SOILS ENGINEERING INVESTIGATION

Proposed Warehouse/Distribution Center
APN: 0405-062-51
Amargosa Road & Live Oak Lane
Hesperia, California

February 24, 2020
Project No. 30-5468-00

Prepared for:

55555 Amargosa Rd., LLC
Attn: Mr. Jason Green
5901 S. Eastern Ave.
Commerce, CA 90040

A.G.I. GEOTECHNICAL, INC.

A. G. I. GEOTECHNICAL, INC.
16555 Sherman Way, Suite A - Van Nuys, CA 91406 - Office: (818) 785-5244 - Facsimile: (818) 785-6251

February 24, 2020

Project No. 30-5468-00

55555 Amargosa Rd., LLC
5901 S. Eastern Ave.
Commerce, CA 90040

Attention: Mr. Jason Green

Subject: **SOILS ENGINEERING INVESTIGATION**
Proposed Warehouse/Distribution Center
APN: 0405-062-51
Amargosa Road & Live Oak Lane
Hesperia, California

Dear Mr. Green:

This report presents the results of the investigation and our opinions regarding the soils engineering factors affecting the development of the subject site. This investigation was performed in January and February, 2020, and consisted of field depthexploration, laboratory testing, engineering analyses of the field and laboratory data and the preparation of this report. *Determination of the presence or not of hazardous or toxic materials in the on-site soils is beyond the scope of this investigation.*

If you have any questions regarding this report, please contact this office.

Respectfully submitted,
A.G.I. GEOTECHNICAL, INC.

Juan A. Vidal, R.G.E. 861
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
JUAN A. VIDAL
No. 861
Exp. 12-31-21
GEOTECHNICAL
STATE OF CALIFORNIA

JAV:wb

Distribution: (4) 55555 Amargosa Rd., LLC

Enclosures: Location Map (Figure 1)
Site Plan (Figure 2)
Boring Logs
Laboratory Test Results
U.S. Seismic Design Maps
Slot Cut Stability Analysis

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INTRODUCTION

DESCRIPTION OF SITE

The subject site is located on the northwest side of Amargosa Road, between Live Oak Lane and the California Aqueduct, in the City of Hesperia, California. The subject property is practically level and presently vacant. The site is bound on the north by a developed property. The location of the site is shown on the enclosed Location Map, Figure 1.

PROPOSED SITE DEVELOPMENT

The proposed development consists of a warehouse/distribution center that will include an approximately 450,000ft^2 building with driveways and adjacent asphalt parking areas, a trash enclosure, guard shacks and advertising signs. It is understood that the proposed building will be tilt-up walls with a concrete slab-on-grade construction. Structural loads are anticipated to be relatively light, less than ten kips per linear foot for continuous footings and less than 100 kips for column loads.

FIELD EXPLORATION

Subsurface conditions were explored by drilling nine exploratory borings at the locations shown on the Site Plan, Figure 2. The borings were drilled to a maximum depth of 41.5 feet below existing ground surface using a truck mounted 8-inch diameter hollow stem flight auger.

The drilling of borings was supervised by our field engineer who logged the materials brought up from borings. Undisturbed and bulk samples were collected at depths appropriate to the investigation. The undisturbed samples were sealed immediately in watertight containers for shipment to our laboratory. The soil sampler used in our investigation included a 2.50-inch I.D. drive barrel lined with 1-inch brass rings. The sampler used in the exploratory boring was driven to a depth of 12 inches with a 140-pound hammer falling from a height of 30 inches. The blow counts noted on the Boring Logs represent the accumulated number of blows that were required to drive the sampler.

SUBSURFACE CONDITIONS

Soil Profile

The existing soil profile, as depicted in the borings to the depth explored, consists of light brown and brown silty sands, well-graded sands with silt and gravel, and poorly-graded sandswith silt and gravel in a damp to slightly moist and medium dense to very dense condition. For a more detailed description of the soils encountered in the exploratory borings, please refer to the Boring Logs enclosed in this report.

Groundwater

No groundwater was encountered in the exploratory borings to the maximum depth explored, 41.5 feet below existing ground surface. The groundwater level may fluctuate because of seasonal changes, injection or extraction of water, variations in temperature and other causes.

LIQUEFACTION POTENTIAL (CYCLIC MOBILITY)

Since the site is **not** located within a State of California Liquefaction Seismic Hazard Zone, a liquefaction analysis was not performed.

ON-SITE INFILTRATION FACILITIES

The soil profile, as depicted in the borings to the depth explored, consists of silty sands, well-graded sands with silt and gravel, and poorly-graded sands with silt and gravel in a damp to slightly moist and very dense condition. These soils generally have poor permeability and they carry the potential for creating perched water conditions. Based on the soils present at the site to the depths explored, it is our opinion that the percolation characteristics of these soils would **not** be suitable for use of a properly functioning infiltration-type of SUSMP system on the subject property.

SEISMICITY AND SEISMIC DESIGN CRITERIA

The southern California region is seismically active and commonly experiences strong ground shaking resulting from earthquakes along active faults. Earthquakes along these faults are part of a continuous, naturally occurring process which has contributed to the characteristic landscape of the region. Research on earthquakes during the past forty years has greatly enhanced our knowledge on the nature of faulting in California; however, seismology is a relatively new science and standard procedures for prediction of geoseismic parameters have not yet been widely accepted. The time, location, and magnitude of an earthquake cannot be

accurately predicted at this time; therefore, data on faults and the nature of earthquakes in California is presently incomplete. However, numerous investigations performed by the United States Geological Survey, California Division of Mines and Geology, and other research institutions have presented techniques to quantify the nature of earthquakes and the estimated impact to development in a seismically active environment.

It is our opinion that future structures should be designed in accordance with the applicable seismic building code as determined by the structural engineer. The subject site is located within **Site Class D** per 2019 California Building Code. The following values of short and long period accelerations are recommended for the Risk-Targeted Maximum Considered Earthquake (MCE_R). The design spectral response acceleration parameters presented on the following table for **Site Class D**, generated by the U.S. Seismic Design Maps Website (https://seismicmaps.org), may be utilized for seismic design:

2019 CBC Seismic Design Parameters

Latitude	34.4328 N
Longitude	117.3783 W
Site Class Definition (ASCE 7-16 Table 20.3-1)	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s (Figure 1613A.2.1)	1.487
Mapped Spectral Response Acceleration at 1s Period, S_1 (Figure 1613A.2.1)	0.577
Short Period Site Coefficient at 0.2s Period, F_a (Table 1613A.2.3(1))	1.000
Long Period Site Coefficient at 1s Period, F_v (Table 1613A.2.3(2))	1.723
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS} (Eq. 16A-36)	1.487
Adjusted Spectral Response Acceleration at 1s Period, S_{M1} (Eq. 16A-37)	0.994
Design Spectral Response Acceleration at 0.2s Period, S_{DS} (Eq. 16A-38)	0.992
Design Spectral Response Acceleration at 1s Period, S_{D1} (Eq. 16A-39)	0.663

LABORATORY TESTING

CLASSIFICATION

Soils were classified visually according to the Unified Soil Classification System. Unit weight and moisture determinations were performed for each undisturbed sample. Results of density and moisture determinations, together with classifications, are shown on the enclosed Boring Logs.

DIRECT SHEAR TESTS (ASTM:D-3080)

In order to determine the shear strength of the soils, direct shear tests were performed on undisturbed and remolded samples of the on-site soils. The remolded sample was tested at 90% of the maximum dry density. To simulate possible adverse field conditions, the samples were saturated prior to shearing. Graphic summaries of the test results, including moisture content at the time of shearing, are included in this report.

GRAIN SIZE DISTRIBUTION (ASTM:D-422-63 (2002))

To aid in classification, sieve analyses and hydrometer tests were performed on typical samples of the upper soils. The results of the tests are shown on the enclosed Grain Size Distribution Charts.

MAXIMUM DENSITY/OPTIMUM MOISTURE (ASTM:D-1557)

The maximum density/optimum moisture content relationship was determined for typical samples of the upper soils. The tests were conducted in accordance with the ASTM:D-1557 standard. Graphic summaries of the results are included with this report.

EXPANSION TESTS (ASTM:D-4829)

Expansion tests were performed on representative samples of the on-site soils in accordance with ASTM:D-4829 to evaluate their volume change with increasing moisture conditions. The results are as follows:

Location	Depth (ft.)	Expansion Index	Potential Expansion
B-1	0-5	1	Very Low
B-3	0-5	1	Very Low
B-5	0-5	1	Very Low
B-9	0-5	2	Very Low

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

The property is suitable for the proposed construction from a geotechnical engineering standpoint. The construction plans should take into account the appropriate soils engineering features of the site. The on-site soils are medium dense to very dense. No groundwater was encountered to the maximum depth explored, 41.5 feet below existing surface. The on-site soils have a very low potential expansion.

SITE PREPARATION

Debris from demolition, vegetation and underground utility lines to be abandoned should be removed from the site. After site clearance, the upper three feet of the on-site soils should be removed and placed back as compacted fill. The removal and compaction should extend three feet beyond the building lines in each direction. After removal, the exposed surface should be scarified to a depth of eight inches, brought to about optimum moisture content and compacted to at least 90% of the maximum dry density as determined by ASTM:D-1557. An estimated shrinkage percentage of 5% was determined by our calculations for the on-site soils.

All excavations resulting from removal of existing obstructions should be backfilled with soil compacted to at least 90% of the maximum dry density as determined by ASTM:D-1557. If any cesspools or seepage pits are encountered during grading, they should be backfilled with vibrated gravel or slurry mix to five feet below finish grade. The upper five feet should be backfilled with soil compacted by mechanical means.

FILL PLACEMENT

Fill soils should be cleared of deleterious debris, placed in six to eight inch lifts, brought to about optimum moisture content, and compacted to at least 90% of the maximum dry density as determined by ASTM:D-1557. **The placement of the fill should be performed under our observation and testing.**

FOUNDATION DESIGN

Type of Foundation

The proposed strucure may be supported on conventional shallow spread (isolated) and continuous footings. Exterior and interior footings should be founded on compacted fill with a minimum embedment of 18 inches below lowest adjacent grade. Minimum

reinforcement in continuous footings should consist of four No. 4 bars: two placed about four inches from the top and two placed about four inches from the bottom.

Soil Bearing Pressures

Footings founded on compacted fill may be designed for a maximum soil bearing pressure of 2,000lb/ft^2. The recommended soil bearing pressure may be increased by 400lb/ft^2 per each additional foot of embedment over 18 inches and by 200lb/ft^2 per each additional foot in width over 18 inches up to 3,500lb/ft^2. In addition, the recommended soil bearing pressures may be increased by one-third when designing for wind and seismic forces.

Expected Settlements

If footings are supported on compacted fill and are sized for the recommended bearing pressures, differential settlements are not expected to exceed ¼ inch in a 30-foot span. Total settlements are anticipated to be less than ¾ inch.

FLOOR SLABS-ON-GRADE

Concrete floor slabs-on-grade thickness and reinforcement should reflect the anticipated use of the slabs and should be designed by the structural engineer. Concrete floor slabs-on-grade should be a minimum of four inches (full) thick with minimum reinforcement consisting of No.4 deformed bars spaced a maximum of 16 inches each way. In areas where floor coverings or equipment that are sensitive to moisture are contemplated, a 10-mil visqueen moisture barrier should be placed beneath the slab with one inch of clean sand between the concrete slabs and the visqueen to aid in curing and to prevent puncture of the visqueen. Cracking of reinforced concrete is a relatively common occurrence. Some cracking of reinforced concrete, including slabs, can be anticipated. Irregularities in new slabs are also common. If cracking of slabs cannot be tolerated, heavily reinforced structural slabs are an option.

The recommendations presented above are intended to reduce the potential for random cracking to which concrete flatwork is often prone. Judicious spacing of crack control joints has proven effective in further reducing random cracking. A structural engineer may recommend the desirable spacing. Usually the crack control joints are placed 12 to 15 feet apart in each direction. Factors influencing cracking of concrete flatwork, (other than expansion, settlement and creep of soils), and which should be avoided, include: poor-quality concrete, excessive time passing between the mixing and placement of the concrete (the concrete should be rejected if this time interval exceeds two hours), temperature and wind conditions at the time of placement of the concrete, curing of the concrete and workmanship. The concrete should be maintained in a moist condition (curing) for at least the first seven days after concrete placement. During hot weather, proper attention should be given to the ingredients, production methods, handling,

placement, protection and curing to prevent excessive concrete temperature or water evaporation. In hot weather and windy conditions, water evaporates more rapidly from the surface of the concrete flatwork. This requires more frequent moistening of the concrete during the curing period or the use of a protective chemical film to prevent evaporation.

LATERAL RESISTANCE

An allowable lateral bearing of 300lb/ft^2 per foot of depth may be assumed up to a maximum of 3,000lb/ft^2. A coefficient of friction between soil and concrete of 0.4 may be used.

LATERAL LOADS

No retaining walls are proposed. Backfill for retaining walls, if any, should consist of granular, free-draining material. Cantilevered retaining walls should be designed to resist an active pressure of 30lb/ft^3 equivalent fluid pressure. Restrained walls should be designed for an at-rest earth pressure of 45lb/ft^3 equivalent fluid pressure. If the on-site upper soils are used for backfill, the at-rest earth pressure should be increased to 100lb/ft^3.

Walls subject to surcharge loads should be designed to include the additional lateral pressure. Walls should have adequate drainage to prevent build-up of hydrostatic pressure.

BACKFILL

All backfill of walls, footings or trenches should be compacted to 90% of the maximum dry density as determined by ASTM:D-1557 **and should be tested by the soils engineer**.

DRAINAGE

Adequate drainage at the site is absolutely essential and it should be provided. Rain gutters should be connected to an appropriate drainage system and carried away from the building and to the street. Yard drainage should be kept adequate to prevent ponding of water and saturation of the soils. Water should be directed to the street in an approved manner. Future performance of the building and other structures will be significantly influenced by the site drainage conditions.

PLANTERS

Planters and lawns adjacent to the building should be avoided. If planters are planned adjacent to the building, they should have the bottom and walls waterproofed and a drain installed to carry irrigation water away from the footing areas.

CONSTRUCTION CUTS

Construction cuts up to five feet in height may be excavated vertically for their entire length and height provided they do not undermine adjacent buildings or property line walls; otherwise, the construction cuts will need to be excavated using the 'A, B, C' slot-cutting method. If the slot-cutting method is used, the cut should be opened at a gradient of 1:1 first, then each slot opened and the removed soils replaced as engineered compacted fill before the subsequent slot is opened. The slots should not exceed eight feet in width or five feet in height. If the construction cuts are to remain open for more than two weeks or if rain is expected while they are open, they should be covered by a plastic membrane kept in place by holding blocks or driven re-bars at the top and bottom of the membrane. No equipment or personnel should stand closer than ten feet from the top of the temporary cut. **We should examine the construction cuts periodically to verify performance.** All construction cuts should comply with the State of California Construction Safety Orders (CAL/OSHA).

PAVED AREAS

The upper on-site soils are fair subgrade. Based on an estimated "R" value of 60 and assuming traffic indices of 5.2 for light duty and 6.3 for heavy duty, the following pavement sections may be used for a twenty-year life. "R" value tests should be performed on the soils exposed at subgrade elevation upon completion of grading to verify the recommended pavement sections.

Light Duty (T.I.5.2)

Two and one-half (2 ½) inches of asphaltic concrete placed on four inches of untreated aggregate base. The aggregate base should be compacted to at least 95% of the maximum density as determined by California Test Method 216-G, the California Impact.

Heavy Duty (T.I.6.3)

Three inches of asphaltic concrete placed on four inches of untreated aggregate base. The aggregate base should be compacted to at least 95% of the maximum density as determined by California Test Method 216-G, the California Impact.

