

TRI-STATE GENERATION & TRANSMISSION, INC.

CROSSPOINT SUBSTATION PRELIMINARY DRAINAGE REPORT

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Prepared by:



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TRI-STATE GENERATION & TRANSMISSION, INC.

CROSSPOINT SUBSTATION FINAL DRAINAGE REPORT

Design Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

David Schieldt
Registered Professional Engineer
State of Colorado No. 47195

Date

Owner/Developer's Statement:

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

Tri-State Generation and Transmission Association
1100 W. 116th Ave
Westminster, CO 80234

Date

El Paso County:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

County Engineer / ECM Administrator

Date



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1.0 General Location and Description

Tri-State Generation and Transmission (TSGT) in coordination with Del-Mont Consultants, Inc. (DMC) is in the process of designing a new substation yard. The scope of work includes the construction of the substation yard, driveway, detention pond and swales, installation of new perimeter fence, and the addition of high voltage electrical equipment and facilities. The purpose of this report is to present the findings from the hydrologic and hydraulic analyses that were performed on the existing property as well as present the results from a detailed analysis performed on the proposed improvements to the property.

1.1 Site Location

The proposed substation yard is located on a 81.67-acre parcel owned by TSGT, situated in the SE ¼ of Section 8, Township 14 South, Range 61 West, 6th Principal Meridian in El Paso County, Colorado. The substation site is accessed from N Lauppe Road. The site is in the Upper Pond Creek Drainage Basin.

1.2 Site Description

The site naturally drains to the south and is currently covered in various grasses. There are currently no features on the site to provide water quality or quantity treatment for discharge from the site. Site layout details will be discussed in more detail in **Section 2**.

There are currently no developments on the properties neighboring the site. No wetlands are present on the site and the site is not located within a floodplain per FIRM Map Number 08041C0875G.

To the knowledge of Del-Mont Consultants, no prior drainage studies have been conducted on this property.

2.0 Drainage Basins and Sub-Basins

The property functions as four small drainage basins, flowing to the south overland to Pond Creek, ultimately flowing into the Arkansas River. Proposed conditions produce several smaller sub-basins and will be discussed in detail in the following sections.

2.1 Existing Drainage Sub-Basins

The existing site was analyzed as four basins. A map illustrating the delineation of the existing property can be found in **Appendix C**. There are no developments on the neighboring properties. **Table 2-1** presents the existing basin and its corresponding acreage.

Table 2-1: Existing Basin Acreages

Sub-Basin	Total Area (Acres)
E1	31.82
E2	15.06
E3	26.94
E4	7.85

2.2 Proposed Drainage Sub-Basins

The proposed conditions will produce several different sub-basins. The proposed site is divided into 15 different sub-basins. The substation yard accounts for 10 of the basins (Y 1-10), which were broken out separately to size the subdrain pipes. The proposed undisturbed areas make up 4 basins (P 1-4), and the detention pond is the last basin (EDB-1). A map illustrating the delineation of the sub-basins can be found in **Appendix C**. The yard areas and the detention pond, which make up greater than 90% of the impervious or improved areas, will be treated. The remainder of the impervious area consists of the access driveway, which creates negligible runoff and will continue to follow historic flow paths. The Proposed basins will follow historical discharge patterns, with a swale and culvert to direct flows under the access driveway. The run-on flows are minimal and will have negligible effects on the site. The majority of the proposed basins will not be disturbed during construction and will not require water quality treatment. The disturbed areas of the proposed basins will be reseeded, and total less the 1 acre. **Table 2-2** presents the proposed sub-basins and their corresponding acreages.

Table 2-2: Proposed Sub-Basin Acreages

Sub-Basin	Total Area (Acres)
Y1	1.02
Y2	1.02
Y3	0.99
Y4	0.99
Y5	0.49
Y6	0.49
Y7	1.21
Y8	1.07
Y9	1.17
Y10	1.17
EDB-1	1.02
P1-N	22.03
P1-S	6.35
P2	9.34
P3	25.46
P4 (Unanalyzed)	7.85

3.0 Drainage Design Criteria

3.1 Methodology

The hydrologic/hydraulic analysis of the site was performed using the Autodesk Storm and Sanitary analysis utilizing the Rational Method model for a 5-year and a 100-year rainfall event. Runoff Coefficients were obtained from El Paso County Drainage Criteria Manual Volume 1 Update, Chapter 6, Section 3.1, Table 6-6. Rainfall Intensity was obtained from EPC DCM Volume 1 Update, Figure 6-5. Modeling results are presented in **Appendix B**.

The Mile High Flood District *Detention Basin Design Workbook* was utilized to determine the required water quality capture volume (WQCV) and detention and to aid in the design the outlet structure. The spreadsheets/worksheets can be found in **Appendix A** and are discussed in more detail in **Section 4.0**.

Soil data was obtained from a Geotechnical Study provided by Terracon and gives a hydrologic soil group B for the site.

The described methods/tools used in the analysis, are in accordance with common engineering practices and guidelines.

3.2 Land Cover Hydrologic Properties

Runoff Coefficients and Percent Impervious numbers, for hydrologic soil group B, were assigned to the various land cover types found on the project, both existing and proposed, and are presented in **Table 3-1**. Runoff coefficients were obtained from Table 6-6, Section 3-1, EPC DCM Volume 1 Update.

Table 3-1: Land Cover Hydrologic Properties

Land Cover Type	Percent Impervious	Runoff Coefficient 5 Year	Runoff Coefficient 100 Year
Gravel	80	0.59	0.70
Historical Flow Analysis	2	0.09	0.36
Pond	100	0.90	0.96

3.3 Weighted Design Values

Utilizing the land cover hydrologic properties presented above, a weighted Runoff Coefficient and Percent Impervious value was calculated for each of the sub-basins, presented in **Section 2.0** to be used for analysis. **Table 3-2** presents the weighted design values for existing conditions and **Table 3-3** presents the weighted design values for proposed conditions. Detailed calculations can be found in **Appendix A**.

Table 3-2: Existing Sub-Basin Weighted Design Values

Sub-Basin	Total Area (Acres)	Weighted Percent Impervious	Weighted Runoff Coefficient 5 year	Weighted Runoff Coefficient 100 year
E1	31.82	2%	0.09	0.36
E2	15.06	2%	0.09	0.36
E3	26.94	2%	0.09	0.36
E4	7.85	2%	0.09	0.36

Table 3-3: Proposed Sub-Basin Weighted Design Values

Sub-Basin	Total Area (Acres)	Weighted Percent Impervious	Weighted Runoff Coefficient 5 year	Weighted Runoff Coefficient 100 year
Y1	1.02	80%	0.59	0.70
Y2	1.02	80%	0.59	0.70
Y3	0.99	80%	0.59	0.70
Y4	0.99	80%	0.59	0.70
Y5	0.49	80%	0.59	0.70
Y6	0.49	80%	0.59	0.70
Y7	1.21	80%	0.59	0.70
Y8	1.07	80%	0.59	0.70
Y9	1.17	80%	0.59	0.70
Y10	1.17	80%	0.59	0.70
EDB-1	1.02	100%	0.90	0.96
P1-N	22.03	2%	0.09	0.36
P1-S	6.35	2%	0.09	0.36
P2	9.34	2%	0.09	0.36
P3	25.46	2%	0.09	0.36
P4	7.85	2%	0.09	0.36

4.0 Drainage Facility Design

4.1 Historical Drainage

Per common practice, the 100-year historical discharge value for the site shall be used to determine the allowable discharge from the site for the proposed conditions. Values presented in **Table 3-2** were used in the model to calculate a historical discharge rate for the existing property. **Table 4-1** presents the discharge rate for the existing property for both the 5-year and 100-year 1-hour storm events although the design is based on the 100-year discharge values.

Table 4-1: Existing Property Discharge Values

Sub-Basin	5-Year Discharge (CFS)	100-Year Discharge (CFS)
E1	7.59	50.95
E2	3.59	24.11
E3	6.40	42.91
E4	1.87	12.57

4.2 Proposed Drainage

Values presented in **Table 3-3** were utilized in the model to calculate the runoff for the proposed conditions. The Mile High Flood District *Detention Basin Design Workbook* was utilized to determine the WQCV in conjunction with the model to size the detention pond (EDB-1). Once the pond was sized, the Mile High Flood District *Detention Basin Design Workbook* was utilized to estimate required orifice sizes in the outlet structure to provide water quality treatment. The model was then used to verify all design elements of the pond and the outlet structure to ensure the pond not only retained the correct WQCV but to also discharge at or less than the required 100-year historic discharge rate presented in **Table 4-1** as well as drain the pond in less than the allowable time per State Requirements. The spreadsheet showing the detailed calculations can be found in **Appendix A**. The design of the outlet structure is detailed in the grading drawings.

The west drainage swales that will receive run-on flows were not analyzed as the contributing areas are extremely small. These swales are designed as a V-bottom swale with 4:1 side slopes, a minimum depth of 1 foot, and a flow line slope of 0.5%. The swale has a max flow capacity 20cfs, which will easily convey the negligible run-on flows.

The proposed detention pond (EDB-1) was designed to provide water quality treatment as well as detain the 100-year storm event while maintaining the required 1-foot of freeboard. The proposed detention pond stage-storage curve is presented in **Table 4-2**. The emergency spillway has been designed to convey the 100 year storm event, however the calculated 100 year water surface elevation is 1.5 feet below the emergency spillway.

Table 4-2: Detention Pond Stage-Storage Table

Elevation	Surface Area (Sq. Ft.)
6187.83 (Top of Micropool)	10
6188	10
6189	4,951
6190	19,823
6191	29,275
6192 (Spillway)	32,758
6193	36,021
6194 (Top of Bank)	39,455

The model of the proposed site conditions was utilized to calculate discharge flow rates from the outlet structure in order to size the pond discharge culvert. **Table 4-3** presents the hydraulic capacity of the culvert and the required capacity to discharge flow from the outlet structure for the 100-year event. Hydraulic calculations for the remainder of the piping systems and corresponding capacities are found in **Appendix B**.

Table 4-3: Outlet Pipe Hydraulic Capacity (100-year event)

Drainage Feature	Pipe Diameter (in)	Total Capacity (cfs)	Required Flow Capacity (cfs)	Remaining Capacity (cfs)
Pond Outlet	18	8.96	7.62	1.34

Table 4-4 presents the discharge rates for the proposed sub-basins for both the 5-year and 100-year 1-hour storm events prior to detention. This discharge value represents the flow rate that the pond is receiving. The discharge from the pond and other basins (total discharge from site) is summarized in **Table 5-1**.

Table 4-4: Proposed Sub-Basin Discharge Values (Pre-Detention)

Sub-Basin	5-Year Discharge (CFS)	100-Year Discharge (CFS)
Y1	2.40	4.79
Y2	2.40	4.79
Y3	2.36	4.69
Y4	2.36	4.69
Y5	1.19	2.38
Y6	1.19	2.38
Y7	2.91	5.79
Y8	2.57	5.13
Y9	2.73	5.44
Y10	2.71	5.39
EDB-1	3.79	6.79

Utilizing the flow rates presented above, the model was utilized to analyze the flow path of water through the piping and pond system. With the installation of the outlet structure, the pond was designed to pass both the 5-year and 100-year events, treat the required WQCV, and slowly release the water in the required length of time after the end of an event set forth by the State. The entire substation drains to the pond and the discharge rate leaving the pond is presented in **Table 5-1**.

Table 4-5 presents the hydraulic capacity of the subdrain pipes and the required capacity for the 100-year 1-hour storm event. These values were obtained from the SSA drainage model. Due to pipe cover a grading constraints, so subdrains could not be sized large enough to pass the 100-year storm event. This was determined not to be a major concern as all the surcharge times are less than five minutes and the overall system can handle a short term backup in the substation yard. A model schematic identifying each pipe can be found in **Appendix C**.

Table 4-5: Subdrain Pipe Hydraulic Capacity (100-year event)

Subdrain ID	Pipe Diameter (in)	Total Capacity (cfs)	Required Flow Capacity (cfs)	Remaining Capacity (cfs)
1-15NP	15	6.06	4.75	1.31
2-18P	18	9.86	4.73	5.12
3-18NP	18	9.92	9.37	0.52
4-18NP	18	8.81	9.54	Surcharged <1m
5-15NP	15	6.02	4.66	1.37
6-18P	18	9.86	4.63	5.23
7-18NP	18	9.92	9.18	0.71
8-24NP	24	19.45	18.07	1.4
9-15P	15	8.01	2.35	5.66
10-30NP	30	17.33	18.75	Surcharged 4m
11-15NP	15	5.98	5.75	0.25
12-18P	18	9.86	5.71	4.14
13-24NP	24	21.37	10.64	10.66
14-15NP	15	6.06	5.40	0.67
15-18P	18	8.05	5.36	2.69
16-18NP	18	8.05	8.73	Surcharged 4m
17-18NP	18	8.05	8.71	Surcharged <1m
18-36NP	36	69.31	37.12	32.1

5.0 Conclusions

5.1 Drainage Concept

The drainage design has been prepared using sound engineering judgement and practices and will provide an effective means of controlling runoff on the project site as well as protect the site from damage. The design has been completed according to common engineering practices and will result in no downstream impacts to any people or structures. Historic flow paths, discharge rates, and water quality have been maintained or improved.

5.2 Compliance with Common Practices

Per common practices, the historical discharge rate from the 100-year storm shall be utilized to determine the allowable discharge rate for the proposed improvements. To demonstrate compliance with this requirement, both the existing and proposed conditions were combined into one overall sub-basin. **Table 5-1** presents the overall discharge rates for the overall basin as well as the individual basins.

Table 5-1: Overall Sub-Basin Discharge Values (Post Detention)

Basin	5-Year Discharge (CFS)		100-Year Discharge (CFS)	
	Existing	Proposed	Existing	Proposed
Yard Area (Y1-10 & EDB)	N/A	0.44*	N/A	7.62*
E1/P1**	7.59	6.76	50.95	47.13
E2/P2**	3.59	2.23	24.11	14.96
E3/P3**	6.40	6.04	42.91	40.56
E4/P4**	1.87	1.87	12.57	12.57
Total	19.45	17.34	130.54	122.84

*Value from MHFD-Detention Spreadsheet (Appendix A)

**Value from SSA Model

The pond outlet structure was sized according to common practices so that the proposed condition 100-year discharge rate is less than the required discharge rate from the 100-year storm event, resulting in compliance with common practices.

The detention pond was also sized according to UDFCD requirements to treat the WQCV, detain the 100-year event, maintain 1 foot of freeboard, and maintain historical discharge patterns resulting in no downstream impacts.

Inspections of the pond and outlet structure will be conducted by the owner on an annual basis as well as after large storm events. If deficiencies are identified or if maintenance is required, maintenance of the outlet structure will be performed by the owner of the property in an effort to return the structure to its original level of functionality. Maintenance may involve cleaning of sediment and debris from the facility, maintaining vegetation growth around the structure, and performing any additional maintenance required.

5.3 Four Step Process

The “Four Step Process” as recommended by the Urban Drainage Flood Control District has been addressed as follows:

Step 1 - Runoff Reduction

Runoff Reduction will be achieved by maintaining all perviousness in all areas not routed through the EDB. Any disturbance in these areas, including the construction of the swales, shall be reseeded and stabilized.

Step 2 – Stabilized Drainageways

All swales proposed on the site will be stabilized with grass cover and the use of Rip-Rap armoring will be implemented in areas of higher concentration and/or velocity. Riprap sizing and pond outlet swale calculations can be found in **Appendix A**.

Step 3 – Provide Water Quality Capture Volume

The detention pond and outlet structure on site have been designed to achieve WQCV. The Mile High Flood District *Detention Basin Design Workbook* was utilized to determine the required water quality capture volume (WQCV) and to aid in the design of the outlet structure. The spreadsheets/worksheets can be found in **Appendix A** and are discussed in more detail in **Section 4.0**. The design was then analyzed with Autodesk Storm and Sanitary analysis utilizing the Rational Method model for a 5-year and a 100-year rainfall event. Modeling results are presented in **Appendix B**.

Step 4 – Consider Need for Industrial and Commercial BMPs

The site has low potential for industrial pollution upon the completion of construction. The improved areas of the site that could see vehicular traffic are all routed through the detention pond system where it receives water quality treatment. The electrical equipment found inside of the yard also utilizes local containment basins to prevent the spilling of contaminants within the yard.

6.0 References

- United States Department of Agriculture Natural Resources Conservation Service. Web Soil Survey
- Mile High Flood District and Flood Control District. *Detention Basin Design Workbook*, Version 4.04, February 2021.
- Urban Drainage and Flood Control District. *Urban Storm Drainage Criteria Manual*, Volume 1-3, June 2001.
- El Paso County, Colorado, *Drainage Criteria Manual*, Volume 1-2, October 31, 2018
- El Paso County, Colorado, *Engineering Criteria Manual*, December 13, 2016
- Yeh and Associates, Inc. *Geotechnical Engineering Study, Crosspoint Substation. Yeh Project Number 221-290*. November 11, 2021

Appendix A

Site Specific Physical Design Properties

Crosspoint Drainage Design

Existing Conditions-5 Year

Area Name	Total Area		Flow Length	Slope (%)	TOC (min)
	(sf)	(acres)			
E1	1385995.8	31.82	500	2%	26.29
E2	656080.46	15.06	500	2%	26.29
E3	1173572.5	26.94	500	1%	26.56
E4	341751.69	7.85	300	2%	26.29

Land Cover Type	Percent Impervious	Runoff Coefficient
Historical Flow Analysis	2%	0.09
Gravel	80%	0.59
Pond	100%	0.9

Roughness Coefficient and Curve Number Analysis

E1					
<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	31.82	0.09	2.86	2%	64%
		sum	2.86		64%
Total Area (ac)	31.818	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

E2					
<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	15.06	0.09	1.36	2%	30%
		sum	1.36		30%
Total Area (ac)	15.062	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

E3					
<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	26.94	0.09	2.42	2%	54%
		sum	2.42		54%
Total Area (ac)	26.942	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

E4					
<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	7.85	0.09	0.71	2%	16%
		sum	0.71		16%
Total Area (ac)	7.846	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

Crosspoint Drainage Design

Proposed Conditions-5 Year

Area Name	Total Area		Flow Length	Slope (%)	TOC (min)
	(sf)	(acres)			
Y1	44288.27	1.02	180	1.25%	10.88
Y2	44288.27	1.02	180	1.25%	10.88
Y3	42940	0.99	170	1.25%	10.61
Y4	42940	0.99	170	1.25%	10.61
Y5	21548.35	0.49	70	1.25%	10.00
Y6	21306.61	0.49	140	1.25%	10.00
Y7	52742.59	1.21	160	1.25%	10.33
Y8	46782.44	1.07	160	1.25%	10.33
Y9	51068.27	1.17	190	1.25%	11.14
Y10	51068.27	1.17	190	1.25%	11.42
EDB-1	44613.98	1.02	40	3.00%	10.00
P1-N	959655.15	22.03	500	2.00%	26.29
P1-S	276731.97	6.35	450	2.00%	26.29
P2	406790.69	9.34	500	2.00%	26.29
P3	1108883.88	25.46	500	1.00%	25.56
P4 (Unchanged)	341751.69	7.85	300	2.00%	26.29

Land Cover Type	Percent Impervious	Runoff Coefficient
Historical Flow Analysis	2%	0.09
Gravel	80%	0.59
Pond	100%	0.9

Roughness Coefficient and Curve Number Analysis

Y1

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.02	0.59	0.60	80%	81.3%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.60		81.3%
Total Area (ac)	1.02	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y2

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.02	0.59	0.60	80%	81.3%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.60		81.3%
Total Area (ac)	1.02	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y3

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.99	0.59	0.58	80%	78.9%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.58		78.9%
Total Area (ac)	0.99	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y4

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.99	0.59	0.58	80%	78.9%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.58		78.9%
Total Area (ac)	0.99	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y5

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.49	0.59	0.29	80%	39.6%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.29		39.6%
Total Area (ac)	0.49	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y6

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.49	0.59	0.29	80%	39.1%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.29		39.1%
Total Area (ac)	0.49	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y7

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.21	0.59	0.71	80%	96.9%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.71		96.9%
Total Area (ac)	1.21	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y8

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.07	0.59	0.63	80%	85.9%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.63		85.9%
Total Area (ac)	1.07	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y9

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.17	0.59	0.69	80%	93.8%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.69		93.8%
Total Area (ac)	1.17	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

Y9

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.17	0.59	0.69	80%	93.8%
Native	0.00	0.09	0.00	2%	0.0%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.69		93.8%
Total Area (ac)	1.17	Weighted	0.59		80%
Weighted Runoff Coefficient	0.59				
Weighted Percent Impervious	80%				

EDB-1

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.00	0.59	0.00	80%	0.0%
Native	0.00	0.09	0.00	2%	0.0%
Pond	1.02	0.9	0.92	100%	102.4%
		sum	0.92		102.4%
Total Area (ac)	1.02	Weighted	0.90		100%
Weighted Runoff Coefficient	0.90				
Weighted Percent Impervious	100%				

P1-N

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.59	0.00	80%	0.0%
Native	22.03	0.09	1.98	2%	44.1%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	1.98		44.1%
Total Area (ac)	22.03	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

P1-S

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.59	0.00	80%	0.0%
Native	6.35	0.09	0.57	2%	12.7%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.57		12.7%
Total Area (ac)	6.35	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

P2

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.59	0.00	80%	0.0%
Native	9.34	0.09	0.84	2%	18.7%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.84		18.7%
Total Area (ac)	9.34	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

P3

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.59	0.00	80%	0.0%
Native	25.46	0.09	2.29	2%	50.9%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	2.29		50.9%
Total Area (ac)	25.46	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

P4

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.59	0.00	80%	0.0%
Native	7.85	0.09	0.71	2%	15.7%
Pond	0.00	0.9	0.00	100%	0.0%
		sum	0.71		15.7%
Total Area (ac)	7.85	Weighted	0.09		2%
Weighted Runoff Coefficient	0.09				
Weighted Percent Impervious	2%				

Crosspoint Drainage Design

Existing Conditions-100 Year

Area Name	Total Area		Flow Length	Slope (%)	TOC (min)
	(sf)	(acres)			
E1	1385995.8	31.82	500	2%	26.29
E2	656080.46	15.06	500	2%	26.29
E3	1173572.5	26.94	500	1%	26.56
E4	341751.69	7.85	300	2%	26.29

Land Cover Type	Percent Impervious	Runoff Coefficient
Historical Flow Analysis	2%	0.36
Gravel	80%	0.7
Pond	100%	0.96

Roughness Coefficient and Curve Number Analysis

E1

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	31.82	0.36	11.45	2%	64%
		sum	11.45		64%
Total Area (ac)	31.818	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

E2

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	15.06	0.36	5.42	2%	30%
		sum	5.42		30%
Total Area (ac)	15.062	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

E3

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	26.94	0.36	9.70	2%	54%
		sum	9.70		54%
Total Area (ac)	26.942	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

E4

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Existing Site	7.85	0.36	2.82	2%	16%
		sum	2.82		16%
Total Area (ac)	7.846	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

Crosspoint Drainage Design

Proposed Conditions-100 Year

Area Name	Total Area		Flow Length	Slope (%)	TOC (min)
	(sf)	(acres)			
Y1	44288.27	1.02	180	1.25%	10.88
Y2	44288.27	1.02	180	1.25%	10.88
Y3	42940	0.99	170	1.25%	10.61
Y4	42940	0.99	170	1.25%	10.61
Y5	21548.35	0.49	70	1.25%	10.00
Y6	21306.61	0.49	140	1.25%	10.00
Y7	52742.59	1.21	160	1.25%	10.33
Y8	46782.44	1.07	160	1.25%	10.33
Y9	51068.27	1.17	190	1.25%	11.14
Y10	51068.27	1.17	190	1.25%	11.42
EDB-1	44613.98	1.02	40	3.00%	10.00
P1-N	959655.15	22.03	500	2.00%	26.29
P1-S	276731.97	6.35	450	2.00%	26.29
P2	406790.69	9.34	500	2.00%	26.29
P3	1108883.88	25.46	500	1.00%	25.56
P4 (Unchanged)	341751.69	7.85	300	2.00%	26.29

Land Cover Type	Percent Impervious	Runoff Coefficient
Historical Flow Analysis	2%	0.36
Gravel	80%	0.7
Pond	100%	0.96

Roughness Coefficient and Curve Number Analysis

Y1					
Description	Total Area (ac)	Runoff Coefficient	A*C	Percent Impervious	A*%
Substation Yard (Gravel)	1.02	0.7	0.71	80%	81.3%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.71		81.3%
Total Area (ac)	1.02	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y2					
Description	Total Area (ac)	Runoff Coefficient	A*C	Percent Impervious	A*%
Substation Yard (Gravel)	1.02	0.7	0.71	80%	81.3%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.71		81.3%
Total Area (ac)	1.02	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y3					
Description	Total Area (ac)	Runoff Coefficient	A*C	Percent Impervious	A*%
Substation Yard (Gravel)	0.99	0.7	0.69	80%	78.9%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.69		78.9%
Total Area (ac)	0.99	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y4

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A°C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.99	0.7	0.69	80%	78.9%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.69		78.9%
Total Area (ac)	0.99	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y5

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A°C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.49	0.7	0.35	80%	39.6%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.35		39.6%
Total Area (ac)	0.49	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y6

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A°C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.49	0.7	0.34	80%	39.1%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.34		39.1%
Total Area (ac)	0.49	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y7

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A°C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.21	0.7	0.85	80%	96.9%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.85		96.9%
Total Area (ac)	1.21	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y8

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A°C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.07	0.7	0.75	80%	85.9%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.75		85.9%
Total Area (ac)	1.07	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y9

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A°C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.17	0.7	0.82	80%	93.8%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.82		93.8%
Total Area (ac)	1.17	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

Y9

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	1.17	0.7	0.82	80%	93.8%
Native	0.00	0.36	0.00	2%	0.0%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	0.82		93.8%
Total Area (ac)	1.17	Weighted	0.70		80%
Weighted Runoff Coefficient	0.70				
Weighted Percent Impervious	80%				

EDB-1

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Substation Yard (Gravel)	0.00	0.7	0.00	80%	0.0%
Native	0.00	0.36	0.00	2%	0.0%
Pond	1.02	0.96	0.98	100%	102.4%
		sum	0.98		102.4%
Total Area (ac)	1.02	Weighted	0.96		100%
Weighted Runoff Coefficient	0.96				
Weighted Percent Impervious	100%				

P1-N

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.7	0.00	80%	0.0%
Native	22.03	0.36	7.93	2%	44.1%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	7.93		44.1%
Total Area (ac)	22.03	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

P1-S

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.7	0.00	80%	0.0%
Native	6.35	0.36	2.29	2%	12.7%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	2.29		12.7%
Total Area (ac)	6.35	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

P2

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.7	0.00	80%	0.0%
Native	9.34	0.36	3.36	2%	18.7%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	3.36		18.7%
Total Area (ac)	9.34	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

P3

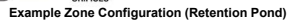
<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.7	0.00	80%	0.0%
Native	25.46	0.36	9.16	2%	50.9%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	9.16		50.9%
Total Area (ac)	25.46	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

P4

<u>Description</u>	<u>Total Area (ac)</u>	<u>Runoff Coefficient</u>	<u>A*C</u>	<u>Percent Impervious</u>	<u>A*%</u>
Gravel	0.00	0.7	0.00	80%	0.0%
Native	7.85	0.36	2.82	2%	15.7%
Pond	0.00	0.96	0.00	100%	0.0%
		sum	2.82		15.7%
Total Area (ac)	7.85	Weighted	0.36		2%
Weighted Runoff Coefficient	0.36				
Weighted Percent Impervious	2%				

MHFD-Detention, Version 4.06 (July 2022)

Basin ID: Detention Pond (EDB-1)

