Appendix H-2 - Project Specific Water Quality Management Plan

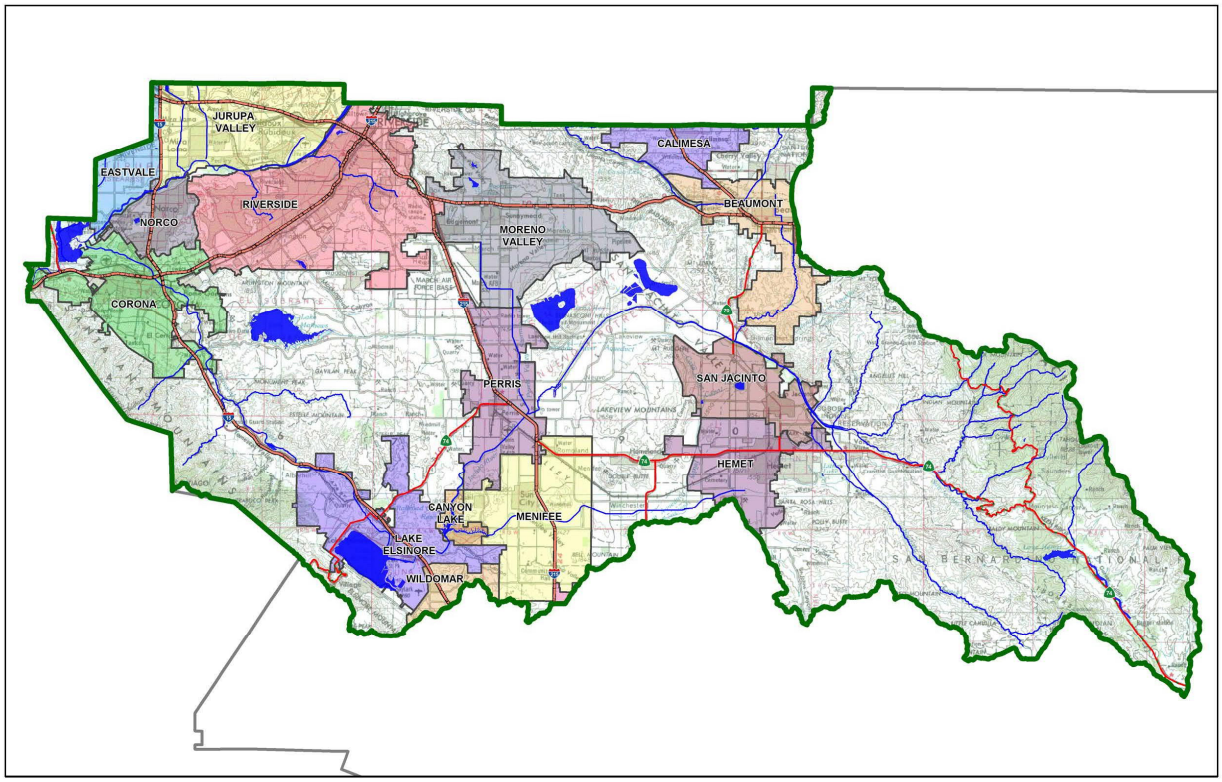
Project Specific Water Quality Management Plan

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

Project Title: APN: 266-320-025-4 (I Kuan Tao Temple)

Development No: Insert text here

Design Review/Case No: Insert text here



☒ Preliminary
☐ Final

Original Date Prepared: 12/04/2020

Revision Date(s): Insert text here

Prepared for Compliance with
Regional Board Order No. R8-2010-0033
Template revised June 30, 2016

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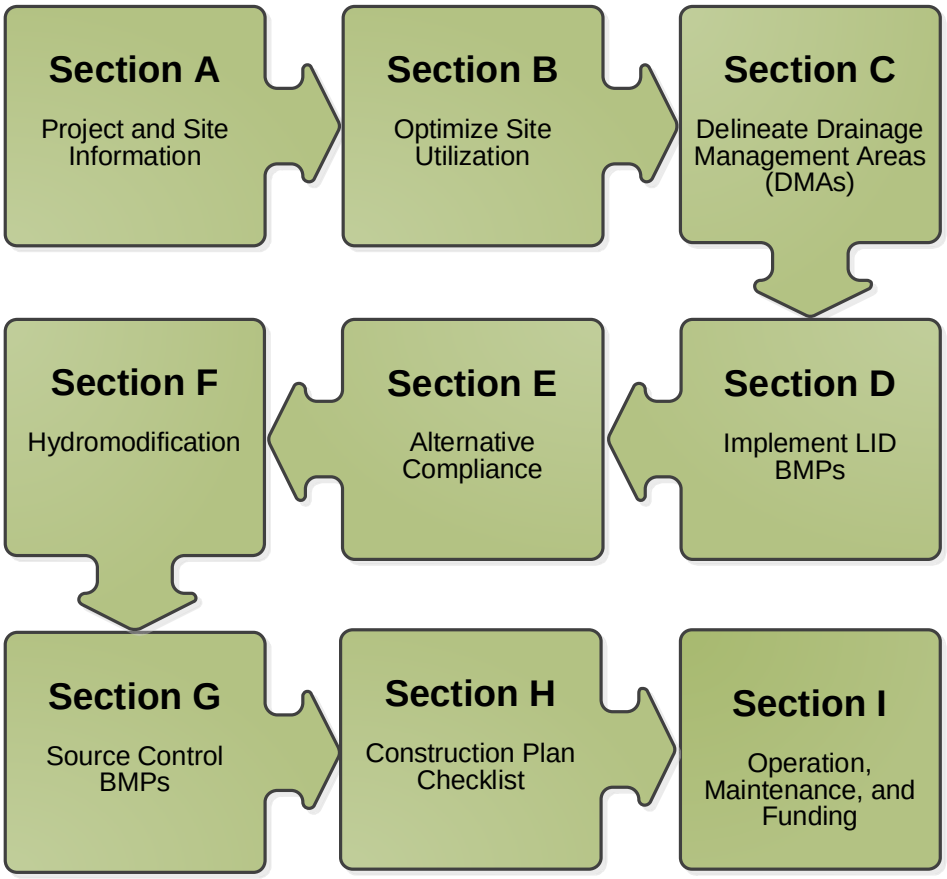
A Brief Introduction

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 Birkin Construction by Allard Engineering for the APN: 266-320-025-4 (I Kuan Tao Temple) project.

This WQMP is intended to comply with the requirements of The County of Riverside for R8-2010-0033 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 County of Riverside Water Quality Ordinance (Municipal Code Section2010 SAR-MS4).

"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
xxxx	
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
Raymond J. Allard, P.E.	Project Manager
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure: RCE 36052, Exp. 6/30/22

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List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Mixed used, Commercial and residential
Planning Area:	Insert text here
Community Name:	Insert text here
Development Name:	I Kuan Tao Temple
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.86043N -117.32195W	
Project Watershed and Sub-Watershed: Santa Ana Region.	
Gross Acres: 16 (Phase I & II)	
APN(s): 266-320-025	
Map Book and Page No.: SECTION 32, TOWNSHIP 3 SOUTH	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Religious Center and Residential Lots
Proposed or Potential SIC Code(s)	8661, 3059
Area of Impervious Project Footprint (SF)	270,072
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	270,072
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 existing Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	Insert text here.
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)	Type B
What is the Water Quality Design Storm Depth for the project?	0.55 inch/day

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
Santa Ana River, Reach 1	List any 303(d) impairments of 1st receiving water, including Approved TMDL pollutant limitations	Insert designated beneficial use of 1st receiving water	Insert distance of project to RARE-designated waters (indicate whether feet, yards, or miles)
Prado Dam Reservour	List any 303(d) impairments of 2nd receiving water, including Approved TMDL pollutant limitations	Insert designated beneficial use of 2nd receiving water	Insert distance of project to RARE-designated waters (indicate whether feet, yards, or miles)
Insert name of 3rd receiving water	List any 303(d) impairments of 3rd receiving water, including Approved TMDL pollutant limitations	Insert designated beneficial use of 3rd receiving water	Insert distance of project to RARE-designated waters (indicate whether feet, yards, or miles)

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?

The proposed site/offsite street area will drain to the proposed Retention/Infiltration BMP basin which will discharge to the proposed storm drain system in Cole Avenue. We will retain/infiltrate the increased volume generated in 10-yr storm event in developed condition. Only release the water in its existing condition. Therefore will preserve the existing drainage pattern.

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

This site is barren and has negligible area of vegetation. The proposed site will preserve existing vegetation as much as possible. Also the proposed site will have planters and landscape areas which will be planted with native vegetation/trees.

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

Yes, the site will have surface infiltration basin where stormwater from water quality storm event will infiltrate into the native sub-soil.

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

No. The existing site condition is barren with natural dirt cover (100% pervious). The proposed site will have planters, landscape area which will be approximately 50% of the site area.

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

Yes. Portion of paved area and the interior streets will drain to landscape area before conveyed to the drainage system.

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 (Phase I)	Landscape/Planters	130,680	B-1
DMA-1 (Phase I)	Roof	58,806	D-1
DMA-1 (Phase I)	Paved Area	137,214	D-2
DMA-2 (Phase II)	Landscape/Planters	296,208	B-1
DMA-2 (Phase II)	Roof	22,216	D-1
DMA-2 (Phase II)	Paved Area	51,836	D-2

DMA-2 (Phase II): Proposed Future Development

[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	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]

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

DMA Name or ID	BMP Name or ID

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
…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).

X☐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: Insert Area (Acres)

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

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: Insert Area (Acres)

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: EIATIA Factor

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: Insert Area (Acres)

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)
Insert Area (Acres)	Insert Area (Acres)

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: Number of daily Toilet Users

Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'

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: Insert Area (Acres)

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: TUTIA Factor

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: Required number of toilet users

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)
Insert Area (Acres)	Insert Area (Acres)

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	☒	☐	☐	☐	☐
DMA-2	☒	☐	☐	☐	☐

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.

Insert narrative description here.

Project is proposing to treat the entire project site and the offsite street improvement areas using a single Infiltration/Retention Basin 5 BMP (Basin-1). The proposed Infiltration/retention Basin-1, is the part of the detention basin-1 proposed for mitigation of outflow from the project site.

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 Co-permittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Co-permittee 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.

For BMP Design Volume (Vbmp) calculation refer to Appendix 6.

Retention/Infiltration Basin-1 Sizing:

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* *BASIN-1*		
	[A]		[B]	[C]	[A] x [C]			
DMA-1 & 2 D2	*189,050*	*Paved Area*	*1.00*	*0.89*	*168,255*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-1 & 2 D1	*81,022*	*Roof/Bldg*	*1.00*	*0.89*	*72,110*			
DMA-1& 2 A1	*426,888*	*Landscape*	*0.10*	*0.11*	*46,958*			
DMA-1	$A_T = \Sigma[A]$ 696,960				$\Sigma = [D]$ 287,323	[E] 0.55	$[F] = \frac{[D]x[E]}{12}$ 13,169	[G] *37,784*

[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

Santa Ana Watershed - BMP Design Volume, V_{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	ALLARD ENGINEERING	Date	8/20/2020
Designed by	ADAM	Case No	
Company Project Number/Name	RIVERSIDE TEMPLE		

BMP Identification

BMP NAME / ID: INF. BASIN-1. DMA-1 (PHASE I)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.55 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA-1	58,806	Roofs	1	0.89	52455			
DMA-1	137214	Concrete or Asphalt	1	0.89	122394.9			
DMA-1	130680	Ornamental Landscaping	0.1	0.11	14434.7			
	326700	Total			189284.6	0.55	8675.5	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{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	ALLARD ENGINEERING	Date	10/15/2020
Designed by	ADAM	Case No	
Company Project Number/Name	RIVERSIDE TEMPLE		

BMP Identification

BMP NAME / ID: INF. BASIN-1. DMA-2 (PHASE-2)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.55 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA-2	22216	Roofs	1	0.89	19816.7			
DMA-2	51836	Concrete or Asphalt	1	0.89	46237.7			
DMA-2	296208	Ornamental Landscaping	0.1	0.11	32718.5			
	370260	Total			98772.9	0.55	4527.1	

Proposed Volume must be greater than the Design Capture Volume

Notes:

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S | T 02 S | T 03 S | T 04 S | T 05 S | T 06 S | T 07 S | T 08 S

0.85 MiraLoma
0.61 Riverside North
0.54 Riverside South
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcres
0.50 LakeMathews
0.68 PerrisReservoir
SITE: 0.55"/HR
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed

Santa Margarita Watershed

CORONA | NORCO | EASTVALE | JURUPA VALLEY | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | HEMET | CANYON LAKE | LAKE ELSINORE | MENIFEE | WILDOMAR | MURRIETA | TEMECULA

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

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 Co-permittee). Check one of the following Boxes:

ü ☐ 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.

List DMAs Here.: DMA-1 & DMA-2

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]
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]

[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	29.9 min	25 min	16%
Volume (Cubic Feet)	12,685	44,971	254%

[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.

Entered time of concentration and volumes are from Phase I & II combined.

**Proposed Retention/Infiltration basin will entirely retain the increase in volume (32,286-cft) in developed condition and will infiltrate within 48 hour drawdown time limit. Therefore, the time of concentration will significantly increase

and volume will be significantly decrease by retaining and infiltration of the increased volume in the proposed basin. Refer to section-7 for the hydrologic calculation for HCOC Mitigation.

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

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)
BMP-1	Retention/filtration Basin-1	CG-2	Lat. 33.85965° Long. -117.32243°

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 Co-permittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Co-permittee 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: Insert text here.

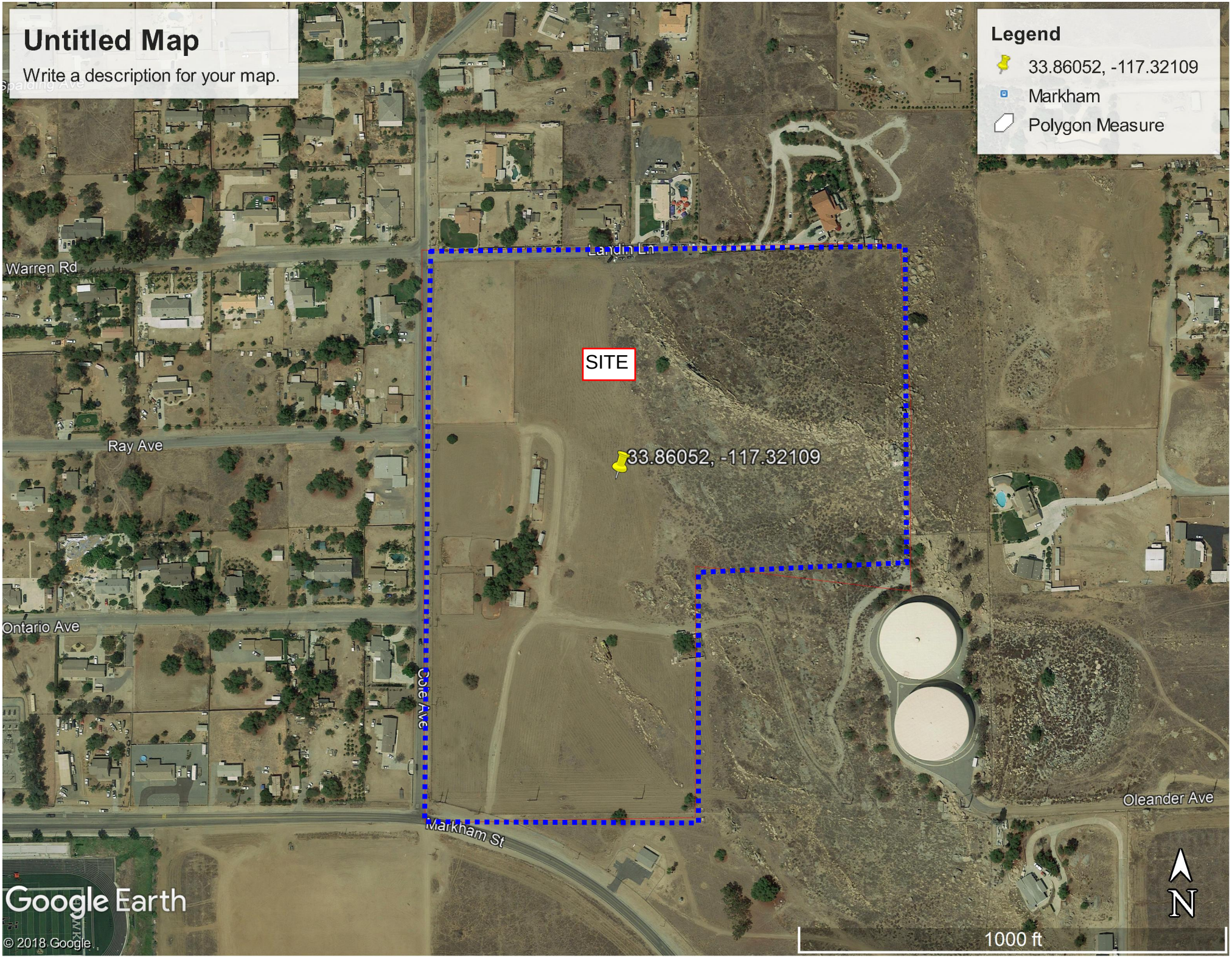
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ 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


Untitled Map
Write a description for your map.
Legend
33.86052, -117.32109
Markham
Polygon Measure
Warren Rd
Ray Ave
Ontario Ave
Cole Ave
Markham St
Oleander Ave
SITE
33.86052, -117.32109
Google Earth
© 2018 Google
N
1000 ft

OVERFLOW OUTFLOW PIPE

COLE AVENUE

COLE AVE

OVERFLOW RISER

MARKHAM ROAD

DMA-2: 8.5 AC

PHASE-II (1 DU/AC)

CATCH BASIN W/FILTER INSERT FOR PRETREATMENT

RET / INF BASIN-1 SURFACE AREA: 24,800 -SF

LANDIN LANE

PHASE-II: PROPOSED FUTURE

GRATE INLET W/FILTER INSERT FOR PRETREATMENT

DMA-1: 7.5 AC

PHASE-I, TEMPLE

NATURE CONSERVATION AREA

1696 EG

NATURE CONSERVATION AREA

VICINITY MAP

N.T.S.

LATITUDE & LONGITUDE

33.86043 N, 117.32195 W

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)

1 inch = 60 ft.

UNDERGROUND SERVICE ALERT

CALL:TOLL FREE

1-800

227-2600

TWO WORKING DAYS BEFORE YOU DIG

REGISTERED PROFESSIONAL ENGINEER
RAYMOND J. ALLARD
No. 36052
Exp. 6/30/20
CIVIL
STATE OF CALIFORNIA

ALLARD ENGINEERING
Civil Engineering - Land Surveying - Land Planning
16866 Seville Avenue
Fontana, California 92335
(909) 356-1815 Fax (909) 356-1795

COUNTY OF RIVERSIDE

RIV. TEMPLE: PHASE I & II

WQMP EXHIBIT

PLOT DATE: October 19, 2020 aeuser1

Filename: I:\Riverside Temple\DWG's\ENTITLEMENT\EXHIBITS\WQMP EXHIBIT-PH-1 and 2 ONSITE ONLY.dwg

Appendix 2: Construction Plans

Grading and Drainage Plans

For Concept grading and drainage plan, please refer to the SHEET CG-1

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Included the geotechnical engineering report for the project site.

Environmental Geotechnology Laboratory, Inc.

January 15, 2020

Grand Pacific Communities
Mr. Richard Chou
100 N. Barranca Street, Suite 950
West Covina, California 91791

Subject: **Report of Geotechnical Engineering Investigation, Proposed New Temple Development, Ten (10) Single-Family Residences with ADUs and JADUs, and Associated Structures, APN: 266-320-025, Cole Avenue & Landin Lane, Riverside, California, EGL Project No.: 19-283-003GE**

Ladies and Gentlemen:

In accordance with your request, Environmental Geotechnology Laboratory, Inc. (EGL) has prepared this geotechnical engineering report for the proposed development at the subject site. The purpose of this report was to evaluate the subsurface conditions and to provide recommendations for foundation designs and other relevant parameters for the proposed construction.

Based on the findings and observations during our investigation, it is concluded that the subject site is suitable for its intended use from the geotechnical engineering viewpoint, provided that recommendations set forth herein are followed.

This opportunity to be of service is sincerely appreciated. If you have any questions pertaining to this report, please call the undersigned.

Respectfully submitted,

Environmental Geotechnology Laboratory, Inc.

Ryan Jones, GE 2852
Project Engineer

Dist: (4) Addressee
HJ/RJ/ky

11819 Goldring Road, Suite A, Arcadia, CA 91006 • Tel.: (626) 263-3588, Fax: (626) 263-3599
E-MAIL: MAIL@EGLAB.COM

REPORT OF GEOTECHNICAL ENGINEERING INVESTIGATION

Proposed New Temple Development,
Ten (10) Single-Family Residences with ADUs and JADUs,
and Associated Structures

APN: 266-320-025

AT

Cole Avenue & Landin Lane
Riverside, California

Prepared by
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY, INC.
Project No.: 19-283-003GE
January 15, 2020

TABLE OF CONTENT

1.0 INTRODUCTION

1.1 Purpose

This report presents a summary of our preliminary geotechnical engineering investigation for the proposed development at the subject site. The purposes of this investigation were to evaluate the subsurface conditions at the area of proposed construction and to provide recommendations pertinent to grading, foundation design and other relevant parameters of the proposed development.

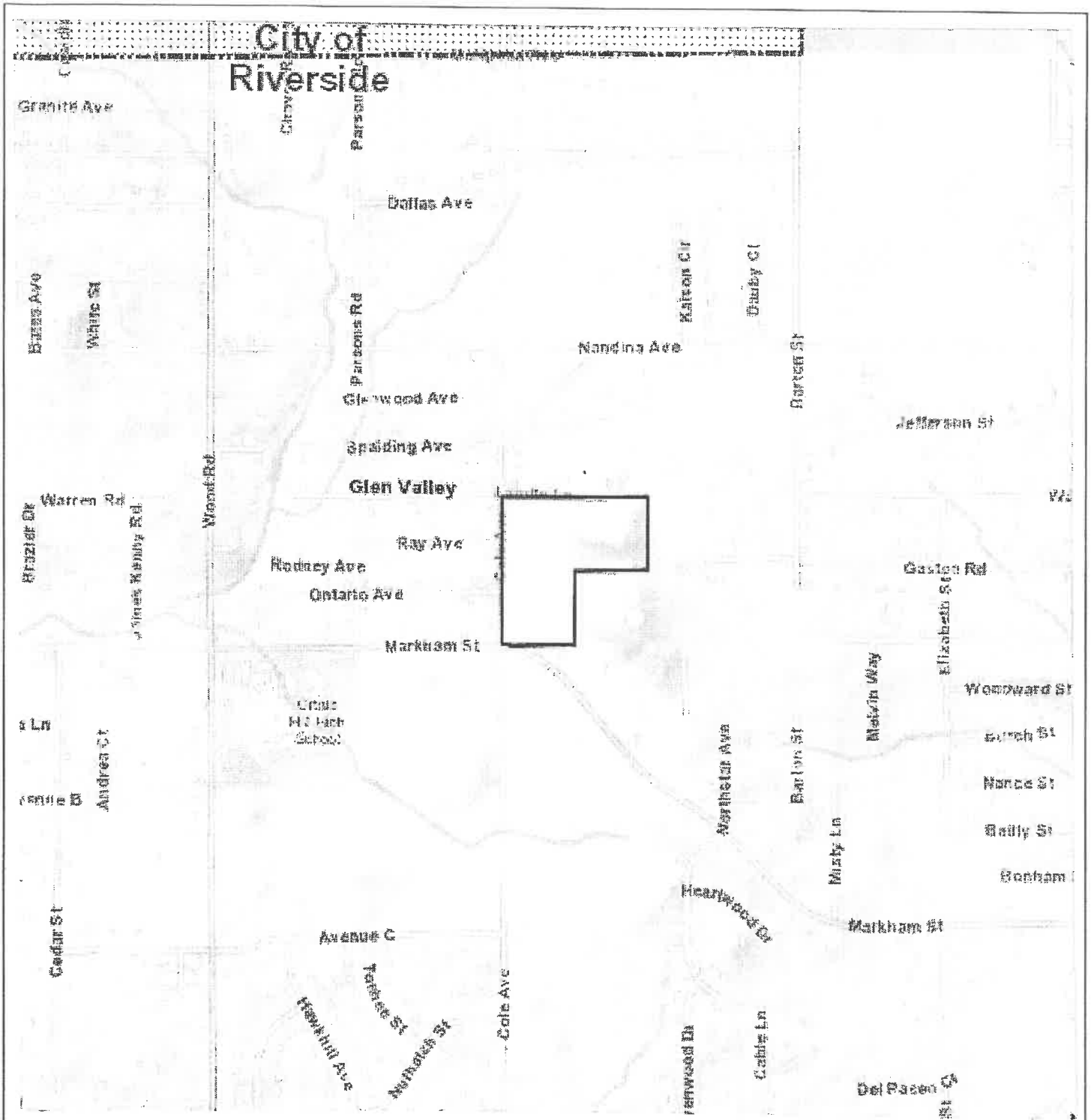
1.2 Scope of Services

Our scope of services included the followings:

- Review of available soil data of the subject site and its vicinity.
- Subsurface exploration consisting of logging and sampling of seven (7) backhoe test pits to a maximum depth of 10.0 feet below the existing grade at the subject site. The exploration was logged by an EGL engineer and presented in Appendix A.
- Perform two (2) percolation tests to determine the design infiltration rate of the soil at the site. Percolation testing on test pits TP-5 and TP-6 at depths of 5' and 9', respectively. Infiltration rate calculations are presented in Appendix C.
- Perform laboratory testing on representative onsite samples to establish soil-engineering characteristics. Field moisture and density are presented on test pit logs in Appendix A. Laboratory test results are presented in Appendix B.
- Engineering analyses of the geotechnical data obtained from our background studies, field investigation, and laboratory testing.
- Preparation of this report to present our findings, conclusions, and recommendations for the proposed construction.

1.3 Site Conditions

The subject site is an "L" shaped property with frontage located on the southeast corner of Cole Avenue and Landin Lane in the City of Riverside, California. The approximate regional location is shown on the Site Location Map (Figure 1). The project site is currently vacant and covered with some bushes and trees. Topographically, the subject site is relatively flat with gentle slopes to the west-northwest within the proposed development area. The northeast portion of subject site is designated as "conservation area" and will remain in its current condition. Detailed configuration of the site is shown on the Site Plan, Figure 2.



Scale: 1" = 1,000'

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY	EGL Proj. No.: 19-283-003 Cole Avenue and Landin Lane Glen Valley, California

SITE (LOCATION) MAP

12/19

Figure 1

Base map adopted from Riverside County , "Map My County Version 8.1, Riverside County, California ": Official Map, 1999, Scale 1"=2,000'

11819 Goldring Road, Unit A, Arcadia, California 91006; Phone (626) 263-3588; Fax (626) 263-3599

1.4 Proposed Construction

Based on the *Site Plan* provided by Creative Design Associates Inc., it is our understanding that the proposed development at the site consists of a new temple development, consisting of 9 buildings on the northwest side of the property and ten (10) single-family residences on the southwest side of the property. The residences will have accessory dwelling units (ADUs) and junior accessory dwelling units (JADUs). The proposed buildings are anticipated to be one and/or two-story wood frame structures with concrete slab-on-grade. Column loads are unknown at this time, but are expected to be light to medium. Cut/fill grading operation is anticipated to achieve the desired grades.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Our field exploration was performed at the subject property on November 22, 2019 with the aid of a rubber-tired backhoe equipped with a 36"-wide bucket of Best Bobcat Backhoe Services. A total of seven (7) test pits were excavated to a maximum depth of 10.0 feet below the existing ground surface. Upon completion of excavation and percolation testing, all test pits were backfilled with onsite soil removed from excavations and tamped. The purpose of the excavation was to investigate the engineering characteristics of the onsite soils with respect to the proposed development.

The test pits were supervised and logged by EGL's engineer. Relatively undisturbed ring samples and bulk samples were collected during excavation for laboratory testing. The approximate locations of these test pits are shown on the Site Plan (Figure 2). Logs of test pits are presented in Appendix A. Ring samples were taken at frequent intervals. The samples, advanced by hand-auger, were obtained by driving a split-tube ring sampler with successive blows of a 32-pound hammer dropping from a height of 48 inches.

2.2 Laboratory Testing

Representative samples were tested for the following parameters: in-situ moisture content and density, direct shear strength, consolidation and corrosion potential. In-situ moisture and density test results are presented on the test pit logs in Appendix A. The results of our laboratory testing along with a summary of the testing procedures are presented in Appendix B.

3.0 SUMMARY OF GEOTECHNICAL CONDITIONS

3.1 Soil Conditions

A total of seven (7) backhoe test pits, TP-1 to TP-7, were excavated within the proposed development area of the subject site. Our subsurface exploration and testing program revealed the existence of natural soil (Qs) and bedrock of Late Cretaceous Val Verde Tonalite (Kvt) to the maximum explored depth of 10.0 feet below existing ground surface. Detailed earth material descriptions encountered and observed in the backhoe test pits are described below and are shown on test pit logs, Appendix A.

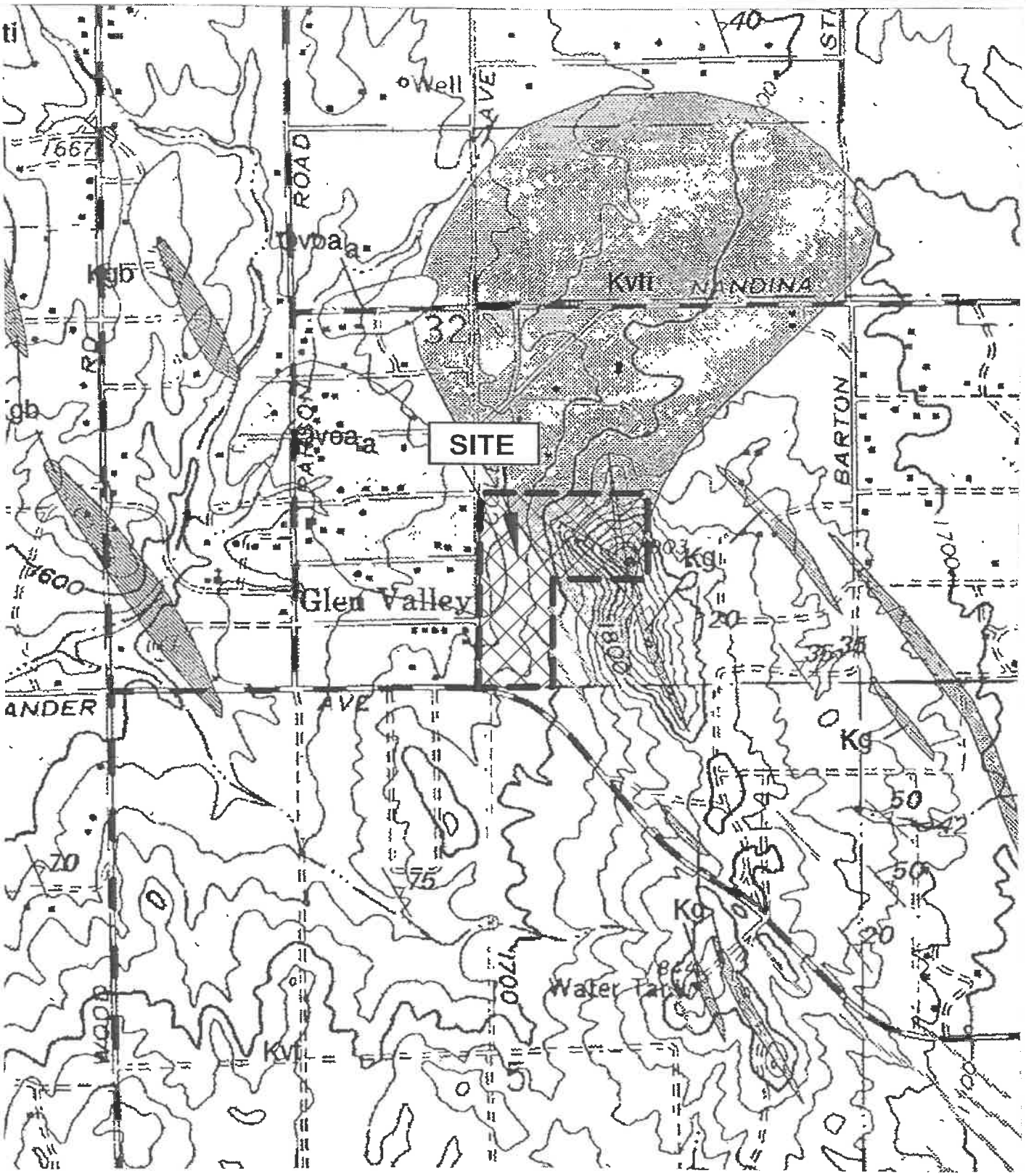
Natural soil (Qs) was encountered within all excavated test pits. As encountered and observed, the onsite natural soil thickness is approximately 2.0 to 9.0 feet thick and consisted predominantly of silty sand (SM) and clayey sand (SC), dark brown and olive brown in color, dry to slightly, and medium dense to very dense. Bedrock of Late Cretaceous Val Verde tonalite (Kvt) was encountered in test pits TP-1, TP-2, TP-3, TP-5 and TP-6. Onsite bedrock consisted of dark olive gray, medium- to coarse-grained, dry to slightly moist, massive and well-foliated, very dense and hard tonalite and granitic rocks. Refusals were encountered within test pits TP-1, TP-2 and TP-3 due to the very dense and tough bedrock material. Based on USGS (2002) the subject site is underlain by Late Cretaceous Val Verde tonalite, gray weathering, relatively homogenous, massive and well-foliated, medium to coarse grained (Kvt, Figure 3).

3.2 Groundwater

Static ground water levels were not encountered during our subsurface investigation to the maximum explored depth of 10.0 feet below the existing ground surface. Groundwater is therefore not expected to be a significant constraint during the construction. However, groundwater may be a significant constraint if grading is completed during the rainy season when perched water is more likely to occur.

4.0 CONCLUSIONS

Based on the results of our subsurface investigation, it is our opinion that the proposed construction is feasible from a geotechnical standpoint, provided the recommendations contained herein are incorporated in the design and construction. The following is a summary of the geotechnical design and construction factors that may affect the development of the site:



Kvt	Late Cretaceous Val Verde tonalite. Grey weathering, relatively homgenous, massive, well foliated, medium- to coarse-grained, hypautomorphoic-granular biotite-hornblende tonalite
Kvti	Late Cretaceous Val Verde tonalite. Tonalite contains abundant melanocratic inclusions, most with compositionally gradtional borders, medium- and small-masses
Kg	Late Cretaceous generic granitic rocks. Granitic dikes, includes texturally diverse group of leucocratic (quartzo-and alkali feldspathic) granitic dikes, few centimeter to over a meter thick and several hundred meters long

Base map adopted from USGS "Geologic Maps of Steel Peak and Riverside East 7.5' Quads, Riverside County, California"; OFR 01-449 and 01-452, 2002; Scale 1"=2,000'

N

Scale: 1" = 1,000'

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

EGL Proj. No.: 19-283-003
Cole Avenue and Landin Lane
Glen Valley, California

REGIONAL (GEOLOGY) MAP

12/19

Figure 3

11819 Goldring Road, Unit A, Arcadia, California 91006; Phone (626) 263-3588; Fax (626) 263-3599

4.1 Seismicity

Our studies of regional and local seismicity indicate that there are no known active faults crossing the property. However, the site is located in a seismically active region and is subject to seismically induced ground shaking from nearby and distant faults, which is a characteristic of all Southern California communities.

4.2 Seismic Induced Hazards

Based on our review of the "*Public Safety Element, City of Riverside General Plan, Liquefaction Zones, Figure PS-2*" (Reference #4), it is concluded that the site is not located within the mapped potential liquefaction area. It is our understanding that a liquefaction study is not required by the city for the subject site.

