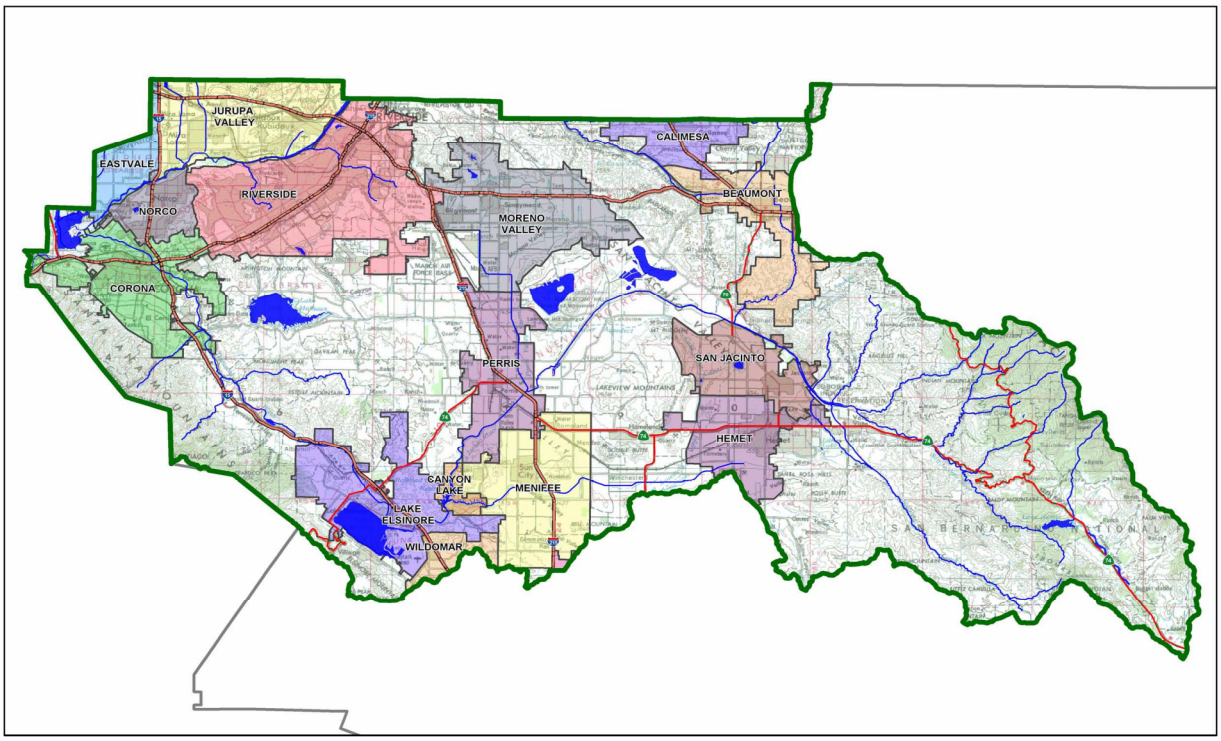
Project Specific Water Quality Management Plan

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

Project Title: Cherry Valley Storage

Development No: CUP230006

Design Review/Case No:



☒ **Preliminary**
☐ **Final**

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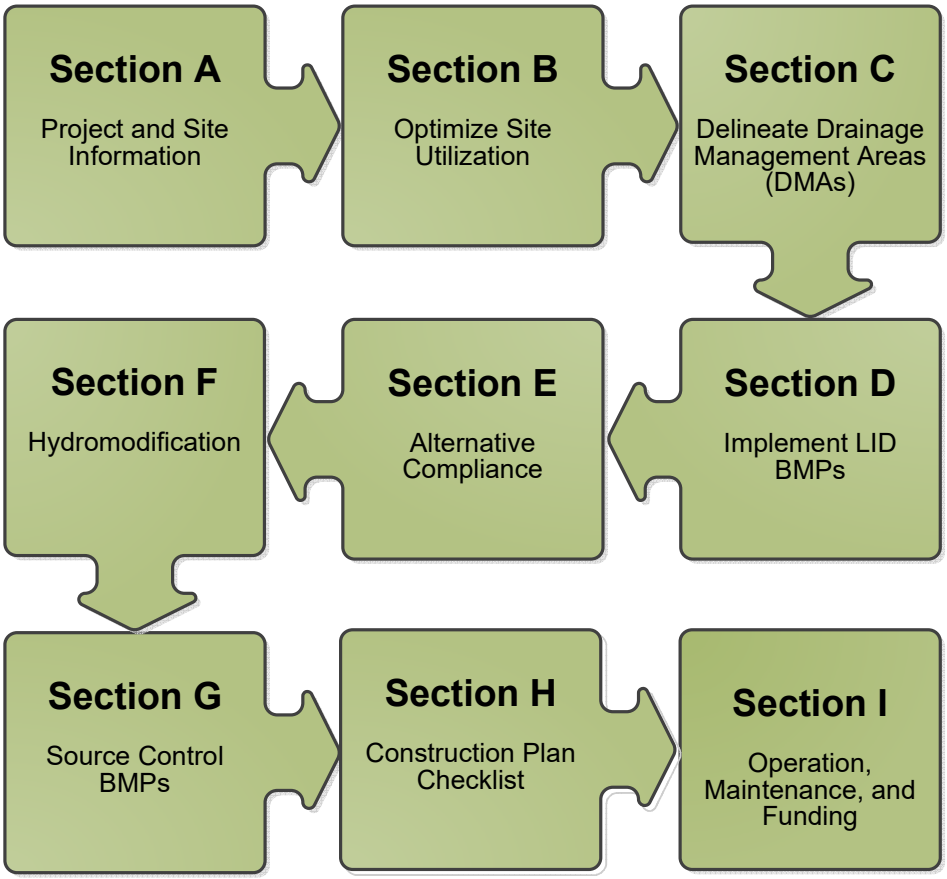
A Brief Introduction

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 AMS Group, LLC by Strand Engineering, Inc. for the Cherry Valley Storage project.

This WQMP is intended to comply with the requirements of Riverside County for Ordinance #754 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under **Error! Reference source not found.** Water Quality Ordinance #754.

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

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

PREPARER'S CERTIFICATION

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

Preparer's Signature	Date
William F. Strand, PE	Engineer
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure: CA Civil #65712

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Section A: Project and Site Information

PROJECT INFORMATION		
Type of Project:	Commercial	
Planning Area:	The Passes	
Community Name:	Cherry Valley	
Development Name:	Cherry Valley Storage	
PROJECT LOCATION		
Latitude & Longitude (DMS): 33°57'46.62" M 116°59'13.69"W		
Project Watershed and Sub-Watershed: Santa Ana River, Little San Gorgonio Creek		
Gross Acres: 8.38 APN(s): 405-230-006 & 010 Map Book and Page No.: 405, 230		
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	Commercial	
Proposed or Potential SIC Code(s)	4225	
Area of Impervious Project Footprint (SF)	365,033	
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	365,033	
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)	6,073	
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)	A	
What is the Water Quality Design Storm Depth for the project?	0.8	

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
Little San Gorgonio Creek	None	MUN, GWR, REC1, REC2, COLD, WILD	0 miles
San Timoteo Creek Reach 3	Indicator Bacteria	GWR, REC1, REC2, WARM, WILD	
Santa Ana River Reach 4	Indicator Bacteria	GWR, REC1, REC2, WARM, WILD, RARE, SPWN	

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 existing site slopes to the southwest. The existing drainage patterns were maintained.

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

The existing site does not have any native vegetation.

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

Yes. The existing infiltration capacity is maintained at the three proposed retention basins.

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

Yes. Landscaped areas were provided where feasible.

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

No. Runoff is routed to three proposed retention basins.

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
P-1	Pavement	24,989	Type D – "Area Draining to BMP"
P-2	Pavement	33,004	Type D – "Area Draining to BMP"
P-3	Pavement/Basin	62,213	Type D – "Area Draining to BMP"
P-4	Pavement/Building	34,566	Type D – "Area Draining to BMP"
P-5	Pavement/Building	33,951	Type D – "Area Draining to BMP"
P-6	Pavement/Building	46,235	Type D – "Area Draining to BMP"
P-7	Pavement/Building	53,144	Type D – "Area Draining to BMP"
P-8	Pavement/Building/Basin	35,223	Type D – "Area Draining to BMP"
P-9	Pavement/Basin	8,318	Type D – "Area Draining to BMP"

[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)	Storm Depth (inches)	DMA Name / ID	[C] from Table C.4 =	Required Retention Depth (inches)

		[A]	[B]		[C]	[D]

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

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

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

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

DMA Name or ID	BMP Name or ID
P1-P3	Retention Basin 1
P-4-P8	Retention Basin 2
P9	Retention Basin 3

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:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

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

D.2 Harvest and Use Assessment

Please check what applies*:*

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

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

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

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

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape: 0.5 AC

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

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: 8.33 AC

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

Enter your EIATIA factor: 1.05

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

Minimum required irrigated area: 8.78 AC

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

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
8.78 AC	0.5 AC

Toilet Use Feasibility

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

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

Projected Number of Daily Toilet Users: 2

Project Type: Commercial

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

Total Area of Impervious Surfaces: 8.33 AC

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

Enter your TUTIA factor: 185

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: 1,541

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)
1,541	2

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.

N/A

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: N/A

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:

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:

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:

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)**
N/A	N/A

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	
P1-P3	☒	☐	☐	☐	☐
P4-P8	☒	☐	☐	☐	☐
P9-P10	☒	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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

N/A

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 1*		
	[A]		[B]	[C]	[A] x [C]			
P-1	*24,989*	*Pavement*	*1*	*0.89*	*22,240*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
P-2	*53,811*	*Pavement*	*1*	*0.89*	*47,891*			
P-3	*62,143*	*Pvmt/Basin*	*0.91*	*0.75*	*46,607*			
	140,943				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
					116,738	0.8	7,783	12,780

[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

Table D.4 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 2*		
	[A]		[B]	[C]	[A] x [C]			
P-4	*34,566*	*Pvmt/Bldg*	*1*	*0.89*	*30,764*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
P-5	*33,951*	*Pvmt/Bldg*	*1*	*0.89*	*30,216*			
P-6	*46,235*	*Pvmt/Bldg*	*1*	*0.89*	*41,149*			
P-7	*53,144*	*Pvmt/Bldg*	*1*	*0.89*	*47,298*			
P-8	*28,044*	*Pvmt/ Bldg/Basin*	*0.68*	*0.48*	*13,461*			
	195,940				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
					162,888	0.8	10,859	18,311

[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

Table D.5 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 3*		
	[A]		[B]	[C]	[A] x [C]			
P-9	*15,497*	*Pvmt/Basin*	*0.55*	*0.37*	*5,734*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
P-10	*6,636*	*Pvmt/Landscape*	*0.94*	*0.79*	*5,242*			
	15,497				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
					10,976	0.8	732	2,998

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

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

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

Section E: Alternative Compliance (LID Waiver Program)

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

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

- *Or* -

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

N/A

E.1 Identify Pollutants of Concern

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

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

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

[1]Cannot Exceed 50%

[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria

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

Table E.3 Treatment Control BMP Sizing

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

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

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
N/A		

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

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

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

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

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

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

INSERT TEXT HERE

F.2 HCOC Mitigation

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

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

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

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

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

HCOC Mitigation – Condition C - The Pre-Development 2-YR runoff is 0.01 CFS and the Post-Development 2-YR runoff is 0 CFS (Hydrographs 15 & 17 from Hydroflow run in Hydrology Study). Condition is met because the post-development 2-year peak flow is less than the pre-development 2-year peak flow.

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
Storm Drain Inlets	Inlet Stencils	Repaint, Stencils, Provide Information to New Owners
Landscape/Outdoor Pesticide		Provide IPM information to New Owners
Refuge Areas	Do Not Dump Hazardous Material Signs	Inspection, Cleanup, Maintenance
Street Sweeping		Sweep Driveways and parking regularly

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)
1	Retention Basin 1	2	116°59'13.25", 33°57'50.17"
1	Retention Basin 2	2	116°59'12.64", 33°57'43.96"
3	Retention Basin 3	2	116°59'12.38", 33°57'42.82"

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism: Owner Funded, Annual Maintenance Budget

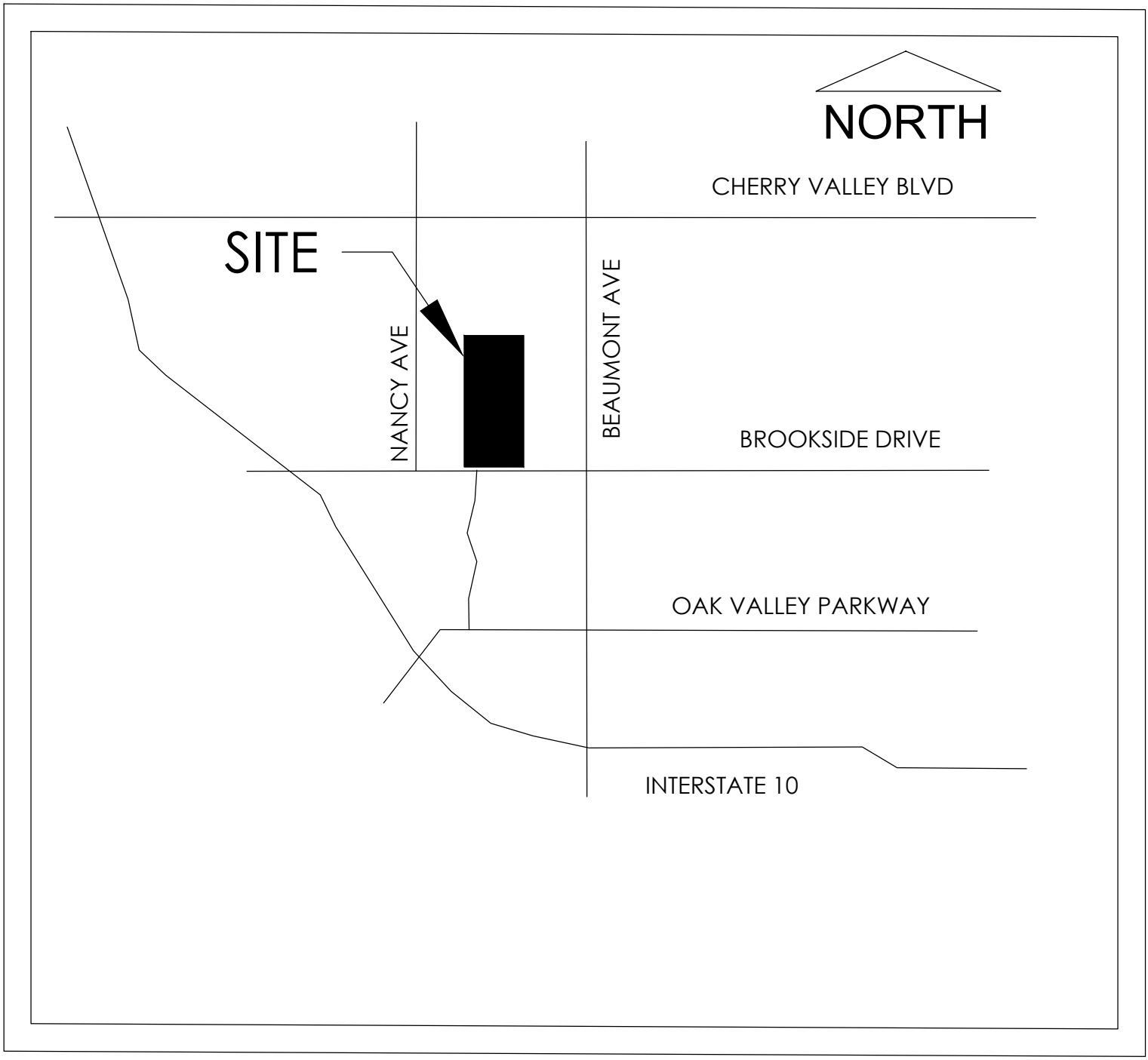
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ 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.

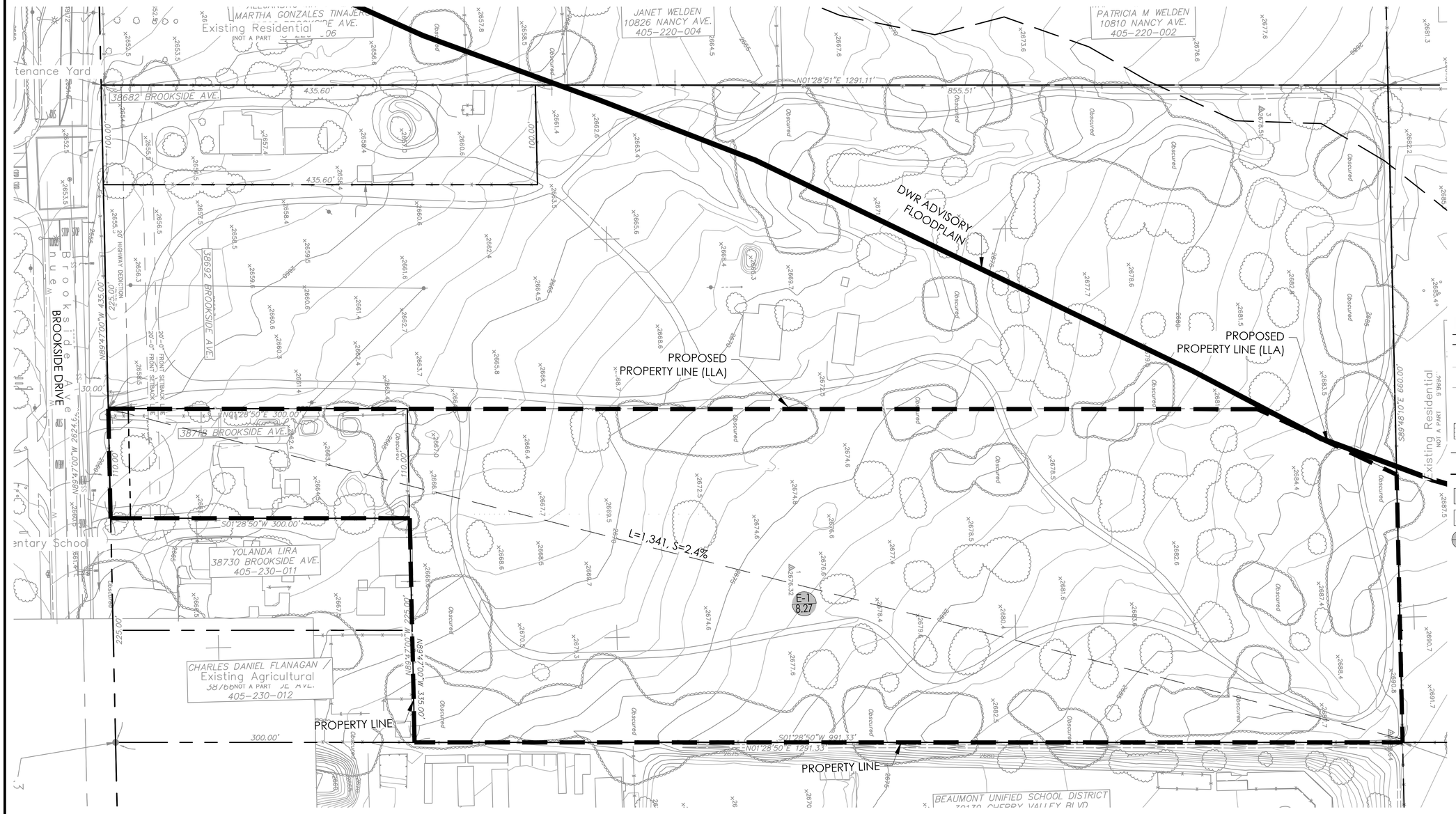
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



VICINITY MAP

NOT TO SCALE



LEGEND

- PROPERTY LINE
- 102.0 — EXISTING CONTOURS
- SD — EXISTING STORM DRAIN
- PROPOSED DRAIN INLET
- PROPOSED LANDSCAPE
- 102 — PROPOSED CONTOURS
- 10" SD — PROPOSED STORM DRAIN
- PROPOSED AC PAVEMENT
- PROPOSED PCC PAVEMENT
- SUBAREA ACREAGE — SUBAREA / ACREAGE

0 50 100 150 feet

1"=50'

SUB-BASIN TABLE

SUBAREA	AREA (AC)	L (FT)	Tc (MIN)	I2(in/hr)	I10(in/hr)	I 100(in/hr)	C	Q2	Q10	Q100
E-1	8.27	1,341	53	0.31	0.98	1.47	0.03	0.01	0.23	0.37

NO.	REVISIONS	RECMD'D	APPRV'D	DATE
1				

811 Know what's **below.** **Call** before you dig.

RECOMMENDED FOR APPROVAL:

OCTOBER 20, 2023

OWNER/DEVELOPER

AMS GROUP, LLC
4758 RODEO LANE
LA VERNE, CA 91750
(626) 922-6343

GEOTECHNICAL/GEOLOGICAL FIRM

INLAND FOUNDATION ENGINEERING
1310 S. SANTA FE AVE.
SAN JACINTO, CA 92581
(951) 654-1555

SOILS ENGINEER DATE

SEAL

CIVIL ENGINEERING FIRM

STRAND ENGINEERING, INC.
1001 Avenida Pico, Ste. C-121, San Clemente, CA 92673 (949) 431-0610

UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER DATE

SEAL

REGISTERED PROFESSIONAL ENGINEER
WILLIAM FREDERICK STRAND
No. C 65712
exp. 9/30/25
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY
APPROVED BY:

CITY ENGINEER LIC. DATE

EXISTING DRAINAGE FOR CHERRY VALLEY STORAGE

38718 BROOKSIDE DRIVE, CHERRY VALLEY, CA

GRADING PERMIT NO.

SHEET 1 OF 3

JOB NO. 1036

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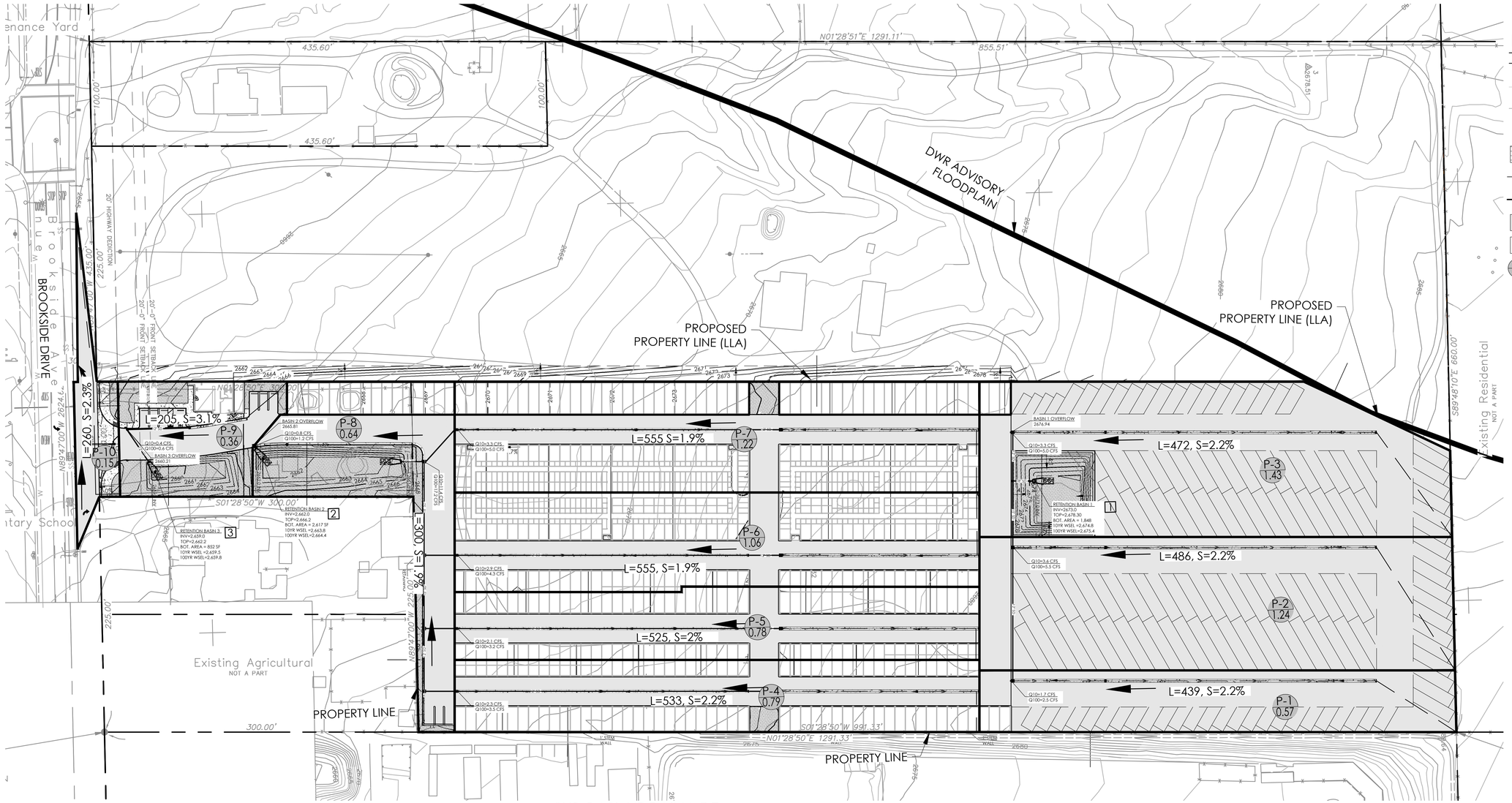

LEGEND

- PROPERTY LINE
- 2660 — EXISTING CONTOURS
- SD — EXISTING STORM DRAIN
- PROPOSED DRAIN INLET
- PROPOSED LANDSCAPE
- 2670 — PROPOSED CONTOURS
- 10" SD — PROPOSED STORM DRAIN
- PROPOSED AC PAVEMENT
- PROPOSED PCC PAVEMENT
- SUBAREA ACREAGE — SUBAREA /DRAINAGE MANAGEMENT AREA
- 1 — STRUCTURAL BMP - RETENTION BASIN 1
- 2 — STRUCTURAL BMP - RETENTION BASIN 2
- 3 — STRUCTURAL BMP - RETENTION BASIN 3

SOURCE CONTROL BMPS

- STREET SWEEPING
- LANDSCAPE/OUTDOOR PESTICIDE
- REFUGE AREAS
- INLET STENCILS

0 50 100 150 feet

1"=50'

SUB-BASIN/DRAINAGE MANAGEMENT AREA TABLE

SUBAREA/ DMA	AREA (AC)	L (FT)	Tc (MIN)	C	Q10 (CFS)	Q100 (CFS)
P-1	0.57	439	6	0.9	1.7	2.5
P-2	1.24	486	6	0.9	3.6	5.5
P-3	1.43	472	8	0.82	3.3	5.0
P-4	0.79	533	6	0.9	2.3	3.5
P-5	0.78	525	7	0.9	2.1	3.2
P-6	1.06	555	7	0.9	2.9	4.3
P-7	1.22	555	7	0.9	3.3	5.0
P-8	0.64	300	13	0.6	0.8	1.2
P-9	0.36	205	11	0.48	0.4	0.6
P-10	0.15	260	6	0.84	0.4	0.6

STRUCTURAL BMP TABLE

BMP	BMP Type	Trib Area	DCV	Vol Provided	Latitude	Longitude
1	RETENTION BASIN	3.24 AC	7,783 CF	14,940 CF	116°59'13.25"	33°57'50.17"
2	RETENTION BASIN	4.50 AC	10,859 CF	15,936 CF	116°59'12.64"	33°57'43.96"
3	RETENTION BASIN	0.36 AC	732*	2,933 CF	116°59'12.38"	33°57'42.82"

* - BASIN 3 IS SIZED FOR SUBAREA P-9 + OVERDETAINS FOR SUBAREA P-10

NO.	REVISIONS	RECMD'D	APPRV'D	DATE
1				

811 Know what's below. Call before you dig.

RECOMMENDED FOR APPROVAL:

NOVEMBER 27, 2023

OWNER/DEVELOPER
AMS GROUP, LLC
4758 RODEO LANE
LA VERNE, CA 91750
(626) 922-6343

GEOTECHNICAL/GEOLOGICAL FIRM
INLAND FOUNDATION ENGINEERING
1310 S. SANTA FE AVE.
SAN JACINTO, CA 92581
(951) 654-1555

SOILS ENGINEER DATE

SEAL

CIVIL ENGINEERING FIRM
STRAND ENGINEERING, INC.
1001 Avenida Pico, Ste. C-121, San Clemente, CA 92673 (949) 431-0610

UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER WILLIAM FREDERICK STRAND No. C 65712 exp. 9/30/25 CIVIL STATE OF CALIFORNIA
NOT FOR CONSTRUCTION

RIVERSIDE COUNTY
APPROVED BY:

CITY ENGINEER LIC. DATE

PROPOSED DRAINAGE
FOR
CHERRY VALLEY STORAGE
38718 BROOKSIDE DRIVE, CHERRY VALLEY, CA

GRADING PERMIT NO.

SHEET 2 OF 3

JOB NO. 1036

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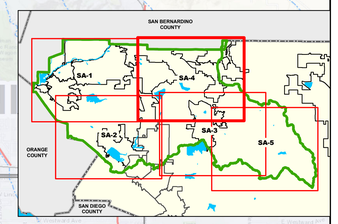
NPDES MUNICIPAL PERMIT
SANTA ANA RIVER WATERSHED
EXHIBIT SA-4
(MORENO VALLEY, PERRIS, CALIMESA, BEAUMONT, SAN JACINTO AREAS)

- CITY MS4 FACILITIES
- COUNTY MS4 FACILITIES
- RCFC&WCD MS4 FACILITIES
- OTHER FACILITIES
- MAJOR OUTFALL SITES
- SAR CORE MONITORING STATIONS
- SANTA ANA RIVER WATERSHED BOUNDARY
- LANDFILL SITES
- SEWAGE TREATMENT PLANTS
- SANTA ANA RIVER/SAN JACINTO RIVER
- BLUE LINE STREAMS
- RIVERSIDE COUNTY BOUNDARY
- INCORPORATED AREAS
- FREEWAYS/HIGHWAYS
- PRIMARY STREETS

N

0 0.5 1 1.5 2 MILES

UPDATED NOVEMBER 2017



SAN BERNARDINO COUNTY
RIVERSIDE COUNTY

CALIMESA
BEAUMONT
MORENO VALLEY
PERRIS
SAN JACINTO
BANNI

SITE

SUNNYMEAD MASTER DRAINAGE PLAN - LINE R-15
SUNNYMEAD MASTER DRAINAGE PLAN - LINE H
SUNNYMEAD MASTER DRAINAGE PLAN - LINE R-7
SUNNYMEAD MASTER DRAINAGE PLAN - LINE R-2
SUNNYMEAD MASTER DRAINAGE PLAN - LINE R-4
SUNNYMEAD - CENTERPOINTE STORM DRAIN
MORENO MASTER DRAINAGE PLAN - LINE F-2
MORENO MASTER DRAINAGE PLAN - LINE F-3
PERRIS VALLEY MASTER DRAINAGE PLAN - LINE B-3
PERRIS VALLEY MASTER DRAINAGE PLAN - LINE S-1
PERRIS VALLEY MASTER DRAINAGE PLAN - LINE A-1
PERRIS VALLEY MASTER DRAINAGE PLAN - LINE D
BEAUMONT MASTER DRAINAGE PLAN - LINE 6
SAN JACINTO MASTER DRAINAGE PLAN - LINE 6

SAR-2015 ArcRgn_MS4 Maps_Map4.mxd

Appendix 2: Construction Plans

Grading and Drainage Plans

CHERRY VALLEY STORAGE

38718 BROOKSIDE DRIVE
RIVERSIDE COUNTY
STATE OF CALIFORNIA
APN: 405-230-010
CUP230006

CONSTRUCTION NOTES:

1. SAWCUT EX. PAVEMENT
2. INSTALL 6" CURB AND GUTTER PER STD. 200
3. INSTALL DRIVEWAY PER STD. 207A
4. INSTALL PCC SIDEWALK PER STD. 401
5. INSTALL AC PAVEMENT (3"AC/6"AB)
6. INSTALL A1-6 CURB PER SPPWC STD. 120-2
7. INSTALL 3' WIDE PCC VALLEY GUTTER
8. INSTALL CURB RAMP CASE A PER STD. 403
9. INSTALL 4" WHITE STRIPING
10. INSTALL ACCESSIBLE PARKING STRIPING AND SIGNAGE
11. 8' FREESTANDING BLOCK WALL PER ARCHITECTURE
12. INSTALL DETAIL DETAIL 27C PER CAMUTCD
13. INSTALL TYPE IV (R) ARROW PER CAMUTCD
14. INSTALL TYPE VI (R) ARROW PER CAMUTCD
15. INSTALL 3' WIDE CONC. V-DITCH
16. INSTALL CONCRETE WHEELSTOPS MIN. 2' FROM CURB

FIRE CONSTRUCTION NOTES:

F1. 8" FIRE BACKFLOW & FDC PER BCVWD PLATE 7
F2. INSTALL 8" DIP FIRE LINE (CL150) PER BCVWD PLATE 6-2
F3. INSTALL FH PER BCVWD PLATE 1

WATER CONSTRUCTION NOTES

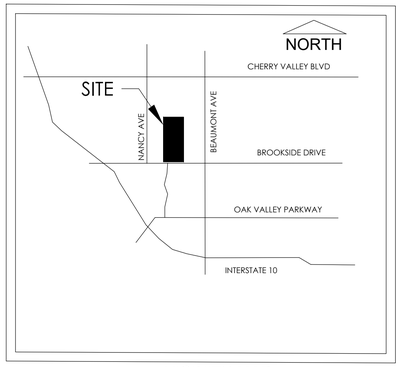
W1. INSTALL 1" DOMESTIC SERVICE PER BCVWD PLATE 6-3
W2. INSTALL 1 TYPE K COPPER WATER LINE PER BCVWD PLATE 6-2
W3. INSTALL 1" IRRIGATION SERVICE PER BCVWD PLATE 6-3 W/ REDUCED PRESSURE BACKFLOW IN CAGE

STORM DRAIN CONSTRUCTION NOTES

D1. INSTALL HDPP STORM DRAIN LINE (HP STORM OR EQUAL)
D2. INSTALL 24"X24" CONCRETE CATCH BASIN (OLDCASTLE OR EQUAL)
D3. INSTALL NYLOPLAST DRAIN BASIN
D4. INSTALL FLARED END SECTION
D5. INSTALL PIPE OUTLET (HEADWALL AND RIPRAP PER STD. 314
D6. INSTALL 3' CURB CUT

SEWER CONSTRUCTION NOTES

S1. INSTALL 6" PVC SEWER
S2. INSTALL ADVANCED TREATMENT UNIT SEPTIC SYSTEM
S3. INSTALL SEEPAGE PITS PER GEOTECH REPORT



VICINITY MAP
NOT TO SCALE

LEGAL DESCRIPTION

ADJUSTED PARCEL PER THE LOT LINE ADJUSTMENT BEING PROCESSED CONCURRENTLY.

APN 405-230-010
AREA: 8.38 AC

CIVIL ENGINEER

STRAND ENGINEERING, INC.
CONTACT: WILLIAM STRAND, PE
1001 AVENIDA PICO C-121
SAN CLEMENTE, CA 92673
(949) 431-0610

ARCHITECT

arclogica
CONTACT: LINDSEY ENGELS
(949) 409-1259

UTILITY CONTACT INFORMATION

WATER: BEAUMONT CHERRY VALLEY WATER DISTRICT (951) 845-9581
SEWER: SEPTIC
STORM DRAINAGE: RIVERSIDE COUNTY (951) 955-1200
ELECTRIC: SOUTHERN CALIFORNIA EDISON (800) 611-1911

BENCHMARK

COUNTY OF RIVERSIDE BENCHMARK C-2-4-65, ON TOP OF BRIDGE WING WALL AT THE SOUTHWEST CORNER OF BROOKSIDE AVE. AND CHERRY AVE.

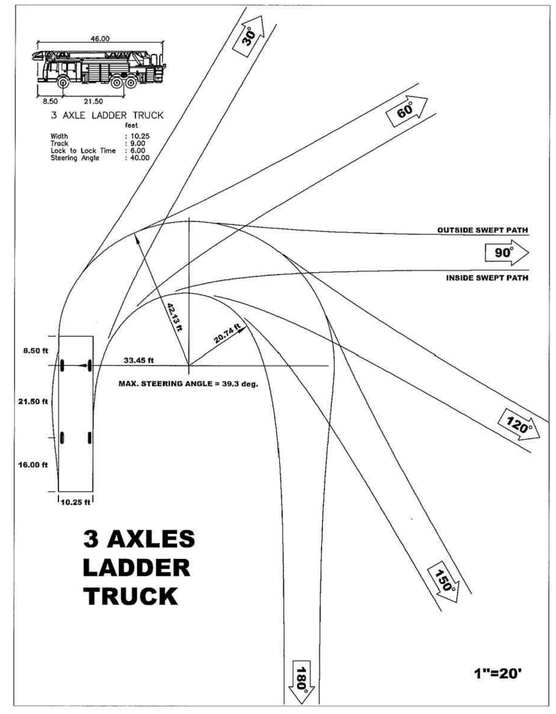
ELEV = 2758.083
DATUM: NGVD 29

SOURCE OF TOPOGRAPHY

TOPOGRAPHIC SURVEY CONDUCTED 6/6/2022 BY
TERRASCRIBE, INC

EARTHWORK

CUT = 14,500
FILL= 12,500
NET IMPORT= 6,000



TURNING TEMPLATE USED FOR LEFT IN AND OUT OF SITE AT BROOKSIDE

NO.	REVISIONS	RECMD'D	APPRV'D	DATE
1				

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RECOMMENDED FOR APPROVAL:

NOVEMBER 27, 2023

OWNER/DEVELOPER

AMS GROUP, LLC
4758 RODEO LANE
LA VERNE, CA 91750
(626) 922-6343

GEOTECHNICAL/GEOLOGICAL FIRM

INLAND FOUNDATION ENGINEERING
1310 S. SANTA FE AVE.
SAN JACINTO, CA 92581
(951) 654-1555

SOILS ENGINEER DATE

SEAL

CIVIL ENGINEERING FIRM

STRAND ENGINEERING, INC.
1001 Avenida Pico, Ste. C-121, San Clemente, CA 92673 (949) 431-0610

UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER DATE

SEAL

REGISTERED PROFESSIONAL ENGINEER WILLIAM FREDERICK STRAND No. C 85712 exp. 9/30/25 CIVIL STATE OF CALIFORNIA

NOT FOR CONSTRUCTION

RIVERSIDE COUNTY
APPROVED BY:

CITY ENGINEER LIC. DATE

PRELIMINARY GRADING PLAN
FOR
CHERRY VALLEY STORAGE

38718 BROOKSIDE DRIVE, CHERRY VALLEY, CA

GRADING PERMIT NO.

SHEET 1 OF 3

JOB NO. 1036

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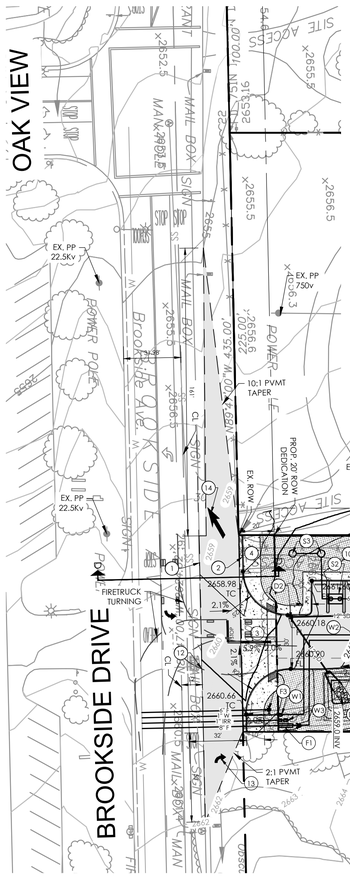

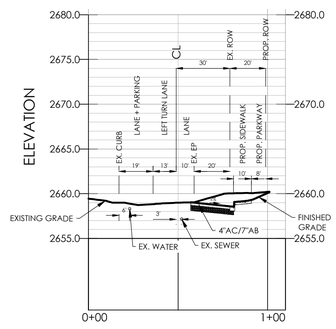

BROOKSIDE DRIVE
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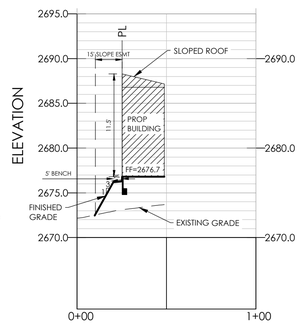
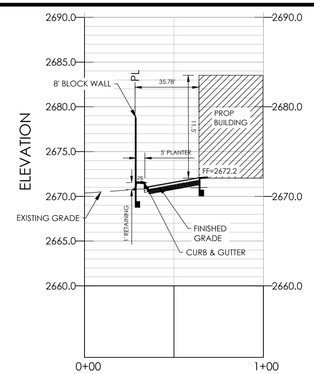


SECTION A-A
1"=40'



SECTION B-B
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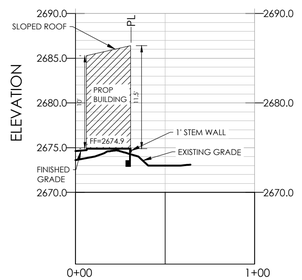

SECTION C-C
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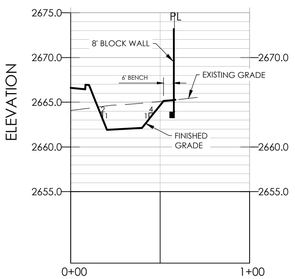
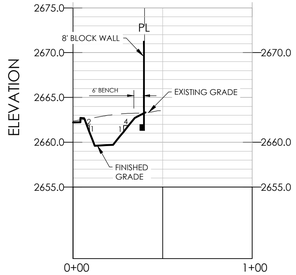


BASIN 2
1"=40'



BASIN 3
1"=40'

0 20 40 80 120 feet
1"=40'

LEGEND

- S — EX. SEWER LINE
- W — EX. WATER LINE
- SD — EX. STORM DRAIN LINE
- ELEC — EX. UNDERGROUND ELECTRICAL
- TELE — EX. TELEPHONE
- 2672 — EX. CONTOUR LINE
- WATER VALVE
- FIRE HYDRANT
- EX. PARKING LOT LIGHT
- DRAIN BASIN
- 102.00' — SPOT ELEVATION
- 2682 — PROP. CONTOUR LINE
- F — PROP. FIRE LINE
- SD — PROP. STORM DRAIN LINE
- PROP. MASONRY WALL
- AC PVMT
- CONCRETE
- LANDSCAPE

NOTE: PAD GRADE = FINISHED FLOOR MINUS 0.67'

NO.	REVISIONS	RECM'D	APPRV'D	DATE
1				

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NOVEMBER 27, 2023

OWNER/DEVELOPER
AMS GROUP, LLC
4758 RODEO LANE
LA VERNE, CA 91750
(626) 922-6343

GEOTECHNICAL/GEOLOGICAL FIRM
INLAND FOUNDATION ENGINEERING
1310 S. SANTA FE AVE.
SAN JACINTO, CA 92581
(951) 654-1555

SOILS ENGINEER — DATE

SEAL

CIVIL ENGINEERING FIRM
STRAND ENGINEERING, INC.
1001 Avenida Pico, Ste. C-121, San Clemente, CA 92673 (949) 431-0610

UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER — DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER — WILLIAM FREDERICK STRAND — No. C 65712 — exp. 9/30/25 — CIVIL — STATE OF CALIFORNIA

RIVERSIDE COUNTY
APPROVED BY:

CITY ENGINEER — LIC. — DATE

PRELIMINARY GRADING PLAN
FOR
CHERRY VALLEY STORAGE

38718 BROOKSIDE DRIVE, CHERRY VALLEY, CA

GRADING PERMIT NO.

SHEET 2 OF 3

JOB NO. 1036

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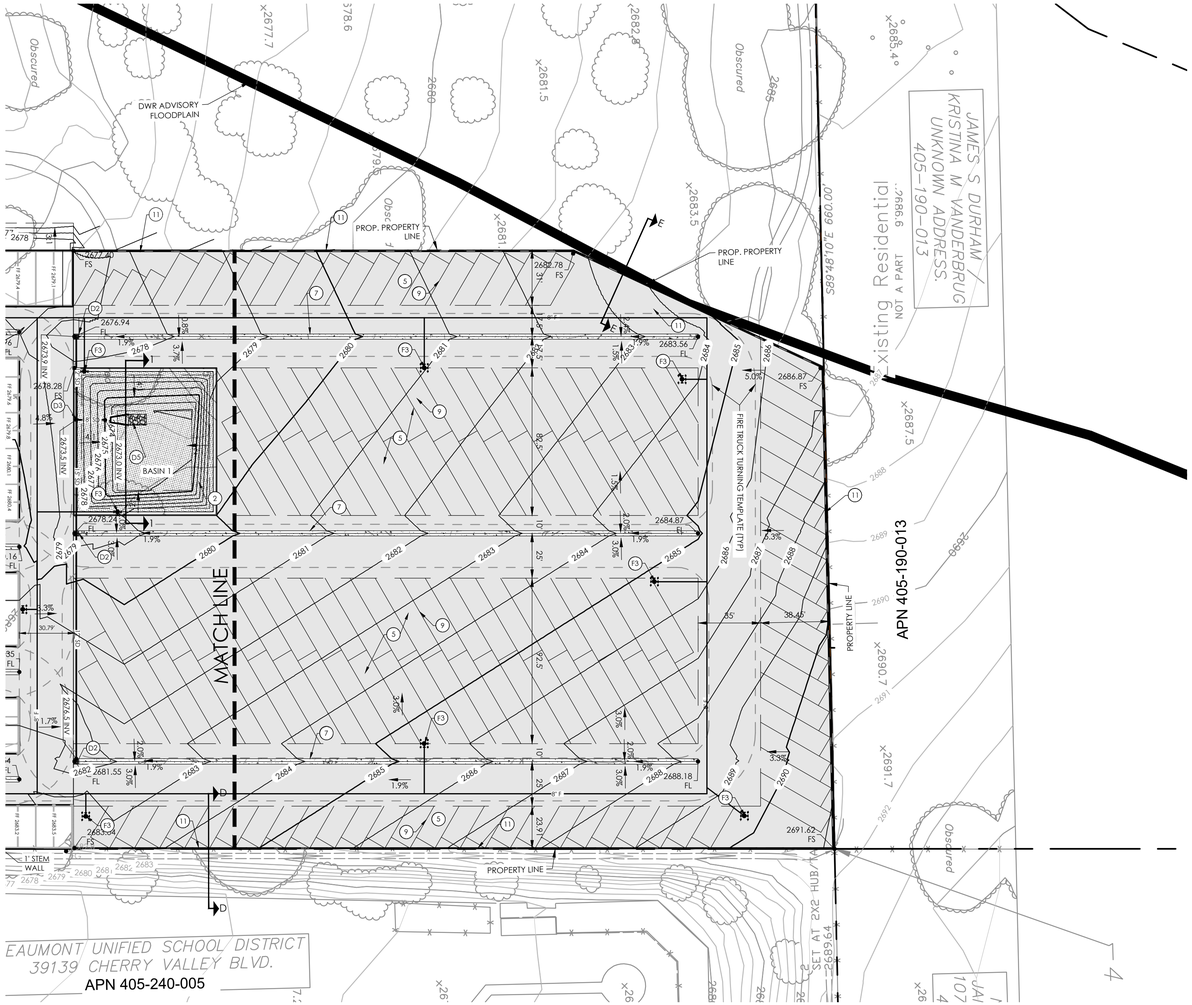

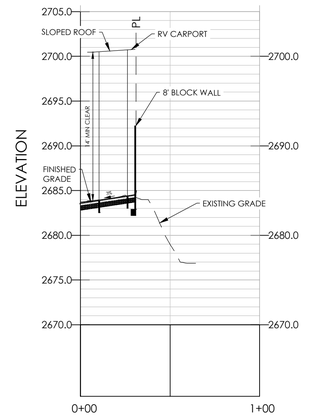

SECTION D-D
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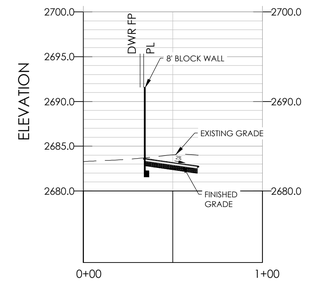

SECTION E-E
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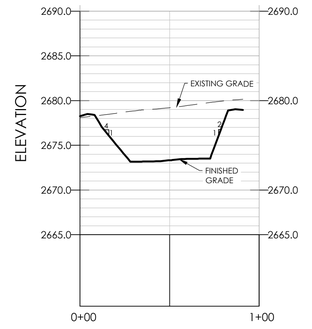

BASIN 1 SECTION
1"=40'

LEGEND

- S — EX. SEWER LINE
- W — EX. WATER LINE
- SD — EX. STORM DRAIN LINE
- ELEC — EX. UNDERGROUND ELECTRICAL
- TELE — EX. TELEPHONE
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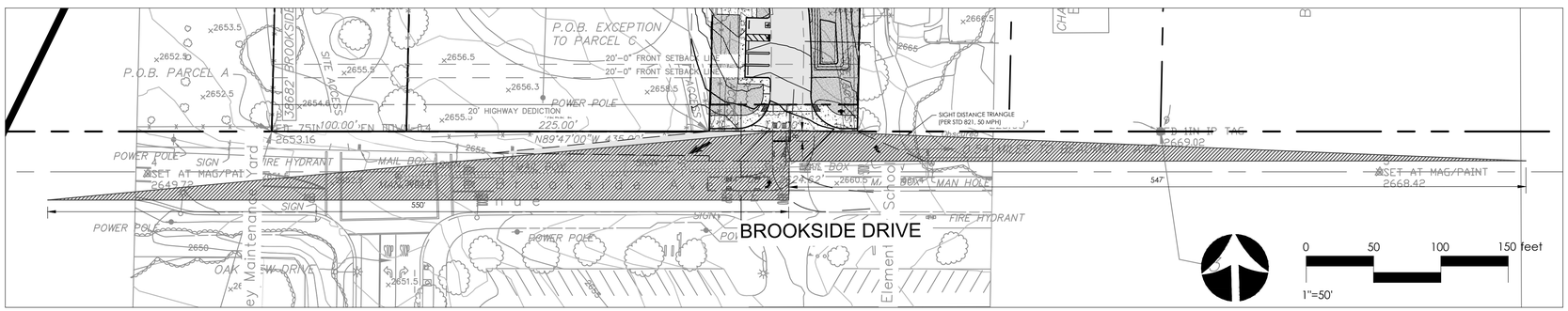
- CONCRETE
- LANDSCAPE



SITE DISTANCE EXHIBIT

0 20 40 80 120 feet
1"=40'

0 50 100 150 feet
1"=50'

NO.	REVISIONS	RECM'D	APPRV'D	DATE

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NOVEMBER 27, 2023

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SAN JACINTO, CA 92581
(951) 654-1555

SOILS ENGINEER — DATE

SEAL

CIVIL ENGINEERING FIRM
STRAND ENGINEERING, INC.
1001 Avenida Pico, Ste. C-121, San Clemente, CA 92673 (949) 431-0610

UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER — DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
WILLIAM FREDERICK STRAND
No. C 65712
exp. 9/30/25
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY
APPROVED BY:

CITY ENGINEER — LIC. — DATE

PRELIMINARY GRADING PLAN
FOR
CHERRY VALLEY STORAGE

38718 BROOKSIDE DRIVE, CHERRY VALLEY, CA

GRADING PERMIT NO.

