Appendix G

Updated Geotechnical Investigation-Results of Percolation Testing

November 15, 2018

Lake Creek Industrial
17551 Norwood Street
Tustin, California 92780

Attention: Mr. Michael Johnson
Principal

Project No.: **18G218-3**

Subject: **Results of Percolation Testing**
Proposed Alder Logistics Center
10336 Alder Avenue
San Bernardino County, California

Reference: Updated Geotechnical Investigation, Proposed Alder Logistics Center, 10336 Alder Avenue, San Bernardino County, California, prepared by Southern California Geotechnical, Inc. (SCG), for Lake Creek Industrial, SCG Project No. 18G218-1, dated November 15, 2018.

Dear Mr. Johnson:

In accordance with your request, we have conducted percolation testing at the subject site. We are pleased to present this report summarizing the results of the percolation testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 18P444 dated November 2, 2018. The scope of services included a visual site reconnaissance and the review of the previously prepared percolation report to determine the infiltration rates of the on-site soils. The percolation testing was performed in accordance with the San Bernardino County Department of Environmental Health Services standards, Soil Percolation (PERC) Test Report Standards: Suitability of Lots and Soils for Use of Leachlines or Seepage Pits, published by the San Bernardino County Department of Environmental Health Services, revised June 2017.

Site and Project Description

The site is located on the west side of Alder Avenue, 600± feet north of Slover Avenue, at the address of 10336 Alder Avenue in an unincorporated area within San Bernardino County, California. The site is bounded to the north by a Southern Pacific Railroad easement, to the west by a railroad yard, to the south by a steel facility and to the east by Alder Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The subject site consists of an assemblage of five parcels which total 8.50± acres. The site is currently developed as the Gene Belk Fruit Packers and Briners facility. This facility includes a metal-frame building located in the northeastern corner of the site. This building is approximately 10,000 square feet and is of metal-frame construction with sheet-metal siding, presumably

supported on a shallow foundation system with a concrete slab-on-grade floor. This building is currently being utilized for produce processing. The existing facility also includes numerous smaller structures and brine tanks throughout the site as well as a single-story single-family residence of wood-frame construction presumably supported on a shallow foundation system with a concrete slab-on-grade floor. Groundcover generally consists of heavily weathered asphaltic concrete pavements with isolated areas of exposed soil and aggregate base, and Portland cement concrete pavements surrounding the brine tanks.

It should be noted that the current owner of the property has provided the approximate locations of existing underground improvements. The existing underground improvements include, but are not limited to, a 10,000-gallon rain storage tank located in the southern region of the site, and two (2) septic systems in the western and eastern regions. The underground improvements presumably extend to a depth of 12± feet below the existing site grades. In addition, each septic system includes a 40±-foot deep 4±-foot diameter seepage pit. The existing underground improvements are depicted on Plate 2 in Appendix A of this report.

Topographic information was obtained from a conceptual grading plan prepared by SB&O, Inc., the project civil engineer. Based on our review of this plan, the existing site topography generally slopes downward to the south to southeast at a gradient of 1 to 2 percent. The elevation at the subject site ranges from 1100± feet mean sea level (msl) at the northwest corner of the site to 1088± feet msl in the southeast corner of the site. There is approximately 12 feet of elevation differential across on subject site.

Proposed Development

The site plan provided to our office by the client indicates that the new development will consist of a 172,780± ft^2 commercial/industrial building located in the northcentral region of the site. The new building will include a 2,000± ft^2 mezzanine. The new building will be constructed with dock-high doors along the southern building wall. The building is expected to be surrounded by asphaltic concrete pavements in the parking and drive lane areas, Portland cement concrete pavements in the loading dock areas, and concrete flatwork and landscaped planters located throughout the site.

We understand that the proposed development will utilize on-site disposal for septic waste water. Based on conversations with SB&O, Inc., and the conceptual precise grading plan provided, a new septic system will be constructed in the southeastern area of the subject site. The new septic system will consist of one (1) sewer septic tank and six (6) sewer seepage pits. The depth of the proposed septic system was not known at the time of this report. The seepage pits are expected to extend to depths of 20 to 25± feet below the existing site grades and the bottom of the sewer septic tank would be approximately 5 feet below the existing site grades.

Previous Study

SCG previously performed a geotechnical investigation at the subject site, which is referenced above. As part of this investigation, six (6) borings were advanced to depths of 5 to 20± feet below the existing site grades. Asphaltic concrete pavements were encountered at the ground surface at most of the boring locations. The pavements consist of 2± inches of asphaltic concrete

with no underlying layer of aggregate base. However, one of the borings was drilled in an area covered with 6± inches of aggregate base at the ground surface. Artificial fill soils were encountered below the pavements and/or aggregate base at all of the boring locations. The fill soils extend to depths of 1½ to 4½± feet below the existing site grades. The fill soils generally consisted of loose to medium dense silty fine sands and medium to coarse sands, with varying fine to coarse gravel content and occasional cobbles. Native alluvial soils were encountered below the fill soils at all of the boring locations, extending to at least the maximum depth explored of 20± feet below the existing site grades. The alluvial soils generally consisted of medium dense to very dense silty fine to medium sands, gravelly fine to coarse sands, fine to coarse sandy gravel, and fine sandy silts, with occasional cobbles. Free water was not encountered during the drilling of any of the borings.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the percolation testing phase of this project consisted of two (2) percolation test borings and one (1) exploratory boring. The borings for this project were drilled on May 29, 2018. The percolation test borings were advanced to depths of 20 and 25± feet below the existing site grades, while the exploratory boring was advanced to a depth of 65± feet (at least 40± feet below the bottom of the percolation test borings) below the existing site grades in the proposed sewage disposal system areas. These borings were logged during drilling by a member of our staff. All of the borings were advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers. The approximate locations of the percolation test borings (identified as P-1 and P-2) and exploratory boring (identified as B-7) are indicated on the Boring and Percolation Test Location Plan, enclosed as Plate 2 of this report.

Upon completion of the drilling of the percolation test borings, the bottoms of the percolation test holes were covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into the test holes so that the perforated PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the perforated PVC casing.

Geotechnical Conditions

Asphaltic concrete pavements were encountered at the ground surface at all three (3) of the boring locations. The pavements consist of 3± inches of asphaltic concrete with 2 to 4± inches of underlying aggregate base. Artificial fill soils were encountered below the pavements at Percolation Borings P-1 and P-2, extending to a depth of 17± feet below the existing site grades. The fill soils generally consist of medium dense to very dense fine to coarse sands with varying silt and gravel content. The fill soils possess a disturbed, mottled, appearance, resulting in their classification as artificial fill. In addition, the fill soils possess a strong organic odor. Based on historical aerial photographs obtained from the internet and communications with the current property owner, it is expected that the existing fill soils encountered at the two (2) percolation boring locations are backfill materials utilized to fill a previous detention basin or the existing 10,000-gallon rain storage tank. Native alluvial soils were encountered below the fill soils or below the existing pavements at all three of the boring locations, extending to at least the maximum depth explored of 65± feet below the existing site grades. The alluvial soils generally consist of

medium dense to very dense silty fine sands, fine sandy silts and gravelly fine to coarse sands. Groundwater was not encountered during drilling of any of the percolation test borings or the exploratory boring. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table was considered to have existed at a depth in excess of 65± feet at the time of this investigation.

Laboratory Testing

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Moisture Content

The moisture contents for the recovered soil samples within the borings were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution has been determined on selected soil samples recovered from the percolation borings. The grain size distribution has been performed using a range of wire mesh screens in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-12 of this report.

Percolation Testing

We understand that the results of the testing will be used to prepare a preliminary design for the proposed on-site sewage disposal system. As previously stated, the percolation testing was performed in general accordance with the On-site Waste Water Disposal System, Soil Percolation (Perc) Test Report Standards: Suitability of Lots and Soils for Use of Leach lines or Seepage Pits, published by the San Bernardino County Department of Environmental Health Services. As required, a Percolation Test Notification of our field testing was submitted in person to the County of San Bernardino, Environmental Health Services division on May 23, 2018. No personnel representing San Bernardino County were present during the percolation testing.

Pre-saturation

The first phase of percolation testing consisted of pre-saturating the percolation test holes. After drilling was completed, a PVC pipe and gravel were installed in each boring, as discussed in a previous section of this report. The borings were pre-saturated by filling the plastic pipe with clean water. After the water percolated into the surrounding soils, the borings were refilled with clean water. In accordance with the San Bernardino County guidelines for gravel packed holes, since at least half of the wetted depth did not percolate from the percolation test borings in 30

minutes or less for at least four (4) consecutive fillings, the percolation testing was conducted the day following the pre-saturation procedure.

