## Appendix F

Geotechnical Engineering Exploration

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# GEOTECHNICAL ENGINEERING EXPLORATION

# PROPOSED RESIDENTIAL DEVELOPMENT

# APN'S 4030-033-901 & 4030-033-903

# 3200 W. 104TH STREET

# INGLEWOOD, CALIFORNIA

**FOR HARRIDGE DEVELOPMENT GROUP LLC**

**IRVINE GEOTECHNICAL, INC. PROJECT NUMBER IC 22068-I**

**JUNE 8, 2022**

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## INTRODUCTION

This report has been prepared per our agreement and summarizes the findings of Irvine Geotechnical's geotechnical engineering exploration performed on the site. The purpose of this study is to evaluate the nature, distribution, and engineering properties of the earth materials underlying the site with respect to the design and construction of the proposed project.

## INTENT

It is the intent of this report to assist in the design and completion of the proposed project. The recommendations are intended to reduce geotechnical risks affecting the project. The professional opinions and advice presented in this report are based upon commonly accepted standards and are subject to the general conditions described in the NOTICE section of this report.

## EXPLORATION

The scope of the field exploration was determined from our initial site visit and consultation with the client. The preliminary plans prepared by the client were considered prior to beginning work on this project. Exploration was conducted using techniques normally applied to this type of project in this setting. This report is limited to the area of the exploration and the proposed project as shown on the enclosed Site Plan. Conditions affecting portions of the property outside the area explored, are beyond the scope of this report.

Exploration was conducted on May 17, 2022, with the aid of a hollow-stem auger drill rig. It included drilling 10 borings to a maximum depth of 30 feet. Samples of the earth materials were obtained and delivered to the soils engineering laboratory of Soil Labworks, LLC for testing and analysis. The staff engineer logged the borings. Appendix I contains a discussion of the laboratory testing procedures and results.

Office tasks included laboratory testing of selected soil samples, reviewing historical topographic maps and aerial photographs, preparing the Site Plan, and performing engineering analysis. Earth materials exposed in the borings are described on the enclosed Log of Borings. The proposed project, surface geologic conditions, and the location of the test pits are shown on the Site Plan.

## PROPOSED PROJECT

Information concerning the proposed project was provided by the client, who also provided a preliminary design concept. It is proposed to develop the parcels with 468 residential units, a park, recreation center, and child development center. The structures will likely be three story with parking on the ground level. Small retaining walls may be used to terrace the site. Grading will include improving site conditions.

## SITE DESCRIPTION

The subject property includes about 24 acres that represent portions of Morningside High School and the Woodworth Imagine Learning Magnet Elementary School in the City of Inglewood, California. The study area is located south of Century Boulevard, east of Prairie Avenue, west of Crenshaw Boulevard and southeast of Sofi Stadium. The site is bounded by 104$^{th}$ Street on the north, S. 10$^{th}$ Avenue and school district property on the east, residential properties on the south, and the campus of Morningside High School on the west. The site contains playing fields, tennis courts, a baseball field, and school buildings.

The study area slopes gently from north to south. Physical relief across the property is about 16 feet and slope gradients are flatter than 5:1. Vegetation on the site consists of weeds, grasses, and some trees. Surface drainage generally is by sheet flow runoff down the contours of the land toward the south and southwest.

## GROUNDWATER

Groundwater was not encountered during exploration in borings excavated to a depth of 30 feet and this area of Inglewood is not known to have a high groundwater table. Historically highest groundwater in this area of Inglewood is estimated to be more than 50 feet below the ground surface (Plate 1.2, *Historically Highest Groundwater Contours and Borehole Log Data Locations, Inglewood 7.5 Minute Quadrangle* in Seismic Hazard Zone Report for the Inglewood Quadrangle, SHZR-027).

## EARTH MATERIALS

### Fill

Fill, associated with previous site grading, underlies portions of the site to a maximum observed thickness of 6 feet in the vicinity of Borings 1, 2, and 5. The fill consists of silty sand and some sandy clay that is yellow brown, slightly moist, and medium dense to dense. The fill contains concrete and brick debris.

### Alluvium

Natural alluvial deposits underlie the subject property and were encountered to the total depths of the borings. The alluvium consists of weakly stratified layers of silty sand, clayey sand, and sand that are orange brown to yellow brown, slightly moist to very moist, and dense to very dense.

## GENERAL SEISMIC CONSIDERATIONS

Southern California is in an active seismic region and numerous known and undiscovered earthquake faults are present in the region. Hazards associated with fault rupture and earthquakes include direct affects such as strong ground shaking and ground rupture, as well as

secondary effects such as liquefaction, landsliding and lurching. The United States Geological Survey (USGS), California Geologic Survey (CGS), Southern California Earthquake Center (SCEC), private consultants and universities have been studying earthquakes in southern California for several decades. Early studies were directed toward earthquake prediction and early warning of strong ground shaking. Research and practice have shown that earthquake prediction is not practical or sufficiently accurate to benefit the public. Also, several recent and damaging earthquakes have occurred on faults that were unknown prior to rupture. Current standards and the California Building Code call for earthquake resistant design of structures as opposed to prediction.

## Alquist-Priolo Fault Rupture Hazard Study Zone

California faults are classified as active, potentially active, or inactive. Faults from past geologic periods of mountain building, but do not display any evidence of recent offset are considered ”inactive” or “potentially active.” Faults that have historically produced earthquakes or show evidence of movement within the Holocene (past 11,000 years) are considered “active faults.” Active faults that can cause large earthquakes may also cause ground rupture. The Alquist-Priolo Act of 1972 was enacted to protect structures from hazards associated with fault ground rupture. No known active faults cross the subject property, and the site is not located within an Alquist-Priolo Fault Rupture Hazard Study Zone.

The northeastern corner of the study area of located more than 150 feet southwest of the western edge of an Alquist-Priolo Zone for the Inglewood fault. At the closest point, the trace (intersection of a fault with the ground surface) of the fault is more than 600 feet from the property. The ground rupture hazard at the site is considered low.

## Building Code Seismic Coefficients

Seismic design parameters within the Building Code include amplification of the seismic forces on the structure depending on the soil type, distance to seismic source and intensity of shaking. The purpose of the code seismic design parameters is to prevent collapse of structures and loss of life during strong ground shaking. Cosmetic damage should be expected.

The following table lists the applicable seismic coefficients for the 2019 California Building Code.

| SEISMIC COEFFICIENTS (2019 California Building Code) | | |
|---|---|---|
| Latitude = 33.9399°N<br>Longitude = 118.3315°W | Short Period (0.2s) | One-Second Period |
| Earth Materials and Site Class<br>Chapter 20 - ASCE 7 | Alluvium - D-Default | |
| Seismic Design Category<br>from Table 1613.2.5(1) and 1613.2.5(2) | D *E | |
| Spectral Accelerations<br>from Figures 1613.2.1 (1) through 1613.2.1(8) | $S_{s(g)}$ = 1.892 | $S_{1(g)}$ = 0.666 |
| Site Coefficients<br>from Tables 1613.2.3 (1) and 1613.2.3 (2) | $F_A$ = 1.2 | $F_V$ = n/a |
| Spectral Response Accelerations<br>from Equations 16-36 and 16-37 | $S_{MS(g)}$ = 2.270 | $S_{M1(g)}$ = n/a |
| Design Accelerations | $S_{DS(g)}$ = 1.513 | $S_{D1(g)}$ = n/a |

## Seismic Hazards

The principal seismic hazard to the subject property and proposed project is strong ground shaking from earthquakes produced by local faults. Modern, well-constructed buildings are designed to resist ground shaking using shear panels, moment-resisting frames, and reinforcement. Additional precautions may be taken to protect private property and reduce the chance of injury, including strapping water heaters and securing furniture and appliances. It is likely that the subject property will be shaken by future earthquakes produced in southern

California. However, secondary effects such as surface rupture, lurching, liquefaction, consolidation, ridge shattering, and landsliding should not occur at the subject property.

## Seismic Hazard Zones

The California State Legislature enacted the Seismic Hazards Mapping Act of 1990, which was prompted by damaging earthquakes in California, and was intended to protect public safety from the effects of strong ground shaking, liquefaction, landslides, and other earthquake related hazards. The Seismic Hazards Mapping Act requires that the State Geologist delineate various "seismic hazards zones." The maps depicting the zones are released by the California Geological Survey.

The Seismic Hazards Mapping Act requires a site investigation by a certified engineering geologist and/or civil engineer with expertise in geotechnical engineering, for projects sited within a hazard zone. The investigation is to include recommendations for a "minimum level of mitigation" that should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy. The Seismic Hazards Mapping Act does not require mitigation to a level of no ground failure and/or no structural damage.

Seismic Hazard Zone delineations are based on correlation of a combination of factors, including surface distribution of soil deposits; physical relief; depth to historic high groundwater; shear strength of the soils; and occurrence of past seismic deformation. The subject property is located within the United States Geologic Survey, Inglewood Quadrangle. Seismic hazards within the Inglewood Quadrangle were evaluated by the CGS in their report, "*Seismic Hazard Zone Report for the* Inglewood *7.5-minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 027."* According to the Seismic Hazard Zones Map, the subject property is not within an area that has been subject to or may be subject to liquefaction or earthquake induced ground deformation.

Based on the over-consolidated earth materials at the site and depth to groundwater, it is the finding o Irvine Geotechnical that the liquefaction hazard of the study area is low to zero.

### Ground Motion

Spectral accelerations and peak ground accelerations at the site were determined for the Risk-Targeted Maximum Considered Earthquake (MCER) and Geometric Mean Peak Ground Acceleration (MCEG) following the procedures in ASCE 7-16 and the 2019 Building Code. The computed PGA for this site is 0.817g. The computed $PGA_M$ for this site is 1.879g. *The adjusted $PGA_M$ for default Site Class D is 0.981g. According to the USGS deaggregation website (https://earthquake.usgs.gov/hazards/interactive/) and using a ground motion with a 10 percent probability of exceedance in 50 years, the modal de-aggregated earthquake PGA and moment magnitude are 0.486g and 6.36, respectively. For a ground motion with a 2 percent probability of exceedance in 50 years, the modal de-aggregated earthquake PGA and moment magnitude are 0.842g and 6.36, respectively. The modal distance to the ground motion source is 1.79 km.

## CONCLUSIONS AND RECOMMENDATIONS

### General Findings

The conclusions and recommendations of this exploration are based upon 10 borings, research of available records, consultation, years of experience observing comparable properties in similar settings and review of the development plans. It is the finding of Irvine Geotechnical that construction of the proposed project is feasible from a geotechnical engineering standpoint provided the advice and recommendations contained in this report are included in the plans and are implemented during construction.

The recommended bearing material is the alluvium, which was encountered at depths of 1 to 6 feet within the study area. The existing fill is not recommended foundation, slab, and paving

support. It is recommended that the fill and disturbed native soils be removed and recompacted to create a compacted fill cap for support of foundations, slabs, and pavements.

# SITE PREPARATION

Surficial materials consisting of fill is present on the site. Remedial grading is recommended to improve site conditions.

## General Grading Specifications

The following guidelines may be used in preparation of the grading plan and job specifications. Irvine Geotechnical would appreciate the opportunity of reviewing the plans to ensure that these recommendations are included. The grading contractor should be provided with a copy of this report.

A. The site should be prepared to receive compacted fill by removing all vegetation, debris, existing fill, and disturbed soils. The exposed excavated area should be observed by the soils engineer prior to placing compacted fill. The exposed grade should be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted to 90 percent of the maximum density.

B. If the fill is intended for structural support, the proposed building site shall be excavated to a minimum depth of 3 feet below the bottom of all footings. Also, the lateral extent of the removal should extend a minimum of five feet beyond the building footprint or equal to the thickness of the fill. If the fill is intended for support of slabs and pavements, the depth of removal may be limited to the thickness of the existing fill and soil. The excavated areas shall be observed by the soils engineer prior to placing compacted fill.

C. Fill, consisting of soil approved by the soils engineer, shall be placed in horizontal lifts, and compacted in six-inch layers with suitable compaction equipment. The excavated onsite materials are considered satisfactory for reuse in the controlled fills. Any imported fill shall be observed by the soils engineer prior to use in fill areas. Rocks larger than six inches in diameter shall not be used in the fill.

D. The fill shall be compacted to at least 90 percent of the maximum laboratory density for the material used. Where cohesionless soil (less than 15 percent finer than 0.005 millimeters) is used for fill, it shall be compacted to a minimum of 95 percent relative

compaction. The fill should be placed at a moisture content that is at or within 3 percent over optimum. The maximum density and optimum moisture content shall be determined by ASTM D 1557-12 or equivalent.

E. Field observation and testing shall be performed by the soils engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until 90 percent compaction is obtained. One compaction test is required for each 500 cubic yards, or two vertical feet of fill placed.

### Shrinking/Bulking

The following table contains the estimated bulking and shrinking factors to be used in determining earthwork volumes. The factors were determined by ratios of in-situ density or compacted density or loose density.

| EARTHWORK FACTORS | | | | | |
|---|---|---|---|---|---|
| Earth Material | In-Situ Density (pcf) | Loose Density (pcf) | Compacted Density (pcf) | Bulking Factor (%) | Shrinking Factor (%) |
| Alluvium | 116.4 | 110 | 122 | 5.8 | 4.6 |
| Fill | 121.4 | 110 | 122 | 10.4 | 0.5 |

## FOUNDATION DESIGN

### General Conditions

The following foundation recommendations are minimum requirements. The structural engineer may require footings that are deeper, wider, or larger in diameter, depending on the final loads.

## Spread Footings

Continuous and/or pad footings may be used to support the proposed structures provided they are founded in approved compacted fill. Continuous footings should be a minimum of 12 inches in width. Pad footings should be a minimum of 30 inches square. The following chart contains the recommended allowable design parameters.

| Bearing Material | Minimum Embedment Depth of Footing (Inches) | Vertical Bearing (psf) | Coefficient of Friction | Passive Earth Pressure (pcf) | Maximum Earth Pressure (psf) |
|---|---|---|---|---|---|
| Approved Compacted Fill | 18 | 2,000 | 0.35 | 250 | 3,500 |

Increases in the bearing value are allowable at a rate of 400 pounds per square foot for each additional foot of footing width or depth to a maximum of 3,500 pounds per square foot. For bearing calculations, the weight of the concrete in the footing may be neglected.

The bearing value shown above is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces.

Footings should be reinforced following the recommendations of the structural engineer. It is recommended that continuous footings be reinforced with a minimum of four #4 steel bars: two placed near the top and two near the bottom of the footings. Footings should be cleaned of all loose soil, moistened, free of shrinkage cracks and approved by the geotechnical engineer prior to placing forms, steel, or concrete.

### Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. A settlement of ¼ to ½ inch may be anticipated. Differential settlement should not exceed ½ inch over 30 feet.

## RETAINING WALLS

### General Design - Static Loading

Cantilevered retaining walls up to 6 feet high that support approved retaining wall backfill, may be designed for an equivalent fluid pressure of 35 pounds per cubic foot. Restrained walls that are pinned at the top by a non-yielding floor should be designed for an at-rest earth pressure. The recommended design at-rest earth pressure on restrained basement walls is an equivalent fluid pressure of 60 pcf.

### Surcharge Loading

Retaining walls that are surcharged by traffic and/or structural loads should be designed to withstand the surcharge. The surcharge loads may be computed following Boussinesq methods. Irvine Geotechnical would be happy to assist the structural engineer in evaluating the surcharge pressure and the point of application from concentrated structural loads.

### Subdrain

The recommended design earth pressures assume a free draining backfill and no buildup of hydrostatic pressures. Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾-inch crushed gravel. The subdrain system should discharge to the atmosphere or to an engineered sump via gravity. Surface drains should not be connected to the subdrain system.

### Backfill

Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557-12. Where access between the retaining wall and the temporary excavation prevents the use of compaction equipment and the retained height is less than 10 feet, retaining walls should be backfilled with 3/4-inch crushed gravel to within 2 feet of the ground surface. Where the area between the wall and the excavation exceeds 18 inches or the retained height is more than 10 feet, the gravel must be vibrated or wheel-rolled and tested for compaction. The upper 2 feet of backfill above the gravel should consist of a compacted fill blanket to the surface. Retaining wall backfill should be capped with a paved surface drain or a concrete slab.

## TEMPORARY EXCAVATIONS

Temporary excavations will be required to perform the removal and compaction. Vertical excavations in earth materials at the site that are not surcharged by existing footings or structures, may be made up to 4 feet. Where vertical excavations exceed 4 feet in height, the upper portion should be trimmed to 1:1 (45 degrees).

### Slot Cutting

Vertical excavations exposing removing support from property lines to perform removal and recompaction will require the use of slot cutting (ABC method).

The slot cutting method uses the earth as a buttress and allows the excavation to proceed in phases. The initial excavation is made at a slope of 1:1. Alternate slots of 8 feet in width may be worked. The remaining earth buttresses should be 16 feet in width. The remedial grading should be completed and backfilled in the slots before the "B" earth buttresses are excavated. The "C" earth buttresses may be excavated upon completion of the remedial grading of the "B" areas.

A representative of the geotechnical engineer should be present during grading to see temporary slopes. All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on top of the excavations nor to flow toward them. No vehicular surcharge should be allowed within three feet of the top of the cut.

### Excavation Characteristics

The test pits did not encounter hard, cemented bedrock or groundwater. Difficult drilling and excavating conditions are not anticipated for the project.

## CORROSION

The corrosiveness of the near surface soils at the site were determined at the laboratory of HDR, with the results summarized in Table I - Laboratory Tests of Soil Samples. The pH of the soils is near neutral and not a factor in corrosion. The chloride content is low and not a factor in design. The sulfate content is negligible and not a factor in concrete design. The resistivity indicates that the soils are severely corrosive to ferrous metals. Cast iron pipes and plumbing are not recommended.

## FLOOR SLABS, CONCRETE DECKING AND PAVING

Floor slabs and concrete decking should be cast over approved compacted fill. The ground should be prepared, and the fill placed in conformance with the SITE PREPARATION section of this report.

Slabs should be at least 4 inches thick and reinforced with a minimum of #4 bars on 16-inch centers, each way. Care should be taken to cast the reinforcement near the center of the slab. For interior slabs and slabs with a floor covering, a moisture barrier is recommended. For performance and concrete curing, it recommended that the vapor barrier be 10-mil thick and placed over at least two inches of clean sand and then covered by at least two inches of clean

sand. The topping sand is intended to prevent punctures during placement of the reinforcing steel and to and aid in the concrete cure.

Slabs which will be provided with a moisture-sensitive floor covering should be designed to resist moisture in conformance with ACI 302.2R-06 (Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Material). Specifications for under-slab vapor retarder/barrier are typically the responsibility of the architect or flooring specialist. We would be happy to assist the architect and/or flooring specialist on their specifications for moisture protection of slabs that are to receive moisture sensitive coverings.

Many agencies require floor slabs be constructed in conformance with the Green Building Code that requires slabs be poured directly on top of the vapor barrier, which is to be underlain by four inches of gravel. Since the vapor barrier is to be placed on the gravel, it is important to exercise care to prevent damaging the moisture barrier during construction. From a geotechnical engineering standpoint, a vapor barrier may be placed over 4 inches of gravel, provided that the vapor barrier is of sufficient strength to resist punctures and tearing. If plastic sheeting is used, this may require a greater than 10 mil thickness. Bentonitic barriers such as Miraclay or Volclay may also be used if they conform to the minimum requirements of durability, strength, and waterproofing. Vapor barriers should conform to ASTM E 1745 and ACI 302.2R-06 (Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials).

Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal one to two percent deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The space between the wall and the deck will require periodic caulking to prevent moisture intrusion into the retaining wall backfill.

It should be noted that cracking of concrete floor slabs is common during curing. The cracking occurs because concrete shrinks as it dries. Crack control joints which are commonly used in exterior decking to control such cracking are normally not used in interior slabs. The

reinforcement recommended above is intended to reduce cracking and its proper placement is critical to the slab's performance. The minor shrinkage cracks which often form in interior slabs generally do not present a problem when carpeting, linoleum, or wood floor coverings are used. The slab cracks can, however, lead to surface cracks in brittle floor coverings such as ceramic tile. A mortar bed or slip sheet is recommended between the slab and tile to limit, the potential for cracking.

Slabs should be protected with a polyethylene plastic vapor barrier placed beneath the slab. This barrier is intended to prevent the upward migration of moisture from the subgrade soils through the porous concrete slab. It should be noted that vapor barriers are penetrated by any number of elements including water lines, drain lines, and footings. These barriers are therefore not completely watertight. It is recommended that a surface seal be placed on slabs which will receive a wood floor. The floor installer should be consulted regarding an adequate product.

The paving section should be cast over approved compacted fill. The ground should be prepared, and the fill placed in conformance with the SITE PREPARATION section of this report. Trench backfill below paving, should be compacted to 90 percent of the maximum dry density. Irrigation water should be prevented from migrating under paving. The following table shows the recommended pavement sections:

| Service | Pavement Thickness (Inches) | Base Course (Inches) |
|---|---|---|
| Passenger Cars/Parking | 3 | 4 |
| Streets/Drive Lanes | 3 | 6 |

Base course should be compacted to at least 95 percent of the maximum dry density.

## DRAINAGE

Control of site drainage is important for the performance of the proposed project. Pad and roof drainage should be collected and transferred to the street or approved location in non-erosive

drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Drainage control devices require periodic cleaning, testing, and maintenance to remain effective.

## Infiltration

Groundwater was not encountered in borings drilled to a depth of 30 feet below the ground surface and historical high groundwater is estimated to be 50 feet. Infiltration is not recommended with 10 feet (vertically or laterally) from any foundation, or where shallow infiltration could migrate toward basement retaining walls. Infiltration via permeable pavers, infiltration pits, or dry wells may be feasible for this project.

Infiltration testing was performed in Boring 10 at a depth interval of 20 to 30 feet. For the test interval, 3-inch diameter slotted PVC pipe was placed. The top of the test interval was sealed with bentonite. The annular space outside the slotted pipe was backfilled with gravel. Solid pipe was used above the perforated pipe sections and extended to the ground surface. The test interval was pre-saturated prior to testing.

The average factored saturated infiltration rate (Ksat) of the alluvium is 1.1 in/hr. The tested infiltration rate is consistent with published values for older native, sand, and silty sand deposits.

The native deposits at the site are suitable for the proposed infiltration, without increasing the potential for settlement of structures. Retaining/basement walls are not planned for this project. Consolidation testing of the alluvium show the risk of hydro-consolidation and ground settlement due to soil saturation from infiltration is low to negligible. The bearing soils consist of over-consolidated alluvium, which is not subject to hydro-collapse and consolidation. Infiltration systems should be located at least 10 feet from existing and proposed structures. Infiltration systems may encroach within 10 feet of the public right-of-way upon permission of Public Works.

## WATERPROOFING

Interior and exterior retaining walls are subject to moisture intrusion, seepage, and leakage and should be waterproofed. Waterproofing paints, compounds, or sheeting can be effective if properly installed. Equally important is the use of a subdrain that daylights to the atmosphere. The subdrain should be covered with ¾-inch crushed gravel to help the collection of water. Yard areas above the wall should be sealed or properly drained to prevent moisture contact with the wall or saturation of wall backfill.

## PLAN REVIEW

Formal plans ready for submittal to the Building Department should be reviewed by Irvine Geotechnical. Any change in scope of the project may require additional work.

## SITE OBSERVATIONS DURING CONSTRUCTION

Please advise Irvine Geotechnical at least 24 hours prior to any required site visit. The agency approved plans and permits should be at the jobsite and available to our representative. The project consultant will perform the observation and post a notice at the jobsite of his visit and findings. This notice should be given to the agency inspector.

During construction, several reviews by this office are recommended to verify site geotechnical conditions and conformance with the intent of the recommendations for construction. Although not all possible geotechnical observation and testing services are required by the reviewing agency, the more site reviews requested, the lower the risk of future problems. It is recommended that all grading, foundation, and drainage excavations be seen by a representative of the geotechnical engineer PRIOR to placing fill, forms, pipe, concrete, or steel. Any fill which is placed should be approved, tested, and verified if used for engineering purposes. A representative of the Geotechnical Engineer should observe temporary excavations.

The following site reviews are advised or required. Should the observations reveal any unforeseen hazards, the engineer will recommend treatment.

| | |
|---|---|
| Pre-construction meeting | Advised |
| Temporary excavations | Required |
| Slot cutting | Required |
| Bottom excavation for removals | Required |
| Compaction of fill | Required |
| Foundation excavations | Required |
| Slab subgrade pre-saturation | Required |
| Slab subgrade moisture barrier membrane | Advised |
| Slab subgrade rock placement | Advised |
| Slab steel placement | Advised |
| Subdrain and rock placement behind retaining walls | Required |
| Compaction of retaining wall backfill | Required |
| Compaction of utility trench backfill | Advised |

Irvine Geotechnical requires at least a 24-hour notice prior to any required site visits. The approved plans and building/grading permits should be on the job and available to the project consultant.

**FINAL INSPECTION**

Many projects are required by the agency to have final geologic and soils engineering reports upon completion of the grading.