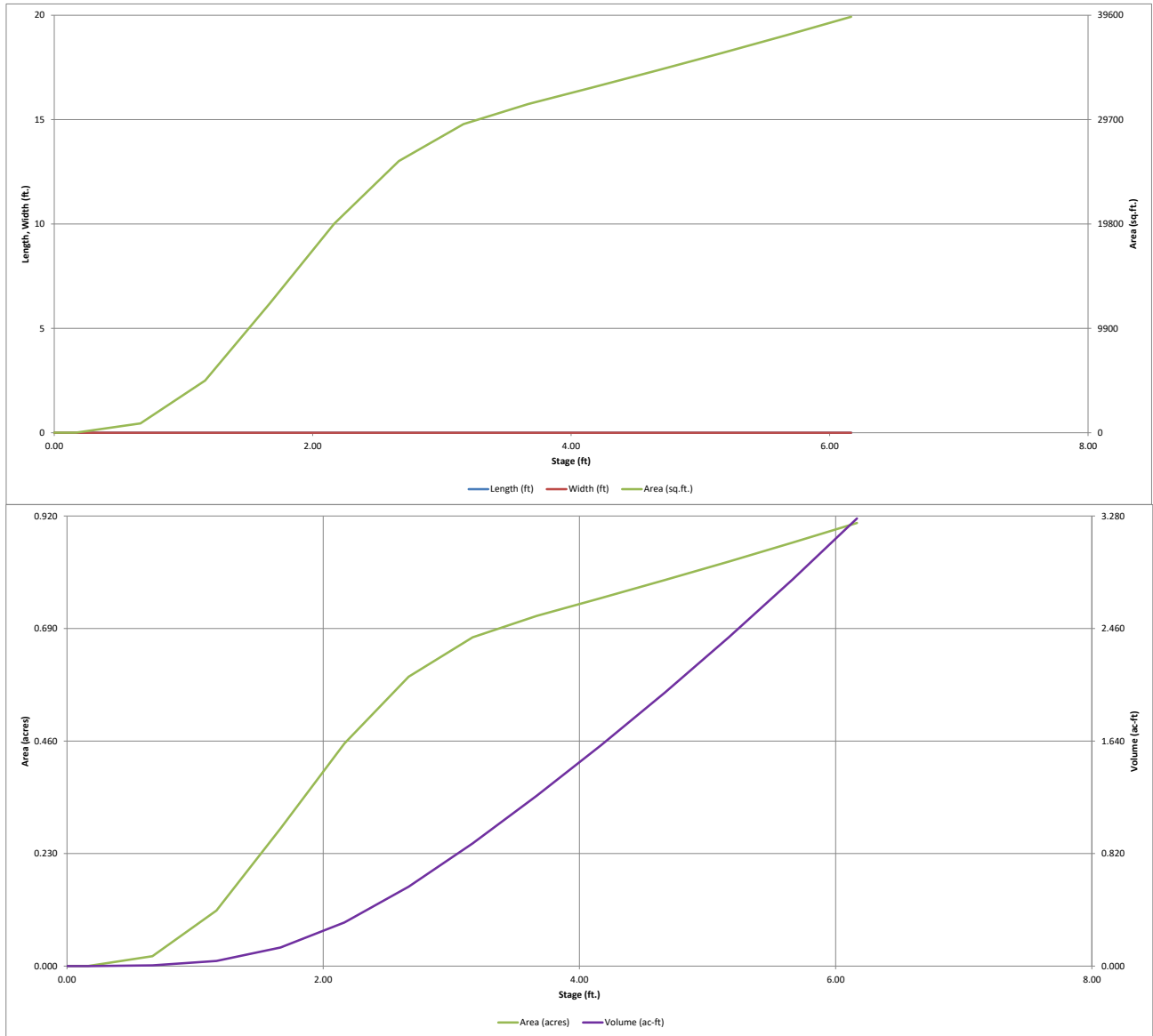


Initial Surcharge Area (A_{ISV})	=	user	ft ²
Surcharge Volume Length (L_{ISV})	=	user	ft
Surcharge Volume Width (W_{ISV})	=	user	ft
Depth of Basin Floor (H_{FLOOR})	=	user	ft
Length of Basin Floor (L_{FLOOR})	=	user	ft
Width of Basin Floor (W_{FLOOR})	=	user	ft
Area of Basin Floor (A_{FLOOR})	=	user	ft ²
Volume of Basin Floor (V_{FLOOR})	=	user	ft ³
Depth of Main Basin (H_{MAIN})	=	user	ft
Length of Main Basin (L_{MAIN})	=	user	ft
Width of Main Basin (W_{MAIN})	=	user	ft
Area of Main Basin (A_{MAIN})	=	user	ft ²
Volume of Main Basin (V_{MAIN})	=	user	ft ³
Calculated Total Basin Volume (V_{TOTAL})	=	user	acre-feet

[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

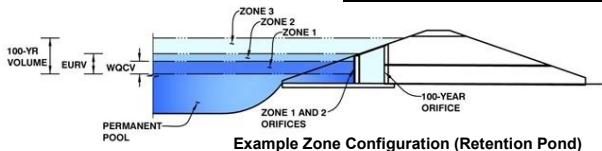


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Crosspoint Substation**

Basin ID: **Detention Pond (EDB-1)**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.13	0.303	Orifice Plate
Zone 2 (EURV)	3.28	0.668	Orifice Plate
Zone 3 (100-year)	3.98	0.496	Weir&Pipe (Restrict)
Total (all zones)		1.467	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.04	0.54	1.04	1.56	2.06	2.58	3.08	
Orifice Area (sq. inches)	0.79	0.79	0.79	1.77	1.77	3.14	3.14	

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orifice

Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Type =
Debris Clogging % = %

Calculated Parameters for Overflow Weir

Height of Grate Upper Edge, H_u = feet
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area =
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = inches
Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres
Basin Volume at Top of Freeboard = acre-ft

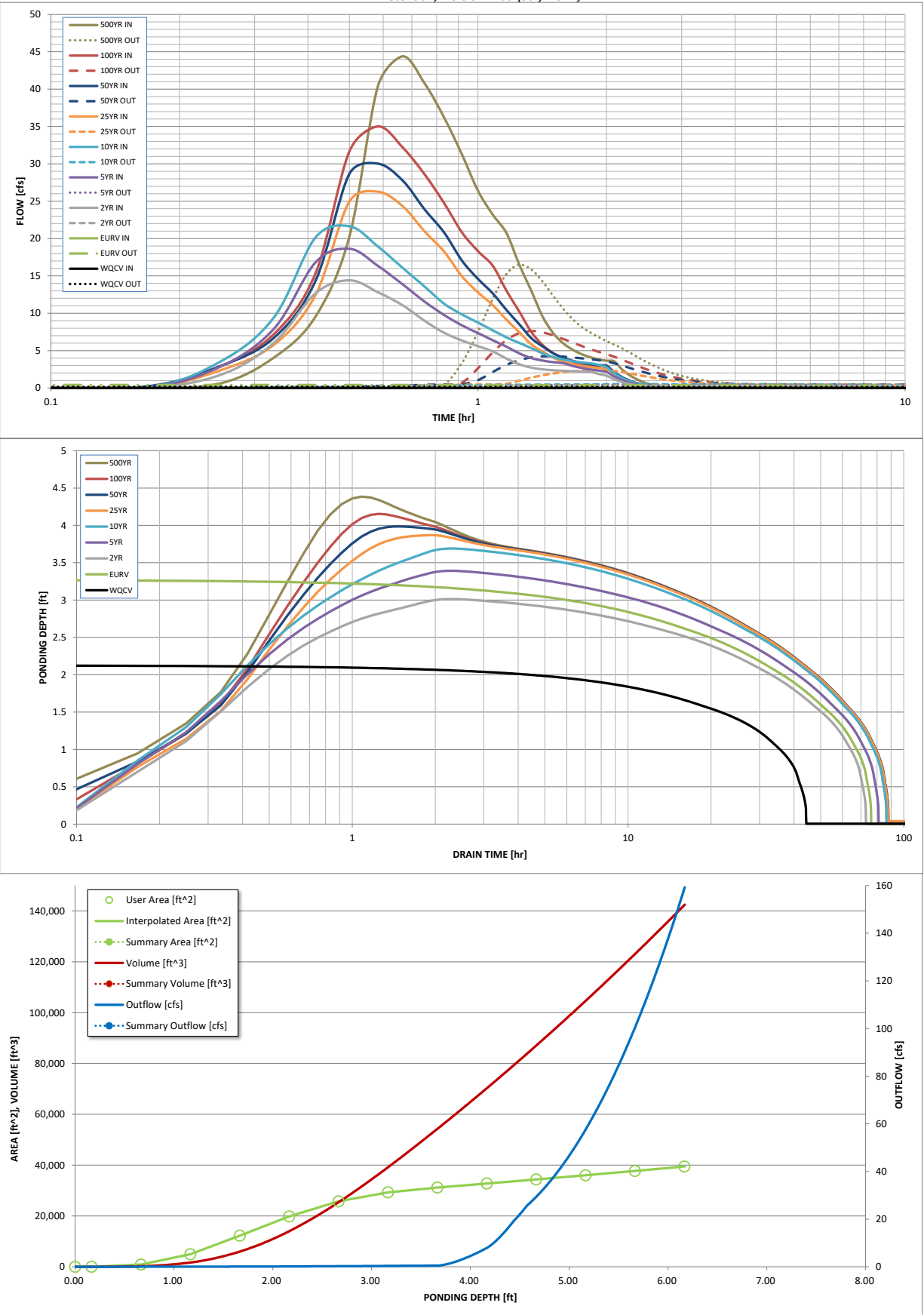
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	0.303	0.970	0.845	1.114	1.336	1.579	1.807	2.066	2.639
CUHP Runoff Volume (acre-ft) =	N/A	N/A	0.845	1.114	1.336	1.579	1.807	2.066	2.639
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.0	2.9	4.3	7.8	9.8	12.6	17.5
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A							
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.10	0.27	0.41	0.73	0.92	1.18	1.65
Peak Inflow Q (cfs) =	N/A	N/A	14.40	18.63	21.65	26.27	30.03	35.01	44.39
Peak Outflow Q (cfs) =	0.16	0.41	0.32	0.44	0.55	2.39	4.26	7.62	16.48
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.1	0.3	0.4	0.6	0.9
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.3	0.5	1.0	1.8
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	66	63	70	74	73	72	71	68
Time to Drain 99% of Inflow Volume (hours) =	42	71	69	76	80	81	80	80	78
Maximum Ponding Depth (ft) =	2.13	3.28	3.01	3.39	3.69	3.87	3.99	4.15	4.39
Area at Maximum Ponding Depth (acres) =	0.44	0.68	0.65	0.69	0.72	0.73	0.74	0.75	0.77
Maximum Volume Stored (acre-ft) =	0.305	0.976	0.796	1.051	1.263	1.386	1.474	1.600	1.775

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.02	0.64
	0:15:00	0.00	0.00	1.77	2.89	3.57	2.39	2.96	2.91	4.09
	0:20:00	0.00	0.00	6.09	7.96	9.50	5.82	6.75	7.25	9.57
	0:25:00	0.00	0.00	12.68	16.82	20.17	12.47	14.35	15.36	20.26
	0:30:00	0.00	0.00	14.40	18.63	21.65	24.97	28.67	31.68	40.43
	0:35:00	0.00	0.00	12.81	16.34	18.92	26.27	30.03	35.01	44.39
	0:40:00	0.00	0.00	11.06	13.86	16.06	24.32	27.75	32.19	40.77
	0:45:00	0.00	0.00	8.99	11.56	13.57	20.95	23.90	28.59	36.19
	0:50:00	0.00	0.00	7.39	9.77	11.28	18.25	20.81	24.74	31.30
	0:55:00	0.00	0.00	6.36	8.39	9.85	14.97	17.07	20.85	26.40
	1:00:00	0.00	0.00	5.60	7.35	8.76	12.80	14.60	18.32	23.19
	1:05:00	0.00	0.00	4.89	6.39	7.71	11.09	12.66	16.35	20.71
	1:10:00	0.00	0.00	3.93	5.52	6.77	9.13	10.42	13.00	16.49
	1:15:00	0.00	0.00	3.17	4.63	6.03	7.45	8.51	10.22	13.00
	1:20:00	0.00	0.00	2.72	4.01	5.33	5.84	6.67	7.50	9.56
	1:25:00	0.00	0.00	2.50	3.67	4.63	4.87	5.56	5.76	7.36
	1:30:00	0.00	0.00	2.37	3.46	4.16	4.07	4.64	4.68	5.98
	1:35:00	0.00	0.00	2.30	3.32	3.82	3.55	4.05	4.00	5.12
	1:40:00	0.00	0.00	2.25	2.95	3.58	3.19	3.63	3.53	4.51
	1:45:00	0.00	0.00	2.21	2.68	3.42	2.96	3.37	3.21	4.12
	1:50:00	0.00	0.00	2.18	2.48	3.30	2.80	3.18	2.99	3.83
	1:55:00	0.00	0.00	1.88	2.33	3.11	2.69	3.06	2.85	3.65
	2:00:00	0.00	0.00	1.65	2.15	2.79	2.62	2.98	2.80	3.58
	2:05:00	0.00	0.00	1.18	1.55	1.99	1.88	2.14	2.01	2.57
	2:10:00	0.00	0.00	0.83	1.09	1.40	1.33	1.51	1.43	1.83
	2:15:00	0.00	0.00	0.58	0.75	0.98	0.93	1.06	1.01	1.29
	2:20:00	0.00	0.00	0.39	0.50	0.66	0.64	0.72	0.69	0.88
	2:25:00	0.00	0.00	0.26	0.33	0.44	0.42	0.48	0.46	0.58
	2:30:00	0.00	0.00	0.16	0.22	0.29	0.29	0.32	0.31	0.39
	2:35:00	0.00	0.00	0.09	0.13	0.17	0.17	0.20	0.19	0.24
	2:40:00	0.00	0.00	0.04	0.07	0.08	0.09	0.10	0.10	0.12
	2:45:00	0.00	0.00	0.02	0.02	0.03	0.03	0.04	0.04	0.05
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

[illegible]

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 3

Designer: Thayne Clement
 Company: Del-Mont Consultants
 Date: June 20, 2025
 Project: Crosspoint Substation
 Location: Yoder, CO

1. Basin Storage Volume

- A) Effective Imperviousness of Tributary Area, I_a
- B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)
- C) Contributing Watershed Area
- D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm
- E) Design Concept
(Select EURV when also designing for flood control)
- F) Design Volume (WQCV) Based on 40-hour Drain Time
($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * \text{Area})$)
- G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV \text{ OTHER}} = (d_6 * (V_{DESIGN} / 0.43))$)
- H) User Input of Water Quality Capture Volume (WQCV) Design Volume
(Only if a different WQCV Design Volume is desired)
- I) NRCS Hydrologic Soil Groups of Tributary Watershed
 i) Percentage of Watershed consisting of Type A Soils
 ii) Percentage of Watershed consisting of Type B Soils
 iii) Percentage of Watershed consisting of Type C/D Soils
- J) Excess Urban Runoff Volume (EURV) Design Volume
 For HSG A: $EURV_A = 1.68 * i^{1.28}$
 For HSG B: $EURV_B = 1.36 * i^{1.08}$
 For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$
- K) User Input of Excess Urban Runoff Volume (EURV) Design Volume
(Only if a different EURV Design Volume is desired)

$I_a =$ %

$i =$

Area = ac

$d_6 =$ in

Choose One

- ☒ Water Quality Capture Volume (WQCV)
☐ Excess Urban Runoff Volume (EURV)

$V_{DESIGN} =$ ac-ft

$V_{DESIGN \text{ OTHER}} =$ ac-ft

$V_{DESIGN \text{ USER}} =$ ac-ft

HSG _A = %

HSG _B = %

HSG _{C/D} = %

$EURV_{DESIGN} =$ ac-ft

$EURV_{DESIGN \text{ USER}} =$ ac-ft

2. Basin Shape: Length to Width Ratio

(A basin length to width ratio of at least 2:1 will improve TSS reduction.)

L : W = : 1

3. Basin Side Slopes

- A) Basin Maximum Side Slopes
(Horizontal distance per unit vertical, 4:1 or flatter preferred)

Z = ft / ft

4. Inlet

- A) Describe means of providing energy dissipation at concentrated inflow locations:

5. Forebay

- A) Minimum Forebay Volume
($V_{MIN} =$ of the WQCV)

- B) Actual Forebay Volume

- C) Forebay Depth
($D_F =$ inch maximum)

- D) Forebay Discharge

- i) Undetained 100-year Peak Discharge

- ii) Forebay Discharge Design Flow
($Q_F = 0.02 * Q_{100}$)

- E) Forebay Discharge Design

- F) Discharge Pipe Size (minimum 8-inches)

- G) Rectangular Notch Width

$V_{MIN} =$ ac-ft

$V_F =$ ac-ft

$D_F =$ in

$Q_{100} =$ cfs

$Q_F =$ cfs

Choose One

- ☐ Berm With Pipe
☒ Wall with Rect. Notch
☐ Wall with V-Notch Weir

Flow too small for berm w/ pipe

Calculated $D_P =$ in

Calculated $W_N =$ in

Design Procedure Form: Extended Detention Basin (EDB)

Sheet 2 of 3

Designer: Thayne Clement
 Company: Del-Mont Consultants
 Date: June 20, 2025
 Project: Crosspoint Substation
 Location: Yoder, CO

6. Trickle Channel

A) Type of Trickle Channel

F) Slope of Trickle Channel

Choose One
☒ Concrete
☐ Soft Bottom

S = 0.0050 ft / ft

7. Micropool and Outlet Structure

A) Depth of Micropool (2.5-foot minimum)

B) Surface Area of Micropool (10 ft² minimum)

C) Outlet Type

D) Smallest Dimension of Orifice Opening Based on Hydrograph Routing
 (Use UD-Detention)

E) Total Outlet Area

D_M = 2.5 ft

A_M = 10 sq ft

Choose One
☒ Orifice Plate
☐ Other (Describe):

D_{orifice} = 1.13 inches

A_{ot} = 8.50 square inches

8. Initial Surge Volume

A) Depth of Initial Surge Volume
 (Minimum recommended depth is 4 inches)

B) Minimum Initial Surge Volume
 (Minimum volume of 0.3% of the WQCV)

C) Initial Surge Provided Above Micropool

D_{IS} = 4 in

V_{IS} = 38 cu ft

V_s = 3.3 cu ft

9. Trash Rack

A) Water Quality Screen Open Area: $A_t = A_{ot} * 38.5 * (e^{-0.095D})$

B) Type of Screen (If specifying an alternative to the materials recommended in the USDCM, indicate "other" and enter the ratio of the total open area to the total screen area for the material specified.)

Other (Y/N): N

C) Ratio of Total Open Area to Total Area (only for type 'Other')

D) Total Water Quality Screen Area (based on screen type)

E) Depth of Design Volume (EURV or WQCV)
 (Based on design concept chosen under 1E)

F) Height of Water Quality Screen (H_{TR})

G) Width of Water Quality Screen Opening (W_{opening})
 (Minimum of 12 inches is recommended)

A_t = 294 square inches

S.S. Well Screen with 60% Open Area

User Ratio =

A_{total} = 490 sq. in.

H = 1.77 feet

H_{TR} = 49.24 inches

W_{opening} = 12.0 inches

VALUE LESS THAN RECOMMENDED MIN. WIDTH.
 WIDTH HAS BEEN SET TO 12 INCHES.

Design Procedure Form: Extended Detention Basin (EDB)

Sheet 3 of 3

Designer: Thayne Clement
Company: Del-Mont Consultants
Date: June 20, 2025
Project: Crosspoint Substation
Location: Yoder, CO

10. Overflow Embankment

A) Describe embankment protection for 100-year and greater overtopping:

B) Slope of Overflow Embankment
 (Horizontal distance per unit vertical, 4:1 or flatter preferred)

Ze = ft / ft

11. Vegetation

Choose One
☐ Irrigated
☒ Not Irrigated

12. Access

A) Describe Sediment Removal Procedures

Notes:

Emergency Spillway Calculations

RipRap Sizing		
Izbash Formula: $D50 = (V^2) / (2 * 32.2 * (0.86^2) * (2.55 - 1))^{1/2}$		
Assume RipRap Specific Gravity 2.55		
Variable	Input	Units
100 year Discharge Rate (Q)	35	cfs
Discharge Velocity (V)	2.57	ft/s
Required D50 Value	1.07	in
Provided D50 Value	6.00	in

Spillway Geometry		
Spillway Bottom Width	10	ft
Spillway Side Slope (X:1)	4	ft
100yr Flow Depth	0.98	ft
Spillway XS Area	13.64	sqft

East Drainage Swale

Bottom Width: 4 ft

Side Slopes: 4:1

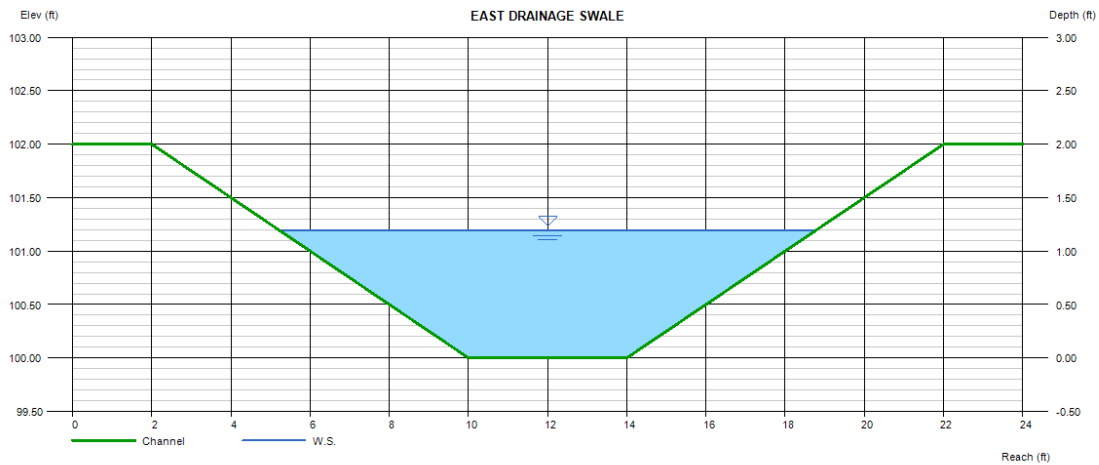
Depth: 2 ft

Running Slope: 1%

Mannings n Value: 0.027

Required Capacity for 100 year storm discharge : 47.13 cfs

Flow Depth for 100 year Discharge: 1.19 ft



Depth	Q	Area	Veloc	Wp	Yc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
1.19	47.13	10.42	4.52	13.81	1.14	13.52	1.51

Appendix B

Rational Method Modeling Results



Project Description

File Name 23148-RM5.SPF

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method Rational
Time of Concentration (TOC) Method User-Defined
Link Routing Method Kinematic Wave
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:05:00 days hh:mm:ss
Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins.....	19
Nodes.....	31
<i>Junctions</i>	23
<i>Outfalls</i>	7
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	1
Links.....	32
<i>Channels</i>	0
<i>Pipes</i>	23
<i>Pumps</i>	0
<i>Orifices</i>	7
<i>Weirs</i>	2
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period..... 5 year(s)

Subbasin Summary

SN	Subbasin ID	Area	Weighted Runoff Coefficient	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)		(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	E1	31.82	0.0900	1.16	0.11	3.34	7.59	0 00:26:17
2	E2	15.06	0.0900	1.16	0.11	1.58	3.59	0 00:26:17
3	E3	26.94	0.0900	1.17	0.11	2.83	6.40	0 00:26:33
4	E4	7.85	0.0900	1.16	0.11	0.82	1.87	0 00:26:17
5	EDB	1.02	0.9000	0.69	0.62	0.63	3.79	0 00:10:00
6	P1-N	22.03	0.0900	1.16	0.11	2.31	5.26	0 00:26:17
7	P1-S	6.35	0.0900	1.16	0.11	0.67	1.52	0 00:26:17
8	P2	9.34	0.0900	1.16	0.11	0.98	2.23	0 00:26:17
9	P3	25.46	0.0900	1.17	0.11	2.67	6.04	0 00:26:33
10	Y1	1.02	0.5900	0.72	0.43	0.43	2.40	0 00:10:52
11	Y10	1.17	0.5900	0.75	0.44	0.52	2.71	0 00:11:25
12	Y2	1.02	0.5900	0.72	0.43	0.43	2.40	0 00:10:52
13	Y3	0.99	0.5900	0.72	0.42	0.42	2.36	0 00:10:36
14	Y4	0.99	0.5900	0.72	0.42	0.42	2.36	0 00:10:36
15	Y5	0.49	0.5900	0.69	0.41	0.20	1.19	0 00:10:00
16	Y6	0.49	0.5900	0.69	0.41	0.20	1.19	0 00:10:00
17	Y7	1.21	0.5900	0.70	0.41	0.50	2.91	0 00:10:19
18	Y8	1.07	0.5900	0.70	0.41	0.44	2.57	0 00:10:19
19	Y9	1.17	0.5900	0.74	0.44	0.51	2.73	0 00:11:08

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)		(ac-in)	(min)
1	Culvert-In	Junction	6174.43	6177.00	0.00	0.00	0.00	5.26	6174.96	0.00	2.04	0 00:00	0.00	0.00
2	Culvert-Out	Junction	6174.22	6177.00	0.00	0.00	0.00	5.25	6174.75	0.00	2.25	0 00:00	0.00	0.00
3	Forebay	Junction	6189.21	6191.50	6189.21	0.00	0.00	21.31	6190.35	0.00	1.86	0 00:00	0.00	0.00
4	J-01	Junction	6196.03	6198.98	6196.03	6195.86	0.00	2.40	6196.58	0.00	2.40	0 00:00	0.00	0.00
5	J-02	Junction	6195.11	6198.30	6195.11	6195.00	0.00	2.39	6195.91	0.00	2.39	0 00:00	0.00	0.00
6	J-03	Junction	6194.13	6197.33	6194.13	6194.11	0.00	4.69	6194.86	0.00	2.47	0 00:00	0.00	0.00
7	J-04	Junction	6194.04	6197.46	6194.04	6194.05	0.00	4.69	6194.82	0.00	2.64	0 00:00	0.00	0.00
8	J-05	Junction	6194.95	6198.18	6194.95	6194.95	0.00	2.36	6195.49	0.00	2.69	0 00:00	0.00	0.00
9	J-06	Junction	6194.03	6197.50	6194.03	6194.00	0.00	2.34	6194.82	0.00	2.68	0 00:00	0.00	0.00
10	J-07	Junction	6193.05	6196.53	6193.05	6193.20	0.00	4.59	6193.77	0.00	2.76	0 00:00	0.00	0.00
11	J-08	Junction	6192.46	6196.68	6192.46	6193.49	0.00	9.19	6193.74	0.00	2.94	0 00:00	0.00	0.00
12	J-09	Junction	6194.15	6197.10	6194.15	6193.08	0.00	1.19	6194.48	0.00	2.62	0 00:00	0.00	0.00
13	J-10	Junction	6190.90	6195.96	6190.90	6192.65	0.00	11.25	6192.47	0.00	3.49	0 00:00	0.00	0.00
14	J-11	Junction	6193.24	6196.48	6193.24	6193.50	0.00	2.91	6193.85	0.00	2.63	0 00:00	0.00	0.00
15	J-12	Junction	6192.32	6195.80	6192.32	6103.00	0.00	2.89	6193.18	0.00	2.62	0 00:00	0.00	0.00
16	J-13	Junction	6190.84	6194.83	6190.84	0.00	0.00	5.35	6191.89	0.00	2.94	0 00:00	0.00	0.00
17	J-14	Junction	6192.59	6195.78	6192.59	6194.61	0.00	2.73	6193.18	0.00	2.60	0 00:00	0.00	0.00
18	J-15	Junction	6191.66	6195.10	6191.66	6194.00	0.00	2.71	6192.49	0.00	2.61	0 00:00	0.00	0.00
19	J-16	Junction	6191.01	6194.13	6191.01	6192.86	0.00	5.38	6191.91	0.00	2.22	0 00:00	0.00	0.00
20	J-17	Junction	6190.95	6194.31	6190.95	6192.80	0.00	5.37	6191.85	0.00	2.46	0 00:00	0.00	0.00
21	J-18	Junction	6189.75	6195.02	6189.75	6192.31	0.00	21.31	6191.46	0.00	3.56	0 00:00	0.00	0.00
22	OutletPipe	Junction	6187.31	6188.81	6187.31	0.00	0.00	0.20	6187.47	0.00	5.84	0 00:00	0.00	0.00
23	OutletStructure	Junction	6187.67	6194.00	6187.67	0.00	0.00	0.20	6187.83	0.00	6.17	0 00:00	0.00	0.00
24	E-Out-1	Outfall	6173.75					7.59	6173.75					
25	E-Out-2	Outfall	6187.75					3.59	6187.75					
26	E-Out-3	Outfall	6195.50					6.39	6195.50					
27	E-Out-4	Outfall	6196.00					1.87	6196.00					
28	P-Out-1	Outfall	6173.75					6.76	6173.75					
29	P-Out-2	Outfall	6186.00					2.43	6186.00					
30	P-Out-3	Outfall	6195.50					6.04	6195.50					
31	DetentionPond	Storage Node	6188.00	6194.00	0.00		0.00	24.48	6190.13				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	10-30NP	Pipe	J-10	J-18	122.00	6190.90	6190.29	0.5000	24.000	0.0120	11.24	17.33	0.65	5.89	1.17	0.59	0.00	Calculated
2	11-15NP	Pipe	J-11	J-12	91.22	6193.24	6192.57	0.7300	15.000	0.0120	2.89	6.00	0.48	5.95	0.61	0.49	0.00	Calculated
3	12-18P	Pipe	J-12	J-13	130.69	6192.32	6191.34	0.7500	18.000	0.0120	2.87	9.85	0.29	4.87	0.55	0.37	0.00	Calculated
4	13-24NP	Pipe	J-13	J-18	11.92	6190.84	6190.75	0.7600	24.000	0.0120	5.35	21.30	0.25	5.64	0.68	0.34	0.00	Calculated
5	14-15NP	Pipe	J-14	J-15	90.26	6192.59	6191.91	0.7500	15.000	0.0120	2.71	6.07	0.45	5.77	0.58	0.47	0.00	Calculated
6	15-18P	Pipe	J-15	J-16	130.00	6191.66	6191.01	0.5000	18.000	0.0120	2.69	8.05	0.33	4.13	0.60	0.40	0.00	Calculated
7	16-18NP	Pipe	J-16	J-17	11.92	6191.01	6190.95	0.5000	18.000	0.0120	5.37	8.07	0.67	4.89	0.89	0.60	0.00	Calculated
8	17-18NP	Pipe	J-17	J-18	240.00	6190.95	6189.75	0.5000	18.000	0.0120	5.29	8.05	0.66	4.93	0.89	0.59	0.00	Calculated
9	18-36NP	Pipe	J-18	Forebay	58.84	6189.75	6189.21	0.9200	36.000	0.0120	21.31	69.22	0.31	8.62	1.14	0.38	0.00	Calculated
10	1-NP15	Pipe	J-01	J-02	89.45	6196.03	6195.36	0.7500	15.000	0.0120	2.39	6.06	0.39	5.65	0.54	0.44	0.00	Calculated
11	2-18P	Pipe	J-02	J-03	130.81	6195.11	6194.13	0.7500	18.000	0.0120	2.37	9.85	0.24	4.62	0.50	0.33	0.00	Calculated
12	3-18NP	Pipe	J-03	J-04	11.92	6194.13	6194.04	0.7600	18.000	0.0120	4.69	9.89	0.47	5.52	0.73	0.48	0.00	Calculated
13	4-18NP	Pipe	J-04	J-08	180.00	6194.04	6192.96	0.6000	18.000	0.0120	4.67	8.81	0.53	5.11	0.78	0.52	0.00	Calculated
14	5-15NP	Pipe	J-05	J-06	90.21	6194.95	6194.28	0.7400	15.000	0.0120	2.34	6.03	0.39	5.64	0.54	0.43	0.00	Calculated
15	6-18P	Pipe	J-06	J-07	130.60	6194.03	6193.05	0.7500	18.000	0.0120	2.32	9.86	0.24	4.59	0.49	0.33	0.00	Calculated
16	7-18NP	Pipe	J-07	J-08	11.92	6193.05	6192.96	0.7600	18.000	0.0120	4.59	9.89	0.46	5.49	0.72	0.48	0.00	Calculated
17	8-24NP	Pipe	J-08	J-10	168.00	6192.46	6191.40	0.6300	24.000	0.0120	9.17	19.47	0.47	6.14	0.97	0.48	0.00	Calculated
18	9-15P	Pipe	J-09	J-10	152.67	6194.15	6192.15	1.3100	15.000	0.0120	1.18	8.01	0.15	6.44	0.32	0.26	0.00	Calculated
19	Culvert	Pipe	Culvert-In	Culvert-Out	42.05	6174.43	6174.22	0.5000	24.000	0.0120	5.25	34.64	0.15	3.98	0.53	0.26	0.00	Calculated
20	Link-03	Pipe	OutletPipe	P-Out-2	228.62	6187.31	6186.00	0.5700	0.000	0.0150	0.20	0.00	0.15	0.00	0.53	0.26	0.00	Calculated
21	Link-09	Pipe	Culvert-Out	P-Out-1	438.78	6174.21	6173.75	0.1000	0.000	0.0150	5.25	0.00	0.15	0.00	0.53	0.26	0.00	Calculated
22	OutletPipe	Pipe	OutletStructure	OutletPipe	58.32	6187.67	6187.31	0.6200	18.000	0.0120	0.20	8.94	0.02	2.02	0.16	0.11	0.00	Calculated
23	TrklChnl	Pipe	Forebay	DetentionPond	164.17	6189.73	6188.25	0.9000	0.000	0.0150	21.31	0.00	0.02	0.00	0.16	0.11	0.00	Calculated
24	Orifice-01	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.000		0.04							
25	Orifice-02	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.000		0.04							
26	Orifice-03	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.000		0.03							
27	Orifice-04	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.500		0.06							
28	Orifice-05	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.500		0.04							
29	Orifice-06	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		2.000		0.00							
30	Orifice-07	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		2.000		0.00							
31	EmergencySpillway	Weir	DetentionPond	OutletPipe		6188.00	6187.31				0.00							
32	Weir	Weir	DetentionPond	OutletStructure		6188.00	6187.67				0.00							