Percolation Testing

SCG subsequently performed the percolation testing the following day on May 30, 2018. According to the San Bernardino County guidelines for soils with fines, it was determined that the percolation testing should consist of at least twelve (12) consecutive 30-minute intervals. During the percolation testing phase, from a fixed reference point, the drop-in water level was measured over a 30-minute period for five (5) hours for both of the percolation test borings (P-1 and P-2). After each time interval was recorded, the test holes were refilled to their initial water height even with the ground surface. During the final (sixth) hour of testing, readings were taken again at every 30 minutes, without refilling. The depths of the percolation test borings were measured after each reading to ensure that caving did not occur. These water level readings are presented on the spreadsheets enclosed with this report. The percolation rate for each of the time intervals is also tabulated on the spreadsheets.

Percolation Results

The procedure used to calculate the percolation rates accounts for the porosity of the gravel which was used to backfill the borings. This material was tested in our laboratory and determined to possess a porosity of approximately 0.4.

Percolation rates are tabulated in gallons per square feet per day. In accordance with San Bernardino County guidelines, it is recommended that the most conservative reading from the latter part of the percolation test be used for design. These rates are summarized below:

Percolation Test Location	Boring Depth (Feet)	Percolation Rate (Q) Gal/ft²/d	San Bernardino County Minimum/Maximum Percolation Rates (Q)
P-1	25	2.4	Minimum = 1.1
P-2	20	1.6	Maximum = 4.0

Historic Groundwater Research

We have researched historic groundwater levels near the subject site. One of the sources which possessed information deemed relevant to the subject site was the State of California Department of Water Resources website. Historic high-water levels from nearby wells included in the report have been presented in the table below.

State Well ID	Approximate Distance from Subject Site	Historic High Water Level bgs (feet)	Available Data Range (years)
340661N1174301W001	0.6 miles (W)	268	1989 to 2017
340672N1173979W001	1.2 miles (E)	240	1956 to 2000
340556N1174454W001	1.7 miles (SW)	225	1912 to 2008

Based on the well data provided above, and our exploratory borings, the ground water at the subject site is estimated to be at least 225± feet below the existing ground surface.

Design Considerations

Based on the soil percolation testing, the percolation rates at the test locations are 1.6 and 2.4 gallons per square foot per day (gal/ft²/d). The San Bernardino County guidelines state that the design flow rate (Q) for seepage pits must be at least 1.1 gal/ft²/d and no greater than 4.0 gal/ft²/d**. Therefore, we recommend that a design percolation rate of 1.6 gal/ft²/d be used for the seepage pits per San Bernardino County guidelines**.

The design of the on-site sewage disposal system should be performed by the project civil engineer. It should be noted that the recommended percolation rate is based on percolation testing at two (2) discrete locations, and the overall percolation rates of the septic system could vary. However, based on the uniformity of the soil at the percolation test boring locations, the percolation rate is not expected to vary significantly. We also recommend that a copy of the DEHS septic system handout "*Taking Care of Your Septic System"* be obtained by the owner/developer and that the recommendations contained in that handout be applied throughout the life of the proposed system.

Abandonment of Percolation Test Borings

We recommend that the percolation test borings be abandoned during construction in the following manner: The upper 5 feet of the boring should be over-drilled to remove the gravel from the boring and the PVC drain pipe should be removed from the upper 5 feet of the boring. The excavation should then be filled with lean concrete slurry. We further recommend that any local well abandonment standards or procedures be observed.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

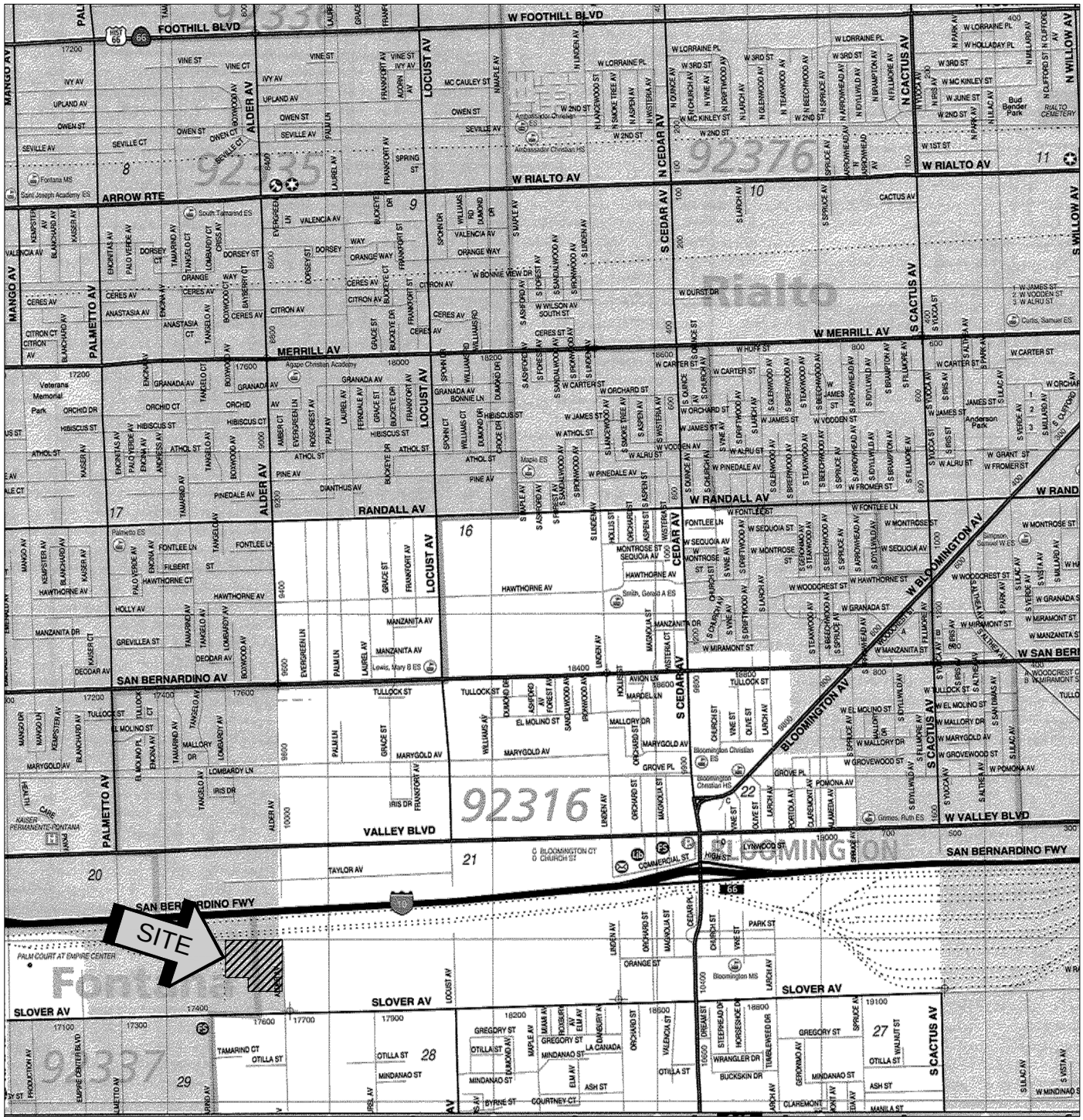
Joseph Lozano Leon
Staff Engineer

Gregory K. Mitchell, GE 2364
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
GREGORY K. MITCHELL
No. 2364
GEOTECHNICAL
STATE OF CALIFORNIA

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 – Boring and Percolation Test Location Plan
Boring Log Legend and Boring Logs (6 pages)
Percolation Test Results Spreadsheets (4 pages)
Grain Size Distribution Graphs (12 pages)



