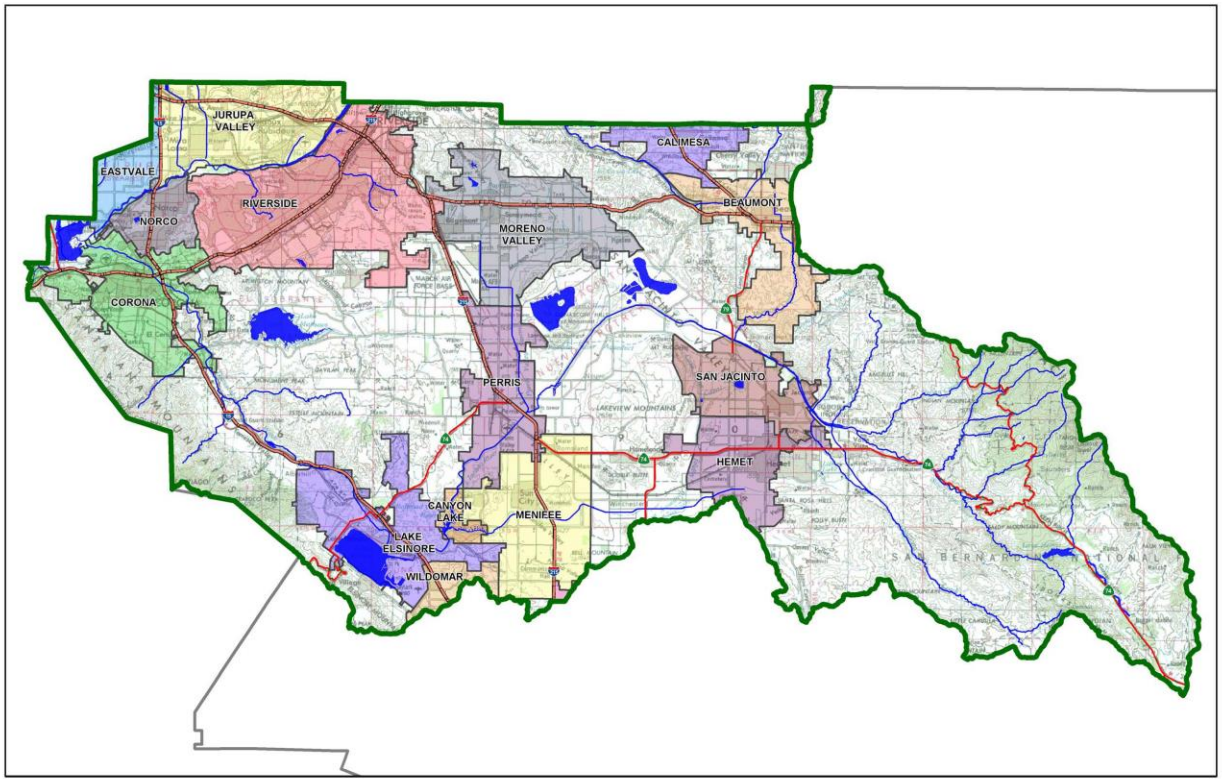
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Motte Country Plaza

Development No:

Design Review/Case No:



☒ **Preliminary**
☐ **Final**

Original Date Prepared: May 2020

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Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
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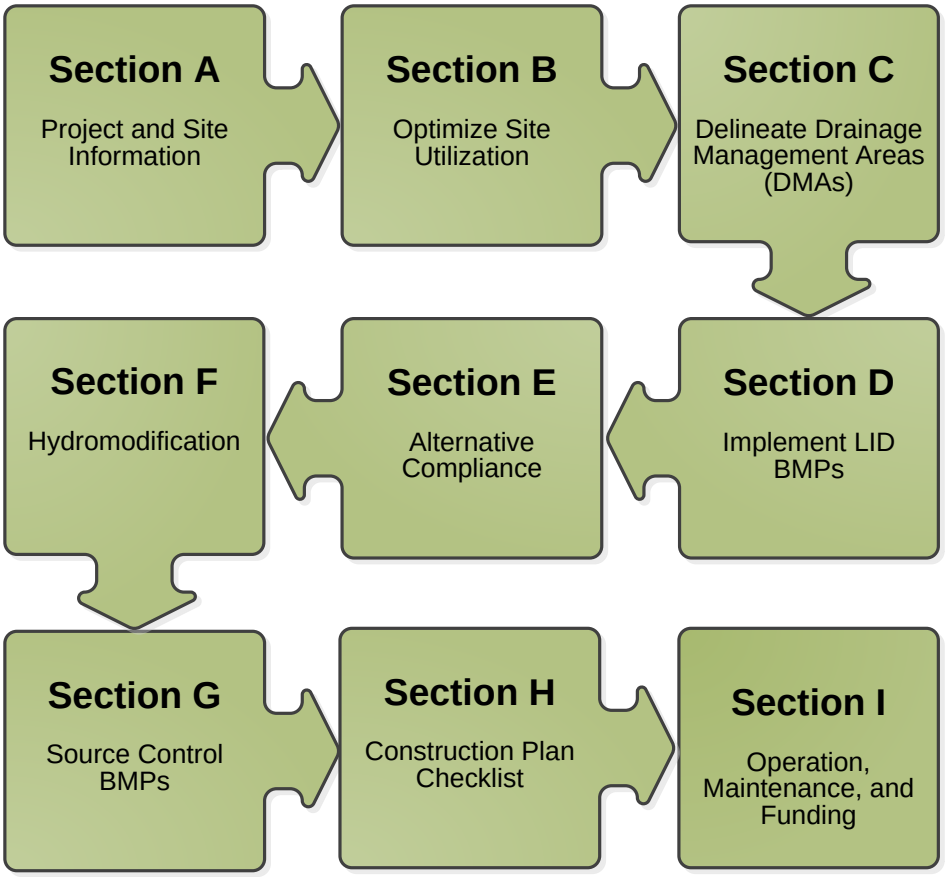
A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Palomarmar, LP by Albert A. Webb Associates for the Motte Country Plaza project.

This WQMP is intended to comply with the requirements of Riverside County Stormwater/Urban Runoff Management and Discharge Controls Ordinance No. 754 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under Riverside County Water Quality Ordinance (Municipal Code Section Chapter 13.12).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Teresa Gibbs, PE	Senior Engineer

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial
Planning Area:	TPM 2018-302
Community Name:	City of Menifee
Development Name:	Motte Country Plaza

PROJECT LOCATION

Latitude & Longitude (DMS): 33˚44'35.76"N 117˚9'48.64"W

Project Watershed and Sub-Watershed: Santa Ana River Watershed & San Jacinto River Subwatershed

Gross Acres: 3.80 AC

APN(s): 329-110-019-0

Map Book and Page No.: Thomas Bros. Map 2010, Page 838 Grid F1

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Commercial
Proposed or Potential SIC Code(s)	1542 – Gen. Contractors Non-Res. Buildings 5812 – Eating Places 5983 – Fuel Oil Dealers 7542 – Carwashes
Area of Impervious Project Footprint (SF)	49,924 sf
Total Area of <u>proposed</u> Impervious Surfaces within the Project Footprint (SF)/or Replacement	49,924 sf
Does the project consist of offsite road improvements?	☐ Y ☒ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of <u>existing</u> Impervious Surfaces within the Project limits Footprint (SF)	32,815 sf
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☐ Y ☒ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	B
What is the Water Quality Design Storm Depth for the project?	0.63 in

The project site proposes to redevelop the eastern portion of Motte Country Plaza within the city of Menifee, California. The project proposes a car wash, a drive through building, gas station, and new parking area. The existing train cart restaurant located within the project area is proposed to be relocated to a vacant piece of land on the western portion of the parcel. The redeveloped portion of the site will drain into a proposed catch basin located in the southeastern corner of the site. Due to site constraints, an underground Modular Wetlands System (MWS) vault is proposed to treat all runoff captured onsite. An underground storage system is also being proposed to mitigate for HCOC requirements. Flows will enter a proposed 18-inch storm drain system which eventually connects into the existing 48-inch Romoland-Motte Farms Storm Drain located approximately 900 feet west of the project site.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Jacinto River Reach 3	None	Intermittent: AGR, GWR, MUN+, REC1, REC2, WARM, WILD	N/A
San Jacinto River Reach 2	None	Intermittent: AGR, GWR, MUN+, REC1, REC2, WARM, WILD	N/A
Canyon Lake (Railroad Canyon Reservoir)	Nutrients, Pathogens	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A
San Jacinto River Reach 1	None	Intermittent: AGR, GWR, MUN+, REC1, REC2, WARM, WILD	N/A
Lake Elsinore	PCBs, Nutrients, Organic Enrichment/Low Dissolved Oxygen, Sediment Toxicity, Unknown Toxicity	MUN, REC1, REC2, WARM, WILD, AGR, PROC	N/A

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N

US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*	☐ Y	☒ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Existing drainage patterns show that the existing site generally drains from north to south and east to west. In the proposed condition, the site will continue to drain from north to south but will drain from west to east. This ensures that any runoff collected onsite can be treated before combining with runoff from adjacent properties. Collected runoff will be directed towards the proposed MWS vault located near the southeastern boundary of the project area. Runoff will then enter the proposed underground storage chambers before flows travel east to west, mimicking the existing drainage pattern.

Did you identify and protect existing vegetation? If so, how? If not, why?

Yes, existing vegetation on the eastern and southern ends will remain or be replaced by new proposed landscaped areas.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Based on an initial geotechnical investigation, there is very little infiltration capacity throughout the project area. Water will not be able to infiltrate at a rate for infiltration treatment to be feasible. However, the commercial site is proposed to contain some landscaped areas that will be scattered throughout the site to maximize infiltration to the best use possible.

Did you identify and minimize impervious area? If so, how? If not, why?

Yes, the impervious areas were minimized as much as possible for the nature of this commercial development. Landscaped areas are provided throughout the site to provide more pervious areas on site where feasible. Concrete walkways are proposed throughout the site to allow safe access from the buildings to the parking lots.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, where possible, runoff will drain towards landscaped areas before ultimately draining towards the proposed basin. Landscaped areas are provided around buildings and concrete walkways to maximize drainage towards pervious areas.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
DMA 1	Mixed Use – Roofs, Concrete/Asphalt, Ornamental Landscaping	59,009	D

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA 1	8'x8' MWS Vault (Biotreatment Device)

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		x
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		x
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		x
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	x	
If Yes, list affected DMAs: All DMAs		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		x
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		x
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 0.21 AC

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 1.15 AC

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 1.05

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 1.21 AC

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
1.21 AC	0.27 AC

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 100

Project Type: Commercial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 1.15 AC

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 141

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 162.15

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
166.15	100 – The projected number of toilet users is preliminary at this time. However, the expected number of toilet users will be significantly less than the minimum required toilet users to justify the use of Harvest and Reuse.

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

Insert narrative description here.

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: Enter Value

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA 1	☐	☐	☐	☒	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

N/A

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
DMA-1	*44279*	*Concrete or Asphalt*	*1*	*0.89*	*39496.9*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Flow Rate on Plans (cfs)*
DMA-1	*5645*	*Roofs*	*1*	*0.89*	*5035.3*			
DMA-1	*9085*	*Ornamental Landscaping*	*0.1*	*0.11*	*1003.5*			
	A_T =59,009				Σ= 45,535.7	[E] = 0.20	[F] = 0.2	[G] = **0.2**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- Or -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

A proposed biotreatment device (underground 8'x8' MWS vault) is proposed to treat all captured runoff from the project area for water quality requirements.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
MWS Vault	Nutrients/Pesticides	Medium
	Sediment	High
	Bacteria	Medium

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

[2] Cross Reference Table E.1 above to populate this column.

[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

N/A

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

The project site is not located in an HCOC exempt area. Therefore, the project site is required to mitigate for the HCOC storm event. Due to site constraints, an underground storage system is being proposed to detain the difference in for both the 2-year 24-hour and 100-year 24-hour storm events. An outlet structure has also been designed to ensure that flows are throttled back to pre-project conditions. The outlet structure calculations can be found in the Hydrology Report for Motte Country Plaza.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
A. On-site storm drain inlets	*Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.*	*Maintain and periodically repaint or replace inlet markings.* *Provide stormwater pollution prevention information to new site owners, lessees, or operators.* *See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com*
B. Landscape/Outdoor Pesticide Use	*Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.* *Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.* *Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.* *Consider using pest-resistant plants, especially adjacent to hardscape.* *To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.*	*Maintain landscaping using minimum or no pesticides.* *See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/* *Provide IPM information to new owners, lessees and operators.*
C. Food Service	*Describe the location and features of the designated cleaning area.* *Describe the items to be cleaned*	*See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores,*

	in this facility and how it has been sized to insure that the largest items can be accommodated.	*Delicatessens, and Bakeries" at http://rcflood.org/stormwater* *Provide this brochure to new site owners, lessees, and operators.*
D. Plazas, Sidewalks and parking lots.		*Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.*
J. Refuse areas	*Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.*	*Adequate number of receptacles shall be provided throughout site. Receptacles shall be regularly inspected, repaired and/or replaced if any leaks identified. Receptacles shall be kept covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at* *www.cabmphandbooks.com*
K. Fuel Dispensing Areas		*The property owner shall dry sweep the fueling area routinely.* *See the Fact Sheet SD-30, "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com*
L. Roofing, Gutters, and Trim	*Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.*	

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
DMA 1	MWS Vault	Plot Plan – Sheet 5	33.743267°N / 117.163240°W

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: The owner shall be responsible for the maintenance of the BMPs.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

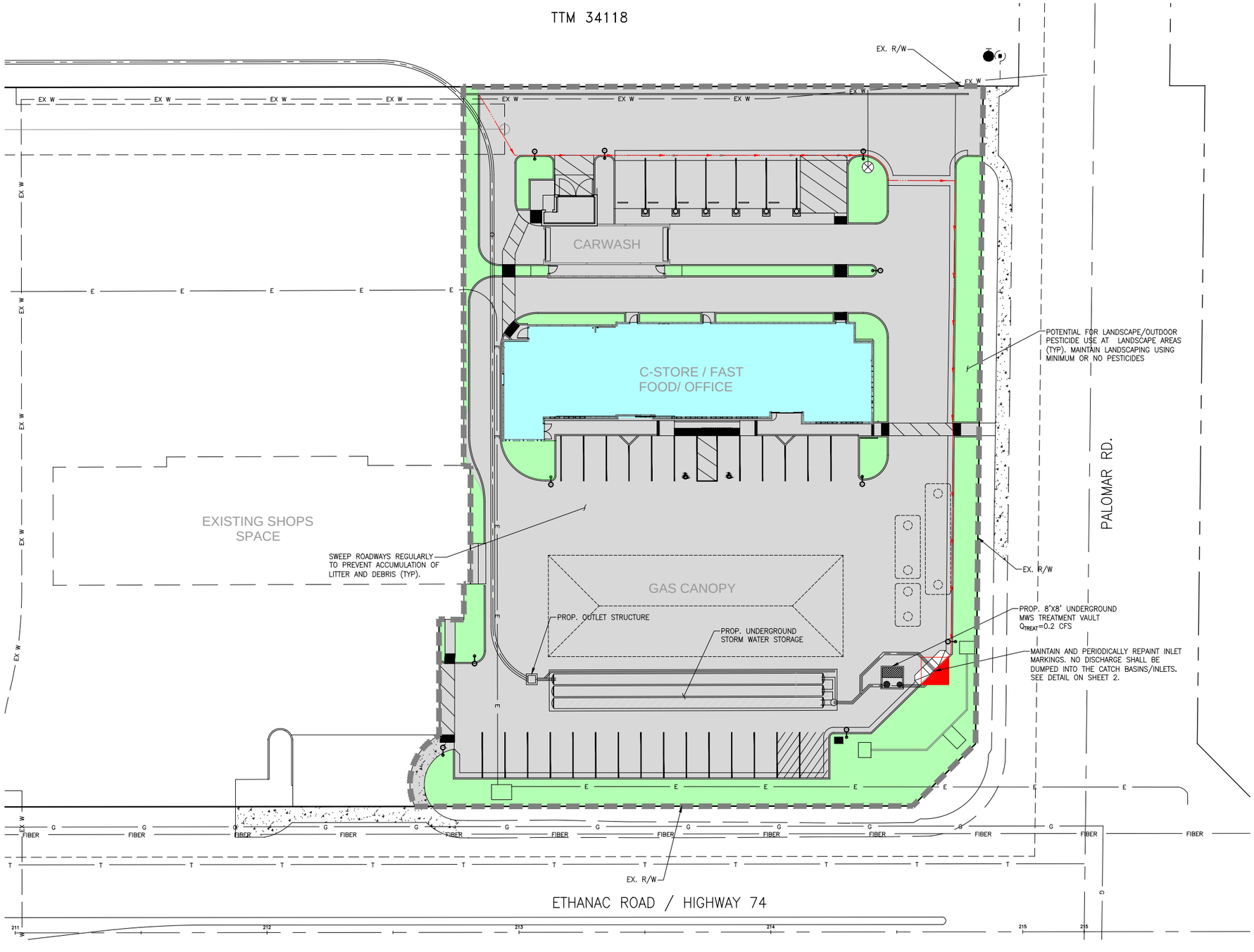
Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

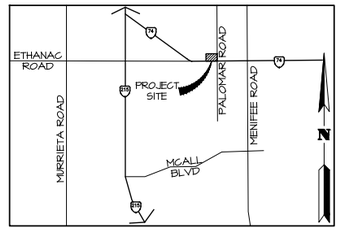
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

WQMP EXHIBIT
MOTTE COUNTRY PLAZA – TPM 2018-302
IN THE COUNTY OF RIVERSIDE, CALIFORNIA

TTM 34118





VICINITY MAP
NTS
SECTION 11 T5S R3W

OWNER/APPLICANT
PALOMARMAR, LP
764 W RAMONA EXPRESSWAY SUITE "C"
PERRIS, CA 92571
CONTACT: MARWAN ALABBASI
PHONE: 951-776-9300

ENGINEER
ALBERT A. WEBB ASSOCIATES
3788 MCCRAY STREET
RIVERSIDE, CA 92506
CONTACT: JENNIFER GILLEN
PHONE: 951-686-1070

SOIL ENGINEER
EARTH STRATA GEOTECHNICAL SERVICES, INC.
42184 REMINGTON AVENUE
TEMECULA, CA 92590
CONTACT: STEPHEN M. POOLE
PHONE: 951-397-8315

A.P.N.
329-110-019-0

DMA 1 – QBMP TABLE	
AREA TYPE	DMA 1
STREETS/IMPERVIOUS (SF)	44,279
ROOF (SF)	5,645
LANDSCAPE (SF)	9,085
QBMP (CFS)	0.2

LEGEND

- LANDSCAPE AREA
- IMPERVIOUS AREA (PAVEMENT/ASPHALT)
- BUILDING
- FLOWLINE
- PROPOSED STORM DRAIN
- PROJECT BOUNDARY
- PROPOSED STORM DRAIN INLET

N W E S WEBB

1" = 20'
10 0 20 40 60

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ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

W.O. 18-0099
SHEET 1 OF 2 SHEETS

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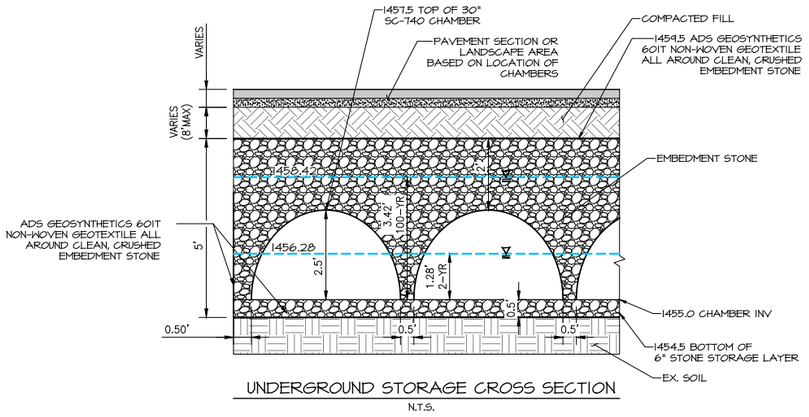
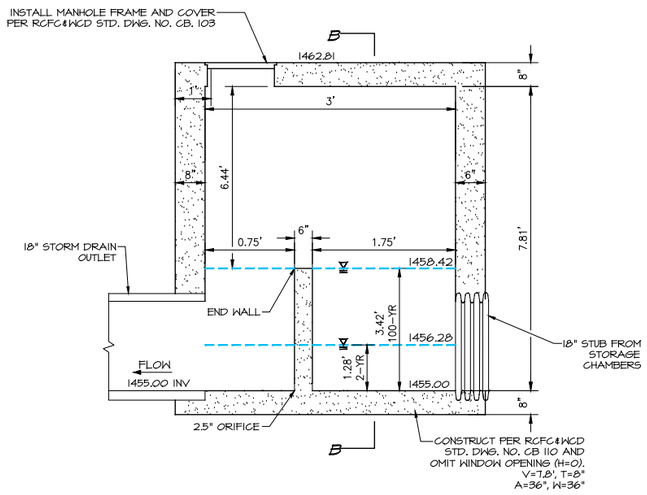
WQMP EXHIBIT
MOTTE COUNTY PLAZA – TPM 2018-302
DETAILS



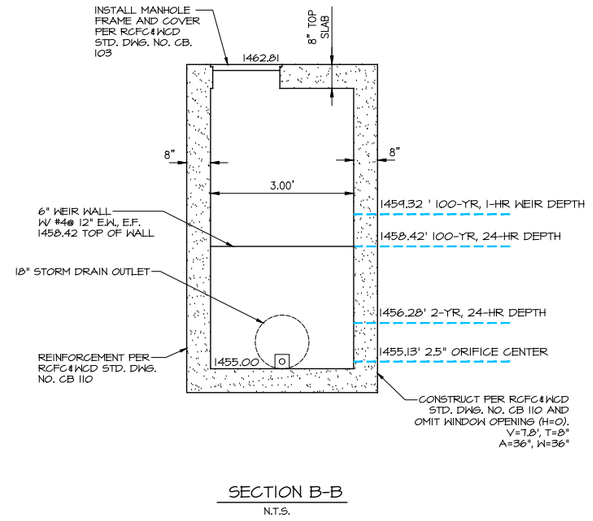
UNDERGROUND STORAGE CROSS SECTION

N.T.S.



OUTLET STRUCTURE (PROFILE VIEW)

N.T.S.



SECTION B-B

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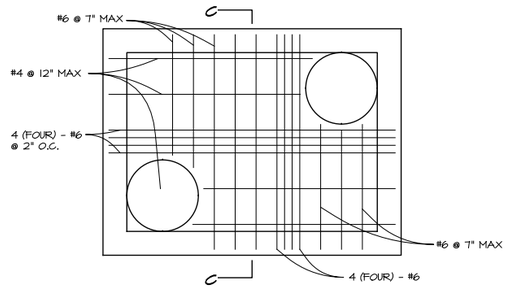
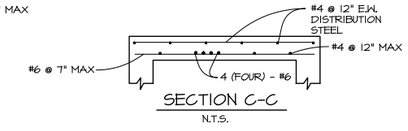


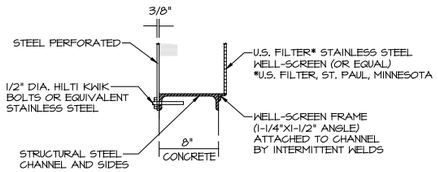
TOP SLAB BOTTOM REINFORCEMENT

N.T.S.



SECTION C-C

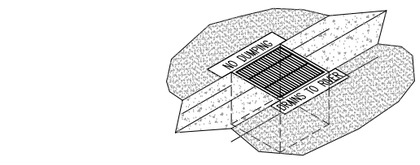
N.T.S.

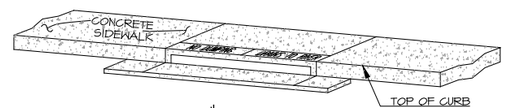


DETAIL A

N.T.S.

* A CERTIFICATION FROM MFG MUST BE SUBMITTED TO THE CITY AFTER INSTALLATION





CATCH BASIN STENCILLING

1. STENCILS TO HAVE 2" LETTERS AS FOLLOWS: "NO DUMPING" "DRAINS TO RIVER"
2. PLACE BOTH STENCILS CENTERED WITHIN THE CATCHBASIN OPENINGS AND WITHIN THE TOP OF THE CURB.
3. SPRAY BOTH STENCILS WITH WHITE PAINT.
4. REMOVE STENCILS WHEN PAINT IS DRY.

NTS

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FAX (951) 788-1256

W.O. 18-0099
SHEET 2 OF 2 SHEETS

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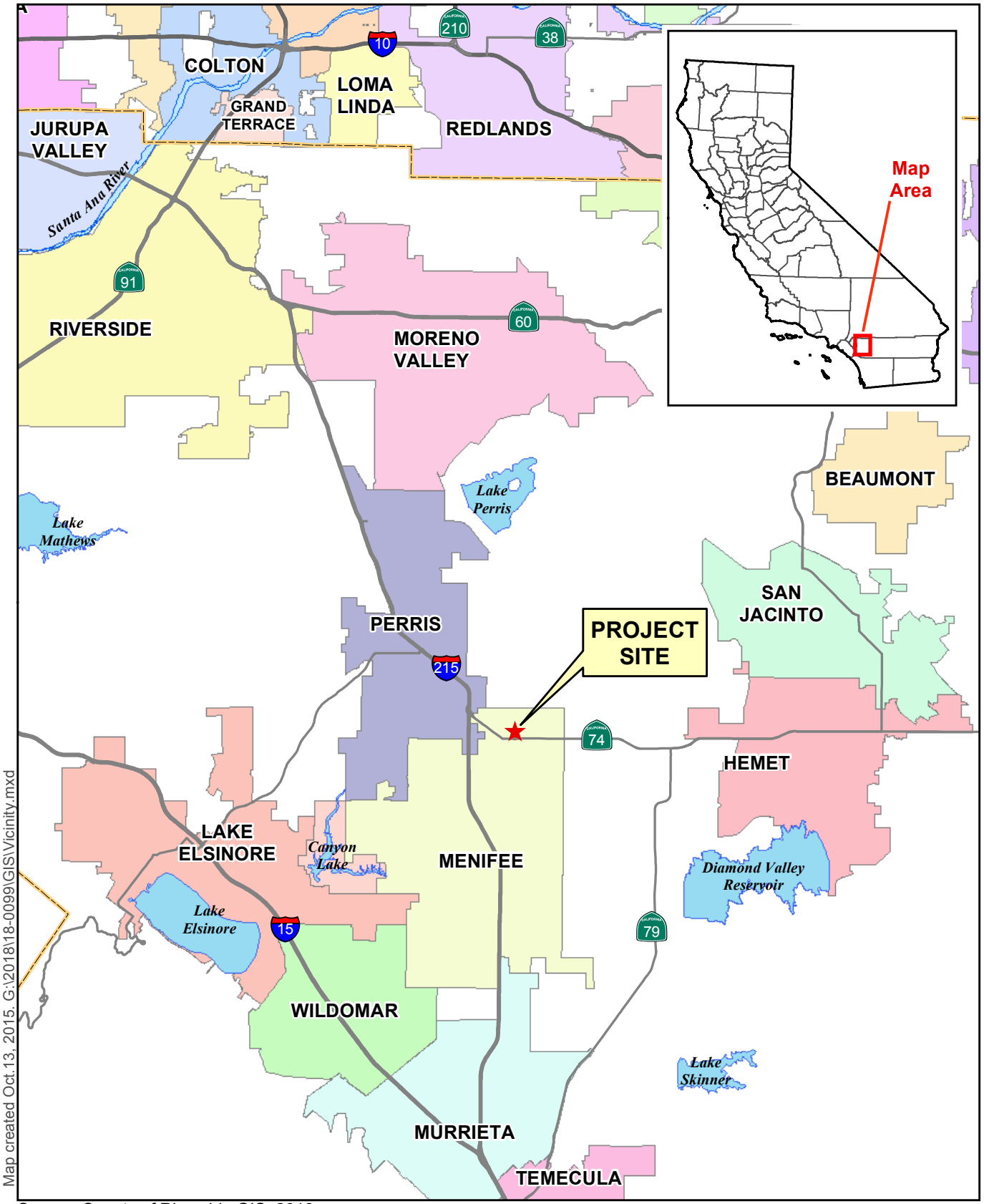


Map created Oct.13, 2015. G:\2018\18-0099\GIS\Vicinity.mxd

Source: County of Riverside GIS, 2018

0 2 4 6 Miles

Figure 1 – Vicinity Map

Alabbasi Motte Plaza

ALBERT A. WEBB ASSOCIATES

G:\2018\18-0099\GIS\Aerial.mxd; Map created 28 Nov 2018

Sources: Riverside Co. GIS, 2018;
USDA NAIP, 2016.