Subbasin : E1

Input Data

Area (ac) 31.82
Weighted Runoff Coefficient 0.09

Runoff Coefficient

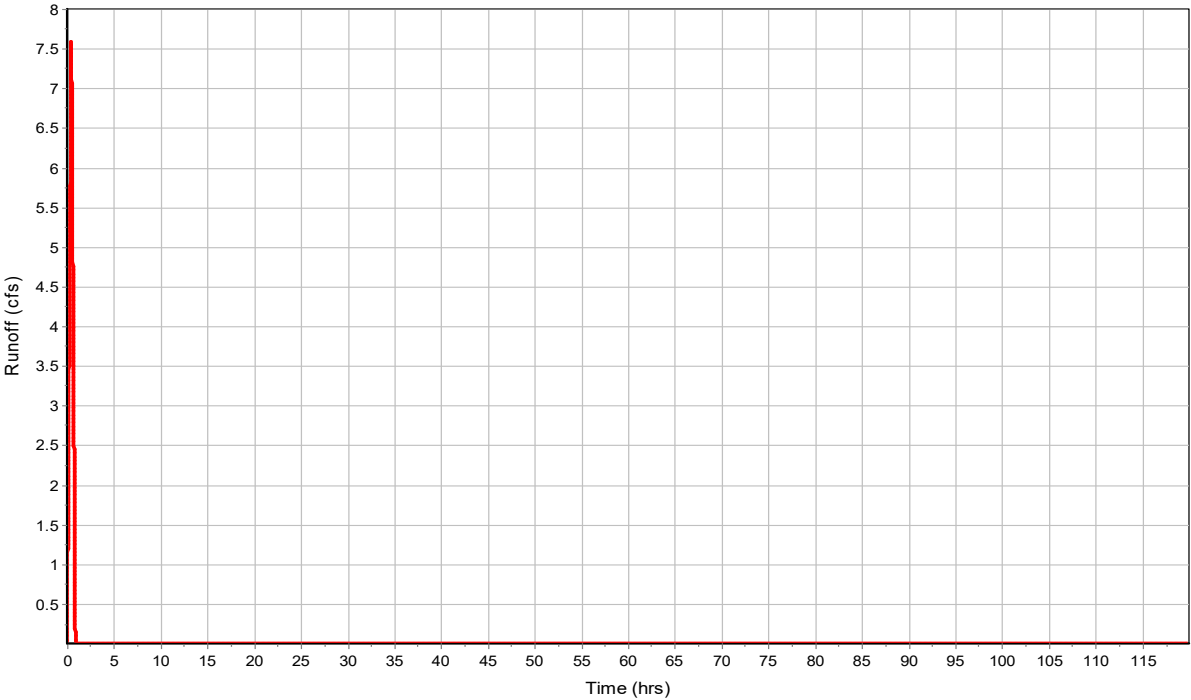
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	31.78	-	0.09
Composite Area & Weighted Runoff Coeff.	31.78		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 0.11
Peak Runoff (cfs) 7.59
Rainfall Intensity 2.651
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : E1

Runoff Hydrograph



Subbasin : E2

Input Data

Area (ac) 15.06
Weighted Runoff Coefficient 0.09

Runoff Coefficient

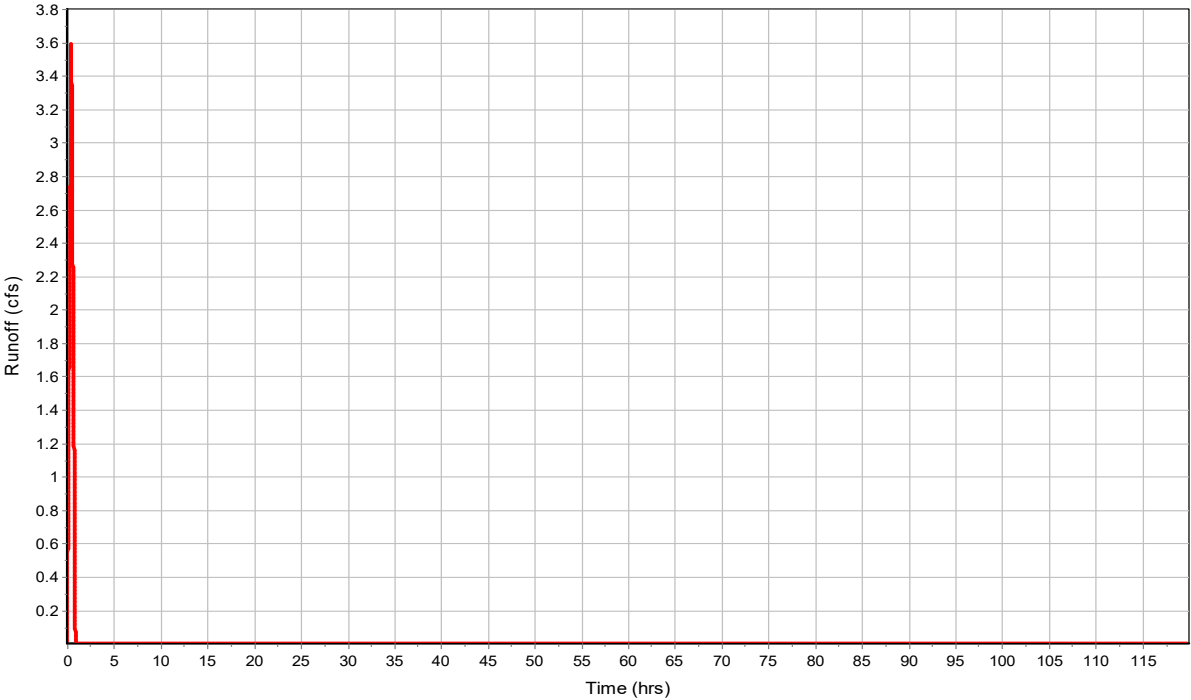
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	14.81	-	0.09
Composite Area & Weighted Runoff Coeff.	14.81		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 0.11
Peak Runoff (cfs) 3.59
Rainfall Intensity 2.651
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : E2

Runoff Hydrograph



Subbasin : E3

Input Data

Area (ac) 26.94
Weighted Runoff Coefficient 0.09

Runoff Coefficient

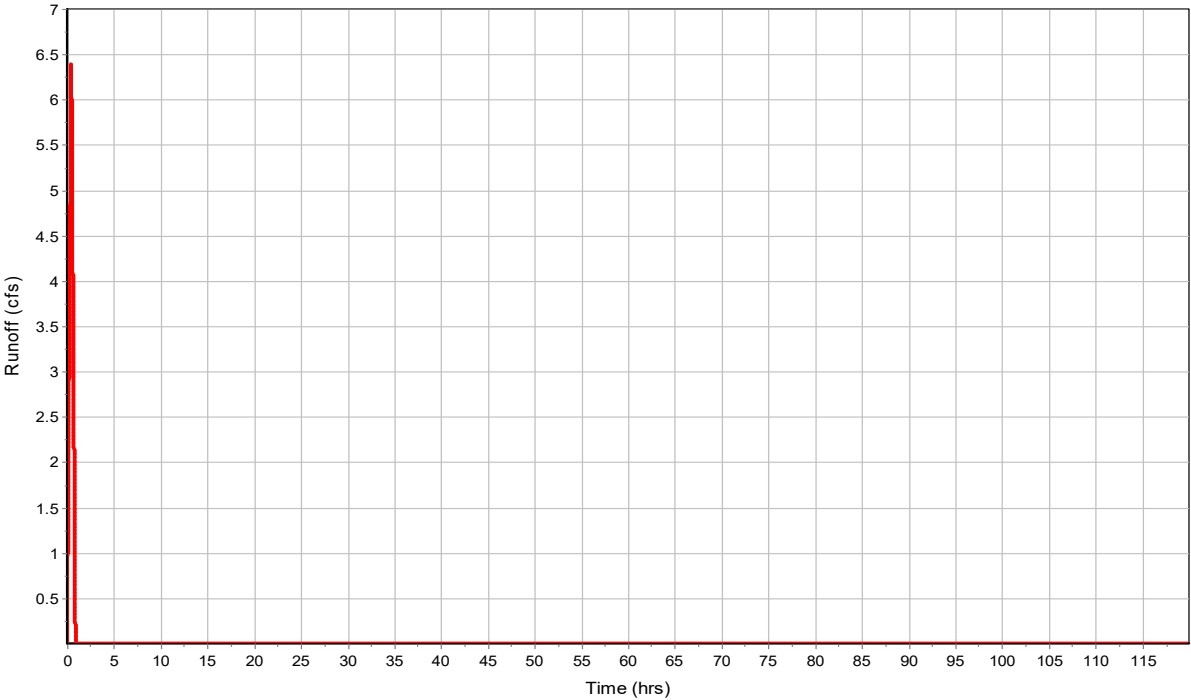
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	26.94	-	0.09
Composite Area & Weighted Runoff Coeff.	26.94		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.17
Total Runoff (in) 0.11
Peak Runoff (cfs) 6.4
Rainfall Intensity 2.637
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:34

Subbasin : E3

Runoff Hydrograph



Subbasin : E4

Input Data

Area (ac) 7.85
Weighted Runoff Coefficient 0.09

Runoff Coefficient

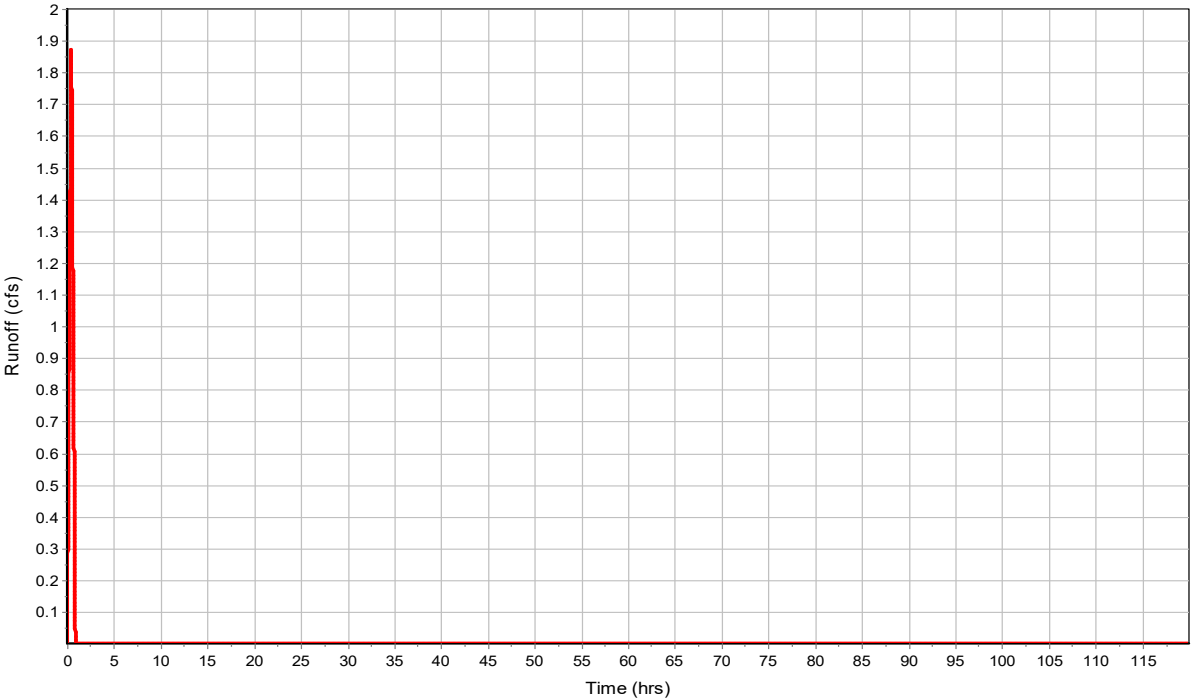
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	7.85	-	0.09
Composite Area & Weighted Runoff Coeff.	7.85		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 0.11
Peak Runoff (cfs) 1.87
Rainfall Intensity 2.651
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : E4

Runoff Hydrograph



Subbasin : EDB

Input Data

Area (ac) 1.02
Weighted Runoff Coefficient 0.9

Runoff Coefficient

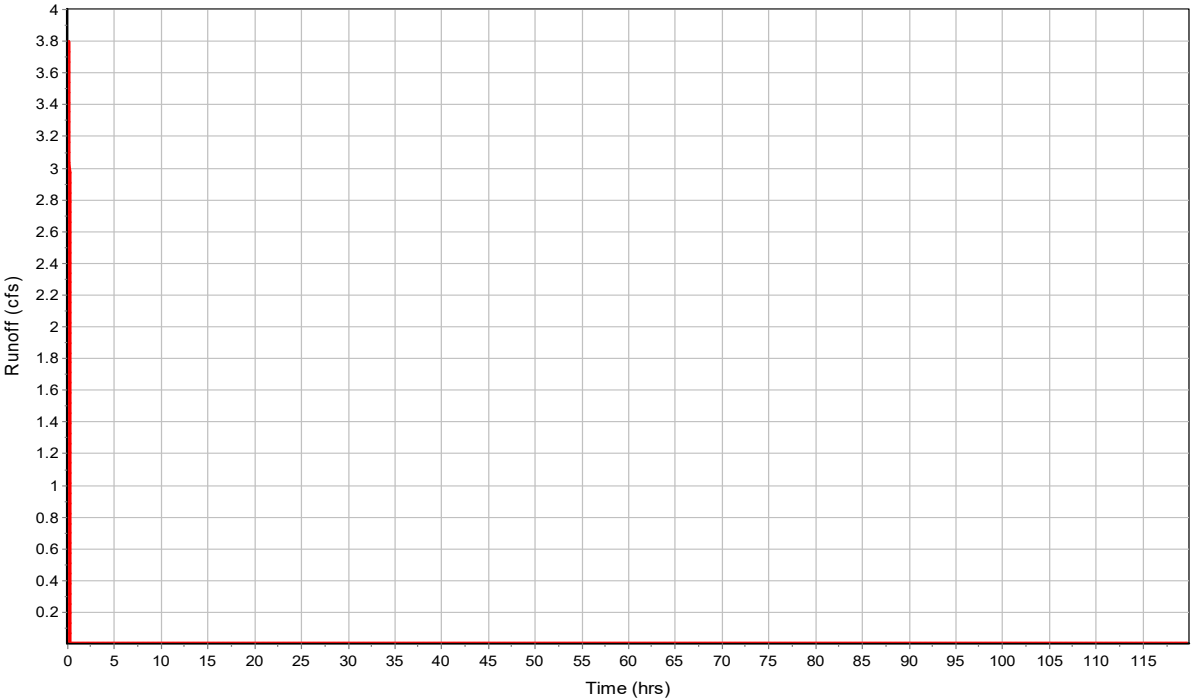
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.02	-	0.9
Composite Area & Weighted Runoff Coeff.	1.02		0.9

Subbasin Runoff Results

Total Rainfall (in) 0.69
Total Runoff (in) 0.62
Peak Runoff (cfs) 3.79
Rainfall Intensity 4.13
Weighted Runoff Coefficient 0.9
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : EDB

Runoff Hydrograph



Subbasin : P1-N

Input Data

Area (ac) 22.03
Weighted Runoff Coefficient 0.09

Runoff Coefficient

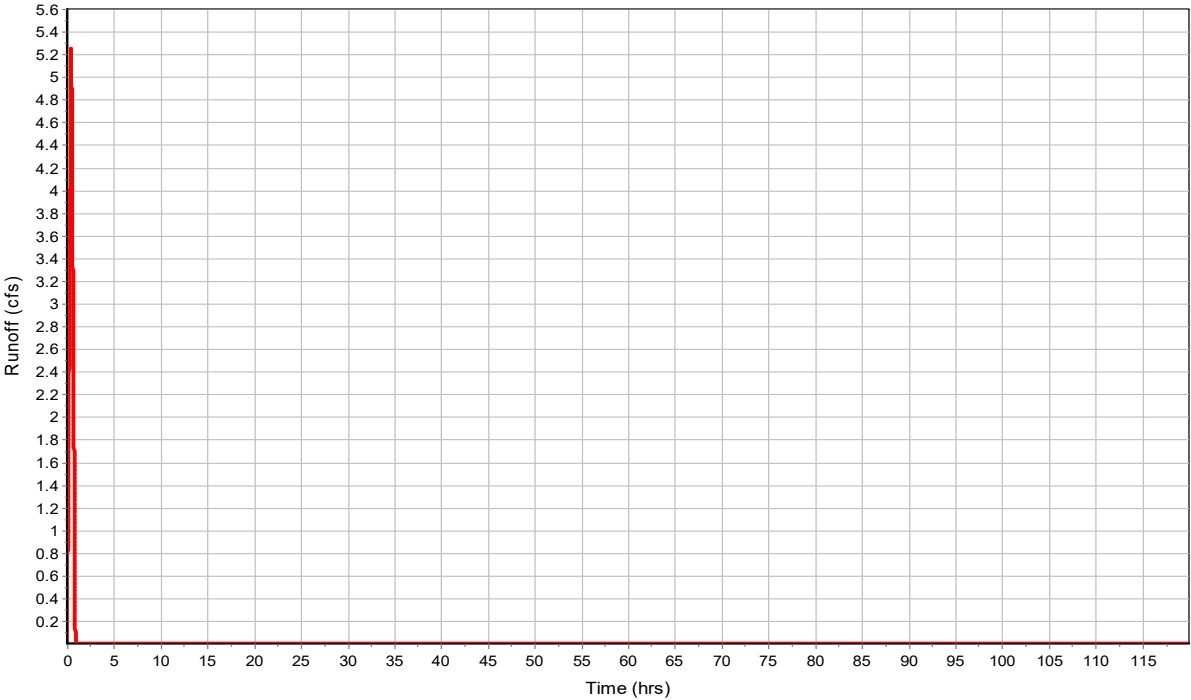
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	22.03	-	0.09
Composite Area & Weighted Runoff Coeff.	22.03		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 0.11
Peak Runoff (cfs) 5.26
Rainfall Intensity 2.651
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : P1-N

Runoff Hydrograph



Subbasin : P1-S

Input Data

Area (ac) 6.35
Weighted Runoff Coefficient 0.09

Runoff Coefficient

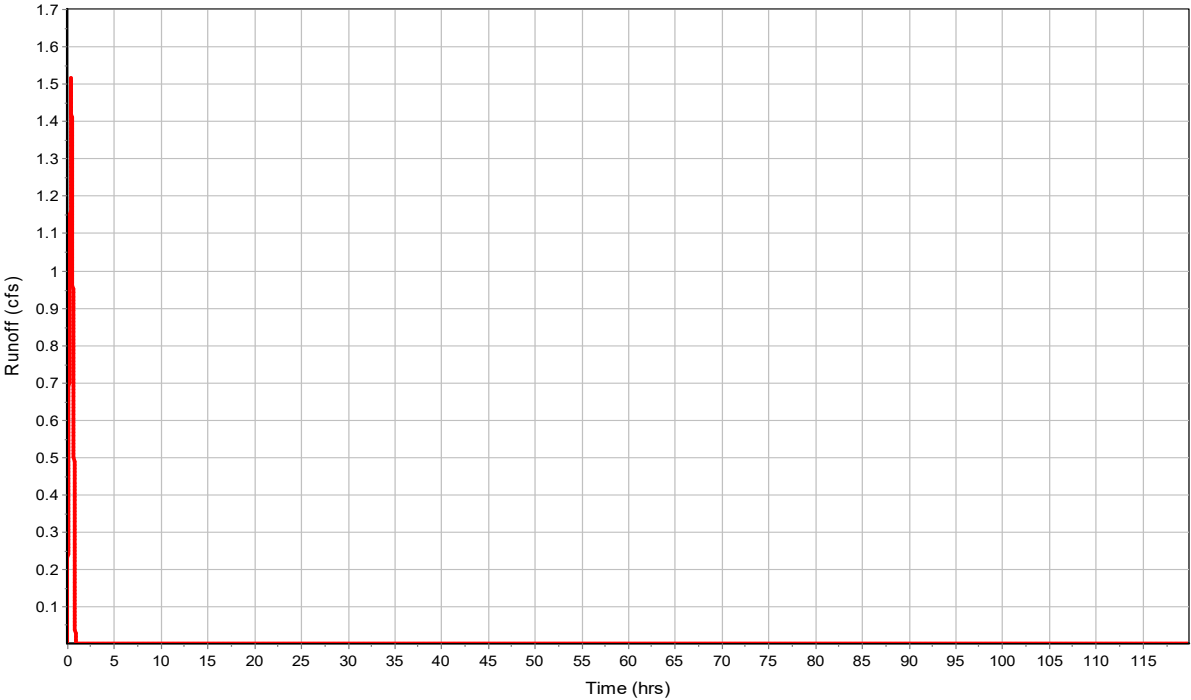
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	6.35	-	0.09
Composite Area & Weighted Runoff Coeff.	6.35		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 0.11
Peak Runoff (cfs) 1.52
Rainfall Intensity 2.651
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : P1-S

Runoff Hydrograph



Subbasin : P2

Input Data

Area (ac) 9.34
Weighted Runoff Coefficient 0.09

Runoff Coefficient

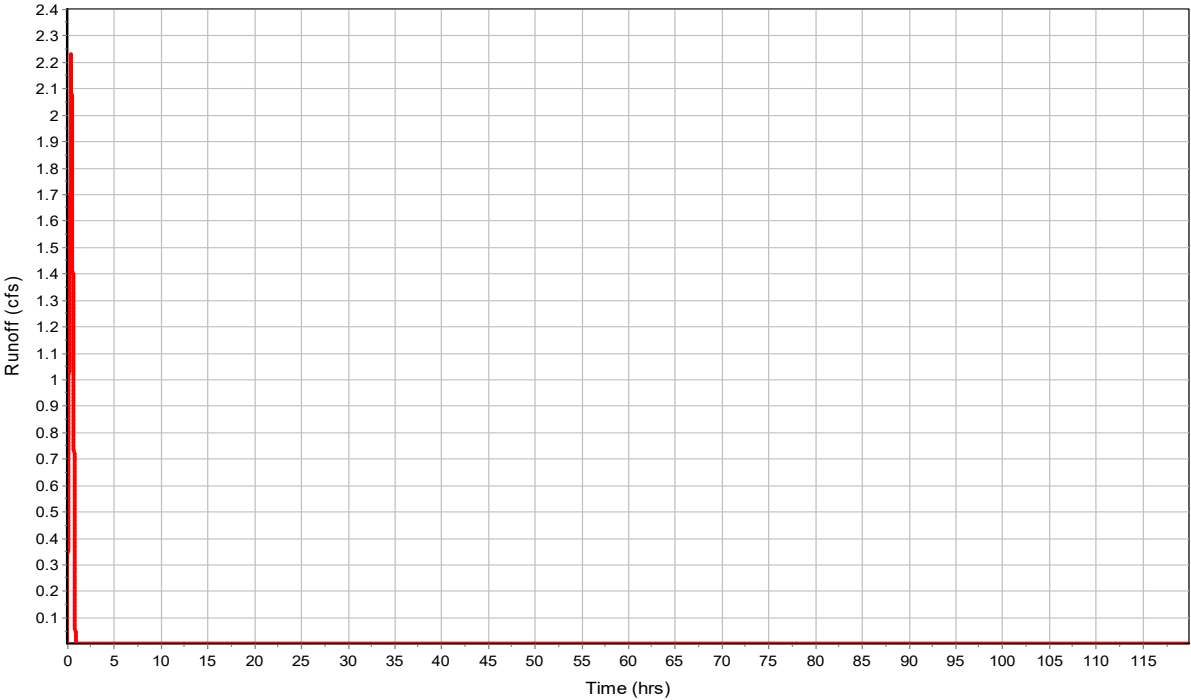
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	9.34	-	0.09
Composite Area & Weighted Runoff Coeff.	9.34		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 0.11
Peak Runoff (cfs) 2.23
Rainfall Intensity 2.651
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : P2

