Stormwater Management Plan

Public Service Electric and Gas Company

West Orange 26kV Switching Station
Project No. 144507

Revision 0
5/9/2024

Stormwater Management Plan

prepared for

Public Service Electric and Gas Company
West Orange 26kV Switching Station
West Orange, New Jersey

Project No. 144507

Revision 0
5/9/2024

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

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Public Service Electric and Gas Company
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Certification

I hereby certify, as a Professional Engineer in the state of New Jersey, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Public Service Electric and Gas Company or others without specific verification or adaptation by the Engineer.

5/9/24

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Additional reference information provided by others and not certified by the above sealing Engineer.

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BMcD	Burns & McDonnell
BMP	Best Management Practice
CF	Cubic Feet
CFS	Cubic Feet per Second
E&S	Erosion and Sedimentation Control
FEMA	Federal Emergency Management Agency
FPS	Feet per Second
FT	Feet
LF	Linear Feet
NAD	North American Datum
NAVD	North American Vertical Datum
NJDEP	State of New Jersey Department of Environmental Protection
PSE&G	Public Service Electric and Gas Company
R.O.W.	Right-of-way
WQv	Water Quality Volume

1.0 SITE CONDITIONS

1.1 Site Description

Public Service Electric and Gas Company (PSE&G) proposes to expand the existing West Orange 26kV switching station, located in West Orange, Essex County, New Jersey. The property is designated by West Orange as Block 155, Lot 26.01 in the City of West Orange, New Jersey which encompasses a total of 23.57 acres (refer to Figure 1-1 for the project's general vicinity map). The site is located at the corner of Prospect Avenue and Mt Pleasant Avenue. One access point to the station will be reconstructed at the south side of the station from Mt Pleasant Avenue. The expansion of the switching station, including the fence replacement, utility connections, and driveway updates, has an overall project disturbance of approximately 3.92 acres.

The site is an existing PSE&G switching station with several concrete foundations, pieces of electrical equipment, significant amounts of below-ground duct banks, a multistory brick building at the western edge of the site and a guard house located near the existing access drive. Immediately adjacent to the proposed site, to the west is a large shed, and to the north is a small parking lot and additional electrical infrastructure.

The proposed station yard is to be made up of standard station gravel, various equipment foundations and new Ameristar security fence which shall replace the existing decorative fence.

1.2 Project Description

Below is a list of major equipment and site improvements to be installed as part of the project:

New
1 – 26kV metal enclosed switchgear ring bus with 28 feeder positions
2 – 26kV capacitor banks
3 – 26kV transformer breakers
1 – 26kV transformer neural ground resistor with fast acting ground witch perimeter fence
Demolition of existing 26kV breakers, disconnects, and feeder positions

1.3 Project Stormwater Management Requirements

Per N.J.A.C. 7:8, a Major Development is defined as:

1. Any development that ultimately disturbs one or more acres of land since February 2, 2004;
2. The creation of one-quarter acre or more of "regulated impervious surface" since February 2, 2004;

3. The creation of one-quarter acre or more of "regulated motor vehicle surface" since March 2, 2021; or
4. A combination of 2 and 3 above that totals an area greater than one-quarter acre or more.

This project will disturb 3.48 acres on site and will increase impervious surfacing by 0.76 acres. Within the new impervious area, 0.22 acres of regulated motor vehicle surfacing will be added.

This site is defined as a major development as it exceeds the one-acre threshold and relates to specific design criteria as follows:

GROUNDWATER RECHARGE – The project is located within a Metropolitan Planning Area (PA1) and is considered an Urban Redevelopment Area, therefore it is exempt from groundwater recharge requirements under N.J.A.C. 7:8-5.4(b)2.

WATER QUALITY – As stated in N.J.A.C. 7:8-5.5, since the project increases regulated motor vehicle surface by less than 0.25 acres, the project does not need to satisfy NJDEP water quality requirements.

WATER QUANTITY – The project was designed to meet N.J.A.C. 7:8-5.6(b)3 by demonstrating that post-construction peak runoff rates for the current and projected 2-, 10-, and 100-year storm events, as defined in N.J.A.C. 7:8-5.7(c) and (d), do not exceed 50%, 75% and 80% of the pre-construction peak runoff rates for the respective storm events.

The pre-developed watersheds associated with the current topography have been delineated, as indicated on Exhibit A. The pre-developed watersheds are reflective of the post developed watersheds that are included in the March 2012 Stormwater Management Report, prepared by TRC Engineers, Inc (See Appendix E). The post-developed watersheds associated with this project's station upgrades, has been presented on Exhibit B.

1.4 Soils

According to the Web Soil Survey developed by the United States Department of Agriculture's (USDA) Natural Resources Conservation Service, the soil groups present on site are URBONB, Urban land, Boonton substratum, and USBONB, Urban land, Boonton substratum – Boonton complex. URBONB is previously developed land with no recorded soil type, therefore Hydrologic Soil Group D was assumed for these areas. USBONB surrounds URBONB on the site, and is classified as soil type B. However, the assumption to analyze the USBONB areas as Hydrologic Soil Group D was confirmed appropriate by the subsurface investigation. Silty Clay and Clayey Silts were found below the gravel and fill sections,

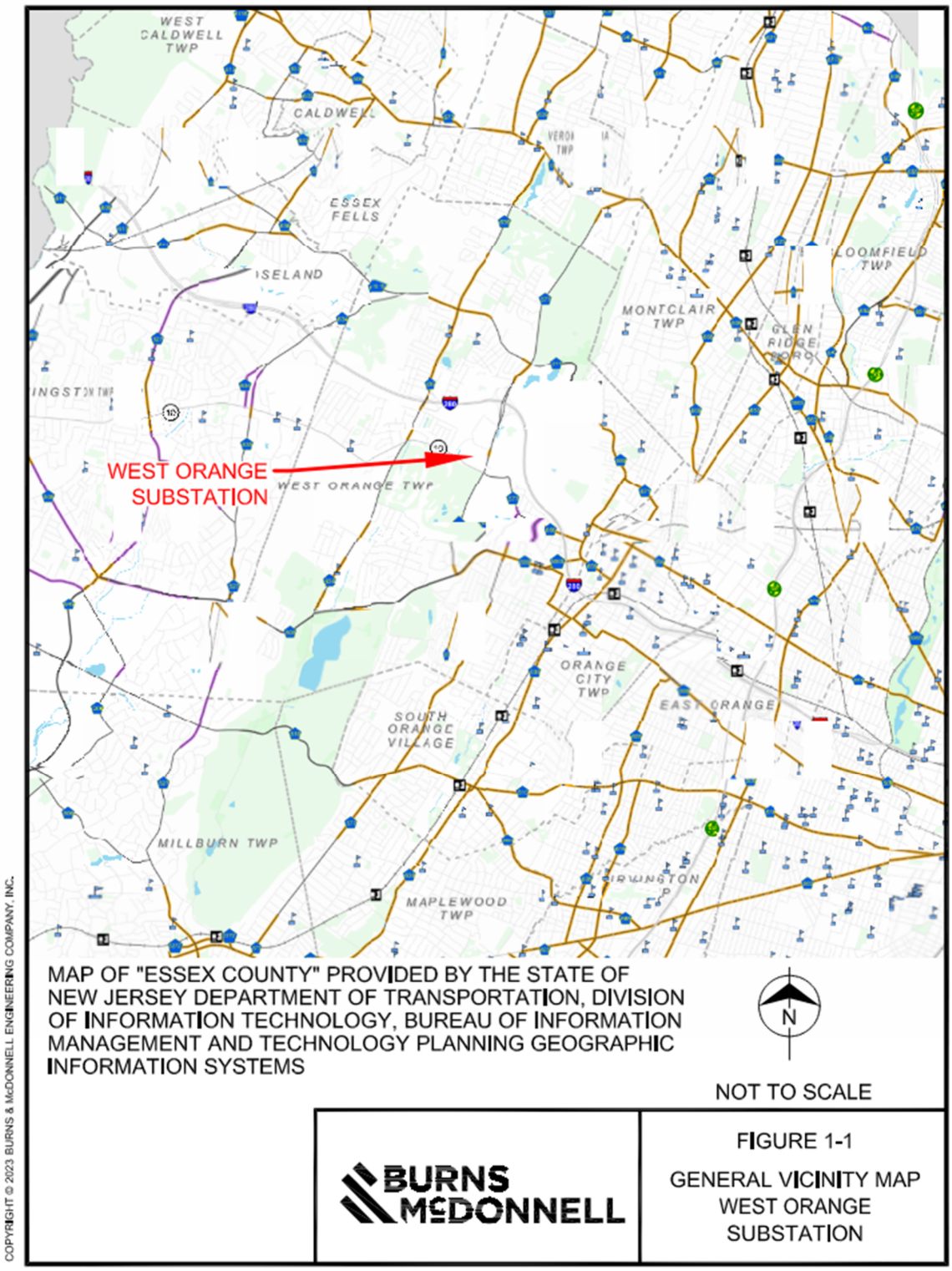
which are shown in Hydrologic Soil Group D on a USDA Soil Texture Triangle, in accordance with Chapter 12 of the BMP Manual. The soil map, soil descriptions and ratings can be found in Appendix F.

1.5 Floodplain

As depicted on FEMA Map Number 34013C0092F (effective date June 4, 2007), the project site is located within a FEMA Zone X, area of minimal flood hazard. The Flood Insurance Rate Map (FIRM) can be found in Appendix F

.

Figure 1-1 General Vicinity Map



2.0 HYDROLOGY AND HYDRAULICS

2.1 Rainfall Data

Rainfall Depths for Essex County were obtained from the NOAA National Weather Service Precipitation Frequency Data Server (See Appendix F). The SCS rainfall distribution for this project is NOAA 24-Hr Type D. See Table 2.1 for existing rainfall data.

Table 2.1: Design Storm Frequency-Depth

Return Frequency (yr)	24 Hour Depth (in)
2	3.42
10	5.20
25	6.44
100	8.71

Per the updated N.J.A.C. 7:8 regulations effective July 17, 2023, an adjustment factor for the respective county is applied for both the current precipitation (per N.J.A.C. 7:8, Table 5-5) and future precipitation (per N.J.A.C. 7:8, Table 5-6) for Essex County for the 2-, 10-, and 100-year return frequencies. The current and future adjusted 24-hour depths are used for stormwater modeling. The resulting design rainfall depths are shown below in Table 2.2.

Table 2.2: Design Storm Frequency with Depth Precipitation Adjustment Factors (AF)

Return Frequency (yr)	24 Hour Depth				
	NOAA Atlas 14 (in)	Current AF	Current Adjusted (in)	Future AF	Future Adjusted (in)
Water Quality (WQ)	1.25[a]				
2	3.42	1.01	3.45	1.19	4.07
10	5.20	1.03	5.37	1.22	6.36
25	6.44	N/A	N/A	N/A	N/A
100	8.71	1.06	9.23	1.33	11.58

[a]N.J.A.C. 7:8-5.5 requires the WQ_v storm to be 1.25 inches of rainfall in two hours.

2.2 Runoff Data

HydroCAD-10 software was utilized to model the stormwater runoff at the site. The SCS TR-55 methodology was used for this model to calculate the pre- and post-developed runoff rates for storage design. Table 2.3 provides detailed information regarding curve numbers and land coverages for pre- and post-developed watersheds, respectively.

Table 2.3: Land Coverages

Land Coverage	CN	HSG	Area (acres)
Pre-Development			
Impervious, Pavement	98	D	1.735
>75% Grass cover, Good	80	D	1.752
Yard Stone/Gravel Pad	85	D	2.011
Brush, Good	73	D	1.271
Non-Contributory*	73-85	D	1.456
Post-Development			
Impervious, Pavement	98	D	2.054
>75% Grass cover, Good	80	D	1.665
Yard Stone/Gravel Pad	85	D	2.332
Brush, Good	73	D	2.024
Non-Contributory*	73-85	D	0.150

*Non-Contributory refers to areas that do not contribute to bioretention or the existing Aquashield system. Non-Contributory areas include the grassed slope areas and the transformer pits.

2.3 Stormwater Management Facilities

As previously stated in Section 1.3, this project is considered a major development, but is only required to treat quantity. A series of bioretention basins with underdrains is proposed to mitigate the effects of higher runoff rates from the proposed development. The bioretention basins consist of a topsoil layer of at least 18 inches in depth, a middle sand layer of at least 6 inches and a bottom gravel layer of at least 12 inches. Filter fabric will also be installed along the sides and bottom of each basin. Perforated underdrains, 4 inches in diameter, will be located throughout the basin. In accordance with the BMP manual, inverts will not be required to be at least 3 inches from the bottom because of the use of a concrete/non-earthen bottom. Pipe crowns will be required to be at least 3 inches from the top of the gravel layer. The bioretention basin systems are located to the east and south of the proposed station upgrades and are designed according to the New Jersey Stormwater Best Practices Manual, Chapter 9.7, Small-Scale Bioretention Systems.

The bioretention basins are designed so that the post-construction peak runoff rates for the current and future 2-, 10- and 100-year storm events are less than 50%, 75% and 80%, respectively, of the pre-construction peak runoff rates as shown in Table 2.4. During storm events, the bioretention basins will capture stormwater runoff, which will filter through the basin's media layers and drain out through a network of perforated underdrains at the bottom of each of the basins. Water will be released from the underdrain system into a stormwater conveyance system, ultimately connecting and discharging into the Township's existing stormwater network, located within Mount Pleasant Avenue.

Table 2.4: Bioretention Basins Discharge

Return Frequency (yr)	Inflow (cfs)	Discharge (cfs)	Stage Elevation (ft)	Surface Area (sf)	Max Available Storage (cf)	Approx. SHWT Elevation (ft)	Bottom of Bioretention Basin Elevation (ft)
	BR-1						
WQ	0.44	0.12	596.68	1,759	6,639	595.00	596.00
2 (Current)	0.93	0.24	598.20				
2 (Future)	1.21	0.30	599.34				
10 (Current)	1.67	0.33	600.08				
10 (Future)	2.13	0.42	600.58				
100 (Current)	3.18	1.24	601.35				
100 (Future)	4.23	1.65	602.16				

Return Frequency (yr)	Inflow (cfs)	Discharge (cfs)	Stage Elevation (ft)	Surface Area (sf)	Max Available Storage (cf)	Approx. SHWT Elevation (ft)	Bottom of Bioretention Basin Elevation (ft)
BR-2							
WQ	0.37	0.11	598.55	1,578	2,187	597.00	598.00
2 (Current)	0.65	0.19	599.40				
2 (Future)	0.84	0.23	600.04				
10 (Current)	1.14	0.33	601.13				
10 (Future)	1.44	0.74	601.23				
100 (Current)	2.14	1.85	601.42				
100 (Future)	2.83	2.78	601.47				
BR-3							
WQ	0.31	0.10	594.44	2,175	5,822	593.00	594.00
2 (Current)	0.59	0.17	595.19				
2 (Future)	0.77	0.20	595.56				
10 (Current)	1.05	0.26	596.66				
10 (Future)	1.34	0.31	597.57				
100 (Current)	1.97	0.34	598.43				
100 (Future)	2.63	0.50	599.05				
BR-4							
WQ	0.50	0.08	595.04	2,894	4,782	593.70	594.70
2 (Current)	0.83	0.14	595.53				
2 (Future)	1.05	0.16	595.75				
10 (Current)	1.44	0.20	596.26				
10 (Future)	1.79	0.23	596.69				
100 (Current)	2.68	0.32	598.36				
100 (Future)	3.49	0.44	598.73				
BR-5							
WQ	0.33	0.08	594.16	1,575	3,203	592.80	593.80
2 (Current)	0.59	0.15	594.69				
2 (Future)	0.75	0.17	594.95				
10 (Current)	1.04	0.21	595.55				
10 (Future)	1.30	0.25	596.23				
100 (Current)	1.96	0.32	597.66				
100 (Future)	2.55	0.35	598.22				

*Basin Information from Exhibit A - Pre-Developed Watershed Map.

A series of trench drains are also included, adjacent to each bioretention basin. These trench drains are intended to prevent off-site drainage from flowing onto the station pad or into the bioretention basins. These areas have been labeled as Non-Contributory and were not taken into consideration when evaluating the bioretention basins. The trench drains adjacent to the basins will connect into a separate stormwater conveyance system, ultimately connecting and discharging into the Township's existing stormwater network, located within Mount Pleasant Avenue, at outfall 0-1A. As shown in Table 2.7, these areas are considered non-contributory because they are to remain in their existing condition and are only captured at the watershed lowpoint to directly route runoff to the stormwater network in Mount Pleasant Avenue to prevent any impact to the station. Each Discharge Point was analyzed to regard only watersheds that contributed to that outfall and were analyzed differently as not all areas are being disturbed/impacted by these improvements. In Table 2.7, the pre-development outfalls comparison versus the post-development outfalls show less flow leaving the site in the post-development condition for each of the current and future projected design storm outfalls per the criteria described in N.J.A.C 7:8.

Stormwater flow from three of the post developed watersheds, PO-DA-A, PO-DA-M and portions of PO-DA C, will mimic the pre-developed drainage patterns of PO-DA 6 and PO-DA 8, utilizing the existing stormwater conveyance system, routing to the existing Aquashield treatment device, ultimately discharging into the Township's existing stormwater network located within Mount Pleasant Avenue. As shown in Table 2.7, post-development flows to O-Aquashield were significantly reduced from pre-development flows, this was accomplished by routing runoff to other BMPs. By reducing the footprint of the watersheds routing to O-Aquashield, we were able to reduce the load to this device and add new capture and treatment via bioretention.

Soil tests were conducted by GZA GeoEnvironmental, Inc. between May 31st, 2022 and January 6th, 2023 (See Appendix E). During the soil investigation, GZA excavated five test pits in the bioretention areas, TP-203, TP-204, TP-205, TP-103 and TP-102, from north to south. The test pits extended to depths of approximately 6 to 10 feet below grade. Groundwater seepage was encountered at varying depths. Table 2.5 provides estimated Seasonal High Water Table (SHWT) elevations used for each basin.

Based off the acquired groundwater locations, each bioretention basin was initially designed to allow for a minimum of 1' of separation between the SHWT and the bottom of the bioretention basin (See Table 2.5). Design was modified to utilize a sealed bioretention basin with concrete on all sides and so therefore in accordance with the New Jersey Stormwater Best Practices Manual, Chapter 9.7, Small-Scale Bioretention Systems, the basins are not required to maintain a separation from the Seasonal High Water Table.

Each bioretention basin will have its own outlet control structure (Refer to Table 2.6) that discharge into a subsurface pipe network that will ultimately drain to Outfall O-1B, located in Mount Pleasant Avenue.

Table 2.5: Bioretention Basin Control Devices

Outlet Control Structure Name	Control Device Outlets
CS-01	(1) – 2.5" circular orifice @ 596.00'
	(1) – 12.0"W x 2.5"H rectangular orifice @ 600.50'
	(1) – 48.0"W x 48.0"L overflow orifice @ 602.40'
	(1) – 12" diameter RCP (SD-21) @ 591.57'
CS-02	(1) – 2.5" circular orifice @ 598.00'
	(1) – 36.0"W x 2.5"H rectangular orifice @ 601.10'
	(1) – 48.0"W x 48.0"L overflow orifice @ 601.40
	(1) – 12" diameter RCP (SD-22) @ 590.35'
CS-03	(1) – 2.5" circular orifice @ 594.00'
	(1) – 2.5"W x 2.5"H rectangular orifice @ 598.50'
	(1) – 48.0"W x 48.0"L overflow orifice @ 601.15'
	(1) – 15" diameter RCP (SD-23) @ 588.19'
CS-04	(1) – 2.5" circular orifice @ 594.70'
	(1) – 2.5"W x 2.5"H rectangular orifice @ 598.30'
	(1) – 48.0"W x 48.0"L overflow orifice @ 599.65'
	(1) – 15" diameter RCP (SD-24) @ 586.53'
CS-05	(1) – 2.5" circular orifice @ 593.80'
	(1) – 12.0"W x 2.5"H rectangular orifice @ 598.20'
	(1) – 48.0"W x 48.0"L overflow orifice @ 599.65'
	(1) – 18" diameter RCP (SD-25) @ 584.63'

2.4 Results

The post-developed watersheds PO-DA A and PO-DA M, which discharge into the existing onsite stormwater pipe network that drains to the AquaShield, will be a reduction in size from the pre-developed watersheds PO-DA 6 and PO-DA 8, thus providing no adverse impact to the original AquaShield design or outfall.

As summarized in Section 2.3, a series of bioretention basins with underdrains will be constructed to address the water quantity for the peak discharge for the newly developed areas associated with the substation expansion, specifically post-developed watersheds PO-DA C, PO-DA E, PO-DA G, PO-DA I, and PO-DA J. Flow rate calculations were completed using HydroCAD software. Refer to Appendix B for the calculations.

The post-developed peak runoff rates for watershed PO-DA N, which drains to an existing inlet manhole similar to watershed PO-DA 1, thus providing no adverse impact to Outfall O-2. The HydroCAD calculations show the post-construction runoff hydrographs for the current and projected 2-, 10-, and 100-year storm events, do not exceed, at any point in time, the pre-construction runoff hydrographs through hydrologic and hydraulic analysis for stormwater leaving the site, for the same storm events. This is summarized in Table 2.7 below.

The bioretention basins with underdrains will provide runoff quantity control in accordance with N.J.A.C. 7:8-5.6. This regulation requires the peak post developed runoff rates to not exceed the peak pre-construction runoff rates for 50% of the 2-year, 75% of the 10-year, and 80% of the 100-year storm events.

Table 2.7 below summarizes the stormwater flow conditions for the project. Both the Current and Future Precipitation Change Factors for Essex County have been considered as per the July 2023 N.J.A.C. 7:8 updates and section .

