

Appendix J: **Hydrology and Water Quality Supporting Information**

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Preliminary
Stormwater Hydromodification
Management Report
for
5670 Camden Avenue

September 2023
Revised: February 2024

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I. Project Data

Table 1. Project Data

Project Name/ APN Number	Cinnabar Elementary APN 567-28-001
Application Submittal Date	May 2023
Owner	Mana Camden Fund, LLC
Project Location	5670 Camden Avenue San Jose, CA
Project Phase No.	n/a
Project Type and Description	Zoning: Multiple Residence District Proposed Land Use: Residential Subdivision
Total Project Site Area (acres)	6.64 AC
Total New Impervious Surface Area	207,051 sf
Total Replaced Impervious Surface Area	13,245 sf
Total Pre-Project Impervious Surface Area	13,245 sf
Total Post-Project Impervious Surface Area	220,296 sf
Net Impervious Area	207,051 sf
Soils Type	Clayey sand with gravel
Groundwater Depth	20-ft
Name of Receiving Body	Guadalupe River
Flood Zone	D
Flood Elevation	N/A

II. Setting & Proposed Stormwater Infrastructure

II.A. Project Location and Description

The Cinnabar Elementary project is located at 5670 Camden Avenue in San Jose, CA and is 6.64 acres. Approximately 13,245 square feet of impervious surface is found at the property. The project proposes a new 108-unit residential subdivision, streets, parking, sidewalks, and landscaping.

The proposed development proposes a total post-project impervious area of 220,296-sf. The project created drainage management areas (DMA) that will be routed to the designated treatment control measure (TCM) - underground infiltration chambers.

II.B. Existing Site Features and Conditions

The existing site is relatively flat and is currently used for recreational purposes and school recreation areas for Beacon School. A soils report was completed by Baez Geotechnical Group and found that the soil has relatively high infiltration rates ranging from 12 in/hr for Treatment Control Measure 1 and 21.6 in/hr for Treatment Control Measure 2.

III. Technical Approach & Modeling

The Cinnabar Elementary project will drain to two Treatment Control Measures (TCM 1 & TCM 2) that are both underground infiltration chambers. The use of bioretention ponds was evaluated and it was determined that they aren't viable for this project since the grading and available space wouldn't allow for two large ponds; however, the underground infiltration chambers would provide adequate stormwater treatment and usable open space. Per the Municipal Regional Stormwater Permit, a Stormwater Hydromodification Management Report is required for this site since the project proposes to create one acre or more of impervious surface. The Bay Area Hydrology Model (BAHM) was used to analyze the hydromodification effects of the proposed development by providing sizing solutions to mitigate the increased runoff while considering long-term pattern flow rates. The recommended effective method for hydromodification control is flow duration control which was implemented using retention at each underground infiltration chamber (TCM 1 & TCM 2). Please see the supporting BAHM data found in section, V.III. Flow-Duration Curves and Model Analysis, of this report which demonstrates how each treatment control measure meets the flow duration criteria.

The proposed underground infiltration facilities were sized by first using the City of San Jose's "Sizing for Volume Based Treatment" worksheet to determine the required design volume. The volume that will infiltrate was calculated. The retention volume is the difference between the required volume and the infiltration volume. The infiltration and storage calculations incorporated the available treatment area and the infiltration rate with a Factor of Safety (FS) of 2. After running this analysis, the chamber stage-storage spreadsheet was used to determine the necessary chamber depth to meet the volume-based treatment. This determined the outlet elevation used in the BAHM software. All in all, each treatment control measure uses a retention and infiltration system to hydromodify the runoff from the DMA to maintain the outflows below the pre-development rate conveyed to the public storm system through the outlet. Please see section, V. Drainage Management Areas, for further details on each treatment control measure.

IV. Conclusion

The Bay Area Hydrology Model (BAHM) shows a passing result for each treatment control facility. Treatment Control Measure 1 will be hydromodified with controlled release to limit the flow to, at or below, the pre-development rate through an outlet set 29" above the bottom of the chamber. The stormwater will then be conveyed to the public storm system on Camden Avenue through the outlet structure. Treatment Control Measure 2 will be hydromodified with controlled release to limit flow to, at or below, the pre-development rate through an outlet set 30" above the bottom of the chamber. The stormwater will then be conveyed to the public storm system on Singletree Way through the outlet structure. The orifice height at each TCM is set to allow for infiltration of the calculated volume-based treatment, please see "Stormwater Control Measures Sizing" section on page 14 of this report.

V. Drainage Management Areas – Post-Project Analysis

V.A. Drainage Management Area 1 Summary

DMA 1, totaling 116,661 square feet, drains rooftops, streets, street parking, landscaping, and sidewalks. **DMA 1** drains to **TCM 1** which is an underground infiltration system with a total system area of 1,988-sf consisting of (48) SC-740 StormTech chambers over 12-in of drainrock with a porosity of 40%. A soils report was completed by Baez Geotechnical Group and found that the soil has a relatively high infiltration rate of 12 in/hr. The design used a factor of safety of 2 or a rate of 6 in/hr. The BAHM analysis shows the retention and infiltration system with an outfall set 29" above the bottom of the chamber to allow the system to hydromodify the release to the public storm system below pre-development flows. See detail on sheet 7.

V.A.1. Table of Drainage Management Area 1

DMA ID	Description of Area	Total Area (SF)	New Impervious Area (SF)	Pervious Area (SF)	TCM ID & Area (SF)	Retention Required (CF)	Retention Provided (CF)
DMA 1	Roof, Parking, Streets, Sidewalk, Landscape	116,661	84,199	32,462	TCM 1 1,988	2,887	2,903

V.B. Drainage Management Area 2 Summary

DMA 2, totaling 172,690 square feet, drains rooftops, streets, street parking, landscaping, and sidewalks. **DMA 2** drains to **TCM 2** which is an underground infiltration system with a total system area of 2,228-sf consisting of (55) SC-740 StormTech chambers over 12-in of drainrock with a porosity of 40%. A soils report was completed by Baez Geotechnical Group and found that the soil has a relatively high infiltration rate of 21.60 in/hr. The design used a factor of safety of 2 or a rate of 10.8 in/hr. The BAHM analysis shows the retention and infiltration system with an outfall set 30" above the bottom of the chamber to allow the system to hydromodify the release to the public storm system below pre-development flows. See detail on sheet 7.

V.B.1. Table of Drainage Management Area 2

DMA ID	Description of Area	Total Area (SF)	New Impervious Area (SF)	Pervious Area (SF)	TCM ID & Area (SF)	Retention Required (CF)	Retention Provided (CF)
DMA 2	Roof, Parking, Streets, Sidewalk, Landscape	172,690	136,097	36,593	TCM 2 2,228	3,363	3,422

VI. Hydromodification Modeling Analysis

The Bay Area Hydrology Model (BAHM) was used to simulate the runoff from the project's site under pre- and post-project conditions. Below are data tables from the BAHM software which summarize the dimensions, treatment area, and the underdrain sizes for each Treatment Control Measure.

Table 1: TCM 1 Details

StormTech 1		
Chamber Model:	740	
Dimensions		
Max Row Length:	180	
Number of Chambers:	48	
Number of Endcaps:	4	
Top Stone Depth:	6	
Bottom Stone Depth:	12	
Infiltration On		
Infiltration rate:	12	
Infiltration safety factor:	2	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		114.48
Total Volume Through Riser (ac-ft.):		0.939
Total Volume Through Facility (ac-ft.):		0
Percent Infiltrated:		99.19
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	0 ft.	
Riser Diameter:	0 in.	
Orifice 1 Diameter:	12 in.	Elevation:2.42 ft.
Element Flows To:		
Outlet 1	Outlet 2	

Table 2: TCM 2 Details

StormTech 2		
Chamber Model:	740	
Dimensions		
Max Row Length:	86	
Number of Chambers:	55	
Number of Endcaps:	10	
Top Stone Depth:	6	
Bottom Stone Depth:	12	
Infiltration On		
Infiltration rate:	21.6	
Infiltration safety factor:	2	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		196.11
Total Volume Through Riser (ac-ft.):		1.125
Total Volume Through Facility (ac-ft.):		0
Percent Infiltrated:		99.43
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	0 ft.	
Riser Diameter:	0 in.	
Orifice 1 Diameter:	15 in.	Elevation:2.5 ft.
Element Flows To:		
Outlet 1	Outlet 2	

VII. Dimensions & Features of Hydromodification System

VII.A. Treatment Control Measure #1

Drainage Management Area #1 will be treated using an underground infiltration system consisting of (48) StormTech chambers with each chamber measuring 51.0" x 30.0" x 85.4" (W x H x Installed length). TCM 1 has a total system area of 1,988-sf comprised of a maximum row length of 180-ft by 11-ft, 12" drain rock depth below the chambers, 6" drain rock thickness of cover above chambers, and 12" wide drain rock around the chamber's perimeter. The treatment facility needs to be 10-ft minimum from any foundation.

VII.B. Treatment Control Measure #2

Drainage Management Area #2 will be treated using an underground infiltration system consisting of (55) StormTech chambers with each chamber measuring 51.0" x 30.0" x 85.4" (W x H x Installed length). TCM 2 has a total system area of 2,228-sf comprised of a maximum row length of 86-ft by 25.5-ft, 12" drain rock depth below the chambers, 6" drain rock thickness of cover above chambers, and 12" wide drain rock around the chamber's perimeter. The treatment facility needs to be 10-ft minimum from any foundation.

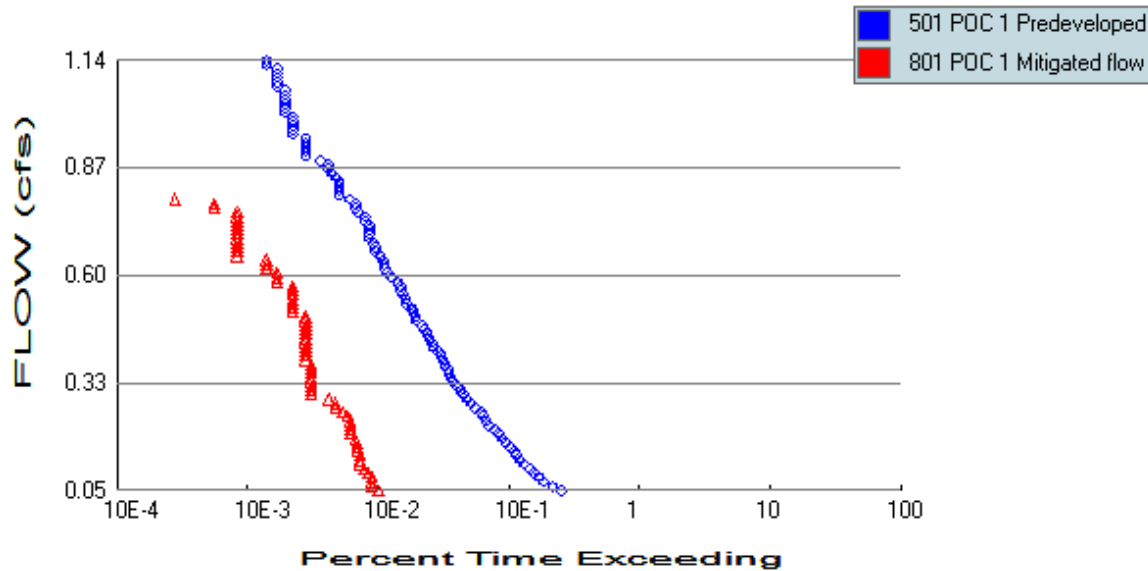
VIII. Flow-Duration Curves & Model Analysis

V.III.A. Point of Compliance #1 – BAHM Analysis

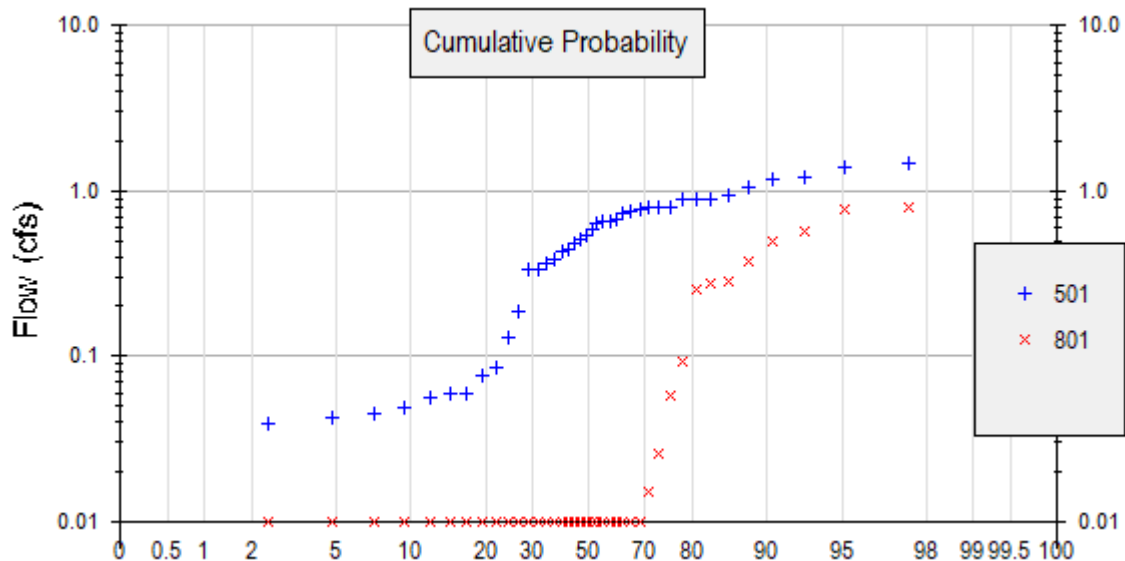
The graphs in this section were created using the BAHM software that used continuous simulated hydrology to compute stormwater runoff for both pre-development and post-development conditions.

Each flow-duration curve's pre-development and mitigated flows are compared at Point of Compliance (POC) – the mitigated flows are not to exceed flow duration standards. The flow duration ranges from 2-year to 25-years. The graphs below for POC #1 demonstrate how the mitigated flow (shown in red) is far to the left of the pre-developed flow (shown in blue) which indicates that the project meets the flow duration criteria since the mitigated flow rate is below the pre-development flow rate.

V.III.A.1. POC#1 – Flow vs. Percent Time Exceeding



V.III.A.2. POC#1 – Cumulative Probability



V.III.A.3. Tabulation of Flow Frequency Return Periods for POC #1

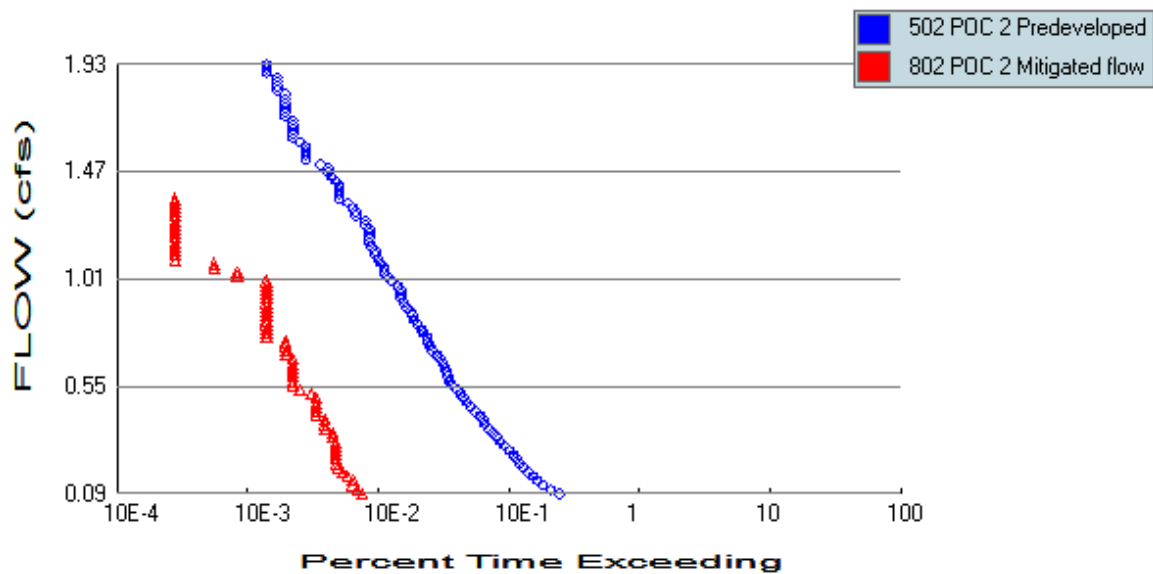
Return Period	Flow Rate (cfs) – Predeveloped	Flow Rate (cfs) – Mitigated
2-year	0.54	0
5-year	0.88	0.18
10-year	1.14	0.47
25-year	1.41	0.78

The table shows that the proposed control measure meets the duration flow criteria for the flow frequency periods for POC #1. Please see attached BAHM analysis under “Duration Flows” for POC #1 on page 15.

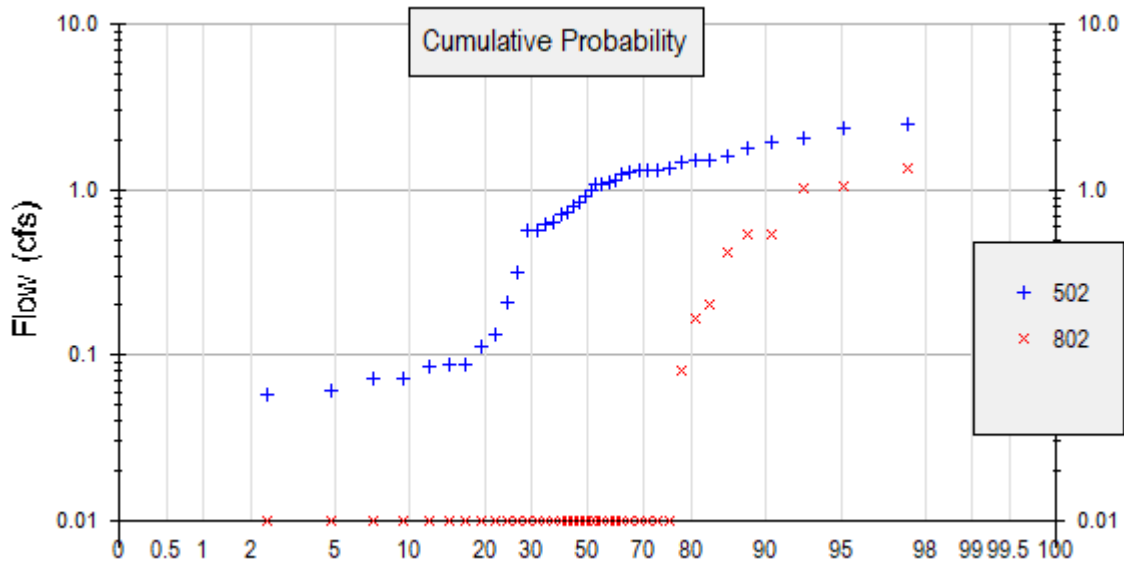
V.III.B. Point of Compliance #2 – BAHM Analysis

The graphs in this section were created using the BAHM software that used continuous simulated hydrology to compute stormwater runoff for both pre-development and post-development conditions. Each flow-duration curve’s pre-development and mitigated flows are compared at Point of Compliance (POC) – the mitigated flows are not to exceed flow duration standards. The flow duration ranges from 2-year to 25-years. The graphs below for POC #2 demonstrate how the mitigated flow (shown in red) is far to the left of the pre-developed flow (shown in blue) which indicates that the project meets the flow duration criteria since the mitigated flow rate is below the pre-development flow rate.

V.III.B.1. POC #2 – Flow vs. Percent Time Exceeding



V.III.B.2. POC #2 – Cumulative Probability



V.III.B.3. Tabulation of Flow Frequency Return Periods for POC #2

Return Period	Flow Rate (cfs) – Predeveloped	Flow Rate (cfs) – Mitigated
2-year	0.91	0
5-year	1.49	0.13
10-year	1.93	0.54
25-year	2.39	1.10

The table above shows that the proposed control measure meets the duration flow criteria for the flow frequency periods for POC #2. Please see attached BAHM analysis under “Duration Flows” for POC #2 on page 15.

IX. Site Plan

Please see attachment on page 13 for site plan.

Stormwater Control Plan Exhibit

DMA 3 - 905 SF
REPLACEMENT
OFF-SITE

DMA 4 - 625 SF
NEW OFF-SITE

PROJECT SITE INFORMATION:

- SOILS TYPE: CLAYEY SAND WITH GRAVEL
- GROUND WATER DEPTH: 20"
- NAME OF RECEIVING BODY: GUADALUPE RIVER
- FLOOD ZONE: D
- FLOOD ELEVATION (IF APPLICABLE): N/A

SOURCE CONTROL MEASURES:

- BENEFICIAL LANDSCAPING.
- USE OF WATER EFFICIENT IRRIGATION SYSTEMS.
- MAINTENANCE (PAVEMENT SWEEPING, CATCH BASIN CLEANING, GOOD HOUSEKEEPING).
- STORM DRAIN LABELING.

SITE DESIGN MEASURES:

- DIRECT RUNOFF FROM ROOFS, SIDEWALKS, PATIOS TO LANDSCAPED AREAS.
- PLANT TREES ADJACENT TO AND IN PARKING AREAS AND ADJACENT TO OTHER IMPERVIOUS AREAS.
- CLUSTER STRUCTURES/PAVEMENT

OPERATION AND MAINTENANCE INFORMATION:

- I. PROPERTY INFORMATION:
- I.A. PROPERTY ADDRESS:
5760 CAMDEN AVENUE
SAN JOSE, CA
- I.B. PROPERTY OWNER:
MANA CAMDEN FUND, LLC
- II. RESPONSIBLE PARTY FOR MAINTENANCE:
- II.A. CONTACT:
SCOTT MURRAY
- II.B. PHONE NUMBER OF CONTACT:
408-406-6000
- II.C. EMAIL:
SM@MANAINV.COM
- II.D. ADDRESS:
5927 BALFOUR CT, SUITE 208
CARLSBAD, CA 92008

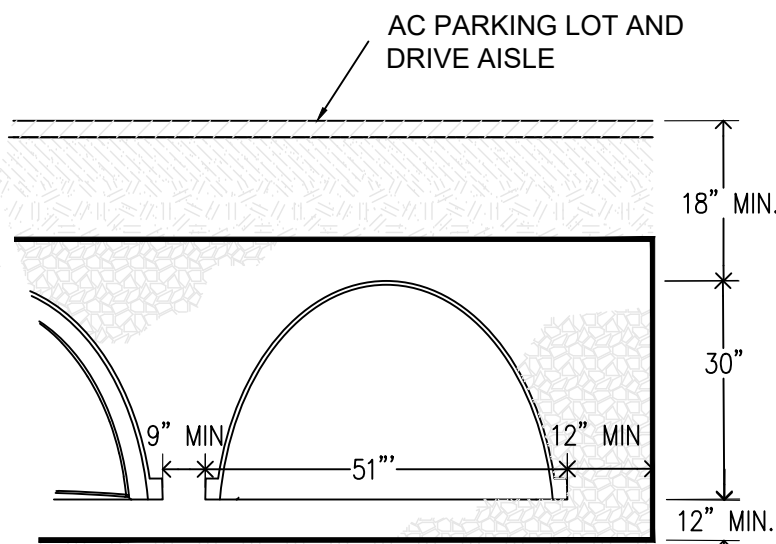
TABLE 1 ROUTINE MAINTENANCE ACTIVITIES FOR SUBSURFACE INFILTRATION TRENCHES		
NO.	MAINTENANCE TASK	FREQUENCY OF TASK
1	MONITOR OBSERVATION WELL TO CONFIRM THAT THE SUBSURFACE INFILTRATION SYSTEM HAS DRAINED DURING DRY SEASON. IF INSPECTION INDICATES THAT THE SYSTEM IS PARTIALLY OR COMPLETELY CLOGGED, RESTORE TO DESIGN CONDITIONS.	ANNUALLY, DURING DRY SEASON
2	REMOVE OBSTRUCTIONS, DEBRIS AND TRASH NEAR INLET AND DISPOSE OF PROPERLY.	MONTHLY DURING WET SEASON, OR AS NEEDED AFTER STORM EVENTS
3	CHECK OBSERVATION WELL 2 TO 3 DAYS AFTER STORMS TO CONFIRM DRAINAGE. THE SUBSURFACE INFILTRATION SYSTEM SHOULD COMPLETELY DEWATER WITHIN 3 DAYS (PREFERRED) OR WITHIN 5 DAYS TO AVOID MOSQUITO PRODUCTION.	MONTHLY DURING WET SEASON, OR AS NEEDED AFTER STORM EVENTS
4	CHECK FOR EROSION AT INFLOW OR OVERFLOW STRUCTURES. REPAIR AS NECESSARY.	MONTHLY, OR AS NEEDED AFTER STORM EVENTS
5	INSPECT SUBSURFACE INFILTRATION SYSTEM USING THE ATTACHED INSPECTION CHECKLIST.	MONTHLY, OR AFTER LARGE STORM EVENTS, AND AFTER REMOVAL OF ACCUMULATED DEBRIS OR MATERIAL

TCM No. 1:

181' LONG X 11' WIDE, 1988 SF INFILTRATION TRENCH WITH 48 STORMTECH SC-740 CHAMBERS WITH 12" ROCK BASE LAYER AND 6" ROCK COVER. OUTLET ORIFICE 27" ABOVE BASE.