**CONSTRUCTION SITE MAINTENANCE**

It is the responsibility of the contractor to maintain a safe construction site. When excavations exist on a site, the area should be fenced, and warning signs posted. Soil generated by foundation and subgrade excavations should be either removed from the site or properly placed as a certified compacted fill. Soil must not be spilled over any descending slope. Workers should not be allowed to enter any unshored trench excavations over five feet deep.

**GENERAL CONDITIONS**

This report and the exploration are subject to the following NOTICE. Please read the NOTICE carefully, it limits our liability.

**NOTICE**

In the event of any changes in the design or location of any structure, as outlined in this report, the conclusions and recommendations contained herein may not be considered valid unless the changes are reviewed by Irvine Geotechnical, and the conclusions and recommendations are modified or reaffirmed after such review.

The subsurface conditions and excavation characteristics described herein have been projected from excavations on the site as indicated and should in no way be construed to reflect any variations that may occur between these excavations or that may result from changes in subsurface conditions.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, irrigation, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can be extremely hazardous. Saturation of earth materials can cause subsidence or slippage of the site.

If conditions encountered during construction appear to differ from those disclosed herein, notify us immediately so we may consider the need for modifications. Compliance with the design concepts, specifications or recommendations during construction requires the review of the geotechnical engineer during construction.

THE EXPLORATION WAS PERFORMED ONLY ON A PORTION OF THE SITE AND CANNOT BE CONSIDERED AS INDICATIVE OF THE PORTIONS OF THE SITE NOT EXPLORED.

This report is issued and made for the sole use and benefit of the client, is not transferable and is as of the exploration date. Any liability in connection herewith shall not exceed the fee for the exploration. No warranty, expressed or implied, is made or intended in connection with the above exploration or by the furnishing of this report or by any other oral or written statement.

THIS REPORT WAS PREPARED ON THE BASIS OF THE PRELIMINARY DEVELOPMENT PLAN OR CONCEPT FURNISHED. FINAL PLANS SHOULD BE REVIEWED BY THIS OFFICE AS ADDITIONAL GEOTECHNICAL WORK MAY BE REQUIRED.

Irvine Geotechnical appreciates the opportunity to provide our service on this project. Any questions concerning the data or interpretation of this report should be directed to the undersigned.

Respectfully submitted,
Irvine Geotechnical, Inc.







Jon A. Irvine
E.G. 1691/G.E. 2891
Z:\Shared\Final\ICprojects\2022 Projects\IC22068 Harridge Morningside\IC22068 Harridge Morningside Prelim Report.docx

Enc: Appendix I - Laboratory Testing by Soil Labworks
Moisture-Density Relationship (Plates A-1 & A-2)
Shear Test Diagrams (Plates B-1 through B-4)
Consolidation Diagrams (Plates C-1 through C-6)
Vicinity Map
Regional Geologic Map
Log of Borings (12 Pages)
In pocket Site Plan

xc: (1) Addressee

## STATEMENT OF RESPONSIBILITY - SOIL TESTING BY SOIL LABWORKS, LLC

Laboratory testing by Soil Labworks, LLC was performed under the supervision of the undersigned engineer. Irvine Geotechnical and Jon A. Irvine has reviewed referenced laboratory testing report dated June 8, 2022, and the results appear to be reasonable for this area of Inglewood. Irvine Geotechnical and the undersigned engineer concurs with the findings of Soil Labworks, LLC and accepts professional responsibility for utilizing the data.

SL22.3985
June 8, 2022

Irvine Geotechnical
145 N. Sierra Madre Boulevard
Suite 1
Pasadena, California 91107

**Subject:** Laboratory Testing

**Site:** 10500 Yukon Avenue
Inglewood, California

**Job:** IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE – IC22068

Laboratory testing for the subject property was performed by Soil Labworks, LLC., under the supervision of the undersigned Engineer. Samples of the earth materials were obtained from the subject property by personnel of Irvine Geotechnical and transported to the laboratory of Soil Labworks for testing and analysis. The laboratory tests performed are described and results are attached.

Services performed by this facility for the subject property were conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions.

Respectfully Submitted:

SOIL LABWORKS, LLC

JON A. IRVINE
G.E. 2891

Enc: Appendix

REGISTERED PROFESSIONAL ENGINEER
JON ALAN IRVINE
GE 2891
Exp. 6-30-24
GEOTECHNICAL
STATE OF CALIFORNIA

2500 Townsgate Road, Suite E, Westlake Village, California 91361
(805) 370-1338 FAX (805) 371-4693

# APPENDIX

## Laboratory Testing

### Sample Retrieval - Drill Rig

Samples of earth materials were obtained at frequent intervals by driving a thick-walled steel sampler conforming to the most recent version of ASTM D 3550/D 3550M-17 with successive drops of a 140 pound hammer falling 30". The earth material was retained in brass rings of 2.416 inches inside diameter and 1.00 inch height. The central portion of the sample was stored in close-fitting, water-tight containers for transportation to the laboratory.

### Moisture Density

The field moisture content and dry density were determined for each of the soil samples. The dry density was determined in pounds per cubic foot following ASTM 2937-17e2. The moisture content was determined as a percentage of the dry soil weight conforming to ASTM 2216-19. The results are presented below in the following table. The percent saturation was calculated on the basis of an estimated specific gravity. Description of earth materials used in this report and shown on the attached Plates were provided by the client.

| Test Pit/Boring No. | Sample Depth (Feet) | Soil Type | Dry Density (pcf) | Moisture Content (percent) | Percent Saturation ($G_s$=2.65) |
|---|---|---|---|---|---|
| B1 | 5 | Alluvium | 123.6 | 8.7 | 68 |
| B1 | 10 | Alluvium | 119.5 | 7.6 | 52 |
| B1 | 15 | Alluvium | 128.8 | 8.6 | 80 |
| B1 | 20 | Alluvium | 102.7 | 2.4 | 11 |
| B1 | 25 | Alluvium | 109.7 | 9.7 | 51 |
| B1 | 30 | Alluvium | 112.8 | 12.7 | 72 |
| B2 | 5 | Fill | 124.9 | 8.3 | 68 |
| B2 | 10 | Alluvium | 125.2 | 12.0 | 99 |
| B2 | 15 | Alluvium | 123.3 | 9.5 | 74 |
| B2 | 20 | Alluvium | 116.2 | 9.1 | 57 |
| B3 | 5 | Alluvium | 113.4 | 17.1 | 99 |
| B3 | 10 | Alluvium | 124.3 | 12.4 | 100 |
| B3 | 15 | Alluvium | 125.5 | 11.0 | 92 |
| B3 | 20 | Alluvium | 110.5 | 3.9 | 21 |
| B4 | 5 | Alluvium | 119.3 | 11.2 | 77 |
| B4 | 10 | Alluvium | 125.0 | 10.6 | 87 |

**Moisture Density (continued)**

| Test Pit/Boring No. | Sample Depth (Feet) | Soil Type | Dry Density (pcf) | Moisture Content (percent) | Percent Saturation ($G_s$=2.65) |
|---|---|---|---|---|---|
| B4 | 15 | Alluvium | 122.6 | 8.9 | 67 |
| B4 | 20 | Alluvium | 106.5 | 1.9 | 9 |
| B5 | 5 | Fill | 117.1 | 7.4 | 48 |
| B5 | 10 | Alluvium | 120.7 | 14.1 | 100 |
| B5 | 15 | Alluvium | 116.7 | 15.9 | 100 |
| B5 | 20 | Alluvium | 106.5 | 3.7 | 18 |
| B6 | 3 | Alluvium | 120.4 | 13.5 | 96 |
| B6 | 5 | Alluvium | 122.4 | 13.3 | 100 |
| B6 | 10 | Alluvium | 119.1 | 15.6 | 100 |
| B6 | 15 | Alluvium | 108.3 | 6.0 | 30 |
| B6 | 20 | Alluvium | 106.0 | 4.3 | 20 |
| B7 | 5 | Alluvium | 121.8 | 11.2 | 83 |
| B7 | 10 | Alluvium | 121.6 | 7.9 | 59 |
| B7 | 15 | Alluvium | 115.3 | 12.6 | 77 |
| B7 | 20 | Alluvium | 110.9 | 2.4 | 13 |
| B8 | 5 | Alluvium | 123.6 | 12.5 | 98 |
| B8 | 10 | Alluvium | 121.7 | 13.9 | 100 |
| B8 | 15 | Alluvium | 111.9 | 19.5 | 100 |
| B8 | 20 | Alluvium | 113.2 | 10.7 | 62 |
| B9 | 5 | Alluvium | 118.8 | 12.4 | 84 |
| B9 | 10 | Alluvium | 114.2 | 6.8 | 40 |
| B9 | 15 | Alluvium | 111.5 | 7.1 | 39 |
| B9 | 20 | Alluvium | 115.0 | 16.3 | 98 |
| B10 | 5 | Fill | 119.9 | 9.1 | 64 |
| B10 | 10 | Alluvium | 122.2 | 14.0 | 100 |
| B10 | 20 | Alluvium | 110.0 | 3.9 | 20 |
| B10 | 30 | Alluvium | 101.0 | 2.9 | 12 |

**Compaction Character**

Compaction tests were performed on bulk samples of the earth materials in accordance with ASTM D1557-12(2021). The results of the tests are provided on the table below and on the "Moisture-Density Relationship", A-Plates. The specific gravity of the alluvium was estimated from the compaction curves.

**Compaction Character (continued)**

| Test Pit/Boring No. | Sample Depth (Feet) | Soil Type | Maximum Dry Density (pcf) | Optimum Moisture Content (Percent) |
|---|---|---|---|---|
| B1 | 2-5 | Alluvium | 129.5 | 9.1 |
| B6 | 2-5 | Alluvium | 123.6 | 10.5 |

**Shear Strength**

The peak and ultimate shear strengths of the fill and alluvium were determined by performing consolidated and drained direct shear tests in conformance with ASTM D3080/D3080M-11. The tests were performed in a strain-controlled machine manufactured by GeoMatic. The rate of deformation was 0.01 inches per minute. Samples were sheared under varying confining pressures, as shown on the "Shear Test Diagrams," B-Plates. Remolded samples were prepared at 90 percent of the maximum density for shear tests. The remolding procedure consists of selecting a representative sample from a bulk bag and sieving it through a No. 4 sieve. The moisture content of the material is then determined. A formula is then used to calculate the weight of the material that must fit in a ring when compacted to 90 percent of the maximum density. This calculated amount of material is then weighed out and pounded into a ring until all the material is used and the ring is full. The moisture conditions during testing are shown on the following table and on the B-Plates. The samples indicated as saturated were artificially saturated in the laboratory. All saturated samples were sheared under submerged conditions.

| Test Pit/ Boring No. | Sample Depth (Feet) | Dry Density (pcf) | As-Tested Moisture Content (percent) |
|---|---|---|---|
| B2 | 5 | 124.9 | 17.9 |
| B3 | 5 | 113.4 | 22.3 |
| B7 | 5 | 121.8 | 20.3 |
| B8 | 5 | 123.6 | 16.8 |
| B1* | 2-5 | 116.6 | 17.2 |
| B6* | 2-5 | 111.2 | 21.4 |

* Sample remolded to 90 % of the laboratory maximum density.

**Consolidation**

One-dimensional consolidation tests were performed on samples of the alluvium in a consolidometer manufactured by GeoMatic in conformance with ASTM D2435/D2435M-11 (2020). The tests were performed on 1-inch high samples retained in brass rings. The samples were initially loaded to approximately ½ of the field over-burden pressure and then unloaded to compensate for the effects of possible disturbance during sampling. Loads were then applied in a geometric progression and resulting deformation recorded. Water was added at a specific load to determine the effect of saturation. The results are plotted on the "Consolidation Test," C-Plates.

**Expansion Index**

The expansive character of the alluvium was determined by performing Expansion Index Tests in accordance with UBC 18.2 and ASTM 4829-21. A bulk sample of earth material was compacted at a specific moisture content using one fifth the compacted energy for the modified proctor test. The sample was then saturated and the expansion measured. The results of the tests are provided on the following table.

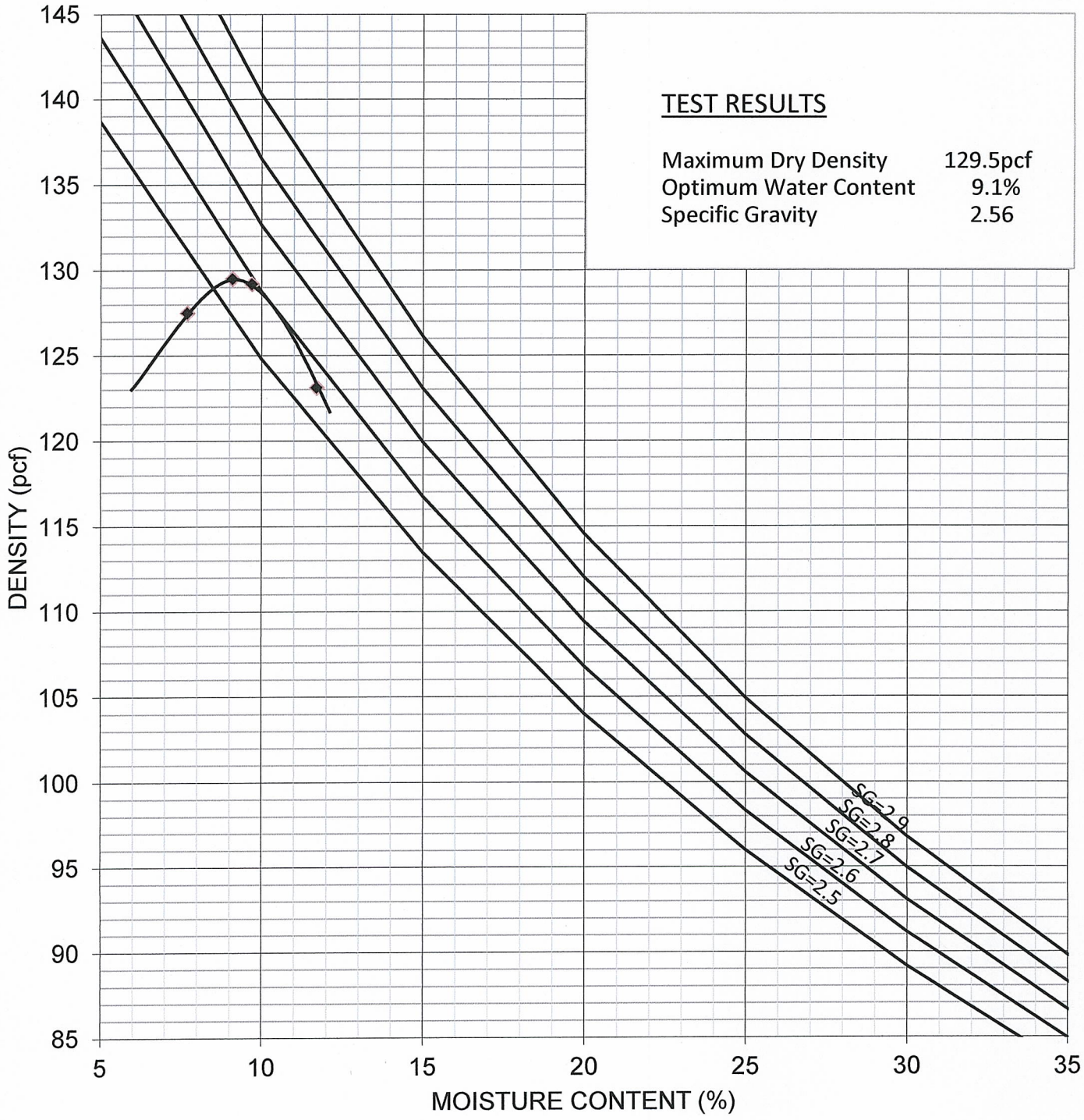
| Test Pit No. | Sample Depth (Feet) | Soil Type | Expansion Index |
|---|---|---|---|
| B1 | 2-5 | Alluvium | 18 |
| B6 | 2-5 | Alluvium | 73 |

SOIL LABWORKS LLC

## MOISTURE-DENSITY RELATIONSHIP A-1

JN: **SL22.3985** CONSULTANT: **JAI**
CLIENT: **IRVINE/Harridge Dev-10500 Yukon Ave**
**B1 @ 2-5'**
EARTH MATERIAL: **ALLUVIUM**

NOTE: ASTM Test Method D-1557-12

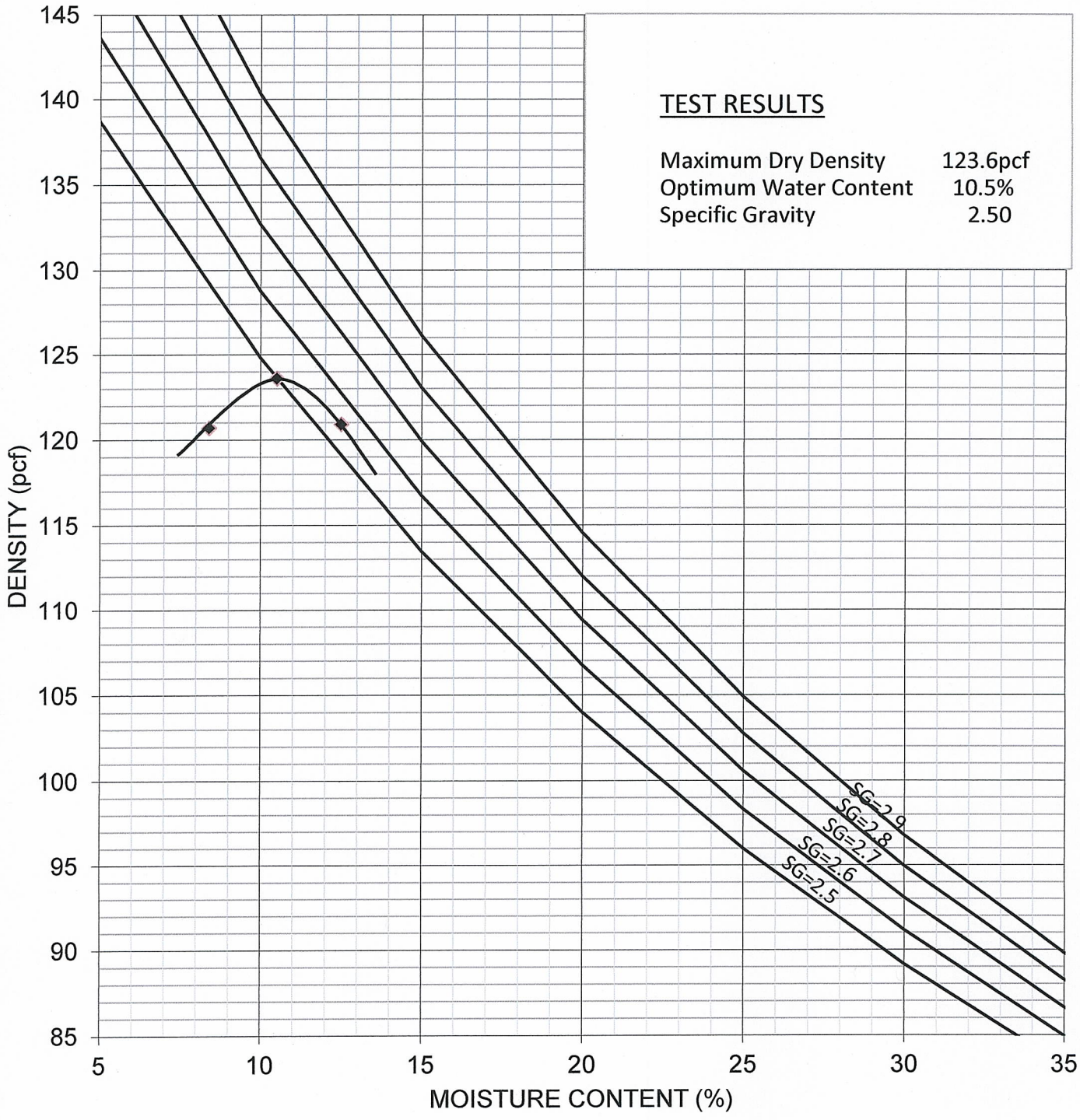


SOIL LABWORKS LLC

## MOISTURE-DENSITY RELATIONSHIP A-2

JN: **SL22.3985** CONSULTANT: **JAI**
CLIENT: **IRVINE/Harridge Dev-10500 Yukon Ave B6 @ 2-5'**
EARTH MATERIAL: **ALLUVIUM**

NOTE: ASTM Test Method D-1557-12



SOIL LABWORKS LLC

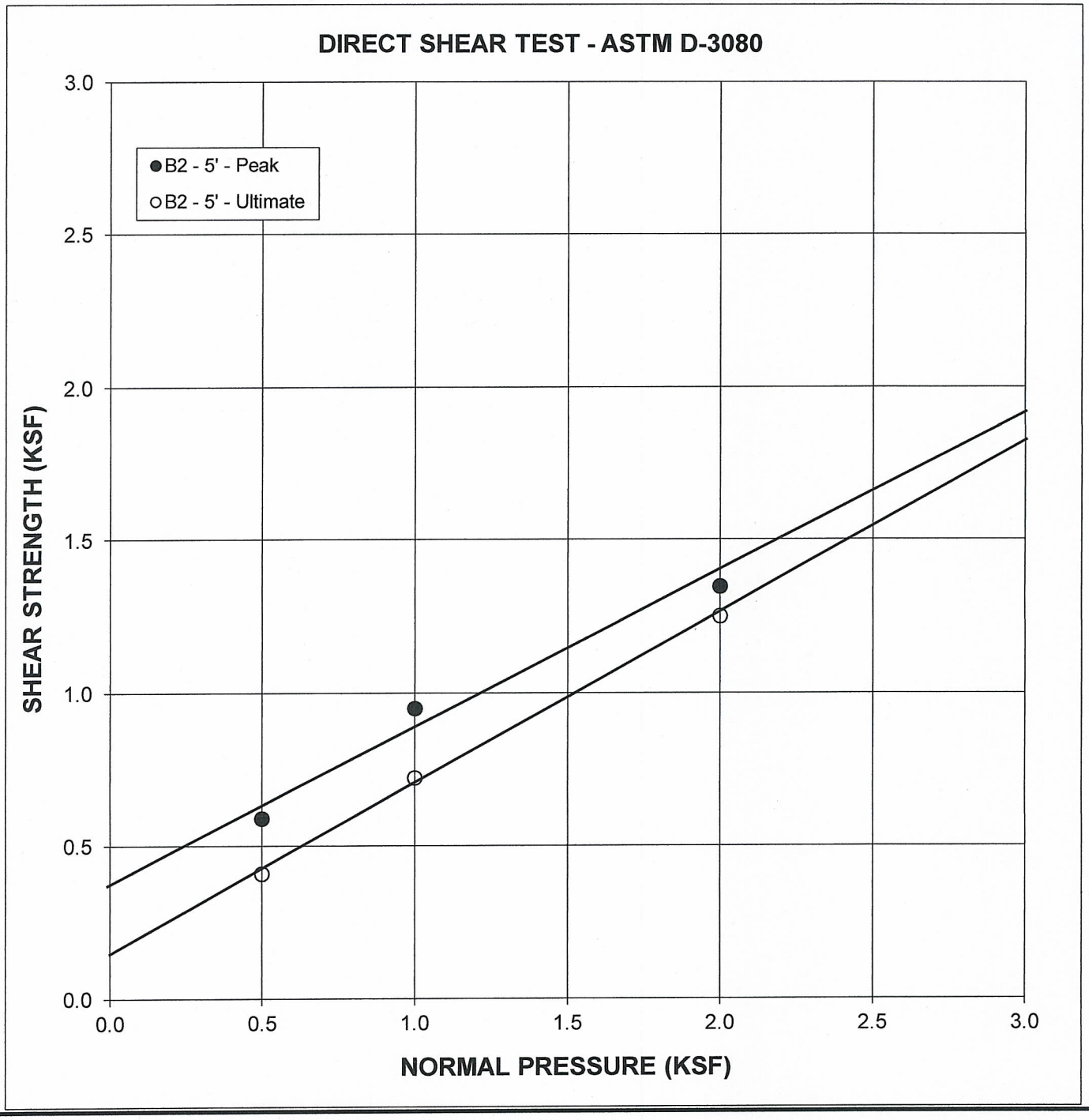
# SHEAR DIAGRAM B-1

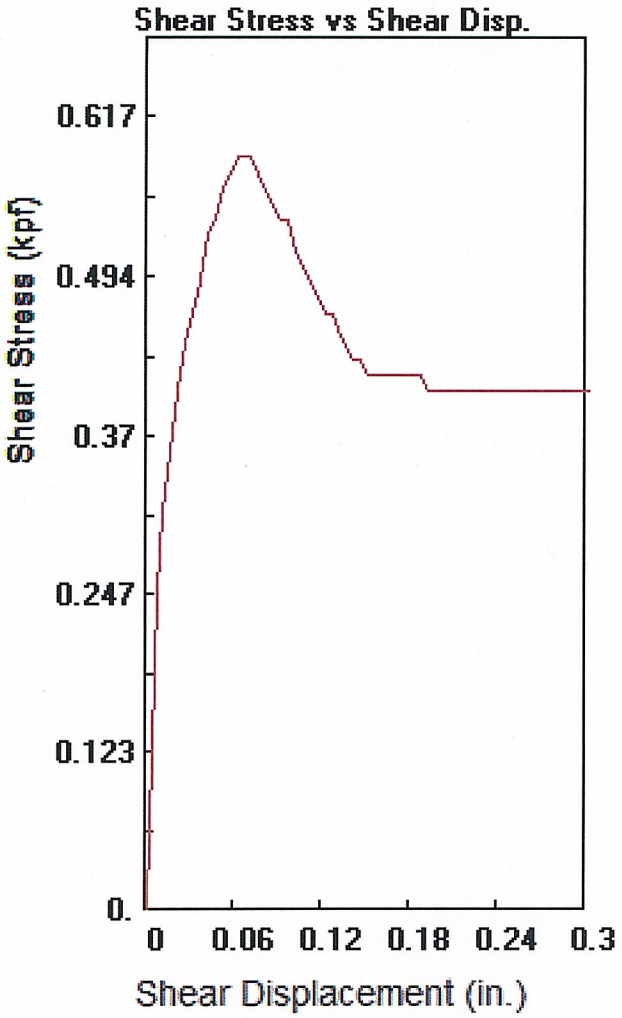
JN: SL22.3985 CONSULTANT JAI
CLIENT: Irvine/Harridge Dev-10500 Yukon Avenue

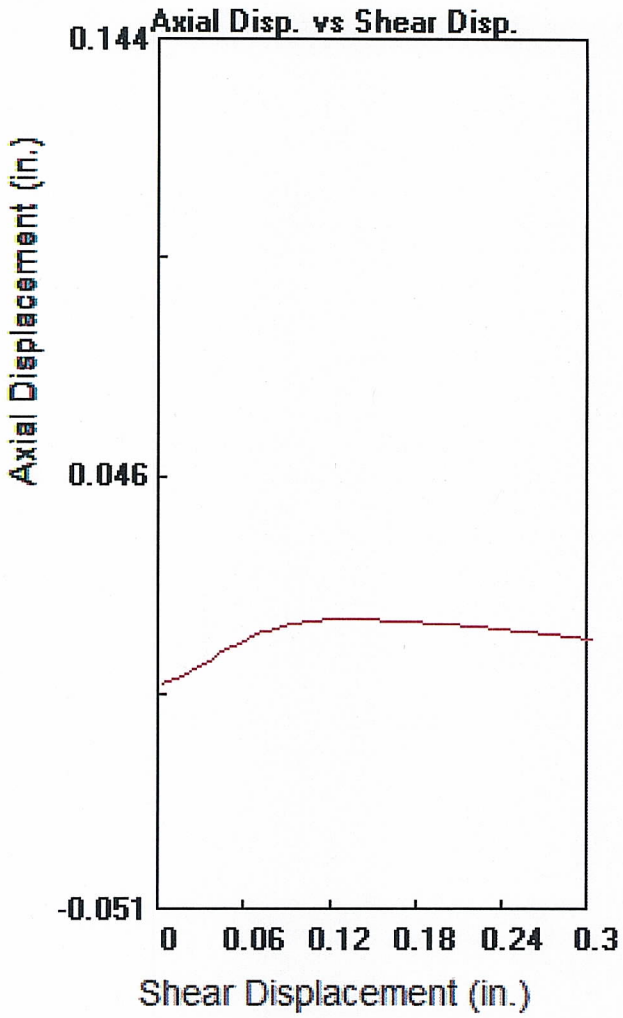
EARTH MATERIAL: FILL

| | PEAK | ULTIMATE | |
|---|---|---|---|
| Phi Angle | 27 | 29.5 | degrees |
| Cohesion | 385 | 140 | psf |

| | |
|---|---|
| Average Moisture Content | 17.9% |
| Average Dry Density (pcf) | 124.9 |
| Percent Saturation | 100.0% |






**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:FILL

Sample: 1

Technician: BF

Boring: B2

Axial Load: 500 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B255.dat

Distance: 0.30 in.