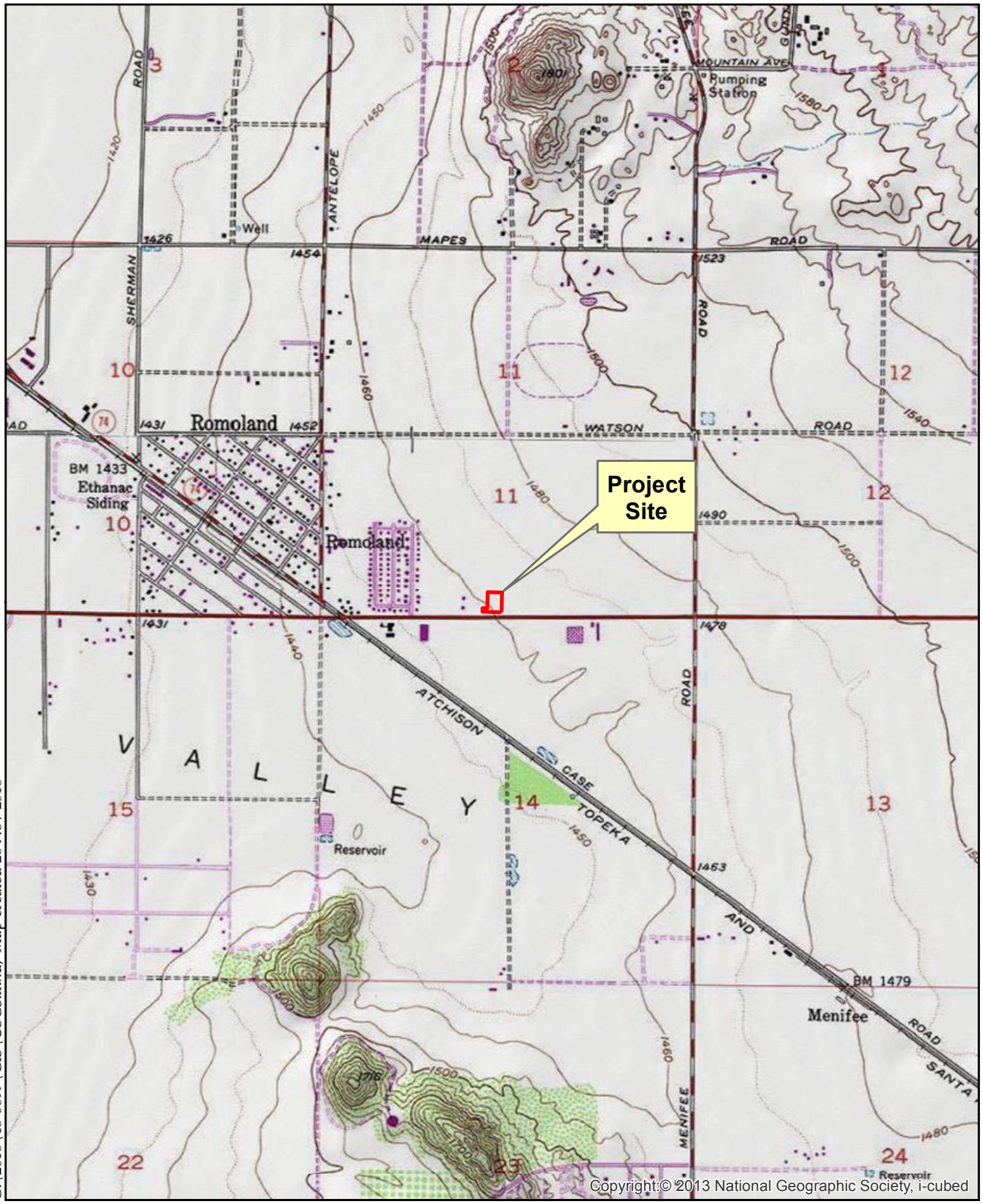
N

0 250 500 750 Feet

Figure 2 - Aerial Map

Alabbasi Motte Plaza

ALBERT A. WEBB ASSOCIATES



G:\2018\18-0099\GIS\USGS.mxd; Map created 28 Nov 2018

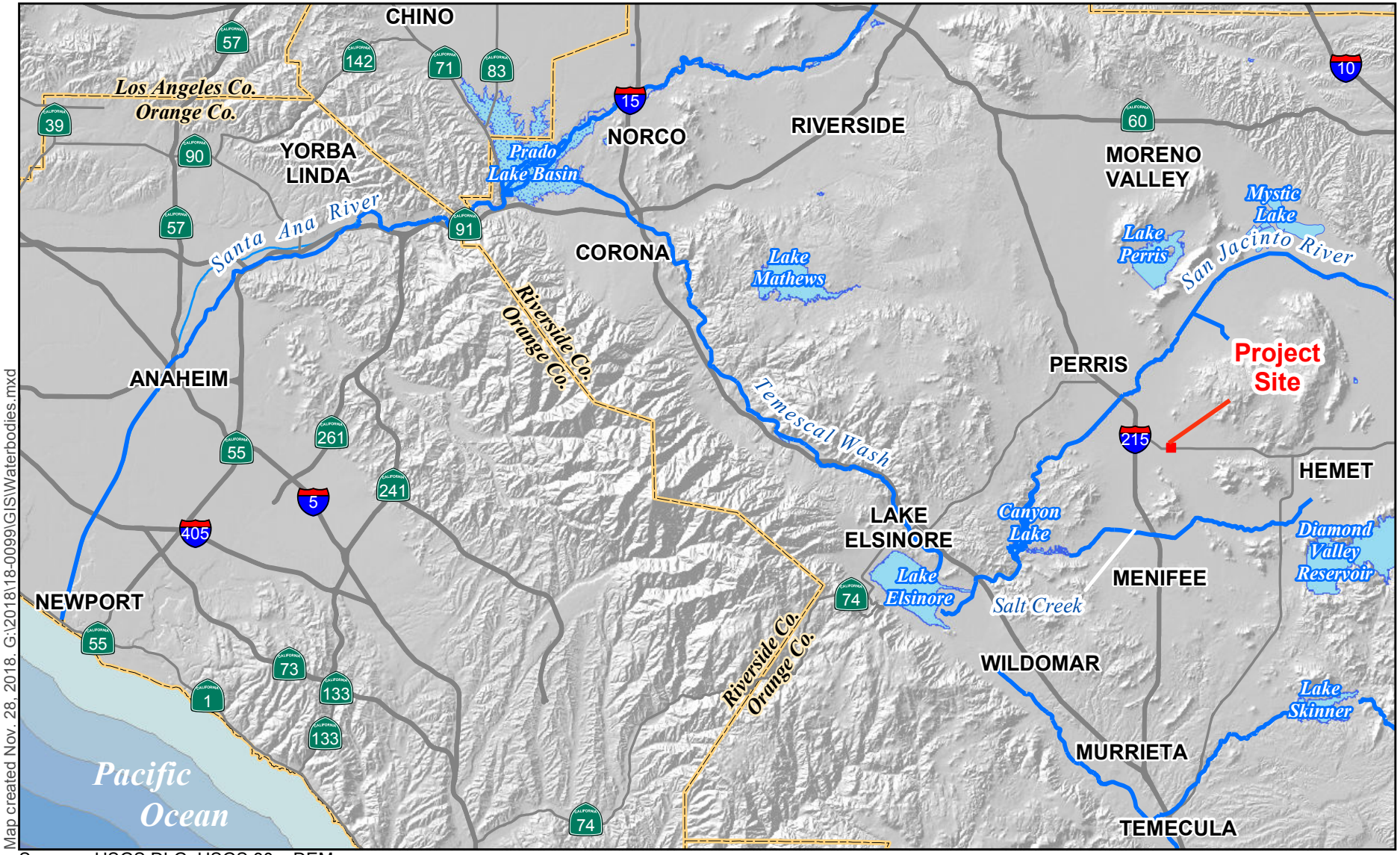
Sources: ESRI / USGS 7.5min Quad
DRGs: ROMOLOAND/PERRIS

0 1,000 2,000 3,000 Feet

Figure 3 - USGS Map

Alabbasi Motte Plaza

ALBERT A. WEBB ASSOCIATES



Map created Nov. 28, 2018. G:\2018\18-0099\GIS\Waterbodies.mxd

Sources: USGS DLG; USGS 30m DEM

0 2 4 6 8 Miles

Figure 4 – Receiving Waterbodies

Alabbasi Motte Plaza

ALBERT A. WEBB ASSOCIATES

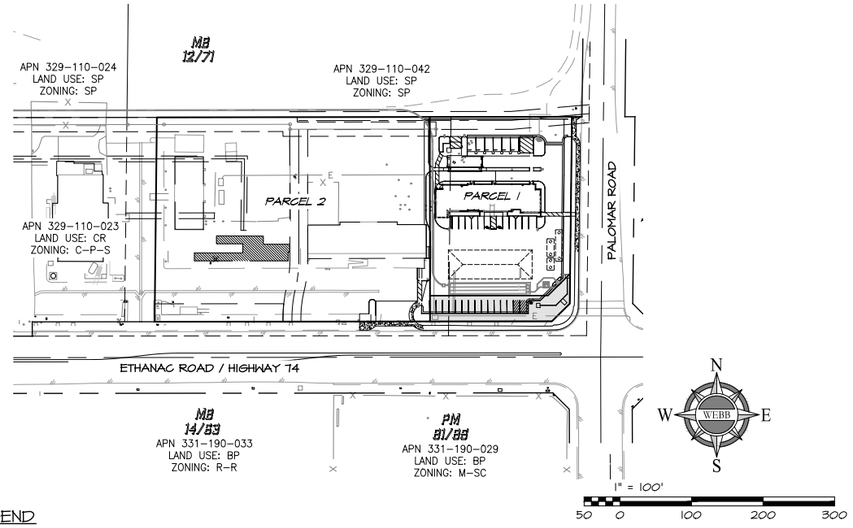
Appendix 2: Construction Plans

Grading and Drainage Plans

IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PLOT PLAN NO. 2018-300

LOCATED IN SECTION 11, T. 5 S., R. 3 W.



LEGEND

- PROPERTY LINE
- IRREVOCABLE OFFER OF DEDICATION (IOD)
- EXISTING CENTERLINE
- EX W — EXISTING WATER LINE
- EDGE OF EXISTING PAVEMENT
- EXISTING EASEMENT
- SD — PROPOSED STORM DRAIN
- SS — PROPOSED SEWER
- EX SD — EXISTING STORM DRAIN
- G — EXISTING GAS
- T — EXISTING TELEPHONE
- FIBER — EXISTING FIBER
- E — EXISTING ELECTRICITY
- PROPOSED SEWER MANHOLE
- PROPOSED WATER METER
- PROP. S/W
- IRREVOCABLE OFFER OF DEDICATION (IOD)
- (15) NUMBER OF PARKING SPACES IN EACH ROW

UTILITY PROVIDERS

WATER	EASTER MUNICIPAL WATER DISTRICT
SEWER	EASTER MUNICIPAL WATER DISTRICT
ELECTRICAL	SOUTHERN CALIFORNIA EDISON
GAS	SOUTHERN CALIFORNIA GAS COMPANY
TELEPHONE	FRONTIER COMMUNICATIONS
CABLE T.V.	CHARTER COMMUNICATIONS

LEGAL DESCRIPTION

LOT 93 OF ROMOLA FARMS, AS SHOWN BY MAP ON FILE IN BOOK 12, PAGE 71 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;

EXCEPTING THE WEST 41.90 FEET CONVEYED BY DEED RECORDED SEPTEMBER 5, 1984 AS INSTRUMENT NO. 194245 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ALSO EXCEPTING THEREFROM THE SOUTHERLY 20 FEET OF SAID LOTS, AS CONVEYED TO THE COUNTY OF RIVERSIDE BY A DOCUMENT RECORDED FEBRUARY 21, 1918 AS INSTRUMENT NO. 32658 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;

ALSO EXCEPTING FROM LOT 93, THAT PORTION OF LOT CONVEYED TO THE COUNTY OF RIVERSIDE, BY A DOCUMENT RECORDED FEBRUARY 1, 1974 AS INSTRUMENT NO. 23009 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA;

ALSO EXCEPTING ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND MINERALS LYING IN AND UNDER SAID LAND, AS RESERVED BY DEED RECORDED FEBRUARY 7, 1966 AS INSTRUMENT NO. 13633 AS TO AN UNDIVIDED ONE-HALF INTEREST AND BY DEED RECORDED FEBRUARY 7, 1966 AS INSTRUMENT NO. 13632 AS TO AN UNDIVIDED ONE-HALF INTEREST;

APN: 329-110-019-0

EASEMENT NOTES

1. AN 8' WIDE EASEMENT FOR EITHER OR BOTH POLE LINES, CONDUITS OR UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED OCTOBER 31, 1978 AS INSTRUMENT NO. 229731 OF O.R.
2. AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED MAY 7, 1979 AS INSTRUMENT NO. 101549 OF OFFICIAL RECORDS. ** BLANKET IN NATURE - AFFECTS THE E'LY 193.00' OF SUBJECT PROPERTY **
3. A 25' EASEMENT FOR PIPELINES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED JUNE 24, 1981 AS INSTRUMENT NO. 121219 OF OFFICIAL RECORDS.
4. AN 8' EASEMENT FORE EITHER OR BOTH POLE LINES, CONDUITS OR UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED DECEMBER 12, 1984 AS INSTRUMENT NO. 265635 OF OFFICIAL RECORDS.
5. A 25' EASEMENT FOR ROAD AND PIPELINES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED MAY 2, 1985 AS INSTRUMENT NO. 93530 OF OFFICIAL RECORDS.

OWNER/APPLICANT

PALOMARMAR, LP
764 W RAMONA EXPRESSWAY SUITE "C"
PERRIS, CA 92571
CONTACT: MARWAN ALABBASI
PHONE: 951-776-9300

SOILS ENGINEER

EARTH STRATA GEOTECHNICAL SERVICES, INC.
42184 REMINGTON AVENUE
TEMECULA, CA 92590
CONTACT: STEPHEN M. POOLE
PHONE: 951-347-8315

A.P.N.

329-110-019-0

ACREAGE

GROSS AREA	3.8 AC
NET AREA	3.8 AC

ENGINEER

ALBERT A. WEBB ASSOCIATES
3788 MCCRAY STREET
RIVERSIDE, CA 92506
CONTACT: JENNIFER GILLEN
PHONE: 951-686-1070

TOPOGRAPHY SOURCE

TOPOGRAPHY FLOWN BY INLAND AERIAL SURVEYS, INC. ON 04/27/18

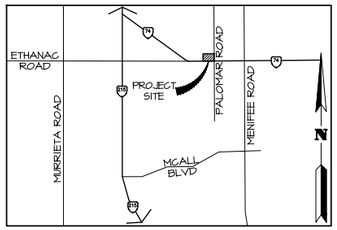
LAND USE

EXISTING LAND USE: SP260
EXISTING ZONING: SP 260

PROPOSED LAND USE: COMMERCIAL
PROPOSED ZONING: C-P-S (HIGHWAY COMM.)

SCHOOL DISTRICT

ROMOLAND SCHOOL DISTRICT
PERRIS UNION HIGH SCHOOL DISTRICT

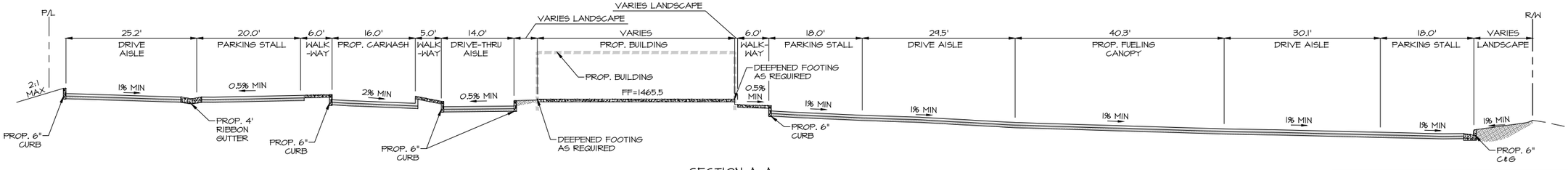


VICINITY MAP
NTS
SECTION 11 T5S R3W

SHEET INDEX

ABBREVIATIONS

AC	ACRE
C&G	CURB AND GUTTER
C/L	CENTERLINE
EX.	EXISTING
FH	FIRE HYDRANT
IOD	IRREVOCABLE OFFER OF DEDICATION
OHE	OVERHEAD ELECTRICAL
PROP.	PROPOSED
R/W	RIGHT OF WAY
SD	STORM DRAIN
SF	SQUARE FEET
S/L	STREET LIGHT
SWR	SANITARY SEWER
S/W	SIDEWALK
WTR	WATER
WQ	WATER QUALITY



SECTION A-A
NTS

SECTION B-B
NTS

REVISIONS	DATE	BY

CITY OF MENIFEE
COUNTY OF RIVERSIDE

MOTTE COUNTRY PLAZA
PLOT PLAN NO. 2018-300
TITLE SHEET & SECTIONS

SCALE: 1"=100'	ALBERT A. WEBB ASSOCIATES	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE, CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	W.O. 18-0099
DATE: 5/21/2020			SHEET 1
DESIGNED: AYS			OF 5 SHEETS
CHECKED: JRG			DWG. NO.
PLN CK REF: REF			
F.B. F.B.			

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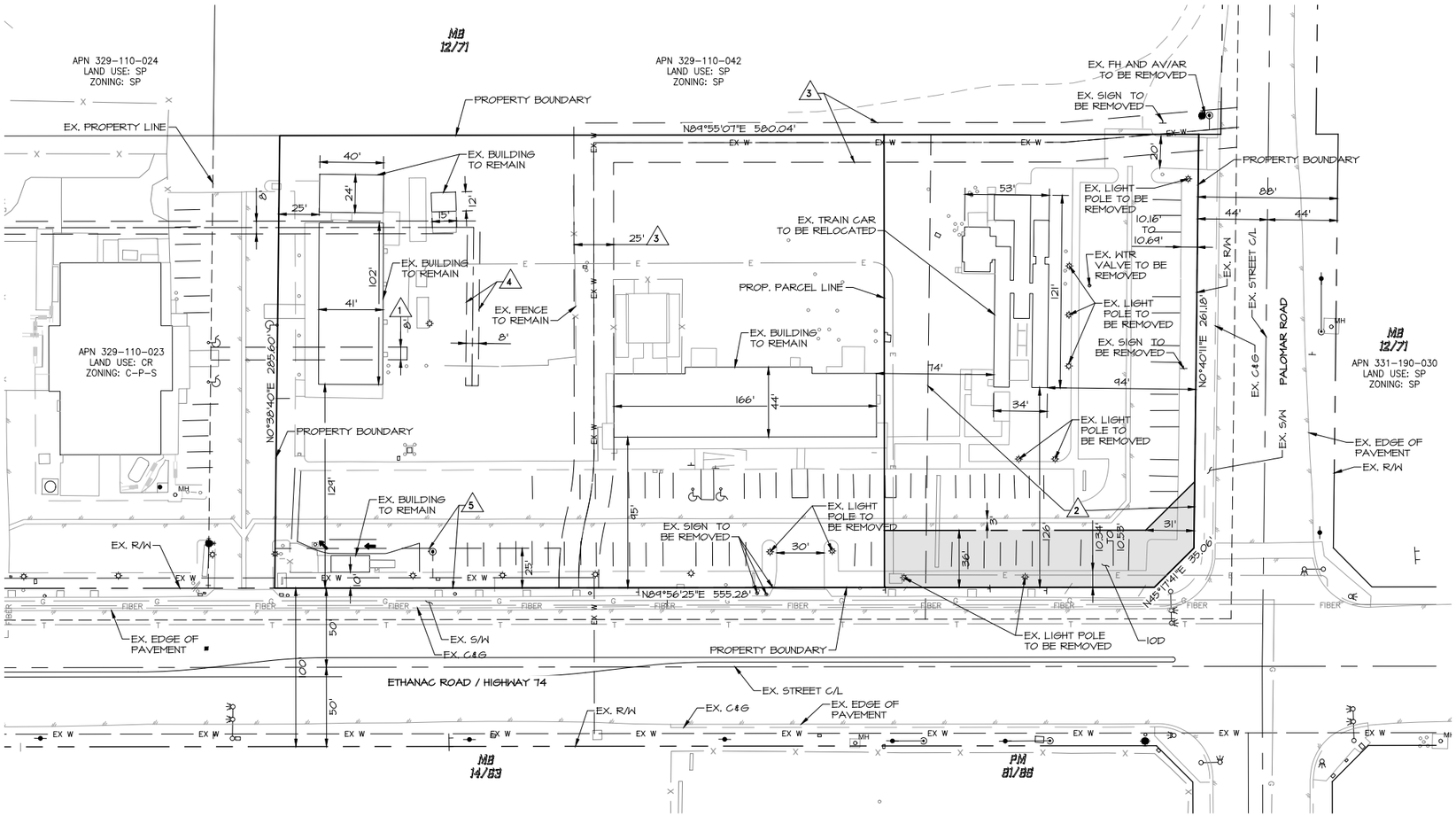

LEGEND

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- IRREVOCABLE OFFER OF DEDICATION (IOD)
- EXISTING CENTERLINE
- EX W — EXISTING WATER LINE
- EDGE OF EXISTING PAVEMENT
- EXISTING EASEMENT
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S/W	SIDEWALK
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EASEMENT NOTES

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2. AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED MAY 7, 1979 AS INSTRUMENT NO. 101549 OF OFFICIAL RECORDS.
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5. A 25' EASEMENT FOR ROAD AND PIPELINES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED MAY 2, 1985 AS INSTRUMENT NO. 93530 OF OFFICIAL RECORDS.

N
W WEBB E
S

1" = 40'

20 0 40 80 120

REVISIONS	DATE	BY

CITY OF MENIFEE
COUNTY OF RIVERSIDE

MOTTE COUNTRY PLAZA
PLOT PLAN NO. 2018-300
EXISTING SITE PLAN

SCALE:	1" = 40'
DATE:	5/21/2020
DESIGNED:	AYS
CHECKED:	JRG
PLN CK REF:	REF
F.B.	F.B.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

W.O.	18-0099
SHEET	2
OF	5 SHEETS
DWG. NO.	

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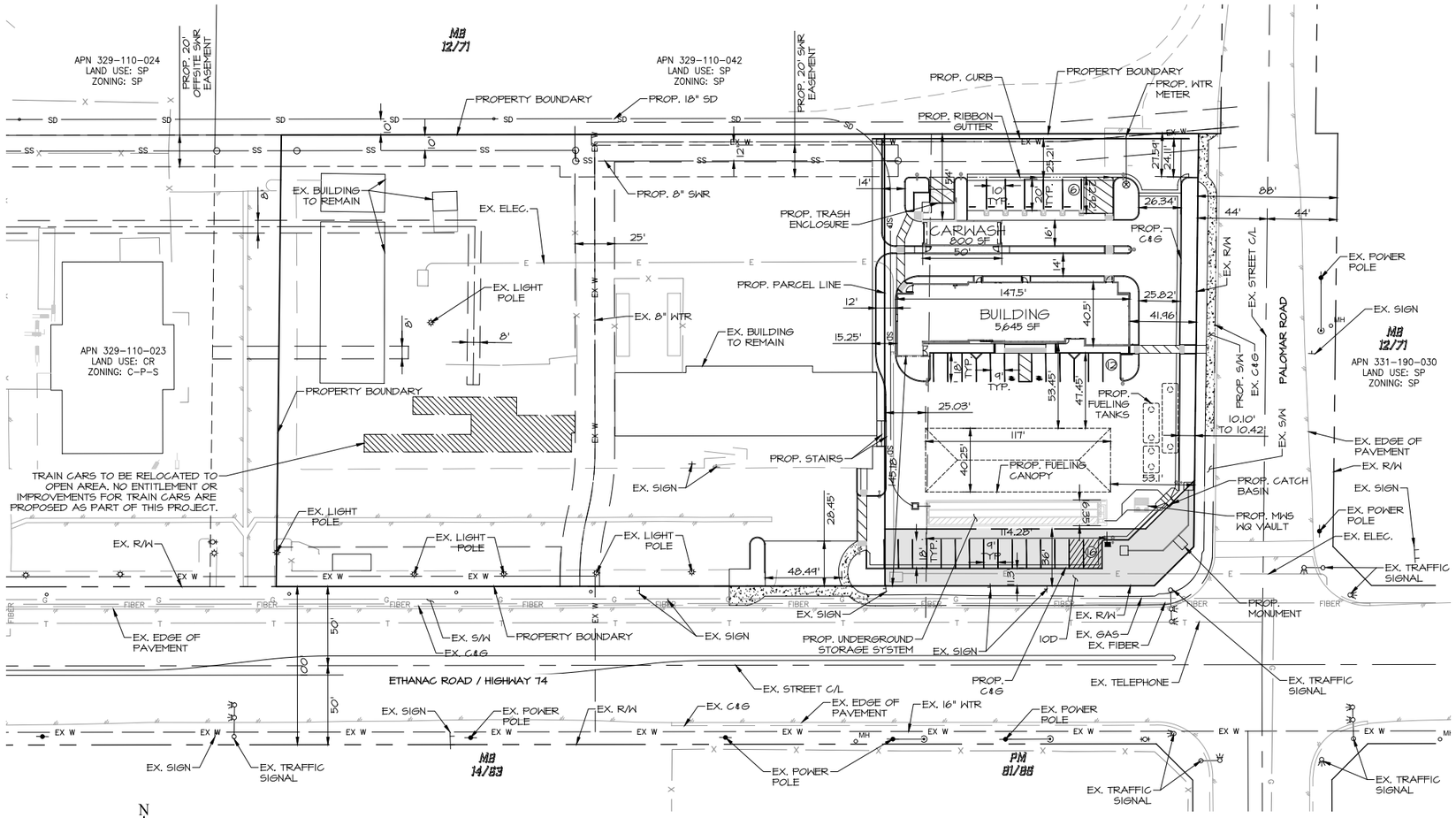
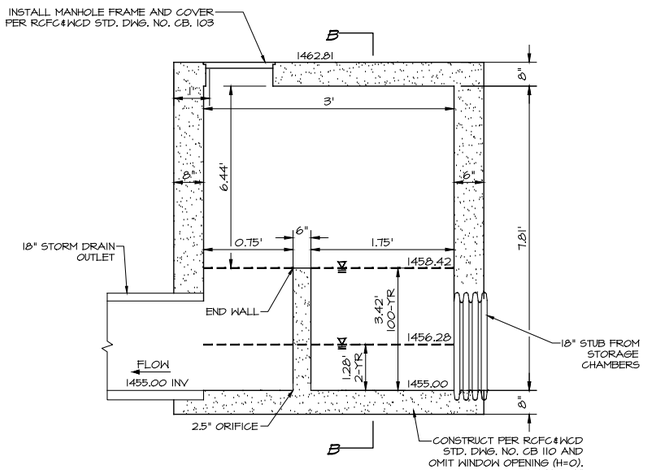
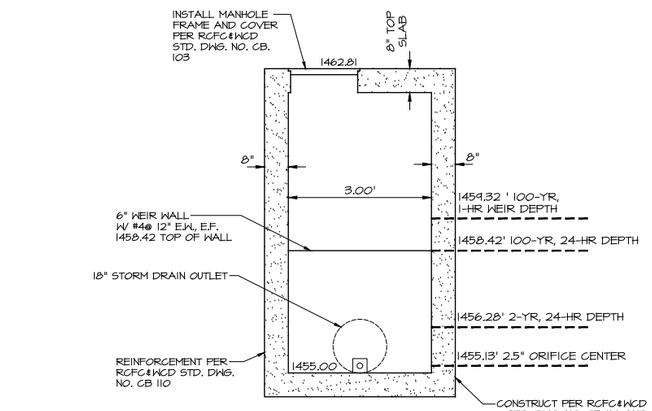
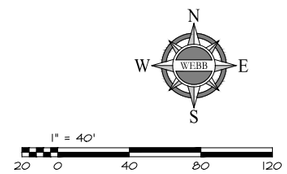




OUTLET STRUCTURE (PROFILE VIEW)
N.T.S.





ABBREVIATIONS

AC	ACRE
C&G	CURB AND GUTTER
C/L	CENTERLINE
EX.	EXISTING
FH	FIRE HYDRANT
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S/L	STREET LIGHT
SWR	SANITARY SEWER
S/W	SIDEWALK
WTR	WATER
WQ	WATER QUALITY

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- PROPOSED WATER METER
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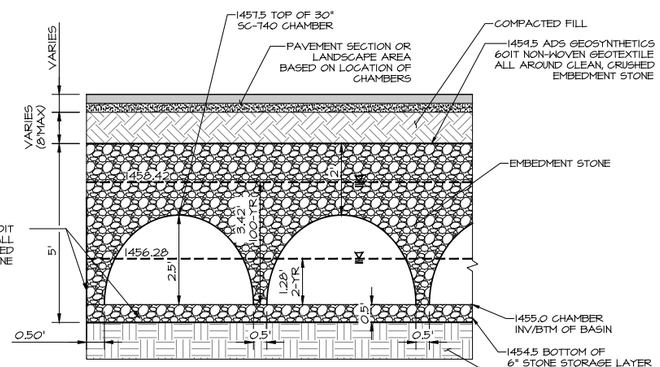
- IRREVOCABLE OFFER OF DEDICATION (IOD)
- NUMBER OF PARKING SPACES IN EACH ROW



UNDERGROUND STORAGE CROSS SECTION
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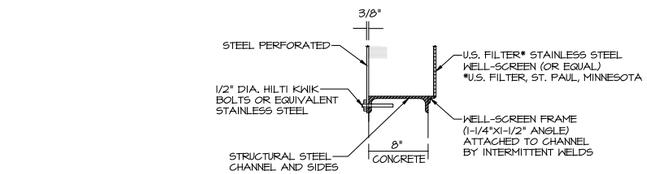
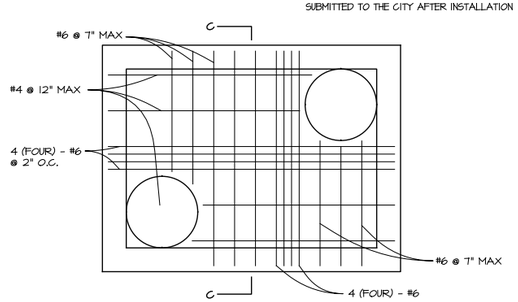


DETAIL A
N.T.S.

* A CERTIFICATION FROM MFG MUST BE SUBMITTED TO THE CITY AFTER INSTALLATION



TOP SLAB BOTTOM REINFORCEMENT
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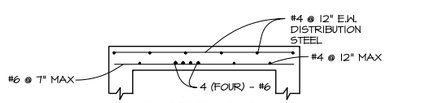
SECTION B-B
N.T.S.



SECTION C-C
N.T.S.

REVISIONS	DATE	BY

CITY OF MENIFEE
COUNTY OF RIVERSIDE

MOTTE COUNTRY PLAZA
PLOT PLAN NO. 2018-300
PROPOSED SITE PLAN

SCALE:	1" = 40'
DATE:	5/21/2020
DESIGNED:	AYS
CHECKED:	JRG
PLN CK REF:	REF
F.B.	F.B.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

W.O.	18-0099
SHEET	3
OF	5 SHEETS
DWG. NO.	