TCM No. 2

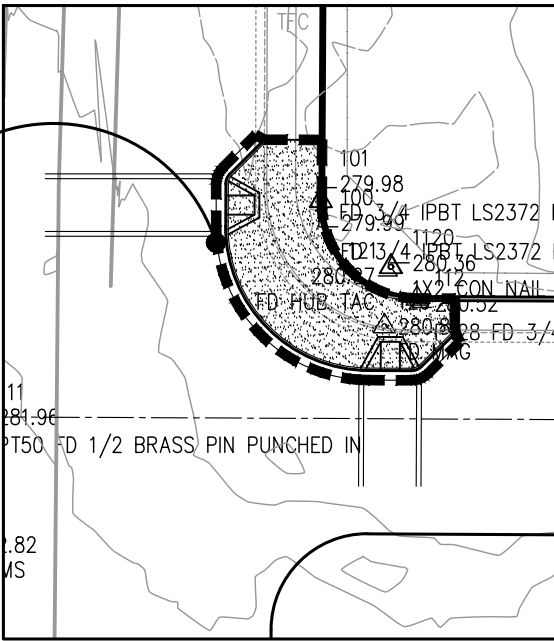
88.25' LONG X 25.55' WIDE, 2228 SF INFILTRATION TRENCH WITH 55 STORMTECH SC-740 CHAMBERS WITH 12" ROCK BASE LAYER AND 6" ROCK COVER. OUTLET ORIFICE 32" ABOVE BASE.



TCM #1 & #2 INFILTRATION PIT AND CHAMBER ELEVATIONS DETAIL

NO SCALE. SEE SHEET 9 FOR MANUFACTURER'S SPECIFICATIONS FOR ADS SC-740 STORMTECH CHAMBER. FOLLOW ALL MANUFACTURER'S INSTALLATION INSTRUCTIONS.

DMA 8 - 905 SF
REPLACEMENT
OFF-SITE



STANDARD STORMWATER CONTROL NOTES:

- STANDING WATER SHALL NOT REMAIN IN THE TREATMENT MEASURES FOR MORE THAN FIVE DAYS, TO PREVENT MOSQUITO GENERATION. SHOULD ANY MOSQUITO ISSUES ARISE, CONTACT THE SANTA CLARA VALLEY VECTOR CONTROL DISTRICT (DISTRICT). MOSQUITO LARVICIDES SHALL BE APPLIED ONLY AND WHEN ABSOLUTELY NECESSARY, AS INDICATED BY THE DISTRICT AND THEN ONLY BY A LICENSED PROFESSIONAL OR CONTRACTOR. CONTACT INFORMATION FOR THE DISTRICT IS PROVIDED BELOW.
- DO NOT USE PESTICIDES OR OTHER CHEMICAL APPLICATIONS TO TREAT DISEASED PLANTS, CONTROL WEEDS OR REMOVED UNWANTED GROWTH. EMPLOY NON-CHEMICAL CONTROLS (BIOLOGICAL, PHYSICAL, AND CULTURAL CONTROLS) TO TREAT A PEST PROBLEM. PRUNE PLANTS PROPERLY AND AT THE APPROPRIATE TIME OF YEAR. PROVIDE ADEQUATE IRRIGATION FOR LANDSCAPE PLANTS. DO NO OVER WATER.

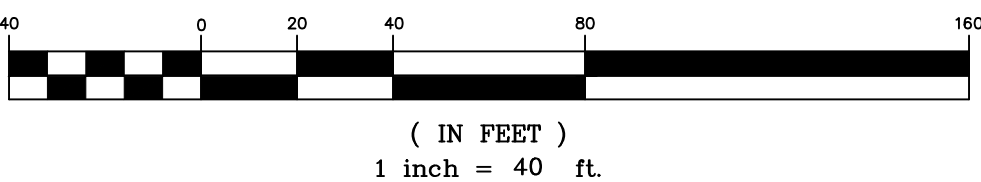
DMA 5 - 1351 SF
NEW OFF-SITE

DMA 6 - 4457 SF
REPLACEMENT
OFF-SITE

DMA 7 - 818 SF
REPLACEMENT
OFF-SITE

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

GRAPHIC SCALE



LEGEND

- DIRECTION OF FLOW
- STORM WATER
- DRAINAGE MANAGEMENT AREA DELINEATION
- TREATMENT CONTROL MEASURE

MANA CAMDEN FUND, LLC
5927 BALFOUR COURT
CARLSBAD, CA 92008

HANNA-BRUNETTI
EST. 1810
CIVIL ENGINEERS - LAND SURVEYORS
CONSTRUCTION MANAGERS
7651 EIGLEBERRY STREET • GILROY • 95020 • CALIFORNIA
OFFICE (408) 842-2173
EMAIL: ENGINEERING@HANNABRUNETTI.COM

STORM WATER CONTROL PLAN
5670 CAMDEN AVENUE
APN 567-28-001
FILE NO. H23-040
SAN JOSE
Project No.: 23025
Design: A.M.
Check: X.
Date: 1/26/24

SHEET
C.9
Of 12 SHEETS
PW PROJECT #
X

REVISIONS

DATE

BY

CSJ

SIZING FOR VOLUME BASED TREATMENT

DMA # 1

Impervious Area = 84199 s.f.

% Imperviousness= 72.17%

MAPsize = 19

Correction Factor= 1.36691

Clay (D): 13.9

Sandy Clay (D): Clay Loam (D): x

Silt Loam/Loam (B):

Not Applicable (100% Impervious):

Are the soils outside the building footprint graded/compacted? Yes Yes/No

If yes, and the soil will be compacted during site preparation and grading, the soil infiltration rate will be decreased. Modify your answer to a soil with a lower infiltration rate (eg. Silt Loam to Clay)

Modified Soil Type:

S= 1.00%

UBS Volume for 1% Slope (UBS1%) = 0.440870385 inches (Use Figure B-2)

UBS Volume for 15% Slope (UBS15%) = 0.460870385 inches (Use Figure B-5)

UBS Volume for X% Slope (UBSX%) = 0.440870385 inches (Corrected Slope for the site)

Adjusted UBS = Correction Factor (Step 2) x UBSx% (Step 5)

Adjusted UBS = 0.60262858 inches

Design Volume = Adjusted UBS (Step 6) x Drainage Area (Step 1) x 1ft/12 inch

Design Volume = 5.558.60 ft³

COMBO FLOW & VOLUME BIORETENTION CALCULATION

Total Drainage Area = 116,861 sq. ft.

Impervious Area = 84,199 sq. ft.

Pervious Area = 32,462 sq. ft.

Equivalent Impervious Area = 3,246 sq. ft.

Total Equivalent Impervious = 87,445 sq. ft.

Rainfall Intensity = 1.72 in/hr

Duration = Adjusted UBS (Step 6) / Rainfall Intensity

Duration = 3.31314292 hrs

Estimate the Surface Area = 2972.06 sq. ft. (Typically start with Total Impervious x 0.03)

Volume of Treated Runoff = 2972.06 cu. ft.

Volume in Ponding Area = 2972.06 cu. ft.

Depth of Pond = 12.8 inches (Round up)

If Depth of Ponding is less than 6" the d INFILTRATION CHAMBERS USED rea. (repeat)

If Depth of Ponding is greater than 12" SEE CALCULATIONS BELOW

If Depth of Ponding is between 6" to 12" Flow-Through Planters.

Infiltration and Storage DMA 1

Required Treatment Volume	5859.00	cubic feet (from SIZING FOR VOLUME BASED TREATMENT worksheet)
Treated Volume	2972.06	cubic feet
Volume to Detain	2886.94	cubic feet
Capacity of 48 Stormtech Camber 740 at 29" is 2903 CF. Set outlet orifice at 29" above bottom.		

1. Amount of Runoff Infiltrated During Storm Event	1988.00	sf
Treatment Area Available	12.00	in/hr
Rate of infiltration	6.64	in/hr (with a Factor of Safety of 2) use
Rate of infiltration	6.64	in/hr (with a Factor of Safety of 2) use
Rainfall Duration	2.99	hours
Infiltrated Volume	2972.06	cubic feet
Required Treatment Volume	5859.00	cubic feet
Treated Volume	2972.06	cubic feet
Volume to Detain	2886.94	cubic feet

SC-740

Chamber Model

Number of Chambers

Number of Endcaps

Stone Voids (porosity)

Base of Stone Elevation

Recommended Stone Below Chambers*

Recommended Stone Above Chambers*

Area of System**

*The minimum stone below and above the chambers to be determined by the design engineer.

System Height (inches)	Incremental Single Chamber Storage (cu.ft)	Incremental Total Chamber Storage (cu.ft)	Incremental Total End Cap Storage (cu.ft)	Incremental Total Storage (cu.ft)	Incremental Chamber, End Cap, & Stone (cu.ft)	Cumulative Total System Storage (cu.ft)	Cumulative System Storage (cu.ft)	Elevation (ft)
48	0.00	0.00	0.00	0.00	66.27	66.27	4,529.72	270.00
47	0.00	0.00	0.00	0.00	66.27	66.27	4,463.45	269.92
46	0.00	0.00	0.00	0.00	66.27	66.27	4,397.19	269.83
45	0.00	0.00	0.00	0.00	66.27	66.27	4,330.92	269.75
44	0.00	0.00	0.00	0.00	66.27	66.27	4,264.65	269.67
43	0.00	0.00	0.00	0.00	66.27	66.27	4,198.39	269.58
42	0.00	0.00	0.00	0.00	66.27	66.27	4,132.12	269.50
41	0.12	0.00	6.00	0.00	63.87	69.87	4,065.85	269.42
40	0.30	0.00	14.43	0.02	60.49	74.93	3,995.99	269.33
39	0.62	0.01	29.58	0.10	54.39	84.08	3,921.05	269.25
38	0.85	0.05	40.88	0.19	49.84	90.91	3,836.98	269.17
37	1.01	0.07	48.55	0.27	46.74	95.56	3,746.07	269.08
36	1.14	0.08	54.64	0.35	44.27	99.26	3,650.51	269.00
35	1.24	0.10	59.70	0.42	42.22	102.34	3,551.25	268.92
34	1.33	0.12	63.99	0.49	40.48	104.95	3,448.91	268.83
33	1.41	0.14	67.72	0.55	38.96	107.23	3,343.96	268.75
32	1.48	0.15	71.10	0.61	37.58	109.29	3,236.73	268.67
31	1.55	0.17	74.25	0.67	36.30	111.22	3,127.44	268.58
30	1.61	0.18	77.19	0.73	35.10	113.02	3,016.22	268.50
29	1.67	0.19	79.94	0.78	33.98	114.69	2,903.20	268.42
28	1.72	0.21	82.49	0.83	32.94	116.26	2,788.51	268.33
27	1.77	0.22	84.87	0.88	31.97	117.72	2,672.25	268.25
26	1.81	0.23	87.08	0.92	31.06	119.07	2,554.53	268.17
25	1.85	0.24	89.02	0.97	30.27	120.26	2,435.46	268.08
24	1.90	0.25	91.06	1.01	29.44	121.51	2,315.10	268.00
23	1.93	0.26	92.88	1.05	28.70	122.62	2,193.69	267.92
22	1.97	0.27	94.58	1.09	28.00	123.67	2,071.07	267.83
21	2.00	0.28	96.17	1.12	27.35	124.64	1,947.40	267.75
20	2.03	0.29	97.66	1.16	26.74	125.55	1,822.76	267.67
19	2.06	0.30	99.07	1.19	26.16	126.42	1,697.21	267.58
18	2.09	0.30	100.44	1.21	25.60	127.26	1,570.79	267.50
17	2.12	0.31	101.82	1.24	25.04	128.10	1,443.52	267.42
16	2.15	0.32	103.15	1.26	24.50	128.92	1,315.42	267.33
15	2.18	0.32	104.42	1.29	23.98	129.69	1,186.51	267.25
14	2.20	0.33	105.65	1.31	23.48	130.44	1,056.82	267.17
13	2.23	0.33	106.86	1.32	23.00	131.17	926.37	267.08
12	0.00	0.00	0.00	0.00	66.27	795.20	267.00	
11	0.00	0.00	0.00	0.00	66.27	66.27	728.93	266.92
10	0.00	0.00	0.00	0.00	66.27	66.27	662.67	266.83
9	0.00	0.00	0.00	0.00	66.27	66.27	596.40	266.75
8	0.00	0.00	0.00	0.00	66.27	66.27	530.13	266.67
7	0.00	0.00	0.00	0.00	66.27	66.27	463.87	266.58
6	0.00	0.00	0.00	0.00	66.27	66.27	397.60	266.50
5	0.00	0.00	0.00	0.00	66.27	66.27	331.33	266.42
4	0.00	0.00	0.00	0.00	66.27	66.27	265.07	266.33
3	0.00	0.00	0.00	0.00	66.27	66.27	198.80	266.25
2	0.00	0.00	0.00	0.00	66.27	66.27	132.53	266.17
1	0.00	0.00	0.00	0.00	66.27	66.27	66.27	266.08
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	266.00

SIZING FOR VOLUME BASED TREATMENT

DMA # 2

Impervious Area = 136097 s.f.

% Imperviousness= 78.81%

MAPsize = 19

Correction Factor= 1.36691

Clay (D): 13.9

Sandy Clay (D): Clay Loam (D): x

Silt Loam/Loam (B):

Not Applicable (100% Impervious):

Are the soils outside the building footprint graded/compacted? Yes Yes/No

If yes, and the soil will be compacted during site preparation and grading, the soil infiltration rate will be decreased. Modify your answer to a soil with a lower infiltration rate (eg. Silt Loam to Clay)

Modified Soil Type:

S= 1.00%

UBS Volume for 1% Slope (UBS1%) = 0.474050032 inches (Use Figure B-2)

UBS Volume for 15% Slope (UBS15%) = 0.494050032 inches (Use Figure B-5)

UBS Volume for X% Slope (UBSX%) = 0.474050032 inches (Corrected Slope for the site)

Adjusted UBS = Correction Factor (Step 2) x UBSx% (Step 5)

Adjusted UBS = 0.64798206 inches

Design Volume = Adjusted UBS (Step 6) x Drainage Area (Step 1) x 1ft/12 inch

Design Volume = 9.325.00 ft³

COMBO FLOW & VOLUME BIORETENTION CALCULATION

Total Drainage Area = 172,690 sq. ft.

Impervious Area = 136,097 sq. ft.

Pervious Area = 36,593 sq. ft.

Equivalent Impervious Area = 3,659 sq. ft.

Total Equivalent Impervious = 139,756 sq. ft.

Rainfall Intensity = 1.72 in/hr

Duration = Adjusted UBS (Step 6) / Rainfall Intensity

Duration = 3.23991029 hrs

Estimate the Surface Area = 4052.06 sq. ft. (Typically start with Total Impervious x 0.03)

Volume of Treated Runoff = 4052.06 cu. ft.

Volume in Ponding Area = 4052.06 cu. ft.

Depth of Pond = 11.2 inches (Round up)

If Depth of Ponding is less than 6" the d INFILTRATION CHAMBERS USED rea. (repeat)

If Depth of Ponding is greater than 12" SEE CALCULATIONS BELOW

If Depth of Ponding is between 6" to 12" Flow-Through Planters.

Infiltration and Storage DMA 2

Required Treatment Volume	9325.00	cubic feet (from SIZING FOR VOLUME BASED TREATMENT worksheet)
Treated Volume	5962.14	cubic feet
Volume to Detain	3362.86	cubic feet
Capacity of 55 Stormtech Camber 740 at 30" is 3422 CF. Set outlet orifice at 30" above bottom.		

1. Amount of Runoff Infiltrated During Storm Event	2172.00	sf
Treatment Area Available	21.60	in/hr
Rate of infiltration	10.80	in/hr (with a Factor of Safety of 2) use
Rate of infiltration	10.80	in/hr (with a Factor of Safety of 2) use
Rainfall Duration	3.05	hours
Infiltrated Volume	5962.14	cubic feet
Required Treatment Volume	9325.00	cubic feet
Treated Volume	5962.14	cubic feet
Volume to Detain	3362.86	cubic feet

SC-740

Chamber Model

Number of Chambers

Number of Endcaps

Stone Voids (porosity)

Base of Stone Elevation

Recommended Stone Below Chambers*

Recommended Stone Above Chambers*

Area of System**

*The minimum stone below and above the chambers to be determined by the design engineer.

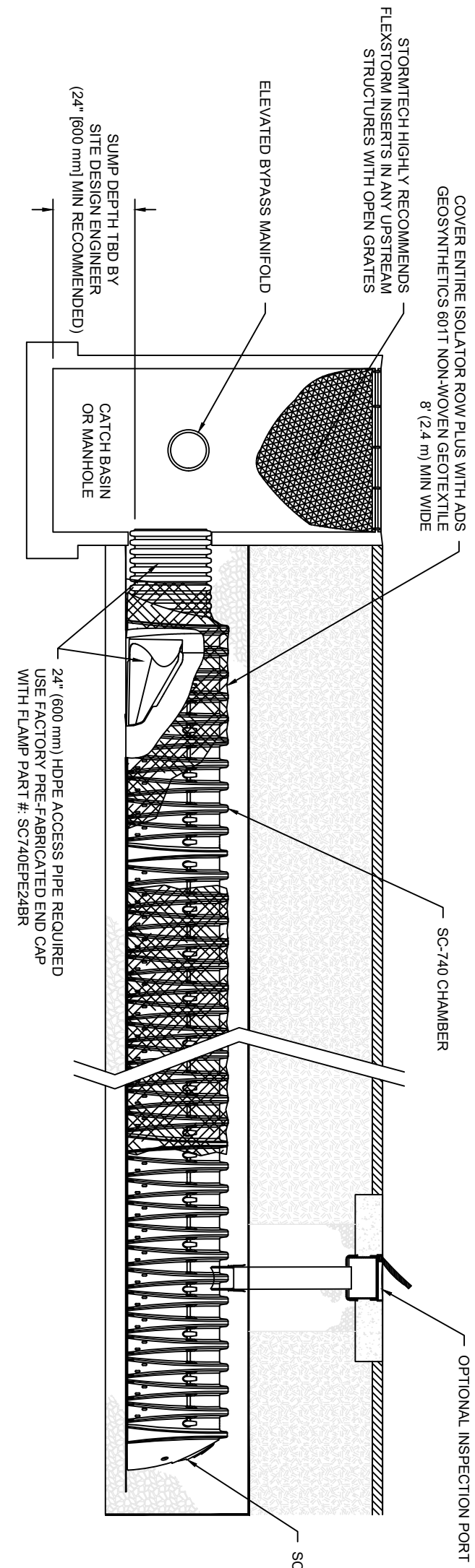
System Height (inches)	Incremental Single Chamber Storage (cu.ft)	Incremental Total Chamber Storage (cu.ft)	Incremental Total End Cap Storage (cu.ft)	Incremental Total Storage (cu.ft)	Incremental Chamber, End Cap, & Stone (cu.ft)	Cumulative Total System Storage (cu.ft)	Cumulative System Storage (cu.ft)	Elevation (ft)
48	0.00	0.00	0.00	0.00	74.27	74.27	5,129.14	272.26
47	0.00	0.00	0.00	0.00	74.27	74.27	5,054.88	272.18
46	0.00	0.00	0.00	0.00	74.27	74.27	4,980.61	272.09
45	0.00	0.00	0.00	0.00	74.27	74.27	4,906.34	272.01
44	0.00	0.00	0.00	0.00	74.27	74.27	4,832.08	271.93
43	0.00	0.00	0.00	0.00	74.27	74.27	4,757.81	271.84
42	0.00	0.00	0.00	0.00	74.27	74.27	4,683.54	271.76
41	0.12	0.00	6.87	0.00	71.52	78.39	4,609.28	271.68
40	0.30	0.00	16.54	0.04	67.64	84.21	4,530.89	271.59
39	0.62	0.03	33.90	0.25	60.61	94.76	4,446.67	271.51
38	0.85	0.05	46.84	0.47	55.34	102.65	4,351.92	271.43
37	1.01	0.07	55.64	0.68	51.74	108.05	4,249.26	271.34
36	1.14	0.08	62.61	0.87	48.88	112.35	4,141.21	271.26
35	1.24	0.10	68.40	1.05	46.49	115.94	4,028.85	271.18
34	1.33	0.12	73.32	1.22	44.45	118.99	3,912.92	271.09
33	1.41	0.14	77.59	1.38	42.68	121.65	3,793.93	271.01
32	1.48	0.15	81.47	1.53	41.07	124.06	3,672.38	270.93
31	1.55	0.17	85.08	1.67	39.57	126.32	3,548.21	270.84
30	1.61	0.18	88.45	1.81	38.16	128.42	3,421.90	270.76
29	1.67	0.19	91.69	1.95	36.85	130.39	3,293.47	270.68
28	1.72	0.21	94.52	2.07	35.63	132.22	3,163.08	270.59
27	1.77	0.22	97.25	2.20	34.49	133.93	3,030.86	270.51
26	1.81	0.23	99.78	2.31	33.43	135.52	2,896.93	270.43
25	1.85	0.24	102.03	2.42	32.50	136.92	2,761.40	270.34
24	1.90	0.25	104.34	2.53	31.52	138.39	2,624.48	270.26
23	1.93	0.26	106.42	2.63	30.65	139.69	2,486.09	270.18
22	1.97	0.27	108.37	2.72	29.83	140.92	2,346.40	270.09
21	2.00	0.28	110.19	2.81	29.07	142.07	2,205.48	270.01
20	2.03	0.29	111.90	2.89	28.35	143.14	2,063.41	269.93
19	2.06	0.30	113.52	2.97	27.67	144.16	1,920.27	269.84
18	2.09	0.30	115.09	3.04	27.02	145.14	1,776.11	269.76
17	2.12	0.31	116.66	3.10	26.36	146.13	1,630.97	269.68
16	2.15	0.32	118.19	3.16	25.72	147.08	1,484.84	269.59
15	2.18	0.32	119.65	3.22	25.12	147.98	1,337.76	269.51
14	2.20	0.33	121.06	3.27	24.54	148.86	1,189.78	269.43
13	2.23	0.33	122.44	3.31	23.97	149.72	1,040.92	269.34
12	0.00	0.00	0.00	0.00	74.27	74.27	891.20	269.26
11	0.00	0.00	0.00	0.00	74.27	74.27	816.93	269.18
10	0.00	0.00	0.00	0.00	74.27	74.27	742.67	269.09
9	0.00	0.00	0.00	0.00	74.27	74.27	668.40	269.01
8	0.00	0.00	0.00	0.00	74.27	74.27	594.13	268.93
7	0.00	0.00	0.00	0.00	74.27	74.27	519.87	268.84
6	0.00	0.00	0.00	0.00	74.27	74.27	445.60	268.76
5	0.00	0.00	0.00	0.00	74.27	74.27	371.33	268.68
4	0.00	0.00	0.00	0.00	74.27	74.27	297.07	268.59
3	0.00	0.00	0.00	0.00	74.27	74.27	222.80	268.51
2	0.00	0.00	0.00	0.00	74.27	74.27	148.53	268.43
1	0.00	0.00	0.00	0.00	74.27	74.27	74.27	268.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	268.26

FORM #138 - Stormwater Evaluation Form

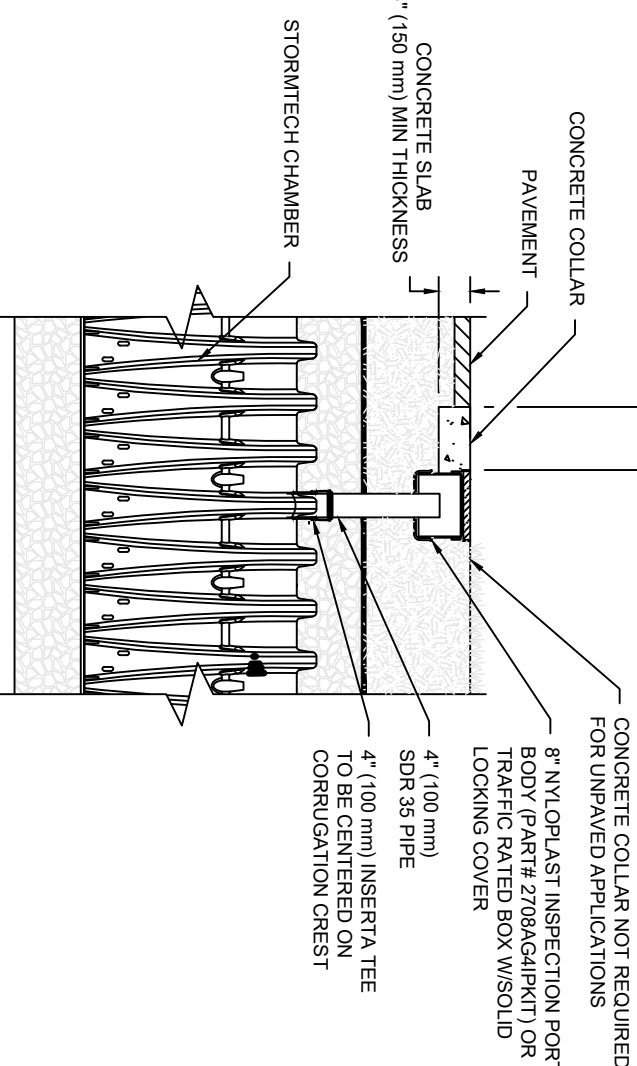


SC-740 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-740.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) COPOLYMERS."
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPED FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE ASHTO LARG BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET CONSIDERATION FOR IMPACT AND MULTIPLE TRUCK PRESSIONS.
- CHAMBERS SHALL BE DESIGNED, TESTED AND APPROVED. LOAD CONSIDERATIONS ARE DEFINED IN ACCORDANCE WITH ASTM F2297, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." LOAD CONSIDERATIONS SHALL INCLUDE: 1) INSTANTANEOUS (1 MIN) ASHTO DESIGN TRUCK LIVE LOAD ON DESIGN TRUCK; 2) MAXIMUM PERMANENT (7.5 MI) COVER LOAD AND 3) ALLOWABLE COVER WITH PAVED (1.75 IN) ASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, THE ARCH STIFFNESS CONSTANT SHALL BE LESS THAN 2".
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.56.
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE ASHTO LARG BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET CONSIDERATION FOR IMPACT AND MULTIPLE TRUCK PRESSIONS.
 - THE TEST DERIVED SHEAR MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 15% DEAD MODULUS BASED ON DESIGN.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.