4.3 Excavatability

Excavation of the subsurface materials should be able to be accomplished with conventional earthwork equipment. However, the bedrock material is very hard and the excavation may become difficult.

4.4 Surficial Soil Removal and Recompaction

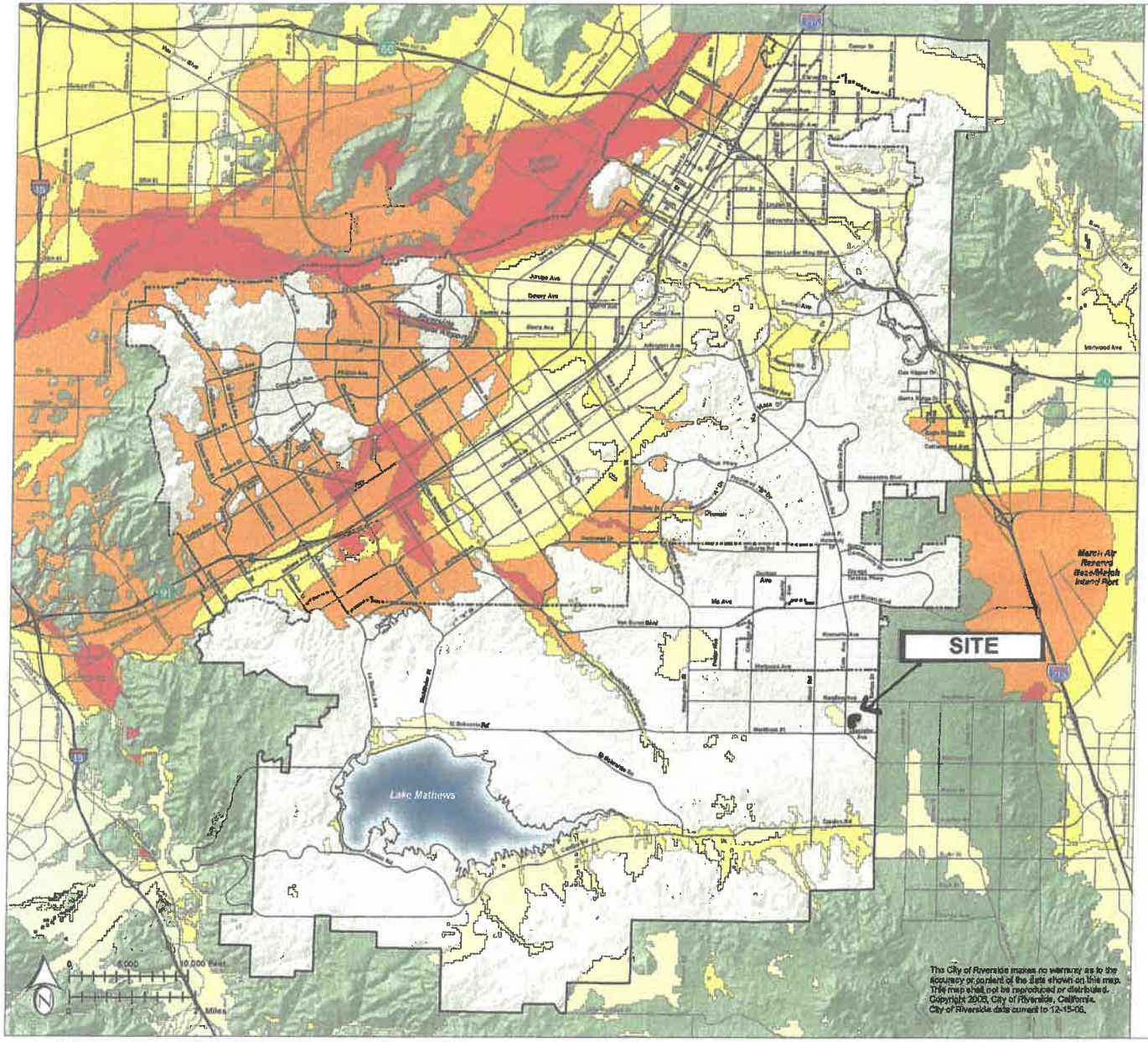
Based on our investigation, it is concluded that the existing surficial soils may not be suitable for structure support as they presently exist and will require remedial grading as discussed herein.

4.5 Groundwater

Static ground water levels were not encountered during our subsurface investigation to the maximum explored depth of 10.0 feet below the existing ground surface. Groundwater is therefore not expected to be a significant constraint during the construction. However, groundwater may be a significant constraint if grading is completed during the rainy season when perched water is more likely to occur.

5.0 RECOMMENDATIONS

Based on the subsurface conditions exposed during field investigation and laboratory testing program, it is recommended that the following recommendations be incorporated in the design and construction phases of the project.



CITY OF RIVERSIDE
GENERAL PLAN 2025

LEGEND

- VERY LOW
- LOW
- MODERATE
- HIGH
- VERY HIGH
- RIVERSIDE CITY BOUNDARY
- RIVERSIDE PROPOSED SPHERE OF INFLUENCE

SOURCE: TRANSPORTATION AND LAND MANAGEMENT AGENCY (TLMA) GEOGRAPHIC INFORMATION SERVICES COUNTY OF RIVERSIDE, JANUARY 1, 2005
http://www.tlma.co.riverside.ca.us/index.html

Figure PS-2
LIQUEFACTION ZONES

5.1 Grading

5.1.1 Site Preparation

Prior to initiating grading operations, any existing vegetation, trash, debris, over-sized materials (greater than 6 inches), and other deleterious materials within construction areas should be removed from the subject site.

5.1.2 Surficial Soil Removals

No detailed grading plan was available at the time of preparing this report however, based on our field exploration and laboratory data obtained to date, it is recommended that the surficial soils be removed to a depth of at least three (3) feet below existing grade or one (1) foot below the bottom of the footing, whichever is deeper. Removal depth should be a minimum of three (3) feet below proposed footings' bottom for any cut and fill transition building pads. The recommended removal should be extended at least 5 feet beyond proposed building lines. Existing near surface soils should also be removed at least one foot within proposed concrete slab and driveway areas. The construction areas should be excavated and then observed by a representative of this office to verify the soil conditions for any potential needs of removal of loose soils and replacement with compacted fill. This may also be necessary due to difference in expansion characteristics of foundation materials beneath a structure.

Locally deeper removals may be necessary to expose competent natural ground. The actual removal depths should be determined in the field as conditions are exposed. Visual inspection and/or testing may be used to define removal requirements.

5.1.3 Treatment of Removal Bottoms

Soils exposed within areas approved for fill placement should be scarified to a depth of 12 inches, conditioned to near optimum moisture content, then compacted in-place to minimum project standards.

5.1.4 Structural Backfill

The onsite soils may be used as compacted fill, provided they are free of organic materials and debris. It is recommended that the allowable size of cobbles to be used as fill material should not be greater than 6 inches within the building pad area and 10 inches within the landscape area. Cobble and boulder should not exceed 20% by dry weight. Soils imported from offsite sources should be similar to and/or sandier than the onsite soils and should be approved by the

soil engineer prior to transporting to the site. Fills should be placed in relatively thin lifts (6 to 8 inches), brought to near optimum moisture content then compacted to at least 90 percent relative compaction based on laboratory standard ASTM D-1557-12.

5.1.5 Fill Slopes

Permanent fill slopes should be constructed no steeper than 2:1 (horizontal to vertical) and should be keyed and benches into competent natural soils materials if placed on slopes steeper than 5:1 (H:V). Clean, cohesionless sand should not be used for fill slopes; some selective grading may be required in this regard. Minimum of 90 percent relative compaction is recommended for competent fill slope construction.

5.1.6 Cut Slopes

Permanent cut slopes should be no steeper than 2:1 (H:V) slope gradient, which is anticipated to be grossly stable. However, field observation will be necessary during grading, by the project geologist, to determine the need for slope stabilization.

5.1.7 Fill Key

Fill key's dimension should be a minimum of ten (10) feet wide and excavated a minimum of two (2) feet into competent natural soils materials, measured from the downslope side. Fill key bottom should also be constructed with a minimum inclined slope of two (2) percent dipping upslope. Subdrains consisting of perforated pipe should be installed in the heel of the key or bench and sloped to discharge to a suitable collection facility. Project engineering geologist and/or geotechnical engineer representatives should observe and approved all fill key excavation and subdrain system prior to fill placement.

5.1.8 Benching

Fills placed on slopes steeper than 5:1 should be keyed and benched into competent natural soils materials as the fill is placed. Project geotechnical engineer and engineering geologist should observe all fill keys and bench cut excavations. Removal and deep benching on side hill slopes may be necessary prior to placement of fills on slopes where creep or slopewash exist.

5.2 Shallow Foundation Design

5.2.1 Bearing Value

An allowable bearing value of 1800 pounds per square foot (psf) may be used for design of the footings placed at a depth of at least 18 inches below the lowest adjacent ground and founded

on the new certified compacted fill. Single spread footings should be at least 24 inches square and continuous footings should be at least 12 inches wide. This bearing value may be increased by 200 psf for each additional foot of depth or width to a maximum value of 2500 psf. The above recommended value may be increased by one third (1/3) when considering short duration seismic or wind loads.

5.2.2 Settlement

Settlement of the footings placed as recommended and subject to no more than allowable loads is not anticipated to exceed 3/4 inch. Differential settlement between adjacent columns is not anticipated to exceed 1/4 inch.

5.2.3 Lateral Pressures

Active earth pressure for static conditions from horizontal backfill may be computed as an equivalent fluid weighting of 30 pcf. Walls that are restrained against lateral movement or rotation at the top may be designed for the at-rest equivalent fluid pressure. An at-rest fluid weighting of 55 pcf may be used for level backfill under static condition. Retaining walls greater than 6' should be designed for an additional seismic lateral force of 30 pcf. The above values assume free-draining conditions with a subdrain system installed behind the walls as recommended.

Passive earth pressure may be computed as an equivalent fluid pressure of 300 pcf, with a maximum earth pressure of 2000 psf. An allowable coefficient of friction between soil and concrete of 0.35 may be used with the dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one third (1/3).

5.3 Foundation Construction

It is anticipated that the entire structure will be underlain by onsite soils of very low expansion potential. Following presented our recommendations for the foundation construction. All footings should be founded at a minimum depth of 18 inches below the lowest adjacent ground surface and founded into new certified compacted fill. All continuous footings should have at least one No. 4 reinforcing bar placed both at the top and one No. 4 reinforcing bar placed at the bottom of the footings. A grade beam of at least 12 inches square, reinforced as recommended above for footings, should be utilized across the garage entrance. Base of the reinforced beam should be at the same elevation as the bottom of the adjoining footings.

5.4 Concrete Slab

Concrete slabs should be a minimum of 4 inches thick and reinforced with a minimum of #3 rebar spaced at 24" on center each way, or its equivalent. All slab reinforcement should be supported to ensure proper positioning during placement of concrete. Concrete slabs in moisture sensitive areas should be underlain with a vapor barrier consisting of a minimum of six-mil polyethylene membrane with all laps sealed. A minimum of two inches of sand should be placed over the membrane to aid in uniform curing of concrete.

5.5 Retaining Wall

Wall should be provided with subdrains to reduce the potential for the buildup of hydrostatic pressure. Backdrains could consist of free drainage materials (SE of 30 or greater) or CalTrans Class 2 permeable materials immediately behind the wall and extending to within 18 inches of the ground surface. A 4-inch diameter perforated pipe wrapped in gravel and geofabric should be installed at the base of the wall and sloped to discharge to a suitable collection facility or through weep holes. Alternatively, commercially available drainage fabric could be used. The fabric manufacturer's recommendations should be followed in the installation of the drainage fabric backdrain.

5.6 Temporary Excavation and Backfill

All trench excavations should conform to CAL-OSHA and local safety codes. All utilities trench backfill should be brought to near optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of ASTM D-1557-12. All temporary excavations should be observed by a field engineer of this office so as to evaluate the suitability of the excavation to the exposed soil conditions.

6.0 SEISMIC DESIGN

Based on our studies on seismicity, there are no known active faults crossing the property. However, the subject site is located in Southern California, which is a tectonically active area. The following CBC 2019 (Chapter 16) & ASCE 7-16 (Chapter 20) seismic related values may be used:

Site Classification: (ASCE, Table 20.3-1)	D
Spectral Response Accelerations (g):	
(CBC, Figure 1613.3.1 (1) 0.2-Second, S_S	1.500
(CBC, Figure 1613.3.1 (2)) 1-Second, S_1	0.556

Site Coefficient:	
(CBC, Table 1613.3.3 (1)) F_a	1.0
(CBC, Table 1613.3.3 (2)) F_v	1.7

Based on the U.S. Seismic Design Maps (USGS, updated January 2019), the proposed structures may be designed to accommodate up to a maximum site horizontal acceleration of 0.500g with 2% probability of being exceeded in 50 years. However, the Project Structural Engineer should be aware of the information provided to determine if any additional structural strengthening is warranted.

7.0 CORROSION POTENTIAL

Chemical laboratory tests were conducted on the existing onsite near surface materials sampled during EGL's field investigation to aid in evaluation of soil corrosion potential and the attack on concrete by sulfate in the soils. The test results are presented in the Appendix B.

According to ACI 318-14 Table 19.3.1.1, a sulfate content of 0.006 percent by weight in soils is assigned to Class "S0" and the severity of exposure to sulfate for concrete placed in contact with the onsite soil is considered "Not Applicable". Based on the testing results and ACI 318-14 Table 19.3.2.1, it is concluded that there is no restriction on the type of cement ("No Type Restriction") to be used at the site; however EGL recommends that Type II cement be used.

Based on the minimum resistivity test results, the subsurface soils are moderately corrosive to buried metal pipe. Any underground steel utilities should be blasted and given protective coating. Should additional protective measures be warranted, a corrosion specialist should be consulted.

8.0 INSPECTION

As a necessary requisite to the use of this report, the following inspection is recommended:

* Temporary excavations.
* Removal of surficial and unsuitable soils.
* Backfill placement and compaction.
* Utility trench backfill.
* Foundation excavation.

The geotechnical engineer should be notified at least 1 day in advance of the start of construction. A joint meeting between the client, the contractor, and the geotechnical engineer is recommended prior to the start of construction to discuss specific procedures and scheduling.

9.0 PERCOLATION TEST

In order to evaluate the feasibility of the proposed infiltration system, EGL has performed a total of two (2) percolation tests at the subject site based on the *Low Impact Development BMP Design Handbook* (Riverside County, 2011). Approximate locations of the test borings are shown on the Site Plan (Figure 2). The percolation tests at this time were performed on test pits TP-5 and TP-6 at depths of 5' and 9' below existing ground surface, respectively, for the proposed infiltration/detention systems. The test borings TP-5 and TP-6 were presoaked and tested on November 22, 2019. The test procedures are described as following:

- 8"-diameter × 20"-deep perforated pipes were placed in the bottom of test pits TP-5 and TP-6 for the percolation test. The bottoms of test borings were also covered with 2 inches of gravel.
- The test borings were filled with a depth of 20 inches of water multiple times for presoak and allowed to completely drain prior to refilling for the percolation test.
- For the percolation test, a depth of 20 inches of water was placed within the test borings. The test time interval between readings used was 10 minutes due to more than 6 inches of water drop two consecutive times in less than 25 minutes during the first two tests.
- Additional six (6) 10-minute increment percolation tests were performed for test borings TP-5 and TP-6, respectively. Field data of two (2) 25 minutes readings and six (6) 10 minutes readings are presented in Appendix C. The last measured drop was used to calculate the design infiltration rate of the soil. Design Infiltration rate calculations are presented in Appendix C.

Based on the soil material encountered and past experience with similar soils the absorption rate of the soil should be adequate for the proposed infiltration system for rainwater runoff at the site. Based on the results of our preliminary percolation tests of the material, the design infiltration rate is 1.18 in/hr. Reduction factor of 2.0 has been applied to our design infiltration rate. It is our opinion that dispersal of on-site storm water runoff by infiltration system is considered feasible

from a geotechnical engineering standpoint. The infiltration system and the final plumbing plans should be designed and prepared by the project Civil Engineer.

Based on the consolidation test results presented in the Appendix B all the samples collected below 5 feet showed a deformation of less than 1.0% at the time of saturation. It is EGL's opinion that hydro-consolidation of the soil due to the proposed infiltration system is negligible and should not impact the proposed structure.

Based on our review of the "*Public Safety Element, City of Riverside General Plan, Liquefaction Zones, Figure PS-2*" (Reference #4), it is concluded that the site is not located within the mapped potential liquefaction area. It is EGL's opinion that the proposed infiltration system will not increase the potential for liquefaction to occur at the site.

Due to the high percentage of sandy materials at the site it is EGL's opinion that infiltration system may be placed at the site. The infiltration system should be a minimum of 10 feet away from the building foundation and should not be surcharged by the building foundation. It is also recommended that the infiltration system be placed within natural soil and not compacted fill material. The infiltration system should also have an overflow or bypass to protect the site from flooding.

10.0 DRAINAGE

The pad should be properly drained toward the street away from the slope and structure via swales or area drains. Positive pad drainage shall be incorporated into the final plans. In no case should water be allowed to pond within the site, impound against structures, or flow in a concentrated and/or uncontrolled manner down the descending slope areas.

11.0 ASPHALT PAVEMENT

Preliminary structural pavement sections are designed according to the CalTrans Highway Design Manual and an assumed "R"-value of 40.

Location	Traffic Index	AC Thickness (inches)	Class 2 Aggregate Base Thickness (inches)	Compacted Subgrade (inches)
Parking Areas	4.5	3	5	12
Driveways	5.0	4	6	12

A traffic index of 4.5 is typically used for parking area for passenger vehicles with an average daily traffic of less than 200 trips. A traffic index of 5.0 is used for drive areas with an average daily traffic of less than 1,200 passenger vehicles with minor truck traffic. These pavement sections are considered preliminary and may be revised after the grading is completed provided additional testing is performed on the subgrade soil.

12.0 106 STATEMENT

Based on our field investigation and the laboratory testing results, it is our opinion that the grading and proposed structures will be safe against hazard from landslide, settlement, or slippage and the proposed construction will have no adversely affect on the geotechnical stability of the adjacent properties provided our recommendations are followed

13.0 REMARKS

The conclusions and recommendations contained herein are based on the findings and observations at the exploratory locations. However, soil materials may vary in characteristics between locations of the exploratory locations. If conditions are encountered during construction which appear to be different from those disclosed by the exploratory work, this office shall be notified so as to recommend the need for modifications. This report has been prepared in accordance with generally accepted professional engineering principles and practice. No warranty is expressed or implied. This report is subject to review by controlling public agencies having jurisdiction.

REFERENCES

1. American Concrete Institute, (2014), "Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary", Chapter 19: Durability Requirements, Sections 19.3.1: Exposure Categories and Classes & 19.3.2: Requirements for Concrete Mixtures; pages 317 to 323, Tables 19.3.1.1 and 19.3.2.1".
2. ASCE, (2010), "ASCE/SEI 7-10, Minimum Design Loads for Buildings and Other Structures: Third Printing, Errata incorporated, Includes Supplement No. 1; prepared and published by American Society of Civil Engineers.
3. CBC, (2019), "California Building Code: California Code of Regulations, Title 24, Part 2, Volume 2 of 2, California Building Standards Commission"; Section 1613 Earthquake Loads.
4. City of Riverside, (2012), "Public Safety Element amended November 2012", https://www.riversideca.gov/planning/gp2025program/GP/10_Public_Safety_Element.pdf
5. Creative Design Associates Inc., (2019) "Site Plan, Corner of Markham Street and Cole Avenue , Riverside, California", scale: 1" = 80', date: November, 2019, CDA project No: 1921, drawing No: AS-101.
6. RCIT, (2019), "Map My County Version 8.1, Riverside County, California", https://gis.countyofriverside.us/Html5Viewer/?viewer=MMC_Public
7. Riverside County, (2011), "Low Impact Development BMP Design Handbook, Appendix A - Infiltration testing"; revised September, 2011, Page 34.
8. USGS, (2002), "Geologic Map of Riverside East 7.5' Quadrangle, Riverside, Riverside County, California"; OFR 01-449 and 01-452; scale 1" = 2000'
9. USGS, (2014), "US Seismic Design Maps"; updated January 2019; prepared by United States Geological Survey; https://earthquake.usgs.gov/ws/designmaps/asce7-10.html

APPENDIX A

FIELD INVESTIGATION

Our field exploration was performed at the subject property on November 22, 2019 with the aid of a rubber-tired backhoe equipped with a 36"-wide bucket of Best Bobcat Backhoe Services. A total of seven (7) test pits were excavated to a maximum depth of 10.0 feet below the existing ground surface. Upon completion of excavation and percolation testing, all test pits were backfilled with onsite soil removed from excavations and tamped. The purpose of the excavation was to investigate the engineering characteristics of the onsite soils with respect to the proposed development.

The test pits were supervised and logged by EGL's engineer. Relatively undisturbed ring samples and bulk samples were collected during excavation for laboratory testing. The approximate locations of these test pits are shown on the Site Plan (Figure 2). Ring samples were taken at frequent intervals. The samples, advanced by hand-auger, were obtained by driving a split-tube ring sampler with successive blows of a 32-pound hammer dropping from a height of 48 inches.

Representative undisturbed samples of the subsurface soils were retained in a series of brass rings, each having an inside diameter of 2.42 inches and a height of 1.00 inch. All ring samples were transported to our laboratory. Bulk surface soil samples were also collected for additional classification and testing.

EGL

TEST PIT LOG: TP-1

PROJECT LOCATION: APN: 266-320-025; Cole Avenue & Landin Lane, Riverside

PROJECT NO: 19-283-003GE

DATE DRILLED: 11/22/2019
DATE LOGGED: 11/22/2019
EXCAVATION METHOD: Backhoe
SAMPLE METHOD: Split-Tube
ELEVATION: N/A
LOGGED BY: KY

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

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Earth Material Descriptions
0 - 2		R	90	SM	114.8	5.8	*Natural Soil (Qs; 0' - 2'):* @ 0.0' Clayey sand, fine to coarse grained, dark brown, dry, dense. @ 2.0' Silty sand, fine to coarse grained, olive brown, slightly moist, very dense.
4 - 6	B	R	150/5"	Bedrock	124.4	2.6	*Bedrock of Late Cretaceous Val Verde Tonalite (kvt; 2' - 5'):* @ 5.0' Late Cretaceous Val Verde tonalite, dark olive gray, dry, medium to coarse grained, massive and well foliated, very dense and hard.
8 - 18							Refusal @ 5.0 feet Total Depth = 5.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches

TEST PIT LOG: TP-2

ELEVATION: N/A
LOGGED BY: KY

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Earth Material Descriptions
0 - 2		R	150/8"	SC	106.8	4.9	*Natural Soil (Qs; 0' - 2'):* @ 2.0' Clayey sand, fine to coarse grained, dark brown, slightly moist, very dense.
4 - 6		R	150/0"	Bedrock	-	-	*Bedrock of Late Cretaceous Val Verde Tonalite (kvt; 2' - 3'):* @ 3.0' Late Cretaceous Val Verde tonalite, dark olive gray, dry, medium to coarse grained, massive and well foliated, very dense and hard; no sample was able to taken due to very tough bedrock.
8 - 18							Refusal @ 3.0 feet Total Depth = 3.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches

EGL

TEST PIT LOG: TP-3

PROJECT LOCATION: APN: 266-320-025; Cole Avenue & Landin Lane, Riverside

PROJECT NO: 19-283-003GE

DATE DRILLED: 11/22/2019
DATE LOGGED: 11/22/2019
EXCAVATION METHOD: Backhoe
SAMPLE METHOD: Split-Tube
ELEVATION: N/A
LOGGED BY: KY

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

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Earth Material Descriptions
0		R	45	SM	106.1	0.7	*Natural Soil (Qs; 0' - 9'):* @ 0.0' Silty sand, fine to coarse grained, light olive brown, dry, medium dense
2	B	R	20	SM	102.3	2.0	@ 2.0' Silty sand, fine to coarse grained, olive brown, dry, medium dense
4							
6		R	22	SM	106.1	1.5	@ 5.0' Silty sand, fine to coarse grained, olive brown, dry, medium dense
8							*Bedrock of Late Cretaceous Val Verde Tonalite (kvt; 9' - 10'):*
10		R	150/0"	Bedrock	-	-	@ 10.0' Late Cretaceous Val Verde tonalite, dark olive gray, dry, medium to coarse grained, massive and well foliated, very dense and hard; no sample was able to taken due to very tough bedrock.
12							
14							Refusal @ 10.0 feet Total Depth = 10.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped
16							
18							
20							Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches

TEST PIT LOG: TP-4

ELEVATION: N/A
LOGGED BY: KY

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Earth Material Descriptions
0		R	150/10"	SM	119.2	1.1	*Natural Soil (Qs; 0' - 2'):* @ 0.0' Silty sand, fine to coarse grained, light olive brown, dry, very dense.
2		R	80	SC	110.0	2.5	@ 2.0' Clayey sand, fine to coarse grained, olive brown, dry, very dense
4							
6		R	150/10"	SM	115.9	3.2	@ 5.0' Silty sand, fine to coarse grained, dark olive brown, dry, very dense, granitic rocks were commonly encountered
8							Total Depth = 5.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped
10							
12							Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches
14							
16							

EGL

TEST PIT LOG: TP-5 (Perc)

PROJECT LOCATION: APN: 266-320-025; Cole Avenue & Landin Lane, Riverside

PROJECT NO: 19-283-003GE

DATE DRILLED: 11/22/2019
DATE LOGGED: 11/22/2019
EXCAVATION METHOD: Backhoe
SAMPLE METHOD: Split-Tube
ELEVATION: N/A
LOGGED BY: KY

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

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Earth Material Descriptions
0		R	120	SM/SC	115.5	1.4	*Natural Soil (Qs; 0' - 2'):* @ 0.0' Silty clayey sand, fine to coarse grained, brown, dry, very dense.
2		R	120/10"	SM/SC	111.6	5.3	@ 1.0' Silty clayey sand, fine to coarse grained, brown, slightly moist, very dense.
4		R	150/8"	Bedrock	117.4	2.2	*Bedrock of Late Cretaceous Val Verde Tonalite (kvt; 2' - 5'):* @ 5.0' Late Cretaceous Val Verde tonalite, dark olive gray, dry, medium to coarse grained, massive and well foliated, very dense and hard.
6							
8							Total Depth = 5.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped After Percolation Test
10							
12							Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches
14							
16							
18							

TEST PIT LOG: TP-6 (Perc)

ELEVATION: N/A
LOGGED BY: KY

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Earth Material Descriptions
0		R	60/10"	SC	107.3	2.5	*Natural Soil (Qs; 0' - 8.5'):* @ 0.0' Clayey sand, fine to coarse grained, olive brown,dry, dense to very dense.
2	B	R	15	SM	103.6	3.1	@ 2.0' Silty sand, fine to coarse grained, olive brown, dry, medium dense.
4		R	20	SM	100.9	6.7	@ 5.0' Silty sand, fine to coarse grained, olive brown, slightly moist, medium dense.
6							
8							*Bedrock of Late Cretaceous Val Verde Tonalite (kvt; 8.5' - 9'):* @ 8.5' Late Cretaceous Val Verde tonalite, dark olive gray, dry, medium to coarse grained, massive and well foliated, very dense and hard.
10							
12							Total Depth = 9.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped After Percolation Test
14							
16							Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches
18							

EGL

TEST PIT LOG: TP-7

PROJECT LOCATION: APN: 266-320-025; Cole Avenue & Landin Lane, Riverside

PROJECT NO: 19-283-003GE

DATE DRILLED:	11/22/2019
DATE LOGGED:	11/22/2019
EXCAVATION METHOD:	Backhoe
SAMPLE METHOD:	Split-Tube
ELEVATION:	N/A
LOGGED BY:	KY

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

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows Counts; ft	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	*Earth Material Descriptions*
0		R	60/10"	SM	113.1	1.1	*Natural Soil (Qs; 0' - 5'):* @ 0.0' Silty sand, fine to coarse grained, brown, dry, dense.
2		R	45/10"	SM	108.0	2.5	@ 2.0' Silty clayey sand, fine to coarse grained, olive brown, dry, dense.
4		R	45	SM	105.9	5.0	@ 5.0' Silty clayey sand, fine to coarse grained, olive brown, slightly moist, dense.
6							
8							Total Depth = 5.0 feet No Caving; No Groundwater Test Pit Backfilled and Tamped
10							
12							Hammer Driving Weight = 32 lbs Hammer Driving Height = 48 inches
14							
16							
18							

APPENDIX B

LABORATORY TESTING

During the subsurface exploration, EGL personnel collected relatively undisturbed ring samples and bulk samples. The following tests were performed on selected soil samples:

Moisture-Density

The moisture content and dry unit weight were determined for each relatively undisturbed soil sample obtained in the test pits in accordance with ASTM D2937 standard. The results of these tests are shown on the test pit logs in Appendix A.

Shear Tests

Shear tests were performed in a direct shear machine of strain-control type in accordance with ASTM D3080 standard. The rate of deformation was 0.025 inch per minute. Selected samples were sheared under varying confining loads in order to determine the Coulomb shear strength parameters: internal friction angle and cohesion. The shear test results are presented in the attached plates.

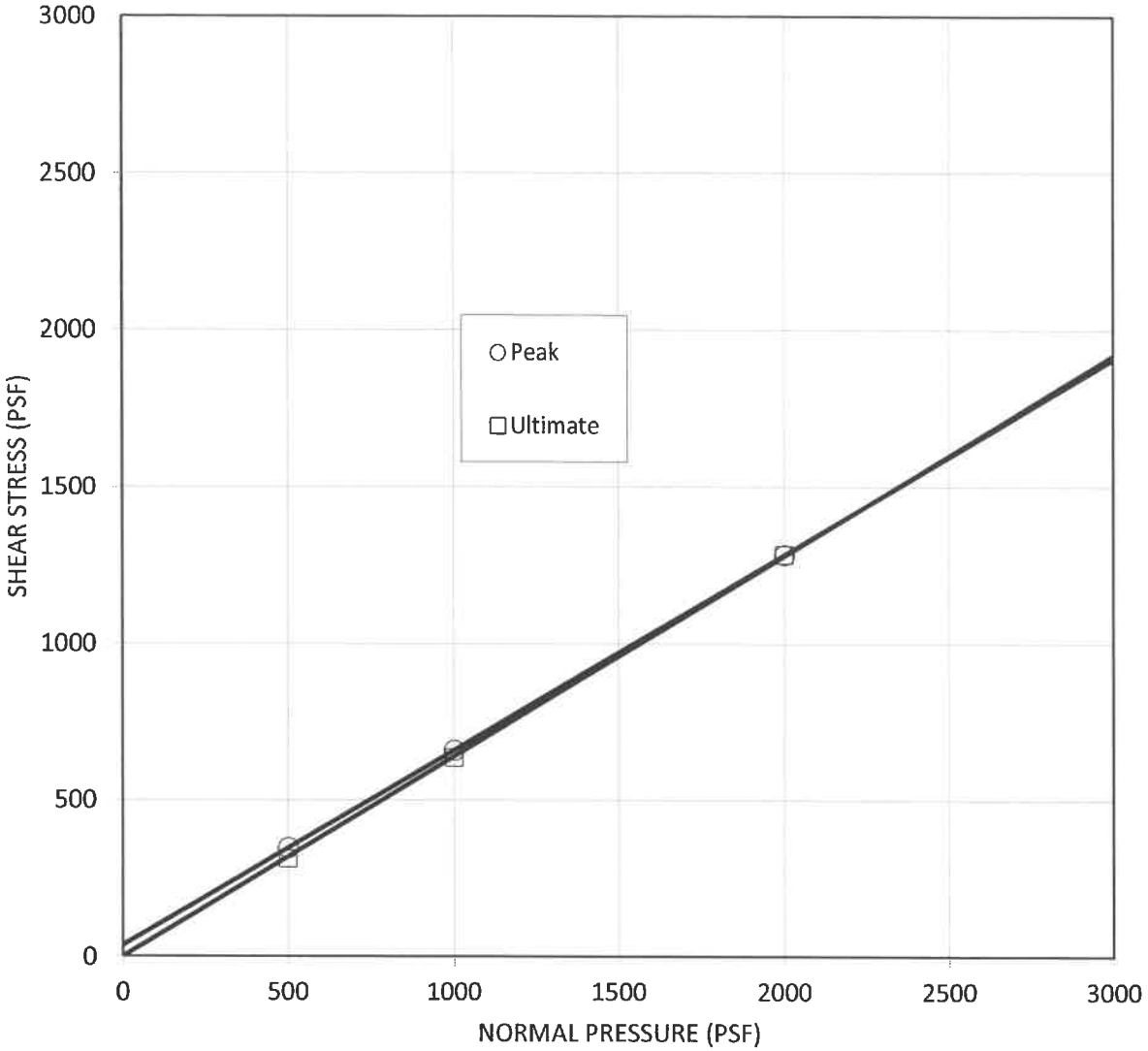
Consolidation Tests

Consolidation tests were performed on selected undisturbed soil samples in accordance with ASTM D2435 standard. The consolidation apparatus is designed for a one-inch high soil filled brass ring. Loads are applied in several increments in a geometric progression and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. The samples were inundated with water at a load of one kilo-pounds (kips) per square foot, and the test results are shown on the attached Figures.

