Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental, and Civil Engineering

LOW IMPACT DEVELOPMENT PLAN

PROVIDES DATE 05/08/2020

JOB ADDRESS:

8589 GARVEY AVE. AND 3001 WALNUT GOVE AVE.
ROSEMEAD, CA 91770

BY
CAL LAND ENGINEERING, INC.

576 E. Lambert Road, Brea, California 92821
Tel: 714-671-1050 - Fax: 714-671-1090 - Email: callandeng@yahoo.com

I. Introduction

This report has been provided in order to determine the best capability of the project to use stormwater quality measures to manage and capture stormwater runoff. The 85th percentile 24 hr rainfall is 0.9" per attached Hydrology map. That is greater than 0.75". The 85th percentile 24 hr rainfall was used for this On-site LID Report.

Per Geotechnical recommendation, infiltration is possible for on site. The infiltration trench will be provided to detain the 85th percentile 24 hr rainfall on site. The infiltration dry-well will be constructed under the basement.

Project Data

Project Name:	TAIWAN CENTER
Address:	8589 Garvey Ave. & 3001 Walnut Grove Ave., Rosemead, CA
APN:	5390-002-004, 041, 042 and 043.
Project Area:	46,059.06 SF (1.057 acres)
Disturbed Area:	46,059.06 SF (1.057 acres)
Impervious Area:	44,896.17 SF (1.031 acres) (97%)
Pervious Area:	1,162.89 SF (0.026 acres) (3 %)
Owner:	TAIWAN CENTER / MR. ALAN THIAN, PRESIDENT
Existing Land Use:	Commercial
Proposed Land Use:	Mix-use residential and commercial

Scope of Work

The project includes demolition of all structures and construction of mix-use residential and commercial building.

Project Designation

This project equal to one acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area. This will result in the designation of "Designated Project"

All "Designated Projects" must retain 100 percent of the SWQDv on-site through infiltration, evapotranspiration, stormwater runoff harvest and use, or a combination thereof unless it is demonstrated that it is technically infeasible to do so. To meet these requirements, Designated Project must:

- Conduct site assessment and identify design considerations, including determining the feasibility of on-site infiltration
- Apply site-specific source control measures
- Calculate the Stormwater Quality Design Volume
- Implement stormwater quality control measures

II. Report

Proposed

Disturbed area 1.057 acres
Type of Development Mix-use Residential and Commercial
Predominate Soil Type No. 003
Using HydroCalc
Length of Flow Path 65'
85^{th} percentile rainfall depth: 0.9
Proportion Impervious Values 0.9748
Qpm = 0.4263 cfs
$V_{Prop.}$ = 3013.17 CF

Peak Flow Hydrologic Analysis

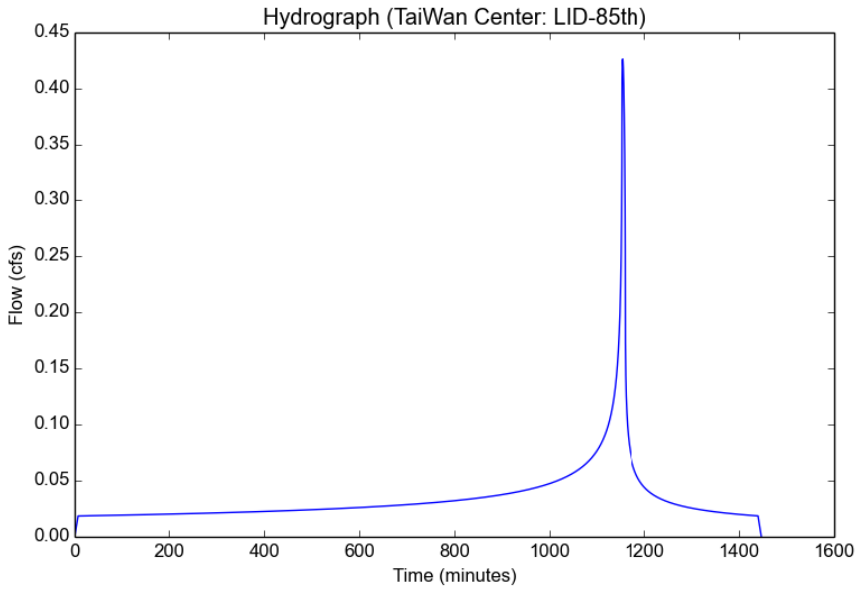
File location: U:/2019/Rosemead/3001 Walnut Grove - Taiwan Center/LID/TaiWan Center - LID-85th.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TaiWan Center
Subarea ID	LID-85th
Area (ac)	1.057
Flow Path Length (ft)	65.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	0.9
Percent Impervious	0.9748
Soil Type	3
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.9
Peak Intensity (in/hr)	0.4584
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.8798
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	0.4263
Burned Peak Flow Rate (cfs)	0.4263
24-Hr Clear Runoff Volume (ac-ft)	0.0692
24-Hr Clear Runoff Volume (cu-ft)	3013.1723



Stormwater Quality Design Volume Calculation

Current water quality requirements are based on treating a specific volume of stormwater runoff from the project site (stormwater quality design volume [SWQDv]). By treating the SWQDv, it is expected that pollutant loads, which are typically higher during the beginning of storm events, will be reduced in the discharge to or prevented from reaching the receiving water.