SC-740 ISOLATOR ROW PLUS DETAIL



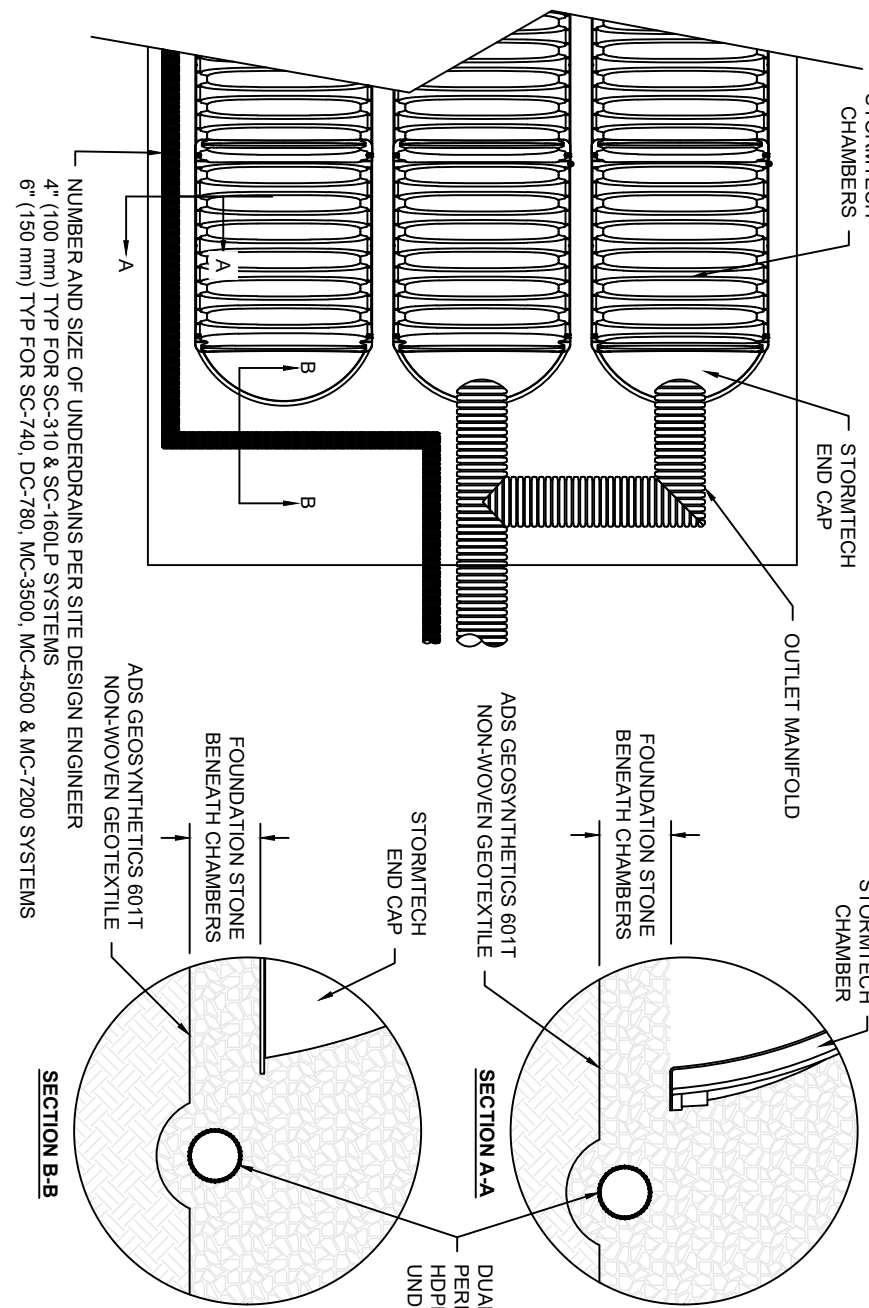
4" PVC INSPECTION PORT DETAIL
(SC SERIES CHAMBER)

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

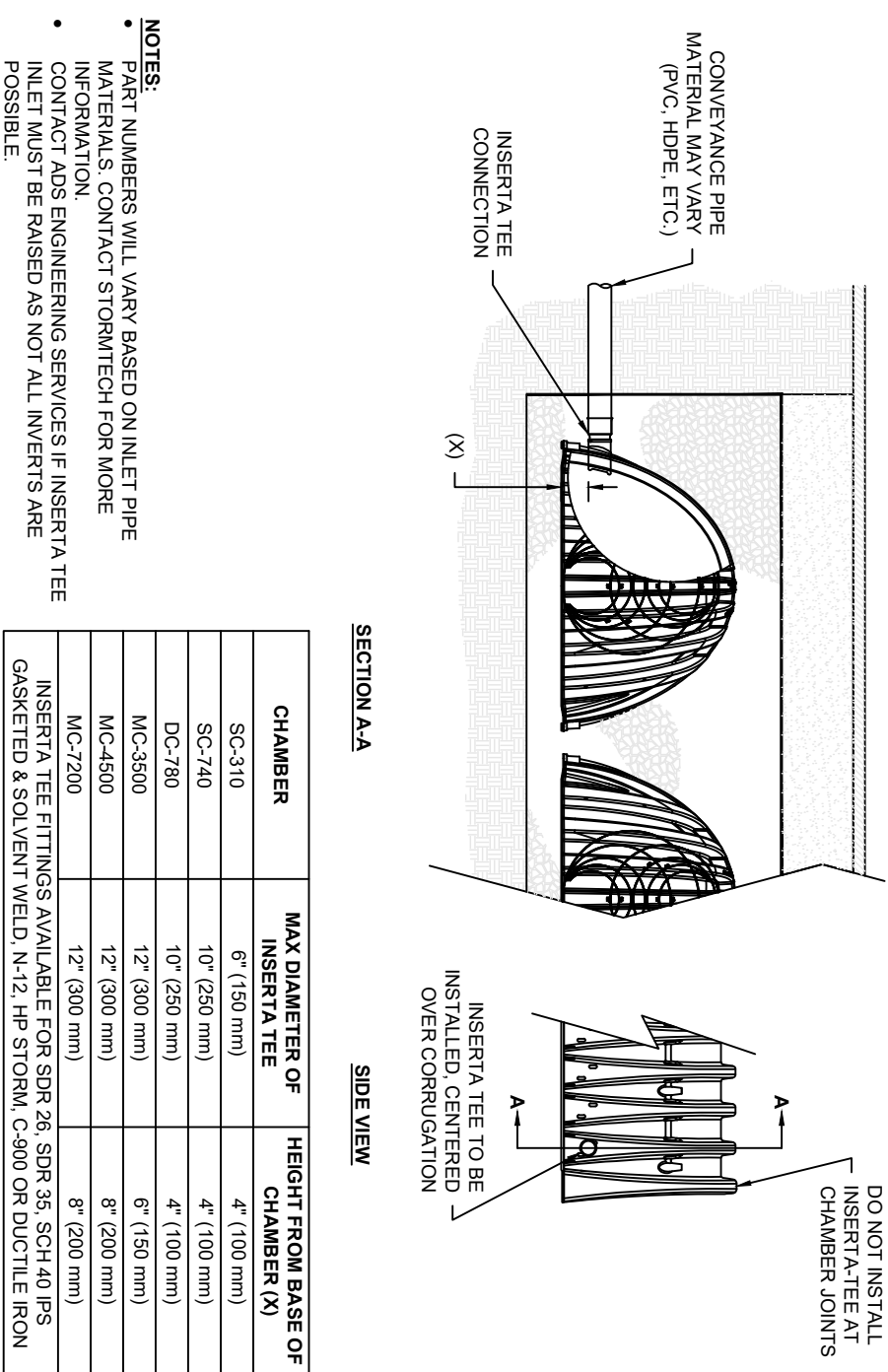
- STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLER.
- STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE STORMTECH SC-310SC-740DC-780 CONSTRUCTION GUIDE.
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DUMPER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS.
 - BACKFILL AS ROWS ARE BUILT, USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - STONESHOOTER LOCATED OFF OF THE CHAMBER BED.
 - BACKFILL LAYER CO SHOULD BE EXCAVATED BASED ON SLOPING OR EXCAVATION.
- THE FOUNDATION STONE SHALL BE LEVELLED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEALED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM 4" (100 mm) SPACING BETWEEN THE CHAMBER ROWS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4" (20 mm).
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- 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.
- ADS RECOMMENDS THE USE OF FLEXSTORM CATCH IT™ INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE CONSTRUCTION GUIDE.

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE STORMTECH SC-310SC-740DC-780 CONSTRUCTION GUIDE.
- THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED.
 - NO OVERLOADED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN CHAMBERS.
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE STORMTECH SC-310SC-740DC-780 CONSTRUCTION GUIDE.
- FILL 3/4" (20 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMPER TRUCK TRAVEL, OR DUMPING USE OF A DUMPER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE DUMPER AND PUSH METHOD ARE NOT COVERED UNDER STORMTECH AT 1-888-882-2884 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.



UNDERDRAIN DETAIL

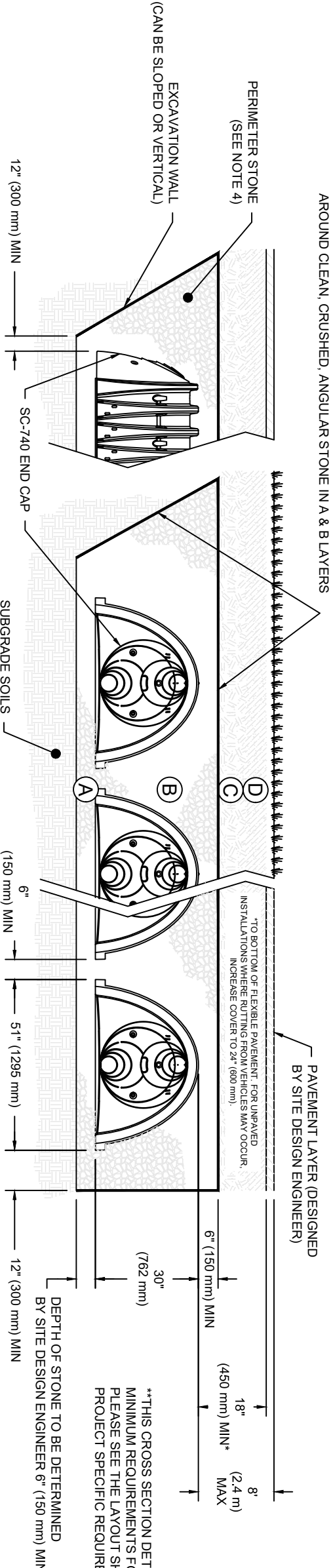


INSERTA-TEE SIDE INLET DETAIL

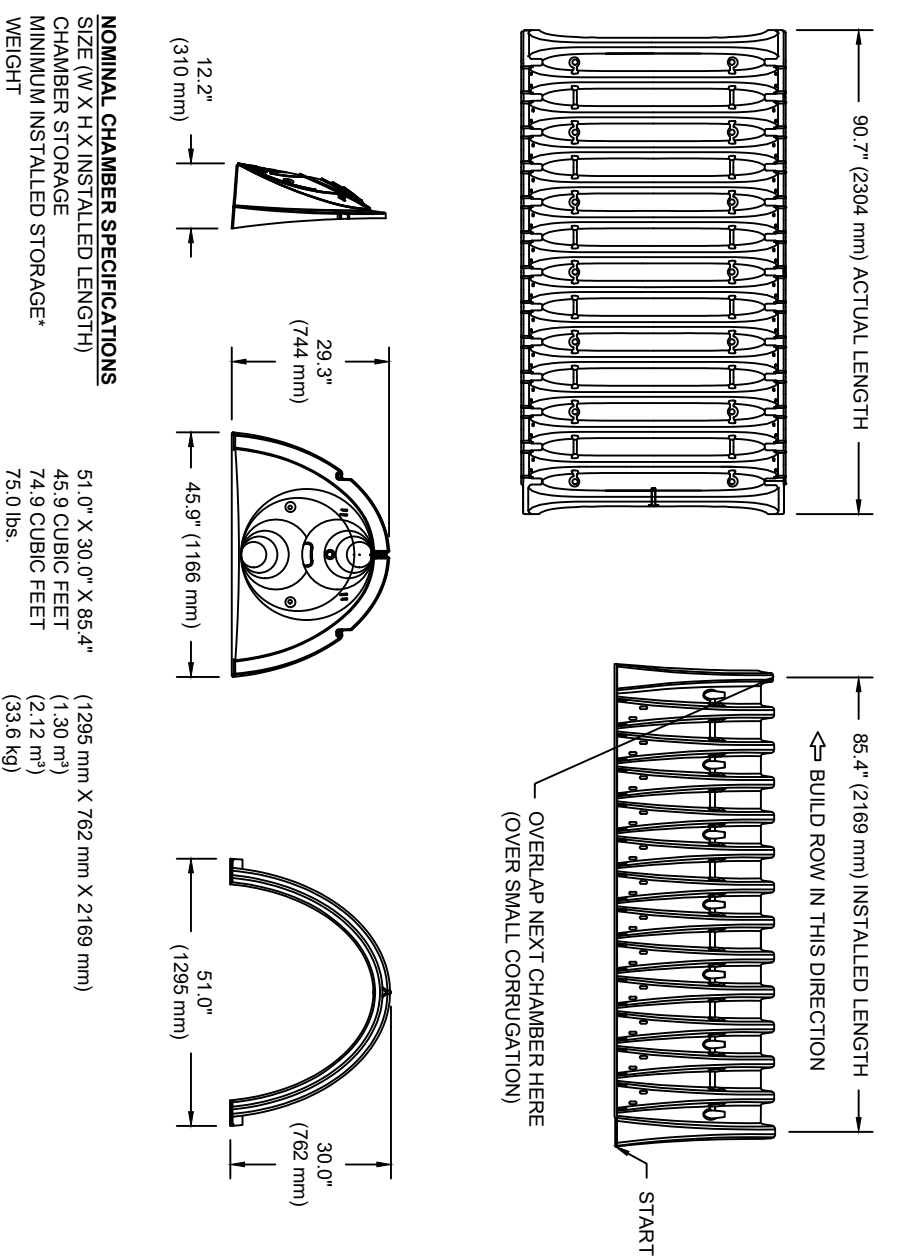
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	CLASSIFICATION	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER D STARTS FROM THE 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 STRENGTHEN MATERIAL AND PREPARED FOR REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER C STARTS FROM THE TOP OF THE EMBEDMENT STONE (B LAYER) TO BE (400 mm) (16 IN) ABOVE THE FINISHED GRADE. THE FINISHED GRADE SUBBASE MAY BE A PART OF THE C LAYER.	ASHTO M45 A-1, A-2.4, A-3 OR ASHTO M43	BEGIN COMPACTING AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT EACH LAYER IN WELL-CRUSHED MATERIAL AND 95% RELATIVE DENSITY FOR VERTICAL TO EXCEED 20,000 LBS (90 kN) OF VERTICAL FORCE. NOT TO EXCEED 20,000 LBS (90 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE (A LAYER) TO THE C LAYER ABOVE.	ASHTO M43	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE C LAYER (B LAYER) OF THE CHAMBER.	ASHTO M43 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.

- PLEASE NOTE: ASHTO DESIGNATIONS ARE FOR GRAVITY ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR FOR ASHTO TYPE 4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (ASHTO M43) STONE".
- STORMTECH CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
 - STORMTECH CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
 - WHERE NEUTRALIZATION SURFACES MAY BE COMPROMISED BY COMPACTING MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) MAXIMUM LIFT USING TWO FULL COVERS WITH A VIBRATORY COMPACTOR. MATERIALS CONTACTING STORMTECH FOR MORE INFORMATION.
 - 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.



- NOTES:**
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
 - SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
 - THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE DESIGN 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 HORIZONTAL TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
 - DO NOT MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING. CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.8.2 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT² (AND B) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C). CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



SC-740 CROSS SECTION DETAIL

REVISIONS	DATE	CSJ	BY
△			
△			
△			
△			

MANA CAMDEN FUND, LLC
5927 BALFOUR COURT
CARLSBAD, CA 92008

HANNA-BRUNETTI
EST. 1910
CIVIL ENGINEERS • LAND SURVEYORS
CONSTRUCTION MANAGERS
7651 EIGLEBERRY STREET • GILROY • 95020 • CALIFORNIA
OFFICE (408) 842-2173
EMAIL: ENGINEERING @ HANNABRUNETTI.COM

STORM WATER CONTROL DETAILS
5670 CAMDEN AVENUE
APN 567-28-001
FILE NO. H23-040
SAN JOSE CALIFORNIA
Project No.: 23025
Designed: A.M.
Checked: XX
Date: 1/26/24

SHEET
C.11
Of 12 SHEETS
PW PROJECT #
X

Stormwater Control Measures Sizing Calculator

SIZING FOR VOLUME BASED TREATMENT			
DMA #	1		
A=	116661	s.f.	
Impervious Area =	84199	s.f.	
		% Imperviousness=	72.17%
MAPsite =	19	Correction Factor= 1.36691	
MAPgage =	13.9		
Clay (D):		Sandy Clay (D):	
		Clay Loam (D):	x
Silt Loam/Loam (B):		Not Applicable (100% Impervious):	
Are the soils outside the building footprint graded/compacted?		Yes	Yes/No
If yes, and the soil will be compacted during site preparation and grading, the soil infiltration rate will be decreased. Modify your answer to a soil with a lower infiltration rate (eg. Silt Loam to Clay)			
Modified Soil Type:			
S=	1.00%		
UBS Volume for 1% Slope (UBS1%) =		0.440870385	inches (Use Figure B-2)
UBS Volume for 15% Slope (UBS15%) =		0.460870385	inches (Use Figure B-5)
UBS Volume for X% Slope (UBSX%) =		0.440870385	inches (Corrected Slope for the site)
Adjusted UBS = Correction Factor (Step 2) x UBSx% (Step 5)			
Adjusted UBS =		0.60262858	inches
Design Volume = Adjusted UBS (Step 6) x Drainage Area (Step 1) x 1ft/12 inch			
Design Volume =		5,858.60	ft^3
COMBO FLOW & VOLUME BIORETENTION CALCULATION			
Total Drainage Area =	116,661	sq. ft	
Impervious Area =	84,199	sq. ft	
Pervious Area =	32,462	sq. ft	
Equivalent Impervious Area =	3,246	sq. ft	
Total Equivalent Impervious =		87,445	sq. ft
Rainfall Intensity =	0.2	in/hr	
Duration = Adjusted UBS (Step 6) / Rainfall Intensity			
Duration =		3.01314292	hrs
Estimate the Surface Area =	2525.97	sq. ft (Typically start with Total Impervious x 0.03)	
Volume of Treated Runoff =	3171.29526	cu. ft	
Volume in Ponding Area =	2687.30918	cu. ft	
Depth of Ponding =	1.06387217	ft	
		Depth of Ponding = 12.8	inches (Round up)
If Depth of Ponding is less than 6" the design can be optimized with a smaller surface area. (repeat)			
If Depth of Ponding is greater than 12" a larger surface area will be required. (repeat)			
If Depth of Ponding is between 6" to 12" this is the range allowable for Bioretention or Flow-Through Planters.			

Section crossed out above doesn't apply since infiltration chambers will be used. Please see calculations on next page.

Infiltration and Storage DMA 1

Required Treatment Volume 5859.00 cubic feet (from SIZING FOR VOLUME BASED TREATMENT worksheet)

1. Amount of Runoff Infiltrated During Storm Event

Treatment Area Available	1988.00	sf
Rate of infiltration	12.00	in/hr
Rate of infiltration	6.00	in/hr (with a Factor of Safety of 2) use
Rainfall Duration	2.99	hours
Infiltrated Volume	2972.06	cubic feet

2. Amount of Runoff to Detain for Infiltration

Required Treatment Volume	5859.00	cubic feet
Treated Volume	2972.06	cubic feet
Volume to Detain	2886.94	cubic feet

Capacity of 48 Stormtech Camber 740 at 29" is 2903 CF. Set outlet orrifice at 29" above bottom.

Chamber Model HS75
 Number of Chambers 48
 Number of Endcaps 4
 Stone Voids (porosity) 40%
 Base of Stone Elevation 266 ft
 Recommended Stone Below Chambers* 12 in.
 Recommended Stone Above Chambers* 6 in.
 Include perimeter stone? Yes
 Standard or metric? Standard
 Area of System** 1988 sq.ft
 **Area must be greater than: 1874.53 sq.ft

*The minimum stone below and above the chambers to be determined by the design engineer.

