

APPENDIX G

HYDROLOGY AND LID REPORT

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CREATIVITY BEYOND ENGINEERING

Preliminary

Hydrology and Hydraulic

And

Low Impact Development (LID) Report for

TownePlace Suites of Monrovia
Huntington & Myrtle

City of Monrovia, California

R.A. Smith Project No. 3160228

Date: September 25, 2017

**Hydrology and Hydraulics Report
(H&H)**

AND

**Low Impact Development Report
(LID)**

FOR

**TownePlace Suites of Monrovia
HUNTINGTON AND MYRTLE
MONROVIA, CALIFORNIA**

Prepared for:

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Preparation Date
September 25, 2017

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Section II. Executive Summary

This report provides description of the LID infiltration volume and practices proposed for the TownePlace Suites of Monrovia project at the southwest corner of Huntington and Myrtle in Monrovia, California. This report also provides hydrologic and hydraulic methodology and results to meet the hydromodification requirements for the proposed project.

Generally

- The project meets the volume requirements for LID requirements through infiltration practices
- The project meets the required maximum discharge requirements as determined by LACFCD.

Section III. Discretionary Permit(s) and Water Quality Conditions

INTRODUCTION

The County of Los Angeles (County) has prepared the 2014 Low Impact Development Standards Manual (LID Standards Manual) to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit for storm water and non-storm water discharges from the MS4 within the coastal watersheds of Los Angeles County (CAS004001, Order No. R4-2012-0175), henceforth referred to in this document as the 2012 MS4 Permit. The LID Standards Manual provides guidance for the implementation of storm water quality control measures in new development and redevelopment and redevelopment projects in unincorporated areas of the County with the intention of improving water quality and mitigating potential water quality impacts from storm water and non-storm water discharges.

This project falls within the list of new development and redevelopment projects/activities requiring the incorporation of Best Management Practices (BMPs) into the project plans:

- Parking lot creating 5,000 square feet or more of surface area, or with 25 or more parking spaces and potentially exposed to storm water runoff

Therefore, BMPs shall be incorporated into project plans to satisfy LID requirements.

This report is prepared for TownePlace Suites of Monrovia, and is intended to comply with the County of Los Angeles requirements for implementation of post-construction BMPs on the proposed project site, except as modified by the City of Monrovia.

Section IV. Project Description

PROJECT INFORMATION

Owner: TP Heritage Inn of Monrovia, LLC
(at time of implementation)
Site Address: SWC
City/State: Monrovia, CA
Project Area: 1.71 ± acres
Occupancy: Commercial

PROJECT LAYOUT

The project site meets the following project categories that require LID:

- Parking lot creating 5,000 square feet or more of surface area, or with 25 or more parking spaces and potentially exposed to storm water runoff.

The TownePlace Suites of Monrovia covers approximately 1.71 and is being developed. County of Los Angeles Department of Public Works, Low Impact Development Standards Manual states the following:

- Where less than 50 percent of the impervious surface of a previously developed site is proposed to be altered and the previous development project was not subject to post-construction storm water quality control measures, only the proposed alteration must meet the requirements of the LID Standards Manual.

Since this project is redeveloping more than 50 percent of the site, the entire property is subject to meet the requirements of the LID Standards Manual.

Section V. Site Description

PROJECT AREA

This project is located across six (6) current properties

APN: 8508-010-901
8508-101-902
8508-101-903
8508-101-904
8508-101-905
8508-101-906

DRAINAGE PATTERN

The existing redevelopment site is approximately 1.93 acres including right of way easements and proposed dedication areas and within the area of the proposed project it consists of approximately 0% impervious area. The site is predominantly gravel stabilized ground cover, but not inclusive of any asphalt or concrete

areas. The proposed redevelopment area consists of approximately 81% impervious area. The proposed pervious areas include subsurface infiltration areas within the proposed parking lot area.

Low Impact Development BMPs are proposed for the redevelopment site to mitigate runoff. The site will drain to infiltration systems sized for 100% of the SWQDv.

TECHNICAL INFEASIBILITY

Based on preliminary data, the site is being designed to infiltrate 100% of the 85th percentage water quality rainfall event. Infiltration results can be found in the Attachments.

BMP DESIGN

The infiltration was sized to treat the SWQDv as defined by the following:

- 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 isohyetal map (www.dpw.lacounty.gov/wrd/hydrologygis)
-

The 85th percentile, 24-hour rain event at the site is 1.2 inches according to the isohyetal map and, therefore, used as the basis of design for the capture system.

Table 1: *Rainfall Data*

SubArea	Rainfall Depth (in)
LID	1.2
25-year	6.32
50-year	7.2

Table 2: *Sub Area Analysis*

SubArea	Area (ac)	85 th Percentile Volume (CF)	Infiltration BMP Volume (CF)	25—Year Volume & Clear Flow Rate
Site	1.926	6,490	7,972	64,521 cf 6.35 cfs (no control)
				1.78 cfs (controlled)

Based on the land use, imperviousness, biofiltration requirements, and 85% rainfall, the SWQDv for the site has been quantified as 0.15 Ac-ft (6,490 cf). This full volume is proposed to be retained on site, based on geotechnical results.

Figure 1: 85th Percentile Isohyetal Map

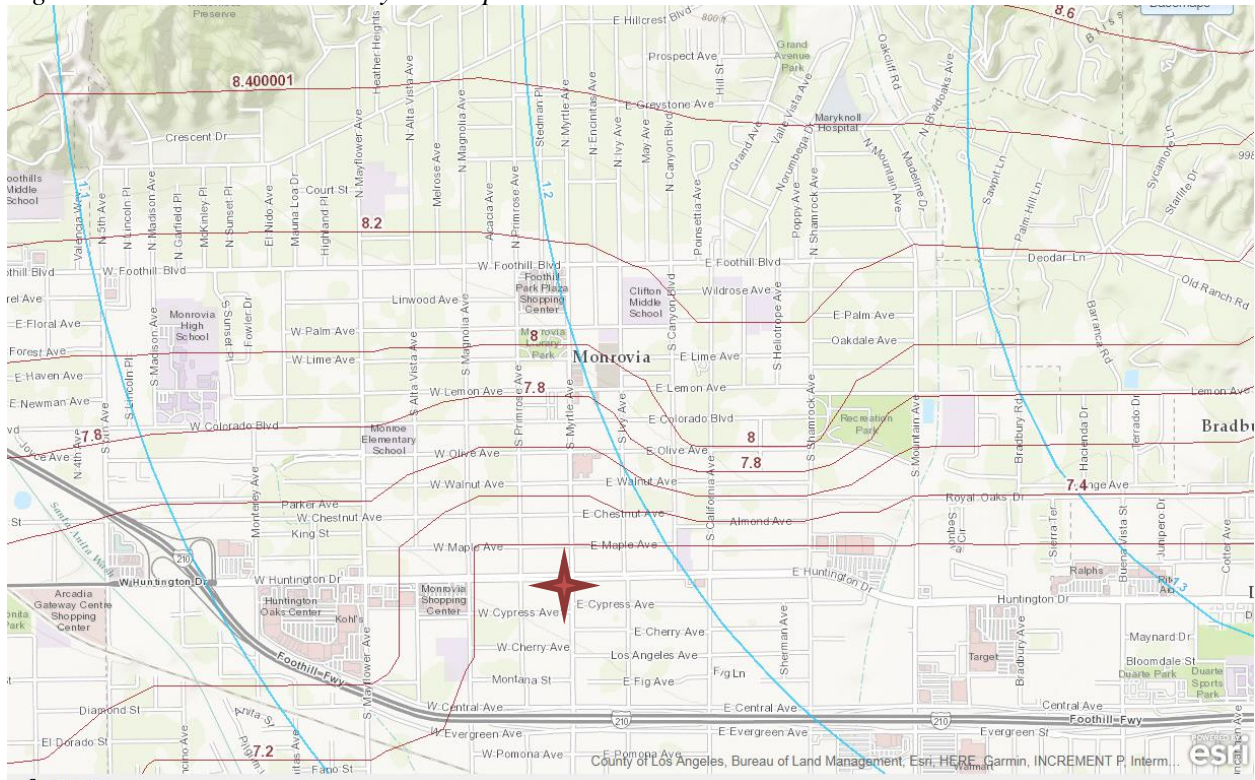


Table 3: *Potential Pollutants by Land Use Type*

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicator s	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
<input type="checkbox"/> Detached Residential Development	P	N	P	P	N	P	P	P
<input type="checkbox"/> Attached Residential Development	P	N	P	P	N	P	P	P ⁽²⁾
<input checked="" type="checkbox"/> Commercial/Industrial Development	P ⁽³⁾	P	P ⁽¹⁾	P ⁽¹⁾	P ⁽⁵⁾	P ⁽¹⁾	P	P
<input type="checkbox"/> Automotive Repair Shops	N	P	N	N	P ^(4, 5)	N	P	P
<input type="checkbox"/> Restaurants (>5,000 ft ²)	P	N	N	N	N	N	P	P
<input type="checkbox"/> Hillside Development (>5,000 ft ²)	P	N	P	P	N	P	P	P
<input checked="" type="checkbox"/> Parking Lots (>5,000 ft ²)	P ⁽⁶⁾	P	P ⁽¹⁾	P ⁽¹⁾	P ⁽⁴⁾	P ⁽¹⁾	P	P
<input type="checkbox"/> Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

P = Potential

N = Not Potential

⁽¹⁾ A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

⁽²⁾ A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

⁽³⁾ A potential Pollutant is land use involving animal waste

⁽⁴⁾ Specifically petroleum hydrocarbons

⁽⁵⁾ Specifically solvents

⁽⁶⁾ Bacterial indicators are routinely detected in pavement runoff

Table 4: *Watershed Description*

Receiving Waters	Sawpit Creek
303(d) Listed Impairments	Bis(2ethylhexl)phthalate (DEHP), Fecal Coliform
Applicable TMDLs	Nutrients, Oil, Trash
Pollutants of Concern for the Project	Nutrients, Oil, Trash
Environmentally Sensitive and Special Biological Significant Areas	None

Section VI. Existing Hydrology

The existing site is approximately 1.71 acres and it consists of approximately 100% pervious area

The current site drains via overland flow towards the southwest corner (alley) of the site.

The Hydraulic Analysis Section, Design Division, DPW, LA County, has been contacted to determine allowable discharge. The district has capacity for 1.04 cfs/acre in existing storm drain in Huntington Drive.

All offsite drainage connections and hydrology shall be routed to the County for approval under separate plan, permit.

Section VII. Proposed Hydrology

The proposed redevelopment area consists of approximately 1.71 acres of impervious area (following Right of Way Dedications) which includes areas of building redevelopment, sidewalks, vehicular access aisles, and parking lots. The proposed pervious areas is landscaping adjacent to the parking lot, a d has not been quantified For hydrologic considerations, the site was modeled as 85% impervious.

Low Impact Development BMP is proposed for the redevelopment site to improve quality of storm water runoff:

- The proposed buildings and pavement areas will be directed to the onsite storm drain collection systems which will collect and infiltrate the first 1.20” of rainfall.

The site is designed to allow storm water to drain to the existing catch basin adjacent to the north of the site along Huntington Drive. This connection shall be permitted through the LA County Flood Control District.

Section VIII. HYDROLOGIC METHODOLOGY

The existing and proposed hydrologic areas have been delineated and percent impervious has been calculated. This information was determined for both areas of ‘free release’ areas within the analysis area and areas directed to the BMPs proposed to meet LID requirements. For the purpose of analysis, the “free release” areas are those areas within the analysis area that are discharged offsite because that particular portion of the redevelopment area cannot feasibly be directed to a BMP. Please note that the BMPs have been sized to capture and infiltrate the entire Storm Water Quality Design Volume treat the runoff from an area that is equivalent in size and percent imperviousness to the redevelopment area.

Peak runoff flow rate and volume has been calculated based upon the HydroCalc program as obtained by the Los Angeles County Department of Public Works website. The HydroCalc program is based upon the modified rational methodology found within the 2006 Los Angeles County Hydrology Manual. This information was determined for the 1.20” 85th percentile storm for the LID aspects as well as the 6.32-inch 25-year, 24-hour rainfall event. Per the Hydrology Manual, a factor of 0.875 was applied to the 7.20-inch, 50-year, 24-hour rainfall event to obtain the depth of the 10-year event.

Rainfall Summaries can be found in Table 2, and utilize supplemental information below.

Table 5: *HydroCalc Additional Informaiton*

	1.20” LID Analysis	6.32” 25-year
%imp	85	85
Soil Type	007	007
Fire Factor	0.71	0.71

As the site conforms to discharge maximums provided by the LA Coutny Flood Control District, no adverse downstream effects are expected.

Section IX. Hydraulic Methodology

There is no change from existing 25-year hydraulics.

Generally, the BMPs are constructed with an overflow to existing LA County Flood Control District (LACFCD)systems in Huntington. This overflow system is used in conditions larger than the 1.2” storm, or where the LID system cannot match discharge rates during larger storms. This “overflow” system and the calculations related to it can be considered “unreliable” within the context of a steady-state HGL analysis.

The outflow for the LID volume (100% x 1.20” runoff) event is infiltration.

Section X. Hydraulic and BMP Design

BASIN ROUTING CONSIDERATIONS

The infiltration system is designed to hold the LID volume in the lower portion of the Chambers. The rest of the chamber volume provides for a pass-through for low-frequency rainfall events (25-year rainfall, etc). The high-elevation outflow provides controlled discharge of the low-frequency rainfall events.

This outlet is designed to meet the maximum release rate of 1.04 cfs/acre as dictated by the LACFCD.

Table 6: *Discharge Summary*

Max Orifice	1.75 CFS/ac
HWSEL	5.89 ft
Area	1.71 sf
Allowable	1.04 CFS/ac
Orifice Release	1.78 CFS

SUB AREA 1 BMP

BMP Design.

The BMP for Sub Area 1 consists of 2 parts.

1. Underground shallow half-arch chamber system surrounded with clean gravel with a 40% porosity to capture and infiltrate the LID volume.
2. An overflow outlet to Huntington

Basin Routing Considerations

The infiltration system is designed to hold the LID volume in the lower portion of the Chambers. The rest of the chamber volume provides for a pass-through for low-frequency rainfall events (25-year rainfall, etc). The high-elevation outflow provides controlled discharge of the low-frequency rainfall events.

This outlet is designed to meet the maximum release rate of 1.04 cfs/acre as dictated by the LACFCD.

As an analysis tool, the site was considered from a hydrological standpoint, with basin routing per the L.A. County Hydrology methodology using Modified PULS for the portion of the storm drain system through the LID sub surface detention system.

To model the 25-year flow, the hydrograph from the LA County HydroCalc program was first utilized, with interstitial TC points (5 min intervals) determined through interpolation.

Secondly, the orifice-flow and weir calculations were determined.

Table 7: Orifice Calculations – Area 1

orifice calculations			
head			Q
elev	(in)	(ft)	cfs
4.49	0.00	0	0
4.50	0.00	0	0
4.75	0.00	0	0
5.00	2.12	0.1767	0.706446
5.25	5.12	0.4267	1.097857
5.50	8.12	0.6767	1.382576
5.75	11.12	0.9267	1.617943
6.00	14.12	1.1767	1.823175
6.25	17.12	1.4267	2.007534
6.50	20.12	1.6767	2.176331
6.75	23.12	1.9267	2.332947
7.00	26.12	2.1767	2.479691

number 1
invert 4.49
diameter/height 8 inches

area 0.6666667 ft
0.3490659 sf

Orifice Flow Calculations

Orifice Flow Equation: $Q = 0.6A \sqrt{2gh}$

- Q = Capacity in CFS
- A = Free open area of grate in sq. ft.
- g = 32.2 (feet per sec/sec)
- h = Head in feet

Third, the stage-storage relationship was determined (see following Stage-Storage Table)

Table 8: Stage Storage Table – Area 1

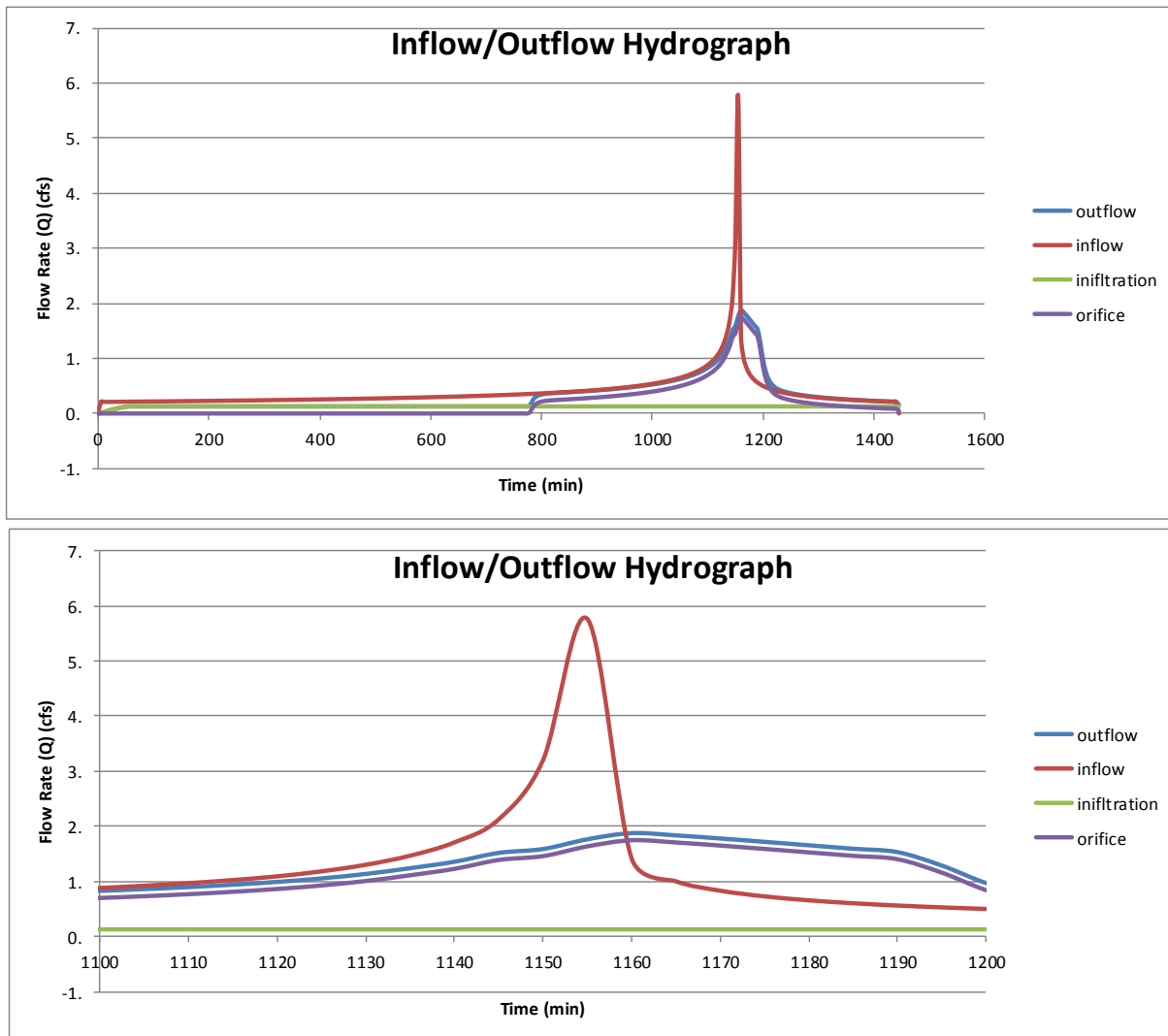
Stage - Storage Table																				
2		3		4		5		6		7		8		9		10		11		
Water surface elevation				Storage								Outflow								
elev	inc height	inc cf/ft	cum.cf/ft	overall height	cf			infiltration	orifice	cfs					2S/dt+0					
0.00	0.00		0					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.50	6		424.44					424.44	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.96	
0.75	9		636.68					636.68	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	4.37	
1.00	10		789.04					789.04	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	5.39	
1.25	15		1137.32					1,137.32	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	7.71	
1.50	18		1587.56					1,587.56	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	10.71	
1.75	21		2032.84					2,032.84	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	13.68	
2.00	24		2471.08					2,471.08	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	16.60	
2.25	27		2902.44					2,902.44	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	19.48	
2.50	30		3324.8					3,324.80	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	22.29	
2.75	33		3737.12					3,737.12	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	25.04	
3.00	36		4137.92					4,137.92	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	27.71	
3.25	39		4525.44					4,525.44	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	30.30	
3.50	42		4897.88					4,897.88	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	32.78	
3.75	45		5252.16					5,252.16	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	35.14	
4.00	48		5585.2					5,585.20	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	37.36	
4.25	51		5890.36					5,890.36	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	39.40	
4.50	54		6148.28					6,148.28	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	41.12	
4.75	55		6415.88					6,415.88	0.13	0.00	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	42.90	
5.00	60		6769.48					6,769.48	0.13	0.71	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	45.97	
5.25	63		6981.88					6,981.88	0.13	1.10	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	47.77	
5.50	66		7193.92					7,193.92	0.13	1.38	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	49.47	

Finally, the Peak Flow and Peak Elevation was determined by analysis of the resulting spreadsheet (as shown in the Attachment).

This information and the hydrograph follows.

The following hydrographs represents the short duration around the peak of the inflow and outflow hydrographs. This depicts the reduction of the inflow/outflow hydrograph resulting from the biofiltration BMP and pipe network prior to the City of Los Angeles Storm Drain.

Table 9: Routing Charts – Area 1



Section XI. Hydromodification

This project qualifies for one of the criteria for exemptions to hydromodification requirements, per Section 8 of the County of Los Angeles Department of Public Works, Low Impact Development Standard Manual:

- Redevelopment of a previously developed site in an urbanized area that does not increase the effective impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project conditions;

To satisfy the hydro-modification requirements, an additional infiltration chambers are provided to allow for attenuation of the peak flow through the infiltration system.

Section XII. Non-Structural LID Best Management Practices (BMPs)

BMP SUMMARY TABLE

In order to reduce anticipated and potential pollutants to the maximum practicable extent, Low Impact Development BMPs, site design BMPs, source control BMPs including non-structural and structural and treatment control BMPs have been incorporated in this LID Plan and are to be implemented. Sizing of the Low Impact Development BMPs is provided in this section. The Best Management Practices incorporated into this LID Plan are summarized on the table.

Table 10: *Routine Non-Structural_Best Management Practices to Prevent Storm Water Pollution for Post Construction*

Identifier	Name	Included	Not applicable	If not applicable, State brief reason
N1	Education for Property Owners, Tenants and Occupants	X		
N2	Activity Restrictions	X		
N3	Common Area Landscape Management		X	
N4	BMP Maintenance	X		
N5	Title 22 CCR Compliance (How Development will comply)	X		
N6	Local Industrial Permit Compliance		X	Not applicable for this project.
N7	Spill Contingency Plan	X		
N8	Underground Storage Tank Compliance		X	No underground storage tank will be onsite.
N9	Hazardous Materials Disclosure Compliance		X	No hazardous materials to be stored onsite.
N10	Uniform Fire Code Implementation	X		
N11	Common Area Litter Control	X		
N12	Employee Training	X		
N13	Housekeeping of Loading Dock	X		
N14	Common Area Catch Basin Inspection	X		
N15	Street Sweeping Private Streets and Parking Lots	X		
N16	Commercial Vehicle Washing		X	No vehicle washing activities will be performed onsite.

N1 Education for Property Owners, Tenants and Occupants Homeowner or Tenant Education

TP Heritage Inn of Monrovia, LLC shall conduct orientation during the first four weeks of startup and as on-going. An awareness program will be established to inform all the employees of the impacts of dumping oil, antifreeze, paints, solvents or other potentially harmful chemicals into storm drain; the proper use (e.g., application methods, frequencies and precautions) and management of fertilizers, pesticides and herbicides in landscaping maintenance practices; the impacts of littering and improper water disposal. Non-structural BMPs implemented are listed and included in Section VI:

SC10-Non-Storm water Discharges
SC11-Spill Prevention Control and Cleanup
SC30-Outdoor loading/Unloading
SC34-Waste Handling & Disposal
SC35-Safer Alternative Products
SC41-Building & Grounds Maintenance
SC43-Parking/Storage Area Maintenance
SC44-Drainage System Maintenance
BMP Maintenance Responsibility/Frequency Matrix in Section VI

N2 Activity Restrictions and Employee Training

TP Heritage Inn of Monrovia, LLC shall conduct daily management of business activities. TP Heritage Inn of Monrovia, LLC will conduct orientation during the first four weeks of startup and as on-going. Each business activity is restricted under the City of Vernon guidance, Conditions, Covenants and Restrictions (CC&Rs), and Conditions of Approval.

N4 BMP Maintenance

In addition to the community awareness program, TP Heritage Inn of Monrovia, LLC, through its site and landscape maintenance contractors will be responsible for inspection and maintenance activities in landscape areas. Debris and other water pollutants will be controlled, contained and disposed of in a proper manner by the maintenance contractors hired by TP Heritage Inn of Monrovia, LLC The site maintenance manager will maintain and inspect non-structural and structural BMPs on the site at least once a month. Each BMPs shall be inspected per required frequency of BMP suggested in the Maintenance Responsibility / Frequency Matrix included in Section VI.

N5 Title 22 CCR Compliance

TP Heritage Inn of Monrovia, LLC and future tenants shall comply with Title 22 of the California Code of Regulations and relevant sections of the California Health and Safety Code regarding hazardous waste management, as enforced by County Environmental Health on behalf of the State. Hazardous materials will be handled and disposed of inside

the proposed building by individual tenants. The disposed hazardous materials will be delivered off-site. Appropriate BMPs shall be implemented:

SC10-Non-Storm water Discharge
SC11-Spill prevention, Control, Cleanup
SC34-Waste Handling and Disposal
BMP Maintenance Responsibility/Frequency Matrix in Section VI

N6 Local Industrial Permit Compliance

Not applicable to this project since this project is commercial site and no fuel dispensing area will be placed. However, TP Heritage Inn of Monrovia, LLC shall comply with permit pertains to the discharge of commercial waste to public properties if there is any discharge to be made.

N7 Spill Contingency Plan

TP Heritage Inn of Monrovia, LLC shall implement a program for controlling accidental spill, litter and so LID waste disposal. TP Heritage Inn of Monrovia, LLC shall prepare the plan which mandates specified types of building or suite occupancies, stock piling of cleanup materials, notification of responsible agencies disposal of cleanup materials, documentation, etc. The following BMPs shall be implemented:

SC10-Non-Storm water Discharge
SC11-Spill prevention, Control, Cleanup
BMP Maintenance Responsibility/Frequency Matrix in Section VI

N8 Underground Storage Tank Compliance

No underground storage tank will be onsite.

N9 Hazardous Material Disclosure Compliance

There are no known hazardous materials to be stored or handled on-site. However, if there is in the future, TP Heritage Inn of Monrovia, LLC and future tenants shall incorporate the information regards to appropriate disclosures of the on-site storage hazardous materials in accordance with County, City and / or Ordinances in Spill Contingency Plan (N7). Appropriate BMPs shall be implemented:

SC10-Non-Storm water Discharge
SC11-Spill prevention, Control, Cleanup
SC34-Waste Handling and Disposal
BMP Maintenance Responsibility/Frequency Matrix in Section VI

N10 Uniform Fire Code Implementation

TP Heritage Inn of Monrovia, LLC shall be responsible to comply with the local Fire Code enforced by fire protection agency.

N11 Common Area Litter Control

TP Heritage Inn of Monrovia, LLC through site maintenance contractor shall implement litter control procedures and management in the landscape and parking lot areas in order to prevent and reduce pollution of storm water runoff on a weekly basis. Waste containers located outside shall be provided with spill prevention features and emptied on a regular basis, but as a minimum on a weekly basis. Appropriate BMPs are included in Section VI:

SC41-Building & Grounds Maintenance
SC43-Parking/Storage Area Maintenance
BMP Maintenance Responsibility/Frequency Matrix in Section VI

N12 Employee Training

TP Heritage Inn of Monrovia, LLC shall conduct an employee training program and shall inform and train employees engaged in maintenance activities regarding the impacts of dumping oil, antifreeze, paints, solvents or other potentially harmful chemicals into storm sewer; the proper use (e.g., application methods, frequencies and precautions) and management of fertilizers, pesticides and herbicides in landscaping maintenance practice; the impacts of littering an improper water disposal. Employee training program shall be conducted on an ongoing basis and during the first month of startup period. This LID Plan shall be a reference to be used for the program and an annual review of the provisions of the LID Plan shall be done by each employee.

The proposed and existing buildings are used for mixed commercial uses and the proposed project site is currently owned by TP Heritage Inn of Monrovia, LLC. If there are any changes of ownership on the site, a new owner shall be responsible once the ownership is transferred. Further guidance and information can be referred to BMPs in Section VIII and the BMP Maintenance Responsibility/Frequency Matrix in Section VI.

N13 Housekeeping of Loading Docks

TP Heritage Inn of Monrovia, LLC shall maintain the loading dock through its contractor per separate plans and permits. TP Heritage Inn of Monrovia, LLC shall maintain good housekeeping practices in the loading dock environment and keep the dock areas clean and free of debris. Loading areas shall be checked periodically to ensure containment of accumulated water and prevention of storm water run-on.

N15 Street Sweeping Private Streets and Parking Lots.

TP Heritage Inn of Monrovia, LLC through its site maintenance contractor shall provide vacuum sweeping of parking lots on a weekly basis. In addition, the sweeping program will be intensified prior to the start of the rainy season around October 15 of every year to minimize water pollution during the “first flush” storm. Further BMPs and information are listed below:

SC34-Waste Handling and Disposal
SC43-Parking/Storage Area Maintenance
BMP Maintenance Responsibility/Frequency Matrix in Section VI

N16 Commercial Vehicle Washing

This BMP is not applicable to the type of use proposed. No vehicle washing activities will be performed onsite.

Table 11: *Routine Structural BMPs*

Name	Included	Not applicable	If not applicable, State brief reason
Provide storm drain system stenciling and signage	X		
Design and construct outdoor material storage areas to reduce pollution introduction		X	No materials will be stored outdoor.
Design and construct trash and waste storage areas to reduce pollution introduction	X		
Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	X		
Protect slopes and channels and provide energy dissipation		X	No slopes or channels are proposed.
Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	X		
a. Dock areas		X	Not proposed/No Activities
b. Maintenance bays		X	Not proposed/No Activities.
c. Vehicle wash areas		X	Not proposed/No Activities.
d. Outdoor processing areas		X	Not proposed/No Activities.
e. Equipment wash areas		X	Not proposed/No Activities.
f. Fueling areas		X	Not proposed/No Activities.
g. Hillside landscaping		X	No hillside is present on the project site.
h. Wash water control for food preparation areas		X	Not proposed/No Activities.
i. Community car wash racks		X	Not proposed/No Activities.

Provide storm drain system stenciling and signage

TP Heritage Inn of Monrovia, LLC shall provide storm drain system stenciling and signage at the appropriate locations. Repair of storm drain system stenciling and signage shall be performed regularly and at least three times a year or as many times a necessary during the storm seasons.

Catch Basin Stenciling and Signage

It is widely recognized that the use of storm drains and catch basins for illegal disposal of waste materials can introduce a significant quantity of pollutants into receiving waters.

Contributing to this problem is the common misconception that storm drains and sanitary sewers are part of the same system and that materials dumped into storm drains will ultimately arrive at a waste water treatment facility.

Stenciling catch basins by the owner will inform the public about non-point source pollution, highlighting the direct link between such basins and sensitive Los Angeles County receiving waters and draws public attention to the fate of materials that are dumped into the storm drain system. The stencil will carry the message “NO DUMPING-DRAINS TO OCEAN”.

SD13-Storm Drain Signage
SC44-Drainage System Maintenance
TC40-Media Filter
TC50-Water Quality Inlet.
BMP Maintenance Responsibility/Frequency Matrix in Section VI.

Design and construct outdoor material storage areas to reduce pollution introduction

Not applicable to this project. No outdoor material storage areas are proposed. Please see architecture plans and improvement plans for detail.

Design and Construct Trash and Waste Storage Areas to Reduce Pollution Introduction

TP Heritage Inn of Monrovia, LLC shall provide trash and waste storage areas through its contractors. See Architecture Plans and Improvement Plans for details. TP Heritage Inn of Monrovia, LLC through its site maintenance contractor shall maintain daily. Trash dumpster shall be picked up at least once a week. Loose trash shall be picked up daily and shall be placed in containers periodically. The trash storage areas shall be inspected and maintained daily by the maintenance contractor in order to prevent overflowing dumpster and open lids. The trash container area shall contain trash bins with covers to prevent rain from entering the bin to reduce water pollution. The bins will be provided with self-closing features and will be inspected on a regular basis as needed for the amount of trash generated. The design of the trash container area will include features such that drainage from adjoining roofs and pavements shall be diverted around the trash container areas. All trash container areas will be surrounded by walls and gates to prevent offsite transport of trash. All employees will be instructed to make sure that covers are kept closed and only opened at the time the trash is deposited. Trash and waste storage areas will be constructed to reduce pollution. It will be located outside the building and trash enclosure will be installed.

SD32-Trash Storage Areas
BMP Maintenance Responsibility/Frequency Matrix in Section VI

Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control

TP Heritage Inn of Monrovia, LLC through site maintenance contractor shall be responsible to inspect irrigation equipment such as water sensors, irrigation heads and

timing on a monthly basis. TP Heritage Inn of Monrovia, LLC shall propose landscape and irrigation system that reduces excess irrigation runoff and promote surface filtration and complies with the County of Los Angeles. For this project, water meters will be installed at appropriate locations. TP Heritage Inn of Monrovia, LLC shall instruct the landscape architect to select plant materials that will minimize the need for fertilizer and pesticides. Limited use of herbicides will be used at the initial installation to deal with existing and latent weeds. Plant materials will be encouraged to spread quickly so as to minimize the future need for herbicide. Hand weeding will take place as plants mature. Herbicides used will be the type that decomposes rapidly. TP Heritage Inn of Monrovia, LLC shall encourage the use of native and drought tolerant plants which adapt to local soil conditions and are resistant to pests where appropriate. Watering practices will be implemented to minimize fungus and mildew potential. The use of gypsum will be encouraged to improve oil drainage and further minimize the need for fertilizers. The following BMPs for the particular subject is included in Section VII:

SD10-Site Design & Landscape Planning

SD12-Efficient Irrigation

SD20-Pervious Pavements

SD31-Maintenance Bays & Docks

BMP Maintenance Responsibility/Frequency Matrix in Section VI.

Protect slopes and channels and provide energy dissipation

Not applicable to this project. No slopes or channels are proposed for this project. Please see improvement plans for details.

Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)

a. Dock areas

Not applicable. No maintenance bays shall be proposed.

b. Maintenance bays

Not applicable. No maintenance bays shall be proposed.

c. Vehicle wash areas

Not applicable. No vehicle wash activities will be performed onsite.

d. Outdoor processing areas

Not applicable. No washing, steam cleaning, vehicle or equipment maintenance and repair, or material processing activities will be conducted onsite.

e. Equipment wash area

Not applicable. No activities of equipment washing will be performed onsite.

f. Fueling area

Not applicable. No activities of fueling will be performed onsite.

g. Hillside landscaping

Not applicable. No nearby hillside is found in the vicinity of the project site.

h. Wash water control for food preparation areas

Not applicable. No food preparation area proposed.

i. Community car wash racks

No activities of car wash will be conducted on-site, therefore, not applicable.

Section XIII. List of Attachments

Attachment A: Rainfall Depth, Soil Type, Location Map

Attachment B: Hydrology Exhibit

Attachment C: HydroCalc Outputs

Attachment D: BMP Design Summary

Attachment E: Existing Storm Drain Plan

Attachment F: Infiltration Analysis

Attachment G: Hydrograph Output

Attachment H: LAFCD Correspondence

Attachment A: Rainfall Depth, Soil Type,
Location Map

34° 15' 00"

CHILAO FLAT 1-H1.39

-118° 07' 30"

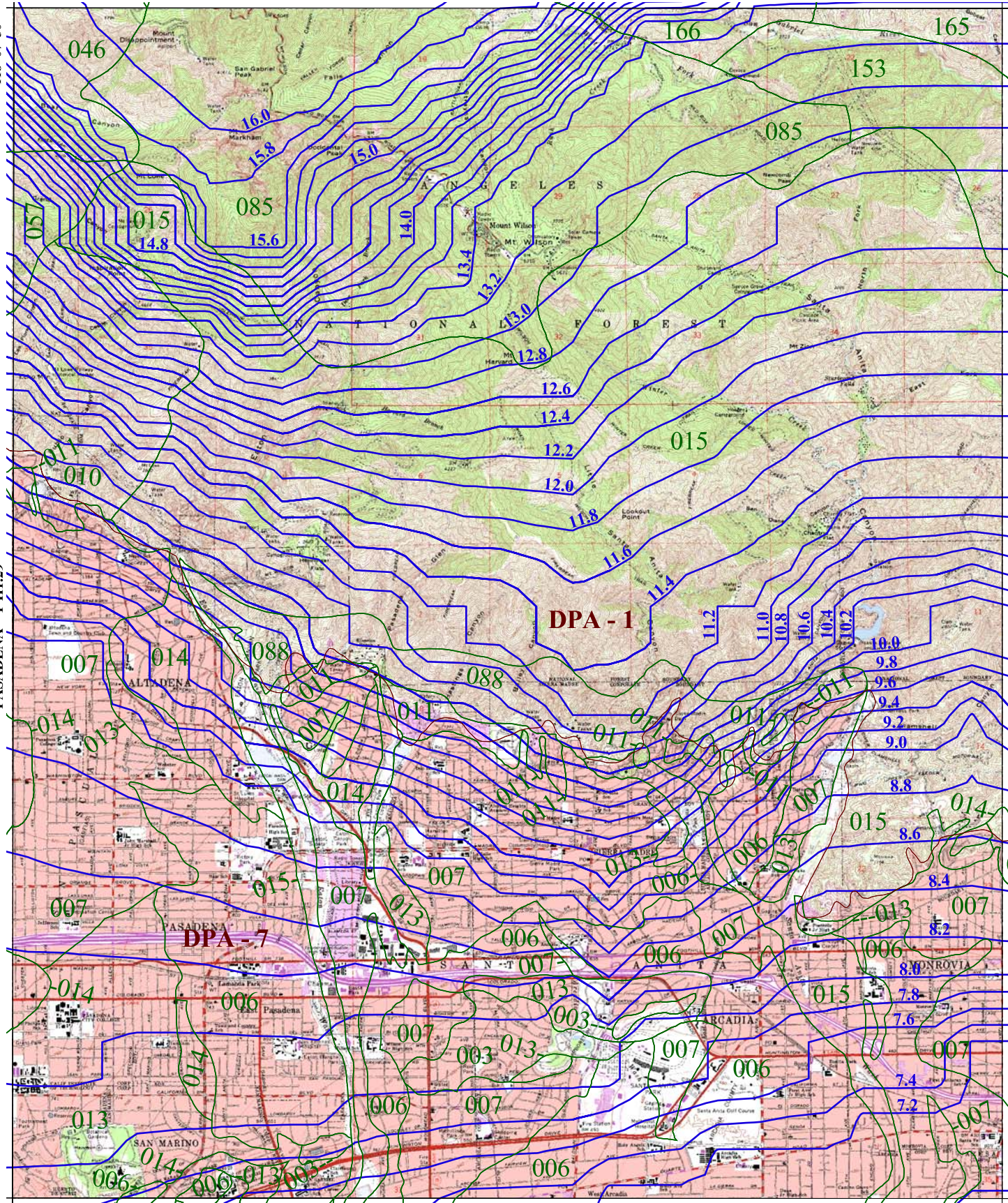
PASADENA 1-H1.29

AZUSA 1-H1.31

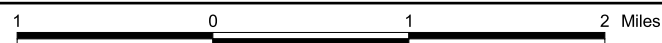
-118° 00' 00"

EL MONTE 1-H1.20

34° 07' 30"



- 016 SOIL CLASSIFICATION AREA
- 7.2 INCHES OF RAINFALL
- DPA - 6 DEBRIS POTENTIAL AREA



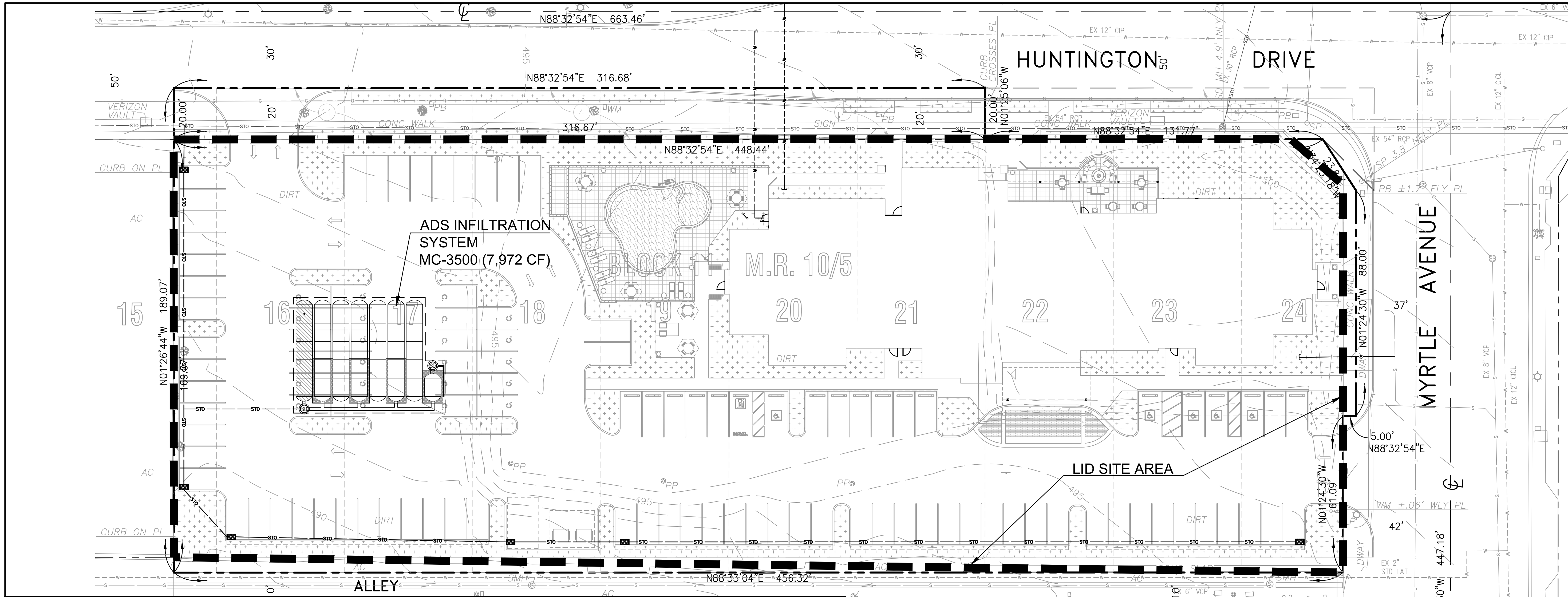
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
 10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

MOUNT WILSON 50-YEAR 24-HOUR ISOHYET

1-H1.30

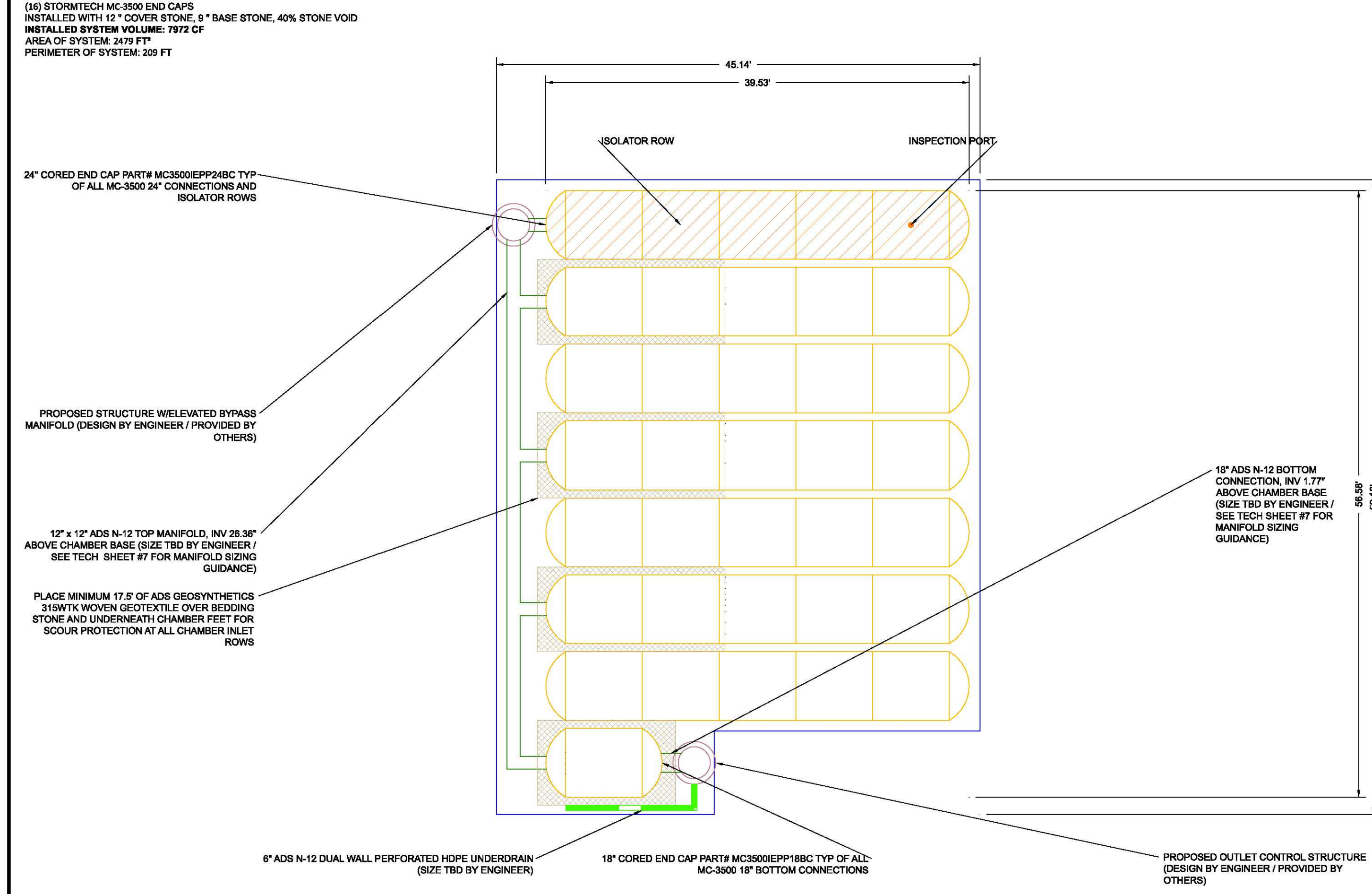


Attachment B: Hydrology Exhibit



CONCEPTUAL LAYOUT
 (86) STORMTECH MC-3500 CHAMBERS
 (46) STORMTECH MC-3500 END CAPS
 INSTALLED WITH 12" COVER STONE, 9" BASE STONE, 40% STONE VOID
 INSTALLED SYSTEM VOLUME: 7972 CF
 AREA OF SYSTEM: 2479 FT²
 PERIMETER OF SYSTEM: 209 FT

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION



REV	DATE	DESCRIPTION

StormTech
 4445 TRUMBULL BLVD
 HULLAND, OH 43028
 1-800-732-7473

NOT TO SCALE

SHEET 2 OF 6

RASN-3160228	MONROVIA, CA
DATE: 08/14/2017	DRAWN: SJJ
PROJECT #: 1604	CHECKED: SJJ

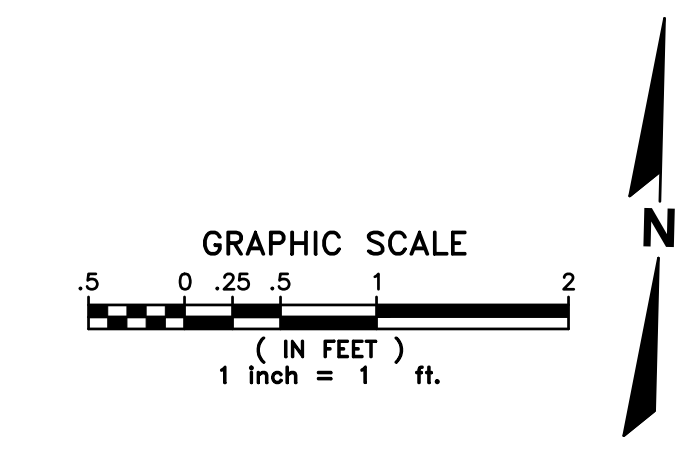
HYDROCALC - L.I.D. ANALYSIS

Peak Flow Hydrologic Analysis
 File location: Q:\160228\Eng Data\Hydrology\Project - SITE WIDE.pdf
 Version: HydroCalc 0.3.1

Input Parameters	
Project Name	Project
Subarea ID	SITE WIDE
Area (ac)	1.926
Flow Path Length (ft)	289.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.2
Percent Impervious	0.85
Soil Type	7
Design Storm Frequency	85th percentile storm
Fire Factor	0.71
LID	True

Output Results	
Modeled (85th percentile storm) Rainfall Depth (in)	1.2
Peak Intensity (in/hr)	0.4144
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	0.6226
Burned Peak Flow Rate (cfs)	0.6549
24-Hr Clear Runoff Volume (ac-ft)	0.149
24-Hr Clear Runoff Volume (cu-ft)	6489.8706

VOLUME TO BE RETAINED ON-SITE



RA SMITH NATIONAL ASSUMES NO RESPONSIBILITY FOR DAMAGES, LIABILITY OR COSTS RESULTING FROM CHANGES OR ALTERATIONS MADE TO THIS PLAN WITHOUT THE EXPRESSED WRITTEN CONSENT OF RA SMITH NATIONAL.

THE LOCATIONS OF EXISTING UTILITY INSTALLATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE. THERE MAY BE OTHER UNDERGROUND UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.



WDID NO.: PENDING



DATE	DESCRIPTION

R.A. Smith National
 Beyond Surveying
 and Engineering
 www.rasmithnational.com

MONROVIA HOTEL
 E HUNTINGTON DRIVE & S MYRTLE AVENUE
 CONCEPTUAL L.I.D. PLAN

© COPYRIGHT 2017
 R.A. Smith National, Inc.
 DATE: 08/14/17
 SCALE: #####
 JOB NO. 3160228
 PROJECT MANAGER:
 SAMUEL JACOBY
 DESIGNED BY: EAR
 CHECKED BY: SJJ
 SHEET NUMBER
 4 OF 4

Attachment C: HydroCalc Outputs

Peak Flow Hydrologic Analysis

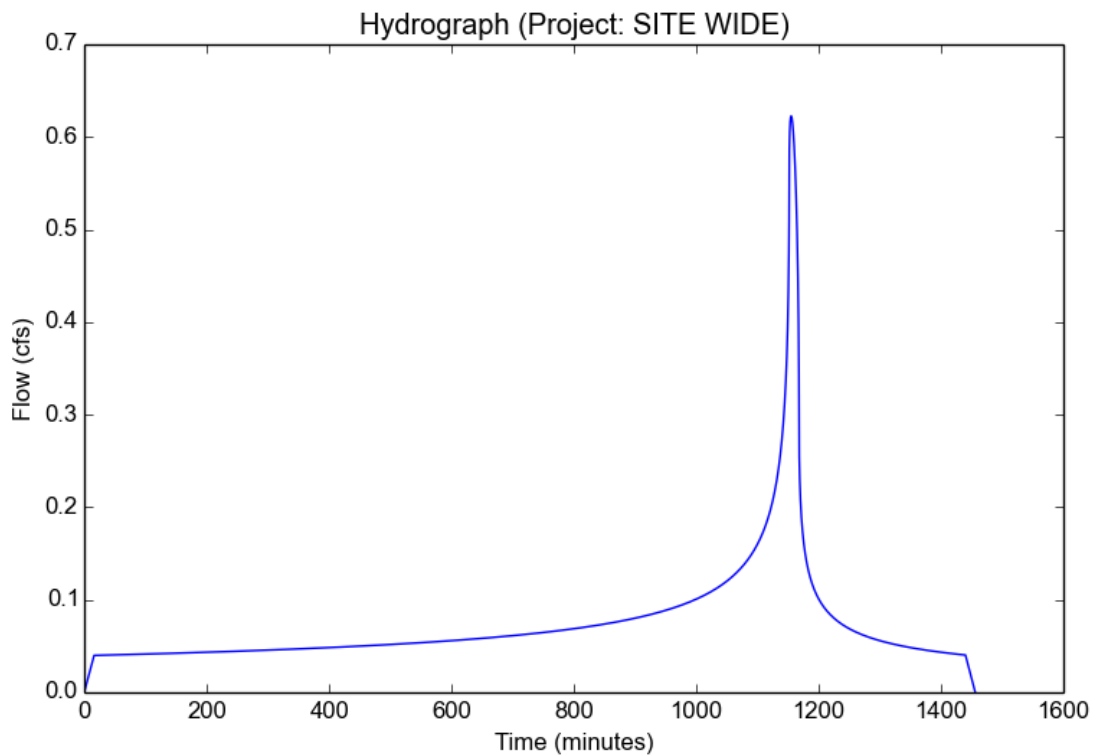
File location: Q:/3160228/Eng Data/Hydrology/Project - SITE WIDE.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	Project
Subarea ID	SITE WIDE
Area (ac)	1.926
Flow Path Length (ft)	289.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.2
Percent Impervious	0.85
Soil Type	7
Design Storm Frequency	85th percentile storm
Fire Factor	0.71
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.2
Peak Intensity (in/hr)	0.4144
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	0.6226
Burned Peak Flow Rate (cfs)	0.6549
24-Hr Clear Runoff Volume (ac-ft)	0.149
24-Hr Clear Runoff Volume (cu-ft)	6489.8706



Attachment D: BMP Design Summary



ADVANCED DRAINAGE SYSTEMS, INC.



RASN-3160228

MONROVIA, CA

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MADE FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
 - a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
 - b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
 - c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS.

STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING..
10. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT

(36) STORMTECH MC-3500 CHAMBERS
 (16) STORMTECH MC-3500 END CAPS
 INSTALLED WITH 12" COVER STONE, 9" BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 7972 CF
 AREA OF SYSTEM: 2479 FT²
 PERIMETER OF SYSTEM: 209 FT

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION

24" CORED END CAP PART# MC3500IEPP24BC TYP OF ALL MC-3500 24" CONNECTIONS AND ISOLATOR ROWS

PROPOSED STRUCTURE W/ELEVATED BYPASS MANIFOLD (DESIGN BY ENGINEER / PROVIDED BY OTHERS)

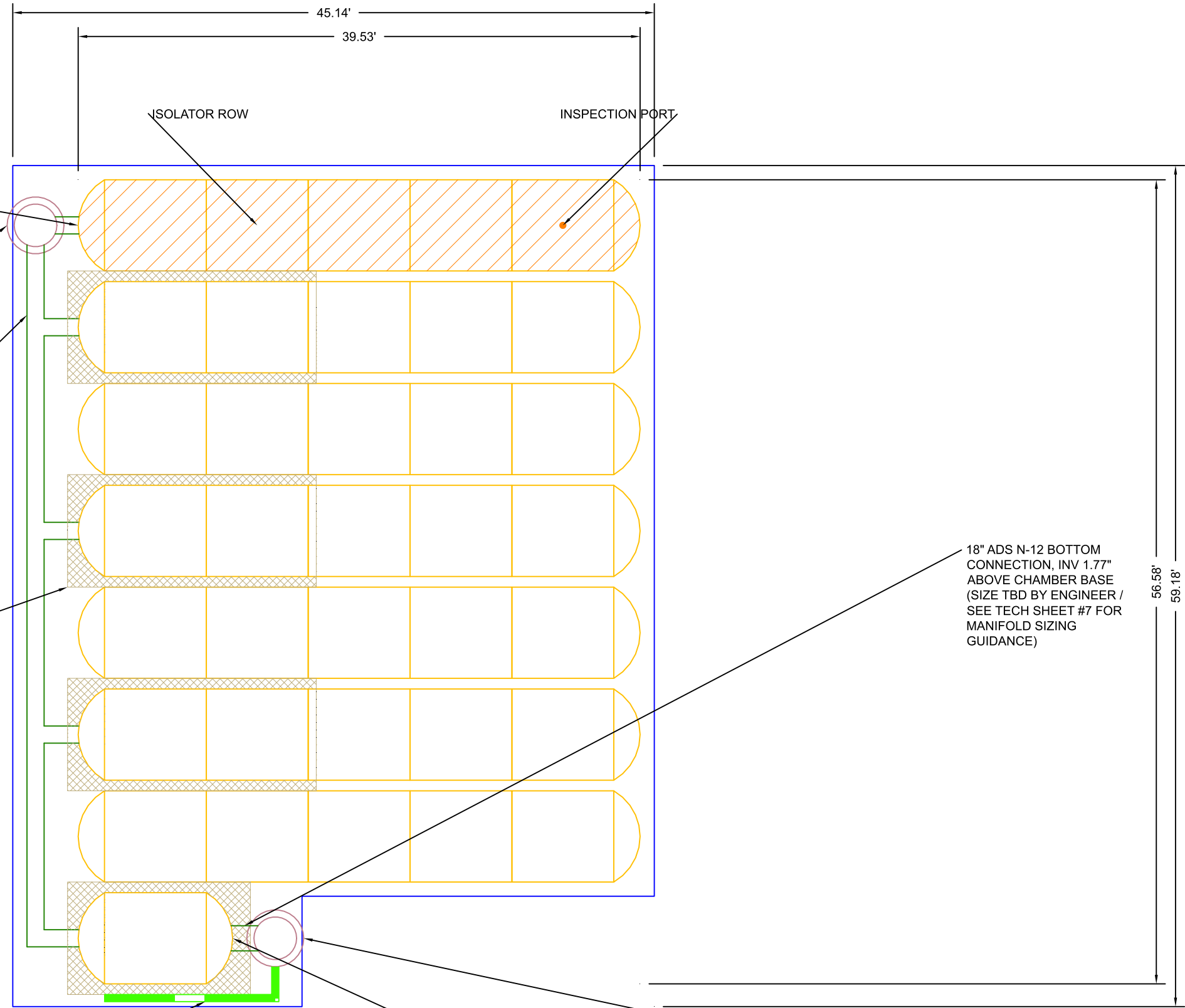
12" x 12" ADS N-12 TOP MANIFOLD, INV 26.36" ABOVE CHAMBER BASE (SIZE TBD BY ENGINEER / SEE TECH SHEET #7 FOR MANIFOLD SIZING GUIDANCE)

PLACE MINIMUM 17.5' OF ADS GEOSYNTHETICS 315WTK WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN (SIZE TBD BY ENGINEER)

18" CORED END CAP PART# MC3500IEPP18BC TYP OF ALL MC-3500 18" BOTTOM CONNECTIONS

PROPOSED OUTLET CONTROL STRUCTURE (DESIGN BY ENGINEER / PROVIDED BY OTHERS)



RASN-3160228	MONROVIA, CA
DATE: 06/10/2016	DRAWN: SJ
PROJECT #: Tool	CHECKED: ---

REV	DRW	CHK	DESCRIPTION

StormTech
 Detention - Retention - Water Quality
 70 NWWOOD ROAD, SUITE 3 | ROCKY HILL, CT | 06067
 860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
 ADVANCED DRAINAGE SYSTEMS, INC.
 4640 TRUEMAN BLVD
 HILLIARD, OH 43026
 1-800-733-7473

NOT TO SCALE

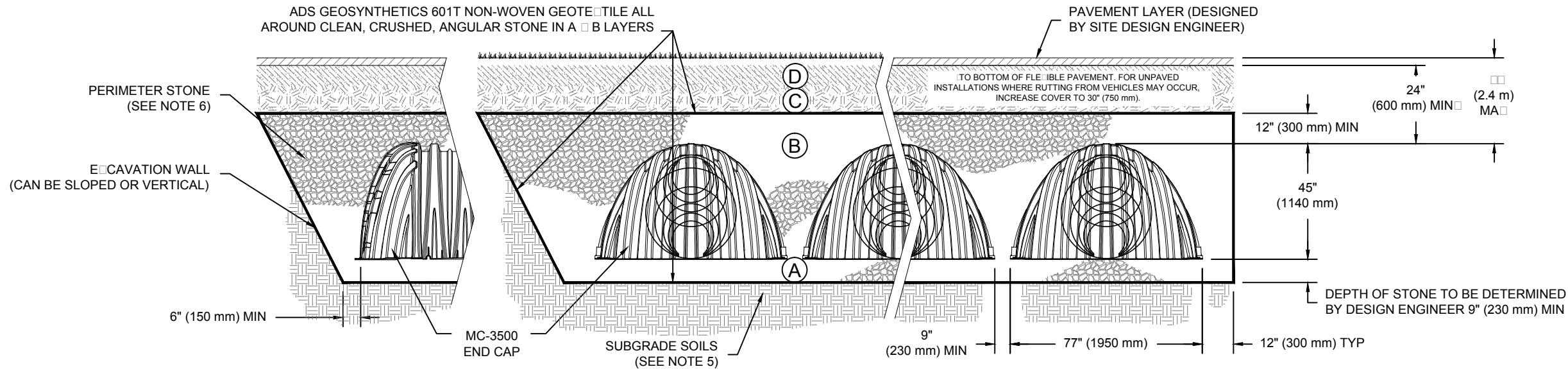
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER D. STARTS FROM THE TOP OF THE C LAYER TO THE BOTTOM OF FLEETIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE D LAYER.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER C. STARTS FROM THE TOP OF THE EMBEDMENT STONE (B LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE C LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 71, 8, 9, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE (A LAYER) TO THE C LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR ALL LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

- MC-3500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2411 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2717 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
- THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- ONCE LAYER C IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER D UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER C OR D AT THE SITE DESIGN ENGINEER'S DISCRETION.

RASN-3160228
MONROVIA, CA

DATE: 06/10/2016
DRAWN: SJ
PROJECT: Tool
CHECKED: --

DESCRIPTION

CHK

DRW

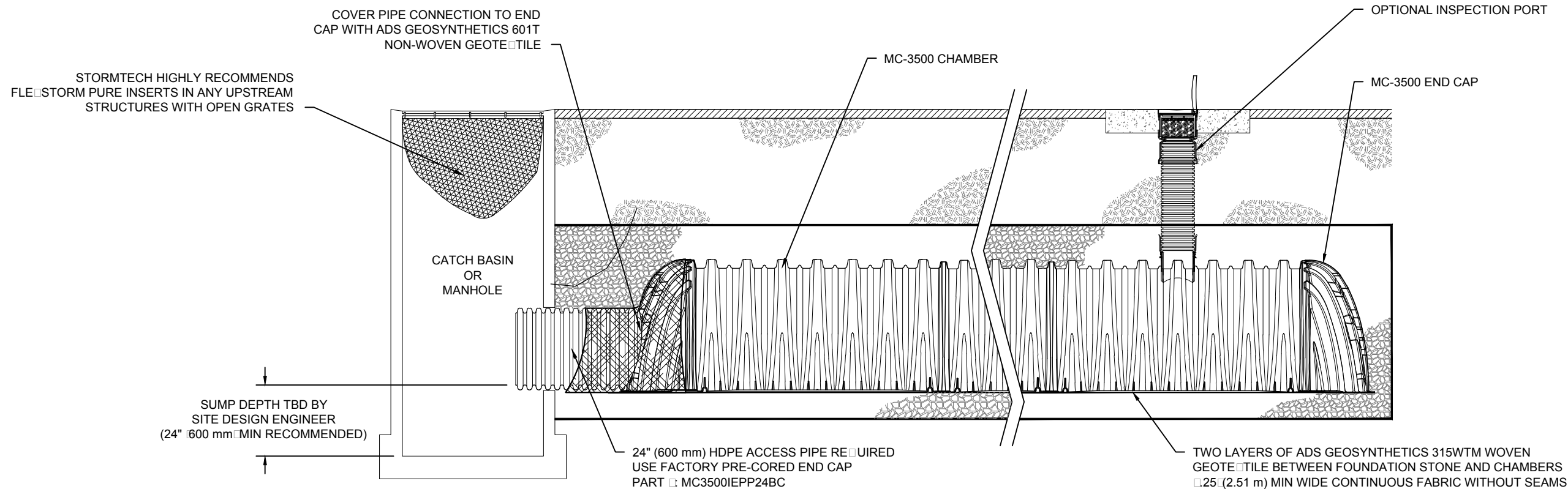
REV



70 INWOOD ROAD, SUITE 3 | ROCKY HILL, CT | 06867
60-528-7111 | 800-92-2894 | WWW.STORMTECH.COM

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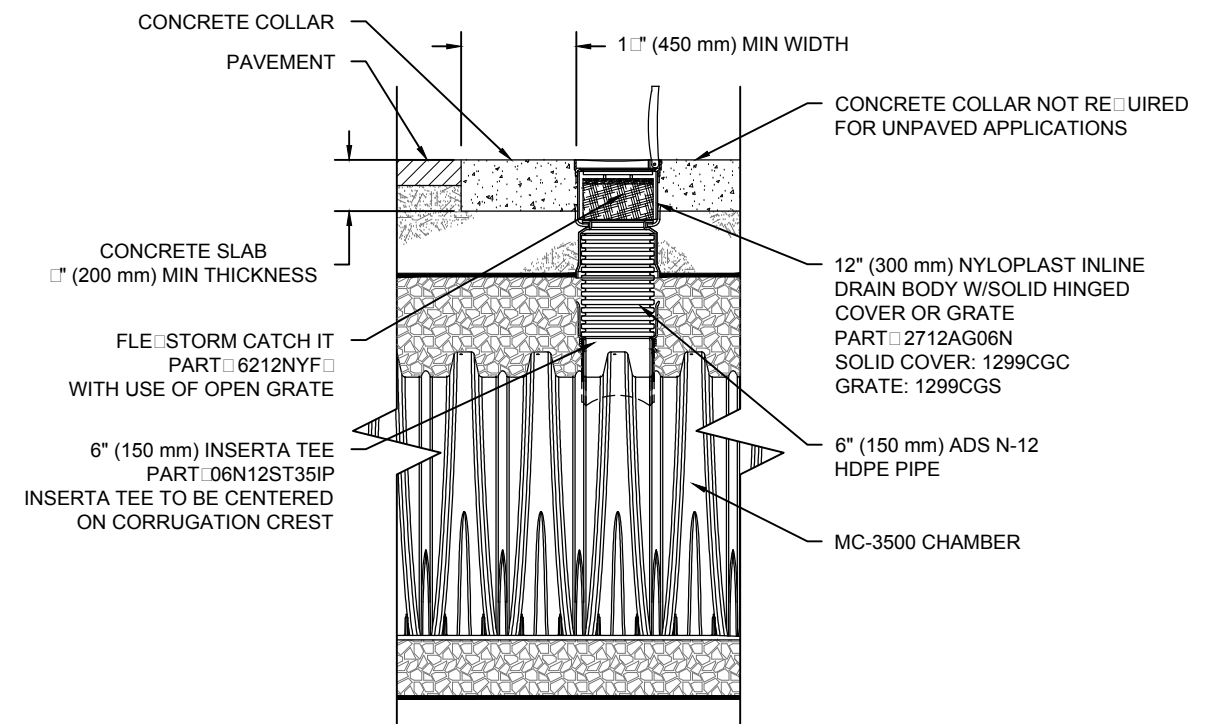
MC-3500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEETSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (76 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (76 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW USING THE DETVAC PROCESS
- A. A FIRED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF DETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS. RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT LETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-3500 6" INSPECTION PORT DETAIL
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PROJECT	TOOL	REV	CHK	DESCRIPTION