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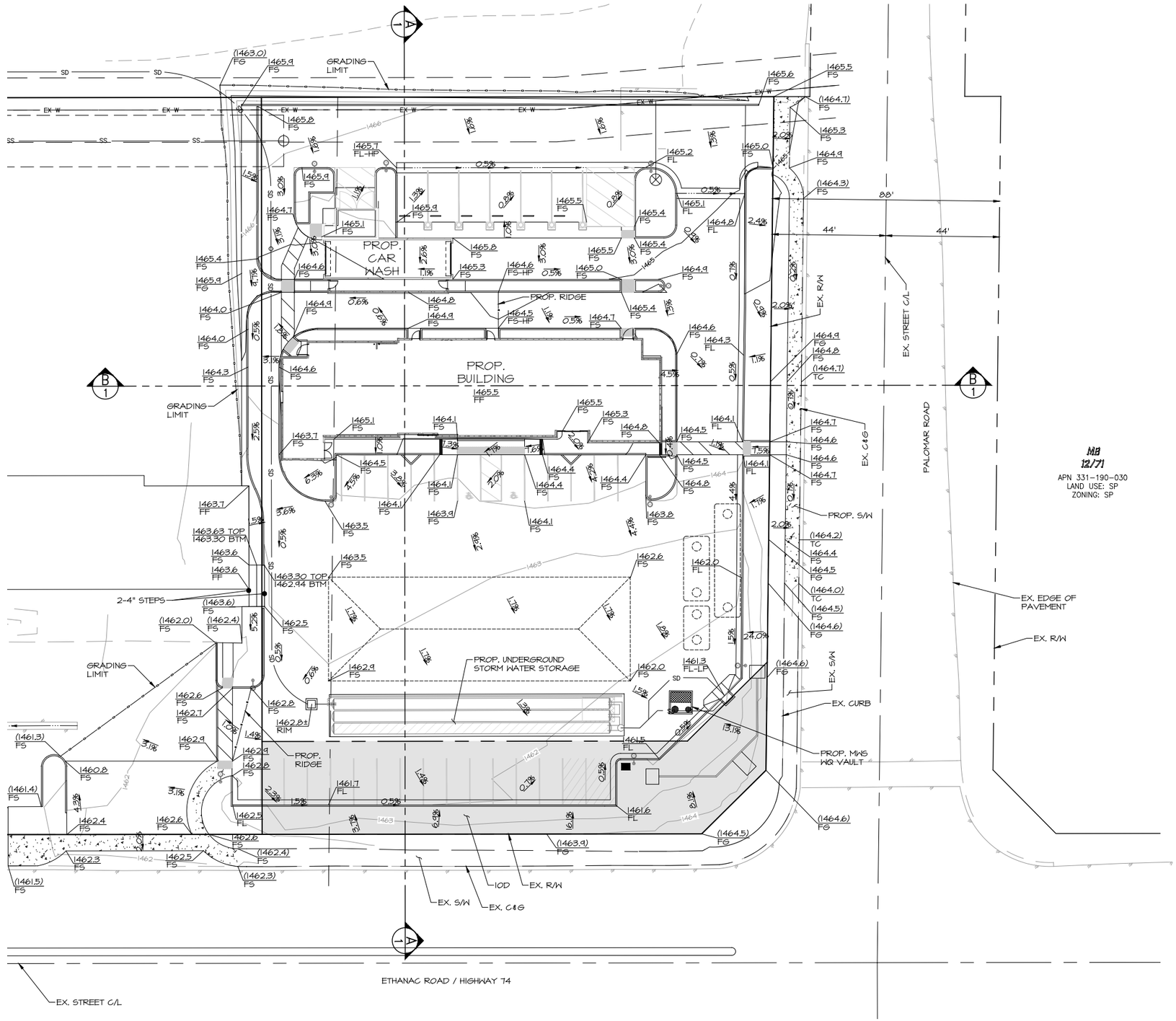

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- (15) NUMBER OF PARKING SPACES IN EACH ROW

MB
12/71

APN 331-190-030
LAND USE: SP
ZONING: SP

ABBREVIATIONS

AC	ACRE
C&G	CURB AND GUTTER
C/L	CENTERLINE
EX.	EXISTING
FH	FIRE HYDRANT
IOD	IRREVOCABLE OFFER OF DEDICATION
OHE	OVERHEAD ELECTRICAL
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S/L	STREET LIGHT
SWR	SANITARY SEWER
S/W	SIDEWALK
WTR	WATER
WQ	WATER QUALITY

N
W WEBB E
S

1" = 20'
10 0 20 40 60

REVISIONS	DATE	BY

CITY OF MENIFEE
COUNTY OF RIVERSIDE

MOTTE COUNTRY PLAZA
PLOT PLAN NO. 2018-300
CONCEPTUAL GRADING

SCALE:	1" = 20'
DATE:	5/21/2020
DESIGNED:	AYS
CHECKED:	JRG
PLN CK REF:	REF
F.B.	F.B.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
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W.O.	18-0099
SHEET	4
OF	5 SHEETS
DWG. NO.	

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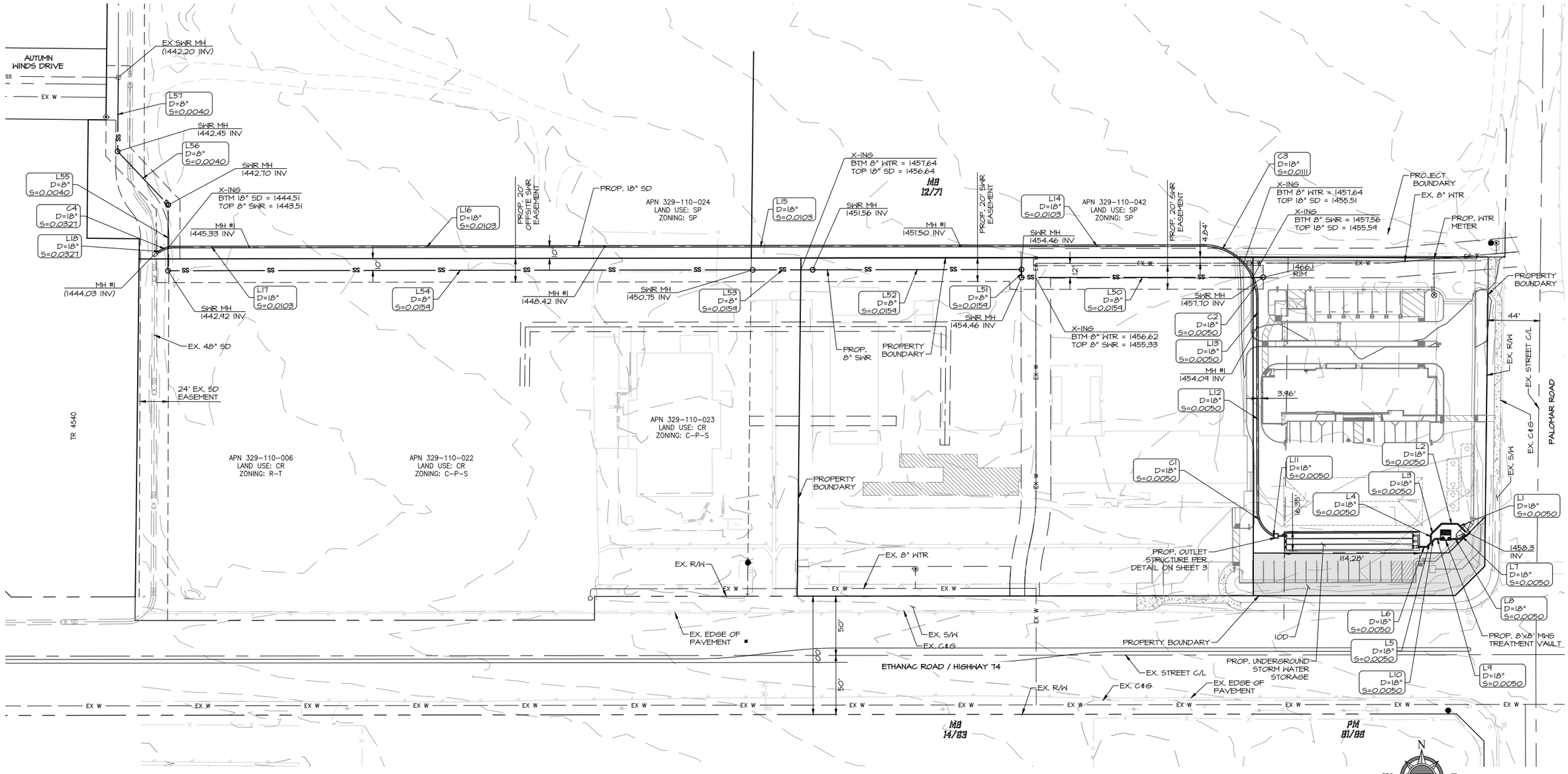

SD LINE AND CURVE DATA				
LINE #/CURVE #	LENGTH	RADIUS	BEARING/DELTA	TANGENT
C1	23.54	22.50	59°57'03"	12.98
C2	33.01	45.00	42°01'34"	17.29
C3	37.66	45.00	47°56'51"	20.01
C4	11.66	22.50	29°42'03"	5.97
L1	9.13		N44°31'50"W	
L2	13.66		N89°31'50"W	
L3	12.68		N45°28'10"E	
L4	7.28		N00°28'10"E	
L5	4.83		N45°28'10"E	
L6	7.28		N89°31'50"W	
L7	5.43		N45°28'10"E	
L8	8.53		N89°31'50"W	

SD LINE AND CURVE DATA				
LINE #/CURVE #	LENGTH	RADIUS	BEARING/DELTA	TANGENT
L9	5.00		N89°31'50"W	
L10	4.83		N45°28'10"E	
L11	3.05		N60°03'34"W	
L12	155.59		N00°06'29"W	
L13	23.72		N00°06'29"W	
L14	205.62		N89°55'07"E	
L15	300.00		N89°55'07"E	
L16	300.00		N89°55'07"E	
L17	63.27		N89°55'07"E	
L18	6.14		N60°13'04"E	

SEWER LINE TABLE		
LINE #	LENGTH	DIRECTION
L50	203.90	N89° 56' 25"E
L51	6.79	N00° 04' 53"W
L52	176.27	N89° 55' 07"E
L53	50.64	N89° 55' 07"E
L54	493.41	N89° 55' 07"E
L55	55.56	N00° 14' 03"E
L56	62.13	N43° 21' 09"W
L57	62.50	N00° 27' 18"E

LEGEND

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REVISIONS	DATE	BY

CITY OF MENIFEE
COUNTY OF RIVERSIDE

MOTTE COUNTRY PLAZA
PLOT PLAN NO. 2018-300
PRELIMINARY UTILITY PLAN

SCALE:	1" = 40'
DATE:	5/21/2020
DESIGNED:	AYS
CHECKED:	JRG
PLN CK REF:	REF
F.B.	F.B.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
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FAX (951) 788-1256

W.O. 18-0099
SHEET 5
OF 5 SHEETS
DWG. NO.

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Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Earth Strata Geotechnical Services, Inc.
Geotechnical, Environmental and Materials Testing Consultants

November 5, 2018

Project No. 182141-12A

Ms. Carissa Hainsworth
MIKE NAGGAR & ASSOCIATES
445 South D Street
Perris, CA 92570

Subject: Interpretive Report for Infiltration System Design, Proposed Convenience Store, Restaurant and Car Wash, Assessor's Parcel Numbers 329-110-019 and 329-110-023, Lot Numbers 93 and 94 of Romola Farms Subdivision, Located at 28480 and 28380 Highway 74, City of Menifee, Riverside County, California

Earth Strata Geotechnical Services, Inc. is pleased to present this infiltration feasibility report for the proposed commercial development, Assessor's Parcel Numbers 329-110-019 and 329-110-023, located at 28480 and 28380 Highway 74 in the City of Menifee, Riverside County, California. The purpose of our study was to determine the infiltration rates and physical characteristics of the subsurface earth materials within the proposed development. We have provided guidelines for the design of onsite bio swale retention systems, where applicable. This study is intended to provide onsite infiltration rates for the earth materials at the approximate depth near the proposed WQMP areas.

PROPERTY DESCRIPTION

The subject property is located at 28480 and 28380 Highway 74 in the City of Menifee, Riverside County, California. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The subject property is comprised of approximately 5.53 acres of partially developed land. The site has been graded. Topographic relief at the subject property is relatively low with the terrain being generally flat. Elevations at the site range from approximately 1,460 to 1465 feet above mean sea level (msl), for a difference of about 5± feet across the entire site. Drainage within the subject property generally flows to the southwest.

The site is currently bordered by residential development to the west, commercial development to the south, as well as vacant property to the north and east. Most of the vegetation on the site consists of moderate amounts of annual weeds/grasses, along with small to large trees bordering the north and east portion of the subject site.

PROPOSED CONSTRUCTION

The proposed commercial development is expected to consist of concrete, wood or steel framed one- and/or two-story structures utilizing slab on grade construction with associated streets, landscape areas, and utilities. The current development plans include a gas station in the eastern portion of the subject site, along with three (3) future development areas positioned throughout the site.

SUBSURFACE EXPLORATION AND INFILTRATION TESTING

SUBSURFACE EXPLORATION

Subsurface exploration within the subject site was performed on April 12 and April 16, 2018 for the exploratory excavations. A truck mounted hollow-stem-auger drill rig was utilized to drill five (5) borings throughout the site to a maximum depth of 21.5 feet. The exploratory holes were excavated for geotechnical evaluation purposes with respect to the proposed developments and to interpret whether groundwater or impermeable soil layers were present. An underground utilities clearance was obtained from Underground Service Alert of Southern California, prior to the subsurface exploration. The approximate locations of the exploratory excavations are shown on the attached Infiltration Location Map, Plate 1 and descriptive logs are presented in Appendix A.

Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions may have been reconciled to reflect laboratory test results with regard to ASTM D 2487.

EARTH MATERIALS

The earth materials on the site are primarily comprised of artificial fill and Quaternary alluvial materials. A general description of the dominant earth materials observed on the site is provided below:

- Artificial Fill, Undocumented (map symbol Afu): Undocumented artificial fill materials were encountered throughout the site within the upper 2 to 4 feet during exploration. These materials are typically locally derived from the native materials and consist generally of light brown to reddish brown silty clayey sand.

- Quaternary Old Alluvial Fan Deposits (map symbol Qof): Quaternary old alluvial fan deposits were encountered beneath the undocumented artificial to the full depth of exploration. These old fan deposits consist predominately of interlayered reddish brown to dark brown, fine to coarse grained clayey sand, silty sand, sandy silt, and occasional poorly-graded sand. These deposits were generally noted to be in a dry to moist, medium dense to very dense state.

GROUNDWATER

Groundwater was not observed during our subsurface exploration.

INFILTRATION TESTING

The percolation testing method per Riverside County Health Department guidelines, with the Porchet Method conversion, was utilized to perform a total of eight (8) percolation tests on November 6 and 7, 2018 to evaluate near surface infiltration rates in order to estimate the amount of storm water runoff that can infiltrate into the WQMP areas. The percolation tests were performed in general accordance with the requirements of Appendix A of the Design Handbook for Low Impact Development Best Management Practices, prepared by Riverside County Flood Control and Water Conservation District. The percolation tests were performed within 5-foot-deep, 8- inch diameter tests holes. The final percolation test reading and infiltration rate is summarized in the following table and the test data recorded in the field is included in Appendix B.

INFILTRATION TEST SUMMARY

The following equation was used in order to convert the percolation rates to infiltration rates.

$$I_t = \frac{\Delta H\,(60)\,r}{\Delta t\,(r + 2Havg)}$$

TEST NUMBER	PERCOLATION HOLE DIAMETER (inches)	INFILTRATION HOLE DEPTH (ft.)	INFILTRATION RATE (in/hour)	DESCRIPTION
I-1	8	5	0.31	Silty SAND
I-2	8	5	0.18	Silty SAND
I-3	8	5	0.22	Silty SAND
I-4	8	5	0.06	Silty SAND
I-5	8	5	0.12	Silty SAND
I-6	8	5	0.17	Silty SAND
I-7	8	5	0.08	Silty SAND
I-8	8	5	0.06	Silty SAND

The infiltration test rates ranged from 0.06 to 0.31 inches per hour.

CONCLUSIONS AND RECOMMENDATIONS

General

From geotechnical and engineering geologic points of view, the proposed WQMP areas, where tested, is considered suitable for partial infiltration for the proposed development, provided the following conclusions and recommendations are incorporated into the plans and are implemented during construction.

Groundwater

Groundwater was not observed during our subsurface exploration. Potential groundwater impact is considered very low to low. Local well data indicates regional groundwater highs of approximately 46 feet below existing ground surface which meets the minimum separation of greater than 10 feet from the bottom of infiltration facility to the groundwater mark.

Geologic/ Geotechnical Screening

The proposed WQMP areas (see Plate 1) are located at a lower elevation than the proposed structures in competent native earth materials.

The proposed structures will be supported by compacted fill and competent earth materials, with groundwater at a depth of approximately 46 feet. According to the County of Riverside reports, the subject site is located in an area where liquefaction potential is considered low. As such, the potential for earthquake induced liquefaction and lateral spreading beneath the proposed structures is considered low due to the

recommended compacted fill, relatively low groundwater level, and the dense nature of the deeper onsite earth materials.

Preliminary laboratory test results indicate onsite earth materials exhibit an expansion potential of **LOW** as classified in accordance with 2016 CBC Section 1803.5.3 and ASTM D4829.

Therefore, infiltration within the proposed WQMP areas will not encroach on any proposed structures and will not increase the risk of geologic hazards.

Recommended Factor of Safety

The recommended factor of safety for the infiltration design is 3.

Based on the data presented in this report and the recommendations set forth herein, it is the opinion of Earth Strata Geotechnical Services that the WQMP area can be designed for an infiltration rate of 0.26 inches per hour in the vicinity of P-1, P-2, P-3, and P-4 and 0.14 inches per hour in the vicinity of P-5, P-6, P-7, and P-8.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **Ms. Carissa Hainsworth** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth Strata Geotechnical Services should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth-Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Earth Strata Geotechnical Services should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth Strata Geotechnical Services should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth-Strata during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

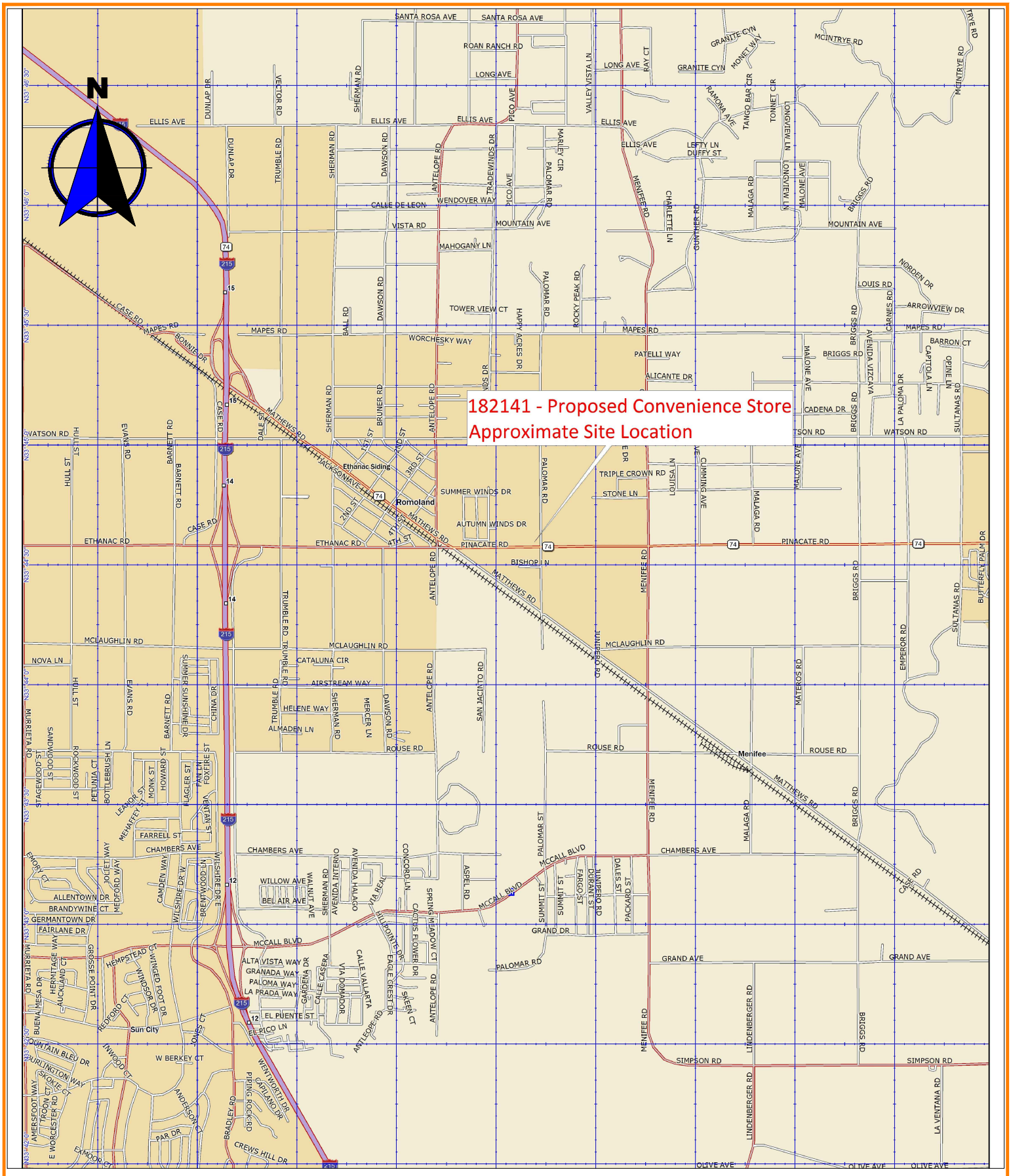
EARTH STRATA GEOTECHNICAL SERVICES, INC.

Stephen M. Poole, PE 40219
President
Principal Engineer

SMP/jf

Distribution: (4) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix A - Exploratory Logs *(Rear of Text)*
Appendix B – Infiltration Test Sheets *(Rear of Text)*
Plate 1 – Infiltration Location Map *(Rear of Text)*



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PROPOSED CONVENIENCE STORE | 182141-12A

VICINITY MAP | SCALE 1:40,625

APR 2018 | FIGURE 1

APPENDIX A

EXPLORATORY LOGS

Geotechnical Boring Log B-1

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0		0-5'				**Artificial Fill, Undocumented (Afu):**
					SC	Clayey SAND; dark brown, slightly moist, medium dense, fine to coarse sand,
	19	2.5'	121.7	9.1		trace gravel
						Quaternary Old Alluvial Fan Deposits (Qof):
					SP-SC	Poorly-graded SAND with Clay; strong brown, dry, very dense, fine to coarse sand,
5	71/11"	5'	120.5	7.0		trace gravel
	47	7.5'	116.3	11.6		
					SM	Silty SAND; strong brown, dry, very dense, fine to coarse sand, trace clay and gravel
10	97/9"	10'	111.3	9.2		
15	90/9"	15'	113.5	11.2		
20	50/6"	20'	97.8	12.7		
						Total Depth: 21 feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-2

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; dark brown, slightly moist, dense, fine to coarse sand,
	44	2.5'	114.8	6.6		trace clay and gravel
						Quaternary Old Alluvial Fan Deposits (Qof):
					SM	Silty SAND; strong brown, dry, very dense, fine to coarse sand
5	50/3"	5'	107.5	6.6		
	50/5"	7.5'			SC	Clayey SAND; dark brown, dry, very dense, fine to coarse sand
10	50/6"	10'	105.3	5.9		
					SM	Silty SAND; stron brown, slightly moist, very dense, fine to coarse sand, trace clay
15	50/5.5"	15'	116.0	10.2		
20	87	20'	103.2	9.5	ML	Sandy SILT; yellowish brown, dry, very dense, fine to medium sand, trace clay
						Total Depth: 21.5 feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-3

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; light brown, dry, medium dense, fine to medium sand
	43	2.5'	115.5	1.5		Dense below 3 feet
5						**Quaternary Old Alluvial Fan Deposits (Qof):**
	80	5'	125.2	6.7	SC	Clayey SAND; dark brown, dry, very dense, fine to coarse sand
	41	7.5'	120.9	12.1	SP-SM	Poorly-graded SAND with Silt; brown, moist, dense, fine to coarse sand
10	83/5"	10'	108.6	12.8		
15	52	15'	107.2	19.1	SM	Silty SAND; brown, moist, very dense, fine to medium sand, trace clay
20	70	20'	106.0	15.5	ML	Sandy SILT; brown, moist, very dense, fine to coarse sand
						Total Depth: 21.5 feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-4

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; medium brown, slightly moist, medium dense, fine to coarse sand
	15	2.5'	115.0	7.1		
5	21	5'	120.8	11.8		**Quaternary Old Alluvial Fan Deposits (Qof):**
					SC	Clayey SAND; dark brown, slightly moist, medium dense, fine to coarse sand
	28	7.5'	126.8	10.1		
10	67	10'	130.2	9.4		Very dense below 10 feet
						Clay nodules below 12 feet
15	84	15	118.3	14.9		
						Total Depth: 16.5 feet
						No Groundwater
20						
25						
30						

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Geotechnical Boring Log B-5

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; reddish brown, slightly moist, medium dense, fine to coarse sand
	26	2.5'	121.6	5.7		**Quaternary Old Alluvial Fan Deposits (Qof):**
					SM	Silty SAND; brown, slightly moist, medium dense, fine to coarse sand, trace clay
5	30	5'	126.4	3.8		
	62	7.5'	112.9	11.1		Very dense below 7 feet
					SC	Clayey SAND; reddish brown, slightly moist, very dense, fine to coarse sand
10	89/10"	10'	110.7	9.6		
					ML	Sandy SILT; reddish brown, slightly moist, very dense, fine to coarse sand
15	79/11"	15'	99.8	20.3		
						Total Depth: 16.5 feet
						No Groundwater
20						
25						
30						

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APPENDIX B

INFILTRATION TEST SHEETS

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-1
Soil Classification: Silty SAND
Test Hole Depth (in): 48

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start 11/6/18 10:00
Stop 11/7/18 14:00

Amount of Water Used / Comments
APPROX. 200 Gallons

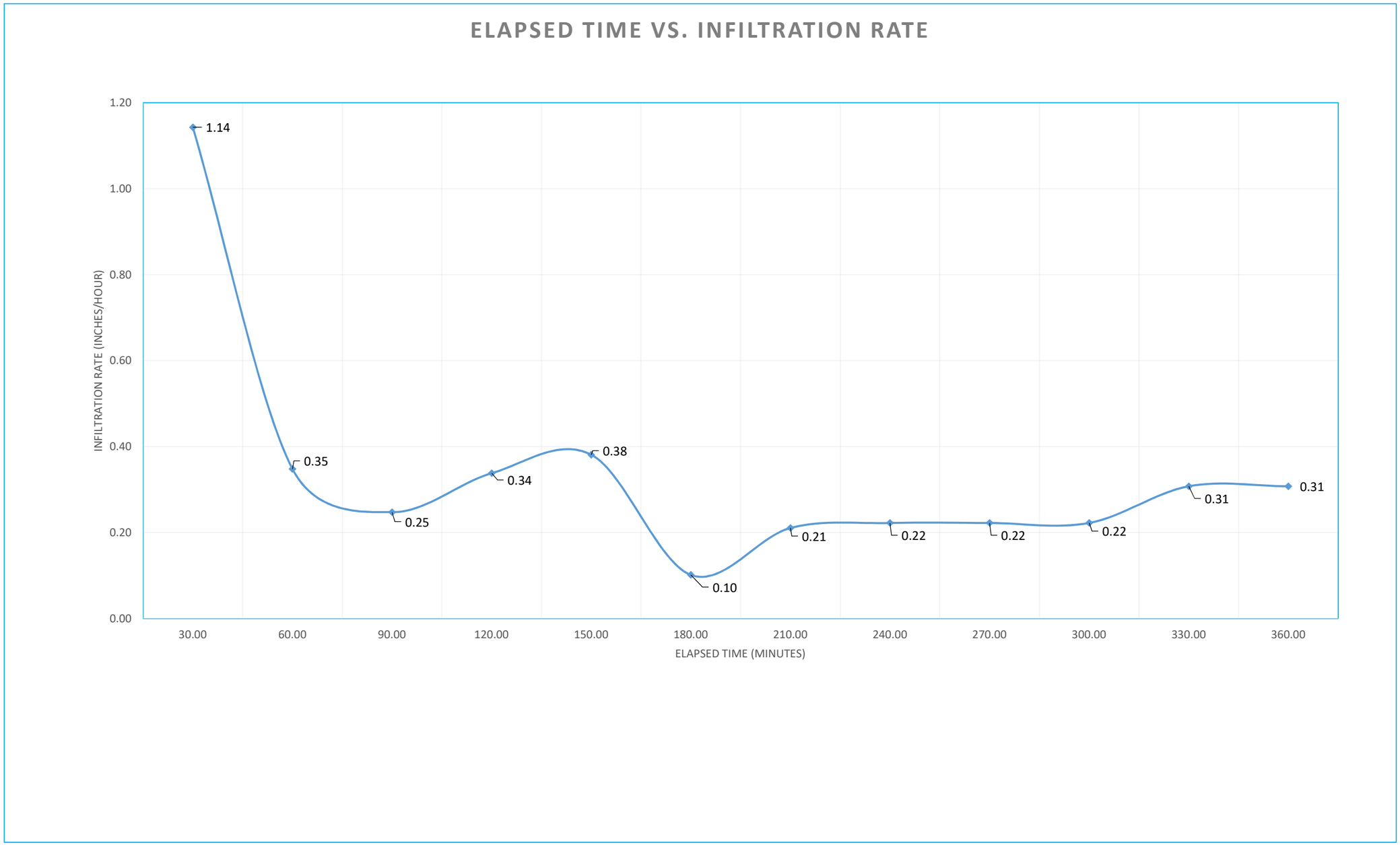
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:00 10:30	30	30	38	8.00	4	60.00
10:30 11:00	30	38	40	2.00	15	60.00
11:00 11:30	30	37.	38.5	1.50	20	60.00
11:30 12:00	30	38.5	40	1.50	20	55.00
12:00 12:30	30	35	37	2.00	15	55.00
12:30 13:00	30	37	37.5	0.50	60	55.00
13:00 13:30	30	37.5	38.5	1.00	30	55.00
13:30 14:00	30	38.5	39.5	1.00	30	55.00
14:00 14:30	30	38.5	39.5	1.00	30	55.00
14:30 15:00	30	38.5	39.5	1.00	30	55.00
15:00 15:30	30	38.5	39.5	1.00	30	50.00
15:30 16:00	30	38.5	39.5	1.00	30	50.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	30.00	22.00	60.00	4.00	8.00	26.00	1.14	30.00
30.00	22.00	20.00	60.00	4.00	2.00	21.00	0.35	60.00
30.00	23.00	21.50	60.00	4.00	1.50	22.25	0.25	90.00
30.00	16.50	15.00	55.00	4.00	1.50	15.75	0.34	120.00
30.00	20.00	18.00	55.00	4.00	2.00	19.00	0.38	150.00
30.00	18.00	17.50	55.00	4.00	0.50	17.75	0.10	180.00
30.00	17.50	16.50	55.00	4.00	1.00	17.00	0.21	210.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	240.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	270.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	300.00
30.00	11.50	10.50	50.00	4.00	1.00	11.00	0.31	330.00
30.00	11.50	10.50	50.00	4.00	1.00	11.00	0.31	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-1