SOURCE: SAN BERNARDINO COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

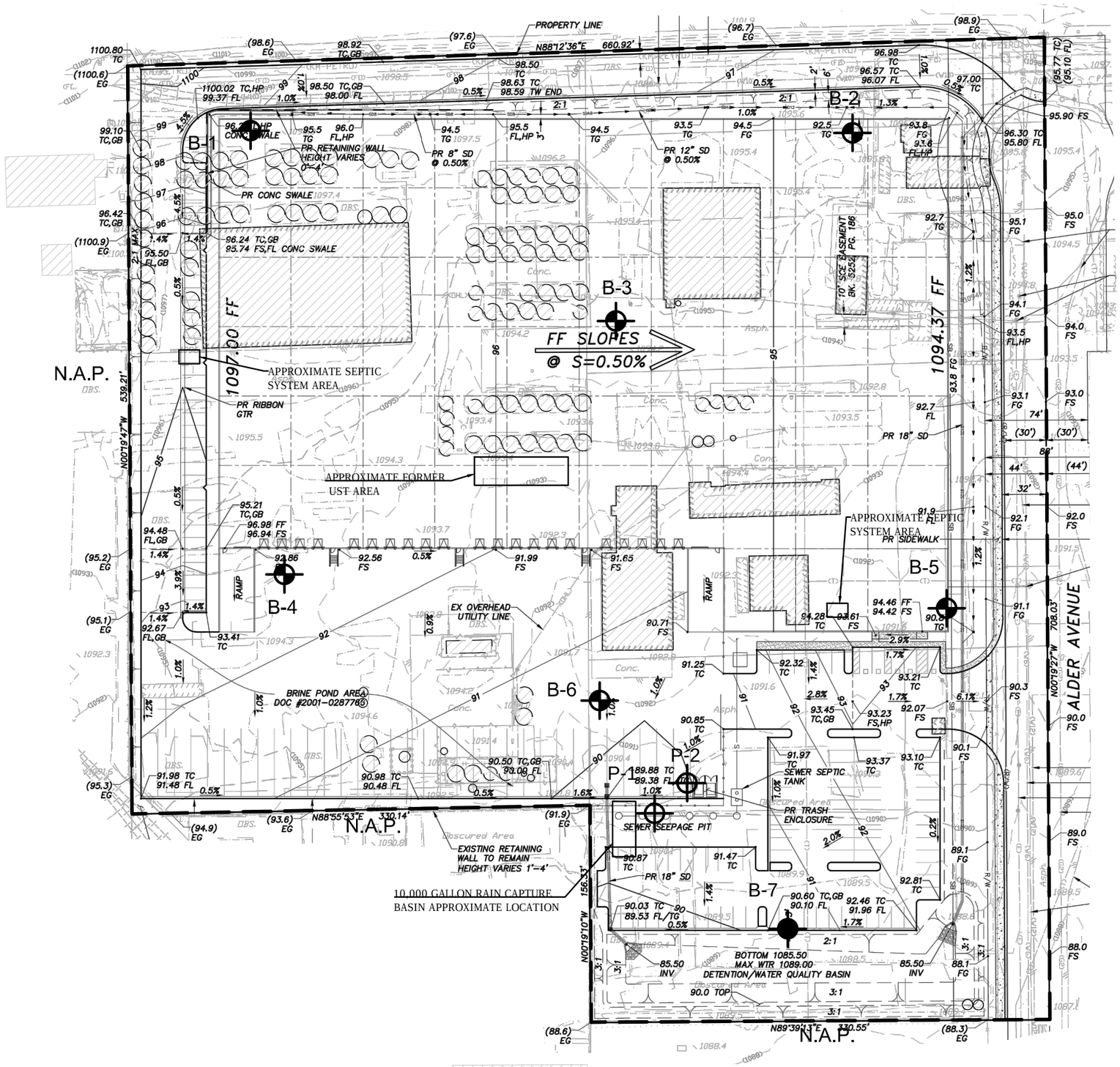
PROPOSED ALDER LOGISTICS CENTER

SAN BERNARDINO COUNTY, CALIFORNIA

SCALE: 1" = 2400'	
DRAWN: JLL CHKD: GKM	
SCG PROJECT 18G218-3	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

- APPROXIMATE PERCOLATION TEST LOCATION FROM PREVIOUS STUDY (SCG PROJECT NO. 18G112-4)
- APPROXIMATE BORING LOCATION FROM PREVIOUS STUDY (SCG PROJECT NO. 18G112-4)
- APPROXIMATE BORING LOCATION FROM PREVIOUS STUDY (SCG PROJECT NO. 18G112-1)
- EXISTING BUILDINGS AND BRINE TANKS TO BE DEMOLISHED

NOTE: SITE PLAN PREPARED BY SB&O, INC.

BORING AND PERCOLATION TEST LOCATION PLAN

PROPOSED ALDER LOGISTICS CENTER

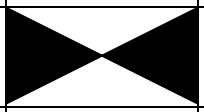
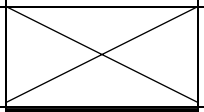
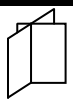
SAN BERNARDINO COUNTY, CALIFORNIA

SCALE: 1" = 80'	
DRAWN: JLL CHKD: GKM	
SCG PROJECT 18G218-3	
PLATE 2	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

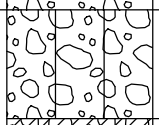
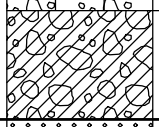
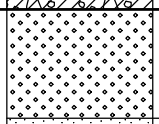
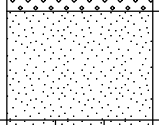
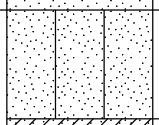
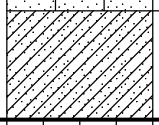
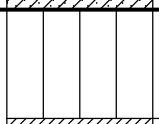
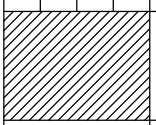
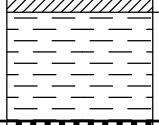
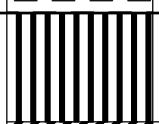
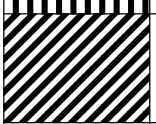
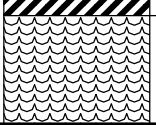
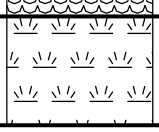
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. P-1

JOB NO.: 18G112-4 | DRILLING DATE: 5/29/18 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 1090 feet
LOCATION: San Bernardino County, California | LOGGED BY: Joseph Lozano Leon | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic concrete, 4± inches Aggregate base							
		45			FILL: Gray Brown fine to coarse Sand, trace to little Silt, trace fine Gravel, mottled, dense-dry to damp		3					
		44					2			7		
5					FILL: Red Brown fine to coarse Sand, little fine Gravel, little Silt, very dense-dry to damp		2			9		
		57			FILL: Gray Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel, some Iron oxide staining, very dense-moist		9			29		
		57			FILL: Gray Brown Gravelly fine to coarse Sand, little Silt, trace Iron oxide staining, very dense-damp		3			9		
10												
					FILL: Dark Gray to Black fine to coarse Sand, little Silt, little fine Gravel, dense-damp to moist							
		45					7			12		
15												
					ALLUVIUM: Gray fine to medium Sand, strong Organic odor, dense-damp							
		31					4			10		
20												
					Dark Green to Gray fine Sandy Silt, trace medium Sand, strong Organic odor, medium dense-moist							
		23					13			72		
25					Boring Terminated at 25'							

TBL 18G112-4.GPJ SOCALGEO.GDT 6/13/18

TEST BORING LOG **PLATE P-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. P-2

JOB NO.: 18G112-4 | DRILLING DATE: 5/29/18 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 1090.5 feet
LOCATION: San Bernardino County, California | LOGGED BY: Joseph Lozano Leon | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic concrete, 2± inches Aggregate base							
		13			FILL: Gray Silty fine Sand, trace medium to coarse Sand, medium dense-damp to moist		7					
		48			FILL: Light Gray Silty fine to coarse Sand, little fine Gravel, dense-dry to damp		2			13		
5		62			FILL: Light Brown to Brown Gravelly fine to coarse Sand, little Silt, very dense-dry to damp		2			10		
		18			FILL: Dark Gray to Black Silty fine to coarse Sand, little fine Gravel, strong Organic odor, medium dense-damp		6			25		
10												
		56			FILL: Black Gravelly fine to coarse Sand, little Silt, strong Organic odor, trace Iron oxide staining, very dense-damp		5			9		
15												
		32			ALLUVIUM: Gray Silty fine to medium Sand, trace coarse Sand, dense-damp to moist		7			27		
20					Boring Terminated at 20'							

TBL 18G112-4.GPJ SOCALGEO.GDT 6/13/18

TEST BORING LOG **PLATE P-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-7