REV	CHK	DESCRIPTION

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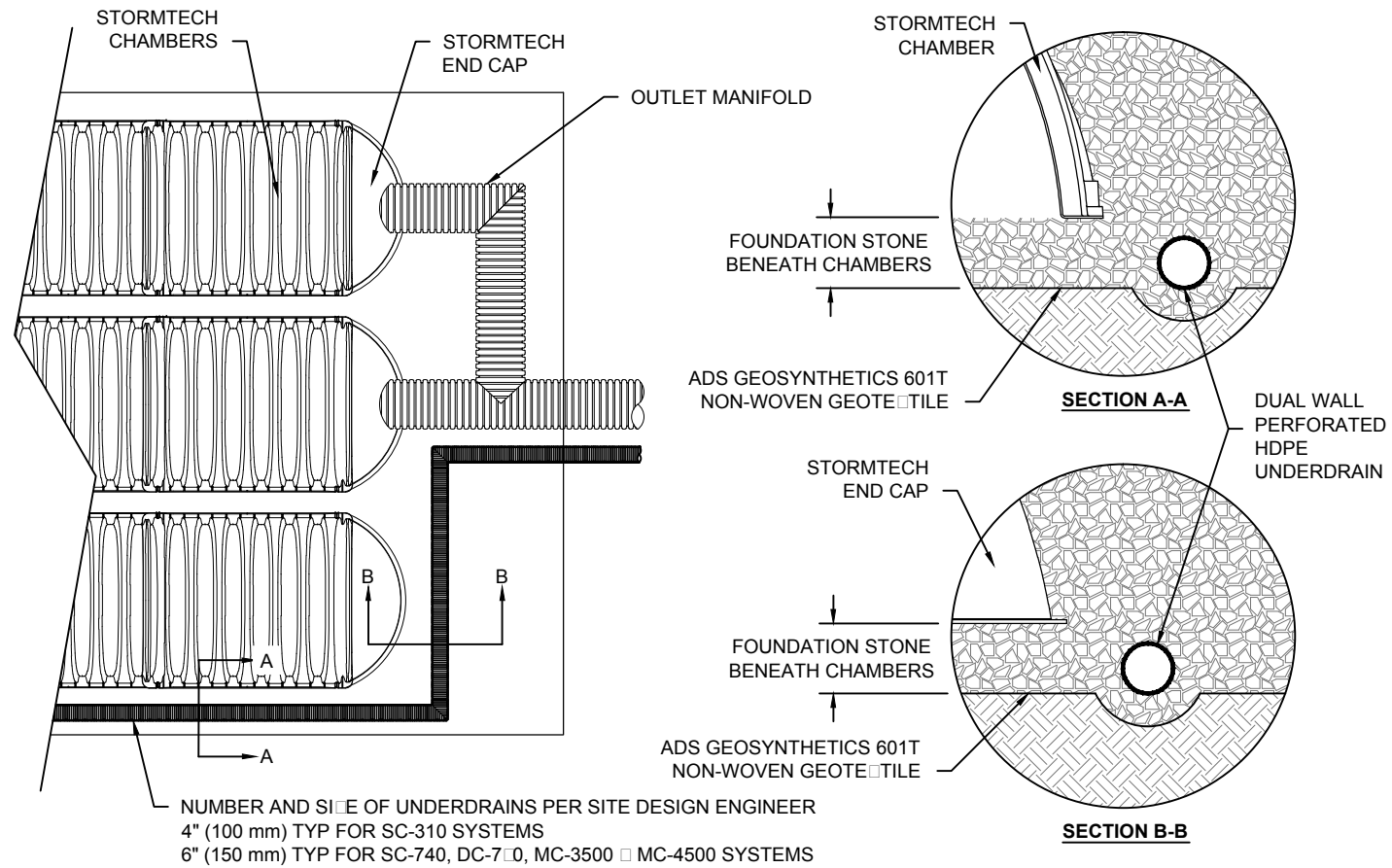
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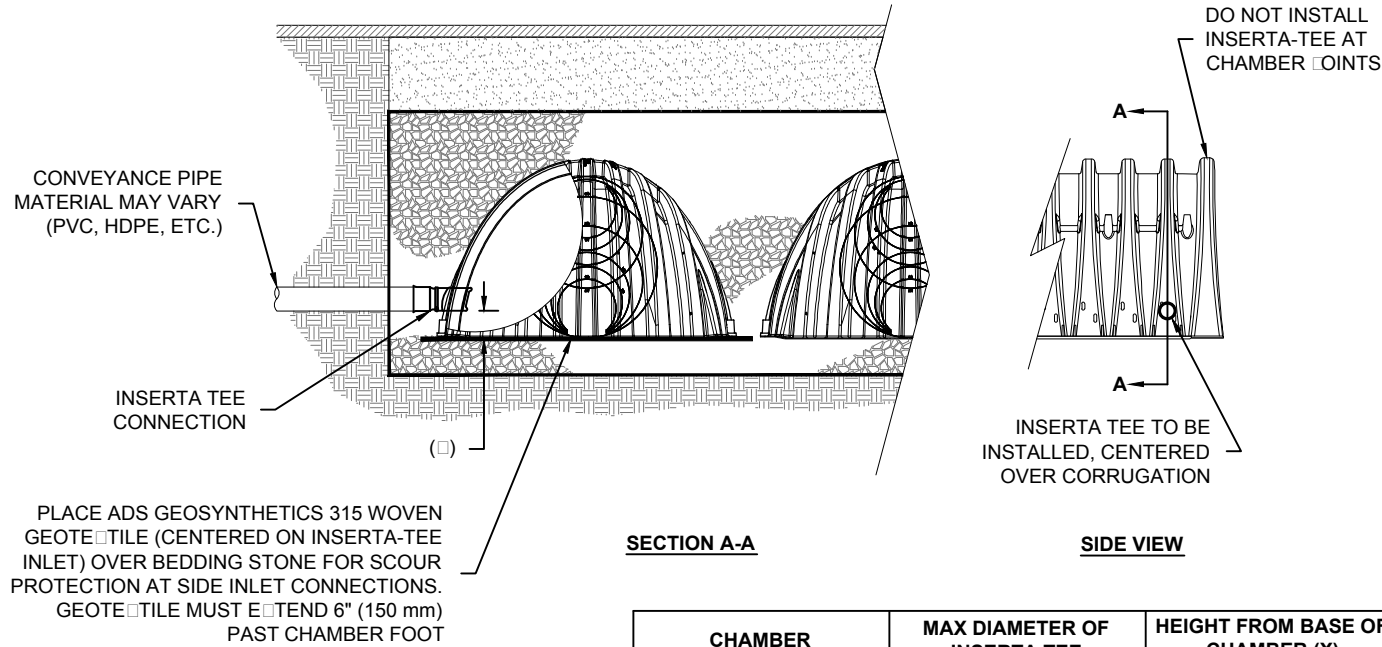
UNDERDRAIN DETAIL

NTS



INSERTA TEE DETAIL

NTS



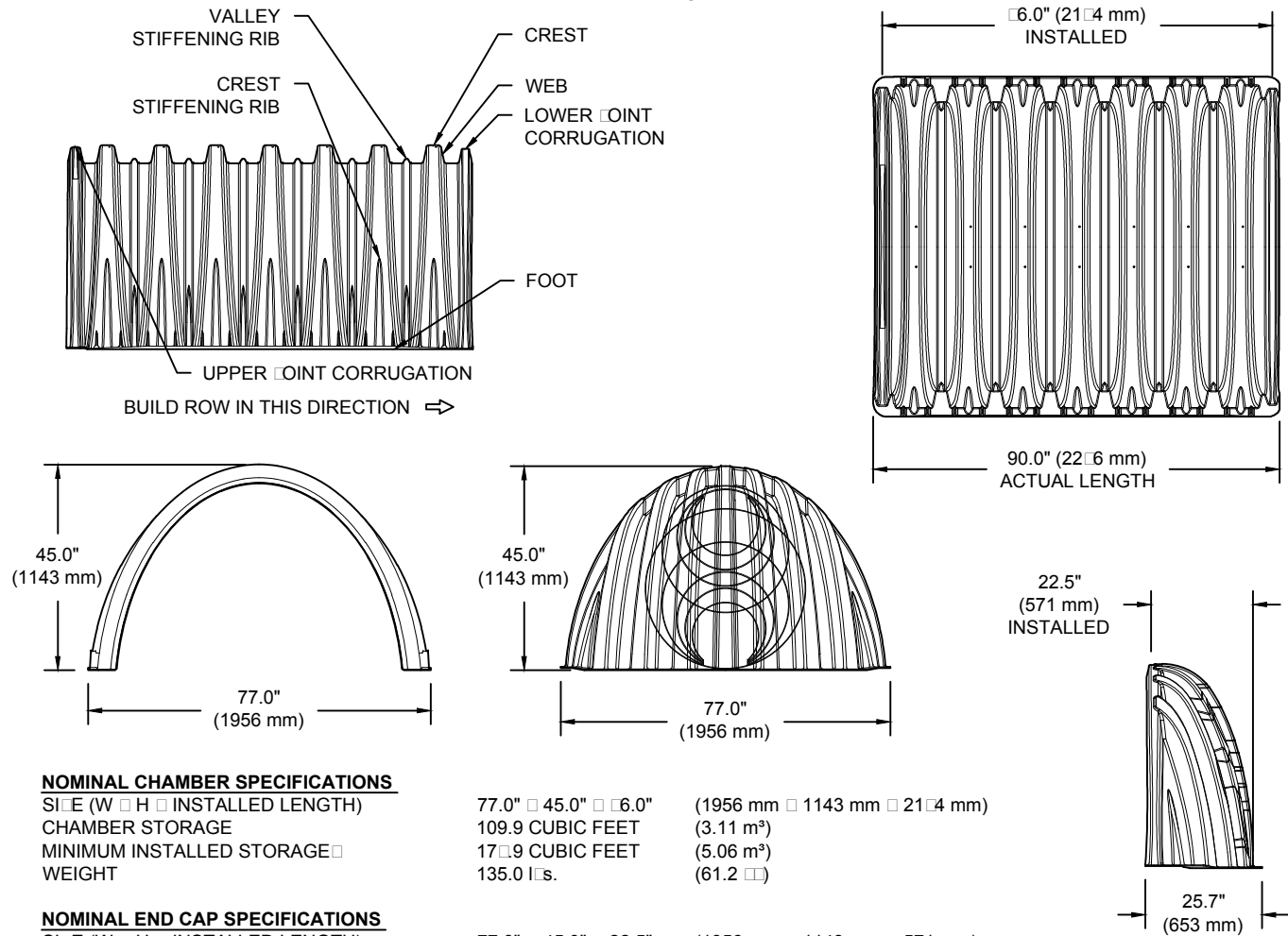
CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-700	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)

INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON

NOTE:
 PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

MC-3500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W x H x INSTALLED LENGTH)	77.0" x 45.0" x 6.0"	(1956 mm x 1143 mm x 214 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m ³)
MINIMUM INSTALLED STORAGE	17.9 CUBIC FEET	(5.06 m ³)
WEIGHT	135.0 lbs.	(61.2 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W x H x INSTALLED LENGTH)	77.0" x 45.0" x 22.5"	(1956 mm x 1143 mm x 571 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m ³)
MINIMUM INSTALLED STORAGE	46.0 CUBIC FEET	(1.30 m ³)
WEIGHT	50.0 lbs.	(22.7 kg)

ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
 STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B	---	---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B	---	---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B	---	---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B	---	---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B	---	---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18BC	---	---	1.77" (45 mm)
MC3500IEPP24TC	24" (600 mm)	14.4" (366 mm)	---
MC3500IEPP24BC	---	---	2.06" (52 mm)
MC3500IEPP30BC	30" (750 mm)	---	---

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECURED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-4" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN B ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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DESCRIPTION

CHK

REV

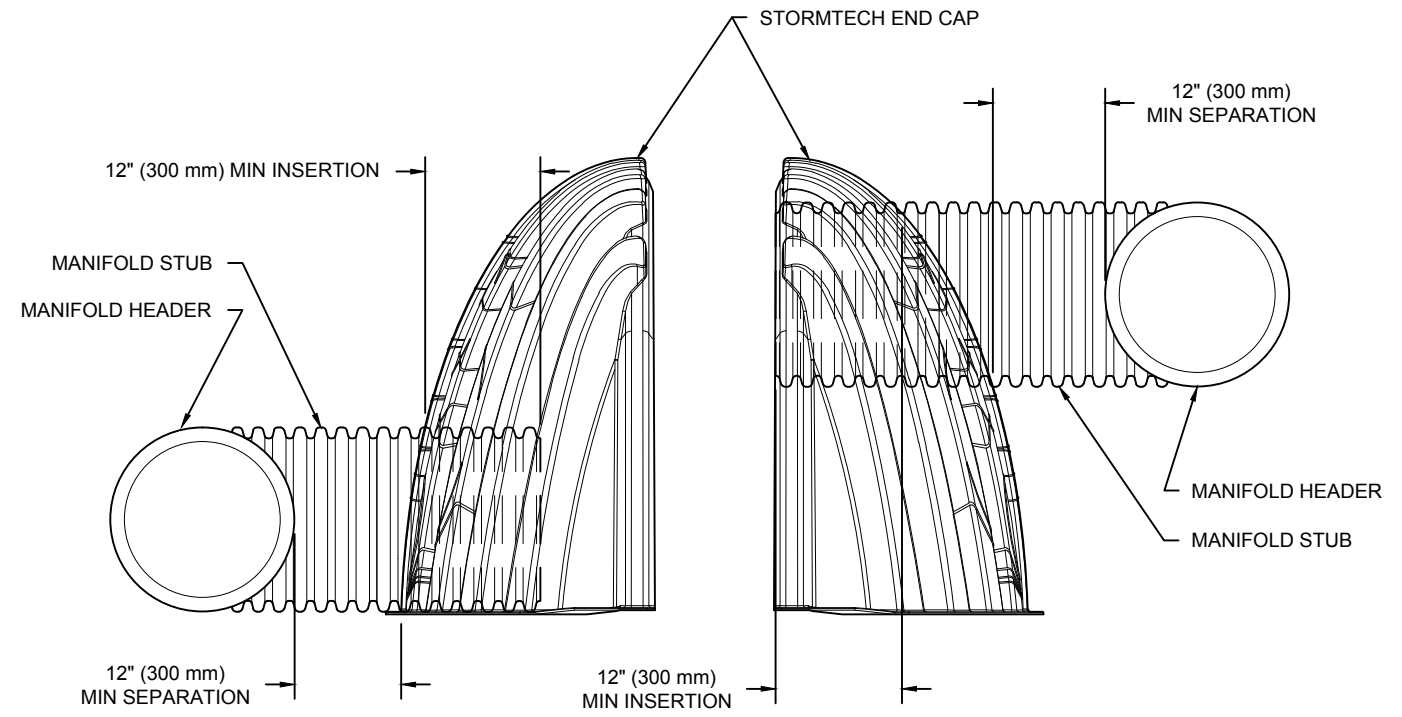


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MC-SERIES END CAP INSERTION DETAIL

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NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

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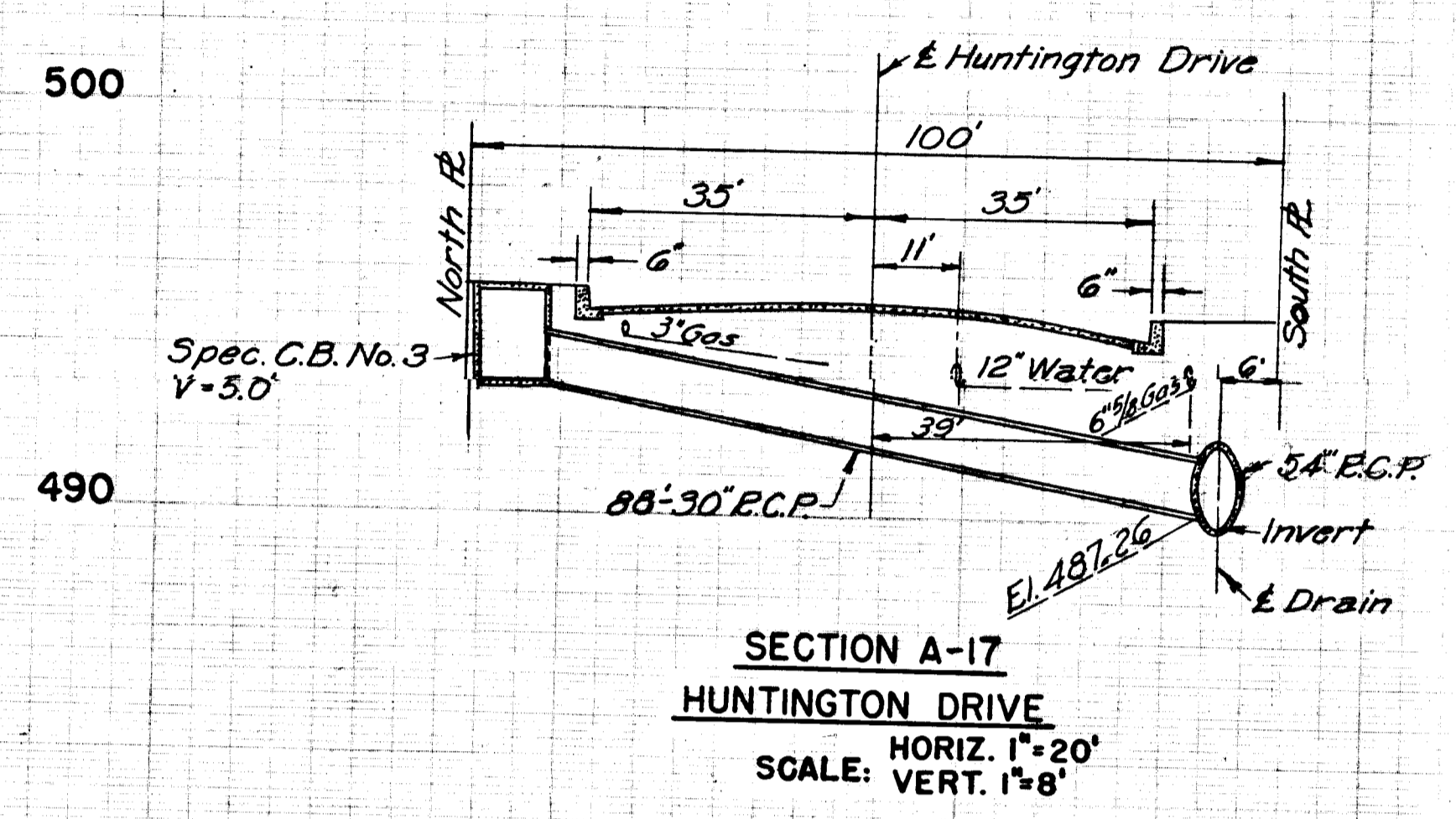
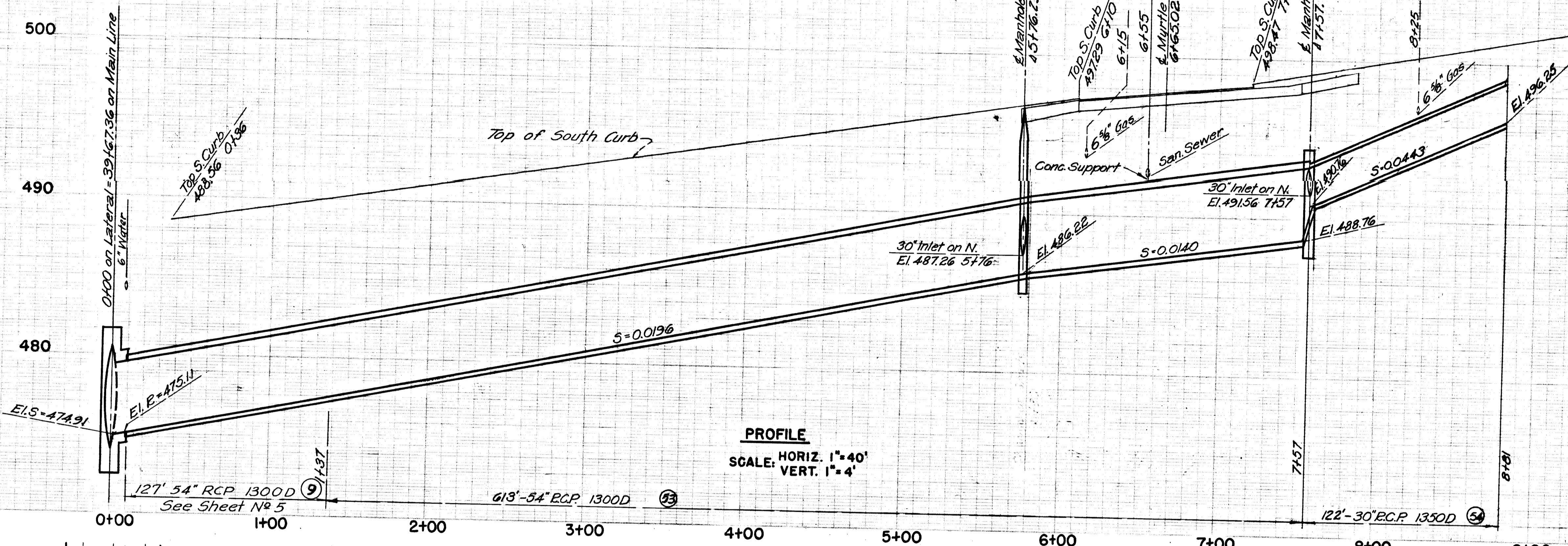
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(860) 528-7100 | FAX: 92-2884 | WWW.STORMTECH.COM

REV	DRW	CHK	DESCRIPTION

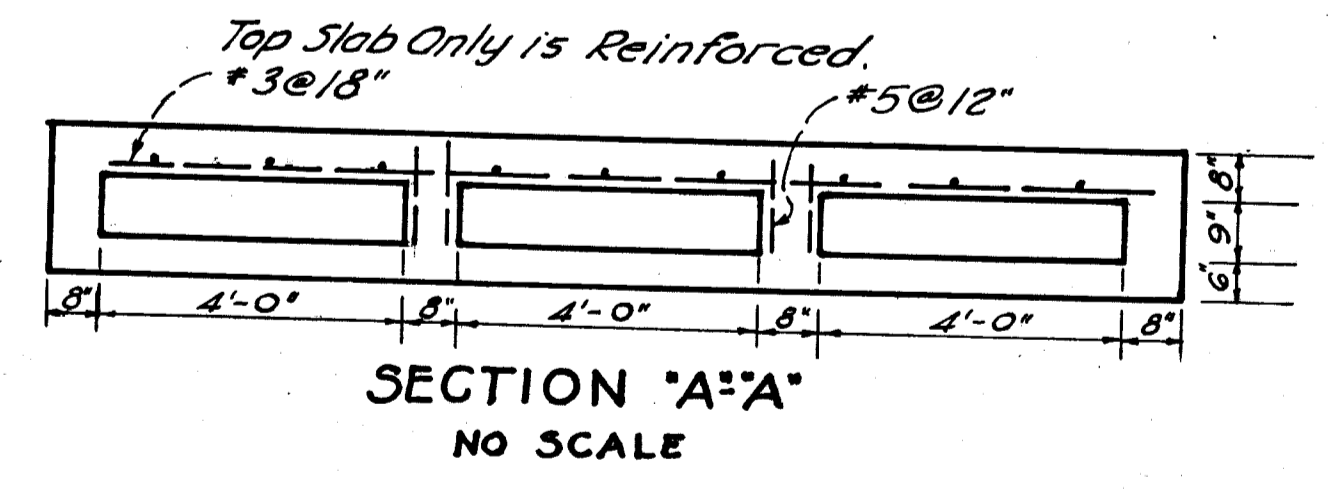
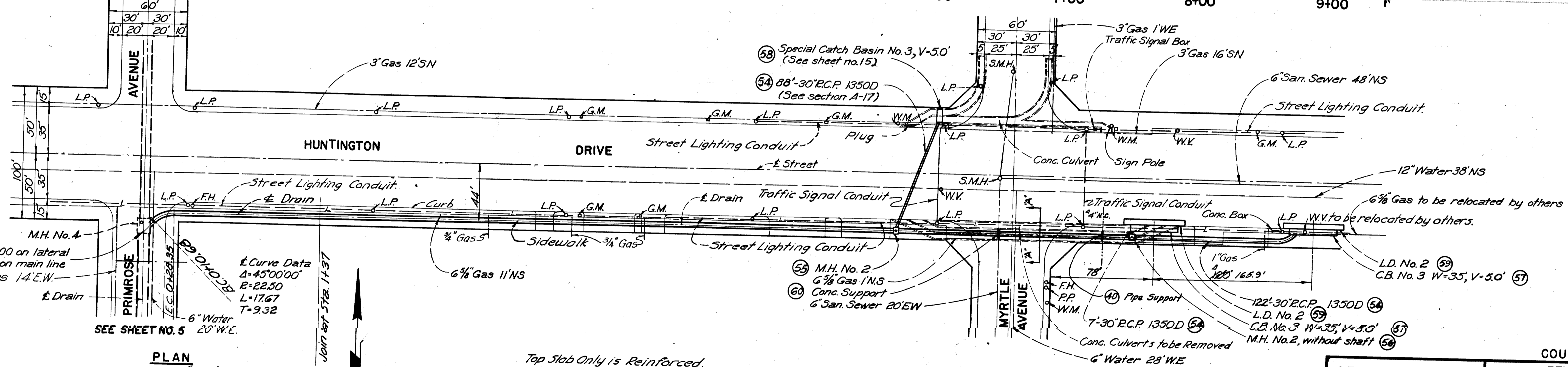
RASN-3160228 MONROVIA, CA	
DATE: 06/10/2016	DRAWN: SJ
PROJECT: Tool	CHECKED: --

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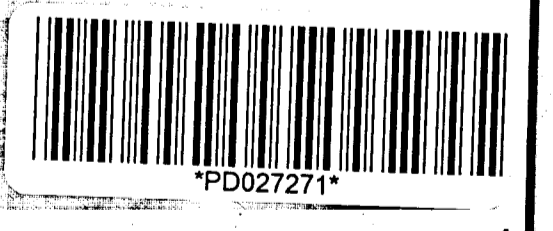
Attachment E: Existing Storm Drain Plan



LA Co. Precise Level Net B.M. 11-10
 66' S of the E. of Huntington Dr. & 5' E. of Myrtle Ave.
 in a well cut thru the pavement & protected by a cast-
 iron cover marked "County Surveyor Monument" a
 3rd County Surveyor Monument marked "B.M. 11-10 1952
 R.E. 63' Set in concrete 10' below the surface of the street.
 F.B. 1376-13 1952 Adj. Elev. 496.646



PREPARED BY
DANIEL MARK JOHNSON & MENDEMINA
 ARCHITECTS & ENGINEERS
 4381 SANDWICH BLVD. LOS ANGELES - CALIFORNIA 90020
 BY *L. Monte* REG. & E. No. 7128



CITY OF MONROVIA		REVISIONS		LOS ANGELES COUNTY FLOOD CONTROL DISTRICT	
APPROVED	DATE	MARK	DATE	DESCRIPTION	
APPROVED <i>[Signature]</i>	June 15 1954	Δ	8-56	Revised to "As Built"	
BY <i>[Signature]</i>					
APPROVED <i>[Signature]</i>	June 13, 1954				
BY <i>[Signature]</i>					

DRAWN BY: MONROVIA	DESIGNED BY: MONROVIA	APPROVED BY: <i>[Signature]</i>
TRACED BY: MONROVIA	SUBMITTED BY: <i>[Signature]</i>	CHECKED BY: <i>[Signature]</i>
CHECKED BY: W.H.E.D.	RECOMMENDED BY: <i>[Signature]</i>	DIVISION ENGINEER (6600)

PROJECT NO. 216	SCALE: AS SHOWN	DATE: APRIL 54	NO. 181-216-DI.17
RUBY CANYON STORM DRAIN			SHEET 17 OF 19
HUNTINGTON DRIVE LATERAL			
R.C.P. CONDUIT			
STA. 0+00 TO STA. 8+81			
PLAN, PROFILE, & SECTIONS			

Attachment F: Infiltration Analysis



SALEM
engineering group, inc.

GEOTECHNICAL ENGINEERING INVESTIGATION

**PROPOSED TOWNEPLACE SUITES HOTEL
E. HUNTINGTON DRIVE & S. MYRTLE AVENUE
MONROVIA, CALIFORNIA**

**SALEM PROJECT NO. 3-216-0956
SEPTEMBER 30, 2016**

PREPARED FOR:

**MR. DON CAPE
THARALDSON INVESTMENTS
4255 DEAN MARTIN DRIVE, STE J
LAS VEGAS, NV 89103**

PREPARED BY:

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September 30, 2016

Project No. 3-216-0956

Mr. Don Cape
Tharaldson Investments
4255 Dean Martin Drive, Ste J
Las Vegas, NV 89103

**Subject: Geotechnical Engineering Investigation
Proposed TownePlace Suites Hotel
E. Huntington Drive & S. Myrtle Avenue
Monrovia, California**

Dear Mr. Cape:


At your request and authorization, SALEM Engineering Group, Inc. (SALEM) has prepared this Geotechnical Engineering Investigation report for the proposed TownePlace Suites Hotel to be located at the subject site.

The accompanying report presents our findings, conclusions, and recommendations regarding the geotechnical aspects of designing and constructing the project as presently proposed. In our opinion, the proposed project is feasible from a geotechnical viewpoint provided our recommendations are incorporated into the design and construction of the project.


We appreciate the opportunity to assist you with this project. Should you have questions regarding this report or need additional information, please contact the undersigned at (909) 980-6455.

Respectfully Submitted,

SALEM ENGINEERING GROUP, INC.



Clarence Jiang, GE
Senior Geotechnical Engineer
RGE 2477



R. Sammy Salem, MS, PE, GE
Principal Engineer
RCE 52762 / RGE 2549



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- Figure 2, Site Plan

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- Figures A-1 through A-8, Logs of Exploratory Soil Borings B-1 through B-8
- Seismic Densification Settlement Analysis

APPENDIX B – LABORATORY TESTING

- Consolidation Test Results
- Direct Shear Test Results
- Gradation Curves
- Expansion Index Test Results
- Corrosivity Test Results
- Maximum Density and Optimum Moisture Test Results
- R-Value Test Results

APPENDIX C – EARTHWORK AND PAVEMENT SPECIFICATIONS



**GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED TOWNEPLACE SUITES HOTEL
E. HUNTINGTON DRIVE AND S. MYRTLE AVENUE
MONROVIA, CALIFORNIA**

1. PURPOSE AND SCOPE

This report presents the results of our Geotechnical Engineering Investigation for the Proposed TownePlace Suites Hotel to be located at the southwest corner of the intersection of E. Huntington Drive and S. Myrtle Avenue in the City of Monrovia, California (see Figure 1, Vicinity Map).

The purpose of our geotechnical engineering investigation was to observe and sample the subsurface conditions encountered at the site, and provide conclusions and recommendations relative to the geotechnical aspects of constructing the project as presently proposed.

The scope of this investigation included a field exploration, percolation testing, laboratory testing, engineering analysis and the preparation of this report. Our field exploration was performed on September 7, 2016 and included the drilling of eight (8) small-diameter soil borings to a maximum depth of 46 feet at the site. Additionally, three (3) percolation test holes were drilled on September 20, 2016 and percolation tests were performed on September 21, 2016 at approximately depths of 5 to 8 feet below existing grade for determination of the percolation rate. The locations of the soil borings and percolation tests are depicted on Figure 2, Site Plan. A detailed discussion of our field investigation, exploratory boring logs are presented in Appendix A.

The eastern portion of the site was occupied by a gas station. The scope of services of this report does not include environmental services, such as chemical analyses of soil and groundwater for possible environmental contaminants.

Laboratory tests were performed on selected soil samples obtained during the investigation to evaluate pertinent physical properties for engineering analyses. Appendix B presents the laboratory test results in tabular and graphic format.

The recommendations presented herein are based on analysis of the data obtained during the investigation and our experience with similar soil and geologic conditions. If project details vary significantly from those described herein, SALEM should be contacted to determine the necessity for review and possible revision of this report. Earthwork and Pavement Specifications are presented in Appendix C. If text of the report conflict with the specifications in Appendix C, the recommendations in the text of the report have precedence.

2. PROJECT DESCRIPTION

We understand that development of the site will include construction of a 5-story TownePlace Suites Hotel with 113 guestrooms. The building footprint coverage is approximately 13,800 square feet. Maximum wall load is expected to be on the order of 6 kips per linear foot. Maximum column load is expected to be on the order of 80 kips. Floor slab soil bearing pressure is expected to be on the order of 150 psf. On-site parking and landscaping are planned to be associated with the development

Concrete and asphaltic concrete pavement for parking area, customers travel lanes, and truck lane are to be designed for standard duty and heavy-duty traffic loading based on an Equivalent Single Axle Load (ESAL) of 18 kips, a maximum load of 60,000 ESAL and a design life of 20 years. The pavement design recommendations provided herein are based on the State of California Department (CALTRANS) design manual.

A site grading plan was not available at the time of preparation of this report. As the existing project area is essentially level, we anticipate that cuts and fills during the earthwork will be minimal and limited to providing a level building pad and positive site drainage. In the event that changes occur in the nature or design of the project, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions of our report are modified. The site configuration and locations of proposed improvements are shown on the Site Plan, Figure 2.

3. SITE LOCATION AND DESCRIPTION

The subject site is rectangular in shape and encompasses approximately 1.77 acres. The site located at the southwest corner of the intersection of E. Huntington Drive and S. Myrtle Avenue in the City of Monrovia, California (see Vicinity Plan, Figure 1). The site was occupied by several commercial buildings with addresses of 102 to 140 W Huntington Drive. The eastern portion of the site was occupied by a gas station and was a LUST (leaking underground storage tanks) site. The scope of services of this report does not include environmental services, such as chemical analyses of soil and groundwater for possible environmental contaminants. The site is currently vacant. The site is predominantly surrounded by residential and commercial developments. The site is gently sloping to the west. It appears the site has been roughly graded with 2 slopes dividing the site to 3 sections. The eastern section is approximately 3 feet higher than the middle section and the middle section is approximately 3 feet higher than the western section.

4. FIELD EXPLORATION

Our field exploration consisted of site surface reconnaissance and subsurface exploration. The exploratory test borings (B-1 through B-8) were drilled on September 7, 2016 in the area shown on the Site Plan, Figure 2. The test borings were advanced with an 8-inch diameter hollow stem auger rotated by a truck-mounted CME-45C drill rig. The test borings were extended to a maximum depth of 46 feet below existing grade. Drilling was limited due to auger refusal on very dense gravelly soil.

The materials encountered in the test borings were visually classified in the field, and logs were recorded by a field engineer and stratification lines were approximated on the basis of observations made at the time of drilling. Visual classification of the materials encountered in the test borings were generally made in accordance with the Unified Soil Classification System (ASTM D2487).

A soil classification chart and key to sampling is presented on the Unified Soil Classification Chart, in Appendix "A." The logs of the test borings are presented in Appendix "A." The Boring Logs include the soil type, color, moisture content, dry density, and the applicable Unified Soil Classification System symbol. The location of the test borings were determined by measuring from features shown on the Site Plan, provided to us. Hence, accuracy can be implied only to the degree that this method warrants.

The actual boundaries between different soil types may be gradual and soil conditions may vary. For a more detailed description of the materials encountered, the Boring Logs in Appendix "A" should be consulted.

Soil samples were obtained from the test borings at the depths shown on the logs of borings. The MCS samples were recovered and capped at both ends to preserve the samples at their natural moisture content; SPT samples were recovered and placed in a sealed bag to preserve their natural moisture content. The borings were backfilled with soil cuttings after completion of the drilling.