Table 2.6: Site Flow Results

Outfall Discharge Point		Q(2-YR) Current (cfs)	Q(2-YR) Future (cfs)	Q(10-YR) Current (cfs)	Q(10-YR) Future (cfs)	Q(100-YR) Current (cfs)	Q(100-YR) Future (cfs)
O-AquaShield (PO-DA 6 / A, DA 8 / M)	Pre	4.09	5.27	7.37	9.33	14.11	18.67
	Post	3.34<4.09 **OK**	4.32<5.27 **OK**	6.09<7.37 **OK**	7.73<9.33 **OK**	11.79<14.11 **OK**	15.60<18.67 **OK**
O-1A (PO-DA K, non-contributory areas (L, H, F, D, B))	Pre	1.59	2.25	3.53	4.74	7.72	10.46
	Post	1.59	2.25	3.53	4.74	7.72	10.46
O-1B[b] (bioretention areas totals (PO-DA 6 / C, 7 / E, G, J, I))	Pre	2.66*50% = 1.33	3.49*50% = 1.75	5.20*75% = 3.90	6.61*75% = 4.96	10.52*80% = 8.42	13.89*80% = 11.11
	Post	0.87<1.33 **OK**	1.04<1.75 **OK**	1.31<3.90 **OK**	1.81<4.96 **OK**	3.61<8.42 OK	5.00<11.11 **OK**
O-2 (PO-DA 1 / N)	Pre	2.45	3.19	4.81	6.07	9.80	12.86
	Post	2.06<2.45 **OK**	2.75<3.19 **OK**	4.02<4.81 **OK**	5.21<6.07 **OK**	8.18<9.80 **OK**	11.03<12.86 **OK**

[b]N.J.A.C. 7:8-5.6 requires post-construction peak runoff rates for the 2-, 10-, and 100-year storm events to be 50%, 75%, and 80%, respectively, of the pre-construction peak runoff rates.

2.5 Other Stormwater Conveyance

Table 2.8 summarizes the results for the proposed subsurface pipe network, conveying flow for the newly developed areas from the bioretention basins and non-contributory trench drains to the project outfall. Storm drainage piping was designed to accommodate the 25-year storm as required by PSE&G. The subsurface conveyance calculations were conducted using CivilStorm software. Refer to Appendix C for the calculations.

Table 2.7: Stormwater Conveyance Results

Pipe	25 Year Flow (cfs)	Pipe Length (ft)	Diameter (in)	Slope (%)	25 Year Velocity (ft/s)	Full Flow Capacity (cfs)
SD-01	5.75	31.63	12” dia.	1.00	7.32	3.58
SD-02	5.75	78.00	12” dia.	1.00	7.32	3.54
SD-03	1.40	5.00	12” dia.	1.00	4.27	3.56
SD-04	7.15	19.06	12” dia.	1.00	9.10	3.56
SD-05	7.15	38.91	18” dia.	1.00	9.10	3.57
SD-06	0.83	5.00	12” dia.	1.00	3.70	3.56
SD-07	7.98	18.81	18” dia.	1.00	6.57	10.56
SD-08	8.22	135.70	18” dia.	1.00	6.56	10.48
SD-09	2.20	5.00	12” dia.	1.00	4.77	3.56
SD-10	10.42	83.62	18” dia.	1.00	5.90	10.53
SD-11	1.75	5.00	12” dia.	1.00	4.52	3.56
SD-12	12.17	158.11	18” dia.	1.00	6.89	10.50
SD-21	5.07	64.50	12” dia.	1.50	6.46	4.37
SD-22	7.85	127.26	12” dia.	1.50	9.99	4.36
SD-23	9.18	93.73	15” dia.	1.50	11.69	4.35
SD-24	10.20	111.26	15” dia.	1.50	12.99	4.36
SD-25	11.42	262.39	15” dia.	1.50	14.54	4.37
SD-26	11.42	29.44	18” dia.	1.50	14.54	4.36

3.0 BEST MANAGEMENT PRACTICES

3.1 NJDEP's Low Impact Development Checklist

NJDEP requires the identification of the nonstructural stormwater management strategies that are incorporated into the design of the project and provides several nonstructural strategies as follows:

1. *Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;*

   The station improvements will install new stormwater management facilities to mitigate the increase in runoff from the site and enhance water quality. There will be no exposed areas of soil and no areas susceptible to erosion and sediment loss. Additionally, retaining walls are to be installed to stabilize areas where steep slopes would otherwise be encountered.

2. *Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;*

   The areas of new impervious surface have been minimized to only what is necessary for the station expansion. New impervious surfaces consist primarily of gravel to surround the proposed electrical equipment and associated structures.

3. *Maximize the protection of natural drainage features and vegetation;*

   Existing vegetation will only be disturbed to the maximum extent necessary to complete construction.

4. *Minimize the decrease in the pre-construction time of concentration;*

   Due to station safety requirements, the land coverage cannot be altered to increase the time of concentration post-construction.

5. *Minimize land disturbance including clearing and grading;*

   Extents of construction and grading are limited to requirements for the station expansion, driving paths, and stormwater management and conveyance structures.

6. *Minimize soil compaction;*

   Low pressure construction equipment will be used wherever possible to minimize soil compaction where minimum compaction limits are not required. Prior to the

restoration and establishment of vegetated areas, the soil will be mechanically loosened to provide proper aeration and drainage through the topsoil and underlying soil layers.

7. *Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.*

   Landscaping installed at the site will not be used for stormwater purposes.

8. *Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas;*

   N/A – Due to the industrial nature of the site and station safety requirements, open channel conveyance systems cannot be installed on site.

9. *Provide preventative source controls;*

   Pollution source control measures, other than soil sediment control measures, have not been provided due to the nature of the proposed project. The station will not generate any pollution in the form of trash, debris, garbage and pet waste.

4.0 SOIL EROSION AND SEDIMENT CONTROL MEASURES

A soil erosion and sediment control plan and associated details have been developed to control sediment during construction activities. Silt sock and/or silt fence will be installed around the perimeter of the areas to be disturbed prior to beginning construction. Newly graded areas will be stabilized with erosion control blanket during construction and the project entrance will be stabilized with 1.5" to 2.5" stone tracking pads. Filter protection will be provided at existing and proposed inlets as indicated on the soil erosion control drawings to minimize sediment from entering the subsurface storm drainage system. Upon completion of earthwork activities, the station yard within the fenced area will be rocked with a sacrificial rock working surface to temporarily stabilize the site.

5.0 CONCLUSIONS

N.J.A.C. 7:8 defines a Major Development as any development that disturbs an acre of land or greater since February 2004, provides an additional quarter acre of impervious area since February 2, 2004, adds one quarter acre of regulated motor vehicle surface since March 2, 2021, or a quarter acre consisting of a combination of impervious and regulated motor vehicle surfaces. As this project disturbs more than one acre, it is classified as a Major Development. However, it does not add an additional 0.25 acres to vehicular traffic and is located within an urban redevelopment area, thus the project is not required to treat water quality or provide groundwater recharge. However, because bioretention basins are implemented for the station expansion areas, water quality will be improved by reducing the average annual total suspended solids load in the runoff. The bioretention basin system with underdrains will address the stormwater quantity requirements, ultimately reducing the combined system outfalls, into the existing municipal storm drain infrastructure, located along Mount Pleasant Avenue. There will be no adverse impact to the public or private lands adjacent to the site. Temporary on-site erosion control measures have been designed in accordance with the New Jersey Department of Environmental Protection's standards set forth in the New Jersey Stormwater BMP Manual and the New Jersey Department of Agriculture's Standards for Soil Erosion and Sediment Control.

EXHIBIT A - PRE-DEVELOPED WATERSHED PLAN



no.	date	by	ckd	description
A	05/07/24	SJM	MJB	ISSUED FOR REVIEW

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400

date	detailed
3/22/24	S. MACALUSO
designed	checked
S. MACALUSO	M. BLAKE

WEST ORANGE SWITCHING STATION
230/26/4KV OUTDOOR SUBSTATION

PRE-DEVELOPED WATERSHED MAP

WEST ORANGE, NJ

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK,NJ.

project	contract
144507	

drawing **EXHIBIT A–** rev. **A**

sheet of sheets

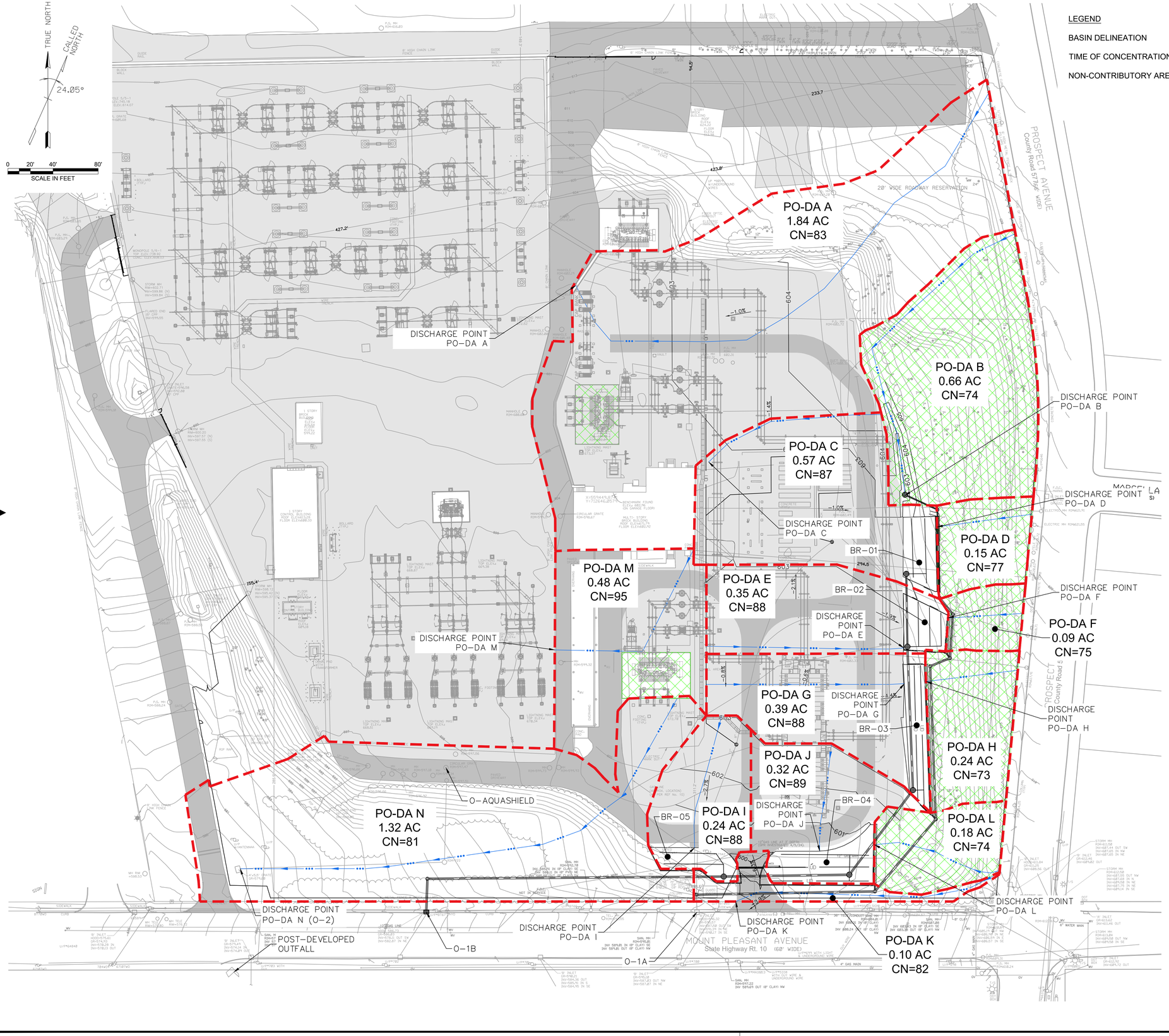
file

MICHAEL J. BLAKE
LIC NO. 24GE05521600
COA NO. 24GA28066400

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Scale For Microfilming
Millimeters
Inches

EXHIBIT B - POST-DEVELOPED WATERSHED PLAN



no.	date	by	ckd	description
A	05/07/24	SJM	MJB	ISSUED FOR REVIEW

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400

date	detailed
3/22/24	S. MACALUSO
designed	checked
S. MACALUSO	M. BLAKE

WEST ORANGE SWITCHING STATION
230/26/4KV OUTDOOR SUBSTATION

POST-DEVELOPED WATERSHED MAP

WEST ORANGE, NJ

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK,NJ.

project	contract
144507	

drawing **EXHIBIT B–** rev. **A**

sheet of sheets

file

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Scale For Microfilming
Millimeters
Inches

APPENDIX A - DESIGN NOTES

Known Data: References

Hydrologic Soil Type (HSG): USDA NRCS Web Soil Survey

URBONB: Urban Land, Boonton substratum, 0 to 8 percent slopes

Hydrologic Soil Group: D (no HSG listed, assume D)

USBONB: Urban Land, Boonton substratum - Boonton complex, 0 to 8 percent slopes

Hydrologic Soil Group: B (used HSG D for a conservative evaluation)

Water Quality Design Storm is 1.25 inches of rainfall in two hours.

24-Hour Precipitation Depths:				NOAA National Weather Service
2 Year =	3.42	in		Precipitation Frequency Data Server
10 Year =	5.21	in		Essex County
25 Year =	6.44	in		NOAA 24-hr Type D Storm Distribution
100 Year =	8.71	in		

Current Precipitation Adjustment Factors						
2 Year =	1.01	x	3.42	=	3.45	in
10 Year =	1.03	x	5.21	=	5.37	in
100 Year =	1.06	x	8.71	=	9.23	in

Future Precipitation Change Factors						
2 Year =	1.19	x	3.42	=	4.07	in
10 Year =	1.22	x	5.21	=	6.36	in
100 Year =	1.33	x	8.71	=	11.58	in

Notes:

1.	Description:	Curve Numbers (CN):	HSG Rating:
	Impervious, Pavement	#	D
	>75% Grass cover, Good	#	D
	Yard Stone/Gravel Pad	#	D
	Brush, Good	#	D
	Non-Contributory	N/A	D

2. HydroCAD software using Calculate separate Pervious/Impervious runoff for all Curve Number (CN) calculations

3. The station crushed stone curve number was established using the equation found in the NJDEP BMP Manual, Chapter 5, where CN = 1000/(S+10), where S is equal to the storage depth in the crushed stone (in this case, 4”), with a voids ratio of 40%.

Land Use								References
Impervious, Pavement	7,888	sf	0.181	ac	D	CN =	98	
>75% Grass cover, Good	19,498	sf	0.448	ac	D	CN =	80	
Yard Stone/Gravel Pad	2,304	sf	0.053	ac	D	CN =	85	
Brush, Good	23,117	sf	0.531	ac	D	CN =	73	
Non-Contributory	0	sf	0.000	ac	D	CN =	0	
Total Area (TA)=	52,807	sf	1.21	ac				
TA (less non contributory)=	52,807	sf	1.21	ac	Composite CN =		80	

Time of Concentration:

Sheet Flow			
L =	23	ft	Smooth surfaces
S =	3.52%	%	
n =	0.011		
Shallow Concentrated Flow			
L =	31	ft	Woodland
S =	24.37%	%	
Shallow Concentrated Flow			
L =	287	ft	Short Grass Pasture
S =	4.62%	%	
Tc =	3.65	min	

Flows:

Current:			Future:			
Q(2) =	2.45	cfs	Q(2) =	3.19	cfs	HydroCAD
Q(10) =	4.81	cfs	Q(10) =	6.07	cfs	HydroCAD
Q(100) =	9.80	cfs	Q(100) =	12.86	cfs	HydroCAD

Runoff Volume (Weighted Average Volume):

Current:			Future:			
V(2) =	0.167	ac-ft	V(2) =	0.217	ac-ft	HydroCAD
V(10) =	0.327	ac-ft	V(10) =	0.416	ac-ft	HydroCAD
V(100) =	0.682	ac-ft	V(100) =	0.908	ac-ft	HydroCAD

Land Use									References
Impervious, Pavement	18,485	sf	0.424	ac	D	CN =	98		
>75% Grass cover, Good	9,771	sf	0.224	ac	D	CN =	80		
Yard Stone/Gravel Pad	53,605	sf	1.231	ac	D	CN =	85		
Brush, Good	14,992	sf	0.344	ac	D	CN =	73		
Non-Contributory	30,878	sf	0.709	ac	D	CN =	0		
Total Area (TA)=	127,731	sf	2.93	ac					
TA (less non contributory)=	96,853	sf	2.22	ac	Composite CN =		85		

Time of Concentration:

Sheet Flow			
L =	100	ft	Woods: Light underbrush
S =	5.43%	%	
n =	0.400		
Shallow Concentrated Flow			
L =	67	ft	Short Grass Pasture
S =	9.08%	%	
Shallow Concentrated Flow			
L =	43	ft	Short Grass Pasture
S =	28.13%	%	
Shallow Concentrated Flow			
L =	281	ft	Unpaved
S =	0.69%	%	
Tc =	16.99	min	

Flows:

Current:			Future:			
Q(2) =	3.45	cfs	Q(2) =	4.50	cfs	HydroCAD
Q(10) =	6.35	cfs	Q(10) =	8.07	cfs	HydroCAD
Q(100) =	12.28	cfs	Q(100) =	16.29	cfs	HydroCAD

Runoff Volume (Weighted Average Volume):

Current:			Future:			
V(2) =	0.377	ac-ft	V(2) =	0.477	ac-ft	HydroCAD
V(10) =	0.693	ac-ft	V(10) =	0.863	ac-ft	HydroCAD
V(100) =	1.369	ac-ft	V(100) =	1.791	ac-ft	HydroCAD

Land Use								References
Impervious, Pavement	4,346	sf	0.100	ac	D	CN =	98	
>75% Grass cover, Good	29,340	sf	0.674	ac	D	CN =	80	
Yard Stone/Gravel Pad	22,892	sf	0.526	ac	D	CN =	85	
Brush, Good	16,829	sf	0.386	ac	D	CN =	73	
Non-Contributory	28,075	sf	0.645	ac	D	CN =	0	
Total Area (TA)=	101,482	sf	2.33	ac				
TA (less non contributory)=	73,407	sf	1.69	ac	Composite CN =		81	

Time of Concentration:

Sheet Flow			
L =	49	ft	Woods: Light underbrush
S =	7.91%	%	
n =	0.400		
Shallow Concentrated Flow			
L =	151	ft	Unpaved
S =	0.71%	%	
Shallow Concentrated Flow			
L =	239	ft	Short Grass Pasture
S =	2.60%	%	
Tc =	11.59	min	

Flows:

Current:			Future:			
Q(2) =	2.66	cfs	Q(2) =	3.49	cfs	HydroCAD
Q(10) =	5.20	cfs	Q(10) =	6.61	cfs	HydroCAD
Q(100) =	10.52	cfs	Q(100) =	13.89	cfs	HydroCAD

Runoff Volume (Weighted Average Volume):

Current:			Future:			
V(2) =	0.239	ac-ft	V(2) =	0.310	ac-ft	HydroCAD
V(10) =	0.467	ac-ft	V(10) =	0.592	ac-ft	HydroCAD
V(100) =	0.968	ac-ft	V(100) =	1.284	ac-ft	HydroCAD

Land Use								References
Impervious, Pavement	11,671	sf	0.268	ac	D	CN =	98	
>75% Grass cover, Good	0	sf	0.000	ac	D	CN =	80	
Yard Stone/Gravel Pad	5,115	sf	0.117	ac	D	CN =	85	
Brush, Good	0	sf	0.000	ac	D	CN =	73	
Non-Contributory	2,493	sf	0.057	ac	D	CN =	0	
Total Area (TA)=	19,279	sf	0.44	ac				
TA (less non contributory)=	16,786	sf	0.39	ac	Composite CN =		94	

Time of Concentration:

Gravel Sheet Flow

L =	100	ft
S =	1.60%	%
n =	0.100	

Gravel Sheet Flow

Shallow Concentrated Flow

L =	78	ft
S =	1.65%	%

Unpaved

Tc = 7.50 min

Flows:

Current:			Future:			
Q(2) =	1.07	cfs	Q(2) =	1.32	cfs	HydroCAD
Q(10) =	1.74	cfs	Q(10) =	2.14	cfs	HydroCAD
Q(100) =	3.09	cfs	Q(100) =	4.01	cfs	HydroCAD

Runoff Volume (Weighted Average Volume):

Current:			Future:			
V(2) =	0.091	ac-ft	V(2) =	0.110	ac-ft	HydroCAD
V(10) =	0.151	ac-ft	V(10) =	0.182	ac-ft	HydroCAD
V(100) =	0.273	ac-ft	V(100) =	0.348	ac-ft	HydroCAD

Land Use									References
Impervious, Pavement	9,878	sf	0.227	ac	D	CN =	98		
>75% Grass cover, Good	14,245	sf	0.327	ac	D	CN =	80		
Yard Stone/Gravel Pad	39,395	sf	0.904	ac	D	CN =	85		
Brush, Good	14,769	sf	0.339	ac	D	CN =	73		
Non-Contributory	2,061	sf	0.047	ac	D	CN =	0		
Total Area (TA)=	80,348	sf	1.84	ac					
TA (less non contributory)=	78,287	sf	1.80	ac	Composite CN =		83		

Time of Concentration:

Sheet Flow			
L =	100	ft	Woods: Light underbrush
S =	5.43%	%	
n =	0.400		
Shallow Concentrated Flow			
L =	67	ft	Short Grass Pasture
S =	5.40%	%	
Gravel Shallow Concentrated Flow			
L =	43	ft	Short Grass Pasture
S =	28.10%	%	
Gravel Shallow Concentrated Flow			
L =	281	ft	Unpaved
S =	0.69%	%	
Tc =	17.15	min	

Flows:

WQ =	1.06						
Q(25) =	6.26	cfs					HydroCAD
Current:			Future:				
Q(2) =	2.63	cfs	Q(2) =	3.45	cfs		HydroCAD
Q(10) =	4.94	cfs	Q(10) =	6.33	cfs		HydroCAD
Q(100) =	9.73	cfs	Q(100) =	12.98	cfs		HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.049	ac-ft					HydroCAD
V(25) =	0.682	ac-ft					HydroCAD
Current:			Future:				
V(2) =	0.284	ac-ft	V(2) =	0.363	ac-ft		HydroCAD
V(10) =	0.535	ac-ft	V(10) =	0.671	ac-ft		HydroCAD
V(100) =	1.076	ac-ft	V(100) =	1.415	ac-ft		HydroCAD

Land Use									References
Impervious, Pavement	0	sf	0.000	ac	D	CN =	98		
>75% Grass cover, Good	1,874	sf	0.043	ac	D	CN =	80		
Yard Stone/Gravel Pad	599	sf	0.014	ac	D	CN =	85		
Brush, Good	26,074	sf	0.599	ac	D	CN =	73		
Non-Contributory	0	sf	0.000	ac	D	CN =	0		
Total Area (TA)=	28,547	sf	0.66	ac					
TA (less non contributory)=	28,547	sf	0.66	ac	Composite CN =		74		

Time of Concentration:

Sheet Flow			
L =	100	ft	Woods: Light underbrush
S =	9.00%	%	
n =	0.400		
Shallow Concentrated Flow			
L =	64	ft	Short Grass Pasture
S =	19.20%	%	
North Channel			
L =	134	ft	Earth, long dense weeds
S =	0.94%	%	
Tc =	12.41	min	

Flows:

WQ =	0.08							
Q(25) =	2.09	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.68	cfs	Q(2) =	0.98	cfs			HydroCAD
Q(10) =	1.56	cfs	Q(10) =	2.11	cfs			HydroCAD
Q(100) =	3.52	cfs	Q(100) =	4.89	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.004	ac-ft						HydroCAD
V(25) =	0.192	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.065	ac-ft	V(2) =	0.089	ac-ft			HydroCAD
V(10) =	0.144	ac-ft	V(10) =	0.189	ac-ft			HydroCAD
V(100) =	0.327	ac-ft	V(100) =	0.446	ac-ft			HydroCAD

Land Use									References
Impervious, Pavement	4,299	sf	0.099	ac	D	CN =	98		
>75% Grass cover, Good	2,396	sf	0.055	ac	D	CN =	80		
Yard Stone/Gravel Pad	17,985	sf	0.413	ac	D	CN =	85		
Brush, Good	0	sf	0.000	ac	D	CN =	73		
Non-Contributory	0	sf	0.000	ac	D	CN =	0		
Total Area (TA)=	24,680	sf	0.57	ac					
TA (less non contributory)=	24,680	sf	0.57	ac	Composite CN =		87		

Time of Concentration:

Gravel Sheet Flow

L =	100	ft
S =	0.18%	%
n =	0.100	

Gravel Sheet Flow

Shallow Concentrated Flow

L =	64	ft
S =	1.06%	%

Unpaved

Tc = 17.10 min

Flows:

WQ =	0.44							
Q(25) =	2.09	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.93	cfs	Q(2) =	1.21	cfs			HydroCAD
Q(10) =	1.67	cfs	Q(10) =	2.13	cfs			HydroCAD
Q(100) =	3.18	cfs	Q(100) =	4.23	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.020	ac-ft						HydroCAD
V(25) =	0.232	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.101	ac-ft	V(2) =	0.128	ac-ft			HydroCAD
V(10) =	0.184	ac-ft	V(10) =	0.228	ac-ft			HydroCAD
V(100) =	0.359	ac-ft	V(100) =	0.467	ac-ft			HydroCAD

Land Use								References
Impervious, Pavement	0	sf	0.000	ac	D	CN =	98	
>75% Grass cover, Good	3,662	sf	0.084	ac	D	CN =	80	
Yard Stone/Gravel Pad	0	sf	0.000	ac	D	CN =	85	
Brush, Good	2,759	sf	0.063	ac	D	CN =	73	
Non-Contributory	0	sf	0.000	ac	D	CN =	0	
Total Area (TA)=	6,421	sf	0.15	ac				
TA (less non contributory)=	6,421	sf	0.15	ac	Composite CN =		77	

Time of Concentration:

Sheet Flow

L =	85	ft	Woods: Light underbrush
S =	17.73%	%	
n =	0.400		

Tc =	6.98	min	

Flows:

WQ =	0.04								
Q(25) =	0.62	cfs							HydroCAD
Current:				Future:					
Q(2) =	0.23	cfs		Q(2) =	0.31	cfs			HydroCAD
Q(10) =	0.48	cfs		Q(10) =	0.63	cfs			HydroCAD
Q(100) =	1.01	cfs		Q(100) =	1.38	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.002	ac-ft						HydroCAD
V(25) =	0.047	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.017	ac-ft	V(2) =	0.023	ac-ft			HydroCAD
V(10) =	0.036	ac-ft	V(10) =	0.046	ac-ft			HydroCAD
V(100) =	0.078	ac-ft	V(100) =	0.106	ac-ft			HydroCAD

Land Use										References
Impervious, Pavement	4,845	sf	0.111	ac	D	CN =	98			
>75% Grass cover, Good	2,044	sf	0.047	ac	D	CN =	80			
Yard Stone/Gravel Pad	8,385	sf	0.192	ac	D	CN =	85			
Brush, Good	0	sf	0.000	ac	D	CN =	73			
Non-Contributory	0	sf	0.000	ac	D	CN =	0			
Total Area (TA)=	15,274	sf	0.35	ac						
TA (less non contributory)=	15,274	sf	0.35	ac	Composite CN =		88			

Time of Concentration:

Gravel Sheet Flow

L =	100	ft
S =	0.30%	%
n =	0.100	

Gravel Sheet Flow

Shallow Concentrated Flow

L =	75	ft
S =	0.55%	%

Unpaved

Tc = 14.46 min

Flows:

WQ =	0.37						
Q(25) =	1.42	cfs					HydroCAD
Current:			Future:				
Q(2) =	0.65	cfs	Q(2) =	0.84	cfs		HydroCAD
Q(10) =	1.14	cfs	Q(10) =	1.44	cfs		HydroCAD
Q(100) =	2.14	cfs	Q(100) =	2.83	cfs		HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.015	ac-ft			HydroCAD
V(25) =	0.149	ac-ft			HydroCAD
Current:			Future:		
V(2) =	0.067	ac-ft	V(2) =	0.084	ac-ft	HydroCAD
V(10) =	0.119	ac-ft	V(10) =	0.147	ac-ft	HydroCAD
V(100) =	0.228	ac-ft	V(100) =	0.295	ac-ft	HydroCAD

Land Use									References
Impervious, Pavement	0	sf	0.000	ac	D	CN =	98		
>75% Grass cover, Good	1,223	sf	0.028	ac	D	CN =	80		
Yard Stone/Gravel Pad	0	sf	0.000	ac	D	CN =	85		
Brush, Good	2,547	sf	0.058	ac	D	CN =	73		
Non-Contributory	0	sf	0.000	ac	D	CN =	0		
Total Area (TA)=	3,770	sf	0.09	ac					
TA (less non contributory)=	3,770	sf	0.09	ac	Composite CN =		75		

Time of Concentration:

Sheet Flow

L =	66	ft	Woods: Light underbrush
S =	22.64%	%	
n =	0.400		

Tc = 5.17 min

Flows:

WQ =	0.02							
Q(25) =	0.38	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.13	cfs	Q(2) =	0.18	cfs			HydroCAD
Q(10) =	0.29	cfs	Q(10) =	0.38	cfs			HydroCAD
Q(100) =	0.62	cfs	Q(100) =	0.84	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.001	ac-ft						HydroCAD
V(25) =	0.026	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.009	ac-ft	V(2) =	0.013	ac-ft			HydroCAD
V(10) =	0.020	ac-ft	V(10) =	0.026	ac-ft			HydroCAD
V(100) =	0.044	ac-ft	V(100) =	0.060	ac-ft			HydroCAD

Land Use										References
Impervious, Pavement	4,875	sf	0.112	ac	D	CN =	98			
>75% Grass cover, Good	2,793	sf	0.064	ac	D	CN =	80			
Yard Stone/Gravel Pad	9,215	sf	0.212	ac	D	CN =	85			
Brush, Good	0	sf	0.000	ac	D	CN =	73			
Non-Contributory	0	sf	0.000	ac	D	CN =	0			
Total Area (TA)=	16,882	sf	0.39	ac						
TA (less non contributory)=	16,882	sf	0.39	ac	Composite CN =		88			

Time of Concentration:

Gravel Sheet Flow

L =	100	ft
S =	0.10%	%
n =	0.100	

Gravel Sheet Flow

Shallow Concentrated Flow

L =	75	ft
S =	1.21%	%

Unpaved

Tc = 21.52 min

Flows:

WQ =	0.31						
Q(25) =	1.30	cfs					HydroCAD
Current:			Future:				
Q(2) =	0.59	cfs	Q(2) =	0.77	cfs		HydroCAD
Q(10) =	1.05	cfs	Q(10) =	1.34	cfs		HydroCAD
Q(100) =	1.97	cfs	Q(100) =	2.63	cfs		HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.016	ac-ft					HydroCAD
V(25) =	0.163	ac-ft					HydroCAD
Current:			Future:				
V(2) =	0.073	ac-ft	V(2) =	0.091	ac-ft		HydroCAD
V(10) =	0.130	ac-ft	V(10) =	0.160	ac-ft		HydroCAD
V(100) =	0.250	ac-ft	V(100) =	0.324	ac-ft		HydroCAD

Land Use									References
Impervious, Pavement	0	sf	0.000	ac	D	CN =	98		
>75% Grass cover, Good	440	sf	0.010	ac	D	CN =	80		
Yard Stone/Gravel Pad	0	sf	0.000	ac	D	CN =	85		
Brush, Good	9,855	sf	0.226	ac	D	CN =	73		
Non-Contributory	0	sf	0.000	ac	D	CN =	0		
Total Area (TA)=	10,295	sf	0.24	ac					
TA (less non contributory)=	10,295	sf	0.24	ac	Composite CN =		73		

Time of Concentration:

Sheet Flow

L =	82	ft	Woods: Light underbrush
S =	17.36%	%	
n =	0.400		

Tc = 6.84 min

Flows:

WQ =	0.03							
Q(25) =	0.92	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.30	cfs	Q(2) =	0.43	cfs			HydroCAD
Q(10) =	0.69	cfs	Q(10) =	0.92	cfs			HydroCAD
Q(100) =	1.54	cfs	Q(100) =	2.13	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.001	ac-ft						HydroCAD
V(25) =	0.068	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.023	ac-ft	V(2) =	0.031	ac-ft			HydroCAD
V(10) =	0.051	ac-ft	V(10) =	0.067	ac-ft			HydroCAD
V(100) =	0.117	ac-ft	V(100) =	0.160	ac-ft			HydroCAD

Land Use										References
Impervious, Pavement	2,904	sf	0.067	ac	D	CN =	98			
>75% Grass cover, Good	1,737	sf	0.040	ac	D	CN =	80			
Yard Stone/Gravel Pad	5,866	sf	0.135	ac	D	CN =	85			
Brush, Good	0	sf	0.000	ac	D	CN =	73			
Non-Contributory	0	sf	0.000	ac	D	CN =	0			
Total Area (TA)=	10,506	sf	0.24	ac						
TA (less non contributory)=	10,506	sf	0.24	ac	Composite CN =		88			

Time of Concentration:

Gravel Sheet Flow

L =	100	ft
S =	2.37%	%
n =	0.100	

Gravel Sheet Flow

Shallow Concentrated Flow

L =	20	ft
S =	3.20%	%

Unpaved

Tc = 5.98 min

Flows:

WQ =	0.33							
Q(25) =	1.30	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.59	cfs	Q(2) =	0.75	cfs			HydroCAD
Q(10) =	1.04	cfs	Q(10) =	1.30	cfs			HydroCAD
Q(100) =	1.96	cfs	Q(100) =	2.55	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.010	ac-ft						HydroCAD
V(25) =	0.101	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.045	ac-ft	V(2) =	0.056	ac-ft			HydroCAD
V(10) =	0.081	ac-ft	V(10) =	0.100	ac-ft			HydroCAD
V(100) =	0.155	ac-ft	V(100) =	0.202	ac-ft			HydroCAD

Land Use								References
Impervious, Pavement	5,294	sf	0.122	ac	D	CN =	98	
>75% Grass cover, Good	3,682	sf	0.085	ac	D	CN =	80	
Yard Stone/Gravel Pad	4,800	sf	0.110	ac	D	CN =	85	
Brush, Good	0	sf	0.000	ac	D	CN =	73	
Non-Contributory	0	sf	0.000	ac	D	CN =	0	
Total Area (TA)=	13,776	sf	0.32	ac				
TA (less non contributory)=	13,776	sf	0.32	ac	Composite CN =		89	

Time of Concentration:

Gravel Sheet Flow

L =	96	ft
S =	3.36%	%
n =	0.100	

Gravel Sheet Flow

Tc = 4.94 min

Flows:

WQ =	0.50						
Q(25) =	1.79	cfs					HydroCAD
Current:			Future:				
Q(2) =	0.83	cfs	Q(2) =	1.05	cfs		HydroCAD
Q(10) =	1.44	cfs	Q(10) =	1.79	cfs		HydroCAD
Q(100) =	2.68	cfs	Q(100) =	3.49	cfs		HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.015	ac-ft					HydroCAD
V(25) =	0.136	ac-ft					HydroCAD
Current:			Future:				
V(2) =	0.062	ac-ft	V(2) =	0.077	ac-ft		HydroCAD
V(10) =	0.109	ac-ft	V(10) =	0.134	ac-ft		HydroCAD
V(100) =	0.207	ac-ft	V(100) =	0.268	ac-ft		HydroCAD

Land Use										References
Impervious, Pavement	1,366	sf	0.031	ac	D	CN =	98			
>75% Grass cover, Good	1,122	sf	0.026	ac	D	CN =	80			
Yard Stone/Gravel Pad	0	sf	0.000	ac	D	CN =	85			
Brush, Good	1,936	sf	0.044	ac	D	CN =	73			
Non-Contributory	0	sf	0.000	ac	D	CN =	0			
Total Area (TA)=	4,424	sf	0.10	ac						
TA (less non contributory)=	4,424	sf	0.10	ac	Composite CN =		82			

Time of Concentration:

Woodland Sheet Flow

L =	100	ft	Woods: Light underbrush
S =	7.72%	%	
n =	0.400		

Shallow Concentrated Flow

L =	139	ft	Woodland
S =	4.24%	%	

Tc = 13.34 min

Flows:

WQ =	0.08							
Q(25) =	0.37	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.16	cfs	Q(2) =	0.20	cfs			HydroCAD
Q(10) =	0.29	cfs	Q(10) =	0.38	cfs			HydroCAD
Q(100) =	0.59	cfs	Q(100) =	0.79	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.003	ac-ft						HydroCAD
V(25) =	0.038	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.016	ac-ft	V(2) =	0.020	ac-ft			HydroCAD
V(10) =	0.030	ac-ft	V(10) =	0.037	ac-ft			HydroCAD
V(100) =	0.059	ac-ft	V(100) =	0.078	ac-ft			HydroCAD

Land Use										References
Impervious, Pavement	0	sf	0.000	ac	D	CN =	98			
>75% Grass cover, Good	927	sf	0.021	ac	D	CN =	80			
Yard Stone/Gravel Pad	232	sf	0.005	ac	D	CN =	85			
Brush, Good	6,837	sf	0.157	ac	D	CN =	73			
Non-Contributory	0	sf	0.000	ac	D	CN =	0			
Total Area (TA)=	7,996	sf	0.18	ac						
TA (less non contributory)=	7,996	sf	0.18	ac	Composite CN =		74			

Time of Concentration:

Sheet Flow

L =	100	ft	Woods: Light underbrush
S =	10.03%	%	
n =	0.400		

Shallow Concentrated Flow

L =	16	ft	Short Grass Pasture
S =	3.39%	%	

Tc = 10.20 min

Flows:

WQ =	0.03							
Q(25) =	0.63	cfs						HydroCAD
Current:			Future:					
Q(2) =	0.21	cfs	Q(2) =	0.30	cfs			HydroCAD
Q(10) =	0.47	cfs	Q(10) =	0.64	cfs			HydroCAD
Q(100) =	1.06	cfs	Q(100) =	1.47	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.001	ac-ft						HydroCAD
V(25) =	0.054	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.019	ac-ft	V(2) =	0.025	ac-ft			HydroCAD
V(10) =	0.041	ac-ft	V(10) =	0.053	ac-ft			HydroCAD
V(100) =	0.092	ac-ft	V(100) =	0.125	ac-ft			HydroCAD

Land Use											References
Impervious, Pavement	13,651	sf	0.313	ac		D		CN =	98		
>75% Grass cover, Good	0	sf	0.000	ac		D		CN =	80		
Yard Stone/Gravel Pad	4,808	sf	0.110	ac		D		CN =	85		
Brush, Good	0	sf	0.000	ac		D		CN =	73		
Non-Contributory	2,493	sf	0.057	ac		D		CN =	0		
Total Area (TA)=	20,952	sf	0.48	ac							
TA (less non contributory)=	18,459	sf	0.42	ac		Composite CN =			95		

Time of Concentration:

Gravel Sheet Flow

L =	100	ft	Gravel Sheet Flow
S =	1.60%	%	
n =	0.100		

Gravel Shallow Concentrated Flow

L =	80	ft	Paved
S =	1.60%	%	

Tc = 7.39 min

Flows:

WQ =	0.96							
Q(25) =	2.35	cfs						HydroCAD
Current:			Future:					
Q(2) =	1.19	cfs	Q(2) =	1.46	cfs			HydroCAD
Q(10) =	1.94	cfs	Q(10) =	2.37	cfs			HydroCAD
Q(100) =	3.42	cfs	Q(100) =	4.42	cfs			HydroCAD

Runoff Volume (Weighted Average Volume):

WQ =	0.030	ac-ft						HydroCAD
V(25) =	0.205	ac-ft						HydroCAD
Current:			Future:					
V(2) =	0.102	ac-ft	V(2) =	0.123	ac-ft			HydroCAD
V(10) =	0.168	ac-ft	V(10) =	0.202	ac-ft			HydroCAD
V(100) =	0.302	ac-ft	V(100) =	0.385	ac-ft			HydroCAD

Land Use									References
Impervious, Pavement	9,139	sf	0.210	ac	D	CN =	98		
>75% Grass cover, Good	18,653	sf	0.428	ac	D	CN =	80		
Yard Stone/Gravel Pad	6,647	sf	0.153	ac	D	CN =	85		
Brush, Good	22,986	sf	0.528	ac	D	CN =	73		
Non-Contributory	0	sf	0.000	ac	D	CN =	0		
Total Area (TA)=	57,424	sf	1.32	ac					
TA (less non contributory)=	57,424	sf	1.32	ac	Composite CN =		81		

Time of Concentration:

Gravel Sheet Flow			
L =	100	ft	Gravel Sheet Flow
S =	1.39%	%	
n =	0.100		
Shallow Concentrated Flow			
L =	19	ft	Paved
S =	4.80%	%	
Shallow Concentrated Flow			
L =	28	ft	Woodland
S =	21.78%	%	
Shallow Concentrated Flow			
L =	305	ft	Short Grass Pasture
S =	4.68%	%	
Tc =	10.89	min	

Flows:

WQ =	0.79						
Q(25) =	5.16	cfs					HydroCAD
Current:			Future:				
Q(2) =	2.06	cfs	Q(2) =	2.75	cfs		HydroCAD
Q(10) =	4.02	cfs	Q(10) =	5.21	cfs		HydroCAD
Q(100) =	8.18	cfs	Q(100) =	11.03	cfs		HydroCAD

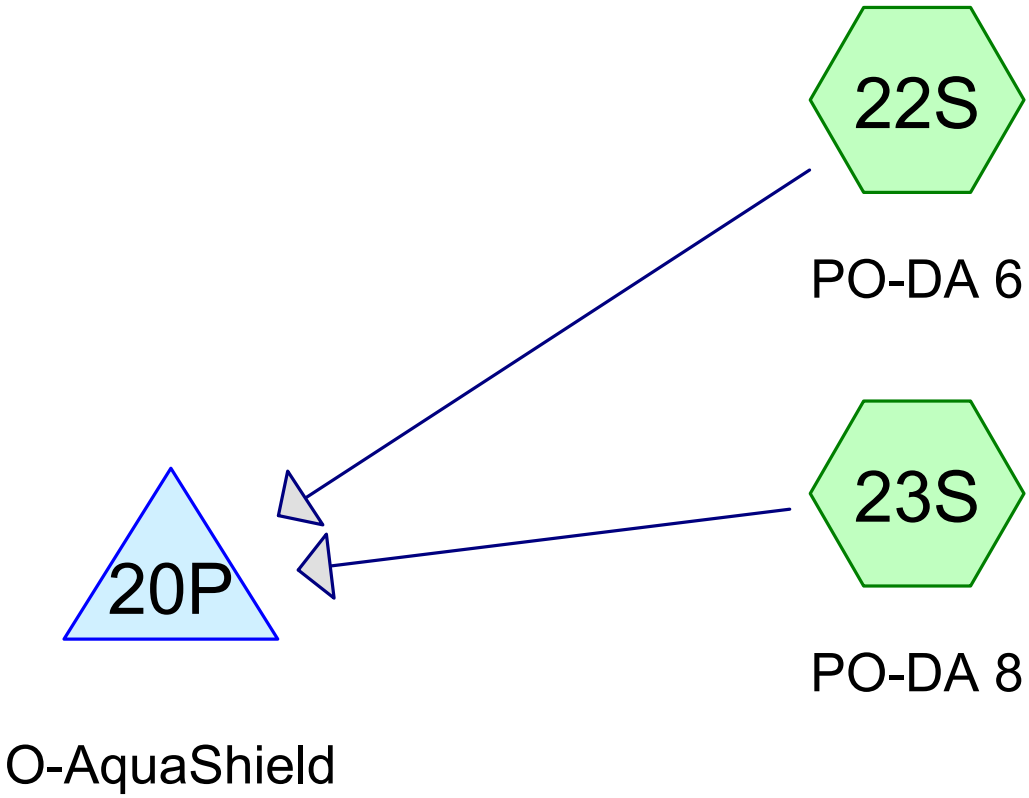
Runoff Volume (Weighted Average Volume):