Stress at Max Def
588 0.061

Stress at Max Disp
0.296 408

**Maximum Load**

588 psf

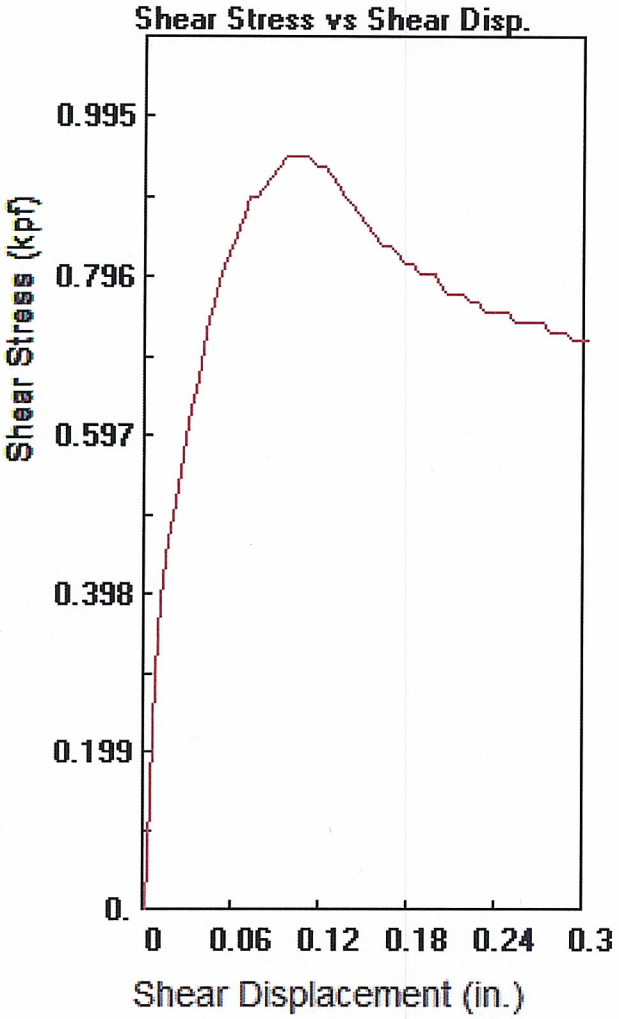
Shear Displacement at maximum Load

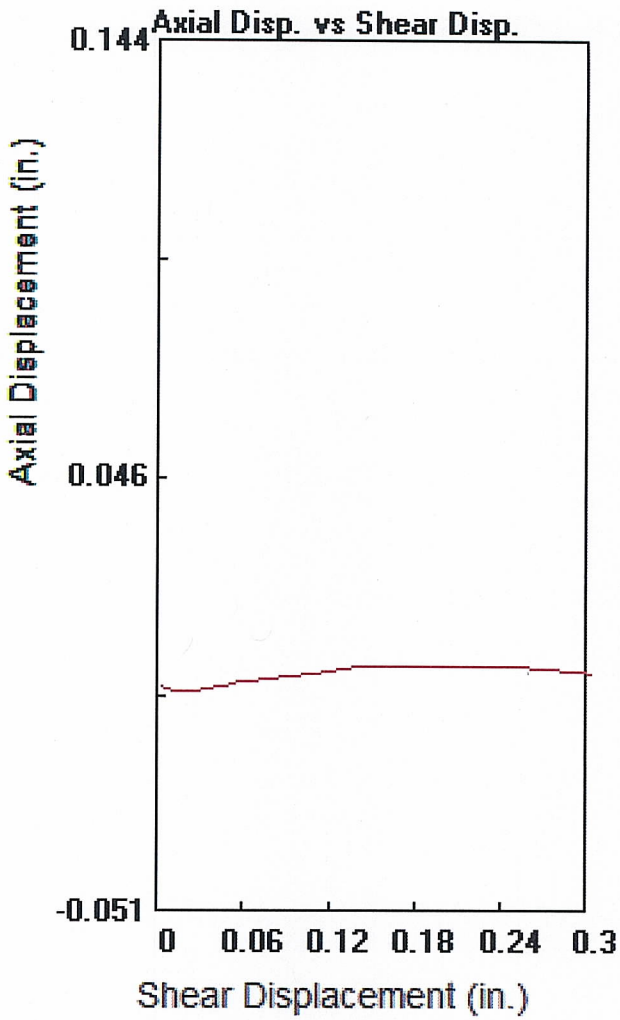
0.0606 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:FILL

Sample: 2

Technician: BF

Boring: B2

Axial Load: 1000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B251.dat

Distance: 0.30 in.

Stress at Max Def
948 0.096

Stress at Max Disp
0.296 720

**Maximum Load**

948 psf

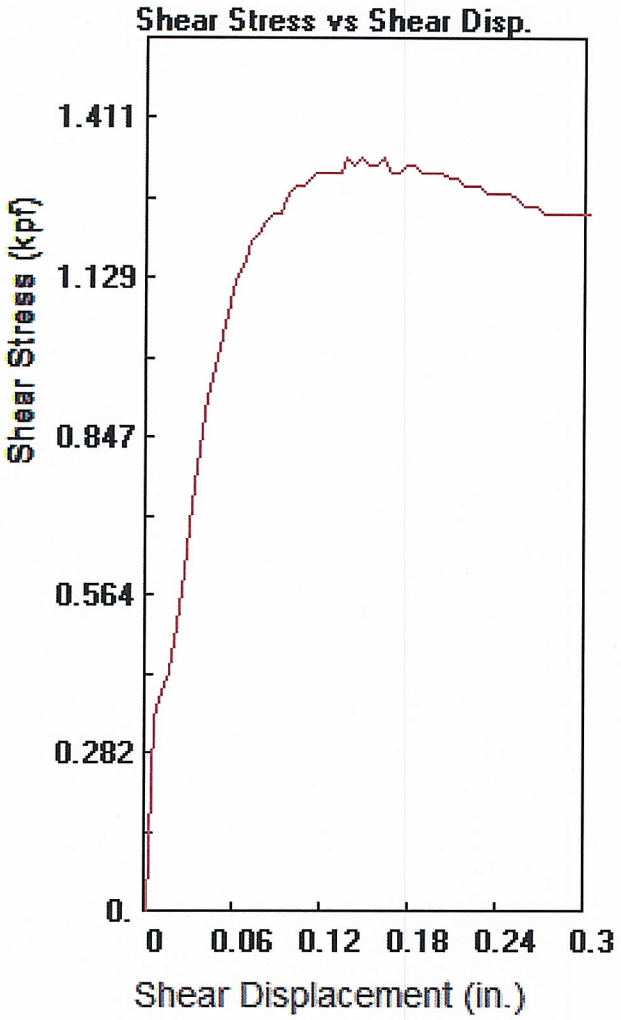
Shear Displacement at maximum Load

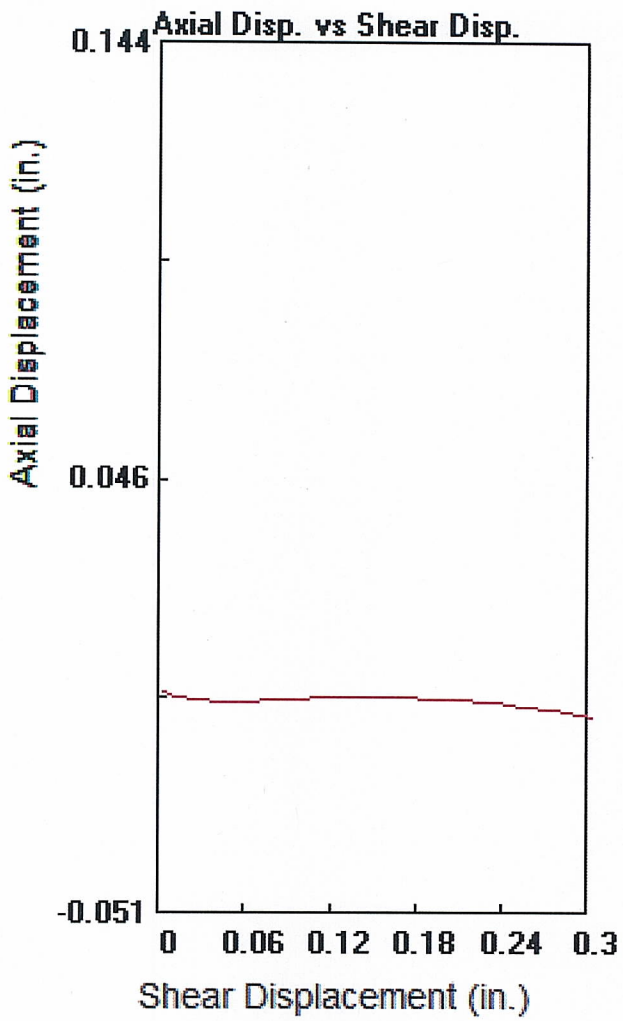
0.0955 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:FILL

Sample: 3

Technician: BF

Boring: B2

Axial Load: 2000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B252.dat

Distance: 0.30 in.

Stress at Max Def
1344 0.136

Stress at Max Disp
0.296 1248

**Maximum Load**

1344 psf

Shear Displacement at maximum Load

0.1355 in.

**Date**

5/31/2022

Soil Labworks

SOIL LABWORKS LLC

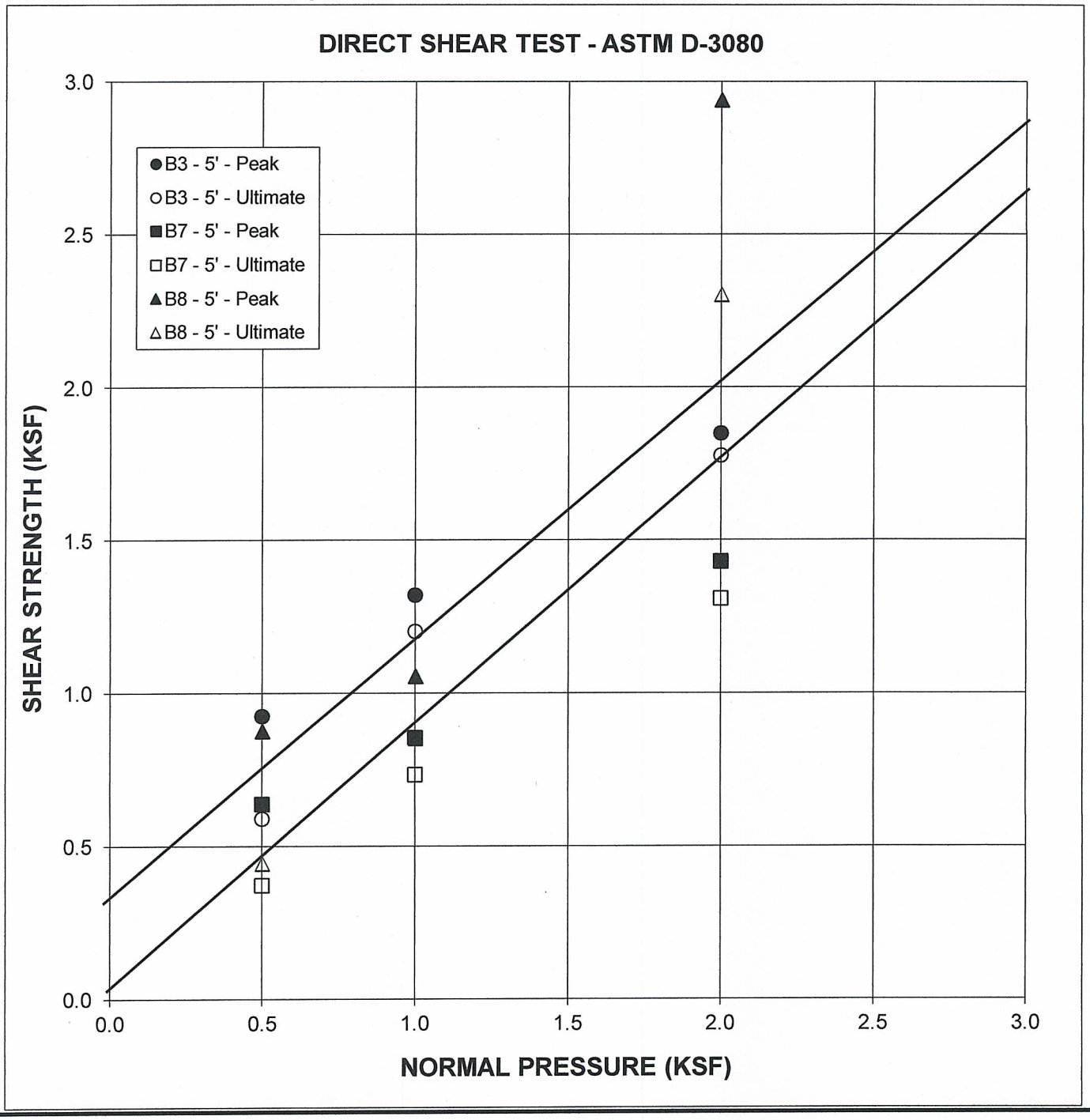
# SHEAR DIAGRAM B-2

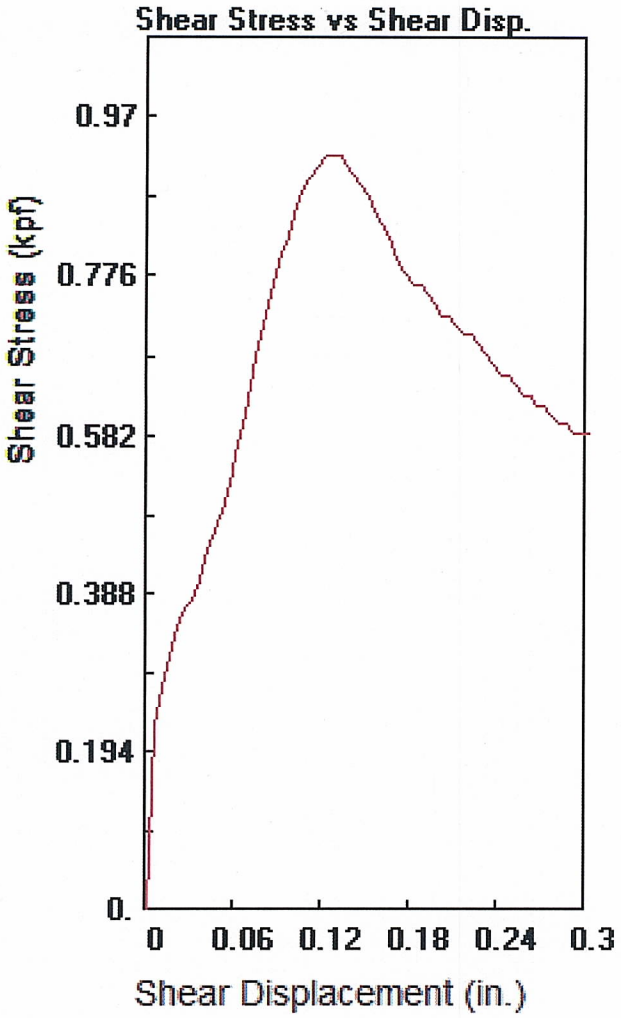
JN: SL22.3985. CONSULTANT JAI
CLIENT: Irvine/Harridge Dev-10500 Yukon Avenue

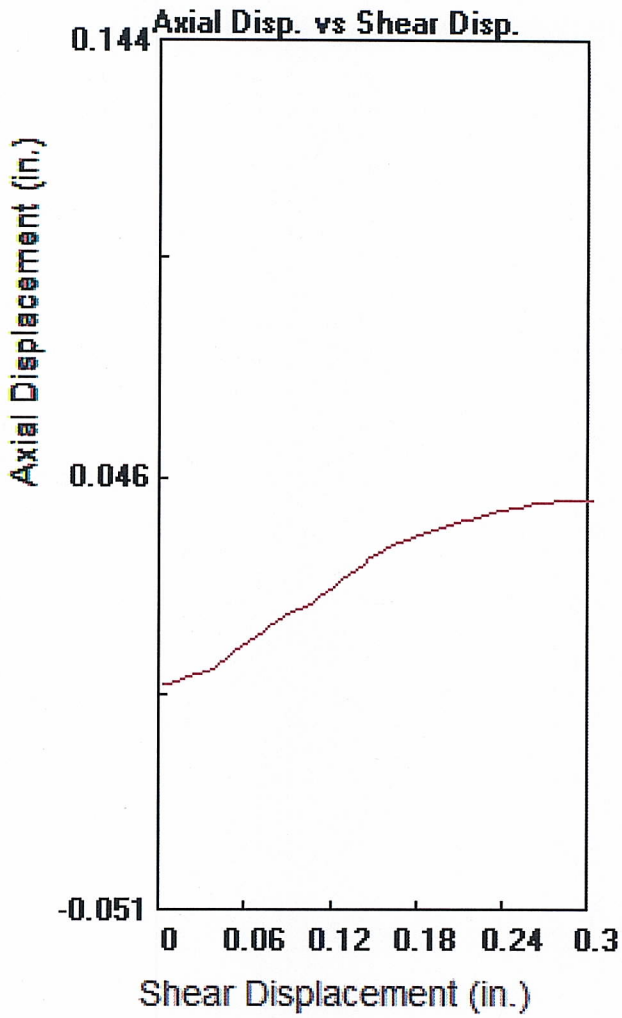
EARTH MATERIAL: ALLUVIUM

| | PEAK | ULTIMATE | |
|---|---|---|---|
| Phi Angle | 40.5 | 41 | degrees |
| Cohesion | 315 | 35 | psf |

| | |
|---|---|
| Average Moisture Content | 19.8% |
| Average Dry Density (pcf) | 119.6 |
| Percent Saturation | 100.0% |






**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 1

Technician: BF

Boring: B3

Axial Load: 500 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B355.dat

Distance: 0.30 in.

Stress at Max Def
924 0.121

Stress at Max Disp
0.296 588

**Maximum Load**

924 psf

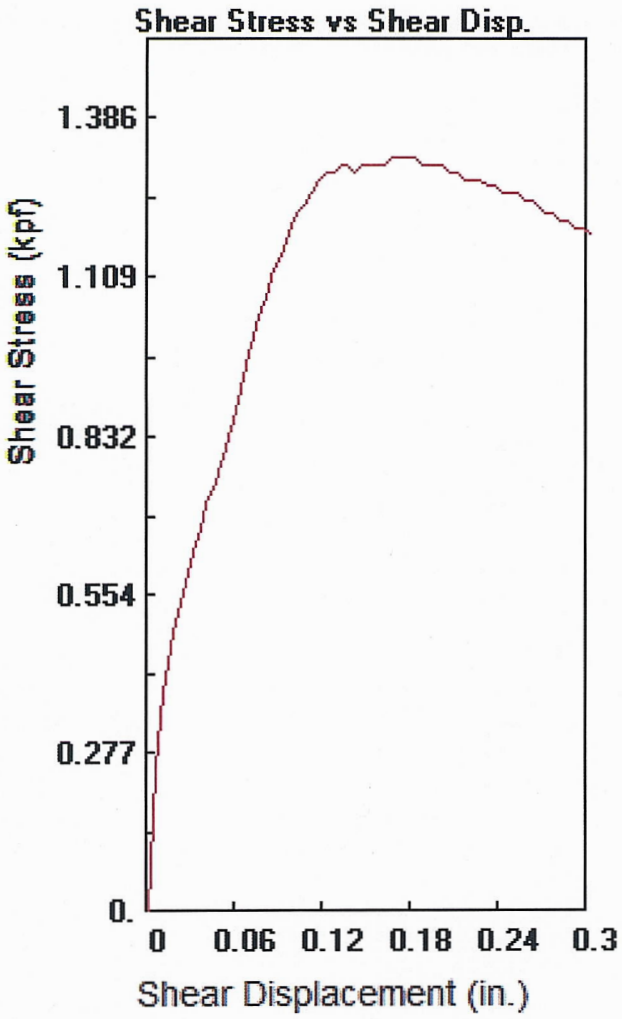
Shear Displacement at maximum Load

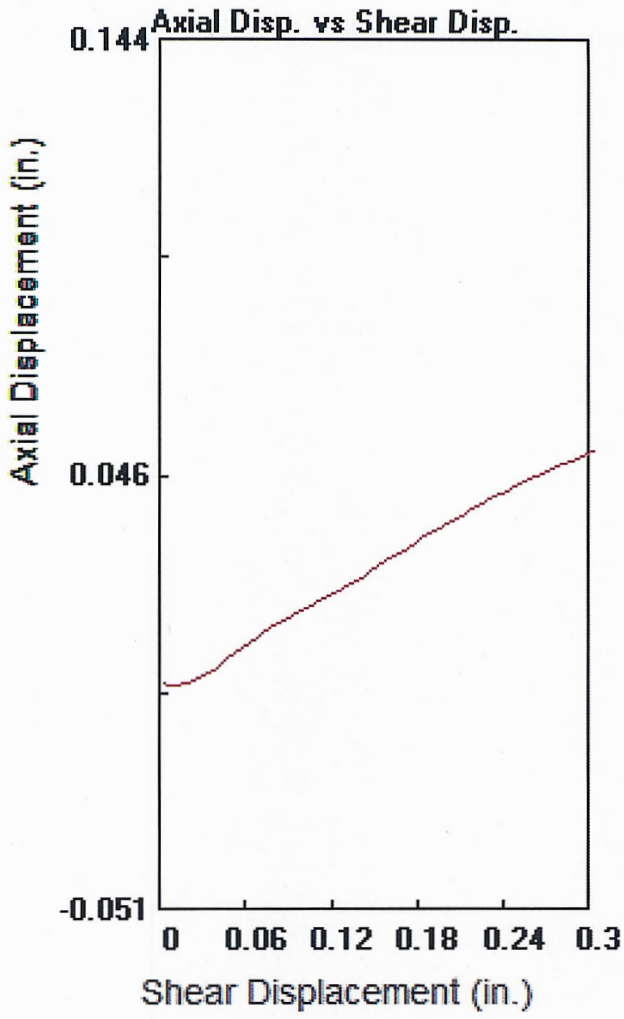
0.1207 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 2

Technician: BF

Boring: B3

Axial Load: 1000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B351.dat

Distance: 0.30 in.