SHEET 3 OF 3

JOB NO. 1036

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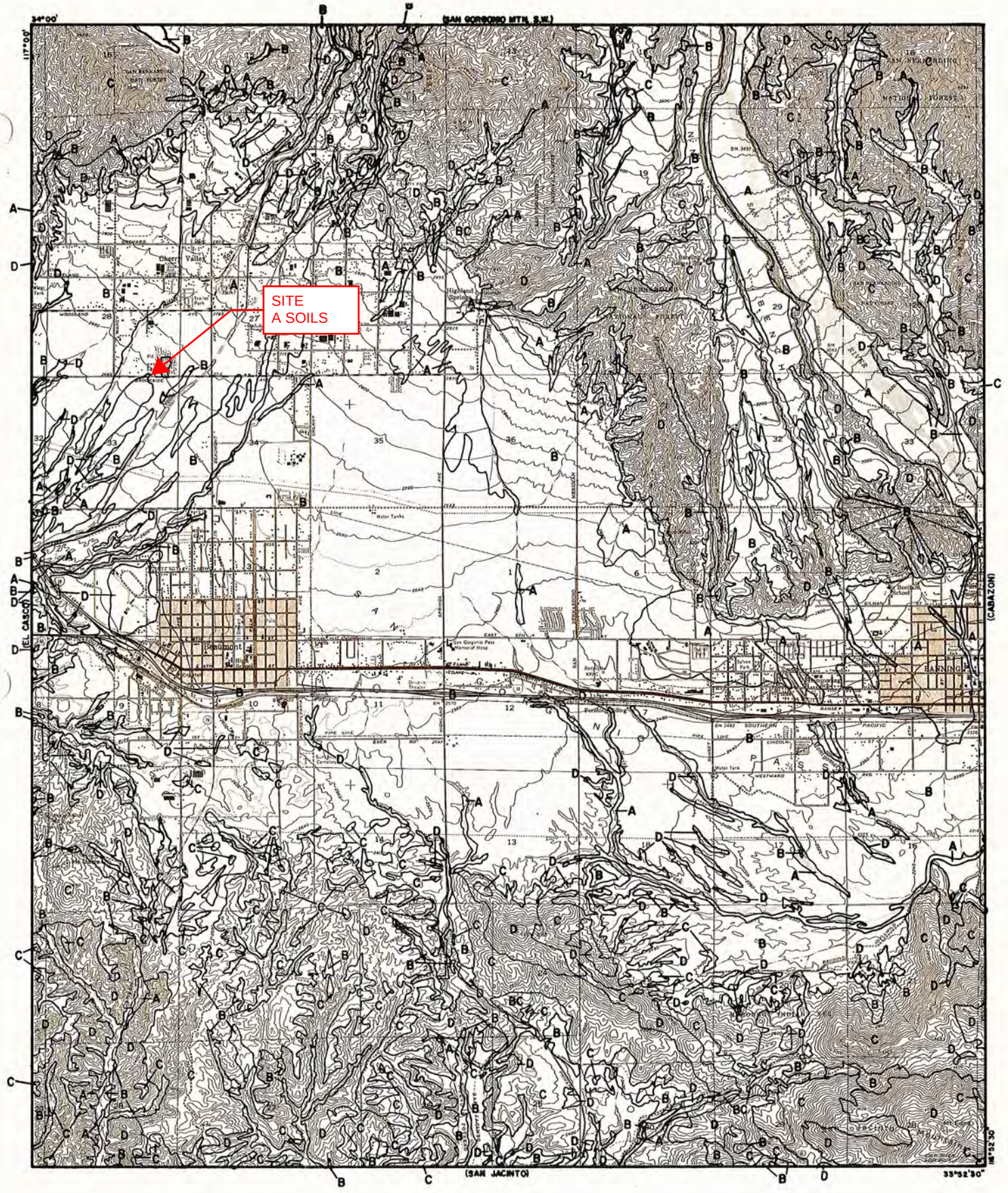
Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR BEAUMONT

PLATE C-1.19

January 20, 2023
Project No. C537-001

Corion Enterprises
100 Wilshire Blvd., Suite 700
Santa Monica, California 90401

Attention: Ms. JoAnn Horeni
Director, Client Relations

Subject: Geotechnical Report Update
Proposed Mini Storage Facility
Brookside Avenue, North Side, East of Nancy Avenue
Cherry Valley Area, Riverside County, California

Dear Ms. Horeni:

We are pleased to submit this geotechnical investigation report update for the subject project. The proposed development is to be located on the north side of Brookside Avenue, east of Nancy Avenue, in the Cherry Valley area of Riverside County.

The proposed development is feasible from a geotechnical engineering standpoint. The primary issues that will require mitigation are related to variable near-surface soil conditions.

We appreciate the opportunity of being of service to you on this project. If there are any questions, please contact our office.

Respectfully,
INLAND FOUNDATION ENGINEERING, INC.

Daniel R. Lind, C.E.G.
Vice President

Allen D. Evans, P.E., G.E.
Principal

DRL:ADE:es
Distribution: Addressee

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INTRODUCTION

The proposed mini-storage development is located on the north side of Brookside Avenue, east of Nancy Avenue, in the Cherry Valley area of Riverside County.

Inland Foundation Engineering, Inc. (IFE) previously conducted a geotechnical investigation at this site in 2009. This report is based on testing and exploration conducted at that time, and our review of existing site conditions. This report provides updated geotechnical design parameters and recommendations for site grading. The following references were used in the preparation of this report:

- Preliminary Geotechnical Report, Proposed Mini Storage Facility, Brookside Avenue, Cherry Valley Area, Riverside County, California, prepared by Inland Foundation Engineering, Inc., dated December 17, 2009, Project No. B464-002

- Response to County Review Comments – County Geologic Report No. 2202, Preliminary Geotechnical Report, Proposed Mini Storage Facility, Brookside Avenue, Cherry Valley Area, Riverside County, California, prepared by Inland Foundation Engineering, Inc., dated June 25, 2010, Project No. B464-002

- Phase I Environmental Site Assessment, Proposed Commercial Development, 38632, 38692 and 38718 Brookside Avenue, Cherry Valley, California, prepared by Inland Foundation Engineering, Inc., dated August 11, 2009, Project No. B464-001

Additional references are appended.

SCOPE OF SERVICE

The purpose of this report is to provide updated geotechnical parameters for design and construction of the proposed improvements on the site. The scope of the geotechnical services included:

- *Review of 2022 California Building Code (CBC) requirements, the general geologic site conditions, and the specific subsurface conditions of the project site.*

- *Evaluation of the engineering and geologic data previously collected for the project site.*

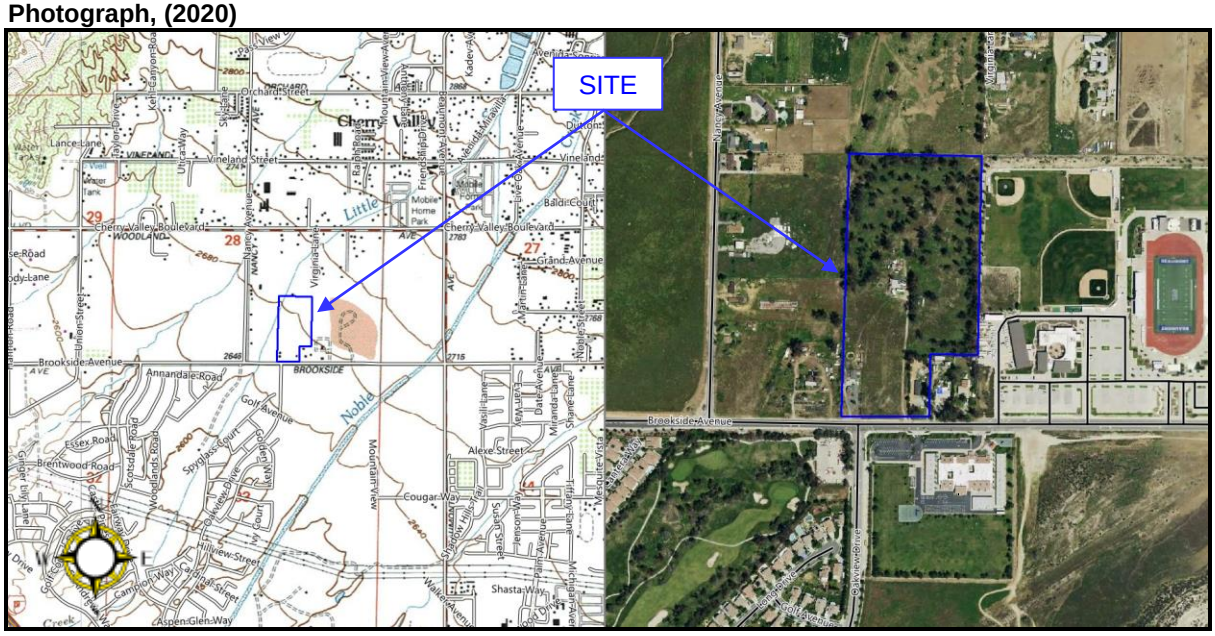
- *Preparation of this report with updated geotechnical conclusions and recommendations for design and construction.*

Evaluation of hazardous waste was not within the scope of service provided by this report. The evaluation of seismic hazards was based on literature review and subsurface exploration previously conducted at the site.

PROJECT AND SITE DESCRIPTION

The project site rests in the southeasterly portion of Section 28, Township 2 South, Range 1 West, SBB&M. The site is located on the north side of Brookside Avenue, east of Nancy Avenue, in the Cherry Valley area of Riverside County. The location of the project site is shown on Figure 1 below.

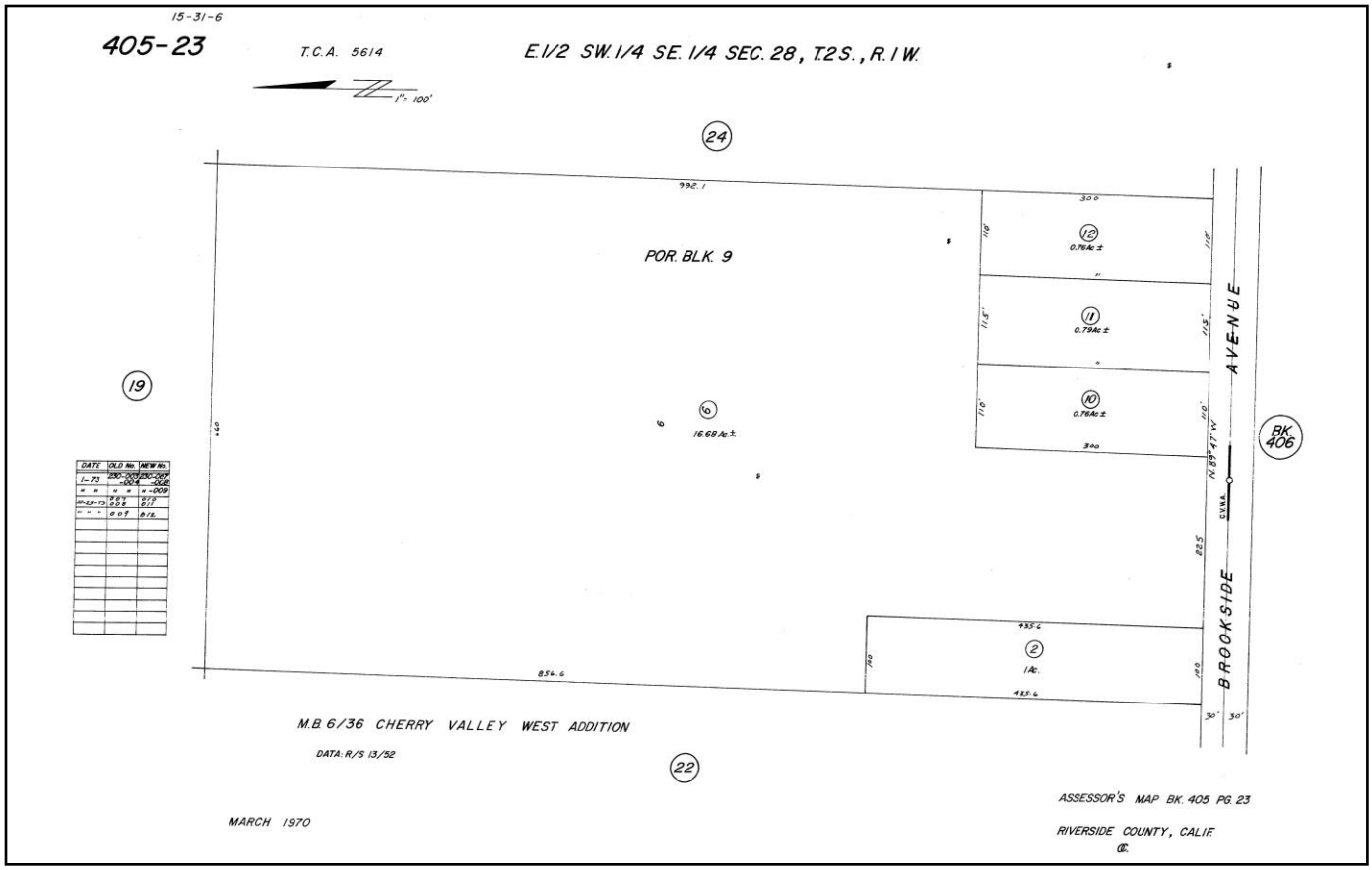
Figure 1: Topographic Map, USGS Topographic Map, Beaumont 7.5' Quadrangle, and Aerial Photograph, (2020)



The project site includes Assessor Parcel Nos. (APN) 405-230-006, 405-230-002, and 405-230-010. All three parcels front along Brookside Avenue. APN 405-230-006 (16.68-acre parcel) is situated between the two smaller parcels and extends along their northern perimeters. APN 405-230-002 (1-acre parcel) is located in the southwest region of the site while APN 405-230-010 (0.76-acre parcel) is located in the south-southeastern region of the site.

Figure 2 below is a portion of the Riverside County assessor parcel map showing the subject parcels.

Figure 2: Riverside County Assessor Parcel Map



APN 405-230-002 (1-acre) is fenced with an occupied residence near the center of the parcel. A detached garage is present on the north side of the residence and an enclosed room is attached on the north side of the garage. A gravel lined driveway extends from Brookside Avenue along the west perimeter of the parcel. A concrete parking area is located between the residence and the garage. The northern portion of the parcel is fenced and contains an empty concrete lined pond, shed and a small barn. The vegetation generally consists of several scattered trees on the parcel.

APN 405-230-006 (16.68-acres) contains a vacant residence near the center of the parcel. A detached carport is present on the north side of the residence. An empty concrete lined swimming pool is present on the west side of the residence. There is a raised terrace from the garage to the north and west of the pond. The flat terrace dips gently to the north and is approximately 3 to 6 feet higher than the adjacent grades. The parcel is vegetated with seasonal weeds, grasses and eucalyptus trees.

APN 405-230-010 (0.76 acre) contains an existing residence with an attached garage near the center of the parcel. A small area behind the residence is a fenced yard. The northern portion of the parcel is undeveloped. Existing dirt bike ramps (up to ±7 feet high) are present in the northwest portion of this parcel.

Two residential properties are located south of APN 405-230-006 (16.68-acre parcel) and east of APN 405-230-010 (0.76-acre parcel). The Beaumont Unified School District office facilities are present on the contiguous property east of the site, east of APN 405-230-006 (16.68-acre parcel). Slopes (2:1 h/v) ranging in height from about 4 to 12 feet extend downward to landscaped areas/infiltration basin at the school district site. A plant nursery is present on the contiguous property to the west of APN 405-230-002 (1-acre parcel) along Brookside Avenue. The other properties surrounding the site are residences and vacant land and/or corrals. Brookside Elementary School is present to the south of the site, across Brookside Avenue. A soil borrow pit is located several hundred feet east of the site and Beaumont High School is located approximately one-quarter mile east of the site. Residences and several small commercial businesses are located north of the site along Cherry Valley Boulevard.

The topography may be described as relatively level (±2,650' to ±2,690' msl) with two drainages running through the project site. One drainage extends across the northwest region of the site and another drainage extends from the northeast region to the center of the site. The site was historically vegetated with a dense growth of eucalyptus trees that has been partially removed.

The proposed construction will consist of a mini-storage facility. The storage facility will be developed on the eastern portion of the site. The remaining northern region and western region of the site will be held for future commercial/industrial use. The current plan indicates twenty-two self-storage structures, car parking, driveways, and carports on the site. The plan indicates that the existing house located on APN 405-230-010 (0.76 acre) will remain.

Our geotechnical exploration of the site was performed for the eastern region of the site that will contain the proposed mini storage facility. It is our understanding that the proposed facility will be supported by a combination of isolated square and continuous wall type foundations. We have not been provided with specific foundation loads. We anticipate however, that continuous wall loads will not exceed 3,000 pounds per linear foot. Isolated column loads of up to 60 kips have been considered in the generation of our geotechnical design parameters.

GEOLOGIC SETTING

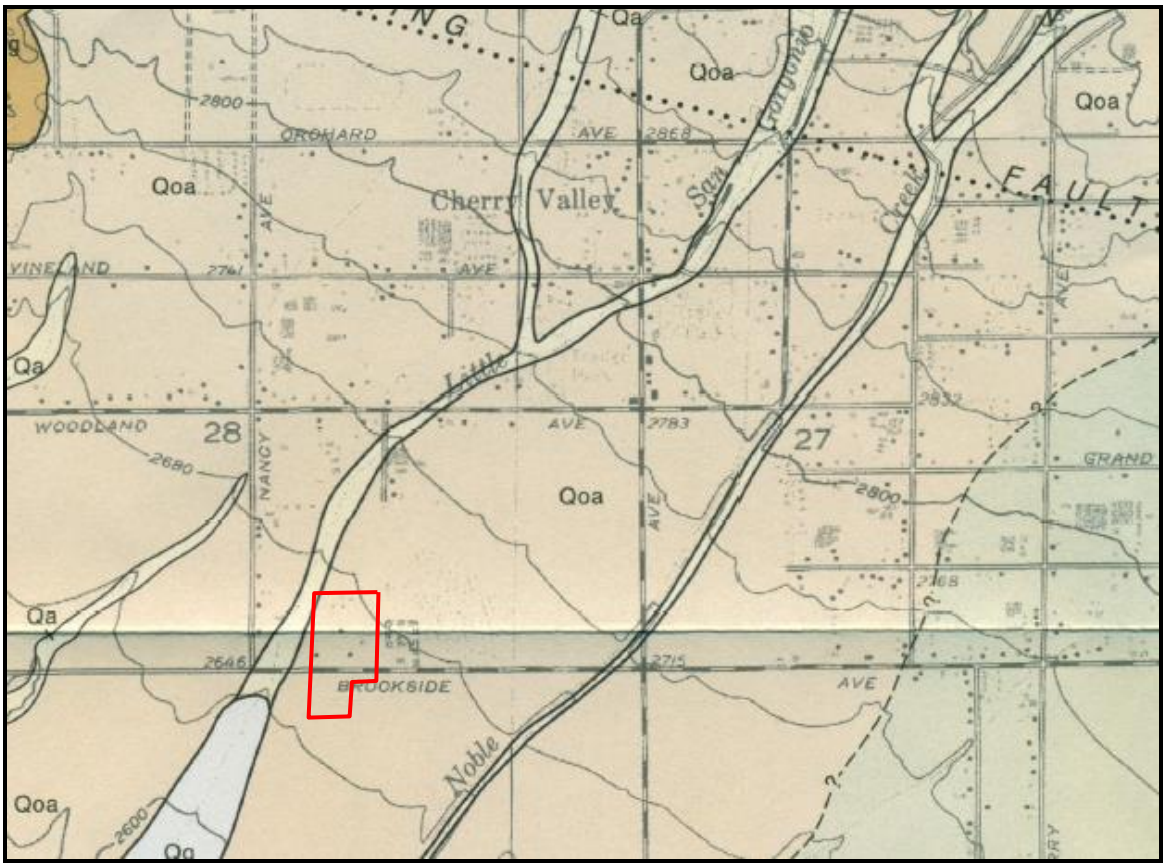
Regional Geology: The site is regionally situated within a natural geomorphic province in southern California known as the Transverse Ranges. The Transverse Ranges consist of a set of easterly-trending mountains and geologic structures that are distinct from the general northwest-southeast trend of the other provinces of California. More specifically, the site is located within the San Bernardino Mountains, an easterly trending structural block that is roughly 55 miles long and 20 miles wide. This mountain range was formed by intense folding and faulting in very late geologic time (predominantly Tertiary time). The geomorphology of this region of the San Bernardino Mountains indicates that the range is

very young, from a geologic standpoint, whereas it was uplifted tectonically predominately during Quaternary time.

Local Geology: Based on local geologic mapping (Dibblee, 2003), the site is shown to be underlain by Quaternary age (late Pleistocene) weakly indurated older alluvial deposits, generally described as being light reddish, dissected alluvial fan sand and gravel, that is crudely bedded (Qoa). A stream channel referred to as the Little San Gorgonio Creek is depicted on the northwesterly portion of the site. Mapping by Dibblee (2003) indicates that these deposits include Holocene-age alluvial sand, gravel and clay (Qa).

Figure 3 below is a portion of the Geologic Map of the Beaumont Quadrangle (Dibblee, 2003) indicating the mapped geologic units in the vicinity of the project site:

Figure 3: Geologic Map of the Beaumont Quadrangle (Dibblee, 2003)



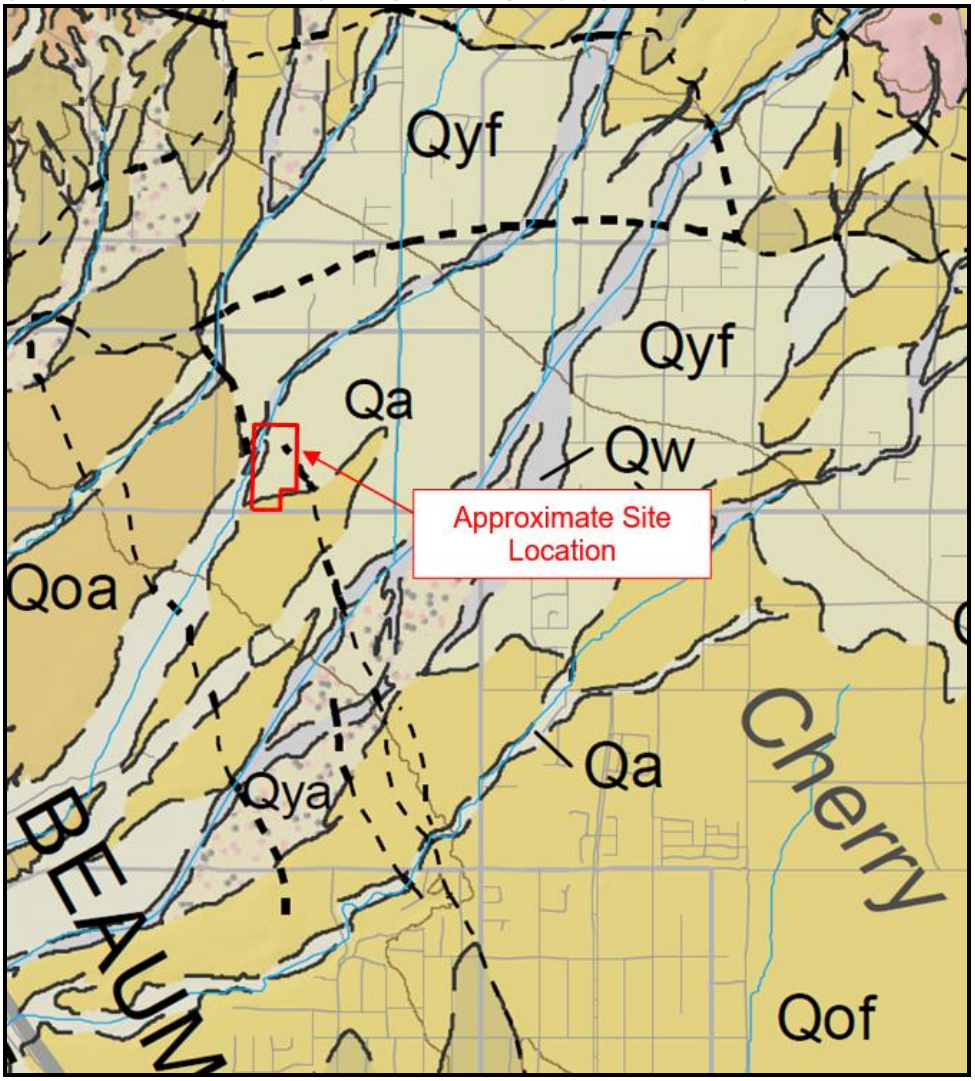
Qoa - Dissected alluvial fan sand and gravel, light reddish, crudely bedded, weakly indurated (late Pleistocene - early Holocene)

Qa - Alluvial sand, gravel and clay of flat flood plains and stream channels, unindurated, undissected (Holocene)

A review of the CGS Preliminary Geologic Map of Quaternary Deposits, Palm Springs 30' x 60' Quadrangle (Lancaster, et al., 2012) indicates the northerly portion of the project site is underlain by young alluvial fan deposits (map symbol Qyf). The southerly portion of the site

is mapped as being underlain by old alluvial fan deposits (Qoa). Alluvial wash materials are mapped on the northwesterly portion of the site. Figure 4 below is a portion of the referenced geologic map showing the mapped geologic units in the vicinity of the project.

Figure 4: Preliminary Geologic Map, Palm Springs Quadrangle (Lancaster, et al., 2012)



Qyf — **Young Alluvial Fan Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

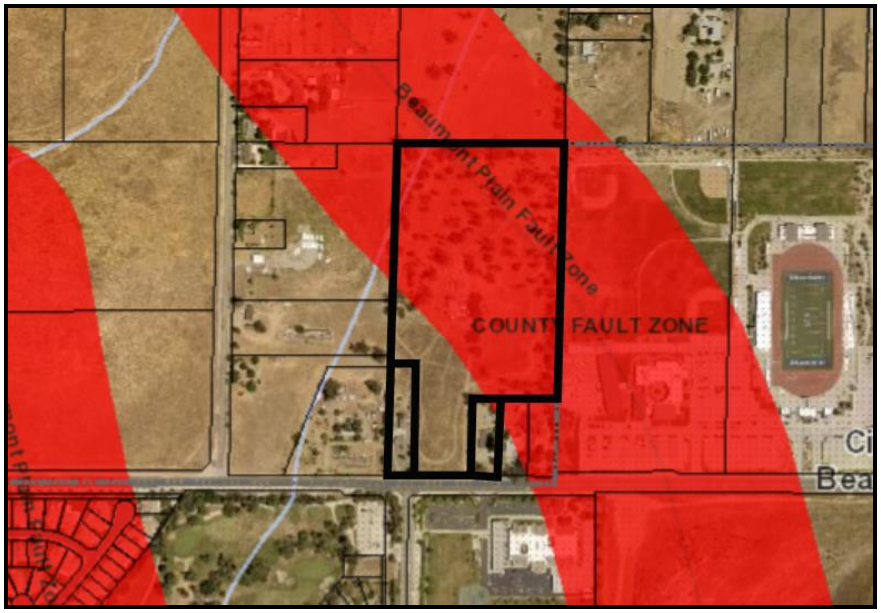
Qof — **Old Alluvial Fan Deposits** - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Fault -- Includes strike-slip, normal, reverse, oblique, and unspecified slip

Faulting: The site is not located within a State of California "Alquist-Priolo Earthquake Fault Zone" for fault rupture hazard (CGS, 2022). A large portion of the project site lies within a Riverside County fault zone associated with the Beaumont Plain Fault. (Riverside County, 2022). This fault is associated with a zone of northwest-trending parallel faults collectively referred to as the Beaumont Plain Fault Zone (Riverside County, 2022 and Matti, Morton, & Cox, 1992). This fault zone consists of en-echelon fault scarps that

traverse through and disrupt late Quaternary alluvial deposits. Figure 5 below is a portion of the County of Riverside TLMA GIS map (2022) indicating the project site in relation to mapped County fault zones in the vicinity of the property.

Figure 5: County of Riverside TLMA GIS Map (2022)



No distinct geomorphic features were observed or mapped on the site (defined scarps, etc.) which suggest the presence of faulting. However, the lack of geomorphic evidence at the site does not alter our conclusion that the presence of faulting at the site is very likely, based on mapping by the County of Riverside and work performed by others.

Our review of the potential for surface fault rupture at this site has included an examination of one non-stereo and five stereo pairs of vertical black and white aerial photographs dating between the years of 1949 and 2020 (see References for a listing) to aid in assessing the geologic and geomorphic characteristics with respect to the site and vicinity. No distinct photolineations or consistent tonal variations were observed on the southerly portion of the property, where the existing residence/proposed office building is located. The northerly portion of the site is largely obscured by trees in the photographs. Very faint tonal variations oriented northwest to southeast of the site were observed in the approximate location of the mapped fault zone northwest of the site near the intersection of Cherry Valley Boulevard and Nancy Avenue, however, these were not consistent in the historical aerial photographs and may not be associated with faulting. Disturbance of adjacent properties, particularly the adjacent property to the east, has obscured viewing evidence of faulting at this location. Based on mapping by others, including, but not limited to Riverside County, Rewis, et al. (2006), Gandhok, et al. (1999), it is our opinion that the faulting within the mapped Riverside County Fault Zone may be present as mapped. Our evaluation did not reveal evidence of the potential for faulting outside of the County of Riverside Fault Zone, where the existing residence/proposed office are located. Although the proposed storage facilities are not “habitable structures”, defined as having human occupancy of 2000 man-

hours or greater per year, based on the information reviewed for this project, it is our opinion there is a potential for surface rupture within the mapped Riverside County fault zone. Damage to the proposed storage structures could occur as a result of surface fault rupture and should be considered by the developer.

A detailed review of surface fault rupture potential at the site was not within the scope of service for this investigation. If habitable structures are planned within the fault zone in the future, a subsurface fault study will be required.

The site and surrounding area have been subjected to strong ground shaking related to active faults that traverse the region. The major faults influencing the site include the San Andreas (Southern Branch and San Bernardino Mountains sections) and the San Jacinto fault (San Jacinto Valley section). The approximate distances to these faults and published maximum earthquake magnitudes are shown in Table 1:

Table 1: Major Fault Parameters

Fault Zone	Approximate Distance (km)	Earthquake Magnitude (M_w)
San Andreas - San Bernardino Mountains Section (Banning Fault)	4.3	7.0*
San Jacinto - San Jacinto Valley (Claremont Fault)	10.3	7.0
San Andreas - Southern Branch	10.4	7.0*
San Jacinto - San Bernardino	23.7	7.0

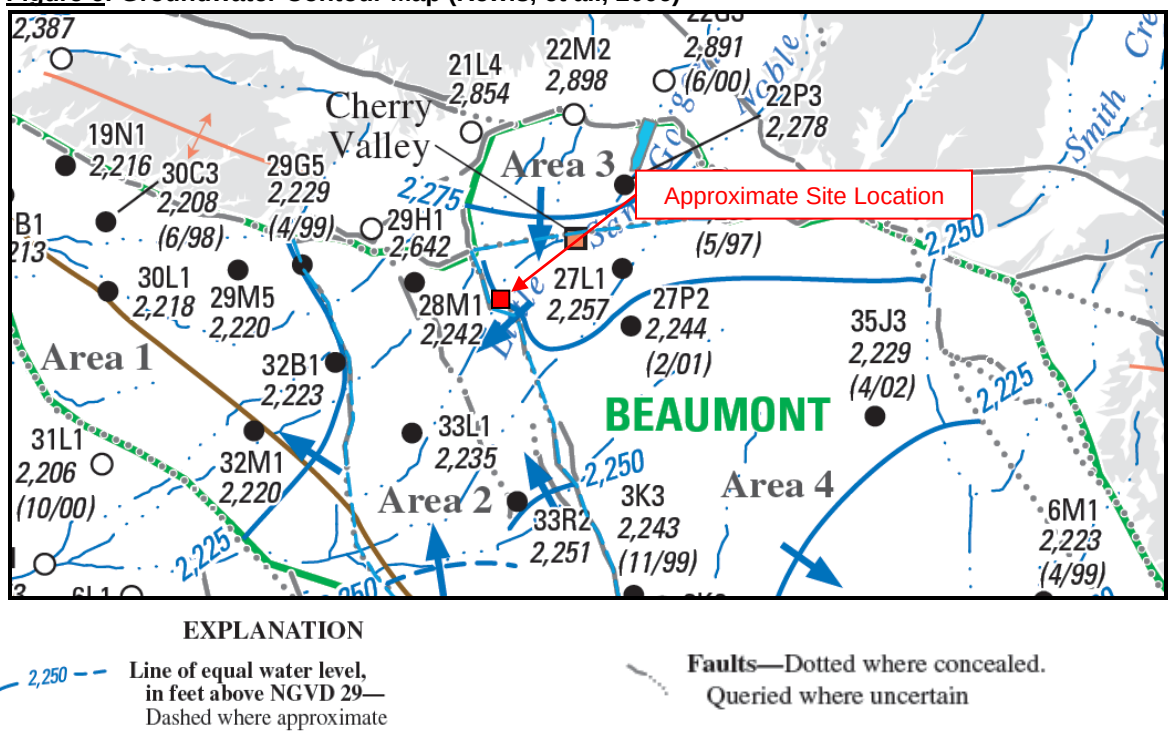
*Published fault parameters indicate an estimated maximum moment magnitude (M_w) earthquake of 7.0 for the San Bernardino Mts. section of the San Andreas fault zone. However, for seismic design purposes, based on published parameters for faults in California from the *Working Group on Earthquake Probabilities* (Field and others, 2008; Willis and others, 2008), we are considering that a cascading effect of rupture will occur along all segments of the San Andreas Fault Zone collectively, rather than just the singular San Bernardino Mts. section. Based on the recently published rupture-model data (Petersen et al., 2008), the total rupture area of these combined faults is 6,847 square kilometers with an associated Maximum Moment Magnitude (M_W) of 8.0.

Groundwater: The site lies within the Cherry Valley Hydrologic Subarea of the Santa Ana River Hydrologic Unit. Groundwater records published by USGS (National Water Information System: Web Interface, 2022) indicate that the depth to groundwater in the vicinity of the project site is greater than 300 feet beneath the existing ground surface. State Well No. 02S/01W-27P003S, located approximately 3,500 feet to the east of the site, was monitored on April 26, 2022. At that time, depth to groundwater was 480.95 feet beneath the existing ground surface. State Well No. 02S/01W-32B003S, located approximately 4,800 feet west of the site, was monitored on April 27, 2022. Depth to groundwater at that time was 437.5 feet beneath the existing ground surface.

Based on a report entitled “Geology, Ground-Water Hydrology, Geochemistry, and Ground-Water Simulation of the Beaumont and Banning Storage Units, San Gorgonio Pass Area, Riverside, California (Rewis, et al., 2006), the mapped elevation of the groundwater in the vicinity of the subject site is on the order of 2,250’ above mean sea level (msl). Based on a low point surface elevation on the site of approximately 2,660’ above msl, this corresponds to a groundwater depth of approximately 410’ below the ground surface.

Figure 6 is a portion of the referenced groundwater contour map.

Figure 6: Groundwater Contour Map (Rewis, et al., 2006)



The groundwater report indicates a continual decline in water levels in the vicinity of the project site between 1927 and the present. In “Area 3”, where the project site is located, water measurements from nearby wells indicate a water-level decline of about 80 feet from the 1960’s to 2004 (Rewis, et al., 2006).

Figure 7 below are maps from the referenced 2006 groundwater report that show ground-water level contours for (A) 1926-1927, (B) 1955, and (C) 1957, which illustrate the decline in groundwater levels. Based on extrapolation of the groundwater contours, historical high groundwater (1927) beneath the project site is on the order of 340 feet beneath the existing ground surface.

Figure 7: Ground-water level contours for (A) 1926-1927, (B) 1955, and (C) 1957

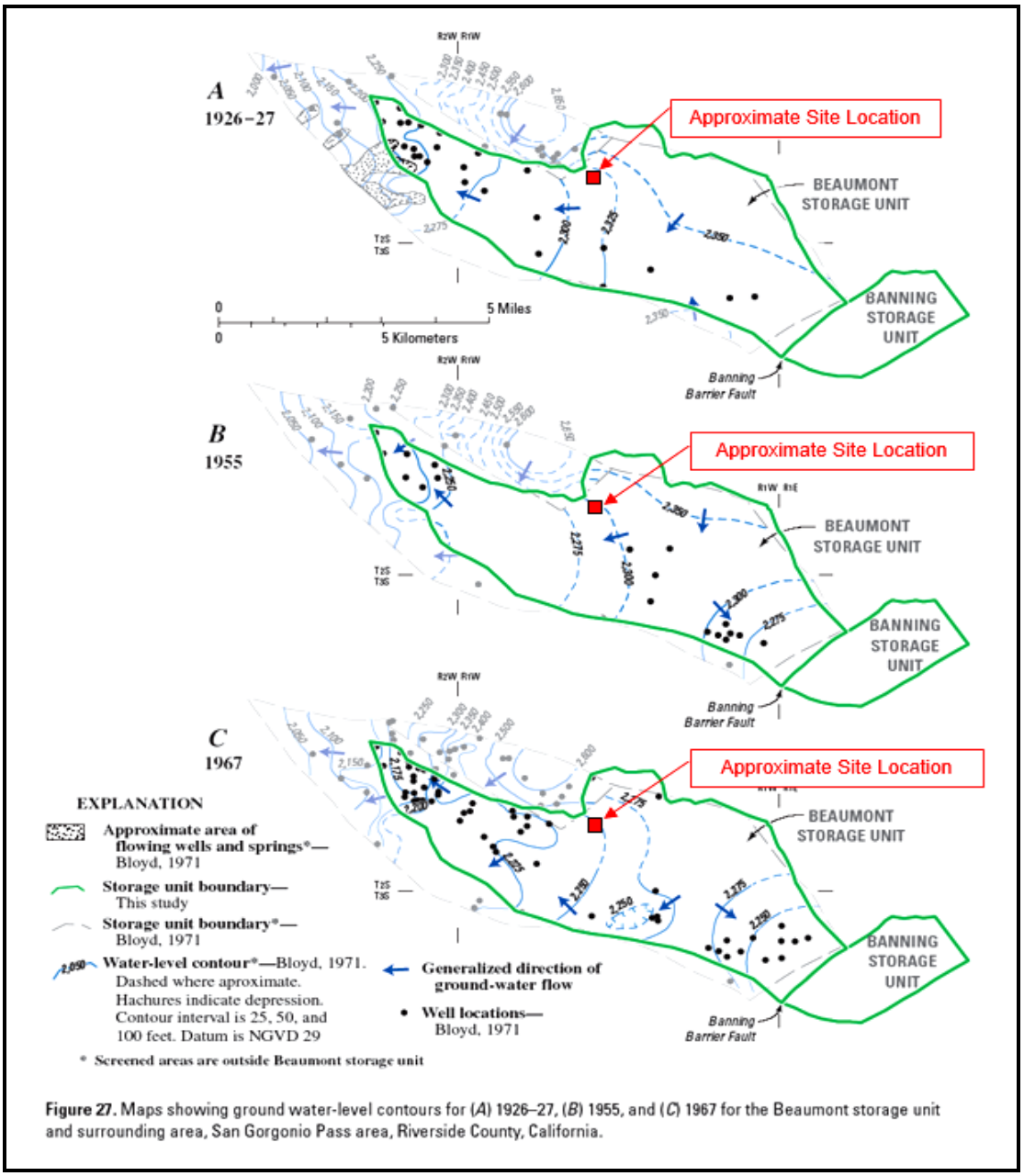


Figure 27. Maps showing ground water-level contours for (*A*) 1926–27, (*B*) 1955, and (*C*) 1967 for the Beaumont storage unit and surrounding area, San Gorgonio Pass area, Riverside County, California.

Seismic Design Parameters: The approximate site coordinates (WGS 84) are 33.9630°N / -116.9869°W. The U.S. Seismic Design Maps website (OSHPD, 2022) was used to evaluate the seismic parameters for this project. Table 3 summarizes design criteria obtained from the 2022 California Building Code (CBC), which is based on ASCE 7-16. The values presented in Table 2 are for the risk-targeted maximum considered earthquake (MCE_R).

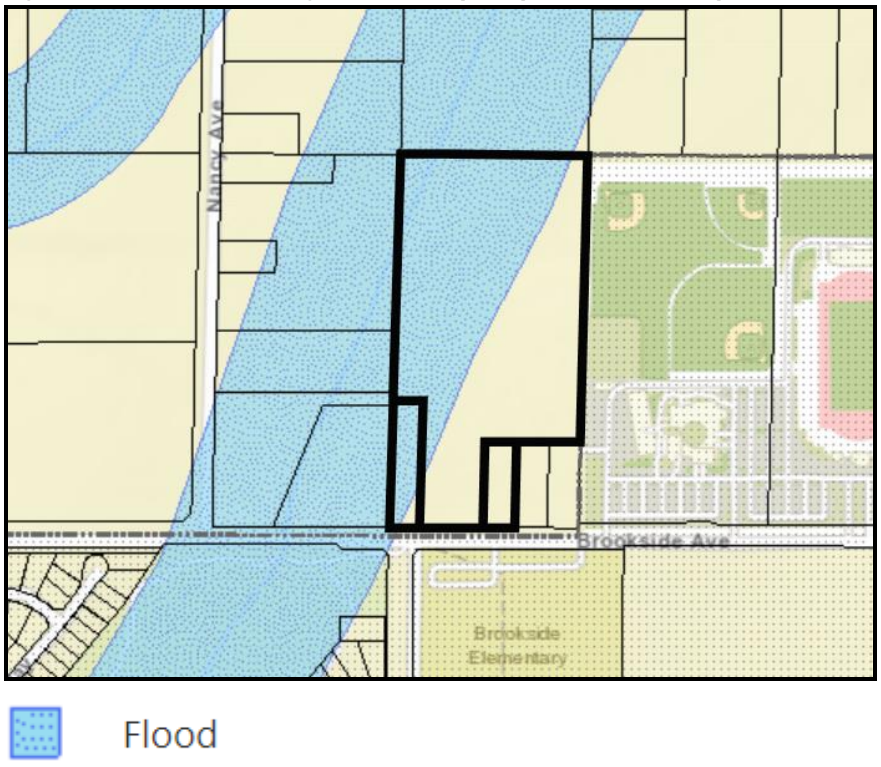
Table 2: 2022 CBC Seismic Design Parameters

Seismic Parameter	Value
S_S - MCE_R Ground Motion for 0.2-sec Period	2.107
S_1 - MCE_R Ground Motion for 1-sec Period	0.724
SD_S - Numeric Seismic Design Value at 0.2-sec period	1.685
PGA - MCE_g Peak Ground Acceleration	0.86
F_{PGA} - Site Amplification Factor at PGA	1.2
PGA_M - Site Modified Peak Ground Acceleration	1.032
SITE CLASS	D (Default)

The seismic design parameters recommended above should be discussed with the project structural engineer, as they may significantly impact the structural design of the project. A site-specific ground motion analysis may result in less conservative seismic design parameters.

Flooding: A review of flood hazards at the site was not in within our scope of service. For informative purposes, a large portion of the project site is located in a mapped Riverside County Flood Control District Flood Zone. Figure 8 below is a portion of the Riverside County TLMA GIS (2022) map depicting the mapped flood zone.

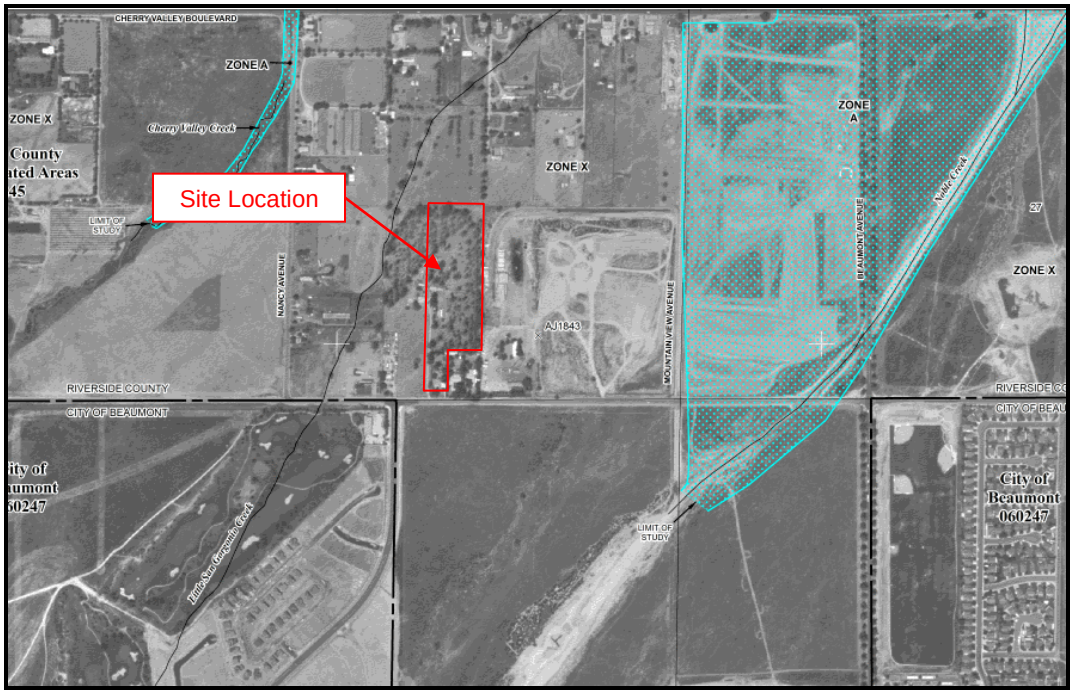
Figure 8: Riverside County TLMA GIS (2022) Flood Zone Map



A review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Map No. 06065C0803G, dated August 28, 2008, indicates that the site

is located in an area designated as “Zone X” (unshaded), described as “Areas determined to be outside the 0.2 percent annual chance flood plain.” Figure 9 below is a portion of the referenced FIRM Map indicating the site and mapped flood hazard zone.