Corrosion Test

Corrosion series of bulk sample was tested in accordance with Caltrans test methods. The series consist of Chloride Content, Sulfate Content, pH, and Minimum Resistivity tests. The methods used and test results are as follows:

Sample Location	pH	CT-412 Chloride (ppm)	CT-417 Sulfate (% by weight)	CT-643 Min. Resistivity (ohm-cm)
TP-3 @ 0-5'	7.29	183	0.006	4,500



Boring No.:	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
TP-2	1	2.0	Ring	SC	○	36	32
					□	0	32

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)	γ_d (pcf)	S (%)
500	4.9	20.6	105.1	92.4
1000	4.9	20.7	105.4	93.5
2000	4.9	19.5	107.9	94.1

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

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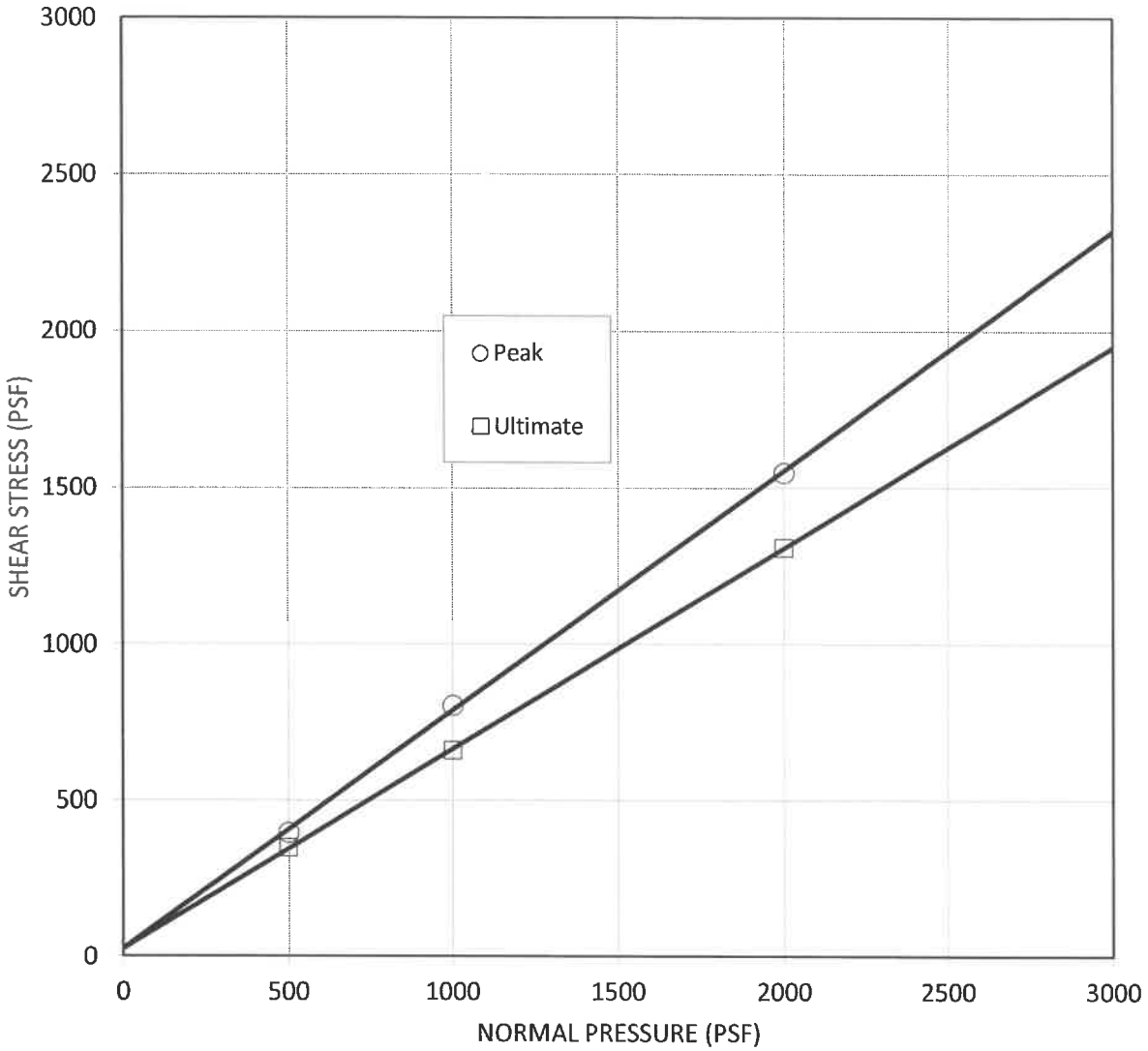
DIRECT SHEAR

01/20 (ASTM D3080) Figure

11819 Goldring Road, Unit A, Arcadia, California 91006; Phone (626) 263-3588; Fax (626) 263-3599



Boring No.:	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
TP-3	3	5.0	Ring	SM	○	24	37
					□	24	33

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)	γ_d (pcf)	S (%)
500	1.5	19.7	106.4	91.2
1000	1.5	19.1	107.8	91.6
2000	1.5	19.4	107.8	92.9

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

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DIRECT SHEAR

01/20 (ASTM D3080) Figure

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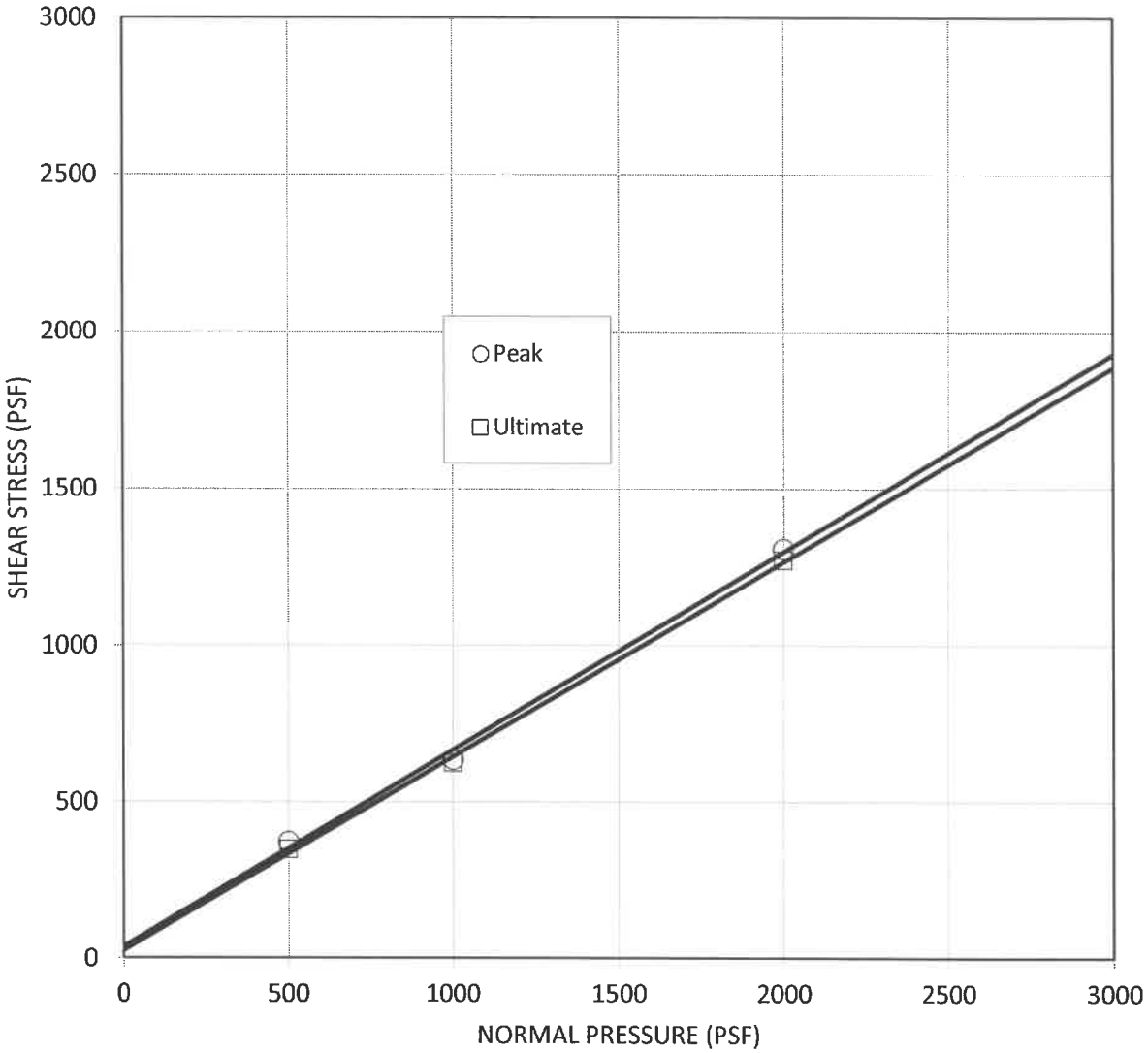

Boring No.:	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
TP-7	2	2.0	Ring	SM	○	36	32
					□	24	32

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)	γ_d (pcf)	S (%)
500	2.5	19.2	107.4	91.3
1000	2.5	19.0	107.6	91.0
2000	2.5	18.6	108.7	91.3

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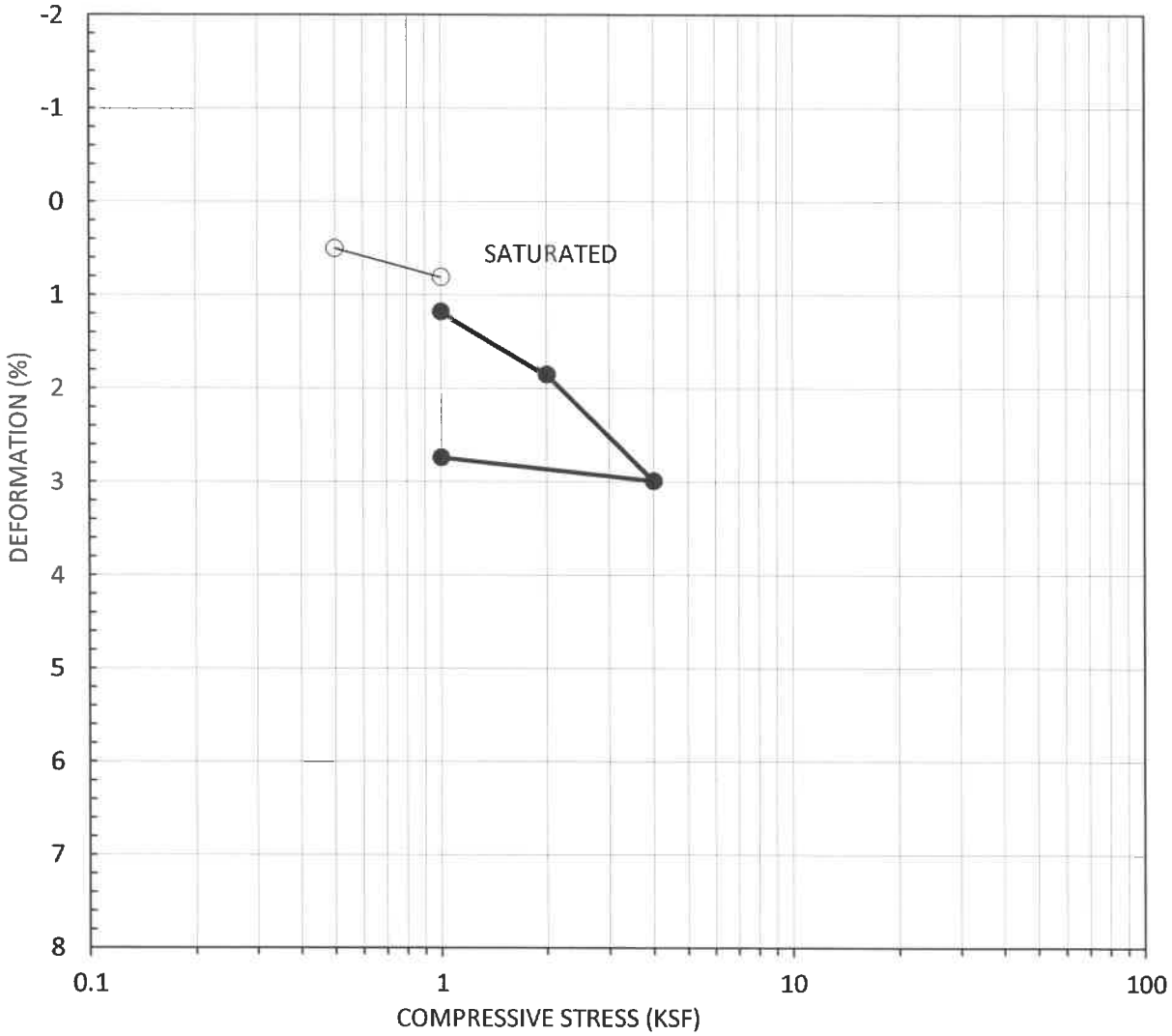

Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density	Init. Void Ratio
○	TP-1	2	5.0	Bedrock	2.6	124.8	0.350

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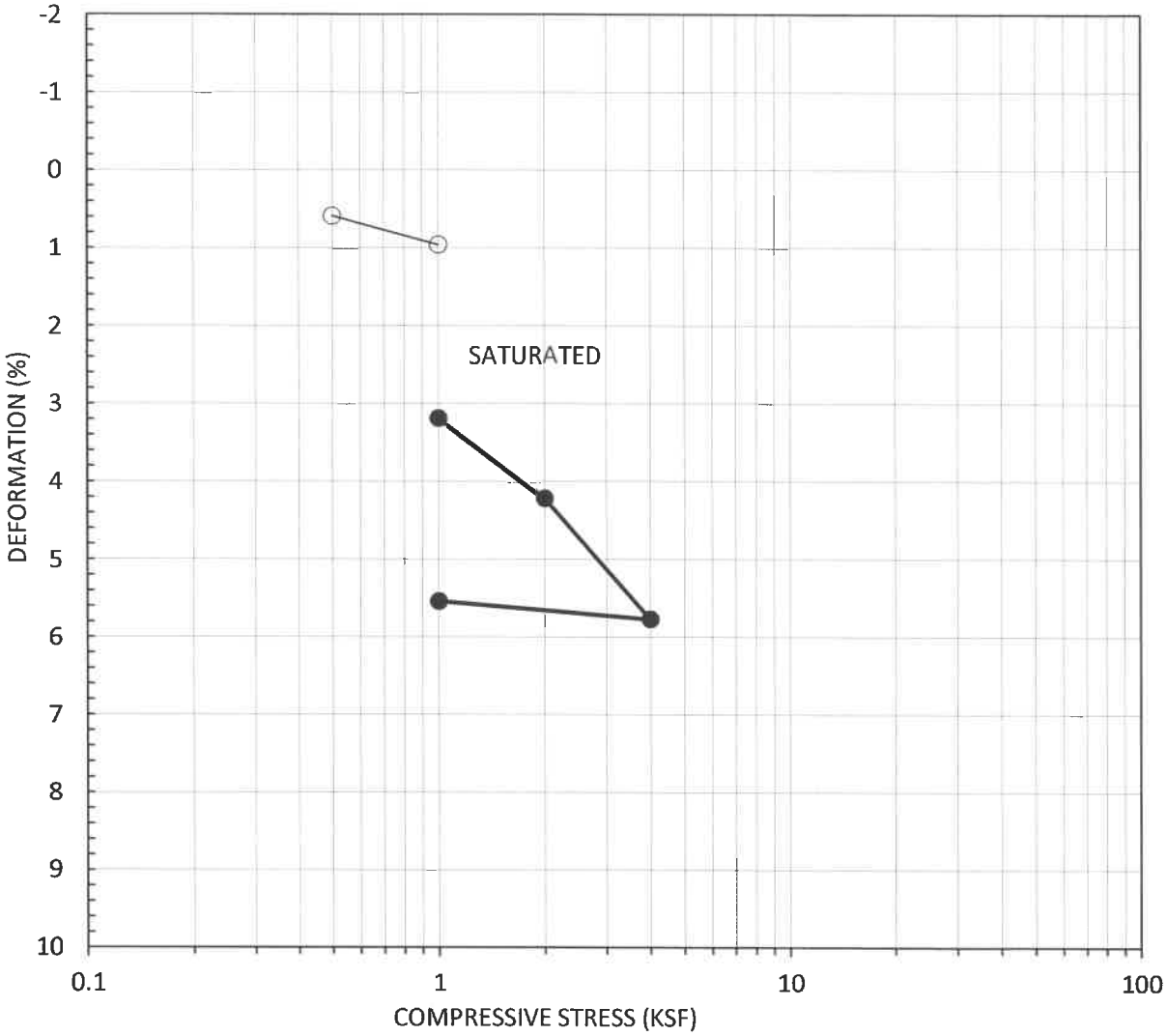
01/20 (ASTM D2435) Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density	Init. Void Ratio
○	TP-4	3	5.0	SM	3.2	116.6	0.445

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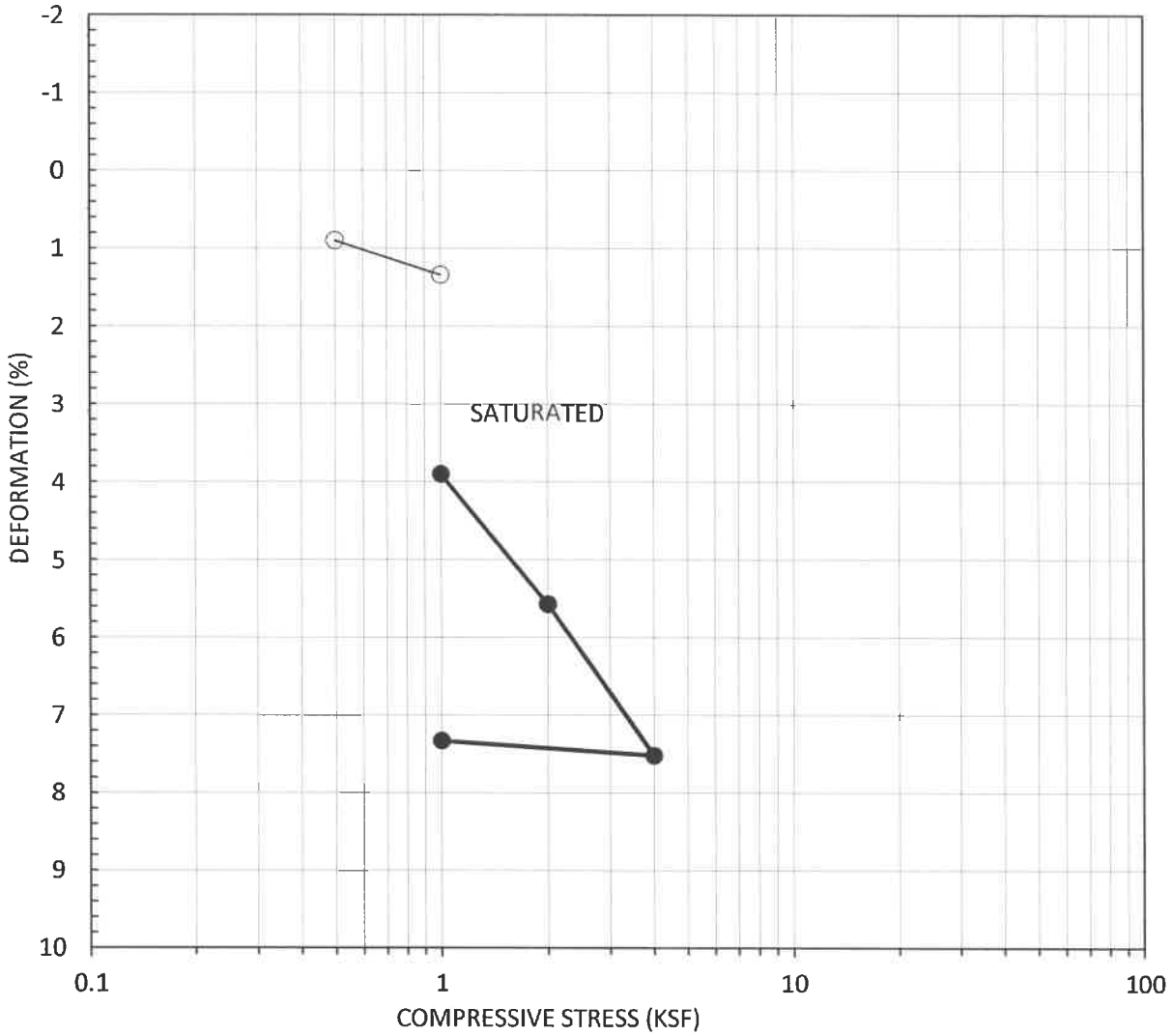
01/20 (ASTM D2435) Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density	Init. Void Ratio
○	TP-6	2	2.0	SM	3.1	106.1	0.589

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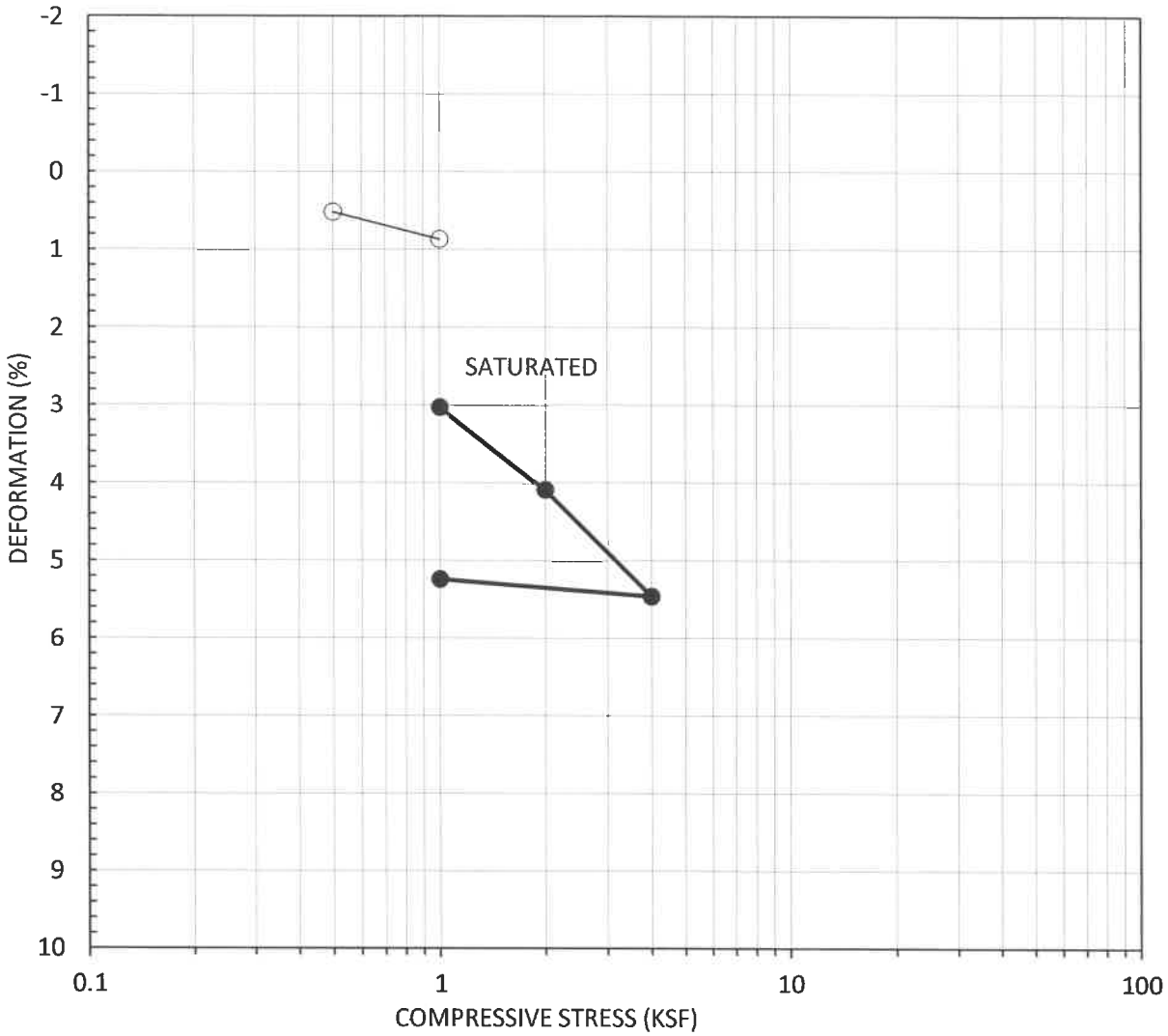

Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density	Init. Void Ratio
○	TP-7	1	0.0	SM	1.1	113.9	0.479

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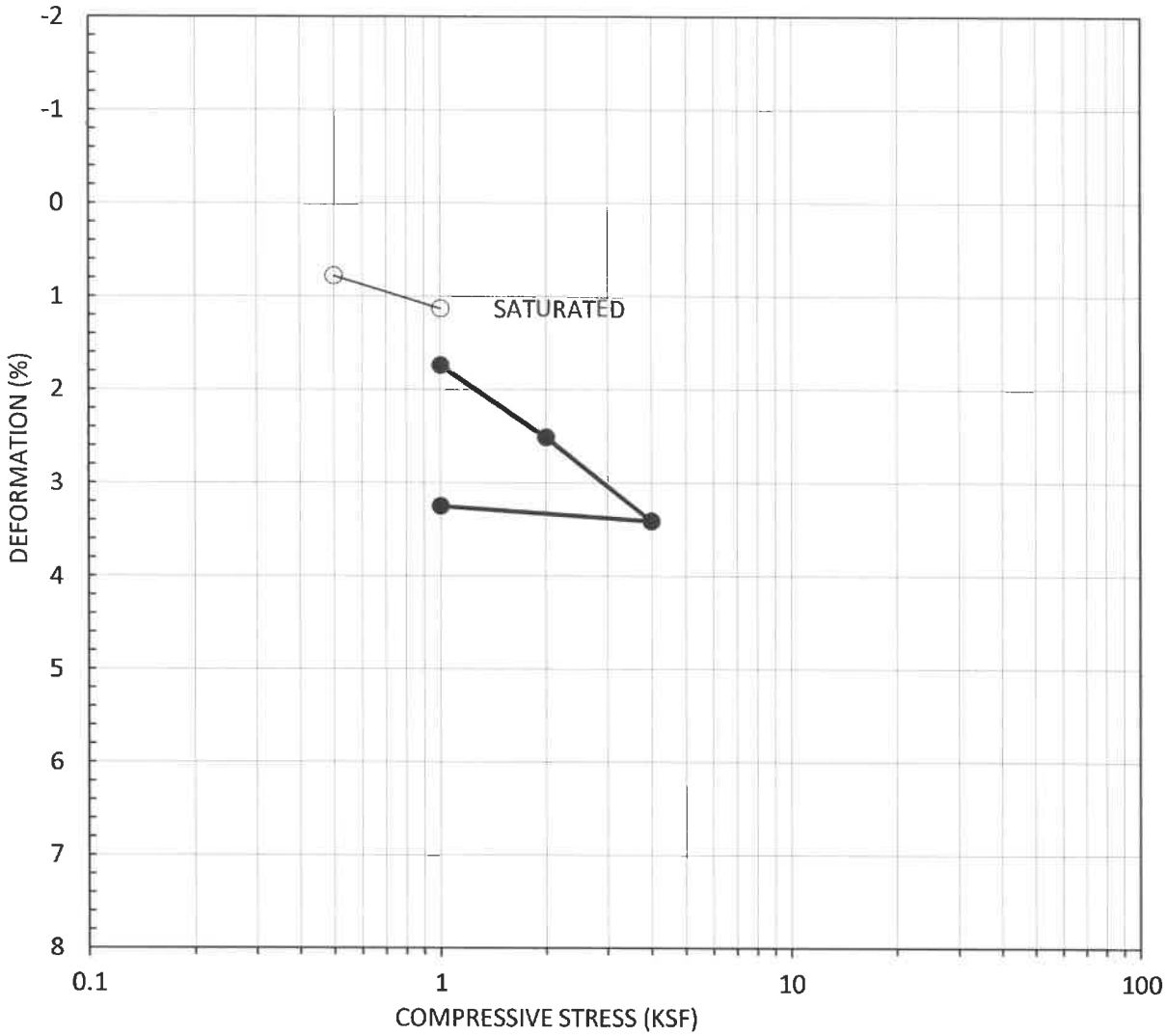
01/20 (ASTM D2435) Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density	Init. Void Ratio
○	TP-7	3	5.0	SM	5.0	107.3	0.570

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LABORATORY

Project Address: (APN: 266-320-025)
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Riverside, California

CONSOLIDATION

01/20 (ASTM D2435) Figure

APPENDIX C: PERCOLATION TEST RESULTS

Infiltration Testing per Riverside County Technical Guidance Document

r (in) = radius hole

t_i (hr:min) = intial time after filling or refilling

t_f (hr:min) = final time

d_b (ft) = depth to bottom

d_i (ft) = depth to water surface at ti

d_f (ft) = depth to water surface at tf

ΔH (in) = change in height over time

Have = average head height over the time interval

t (hr) = Time reading interval

It (in/hr) = (ΔHxr)/(Δt(r+2Havg)) tested infiltration rate

TP-5									
r (in)	t_i (hr:min)	t_f (hr:min)	Δt (hr)	d_b (in)	d_i (in)	d_f (in)	ΔH (in)	H_{ave} (ft)	It (in/hr)
4	10:24	10:49	0.42	20.0	0.0	12.0	12.0	14.0	3.57
4	10:50	11:15	0.42	20.0	0.0	9.0	9.0	15.5	2.45
4	11:16	11:26	0.17	20.0	0.0	5.0	5.0	17.5	3.02
4	11:26	11:36	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	11:37	11:47	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	11:47	11:57	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	11:58	12:08	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	12:10	12:20	0.17	20.0	0.0	4.0	4.0	18.0	2.35

Factor of Safety based on the Technical Guidance Document for WQMP, Worksheet H & Tables VII.3 & VII.4

FS = 2

Design Infiltration Rate = Tested Infiltration Rate / FS (in/hour) = **1.18**

TP-6									
r (in)	t_i (hr:min)	t_f (hr:min)	t (hr)	d_b (in)	d_i (in)	d_f (in)	ΔH (in)	H_{ave} (ft)	It (in/hr)
4	11:02	11:27	0.42	20.0	0.0	13.0	13.0	13.5	3.99
4	11:41	12:06	0.42	20.0	0.0	9.0	9.0	15.5	2.45
4	12:07	12:17	0.17	20.0	0.0	5.0	5.0	17.5	3.02
4	12:19	12:29	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	12:33	12:43	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	12:47	12:57	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	12:58	13:08	0.17	20.0	0.0	4.0	4.0	18.0	2.35
4	13:10	13:20	0.17	20.0	0.0	4.0	4.0	18.0	2.35

Factor of Safety based on the Technical Guidance Document for WQMP, Worksheet H & Tables VII.3 & VII.4

FS = 2

Design Infiltration Rate = Tested Infiltration Rate / FS (in/hour) = **1.18**

WARREN AVENUE

LANDIN LANE

S 88°52'59" W 1327.85'

RETENTION BASIN

87 OVERFLOW PARKING STALLS

CONSERVATION AREA BOUNDARY LINE

177 PARKING STALLS

TP–5

TP–4

LARGE AUDITORIUM 7500 SF

LARGE MEETING RM 1 2298 SF

LARGE MEETING RM 2 2298 SF

EXHIBITION 1 2298 SF

EXHIBITION 2 2298 SF

RAY AVENUE

COLE STREET

MAIN PRAYER HALL 5025 SF

OFFICE 3151 SF

LECTURE 1 2220 SF

LIBRARY 1784 SF

TP–6

SUNDAY SCHOOL 10000 SF

LARGE DINING 3388 SF

ENSUITE 2820 SF

TP–3

DINING 852 SF

LAUNDRY 249 SF

KITCHEN 816 SF

TP–7

S-W ¼ S-W ¼ SEC. 32
T. 3 S. R. 4 W. SBB&M

S 88°28'37" W 660.00'

NORTH

SCALE: 1"=60'–0"

ONTARIO AVENUE

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

SINGLE FAMILY RESIDENCE WITH JADU AND ADU

N 0°14'41" W 1341.92'

N 0°14'41" W 660.00'

CONSERVATION AREA BOUNDARY LINE

TP–2

TP–1

S 88°28'37" W 669.83'

1329.83'

MARKHAM STREET

LEGEND

TP–1 Approximate Location of Exploratory Backhoe Test Pit No. 1 (EGL, 2019)

Environmental Geotechnology Laboratory, Inc.

Project Address:
APN: 266–320–025
Cole Avenue & Landin Lane
Riverside, California
EGL Project No. 19–283–003

Site Plan

01/2020

FIGURE 2

Appendix 4: Historical Site Conditions

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

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Volume, V_{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	ALLARD ENGINEERING	Date	8/20/2020
Designed by	ADAM	Case No	
Company Project Number/Name	RIVERSIDE TEMPLE		

BMP Identification

BMP NAME / ID: INF. BASIN-1. DMA-1 (PHASE I)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.55 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA-1	58,806	Roofs	1	0.89	52455			
DMA-1	137214	Concrete or Asphalt	1	0.89	122394.9			
DMA-1	130680	Ornamental Landscaping	0.1	0.11	14434.7			
	326700	Total			189284.6	0.55	8675.5	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{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	ALLARD ENGINEERING	Date	10/15/2020
Designed by	ADAM	Case No	
Company Project Number/Name	RIVERSIDE TEMPLE		

BMP Identification

BMP NAME / ID: INF. BASIN-1. DMA-2 (PHASE-2)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.55 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA-2	22216	Roofs	1	0.89	19816.7			
DMA-2	51836	Concrete or Asphalt	1	0.89	46237.7			
DMA-2	296208	Ornamental Landscaping	0.1	0.11	32718.5			
	370260	Total			98772.9	0.55	4527.1	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Combined Design Capture Volume (Ph1 & 2): 13,203 CF
Provided Volume: 37,784 CF

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S | T 02 S | T 03 S | T 04 S | T 05 S | T 06 S | T 07 S | T 08 S

0.85 MiraLoma
0.61 Riverside North
0.54 Riverside South
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcres
0.50 LakeMathews
0.68 PerrisReservoir
SITE: 0.55"/HR
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed

Santa Margarita Watershed

CORONA | NORCO | EASTVALE | JURUPA VALLEY | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | HEMET | CANYON LAKE | LAKE ELSINORE | MENIFEE | WILDOMAR | MURRIETA | TEMECULA

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID RET-1	Legend:	Required Entries / Calculated Cells

Company Name: ALLARD ENG Date: 10/15/2020

Designed by: ADAM County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	16	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	37,784	ft^3

Maximum Depth

a) Infiltration rate	I =	2.36	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	2	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	7.1	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		30	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	9446	ft^2
d) Proposed Design Surface Area	A_D =	24,800	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	189	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	189	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes:

3.1 INFILTRATION BASIN

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evapotranspiration (when vegetated), Evaporation, and Sedimentation
Maximum Treatment Area	50 acres
Other Names	Bioinfiltration Basin

Description

An Infiltration Basin is a flat earthen basin designed to capture the design capture volume, V_{BMP}. The stormwater infiltrates through the bottom of the basin into the underlying soil over a 72 hour drawdown period. Flows exceeding V_{BMP} must discharge to a downstream conveyance system. Trash and sediment accumulate within the forebay as stormwater passes into the basin. Infiltration basins are highly effective in removing all targeted pollutants from stormwater runoff.

Figure 1 – Infiltration Basin

See Appendix A, and Appendix C, Section 1 of *Basin Guidelines*, for additional requirements.

Siting Considerations

The use of infiltration basins may be restricted by concerns over ground water contamination, soil permeability, and clogging at the site. See the applicable WQMP for any specific feasibility considerations for using infiltration BMPs. Where this BMP is being used, the soil beneath the basin must be thoroughly evaluated in a geotechnical report since the underlying soils are critical to the basin's long term performance. To protect the basin from erosion, the sides and bottom of the basin must be vegetated, preferably with native or low water use plant species.

In addition, these basins may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur
- Sites with very low soil infiltration rates
- Sites with high groundwater tables or excessively high soil infiltration rates, where pollutants can affect ground water quality
- Sites with unstabilized soil or construction activity upstream
- On steeply sloping terrain
- Infiltration basins located in a fill condition should refer to Appendix A of this Handbook for details on special requirements/restrictions

Setbacks

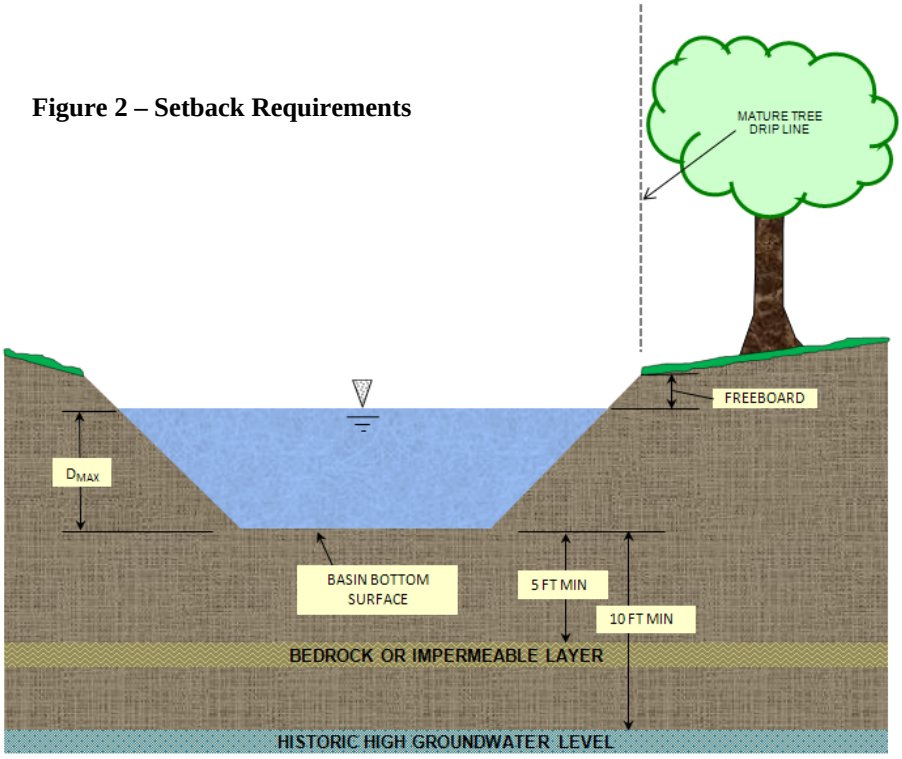
Always consult your geotechnical engineer for site specific recommendations regarding setbacks for infiltration trenches. Recommended setbacks are needed to protect buildings, existing trees, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process since they can affect where infiltration facilities may be placed and how deep they are allowed to be. For instance, depth setbacks can dictate fairly shallow facilities that will have a larger footprint and, in some cases, may make an infiltration basin infeasible. In that instance, another BMP must be selected.

