Appendix G:
Hydrology and Water Quality Supporting Information

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Balance Hydrologics

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June 7, 2024

Gordon Zanin, P.E.
Carlson, Barbee & Gibson, Inc.
2633 Camino Ramon, Suite 350
San Ramon, California 94583

RE: Modeling of Stormwater Runoff Flow-Duration and Peak Flow Control Performance Elworthy Property Project, Town of Danville

Dear Gordon:

Thank you again for contacting Balance Hydrologics ("Balance") regarding assistance with hydrologic and hydraulic modeling of the flow-duration and peak flow control performance of the stormwater infrastructure for the proposed Elworth Property Project ("Project") in the Town of Danville ("Town"). The objective of the work has been to provide modeling support to assist in sizing stormwater facilities so they will provide flow-duration control to meet the prevailing requirements in the third issuance of the Municipal Regional Stormwater Permit ("MRP3") and the Contra Costa Clean Water Program, as well as peak flow control consistent with the requirements of the Town and the Contra Costa County Flood Control and Water Conservation District ("Flood Control").

We have reviewed the site plan information you provided, along with parameters for the respective Drainage Management Areas ("DMAs") and used this information to complete pertinent hydrologic and hydraulic modeling to support the design of the stormwater management infrastructure. This letter report summarizes the technical approach used, the input parameters and assumptions, and concludes with a brief discussion of the results.

Technical Approach and Methodology

The analysis completed was focused on two distinct objectives for stormwater management at the site that stem from requirements of the City and the MRP. The first of these is the need to mitigate potential impacts due to changes in the magnitude and duration of runoff flow rate at the site. Control of these potential hydromodification impacts is explicitly required per Section C.3.g of the MRP3 (RWQCB Order R2-2022-0018), which strictly limits changes in the duration of runoff flow rates in the range from one-tenth of the 2-year event flow to the 10-year event flow. Compliance with the pertinent requirements is typically demonstrated through use of continuous-simulation hydrologic modeling capable of characterizing the long-term changes in site runoff associated with development. For the Project site, modeling work was completed using version 2023 of the Bay Area Hydrologic Model ("BAHM"). Use of this modeling platform allows for simulation of runoff for pre- and post-project conditions over a

49-year period (Water Years 1973 through 2021) with explicit model output showing how the proposed Integrated Management Practices ("IMPs") fully mitigate the potential hydromodification impacts.

The second objective relates to demonstrating that the project will not have adverse downstream impacts related to peak flow rates from large design storm events, specifically those larger than the upper-bound 10-year event threshold that applies for hydromodification management. The methodology utilized in this case follows the design guidance provided by Flood Control with modeling of the 10- and 100-year design events using the U.S. Army Corps of Engineers HEC-HMS software platform.

Watershed Context

The Project site lies within the southeasternmost portions of the San Ramon Creek watershed, which is a major tributary of Walnut Creek, the largest single stream system in Contra Costa County (see **Figure 1** for vicinity map). The Elworthy site straddles a sub-watershed divide, with runoff in the eastern part flowing to an unnamed channel that first flows south into the Crow Canyon Country Club before turning to the west and then north to eventually join San Ramon Creek just south of El Capitan Drive. Runoff from the western portions of the site flows to several locations at the eastern edge of existing sub-divisions where it is collected in existing storm drains. These storm drain systems are part of the larger Alicante Drive trunk drain system that flows west to discharge into the same unnamed tributary. To confirm compliance with pertinent flow control requirements, all calculations and modeling were completed with the objective of avoiding impacts to all points receiving runoff from the site, with separate points of compliance used for the eastern channel and the western storm drain system.

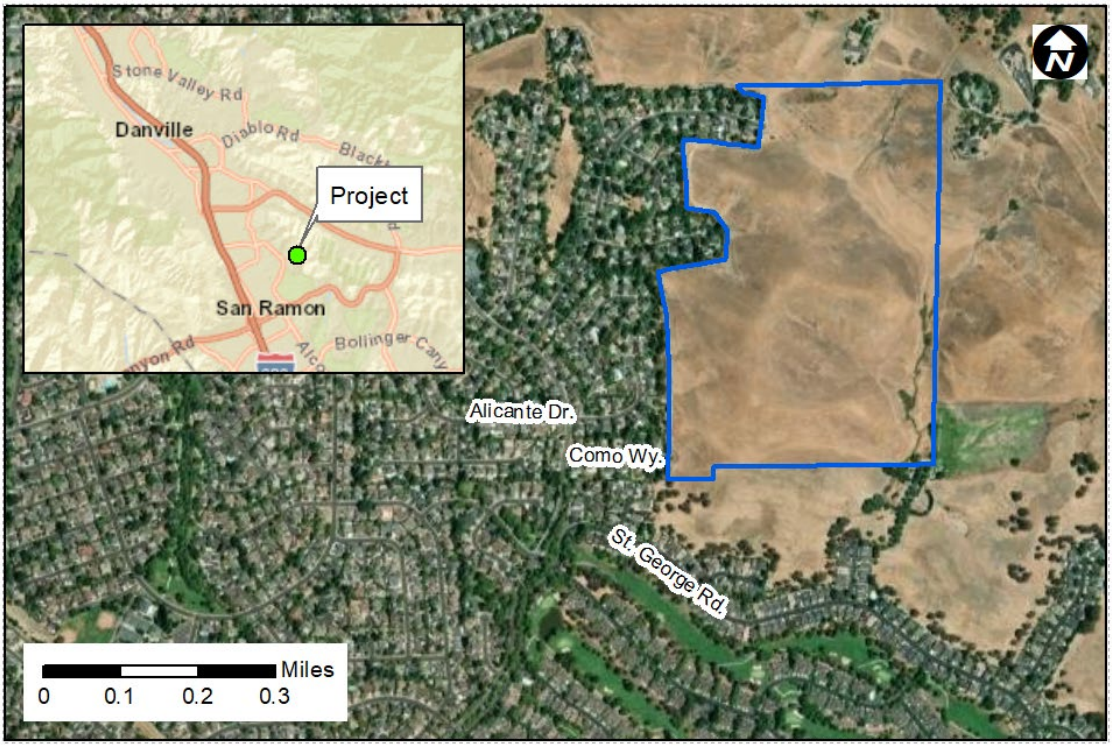


Figure 1. Project Vicinity Map

Model Input Parameters and Assumptions

The input parameters used in the storm drain modeling are summarized in the following tables and attached figures. The assumptions used are as follows:

Soil mapping information. Soil mapping compiled by the Natural Resources Conservation Service indicates that the entire site is underlain by Diablo clay soils, which are classified in Hydrologic Soil Group C (see **Appendix A**).

Drainage management areas (DMAs) and drainage patterns. A total of six separate DMAs were defined covering all areas on the Project property that are planned for development and/or drainage improvements. Drainage boundaries were defined using aerial topography provided by Carlson, Barbee & Gibson ("CBG") and are illustrated in **Appendix B.** Pre-project DMAs are illustrated below in **Figure 2** and post-project DMAs illustrated below in **Figure 3**. Land use parameters for each DMA are summarized in **Table 1 and 2** below. It is important to note that although all project development is limited to DMAs 1 and 2, additional drainage improvements in the form of new concrete V-ditches are proposed for DMAs 3 through 6 to collect runoff from open space, hillsides upslope of the Project and better direct it into the Alicante Drive trunk storm drain system. Brief descriptions of each DMA include:

- *DMA 1*. This DMA includes all areas that drain to the channel on the east side of site. It is further divided into two sub-areas for the pre-project case, wherein land use is open space grassland. In the post-project case, there are four sub-areas, with DMA 1A including all the proposed residential lots and the majority of street area. The remaining post-project DMAs represent open space areas that are to remain. DMAs 1A, 1B, and 1C will be routed to a new outfall in the eastern channel. The total DMA 1 area is 32.62 acres for pre-project conditions and 33.51 acres for the post-project case. The small increase in area is due to minor changes in drainage boundaries and is fully mitigated as discussed below.

- *DMA 2*. This area accounts for drainage to the existing eastern end of Como Way. For pre-project conditions the total area is 3.93 acres, all open space grassland, of which approximately 0.48 acres (unpiped DMA 2U) drain by sheetflow into existing downslope lots. In the proposed conditions the DMA is divided into three areas with DMA 2A including the entrance portion of the street. The total area decreases to 3.71 acres and a new V-ditch is included to intercept overland flow upslope of existing lots.

- *DMA 3*. This DMA is included to account for runoff that currently flows toward lots along Balceta Court. It is divided into two open space grassland sub-areas in the pre-project case totaling 7.95 acres, of which 2.70 acres do not currently have an intercepting V-ditch. The post-project condition will add a new V-ditch and storm drain connection to avoid overland flow into existing lots. The total drainage area will decrease slightly to 7.53 acres due to grading along the boundary with DMA 1B.

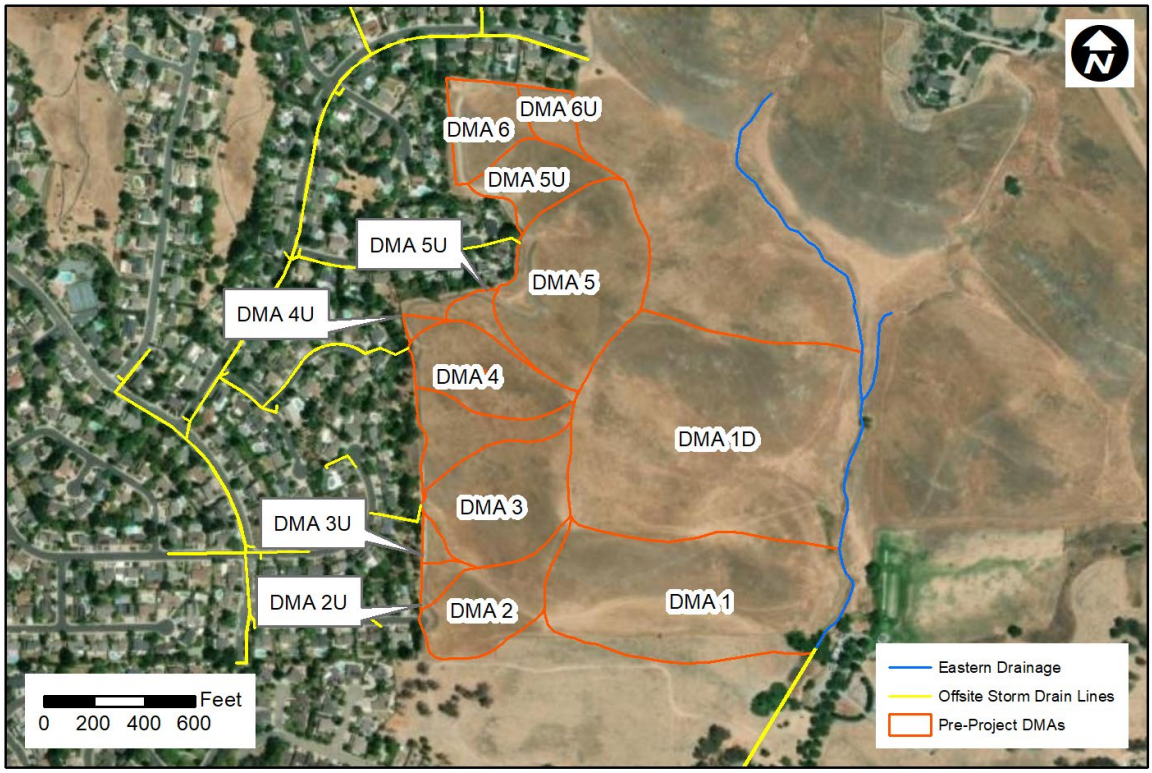


Figure 2. Pre-Project DMAs

Table 1. Pre-Project Drainage Management Area (DMA) properties

DMA	Area (acres)	Area (sq miles)	Impervious (acres)	Impervious (%)	Pervious (acres)	Infiltration (in/hr)
DMA 1A	12.18	0.0190	0	0	12.18	0.17
DMA 1D	20.44	0.0319	0	0	20.44	0.17
1 Sub-total	***32.61***					
DMA 2A	3.45	0.0054	0	0	3.45	0.17
DMA 2 Unpiped	0.48	0.0008	0	0	0.48	0.17
2 Sub-total	***3.93***					
DMA 3	5.25	0.0082	0	0	5.25	0.17
DMA 3 Unpiped	2.70	0.0042	0	0	2.70	0.17
3 Sub-total	***7.95***					
DMA 4	3.55	0.0055	0	0	3.55	0.17
DMA 4 Unpiped	0.20	0.0003	0	0	0.20	0.17
4 Sub-total	***3.75***					
DMA 5	7.80	0.0122	0	0	7.80	0.17
DMA 5 Unpiped	2.98	0.0047	0	0	2.98	0.17
5 Sub-total	***10.78***					
DMA 6	2.28	0.0036	0	0	2.28	0.17
DMA 6 Unpiped	1.03	0.0016	0	0	1.03	0.17
6 Sub-total	***3.31***					
Overall Total	***62.33***	***0.0974***	***0.00***		***62.33***	