JOB NO.: 18G112-4 | DRILLING DATE: 5/29/18 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 45 feet
LOCATION: San Bernardino County, California | LOGGED BY: Joseph Lozano Leon | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1089 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic concrete, 4± inches Aggregate base							
					ALLUVIUM: Light Gray Brown to Gray Brown fine to medium Sand, trace to little fine to coarse Gravel, little Silt, trace coarse Sand, dense-dry to damp							
5		37					2					
					Light Brown to Brown Gravelly fine to coarse Sand, little Silt, dense to very dense-damp							
10		45					3					
		86/8"					4					
15												
					Light Gray Brown fine to medium Sand, trace to little Silt, trace fine Gravel, dense-damp							
		32					4					
20												
					Gray Brown Silty fine Sand to fine Sandy Silt, medium dense-damp							
		27					6					
25												
					Gray Brown Gravelly fine to coarse Sand, trace to little Silt, very dense-dry to damp							
		54					2					
30												
		27					4					
					Brown Silty fine Sand to fine Sandy Silt, medium dense-moist		9					

TBL 18G112-4A.GPJ SOCALGEO.GDT 6/13/18

TEST BORING LOG

PLATE B-3a

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-7

JOB NO.: 18G112-4 | DRILLING DATE: 5/29/18 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 45 feet
LOCATION: San Bernardino County, California | LOGGED BY: Joseph Lozano Leon | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Brown Silty fine Sand to fine Sandy Silt, medium dense-moist							
		26					9					
40					Brown fine Sandy Silt, little Iron oxide staining, medium dense-very moist		18					
					Gray Brown Gravelly fine to medium Sand, little Silt, dense-damp							
		35					5					
45												
					Brown to Dark Brown fine Sandy Silt, little Iron oxide staining, very dense-moist							
		54					5					
50												
					Gray Gravelly fine to medium Sand, trace coarse Sand, little Silt, dense-moist to very moist							
		36					15					
55												
					Brown Silty fine Sand, some Iron oxide staining, dense-moist							
		41					10					
					Gray Brown fine to medium Sand, trace to little Silt, dense-damp		4					
60												
					Brown Silty fine Sand, trace medium to coarse Sand, trace fine Gravel, very dense-damp							
		63					5					
65												
					Boring Terminated at 65'							

TBL 18G112-4A.GPJ SOCALGEO.GDT 6/13/18

TEST BORING LOG **PLATE B-3b**

PERCOLATION CALCULATIONS - PRESATURATION

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	18G112-4
Engineer	Scott McCann

Borehole Diameter	8	(in)
Borehole Depth	25.2	(ft)
Perforated Pipe Diameter	3	(in)
Porosity of Gravel Backfill	0.4	

Percolation Boring No.	P-1

Interval Number		Time	Time Interval (hrs)	Water Depth (ft)	Change in Water Level (ft)	Did Seepage Exceed 1/2 Wetted Depth?	Overnight Pre-Saturation Required?
1	Initial	1:00 PM	0.5000	0	12.8	YES	NO
	Final	1:30 PM		12.8			
2	Initial	1:30 PM	0.5000	0	12.63	YES	NO
	Final	2:00 PM		12.63			
3	Initial	2:00 PM	0.5000	0	12.52	NO	YES
	Final	2:30 PM		12.52			
4	Initial	-	0.0000	0	0	0	YES
	Final	-		0			

PERCOLATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	18G112-4
Engineer	Scott McCann

Borehole Diameter	8	(in)
Borehole Depth	25.2	(ft)
Perforated Pipe Diameter	3	(in)
Porosity of Gravel Backfill	0.4	

Percolation Boring No. P-1

Interval Number		Time	Time Interval (hrs)	Water Depth (ft)	Change in Water Level (ft)	Average Length of Water Column (ft)	Percolation Rate Q (gal/ft^2/day)	Percolation Rate Adjusted for Gravel Porosity Q (gal/ft^2/day)
1	Initial	8:00 AM	0.5000	0	12.64	18.88	8.03	3.89
	Final	8:30 AM		12.64				
2	Initial	8:30 AM	0.5000	0	12.45	18.975	7.87	3.81
	Final	9:00 AM		12.45				
3	Initial	9:00 AM	0.5000	0	12.27	19.065	7.72	3.74
	Final	9:30 AM		12.27				
4	Initial	9:30 AM	0.5000	0	12.07	19.165	7.56	3.66
	Final	10:00 AM		12.07				
5	Initial	10:00 AM	0.5000	0	11.88	19.26	7.40	3.59
	Final	10:30 AM		11.88				
6	Initial	10:30 AM	0.5000	0	11.65	19.375	7.22	3.50
	Final	11:00 AM		11.65				
7	Initial	11:00 AM	0.5000	0	11.04	19.68	6.73	3.26
	Final	11:30 AM		11.04				
8	Initial	11:30 AM	0.5000	0	10.81	19.795	6.55	3.17
	Final	12:00 PM		10.81				
9	Initial	12:00 PM	0.5000	0	10.79	19.805	6.54	3.17
	Final	12:30 PM		10.79				
10	Initial	12:30 PM	0.5000	0	10.8	19.8	6.55	3.17
	Final	1:00 PM		10.8				
11	Initial	1:00 PM	0.5000	4	7.22	17.59	4.93	2.39
	Final	1:30 PM		11.22				
12	Initial	1:30 PM	0.5000	4	7.27	17.565	4.97	2.41
	Final	2:00 PM		11.27				

Per County Standards, percolation rate calculated as follows:

Where: Q = Rate in Gallons per sqaure foot of sidewall per day

F = Drop during time interval in feet

T = Time interval in hours

D = Borehole diameter in feet

L_{AV} = Average depth of water column during the time interval in feet

n = porosity of gravel

d = Pipe diameter in feet

$$Q = \frac{\frac{F}{T} D * 9}{L_{AV}}$$

Adjusted percolation rate also accounts for porosity of the gravel backfill.

$$Q_{adj} = \frac{\frac{F}{T} D * 9}{L_{AV}} \frac{(nD^2 + d^2(1-n))}{D^2}$$

PERCOLATION CALCULATIONS - PRESATURATION

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	18G112-4
Engineer	Scott McCann

Borehole Diameter	8	(in)
Borehole Depth	20.2	(ft)
Perforated Pipe Diameter	3	(in)
Porosity of Gravel Backfill	0.4	

Percolation Boring No.	P-2

Interval Number		Time	Time Interval (hrs)	Water Depth (ft)	Change in Water Level (ft)	Did Seepage Exceed 1/2 Wetted Depth?	Overnight Pre-Saturation Required?
1	Initial	1:15 PM	0.5000	0	8.03	NO	YES
	Final	1:45 PM		8.03			
2	Initial	-	0.0000	0	0	0	YES
	Final	-		0			
3	Initial	-	0.0000	0	0	0	YES
	Final	-		0			
4	Initial	-	0.0000	0	0	0	YES
	Final	-		0			

PERCOLATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	18G112-4
Engineer	Scott McCann

Borehole Diameter	8	(in)
Borehole Depth	20.2	(ft)
Perforated Pipe Diameter	3	(in)
Porosity of Gravel Backfill	0.4	

Percolation Boring No. P-2

Interval Number		Time	Time Interval (hrs)	Water Depth (ft)	Change in Water Level (ft)	Average Length of Water Column (ft)	Percolation Rate Q (gal/ft^2/day)	Percolation Rate Adjusted for Gravel Porosity Q (gal/ft^2/day)
1	Initial	8:15 AM	0.5000	0	7.96	16.22	5.89	2.85
	Final	8:45 AM		7.96				
2	Initial	8:45 AM	0.5000	0	7.83	16.285	5.77	2.79
	Final	9:15 AM		7.83				
3	Initial	9:15 AM	0.5000	0	7.76	16.32	5.71	2.76
	Final	9:45 AM		7.76				
4	Initial	9:45 AM	0.5000	0	7.75	16.325	5.70	2.76
	Final	10:15 AM		7.75				
5	Initial	10:15 AM	0.5000	0	7.76	16.32	5.71	2.76
	Final	10:45 AM		7.76				
6	Initial	10:45 AM	0.5000	0	7.74	16.33	5.69	2.75
	Final	11:15 AM		7.74				
7	Initial	11:15 AM	0.5000	0	7.74	16.33	5.69	2.75
	Final	11:45 AM		7.74				
8	Initial	11:45 AM	0.5000	0	7.73	16.335	5.68	2.75
	Final	12:15 PM		7.73				
9	Initial	12:15 PM	0.5000	0	7.74	16.33	5.69	2.75
	Final	12:45 PM		7.74				
10	Initial	12:45 PM	0.5000	7.73	3.07	10.935	3.37	1.63
	Final	1:15 PM		10.8				
11	Initial	1:15 PM	0.5000	4	3.88	14.26	3.27	1.58
	Final	1:45 PM		7.88				
12	Initial	1:45 PM	0.5000	4	3.83	14.285	3.22	1.56
	Final	2:15 PM		7.83				