Infiltration basins typically must be set back:

- 10 feet from the historic high groundwater (measured vertically from the bottom of the basin, as shown in Figure 2)
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the basin, as shown in Figure 2)
- From all existing mature tree drip lines as indicated in Figure 2 (to protect their root structure)
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report. All other setbacks shall be in accordance with applicable standards of the District's *Basin Guidelines* (Appendix C).

Figure 2 – Setback Requirements



Forebay

A concrete forebay shall be provided to reduce sediment clogging and to reduce erosion. The forebay shall have a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall / berm. Full height notch-type weir(s), offset from the line of flow from the basin inlet to prevent short circuiting, shall be used to outlet the forebay. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 2).

Overflow

Flows exceeding V_{BMP} must discharge to an acceptable downstream conveyance system. Where an adequate outlet is present, an overflow structure may be used. Where an embankment is present, an emergency spillway may be used instead. Overflows must be placed just above the design water surface for V_{BMP} and be near the outlet of the system. The overflow structure shall be similar to the District's Standard Drawing CB 110. Additional details may be found in the District's *Basin Guidelines* (Appendix C).

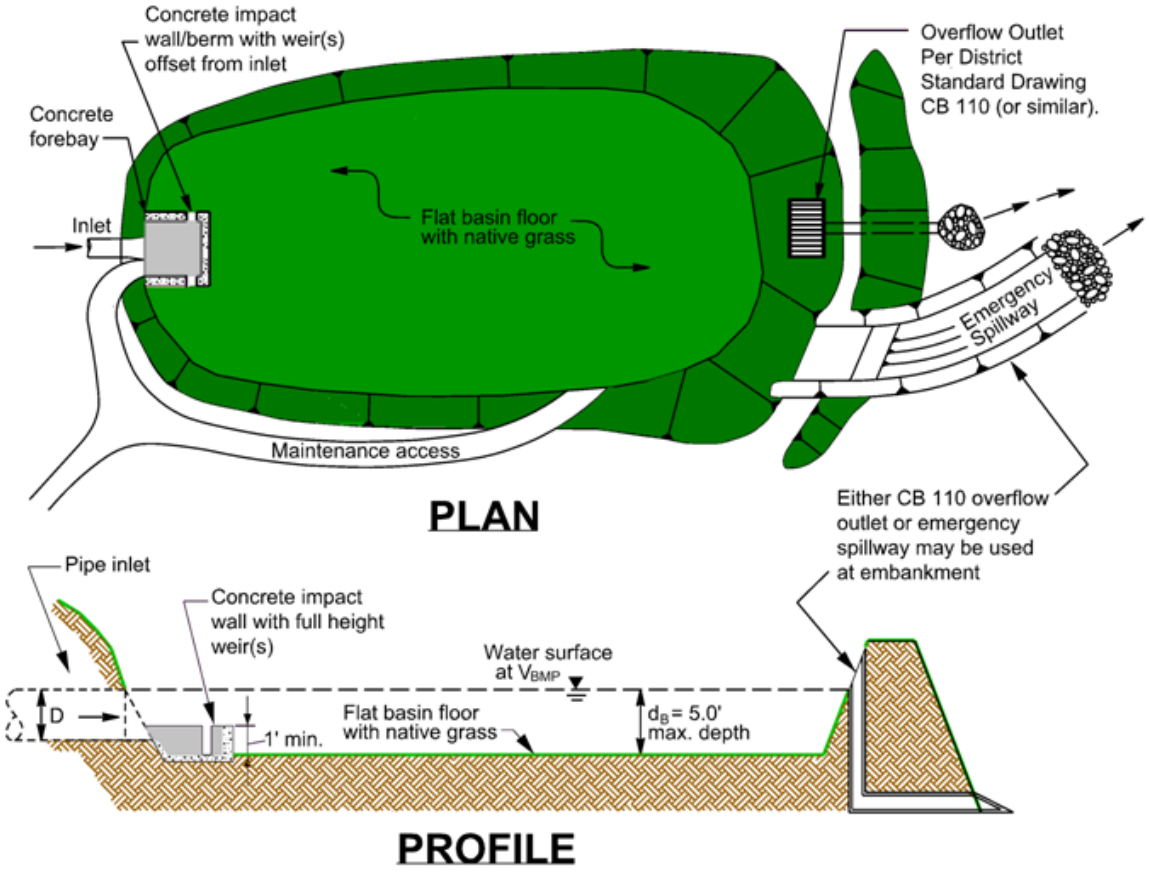


Figure 3 – Infiltration Basin

Landscaping Requirements

Basin vegetation provides erosion protection, improves sediment removal and assists in allowing infiltration to occur. The basin surface and side slopes shall be planted with native grasses. Proper landscape management is also required to ensure that the vegetation does not contribute to water pollution through pesticides, herbicides, or fertilizers. Landscaping shall be in accordance with County of Riverside Ordinance 859 and the District's *Basin Guidelines* (Appendix C), or other guidelines issued by the Engineering Authority.

Maintenance

Normal maintenance of an infiltration basin includes the maintenance of landscaping, debris and trash removal from the surface of the basin, and tending to problems associated with standing water (vectors, odors, etc.). Significant ponding, especially more than 72 hours after an event, may indicate that the basin surface is no longer providing sufficient infiltration and requires aeration. See the District's *Basin Guidelines* (Appendix C) for additional requirements (i.e., fencing, maintenance access, etc.).

Table 1 - Inspection and Maintenance

Schedule	Inspection and Maintenance Activity
Ongoing including just before annual storm seasons and following rainfall events.	• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be strenuously avoided to ensure they don't contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products shouldn't be needed. If such projects are used, o Products shall be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding. o Fertilizers should not be applied within 15 days before, after, or during the rain season. • Remove debris and litter from the entire basin to minimize clogging and improve aesthetics. • Check for obvious problems and repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom. There should be no long-term ponding water. • Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed. • Revegetate side slopes where needed.
Annually. If possible, schedule these inspections within 72 hours after a significant rainfall.	• Inspection of hydraulic and structural facilities. Examine the inlet for blockage, the embankment and spillway integrity, as well as damage to any structural element. • Check for erosion, slumping and overgrowth. Repair as needed. • Check basin depth for sediment build up and reduced total capacity. Scrape bottom as needed and remove sediment. Restore to original cross-section and infiltration rate. Replant basin vegetation. • Verify the basin bottom is allowing acceptable infiltration. Use a disc or other method to aerate basin bottom only if there is actual significant loss of infiltrative capacity, rather than on a routine basis[1]. • No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.

1. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Table 2 - Design and Sizing Criteria for Infiltration Basins

Design Parameter	Infiltration Basin
Design Volume	V_{BMP}
Forebay Volume	0.5% V_{BMP}
Drawdown time (maximum)	72 hours
Maximum tributary area	50 acres [2]
Minimum infiltration rate	Must be sufficient to drain the basin within the required Drawdown time over the life of the BMP. The WQMP may include specific requirements for minimum tested infiltration rates.
Maximum Depth	5 feet
Spillway erosion control	Energy dissipators to reduce velocities[1]
Basin Slope	0%
Freeboard (minimum)	1 foot [1]
Historic High Groundwater Setback (max)	10 feet
Bedrock/impermeable layer setback (max)	5 feet
Tree setbacks	Mature tree drip line must not overhang the basin
Set back from wells, tanks or springs	100 feet
Set back from foundations	As recommended in Geotechnical Report

1. **Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures**
2. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the District's Basin Guidelines (Appendix C). In addition, information herein may be superseded by other guidelines issued by the co-permittee.

INFILTRATION BASIN SIZING PROCEDURE

1. Find the Design Volume, V_{BMP}.
   a) Enter the Tributary Area, $A_{T.}$
   b) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.
2. Determine the Maximum Depth.
   a) Enter the infiltration rate. The infiltration rate shall be established as described in Appendix A: "Infiltration Testing".
   b) Enter the design Factor of Safety from Table 1 in Appendix A: "Infiltration Testing".
   c) The spreadsheet will determine D_1, the maximum allowable depth of the basin based on the infiltration rate along with the maximum drawdown time (72 hours) and the Factor of Safety.

$$D_1 = [(t) \times (I)] / 12s$$

Where I = site infiltration rate (in/hr)
s = safety factor
t = drawdown time (maximum 72 hours)

d) Enter the depth of freeboard.

e) Enter the depth to the historic high groundwater level measured from the top of the basin.

f) Enter the depth to the top of bedrock or other impermeable layer measured from the finished grade.

g) The spreadsheet will determine D_2, the total basin depth (including freeboard, if used) of the basin, based on restrictions to the depth by groundwater and an impermeable layer.

D_2 = Depth to groundwater – (10 + freeboard) (ft);

or

D_2 = Depth to impermeable layer – (5 + freeboard) (ft)

Whichever is least.

h) The spreadsheet will determine the maximum allowable effective depth of basin, D_{MAX}, based on the smallest value between D_1 and D_2. D_{MAX} is the maximum depth of water only and does not include freeboard. D_{MAX} shall not exceed 5 feet.

3. Basin Geometry

a) Enter the basin side slopes, z (no steeper than 4:1).

b) Enter the proposed basin depth, d_B excluding freeboard.

c) The spreadsheet will determine the minimum required surface area of the basin:

$$A_s = V_{BMP} / d_B$$

Where A_s = minimum area required (ft^2)
V_{BMP} = volume of the infiltration basin (ft^3)
d_B= proposed depth not to exceed maximum allowable depth, D_{MAX} (ft)

d) Enter the proposed bottom surface area. This area shall not be less than the minimum required surface area.

4. Forebay

A concrete forebay with a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall shall be provided. Full-height rectangular weir(s) shall be used to outlet the forebay. The weir(s) must be offset from the line of flow from the basin inlet. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 2).

a) The spreadsheet will determine the minimum required forebay volume based on 0.5% V_{BMP}.

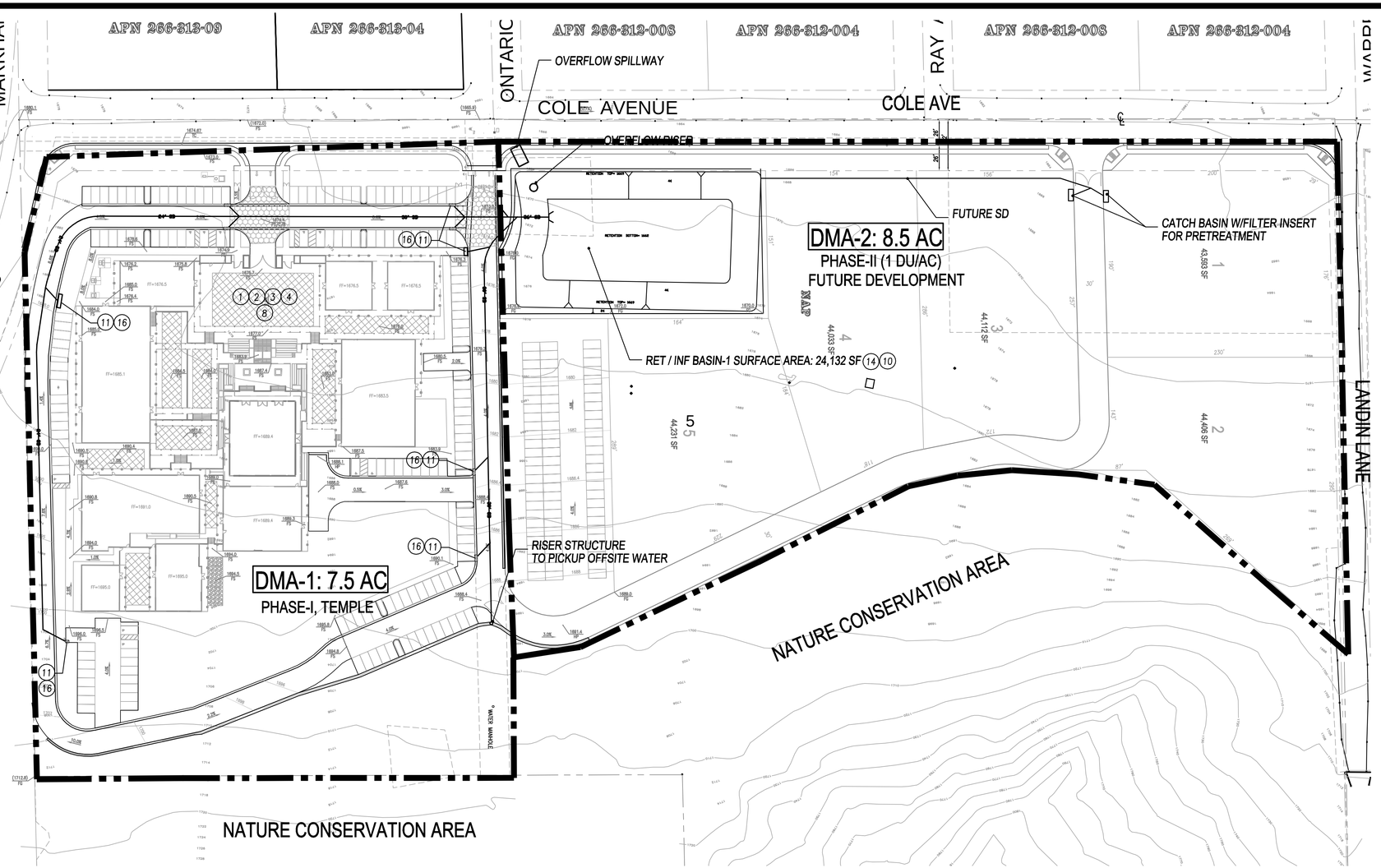
b) Enter the proposed depth of the forebay berm/splashwall (1foot minimum).

c) The spreadsheet will determine the minimum required forebay surface area.

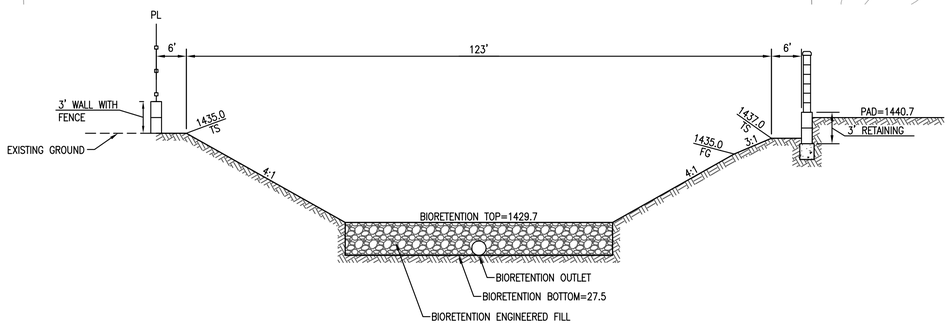
d) Enter the width of rectangular weir to be used (minimum 1.5 inches). Weir width should be established based on a 5 minute drawdown time.

Appendix 7: Hydromodification

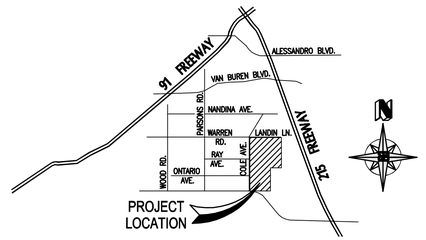
Supporting Detail Relating to Hydrologic Conditions of Concern



NATURE CONSERVATION AREA



RETENTION BASIN DETAIL



VICINITY MAP
N.T.S.

BMP LIST:

1. EDUCATION OF PROPERTY OWNERS
2. ACTIVITY RESTRICTIONS
3. SPILL CONTINGENCY
4. TRAINING/EDUCATION PROGRAM
5. PARKING LOT VACUUM SWEEPING
6. COMMON AREA CATCH BASIN INSPECTION
7. LANDSCAPE PLANNING (SD-10)
8. ROOF RUNOFF CONTROLS (SD-11)
9. EFFICIENT IRRIGAION (SD-12)
10. STORM DRAIN SIGNAGE (SD-13)
11. INLET TRASH RACK
12. NOT USED.
13. TRASH STORAGE AREAS (SD-32)
14. RETENTION/INFILTRATION BASIN-1 (TC-11)
15. CATCH BASIN FILTER INSERT-ADS FLEXSTORM CATCH IT OR APPROVED EQUAL
16. TRAFFIC GRATE FILTER INSERT-OLDCASTLE FLOGARD INSERT FILTER OR APPROVED EQUAL

LATITUDE & LONGITUDE
33.86043 N, 117.32195 W

N

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.

UNDERGROUND SERVICE ALERT
CALL BEFORE YOU DIG
CALL:TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

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STATE OF CALIFORNIA

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Civil Engineering - Land Surveying - Land Planning
16866 Seville Avenue
Fontana, California 92335
(909) 356-1815 Fax (909) 356-1795

COUNTY OF RIVERSIDE
I KUAN TAO TEMPLE-PHASE-1 & 2
WQMP EXHIBIT

PLOT DATE: December 08, 2020 owuser1

Filename: I:\Riverside Temple\DWG's\ENTITLEMENT\EXHIBITS\WQMP EXHIBIT-PH-1 and 2 ONSITE 12-8-2020.dwg

HCOC MITIGATION DMA-1 (PH-1)

RATIONAL METHOD HYDROLOGY-2YR STORM EVENT-DMA-1 (PH-1) PREDEVELOPED CONDITION

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
       Rational Hydrology Study        Date: 09/17/20  File:EX2.out
------------------------------------------------------------------------
RIVERSIDE TEMPLE-PH1
2YR STORM EVENT-UNDEV
PRE-DEVELOPED CONDITION

------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 5028

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Riverside ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.700(In/Hr)
100 year storm 10 minute intensity =  2.680(In/Hr)
100 year storm 60 minute intensity =  1.000(In/Hr)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.490(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   855.000(Ft.)
Top (of initial area) elevation =  1711.000(Ft.)
Bottom (of initial area) elevation =  1666.000(Ft.)
Difference in elevation =    45.000(Ft.)
Slope =    0.05263  s(percent)=       5.26
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.217 min.
Rainfall intensity =      1.082(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.668
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.423(CFS)
Total initial stream area =        7.500(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            7.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
```

Area averaged RI index number = 78.0

RATIONAL METHOD HYDROLOGY-2YR STORM EVENT-DMA-1 (PH-1) DEVELOPED CONDITION

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
       Rational Hydrology Study        Date: 09/17/20  File:DEV2.out
------------------------------------------------------------------------
RIVERSIDE TEMPLE-PH1
2-YR STORM EVENT
DEVELOPED CONDITION

------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 5028

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Riverside ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.700(In/Hr)
100 year storm 10 minute intensity =  2.680(In/Hr)
100 year storm 60 minute intensity =  1.000(In/Hr)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.490(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   575.000(Ft.)
Top (of initial area) elevation =  1711.000(Ft.)
Bottom (of initial area) elevation =  1686.000(Ft.)
Difference in elevation =    25.000(Ft.)
Slope =    0.04348  s(percent)=       4.35
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.799 min.
Rainfall intensity =      1.409(In/Hr) for a     2.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.766
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.777(CFS)
Total initial stream area =        3.500(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
```

```
Top of street segment elevation =  1686.000(Ft.)
End of street segment elevation =  1665.000(Ft.)
Length of street segment  =   376.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  15.000(Ft.)
Distance from crown to crossfall grade break  =   8.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  0.020(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.840(CFS)
Depth of flow =   0.131(Ft.), Average velocity =   4.306(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.464(Ft.)
Flow velocity =   4.31(Ft/s)
Travel time =    1.46 min.     TC =   10.25  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.759
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.296(In/Hr) for a     2.0 year storm
Subarea runoff =      3.934(CFS) for      4.000(Ac.)
Total runoff =      7.711(CFS)        Total area =       7.500(Ac.)
Street flow at end of street =      7.711(CFS)
Half street flow at end of street =      3.856(CFS)
Depth of flow =   0.148(Ft.), Average velocity =   4.627(Ft/s)
Flow width (from curb towards crown)=   9.336(Ft.)
End of computations, total study area =            7.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
```

RATIONAL METHOD HYDROLOGY-2YR STORM EVENT-DMA-2 (PH-2) PREDEVELOPED CONDITION

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
       Rational Hydrology Study        Date: 10/13/20  File:EX2.out
------------------------------------------------------------------------
RIVERSIDE TEMPLE
PHASE-2, ONSITE ONLY
2-YR STORM EVENT
UN-DEVELOPED CONDITION
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 5028

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Riverside ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.700(In/Hr)
100 year storm 10 minute intensity =  2.680(In/Hr)
100 year storm 60 minute intensity =  1.000(In/Hr)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.490(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        0.000 to Point/Station        1.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   990.000(Ft.)
Top (of initial area) elevation =  1698.000(Ft.)
Bottom (of initial area) elevation =  1656.000(Ft.)
Difference in elevation =    42.000(Ft.)
Slope =    0.04242  s(percent)=       4.24
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.740 min.
Rainfall intensity =      1.024(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.658
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.726(CFS)
Total initial stream area =        8.500(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            8.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
```

Area averaged RI index number = 78.0

RATIONAL METHOD HYDROLOGY-2YR STORM EVENT-DMA-2 (PH-2) DEVELOPED CONDITION

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
       Rational Hydrology Study        Date: 10/14/20  File:DEV2.out
------------------------------------------------------------------------
RIVERSIDE TEMPLE-PH2
2-YR STORM EVENT
DEVELOPED CONDITION

------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 5028

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Riverside ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.700(In/Hr)
100 year storm 10 minute intensity =  2.680(In/Hr)
100 year storm 60 minute intensity =  1.000(In/Hr)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.490(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        0.000 to Point/Station        1.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   560.000(Ft.)
Top (of initial area) elevation =  1698.000(Ft.)
Bottom (of initial area) elevation =  1681.000(Ft.)
Difference in elevation =    17.000(Ft.)
Slope =    0.03036  s(percent)=       3.04
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.136 min.
Rainfall intensity =      1.181(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.562
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      3.846(CFS)
Total initial stream area =        5.800(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
```

```
Top of street segment elevation =  1681.000(Ft.)
End of street segment elevation =  1669.000(Ft.)
Length of street segment  =   290.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  15.000(Ft.)
Distance from crown to crossfall grade break  =   7.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.017(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.741(CFS)
Depth of flow =   0.135(Ft.), Average velocity =   3.671(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.168(Ft.)
Flow velocity =   3.67(Ft/s)
Travel time =    1.32 min.     TC =   13.45  min.
 Adding area flow to street
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.551
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      1.116(In/Hr) for a     2.0 year storm
Subarea runoff =      1.661(CFS) for      2.700(Ac.)
Total runoff =      5.507(CFS)        Total area =       8.500(Ac.)
Street flow at end of street =      5.507(CFS)
Half street flow at end of street =      2.754(CFS)
Depth of flow =   0.144(Ft.), Average velocity =   3.814(Ft/s)
Flow width (from curb towards crown)=   8.622(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1669.000(Ft.)
Downstream point/station elevation =  1664.000(Ft.)
Pipe length  =   430.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     5.507(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.507(CFS)
Normal flow depth in pipe =   11.25(In.)
Flow top width inside pipe =   12.99(In.)
Critical Depth =   11.40(In.)
Pipe flow velocity =      5.58(Ft/s)
Travel time through pipe =    1.29 min.
Time of concentration (TC) =    14.74 min.
End of computations, total study area =            8.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.800
Area averaged RI index number =  56.0
```

UNIT HYDROGRAPH ANALYSIS-2YR, 24 HR DURATION STORM EVENT -DMA-1 (PH-1) PREDEVELOPED CONDITION

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  09/17/20 File: UH2EX242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 5028

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
RIVERSIDE TEMPLE-PH1
UH 2-YR STORM EVENT
àS
PRE-DEVELOPED CONDITION
------------------------------------------------------------------------
Drainage Area =       7.50(Ac.)  =      0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       7.50(Ac.)  =      0.012 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.190 Hr.
Lag time =    11.40 Min.
25% of lag time =     2.85 Min.
40% of lag time =     4.56 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        7.50           2.20                 16.50

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        7.50           5.50                 41.25

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.200(In)
Area Averaged 100-Year Rainfall =    5.500(In)