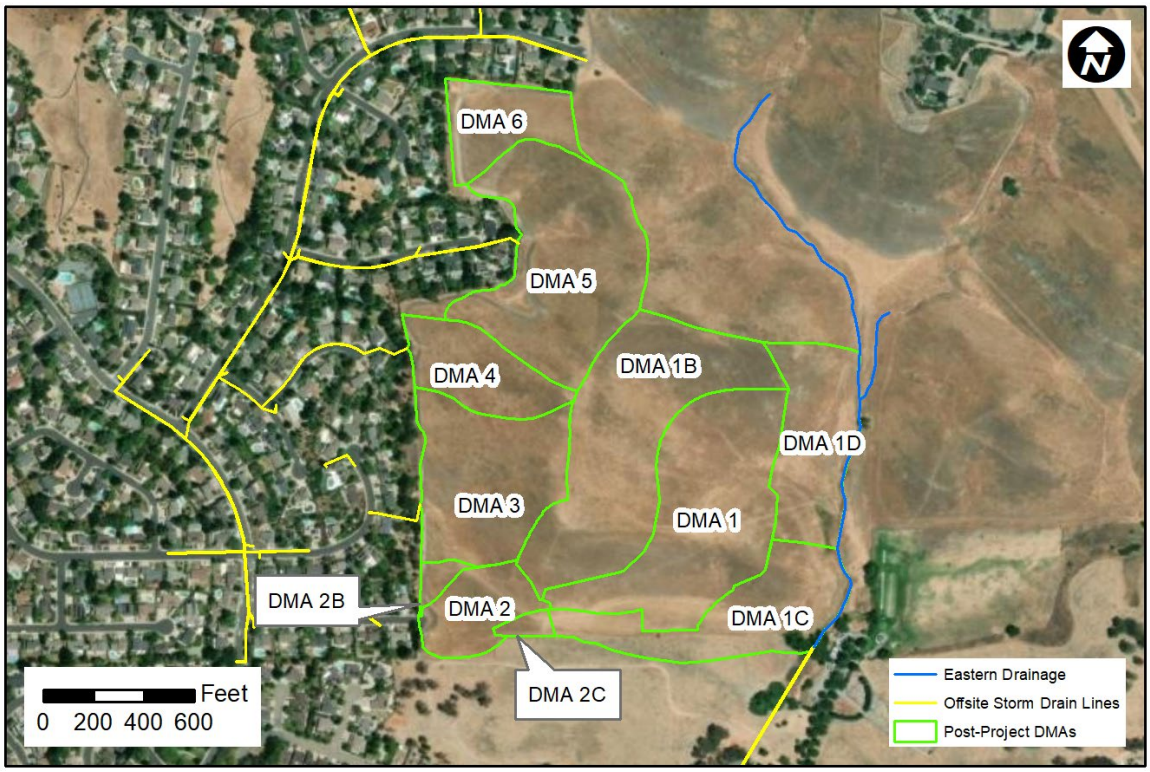


Figure 3. Post-Project DMAs

Table 2. Post-Project DMA properties

DMA	Area (acres)	Area (sq miles)	Impervious (acres)	Impervious (%)	Pervious (acres)	Infiltration (in/hr)
DMA 1A	10.56	0.0165	6.76	64	3.80	0.06
DMA 1B	11.45	0.0179	0.00	0	11.45	0.17
DMA 1C	6.13	0.0096	0.00	0	6.13	0.17
DMA 1D	5.37	0.0084	0.00	0	5.37	0.17
1 Sub-total	***33.51***					
DMA 2A	2.80	0.0044	0.44	16	2.36	0.14
DMA 2B	0.49	0.0008	0.00	0	0.49	0.17
DMA 2C	0.41	0.0006	0.00	0	0.41	0.17
2 Sub-total	***3.71***					
DMA 3	7.53	0.0118	0.00	0	7.53	0.17
DMA 4	3.75	0.0059	0.00	0	3.75	0.17
DMA 5	10.78	0.0168	0.00	0	10.78	0.17
DMA 6	3.31	0.0052	0.00	0	3.31	0.17
Overall Total	***62.57***	***0.0978***	***7.20***	0	***55.38***	

- *DMA 4*. This DMA includes grassland open space areas that currently flows toward lots along Castenada Court. A small segment of new V-ditch is planned to direct all upslope runoff to the existing storm drain inlet. Pre- and post-project drainage area is unchanged at 3.75 acres.

- *DMA 5*. This larger DMA represents the open space grassland that drains toward the lots at the end of Corte Dorado. Totaling 10.78 acres in the pre-project condition, approximately 2.98 acres appear to have no intercepting V-ditch. The post-project case anticipates the construction of new V-ditches to intercept all upslope areas with no change in the overall drainage area or land use.

- *DMA 6*. This DMA includes 3.31 acres of upslope areas that drain toward Borica Drive, approximately one-third of which do not have an intercepting V-ditch. The only change in the post-project conditions will be the addition of a new V-ditch segment so that all runoff can be intercepted and directed to the existing storm drain system.

Land use and design storm lag time. As summarized in **Tables 1 and 2, t**here is essentially no pre-project impervious cover. The limited extent and compact configuration of the proposed residential lots and access road result in 7.20 acres of impervious cover in the post-project case. Lag time values calculated using the Flood Control formula are generally quite short, consistent with the steep nature of the undeveloped DMAs in both the pre- and post-project configurations and are summarized in **Table 3** below.

Integrated management practices (IMPs). As mentioned above there are two primary IMP facilities to treat stormwater runoff prior to it leaving the site. These include bioretention basins for DMA 1 and DMA 2. Each IMP will be constructed to the standards described in the Stormwater C.3 Guidebook published by the Contra Costa Clean Water Program. The IMPs have been sized and designed to meet or exceed the requirements for both water-quality and flow-duration control (hydromodification management).

Design storm information. The mean annual precipitation (MAP) is 19.5 inches at the site per isohyetal mapping prepared by Flood Control. On this basis, the 10-year, 24-hour rainfall design rainfall total is 3.72 inches, and the corresponding value for the 100-year, 24-hour design storm is 5.55 inches.

Table 3. DMA Lag Time Summary

DMA	Flow Path (*miles*) (longest)	Flow Path (*miles*) (centroid)	Elevations (*feet*) (high)	Elevations (*feet*) (low)	Slope (ft/mile)	N Value (no units)	Lag Time (hrs)
Pre-project							
DMA 1	0.231	0.097	716	545	740	0.075	0.121
DMA 1D	0.252	0.131	761	558	806	0.075	0.138
DMA 2	0.136	0.055	715	560	1,137	0.075	0.074
DMA 2U							0.050
DMA 3	0.131	0.057	732	576	1,194	0.075	0.073
DMA 3U							0.070
DMA 4	0.133	0.059	742	574	1,267	0.075	0.073
DMA 4U							0.050
DMA 5	0.138	0.095	764	615	1,078	0.057	0.070
DMA 5U							0.070
DMA 6	0.131	0.036	690	618	551	0.050	0.047
DMA 6U							

DMA	Flow Path (*miles*) (longest)	Flow Path (*miles*) (centroid)	Elevations (*feet*) (high)	Elevations (*feet*) (low)	Slope (ft/mile)	N Value (no units)	Lag Time (hrs)
Post-project							
DMA 1	0.225	0.097	648	608	177	0.025	0.052
DMA 1B	0.290	0.161	761	611	518	0.075	0.171
DMA 1C	0.161	0.059	645	545	621	0.075	0.090
DMA 1D	0.170	0.081	706	558	868	0.075	0.098
DMA 2	0.136	0.063	655	557	719	0.045	0.051
DMA 2B							
DMA 2C							
DMA 3	0.159	0.095	738	576	1018	0.060	0.078
DMA 4	0.133	0.059	742	574	1267	0.075	0.073
DMA 5	0.138	0.095	764	615	1078	0.057	0.070
DMA 6	0.133	0.047	729	618	837	0.050	0.049

Bioretention Basin Design

The design of the bioretention basins will utilize vertical sides and was designed with 18 inches of media layer composed of amended soil with the required 5 inch/hour infiltration rate. Bioretention basin stage storage characteristics are provided below in **Table 4**.

Bioretention 1 will be underlain by a 1-foot-thick gravel layer. Outflow will be regulated by a 12-inch diameter underdrain, 6.5-inch diameter lower orifice, and a riser outlet structure with a 0.75-foot high by 1-footwide rectangular orifice set at 608.25 feet in elevation and a grate elevation of 610.25 feet.

Bioretention 2 will be underlain by 2.5 feet of gravel. Outflow will be regulated by a 6-inch diameter underdrain, 4-inch diameter lower orifice, and a riser outlet structure with a 0.75-foot high by 0.75-foot-wide rectangular orifice set at 558.17 feet in elevation and a grate elevation of 559.85 feet.

Table 4. Bioretention Basin Characteristics

Elevation	Area		Storage	Elevation	Area		Storage
(feet)	*(ft^2)*	*(acres)*	*(ac-ft)*	*(feet)*	*(ft^2)*	*(acres)*	*(ac-ft)*
Bioretention 1				***Bioretention 2***			
607.50	10560	0.24	0.00	556.50	1140	0.03	0.00
608.00	11580	0.27	0.13	557.00	1390	0.03	0.01
608.25	12100	0.28	0.20	557.50	1630	0.04	0.03
608.50	12620	0.29	0.27	558.00	1930	0.04	0.05
609.00	13680	0.31	0.42	558.50	2210	0.05	0.08
609.50	14750	0.34	0.58	559.00	2540	0.06	0.10
610.00	15830	0.36	0.76	559.50	2920	0.07	0.13
610.25	16400	0.38	0.85	559.75	3040	0.07	0.15
610.50	16940	0.39	0.94	559.85	3100	0.07	0.16
611.00	18270	0.42	1.15	560.00	3200	0.07	0.17
612.00	20760	0.48	1.59	560.50	3610	0.08	0.21
				561.00	3900	0.09	0.25

Flow-Duration Control Results

The BAHM model was run for both the pre- and post-project (mitigated) conditions. As required by the modifications to the Contra Costa Hydrograph Modification Management Plan, flow-duration compliance was set for the range from one-tenth of the 2-year flow (0.1 Q2) to the 10-year flow (Q10). The modeling results are summarized in the attached **Appendix C** in the form of the standard BAHM output report. For point of compliance (POC) 1, flow rates for the pre-project ranged from 16.04 cfs for the Q2 threshold to 28.24 cfs for the Q10 upper control level. For POC 2, flow rates for the pre-project ranged from 14.62 cfs for the Q2 threshold to 25.73 cfs for the Q10 upper control level.

Water Quality Control Results

CCHM explicitly models the treatment capacity for bioretention facilities. The level of treatment is based on the amount of filtration through the amended soil layer. The water quality percent filtered for the overall project site meets the performance requirements for the C3 guidelines. Bioretention 1 shows 88 percent treatment, and Bioretention 2 shows 80 percent treatment.

Peak Flow Control Results

A HEC-HMS model was performed for the 10-, and 100-year, 24-hour storm events. The results are summarized in **Table 5** and **Table 6** for pre-project and post-project modeled conditions (also attached in **Appendix D)**.

Table 5. HEC-HMS Peak Flow Results

	Pre-Project		Post-Project (Mitigated)	
	10-year	100-year	10-year	100-year
Peak Flow *(cfs)*				
DMA 1	39.8	65.2	32.5	62.3
DMA 2	5.4	8.6	3.8	8.0
Alicante Drive	41.3	65.2	38.9	63.5

Table 5 shows that predicted post-project peak flow rates will be reduced from the pre-project condition when looking at Project development in DMAs 1 and 2 as well as overall Project stormwater improvements at the downstream connection at Alicante Drive.

Table 6. Bioretention Basin 100-year, 24-hour Freeboard

	Max WSE *(feet)*	***Berm*** *(feet)*	***Freeboard*** *(feet)*
Bioretention 1	611.0	612.0	1.0
Bioretention 2	560.1	561.0	0.9

Table 6 shows that under post-project conditions, Bioretention Basins 1 and 2 both have approximately 1 foot of freeboard.

Closing

Thank you again for the opportunity to assist with these storm drainage analyses and modeling for the Elworth Property Project. Please do not hesitate to contact Balance staff if you have questions related to the modeling work, results, or conclusions presented herein.

Sincerely,
BALANCE HYDROLOGICS, Inc.

Edward D. Ballman, P.E. 64095
Principal Engineer

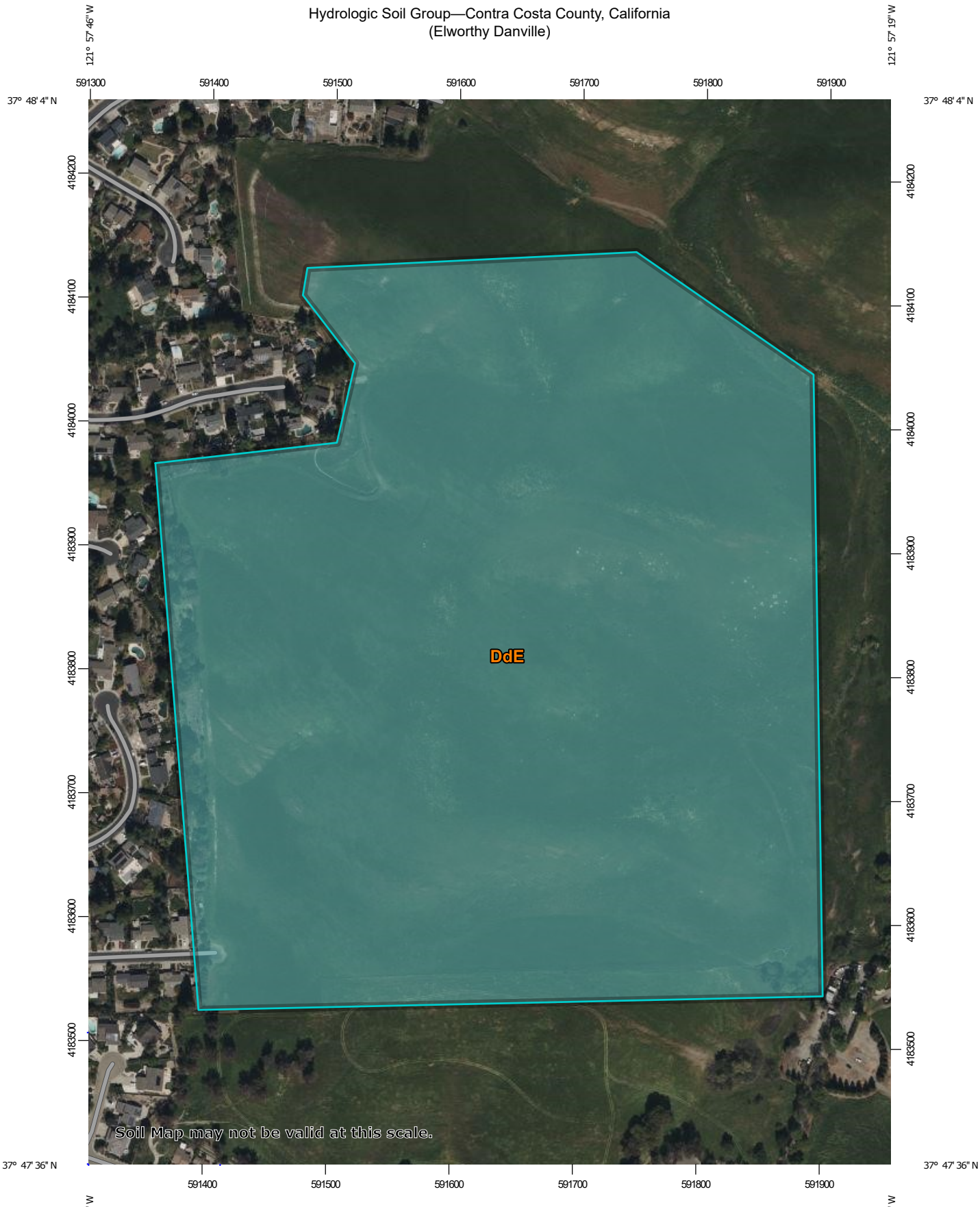
Denise Tu, EIT
Hydrologist

Enclosures: Appendix A. Web Soil Survey Report
Appendix B. Pre-Project and Post-Project DMA Exhibits (CBG)
Appendix C. BAHM Summary Report
Appendix D. HEC-HMS Results Summary