Figure 9: FIRM Map No. 06065C0803G, dated August 28, 2008



OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

SPECIAL FLOOD HAZARD AREAS SUBJET TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazards Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations Determined.

Secondary Seismic Hazards: The primary geologic hazard affecting the project is ground shaking. Secondary permanent or transient seismic hazards generally associated with severe ground shaking during an earthquake include, but are not limited to; ground rupture, liquefaction, seismically-induced settlement, seiches or tsunamis, landsliding, debris flow, and rockfalls. These are discussed below:

Ground Rupture: Ground rupture is generally considered most likely to occur along pre-existing faults. A large portion of the project site lies within a Riverside County fault zone associated with the Beaumont Plain Fault Zone, (Riverside County, 2022). On this basis, the potential for fault rupture at the site is high.

Slope Failure: Based on the relatively planar topography, no slopes will exist to represent a hazard to this project.

Liquefaction: In general, liquefaction is a phenomenon that occurs where there is a loss of strength or stiffness in the soils that can result in the settlement of buildings, ground failure, or other hazards. The main factors contributing to this phenomenon are: 1) cohesionless, granular soil with relatively low density (usually of Holocene age); 2) shallow ground water (generally less than 50 feet); and 3) moderate to high seismic ground shaking.

Groundwater was not encountered within the exploratory borings, which extended up to a maximum depth of approximately 50 feet below the existing ground surface. The regional groundwater table beneath the site is expected to be at a depth greater than 300 feet. On this basis, the potential for liquefaction at the site is very low.

Lurching: Ground lurching is the horizontal movement of soil, sediments, or fill located on relatively steep embankments or scarps as a result of seismic activity, forming irregular ground surface cracks. The potential for lateral spreading or lurching is highest in areas underlain by soft, saturated materials, especially where bordered by steep banks or adjacent hard ground. Due to the flat-lying nature of the site, distance from embankments, the potential for ground lurching and/or lateral spreading is considered very low.

Seismically-Induced Settlement: The site is underlain to a depth of 35 to 40 feet by medium dense to dense alluvial deposits consisting of silty sand and silty sand with gravel (SM), and sandy gravel (GS). Sampler blow count and laboratory unit weight test data indicate these deposits are medium dense to dense, with estimated in-situ relative compaction of 89 to 100. Refer to the Subsurface Conditions section of this report. The potential for seismically-induced settlement is not significant.

Seiches/Tsunamis: A seiche is a standing wave in an enclosed or partially enclosed body of water. In order for a seiche to form, the body of water needs to be at least partially bounded, allowing the formation of the standing wave. Tsunamis are very large ocean waves that are caused by an underwater earth-quake or volcanic eruption, often causing extreme destruction when they strike land.

There are no bodies of water on or adjacent to the project site. Based on the distance to large, open bodies of water and the elevation of the site with respect to sea level, the potential for seiches/tsunamis does not present a hazard to this project.

Landsliding: Due to the relatively low-lying relief of the site and adjacent areas, the potential for landsliding due to seismic shaking is considered very low.

Debris Flow: We understand that historical FEMA maps show a “blue-line” stream traversing the uppermost northwest corner of the site, and that flood control projects northeast of the site have diverted this flow into Noble Creek.

A review of the current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Map No. 06065C0803G, dated August 28, 2008, indicates that the site is located in an area designated as “Zone X” (unshaded), described as “Areas determined to be outside the 0.2 percent annual chance flood plain.”

Based on the information reviewed, it is our opinion that the potential for debris flow is low for this project.

Rockfalls: Since no large rock outcrops are present at or adjacent to the site, the possibility of rockfalls during seismic shaking is nil.

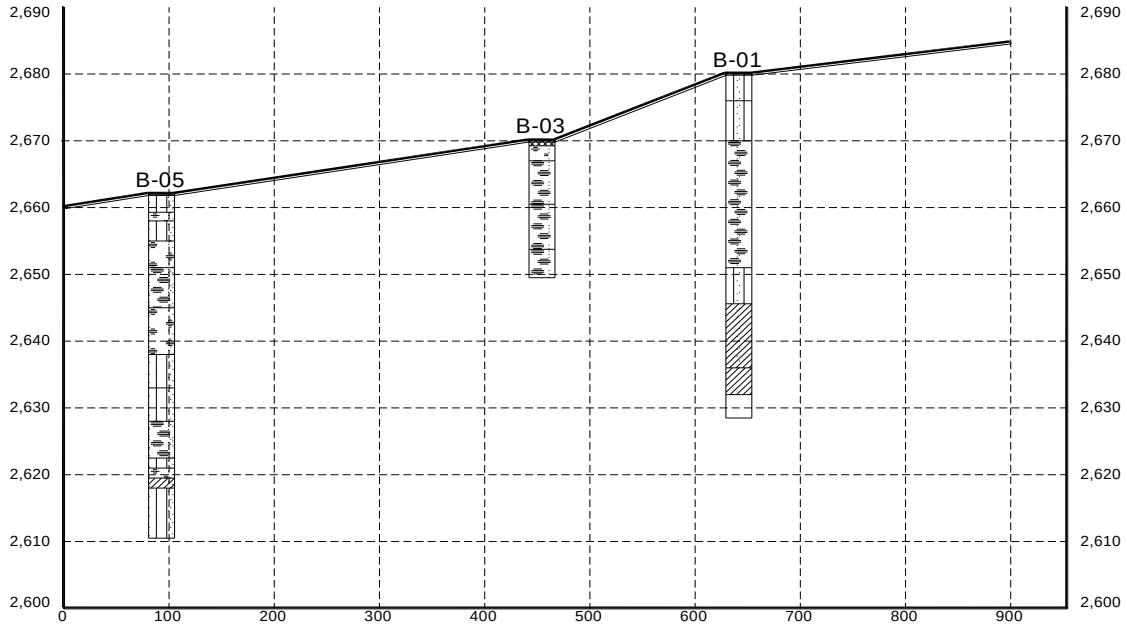
Other Geologic Hazards: There are other geologic hazards not necessarily associated with seismic activity that occur statewide. These hazards include, but are not limited to, methane gas, hydrogen-sulfide gas, tar seeps, Radon-222 gas, and naturally occurring asbestos. Of these hazards, there are none that appear to impact the site.

SUBSURFACE CONDITIONS

Our 2009 field and laboratory exploration and testing indicate that the site is underlain by alluvial deposits. The soil encountered in the upper 35 to 40 feet generally consisted of silty sand and silty sand with gravel (SM), and sandy gravel (GS). Sampler blow count and laboratory unit weight test data indicate these deposits are medium dense to dense, with estimated in-situ relative compaction of 89 to 100 percent. The soil encountered below 35 to 40 feet generally consisted of medium dense silty sand (SM), clayey sand (SC), sandy clay (CL), and sandy silty clay (ML-CL). The soil encountered was slightly moist to moist.

Groundwater was not encountered during the investigation. A typical profile is indicated on Figure 10 below.

Figure 10: Generalized Subsurface Profile



Laboratory testing indicates native soils within the zone of influence to the proposed development are non-plastic (PI=0) and can be assumed to be non-expansive.

Consolidation testing indicates that the soil is slightly compressible and over-consolidated. This testing indicated that the soil is not subject to saturation collapse.

Analytical testing indicates the concentration of sulfates in the soil may be approximately 0.001 percent which is considered to be negligible with respect to sulfate attack on concrete. Chloride concentrations are less than 500 parts per million. The soil is neutral to slightly acidic with pH values of 6.0 to 6.9. Saturated resistivity values ranged from 10,000 to 15,000 ohm-cm.

The site is occupied by numerous existing structures and other improvements to be demolished. A review of aerial photographs and historical topographic maps indicates that other structures previously occupied portions of the site. Based on past site use, there are likely buried / abandoned septic tanks, utility lines, undocumented fill, buried debris and other unsuitable conditions within the near-surface soil that should be removed during project grading.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review of current site conditions and current building code requirements, the conclusions and recommendations in the referenced 2009 geotechnical report remain applicable, unless otherwise noted. It is our opinion that the proposed construction will be

feasible from a geotechnical engineering standpoint. The site soil is suitable for providing foundation and pavement support with recompaction as recommended herein.

A large portion of the site was historically vegetated by a dense growth of eucalyptus trees. The removal of the root zone and disturbed soils associated with the eucalyptus trees may be a primary concern during the grading. There are also likely buried / abandoned septic tanks, utility lines, undocumented fill, buried debris and other unsuitable conditions within the near-surface soil that should be removed during project grading.

Testing indicates that on-site soils are non-plastic and may be assumed to be non-expansive.

Groundwater was not encountered within the exploratory borings. Historical data suggests that groundwater is on the order of 340± feet below the existing ground surface. It is our opinion that groundwater will not influence the proposed construction.

The following paragraphs present more detailed design criteria which have been developed on the basis of our field and laboratory exploration and testing.

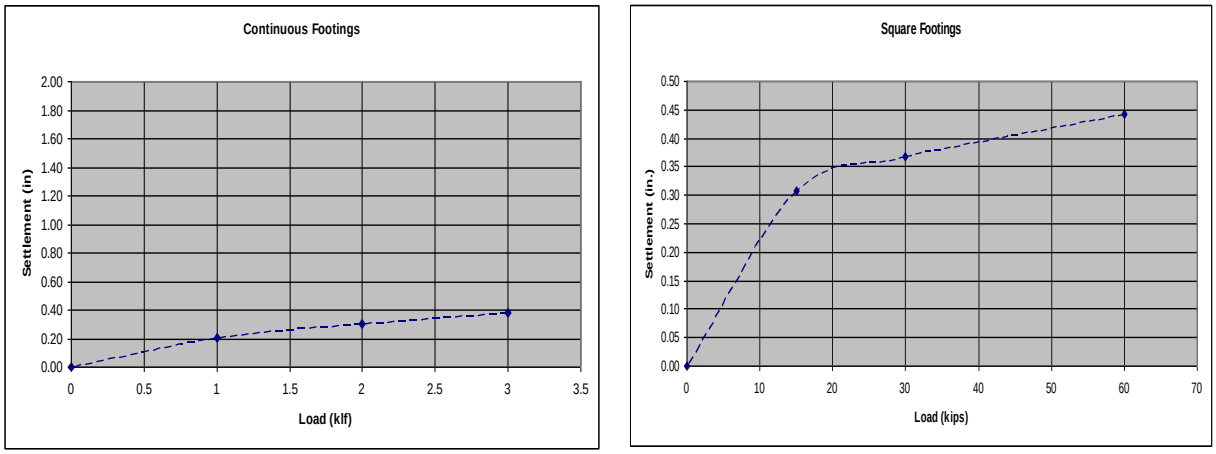
Foundation Design: The results of our exploration and testing indicate that either continuous wall or isolated square footings, which are supported upon dense, undisturbed soils or properly recompacted native material, may be expected to provide satisfactory support for the proposed structures. Footings should not span from cut to fill. Where such a transition occurs, all footings should be underlain by the minimum compacted fill thickness indicated under Item 4 in the General Site Grading section of this report.

Footings should have a minimum width of twelve inches and should be founded a minimum of twelve inches beneath the lowest adjacent final grade. Foundations supporting two floors should have a minimum width of fifteen inches and should be supported a minimum of eighteen inches beneath the lowest adjacent final grade. For design, we recommend an allowable soil bearing capacity of 1,600 pounds per square foot.

The recommendations made in the preceding paragraph are based on the assumption that all footings will be supported upon dense, undisturbed or properly compacted soil. All grading shall be performed under the testing and inspection of a representative of this firm. Prior to the placement of concrete, we recommend that the footing excavations be inspected in order to verify that they extend into satisfactory soil and are free of loose and disturbed materials. If concrete is to be placed on dry absorptive soil in hot and dry weather, the soil should be dampened but not to a point that there is free-standing water prior to placement. The formwork and reinforcement should also be dampened.

Settlements of properly designed and constructed footings are expected to be within tolerable limits for the proposed structure. Both continuous wall and isolated square footings carrying the design loads within the limits of the allowable bearing capacity are expected to experience a maximum settlement of one inch. Differential settlements due to uniform loads are expected to be less than one-half inch vertical over 20 feet horizontal. Differential settlements between loads of different magnitudes may be estimated on the bases of our settlement analyses which are presented graphically on Figure 11 below:

Figure 11: Differential Settlement



Lateral Design: The allowable bearing capacity provided in the preceding section is for the total of dead and frequently applied live loads. These may be increased by 33 percent to provide for lateral loads of short duration such as those caused by wind or seismic forces.

Resistance to lateral loads will be provided by a combination of friction acting at the base of the slab or foundation and passive earth pressure. A coefficient of friction of 0.4 between soil and concrete may be used with dead load forces only. A passive earth pressure of 260 pounds per square foot, per foot of depth, may be used for the sides of footings poured against recompacted or dense native material. Passive earth pressure should be ignored within the upper one foot except where confined as beneath a floor slab, for example.

Trench Wall Stability: Significant caving did not occur within our 2009 exploratory borings. All excavations should be configured in accordance with the requirements of CalOSHA. We would classify the soils as Type C. The classification of the soil and the shoring and/or slope configuration should be the responsibility of the contractor on the basis of the trench depth and the soil encountered. The contractor should have a “competent person” on-site for the purpose of assuring safety within and about all construction excavations.

Retaining Walls: Retaining walls may be necessary during construction and/or landscaping. The retaining walls may be designed for an active earth pressure equivalent to that exerted by a fluid weighing not less than that shown in the following Table 3:

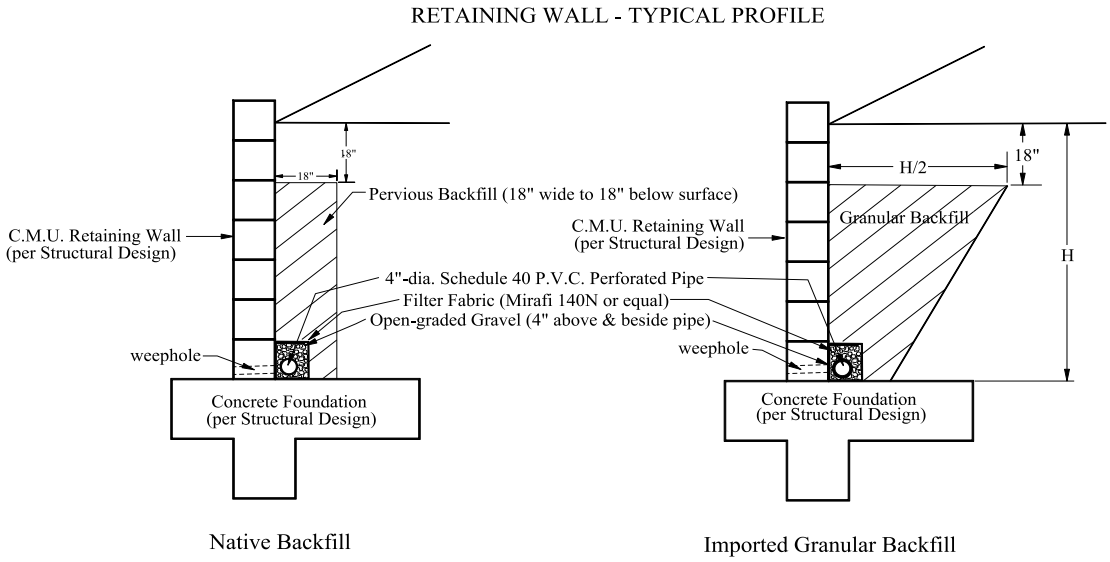
Table 3: Retaining Wall Design Parameters

Surface Slope of Retained Material Horizontal:Vertical	If clean sand and/or gravel with $\phi = 38°$ is used to backfill	If native soils are used to backfill
Level	30	40
2 to 1	43	60

For walls that are restrained, an "At-Rest" lateral earth pressure should be used. This may be taken as an Equivalent Fluid Pressure of 62 pounds per cubic foot with the resultant applied at mid-height.

Any applicable construction and seismic surcharges should be added to the above pressures. The effects of seismic forces may be characterized as an Equivalent Fluid Pressure of 30 pounds per cubic foot. The resultant of seismic forces should be applied above the base of the wall a distance of 0.6H where H is the total height.

Figure 12: Retaining Wall Typical Profile



At least 12 inches of granular material should be used in the backfill behind the walls and water pressure should not be permitted to build up behind retaining walls. The upper 12 to 18 inches of the backfill should consist of soil having a low permeability (less than 10^{-6} cm/sec). All backfill shall be non-expansive. A subdrain should be constructed along the base of the backfill.

Concrete Slabs-on-Grade: Concrete slabs-on-grade shall have a minimum thickness of four inches. During final grading and prior to the placement of concrete, all surfaces to receive concrete slabs-on-grade shall be compacted in order to maintain a minimum compacted fill thickness of 12 inches. Regardless of the extent of compaction, all concrete will crack due to shrinkage. The soils are not significantly expansive and there are no geotechnical engineering factors that would be used to develop recommendations for the design (ie. thickness, reinforcement, joint spacing, etc.) of non-structural slabs. However, these are important elements of the design of concrete slabs-on-grade that should not be overlooked. Non-reinforced slabs with no control joints, poorly placed control joints and/or poorly constructed control joints will crack at random locations and could result in unsightly appearance regardless of the soil condition.

Load bearing slabs may be designed using a Modulus of Subgrade Reaction not exceeding 125 pounds per square inch per inch.

Slabs that are designed and constructed in accordance with the provisions of the American Concrete Institute (ACI) as a minimum will perform much better and will be more pleasing in appearance. Shrinkage of concrete should be anticipated. This will result in cracks in all concrete slabs-on-grade. Shrinkage cracks may be directed to saw-cut "control joints" spaced on the basis of slab thickness and reinforcement. ACI typically recommend control joint spacings in unreinforced concrete at maximum intervals equal to the slab thickness times 24. A level subgrade is also an important element in achieving some “control” in the locations of shrinkage cracks. Control joints should be cut immediately following the finishing process and prior to the placement of the curing cover or membrane. Control joints that are cut on the day following the concrete placement are generally ineffective. The placement of reinforcing steel will help in reducing crack width and propagation as-well-as providing for an increase in the control joint spacing. The use of welded wire mesh has typically been observed to be of limited value due to difficulties and lack of care in maintaining the level of the steel in the concrete during placement. The addition of water to the mix to enhance placement and workability frequently results in an excessive water-cement ratio that weakens the concrete, increases drying times and results more cracking due to concrete shrinkage during the initial cure.

It should be assumed that the soils under the slab will likely become saturated during the life of the structure. Moisture will also be emitted from the concrete mixture as it cures. Flooring manufacturers may have specific requirements related to emission rates from concrete that should be achieved prior to the placement of flooring. Typically, these range from 3 to 5 pounds of water per 1000 square feet per 24-hour period. The emission rates are measured using an approximate 72-hour test procedure that we are able to conduct upon request. The drying time of the concrete may be reduced using a lower water-cement ratio such as 0.5 or 0.45. The use of fly

ash may enhance workability of the mix and reduce the alkali content within the slab. The use of a chemical membrane or curing compound may increase the drying time. Other suitable curing methods are available. The curing method is important in reducing plastic shrinkage cracking and should not be eliminated to reduce dry times.

Where slabs are to receive moisture sensitive floor coverings, we recommend the use of a vapor retarder. There are various products manufactured for this purpose. ASTM currently provides a standard water vapor permeance of 0.3 perms. Such materials would allow up to 18 gallons of water per week in a 50,000 square foot area. Therefore, it should be understood that these materials are not vapor "barriers". Some flooring applications may require more effective retarders. Therefore, the selection of the vapor retarder should be based upon the type of flooring material and is not considered to be a Geotechnical Engineering design parameter.

Vapor retarders should have a minimum thickness of 10-mil unless otherwise specified. It is possible that the retarders will be exposed to equipment loads such as ready-mix trucks, buggies, laser screeds, etc. In such cases, the thickness shall be increased to at least 15-mil. Vapor retarders should be placed between two 2-inch thick layers of sand in order to reduce the potential of punctures and to aid in the curing process. In lieu of this, the concrete may be placed directly upon the vapor retarder but should be designed with reinforcement to offset additional curling stresses. Seams and holes made for underground utilities should be properly sealed per the recommendations of the manufacturer.

The vapor retarder recommended in the preceding paragraphs is a common method of reducing the migration of moisture through the slab. It will not prevent all moisture migration through the slab nor will it prohibit the formation of mold or other moisture related problems. For moisture sensitive floor coverings, an expert in that field should be consulted to properly design a vapor retarder suitable for the specific application.

If concrete is to be placed on a dry absorptive subgrade in hot and dry weather, the subgrade should be dampened but not to a point that there is freestanding water prior to placement. The formwork and reinforcement should also be dampened.

Expansive Soils: On-site soils are not considered to be significantly expansive. Laboratory testing indicates a Plasticity Index (PI) of 0. On this basis, special design criteria for expansive soils will not be necessary. Specifically, reinforcement and thickening of foundations and slabs-on-grade in order to resist expansive soil pressures will not be necessary. Reinforcement may be required for other purposes related to structural properties. Nominal reinforcement is recommended for all foundations and concrete slabs-on-grade.

Tentative Pavement Design: All surfaces to receive asphalt concrete paving should be underlain by a minimum compacted fill thickness of 12 inches (excluding aggregate base). This may be performed as described in the Site Grading Section of this report. Due to changes expected within the soils due to the effects of blending during site grading, actual R-Value testing was not performed during this study. On the basis of an estimated R-Value of 40, we make the following tentative recommendations for structural pavement section design:

Table 4: Tentative Pavement Design

Service	Asphalt Concrete Thickness (ft.)	Base Course Thickness (ft.)
Brookside Avenue (Assumed TI=7.0)	0.33	0.58
Interior Parking and Driveways (Assumed TI=4.5)	0.25	0.50

These recommendations are provided for estimating purposes only. At the completion of rough grading, when the actual soils are more accurately defined, samples may be obtained for actual R-Value testing which will serve as a basis for the actual structural street section design. The final testing and design will be completed by the geotechnical engineer. All work within the roadway area should be done in accordance with the applicable codes, ordinances and requirements of Riverside County and will be performed under the inspection of that agency.

General Site Grading: All grading should be performed in accordance with the applicable provisions of the 2022 California Building Code. The following specifications have been developed on the basis of our field and laboratory testing:

1. **Clearing and Grubbing:** All building, slab and pavement areas and all surfaces to receive compacted fill should be cleared of existing loose soil, artificial fill, vegetation, debris, septic systems, and other unsuitable materials. All below-grade structures, including abandoned swimming pools and building foundations, should be removed. We recommend a minimum overexcavation of at least 24 inches to provide assurance of removing unsuitable materials and processing of roots and loose and disturbed soils. Abandoned underground utility lines should be traced out and completely removed from the site. Each end of the abandoned utility line should be securely capped at the entrance and exit to the site to prevent any water from entering the site. Soils loosened due to the removal of trees should be removed and replaced as controlled compacted fill under the direction of the geotechnical engineer.

2. **Preparation of Surfaces to Receive Compacted Fill:** All surfaces to receive compacted fill should be subjected to compaction testing prior to

processing. Testing should indicate a relative compaction of at least 85 percent within the unprocessed native soils. If roots or other deleterious materials are encountered or if the relative compaction fails to meet the acceptance criterion, additional overexcavation will be required until satisfactory conditions are encountered. Upon approval, surfaces to receive fill shall be scarified, brought to near optimum moisture content, and compacted to a minimum of 90 percent relative compaction.

3. **Placement of Compacted Fill:** Fill materials consisting of on-site soils or approved imported granular soils, should be spread in shallow lifts, and compacted at near optimum moisture content to a minimum of 90 percent relative compaction. Our observations of the material encountered during our exploration and testing indicate that compaction will be most readily obtained by means of heavy rubber-wheeled or vibratory compactors. This should be determined by the grading contractor prior to the commencement of site grading.

4. **Preparation of Building Areas:** Support for buildings should not transition from cut to fill. All building areas should be underlain entirely by dense, undisturbed soil or a uniform compacted fill thickness based upon the footing type and configuration. This assumes that the footing width is directly proportional to the applied load on the basis of the allowable soil bearing capacity provided in this report. Table 5 presents the recommended depth and extent of recompaction for continuous and isolated square footings:

Table 5: Recommended Building Area Preparation

Foundation Type	Depth of Recompaction below Footing	Extent of Recompaction beyond Footing Edges
Isolated Square	12 Inches	5 Feet
Continuous	12 Inches	5 Feet

Footing areas should be overexcavated to the depths and extents indicated in the preceding table. This zone of recompaction should also extend a minimum of 24 inches below the existing ground surface. The surface of the overexcavation should then be reviewed for compliance with the criteria of Item 2 under this section. Upon approval the surface should be scarified, brought to near optimum moisture content and compacted to a minimum of 90 percent relative compaction. An inspection should then be made by a representative of this firm, in order to verify the depth of the overexcavation and the relative compaction obtained. The excavated material may then be replaced as controlled compacted fill.

5. **Preparation of Slab and Paving Areas:** During final grading and immediately prior to the placement of concrete or a base course, all surfaces to receive asphalt concrete paving or concrete slabs-on-grade should be processed and tested to assure compaction for a depth of at least of 12 inches. This may be accomplished by a combination of overexcavation, scarification and recompaction of the surface, and replacement of the excavated material as controlled compacted fill. Compaction of the slab areas should be to a minimum of 90 percent relative compaction. Compaction within the proposed pavement areas should be to a minimum of 95 percent relative compaction for both the subgrade and base course.

6. **Utility Trench Backfill:** It is our opinion that utility trench backfill consisting of the on-site soil types should be placed by mechanical compaction to a minimum of 90 percent relative compaction. This is with the exception of the upper 12 inches under pavement areas where the minimum relative compaction should be 95 percent. Jetting of the native soils is not recommended.

7. **Testing and Inspection:** During grading tests and observations should be performed by a representative of this firm to verify that the grading is performed per the project specifications. Field density testing should be performed per the current ASTM D1556 or ASTM D6938 test methods. The minimum acceptable degree of compaction should be 90 percent of the maximum dry density, based on ASTM D1557, except where superseded by more stringent requirements, such as beneath pavement. Where testing indicates insufficient density, additional compactive effort should be applied until retesting indicates satisfactory compaction.

LIMITATIONS

The findings and recommendations of this report are based upon a review of previous exploration and testing on the site. Should conditions be encountered during construction that are different than indicated herein, our office should be notified in order to determine if revisions or retesting are warranted. This report was prepared prior to the preparation of a grading plan for the project. We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to assure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

Evaluation of hazardous waste was not within the scope of services provided. The evaluation of seismic hazards was based upon a literature review.
This update report was prepared for Corion Enterprises for use in the design and construction of the proposed mini storage facility. This report may only be used by Corion Enterprises for this purpose. The use of this report by parties or for other purposes is not

authorized without written permission by Inland Foundation Engineering, Inc. Inland Foundation Engineering, Inc. will not be liable for any projects connected with the unauthorized use of this report.

The recommendations of this report are considered to be preliminary. The final design parameters may only be determined or confirmed at the completion of site grading on the basis of observations made during the site grading operation. To this extent, this report is not considered to be complete until the completion of both the design process and the site preparation.

The information in this report represents professional opinions that have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, either expressed or implied, is made as to the professional advice included in this report.

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APPENDIX A – Site Exploration

APPENDIX A

SITE EXPLORATION

For the 2009 site investigation for this project, five exploratory borings were drilled with a truck-mounted hollow-stem auger drill rig at the approximate locations shown on Figure No. A-8. The materials encountered during drilling were logged by a staff geologist. Boring logs are included with this report as Figures Nos. A-3 through A-7.

Representative soil samples were obtained within the borings by driving a thin-walled steel penetration sampler with successive 30-inch drops of a 140-pound hammer. The numbers of blows required to achieve each six inches of penetration were recorded on the boring logs. Two different samplers were used; a Standard Penetration Test (SPT) sampler and a modified California sampler with brass sample rings. Representative bulk soil samples were also obtained from the auger cuttings. Samples were placed in moisture sealed containers and transported to our laboratory for further testing and evaluation. Laboratory tests results are discussed and included in Appendix B.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487-06)

PRIMARY DIVISIONS			GROUP SYMBOLS		SECONDARY DIVISIONS
COARSE GRAINED SOILS – MORE THAN HALF OF MATERIALS IS LARGER THAN #200 SIEVE SIZE	GRAVELS – MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN) 5% FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS – MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN) 5% FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM		SILTY SANDS, SAND-SILT MIXTURES
			SC		CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS – MORE THAN HALF OF MATERIALS IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS – LIQUID LIMIT IS LESS THAN 50		ML		INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL		ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS – LIQUID LIMIT IS GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT		PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS
TYPICAL FORMATIONAL MATERIALS	SANDSTONES		SS		
	SILTSTONES		SH		
	CLAYSTONES		CS		
	LIMESTONES		LS		
	SHALE		SL		

CONSISTENCY CRITERIA BASES ON FIELD TESTS

RELATIVE DENSITY – COARSE – GRAIN SOIL

RELATIVE DENSITY	SPT * (# BLOWS/FT)	RELATIVE DENSITY (%)
VERY LOOSE	<4	0-15
LOOSE	4-10	15-35
MEDIUM DENSE	10-30	35-65
DENSE	30-50	65-85
VERY DENSE	>50	85-100

CONSISTENCY – FINE-GRAIN SOIL

CONSISTENCY	SPT* (# BLOWS/FT)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET ** PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)
Very Soft	<2	<0.13	<0.25
Soft	2-4	0.13-0.25	0.25-0.5
Medium Stiff	4-8	0.25-0.5	0.5-1.0
Stiff	8-15	0.5-1.0	1.0-2.0
Very Stiff	15-30	1.0-2.0	2.0-4.0
Hard	>30	>2.0	>4.0

* NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1 3/8 INCH I.D.) SPLIT BARREL SAMPLER (ASTM -1586 STANDARD PENETRATION TEST)

** UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ.FT. READ FROM POCKET PENETROMETER

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp but no visible water
WET	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbled or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

EXPLANATION OF LOGS

Figure A-2

LOG OF BORING B-01

Elevation:	2680.0 Date(s) Drilled: 11/19/09	Logged by:	FWC
Drilling Method:	Rotary Auger	Hammer Type:	Auto-Trip
Drilling Rig:	Mobile B-53	Hammer Weight:	140 lb.
Boring Diameter:	8-inches	Hammer Drop:	30-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	USCS	SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	RELATIVE COMPACTION (%)
	SM	BULK				
		SS	13	2	122	
5	SM	BULK	10			
		SS	8	2	119	
			12			
		SS	12	2	119	
10	GS	BULK	15			
		SS	13	1	126	
			17			
15		SS	19	1	132	
			37			
		SS	28	1	136	
			26			
20		SS	15	2	124	
			23			
25		SPT	17	3		
			11			
30	SM	SS	20	4	122	
		SPT	25	5		
			14			
35	SC		16			
		SPT	17	3		
			17			
40		SS	14	9	113	
		SPT	26	7		
			13			
45	CL		14			
		SPT	15	8		
			15			
50	ML CL	SPT	16	0		
			22			

SILTY SAND, fine to coarse grained with gravel, gray brown, slightly moist, medium dense, interbedded with thin layers gravel throughout.

SILTY SAND with GRAVEL, fine to coarse grained, dark red brown, dry to slightly moist, medium dense, interbedded with thin layers sand throughout.

SANDY GRAVEL, fine to coarse grained, olive brown, dry to slightly moist, medium dense.

SILTY SAND with GRAVEL, fine to medium grained, red brown, moist, medium dense, weakly to moderately cemented.

CLAYEY SAND, very fine to fine grained, red brown, slightly moist, medium dense

SANDY CLAY, very fine to fine grained, dark red brown, slightly moist, stiff to hard.

SANDY SILTY CLAY, very fine to fine grained, dark red brown, moist, hard.

End of boring at 51.5 feet. No groundwater or mottling encountered.

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Figure No. **A-3**

LOG OF BORING B-02

Elevation:	2676.0	Date(s) Drilled:	11/19/09	Logged by:	FWC
Drilling Method:	Rotary Auger			Hammer Type:	Auto-Trip
Drilling Rig:	Mobile B-53			Hammer Weight:	140 lb.
Boring Diameter:	8-inches			Hammer Drop:	30-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	USCS	SAMPLES: DRIVE SAMPLE	SAMPLES: BULK SAMPLE	SAMPLES: SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	RELATIVE COMPACTION (%)
	SM			BULK				
				SS	6 10	2	119	
5				SS	5 8	2	120	
	GS			SS	19 28	1	137	
10				SS	14 16	1	143	
15	SM			SS	17 30	1	131	

SILTY SAND, fine to coarse grained with gravel, gray brown, slightly moist, loose, interbedded with thin layers sand throughout.

SANDY GRAVEL, fine to coarse grained, light brown, dry, medium dense.

SILTY SAND with GRAVEL, fine to coarse grained, olive brown, slightly moist, dense, weakly cemented.

End of boring at 15.5 feet. No groundwater or mottling encountered.

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Figure No. **A-4**

LOG OF BORING B-03

Elevation:	2670.0	Date(s) Drilled:	11/19/09	Logged by:	FWC
Drilling Method:	Rotary Auger			Hammer Type:	Auto-Trip
Drilling Rig:	Mobile B-53			Hammer Weight:	140 lb.
Boring Diameter:	8-inches			Hammer Drop:	30-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	USCS	SAMPLES: DRIVE SAMPLE	SAMPLES: BULK SAMPLE	SAMPLES: SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	RELATIVE COMPACTION (%)
	SW			SS	6	1	124	
	GS			BULK	9			
5				SS	12	1	133	
					13			
				SS	8			
					21 NR			
10	GS			BULK				
				SS	18	2	126	
					20			
				SS	20	1	135	
15					20			
	GS			SS	37	2	135	
					37			
20				SS	23	1	123	
					27			

ARTIFICIAL FILL, SILTY SAND, fine to coarse grained with gravel, gray brown, slightly moist, loose to medium dense.

SAND, fine to coarse grained with trace gravel, olive brown, dry, medium dense.

SANDY GRAVEL, fine to coarse grained, olive brown, dry to slightly moist, medium dense.

SANDY GRAVEL, fine to coarse grained with silt, olive brown, dry to slightly moist, medium dense.

- cobble -

- rocky layers from 15.5 to 17.5 feet -

SANDY GRAVEL, fine to coarse grained, brown, dry to slightly moist, dense, weakly cemented.

End of boring at 20.5 feet. No groundwater or mottling encountered.

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Figure No. **A-5**

LOG OF BORING B-04

Elevation:	2672.0	Date(s) Drilled:	11/19/09	Logged by:	FWC
Drilling Method:	Rotary Auger			Hammer Type:	Auto-Trip
Drilling Rig:	Mobile B-53			Hammer Weight:	140 lb.
Boring Diameter:	8-inches			Hammer Drop:	30-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	USCS	Description	SAMPLES: DRIVE SAMPLE	SAMPLES: BULK SAMPLE	SAMPLES: SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	RELATIVE COMPACTION (%)
	SM	**SILTY SAND,** fine to medium grained, olive brown, slightly moist to moist, loose.		■	BULK		18	114	
					SS	6	6	120	
5	SW SM	**SAND,** fine to coarse grained with gravel, olive brown, slightly moist, medium dense.		■	BULK	10			
	SP SM	**SILTY SAND,** fine to medium grained, olive brown, moist, medium dense.		■	BULK	13	3	128	
					SS	17			
10		**SAND with SILT and GRAVEL,** fine to coarse grained, olive brown, dry to slightly moist, medium dense.		■	SS	11	3	124	
						16			
	GS	**SANDY GRAVEL,** fine to medium grained, olive brown, dry to slightly moist, medium dense.		■	SS	22	3	130	
15						28			
					SS	35	1	128	
						24			
20					SS	26	2	132	
		End of boring at 20.5 feet. No groundwater or mottling encountered.				30			

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Figure No.
A-6

LOG OF BORING B-05

Elevation:	2662.0	Date(s) Drilled:	11/19/09	Logged by:	FWC
Drilling Method:	Rotary Auger			Hammer Type:	Auto-Trip
Drilling Rig:	Mobile B-53			Hammer Weight:	140 lb.
Boring Diameter:	8-inches			Hammer Drop:	30-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	USCS	Description	SAMPLES: DRIVE SAMPLE	SAMPLES: BULK SAMPLE	SAMPLES: SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	RELATIVE COMPACTION (%)
	SM	**SILTY SAND,** fine to coarse grained, olive brown, dry to slightly moist, loose.							
		SAND with GRAVEL, fine to coarse grained, red brown, slightly moist, medium dense.	✓		SS	7 7	2	118	
5	SM	**SILTY SAND,** fine to medium grained with gravel, olive brown, slightly moist, medium dense.	✓		SS	4 5 10	5	122	
	SG	**GRAVELLY SAND,** fine to coarse grained, olive brown, slightly moist, medium dense.	✓		SS	10 13	5	121	
10	GS	**SANDY GRAVEL,** fine to coarse grained, olive brown, dry to slightly moist, medium dense. - rocky layer -	✓	■	BULK SS	16 23	4	124	
15			✓	■	SS	9 11	3	120	
	SG	**GRAVELLY SAND,** fine to coarse grained with silt, olive brown, slightly moist, medium dense.	✓		SS	9 12	6	124	
20			✓		SS	9 11	6	119	
	SM	**SILTY SAND,** fine to medium grained with trace gravel, red brown, slightly moist, medium dense.	☒	■	BULK SPT	8 10	9		
25									
	SM	**SILTY SAND,** fine to medium grained with gravel and trace clay, red brown, moist, medium dense.	✓		SS	13	10	119	
30			☒		SPT	18 12 24	8		
	GS	**SANDY GRAVEL,** fine to coarse grained with cobbles, olive brown, slightly moist, medium dense. - rocky layer 35 to 37 feet -	☒		SPT	35 35	3		
35									
	SM	- rocky layer -							
40	SM SW	**SILTY SAND,** fine to medium grained with trace gravel, orange brown, moist, medium dense.	✓		SS	23	9	120	
	SC	**SAND,** fine to coarse grained, olive, slightly moist, medium dense.	☒		SPT	41 21 15	4		
	SM	**CLAYEY SAND,** very fine to fine grained, red brown, moist, medium dense.	☒		SPT	13 15	9		
45		**SILTY SAND,** very fine to fine grained, red brown, moist, medium dense.							
50			☒		SPT	13	6		
		End of boring at 51.5 feet. No groundwater or mottling encountered.				13			

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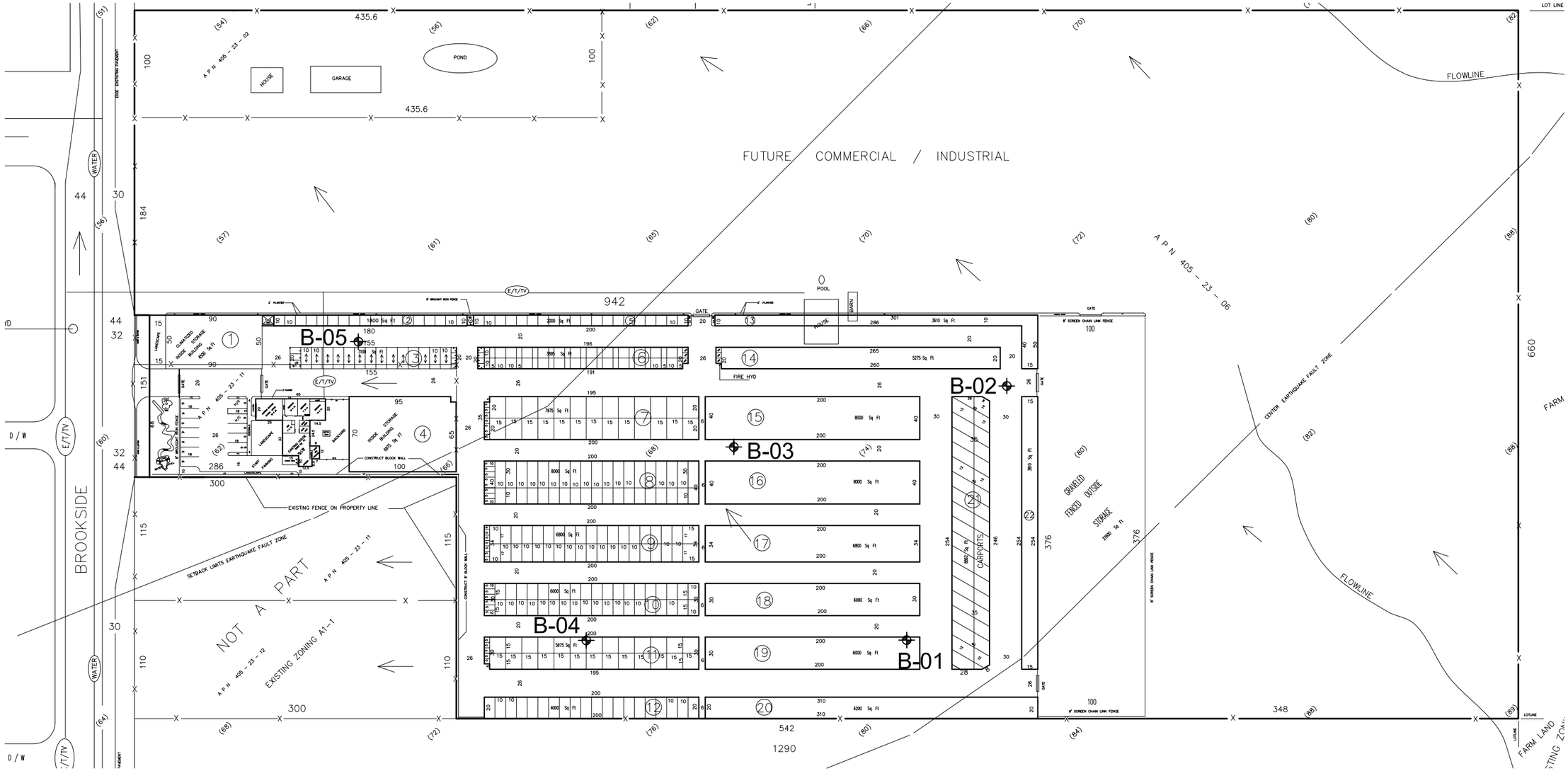
Figure No. **A-7**

SITE PLAN

Proposed Mini Storage Facility

Brookside Avenue, Cherry Valley Area, Riverside County, California



GRAPHIC SCALE

100 0 50 100 200 400

1 INCH = 100 FT

LEGEND

⌖ = Approximate Location of Exploratory Boring

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JOB NO.: B464-002

DATE: December 2009

Fig. A-8

APPENDIX B –
Laboratory Testing

APPENDIX B

LABORATORY TESTING

Representative soil samples obtained from our borings were returned to our laboratory for additional observation and testing. Descriptions of the tests performed are provided below.

Unit Weight and Moisture Content: Ring samples were weighed and measured to evaluate their unit weight. A small portion of each sample was then tested for moisture content. The testing was performed per ASTM D2937 and D2216. The results of the testing are shown on the boring logs (Figure Nos. A-3 through A-7).

Maximum Density-Optimum Moisture Content: Three samples were selected for maximum density testing in accordance with ASTM D1557. The test results are presented graphically on Figure B-3.

Sieve Analysis: Three soil samples were selected for sieve analysis testing in accordance with ASTM D422. These tests provide information for classifying the soil in accordance with the Unified Classification System. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing are shown on Figure B-4.

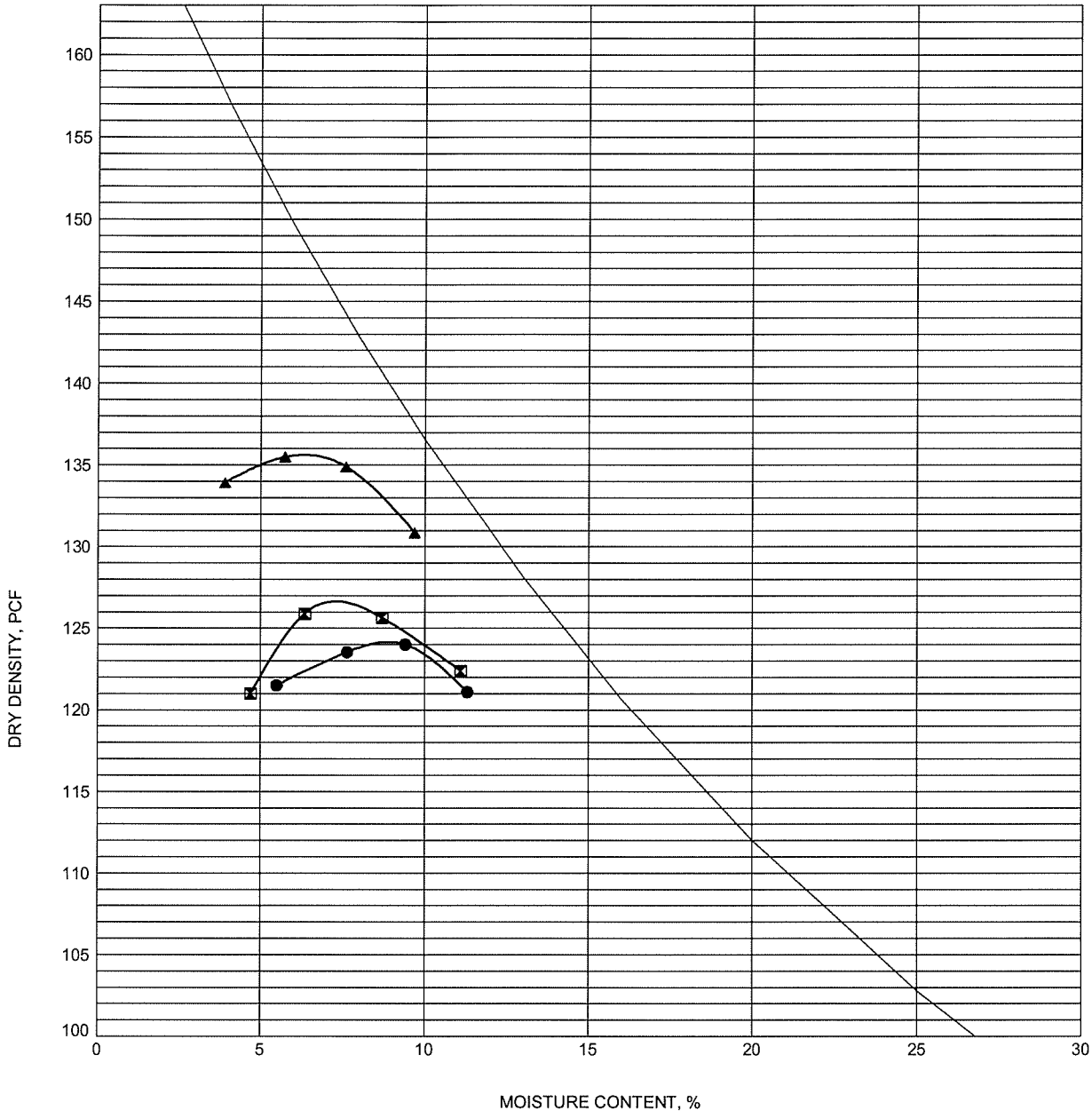
Plastic Index: Three samples were selected for plastic index testing in accordance with ASTM D4318. These tests provide information regarding soil plasticity and are also used for developing classifications for the soil in accordance with the Unified Classification System. The results are shown on Figure B-4.

Direct Shear Testing: One sample was selected for direct shear strength testing in accordance with ASTM D3080. This testing measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation bearing capacity and lateral earth pressure. Test results are shown on Figure B-5.

Consolidation Testing: One sample was selected for consolidation testing in accordance with ASTM D2435. This test is used to evaluate the magnitude and rate of settlement of a structure or earth fill. The results of this testing are presented graphically on Figure B-6.

Analytical Testing: Two samples were selected to evaluate the concentration of soluble sulfates and chlorides, pH level, and resistivity of and within the on-site soils. The results are shown in the following table.