Concrete Floor Slabs (Loading and Unloading Areas)

We recommend that concrete slabs be used for loading, unloading and truck turning areas. The concrete slabs should be a minimum of six inches thick, reinforced with 6x6-6/6 welded wire mesh or #3 bars placed at 18 inches on-center and placed at slab about mid-height. The upper six inches of earth material beneath the slabs should consist of untreated aggregate base. The aggregate base should be compacted to at least 95% of

the maximum density as determined by California Test Method 216-G, the California Impact.

RECOMMENDED INSPECTIONS

It is strongly recommended (and is a condition of use of this report), that the developer ensures that each phase of construction be properly inspected and approved by the local Building Department official.

WORKMAN SAFETY-EXCAVATIONS

It is essential for the contractor to provide adequate shoring and safety equipment as required by the State or Federal OSHA regulations. All regulations of the State or Federal OSHA should be followed before allowing workmen in a trench or other excavation. If excavations are to be made during the rainy season, particular care should be given to ensure that berms or other devices will prevent surface water from flowing over the top of the excavation or ponding at the top of the excavations.

OBSERVATION

Removal bottoms should be examined and approved by us and the City inspector before any fill is placed. Footing excavations should be examined by us prior to forming or placement of reinforcing steel to confirm that the soil conditions meet the requirements set by this report. Footing excavations should be kept moist and concrete should be placed as soon as possible after excavations are completed, examined and approved by us and the City inspector.

REVIEW

The geotechnical consultants shall review and sign the plans and specifications.

REGULATORY AGENCY REVIEW AND ADDITIONAL CONSULTING

All geotechnical and/or engineering geologic aspects of the proposed development are subject to review and approval by the government reviewing agency. It should be understood that the government reviewing agency may approve or deny any portion of the proposed development which may require additional geotechnical services by this office. Additional geotechnical services may include review responses, supplemental letters, plan reviews, construction/site observations, meetings, etc. The fees for generating additional reports, letters, exploration, analyses, etc. will be billed on a time and material basis.

COMMENTS

The conclusions and recommendations presented in this report are based on research, site observations and limited subsurface information. The conclusions and recommendations presented are based on the supposition that subsurface conditions do not vary significantly from those indicated. Although no significant variations in subsurface conditions are anticipated, the possibility of significant variations cannot be ruled out. If such conditions are encountered, this consultant should be contacted immediately to consider the need for modification of this project.

This report was prepared for the exclusive use of 55555 Amargosa Rd., LLC and their design consultants for the specific project outlined herein. This report may not be suitable for use by other parties or other uses. This report is subject to review by regulatory agencies and these agencies may require their approval before the project can proceed. No guarantee that the regulatory public agency or agencies will approve the project is intended, expressed or implied.

One of the purposes of this report is to provide the client with advice regarding geotechnical conditions on the site. It is important to recognize that other consultants could arrive at different conclusions and recommendations. No warranties of future site performance are intended, expressed or implied.

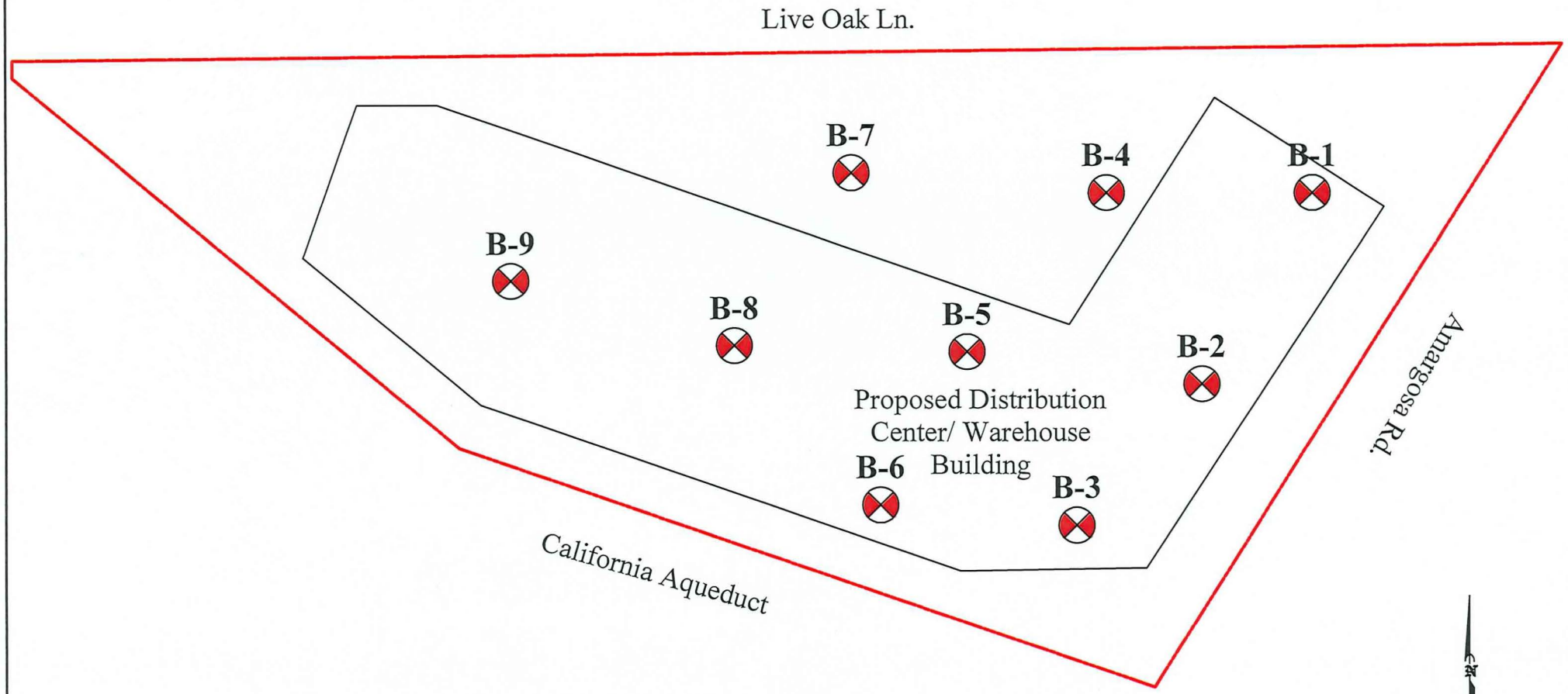
FIGURE 1

LOCATION MAP

Amargosa Rd. & Live Oak Ln., Hesperia

A.G.I. GEOTECHNICAL, INC.
Engineering Geology • Geotechnical Engineering
16555 Sherman Way, Ste. A • Van Nuys, CA 91406
(818) 785-5244 • Fax (818) 785-6251

PROJECT NO.	30-5468-00
DATE	1-2020
PREPARED BY	AM
APPROVED BY	JAV



EXPLANATION

B-1 ⊗ Approximate Location of Exploratory Boring

Scale 1/16" = 1'-0"

FIGURE 2

A.G.I. GEOTECHNICAL, INC.
Engineering Geology • Geotechnical Engineering
16555 Sherman Way, Ste. A • Van Nuys, CA 91406
(818) 785-5244 • Fax (818) 785-6251

SITE PLAN

Amargosa Rd. & Live Oak Ln., Hesperia

PROJECT NO.	30-5468-00
DATE	02-2020
PREPARED BY	WFB
APPROVED BY	JAV

BORING LOGS

LEGEND

 Ring Sample, or Bulk Sample

 Standard Penetration Test (SPT)

 Ground Water Level

SOIL SIZE	
COMPONENT	SIZE RANGE
Boulders	Above 12"
Cobbles	3"-12"
Gravel	#4 - 3"
coarse	¾" - 3"
fine	#4 - ¾"
Sand	#200-#4
coarse	#10-#4
medium	#40-#10
fine	#200-#40
Fines (Silt or Clays)	Below #200

PLASTICITY OF FINE GRAINED SOILS	
PLASTICITY INDEX	VOLUME CHANGE POTENTIAL
0-15	Probably Low
15-30	Probably Moderate
30 or more	Probably High

WATER CONTENT
Dry: No feel of moisture
Damp: Much less than normal moisture
Moist: Normal moisture
Wet: Much greater than normal moisture
Saturated: At or near saturation

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

RELATIVE DENSITY	
SANDS & GRAVELS	BLOWS PER FOOT
Very loose	0-4
Loose	4-10
Medium dense	10-30
Dense	30-50
Very dense	Over 50

CONSISTENCY	
CLAYS & SILTS	BLOWS PER FOOT
Very soft	0-2
Soft	2-4
Firm	4-8
Stiff	8-15
Very stiff	15-30
Hard	Over 30

BORING NUMBER B-1

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
0													
	X	48/$\frac{50}{4"}$	X	8.3	125	136				Alluvium Brown Silty SAND (Slightly moist, very dense)			SM
5	X	19/28/41		1.6	124	126				Light brown Silty SAND (Damp, dense)			SM
10	X	26/28/45		2.2	114	116							
15	X	26/28/32		1.3	112	114							
20	X	19/28/37		1.7	121	123				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense)			SW - SM
25	X	21/46/49		1.4	121	122							
30	X	32/40/$\frac{50}{2"}$		3.6	117	122				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-2

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

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DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D_{50}	Classification
0													
	☒	11/22/$\frac{50}{5"}$		11.2	129	144				Alluvium Brown Silty SAND (Slightly moist, very dense)			SM
5	☒	$\frac{50}{5"}$		3.7	124	129				Light brown Silty SAND (Damp, very dense to dense)			SM
10	☒	18/21/26		4.1	119	124							
15	☒	23/31/50		2.1	113	116							
20	☒	29/$\frac{50}{6"}$		1.8	111	113				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense)			SW - SM
25	☒	28/43/$\frac{50}{5"}$		2.0	127	129							
30	☒	11/26/50		4.1	117	121				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-3

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

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DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D_{50}	Classification
0													
	X	10/21/5"	X	5.9	130	138				Alluvium Brown Silty SAND (Damp, very dense)			SM
5	X	22/33/41		4.9	128	135				Light brown Silty SAND (Damp, dense to very dense)			SM
10	X	25/32/38		3.1	119	123							
15	X	33/34/3"		2.2	118	120							
20	X	37/48/3"		1.8	115	117				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense)			SW - SM
25	X	28/42/2"		1.9	119	121							
30	X	22/48/2"		4.3	119	124				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-4

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D_{50}	Classification
0													
	X	7/32/$\frac{50}{4"}$		3.0	121	125				Alluvium Brown Silty SAND (Damp, very dense)			SM
5	X	38/$\frac{50}{4"}$		3.9	116	120				Light brown Silty SAND (Damp, dense to very dense)			SM
10	X	19/20/31		3.7	121	125							
15	X	11/30/$\frac{50}{2"}$		2.1	115	118							
20	X	17/$\frac{50}{6"}$		1.9	119	121				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense to dense)			SW - SM
25	X	16/21/36		2.8	126	130							
30	X	20/21/46		2.1	116	119				Brown Well-graded SAND with Silt (Damp, dense)			SW - SM

A.G.I. GEOTECHNICAL, INC.
A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center
PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia
DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"
EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A
DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop
LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
35	X	18/36/$\frac{50}{5"}$		1.8	119	122				Light brown Poorly-graded SAND with Silt & Gravel (Damp, dense)			SP - SM
40	X	38/$\frac{50}{6"}$		1.8	116	118							
45										Total Depth: 41.5' No Water			
50													
55													
60													
65													

BORING NUMBER B-5

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
0										Alluvium Brown Silty SAND (Damp, medium dense)			SM
	X	8/10/20	X	4.7	121	127							
5	X	19/31/40		4.6	127	133				Light brown Silty SAND (Damp, dense to very dense)			SM
10	X	15/25/46		2.5	123	126							
15	X	16/29/$\frac{50}{5"}$		2.0	120	123							
20	X	9/21/36		1.8	120	122				Light brown Well-graded SAND with Silt & Gravel (Damp, dense)			SW - SM
25	X	20/27/50		4.0	115	120							
30	X	20/49/$\frac{50}{4"}$		2.3	124	126				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-6

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
0													
	X	15/$\frac{50}{6"}$		6.7	132	141				Alluvium Brown Silty SAND (Damp, very dense)			SM
5	X	30/$\frac{50}{5"}$		4.5	126	132				Light brown Silty SAND (Damp, very dense)			SM
10	X	28/38/36		2.4	124	127							
15	X	19/26/$\frac{50}{5"}$		1.7	118	120							
20	X	34/36/$\frac{50}{4"}$		2.4	110	113				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense)			SW - SM
25	X	18/35/$\frac{50}{5"}$		2.6	117	120							
30	X	$\frac{50}{6"}$		2.5	105	108				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-7

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
0													
	X	18/5"		7.2	136	146				Alluvium Brown Silty SAND (Damp, very dense)			SM
5	X	18/30/5"		3.9	128	133				Light brown Silty SAND (Damp, very dense)			SM
10	X	22/38/50		2.2	124	127							
15	X	31/36/50		2.0	121	124							
20	X	22/34/45		1.5	124	126				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense)			SW - SM
25	X	20/40/4"		4.4	126	132							
30	X	26/6"		2.2	118	121				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-8

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

LOGGED BY: CWL CHECKED BY: JAV

DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D50	Classification
0										Alluvium Brown Silty SAND (Damp, very dense)			SM
	X	44/49/$\frac{50}{4"}$		3.7	127	132							
5	X	45/32/46		2.8	125	128				Light brown Silty SAND (Damp, dense to very dense)			SM
10	X	25/28/40		7.1	114	122							
15	X	20/30/$\frac{50}{6"}$		2.0	121	123							
20	X	34/38/50		2.0	116	119				Light brown Well-graded SAND with Silt & Gravel (Damp, very dense)			SW - SM
25	X	21/40/50		1.2	125	127							
30	X	24/$\frac{50}{5"}$		2.3	121	123				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

BORING NUMBER B-9

A.G.I. GEOTECHNICAL, INC.