5. LABORATORY TESTING

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural moisture, density, shear strength, consolidation potential, expansion potential, maximum density and optimum moisture determination, R-Value, and gradation of the materials encountered. In addition, chemical tests were performed to evaluate the corrosivity of the soils to buried concrete and metal. Details of the laboratory test program and the results of laboratory test are summarized in Appendix "B." This information, along with the field observations, was used to prepare the final boring logs in Appendix "A."

6. GEOLOGIC SETTING

The subject site is located within the northern portions of the San Gabriel Valley located within the Peninsular Range. The San Gabriel Valley is situated between the San Gabriel Mountains to the north, the San Jose Hills to the east, the Santa Ana Mountains to the south, and the Verdugo Mountains to the west. The San Gabriel Valley is dominated by northwest-trending faults and adjacent anticlinal uplifts. The intervening deep synclinal troughs are filled with poorly consolidated Upper Pleistocene and unconsolidated Holocene sediments. Tectonism of the region is dominated by the interaction of the East Pacific Plate and the North American Plate along a transform boundary. Deposits encountered on the subject site during exploratory drilling are discussed in detail in this report

7. GEOLOGIC HAZARDS

7.1 Faulting and Seismicity

The Peninsular Range has historically been a province of relatively high seismic activity. The nearest faults to the project site are associated with the Raymond fault system located approximately 1.4 miles from the site. There are no known active fault traces in the project vicinity. Based on mapping and historical seismicity, the seismicity of the Peninsular Range has been generally considered high by the scientific community.

The project area is not within an Alquist-Priolo Earthquake Fault (Special Studies) Zone and will not require a special site investigation by an Engineering Geologist. Soils on site are classified as Site Class D in accordance with Chapter 16 of the California Building Code.

The proposed structures are determined to be in Seismic Design Category E. To determine the distance of known active faults within 100 miles of the site, we used the United States Geological Survey (USGS) web-based application *2008 National Seismic Hazard Maps - Fault Parameters*. Site latitude is 34.1401° North; site longitude is 118.0017° West. The ten closest active faults are summarized below in Table 7.1.

**TABLE 7.1
REGIONAL FAULT SUMMARY**

Fault Name	Distance to Site (miles)	Maximum Earthquake Magnitude, M_w
Raymond	1.4	6.8
Sierra Madre Connected	1.7	7.3
Clamshell-Sawpit	2.6	6.7
Elysian Park (Upper)	7.6	6.7
Verdugo	8.9	6.9
San Jose	9.8	6.7
Elsinore; W+GI+T+J+CM	10.4	7.9
Hollywood	13.3	6.7
Puente Hills (LA)	13.9	7.0
Puente Hills (Santa Fe Springs)	14.4	6.7

The faults tabulated above and numerous other faults in the region are sources of potential ground motion. However, earthquakes that might occur on other faults throughout California are also potential generators of significant ground motion and could subject the site to intense ground shaking.

7.2 Surface Fault Rupture

The site is not within a currently established State of California Earthquake Fault Zone for surface fault rupture hazards. No active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

7.3 Ground Shaking

We used the USGS web-based application *US Seismic Design Maps* to estimate the peak ground acceleration adjusted for site class effects (PGA_M). Because of the proximity to the subject site and the maximum probable events for these faults, it appears that a maximum probable event along the fault zones could produce a peak horizontal acceleration of approximately 0.845 g (2% probability of being exceeded in 50 years). While listing PGA is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the site.

7.4 Liquefaction

Soil liquefaction is a state of soil particles suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs under saturated conditions in soils such as sand in which the strength is purely frictional. Primary factors that trigger liquefaction are: moderate to strong ground shaking (seismic source), relatively clean, loose granular soils (primarily poorly graded sands and silty sands), and saturated soil conditions (shallow groundwater). Due to the increasing overburden pressure with depth, liquefaction of granular soils is generally limited to the upper 50 feet of a soil profile. However, liquefaction has occurred in soils other than clean sand.

The soils encountered within the depth of 46 feet on the project site consisted predominately of gravelly sand with varying amounts of silt, and sand. The historically highest groundwater is estimated to be at a depth of more than 50 feet below ground surface according to regional groundwater data and the Seismic Hazard Zone Report 030, Mt. Wilson 7.5-Minute Quadrangle, Plate 1.2 (open file report 98-21). Low to very low cohesion strength is associated with the sandy soil. A seismic hazard, which could cause damage to the proposed development during seismic shaking, is the post-liquefaction settlement of the liquefied sands.

In accordance with the State of California, Seismic Hazard Zone Map, Mt. Wilson Quadrangle, dated March 25, 1999 the site is NOT located within the potential liquefaction zone. Therefore, no mitigation measures are warranted. Detailed geotechnical engineering recommendations are presented in the remaining portions of the text. The recommendations are based on the properties of the materials identified during our investigation.

7.5 Seismic Densification

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on site subsurface conditions and the high seismicity of the region, any loose granular materials at the site could be vulnerable to this potential hazard. Our analysis of dynamic densification of “dry” soil in the upper 50 feet of existing soil profile was performed.

For the analysis, a maximum earthquake magnitude of 7.3 M_w and a peak horizontal ground surface acceleration of 0.845g (with a 2 percent probability of exceedance in 50 years) were considered appropriate for the analysis. The seismic densification of dry to damp alluvial sandy soils due to onsite seismic activity is calculated to have a total settlement of approximately 1.02 inch. The seismic settlement analysis is included in Appendix A.

7.6 Lateral Spreading

Lateral spreading is a phenomenon in which soils move laterally during seismic shaking and is often associated with liquefaction. The amount of movement depends on the soil strength, duration and intensity of seismic shaking, topography, and free face geometry. Due to the relatively flat site topography, we judge the likelihood of lateral spreading to be low.

7.7 Landslides

There are no known landslides at the site, nor is the site in the path of any known or potential landslides. We do not consider the potential for a landslide to be a hazard to this project.

7.8 Tsunamis and Seiches

The site is not located within a coastal area. Therefore, tsunamis (seismic sea waves) are not considered a significant hazard at the site. Seiches are large waves generated in enclosed bodies of water in response to ground shaking. No major water-retaining structures are located immediately up gradient from the project site. Flooding from a seismically-induced seiche is considered unlikely.

8. SOIL AND GROUNDWATER CONDITIONS

8.1 Subsurface Conditions

The subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the soils within the depth of exploration consisted of up to 7 feet of fill consisting of loose to medium dense gravelly sand with trace silt underlain by alluvium deposits of loose to dense gravelly sand with silt, and dense sand.

Thicker fill soils are anticipated to be present onsite between our test boring locations since the site was occupied by a gas station. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates that some compaction effort had been applied to the fill soils during placement. Based on the laboratory test results, the fill had a relative compaction of 79.1 to 86.0 percent of the maximum dry density based on ASTM D1557-07 Test Method with moisture content of 2.1 to 4.5%.

All undocumented fill materials should be removed and replaced with Engineered Fill. Prior to fill placement, Salem Engineering Group, Inc. should inspect the bottom of the excavation to verify no additional excavation will be required. Verification of the extent of fill should be determined during site grading.

The soils were classified in the field during the drilling and sampling operations. The stratification lines were approximated by the field engineer on the basis of observations made at the time of drilling. The actual boundaries between different soil types may be gradual and soil conditions may vary. For a more detailed description of the materials encountered, the Boring Logs in Appendix "A" should be consulted.

The Boring Logs include the soil type, color, moisture content, dry density, and the applicable Unified Soil Classification System symbol. The locations of the test borings were determined by measuring from feature shown on the Site Plan, provided to us. Hence, accuracy can be implied only to the degree that this method warrants.

8.2 Groundwater

The test boring locations were checked for the presence of groundwater during and after the drilling operations. Free groundwater was not encountered during this investigation. The historically highest

groundwater is estimated to be at a depth of more than 50 feet below ground surface according to regional groundwater data and the Seismic Hazard Zone Report 030, Mt. Wilson 7.5-Minute Quadrangle, Plate 1.2 (open file report 98-21).

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, localized pumping, and climatic conditions as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

8.3 Soil Corrosion Screening

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete and the soil. The 2011 Edition of ACI 318 (ACI 318) has established criteria for evaluation of sulfate and chloride levels and how they relate to cement reactivity with soil and/or water.

A soil sample was obtained from the project site and was tested for the evaluation of the potential for concrete deterioration or steel corrosion due to attack by soil-borne soluble salts and soluble chloride. The water-soluble sulfate concentration in the saturation extract from the soil sample was detected to be 50 mg/kg.

ACI 318 Tables 4.2.1 and 4.3.1 outline exposure categories, classes, and concrete requirements by exposure class. ACI 318 requirements for site concrete based upon soluble sulfate are summarized in Table 8.3 below.

**TABLE 8.3
WATER SOLUBLE SULFATE EXPOSURE REQUIREMENTS**

Water Soluble Sulfate (SO₄) in Soil, Percentage by Weight	Exposure Severity	Exposure Class	Maximum w/cm Ratio	Minimum Concrete Compressive Strength	Cementations Materials Type
0.005	Not Applicable	S0	N/A	2,500 psi	No Restriction

The water-soluble chloride concentration detected in saturation extract from the soil samples was 17 mg/kg. This level of chloride concentration is considered low.

It is recommended that a qualified corrosion engineer be consulted regarding protection of buried steel or ductile iron piping and conduit or, at a minimum, applicable manufacturer's recommendations for corrosion protection of buried metal pipe be closely followed.

8.4 Percolation Testing

Three percolation tests (P-1 through P-3) were drilled on September 20, 2106 and performed on September 21, 2105 at the proposed infiltration system area, and were conducted in accordance with the criteria set in the Low Impact Development BMP Guideline of the County of Los Angeles, Department of Public Works. Results of the falling head tests are presented in the attachments to this report.

The approximate locations of the percolation tests are shown on the attached Site Plan, Figure 2. The holes were pre-saturated a minimum of 4 hours before percolation testing commenced.

Percolation rates were measured by filling the test hole with clean water and measuring the water drops at a certain time interval. The percolation rate data are presented in tabular format at the end of this Appendix. The difference in the percolation rates are reflected by the varied type of soil materials at the bottom of the test hole. The test results are as follows:

Test No.	Depth (feet)	Percolation Rate (inch/hour)	Reduction Factor	Adjusted Percolation Rate (inch/hour)	Soil Type
P-1	6.0	8.64	4.11	2.10	Gravelly SAND (SP)
P-2	5.5	9.36	4.35	2.15	Gravelly SAND (SP)
P-3	8.0	10.08	4.06	2.48	Gravelly SAND (SP)

Please be advised that when performing percolation testing services in relatively small diameter borings, that the testing may not fully model the actual full scale long term performance of a given site. This is particularly true where percolation test data is to be used in the design of large infiltration system such as may be proposed for the site. The measured percolation rate includes dispersion of the water at the sidewalls of the boring as well as into the underlying soils. Subsurface conditions, including percolation rates, can change over time as fine-grained soils migrate.

It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites. The soil absorption or percolation rates are based on tests conducted with clear water. The percolation rates may vary with time as a result of soil clogging from water impurities. The percolation rates will deteriorate over time due to the soil conditions and a factor of safety (FS) may be applied. The owner or civil engineer may elect to use a lower factor of safety for the design; however, more frequent maintenance will be expected. The soils may also become less permeable to impermeable if the soil is compacted. Thus, periodic maintenance consisting of clearing the bottom of the drainage basin of clogged soils should be expected.

The percolation rate may become slower if the surrounding soil is wet or saturated due to prolonged rainfalls. The owner or civil engineer may elect to use a lower factor of safety for the design; however, more frequent maintenance consisting of clearing the bottom of the drainage basin of clogged soils will be expected. Additional percolation tests may be conducted at bottom of the drainage basin during

construction to determine the actual percolation rate. Groundwater, if closer to the bottom of the drainage basin, will also reduce the percolation rate.

System shall be located at minimum distances of 10 feet from any foundations and 10 feet from property lines. Infiltration in compacted fill is not allowed. Provided that the infiltration system is located at a minimum distance of 10 feet away from any foundations, the infiltration would not result in distress to the adjacent buildings.

The scope of our services did not include a groundwater study and was limited to the performance of percolation testing and the submitted of the data only. Our services did not include those associated with an Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring logs regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 General

- 9.1.1 Based upon the data collected during this investigation, and from a geotechnical engineering standpoint, it is our opinion that the site is suitable for the proposed construction of improvements at the site as planned, provided the recommendations contained in this report are incorporated into the project design and construction. Conclusions and recommendations provided in this report are based on our review of available literature, analysis of data obtained from our field exploration and laboratory testing program, and our understanding of the proposed development at this time.
- 9.1.2 The primary geotechnical constraints identified in our investigation is the presence of potentially compressible material at the site. Recommendations to mitigate the effects of these soils are provided in this report.
- 9.1.3 The eastern portion of the site was occupied by a gas station. The scope of services of this report does not include environmental services, such as chemical analyses of soil and groundwater for possible environmental contaminants.
- 9.1.4 Up to 7 feet of fill soils were encountered in our borings. Thicker fill soils may be present onsite between our test boring locations. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates that some compaction effort had been applied to the fill soils during placement. However, the consistency of the fills should be verified during site construction. Prior to fill placement, Salem Engineering Group, Inc. should inspect the bottom of the excavation to verify no additional excavation will be required. All undocumented fill soils encountered during construction should be replaced with Engineered Fill.
- 9.1.5 Site demolition activities shall include removal of all surface obstructions not intended to be incorporated into final site design. In addition, underground buried structures and/or utility

lines encountered during demolition and construction should be properly removed and the resulting excavations backfilled with Engineered Fill. It is suspected that possible demolition activities of the existing structures may disturb the upper soils. After demolition activities, it is recommended that disturbed soils be removed and/or recompacted.

- 9.1.6 The near-surface onsite soils are moisture-sensitive and are moderately compressible (collapsible soil) under saturated conditions. Structures within the project vicinity have experienced excessive post-construction settlement, when the foundation soils become near saturated. The collapsible or weak soils should be removed and recompacted according to the recommendations in the Grading section of this report (Section 9.5).
- 9.1.7 Based on the subsurface conditions at the site and the anticipated structural loading, we anticipate that the proposed building may be supported using conventional shallow foundations provided that the recommendations presented herein are incorporated in the design and construction of the project.
- 9.1.8 Provided the site is graded in accordance with the recommendations of this report and foundations constructed as described herein, we estimate that total settlement due to static and seismic loads utilizing conventional shallow foundations for the proposed building will be within 1½ inches and the corresponding differential settlement will be less than ¾ inch.
- 9.1.9 All references to relative compaction and optimum moisture content in this report are based on ASTM D 1557 (latest edition).
- 9.1.10 SALEM shall review the project grading plans and foundation plans prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required. If SALEM is not provided plans and specifications for review, we cannot assume any responsibility for the future performance of the project.
- 9.1.11 SALEM shall be present at the site during site demolition and preparation to observe site clearing/demolition, preparation of exposed surfaces after clearing, and placement, treatment and compaction of fill material.
- 9.1.12 SALEM's observations should be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. Moisture content of footings and slab subgrade should be tested immediately prior to concrete placement. SALEM should observe foundation excavations prior to placement of reinforcing steel or concrete to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report.

9.2 Seismic Design Criteria

- 9.2.1 For seismic design of the structures, and in accordance with the seismic provisions of the 2013 CBC, our recommended parameters are shown below. These parameters are based on Probabilistic Ground Motion of 2% Probability of Exceedance in 50 years. The Site Class was determined based on the results of our field exploration.

**TABLE 9.2.1
2013 CBC SEISMIC DESIGN PARAMETERS**

Seismic Item	Symbol	Value	2010 ASCE 7 or 2013 CBC Reference
Site Coordinates (Datum = NAD 83)		34.1398 Lat -118.0017 Lon	
Site Class	--	D	ASCE 7 Table 20.3
Soil Profile Name	--	Stiff Soil	ASCE 7 Table 20.3
Risk Category	--	II	CBC Table 1604.5
Site Coefficient for PGA	F_{PGA}	1.000	ASCE 7 Table 11.8-1
Peak Ground Acceleration (adjusted for Site Class effects)	PGA_M	0.845g	ASCE 7 Equation 11.8-1
Seismic Design Category	SDC	E	ASCE 7 Table 11.6-1 & 2
Mapped Spectral Acceleration (Short period - 0.2 sec)	S_S	2.220 g	CBC Figure 1613.3.1(1-6)
Mapped Spectral Acceleration (1.0 sec. period)	S_1	0.900 g	CBC Figure 1613.3.1(1-6)
Site Class Modified Site Coefficient	F_a	1.000	CBC Table 1613.3.3(1)
Site Class Modified Site Coefficient	F_v	1.500	CBC Table 1613.3.3(2)
MCE Spectral Response Acceleration (Short period - 0.2 sec) $S_{MS} = F_a S_S$	S_{MS}	2.220 g	CBC Equation 16-37
MCE Spectral Response Acceleration (1.0 sec. period) $S_{M1} = F_v S_1$	S_{M1}	1.350 g	CBC Equation 16-38
Design Spectral Response Acceleration $S_{DS} = \frac{2}{3} S_{MS}$ (short period - 0.2 sec)	S_{DS}	1.480 g	CBC Equation 16-39
Design Spectral Response Acceleration $S_{D1} = \frac{2}{3} S_{M1}$ (1.0 sec. period)	S_{D1}	0.900 g	CBC Equation 16-40

9.2.2 Conformance to the criteria in the above table for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

9.3 Soil and Excavation Characteristics

9.3.1 Based on the soil conditions encountered in our soil borings, the onsite soils can be excavated with moderate effort using conventional excavation equipment.

9.3.2 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable Occupational Safety and Health Administration (OSHA) rules and regulations to maintain safety and maintain the stability of adjacent existing improvements.

9.3.3 The upper soils are moisture-sensitive and moderately collapsible under saturated conditions. These soils, in their present condition, possess moderate risk to construction in terms of possible post-construction movement of the foundations and floor systems if no mitigation

measures are employed. Accordingly, measures are considered necessary to reduce anticipated collapse potential. Mitigation measures will not eliminate post-construction soil movement, but will reduce the soil movement. Success of the mitigation measures will depend on the thoroughness of the contractor in dealing with the soil conditions.

9.3.4 The near surface soils identified as part of our investigation are, generally slightly moist due to the absorption characteristics of the soil. Earthwork operations may encounter very moist unstable soils which may require removal to a stable bottom. Exposed native soils exposed as part of site grading operations shall not be allowed to dry out and should be kept continuously moist prior to placement of subsequent fill.

9.4 Materials for Fill

9.4.1 Excavated soils generated from cut operations at the site are suitable for use as general Engineered Fill in structural areas, provided they do not contain deleterious matter, organic material, or rock material larger than 3 inches in maximum dimension.

9.4.2 The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since they have complete control of the project site.

9.4.3 Environmental characteristics and corrosion potential of import soil materials should also be considered.

9.4.4 Proposed import materials should be sampled, tested, and approved by SALEM prior to its transportation to the site.

9.4.5 Import soil shall be well-graded, slightly cohesive silty fine sand or sandy silt, with relatively impervious characteristics when compacted. A clean sand or very sandy soil is not acceptable for this purpose. This material should be approved by the Engineer prior to use and should typically possess the soil characteristics summarized below in Table 9.4.5.

**TABLE 9.4.5
IMPORT FILL REQUIREMENTS**

Minimum Percent Passing No. 200 Sieve	10
Maximum Percent Passing No. 200 Sieve	50
Minimum Percent Passing No. 4 Sieve	70
Maximum Particle Size	3"
Maximum Plasticity Index	10
Maximum CBC Expansion Index	15

9.5 Grading

- 9.5.1 A SALEM representative should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Geotechnical Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section as well as other portions of this report.
- 9.5.2 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer and geotechnical engineer in attendance.
- 9.5.3 Site preparation should begin with removal of existing surface/subsurface structures, underground utilities (as required), any existing uncertified fill, and debris. Excavations or depressions resulting from site clearing operations, or other existing excavations or depressions, should be restored with Engineered Fill in accordance with the recommendations of this report.
- 9.5.4 Surface vegetation consisting of grasses and other similar vegetation should be removed by stripping to a sufficient depth to remove organic-rich topsoil. The upper 2 to 4 inches of the soils containing, vegetation, roots and other objectionable organic matter encountered at the time of grading should be stripped and removed from the surface. Deeper stripping may be required in localized areas. In addition, existing concrete and asphalt materials shall be removed from areas of proposed improvements and stockpiled separately from excavated soil material. The stripped vegetation, asphalt and concrete materials will not be suitable for use as Engineered Fill or within 5 feet of building pads or within pavement areas. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas or exported from the site.
- 9.5.5 Structural building pad areas should be considered as areas extending a minimum of 5 feet horizontally beyond the outside dimensions of buildings, including footings and non-cantilevered overhangs carrying structural loads.
- 9.5.6 To minimize post-construction soil movement and provide uniform support for the proposed structures, it is recommended that overexcavation and recompaction within the proposed building pad be performed to a minimum depth of **seven (7) feet** below existing grade or **three (3) feet** below proposed footing bottom, whichever is deeper. For the building footprint to be located within the middle section of the site (i.e. the ground is approximately 3 feet lower than the eastern section), overexcavation and recompaction may be performed to a minimum depth of **four (4) feet** below existing grade or **three (3) feet** below proposed footing bottom, whichever is deeper. The overexcavation and recompaction should also extend laterally to a minimum of 5 feet beyond the outer edges of the proposed footings.
- 9.5.7 Up to **7 feet** of fill soils were encountered in our borings. The eastern portion of the site was occupied by a gas station. Thicker fill soils are anticipated to be present onsite between our test boring locations. The undocumented fill materials are not suitable to support the proposed structures. **All undocumented fill materials encountered during grading should be**

removed and replaced with Engineered Fill. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction.

- 9.5.8 Prior to placement of fill soils, the upper 12 inches of native subgrade soils should be scarified, moisture-conditioned to **no less than the optimum moisture content** and recompacted to a minimum of 95 percent of the maximum dry density based on ASTM D1557-07 Test Method.
- 9.5.9 All Engineered Fill (including scarified ground surfaces and backfill) should be placed in thin lifts to allow for adequate bonding and compaction (typically 6 to 8 inches in loose thickness).
- 9.5.10 Engineered Fill soils should be placed, moisture conditioned to near the optimum moisture content, and compacted to at least 95% relative compaction.
- 9.5.11 An integral part of satisfactory fill placement is the stability of the placed lift of soil. If placed materials exhibit excessive instability as determined by a SALEM field representative, the lift will be considered unacceptable and shall be remedied prior to placement of additional fill material. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.
- 9.5.12 Within pavement areas, it is recommended that scarification, moisture conditioning and recompaction be performed to at least 12 inches below existing grade or finish grade, whichever is deeper. In addition, the upper 12 inches of final pavement subgrade, whether completed at-grade, by excavation, or by filling, should be uniformly moisture-conditioned to no less than the optimum moisture content and compacted to at least 95% relative compaction.
- 9.5.13 Final pavement subgrade should be finished to a smooth, unyielding surface. We further recommend proof-rolling the subgrade with a loaded water truck (or similar equipment with high contact pressure) to verify the stability of the subgrade prior to placing aggregate base.
- 9.5.14 The most effective site preparation alternatives will depend on site conditions prior to grading. We should evaluate site conditions and provide supplemental recommendations immediately prior to grading, if necessary.
- 9.5.15 We do not anticipate groundwater or seepage to adversely affect construction if conducted during the drier months of the year (typically summer and fall). However, groundwater and soil moisture conditions could be significantly different during the wet season (typically winter and spring) as surface soil becomes wet; perched groundwater conditions may develop. Grading during this time period will likely encounter wet materials resulting in possible excavation and fill placement difficulties. Project site winterization consisting of placement of aggregate base and protecting exposed soils during construction should be performed. If the construction schedule requires grading operations during the wet season, we can provide additional recommendations as conditions warrant.
- 9.5.16 The wet soils may become non conducive to site grading as the upper soils yield under the weight of the construction equipment. Therefore, mitigation measures should be performed for stabilization. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved

fill material or placement of crushed rocks or aggregate base material; or mixing the soil with an approved lime or cement product.

The most common remedial measure of stabilizing the bottom of the excavation due to wet soil condition is to reduce the moisture of the soil to near the optimum moisture content by having the subgrade soils scarified and aerated or mixed with drier soils prior to compacting. However, the drying process may require an extended period of time and delay the construction operation. To expedite the stabilizing process, crushed rock may be utilized for stabilization provided this method is approved by the owner for the cost purpose.

If the use of crushed rock is considered, it is recommended that the upper soft and wet soils be replaced by 6 to 24 inches of ¾-inch to 1-inch crushed rocks. The thickness of the rock layer depends on the severity of the soil instability. The recommended 6 to 24 inches of crushed rock material will provide a stable platform. It is further recommended that lighter compaction equipment be utilized for compacting the crushed rock. A layer of geofabric is recommended to be placed on top of the compacted crushed rock to minimize migration of soil particles into the voids of the crushed rock, resulting in soil movement. Although it is not required, the use of geogrid (e.g. Tensar BX 1100 or TX 140) below the crushed rock will enhance stability and reduce the required thickness of crushed rock necessary for stabilization.

Our firm should be consulted prior to implementing remedial measures to provide appropriate recommendations.

9.6 Shallow Foundations

- 9.6.1 The site is suitable for use of conventional shallow foundations consisting of continuous footings and isolated pad footings bearing in properly compacted Engineered Fill.
- 9.6.2 The bearing wall footings considered for the structure should be continuous with a minimum width of 18 inches and extend to a minimum depth of 24 inches below the lowest adjacent grade. Isolated column footings should have a minimum width of 24 inches and extend a minimum depth of 24 inches below the lowest adjacent grade. The bottom of footing excavations should be maintained free of loose and disturbed soil. Footing concrete should be placed into a neat excavation.
- 9.6.3 The horizontal distance between the outer edges of the footing bottom and the adjacent slope face should be at least 6 feet.
- 9.6.4 For design purposes, total settlement due to static and seismic loadings on the order of 1½ inches may be assumed for shallow footings. Differential settlement due to static and seismic loadings, along a 20-foot exterior wall footing or between adjoining column footings, should be ¾ inch, producing an angular distortion of 0.003. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. The footing excavations should not be allowed to dry out any time prior to pouring concrete.

9.6.5 Footings proportioned as recommended above may be designed for the maximum allowable soil bearing pressures shown in the table below:

Loading Condition	Allowable Bearing
Dead Load Only	2,500 psf
Dead-Plus-Live Load	3,000 psf
Total Load, Including Wind or Seismic Loads	4,000 psf

9.6.6 Resistance to lateral footing displacement can be computed using an allowable coefficient of friction factor of 0.45 acting between the base of foundations and the supporting native subgrade.

9.6.7 Lateral resistance for footings can alternatively be developed using an equivalent fluid passive pressure of 400 pounds per cubic foot acting against the appropriate vertical native footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. An increase of one-third is permitted when using the alternate load combination in Section 1605.3.2 of the 2013 CBC that includes wind or earthquake loads.

9.6.8 Minimum reinforcement for footings should consist of eight No. 4 steel reinforcing bars; four placed near the top of the footing and four near the bottom or be designed by the project structural engineer.

9.6.9 Underground utilities running parallel to footings should not be constructed in the zone of influence of footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom edge of the footing.

9.6.10 The foundation subgrade should be sprinkled as necessary to maintain a moist condition without significant shrinkage cracks as would be expected in any concrete placement. Prior to placing rebar reinforcement, foundation excavations should be evaluated by a representative of SALEM for appropriate support characteristics and moisture content. Moisture conditioning may be required for the materials exposed at footing bottom, particularly if foundation excavations are left open for an extended period.

9.7 Concrete Slabs-on-Grade

9.7.1 Slab thickness and reinforcement should be determined by the structural engineer based on the anticipated loading. We recommend that non-structural slabs-on-grade be at least 4 inches thick and underlain by six (6) inches of clean compacted granular aggregate subbase material compacted to at least 95% relative compaction.

9.7.2 Granular aggregate subbase material shall be clean and conform to ASTM D-2940, Latest Edition (Table 1, bases) with at least 95 percent passing a 1½-inch sieve and not more than 8% passing a No. 200 sieve or its approved equivalents to prevent capillary moisture rise.

- 9.7.3 We recommend reinforcing slabs, at a minimum, with No. 3 reinforcing bars placed 18 inches on center, each way.
- 9.7.4 Slabs subject to structural loading may be designed utilizing a modulus of subgrade reaction K of 250 pounds per square inch per inch. The K value was approximated based on inter-relationship of soil classification and bearing values (Portland Cement Association, Rocky Mountain Northwest).
- 9.7.5 The spacing of crack control joints should be designed by the project structural engineer. In order to regulate cracking of the slabs, we recommend that full depth construction joints or control joints be provided at a maximum spacing of 15 feet in each direction for 5-inch thick slabs and 12 feet for 4-inch thick slabs.
- 9.7.6 Crack control joints should extend a minimum depth of one-fourth the slab thickness and should be constructed using saw-cuts or other methods as soon as practical after concrete placement. The exterior floors should be poured separately in order to act independently of the walls and foundation system.
- 9.7.7 It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the structures is recommended.
- 9.7.8 Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To minimize moisture vapor intrusion, it is recommended that a vapor retarder be installed in accordance with manufacturer's recommendations and/or ASTM guidelines, whichever is more stringent. In addition, ventilation of the structure is recommended to reduce the accumulation of interior moisture.
- 9.7.9 In areas where it is desired to reduce floor dampness where moisture-sensitive coverings are anticipated, construction should have a suitable waterproof vapor retarder (a minimum of 15 mils thick polyethylene vapor retarder sheeting, Raven Industries "VaporBlock 15, Stego Industries 15 mil "StegoWrap" or W.R. Meadows Sealtight 15 mil "Perminator") incorporated into the floor slab design. The water vapor retarder should be decay resistant material complying with ASTM E96 not exceeding 0.04 perms, ASTM E154 and ASTM E1745 Class A. The vapor barrier should be placed between the concrete slab and the compacted granular aggregate subbase material. The water vapor retarder (vapor barrier) should be installed in accordance with ASTM Specification E 1643-94.
- 9.7.10 The concrete may be placed directly on vapor retarder. The vapor retarder should be inspected prior to concrete placement. Cut or punctured retarder should be repaired using vapor retarder material lapped 6 inches beyond damaged areas and taped.
- 9.7.11 The recommendations of this report are intended to reduce the potential for cracking of slabs due to soil movement. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade may exhibit some cracking due to soil movement. This is common for project areas that contain expansive soils since designing to

eliminate potential soil movement is cost prohibitive. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

9.7.12 Proper finishing and curing should be performed in accordance with the latest guidelines provided by the American Concrete Institute, Portland Cement Association, and ASTM.

9.8 Lateral Earth Pressures and Frictional Resistance

9.8.1 Active, at-rest and passive unit lateral earth pressures against footings and walls are summarized in the table below:

Lateral Pressure Conditions	Ultimate Equivalent Fluid Pressure, pcf
Active Pressure, Drained	33
At-Rest Pressure, Drained	52
Passive Pressure	400
Related Parameters	
Allowable Coefficient of Friction	0.45
In-Place Soil Density (lbs/ft ³)	120

9.8.2 Active pressure applies to walls, which are free to rotate. At-rest pressure applies to walls, which are restrained against rotation. The preceding lateral earth pressures assume sufficient drainage behind retaining walls to prevent the build-up of hydrostatic pressure.

9.8.3 The top one-foot of adjacent subgrade should be deleted from the passive pressure computation.

9.8.4 A safety factor consistent with the design conditions should be included in the usage of the above values.

9.8.5 For stability against lateral sliding, which is resisted solely by the passive pressure, we recommend a minimum safety factor of 1.5.

9.8.6 For stability against lateral sliding, which is resisted by the combined passive and frictional resistance, a minimum safety factor of 2.0 is recommended.

9.8.7 For lateral stability against seismic loading conditions, we recommend a minimum safety factor of 1.1.

9.8.8 For dynamic seismic lateral loading the following equation shall be used:

Dynamic Seismic Lateral Loading Equation
Dynamic Seismic Lateral Load = $\frac{3}{8}\gamma K_h H^2$
Where: γ = In-Place Soil Density
K_h = Horizontal Acceleration = $\frac{2}{3}PGA_M$
H = Wall Height

9.9 Retaining Walls

- 9.9.1 Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches wide and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic-concrete or other suitable backfill to minimize surface drainage into the wall drain system. The gravel should conform to Class II permeable materials graded in accordance with the current CalTrans Standard Specifications.
- 9.9.2 Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel provided they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.
- 9.9.3 Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The top of the perforated pipe should be placed at or below the bottom of the adjacent floor slab or pavements. The pipe should be placed in the center line of the drainage blanket and should have a minimum diameter of 4 inches. Slots should be no wider than 1/8-inch in diameter, while perforations should be no more than 1/4-inch in diameter.
- 9.9.4 If retaining walls are less than 5 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 2-inch minimum diameter holes (concrete walls) or unmortared head joints (masonry walls) and placed no higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to the CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep hole to retard soil piping.
- 9.9.5 During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

9.10 Temporary Excavations

- 9.10.1 We anticipate that the majority of the sandy site soils will be classified as Cal-OSHA “Type C” soil when encountered in excavations during site development and construction. Excavation sloping, benching, the use of trench shields, and the placement of trench spoils should conform to the latest applicable Cal-OSHA standards. The contractor should have a Cal-OSHA-approved “competent person” onsite during excavation to evaluate trench conditions and make appropriate recommendations where necessary.
- 9.10.2 It is the contractor’s responsibility to provide sufficient and safe excavation support as well as protecting nearby utilities, structures, and other improvements which may be damaged by earth movements. All onsite excavations must be conducted in such a manner that potential surcharges from existing structures, construction equipment, and vehicle loads are resisted. The surcharge area may be defined by a 1:1 projection down and away from the bottom of an existing foundation or vehicle load.
- 9.10.3 Temporary excavations and slope faces should be protected from rainfall and erosion. Surface runoff should be directed away from excavations and slopes.
- 9.10.4 Open, unbraced excavations in undisturbed soils should be made according to the slopes presented in the following table:

RECOMMENDED EXCAVATION SLOPES

Depth of Excavation (ft)	Slope (Horizontal : Vertical)
0-5	1:1
5-10	2:1

- 9.10.5 If, due to space limitation, excavations near property lines or existing structures are performed in a vertical position, slot cuts, braced shorings or shields may be used for supporting vertical excavations. Therefore, in order to comply with the local and state safety regulations, a properly designed and installed shoring system would be required to accomplish planned excavations and installation. A Specialty Shoring Contractor should be responsible for the design and installation of such a shoring system during construction.
- 9.10.6 Braced shorings should be designed for a maximum pressure distribution of 30H, (where H is the depth of the excavation in feet). The foregoing does not include excess hydrostatic pressure or surcharge loading. Fifty percent of any surcharge load, such as construction equipment weight, should be added to the lateral load given herein. Equipment traffic should concurrently be limited to an area at least 3 feet from the shoring face or edge of the slope.
- 9.10.7 The excavation and shoring recommendations provided herein are based on soil characteristics derived from the borings within the area. Variations in soil conditions will likely be encountered during the excavations. SALEM Engineering Group, Inc. should be afforded the opportunity to provide field review to evaluate the actual conditions and account for field

condition variations not otherwise anticipated in the preparation of this recommendation. Slope height, slope inclination, or excavation depth should in no case exceed those specified in local, state, or federal safety regulation, (e.g. OSHA) standards for excavations, 29 CFR part 1926, or Assessor's regulations.