APPENDIX A

Web Soil Survey Report

Hydrologic Soil Group—Contra Costa County, California
(Elworthy Danville)



Map Scale: 1:4,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Contra Costa County, California
Survey Area Data: Version 20, Sep 12, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 9, 2022—Mar 11, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DdE	Diablo clay, 15 to 30 percent slopes, MLRA 15	C	70.9	100.0%
Totals for Area of Interest			**70.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

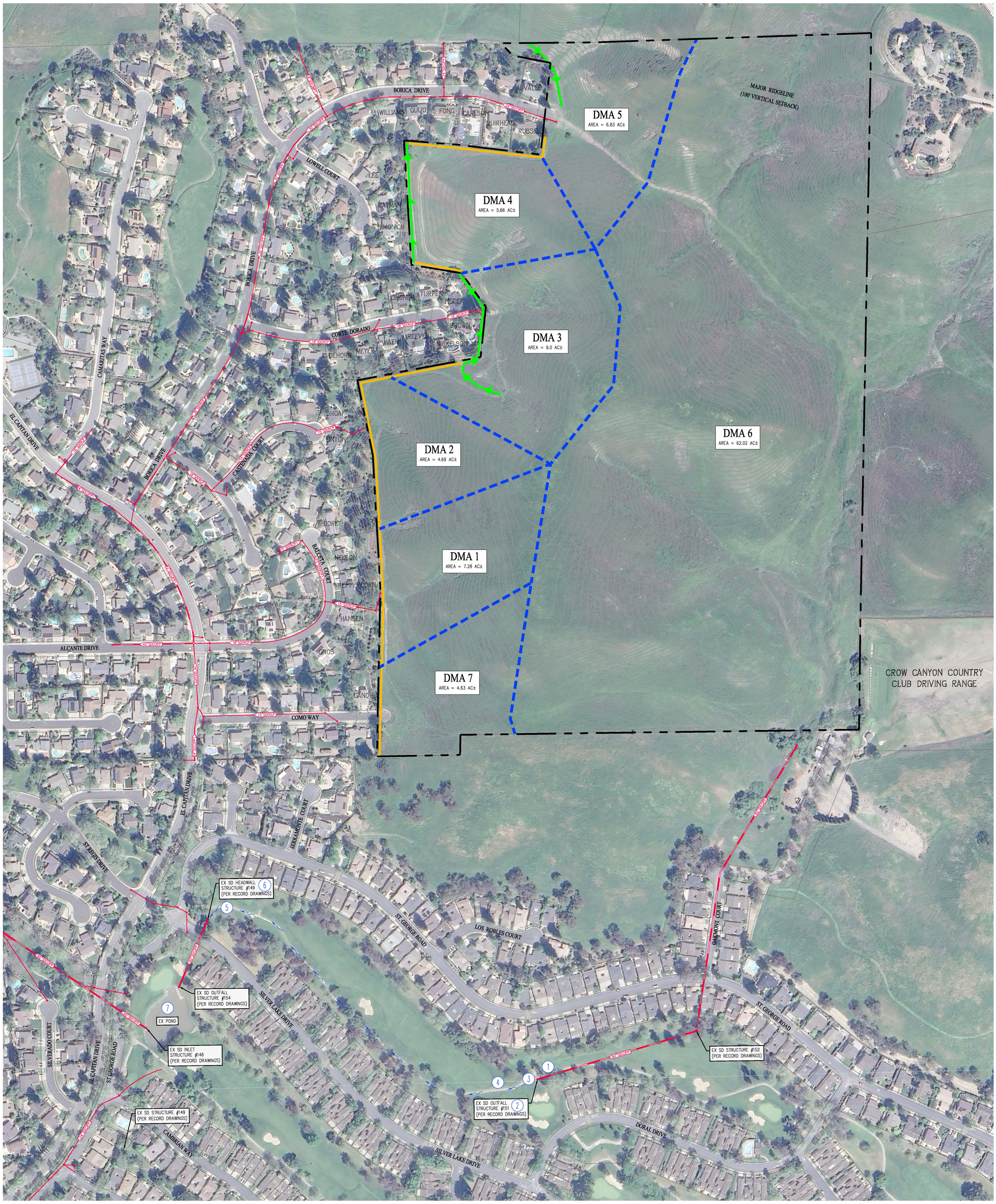
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B

Pre-Project and Post-Project DMA Exhibits (CBG)



LEGEND

- EXISTING PROPERTY LINE
- 5' CONTOUR LINE
- EXISTING DRAINAGE MANAGEMENT AREA (DMA)
- IMAGE NUMBER (SEE SHEET 2)
- EXISTING STORM DRAIN PIPE
- EXISTING STORM DRAIN MANHOLE
- EXISTING STORM DRAIN INLET
- EXISTING GOLF COURSE SWALE AND DIRECTION
- EXISTING CONCRETE DITCH
- NO VISIBLE CONCRETE DITCH

EXISTING DRAINAGE AREAS
ELWORTHY PROPERTY

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=120' DATE: FEBRUARY 8, 2024

0 120 240 360

cbg CIVIL ENGINEERS ▪ SURVEYORS ▪ PLANNERS
SAN RAMON ▪ (925) 866-0322
ROSEVILLE ▪ (916) 788-4456
WWW.CBANDG.COM

SHEET NO. 1 OF 2 SHEETS



LEGEND

- EXISTING PROPERTY LINE
- POST DRAINAGE MANAGEMENT AREA (DMA)
- EXISTING CONCRETE DITCH
- PROPOSED CONCRETE DITCH
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- EXISTING GOLF COURSE SWALE AND DIRECTION

POST CONSTRUCTION
BIORETENTION DRAINAGE AREAS
ELWORTHY PROPERTY

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1'=120' DATE: APRIL 25, 2024

0 120 240 360

cbg CIVIL ENGINEERS ▪ SURVEYORS ▪ PLANNERS
SAN RAMON ▪ (925) 866-0322
ROSEVILLE ▪ (916) 788-4456
WWW.CBANDG.COM

G:\2107-020\ACAD\EXHIBITS\XB-017 BIORETENTION POST DMA.DWG

APPENDIX C

BAHM Summary Report

BAHM2023

PROJECT REPORT

General Model Information

BAHM2023 Project Name: 224019 Elworthy Apr 2024

Site Name:	Elworthy
Site Address:	
City:	Danville
Report Date:	6/5/2024
Gage:	St Marys
Data Start:	1972/10/01
Data End:	2021/09/30
Timestep:	Hourly
Precip Scale:	1.125
Version Date:	2023/12/22

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year
Low Flow Threshold for POC2:	10 Percent of the 2 Year
High Flow Threshold for POC2:	10 Year

Landuse Basin Data

Pre-Project Land Use

DMA 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	12.176
Pervious Total	12.176
Impervious Land Use	acre
Impervious Total	0
Basin Total	12.176

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1

DMA 1D

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	20.438
Pervious Total	20.438
Impervious Land Use	acre
Impervious Total	0
Basin Total	20.438

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1

DMA 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	3.935
Pervious Total	3.935
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.935

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	7.948
Pervious Total	7.948
Impervious Land Use	acre
Impervious Total	0
Basin Total	7.948

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 4

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	3.749
Pervious Total	3.749
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.749

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 5

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	10.781
Pervious Total	10.781
Impervious Land Use	acre
Impervious Total	0
Basin Total	10.781

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 6

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	3.306
Pervious Total	3.306
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.306

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

Mitigated Land Use

DMA 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C D,Grass,Ste(10-20)	2.363
Pervious Total	2.363

Impervious Land Use	acre
Roads,Mod(5-10%)	0.35
Impervious Total	0.35
Basin Total	2.713

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

Surface	Bio 2	Surface	Bio 2

DMA 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C D,Grass,Mod(5-10%)	3.8
Pervious Total	3.8

Impervious Land Use	acre
Roads,Flat(0-5%)	3.14
Roof Area	3.14
Impervious Total	6.28
Basin Total	10.08

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
Surface Bio 1	Surface Bio 1	

DMA 1B

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	11.446
Pervious Total	11.446
Impervious Land Use	acre
Impervious Total	0
Basin Total	11.446

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1

DMA 1C

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Mod(5-10%)	6.132
Pervious Total	6.132
Impervious Land Use	acre
Impervious Total	0
Basin Total	6.132

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1

DMA 1D

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	5.372
Pervious Total	5.372
Impervious Land Use	acre
Impervious Total	0
Basin Total	5.372

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1

DMA 2B

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	0.904
Pervious Total	0.904
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.904

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 3

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	7.525
Pervious Total	7.525
Impervious Land Use	acre
Impervious Total	0
Basin Total	7.525

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 4

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	3.749
Pervious Total	3.749
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.749

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 5

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	10.781
Pervious Total	10.781
Impervious Land Use	acre
Impervious Total	0
Basin Total	10.781

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

DMA 6

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C D,Grass,Ste(10-20)	3.306
Pervious Total	3.306
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.306

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

Routing Elements
Pre-Project Routing

Mitigated Routing

Bio 1

Bottom Length:	105.60 ft.
Bottom Width:	100.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	BAHM 5
Material thickness of second layer:	1
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	1
Orifice Diameter (in.):	6.5
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	835.834
Total Outflow (ac-ft.):	953.701
Percent Through Underdrain:	87.64
Discharge Structure	
Riser Height:	2.75 ft.
Riser Diameter:	24 in.
Orifice 1 Diameter:	11.700 inElevation:0.75 ft.
Element Outlets:	
Outlet 1	Outlet 2
Outlet Flows To:	

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.2424	0.0000	0.0000	0.0000
0.0769	0.2424	0.0071	0.0000	0.0000
0.1538	0.2424	0.0142	0.0000	0.0000
0.2308	0.2424	0.0213	0.0000	0.0000
0.3077	0.2424	0.0283	0.0000	0.0000
0.3846	0.2424	0.0354	0.0000	0.0000
0.4615	0.2424	0.0425	0.0644	0.0000
0.5385	0.2424	0.0496	0.0879	0.0000
0.6154	0.2424	0.0567	0.1180	0.0000
0.6923	0.2424	0.0638	0.1551	0.0000
0.7692	0.2424	0.0709	0.1998	0.0000
0.8462	0.2424	0.0779	0.2100	0.0000
0.9231	0.2424	0.0850	0.3120	0.0000
1.0000	0.2424	0.0921	0.3477	0.0000
1.0769	0.2424	0.0992	0.3839	0.0000
1.1538	0.2424	0.1063	0.3871	0.0000
1.2308	0.2424	0.1134	0.4493	0.0000
1.3077	0.2424	0.1205	0.5037	0.0000
1.3846	0.2424	0.1276	0.5526	0.0000
1.4615	0.2424	0.1346	0.5974	0.0000
1.5385	0.2424	0.1424	0.6390	0.0000
1.6154	0.2424	0.1501	0.6780	0.0000
1.6923	0.2424	0.1579	0.7148	0.0000
1.7692	0.2424	0.1656	0.7498	0.0000
1.8462	0.2424	0.1733	0.7833	0.0000
1.9231	0.2424	0.1811	0.8153	0.0000
2.0000	0.2424	0.1888	0.8462	0.0000

2.0769	0.2424	0.1966	0.8759	0.0000
2.1538	0.2424	0.2043	0.9326	0.0000
2.2308	0.2424	0.2120	0.9861	0.0000
2.3077	0.2424	0.2198	1.0371	0.0000
2.3846	0.2424	0.2275	1.0860	0.0000
2.4615	0.2424	0.2352	1.1465	0.0000
2.5000	0.2424	0.2391	1.1575	0.0000