System Height (Inches)	Incremental Single Chamber Storage (cu.ft)	Incremental Single End Cap Storage (cu.ft)	Incremental Total Chamber Storage (cu.ft)	Incremental Total End Cap Storage (cu.ft)	Incremental Stone Storage (cu.ft)	Incremental Chamber, End Cap, & Stone (cu.ft)	Cumulative Total Storage for System (cu.ft)	Cumulative System Storage (cu.ft)	Elevation (ft)
48	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,529.72	270.00
47	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,463.45	269.92
46	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,397.19	269.83
45	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,330.92	269.75
44	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,264.65	269.67
43	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,198.39	269.58
42	0.00	0.00	0.00	0.00	66.27	66.27	66.27	4,132.12	269.50
41	0.12	0.00	6.00	0.00	63.87	69.87	69.87	4,065.85	269.42
40	0.30	0.00	14.43	0.02	60.49	74.93	74.93	3,995.99	269.33
39	0.62	0.03	29.58	0.10	54.39	84.08	84.08	3,921.05	269.25
38	0.85	0.05	40.88	0.19	49.84	90.91	90.91	3,836.98	269.17
37	1.01	0.07	48.55	0.27	46.74	95.56	95.56	3,746.07	269.08
36	1.14	0.09	54.64	0.35	44.27	99.26	99.26	3,650.51	269.00
35	1.24	0.10	59.70	0.42	42.22	102.34	102.34	3,551.25	268.92
34	1.33	0.12	63.99	0.49	40.48	104.95	104.95	3,448.91	268.83
33	1.41	0.14	67.72	0.55	38.96	107.23	107.23	3,343.96	268.75
32	1.48	0.15	71.10	0.61	37.58	109.29	109.29	3,236.73	268.67
31	1.55	0.17	74.25	0.67	36.30	111.22	111.22	3,127.44	268.58
30	1.61	0.18	77.19	0.73	35.10	113.02	113.02	3,016.22	268.50
29	1.67	0.19	79.94	0.78	33.98	114.69	114.69	2,903.20	268.42
28	1.72	0.21	82.49	0.83	32.94	116.26	116.26	2,788.51	268.33
27	1.77	0.22	84.87	0.88	31.97	117.72	117.72	2,672.25	268.25
26	1.81	0.23	87.08	0.92	31.06	119.07	119.07	2,554.53	268.17
25	1.85	0.24	89.02	0.97	30.27	120.26	120.26	2,435.46	268.08
24	1.90	0.25	91.06	1.01	29.44	121.51	121.51	2,315.20	268.00
23	1.93	0.26	92.88	1.05	28.70	122.62	122.62	2,193.69	267.92
22	1.97	0.27	94.58	1.09	28.00	123.67	123.67	2,071.07	267.83
21	2.00	0.28	96.17	1.12	27.35	124.64	124.64	1,947.40	267.75
20	2.03	0.29	97.66	1.16	26.74	125.55	125.55	1,822.76	267.67
19	2.06	0.30	99.07	1.19	26.16	126.42	126.42	1,697.21	267.58
18	2.09	0.30	100.44	1.21	25.60	127.26	127.26	1,570.79	267.50
17	2.12	0.31	101.82	1.24	25.04	128.10	128.10	1,443.52	267.42
16	2.15	0.32	103.15	1.26	24.50	128.92	128.92	1,315.42	267.33
15	2.18	0.32	104.42	1.29	23.98	129.69	129.69	1,186.51	267.25
14	2.20	0.33	105.65	1.31	23.48	130.44	130.44	1,056.82	267.17
13	2.23	0.33	106.86	1.32	23.00	131.17	131.17	926.37	267.08
12	0.00	0.00	0.00	0.00	66.27	66.27	66.27	795.20	267.00
11	0.00	0.00	0.00	0.00	66.27	66.27	66.27	728.93	266.92
10	0.00	0.00	0.00	0.00	66.27	66.27	66.27	662.67	266.83
9	0.00	0.00	0.00	0.00	66.27	66.27	66.27	596.40	266.75
8	0.00	0.00	0.00	0.00	66.27	66.27	66.27	530.13	266.67
7	0.00	0.00	0.00	0.00	66.27	66.27	66.27	463.87	266.58
6	0.00	0.00	0.00	0.00	66.27	66.27	66.27	397.60	266.50
5	0.00	0.00	0.00	0.00	66.27	66.27	66.27	331.33	266.42
4	0.00	0.00	0.00	0.00	66.27	66.27	66.27	265.07	266.33
3	0.00	0.00	0.00	0.00	66.27	66.27	66.27	198.80	266.25
2	0.00	0.00	0.00	0.00	66.27	66.27	66.27	132.53	266.17
1	0.00	0.00	0.00	0.00	66.27	66.27	66.27	66.27	266.08
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	266.00

2,903 CF

Note: The capacity of the (48) StormTech Chambers for TCM 1 is set 29" above the bottom per calculated design capacity (2,903 CF) on the previous page.

SIZING FOR VOLUME BASED TREATMENT			
DMA #	2		
A=	172690	s.f.	
Impervious Area =	136097	s.f.	
		% Imperviousness=	78.81%
MAPsite =	19	Correction Factor= 1.36691	
MAPgage =	13.9		
Clay (D):		Sandy Clay (D):	
		Clay Loam (D):	x
Silt Loam/Loam (B):		Not Applicable (100% Impervious):	
Are the soils outside the building footprint graded/compacted?			Yes Yes/No
If yes, and the soil will be compacted during site preparation and grading, the soil infiltration rate will be decreased. Modify your answer to a soil with a lower infiltration rate (eg. Silt Loam to Clay)			
Modified Soil Type:			
S=	1.00%		
UBS Volume for 1% Slope (UBS1%) =		0.474050032	inches (Use Figure B-2)
UBS Volume for 15% Slope (UBS15%) =		0.494050032	inches (Use Figure B-5)
UBS Volume for X% Slope (UBSX%) =		0.474050032	inches (Corrected Slope for the site)
Adjusted UBS = Correction Factor (Step 2) x UBSx% (Step 5)			
Adjusted UBS =		0.64798206	inches
Design Volume = Adjusted UBS (Step 6) x Drainage Area (Step 1) x 1ft/12 inch			
Design Volume =		9,325.00	ft^3
COMBO FLOW & VOLUME BIORETENTION CALCULATION			
Total Drainage Area =	172,690	sq. ft	
Impervious Area =	136,097	sq. ft	
Pervious Area =	36,593	sq. ft	
Equivalent Impervious Area =	3,659	sq. ft	
Total Equivalent Impervious =		139,756	sq. ft
Rainfall Intensity =	0.2	in/hr	
Duration = Adjusted UBS (Step 6) / Rainfall Intensity			
Duration =	3.23991029	hrs	
Estimate the Surface Area =	4082.91	sq. ft (Typically start with Total Impervious x 0.03)	
Volume of Treated Runoff =	5511.77588	cu. ft	
Volume in Ponding Area =	3813.22591	cu. ft	
Depth of Ponding =	0.93394807	ft	
		Depth of Ponding = 11.2	inches (Round up)
If Depth of Ponding is less than 6" the design can be optimized with a smaller surface area. (repeat)			
If Depth of Ponding is greater than 12" a larger surface area will be required. (repeat)			
If Depth of Ponding is between 6" to 12" this is the range allowable for Bioretention or Flow-Through Planters.			

Section crossed out above doesn't apply since infiltration chambers will be used. Please see calculations on next page.

Infiltration and Storage DMA 2

Required Treatment Volume 9325.00 cubic feet (from SIZING FOR VOLUME BASED TREATMENT worksheet)

1. Amount of Runoff Infiltrated During Storm Event

Treatment Area Available	2172.00	sf
Rate of infiltration	21.60	in/hr
Rate of infiltration	10.80	in/hr (with a Factor of Safety of 2) use
Rainfall Duration	3.05	hours
Infiltrated Volume	5962.14	cubic feet

2. Amount of Runoff to Detain for Infiltration

Required Treatment Volume	9325.00	cubic feet
Treated Volume	5962.14	cubic feet
Volume to Detain	3362.86	cubic feet

Capacity of 55 Stormtech Camber 740 at 30" is 3422 CF. Set outlet orrifice at 30" above bottom.

Chamber Model

HS75

Number of Chambers

55

Number of Endcaps

10

Stone Voids (porosity)

40%

Base of Stone Elevation

268.26

ft

Recommended Stone Below Chambers*

12

in.

Include perimeter stone?

Yes

Recommended Stone Above Chambers*

6

in.

Standard or metric?

Standard

Area of System** 2228 sq.ft

**Area must be greater than: 2034.57 sq.ft

*The minimum stone below and above the chambers to be determined by the design engineer.

System Height (Inches)	Incremental Single Chamber Storage (cu.ft)	Incremental Single End Cap Storage (cu.ft)	Incremental Total Chamber Storage (cu.ft)	Incremental Total End Cap Storage (cu.ft)	Incremental Stone Storage (cu.ft)	Incremental Chamber, End Cap, & Stone (cu.ft)	Cumulative Total Storage for System (cu.ft)	Cumulative System Storage (cu.ft)	Elevation (ft)
48	0.00	0.00	0.00	0.00	74.27	74.27	74.27	5,129.14	272.26
47	0.00	0.00	0.00	0.00	74.27	74.27	74.27	5,054.88	272.18
46	0.00	0.00	0.00	0.00	74.27	74.27	74.27	4,980.61	272.09
45	0.00	0.00	0.00	0.00	74.27	74.27	74.27	4,906.34	272.01
44	0.00	0.00	0.00	0.00	74.27	74.27	74.27	4,832.08	271.93
43	0.00	0.00	0.00	0.00	74.27	74.27	74.27	4,757.81	271.84
42	0.00	0.00	0.00	0.00	74.27	74.27	74.27	4,683.54	271.76
41	0.12	0.00	6.87	0.00	71.52	78.39	78.39	4,609.28	271.68
40	0.30	0.00	16.54	0.04	67.64	84.21	84.21	4,530.89	271.59
39	0.62	0.03	33.90	0.25	60.61	94.76	94.76	4,446.67	271.51
38	0.85	0.05	46.84	0.47	55.34	102.65	102.65	4,351.92	271.43
37	1.01	0.07	55.64	0.68	51.74	108.05	108.05	4,249.26	271.34
36	1.14	0.09	62.61	0.87	48.88	112.35	112.35	4,141.21	271.26
35	1.24	0.10	68.40	1.05	46.49	115.94	115.94	4,028.85	271.18
34	1.33	0.12	73.32	1.22	44.45	118.99	118.99	3,912.92	271.09
33	1.41	0.14	77.59	1.38	42.68	121.65	121.65	3,793.93	271.01
32	1.48	0.15	81.47	1.53	41.07	124.06	124.06	3,672.28	270.93
31	1.55	0.17	85.08	1.67	39.57	126.32	126.32	3,548.21	270.84
30	1.61	0.18	88.45	1.81	38.16	128.42	128.42	3,421.90	270.76
29	1.67	0.19	91.59	1.95	36.85	130.39	130.39	3,293.47	270.68
28	1.72	0.21	94.52	2.07	35.63	132.22	132.22	3,163.08	270.59
27	1.77	0.22	97.25	2.20	34.49	133.93	133.93	3,030.86	270.51
26	1.81	0.23	99.78	2.31	33.43	135.52	135.52	2,896.93	270.43
25	1.85	0.24	102.01	2.42	32.50	136.92	136.92	2,761.40	270.34
24	1.90	0.25	104.34	2.53	31.52	138.39	138.39	2,624.48	270.26
23	1.93	0.26	106.42	2.63	30.65	139.69	139.69	2,486.09	270.18
22	1.97	0.27	108.37	2.72	29.83	140.92	140.92	2,346.40	270.09
21	2.00	0.28	110.19	2.81	29.07	142.07	142.07	2,205.48	270.01
20	2.03	0.29	111.90	2.89	28.35	143.14	143.14	2,063.41	269.93
19	2.06	0.30	113.52	2.97	27.67	144.16	144.16	1,920.27	269.84
18	2.09	0.30	115.09	3.04	27.02	145.14	145.14	1,776.11	269.76
17	2.12	0.31	116.66	3.10	26.36	146.13	146.13	1,630.97	269.68
16	2.15	0.32	118.19	3.16	25.72	147.08	147.08	1,484.84	269.59
15	2.18	0.32	119.65	3.22	25.12	147.98	147.98	1,337.76	269.51
14	2.20	0.33	121.06	3.27	24.54	148.86	148.86	1,189.78	269.43
13	2.23	0.33	122.44	3.31	23.97	149.72	149.72	1,040.92	269.34
12	0.00	0.00	0.00	0.00	74.27	74.27	74.27	891.20	269.26
11	0.00	0.00	0.00	0.00	74.27	74.27	74.27	816.93	269.18
10	0.00	0.00	0.00	0.00	74.27	74.27	74.27	742.67	269.09
9	0.00	0.00	0.00	0.00	74.27	74.27	74.27	668.40	269.01
8	0.00	0.00	0.00	0.00	74.27	74.27	74.27	594.13	268.93
7	0.00	0.00	0.00	0.00	74.27	74.27	74.27	519.87	268.84
6	0.00	0.00	0.00	0.00	74.27	74.27	74.27	445.60	268.76
5	0.00	0.00	0.00	0.00	74.27	74.27	74.27	371.33	268.68
4	0.00	0.00	0.00	0.00	74.27	74.27	74.27	297.07	268.59
3	0.00	0.00	0.00	0.00	74.27	74.27	74.27	222.80	268.51
2	0.00	0.00	0.00	0.00	74.27	74.27	74.27	148.53	268.43
1	0.00	0.00	0.00	0.00	74.27	74.27	74.27	74.27	268.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	268.26

3,422 CF

Note: The capacity of the (55) StormTech Chambers for TCM 2 is set 30" above the bottom per calculated design capacity (3,422 CF) on the previous page.

DMA 1 Hydromodification

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre
B,Grass,Flat(0-5%) 2.55

Pervious Total 2.55

Impervious Land Use acre
Roof Area 0.13

Impervious Total 0.13

Basin Total 2.68

Element Flows To:
Surface Interflow Groundwater

Mitigated Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre
B,Grass,Flat(0-5%) 0.75

Pervious Total 0.75

Impervious Land Use acre
Roads,Flat(0-5%) 0.57
Roof Area 0.85
Driveways,Flat(0-5%) 0.21
Sidewalks,Flat(0-5%) 0.3

Impervious Total 1.93

Basin Total 2.68

Element Flows To:

Surface	Interflow	Groundwater
StormTech 1	StormTech 1	

Mitigated Routing

StormTech 1

Chamber Model: 740
 Dimensions
 Max Row Length: 180
 Number of Chambers: 48
 Number of Endcaps: 4
 Top Stone Depth: 6
 Bottom Stone Depth: 12
 Infiltration On
 Infiltration rate: 12
 Infiltration safety factor: 2
 Wetted surface area On
 Total Volume Infiltrated (ac-ft.): 114.48
 Total Volume Through Riser (ac-ft.): 0.939
 Total Volume Through Facility (ac-ft.): 0
 Percent Infiltrated: 99.19
 Total Precip Applied to Facility: 0
 Total Evap From Facility: 0
 Discharge Structure
 Riser Height: 0 ft.
 Riser Diameter: 0 in.
 Orifice 1 Diameter: 12 in. Elevation: 2.42 ft.
 Element Flows To:
 Outlet 1 Outlet 2

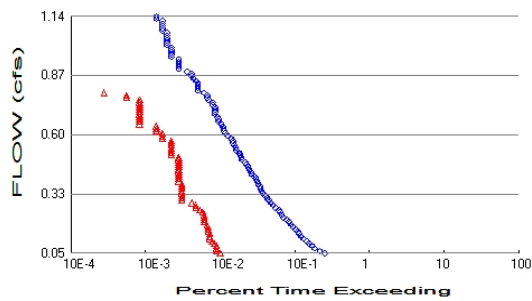
StormTech Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.037	0.000	0.000	0.000
0.0833	0.037	0.001	0.000	0.901
0.1667	0.037	0.002	0.000	0.901
0.2500	0.037	0.003	0.000	0.901
0.3333	0.037	0.005	0.000	0.901
0.4167	0.037	0.006	0.000	0.901
0.5000	0.037	0.007	0.000	0.901
0.5833	0.037	0.008	0.000	0.901
0.6667	0.037	0.010	0.000	0.901
0.7500	0.037	0.011	0.000	0.901
0.8333	0.037	0.012	0.000	0.901
0.9167	0.037	0.013	0.000	0.901
1.0000	0.037	0.014	0.000	0.901
1.0833	0.037	0.017	0.000	0.901
1.1667	0.037	0.020	0.000	0.000
1.2500	0.037	0.023	0.000	0.000
1.3333	0.037	0.025	0.000	0.000
1.4167	0.037	0.028	0.000	0.000
1.5000	0.037	0.031	0.000	0.000
1.5833	0.037	0.033	0.000	0.000
1.6667	0.037	0.036	0.000	0.000
1.7500	0.037	0.038	0.000	0.000
1.8333	0.037	0.041	0.000	0.000
1.9167	0.037	0.043	0.000	0.000
2.0000	0.037	0.046	0.000	0.000
2.0833	0.037	0.048	0.000	0.000

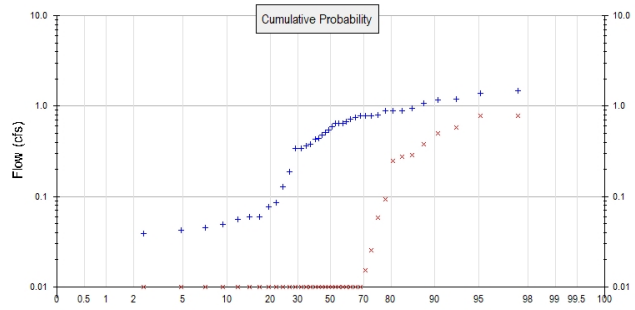
2.1667	0.037	0.051	0.000	0.000
2.2500	0.037	0.053	0.000	0.000
2.3333	0.037	0.056	0.000	0.000
2.4167	0.037	0.058	0.000	0.000
2.5000	0.037	0.060	1.105	0.000
2.5833	0.037	0.062	1.579	0.000
2.6667	0.037	0.065	1.940	0.000
2.7500	0.037	0.067	2.244	0.000
2.8333	0.037	0.069	2.512	0.000
2.9167	0.037	0.071	2.753	0.000
3.0000	0.037	0.073	2.976	0.000
3.0833	0.037	0.075	3.182	0.000
3.1667	0.037	0.076	3.376	0.000
3.2500	0.037	0.078	3.560	0.000
3.3333	0.037	0.079	3.734	0.000
3.4167	0.037	0.081	3.901	0.000
3.5000	0.037	0.082	4.061	0.000
3.5833	0.037	0.083	4.214	0.000
3.6667	0.037	0.085	4.363	0.000
3.7500	0.037	0.086	4.506	0.000
3.8333	0.037	0.087	4.645	0.000
3.9167	0.037	0.088	4.780	0.000
4.0000	0.037	0.090	4.911	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated



Predeveloped Landuse Totals for POC #1

Total Pervious Area: 2.55
Total Impervious Area: 0.13

Mitigated Landuse Totals for POC #1

Total Pervious Area: 0.75
Total Impervious Area: 1.93

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.540382
5 year	0.881051
10 year	1.138443
25 year	1.410737

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0.182262
10 year	0.470326
25 year	0.783191

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1960	0.129	0.000
1961	0.042	0.000
1962	0.589	0.000
1963	0.896	0.015
1964	0.787	0.380
1965	0.338	0.000
1966	0.036	0.000
1967	0.778	0.058
1968	1.392	0.788
1969	0.726	0.000
1970	0.796	0.000
1971	0.640	0.000
1972	0.049	0.000
1973	0.652	0.250

1974	0.652	0.000
1975	0.507	0.000
1976	0.059	0.000
1977	0.059	0.000
1978	0.540	0.000
1979	0.429	0.000
1980	1.161	0.499
1981	0.045	0.000
1982	1.202	0.577
1983	1.066	0.276
1984	0.365	0.000
1985	0.382	0.092
1986	0.942	0.287
1987	0.039	0.000
1988	0.440	0.000
1989	0.055	0.000
1990	0.076	0.000
1991	0.339	0.000
1992	0.880	0.026
1993	0.786	0.000
1994	0.086	0.000
1995	0.882	0.000
1996	1.491	0.782
1997	0.746	0.000
1998	0.676	0.000
1999	0.188	0.000
2000	0.479	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.4912	0.7879
2	1.3918	0.7821
3	1.2015	0.5772
4	1.1612	0.4985
5	1.0656	0.3801
6	0.9416	0.2872
7	0.8961	0.2761
8	0.8817	0.2499
9	0.8802	0.0921
10	0.7963	0.0582
11	0.7871	0.0257
12	0.7857	0.0151
13	0.7782	0.0000
14	0.7461	0.0000
15	0.7257	0.0000
16	0.6756	0.0000
17	0.6524	0.0000
18	0.6522	0.0000
19	0.6398	0.0000
20	0.5893	0.0000
21	0.5404	0.0000
22	0.5071	0.0000
23	0.4788	0.0000
24	0.4395	0.0000
25	0.4286	0.0000
26	0.3816	0.0000
27	0.3655	0.0000

28	0.3390	0.0000
29	0.3378	0.0000
30	0.1879	0.0000
31	0.1291	0.0000
32	0.0863	0.0000
33	0.0762	0.0000
34	0.0595	0.0000
35	0.0590	0.0000
36	0.0553	0.0000
37	0.0493	0.0000
38	0.0454	0.0000
39	0.0420	0.0000
40	0.0386	0.0000
41	0.0363	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0540	906	36	3	Pass
0.0650	781	32	4	Pass
0.0759	669	32	4	Pass
0.0869	611	32	5	Pass
0.0979	561	30	5	Pass
0.1088	524	28	5	Pass
0.1198	473	26	5	Pass
0.1307	439	26	5	Pass
0.1417	412	26	6	Pass
0.1526	394	25	6	Pass
0.1636	369	25	6	Pass
0.1745	339	25	7	Pass
0.1855	321	24	7	Pass
0.1964	299	22	7	Pass
0.2074	278	22	7	Pass
0.2183	255	22	8	Pass
0.2293	240	22	9	Pass
0.2402	230	21	9	Pass
0.2512	218	19	8	Pass
0.2622	199	17	8	Pass
0.2731	185	17	9	Pass
0.2841	172	15	8	Pass
0.2950	161	11	6	Pass
0.3060	154	11	7	Pass
0.3169	147	11	7	Pass
0.3279	134	11	8	Pass
0.3388	129	11	8	Pass
0.3498	124	11	8	Pass
0.3607	122	11	9	Pass
0.3717	116	11	9	Pass
0.3826	113	10	8	Pass
0.3936	108	10	9	Pass
0.4046	102	10	9	Pass
0.4155	94	10	10	Pass
0.4265	92	10	10	Pass
0.4374	88	10	11	Pass
0.4484	85	10	11	Pass
0.4593	81	10	12	Pass
0.4703	78	10	12	Pass
0.4812	71	10	14	Pass
0.4922	69	10	14	Pass
0.5031	67	8	11	Pass
0.5141	65	8	12	Pass
0.5250	59	8	13	Pass
0.5360	58	8	13	Pass
0.5469	55	8	14	Pass
0.5579	54	8	14	Pass
0.5689	53	8	15	Pass
0.5798	51	6	11	Pass
0.5908	46	6	13	Pass
0.6017	42	6	14	Pass
0.6127	41	5	12	Pass
0.6236	40	5	12	Pass

0.6346	39	5	12	Pass
0.6455	37	3	8	Pass
0.6565	34	3	8	Pass
0.6674	34	3	8	Pass
0.6784	33	3	9	Pass
0.6893	31	3	9	Pass
0.7003	31	3	9	Pass
0.7113	31	3	9	Pass
0.7222	31	3	9	Pass
0.7332	29	3	10	Pass
0.7441	29	3	10	Pass
0.7551	25	3	12	Pass
0.7660	24	2	8	Pass
0.7770	24	2	8	Pass
0.7879	22	1	4	Pass
0.7989	18	0	0	Pass
0.8098	18	0	0	Pass
0.8208	18	0	0	Pass
0.8317	18	0	0	Pass
0.8427	17	0	0	Pass
0.8536	16	0	0	Pass
0.8646	15	0	0	Pass
0.8756	15	0	0	Pass
0.8865	13	0	0	Pass
0.8975	10	0	0	Pass
0.9084	10	0	0	Pass
0.9194	10	0	0	Pass
0.9303	10	0	0	Pass
0.9413	10	0	0	Pass
0.9522	8	0	0	Pass
0.9632	8	0	0	Pass
0.9741	8	0	0	Pass
0.9851	8	0	0	Pass
0.9960	8	0	0	Pass
1.0070	7	0	0	Pass
1.0180	7	0	0	Pass
1.0289	7	0	0	Pass
1.0399	7	0	0	Pass
1.0508	7	0	0	Pass
1.0618	7	0	0	Pass
1.0727	6	0	0	Pass
1.0837	6	0	0	Pass
1.0946	6	0	0	Pass
1.1056	6	0	0	Pass
1.1165	6	0	0	Pass
1.1275	5	0	0	Pass
1.1384	5	0	0	Pass

DMA 2 Hydromodification

Basin 2

Bypass: No

GroundWater: No

Pervious Land Use acre
B,Grass,Flat(0-5%) 3.77

Pervious Total 3.77

Impervious Land Use acre
Roof Area 0.19

Impervious Total 0.19

Basin Total 3.96

Element Flows To:		
Surface	Interflow	Groundwater

Basin 2

Bypass: No

GroundWater: No

Pervious Land Use acre
B,Grass,Flat(0-5%) 0.84

Pervious Total 0.84

Impervious Land Use acre
Roads,Flat(0-5%) 0.93
Roof Area 1.32
Driveways,Flat(0-5%) 0.2
Sidewalks,Flat(0-5%) 0.67