9.11 Underground Utilities

- 9.11.1 Underground utility trenches should be backfilled with properly compacted material. The material excavated from the trenches should be adequate for use as backfill provided it does not contain deleterious matter, vegetation or rock larger than 3 inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding 8 inches and compacted to at least 95% relative compaction at or above optimum moisture content.
- 9.11.2 Bedding and pipe zone backfill typically extends from the bottom of the trench excavations to approximately 6 to 12 inches above the crown of the pipe. Pipe bedding and backfill material should conform to the requirements of the governing utility agency.
- 9.11.3 It is suggested that underground utilities crossing beneath new or existing structures be plugged at entry and exit locations to the building or structure to prevent water migration. Trench plugs can consist of on-site clay soils, if available, or sand cement slurry. The trench plugs should extend 2 feet beyond each side of individual perimeter foundations.
- 9.11.4 The contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

9.12 Surface Drainage

- 9.12.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change to important engineering properties. Proper drainage should be maintained at all times.
- 9.12.2 The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than 5 percent for a minimum distance of 10 feet.
- 9.12.3 Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2 percent away from the building and drainage gradients maintained to carry all surface water to collection facilities and off site. These grades should be maintained for the life of the project. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed.
- 9.12.4 Roof drains should be installed with appropriate downspout extensions out-falling on splash blocks so as to direct water a minimum of 5 feet away from the structures or be connected to the storm drain system for the development.

9.13 Pavement Design

9.13.1 Based on site soil conditions and laboratory test results, an R-value of 50 was used for the preliminary flexible asphaltic concrete pavement design. The R-value may be verified during grading of the pavement areas.

9.13.2 The pavement design recommendations provided herein are based on the State of California Department of Transportation (CALTRANS) design manual. The asphaltic concrete (flexible pavement) is based on a 20-year pavement life utilizing 1200 passenger vehicles, 10 single unit trucks, and 2 multi-unit trucks. The following table shows the recommended pavement sections for various traffic indices.

**TABLE 9.13.2
ASPHALT CONCRETE PAVEMENT THICKNESSES**

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Compacted Subgrade*
5.0 (Parking and Vehicle Drive Areas)	2.5"	4.0"	12.0"
6.0 (Heavy Truck Areas)	3.0"	4.0"	12.0"

**95% compaction based on ASTM D1557-07 Test Method*

9.13.3 The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

**TABLE 9.13.3
PORTLAND CEMENT CONCRETE PAVEMENT THICKNESSES**

Traffic Index	Portland Cement Concrete*	Class II Aggregate Base**	Compacted Subgrade**
5.0 (Light Duty)	5.0"	4.0"	12.0"
6.0 (Heavy Duty)	6.0"	4.0"	12.0"

** Minimum Compressive Strength of 4,000 psi
** 95% compaction based on ASTM D1557-07 Test Method*

10. PLAN REVIEW, CONSTRUCTION OBSERVATION AND TESTING

10.1 Plan and Specification Review

10.1.1 SALEM should review the project plans and specifications prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

10.2 Construction Observation and Testing Services

- 10.2.1 The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer of Record throughout the construction phase. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. If we are not retained for these services, we cannot assume any responsibility for others interpretation of our recommendations, and therefore the future performance of the project.
- 10.2.2 SALEM should be present at the site during site preparation to observe site clearing, preparation of exposed surfaces after clearing, and placement, treatment and compaction of fill material.
- 10.2.3 SALEM's observations should be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. Moisture content of footings and slab subgrade should be tested immediately prior to concrete placement. SALEM should observe foundation excavations prior to placement of reinforcing steel or concrete to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report.

11. LIMITATIONS AND CHANGED CONDITIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the test borings drilled at the approximate locations shown on the Site Plan, Figure 2. The report does not reflect variations which may occur between borings. The nature and extent of such variations may not become evident until construction is initiated.

If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of such variations. The findings and recommendations presented in this report are valid as of the present and for the proposed construction.

If site conditions change due to natural processes or human intervention on the property or adjacent to the site, or changes occur in the nature or design of the project, or if there is a substantial time lapse between the submission of this report and the start of the work at the site, the conclusions and recommendations contained in our report will not be considered valid unless the changes are reviewed by SALEM and the conclusions of our report are modified or verified in writing. The validity of the recommendations contained in this report is also dependent upon an adequate testing and observations program during the construction phase. Our firm assumes no responsibility for construction compliance with the design concepts or recommendations unless we have been retained to perform the on-site testing and review during construction.

SALEM has prepared this report for the exclusive use of the owner and project design consultants. SALEM does not practice in the field of corrosion engineering. It is recommended that a qualified corrosion engineer be consulted regarding protection of buried steel or ductile iron piping and conduit or, at a minimum, that manufacturer's recommendations for corrosion protection be closely followed. Further, a corrosion engineer may be needed to incorporate the necessary precautions to avoid premature

corrosion of concrete slabs and foundations in direct contact with native soil. The importation of soil and or aggregate materials to the site should be screened to determine the potential for corrosion to concrete and buried metal piping. The report has been prepared in accordance with generally accepted geotechnical engineering practices in the area. No other warranties, either express or implied, are made as to the professional advice provided under the terms of our agreement and included in this report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (909) 980-6455.

Respectfully Submitted,

SALEM ENGINEERING GROUP, INC.



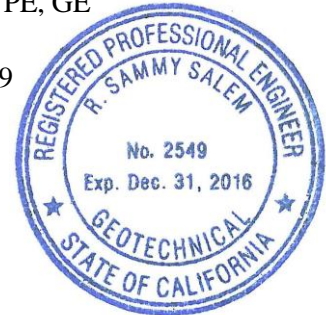
Ibrahim Ibrahim, MS, EIT
Geotechnical Staff Engineer

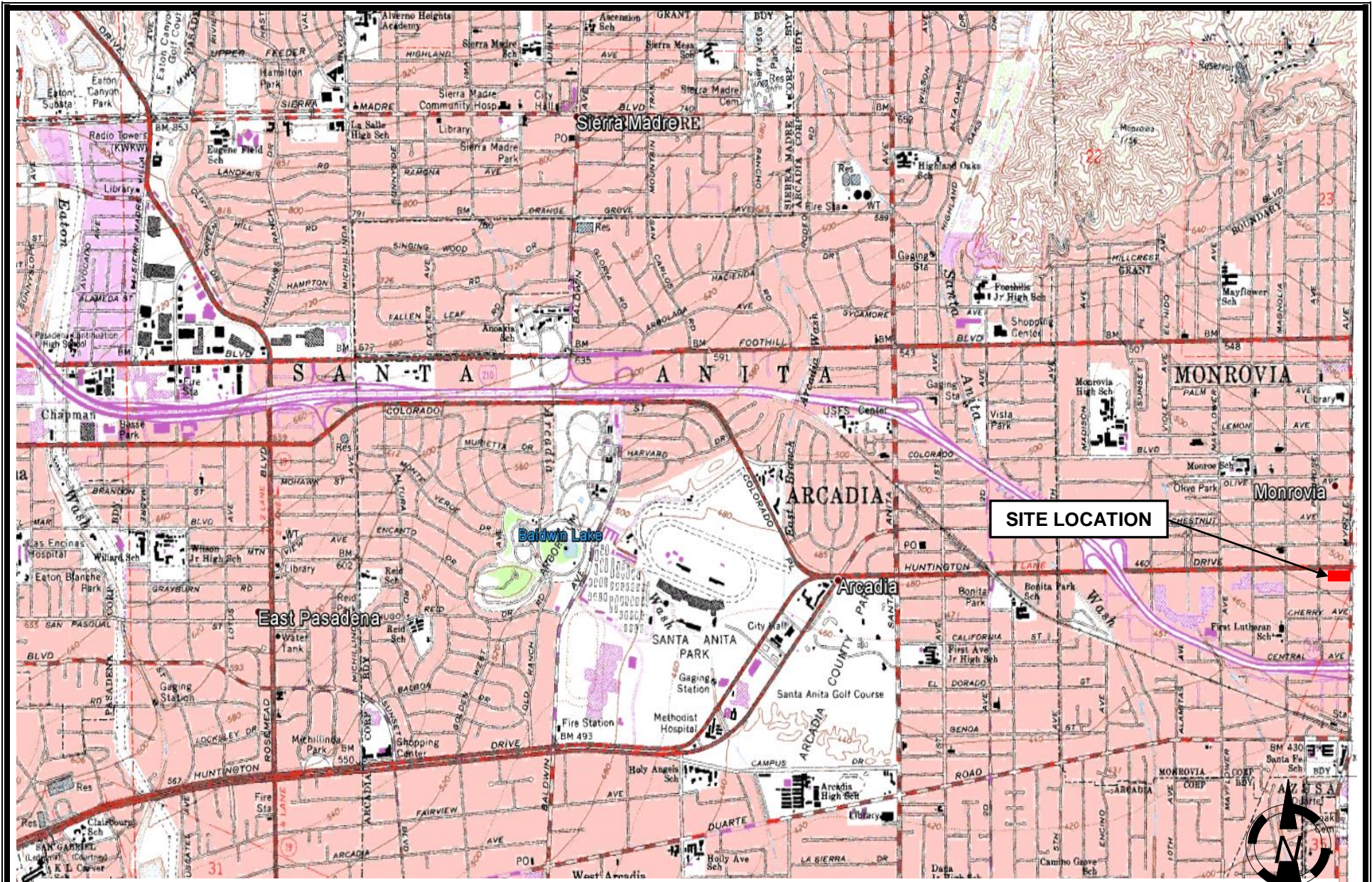


Clarence Jiang, GE
Senior Geotechnical Engineer
RGE 2477



R. Sammy Salem, MS, PE, GE
Principal Engineer
RCE 52762 / RGE 2549





Source Image: U.S. Geological Survey Mt. Wilson, California 7.5 1966, (Photorevised 1988)

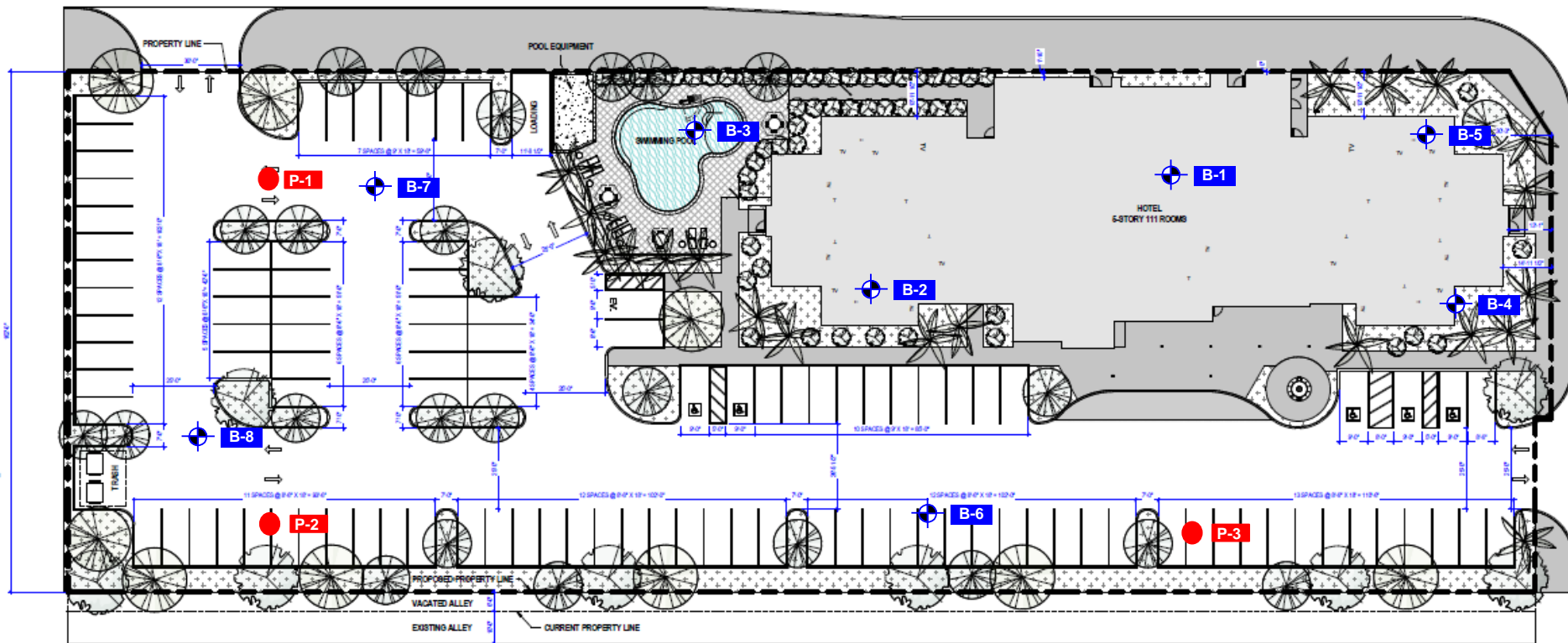
VICINITY MAP

GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed TownePlace Suites Hotel
SWC E. Huntington Drive and S. Myrtle Avenue
Monrovia, California

SCALE:
 NOT TO SCALE
 DRAWN BY:
 AA
 PROJECT NO.
 3-216-0956

DATE:
 09/2016
 APPROVED BY:
 CJ
 FIGURE NO.
 1





1 SITE PLAN
1/8" = 1'-0"



SITE PLAN

GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed TownePlace Suites Hotel
SWC E. Huntington Drive and S. Myrtle Avenue
Monrovia, California

SCALE:
NOT TO SCALE

DRAWN BY:
II



PROJECT NO.
3-216-0956

DATE:
09/2016

APPROVED BY:
CJ

FIGURE NO.
2

LEGEND:

-  **B-1** Soil Boring Locations
-  **P-1** Percolation Test Locations
- All Locations Approximate



A


















APPENDIX A FIELD EXPLORATION

Fieldwork for our investigation (drilling) was conducted on September 7, 2016 and included a site visit, subsurface exploration, and soil sampling. Percolation tests were drilled on September 20, 2016 and were performed on September 21, 2016. The locations of the exploratory borings and percolation tests are shown on the Site Plan, Figure 2. Boring logs for our exploration are presented in figures following the text in this appendix. Borings were located in the field using existing reference points. Therefore, actual boring locations may deviate slightly.

In general, our borings were performed using a truck-mounted CME-45C drill rig equipped with an 8-inch hollow stem auger. Sampling in the borings was accomplished using a hydraulic 140-pound hammer with a 30-inch drop. Samples were obtained with a 3-inch outside-diameter (OD), split spoon (California Modified) sampler, and a 2-inch OD, Standard Penetration Test (SPT) sampler. The number of blows required to drive the sampler the last 12 inches (or fraction thereof) of the 18-inch sampling interval were recorded on the boring logs. The blow counts shown on the boring logs should not be interpreted as standard SPT “N” values; corrections have not been applied. Upon completion, the borings were backfilled with drill cuttings.

Subsurface conditions encountered in the exploratory borings were visually examined, classified and logged in general accordance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D2488). This system uses the Unified Soil Classification System (USCS) for soil designations. The logs depict soil and geologic conditions encountered and depths at which samples were obtained. The logs also include our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, drill rig penetration rates, excavation characteristics and other factors. The transition between materials may be abrupt or gradual. Where applicable, the field logs were revised based on subsequent laboratory testing.

Unified Soil Classification System

Major Divisions			Letter	Symbol	Description	
Coarse-grained Soils More than 1/2 retained on the No. 200 Sieve	Gravels More than 1/2 coarse fraction retained on the No. 4 sieve	Clean Gravels	GW		Well-graded gravels and gravel-sand mixtures, little or no fines.	
		Gravels	GP		Poorly-graded gravels and gravel-sand mixtures, little or no fines.	
		Gravels With Fines	GM		Silty gravels, gravel-sand-silt mixtures.	
			GC		Clayey gravels, gravel-sand-clay mixtures.	
	Sands More than 1/2 passing through the No. 4 sieve	Clean Sands	SW		Well-graded sands and gravelly sands, little or no fines.	
			SP		Poorly-graded sands and gravelly sands, little or no fines.	
		Sands With Fines	SM		Silty sands, sand-silt mixtures	
			SC		Clayey sands, sandy-clay mixtures.	
	Fine-grained Soils More than 1/2 passing through the No. 200 Sieve	Silts and Clays Liquid Limit less than 50%		ML		Inorganic silts, very fine sands, rock flour, silty or clayey fine sands.
				CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL		Organic clays of medium to high plasticity.		
Silts and Clays Liquid Limit greater than 50%		MH		Inorganic silts, micaceous or diatomaceous fines sands or silts, elastic silts.		
		CH		Inorganic clays of high plasticity, fat clays.		
		OH		Organic clays of medium to high plasticity.		
Highly Organic Soils			PT		Peat, muck, and other highly organic soils.	
Consistency Classification						
<i>Granular Soils</i>			<i>Cohesive Soils</i>			
Description - Blows Per Foot (Corrected)			Description - Blows Per Foot (Corrected)			
	<u>MCS</u>	<u>SPT</u>		<u>MCS</u>	<u>SPT</u>	
Very loose	<5	<4	Very soft	<3	<2	
Loose	5 - 15	4 - 10	Soft	3 - 5	2 - 4	
Medium dense	16 - 40	11 - 30	Firm	6 - 10	5 - 8	
Dense	41 - 65	31 - 50	Stiff	11 - 20	9 - 15	
Very dense	>65	>50	Very Stiff	21 - 40	16 - 30	
			Hard	>40	>30	
MCS = Modified California Sampler			SPT = Standard Penetration Test Sampler			

Boring No. B-1

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-1

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test 20 40 60 80	Water Level
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count		
0		Ground Surface							
		Gravelly SAND (SP) <u>Fill</u> ; medium dense; slightly moist; brown; fine-medium grained; with trace of silt.	115.3	4.3	MCS		31		
5		Gravelly SAND (SP) Dense; slightly moist; brown; fine-coarse grained; with trace of silt.	113.0	4.3	MCS		41		
10		Grades as above; medium dense; fine-medium grained; with less gravel.	105.6	8.7	MCS		17		
15		Grades as above.	-	6.7	SPT		14		
20		Grades as above.	-	7.9	SPT		18		
25		SAND (SP) Dense; slightly moist; light gray; medium-coarse grained; with trace gravel.	-	3.3	SPT		32		

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 2

Drill Date: 09/07/2016
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-1

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No.: 3-216-0956

Figure No.: A-1

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test 20 40 60 80	Water Level
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count		
30		Grades as above; medium dense.	-	6.7	SPT		26		
35		Grades as above; with trace clay; no gravel.	-	10.6	SPT		19		
40		Grades as above; no clay.	-	5.4	SPT		24		
45		Grades as above.							
50		Auger refusal at 46 feet due to gravel.							

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 2 of 2

Drill Date: 09/07/2016
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-2

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-2

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test 20 40 60 80	Water Level
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count		
0		Ground Surface							
		Gravelly SAND (SP) Fill; medium dense; slightly moist; brown; fine-medium grained; with trace silt.	106.0	2.1	MCS		25		
5		Gravelly SAND (SP) Medium dense; slightly moist; brown; fine-medium grained; with trace silt.	110.1	6.1	MCS		19		
10		Grades as above; slightly moist.	-	2.7	SPT		17		
15		Grades as above; moist.	-	7.0	SPT		14		
20		Grades as above.							
25		End of Borehole							

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 09/07/2016
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-3

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-3

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test				Water Level	
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count						
0		Ground Surface											
	[Symbol]	Gravelly SAND (SP) Medium dense; slightly moist; brown; fine-medium graine; with trace silt	110.0	1.9	MCS		16	●					
5		Grades as above.	111.3	2.4	MCS		21	●					
10		Grades as above.	-	2.5	SPT		17	●					
15		Grades as above; with less gravel.	-	4.5	SPT		16	●					
20		Grades as above.											
		End of Borehole											
25													

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 09/07/2016
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-4

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-4

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test				Water Level	
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count						
0		Ground Surface											
		Gravelly SAND (SP) Fill: loose; slightly moist; brown; fine-medium grained; with trace silt.	107.2	4.5	MCS		15	20	40	60	80		
5		Grades as above.	109.9	3.8	MCS		11						
		Gravelly SAND (SP) Medium dense; slightly moist; brown; fine-medium grained; with trace silt.	-	2.3	SPT		21						
10		Grades as above; medium dense.											
15		Grades as above.	-	2.9	SPT		19						
20		Grades as above.											
		End of Borehole											
25													

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 09/07/2016
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-5

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-5

Logged By: SMG

Initial: None

At Completion: None

Depth to Water >

SUBSURFACE PROFILE			SAMPLE					Penetration Test	Water Level
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count		
0		Ground Surface						20 40 60 80	
		Gravelly SAND (SP)							
		Fill: medium dense; slightly moist; brown; fine-medium grained; with trace clay.	113.6	2.9	MCS		26	●	
5		Drilling Terminated at 3.5 due to suspect underground utilities.							
10									
15									
20									
25									

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 09/07/2016
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-6

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-6

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test				Water Level	
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count						
0		Ground Surface											
		Gravelly SAND (SP) Medium dense; slightly moist; brown; fine-medium grained; with trace silt.	-	2.5	SPT		11	●					
5		Grades as above.	-	4.1	SPT		11	●					
10		Grades as above.											
		End of Borehole											
15													
20													
25													

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 9/7/16
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-7

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No.: 3-216-0956

Figure No.: A-7

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test 20 40 60 80	Water Level
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count		
0		Ground Surface							
		Gravelly SAND (SP) Loose; slightly moist; brown; fine-medium graine; with trace silt.	106.5	2.7	SPT		13		
5		Grades as above; medium dense; fine-coarse grained; with trace cobbles.	111.5	1.5	SPT		26		
10		Grades as above.							
		End of Borehole							
15									
20									
25									

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 9/7/16
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Boring No. B-8

Project: Proposed TownePlace Suites Hotel

Client: Tharaldson Investments

Location: SWC E. Huntington Drive and S. Myrtle Avenue, Monrovia, CA

Grnd. Surf. Elev. (Ft. MSL) N/A

Project No: 3-216-0956

Figure No.: A-8

Logged By: SMG

Initial: None

Depth to Water>

At Completion: None

SUBSURFACE PROFILE			SAMPLE					Penetration Test 20 40 60 80	Water Level
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture Content (%)	Sampler Type	Penetration	Blow Count		
0		Ground Surface							
		Gravelly SAND (SP) Loose; slightly moist; brown; fine-medium grained; with trace silt.	114.4	3.1	SPT		14	●	
5		Grades as above; medium dense.						●	
		Grades as above.	105.9	2.8	SPT		26		
10		End of Borehole							
15									
20									
25									

Drill Method: Hollow Stem Auger
Drill Rig: CME 45C
Driller: Salem Engineering Group, inc.
Sheet: 1 of 1

Drill Date: 9/7/16
Borehole Size: 8 inches
Hammer Type: Auto Trip
Weight & Drop: 140 lbs./30 in.



Percolation Test Worksheet

Project: Proposed TownePlace Suites Hotel
 SWC of E. Huntington Dr. & S. Myrtle Ave.
 Monrovia, CA

Job No.: 3-216-0956
Date Drilled: 9/20/2016
Soil Classification: Gravelly SAND
 (SP)

Vol. in 1" Wtr Col. (in³) 50.3

Safety Factor: 1
Hole Dia.: 8 in.
Pipe Dia.: 3 in.

Test Hole No.: P-1
Tested by: SK
Drilled Hole Depth: 6 ft.

Presoaking Date: 9/20/2016
Test Date: 9/21/2016

Pipe stickup: 0.1 ft

Time Start	Time Finish	Depth of Test Hole (ft) [#]	Refill- Yes or No	Elapsed Time (hrs:min)	Initial Water Level [#] (ft)	Final Water Level [#] (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (in/hr)		Reduction Factor	Adjusted Perc Rate (in/hr)	
10:05	10:15	6.1	Y	0:10	5.00	5.17	2.04	10	12.24		4.05	3.03	
10:16	10:26	6.1	Y	0:10	5.03	5.19	1.92	10	11.52		3.97	2.90	
10:27	10:37	6.1	Y	0:10	5.01	5.16	1.80	10	10.80		4.05	2.67	
10:38	10:48	6.1	Y	0:10	4.98	5.12	1.68	10	10.08		4.15	2.43	
10:49	10:59	6.1	Y	0:10	5.00	5.13	1.56	10	9.36		4.11	2.28	
11:00	11:10	6.1	Y	0:10	4.97	5.10	1.56	10	9.36		4.20	2.23	
11:11	11:21	6.1	Y	0:10	5.02	5.14	1.44	10	8.64		4.06	2.13	
11:22	11:32	6.1	Y	0:10	5.01	5.13	1.44	10	8.64		4.09	2.11	
11:33	11:43	6.1	Y	0:10	5.00	5.12	1.44	10	8.64		4.12	2.10	
11:44	11:54	6.1	Y	0:10	4.98	5.10	1.44	10	8.64		4.18	2.07	
Recommended for Design:									Average of Last 3 Readings		8.64	4.11	2.10

* Average of last 4 readings

Percolation Test Worksheet

Project: Proposed TownePlace Suites Hotel
SWC of E. Huntington Dr. & S. Myrtle Ave.
Monrovia, CA

Job No.: 3-216-0956
Date Drilled: 9/20/2016
Soil Classification: Gravelly SAND (SP)

Vol. in 1" Wtr Col. (in³) 50.3
Safety Factor: 1
Hole Dia.: 8 in.
Pipe Dia.: 3 in.

Test Hole No.: P-2
Tested by: SK
Drilled Hole Depth: 5.5 ft.

Presoaking Date: 9/20/2016
Test Date: 9/21/2016
Pipe stickup: 0.2 ft

Time Start	Time Finish	Depth of Test Hole (ft) [#]	Refill- Yes or No	Elapsed Time (hrs:min)	Initial Water Level [#] (ft)	Final Water Level [#] (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (in/hr)		Reduction Factor*	Adjusted Perc Rate (in/hr)*	
10:10	10:20	5.7	Y	0:10	4.50	4.67	2.04	10	12.24		4.35	2.82	
10:21	10:31	5.7	Y	0:10	4.53	4.69	1.92	10	11.52		4.27	2.70	
10:32	10:42	5.7	Y	0:10	4.51	4.66	1.80	10	10.80		4.35	2.49	
10:43	10:53	5.7	Y	0:10	4.52	4.67	1.80	10	10.80		4.32	2.50	
10:54	11:04	5.7	Y	0:10	4.54	4.68	1.68	10	10.08		4.27	2.36	
11:05	11:15	5.7	Y	0:10	4.56	4.70	1.68	10	10.08		4.21	2.39	
11:16	11:26	5.7	Y	0:10	4.51	4.64	1.56	10	9.36		4.38	2.14	
11:27	11:37	5.7	Y	0:10	4.53	4.66	1.56	10	9.36		4.32	2.17	
11:38	11:48	5.7	Y	0:10	4.52	4.65	1.56	10	9.36		4.35	2.15	
11:49	11:59	5.7	Y	0:10	4.51	4.64	1.56	10	9.36		4.38	2.14	
Recommended for Design:									Average of Last 3 Readings		9.36	4.35	2.15

* Average of last 4 readings

Percolation Test Worksheet

Project: Proposed TownePlace Suites Hotel
 SWC of E. Huntington Dr. & S. Myrtle Ave.
 Monrovia, CA

Job No.: 3-216-0956
Date Drilled: 9/20/2016
Soil Classification: Gravelly SAND
 (SP)

Vol. in 1" Wtr Col. (in³) 50.3

Safety Factor: 1
Hole Dia.: 8 in.
Pipe Dia.: 3 in.

Test Hole No.: P-3
Tested by: SK
Drilled Hole Depth: 8 ft.

Presoaking Date: 9/20/2016
Test Date: 9/21/2016

Pipe stickup: 0 ft

Time Start	Time Finish	Depth of Test Hole (ft) [#]	Refill- Yes or No	Elapsed Time (hrs:min)	Initial Water Level [#] (ft)	Final Water Level [#] (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (in/hr)		Reduction Factor*	Adjusted Perc Rate (in/hr)*	
12:00	12:10	8.0	Y	0:10	6.93	7.11	2.16	10	12.96		3.94	3.29	
12:11	12:21	8.0	Y	0:10	6.89	7.06	2.04	10	12.24		4.08	3.00	
12:22	12:32	8.0	Y	0:10	6.88	7.04	1.92	10	11.52		4.12	2.80	
12:33	12:43	8.0	Y	0:10	6.90	7.06	1.92	10	11.52		4.06	2.84	
12:44	12:54	8.0	Y	0:10	6.87	7.02	1.80	10	10.80		4.17	2.59	
12:55	13:05	8.0	Y	0:10	6.93	7.07	1.68	10	10.08		4.00	2.52	
13:06	13:16	8.0	Y	0:10	6.90	7.04	1.68	10	10.08		4.09	2.46	
13:17	13:27	8.0	Y	0:10	6.91	7.05	1.68	10	10.08		4.06	2.48	
13:28	13:38	8.0	Y	0:10	6.90	7.04	1.68	10	10.08		4.09	2.46	
Recommended for Design:									Average of Last 3 Readings		10.08	4.06	2.48

* Average of last 4 readings

DRY SETTLEMENT DUE TO EARTHQUAKE SHAKING

Job No. **3-216-0956** Job Name **Proposed TownePlace Suites Hotel**
 Boring No. **B-1** Drill Date **09/07/16**

* Use Fig. 11 of Tokimatsu & Seed (1987)
 ** Use Fig. 13 of Tokimatsu & Seed (1987)
 *** $MSF=10^{2.24/Mw} / Mw^{2.56}$
 # $C_N=2.2/(1.2+\sigma'_o/P_a)$

+ From Pradel, D. (1998) equations for modulus reduction curve

User Input Section			
Earthquake Data		Drilling GW Depth (ft)	50
Mag. (M_w)	7.3	Earthquake GW Depth (ft)	50
a_{max}/g	0.845	Rod Stick-Up (ft)	3
MSF***	1.07	SPT N-Value Correction Factors	
Energy Ratio	C_E	1.60	Notes
Borehole Dia.	C_B	1.15	Notes
Sampling Method	C_S	1.2	Notes
Factor of Safety	FS	1.0	
Rod Length	C_R	Calculated	
Overburden Press	C_N	Calculated	

Lookup Tables

% Fines	ΔN	Length	C_R
0	0	1	0.75
10	1	12	0.85
25	2	20	0.95
50	4	30	0.98
75	5	33	1

Depth (ft)	Dry Unit		Fines %	SPT Field N	Layer (ft)	Unit Wt (pcf)	Total σ_o		Eff. σ'_o (psf)	SPT $C_N^{\#}$	SPT		Fines Corct'd SPT (N_{160f})	Eff. σ'_{oeq} (psf)	σ_o/σ'_{oeq}	r_d	Shear Modulus $G_{max}^{##}$	Cyclic Shear Stress T_{av}	Shear Strain/Shear Modulus Ratio $\gamma_{eff}(G_{eff}/G_{max})$	a^+	b^+	Eff. Shear Strain $\gamma(\%)*$	Vol. Strain (1-way) $V\%^{**}$	Vol. Strain Mw Corct'd $V\%^{+}$	S (2-way) in.
	Wt (pcf)	w (%)					bottom (psf)	mid-pt. (psf)			(N_{160})	ΔN													
2	115	4.3	3.4	22	2.0	119.9	240	120	120	1.75	63.6	0.0	63.6	120	1.000	0.997	7.05E+05	65.7	9.32E-05	1.50E-1	2.91E+4	2.6E-02	5.2E-3	0.00	0.00
5	113	4.3	4.3	29	3.0	117.9	593	417	417	1.56	75.0	0.0	75.0	417	1.000	0.990	1.39E+06	226.6	1.63E-04	1.80E-1	1.66E+4	5.1E-02	8.1E-3	0.01	0.01
10	105	8.7	7.4	17	5.0	114.1	1164	879	879	1.34	42.8	0.0	42.8	879	1.000	0.979	1.67E+06	472.5	2.83E-04	2.02E-1	1.19E+4	1.6E-01	5.3E-2	0.05	0.06
15	100	6.7	4.1	14	5.0	106.7	1698	1431	1431	1.15	30.2	0.0	30.2	1431	1.000	0.968	1.90E+06	761.0	4.01E-04	2.17E-1	9.54E+3	3.6E-01	1.9E-1	0.18	0.22
20	100	7.9	4.1	18	5.0	107.9	2237	1967	1967	1.01	38.0	0.0	38.0	1967	1.000	0.956	2.41E+06	1033.5	4.30E-04	2.28E-1	8.27E+3	3.1E-01	1.2E-1	0.12	0.14
25	100	3.3	4.6	32	5.0	103.3	2754	2495	2495	0.90	60.3	0.0	60.3	2495	1.000	0.941	3.16E+06	1289.7	4.08E-04	2.36E-1	7.43E+3	1.9E-01	4.1E-2	0.04	0.05
30	100	6.7	6.3	26	5.0	106.7	3287	3020	3020	0.81	46.6	0.0	46.6	3020	1.000	0.919	3.19E+06	1524.8	4.78E-04	2.43E-1	6.82E+3	2.8E-01	8.4E-2	0.08	0.10
35	100	10.6	6.3	19	5.0	110.6	3840	3564	3564	0.74	31.0	0.0	31.0	3564	1.000	0.888	3.02E+06	1738.7	5.75E-04	2.49E-1	6.33E+3	4.8E-01	2.5E-1	0.24	0.28
40	100	5.4	4.6	24	5.0	105.4	4367	4104	4104	0.68	35.9	0.0	35.9	4104	1.000	0.848	3.41E+06	1910.6	5.61E-04	2.54E-1	5.94E+3	3.6E-01	1.5E-1	0.15	0.17
45	100	5.4	4.6	50	5.0	105.4	4894	4631	4631	0.63	69.1	0.0	69.1	4631	1.000	0.799	4.50E+06	2033.0	4.52E-04	2.59E-1	5.62E+3	1.5E-01	2.7E-2	0.03	0.00
50	100	5.4	4.6	50	5.0	105.4	5421	5158	5158	0.58	64.3	0.0	64.3	5158	1.000	0.748	4.64E+06	2118.6	4.57E-04	2.63E-1	5.36E+3	1.5E-01	2.8E-2	0.03	0.00
The total seismic-induced settlement calculation is based on a water table depth of 50 feet below grade																							Total	1.02	

APPENDIX

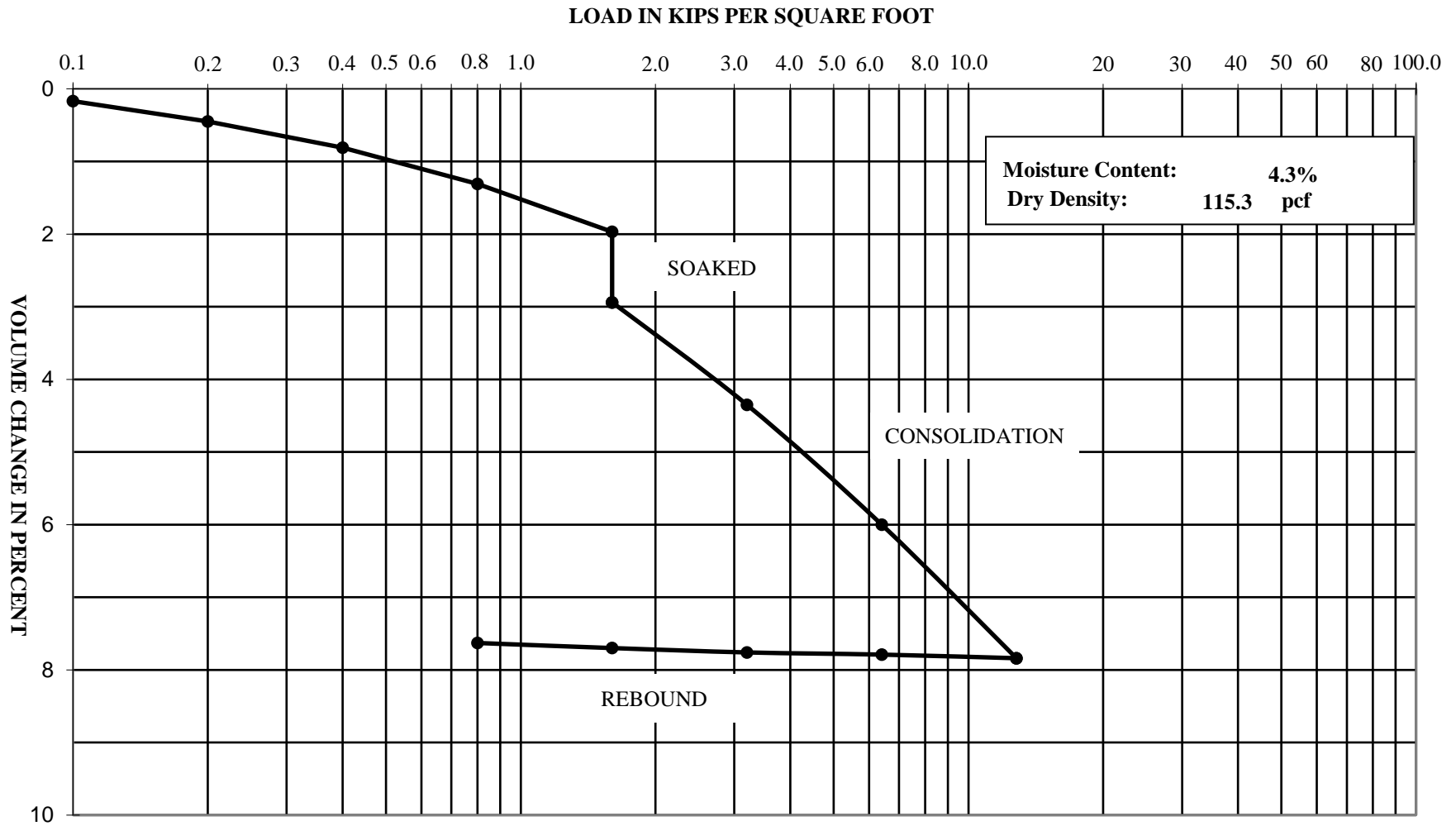
B



APPENDIX B LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM), Caltrans, or other suggested procedures. Selected samples were tested for in-situ dry density and moisture content, corrosivity, consolidation, shear strength, expansion, R-value, maximum density and optimum moisture content, and grain size distribution. The results of the laboratory tests are summarized in the following figures.