Stress at Max Def
1320 0.166

Stress at Max Disp
0.296 1200

**Maximum Load**

1320 psf

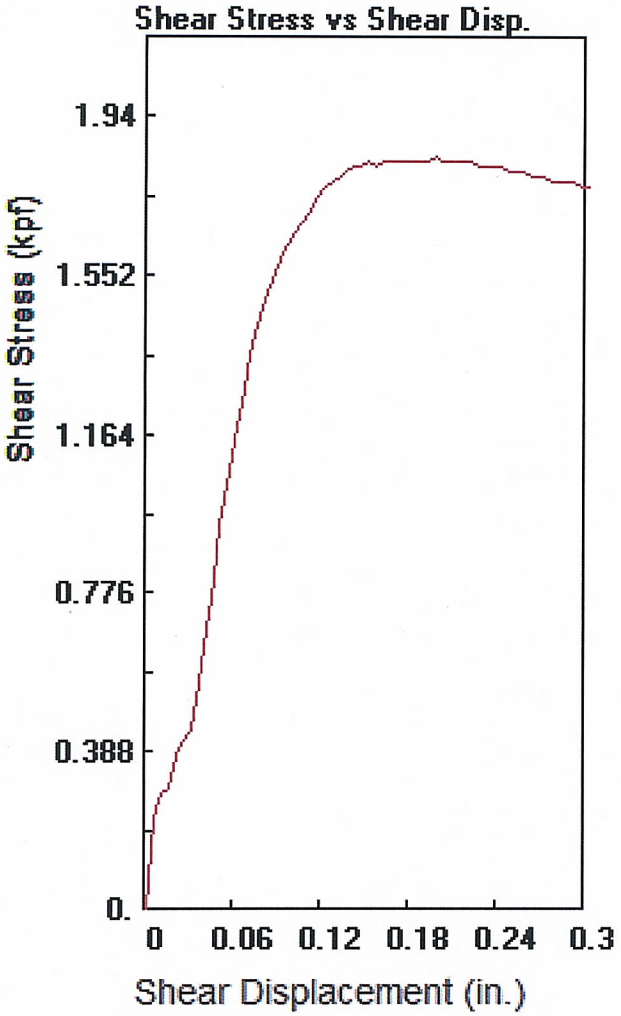
Shear Displacement at maximum Load

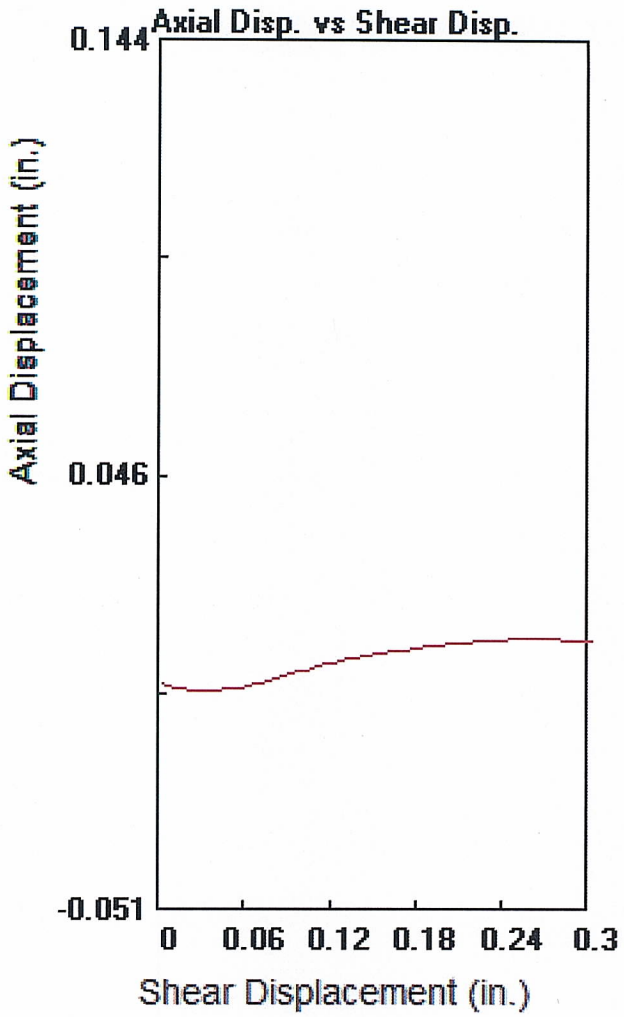
0.1657 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 3

Technician: BF

Boring: B3

Axial Load: 2000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B352.dat

Distance: 0.30 in.

Stress at Max Def
1848 0.196

Stress at Max Disp
0.296 1776

**Maximum Load**

1848 psf

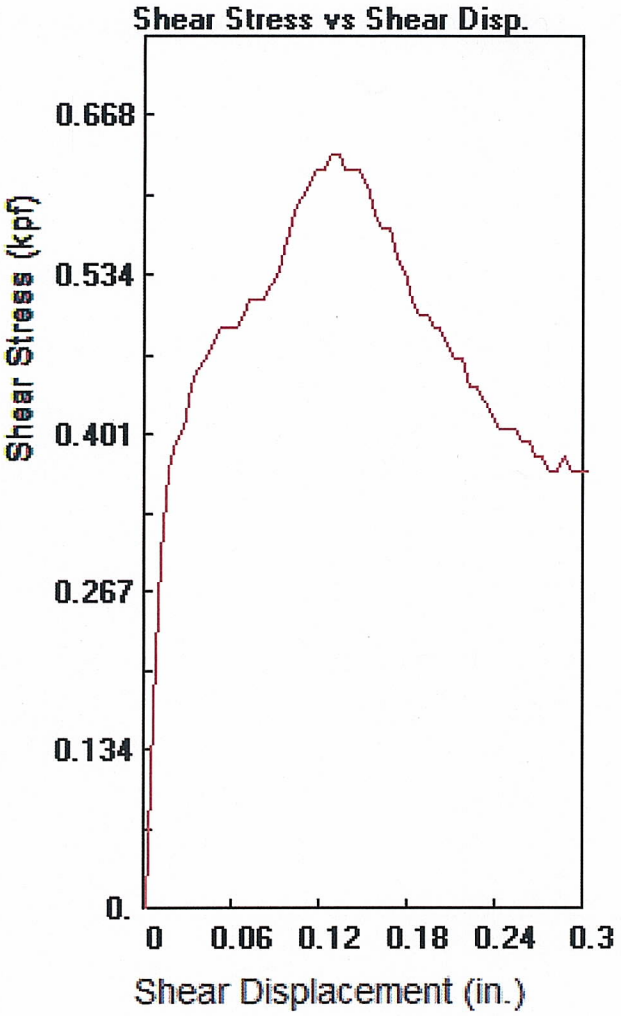
Shear Displacement at maximum Load

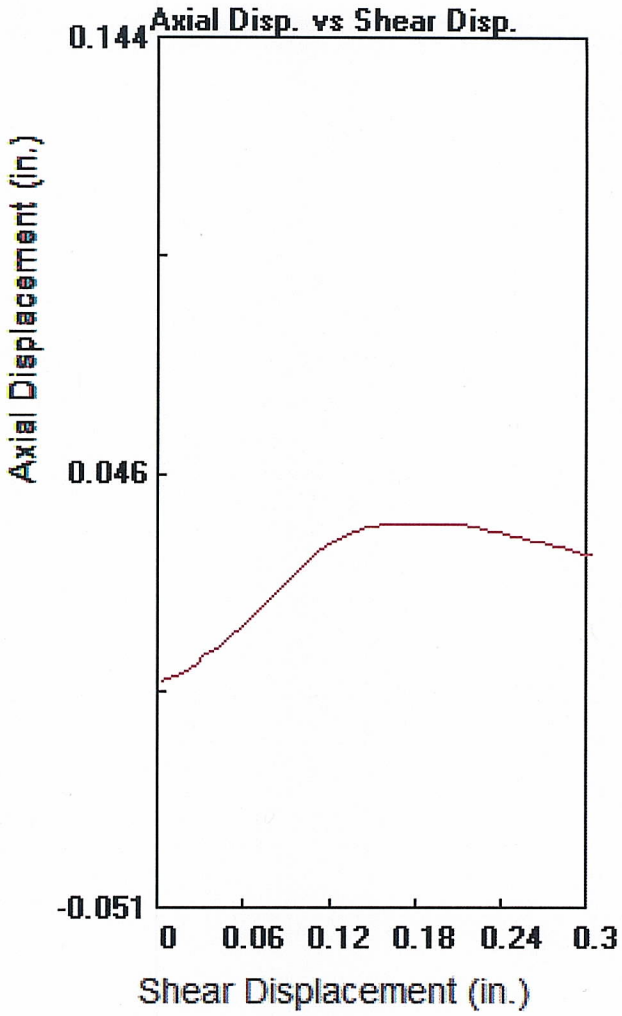
0.1955 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 1

Technician: BF

Boring: B7

Axial Load: 500 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B755.dat

Distance: 0.30 in.

Stress at Max Def
636 0.126

Stress at Max Disp
0.296 372

**Maximum Load**

636 psf

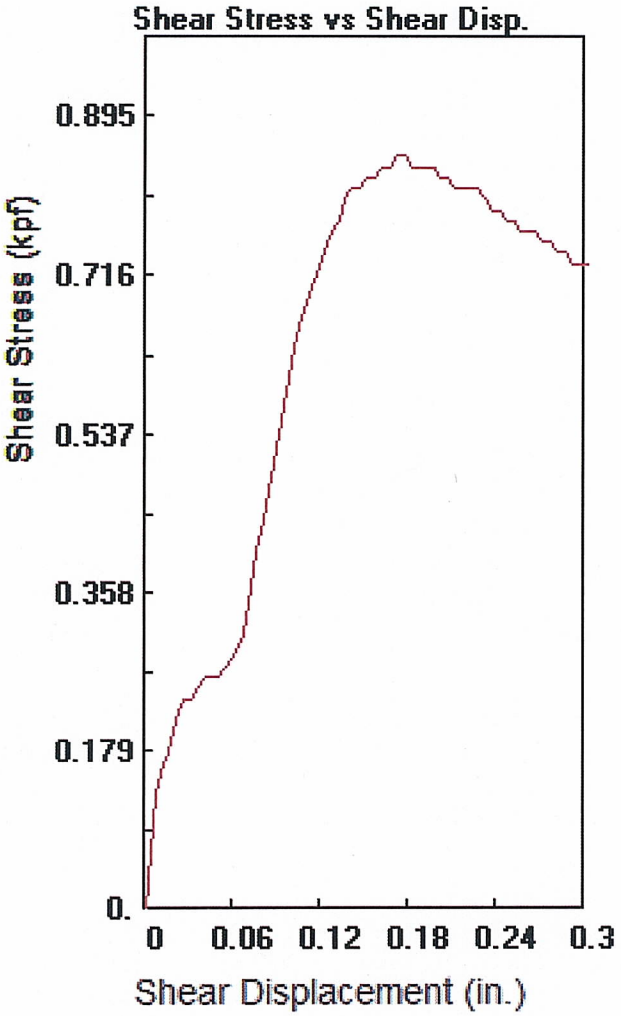
**Shear Displacement at maximum Load**

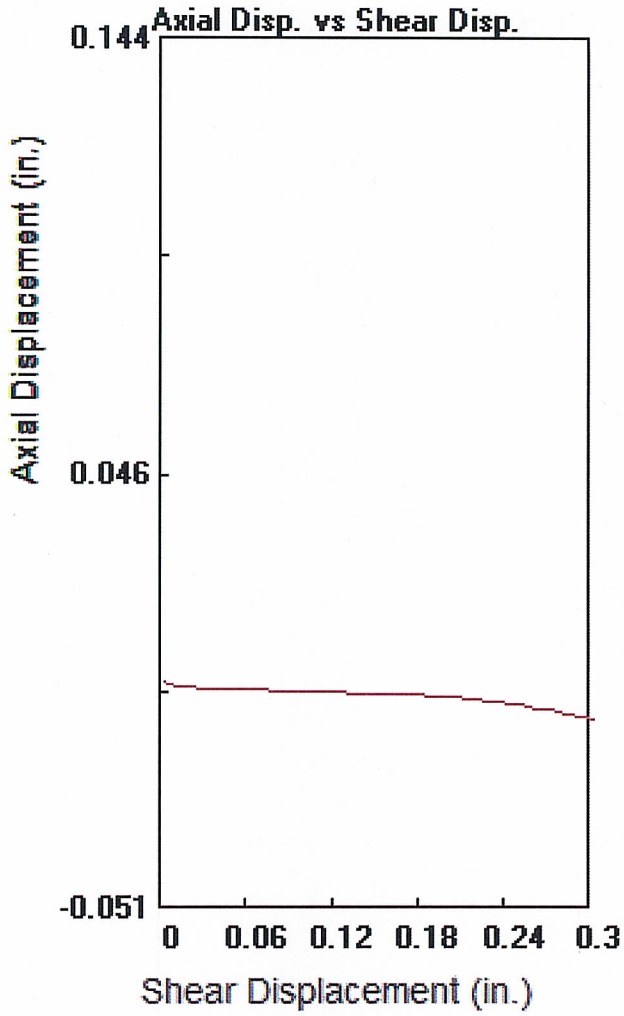
0.1256 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 2

Technician: BF

Boring: B7

Axial Load: 1000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B751.dat

Distance: 0.30 in.

Stress at Max Def
852 0.171

Stress at Max Disp
0.296 732

**Maximum Load**

852 psf

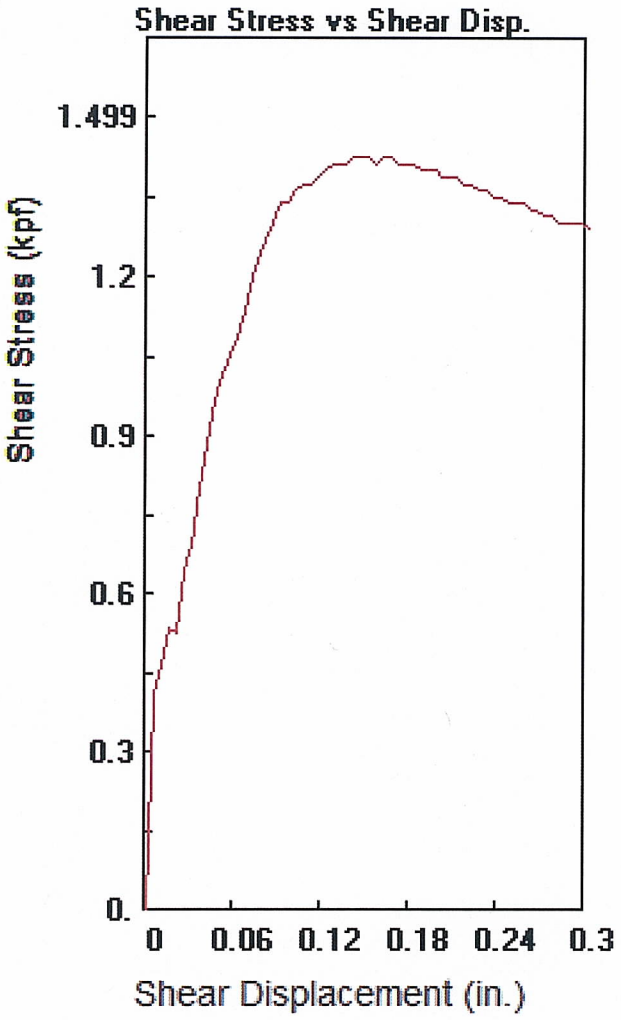
Shear Displacement at maximum Load

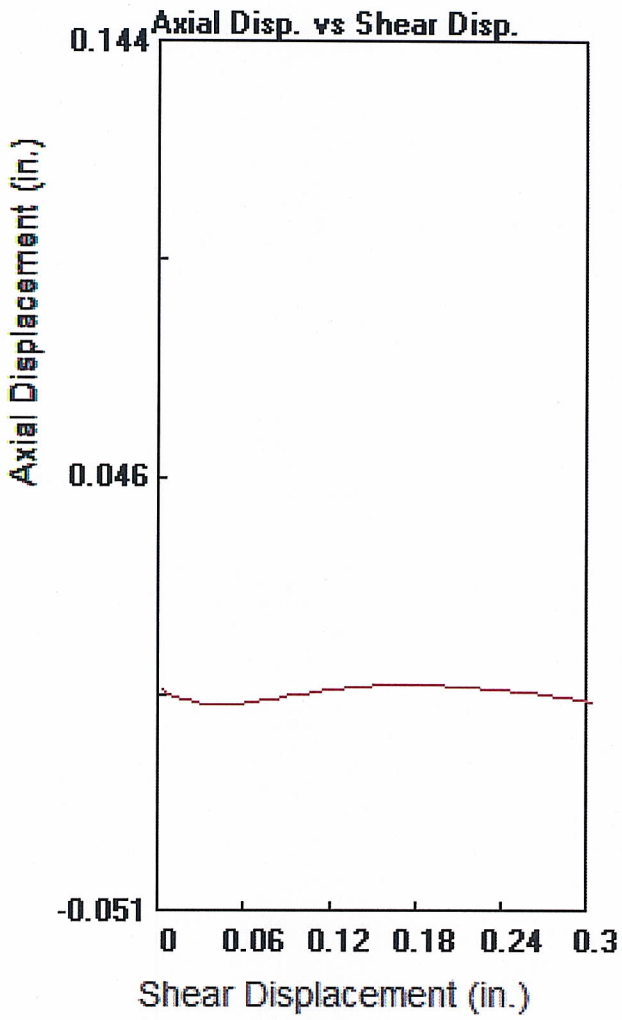
0.1705 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 3

Technician: BF

Boring: B7

Axial Load: 2000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B752.dat

Distance: 0.30 in.

Stress at Max Def
1428 0.141

Stress at Max Disp
0.296 1308

**Maximum Load**

1428 psf

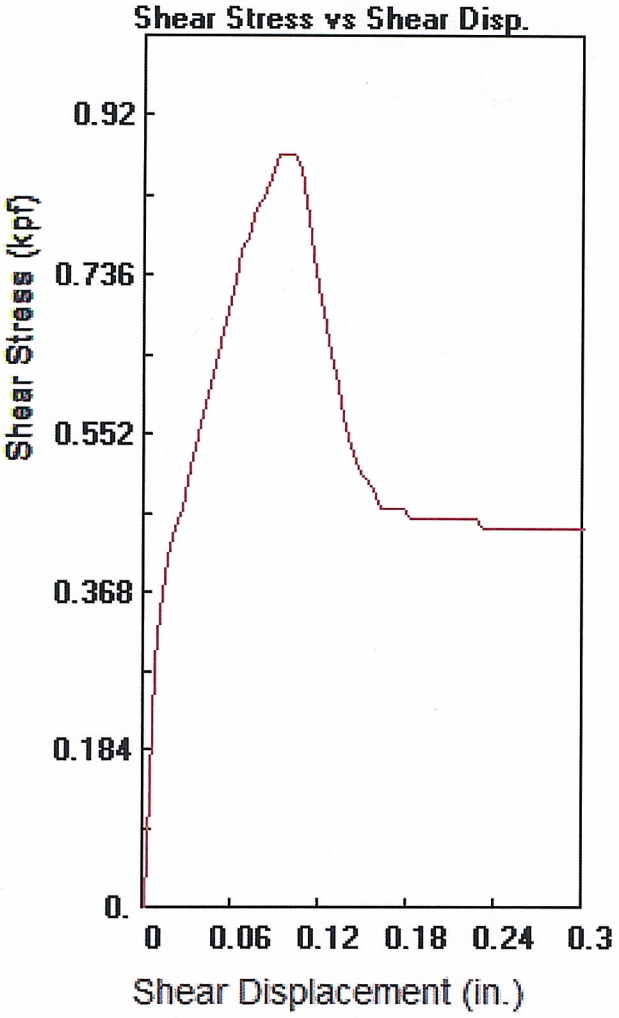
Shear Displacement at maximum Load

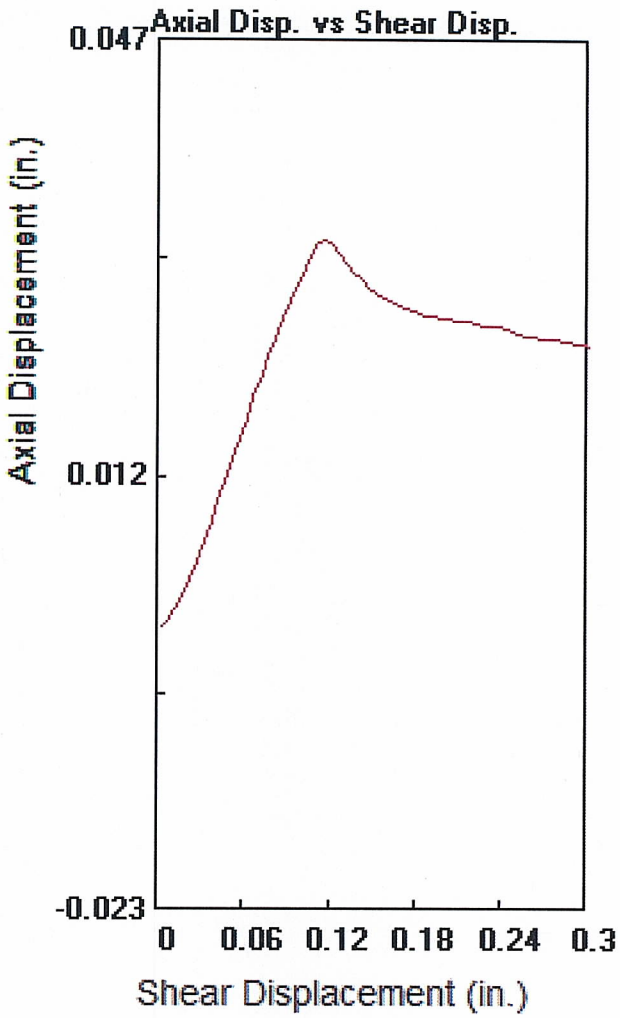
0.1407 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 1

Technician: BF

Boring: B8

Axial Load: 500 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B855.dat

Distance: 0.30 in.

Stress at Max Def
876 0.091

Stress at Max Disp
0.296 444

**Maximum Load**

876 psf

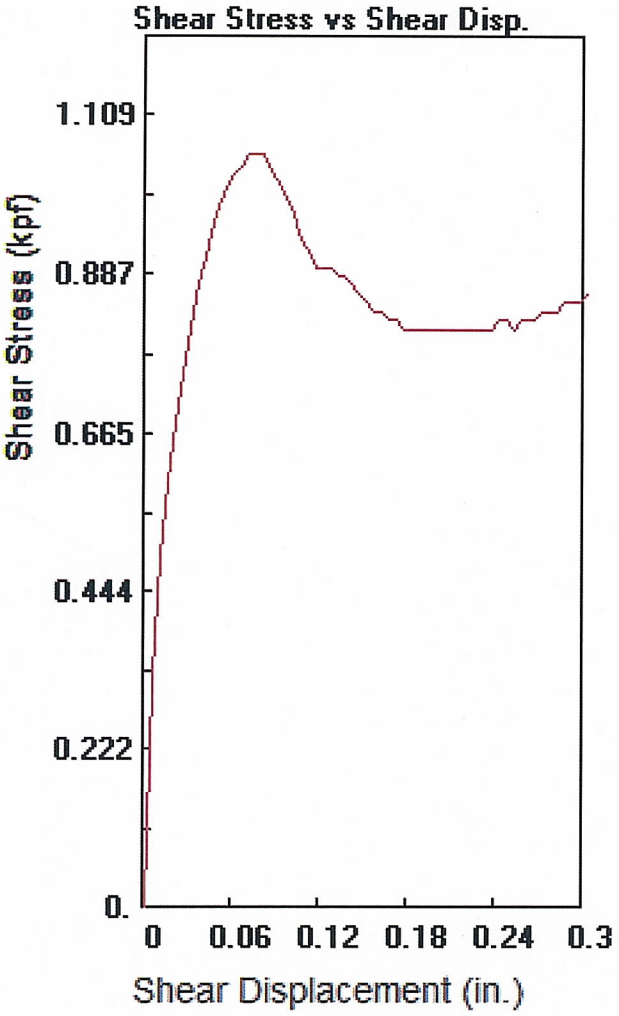
**Shear Displacement at maximum Load**

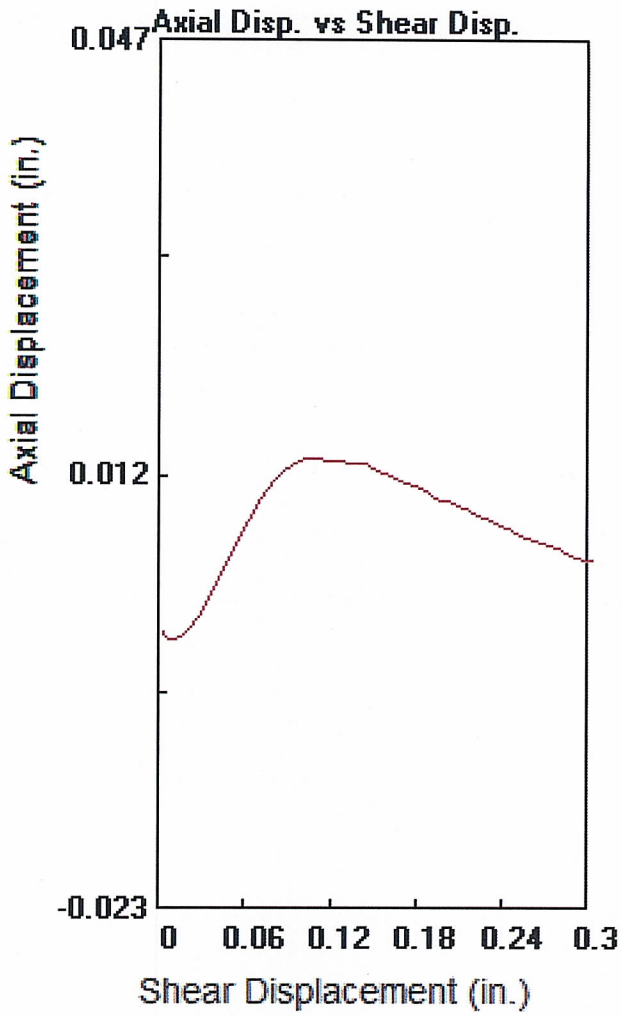
0.0905 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 2

Technician: BF

Boring: B8

Axial Load: 1000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B851.dat

Distance: 0.30 in.