Impervious Total 3.12

Basin Total 3.96

Element Flows To:

Surface	Interflow	Groundwater
StormTech 2	StormTech 2	

StormTech 2

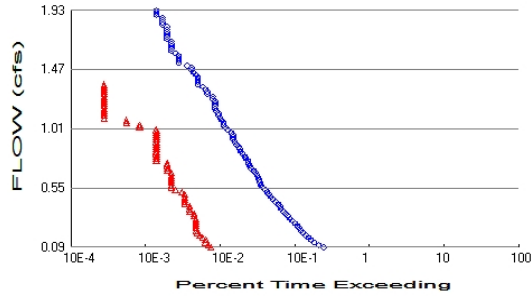
Chamber Model: 740
 Dimensions
 Max Row Length: 86
 Number of Chambers: 55
 Number of Endcaps: 10
 Top Stone Depth: 6
 Bottom Stone Depth: 12
 Infiltration On
 Infiltration rate: 21.6
 Infiltration safety factor: 2
 Wetted surface area On
 Total Volume Infiltrated (ac-ft.): 196.11
 Total Volume Through Riser (ac-ft.): 1.125
 Total Volume Through Facility (ac-ft.): 0
 Percent Infiltrated: 99.43
 Total Precip Applied to Facility: 0
 Total Evap From Facility: 0
 Discharge Structure
 Riser Height: 0 ft.
 Riser Diameter: 0 in.
 Orifice 1 Diameter: 15 in. Elevation: 2.5 ft.
 Element Flows To:
 Outlet 1 Outlet 2

StormTech Hydraulic Table

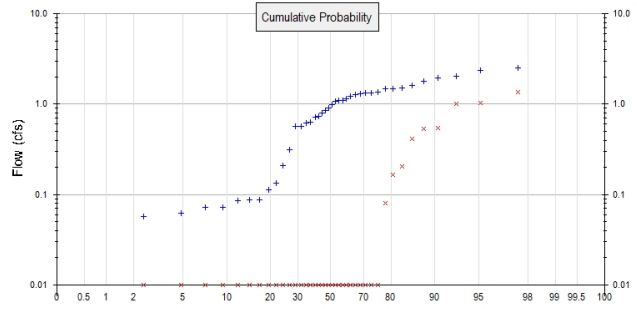
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.042	0.000	0.000	0.000
0.0833	0.042	0.001	0.000	1.859
0.1667	0.042	0.002	0.000	1.859
0.2500	0.042	0.004	0.000	1.859
0.3333	0.042	0.005	0.000	1.859
0.4167	0.042	0.007	0.000	1.859
0.5000	0.042	0.008	0.000	1.859
0.5833	0.042	0.010	0.000	1.859
0.6667	0.042	0.011	0.000	1.859
0.7500	0.042	0.012	0.000	1.859
0.8333	0.042	0.014	0.000	1.859
0.9167	0.042	0.015	0.000	1.859
1.0000	0.042	0.017	0.000	1.859
1.0833	0.042	0.020	0.000	1.859
1.1667	0.042	0.023	0.000	0.000
1.2500	0.042	0.026	0.000	0.000
1.3333	0.042	0.029	0.000	0.000
1.4167	0.042	0.032	0.000	0.000
1.5000	0.042	0.035	0.000	0.000
1.5833	0.042	0.038	0.000	0.000
1.6667	0.042	0.041	0.000	0.000
1.7500	0.042	0.044	0.000	0.000
1.8333	0.042	0.047	0.000	0.000
1.9167	0.042	0.050	0.000	0.000
2.0000	0.042	0.053	0.000	0.000
2.0833	0.042	0.055	0.000	0.000
2.1667	0.042	0.058	0.000	0.000
2.2500	0.042	0.061	0.000	0.000

2.3333	0.042	0.064	0.000	0.000
2.4167	0.042	0.066	0.000	0.000
2.5000	0.042	0.069	0.000	0.000
2.5833	0.042	0.072	1.762	0.000
2.6667	0.042	0.074	2.492	0.000
2.7500	0.042	0.077	3.052	0.000
2.8333	0.042	0.079	3.525	0.000
2.9167	0.042	0.081	3.941	0.000
3.0000	0.042	0.083	4.317	0.000
3.0833	0.042	0.086	4.663	0.000
3.1667	0.042	0.088	4.985	0.000
3.2500	0.042	0.090	5.287	0.000
3.3333	0.042	0.091	5.573	0.000
3.4167	0.042	0.093	5.845	0.000
3.5000	0.042	0.094	6.105	0.000
3.5833	0.042	0.096	6.355	0.000
3.6667	0.042	0.097	6.595	0.000
3.7500	0.042	0.098	6.826	0.000
3.8333	0.042	0.100	7.050	0.000
3.9167	0.042	0.101	7.267	0.000
4.0000	0.042	0.103	7.478	0.000

POC 2



+ Predeveloped x Mitigated



Predeveloped Landuse Totals for POC #2

Total Pervious Area: 3.77
Total Impervious Area: 0.19

Mitigated Landuse Totals for POC #2

Total Pervious Area: 0.84
Total Impervious Area: 3.12

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	Flow(cfs)
2 year	0.913982
5 year	1.493429
10 year	1.931069
25 year	2.390915

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	Flow(cfs)
2 year	0
5 year	0.128783
10 year	0.540617
25 year	1.102245

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	Predeveloped	Mitigated
1960	0.210	0.000
1961	0.062	0.000
1962	0.995	0.000
1963	1.517	0.000
1964	1.330	0.417
1965	0.567	0.000
1966	0.053	0.000
1967	1.315	0.000
1968	2.360	1.039
1969	1.229	0.000
1970	1.346	0.000
1971	1.081	0.000
1972	0.073	0.000
1973	1.097	0.165
1974	1.104	0.000

1975	0.850	0.000
1976	0.087	0.000
1977	0.086	0.000
1978	0.914	0.000
1979	0.715	0.000
1980	1.970	0.543
1981	0.072	0.000
1982	2.033	1.020
1983	1.807	0.000
1984	0.613	0.000
1985	0.634	0.205
1986	1.595	0.534
1987	0.057	0.000
1988	0.739	0.000
1989	0.087	0.000
1990	0.112	0.000
1991	0.572	0.000
1992	1.490	0.081
1993	1.326	0.000
1994	0.134	0.000
1995	1.496	0.000
1996	2.524	1.369
1997	1.264	0.000
1998	1.140	0.000
1999	0.313	0.000
2000	0.805	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	2.5239	1.3692
2	2.3596	1.0394
3	2.0328	1.0199
4	1.9697	0.5425
5	1.8073	0.5344
6	1.5949	0.4167
7	1.5166	0.2045
8	1.4962	0.1650
9	1.4898	0.0805
10	1.3460	0.0000
11	1.3295	0.0000
12	1.3261	0.0000
13	1.3145	0.0000
14	1.2639	0.0000
15	1.2288	0.0000
16	1.1397	0.0000
17	1.1044	0.0000
18	1.0970	0.0000
19	1.0809	0.0000
20	0.9947	0.0000
21	0.9140	0.0000
22	0.8496	0.0000
23	0.8055	0.0000
24	0.7394	0.0000
25	0.7154	0.0000
26	0.6343	0.0000
27	0.6125	0.0000
28	0.5719	0.0000

29	0.5671	0.0000
30	0.3135	0.0000
31	0.2101	0.0000
32	0.1345	0.0000
33	0.1120	0.0000
34	0.0869	0.0000
35	0.0867	0.0000
36	0.0863	0.0000
37	0.0725	0.0000
38	0.0721	0.0000
39	0.0616	0.0000
40	0.0571	0.0000
41	0.0532	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0914	868	27	3	Pass
0.1100	751	25	3	Pass
0.1286	652	23	3	Pass
0.1471	592	23	3	Pass
0.1657	552	21	3	Pass
0.1843	510	19	3	Pass
0.2029	464	18	3	Pass
0.2215	431	17	3	Pass
0.2401	409	17	4	Pass
0.2586	390	17	4	Pass
0.2772	364	17	4	Pass
0.2958	334	17	5	Pass
0.3144	314	17	5	Pass
0.3330	293	16	5	Pass
0.3516	271	16	5	Pass
0.3701	251	14	5	Pass
0.3887	238	14	5	Pass
0.4073	230	14	6	Pass
0.4259	216	12	5	Pass
0.4445	198	12	6	Pass
0.4630	182	12	6	Pass
0.4816	172	12	6	Pass
0.5002	160	12	7	Pass
0.5188	153	11	7	Pass
0.5374	145	9	6	Pass
0.5560	132	8	6	Pass
0.5745	127	8	6	Pass
0.5931	122	8	6	Pass
0.6117	120	8	6	Pass
0.6303	116	8	6	Pass
0.6489	113	8	7	Pass
0.6675	107	8	7	Pass
0.6860	101	7	6	Pass
0.7046	93	7	7	Pass
0.7232	90	7	7	Pass
0.7418	86	7	8	Pass
0.7604	85	5	5	Pass
0.7790	80	5	6	Pass
0.7975	77	5	6	Pass
0.8161	72	5	6	Pass
0.8347	68	5	7	Pass
0.8533	66	5	7	Pass
0.8719	64	5	7	Pass
0.8904	59	5	8	Pass
0.9090	56	5	8	Pass
0.9276	54	5	9	Pass
0.9462	54	5	9	Pass
0.9648	53	5	9	Pass
0.9834	51	5	9	Pass
1.0019	46	5	10	Pass
1.0205	42	3	7	Pass
1.0391	40	3	7	Pass
1.0577	40	2	5	Pass

1.0763	38	2	5	Pass
1.0949	36	1	2	Pass
1.1134	34	1	2	Pass
1.1320	34	1	2	Pass
1.1506	32	1	3	Pass
1.1692	31	1	3	Pass
1.1878	31	1	3	Pass
1.2064	31	1	3	Pass
1.2249	31	1	3	Pass
1.2435	29	1	3	Pass
1.2621	29	1	3	Pass
1.2807	24	1	4	Pass
1.2993	24	1	4	Pass
1.3178	23	1	4	Pass
1.3364	21	1	4	Pass
1.3550	18	1	5	Pass
1.3736	18	0	0	Pass
1.3922	18	0	0	Pass
1.4108	18	0	0	Pass
1.4293	17	0	0	Pass
1.4479	16	0	0	Pass
1.4665	15	0	0	Pass
1.4851	15	0	0	Pass
1.5037	13	0	0	Pass
1.5223	10	0	0	Pass
1.5408	10	0	0	Pass
1.5594	10	0	0	Pass
1.5780	10	0	0	Pass
1.5966	9	0	0	Pass
1.6152	8	0	0	Pass
1.6337	8	0	0	Pass
1.6523	8	0	0	Pass
1.6709	8	0	0	Pass
1.6895	8	0	0	Pass
1.7081	7	0	0	Pass
1.7267	7	0	0	Pass
1.7452	7	0	0	Pass
1.7638	7	0	0	Pass
1.7824	7	0	0	Pass
1.8010	7	0	0	Pass
1.8196	6	0	0	Pass
1.8382	6	0	0	Pass
1.8567	6	0	0	Pass
1.8753	6	0	0	Pass
1.8939	5	0	0	Pass
1.9125	5	0	0	Pass
1.9311	5	0	0	Pass

Soils Report

GEOTECHNICAL INVESTIGATION
CAMDEN AVENUE RESIDENTIAL DEVELOPMENT
BLOSSOM HILL ROAD AND SINGLETREE WAY
SAN JOSE, CALIFORNIA

for
Mana Camden Fund, LLC
September 15, 2023

BGG Project No. G367.01

Via E-Mail

September 15, 2023
BGG Project No. G367.01

Scott Murray
Mana Camden Fund, LLC
5927 Balfour Court, Suite 208
Carlsbad, California 92008

Subject: **Geotechnical Investigation**
Camden Avenue Residential Development
Between Blossom Hill Road and Singletree Way
San Jose, California

Dear Mr. Murray:

Baez Geotechnical Group (BGG) has completed a geotechnical investigation for the design and construction of a proposed residential development at the subject site in San Jose, California. The irregular shaped site is located on the east side of Camden Avenue, north of Singletree Way, to the north and east of Beacon School, as shown on Plate 1, Vicinity Map. It is our understanding that the approximately 8.3-acre site will be developed with 105 new townhomes constructed within nineteen 3-unit buildings and twelve 4-unit buildings. The site is relatively flat, hence minor grading is anticipated.

PURPOSE AND SCOPE OF SERVICES

The purpose of our investigation was to evaluate the subject site with respect to soil and groundwater conditions, and to provide geotechnical recommendations for the design and construction of the proposed improvements. The scope of our services included a review of available geologic literature covering the site, field exploration, field percolation testing, laboratory testing, engineering analyses, and preparation of this report.

FIELD EXPLORATION, PERCOLATION TESTING, AND LABORATORY TESTING

FIELD EXPLORATION

Our field exploration was conducted on August 15, 2023, which consisted of drilling borings and excavating test pits in the locations shown on Plate 2, Site Plan. Four borings were drilled to depths of up to 21-feet below the ground surface (bgs) using a truck-mounted drill rig equipped with hollow stem augers. Materials encountered in the borings were visually classified in the field and logs were recorded. Driven Standard Penetration Test (SPT) and Modified California split spoon tube soil samples were obtained for laboratory testing. The borings were backfilled with grout upon completion, per local agency requirements. The boring logs, showing soil classifications and blow counts, are contained in Appendix A.

Three test pits were excavated to depths between 5-feet and 7-feet bgs using a subcompact excavator equipped with a 2-foot-wide bucket. Materials encountered in the test pits were visually classified in the field and logs were recorded. Bulk soil samples were obtained for laboratory testing and the test pits were then backfilled loosely and track-walked upon completion. The test pit logs showing descriptions of the materials encountered are contained in Appendix B.

FIELD PERCOLATION TESTING

Field percolation testing was performed in the bottom of five additional borings, BP1 through BP5, drilled to depths between 2-feet and 5-feet bgs near the locations of proposed bioretention areas. The locations of the field percolation tests are shown on Plate 2, Site Plan and logs for the percolation test borings are contained in Appendix A. Upon drilling to the testing depth, open-ended PVC pipes were placed in the boreholes, approximately 2-inches of clean pea gravel was placed in the bottom of the holes, and the bottoms of the holes were then saturated. Subsequently, an approximately two-foot-tall column of water was poured into the test pipes and the testing began. The time elapsed for the water level to drop in the pipes was monitored until stabilized rates were observed and recorded. The following is a summary of the stabilized percolation rates recorded for the soils encountered at the specified depths at each test location.

SUMMARY OF FIELD PERCOLATION RATES

Test Location and Depth (depth below ground surface)		Soil Type at Test Depth	Infiltration Rate (inches/hour)
BP1	2 feet	SC/GP – Clayey Sand with Gravel and Sandy Gravel with Clay	6.4
BP2	5 feet	GP/GC – Sandy Gravel with Clay and Clayey Gravel with Sand	21.6
BP3	5 feet	GP/GC – Sandy Gravel with Clay and Clayey Gravel with Sand	16.6
BP4	5 feet	GP/GC – Sandy Gravel with Clay and Clayey Gravel with Sand	12.0
BP5	2 feet	SC/GP – Clayey Sand with Gravel and Sandy Gravel with Clay	7.2

The project civil engineer or stormwater management system designer should determine the appropriate infiltration rate to be used for design purposes, based upon these test results. An appropriate safety factor should be applied to the field percolation rates.

LABORATORY TESTING

Laboratory testing was performed on selected samples obtained from our borings, including tests for sieve analysis, hydrometer, Atterberg Limits, consolidation/swell, direct shear, R-Value, and corrosion. Some of the laboratory test results are summarized below and within the boring and test pit logs, and the complete test results are contained in Appendix C.

A bulk sample containing soil obtained from TP1 between depths of 1-foot to 5-feet bgs was found to have a maximum dry density of 129.4 pcf, an optimum moisture content of 10.1 percent, and an R-Value of 61.

LABORATORY TEST RESULTS – SIEVE, HYDROMETER, ATTERBERG LIMITS

Location & Depth	% Gravel/Cobbles	% Sand	% Fines ⁽¹⁾	PI ⁽²⁾	LL ⁽³⁾
TP1: 1-5 feet	53	33	14	8	26
B2: 7.5-8.5 feet	61	31	8	11	30
B3: 15-16.5 feet	34	48	18	---	---
B4: 20-21.5 feet	49	39	12	---	---

⁽¹⁾ % Fines = % Passing No. 200 sieve, percentage of silt and clay sized particles

⁽²⁾ PI = Plasticity Index, ⁽³⁾ LL = Liquid Limit

The single-point consolidation/swell test consisted of loading a relatively undisturbed soil sample with an initial seating load approximately equivalent to the in-situ overburden pressure, then recording the amount of long-term consolidation/swell after adding a surcharge load of 1,500 psf and again after saturation.

LABORATORY TEST RESULTS – CONSOLIDATION/SWELL

Location and Depth	Soil Type	Percent Moisture In-situ / Saturation	Consolidation or Swell ⁽¹⁾	Consolidation or Swell ⁽²⁾
TP1: 1-5 feet Remolded to 90%	SC/GP – Clayey Sand with Gravel and Sandy Gravel with Clay	9.6% / 56%	-0.2%	-0.2%

⁽¹⁾ Consolidation or swell percent after adding surcharge load

⁽²⁾ Additional consolidation or swell after saturation

LABORATORY TEST RESULTS –DIRECT SHEAR

Location and Depth	Soil Type	Friction Angle	Cohesion
TP1: 1-5 feet Remolded to 90%	SC/GP – Clayey Sand with Gravel and Sandy Gravel with Clay	Peak: 29 degrees Residual: 30 degrees	Peak: 285 psf Residual: 140 psf
B3: 6.5-7.5 feet	GP/GC – Sandy Gravel with Clay and Clayey Gravel with Sand	Peak: 25 degrees Residual: 24 degrees	Peak: 1,161 psf Residual: 1,100 psf

A bulk sample containing soil from test pit TP1 between depths of 1 to 5-feet bgs was submitted to CERCO Analytical, a state-certified analytical laboratory, for corrosion testing. The corrosion test results and a brief evaluation are contained in Appendix D. The soil was found to be moderately corrosive to buried metals and not corrosive to concrete in contact with the ground. The corrosion test results should be forwarded to the civil, structural, and underground utility design engineers.

GEOTECHNICAL FINDINGS

SITE DESCRIPTION

The proposed residential development site is currently in use for recreational sports fields and school recreation areas, to the north and east of Beacon School. The portion of the site east of the school contains four baseball diamonds, a pitching mound area, and several storage buildings. The narrow portion of the site to the north of the school contains a batting cage and recreation areas for the school facility. Occasional small to medium trees line the edges of the site. The site is relatively flat with surface elevations varying between 271 and 278 feet above mean sea level (MSL).

SUBSURFACE CONDITIONS

The site is mantled by the Urban Land-Flaskan complex, according to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey. The upper 5-feet of these soils are reported to contain 22 to 92 percent passing the No. 4 sieve (contain 8 to 72 percent gravel), have 6 to 55 percent passing the No. 200 sieve (silt-sized and clay-sized particles), have a Liquid Limit between 24 and 51, and have a Plasticity Index between 9 and 25 (moderately expansive). These soils are classified in Hydrologic Group C with infiltration rates between 0.2 to 0.6 inches per hour.

The following is a general summary of the subsurface soil conditions encountered in our borings. More detailed descriptions are contained in the boring logs in Appendix A and the test pit logs in Appendix B.

- Upper 2 to 5-feet bgs – Dense clayey sand with gravel to sandy gravel with clay.
- Loose to medium dense undocumented fill was encountered in the northern portion of the site in boring B2 and test pit TP2.
- Between 2 to 5-feet bgs down to 21-feet bgs – very dense sandy gravel with clay to clayey gravel with sand, with cobbles up to 1-foot in diameter.
- The Mobile 53R drill rig equipped with hollow stem augers encountered refusal at a depth of about 20-feet bgs in the two deeper borings.

GROUNDWATER

According to the California Department of Water Resources (DWR) Water Data Library website, two groundwater monitoring wells are located within about ½-mile from the site. Groundwater levels reported for a well north of the site, which has a ground surface elevation of about 230-feet MSL, were more than 50-feet-deep prior to about 1970 and more than 25-feet-deep since circa 1970. A well northeast of the site which has a ground surface elevation of about 215-feet MSL had reported groundwater levels more than 15-feet-deep. The Camden residential development site is at approximately elevation 275-feet MSL and is located closer to the mountains to the south, whereas the reported nearby wells are in the lower alluvial basin north of the site. Hence, it is our opinion that groundwater levels at the Camden site are deeper than reported in these nearby wells.

Groundwater was not encountered in our deepest borings drilled to maximum depths of 20-feet and 21½-feet bgs (both borings met refusal). Numerous factors contribute to groundwater level fluctuations including precipitation, irrigation, and well pumping. A detailed evaluation of these and other factors, which may be responsible for groundwater fluctuations, was beyond the scope of this investigation.

RELEVANT GEOLOGIC HAZARDS

The site is located within a seismically active region and will experience seismic shaking from large earthquakes. According to the ASCE 7 Hazard Tool website (utilizing ASCE7-16), the site modified peak ground acceleration is 0.99g. Alternately, the site modified peak ground acceleration utilizing ASCE7-22 is 0.66g. The site is not located within a seismic hazard zone mapped for earthquake faults by the California Geological Survey. Hence, the likelihood for surface fault rupture to occur at the site is nil.

The site is not mapped to be in a California seismic hazard zone for liquefaction. Liquefaction is the temporary transformation of saturated, loose to medium dense, sandy and silty soils from a solid state to a liquid state due to strong ground shaking during a major earthquake. Groundwater was not encountered in our deepest boring at a depth 21½-feet bgs. It is our opinion that the potential for liquefaction induced differential ground settlement and/or lateral spreading to impact the proposed project are very low since the site is underlain by dense to very dense gravelly and cobbly soils and groundwater levels are relatively deep. The potential for seismically induced dry ground settlement caused by the consolidation of sandy soils above the water table is also low, due to the predominantly gravelly and clayey soils.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

We conclude, from a geotechnical engineering standpoint, that the proposed residential development can generally be constructed as planned, provided that the conclusions and recommendations contained in this report are incorporated into the project design and during construction. The predominant geotechnical consideration for this project is the presence of soils consisting of dense clayey gravels and sandy gravels with cobbles up to about 1-foot in diameter. This will impact excavations during mass grading, foundation construction, and underground utility installations, as follows:

- We are recommending Post-Tensioned (PT) Slab foundations rather than shallow foundations due to the difficulty for excavating neat foundation cuts in the gravelly and cobbly soils.
- The grading, foundation, and underground utility contractors should be made aware of gravelly and cobbly soil conditions. Cobbles up to about one foot in diameter were encountered in our test pits, which were excavated up to 7-feet-deep.
- Compacting gravelly and cobbly soil may require specifying a performance criteria for assessing compaction since laboratory maximum density test results will not be

representative of the oversized material characteristics. This will likely include determining the number of passes of a compactor required until field density tests show minimal increase in density with additional effort.

- Oversized material, if encountered during grading and utility excavations, will need to be buried in deeper fills or segregated to be used in landscape areas or offhauled.

SITE PREPARATION AND GRADING

Our general site preparation and grading recommendations are as follows:

1. Existing grass, weeds, trees, underground utilities, and structures should be removed. The excavations from the removal of tree roots, foundations, and underground utility lines will need to be backfilled with engineered fill.
2. Existing undocumented fill in the northern portion of the site will need to be removed and replaced with engineered fill.
3. Building pad and fill areas should be scarified to a depth of 1-foot and compacted as prescribed below.
4. Gravel and cobbles more than 4-inches in largest dimension should be buried in deeper fills in building pad areas, segregated to be utilized in landscape areas, or removed from the site.
5. If zones of soft or loose soil are encountered during grading or soil processing operations, additional overexcavation of the loose soils may be required to expose deeper, firm soils. This should be determined in the field by the soils engineer.
6. Engineered fill soils should be compacted to not less than 90 percent relative compaction at moisture contents a minimum of 3 percent over the optimum moisture.
7. A performance specification will need to be developed in the field to assess adequate compaction/processing for material with excessive gravel and cobble content.
8. Relative compaction refers to the in-place dry density of soil expressed as a percentage of its maximum dry density as determined by ASTM D1557 maximum density test procedure. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.
9. Fill should be properly moisture conditioned and placed in thin lifts (normally 6 to 8 inches, depending on the compaction equipment used) and compacted as prescribed above.
10. The onsite soils are generally suitable for use as engineered fill, provided they are free of debris, significant vegetation, rocks greater than 4 inches in largest dimension, and other deleterious matter. Debris, if encountered during grading, will need to be removed from the site.
11. Import fill, if required, should be subject to the evaluation of the soil engineer prior to its use. Import fill should have a Plasticity Index less than 12, contain no deleterious matter, and contain no rocks greater than 6 inches in largest dimension. Imported soil should be evaluated for potential environmental contamination prior to importing to the site.