Runoff Hydrograph



Subbasin : P3

Input Data

Area (ac) 25.46
Weighted Runoff Coefficient 0.09

Runoff Coefficient

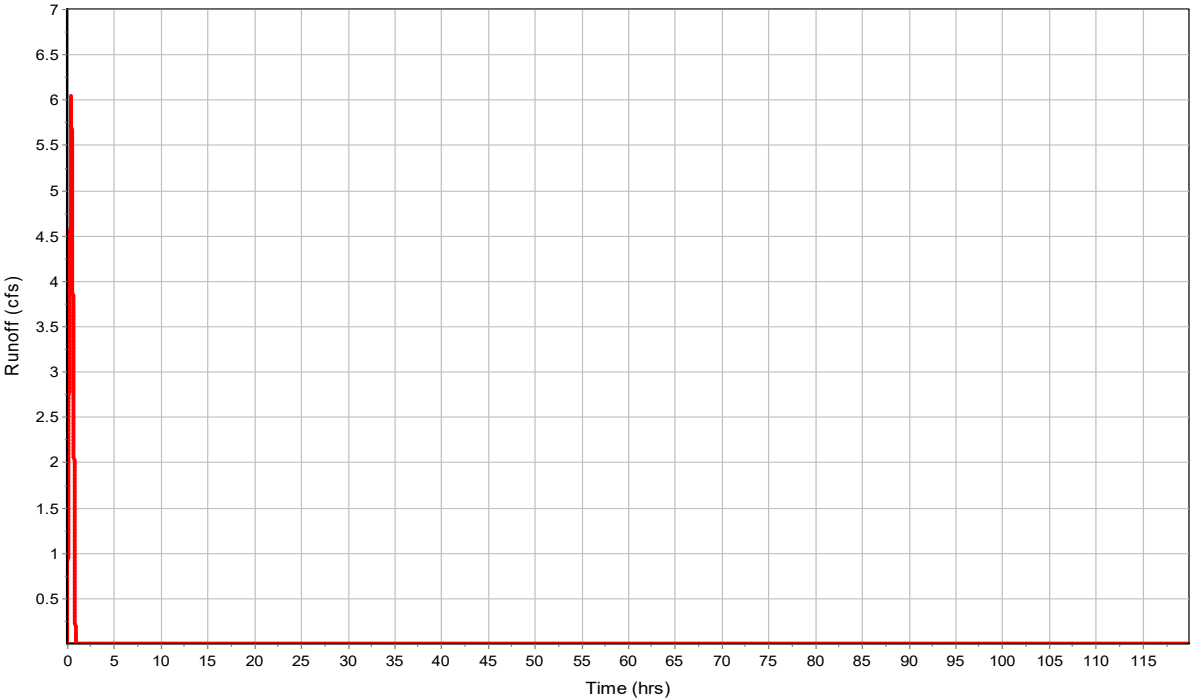
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	25.46	-	0.09
Composite Area & Weighted Runoff Coeff.	25.46		0.09

Subbasin Runoff Results

Total Rainfall (in) 1.17
Total Runoff (in) 0.11
Peak Runoff (cfs) 6.04
Rainfall Intensity 2.637
Weighted Runoff Coefficient 0.09
Time of Concentration (days hh:mm:ss) 0 00:26:34

Subbasin : P3

Runoff Hydrograph



Subbasin : Y1

Input Data

Area (ac) 1.02
Weighted Runoff Coefficient 0.59

Runoff Coefficient

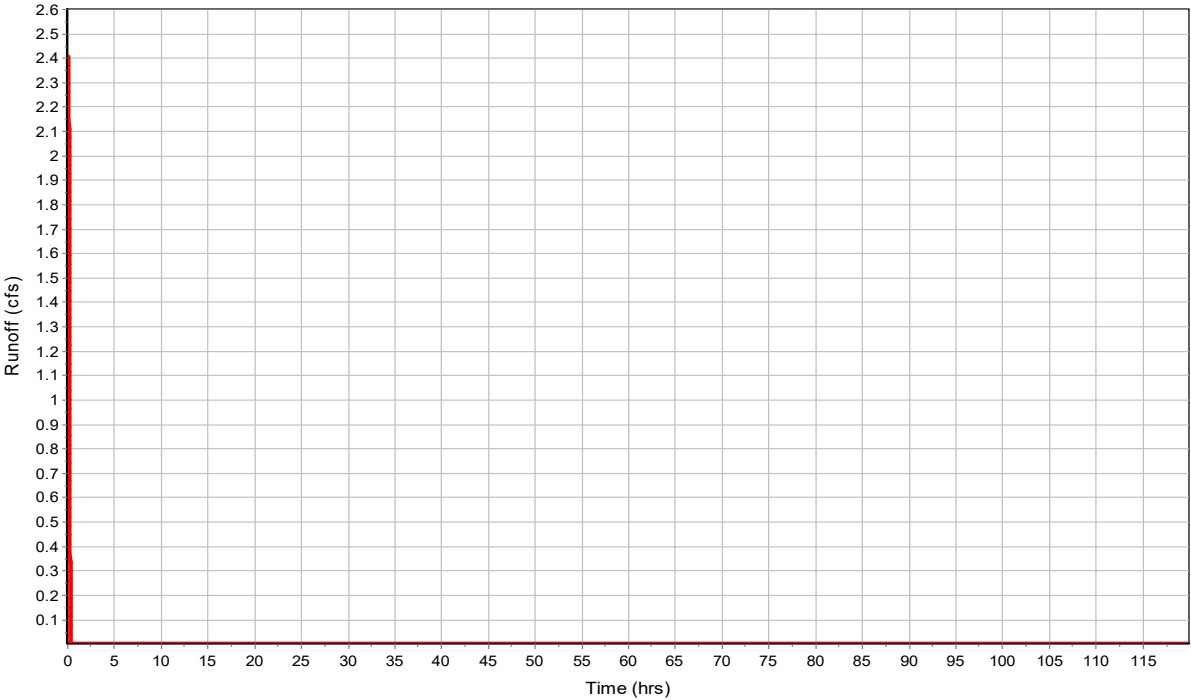
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.02	-	0.59
Composite Area & Weighted Runoff Coeff.	1.02		0.59

Subbasin Runoff Results

Total Rainfall (in) 0.72
Total Runoff (in) 0.43
Peak Runoff (cfs) 2.4
Rainfall Intensity 3.995
Weighted Runoff Coefficient 0.59
Time of Concentration (days hh:mm:ss) 0 00:10:53

Subbasin : Y1

Runoff Hydrograph



Subbasin : Y10

Input Data

Area (ac) 1.17
Weighted Runoff Coefficient 0.59

Runoff Coefficient

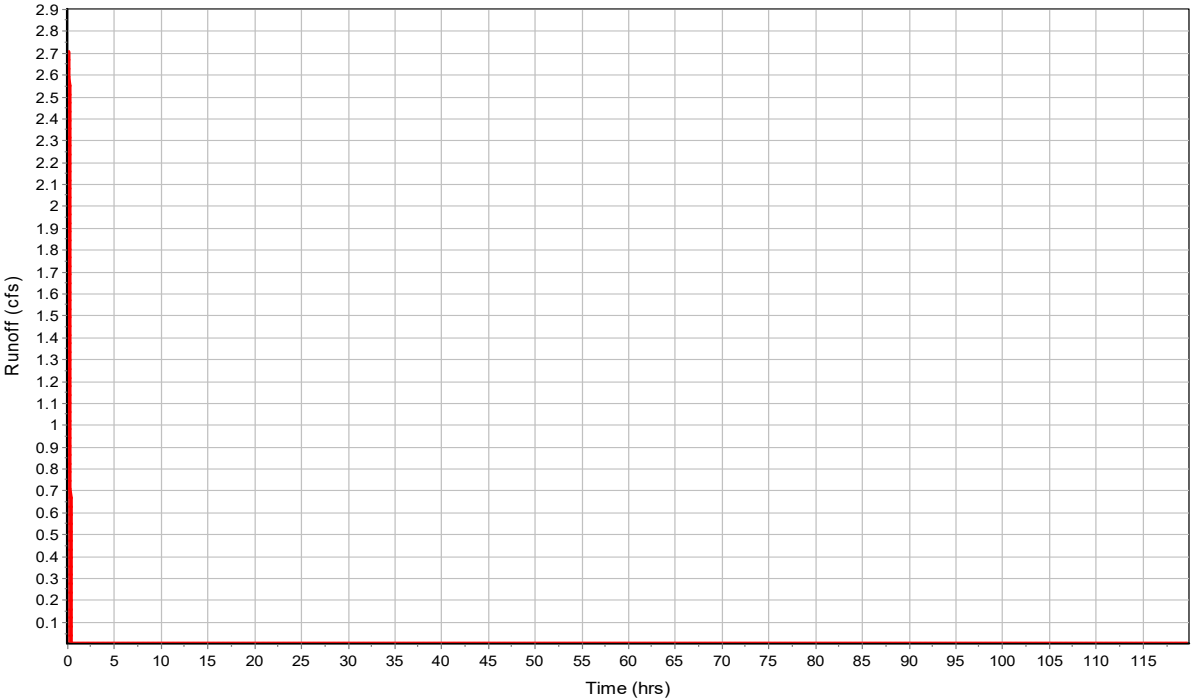
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.17	-	0.59
Composite Area & Weighted Runoff Coeff.	1.17		0.59

Subbasin Runoff Results

Total Rainfall (in) 0.75
Total Runoff (in) 0.44
Peak Runoff (cfs) 2.71
Rainfall Intensity 3.919
Weighted Runoff Coefficient 0.59
Time of Concentration (days hh:mm:ss) 0 00:11:25

Subbasin : Y10

Runoff Hydrograph



Subbasin : Y2

Input Data

Area (ac) 1.02
Weighted Runoff Coefficient 0.59

Runoff Coefficient

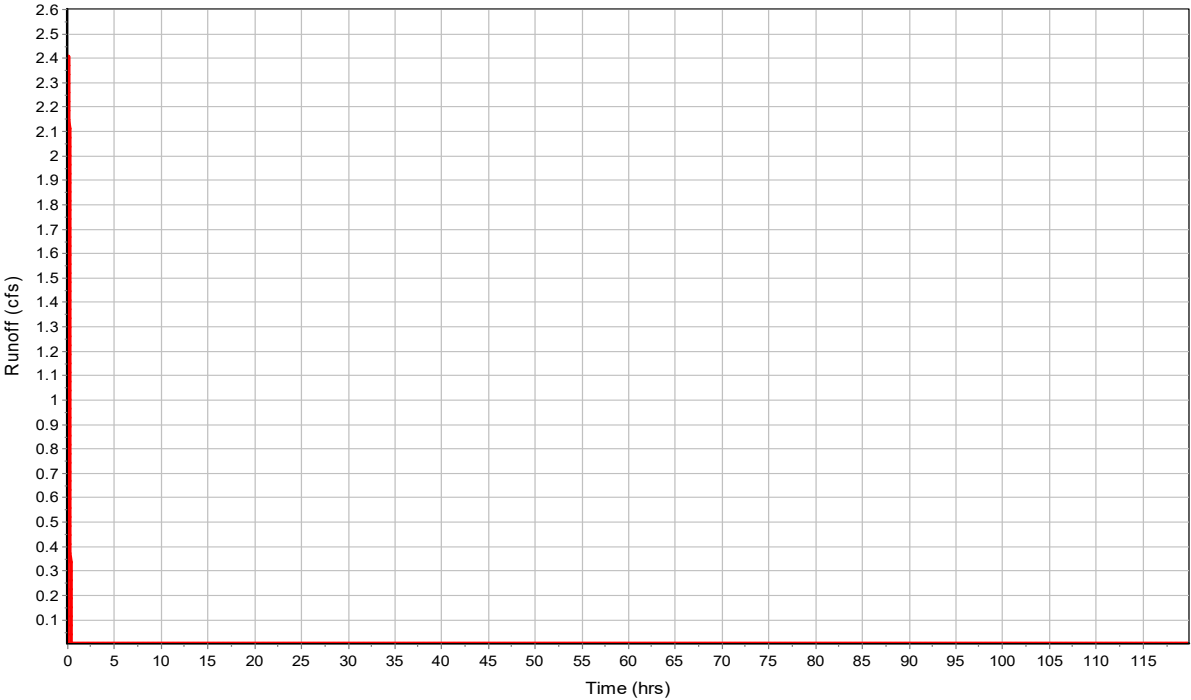
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.02	-	0.59
Composite Area & Weighted Runoff Coeff.	1.02		0.59

Subbasin Runoff Results

Total Rainfall (in) 0.72
Total Runoff (in) 0.43
Peak Runoff (cfs) 2.4
Rainfall Intensity 3.995
Weighted Runoff Coefficient 0.59
Time of Concentration (days hh:mm:ss) 0 00:10:53

Subbasin : Y2

Runoff Hydrograph



Subbasin : Y3

Input Data

Area (ac) 0.99
Weighted Runoff Coefficient 0.59

Runoff Coefficient

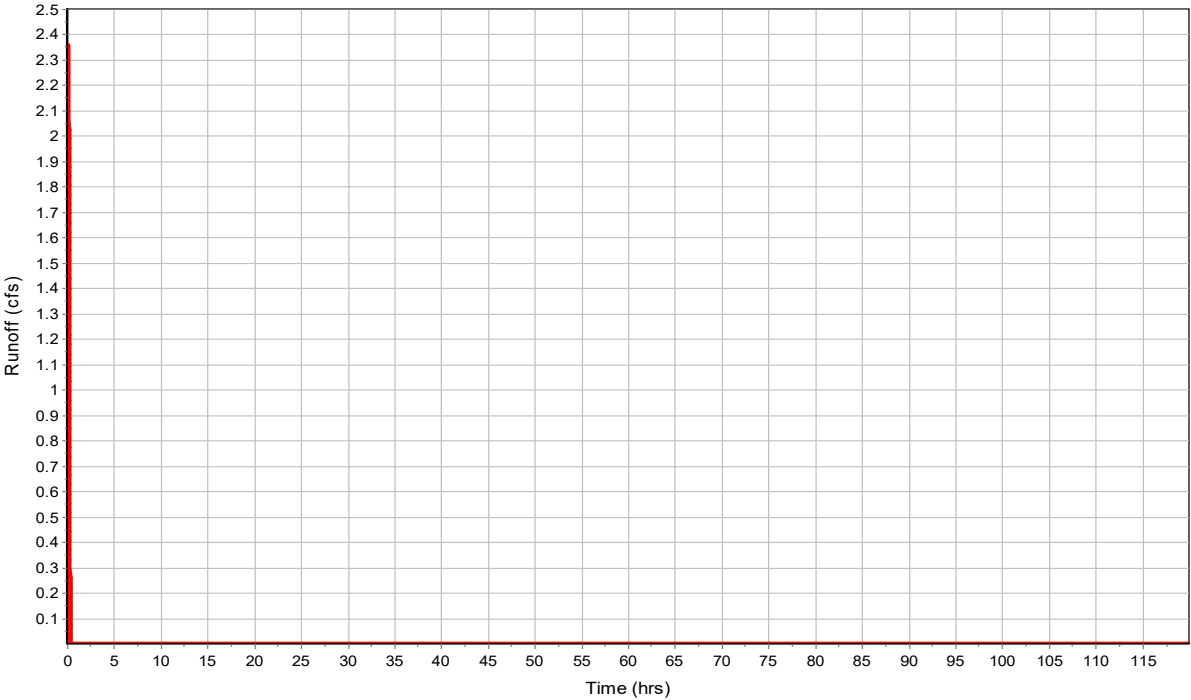
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.99	-	0.59
Composite Area & Weighted Runoff Coeff.	0.99		0.59

Subbasin Runoff Results

Total Rainfall (in) 0.72
Total Runoff (in) 0.42
Peak Runoff (cfs) 2.36
Rainfall Intensity 4.035
Weighted Runoff Coefficient 0.59
Time of Concentration (days hh:mm:ss) 0 00:10:37

Subbasin : Y3

Runoff Hydrograph



Subbasin : Y4

Input Data

Area (ac) 0.99
Weighted Runoff Coefficient 0.59

Runoff Coefficient

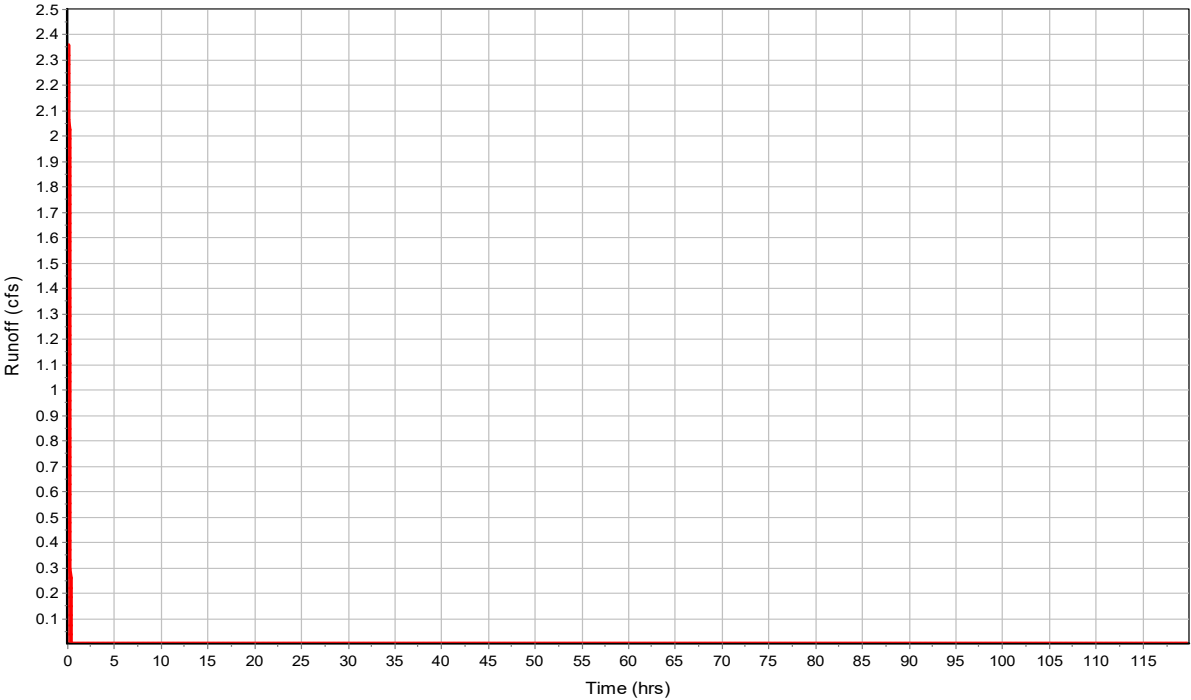
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.99	-	0.59
Composite Area & Weighted Runoff Coeff.	0.99		0.59

Subbasin Runoff Results

Total Rainfall (in) 0.72
Total Runoff (in) 0.42
Peak Runoff (cfs) 2.36
Rainfall Intensity 4.035
Weighted Runoff Coefficient 0.59
Time of Concentration (days hh:mm:ss) 0 00:10:37

Subbasin : Y4

Runoff Hydrograph



Subbasin : Y5

Input Data

Area (ac)	0.49
Weighted Runoff Coefficient	0.59

Runoff Coefficient

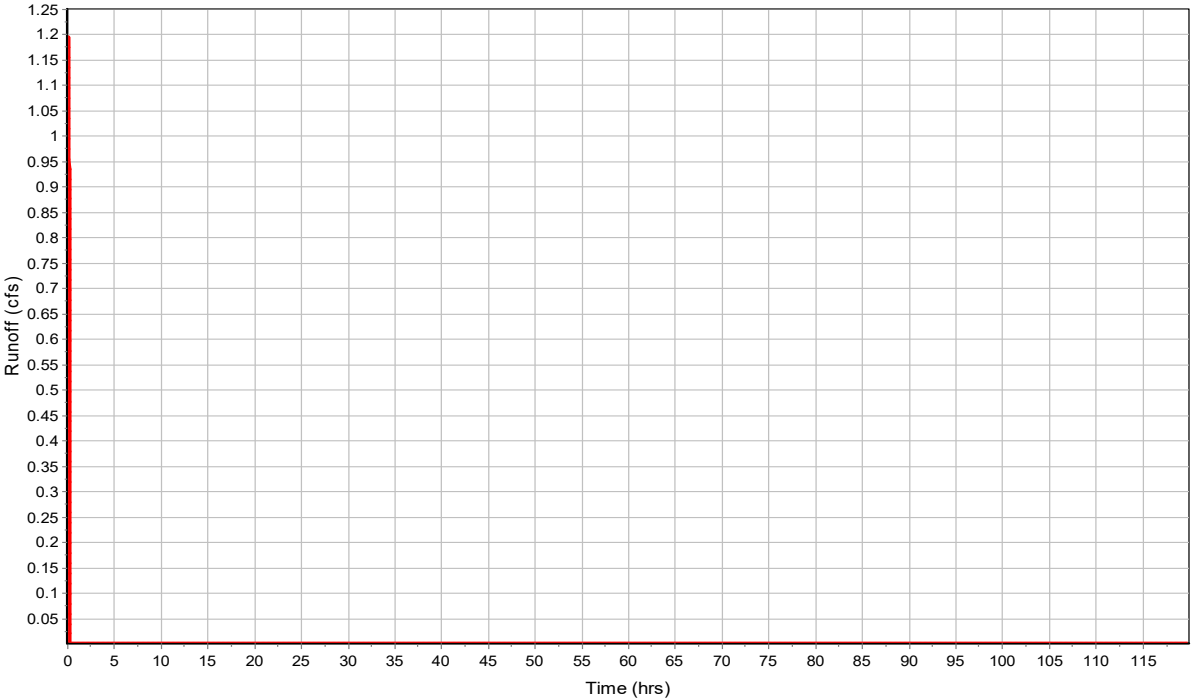
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.49	-	0.59
Composite Area & Weighted Runoff Coeff.	0.49		0.59

Subbasin Runoff Results

Total Rainfall (in)	0.69
Total Runoff (in)	0.41
Peak Runoff (cfs)	1.19
Rainfall Intensity	4.13
Weighted Runoff Coefficient	0.59
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : Y5

Runoff Hydrograph



Subbasin : Y6

Input Data

Area (ac)	0.49
Weighted Runoff Coefficient	0.59

Runoff Coefficient

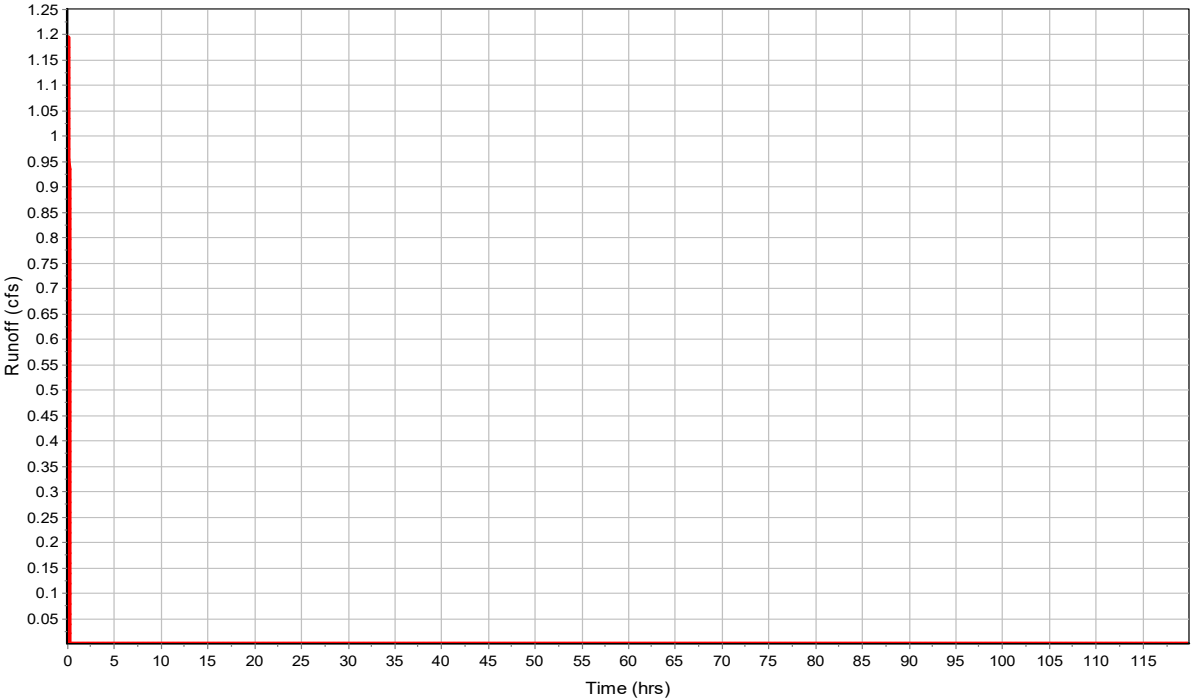
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.49	-	0.59
Composite Area & Weighted Runoff Coeff.	0.49		0.59

Subbasin Runoff Results

Total Rainfall (in)	0.69
Total Runoff (in)	0.41
Peak Runoff (cfs)	1.19
Rainfall Intensity	4.13
Weighted Runoff Coefficient	0.59
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : Y6

Runoff Hydrograph



Subbasin : Y7

Input Data

Area (ac)	1.21
Weighted Runoff Coefficient	0.59

Runoff Coefficient

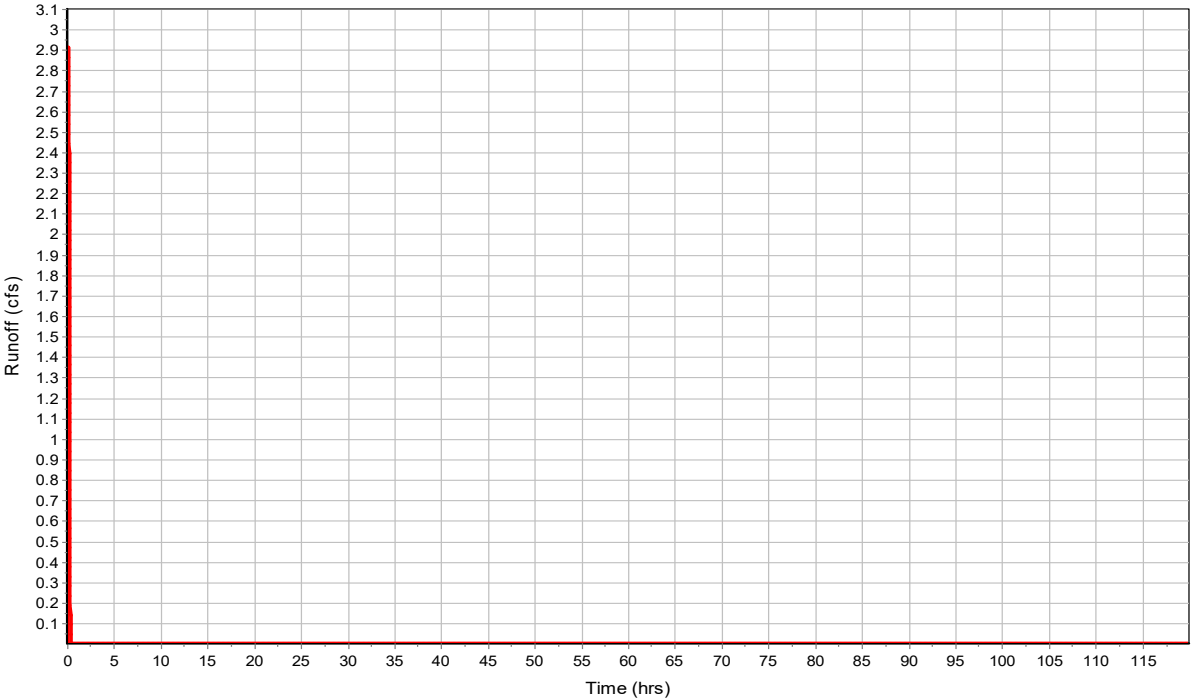
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.21	-	0.59
Composite Area & Weighted Runoff Coeff.	1.21		0.59

Subbasin Runoff Results

Total Rainfall (in)	0.7
Total Runoff (in)	0.41
Peak Runoff (cfs)	2.91
Rainfall Intensity	4.077
Weighted Runoff Coefficient	0.59
Time of Concentration (days hh:mm:ss)	0 00:10:20