Stress at Max Def
1056 0.07

Stress at Max Disp
0.296 852

**Maximum Load**

1056 psf

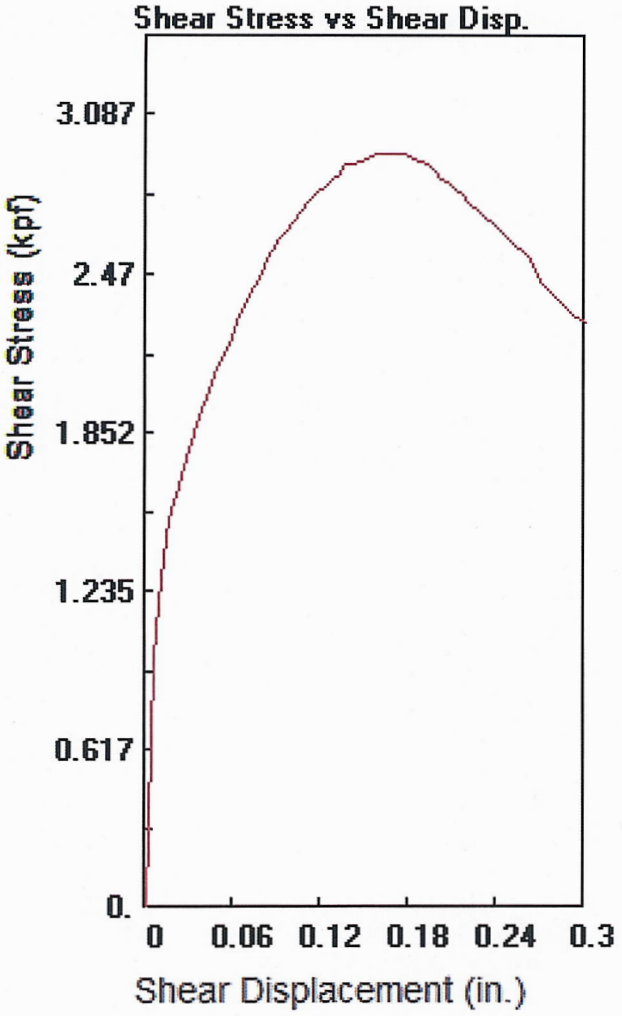
Shear Displacement at maximum Load

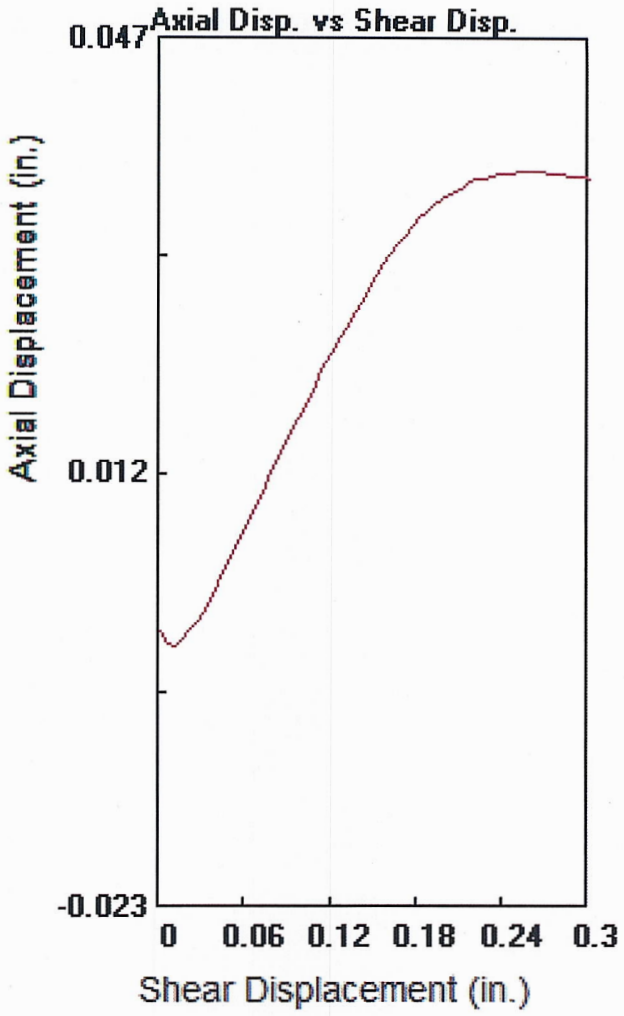
0.0704 in.

**Date**

5/31/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEVELOPMENT

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 3

Technician: BF

Boring: B8

Axial Load: 2000 psf

Depth: 5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B852.dat

Distance: 0.30 in.

Stress at Max Def
2940 0.156

Stress at Max Disp
0.296 2304

**Maximum Load**

2940 psf

**Shear Displacement at maximum Load**

0.1557 in.

**Date**

5/31/2022

Soil Labworks

# SHEAR DIAGRAM B-3

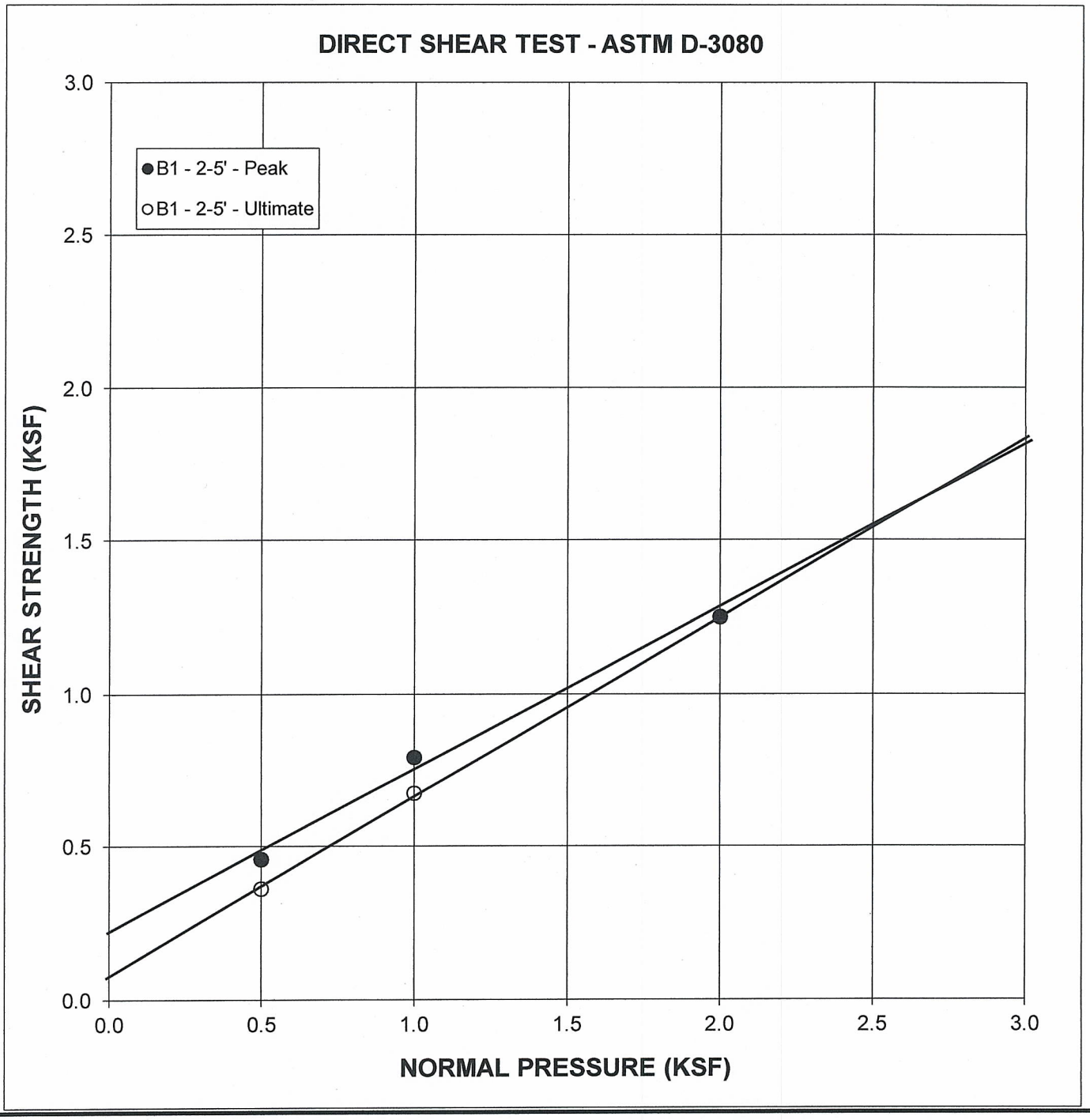
JN: **SL22.3985** CONSULTANT **JAI**
CLIENT: **Irvine/Harridge Dev-10500 Yukon Avenue**

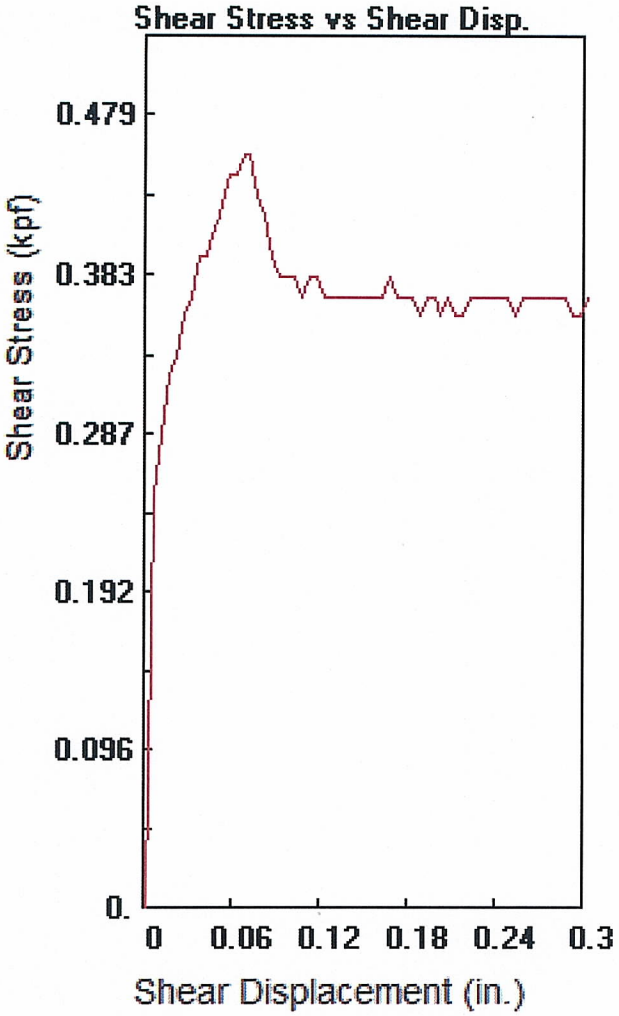
EARTH MATERIAL: **ALLUVIUM**

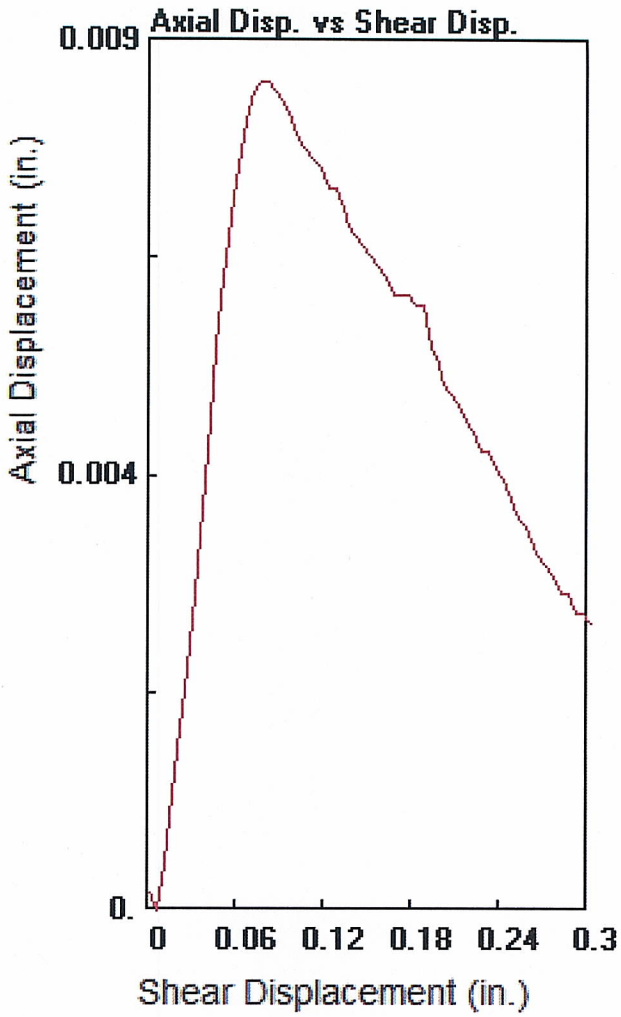
**Sample remolded to 90 % of the laboratory maximum density**

| | PEAK | ULTIMATE | |
|---|---|---|---|
| Phi Angle | 28 | 30.5 | degrees |
| Cohesion | 225 | 250 | psf |

| | |
|---|---|
| Average Moisture Content | 17.2% |
| Average Dry Density (pcf) | 116.6 |
| Percent Saturation | 100.0% |






**Parameters**

Client: IRVINE/HARRIDGE DEV

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 1

Technician: BF

Boring: B1

Axial Load: 500 psf

Depth: 2-5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B12-55 REMOLD.dat

Distance: 0.30 in.

Stress at Max Def
456 0.066

Stress at Max Disp
0.296 360

**Maximum Load**

456 psf

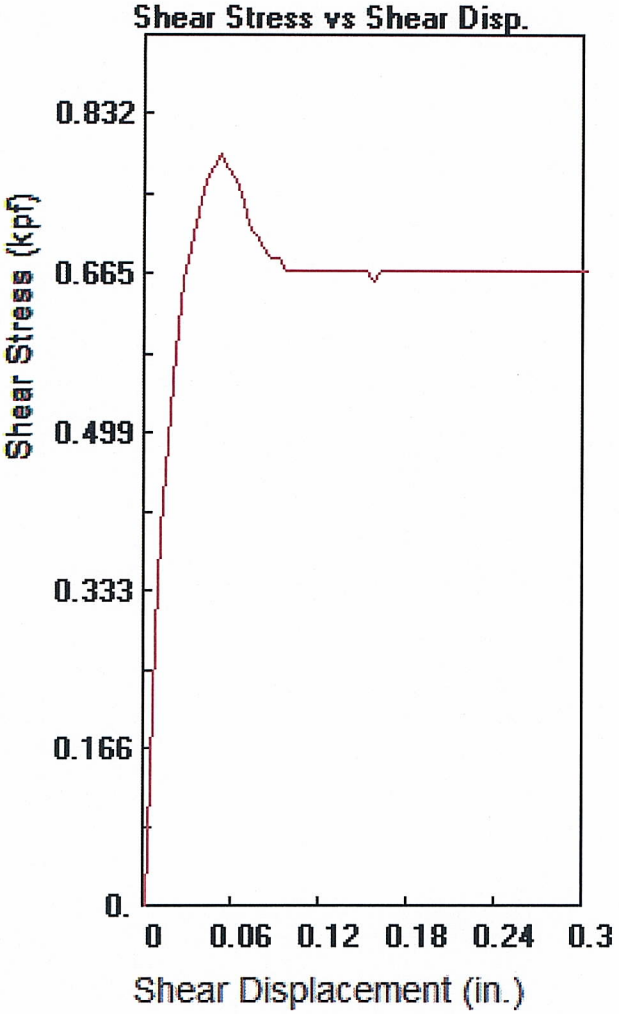
**Shear Displacement at maximum Load**

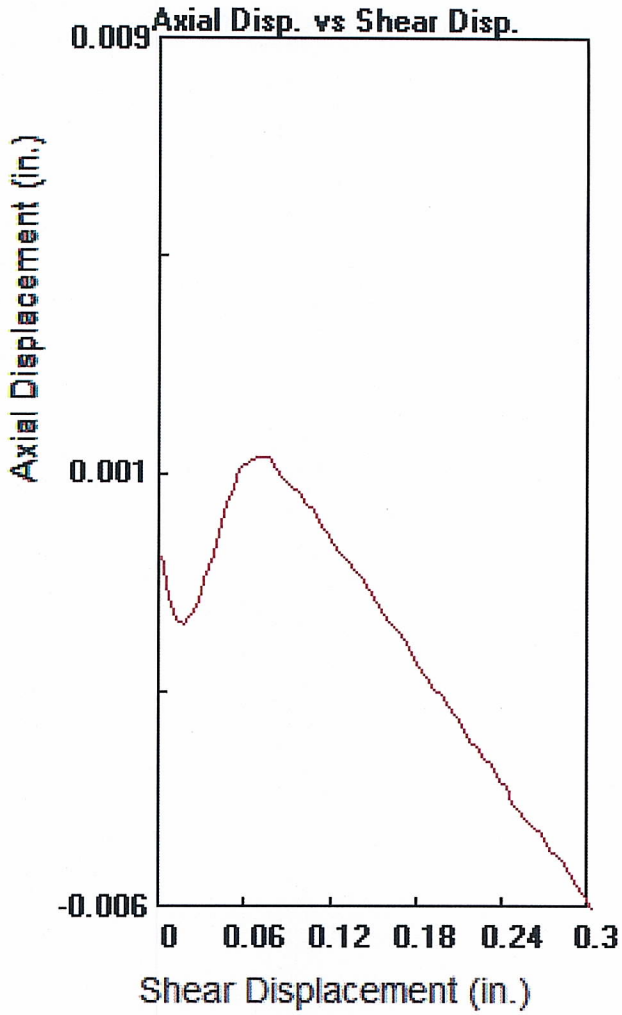
0.0656 in.

**Date**

6/6/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEV

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 2

Technician: BF

Boring: B1

Axial Load: 1000 psf

Depth: 2-5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B12-51 REMOLD.dat

Distance: 0.30 in.

Stress at Max Def
792 0.051

Stress at Max Disp
0.296 672

**Maximum Load**

792 psf

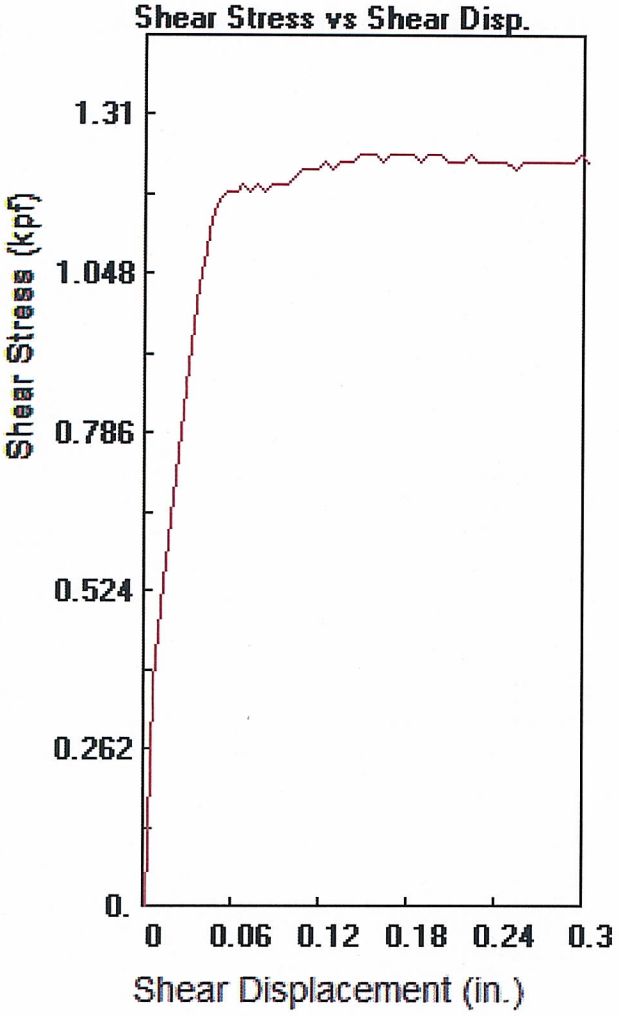
Shear Displacement at maximum Load

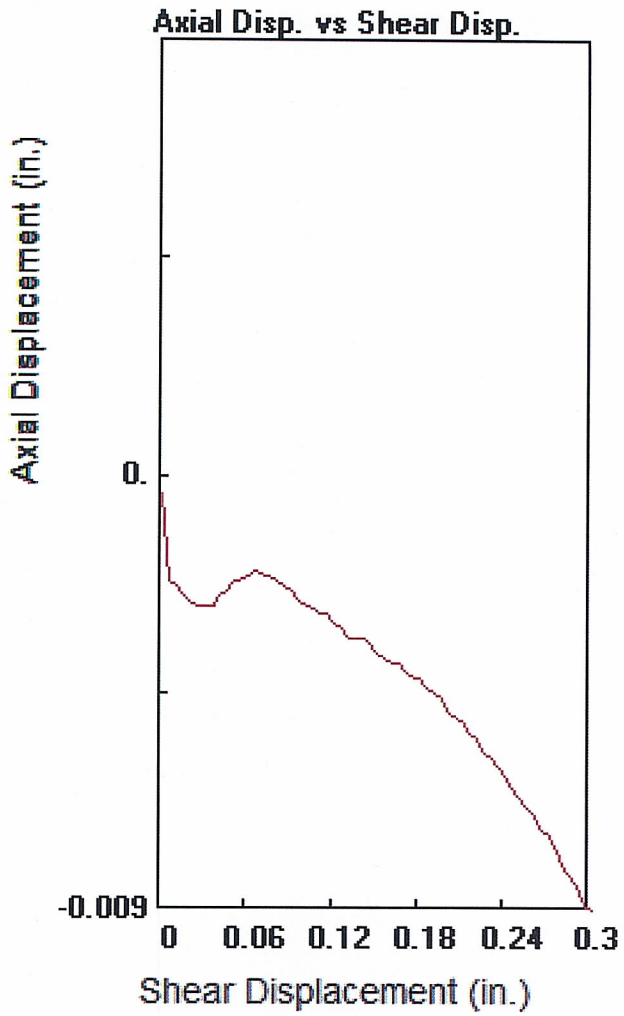
0.0505 in.

**Date**

6/6/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEV

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 3

Technician: BF

Boring: B1

Axial Load: 2000 psf

Depth: 2-5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B12-52 REMOLD.dat

Distance: 0.30 in.

Stress at Max Def
1248 0.146

Stress at Max Disp
0.296 1248

**Maximum Load**

1248 psf

Shear Displacement at maximum Load

0.1455 in.