Sample Location	Sample Depth (ft.)	Water-Soluble Sulfates (%)	Chlorides (ppm)	Minimum Resistivity (ohm-cm)	pH
B-02	0.0 – 6.0	0.001	108	10,000	6.0
B-04	0.0 – 4.0	0.001	60	15,000	6.9



Specimen Identification			Classification	Max.Density	MC%
●	B-02	0.0	POORLY GRADED SAND with SILT SP-SM	124.5	9.0
⊠	B-04	0.0	SILTY SAND SM	127.0	7.5
▲	B-04	6.3	POORLY GRADED SAND with SILT and GRAVEL SP-SM	136.0	7.0

PROJECT Geotechnical Exploration
Brookside Avenue

PROJECT NO. B464-002
DATE December 17, 2009

MAXIMUM DENSITY-OPTIMUM MOISTURE CURVES

Inland Foundation Engineering, Inc.
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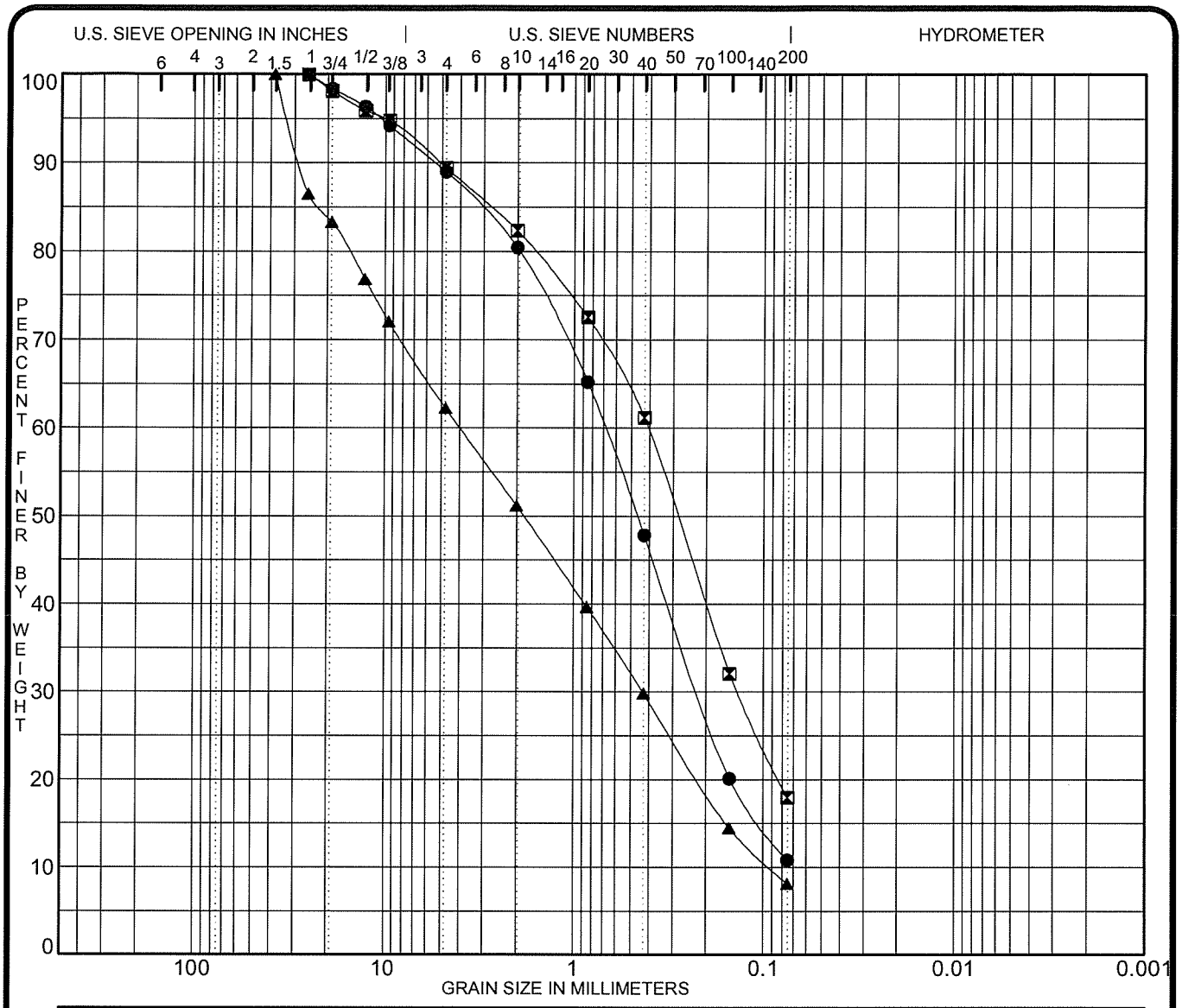
Figure No. B-3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	S.G.	LL	PL	PI	Cc	Cu
●	B-02	0.0	POORLY GRADED SAND with SILT SP-SM		NP	NP	NP	0.97	9.8
⊠	B-04	0.0	SILTY SAND SM		NP	NP	NP		
▲	B-04	6.3	POORLY GRADED SAND with SILT and GRAVEL SP-SM		NP	NP	NP	0.51	43.3

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-02	0.0	25.40	0.69	0.217		11.0	78.2	10.8	
⊠	B-04	0.0	25.40	0.41	0.135		10.6	71.5	18.0	
▲	B-04	6.3	38.00	3.98	0.430	0.0919	37.7	54.1	8.1	

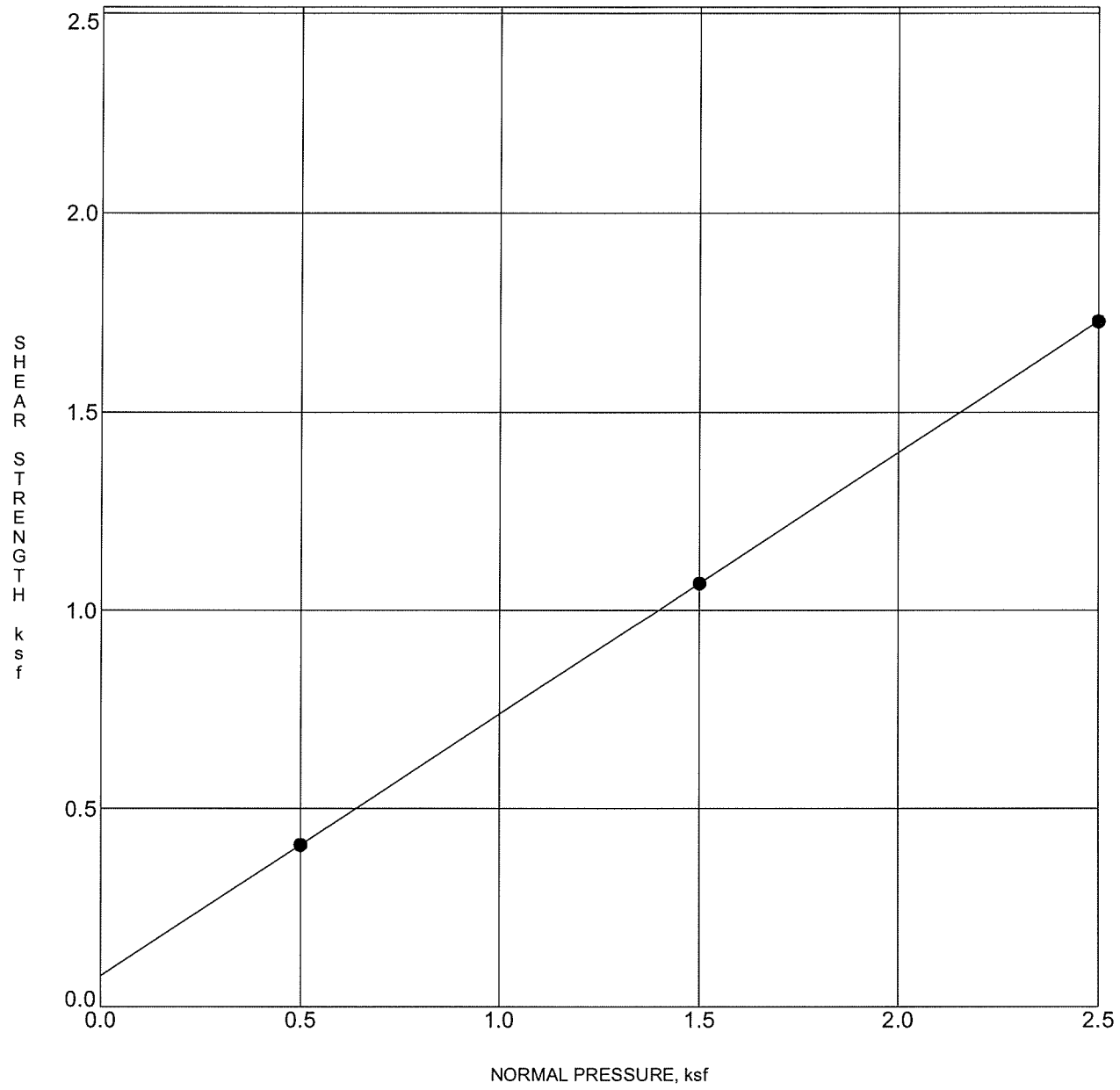
PROJECT Geotechnical Exploration
Brookside Avenue

PROJECT NO. B464-002
DATE December 17, 2009

GRADATION CURVES

Inland Foundation Engineering, Inc.
San Jacinto, California 92583

Figure No. B-4



Specimen Identification			Classification	Phi	Cohesion	DD	MC%
●	**B-04**	**0.0**	**SILTY SAND SM**	**33**	**0.078**	**114**	**18**

PROJECT Geotechnical Exploration
Brookside Avenue

PROJECT NO. B464-002
DATE December 17, 2009

SHEAR TEST DIAGRAM

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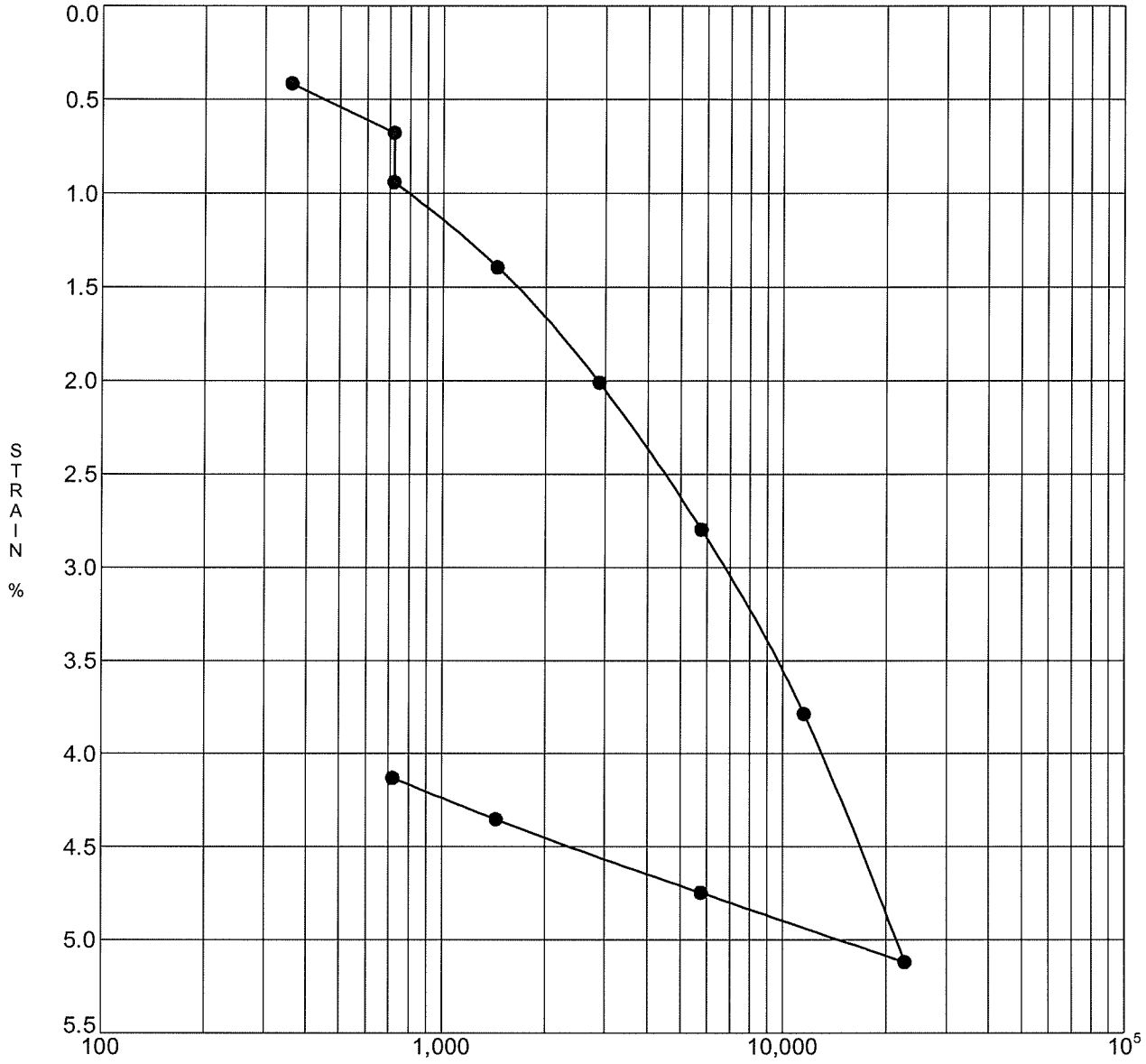
San Jacinto, California 92583

Figure No. B-5



Specimen Identification		Classification	DD	MC%
● B-05 2.5		**SAND with GRAVEL**	**118**	**2**
⊠				
▲				
★				
✕				
✪				

PROJECT Geotechnical Exploration
Brookside Avenue

PROJECT NO. B464-002
DATE December 17, 2009

CONSOLIDATION TEST

Inland Foundation Engineering, Inc.
San Jacinto, California 92583

Figure No. B-6

June 2, 2023
Project No. C537-002

Corion Enterprises
100 Wilshire Blvd., Suite 700
Santa Monica, California 90401

Attention: Ms. JoAnn Horeni
Director, Client Relations

Subject: Infiltration Testing
Proposed Cherry Valley Storage
Brookside Avenue, North Side, East of Nancy Avenue
Cherry Valley Area, Riverside County, California

Dear Ms. Horeni:

This report presents the results of infiltration (percolation) testing performed for a stormwater infiltration system at the subject site. The testing was conducted in general conformance with our proposal dated April 25, 2023.

The following references were used for the testing and preparation of this report.

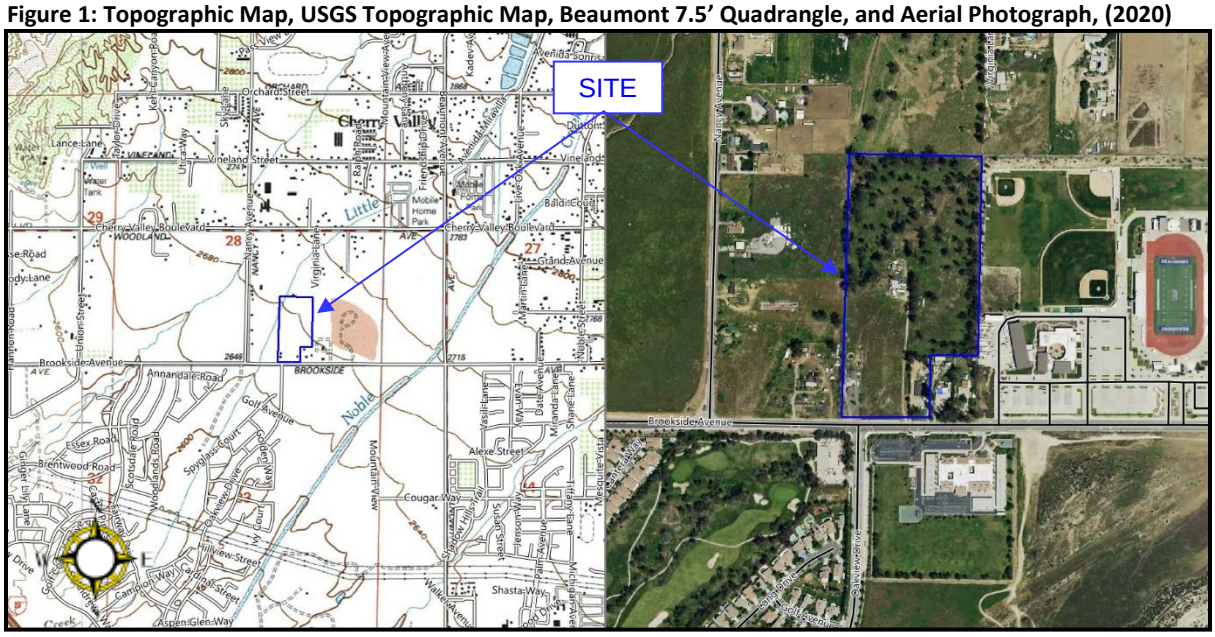
- Preliminary Grading Plan for Cherry Valley Storage, 38718 Brookside Drive, Cherry Valley, California, prepared by Strand Engineering, Inc., dated May 26, 2023

- Geotechnical Report Update, Proposed Mini Storage Facility, Brookside Avenue, North Side, East of Nancy Avenue, Cherry Valley Area, Riverside County, California, prepared by Inland Foundation Engineering, Inc., dated January 20, 2023, Project No. C537-002.

PROJECT AND SITE DESCRIPTION

The project site is located on the north side of Brookside Avenue, east of Nancy Avenue, in the Cherry Valley area of Riverside County. The site location is shown below.

Figure 1: Topographic Map, USGS Topographic Map, Beaumont 7.5' Quadrangle, and Aerial Photograph, (2020)



The project site occupies approximately 8.4 acres and will be developed with a storage facility. The facility will include a small office building, self-storage structures, RV storage with shade structures, and drive aisles.

Three infiltration basins are proposed at the locations shown on Figure A-1. The basins will range in depth from approximately 4 to 8 feet below adjacent surface grades.

SUBSURFACE CONDTIONS

Exploratory borings were drilled at each basin location to depths of approximately 20 feet below ground surface. Alluvial soil consisting of silty sand (SM) and sand with silt (SP-SM) was encountered to depths of about 3 to 5 feet. Gravel with sand (GP) was encountered below the surface soil to the depth explored, 20 feet. Logs of the exploratory borings are included with this report in Appendix A.

Groundwater was not encountered in the exploratory borings. No mottling or other indications of historic high groundwater were observed. Groundwater data compiled for the referenced geotechnical report update indicate the depth to historic high groundwater is more than 300 feet below ground surface.

Based on the conditions encountered in the borings and historical groundwater data, there will be a minimum of 5 feet of permeable soil below the infiltration facilities and a minimum of 10 feet between the bottom of the infiltration facilities and historical high groundwater levels.

INFILTRATION TESTING

Infiltration testing was conducted in general accordance with Appendix A of the Riverside County Low Impact Development BMP Design Handbook (2011). The Riverside County Department of Environmental Health shallow percolation test procedure was used. The percolation rates were converted to infiltration rates using the Porchet method.

Two percolation tests were performed at each proposed basin location. The test holes were drilled on May 30, 2023 to depths ranging from approximately 48 to 78 inches below existing ground surface. The test holes were approximately ten (10) inches in diameter. A two-inch thick layer of gravel was placed in the bottom of each test hole. The test holes were then pre-soaked by filling to ground surface (at least 5 times the hole radius).

Upon return to the site on May 31, 2023, all pre-soak water had percolated through the test holes and percolation testing of the test holes commenced. For all tests, more than 6 inches of water seeped away twice consecutively in less than 25 minutes, which meets the sandy soil criteria. The tests were then run for an additional hour with measurements taken every 10 minutes. For all tests except P-01, there was no standing water remaining in the hole at the end of the 10-minute reading interval. Copies of the field test data are included in Appendix A.

The measured percolation rates ranged from less than 0.33 to 0.67 minutes per inch. Percolation test rates were converted to infiltration rates (I_c) using the Porchet method and the following equation:

$$I_c = \Delta H 60 r / \Delta t (r + 2H_{avg})$$

Where:

r = Test Hole Radius (in.)
H_{avg} = Average Height of Water during Test Interval (in.)
ΔH = Change in Water Height during Test Interval (in.), and
Δt = Time Interval (in.)

The corresponding calculated infiltration rates (I_c) ranged from 9 to more than 26 inches per hour. These values exclude factors of safety. The table below provides a summary of the test data with values for I_c:

Percolation Test No.	Percolation Rate (min/in)	Depth Below Existing Ground Surface (in)	Infiltration Rate (I_c) (in/hr)
Basin 1			
P-05	<0.33	48	>26
P-06	<0.33	78	>26
Basin 2			
P-03	<0.33	48	>26
P-04	<0.33	72	>26
Basin 3			
P-01	0.67	48	9
P-02	<0.33	68	>26

Per Table 1-1 Option 2 (Percolation Tests) use FS=3

LIMITATIONS

This report was prepared for Corion Enterprises for their use in the design of the proposed stormwater infiltration systems at the subject location. This report may only be used by Corion Enterprises for this purpose. The use of this report by parties or for other purposes is not authorized without written permission by Inland Foundation Engineering, Inc. Inland Foundation Engineering, Inc. will not be liable for any projects connected with the unauthorized use of this report.

The information in this report represents professional opinions that have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, either expressed or implied, is made as to the professional advice included in this report.

We appreciate being of service to you on this project. If you have any questions, please contact our office.

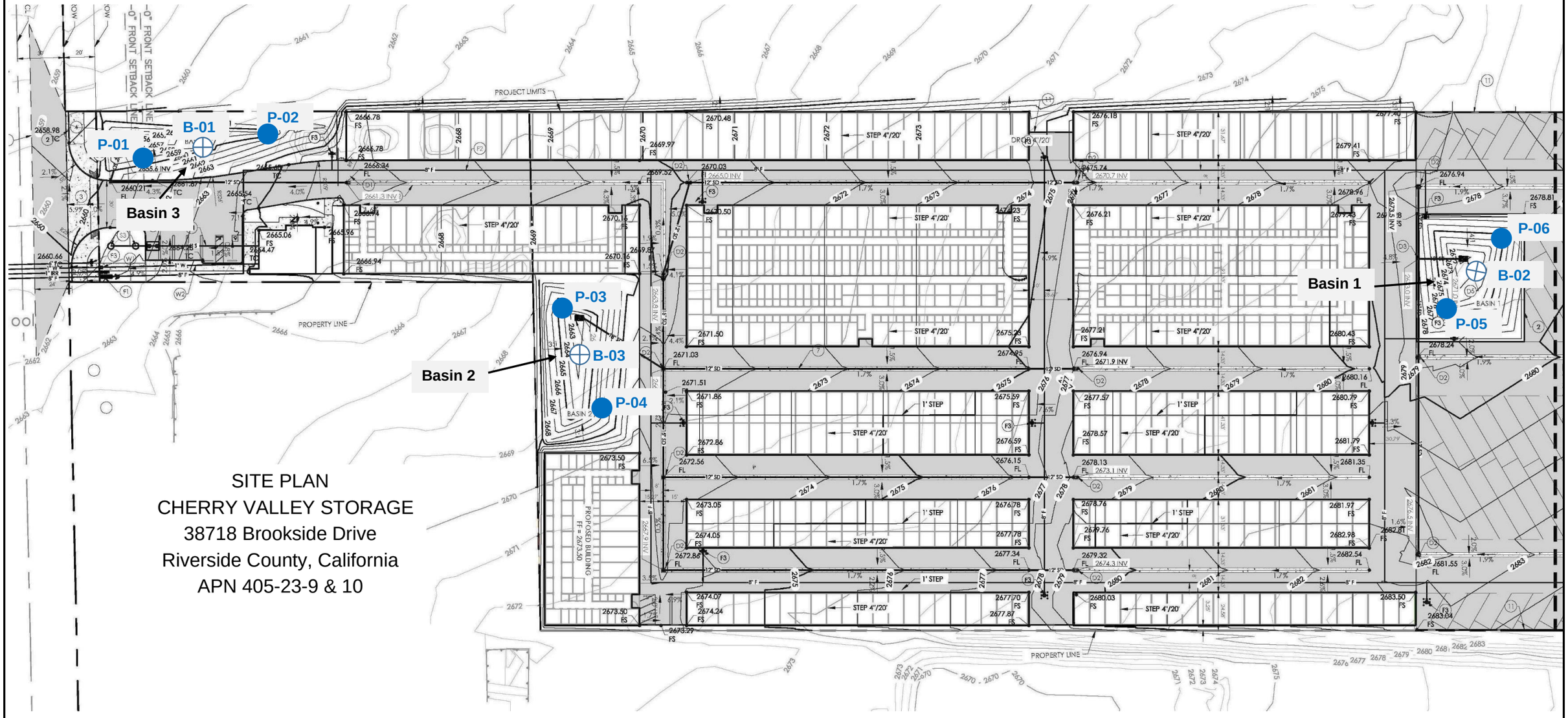
Respectfully,
INLAND FOUNDATION ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER ALLEN D. EVANS No. 2060 GEOTECHNICAL STATE OF CALIFORNIA

Allen D. Evans, P.E., G.E.
Principal

ADE:es
Distribution: Addressee

APPENDIX A



SITE PLAN
CHERRY VALLEY STORAGE
38718 Brookside Drive
Riverside County, California
APN 405-23-9 & 10

Base Map: Preliminary Grading Plan prepared by Strand Engineering, Inc.

- Approximate Location of Percolation Test for Infiltration Basin
- Approximate Location of Deep Boring

N

IFE Inland Foundation Engineering, Inc.
1310 S. Santa Fe Avenue, San Jacinto, CA 92583 | (951) 654-1555

Figure No. A-1	Corion Enterprises Cherry Valley Storage 38718 Brookside Drive, Riverside County, CA	
	Drawn By: ES	Project No. C537-002
	Scale: 1"= 60'	Date: June 2023

LOG OF BORING B-01

DRILLING RIG	**Mobile B61**	DATE DRILLED	**5/30/23**	HAMMER TYPE	
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**-inches**
GROUND ELEVATION	**+/- 2671 ft**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
	SM		**SILTY SAND,** fine to medium, gray brown, moist, medium dense.						
5	GP		**GRAVEL with SAND,** fine to coarse, gray brown, moist, medium dense.						
10									
15									
20			End of boring at 20 feet. No groundwater or mottling encountered. Backfilled with native soil.						

Inland Foundation Engineering, Inc.

CLIENT	**Corion Enterprises**
PROJECT NAME	**Cherry Valley Storage**
PROJECT LOCATION	**38718 Brookside Drive**
	Riverside County, CA
PROJECT NUMBER	**C537-002**

FIGURE NO. A-2

IFE BORING - GINT STD US LAB.GDT - 6/1/23 14:29 - P:\C537\002\GINT.GPJ

LOG OF BORING B-02

DRILLING RIG	**Mobile B61**	DATE DRILLED	**5/30/23**	HAMMER TYPE	
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**-inches**
GROUND ELEVATION	**+/- 2660 ft**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
	SP-SM		**SAND with SILT,** and GRAVEL, fine to coarse, gray brown, slightly moist, loose.						
5									
	GP		**GRAVEL with SAND,** fine to coarse, gray brown, slightly moist, medium dense.						
10			- boulders						
15									
20			End of boring at 20 feet. No groundwater or mottling encountered. Backfilled with native soil.						

Inland Foundation Engineering, Inc.

CLIENT	**Corion Enterprises**
PROJECT NAME	**Cherry Valley Storage**
PROJECT LOCATION	**38718 Brookside Drive**
	Riverside County, CA
PROJECT NUMBER	**C537-002**

FIGURE NO. A-3

IFE BORING - GINT STD US LAB.GDT - 6/1/23 14:29 - P:\C537\002\GINT.GPJ

LOG OF BORING B-03

DRILLING RIG	**Mobile B61**	DATE DRILLED	**5/30/23**	HAMMER TYPE	
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**-inches**
GROUND ELEVATION	**+/- 2663 ft**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.						
	SM		**SILTY SAND,** fine to medium, gray brown, slightly moist, medium dense.						
5	GP		**GRAVEL with SAND,** fine to coarse, gray brown, slightly moist, medium dense.						
10									
15									
20									
			End of boring at 20 feet. No groundwater or mottling encountered. Backfilled with native soil.						

Inland Foundation Engineering, Inc.

CLIENT	**Corion Enterprises**
PROJECT NAME	**Cherry Valley Storage**
PROJECT LOCATION	**38718 Brookside Drive**
	Riverside County, CA
PROJECT NUMBER	**C537-002**

FIGURE NO. A-4

PERCOLATION TEST DATA SHEET – INFILTRATION TESTING

Project: Corian Enterprises	**Project No.:** C537-002	**Date:** 5/31/2023
Test Hole No.: P-01	**Tested By:** Floyd Collins and Chris Dahlgren	
Depth of Test Hole (D_T): 48"	**USCS Soil Classification:** SM	

Test Hole Dimensions (inches)	**Length**	**Width**
Diameter (if round)= 10" **Sides (if rectangular) =**		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" (Y/N)
1	11:48	12:13	25	18	44	26	Y
2	12:16	12:41	25	18	44	26	Y
3							

***If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".**

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	$\Delta D=\Delta H$ Change in Water Level (in.)	Perc. Rate min./in.	H_{Avg} $(D_T - D_o) + (D_T - D_f) \div 2$	I_T $\frac{\Delta H\ 60r}{\Delta t(r+2H)_{Avg}}$
1	12:44	12:54	10	18	33 ½	15 ½	0.65	22.25	9
2	12:56	1:06	10	18	33 ½	15 ½	0.65	22.25	9
3	1:10	1:20	10	18	33	15	0.67	22.50	9
4	1:22	1:32	10	18	33	15	0.67	22.50	9
5	1:37	1:47	10	18	33	15	0.67	22.50	9
6	1:50	2:00	10	18	33	15	0.67	22.50	9

COMMENTS: Presoaked on 5/30/23. Dry hole prior to testing. Hole filled to test level and tests begun. Temperature ~55°F during resting. Overcast.

PERCOLATION TEST DATA SHEET – INFILTRATION TESTING

Project: Corian Enterprises	**Project No.:** C537-002	**Date:** 5/31/2023
Test Hole No.: P-02	**Tested By:** Floyd Collins and Chris Dahlgren	
Depth of Test Hole (D_T): 68”	**USCS Soil Classification:** SP-SM w/gravel	

Test Hole Dimensions (inches)	**Length**	**Width**
Diameter (if round)= 10” **Sides (if rectangular) =**		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6″ (Y/N)
1	11:45	12:10	25	38	68	30	Y
2	12:12	12:37	25	38	68	30	Y
3							

***If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25″.**

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	$\Delta D=\Delta H$ Change in Water Level (in.)	Perc. Rate min./in.	H_{Avg} $(D_T - D_o) + (D_T - D_f) \div 2$	I_T $\frac{\Delta H\ 60r}{\Delta t(r+2H)_{Avg}}$
1	12:40	12:50	10	38	68*	30	<0.33	15.00	>26
2	12:51	1:01	10	38	68*	30	<0.33	15.00	>26
3	1:04	1:14	10	38	68*	30	<0.33	15.00	>26
4	1:16	1:26	10	38	68*	30	<0.33	15.00	>26
5	1:28	1:38	10	38	68*	30	<0.33	15.00	>26
6	1:41	1:51	10	38	68*	30	<0.33	15.00	>26

*No standing water in the hole at end of 10 minute test period

COMMENTS: Presoaked on 5/30/23. Dry hole prior to testing. Hole filled to test level and tests begun. Temperature ~55°F during resting. Overcast.

PERCOLATION TEST DATA SHEET – INFILTRATION TESTING

Project: Corian Enterprises	**Project No.:** C537-002	**Date:** 5/31/2023
Test Hole No.: P-03	**Tested By:** Floyd Collins and Chris Dahlgren	
Depth of Test Hole (D_T): 48”	**USCS Soil Classification:** SP-SM w/gravel	

Test Hole Dimensions (inches)	**Length**	**Width**
Diameter (if round)= 10” **Sides (if rectangular) =**		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6″ (Y/N)
1	9:35	10:00	25	18	48	30	Y
2	10:02	10:27	25	18	48	30	Y
3							

***If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25″.**

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	$\Delta D=\Delta H$ Change in Water Level (in.)	Perc. Rate min./in.	H_{Avg} $(D_T - D_o) + (D_T - D_f) \div 2$	I_T $\frac{\Delta H\ 60r}{\Delta t(r+2H)_{Avg}}$
1	10:28	10:38	10	18	48*	30	<0.33	15.00	>26
2	10:40	10:50	10	18	48*	30	<0.33	15.00	>26
3	10:51	11:01	10	18	48*	30	<0.33	15.00	>26
4	11:03	11:13	10	18	48*	30	<0.33	15.00	>26
5	11:14	11:24	10	18	48*	30	<0.33	15.00	>26
6	11:26	11:36	10	18	48*	30	<0.33	15.00	>26

*No standing water in the hole at end of 10 minute test period

COMMENTS: Presoaked on 5/30/23. Dry hole prior to testing. Hole filled to test level and tests begun. Temperature ~53°F during resting. Overcast.

PERCOLATION TEST DATA SHEET – INFILTRATION TESTING

Project: Corian Enterprises	**Project No.:** C537-002	**Date:** 5/31/2023
Test Hole No.: P-04	**Tested By:** Floyd Collins and Chris Dahlgren	
Depth of Test Hole (D_T): 72”	**USCS Soil Classification:** SP-SM w/gravel	

Test Hole Dimensions (inches)	**Length**	**Width**
Diameter (if round)= 10” **Sides (if rectangular) =**		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6″ (Y/N)
1	9:33	9:58	25	42	72	30	Y
2	10:00	10:25	25	42	72	30	Y
3							

***If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25″.**

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	$\Delta D=\Delta H$ Change in Water Level (in.)	Perc. Rate min./in.	H_{Avg} $(D_T - D_o) + (D_T - D_f) \div 2$	I_T $\frac{\Delta H\ 60r}{\Delta t(r+2H)_{Avg}}$
1	10:33	10:43	10	42	72*	30	<0.33	15.00	>26
2	10:44	10:54	10	42	72*	30	<0.33	15.00	>26
3	10:56	11:06	10	42	72*	30	<0.33	15.00	>26
4	11:07	11:17	10	42	72*	30	<0.33	15.00	>26
5	11:19	11:29	10	42	72*	30	<0.33	15.00	>26
6	11:30	11:40	10	42	72*	30	<0.33	15.00	>26

*No standing water in the hole at end of 10 minute test period

COMMENTS: Presoaked on 5/30/23. Dry hole prior to testing. Hole filled to test level and tests begun. Temperature ~53°F during resting. Overcast.

PERCOLATION TEST DATA SHEET – INFILTRATION TESTING

Project: Corian Enterprises	**Project No.:** C537-002	**Date:** 5/31/2023
Test Hole No.: P-05	**Tested By:** Floyd Collins and Chris Dahlgren	
Depth of Test Hole (D_T): 48"	**USCS Soil Classification:** SP-SM w/gravel	

Test Hole Dimensions (inches)	**Length**	**Width**
Diameter (if round)= 10" **Sides (if rectangular) =**		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" (Y/N)
1	7:25	7:50	25	18	48	30	Y
2	7:53	8:18	25	18	48	30	Y
3							

***If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".**

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	$\Delta D=\Delta H$ Change in Water Level (in.)	Perc. Rate min./in.	H_{Avg} $(D_T - D_o) + (D_T - D_f) \div 2$	I_T $\frac{\Delta H\ 60r}{\Delta t(r+2H)_{Avg}}$
1	8:20	8:30	10	18	48*	30	<0.33	15.00	>26
2	8:32	8:42	10	18	48*	30	<0.33	15.00	>26
3	8:44	8:54	10	18	48*	30	<0.33	15.00	>26
4	8:56	9:06	10	18	48*	30	<0.33	15.00	>26
5	9:08	9:18	10	18	48*	30	<0.33	15.00	>26
6	9:20	9:30	10	18	48*	30	<0.33	15.00	>26

*No standing water in the hole at end of 10 minute test period

COMMENTS: Presoaked on 5/30/23. Dry hole prior to testing. Hole filled to test level and tests begun. Temperature ~51°F during resting. Overcast.

PERCOLATION TEST DATA SHEET – INFILTRATION TESTING

Project: Corian Enterprises	**Project No.:** C537-002	**Date:** 5/31/2023
Test Hole No.: P-06	**Tested By:** Floyd Collins and Chris Dahlgren	
Depth of Test Hole (D_T): 78”	**USCS Soil Classification:** SP-SM w/gravel	

Test Hole Dimensions (inches)	**Length**	**Width**
Diameter (if round)= 10” **Sides (if rectangular) =**		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6″ (Y/N)
1	7:20	7:45	25	48	78	30	Y
2	7:47	8:12	25	48	78	30	Y
3							

***If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25″.**

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	$\Delta D=\Delta H$ Change in Water Level (in.)	Perc. Rate min./in.	H_{Avg} $(D_T - D_o) + (D_T - D_f) \div 2$	I_T $\frac{\Delta H\ 60r}{\Delta t(r+2H)_{Avg}}$
1	8:14	8:24	10	48	78*	30	<0.33	15.00	>26
2	8:25	8:35	10	48	78*	30	<0.33	15.00	>26
3	8:36	8:46	10	48	78*	30	<0.33	15.00	>26
4	8:47	8:57	10	48	78*	30	<0.33	15.00	>26
5	8:58	9:08	10	48	78*	30	<0.33	15.00	>26
6	9:09	9:19	10	48	78*	30	<0.33	15.00	>26

*No standing water in the hole at end of 10 minute test period

COMMENTS: Presoaked on 5/30/23. Dry hole prior to testing. Hole filled to test level and tests begun. Temperature ~51°F during resting. Overcast.

Appendix 4: Historical Site Conditions

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

*TO BE PROVIDED WITH FINAL WQMP

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

*N/A – LID FEATURES INCORPORATED (SEE APPENDIX 6)

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

C Value Calculations (Area Weighted)

Basin	Impervious Area	Impervious C Value	Pervious Area	Pervious C Values	Runoff Factor
P-1	0.57	0.9	0	0	0.90
P-2	1.24	0.9	0	0	0.90
P-3	1.3	0.9	0.13	0	0.82
P-4	0.79	0.9	0	0	0.90
P-5	0.78	0.9	0	0	0.90
P-6	1.06	0.9	0	0	0.90
P-7	1.22	0.9	0	0	0.90
P-8	0.43	0.9	0.21	0	0.60
P-9	0.19	0.9	0.17	0	0.48
P-10	0.14	0.9	0.01	0	0.84
Total	7.72	0.9	0.52	0	0.84

C Values from RCHM Plate E6.3 (C=0.9 for commercial, C=0 for natural)

BASIN 1 STAGE STORAGE

Basin 1
Project:
Basin Description:

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)
2,673.000	60.70	N/A	N/A	0.00
2,674.000	2,110.64	1.000	1085.67	1085.67
2,675.000	2,819.52	1.000	2465.08	3550.75
2,676.000	3,431.84	1.000	3125.68	6676.43
2,677.000	4,133.05	1.000	3782.44	10458.87
2,678.000	4,828.40	1.000	4480.72	14939.59

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: Basin 1	Legend:	Required Entries / Calculated Cells
Company Name: Strand Engineering, Inc			Date: 10/20/2023
Designed by: W. Strand			County/City Case No.: CUP 23006

Design Volume

a) Tributary area (BMP subarea)	A_T =	3.2	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	7,783	ft^3

Maximum Depth

a) Infiltration rate	I =	26	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	52.0	ft
d) Enter the depth of freeboard (at least 1 ft)		2.5	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		340	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		500	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	327.5	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	52.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4.7	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	1656	ft^2
d) Proposed Design Surface Area	A_D =	4474	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	39	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	39	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

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: Strand Engineering Inc.

Date: 11/25123

Designed by: W. Strand

Case No:

Company Project Number/Name: Cherry Valley Storag

BMP Identification

BMP NAME / ID: Basin 1

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}= 0.80 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)*
P-1	*24,989*	*Pavement*	*1*	*0.89*	*22290.2*			
P-2	*53,811*	*Pavement*	*1*	*0.89*	*47999.4*			
P-3	*62,143*	*Pavement/Basin*	*0.91*	*0.74*	*46295.7*			
	140943		***Total***		**116585.3**	**0.80**	**7772.4**	

#N/A

Proposed Volume must be greater than the Design Capture Volume

Notes:

BASIN 2 STAGE STORAGE

Basin 2
Project:
Basin Description:

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)
2,662.000	773.99	N/A	N/A	0.00
2,663.000	2,653.72	1.000	1713.86	1713.86
2,664.000	3,795.29	1.000	3224.51	4938.36
2,665.000	4,860.57	1.000	4327.93	9266.30
2,666.000	6,035.67	1.000	5448.12	14714.41
2,666.200	6,185.09	0.200	1222.08	15936.49

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: Basin 2	Legend:	Required Entries / Calculated Cells
Company Name: Strand Engineering, Inc		Date:	10/20/2023
Designed by: W. Strand		County/City Case No.:	CUP 23006

Design Volume

a) Tributary area (BMP subarea)	A_T =	4.5	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	10,859	ft^3

Maximum Depth

a) Infiltration rate	I =	17.5	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	35.0	ft
d) Enter the depth of freeboard (at least 1 ft)		2.7	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		340	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		500	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	327.3	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	35.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4.5	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	2413	ft^2
d) Proposed Design Surface Area	A_D =	6042	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	54	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	54	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

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: Strand Engineering Inc. Date: 11/25123

Designed by: W. Strand Case No:

Company Project Number/Name: Cherry Valley Storag

BMP Identification

BMP NAME / ID: Basin 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}= 0.80 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)*
P-4	*34,566*	*Pavement/Bldg*	*1*	*0.89*	*30832.9*			
P-5	*33,951*	*Pavement/Bldg*	*1*	*0.89*	*30284.3*			
P-6	*46,235*	*Pavement/Bldg*	*1*	*0.89*	*41241.6*			
P-7	*53144*	*Pavement/Bldg*	*1*	*0.89*	*47404.4*			
P-8	*28044*	*Pavement/Bldg/Basin*	*0.68*	*0.48*	*13333*			
	195940	**Total**			**163096.2**	**0.80**	**10873.1**	

#N/A

Proposed Volume must be greater than the Design Capture Volume

Notes:

BASIN 3 STAGE STORAGE

Basin 3
Project:
Basin Description:

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)
2,659.000	185.40	N/A	N/A	0.00
2,660.000	715.42	1.000	450.41	450.41
2,661.000	1,232.14	1.000	973.78	1424.19
2,662.000	1,786.02	1.000	1509.08	2933.27

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: Basin 3	Legend:	Required Entries / Calculated Cells
Company Name: Strand Engineering, Inc			Date: 10/20/2023
Designed by: W. Strand			County/City Case No.: CUP 23006

Design Volume

a) Tributary area (BMP subarea)	A_T =	0.36	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	732	ft^3

Maximum Depth

a) Infiltration rate	I =	17.5	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	35.0	ft
d) Enter the depth of freeboard (at least 1 ft)		2.8	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		340	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		500	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	327.2	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	35.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	1.1	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	665	ft^2
d) Proposed Design Surface Area	A_D =	1786	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	4	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	4	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

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	Strand Engineering Inc.	Date	11/25123
Designed by	W. Strand	Case No	
Company Project Number/Name	Cherry Valley Storag		

BMP Identification

BMP NAME / ID: Basin 3

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}= 0.80 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)
P-9	15,497	Pavement/Basin	0.55	0.37	5772.6			
P-10	6,636	Pavement/Landscape	0.94	0.79	5249			
	22133	Total			11021.6	0.80	734.8	

#N/A

Proposed Volume must be greater than the Design Capture Volume

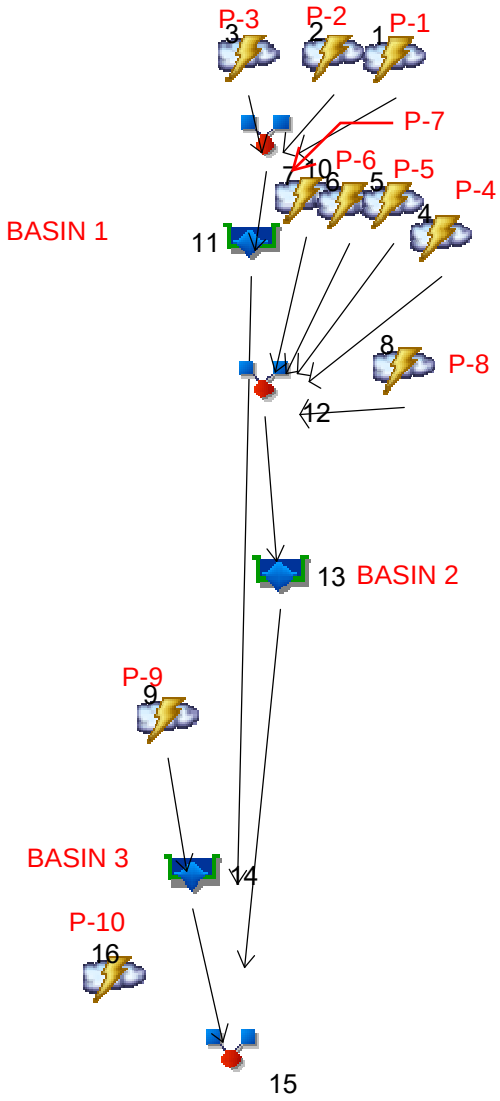
Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Watershed Model Schematic

PROPOSED CONDITIONS HYDRAFLOW MODEL



Legend

Hyd.	Origin	Description
1	Rational	P-1
2	Rational	P-2
3	Rational	P-3
4	Rational	P-4
5	Rational	P-5
6	Rational	P-6
7	Rational	P-7
8	Rational	P-8
9	Rational	P-9
10	Combine	<no description>
11	Reservoir	Pond 1
12	Combine	<no description>
13	Reservoir	Pond 2
14	Reservoir	Pond 3
15	Combine	Point of Compliance
16	Rational	P-10

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Rational	------	-------	0.560	-------	-------	1.678	-------	-------	2.536	P-1
2	Rational	------	-------	1.219	-------	-------	3.649	-------	-------	5.518	P-2
3	Rational	------	-------	1.104	-------	-------	3.281	-------	-------	4.958	P-3
4	Rational	------	-------	0.777	-------	-------	2.325	-------	-------	3.515	P-4
5	Rational	------	-------	0.709	-------	-------	2.112	-------	-------	3.192	P-5
6	Rational	------	-------	0.963	-------	-------	2.870	-------	-------	4.338	P-6
7	Rational	------	-------	1.108	-------	-------	3.303	-------	-------	4.993	P-7
8	Rational	------	-------	0.278	-------	-------	0.825	-------	-------	1.246	P-8
9	Rational	------	-------	0.137	-------	-------	0.407	-------	-------	0.614	P-9
10	Combine	1, 2, 3,	-------	2.607	-------	-------	7.788	-------	-------	11.77	<no description>
11	Reservoir	10	-------	0.000	-------	-------	0.000	-------	-------	0.000	Pond 1
12	Combine	4, 5, 6, 7, 8,	-------	3.576	-------	-------	10.67	-------	-------	16.12	<no description>
13	Reservoir	12	-------	0.000	-------	-------	0.000	-------	-------	0.000	Pond 2
14	Reservoir	9	-------	0.000	-------	-------	0.000	-------	-------	0.000	Pond 3
15	Combine	11, 13, 14	-------	0.000	-------	-------	0.000	-------	-------	0.000	Point of Compliance
16	Rational	------	-------	0.138	-------	-------	0.412	-------	-------	0.623	P-10

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.560	1	6	202	------	------	------	P-1
2	Rational	1.219	1	6	439	------	------	------	P-2
3	Rational	1.104	1	8	530	------	------	------	P-3
4	Rational	0.777	1	6	280	------	------	------	P-4
5	Rational	0.709	1	7	298	------	------	------	P-5
6	Rational	0.963	1	7	404	------	------	------	P-6
7	Rational	1.108	1	7	465	------	------	------	P-7
8	Rational	0.278	1	13	217	------	------	------	P-8
9	Rational	0.137	1	11	90	------	------	------	P-9
10	Combine	2.607	1	6	1,170	1, 2, 3,	------	------	<no description>
11	Reservoir	0.000	1	65	0	10	2673.90	979	Pond 1
12	Combine	3.576	1	7	1,664	4, 5, 6, 7, 8,	------	------	<no description>
13	Reservoir	0.000	1	20	0	12	2662.81	1,381	Pond 2
14	Reservoir	0.000	1	18	0	9	2659.18	79.4	Pond 3
15	Combine	0.000	1	20	0	11, 13, 14	------	------	Point of Compliance
16	Rational	0.138	1	6	50	------	------	------	P-10

Hydrograph Report

Hyd. No. 1

P-1

Hydrograph type	=	Rational	Peak discharge	=	0.560 cfs
Storm frequency	=	2 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	202 cuft
Drainage area	=	0.570 ac	Runoff coeff.	=	0.9
Intensity	=	1.092 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

FAA Formula Tc Worksheet

Tc = 1.8(1.1 - C) x Flow length^0.5 / Watercourse slope^0.333 Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No. 1