The design storm, from which the SWQDv is calculated, is defined as the greater of:

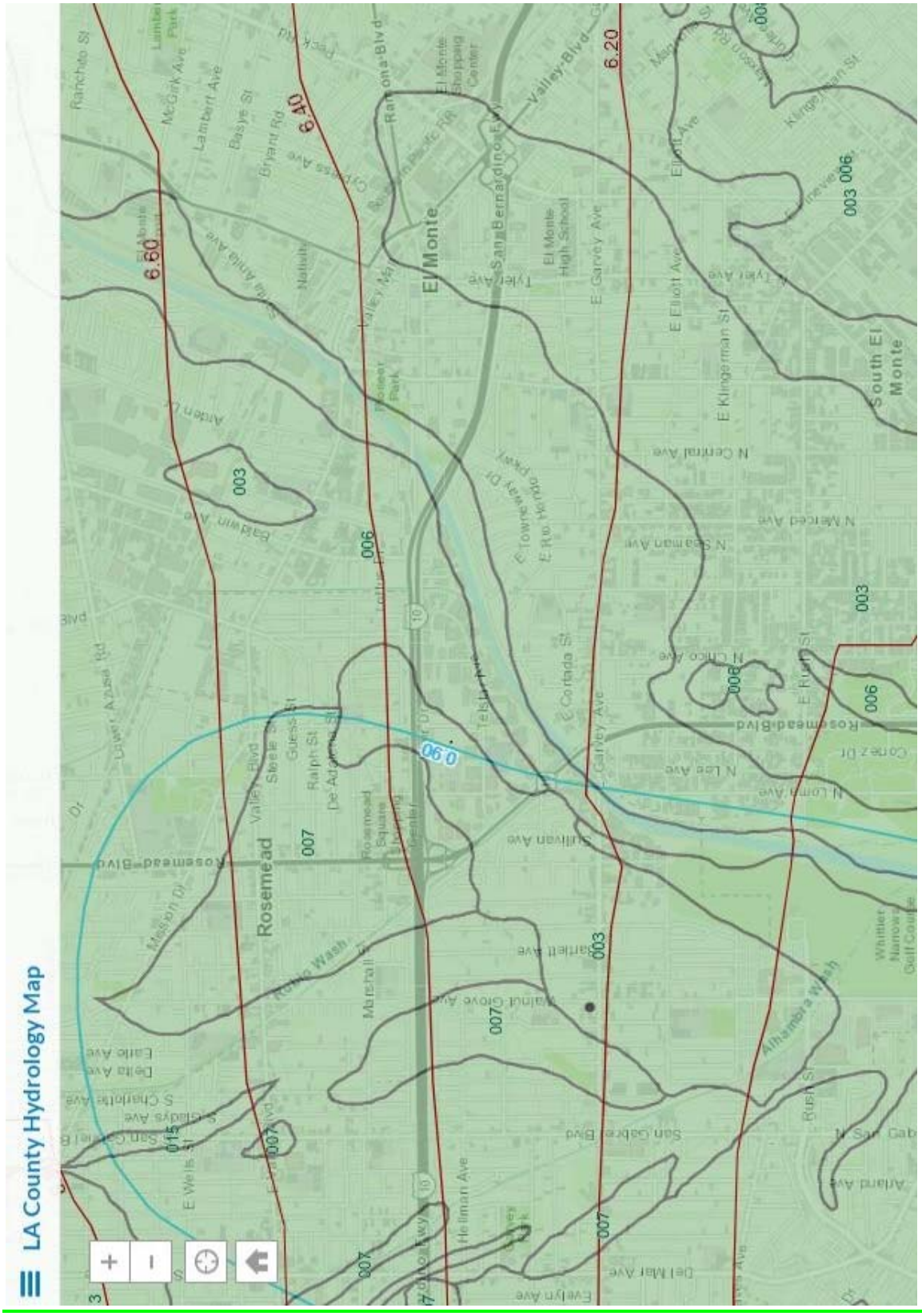
- The 0.75 inch, 24-hour rain event; or
- The 85th percentile, 24-hour rain event as determined from the Los Angeles County 85th percentile precipitation isoheytal map

For this project, the 85th percentile, 24-hour rain event will be used, which is 0.9 inch.

Using Hydrocalc:

SWQDv = 3031.17 cu.ft.

Hydrology Map



Infiltration Calculation

SWQDv = 3013.17 cu.ft.

f_{design} (Infiltration rate) = 1 in/hr

Dry Well Calculation:

$$V = \pi r^2 h$$

Where:

- V = Volume [ft];
- r = radius of drywell [ft]; and
- h_1 = depth of dry well [ft] (Storage)
- h_2 = depth of dry well [ft] (Infiltration)
- n_t = Dry well fill porosity (40%)

$V_1 = \pi r^2 h_1$
$V_1 = 3.1416 \times 2^2 \times 20$
$V_1 = 251.33\ ft^3$

$V_2 = \pi r^2 h_2$
$V_2 = 3.1416 \times 2^2 \times (16 \times 0.4)$
$V_2 = 80.42\ ft^3$

Total Volume = 251.33 + 80.42 = 331.75 ft^3

Storage Tank

Use Concrete Storage Tank = 2350 CF

Volume of Dry well + Volume of Storage Tank
= 331.75 ft^3 x2 + 2350 ft^3
= 3013.50 ft^3 > 3013.17 ft^3

Infiltration Rate = 1 inch. / hr.
= 0.083 ft. / hr.

Perimeter of Drywell = 2 x 3.1416 x r
= 12.57 ft.

Capacity = 12. 57 ft. x h_2
= 12.57 x 16 = 201.12 ft^2

Infiltration rate x Capacity = 0.083 x 201.12 = 16.69 ft^3 / hr.