A.G.I. Geotechnical, Inc. 16555 Sherman Way, Unit A Van Nuys, California 91406 Telephone: (818) 785-5244 Fax: (818) 785-6251

CLIENT: 55555 Amargosa Rd., LLC PROJECT NAME: Proposed Warehouse/ Distribution Center

PROJECT NUMBER: 30-5468-00 PROJECT LOCATION: Amargosa Rd. & Live Oak Ln., Hesperia

DATE STARTED: 01/30/2020 COMPLETED: 01/31/2020 GROUND ELEVATION: N/A BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow Stem Auger GROUND WATER LEVELS: N/A

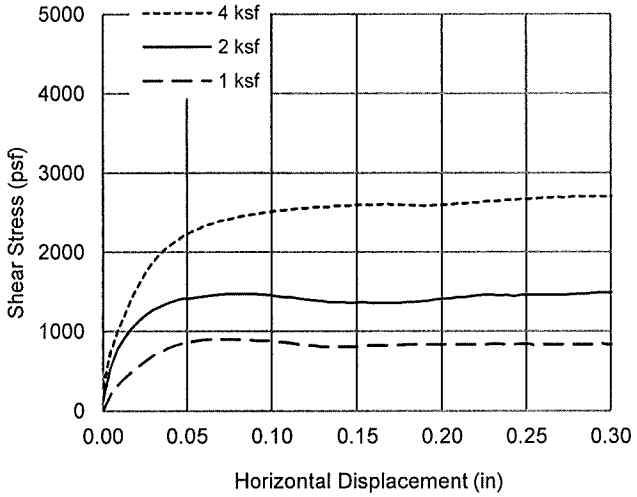
DRILLING CONTRACTOR: Choice Drilling SAMPLING METHOD: Autohammer, 140 lb., 30" Drop

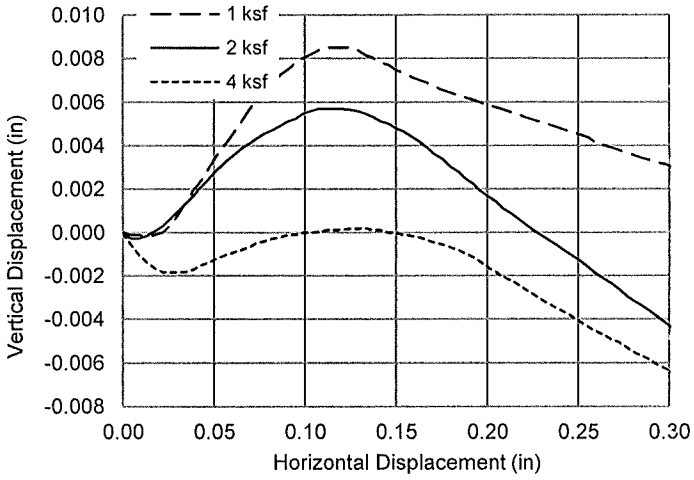
LOGGED BY: CWL CHECKED BY: JAV

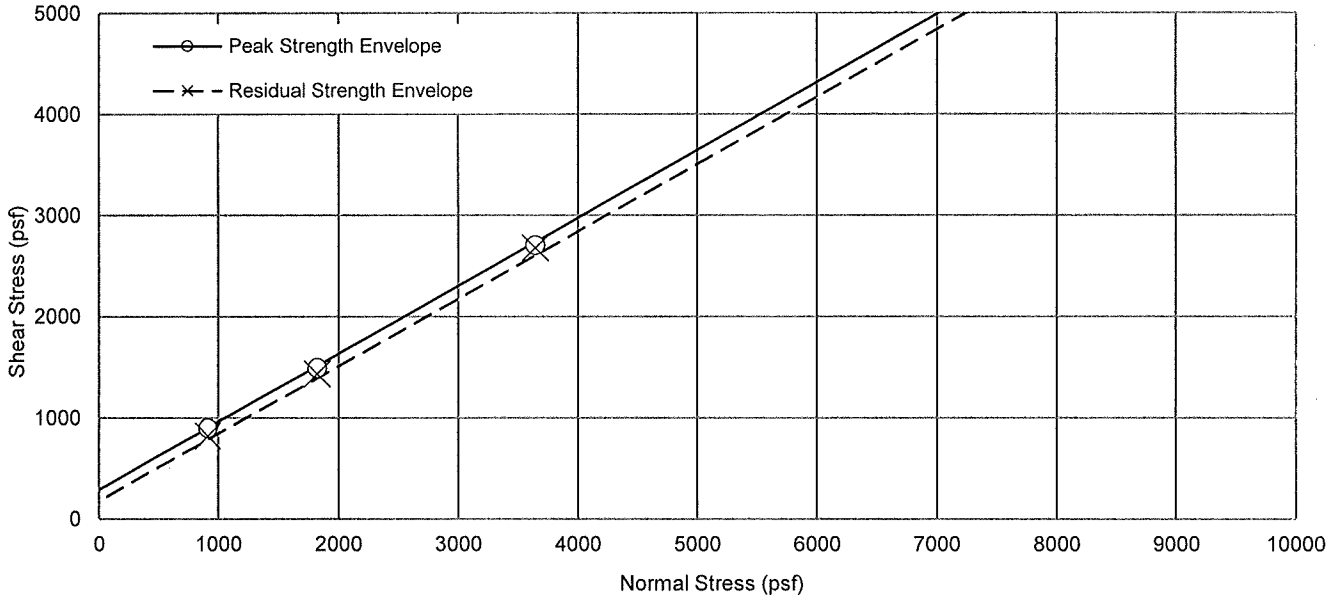
DEPTH (ft)	DRIVE SAMPLE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
0													
	☒	24/$\frac{50}{4"}$	X	5.6	121	127				Alluvium Brown Silty SAND (Damp, very dense)			SM
5	☒	30/$\frac{50}{4"}$		4.3	122	128				Light brown Silty SAND (Damp, very dense to dense)			SM
10	☒	17/22/30		3.4	128	133							
15	☒	12/24/28		4.4	116	121							
20	☒	16/32/40		1.3	118	119				Light brown Well-graded SAND with Silt & Gravel (Damp, dense to very dense)			SW - SM
25	☒	24/$\frac{50}{5"}$		3.4	118	122							
30	☒	49/$\frac{50}{5"}$		3.5	116	120				Brown Well-graded SAND with Silt (Damp, very dense)			SW - SM
										Total Depth: 31.5' No Water			

LABORATORY TEST RESULTS

Sample ID :		1 ksf	2 ksf	4 ksf			
Initial	Water Content (%)	7.5	7.5	7.5			
	Dry Density (%)	136.0	135.6	135.0			
	Saturation (%)	84.8	83.5	81.7			
Final	Water Content (%)	9.6	9.9	9.8			
	Dry Density (pcf)	135.4	134.7	133.8			
	Saturation (%)	106.1	106.6	102.1			
Normal Stress (psf)		910	1821	3642			
Peak Shear Stress (psf)		898	1490	2703			
Residual Shear Stress (psf)		817	1432	2673			







Peak Cohesion, c' (psf):	291	Residual Cohesion, c (psf):	180
Peak Friction, ϕ' (deg):	33.9	Residual Friction, ϕ' (deg):	33.6

DIRECT SHEAR TEST (ASTM:D-3080)

SAMPLE TYPE: Remolded
DESCRIPTION: Silty SAND

LL:
PL:
PI:
% <0.75μ
% <0.02μ
EI

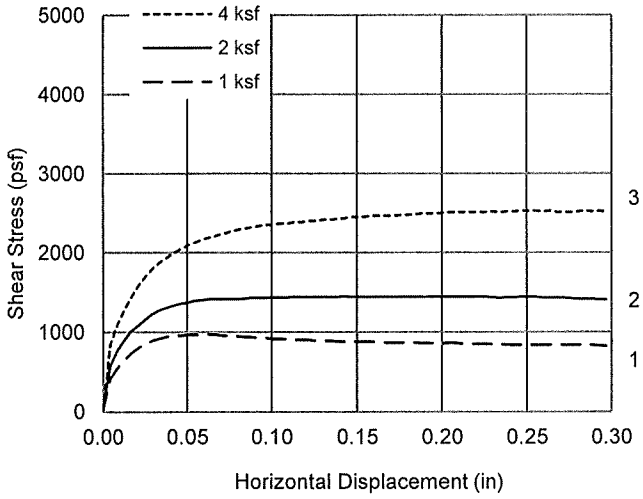
USCS:
GEOLOGY:
SYMBOL:
REMARKS:

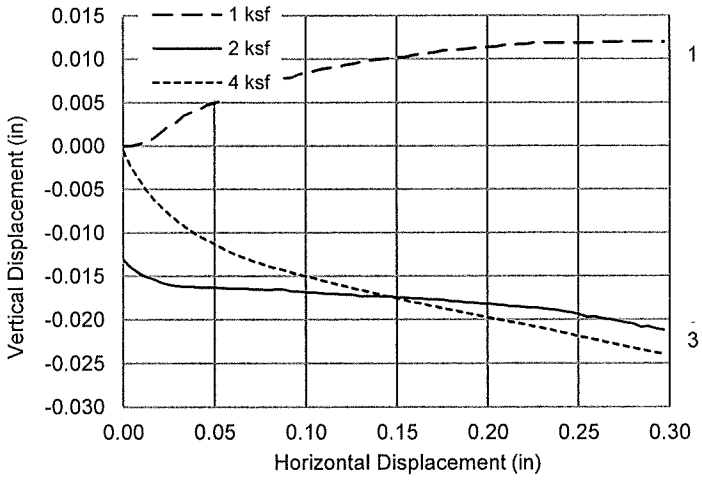
CLIENT: 55555 Amargosa Rd., LLC
PROJECT NAME:
LOCATION: Amargosa Rd. & Live Oak Ln.
Hesperia
SAMPLE LOCATION: B-1 @ 0-5'

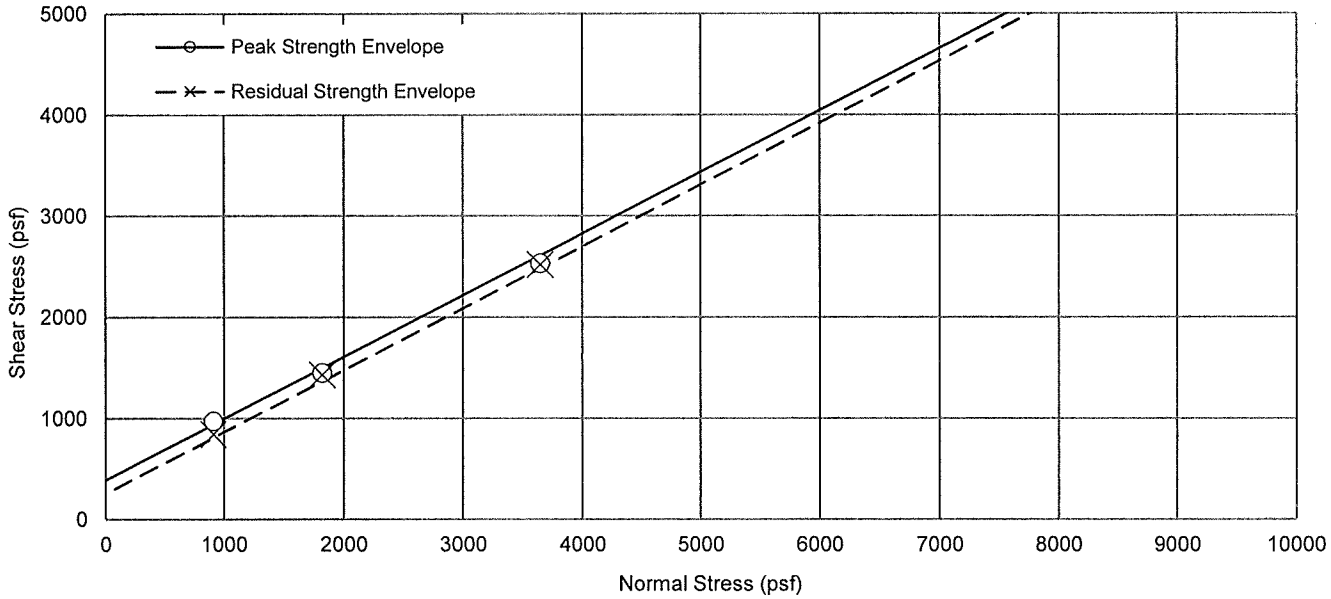
PROJECT NO.: 30-5468-00 TESTED: 02/19/20

A.G.I. GEOTECHNICAL, INC.

	Sample ID :	1 ksf	2 ksf	4 ksf			
Initial	Water Content (%)	8.3	8.3	8.3			
	Dry Density (%)	124.6	124.1	123.7			
	Saturation (%)	63.6	62.7	61.9			
Final	Water Content (%)	13.7	13.8	14.1			
	Dry Density (pcf)	123.5	123.1	122.5			
	Saturation (%)	101.6	101.1	101.4			
Normal Stress (psf)		910	1821	3642			
Peak Shear Stress (psf)		971	1447	2528			
Residual Shear Stress (psf)		840	1428	2517			







Peak Cohesion, c' (psf):	388	Residual Cohesion, c (psf):	254
Peak Friction, ϕ' (deg):	31.4	Residual Friction, ϕ' (deg):	31.5

DIRECT SHEAR TEST (ASTM:D-3080)

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND

LL:
PL:
PI:
% <0.75μ
% <0.02μ
EI

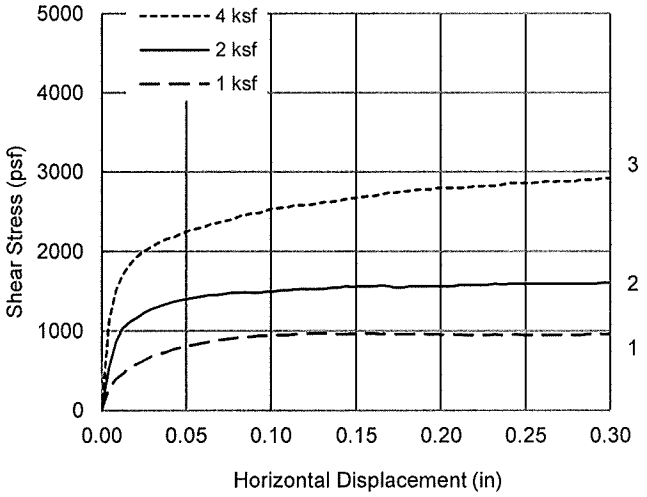
USCS:
GEOLOGY:
SYMBOL:
REMARKS:

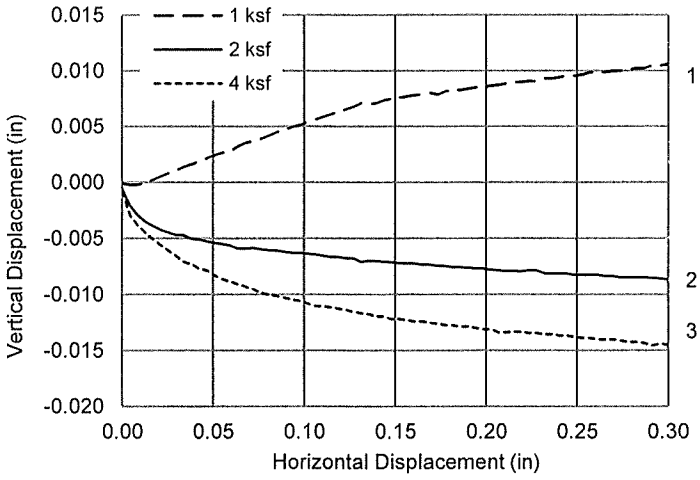
CLIENT: 55555 Amargosa Rd., LLC
PROJECT NAME:
LOCATION: Amargosa Rd. & Live Oak Ln.
Los Angeles
SAMPLE LOCATION: B-1 @ 2.5'

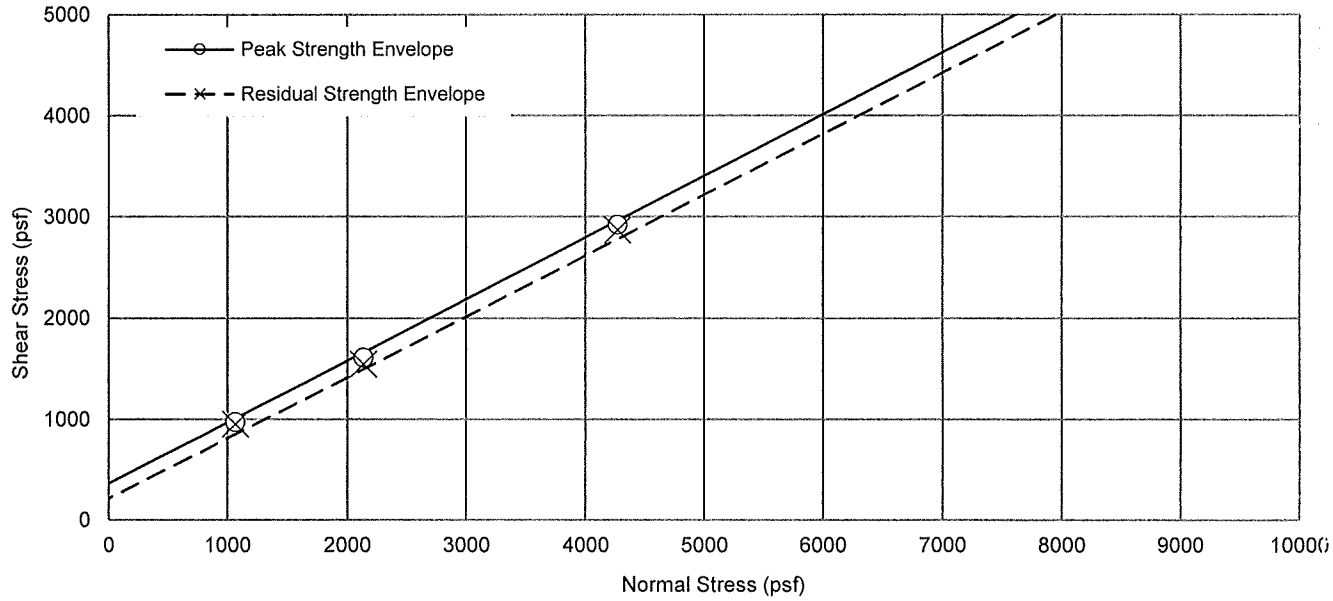
PROJECT NO.: 30-5468-00 TESTED: 02/19/20

A.G.I. GEOTECHNICAL, INC.