Per County Standards, percolation rate calculated as follows:

Where: Q = Rate in Gallons per sqaure foot of sidewall per day

F = Drop during time interval in feet

T = Time interval in hours

D = Borehole diameter in feet

L_{AV} = Average depth of water column during the time interval in feet

n = porosity of gravel

d = Pipe diameter in feet

$$Q = \frac{\frac{F}{T} D * 9}{L_{AV}}$$

Adjusted percolation rate also accounts for porosity of the gravel backfill.

$$Q_{adj} = \frac{\frac{F}{T} D * 9}{L_{AV}} \frac{(nD^2 + d^2(1-n))}{D^2}$$

Grain Size Distribution

Sample Description	P-1 @ 3.5 feet
Soil Classification	Gray Brown fine to coarse Sand, trace to little Silt, trace fine Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-1

SoCalGeo
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Grain Size Distribution

Sample Description	P-1 @ 6 feet
Soil Classification	Red Brown fine to coarse Sand, little Silt, little fine Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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Grain Size Distribution

Sample Description	P-1 @ 7 feet
Soil Classification	Gray Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-3

SoCalGeo
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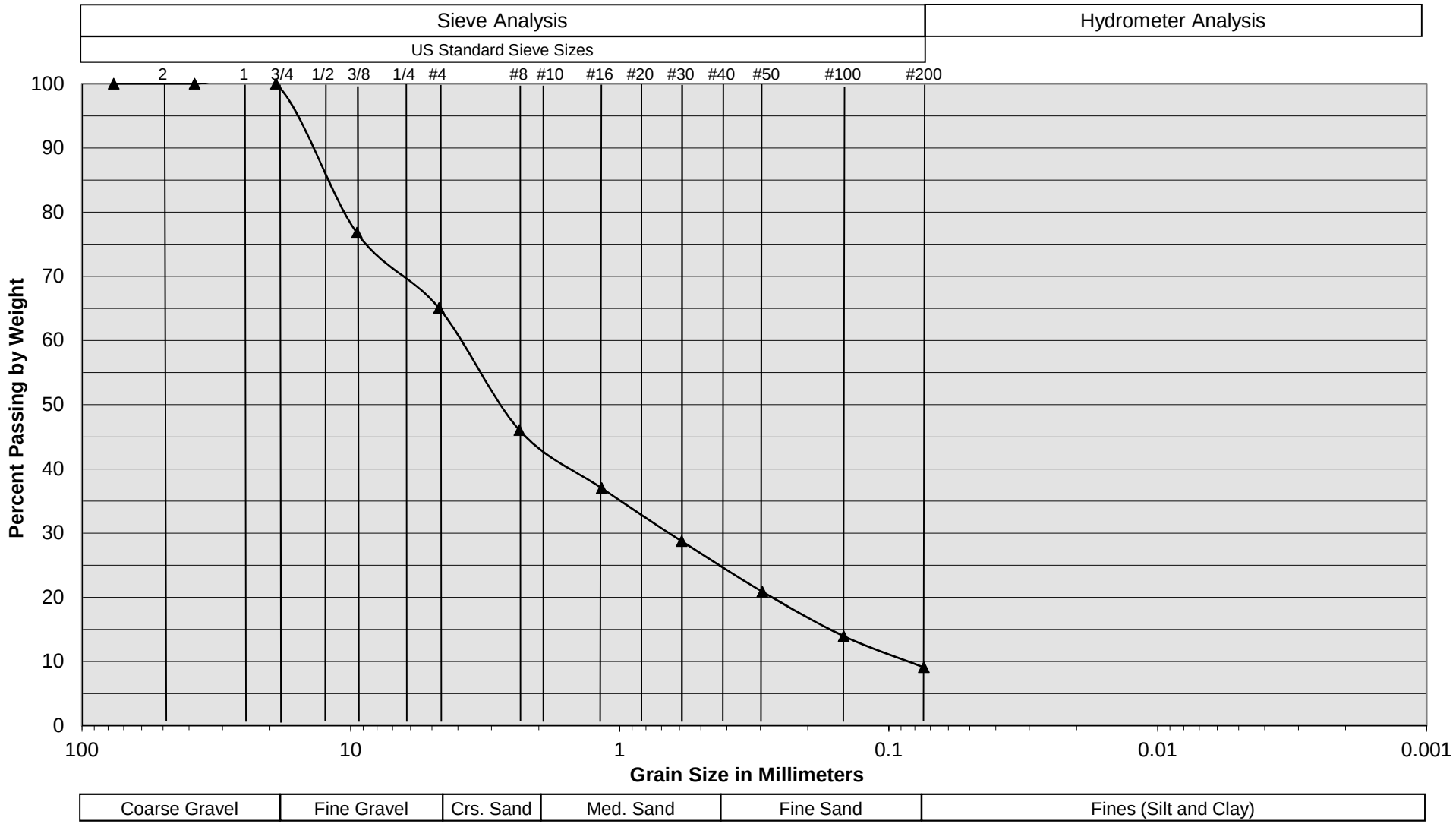
Grain Size Distribution



Sample Description	P-1 @ 8.5 feet
Soil Classification	Gray Gravelly fine to coarse Sand, little Silt

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-4

SoCalGeo
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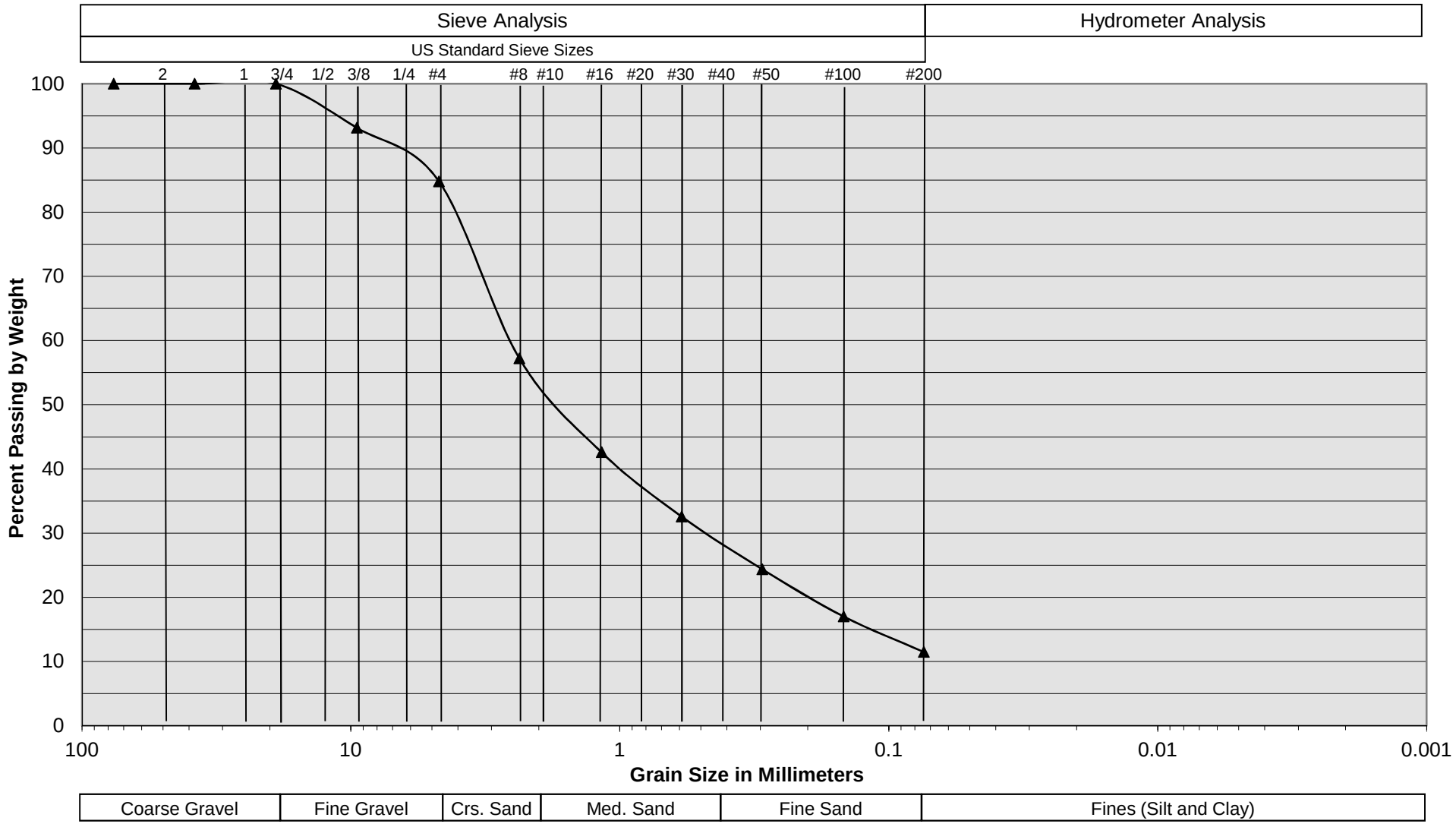
Grain Size Distribution