Subbasin : Y7

Runoff Hydrograph



Subbasin : Y8

Input Data

Area (ac)	1.07
Weighted Runoff Coefficient	0.59

Runoff Coefficient

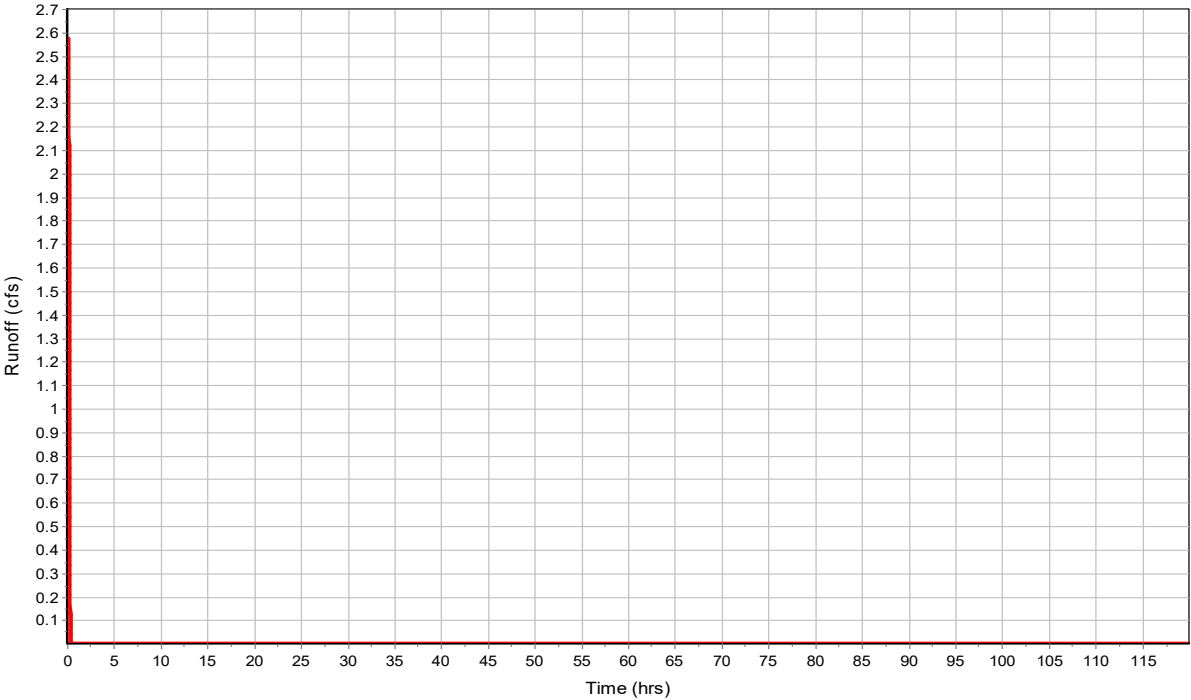
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.07	-	0.59
Composite Area & Weighted Runoff Coeff.	1.07		0.59

Subbasin Runoff Results

Total Rainfall (in)	0.7
Total Runoff (in)	0.41
Peak Runoff (cfs)	2.57
Rainfall Intensity	4.077
Weighted Runoff Coefficient	0.59
Time of Concentration (days hh:mm:ss)	0 00:10:20

Subbasin : Y8

Runoff Hydrograph



Subbasin : Y9

Input Data

Area (ac)	1.17
Weighted Runoff Coefficient	0.59

Runoff Coefficient

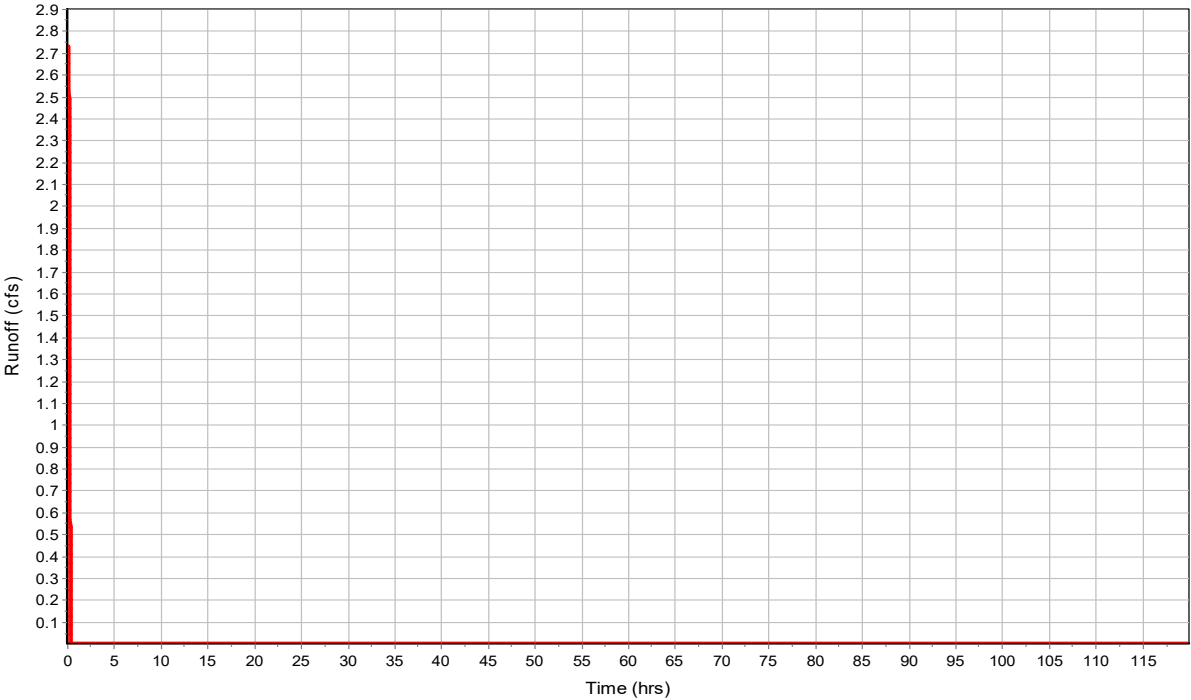
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.17	-	0.59
Composite Area & Weighted Runoff Coeff.	1.17		0.59

Subbasin Runoff Results

Total Rainfall (in)	0.74
Total Runoff (in)	0.44
Peak Runoff (cfs)	2.73
Rainfall Intensity	3.958
Weighted Runoff Coefficient	0.59
Time of Concentration (days hh:mm:ss)	0 00:11:08

Subbasin : Y9

Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	Culvert-In	6174.43	6177.00	2.57	0.00	-6174.43	0.00	-6177.00	0.00	0.00
2	Culvert-Out	6174.22	6177.00	2.78	0.00	-6174.22	0.00	-6177.00	0.00	0.00
3	Forebay	6189.21	6191.50	2.29	6189.21	0.00	0.00	-6191.50	0.00	0.00
4	J-01	6196.03	6198.98	2.95	6196.03	0.00	6195.86	-3.13	0.00	0.00
5	J-02	6195.11	6198.30	3.19	6195.11	0.00	6195.00	-3.30	0.00	0.00
6	J-03	6194.13	6197.33	3.20	6194.13	0.00	6194.11	-3.23	0.00	0.00
7	J-04	6194.04	6197.46	3.42	6194.04	0.00	6194.05	-3.42	0.00	0.00
8	J-05	6194.95	6198.18	3.23	6194.95	0.00	6194.95	-3.23	0.00	0.00
9	J-06	6194.03	6197.50	3.47	6194.03	0.00	6194.00	-3.50	0.00	0.00
10	J-07	6193.05	6196.53	3.48	6193.05	0.00	6193.20	-3.33	0.00	0.00
11	J-08	6192.46	6196.68	4.22	6192.46	0.00	6193.49	-3.19	0.00	0.00
12	J-09	6194.15	6197.10	2.95	6194.15	0.00	6193.08	-4.02	0.00	0.00
13	J-10	6190.90	6195.96	5.06	6190.90	0.00	6192.65	-3.31	0.00	0.00
14	J-11	6193.24	6196.48	3.24	6193.24	0.00	6193.50	-2.98	0.00	0.00
15	J-12	6192.32	6195.80	3.48	6192.32	0.00	6103.00	-92.80	0.00	0.00
16	J-13	6190.84	6194.83	3.99	6190.84	0.00	0.00	-6194.83	0.00	0.00
17	J-14	6192.59	6195.78	3.19	6192.59	0.00	6194.61	-1.18	0.00	0.00
18	J-15	6191.66	6195.10	3.44	6191.66	0.00	6194.00	-1.10	0.00	0.00
19	J-16	6191.01	6194.13	3.12	6191.01	0.00	6192.86	-1.28	0.00	0.00
20	J-17	6190.95	6194.31	3.36	6190.95	0.00	6192.80	-1.52	0.00	0.00
21	J-18	6189.75	6195.02	5.27	6189.75	0.00	6192.31	-2.71	0.00	0.00
22	OutletPipe	6187.31	6188.81	1.50	6187.31	0.00	0.00	-6188.81	0.00	0.00
23	OutletStructure	6187.67	6194.00	6.33	6187.67	0.00	0.00	-6194.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1	Culvert-In	5.26	5.26	6174.96	0.53	0.00	2.04	6174.43	0.00	0 00:26	0 00:00	0.00	0.00
2	Culvert-Out	5.25	0.00	6174.75	0.53	0.00	2.25	6174.22	0.00	0 00:26	0 00:00	0.00	0.00
3	Forebay	21.31	0.00	6190.35	1.14	0.00	1.86	6189.73	0.52	0 00:11	0 00:00	0.00	0.00
4	J-01	2.40	2.40	6196.58	0.55	0.00	2.40	6196.03	0.00	0 00:11	0 00:00	0.00	0.00
5	J-02	2.39	0.00	6195.91	0.80	0.00	2.39	6195.36	0.25	0 00:11	0 00:00	0.00	0.00
6	J-03	4.69	2.40	6194.86	0.73	0.00	2.47	6194.13	0.00	0 00:11	0 00:00	0.00	0.00
7	J-04	4.69	0.00	6194.82	0.78	0.00	2.64	6194.04	0.00	0 00:11	0 00:00	0.00	0.00
8	J-05	2.36	2.36	6195.49	0.54	0.00	2.69	6194.95	0.00	0 00:10	0 00:00	0.00	0.00
9	J-06	2.34	0.00	6194.82	0.79	0.00	2.68	6194.28	0.25	0 00:11	0 00:00	0.00	0.00
10	J-07	4.59	2.36	6193.77	0.72	0.00	2.76	6193.05	0.00	0 00:11	0 00:00	0.00	0.00
11	J-08	9.19	0.00	6193.74	1.28	0.00	2.94	6192.96	0.50	0 00:11	0 00:00	0.00	0.00
12	J-09	1.19	1.19	6194.48	0.33	0.00	2.62	6194.15	0.00	0 00:10	0 00:00	0.00	0.00
13	J-10	11.25	1.19	6192.47	1.57	0.00	3.49	6192.15	1.25	0 00:10	0 00:00	0.00	0.00
14	J-11	2.91	2.91	6193.85	0.61	0.00	2.63	6193.24	0.00	0 00:10	0 00:00	0.00	0.00
15	J-12	2.89	0.00	6193.18	0.86	0.00	2.62	6192.57	0.25	0 00:10	0 00:00	0.00	0.00
16	J-13	5.35	2.57	6191.89	1.05	0.00	2.94	6191.34	0.50	0 00:10	0 00:00	0.00	0.00
17	J-14	2.73	2.73	6193.18	0.59	0.00	2.60	6192.59	0.00	0 00:11	0 00:00	0.00	0.00
18	J-15	2.71	0.00	6192.49	0.83	0.00	2.61	6191.91	0.25	0 00:11	0 00:00	0.00	0.00
19	J-16	5.38	2.71	6191.91	0.90	0.00	2.22	6191.01	0.00	0 00:11	0 00:00	0.00	0.00
20	J-17	5.37	0.00	6191.85	0.90	0.00	2.46	6190.95	0.00	0 00:11	0 00:00	0.00	0.00
21	J-18	21.31	0.00	6191.46	1.71	0.00	3.56	6190.75	1.00	0 00:11	0 00:00	0.00	0.00
22	OutletPipe	0.20	0.00	6187.47	0.16	0.00	5.84	6187.35	0.04	0 00:26	0 00:00	0.00	0.00
23	OutletStructure	0.20	0.00	6187.83	0.16	0.00	6.17	6187.71	0.04	0 00:26	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate	No. of Barrels
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)		
1	10-30NP	122.00	6190.90	0.00	6190.29	0.54	0.61	0.5000	CIRCULAR	24.000	24.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
2	11-15NP	91.22	6193.24	0.00	6192.57	0.25	0.67	0.7300	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
3	12-18P	130.69	6192.32	0.00	6191.34	0.50	0.98	0.7500	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
4	13-24NP	11.92	6190.84	0.00	6190.75	1.00	0.09	0.7600	CIRCULAR	24.000	24.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
5	14-15NP	90.26	6192.59	0.00	6191.91	0.25	0.68	0.7500	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
6	15-18P	130.00	6191.66	0.00	6191.01	0.00	0.65	0.5000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
7	16-18NP	11.92	6191.01	0.00	6190.95	0.00	0.06	0.5000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
8	17-18NP	240.00	6190.95	0.00	6189.75	0.00	1.20	0.5000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
9	18-36NP	58.84	6189.75	0.00	6189.21	0.00	0.54	0.9200	CIRCULAR	36.000	36.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
10	1-NP15	89.45	6196.03	0.00	6195.36	0.25	0.67	0.7500	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
11	2-18P	130.81	6195.11	0.00	6194.13	0.00	0.98	0.7500	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
12	3-18NP	11.92	6194.13	0.00	6194.04	0.00	0.09	0.7600	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
13	4-18NP	180.00	6194.04	0.00	6192.96	0.50	1.08	0.6000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
14	5-15NP	90.21	6194.95	0.00	6194.28	0.25	0.67	0.7400	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
15	6-18P	130.60	6194.03	0.00	6193.05	0.00	0.98	0.7500	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
16	7-18NP	11.92	6193.05	0.00	6192.96	0.50	0.09	0.7600	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
17	8-24NP	168.00	6192.46	0.00	6191.40	0.50	1.06	0.6300	CIRCULAR	24.000	24.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
18	9-15P	152.67	6194.15	0.00	6192.15	1.25	2.00	1.3100	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No	1
19	Culvert	42.05	6174.43	0.00	6174.22	0.00	0.21	0.5000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No	2
20	Link-03	228.62	6187.31	0.00	6186.00	0.00	1.31	0.5700	Dummy	0.000	0.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
21	Link-09	438.78	6174.21	-0.01	6173.75	0.00	0.46	0.1000	Dummy	0.000	0.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
22	OutletPipe	58.32	6187.67	0.00	6187.31	0.00	0.36	0.6200	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1
23	Trk Chnl	164.17	6189.73	0.52	6188.25	0.25	1.48	0.9000	Dummy	0.000	0.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	10-30NP	11.24	0 00:11	17.33	0.65	5.89	0.35	1.17	0.59	0.00		Calculated
2	11-15NP	2.89	0 00:10	6.00	0.48	5.95	0.26	0.61	0.49	0.00		Calculated
3	12-18P	2.87	0 00:10	9.85	0.29	4.87	0.45	0.55	0.37	0.00		Calculated
4	13-24NP	5.35	0 00:10	21.30	0.25	5.64	0.04	0.68	0.34	0.00		Calculated
5	14-15NP	2.71	0 00:11	6.07	0.45	5.77	0.26	0.58	0.47	0.00		Calculated
6	15-18P	2.69	0 00:11	8.05	0.33	4.13	0.52	0.60	0.40	0.00		Calculated
7	16-18NP	5.37	0 00:11	8.07	0.67	4.89	0.04	0.89	0.60	0.00		Calculated
8	17-18NP	5.29	0 00:12	8.05	0.66	4.93	0.81	0.89	0.59	0.00		Calculated
9	18-36NP	21.31	0 00:11	69.22	0.31	8.62	0.11	1.14	0.38	0.00		Calculated
10	1-NP15	2.39	0 00:11	6.06	0.39	5.65	0.26	0.54	0.44	0.00		Calculated
11	2-18P	2.37	0 00:11	9.85	0.24	4.62	0.47	0.50	0.33	0.00		Calculated
12	3-18NP	4.69	0 00:11	9.89	0.47	5.52	0.04	0.73	0.48	0.00		Calculated
13	4-18NP	4.67	0 00:11	8.81	0.53	5.11	0.59	0.78	0.52	0.00		Calculated
14	5-15NP	2.34	0 00:11	6.03	0.39	5.64	0.27	0.54	0.43	0.00		Calculated
15	6-18P	2.32	0 00:11	9.86	0.24	4.59	0.47	0.49	0.33	0.00		Calculated
16	7-18NP	4.59	0 00:11	9.89	0.46	5.49	0.04	0.72	0.48	0.00		Calculated
17	8-24NP	9.17	0 00:11	19.47	0.47	6.14	0.46	0.97	0.48	0.00		Calculated
18	9-15P	1.18	0 00:10	8.01	0.15	6.44	0.40	0.32	0.26	0.00		Calculated
19	Culvert	5.25	0 00:26	34.64	0.15	3.98	0.18	0.53	0.26	0.00		Calculated
20	Link-03	0.20	0 00:26	0.00	0.15	0.00		0.53	0.26	0.00		Calculated
21	Link-09	5.25	0 00:26	0.00	0.15	0.00		0.53	0.26	0.00		Calculated
22	OutletPipe	0.20	0 00:26	8.94	0.02	2.02	0.48	0.16	0.11	0.00		Calculated
23	TrklChnl	21.31	0 00:11	0.00	0.02	0.00		0.16	0.11	0.00		Calculated

Storage Nodes

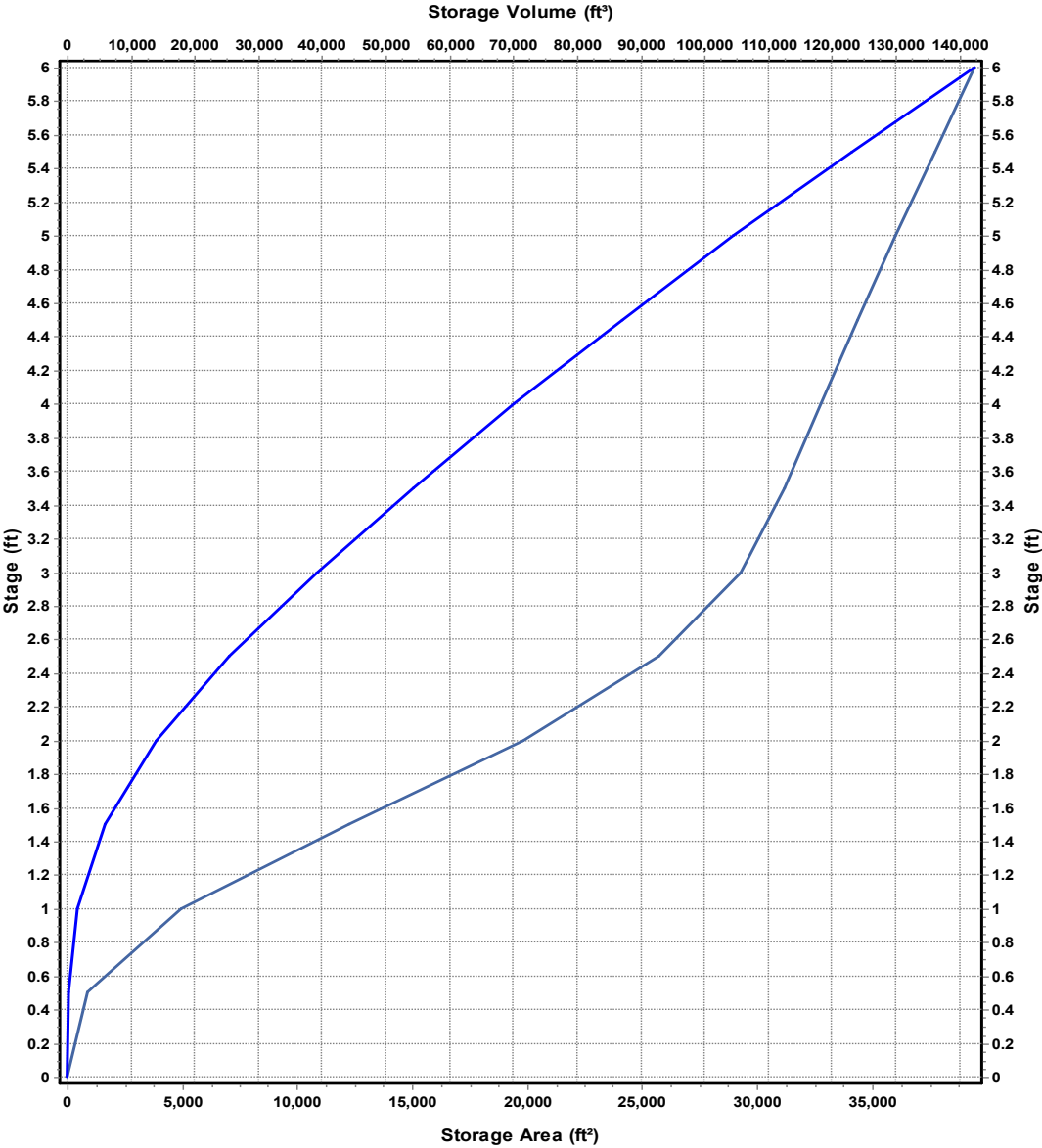
Storage Node : DetentionPond

Input Data	
Invert Elevation (ft)	6188.00
Max (Rim) Elevation (ft)	6194.00
Max (Rim) Offset (ft)	6.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-6188.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-01			
	Stage	Storage	Storage
	(ft)	Area	Volume
		(ft²)	(ft³)
	0	10	0
	0.5	882.13	223.03
	1	4951.3	1681.39
	1.5	12246.1	5980.74
	2	19823.28	13998.09
	2.5	25766.41	25395.51
	3	29274.59	39155.76
	3.5	31177.97	54268.9
	4	32757.61	70252.8
	4.5	34372.11	87035.23
	5	36021.48	104633.63
	5.5	37713.37	123067.34
	6	39455.42	142359.54

Storage Area Volume Curves



Storage Area Storage Volume

Storage Node : DetentionPond (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	EmergencySpillway	Trapezoidal	No	6192.00	4.00	10.00	2.00	3.33
2	Weir	Trapezoidal	No	6191.50	3.50	4.00	1.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Orifice-01	Side	CIRCULAR	No	1.00			6187.67	0.61
2	Orifice-02	Side	CIRCULAR	No	1.00			6188.17	0.61
3	Orifice-03	Side	CIRCULAR	No	1.00			6188.67	0.61
4	Orifice-04	Side	CIRCULAR	No	1.50			6189.17	0.61
5	Orifice-05	Side	CIRCULAR	No	1.50			6189.67	0.61
6	Orifice-06	Side	CIRCULAR	No	2.00			6190.17	0.61
7	Orifice-07	Side	CIRCULAR	No	2.00			6190.67	0.61

Output Summary Results

Peak Inflow (cfs)	24.48
Peak Lateral Inflow (cfs)	3.79
Peak Outflow (cfs)	0.2
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	6190.13
Max HGL Depth Attained (ft)	2.13
Average HGL Elevation Attained (ft)	6188.49
Average HGL Depth Attained (ft)	0.49
Time of Max HGL Occurrence (days hh:mm)	0 00:26
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name 23148-RM100.SPF

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method Rational
Time of Concentration (TOC) Method User-Defined
Link Routing Method Kinematic Wave
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:05:00 days hh:mm:ss
Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins.....	19
Nodes.....	31
<i>Junctions</i>	23
<i>Outfalls</i>	7
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	1
Links.....	32
<i>Channels</i>	0
<i>Pipes</i>	23
<i>Pumps</i>	0
<i>Orifices</i>	7
<i>Weirs</i>	2
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period..... 100 year(s)

Subbasin Summary

SN	Subbasin ID	Area	Weighted Runoff Coefficient	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)		(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	E1	31.82	0.3600	1.95	0.70	22.37	50.95	0 00:26:17
2	E2	15.06	0.3600	1.95	0.70	10.59	24.11	0 00:26:17
3	E3	26.94	0.3600	1.95	0.70	18.97	42.91	0 00:26:33
4	E4	7.85	0.3600	1.95	0.70	5.52	12.57	0 00:26:17
5	EDB	1.02	0.9600	1.16	1.11	1.13	6.79	0 00:10:00
6	P1-N	22.03	0.3600	1.95	0.70	15.49	35.27	0 00:26:17
7	P1-S	6.35	0.3600	1.95	0.70	4.46	10.17	0 00:26:17
8	P2	9.34	0.3600	1.95	0.70	6.57	14.96	0 00:26:17
9	P3	25.46	0.3600	1.95	0.70	17.92	40.56	0 00:26:33
10	Y1	1.02	0.7000	1.21	0.85	0.86	4.79	0 00:10:52
11	Y10	1.17	0.7000	1.26	0.88	1.03	5.39	0 00:11:25
12	Y2	1.02	0.7000	1.21	0.85	0.86	4.79	0 00:10:52
13	Y3	0.99	0.7000	1.20	0.84	0.83	4.69	0 00:10:36
14	Y4	0.99	0.7000	1.20	0.84	0.83	4.69	0 00:10:36
15	Y5	0.49	0.7000	1.16	0.81	0.40	2.38	0 00:10:00
16	Y6	0.49	0.7000	1.16	0.81	0.40	2.38	0 00:10:00
17	Y7	1.21	0.7000	1.18	0.83	1.00	5.80	0 00:10:19
18	Y8	1.07	0.7000	1.18	0.83	0.88	5.13	0 00:10:19
19	Y9	1.17	0.7000	1.24	0.87	1.01	5.44	0 00:11:08