12. Observation and soil density tests should be performed during site preparation and grading to assist the contractor in obtaining the required degree of compaction and proper moisture content. Where the compaction and moisture content are outside the range required, additional effort and adjustments to the moisture content should be made until the specified compaction and moisture conditioning is achieved.
13. The soil engineer should be notified at least 48 hours prior to the start of any grading operations. The procedure and methods of grading may then be discussed between the contractor and the soils engineer.

UTILITY TRENCH EXCAVATION AND BACKFILL

Excavations should conform to applicable State and Federal industrial safety requirements. Temporary trench sidewalls more than 4-feet deep may have to be laid back to 1H:1V or flatter to have stable sidewalls.

Materials quality, placement procedures, and compaction operations for utility line bedding and shading materials should meet local agency and/or other applicable agency requirements. Utility trench backfill above the shading materials may be comprised of the onsite soils, provided they are processed to remove gravel larger than 4-inches in largest dimension, rubbish, vegetation, and other undesirable substances. Backfill materials should be placed in level lifts about 8 to 10 inches in loose thickness, moisture conditioned, and mechanically compacted according to the requirements contained in the “Site Preparation and Grading” section.

The underground utility contractor should be made aware of the gravelly and cobbly soil conditions at the site. Gravel and cobbles up to 1-foot in diameter are present at the site. During construction, the gravel and cobble-sized particles may be susceptible to caving/falling from the excavation sidewalls.

CALIFORNIA BUILDING CODE (CBC) SEISMIC DESIGN PARAMETERS

The subject site is located at approximately 37.2352 degrees north latitude and -121.9016 degrees west longitude. The site is located in a deep alluvial valley; hence the structural engineer should utilize Site Class D – Stiff Soil for determining seismic response spectra parameters. According to the ASCE 7 Hazard Tool website (utilizing ASCE7-16), the site modified peak ground acceleration is 0.98g. Alternately, the site modified peak ground acceleration utilizing ASCE7-22 is 0.76g.

FOUNDATIONS

We recommend utilizing post-tensioned (PT) slab-on-grade foundations for the proposed townhome residences. The design criteria contained in the third edition of the PTI design manual was utilized to develop the following parameters.

PT SLAB DESIGN PARAMETERS

Allowable Bearing Capacity (may be increased by 1/3 for temporary seismic and wind loads, at the discretion of the structural engineer)	2,000 psf overall 2,500 psf isolated
Passive Equivalent Fluid Pressure (neglect the upper foot if the ground surface is not confined by slabs or pavement)	300 pcf
Base Friction Coefficient	0.30
<u>Edge Moisture Variation Distance</u> Center Lift Edge Lift	9.0 feet 5.5 feet
<u>Differential Swell</u> Center Lift Edge Lift	0.80 inches 1.20 inches

PT slab foundations can be constructed directly on properly prepared subgrade soils. The upper foot of the building pad subgrades should be presoaked to at least 3% over the optimum moisture content and the subgrade soils should not be permitted to dry out before placement of the vapor retarder. Where moisture vapor through the slabs would be objectionable, the use of a vapor retarder should be considered. From a geotechnical standpoint, we do not require a sand layer above the vapor retarder. Compacted subgrade soils may become disturbed during utility trench excavation and backfilling. Disturbed soils should be uniformly moisture conditioned and recompacted prior to concrete placement.

Site walls, landscape structures, and other minor structures can be supported on shallow strip and pedestal footings or drilled, reinforced concrete piers. The following are recommendations for these types of foundations.

SHALLOW STRIP AND ISOLATED PEDESTAL FOUNDATIONS

Allowable Bearing Capacity (DL + LL) (may be increased by one-third for temporary seismic and wind loads, at the discretion of the structural engineer)	2,500 psf
Allowable Passive Equivalent Fluid Pressure (neglect the upper foot if the ground surface is not confined by slabs or pavement)	300 pcf
Allowable Base Friction Coefficient	0.30
Minimum Footing Depth	2-feet

It is recommended that footing excavations be probed by the geotechnical engineer prior to the placement of reinforcing steel. Concrete for footings should be placed against undisturbed engineered fill or firm onsite soils.

The foundation contractor should be made aware of the gravelly and cobbly soil conditions at the site. Gravel and cobbles up to 1-foot in diameter are present at the site. During construction, the gravel and cobble-sized particles may be susceptible to caving/falling into foundation excavations.

DRILLED REINFORCED CONCRETE PIERS

Allowable Skin Friction Vertically Down, Ignore the upper foot	400 psf
Allowable Skin Friction Vertically Up, Ignore the upper foot	250 psf
Allowable Lateral Passive Resistance, equivalent fluid pressure Acting on 1.5 pier diameters, Ignore the upper 2-feet	300 pcf
Minimum Pier/Pile Diameter	12 inches

The bottoms of drilled pier holes should be cleaned to remove loose soil, gravel, cobbles, and slough prior to placing reinforcing steel and concrete.

EXTERIOR FLATWORK SUGGESTIONS

We suggest that exterior concrete flatwork, such as sidewalks, walkways, and patios, be at least 5-inches-thick and reinforced with reinforcing bars. Driveways and drive aisles should be at least 6-inches-thick and reinforced. Where possible, flatwork should be doweled into adjacent flatwork and driveways to reduce the potential for differential vertical movement caused by the expansive soils. The flatwork section can be constructed directly on properly prepared subgrade soils that have been presoaked to at least 3% over the optimum moisture content, compacted, and rolled smooth. The subgrade soil should be maintained in a saturated condition and should not be permitted to dry out prior to concrete placement.

RETAINING WALLS

The following lateral pressures should be utilized in the design for retaining walls. The recommended lateral pressures assume drained conditions and that retaining walls will have drainage. Exterior retaining walls less than 2-feet-tall do not require drainage.

Active Equivalent Fluid Pressure (Level backfill and drained conditions)	35 pcf
At-Rest Equivalent Fluid Pressure (Level backfill and drained conditions)	55 pcf
Surcharge Load, where applicable	Designated by structural engineer

PAVEMENT RECOMMENDATIONS

We are providing recommendations for structural pavement sections that will be supported by the onsite soils. Our pavement analyses are based upon an R-Value of 30 using the Caltrans Design Method for Flexible Pavement for a 20-year design life. The following are our recommendations

for Asphalt Concrete (AC) pavement sections along with their corresponding traffic indices (TI), which are indications of load frequency and intensity.

AC PAVEMENT SECTIONS

Traffic Index	AC (in)	Class 2 AB (in)	Total (in)
TI=4.5	3	4	7
TI=5	3	5	8
TI=6	3	8	11
TI=7	4	9	13

The upper foot of the subgrade soils in pavement areas should be compacted to at least 95 percent relative compaction and rolled to provide a smooth and unyielding surface. Class 2 aggregate base (AB) should also be compacted to at least 95 percent relative compaction in pavement areas.

ADDITIONAL SOIL ENGINEERING SERVICES

To a degree, the performance of the proposed project is dependent on the procedures and quality of the construction. Therefore, we should provide observation of the contractor's procedures and the exposed soil conditions, and field and laboratory testing during site clearing, mass grading, building pad preparation, placement and compaction of fill, underground utility and retaining wall backfilling, and foundation and pavement construction. These observations will allow us to check the contractor's work for conformance with the intent of our recommendations and to observe any unanticipated soil conditions that could require modification of our recommendations. In addition, we would welcome the opportunity to meet with the contractor prior to the start of earthwork operations to discuss the procedures and methods of construction. This can facilitate the performance of the construction operations and minimize possible misunderstanding and construction delays.

LIMITATIONS

The conclusions and recommendations contained in this report are based upon the information provided to us regarding the proposed site improvements, subsurface conditions encountered in our field explorations, laboratory testing, and professional judgment. This study has been conducted in accordance with current professional geotechnical engineering standards; no other warranty is expressed or implied.

If changes are planned or implemented regarding the nature, design, and/or location of the proposed improvements, or if it is found during construction that subsurface conditions differ from those described in this report, then the conclusions and recommendations in this report shall be considered invalid, unless the changes are reviewed, and the conclusions and recommendations are modified or approved in writing.

Should you have questions or need additional information, please contact us. We appreciate the opportunity to provide professional services to you and to be involved in the design for the Camden residential development project.

Respectfully Submitted,

BAEZ GEOTECHNICAL GROUP



Stefanie Parman-Ribeiro
Project Engineer



William R. Stevens
Principal Engineer
GE 2339

Attachments:

Plate 1 – Vicinity Map

Plate 2 – Site Plan

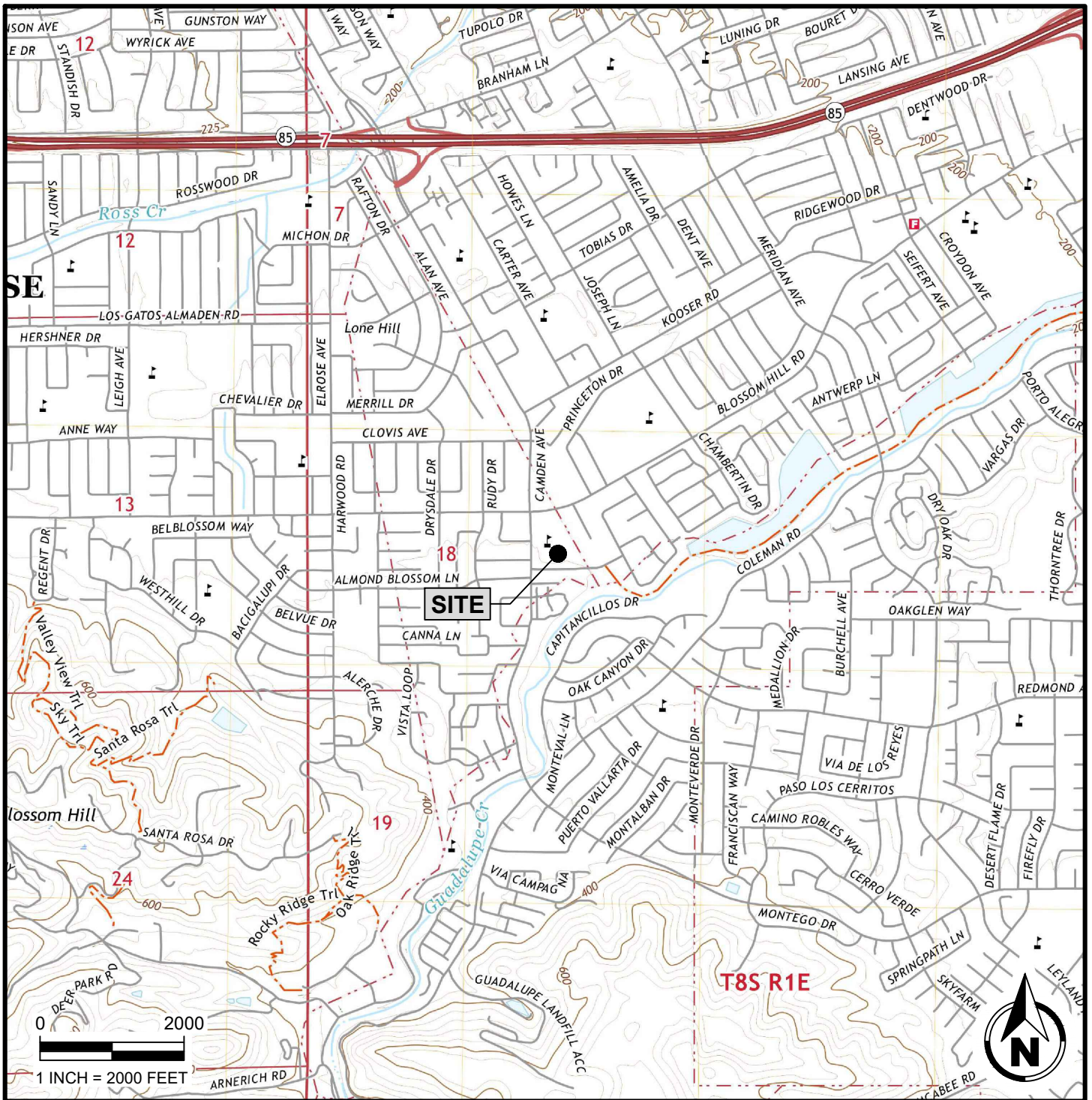
Appendix A – Boring Logs

Appendix B – Test Pit Logs

Appendix C – Geotechnical Laboratory Test Results

Appendix D – CERCO Analytical Corrosion Test Results

E://1-BGG/G367-Camden Ave/Report/GI G367 Manna Camden.docx



BASE: PORTION OF U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, SAN JOSE WEST, CALIFORNIA, PHOTOREVISED 2021, AT A SCALE OF 1:24,000.

VICINITY MAP

CAMDEN AVENUE TOWNHOMES

5670 CAMDEN AVENUE
SAN JOSE, CALIFORNIA

FOR
MANA CAMDEN FUND, LLC



BASE: GOOGLE EARTH IMAGE 5/13/2023 AND DRAWINGS FROM HANNA-BRUNETTI DETAILS



EXPLANATION:

- B4 APPROXIMATE BORING LOCATION
- BP5 PERCOLATION TEST LOCATION
- TP3 APPROXIMATE TEST PIT LOCATION

SITE PLAN CAMDEN AVENUE TOWNHOMES

5670 CAMDEN AVENUE
SAN JOSE, CALIFORNIA
FOR
MANA CAMDEN FUND, LLC

APPENDIX A

Boring Logs



BAEZ GEOTECHNICAL GROUP

BORING NUMBER: B1

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 278 feet above mean sea level (MSL)
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size	278	0						
					42				
		273	5		47				
GP/ GC	SANDY GRAVEL with CLAY and SILT to CLAYEY GRAVEL with SAND and SILT, tan to medium brown with light tan mottling, moist, very dense, subrounded gravel up to 1½-inch size								
					55				
		268	10						
	Bottom of Boring at 10 feet bgs. Groundwater was not encountered.								
		263	15						
		258	20						

BORING NUMBER: B2

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 275 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, very moist to wet, loose to medium dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size [FILL] at 2½ feet, 2-inch-diameter irrigation line encountered	275	0						
					10				
GP/ GC	SANDY GRAVEL with CLAY and SILT to CLAYEY GRAVEL with SAND and SILT, tan to medium brown with light tan mottling, slightly moist to moist, medium dense to very dense, subrounded gravel up to 1½-inch size (61% gravel, 31% sand, 8% silt/clay fines)	270	5		27				
					52			11	8
		265	10		67				
	Bottom of Boring at 11 feet bgs. Groundwater was not encountered.								
		260	15						
		255	20						

BORING NUMBER: B3

PAGE 1 OF 2

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 272 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GC	CLAYEY SAND with GRAVEL to CLAYEY GRAVEL with SAND and SILT, tan to medium brown, dry to slightly moist, dense, subrounded gravel up to 1½-inch size	272	0						
GP/ GC	SANDY GRAVEL with CLAY and SILT to CLAYEY GRAVEL with SAND and SILT, tan to medium brown with light tan mottling, slightly moist to moist, medium dense to very dense, subrounded gravel up to 1½-inch size	267	5		36				
	(c = 1,161 psf peak and 1,100 40 psf residual) (φ = 25 degrees peak, φ = 24 degrees residual)				48	116	4.8		
		262	10		65				
	from 15 to 15½ feet, very moist to moist (34% gravel, 48% sand, 18% silt/clay fines)	257	15		49				18
		252	20						

Boring met practical refusal at 20 feet bgs. Groundwater was not encountered.

BORING NUMBER: B4

PAGE 1 OF 2

PROJECT NAME: Camden Avenue Townhomes
 PROJECT NUMBER: G367.01
 DATE DRILLED: 08/15/2023
 DRILLING CONTRACTOR: Exploration Geoservices
 DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
 LOGGED BY: KR
 NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
 CLIENT: Mana Camden Fund, LLC
 GROUND ELEVATION: 271 feet MSL
 GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GC	CLAYEY SAND with GRAVEL to CLAYEY GRAVEL with SAND and SILT, tan to medium brown, dry to slightly moist, dense	271	0						
GP/ GC	SANDY GRAVEL with CLAY to CLAYEY GRAVEL with SAND, tan to medium brown with light tan mottling, slightly moist to moist, medium dense to very dense, subrounded gravel up to 1½-inch size	266	5						
		261	10						
		256	15						
		251	20						

BORING NUMBER: B4

PAGE 2 OF 2

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 271 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:

 Standard Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SM	SANDY GRAVEL with CLAY to CLAYEY GRAVEL with SAND, tan to medium brown with dark brown mottling, slightly moist to moist, medium dense to very dense (49% gravel, 39% sand, 12% silt/clay fines)	251	20		54				12
	Boring met practical refusal at 21½ feet bgs. Groundwater was not encountered.								
		246	25						
		241	30						
		236	35						
		231	40						

BORING NUMBER: BP1

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 277 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size	277	0						
	Bottom of Boring at 2 feet bgs. Groundwater was not encountered.	272	5						
		267	10						
		262	15						
		257	20						

BORING NUMBER: BP2

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 274 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size	274	0						
GP/ GC	SANDY GRAVEL with CLAY and SILT to CLAYEY GRAVEL with SAND and SILT, tan to medium brown with light tan mottling, moist, very dense, subrounded gravel up to 1½-inch size	269	5						
	Bottom of Boring at 5 feet bgs. Groundwater was not encountered.	264	10						
		259	15						
		254	20						

BORING NUMBER: BP3

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 273 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size	273	0						
GP/ GC	SANDY GRAVEL with CLAY and SILT to CLAYEY GRAVEL with SAND and SILT, tan to medium brown with light tan mottling, moist, very dense, subrounded gravel up to 1½-inch size	268	5						
	Bottom of Boring at 5 feet bgs. Groundwater was not encountered.	263	10						
		258	15						
		253	20						

BORING NUMBER: BP4

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 276 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size	276	0						
GP/ GC	SANDY GRAVEL with CLAY and SILT to CLAYEY GRAVEL with SAND and SILT, tan to medium brown with light tan mottling, moist, very dense, subrounded gravel up to 1½-inch size	271	5						
	Bottom of Boring at 5 feet bgs. Groundwater was not encountered.	266	10						
		261	15						
		256	20						

BORING NUMBER: BP5

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE DRILLED: 08/15/2023
DRILLING CONTRACTOR: Exploration Geoservices
DRILLING METHOD: Mobile Drill 53R with Hollow Stem Auger
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 276 feet MSL
GROUNDWATER ELEVATION: Not Encountered

SAMPLER TYPE:



Modified California
Sampler



Standard
Penetration Test

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, dense, fine- to coarse-grained sand, subrounded gravel up to 1-inch size	276	0						
	Bottom of Boring at 2 feet bgs. Groundwater was not encountered.	271	5						
		266	10						
		261	15						
		256	20						

APPENDIX B

Test Pit Logs



BAEZ GEOTECHNICAL GROUP

TEST PIT NUMBER: TP1

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes

PROJECT LOCATION: 5670 Camden Avenue, San Jose

PROJECT NUMBER: G367.01

CLIENT: Mana Camden Fund, LLC

DATE EXCAVATED: 08/15/2023

GROUND ELEVATION: 275 feet above mean sea level (MSL)

EXCAVATION CONTRACTOR: Lion River Construction

GROUNDWATER: Groundwater not encountered

EXCAVATION METHOD: CAT 303.5E2

SAMPLER TYPE:

LOGGED BY: KR



Bulk Sample



Modified California Sampler

NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GP	CLAYEY SAND with GRAVEL to SANDY GRAVEL with CLAY, tan with mottled dark and medium brown, moist, medium dense to dense, fine- to coarse-grained sand, subrounded gravel up to 2-inch size	275	0						
GP/ GC	SANDY GRAVEL with CLAY to CLAYEY GRAVEL with SAND, tan to medium brown with dark brown mottling, moist, dense, rounded cobbles up to 12-inch size (53% gravel and cobbles, 33% sand, 14% silt/clay fines) (Sample remolded to 90% relative compaction: consolidated 0.2% upon loading to 1,500 psf and an additional 0.2% after saturation) (Sample remolded to 90% relative compaction: c = 286 psf peak, c = 140 psf residual, ϕ = 29 degrees peak, ϕ = 30 degrees residual)	270	5					8	14
	Bottom of Test Pit at 5 feet below ground surface (bgs). Groundwater was not encountered.	265	10						
		260	15						

TEST PIT NUMBER: TP2

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes

PROJECT LOCATION: 5670 Camden Avenue, San Jose

PROJECT NUMBER: G367.01

CLIENT: Mana Camden Fund, LLC

DATE EXCAVATED: 08/15/2023

GROUND ELEVATION: 271 feet MSL

EXCAVATION CONTRACTOR: Lion River Construction

GROUNDWATER: Groundwater not encountered

EXCAVATION METHOD: CAT 303.5E2

SAMPLER TYPE:

LOGGED BY: KR



Bulk Sample



Modified California
Sampler

NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
SC/ GC	CLAYEY SAND with GRAVEL to CLAYEY GRAVEL with SAND and SILT, tan to medium brown, dry to slightly moist, medium dense, angular gravel up to 1-inch size [FILL]	271	0						
GP/ GC	SANDY GRAVEL with CLAY to CLAYEY GRAVEL with SAND, tan to medium brown with dark brown mottling, moist, dense, rounded cobbles up to 12-inch size	266	5						
	Bottom of Test Pit at 7 feet bgs. Groundwater was not encountered.	261	10						
		256	15						

TEST PIT NUMBER: TP3

PAGE 1 OF 1

PROJECT NAME: Camden Avenue Townhomes
PROJECT NUMBER: G367.01
DATE EXCAVATED: 08/15/2023
EXCAVATION CONTRACTOR: Lion River Construction
EXCAVATION METHOD: CAT 303.5E2
LOGGED BY: KR
NOTES: Elevation from Site Plan by Hanna-Brunetti 6/27/23

PROJECT LOCATION: 5670 Camden Avenue, San Jose
CLIENT: Mana Camden Fund, LLC
GROUND ELEVATION: 272 feet MSL
GROUNDWATER: Groundwater not encountered

SAMPLER TYPE:



Bulk Sample



Modified California Sampler

USCS	MATERIAL DESCRIPTION	ELEVATION (feet)	DEPTH (feet)	SAMPLER	BLOW COUNT (blows/foot)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (%)	PLASTICITY INDEX	FINES CONTENT % PASSING #200
GP/ GC	SANDY GRAVEL with CLAY to CLAYEY GRAVEL with SAND, tan to medium brown with dark brown mottling, slightly moist to moist, dense, rounded cobbles up to 12-inch size Below 2 feet, moist	272	0						
		267	5						
	Bottom of Test Pit at 5 feet bgs. Groundwater was not encountered.	262	10						
		257	15						

APPENDIX C

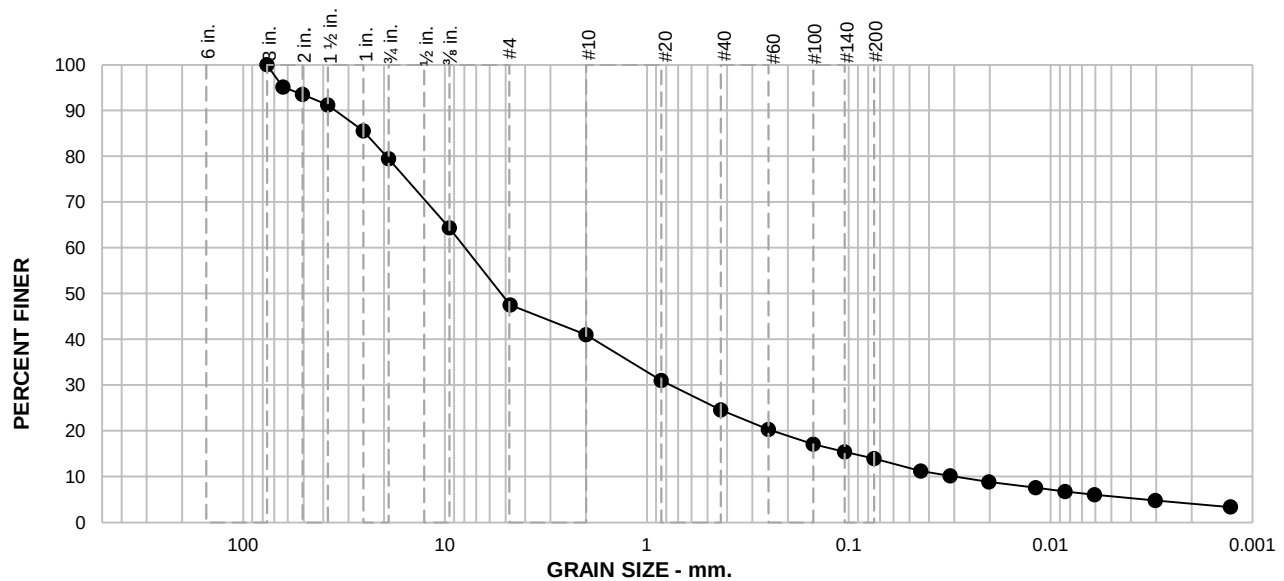
Geotechnical Laboratory Test Results



BAEZ GEOTECHNICAL GROUP

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D422



SAMPLE ID: TP1@1-5

DEPTH (ft): 1-5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	20.5	32.0	6.5	16.4	10.6	9.9	4.1
SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)	SOIL DESCRIPTION See exploration logs			
3 in.	100.0			ATTERBERG LIMITS PL = 18 LL = 26 PI = 8			
2.5 in.	95.1						
2 in.	93.5			COEFFICIENTS D ₉₀ = 34.9827 mm D ₈₅ = 24.7983 mm D ₆₀ = 7.9712 mm D ₅₀ = 5.2682 mm D ₃₀ = 0.7641 mm D ₁₅ = 0.0954 mm D ₁₀ = 0.0294 mm C _u = 270.81 C _c = 2.49			
1 1/2 in.	91.2						
1 in.	85.5			CLASSIFICATION USCS = GC			
3/4 in.	79.5						
3/8 in.	64.3			REMARKS Silt/clay division of 0.002mm used PI: ASTM D4318, Wet Method USCS: ASTM D2487			
#4	47.5						
#10	41.0						
#20	31.0						
#40	24.6						
#60	20.3						
#100	17.1						
#140	15.4						
#200	14.0						
0.0439 mm.	11.2						
0.0315 mm.	10.2						
0.0203 mm.	8.9						
0.0119 mm.	7.6						
0.0085 mm.	6.8						
0.0061 mm.	6.0						
0.0030 mm.	4.8						

* (no specification provided)

CLIENT: Baez Geotechnical Group, Inc.



PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

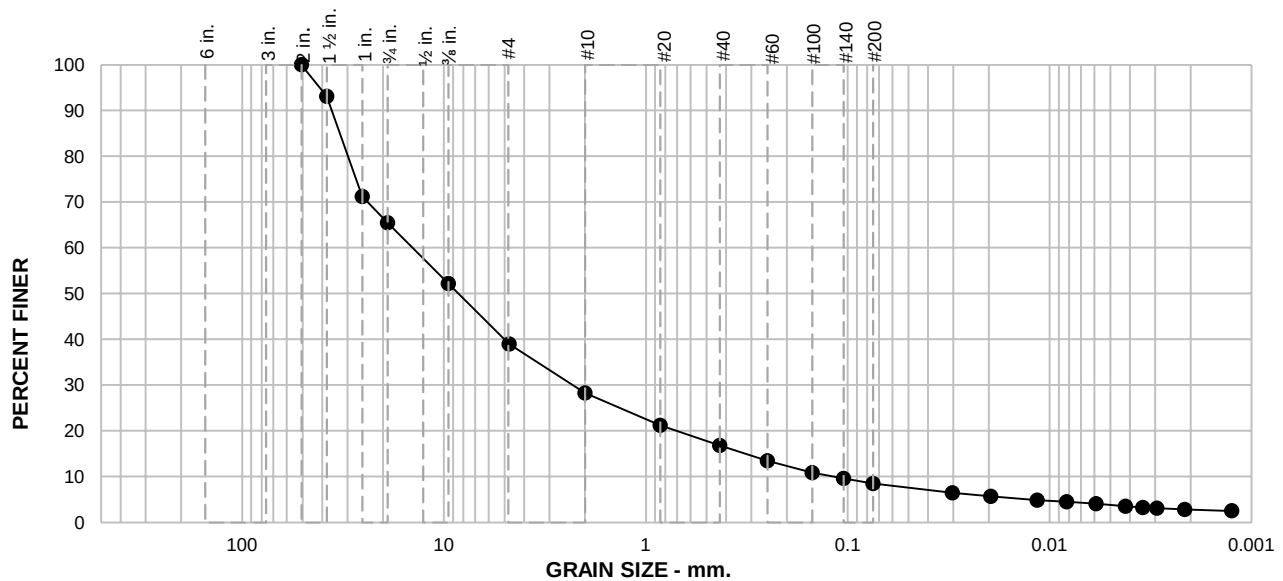
REPORT DATE: 9/1/2023

TESTED BY: L. Schmitz

REVIEWED BY: N. Broussard

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D422



SAMPLE ID: B2@7.5-8.5

DEPTH (ft): 7.5-8.5

LOCATION: B2

% +75mm		% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		35	26	11	11	9	5.0	3.0
SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)	SOIL DESCRIPTION See exploration logs				
2 in.	100			ATTERBERG LIMITS PL = 19 LL = 30 PI = 11				
1.5 in.	93							
1 in.	71							
0.75 in.	65			COEFFICIENTS D ₉₀ = 36.0506 mm D ₈₅ = 32.8770 mm D ₆₀ = 14.5920 mm D ₅₀ = 8.5581 mm D ₃₀ = 2.3406 mm D ₁₅ = 0.3279 mm D ₁₀ = 0.1050 mm C _u = 138.97 C _c = 3.58				
0.38 in.	52							
#4	39							
#10	28			CLASSIFICATION USCS = GP-GC				
#20	21							
#40	17							
#60	13			REMARKS Silt/clay division of 0.002mm used PI: ASTM D4318, Wet Method				
#100	11							
#140	10							
#200	8							
0.0303 mm.	6.5							
0.0196 mm.	5.7							
0.0115 mm.	4.9							
0.0082 mm.	4.5							
0.0059 mm.	4.1							
0.0042 mm.	3.5							
0.0035 mm.	3.3							
0.0029 mm.	3.1							
0.0021 mm.	2.8							

* (no specification provided)

CLIENT: Baez Geotechnical Group, Inc.



PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

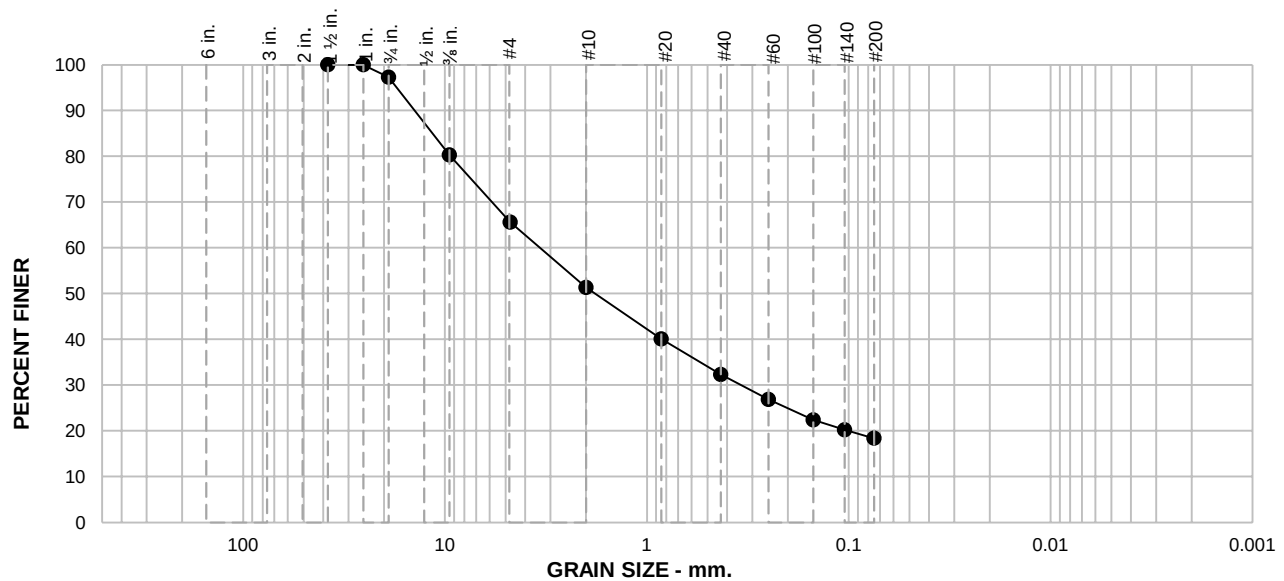
REPORT DATE: 8/24/2023

TESTED BY: K. Lecce

REVIEWED BY: J. Moriarty

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D6913, Method B



SAMPLE ID: B3@15-16.5

DEPTH (ft): 15-16.5

LOCATION: B3

% +75mm		% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		3	31	15	19	14	18	
SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)	SOIL DESCRIPTION				
				See exploration logs				
				ATTERBERG LIMITS				
				PL =		LL =		PI =
				COEFFICIENTS				
				D ₉₀ = 14.3199 mm		D ₈₅ = 11.6789 mm		D ₆₀ = 3.3607 mm
				D ₅₀ = 1.8503 mm		D ₃₀ = 0.3461 mm		D ₁₅ =
				D ₁₀ =		C _u =		C _c =
				CLASSIFICATION				
				USCS =				
REMARKS								

* (no specification provided)

CLIENT: Baez Geotechnical Group, Inc.



PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

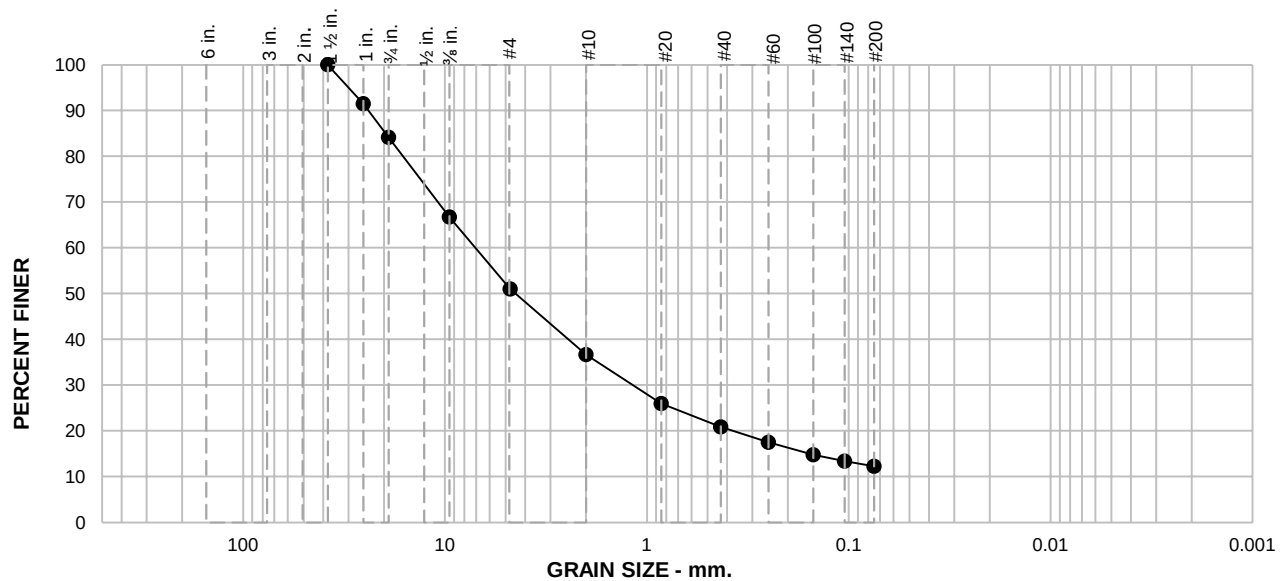
REPORT DATE: 8/24/2023

TESTED BY: K. Lecce

REVIEWED BY: J. Moriarty

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D6913, Method B



SAMPLE ID: B4@20-21.5

DEPTH (ft): 20-21.5

LOCATION: B4

% +75mm		% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		16	33	14	16	9	12	
SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)	SOIL DESCRIPTION				
				See exploration logs				
1.5 in.	100			ATTERBERG LIMITS				
1 in.	91							
0.75 in.	84							
0.38 in.	67							
#4	51			COEFFICIENTS				
#10	37							
#20	26							
#40	21							
#60	18			CLASSIFICATION				
#100	15							
#140	13							
#200	12							
				REMARKS				

* (no specification provided)

CLIENT: Baez Geotechnical Group, Inc.



PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

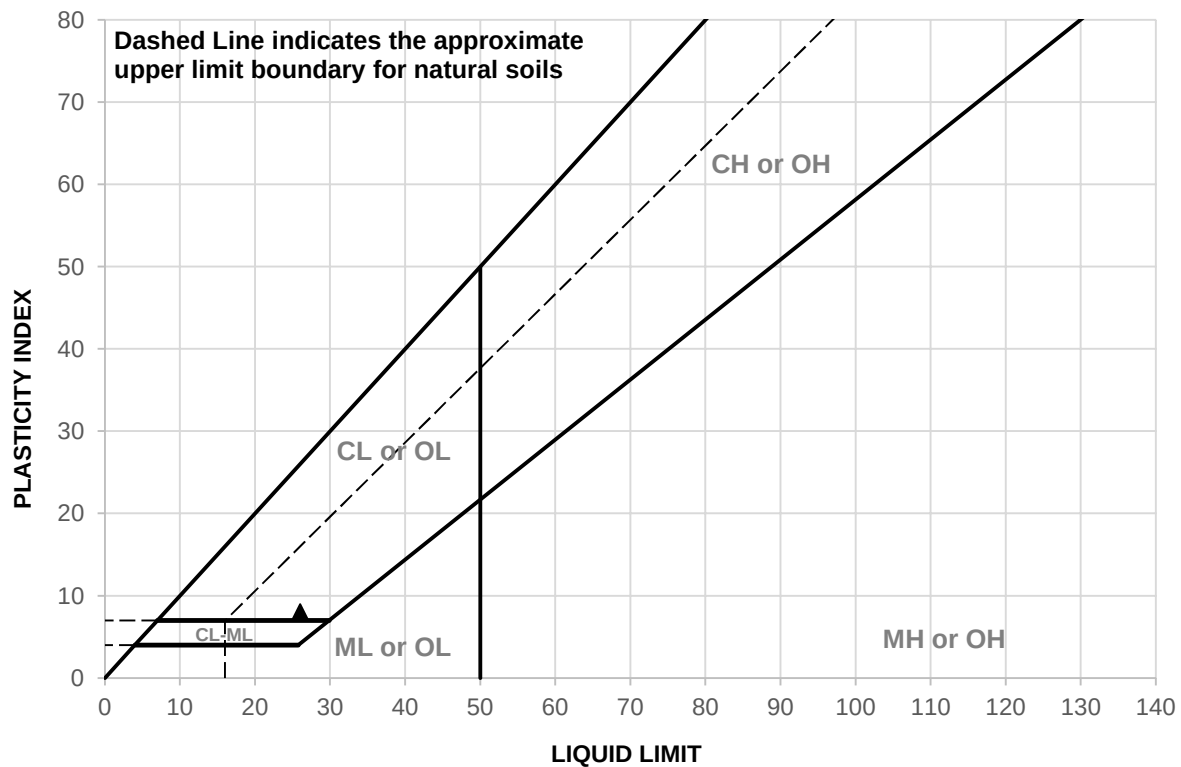
REPORT DATE: 8/24/2023

TESTED BY: K. Lecce

REVIEWED BY: J. Moriarty

LIQUID AND PLASTIC LIMITS TEST REPORT

ASTM D4318



	SAMPLE ID	DEPTH (ft)	MATERIAL DESCRIPTION	LL	PL	PI
▲	TP1@1-5	1-5	See exploration logs	26	18	8

	SAMPLE ID	TEST METHOD	REMARKS
▲	TP1@1-5	PI: ASTM D4318, Wet Method	



CLIENT: Baez Geotechnical Group, Inc.

PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

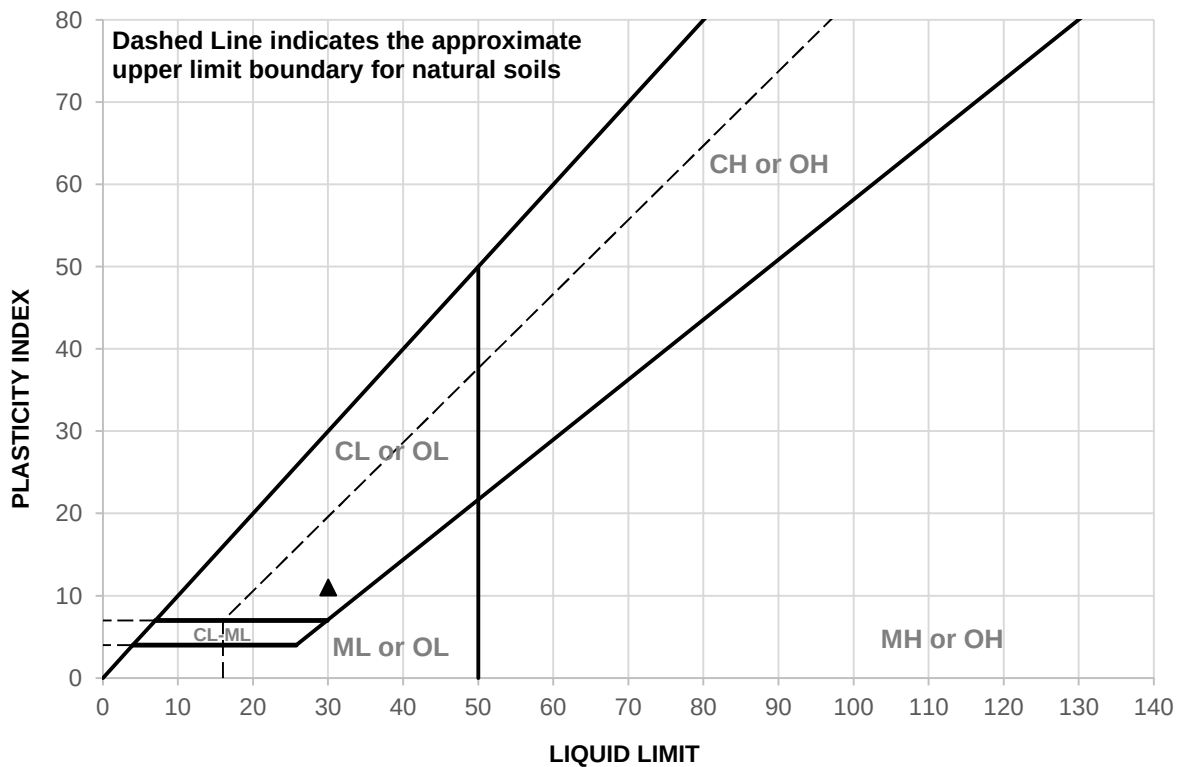
REPORT DATE: 8/29/2023

TESTED BY: L. Schmitz

REVIEWED BY: M. Gilbert

LIQUID AND PLASTIC LIMITS TEST REPORT

ASTM D4318



	SAMPLE ID	DEPTH (ft)	MATERIAL DESCRIPTION	LL	PL	PI
▲	B2@7.5-8.5	7.5-8.5	See exploration logs	30	19	11

	SAMPLE ID	TEST METHOD	REMARKS
▲	B2@7.5-8.5	PI: ASTM D4318, Wet Method	



CLIENT: Baez Geotechnical Group, Inc

PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.213 PHLAB

PROJECT LOCATION: San Jose, CA

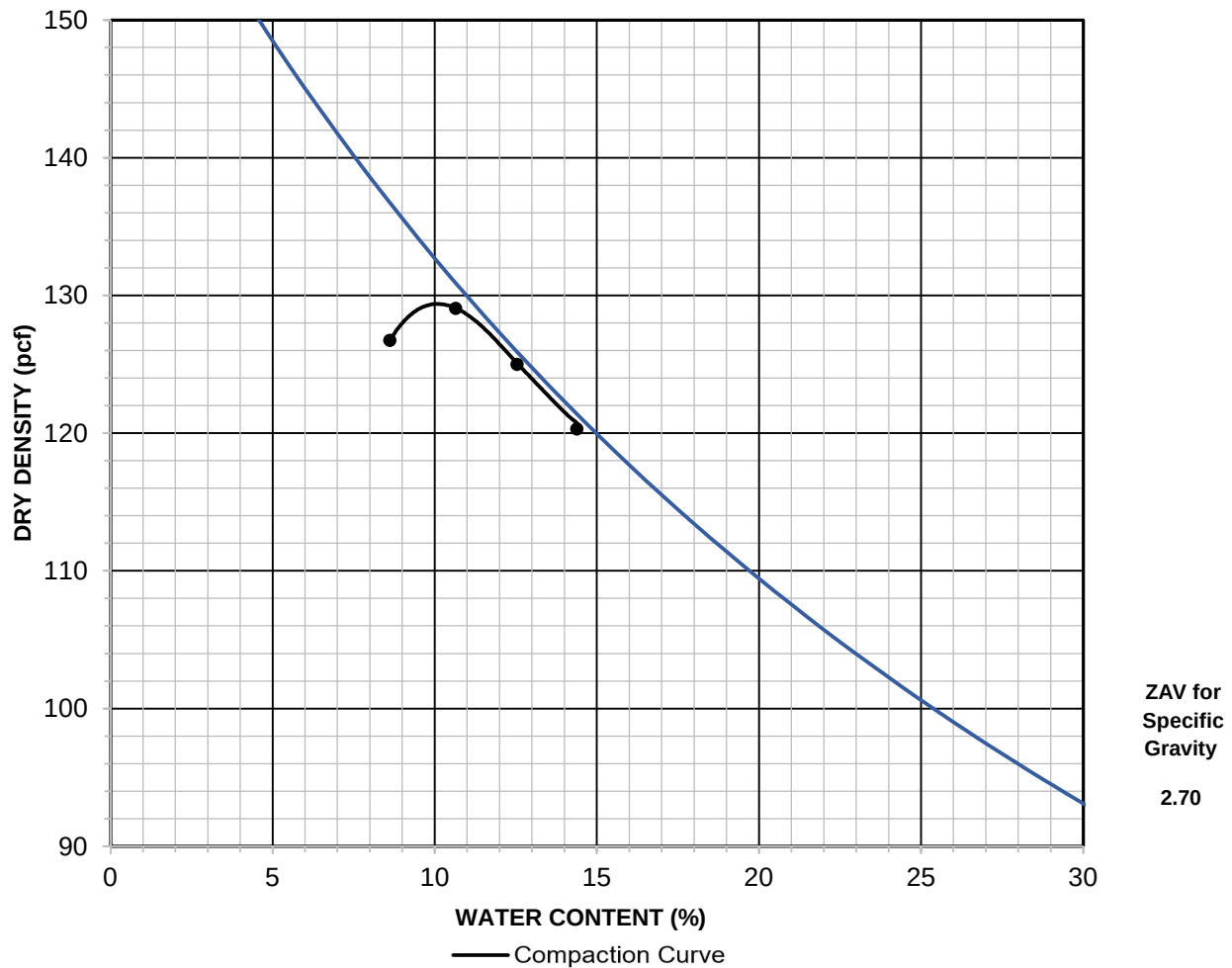
REPORT DATE: 8/24/2023

TESTED BY: K. Lecce

REVIEWED BY: J. Moriarty

COMPACTION CURVE REPORT

ASTM D1557



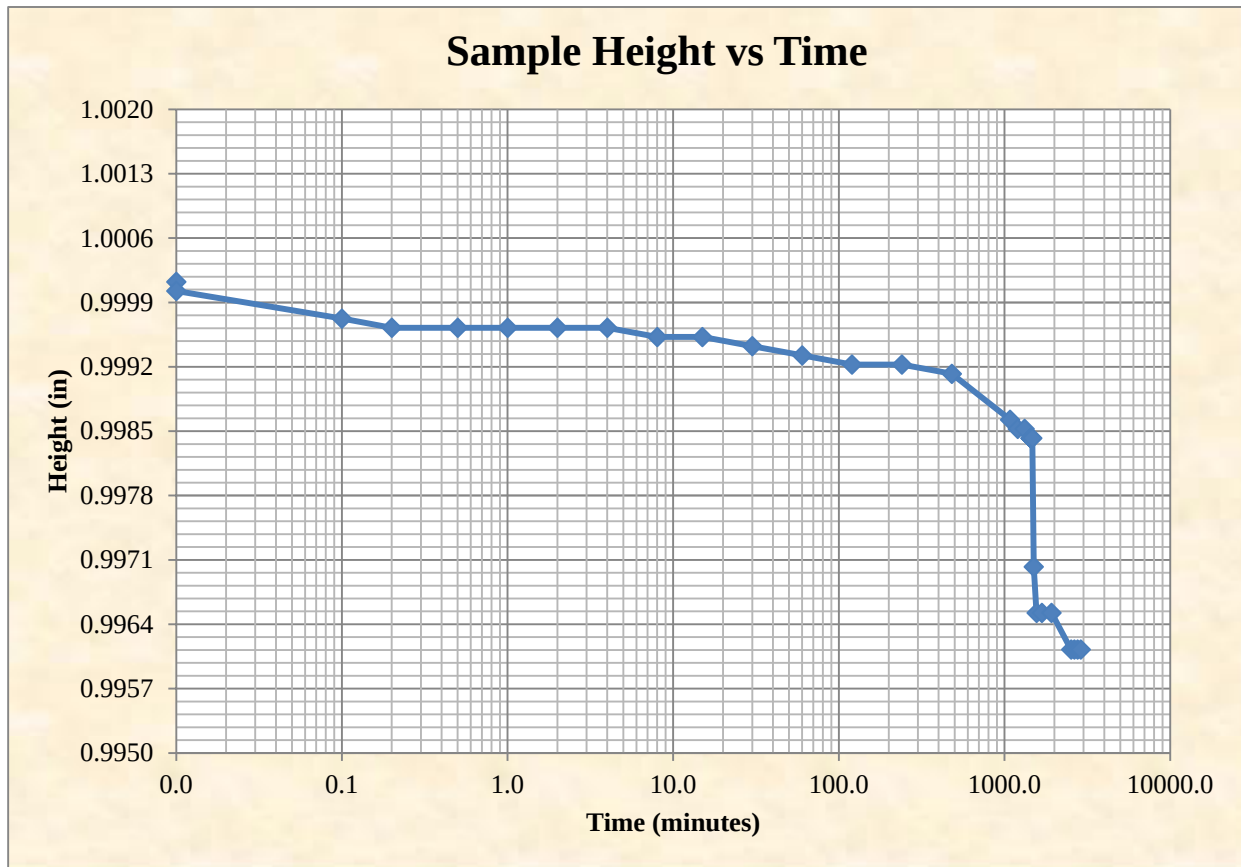
Curve Number: TP1@1-5
Test Specification: Method A
Sample Location: TP1 at 1 to 5 feet