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-2
Soil Classification: Silty SAND
Test Hole Depth (in): 48

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

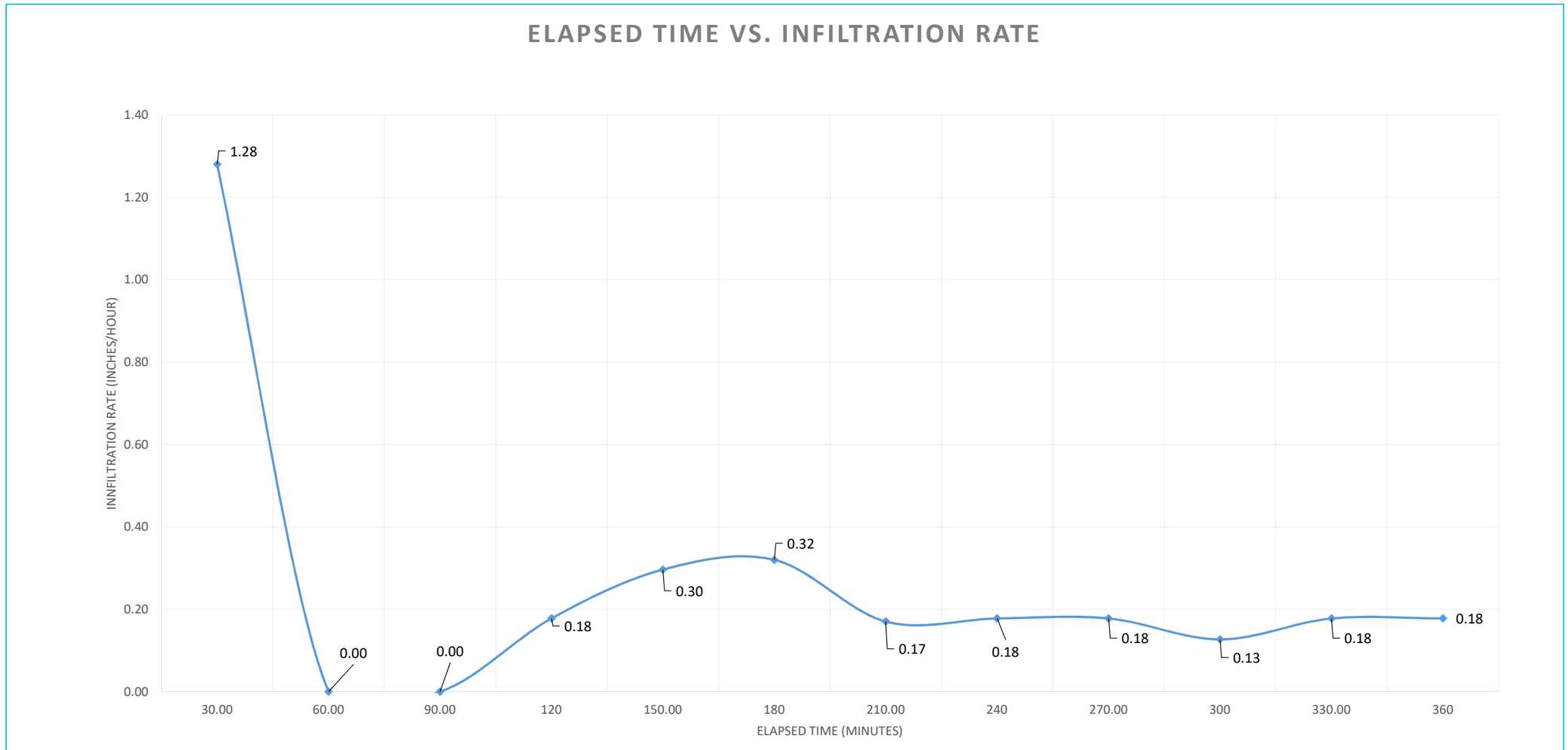
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:01						
10:31	30	28	36	8.00	4	55.00
10:31						
11:01	30	36	36	0.00	#DIV/0!	55.00
11:01						
11:31	30	34	34	0.00	#DIV/0!	55.00
11:31						
12:01	30	34	35	1.00	30	55.00
12:01						
12:31	30	29	31	2.00	15	55.00
12:31						
13:01	30	31	33	2.00	15	55.00
13:01						
13:31	30	33	34	1.00	30	55.00
13:31						
14:01	30	34	35	1.00	30	55.00
14:01						
14:31	30	34	35	1.00	30	55.00
14:31						
15:01	30	34	35	1.00	30	5.00
15:01						
15:31	30	34	35	1.00	30	55.00
15:31						
16:01	30	34	35	1.00	30	55.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	27.00	19.00	55.00	4.00	8.00	23.00	1.28	30.00
30.00	19.00	19.00	55.00	4.00	0.00	19.00	0.00	60.00
30.00	21.00	21.00	55.00	4.00	0.00	21.00	0.00	90.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	120.00
30.00	26.00	24.00	55.00	4.00	2.00	25.00	0.30	150.00
30.00	24.00	22.00	55.00	4.00	2.00	23.00	0.32	180.00
30.00	22.00	21.00	55.00	4.00	1.00	21.50	0.17	210.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	240.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	270.00
30.00	-29.00	-30.00	5.00	4.00	1.00	29.50	0.13	300.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	330.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-2



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-3
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

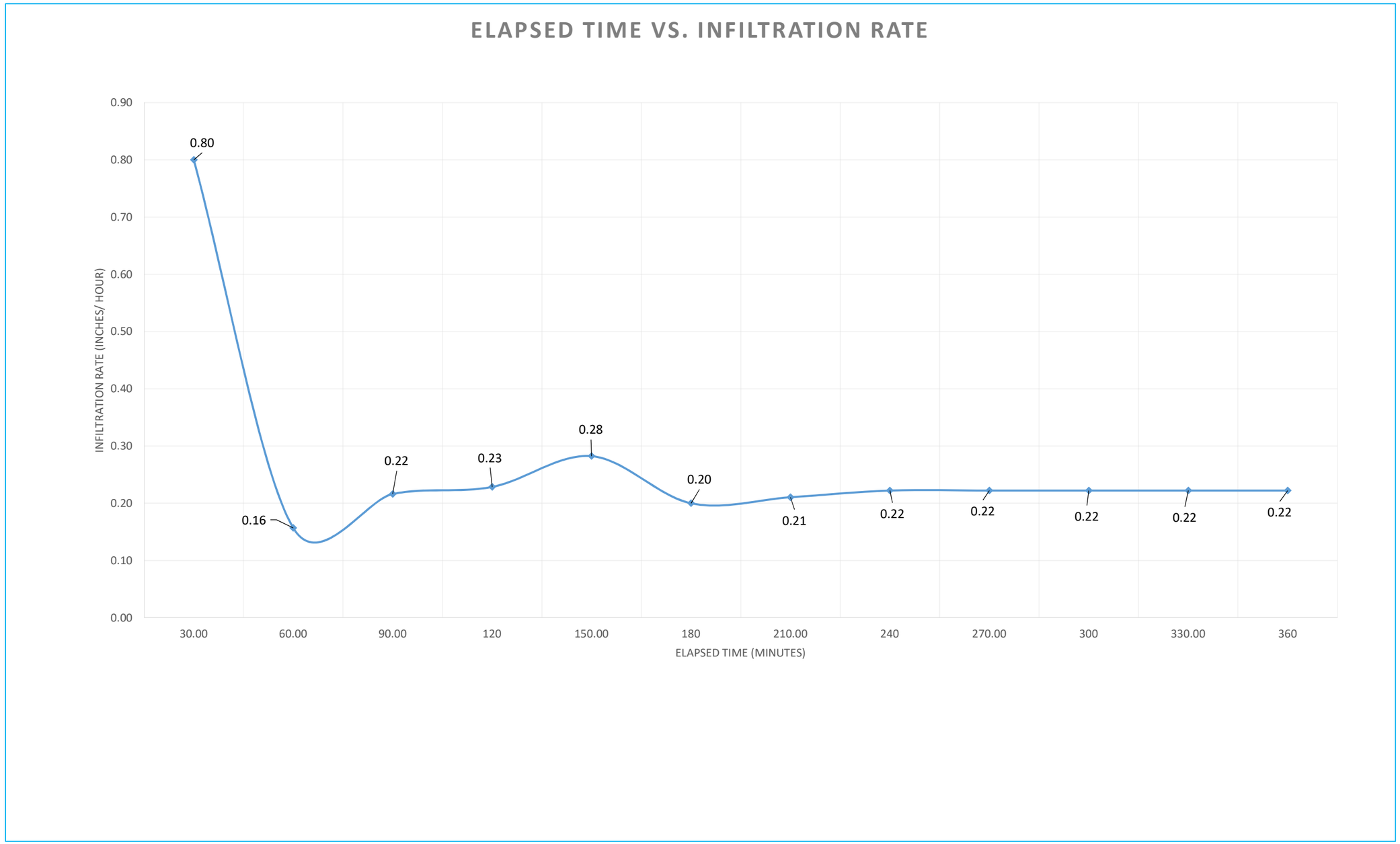
Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:02						
10:32	30	40	44	4.00	8	60.00
10:32						
11:02	30	44	44.5	0.50	60	55.00
11:02						
11:32	30	38	39	1.00	30	55.00
11:32						
12:02	30	39	40	1.00	30	55.00
12:02						
12:32	30	35	36.5	1.50	20	55.00
12:32						
13:02	30	36.5	37.5	1.00	30	55.00
13:02						
13:32	30	37.5	38.5	1.00	30	55.00
13:32						
14:02	30	38.5	39.5	1.00	30	55.00
14:02						
14:32	30	38.5	39.5	1.00	30	55.00
14:32						
15:02	30	38.5	39.5	1.00	30	55.00
15:02						
15:32	30	38.5	39.5	1.00	30	55.00
15:32						
16:02	30	38.5	39.5	1.00	30	55.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	20.00	16.00	60.00	4.00	4.00	18.00	0.80	30.00
30.00	11.00	10.50	55.00	4.00	0.50	10.75	0.16	60.00
30.00	17.00	16.00	55.00	4.00	1.00	16.50	0.22	90.00
30.00	16.00	15.00	55.00	4.00	1.00	15.50	0.23	120.00
30.00	20.00	18.50	55.00	4.00	1.50	19.25	0.28	150.00
30.00	18.50	17.50	55.00	4.00	1.00	18.00	0.20	180.00
30.00	17.50	16.50	55.00	4.00	1.00	17.00	0.21	210.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	240.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	270.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	300.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	330.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	360.00

Job No.: 182141-12A

Job Name: HWY 74 & PALOMAR ROAD

Test Hole Number: P-3



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-4
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

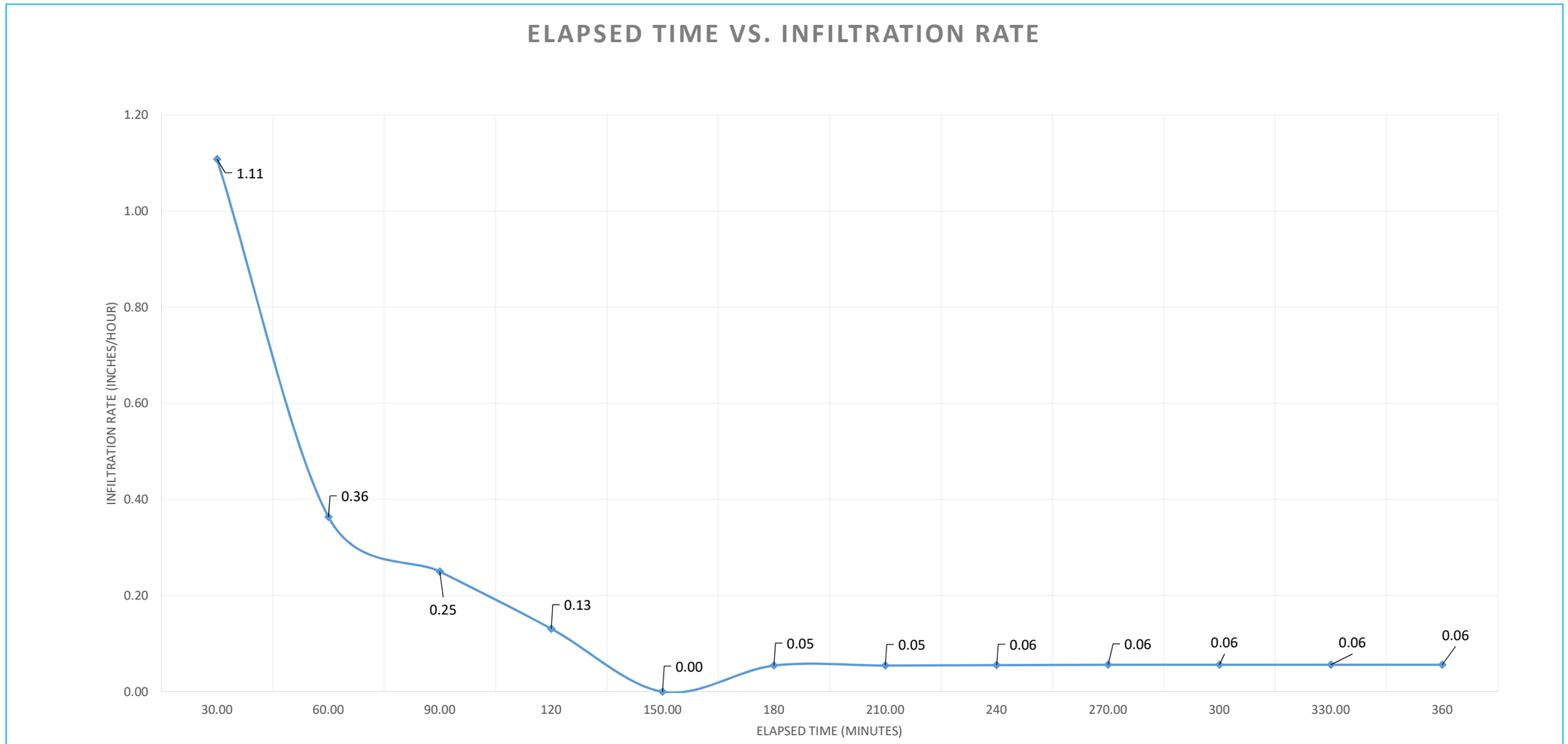
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:03						
10:33	30	25	34	9.00	4	60.00
10:33						
11:03	30	34	36	2.00	15	55.00
11:03						
11:33	30	24	26	2.00	15	55.00
11:33						
12:03	30	26	27	1.00	30	55.00
12:03						
12:33	30	20	20	0.00	#DIV/0!	55.00
12:33						
13:03	30	20	20.5	0.50	60	55.00
13:03						
13:33	30	20	20.5	0.50	60	55.00
13:33						
14:03	30	20.5	21	0.50	60	55.00
14:03						
14:33	30	21	21.5	0.50	60	55.00
14:33						
15:03	30	21	21.5	0.50	60	55.00
15:03						
15:33	30	21	21.5	0.50	60	55.00
15:33						
16:03	30	21	21.5	0.50	60	55.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	35.00	26.00	60.00	4.00	9.00	30.50	1.11	30.00
30.00	21.00	19.00	55.00	4.00	2.00	20.00	0.36	60.00
30.00	31.00	29.00	55.00	4.00	2.00	30.00	0.25	90.00
30.00	29.00	28.00	55.00	4.00	1.00	28.50	0.13	120.00
30.00	35.00	35.00	55.00	4.00	0.00	35.00	0.00	150.00
30.00	35.00	34.50	55.00	4.00	0.50	34.75	0.05	180.00
30.00	35.00	34.50	55.00	4.00	0.50	34.75	0.05	210.00
30.00	34.50	34.00	55.00	4.00	0.50	34.25	0.06	240.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	270.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	300.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	330.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-4



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-5
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

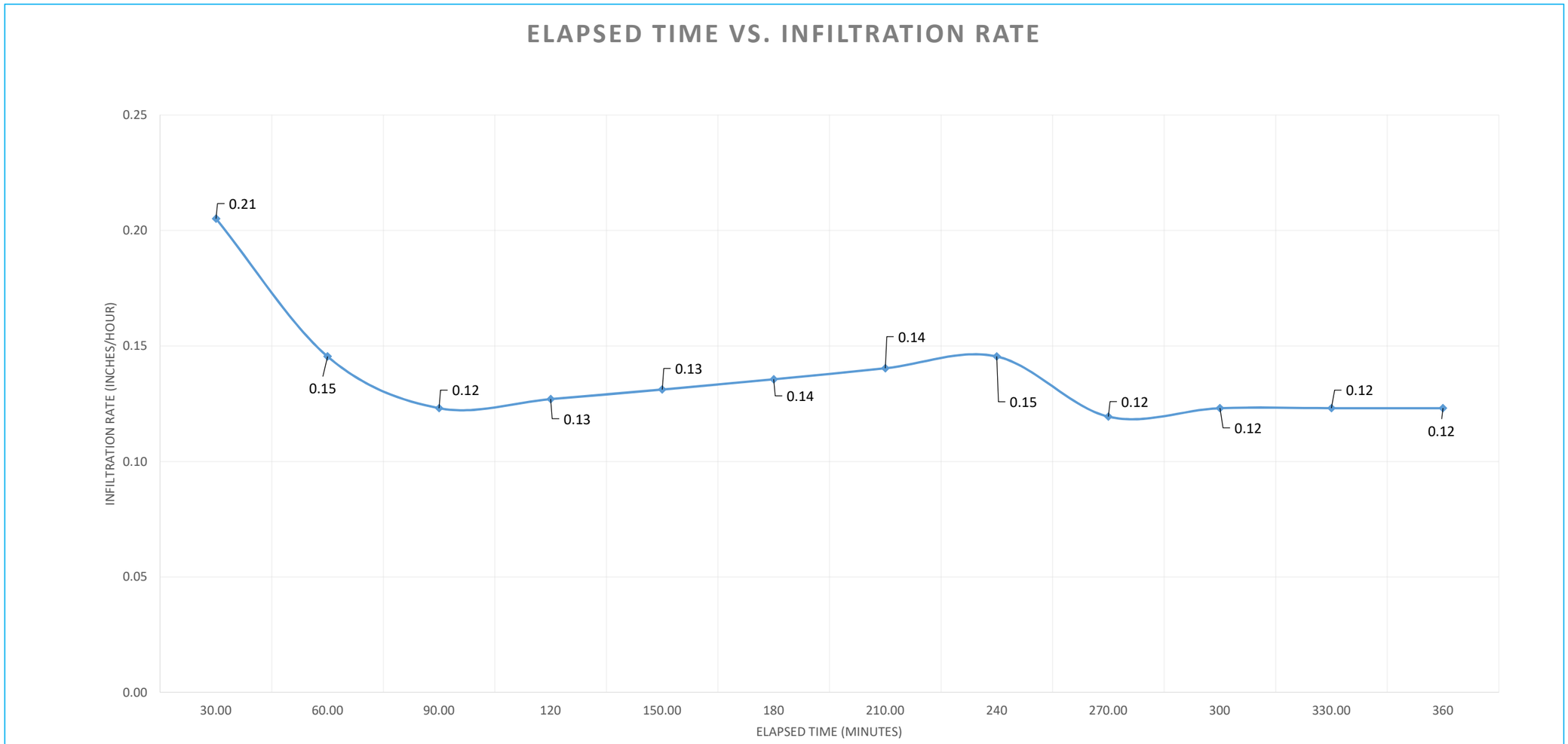
Time	*Time Interval (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*	*Total Depth of Percolation Hole*
8:00						
8:30	30	42	43	1.00	30	60.00
8:30						
9:00	30	43	43.5	0.50	60	55.00
9:00						
9:30	30	40.5	41	0.50	60	55.00
9:30						
10:00	30	41	41.5	0.50	60	55.00
10:00						
10:30	30	41.5	42	0.50	60	55.00
10:30						
11:00	30	42	42.5	0.50	60	55.00
11:00						
11:30	30	42.5	43	0.50	60	55.00
11:30						
12:00	30	43	43.5	0.50	60	55.00
12:00						
12:30	30	40	40.5	0.50	60	55.00
12:30						
13:00	30	40.5	41	0.50	60	55.00
13:00						
13:30	30	40.5	41	0.50	60	55.00
13:30						
14:00	30	40.5	41	0.50	60	55.00

Time interval Δt	*Initial Water H_0*	*Final Water H_f*	*Total Depth of Test Hole D_t*	*Raduis of Perc Hole r*	*ΔH*	*H Avg*	*ΔH 60 r)/(Δt (r+2Havg)) It*	*ELAPSED TIME Δt*
30.00	18.00	17.00	60.00	4.00	1.00	17.50	0.21	30.00
30.00	12.00	11.50	55.00	4.00	0.50	11.75	0.15	60.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	90.00
30.00	14.00	13.50	55.00	4.00	0.50	13.75	0.13	120.00
30.00	13.50	13.00	55.00	4.00	0.50	13.25	0.13	150.00
30.00	13.00	12.50	55.00	4.00	0.50	12.75	0.14	180.00
30.00	12.50	12.00	55.00	4.00	0.50	12.25	0.14	210.00
30.00	12.00	11.50	55.00	4.00	0.50	11.75	0.15	240.00
30.00	15.00	14.50	55.00	4.00	0.50	14.75	0.12	270.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	300.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	330.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	360.00

Job No.: 182141-12A

Job Name: HWY 74 & PALOMAR ROAD

Test Hole Number: P-5



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-6
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Amount of Water Used / Comments
APPROX. 200 Gallons

Date / Time
Start
Stop

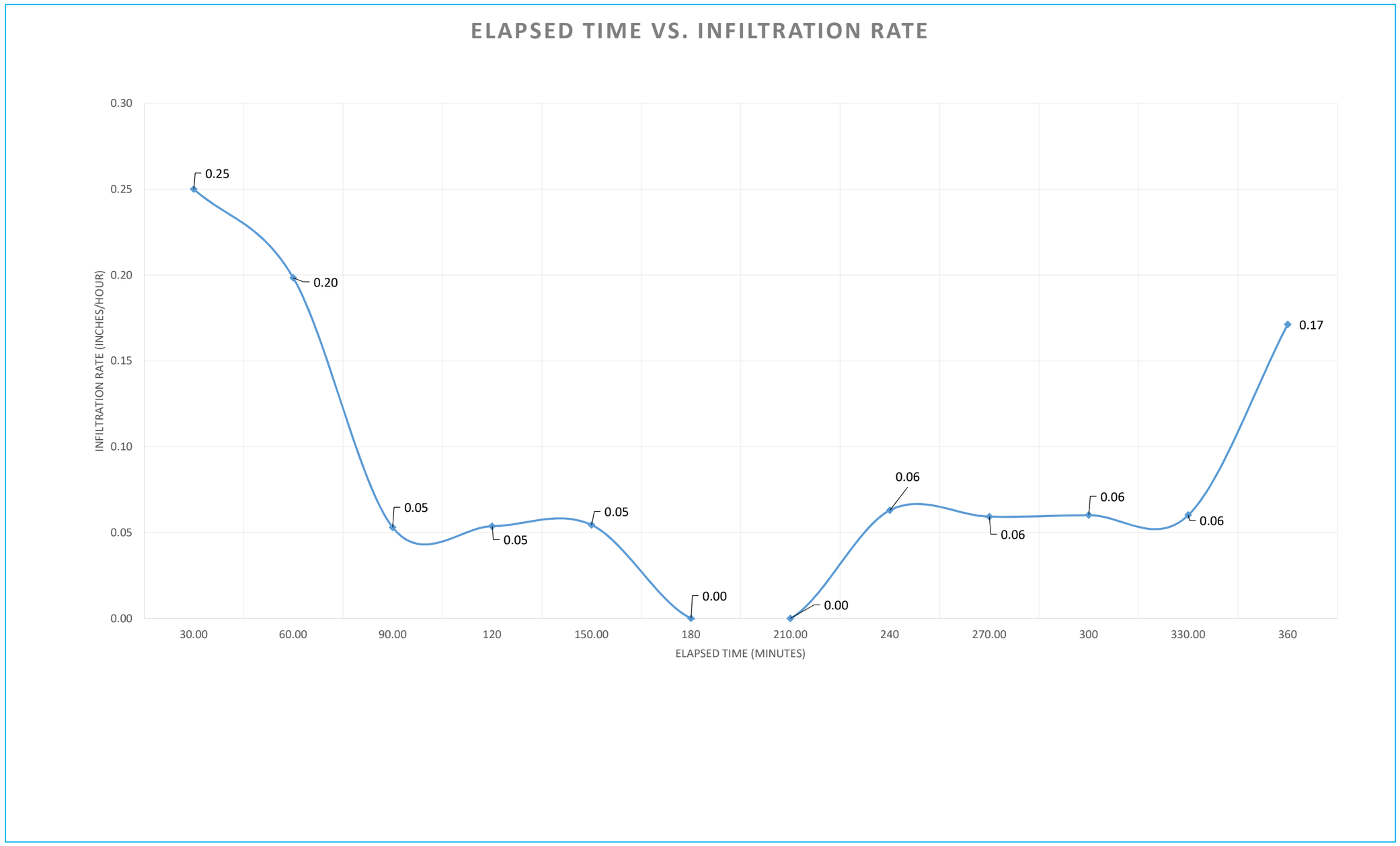
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
r_2Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
8:01	30	24	26	2.00	15	55.00
8:31						
8:31	30	26	27.5	1.50	20	55.00
9:01						
9:00	30	19	19.5	0.50	60	55.00
9:30						
9:30	30	19.5	20	0.50	60	55.00
10:00						
10:00	30	20	20.5	0.50	60	55.00
10:30						
10:30	30	20.5	20.5	0.00	0	50.00
11:00						
11:00	30	20.5	20.5	0.00	0	48.00
11:30						
11:30	30	18	18.5	0.50	60	48.00
12:00						
12:00	30	16	16.5	0.50	60	48.00
12:30						
12:30	30	16.5	17	0.50	60	48.00
13:00						
13:00	30	16.5	17	0.50	60	48.00
13:30						
13:30	30	16.6	18	1.40	22	48.00
14:00						

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	31.00	29.00	55.00	4.00	2.00	30.00	0.25	30.00
30.00	29.00	27.50	55.00	4.00	1.50	28.25	0.20	60.00
30.00	36.00	35.50	55.00	4.00	0.50	35.75	0.05	90.00
30.00	35.50	35.00	55.00	4.00	0.50	35.25	0.05	120.00
30.00	35.00	34.50	55.00	4.00	0.50	34.75	0.05	150.00
30.00	29.50	29.50	50.00	4.00	0.00	29.50	0.00	180.00
30.00	27.50	27.50	48.00	4.00	0.00	27.50	0.00	210.00
30.00	30.00	29.50	48.00	4.00	0.50	29.75	0.06	240.00
30.00	32.00	31.50	48.00	4.00	0.50	31.75	0.06	270.00
30.00	31.50	31.00	48.00	4.00	0.50	31.25	0.06	300.00
30.00	31.50	31.00	48.00	4.00	0.50	31.25	0.06	330.00
30.00	31.40	30.00	48.00	4.00	1.40	30.70	0.17	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-6



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-7
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Amount of Water Used / Comments
APPROX. 200 Gallons

Date / Time
Start
Stop

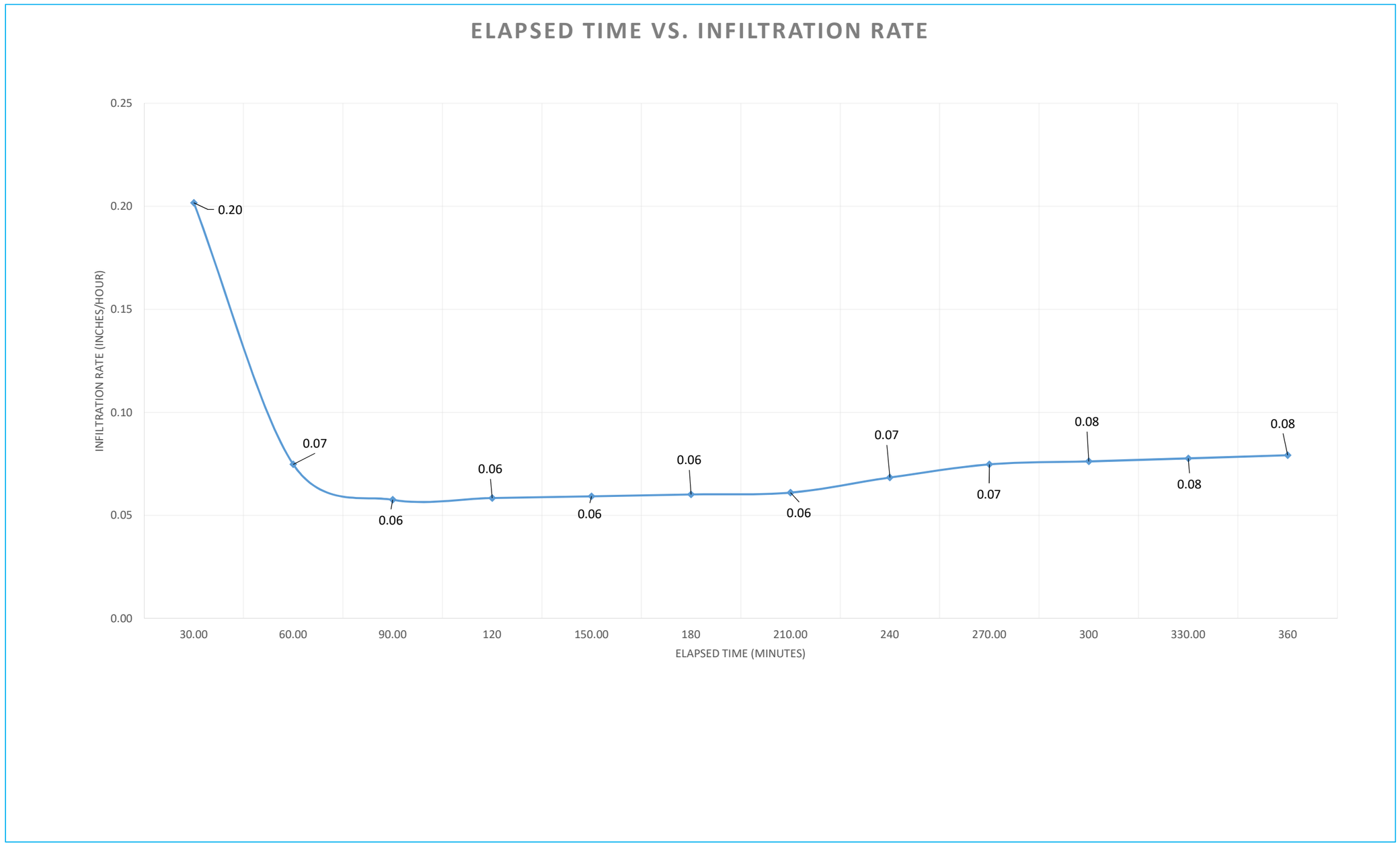
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
8:02						
8:32	30	26.5	28	1.50	20	55.00
8:32						
9:02	30	28	28.5	0.50	60	53.00
9:02						
9:32	30	20	20.5	0.50	60	53.00
9:32						
10:02	30	20.5	21	0.50	60	53.00
10:02						
10:32	30	21	21.5	0.50	60	53.00
10:32						
11:02	30	21.5	22	0.50	60	53.00
11:02						
11:32	30	22	22.5	0.50	60	53.00
11:32						
12:02	30	22.5	23	0.50	60	50.00
12:02						
12:32	30	23	23.5	0.50	60	48.00
12:32						
13:02	30	23.5	24	0.50	60	48.00
13:02						
13:32	30	24	24.5	0.50	60	48.00
13:32						
14:02	30	24.5	25	0.50	60	48.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	28.50	27.00	55.00	4.00	1.50	27.75	0.20	30.00
30.00	25.00	24.50	53.00	4.00	0.50	24.75	0.07	60.00
30.00	33.00	32.50	53.00	4.00	0.50	32.75	0.06	90.00
30.00	32.50	32.00	53.00	4.00	0.50	32.25	0.06	120.00
30.00	32.00	31.50	53.00	4.00	0.50	31.75	0.06	150.00
30.00	31.50	31.00	53.00	4.00	0.50	31.25	0.06	180.00
30.00	31.00	30.50	53.00	4.00	0.50	30.75	0.06	210.00
30.00	27.50	27.00	50.00	4.00	0.50	27.25	0.07	240.00
30.00	25.00	24.50	48.00	4.00	0.50	24.75	0.07	270.00
30.00	24.50	24.00	48.00	4.00	0.50	24.25	0.08	300.00
30.00	24.00	23.50	48.00	4.00	0.50	23.75	0.08	330.00
30.00	23.50	23.00	48.00	4.00	0.50	23.25	0.08	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-7