Sample ID :		1 ksf	2 ksf	4 ksf			
Initial	Water Content (%)	7.5	7.5	7.5			
	Dry Density (%)	134.9	134.3	133.7			
	Saturation (%)	81.3	79.6	77.8			
Final	Water Content (%)	10.0	10.2	10.3			
	Dry Density (pcf)	134.1	133.3	132.4			
	Saturation (%)	105.3	104.4	102.1			
Normal Stress (psf)		1067	2134	4269			
Peak Shear Stress (psf)		972	1607	2918			
Residual Shear Stress (psf)		949	1543	2866			







Peak Cohesion, c' (psf):	360	Residual Cohesion, c (psf):	211	**DIRECT SHEAR TEST (ASTM:D-3080)**
Peak Friction, ϕ' (deg):	31.3	Residual Friction, Φ' (deg):	31.0	

SAMPLE TYPE: Remolded
DESCRIPTION: Silty SAND

LL:
PL:
PI:
% <0.75μ
% <0.02μ
EI

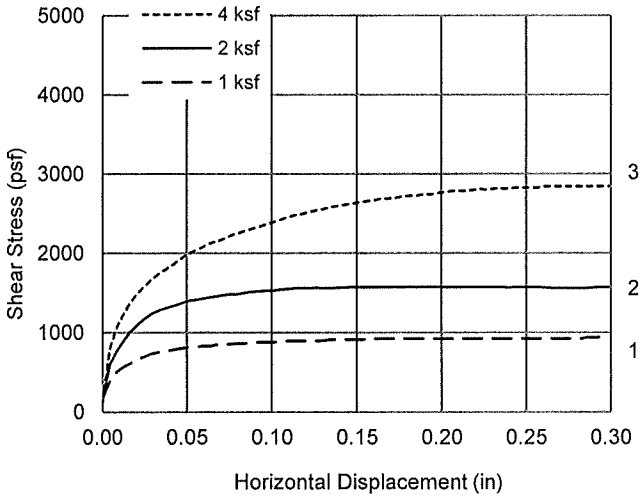
USCS:
GEOLOGY:
SYMBOL:
REMARKS:

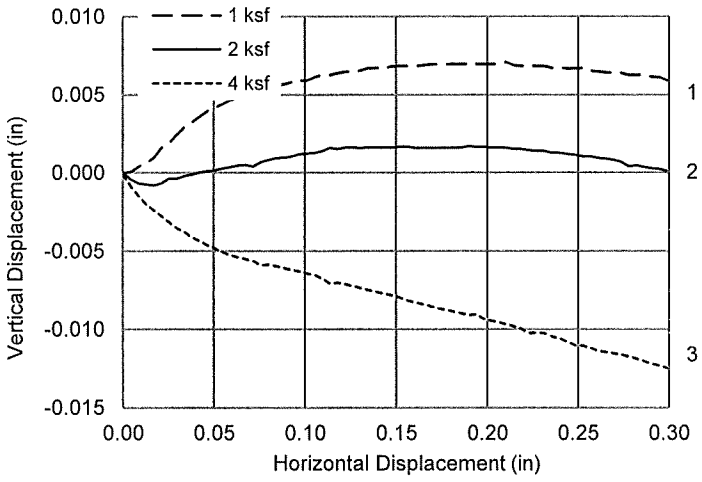
CLIENT: 55555 Amargosa Rd., LLC
PROJECT NAME:
LOCATION: Amargosa Rd. & Live Oak Ln.
Hesperia
SAMPLE LOCATION: B-3 @ 0-5'

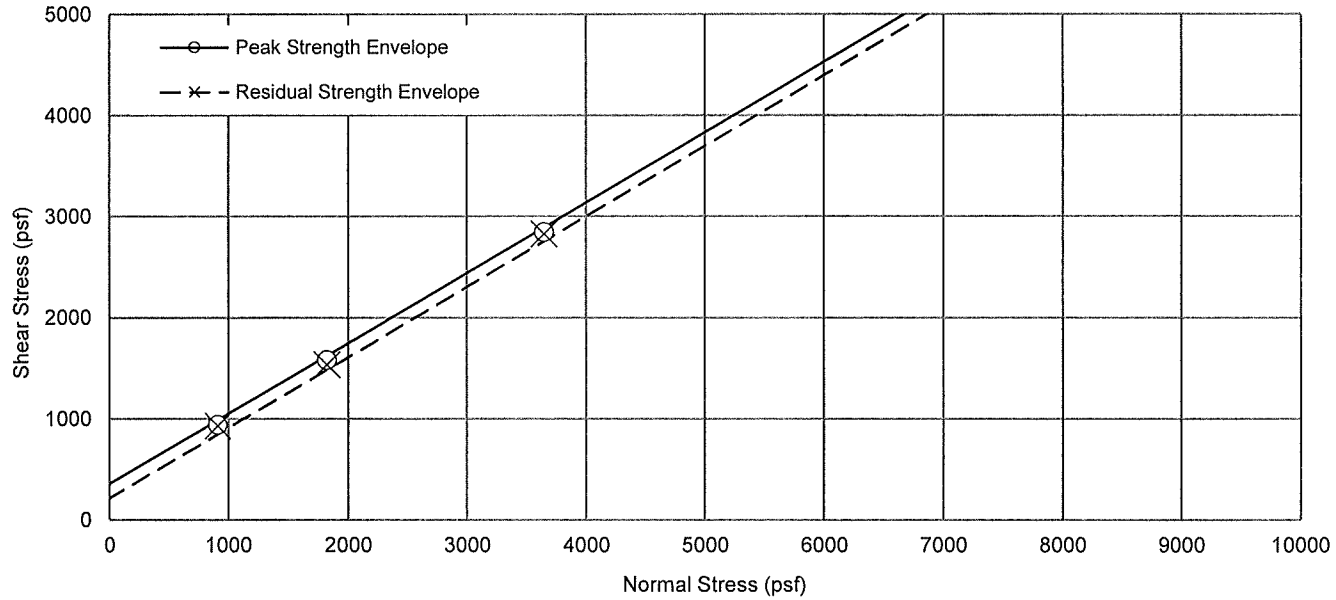
PROJECT NO.: 30-5468-00 TESTED: 02/22/20

AGI
A.G.I. GEOTECHNICAL, INC.

	Sample ID :	1 ksf	2 ksf	4 ksf			
Initial	Water Content (%)	7.5	7.5	7.5			
	Dry Density (%)	136.4	135.9	135.4			
	Saturation (%)	86.1	84.5	82.9			
Final	Water Content (%)	9.2	9.5	9.7			
	Dry Density (pcf)	135.7	135.0	134.2			
	Saturation (%)	102.8	103.4	102.5			
Normal Stress (psf)		910	1821	3642			
Peak Shear Stress (psf)		940	1579	2842			
Residual Shear Stress (psf)		925	1532	2825			







Peak Cohesion, c' (psf):	355	Residual Cohesion, c (psf):	214
Peak Friction, ϕ' (deg):	34.8	Residual Friction, ϕ' (deg):	34.9

DIRECT SHEAR TEST (ASTM:D-3080)

SAMPLE TYPE: Remolded
DESCRIPTION: Silty SAND

LL:
PL:
PI:
% <0.75μ
% <0.02μ
EI

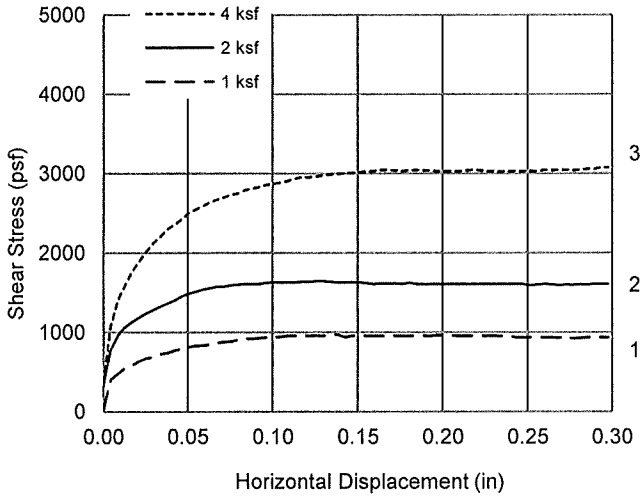
USCS:
GEOLOGY:
SYMBOL:
REMARKS:

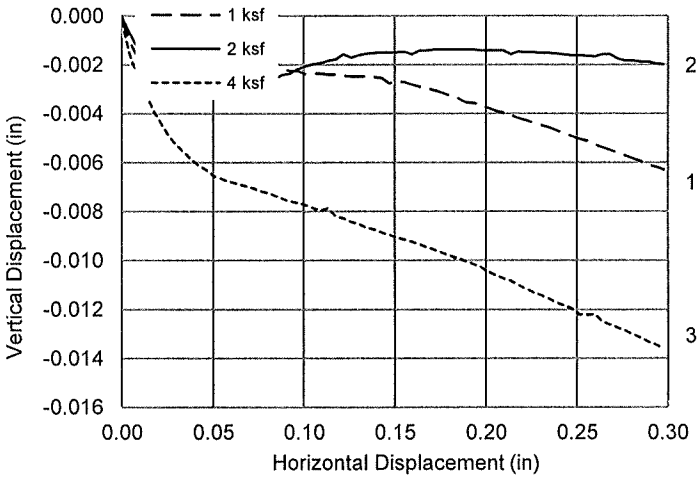
CLIENT: 55555 Amargosa Rd., LLC
PROJECT NAME:
LOCATION: Amargosa Rd. & Live Oak Ln.
Hesperia
SAMPLE LOCATION: B-5 @ 0-5'

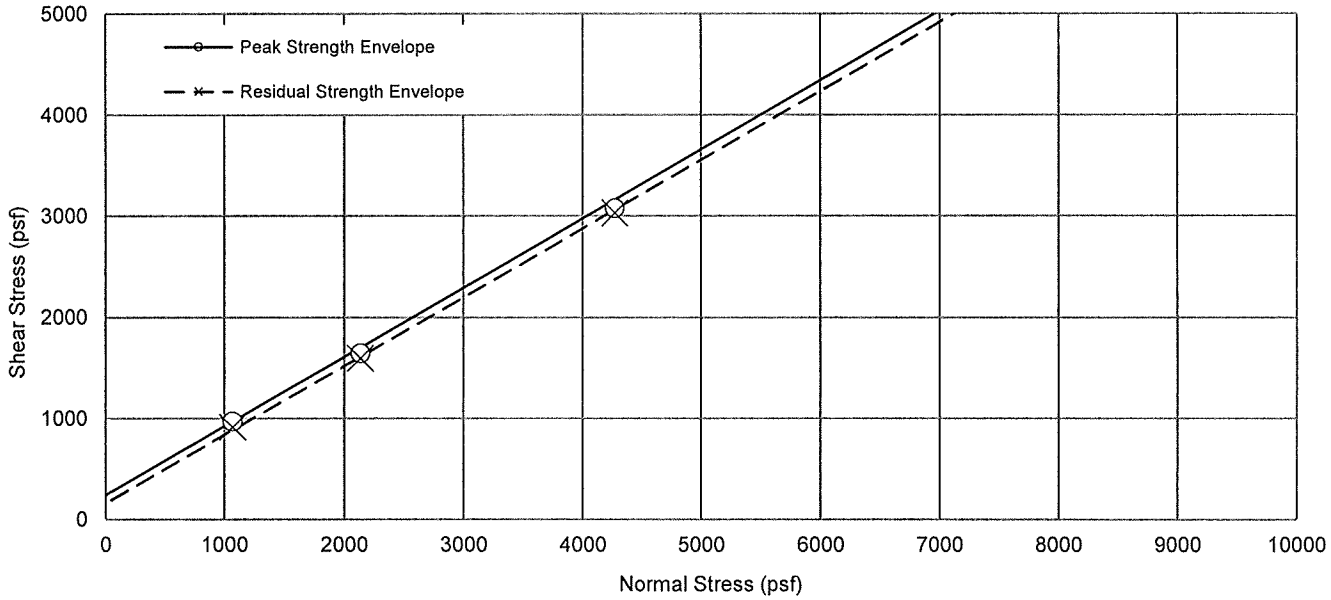
PROJECT NO.: 30-5468-00 TESTED: 02/22/20

A.G.I. GEOTECHNICAL, INC.