Drain in 96 hrs. = 16.69 ft^3 / hr. x 96 hr.
= 1602.24 ft^3 x 2 = 3204.48 ft^3

V = 3204.48 ft^3 > 3013.17 ft^3

CONCLUSION

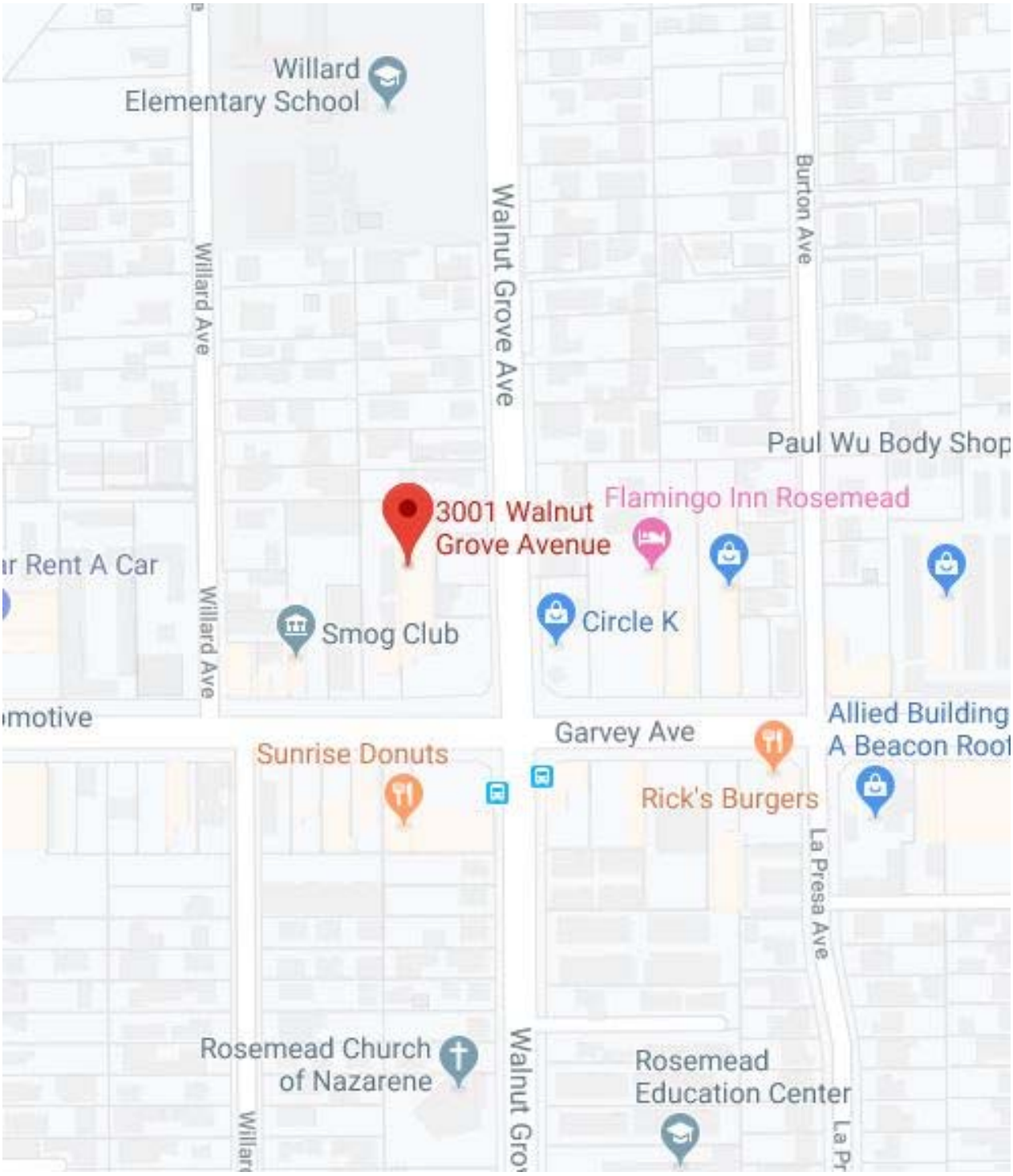
Storage Volume:
Per LID request =3013.17 CF

Total provide= 3013.50 CF

Volume (Total provide 3013.50 CF) > Volume (Total request 3013.17 CF) OK

The Dry-well will be installed on the project site to reduce the peak discharge rate, volume, and duration of the flow. These BMP's are designed to collect the site drains from the corresponding Tributary Drainage Areas and to soak water on site prior to draining to pump pit, pump drainage to street.

Vicinity Map



III. Infiltration report

Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental, and Civil Engineering

November 18, 2019

Taiwan Center
3001 Walnut Grove,
Rosemead, CA 91770

Attention: Mr. Alan Thian

Subject: Percolation Feasibility Testing for the Proposed Infiltration System, 4-Story Mixed Use Development, with One-Level of Subterraneous Garage, 3001 Walnut Grove Avenue and nearby lots, APN: 5288-001-040, 041, 042, 043, Rosemead, California, QCI Project No.: 19-221-001Per

References: County of Los Angeles, Department of public works, 2017, Guidelines for Design, Investigation and Reporting, Low Impact Development Stormwater Infiltration, GS200.2, dated June 30, 2017.

Gentlemen:

As requested and authorized, Cal Land Engineering, Inc. (CLE) has performed a feasibility percolation evaluation for the above project located at the subject site.

The purpose of this report is to aid in the design and construction of the required storm water infiltration system. The professional opinions and geotechnical information contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction. The scope of our study is limited to the area explored, which is shown on Figure 2, (Site Plan).

SITE CONDITIONS

The project site is located on the northwest corner of Garvey Avenue and Walnut Grove Avenue, in the City of Rosemead, California. The approximate location of the site is presented in the attached Site Location Map (Figure 1). The lot size is approximately 46,075 square feet (1.060 acres). The site is relatively flat and is currently occupied by constructions. No major surface erosions were observed during our subsurface investigation.