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft ²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1	Culvert-In	Junction	6174.43	6178.00	0.00	0.00	0.00	35.27	6178.00	0.00	0.00	0 00:26	0.00	1.00
2	Culvert-Out	Junction	6174.22	6178.00	0.00	0.00	0.00	37.15	6176.03	0.00	1.97	0 00:00	0.00	0.00
3	Forebay	Junction	6189.21	6191.50	6189.21	0.00	0.00	37.12	6190.77	0.00	1.44	0 00:00	0.00	0.00
4	1-Jun	Junction	6195.11	6198.30	6195.11	6195.00	0.00	4.75	6196.19	0.00	2.11	0 00:00	0.00	0.00
5	2-Jun	Junction	6194.03	6197.50	6194.03	6194.00	0.00	4.66	6195.10	0.00	2.40	0 00:00	0.00	0.00
6	3-Jun	Junction	6192.32	6195.80	6192.32	6103.00	0.00	5.75	6193.55	0.00	2.25	0 00:00	0.00	0.00
7	4-Jun	Junction	6191.66	6195.10	6191.66	6194.00	0.00	5.40	6192.83	0.00	2.27	0 00:00	0.00	0.00
8	Null Structure	Junction	6190.84	6194.83	6190.84	0.00	0.00	10.64	6192.16	0.00	2.67	0 00:00	0.00	0.00
9	OutletPipe	Junction	6187.31	6188.81	6187.31	0.00	0.00	0.34	6187.51	0.00	5.80	0 00:00	0.00	0.00
10	OutletStructure	Junction	6187.67	6194.00	6187.67	0.00	0.00	0.34	6187.87	0.00	6.13	0 00:00	0.00	0.00
11	Structure - (10)	Junction	6190.90	6195.96	6190.90	6192.65	0.00	22.23	6195.96	0.00	0.00	0 00:11	0.28	6.00
12	Structure - (11)	Junction	6194.95	6198.18	6194.95	6194.95	0.00	4.69	6195.78	0.00	2.40	0 00:00	0.00	0.00
13	Structure - (12)	Junction	6193.05	6196.53	6193.05	6193.20	0.00	9.18	6194.19	0.00	2.34	0 00:00	0.00	0.00
14	Structure - (13)	Junction	6192.46	6196.68	6192.46	6193.49	0.00	18.12	6194.36	0.00	2.32	0 00:00	0.00	0.00
15	Structure - (15)	Junction	6196.03	6198.98	6196.03	6195.86	0.00	4.79	6196.87	0.00	2.11	0 00:00	0.00	0.00
16	Structure - (16)	Junction	6194.13	6197.33	6194.13	6194.11	0.00	9.37	6195.29	0.00	2.04	0 00:00	0.00	0.00
17	Structure - (17)	Junction	6194.04	6197.46	6194.04	6194.05	0.00	9.37	6197.46	0.00	0.00	0 00:11	0.01	2.00
18	Structure - (2)	Junction	6191.01	6194.13	6191.01	6192.86	0.00	10.72	6194.13	0.00	0.00	0 00:11	0.13	6.00
19	Structure - (22)	Junction	6194.15	6197.10	6194.15	6193.08	0.00	2.38	6194.62	0.00	2.48	0 00:00	0.00	0.00
20	Structure - (3)	Junction	6190.95	6194.31	6190.95	6192.80	0.00	8.73	6194.31	0.00	0.00	0 00:10	0.01	6.00
21	Structure - (6)	Junction	6193.24	6196.48	6193.24	6193.50	0.00	5.80	6194.23	0.00	2.25	0 00:00	0.00	0.00
22	Structure - (8)	Junction	6189.75	6195.02	6189.75	6192.31	0.00	37.07	6192.29	0.00	2.73	0 00:00	0.00	0.00
23	Structure-(4)	Junction	6192.59	6195.78	6192.59	6194.61	0.00	5.44	6193.51	0.00	2.27	0 00:00	0.00	0.00
24	E-Out-1	Outfall	6173.75					50.95	6173.75					
25	E-Out-2	Outfall	6187.75					24.11	6187.75					
26	E-Out-3	Outfall	6195.50					42.91	6195.50					
27	E-Out-4	Outfall	6196.00					12.57	6196.00					
28	P-Out-1	Outfall	6173.75					47.13	6173.75					
29	P-Out-2	Outfall	6186.00					15.29	6186.00					
30	P-Out-3	Outfall	6195.50					40.56	6195.50					
31	DetentionPond	Storage Node	6188.00	6194.00	0.00		0.00	43.91	6190.72				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	10-30NP	Pipe	Structure - (10)	Structure - (8)	122.00	6190.90	6190.29	0.5000	24.000	0.0120	18.75	17.33	1.08	6.58	2.00	1.00	4.00	SURCHARGED
2	11-15NP	Pipe	Structure - (6)	3-Jun	91.22	6193.24	6192.57	0.7300	15.000	0.0120	5.75	6.00	0.96	6.87	0.98	0.78	0.00	Calculated
3	12-18P	Pipe	3-Jun	Null Structure	130.69	6192.32	6191.34	0.7500	18.000	0.0120	5.71	9.85	0.58	5.82	0.82	0.55	0.00	Calculated
4	13-24NP	Pipe	Null Structure	Structure - (8)	11.92	6190.84	6190.75	0.7600	24.000	0.0120	10.64	21.30	0.50	6.78	1.00	0.50	0.00	Calculated
5	14-15NP	Pipe	Structure-(4)	4-Jun	90.26	6192.59	6191.91	0.7500	15.000	0.0120	5.40	6.07	0.89	6.69	0.92	0.73	0.00	Calculated
6	15-18P	Pipe	4-Jun	Structure - (2)	130.00	6191.66	6191.01	0.5000	18.000	0.0120	5.36	8.05	0.67	4.91	0.89	0.60	0.00	Calculated
7	16-18NP	Pipe	Structure - (2)	Structure - (3)	11.92	6191.01	6190.95	0.5000	18.000	0.0120	8.73	8.07	1.08	5.33	1.50	1.00	4.00	SURCHARGED
8	17-18NP	Pipe	Structure - (3)	Structure - (8)	240.00	6190.95	6189.75	0.5000	18.000	0.0120	8.71	8.05	1.08	5.42	1.38	0.92	0.00	> CAPACITY
9	18-36NP	Pipe	Structure - (8)	Forebay	58.84	6189.75	6189.21	0.9200	36.000	0.0120	37.12	69.22	0.54	10.08	1.56	0.52	0.00	Calculated
10	1-NP15	Pipe	Structure - (15)	1-Jun	89.45	6196.03	6195.36	0.7500	15.000	0.0120	4.75	6.06	0.78	6.50	0.83	0.67	0.00	Calculated
11	2-18P	Pipe	1-Jun	Structure - (16)	130.81	6195.11	6194.13	0.7500	18.000	0.0120	4.73	9.85	0.48	5.55	0.73	0.49	0.00	Calculated
12	3-18NP	Pipe	Structure - (16)	Structure - (17)	11.92	6194.13	6194.04	0.7600	18.000	0.0120	9.37	9.89	0.95	6.36	1.16	0.78	0.00	Calculated
13	4-18NP	Pipe	Structure - (17)	Structure - (13)	180.00	6194.04	6192.96	0.6000	18.000	0.0120	9.54	8.81	1.08	5.87	1.39	0.92	0.00	> CAPACITY
14	5-15NP	Pipe	Structure - (11)	2-Jun	90.21	6194.95	6194.28	0.7400	15.000	0.0120	4.66	6.03	0.77	6.50	0.82	0.66	0.00	Calculated
15	6-18P	Pipe	2-Jun	Structure - (12)	130.60	6194.03	6193.05	0.7500	18.000	0.0120	4.63	9.86	0.47	5.53	0.72	0.48	0.00	Calculated
16	7-18NP	Pipe	Structure - (12)	Structure - (13)	11.92	6193.05	6192.96	0.7600	18.000	0.0120	9.18	9.89	0.93	6.35	1.14	0.76	0.00	Calculated
17	8-24NP	Pipe	Structure - (13)	Structure - (10)	168.00	6192.46	6191.40	0.6300	24.000	0.0120	18.07	19.47	0.93	7.13	1.52	0.76	0.00	Calculated
18	9-15P	Pipe	Structure - (22)	Structure - (10)	152.67	6194.15	6192.15	1.3100	15.000	0.0120	2.35	8.01	0.29	7.53	0.46	0.37	0.00	Calculated
19	Culvert	Pipe	Culvert-In	Culvert-Out	42.05	6174.43	6174.22	0.5000	24.000	0.0120	37.15	34.64	1.07	6.46	1.83	0.91	0.00	> CAPACITY
20	Link-03	Pipe	OutletPipe	P-Out-2	228.62	0.00	0.00	0.0000	0.000	0.0150	0.34	0.00	1.07	0.00	1.83	0.91	0.00	> CAPACITY
21	Link-09	Pipe	Culvert-Out	P-Out-1	423.13	0.00	6173.75	-1459.0700	0.000	0.0150	37.15	0.00	1.07	0.00	1.83	0.91	0.00	> CAPACITY
22	OutletPipe	Pipe	OutletStructure	OutletPipe	58.32	6187.67	6187.31	0.6200	18.000	0.0120	0.34	8.94	0.04	2.42	0.20	0.13	0.00	Calculated
23	TrklChnl	Pipe	Forebay	DetentionPond	164.17	6189.73	6188.25	0.9000	0.000	0.0150	37.12	0.00	0.04	0.00	0.20	0.13	0.00	Calculated
24	Orifice-01	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.000		0.04							
25	Orifice-02	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.000		0.04							
26	Orifice-03	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.000		0.04							
27	Orifice-04	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.500		0.07							
28	Orifice-05	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		1.500		0.06							
29	Orifice-06	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		2.000		0.07							
30	Orifice-07	Orifice	DetentionPond	OutletStructure		6188.00	6187.67		2.000		0.01							
31	EmergencySpillway	Weir	DetentionPond	OutletPipe		6188.00	6187.31				0.00							
32	Weir	Weir	DetentionPond	OutletStructure		6188.00	6187.67				0.00							

Subbasin Hydrology

Subbasin : E1

Input Data

Area (ac) 31.82
Weighted Runoff Coefficient 0.36

Runoff Coefficient

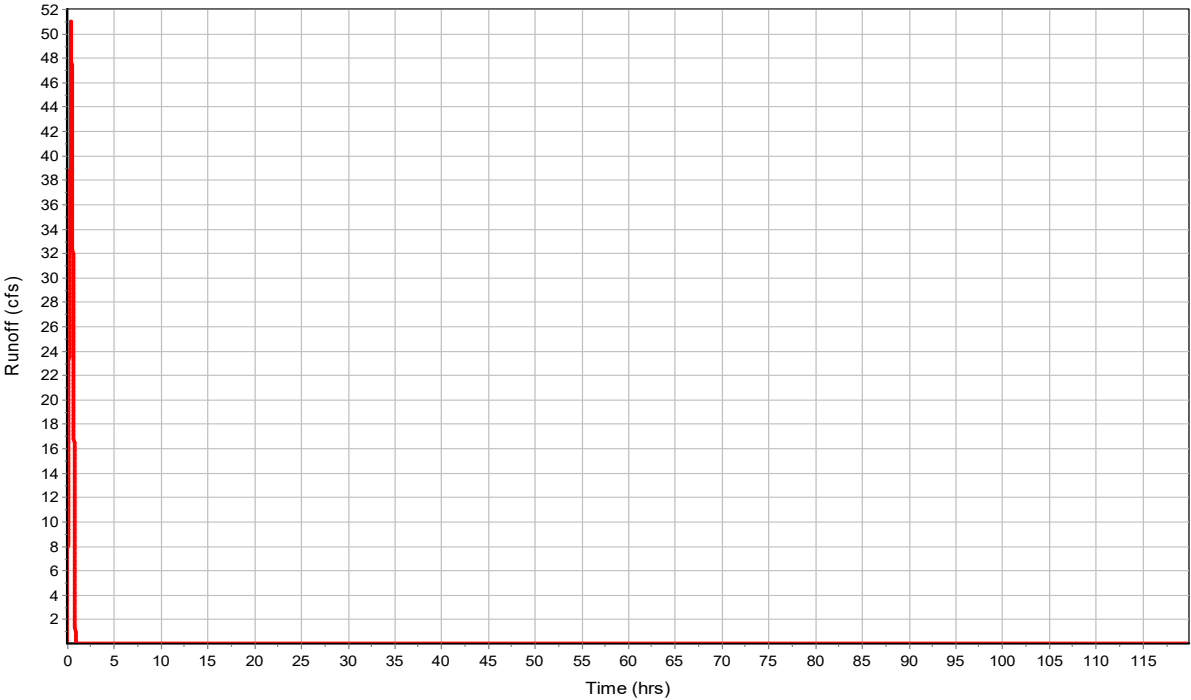
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	31.78	-	0.36
Composite Area & Weighted Runoff Coeff.	31.78		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 50.95
Rainfall Intensity 4.448
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : E1

Runoff Hydrograph



Subbasin : E2

Input Data

Area (ac) 15.06
Weighted Runoff Coefficient 0.36

Runoff Coefficient

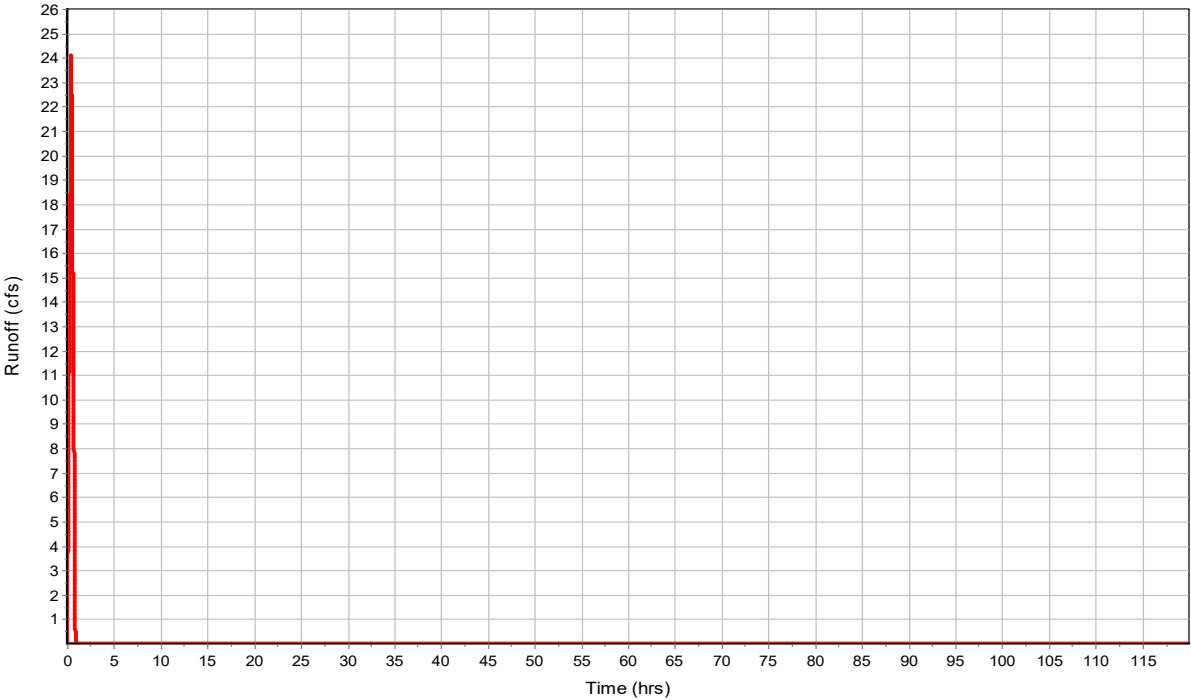
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	14.81	-	0.36
Composite Area & Weighted Runoff Coeff.	14.81		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 24.11
Rainfall Intensity 4.448
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : E2

Runoff Hydrograph



Subbasin : E3

Input Data

Area (ac) 26.94
Weighted Runoff Coefficient 0.36

Runoff Coefficient

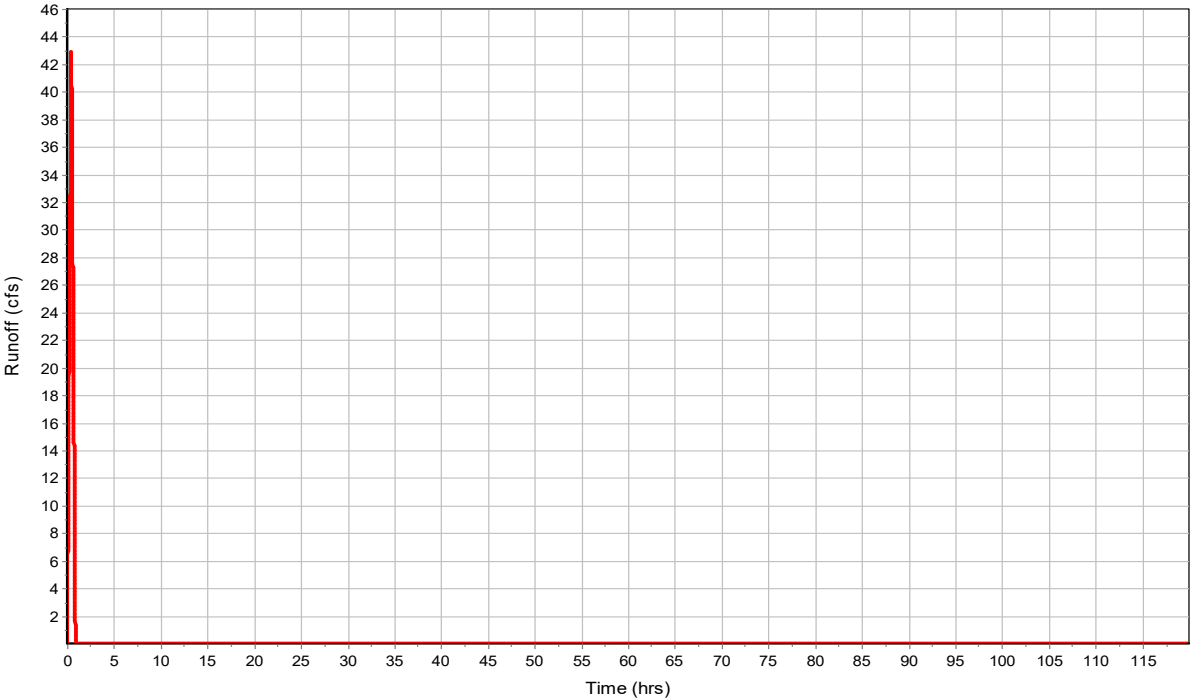
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	26.94	-	0.36
Composite Area & Weighted Runoff Coeff.	26.94		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 42.91
Rainfall Intensity 4.425
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:34

Subbasin : E3

Runoff Hydrograph



Subbasin : E4

Input Data

Area (ac) 7.85
Weighted Runoff Coefficient 0.36

Runoff Coefficient

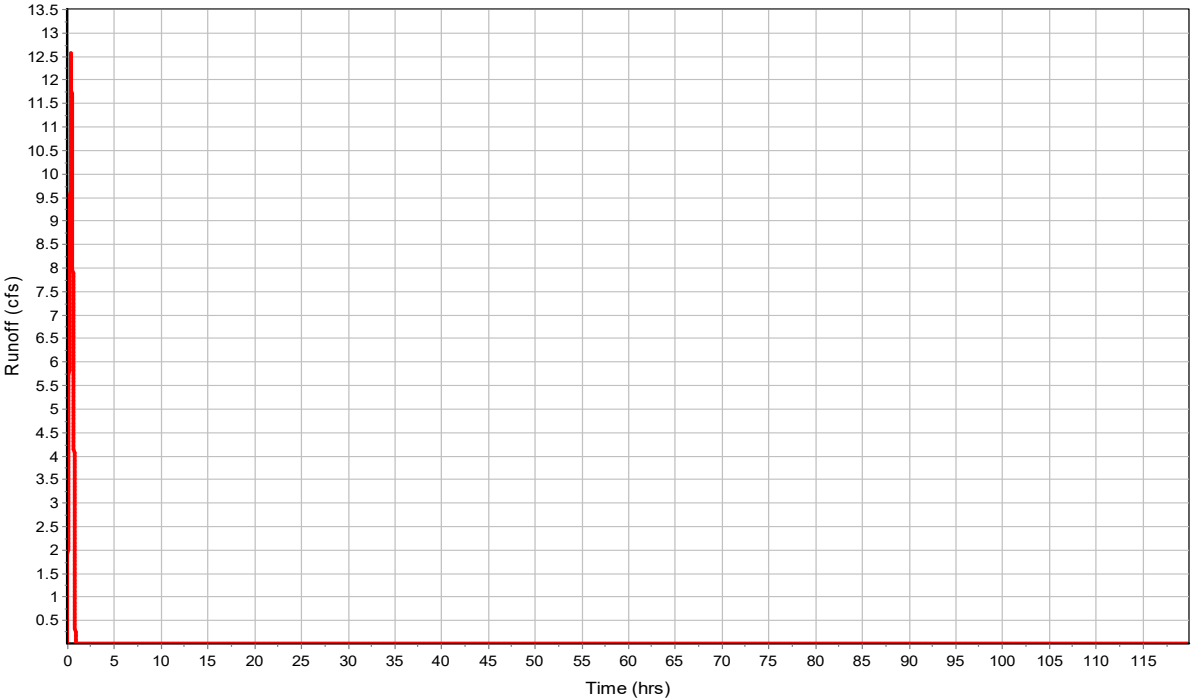
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	7.85	-	0.36
Composite Area & Weighted Runoff Coeff.	7.85		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 12.57
Rainfall Intensity 4.448
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : E4

Runoff Hydrograph



Subbasin : EDB

Input Data

Area (ac) 1.02
Weighted Runoff Coefficient 0.96

Runoff Coefficient

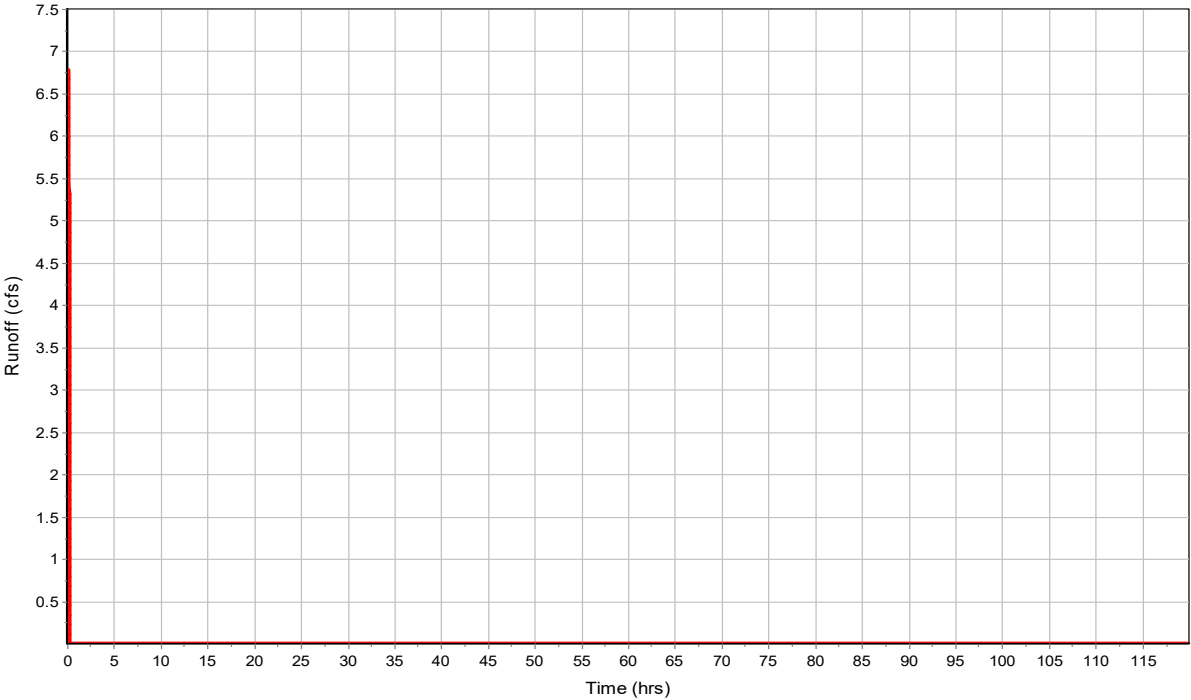
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.02	-	0.96
Composite Area & Weighted Runoff Coeff.	1.02		0.96

Subbasin Runoff Results

Total Rainfall (in) 1.16
Total Runoff (in) 1.11
Peak Runoff (cfs) 6.79
Rainfall Intensity 6.93
Weighted Runoff Coefficient 0.96
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : EDB

Runoff Hydrograph



Subbasin : P1-N

Input Data

Area (ac) 22.03
Weighted Runoff Coefficient 0.36

Runoff Coefficient

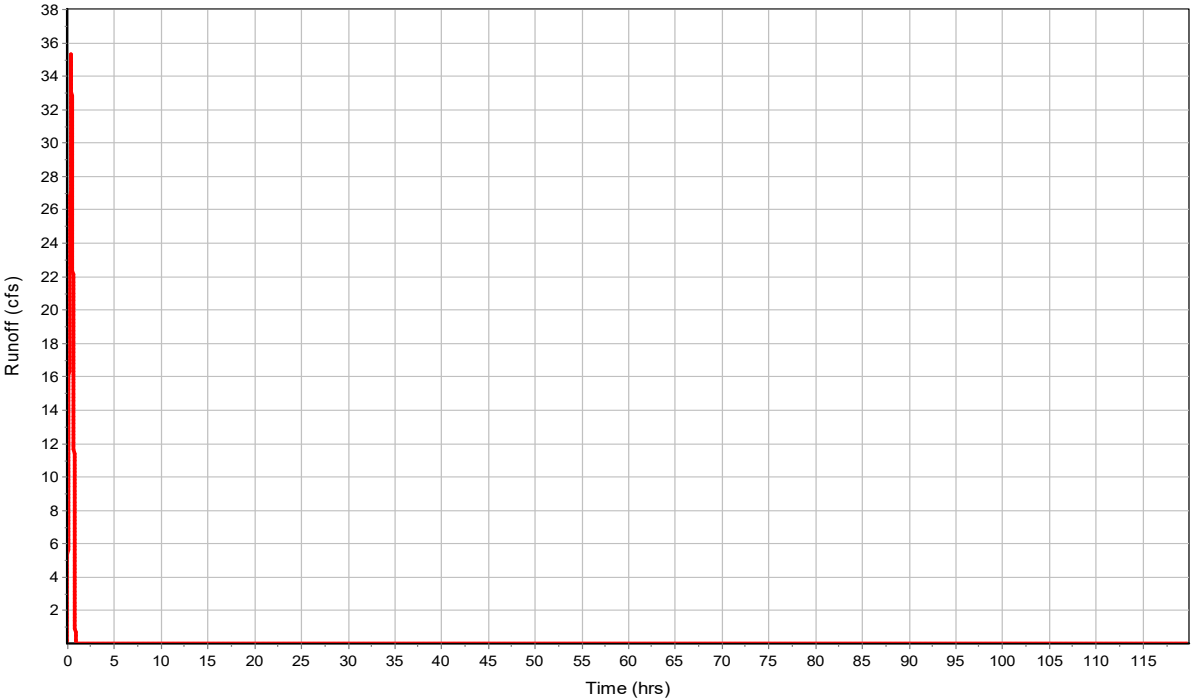
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	22.03	-	0.36
Composite Area & Weighted Runoff Coeff.	22.03		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 35.27
Rainfall Intensity 4.448
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : P1-N

Runoff Hydrograph



Subbasin : P1-S

Input Data

Area (ac) 6.35
Weighted Runoff Coefficient 0.36

Runoff Coefficient

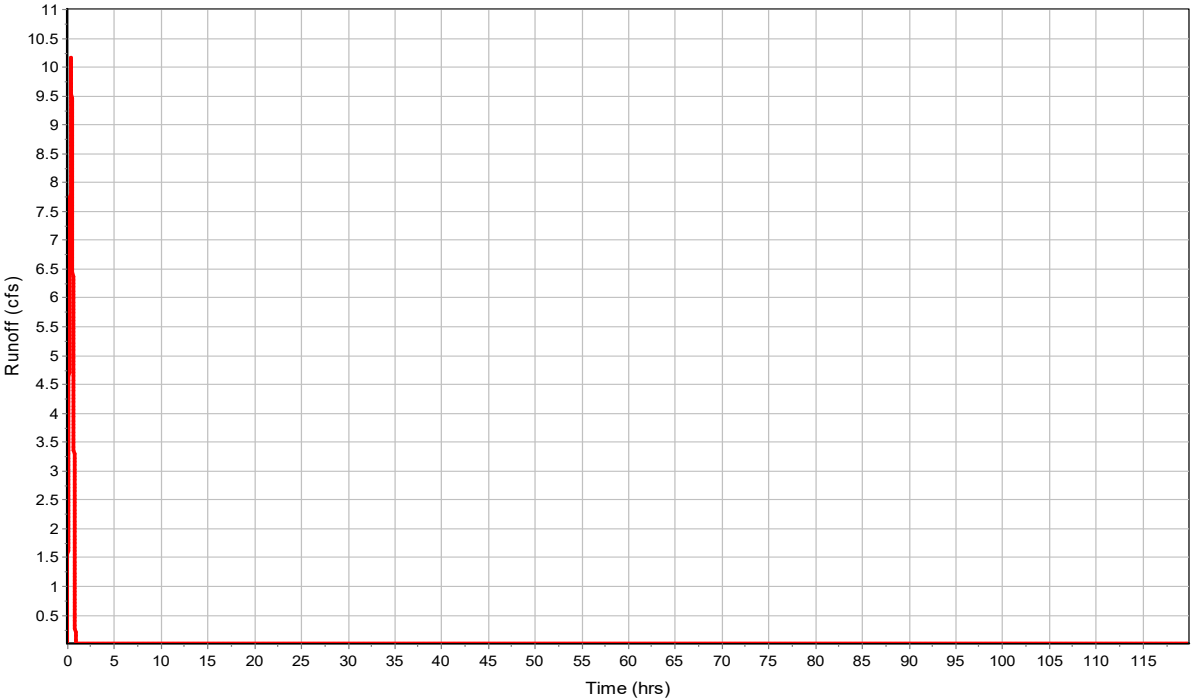
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	6.35	-	0.36
Composite Area & Weighted Runoff Coeff.	6.35		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 10.17
Rainfall Intensity 4.448
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : P1-S

Runoff Hydrograph



Subbasin : P2

Input Data

Area (ac) 9.34
Weighted Runoff Coefficient 0.36

Runoff Coefficient

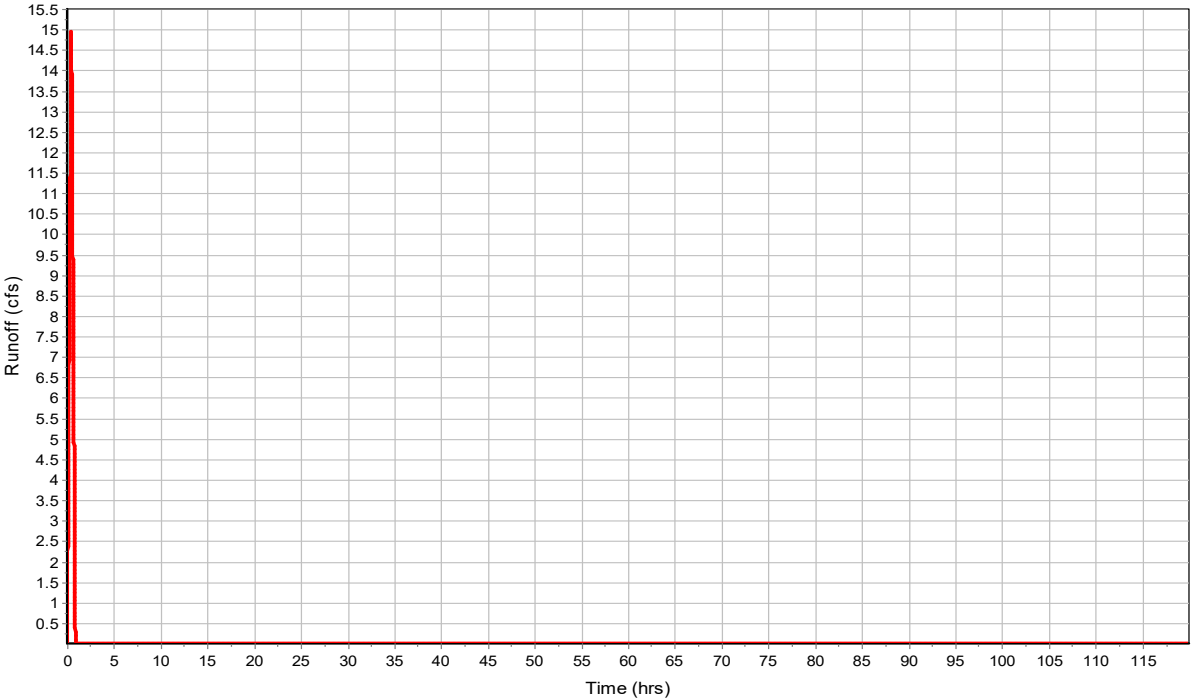
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	14.81	-	0.36
Composite Area & Weighted Runoff Coeff.	14.81		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 14.96
Rainfall Intensity 4.448
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:17