Sample Description	P-1 @ 13.5 feet
Soil Classification	Dark Gray to Black fine to coarse Sand, little Silt, little fine Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-5

SoCalGeo
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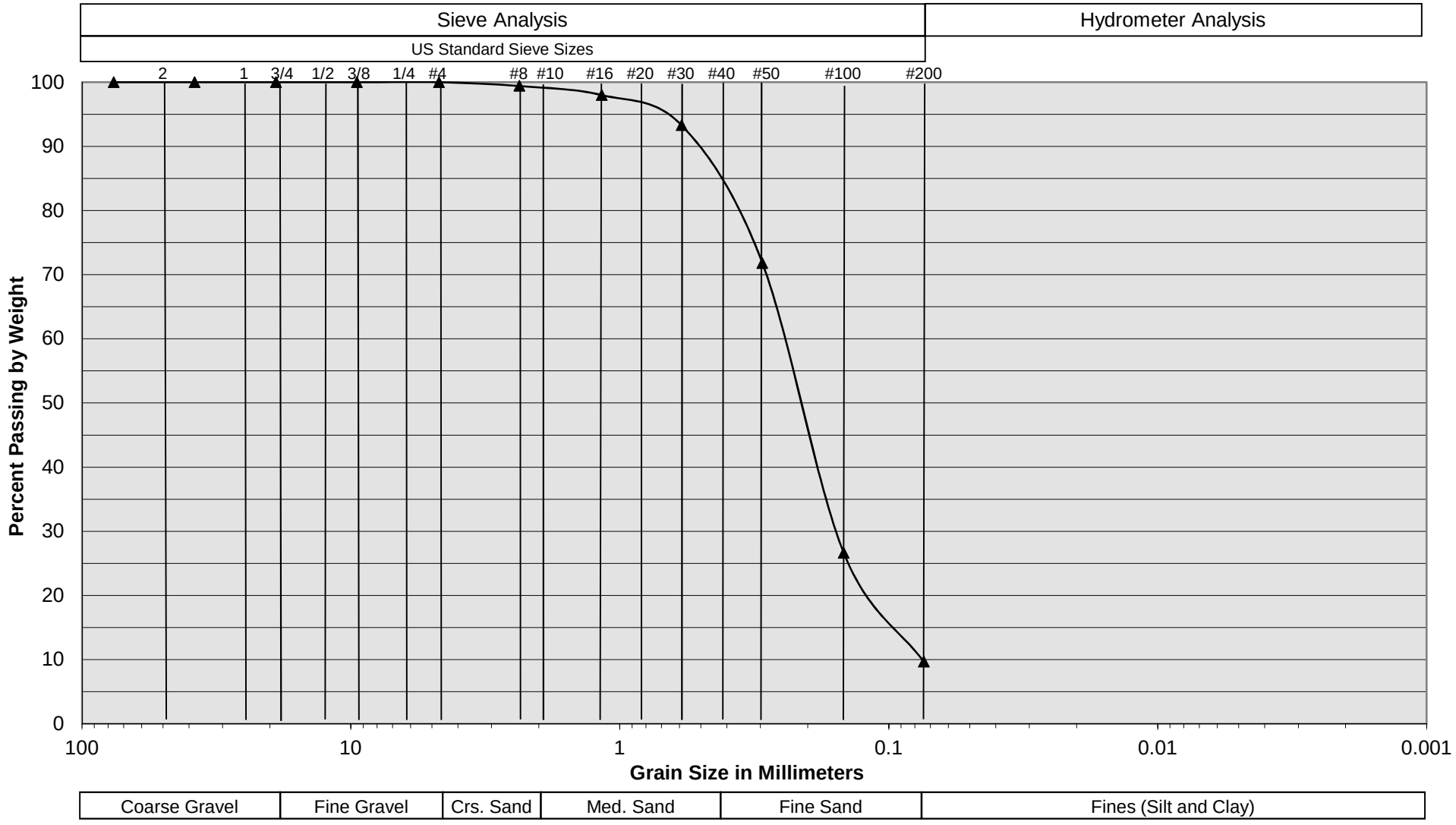
Grain Size Distribution



Sample Description	P-1 @ 18.5 feet
Soil Classification	Gray fine to medium Sand, little Silt

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-6

SoCalGeo
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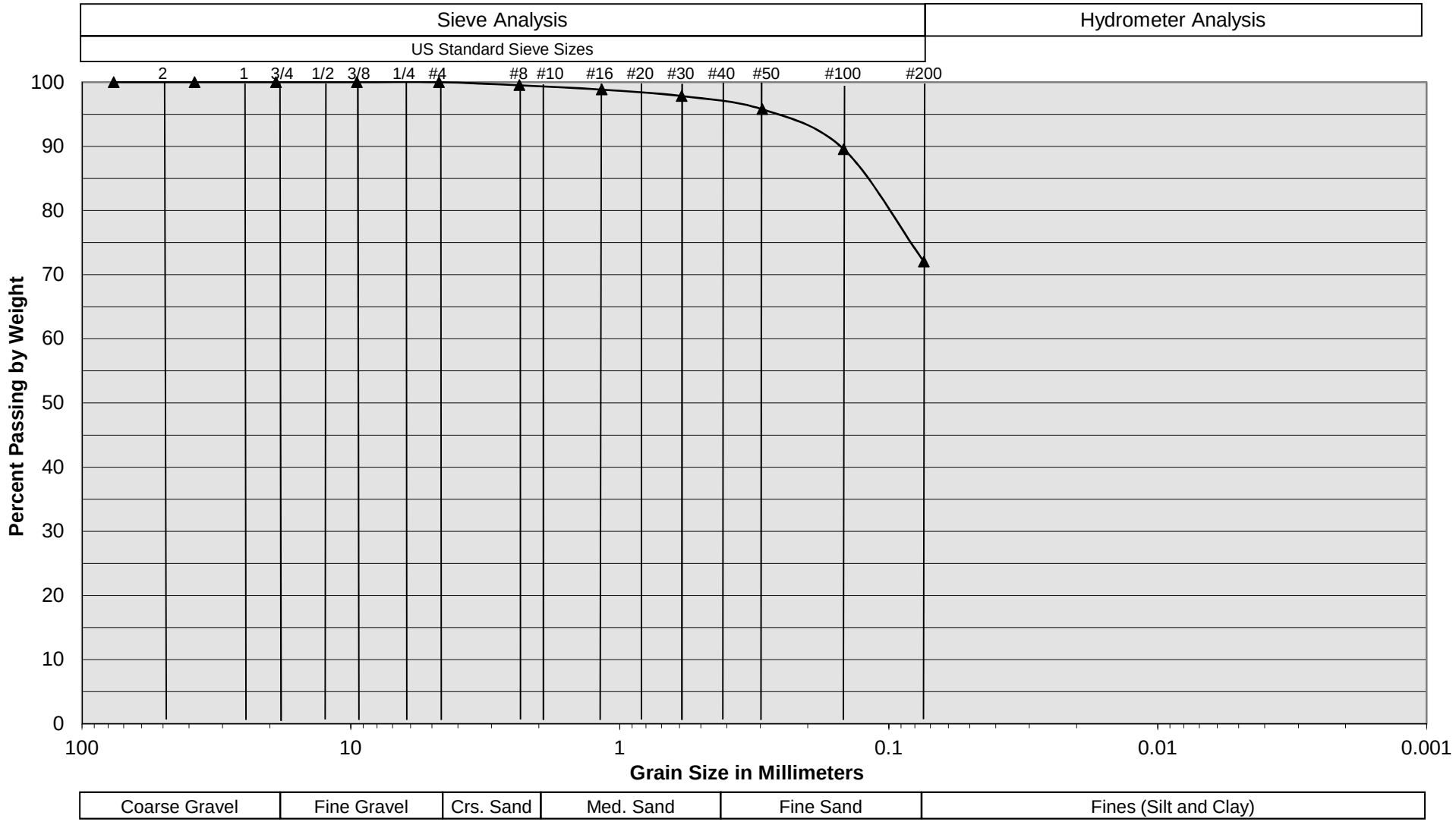
A California Corporation