Bioretention Surface Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
2.5000	0.2424	0.2391	0.0000	1.2222	0.0000
2.5769	0.2457	0.2579	0.0000	1.2222	0.0000
2.6538	0.2490	0.2769	0.0000	1.3476	0.0000
2.7308	0.2523	0.2962	0.0000	1.4103	0.0000
2.8077	0.2556	0.3157	0.0000	1.4729	0.0000
2.8846	0.2590	0.3355	0.0000	1.5356	0.0000
2.9615	0.2624	0.3556	0.0000	1.5983	0.0000
3.0385	0.2658	0.3759	0.0000	1.6610	0.0000
3.1154	0.2692	0.3965	0.0000	1.7236	0.0000
3.1923	0.2726	0.4173	0.0000	1.7863	0.0000
3.2692	0.2761	0.4384	0.5151	1.8490	0.0000
3.3462	0.2796	0.4598	1.1519	1.9117	0.0000
3.4231	0.2831	0.4814	1.5454	1.9744	0.0000
3.5000	0.2866	0.5033	1.8574	2.0370	0.0000
3.5769	0.2902	0.5255	2.1240	2.0997	0.0000
3.6538	0.2937	0.5480	2.3607	2.1624	0.0000
3.7308	0.2973	0.5707	2.5757	2.2251	0.0000
3.8077	0.3009	0.5937	2.7741	2.2878	0.0000
3.8846	0.3046	0.6170	2.9593	2.3504	0.0000
3.9615	0.3082	0.6406	3.1335	2.4131	0.0000
4.0385	0.3119	0.6644	3.2985	2.4758	0.0000
4.1154	0.3156	0.6886	3.4557	2.5385	0.0000
4.1923	0.3194	0.7130	3.6060	2.6011	0.0000
4.2692	0.3231	0.7377	3.7503	2.6638	0.0000
4.3462	0.3269	0.7627	3.8893	2.7265	0.0000
4.4231	0.3307	0.7880	4.0234	2.7892	0.0000
4.5000	0.3345	0.8136	4.1532	2.8519	0.0000
4.5769	0.3383	0.8394	4.2791	2.9145	0.0000
4.6538	0.3422	0.8656	4.4014	2.9772	0.0000
4.7308	0.3460	0.8921	4.5204	3.0399	0.0000
4.8077	0.3499	0.9189	4.6363	3.1026	0.0000
4.8846	0.3539	0.9459	4.7494	3.1652	0.0000
4.9615	0.3578	0.9733	4.8599	3.2279	0.0000
5.0385	0.3618	1.0010	4.9679	3.2906	0.0000
5.1154	0.3658	1.0289	5.0736	3.3533	0.0000
5.1923	0.3698	1.0572	5.1771	3.4160	0.0000
5.2692	0.3738	1.0858	5.3353	3.4786	0.0000
5.3462	0.3778	1.1147	6.0103	3.5413	0.0000
5.4231	0.3819	1.1440	6.9978	3.6040	0.0000
5.5000	0.3860	1.1735	8.1952	3.6667	0.0000
5.5769	0.3901	1.2034	9.5372	3.7293	0.0000
5.6538	0.3943	1.2335	10.962	3.7920	0.0000
5.7308	0.3984	1.2640	12.405	3.8547	0.0000
5.8077	0.4026	1.2948	13.803	3.9174	0.0000
5.8846	0.4068	1.3259	15.095	3.9801	0.0000
5.9615	0.4110	1.3574	16.231	4.0427	0.0000
6.0385	0.4153	1.3892	17.178	4.1054	0.0000
6.1154	0.4195	1.4213	17.932	4.1681	0.0000

6.1923	0.4238	1.4537	18.521	4.2308	0.0000
6.2692	0.4281	1.4865	19.174	4.2778	0.0000
6.3462	0.4325	1.5196	19.727	4.2778	0.0000
6.4231	0.4368	1.5530	20.262	4.2778	0.0000
6.5000	0.4412	1.5868	20.782	4.2778	0.0000
6.5769	0.4456	1.6209	21.288	4.2778	0.0000
6.6538	0.4500	1.6554	21.781	4.2778	0.0000
6.7308	0.4545	1.6901	22.261	4.2778	0.0000
6.8077	0.4589	1.7253	22.731	4.2778	0.0000
6.8846	0.4634	1.7608	23.190	4.2778	0.0000
6.9615	0.4679	1.7966	23.639	4.2778	0.0000
7.0000	0.4702	1.8146	24.079	4.2778	0.0000

Discharge Structure
Riser Height: 2.75 ft.
Riser Diameter: 24 in.
Orifice 1 Diameter: 11.700 inElevation:0.75 ft.
Element Flow Outlets:
Outlet 1 Outlet 2
Outlets Flow To:

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.2424	0.0000	0.0000	0.0000
0.0769	0.2424	0.0071	0.0000	0.0000
0.1538	0.2424	0.0142	0.0000	0.0000
0.2308	0.2424	0.0213	0.0000	0.0000
0.3077	0.2424	0.0283	0.0000	0.0000
0.3846	0.2424	0.0354	0.0000	0.0000
0.4615	0.2424	0.0425	0.0644	0.0000
0.5385	0.2424	0.0496	0.0879	0.0000
0.6154	0.2424	0.0567	0.1180	0.0000
0.6923	0.2424	0.0638	0.1551	0.0000
0.7692	0.2424	0.0709	0.1998	0.0000
0.8462	0.2424	0.0779	0.2100	0.0000
0.9231	0.2424	0.0850	0.3120	0.0000
1.0000	0.2424	0.0921	0.3477	0.0000
1.0769	0.2424	0.0992	0.3839	0.0000
1.1538	0.2424	0.1063	0.3871	0.0000
1.2308	0.2424	0.1134	0.4493	0.0000
1.3077	0.2424	0.1205	0.5037	0.0000
1.3846	0.2424	0.1276	0.5526	0.0000
1.4615	0.2424	0.1346	0.5974	0.0000
1.5385	0.2424	0.1424	0.6390	0.0000
1.6154	0.2424	0.1501	0.6780	0.0000
1.6923	0.2424	0.1579	0.7148	0.0000
1.7692	0.2424	0.1656	0.7498	0.0000
1.8462	0.2424	0.1733	0.7833	0.0000
1.9231	0.2424	0.1811	0.8153	0.0000
2.0000	0.2424	0.1888	0.8462	0.0000
2.0769	0.2424	0.1966	0.8759	0.0000
2.1538	0.2424	0.2043	0.9326	0.0000
2.2308	0.2424	0.2120	0.9861	0.0000
2.3077	0.2424	0.2198	1.0371	0.0000
2.3846	0.2424	0.2275	1.0860	0.0000
2.4615	0.2424	0.2352	1.1465	0.0000

2.5000	0.2424	0.2391	1.1575	0.0000

Bioretention Surface Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
2.5000	0.2424	0.2391	0.0000	1.2222	0.0000
2.5769	0.2457	0.2579	0.0000	1.2222	0.0000
2.6538	0.2490	0.2769	0.0000	1.3476	0.0000
2.7308	0.2523	0.2962	0.0000	1.4103	0.0000
2.8077	0.2556	0.3157	0.0000	1.4729	0.0000
2.8846	0.2590	0.3355	0.0000	1.5356	0.0000
2.9615	0.2624	0.3556	0.0000	1.5983	0.0000
3.0385	0.2658	0.3759	0.0000	1.6610	0.0000
3.1154	0.2692	0.3965	0.0000	1.7236	0.0000
3.1923	0.2726	0.4173	0.0000	1.7863	0.0000
3.2692	0.2761	0.4384	0.5151	1.8490	0.0000
3.3462	0.2796	0.4598	1.1519	1.9117	0.0000
3.4231	0.2831	0.4814	1.5454	1.9744	0.0000
3.5000	0.2866	0.5033	1.8574	2.0370	0.0000
3.5769	0.2902	0.5255	2.1240	2.0997	0.0000
3.6538	0.2937	0.5480	2.3607	2.1624	0.0000
3.7308	0.2973	0.5707	2.5757	2.2251	0.0000
3.8077	0.3009	0.5937	2.7741	2.2878	0.0000
3.8846	0.3046	0.6170	2.9593	2.3504	0.0000
3.9615	0.3082	0.6406	3.1335	2.4131	0.0000
4.0385	0.3119	0.6644	3.2985	2.4758	0.0000
4.1154	0.3156	0.6886	3.4557	2.5385	0.0000
4.1923	0.3194	0.7130	3.6060	2.6011	0.0000
4.2692	0.3231	0.7377	3.7503	2.6638	0.0000
4.3462	0.3269	0.7627	3.8893	2.7265	0.0000
4.4231	0.3307	0.7880	4.0234	2.7892	0.0000
4.5000	0.3345	0.8136	4.1532	2.8519	0.0000
4.5769	0.3383	0.8394	4.2791	2.9145	0.0000
4.6538	0.3422	0.8656	4.4014	2.9772	0.0000
4.7308	0.3460	0.8921	4.5204	3.0399	0.0000
4.8077	0.3499	0.9189	4.6363	3.1026	0.0000
4.8846	0.3539	0.9459	4.7494	3.1652	0.0000
4.9615	0.3578	0.9733	4.8599	3.2279	0.0000
5.0385	0.3618	1.0010	4.9679	3.2906	0.0000
5.1154	0.3658	1.0289	5.0736	3.3533	0.0000
5.1923	0.3698	1.0572	5.1771	3.4160	0.0000
5.2692	0.3738	1.0858	5.3353	3.4786	0.0000
5.3462	0.3778	1.1147	6.0103	3.5413	0.0000
5.4231	0.3819	1.1440	6.9978	3.6040	0.0000
5.5000	0.3860	1.1735	8.1952	3.6667	0.0000
5.5769	0.3901	1.2034	9.5372	3.7293	0.0000
5.6538	0.3943	1.2335	10.962	3.7920	0.0000
5.7308	0.3984	1.2640	12.405	3.8547	0.0000
5.8077	0.4026	1.2948	13.803	3.9174	0.0000
5.8846	0.4068	1.3259	15.095	3.9801	0.0000
5.9615	0.4110	1.3574	16.231	4.0427	0.0000
6.0385	0.4153	1.3892	17.178	4.1054	0.0000
6.1154	0.4195	1.4213	17.932	4.1681	0.0000
6.1923	0.4238	1.4537	18.521	4.2308	0.0000
6.2692	0.4281	1.4865	19.174	4.2778	0.0000
6.3462	0.4325	1.5196	19.727	4.2778	0.0000
6.4231	0.4368	1.5530	20.262	4.2778	0.0000
6.5000	0.4412	1.5868	20.782	4.2778	0.0000
6.5769	0.4456	1.6209	21.288	4.2778	0.0000

6.6538	0.4500	1.6554	21.781	4.2778	0.0000
6.7308	0.4545	1.6901	22.261	4.2778	0.0000
6.8077	0.4589	1.7253	22.731	4.2778	0.0000
6.8846	0.4634	1.7608	23.190	4.2778	0.0000
6.9615	0.4679	1.7966	23.639	4.2778	0.0000
7.0000	0.4702	1.8146	24.079	4.2778	0.0000

Bio 2

Bottom Length:	114.00 ft.
Bottom Width:	10.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	BAHM 5
Material thickness of second layer:	2.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	4
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	152.467
Total Outflow (ac-ft.):	189.867
Percent Through Underdrain:	80.3
Discharge Structure	
Riser Height:	3.35 ft.
Riser Diameter:	24 in.
Orifice 1 Diameter:	10.200 inElevation:1.67 ft.
Element Outlets:	
Outlet 1	Outlet 2
Outlet Flows To:	

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0262	0.0000	0.0000	0.0000
0.0934	0.0262	0.0009	0.0000	0.0000
0.1868	0.0262	0.0019	0.0000	0.0000
0.2802	0.0262	0.0028	0.0000	0.0000
0.3736	0.0262	0.0037	0.0000	0.0000
0.4670	0.0262	0.0046	0.0053	0.0000
0.5604	0.0262	0.0056	0.0066	0.0000
0.6538	0.0262	0.0065	0.0097	0.0000
0.7473	0.0262	0.0074	0.0138	0.0000
0.8407	0.0262	0.0084	0.0191	0.0000
0.9341	0.0262	0.0093	0.0246	0.0000
1.0275	0.0262	0.0102	0.0255	0.0000
1.1209	0.0262	0.0111	0.0334	0.0000
1.2143	0.0262	0.0121	0.0426	0.0000
1.3077	0.0262	0.0130	0.0533	0.0000
1.4011	0.0262	0.0139	0.0632	0.0000
1.4945	0.0262	0.0149	0.0656	0.0000
1.5879	0.0262	0.0159	0.0795	0.0000
1.6813	0.0262	0.0169	0.0950	0.0000
1.7747	0.0262	0.0179	0.1122	0.0000
1.8681	0.0262	0.0189	0.1251	0.0000
1.9615	0.0262	0.0199	0.1309	0.0000
2.0549	0.0262	0.0209	0.2841	0.0000
2.1484	0.0262	0.0220	0.3523	0.0000
2.2418	0.0262	0.0230	0.3766	0.0000
2.3352	0.0262	0.0240	0.3995	0.0000
2.4286	0.0262	0.0250	0.4210	0.0000
2.5220	0.0262	0.0260	0.4266	0.0000
2.6154	0.0262	0.0270	0.4266	0.0000

2.7088	0.0262	0.0281	0.4266	0.0000
2.8022	0.0262	0.0291	0.4266	0.0000
2.8956	0.0262	0.0301	0.4266	0.0000
2.9890	0.0262	0.0311	0.4266	0.0000
3.0824	0.0262	0.0321	0.4266	0.0000
3.1758	0.0262	0.0331	0.4266	0.0000
3.2692	0.0262	0.0341	0.4266	0.0000
3.3626	0.0262	0.0352	0.4266	0.0000
3.4560	0.0262	0.0362	0.4266	0.0000
3.5495	0.0262	0.0372	0.4266	0.0000
3.6429	0.0262	0.0382	0.4266	0.0000
3.7363	0.0262	0.0392	0.4266	0.0000
3.8297	0.0262	0.0402	0.4266	0.0000
3.9231	0.0262	0.0412	0.4266	0.0000
4.0000	0.0262	0.0421	0.4266	0.0000