	Sample ID :	1 ksf	2 ksf	4 ksf			
Initial	Water Content (%)	3.7	3.7	3.7			
	Dry Density (%)	126.9	126.3	125.8			
	Saturation (%)	30.5	29.9	29.4			
Final	Water Content (%)	12.9	13.2	13.3			
	Dry Density (pcf)	126.3	125.6	124.8			
	Saturation (%)	104.3	104.4	102.6			
Normal Stress (psf)		1067	2134	4269			
Peak Shear Stress (psf)		969	1644	3074			
Residual Shear Stress (psf)		911	1591	3028			







Peak Cohesion, c' (psf):	240	Residual Cohesion, c (psf):	159
Peak Friction, ϕ' (deg):	34.4	Residual Friction, ϕ' (deg):	34.2

DIRECT SHEAR TEST (ASTM:D-3080)

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND

LL:
PL:
PI:
% <0.75μ
% <0.02μ
El

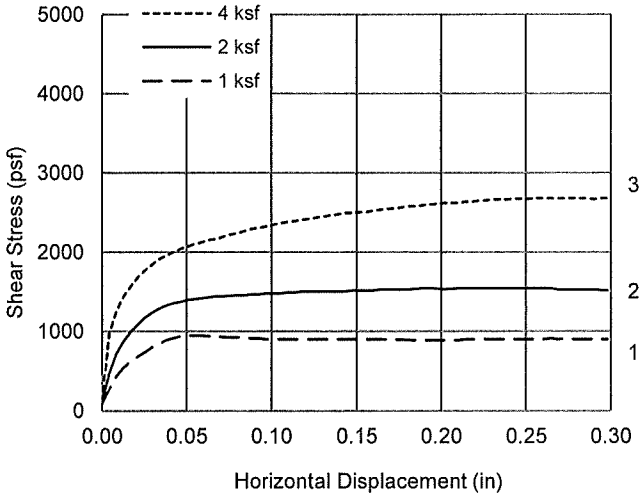
USCS:
GEOLOGY:
SYMBOL:
REMARKS:

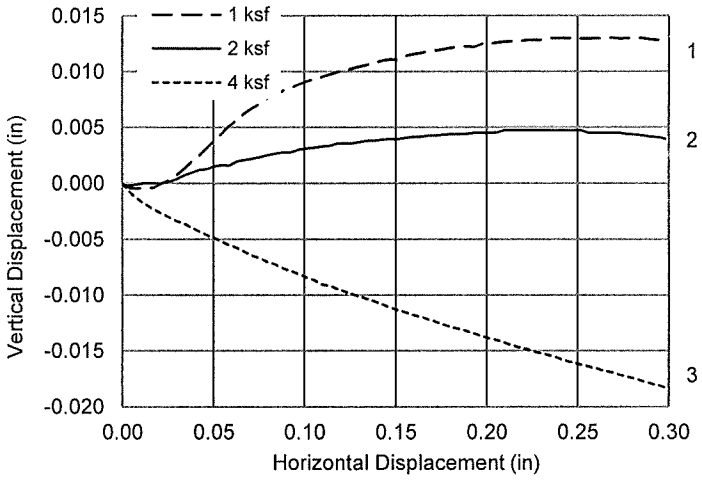
CLIENT: 55555 Amargosa Rd., LLC
PROJECT NAME:
LOCATION: Amargosa Rd. & Live Oak Ln.
Hesperia
SAMPLE LOCATION: B-8 @ 2.5'

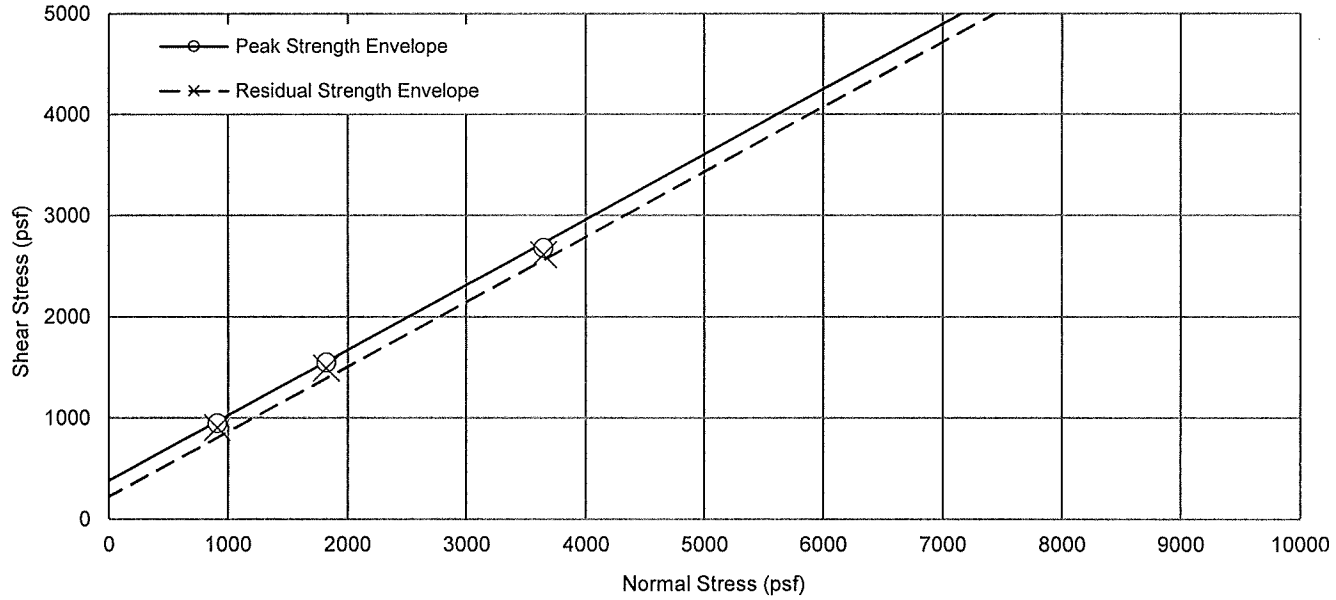
PROJECT NO.: 30-5468-00 TESTED: 02/21/20

A.G.I. GEOTECHNICAL, INC.

	Sample ID :	1 ksf	2 ksf	4 ksf			
Initial	Water Content (%)	8.0	8.0	8.0			
	Dry Density (%)	134.7	134.1	133.6			
	Saturation (%)	86.1	84.3	82.7			
Final	Water Content (%)	9.8	10.1	10.4			
	Dry Density (pcf)	133.8	133.0	132.3			
	Saturation (%)	102.1	102.2	102.7			
Normal Stress (psf)		910	1821	3642			
Peak Shear Stress (psf)		946	1545	2677			
Residual Shear Stress (psf)		900	1488	2611			







Peak Cohesion, c' (psf):	379	Residual Cohesion, c (psf):	222
Peak Friction, ϕ' (deg):	32.8	Residual Friction, ϕ' (deg):	32.7

DIRECT SHEAR TEST (ASTM:D-3080)

SAMPLE TYPE: Remolded
DESCRIPTION: Silty SAND

LL:
PL:
PI:
% <0.75μ
% <0.02μ
EI

USCS:
GEOLOGY:
SYMBOL:
REMARKS:

CLIENT: 55555 Amargosa Rd., LLC
PROJECT NAME:
LOCATION: Amargosa Rd. & Live Oak Ln.
Hesperia
SAMPLE LOCATION: B-9 @ 0-5'

PROJECT NO.: 30-5468-00 TESTED: 02/19/20

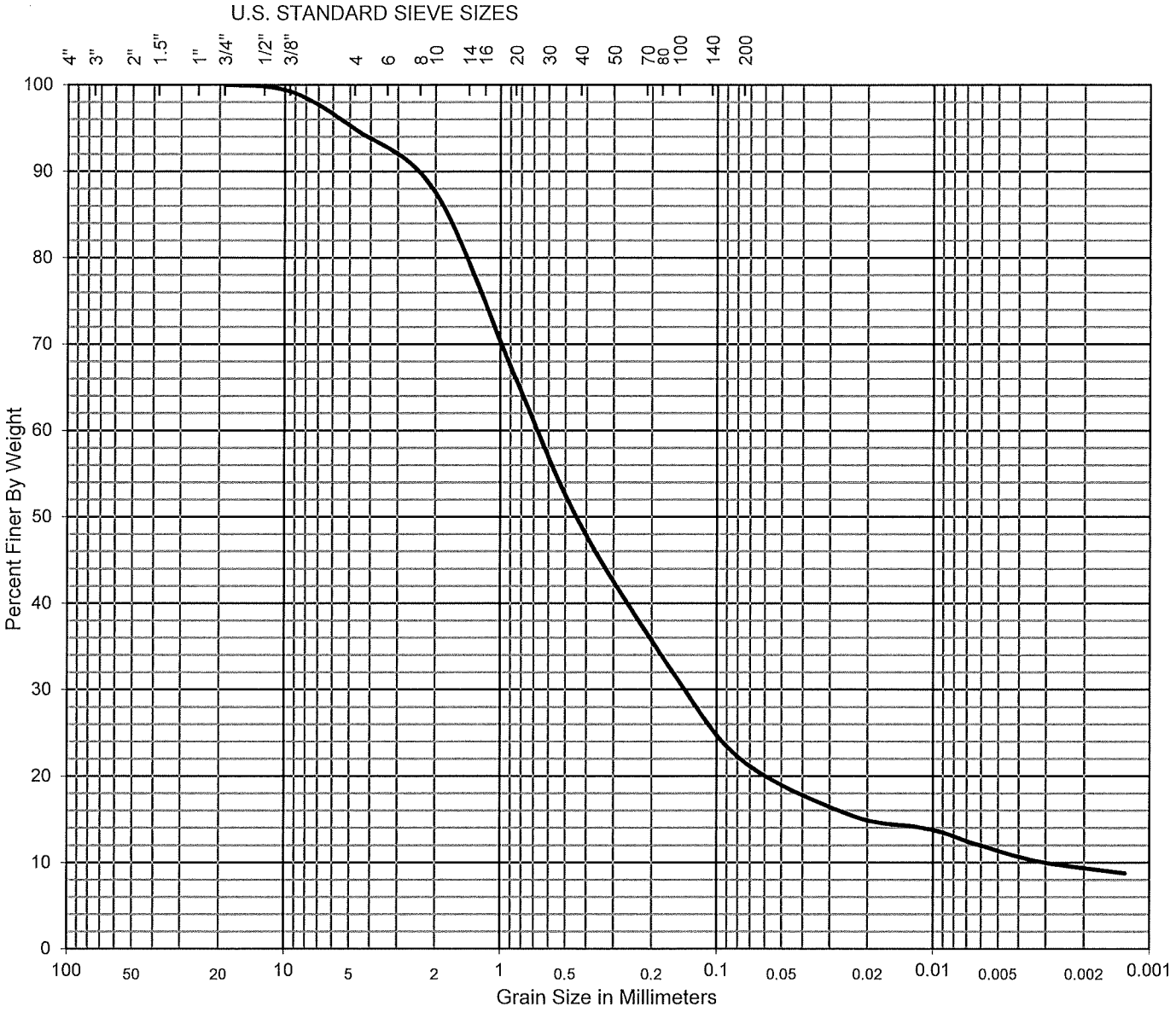
A.G.I. GEOTECHNICAL, INC.

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-1			**DEPTH (FT)**	0-5
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	5.1	**Sand (%)**	73.2			**Silt & Clay (%)**	21.7
D_{10} (mm)	-	**D_{30} (mm)**	-	**D_{60} (mm)**	-	**D_{50} (mm)**	-
C_u	-	**C_c**	-			**% Fines (< 75υm)**	21.7

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM)



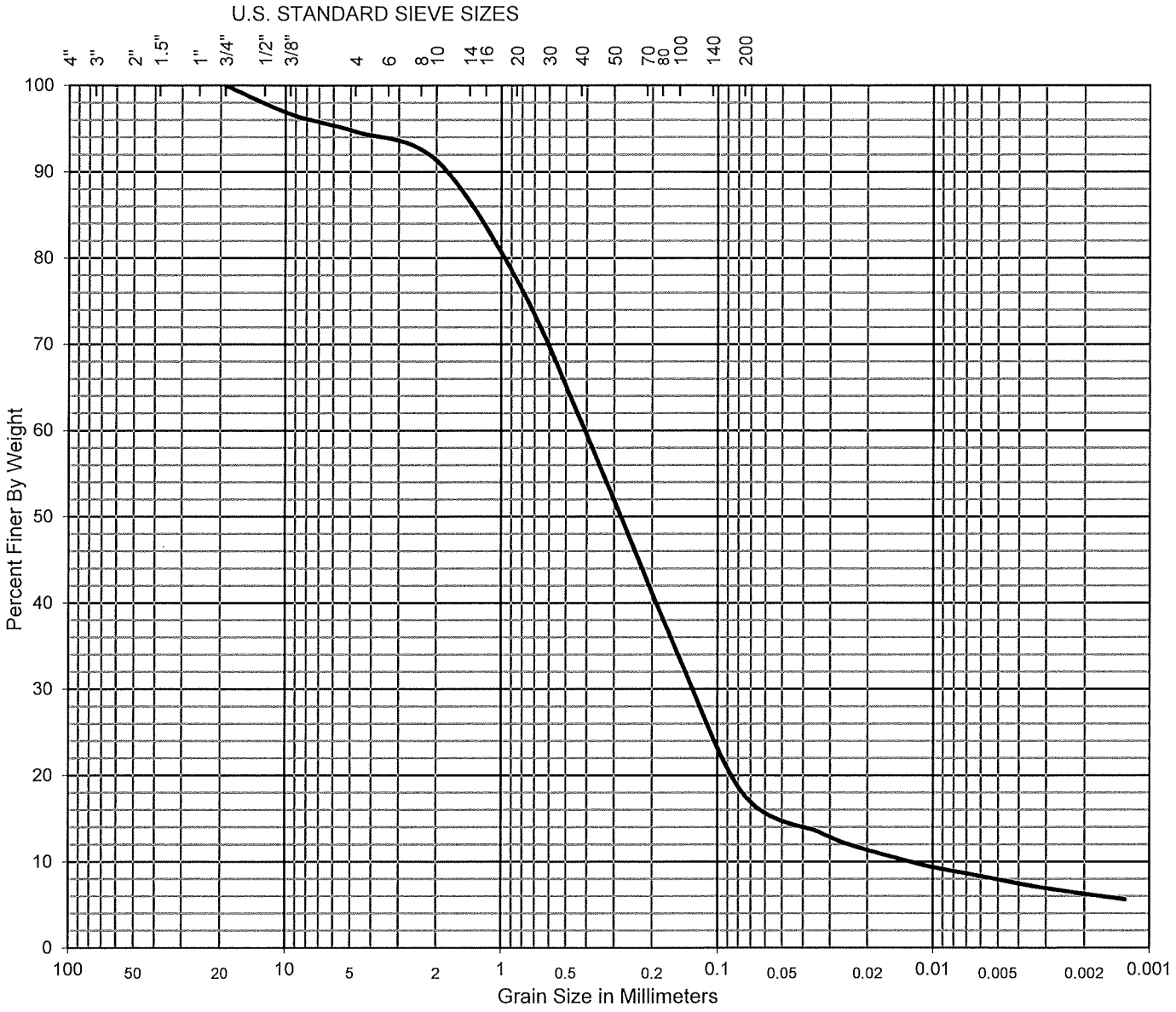
GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-2			**DEPTH (FT)**	10
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	5.3	**Sand (%)**	77.0			**Silt & Clay (%)**	17.7
D_{10} (mm)	-	**D_{30} (mm)**	-	**D_{60} (mm)**	-	**D_{50} (mm)**	-
C_u	-	**C_c**	-			**% Fines (< 75υm)**	17.7

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM)



GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

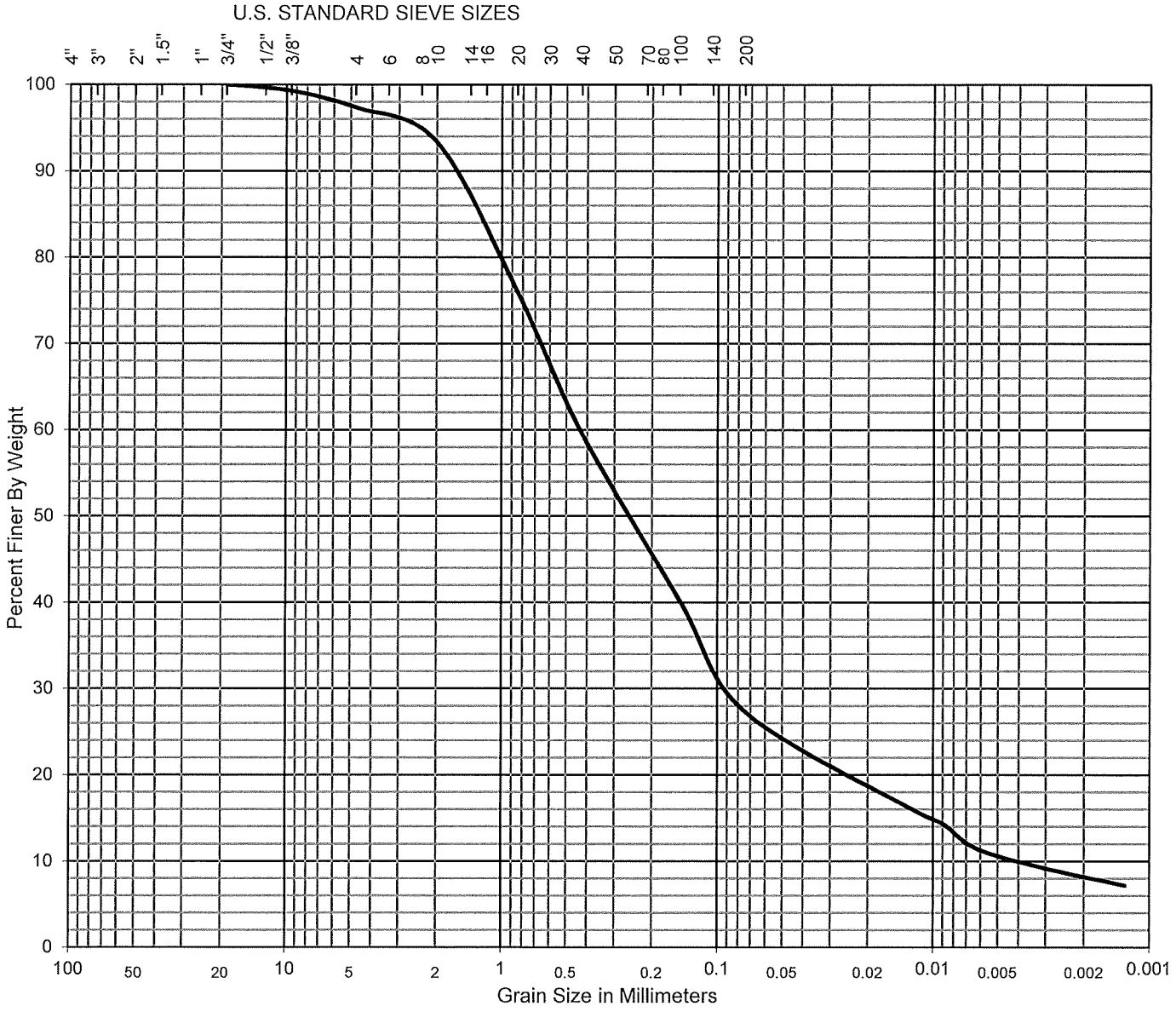
A.G.I. GEOTECHNICAL, INC.