CONSOLIDATION - PRESSURE TEST DATA ASTM D 2435



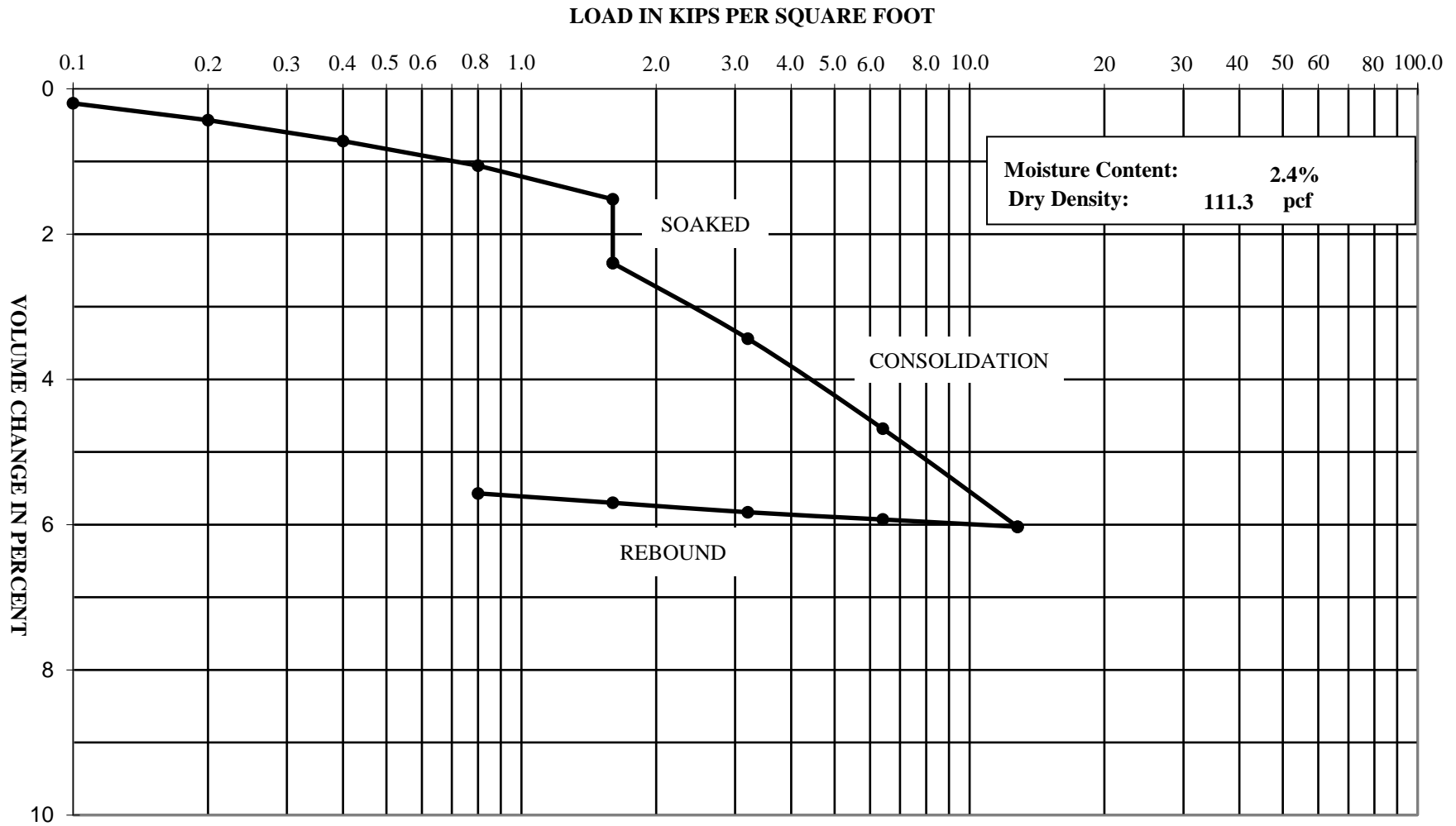
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 2'



CONSOLIDATION - PRESSURE TEST DATA ASTM D 2435



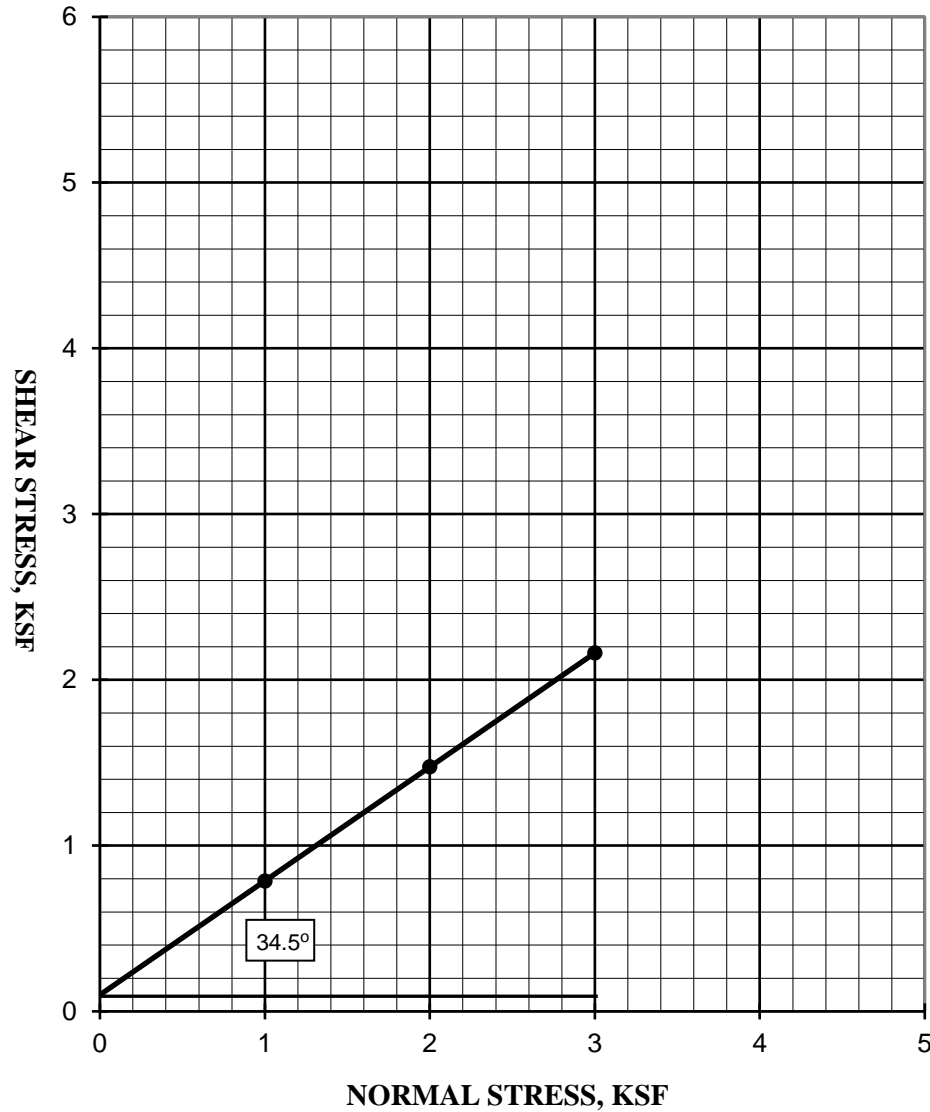
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-3 @ 5'



**SHEAR STRENGTH DIAGRAM
(DIRECT SHEAR)
ASTM D - 3080**



**Proposed TownePlace Suites Hotel, SWC E.
Huntington Dr. & S. Myrtle Ave., Monrovia, CA**

Project Number: 3-216-0956

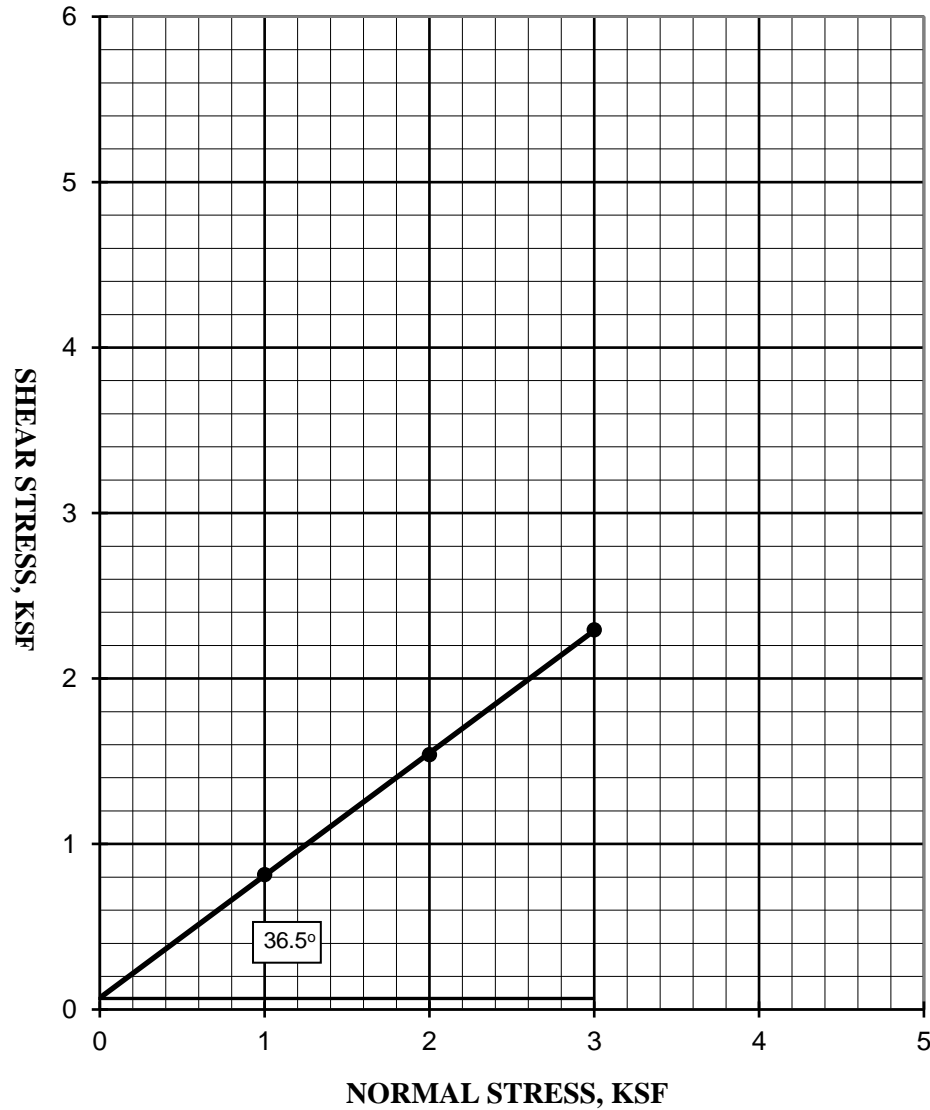
**Boring: B-1 @ 5'
Soil Type: Gravelly SAND (SP) w/trace silt**

**Friction Angle: 34.5 degrees
Cohesion: 100 psf**

**Moisture Content 4.3%
Dry Density 113.0 pcf**



**SHEAR STRENGTH DIAGRAM
(DIRECT SHEAR)
ASTM D - 3080**



**Proposed TownePlace Suites Hotel, SWC E.
Huntington Dr. & S. Myrtle Ave., Monrovia, CA**

Project Number: 3-216-0956

Boring: B-3 @ 2'

Soil Type: Gravelly SAND (SP) w/trace silt

Friction Angle: 36.5 degrees

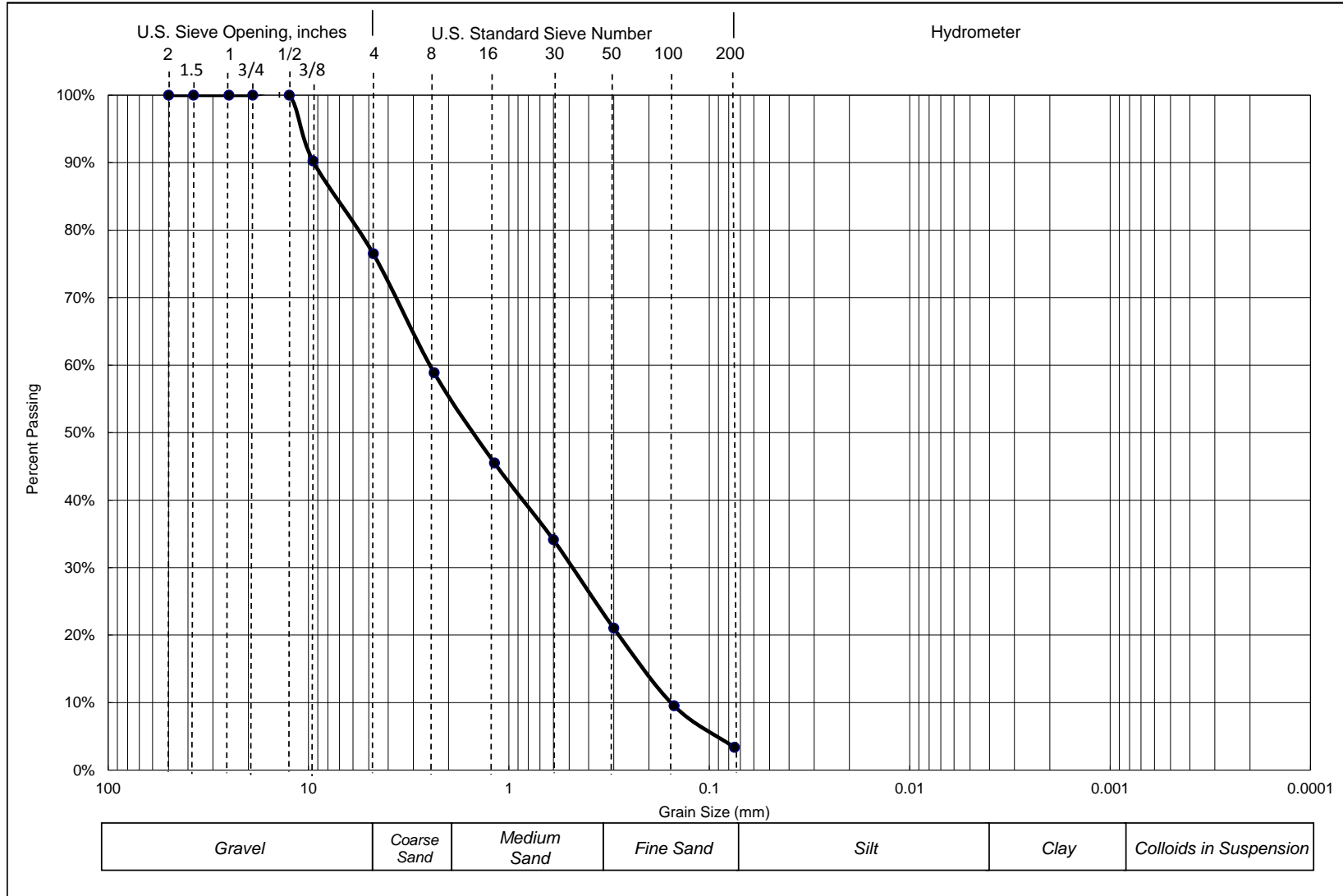
Cohesion: 70 psf

Moisture Content 1.9%

Dry Density 110.0 pcf



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 2'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	90.2%
No. 4	4.75	76.5%
No. 8	2.36	58.9%
No. 16	1.18	45.5%
No. 30	0.6	34.1%
No. 50	0.3	21.0%
No. 100	0.15	9.5%
No. 200	0.075	3.4%

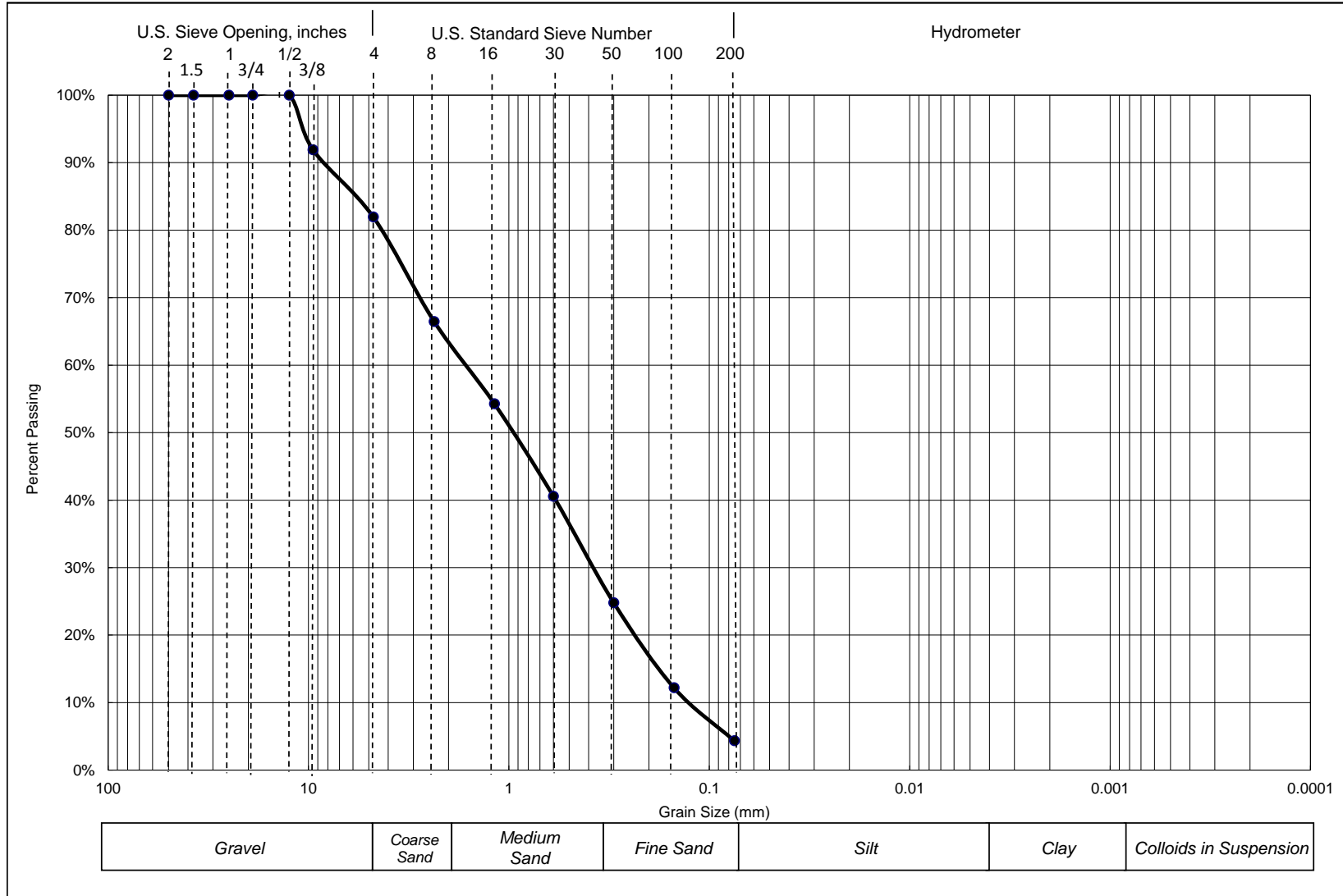
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 2'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 5'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	91.9%
No. 4	4.75	81.9%
No. 8	2.36	66.4%
No. 16	1.18	54.3%
No. 30	0.6	40.6%
No. 50	0.3	24.8%
No. 100	0.15	12.2%
No. 200	0.075	4.3%

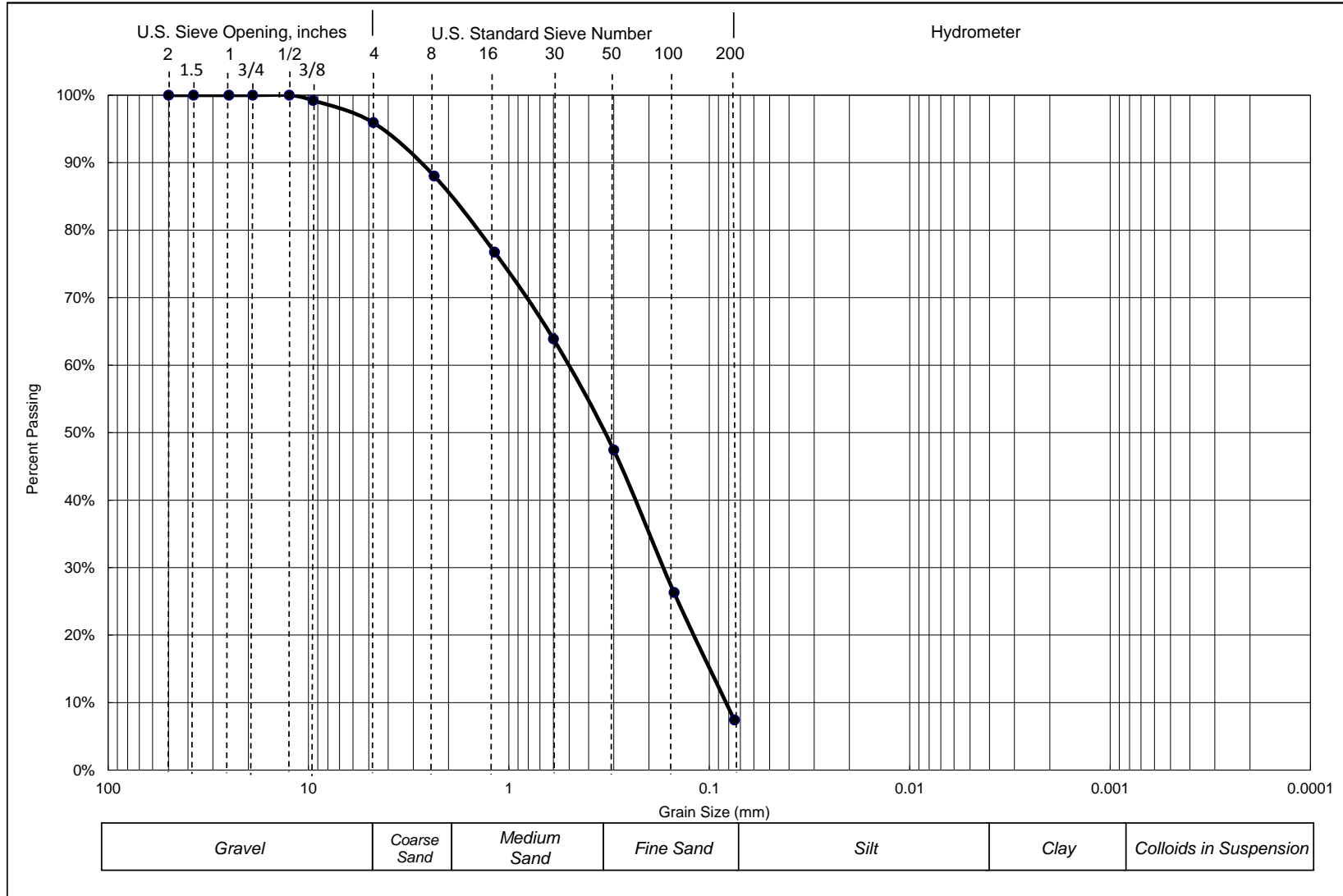
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 5'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 10'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	99.2%
No. 4	4.75	95.9%
No. 8	2.36	88.0%
No. 16	1.18	76.8%
No. 30	0.6	63.9%
No. 50	0.3	47.4%
No. 100	0.15	26.3%
No. 200	0.075	7.4%

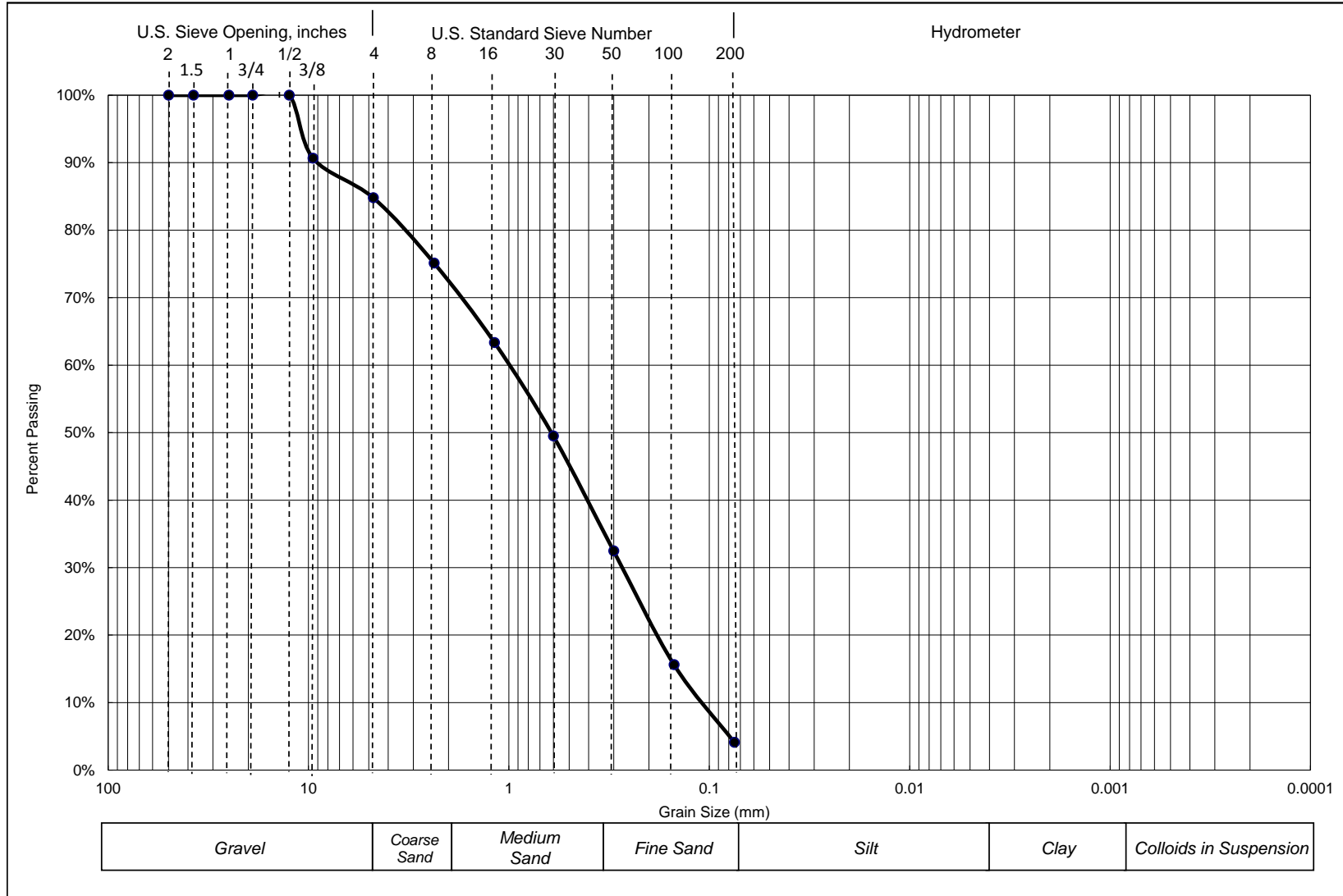
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 10'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 15'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	90.7%
No. 4	4.75	84.8%
No. 8	2.36	75.1%
No. 16	1.18	63.3%
No. 30	0.6	49.5%
No. 50	0.3	32.5%
No. 100	0.15	15.6%
No. 200	0.075	4.1%

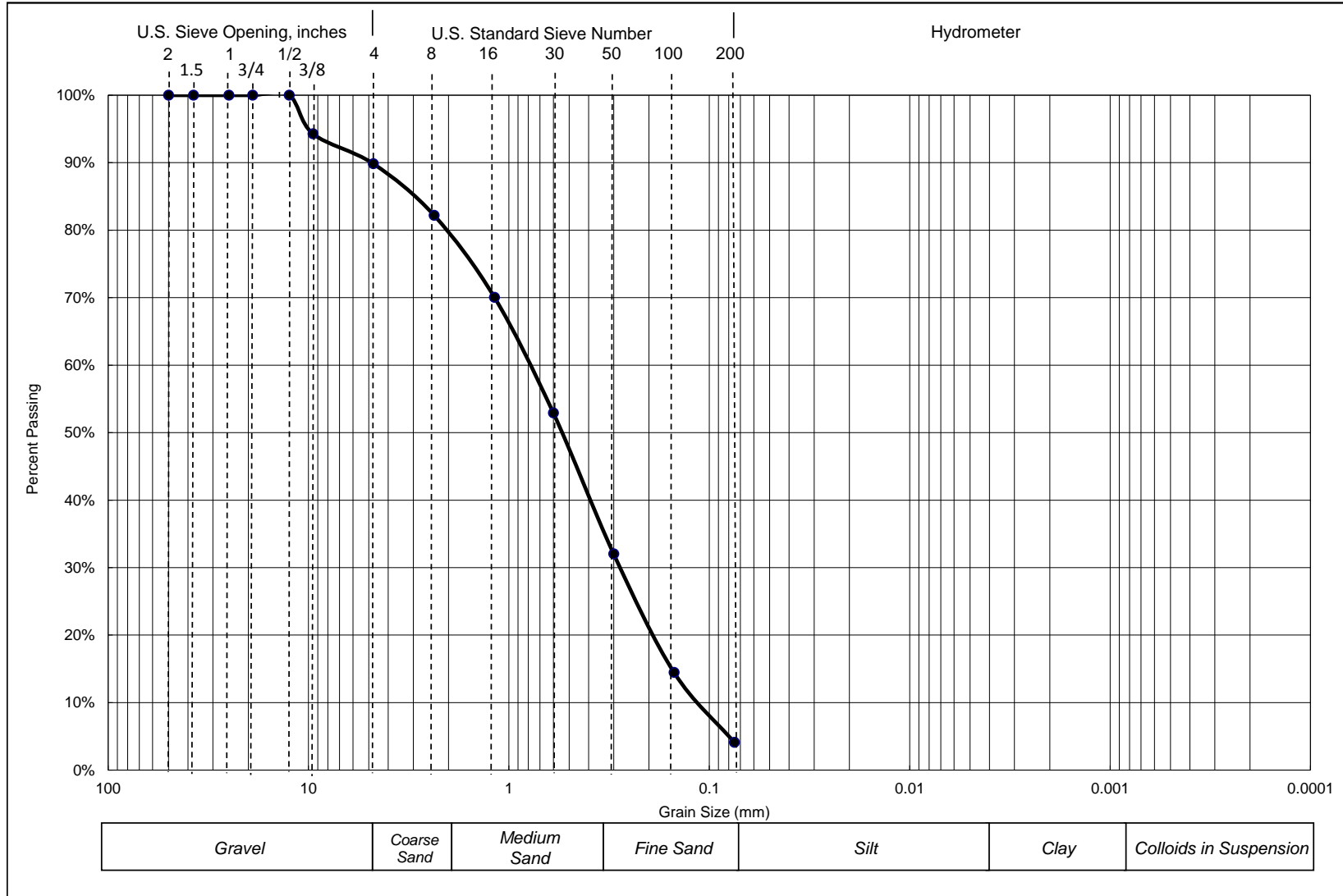
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1@ 15'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 20'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	94.3%
No. 4	4.75	89.8%
No. 8	2.36	82.2%
No. 16	1.18	70.0%
No. 30	0.6	52.9%
No. 50	0.3	32.0%
No. 100	0.15	14.5%
No. 200	0.075	4.1%