Bioretention Surface Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
4.0000	0.0262	0.0421	0.0000	0.1319	0.0000
4.0934	0.0273	0.0446	0.0000	0.1319	0.0000
4.1868	0.0284	0.0472	0.0000	0.1484	0.0000
4.2802	0.0295	0.0499	0.0000	0.1566	0.0000
4.3736	0.0307	0.0527	0.0000	0.1648	0.0000
4.4670	0.0318	0.0556	0.0000	0.1730	0.0000
4.5604	0.0330	0.0586	0.0000	0.1812	0.0000
4.6538	0.0341	0.0618	0.0000	0.1895	0.0000
4.7473	0.0353	0.0650	0.0000	0.1977	0.0000
4.8407	0.0365	0.0684	0.0000	0.2059	0.0000
4.9341	0.0376	0.0718	0.0000	0.2141	0.0000
5.0275	0.0388	0.0754	0.0000	0.2223	0.0000
5.1209	0.0400	0.0791	0.0000	0.2305	0.0000
5.2143	0.0412	0.0829	0.0000	0.2388	0.0000
5.3077	0.0424	0.0868	0.0000	0.2470	0.0000
5.4011	0.0436	0.0908	0.0000	0.2552	0.0000
5.4945	0.0448	0.0949	0.0000	0.2634	0.0000
5.5879	0.0461	0.0992	0.0000	0.2716	0.0000
5.6813	0.0473	0.1035	0.3004	0.2798	0.0000
5.7747	0.0485	0.1080	0.9137	0.2881	0.0000
5.8681	0.0498	0.1126	1.2567	0.2963	0.0000
5.9615	0.0510	0.1173	1.5244	0.3045	0.0000
6.0549	0.0523	0.1221	1.7517	0.3127	0.0000
6.1484	0.0535	0.1271	1.9527	0.3209	0.0000
6.2418	0.0548	0.1321	2.1348	0.3291	0.0000
6.3352	0.0561	0.1373	2.3026	0.3374	0.0000
6.4286	0.0574	0.1426	2.4590	0.3456	0.0000
6.5220	0.0587	0.1480	2.6060	0.3538	0.0000
6.6154	0.0600	0.1536	2.7451	0.3620	0.0000
6.7088	0.0613	0.1592	2.8776	0.3702	0.0000
6.8022	0.0626	0.1650	3.0041	0.3784	0.0000
6.8956	0.0639	0.1709	3.1256	0.3867	0.0000
6.9890	0.0652	0.1769	3.2425	0.3949	0.0000
7.0824	0.0665	0.1831	3.3554	0.4031	0.0000
7.1758	0.0679	0.1894	3.4645	0.4113	0.0000
7.2692	0.0692	0.1958	3.5704	0.4195	0.0000
7.3626	0.0706	0.2023	3.7033	0.4277	0.0000
7.4560	0.0719	0.2090	4.5050	0.4359	0.0000
7.5495	0.0733	0.2157	5.7496	0.4442	0.0000
7.6429	0.0747	0.2227	7.2696	0.4524	0.0000

7.7363	0.0761	0.2297	8.9521	0.4606	0.0000
7.8297	0.0774	0.2369	10.684	0.4688	0.0000
7.9231	0.0788	0.2442	12.350	0.4770	0.0000
8.0165	0.0802	0.2516	13.845	0.4852	0.0000
8.1099	0.0816	0.2591	15.088	0.4935	0.0000
8.2033	0.0830	0.2668	16.044	0.5017	0.0000
8.2967	0.0845	0.2747	16.750	0.5099	0.0000
8.3901	0.0859	0.2826	17.505	0.5181	0.0000
8.4835	0.0873	0.2907	18.149	0.5263	0.0000
8.5000	0.0876	0.2921	18.769	0.5278	0.0000

Discharge Structure
Riser Height: 3.35 ft.
Riser Diameter: 24 in.
Orifice 1 Diameter: 10.200 in Elevation:1.67 ft.
Element Flow Outlets:
Outlet 1 Outlet 2
Outlets Flow To:

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0262	0.0000	0.0000	0.0000
0.0934	0.0262	0.0009	0.0000	0.0000
0.1868	0.0262	0.0019	0.0000	0.0000
0.2802	0.0262	0.0028	0.0000	0.0000
0.3736	0.0262	0.0037	0.0000	0.0000
0.4670	0.0262	0.0046	0.0053	0.0000
0.5604	0.0262	0.0056	0.0066	0.0000
0.6538	0.0262	0.0065	0.0097	0.0000
0.7473	0.0262	0.0074	0.0138	0.0000
0.8407	0.0262	0.0084	0.0191	0.0000
0.9341	0.0262	0.0093	0.0246	0.0000
1.0275	0.0262	0.0102	0.0255	0.0000
1.1209	0.0262	0.0111	0.0334	0.0000
1.2143	0.0262	0.0121	0.0426	0.0000
1.3077	0.0262	0.0130	0.0533	0.0000
1.4011	0.0262	0.0139	0.0632	0.0000
1.4945	0.0262	0.0149	0.0656	0.0000
1.5879	0.0262	0.0159	0.0795	0.0000
1.6813	0.0262	0.0169	0.0950	0.0000
1.7747	0.0262	0.0179	0.1122	0.0000
1.8681	0.0262	0.0189	0.1251	0.0000
1.9615	0.0262	0.0199	0.1309	0.0000
2.0549	0.0262	0.0209	0.2841	0.0000
2.1484	0.0262	0.0220	0.3523	0.0000
2.2418	0.0262	0.0230	0.3766	0.0000
2.3352	0.0262	0.0240	0.3995	0.0000
2.4286	0.0262	0.0250	0.4210	0.0000
2.5220	0.0262	0.0260	0.4266	0.0000
2.6154	0.0262	0.0270	0.4266	0.0000
2.7088	0.0262	0.0281	0.4266	0.0000
2.8022	0.0262	0.0291	0.4266	0.0000
2.8956	0.0262	0.0301	0.4266	0.0000
2.9890	0.0262	0.0311	0.4266	0.0000
3.0824	0.0262	0.0321	0.4266	0.0000
3.1758	0.0262	0.0331	0.4266	0.0000

3.2692	0.0262	0.0341	0.4266	0.0000
3.3626	0.0262	0.0352	0.4266	0.0000
3.4560	0.0262	0.0362	0.4266	0.0000
3.5495	0.0262	0.0372	0.4266	0.0000
3.6429	0.0262	0.0382	0.4266	0.0000
3.7363	0.0262	0.0392	0.4266	0.0000
3.8297	0.0262	0.0402	0.4266	0.0000
3.9231	0.0262	0.0412	0.4266	0.0000
4.0000	0.0262	0.0421	0.4266	0.0000

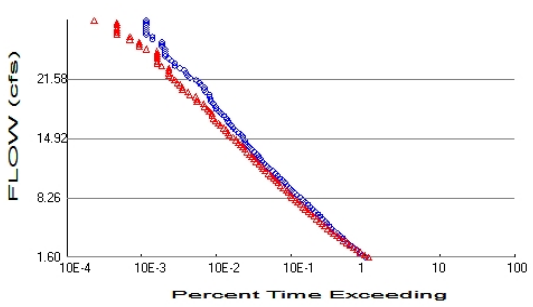
Bioretention Surface Hydraulic Table

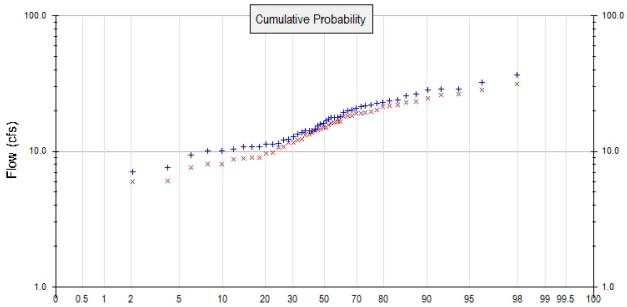
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
4.0000	0.0262	0.0421	0.0000	0.1319	0.0000
4.0934	0.0273	0.0446	0.0000	0.1319	0.0000
4.1868	0.0284	0.0472	0.0000	0.1484	0.0000
4.2802	0.0295	0.0499	0.0000	0.1566	0.0000
4.3736	0.0307	0.0527	0.0000	0.1648	0.0000
4.4670	0.0318	0.0556	0.0000	0.1730	0.0000
4.5604	0.0330	0.0586	0.0000	0.1812	0.0000
4.6538	0.0341	0.0618	0.0000	0.1895	0.0000
4.7473	0.0353	0.0650	0.0000	0.1977	0.0000
4.8407	0.0365	0.0684	0.0000	0.2059	0.0000
4.9341	0.0376	0.0718	0.0000	0.2141	0.0000
5.0275	0.0388	0.0754	0.0000	0.2223	0.0000
5.1209	0.0400	0.0791	0.0000	0.2305	0.0000
5.2143	0.0412	0.0829	0.0000	0.2388	0.0000
5.3077	0.0424	0.0868	0.0000	0.2470	0.0000
5.4011	0.0436	0.0908	0.0000	0.2552	0.0000
5.4945	0.0448	0.0949	0.0000	0.2634	0.0000
5.5879	0.0461	0.0992	0.0000	0.2716	0.0000
5.6813	0.0473	0.1035	0.3004	0.2798	0.0000
5.7747	0.0485	0.1080	0.9137	0.2881	0.0000
5.8681	0.0498	0.1126	1.2567	0.2963	0.0000
5.9615	0.0510	0.1173	1.5244	0.3045	0.0000
6.0549	0.0523	0.1221	1.7517	0.3127	0.0000
6.1484	0.0535	0.1271	1.9527	0.3209	0.0000
6.2418	0.0548	0.1321	2.1348	0.3291	0.0000
6.3352	0.0561	0.1373	2.3026	0.3374	0.0000
6.4286	0.0574	0.1426	2.4590	0.3456	0.0000
6.5220	0.0587	0.1480	2.6060	0.3538	0.0000
6.6154	0.0600	0.1536	2.7451	0.3620	0.0000
6.7088	0.0613	0.1592	2.8776	0.3702	0.0000
6.8022	0.0626	0.1650	3.0041	0.3784	0.0000
6.8956	0.0639	0.1709	3.1256	0.3867	0.0000
6.9890	0.0652	0.1769	3.2425	0.3949	0.0000
7.0824	0.0665	0.1831	3.3554	0.4031	0.0000
7.1758	0.0679	0.1894	3.4645	0.4113	0.0000
7.2692	0.0692	0.1958	3.5704	0.4195	0.0000
7.3626	0.0706	0.2023	3.7033	0.4277	0.0000
7.4560	0.0719	0.2090	4.5050	0.4359	0.0000
7.5495	0.0733	0.2157	5.7496	0.4442	0.0000
7.6429	0.0747	0.2227	7.2696	0.4524	0.0000
7.7363	0.0761	0.2297	8.9521	0.4606	0.0000
7.8297	0.0774	0.2369	10.684	0.4688	0.0000
7.9231	0.0788	0.2442	12.350	0.4770	0.0000
8.0165	0.0802	0.2516	13.845	0.4852	0.0000
8.1099	0.0816	0.2591	15.088	0.4935	0.0000
8.2033	0.0830	0.2668	16.044	0.5017	0.0000

8.2967	0.0845	0.2747	16.750	0.5099	0.0000
8.3901	0.0859	0.2826	17.505	0.5181	0.0000
8.4835	0.0873	0.2907	18.149	0.5263	0.0000
8.5000	0.0876	0.2921	18.769	0.5278	0.0000

Analysis Results

POC 1





\+ Pre-Project x Mitigated

Pre-Project Landuse Totals for POC #1
Total Pervious Area: 32.614
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 26.75
Total Impervious Area: 6.28

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Pre-Project. POC #1

Return Period	**Flow(cfs)**
2 year	16.0412
5 year	23.0368
10 year	28.2415
25 year	32.0964

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	15.0621
5 year	21.3786
10 year	24.7808
25 year	28.2148

Annual Peaks

Annual Peaks for Pre-Project and Mitigated. POC #1

Year	**Pre-Project**	**Mitigated**
1973	25.813	23.334
1974	14.187	13.327
1975	21.564	19.687
1976	10.767	10.714
1977	9.418	8.080
1978	19.421	18.305
1979	12.192	11.635
1980	15.912	15.083
1981	14.258	11.666
1982	16.041	15.629
1983	28.672	26.372
1984	16.902	15.062
1985	26.495	22.884
1986	17.746	16.456

1987	14.173	13.812
1988	15.371	14.076
1989	10.385	8.071
1990	13.334	12.348
1991	7.084	5.994
1992	17.334	16.228
1993	22.663	18.987
1994	3.512	3.002
1995	20.731	18.304
1996	10.867	9.632
1997	36.513	31.311
1998	21.836	19.461
1999	11.291	8.909
2000	12.847	12.178
2001	10.103	7.631
2002	14.495	14.330
2003	32.096	28.215
2004	21.425	20.172
2005	17.779	16.076
2006	28.632	25.955
2007	11.428	9.043
2008	19.957	18.988
2009	10.892	8.800
2010	23.037	21.614
2011	13.806	13.197
2012	18.033	16.506
2013	23.588	21.895
2014	11.254	10.796
2015	17.679	14.655
2016	23.794	21.379
2017	28.242	24.781
2018	10.102	8.964
2019	20.088	18.145
2020	12.336	9.796
2021	7.620	6.038

Ranked Annual Peaks

Ranked Annual Peaks for Pre-Project and Mitigated. POC #1

Rank	Pre-Project	Mitigated
1	36.5134	31.3113
2	32.0964	28.2148
3	28.6723	26.3723
4	28.6324	25.9545
5	28.2415	24.7808
6	26.4950	23.3343
7	25.8125	22.8837
8	23.7935	21.8952
9	23.5879	21.6142
10	23.0368	21.3786
11	22.6629	20.1722
12	21.8362	19.6867
13	21.5640	19.4614
14	21.4251	18.9881
15	20.7309	18.9873
16	20.0875	18.3049
17	19.9567	18.3037
18	19.4211	18.1452
19	18.0334	16.5057