WQ =	0.031	ac-ft					HydroCAD
V(25) =	0.469	ac-ft					HydroCAD
Current:			Future:				
V(2) =	0.188	ac-ft	V(2) =	0.243	ac-ft		HydroCAD
V(10) =	0.364	ac-ft	V(10) =	0.461	ac-ft		HydroCAD
V(100) =	0.752	ac-ft	V(100) =	0.998	ac-ft		HydroCAD

APPENDIX B - HYDROCAD OUTPUTS

APPENDIX B.1- PRE-DEVELOPED OUTFALL = O-AQUASHIELD

PRE-DEVELOPED:
OUTFALL = O-AQUASHIELD



Subcat Reach Pond Link

Routing Diagram for West Orange HydroCAD_Pre
Prepared by Burns & McDonnell, Printed 5/13/2024
HydroCAD® 10.20-4b s/n 08510 © 2023 HydroCAD Software Solutions LLC

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50 Subcat 23S: PO-DA 8
52 Pond 20P: O-AquaShield

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
2	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
3	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
4	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
5	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
6	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.224	80	>75% Grass cover, Good, HSG D (22S)
0.344	73	Brush, Good, HSG D (22S)
0.692	98	Impervious, Pavement, HSG D (22S, 23S)
1.348	85	Yard Stone/Gravel Pad, HSG D (22S, 23S)
2.609	**86**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
2.609	HSG D	22S, 23S
0.000	Other	
2.609		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.224	0.000	0.224	>75% Grass cover, Good	22S
0.000	0.000	0.000	0.344	0.000	0.344	Brush, Good	22S
0.000	0.000	0.000	0.692	0.000	0.692	Impervious, Pavement	22S, 23S
0.000	0.000	0.000	1.348	0.000	1.348	Yard Stone/Gravel Pad	22S, 23S
0.000	**0.000**	**0.000**	**2.609**	**0.000**	**2.609**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment22S: PO-DA 6 Runoff Area=96,853 sf 19.09% Impervious Runoff Depth>2.04"
Flow Length=491' Tc=18.1 min CN=WQ Runoff=3.47 cfs 0.377 af

Subcatchment23S: PO-DA 8 Runoff Area=16,786 sf 69.53% Impervious Runoff Depth>2.83"
Flow Length=178' Tc=8.1 min CN=WQ Runoff=1.07 cfs 0.091 af

Pond 20P: O-AquaShield Inflow=4.09 cfs 0.468 af
Primary=4.09 cfs 0.468 af

Total Runoff Area = 2.609 ac Runoff Volume = 0.468 af Average Runoff Depth = 2.15"
73.46% Pervious = 1.917 ac 26.54% Impervious = 0.692 ac

Summary for Subcatchment 22S: PO-DA 6

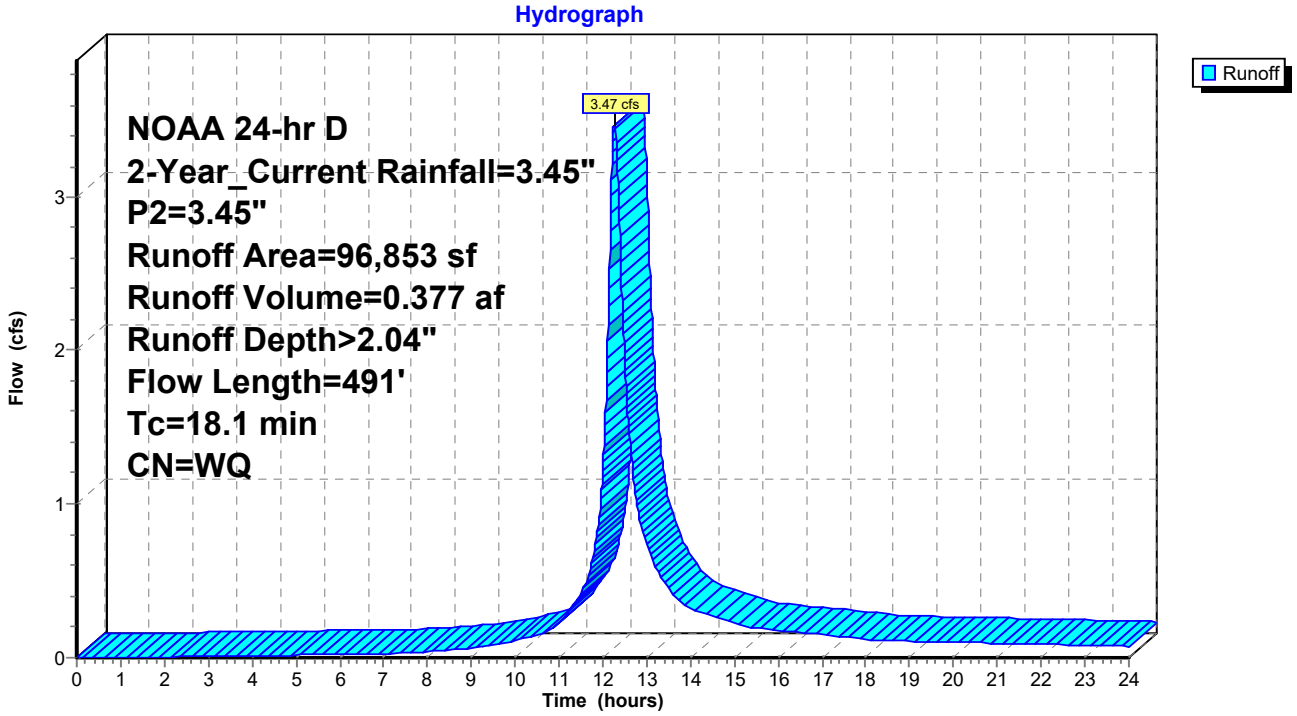
Runoff = 3.47 cfs @ 12.27 hrs, Volume= 0.377 af, Depth> 2.04"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	18,485	98	Impervious, Pavement, HSG D
	9,771	80	>75% Grass cover, Good, HSG D
*	53,605	85	Yard Stone/Gravel Pad, HSG D
	14,992	73	Brush, Good, HSG D
	96,853		Weighted Average
	78,368		80.91% Pervious Area
	18,485		19.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.5	67	0.0908	2.11		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.2813	3.71		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.1	491	Total			

Subcatchment 22S: PO-DA 6



Hydrograph for Subcatchment 22S: PO-DA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.01
3.00	0.13	0.00	0.01
3.50	0.16	0.00	0.01
4.00	0.18	0.00	0.01
4.50	0.21	0.00	0.02
5.00	0.24	0.00	0.02
5.50	0.26	0.00	0.02
6.00	0.29	0.00	0.02
6.50	0.33	0.00	0.02
7.00	0.36	0.00	0.03
7.50	0.40	0.00	0.03
8.00	0.45	0.00	0.04
8.50	0.50	0.01	0.05
9.00	0.55	0.02	0.06
9.50	0.61	0.03	0.08
10.00	0.68	0.05	0.11
10.50	0.77	0.08	0.15
11.00	0.90	0.13	0.23
11.50	1.09	0.22	0.42
12.00	1.65	0.55	**1.22**
12.50	2.36	1.07	**1.93**
13.00	2.55	1.22	0.73
13.50	2.68	1.32	0.46
14.00	2.77	1.39	0.33
14.50	2.84	1.46	0.28
15.00	2.90	1.51	0.23
15.50	2.95	1.55	0.19
16.00	3.00	1.59	0.18
16.50	3.05	1.63	0.16
17.00	3.09	1.66	0.15
17.50	3.12	1.69	0.14
18.00	3.16	1.72	0.12
18.50	3.19	1.75	0.11
19.00	3.21	1.77	0.11
19.50	3.24	1.79	0.11
20.00	3.27	1.82	0.10
20.50	3.29	1.84	0.10
21.00	3.32	1.86	0.10
21.50	3.34	1.88	0.09
22.00	3.37	1.90	0.09
22.50	3.39	1.92	0.08
23.00	3.41	1.94	0.08
23.50	3.43	1.96	0.08
24.00	**3.45**	**1.97**	0.07

Summary for Subcatchment 23S: PO-DA 8

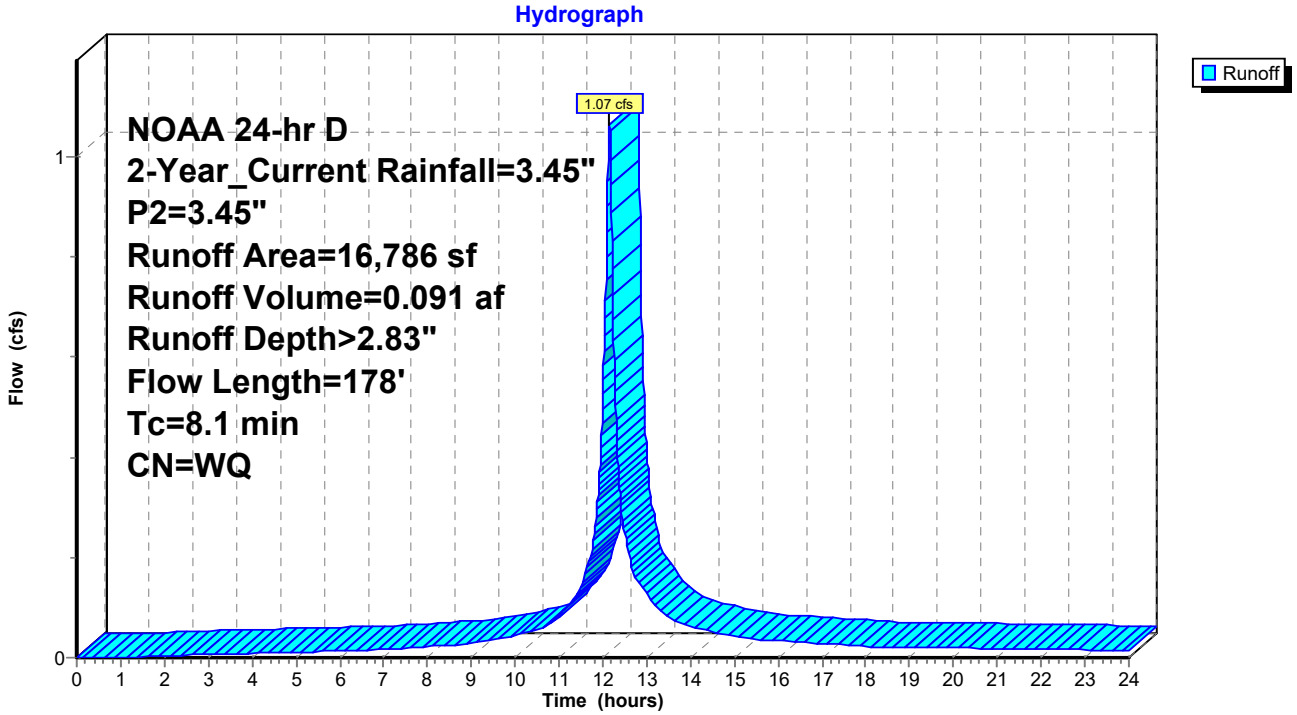
Runoff = 1.07 cfs @ 12.15 hrs, Volume= 0.091 af, Depth> 2.83"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	11,671	98	Impervious, Pavement, HSG D
*	5,115	85	Yard Stone/Gravel Pad, HSG D
	16,786		Weighted Average
	5,115		30.47% Pervious Area
	11,671		69.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.6	78	0.0165	2.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
8.1	178	Total			

Subcatchment 23S: PO-DA 8



Hydrograph for Subcatchment 23S: PO-DA 8

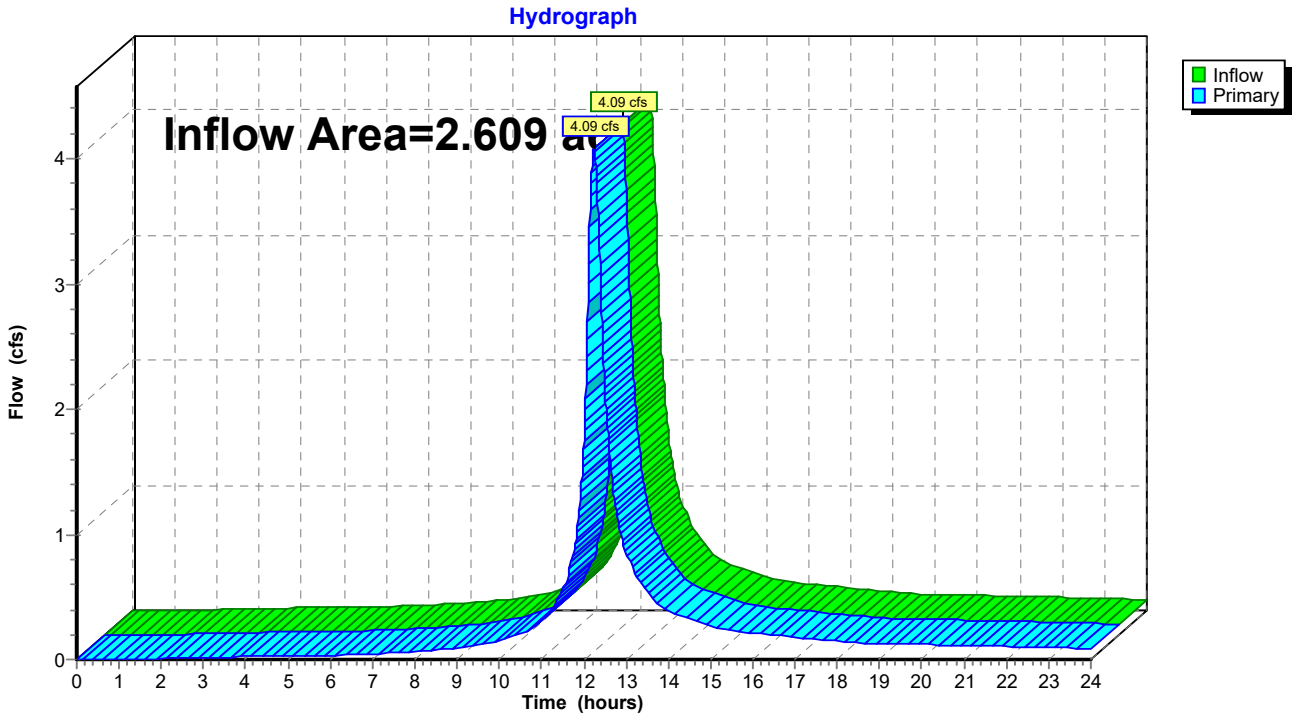
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.01
3.00	0.13	0.00	0.01
3.50	0.16	0.00	0.01
4.00	0.18	0.00	0.01
4.50	0.21	0.01	0.01
5.00	0.24	0.02	0.01
5.50	0.26	0.02	0.01
6.00	0.29	0.03	0.01
6.50	0.33	0.05	0.01
7.00	0.36	0.06	0.02
7.50	0.40	0.08	0.02
8.00	0.45	0.11	0.02
8.50	0.50	0.13	0.03
9.00	0.55	0.17	0.03
9.50	0.61	0.21	0.04
10.00	0.68	0.26	0.05
10.50	0.77	0.32	0.05
11.00	0.90	0.42	0.08
11.50	1.09	0.58	0.14
12.00	1.65	1.08	**0.53**
12.50	2.36	1.73	**0.24**
13.00	2.55	1.92	0.13
13.50	2.68	2.04	0.08
14.00	2.77	2.12	0.06
14.50	2.84	2.20	0.05
15.00	2.90	2.26	0.04
15.50	2.95	2.31	0.04
16.00	3.00	2.35	0.03
16.50	3.05	2.39	0.03
17.00	3.09	2.43	0.03
17.50	3.12	2.47	0.03
18.00	3.16	2.50	0.02
18.50	3.19	2.53	0.02
19.00	3.21	2.56	0.02
19.50	3.24	2.58	0.02
20.00	3.27	2.61	0.02
20.50	3.29	2.64	0.02
21.00	3.32	2.66	0.02
21.50	3.34	2.68	0.02
22.00	3.37	2.71	0.02
22.50	3.39	2.73	0.02
23.00	3.41	2.75	0.02
23.50	3.43	2.77	0.01
24.00	**3.45**	**2.79**	0.01

Summary for Pond 20P: O-AquaShield

Inflow Area = 2.609 ac, 26.54% Impervious, Inflow Depth > 2.15" for 2-Year_Current event
Inflow = 4.09 cfs @ 12.24 hrs, Volume= 0.468 af
Primary = 4.09 cfs @ 12.24 hrs, Volume= 0.468 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 20P: O-AquaShield



Hydrograph for Pond 20P: O-AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.02		0.02
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.03		0.03
5.00	0.03		0.03
5.50	0.03		0.03
6.00	0.03		0.03
6.50	0.04		0.04
7.00	0.04		0.04
7.50	0.05		0.05
8.00	0.06		0.06
8.50	0.08		0.08
9.00	0.09		0.09
9.50	0.12		0.12
10.00	0.16		0.16
10.50	0.20		0.20
11.00	0.31		0.31
11.50	0.56		0.56
12.00	**1.75**		**1.75**
12.50	**2.17**		**2.17**
13.00	0.86		0.86
13.50	0.54		0.54
14.00	0.39		0.39
14.50	0.33		0.33
15.00	0.27		0.27
15.50	0.23		0.23
16.00	0.21		0.21
16.50	0.20		0.20
17.00	0.18		0.18
17.50	0.16		0.16
18.00	0.15		0.15
18.50	0.13		0.13
19.00	0.13		0.13
19.50	0.13		0.13
20.00	0.12		0.12
20.50	0.12		0.12
21.00	0.11		0.11
21.50	0.11		0.11
22.00	0.11		0.11
22.50	0.10		0.10
23.00	0.10		0.10
23.50	0.09		0.09
24.00	0.09		0.09

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment22S: PO-DA 6 Runoff Area=96,853 sf 19.09% Impervious Runoff Depth>2.57"
Flow Length=491' Tc=17.0 min CN=WQ Runoff=4.50 cfs 0.477 af

Subcatchment23S: PO-DA 8 Runoff Area=16,786 sf 69.53% Impervious Runoff Depth>3.43"
Flow Length=178' Tc=7.5 min CN=WQ Runoff=1.32 cfs 0.110 af

Pond 20P: O-AquaShield Inflow=5.27 cfs 0.587 af
Primary=5.27 cfs 0.587 af

Total Runoff Area = 2.609 ac Runoff Volume = 0.587 af Average Runoff Depth = 2.70"
73.46% Pervious = 1.917 ac 26.54% Impervious = 0.692 ac

Summary for Subcatchment 22S: PO-DA 6

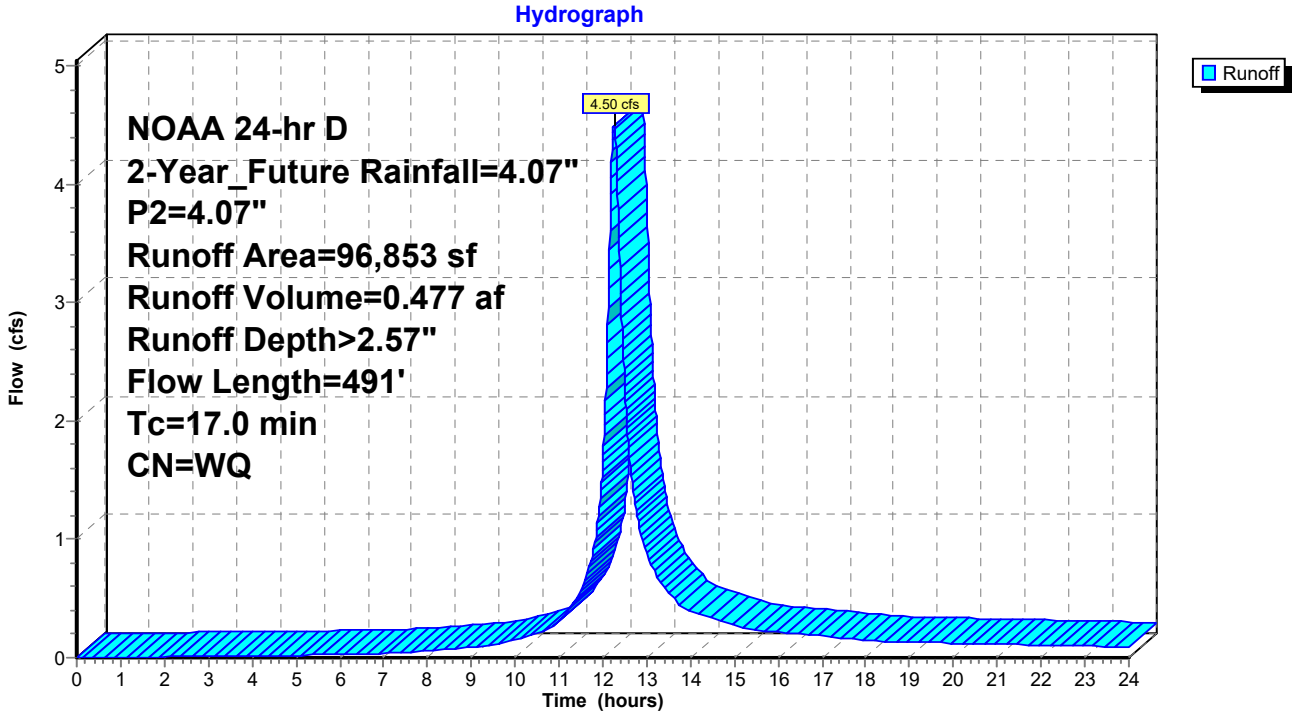
Runoff = 4.50 cfs @ 12.26 hrs, Volume= 0.477 af, Depth> 2.57"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	18,485	98	Impervious, Pavement, HSG D
	9,771	80	>75% Grass cover, Good, HSG D
*	53,605	85	Yard Stone/Gravel Pad, HSG D
	14,992	73	Brush, Good, HSG D
	96,853		Weighted Average
	78,368		80.91% Pervious Area
	18,485		19.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0543	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.5	67	0.0908	2.11		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.2813	3.71		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.0	491	Total			