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-8
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

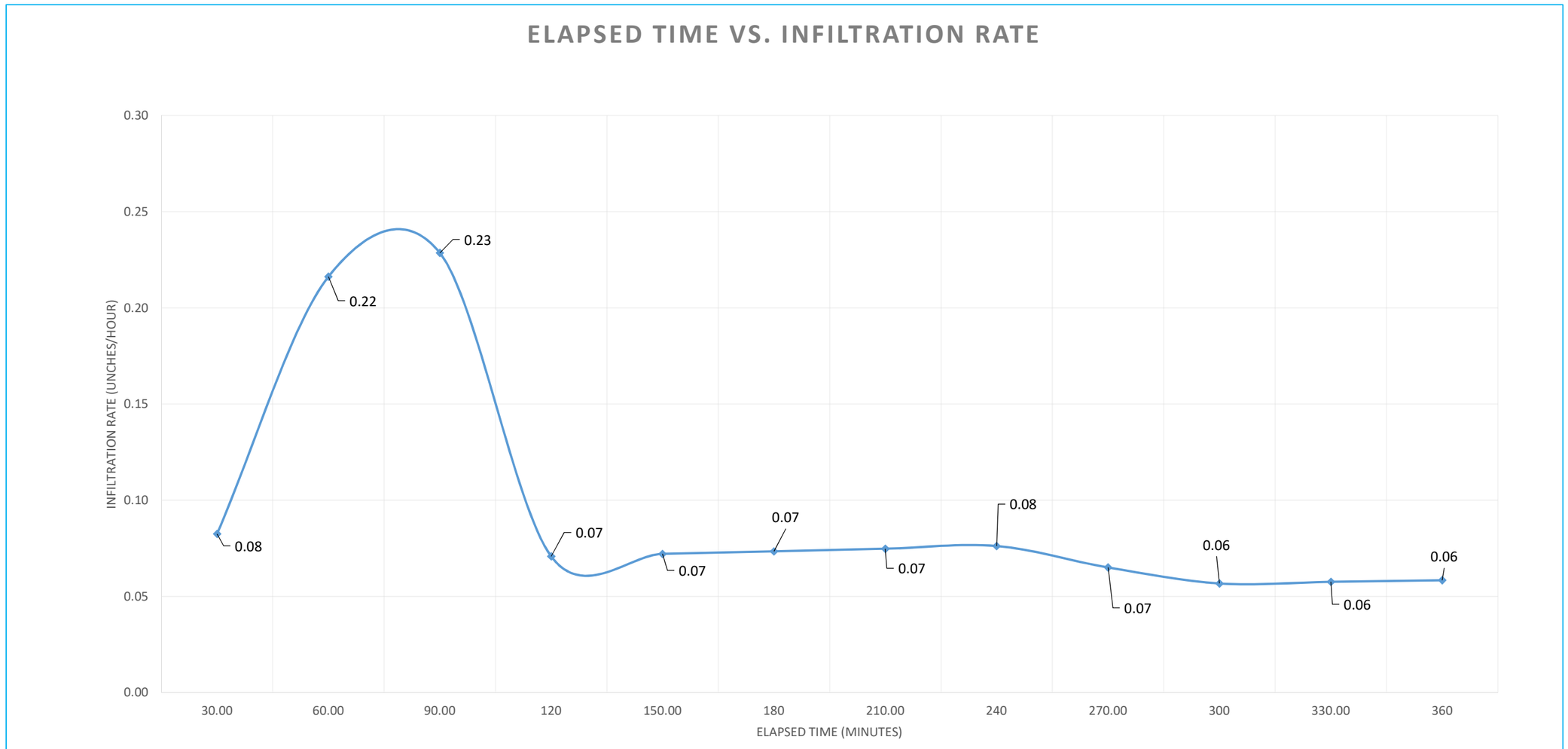
Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
8:03						
8:33	30	37.5	38	0.50	60	60.00
8:33						
9:03	30	38	39	1.00	30	55.00
9:03						
9:33	30	39	40	1.00	30	55.00
9:33						
10:03	30	28.5	29	0.50	60	55.00
10:03						
10:33	30	29	29.5	0.50	60	55.00
10:33						
11:03	30	29.5	30	0.50	60	55.00
11:03						
11:33	30	30	30.5	0.50	60	55.00
11:33						
12:03	30	30.5	31	0.50	60	55.00
12:03						
12:33	30	26	26.5	0.50	60	55.00
12:33						
13:03	30	26.5	27	0.50	60	60.00
13:03						
13:33	30	27	27.5	0.50	60	60.00
13:33						
14:03	30	27.5	28	0.50	60	60.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	22.50	22.00	60.00	4.00	0.50	22.25	0.08	30.00
30.00	17.00	16.00	55.00	4.00	1.00	16.50	0.22	60.00
30.00	16.00	15.00	55.00	4.00	1.00	15.50	0.23	90.00
30.00	26.50	26.00	55.00	4.00	0.50	26.25	0.07	120.00
30.00	26.00	25.50	55.00	4.00	0.50	25.75	0.07	150.00
30.00	25.50	25.00	55.00	4.00	0.50	25.25	0.07	180.00
30.00	25.00	24.50	55.00	4.00	0.50	24.75	0.07	210.00
30.00	24.50	24.00	55.00	4.00	0.50	24.25	0.08	240.00
30.00	29.00	28.50	55.00	4.00	0.50	28.75	0.07	270.00
30.00	33.50	33.00	60.00	4.00	0.50	33.25	0.06	300.00
30.00	33.00	32.50	60.00	4.00	0.50	32.75	0.06	330.00
30.00	32.50	32.00	60.00	4.00	0.50	32.25	0.06	360.00

Job No.: 182141-12A

Job Name: HWY 74 & PALOMAR ROAD

Test Hole Number: P-8



Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

N/A

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Albert A. Webb Associates	Date	5/18/2020
Designed by	AYS	Case No	
Company Project Number/Name	18-0099 Motte County Plaza		

BMP Identification

BMP NAME / ID: DMA 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

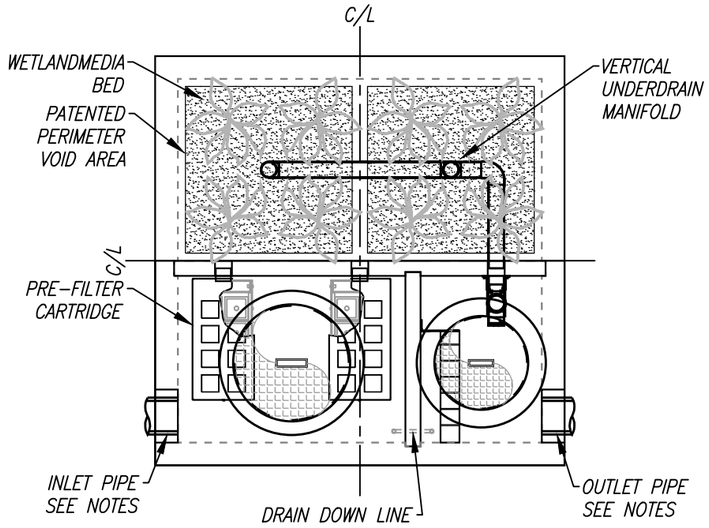
DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
ASPHALT / PVMT	*44279*	*Concrete or Asphalt*	*1*	*0.89*	*39496.9*			
BUILDINGS	*5645*	*Roofs*	*1*	*0.892*	*5035.3*			
LANDSCAPE AREAS	*9085*	*Ornamental Landscaping*	*0.1*	*0.110458*	*1003.5*			
	59009		***Total***		**45535.7**	**0.20**	***0.2***	***0.2***

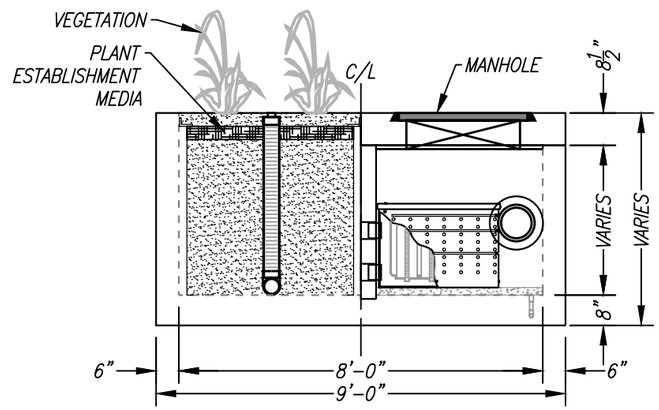
Notes:

SITE SPECIFIC DATA			
PROJECT NUMBER		18-0099	
PROJECT NAME		Motte County Plaza	
PROJECT LOCATION		Menifee, CA	
STRUCTURE ID		DMA -1 MWS Vault	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.20	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			DVERT
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	1458.2	HDPE	18"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	1455.2	HDPE	18"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	1461.66		
SURFACE LOAD	DIRECT TRAFFIC		
FRAME & COVER	ø30"	UNDERGROUND	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



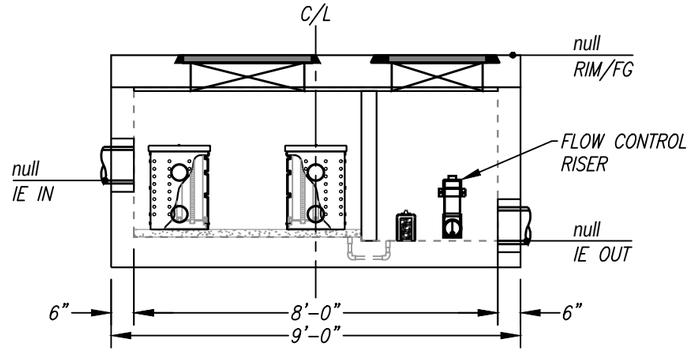
LEFT END VIEW

INSTALLATION NOTES

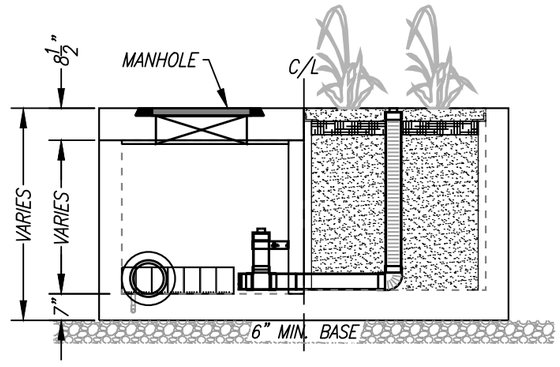
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.231
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

Bio Clean
A Forterra Company

MWS-L-8-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

5/23/19 10:LEF

Bio Clean

A Forterra Company

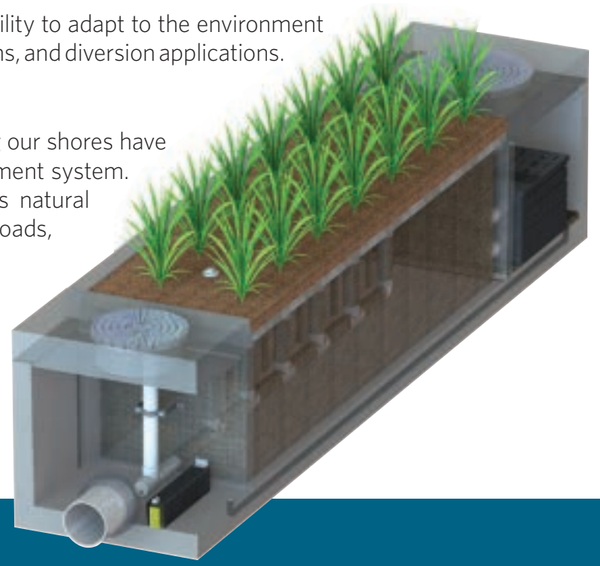
Modular Wetlands® System Linear

A Stormwater Biofiltration Solution

OVERVIEW

The Bio Clean Modular Wetlands® System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint, higher treatment capacity, and a wide range of versatility. While most biofilters use little or no pretreatment, the Modular Wetlands® incorporates an advanced pretreatment chamber that includes separation and pre-filter cartridges. In this chamber, sediment and hydrocarbons are removed from runoff before entering the biofiltration chamber, reducing maintenance costs and improving performance.

Horizontal flow also gives the system the unique ability to adapt to the environment through a variety of configurations, bypass orientations, and diversion applications.



The Urban Impact

For hundreds of years, natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as cities grow and develop, our environment's natural filtration systems are blanketed with impervious roads, rooftops, and parking lots.

Bio Clean understands this loss and has spent years re-establishing nature's presence in urban areas, and rejuvenating waterways with the Modular Wetlands® System Linear.

PERFORMANCE

The Modular Wetlands® continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons, and bacteria. Since 2007 the Modular Wetlands® has been field tested on numerous sites across the country and is proven to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. In fact, the Modular Wetlands® harnesses some of the same biological processes found in natural wetlands in order to collect, transform, and remove even the most harmful pollutants.

66% REMOVAL OF DISSOLVED ZINC	**69%** REMOVAL OF TOTAL ZINC	**38%** REMOVAL OF DISSOLVED COPPER	**64%** REMOVAL OF TOTAL PHOSPHORUS	
45% REMOVAL OF NITROGEN	**50%** REMOVAL OF TOTAL COPPER	**95%** REMOVAL OF MOTOR OIL	**67%** REMOVAL OF ORTHO PHOSPHORUS	**85%** REMOVAL OF TSS

APPROVALS

The Modular Wetlands® System Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation and perhaps the world. Here is a list of some of the most high-profile approvals, certifications, and verifications from around the country.

Washington State Department of Ecology TAPE Approved
The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft² loading rate. The highest performing BMP on the market for all main pollutant categories.

California Water Resources Control Board, Full Capture Certification
The Modular Wetlands® System is the first biofiltration system to receive certification as a full capture trash treatment control device.

Virginia Department of Environmental Quality, Assignment
The Virginia Department of Environmental Quality assigned the MWS Linear the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) regulation technical criteria.

Maryland Department of the Environment, Approved ESD
Granted Environmental Site Design (ESD) status for new construction, redevelopment, and retrofitting when designed in accordance with the design manual.

MASTEP Evaluation
The University of Massachusetts at Amherst – Water Resources Research Center issued a technical evaluation report noting removal rates up to 84% TSS, 70% total phosphorus, 68.5% total zinc, and more.

Rhode Island Department of Environmental Management, Approved BMP
Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% pathogens, 30% total phosphorus, and 30% total nitrogen.

ADVANTAGES

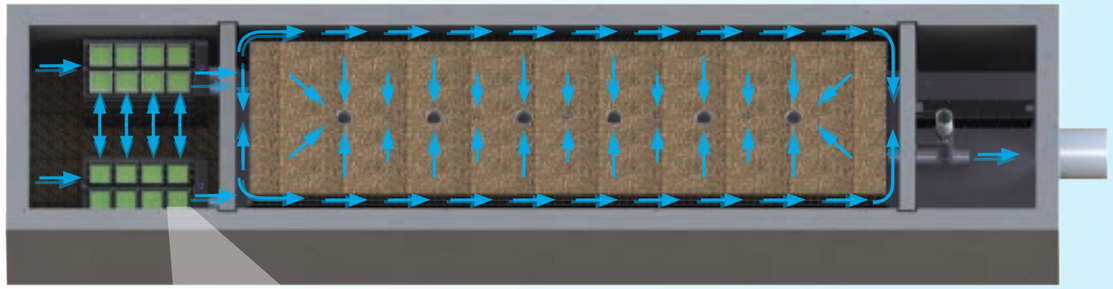
- HORIZONTAL FLOW BIOFILTRATION
- GREATER FILTER SURFACE AREA
- PRETREATMENT CHAMBER
- PATENTED PERIMETER VOID AREA
- FLOW CONTROL
- NO DEPRESSED PLANTER AREA
- AUTO DRAINDOWN MEANS NO MOSQUITO VECTOR

OPERATION

The Modular Wetlands® System Linear is the most efficient and versatile biofiltration system on the market, and it is the only system with horizontal flow which:

- Improves performance
- Reduces footprint
- Minimizes maintenance

Figure 1 & Figure 2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.



2x to 3x more surface area than traditional downward flow bioretention systems.

Figure 2, Top View

1 PRETREATMENT

SEPARATION

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

PRE-FILTER CARTRIDGES

- Over 25 sq. ft. of surface area per cartridge
- Utilizes BioMediaGREEN™ filter material
- Removes over 80% of TSS and 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber

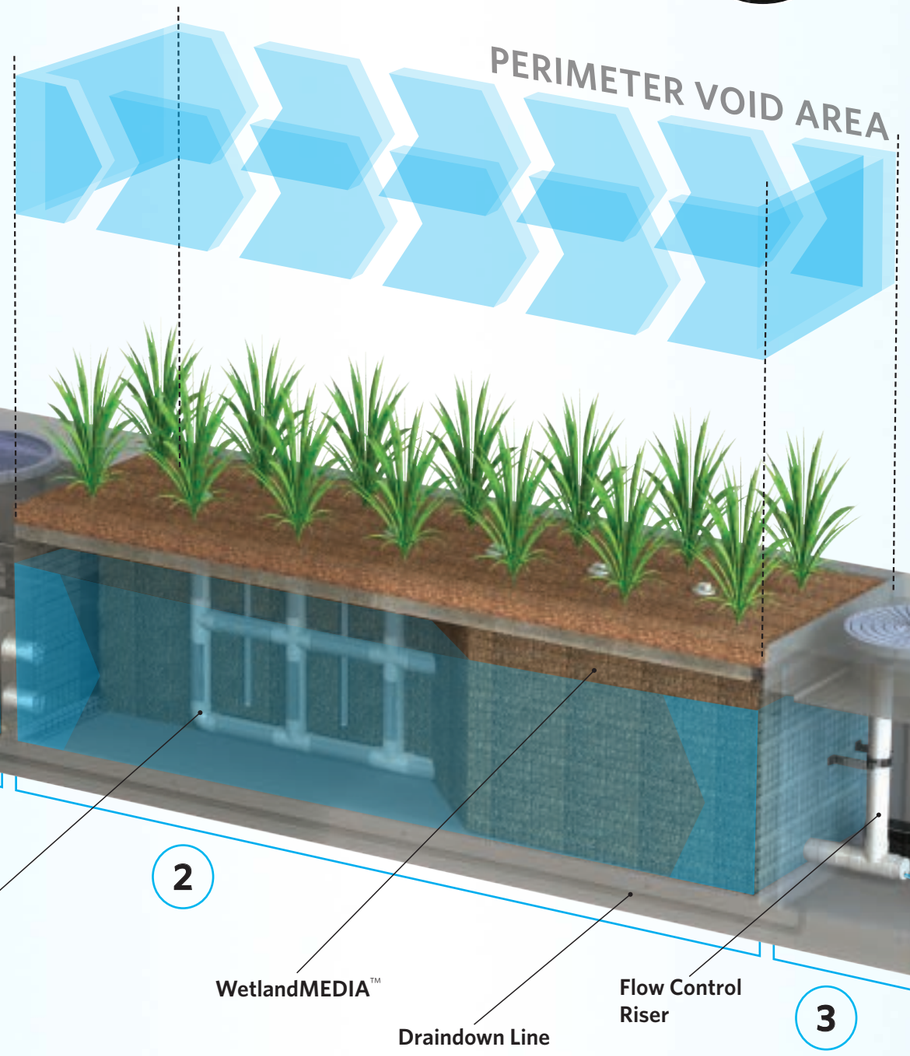


Figure 1

2 BIOFILTRATION

HORIZONTAL FLOW

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

PATENTED PERIMETER VOID AREA

- Vertically extends void area between the walls and the WetlandMEDIA™ on all four sides
- Maximizes surface area of the media for higher treatment capacity

WETLANDMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and lightweight

3 DISCHARGE

FLOW CONTROL

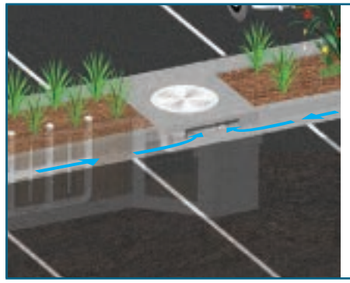
- Orifice plate controls flow of water through WetlandMEDIA™ to a level lower than the media's capacity
- Extends the life of the media and improves performance

DRAINDOWN FILTER

- The draindown is an optional feature that completely drains the pretreatment chamber
- Water that drains from the pretreatment chamber between storm events will be treated

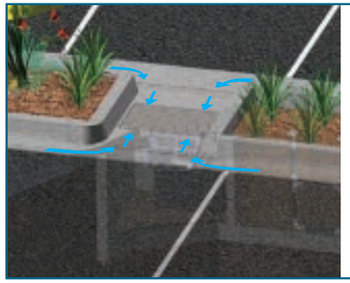
CONFIGURATIONS

The Modular Wetlands® System Linear is the preferred biofiltration system of civil engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your storm drain design.



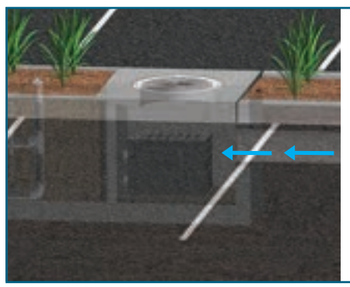
CURB TYPE

The Curb Type configuration accepts sheet flow through a curb opening and is commonly used along roadways and parking lots. It can be used in sump or flow-by conditions. Length of curb opening varies based on model and size.



GRATE TYPE

The Grate Type configuration offers the same features and benefits as the Curb Type but with a grated/drop inlet above the systems pretreatment chamber. It has the added benefit of allowing pedestrian access over the inlet. ADA-compliant grates are available to assure easy and safe access. The Grate Type can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



VAULT TYPE

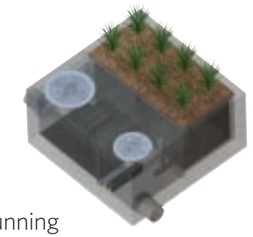
The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pretreatment chamber, meaning the Modular Wetlands® can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/ bioretention systems. Another benefit of the "pipe-in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.

DOWNSPOUT TYPE

The Downspout Type is a variation of the Vault Type and is designed to accept a vertical downspout pipe from rooftop and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter, and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

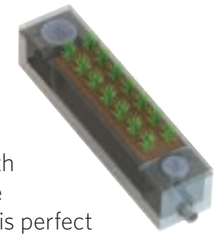
ORIENTATIONS

SIDE-BY-SIDE



The Side-By-Side orientation places the pretreatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.

END-TO-END



The End-To-End orientation places the pretreatment and discharge chambers on opposite ends of the biofiltration chamber, therefore minimizing the width of the system to 5 ft. (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is that bypass must be external.

BYPASS

INTERNAL BYPASS WEIR (SIDE-BY-SIDE ONLY)

The Side-By-Side orientation places the pretreatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pretreatment chamber directly to the discharge chamber.

EXTERNAL DIVERSION WEIR STRUCTURE

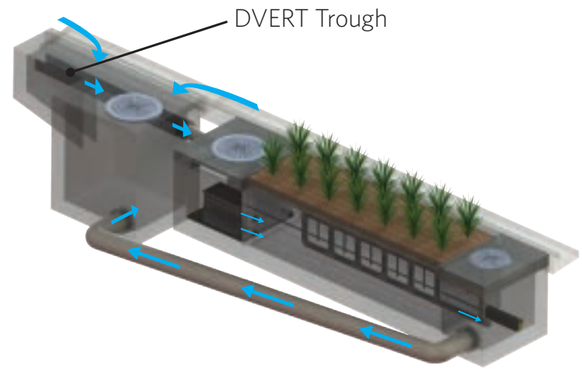
This traditional offline diversion method can be used with the Modular Wetlands® in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the Modular Wetlands® for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

FLOW-BY-DESIGN

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the Modular Wetlands® and into the standard inlet downstream.

DVERT LOW FLOW DIVERSION

This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the Modular Wetlands® via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over



to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allow the Modular Wetlands® to be installed anywhere space is available.

SPECIFICATIONS

FLOW-BASED DESIGNS

The Modular Wetlands® System Linear can be used in stand-alone applications to meet treatment flow requirements. Since the Modular Wetlands® is the only biofiltration system that can accept inflow pipes several feet below the surface, it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

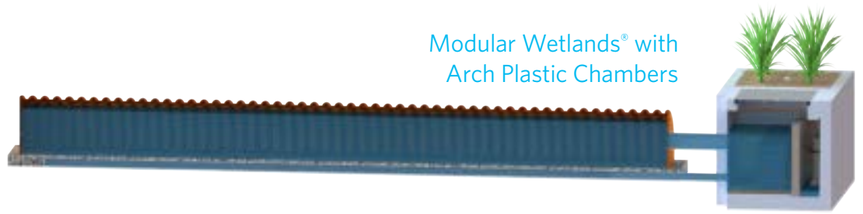
MODEL #	DIMENSIONS	WETLANDMEDIA SURFACE AREA (sq. ft.)	TREATMENT FLOW RATE (cfs)
MWS-L-4-4	4′ x 4′	23	0.052
MWS-L-4-6	4′ x 6′	32	0.073
MWS-L-4-8	4′ x 8′	50	0.115
MWS-L-4-13	4′ x 13′	63	0.144
MWS-L-4-15	4′ x 15′	76	0.175
MWS-L-4-17	4′ x 17′	90	0.206
MWS-L-4-19	4′ x 19′	103	0.237
MWS-L-4-21	4′ x 21′	117	0.268
MWS-L-6-8	7′ x 9′	64	0.147
MWS-L-8-8	8′ x 8′	100	0.230
MWS-L-8-12	8′ x 12′	151	0.346
MWS-L-8-16	8′ x 16′	201	0.462
MWS-L-8-20	9′ x 21′	252	0.577
MWS-L-8-24	9′ x 25′	302	0.693
MWS-L-10-20	10' x 20'	302	0.693

VOLUME-BASED DESIGNS

HORIZONTAL FLOW BIOFILTRATION ADVANTAGE

Modular Wetlands® with
Box Culvert Prestorage

The Modular Wetlands® System Linear offers a unique advantage in the world of biofiltration due to its exclusive horizontal flow design: Volume-Based Design. No other biofilter has the ability to be placed downstream of detention ponds, extended dry detention basins, underground storage systems and permeable paver reservoirs. The systems horizontal flow configuration and built-in orifice control allows it to be installed with just 6" of fall between inlet and outlet pipe for a simple connection to projects with shallow downstream tie-in points. In the example above, the Modular Wetlands® is installed downstream of underground box culvert storage. Designed for the water quality volume, the Modular Wetlands® will treat and discharge the required volume within local draindown time requirements.



Modular Wetlands® with
Arch Plastic Chambers

DESIGN SUPPORT

Bio Clean engineers are trained to provide you with superior support for all volume sizing configurations throughout the country. Our vast knowledge of state and local regulations allow us to quickly and efficiently size a system to maximize feasibility. Volume control and hydromodification regulations are expanding the need to decrease the cost and size of your biofiltration system. Bio Clean will help you realize these cost savings with the Modular Wetlands®, the only biofilter than can be used downstream of storage BMPs.

ADVANTAGES

- LOWER COST THAN FLOW-BASED DESIGN
- MEETS LID REQUIREMENTS
- BUILT-IN ORIFICE CONTROL STRUCTURE
- WORKS WITH DEEP INSTALLATIONS

APPLICATIONS

The Modular Wetlands® System Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.

INDUSTRIAL

Many states enforce strict regulations for discharges from industrial sites. The Modular Wetlands® has helped various sites meet difficult EPA-mandated effluent limits for dissolved metals and other pollutants.

RESIDENTIAL

Low to high density developments can benefit from the versatile design of the Modular Wetlands®. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.

STREETS

Street applications can be challenging due to limited space. The Modular Wetlands® is very adaptable, and it offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.

PARKING LOTS

Parking lots are designed to maximize space and the Modular Wetlands'® 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.

COMMERCIAL

Compared to bioretention systems, the Modular Wetlands® can treat far more area in less space, meeting treatment and volume control requirements.

MIXED USE

The Modular Wetlands® can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications include:

• Agriculture • Reuse • Low Impact Development • Waste Water

PLANT SELECTION

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the Modular Wetlands® System Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade, the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the Modular Wetlands®, giving the plants more contact time so that pollutants are more successfully decomposed, volatilized, and incorporated into the biomass of the Modular Wetlands'® micro/macro flora and fauna.