20	17.7794	16.4563
21	17.7455	16.2283
22	17.6792	16.0763
23	17.3342	15.6292
24	16.9021	15.0828
25	16.0412	15.0621
26	15.9115	14.6545
27	15.3705	14.3295
28	14.4952	14.0756
29	14.2583	13.8120
30	14.1869	13.3272
31	14.1732	13.1970
32	13.8063	12.3479
33	13.3343	12.1784
34	12.8466	11.6655
35	12.3360	11.6354
36	12.1923	10.7958
37	11.4282	10.7144
38	11.2908	9.7962
39	11.2538	9.6315
40	10.8919	9.0429
41	10.8670	8.9635
42	10.7668	8.9092
43	10.3852	8.8000
44	10.1027	8.0800
45	10.1018	8.0710
46	9.4181	7.6311
47	7.6204	6.0376
48	7.0837	5.9944
49	3.5117	3.0019

Duration Flows

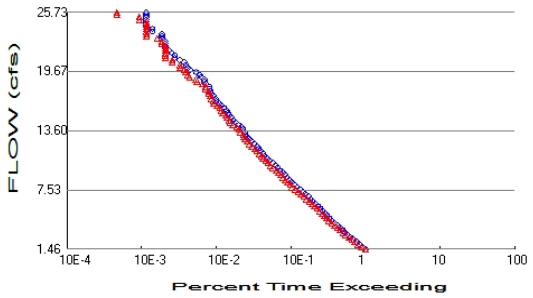
The Facility PASSED

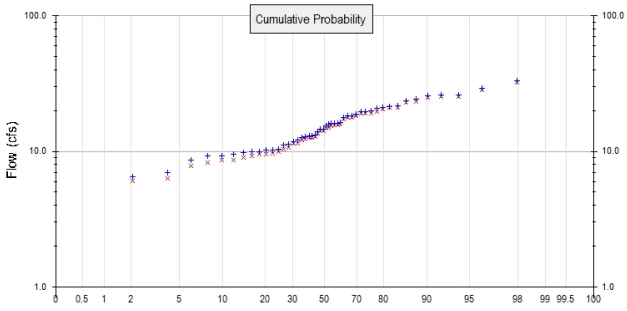
Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.6041	4312	4738	109	Pass
1.8732	3932	4176	106	Pass
2.1422	3567	3715	104	Pass
2.4113	3244	3309	102	Pass
2.6804	2970	2959	99	Pass
2.9494	2721	2661	97	Pass
3.2185	2498	2412	96	Pass
3.4876	2308	2183	94	Pass
3.7566	2130	1951	91	Pass
4.0257	1956	1771	90	Pass
4.2948	1809	1602	88	Pass
4.5638	1658	1472	88	Pass
4.8329	1517	1341	88	Pass
5.1020	1413	1224	86	Pass
5.3710	1317	1136	86	Pass
5.6401	1232	1044	84	Pass
5.9092	1143	956	83	Pass
6.1782	1070	876	81	Pass
6.4473	1000	798	79	Pass
6.7163	921	741	80	Pass
6.9854	853	683	80	Pass
7.2545	795	632	79	Pass
7.5235	733	582	79	Pass
7.7926	674	529	78	Pass
8.0617	621	491	79	Pass
8.3307	571	450	78	Pass
8.5998	526	427	81	Pass
8.8689	477	398	83	Pass
9.1379	445	377	84	Pass
9.4070	409	340	83	Pass
9.6761	382	312	81	Pass
9.9451	361	289	80	Pass
10.2142	335	270	80	Pass
10.4832	308	253	82	Pass
10.7523	288	233	80	Pass
11.0214	267	219	82	Pass
11.2904	247	194	78	Pass
11.5595	224	184	82	Pass
11.8286	209	174	83	Pass
12.0976	195	162	83	Pass
12.3667	182	149	81	Pass
12.6358	170	139	81	Pass
12.9048	159	129	81	Pass
13.1739	150	121	80	Pass
13.4430	139	110	79	Pass
13.7120	128	104	81	Pass
13.9811	118	98	83	Pass
14.2501	111	92	82	Pass
14.5192	105	85	80	Pass
14.7883	104	79	75	Pass
15.0573	98	72	73	Pass
15.3264	93	64	68	Pass
15.5955	86	62	72	Pass

15.8645	78	58	74	Pass
16.1336	73	54	73	Pass
16.4027	68	49	72	Pass
16.6717	64	46	71	Pass
16.9408	62	42	67	Pass
17.2099	60	39	65	Pass
17.4789	55	38	69	Pass
17.7480	50	38	76	Pass
18.0171	47	35	74	Pass
18.2861	43	33	76	Pass
18.5552	42	30	71	Pass
18.8242	39	29	74	Pass
19.0933	37	24	64	Pass
19.3624	36	24	66	Pass
19.6314	35	23	65	Pass
19.9005	35	19	54	Pass
20.1696	31	18	58	Pass
20.4386	30	15	50	Pass
20.7077	30	15	50	Pass
20.9768	27	14	51	Pass
21.2458	26	13	50	Pass
21.5149	23	12	52	Pass
21.7840	19	11	57	Pass
22.0530	18	10	55	Pass
22.3221	17	10	58	Pass
22.5911	16	10	62	Pass
22.8602	14	10	71	Pass
23.1293	12	8	66	Pass
23.3983	12	7	58	Pass
23.6674	11	7	63	Pass
23.9365	10	7	70	Pass
24.2055	9	7	77	Pass
24.4746	9	7	77	Pass
24.7437	9	7	77	Pass
25.0127	9	5	55	Pass
25.2818	8	4	50	Pass
25.5509	8	4	50	Pass
25.8199	8	4	50	Pass
26.0890	6	3	50	Pass
26.3580	6	3	50	Pass
26.6271	5	2	40	Pass
26.8962	5	2	40	Pass
27.1652	5	2	40	Pass
27.4343	5	2	40	Pass
27.7034	5	2	40	Pass
27.9724	5	2	40	Pass
28.2415	5	1	20	Pass

Water Quality

POC 2





+ Pre-Project x Mitigated

Pre-Project Landuse Totals for POC #2
Total Pervious Area: 29.719
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 28.628
Total Impervious Area: 0.35

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Pre-Project. POC #2

Return Period	**Flow(cfs)**
2 year	14.6173
5 year	20.9919
10 year	25.7346
25 year	29.2473

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	14.266
5 year	20.4443
10 year	24.8801
25 year	28.3012

Annual Peaks

Annual Peaks for Pre-Project and Mitigated. POC #2

Year	**Pre-Project**	**Mitigated**
1973	23.521	22.817
1974	12.928	12.572
1975	19.650	19.095
1976	9.811	9.559
1977	8.582	7.767
1978	17.697	17.254
1979	11.110	10.702
1980	14.499	14.139
1981	12.993	12.133
1982	14.617	14.266
1983	26.127	25.413
1984	15.402	14.872
1985	24.143	23.270
1986	16.170	15.735
1987	12.915	12.610

1988	14.006	13.614
1989	9.463	8.640
1990	12.151	11.394
1991	6.455	6.009
1992	15.796	15.374
1993	20.651	19.571
1994	3.200	2.952
1995	18.891	18.270
1996	9.902	8.984
1997	33.272	32.094
1998	19.898	19.031
1999	10.289	9.509
2000	11.706	11.411
2001	9.206	8.311
2002	13.209	12.909
2003	29.247	28.301
2004	19.523	19.017
2005	16.201	15.659
2006	26.091	25.272
2007	10.414	9.680
2008	18.185	17.742
2009	9.925	9.224
2010	20.992	20.444
2011	12.581	12.279
2012	16.433	15.973
2013	21.494	20.940
2014	10.255	9.953
2015	16.110	14.928
2016	21.681	21.033
2017	25.735	24.880
2018	9.205	8.622
2019	18.304	17.676
2020	11.241	10.436
2021	6.944	6.345

Ranked Annual Peaks

Ranked Annual Peaks for Pre-Project and Mitigated. POC #2

Rank	Pre-Project	Mitigated
1	33.2723	32.0936
2	29.2473	28.3012
3	26.1272	25.4132
4	26.0908	25.2721
5	25.7346	24.8801
6	24.1432	23.2704
7	23.5213	22.8172
8	21.6814	21.0326
9	21.4941	20.9404
10	20.9919	20.4443
11	20.6512	19.5712
12	19.8979	19.0948
13	19.6499	19.0307
14	19.5233	19.0172
15	18.8907	18.2698
16	18.3044	17.7419
17	18.1852	17.6759
18	17.6972	17.2537
19	16.4327	15.9734
20	16.2012	15.7347

21	16.1703	15.6586
22	16.1099	15.3740
23	15.7955	14.9280
24	15.4018	14.8717
25	14.6173	14.2660
26	14.4991	14.1388
27	14.0061	13.6141
28	13.2085	12.9092
29	12.9926	12.6104
30	12.9276	12.5722
31	12.9151	12.2793
32	12.5808	12.1330
33	12.1507	11.4111
34	11.7063	11.3939
35	11.2410	10.7019
36	11.1100	10.4359
37	10.4138	9.9527
38	10.2885	9.6798
39	10.2549	9.5595
40	9.9251	9.5086
41	9.9024	9.2240
42	9.8111	8.9842
43	9.4634	8.6397
44	9.2059	8.6225
45	9.2051	8.3115
46	8.5821	7.7671
47	6.9440	6.3452
48	6.4549	6.0089
49	3.2000	2.9521

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.4617	4317	4276	99	Pass
1.7069	3934	3846	97	Pass
1.9521	3567	3469	97	Pass
2.1973	3244	3122	96	Pass
2.4425	2970	2845	95	Pass
2.6876	2721	2586	95	Pass
2.9328	2498	2365	94	Pass
3.1780	2308	2181	94	Pass
3.4232	2130	1974	92	Pass
3.6684	1956	1808	92	Pass
3.9135	1809	1665	92	Pass
4.1587	1658	1529	92	Pass
4.4039	1517	1409	92	Pass
4.6491	1413	1315	93	Pass
4.8943	1317	1206	91	Pass
5.1394	1232	1124	91	Pass
5.3846	1143	1042	91	Pass
5.6298	1070	971	90	Pass
5.8750	1001	893	89	Pass
6.1202	921	827	89	Pass
6.3653	853	769	90	Pass
6.6105	795	702	88	Pass
6.8557	734	643	87	Pass
7.1009	674	589	87	Pass
7.3461	621	541	87	Pass
7.5912	570	500	87	Pass
7.8364	526	449	85	Pass
8.0816	477	424	88	Pass
8.3268	445	391	87	Pass
8.5720	409	361	88	Pass
8.8171	382	342	89	Pass
9.0623	361	318	88	Pass
9.3075	335	295	88	Pass
9.5527	308	273	88	Pass
9.7979	288	249	86	Pass
10.0430	268	229	85	Pass
10.2882	248	213	85	Pass
10.5334	224	198	88	Pass
10.7786	209	184	88	Pass
11.0238	195	174	89	Pass
11.2690	183	162	88	Pass
11.5141	170	150	88	Pass
11.7593	159	143	89	Pass
12.0045	150	130	86	Pass
12.2497	139	120	86	Pass
12.4949	128	113	88	Pass
12.7400	118	105	88	Pass
12.9852	111	101	90	Pass
13.2304	105	99	94	Pass
13.4756	104	92	88	Pass
13.7208	98	87	88	Pass
13.9659	93	81	87	Pass
14.2111	86	72	83	Pass

14.4563	78	66	84	Pass
14.7015	73	64	87	Pass
14.9467	68	60	88	Pass
15.1918	64	58	90	Pass
15.4370	62	52	83	Pass
15.6822	60	50	83	Pass
15.9274	55	48	87	Pass
16.1726	50	44	88	Pass
16.4177	47	40	85	Pass
16.6629	43	39	90	Pass
16.9081	42	37	88	Pass
17.1533	39	36	92	Pass
17.3985	37	34	91	Pass
17.6436	36	34	94	Pass
17.8888	35	31	88	Pass
18.1340	35	31	88	Pass
18.3792	31	28	90	Pass
18.6244	30	24	80	Pass
18.8695	30	23	76	Pass
19.1147	27	19	70	Pass
19.3599	26	18	69	Pass
19.6051	23	17	73	Pass
19.8503	19	16	84	Pass
20.0954	18	14	77	Pass
20.3406	17	14	82	Pass
20.5858	16	11	68	Pass
20.8310	14	11	78	Pass
21.0762	12	9	75	Pass
21.3214	12	9	75	Pass
21.5665	11	9	81	Pass
21.8117	10	9	90	Pass
22.0569	9	9	100	Pass
22.3021	9	9	100	Pass
22.5473	9	8	88	Pass
22.7924	9	8	88	Pass
23.0376	8	7	87	Pass
23.2828	8	5	62	Pass
23.5280	8	5	62	Pass
23.7732	6	5	83	Pass
24.0183	6	5	83	Pass
24.2635	5	5	100	Pass
24.5087	5	5	100	Pass
24.7539	5	5	100	Pass
24.9991	5	4	80	Pass
25.2442	5	4	80	Pass
25.4894	5	2	40	Pass
25.7346	5	2	40	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Pre-Project Schematic



Mitigated Schematic



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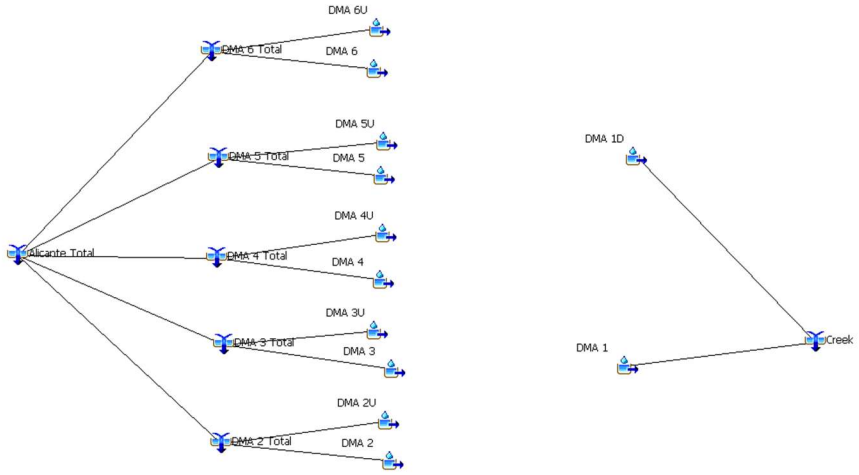
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APPENDIX D