Point rain (area averaged) =    2.200(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.200(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
     7.500           78.00          0.000
 Total Area Entered =      7.50(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
78.0  78.0      0.268     0.000        0.268       1.000      0.268
                                                 Sum (F) =   0.268
```

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	43.860	5.010	0.379
2	0.167	87.719	20.993	1.587
3	0.250	131.579	28.336	2.142
4	0.333	175.439	15.555	1.176
5	0.417	219.298	7.598	0.574
6	0.500	263.158	5.100	0.385
7	0.583	307.018	3.802	0.287
8	0.667	350.877	2.843	0.215
9	0.750	394.737	2.267	0.171
10	0.833	438.596	1.726	0.130
11	0.917	482.456	1.383	0.105
12	1.000	526.316	1.256	0.095
13	1.083	570.175	0.974	0.074
14	1.167	614.035	0.806	0.061
15	1.250	657.895	0.652	0.049
16	1.333	701.754	0.498	0.038
17	1.417	745.614	0.439	0.033
18	1.500	789.474	0.439	0.033
19	1.583	833.333	0.325	0.025
		Sum = 100.000	Sum=	7.559

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.474	0.016	0.00
2	0.17	0.07	0.018	0.473	0.016	0.00
3	0.25	0.07	0.018	0.471	0.016	0.00
4	0.33	0.10	0.026	0.469	0.024	0.00
5	0.42	0.10	0.026	0.467	0.024	0.00
6	0.50	0.10	0.026	0.465	0.024	0.00
7	0.58	0.10	0.026	0.463	0.024	0.00
8	0.67	0.10	0.026	0.462	0.024	0.00
9	0.75	0.10	0.026	0.460	0.024	0.00
10	0.83	0.13	0.035	0.458	0.032	0.00
11	0.92	0.13	0.035	0.456	0.032	0.00
12	1.00	0.13	0.035	0.454	0.032	0.00
13	1.08	0.10	0.026	0.453	0.024	0.00
14	1.17	0.10	0.026	0.451	0.024	0.00
15	1.25	0.10	0.026	0.449	0.024	0.00
16	1.33	0.10	0.026	0.447	0.024	0.00
17	1.42	0.10	0.026	0.445	0.024	0.00
18	1.50	0.10	0.026	0.444	0.024	0.00
19	1.58	0.10	0.026	0.442	0.024	0.00
20	1.67	0.10	0.026	0.440	0.024	0.00
21	1.75	0.10	0.026	0.438	0.024	0.00
22	1.83	0.13	0.035	0.437	0.032	0.00
23	1.92	0.13	0.035	0.435	0.032	0.00
24	2.00	0.13	0.035	0.433	0.032	0.00
25	2.08	0.13	0.035	0.431	0.032	0.00
26	2.17	0.13	0.035	0.430	0.032	0.00
27	2.25	0.13	0.035	0.428	0.032	0.00
28	2.33	0.13	0.035	0.426	0.032	0.00
29	2.42	0.13	0.035	0.424	0.032	0.00
30	2.50	0.13	0.035	0.423	0.032	0.00
31	2.58	0.17	0.044	0.421	0.040	0.00
32	2.67	0.17	0.044	0.419	0.040	0.00

33	2.75	0.17	0.044	0.417	0.040	0.00
34	2.83	0.17	0.044	0.416	0.040	0.00
35	2.92	0.17	0.044	0.414	0.040	0.00
36	3.00	0.17	0.044	0.412	0.040	0.00
37	3.08	0.17	0.044	0.411	0.040	0.00
38	3.17	0.17	0.044	0.409	0.040	0.00
39	3.25	0.17	0.044	0.407	0.040	0.00
40	3.33	0.17	0.044	0.405	0.040	0.00
41	3.42	0.17	0.044	0.404	0.040	0.00
42	3.50	0.17	0.044	0.402	0.040	0.00
43	3.58	0.17	0.044	0.400	0.040	0.00
44	3.67	0.17	0.044	0.399	0.040	0.00
45	3.75	0.17	0.044	0.397	0.040	0.00
46	3.83	0.20	0.053	0.395	0.048	0.01
47	3.92	0.20	0.053	0.394	0.048	0.01
48	4.00	0.20	0.053	0.392	0.048	0.01
49	4.08	0.20	0.053	0.390	0.048	0.01
50	4.17	0.20	0.053	0.389	0.048	0.01
51	4.25	0.20	0.053	0.387	0.048	0.01
52	4.33	0.23	0.062	0.385	0.055	0.01
53	4.42	0.23	0.062	0.384	0.055	0.01
54	4.50	0.23	0.062	0.382	0.055	0.01
55	4.58	0.23	0.062	0.381	0.055	0.01
56	4.67	0.23	0.062	0.379	0.055	0.01
57	4.75	0.23	0.062	0.377	0.055	0.01
58	4.83	0.27	0.070	0.376	0.063	0.01
59	4.92	0.27	0.070	0.374	0.063	0.01
60	5.00	0.27	0.070	0.372	0.063	0.01
61	5.08	0.20	0.053	0.371	0.048	0.01
62	5.17	0.20	0.053	0.369	0.048	0.01
63	5.25	0.20	0.053	0.368	0.048	0.01
64	5.33	0.23	0.062	0.366	0.055	0.01
65	5.42	0.23	0.062	0.364	0.055	0.01
66	5.50	0.23	0.062	0.363	0.055	0.01
67	5.58	0.27	0.070	0.361	0.063	0.01
68	5.67	0.27	0.070	0.360	0.063	0.01
69	5.75	0.27	0.070	0.358	0.063	0.01
70	5.83	0.27	0.070	0.356	0.063	0.01
71	5.92	0.27	0.070	0.355	0.063	0.01
72	6.00	0.27	0.070	0.353	0.063	0.01
73	6.08	0.30	0.079	0.352	0.071	0.01
74	6.17	0.30	0.079	0.350	0.071	0.01
75	6.25	0.30	0.079	0.349	0.071	0.01
76	6.33	0.30	0.079	0.347	0.071	0.01
77	6.42	0.30	0.079	0.345	0.071	0.01
78	6.50	0.30	0.079	0.344	0.071	0.01
79	6.58	0.33	0.088	0.342	0.079	0.01
80	6.67	0.33	0.088	0.341	0.079	0.01
81	6.75	0.33	0.088	0.339	0.079	0.01
82	6.83	0.33	0.088	0.338	0.079	0.01
83	6.92	0.33	0.088	0.336	0.079	0.01
84	7.00	0.33	0.088	0.335	0.079	0.01
85	7.08	0.33	0.088	0.333	0.079	0.01
86	7.17	0.33	0.088	0.332	0.079	0.01
87	7.25	0.33	0.088	0.330	0.079	0.01
88	7.33	0.37	0.097	0.329	0.087	0.01
89	7.42	0.37	0.097	0.327	0.087	0.01
90	7.50	0.37	0.097	0.326	0.087	0.01
91	7.58	0.40	0.106	0.324	0.095	0.01
92	7.67	0.40	0.106	0.323	0.095	0.01
93	7.75	0.40	0.106	0.321	0.095	0.01
94	7.83	0.43	0.114	0.320	0.103	0.01
95	7.92	0.43	0.114	0.318	0.103	0.01
96	8.00	0.43	0.114	0.317	0.103	0.01
97	8.08	0.50	0.132	0.315	0.119	0.01
98	8.17	0.50	0.132	0.314	0.119	0.01
99	8.25	0.50	0.132	0.312	0.119	0.01
100	8.33	0.50	0.132	0.311	0.119	0.01
101	8.42	0.50	0.132	0.309	0.119	0.01
102	8.50	0.50	0.132	0.308	0.119	0.01
103	8.58	0.53	0.141	0.306	0.127	0.01

104	8.67	0.53	0.141	0.305	0.127	0.01
105	8.75	0.53	0.141	0.304	0.127	0.01
106	8.83	0.57	0.150	0.302	0.135	0.01
107	8.92	0.57	0.150	0.301	0.135	0.01
108	9.00	0.57	0.150	0.299	0.135	0.01
109	9.08	0.63	0.167	0.298	0.150	0.02
110	9.17	0.63	0.167	0.296	0.150	0.02
111	9.25	0.63	0.167	0.295	0.150	0.02
112	9.33	0.67	0.176	0.294	0.158	0.02
113	9.42	0.67	0.176	0.292	0.158	0.02
114	9.50	0.67	0.176	0.291	0.158	0.02
115	9.58	0.70	0.185	0.289	0.166	0.02
116	9.67	0.70	0.185	0.288	0.166	0.02
117	9.75	0.70	0.185	0.287	0.166	0.02
118	9.83	0.73	0.194	0.285	0.174	0.02
119	9.92	0.73	0.194	0.284	0.174	0.02
120	10.00	0.73	0.194	0.283	0.174	0.02
121	10.08	0.50	0.132	0.281	0.119	0.01
122	10.17	0.50	0.132	0.280	0.119	0.01
123	10.25	0.50	0.132	0.278	0.119	0.01
124	10.33	0.50	0.132	0.277	0.119	0.01
125	10.42	0.50	0.132	0.276	0.119	0.01
126	10.50	0.50	0.132	0.274	0.119	0.01
127	10.58	0.67	0.176	0.273	0.158	0.02
128	10.67	0.67	0.176	0.272	0.158	0.02
129	10.75	0.67	0.176	0.270	0.158	0.02
130	10.83	0.67	0.176	0.269	0.158	0.02
131	10.92	0.67	0.176	0.268	0.158	0.02
132	11.00	0.67	0.176	0.266	0.158	0.02
133	11.08	0.63	0.167	0.265	0.150	0.02
134	11.17	0.63	0.167	0.264	0.150	0.02
135	11.25	0.63	0.167	0.263	0.150	0.02
136	11.33	0.63	0.167	0.261	0.150	0.02
137	11.42	0.63	0.167	0.260	0.150	0.02
138	11.50	0.63	0.167	0.259	0.150	0.02
139	11.58	0.57	0.150	0.257	0.135	0.01
140	11.67	0.57	0.150	0.256	0.135	0.01
141	11.75	0.57	0.150	0.255	0.135	0.01
142	11.83	0.60	0.158	0.254	0.143	0.02
143	11.92	0.60	0.158	0.252	0.143	0.02
144	12.00	0.60	0.158	0.251	0.143	0.02
145	12.08	0.83	0.220	0.250	0.198	0.02
146	12.17	0.83	0.220	0.249	0.198	0.02
147	12.25	0.83	0.220	0.247	0.198	0.02
148	12.33	0.87	0.229	0.246	0.206	0.02
149	12.42	0.87	0.229	0.245	0.206	0.02
150	12.50	0.87	0.229	0.244	0.206	0.02
151	12.58	0.93	0.246	0.242	---	0.00
152	12.67	0.93	0.246	0.241	---	0.01
153	12.75	0.93	0.246	0.240	---	0.01
154	12.83	0.97	0.255	0.239	---	0.02
155	12.92	0.97	0.255	0.238	---	0.02
156	13.00	0.97	0.255	0.236	---	0.02
157	13.08	1.13	0.299	0.235	---	0.06
158	13.17	1.13	0.299	0.234	---	0.07
159	13.25	1.13	0.299	0.233	---	0.07
160	13.33	1.13	0.299	0.232	---	0.07
161	13.42	1.13	0.299	0.230	---	0.07
162	13.50	1.13	0.299	0.229	---	0.07
163	13.58	0.77	0.202	0.228	0.182	0.02
164	13.67	0.77	0.202	0.227	0.182	0.02
165	13.75	0.77	0.202	0.226	0.182	0.02
166	13.83	0.77	0.202	0.225	0.182	0.02
167	13.92	0.77	0.202	0.223	0.182	0.02
168	14.00	0.77	0.202	0.222	0.182	0.02
169	14.08	0.90	0.238	0.221	---	0.02
170	14.17	0.90	0.238	0.220	---	0.02
171	14.25	0.90	0.238	0.219	---	0.02
172	14.33	0.87	0.229	0.218	---	0.01
173	14.42	0.87	0.229	0.217	---	0.01
174	14.50	0.87	0.229	0.216	---	0.01

175	14.58	0.87	0.229	0.214	---	0.01
176	14.67	0.87	0.229	0.213	---	0.02
177	14.75	0.87	0.229	0.212	---	0.02
178	14.83	0.83	0.220	0.211	---	0.01
179	14.92	0.83	0.220	0.210	---	0.01
180	15.00	0.83	0.220	0.209	---	0.01
181	15.08	0.80	0.211	0.208	---	0.00
182	15.17	0.80	0.211	0.207	---	0.00
183	15.25	0.80	0.211	0.206	---	0.01
184	15.33	0.77	0.202	0.205	0.182	0.02
185	15.42	0.77	0.202	0.204	0.182	0.02
186	15.50	0.77	0.202	0.203	0.182	0.02
187	15.58	0.63	0.167	0.202	0.150	0.02
188	15.67	0.63	0.167	0.201	0.150	0.02
189	15.75	0.63	0.167	0.200	0.150	0.02
190	15.83	0.63	0.167	0.199	0.150	0.02
191	15.92	0.63	0.167	0.198	0.150	0.02
192	16.00	0.63	0.167	0.197	0.150	0.02
193	16.08	0.13	0.035	0.196	0.032	0.00
194	16.17	0.13	0.035	0.195	0.032	0.00
195	16.25	0.13	0.035	0.194	0.032	0.00
196	16.33	0.13	0.035	0.193	0.032	0.00
197	16.42	0.13	0.035	0.192	0.032	0.00
198	16.50	0.13	0.035	0.191	0.032	0.00
199	16.58	0.10	0.026	0.190	0.024	0.00
200	16.67	0.10	0.026	0.189	0.024	0.00
201	16.75	0.10	0.026	0.188	0.024	0.00
202	16.83	0.10	0.026	0.187	0.024	0.00
203	16.92	0.10	0.026	0.186	0.024	0.00
204	17.00	0.10	0.026	0.185	0.024	0.00
205	17.08	0.17	0.044	0.184	0.040	0.00
206	17.17	0.17	0.044	0.183	0.040	0.00
207	17.25	0.17	0.044	0.182	0.040	0.00
208	17.33	0.17	0.044	0.181	0.040	0.00
209	17.42	0.17	0.044	0.180	0.040	0.00
210	17.50	0.17	0.044	0.179	0.040	0.00
211	17.58	0.17	0.044	0.178	0.040	0.00
212	17.67	0.17	0.044	0.178	0.040	0.00
213	17.75	0.17	0.044	0.177	0.040	0.00
214	17.83	0.13	0.035	0.176	0.032	0.00
215	17.92	0.13	0.035	0.175	0.032	0.00
216	18.00	0.13	0.035	0.174	0.032	0.00
217	18.08	0.13	0.035	0.173	0.032	0.00
218	18.17	0.13	0.035	0.172	0.032	0.00
219	18.25	0.13	0.035	0.172	0.032	0.00
220	18.33	0.13	0.035	0.171	0.032	0.00
221	18.42	0.13	0.035	0.170	0.032	0.00
222	18.50	0.13	0.035	0.169	0.032	0.00
223	18.58	0.10	0.026	0.168	0.024	0.00
224	18.67	0.10	0.026	0.167	0.024	0.00
225	18.75	0.10	0.026	0.167	0.024	0.00
226	18.83	0.07	0.018	0.166	0.016	0.00
227	18.92	0.07	0.018	0.165	0.016	0.00
228	19.00	0.07	0.018	0.164	0.016	0.00
229	19.08	0.10	0.026	0.163	0.024	0.00
230	19.17	0.10	0.026	0.163	0.024	0.00
231	19.25	0.10	0.026	0.162	0.024	0.00
232	19.33	0.13	0.035	0.161	0.032	0.00
233	19.42	0.13	0.035	0.160	0.032	0.00
234	19.50	0.13	0.035	0.160	0.032	0.00
235	19.58	0.10	0.026	0.159	0.024	0.00
236	19.67	0.10	0.026	0.158	0.024	0.00
237	19.75	0.10	0.026	0.157	0.024	0.00
238	19.83	0.07	0.018	0.157	0.016	0.00
239	19.92	0.07	0.018	0.156	0.016	0.00
240	20.00	0.07	0.018	0.155	0.016	0.00
241	20.08	0.10	0.026	0.155	0.024	0.00
242	20.17	0.10	0.026	0.154	0.024	0.00
243	20.25	0.10	0.026	0.153	0.024	0.00
244	20.33	0.10	0.026	0.153	0.024	0.00
245	20.42	0.10	0.026	0.152	0.024	0.00

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246  20.50     0.10      0.026         0.151     0.024         0.00
247  20.58     0.10      0.026         0.151     0.024         0.00
248  20.67     0.10      0.026         0.150     0.024         0.00
249  20.75     0.10      0.026         0.150     0.024         0.00
250  20.83     0.07      0.018         0.149     0.016         0.00
251  20.92     0.07      0.018         0.148     0.016         0.00
252  21.00     0.07      0.018         0.148     0.016         0.00
253  21.08     0.10      0.026         0.147     0.024         0.00
254  21.17     0.10      0.026         0.147     0.024         0.00
255  21.25     0.10      0.026         0.146     0.024         0.00
256  21.33     0.07      0.018         0.145     0.016         0.00
257  21.42     0.07      0.018         0.145     0.016         0.00
258  21.50     0.07      0.018         0.144     0.016         0.00
259  21.58     0.10      0.026         0.144     0.024         0.00
260  21.67     0.10      0.026         0.143     0.024         0.00
261  21.75     0.10      0.026         0.143     0.024         0.00
262  21.83     0.07      0.018         0.142     0.016         0.00
263  21.92     0.07      0.018         0.142     0.016         0.00
264  22.00     0.07      0.018         0.141     0.016         0.00
265  22.08     0.10      0.026         0.141     0.024         0.00
266  22.17     0.10      0.026         0.140     0.024         0.00
267  22.25     0.10      0.026         0.140     0.024         0.00
268  22.33     0.07      0.018         0.139     0.016         0.00
269  22.42     0.07      0.018         0.139     0.016         0.00
270  22.50     0.07      0.018         0.139     0.016         0.00
271  22.58     0.07      0.018         0.138     0.016         0.00
272  22.67     0.07      0.018         0.138     0.016         0.00
273  22.75     0.07      0.018         0.137     0.016         0.00
274  22.83     0.07      0.018         0.137     0.016         0.00
275  22.92     0.07      0.018         0.137     0.016         0.00
276  23.00     0.07      0.018         0.136     0.016         0.00
277  23.08     0.07      0.018         0.136     0.016         0.00
278  23.17     0.07      0.018         0.136     0.016         0.00
279  23.25     0.07      0.018         0.136     0.016         0.00
280  23.33     0.07      0.018         0.135     0.016         0.00
281  23.42     0.07      0.018         0.135     0.016         0.00
282  23.50     0.07      0.018         0.135     0.016         0.00
283  23.58     0.07      0.018         0.135     0.016         0.00
284  23.67     0.07      0.018         0.134     0.016         0.00
285  23.75     0.07      0.018         0.134     0.016         0.00
286  23.83     0.07      0.018         0.134     0.016         0.00
287  23.92     0.07      0.018         0.134     0.016         0.00
288  24.00     0.07      0.018         0.134     0.016         0.00
    Sum =     100.0                                 Sum =     2.6
      Flood volume = Effective rainfall      0.22(In)
       times area       7.5(Ac.)/[(In)/(Ft.)] =       0.1(Ac.Ft)
      Total soil loss =      1.98(In)
      Total soil loss =     1.238(Ac.Ft)
      Total rainfall =      2.20(In)
      Flood volume =        5947.1 Cubic Feet
      Total soil loss =       53947.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.444(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ------------------------------------------------------------------------
   0+ 5       0.0000      0.00  Q         |         |         |         |
   0+10       0.0000      0.00  Q         |         |         |         |
   0+15       0.0001      0.01  Q         |         |         |         |
   0+20       0.0001      0.01  Q         |         |         |         |
   0+25       0.0002      0.01  Q         |         |         |         |
   0+30       0.0003      0.01  Q         |         |         |         |
   0+35       0.0004      0.02  Q         |         |         |         |
   0+40       0.0006      0.02  Q         |         |         |         |
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0+45	0.0007	0.02	Q	|	|	|	|
0+50	0.0008	0.02	Q	|	|	|	|
0+55	0.0009	0.02	Q	|	|	|	|
1+ 0	0.0011	0.02	Q	|	|	|	|
1+ 5	0.0013	0.02	Q	|	|	|	|
1+10	0.0014	0.02	Q	|	|	|	|
1+15	0.0016	0.02	Q	|	|	|	|
1+20	0.0017	0.02	Q	|	|	|	|
1+25	0.0018	0.02	Q	|	|	|	|
1+30	0.0020	0.02	Q	|	|	|	|
1+35	0.0021	0.02	Q	|	|	|	|
1+40	0.0023	0.02	Q	|	|	|	|
1+45	0.0024	0.02	Q	|	|	|	|
1+50	0.0025	0.02	Q	|	|	|	|
1+55	0.0027	0.02	Q	|	|	|	|
2+ 0	0.0029	0.02	Q	|	|	|	|
2+ 5	0.0030	0.02	Q	|	|	|	|
2+10	0.0032	0.03	Q	|	|	|	|
2+15	0.0034	0.03	Q	|	|	|	|
2+20	0.0036	0.03	QV	|	|	|	|
2+25	0.0037	0.03	QV	|	|	|	|
2+30	0.0039	0.03	QV	|	|	|	|
2+35	0.0041	0.03	QV	|	|	|	|
2+40	0.0043	0.03	QV	|	|	|	|
2+45	0.0045	0.03	QV	|	|	|	|
2+50	0.0047	0.03	QV	|	|	|	|
2+55	0.0049	0.03	QV	|	|	|	|
3+ 0	0.0052	0.03	QV	|	|	|	|
3+ 5	0.0054	0.03	QV	|	|	|	|
3+10	0.0056	0.03	QV	|	|	|	|
3+15	0.0058	0.03	QV	|	|	|	|
3+20	0.0061	0.03	QV	|	|	|	|
3+25	0.0063	0.03	QV	|	|	|	|
3+30	0.0065	0.03	QV	|	|	|	|
3+35	0.0067	0.03	QV	|	|	|	|
3+40	0.0070	0.03	Q V	|	|	|	|
3+45	0.0072	0.03	Q V	|	|	|	|
3+50	0.0074	0.03	Q V	|	|	|	|
3+55	0.0077	0.03	Q V	|	|	|	|
4+ 0	0.0079	0.04	Q V	|	|	|	|
4+ 5	0.0082	0.04	Q V	|	|	|	|
4+10	0.0084	0.04	Q V	|	|	|	|
4+15	0.0087	0.04	Q V	|	|	|	|
4+20	0.0090	0.04	Q V	|	|	|	|
4+25	0.0093	0.04	Q V	|	|	|	|
4+30	0.0096	0.04	Q V	|	|	|	|
4+35	0.0099	0.04	Q V	|	|	|	|
4+40	0.0102	0.04	Q V	|	|	|	|
4+45	0.0105	0.05	Q V	|	|	|	|
4+50	0.0108	0.05	Q V	|	|	|	|
4+55	0.0111	0.05	Q V	|	|	|	|
5+ 0	0.0115	0.05	Q V	|	|	|	|
5+ 5	0.0118	0.05	Q V	|	|	|	|
5+10	0.0121	0.05	Q V	|	|	|	|
5+15	0.0124	0.04	Q V	|	|	|	|
5+20	0.0127	0.04	Q V	|	|	|	|
5+25	0.0130	0.04	Q V	|	|	|	|
5+30	0.0134	0.05	Q V	|	|	|	|
5+35	0.0137	0.05	Q V	|	|	|	|
5+40	0.0140	0.05	Q V	|	|	|	|
5+45	0.0143	0.05	Q V	|	|	|	|
5+50	0.0147	0.05	Q V	|	|	|	|
5+55	0.0151	0.05	Q V	|	|	|	|
6+ 0	0.0154	0.05	Q V	|	|	|	|
6+ 5	0.0158	0.05	Q V	|	|	|	|
6+10	0.0161	0.05	Q V	|	|	|	|
6+15	0.0165	0.06	Q V	|	|	|	|
6+20	0.0169	0.06	Q V	|	|	|	|
6+25	0.0173	0.06	Q V	|	|	|	|
6+30	0.0177	0.06	Q V	|	|	|	|
6+35	0.0181	0.06	Q V	|	|	|	|

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 6+40       0.0186      0.06  Q    V    |          |          |          |
 6+45       0.0190      0.06  Q    V    |          |          |          |
 6+50       0.0194      0.06  Q    V    |          |          |          |
 6+55       0.0199      0.06  Q    V    |          |          |          |
 7+ 0       0.0203      0.07  Q    V    |          |          |          |
 7+ 5       0.0208      0.07  Q     V   |          |          |          |
 7+10       0.0212      0.07  Q     V   |          |          |          |
 7+15       0.0217      0.07  Q     V   |          |          |          |
 7+20       0.0221      0.07  Q     V   |          |          |          |
 7+25       0.0226      0.07  Q     V   |          |          |          |
 7+30       0.0231      0.07  Q     V   |          |          |          |
 7+35       0.0236      0.07  Q     V   |          |          |          |
 7+40       0.0241      0.07  Q      V  |          |          |          |
 7+45       0.0246      0.08  Q      V  |          |          |          |
 7+50       0.0251      0.08  Q      V  |          |          |          |
 7+55       0.0257      0.08  Q      V  |          |          |          |
 8+ 0       0.0262      0.08  Q      V  |          |          |          |
 8+ 5       0.0268      0.08  Q      V  |          |          |          |
 8+10       0.0274      0.09  Q       V |          |          |          |
 8+15       0.0281      0.09  Q       V |          |          |          |
 8+20       0.0287      0.09  Q       V |          |          |          |
 8+25       0.0294      0.10  Q       V |          |          |          |
 8+30       0.0300      0.10  Q       V |          |          |          |
 8+35       0.0307      0.10  Q       V |          |          |          |
 8+40       0.0314      0.10  Q        V|          |          |          |
 8+45       0.0321      0.10  Q        V|          |          |          |
 8+50       0.0328      0.10  Q        V|          |          |          |
 8+55       0.0335      0.11  Q        V|          |          |          |
 9+ 0       0.0343      0.11  Q         V          |          |          |
 9+ 5       0.0350      0.11  Q         V          |          |          |
 9+10       0.0358      0.11  Q         V          |          |          |
 9+15       0.0366      0.12  Q         V          |          |          |
 9+20       0.0375      0.12  Q         V          |          |          |
 9+25       0.0383      0.12  Q         |V         |          |          |
 9+30       0.0392      0.13  Q         |V         |          |          |
 9+35       0.0401      0.13  Q         |V         |          |          |
 9+40       0.0410      0.13  Q         | V        |          |          |
 9+45       0.0419      0.13  Q         | V        |          |          |
 9+50       0.0428      0.14  Q         | V        |          |          |
 9+55       0.0438      0.14  Q         | V        |          |          |
10+ 0       0.0448      0.14  Q         |  V       |          |          |
10+ 5       0.0457      0.14  Q         |  V       |          |          |
10+10       0.0466      0.13  Q         |  V       |          |          |
10+15       0.0475      0.12  Q         |  V       |          |          |
10+20       0.0482      0.11  Q         |   V      |          |          |
10+25       0.0490      0.11  Q         |   V      |          |          |
10+30       0.0497      0.11  Q         |   V      |          |          |
10+35       0.0505      0.11  Q         |   V      |          |          |
10+40       0.0512      0.11  Q         |    V     |          |          |
10+45       0.0521      0.12  Q         |    V     |          |          |
10+50       0.0529      0.13  Q         |    V     |          |          |
10+55       0.0538      0.13  Q         |    V     |          |          |
11+ 0       0.0547      0.13  Q         |     V    |          |          |
11+ 5       0.0556      0.13  Q         |     V    |          |          |
11+10       0.0565      0.13  Q         |     V    |          |          |
11+15       0.0574      0.13  Q         |     V    |          |          |
11+20       0.0582      0.13  Q         |      V   |          |          |
11+25       0.0591      0.13  Q         |      V   |          |          |
11+30       0.0600      0.13  Q         |      V   |          |          |
11+35       0.0608      0.13  Q         |      V   |          |          |
11+40       0.0617      0.12  Q         |       V  |          |          |
11+45       0.0625      0.12  Q         |       V  |          |          |
11+50       0.0633      0.12  Q         |       V  |          |          |
11+55       0.0641      0.12  Q         |       V  |          |          |
12+ 0       0.0650      0.12  Q         |        V |          |          |
12+ 5       0.0658      0.12  Q         |        V |          |          |
12+10       0.0667      0.13  Q         |        V |          |          |
12+15       0.0677      0.15  Q         |        V |          |          |
12+20       0.0688      0.15  Q         |         V          |          |
12+25       0.0698      0.16  Q         |         V          |          |
12+30       0.0710      0.16  Q         |         V          |          |
```

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12+35       0.0720      0.16  Q         |         |V        |         |
12+40       0.0729      0.13  Q         |         |V        |         |
12+45       0.0736      0.09  Q         |         |V        |         |
12+50       0.0741      0.08  Q         |         |V        |         |
12+55       0.0748      0.09  Q         |         |V        |         |
13+ 0       0.0755      0.11  Q         |         | V       |         |
13+ 5       0.0765      0.14  Q         |         | V       |         |
13+10       0.0780      0.22  Q         |         | V       |         |
13+15       0.0802      0.32  |Q        |         |  V      |         |
13+20       0.0828      0.38  |Q        |         |   V     |         |
13+25       0.0857      0.42  |Q        |         |    V    |         |
13+30       0.0888      0.44  |Q        |         |     V   |         |
13+35       0.0918      0.44  |Q        |         |     V   |         |
13+40       0.0944      0.38  |Q        |         |      V  |         |
13+45       0.0964      0.29  |Q        |         |       V |         |
13+50       0.0980      0.23  Q         |         |       V |         |
13+55       0.0995      0.21  Q         |         |        V|         |
14+ 0       0.1008      0.20  Q         |         |        V|         |
14+ 5       0.1021      0.19  Q         |         |        V|         |
14+10       0.1033      0.18  Q         |         |         V         |
14+15       0.1045      0.16  Q         |         |         V         |
14+20       0.1056      0.16  Q         |         |         V         |
14+25       0.1065      0.14  Q         |         |         |V        |
14+30       0.1074      0.13  Q         |         |         |V        |
14+35       0.1082      0.12  Q         |         |         |V        |
14+40       0.1091      0.12  Q         |         |         |V        |
14+45       0.1099      0.12  Q         |         |         | V       |
14+50       0.1107      0.12  Q         |         |         | V       |
14+55       0.1114      0.11  Q         |         |         | V       |
15+ 0       0.1121      0.09  Q         |         |         | V       |
15+ 5       0.1127      0.09  Q         |         |         |  V      |
15+10       0.1132      0.07  Q         |         |         |  V      |
15+15       0.1136      0.06  Q         |         |         |  V      |
15+20       0.1140      0.06  Q         |         |         |  V      |
15+25       0.1145      0.08  Q         |         |         |  V      |
15+30       0.1153      0.11  Q         |         |         |  V      |
15+35       0.1162      0.12  Q         |         |         |   V     |
15+40       0.1170      0.13  Q         |         |         |   V     |
15+45       0.1179      0.12  Q         |         |         |   V     |
15+50       0.1187      0.12  Q         |         |         |   V     |
15+55       0.1196      0.12  Q         |         |         |    V    |
16+ 0       0.1204      0.12  Q         |         |         |    V    |
16+ 5       0.1212      0.12  Q         |         |         |    V    |
16+10       0.1219      0.10  Q         |         |         |    V    |
16+15       0.1224      0.07  Q         |         |         |    V    |
16+20       0.1228      0.06  Q         |         |         |    V    |
16+25       0.1231      0.05  Q         |         |         |     V   |
16+30       0.1234      0.04  Q         |         |         |     V   |
16+35       0.1237      0.04  Q         |         |         |     V   |
16+40       0.1239      0.04  Q         |         |         |     V   |
16+45       0.1241      0.03  Q         |         |         |     V   |
16+50       0.1243      0.03  Q         |         |         |     V   |
16+55       0.1245      0.03  Q         |         |         |     V   |
17+ 0       0.1247      0.03  Q         |         |         |     V   |
17+ 5       0.1249      0.02  Q         |         |         |     V   |
17+10       0.1250      0.03  Q         |         |         |     V   |
17+15       0.1252      0.03  Q         |         |         |     V   |
17+20       0.1255      0.03  Q         |         |         |     V   |
17+25       0.1257      0.03  Q         |         |         |     V   |
17+30       0.1259      0.03  Q         |         |         |     V   |
17+35       0.1261      0.03  Q         |         |         |     V   |
17+40       0.1263      0.03  Q         |         |         |      V  |
17+45       0.1266      0.03  Q         |         |         |      V  |
17+50       0.1268      0.03  Q         |         |         |      V  |
17+55       0.1270      0.03  Q         |         |         |      V  |
18+ 0       0.1272      0.03  Q         |         |         |      V  |
18+ 5       0.1274      0.03  Q         |         |         |      V  |
18+10       0.1276      0.03  Q         |         |         |      V  |
18+15       0.1278      0.03  Q         |         |         |      V  |
18+20       0.1279      0.03  Q         |         |         |      V  |
18+25       0.1281      0.03  Q         |         |         |      V  |
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18+30	0.1283	0.03	Q	|	|	|	V |
18+35	0.1285	0.03	Q	|	|	|	V |
18+40	0.1287	0.03	Q	|	|	|	V |
18+45	0.1288	0.02	Q	|	|	|	V |
18+50	0.1290	0.02	Q	|	|	|	V |
18+55	0.1291	0.02	Q	|	|	|	V |
19+ 0	0.1293	0.02	Q	|	|	|	V |
19+ 5	0.1294	0.02	Q	|	|	|	V |
19+10	0.1295	0.02	Q	|	|	|	V |
19+15	0.1296	0.02	Q	|	|	|	V |
19+20	0.1297	0.02	Q	|	|	|	V |
19+25	0.1299	0.02	Q	|	|	|	V |
19+30	0.1301	0.02	Q	|	|	|	V |
19+35	0.1302	0.02	Q	|	|	|	V |
19+40	0.1304	0.02	Q	|	|	|	V |
19+45	0.1305	0.02	Q	|	|	|	V |
19+50	0.1307	0.02	Q	|	|	|	V |
19+55	0.1308	0.02	Q	|	|	|	V |
20+ 0	0.1309	0.02	Q	|	|	|	V |
20+ 5	0.1310	0.02	Q	|	|	|	V |
20+10	0.1311	0.02	Q	|	|	|	V |
20+15	0.1313	0.02	Q	|	|	|	V |
20+20	0.1314	0.02	Q	|	|	|	V |
20+25	0.1315	0.02	Q	|	|	|	V |
20+30	0.1317	0.02	Q	|	|	|	V |
20+35	0.1318	0.02	Q	|	|	|	V |
20+40	0.1319	0.02	Q	|	|	|	V |
20+45	0.1321	0.02	Q	|	|	|	V |
20+50	0.1322	0.02	Q	|	|	|	V |
20+55	0.1323	0.02	Q	|	|	|	V |
21+ 0	0.1324	0.02	Q	|	|	|	V |
21+ 5	0.1326	0.02	Q	|	|	|	V |
21+10	0.1327	0.02	Q	|	|	|	V |
21+15	0.1328	0.02	Q	|	|	|	V |
21+20	0.1329	0.02	Q	|	|	|	V |
21+25	0.1330	0.02	Q	|	|	|	V |
21+30	0.1331	0.02	Q	|	|	|	V|
21+35	0.1332	0.02	Q	|	|	|	V|
21+40	0.1334	0.02	Q	|	|	|	V|
21+45	0.1335	0.02	Q	|	|	|	V|
21+50	0.1336	0.02	Q	|	|	|	V|
21+55	0.1337	0.02	Q	|	|	|	V|
22+ 0	0.1338	0.02	Q	|	|	|	V|
22+ 5	0.1339	0.02	Q	|	|	|	V|
22+10	0.1340	0.02	Q	|	|	|	V|
22+15	0.1342	0.02	Q	|	|	|	V|
22+20	0.1343	0.02	Q	|	|	|	V|
22+25	0.1344	0.02	Q	|	|	|	V|
22+30	0.1345	0.02	Q	|	|	|	V|
22+35	0.1346	0.01	Q	|	|	|	V|
22+40	0.1347	0.01	Q	|	|	|	V|
22+45	0.1348	0.01	Q	|	|	|	V|
22+50	0.1349	0.01	Q	|	|	|	V|
22+55	0.1350	0.01	Q	|	|	|	V|
23+ 0	0.1351	0.01	Q	|	|	|	V|
23+ 5	0.1352	0.01	Q	|	|	|	V|
23+10	0.1353	0.01	Q	|	|	|	V|
23+15	0.1354	0.01	Q	|	|	|	V|
23+20	0.1355	0.01	Q	|	|	|	V|
23+25	0.1356	0.01	Q	|	|	|	V|
23+30	0.1357	0.01	Q	|	|	|	V|
23+35	0.1358	0.01	Q	|	|	|	V|
23+40	0.1358	0.01	Q	|	|	|	V|
23+45	0.1359	0.01	Q	|	|	|	V|
23+50	0.1360	0.01	Q	|	|	|	V|
23+55	0.1361	0.01	Q	|	|	|	V|
24+ 0	0.1362	0.01	Q	|	|	|	V|
24+ 5	0.1363	0.01	Q	|	|	|	V|
24+10	0.1364	0.01	Q	|	|	|	V|
24+15	0.1364	0.01	Q	|	|	|	V|
24+20	0.1364	0.00	Q	|	|	|	V|

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   24+25       0.1365      0.00  Q         |         |         |         V|
   24+30       0.1365      0.00  Q         |         |         |         V|
   24+35       0.1365      0.00  Q         |         |         |         V|
   24+40       0.1365      0.00  Q         |         |         |         V|
   24+45       0.1365      0.00  Q         |         |         |         V|
   24+50       0.1365      0.00  Q         |         |         |         V|
   24+55       0.1365      0.00  Q         |         |         |         V|
   25+ 0       0.1365      0.00  Q         |         |         |         V|
   25+ 5       0.1365      0.00  Q         |         |         |         V|
   25+10       0.1365      0.00  Q         |         |         |         V|
   25+15       0.1365      0.00  Q         |         |         |         V|
   25+20       0.1365      0.00  Q         |         |         |         V|
   25+25       0.1365      0.00  Q         |         |         |         V|
   25+30       0.1365      0.00  Q         |         |         |         V|
-------------------------------------------------------------------------
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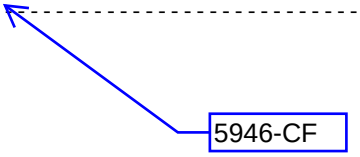

UNIT HYDROGRAPH ANALYSIS-2YR, 24 HR DURATION STORM EVENT -DMA-2 (PH-2) PREDEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Study date 10/14/20 File: UH2EX242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 5028

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RIVERSIDE TEMPLE-PH2
UH 2-YR STORM EVENT
àS
PRE-DEVELOPED CONDITION

Drainage Area = 8.50(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.50(Ac.) = 0.013 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.210 Hr.
Lag time = 12.60 Min.
25% of lag time = 3.15 Min.
40% of lag time = 5.04 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.50	2.20	18.70

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.50	5.50	46.75

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.200(In)
Area Averaged 100-Year Rainfall = 5.500(In)

Point rain (area averaged) = 2.200(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.500	78.00	0.000

Total Area Entered = 8.50(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
78.0	78.0	0.268	0.000	0.268	1.000	0.268
					Sum (F) =	0.268

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	39.683	4.304	0.369
2	0.167	79.365	17.638	1.511
3	0.250	119.048	26.578	2.277
4	0.333	158.730	17.602	1.508
5	0.417	198.413	8.615	0.738
6	0.500	238.095	5.409	0.463
7	0.583	277.778	4.029	0.345
8	0.667	317.460	3.107	0.266
9	0.750	357.143	2.445	0.209
10	0.833	396.825	1.959	0.168
11	0.917	436.508	1.545	0.132
12	1.000	476.190	1.254	0.107
13	1.083	515.873	1.170	0.100
14	1.167	555.556	0.929	0.080
15	1.250	595.238	0.773	0.066
16	1.333	634.921	0.653	0.056
17	1.417	674.603	0.526	0.045
18	1.500	714.286	0.408	0.035
19	1.583	753.968	0.397	0.034
20	1.667	793.651	0.397	0.034
21	1.750	833.333	0.262	0.022
		Sum = 100.000	Sum=	8.566

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.474	0.016	0.00
2	0.17	0.07	0.018	0.473	0.016	0.00
3	0.25	0.07	0.018	0.471	0.016	0.00
4	0.33	0.10	0.026	0.469	0.024	0.00
5	0.42	0.10	0.026	0.467	0.024	0.00
6	0.50	0.10	0.026	0.465	0.024	0.00
7	0.58	0.10	0.026	0.463	0.024	0.00
8	0.67	0.10	0.026	0.462	0.024	0.00
9	0.75	0.10	0.026	0.460	0.024	0.00
10	0.83	0.13	0.035	0.458	0.032	0.00
11	0.92	0.13	0.035	0.456	0.032	0.00
12	1.00	0.13	0.035	0.454	0.032	0.00
13	1.08	0.10	0.026	0.453	0.024	0.00
14	1.17	0.10	0.026	0.451	0.024	0.00
15	1.25	0.10	0.026	0.449	0.024	0.00
16	1.33	0.10	0.026	0.447	0.024	0.00
17	1.42	0.10	0.026	0.445	0.024	0.00
18	1.50	0.10	0.026	0.444	0.024	0.00
19	1.58	0.10	0.026	0.442	0.024	0.00
20	1.67	0.10	0.026	0.440	0.024	0.00
21	1.75	0.10	0.026	0.438	0.024	0.00
22	1.83	0.13	0.035	0.437	0.032	0.00
23	1.92	0.13	0.035	0.435	0.032	0.00
24	2.00	0.13	0.035	0.433	0.032	0.00
25	2.08	0.13	0.035	0.431	0.032	0.00
26	2.17	0.13	0.035	0.430	0.032	0.00
27	2.25	0.13	0.035	0.428	0.032	0.00
28	2.33	0.13	0.035	0.426	0.032	0.00
29	2.42	0.13	0.035	0.424	0.032	0.00
30	2.50	0.13	0.035	0.423	0.032	0.00

31	2.58	0.17	0.044	0.421	0.040	0.00
32	2.67	0.17	0.044	0.419	0.040	0.00
33	2.75	0.17	0.044	0.417	0.040	0.00
34	2.83	0.17	0.044	0.416	0.040	0.00
35	2.92	0.17	0.044	0.414	0.040	0.00
36	3.00	0.17	0.044	0.412	0.040	0.00
37	3.08	0.17	0.044	0.411	0.040	0.00
38	3.17	0.17	0.044	0.409	0.040	0.00
39	3.25	0.17	0.044	0.407	0.040	0.00
40	3.33	0.17	0.044	0.405	0.040	0.00
41	3.42	0.17	0.044	0.404	0.040	0.00
42	3.50	0.17	0.044	0.402	0.040	0.00
43	3.58	0.17	0.044	0.400	0.040	0.00
44	3.67	0.17	0.044	0.399	0.040	0.00
45	3.75	0.17	0.044	0.397	0.040	0.00
46	3.83	0.20	0.053	0.395	0.048	0.01
47	3.92	0.20	0.053	0.394	0.048	0.01
48	4.00	0.20	0.053	0.392	0.048	0.01
49	4.08	0.20	0.053	0.390	0.048	0.01
50	4.17	0.20	0.053	0.389	0.048	0.01
51	4.25	0.20	0.053	0.387	0.048	0.01
52	4.33	0.23	0.062	0.385	0.055	0.01
53	4.42	0.23	0.062	0.384	0.055	0.01
54	4.50	0.23	0.062	0.382	0.055	0.01
55	4.58	0.23	0.062	0.381	0.055	0.01
56	4.67	0.23	0.062	0.379	0.055	0.01
57	4.75	0.23	0.062	0.377	0.055	0.01
58	4.83	0.27	0.070	0.376	0.063	0.01
59	4.92	0.27	0.070	0.374	0.063	0.01
60	5.00	0.27	0.070	0.372	0.063	0.01
61	5.08	0.20	0.053	0.371	0.048	0.01
62	5.17	0.20	0.053	0.369	0.048	0.01
63	5.25	0.20	0.053	0.368	0.048	0.01
64	5.33	0.23	0.062	0.366	0.055	0.01
65	5.42	0.23	0.062	0.364	0.055	0.01
66	5.50	0.23	0.062	0.363	0.055	0.01
67	5.58	0.27	0.070	0.361	0.063	0.01
68	5.67	0.27	0.070	0.360	0.063	0.01
69	5.75	0.27	0.070	0.358	0.063	0.01
70	5.83	0.27	0.070	0.356	0.063	0.01
71	5.92	0.27	0.070	0.355	0.063	0.01
72	6.00	0.27	0.070	0.353	0.063	0.01
73	6.08	0.30	0.079	0.352	0.071	0.01
74	6.17	0.30	0.079	0.350	0.071	0.01
75	6.25	0.30	0.079	0.349	0.071	0.01
76	6.33	0.30	0.079	0.347	0.071	0.01
77	6.42	0.30	0.079	0.345	0.071	0.01
78	6.50	0.30	0.079	0.344	0.071	0.01
79	6.58	0.33	0.088	0.342	0.079	0.01
80	6.67	0.33	0.088	0.341	0.079	0.01
81	6.75	0.33	0.088	0.339	0.079	0.01
82	6.83	0.33	0.088	0.338	0.079	0.01
83	6.92	0.33	0.088	0.336	0.079	0.01
84	7.00	0.33	0.088	0.335	0.079	0.01
85	7.08	0.33	0.088	0.333	0.079	0.01
86	7.17	0.33	0.088	0.332	0.079	0.01
87	7.25	0.33	0.088	0.330	0.079	0.01
88	7.33	0.37	0.097	0.329	0.087	0.01
89	7.42	0.37	0.097	0.327	0.087	0.01
90	7.50	0.37	0.097	0.326	0.087	0.01
91	7.58	0.40	0.106	0.324	0.095	0.01
92	7.67	0.40	0.106	0.323	0.095	0.01
93	7.75	0.40	0.106	0.321	0.095	0.01
94	7.83	0.43	0.114	0.320	0.103	0.01
95	7.92	0.43	0.114	0.318	0.103	0.01
96	8.00	0.43	0.114	0.317	0.103	0.01
97	8.08	0.50	0.132	0.315	0.119	0.01
98	8.17	0.50	0.132	0.314	0.119	0.01
99	8.25	0.50	0.132	0.312	0.119	0.01
100	8.33	0.50	0.132	0.311	0.119	0.01
101	8.42	0.50	0.132	0.309	0.119	0.01