Subbasin : P2

Runoff Hydrograph



Subbasin : P3

Input Data

Area (ac) 25.46
Weighted Runoff Coefficient 0.36

Runoff Coefficient

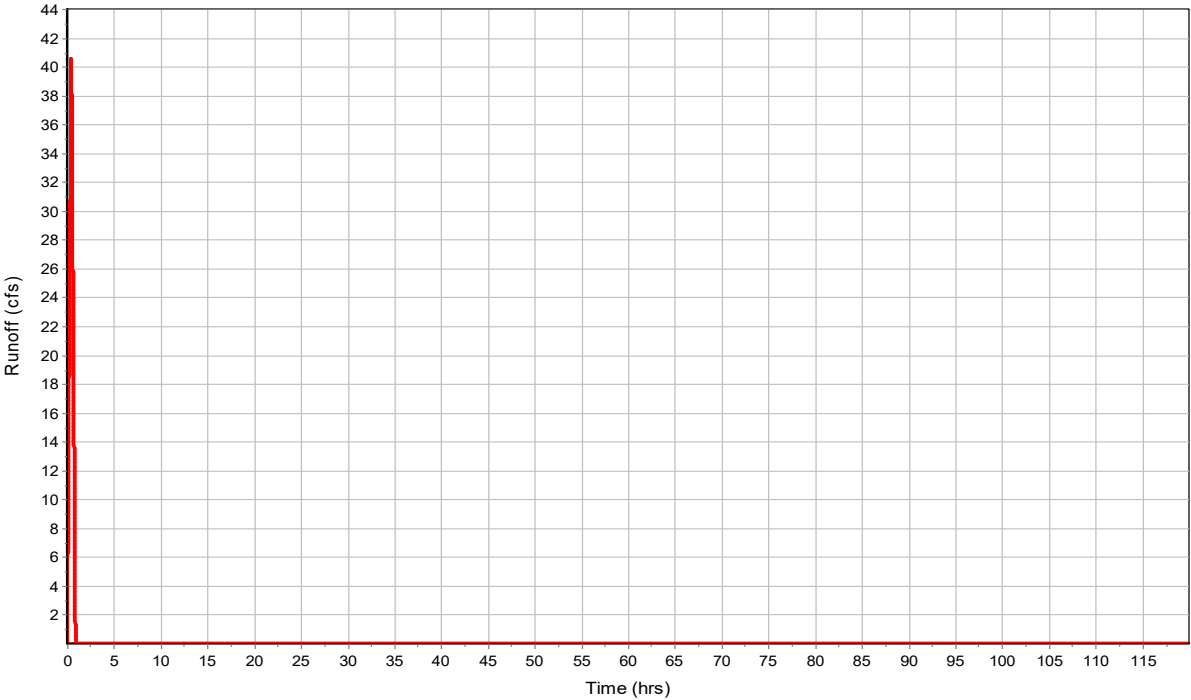
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	26.94	-	0.36
Composite Area & Weighted Runoff Coeff.	26.94		0.36

Subbasin Runoff Results

Total Rainfall (in) 1.95
Total Runoff (in) 0.7
Peak Runoff (cfs) 40.56
Rainfall Intensity 4.425
Weighted Runoff Coefficient 0.36
Time of Concentration (days hh:mm:ss) 0 00:26:34

Subbasin : P3

Runoff Hydrograph



Subbasin : Y1

Input Data

Area (ac) 1.02
Weighted Runoff Coefficient 0.7

Runoff Coefficient

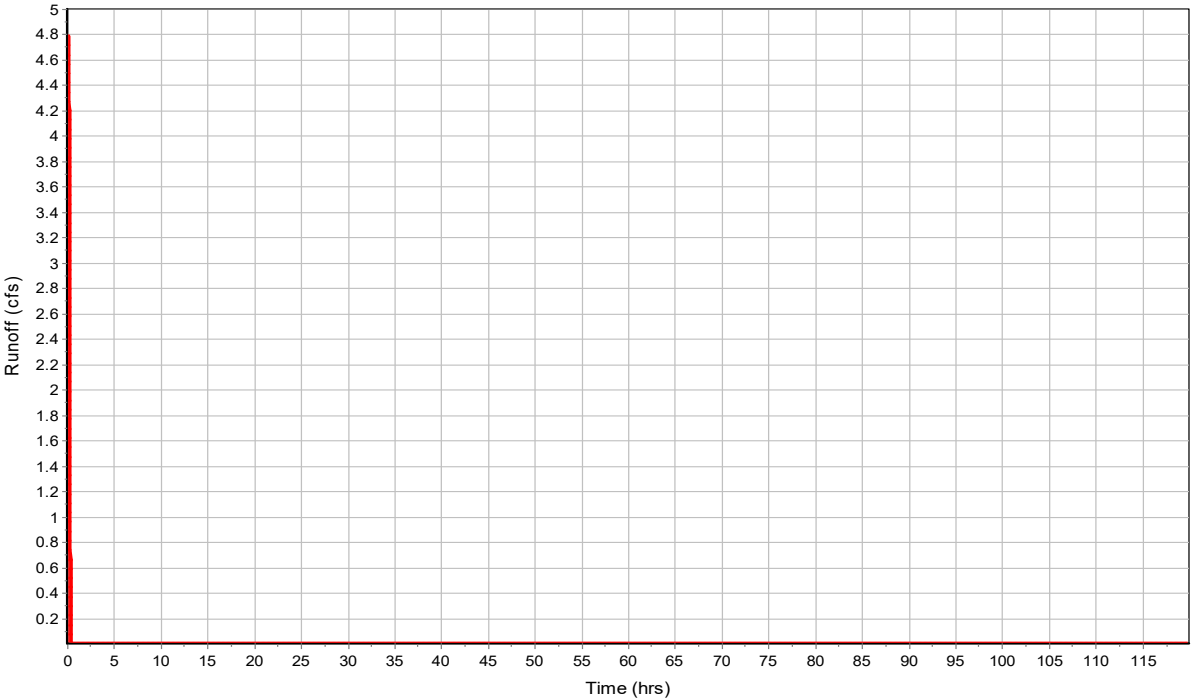
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.02	-	0.7
Composite Area & Weighted Runoff Coeff.	1.02		0.7

Subbasin Runoff Results

Total Rainfall (in) 1.21
Total Runoff (in) 0.85
Peak Runoff (cfs) 4.79
Rainfall Intensity 6.704
Weighted Runoff Coefficient 0.7
Time of Concentration (days hh:mm:ss) 0 00:10:53

Subbasin : Y1

Runoff Hydrograph



Subbasin : Y10

Input Data

Area (ac) 1.17
Weighted Runoff Coefficient 0.7

Runoff Coefficient

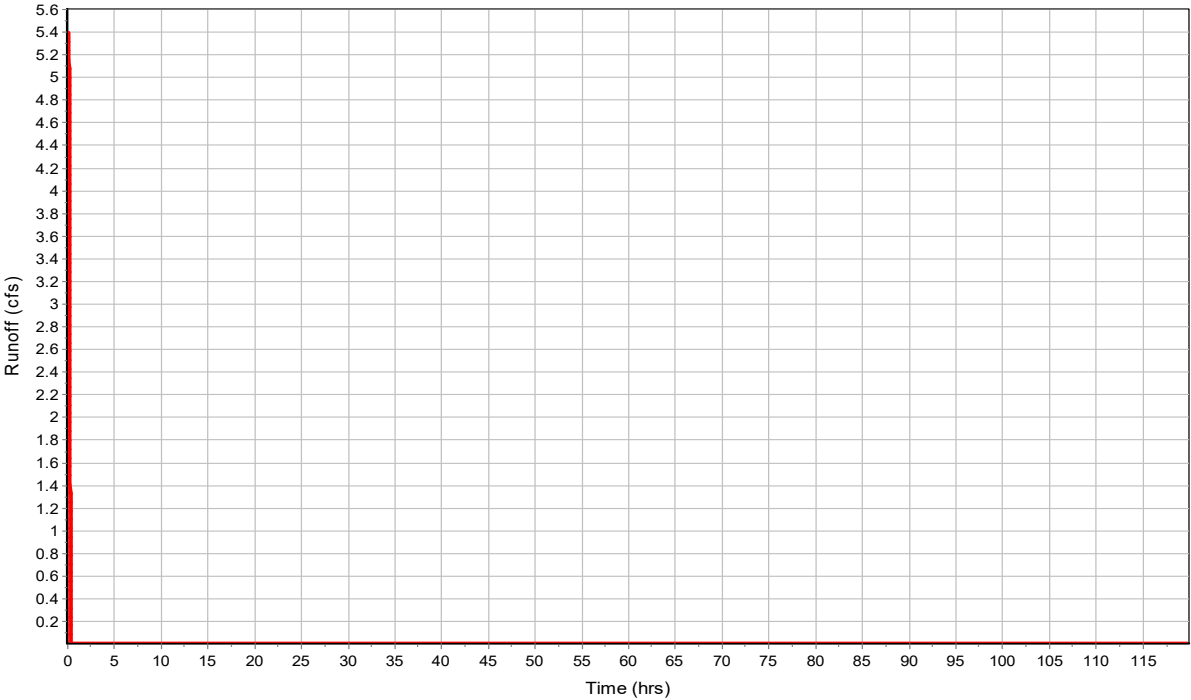
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.17	-	0.7
Composite Area & Weighted Runoff Coeff.	1.17		0.7

Subbasin Runoff Results

Total Rainfall (in) 1.26
Total Runoff (in) 0.88
Peak Runoff (cfs) 5.39
Rainfall Intensity 6.578
Weighted Runoff Coefficient 0.7
Time of Concentration (days hh:mm:ss) 0 00:11:25

Subbasin : Y10

Runoff Hydrograph



Subbasin : Y2

Input Data

Area (ac) 1.02
Weighted Runoff Coefficient 0.7

Runoff Coefficient

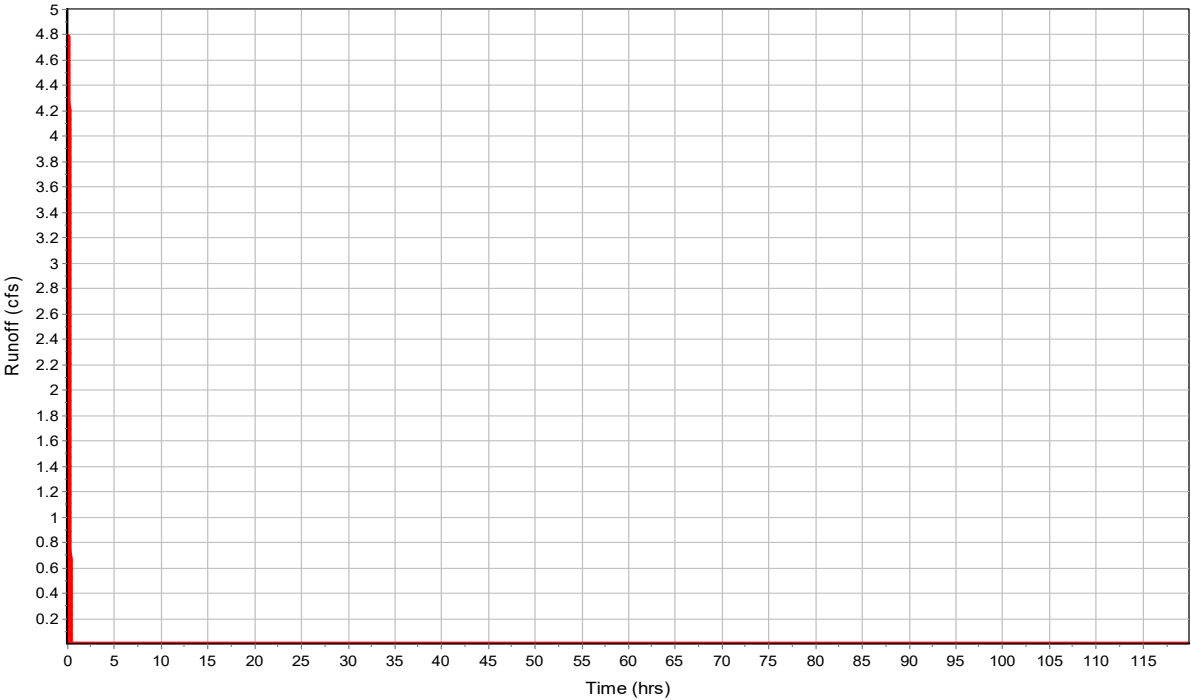
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.02	-	0.7
Composite Area & Weighted Runoff Coeff.	1.02		0.7

Subbasin Runoff Results

Total Rainfall (in) 1.21
Total Runoff (in) 0.85
Peak Runoff (cfs) 4.79
Rainfall Intensity 6.704
Weighted Runoff Coefficient 0.7
Time of Concentration (days hh:mm:ss) 0 00:10:53

Subbasin : Y2

Runoff Hydrograph



Subbasin : Y3

Input Data

Area (ac) 0.99
Weighted Runoff Coefficient 0.7

Runoff Coefficient

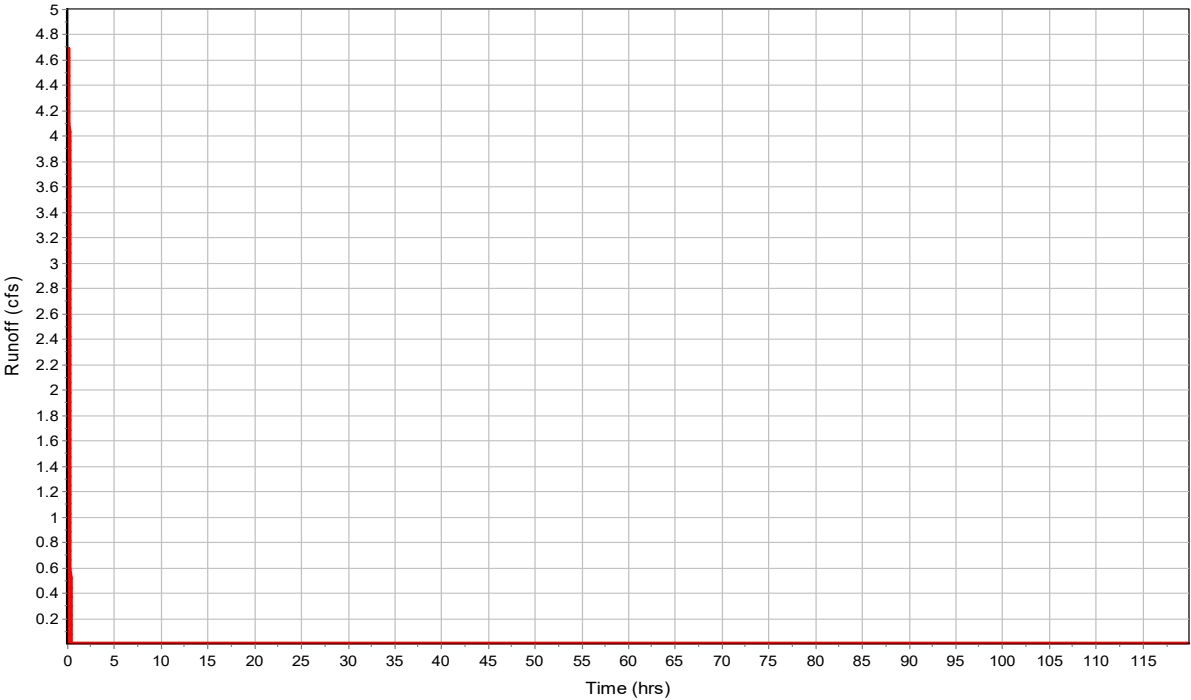
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.99	-	0.7
Composite Area & Weighted Runoff Coeff.	0.99		0.7

Subbasin Runoff Results

Total Rainfall (in) 1.2
Total Runoff (in) 0.84
Peak Runoff (cfs) 4.69
Rainfall Intensity 6.771
Weighted Runoff Coefficient 0.7
Time of Concentration (days hh:mm:ss) 0 00:10:37

Subbasin : Y3

Runoff Hydrograph



Subbasin : Y4

Input Data

Area (ac) 0.99
Weighted Runoff Coefficient 0.7

Runoff Coefficient

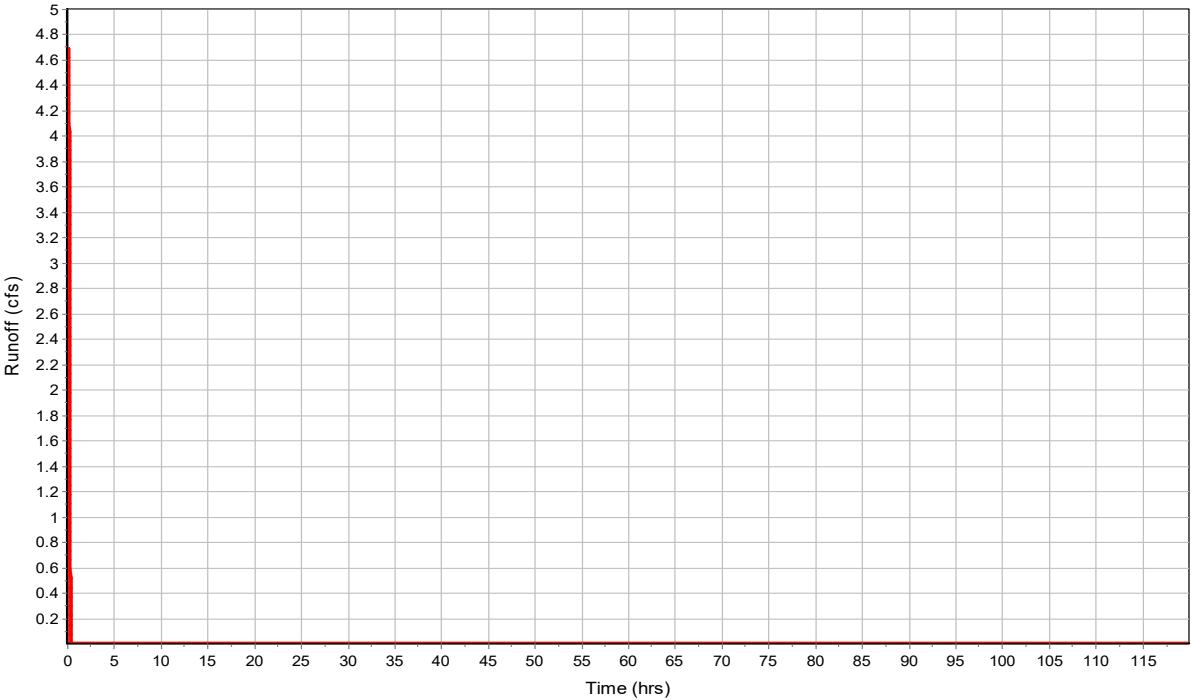
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.99	-	0.7
Composite Area & Weighted Runoff Coeff.	0.99		0.7

Subbasin Runoff Results

Total Rainfall (in) 1.2
Total Runoff (in) 0.84
Peak Runoff (cfs) 4.69
Rainfall Intensity 6.771
Weighted Runoff Coefficient 0.7
Time of Concentration (days hh:mm:ss) 0 00:10:37

Subbasin : Y4

Runoff Hydrograph



Subbasin : Y5

Input Data

Area (ac)	0.49
Weighted Runoff Coefficient	0.7

Runoff Coefficient

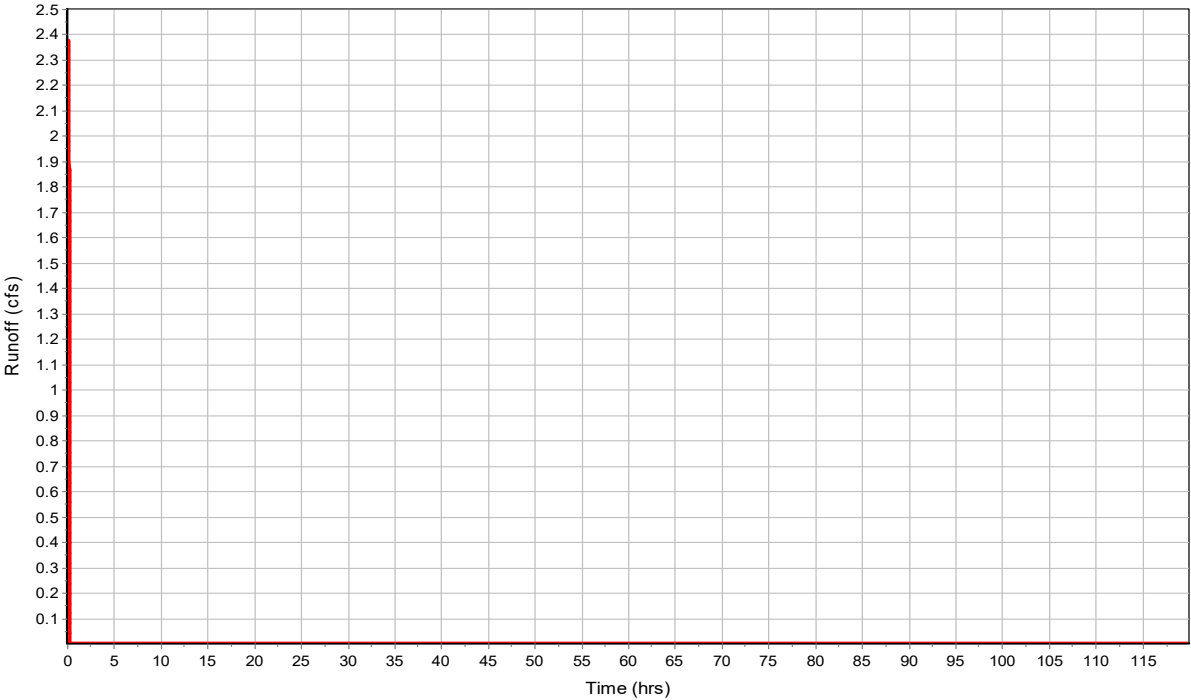
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.49	-	0.7
Composite Area & Weighted Runoff Coeff.	0.49		0.7

Subbasin Runoff Results

Total Rainfall (in)	1.16
Total Runoff (in)	0.81
Peak Runoff (cfs)	2.38
Rainfall Intensity	6.93
Weighted Runoff Coefficient	0.7
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : Y5

Runoff Hydrograph



Subbasin : Y6

Input Data

Area (ac)	0.49
Weighted Runoff Coefficient	0.7

Runoff Coefficient

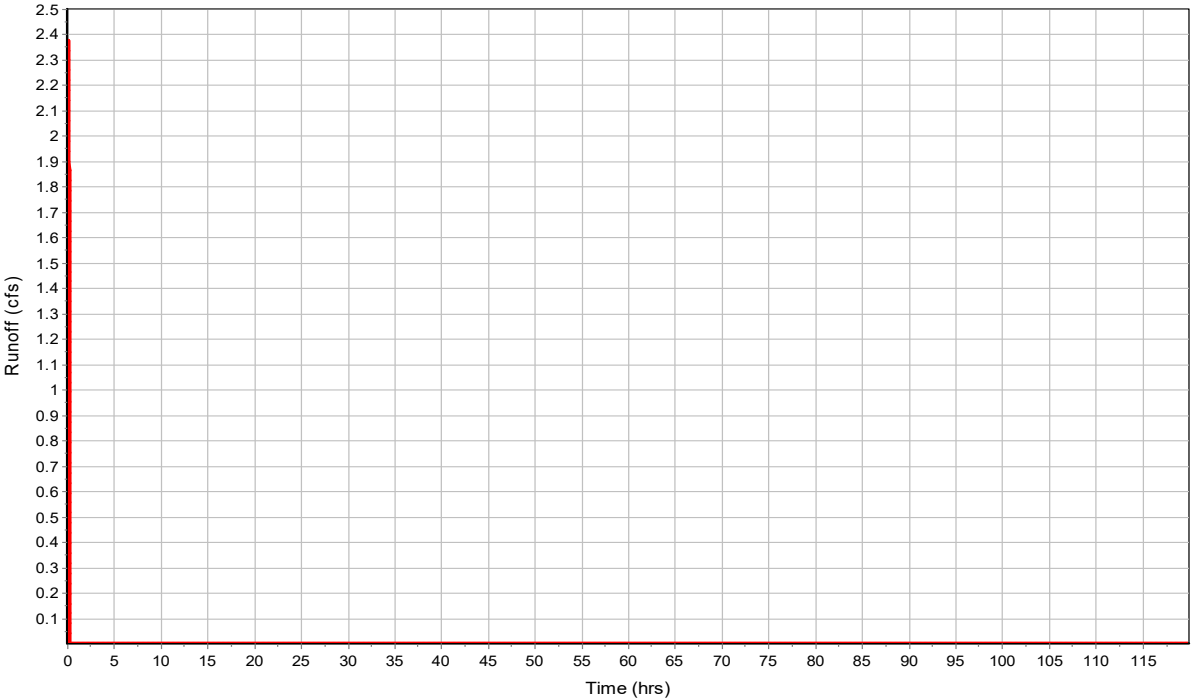
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.49	-	0.7
Composite Area & Weighted Runoff Coeff.	0.49		0.7

Subbasin Runoff Results

Total Rainfall (in)	1.16
Total Runoff (in)	0.81
Peak Runoff (cfs)	2.38
Rainfall Intensity	6.93
Weighted Runoff Coefficient	0.7
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : Y6

Runoff Hydrograph



Subbasin : Y7

Input Data

Area (ac)	1.21
Weighted Runoff Coefficient	0.7

Runoff Coefficient

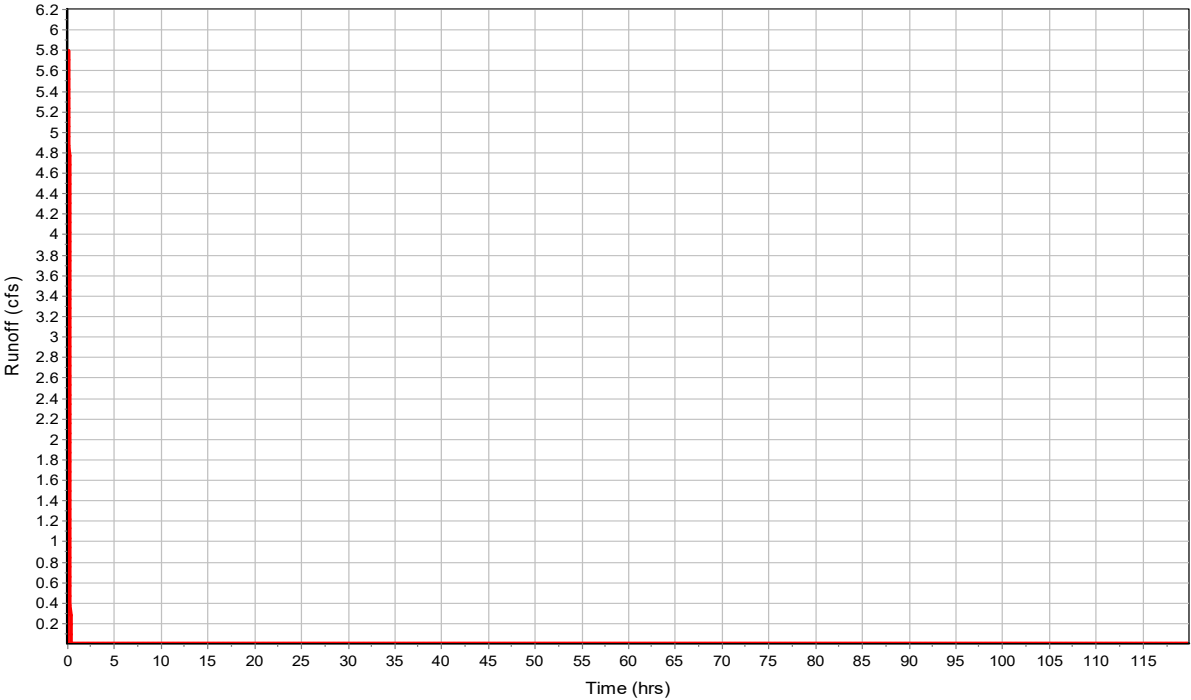
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.21	-	0.7
Composite Area & Weighted Runoff Coeff.	1.21		0.7

Subbasin Runoff Results

Total Rainfall (in)	1.18
Total Runoff (in)	0.83
Peak Runoff (cfs)	5.8
Rainfall Intensity	6.842
Weighted Runoff Coefficient	0.7
Time of Concentration (days hh:mm:ss)	0 00:10:20