HEC-HMS Results Summary

HEC-HMS 4.11 Results

Pre-Project Schematic



Pre-Project 10-year, 24-hour

Global Summary Results for Run "Pre 010y 24h"

Project: Elworthy April 2024 Simulation Run: Pre 010y 24h

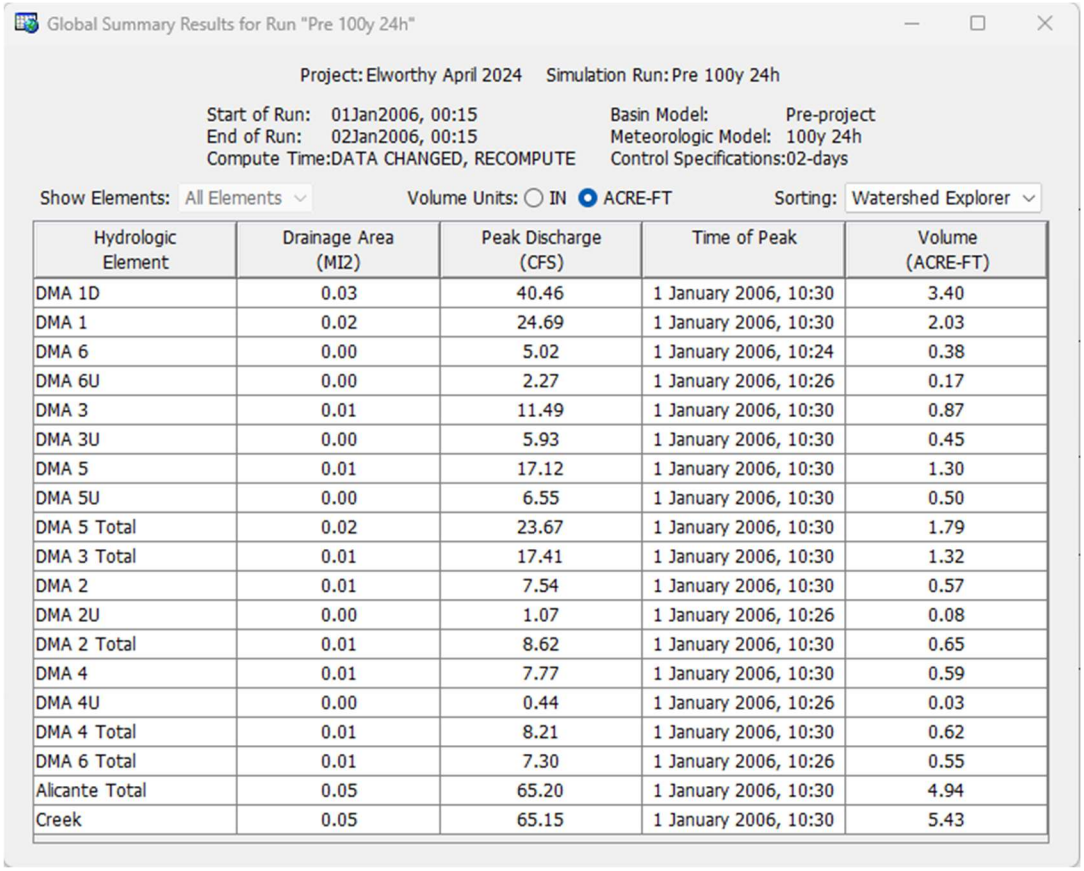
Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Pre-project
Meteorologic Model: 010y 24h
Control Specifications: 02-days

Show Elements: All Elements Volume Units: IN ACRE-FT Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1D	0.03	24.64	1 January 2006, 10:31	1.55
DMA 1	0.02	15.15	1 January 2006, 10:30	0.92
DMA 6	0.00	3.24	1 January 2006, 10:30	0.17
DMA 6U	0.00	1.46	1 January 2006, 10:30	0.08
DMA 3	0.01	7.24	1 January 2006, 10:30	0.40
DMA 3U	0.00	3.75	1 January 2006, 10:30	0.20
DMA 5	0.01	10.84	1 January 2006, 10:30	0.59
DMA 5U	0.00	4.14	1 January 2006, 10:30	0.23
DMA 5 Total	0.02	14.98	1 January 2006, 10:30	0.82
DMA 3 Total	0.01	10.99	1 January 2006, 10:30	0.60
DMA 2	0.01	4.75	1 January 2006, 10:30	0.26
DMA 2U	0.00	0.69	1 January 2006, 10:30	0.04
DMA 2 Total	0.01	5.44	1 January 2006, 10:30	0.30
DMA 4	0.01	4.90	1 January 2006, 10:30	0.27
DMA 4U	0.00	0.28	1 January 2006, 10:30	0.02
DMA 4 Total	0.01	5.18	1 January 2006, 10:30	0.28
DMA 6 Total	0.01	4.70	1 January 2006, 10:30	0.25
Alicante Total	0.05	41.30	1 January 2006, 10:30	2.25
Creek	0.05	39.78	1 January 2006, 10:30	2.47

Pre-Project 100-year, 24-hour


Global Summary Results for Run "Pre 100y 24h"

Project: Elworthy April 2024 Simulation Run: Pre 100y 24h

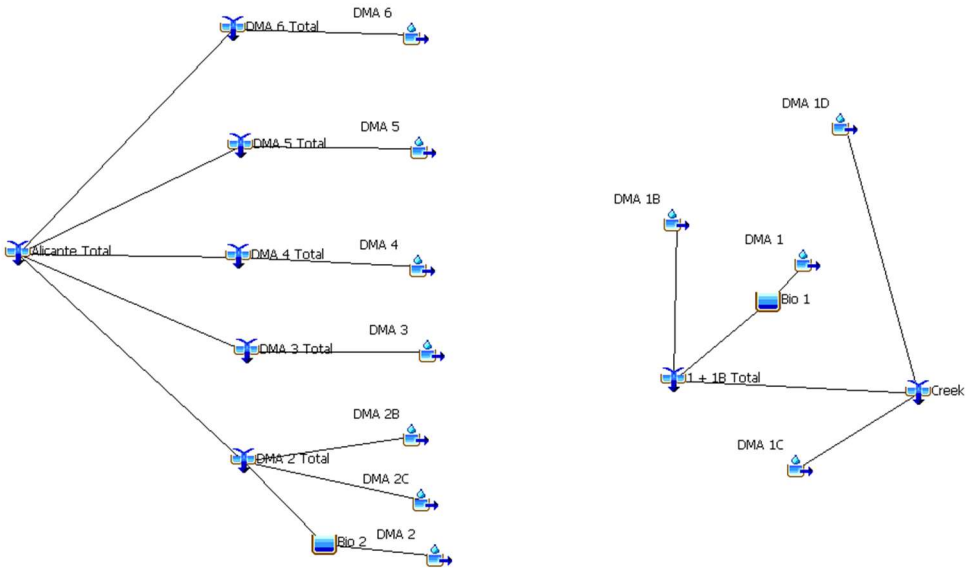
Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Pre-project
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Show Elements: All Elements | Volume Units: IN ACRE-FT | Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1D	0.03	40.46	1 January 2006, 10:30	3.40
DMA 1	0.02	24.69	1 January 2006, 10:30	2.03
DMA 6	0.00	5.02	1 January 2006, 10:24	0.38
DMA 6U	0.00	2.27	1 January 2006, 10:26	0.17
DMA 3	0.01	11.49	1 January 2006, 10:30	0.87
DMA 3U	0.00	5.93	1 January 2006, 10:30	0.45
DMA 5	0.01	17.12	1 January 2006, 10:30	1.30
DMA 5U	0.00	6.55	1 January 2006, 10:30	0.50
DMA 5 Total	0.02	23.67	1 January 2006, 10:30	1.79
DMA 3 Total	0.01	17.41	1 January 2006, 10:30	1.32
DMA 2	0.01	7.54	1 January 2006, 10:30	0.57
DMA 2U	0.00	1.07	1 January 2006, 10:26	0.08
DMA 2 Total	0.01	8.62	1 January 2006, 10:30	0.65
DMA 4	0.01	7.77	1 January 2006, 10:30	0.59
DMA 4U	0.00	0.44	1 January 2006, 10:26	0.03
DMA 4 Total	0.01	8.21	1 January 2006, 10:30	0.62
DMA 6 Total	0.01	7.30	1 January 2006, 10:26	0.55
Alicante Total	0.05	65.20	1 January 2006, 10:30	4.94
Creek	0.05	65.15	1 January 2006, 10:30	5.43

Post-Project Schematic



Post-Project 10-year, 24-hour

Global Summary Results for Run "Post 010y 24h"

Project: Elworthy April 2024 Simulation Run: Post 010y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Post-project
Meteorologic Model: 010y 24h
Control Specifications: 02-days

Show Elements: All Elements Volume Units: IN ACRE-FT Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 3	0.01	10.25	1 January 2006, 1...	0.57
DMA 5	0.02	14.98	1 January 2006, 1...	0.82
DMA 5 Total	0.02	14.98	1 January 2006, 1...	0.82
DMA 3 Total	0.01	10.25	1 January 2006, 1...	0.57
DMA 2	0.00	4.06	1 January 2006, 1...	0.24
Bio 2	0.00	2.60	1 January 2006, 1...	0.25
DMA 2B	0.00	0.70	1 January 2006, 1...	0.04
DMA 2C	0.00	0.59	1 January 2006, 1...	0.03
DMA 4	0.01	5.17	1 January 2006, 1...	0.28
DMA 4 Total	0.01	5.17	1 January 2006, 1...	0.28
DMA 2 Total	0.01	3.80	1 January 2006, 1...	0.32
DMA 6	0.01	4.70	1 January 2006, 1...	0.25
DMA 6 Total	0.01	4.70	1 January 2006, 1...	0.25
DMA 1	0.02	16.16	1 January 2006, 1...	1.78
DMA 1B	0.02	13.00	1 January 2006, 1...	0.87
Bio 1	0.02	5.58	1 January 2006, 1...	1.77
1 + 1B Total	0.03	17.64	1 January 2006, 1...	2.63
DMA 1C	0.01	8.11	1 January 2006, 1...	0.46
DMA 1D	0.01	6.98	1 January 2006, 1...	0.41
Creek	0.05	32.46	1 January 2006, 1...	3.50
Alicante Total	0.05	38.90	1 January 2006, 1...	2.24

Summary Results for Reservoir "Bio 1"

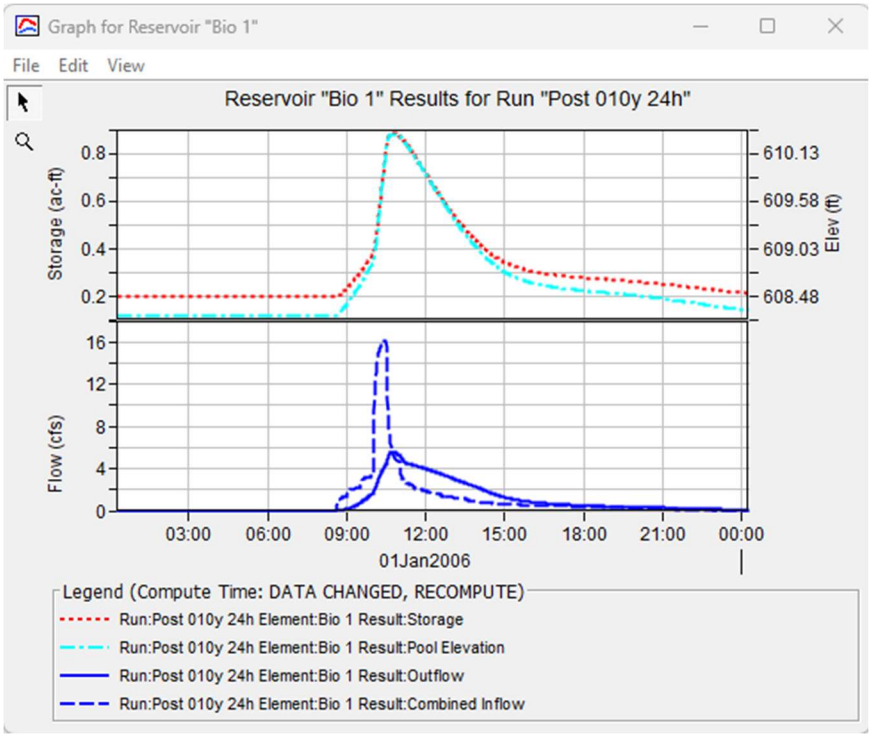
Project: Elworthy April 2024 Simulation Run: Post 010y 24h
Reservoir: Bio 1

Start of Run:	01Jan2006, 00:15	Basin Model:	Post-project
End of Run:	02Jan2006, 00:15	Meteorologic Model:	010y 24h
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	02-days

Volume Units: ○ IN ● ACRE-FT

Computed Results

Peak Inflow:	16.16 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:27
Peak Discharge:	5.58 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:45
Inflow Volume:	1.78 (ACRE-FT)	Peak Storage:	0.89 (ACRE-FT)
Discharge Volume:	1.77 (ACRE-FT)	Peak Elevation:	610.35 (FT)



Summary Results for Reservoir "Bio 2"