**Date**

6/6/2022

Soil Labworks

# SHEAR DIAGRAM B-4

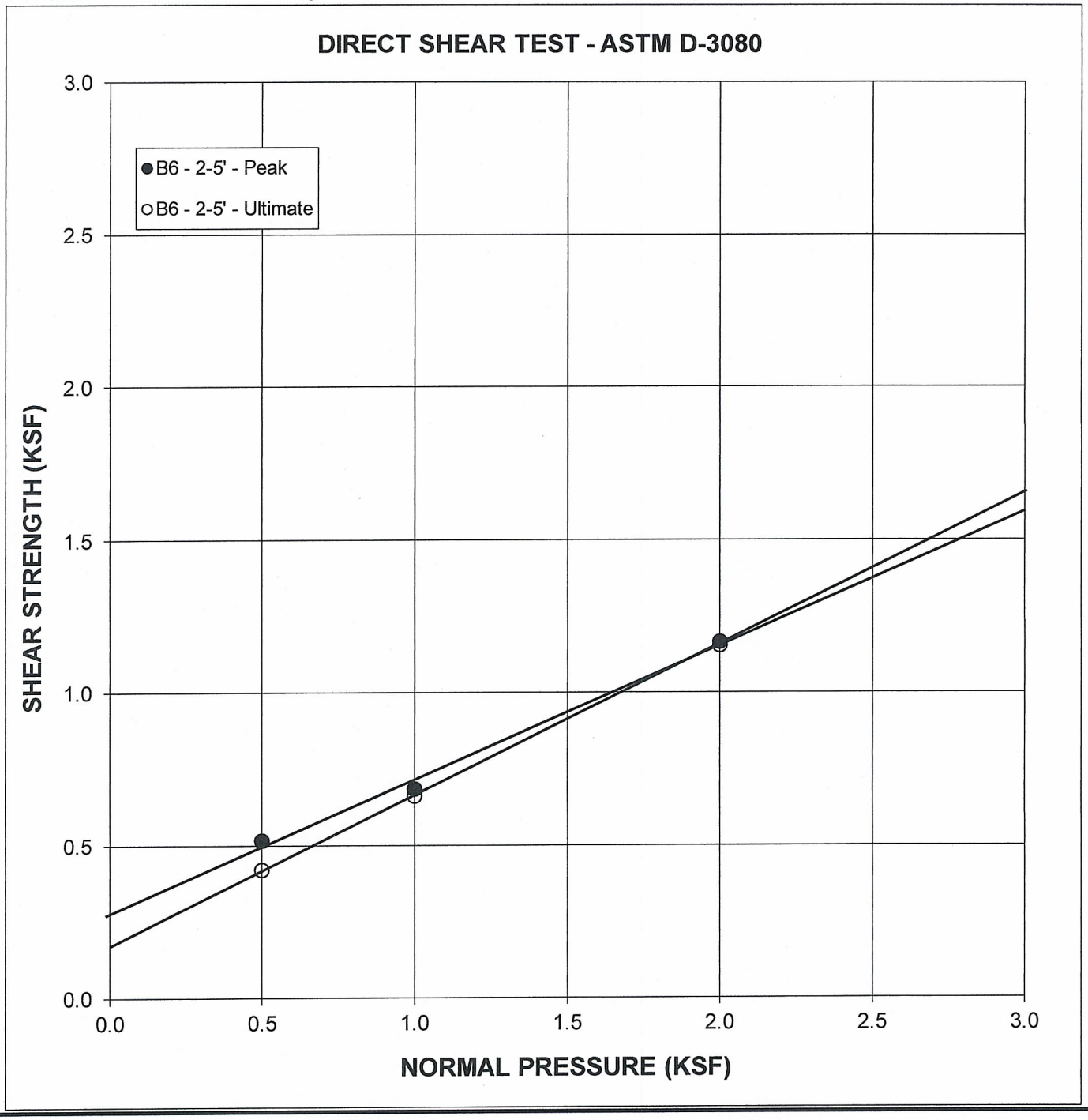
JN: SL22.3985 CONSULTANT JAI
CLIENT: Irvine/Harridge Dev-10500 Yukon Avenue

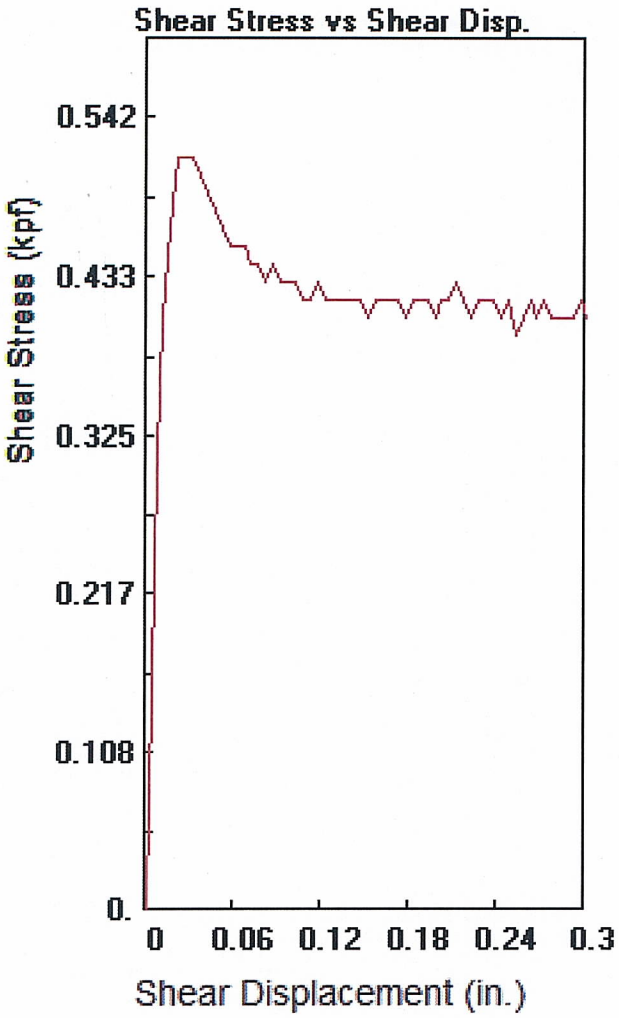
EARTH MATERIAL: ALLUVIUM

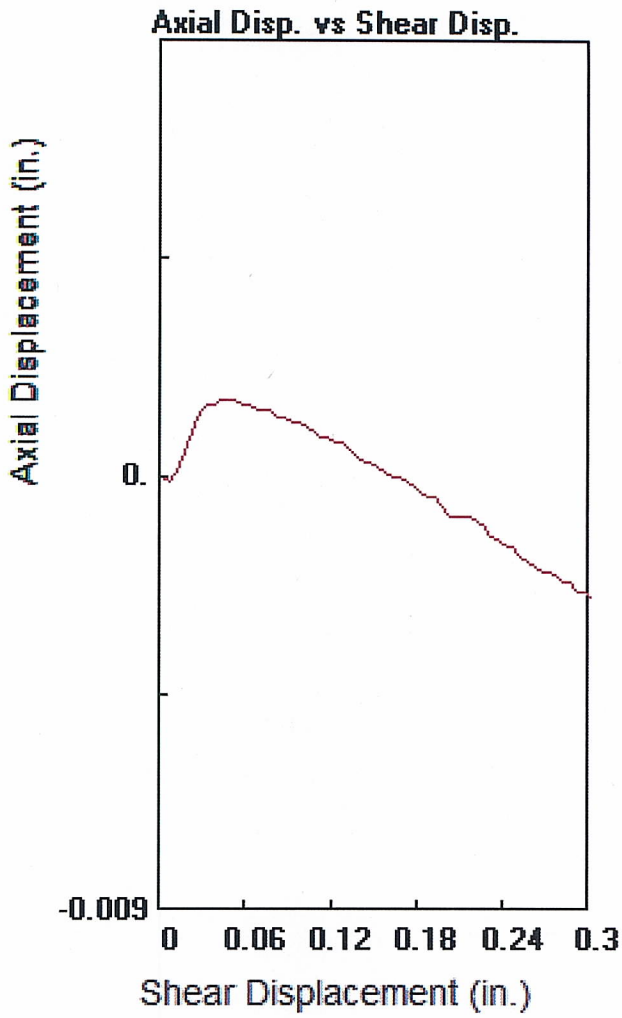
**Sample remolded to 90 % of the laboratory maximum density**

| | PEAK | ULTIMATE | |
|---|---|---|---|
| Phi Angle | 23.5 | 26 | degrees |
| Cohesion | 275 | 175 | psf |

| | |
|---|---|
| Average Moisture Content | 21.4% |
| Average Dry Density (pcf) | 111.2 |
| Percent Saturation | 100.0% |






**Parameters**

Client: IRVINE/HARRIDGE DEV

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 1

Technician: BF

Boring: B6

Axial Load: 500 psf

Depth: 2-5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B62-55 REMOLD.dat

Distance: 0.30 in.

Stress at Max Def
516 0.021

Stress at Max Disp
0.296 420

**Maximum Load**

516 psf

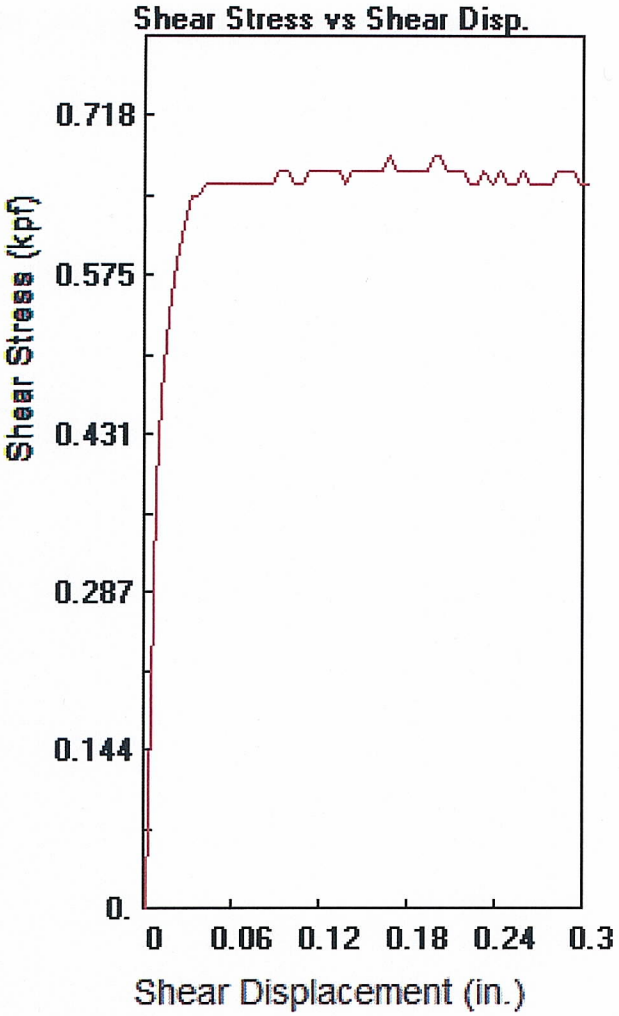
Shear Displacement at maximum Load

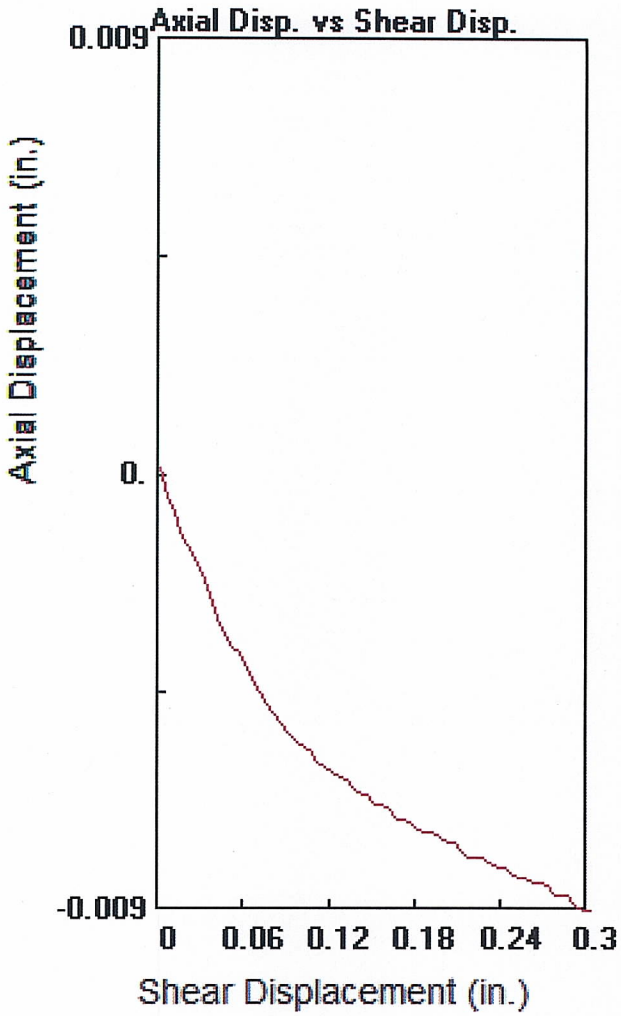
0.0205 in.

**Date**

6/6/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEV

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 2

Technician: BF

Boring: B6

Axial Load: 1000 psf

Depth: 2-5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B62-51 REMOLD.dat

Distance: 0.30 in.

Stress at Max Def
684 0.166

Stress at Max Disp
0.296 660

**Maximum Load**

684 psf

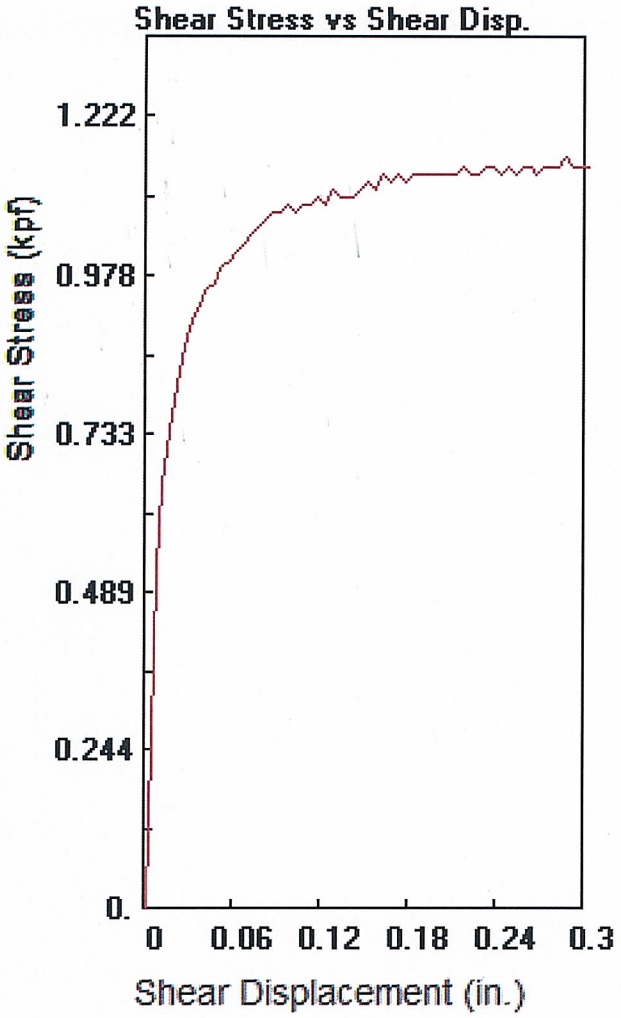
Shear Displacement at maximum Load

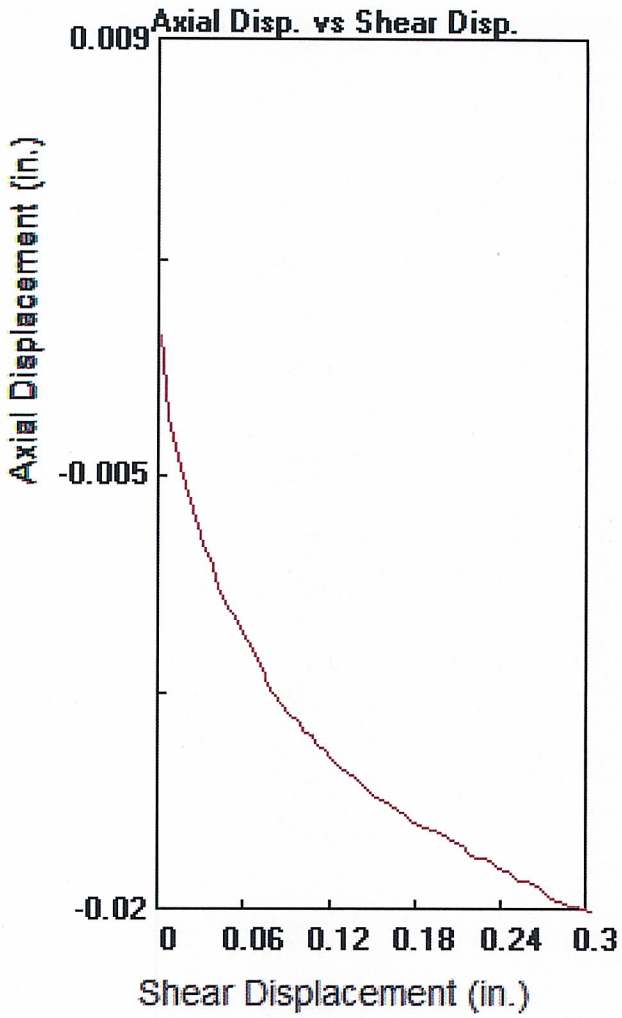
0.1655 in.

**Date**

6/6/2022

Soil Labworks




**Parameters**

Client: IRVINE/HARRIDGE DEV

Location: 10500 YUKON AVE

Job # 3985

Soil Type:ALLUVIUM

Sample: 3

Technician: BF

Boring: B6

Axial Load: 2000 psf

Depth: 2-5 ft.

Shear Rate: 0.010 in./sec.

File: 3985B62-52 REMOLD.dat

Distance: 0.30 in.

Stress at Max Def
1164 0.286

Stress at Max Disp
0.296 1152

**Maximum Load**

1164 psf

Shear Displacement at maximum Load

0.2857 in.

**Date**

6/6/2022

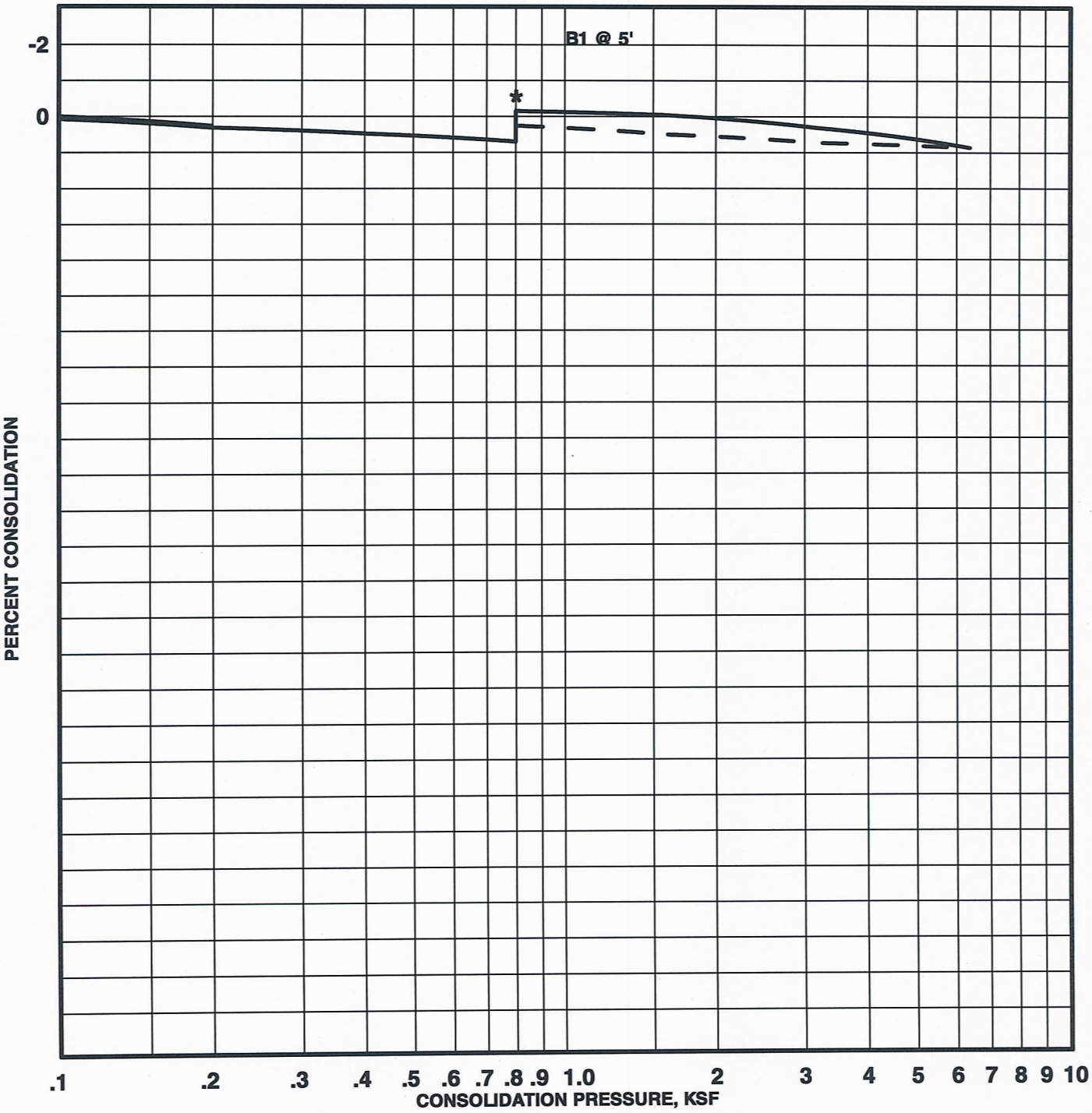
Soil Labworks

# CONSOLIDATION TEST

**PROJECT: IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE - 10500 YUKON AVENUE**

**SAMPLE: B1 @ 5'**

## ALLUVIUM




* Water Added

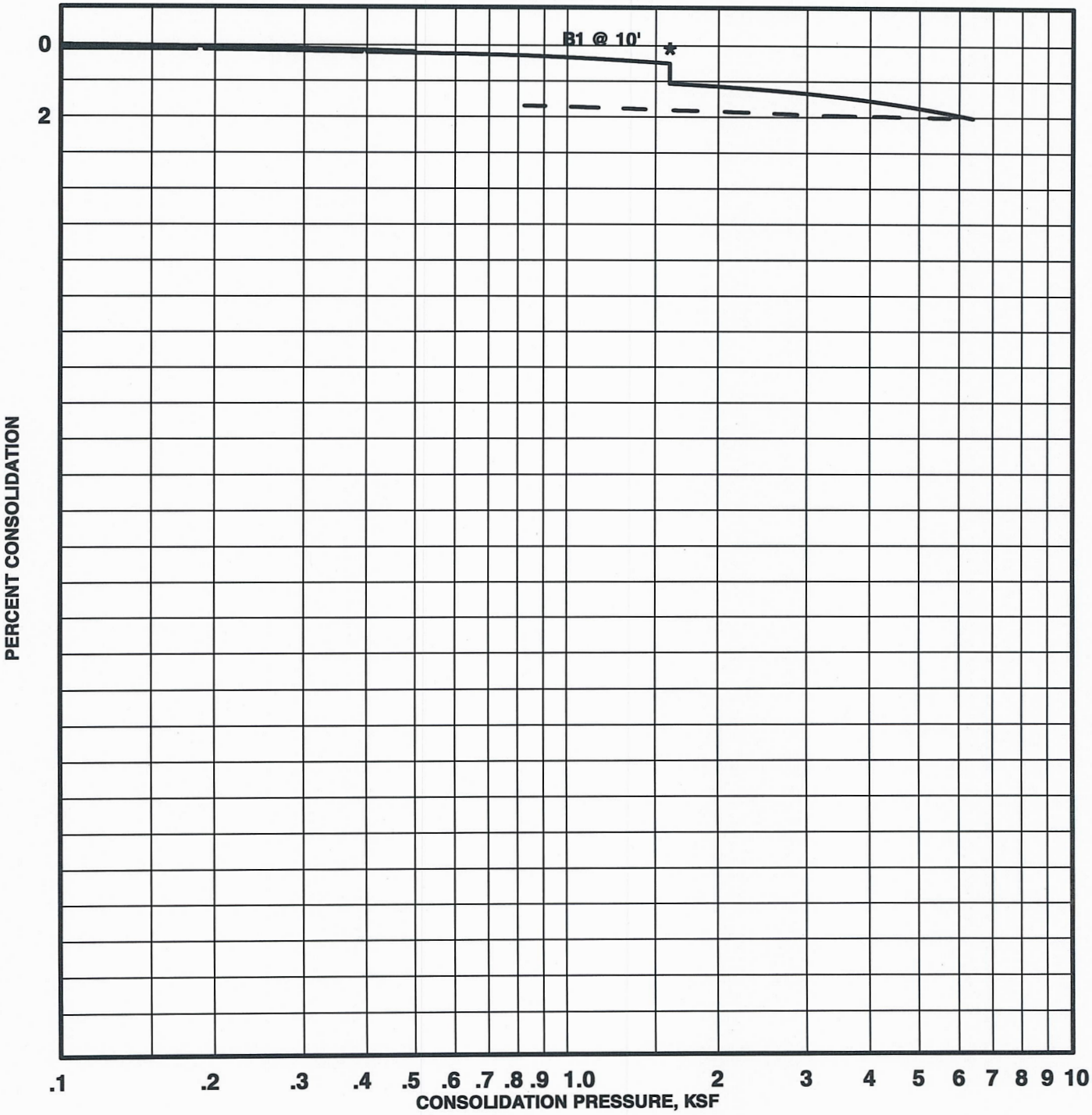
PLATE:

# CONSOLIDATION TEST

**PROJECT: IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE - 10500 YUKON AVENUE**

**SAMPLE: B1 @ 10'**

## ALLULVIUM




* Water Added

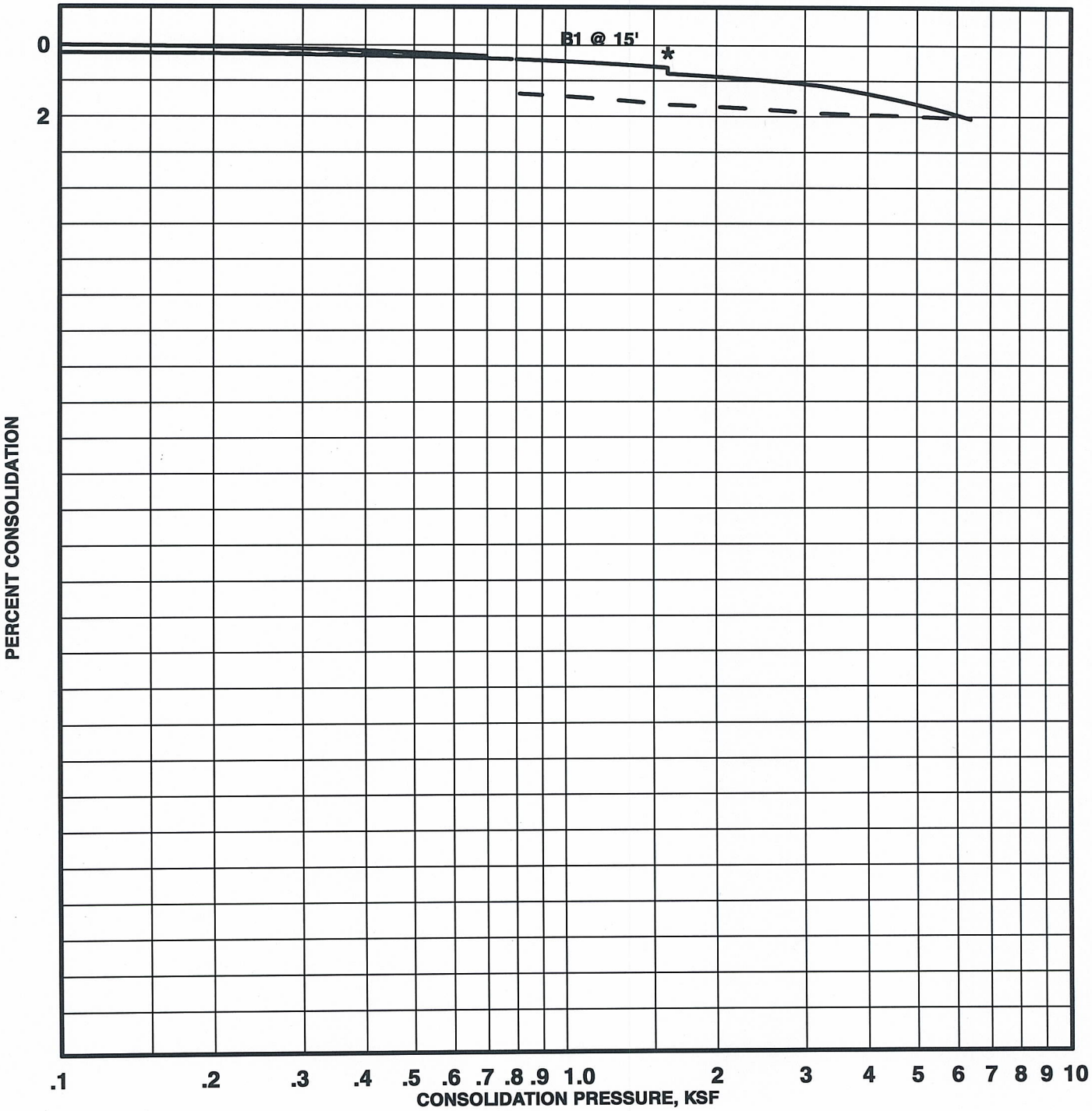
PLATE:

# CONSOLIDATION TEST

**PROJECT: IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE - 10500 YUKON AVENUE**

**SAMPLE: B1 @ 15'**

## ALLUVIUM




* Water Added

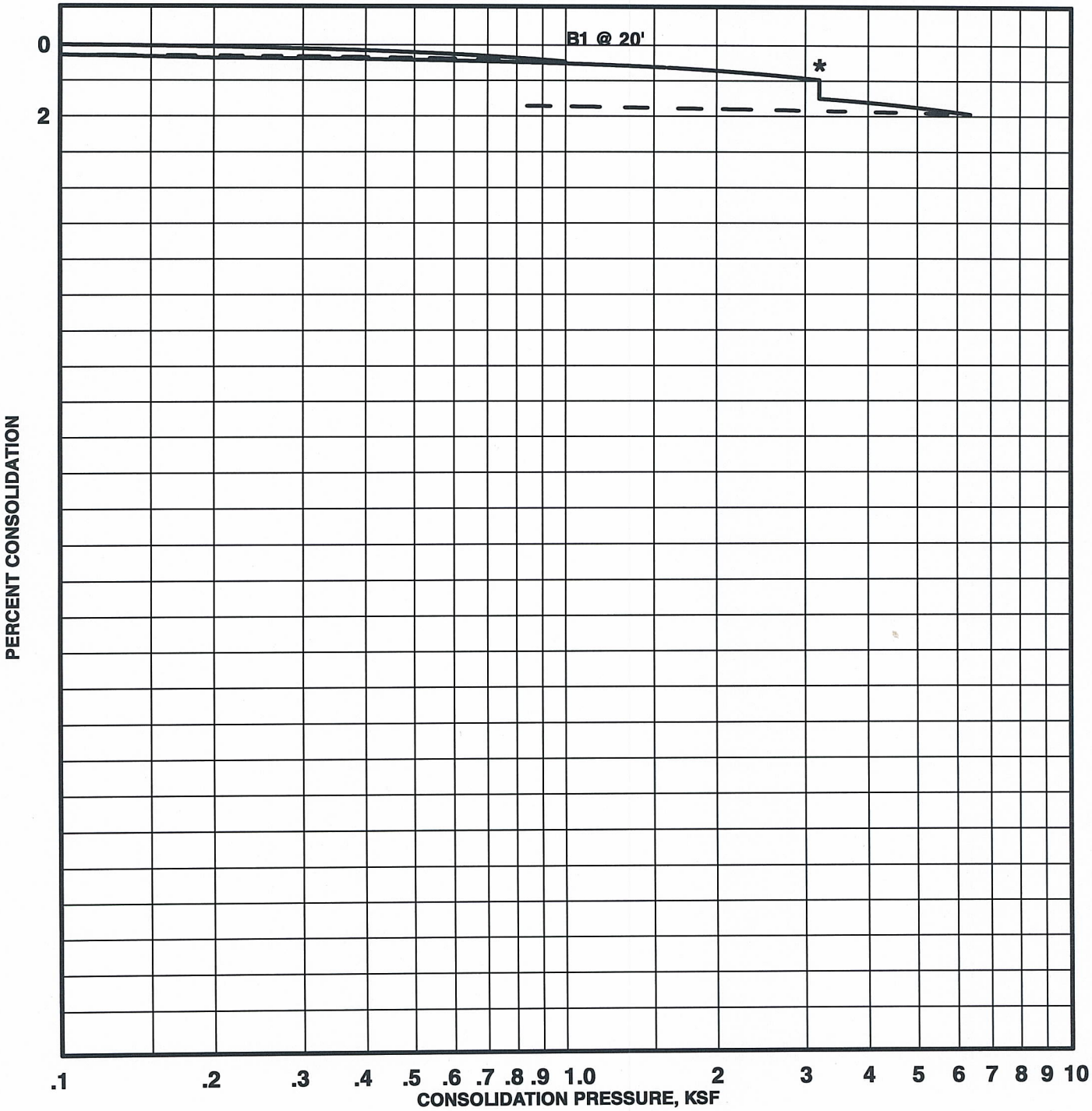
PLATE:

# CONSOLIDATION TEST

**PROJECT: IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE - 10500 YUKON AVENUE**

**SAMPLE: B1 @ 20'**

## ALLUVIUM




* Water Added

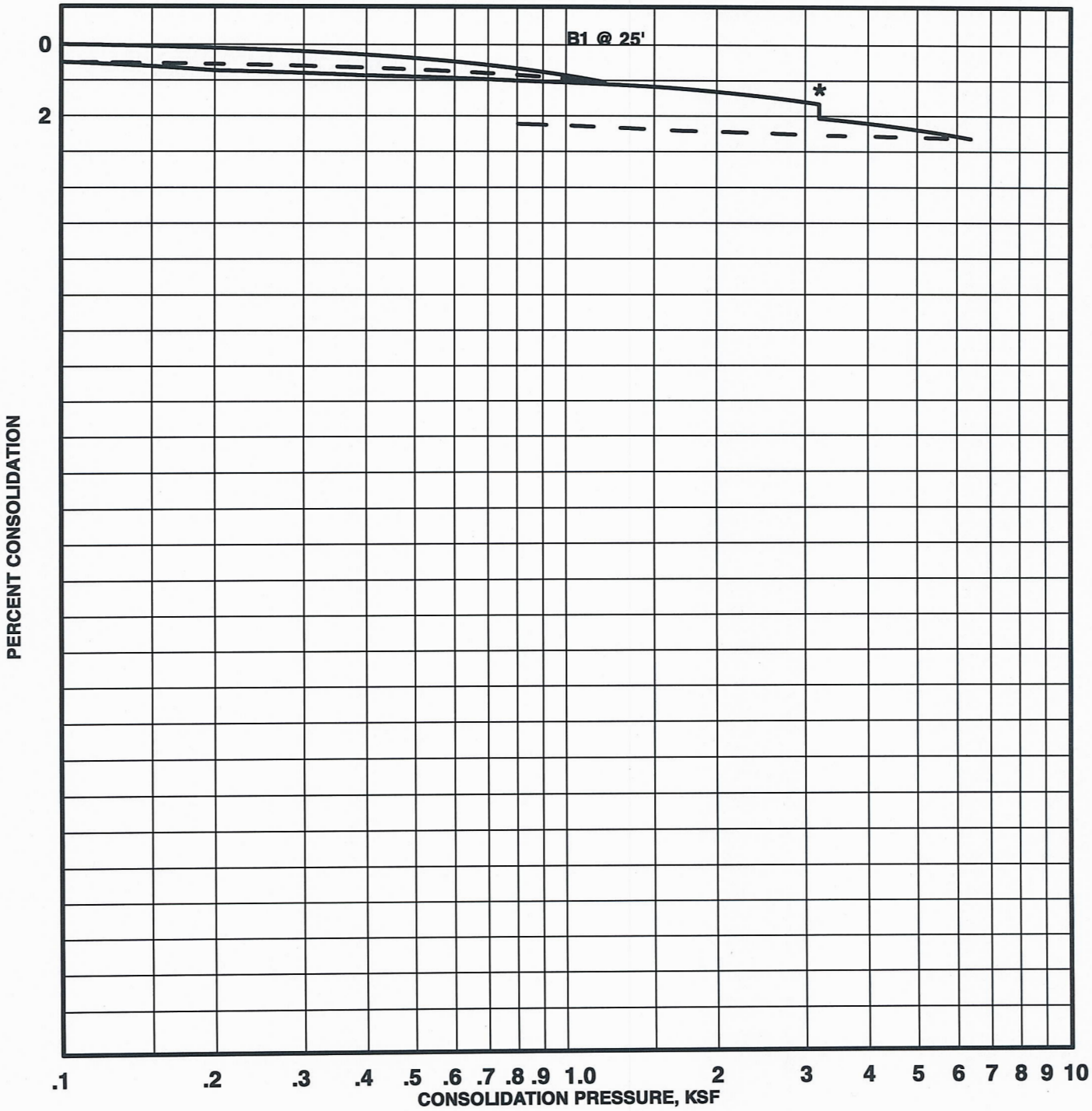
PLATE:

# CONSOLIDATION TEST

**PROJECT: IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE - 10500 YUKON AVENUE**

**SAMPLE: B1 @ 25'**

## ALLUVIUM




* Water Added

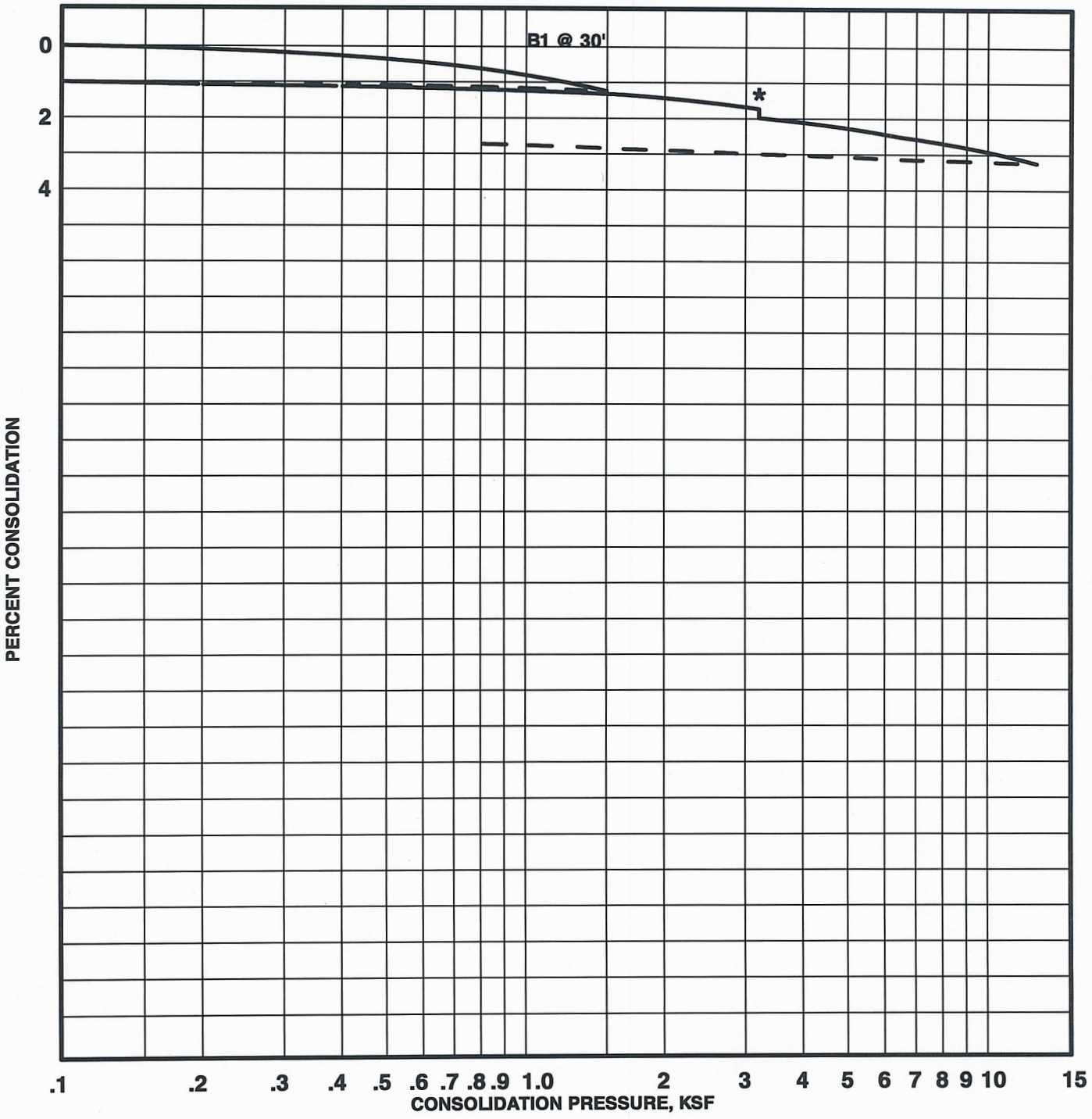
PLATE:

# CONSOLIDATION TEST

**PROJECT: IRVINE/HARRIDGE DEVELOPMENT-MORNINGSIDE - 10500 YUKON AVENUE**

**SAMPLE: B1 @ 30'**

## ALLUVIUM




* Water Added

PLATE:

# TRANSMITTAL LETTER

**DATE:** June 7, 2022

**ATTENTION:** **Jon Irvine**

**TO:** Irvine Geotechnical
145 N. Sierra Madre Blvd., Suite 1
Pasadena, CA 91107

**SUBJECT:** Laboratory Test Data
Harridge Development-Morningside
Your #3985, HDR Lab #22-0555LAB

**COMMENTS:** Enclosed are the results for the subject project.

James T. Keegan, MD
Corrosion and Lab Services Section Manager

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

## Table 1 - Laboratory Tests on Soil Samples

***Irvine Geotechnical***
***Harridge Development-Morningside***
***Your #3985, HDR Lab #22-0555LAB***
***7-Jun-22***

| **Sample ID** | | | B6 @ 2-5' |
|---|---|---|---|
| **Resistivity** | | **Units** | |
| as-received | | ohm-cm | 172,000 |
| minimum | | ohm-cm | 1,040 |
| **pH** | | | 6.8 |
| **Electrical Conductivity** | | mS/cm | 0.16 |
| **Chemical Analyses** | | | |
| **Cations** | | | |
| calcium | $Ca^{2+}$ | mg/kg | ND |
| magnesium | $Mg^{2+}$ | mg/kg | ND |
| sodium | $Na^{1+}$ | mg/kg | 185 |
| potassium | $K^{1+}$ | mg/kg | ND |
| ammonium | $NH_4^{1+}$ | mg/kg | ND |
| **Anions** | | | |
| carbonate | $CO_3^{2-}$ | mg/kg | ND |
| bicarbonate | $HCO_3^{1-}$ | mg/kg | 217 |
| fluoride | $F^{1-}$ | mg/kg | 23 |
| chloride | $Cl^{1-}$ | mg/kg | 25 |
| sulfate | $SO_4^{2-}$ | mg/kg | 126 |
| nitrate | $NO_3^{1-}$ | mg/kg | 4.3 |
| phosphate | $PO_4^{3-}$ | mg/kg | ND |
| **Other Tests** | | | |
| sulfide | $S^{2-}$ | qual | na |
| Redox | | mV | na |

Minimum resistivity and pH per CTM 643, Chloride per CTM 422, Sulfate per CTM 417

Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.

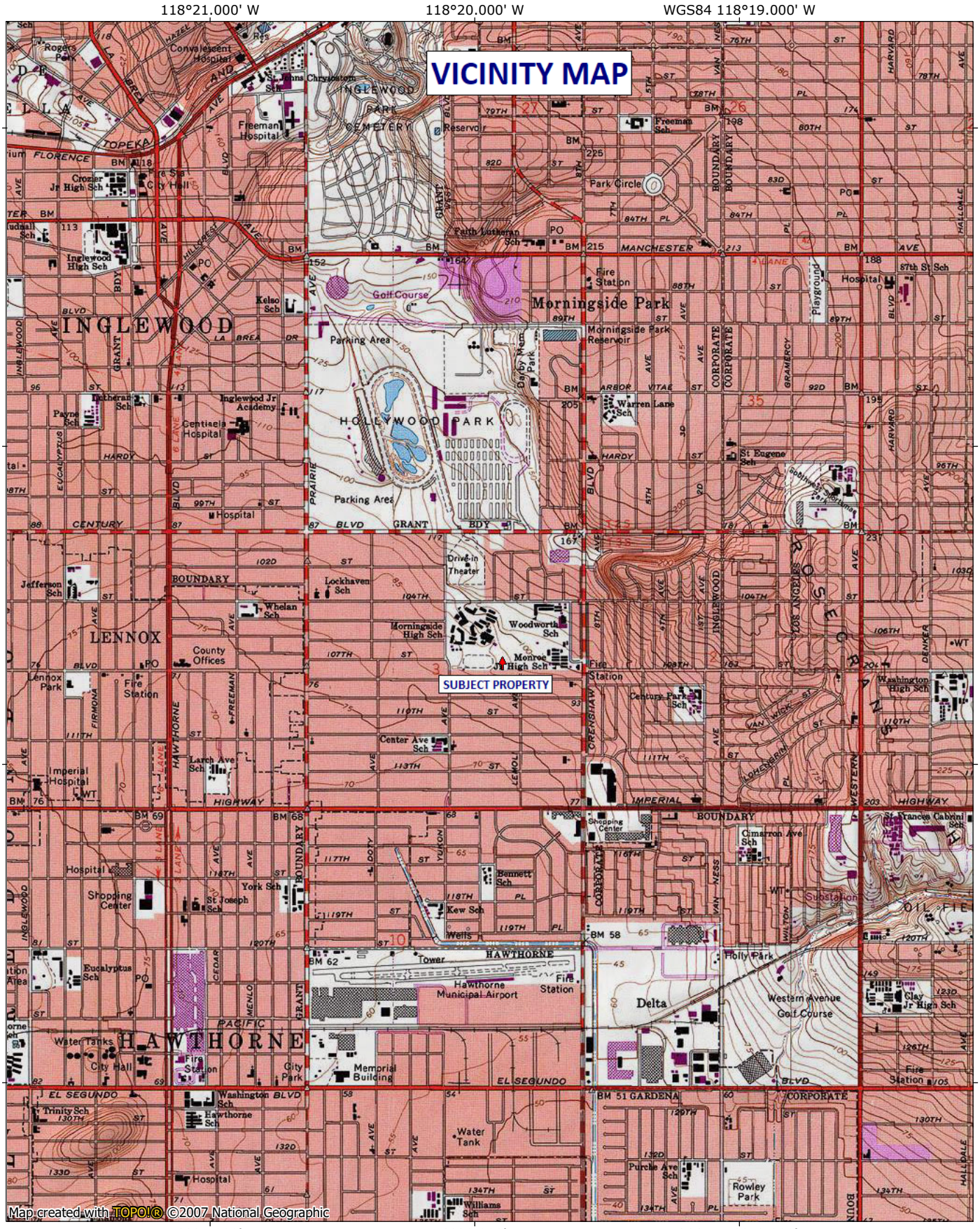
mg/kg = milligrams per kilogram (parts per million) of dry soil.