Grain Size Distribution



Sample Description	P-1 @ 23.5 feet
Soil Classification	Dark Green to Gray fine Sandy Silt, trace medium Sand

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-7

SoCalGeo
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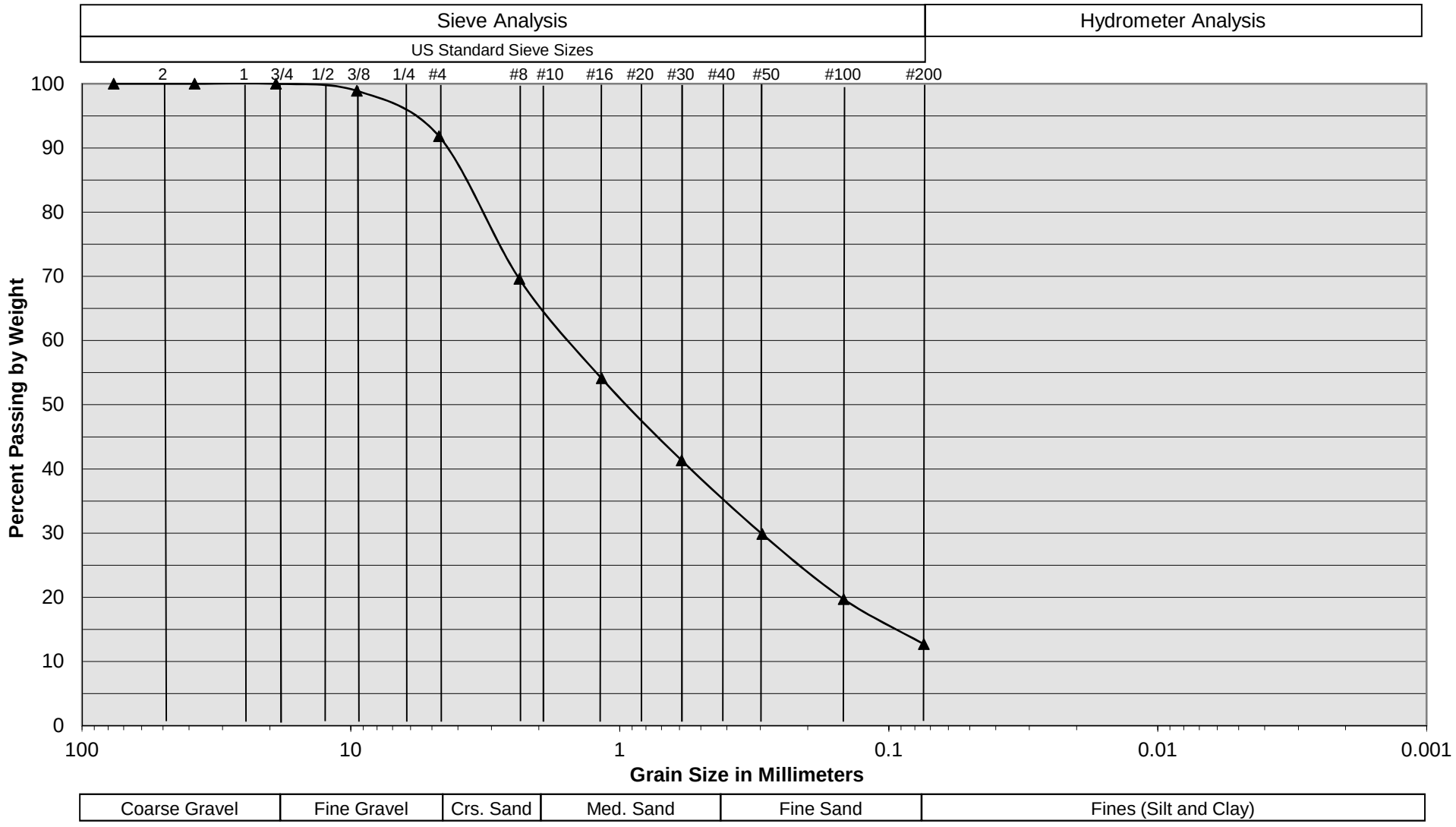
Grain Size Distribution



Sample Description	P-2 @ 3.5 feet
Soil Classification	Light Gray Silty fine to coarse Sand, little fine Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-8

SoCalGeo
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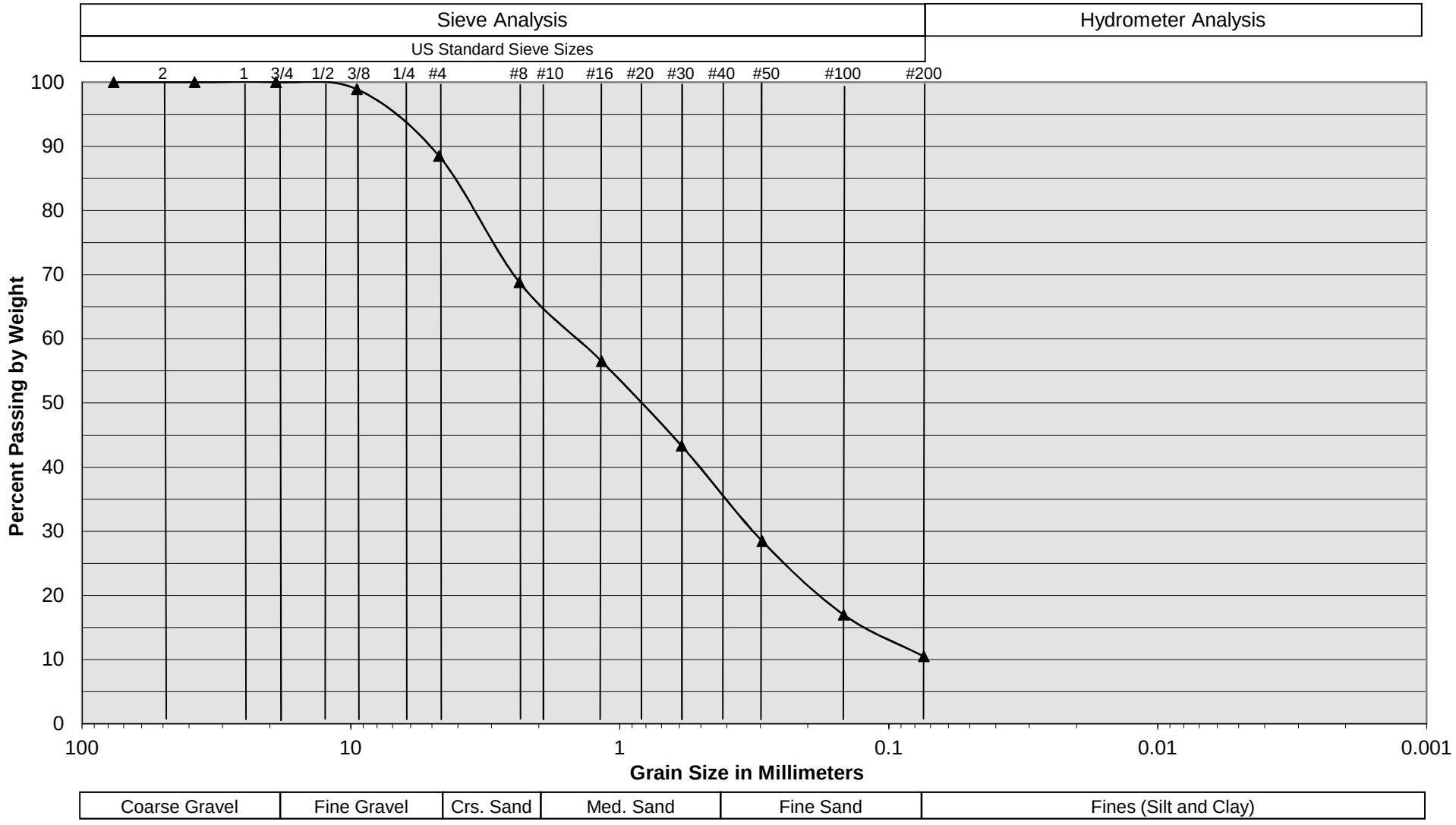
A California Corporation