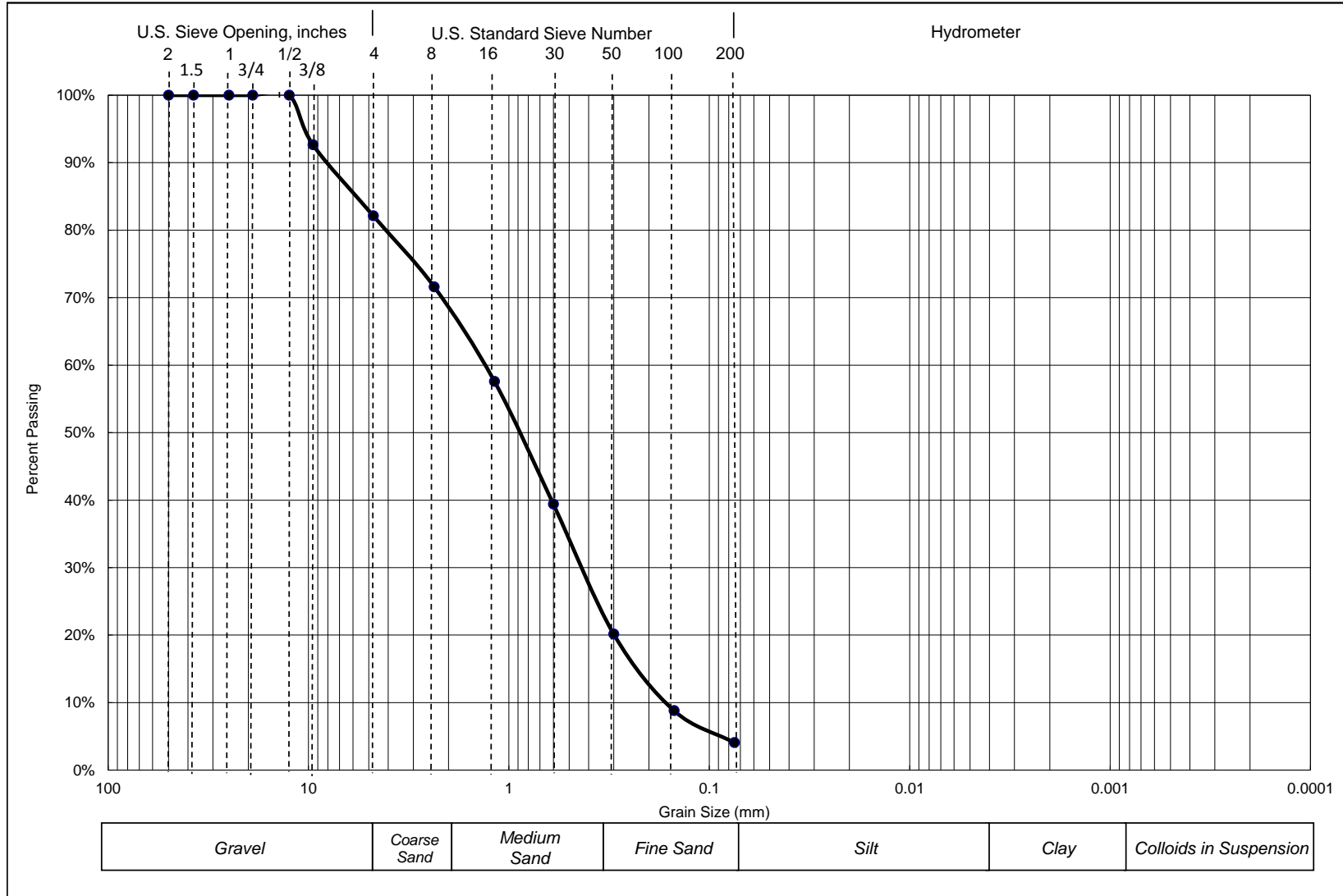
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 20'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 25'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	92.6%
No. 4	4.75	82.1%
No. 8	2.36	71.6%
No. 16	1.18	57.6%
No. 30	0.6	39.4%
No. 50	0.3	20.2%
No. 100	0.15	8.8%
No. 200	0.075	4.1%

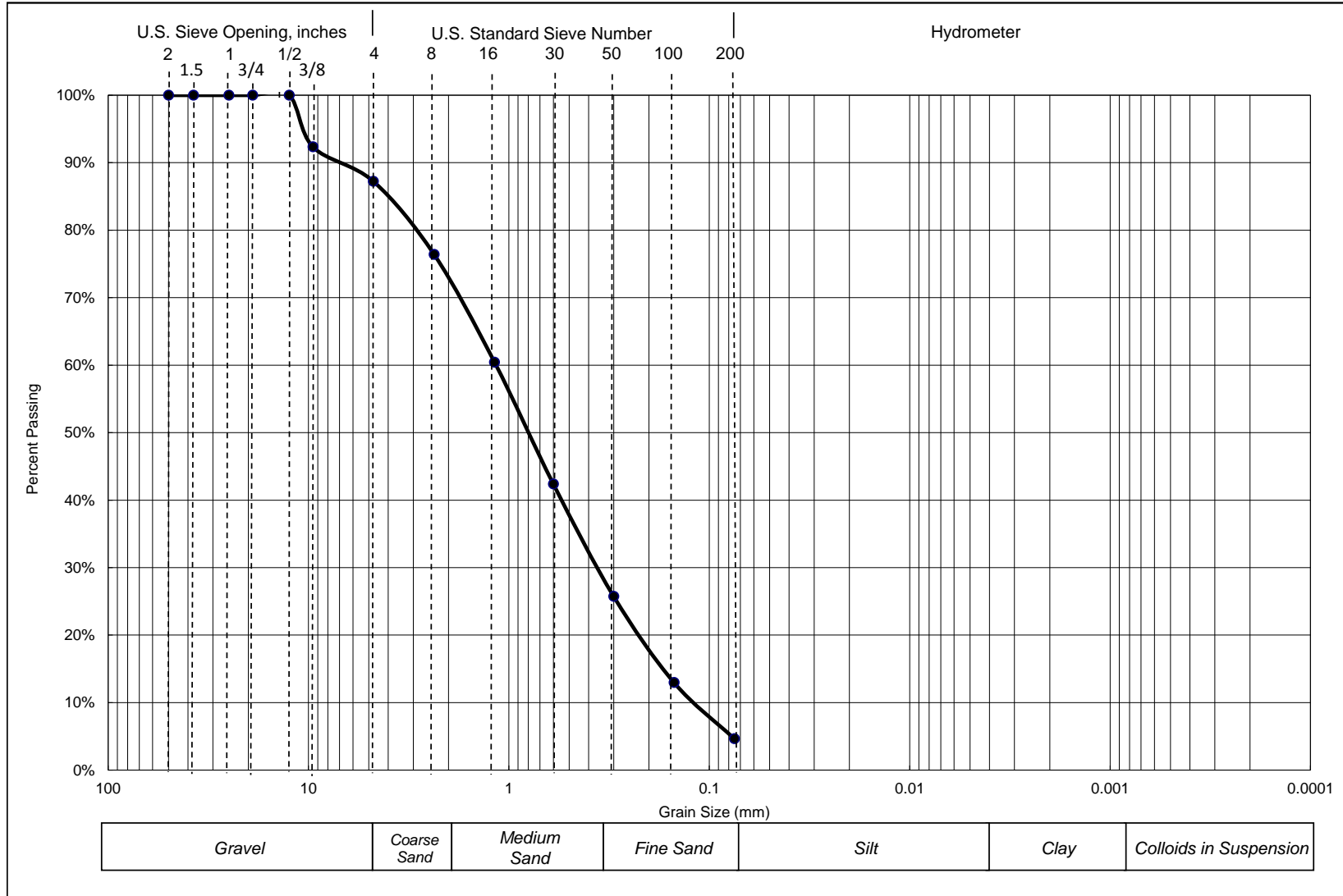
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 25'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 30'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	92.3%
No. 4	4.75	87.2%
No. 8	2.36	76.4%
No. 16	1.18	60.4%
No. 30	0.6	42.4%
No. 50	0.3	25.7%
No. 100	0.15	13.0%
No. 200	0.075	4.6%

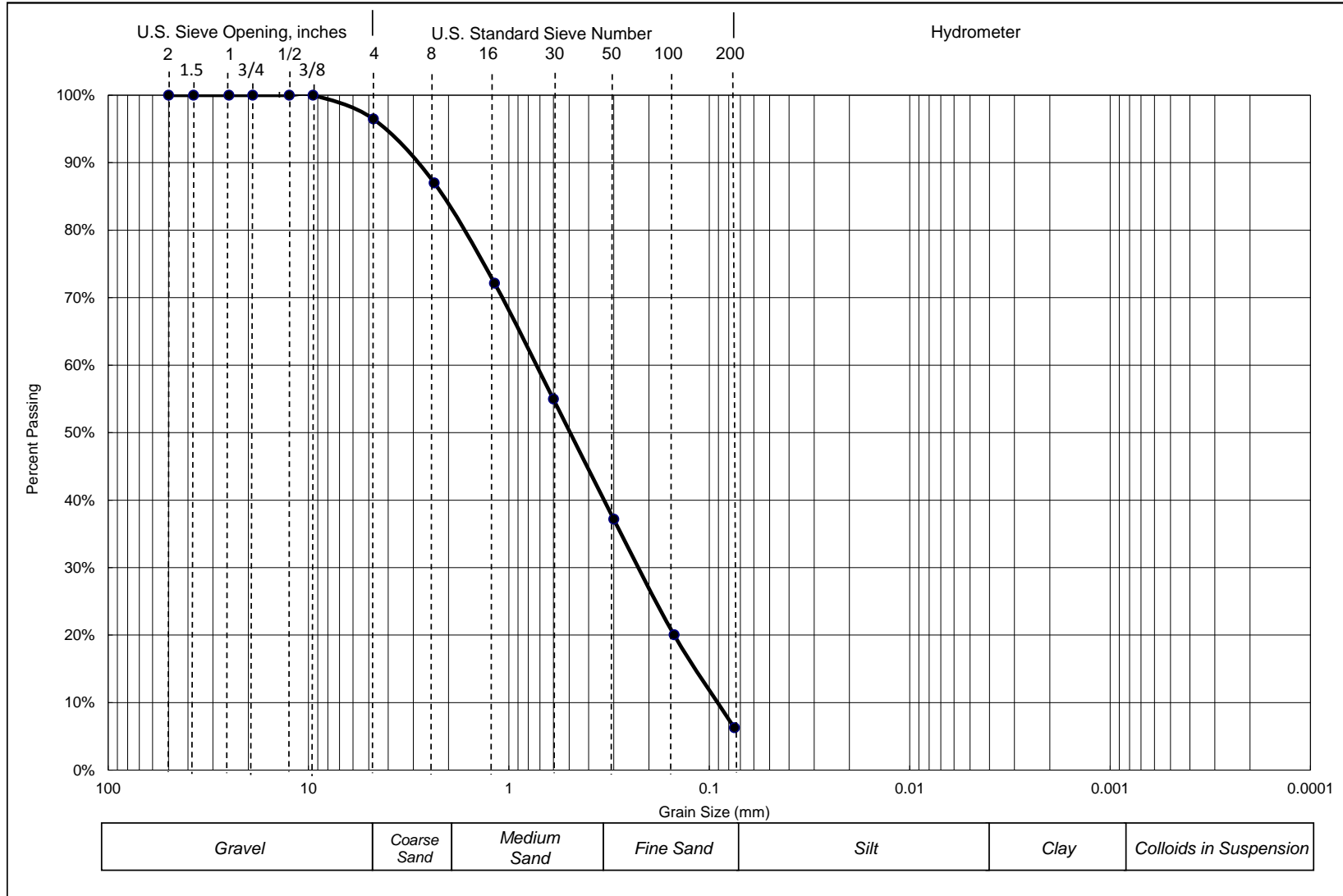
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 30'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 35'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	100.0%
No. 4	4.75	96.5%
No. 8	2.36	87.0%
No. 16	1.18	72.2%
No. 30	0.6	55.0%
No. 50	0.3	37.2%
No. 100	0.15	20.1%
No. 200	0.075	6.3%

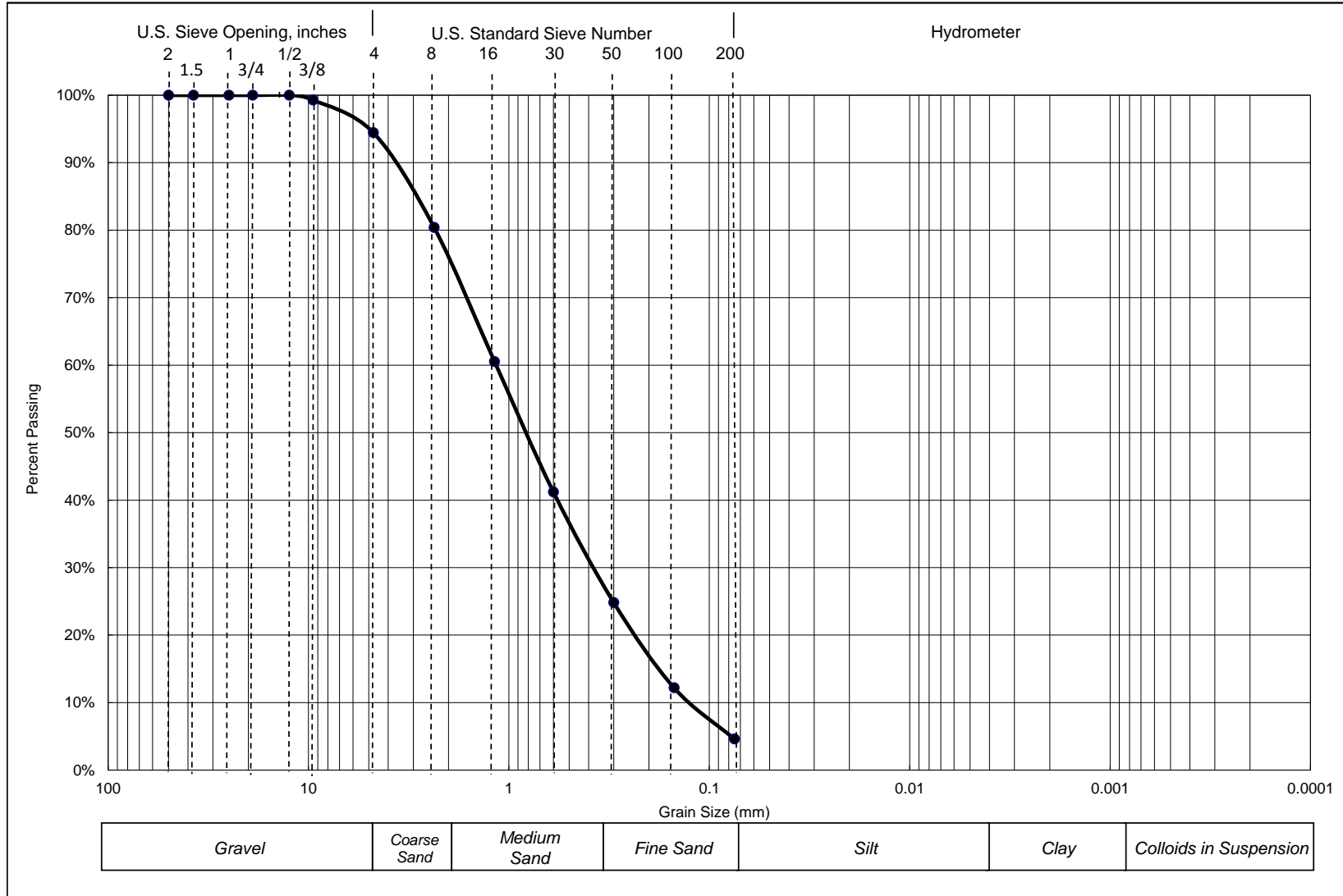
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 35'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 40'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	99.3%
No. 4	4.75	94.4%
No. 8	2.36	80.4%
No. 16	1.18	60.5%
No. 30	0.6	41.2%
No. 50	0.3	24.8%
No. 100	0.15	12.2%
No. 200	0.075	4.6%

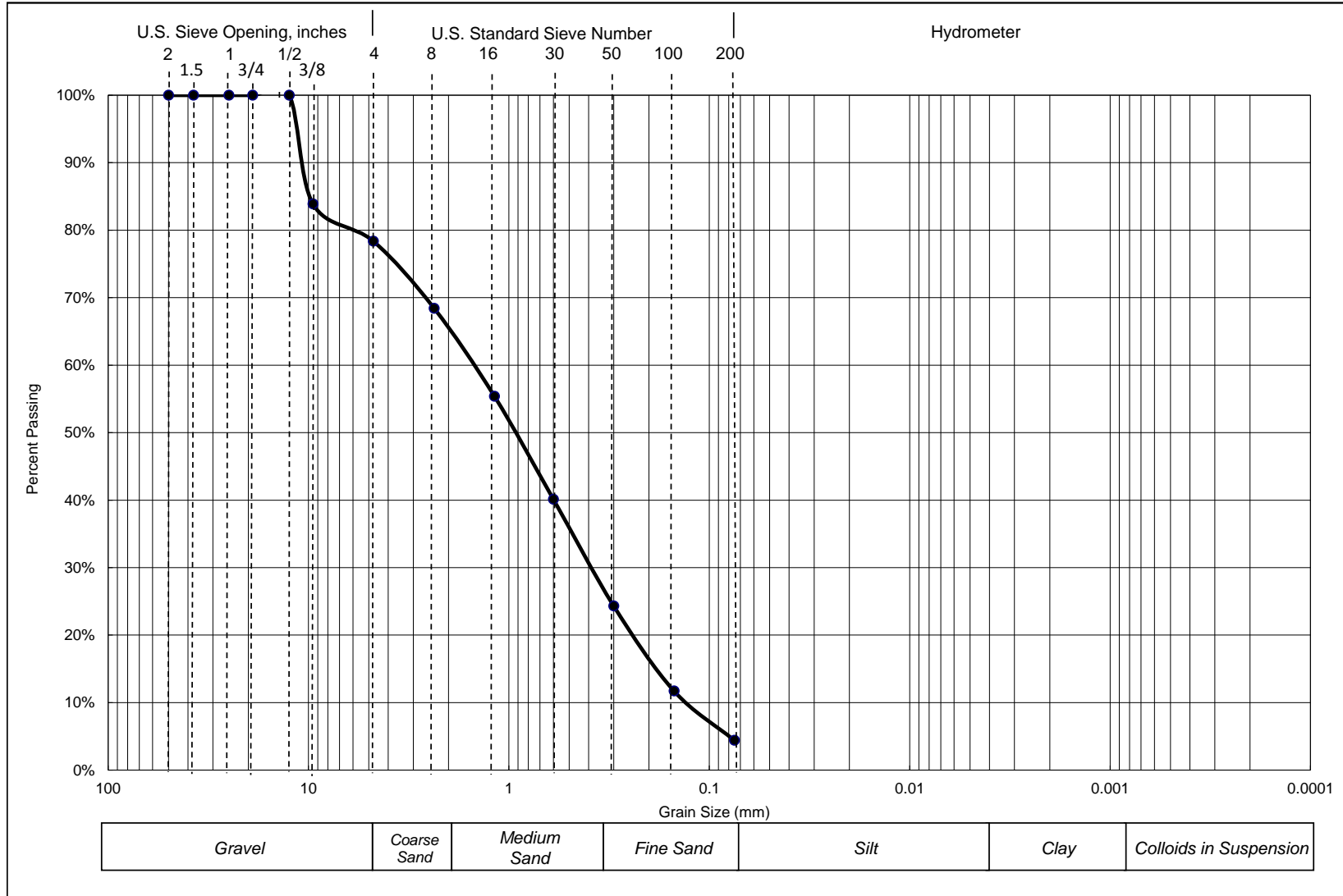
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-1 @ 40'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-3 @ 2'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	83.9%
No. 4	4.75	78.4%
No. 8	2.36	68.4%
No. 16	1.18	55.4%
No. 30	0.6	40.1%
No. 50	0.3	24.3%
No. 100	0.15	11.7%
No. 200	0.075	4.4%

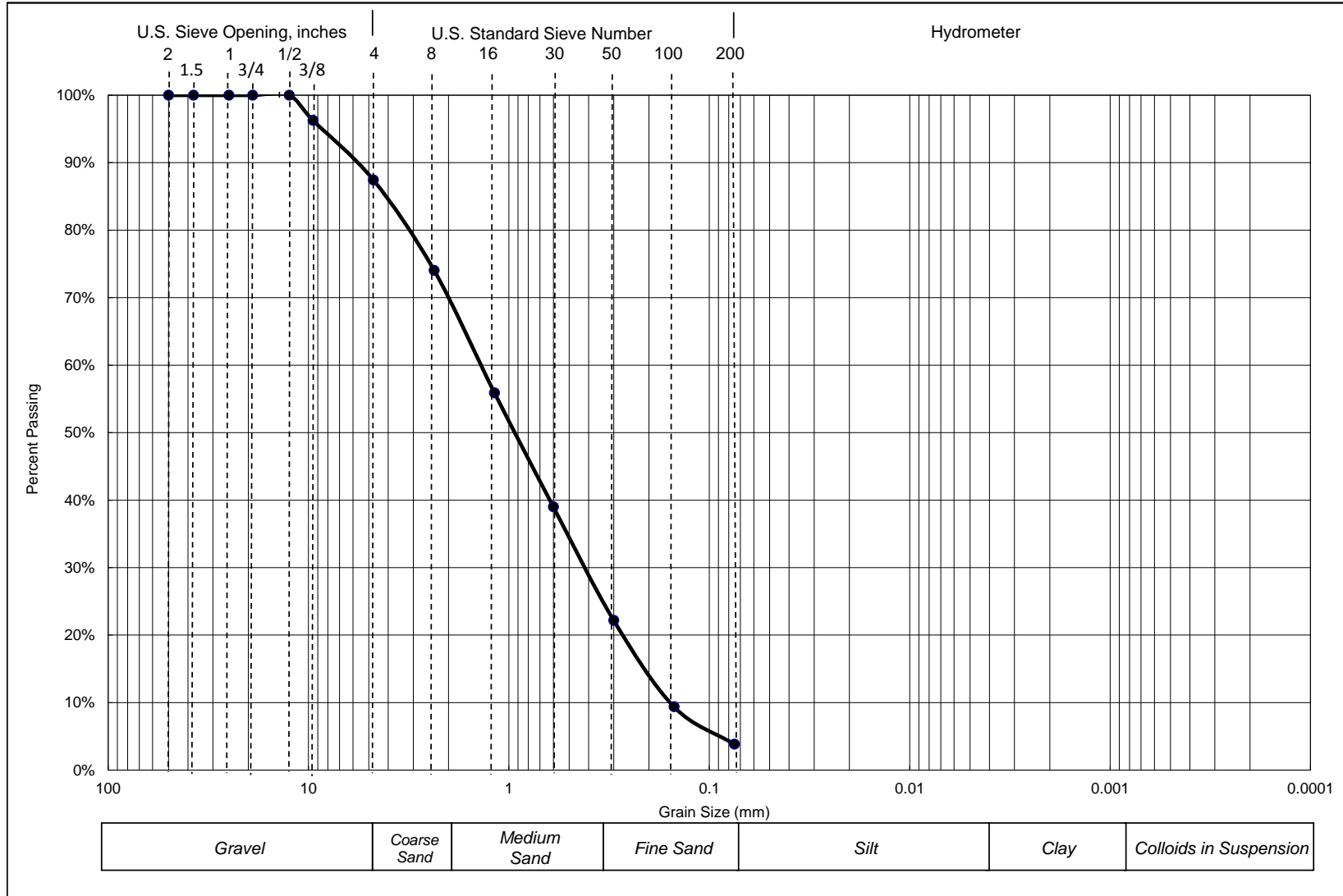
Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-3 @ 2'



**PARTICLE SIZE DISTRIBUTION DIAGRAM
GRADATION TEST - ASTM D 422**



Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-3 @ 5'



DRY SIEVE ANALYSIS (ASTM D422 without Hydrometer)

Sieve Size	Particle Size, mm	Percent Passing
1 1/2-in.	37.5	100.0%
1-in.	25	100.0%
3/4-in.	19	100.0%
1/2-in.	12.5	100.0%
3/8-in.	9.5	96.3%
No. 4	4.75	87.4%
No. 8	2.36	74.0%
No. 16	1.18	55.9%
No. 30	0.6	39.0%
No. 50	0.3	22.2%
No. 100	0.15	9.4%
No. 200	0.075	3.8%

Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Boring: B-3 @ 5'



EXPANSION INDEX TEST

ASTM D 4829 / UBC Std. 29-2

Project Number: 3-216-0956

Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Date Tested: 8/26/16

Sample location/ Depth: B-2 @ 0' - 3'

Sample Number: 1

Soil Classification: Gravelly SAND (SP) w/trace silt

Trial #	1	2	3
Weight of Soil & Mold, gms	596.8		
Weight of Mold, gms	186.7		
Weight of Soil, gms	410.1		
Wet Density, Lbs/cu.ft.	123.7		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	274.1		
Moisture Content, %	9.4		
Dry Density, Lbs/cu.ft.	113.0		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	52.0		

Time	Initial	30 min	1 hr	6 hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0000

$$\begin{aligned} \text{Expansion Index}_{\text{measured}} &= 0 \\ \text{Expansion Index}_{50} &= 0.0 \end{aligned}$$

Expansion Index = **0**

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

CHEMICAL ANALYSIS

SO₄ - Modified Caltrans 417 & Cl - Modified Caltrans 417/422

Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Date: 9/14/16

Soil Classification: Gravelly SAND (SP) w/trace silt

Sample Number	Sample Location	Soluble Sulfate SO ₄ -S	Soluble Chloride Cl	pH
1a.	B-1 @ 0' - 3'	50 mg/Kg	17 mg/Kg	7.7
1b.	B-1 @ 0' - 3'	50 mg/Kg	17 mg/Kg	7.7
1c.	B-1 @ 0' - 3'	50 mg/Kg	17 mg/Kg	7.7
Average:		50 mg/Kg	17 mg/Kg	7.7

LABORATORY COMPACTION CURVE

ASTM - D1557, D698

Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Date Tested: 9/16/16

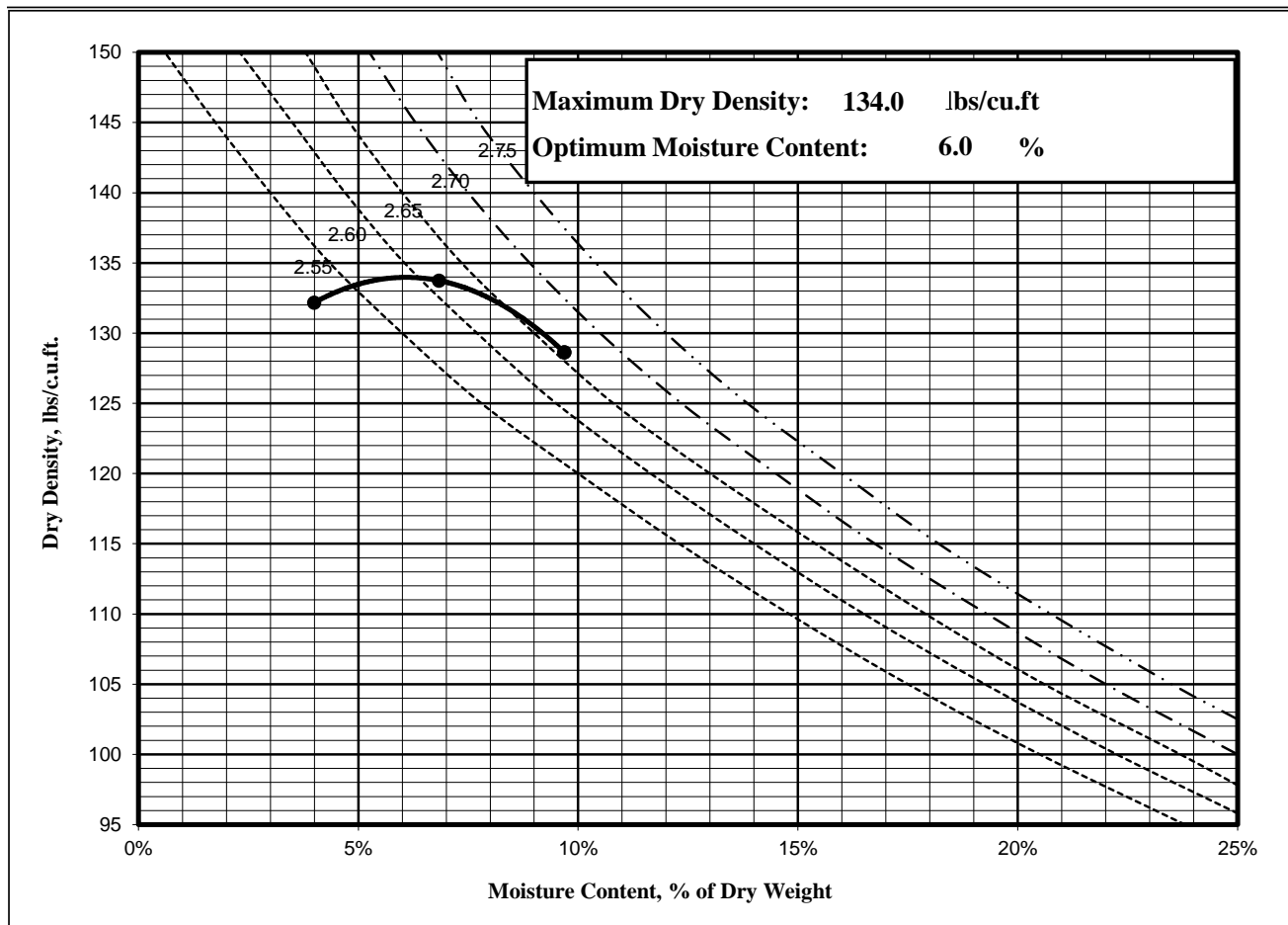
Sample Location: B-1 @ 0' - 3'

Soil Classification: Gravelly SAND (SP) w/trace silt

Sample/Curve Number: 1

Test Method: 1557 A

	1	2	3
Weight of Moist Specimen & Mold, gm	4164.0	4137.0	4082.0
Weight of Compaction Mold, gm	2005.8	2005.8	2005.8
Weight of Moist Specimen, gm	2158.2	2131.2	2076.2
Volume of mold, cu. ft.	0.0333	0.0333	0.0333
Wet Density, lbs/cu.ft.	142.9	141.1	137.5
Weight of Wet (Moisture) Sample, gm	600.0	600.0	600.0
Weight of Dry (Moisture) Sample, gm	578.2	569.9	586.9
Moisture Content, %	6.8%	9.7%	4.0%
Dry Density, lbs/cu.ft.	133.7	128.6	132.2



Resistance R - Value and Expansion Pressure of Compacted Soils

ASTM D2844-94, Cal 301

Proposed TownePlace Suites Hotel, SWC E. Huntington Dr. & S. Myrtle Ave., Monrovia, CA

Project Number: 3-216-0956

Sample Date: 9/7/16

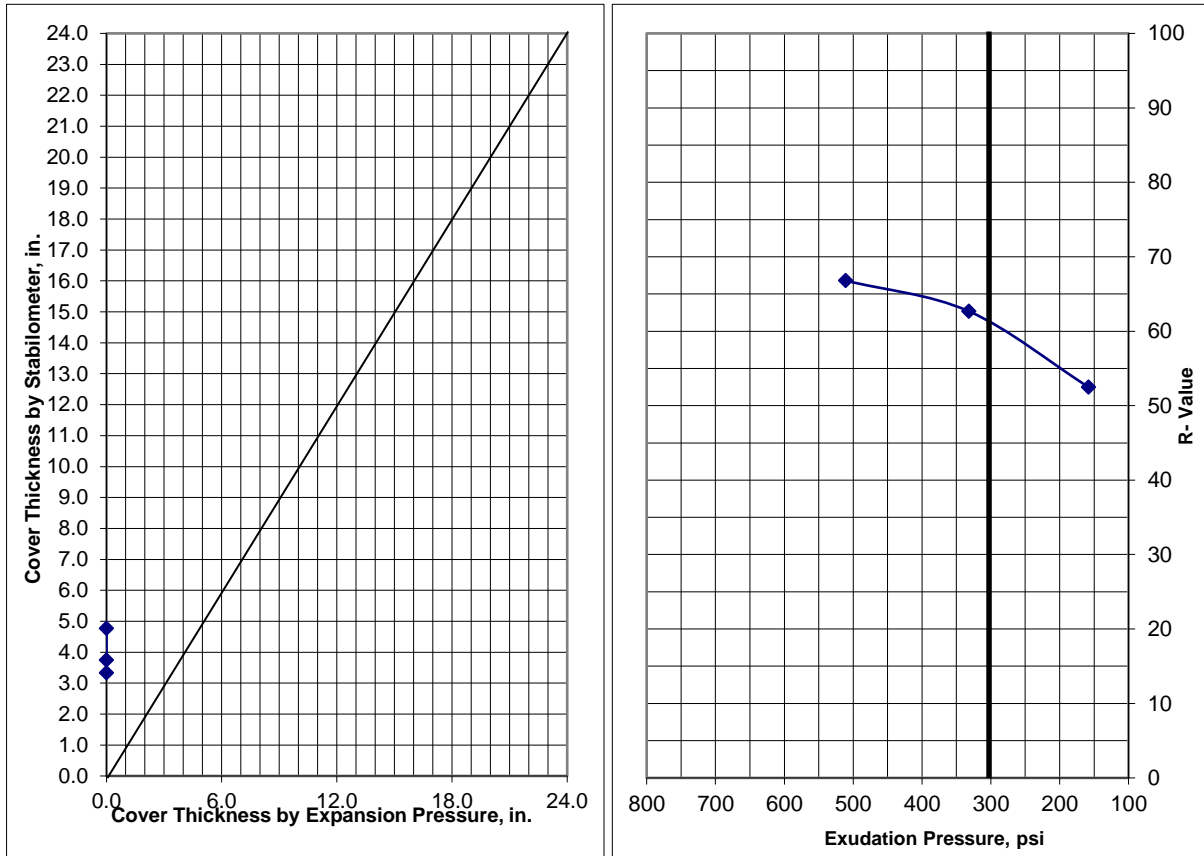
Date Tested: 9/21/16

Sampled By: SMG

Tested By: SK

Sample Location: B-6 @ 0-2'

Material Description: Gravelly Sand (SP) w/trace silt



Specimen	1	2	3
Exudation Pressure, psi	511	332	158
Moisture at Test, %	5.8	6.3	6.8
Dry Density, pcf	127.2	126.5	125.8
Expansion Pressure, psf	0	0	0.0
Thickness by Stabilometer, in.	3.3	3.7	4.8
Thickness by Expansion Pressure, in	0.0	0.0	0.0
R-Value by Stabilometer	67	63	52
R-Value by Expansion Pressure	NA		
R-Value at 300 psi Exudation Pressure	61		

Controlling R-Value	61
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APPENDIX

C



APPENDIX C

GENERAL EARTHWORK AND PAVEMENT SPECIFICATIONS

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

1.0 SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including, but not limited to, the furnishing of all labor, tools and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans and disposal of excess materials.