A wide range of plants are suitable for use in the Modular Wetlands®, but selections vary by location and climate. View suitable plants by visiting biocleanenvironmental.com/plants.

INSTALLATION

The Modular Wetlands® is simple, easy to install, and has a space-efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles precast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians is available to supervise installations and provide technical support.

MAINTENANCE

Reduce your maintenance costs, man hours, and materials with the Modular Wetlands®. Unlike other biofiltration systems that provide no pretreatment, the Modular Wetlands® is a self-contained treatment train which incorporates simple and effective pretreatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pretreatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pretreatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long-term operation, and there is absolutely no need to replace expensive biofiltration media.

Bio Clean
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biocleanenvironmental.com

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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADVANCED DRAINAGE SYSTEMS, INC.

SiteASSIST™ by StormTech

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18-0099 MOTTE COUNTY PLAZA

MENIFEE, CA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. 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.
8. 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 DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

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

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

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

PROPOSED LAYOUT

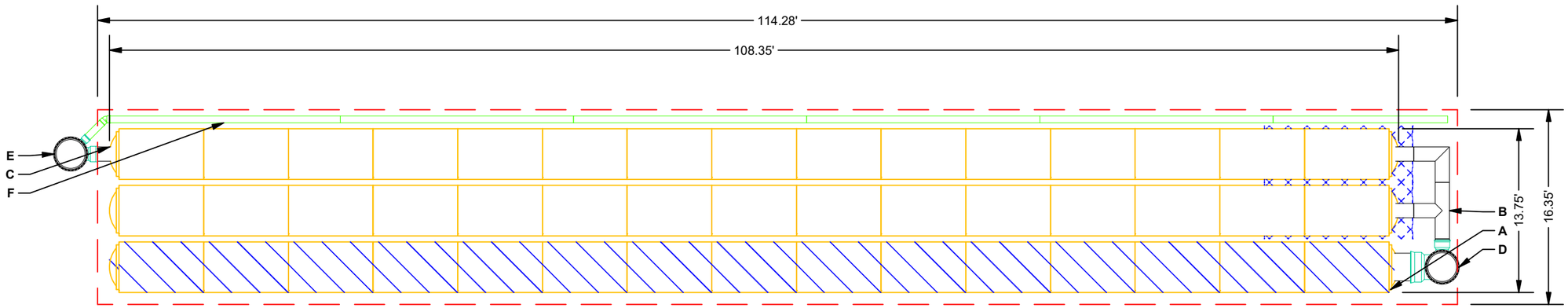
45	STORMTECH SC-740 CHAMBERS
6	STORMTECH SC-740 END CAPS
18	STONE ABOVE (in)
6	STONE BELOW (in)
40	STONE VOID
4604	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
1869	SYSTEM AREA (SF)
261.3	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	1465.50
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1459.50
TOP OF STONE:	1459.00
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1459.00
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1459.00
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1459.00
TOP OF SC-740 CHAMBER:	1457.50
12" x 12" TOP MANIFOLD INVERT:	1456.04
12" BOTTOM CONNECTION INVERT:	1455.10
24" ISOLATOR ROW INVERT:	1455.01
BOTTOM OF SC-740 CHAMBER:	1455.00
UNDERDRAIN INVERT:	1454.50
BOTTOM OF STONE:	1454.50

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PREFABRICATED END CAP/TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR ROWS	0.10"	
MANIFOLD	B	12" x 12" TOP MANIFOLD, ADS N-12	12.50"	
PIPE CONNECTION	C	12" BOTTOM CONNECTION	1.20"	
NYLOPLAST (INLET W/ ISO ROW)	D	30" DIAMETER (24.00" SUMP MIN)		4.6 CFS IN
NYLOPLAST (OUTLET)	E	30" DIAMETER (DESIGN BY ENGINEER)		2.0 CFS OUT
UNDERDRAIN	F	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW
(SEE DETAIL)

PLACE MINIMUM 12.50' OF ADS GEOSYNTHETICS 315WTK WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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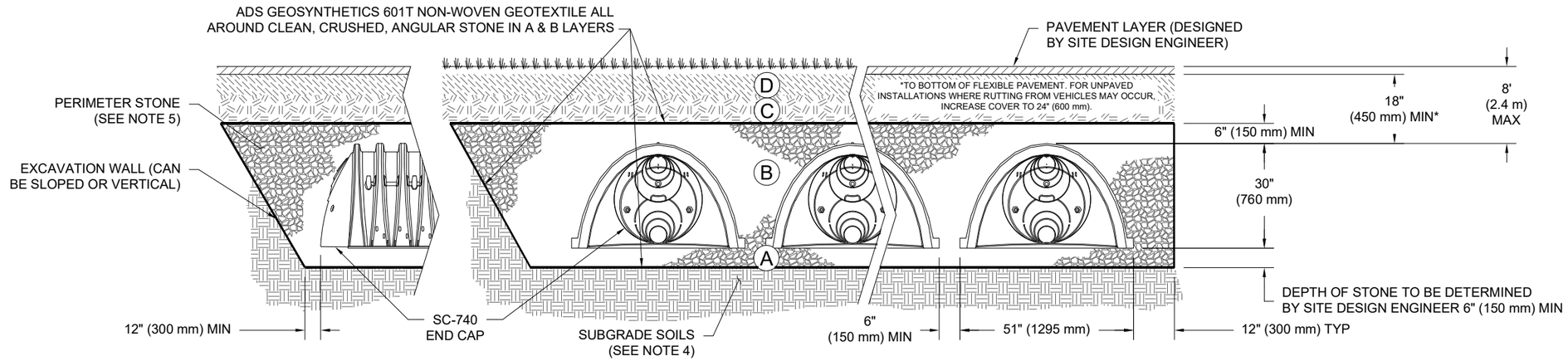
0 10' 20'

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. 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:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. 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.

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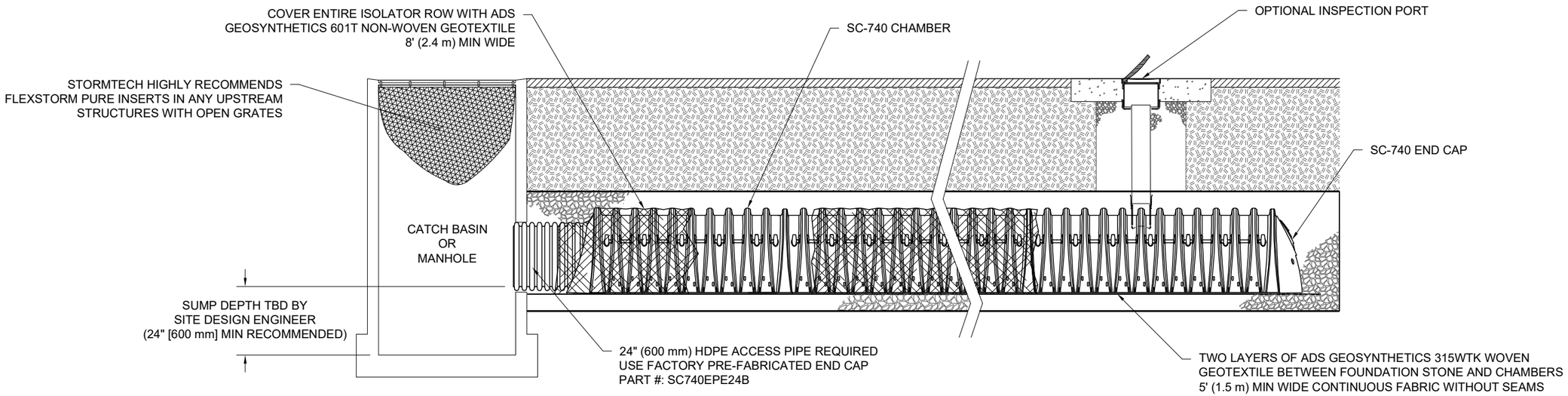

SC-740 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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UNDERDRAIN DETAIL

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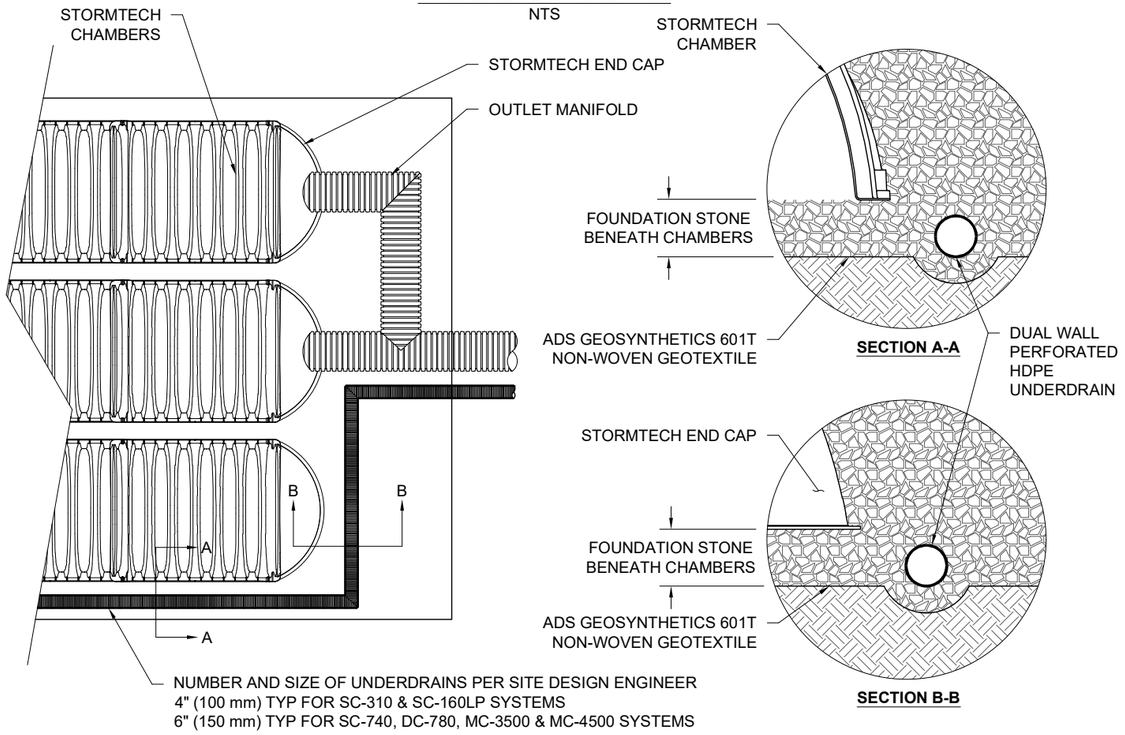

SC-740 TECHNICAL SPECIFICATION

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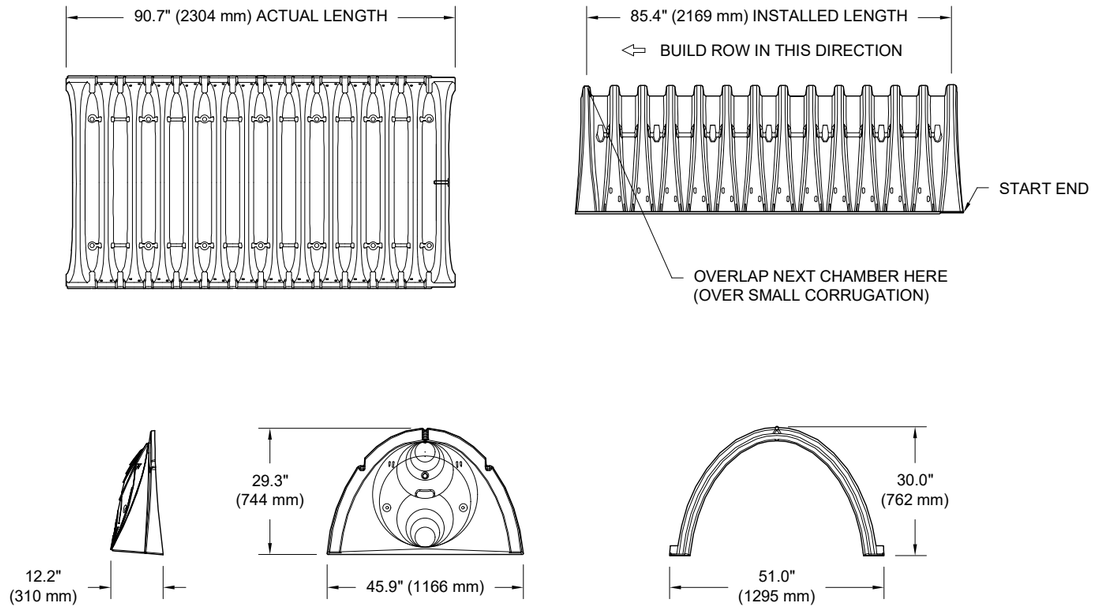
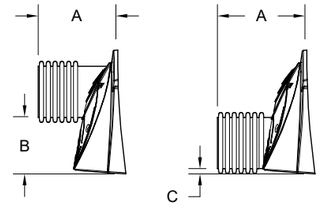


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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NYLOPLAST DRAIN BASIN

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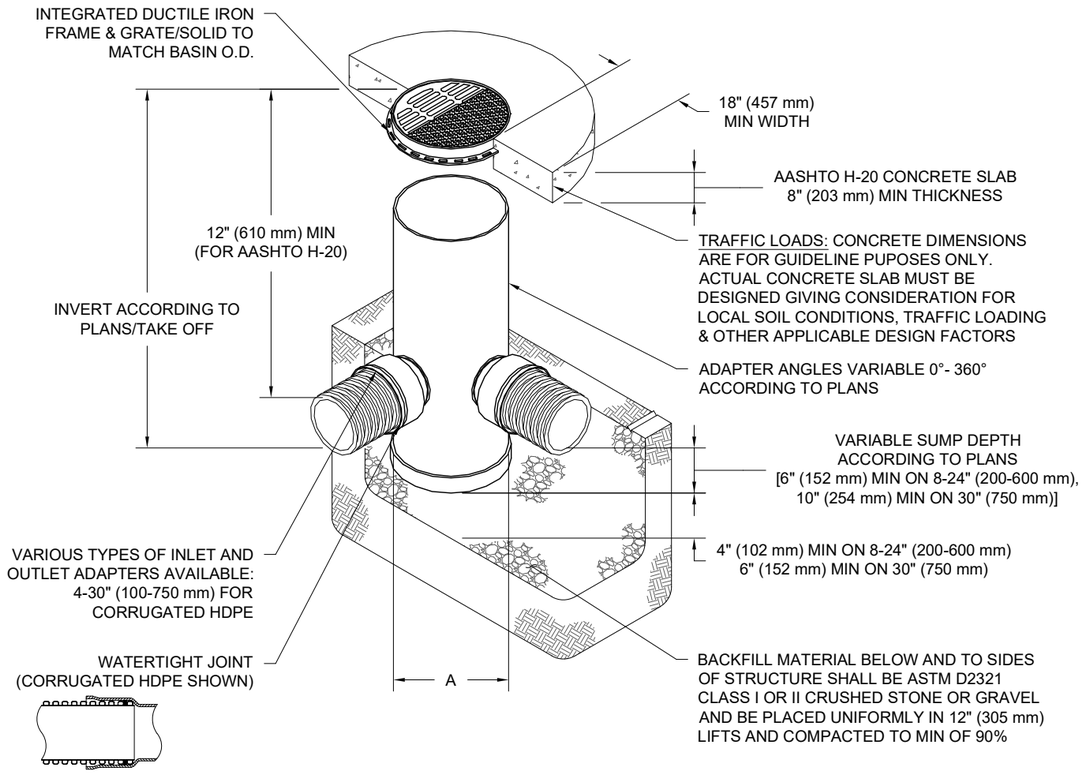

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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ADS
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Project:

Chamber Model -	SC-740	
Units -	**Imperial**	Click Here for Metric
	10	
Number of chambers -	45	
Voids in the stone (porosity) -	40	%
Base of STONE Elevation -	1454.50	ft
Amount of Stone Above Chambers -	24	in
Amount of Stone Below Chambers -	6	in
Area of system -	1869	sf Min. Area - 1521 sf min. area

☑ Include Perimeter Stone in Calculations

Height of System *(inches)*	Incremental Single Chamber *(cubic feet)*	Incremental Total Chamber *(cubic feet)*	Incremental Stone *(cubic feet)*	Incremental Ch & St *(cubic feet)*	Cumulative Chamber *(cubic feet)*	Elevation *(feet)*
60	0.00	0.00	62.28	62.28	4977.67	1459.50
59	0.00	0.00	62.28	62.28	4915.39	1459.42
58	0.00	0.00	62.28	62.28	4853.11	1459.33
57	0.00	0.00	62.28	62.28	4790.82	1459.25
56	0.00	0.00	62.28	62.28	4728.54	1459.17
55	0.00	0.00	62.28	62.28	4666.26	1459.08
54	0.00	0.00	62.28	62.28	4603.97	1459.00
53	0.00	0.00	62.28	62.28	4541.69	1458.92
52	0.00	0.00	62.28	62.28	4479.41	1458.83
51	0.00	0.00	62.28	62.28	4417.12	1458.75
50	0.00	0.00	62.28	62.28	4354.84	1458.67
49	0.00	0.00	62.28	62.28	4292.56	1458.58
48	0.00	0.00	62.28	62.28	4230.27	1458.50
47	0.00	0.00	62.28	62.28	4167.99	1458.42
46	0.00	0.00	62.28	62.28	4105.71	1458.33
45	0.00	0.00	62.28	62.28	4043.42	1458.25
44	0.00	0.00	62.28	62.28	3981.14	1458.17
43	0.00	0.00	62.28	62.28	3918.86	1458.08
42	0.00	0.00	62.28	62.28	3856.57	1458.00
41	0.00	0.00	62.28	62.28	3794.29	1457.92
40	0.00	0.00	62.28	62.28	3732.01	1457.83
39	0.00	0.00	62.28	62.28	3669.72	1457.75
38	0.00	0.00	62.28	62.28	3607.44	1457.67
37	0.00	0.00	62.28	62.28	3545.16	1457.58
36	0.05	2.47	61.29	63.77	3482.87	1457.50
35	0.16	7.33	59.35	66.68	3419.10	1457.42
34	0.28	12.69	57.21	69.90	3352.42	1457.33
33	0.60	27.18	51.41	78.59	3282.53	1457.25
32	0.80	36.08	47.85	83.93	3203.94	1457.17
31	0.95	42.78	45.17	87.95	3120.01	1457.08
30	1.07	48.35	42.94	91.30	3032.06	1457.00
29	1.18	53.12	41.03	94.16	2940.76	1456.92
28	1.27	56.95	39.50	96.46	2846.60	1456.83
27	1.36	60.98	37.89	98.87	2750.15	1456.75
26	1.45	65.43	36.11	101.54	2651.28	1456.67
25	1.52	68.61	34.84	103.45	2549.73	1456.58
24	1.58	71.20	33.80	105.01	2446.28	1456.50
23	1.64	73.90	32.72	106.62	2341.28	1456.42
22	1.70	76.48	31.69	108.17	2234.65	1456.33
21	1.75	78.88	30.73	109.61	2126.48	1456.25
20	1.80	81.13	29.83	110.96	2016.87	1456.17
19	1.85	83.47	28.89	112.37	1905.91	1456.08
18	1.89	85.19	28.21	113.40	1793.54	1456.00
17	1.93	87.03	27.47	114.50	1680.15	1455.92
16	1.97	88.87	26.73	115.61	1565.64	1455.83
15	2.01	90.45	26.10	116.55	1450.04	1455.75
14	2.04	92.02	25.47	117.50	1333.48	1455.67
13	2.07	93.37	24.93	118.31	1215.99	1455.58
12	2.10	94.72	24.39	119.12	1097.68	1455.50
11	2.13	95.93	23.91	119.84	978.56	1455.42
10	2.15	96.92	23.51	120.44	858.72	1455.33
9	2.18	97.97	23.10	121.06	738.28	1455.25
8	2.20	98.93	22.71	121.64	617.22	1455.17
7	2.21	99.33	22.55	121.88	495.58	1455.08
6	0.00	0.00	62.28	62.28	373.70	1455.00
5	0.00	0.00	62.28	62.28	311.42	1454.92
4	0.00	0.00	62.28	62.28	249.13	1454.83
3	0.00	0.00	62.28	62.28	186.85	1454.75
2	0.00	0.00	62.28	62.28	124.57	1454.67
1	0.00	0.00	62.28	62.28	62.28	1454.58

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

All collected runoff is will be conveyed towards the proposed underground storage chambers, sized to mitigate the 2-year, 24-hour and 100-year, 24-hour storm event as required for HCOC mitigation requirements.

UG Chambers - Stage/Storage/Outflow Table

W.O.# 18-0099

Basin Information: Underground Storage Chambers			2/100-YEAR	ORIFICE
Tributary Area:	1.40 AC		Q EXISTING	0.15 / 0.34
DCV=	35,911 CF			
Bottom Elevation:	1455.00		Opening (in)	2.5
Bottom Length:	105	ft	# of Orifices	1
Bottom Area:	1,868	sf	Area (sf)	0.0341
Bottom Slope:	0	%	Opening (ft)	0.2083
			Total Area (sf)	0.0341
$Q_{ORIFICE}$= Cd*Area*(2*G*H)$^{0.5}$			G (ft/s^2)	32.2
Q_{WEIR}= C*L*H$^{3/2}$			Cd	0.66
			Invert H (ft)	0.125

2-Year & 100-Year

#	Elevation (ft)	Depth (ft)	Storage (cf)	Storage (ac-ft)	H (ft)	Q (cfs)	Total Q (cfs)	Comments
1	**1454.5**	**0**	**0.00**	**0.000**			**0.00**	**Bottom of Embedment Stone**
2	1455	0.5	373.70	0.009			0.00	Bottom of Chamber/Orifice Invert
3	1455.125	0.625	556.40	0.013	0	0.00	0.00	Middle of Orifice
4	1455.25	0.75	738.28	0.017	0.125	0.06	0.06	Top of Orifice
5	1455.5	1	1097.68	0.025	0.375	0.11	0.11	
6	**1456**	**1.5**	**1793.54**	**0.041**	**0.875**	**0.17**	**0.17**	**Top of 2-Year Event (1455.78)**
7	1456.5	2	2446.28	0.056	1.375	0.21	0.21	
8	1457	2.5	3032.06	0.070	1.875	0.25	0.25	
9	1457.5	3	3482.87	0.080	2.375	0.28	0.28	
10	**1458**	**3.5**	**3856.57**	**0.089**	**2.875**	**0.31**	**0.31**	**Top of 100-Year Event (1457.92)**
11	1458.5	4	4230.27	0.097	3.375	0.33	0.33	
12	1459	4.5	4603.97	0.106	3.875	0.36	0.36	Top of Chamber & Emedment Stone

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 05/18/20

18-0099 - MOTTE COUNTY PLAZA
BASIN ROUTING
2-YEAR, 24-HOUR ORIFICE
2020-05-18   AYS

Program License Serial Number 4010

********** HYDROGRAPH INFORMATION **********

From study/file name: ONSITEPROP242.rte
**********HYDROGRAPH DATA**********
Number of intervals =   289
Time interval =   5.0 (Min.)
Maximum/Peak flow rate =   0.211 (CFS)
Total volume =   0.128 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS)   0.000   0.000   0.000   0.000   0.000
Vol (Ac.Ft)   0.000   0.000   0.000   0.000   0.000
****

++++++++++
Process from Point/Station   100.000 to Point/Station   101.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 289
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)

Initial basin depth =   0.00 (Ft.)
Initial basin storage =   0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.009	0.001	0.009	0.009
0.625	0.013	0.001	0.013	0.013
0.750	0.017	0.060	0.017	0.017
1.000	0.025	0.110	0.025	0.025
1.500	0.041	0.170	0.040	0.042
2.000	0.056	0.210	0.055	0.057
2.500	0.070	0.250	0.069	0.071
3.000	0.080	0.280	0.079	0.081
3.500	0.089	0.310	0.088	0.090
4.000	0.097	0.330	0.096	0.098
4.500	0.106	0.360	0.105	0.107

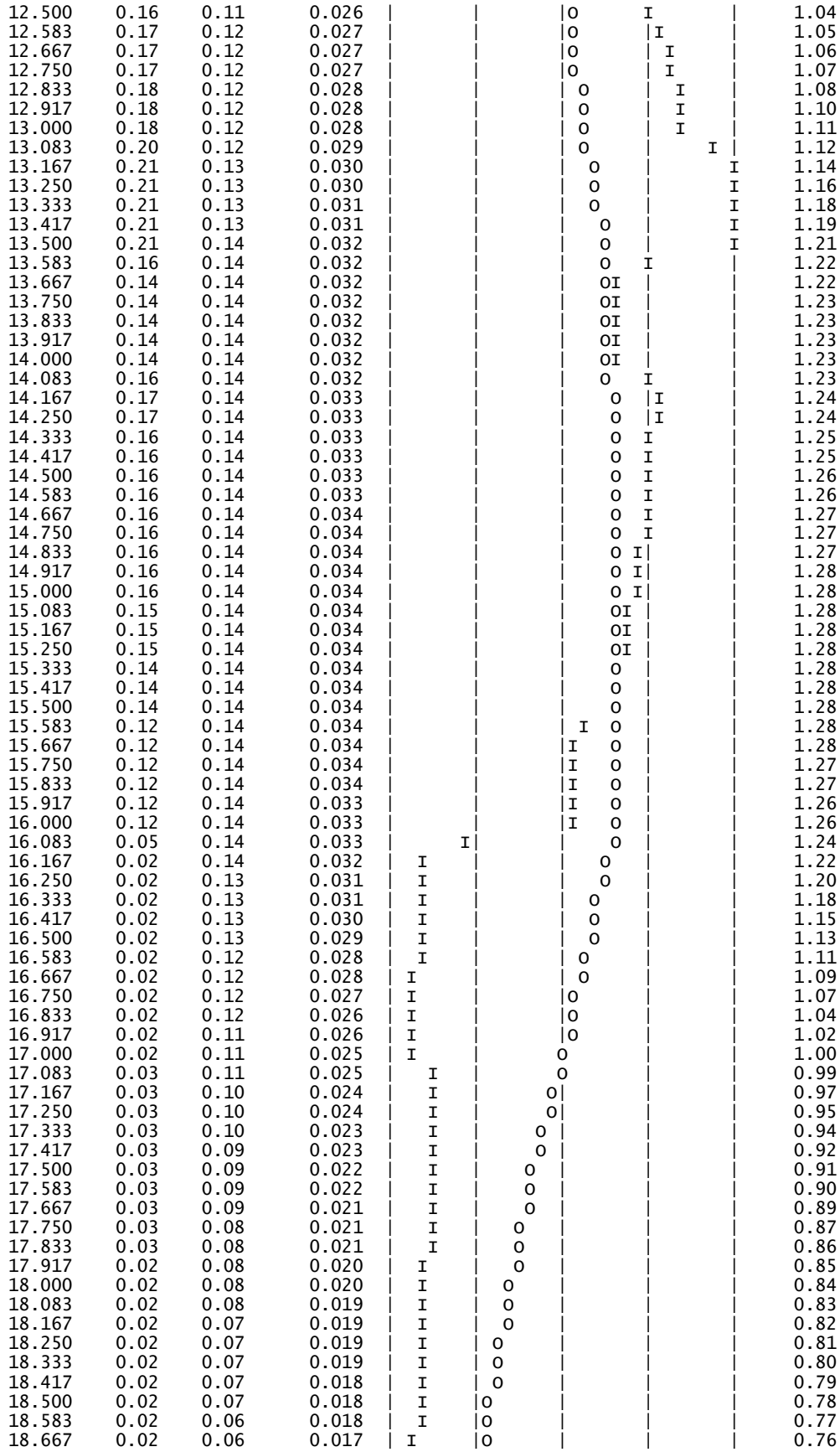
Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time Inflow Outflow Storage Depth