RESULTS		MATERIAL DESCRIPTION
Maximum Dry Density, pcf	129.4	See exploration logs
Optimum Moisture Content, %	10.1	
Remarks		



CLIENT: Baez Geotechnical Group, Inc.
PROJECT NAME: G367.01 - Camden
PROJECT NO: 14368.000.215 PHLAB
PROJECT LOCATION: San Jose, CA
REPORT DATE: 8/28/2023
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

ONE DIMENSIONAL SWELL/COLLAPSE POTENTIAL - METHOD 'C' Modified
ASTM D4546



SAMPLE ID: TP1@1-5
SAMPLE DESCRIPTION: See exploration logs
TYPE OF WATER USED: Distilled
TRANSPORTATION METHOD: Insulated bucket
STORAGE ENVIRONMENT: Controlled

USCS: n/a

IN-SITU LOAD (psf): 300
DESIGN LOAD (psf): 1500
SOURCE OF WATER: Distilled
SAMPLING DATE: n/a
TEST START DATE: 08/30/23

Remolded? (Y/N): Y
Number of lifts, if remolded: 1
Specific Gravity, <#4 (Measured): 2.748
Initial sample height (in): 1.0001
Dry in-situ load height (in): 1.0000
Dry design load height (in): 0.9984
Wet design load height (in): 0.9961
Initial sample mass (g): 148.77
Final saturated sample mass (g): 158.64
Initial-test dry density (pcf): 116.72

Initial % Saturation: 55.98
Final % Saturation: 99.98
Initial water content: 9.57
Final water content: 16.84
Post-test dry density (pcf): 117.19

Dry In-situ load % SWELL/COLLAPSE: -0.01
Dry design load % SWELL/COLLAPSE: -0.16
Wet design load % SWELL/COLLAPSE: -0.23
Overall % SWELL/COLLAPSE: -0.40

Testing remarks: As requested by client, an in-situ load was added and then a design load was added prior to saturation. Note, gravels larger #4 were removed and replaced with trimmings.

PROJECT NAME: G367.01 - Camden, San Jose, CA
PROJECT NUMBER: 14368.000.215 PHLAB
CLIENT: Baez Geotechnical Group, Inc.
PHASE NUMBER: LAB

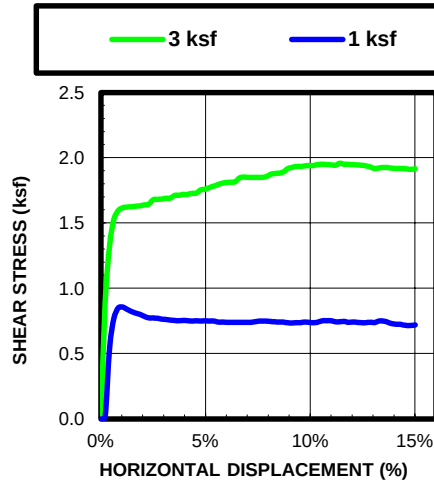
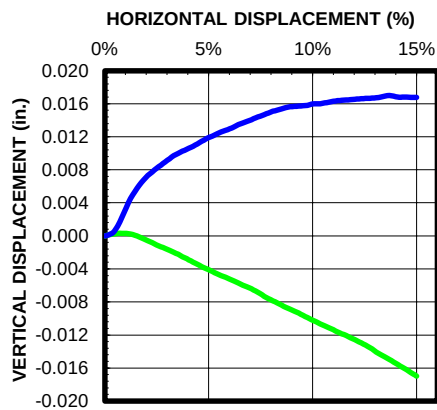
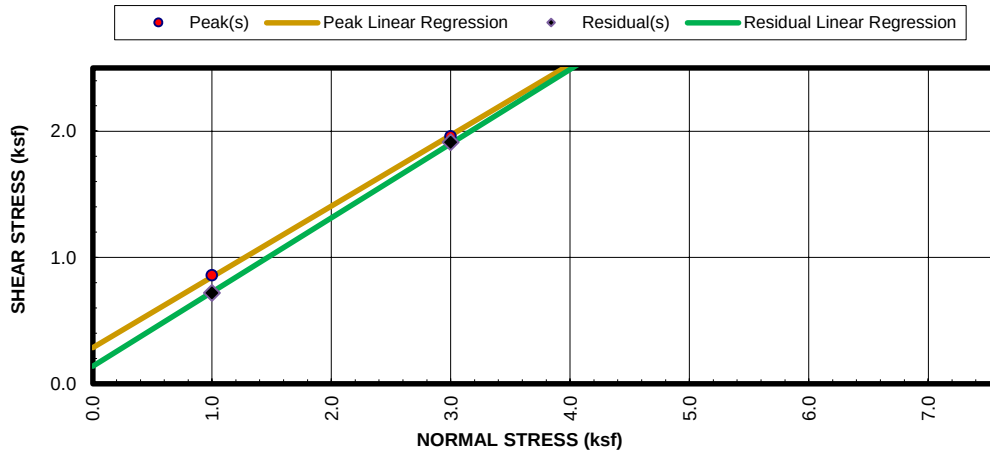
REPORT DATE: 09/01/23

ENGEO
— Expect Excellence —

Tested by: K. Lecce

Reviewed by: J. Moriarty

CONSOLIDATED DRAINED DIRECT SHEAR ASTM D3080



SPECIMEN					
INITIAL PARAMETERS	3 ksf	1 ksf			
MOISTURE (%)	10.10	10.10			
DRY DENSITY (PCF)	116.46	116.46			
VOID RATIO	0.473	0.473			
SATURATION (%)	58.67	58.67			
DIAMETER (IN.)	2.412	2.412			
HEIGHT (IN.)	1.000	1.000			
DIAMETER-TO-HEIGHT RATIO	2.412	2.412			
SPECIFIC GRAVITY (ASTM D854)	2.748	2.748			
FINAL PARAMETERS	4 ksf	2 ksf			
MOISTURE (%)	16.89	16.85			
DRY DENSITY (PCF)	117.17	117.26			
VOID RATIO	0.464	0.463			
SATURATION (%)	100.00	100.00			
DIAMETER (IN.)	2.412	2.412			
HEIGHT (IN.)	0.994	0.993			
NORMAL STRESS (ksf)	3.00	1.00			
PEAK STRESS (ksf)	1.96	0.86			
PEAK STRAIN (%)	11.40	1.04			
RESIDUAL STRESS (ksf)	1.91	0.72			
RESIDUAL STRAIN (%)	15.00	15.00			
RATE (IN/MIN)	0.00443	0.00603			
DIAMETER-TO-HEIGHT RATIO	2.427	2.429			
SPECIMEN INFORMATION		STRENGTH PARAMETERS		φ°	C(psf)
SAMPLE ID:	TP1@1-5				
DEPTH (ft):	1-5 feet	PEAK:		29.3	285.6
SAMPLE TYPE:	Remolded	RESIDUAL:		30.4	140.0
DESCRIPTION:	See exploration logs	ASTM D4318			
		LIQUID LIMIT		26	
		PLASTIC LIMIT:		18	
REMARKS:	Consolidation data inconclusive. Default minimum shear rates used per ASTM D3080. Specimens remolded to 90% of ASTM D1557 Method A max. dry density of 129.4 pcf and 0% over optimum moisture content of 10.1%				



CLIENT: Baez Geotechnical Group, Inc.

PROJECT NAME: G367.01 - Camden, San Jose, CA

PROJECT NO: 14368.00.215 PHLAB

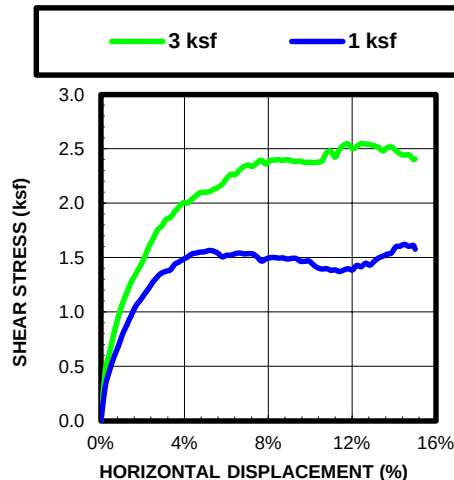
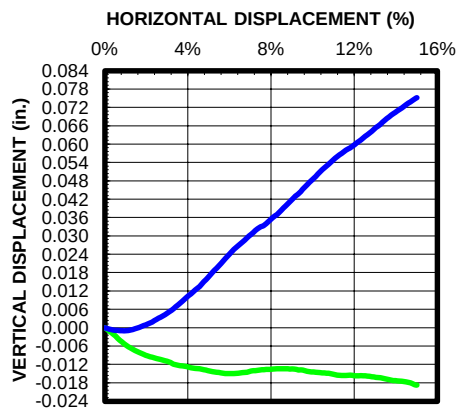
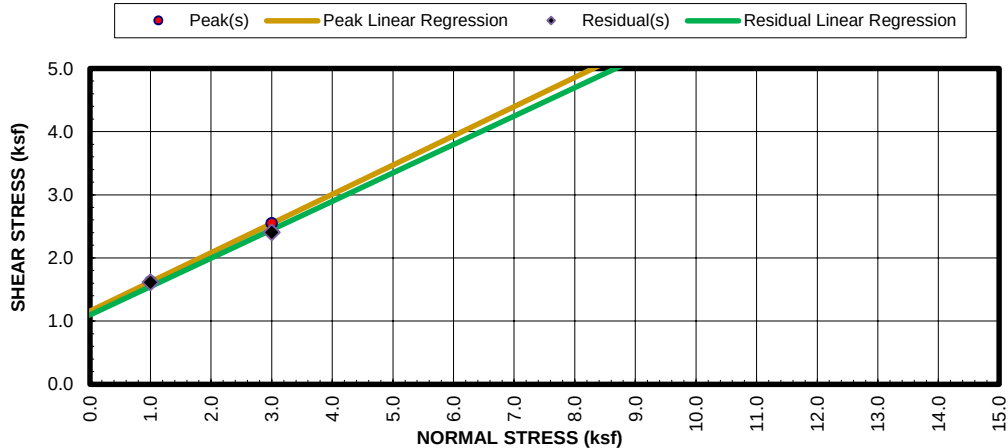
PROJECT LOCATION: San Jose, CA

REPORT DATE: 8/29/2023

TESTED BY: R. Montalvo

REVIEWED BY: M. Gilbert

CONSOLIDATED DRAINED DIRECT SHEAR ASTM D3080



SPECIMEN				
INITIAL PARAMETERS	3 ksf	1 ksf		
MOISTURE (%)	4.80	4.80		
DRY DENSITY (PCF)	116.87	115.06		
VOID RATIO	0.500	0.524		
SATURATION (%)	26.95	25.73		
DIAMETER (IN.)	2.415	2.415		
HEIGHT (IN.)	1.005	1.003		
DIAMETER-TO-HEIGHT RATIO	2.403	2.407		
SPECIFIC GRAVITY (ASTM D854)	2.808	2.808		
FINAL PARAMETERS	3 ksf	1 ksf		
MOISTURE (%)	15.76	17.95		
DRY DENSITY (PCF)	121.53	116.55		
VOID RATIO	0.442	0.504		
SATURATION (%)	100.00	100.00		
DIAMETER (IN.)	2.415	2.415		
HEIGHT (IN.)	0.966	0.971		
NORMAL STRESS (ksf)	3.00	1.00		
PEAK STRESS (ksf)	2.55	1.62		
PEAK STRAIN (%)	12.42	14.49		
RESIDUAL STRESS (ksf)	2.40	1.61		
RESIDUAL STRAIN (%)	15.00	15.00		
RATE (IN/MIN)	0.00604	0.00604		
DIAMETER-TO-HEIGHT RATIO	2.499	2.488		
SPECIMEN INFORMATION		STRENGTH PARAMETERS		
SAMPLE ID:	B3@6.5-7.5		ϕ°	C(psf)
DEPTH (ft):	6.5-7.5 ft	PEAK:	24.8	1161
SAMPLE TYPE:	In-situ	RESIDUAL:	24.2	1100
DESCRIPTION:	See exploration logs	ASTM D4318		
		LIQUID LIMIT		n/a
		PLASTIC LIMIT:		n/a
REMARKS:	Consolidation data inconclusive. Default minimum shear rates used per ASTM D3080			



CLIENT: Baez Geotechnical Group, Inc.

PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

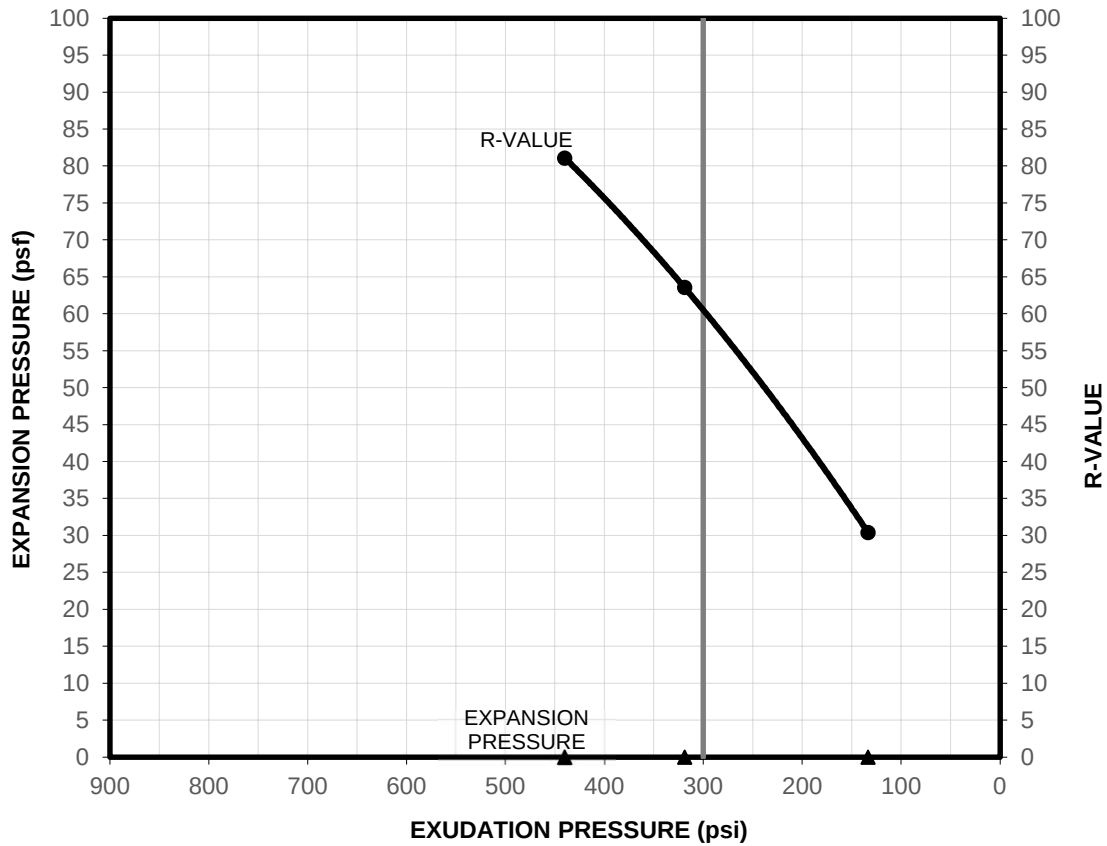
REPORT DATE: 8/31/2023

TESTED BY: K. Lecce

REVIEWED BY: J. Moriarty

R-VALUE TEST REPORT

CTM 301



SAMPLE ID	MATERIAL DESCRIPTION	SAMPLE LOCATION		
TP1@1-5	See exploration logs	TP1 at 1 to 5 feet		
SPECIMENS		1	2	3
EXUDATION PRESSURE (psi)		440	319	133
EXPANSION PRESSURE (psf)		0	0	0
R-VALUE		81	64	30
MOISTURE CONTENT (%)		9.0	9.7	11.0
DRY DENSITY (pcf)		131.5	131.1	129.4
EXPANSION PRESSURE (psf) AT EXUDATION PRESSURE OF 300 psi		0		
R-VALUE AT EXUDATION PRESSURE OF 300 psi		TEST RESULT		
		61		



CLIENT: Baez Geotechnical Group, Inc.

PROJECT NAME: G367.01 - Camden

PROJECT NO: 14368.000.215 PHLAB

PROJECT LOCATION: San Jose, CA

REPORT DATE: 8/29/2023

TESTED BY: M. Ryan

REVIEWED BY: M. Gilbert

APPENDIX D

CERCO Analytical Corrosion Test Results



30 August, 2023

Job No. 2308055
Cust. No. 13042

1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Ms. Stefanie Parman
Baez Geotechnical Group, Inc.
P.O. Box 296
Oakdale, CA 95361

Subject: Project No.: G367.01
Project Name: Camden Avenue-San Jose, CA
Corrosivity Analysis – ASTM Methods

Dear Ms. Parman:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on August 28, 2023. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as “moderately corrosive”. All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration reflects none detected with a reporting limit of 15 mg/kg.

The sulfate ion concentration is 16 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The sulfide ion concentrations reflect none detected with a reporting limit of 50 mg/kg.

The pH of the soil is 6.74, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 170-mV and is indicative of potentially “moderately corrosive” soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc.* at (925) 927-6630.

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.


J. Darby Howard, Jr., P.E.
President

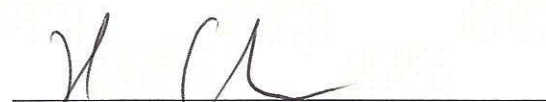
JDH/jdl
Enclosure

Client: Baez Geotechnical Group
Client's Project No.: G367.01
Client's Project Name: Camden Avenue-San Jose, CA
Date Sampled: 15-Aug-23
Date Received: 28-Aug-23
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 30-Aug-2023

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2308055-001	TP1 @ 1-5'	170	6.74	-	4,800	N.D.	N.D.	16

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	29-Aug-2023	29-Aug-2023	-	29-Aug-2023	29-Aug-2023	29-Aug-2023	29-Aug-2023


Julia Clauson
Chemist

* Results Reported on "As Received" Basis

N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Operation & Maintenance

OPERATION AND MAINTENANCE INFORMATION:

I. PROPERTY INFORMATION:

I.A. PROPERTY ADDRESS:
5670 CAMDEN AVENUE
SAN JOSE, CA

I.B. PROPERTY OWNER:
MANA HANA LEI, LLC

II. RESPONSIBLE PARTY FOR MAINTENANCE:

II.A. CONTACT:
SCOTT MURRAY

II.B. PHONE NUMBER OF CONTACT:
408-406-6000

EMAML_SM@MANAINV.COM

II.C. ADDRESS:
5927 BALFOUR CT, SUITE 208
CARLSBAD, CA 92008

PROJECT SITE INFORMATION:

1. SOILS TYPE: CLAYEY SAND WITH GRAVEL
2. GROUND WATER DEPTH: 20'
3. NAME OF RECEIVING BODY: GUADALUPE RIVER
4. FLOOD ZONE: D
5. FLOOD ELEVATION (IF APPLICABLE): N/A

SOURCE CONTROL MEASURES:

1. BENEFICIAL LANDSCAPING.
2. USE OF WATER EFFICIENT IRRIGATION SYSTEMS.
3. MAINTENANCE (PAVEMENT SWEEPING, CATCH BASIN CLEANING, GOOD HOUSEKEEPING).
4. STORM DRAIN LABELING.

SITE DESIGN MEASURES:

1. DIRECT RUNOFF FROM ROOFS, SIDEWALKS, PATIOS TO LANDSCAPED AREAS.
2. PLANT TREES ADJACENT TO AND IN PARKING AREAS AND ADJACENT TO OTHER IMPERVIOUS AREAS.

TABLE 1
ROUTINE MAINTENANCE ACTIVITIES FOR SUBSURFACE INFILTRATION TRENCHES

NO.	MAINTENANCE TASK	FREQUENCY OF TASK
1	MONITOR OBSERVATION WELL TO CONFIRM THAT THE SUBSURFACE INFILTRATION SYSTEM HAS DRAINED DURING DRY SEASON. IF INSPECTION INDICATES THAT THE SYSTEM IS PARTIALLY OR COMPLETELY CLOGGED, RESTORE TO DESIGN CONDITIONS.	ANNUALLY, DURING DRY SEASON
2	REMOVE OBSTRUCTIONS, DEBRIS AND TRASH NEAR INLET AND DISPOSE OF PROPERLY.	MONTHLY DURING WET SEASON, OR AS NEEDED AFTER STORM EVENTS
3	CHECK OBSERVATION WELL 2 TO 3 DAYS AFTER STORMS TO CONFIRM DRAINAGE. THE SUBSURFACE INFILTRATION SYSTEM SHOULD COMPLETELY DEWATER WITHIN 3 DAYS (PREFERRED) OR WITHIN 5 DAYS TO AVOID MOSQUITO PRODUCTION.	MONTHLY DURING WET SEASON, OR AS NEEDED AFTER STORM EVENTS
4	CHECK FOR EROSION AT INFLOW OR OVERFLOW STRUCTURES. REPAIR AS NECESSARY.	MONTHLY, OR AS NEEDED AFTER STORM EVENTS
5	INSPECT SUBSURFACE INFILTRATION SYSTEM USING THE ATTACHED INSPECTION CHECKLIST.	MONTHLY, OR AFTER LARGE STORM EVENTS, AND AFTER REMOVAL OF ACCUMULATED DEBRIS OR MATERIAL

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