FIELD EXPLORATION

Field exploration for this investigation consisted of drilling one-percolation boring (P-1) to the depth of approximately 35-36 feet below existing site grade (depth corresponds to the bottom the proposed of infiltration system) on October 4, 2019 and two additional borings to the maximum depth of 51.5 feet below the existing grade on October 3, 2019 . Approximate boring locations are presented on Figure 2, Site Plan

Description of the soil materials encountered during drilling was entered into the boring logs in accordance with the Unified Soil Classification System (USCS) and Hydraulic Soil Group (HSG). The boring logs are included in Appendix A.

SUBSURFACE CONDITION

The onsite near surface soils consist predominantly of clayey sand (SC). In general, these soils exist in the loose and moist condition. Underlying the surface soils, fine grained clayey sand (SC), silty sand (SM), poorly graded sand (SP) and sandy clay (CL) were disclosed in the borings to the

depths explored (51.5 feet below the existing ground surface). These soils exist in medium dense to very dense and very stiff and slightly moist to very moist conditions. In general, the soils become denser as depth increases.

GROUNDWATER

Ground water level was not encountered to the depth explored (approximately 51.5 feet below the existing grade) during our subsurface investigation. In our opinion, groundwater will not be a problem during the near surface construction. Based on our review of the "Historically Highest Ground Water Contours and Borehole Log Data Locations, El Monte Quadrangle", by CGS (formerly CDMG), it is estimated that the highest historical ground water level is approximately 10 feet below the existing grade.

LABORATORY TESTING

Laboratory testing including Expansion Potential and Mechanical Analysis were performed on selective soil samples:

EXPANSION INDEX

Laboratory Expansion Index test was conducted on the existing onsite near surface materials sampled during QCI's field investigation to aid in evaluation of soil expansion potential. The test is performed in accordance with ASTM D-4829. The testing result is presented below:

Sample Location	Expansion Index	Expansion Potential
P-1 @ 35'-36'	2	Very Low

PARTICLE-SIZE ANALYSIS & PERCENT PASSING #200 SIEVE

Particle-size analyses were determined for selected soil samples in accordance with ASTM D442 standard. The results were plotted and presented in appendix C. Percent of soil passing #200 sieve were determined for selected soil samples in accordance with ASTM D1140 standard. The test results are presented in the following table:

Sample Location	% Passing #200
P-1 @ 35'-36'	30.5

PERCOLATION RATE/ PERMEABILITY

Percolation rate and permeability of the subsurface material, encountered in Boring P-1, was drilled to a depth of 35'-36' feet (advanced 12 inches more) at previously assigned locations and a 2-inch diameter perforated PVC pipe casing with a solid end cap was installed in each boring after the completion of the drilling. Gravelly filter materials were placed between the PVC pipe and the drill holes.

The test boring was pre-soaked on October 4, 2019 prior to percolation testing, to ensure the sand around the perforated pipe is fully saturated. After the presoak, the time interval for recording the water drop was determined between the readings for P-1, hole. For P-1 the hole was filled with water 12 inches above the bottom of the excavated hole and PVC end cap. Water remained in the hole after 10 minutes and drain before 30 minutes and the time interval between the readings was determined to be 10 minutes. Therefore, rate of surface water drop was measured every 10 minutes for P-1 and testing stopped after a minimum of eight readings and after noticing a stabilized rate of drop was obtained. Upon completion of tests, the boring was backfilled with the soil cuttings.

Numerous measurements recorded within the test period indicated an average percolation rate of 8.50 inch/hour for P-1. The results of percolation test for boring P-1, provided in Appendix B. The percolation rates were reduced and readjusted to account for the discharge of water from both the sides and bottom of borings (i.e., non-vertical flow). The following formula was used to determine the infiltration rates, GS200.2, dated June 30, 2017:

Reduction Factor (Rft) = $\frac{(2d1-\Delta d)}{DIA} + 1$ (Reference GS200.2, dated June 30, 2017)

Where:
d1=Initial Water Depth (in)
Δd = Water level drop of the final period of stabilized rate (in)
DIA = Diameter of boring (in)
Infiltration Rate = Pre-adjusted Percolation Rate divided by Reduction Factor

Total Reduction Factor RF = RFt x RFv x RFs

P-1, Reduction Factor (Rft) = $\frac{(2d1-\Delta d)}{DIA} + 1$ or $\frac{(2 \times 18)-8.50}{6.0} + 1 = 5.583$

The site is underlain by relative uniform of alluvial deposits. It is our understanding that stormwater infiltration BMPs with pretreatment components and regular maintenance programs will be implemented. The following presents the calculations of the recommended infiltration rate for the onsite stormwater system

Total Reduction Factor RF = RFt x RFv x RFs = (5.583x3x3) = 50.24

Boring P-1
Design Infiltration Rate = 51.00 / (5.583x3x3) = 1.01 in/hr

CONCLUSIONS AND RECOMMENDATIONS

Our review and analysis of collected data and percolation testing indicate that the proposed infiltration system is feasible from geotechnical viewpoint and permeability rates exceed the required minimum 0.3 inch/hour for onsite soils. It is our opinion that the infiltration rate of 1.0 inch/hour may be used for the design of the onsite infiltration.

LIMITATIONS

Soil materials vary in character between excavations. Site conditions may vary due to seasonal changes or other factors. Therefore, we assume no responsibility or liability for work, testing or recommendations performed or provided by others. Site geotechnical or environmental factors, are not part of the scope of this work.