Subcatchment 22S: PO-DA 6



Hydrograph for Subcatchment 22S: PO-DA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.01
2.50	0.12	0.00	0.01
3.00	0.15	0.00	0.01
3.50	0.18	0.00	0.02
4.00	0.21	0.00	0.02
4.50	0.25	0.00	0.02
5.00	0.28	0.00	0.02
5.50	0.31	0.00	0.02
6.00	0.35	0.00	0.02
6.50	0.39	0.00	0.03
7.00	0.43	0.00	0.04
7.50	0.48	0.01	0.05
8.00	0.53	0.02	0.06
8.50	0.58	0.03	0.07
9.00	0.65	0.04	0.09
9.50	0.72	0.06	0.11
10.00	0.81	0.09	0.15
10.50	0.91	0.13	0.20
11.00	1.06	0.20	0.32
11.50	1.29	0.33	0.57
12.00	1.95	0.76	**1.65**
12.50	2.78	1.41	**2.29**
13.00	3.01	1.60	0.88
13.50	3.16	1.72	0.55
14.00	3.26	1.81	0.40
14.50	3.35	1.89	0.34
15.00	3.42	1.95	0.28
15.50	3.49	2.00	0.24
16.00	3.54	2.05	0.22
16.50	3.59	2.10	0.20
17.00	3.64	2.14	0.18
17.50	3.68	2.18	0.17
18.00	3.72	2.21	0.15
18.50	3.76	2.24	0.14
19.00	3.79	2.27	0.13
19.50	3.82	2.30	0.13
20.00	3.86	2.33	0.12
20.50	3.89	2.36	0.12
21.00	3.92	2.38	0.12
21.50	3.95	2.41	0.11
22.00	3.97	2.43	0.11
22.50	4.00	2.46	0.10
23.00	4.02	2.48	0.10
23.50	4.05	2.50	0.09
24.00	**4.07**	**2.52**	0.09

Summary for Subcatchment 23S: PO-DA 8

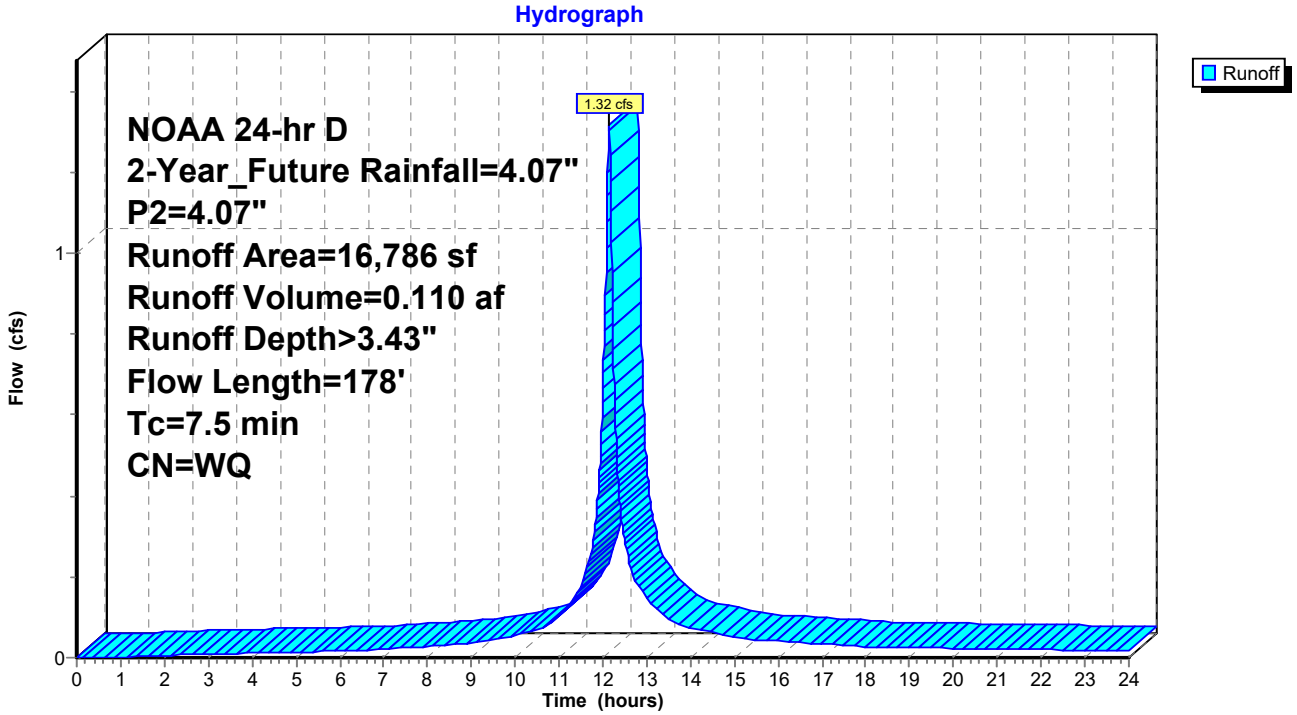
Runoff = 1.32 cfs @ 12.14 hrs, Volume= 0.110 af, Depth> 3.43"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	11,671	98	Impervious, Pavement, HSG D
*	5,115	85	Yard Stone/Gravel Pad, HSG D
	16,786		Weighted Average
	5,115		30.47% Pervious Area
	11,671		69.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.0160	0.24		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.6	78	0.0165	2.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
7.5	178	Total			

Subcatchment 23S: PO-DA 8



Hydrograph for Subcatchment 23S: PO-DA 8

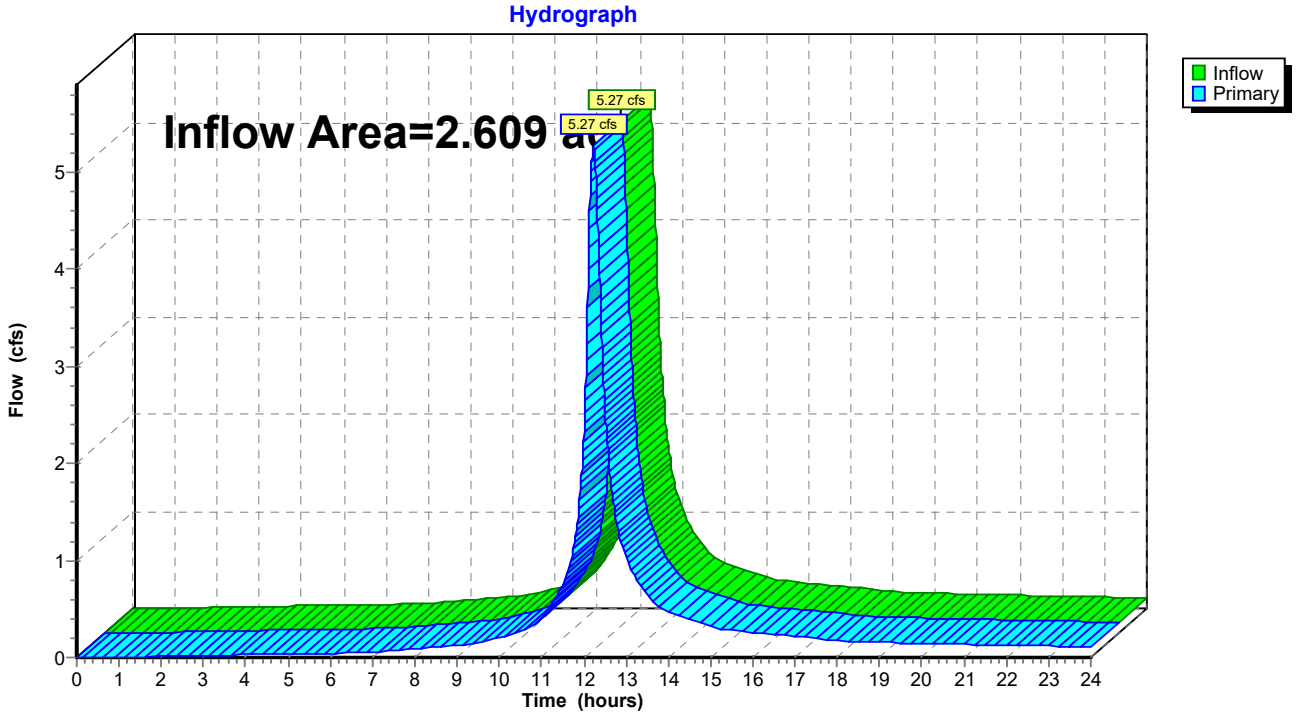
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.01
2.50	0.12	0.00	0.01
3.00	0.15	0.00	0.01
3.50	0.18	0.00	0.01
4.00	0.21	0.01	0.01
4.50	0.25	0.02	0.01
5.00	0.28	0.03	0.01
5.50	0.31	0.04	0.02
6.00	0.35	0.06	0.02
6.50	0.39	0.07	0.02
7.00	0.43	0.10	0.02
7.50	0.48	0.12	0.02
8.00	0.53	0.15	0.03
8.50	0.58	0.19	0.03
9.00	0.65	0.23	0.04
9.50	0.72	0.28	0.04
10.00	0.81	0.35	0.06
10.50	0.91	0.43	0.07
11.00	1.06	0.55	0.10
11.50	1.29	0.75	0.17
12.00	1.95	1.35	**0.67**
12.50	2.78	2.14	**0.29**
13.00	3.01	2.36	0.15
13.50	3.16	2.50	0.10
14.00	3.26	2.61	0.07
14.50	3.35	2.69	0.06
15.00	3.42	2.76	0.05
15.50	3.49	2.82	0.04
16.00	3.54	2.88	0.04
16.50	3.59	2.93	0.04
17.00	3.64	2.97	0.03
17.50	3.68	3.02	0.03
18.00	3.72	3.05	0.03
18.50	3.76	3.09	0.03
19.00	3.79	3.12	0.03
19.50	3.82	3.15	0.02
20.00	3.86	3.18	0.02
20.50	3.89	3.21	0.02
21.00	3.92	3.24	0.02
21.50	3.95	3.27	0.02
22.00	3.97	3.30	0.02
22.50	4.00	3.32	0.02
23.00	4.02	3.35	0.02
23.50	4.05	3.37	0.02
24.00	**4.07**	**3.39**	0.02

Summary for Pond 20P: O-AquaShield

Inflow Area = 2.609 ac, 26.54% Impervious, Inflow Depth > 2.70" for 2-Year_Future event
Inflow = 5.27 cfs @ 12.22 hrs, Volume= 0.587 af
Primary = 5.27 cfs @ 12.22 hrs, Volume= 0.587 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 20P: O-AquaShield



Hydrograph for Pond 20P: O-AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.01		0.01
2.50	0.02		0.02
3.00	0.02		0.02
3.50	0.03		0.03
4.00	0.03		0.03
4.50	0.03		0.03
5.00	0.04		0.04
5.50	0.04		0.04
6.00	0.04		0.04
6.50	0.05		0.05
7.00	0.06		0.06
7.50	0.07		0.07
8.00	0.09		0.09
8.50	0.10		0.10
9.00	0.12		0.12
9.50	0.16		0.16
10.00	0.21		0.21
10.50	0.27		0.27
11.00	0.42		0.42
11.50	0.74		0.74
12.00	**2.32**		**2.32**
12.50	**2.57**		**2.57**
13.00	1.03		1.03
13.50	0.65		0.65
14.00	0.47		0.47
14.50	0.40		0.40
15.00	0.33		0.33
15.50	0.28		0.28
16.00	0.26		0.26
16.50	0.24		0.24
17.00	0.22		0.22
17.50	0.20		0.20
18.00	0.18		0.18
18.50	0.16		0.16
19.00	0.16		0.16
19.50	0.15		0.15
20.00	0.15		0.15
20.50	0.14		0.14
21.00	0.14		0.14
21.50	0.13		0.13
22.00	0.13		0.13
22.50	0.12		0.12
23.00	0.12		0.12
23.50	0.11		0.11
24.00	0.11		0.11

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment22S: PO-DA 6 Runoff Area=96,853 sf 19.09% Impervious Runoff Depth>3.74"
Flow Length=491' Tc=18.1 min CN=WQ Runoff=6.35 cfs 0.693 af

Subcatchment23S: PO-DA 8 Runoff Area=16,786 sf 69.53% Impervious Runoff Depth>4.69"
Flow Length=178' Tc=8.1 min CN=WQ Runoff=1.74 cfs 0.151 af

Pond 20P: O-AquaShield Inflow=7.37 cfs 0.844 af
Primary=7.37 cfs 0.844 af

Total Runoff Area = 2.609 ac Runoff Volume = 0.844 af Average Runoff Depth = 3.88"
73.46% Pervious = 1.917 ac 26.54% Impervious = 0.692 ac

Summary for Subcatchment 22S: PO-DA 6

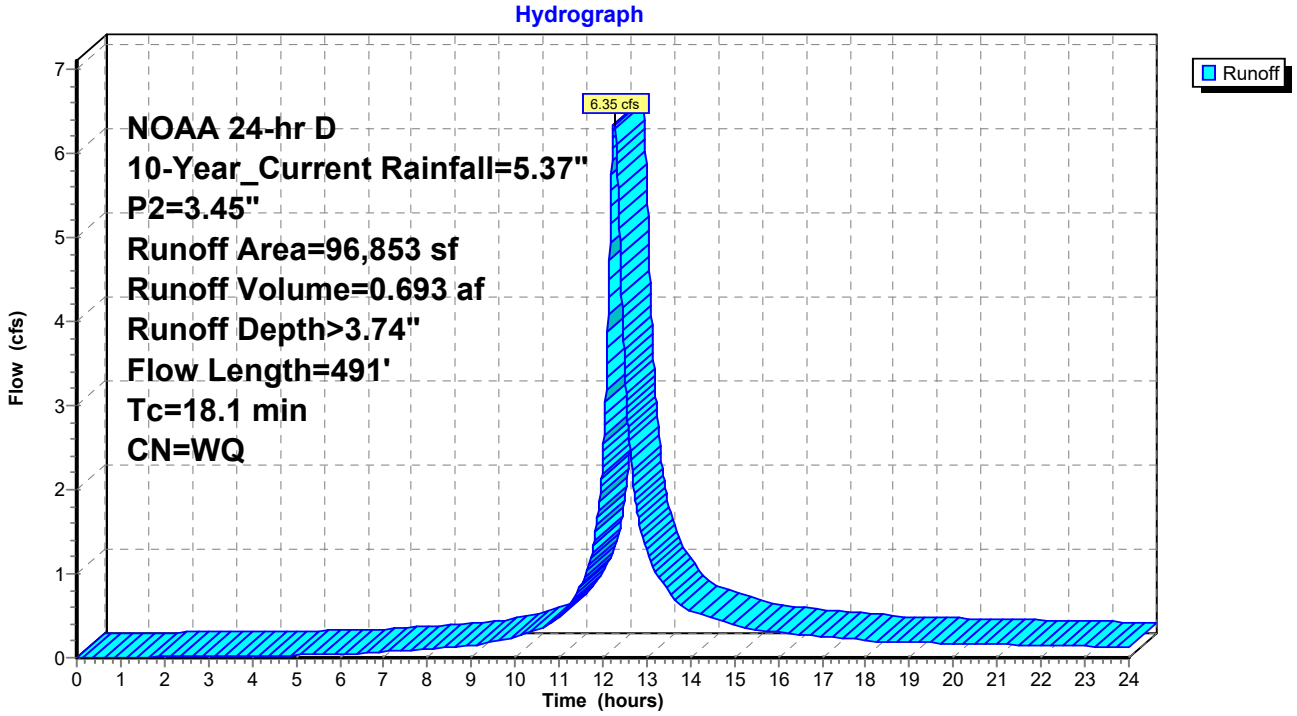
Runoff = 6.35 cfs @ 12.26 hrs, Volume= 0.693 af, Depth> 3.74"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	18,485	98	Impervious, Pavement, HSG D
	9,771	80	>75% Grass cover, Good, HSG D
*	53,605	85	Yard Stone/Gravel Pad, HSG D
	14,992	73	Brush, Good, HSG D
	96,853		Weighted Average
	78,368		80.91% Pervious Area
	18,485		19.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.5	67	0.0908	2.11		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.2813	3.71		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.1	491	Total			

Subcatchment 22S: PO-DA 6



Hydrograph for Subcatchment 22S: PO-DA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.01
2.00	0.13	0.00	0.01
2.50	0.16	0.00	0.02
3.00	0.20	0.00	0.02
3.50	0.24	0.00	0.02
4.00	0.28	0.00	0.03
4.50	0.32	0.00	0.03
5.00	0.37	0.00	0.03
5.50	0.41	0.00	0.04
6.00	0.46	0.01	0.04
6.50	0.51	0.01	0.06
7.00	0.57	0.02	0.07
7.50	0.63	0.04	0.09
8.00	0.70	0.06	0.10
8.50	0.77	0.08	0.12
9.00	0.85	0.11	0.15
9.50	0.95	0.15	0.19
10.00	1.06	0.20	0.26
10.50	1.20	0.28	0.33
11.00	1.40	0.39	0.50
11.50	1.70	0.58	0.86
12.00	2.57	1.24	**2.36**
12.50	3.67	2.16	**3.45**
13.00	3.97	2.43	1.27
13.50	4.17	2.61	0.79
14.00	4.31	2.73	0.56
14.50	4.42	2.84	0.47
15.00	4.52	2.93	0.39
15.50	4.60	3.00	0.33
16.00	4.67	3.07	0.30
16.50	4.74	3.13	0.28
17.00	4.80	3.19	0.26
17.50	4.86	3.24	0.23
18.00	4.91	3.29	0.21
18.50	4.96	3.33	0.19
19.00	5.00	3.37	0.18
19.50	5.05	3.41	0.18
20.00	5.09	3.45	0.17
20.50	5.13	3.49	0.17
21.00	5.17	3.52	0.16
21.50	5.21	3.56	0.15
22.00	5.24	3.59	0.15
22.50	5.28	3.62	0.14
23.00	5.31	3.65	0.14
23.50	5.34	3.68	0.13
24.00	**5.37**	**3.71**	0.12

Summary for Subcatchment 23S: PO-DA 8

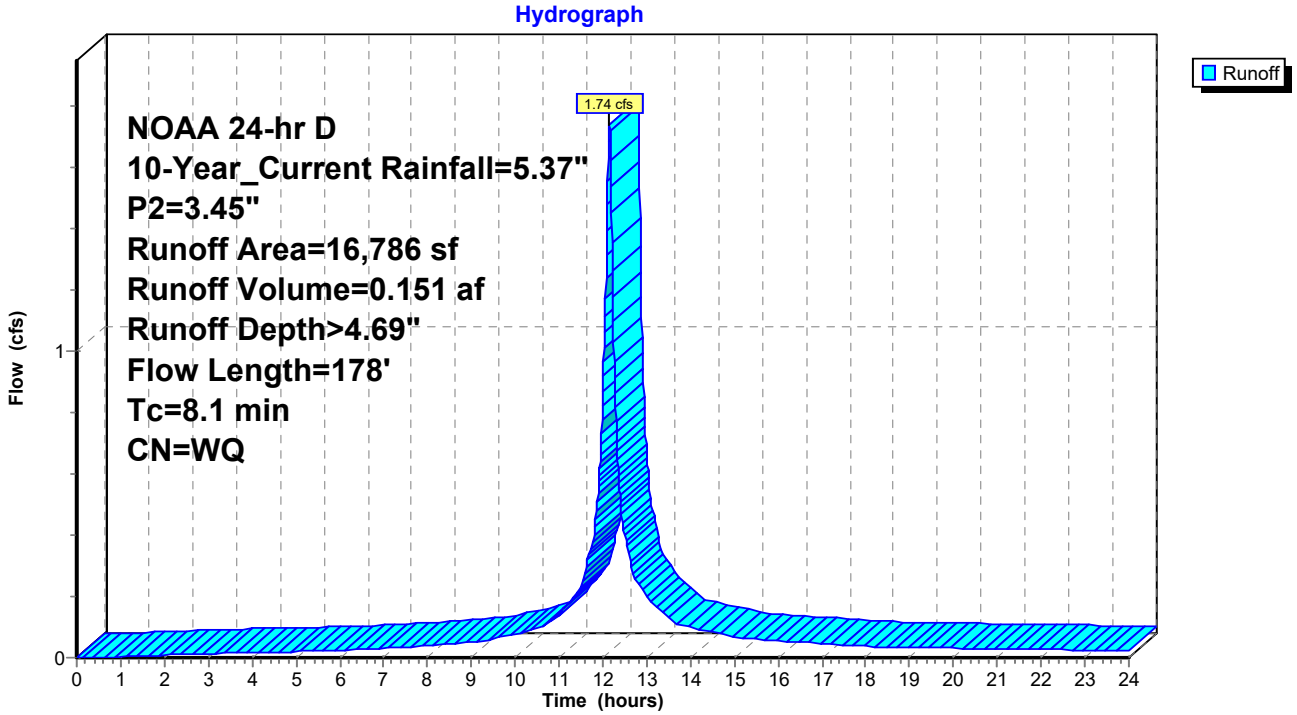
Runoff = 1.74 cfs @ 12.15 hrs, Volume= 0.151 af, Depth> 4.69"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	11,671	98	Impervious, Pavement, HSG D
*	5,115	85	Yard Stone/Gravel Pad, HSG D
	16,786		Weighted Average
	5,115		30.47% Pervious Area
	11,671		69.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.6	78	0.0165	2.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
8.1	178	Total			