102	8.50	0.50	0.132	0.308	0.119	0.01
103	8.58	0.53	0.141	0.306	0.127	0.01
104	8.67	0.53	0.141	0.305	0.127	0.01
105	8.75	0.53	0.141	0.304	0.127	0.01
106	8.83	0.57	0.150	0.302	0.135	0.01
107	8.92	0.57	0.150	0.301	0.135	0.01
108	9.00	0.57	0.150	0.299	0.135	0.01
109	9.08	0.63	0.167	0.298	0.150	0.02
110	9.17	0.63	0.167	0.296	0.150	0.02
111	9.25	0.63	0.167	0.295	0.150	0.02
112	9.33	0.67	0.176	0.294	0.158	0.02
113	9.42	0.67	0.176	0.292	0.158	0.02
114	9.50	0.67	0.176	0.291	0.158	0.02
115	9.58	0.70	0.185	0.289	0.166	0.02
116	9.67	0.70	0.185	0.288	0.166	0.02
117	9.75	0.70	0.185	0.287	0.166	0.02
118	9.83	0.73	0.194	0.285	0.174	0.02
119	9.92	0.73	0.194	0.284	0.174	0.02
120	10.00	0.73	0.194	0.283	0.174	0.02
121	10.08	0.50	0.132	0.281	0.119	0.01
122	10.17	0.50	0.132	0.280	0.119	0.01
123	10.25	0.50	0.132	0.278	0.119	0.01
124	10.33	0.50	0.132	0.277	0.119	0.01
125	10.42	0.50	0.132	0.276	0.119	0.01
126	10.50	0.50	0.132	0.274	0.119	0.01
127	10.58	0.67	0.176	0.273	0.158	0.02
128	10.67	0.67	0.176	0.272	0.158	0.02
129	10.75	0.67	0.176	0.270	0.158	0.02
130	10.83	0.67	0.176	0.269	0.158	0.02
131	10.92	0.67	0.176	0.268	0.158	0.02
132	11.00	0.67	0.176	0.266	0.158	0.02
133	11.08	0.63	0.167	0.265	0.150	0.02
134	11.17	0.63	0.167	0.264	0.150	0.02
135	11.25	0.63	0.167	0.263	0.150	0.02
136	11.33	0.63	0.167	0.261	0.150	0.02
137	11.42	0.63	0.167	0.260	0.150	0.02
138	11.50	0.63	0.167	0.259	0.150	0.02
139	11.58	0.57	0.150	0.257	0.135	0.01
140	11.67	0.57	0.150	0.256	0.135	0.01
141	11.75	0.57	0.150	0.255	0.135	0.01
142	11.83	0.60	0.158	0.254	0.143	0.02
143	11.92	0.60	0.158	0.252	0.143	0.02
144	12.00	0.60	0.158	0.251	0.143	0.02
145	12.08	0.83	0.220	0.250	0.198	0.02
146	12.17	0.83	0.220	0.249	0.198	0.02
147	12.25	0.83	0.220	0.247	0.198	0.02
148	12.33	0.87	0.229	0.246	0.206	0.02
149	12.42	0.87	0.229	0.245	0.206	0.02
150	12.50	0.87	0.229	0.244	0.206	0.02
151	12.58	0.93	0.246	0.242	---	0.00
152	12.67	0.93	0.246	0.241	---	0.01
153	12.75	0.93	0.246	0.240	---	0.01
154	12.83	0.97	0.255	0.239	---	0.02
155	12.92	0.97	0.255	0.238	---	0.02
156	13.00	0.97	0.255	0.236	---	0.02
157	13.08	1.13	0.299	0.235	---	0.06
158	13.17	1.13	0.299	0.234	---	0.07
159	13.25	1.13	0.299	0.233	---	0.07
160	13.33	1.13	0.299	0.232	---	0.07
161	13.42	1.13	0.299	0.230	---	0.07
162	13.50	1.13	0.299	0.229	---	0.07
163	13.58	0.77	0.202	0.228	0.182	0.02
164	13.67	0.77	0.202	0.227	0.182	0.02
165	13.75	0.77	0.202	0.226	0.182	0.02
166	13.83	0.77	0.202	0.225	0.182	0.02
167	13.92	0.77	0.202	0.223	0.182	0.02
168	14.00	0.77	0.202	0.222	0.182	0.02
169	14.08	0.90	0.238	0.221	---	0.02
170	14.17	0.90	0.238	0.220	---	0.02
171	14.25	0.90	0.238	0.219	---	0.02
172	14.33	0.87	0.229	0.218	---	0.01

173	14.42	0.87	0.229	0.217	---	0.01
174	14.50	0.87	0.229	0.216	---	0.01
175	14.58	0.87	0.229	0.214	---	0.01
176	14.67	0.87	0.229	0.213	---	0.02
177	14.75	0.87	0.229	0.212	---	0.02
178	14.83	0.83	0.220	0.211	---	0.01
179	14.92	0.83	0.220	0.210	---	0.01
180	15.00	0.83	0.220	0.209	---	0.01
181	15.08	0.80	0.211	0.208	---	0.00
182	15.17	0.80	0.211	0.207	---	0.00
183	15.25	0.80	0.211	0.206	---	0.01
184	15.33	0.77	0.202	0.205	0.182	0.02
185	15.42	0.77	0.202	0.204	0.182	0.02
186	15.50	0.77	0.202	0.203	0.182	0.02
187	15.58	0.63	0.167	0.202	0.150	0.02
188	15.67	0.63	0.167	0.201	0.150	0.02
189	15.75	0.63	0.167	0.200	0.150	0.02
190	15.83	0.63	0.167	0.199	0.150	0.02
191	15.92	0.63	0.167	0.198	0.150	0.02
192	16.00	0.63	0.167	0.197	0.150	0.02
193	16.08	0.13	0.035	0.196	0.032	0.00
194	16.17	0.13	0.035	0.195	0.032	0.00
195	16.25	0.13	0.035	0.194	0.032	0.00
196	16.33	0.13	0.035	0.193	0.032	0.00
197	16.42	0.13	0.035	0.192	0.032	0.00
198	16.50	0.13	0.035	0.191	0.032	0.00
199	16.58	0.10	0.026	0.190	0.024	0.00
200	16.67	0.10	0.026	0.189	0.024	0.00
201	16.75	0.10	0.026	0.188	0.024	0.00
202	16.83	0.10	0.026	0.187	0.024	0.00
203	16.92	0.10	0.026	0.186	0.024	0.00
204	17.00	0.10	0.026	0.185	0.024	0.00
205	17.08	0.17	0.044	0.184	0.040	0.00
206	17.17	0.17	0.044	0.183	0.040	0.00
207	17.25	0.17	0.044	0.182	0.040	0.00
208	17.33	0.17	0.044	0.181	0.040	0.00
209	17.42	0.17	0.044	0.180	0.040	0.00
210	17.50	0.17	0.044	0.179	0.040	0.00
211	17.58	0.17	0.044	0.178	0.040	0.00
212	17.67	0.17	0.044	0.178	0.040	0.00
213	17.75	0.17	0.044	0.177	0.040	0.00
214	17.83	0.13	0.035	0.176	0.032	0.00
215	17.92	0.13	0.035	0.175	0.032	0.00
216	18.00	0.13	0.035	0.174	0.032	0.00
217	18.08	0.13	0.035	0.173	0.032	0.00
218	18.17	0.13	0.035	0.172	0.032	0.00
219	18.25	0.13	0.035	0.172	0.032	0.00
220	18.33	0.13	0.035	0.171	0.032	0.00
221	18.42	0.13	0.035	0.170	0.032	0.00
222	18.50	0.13	0.035	0.169	0.032	0.00
223	18.58	0.10	0.026	0.168	0.024	0.00
224	18.67	0.10	0.026	0.167	0.024	0.00
225	18.75	0.10	0.026	0.167	0.024	0.00
226	18.83	0.07	0.018	0.166	0.016	0.00
227	18.92	0.07	0.018	0.165	0.016	0.00
228	19.00	0.07	0.018	0.164	0.016	0.00
229	19.08	0.10	0.026	0.163	0.024	0.00
230	19.17	0.10	0.026	0.163	0.024	0.00
231	19.25	0.10	0.026	0.162	0.024	0.00
232	19.33	0.13	0.035	0.161	0.032	0.00
233	19.42	0.13	0.035	0.160	0.032	0.00
234	19.50	0.13	0.035	0.160	0.032	0.00
235	19.58	0.10	0.026	0.159	0.024	0.00
236	19.67	0.10	0.026	0.158	0.024	0.00
237	19.75	0.10	0.026	0.157	0.024	0.00
238	19.83	0.07	0.018	0.157	0.016	0.00
239	19.92	0.07	0.018	0.156	0.016	0.00
240	20.00	0.07	0.018	0.155	0.016	0.00
241	20.08	0.10	0.026	0.155	0.024	0.00
242	20.17	0.10	0.026	0.154	0.024	0.00
243	20.25	0.10	0.026	0.153	0.024	0.00

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244  20.33     0.10      0.026         0.153     0.024         0.00
245  20.42     0.10      0.026         0.152     0.024         0.00
246  20.50     0.10      0.026         0.151     0.024         0.00
247  20.58     0.10      0.026         0.151     0.024         0.00
248  20.67     0.10      0.026         0.150     0.024         0.00
249  20.75     0.10      0.026         0.150     0.024         0.00
250  20.83     0.07      0.018         0.149     0.016         0.00
251  20.92     0.07      0.018         0.148     0.016         0.00
252  21.00     0.07      0.018         0.148     0.016         0.00
253  21.08     0.10      0.026         0.147     0.024         0.00
254  21.17     0.10      0.026         0.147     0.024         0.00
255  21.25     0.10      0.026         0.146     0.024         0.00
256  21.33     0.07      0.018         0.145     0.016         0.00
257  21.42     0.07      0.018         0.145     0.016         0.00
258  21.50     0.07      0.018         0.144     0.016         0.00
259  21.58     0.10      0.026         0.144     0.024         0.00
260  21.67     0.10      0.026         0.143     0.024         0.00
261  21.75     0.10      0.026         0.143     0.024         0.00
262  21.83     0.07      0.018         0.142     0.016         0.00
263  21.92     0.07      0.018         0.142     0.016         0.00
264  22.00     0.07      0.018         0.141     0.016         0.00
265  22.08     0.10      0.026         0.141     0.024         0.00
266  22.17     0.10      0.026         0.140     0.024         0.00
267  22.25     0.10      0.026         0.140     0.024         0.00
268  22.33     0.07      0.018         0.139     0.016         0.00
269  22.42     0.07      0.018         0.139     0.016         0.00
270  22.50     0.07      0.018         0.139     0.016         0.00
271  22.58     0.07      0.018         0.138     0.016         0.00
272  22.67     0.07      0.018         0.138     0.016         0.00
273  22.75     0.07      0.018         0.137     0.016         0.00
274  22.83     0.07      0.018         0.137     0.016         0.00
275  22.92     0.07      0.018         0.137     0.016         0.00
276  23.00     0.07      0.018         0.136     0.016         0.00
277  23.08     0.07      0.018         0.136     0.016         0.00
278  23.17     0.07      0.018         0.136     0.016         0.00
279  23.25     0.07      0.018         0.136     0.016         0.00
280  23.33     0.07      0.018         0.135     0.016         0.00
281  23.42     0.07      0.018         0.135     0.016         0.00
282  23.50     0.07      0.018         0.135     0.016         0.00
283  23.58     0.07      0.018         0.135     0.016         0.00
284  23.67     0.07      0.018         0.134     0.016         0.00
285  23.75     0.07      0.018         0.134     0.016         0.00
286  23.83     0.07      0.018         0.134     0.016         0.00
287  23.92     0.07      0.018         0.134     0.016         0.00
288  24.00     0.07      0.018         0.134     0.016         0.00
    Sum =     100.0                                 Sum =     2.6
      Flood volume = Effective rainfall      0.22(In)
       times area       8.5(Ac.)/[(In)/(Ft.)] =       0.2(Ac.Ft)
      Total soil loss =      1.98(In)
      Total soil loss =     1.404(Ac.Ft)
      Total rainfall =      2.20(In)
      Flood volume =        6740.0 Cubic Feet
      Total soil loss =       61139.8 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.495(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------
   0+ 5       0.0000      0.00  Q         |         |         |         |
   0+10       0.0000      0.00  Q         |         |         |         |
   0+15       0.0001      0.01  Q         |         |         |         |
   0+20       0.0001      0.01  Q         |         |         |         |
   0+25       0.0002      0.01  Q         |         |         |         |
   0+30       0.0003      0.02  Q         |         |         |         |
```

0+35	0.0005	0.02	Q	|	|	|	|
0+40	0.0006	0.02	Q	|	|	|	|
0+45	0.0007	0.02	Q	|	|	|	|
0+50	0.0009	0.02	Q	|	|	|	|
0+55	0.0010	0.02	Q	|	|	|	|
1+ 0	0.0012	0.02	Q	|	|	|	|
1+ 5	0.0014	0.03	Q	|	|	|	|
1+10	0.0016	0.03	Q	|	|	|	|
1+15	0.0017	0.02	Q	|	|	|	|
1+20	0.0019	0.02	Q	|	|	|	|
1+25	0.0020	0.02	Q	|	|	|	|
1+30	0.0022	0.02	Q	|	|	|	|
1+35	0.0024	0.02	Q	|	|	|	|
1+40	0.0025	0.02	Q	|	|	|	|
1+45	0.0027	0.02	Q	|	|	|	|
1+50	0.0028	0.02	Q	|	|	|	|
1+55	0.0030	0.02	Q	|	|	|	|
2+ 0	0.0032	0.03	Q	|	|	|	|
2+ 5	0.0034	0.03	Q	|	|	|	|
2+10	0.0036	0.03	Q	|	|	|	|
2+15	0.0038	0.03	Q	|	|	|	|
2+20	0.0040	0.03	QV	|	|	|	|
2+25	0.0042	0.03	QV	|	|	|	|
2+30	0.0044	0.03	QV	|	|	|	|
2+35	0.0046	0.03	QV	|	|	|	|
2+40	0.0048	0.03	QV	|	|	|	|
2+45	0.0050	0.03	QV	|	|	|	|
2+50	0.0053	0.03	QV	|	|	|	|
2+55	0.0055	0.04	QV	|	|	|	|
3+ 0	0.0058	0.04	QV	|	|	|	|
3+ 5	0.0060	0.04	QV	|	|	|	|
3+10	0.0063	0.04	QV	|	|	|	|
3+15	0.0065	0.04	QV	|	|	|	|
3+20	0.0068	0.04	QV	|	|	|	|
3+25	0.0070	0.04	QV	|	|	|	|
3+30	0.0073	0.04	QV	|	|	|	|
3+35	0.0075	0.04	QV	|	|	|	|
3+40	0.0078	0.04	Q V	|	|	|	|
3+45	0.0081	0.04	Q V	|	|	|	|
3+50	0.0083	0.04	Q V	|	|	|	|
3+55	0.0086	0.04	Q V	|	|	|	|
4+ 0	0.0089	0.04	Q V	|	|	|	|
4+ 5	0.0092	0.04	Q V	|	|	|	|
4+10	0.0095	0.04	Q V	|	|	|	|
4+15	0.0098	0.04	Q V	|	|	|	|
4+20	0.0101	0.04	Q V	|	|	|	|
4+25	0.0104	0.05	Q V	|	|	|	|
4+30	0.0107	0.05	Q V	|	|	|	|
4+35	0.0111	0.05	Q V	|	|	|	|
4+40	0.0114	0.05	Q V	|	|	|	|
4+45	0.0118	0.05	Q V	|	|	|	|
4+50	0.0121	0.05	Q V	|	|	|	|
4+55	0.0125	0.05	Q V	|	|	|	|
5+ 0	0.0129	0.06	Q V	|	|	|	|
5+ 5	0.0132	0.06	Q V	|	|	|	|
5+10	0.0136	0.05	Q V	|	|	|	|
5+15	0.0140	0.05	Q V	|	|	|	|
5+20	0.0143	0.05	Q V	|	|	|	|
5+25	0.0147	0.05	Q V	|	|	|	|
5+30	0.0150	0.05	Q V	|	|	|	|
5+35	0.0154	0.05	Q V	|	|	|	|
5+40	0.0157	0.05	Q V	|	|	|	|
5+45	0.0161	0.06	Q V	|	|	|	|
5+50	0.0165	0.06	Q V	|	|	|	|
5+55	0.0169	0.06	Q V	|	|	|	|
6+ 0	0.0173	0.06	Q V	|	|	|	|
6+ 5	0.0177	0.06	Q V	|	|	|	|
6+10	0.0182	0.06	Q V	|	|	|	|
6+15	0.0186	0.06	Q V	|	|	|	|
6+20	0.0190	0.06	Q V	|	|	|	|
6+25	0.0195	0.07	Q V	|	|	|	|

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 6+30      0.0199      0.07  Q    V    |         |         |         |
 6+35      0.0204      0.07  Q    V    |         |         |         |
 6+40      0.0209      0.07  Q    V    |         |         |         |
 6+45      0.0214      0.07  Q    V    |         |         |         |
 6+50      0.0218      0.07  Q    V    |         |         |         |
 6+55      0.0223      0.07  Q    V    |         |         |         |
 7+ 0      0.0229      0.07  Q    V    |         |         |         |
 7+ 5      0.0234      0.07  Q     V   |         |         |         |
 7+10      0.0239      0.07  Q     V   |         |         |         |
 7+15      0.0244      0.07  Q     V   |         |         |         |
 7+20      0.0249      0.07  Q     V   |         |         |         |
 7+25      0.0254      0.08  Q     V   |         |         |         |
 7+30      0.0260      0.08  Q     V   |         |         |         |
 7+35      0.0265      0.08  Q     V   |         |         |         |
 7+40      0.0271      0.08  Q      V  |         |         |         |
 7+45      0.0277      0.08  Q      V  |         |         |         |
 7+50      0.0283      0.09  Q      V  |         |         |         |
 7+55      0.0289      0.09  Q      V  |         |         |         |
 8+ 0      0.0295      0.09  Q      V  |         |         |         |
 8+ 5      0.0302      0.09  Q      V  |         |         |         |
 8+10      0.0308      0.10  Q      V  |         |         |         |
 8+15      0.0316      0.10  Q       V |         |         |         |
 8+20      0.0323      0.11  Q       V |         |         |         |
 8+25      0.0330      0.11  Q       V |         |         |         |
 8+30      0.0338      0.11  Q       V |         |         |         |
 8+35      0.0345      0.11  Q       V |         |         |         |
 8+40      0.0353      0.11  Q        V|         |         |         |
 8+45      0.0361      0.11  Q        V|         |         |         |
 8+50      0.0369      0.12  Q        V|         |         |         |
 8+55      0.0377      0.12  Q        V|         |         |         |
 9+ 0      0.0386      0.12  Q        V|         |         |         |
 9+ 5      0.0394      0.12  Q         V         |         |         |
 9+10      0.0403      0.13  Q         V         |         |         |
 9+15      0.0412      0.13  Q         V         |         |         |
 9+20      0.0421      0.14  Q         V         |         |         |
 9+25      0.0431      0.14  Q         |V        |         |         |
 9+30      0.0441      0.14  Q         |V        |         |         |
 9+35      0.0451      0.15  Q         |V        |         |         |
 9+40      0.0461      0.15  Q         |V        |         |         |
 9+45      0.0471      0.15  Q         | V       |         |         |
 9+50      0.0482      0.15  Q         | V       |         |         |
 9+55      0.0493      0.16  Q         | V       |         |         |
10+ 0      0.0504      0.16  Q         |  V      |         |         |
10+ 5      0.0515      0.16  Q         |  V      |         |         |
10+10      0.0525      0.15  Q         |  V      |         |         |
10+15      0.0534      0.14  Q         |  V      |         |         |
10+20      0.0543      0.13  Q         |   V     |         |         |
10+25      0.0552      0.12  Q         |   V     |         |         |
10+30      0.0560      0.12  Q         |   V     |         |         |
10+35      0.0569      0.12  Q         |   V     |         |         |
10+40      0.0577      0.13  Q         |   V     |         |         |
10+45      0.0587      0.14  Q         |    V    |         |         |
10+50      0.0596      0.14  Q         |    V    |         |         |
10+55      0.0606      0.14  Q         |    V    |         |         |
11+ 0      0.0616      0.15  Q         |    V    |         |         |
11+ 5      0.0627      0.15  Q         |     V   |         |         |
11+10      0.0637      0.15  Q         |     V   |         |         |
11+15      0.0647      0.14  Q         |     V   |         |         |
11+20      0.0656      0.14  Q         |     V   |         |         |
11+25      0.0666      0.14  Q         |      V  |         |         |
11+30      0.0676      0.14  Q         |      V  |         |         |
11+35      0.0686      0.14  Q         |      V  |         |         |
11+40      0.0696      0.14  Q         |      V  |         |         |
11+45      0.0705      0.14  Q         |       V |         |         |
11+50      0.0714      0.13  Q         |       V |         |         |
11+55      0.0723      0.13  Q         |       V |         |         |
12+ 0      0.0733      0.13  Q         |       V |         |         |
12+ 5      0.0742      0.14  Q         |        V|         |         |
12+10      0.0752      0.15  Q         |        V|         |         |
12+15      0.0764      0.16  Q         |        V|         |         |
12+20      0.0775      0.17  Q         |         V         |         |
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12+25       0.0788      0.18  Q         |         V         |         |
12+30       0.0800      0.18  Q         |         V         |         |
12+35       0.0812      0.18  Q         |         V         |         |
12+40       0.0823      0.15  Q         |         |V        |         |
12+45       0.0831      0.11  Q         |         |V        |         |
12+50       0.0837      0.09  Q         |         |V        |         |
12+55       0.0844      0.10  Q         |         |V        |         |
13+ 0       0.0853      0.12  Q         |         | V       |         |
13+ 5       0.0863      0.15  Q         |         | V       |         |
13+10       0.0879      0.23  Q         |         | V       |         |
13+15       0.0903      0.34  |Q        |         |  V      |         |
13+20       0.0931      0.42  |Q        |         |   V     |         |
13+25       0.0963      0.46  |Q        |         |   V     |         |
13+30       0.0997      0.49  |Q        |         |    V    |         |
13+35       0.1031      0.49  |Q        |         |     V   |         |
13+40       0.1061      0.44  |Q        |         |      V  |         |
13+45       0.1084      0.34  |Q        |         |       V |         |
13+50       0.1103      0.27  |Q        |         |       V |         |
13+55       0.1120      0.25  Q         |         |       V |         |
14+ 0       0.1136      0.23  Q         |         |        V|         |
14+ 5       0.1151      0.22  Q         |         |        V|         |
14+10       0.1165      0.20  Q         |         |         V         |
14+15       0.1178      0.19  Q         |         |         V         |
14+20       0.1190      0.18  Q         |         |         V         |
14+25       0.1202      0.17  Q         |         |         |V        |
14+30       0.1212      0.15  Q         |         |         |V        |
14+35       0.1222      0.14  Q         |         |         |V        |
14+40       0.1231      0.14  Q         |         |         |V        |
14+45       0.1241      0.14  Q         |         |         | V       |
14+50       0.1250      0.14  Q         |         |         | V       |
14+55       0.1259      0.13  Q         |         |         | V       |
15+ 0       0.1267      0.11  Q         |         |         | V       |
15+ 5       0.1274      0.10  Q         |         |         | V       |
15+10       0.1280      0.09  Q         |         |         |  V      |
15+15       0.1285      0.07  Q         |         |         |  V      |
15+20       0.1290      0.07  Q         |         |         |  V      |
15+25       0.1296      0.09  Q         |         |         |  V      |
15+30       0.1304      0.12  Q         |         |         |  V      |
15+35       0.1313      0.14  Q         |         |         |  V      |
15+40       0.1323      0.14  Q         |         |         |   V     |
15+45       0.1333      0.14  Q         |         |         |   V     |
15+50       0.1342      0.14  Q         |         |         |   V     |
15+55       0.1352      0.14  Q         |         |         |   V     |
16+ 0       0.1361      0.14  Q         |         |         |    V    |
16+ 5       0.1371      0.13  Q         |         |         |    V    |
16+10       0.1379      0.12  Q         |         |         |    V    |
16+15       0.1385      0.09  Q         |         |         |    V    |
16+20       0.1389      0.07  Q         |         |         |    V    |
16+25       0.1393      0.06  Q         |         |         |     V   |
16+30       0.1397      0.05  Q         |         |         |     V   |
16+35       0.1400      0.05  Q         |         |         |     V   |
16+40       0.1403      0.04  Q         |         |         |     V   |
16+45       0.1405      0.04  Q         |         |         |     V   |
16+50       0.1408      0.03  Q         |         |         |     V   |
16+55       0.1410      0.03  Q         |         |         |     V   |
17+ 0       0.1412      0.03  Q         |         |         |     V   |
17+ 5       0.1414      0.03  Q         |         |         |     V   |
17+10       0.1416      0.03  Q         |         |         |     V   |
17+15       0.1418      0.03  Q         |         |         |     V   |
17+20       0.1421      0.04  Q         |         |         |     V   |
17+25       0.1423      0.04  Q         |         |         |     V   |
17+30       0.1426      0.04  Q         |         |         |     V   |
17+35       0.1428      0.04  Q         |         |         |     V   |
17+40       0.1431      0.04  Q         |         |         |     V   |
17+45       0.1433      0.04  Q         |         |         |      V  |
17+50       0.1436      0.04  Q         |         |         |      V  |
17+55       0.1438      0.04  Q         |         |         |      V  |
18+ 0       0.1441      0.03  Q         |         |         |      V  |
18+ 5       0.1443      0.03  Q         |         |         |      V  |
18+10       0.1445      0.03  Q         |         |         |      V  |
18+15       0.1447      0.03  Q         |         |         |      V  |
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18+20	0.1449	0.03	Q	|	|	|	V |
18+25	0.1451	0.03	Q	|	|	|	V |
18+30	0.1454	0.03	Q	|	|	|	V |
18+35	0.1456	0.03	Q	|	|	|	V |
18+40	0.1458	0.03	Q	|	|	|	V |
18+45	0.1459	0.03	Q	|	|	|	V |
18+50	0.1461	0.03	Q	|	|	|	V |
18+55	0.1463	0.02	Q	|	|	|	V |
19+ 0	0.1464	0.02	Q	|	|	|	V |
19+ 5	0.1466	0.02	Q	|	|	|	V |
19+10	0.1467	0.02	Q	|	|	|	V |
19+15	0.1468	0.02	Q	|	|	|	V |
19+20	0.1470	0.02	Q	|	|	|	V |
19+25	0.1472	0.02	Q	|	|	|	V |
19+30	0.1473	0.03	Q	|	|	|	V |
19+35	0.1475	0.03	Q	|	|	|	V |
19+40	0.1477	0.03	Q	|	|	|	V |
19+45	0.1479	0.02	Q	|	|	|	V |
19+50	0.1480	0.02	Q	|	|	|	V |
19+55	0.1482	0.02	Q	|	|	|	V |
20+ 0	0.1483	0.02	Q	|	|	|	V |
20+ 5	0.1484	0.02	Q	|	|	|	V |
20+10	0.1486	0.02	Q	|	|	|	V |
20+15	0.1487	0.02	Q	|	|	|	V |
20+20	0.1489	0.02	Q	|	|	|	V |
20+25	0.1490	0.02	Q	|	|	|	V |
20+30	0.1492	0.02	Q	|	|	|	V |
20+35	0.1493	0.02	Q	|	|	|	V |
20+40	0.1495	0.02	Q	|	|	|	V |
20+45	0.1496	0.02	Q	|	|	|	V |
20+50	0.1498	0.02	Q	|	|	|	V |
20+55	0.1499	0.02	Q	|	|	|	V |
21+ 0	0.1501	0.02	Q	|	|	|	V |
21+ 5	0.1502	0.02	Q	|	|	|	V |
21+10	0.1503	0.02	Q	|	|	|	V |
21+15	0.1504	0.02	Q	|	|	|	V |
21+20	0.1506	0.02	Q	|	|	|	V |
21+25	0.1507	0.02	Q	|	|	|	V |
21+30	0.1508	0.02	Q	|	|	|	V |
21+35	0.1510	0.02	Q	|	|	|	V|
21+40	0.1511	0.02	Q	|	|	|	V|
21+45	0.1512	0.02	Q	|	|	|	V|
21+50	0.1514	0.02	Q	|	|	|	V|
21+55	0.1515	0.02	Q	|	|	|	V|
22+ 0	0.1516	0.02	Q	|	|	|	V|
22+ 5	0.1518	0.02	Q	|	|	|	V|
22+10	0.1519	0.02	Q	|	|	|	V|
22+15	0.1520	0.02	Q	|	|	|	V|
22+20	0.1522	0.02	Q	|	|	|	V|
22+25	0.1523	0.02	Q	|	|	|	V|
22+30	0.1524	0.02	Q	|	|	|	V|
22+35	0.1525	0.02	Q	|	|	|	V|
22+40	0.1526	0.02	Q	|	|	|	V|
22+45	0.1528	0.02	Q	|	|	|	V|
22+50	0.1529	0.02	Q	|	|	|	V|
22+55	0.1530	0.02	Q	|	|	|	V|
23+ 0	0.1531	0.02	Q	|	|	|	V|
23+ 5	0.1532	0.02	Q	|	|	|	V|
23+10	0.1533	0.02	Q	|	|	|	V|
23+15	0.1534	0.02	Q	|	|	|	V|
23+20	0.1535	0.02	Q	|	|	|	V|
23+25	0.1536	0.02	Q	|	|	|	V|
23+30	0.1537	0.02	Q	|	|	|	V|
23+35	0.1538	0.02	Q	|	|	|	V|
23+40	0.1539	0.02	Q	|	|	|	V|
23+45	0.1540	0.02	Q	|	|	|	V|
23+50	0.1541	0.02	Q	|	|	|	V|
23+55	0.1542	0.02	Q	|	|	|	V|
24+ 0	0.1543	0.02	Q	|	|	|	V|
24+ 5	0.1544	0.01	Q	|	|	|	V|
24+10	0.1545	0.01	Q	|	|	|	V|

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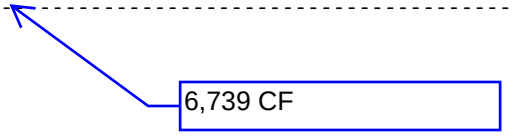
  24+15       0.1546      0.01  Q          |          |          |         V|
  24+20       0.1546      0.01  Q          |          |          |         V|
  24+25       0.1546      0.00  Q          |          |          |         V|
  24+30       0.1547      0.00  Q          |          |          |         V|
  24+35       0.1547      0.00  Q          |          |          |         V|
  24+40       0.1547      0.00  Q          |          |          |         V|
  24+45       0.1547      0.00  Q          |          |          |         V|
  24+50       0.1547      0.00  Q          |          |          |         V|
  24+55       0.1547      0.00  Q          |          |          |         V|
  25+ 0       0.1547      0.00  Q          |          |          |         V|
  25+ 5       0.1547      0.00  Q          |          |          |         V|
  25+10       0.1547      0.00  Q          |          |          |         V|
  25+15       0.1547      0.00  Q          |          |          |         V|
  25+20       0.1547      0.00  Q          |          |          |         V|
  25+25       0.1547      0.00  Q          |          |          |         V|
  25+30       0.1547      0.00  Q          |          |          |         V|
  25+35       0.1547      0.00  Q          |          |          |         V|
  25+40       0.1547      0.00  Q          |          |          |         V|
-------------------------------------------------------------------------------
```



COMBINED VOLUME FROM DMA-1,2 IN PRE-DEVELOPED CONDITION: 12,685-CF

UNIT HYDROGRAPH ANALYSIS-2YR, 24 HR DURATION STORM EVENT -DMA-1 (PH-1) DEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Study date 09/17/20 File: UH2DEV242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 5028

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RIVERSIDE TEMPLE PH1
2YR 24 HR EVENT
DEVELOPED CONDITION

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.22 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.29 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
7.50	2.20	16.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
7.50	5.50	41.25

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.200(In)
Area Averaged 100-Year Rainfall = 5.500(In)

Point rain (area averaged) = 2.200(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.650

Total Area Entered = 7.50(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.650	0.212	1.000	0.212
					Sum (F) =	0.212

Area averaged mean soil loss (F) (In/Hr) = 0.212
Minimum soil loss rate ((In/Hr)) = 0.106
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.380

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.827	8.404	0.635
2	0.167	121.655	34.544	2.611
3	0.250	182.482	26.312	1.989
4	0.333	243.309	10.161	0.768
5	0.417	304.136	6.048	0.457
6	0.500	364.964	4.074	0.308
7	0.583	425.791	2.887	0.218
8	0.667	486.618	2.046	0.155
9	0.750	547.445	1.686	0.127
10	0.833	608.273	1.236	0.093
11	0.917	669.100	0.931	0.070
12	1.000	729.927	0.666	0.050
13	1.083	790.754	0.608	0.046
14	1.167	851.582	0.397	0.030
		Sum = 100.000	Sum=	7.559

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.376	0.007	0.01
2	0.17	0.07	0.018	0.374	0.007	0.01
3	0.25	0.07	0.018	0.373	0.007	0.01
4	0.33	0.10	0.026	0.371	0.010	0.02
5	0.42	0.10	0.026	0.370	0.010	0.02
6	0.50	0.10	0.026	0.369	0.010	0.02
7	0.58	0.10	0.026	0.367	0.010	0.02
8	0.67	0.10	0.026	0.366	0.010	0.02
9	0.75	0.10	0.026	0.364	0.010	0.02
10	0.83	0.13	0.035	0.363	0.013	0.02
11	0.92	0.13	0.035	0.361	0.013	0.02
12	1.00	0.13	0.035	0.360	0.013	0.02
13	1.08	0.10	0.026	0.359	0.010	0.02
14	1.17	0.10	0.026	0.357	0.010	0.02
15	1.25	0.10	0.026	0.356	0.010	0.02
16	1.33	0.10	0.026	0.354	0.010	0.02
17	1.42	0.10	0.026	0.353	0.010	0.02
18	1.50	0.10	0.026	0.351	0.010	0.02
19	1.58	0.10	0.026	0.350	0.010	0.02
20	1.67	0.10	0.026	0.349	0.010	0.02
21	1.75	0.10	0.026	0.347	0.010	0.02
22	1.83	0.13	0.035	0.346	0.013	0.02
23	1.92	0.13	0.035	0.344	0.013	0.02
24	2.00	0.13	0.035	0.343	0.013	0.02
25	2.08	0.13	0.035	0.342	0.013	0.02
26	2.17	0.13	0.035	0.340	0.013	0.02
27	2.25	0.13	0.035	0.339	0.013	0.02
28	2.33	0.13	0.035	0.338	0.013	0.02
29	2.42	0.13	0.035	0.336	0.013	0.02
30	2.50	0.13	0.035	0.335	0.013	0.02
31	2.58	0.17	0.044	0.333	0.017	0.03
32	2.67	0.17	0.044	0.332	0.017	0.03
33	2.75	0.17	0.044	0.331	0.017	0.03
34	2.83	0.17	0.044	0.329	0.017	0.03
35	2.92	0.17	0.044	0.328	0.017	0.03
36	3.00	0.17	0.044	0.327	0.017	0.03
37	3.08	0.17	0.044	0.325	0.017	0.03