P-1

Description

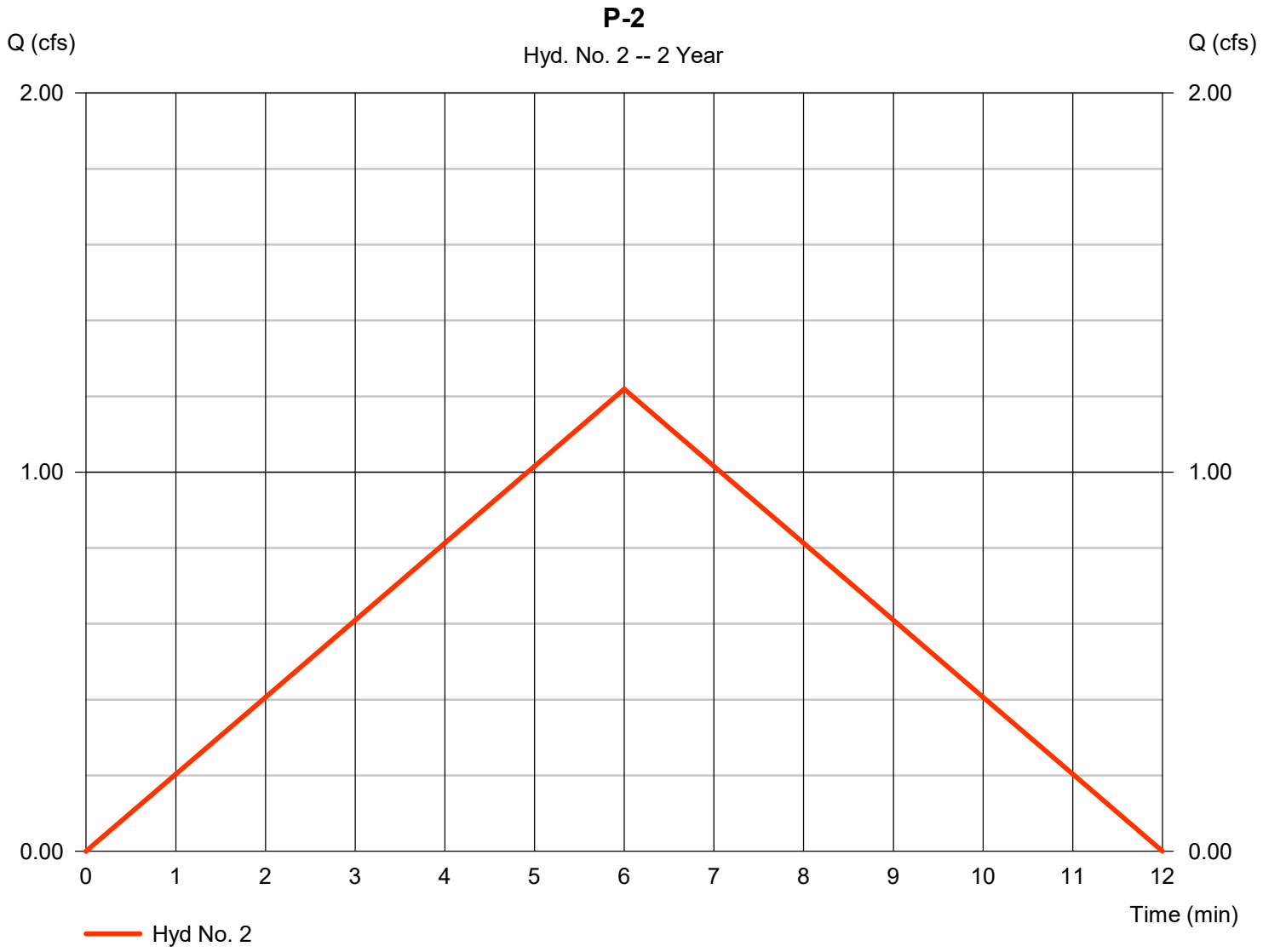
Flow length (ft)	= 439.00
Watercourse slope (%)	= 2.20
Runoff coefficient (C)	= 0.90
Time of Conc. (min)	**= 6**

Hydrograph Report

Hyd. No. 2

P-2

Hydrograph type	=	Rational	Peak discharge	=	1.219 cfs
Storm frequency	=	2 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	439 cuft
Drainage area	=	1.240 ac	Runoff coeff.	=	0.9
Intensity	=	1.092 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Tc = 1.8(1.1 - C) x Flow length^0.5 / Watercourse slope^0.333 Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No. 2

P-2

Description

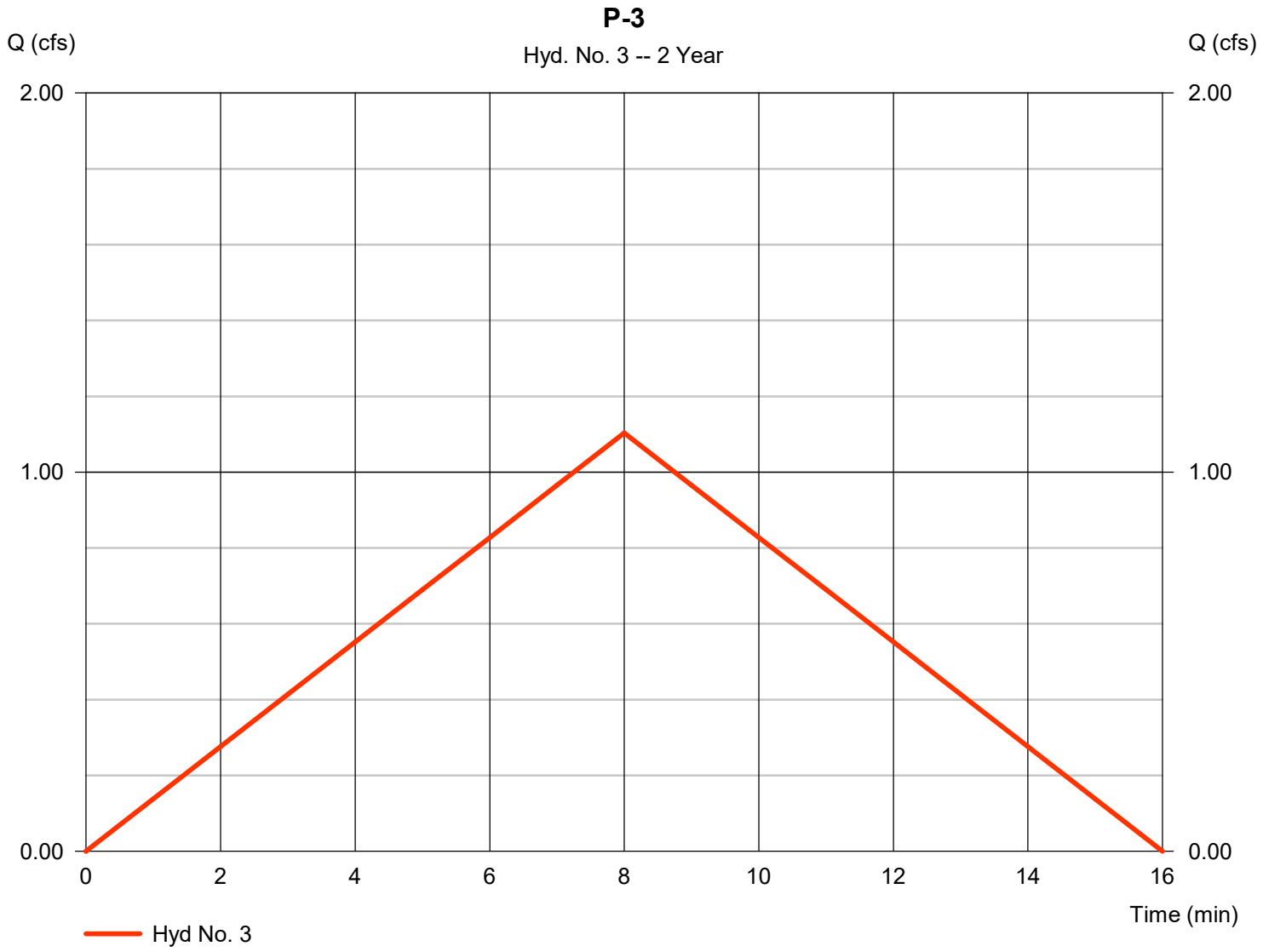
Flow length (ft)	= 486.00
Watercourse slope (%)	= 2.20
Runoff coefficient (C)	= 0.90
Time of Conc. (min)	**= 6**

Hydrograph Report

Hyd. No. 3

P-3

Hydrograph type	=	Rational	Peak discharge	=	1.104 cfs
Storm frequency	=	2 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	530 cuft
Drainage area	=	1.430 ac	Runoff coeff.	=	0.82
Intensity	=	0.941 in/hr	Tc by FAA	=	8.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 3

P-3

Description

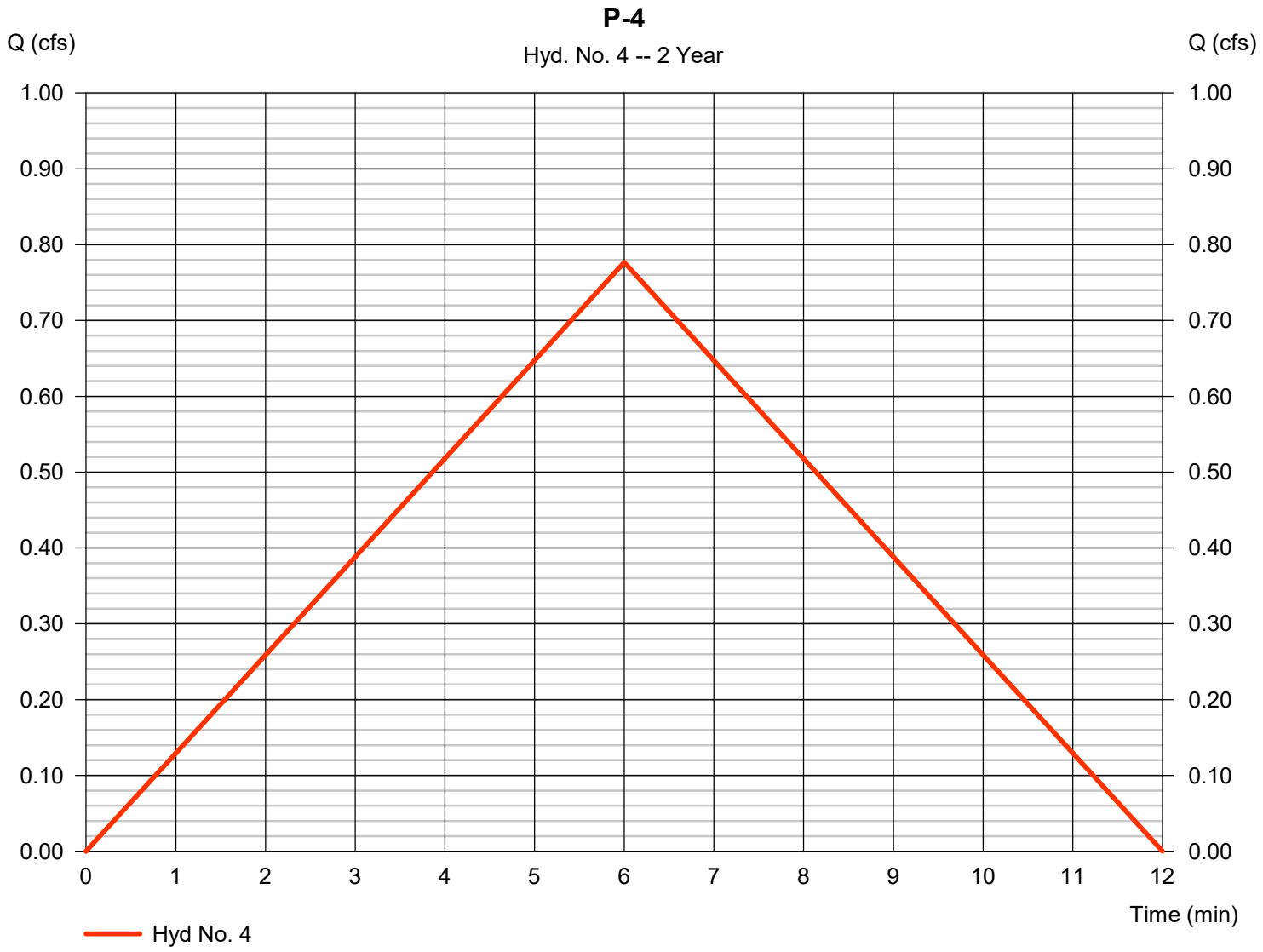
Flow length (ft)	= 472.00
Watercourse slope (%)	= 2.20
Runoff coefficient (C)	= 0.82
Time of Conc. (min)	**= 8**

Hydrograph Report

Hyd. No. 4

P-4

Hydrograph type	=	Rational	Peak discharge	=	0.777 cfs
Storm frequency	=	2 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	280 cuft
Drainage area	=	0.790 ac	Runoff coeff.	=	0.9
Intensity	=	1.092 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 4

P-4

Description

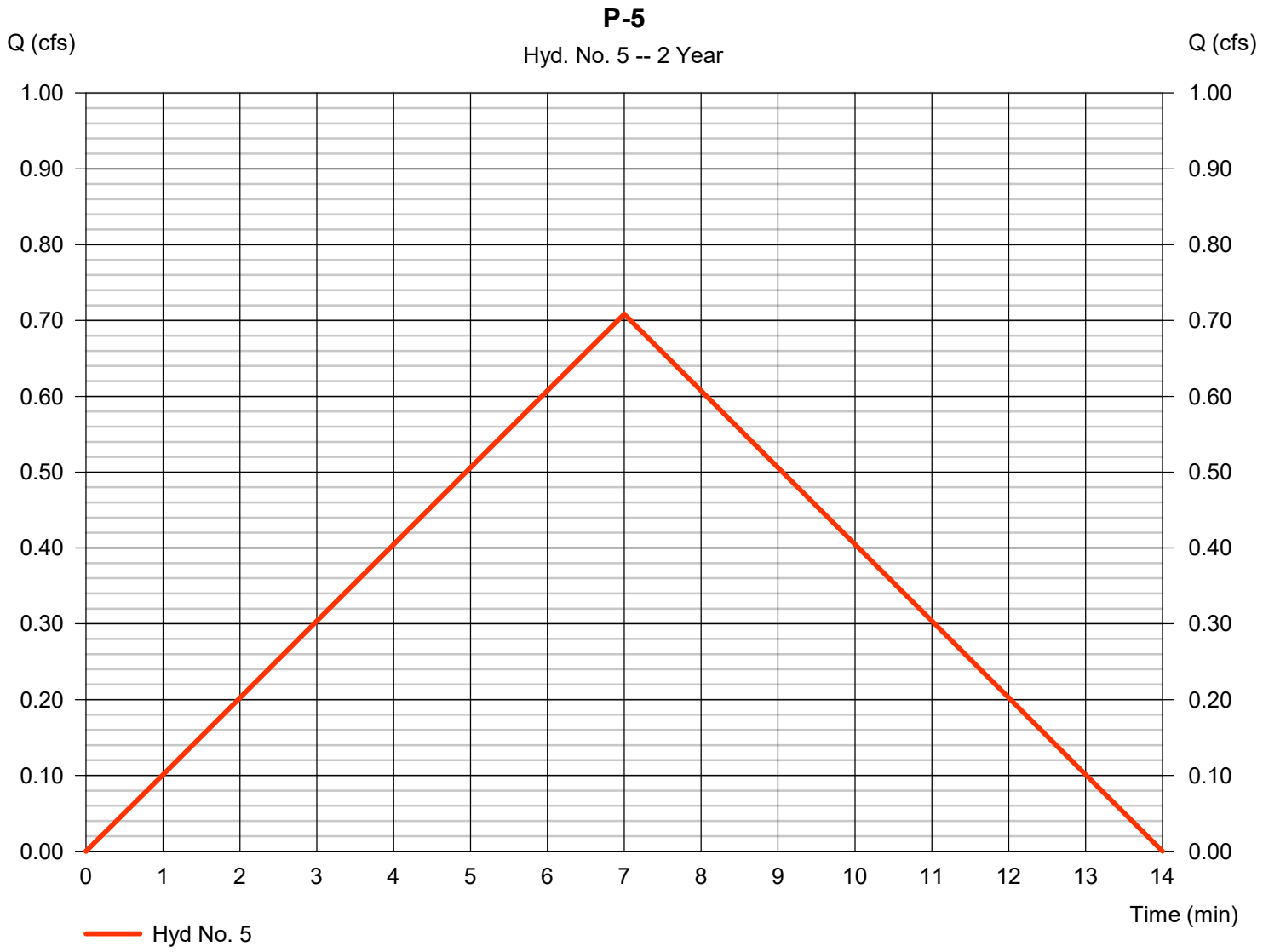
Flow length (ft)	= 533.00
Watercourse slope (%)	= 2.20
Runoff coefficient (C)	= 0.90
Time of Conc. (min)	**= 6**

Hydrograph Report

Hyd. No. 5

P-5

Hydrograph type	=	Rational	Peak discharge	=	0.709 cfs
Storm frequency	=	2 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	298 cuft
Drainage area	=	0.780 ac	Runoff coeff.	=	0.9
Intensity	=	1.009 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 5

P-5

Description

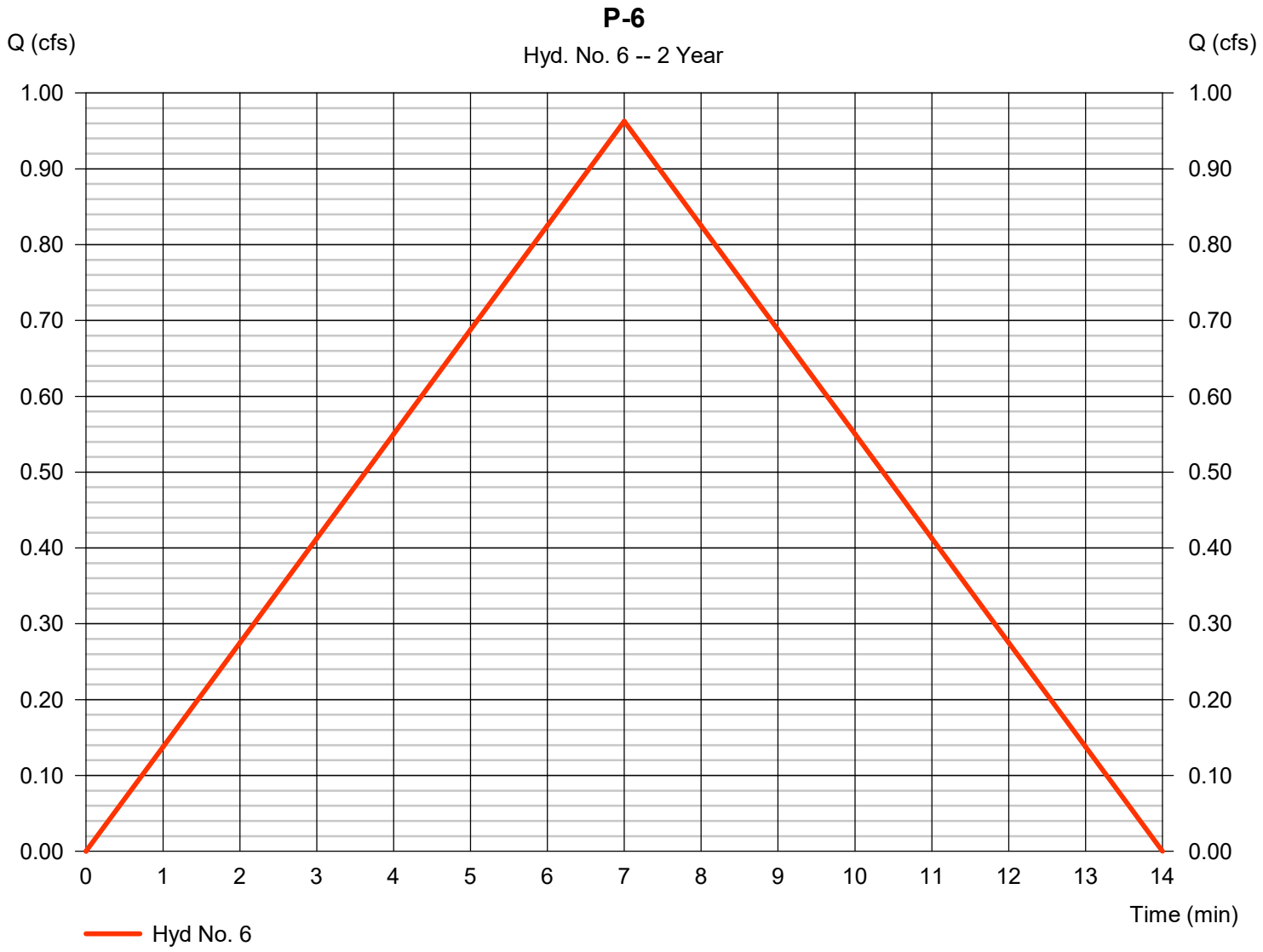
Flow length (ft)	= 525.00
Watercourse slope (%)	= 2.00
Runoff coefficient (C)	= 0.90
Time of Conc. (min)	**= 7**

Hydrograph Report

Hyd. No. 6

P-6

Hydrograph type	=	Rational	Peak discharge	=	0.963 cfs
Storm frequency	=	2 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	404 cuft
Drainage area	=	1.060 ac	Runoff coeff.	=	0.9
Intensity	=	1.009 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 6

P-6

Description

Flow length (ft)	= 555.00
Watercourse slope (%)	= 1.90
Runoff coefficient (C)	= 0.90

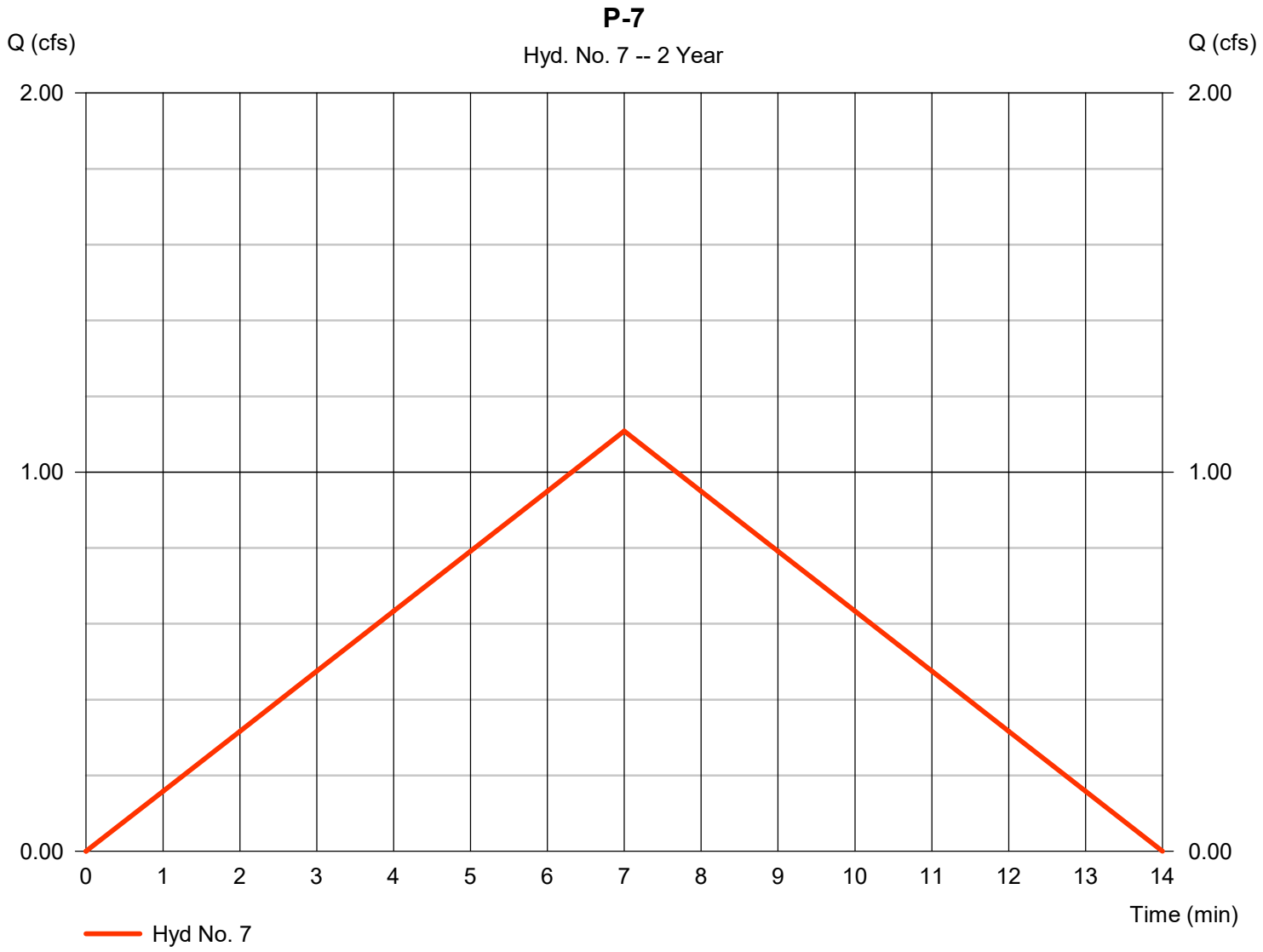
Time of Conc. (min) = 7

Hydrograph Report

Hyd. No. 7

P-7

Hydrograph type	=	Rational	Peak discharge	=	1.108 cfs
Storm frequency	=	2 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	465 cuft
Drainage area	=	1.220 ac	Runoff coeff.	=	0.9
Intensity	=	1.009 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 7

P-7

Description

Flow length (ft)	= 555.00
Watercourse slope (%)	= 1.90
Runoff coefficient (C)	= 0.90

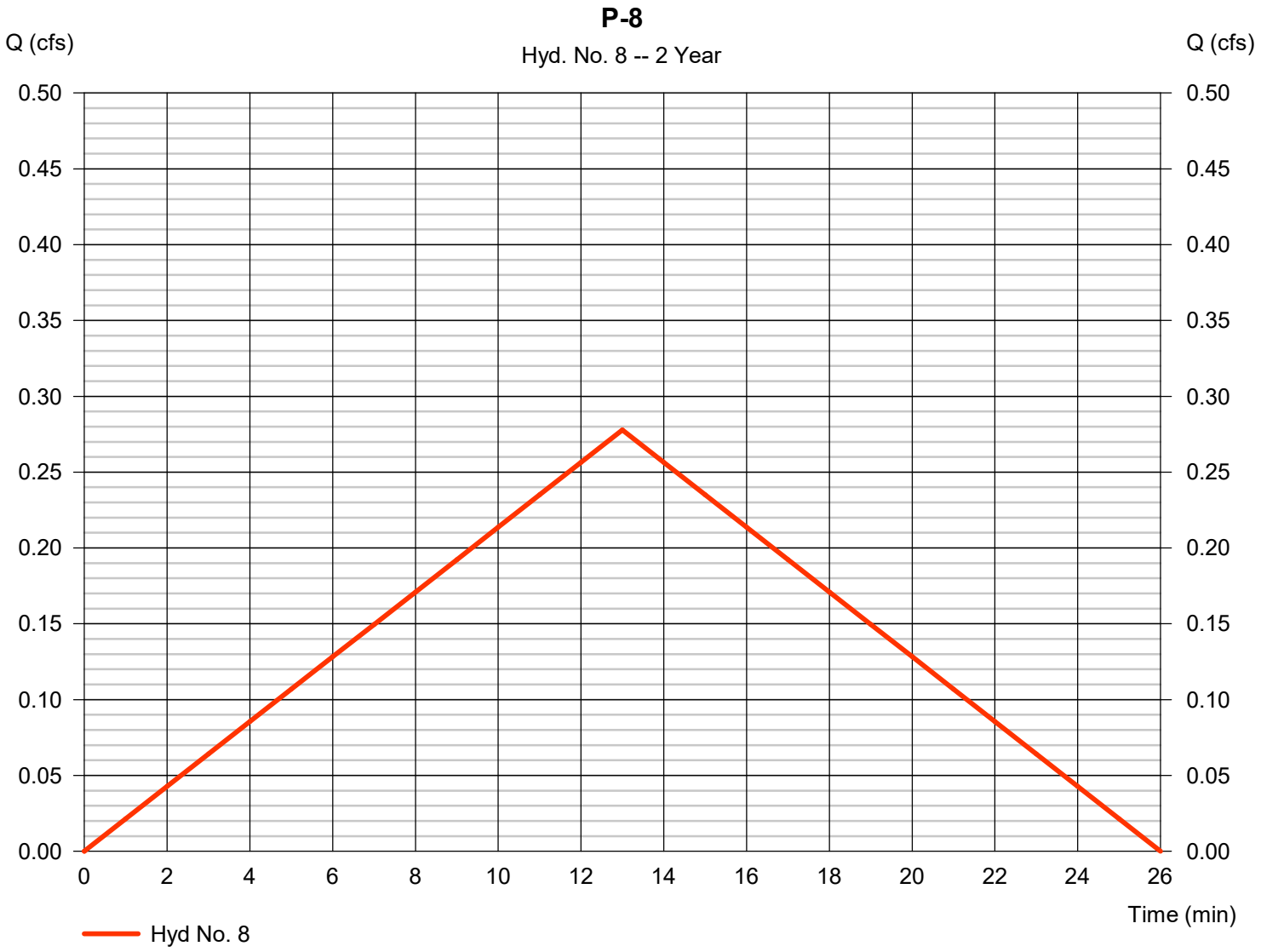
Time of Conc. (min) = 7

Hydrograph Report

Hyd. No. 8

P-8

Hydrograph type	=	Rational	Peak discharge	=	0.278 cfs
Storm frequency	=	2 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	217 cuft
Drainage area	=	0.640 ac	Runoff coeff.	=	0.6
Intensity	=	0.724 in/hr	Tc by FAA	=	13.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 8

P-8

Description

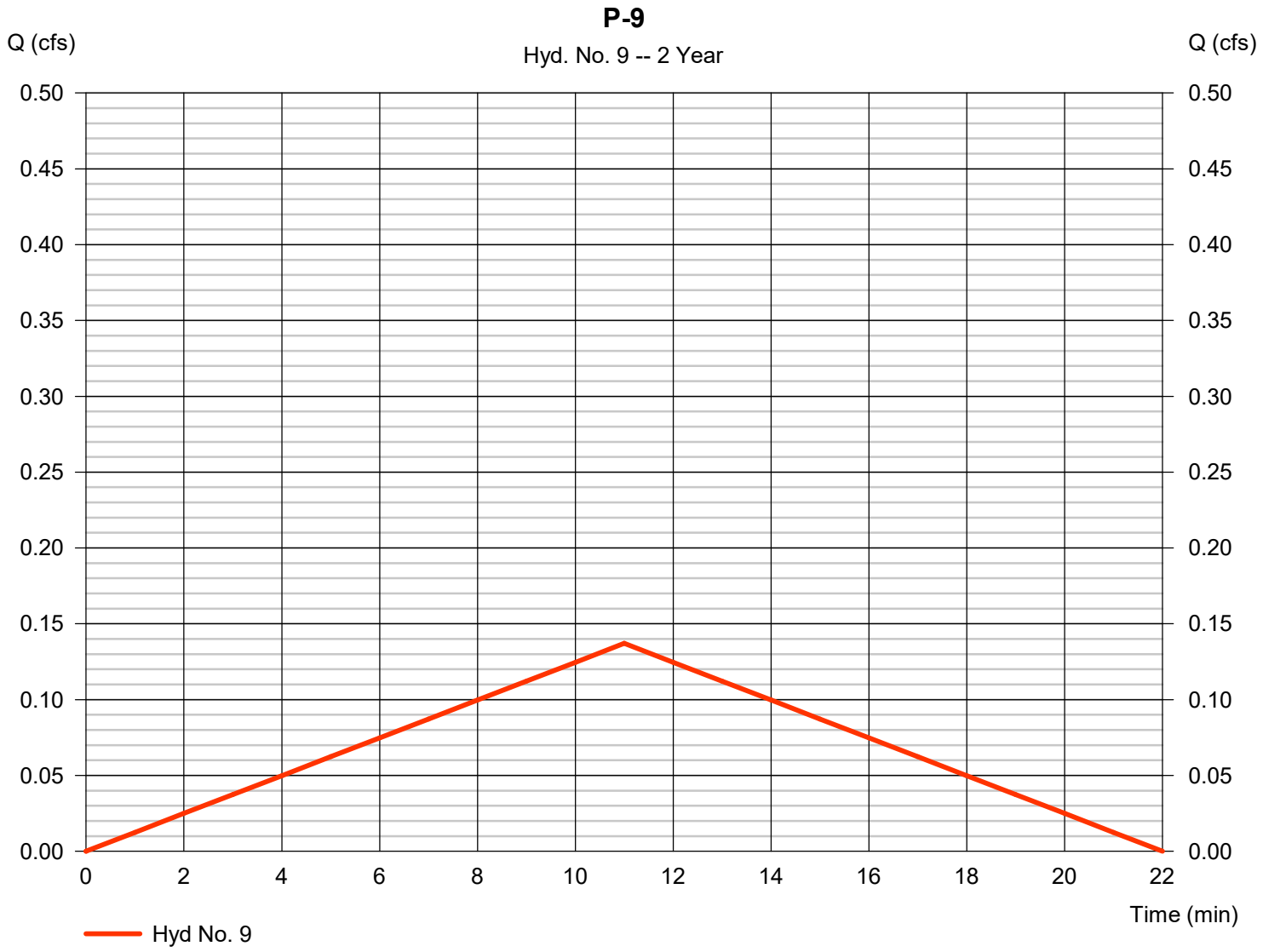
Flow length (ft)	= 300.00
Watercourse slope (%)	= 1.90
Runoff coefficient (C)	= 0.60
Time of Conc. (min)	**= 13**

Hydrograph Report

Hyd. No. 9

P-9

Hydrograph type	=	Rational	Peak discharge	=	0.137 cfs
Storm frequency	=	2 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	90 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.48
Intensity	=	0.793 in/hr	Tc by FAA	=	11.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 9

P-9

Description

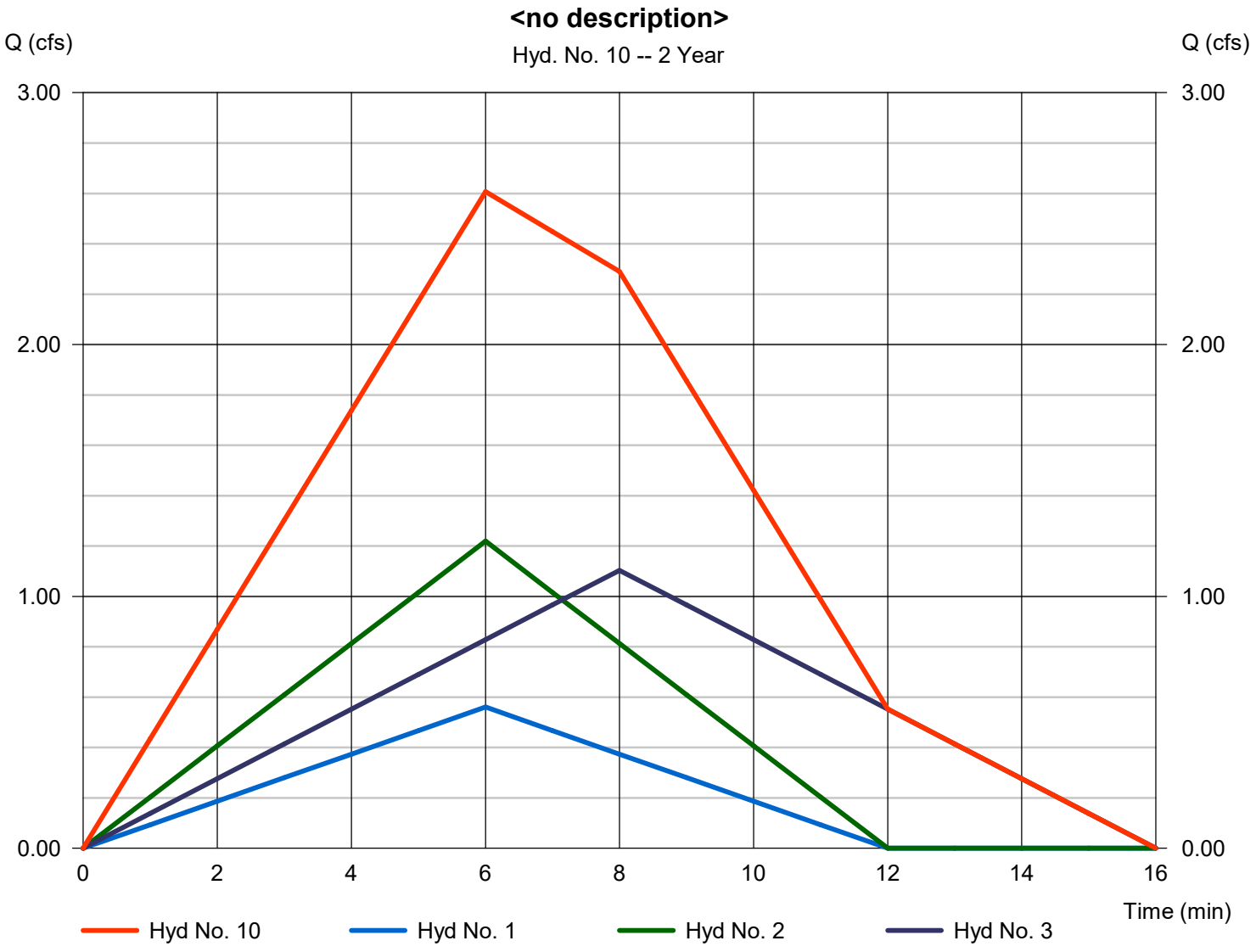
Flow length (ft)	= 205.00
Watercourse slope (%)	= 3.10
Runoff coefficient (C)	= 0.48
Time of Conc. (min)	**= 11**

Hydrograph Report

Hyd. No. 10

<no description>

Hydrograph type	= Combine	Peak discharge	= 2.607 cfs
Storm frequency	= 2 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 1,170 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 3.240 ac



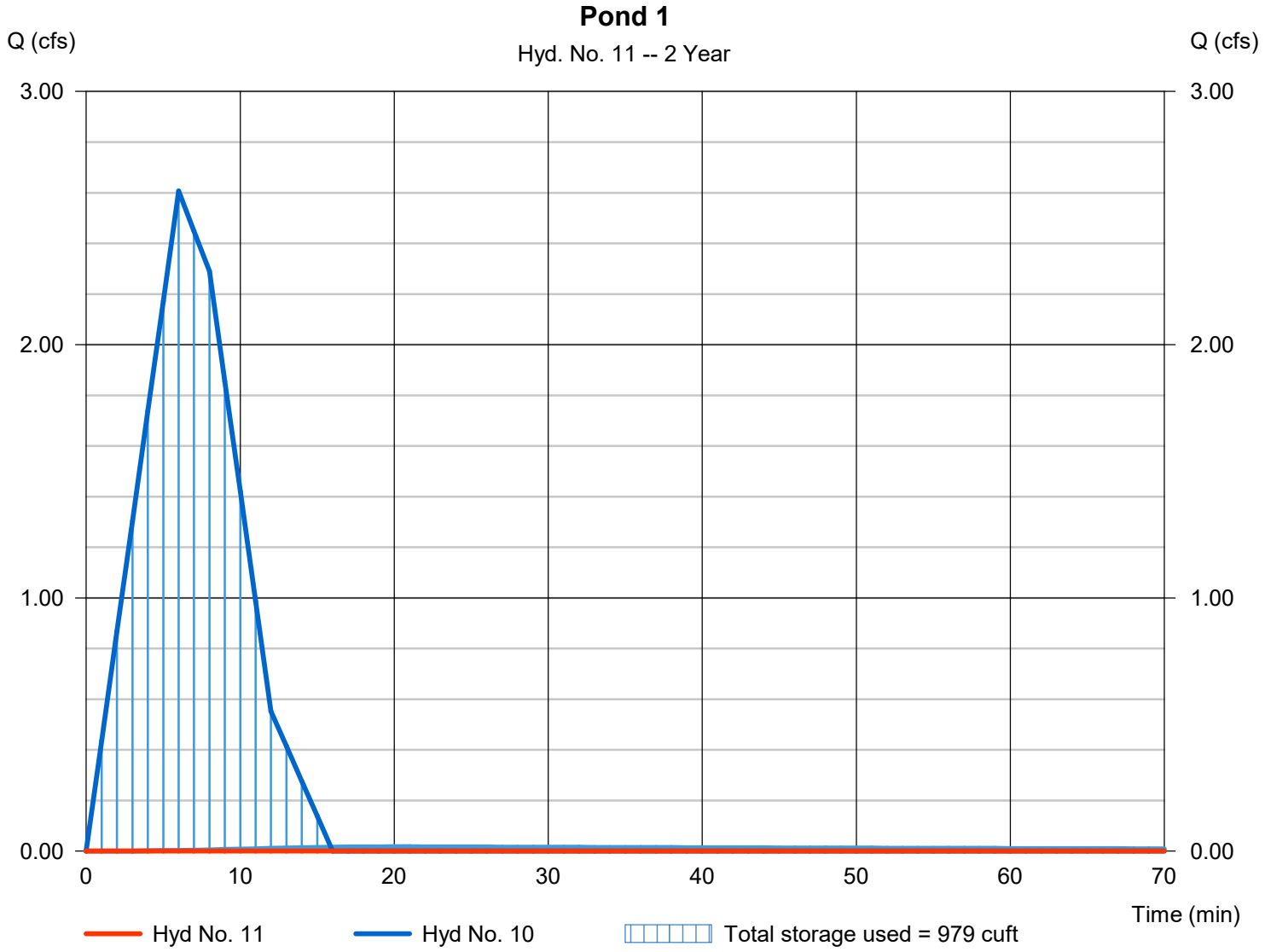
Hydrograph Report

Hyd. No. 11

Pond 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 10 - <no description>	Max. Elevation	= 2673.90 ft
Reservoir name	= POND 1	Max. Storage	= 979 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 2 - POND 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 2673.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2673.00	61	0	0
1.00	2674.00	2,111	1,086	1,086
2.00	2675.00	2,820	2,466	3,552
3.00	2676.00	3,432	3,126	6,678
4.00	2677.00	4,133	3,783	10,460
5.00	2678.00	4,828	4,481	14,941

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

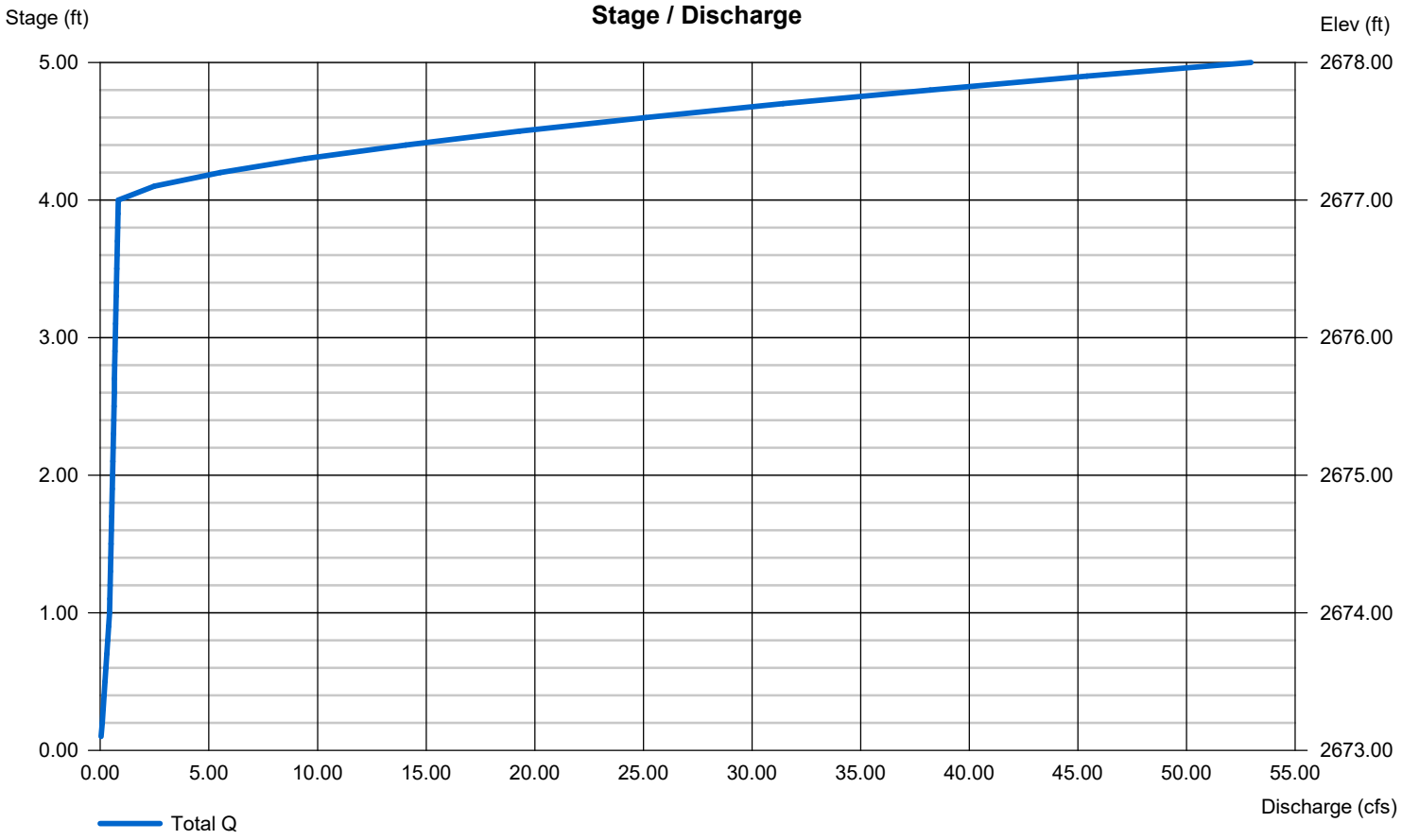
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 2677.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 8.700 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

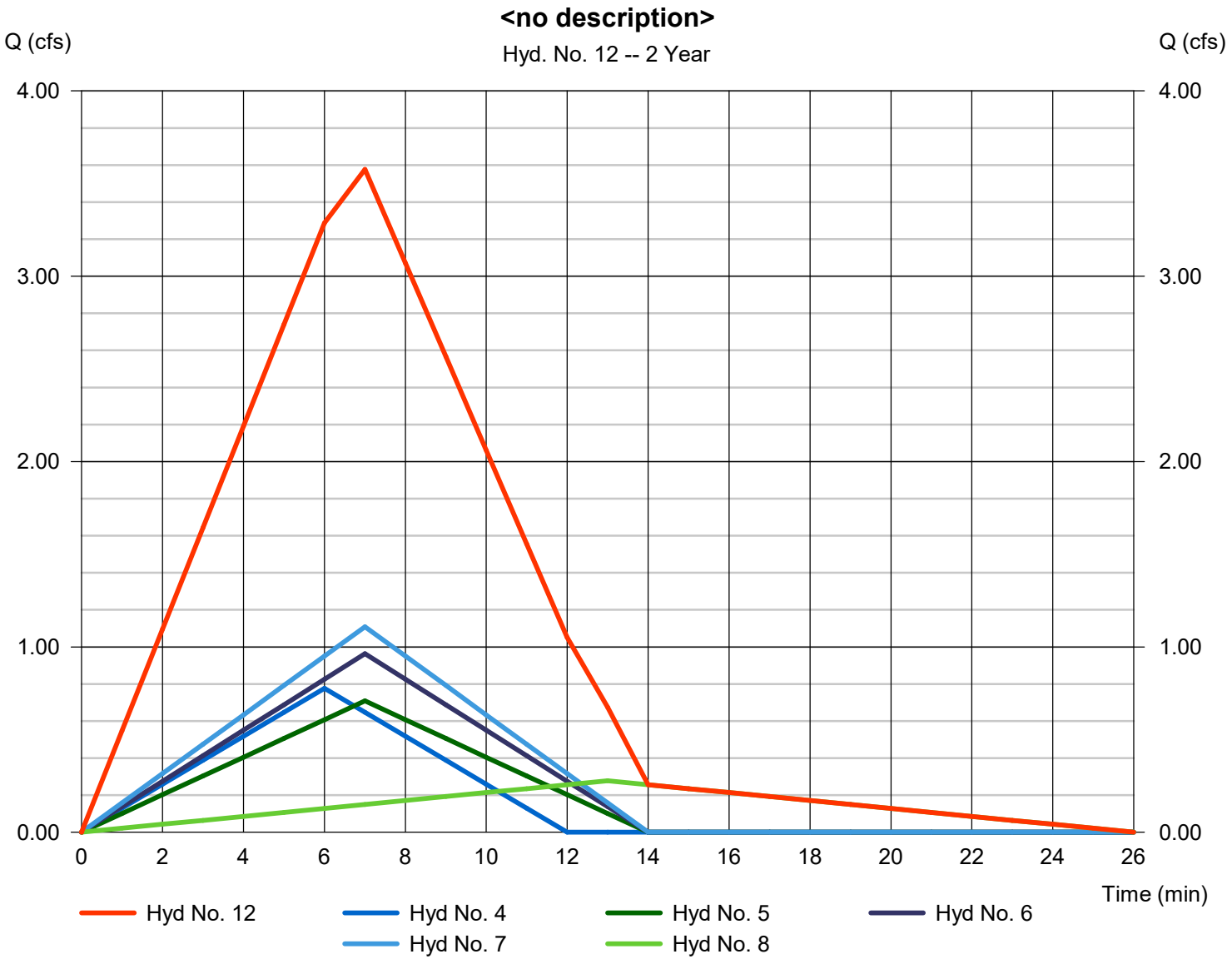


Hydrograph Report

Hyd. No. 12

<no description>

Hydrograph type	= Combine	Peak discharge	= 3.576 cfs
Storm frequency	= 2 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 1,664 cuft
Inflow hyds.	= 4, 5, 6, 7, 8	Contrib. drain. area	= 4.490 ac