Since our study is based upon the site materials observed, engineering research and analyses, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty is expressed or implied. Standards of practice are subject to change with time.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Very truly yours,
CAL LAND ENGINEERING, INC.
dba QUARTECH CONSULTANTS

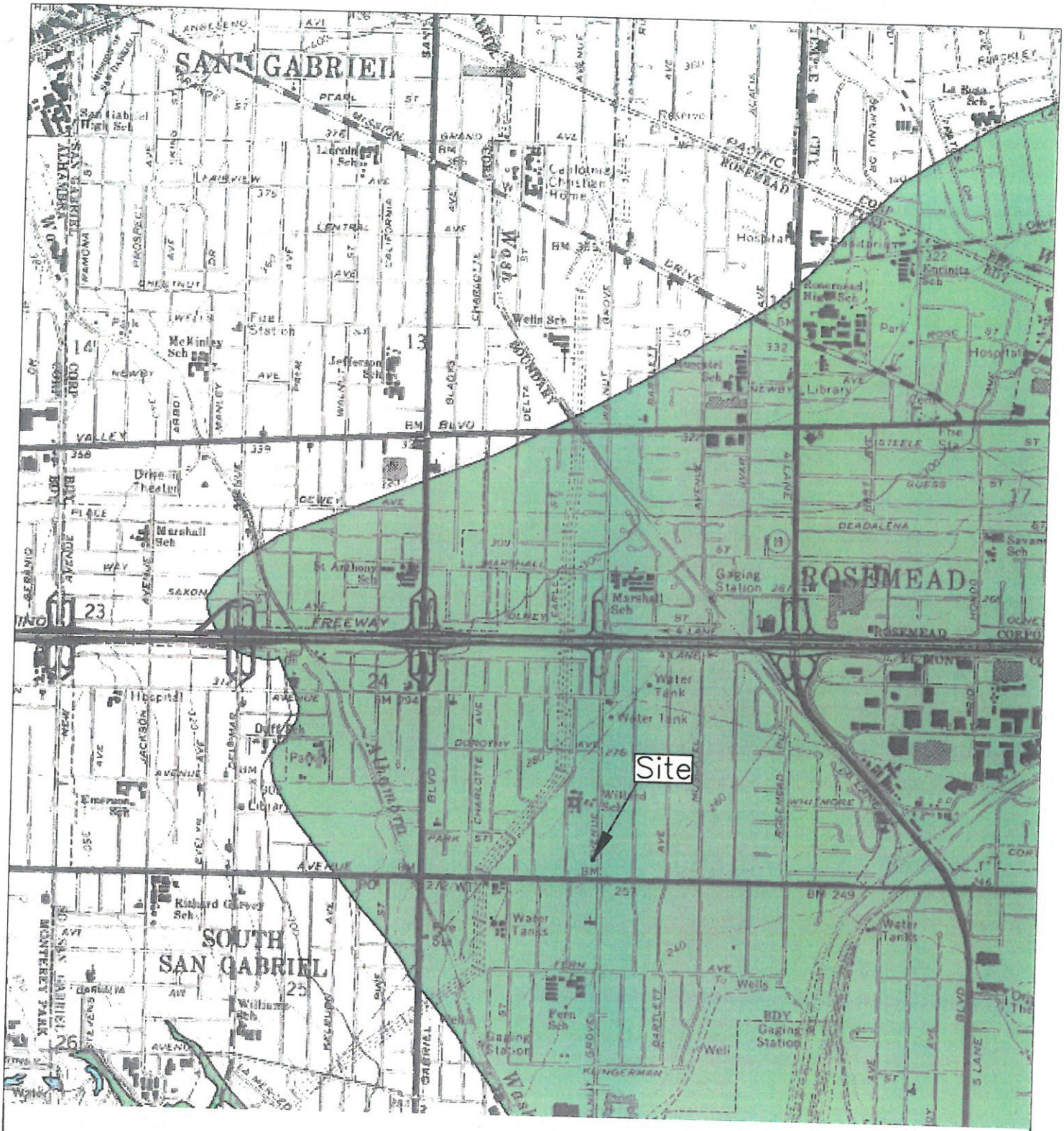
Jack C. Lee, GE 2153
Principal Engineer

Abe Kazemzadeh
Project Engineer

Enclosures:
Figure 1 - Site Location Map
Figure 1a - Historical Highest Groundwater Level
Figure 2 - Site Plan (Boring Location Map)

Appendix A - Boring Logs
Appendix B - Percolation Test Results
Appendix C -Sieve Analysis

Dist: (4) Addressee;