Subcatchment 23S: PO-DA 8



Hydrograph for Subcatchment 23S: PO-DA 8

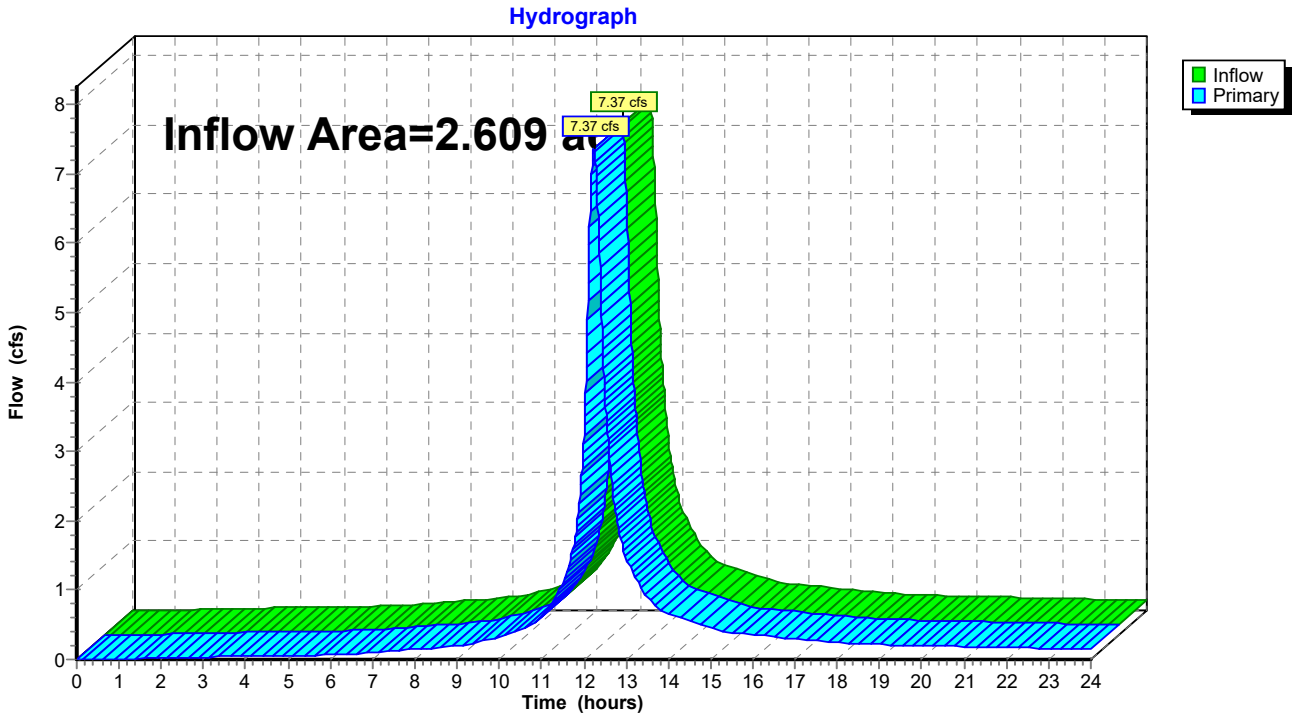
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.01
2.00	0.13	0.00	0.01
2.50	0.16	0.00	0.01
3.00	0.20	0.01	0.01
3.50	0.24	0.02	0.02
4.00	0.28	0.03	0.02
4.50	0.32	0.05	0.02
5.00	0.37	0.07	0.02
5.50	0.41	0.09	0.02
6.00	0.46	0.11	0.02
6.50	0.51	0.14	0.03
7.00	0.57	0.18	0.03
7.50	0.63	0.22	0.04
8.00	0.70	0.27	0.04
8.50	0.77	0.32	0.05
9.00	0.85	0.39	0.05
9.50	0.95	0.46	0.06
10.00	1.06	0.56	0.08
10.50	1.20	0.67	0.09
11.00	1.40	0.84	0.14
11.50	1.70	1.12	0.23
12.00	2.57	1.94	**0.87**
12.50	3.67	3.00	**0.39**
13.00	3.97	3.30	0.20
13.50	4.17	3.49	0.13
14.00	4.31	3.62	0.10
14.50	4.42	3.74	0.08
15.00	4.52	3.83	0.07
15.50	4.60	3.91	0.06
16.00	4.67	3.99	0.06
16.50	4.74	4.05	0.05
17.00	4.80	4.12	0.05
17.50	4.86	4.17	0.04
18.00	4.91	4.22	0.04
18.50	4.96	4.27	0.03
19.00	5.00	4.31	0.03
19.50	5.05	4.35	0.03
20.00	5.09	4.40	0.03
20.50	5.13	4.44	0.03
21.00	5.17	4.47	0.03
21.50	5.21	4.51	0.03
22.00	5.24	4.55	0.03
22.50	5.28	4.58	0.03
23.00	5.31	4.61	0.02
23.50	5.34	4.64	0.02
24.00	**5.37**	**4.67**	0.02

Summary for Pond 20P: O-AquaShield

Inflow Area = 2.609 ac, 26.54% Impervious, Inflow Depth > 3.88" for 10-Year_Current event
Inflow = 7.37 cfs @ 12.24 hrs, Volume= 0.844 af
Primary = 7.37 cfs @ 12.24 hrs, Volume= 0.844 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 20P: O-AquaShield



Hydrograph for Pond 20P: O-AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.02		0.02
2.50	0.03		0.03
3.00	0.03		0.03
3.50	0.04		0.04
4.00	0.04		0.04
4.50	0.05		0.05
5.00	0.05		0.05
5.50	0.06		0.06
6.00	0.07		0.07
6.50	0.08		0.08
7.00	0.10		0.10
7.50	0.12		0.12
8.00	0.14		0.14
8.50	0.17		0.17
9.00	0.20		0.20
9.50	0.25		0.25
10.00	0.33		0.33
10.50	0.42		0.42
11.00	0.64		0.64
11.50	1.09		1.09
12.00	**3.23**		**3.23**
12.50	**3.84**		**3.84**
13.00	1.48		1.48
13.50	0.92		0.92
14.00	0.66		0.66
14.50	0.56		0.56
15.00	0.46		0.46
15.50	0.39		0.39
16.00	0.36		0.36
16.50	0.33		0.33
17.00	0.30		0.30
17.50	0.27		0.27
18.00	0.25		0.25
18.50	0.23		0.23
19.00	0.22		0.22
19.50	0.21		0.21
20.00	0.20		0.20
20.50	0.20		0.20
21.00	0.19		0.19
21.50	0.18		0.18
22.00	0.18		0.18
22.50	0.17		0.17
23.00	0.16		0.16
23.50	0.15		0.15
24.00	0.15		0.15

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment22S: PO-DA 6 Runoff Area=96,853 sf 19.09% Impervious Runoff Depth>4.66"
Flow Length=491' Tc=17.0 min CN=WQ Runoff=8.07 cfs 0.863 af

Subcatchment23S: PO-DA 8 Runoff Area=16,786 sf 69.53% Impervious Runoff Depth>5.66"
Flow Length=178' Tc=7.5 min CN=WQ Runoff=2.14 cfs 0.182 af

Pond 20P: O-AquaShield Inflow=9.33 cfs 1.045 af
Primary=9.33 cfs 1.045 af

Total Runoff Area = 2.609 ac Runoff Volume = 1.045 af Average Runoff Depth = 4.81"
73.46% Pervious = 1.917 ac 26.54% Impervious = 0.692 ac

Summary for Subcatchment 22S: PO-DA 6

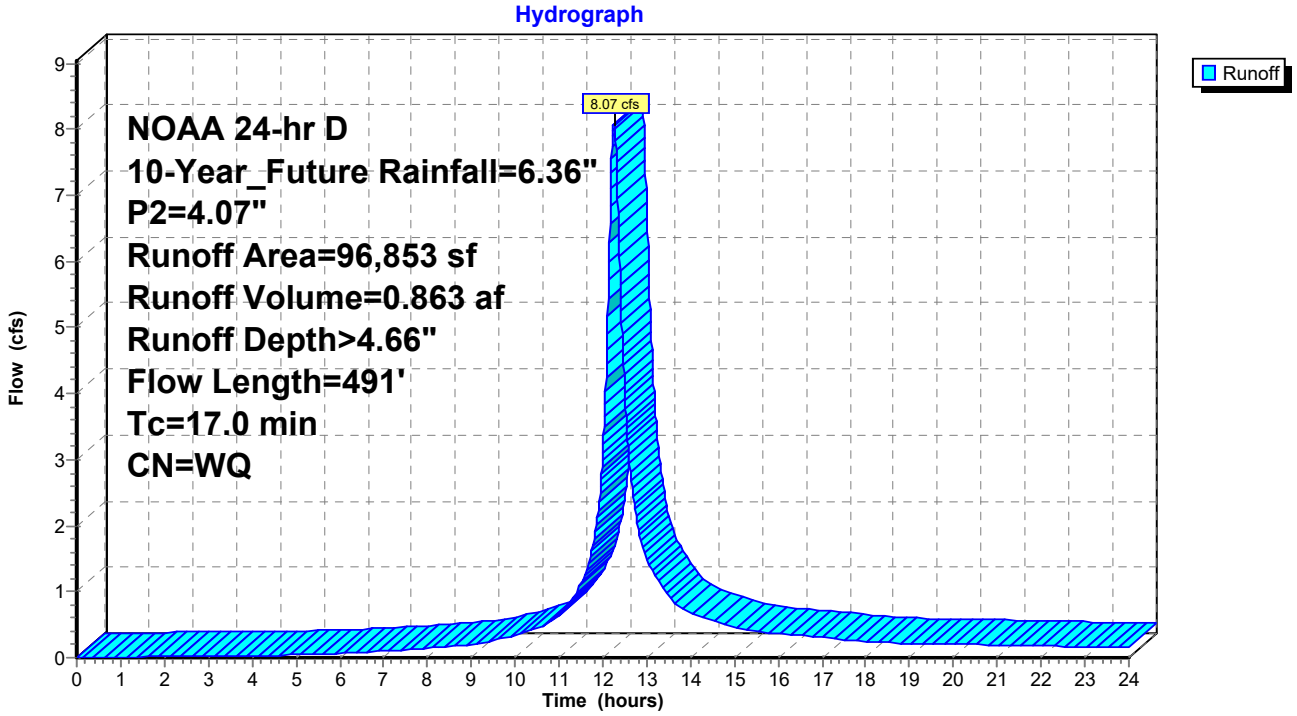
Runoff = 8.07 cfs @ 12.25 hrs, Volume= 0.863 af, Depth> 4.66"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	18,485	98	Impervious, Pavement, HSG D
	9,771	80	>75% Grass cover, Good, HSG D
*	53,605	85	Yard Stone/Gravel Pad, HSG D
	14,992	73	Brush, Good, HSG D
	96,853		Weighted Average
	78,368		80.91% Pervious Area
	18,485		19.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0543	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.5	67	0.0908	2.11		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.2813	3.71		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.0	491	Total			

Subcatchment 22S: PO-DA 6



Hydrograph for Subcatchment 22S: PO-DA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.01
2.00	0.15	0.00	0.02
2.50	0.20	0.00	0.02
3.00	0.24	0.00	0.03
3.50	0.29	0.00	0.03
4.00	0.33	0.00	0.03
4.50	0.38	0.00	0.04
5.00	0.43	0.00	0.05
5.50	0.49	0.01	0.06
6.00	0.54	0.02	0.06
6.50	0.60	0.03	0.08
7.00	0.67	0.05	0.10
7.50	0.74	0.07	0.12
8.00	0.83	0.10	0.15
8.50	0.91	0.14	0.17
9.00	1.01	0.18	0.20
9.50	1.12	0.23	0.26
10.00	1.26	0.31	0.34
10.50	1.42	0.40	0.44
11.00	1.65	0.55	0.65
11.50	2.02	0.81	1.12
12.00	3.05	1.63	**3.11**
12.50	4.34	2.77	**4.01**
13.00	4.71	3.10	1.51
13.50	4.94	3.31	0.95
14.00	5.10	3.46	0.68
14.50	5.24	3.59	0.57
15.00	5.35	3.69	0.47
15.50	5.45	3.78	0.40
16.00	5.53	3.87	0.37
16.50	5.62	3.94	0.34
17.00	5.69	4.01	0.31
17.50	5.76	4.07	0.28
18.00	5.82	4.13	0.25
18.50	5.87	4.18	0.23
19.00	5.93	4.23	0.22
19.50	5.98	4.28	0.21
20.00	6.03	4.33	0.21
20.50	6.07	4.37	0.20
21.00	6.12	4.42	0.19
21.50	6.16	4.46	0.19
22.00	6.21	4.50	0.18
22.50	6.25	4.54	0.17
23.00	6.29	4.57	0.16
23.50	6.32	4.61	0.16
24.00	**6.36**	**4.64**	0.15

Summary for Subcatchment 23S: PO-DA 8

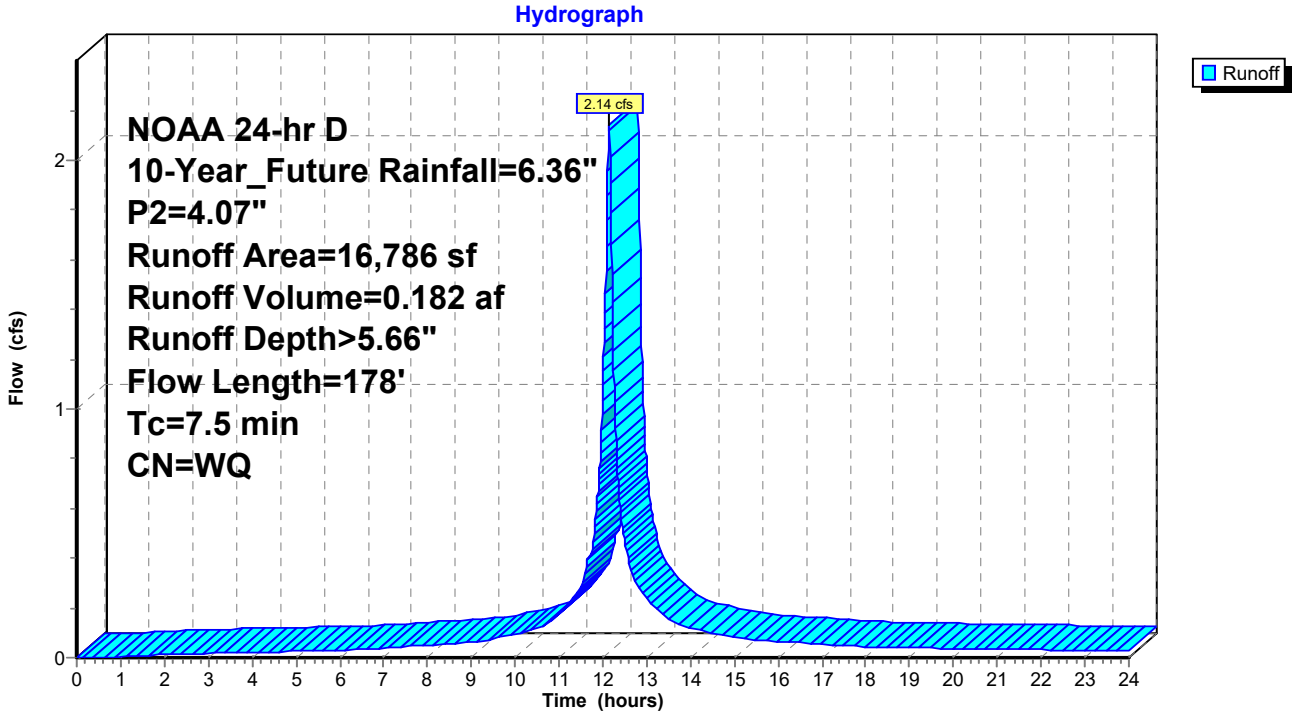
Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.182 af, Depth> 5.66"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	11,671	98	Impervious, Pavement, HSG D
*	5,115	85	Yard Stone/Gravel Pad, HSG D
	16,786		Weighted Average
	5,115		30.47% Pervious Area
	11,671		69.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.0160	0.24		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.6	78	0.0165	2.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
7.5	178	Total			

Subcatchment 23S: PO-DA 8



Hydrograph for Subcatchment 23S: PO-DA 8

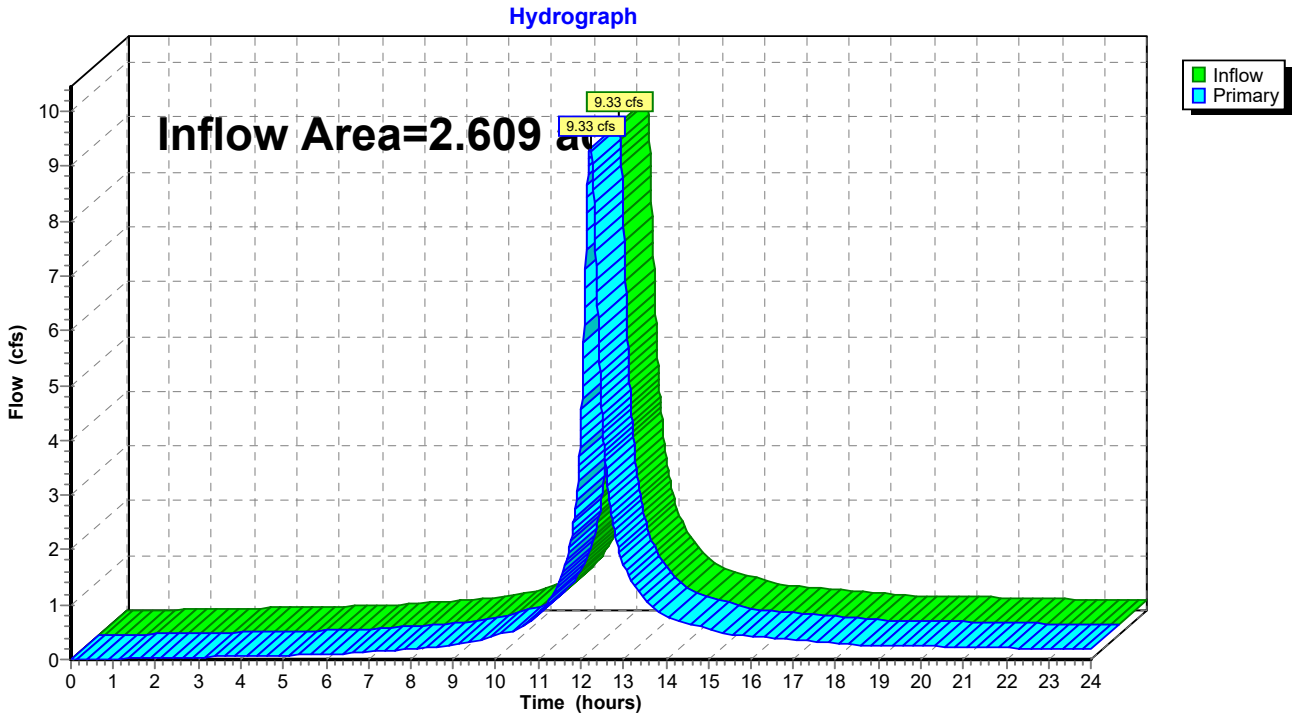
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.01
2.00	0.15	0.00	0.01
2.50	0.20	0.01	0.02
3.00	0.24	0.02	0.02
3.50	0.29	0.03	0.02
4.00	0.33	0.05	0.02
4.50	0.38	0.07	0.02
5.00	0.43	0.10	0.03
5.50	0.49	0.13	0.03
6.00	0.54	0.16	0.03
6.50	0.60	0.20	0.03
7.00	0.67	0.25	0.04
7.50	0.74	0.30	0.04
8.00	0.83	0.36	0.05
8.50	0.91	0.43	0.06
9.00	1.01	0.51	0.06
9.50	1.12	0.61	0.08
10.00	1.26	0.72	0.10
10.50	1.42	0.87	0.11
11.00	1.65	1.08	0.17
11.50	2.02	1.41	0.29
12.00	3.05	2.40	**1.10**
12.50	4.34	3.66	**0.46**
13.00	4.71	4.02	0.24
13.50	4.94	4.24	0.15
14.00	5.10	4.41	0.12
14.50	5.24	4.54	0.10
15.00	5.35	4.65	0.08
15.50	5.45	4.75	0.07
16.00	5.53	4.84	0.07
16.50	5.62	4.92	0.06
17.00	5.69	4.99	0.06
17.50	5.76	5.06	0.05
18.00	5.82	5.12	0.04
18.50	5.87	5.17	0.04
19.00	5.93	5.22	0.04
19.50	5.98	5.27	0.04
20.00	6.03	5.32	0.04
20.50	6.07	5.37	0.04
21.00	6.12	5.42	0.03
21.50	6.16	5.46	0.03
22.00	6.21	5.50	0.03
22.50	6.25	5.54	0.03
23.00	6.29	5.58	0.03
23.50	6.32	5.62	0.03
24.00	**6.36**	**5.65**	0.03

Summary for Pond 20P: O-AquaShield

Inflow Area = 2.609 ac, 26.54% Impervious, Inflow Depth > 4.81" for 10-Year_Future event
Inflow = 9.33 cfs @ 12.22 hrs, Volume= 1.045 af
Primary = 9.33 cfs @ 12.22 hrs, Volume= 1.045 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 20P: O-AquaShield