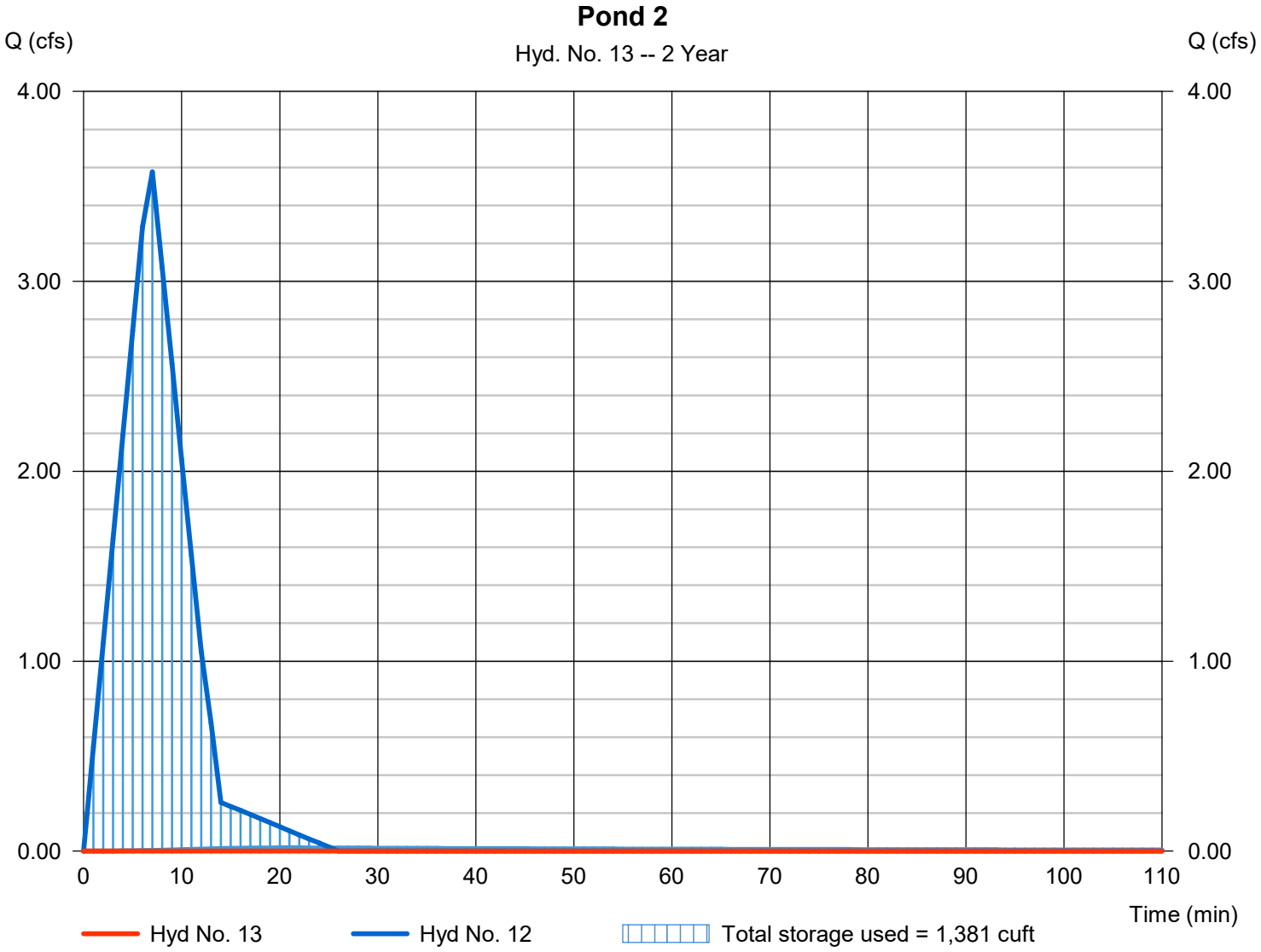
Hydrograph Report

Hyd. No. 13

Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 12 - <no description>	Max. Elevation	= 2662.81 ft
Reservoir name	= POND 2	Max. Storage	= 1,381 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 3 - POND 2

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 2662.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2662.00	774	0	0
1.00	2663.00	2,654	1,714	1,714
2.00	2664.00	3,795	3,225	4,939
3.00	2665.00	4,861	4,328	9,267
4.00	2666.00	6,036	5,449	14,715
4.20	2666.20	6,185	1,222	15,937

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

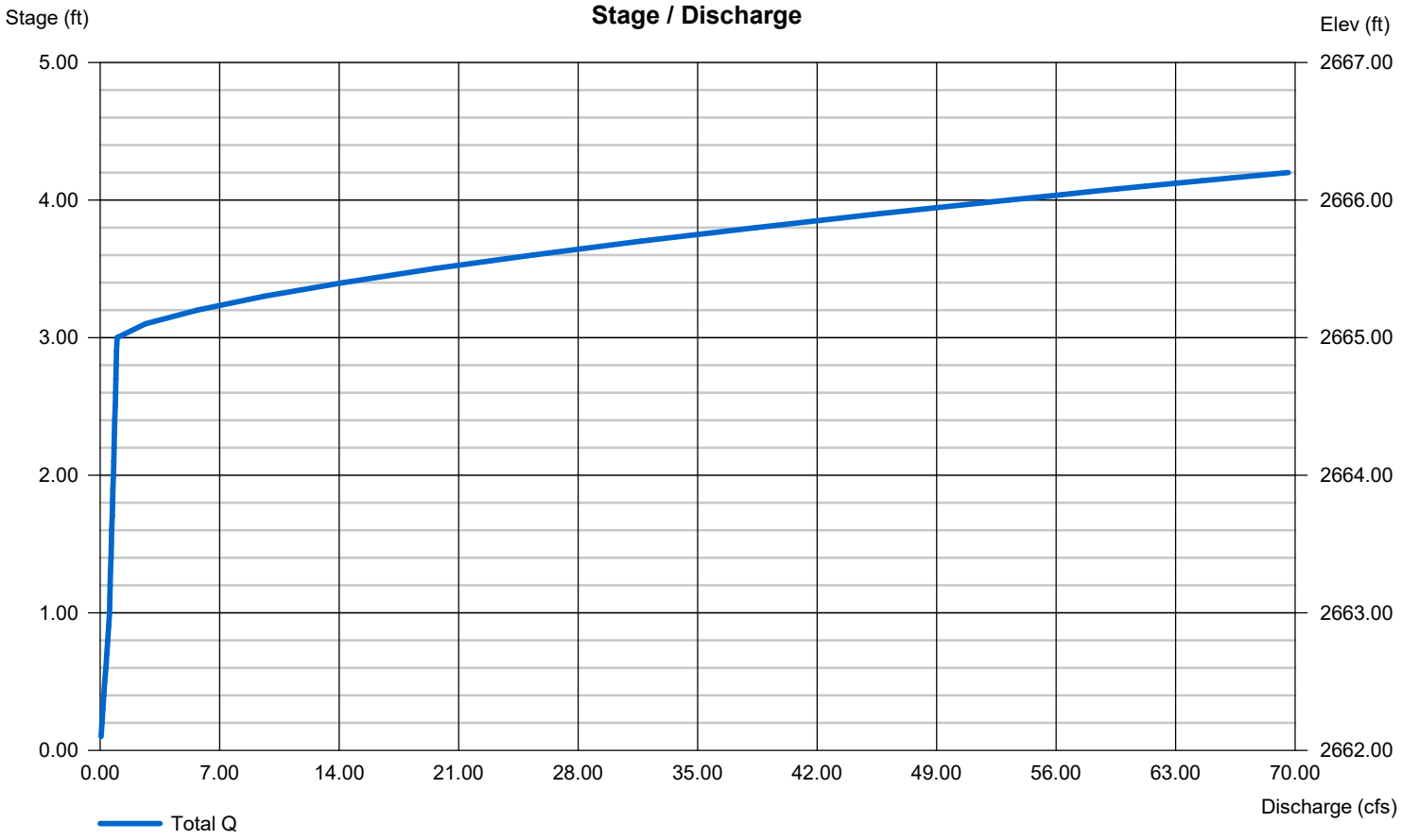
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 2665.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 8.700 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



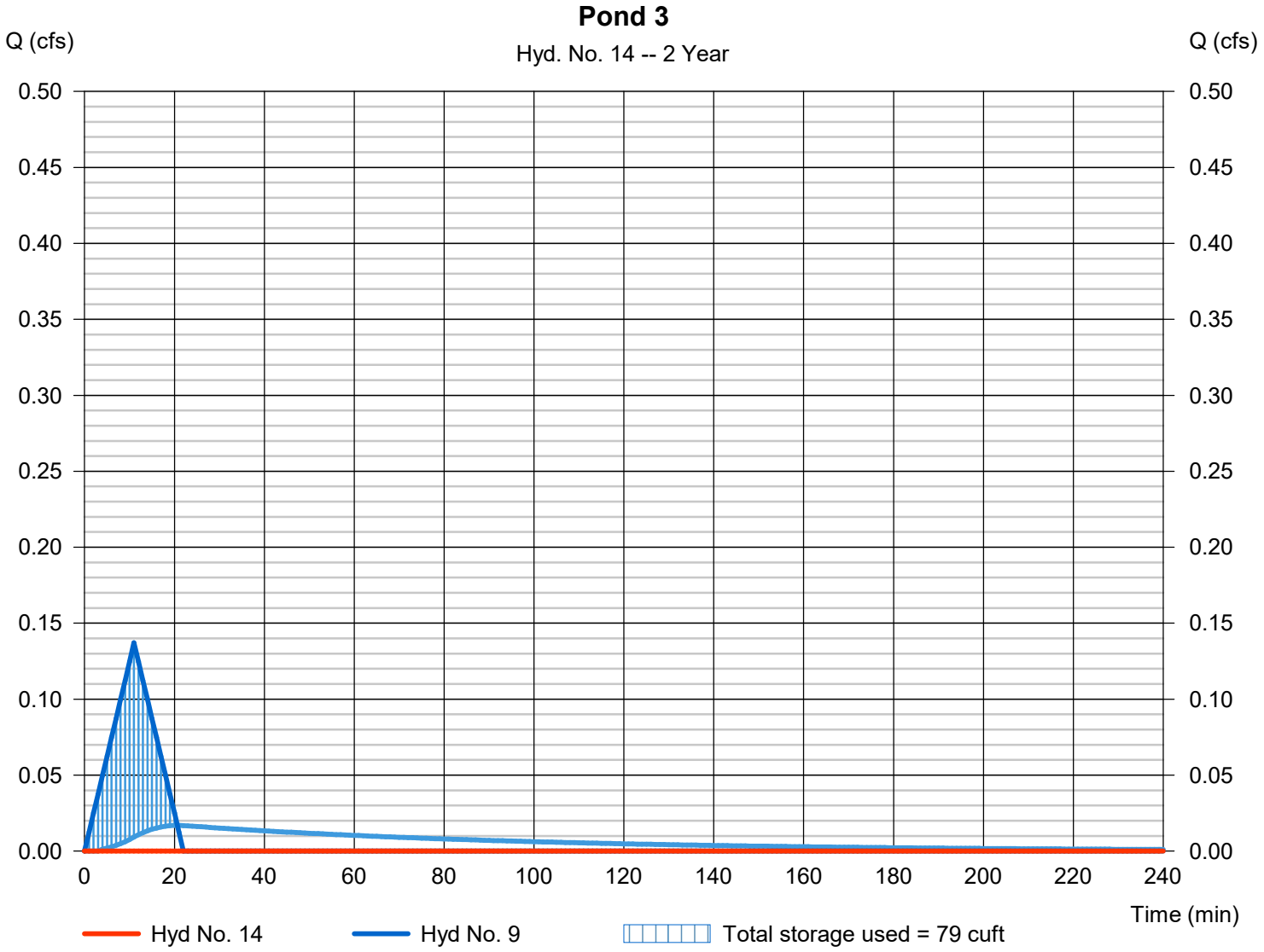
Hydrograph Report

Hyd. No. 14

Pond 3

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	9 - P-9	Max. Elevation	=	2659.18 ft
Reservoir name	=	POND 3	Max. Storage	=	79 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 1 - POND 3

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 2659.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2659.00	185	0	0
1.00	2660.00	715	450	450
2.00	2661.00	1,232	974	1,424
3.00	2662.00	1,786	1,509	2,933

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

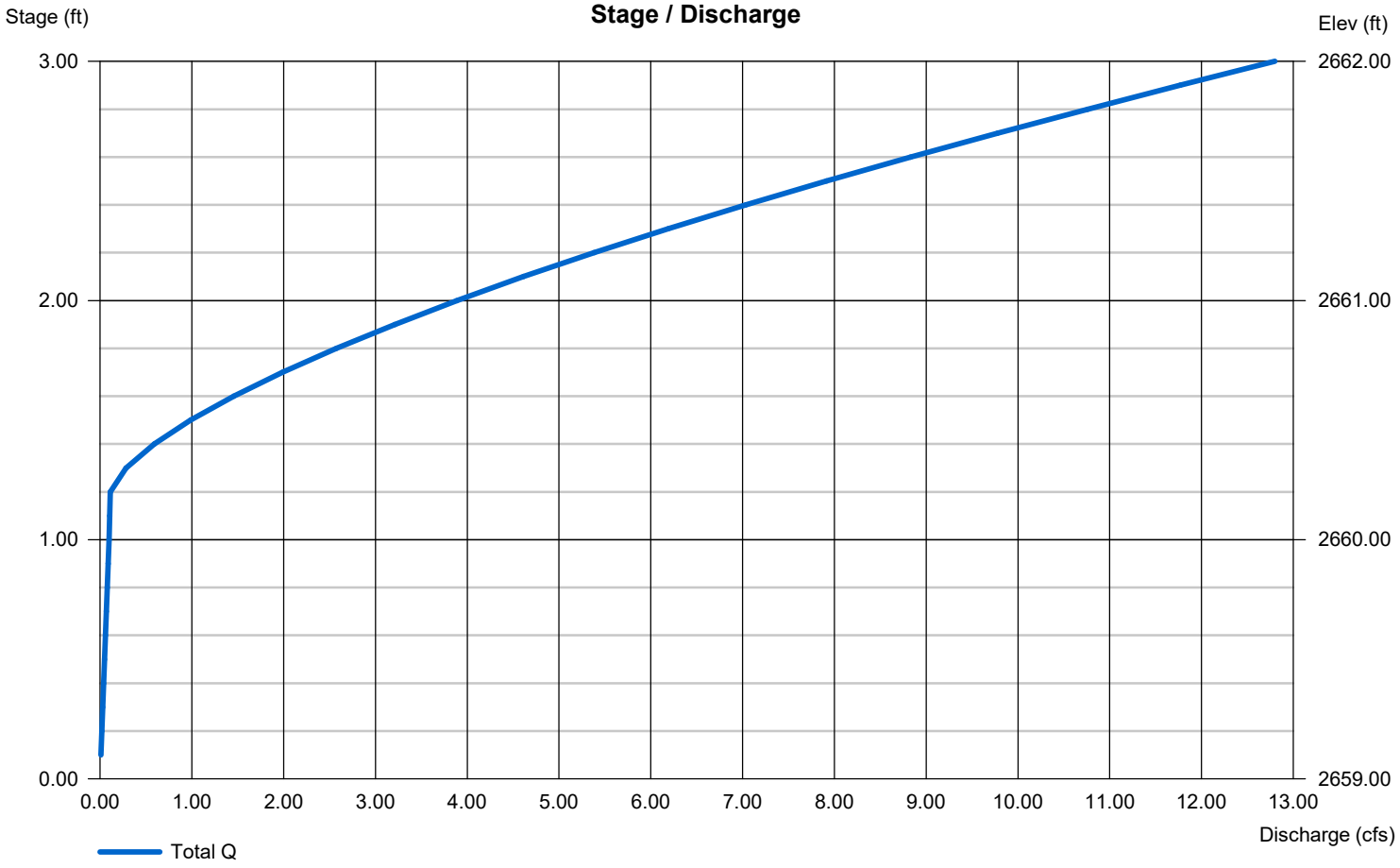
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	0.00	0.00	0.00
Crest El. (ft)	= 2660.20	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.800 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

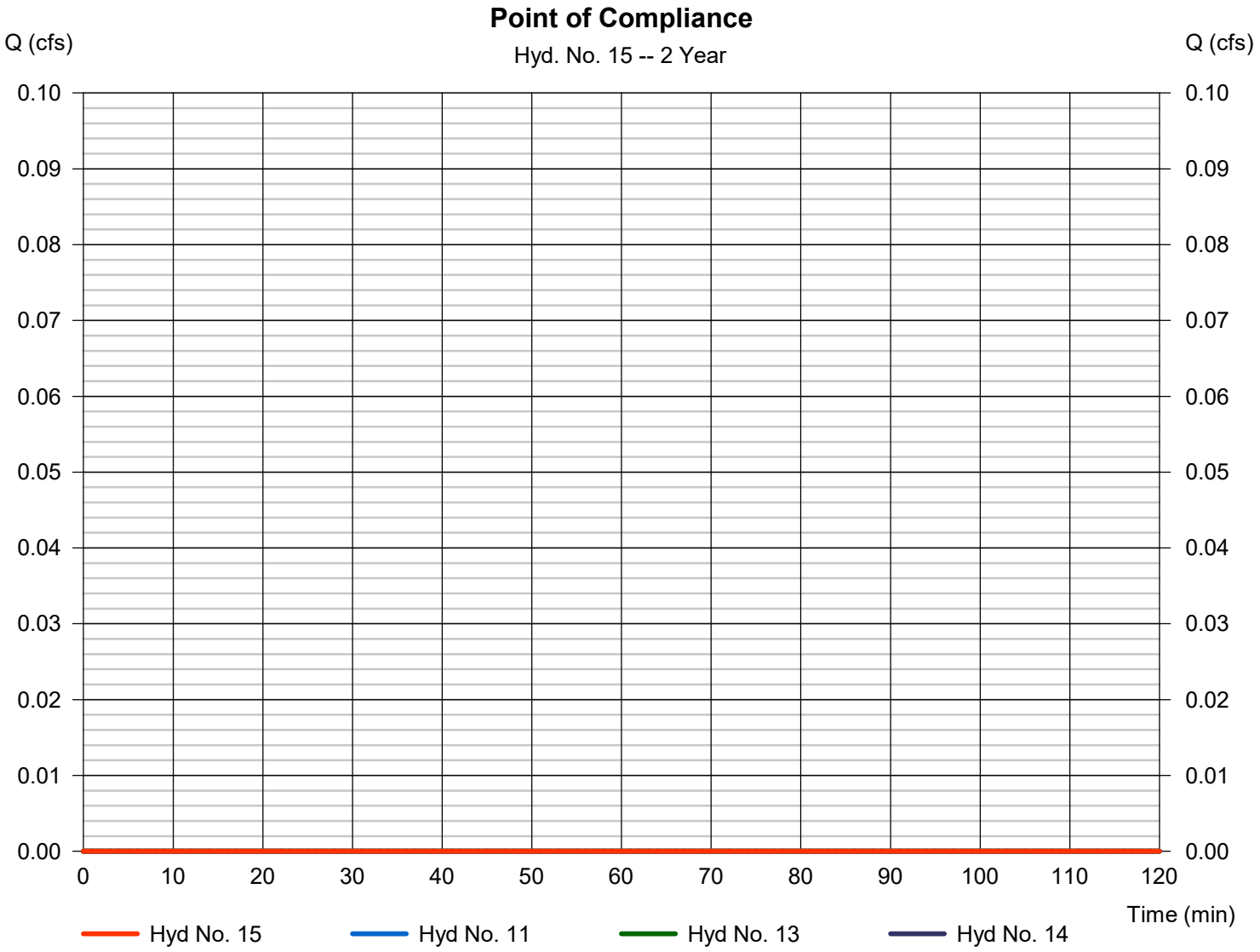


Hydrograph Report

Hyd. No. 15

Point of Compliance

Hydrograph type	= Combine	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyds.	= 11, 13, 14	Contrib. drain. area	= 0.000 ac

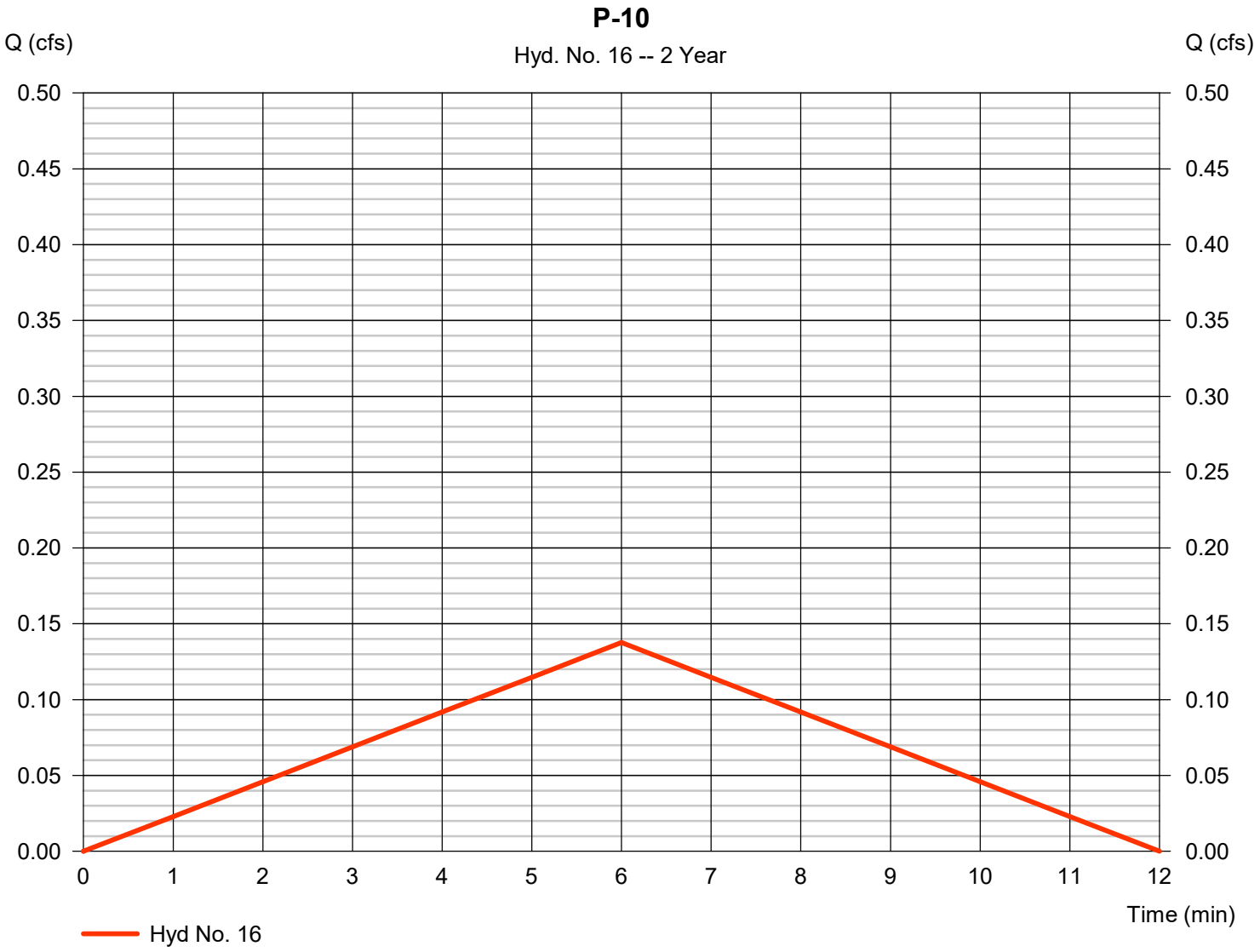


Hydrograph Report

Hyd. No. 16

P-10

Hydrograph type	=	Rational	Peak discharge	=	0.138 cfs
Storm frequency	=	2 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	50 cuft
Drainage area	=	0.150 ac	Runoff coeff.	=	0.84
Intensity	=	1.092 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



FAA Formula Tc Worksheet

Hyd. No. 16

P-10

Description

Flow length (ft)	= 260.00
Watercourse slope (%)	= 2.30
Runoff coefficient (C)	= 0.84

Time of Conc. (min) = 6

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

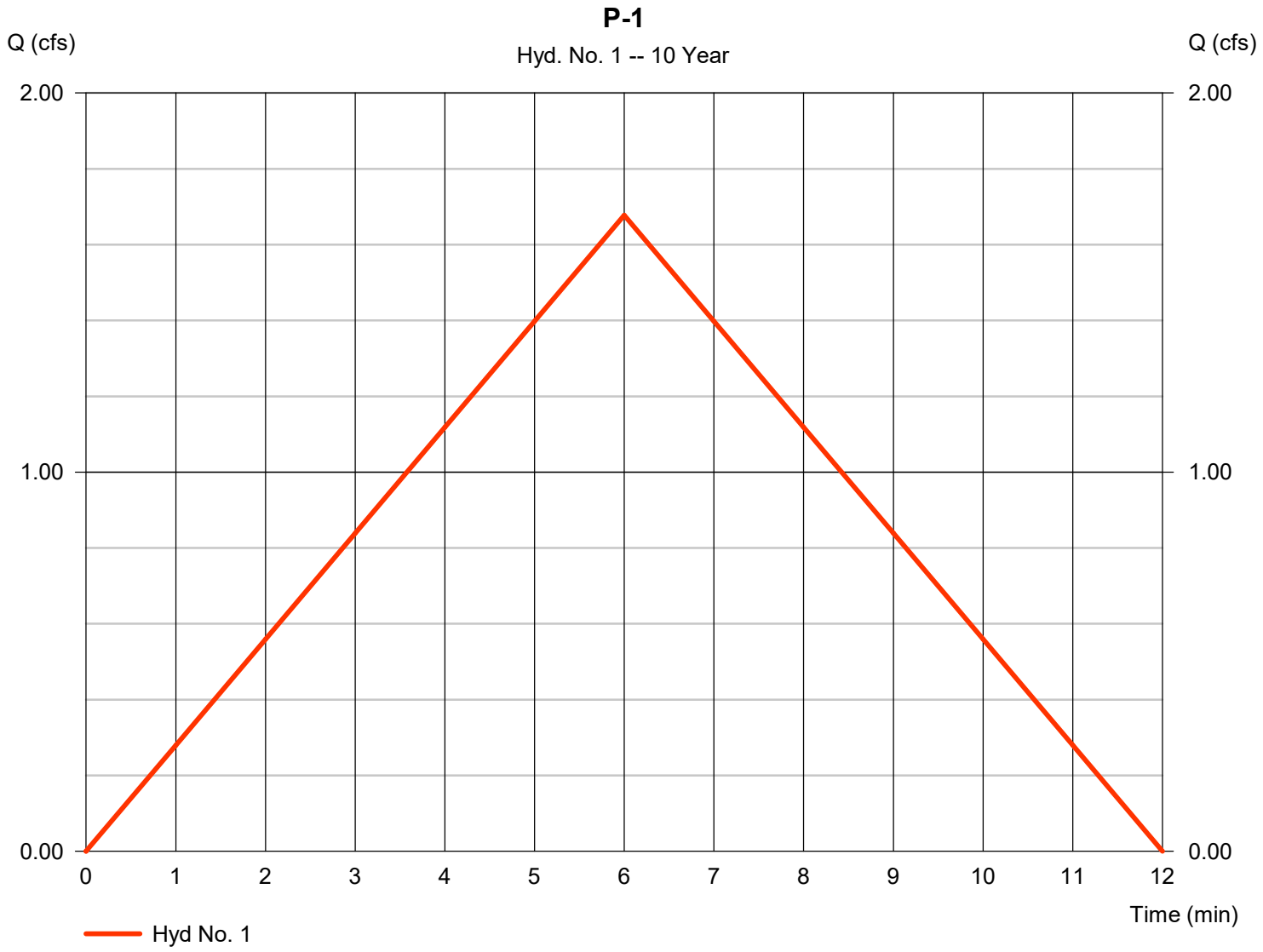
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.678	1	6	604	------	------	------	P-1
2	Rational	3.649	1	6	1,314	------	------	------	P-2
3	Rational	3.281	1	8	1,575	------	------	------	P-3
4	Rational	2.325	1	6	837	------	------	------	P-4
5	Rational	2.112	1	7	887	------	------	------	P-5
6	Rational	2.870	1	7	1,205	------	------	------	P-6
7	Rational	3.303	1	7	1,387	------	------	------	P-7
8	Rational	0.825	1	13	643	------	------	------	P-8
9	Rational	0.407	1	11	268	------	------	------	P-9
10	Combine	7.788	1	6	3,493	1, 2, 3,	------	------	<no description>
11	Reservoir	0.000	1	109	0	10	2674.83	3,141	Pond 1
12	Combine	10.67	1	7	4,960	4, 5, 6, 7, 8,	------	------	<no description>
13	Reservoir	0.000	1	99	0	12	2663.80	4,306	Pond 2
14	Reservoir	0.000	1	20	0	9	2659.52	235	Pond 3
15	Combine	0.000	1	99	0	11, 13, 14	------	------	Point of Compliance
16	Rational	0.412	1	6	148	------	------	------	P-10

Hydrograph Report

Hyd. No. 1

P-1

Hydrograph type	=	Rational	Peak discharge	=	1.678 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	604 cuft
Drainage area	=	0.570 ac	Runoff coeff.	=	0.9
Intensity	=	3.270 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

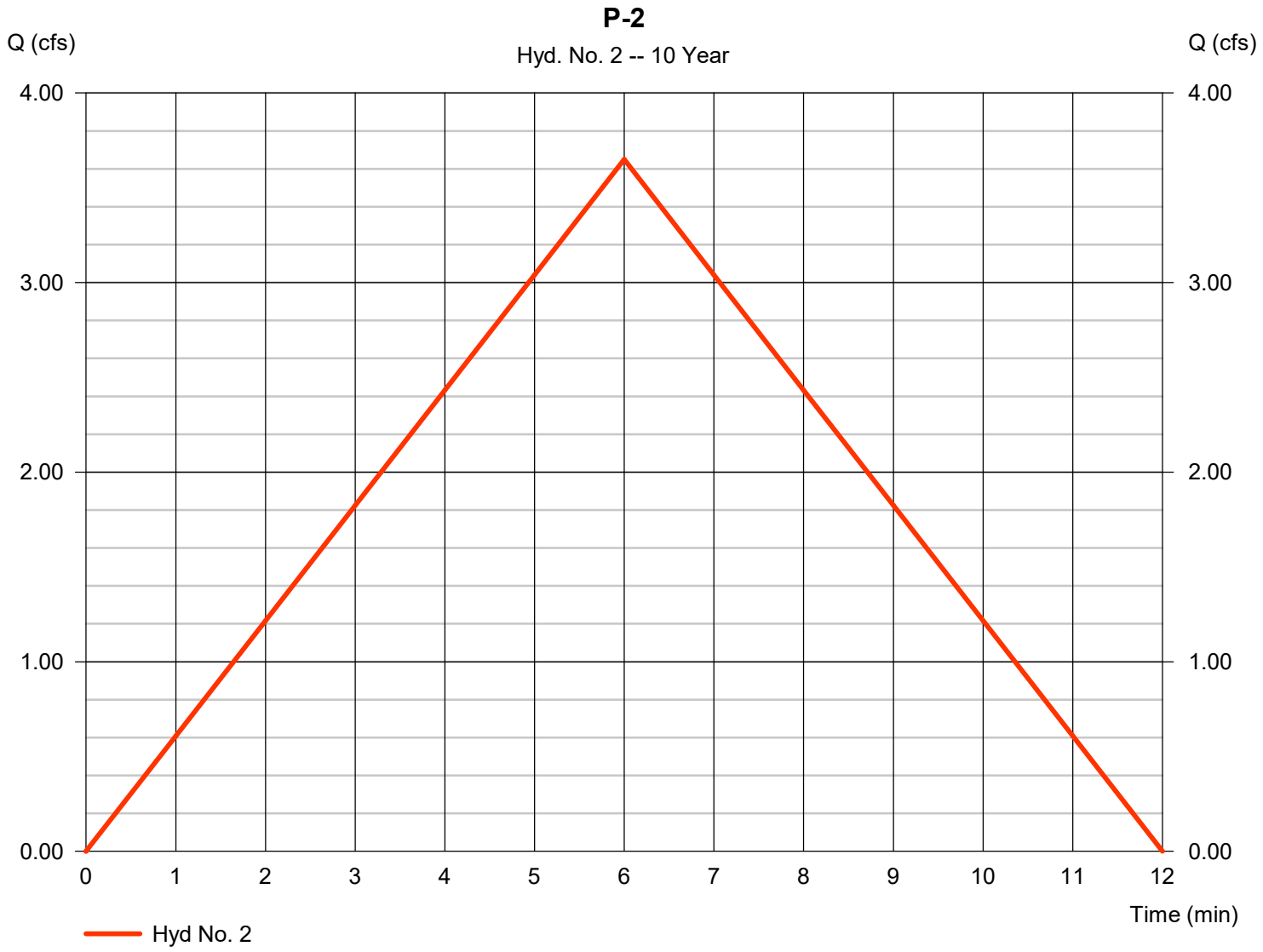


Hydrograph Report

Hyd. No. 2

P-2

Hydrograph type	=	Rational	Peak discharge	=	3.649 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	1,314 cuft
Drainage area	=	1.240 ac	Runoff coeff.	=	0.9
Intensity	=	3.270 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hyd. No. 3

P-3

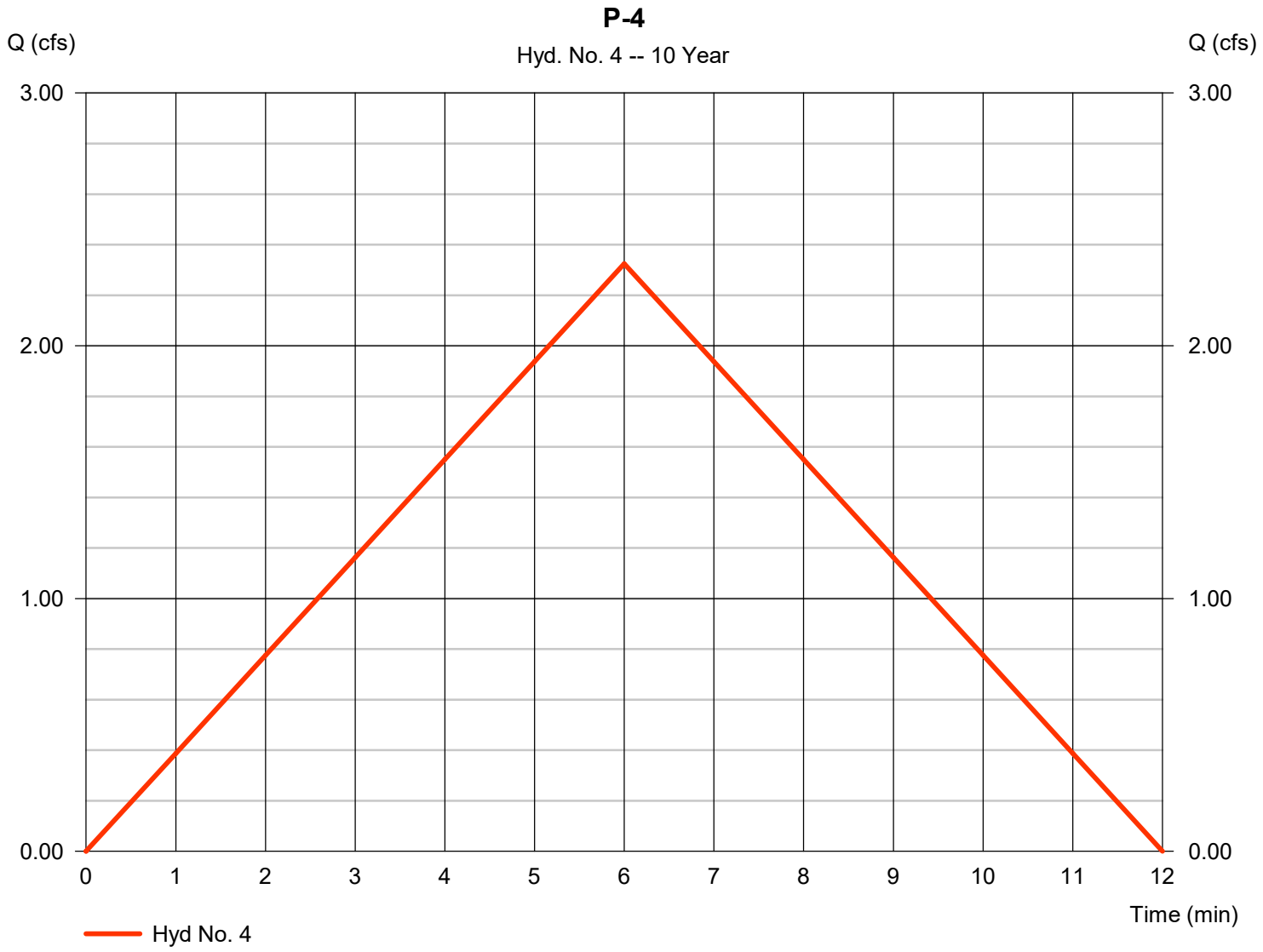
Hydrograph type	=	Rational	Peak discharge	=	3.281 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	1,575 cuft
Drainage area	=	1.430 ac	Runoff coeff.	=	0.82
Intensity	=	2.798 in/hr	Tc by FAA	=	8.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 4

P-4

Hydrograph type	=	Rational	Peak discharge	=	2.325 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	837 cuft
Drainage area	=	0.790 ac	Runoff coeff.	=	0.9
Intensity	=	3.270 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

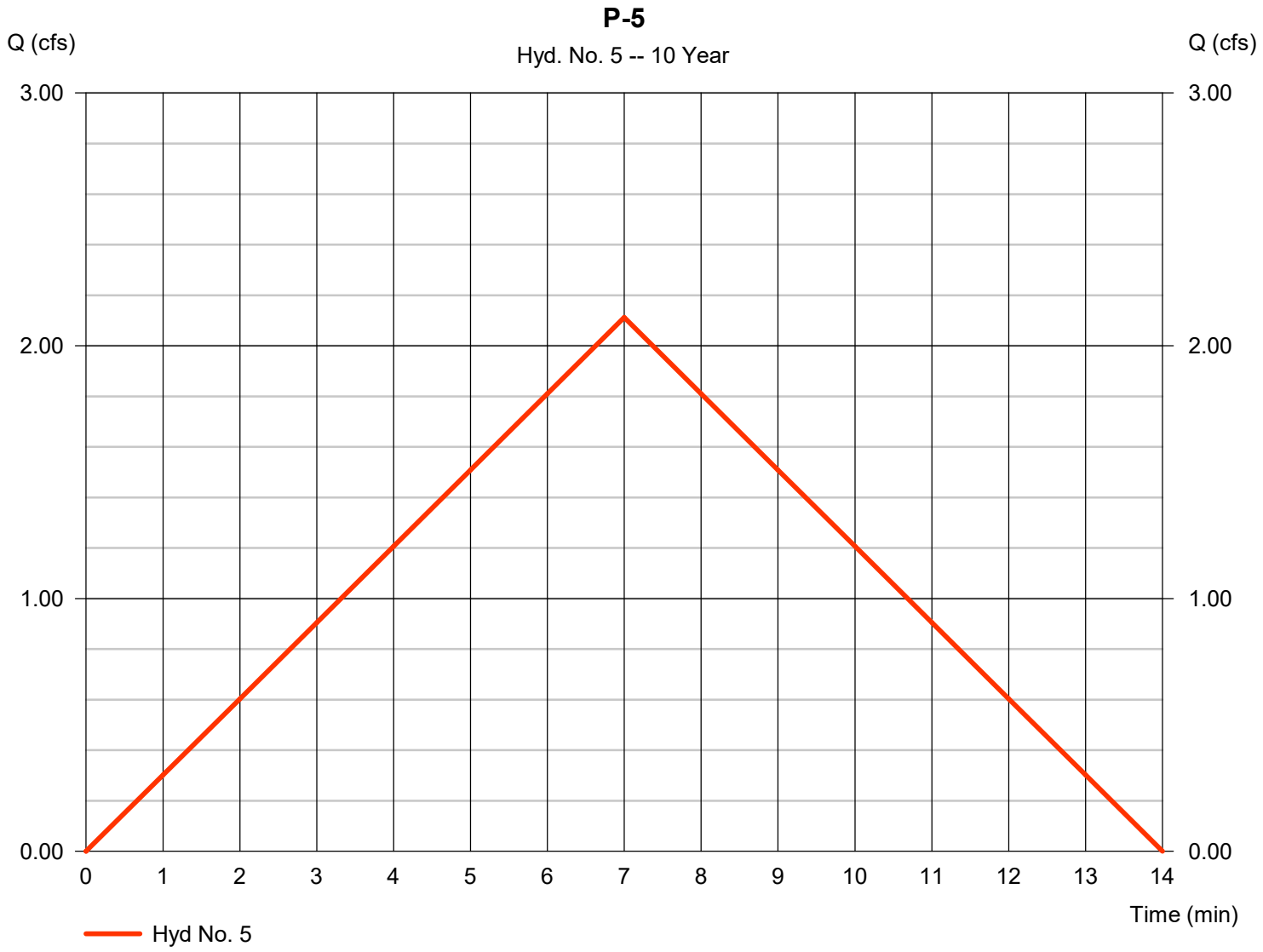


Hydrograph Report

Hyd. No. 5

P-5

Hydrograph type	=	Rational	Peak discharge	=	2.112 cfs
Storm frequency	=	10 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	887 cuft
Drainage area	=	0.780 ac	Runoff coeff.	=	0.9
Intensity	=	3.008 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

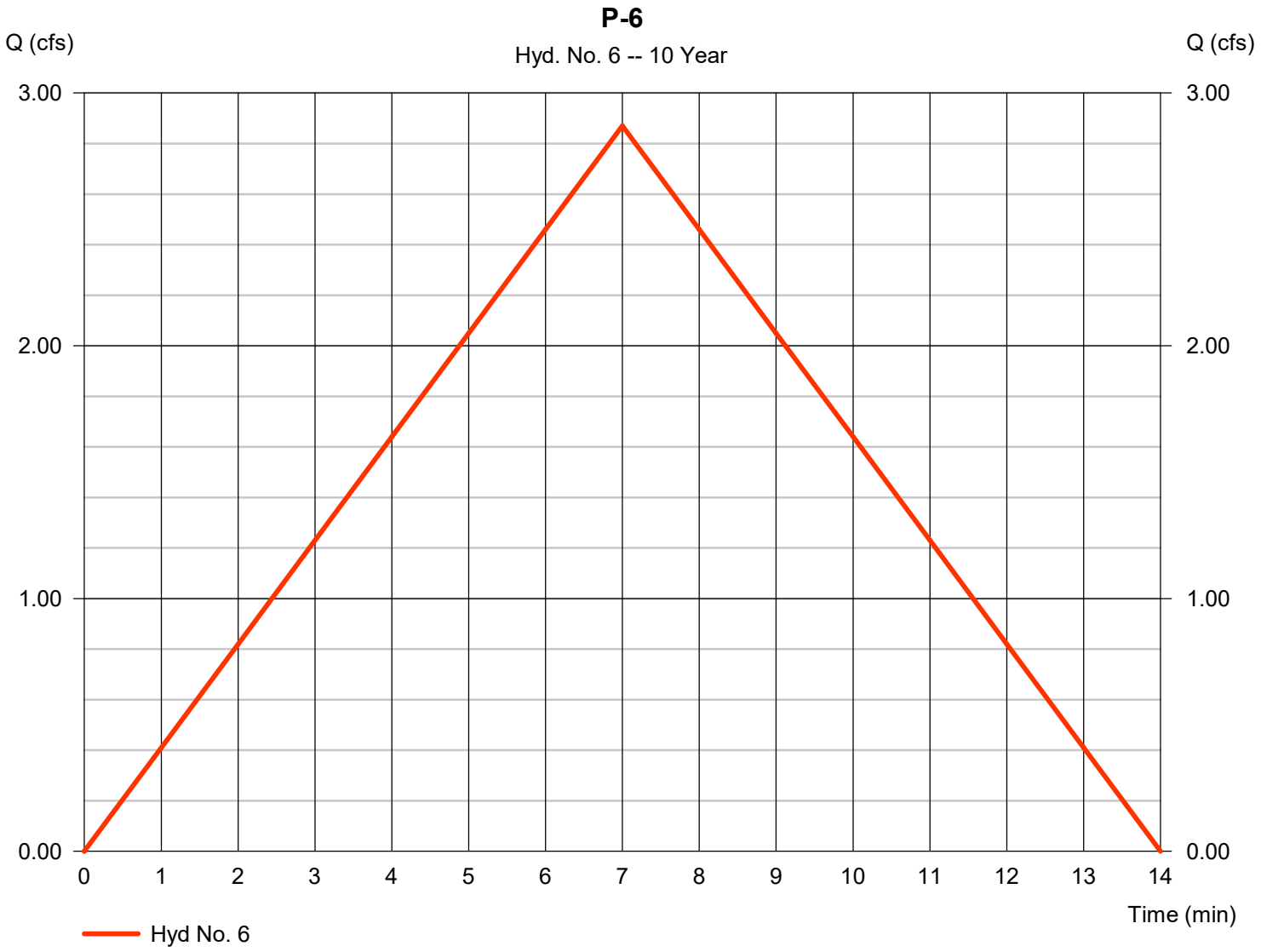


Hydrograph Report

Hyd. No. 6

P-6

Hydrograph type	=	Rational	Peak discharge	=	2.870 cfs
Storm frequency	=	10 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,205 cuft
Drainage area	=	1.060 ac	Runoff coeff.	=	0.9
Intensity	=	3.008 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

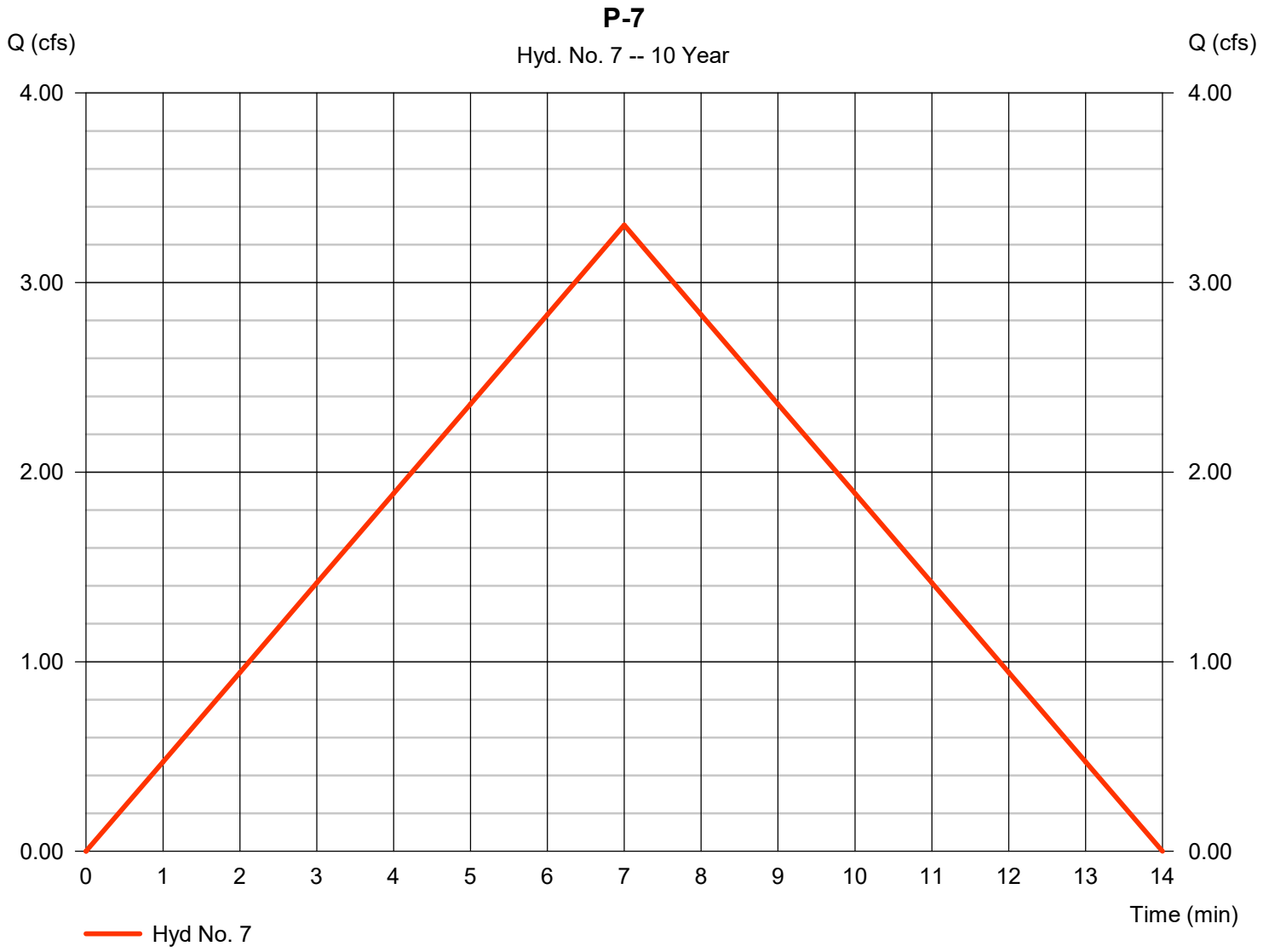


Hydrograph Report

Hyd. No. 7

P-7

Hydrograph type	=	Rational	Peak discharge	=	3.303 cfs
Storm frequency	=	10 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,387 cuft
Drainage area	=	1.220 ac	Runoff coeff.	=	0.9
Intensity	=	3.008 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hyd. No. 8