LEGEND

Maps modified from "Seismic Hazard Zones, El Monte Quadrangle" by CDMG

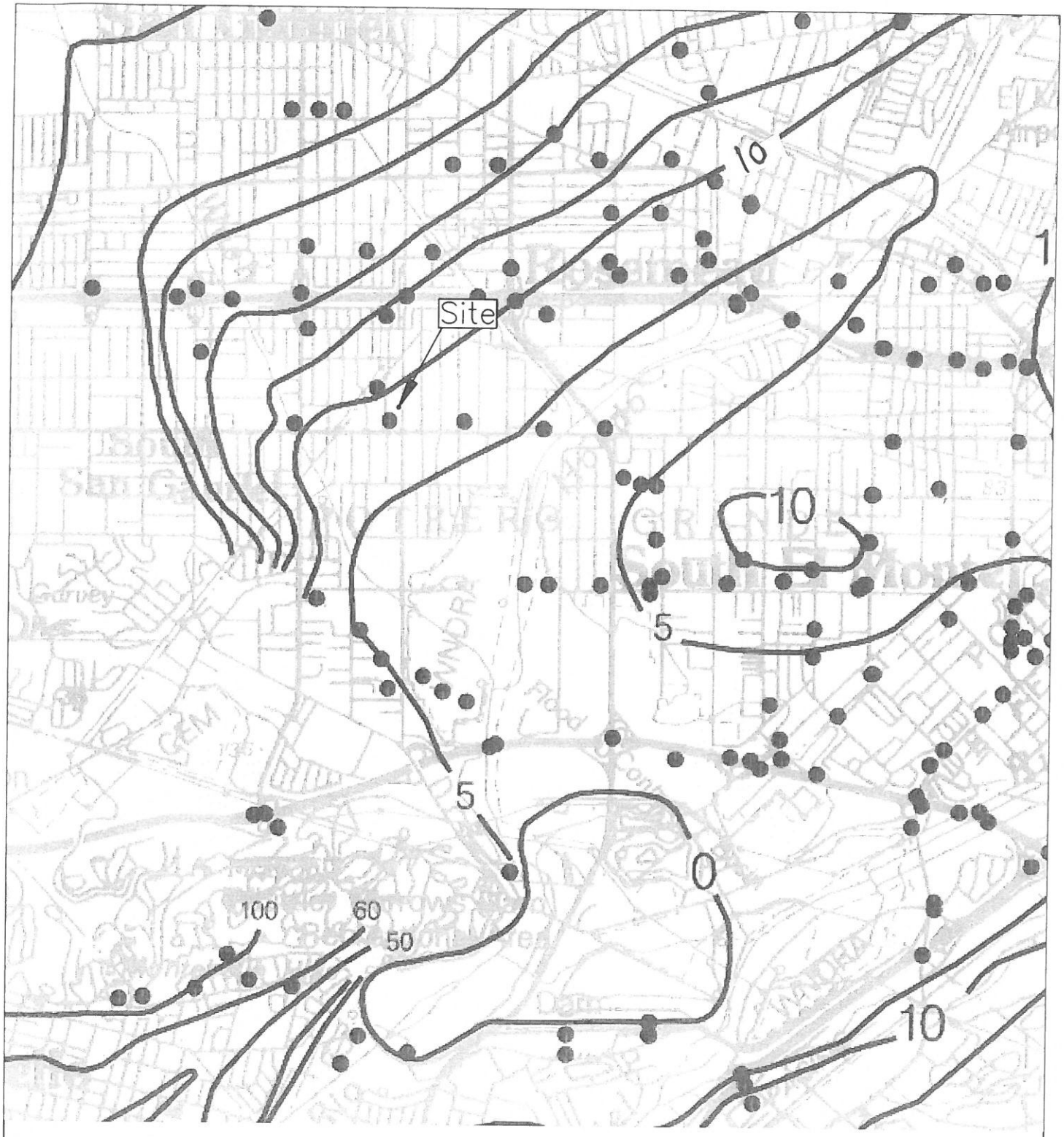
Area Subjected to Liquefaction Induced Settlement

CalLand Engineering, Inc. dba Quartech Consultants Geotechnical, Enviromental & Civil Engineering Services	Project Address: APN: 5288-001-040, 041, 042, 043 3001 Walnut Grove Rosemead, California

Site Location Map

11/19

FIGURE 1



N

NOT TO SCALE

LEGEND

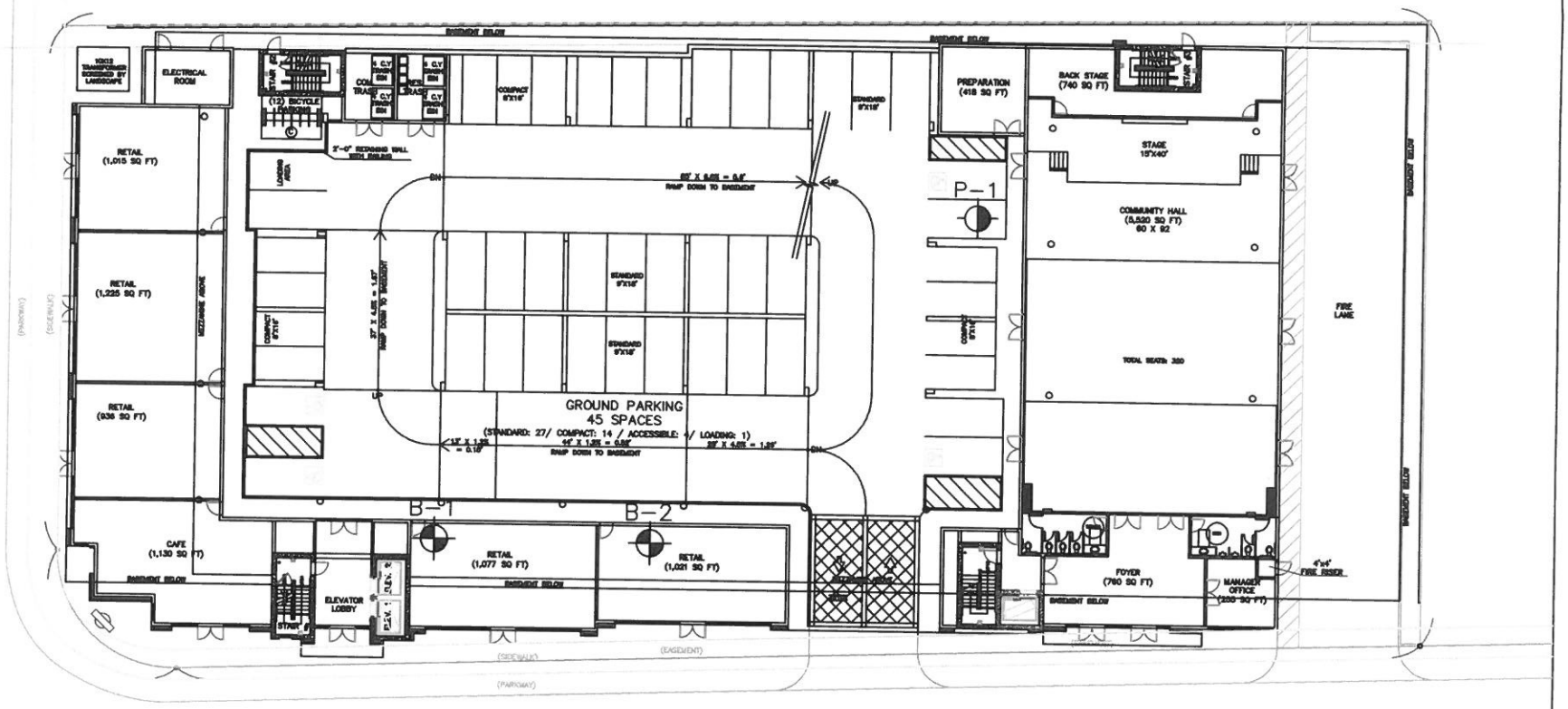
Maps modified from "Historically Highest Ground Water Contours and Borehole Log Data Locations, El Monte Quadrangle" by CGS