(Hours)	(CFS)	(CFS)	(Ac.Ft)	.0	0.1	0.11	0.16	0.21 (Ft.)
0.083	0.01	0.00	0.000	OI	|	|	|	| 0.00
0.167	0.01	0.00	0.000	OI	|	|	|	| 0.01
0.250	0.01	0.00	0.000	OI	|	|	|	| 0.01
0.333	0.02	0.00	0.000	O I	|	|	|	| 0.02
0.417	0.02	0.00	0.000	O I	|	|	|	| 0.02
0.500	0.02	0.00	0.001	O I	|	|	|	| 0.03
0.583	0.02	0.00	0.001	O I	|	|	|	| 0.04
0.667	0.02	0.00	0.001	O I	|	|	|	| 0.04
0.750	0.02	0.00	0.001	O I	|	|	|	| 0.05
0.833	0.02	0.00	0.001	O I	|	|	|	| 0.06
0.917	0.02	0.00	0.001	O I	|	|	|	| 0.07
1.000	0.02	0.00	0.001	O I	|	|	|	| 0.08
1.083	0.02	0.00	0.002	O I	|	|	|	| 0.09
1.167	0.02	0.00	0.002	O I	|	|	|	| 0.09
1.250	0.02	0.00	0.002	O I	|	|	|	| 0.10
1.333	0.02	0.00	0.002	O I	|	|	|	| 0.11
1.417	0.02	0.00	0.002	O I	|	|	|	| 0.12
1.500	0.02	0.00	0.002	O I	|	|	|	| 0.12
1.583	0.02	0.00	0.002	O I	|	|	|	| 0.13
1.667	0.02	0.00	0.002	O I	|	|	|	| 0.14
1.750	0.02	0.00	0.003	O I	|	|	|	| 0.14
1.833	0.02	0.00	0.003	O I	|	|	|	| 0.15
1.917	0.02	0.00	0.003	O I	|	|	|	| 0.16
2.000	0.02	0.00	0.003	O I	|	|	|	| 0.17
2.083	0.02	0.00	0.003	O I	|	|	|	| 0.18
2.167	0.02	0.00	0.003	O I	|	|	|	| 0.19
2.250	0.02	0.00	0.004	O I	|	|	|	| 0.20
2.333	0.02	0.00	0.004	O I	|	|	|	| 0.21
2.417	0.02	0.00	0.004	O I	|	|	|	| 0.22
2.500	0.02	0.00	0.004	O I	|	|	|	| 0.23
2.583	0.03	0.00	0.004	O I	|	|	|	| 0.24
2.667	0.03	0.00	0.004	O I	|	|	|	| 0.25
2.750	0.03	0.00	0.005	O I	|	|	|	| 0.26
2.833	0.03	0.00	0.005	O I	|	|	|	| 0.27
2.917	0.03	0.00	0.005	O I	|	|	|	| 0.28
3.000	0.03	0.00	0.005	O I	|	|	|	| 0.29
3.083	0.03	0.00	0.005	O I	|	|	|	| 0.31
3.167	0.03	0.00	0.006	O I	|	|	|	| 0.32
3.250	0.03	0.00	0.006	O I	|	|	|	| 0.33
3.333	0.03	0.00	0.006	O I	|	|	|	| 0.34
3.417	0.03	0.00	0.006	O I	|	|	|	| 0.35
3.500	0.03	0.00	0.007	O I	|	|	|	| 0.36
3.583	0.03	0.00	0.007	O I	|	|	|	| 0.38
3.667	0.03	0.00	0.007	O I	|	|	|	| 0.39
3.750	0.03	0.00	0.007	O I	|	|	|	| 0.40
3.833	0.04	0.00	0.007	O I	|	|	|	| 0.41
3.917	0.04	0.00	0.008	O I	|	|	|	| 0.42
4.000	0.04	0.00	0.008	O I	|	|	|	| 0.44
4.083	0.04	0.00	0.008	O I	|	|	|	| 0.45
4.167	0.04	0.00	0.008	O I	|	|	|	| 0.47
4.250	0.04	0.00	0.009	O I	|	|	|	| 0.48
4.333	0.04	0.00	0.009	O I	|	|	|	| 0.49
4.417	0.04	0.00	0.009	O I	|	|	|	| 0.51
4.500	0.04	0.00	0.009	O I	|	|	|	| 0.52
4.583	0.04	0.00	0.010	O I	|	|	|	| 0.52
4.667	0.04	0.00	0.010	O I	|	|	|	| 0.53
4.750	0.04	0.00	0.010	O I	|	|	|	| 0.54
4.833	0.05	0.00	0.011	O I	|	|	|	| 0.55
4.917	0.05	0.00	0.011	O I	|	|	|	| 0.56
5.000	0.05	0.00	0.011	O I	|	|	|	| 0.57
5.083	0.04	0.00	0.012	O I	|	|	|	| 0.58
5.167	0.04	0.00	0.012	O I	|	|	|	| 0.59
5.250	0.04	0.00	0.012	O I	|	|	|	| 0.60
5.333	0.04	0.00	0.012	O I	|	|	|	| 0.61
5.417	0.04	0.00	0.013	O I	|	|	|	| 0.62
5.500	0.04	0.00	0.013	O I	|	|	|	| 0.62
5.583	0.05	0.01	0.013	O I	|	|	|	| 0.63
5.667	0.05	0.01	0.014	|O I	|	|	|	| 0.64
5.750	0.05	0.01	0.014	| O I	|	|	|	| 0.65
5.833	0.05	0.02	0.014	| O I	|	|	|	| 0.66
5.917	0.05	0.02	0.014	| O I	|	|	|	| 0.67
6.000	0.05	0.02	0.014	| O I	|	|	|	| 0.67
6.083	0.05	0.03	0.015	| O I	|	|	|	| 0.68
6.167	0.06	0.03	0.015	| O I	|	|	|	| 0.68

6.250	0.06	0.03	0.015	o I				0.69
6.333	0.06	0.03	0.015	o I				0.69
6.417	0.06	0.04	0.015	o I				0.70
6.500	0.06	0.04	0.015	o I				0.70
6.583	0.06	0.04	0.016	o I				0.71
6.667	0.06	0.04	0.016	o I				0.71
6.750	0.06	0.04	0.016	o I				0.72
6.833	0.06	0.05	0.016	o I				0.72
6.917	0.06	0.05	0.016	o I				0.72
7.000	0.06	0.05	0.016	o I				0.73
7.083	0.06	0.05	0.016	o I				0.73
7.167	0.06	0.05	0.016	o I				0.73
7.250	0.06	0.05	0.016	o I				0.73
7.333	0.07	0.05	0.017	o I				0.74
7.417	0.07	0.05	0.017	o I				0.74
7.500	0.07	0.06	0.017	o I				0.74
7.583	0.07	0.06	0.017	o I				0.74
7.667	0.07	0.06	0.017	o I				0.75
7.750	0.07	0.06	0.017	o I				0.75
7.833	0.08	0.06	0.017	o I				0.75
7.917	0.08	0.06	0.017	o I				0.76
8.000	0.08	0.06	0.017	o I				0.76
8.083	0.09	0.06	0.018	o I				0.77
8.167	0.09	0.06	0.018	o I				0.77
8.250	0.09	0.07	0.018	o I				0.78
8.333	0.09	0.07	0.018	o I				0.78
8.417	0.09	0.07	0.018	o I				0.79
8.500	0.09	0.07	0.018	o I				0.80
8.583	0.10	0.07	0.019	o I				0.80
8.667	0.10	0.07	0.019	o I				0.81
8.750	0.10	0.07	0.019	o I				0.81
8.833	0.10	0.07	0.019	o I				0.82
8.917	0.11	0.08	0.019	o I				0.83
9.000	0.11	0.08	0.020	o I				0.83
9.083	0.11	0.08	0.020	o I				0.84
9.167	0.12	0.08	0.020	o I				0.85
9.250	0.12	0.08	0.020	o I				0.86
9.333	0.12	0.08	0.021	o I				0.86
9.417	0.12	0.08	0.021	o I				0.87
9.500	0.12	0.09	0.021	o I				0.88
9.583	0.13	0.09	0.021	o I				0.89
9.667	0.13	0.09	0.022	o I				0.90
9.750	0.13	0.09	0.022	o I				0.91
9.833	0.13	0.09	0.022	o I				0.92
9.917	0.14	0.09	0.023	o I				0.92
10.000	0.14	0.10	0.023	o I				0.93
10.083	0.10	0.10	0.023	oI				0.94
10.167	0.09	0.10	0.023	o				0.94
10.250	0.09	0.10	0.023	o				0.94
10.333	0.09	0.10	0.023	o				0.94
10.417	0.09	0.10	0.023	o				0.94
10.500	0.09	0.10	0.023	o				0.93
10.583	0.12	0.10	0.023	o I				0.94
10.667	0.12	0.10	0.023	o I				0.94
10.750	0.12	0.10	0.023	o I				0.95
10.833	0.12	0.10	0.023	o I				0.95
10.917	0.12	0.10	0.024	o I				0.96
11.000	0.12	0.10	0.024	o I				0.96
11.083	0.12	0.10	0.024	o I				0.97
11.167	0.12	0.10	0.024	o I				0.97
11.250	0.12	0.10	0.024	o I				0.97
11.333	0.12	0.10	0.024	o I				0.97
11.417	0.12	0.11	0.024	o I				0.98
11.500	0.12	0.11	0.024	oI				0.98
11.583	0.11	0.11	0.024	o				0.98
11.667	0.11	0.11	0.024	o				0.98
11.750	0.11	0.11	0.024	o				0.98
11.833	0.11	0.11	0.024	o				0.98
11.917	0.11	0.11	0.024	o				0.98
12.000	0.11	0.11	0.024	o				0.98
12.083	0.14	0.11	0.025	o I				0.99
12.167	0.16	0.11	0.025	o I				1.00
12.250	0.16	0.11	0.025	o I				1.01
12.333	0.16	0.11	0.026	o I				1.02
12.417	0.16	0.11	0.026	o I				1.03



18.750	0.02	0.06	0.017	| I |O | | | 0.75
18.833	0.01	0.06	0.017	| I O | | | 0.74
18.917	0.01	0.05	0.016	|I O| | | 0.73
19.000	0.01	0.05	0.016	|I O| | | 0.73
19.083	0.02	0.04	0.016	| I O | | | 0.72
19.167	0.02	0.04	0.016	| I O | | | 0.71
19.250	0.02	0.04	0.016	| I O | | | 0.71
19.333	0.02	0.04	0.016	| I O | | | 0.70
19.417	0.02	0.04	0.015	| I O | | | 0.70
19.500	0.02	0.04	0.015	| I O | | | 0.70
19.583	0.02	0.03	0.015	| I O | | | 0.70
19.667	0.02	0.03	0.015	| I O | | | 0.69
19.750	0.02	0.03	0.015	| I O | | | 0.69
19.833	0.01	0.03	0.015	| I O | | | 0.69
19.917	0.01	0.03	0.015	|I O | | | 0.68
20.000	0.01	0.03	0.015	|I O | | | 0.68
20.083	0.02	0.03	0.015	| IO | | | 0.68
20.167	0.02	0.02	0.015	| IO | | | 0.68
20.250	0.02	0.02	0.015	| IO | | | 0.67
20.333	0.02	0.02	0.015	| IO | | | 0.67
20.417	0.02	0.02	0.015	| IO | | | 0.67
20.500	0.02	0.02	0.014	| IO | | | 0.67
20.583	0.02	0.02	0.014	| IO | | | 0.67
20.667	0.02	0.02	0.014	| IO | | | 0.67
20.750	0.02	0.02	0.014	| IO | | | 0.67
20.833	0.01	0.02	0.014	| IO | | | 0.67
20.917	0.01	0.02	0.014	|I O | | | 0.67
21.000	0.01	0.02	0.014	|IO | | | 0.66
21.083	0.02	0.02	0.014	| O | | | 0.66
21.167	0.02	0.02	0.014	| O | | | 0.66
21.250	0.02	0.02	0.014	| O | | | 0.66
21.333	0.01	0.02	0.014	| O | | | 0.66
21.417	0.01	0.02	0.014	|IO | | | 0.66
21.500	0.01	0.02	0.014	|IO | | | 0.66
21.583	0.02	0.02	0.014	| O | | | 0.66
21.667	0.02	0.02	0.014	| O | | | 0.66
21.750	0.02	0.02	0.014	| O | | | 0.66
21.833	0.01	0.02	0.014	| O | | | 0.66
21.917	0.01	0.02	0.014	|IO | | | 0.66
22.000	0.01	0.02	0.014	|IO | | | 0.66
22.083	0.02	0.02	0.014	| O | | | 0.66
22.167	0.02	0.02	0.014	| O | | | 0.66
22.250	0.02	0.02	0.014	| O | | | 0.66
22.333	0.01	0.02	0.014	| O | | | 0.66
22.417	0.01	0.02	0.014	|IO | | | 0.66
22.500	0.01	0.02	0.014	|IO | | | 0.66
22.583	0.01	0.02	0.014	|IO | | | 0.66
22.667	0.01	0.02	0.014	|IO | | | 0.66
22.750	0.01	0.02	0.014	|IO | | | 0.65
22.833	0.01	0.01	0.014	|IO | | | 0.65
22.917	0.01	0.01	0.014	|IO | | | 0.65
23.000	0.01	0.01	0.014	|IO | | | 0.65
23.083	0.01	0.01	0.014	|IO | | | 0.65
23.167	0.01	0.01	0.014	|IO | | | 0.65
23.250	0.01	0.01	0.014	|IO | | | 0.65
23.333	0.01	0.01	0.014	|IO | | | 0.65
23.417	0.01	0.01	0.014	|IO | | | 0.65
23.500	0.01	0.01	0.014	|IO | | | 0.65
23.583	0.01	0.01	0.014	|IO | | | 0.65
23.667	0.01	0.01	0.014	|IO | | | 0.65
23.750	0.01	0.01	0.014	|O | | | 0.65
23.833	0.01	0.01	0.014	|O | | | 0.65
23.917	0.01	0.01	0.014	|O | | | 0.65
24.000	0.01	0.01	0.014	|O | | | 0.65
24.083	0.00	0.01	0.014	IO | | | 0.65
24.167	0.00	0.01	0.014	IO | | | 0.65
24.250	0.00	0.01	0.014	IO | | | 0.64
24.333	0.00	0.01	0.014	IO | | | 0.64
24.417	0.00	0.01	0.014	IO | | | 0.64
24.500	0.00	0.01	0.013	IO | | | 0.64
24.583	0.00	0.01	0.013	IO | | | 0.64
24.667	0.00	0.01	0.013	O | | | 0.64
24.750	0.00	0.01	0.013	O | | | 0.63
24.833	0.00	0.01	0.013	O | | | 0.63
24.917	0.00	0.00	0.013	O | | | 0.63

25.000	0.00	0.00	0.013	o	|	|	|	0.63
25.083	0.00	0.00	0.013	o	|	|	|	0.63
25.167	0.00	0.00	0.013	o	|	|	|	0.63
25.250	0.00	0.00	0.013	o	|	|	|	0.63
25.333	0.00	0.00	0.013	o	|	|	|	0.63
25.417	0.00	0.00	0.013	o	|	|	|	0.63
25.500	0.00	0.00	0.013	o	|	|	|	0.63
25.583	0.00	0.00	0.013	o	|	|	|	0.63
25.667	0.00	0.00	0.013	o	|	|	|	0.63
25.750	0.00	0.00	0.013	o	|	|	|	0.63
25.833	0.00	0.00	0.013	o	|	|	|	0.63
25.917	0.00	0.00	0.013	o	|	|	|	0.63
26.000	0.00	0.00	0.013	o	|	|	|	0.63
26.083	0.00	0.00	0.013	o	|	|	|	0.63
26.167	0.00	0.00	0.013	o	|	|	|	0.62

Remaining water in basin = 0.01 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 314
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.144 (CFS)
Total volume = 0.115 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 05/18/20

18-0099 - MOTTE COUNTY PLAZA
BASIN ROUTING
100-YEAR, 24-HOUR ORIFICE
2020-05-18   AYS

Program License Serial Number 4010

********** HYDROGRAPH INFORMATION **********

From study/file name: ONSITEPROP24100.rte
**********HYDROGRAPH DATA**********
Number of intervals =   289
Time interval =   5.0 (Min.)
Maximum/Peak flow rate =   0.487 (CFS)
Total volume =   0.294 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS)   0.000   0.000   0.000   0.000   0.000
Vol (Ac.Ft)   0.000   0.000   0.000   0.000   0.000
****

++++++++++
Process from Point/Station   100.000 to Point/Station   101.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 289
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)

Initial basin depth =   0.00 (Ft.)
Initial basin storage =   0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.009	0.001	0.009	0.009
0.625	0.013	0.001	0.013	0.013
0.750	0.017	0.060	0.017	0.017
1.000	0.025	0.110	0.025	0.025
1.500	0.041	0.170	0.040	0.042
2.000	0.056	0.210	0.055	0.057
2.500	0.070	0.250	0.069	0.071
3.000	0.080	0.280	0.079	0.081
3.500	0.089	0.310	0.088	0.090
4.000	0.097	0.330	0.096	0.098
4.500	0.106	0.360	0.105	0.107

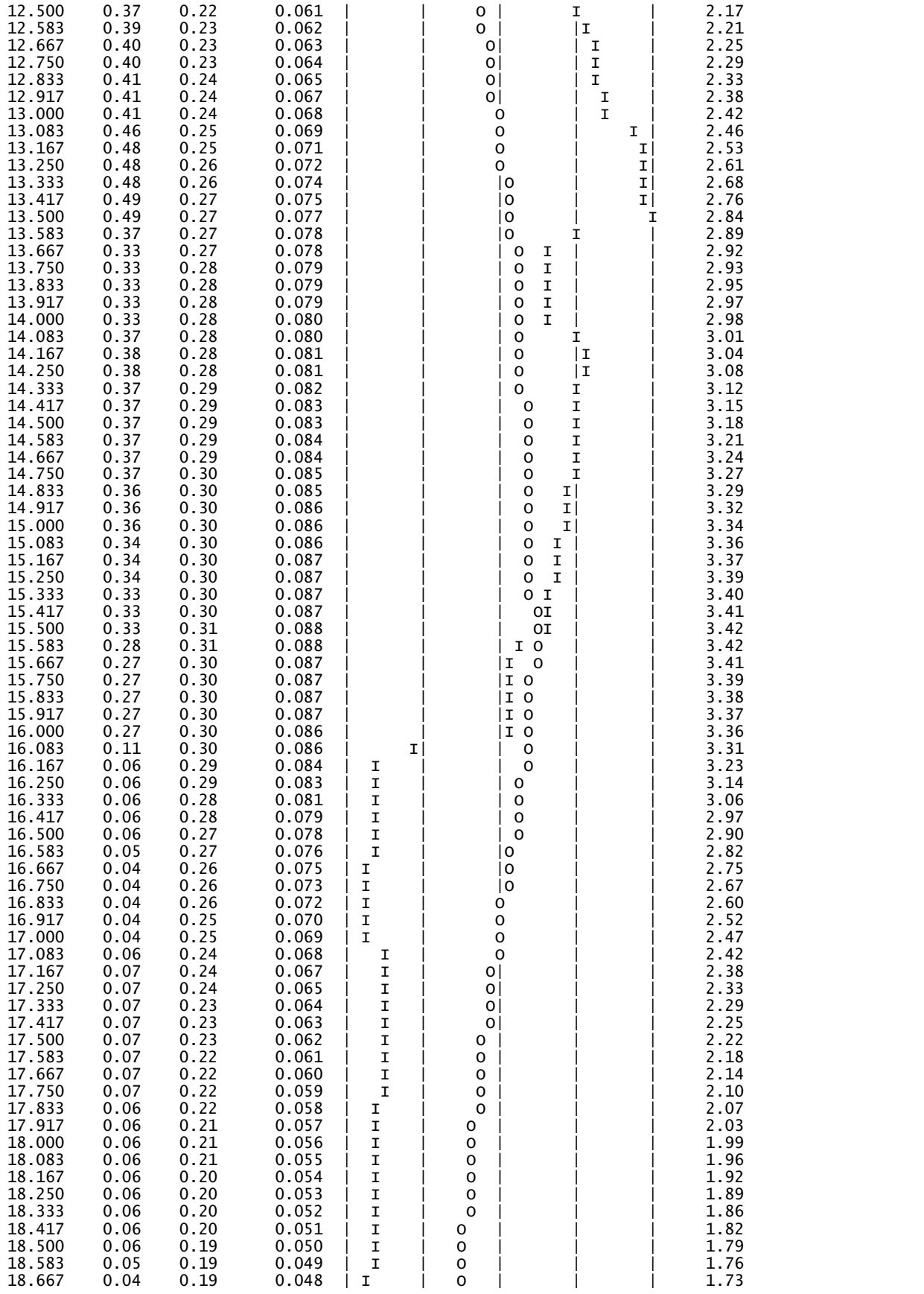
Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time Inflow Outflow Storage Depth

(Hours)	(CFS)	(CFS)	(Ac.Ft)	.0	0.1	0.24	0.37	0.49 (Ft.)
0.083	0.02	0.00	0.000	OI	|	|	|	| 0.00
0.167	0.03	0.00	0.000	OI	|	|	|	| 0.01
0.250	0.03	0.00	0.000	OI	|	|	|	| 0.02
0.333	0.04	0.00	0.001	O I	|	|	|	| 0.04
0.417	0.04	0.00	0.001	O I	|	|	|	| 0.05
0.500	0.04	0.00	0.001	O I	|	|	|	| 0.07
0.583	0.04	0.00	0.002	O I	|	|	|	| 0.09
0.667	0.04	0.00	0.002	O I	|	|	|	| 0.10
0.750	0.04	0.00	0.002	O I	|	|	|	| 0.12
0.833	0.05	0.00	0.002	O I	|	|	|	| 0.14
0.917	0.06	0.00	0.003	O I	|	|	|	| 0.16
1.000	0.06	0.00	0.003	O I	|	|	|	| 0.18
1.083	0.05	0.00	0.004	O I	|	|	|	| 0.20
1.167	0.04	0.00	0.004	O I	|	|	|	| 0.22
1.250	0.04	0.00	0.004	O I	|	|	|	| 0.23
1.333	0.04	0.00	0.004	O I	|	|	|	| 0.25
1.417	0.04	0.00	0.005	O I	|	|	|	| 0.26
1.500	0.04	0.00	0.005	O I	|	|	|	| 0.28
1.583	0.04	0.00	0.005	O I	|	|	|	| 0.30
1.667	0.04	0.00	0.006	O I	|	|	|	| 0.31
1.750	0.04	0.00	0.006	O I	|	|	|	| 0.33
1.833	0.05	0.00	0.006	O I	|	|	|	| 0.35
1.917	0.06	0.00	0.007	O I	|	|	|	| 0.37
2.000	0.06	0.00	0.007	O I	|	|	|	| 0.39
2.083	0.06	0.00	0.007	O I	|	|	|	| 0.41
2.167	0.06	0.00	0.008	O I	|	|	|	| 0.43
2.250	0.06	0.00	0.008	O I	|	|	|	| 0.45
2.333	0.06	0.00	0.009	O I	|	|	|	| 0.47
2.417	0.06	0.00	0.009	O I	|	|	|	| 0.50
2.500	0.06	0.00	0.009	O I	|	|	|	| 0.51
2.583	0.07	0.00	0.010	O I	|	|	|	| 0.52
2.667	0.07	0.00	0.010	O I	|	|	|	| 0.54
2.750	0.07	0.00	0.011	O I	|	|	|	| 0.55
2.833	0.07	0.00	0.011	O I	|	|	|	| 0.57
2.917	0.07	0.00	0.012	O I	|	|	|	| 0.58
3.000	0.07	0.00	0.012	O I	|	|	|	| 0.60
3.083	0.07	0.00	0.013	O I	|	|	|	| 0.61
3.167	0.07	0.00	0.013	O I	|	|	|	| 0.63
3.250	0.07	0.01	0.014	O I	|	|	|	| 0.64
3.333	0.07	0.01	0.014	O I	|	|	|	| 0.65
3.417	0.07	0.02	0.014	|O I	|	|	|	| 0.67
3.500	0.07	0.03	0.015	|O I	|	|	|	| 0.68
3.583	0.07	0.03	0.015	|O I	|	|	|	| 0.69
3.667	0.07	0.03	0.015	| O I	|	|	|	| 0.69
3.750	0.07	0.04	0.015	| O I	|	|	|	| 0.70
3.833	0.08	0.04	0.016	| O I	|	|	|	| 0.71
3.917	0.09	0.05	0.016	| O I	|	|	|	| 0.72
4.000	0.09	0.05	0.016	| O I	|	|	|	| 0.73
4.083	0.09	0.05	0.016	| O I	|	|	|	| 0.73
4.167	0.09	0.06	0.017	| O I	|	|	|	| 0.74
4.250	0.09	0.06	0.017	| O I	|	|	|	| 0.75
4.333	0.10	0.06	0.017	| O I	|	|	|	| 0.75
4.417	0.10	0.06	0.017	| O I	|	|	|	| 0.76
4.500	0.10	0.06	0.018	| O I	|	|	|	| 0.77
4.583	0.10	0.07	0.018	| O I	|	|	|	| 0.78
4.667	0.10	0.07	0.018	| O I	|	|	|	| 0.78
4.750	0.10	0.07	0.018	| O I	|	|	|	| 0.79
4.833	0.11	0.07	0.019	| O I|	|	|	| 0.80
4.917	0.11	0.07	0.019	| O I|	|	|	| 0.81
5.000	0.11	0.07	0.019	| O I|	|	|	| 0.82
5.083	0.09	0.07	0.019	| O I |	|	|	| 0.82
5.167	0.09	0.08	0.019	| OI |	|	|	| 0.83
5.250	0.09	0.08	0.019	| OI |	|	|	| 0.83
5.333	0.10	0.08	0.020	| OI |	|	|	| 0.83
5.417	0.10	0.08	0.020	| OI |	|	|	| 0.84
5.500	0.10	0.08	0.020	| OI |	|	|	| 0.84
5.583	0.11	0.08	0.020	| O I|	|	|	| 0.85
5.667	0.11	0.08	0.020	| O I|	|	|	| 0.85
5.750	0.11	0.08	0.021	| O I|	|	|	| 0.86
5.833	0.11	0.08	0.021	| O I|	|	|	| 0.87
5.917	0.11	0.08	0.021	| O I|	|	|	| 0.87
6.000	0.11	0.09	0.021	| O I|	|	|	| 0.88
6.083	0.12	0.09	0.021	| O I	|	|	| 0.89
6.167	0.13	0.09	0.022	| O I	|	|	| 0.89

6.250	0.13	0.09	0.022	o I				0.90
6.333	0.13	0.09	0.022	o I				0.91
6.417	0.13	0.09	0.022	o I				0.92
6.500	0.13	0.10	0.023	o I				0.93
6.583	0.14	0.10	0.023	o |I				0.93
6.667	0.14	0.10	0.023	o |I				0.94
6.750	0.14	0.10	0.023	o |I				0.95
6.833	0.14	0.10	0.024	o |I				0.96
6.917	0.14	0.10	0.024	o |I				0.97
7.000	0.14	0.11	0.024	o |I				0.98
7.083	0.14	0.11	0.025	o|I				0.98
7.167	0.14	0.11	0.025	o|I				0.99
7.250	0.14	0.11	0.025	o|I				1.00
7.333	0.15	0.11	0.025	o| I				1.01
7.417	0.16	0.11	0.026	o| I				1.02
7.500	0.16	0.11	0.026	o| I				1.03
7.583	0.17	0.11	0.026	o| I				1.04
7.667	0.17	0.12	0.027	o| I				1.05
7.750	0.17	0.12	0.027	o| I				1.06
7.833	0.18	0.12	0.027	o| I				1.07
7.917	0.18	0.12	0.028	o| I				1.09
8.000	0.18	0.12	0.028	o I				1.10
8.083	0.21	0.12	0.029	o I				1.11
8.167	0.21	0.13	0.029	o I				1.13
8.250	0.21	0.13	0.030	o I				1.15
8.333	0.21	0.13	0.030	o I				1.17
8.417	0.21	0.13	0.031	o I				1.19
8.500	0.21	0.13	0.032	o I				1.20
8.583	0.22	0.14	0.032	o I				1.22
8.667	0.23	0.14	0.033	|o I				1.24
8.750	0.23	0.14	0.033	|o I				1.26
8.833	0.24	0.14	0.034	|o I|				1.28
8.917	0.24	0.15	0.035	|o I|				1.30
9.000	0.24	0.15	0.035	|o I|				1.32
9.083	0.26	0.15	0.036	|o |I				1.34
9.167	0.27	0.15	0.037	| o |I				1.37
9.250	0.27	0.16	0.038	| o |I				1.39
9.333	0.28	0.16	0.038	| o | I				1.42
9.417	0.28	0.16	0.039	| o | I				1.44
9.500	0.28	0.17	0.040	| o | I				1.47
9.583	0.29	0.17	0.041	| o | I				1.49
9.667	0.30	0.17	0.042	| o | I				1.52
9.750	0.30	0.17	0.043	| o | I				1.55
9.833	0.31	0.18	0.043	| o | I				1.58
9.917	0.31	0.18	0.044	| o | I				1.61
10.000	0.31	0.18	0.045	| o | I				1.64
10.083	0.24	0.18	0.046	| o I|				1.66
10.167	0.21	0.18	0.046	| o I |				1.67
10.250	0.21	0.18	0.046	| o I |				1.68
10.333	0.21	0.18	0.047	| o I |				1.69
10.417	0.21	0.19	0.047	| o I |				1.69
10.500	0.21	0.19	0.047	| o I |				1.70
10.583	0.27	0.19	0.047	| o |I				1.71
10.667	0.28	0.19	0.048	| o | I				1.73
10.750	0.28	0.19	0.049	| o | I				1.75
10.833	0.28	0.19	0.049	| o | I				1.77
10.917	0.28	0.19	0.050	| o | I				1.80
11.000	0.28	0.20	0.050	| o | I				1.82
11.083	0.27	0.20	0.051	| o |I				1.84
11.167	0.27	0.20	0.052	| o |I				1.85
11.250	0.27	0.20	0.052	| o |I				1.87
11.333	0.27	0.20	0.053	| o |I				1.88
11.417	0.27	0.20	0.053	| o |I				1.90
11.500	0.27	0.20	0.053	| o |I				1.92
11.583	0.25	0.20	0.054	| o I				1.93
11.667	0.24	0.21	0.054	| o I|				1.94
11.750	0.24	0.21	0.054	| o I|				1.95
11.833	0.25	0.21	0.055	| o I				1.96
11.917	0.26	0.21	0.055	| o I				1.97
12.000	0.26	0.21	0.055	| o I				1.98
12.083	0.33	0.21	0.056	| o | I |				2.00
12.167	0.36	0.21	0.057	| o | I|				2.03
12.250	0.36	0.22	0.058	| o | I|				2.06
12.333	0.37	0.22	0.059	| o | I				2.10
12.417	0.37	0.22	0.060	| o | I				2.14