Hydrograph for Pond 20P: O-AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.02		0.02
2.00	0.03		0.03
2.50	0.04		0.04
3.00	0.04		0.04
3.50	0.05		0.05
4.00	0.05		0.05
4.50	0.06		0.06
5.00	0.07		0.07
5.50	0.08		0.08
6.00	0.09		0.09
6.50	0.11		0.11
7.00	0.14		0.14
7.50	0.17		0.17
8.00	0.20		0.20
8.50	0.23		0.23
9.00	0.26		0.26
9.50	0.34		0.34
10.00	0.44		0.44
10.50	0.55		0.55
11.00	0.83		0.83
11.50	1.41		1.41
12.00	**4.20**		**4.20**
12.50	**4.48**		**4.48**
13.00	1.75		1.75
13.50	1.10		1.10
14.00	0.80		0.80
14.50	0.67		0.67
15.00	0.55		0.55
15.50	0.47		0.47
16.00	0.43		0.43
16.50	0.40		0.40
17.00	0.36		0.36
17.50	0.33		0.33
18.00	0.29		0.29
18.50	0.27		0.27
19.00	0.26		0.26
19.50	0.25		0.25
20.00	0.25		0.25
20.50	0.24		0.24
21.00	0.23		0.23
21.50	0.22		0.22
22.00	0.21		0.21
22.50	0.20		0.20
23.00	0.19		0.19
23.50	0.18		0.18
24.00	0.18		0.18

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment22S: PO-DA 6 Runoff Area=96,853 sf 19.09% Impervious Runoff Depth>7.39"
Flow Length=491' Tc=18.1 min CN=WQ Runoff=12.28 cfs 1.369 af

Subcatchment23S: PO-DA 8 Runoff Area=16,786 sf 69.53% Impervious Runoff Depth>8.49"
Flow Length=178' Tc=8.1 min CN=WQ Runoff=3.09 cfs 0.273 af

Pond 20P: O-AquaShield Inflow=14.11 cfs 1.642 af
Primary=14.11 cfs 1.642 af

Total Runoff Area = 2.609 ac Runoff Volume = 1.642 af Average Runoff Depth = 7.55"
73.46% Pervious = 1.917 ac 26.54% Impervious = 0.692 ac

Summary for Subcatchment 22S: PO-DA 6

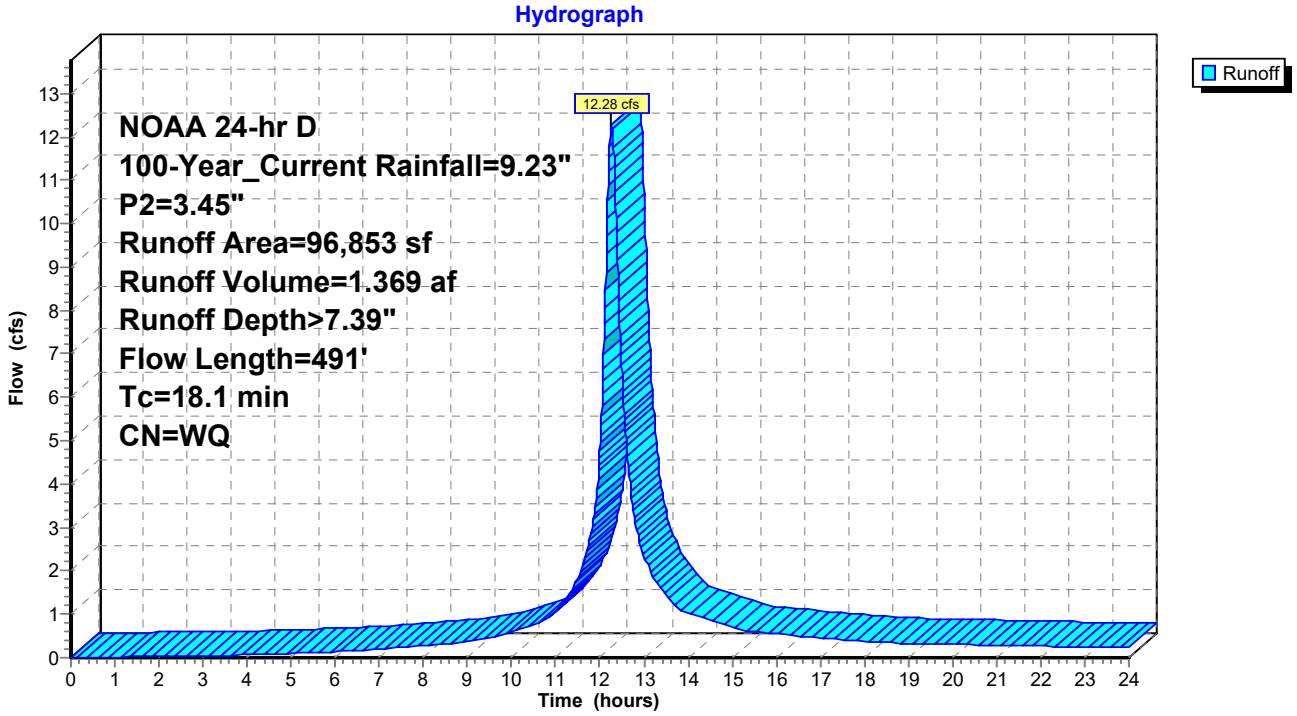
Runoff = 12.28 cfs @ 12.26 hrs, Volume= 1.369 af, Depth> 7.39"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	18,485	98	Impervious, Pavement, HSG D
	9,771	80	>75% Grass cover, Good, HSG D
*	53,605	85	Yard Stone/Gravel Pad, HSG D
	14,992	73	Brush, Good, HSG D
	96,853		Weighted Average
	78,368		80.91% Pervious Area
	18,485		19.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.5	67	0.0908	2.11		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.2813	3.71		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.1	491	Total			

Subcatchment 22S: PO-DA 6



Hydrograph for Subcatchment 22S: PO-DA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.00	0.02
2.00	0.22	0.00	0.03
2.50	0.28	0.00	0.04
3.00	0.35	0.00	0.04
3.50	0.41	0.00	0.05
4.00	0.48	0.01	0.07
4.50	0.56	0.02	0.09
5.00	0.63	0.04	0.10
5.50	0.71	0.06	0.12
6.00	0.79	0.09	0.14
6.50	0.88	0.12	0.16
7.00	0.97	0.16	0.20
7.50	1.08	0.21	0.24
8.00	1.20	0.27	0.28
8.50	1.33	0.35	0.33
9.00	1.46	0.43	0.38
9.50	1.63	0.54	0.47
10.00	1.83	0.67	0.61
10.50	2.07	0.84	0.75
11.00	2.40	1.10	1.10
11.50	2.93	1.53	1.83
12.00	4.42	2.84	**4.78**
12.50	6.30	4.59	**6.54**
13.00	6.83	5.09	2.37
13.50	7.16	5.41	1.45
14.00	7.40	5.64	1.03
14.50	7.60	5.83	0.87
15.00	7.77	5.99	0.71
15.50	7.90	6.12	0.60
16.00	8.03	6.24	0.55
16.50	8.15	6.36	0.51
17.00	8.26	6.46	0.47
17.50	8.35	6.56	0.42
18.00	8.44	6.64	0.38
18.50	8.52	6.72	0.34
19.00	8.60	6.79	0.33
19.50	8.67	6.86	0.32
20.00	8.75	6.93	0.31
20.50	8.82	7.00	0.30
21.00	8.88	7.07	0.29
21.50	8.95	7.13	0.28
22.00	9.01	7.19	0.27
22.50	9.07	7.25	0.26
23.00	9.12	7.30	0.25
23.50	9.18	7.35	0.23
24.00	**9.23**	**7.40**	0.22

Summary for Subcatchment 23S: PO-DA 8

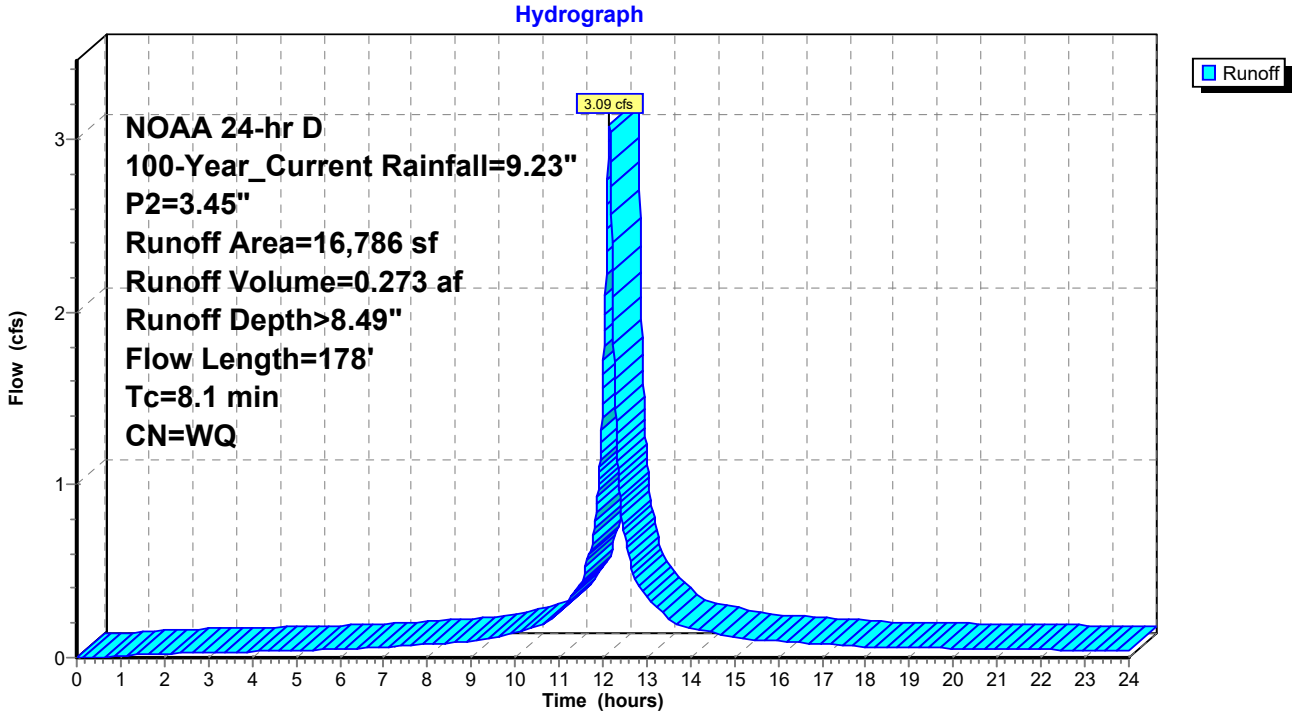
Runoff = 3.09 cfs @ 12.15 hrs, Volume= 0.273 af, Depth> 8.49"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	11,671	98	Impervious, Pavement, HSG D
*	5,115	85	Yard Stone/Gravel Pad, HSG D
	16,786		Weighted Average
	5,115		30.47% Pervious Area
	11,671		69.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.6	78	0.0165	2.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
8.1	178	Total			

Subcatchment 23S: PO-DA 8



Hydrograph for Subcatchment 23S: PO-DA 8

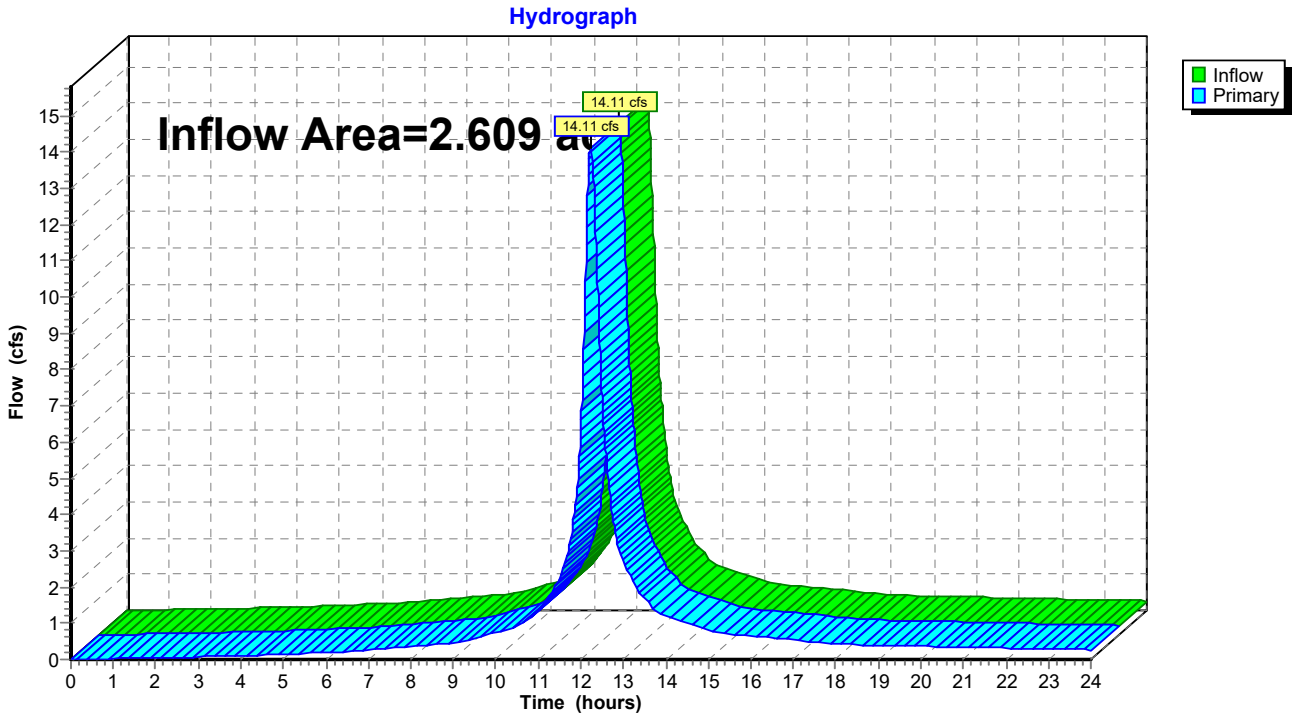
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.00	0.02
2.00	0.22	0.01	0.02
2.50	0.28	0.03	0.03
3.00	0.35	0.06	0.03
3.50	0.41	0.09	0.03
4.00	0.48	0.13	0.04
4.50	0.56	0.17	0.04
5.00	0.63	0.22	0.04
5.50	0.71	0.28	0.05
6.00	0.79	0.34	0.05
6.50	0.88	0.40	0.05
7.00	0.97	0.48	0.06
7.50	1.08	0.57	0.07
8.00	1.20	0.67	0.08
8.50	1.33	0.78	0.09
9.00	1.46	0.90	0.10
9.50	1.63	1.05	0.12
10.00	1.83	1.24	0.15
10.50	2.07	1.46	0.17
11.00	2.40	1.77	0.26
11.50	2.93	2.28	0.43
12.00	4.42	3.74	**1.56**
12.50	6.30	5.60	**0.70**
13.00	6.83	6.12	0.36
13.50	7.16	6.45	0.23
14.00	7.40	6.69	0.17
14.50	7.60	6.89	0.15
15.00	7.77	7.05	0.12
15.50	7.90	7.19	0.10
16.00	8.03	7.31	0.10
16.50	8.15	7.43	0.09
17.00	8.26	7.54	0.08
17.50	8.35	7.63	0.07
18.00	8.44	7.72	0.06
18.50	8.52	7.80	0.06
19.00	8.60	7.88	0.06
19.50	8.67	7.95	0.06
20.00	8.75	8.02	0.05
20.50	8.82	8.09	0.05
21.00	8.88	8.16	0.05
21.50	8.95	8.22	0.05
22.00	9.01	8.29	0.05
22.50	9.07	8.34	0.05
23.00	9.12	8.40	0.04
23.50	9.18	8.45	0.04
24.00	**9.23**	**8.51**	0.04

Summary for Pond 20P: O-AquaShield

Inflow Area = 2.609 ac, 26.54% Impervious, Inflow Depth > 7.55" for 100-Year_Current event
Inflow = 14.11 cfs @ 12.24 hrs, Volume= 1.642 af
Primary = 14.11 cfs @ 12.24 hrs, Volume= 1.642 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 20P: O-AquaShield



Hydrograph for Pond 20P: O-AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.02		0.02
1.50	0.04		0.04
2.00	0.06		0.06
2.50	0.07		0.07
3.00	0.07		0.07
3.50	0.09		0.09
4.00	0.11		0.11
4.50	0.12		0.12
5.00	0.14		0.14
5.50	0.16		0.16
6.00	0.18		0.18
6.50	0.22		0.22
7.00	0.26		0.26
7.50	0.31		0.31
8.00	0.36		0.36
8.50	0.42		0.42
9.00	0.47		0.47
9.50	0.59		0.59
10.00	0.75		0.75
10.50	0.93		0.93
11.00	1.36		1.36
11.50	2.26		2.26
12.00	**6.34**		**6.34**
12.50	**7.23**		**7.23**
13.00	2.73		2.73
13.50	1.68		1.68
14.00	1.20		1.20
14.50	1.01		1.01
15.00	0.83		0.83
15.50	0.70		0.70
16.00	0.65		0.65
16.50	0.60		0.60
17.00	0.55		0.55
17.50	0.49		0.49
18.00	0.44		0.44
18.50	0.41		0.41
19.00	0.39		0.39
19.50	0.38		0.38
20.00	0.37		0.37
20.50	0.35		0.35
21.00	0.34		0.34
21.50	0.33		0.33
22.00	0.31		0.31
22.50	0.30		0.30
23.00	0.29		0.29
23.50	0.28		0.28
24.00	0.26		0.26

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment22S: PO-DA 6 Runoff Area=96,853 sf 19.09% Impervious Runoff Depth>9.66"
Flow Length=491' Tc=17.0 min CN=WQ Runoff=16.29 cfs 1.791 af

Subcatchment23S: PO-DA 8 Runoff Area=16,786 sf 69.53% Impervious Runoff Depth>10.83"
Flow Length=178' Tc=7.5 min CN=WQ Runoff=4.01 cfs 0.348 af

Pond 20P: O-AquaShield Inflow=18.67 cfs 2.138 af
Primary=18.67 cfs 2.138 af

Total Runoff Area = 2.609 ac Runoff Volume = 2.138 af Average Runoff Depth = 9.84"
73.46% Pervious = 1.917 ac 26.54% Impervious = 0.692 ac

Summary for Subcatchment 22S: PO-DA 6

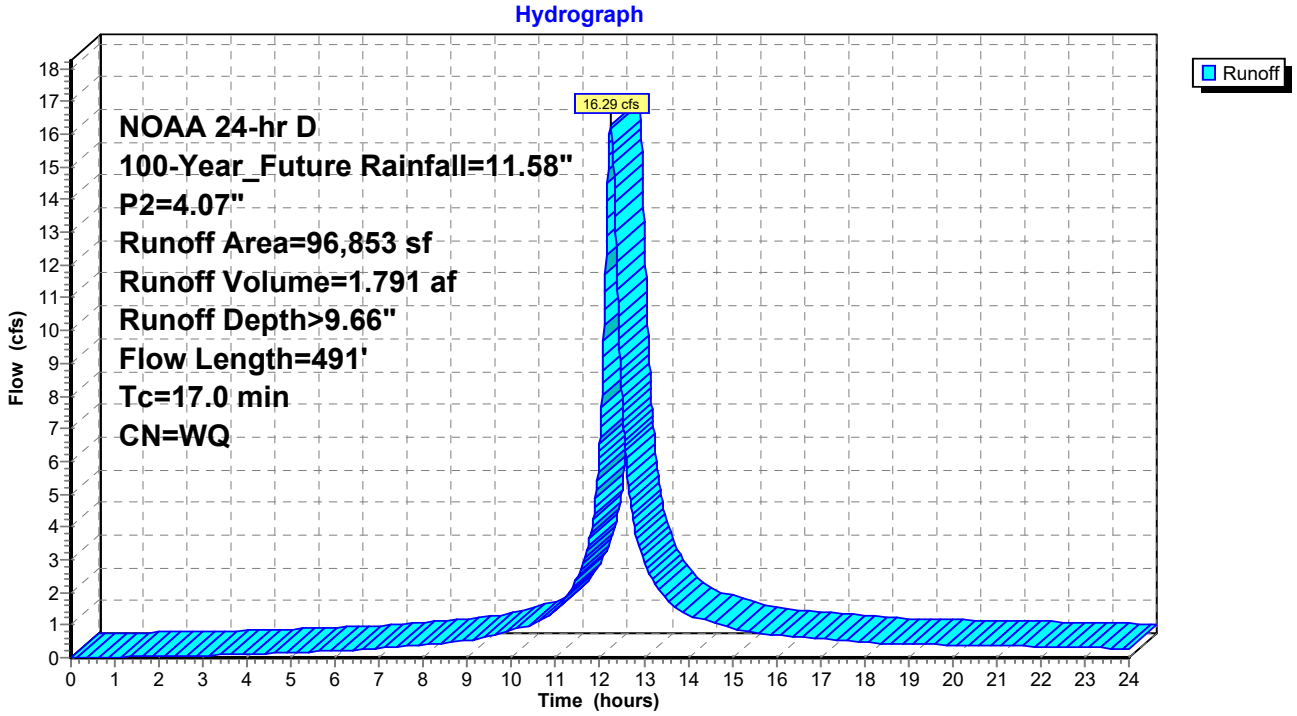
Runoff = 16.29 cfs @ 12.25 hrs, Volume= 1.791 af, Depth> 9.66"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	18,485	98	Impervious, Pavement, HSG D
	9,771	80	>75% Grass cover, Good, HSG D
*	53,605	85	Yard Stone/Gravel Pad, HSG D
	14,992	73	Brush, Good, HSG D
	96,853		Weighted Average
	78,368		80.91% Pervious Area
	18,485		19.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0543	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.5	67	0.0908	2.11		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.2813	3.71		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.0	491	Total			