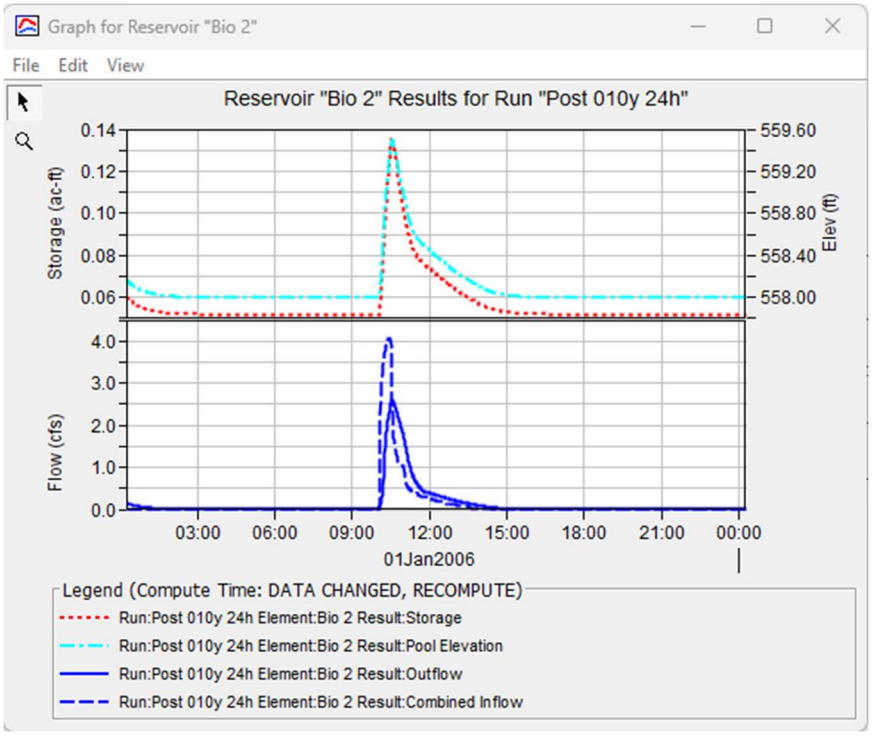
Project: Elworthy April 2024 Simulation Run: Post 010y 24h
Reservoir: Bio 2

Start of Run:	01Jan2006, 00:15	Basin Model:	Post-project
End of Run:	02Jan2006, 00:15	Meteorologic Model:	010y 24h
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	02-days

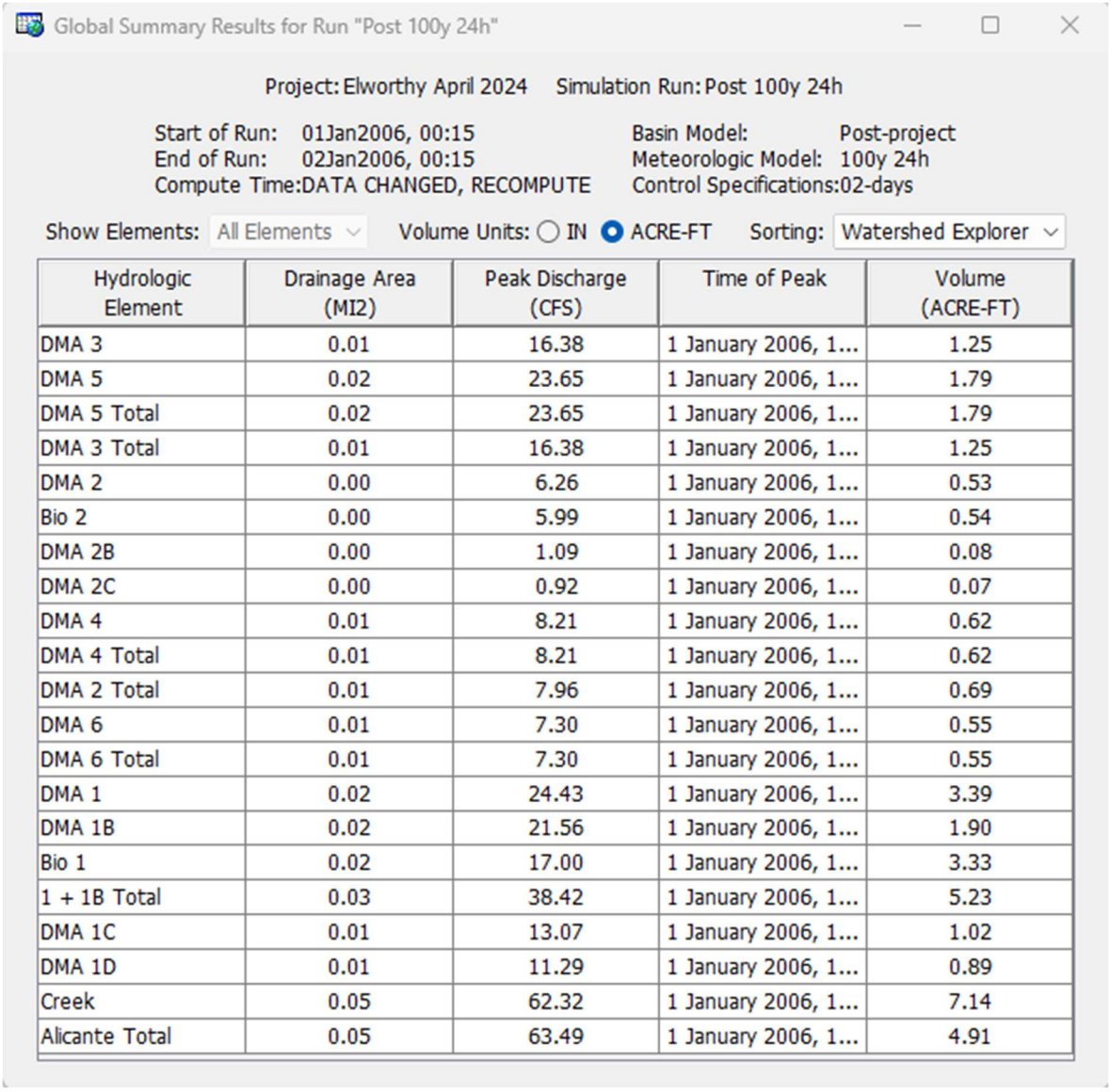
Volume Units: ○ IN ● ACRE-FT

Computed Results

Peak Inflow:	4.06 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:30
Peak Discharge:	2.60 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:33
Inflow Volume:	0.24 (ACRE-FT)	Peak Storage:	0.13 (ACRE-FT)
Discharge Volume:	0.25 (ACRE-FT)	Peak Elevation:	559.49 (FT)



Post-Project 100-year, 24-hour



Global Summary Results for Run "Post 100y 24h"

Project: Elworthy April 2024 Simulation Run: Post 100y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Post-project
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Show Elements: All Elements | Volume Units: IN ACRE-FT | Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 3	0.01	16.38	1 January 2006, 1...	1.25
DMA 5	0.02	23.65	1 January 2006, 1...	1.79
DMA 5 Total	0.02	23.65	1 January 2006, 1...	1.79
DMA 3 Total	0.01	16.38	1 January 2006, 1...	1.25
DMA 2	0.00	6.26	1 January 2006, 1...	0.53
Bio 2	0.00	5.99	1 January 2006, 1...	0.54
DMA 2B	0.00	1.09	1 January 2006, 1...	0.08
DMA 2C	0.00	0.92	1 January 2006, 1...	0.07
DMA 4	0.01	8.21	1 January 2006, 1...	0.62
DMA 4 Total	0.01	8.21	1 January 2006, 1...	0.62
DMA 2 Total	0.01	7.96	1 January 2006, 1...	0.69
DMA 6	0.01	7.30	1 January 2006, 1...	0.55
DMA 6 Total	0.01	7.30	1 January 2006, 1...	0.55
DMA 1	0.02	24.43	1 January 2006, 1...	3.39
DMA 1B	0.02	21.56	1 January 2006, 1...	1.90
Bio 1	0.02	17.00	1 January 2006, 1...	3.33
1 + 1B Total	0.03	38.42	1 January 2006, 1...	5.23
DMA 1C	0.01	13.07	1 January 2006, 1...	1.02
DMA 1D	0.01	11.29	1 January 2006, 1...	0.89
Creek	0.05	62.32	1 January 2006, 1...	7.14
Alicante Total	0.05	63.49	1 January 2006, 1...	4.91

Summary Results for Reservoir "Bio 1"

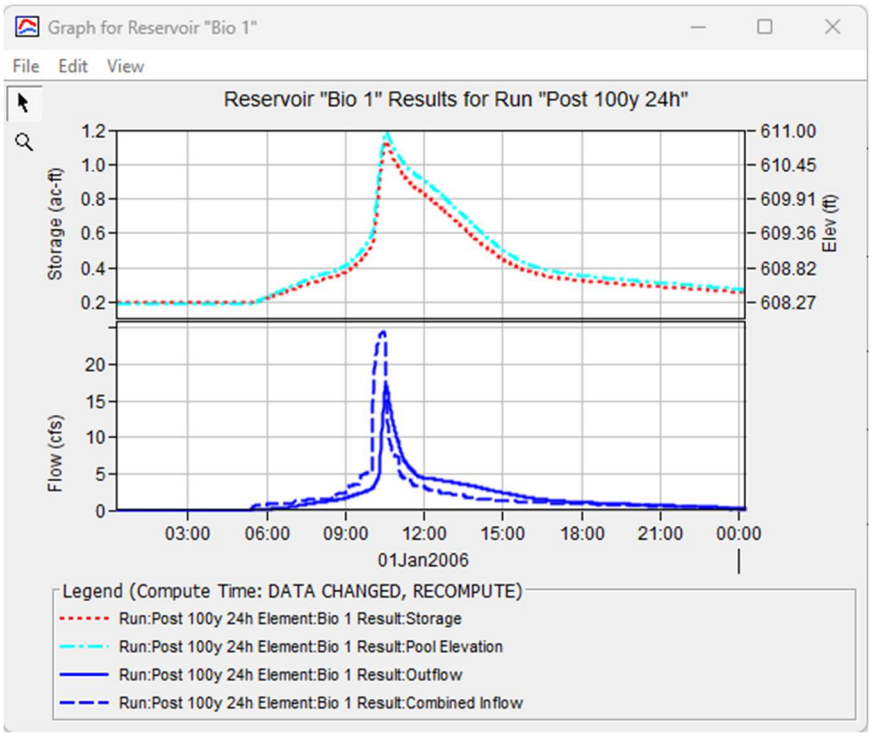
Project: Elworthy April 2024 Simulation Run: Post 100y 24h
Reservoir: Bio 1

Start of Run:	01Jan2006, 00:15	Basin Model:	Post-project
End of Run:	02Jan2006, 00:15	Meteorologic Model:	100y 24h
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	02-days

Volume Units: ○ IN ● ACRE-FT

Computed Results

Peak Inflow:	24.43 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:27
Peak Discharge:	17.00 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:33
Inflow Volume:	3.39 (ACRE-FT)	Peak Storage:	1.13 (ACRE-FT)
Discharge Volume:	3.33 (ACRE-FT)	Peak Elevation:	610.97 (FT)



Summary Results for Reservoir "Bio 2"

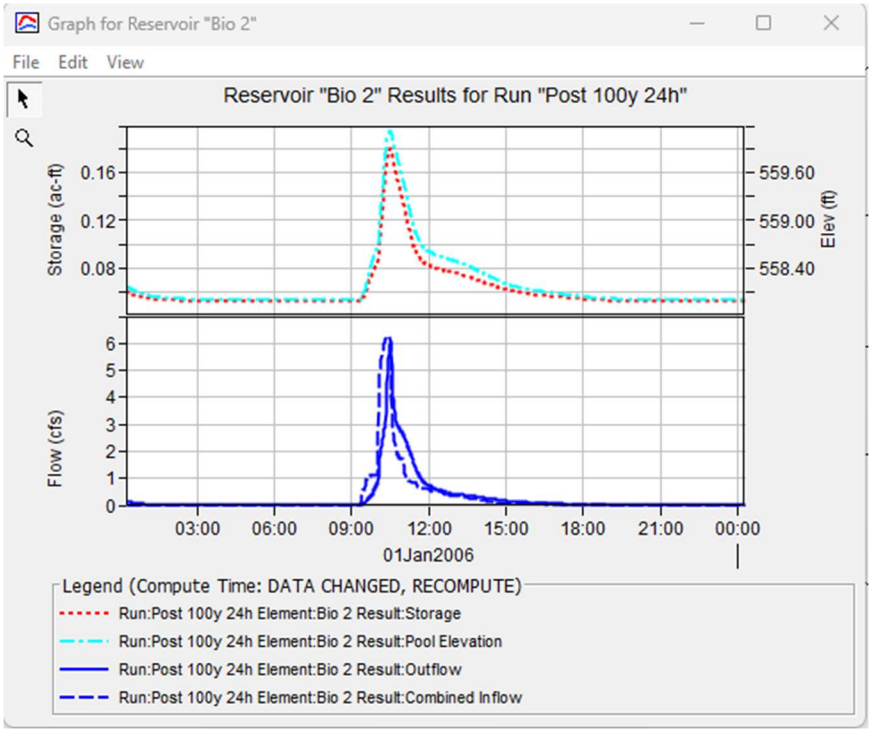
Project: Elworthy April 2024 Simulation Run: Post 100y 24h
Reservoir: Bio 2

Start of Run:	01Jan2006, 00:15	Basin Model:	Post-project
End of Run:	02Jan2006, 00:15	Meteorologic Model:	100y 24h
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	02-days

Volume Units: ○ IN ◉ ACRE-FT

Computed Results

Peak Inflow:	6.26 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:26
Peak Discharge:	5.99 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:31
Inflow Volume:	0.53 (ACRE-FT)	Peak Storage:	0.18 (ACRE-FT)
Discharge Volume:	0.54 (ACRE-FT)	Peak Elevation:	560.14 (FT)



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