Subbasin : Y7

Runoff Hydrograph



Subbasin : Y8

Input Data

Area (ac)	1.07
Weighted Runoff Coefficient	0.7

Runoff Coefficient

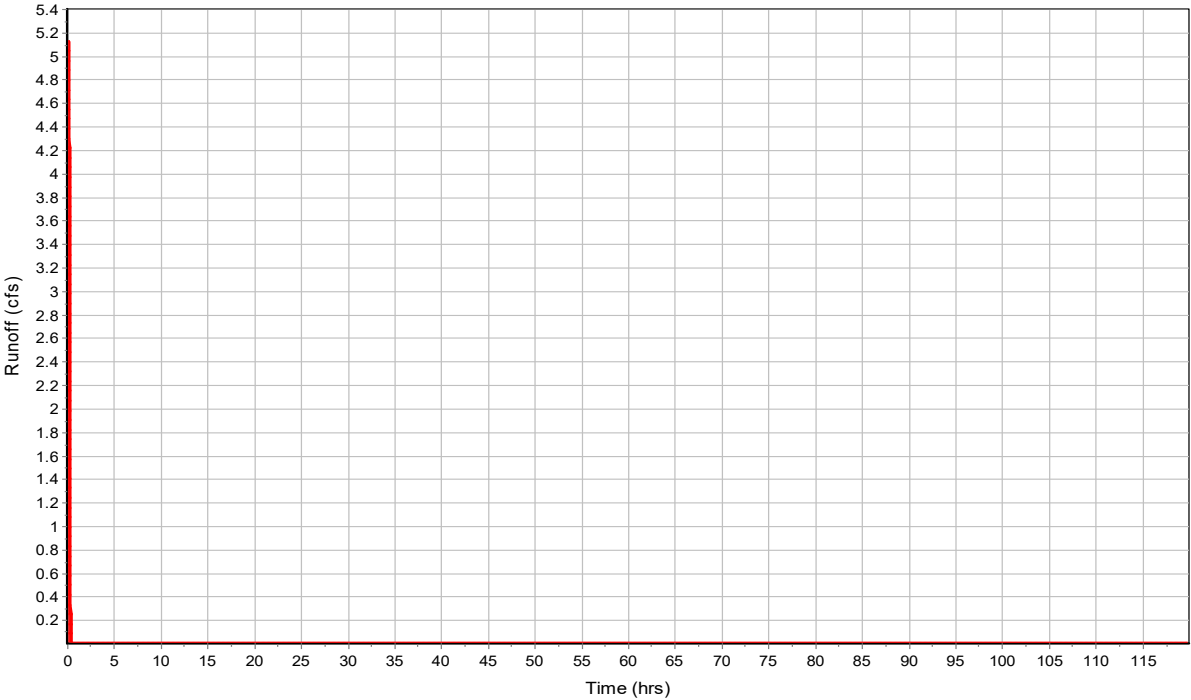
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.07	-	0.7
Composite Area & Weighted Runoff Coeff.	1.07		0.7

Subbasin Runoff Results

Total Rainfall (in)	1.18
Total Runoff (in)	0.83
Peak Runoff (cfs)	5.13
Rainfall Intensity	6.842
Weighted Runoff Coefficient	0.7
Time of Concentration (days hh:mm:ss)	0 00:10:20

Subbasin : Y8

Runoff Hydrograph



Subbasin : Y9

Input Data

Area (ac)	1.17
Weighted Runoff Coefficient	0.7

Runoff Coefficient

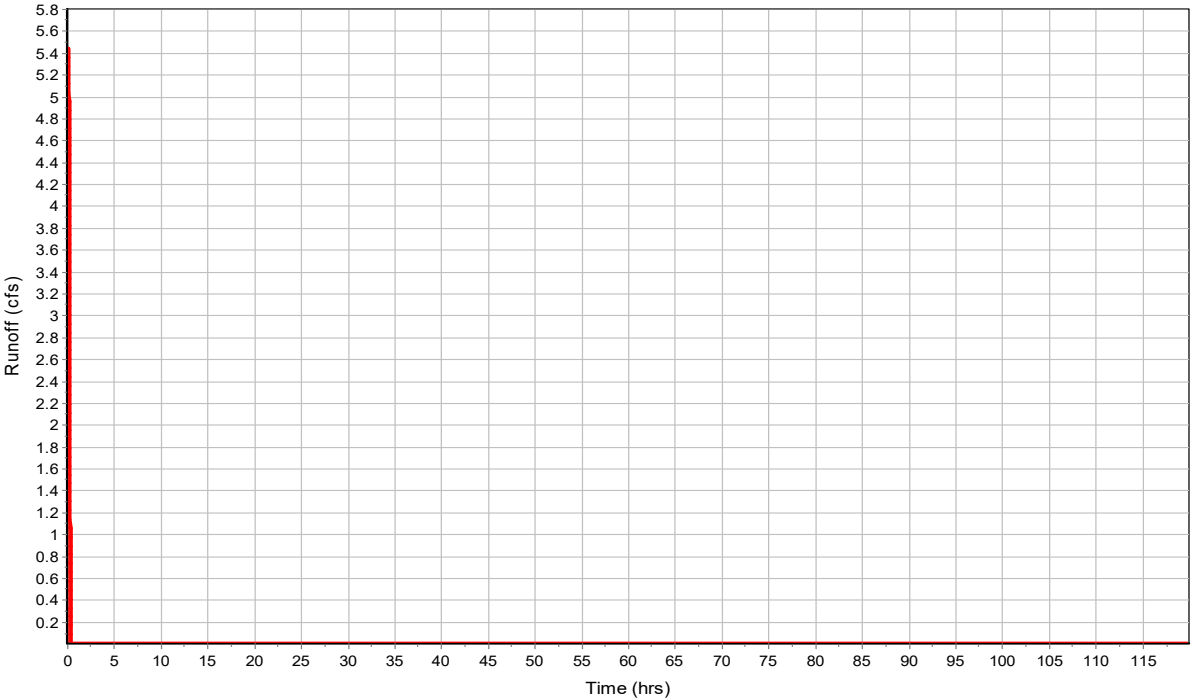
Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.17	-	0.7
Composite Area & Weighted Runoff Coeff.	1.17		0.7

Subbasin Runoff Results

Total Rainfall (in)	1.24
Total Runoff (in)	0.87
Peak Runoff (cfs)	5.44
Rainfall Intensity	6.642
Weighted Runoff Coefficient	0.7
Time of Concentration (days hh:mm:ss)	0 00:11:08

Subbasin : Y9

Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	Culvert-In	6174.43	6178.00	3.57	0.00	-6174.43	0.00	-6178.00	0.00	0.00
2	Culvert-Out	6174.22	6178.00	3.78	0.00	-6174.22	0.00	-6178.00	0.00	0.00
3	Forebay	6189.21	6191.50	2.29	6189.21	0.00	0.00	-6191.50	0.00	0.00
4	1-Jun	6195.11	6198.30	3.19	6195.11	0.00	6195.00	-3.30	0.00	0.00
5	2-Jun	6194.03	6197.50	3.47	6194.03	0.00	6194.00	-3.50	0.00	0.00
6	3-Jun	6192.32	6195.80	3.48	6192.32	0.00	6103.00	-92.80	0.00	0.00
7	4-Jun	6191.66	6195.10	3.44	6191.66	0.00	6194.00	-1.10	0.00	0.00
8	Null Structure	6190.84	6194.83	3.99	6190.84	0.00	0.00	-6194.83	0.00	0.00
9	OutletPipe	6187.31	6188.81	1.50	6187.31	0.00	0.00	-6188.81	0.00	0.00
10	OutletStructure	6187.67	6194.00	6.33	6187.67	0.00	0.00	-6194.00	0.00	0.00
11	Structure - (10)	6190.90	6195.96	5.06	6190.90	0.00	6192.65	-3.31	0.00	0.00
12	Structure - (11)	6194.95	6198.18	3.23	6194.95	0.00	6194.95	-3.23	0.00	0.00
13	Structure - (12)	6193.05	6196.53	3.48	6193.05	0.00	6193.20	-3.33	0.00	0.00
14	Structure - (13)	6192.46	6196.68	4.22	6192.46	0.00	6193.49	-3.19	0.00	0.00
15	Structure - (15)	6196.03	6198.98	2.95	6196.03	0.00	6195.86	-3.13	0.00	0.00
16	Structure - (16)	6194.13	6197.33	3.20	6194.13	0.00	6194.11	-3.23	0.00	0.00
17	Structure - (17)	6194.04	6197.46	3.42	6194.04	0.00	6194.05	-3.42	0.00	0.00
18	Structure - (2)	6191.01	6194.13	3.12	6191.01	0.00	6192.86	-1.28	0.00	0.00
19	Structure - (22)	6194.15	6197.10	2.95	6194.15	0.00	6193.08	-4.02	0.00	0.00
20	Structure - (3)	6190.95	6194.31	3.36	6190.95	0.00	6192.80	-1.52	0.00	0.00
21	Structure - (6)	6193.24	6196.48	3.24	6193.24	0.00	6193.50	-2.98	0.00	0.00
22	Structure - (8)	6189.75	6195.02	5.27	6189.75	0.00	6192.31	-2.71	0.00	0.00
23	Structure-(4)	6192.59	6195.78	3.19	6192.59	0.00	6194.61	-1.18	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1	Culvert-In	35.27	35.27	6178.00	3.57	0.00	0.00	6174.44	0.01	0 00:26	0 00:26	0.00	1.00
2	Culvert-Out	37.15	0.00	6176.03	1.81	0.00	1.97	6174.23	0.01	0 00:26	0 00:00	0.00	0.00
3	Forebay	37.12	0.00	6190.77	1.56	0.00	1.44	6189.74	0.53	0 00:10	0 00:00	0.00	0.00
4	1-Jun	4.75	0.00	6196.19	1.08	0.00	2.11	6195.36	0.25	0 00:11	0 00:00	0.00	0.00
5	2-Jun	4.66	0.00	6195.10	1.07	0.00	2.40	6194.28	0.25	0 00:11	0 00:00	0.00	0.00
6	3-Jun	5.75	0.00	6193.55	1.23	0.00	2.25	6192.57	0.25	0 00:10	0 00:00	0.00	0.00
7	4-Jun	5.40	0.00	6192.83	1.17	0.00	2.27	6191.91	0.25	0 00:11	0 00:00	0.00	0.00
8	Null Structure	10.64	5.12	6192.16	1.32	0.00	2.67	6191.34	0.50	0 00:10	0 00:00	0.00	0.00
9	OutletPipe	0.34	0.00	6187.51	0.20	0.00	5.80	6187.37	0.06	0 00:26	0 00:00	0.00	0.00
10	OutletStructure	0.34	0.00	6187.87	0.20	0.00	6.13	6187.73	0.06	0 00:25	0 00:00	0.00	0.00
11	Structure - (10)	22.23	2.38	6195.96	5.06	0.00	0.00	6192.15	1.25	0 00:08	0 00:11	0.28	6.00
12	Structure - (11)	4.69	4.69	6195.78	0.83	0.00	2.40	6194.95	0.00	0 00:10	0 00:00	0.00	0.00
13	Structure - (12)	9.18	4.69	6194.19	1.14	0.00	2.34	6193.05	0.00	0 00:11	0 00:00	0.00	0.00
14	Structure - (13)	18.12	0.00	6194.36	1.90	0.00	2.32	6192.96	0.50	0 00:12	0 00:00	0.00	0.00
15	Structure - (15)	4.79	4.79	6196.87	0.84	0.00	2.11	6196.03	0.00	0 00:11	0 00:00	0.00	0.00
16	Structure - (16)	9.37	4.79	6195.29	1.16	0.00	2.04	6194.13	0.00	0 00:11	0 00:00	0.00	0.00
17	Structure - (17)	9.37	0.00	6197.46	3.42	0.00	0.00	6194.04	0.00	0 00:10	0 00:11	0.01	2.00
18	Structure - (2)	10.72	5.39	6194.13	3.12	0.00	0.00	6191.01	0.00	0 00:08	0 00:11	0.13	6.00
19	Structure - (22)	2.38	2.38	6194.62	0.47	0.00	2.48	6194.15	0.00	0 00:10	0 00:00	0.00	0.00
20	Structure - (3)	8.73	0.00	6194.31	3.36	0.00	0.00	6190.95	0.00	0 00:09	0 00:10	0.01	6.00
21	Structure - (6)	5.80	5.80	6194.23	0.99	0.00	2.25	6193.24	0.00	0 00:10	0 00:00	0.00	0.00
22	Structure - (8)	37.07	0.00	6192.29	2.54	0.00	2.73	6190.75	1.00	0 00:10	0 00:00	0.00	0.00
23	Structure-(4)	5.44	5.44	6193.51	0.92	0.00	2.27	6192.59	0.00	0 00:11	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1	10-30NP	122.00	6190.90	0.00	6190.29	0.54	0.61	0.5000	CIRCULAR	24.000	24.000	0.0120	0.0000	0.0000	0.0000	0.00	No
2	11-15NP	91.22	6193.24	0.00	6192.57	0.25	0.67	0.7300	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No
3	12-18P	130.69	6192.32	0.00	6191.34	0.50	0.98	0.7500	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
4	13-24NP	11.92	6190.84	0.00	6190.75	1.00	0.09	0.7600	CIRCULAR	24.000	24.000	0.0120	0.0000	0.0000	0.0000	0.00	No
5	14-15NP	90.26	6192.59	0.00	6191.91	0.25	0.68	0.7500	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No
6	15-18P	130.00	6191.66	0.00	6191.01	0.00	0.65	0.5000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
7	16-18NP	11.92	6191.01	0.00	6190.95	0.00	0.06	0.5000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
8	17-18NP	240.00	6190.95	0.00	6189.75	0.00	1.20	0.5000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
9	18-36NP	58.84	6189.75	0.00	6189.21	0.00	0.54	0.9200	CIRCULAR	36.000	36.000	0.0120	0.0000	0.0000	0.0000	0.00	No
10	1-NP15	89.45	6196.03	0.00	6195.36	0.25	0.67	0.7500	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No
11	2-18P	130.81	6195.11	0.00	6194.13	0.00	0.98	0.7500	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
12	3-18NP	11.92	6194.13	0.00	6194.04	0.00	0.09	0.7600	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
13	4-18NP	180.00	6194.04	0.00	6192.96	0.50	1.08	0.6000	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
14	5-15NP	90.21	6194.95	0.00	6194.28	0.25	0.67	0.7400	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No
15	6-18P	130.60	6194.03	0.00	6193.05	0.00	0.98	0.7500	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
16	7-18NP	11.92	6193.05	0.00	6192.96	0.50	0.09	0.7600	CIRCULAR	18.000	18.000	0.0120	0.0000	0.0000	0.0000	0.00	No
17	8-24NP	168.00	6192.46	0.00	6191.40	0.50	1.06	0.6300	CIRCULAR	24.000	24.000	0.0120	0.0000	0.0000	0.0000	0.00	No
18	9-15P	152.67	6194.15	0.00	6192.15	1.25	2.00	1.3100	CIRCULAR	15.000	15.000	0.0120	0.0000	0.0000	0.0000	0.00	No
19	Culvert	42.05	6174.43	0.00	6174.22	0.00	0.21	0.5000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
20	Link-03	228.62	0.00	-6187.31	0.00	-6186.00	0.00	0.0000	Dummy	0.000	0.000	0.0150	0.5000	0.5000	0.0000	0.00	No
21	Link-09	423.13	0.00	-6174.22	6173.75	0.00	-6173.75	-1459.0700	Dummy	0.000	0.000	0.0150	0.5000	0.5000	0.0000	0.00	No
22	OutletPipe	58.32	6187.67	0.00	6187.31	0.00	0.36	0.6200	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
23	Trk Chnl	164.17	6189.73	0.52	6188.25	0.25	1.48	0.9000	Dummy	0.000	0.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of
Barrels

	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	2
	1
	1
	1
	1

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	10-30NP	18.75	0 00:09	17.33	1.08	6.58	0.31	2.00	1.00	4.00		SURCHARGED
2	11-15NP	5.75	0 00:10	6.00	0.96	6.87	0.22	0.98	0.78	0.00		Calculated
3	12-18P	5.71	0 00:10	9.85	0.58	5.82	0.37	0.82	0.55	0.00		Calculated
4	13-24NP	10.64	0 00:10	21.30	0.50	6.78	0.03	1.00	0.50	0.00		Calculated
5	14-15NP	5.40	0 00:11	6.07	0.89	6.69	0.22	0.92	0.73	0.00		Calculated
6	15-18P	5.36	0 00:11	8.05	0.67	4.91	0.44	0.89	0.60	0.00		Calculated
7	16-18NP	8.73	0 00:10	8.07	1.08	5.33	0.04	1.50	1.00	4.00		SURCHARGED
8	17-18NP	8.71	0 00:14	8.05	1.08	5.42	0.74	1.38	0.92	0.00		> CAPACITY
9	18-36NP	37.12	0 00:10	69.22	0.54	10.08	0.10	1.56	0.52	0.00		Calculated
10	1-NP15	4.75	0 00:11	6.06	0.78	6.50	0.23	0.83	0.67	0.00		Calculated
11	2-18P	4.73	0 00:11	9.85	0.48	5.55	0.39	0.73	0.49	0.00		Calculated
12	3-18NP	9.37	0 00:11	9.89	0.95	6.36	0.03	1.16	0.78	0.00		Calculated
13	4-18NP	9.54	0 00:12	8.81	1.08	5.87	0.51	1.39	0.92	0.00		> CAPACITY
14	5-15NP	4.66	0 00:11	6.03	0.77	6.50	0.23	0.82	0.66	0.00		Calculated
15	6-18P	4.63	0 00:11	9.86	0.47	5.53	0.39	0.72	0.48	0.00		Calculated
16	7-18NP	9.18	0 00:11	9.89	0.93	6.35	0.03	1.14	0.76	0.00		Calculated
17	8-24NP	18.07	0 00:11	19.47	0.93	7.13	0.39	1.52	0.76	0.00		Calculated
18	9-15P	2.35	0 00:10	8.01	0.29	7.53	0.34	0.46	0.37	0.00		Calculated
19	Culvert	37.15	0 00:26	34.64	1.07	6.46	0.11	1.83	0.91	0.00		> CAPACITY
20	Link-03	0.34	0 00:26	0.00	1.07	0.00		1.83	0.91	0.00		> CAPACITY
21	Link-09	37.15	0 00:26	0.00	1.07	0.00		1.83	0.91	0.00		> CAPACITY
22	OutletPipe	0.34	0 00:26	8.94	0.04	2.42	0.40	0.20	0.13	0.00		Calculated
23	TrklChnl	37.12	0 00:10	0.00	0.04	0.00		0.20	0.13	0.00		Calculated

Storage Nodes

Storage Node : DetentionPond

Input Data

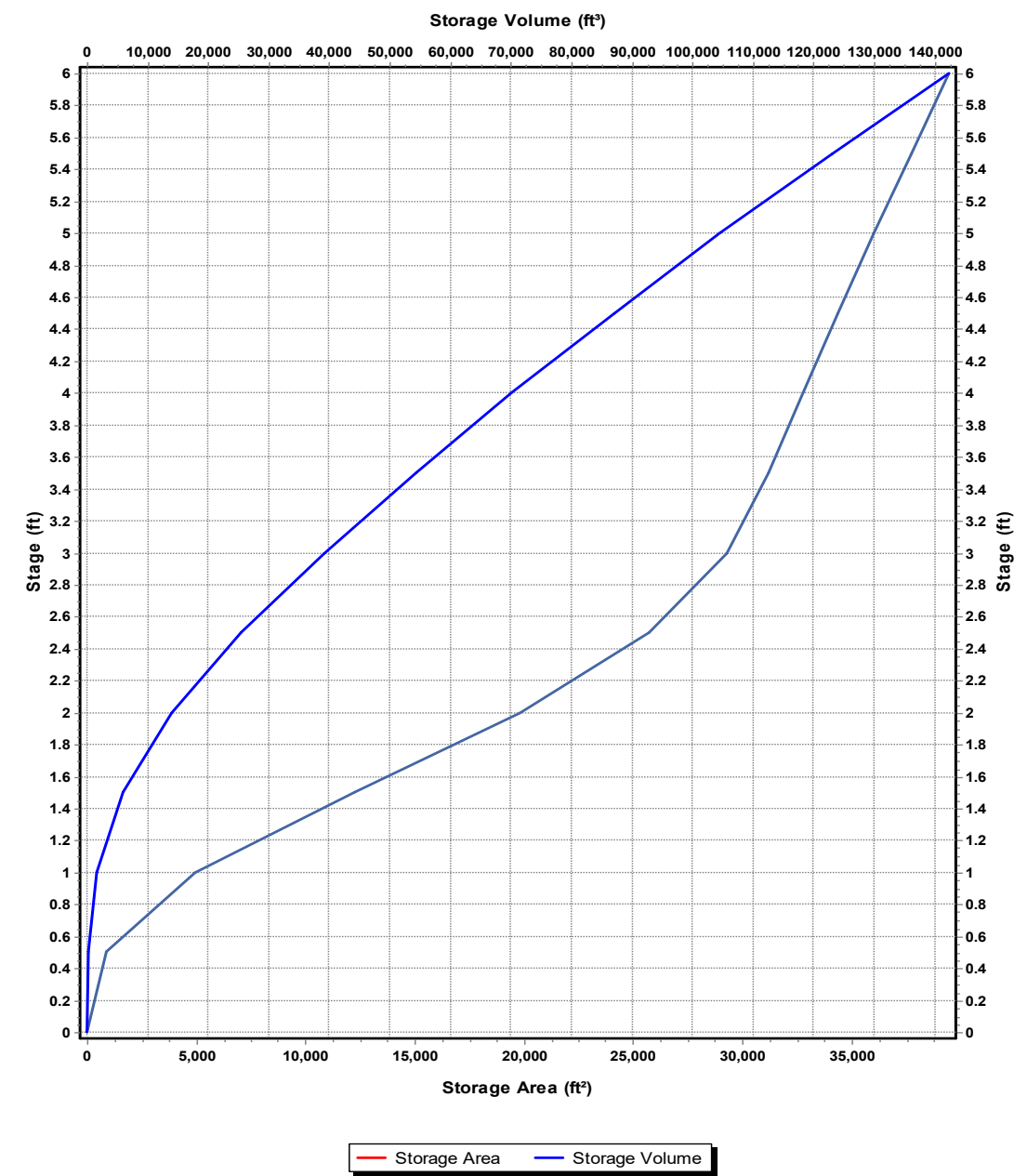
Invert Elevation (ft)	6188.00
Max (Rim) Elevation (ft)	6194.00
Max (Rim) Offset (ft)	6.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-6188.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-01

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	10	0
0.5	882.13	223.03
1	4951.3	1681.39
1.5	12246.1	5980.74
2	19823.28	13998.09
2.5	25766.41	25395.51
3	29274.59	39155.76
3.5	31177.97	54268.9
4	32757.61	70252.8
4.5	34372.11	87035.23
5	36021.48	104633.63
5.5	37713.37	123067.34
6	39455.42	142359.54

Storage Area Volume Curves



Storage Node : DetentionPond (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	EmergencySpillway	Trapezoidal	No	6192.00	4.00	10.00	2.00	3.33
2	Weir	Trapezoidal	No	6191.50	3.50	4.00	1.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Orifice-01	Side	CIRCULAR	No	1.00			6187.67	0.61
2	Orifice-02	Side	CIRCULAR	No	1.00			6188.17	0.61
3	Orifice-03	Side	CIRCULAR	No	1.00			6188.67	0.61
4	Orifice-04	Side	CIRCULAR	No	1.50			6189.17	0.61
5	Orifice-05	Side	CIRCULAR	No	1.50			6189.67	0.61
6	Orifice-06	Side	CIRCULAR	No	2.00			6190.17	0.61
7	Orifice-07	Side	CIRCULAR	No	2.00			6190.67	0.61

Output Summary Results

Peak Inflow (cfs)	43.91
Peak Lateral Inflow (cfs)	6.79
Peak Outflow (cfs)	0.34
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	6190.72
Max HGL Depth Attained (ft)	2.72
Average HGL Elevation Attained (ft)	6188.79
Average HGL Depth Attained (ft)	0.79
Time of Max HGL Occurrence (days hh:mm)	0 00:25
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Appendix C

Site Maps & Design Drawings



A = BASIN
B = AREA IN ACRES
C = WEIGHTED RUNOFF COEFFICIENT

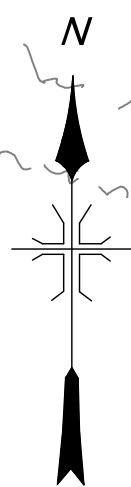
Existing			
Design Point	Contributing Area	Runoff Peak 5-year Event	Runoff Peak 100-year Event
	(acres)	(cfs)	(cfs)
1	31.82	7.59	50.95
2	15.06	3.59	24.11
3	26.94	6.40	42.91

1" = 50'

Scale in feet

50' 0 50' 100'

A horizontal scale bar with alternating black and white segments. The total length is 100 feet, with a midpoint at 50 feet. The segments are labeled 50', 0, 50', and 100' from left to right.



EXISTING DRAINAGE BASINS

DESIGNED BY:	TMC	SCALE	AS NOTED	CHECKED BY:	DWS
DRAWN BY:	TMC	FILE NAME:	23140_CAGE.DWG	DATE ISSUED:	5/1/25

[illegible]

This site plan illustrates a comprehensive stormwater management system. The central feature is a large rectangular pond area divided into several smaller sections by blue lines. These sections are labeled Y1 through Y10, each containing numerical values representing flow or volume. To the left of this main pond area is a smaller section labeled P3. Below the main pond area is a rectangular structure labeled EDB-1, which includes a forebay and an outlet structure. To the right of EDB-1 is another rectangular structure labeled P1-S. Further to the right is a long, narrow structure labeled P1-N. The entire system is surrounded by topographic contour lines indicating elevation. Various other labels include 'ADS SUBDRAIN SIZE VARIES', 'DETENTION BASIN 4:1 BERM SLOPES', 'OUTLET STRUCTURE', 'EMERGENCY SPILLWAY AND POND OUTFALL D₅₀ = 6" RIPRAP', and '(2) 24" RCP CULVERTS'. The plan also shows a network of swales and culverts connecting different parts of the system.

Diagram illustrating the relationship between contour lines and a proposed drainage basin boundary. The contours are labeled 5800 and 5796. A blue line represents the proposed drainage basin boundary. Arrows indicate the flow direction towards the basin.

EXISTING INDEX CONTOUR
EXISTING INTERMEDIATE CONTOUR
PROPOSED INDEX CONTOUR
PROPOSED INTERMEDIATE CONTOUR
PROPOSED DRAINAGE FLOWLINE
FLOW ARROW
PROPOSED DRAINAGE BASIN

A = BASIN
B = AREA IN ACRES
C = WEIGHTED RUNOFF COEFFICIENT

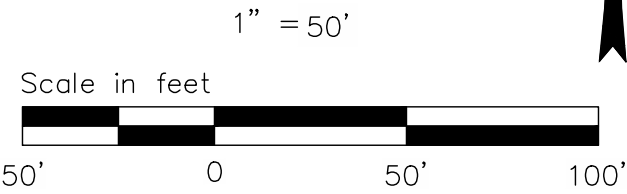
D = DESIGN POINT DESIGNATION

Summary Runoff Tables			
Existing			
Design Point	Contributing Area	Runoff Peak 5-year Event	Runoff Peak 100-year Event
	(acres)	(cfs)	(cfs)
1	31.82	7.59	50.95
2	15.06	3.59	24.11
3	26.94	6.40	42.91

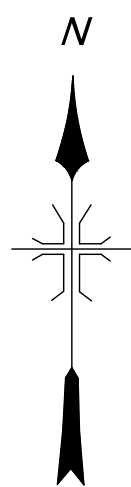
Summary Runoff Tables			
Proposed			
Design Point	Contributing Area	Runoff Peak 5-year Event	Runoff Peak 100-year Event
	(acres)	(cfs)	(cfs)
1	28.38	6.77	45.44
2	9.34	2.23	14.96
3	25.46	6.04	40.56
4	10.64	18.63	35.01
5	10.64	0.41	7.63

Water Quality Treatment Summary Table		
Basin ID(s)	PCM Tributary Area	PCM ID
Y1-Y10	9.62	EDB-1
EDB-1	1.02	EDB-1
P1-P3	63.18	Runoff Reduction

NOTE: THIS DRAWING IS A SCHEMATIC REPRESENTATION OF THE PROPOSED DRAINAGE BASINS. FOR ALL DESIGN SPECIFIC INFORMATION SEE CIVIL PLANS.

[illegible]

NOTE: THIS DRAWING IS A SCHEMATIC REPRESENTATION OF THE AUTODESK STORM AND SANITARY ANALYSIS MODEL. FOR ALL DESIGN SPECIFIC INFORMATION SEE CIVIL PLANS.



DMC JOB NO.:	23148
SHEET NO.:	C-3
OF	2
	SHEETS