18.750	0.04	0.19	0.047	| I | o | | |	1.69
18.833	0.03	0.18	0.046	| I | o | | |	1.66
18.917	0.03	0.18	0.045	|I | o | | |	1.63
19.000	0.03	0.18	0.044	|I | o | | |	1.59
19.083	0.04	0.17	0.043	| I | o | | |	1.56
19.167	0.04	0.17	0.042	| I | o | | |	1.53
19.250	0.04	0.17	0.041	| I | o | | |	1.50
19.333	0.05	0.17	0.040	| I |o | | |	1.47
19.417	0.06	0.16	0.039	| I |o | | |	1.45
19.500	0.06	0.16	0.039	| I |o | | |	1.43
19.583	0.05	0.16	0.038	| I |o | | |	1.40
19.667	0.04	0.16	0.037	| I |o | | |	1.38
19.750	0.04	0.15	0.036	| I |o | | |	1.35
19.833	0.03	0.15	0.036	| I |o | | |	1.33
19.917	0.03	0.15	0.035	|I |o | | |	1.30
20.000	0.03	0.14	0.034	|I |o | | |	1.28
20.083	0.04	0.14	0.033	| I |o | | |	1.26
20.167	0.04	0.14	0.033	| I |o | | |	1.24
20.250	0.04	0.14	0.032	| I |o | | |	1.21
20.333	0.04	0.13	0.031	| I |o | | |	1.19
20.417	0.04	0.13	0.031	| I |o | | |	1.18
20.500	0.04	0.13	0.030	| I |o | | |	1.16
20.583	0.04	0.13	0.029	| I |o | | |	1.14
20.667	0.04	0.12	0.029	| I |o | | |	1.12
20.750	0.04	0.12	0.028	| I |o | | |	1.10
20.833	0.03	0.12	0.028	| I |o| | |	1.09
20.917	0.03	0.12	0.027	|I |o| | |	1.07
21.000	0.03	0.12	0.027	|I |o| | |	1.05
21.083	0.04	0.11	0.026	| I |o| | |	1.03
21.167	0.04	0.11	0.025	| I |o| | |	1.01
21.250	0.04	0.11	0.025	| I |o| | |	1.00
21.333	0.03	0.11	0.024	| I |o| | |	0.98
21.417	0.03	0.10	0.024	|I |o | | |	0.97
21.500	0.03	0.10	0.023	|I |o | | |	0.95
21.583	0.04	0.10	0.023	| I |o | | |	0.94
21.667	0.04	0.10	0.023	| I |o | | |	0.93
21.750	0.04	0.09	0.022	| I |o | | |	0.92
21.833	0.03	0.09	0.022	| I |o | | |	0.90
21.917	0.03	0.09	0.022	|I |o | | |	0.89
22.000	0.03	0.09	0.021	|I |o | | |	0.88
22.083	0.04	0.08	0.021	| I |o | | |	0.87
22.167	0.04	0.08	0.020	| I |o | | |	0.86
22.250	0.04	0.08	0.020	| I |o | | |	0.85
22.333	0.03	0.08	0.020	| I |o | | |	0.84
22.417	0.03	0.08	0.020	|I |o | | |	0.83
22.500	0.03	0.07	0.019	|I |o | | |	0.82
22.583	0.03	0.07	0.019	|I |o | | |	0.81
22.667	0.03	0.07	0.019	|I |o | | |	0.80
22.750	0.03	0.07	0.018	|I |o | | |	0.79
22.833	0.03	0.07	0.018	|I |o | | |	0.78
22.917	0.03	0.07	0.018	|I |o | | |	0.78
23.000	0.03	0.06	0.018	|I |o | | |	0.77
23.083	0.03	0.06	0.017	|I |o | | |	0.76
23.167	0.03	0.06	0.017	|I |o | | |	0.75
23.250	0.03	0.06	0.017	|I o | | |	0.75
23.333	0.03	0.06	0.017	|I o | | |	0.74
23.417	0.03	0.05	0.017	|I o | | |	0.74
23.500	0.03	0.05	0.016	|I o | | |	0.73
23.583	0.03	0.05	0.016	|I o | | |	0.73
23.667	0.03	0.05	0.016	|I o | | |	0.72
23.750	0.03	0.04	0.016	|IO | | |	0.72
23.833	0.03	0.04	0.016	|IO | | |	0.71
23.917	0.03	0.04	0.016	|IO | | |	0.71
24.000	0.03	0.04	0.016	|IO | | |	0.71
24.083	0.01	0.04	0.016	I o | | |	0.70
24.167	0.00	0.04	0.015	I o | | |	0.70
24.250	0.00	0.03	0.015	I o | | |	0.69
24.333	0.00	0.03	0.015	IO | | |	0.68
24.417	0.00	0.03	0.015	IO | | |	0.68
24.500	0.00	0.02	0.015	IO | | |	0.67
24.583	0.00	0.02	0.014	IO | | |	0.67
24.667	0.00	0.02	0.014	IO | | |	0.66
24.750	0.00	0.02	0.014	IO | | |	0.66
24.833	0.00	0.02	0.014	IO | | |	0.66
24.917	0.00	0.01	0.014	o | | |	0.65

25.000	0.00	0.01	0.014	O	|	|	|	0.65
25.083	0.00	0.01	0.014	O	|	|	|	0.65
25.167	0.00	0.01	0.014	O	|	|	|	0.64
25.250	0.00	0.01	0.014	O	|	|	|	0.64
25.333	0.00	0.01	0.014	O	|	|	|	0.64
25.417	0.00	0.01	0.013	O	|	|	|	0.64
25.500	0.00	0.01	0.013	O	|	|	|	0.64
25.583	0.00	0.01	0.013	O	|	|	|	0.64
25.667	0.00	0.01	0.013	O	|	|	|	0.63
25.750	0.00	0.01	0.013	O	|	|	|	0.63
25.833	0.00	0.00	0.013	O	|	|	|	0.63
25.917	0.00	0.00	0.013	O	|	|	|	0.63
26.000	0.00	0.00	0.013	O	|	|	|	0.63
26.083	0.00	0.00	0.013	O	|	|	|	0.63
26.167	0.00	0.00	0.013	O	|	|	|	0.63
26.250	0.00	0.00	0.013	O	|	|	|	0.63
26.333	0.00	0.00	0.013	O	|	|	|	0.63
26.417	0.00	0.00	0.013	O	|	|	|	0.63
26.500	0.00	0.00	0.013	O	|	|	|	0.63
26.583	0.00	0.00	0.013	O	|	|	|	0.63
26.667	0.00	0.00	0.013	O	|	|	|	0.63
26.750	0.00	0.00	0.013	O	|	|	|	0.63
26.833	0.00	0.00	0.013	O	|	|	|	0.63
26.917	0.00	0.00	0.013	O	|	|	|	0.63
27.000	0.00	0.00	0.013	O	|	|	|	0.63
27.083	0.00	0.00	0.013	O	|	|	|	0.62

Remaining water in basin = 0.01 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 325
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.305 (CFS)
Total volume = 0.281 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

OUTLET STRUCTURE FOR UNDERGROUND CHAMBERS
Q100=3.70 CFS
3' WIDE WEIR WALL WITHIN OUTLET STRUCTURE

WEIR CALCULATIONS

EQUATIONS

Q=CL(h)^(3/2)
where
L= 3 ft
C= 3

WEIR	Q (WEIR)	50% CLOGGING
HIGH		
Ft	CFS	CFS
0.50	3.2	1.6
0.75	5.8	2.9
0.90	7.7	3.8

NOTE: ***Weir calculations above assume a clogging factor of 0.50. This reduction takes into account the grate bars. Calculations also assume the 2-year orifice and 100-year orifice are totally clogged (not conveying any flows).***

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

To be provided in final engineering.

Appendix 9: O&M

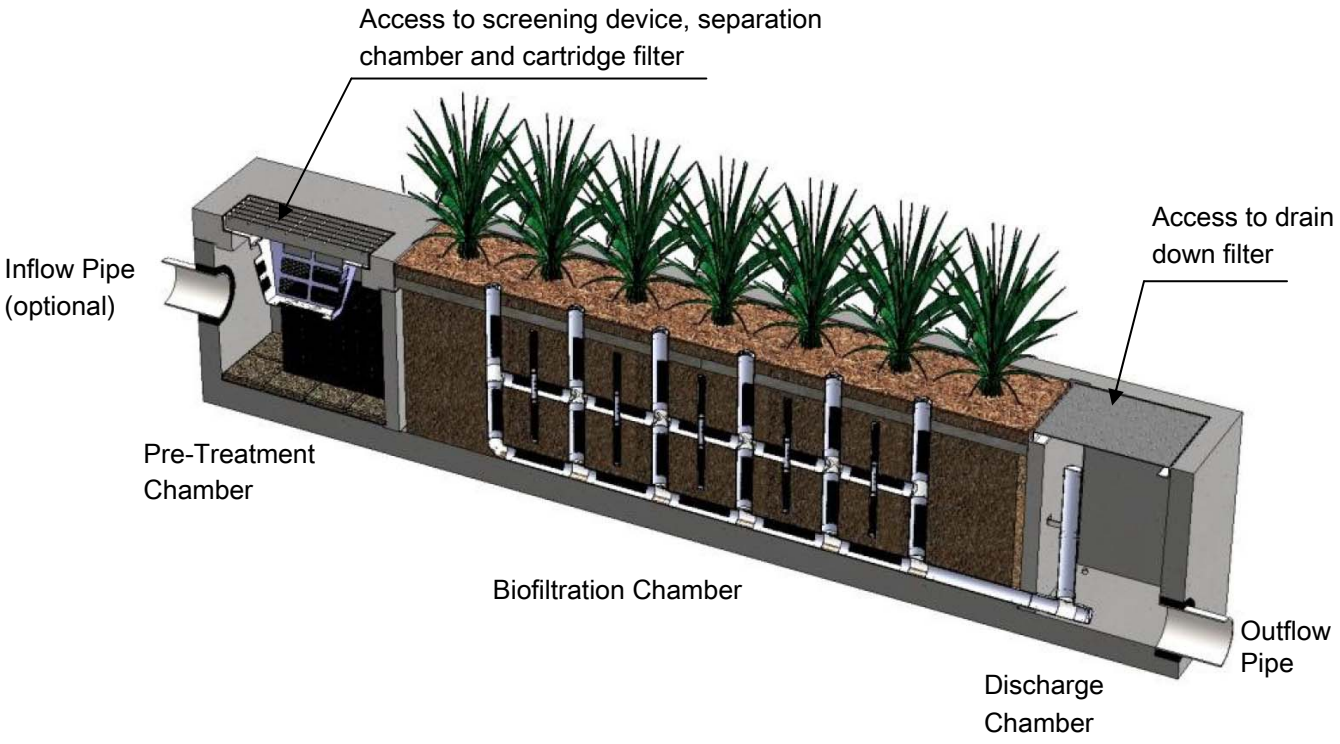
Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.

Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.

Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.

Inspection Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

Maintenance Report

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

SiteASSIST™ by StormTech

FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

StormTech® An ADS company

SC-310/SC-740/DC-780

StormTech Construction Guide

REQUIRED MATERIALS AND EQUIPMENT LIST

- Acceptable fill materials per Table 1
- Woven and non-woven geotextiles
- StormTech solid end caps and pre-cored end caps
- StormTech chambers
- StormTech manifolds and fittings

IMPORTANT NOTES:

A. This installation guide provides the minimum requirements for proper installation of chambers. Non-adherence to this guide may result in damage to chambers during installation. Replacement of damaged chambers during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the chambers for distortion, damage and joint integrity as work progresses.

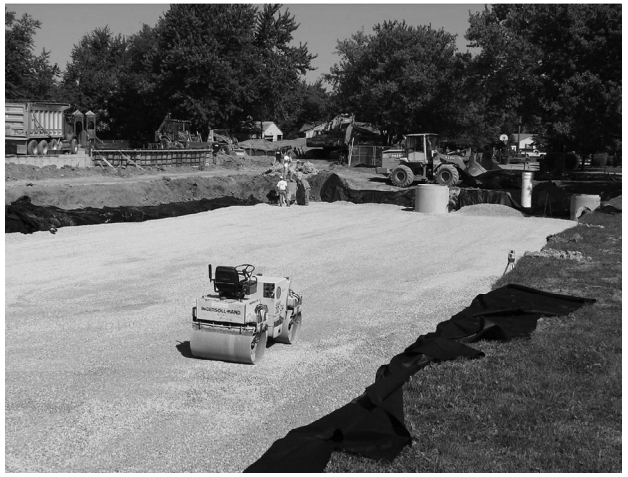
B. Use of a dozer to push embedment stone between the rows of chambers may cause damage to chambers and is not an acceptable backfill method. Any chambers damaged by using the "dump and push" method are not covered under the StormTech standard warranty.

C. Care should be taken in the handling of chambers and end caps. Avoid dropping, prying or excessive force on chambers during removal from pallet and initial placement.

Requirements for System Installation

Excavate bed and prepare subgrade per engineer's plans.

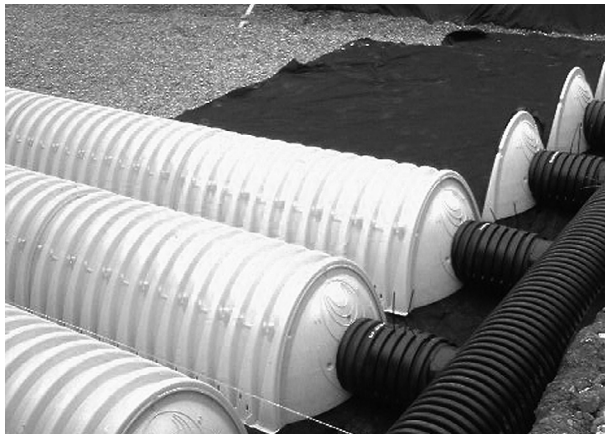
Place non-woven geotextile over prepared soils and up excavation walls. Install underdrains if required.



Place clean, crushed, angular stone foundation 6" (150 mm) min. Compact to achieve a flat surface.

Manifold, Scour Fabric and Chamber Assembly

Install manifolds and lay out woven scour geotextile at inlet rows [min. 12.5 ft (3.8 m)] at each inlet end cap. Place a continuous piece (no seams, double layer) along entire length of Isolator® Row(s).



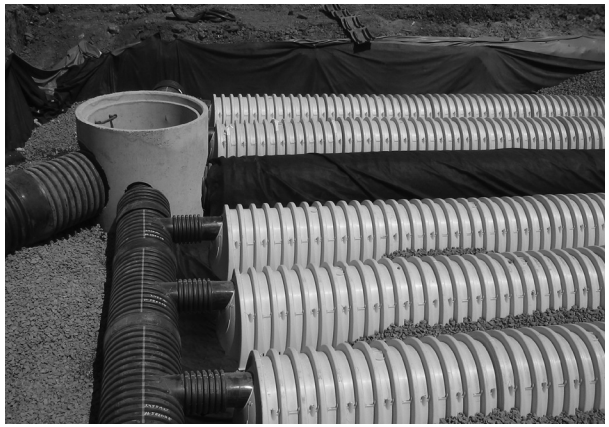
Align the first chamber and end cap of each row with inlet pipes. Contractor may choose to postpone stone placement around end chambers and leave ends of rows open for easy inspection of chambers during the backfill process.

Continue installing chambers by overlapping chamber end corrugations. Chamber joints are labeled “Lower Joint – Overlap Here” and “Build this direction – Upper Joint” Be sure that the chamber placement does not exceed the reach of the construction equipment used to place the stone. Maintain minimum 6” (150 mm) spacing between rows.

Attaching the End Caps

Lift the end of the chamber a few inches off the ground. With the curved face of the end cap facing outward, place the end cap into the chamber’s end corrugation.

Prefabricated End Caps



24” (600 mm) inlets are the maximum size that can fit into a SC-740/DC-780 end cap and must be prefabricated with a 24” (600 mm) pipe stub. SC-310 chambers with a 12” (300 mm) inlet pipe must use a prefabricated end cap with a 12” (300 mm) pipe stub.

Isolator Row

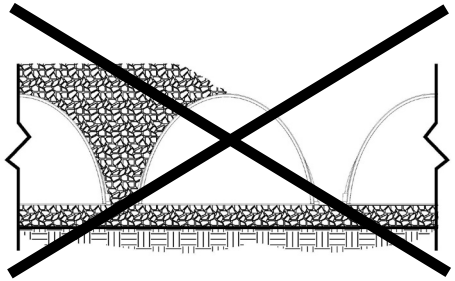
Place two continuous layers of ADS Woven fabric between the foundation stone and the isolator row chambers, making sure the fabric lays flat and extends the entire width of the chamber feet. Drape a strip of ADS non-woven geotextile over the row of chambers (not required over DC-780). This is the same type of non-woven geotextile used as a separation layer around the angular stone of the StormTech system.

Initial Anchoring of Chambers – Embedment Stone

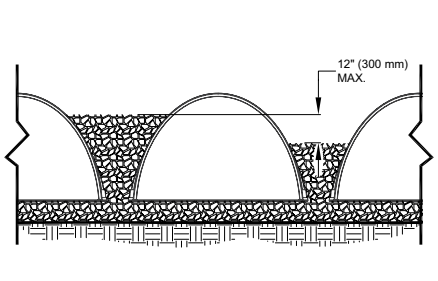
Initial embedment shall be spotted along the centerline of the chamber evenly anchoring the lower portion of the chamber. This is best accomplished with a stone conveyor or excavator reaching along the row.

No equipment shall be operated on the bed at this stage of the installation. Excavators must be located off the bed. Dump trucks shall not dump stone directly on to the bed. Dozers or loaders are not allowed on the bed at this time.

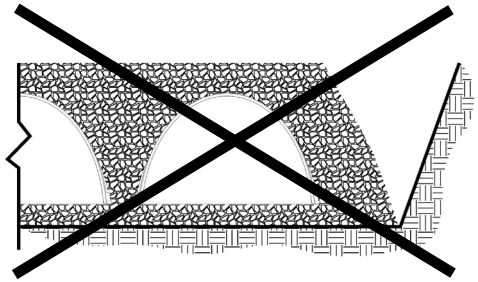
Backfill of Chambers – Embedment Stone



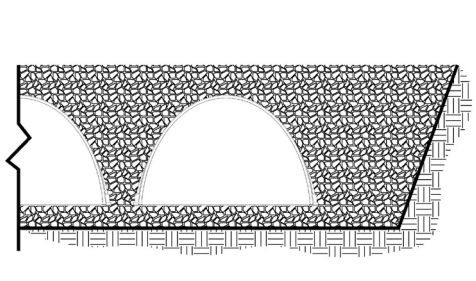
UNEVEN BACKFILL



EVEN BACKFILL



PERIMETER NOT BACKFILLED



PERIMETER FULLY BACKFILLED

Backfill chambers evenly. Stone column height should never differ by more than 12” (300 mm) between adjacent chamber rows or between chamber rows and perimeter.

Perimeter stone must be brought up evenly with chamber rows. Perimeter must be fully backfilled, with stone extended horizontally to the excavation wall.

Backfill - Embedment Stone & Cover Stone

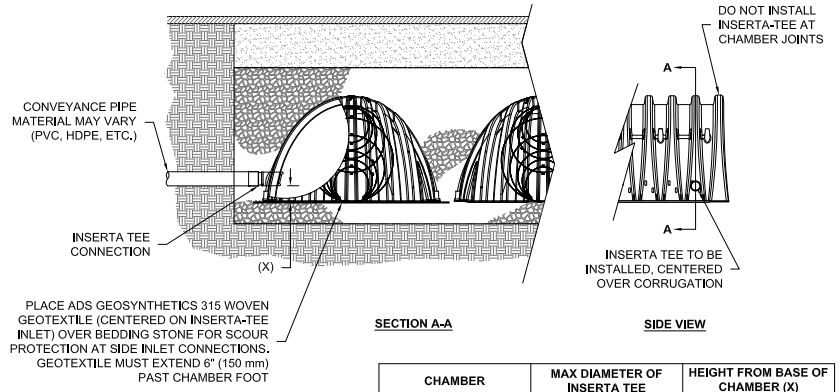
Continue evenly backfilling between rows and around perimeter until embedment stone reaches tops of chambers. Perimeter stone must extend horizontally to the excavation wall for both straight or sloped sidewalls. **Only after chambers have been backfilled to top of chamber and with a minimum 6" (150 mm) of cover stone on top of chambers can small dozers be used over the chambers for backfilling remaining cover stone.**

Small dozers and skid loaders may be used to finish grading stone backfill in accordance with ground pressure limits in Table 2. They must push material parallel to rows only. Never push perpendicular to rows. StormTech recommends that the contractor inspect chambers before placing final backfill. Any chambers damaged by construction shall be removed and replaced.

Final Backfill of Chambers – Fill Material

Install non-woven geotextile over stone. Geotextile must overlap 24" (600 mm) min. where edges meet. Compact each lift of backfill as specified in the site design engineer's drawings. Roller travel parallel with rows.

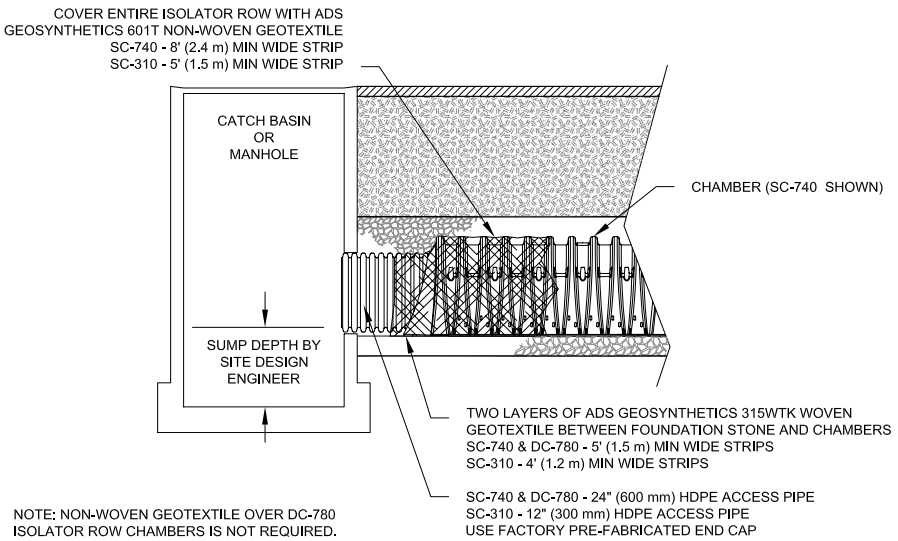
Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

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

StormTech Isolator Row Detail



NOTE: NON-WOVEN GEOTEXTILE OVER DC-780 ISOLATOR ROW CHAMBERS IS NOT REQUIRED.

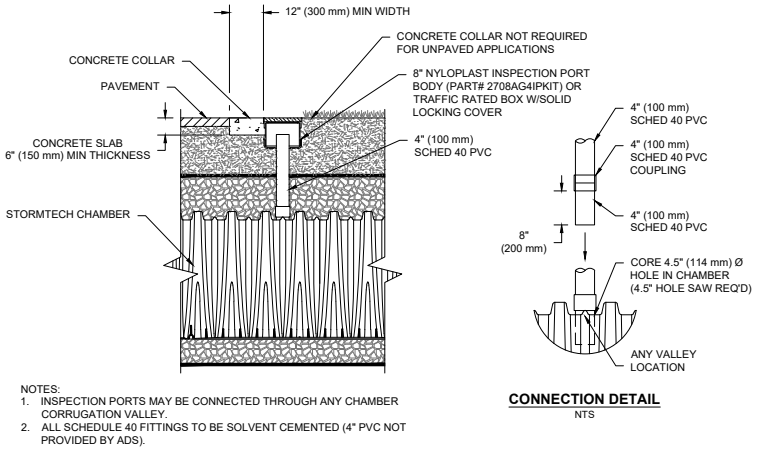
Table 1- Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation[1]	Compaction/Density Requirement
Ⓓ **Final Fill:** Fill Material for layer 'D' starts from the top of the 'C' layer to the bottom of flexible pavement or unpaved finished grade above. Note that the pavement subbase may be part of the 'D' layer.	Any soil/rock materials, native soils or per engineer's plans. Check plans for pavement subgrade requirements.	N/A	Prepare per site design engineer's plans. Paved installations may have stringent material and preparation requirements.
Ⓒ **Initial Fill:** Fill Material for layer 'C' starts from the top of the embedment stone ('B' layer) to 18" (450 mm) above the top of the chamber. Note that pavement subbase may be part of the 'C' layer.	Granular well-graded soil/ aggregate mixtures, <35% fines or processed aggregate. Most pavement subbase materials can be used in lieu of this layer.	AASHTO M45 A-1, A-2-4, A-3 or AASHTO M431 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin compaction after min. 12" (300 mm) of material over the chambers is reached. Compact additional layers in 6" (150 mm) max. lifts to a min. 95% Proctor density for well-graded material and 95% relative density for processed aggregate materials. Roller gross vehicle weight not to exceed 12,000 lbs (53 kN). Dynamic force not to exceed 20,000 lbs (89 kN)
Ⓑ **Embedment Stone:** Embedment Stone surrounding chambers from the foundation stone to the 'C' layer above.	Clean, crushed, angular stone	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	No compaction required.
Ⓐ **Foundation Stone:** Foundation Stone below the chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone,	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	Place and compact in 6" (150 mm) lifts using two full coverages with a vibratory compactor.[2,3]

PLEASE NOTE:

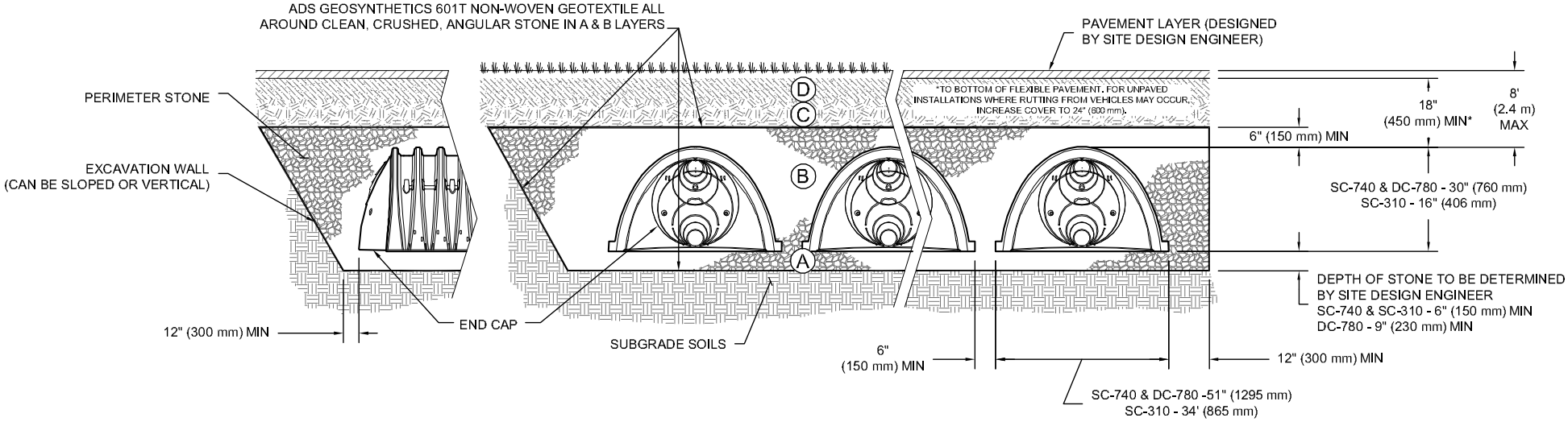
1. ***The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular no. 4 (AASHTO M43) stone".***
2. ***StormTech compaction requirements are met for 'A' location materials when placed and compacted in 6" (150 mm) (max) lifts using two full coverages with a vibratory compactor.***
3. ***Where infiltration surfaces may be comprised by compaction, for standard installations and standard design load conditions, a flat surface may be achieved by raking or dragging without compaction equipment. For special load designs, contact StormTech for compaction requirements.***

Figure 1- Inspection Port Detail



NOTES:
1. INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED (4" PVC NOT PROVIDED BY ADS).

Figure 2 - Fill Material Locations



NOTES:

1. ***36" (900 mm) of stabilized cover materials over the chambers is required for full dump truck travel and dumping.***
2. ***During paving operations, dump truck axle loads on 18" (450 mm) of cover may be necessary. Precautions should be taken to avoid rutting of the road base layer, to ensure that compaction requirements have been met, and that a minimum of 18" (450 mm) of cover exists over the chambers. Contact StormTech for additional guidance on allowable axle loads during paving.***
3. ***Ground pressure for track dozers is the vehicle operating weight divided by total ground contact area for both tracks. Excavators will exert higher ground pressures based on loaded bucket weight and boom extension.***
4. ***Mini-excavators (< 8,000lbs/3,628 kg) can be used with at least 12" (300 mm) of stone over the chambers and are limited by the maximum ground pressures in Table 2 based on a full bucket at maximum boom extension.***
5. ***Storage of materials such as construction materials, equipment, spoils, etc. should not be located over the StormTech system. The use of equipment over the StormTech system not covered in Table 2 (ex. soil mixing equipment, cranes, etc) is limited. Please contact StormTech for more information.***
6. ***Allowable track loads based on vehicle travel only. Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.***

Table 2 - Maximum Allowable Construction Vehicle Loads[5]

Material Location	Fill Depth over Chambers in. [mm]	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads[6]		Maximum Allowable Roller Loads
		Max Axle Load for Trucks lbs [kN]	Max Wheel Load for Loaders lbs [kN]	Track Width in. [mm]	Max Ground Pressure psf [kPa]	Max Drum Weight or Dynamic Force lbs [kN]
Ⓓ Final Fill Material	36" [900] Compacted	32,000 [142]	16,000 [71]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	3420 [164] 2350 [113] 1850 [89] 1510 [72] 1310 [63]	38,000 [169]
Ⓒ Initial Fill Material	24" [600] Compacted	32,000 [142]	16,000 [71]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	2480 [119] 1770 [85] 1430 [68] 1210 [58] 1070 [51]	20,000 [89]
	24" [600] Loose/Dumped	32,000 [142]	16,000 [71]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	2245 [107] 1625 [78] 1325 [63] 1135 [54] 1010 [48]	20,000 [89] Roller gross vehicle weight not to exceed 12,000 lbs. [53 kN]
	18" [450]	32,000 [142]	16,000 [71]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	2010 [96] 1480 [71] 1220 [58] 1060 [51] 950 [45]	20,000 [89] Roller gross vehicle weight not to exceed 12,000 lbs. [53 kN]
Ⓑ Embedment Stone	12" [300]	16,000 [71]	NOT ALLOWED	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	1540 [74] 1190 [57] 1010 [48] 910 [43] 840 [40]	20,000 [89] Roller gross vehicle weight not to exceed 12,000 lbs. [53 kN]
	6" [150]	8,000 [35]	NOT ALLOWED	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	1070 [51] 900 [43] 800 [38] 760 [36] 720 [34]	NOT ALLOWED

Table 3 - Placement Methods and Descriptions

Material Location	Placement Methods/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Roller Load Restrictions
		See Table 2 for Maximum Construction Loads		
Ⓓ Final Fill Material	A variety of placement methods may be used. All construction loads must not exceed the maximum limits in Table 2.	36" (900 mm) minimum cover required for dump trucks to dump over chambers.	Dozers to push parallel to rows until 36" (900mm) compaced cover is reached.[4]	Roller travel parallel to rows only until 36" (900 mm) compacted cover is reached.
Ⓒ Initial Fill Material	Excavator positioned off bed recommended. Small excavator allowed over chambers. Small dozer allowed.	Asphalt can be dumped into paver when compacted pavement subbase reaches 18" (450 mm) above top of chambers.	Small LGP track dozers & skid loaders allowed to grade cover stone with at least 6" (150 mm) stone under tracks at all times. Equipment must push parallel to rows at all times.	Use dynamic force of roller only after compacted fill depth reaches 12" (300 mm) over chambers. Roller travel parallel to chamber rows only.
Ⓑ Embedment Stone	No equipment allowed on bare chambers. Use excavator or stone conveyor positioned off bed or on foundation stone to evenly fill around all chambers to at least the top of chambers.	No wheel loads allowed. Material must be placed outside the limits of the chamber bed.	No tracked equipment is allowed on chambers until a min. 6" (150 mm) cover stone is in place.	No rollers allowed.
Ⓐ Foundation Stone	No StormTech restrictions. Contractor responsible for any conditions or requirements by others relative to subgrade bearing capacity, dewatering or protection of subgrade.			

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

To be provided during final engineering.