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-3			**DEPTH (FT)**	0-5
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	2.6	**Sand (%)**	70.0			**Silt & Clay (%)**	27.4
D_{10} (mm)	-	**D_{30} (mm)**	-	**D_{60} (mm)**	-	**D_{50} (mm)**	-
C_u	-	**C_c**	-			**% Fines (< 75υm)**	27.4

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM)



GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

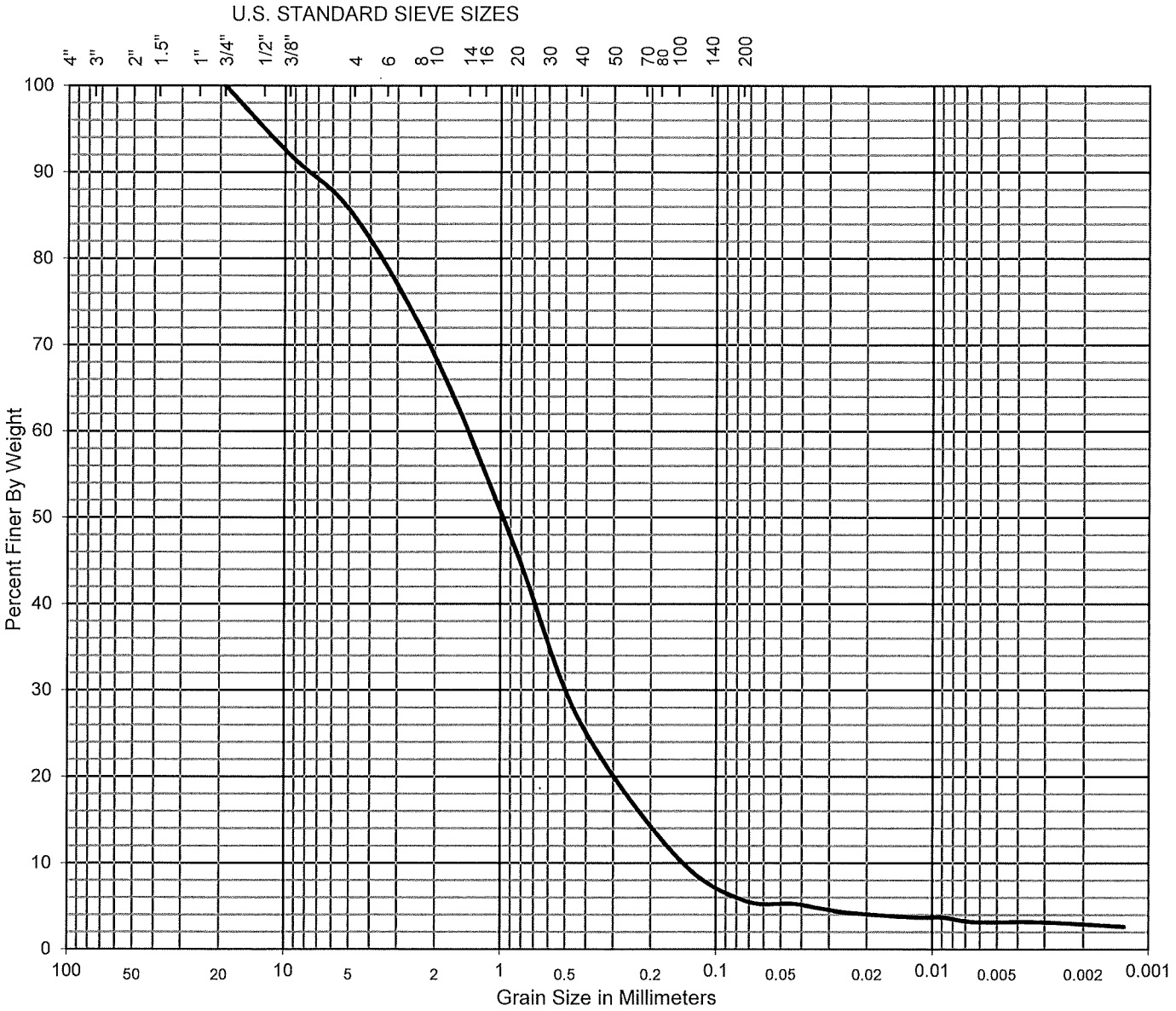
A.G.I. GEOTECHNICAL, INC.

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-3			**DEPTH (FT)**	20
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	15.1	**Sand (%)**	79.2			**Silt & Clay (%)**	5.7
D_{10} (mm)	0.15	**D_{30} (mm)**	0.50	**D_{60} (mm)**	1.50	**D_{50} (mm)**	1.00
C_u	10.00	**C_c**	1.11			**% Fines (< 75υm)**	5.7

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Well-Graded SAND with Silt & Gravel (SW-SM)



GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

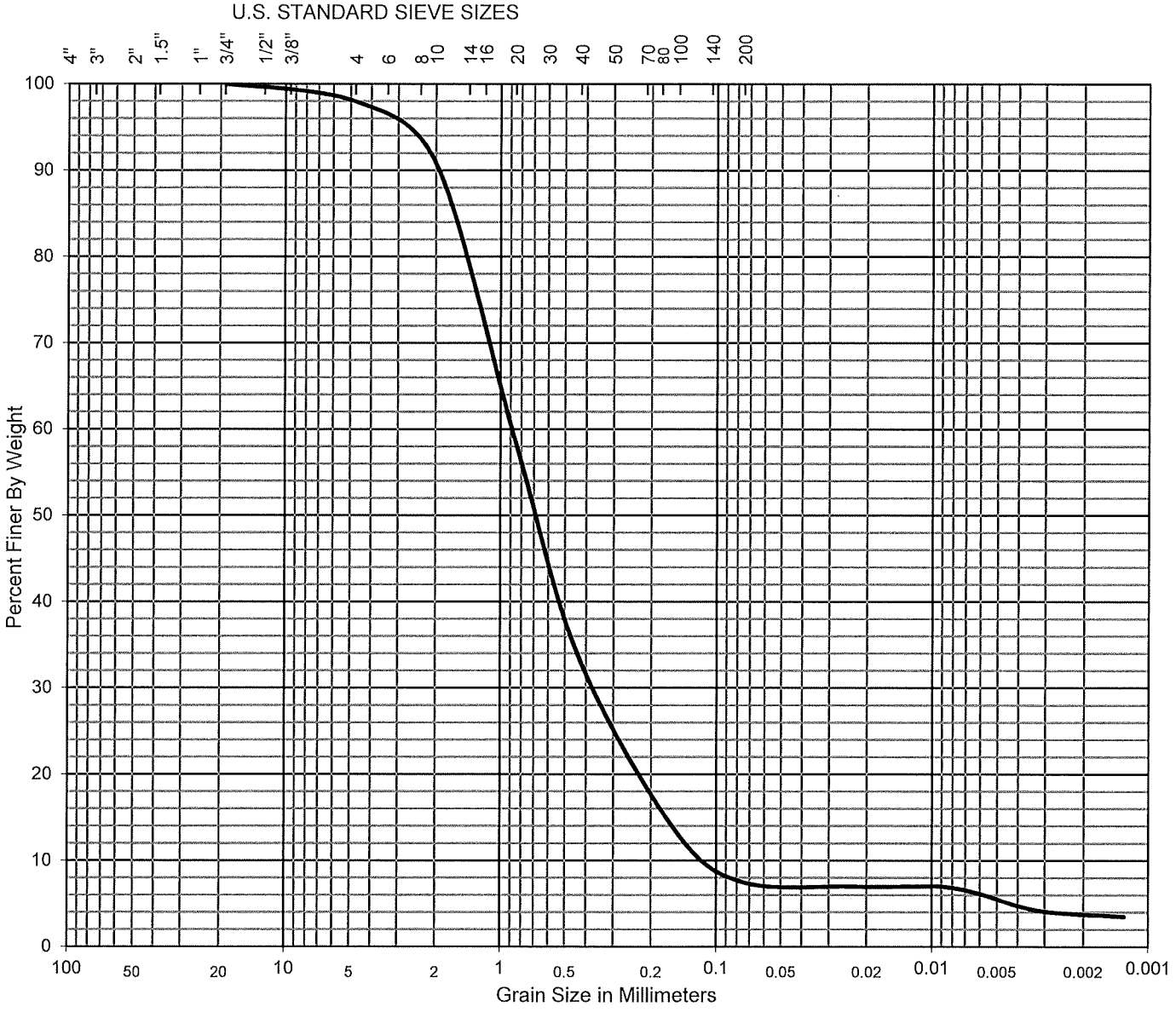
A.G.I. GEOTECHNICAL, INC.

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-4			**DEPTH (FT)**	30
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	2.0	**Sand (%)**	90.5			**Silt & Clay (%)**	7.5
D_{10} (mm)	0.13	**D_{30} (mm)**	0.38	**D_{60} (mm)**	0.90	**D_{50} (mm)**	0.70
C_u	6.92	**C_c**	1.23			**% Fines (< 75υm)**	7.5

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Well-Graded SAND with Silt (SW-SM)



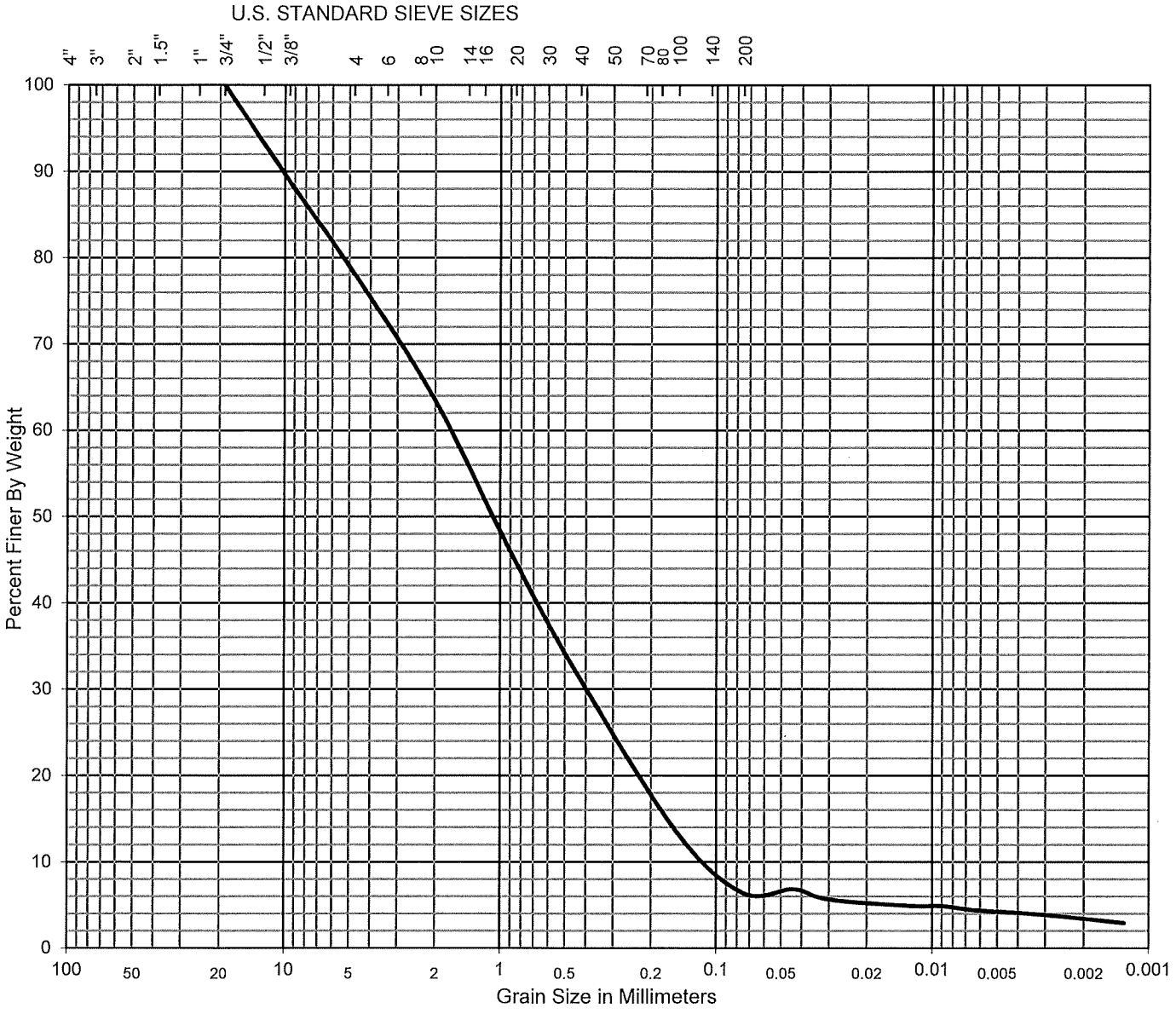
GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-4			**DEPTH (FT)**	40
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	21.8	**Sand (%)**	71.8			**Silt & Clay (%)**	6.4
D_{10} (mm)	0.13	**D_{30} (mm)**	0.40	**D_{60} (mm)**	1.80	**D_{50} (mm)**	1.20
C_u	13.85	**C_c**	0.68			**% Fines (< 75υm)**	6.4

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Poorly-Graded SAND with Silt & Gravel (SP-SM)



GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

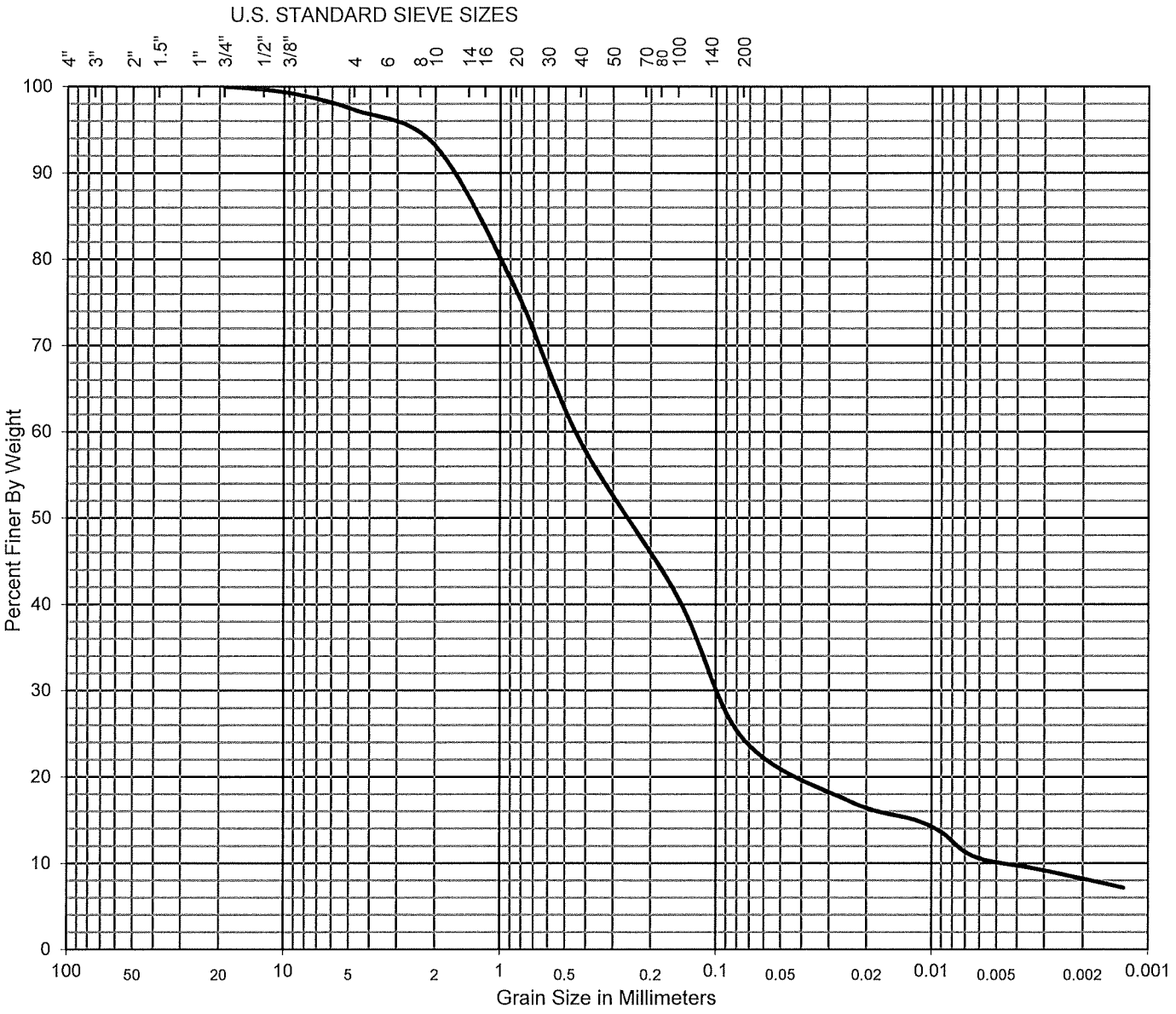
A.G.I. GEOTECHNICAL, INC.

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-5			**DEPTH (FT)**	0-5
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	2.7	**Sand (%)**	72.9			**Silt & Clay (%)**	24.5
D_{10} (mm)	-	**D_{30} (mm)**	-	**D_{60} (mm)**	-	**D_{50} (mm)**	-
C_u	-	**C_c**	-			**% Fines (< 75υm)**	24.5

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM)



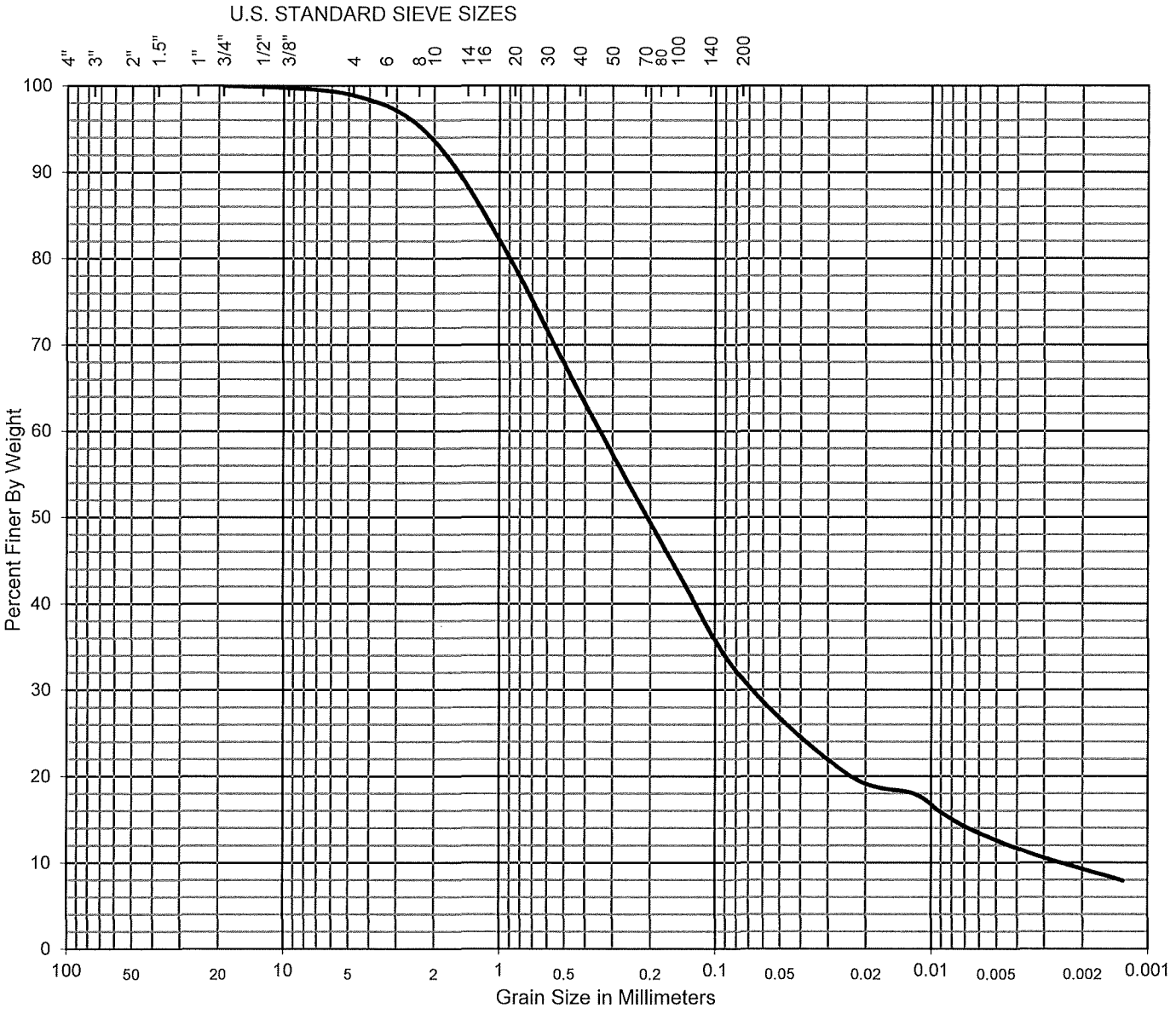
GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

GRAIN SIZE DISTRIBUTION

PROJECT NO.	30-5468-00	**BORING NO.**	B-9			**DEPTH (FT)**	0-5
Liquid Limit (%)	-	**Plastic Limit (%)**	-			**Plasticity Index**	-
Gravel (%)	1.1	**Sand (%)**	67.6			**Silt & Clay (%)**	31.3
D_{10} (mm)	-	**D_{30} (mm)**	-	**D_{60} (mm)**	-	**D_{50} (mm)**	-
C_u	-	**C_c**	-			**% Fines (< 75υm)**	31.3

REPRESENTATIVE FOR Alluvium

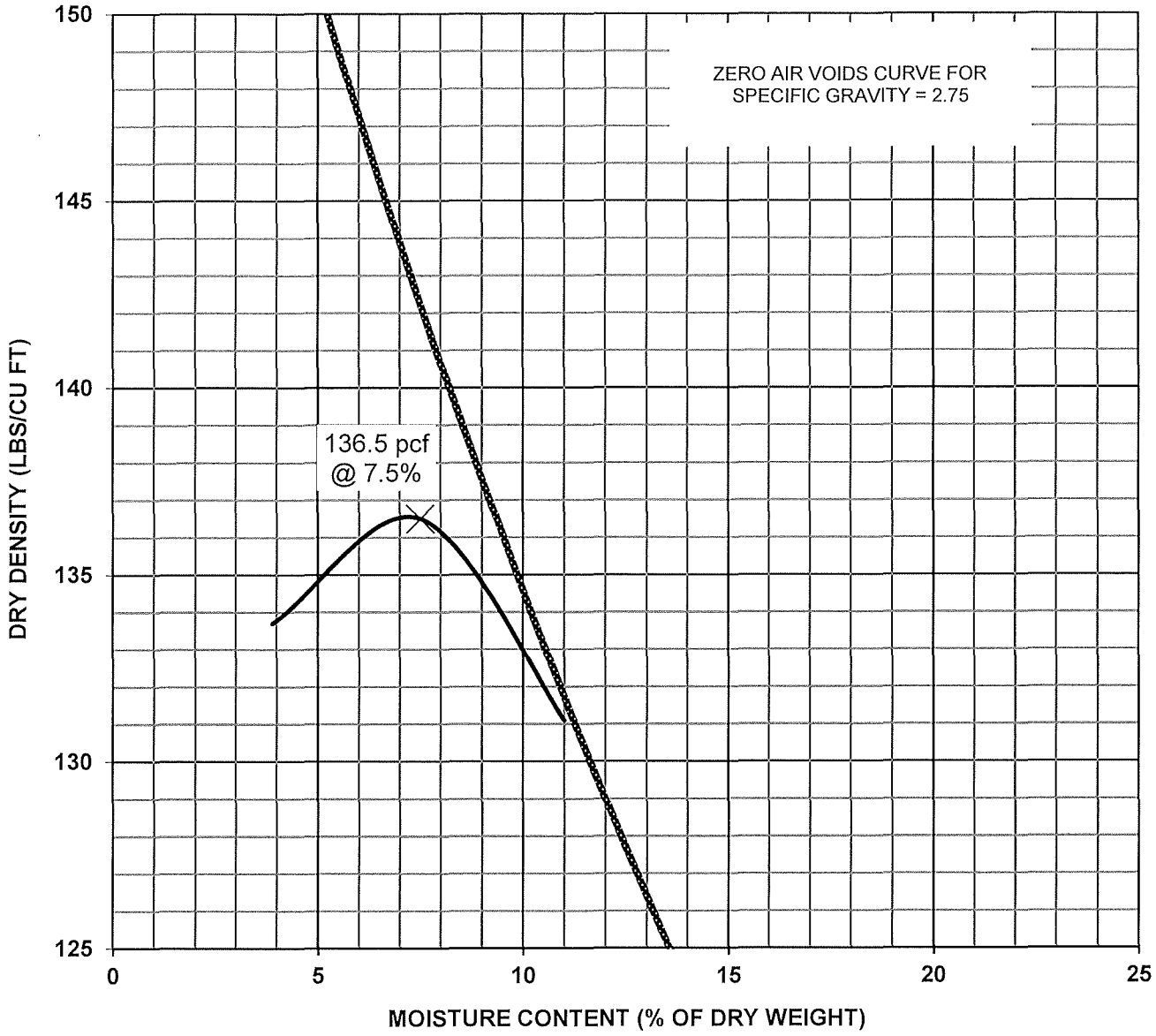
SOIL TYPE AND DESCRIPTION Silty SAND (SM)



GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

A.G.I. GEOTECHNICAL, INC.

MAXIMUM DENSITY CURVE



PROJECT NO. 30-5468-00 **BORING NO.** B-1 **DEPTH (FT)** 0-5

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM), (E.I. = 1, Very Low)

MAXIMUM DRY DENSITY (LBS/CU FT) 136.5

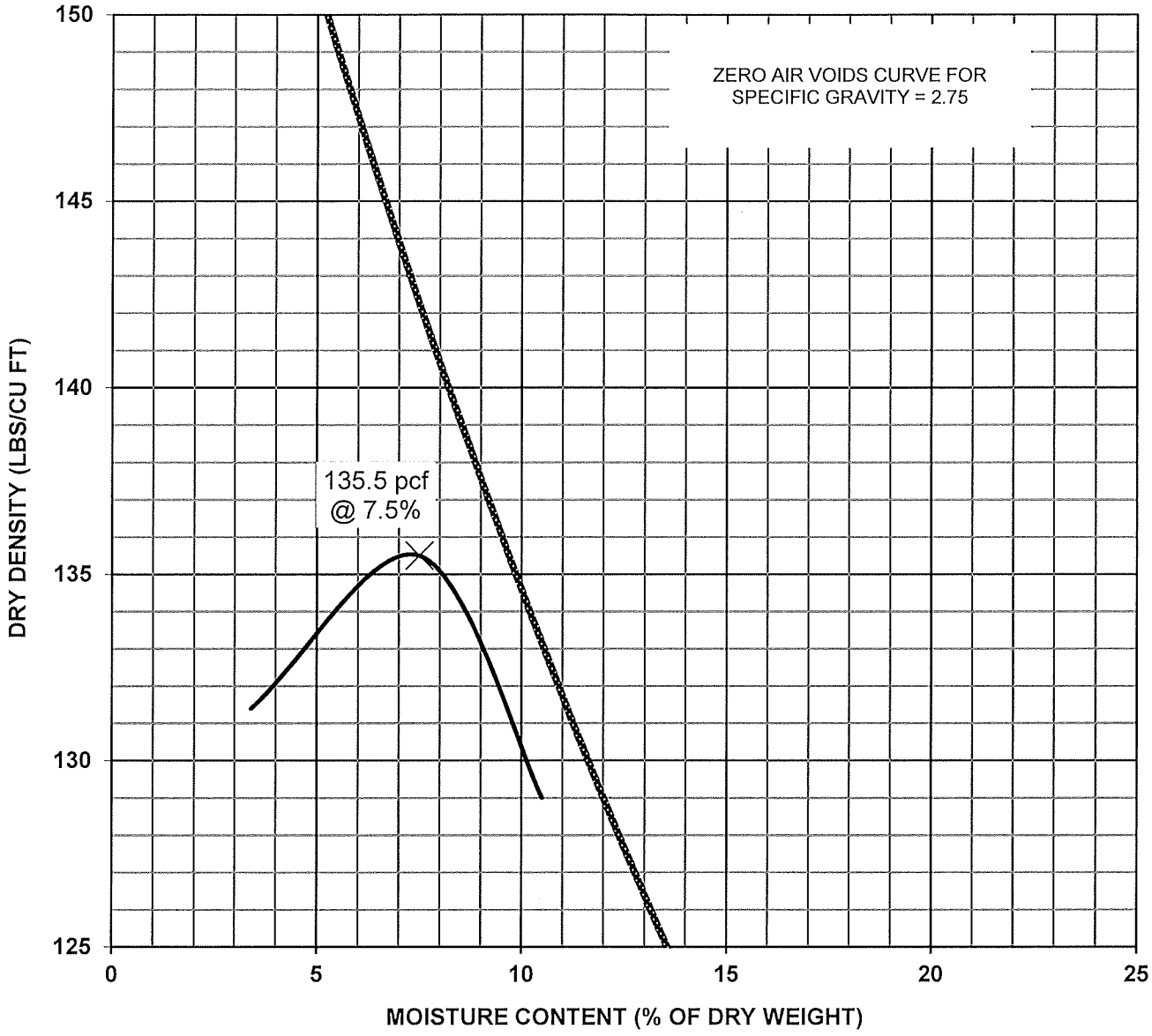
OPTIMUM MOISTURE CONTENT (% OF DRY WEIGHT) 7.5

METHOD OF COMPACTION
ASTM:D-1557

AGI

A.G.I. GEOTECHNICAL, INC.