38	3.17	0.17	0.044	0.324	0.017	0.03
39	3.25	0.17	0.044	0.323	0.017	0.03
40	3.33	0.17	0.044	0.321	0.017	0.03
41	3.42	0.17	0.044	0.320	0.017	0.03
42	3.50	0.17	0.044	0.319	0.017	0.03
43	3.58	0.17	0.044	0.317	0.017	0.03
44	3.67	0.17	0.044	0.316	0.017	0.03
45	3.75	0.17	0.044	0.315	0.017	0.03
46	3.83	0.20	0.053	0.313	0.020	0.03
47	3.92	0.20	0.053	0.312	0.020	0.03
48	4.00	0.20	0.053	0.311	0.020	0.03
49	4.08	0.20	0.053	0.309	0.020	0.03
50	4.17	0.20	0.053	0.308	0.020	0.03
51	4.25	0.20	0.053	0.307	0.020	0.03
52	4.33	0.23	0.062	0.305	0.023	0.04
53	4.42	0.23	0.062	0.304	0.023	0.04
54	4.50	0.23	0.062	0.303	0.023	0.04
55	4.58	0.23	0.062	0.301	0.023	0.04
56	4.67	0.23	0.062	0.300	0.023	0.04
57	4.75	0.23	0.062	0.299	0.023	0.04
58	4.83	0.27	0.070	0.298	0.027	0.04
59	4.92	0.27	0.070	0.296	0.027	0.04
60	5.00	0.27	0.070	0.295	0.027	0.04
61	5.08	0.20	0.053	0.294	0.020	0.03
62	5.17	0.20	0.053	0.292	0.020	0.03
63	5.25	0.20	0.053	0.291	0.020	0.03
64	5.33	0.23	0.062	0.290	0.023	0.04
65	5.42	0.23	0.062	0.289	0.023	0.04
66	5.50	0.23	0.062	0.287	0.023	0.04
67	5.58	0.27	0.070	0.286	0.027	0.04
68	5.67	0.27	0.070	0.285	0.027	0.04
69	5.75	0.27	0.070	0.284	0.027	0.04
70	5.83	0.27	0.070	0.282	0.027	0.04
71	5.92	0.27	0.070	0.281	0.027	0.04
72	6.00	0.27	0.070	0.280	0.027	0.04
73	6.08	0.30	0.079	0.279	0.030	0.05
74	6.17	0.30	0.079	0.277	0.030	0.05
75	6.25	0.30	0.079	0.276	0.030	0.05
76	6.33	0.30	0.079	0.275	0.030	0.05
77	6.42	0.30	0.079	0.274	0.030	0.05
78	6.50	0.30	0.079	0.272	0.030	0.05
79	6.58	0.33	0.088	0.271	0.033	0.05
80	6.67	0.33	0.088	0.270	0.033	0.05
81	6.75	0.33	0.088	0.269	0.033	0.05
82	6.83	0.33	0.088	0.268	0.033	0.05
83	6.92	0.33	0.088	0.266	0.033	0.05
84	7.00	0.33	0.088	0.265	0.033	0.05
85	7.08	0.33	0.088	0.264	0.033	0.05
86	7.17	0.33	0.088	0.263	0.033	0.05
87	7.25	0.33	0.088	0.262	0.033	0.05
88	7.33	0.37	0.097	0.260	0.037	0.06
89	7.42	0.37	0.097	0.259	0.037	0.06
90	7.50	0.37	0.097	0.258	0.037	0.06
91	7.58	0.40	0.106	0.257	0.040	0.07
92	7.67	0.40	0.106	0.256	0.040	0.07
93	7.75	0.40	0.106	0.254	0.040	0.07
94	7.83	0.43	0.114	0.253	0.043	0.07
95	7.92	0.43	0.114	0.252	0.043	0.07
96	8.00	0.43	0.114	0.251	0.043	0.07
97	8.08	0.50	0.132	0.250	0.050	0.08
98	8.17	0.50	0.132	0.249	0.050	0.08
99	8.25	0.50	0.132	0.247	0.050	0.08
100	8.33	0.50	0.132	0.246	0.050	0.08
101	8.42	0.50	0.132	0.245	0.050	0.08
102	8.50	0.50	0.132	0.244	0.050	0.08
103	8.58	0.53	0.141	0.243	0.054	0.09
104	8.67	0.53	0.141	0.242	0.054	0.09
105	8.75	0.53	0.141	0.241	0.054	0.09
106	8.83	0.57	0.150	0.239	0.057	0.09
107	8.92	0.57	0.150	0.238	0.057	0.09
108	9.00	0.57	0.150	0.237	0.057	0.09

109	9.08	0.63	0.167	0.236	0.064	0.10
110	9.17	0.63	0.167	0.235	0.064	0.10
111	9.25	0.63	0.167	0.234	0.064	0.10
112	9.33	0.67	0.176	0.233	0.067	0.11
113	9.42	0.67	0.176	0.232	0.067	0.11
114	9.50	0.67	0.176	0.230	0.067	0.11
115	9.58	0.70	0.185	0.229	0.070	0.11
116	9.67	0.70	0.185	0.228	0.070	0.11
117	9.75	0.70	0.185	0.227	0.070	0.11
118	9.83	0.73	0.194	0.226	0.074	0.12
119	9.92	0.73	0.194	0.225	0.074	0.12
120	10.00	0.73	0.194	0.224	0.074	0.12
121	10.08	0.50	0.132	0.223	0.050	0.08
122	10.17	0.50	0.132	0.222	0.050	0.08
123	10.25	0.50	0.132	0.221	0.050	0.08
124	10.33	0.50	0.132	0.220	0.050	0.08
125	10.42	0.50	0.132	0.218	0.050	0.08
126	10.50	0.50	0.132	0.217	0.050	0.08
127	10.58	0.67	0.176	0.216	0.067	0.11
128	10.67	0.67	0.176	0.215	0.067	0.11
129	10.75	0.67	0.176	0.214	0.067	0.11
130	10.83	0.67	0.176	0.213	0.067	0.11
131	10.92	0.67	0.176	0.212	0.067	0.11
132	11.00	0.67	0.176	0.211	0.067	0.11
133	11.08	0.63	0.167	0.210	0.064	0.10
134	11.17	0.63	0.167	0.209	0.064	0.10
135	11.25	0.63	0.167	0.208	0.064	0.10
136	11.33	0.63	0.167	0.207	0.064	0.10
137	11.42	0.63	0.167	0.206	0.064	0.10
138	11.50	0.63	0.167	0.205	0.064	0.10
139	11.58	0.57	0.150	0.204	0.057	0.09
140	11.67	0.57	0.150	0.203	0.057	0.09
141	11.75	0.57	0.150	0.202	0.057	0.09
142	11.83	0.60	0.158	0.201	0.060	0.10
143	11.92	0.60	0.158	0.200	0.060	0.10
144	12.00	0.60	0.158	0.199	0.060	0.10
145	12.08	0.83	0.220	0.198	---	0.02
146	12.17	0.83	0.220	0.197	---	0.02
147	12.25	0.83	0.220	0.196	---	0.02
148	12.33	0.87	0.229	0.195	---	0.03
149	12.42	0.87	0.229	0.194	---	0.03
150	12.50	0.87	0.229	0.193	---	0.04
151	12.58	0.93	0.246	0.192	---	0.05
152	12.67	0.93	0.246	0.191	---	0.06
153	12.75	0.93	0.246	0.190	---	0.06
154	12.83	0.97	0.255	0.189	---	0.07
155	12.92	0.97	0.255	0.188	---	0.07
156	13.00	0.97	0.255	0.187	---	0.07
157	13.08	1.13	0.299	0.186	---	0.11
158	13.17	1.13	0.299	0.185	---	0.11
159	13.25	1.13	0.299	0.184	---	0.11
160	13.33	1.13	0.299	0.183	---	0.12
161	13.42	1.13	0.299	0.182	---	0.12
162	13.50	1.13	0.299	0.182	---	0.12
163	13.58	0.77	0.202	0.181	---	0.02
164	13.67	0.77	0.202	0.180	---	0.02
165	13.75	0.77	0.202	0.179	---	0.02
166	13.83	0.77	0.202	0.178	---	0.02
167	13.92	0.77	0.202	0.177	---	0.03
168	14.00	0.77	0.202	0.176	---	0.03
169	14.08	0.90	0.238	0.175	---	0.06
170	14.17	0.90	0.238	0.174	---	0.06
171	14.25	0.90	0.238	0.173	---	0.06
172	14.33	0.87	0.229	0.173	---	0.06
173	14.42	0.87	0.229	0.172	---	0.06
174	14.50	0.87	0.229	0.171	---	0.06
175	14.58	0.87	0.229	0.170	---	0.06
176	14.67	0.87	0.229	0.169	---	0.06
177	14.75	0.87	0.229	0.168	---	0.06
178	14.83	0.83	0.220	0.167	---	0.05
179	14.92	0.83	0.220	0.166	---	0.05

180	15.00	0.83	0.220	0.166	---	0.05
181	15.08	0.80	0.211	0.165	---	0.05
182	15.17	0.80	0.211	0.164	---	0.05
183	15.25	0.80	0.211	0.163	---	0.05
184	15.33	0.77	0.202	0.162	---	0.04
185	15.42	0.77	0.202	0.161	---	0.04
186	15.50	0.77	0.202	0.161	---	0.04
187	15.58	0.63	0.167	0.160	---	0.01
188	15.67	0.63	0.167	0.159	---	0.01
189	15.75	0.63	0.167	0.158	---	0.01
190	15.83	0.63	0.167	0.157	---	0.01
191	15.92	0.63	0.167	0.156	---	0.01
192	16.00	0.63	0.167	0.156	---	0.01
193	16.08	0.13	0.035	0.155	0.013	0.02
194	16.17	0.13	0.035	0.154	0.013	0.02
195	16.25	0.13	0.035	0.153	0.013	0.02
196	16.33	0.13	0.035	0.153	0.013	0.02
197	16.42	0.13	0.035	0.152	0.013	0.02
198	16.50	0.13	0.035	0.151	0.013	0.02
199	16.58	0.10	0.026	0.150	0.010	0.02
200	16.67	0.10	0.026	0.149	0.010	0.02
201	16.75	0.10	0.026	0.149	0.010	0.02
202	16.83	0.10	0.026	0.148	0.010	0.02
203	16.92	0.10	0.026	0.147	0.010	0.02
204	17.00	0.10	0.026	0.146	0.010	0.02
205	17.08	0.17	0.044	0.146	0.017	0.03
206	17.17	0.17	0.044	0.145	0.017	0.03
207	17.25	0.17	0.044	0.144	0.017	0.03
208	17.33	0.17	0.044	0.143	0.017	0.03
209	17.42	0.17	0.044	0.143	0.017	0.03
210	17.50	0.17	0.044	0.142	0.017	0.03
211	17.58	0.17	0.044	0.141	0.017	0.03
212	17.67	0.17	0.044	0.141	0.017	0.03
213	17.75	0.17	0.044	0.140	0.017	0.03
214	17.83	0.13	0.035	0.139	0.013	0.02
215	17.92	0.13	0.035	0.139	0.013	0.02
216	18.00	0.13	0.035	0.138	0.013	0.02
217	18.08	0.13	0.035	0.137	0.013	0.02
218	18.17	0.13	0.035	0.137	0.013	0.02
219	18.25	0.13	0.035	0.136	0.013	0.02
220	18.33	0.13	0.035	0.135	0.013	0.02
221	18.42	0.13	0.035	0.135	0.013	0.02
222	18.50	0.13	0.035	0.134	0.013	0.02
223	18.58	0.10	0.026	0.133	0.010	0.02
224	18.67	0.10	0.026	0.133	0.010	0.02
225	18.75	0.10	0.026	0.132	0.010	0.02
226	18.83	0.07	0.018	0.131	0.007	0.01
227	18.92	0.07	0.018	0.131	0.007	0.01
228	19.00	0.07	0.018	0.130	0.007	0.01
229	19.08	0.10	0.026	0.129	0.010	0.02
230	19.17	0.10	0.026	0.129	0.010	0.02
231	19.25	0.10	0.026	0.128	0.010	0.02
232	19.33	0.13	0.035	0.128	0.013	0.02
233	19.42	0.13	0.035	0.127	0.013	0.02
234	19.50	0.13	0.035	0.126	0.013	0.02
235	19.58	0.10	0.026	0.126	0.010	0.02
236	19.67	0.10	0.026	0.125	0.010	0.02
237	19.75	0.10	0.026	0.125	0.010	0.02
238	19.83	0.07	0.018	0.124	0.007	0.01
239	19.92	0.07	0.018	0.124	0.007	0.01
240	20.00	0.07	0.018	0.123	0.007	0.01
241	20.08	0.10	0.026	0.123	0.010	0.02
242	20.17	0.10	0.026	0.122	0.010	0.02
243	20.25	0.10	0.026	0.121	0.010	0.02
244	20.33	0.10	0.026	0.121	0.010	0.02
245	20.42	0.10	0.026	0.120	0.010	0.02
246	20.50	0.10	0.026	0.120	0.010	0.02
247	20.58	0.10	0.026	0.119	0.010	0.02
248	20.67	0.10	0.026	0.119	0.010	0.02
249	20.75	0.10	0.026	0.118	0.010	0.02
250	20.83	0.07	0.018	0.118	0.007	0.01

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251  20.92     0.07      0.018         0.117     0.007         0.01
252  21.00     0.07      0.018         0.117     0.007         0.01
253  21.08     0.10      0.026         0.117     0.010         0.02
254  21.17     0.10      0.026         0.116     0.010         0.02
255  21.25     0.10      0.026         0.116     0.010         0.02
256  21.33     0.07      0.018         0.115     0.007         0.01
257  21.42     0.07      0.018         0.115     0.007         0.01
258  21.50     0.07      0.018         0.114     0.007         0.01
259  21.58     0.10      0.026         0.114     0.010         0.02
260  21.67     0.10      0.026         0.113     0.010         0.02
261  21.75     0.10      0.026         0.113     0.010         0.02
262  21.83     0.07      0.018         0.113     0.007         0.01
263  21.92     0.07      0.018         0.112     0.007         0.01
264  22.00     0.07      0.018         0.112     0.007         0.01
265  22.08     0.10      0.026         0.112     0.010         0.02
266  22.17     0.10      0.026         0.111     0.010         0.02
267  22.25     0.10      0.026         0.111     0.010         0.02
268  22.33     0.07      0.018         0.110     0.007         0.01
269  22.42     0.07      0.018         0.110     0.007         0.01
270  22.50     0.07      0.018         0.110     0.007         0.01
271  22.58     0.07      0.018         0.110     0.007         0.01
272  22.67     0.07      0.018         0.109     0.007         0.01
273  22.75     0.07      0.018         0.109     0.007         0.01
274  22.83     0.07      0.018         0.109     0.007         0.01
275  22.92     0.07      0.018         0.108     0.007         0.01
276  23.00     0.07      0.018         0.108     0.007         0.01
277  23.08     0.07      0.018         0.108     0.007         0.01
278  23.17     0.07      0.018         0.108     0.007         0.01
279  23.25     0.07      0.018         0.107     0.007         0.01
280  23.33     0.07      0.018         0.107     0.007         0.01
281  23.42     0.07      0.018         0.107     0.007         0.01
282  23.50     0.07      0.018         0.107     0.007         0.01
283  23.58     0.07      0.018         0.107     0.007         0.01
284  23.67     0.07      0.018         0.106     0.007         0.01
285  23.75     0.07      0.018         0.106     0.007         0.01
286  23.83     0.07      0.018         0.106     0.007         0.01
287  23.92     0.07      0.018         0.106     0.007         0.01
288  24.00     0.07      0.018         0.106     0.007         0.01
    Sum =     100.0                                 Sum =    12.0
      Flood volume = Effective rainfall      1.00(In)
       times area       7.5(Ac.)/[(In)/(Ft.)] =       0.6(Ac.Ft)
      Total soil loss =      1.20(In)
      Total soil loss =     0.748(Ac.Ft)
      Total rainfall =      2.20(In)
      Flood volume =       27319.0 Cubic Feet
      Total soil loss =       32575.1 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.888(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ------------------------------------------------------------------------
   0+ 5       0.0000      0.01  Q         |         |         |         |
   0+10       0.0003      0.04  Q         |         |         |         |
   0+15       0.0007      0.06  Q         |         |         |         |
   0+20       0.0012      0.07  Q         |         |         |         |
   0+25       0.0018      0.09  Q         |         |         |         |
   0+30       0.0025      0.10  Q         |         |         |         |
   0+35       0.0032      0.11  Q         |         |         |         |
   0+40       0.0040      0.11  Q         |         |         |         |
   0+45       0.0048      0.12  Q         |         |         |         |
   0+50       0.0056      0.12  Q         |         |         |         |
   0+55       0.0066      0.14  Q         |         |         |         |
   1+ 0       0.0076      0.15  Q         |         |         |         |
   1+ 5       0.0087      0.15  Q         |         |         |         |
```
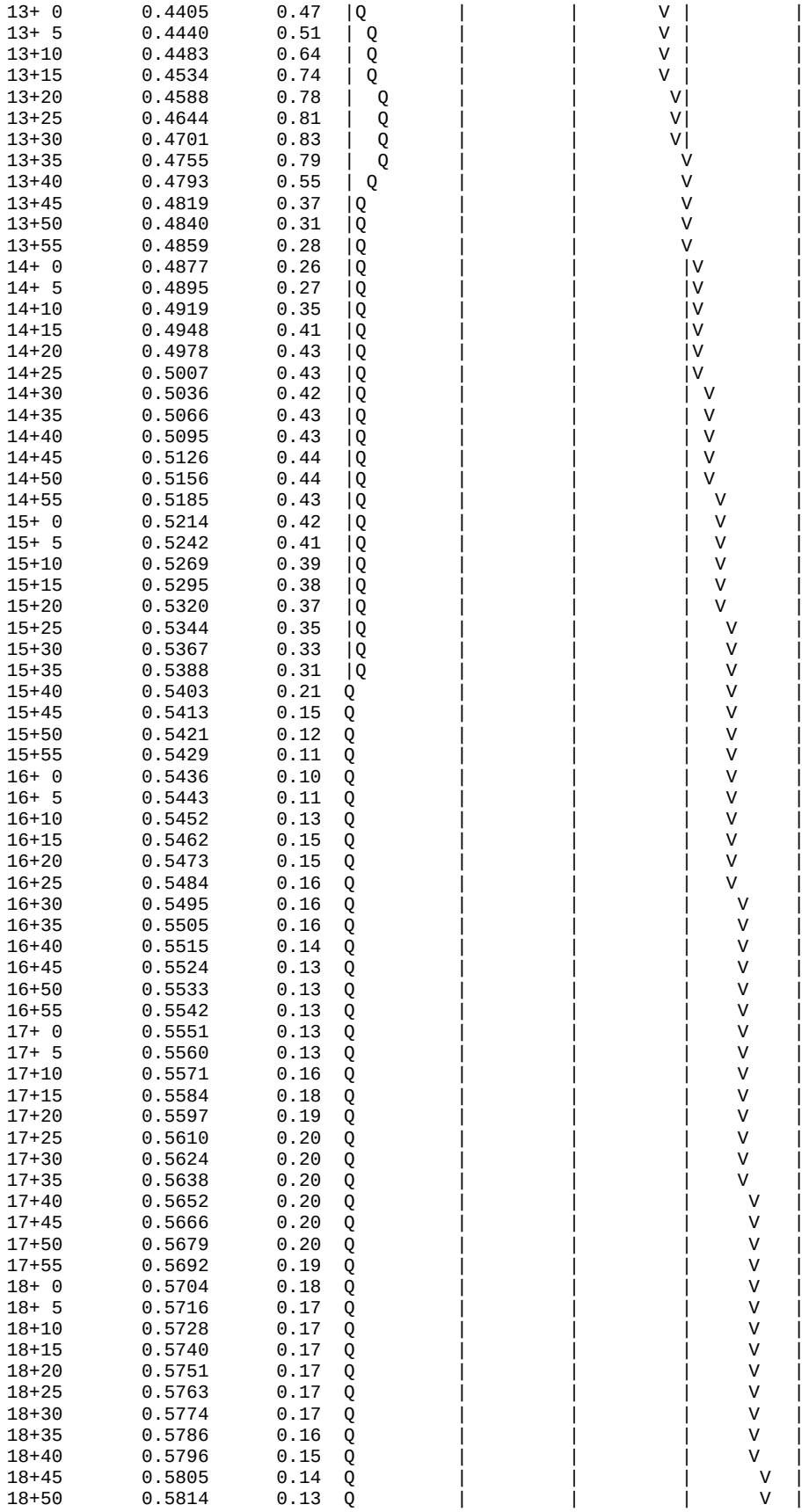
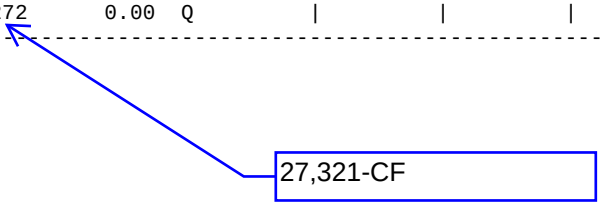

1+10	0.0096	0.14	Q	|	|	|	|
1+15	0.0105	0.13	Q	|	|	|	|
1+20	0.0114	0.13	Q	|	|	|	|
1+25	0.0123	0.13	Q	|	|	|	|
1+30	0.0132	0.13	Q	|	|	|	|
1+35	0.0141	0.13	Q	|	|	|	|
1+40	0.0149	0.13	Q	|	|	|	|
1+45	0.0158	0.12	QV	|	|	|	|
1+50	0.0167	0.13	QV	|	|	|	|
1+55	0.0176	0.14	QV	|	|	|	|
2+ 0	0.0187	0.15	QV	|	|	|	|
2+ 5	0.0198	0.16	QV	|	|	|	|
2+10	0.0209	0.16	QV	|	|	|	|
2+15	0.0220	0.16	QV	|	|	|	|
2+20	0.0231	0.16	QV	|	|	|	|
2+25	0.0242	0.16	QV	|	|	|	|
2+30	0.0253	0.16	QV	|	|	|	|
2+35	0.0265	0.17	QV	|	|	|	|
2+40	0.0277	0.18	QV	|	|	|	|
2+45	0.0291	0.19	QV	|	|	|	|
2+50	0.0304	0.20	QV	|	|	|	|
2+55	0.0318	0.20	Q V	|	|	|	|
3+ 0	0.0332	0.20	Q V	|	|	|	|
3+ 5	0.0346	0.20	Q V	|	|	|	|
3+10	0.0360	0.20	Q V	|	|	|	|
3+15	0.0374	0.20	Q V	|	|	|	|
3+20	0.0388	0.21	Q V	|	|	|	|
3+25	0.0402	0.21	Q V	|	|	|	|
3+30	0.0417	0.21	Q V	|	|	|	|
3+35	0.0431	0.21	Q V	|	|	|	|
3+40	0.0445	0.21	Q V	|	|	|	|
3+45	0.0459	0.21	Q V	|	|	|	|
3+50	0.0474	0.21	Q V	|	|	|	|
3+55	0.0489	0.22	Q V	|	|	|	|
4+ 0	0.0505	0.23	Q V	|	|	|	|
4+ 5	0.0522	0.24	Q V	|	|	|	|
4+10	0.0538	0.24	Q V	|	|	|	|
4+15	0.0555	0.24	Q V	|	|	|	|
4+20	0.0572	0.25	Q V	|	|	|	|
4+25	0.0590	0.26	|Q V	|	|	|	|
4+30	0.0609	0.27	|Q V	|	|	|	|
4+35	0.0629	0.28	|Q V	|	|	|	|
4+40	0.0648	0.28	|Q V	|	|	|	|
4+45	0.0668	0.28	|Q V	|	|	|	|
4+50	0.0687	0.29	|Q V	|	|	|	|
4+55	0.0708	0.30	|Q V	|	|	|	|
5+ 0	0.0730	0.32	|Q V	|	|	|	|
5+ 5	0.0752	0.31	|Q V	|	|	|	|
5+10	0.0772	0.29	|Q V	|	|	|	|
5+15	0.0790	0.27	|Q V	|	|	|	|
5+20	0.0808	0.26	|Q V	|	|	|	|
5+25	0.0827	0.27	|Q V	|	|	|	|
5+30	0.0847	0.28	|Q V	|	|	|	|
5+35	0.0867	0.29	|Q V	|	|	|	|
5+40	0.0888	0.30	|Q V	|	|	|	|
5+45	0.0909	0.32	|Q V	|	|	|	|
5+50	0.0931	0.32	|Q V	|	|	|	|
5+55	0.0954	0.32	|Q V	|	|	|	|
6+ 0	0.0976	0.33	|Q V	|	|	|	|
6+ 5	0.0999	0.33	|Q V	|	|	|	|
6+10	0.1022	0.34	|Q V	|	|	|	|
6+15	0.1047	0.36	|Q V	|	|	|	|
6+20	0.1072	0.36	|Q V	|	|	|	|
6+25	0.1097	0.36	|Q V	|	|	|	|
6+30	0.1122	0.37	|Q V	|	|	|	|
6+35	0.1148	0.37	|Q V	|	|	|	|
6+40	0.1175	0.39	|Q V	|	|	|	|
6+45	0.1202	0.40	|Q V	|	|	|	|
6+50	0.1230	0.40	|Q V	|	|	|	|
6+55	0.1258	0.41	|Q V	|	|	|	|
7+ 0	0.1286	0.41	|Q V	|	|	|	|

7+ 5	0.1314	0.41	Q V				
7+10	0.1342	0.41	Q V				
7+15	0.1371	0.41	Q V				
7+20	0.1399	0.41	Q V				
7+25	0.1429	0.43	Q V				
7+30	0.1459	0.44	Q V				
7+35	0.1490	0.45	Q V				
7+40	0.1522	0.47	Q V				
7+45	0.1555	0.48	Q V				
7+50	0.1588	0.49	Q V				
7+55	0.1623	0.50	Q V				
8+ 0	0.1659	0.52	Q V				
8+ 5	0.1695	0.53	Q V				
8+10	0.1734	0.56	Q V				
8+15	0.1775	0.59	Q V				
8+20	0.1816	0.60	Q V				
8+25	0.1857	0.60	Q V				
8+30	0.1899	0.61	Q V				
8+35	0.1942	0.61	Q V				
8+40	0.1985	0.63	Q V				
8+45	0.2029	0.64	Q V				
8+50	0.2074	0.65	Q V				
8+55	0.2121	0.67	Q V				
9+ 0	0.2168	0.68	Q V				
9+ 5	0.2216	0.70	Q V				
9+10	0.2266	0.73	Q V				
9+15	0.2318	0.75	Q V				
9+20	0.2370	0.77	Q V				
9+25	0.2425	0.79	Q V				
9+30	0.2480	0.80	Q V				
9+35	0.2536	0.81	Q V				
9+40	0.2593	0.83	Q V				
9+45	0.2651	0.85	Q V				
9+50	0.2710	0.86	Q V				
9+55	0.2771	0.87	Q V				
10+ 0	0.2832	0.89	Q V				
10+ 5	0.2892	0.87	Q V				
10+10	0.2945	0.77	Q V				
10+15	0.2993	0.70	Q V				
10+20	0.3040	0.67	Q V				
10+25	0.3085	0.66	Q V				
10+30	0.3130	0.65	Q V				
10+35	0.3175	0.66	Q V				
10+40	0.3225	0.72	Q V				
10+45	0.3278	0.77	Q V				
10+50	0.3332	0.79	Q V				
10+55	0.3387	0.80	Q V				
11+ 0	0.3443	0.81	Q V				
11+ 5	0.3498	0.81	Q V				
11+10	0.3553	0.80	Q V				
11+15	0.3608	0.79	Q V				
11+20	0.3662	0.79	Q V				
11+25	0.3716	0.79	Q V				
11+30	0.3770	0.79	Q V				
11+35	0.3824	0.78	Q V				
11+40	0.3876	0.75	Q V				
11+45	0.3926	0.73	Q V				
11+50	0.3975	0.72	Q V				
11+55	0.4026	0.73	Q V				
12+ 0	0.4077	0.74	Q V				
12+ 5	0.4124	0.69	Q V				
12+10	0.4159	0.49	Q V				
12+15	0.4182	0.35	Q V				
12+20	0.4203	0.30	Q V				
12+25	0.4223	0.29	Q V				
12+30	0.4243	0.29	Q V				
12+35	0.4264	0.30	Q V				
12+40	0.4288	0.35	Q V				
12+45	0.4315	0.38	Q V				
12+50	0.4342	0.40	Q V				
12+55	0.4372	0.44	Q V				



18+55	0.5822	0.11	Q	|	|	|	V |
19+ 0	0.5829	0.10	Q	|	|	|	V |
19+ 5	0.5835	0.10	Q	|	|	|	V |
19+10	0.5843	0.11	Q	|	|	|	V |
19+15	0.5851	0.12	Q	|	|	|	V |
19+20	0.5859	0.12	Q	|	|	|	V |
19+25	0.5869	0.14	Q	|	|	|	V |
19+30	0.5879	0.15	Q	|	|	|	V |
19+35	0.5890	0.15	Q	|	|	|	V |
19+40	0.5899	0.14	Q	|	|	|	V |
19+45	0.5908	0.13	Q	|	|	|	V |
19+50	0.5917	0.12	Q	|	|	|	V |
19+55	0.5924	0.11	Q	|	|	|	V |
20+ 0	0.5931	0.10	Q	|	|	|	V |
20+ 5	0.5938	0.10	Q	|	|	|	V |
20+10	0.5945	0.11	Q	|	|	|	V |
20+15	0.5953	0.12	Q	|	|	|	V |
20+20	0.5961	0.12	Q	|	|	|	V |
20+25	0.5970	0.12	Q	|	|	|	V |
20+30	0.5978	0.12	Q	|	|	|	V |
20+35	0.5987	0.12	Q	|	|	|	V |
20+40	0.5995	0.12	Q	|	|	|	V |
20+45	0.6003	0.12	Q	|	|	|	V |
20+50	0.6012	0.12	Q	|	|	|	V |
20+55	0.6019	0.11	Q	|	|	|	V |
21+ 0	0.6025	0.09	Q	|	|	|	V |
21+ 5	0.6032	0.09	Q	|	|	|	V |
21+10	0.6039	0.11	Q	|	|	|	V |
21+15	0.6047	0.12	Q	|	|	|	V |
21+20	0.6055	0.11	Q	|	|	|	V |
21+25	0.6062	0.10	Q	|	|	|	V |
21+30	0.6069	0.09	Q	|	|	|	V |
21+35	0.6075	0.09	Q	|	|	|	V |
21+40	0.6082	0.10	Q	|	|	|	V |
21+45	0.6090	0.11	Q	|	|	|	V |
21+50	0.6098	0.11	Q	|	|	|	V |
21+55	0.6105	0.10	Q	|	|	|	V |
22+ 0	0.6111	0.09	Q	|	|	|	V |
22+ 5	0.6117	0.09	Q	|	|	|	V|
22+10	0.6125	0.10	Q	|	|	|	V|
22+15	0.6133	0.11	Q	|	|	|	V|
22+20	0.6140	0.11	Q	|	|	|	V|
22+25	0.6147	0.10	Q	|	|	|	V|
22+30	0.6154	0.09	Q	|	|	|	V|
22+35	0.6160	0.09	Q	|	|	|	V|
22+40	0.6166	0.09	Q	|	|	|	V|
22+45	0.6172	0.09	Q	|	|	|	V|
22+50	0.6178	0.08	Q	|	|	|	V|
22+55	0.6183	0.08	Q	|	|	|	V|
23+ 0	0.6189	0.08	Q	|	|	|	V|
23+ 5	0.6195	0.08	Q	|	|	|	V|
23+10	0.6201	0.08	Q	|	|	|	V|
23+15	0.6206	0.08	Q	|	|	|	V|
23+20	0.6212	0.08	Q	|	|	|	V|
23+25	0.6218	0.08	Q	|	|	|	V|
23+30	0.6223	0.08	Q	|	|	|	V|
23+35	0.6229	0.08	Q	|	|	|	V|
23+40	0.6235	0.08	Q	|	|	|	V|
23+45	0.6240	0.08	Q	|	|	|	V|
23+50	0.6246	0.08	Q	|	|	|	V|
23+55	0.6252	0.08	Q	|	|	|	V|
24+ 0	0.6258	0.08	Q	|	|	|	V|
24+ 5	0.6263	0.08	Q	|	|	|	V|
24+10	0.6266	0.05	Q	|	|	|	V|
24+15	0.6268	0.03	Q	|	|	|	V|
24+20	0.6269	0.02	Q	|	|	|	V|
24+25	0.6270	0.01	Q	|	|	|	V|
24+30	0.6270	0.01	Q	|	|	|	V|
24+35	0.6271	0.01	Q	|	|	|	V|
24+40	0.6271	0.00	Q	|	|	|	V|
24+45	0.6271	0.00	Q	|	|	|	V|

```
   24+50       0.6271      0.00  Q         |         |         |        V|
   24+55       0.6271      0.00  Q         |         |         |        V|
   25+ 0       0.6272      0.00  Q         |         |         |        V|
   25+ 5       0.6272      0.00  Q         |         |         |        V|
-------------------------------------------------------------------------
```



UNIT HYDROGRAPH ANALYSIS-2YR, 24 HR DURATION STORM EVENT -DMA-2 (PH-2) DEVELOPED CONDITION

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  10/14/20 File: UH2DEV242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 5028

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
RIVERSIDE TEMPLE PH-2
2YR 24 HR EVENT
DEVELOPED CONDITION

------------------------------------------------------------------------
Drainage Area =       8.50(Ac.)  =      0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       8.50(Ac.)  =      0.013 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.196 Hr.
Lag time =    11.76 Min.
25% of lag time =     2.94 Min.
40% of lag time =     4.70 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        8.50           2.20                 18.70

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        8.50           5.50                 46.75

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.200(In)
Area Averaged 100-Year Rainfall =    5.500(In)

Point rain (area averaged) =    2.200(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.200(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
     8.500           56.00          0.200
 Total Area Entered =      8.50(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  56.0      0.511     0.200        0.419       1.000      0.419
                                                 Sum (F) =   0.419
```

Area averaged mean soil loss (F) (In/Hr) = 0.419
Minimum soil loss rate ((In/Hr)) = 0.209
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.740

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	42.517	4.778	0.409
2	0.167	85.034	19.899	1.705
3	0.250	127.551	27.905	2.390
4	0.333	170.068	16.195	1.387
5	0.417	212.585	7.881	0.675
6	0.500	255.102	5.187	0.444
7	0.583	297.619	3.879	0.332
8	0.667	340.136	2.908	0.249
9	0.750	382.653	2.351	0.201
10	0.833	425.170	1.800	0.154
11	0.917	467.687	1.396	0.120
12	1.000	510.204	1.280	0.110
13	1.083	552.721	1.033	0.089
14	1.167	595.238	0.840	0.072
15	1.250	637.755	0.698	0.060
16	1.333	680.272	0.553	0.047
17	1.417	722.789	0.432	0.037
18	1.500	765.306	0.425	0.036
19	1.583	807.823	0.560	0.048
		Sum = 100.000	Sum=	8.566

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.743	0.013	0.00
2	0.17	0.07	0.018	0.740	0.013	0.00
3	0.25	0.07	0.018	0.737	0.013	0.00
4	0.33	0.10	0.026	0.734	0.020	0.01
5	0.42	0.10	0.026	0.731	0.020	0.01
6	0.50	0.10	0.026	0.728	0.020	0.01
7	0.58	0.10	0.026	0.725	0.020	0.01
8	0.67	0.10	0.026	0.723	0.020	0.01
9	0.75	0.10	0.026	0.720	0.020	0.01
10	0.83	0.13	0.035	0.717	0.026	0.01
11	0.92	0.13	0.035	0.714	0.026	0.01
12	1.00	0.13	0.035	0.711	0.026	0.01
13	1.08	0.10	0.026	0.708	0.020	0.01
14	1.17	0.10	0.026	0.706	0.020	0.01
15	1.25	0.10	0.026	0.703	0.020	0.01
16	1.33	0.10	0.026	0.700	0.020	0.01
17	1.42	0.10	0.026	0.697	0.020	0.01
18	1.50	0.10	0.026	0.694	0.020	0.01
19	1.58	0.10	0.026	0.692	0.020	0.01
20	1.67	0.10	0.026	0.689	0.020	0.01
21	1.75	0.10	0.026	0.686	0.020	0.01
22	1.83	0.13	0.035	0.683	0.026	0.01
23	1.92	0.13	0.035	0.681	0.026	0.01
24	2.00	0.13	0.035	0.678	0.026	0.01
25	2.08	0.13	0.035	0.675	0.026	0.01
26	2.17	0.13	0.035	0.672	0.026	0.01
27	2.25	0.13	0.035	0.670	0.026	0.01
28	2.33	0.13	0.035	0.667	0.026	0.01
29	2.42	0.13	0.035	0.664	0.026	0.01
30	2.50	0.13	0.035	0.662	0.026	0.01
31	2.58	0.17	0.044	0.659	0.033	0.01
32	2.67	0.17	0.044	0.656	0.033	0.01