P-8

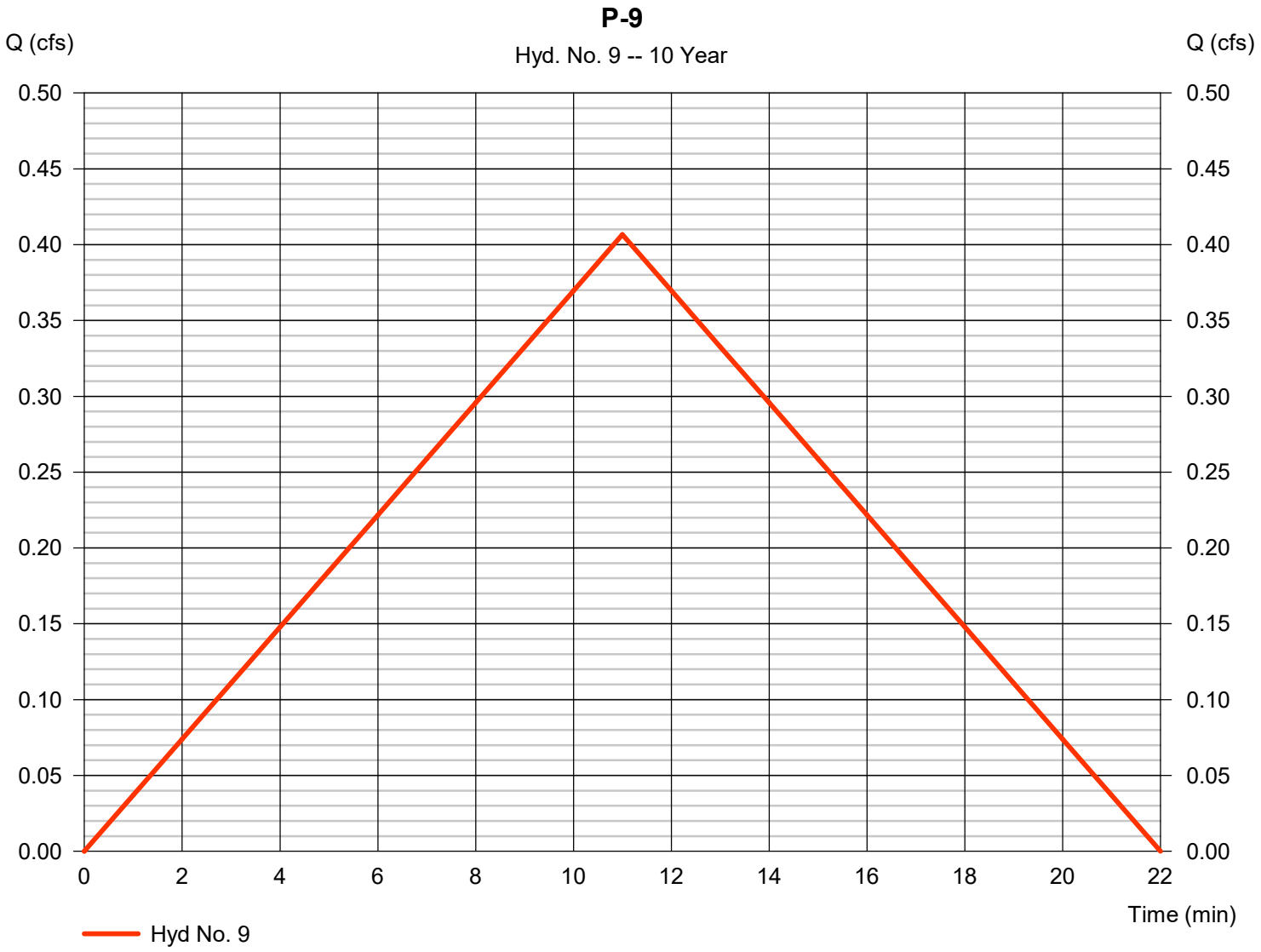
Hydrograph type	=	Rational	Peak discharge	=	0.825 cfs
Storm frequency	=	10 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	643 cuft
Drainage area	=	0.640 ac	Runoff coeff.	=	0.6
Intensity	=	2.148 in/hr	Tc by FAA	=	13.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 9

P-9

Hydrograph type	=	Rational	Peak discharge	=	0.407 cfs
Storm frequency	=	10 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	268 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.48
Intensity	=	2.353 in/hr	Tc by FAA	=	11.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

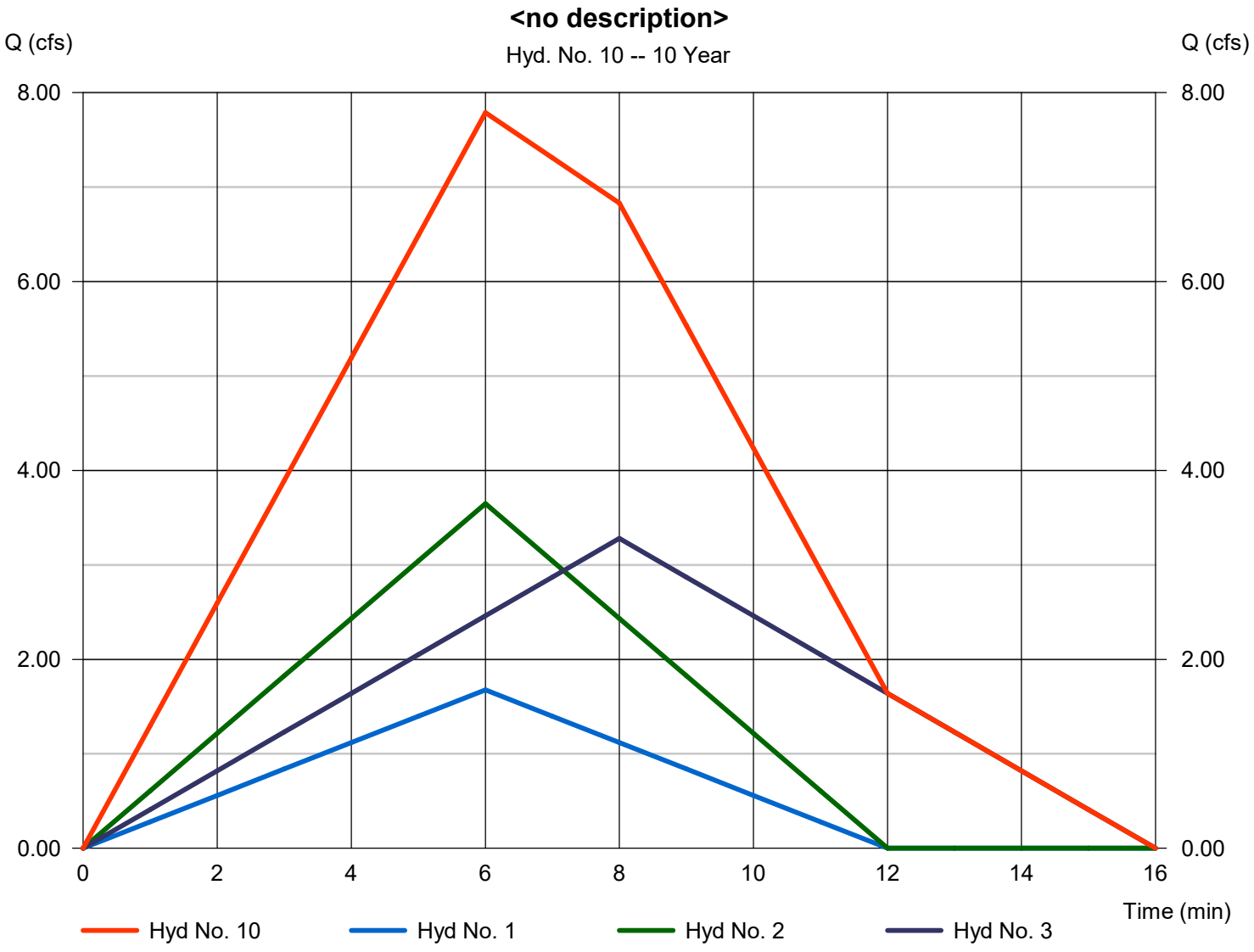


Hydrograph Report

Hyd. No. 10

<no description>

Hydrograph type	= Combine	Peak discharge	= 7.788 cfs
Storm frequency	= 10 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 3,493 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 3.240 ac



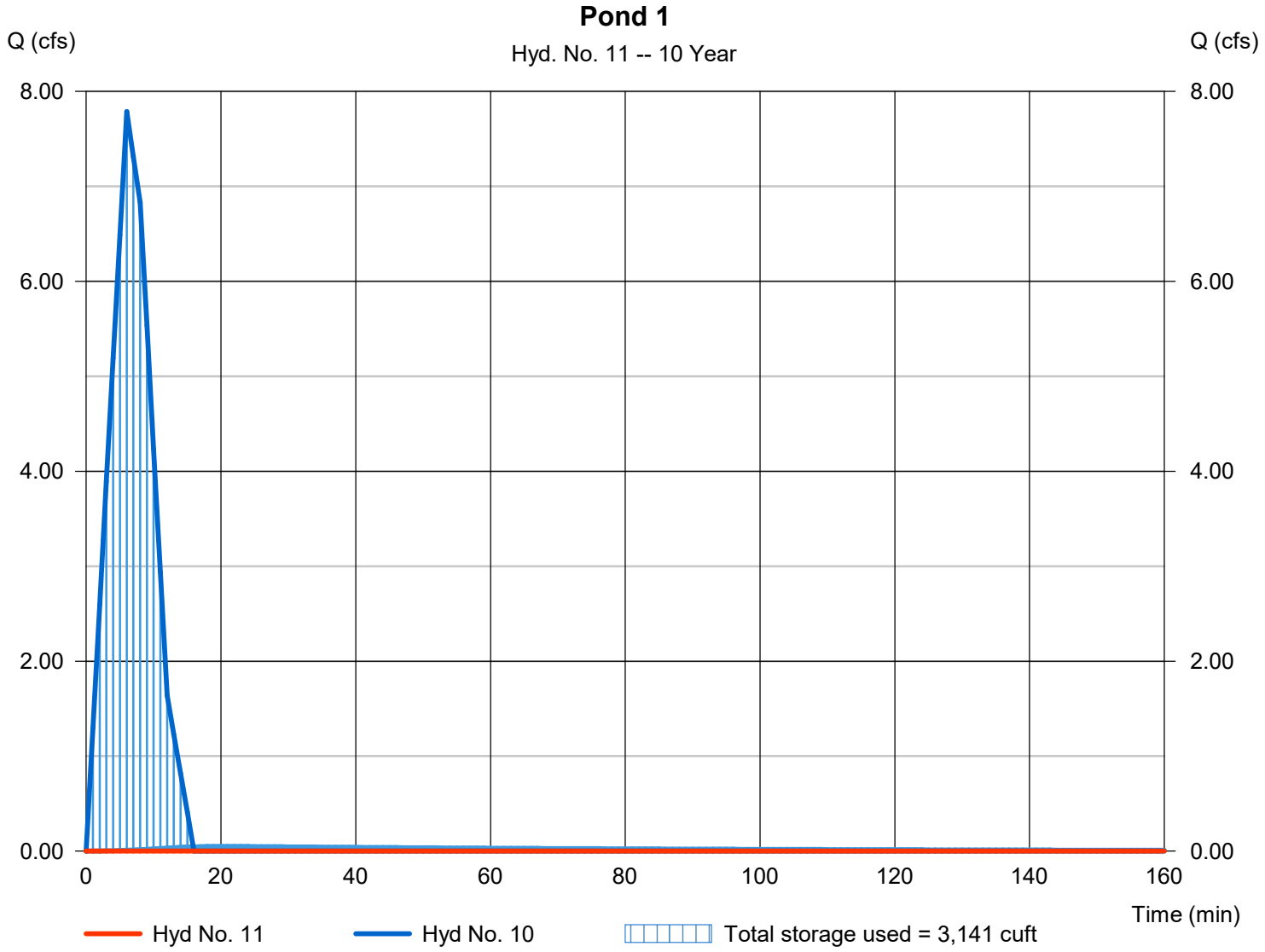
Hydrograph Report

Hyd. No. 11

Pond 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	109 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	10 - <no description>	Max. Elevation	=	2674.83 ft
Reservoir name	=	POND 1	Max. Storage	=	3,141 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

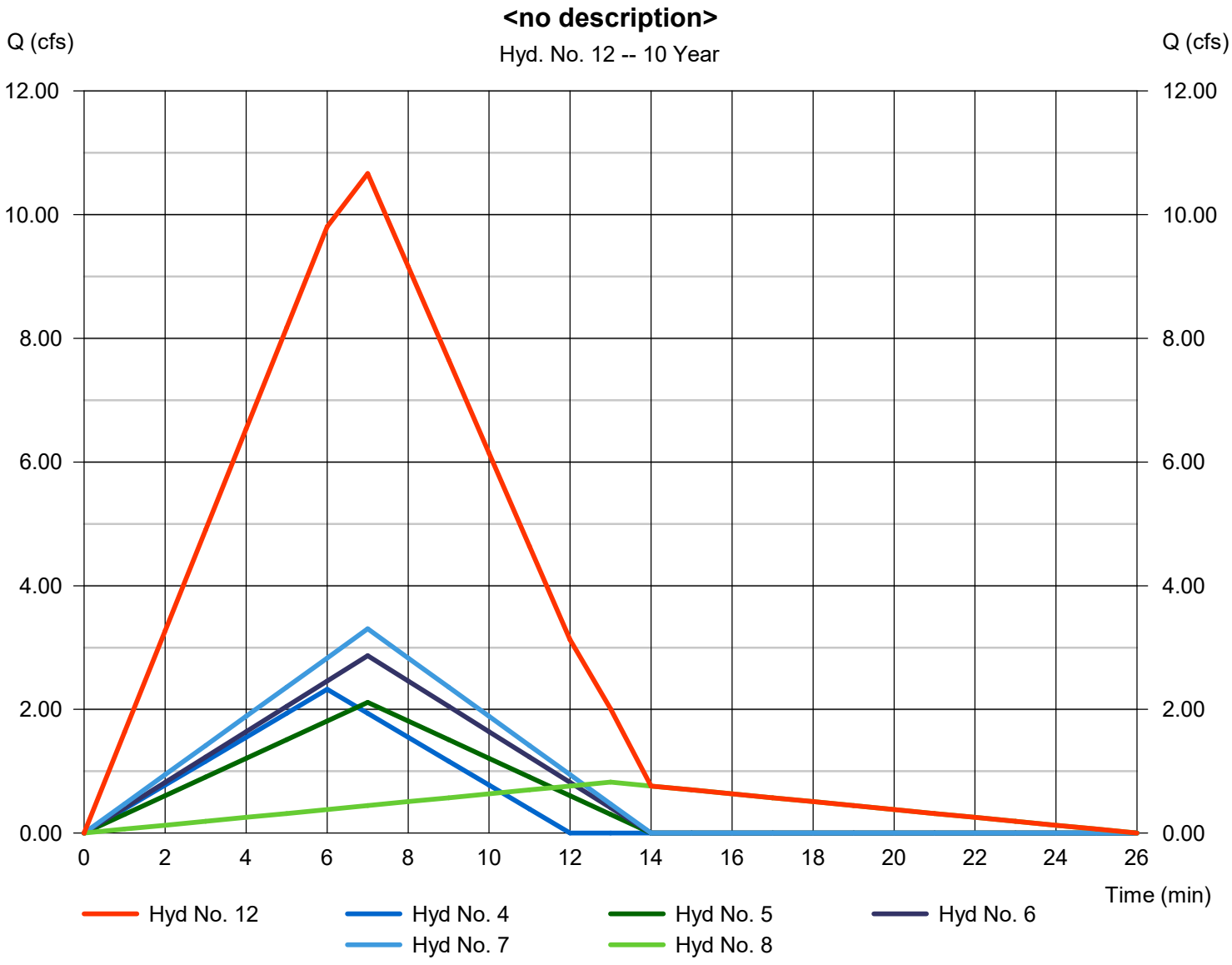


Hydrograph Report

Hyd. No. 12

<no description>

Hydrograph type	= Combine	Peak discharge	= 10.67 cfs
Storm frequency	= 10 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 4,960 cuft
Inflow hyds.	= 4, 5, 6, 7, 8	Contrib. drain. area	= 4.490 ac



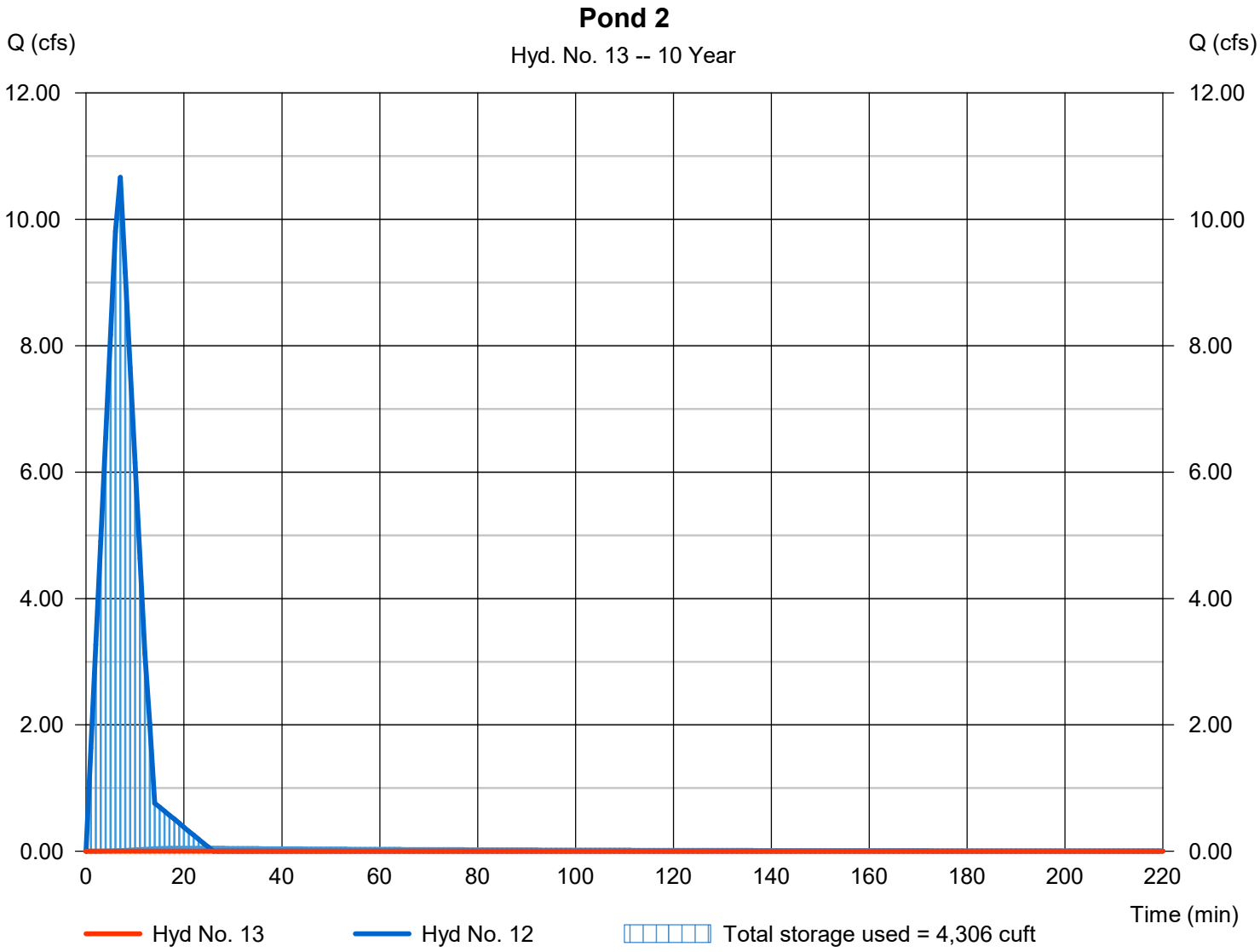
Hydrograph Report

Hyd. No. 13

Pond 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	99 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	12 - <no description>	Max. Elevation	=	2663.80 ft
Reservoir name	=	POND 2	Max. Storage	=	4,306 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



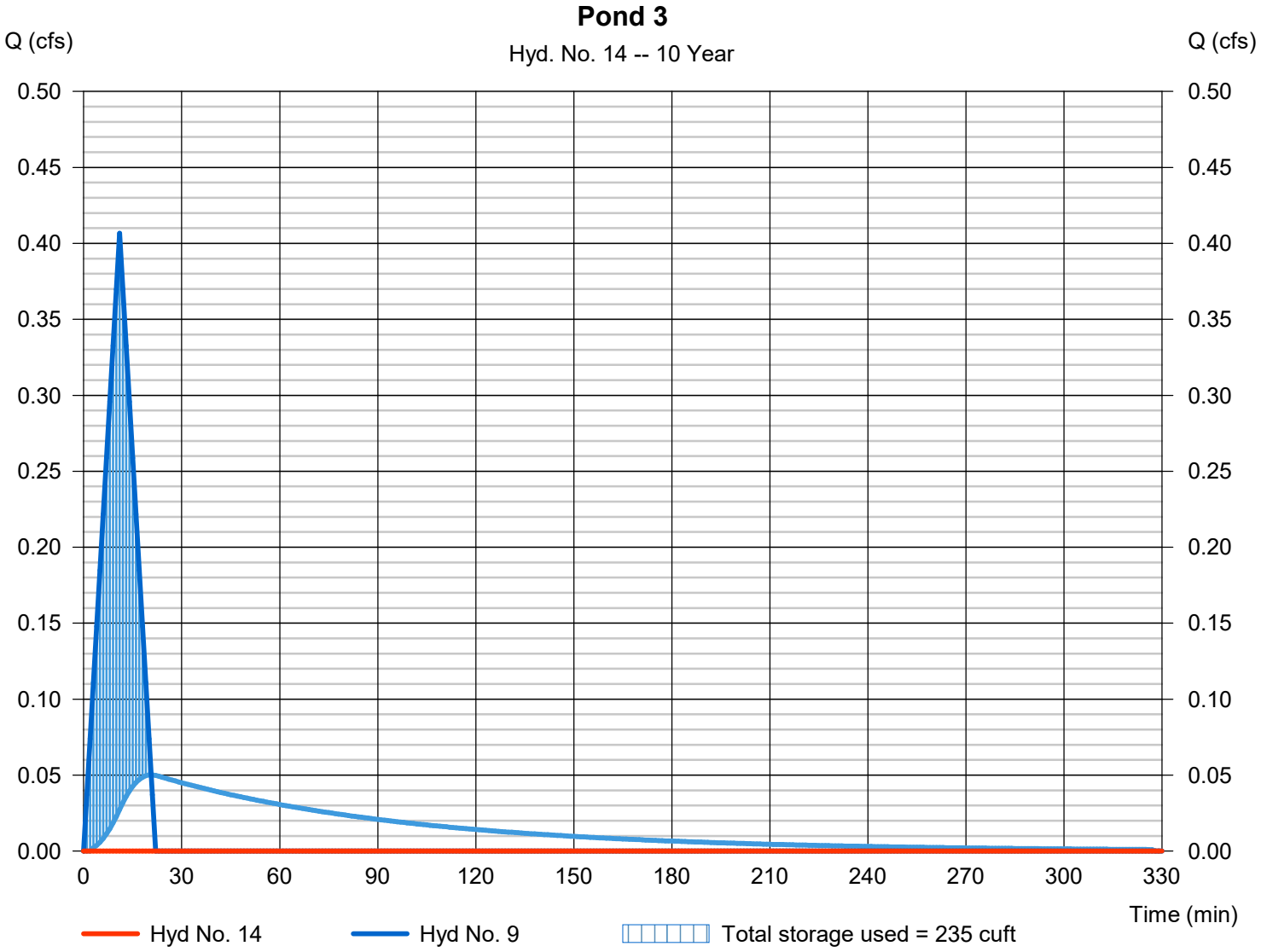
Hydrograph Report

Hyd. No. 14

Pond 3

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 9 - P-9	Max. Elevation	= 2659.52 ft
Reservoir name	= POND 3	Max. Storage	= 235 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

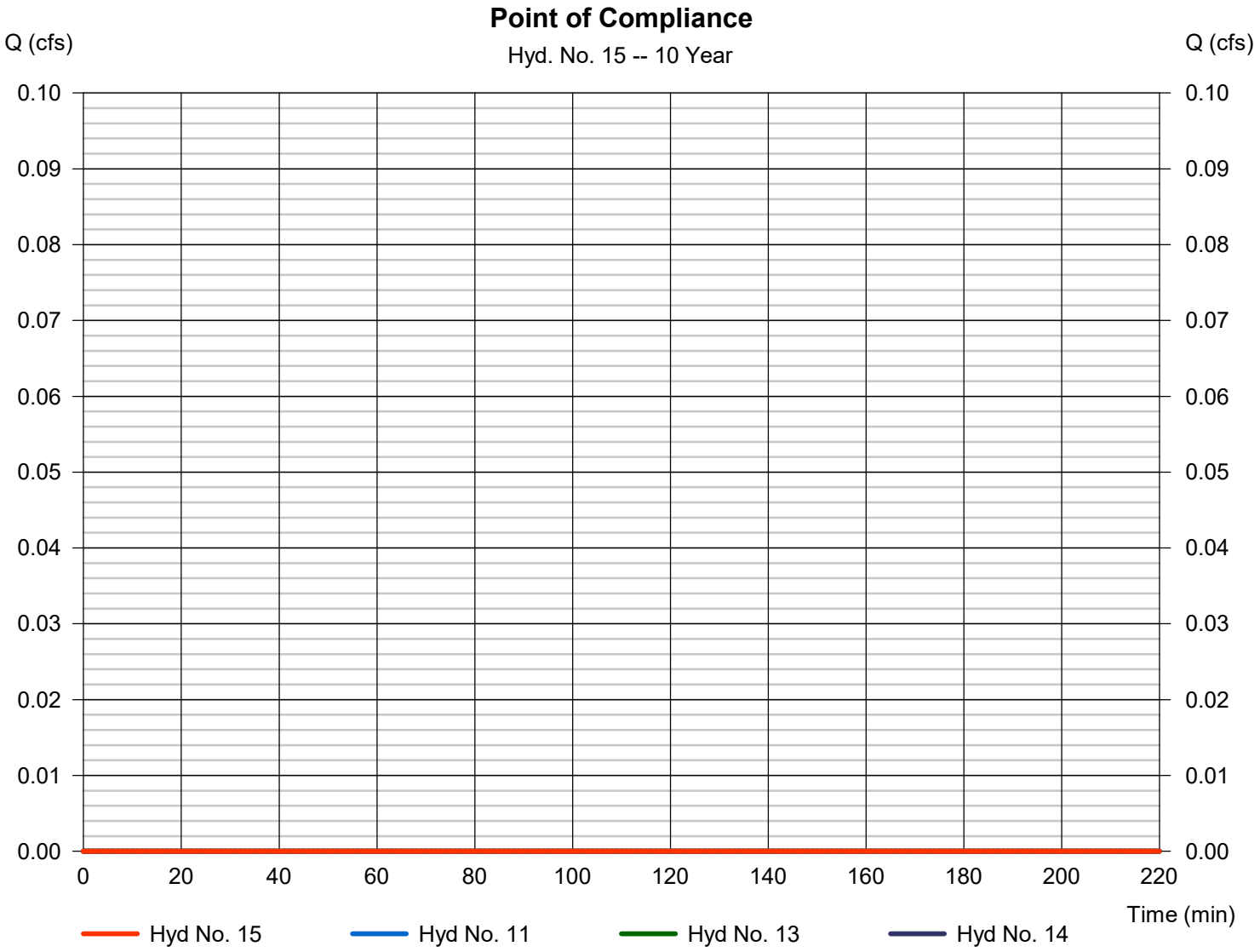


Hydrograph Report

Hyd. No. 15

Point of Compliance

Hydrograph type	= Combine	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 99 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyds.	= 11, 13, 14	Contrib. drain. area	= 0.000 ac

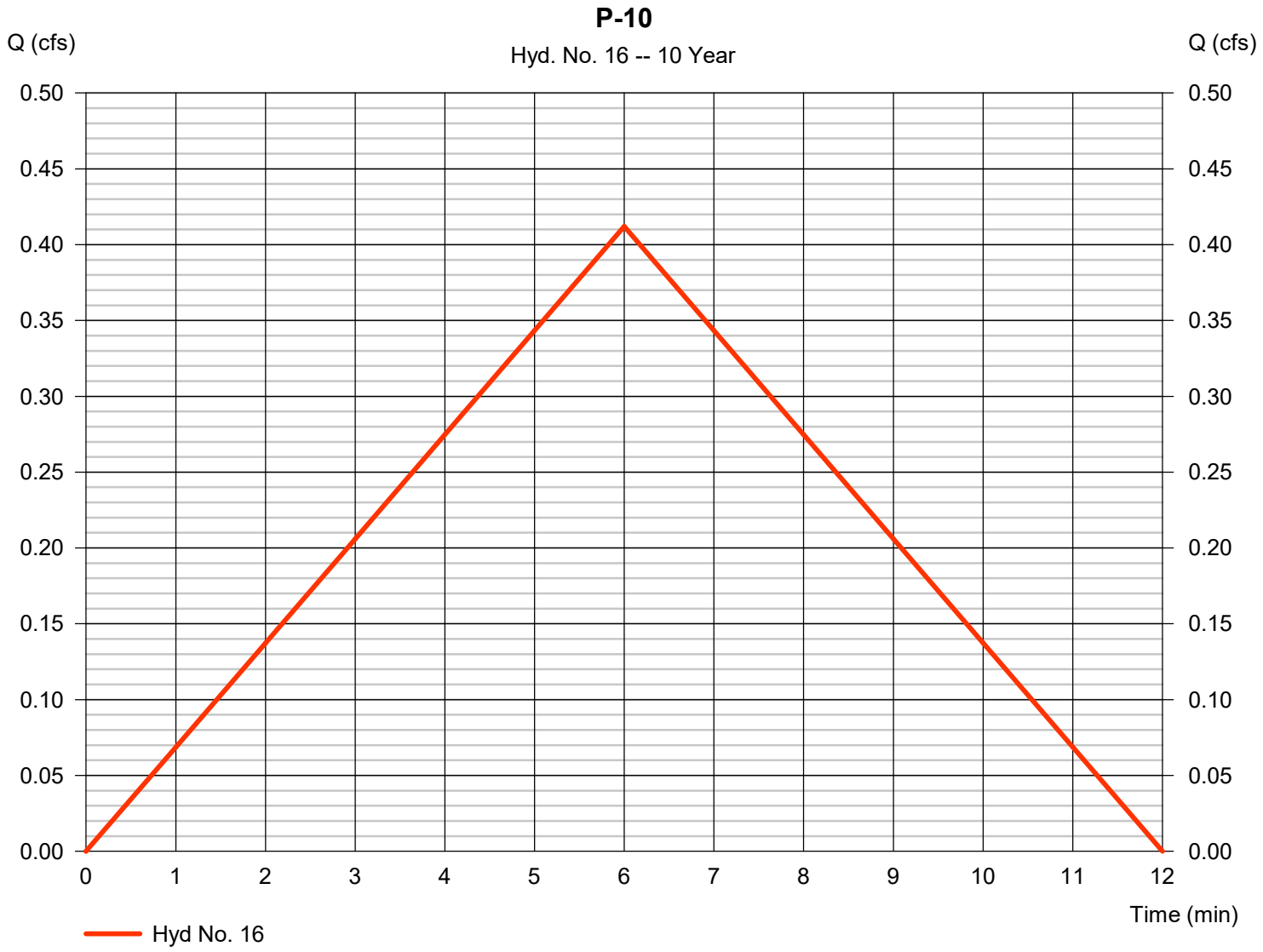


Hydrograph Report

Hyd. No. 16

P-10

Hydrograph type	=	Rational	Peak discharge	=	0.412 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	148 cuft
Drainage area	=	0.150 ac	Runoff coeff.	=	0.84
Intensity	=	3.270 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

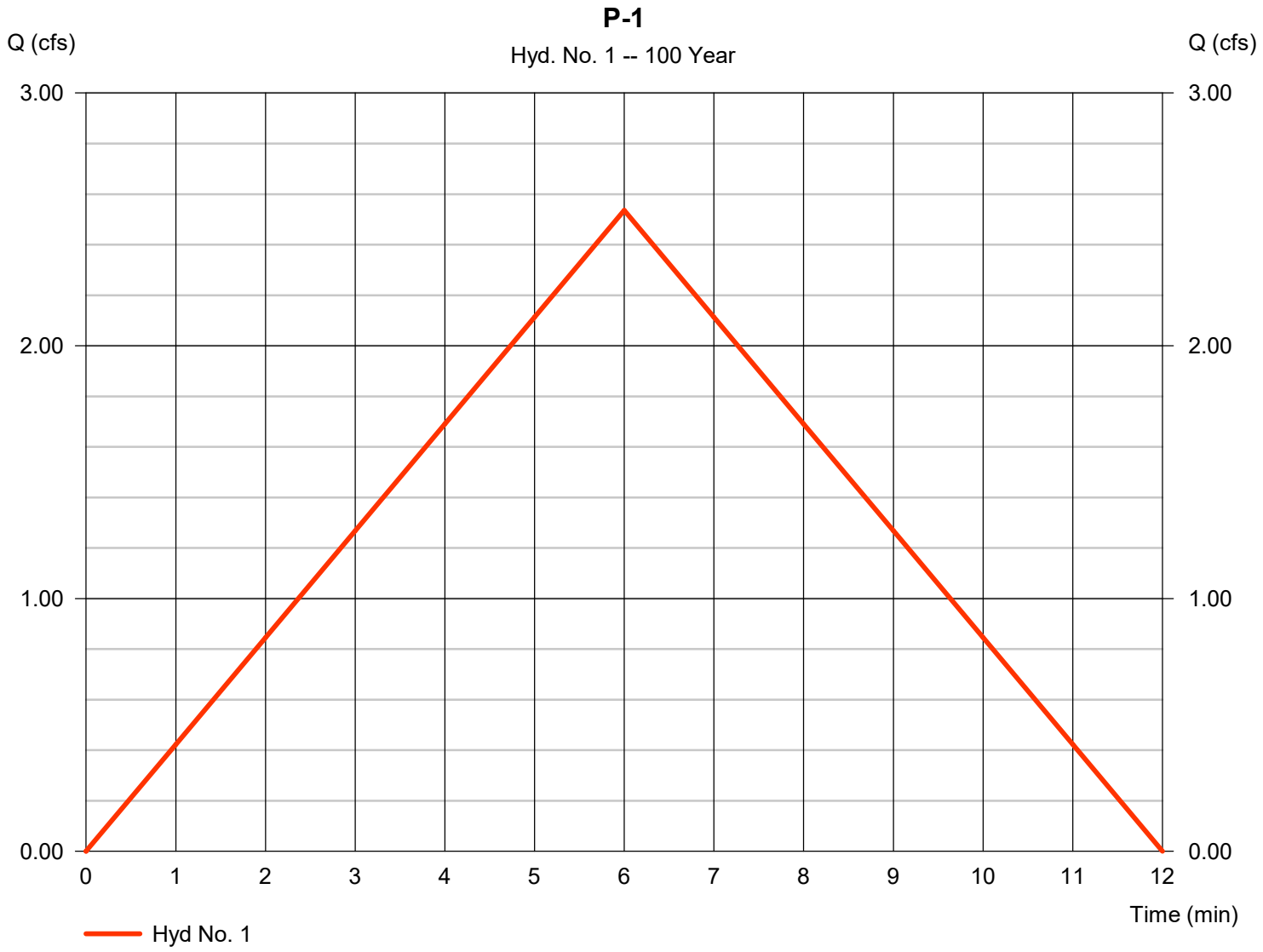
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	2.536	1	6	913	------	------	------	P-1
2	Rational	5.518	1	6	1,986	------	------	------	P-2
3	Rational	4.958	1	8	2,380	------	------	------	P-3
4	Rational	3.515	1	6	1,265	------	------	------	P-4
5	Rational	3.192	1	7	1,341	------	------	------	P-5
6	Rational	4.338	1	7	1,822	------	------	------	P-6
7	Rational	4.993	1	7	2,097	------	------	------	P-7
8	Rational	1.246	1	13	971	------	------	------	P-8
9	Rational	0.614	1	11	405	------	------	------	P-9
10	Combine	11.77	1	6	5,279	1, 2, 3,	------	------	<no description>
11	Reservoir	0.000	1	162	0	10	2675.42	4,864	Pond 1
12	Combine	16.12	1	7	7,496	4, 5, 6, 7, 8,	------	------	<no description>
13	Reservoir	0.000	1	153	0	12	2664.40	6,650	Pond 2
14	Reservoir	0.000	1	55	0	9	2659.79	356	Pond 3
15	Combine	0.000	1	153	0	11, 13, 14	------	------	Point of Compliance
16	Rational	0.623	1	6	224	------	------	------	P-10

Hydrograph Report

Hyd. No. 1

P-1

Hydrograph type	=	Rational	Peak discharge	=	2.536 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	913 cuft
Drainage area	=	0.570 ac	Runoff coeff.	=	0.9
Intensity	=	4.944 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

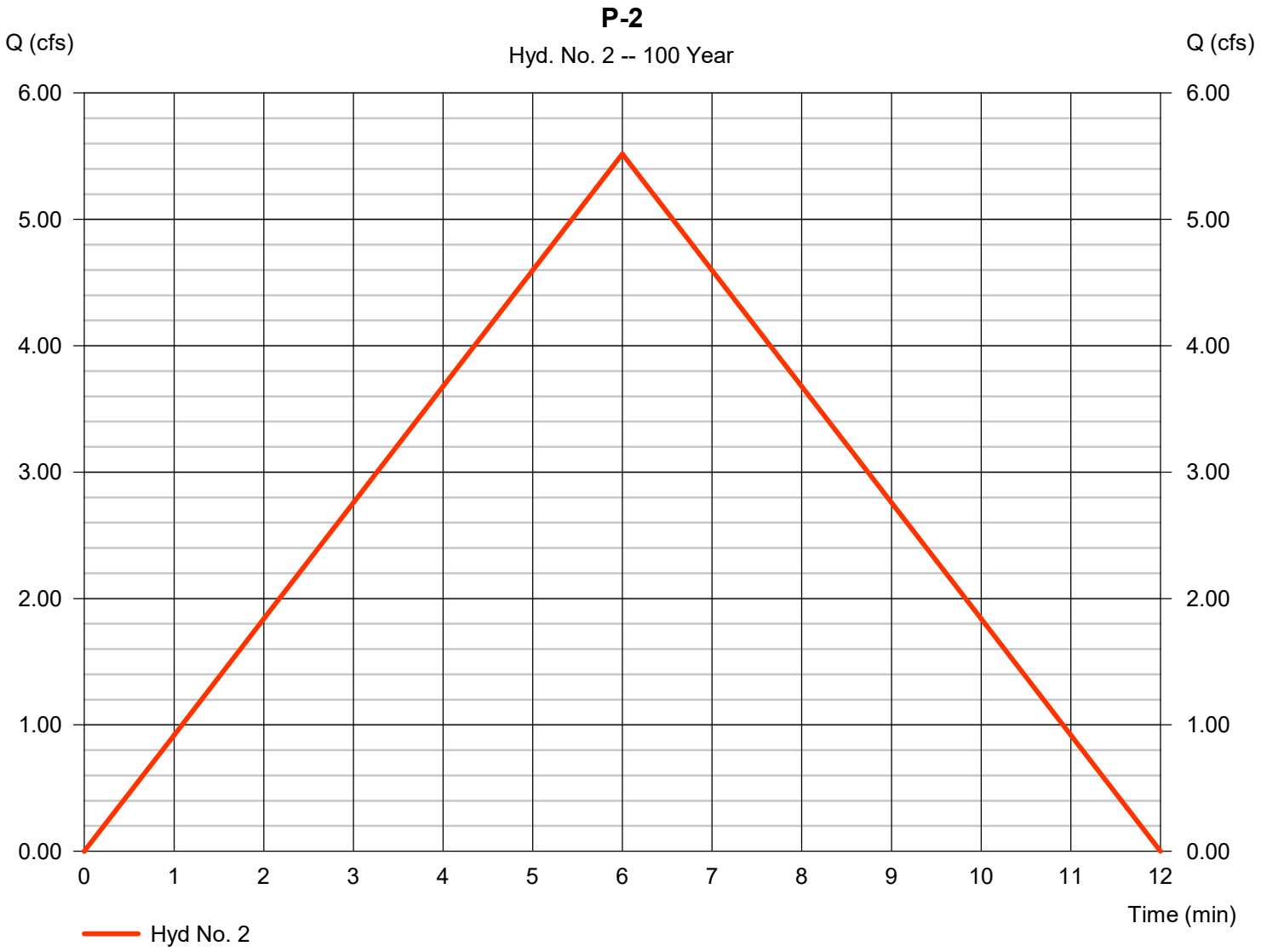


Hydrograph Report

Hyd. No. 2

P-2

Hydrograph type	=	Rational	Peak discharge	=	5.518 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	1,986 cuft
Drainage area	=	1.240 ac	Runoff coeff.	=	0.9
Intensity	=	4.944 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

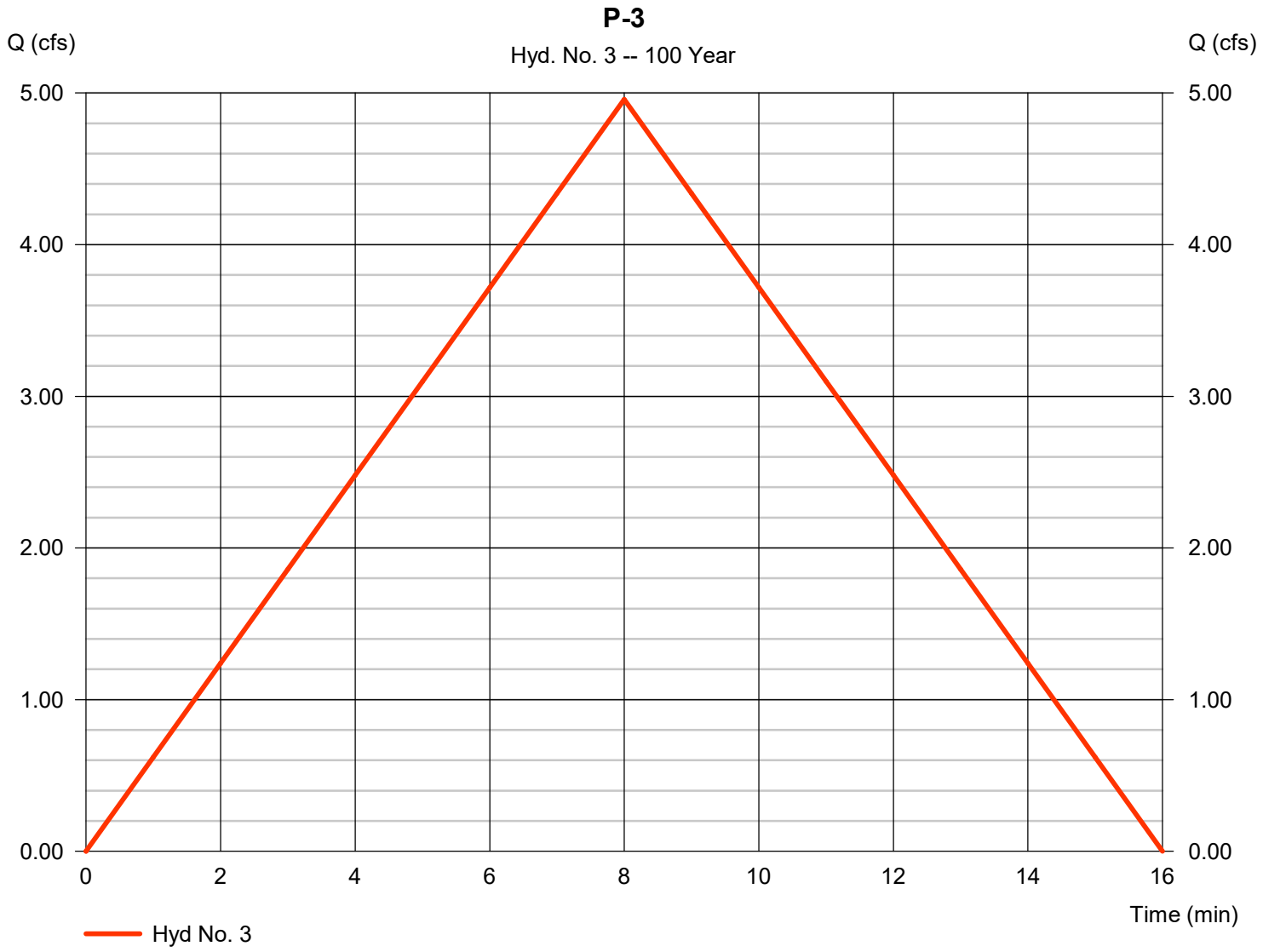


Hydrograph Report

Hyd. No. 3

P-3

Hydrograph type	=	Rational	Peak discharge	=	4.958 cfs
Storm frequency	=	100 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	2,380 cuft
Drainage area	=	1.430 ac	Runoff coeff.	=	0.82
Intensity	=	4.228 in/hr	Tc by FAA	=	8.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