MAXIMUM DENSITY CURVE



PROJECT NO. 30-5468-00 **BORING NO.** B-3 **DEPTH (FT)** 0-5

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM), (E.I. = 1, Very Low)

MAXIMUM DRY DENSITY (LBS/CU FT) 135.5

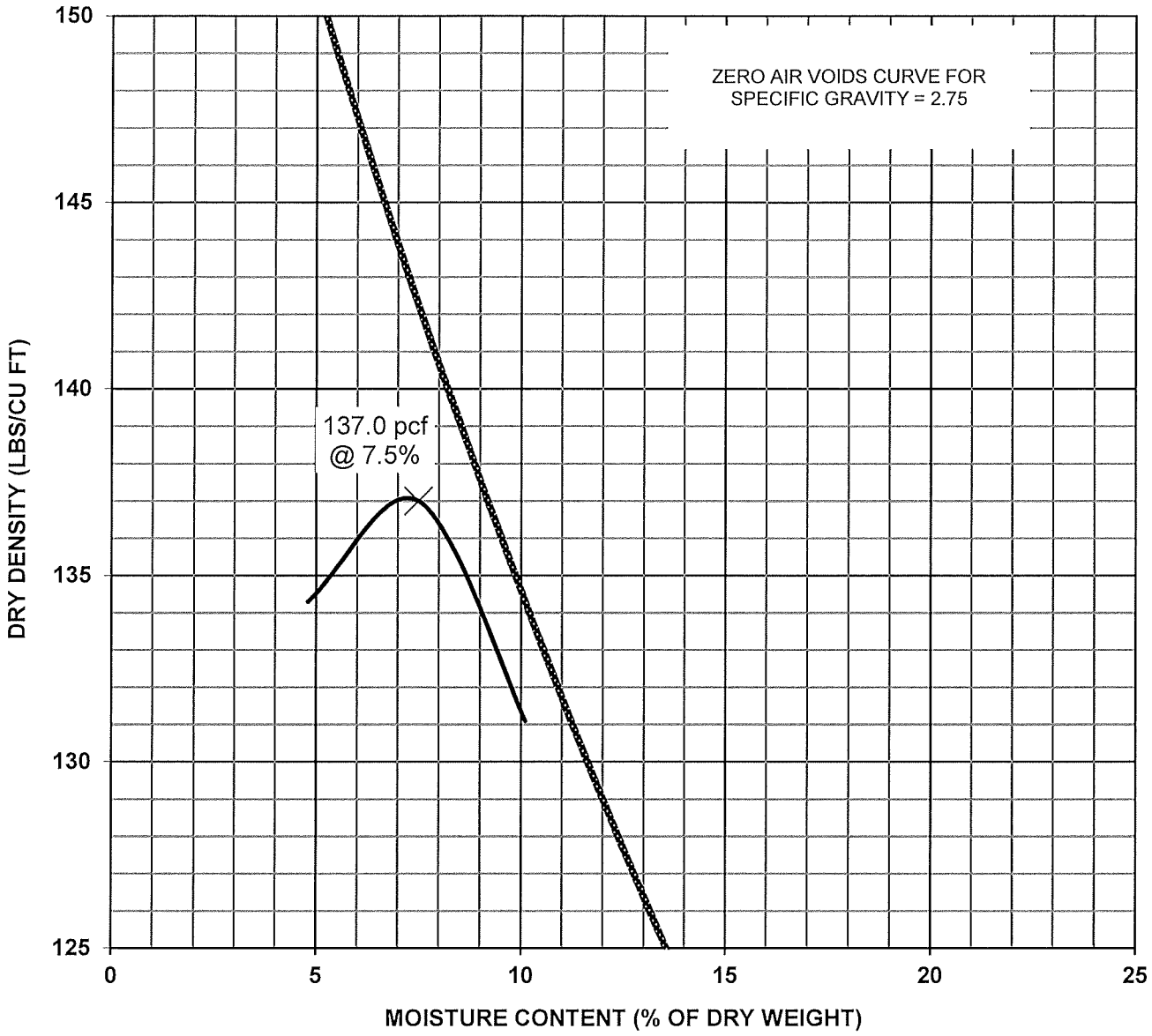
OPTIMUM MOISTURE CONTENT (% OF DRY WEIGHT) 7.5

METHOD OF COMPACTION
ASTM:D-1557

AGI

A.G.I. GEOTECHNICAL, INC.

MAXIMUM DENSITY CURVE



PROJECT NO. 30-5468-00 **BORING NO.** B-5 **DEPTH (FT)** 0-5

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM), (E.I. = 1, Very Low)

MAXIMUM DRY DENSITY (LBS/CU FT) 137.0

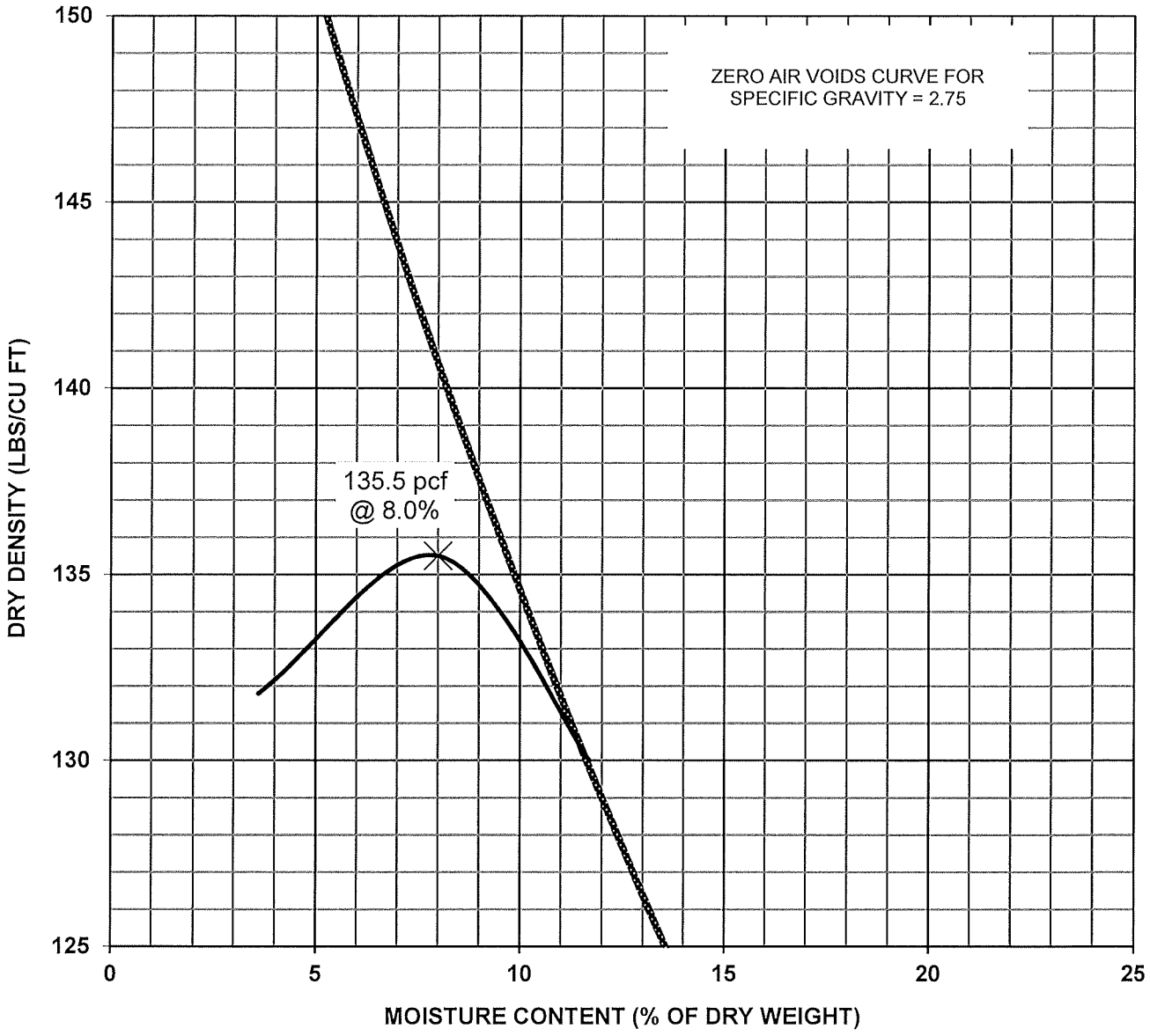
OPTIMUM MOISTURE CONTENT (% OF DRY WEIGHT) 7.5

METHOD OF COMPACTION
ASTM:D-1557

AGI

A.G.I. GEOTECHNICAL, INC.

MAXIMUM DENSITY CURVE



PROJECT NO. 30-5468-00 **BORING NO.** B-9 **DEPTH (FT)** 0-5

REPRESENTATIVE FOR Alluvium

SOIL TYPE AND DESCRIPTION Silty SAND (SM), (E.I. = 2, Very Low)

MAXIMUM DRY DENSITY (LBS/CU FT) 135.5

OPTIMUM MOISTURE CONTENT (% OF DRY WEIGHT) 8.0

METHOD OF COMPACTION
ASTM:D-1557

AGI

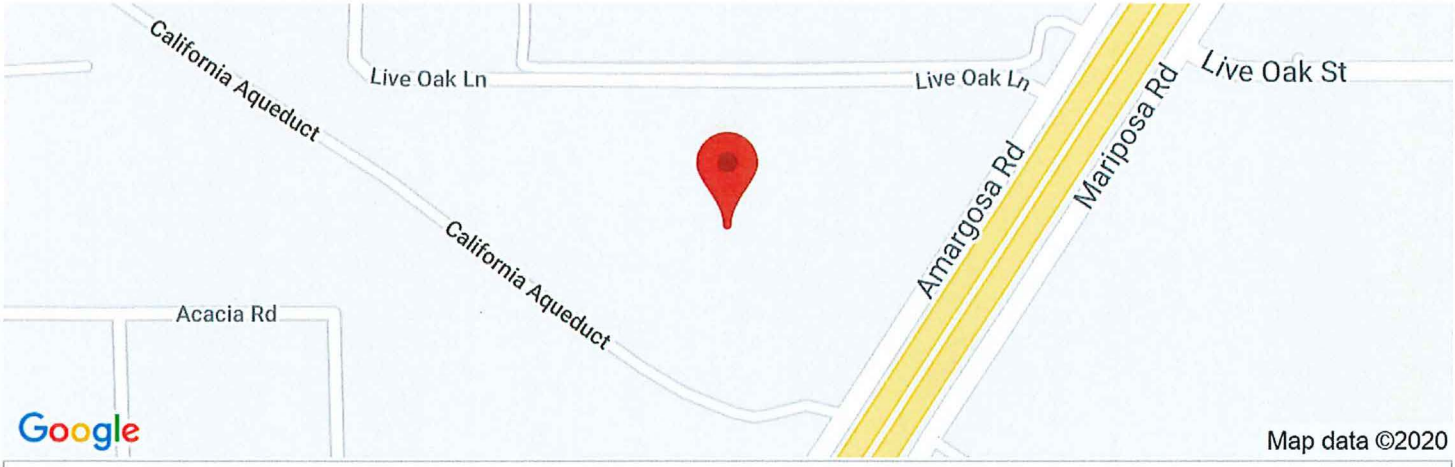
A.G.I. GEOTECHNICAL, INC.

U.S. SEISMIC DESIGN MAPS

A.G.I. GEOTECHNICAL, INC.

Amargosa Rd. & Live Oak Ln., Hesperia

Latitude, Longitude: 34.43279482, -117.37832187



Date	2/25/2020, 12:10:00 PM
Design Code Reference Document	ASCE7-16
Risk Category	III
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.487	MCE_R ground motion. (for 0.2 second period)
S_1	0.577	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.487	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.992	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.55	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	1.487	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.604	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.577	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.637	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.927	Mapped value of the risk coefficient at short periods
C_{R1}	0.906	Mapped value of the risk coefficient at a period of 1 s

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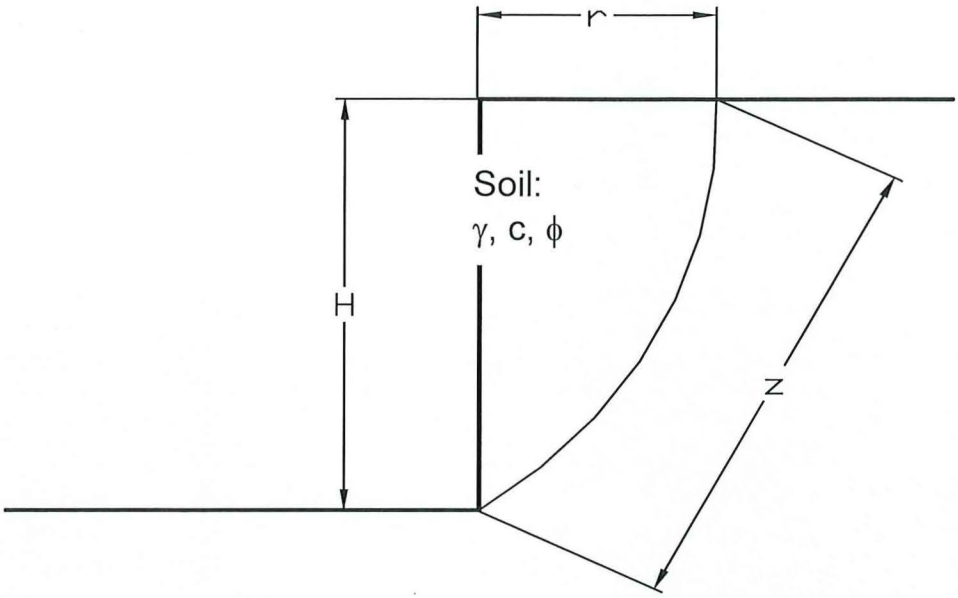
SLOT CUT STABILITY ANALYSIS

A.G.I. GEOTECHNICAL, INC.

SLOT CUT STABILITY ANALYSIS



Description	Value
Unit Weight, γ (pcf)	130.0
Friction, ϕ (deg)	31.0
Cohesion, c (psf)	159.0

Cut Height, H (ft)	5.0
Failure Radius, r (ft)	4.0
Failure Width, B = 2r (ft)	8.0

Volume, $V = \pi r^2 H / 4$ (ft^3)	63
Weight, $W = V\gamma$ (lb)	8,190
Surcharge, Q (lb)	1,000
Weight+Surcharge, W + Q, (lb)	9,190

Surface Area, $A = 0.5236r((r^2+4H^2)^{3/2} - r^3)$ (ft^2)	50
Driving Force, $F_D = WH / (r^2+H^2)^{1/2}$ (lb)	7,176
Normal Force, $F_N = Wr / (r^2+H^2)^{1/2}$ (lb)	5,741
Frictional Resistance, $R_F = F_N \tan\phi$ (lb)	3,450
Cohesive Resistance, $R_C = A\ c$ (lb)	7,950
Total Resistance, $R = R_F + R_C$ (lb)	11,400
Factor of Safety, $FS = R / F_D$	1.59

A.G.I. GEOTECHNICAL, INC.

Project No.: 30-5468-00	Date: 2/24/2020
Calc. By: WFB	
Proj Name: Amargosa Rd. & Live Oak Ln.	