Grain Size Distribution



Sample Description	P-2 @ 6 feet
Soil Classification	Light Brown to Brown Gravelly fine to coarse Sand, little Silt

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-9

SoCalGeo
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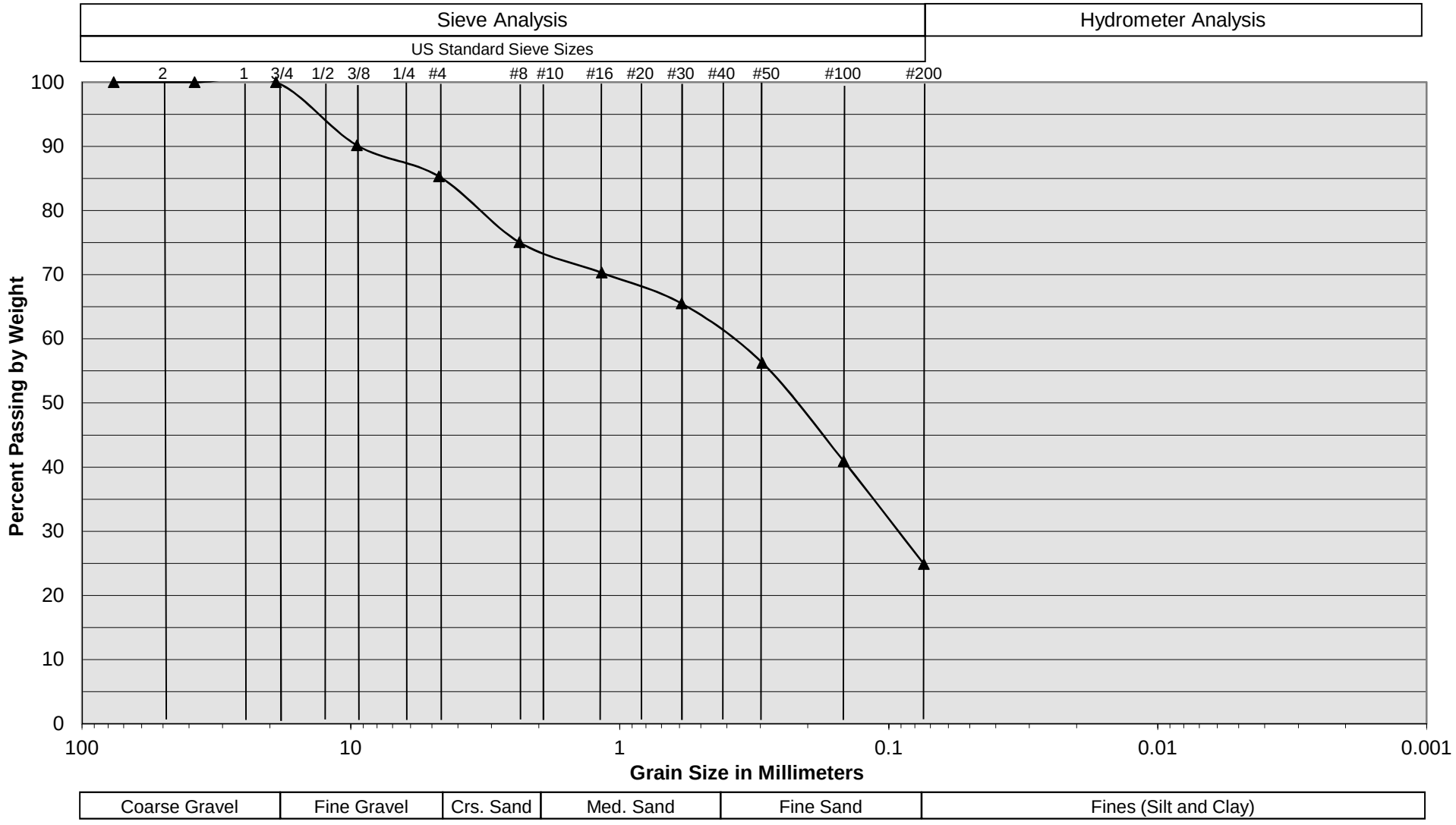
Grain Size Distribution



Sample Description	P-2 @ 8.5 feet
Soil Classification	Dark Gray to Black Silty fine to coarse Sand, little fine Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-10

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Grain Size Distribution

Sample Description	P-2 @ 13.5 feet
Soil Classification	Black Gravelly fine to coarse Sand, little Silt

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-11

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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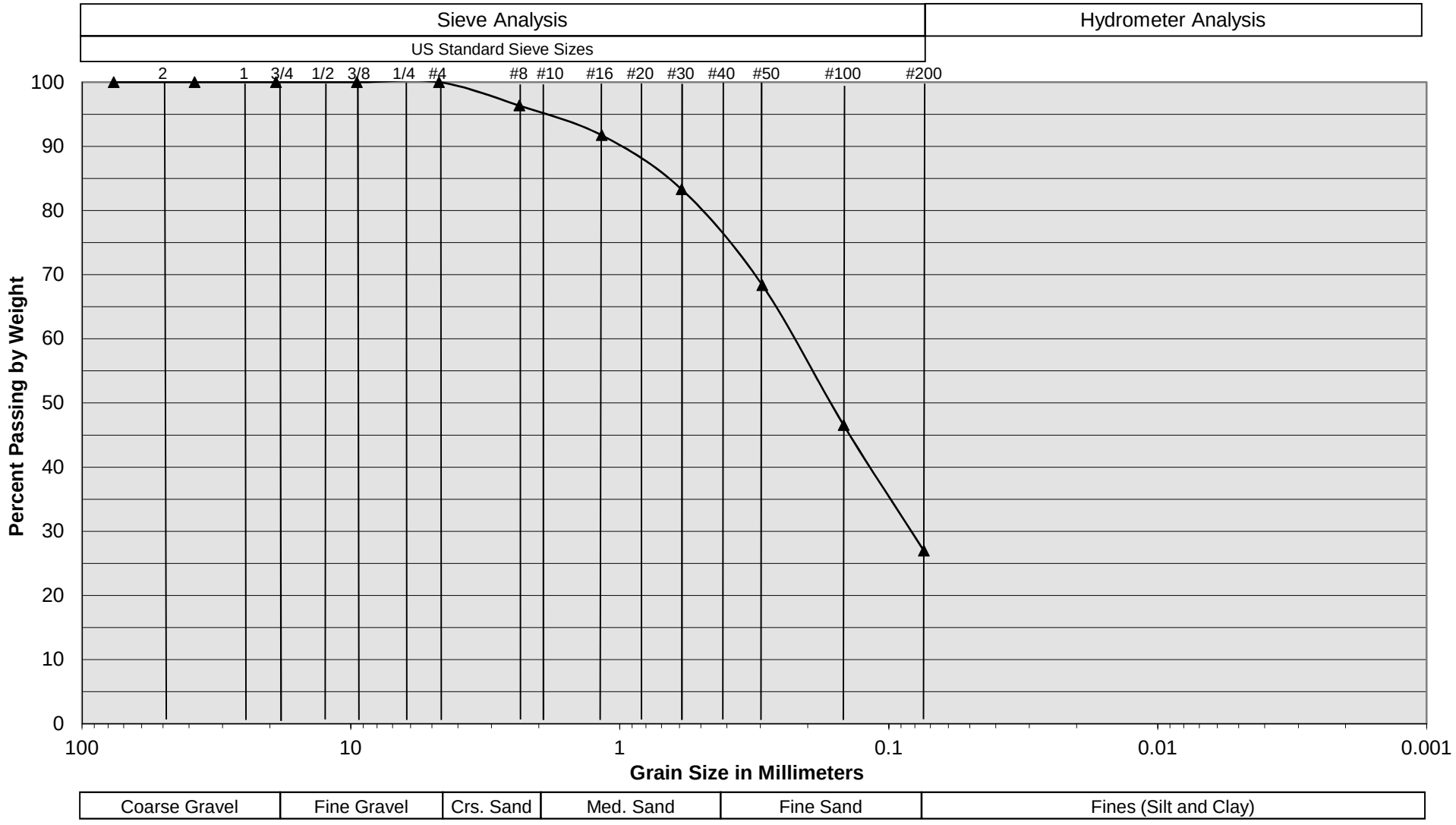
Grain Size Distribution



Sample Description	P-2 @ 18.5 feet
Soil Classification	Gray Silty fine to medium Sand, trace coarse Sand

Proposed Warehouse
San Bernardino County, CA
Project No. 18G112-4
PLATE C-12

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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