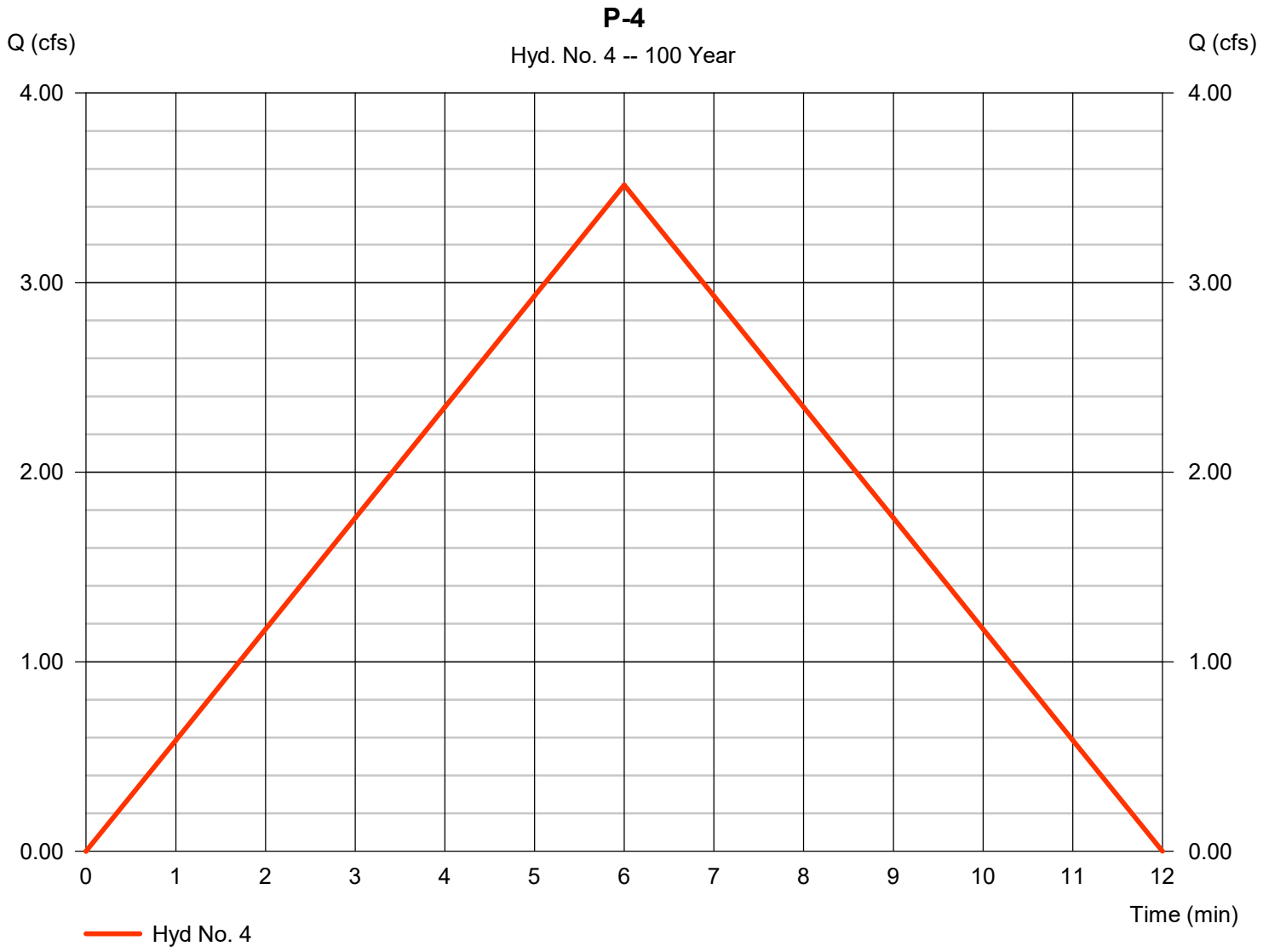


Hydrograph Report

Hyd. No. 4

P-4

Hydrograph type	=	Rational	Peak discharge	=	3.515 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	1,265 cuft
Drainage area	=	0.790 ac	Runoff coeff.	=	0.9
Intensity	=	4.944 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

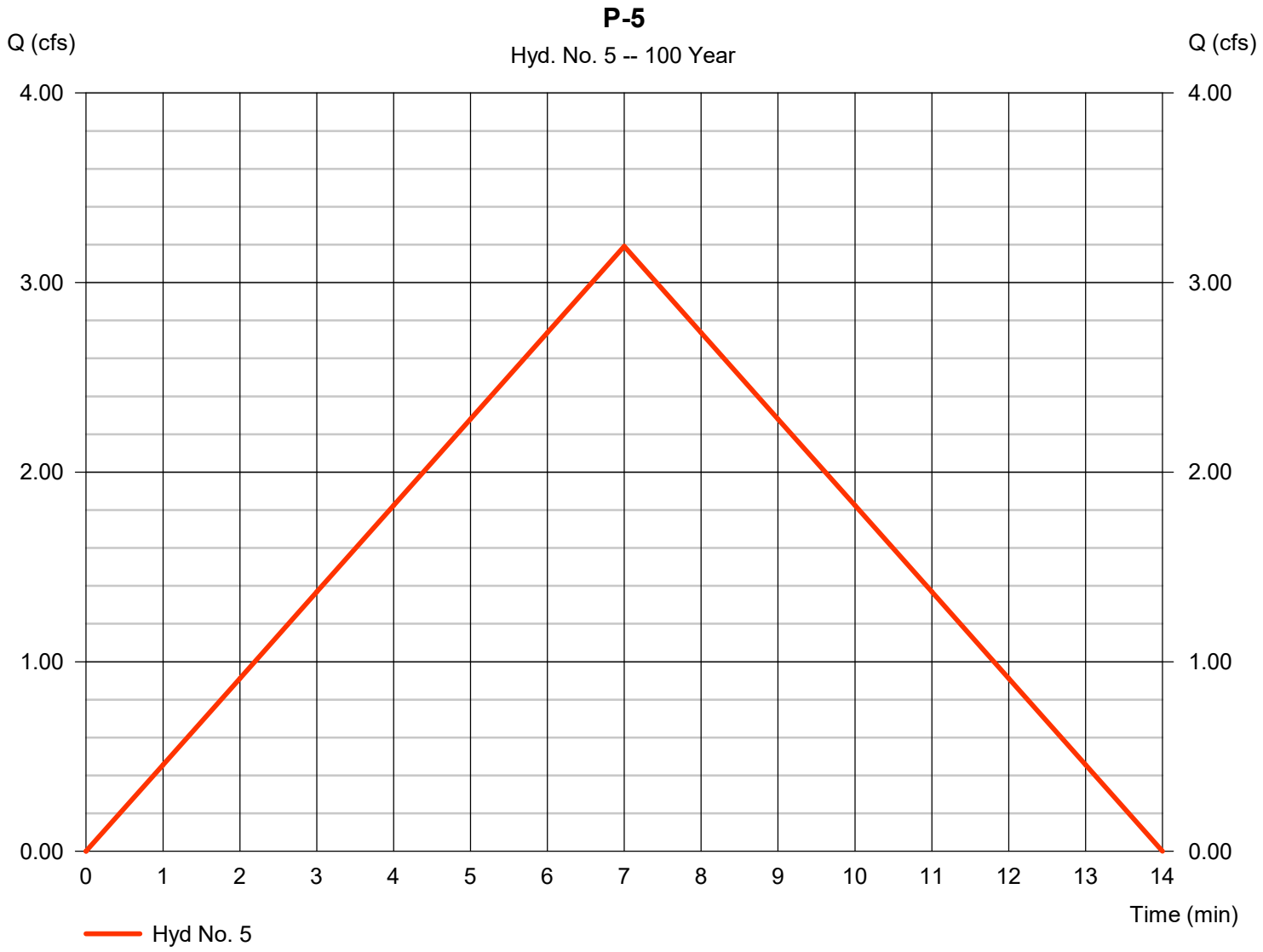


Hydrograph Report

Hyd. No. 5

P-5

Hydrograph type	=	Rational	Peak discharge	=	3.192 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,341 cuft
Drainage area	=	0.780 ac	Runoff coeff.	=	0.9
Intensity	=	4.547 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

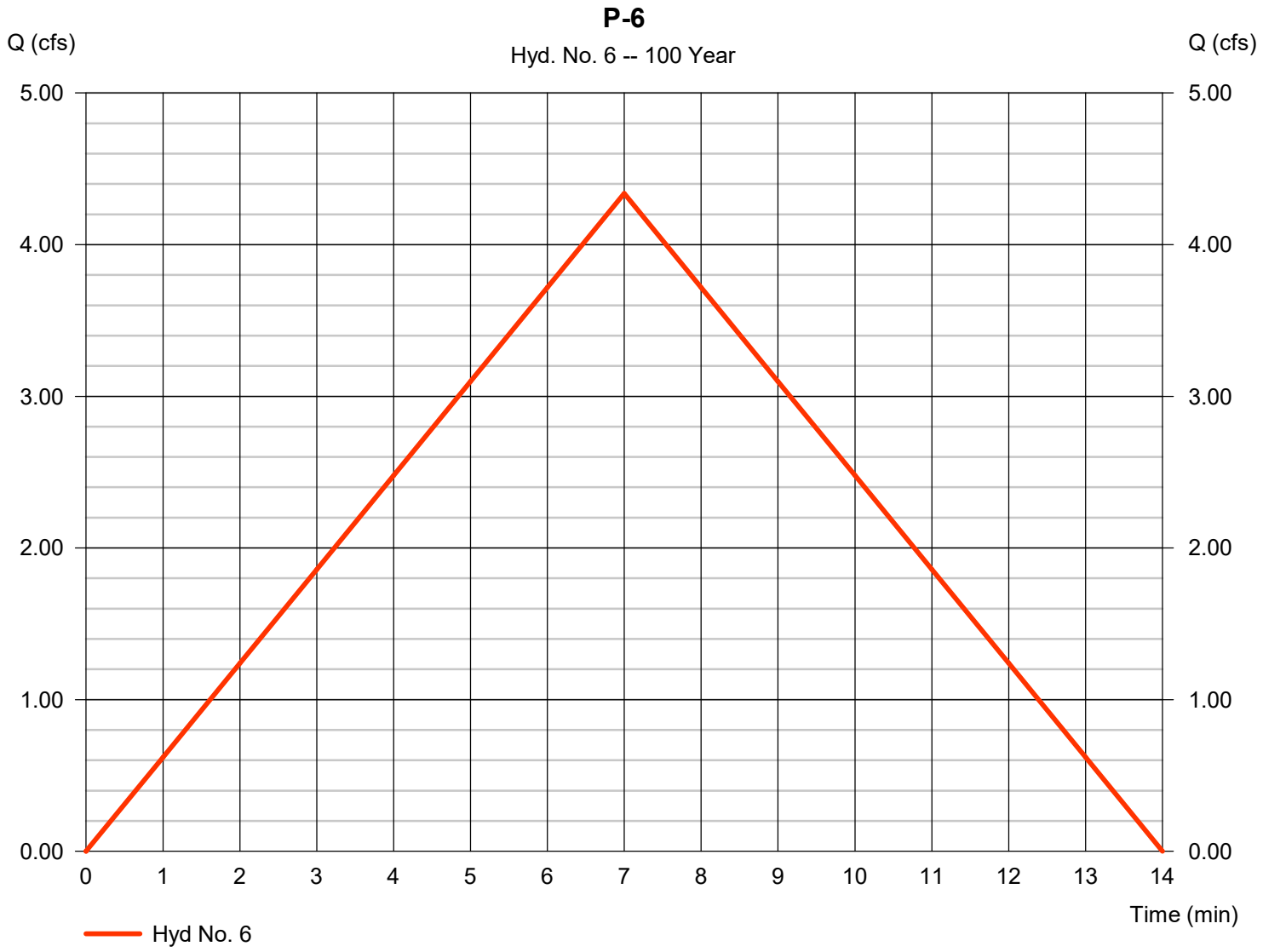


Hydrograph Report

Hyd. No. 6

P-6

Hydrograph type	=	Rational	Peak discharge	=	4.338 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,822 cuft
Drainage area	=	1.060 ac	Runoff coeff.	=	0.9
Intensity	=	4.547 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

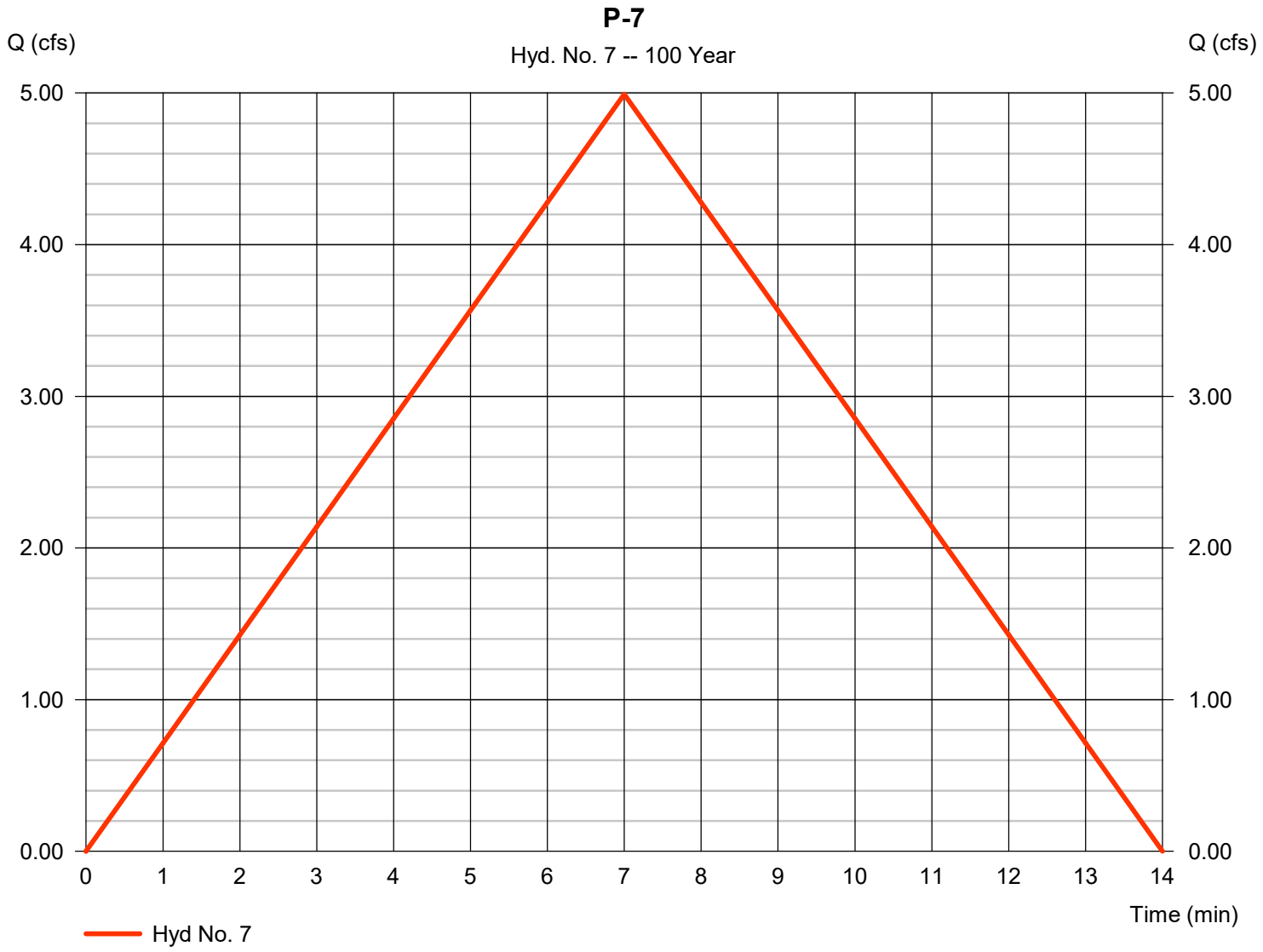


Hydrograph Report

Hyd. No. 7

P-7

Hydrograph type	=	Rational	Peak discharge	=	4.993 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	2,097 cuft
Drainage area	=	1.220 ac	Runoff coeff.	=	0.9
Intensity	=	4.547 in/hr	Tc by FAA	=	7.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hyd. No. 8

P-8

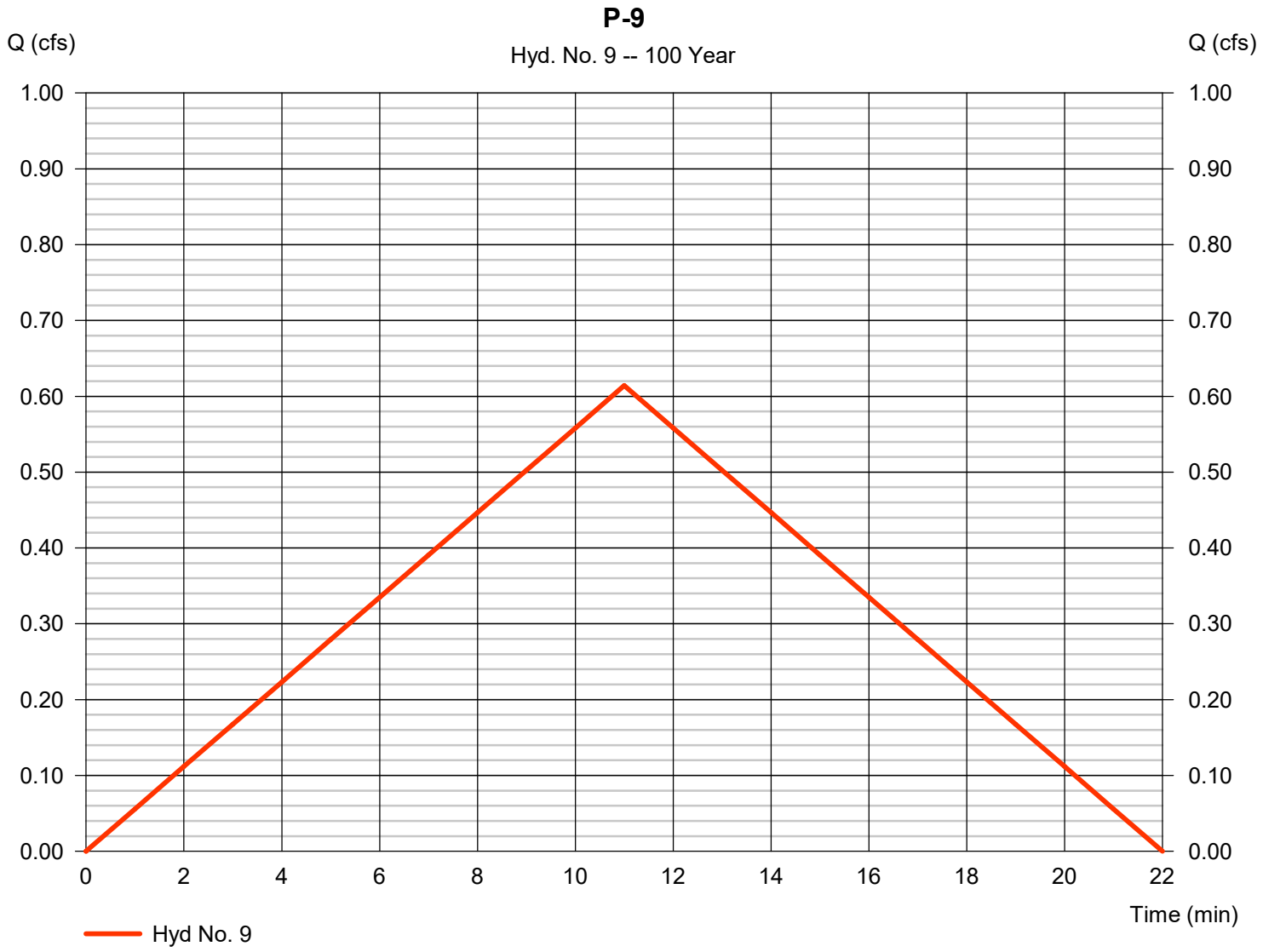
Hydrograph type	=	Rational	Peak discharge	=	1.246 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	971 cuft
Drainage area	=	0.640 ac	Runoff coeff.	=	0.6
Intensity	=	3.244 in/hr	Tc by FAA	=	13.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 9

P-9

Hydrograph type	=	Rational	Peak discharge	=	0.614 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	405 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.48
Intensity	=	3.554 in/hr	Tc by FAA	=	11.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1

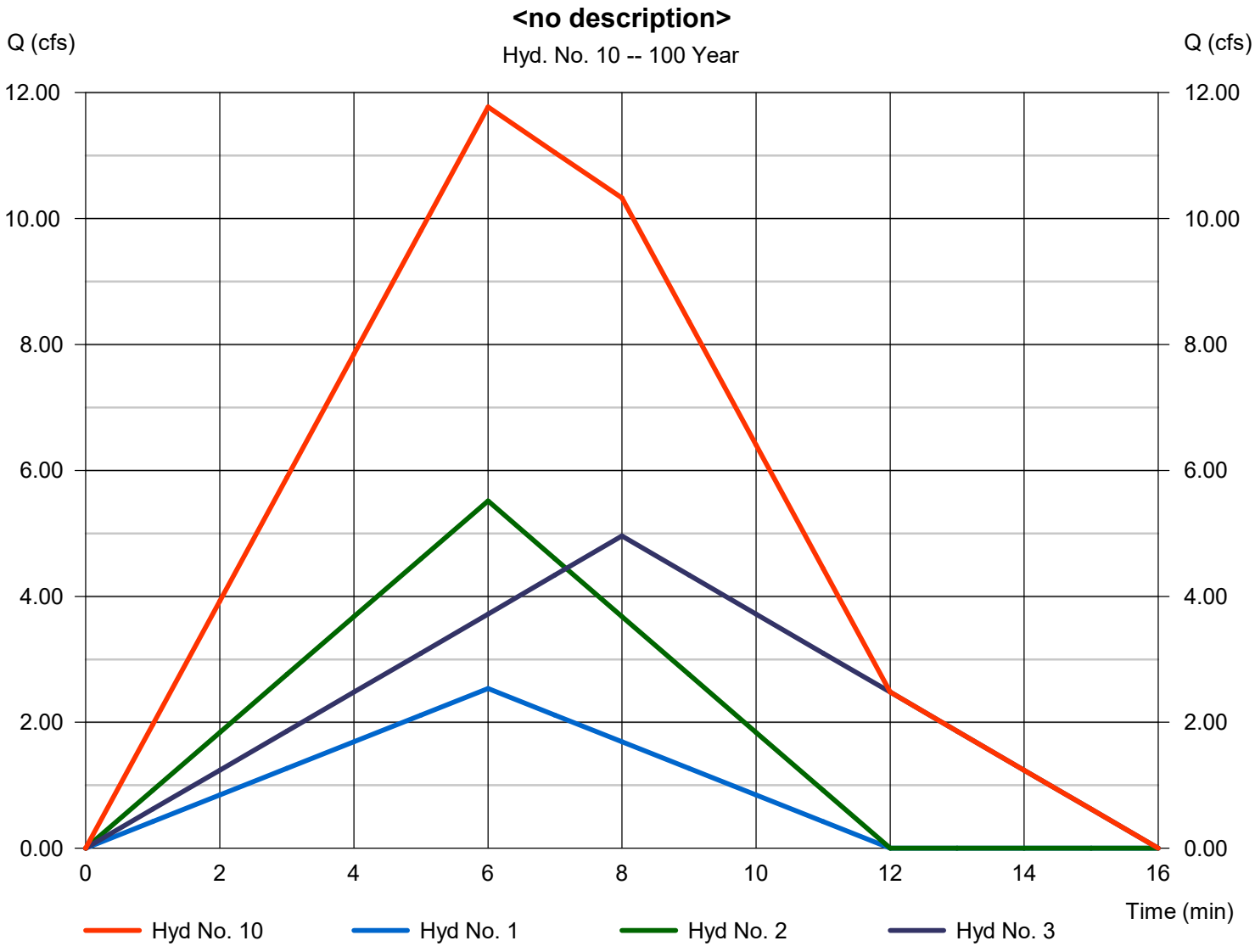


Hydrograph Report

Hyd. No. 10

<no description>

Hydrograph type	=	Combine	Peak discharge	=	11.77 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	5,279 cuft
Inflow hyds.	=	1, 2, 3	Contrib. drain. area	=	3.240 ac



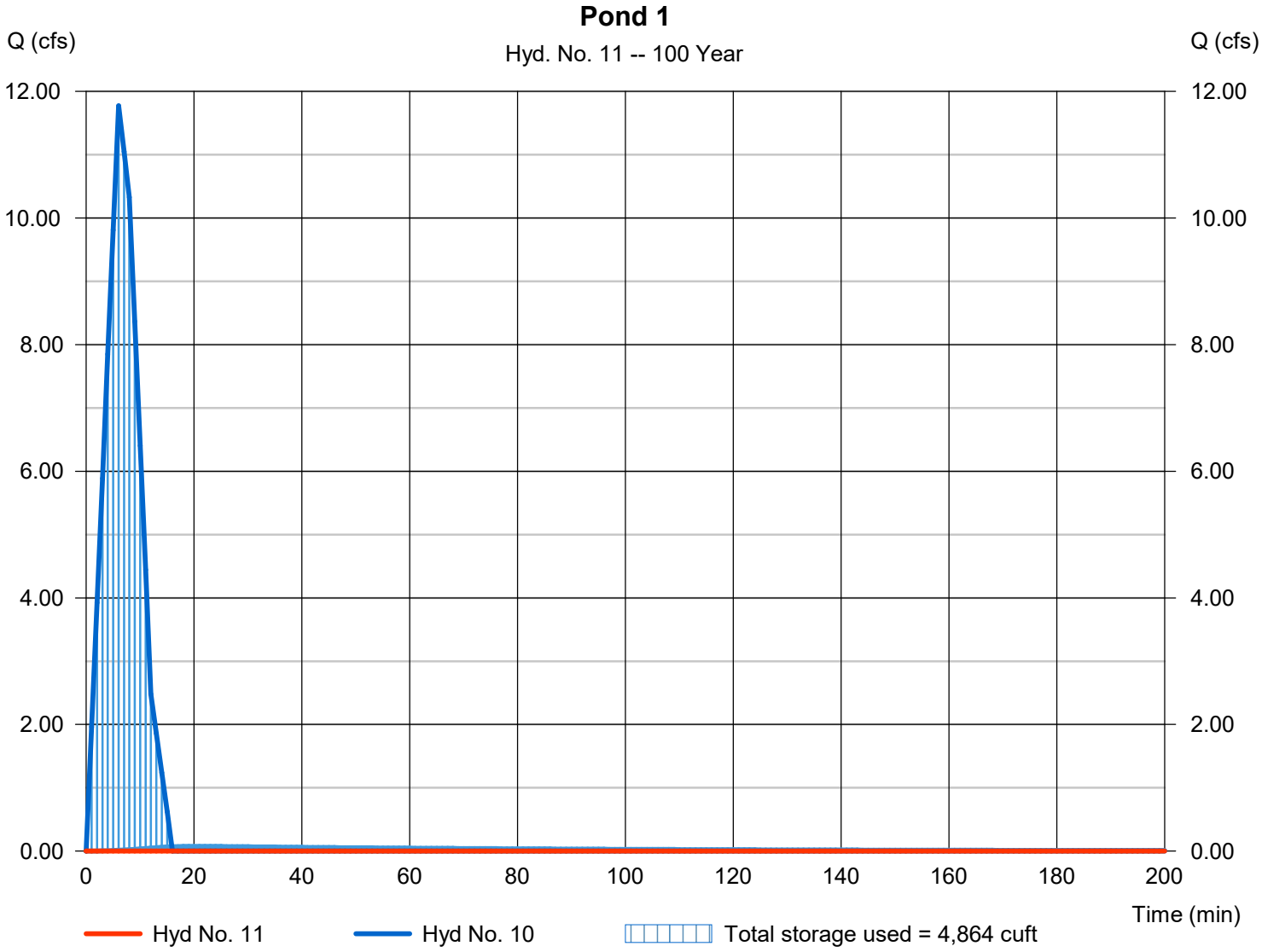
Hydrograph Report

Hyd. No. 11

Pond 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 162 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 10 - <no description>	Max. Elevation	= 2675.42 ft
Reservoir name	= POND 1	Max. Storage	= 4,864 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

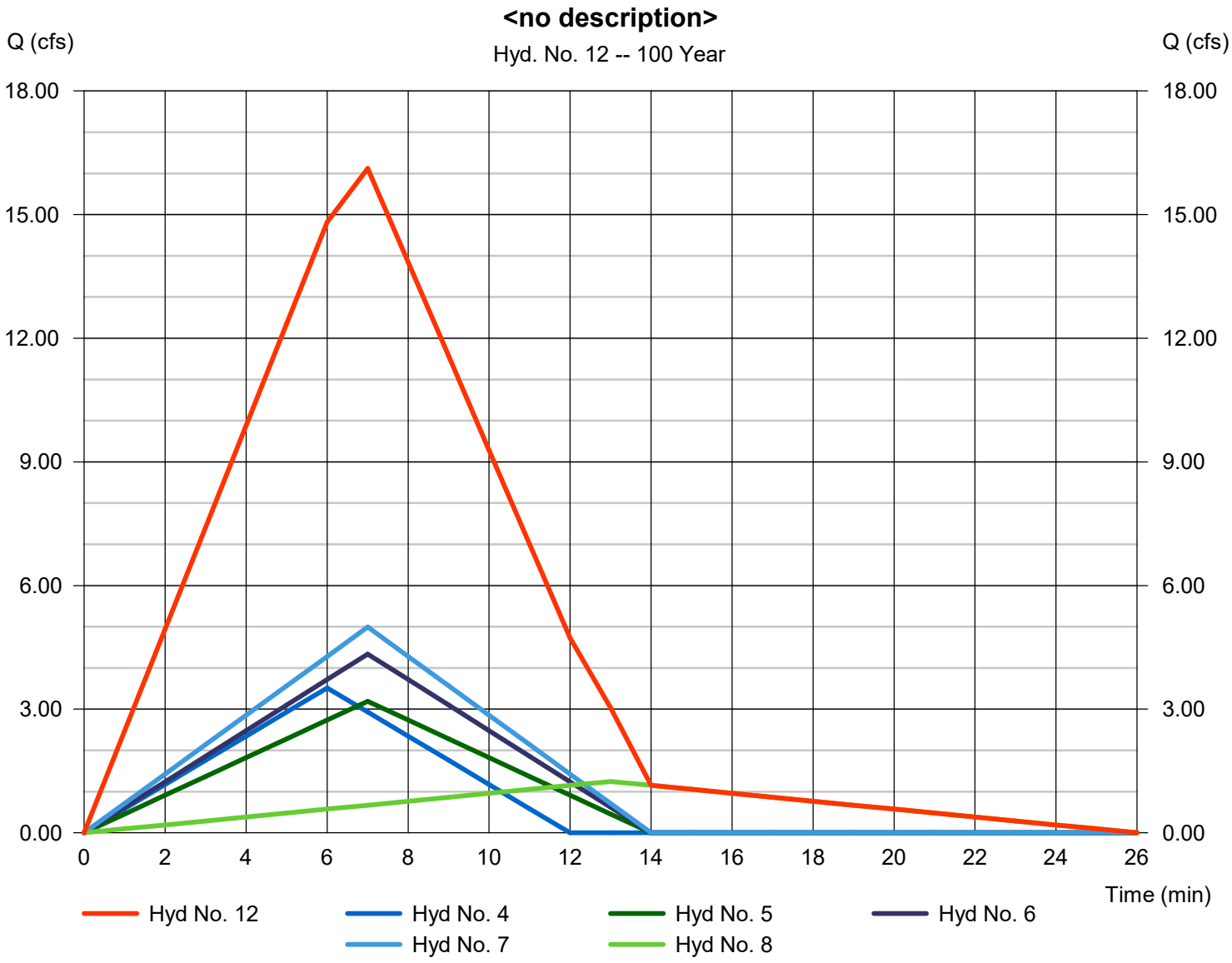


Hydrograph Report

Hyd. No. 12

<no description>

Hydrograph type	= Combine	Peak discharge	= 16.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 7,496 cuft
Inflow hyds.	= 4, 5, 6, 7, 8	Contrib. drain. area	= 4.490 ac



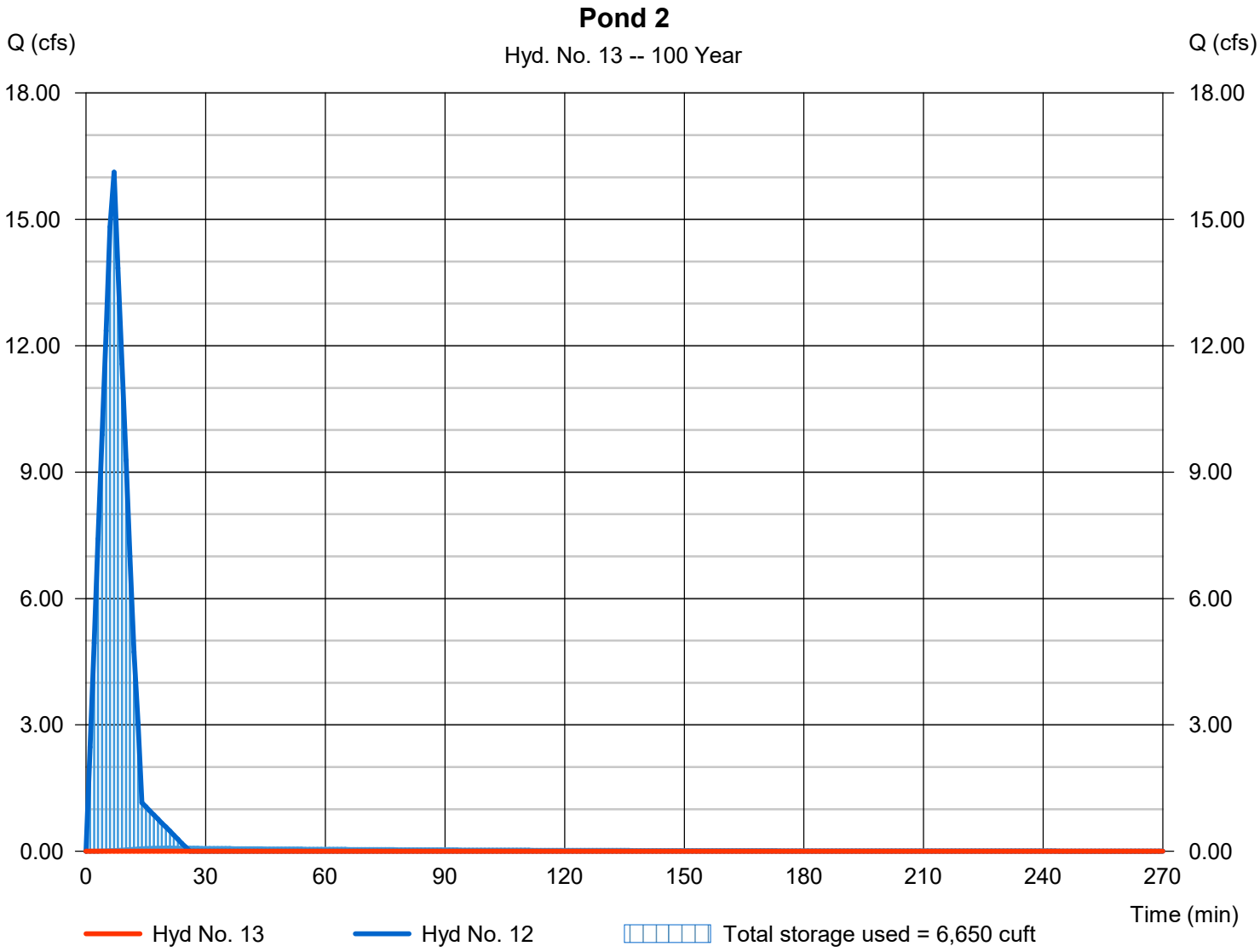
Hydrograph Report

Hyd. No. 13

Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 153 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 12 - <no description>	Max. Elevation	= 2664.40 ft
Reservoir name	= POND 2	Max. Storage	= 6,650 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



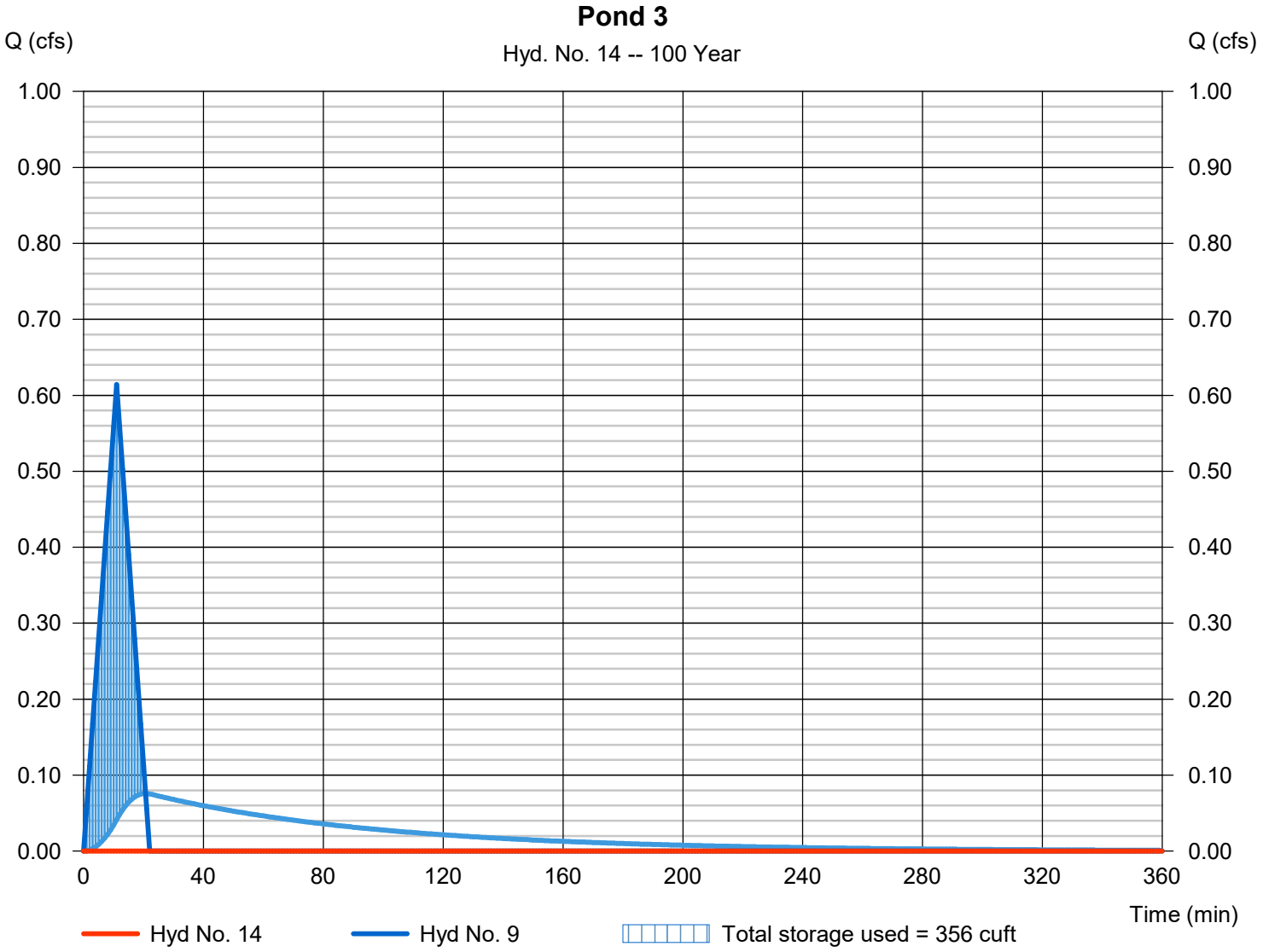
Hydrograph Report

Hyd. No. 14

Pond 3

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	55 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	9 - P-9	Max. Elevation	=	2659.79 ft
Reservoir name	=	POND 3	Max. Storage	=	356 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

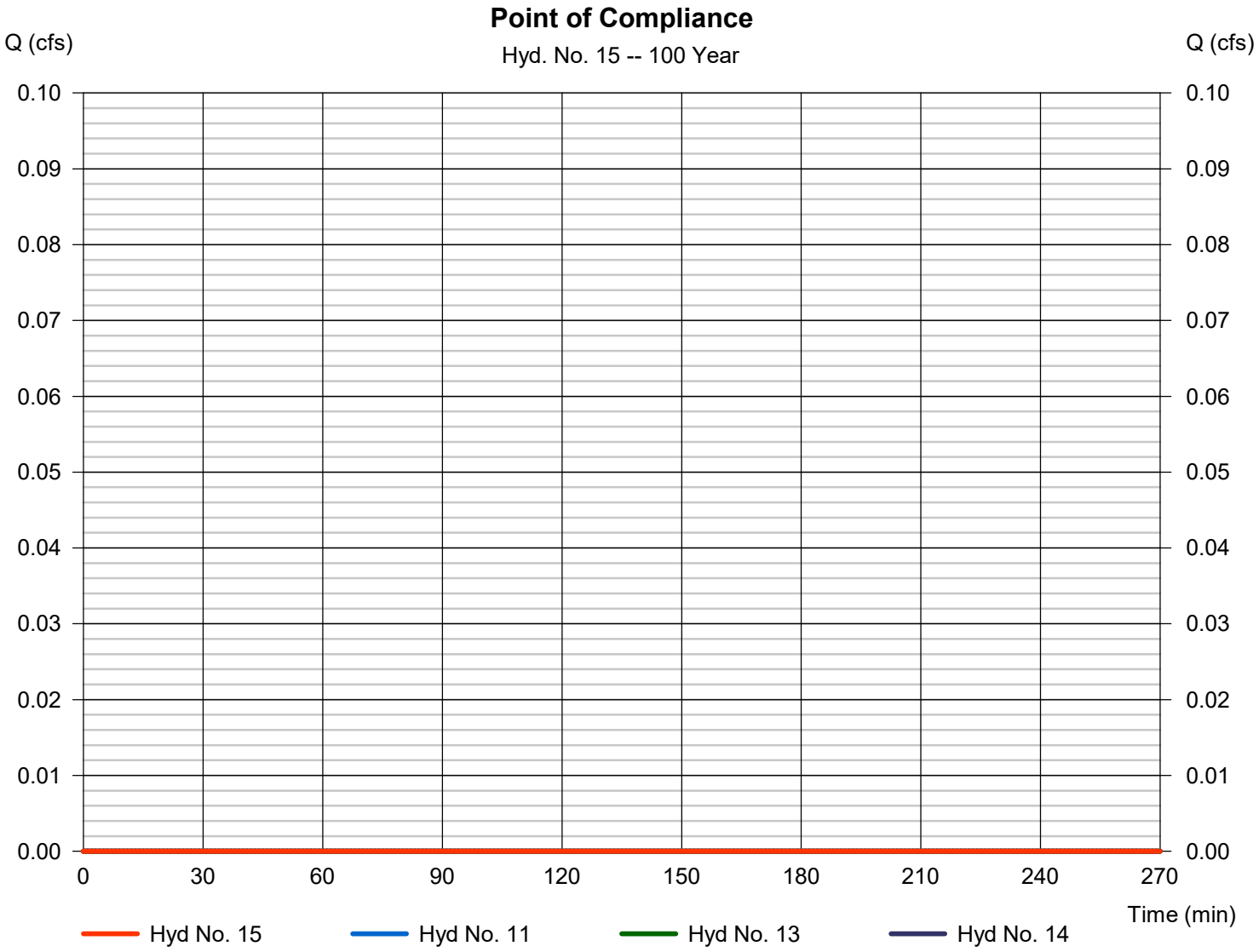


Hydrograph Report

Hyd. No. 15

Point of Compliance

Hydrograph type	= Combine	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 153 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyds.	= 11, 13, 14	Contrib. drain. area	= 0.000 ac

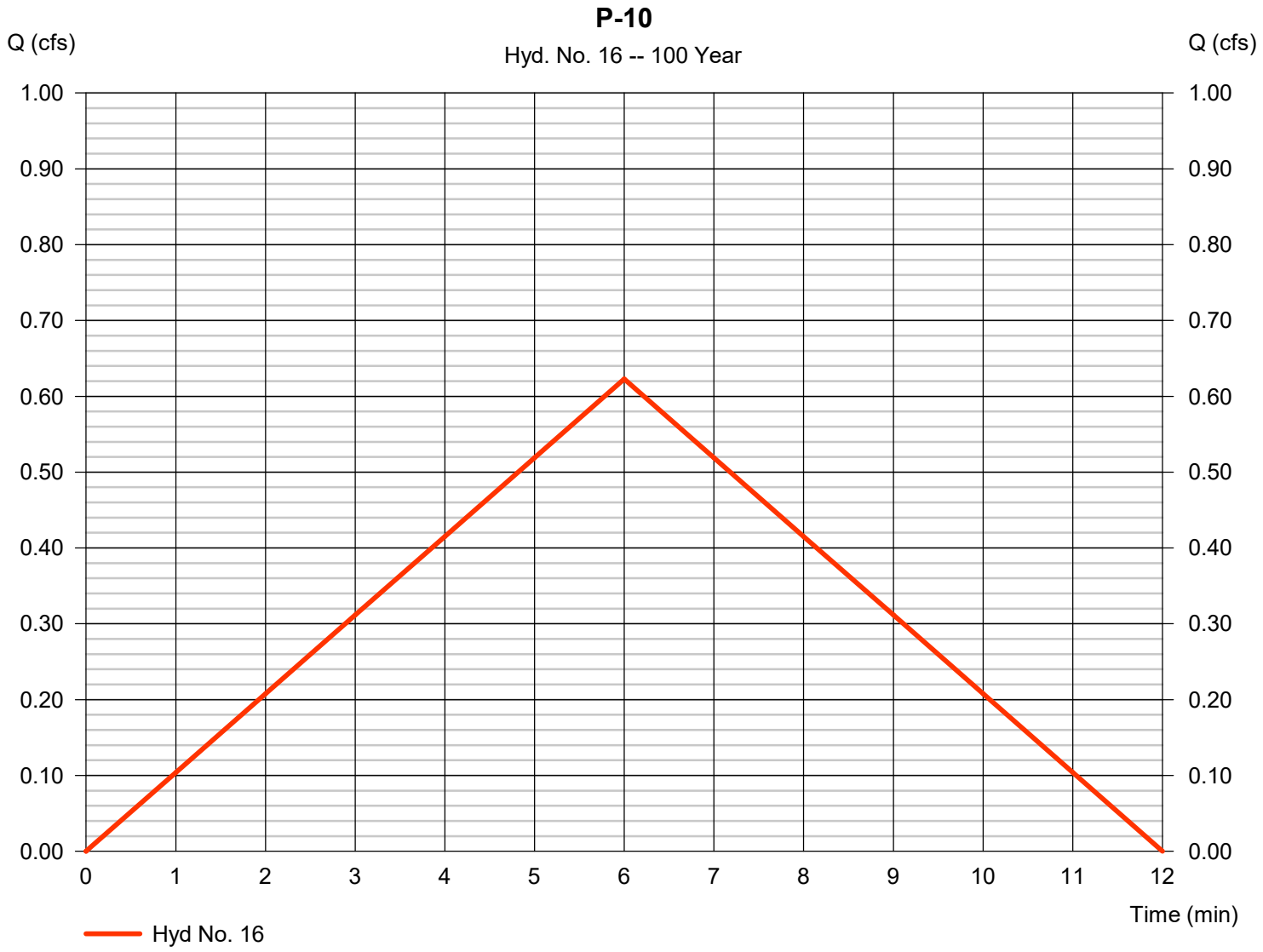


Hydrograph Report

Hyd. No. 16

P-10

Hydrograph type	=	Rational	Peak discharge	=	0.623 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	224 cuft
Drainage area	=	0.150 ac	Runoff coeff.	=	0.84
Intensity	=	4.944 in/hr	Tc by FAA	=	6.00 min
IDF Curve	=	Cherry Valley.IDF	Asc/Rec limb fact	=	1/1



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	3.5440	1.1000	0.6004	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	8.8347	0.1000	0.5496	--------
25	0.0000	0.0000	0.0000	--------
50	0.0000	0.0000	0.0000	--------
100	13.4033	0.1000	0.5515	--------

File name: Cherry Valley.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.20	0.84	0.67	0.57	0.50	0.45	0.41	0.38	0.36	0.33	0.32	0.30
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	3.61	2.48	1.99	1.70	1.50	1.36	1.25	1.16	1.09	1.03	0.98	0.93
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	5.46	3.74	3.00	2.56	2.27	2.05	1.88	1.75	1.64	1.55	1.47	1.40

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	2.20	0.00	3.30	4.25	5.77	6.80	7.95
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Table I.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Storm Drain Inlets	Inlet Stencils	Repaint, Stencils, Provide Information to New Owners
Landscape/Outdoor Pesticide		Provide IPM information to New Owners
Refuge Areas	Do Not Dump Hazardous Material Signs	Inspection, Cleanup, Maintenance

Appendix 8

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the 2014 SMR WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 31 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	☒ **Locations of inlets.**	☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☒ **Maintain and periodically repaint or replace inlet markings.** ☒ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☐ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☐ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ D1. **Need for future indoor & structural pest control**		☐ **Note building design features that discourage entry of pests.**	☐ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☒ D2. **Landscape/ Outdoor Pesticide Use**	☐ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☐ **Show self-retaining landscape areas, if any.** ☒ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ☐ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ☒ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ☒ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ☐ **Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	☒ **Maintain landscaping using minimum or no pesticides.** ☒ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://www.rcflood.org/stormwater/Downloads/LandscapeGardenBrochure.pdf ☒ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://www.rcflood.org/stormwater/Downloads/poolsandspas.pdf**
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://www.rcflood.org/stormwater/downloads/FoodServ.pdf** **Provide this brochure to new site owners, lessees, and operators.**
☒ G. **Refuse areas**	☒ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☒ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☒ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☒ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://www.rcflood.org/stormwater/Downloads/IndustrialCommercialFacilities.pdf
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	❑ **Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** www.cchealth.org/groups/hazmat/	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://www.rcflood.org/stormwater/downloads/OutdoorCleaningActivities.pdf** ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** **Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at** http://rcflood.org/stormwater/ **Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at** http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** ❑ **Include controls for other sources as specified by local reviewer.**	

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ P. **Plazas, sidewalks, and parking lots.**			☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

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

*TO BE PROVIDED WITH FINAL WQMP

Appendix 10: Educational Materials

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

*TO BE PROVIDED WITH FINAL WQMP