CalLand Engineering, Inc. dba Quartech Consultants Geotechnical, Environmental & Civil Engineering Services	Project Address: APN: 5288–001–040, 041, 042, 043 3001 Walnut Grove Rosemead, California

Site Locational Map
Historical Highest Groundwater Level

11/19

FIGURE 1a



LEGEND

B-1 Approximate boring location

P-1 Approximate percolation location

SCALE: 1" = 40'

CalLand Engineering, Inc. dba Quartech Consultants Geotechnical, Environmental & Civil Engineering Services	Project Address: APN: 5288-001-040, 041, 042,043 3001 Walnut Grove Rosemead, California

SITE PLAN

11/19

FIGURE 2

Appendix A

Boring Logs

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BORING LOG B-1

PROJECT LOCATION: 3001 Walnut Grove Ave., Rosemead, CA
PROJECT NO.: 19-221-001

DATE DRILLED: 10/3/2019
SAMPLE METHOD: Hollow Stem
ELEVATION: N/A
LOGGED BY: MW

B: Bulk Bag
S: Standard Penetration Test
R: Ring Sample

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/6"	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Description of Material
							5" Concrete thicness.
	B		2	SC		14.2	Clayey sand, fine grained, dark brown, moist, loose
2		R	3	SC	101.1	17.3	Clayey sand, fine grained, dark brown, moist, loose to medium dense
			8				Percent of Fines:48.5
5		R	3	SC	104.5	15.2	Clayey sand, fine grained, dark brown, moist, medium dense
			10				Percent of Fines: 41.2
			14				
			8				
10	B	S	12	SM		6.8	Silty sand, medium grained, medium brown, slightly moist, medium dense
			17				Percent of Fines: 12.9
			11				
15		R	22	SP	106.4	2.9	Gravelly sand, coarse grained, reddish brown, slightly moist, dense
			29				Percent of Fines: 4.2
			9				
20		S	17	SP-SM		3.9	Sand and silty sand, medium grained, grayish brown, slightly moist, dense
			20				Percent of Fines:9.2
			11				
25		R	19	SC	121.7	16.3	Clayey sand, fine grained, dark brown, very moist, dense
			24				Percent of Fines:35.4
			7				
30		R	11	CL	105.3	21.2	Sandy clay, medium brown, very moist, very stiff
			19				Percent of Fines: 72.0,LL= 32, PL= 22, PI= 10
			11				
35		S	18	SC		20.6	Clayey sand, fine grained, medium brown, very moist, dense
			22				Percent of Fines: 32.3

CalLand Engineering, Inc
dba Quartech Consultants

BORING LOG B-1

PROJECT LOCATION: 3001 Walnut Grove Ave., Rosemead, CA
PROJECT NO.: 19-221-001

DATE DRILLED: 10/3/2019
SAMPLE METHOD: Hollow Stem
ELEVATION: N/A
LOGGED BY: MW

B: Bulk Bag
S: Standard Penetration Test
R: Ring Sample

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/6"	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Description of Material
40		S	9 13 18	SM		14.1	Silty sand, fine grained, yellowish brown, moist, dense Percent of Fines: 40.6
45		S	22 41 50/5"	SM		7.9	Silty sand, fine grained, grayish brown, slightly moist to moist, very dense Percent of Fines: 32.2
50		R	9 14 23	CL	101.8	23.5	Sandy clay, grayish brown, very moist, very stiff Percent of Fines: 75.1. LL = 33, PL = 22, PI = 11
55							Total Depth: 51.5 feet No Groundwater Hole Backfilled Hammer Driving Weight: 140 lbs Hammer Driving Height: 30 inches
60							
65							
70							

CalLand Engineering, Inc
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BORING LOG B-2

PROJECT LOCATION: 3001 Walnut Grove Ave., Rosemead, CA
PROJECT NO.: 19-221-001

DATE DRILLED: 10/3/2019
SAMPLE METHOD: Hollow Stem
ELEVATION: N/A
LOGGED BY: MW

B: Bulk Bag
S: Standard Penetration Test
R: Ring Sample

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/6"	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Description of Material
							5" Concrete thickness
2		R	4 5 10	SC	103.2	15.1	Clayey sand, fine grained, dark brown, moist, loose to medium dense
5		S	4 9 9	SM		12.2	Silty sand, fine grained, medium brown, moist, medium dense
10		R	10 18 20	SM	108.2	7.7	Silty sand, medium grained, medium brown, slightly moist, medium dense
15		S	12 18 21	SP-SM		4.1	Sand and silty sand, medium grained, brown, slightly moist, dense
20		S	10 17 22	SM		7.3	Silty sand, medium grained, medium brown, slightly moist, dense
25							Total Depth: 21.5 feet No Groundwater Hole Backfilled Hammer Driving Weight: 140 lbs Hammer Driving Height: 30 inches
30							
35							