Redox = oxidation-reduction potential in millivolts

ND = not detected

na = not analyzed

TOPO! map printed on 06/05/22 from "IRVINE.tpo"




NATIONAL GEOGRAPHIC

0 .5 1 MILES

1000 0 1000 2000 3000 4000 5000 FEET

1 .5 0 KILOMETERS 1

1000 0 1000 METERS

TN ★ MN

11½°

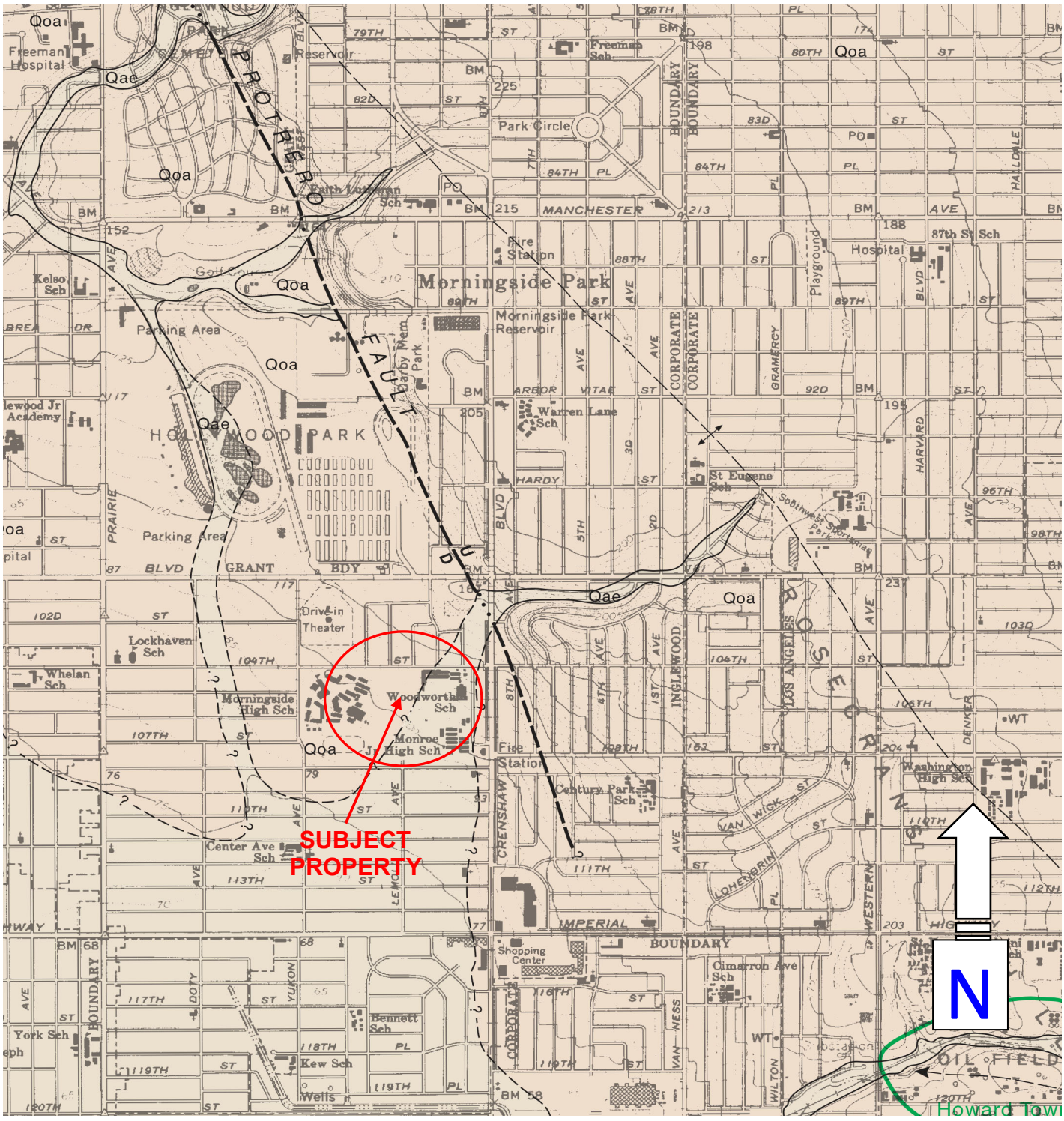
06/05/22

IRVINE GEOTECHNICAL Inc

# REGIONAL GEOLOGIC MAP

IC: **22068** CONSULT: **JAI**
CLIENT **HARRIDGE DEVELOPMENT GROUP**
SCALE: **1" = 2,000'**

REFERENCE: Geologic Map of the Venice and Inglewood Quadrangles, T.W. Dibblee, 2007



IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 98 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Grass Field

## BORING 1



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 98.0 | 0 | **FILL:** Silty Sand, yellow brown, slightly moist, medium dense, some concrete fragments |
| | | | | | | | 97.0 | 1 | |
| B | 2-5 | | | | | | 96.0 | 2 | |
| | | | | | | | 95.0 | 3 | |
| | | | | | | | 94.0 | 4 | |
| R | 5 | 10/29/30 | 8.7 | 123.6 | 68 | SM | 93.0 | 5 | some roots, porous |
| | | | | | | | 92.0 | 6 | |
| | | | | | | | 91.0 | 7 | **ALLUVIUM:** Clayey Sand with some Gravel, orange brown, moist, very dense |
| | | | | | | | 90.0 | 8 | |
| | | | | | | | 89.0 | 9 | |
| R | 10 | 15/32/47 | 7.6 | 119.5 | 52 | SC | 88.0 | 10 | |
| | | | | | | | 87.0 | 11 | |
| | | | | | | | 86.0 | 12 | |
| | | | | | | | 85.0 | 13 | |
| | | | | | | | 84.0 | 14 | |
| R | 15 | 22/39/50 | 8.6 | 128.8 | 80 | SC | 83.0 | 15 | |
| | | | | | | | 82.0 | 16 | |
| | | | | | | | 81.0 | 17 | |
| | | | | | | | 80.0 | 18 | |
| | | | | | | | 79.0 | 19 | Sand, medium to coarse, mottled yellow brown and white, slightly moist, dense |
| R | 20 | 10/27/30 | 2.4 | 102.7 | 11 | SW | 78.0 | 20 | |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 98 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Grass Field

## BORING 1



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| R | 20 | 10/27/30 | 2.4 | 102.7 | 11 | SW | 78.0 | 20 | Sand, medium to coarse grained, mottled yellow brown and white, slightly moist, dense |
| | | | | | | | 77.0 | 21 | |
| | | | | | | | 76.0 | 22 | |
| | | | | | | | 75.0 | 23 | |
| | | | | | | | 74.0 | 24 | |
| R | 25 | 12/15/33 | 9.7 | 109.7 | 51 | SW | 73.0 | 25 | Sand, medium grained, yellow brown, dense |
| | | | | | | | 72.0 | 26 | |
| | | | | | | | 71.0 | 27 | |
| | | | | | | | 70.0 | 28 | Silty Sand, orange brown and yellow brown, moist, very dense |
| | | | | | | | 69.0 | 29 | |
| R | 30 | 8/23/49 | 12.7 | 112.8 | 72 | SW | 68.0 | 30 | **END B1 @ 30':** Fill to 6 feet; No Water |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 98.3 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Soccer Field

## BORING 2



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 98.3 | 0 | **FILL:** Silty Sand with some gravel, mottled orange brown and yellow brown, slightly moist, very dense, porous |
| | | | | | | | 97.3 | 1 | |
| | | | | | | | 96.3 | 2 | |
| | | | | | | | 95.3 | 3 | |
| | | | | | | | 94.3 | 4 | |
| R | 5 | 10/27/41 | 8.3 | 124.9 | 68 | SM | 93.3 | 5 | |
| | | | | | | | 92.3 | 6 | **ALLUVIUM:** Clayey Sand, reddish brown, slightly moist, very dense |
| | | | | | | | 91.3 | 7 | |
| | | | | | | | 90.3 | 8 | |
| | | | | | | | 89.3 | 9 | |
| R | 10 | 10/34/50 | 12.0 | 125.2 | 99 | SC | 88.3 | 10 | |
| | | | | | | | 87.3 | 11 | |
| | | | | | | | 86.3 | 12 | |
| | | | | | | | 85.3 | 13 | |
| | | | | | | | 84.3 | 14 | Silty Sand with Clay binder, slightly moist, very dense, slightly porous |
| R | 15 | 15/28/50 | 9.5 | 123.3 | 74 | SC | 83.3 | 15 | |
| | | | | | | | 82.3 | 16 | |
| | | | | | | | 81.3 | 17 | |
| | | | | | | | 80.3 | 18 | |
| | | | | | | | 79.3 | 19 | Silty Sand, orange brown, slightly moist, medium dense |
| R | 20 | 9/10/15 | 9.1 | 116.2 | 57 | SM | 78.3 | 20 | **END B2 @ 20':** No Water; Fill to 6 feet |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 99.7 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Soccer Field

## BORING 3



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 99.7 | 0 | **FILL:** Silty Sand with some gravel, mottled orange brown and yellow brown, slightly moist, very dense |
| | | | | | | | 98.7 | 1 | |
| | | | | | | CL | 97.7 | 2 | Sandy Clay, yellow black, moist, firm to stiff |
| | | | | | | | 96.7 | 3 | |
| | | | | | | | 95.7 | 4 | |
| R | 5 | 6/14/22 | 17.1 | 113.4 | 99 | SC | 94.7 | 5 | **ALLUVIUM:** Clayey Sand, orange brown, very moist, very dense |
| | | | | | | | 93.7 | 6 | |
| | | | | | | | 92.7 | 7 | |
| | | | | | | | 91.7 | 8 | |
| | | | | | | | 90.7 | 9 | |
| R | 10 | 12/23/33 | 12.4 | 124.3 | 100 | SC | 89.7 | 10 | Clayey Sand, orange brown, very moist, dense |
| | | | | | | | 88.7 | 11 | |
| | | | | | | | 87.7 | 12 | |
| | | | | | | | 86.7 | 13 | |
| | | | | | | | 85.7 | 14 | |
| R | 15 | 12/23/30 | 11.0 | 125.5 | 92 | SC | 84.7 | 15 | |
| | | | | | | | 83.7 | 16 | |
| | | | | | | | 82.7 | 17 | |
| | | | | | | | 81.7 | 18 | |
| | | | | | | | 80.7 | 19 | Sand, coarse grained, mottled yellow brown and orange brown, slightly moist, very dense |
| R | 20 | 19/35/50 | 3.9 | 110.5 | 21 | SW | 79.7 | 20 | **END B3 @ 20':** No Water; Fill to 4 feet |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 101.8 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Parking Lot

## BORING 4



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 101.8 | 0 | **FILL:** Silty Sand with some gravel, mottled orange brown and yellow brown, slightly moist |
| | | | | | | | 100.8 | 1 | |
| | | | | | | | 99.8 | 2 | **ALLUVIUM:** Silty Sand with Clay binder, orange brown, slightly moist, very dense |
| | | | | | | | 98.8 | 3 | |
| | | | | | | | 97.8 | 4 | |
| R | 5 | 9/23/50 | 11.2 | 119.3 | 77 | SM | 96.8 | 5 | |
| | | | | | | | 95.8 | 6 | |
| | | | | | | | 94.8 | 7 | |
| | | | | | | | 93.8 | 8 | |
| | | | | | | | 92.8 | 9 | |
| R | 10 | 14/28/50 | 10.6 | 125.0 | 87 | SM | 91.8 | 10 | orange brown and reddish brown, very dense |
| | | | | | | | 90.8 | 11 | |
| | | | | | | | 89.8 | 12 | |
| | | | | | | | 88.8 | 13 | |
| | | | | | | | 87.8 | 14 | Sand, medium grained, orange brown, slightly moist, very dense |
| R | 15 | 11/24/40 | 8.9 | 122.6 | 67 | SW | 86.8 | 15 | |
| | | | | | | | 85.8 | 16 | |
| | | | | | | | 84.8 | 17 | |
| | | | | | | | 83.8 | 18 | Sand, medium to coarse, orange brown, dense |
| | | | | | | | 82.8 | 19 | |
| R | 20 | 9/19/32 | 1.9 | 106.5 | 9 | SW | 81.8 | 20 | **END B4 @ 20':** No Water; Fill to 12 inches |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 101.6 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Grass Field

## BORING 5



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 101.6 | 0 | **FILL:** Silty Sand, yellow brown, slightly moist, medium dense, porous |
| | | | | | | | 100.6 | 1 | |
| | | | | | | | 99.6 | 2 | |
| | | | | | | | 98.6 | 3 | |
| | | | | | | | 97.6 | 4 | |
| R | 5 | 9/23/50 | 7.4 | 117.1 | 48 | SM | 96.6 | 5 | |
| | | | | | | | 95.6 | 6 | **ALLUVIUM:** Silty Sand with Clay binder, orange brown, slightly moist, very dense |
| | | | | | | | 94.6 | 7 | |
| | | | | | | | 93.6 | 8 | |
| | | | | | | | 92.6 | 9 | |
| R | 10 | 14/28/50 | 14.1 | 120.7 | 100 | SM | 91.6 | 10 | |
| | | | | | | | 90.6 | 11 | |
| | | | | | | | 89.6 | 12 | |
| | | | | | | | 88.6 | 13 | |
| | | | | | | | 87.6 | 14 | |
| R | 15 | 11/24/40 | 15.9 | 116.7 | 100 | SM | 86.6 | 15 | reddish brown |
| | | | | | | | 85.6 | 16 | |
| | | | | | | | 84.6 | 17 | |
| | | | | | | | 83.6 | 18 | |
| | | | | | | | 82.6 | 19 | Sand, medium to coarse grained, orange brown, dense |
| R | 20 | 9/19/32 | 3.7 | 106.5 | 18 | SW | 81.6 | 20 | **END B5 @ 20':** No Water; Fill to 12 inches |

# LOG OF BORING

IRVINE GEOTECHNICAL Inc

| | |
|---|---|
| PROJECT | IC22068 HARRIDGE MORNINGSIDE |
| DRILL DATE | 5/17/2022 |
| LOG DATE | 5/17/2022 |
| LOGGED BY | RC |
| DRILL TYPE | HOLLOW-STEM |
| DIAMETER | 8 INCHES |

SURFACE ELEVATION 101.6 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Soccer Field

## BORING 6



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 101.6 | 0 | **FILL:** Silty Sand, yellow brown, slightly moist, medium dense, porous |
| B | 2 - 5 | | | | | | 100.6 | 1 | **ALLUVIUM:** Clayey Sand, orange brown, very moist, dense |
| | | | | | | | 99.6 | 2 | |
| R | 3 | 7/14/24 | 13.5 | 120.4 | 96 | SC | 98.6 | 3 | |
| | | | | | | | 97.6 | 4 | |
| R | 5 | 7/15/26 | 13.3 | 122.4 | 100 | SC | 96.6 | 5 | |
| | | | | | | | 95.6 | 6 | |
| | | | | | | | 94.6 | 7 | |
| | | | | | | | 93.6 | 8 | |
| | | | | | | | 92.6 | 9 | |
| R | 10 | 13/23/23 | 15.6 | 119.1 | 100 | SC | 91.6 | 10 | |
| | | | | | | | 90.6 | 11 | |
| | | | | | | | 89.6 | 12 | |
| | | | | | | | 88.6 | 13 | |
| | | | | | | | 87.6 | 14 | |
| R | 15 | 8/17/27 | 6.0 | 108.3 | 20 | SW | 86.6 | 15 | Sand, medium, orange brown and yellow brown, slightly moist, dense |
| | | | | | | | 85.6 | 16 | |
| | | | | | | | 84.6 | 17 | |
| | | | | | | | 83.6 | 18 | |
| | | | | | | | 82.6 | 19 | |
| R | 20 | 9/20/29 | 4.3 | 106.0 | 20 | SW | 81.6 | 20 | **END B6 @ 20':** No Water; Fill to 12 inches |

# LOG OF BORING

IRVINE GEOTECHNICAL Inc

| | |
|---|---|
| PROJECT | IC22068 HARRIDGE MORNINGSIDE |
| DRILL DATE | 5/17/2022 |
| LOG DATE | 5/17/2022 |
| LOGGED BY | RC |
| DRILL TYPE | HOLLOW-STEM |
| DIAMETER | 8 INCHES |
| SURFACE ELEVATION | 111 feet |
| DRILLING CONTRACTOR | CHARLIES DRILLING |
| SURFACE CONDITIONS | Grass Field |

## BORING 7



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 111.0 | 0 | **FILL:** Silty Sand, yellow brown, slightly moist, medium dense, porous |
| | | | | | | | 110.0 | 1 | |
| | | | | | | | 109.0 | 2 | **ALLUVIUM:** Clayey Sand, orange brown, moist, dense |
| | | | | | | | 108.0 | 3 | |
| | | | | | | | 107.0 | 4 | |
| R | 5 | 11/24/41 | 11.2 | 121.8 | 83 | SC | 106.0 | 5 | |
| | | | | | | | 105.0 | 6 | |
| | | | | | | | 104.0 | 7 | |
| | | | | | | | 103.0 | 8 | Silty Sand, with Clay binder, orange brown, moist, very dense |
| | | | | | | | 102.0 | 9 | |
| R | 10 | 21/43/50 | 7.9 | 121.6 | 59 | SM | 101.0 | 10 | |
| | | | | | | | 100.0 | 11 | |
| | | | | | | | 99.0 | 12 | |
| | | | | | | | 98.0 | 13 | |
| | | | | | | | 97.0 | 14 | |
| R | 15 | 20/50-6" | 12.6 | 115.3 | 77 | SM | 96.0 | 15 | |
| | | | | | | | 95.0 | 16 | |
| | | | | | | | 94.0 | 17 | |
| | | | | | | | 93.0 | 18 | |
| | | | | | | | 92.0 | 19 | Sand, medium to coarse, orange brown, slightly moist, very dense |
| R | 20 | 21/39/50 | 2.4 | 110.9 | 13 | SW | 91.0 | 20 | **END B6 @ 20':** No Water; Fill to 2 feet |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 113.2 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Baseball Field

## BORING 8



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 113.2 | 0 | **FILL:** Silty Sand, yellow brown, slightly moist, medium dense |
| | | | | | | | 112.2 | 1 | |
| | | | | | | | 111.2 | 2 | **ALLUVIUM:** Silty Sand, orange brown, slightly moist to moist, dense |
| | | | | | | | 110.2 | 3 | |
| | | | | | | | 109.2 | 4 | |
| R | 5 | 15/24/30 | 12.5 | 123.6 | 98 | SM | 108.2 | 5 | |
| | | | | | | | 107.2 | 6 | |
| | | | | | | | 106.2 | 7 | |
| | | | | | | | 105.2 | 8 | Clayey Sand, yellow brown, very moist, very dense |
| | | | | | | | 104.2 | 9 | |
| R | 10 | 17/37/45 | 13.9 | 121.7 | 100 | SC | 103.2 | 10 | |
| | | | | | | | 102.2 | 11 | |
| | | | | | | | 101.2 | 12 | |
| | | | | | | | 100.2 | 13 | |
| | | | | | | | 99.2 | 14 | |
| R | 15 | 10/25/42 | 19.5 | 111.9 | 100 | SC | 98.2 | 15 | Silty Sand, yellow brown with orange mottling, very moist, very dense |
| | | | | | | | 97.2 | 16 | |
| | | | | | | | 96.2 | 17 | |
| | | | | | | | 95.2 | 18 | |
| | | | | | | | 94.2 | 19 | |
| R | 20 | 15/33/39 | 10.7 | 113.2 | 62 | SW | 93.2 | 20 | Sand, fine to medium, yellow brown, slightly moist, very dense<br>**END B8 @ 20':** No Water; Fill to 12 inches |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 112.5 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Baseball Field

## BORING 9



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 112.5 | 0 | **FILL:** Silty Sand, yellow brown, slightly moist, medium dense |
| | | | | | | | 111.5 | 1 | |
| | | | | | | | 110.5 | 2 | **ALLUVIUM:** Silty Sand, orange brown, slightly moist to moist, very dense |
| | | | | | | | 109.5 | 3 | |
| | | | | | | | 108.5 | 4 | |
| R | 5 | 12/25/41 | 12.4 | 118.8 | 84 | SM | 107.5 | 5 | |
| | | | | | | | 106.5 | 6 | |
| | | | | | | | 105.5 | 7 | |
| | | | | | | | 104.5 | 8 | |
| | | | | | | | 103.5 | 9 | Sand, fine to medium, yellow light brown, moist, dense |
| R | 10 | 12/17/27 | 6.8. | 114.2 | 40 | SW | 102.5 | 10 | |
| | | | | | | | 101.5 | 11 | |
| | | | | | | | 100.5 | 12 | |
| | | | | | | | 99.5 | 13 | |
| | | | | | | | 98.5 | 14 | |
| R | 15 | 22/50-6" | 7.1 | 111.5 | 39 | SW | 97.5 | 15 | orange brown, very dense |
| | | | | | | | 96.5 | 16 | |
| | | | | | | | 95.5 | 17 | |
| | | | | | | | 94.5 | 18 | |
| | | | | | | | 93.5 | 19 | Silty Sand, orange brown, moist, very dense |
| R | 20 | 9/26/43 | 16.3 | 115.0 | 98 | SM | 92.5 | 20 | **END B9 @ 20':** No Water; Fill to 12 inches |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 103.5 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Baseball Field

## BORING 10



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (pcf) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | 103.5 | 0 | **FILL:** Silty Sand, mottled orange brown and grey brown, slightly moist, very dense, porous |
| | | | | | | | 102.5 | 1 | |
| | | | | | | | 101.5 | 2 | |
| | | | | | | | 100.5 | 3 | |
| | | | | | | | 99.5 | 4 | |
| R | 5 | 24/50-6" | 9.1 | 119.9 | 64 | SM | 98.5 | 5 | |
| | | | | | | | 97.5 | 6 | **ALLUVIUM:** Silty Sand, orange brown, moist, very dense |
| | | | | | | | 96.5 | 7 | |
| | | | | | | | 95.5 | 8 | |
| | | | | | | | 94.5 | 9 | |
| R | 10 | 10/27/29 | 14.0 | 122.2 | 100 | SM | 93.5 | 10 | |
| | | | | | | | 92.5 | 11 | |
| | | | | | | | 91.5 | 12 | Sand, coarse, yellow brown and white, slightly moist, dense |
| | | | | | | | 90.5 | 13 | |
| | | | | | | | 89.5 | 14 | |
| | | | | | | | 88.5 | 15 | |
| | | | | | | | 87.5 | 16 | |
| | | | | | | | 86.5 | 17 | |
| | | | | | | | 85.5 | 18 | |
| | | | | | | | 84.5 | 19 | |
| R | 20 | 10/18/22 | 3.9 | 110.0 | 20 | SW | 83.5 | 20 | |

IRVINE GEOTECHNICAL Inc

# LOG OF BORING

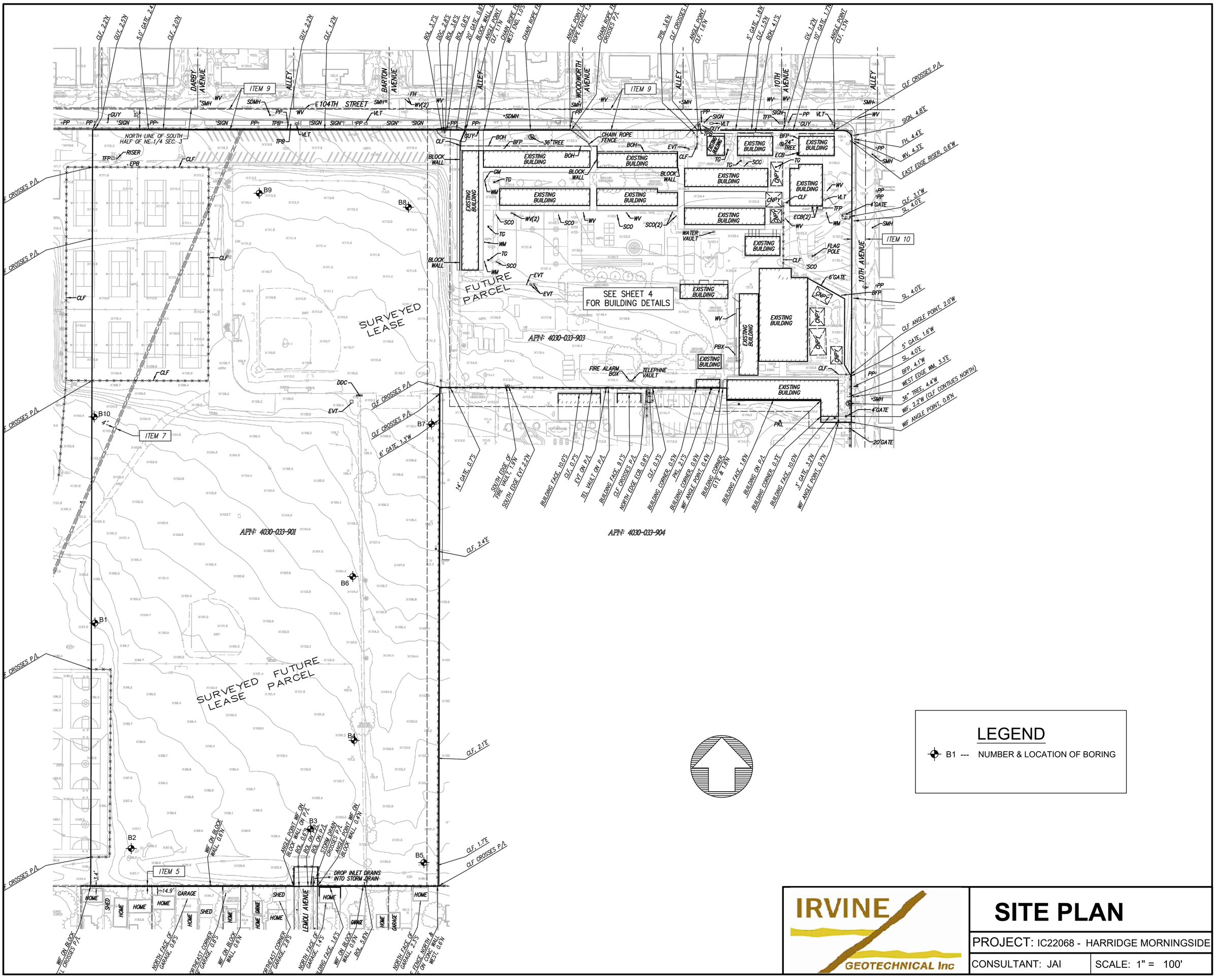
PROJECT IC22068 HARRIDGE MORNINGSIDE
DRILL DATE 5/17/2022
LOG DATE 5/17/2022
LOGGED BY RC
DRILL TYPE HOLLOW-STEM
DIAMETER 8 INCHES

SURFACE ELEVATION 103.5 feet
DRILLING CONTRACTOR CHARLIES DRILLING
SURFACE CONDITIONS Baseball Field

## BORING 10



| Sample Type | Sample Depth (feet) | Blows per foot | Moisture (%) | Dry Unit Weight (puff) | Saturation (%) | USCS Code | Elevation (feet) | Depth (feet) | Lithologic Description |
|---|---|---|---|---|---|---|---|---|---|
| R | 20 | 10/18/22 | 3.9 | 110.0 | 20 | SW | 83.5 | 20 | Sand, coarse, yellow brown and white, slightly moist, dense |
| | | | | | | | 82.5 | 21 | |
| | | | | | | | 81.5 | 22 | |
| | | | | | | | 80.5 | 23 | |
| | | | | | | | 79.5 | 24 | |
| | | | | | | | 78.5 | 25 | |
| | | | | | | | 77.5 | 26 | |
| | | | | | | | 76.5 | 27 | |
| | | | | | | | 75.5 | 28 | |
| | | | | | | | 74.5 | 29 | |
| R | 30 | 13/21/50 | 2.9 | 101.0 | 12 | SW | 73.5 | 30 | very dense |
| | | | | | | | | | **END B10 @ 20':** No Water; Fill to 6 feet |




IRVINE GEOTECHNICAL Inc

# SITE PLAN

PROJECT: IC22068 - HARRIDGE MORNINGSIDE

CONSULTANT: JAI | SCALE: 1" = 100'