2.0 PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of SALEM Engineering Group, Incorporated, hereinafter referred to as the Soils Engineer and/or Testing Agency. Attainment of design grades, when achieved, shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary adjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer, or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

3.0 TECHNICAL REQUIREMENTS: All compacted materials shall be densified to no less than 95 percent of relative compaction based on ASTM D1557 Test Method (latest edition), UBC or CAL-216, or as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

4.0 SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the Geotechnical Engineering Report. The Contractor shall make his own interpretation of the data contained in the Geotechnical Engineering Report and the Contractor shall not be relieved of liability for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

5.0 DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or wind-blown materials attributable to his work. Site preparation shall consist of site clearing and grubbing and preparation of foundation materials for receiving fill.

6.0 CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter and all other matter determined by the Soils Engineer to be deleterious. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed improvement areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots greater than 1 inch in diameter. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavations is not permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas which are to receive fill materials shall not be permitted.

7.0 SUBGRADE PREPARATION: Surfaces to receive Engineered Fill and/or building or slab loads shall be prepared as outlined above, scarified to a minimum of 12 inches, moisture-conditioned as necessary, and recompacted to 95 percent relative compaction.

Loose soil areas and/or areas of disturbed soil shall be moisture-conditioned as necessary and recompacted to 95 percent relative compaction (90% for silty or clayey soil). All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any fill material.

8.0 EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

9.0 FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence or approval of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills, provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

10.0 PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. Compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer. Both cut and fill shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

11.0 SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing, or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill is as specified.

12.0 DEFINITIONS - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to, is the most recent edition of the Standard Specifications of the State of California, Department of Transportation. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as determined by ASTM D1557 Test Method (latest edition) or California Test Method 216 (CAL-216), as applicable.

13.0 PREPARATION OF THE SUBGRADE - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 95 percent based upon ASTM D1557. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

14.0 AGGREGATE BASE - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class II material, ¾-inch or 1½-inches maximum size. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent based upon CAL-216. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

15.0 AGGREGATE SUBBASE - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class II Subbase material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent based upon CAL-216, and it shall be spread and compacted in accordance with the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

16.0 ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades, and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10, unless otherwise stipulated or local conditions warrant more stringent grade. The mineral aggregate shall be Type A or B, ½ inch maximum size, medium grading, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning, and mixing of the materials shall conform to Section 39. The prime coat, spreading and compacting equipment, and spreading and compacting the mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50 degrees F. The surfacing shall be rolled with a combination steel-wheel and pneumatic rollers, as described in the Standard Specifications. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

Attachment G: Hydrograph Output

Area 1

TPS Monrovia Site - 25-year analysis

	time	inflow	lj+l _j +1	(2S _j /dt)-Q _j	(2S _j +1/dt)+Q _j +1	1	2
1	0	0.	0.	0.	0.	0.	2.96
2	5	0.21	0.21	0.19	0.21	0.	2.96
3	10	0.21	0.42	0.56	0.61	0.	2.96
4	15	0.21	0.42	0.89	0.98	0.	2.96
5	20	0.21	0.42	1.2	1.32	0.	2.96
6	25	0.21	0.42	1.48	1.62	0.	2.96
7	30	0.21	0.42	1.74	1.91	0.	2.96
8	35	0.21	0.42	1.98	2.17	0.	2.96
9	40	0.21	0.43	2.19	2.4	0.	2.96
10	45	0.21	0.43	2.39	2.62	0.	2.96
11	50	0.21	0.43	2.57	2.82	0.	2.96
12	55	0.21	0.43	2.75	3.	2.96	4.37
13	60	0.21	0.43	2.92	3.17	2.96	4.37
14	65	0.22	0.43	3.09	3.35	2.96	4.37
15	70	0.22	0.43	3.26	3.52	2.96	4.37
16	75	0.22	0.43	3.44	3.7	2.96	4.37
17	80	0.22	0.43	3.61	3.87	2.96	4.37
18	85	0.22	0.43	3.79	4.05	2.96	4.37
19	90	0.22	0.43	3.97	4.22	2.96	4.37
20	95	0.22	0.44	4.15	4.4	4.37	5.39
21	100	0.22	0.44	4.32	4.58	4.37	5.39
22	105	0.22	0.44	4.5	4.76	4.37	5.39
23	110	0.22	0.44	4.69	4.94	4.37	5.39
24	115	0.22	0.44	4.87	5.13	4.37	5.39
25	120	0.22	0.44	5.05	5.31	4.37	5.39
26	125	0.22	0.44	5.24	5.49	5.39	7.71
27	130	0.22	0.44	5.42	5.68	5.39	7.71
28	135	0.22	0.44	5.61	5.86	5.39	7.71
29	140	0.22	0.44	5.79	6.05	5.39	7.71
30	145	0.22	0.45	5.98	6.24	5.39	7.71
31	150	0.22	0.45	6.17	6.43	5.39	7.71
32	155	0.22	0.45	6.36	6.62	5.39	7.71
33	160	0.22	0.45	6.55	6.81	5.39	7.71
34	165	0.23	0.45	6.75	7.	5.39	7.71
35	170	0.23	0.45	6.94	7.2	5.39	7.71
36	175	0.23	0.45	7.13	7.39	5.39	7.71
37	180	0.23	0.45	7.33	7.59	5.39	7.71
38	185	0.23	0.45	7.53	7.78	7.71	10.71
39	190	0.23	0.46	7.73	7.98	7.71	10.71
40	195	0.23	0.46	7.92	8.18	7.71	10.71
41	200	0.23	0.46	8.12	8.38	7.71	10.71
42	205	0.23	0.46	8.33	8.58	7.71	10.71
43	210	0.23	0.46	8.53	8.79	7.71	10.71
44	215	0.23	0.46	8.73	8.99	7.71	10.71

Area 1

TPS Monrovia Site - 25-year analysis

	time	inflow	lj+l _j +1	(2S _j /dt)-Q _j	(2S _j +1/dt)+Q _j +1	1	2
45	220	0.23	0.46	8.94	9.19	7.71	10.71
46	225	0.23	0.46	9.14	9.4	7.71	10.71
47	230	0.23	0.46	9.35	9.61	7.71	10.71
48	235	0.23	0.47	9.56	9.82	7.71	10.71
49	240	0.23	0.47	9.77	10.02	7.71	10.71
50	245	0.23	0.47	9.98	10.24	7.71	10.71
51	250	0.23	0.47	10.19	10.45	7.71	10.71
52	255	0.24	0.47	10.4	10.66	7.71	10.71
53	260	0.24	0.47	10.62	10.87	10.71	13.68
54	265	0.24	0.47	10.83	11.09	10.71	13.68
55	270	0.24	0.47	11.05	11.31	10.71	13.68
56	275	0.24	0.48	11.27	11.53	10.71	13.68
57	280	0.24	0.48	11.49	11.74	10.71	13.68
58	285	0.24	0.48	11.71	11.97	10.71	13.68
59	290	0.24	0.48	11.93	12.19	10.71	13.68
60	295	0.24	0.48	12.15	12.41	10.71	13.68
61	300	0.24	0.48	12.38	12.63	10.71	13.68
62	305	0.24	0.48	12.6	12.86	10.71	13.68
63	310	0.24	0.48	12.83	13.09	10.71	13.68
64	315	0.24	0.49	13.06	13.32	10.71	13.68
65	320	0.24	0.49	13.29	13.55	10.71	13.68
66	325	0.24	0.49	13.52	13.78	13.68	16.6
67	330	0.25	0.49	13.75	14.01	13.68	16.6
68	335	0.25	0.49	13.99	14.24	13.68	16.6
69	340	0.25	0.49	14.22	14.48	13.68	16.6
70	345	0.25	0.49	14.46	14.72	13.68	16.6
71	350	0.25	0.5	14.7	14.96	13.68	16.6
72	355	0.25	0.5	14.94	15.2	13.68	16.6
73	360	0.25	0.5	15.18	15.44	13.68	16.6
74	365	0.25	0.5	15.42	15.68	13.68	16.6
75	370	0.25	0.5	15.67	15.92	13.68	16.6
76	375	0.25	0.5	15.91	16.17	13.68	16.6
77	380	0.25	0.5	16.16	16.42	13.68	16.6
78	385	0.25	0.51	16.41	16.67	16.6	19.48
79	390	0.25	0.51	16.66	16.92	16.6	19.48
80	395	0.26	0.51	16.91	17.17	16.6	19.48
81	400	0.26	0.51	17.16	17.42	16.6	19.48
82	405	0.26	0.51	17.42	17.68	16.6	19.48
83	410	0.26	0.51	17.68	17.93	16.6	19.48
84	415	0.26	0.52	17.93	18.19	16.6	19.48
85	420	0.26	0.52	18.19	18.45	16.6	19.48
86	425	0.26	0.52	18.46	18.71	16.6	19.48
87	430	0.26	0.52	18.72	18.98	16.6	19.48
88	435	0.26	0.52	18.98	19.24	16.6	19.48
89	440	0.26	0.52	19.25	19.51	19.48	22.29

Area 1

TPS Monrovia Site - 25-year analysis

	time	inflow	lj+l _j +1	(2S _j /dt)-Q _j	(2S _j +1/dt)+Q _j +1	1	2
90	445	0.26	0.53	19.52	19.78	19.48	22.29
91	450	0.26	0.53	19.79	20.05	19.48	22.29
92	455	0.27	0.53	20.06	20.32	19.48	22.29
93	460	0.27	0.53	20.33	20.59	19.48	22.29
94	465	0.27	0.53	20.61	20.87	19.48	22.29
95	470	0.27	0.53	20.89	21.14	19.48	22.29
96	475	0.27	0.54	21.17	21.42	19.48	22.29
97	480	0.27	0.54	21.45	21.7	19.48	22.29
98	485	0.27	0.54	21.73	21.99	19.48	22.29
99	490	0.27	0.54	22.02	22.27	19.48	22.29
100	495	0.27	0.54	22.3	22.56	22.29	25.04
101	500	0.27	0.55	22.59	22.85	22.29	25.04
102	505	0.27	0.55	22.88	23.14	22.29	25.04
103	510	0.28	0.55	23.17	23.43	22.29	25.04
104	515	0.28	0.55	23.47	23.73	22.29	25.04
105	520	0.28	0.55	23.77	24.02	22.29	25.04
106	525	0.28	0.56	24.06	24.32	22.29	25.04
107	530	0.28	0.56	24.36	24.62	22.29	25.04
108	535	0.28	0.56	24.67	24.93	22.29	25.04
109	540	0.28	0.56	24.97	25.23	25.04	27.71
110	545	0.28	0.56	25.28	25.54	25.04	27.71
111	550	0.28	0.57	25.59	25.85	25.04	27.71
112	555	0.29	0.57	25.9	26.16	25.04	27.71
113	560	0.29	0.57	26.21	26.47	25.04	27.71
114	565	0.29	0.57	26.53	26.79	25.04	27.71
115	570	0.29	0.58	26.85	27.11	25.04	27.71
116	575	0.29	0.58	27.17	27.43	25.04	27.71
117	580	0.29	0.58	27.49	27.75	27.71	30.3
118	585	0.29	0.58	27.82	28.08	27.71	30.3
119	590	0.29	0.59	28.15	28.4	27.71	30.3
120	595	0.29	0.59	28.48	28.73	27.71	30.3
121	600	0.3	0.59	28.81	29.07	27.71	30.3
122	605	0.3	0.59	29.14	29.4	27.71	30.3
123	610	0.3	0.6	29.48	29.74	27.71	30.3
124	615	0.3	0.6	29.82	30.08	27.71	30.3
125	620	0.3	0.6	30.17	30.42	30.3	32.78
126	625	0.3	0.6	30.51	30.77	30.3	32.78
127	630	0.3	0.61	30.86	31.12	30.3	32.78
128	635	0.3	0.61	31.21	31.47	30.3	32.78
129	640	0.31	0.61	31.56	31.82	30.3	32.78
130	645	0.31	0.61	31.92	32.18	30.3	32.78
131	650	0.31	0.62	32.28	32.54	30.3	32.78
132	655	0.31	0.62	32.64	32.9	32.78	35.14
133	660	0.31	0.62	33.01	33.27	32.78	35.14
134	665	0.31	0.63	33.38	33.63	32.78	35.14

Area 1

TPS Monrovia Site - 25-year analysis

	time	inflow	lj+l _j +1	(2S _j /dt)-Q _j	(2S _j +1/dt)+Q _j +1	1	2
135	670	0.32	0.63	33.75	34.	32.78	35.14
136	675	0.32	0.63	34.12	34.38	32.78	35.14
137	680	0.32	0.63	34.5	34.76	32.78	35.14
138	685	0.32	0.64	34.88	35.14	32.78	35.14
139	690	0.32	0.64	35.26	35.52	35.14	37.36
140	695	0.32	0.64	35.65	35.91	35.14	37.36
141	700	0.32	0.65	36.04	36.3	35.14	37.36
142	705	0.33	0.65	36.43	36.69	35.14	37.36
143	710	0.33	0.65	36.83	37.09	35.14	37.36
144	715	0.33	0.66	37.23	37.49	37.36	39.4
145	720	0.33	0.66	37.64	37.89	37.36	39.4
146	725	0.33	0.67	38.04	38.3	37.36	39.4
147	730	0.34	0.67	38.45	38.71	37.36	39.4
148	735	0.34	0.67	38.87	39.13	37.36	39.4
149	740	0.34	0.68	39.29	39.55	39.4	41.12
150	745	0.34	0.68	39.71	39.97	39.4	41.12
151	750	0.34	0.68	40.14	40.39	39.4	41.12
152	755	0.34	0.69	40.57	40.83	39.4	41.12
153	760	0.35	0.69	41.	41.26	41.12	42.9
154	765	0.35	0.7	41.44	41.7	41.12	42.9
155	770	0.35	0.7	41.88	42.14	41.12	42.9
156	775	0.35	0.7	42.33	42.59	41.12	42.9
157	780	0.36	0.71	42.72	43.04	42.9	45.97
158	785	0.36	0.71	42.93	43.43	42.9	45.97
159	790	0.36	0.72	43.05	43.65	42.9	45.97
160	795	0.36	0.72	43.11	43.77	42.9	45.97
161	800	0.36	0.73	43.15	43.84	42.9	45.97
162	805	0.37	0.73	43.17	43.88	42.9	45.97
163	810	0.37	0.74	43.19	43.91	42.9	45.97
164	815	0.37	0.74	43.2	43.93	42.9	45.97
165	820	0.38	0.75	43.21	43.95	42.9	45.97
166	825	0.38	0.75	43.21	43.96	42.9	45.97
167	830	0.38	0.76	43.22	43.97	42.9	45.97
168	835	0.38	0.76	43.23	43.98	42.9	45.97
169	840	0.39	0.77	43.23	44.	42.9	45.97
170	845	0.39	0.78	43.24	44.01	42.9	45.97
171	850	0.39	0.78	43.25	44.02	42.9	45.97
172	855	0.4	0.79	43.25	44.03	42.9	45.97
173	860	0.4	0.79	43.26	44.05	42.9	45.97
174	865	0.4	0.8	43.27	44.06	42.9	45.97
175	870	0.4	0.81	43.28	44.07	42.9	45.97
176	875	0.41	0.81	43.28	44.09	42.9	45.97
177	880	0.41	0.82	43.29	44.1	42.9	45.97
178	885	0.42	0.83	43.3	44.12	42.9	45.97
179	890	0.42	0.83	43.31	44.13	42.9	45.97

Area 1

TPS Monrovia Site - 25-year analysis

	time	inflow	lj+l _j +1	(2S _j /dt)-Q _j	(2S _j +1/dt)+Q _j +1	1	2
180	895	0.42	0.84	43.32	44.15	42.9	45.97
181	900	0.43	0.85	43.32	44.17	42.9	45.97
182	905	0.43	0.86	43.33	44.18	42.9	45.97
183	910	0.43	0.86	43.34	44.2	42.9	45.97
184	915	0.44	0.87	43.35	44.22	42.9	45.97
185	920	0.44	0.88	43.36	44.23	42.9	45.97
186	925	0.45	0.89	43.37	44.25	42.9	45.97
187	930	0.45	0.9	43.38	44.27	42.9	45.97
188	935	0.46	0.91	43.39	44.29	42.9	45.97
189	940	0.46	0.92	43.4	44.31	42.9	45.97
190	945	0.47	0.93	43.42	44.33	42.9	45.97
191	950	0.47	0.94	43.43	44.36	42.9	45.97
192	955	0.48	0.95	43.44	44.38	42.9	45.97
193	960	0.48	0.96	43.45	44.4	42.9	45.97
194	965	0.49	0.97	43.47	44.43	42.9	45.97
195	970	0.5	0.99	43.48	44.45	42.9	45.97
196	975	0.5	1.	43.49	44.48	42.9	45.97
197	980	0.51	1.01	43.51	44.5	42.9	45.97
198	985	0.52	1.03	43.52	44.53	42.9	45.97
199	990	0.52	1.04	43.54	44.56	42.9	45.97
200	995	0.53	1.05	43.56	44.59	42.9	45.97
201	1000	0.54	1.07	43.57	44.63	42.9	45.97
202	1005	0.55	1.09	43.59	44.66	42.9	45.97
203	1010	0.56	1.1	43.61	44.7	42.9	45.97
204	1015	0.57	1.12	43.63	44.73	42.9	45.97
205	1020	0.58	1.14	43.65	44.77	42.9	45.97
206	1025	0.59	1.16	43.67	44.81	42.9	45.97
207	1030	0.6	1.18	43.7	44.86	42.9	45.97
208	1035	0.61	1.21	43.72	44.9	42.9	45.97
209	1040	0.62	1.23	43.75	44.95	42.9	45.97
210	1045	0.63	1.25	43.78	45.	42.9	45.97
211	1050	0.65	1.28	43.81	45.06	42.9	45.97
212	1055	0.66	1.31	43.84	45.12	42.9	45.97
213	1060	0.68	1.34	43.87	45.18	42.9	45.97
214	1065	0.7	1.38	43.91	45.25	42.9	45.97
215	1070	0.72	1.41	43.95	45.32	42.9	45.97
216	1075	0.74	1.45	43.99	45.4	42.9	45.97
217	1080	0.76	1.5	44.04	45.49	42.9	45.97
218	1085	0.78	1.54	44.09	45.58	42.9	45.97
219	1090	0.81	1.6	44.14	45.69	42.9	45.97
220	1095	0.84	1.66	44.21	45.8	42.9	45.97
221	1100	0.88	1.72	44.28	45.93	42.9	45.97
222	1105	0.92	1.8	44.36	46.08	45.97	47.77
223	1110	0.97	1.89	44.45	46.25	45.97	47.77
224	1115	1.02	1.99	44.57	46.45	45.97	47.77

Area 1

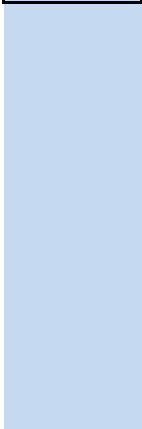
TPS Monrovia Site - 25-year analysis

	time	inflow	Ij+Ij+1	(2Sj/dt)-Qj	(2Sj+1/dt)+Qj+1	1	2
225	1120	1.09	2.12	44.7	46.68	45.97	47.77
226	1125	1.18	2.27	44.87	46.98	45.97	47.77
227	1130	1.3	2.48	45.08	47.35	45.97	47.77
228	1135	1.47	2.77	45.37	47.85	47.77	49.47
229	1140	1.71	3.17	45.83	48.54	47.77	49.47
230	1145	2.13	3.83	46.63	49.67	49.47	0.
231	1150	3.2	5.33	48.79	51.96	49.47	0.
232	1155	5.76	8.97	54.23	57.75	49.47	0.
233	1160	1.41	7.18	57.65	61.4	49.47	0.
234	1165	1.	2.42	56.4	60.07	49.47	0.
235	1170	0.83	1.83	54.67	58.23	49.47	0.
236	1175	0.73	1.56	52.79	56.23	49.47	0.
237	1180	0.66	1.38	50.87	54.18	49.47	0.
238	1185	0.6	1.26	48.94	52.13	49.47	0.
239	1190	0.56	1.16	47.04	50.11	49.47	0.
240	1195	0.53	1.09	45.56	48.13	47.77	49.47
241	1200	0.5	1.03	44.65	46.59	45.97	47.77
242	1205	0.48	0.97	44.11	45.62	42.9	45.97
243	1210	0.45	0.93	43.8	45.04	42.9	45.97
244	1215	0.44	0.89	43.61	44.69	42.9	45.97
245	1220	0.42	0.86	43.49	44.46	42.9	45.97
246	1225	0.41	0.83	43.4	44.31	42.9	45.97
247	1230	0.39	0.8	43.35	44.2	42.9	45.97
248	1235	0.38	0.78	43.3	44.12	42.9	45.97
249	1240	0.37	0.75	43.27	44.05	42.9	45.97
250	1245	0.36	0.73	43.23	44.	42.9	45.97
251	1250	0.35	0.71	43.21	43.95	42.9	45.97
252	1255	0.34	0.7	43.18	43.9	42.9	45.97
253	1260	0.34	0.68	43.16	43.86	42.9	45.97
254	1265	0.33	0.67	43.14	43.83	42.9	45.97
255	1270	0.32	0.65	43.13	43.79	42.9	45.97
256	1275	0.32	0.64	43.11	43.76	42.9	45.97
257	1280	0.31	0.63	43.09	43.73	42.9	45.97
258	1285	0.3	0.61	43.08	43.71	42.9	45.97
259	1290	0.3	0.6	43.06	43.68	42.9	45.97
260	1295	0.29	0.59	43.05	43.66	42.9	45.97
261	1300	0.29	0.58	43.04	43.63	42.9	45.97
262	1305	0.28	0.57	43.03	43.61	42.9	45.97
263	1310	0.28	0.56	43.02	43.59	42.9	45.97
264	1315	0.28	0.56	43.01	43.57	42.9	45.97
265	1320	0.27	0.55	43.	43.55	42.9	45.97
266	1325	0.27	0.54	42.99	43.54	42.9	45.97
267	1330	0.26	0.53	42.98	43.52	42.9	45.97
268	1335	0.26	0.53	42.97	43.5	42.9	45.97
269	1340	0.26	0.52	42.96	43.49	42.9	45.97

Area 1

TPS Monrovia Site - 25-year analysis

	time	inflow	lj+l _{j+1}	(2S _j /dt)-Q _j	(2S _{j+1} /dt)+Q _{j+1}	1	2
270	1345	0.25	0.51	42.95	43.47	42.9	45.97
271	1350	0.25	0.51	42.94	43.46	42.9	45.97
272	1355	0.25	0.5	42.94	43.44	42.9	45.97
273	1360	0.25	0.49	42.93	43.43	42.9	45.97
274	1365	0.24	0.49	42.92	43.42	42.9	45.97
275	1370	0.24	0.48	42.92	43.41	42.9	45.97
276	1375	0.24	0.48	42.91	43.39	42.9	45.97
277	1380	0.24	0.47	42.9	43.38	42.9	45.97
278	1385	0.23	0.47	42.9	43.37	42.9	45.97
279	1390	0.23	0.46	42.89	43.36	42.9	45.97
280	1395	0.23	0.46	42.89	43.35	42.9	45.97
281	1400	0.23	0.45	42.88	43.34	42.9	45.97
282	1405	0.22	0.45	42.87	43.33	42.9	45.97
283	1410	0.22	0.45	42.87	43.32	42.9	45.97
284	1415	0.22	0.44	42.86	43.31	42.9	45.97
285	1420	0.22	0.44	42.86	43.3	42.9	45.97
286	1425	0.22	0.43	42.86	43.29	42.9	45.97
287	1430	0.21	0.43	42.85	43.29	42.9	45.97
288	1435	0.21	0.43	42.85	43.28	42.9	45.97
289	1440	0.21	0.42	42.84	43.27	42.9	45.97
290	1445	0.	0.21	42.73	43.05	42.9	45.97
291	1450						
292	1455						
293	1460						



Area 1

3	4	outflow	inifltratio	orifice
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.13	0.13	0.13	0.
0.13	0.84	0.16	0.13	0.03
0.13	0.84	0.25	0.13	0.12
0.13	0.84	0.3	0.13	0.17
0.13	0.84	0.33	0.13	0.2
0.13	0.84	0.34	0.13	0.22
0.13	0.84	0.35	0.13	0.23
0.13	0.84	0.36	0.13	0.23
0.13	0.84	0.37	0.13	0.24
0.13	0.84	0.37	0.13	0.24
0.13	0.84	0.37	0.13	0.24
0.13	0.84	0.38	0.13	0.25
0.13	0.84	0.38	0.13	0.25
0.13	0.84	0.38	0.13	0.25
0.13	0.84	0.38	0.13	0.26
0.13	0.84	0.39	0.13	0.26
0.13	0.84	0.39	0.13	0.26
0.13	0.84	0.39	0.13	0.26
0.13	0.84	0.4	0.13	0.27
0.13	0.84	0.4	0.13	0.27
0.13	0.84	0.4	0.13	0.27
0.13	0.84	0.41	0.13	0.28
0.13	0.84	0.41	0.13	0.28
0.13	0.84	0.41	0.13	0.28

Area 1

3	4	outflow	inifltratio	orifice
0.13	0.84	0.42	0.13	0.29
0.13	0.84	0.42	0.13	0.29
0.13	0.84	0.42	0.13	0.3
0.13	0.84	0.43	0.13	0.3
0.13	0.84	0.43	0.13	0.3
0.13	0.84	0.44	0.13	0.31
0.13	0.84	0.44	0.13	0.31
0.13	0.84	0.44	0.13	0.32
0.13	0.84	0.45	0.13	0.32
0.13	0.84	0.45	0.13	0.33
0.13	0.84	0.46	0.13	0.33
0.13	0.84	0.46	0.13	0.34
0.13	0.84	0.47	0.13	0.34
0.13	0.84	0.47	0.13	0.35
0.13	0.84	0.48	0.13	0.35
0.13	0.84	0.49	0.13	0.36
0.13	0.84	0.49	0.13	0.36
0.13	0.84	0.5	0.13	0.37
0.13	0.84	0.51	0.13	0.38
0.13	0.84	0.51	0.13	0.38
0.13	0.84	0.52	0.13	0.39
0.13	0.84	0.53	0.13	0.4
0.13	0.84	0.53	0.13	0.41
0.13	0.84	0.54	0.13	0.41
0.13	0.84	0.55	0.13	0.42
0.13	0.84	0.56	0.13	0.43
0.13	0.84	0.57	0.13	0.44
0.13	0.84	0.58	0.13	0.45
0.13	0.84	0.59	0.13	0.46
0.13	0.84	0.6	0.13	0.47
0.13	0.84	0.61	0.13	0.48
0.13	0.84	0.63	0.13	0.5
0.13	0.84	0.64	0.13	0.51
0.13	0.84	0.65	0.13	0.53
0.13	0.84	0.67	0.13	0.54
0.13	0.84	0.69	0.13	0.56
0.13	0.84	0.71	0.13	0.58
0.13	0.84	0.73	0.13	0.6
0.13	0.84	0.75	0.13	0.62
0.13	0.84	0.77	0.13	0.64
0.13	0.84	0.8	0.13	0.67
0.13	0.84	0.83	0.13	0.7
0.84	1.23	0.86	0.13	0.73
0.84	1.23	0.9	0.13	0.77
0.84	1.23	0.94	0.13	0.81

Area 1

3	4	outflow	inifltratio	orifice
0.84	1.23	0.99	0.13	0.86
0.84	1.23	1.05	0.13	0.93
0.84	1.23	1.14	0.13	1.01
1.23	1.51	1.24	0.13	1.11
1.23	1.51	1.36	0.13	1.23
1.51	0.	1.52	0.13	1.39
1.51	0.	1.59	0.13	1.46
1.51	0.	1.76	0.13	1.64
1.51	0.	1.88	0.13	1.75
1.51	0.	1.84	0.13	1.71
1.51	0.	1.78	0.13	1.65
1.51	0.	1.72	0.13	1.59
1.51	0.	1.66	0.13	1.53
1.51	0.	1.59	0.13	1.46
1.51	0.	1.53	0.13	1.4
1.23	1.51	1.29	0.13	1.16
0.84	1.23	0.97	0.13	0.84
0.13	0.84	0.76	0.13	0.63
0.13	0.84	0.62	0.13	0.49
0.13	0.84	0.54	0.13	0.41
0.13	0.84	0.49	0.13	0.36
0.13	0.84	0.45	0.13	0.33
0.13	0.84	0.43	0.13	0.3
0.13	0.84	0.41	0.13	0.28
0.13	0.84	0.39	0.13	0.27
0.13	0.84	0.38	0.13	0.25
0.13	0.84	0.37	0.13	0.24
0.13	0.84	0.36	0.13	0.23
0.13	0.84	0.35	0.13	0.22
0.13	0.84	0.34	0.13	0.21
0.13	0.84	0.33	0.13	0.21
0.13	0.84	0.33	0.13	0.2
0.13	0.84	0.32	0.13	0.19
0.13	0.84	0.31	0.13	0.19
0.13	0.84	0.31	0.13	0.18
0.13	0.84	0.3	0.13	0.17
0.13	0.84	0.3	0.13	0.17
0.13	0.84	0.29	0.13	0.16
0.13	0.84	0.29	0.13	0.16
0.13	0.84	0.28	0.13	0.15
0.13	0.84	0.28	0.13	0.15
0.13	0.84	0.27	0.13	0.14
0.13	0.84	0.27	0.13	0.14
0.13	0.84	0.26	0.13	0.14

Area 1

3	4	outflow	inifltratio	orifice
0.13	0.84	0.26	0.13	0.13
0.13	0.84	0.26	0.13	0.13
0.13	0.84	0.25	0.13	0.13
0.13	0.84	0.25	0.13	0.12
0.13	0.84	0.25	0.13	0.12
0.13	0.84	0.24	0.13	0.12
0.13	0.84	0.24	0.13	0.11
0.13	0.84	0.24	0.13	0.11
0.13	0.84	0.24	0.13	0.11
0.13	0.84	0.23	0.13	0.11
0.13	0.84	0.23	0.13	0.1
0.13	0.84	0.23	0.13	0.1
0.13	0.84	0.23	0.13	0.1
0.13	0.84	0.23	0.13	0.1
0.13	0.84	0.22	0.13	0.09
0.13	0.84	0.22	0.13	0.09
0.13	0.84	0.22	0.13	0.09
0.13	0.84	0.22	0.13	0.09
0.13	0.84	0.22	0.13	0.09
0.13	0.84	0.21	0.13	0.08
0.13	0.84	0.16	0.13	0.03



Attachment H: LAFCD Correspondence



LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION - HYDRAULIC ANALYSIS UNIT

Office Use Only
[] Sent Initials:
[] Fax [] Email [] Other:
Date: Time:

INFORMATION REQUEST SUMMARY

INFORMATION REQUESTED BY

*Requester's Name: Eric Robles
Company: RA Smith National
*Phone Number: 949-242-8044 Fax Number: 949-387-3915
*Email: Eric.Robles@RASmithNational.com

Method of Contact: [] Walk-in [] Phone [] Fax [X] Email [] Prelim. Mtg. Date: 08/14/17

Intended Use: Storm Drain Connection

Proposed Project Type: Storm Drain Connection Acreage Involved: 1.926 ac

*Will information be used in any litigation? [] YES [X] NO
Case Info. Name: No: Location:

INFORMATION REQUESTED (Attach Assessor Map)

LACFCD Facility: Name: BI 0216
Unit: Line: Station:
City: Monrovia

*Street/Cross-street: Huntington Drive and Myrtle Avenue for storm drain BI 0216

*Thomas Guide: Page: 567 Grid: G-5 [] Site Map/Plans Submitted
Info. Requested:

Allowable Discharge, Allowable Q, and Design HGL

*Required Information. See Page 2 of 2 for Instructions.

BELOW SECTION TO BE COMPLETED BY THE HYDRAULIC ANALYSIS UNIT

INFORMATION PROVIDED:

Allowable q & design HGL

REFERENCES SEARCHED:

Project No. 216

COMMENTS, ETC:

Allowable q = 1.04 cfs/acre. Also, please see attached HGL calculation sheet.

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION
Hydraulic Analysis Unit
OFFICIAL RECORD DOCUMENT
Issued By: Carlos Lopez
Date: 8/23/2017
PUBLIC SERVICE THAT WORKS

INFORMATION PROVIDED BY: Carlos Lopez

Date: 8/23/2017

INFORMATION REVIEWED BY: Ambrose C. Ajaelo PE

Date: 08/23/2017

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