33	2.75	0.17	0.044	0.653	0.033	0.01
34	2.83	0.17	0.044	0.651	0.033	0.01
35	2.92	0.17	0.044	0.648	0.033	0.01
36	3.00	0.17	0.044	0.645	0.033	0.01
37	3.08	0.17	0.044	0.643	0.033	0.01
38	3.17	0.17	0.044	0.640	0.033	0.01
39	3.25	0.17	0.044	0.637	0.033	0.01
40	3.33	0.17	0.044	0.635	0.033	0.01
41	3.42	0.17	0.044	0.632	0.033	0.01
42	3.50	0.17	0.044	0.629	0.033	0.01
43	3.58	0.17	0.044	0.627	0.033	0.01
44	3.67	0.17	0.044	0.624	0.033	0.01
45	3.75	0.17	0.044	0.622	0.033	0.01
46	3.83	0.20	0.053	0.619	0.039	0.01
47	3.92	0.20	0.053	0.616	0.039	0.01
48	4.00	0.20	0.053	0.614	0.039	0.01
49	4.08	0.20	0.053	0.611	0.039	0.01
50	4.17	0.20	0.053	0.608	0.039	0.01
51	4.25	0.20	0.053	0.606	0.039	0.01
52	4.33	0.23	0.062	0.603	0.046	0.02
53	4.42	0.23	0.062	0.601	0.046	0.02
54	4.50	0.23	0.062	0.598	0.046	0.02
55	4.58	0.23	0.062	0.596	0.046	0.02
56	4.67	0.23	0.062	0.593	0.046	0.02
57	4.75	0.23	0.062	0.590	0.046	0.02
58	4.83	0.27	0.070	0.588	0.052	0.02
59	4.92	0.27	0.070	0.585	0.052	0.02
60	5.00	0.27	0.070	0.583	0.052	0.02
61	5.08	0.20	0.053	0.580	0.039	0.01
62	5.17	0.20	0.053	0.578	0.039	0.01
63	5.25	0.20	0.053	0.575	0.039	0.01
64	5.33	0.23	0.062	0.573	0.046	0.02
65	5.42	0.23	0.062	0.570	0.046	0.02
66	5.50	0.23	0.062	0.568	0.046	0.02
67	5.58	0.27	0.070	0.565	0.052	0.02
68	5.67	0.27	0.070	0.563	0.052	0.02
69	5.75	0.27	0.070	0.560	0.052	0.02
70	5.83	0.27	0.070	0.558	0.052	0.02
71	5.92	0.27	0.070	0.555	0.052	0.02
72	6.00	0.27	0.070	0.553	0.052	0.02
73	6.08	0.30	0.079	0.550	0.059	0.02
74	6.17	0.30	0.079	0.548	0.059	0.02
75	6.25	0.30	0.079	0.546	0.059	0.02
76	6.33	0.30	0.079	0.543	0.059	0.02
77	6.42	0.30	0.079	0.541	0.059	0.02
78	6.50	0.30	0.079	0.538	0.059	0.02
79	6.58	0.33	0.088	0.536	0.065	0.02
80	6.67	0.33	0.088	0.533	0.065	0.02
81	6.75	0.33	0.088	0.531	0.065	0.02
82	6.83	0.33	0.088	0.529	0.065	0.02
83	6.92	0.33	0.088	0.526	0.065	0.02
84	7.00	0.33	0.088	0.524	0.065	0.02
85	7.08	0.33	0.088	0.521	0.065	0.02
86	7.17	0.33	0.088	0.519	0.065	0.02
87	7.25	0.33	0.088	0.517	0.065	0.02
88	7.33	0.37	0.097	0.514	0.072	0.03
89	7.42	0.37	0.097	0.512	0.072	0.03
90	7.50	0.37	0.097	0.510	0.072	0.03
91	7.58	0.40	0.106	0.507	0.078	0.03
92	7.67	0.40	0.106	0.505	0.078	0.03
93	7.75	0.40	0.106	0.503	0.078	0.03
94	7.83	0.43	0.114	0.500	0.085	0.03
95	7.92	0.43	0.114	0.498	0.085	0.03
96	8.00	0.43	0.114	0.496	0.085	0.03
97	8.08	0.50	0.132	0.493	0.098	0.03
98	8.17	0.50	0.132	0.491	0.098	0.03
99	8.25	0.50	0.132	0.489	0.098	0.03
100	8.33	0.50	0.132	0.487	0.098	0.03
101	8.42	0.50	0.132	0.484	0.098	0.03
102	8.50	0.50	0.132	0.482	0.098	0.03
103	8.58	0.53	0.141	0.480	0.104	0.04

104	8.67	0.53	0.141	0.477	0.104	0.04
105	8.75	0.53	0.141	0.475	0.104	0.04
106	8.83	0.57	0.150	0.473	0.111	0.04
107	8.92	0.57	0.150	0.471	0.111	0.04
108	9.00	0.57	0.150	0.469	0.111	0.04
109	9.08	0.63	0.167	0.466	0.124	0.04
110	9.17	0.63	0.167	0.464	0.124	0.04
111	9.25	0.63	0.167	0.462	0.124	0.04
112	9.33	0.67	0.176	0.460	0.130	0.05
113	9.42	0.67	0.176	0.457	0.130	0.05
114	9.50	0.67	0.176	0.455	0.130	0.05
115	9.58	0.70	0.185	0.453	0.137	0.05
116	9.67	0.70	0.185	0.451	0.137	0.05
117	9.75	0.70	0.185	0.449	0.137	0.05
118	9.83	0.73	0.194	0.447	0.143	0.05
119	9.92	0.73	0.194	0.444	0.143	0.05
120	10.00	0.73	0.194	0.442	0.143	0.05
121	10.08	0.50	0.132	0.440	0.098	0.03
122	10.17	0.50	0.132	0.438	0.098	0.03
123	10.25	0.50	0.132	0.436	0.098	0.03
124	10.33	0.50	0.132	0.434	0.098	0.03
125	10.42	0.50	0.132	0.432	0.098	0.03
126	10.50	0.50	0.132	0.430	0.098	0.03
127	10.58	0.67	0.176	0.427	0.130	0.05
128	10.67	0.67	0.176	0.425	0.130	0.05
129	10.75	0.67	0.176	0.423	0.130	0.05
130	10.83	0.67	0.176	0.421	0.130	0.05
131	10.92	0.67	0.176	0.419	0.130	0.05
132	11.00	0.67	0.176	0.417	0.130	0.05
133	11.08	0.63	0.167	0.415	0.124	0.04
134	11.17	0.63	0.167	0.413	0.124	0.04
135	11.25	0.63	0.167	0.411	0.124	0.04
136	11.33	0.63	0.167	0.409	0.124	0.04
137	11.42	0.63	0.167	0.407	0.124	0.04
138	11.50	0.63	0.167	0.405	0.124	0.04
139	11.58	0.57	0.150	0.403	0.111	0.04
140	11.67	0.57	0.150	0.401	0.111	0.04
141	11.75	0.57	0.150	0.399	0.111	0.04
142	11.83	0.60	0.158	0.397	0.117	0.04
143	11.92	0.60	0.158	0.395	0.117	0.04
144	12.00	0.60	0.158	0.393	0.117	0.04
145	12.08	0.83	0.220	0.391	0.163	0.06
146	12.17	0.83	0.220	0.389	0.163	0.06
147	12.25	0.83	0.220	0.387	0.163	0.06
148	12.33	0.87	0.229	0.385	0.169	0.06
149	12.42	0.87	0.229	0.383	0.169	0.06
150	12.50	0.87	0.229	0.381	0.169	0.06
151	12.58	0.93	0.246	0.379	0.182	0.06
152	12.67	0.93	0.246	0.377	0.182	0.06
153	12.75	0.93	0.246	0.376	0.182	0.06
154	12.83	0.97	0.255	0.374	0.189	0.07
155	12.92	0.97	0.255	0.372	0.189	0.07
156	13.00	0.97	0.255	0.370	0.189	0.07
157	13.08	1.13	0.299	0.368	0.221	0.08
158	13.17	1.13	0.299	0.366	0.221	0.08
159	13.25	1.13	0.299	0.364	0.221	0.08
160	13.33	1.13	0.299	0.362	0.221	0.08
161	13.42	1.13	0.299	0.361	0.221	0.08
162	13.50	1.13	0.299	0.359	0.221	0.08
163	13.58	0.77	0.202	0.357	0.150	0.05
164	13.67	0.77	0.202	0.355	0.150	0.05
165	13.75	0.77	0.202	0.353	0.150	0.05
166	13.83	0.77	0.202	0.352	0.150	0.05
167	13.92	0.77	0.202	0.350	0.150	0.05
168	14.00	0.77	0.202	0.348	0.150	0.05
169	14.08	0.90	0.238	0.346	0.176	0.06
170	14.17	0.90	0.238	0.344	0.176	0.06
171	14.25	0.90	0.238	0.343	0.176	0.06
172	14.33	0.87	0.229	0.341	0.169	0.06
173	14.42	0.87	0.229	0.339	0.169	0.06
174	14.50	0.87	0.229	0.337	0.169	0.06

175	14.58	0.87	0.229	0.336	0.169	0.06
176	14.67	0.87	0.229	0.334	0.169	0.06
177	14.75	0.87	0.229	0.332	0.169	0.06
178	14.83	0.83	0.220	0.331	0.163	0.06
179	14.92	0.83	0.220	0.329	0.163	0.06
180	15.00	0.83	0.220	0.327	0.163	0.06
181	15.08	0.80	0.211	0.325	0.156	0.05
182	15.17	0.80	0.211	0.324	0.156	0.05
183	15.25	0.80	0.211	0.322	0.156	0.05
184	15.33	0.77	0.202	0.320	0.150	0.05
185	15.42	0.77	0.202	0.319	0.150	0.05
186	15.50	0.77	0.202	0.317	0.150	0.05
187	15.58	0.63	0.167	0.316	0.124	0.04
188	15.67	0.63	0.167	0.314	0.124	0.04
189	15.75	0.63	0.167	0.312	0.124	0.04
190	15.83	0.63	0.167	0.311	0.124	0.04
191	15.92	0.63	0.167	0.309	0.124	0.04
192	16.00	0.63	0.167	0.308	0.124	0.04
193	16.08	0.13	0.035	0.306	0.026	0.01
194	16.17	0.13	0.035	0.304	0.026	0.01
195	16.25	0.13	0.035	0.303	0.026	0.01
196	16.33	0.13	0.035	0.301	0.026	0.01
197	16.42	0.13	0.035	0.300	0.026	0.01
198	16.50	0.13	0.035	0.298	0.026	0.01
199	16.58	0.10	0.026	0.297	0.020	0.01
200	16.67	0.10	0.026	0.295	0.020	0.01
201	16.75	0.10	0.026	0.294	0.020	0.01
202	16.83	0.10	0.026	0.292	0.020	0.01
203	16.92	0.10	0.026	0.291	0.020	0.01
204	17.00	0.10	0.026	0.289	0.020	0.01
205	17.08	0.17	0.044	0.288	0.033	0.01
206	17.17	0.17	0.044	0.286	0.033	0.01
207	17.25	0.17	0.044	0.285	0.033	0.01
208	17.33	0.17	0.044	0.284	0.033	0.01
209	17.42	0.17	0.044	0.282	0.033	0.01
210	17.50	0.17	0.044	0.281	0.033	0.01
211	17.58	0.17	0.044	0.279	0.033	0.01
212	17.67	0.17	0.044	0.278	0.033	0.01
213	17.75	0.17	0.044	0.277	0.033	0.01
214	17.83	0.13	0.035	0.275	0.026	0.01
215	17.92	0.13	0.035	0.274	0.026	0.01
216	18.00	0.13	0.035	0.272	0.026	0.01
217	18.08	0.13	0.035	0.271	0.026	0.01
218	18.17	0.13	0.035	0.270	0.026	0.01
219	18.25	0.13	0.035	0.268	0.026	0.01
220	18.33	0.13	0.035	0.267	0.026	0.01
221	18.42	0.13	0.035	0.266	0.026	0.01
222	18.50	0.13	0.035	0.265	0.026	0.01
223	18.58	0.10	0.026	0.263	0.020	0.01
224	18.67	0.10	0.026	0.262	0.020	0.01
225	18.75	0.10	0.026	0.261	0.020	0.01
226	18.83	0.07	0.018	0.259	0.013	0.00
227	18.92	0.07	0.018	0.258	0.013	0.00
228	19.00	0.07	0.018	0.257	0.013	0.00
229	19.08	0.10	0.026	0.256	0.020	0.01
230	19.17	0.10	0.026	0.255	0.020	0.01
231	19.25	0.10	0.026	0.253	0.020	0.01
232	19.33	0.13	0.035	0.252	0.026	0.01
233	19.42	0.13	0.035	0.251	0.026	0.01
234	19.50	0.13	0.035	0.250	0.026	0.01
235	19.58	0.10	0.026	0.249	0.020	0.01
236	19.67	0.10	0.026	0.248	0.020	0.01
237	19.75	0.10	0.026	0.247	0.020	0.01
238	19.83	0.07	0.018	0.245	0.013	0.00
239	19.92	0.07	0.018	0.244	0.013	0.00
240	20.00	0.07	0.018	0.243	0.013	0.00
241	20.08	0.10	0.026	0.242	0.020	0.01
242	20.17	0.10	0.026	0.241	0.020	0.01
243	20.25	0.10	0.026	0.240	0.020	0.01
244	20.33	0.10	0.026	0.239	0.020	0.01
245	20.42	0.10	0.026	0.238	0.020	0.01

246	20.50	0.10	0.026	0.237	0.020	0.01
247	20.58	0.10	0.026	0.236	0.020	0.01
248	20.67	0.10	0.026	0.235	0.020	0.01
249	20.75	0.10	0.026	0.234	0.020	0.01
250	20.83	0.07	0.018	0.233	0.013	0.00
251	20.92	0.07	0.018	0.232	0.013	0.00
252	21.00	0.07	0.018	0.231	0.013	0.00
253	21.08	0.10	0.026	0.230	0.020	0.01
254	21.17	0.10	0.026	0.229	0.020	0.01
255	21.25	0.10	0.026	0.228	0.020	0.01
256	21.33	0.07	0.018	0.228	0.013	0.00
257	21.42	0.07	0.018	0.227	0.013	0.00
258	21.50	0.07	0.018	0.226	0.013	0.00
259	21.58	0.10	0.026	0.225	0.020	0.01
260	21.67	0.10	0.026	0.224	0.020	0.01
261	21.75	0.10	0.026	0.223	0.020	0.01
262	21.83	0.07	0.018	0.223	0.013	0.00
263	21.92	0.07	0.018	0.222	0.013	0.00
264	22.00	0.07	0.018	0.221	0.013	0.00
265	22.08	0.10	0.026	0.220	0.020	0.01
266	22.17	0.10	0.026	0.220	0.020	0.01
267	22.25	0.10	0.026	0.219	0.020	0.01
268	22.33	0.07	0.018	0.218	0.013	0.00
269	22.42	0.07	0.018	0.218	0.013	0.00
270	22.50	0.07	0.018	0.217	0.013	0.00
271	22.58	0.07	0.018	0.216	0.013	0.00
272	22.67	0.07	0.018	0.216	0.013	0.00
273	22.75	0.07	0.018	0.215	0.013	0.00
274	22.83	0.07	0.018	0.215	0.013	0.00
275	22.92	0.07	0.018	0.214	0.013	0.00
276	23.00	0.07	0.018	0.214	0.013	0.00
277	23.08	0.07	0.018	0.213	0.013	0.00
278	23.17	0.07	0.018	0.213	0.013	0.00
279	23.25	0.07	0.018	0.212	0.013	0.00
280	23.33	0.07	0.018	0.212	0.013	0.00
281	23.42	0.07	0.018	0.211	0.013	0.00
282	23.50	0.07	0.018	0.211	0.013	0.00
283	23.58	0.07	0.018	0.211	0.013	0.00
284	23.67	0.07	0.018	0.210	0.013	0.00
285	23.75	0.07	0.018	0.210	0.013	0.00
286	23.83	0.07	0.018	0.210	0.013	0.00
287	23.92	0.07	0.018	0.210	0.013	0.00
288	24.00	0.07	0.018	0.209	0.013	0.00
Sum =		100.0			Sum =	6.9

Flood volume = Effective rainfall 0.57(In)
times area 8.5(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 1.63(In)
Total soil loss = 1.153(Ac.Ft)
Total rainfall = 2.20(In)
Flood volume = 17648.8 Cubic Feet
Total soil loss = 50231.1 Cubic Feet

Peak flow rate of this hydrograph = 0.644(CFS)

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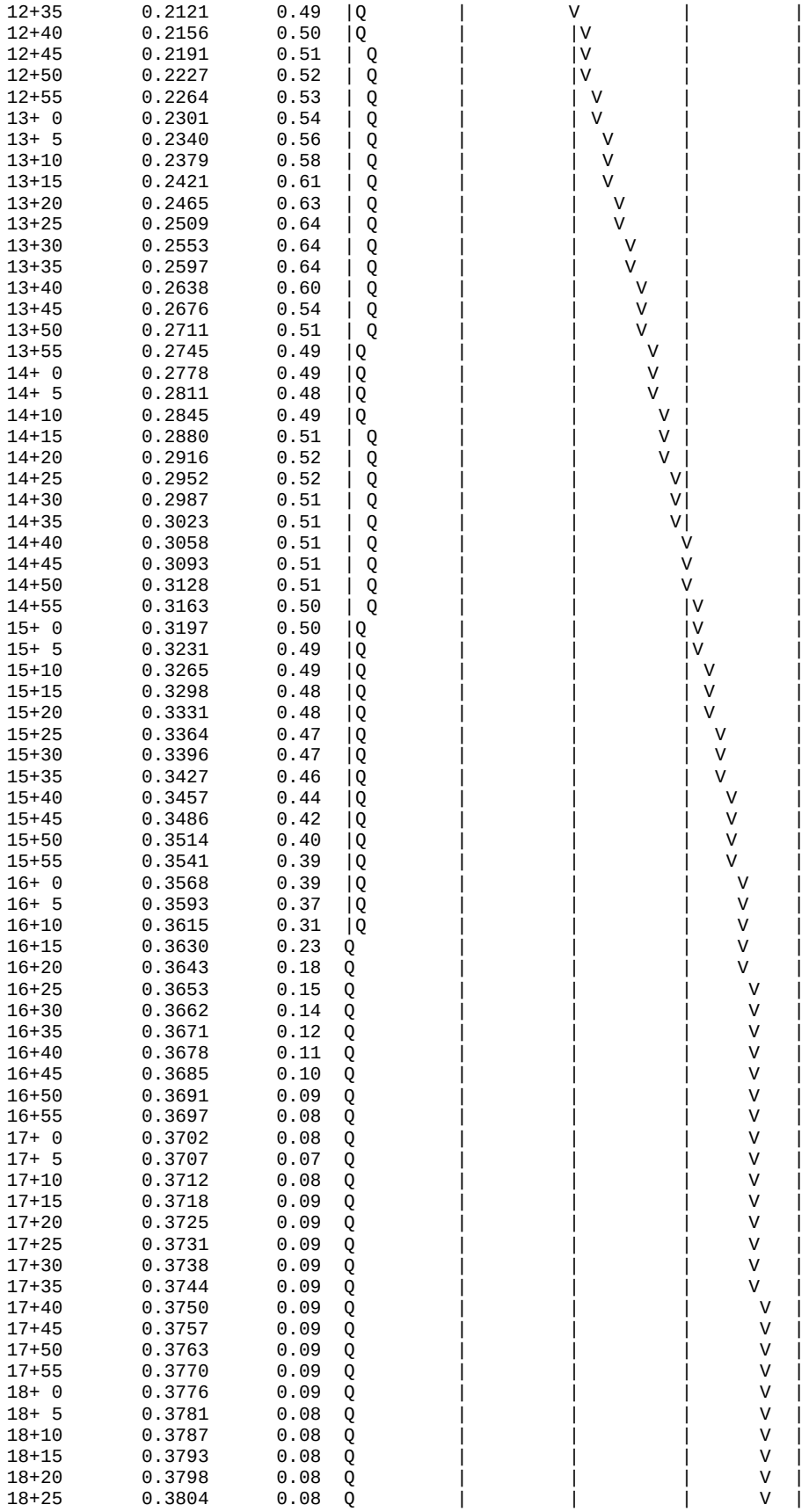
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.02	Q	|	|	|	|
0+20	0.0004	0.03	Q	|	|	|	|
0+25	0.0007	0.03	Q	|	|	|	|
0+30	0.0009	0.04	Q	|	|	|	|
0+35	0.0013	0.05	Q	|	|	|	|
0+40	0.0016	0.05	Q	|	|	|	|

0+45	0.0020	0.05	Q	|	|	|	|
0+50	0.0023	0.05	Q	|	|	|	|
0+55	0.0028	0.06	Q	|	|	|	|
1+ 0	0.0032	0.07	Q	|	|	|	|
1+ 5	0.0037	0.07	Q	|	|	|	|
1+10	0.0041	0.07	Q	|	|	|	|
1+15	0.0046	0.06	Q	|	|	|	|
1+20	0.0050	0.06	Q	|	|	|	|
1+25	0.0054	0.06	Q	|	|	|	|
1+30	0.0058	0.06	Q	|	|	|	|
1+35	0.0062	0.06	Q	|	|	|	|
1+40	0.0066	0.06	Q	|	|	|	|
1+45	0.0071	0.06	Q	|	|	|	|
1+50	0.0075	0.06	Q	|	|	|	|
1+55	0.0079	0.06	Q	|	|	|	|
2+ 0	0.0084	0.07	Q	|	|	|	|
2+ 5	0.0089	0.07	Q	|	|	|	|
2+10	0.0094	0.07	Q	|	|	|	|
2+15	0.0099	0.08	Q	|	|	|	|
2+20	0.0104	0.08	QV	|	|	|	|
2+25	0.0110	0.08	QV	|	|	|	|
2+30	0.0115	0.08	QV	|	|	|	|
2+35	0.0120	0.08	QV	|	|	|	|
2+40	0.0126	0.08	QV	|	|	|	|
2+45	0.0132	0.09	QV	|	|	|	|
2+50	0.0138	0.09	QV	|	|	|	|
2+55	0.0145	0.09	QV	|	|	|	|
3+ 0	0.0151	0.09	QV	|	|	|	|
3+ 5	0.0158	0.09	QV	|	|	|	|
3+10	0.0164	0.10	QV	|	|	|	|
3+15	0.0171	0.10	QV	|	|	|	|
3+20	0.0178	0.10	QV	|	|	|	|
3+25	0.0184	0.10	QV	|	|	|	|
3+30	0.0191	0.10	QV	|	|	|	|
3+35	0.0198	0.10	QV	|	|	|	|
3+40	0.0204	0.10	Q V	|	|	|	|
3+45	0.0211	0.10	Q V	|	|	|	|
3+50	0.0218	0.10	Q V	|	|	|	|
3+55	0.0225	0.10	Q V	|	|	|	|
4+ 0	0.0232	0.11	Q V	|	|	|	|
4+ 5	0.0240	0.11	Q V	|	|	|	|
4+10	0.0248	0.11	Q V	|	|	|	|
4+15	0.0256	0.11	Q V	|	|	|	|
4+20	0.0264	0.12	Q V	|	|	|	|
4+25	0.0272	0.12	Q V	|	|	|	|
4+30	0.0281	0.13	Q V	|	|	|	|
4+35	0.0290	0.13	Q V	|	|	|	|
4+40	0.0299	0.13	Q V	|	|	|	|
4+45	0.0308	0.13	Q V	|	|	|	|
4+50	0.0317	0.13	Q V	|	|	|	|
4+55	0.0327	0.14	Q V	|	|	|	|
5+ 0	0.0337	0.15	Q V	|	|	|	|
5+ 5	0.0347	0.15	Q V	|	|	|	|
5+10	0.0357	0.14	Q V	|	|	|	|
5+15	0.0366	0.13	Q V	|	|	|	|
5+20	0.0374	0.13	Q V	|	|	|	|
5+25	0.0383	0.13	Q V	|	|	|	|
5+30	0.0393	0.13	Q V	|	|	|	|
5+35	0.0402	0.14	Q V	|	|	|	|
5+40	0.0412	0.14	Q V	|	|	|	|
5+45	0.0422	0.15	Q V	|	|	|	|
5+50	0.0432	0.15	Q V	|	|	|	|
5+55	0.0442	0.15	Q V	|	|	|	|
6+ 0	0.0453	0.15	Q V	|	|	|	|
6+ 5	0.0464	0.15	Q V	|	|	|	|
6+10	0.0475	0.16	Q V	|	|	|	|
6+15	0.0486	0.17	Q V	|	|	|	|
6+20	0.0498	0.17	Q V	|	|	|	|
6+25	0.0509	0.17	Q V	|	|	|	|
6+30	0.0521	0.17	Q V	|	|	|	|
6+35	0.0533	0.17	Q V	|	|	|	|

```
 6+40      0.0545      0.18  Q    V    |         |         |         |
 6+45      0.0558      0.18  Q    V    |         |         |         |
 6+50      0.0571      0.19  Q    V    |         |         |         |
 6+55      0.0584      0.19  Q    V    |         |         |         |
 7+ 0      0.0597      0.19  Q    V    |         |         |         |
 7+ 5      0.0611      0.19  Q     V   |         |         |         |
 7+10      0.0624      0.19  Q     V   |         |         |         |
 7+15      0.0637      0.19  Q     V   |         |         |         |
 7+20      0.0651      0.20  Q     V   |         |         |         |
 7+25      0.0665      0.20  Q     V   |         |         |         |
 7+30      0.0679      0.21  Q     V   |         |         |         |
 7+35      0.0693      0.21  Q     V   |         |         |         |
 7+40      0.0708      0.22  Q     V   |         |         |         |
 7+45      0.0723      0.22  Q      V  |         |         |         |
 7+50      0.0739      0.23  Q      V  |         |         |         |
 7+55      0.0755      0.23  Q      V  |         |         |         |
 8+ 0      0.0772      0.24  Q      V  |         |         |         |
 8+ 5      0.0788      0.25  Q      V  |         |         |         |
 8+10      0.0806      0.26  |Q     V  |         |         |         |
 8+15      0.0825      0.27  |Q      V |         |         |         |
 8+20      0.0844      0.28  |Q      V |         |         |         |
 8+25      0.0863      0.28  |Q      V |         |         |         |
 8+30      0.0883      0.28  |Q      V |         |         |         |
 8+35      0.0902      0.29  |Q      V |         |         |         |
 8+40      0.0923      0.29  |Q       V|         |         |         |
 8+45      0.0943      0.30  |Q       V|         |         |         |
 8+50      0.0964      0.30  |Q       V|         |         |         |
 8+55      0.0986      0.31  |Q       V|         |         |         |
 9+ 0      0.1008      0.32  |Q       V|         |         |         |
 9+ 5      0.1030      0.32  |Q        V         |         |         |
 9+10      0.1053      0.33  |Q        V         |         |         |
 9+15      0.1077      0.35  |Q        V         |         |         |
 9+20      0.1102      0.36  |Q        V         |         |         |
 9+25      0.1127      0.36  |Q        |V        |         |         |
 9+30      0.1152      0.37  |Q        |V        |         |         |
 9+35      0.1178      0.38  |Q        |V        |         |         |
 9+40      0.1205      0.39  |Q        |V        |         |         |
 9+45      0.1232      0.39  |Q        | V       |         |         |
 9+50      0.1260      0.40  |Q        | V       |         |         |
 9+55      0.1288      0.41  |Q        | V       |         |         |
10+ 0      0.1316      0.41  |Q        | V       |         |         |
10+ 5      0.1345      0.41  |Q        |  V      |         |         |
10+10      0.1371      0.39  |Q        |  V      |         |         |
10+15      0.1396      0.35  |Q        |  V      |         |         |
10+20      0.1419      0.33  |Q        |   V     |         |         |
10+25      0.1441      0.32  |Q        |   V     |         |         |
10+30      0.1462      0.32  |Q        |   V     |         |         |
10+35      0.1484      0.32  |Q        |   V     |         |         |
10+40      0.1507      0.33  |Q        |   V     |         |         |
10+45      0.1532      0.36  |Q        |    V    |         |         |
10+50      0.1557      0.37  |Q        |    V    |         |         |
10+55      0.1583      0.38  |Q        |    V    |         |         |
11+ 0      0.1609      0.38  |Q        |    V    |         |         |
11+ 5      0.1636      0.38  |Q        |     V   |         |         |
11+10      0.1662      0.38  |Q        |     V   |         |         |
11+15      0.1688      0.38  |Q        |     V   |         |         |
11+20      0.1713      0.37  |Q        |     V   |         |         |
11+25      0.1739      0.37  |Q        |      V  |         |         |
11+30      0.1765      0.37  |Q        |      V  |         |         |
11+35      0.1790      0.37  |Q        |      V  |         |         |
11+40      0.1815      0.36  |Q        |      V  |         |         |
11+45      0.1839      0.35  |Q        |       V |         |         |
11+50      0.1863      0.35  |Q        |       V |         |         |
11+55      0.1887      0.35  |Q        |       V |         |         |
12+ 0      0.1911      0.35  |Q        |       V |         |         |
12+ 5      0.1936      0.36  |Q        |        V|         |         |
12+10      0.1963      0.39  |Q        |        V|         |         |
12+15      0.1992      0.43  |Q        |        V|         |         |
12+20      0.2023      0.45  |Q        |        V|         |         |
12+25      0.2055      0.46  |Q        |         V         |         |
12+30      0.2088      0.48  |Q        |         V         |         |
```



18+30	0.3809	0.08	Q	|	|	|	V |
18+35	0.3815	0.08	Q	|	|	|	V |
18+40	0.3820	0.07	Q	|	|	|	V |
18+45	0.3825	0.07	Q	|	|	|	V |
18+50	0.3829	0.06	Q	|	|	|	V |
18+55	0.3833	0.06	Q	|	|	|	V |
19+ 0	0.3837	0.05	Q	|	|	|	V |
19+ 5	0.3840	0.05	Q	|	|	|	V |
19+10	0.3844	0.05	Q	|	|	|	V |
19+15	0.3847	0.05	Q	|	|	|	V |
19+20	0.3851	0.06	Q	|	|	|	V |
19+25	0.3856	0.06	Q	|	|	|	V |
19+30	0.3860	0.07	Q	|	|	|	V |
19+35	0.3865	0.07	Q	|	|	|	V |
19+40	0.3870	0.07	Q	|	|	|	V |
19+45	0.3874	0.06	Q	|	|	|	V |
19+50	0.3879	0.06	Q	|	|	|	V |
19+55	0.3882	0.06	Q	|	|	|	V |
20+ 0	0.3886	0.05	Q	|	|	|	V |
20+ 5	0.3889	0.05	Q	|	|	|	V |
20+10	0.3893	0.05	Q	|	|	|	V |
20+15	0.3896	0.05	Q	|	|	|	V |
20+20	0.3900	0.06	Q	|	|	|	V |
20+25	0.3904	0.06	Q	|	|	|	V |
20+30	0.3908	0.06	Q	|	|	|	V |
20+35	0.3912	0.06	Q	|	|	|	V |
20+40	0.3916	0.06	Q	|	|	|	V |
20+45	0.3920	0.06	Q	|	|	|	V |
20+50	0.3924	0.06	Q	|	|	|	V |
20+55	0.3928	0.05	Q	|	|	|	V |
21+ 0	0.3931	0.05	Q	|	|	|	V |
21+ 5	0.3934	0.05	Q	|	|	|	V |
21+10	0.3937	0.05	Q	|	|	|	V |
21+15	0.3941	0.05	Q	|	|	|	V |
21+20	0.3945	0.05	Q	|	|	|	V |
21+25	0.3948	0.05	Q	|	|	|	V |
21+30	0.3952	0.05	Q	|	|	|	V|
21+35	0.3955	0.04	Q	|	|	|	V|
21+40	0.3958	0.05	Q	|	|	|	V|
21+45	0.3961	0.05	Q	|	|	|	V|
21+50	0.3965	0.05	Q	|	|	|	V|
21+55	0.3969	0.05	Q	|	|	|	V|
22+ 0	0.3972	0.05	Q	|	|	|	V|
22+ 5	0.3975	0.04	Q	|	|	|	V|
22+10	0.3978	0.05	Q	|	|	|	V|
22+15	0.3982	0.05	Q	|	|	|	V|
22+20	0.3985	0.05	Q	|	|	|	V|
22+25	0.3989	0.05	Q	|	|	|	V|
22+30	0.3992	0.05	Q	|	|	|	V|
22+35	0.3995	0.04	Q	|	|	|	V|
22+40	0.3998	0.04	Q	|	|	|	V|
22+45	0.4001	0.04	Q	|	|	|	V|
22+50	0.4004	0.04	Q	|	|	|	V|
22+55	0.4007	0.04	Q	|	|	|	V|
23+ 0	0.4009	0.04	Q	|	|	|	V|
23+ 5	0.4012	0.04	Q	|	|	|	V|
23+10	0.4015	0.04	Q	|	|	|	V|
23+15	0.4018	0.04	Q	|	|	|	V|
23+20	0.4020	0.04	Q	|	|	|	V|
23+25	0.4023	0.04	Q	|	|	|	V|
23+30	0.4026	0.04	Q	|	|	|	V|
23+35	0.4029	0.04	Q	|	|	|	V|
23+40	0.4031	0.04	Q	|	|	|	V|
23+45	0.4034	0.04	Q	|	|	|	V|
23+50	0.4037	0.04	Q	|	|	|	V|
23+55	0.4039	0.04	Q	|	|	|	V|
24+ 0	0.4042	0.04	Q	|	|	|	V|
24+ 5	0.4045	0.04	Q	|	|	|	V|
24+10	0.4047	0.03	Q	|	|	|	V|
24+15	0.4048	0.02	Q	|	|	|	V|
24+20	0.4049	0.01	Q	|	|	|	V|

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  24+25       0.4049      0.01  Q         |         |         |        V|
  24+30       0.4050      0.01  Q         |         |         |        V|
  24+35       0.4050      0.01  Q         |         |         |        V|
  24+40       0.4051      0.00  Q         |         |         |        V|
  24+45       0.4051      0.00  Q         |         |         |        V|
  24+50       0.4051      0.00  Q         |         |         |        V|
  24+55       0.4051      0.00  Q         |         |         |        V|
  25+ 0       0.4051      0.00  Q         |         |         |        V|
  25+ 5       0.4051      0.00  Q         |         |         |        V|
  25+10       0.4051      0.00  Q         |         |         |        V|
  25+15       0.4052      0.00  Q         |         |         |        V|
  25+20       0.4052      0.00  Q         |         |         |        V|
  25+25       0.4052      0.00  Q         |         |         |        V|
  25+30       0.4052      0.00  Q         |         |         |         V
-------------------------------------------------------------------------
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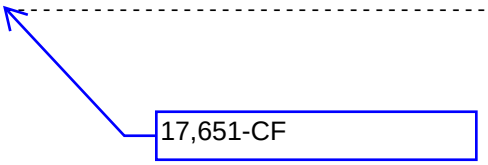

COMBINED VOLUME FROM DMA-1,2 (PH-1,2) IN DEVELOPED CONDITION: 44,972-CF

INCREASE IN VOLUME IN DEVELOPED CONDITION: 32,287 CF

VOLUME PROVIDED IN RETNTION/INFILTRATION BASIN FOR INFILTRATION:1: 37,784 CF

THEREFORE HCOC MITIGATED

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID RET-1	Legend:	Required Entries / Calculated Cells

Company Name: ALLARD ENG Date: 10/15/2020

Designed by: ADAM County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	16	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	37,784	ft^3

Maximum Depth

a) Infiltration rate	I =	2.36	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	2	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	7.1	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		30	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	9446	ft^2
d) Proposed Design Surface Area	A_D =	19037	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	189	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	189	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes:

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 9: O&M

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

Appendix 10: Educational Materials

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