Appendix B

Percolation Test Results

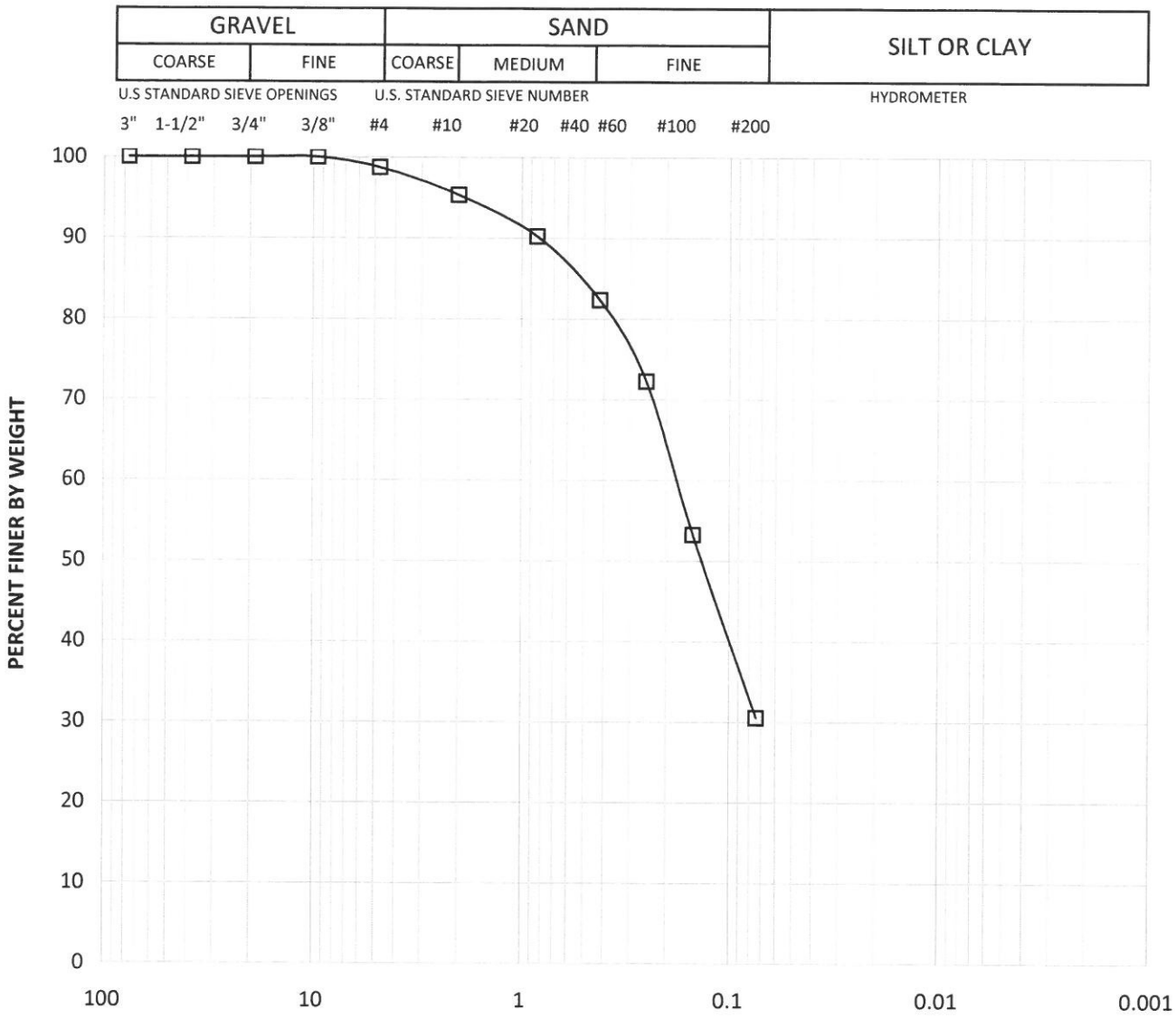
Boring/ Excavation Percolation Test Field Log

	3001 Walnut Grove Avenue	Date:	4-Oct-19		
Project Location:	Rosemead , CA	Boring/ Test Number	P-1		
Earth Description	Alluvium	Diameter of Boring	6"	Diameter of Casing	2"
Test By	CIS	Depth of Boring	36'		
Liquid Description	Tap Water	Depth of Invert of BMP	35'		
Measurement Method	Sounder	Depth of Water Table	N/A		
		Depth of Initial Water Depth (d1)	18"		
Time Interval Standard					
Start Time for Pre-Soak	10:30 AM	Water Remaining In Boring (Y/N)	Yes after 10' and before 30'		
Start Time for Standard	12:41 PM	Standard Time Interval Between Readings	10 Mins		

Reading Number	Time Start/ End (hh:mm)	Elapsed Time Δtime (mins)	Water Drop During Standard Time Interval Δd (inches)	Percolation Rate for Reading (in/hr)	Soil Description / Notes / Comments
1	12:41 AM 12:51 PM	10	10.80	64.80	Light brown, silty sand (SM)
2	12:52 PM 1:02 PM	10	10.80	64.80	Hydrologic Soil Group A
3	1:04 PM 1:14 PM	10	9.60	57.60	
4	1:16 PM 1:26 PM	10	9.20	55.20	
5	1:28 PM 1:38 PM	10	8.60	51.60	
6	1:40 PM 1:50 PM	10	8.50	51.00	
7	1:52 PM 2:02 PM	10	8.50	51.00	
8	2:04 PM 2:14 PM	10	8.50	51.00	Stabilized Rate Archieved

Appendix C

Sieve Analysis



SYMBOL	SAMPLE ID	DEPTH (FT)	SAMPLE TPYE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	P-1	35'-36'	BULK	SM	N/A	N/A

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Project Address:
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3001 Walnut Grove Avenue
Rosemead, California

MODIFIED PROCTOR

(ASTM D1557)

11/19

FIGURE 1