    0.76    2.96    0.00    0.00    0.00
47.15   2.24    0.76    2.96    0.00    0.00    0.00
47.20   2.24    0.76    2.96    0.00    0.00    0.00
47.25   2.24    0.76    2.96    0.00    0.00    0.00
47.30   2.24    0.76    2.96    0.00    0.00    0.00
47.35   2.24    0.76    2.96    0.00    0.00    0.00
47.40   2.24    0.76    2.96    0.00    0.00    0.00
47.45   2.24    0.76    2.96    0.00    0.00    0.00
47.50   2.24    0.76    2.96    0.00    0.00    0.00
47.55   2.24    0.76    2.96    0.00    0.00    0.00
47.60   2.24    0.76    2.96    0.00    0.00    0.00
47.65   2.24    0.76    2.96    0.00    0.00    0.00
47.70   2.24    0.76    2.96    0.00    0.00    0.00
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47.75   2.24    0.75    2.96    0.00    0.00    0.00
47.80   2.24    0.75    2.96    0.00    0.00    0.00
47.85   2.23    0.75    2.96    0.00    0.00    0.00
47.90   2.23    0.75    2.96    0.00    0.00    0.00
47.95   2.23    0.75    2.96    0.00    0.00    0.00
48.00   2.23    0.75    2.96    0.00    0.00    0.00
48.05   2.23    0.75    2.96    0.00    0.00    0.00
48.10   2.23    0.75    2.96    0.00    0.00    0.00
48.15   2.23    0.75    2.96    0.00    0.00    0.00
48.20   2.23    0.75    2.96    0.00    0.00    0.00
48.25   2.23    0.75    2.96    0.00    0.00    0.00
48.30   2.23    0.75    2.96    0.00    0.00    0.00
48.35   2.23    0.75    2.96    0.00    0.00    0.00
48.40   2.23    0.75    2.97    0.00    0.00    0.00
48.45   2.23    0.75    2.97    0.00    0.00    0.00
48.50   2.23    0.75    2.97    0.00    0.00    0.00
48.55   2.23    0.75    2.97    0.00    0.00    0.00
48.60   2.23    0.75    2.97    0.00    0.00    0.00
48.65   2.23    0.75    2.97    0.00    0.00    0.00
48.70   2.23    0.75    2.97    0.00    0.00    0.00
48.75   2.22    0.75    2.97    0.00    0.00    0.00
48.80   2.22    0.75    2.97    0.00    0.00    0.00
48.85   2.22    0.75    2.97    0.00    0.00    0.00
48.90   2.22    0.75    2.97    0.00    0.00    0.00
48.95   2.22    0.75    2.97    0.00    0.00    0.00
49.00   2.22    0.75    2.97    0.00    0.00    0.00
49.05   2.22    0.75    2.97    0.00    0.00    0.00
49.10   2.22    0.75    2.97    0.00    0.00    0.00
49.15   2.22    0.75    2.97    0.00    0.00    0.00
49.20   2.22    0.75    2.97    0.00    0.00    0.00
49.25   2.22    0.75    2.97    0.00    0.00    0.00
49.30   2.22    0.75    2.97    0.00    0.00    0.00
49.35   2.22    0.75    2.97    0.00    0.00    0.00
49.40   2.22    0.75    2.97    0.00    0.00    0.00
49.45   2.22    0.75    2.97    0.00    0.00    0.00
49.50   2.22    0.75    2.97    0.00    0.00    0.00
49.55   2.22    0.75    2.97    0.00    0.00    0.00
49.60   2.22    0.75    2.97    0.00    0.00    0.00
49.65   2.21    0.75    2.97    0.00    0.00    0.00
49.70   2.21    0.74    2.97    0.00    0.00    0.00
49.75   2.21    0.74    2.97    0.00    0.00    0.00
49.80   2.21    0.74    2.97    0.00    0.00    0.00
49.85   2.21    0.74    2.97    0.00    0.00    0.00
49.90   2.21    0.74    2.97    0.00    0.00    0.00
49.95   2.21    0.74    2.97    0.00    0.00    0.00
50.00   2.21    0.74    2.97    0.00    0.00    0.00
_______________________________________________________
* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5,  CRR is limited to 2,    CSR is limited to 2)

Units:  Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.
___________________________________________________________________________________
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm            Cyclic resistance ratio from soils
CSRsf           Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.            Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat           Settlement from saturated sands
S_dry           Settlement from Unsaturated Sands
S_all           Total Settlement from Saturated and Unsaturated Sands
NoLiq           No-Liquefy Soils
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