Subcatchment 22S: PO-DA 6



Hydrograph for Subcatchment 22S: PO-DA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.02
1.50	0.20	0.00	0.04
2.00	0.28	0.00	0.05
2.50	0.36	0.00	0.05
3.00	0.44	0.00	0.07
3.50	0.52	0.01	0.09
4.00	0.61	0.03	0.11
4.50	0.70	0.06	0.14
5.00	0.79	0.09	0.16
5.50	0.89	0.12	0.19
6.00	0.99	0.17	0.21
6.50	1.10	0.22	0.25
7.00	1.22	0.29	0.30
7.50	1.35	0.36	0.35
8.00	1.50	0.45	0.41
8.50	1.66	0.56	0.47
9.00	1.84	0.68	0.53
9.50	2.04	0.83	0.66
10.00	2.30	1.02	0.84
10.50	2.59	1.25	1.03
11.00	3.01	1.60	1.50
11.50	3.67	2.17	2.48
12.00	5.55	3.88	**6.53**
12.50	7.91	6.13	**7.95**
13.00	8.57	6.76	2.94
13.50	8.99	7.17	1.83
14.00	9.28	7.46	1.30
14.50	9.54	7.70	1.10
15.00	9.74	7.90	0.90
15.50	9.92	8.07	0.76
16.00	10.08	8.23	0.70
16.50	10.23	8.38	0.65
17.00	10.36	8.51	0.59
17.50	10.48	8.63	0.53
18.00	10.59	8.73	0.48
18.50	10.69	8.83	0.44
19.00	10.79	8.93	0.42
19.50	10.88	9.02	0.41
20.00	10.97	9.11	0.40
20.50	11.06	9.19	0.38
21.00	11.14	9.27	0.37
21.50	11.22	9.35	0.35
22.00	11.30	9.43	0.34
22.50	11.38	9.50	0.33
23.00	11.45	9.57	0.31
23.50	11.52	9.64	0.30
24.00	**11.58**	**9.70**	0.28

Summary for Subcatchment 23S: PO-DA 8

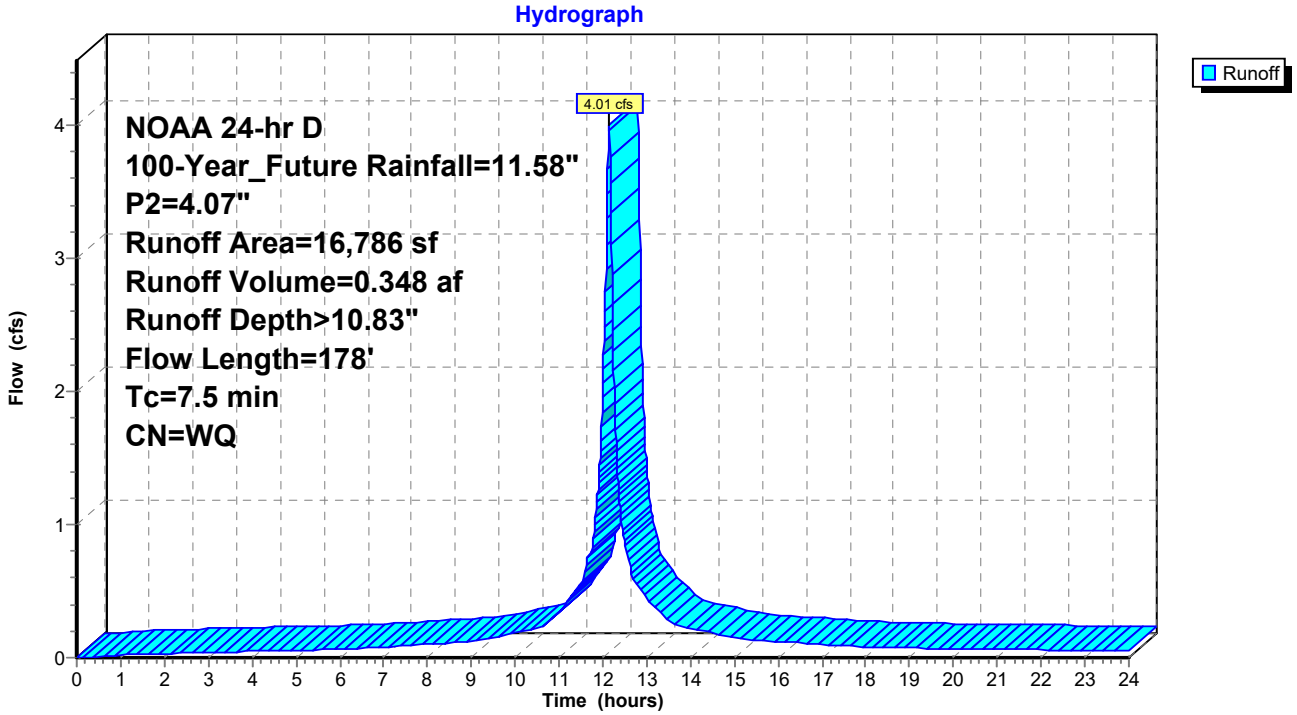
Runoff = 4.01 cfs @ 12.14 hrs, Volume= 0.348 af, Depth>10.83"
Routed to Pond 20P : O-AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	11,671	98	Impervious, Pavement, HSG D
*	5,115	85	Yard Stone/Gravel Pad, HSG D
	16,786		Weighted Average
	5,115		30.47% Pervious Area
	11,671		69.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.0160	0.24		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.6	78	0.0165	2.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
7.5	178	Total			

Subcatchment 23S: PO-DA 8



Hydrograph for Subcatchment 23S: PO-DA 8

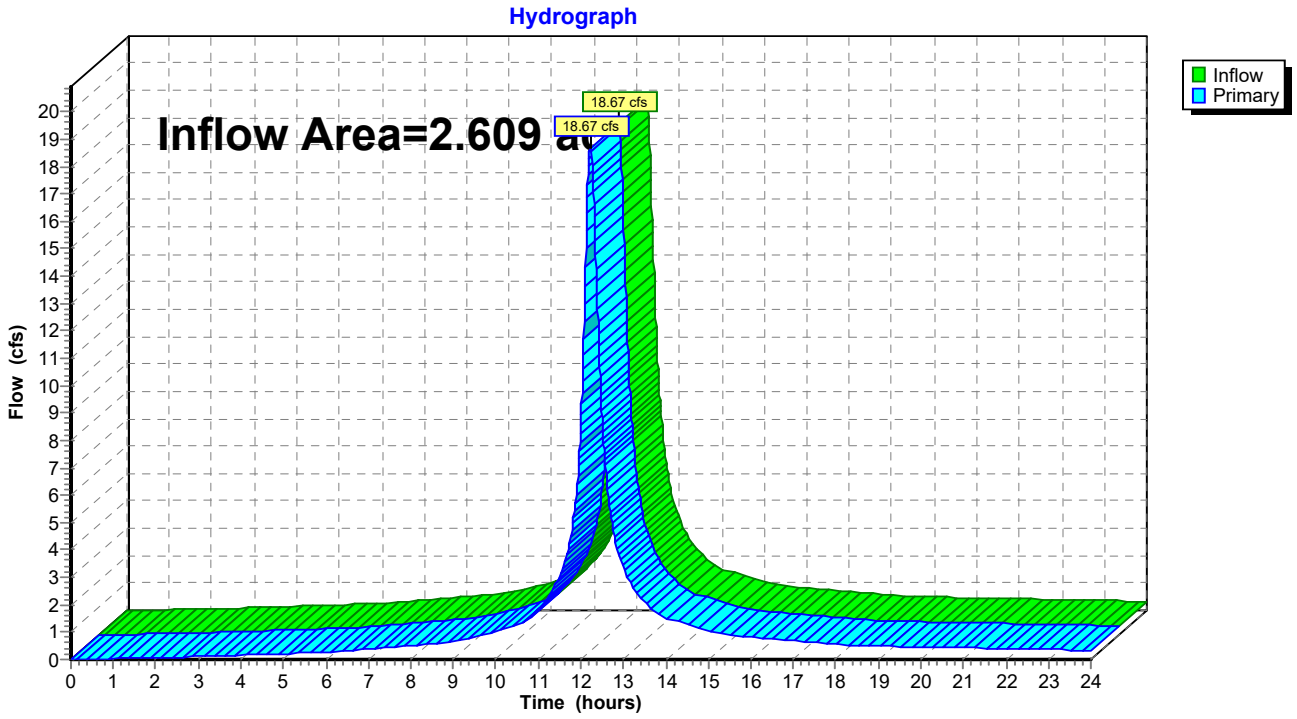
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.02
1.50	0.20	0.01	0.03
2.00	0.28	0.03	0.03
2.50	0.36	0.06	0.04
3.00	0.44	0.10	0.04
3.50	0.52	0.15	0.04
4.00	0.61	0.21	0.05
4.50	0.70	0.27	0.05
5.00	0.79	0.34	0.06
5.50	0.89	0.41	0.06
6.00	0.99	0.49	0.06
6.50	1.10	0.59	0.07
7.00	1.22	0.69	0.08
7.50	1.35	0.81	0.09
8.00	1.50	0.94	0.10
8.50	1.66	1.08	0.11
9.00	1.84	1.24	0.12
9.50	2.04	1.44	0.15
10.00	2.30	1.67	0.19
10.50	2.59	1.96	0.23
11.00	3.01	2.36	0.34
11.50	3.67	3.00	0.55
12.00	5.55	4.85	**2.07**
12.50	7.91	7.19	**0.86**
13.00	8.57	7.85	0.45
13.50	8.99	8.26	0.29
14.00	9.28	8.56	0.22
14.50	9.54	8.81	0.18
15.00	9.74	9.02	0.15
15.50	9.92	9.19	0.13
16.00	10.08	9.35	0.12
16.50	10.23	9.50	0.11
17.00	10.36	9.63	0.10
17.50	10.48	9.75	0.09
18.00	10.59	9.86	0.08
18.50	10.69	9.96	0.08
19.00	10.79	10.06	0.07
19.50	10.88	10.15	0.07
20.00	10.97	10.24	0.07
20.50	11.06	10.33	0.07
21.00	11.14	10.41	0.06
21.50	11.22	10.49	0.06
22.00	11.30	10.57	0.06
22.50	11.38	10.64	0.06
23.00	11.45	10.72	0.05
23.50	11.52	10.78	0.05
24.00	**11.58**	**10.85**	0.05

Summary for Pond 20P: O-AquaShield

Inflow Area = 2.609 ac, 26.54% Impervious, Inflow Depth > 9.84" for 100-Year_Future event
Inflow = 18.67 cfs @ 12.22 hrs, Volume= 2.138 af
Primary = 18.67 cfs @ 12.22 hrs, Volume= 2.138 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 20P: O-AquaShield

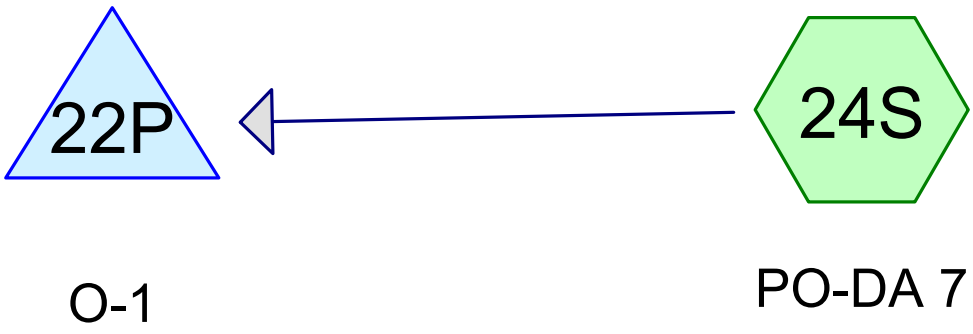


Hydrograph for Pond 20P: O-AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.04		0.04
1.50	0.06		0.06
2.00	0.08		0.08
2.50	0.09		0.09
3.00	0.11		0.11
3.50	0.14		0.14
4.00	0.16		0.16
4.50	0.19		0.19
5.00	0.22		0.22
5.50	0.25		0.25
6.00	0.27		0.27
6.50	0.32		0.32
7.00	0.38		0.38
7.50	0.44		0.44
8.00	0.51		0.51
8.50	0.58		0.58
9.00	0.66		0.66
9.50	0.81		0.81
10.00	1.03		1.03
10.50	1.26		1.26
11.00	1.84		1.84
11.50	3.03		3.03
12.00	**8.59**		**8.59**
12.50	**8.81**		**8.81**
13.00	3.39		3.39
13.50	2.11		2.11
14.00	1.52		1.52
14.50	1.28		1.28
15.00	1.05		1.05
15.50	0.89		0.89
16.00	0.82		0.82
16.50	0.76		0.76
17.00	0.69		0.69
17.50	0.62		0.62
18.00	0.56		0.56
18.50	0.51		0.51
19.00	0.50		0.50
19.50	0.48		0.48
20.00	0.46		0.46
20.50	0.45		0.45
21.00	0.43		0.43
21.50	0.42		0.42
22.00	0.40		0.40
22.50	0.38		0.38
23.00	0.37		0.37
23.50	0.35		0.35
24.00	0.33		0.33

APPENDIX B.2- PRE-DEVELOPED OUTFALL = O-1

PRE-DEVELOPED:
OUTFALL = O-1



Subcat Reach Pond Link

Routing Diagram for West Orange HydroCAD_Pre
Prepared by Burns & McDonnell, Printed 5/13/2024
HydroCAD® 10.20-4b s/n 08510 © 2023 HydroCAD Software Solutions LLC

West Orange HydroCAD_Pre
Prepared by Burns & McDonnell
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100-Year_Future Event
36 Node Listing
37 Subcat 24S: PO-DA 7
40 Pond 22P: O-1

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
2	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
3	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
4	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
5	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
6	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.674	80	>75% Grass cover, Good, HSG D (24S)
0.386	73	Brush, Good, HSG D (24S)
0.100	98	Impervious, Pavement, HSG D (24S)
0.526	85	Yard Stone/Gravel Pad, HSG D (24S)
1.685	**81**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.685	HSG D	24S
0.000	Other	
1.685		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.674	0.000	0.674	>75% Grass cover, Good	24S
0.000	0.000	0.000	0.386	0.000	0.386	Brush, Good	24S
0.000	0.000	0.000	0.100	0.000	0.100	Impervious, Pavement	24S
0.000	0.000	0.000	0.526	0.000	0.526	Yard Stone/Gravel Pad	24S
0.000	**0.000**	**0.000**	**1.685**	**0.000**	**1.685**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment24S: PO-DA 7 Runoff Area=73,407 sf 5.92% Impervious Runoff Depth>1.70"
Flow Length=439' Tc=12.1 min CN=WQ Runoff=2.66 cfs 0.239 af

Pond 22P: O-1 Inflow=2.66 cfs 0.239 af
Primary=2.66 cfs 0.239 af

Total Runoff Area = 1.685 ac Runoff Volume = 0.239 af Average Runoff Depth = 1.70"
94.08% Pervious = 1.585 ac 5.92% Impervious = 0.100 ac

Summary for Subcatchment 24S: PO-DA 7

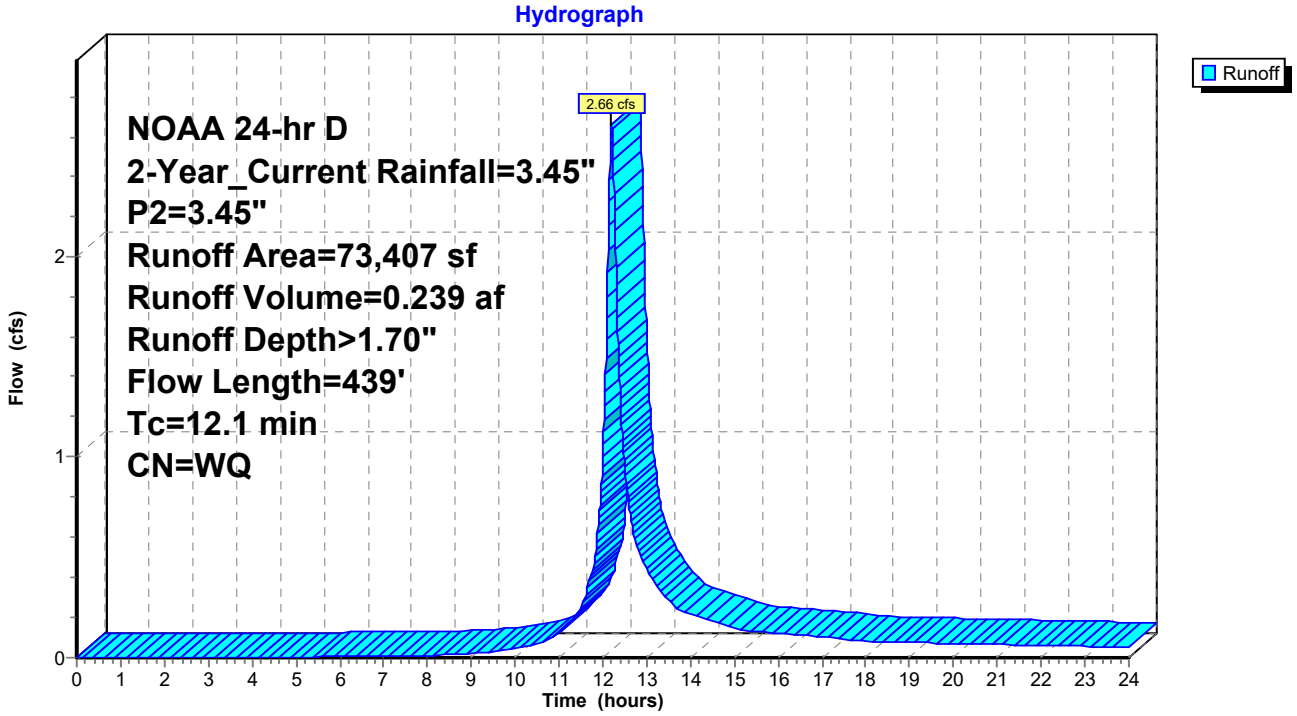
Runoff = 2.66 cfs @ 12.20 hrs, Volume= 0.239 af, Depth> 1.70"
Routed to Pond 22P : O-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	4,346	98	Impervious, Pavement, HSG D
	29,340	80	>75% Grass cover, Good, HSG D
*	22,892	85	Yard Stone/Gravel Pad, HSG D
	16,829	73	Brush, Good, HSG D
	73,407		Weighted Average
	69,061		94.08% Pervious Area
	4,346		5.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	49	0.0791	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
1.9	151	0.0071	1.36		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	239	0.0260	1.13		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
12.1	439	Total			

Subcatchment 24S: PO-DA 7



Hydrograph for Subcatchment 24S: PO-DA 7

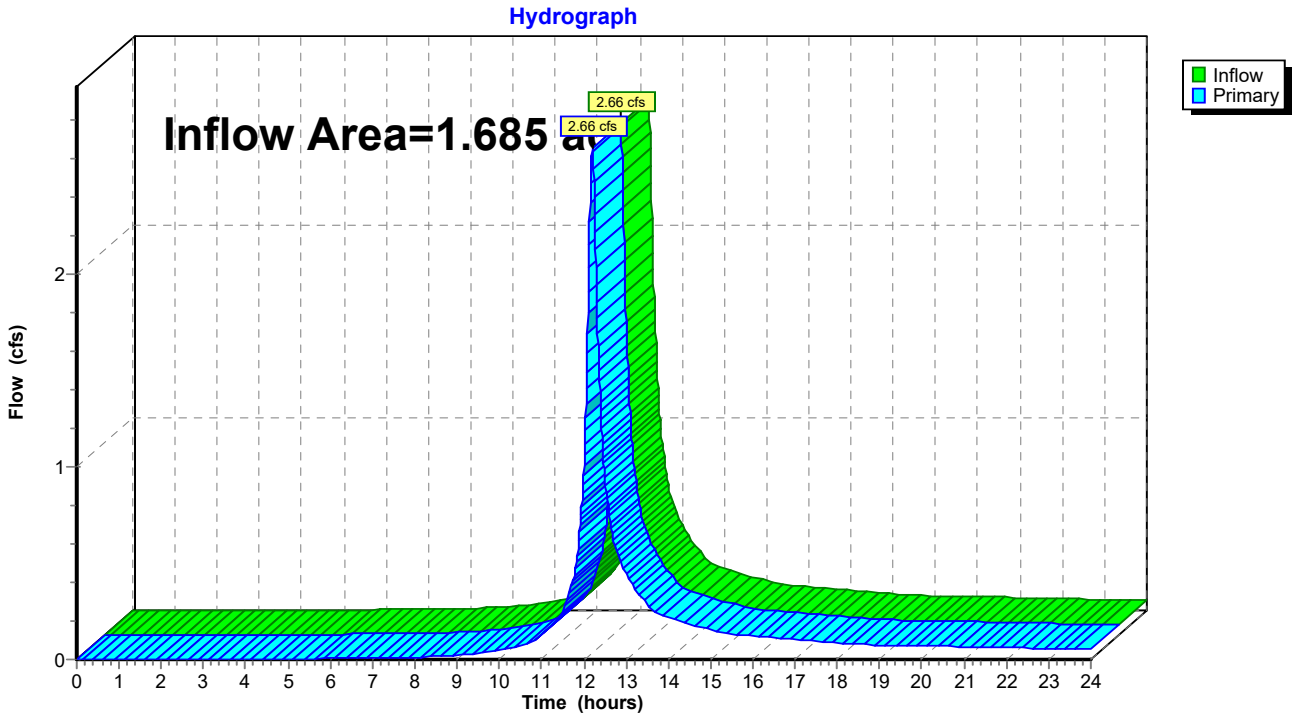
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.01
7.00	0.36	0.00	0.01
7.50	0.40	0.00	0.01
8.00	0.45	0.00	0.01
8.50	0.50	0.00	0.02
9.00	0.55	0.00	0.02
9.50	0.61	0.01	0.03
10.00	0.68	0.02	0.05
10.50	0.77	0.03	0.07
11.00	0.90	0.07	0.13
11.50	1.09	0.13	0.25
12.00	1.65	0.40	**1.01**
12.50	2.36	0.84	**0.94**
13.00	2.55	0.98	0.45
13.50	2.68	1.07	0.29
14.00	2.77	1.14	0.22
14.50	2.84	1.19	0.19
15.00	2.90	1.24	0.15
15.50	2.95	1.28	0.13
16.00	3.00	1.32	0.12
16.50	3.05	1.35	0.11
17.00	3.09	1.38	0.10
17.50	3.12	1.41	0.09
18.00	3.16	1.43	0.08
18.50	3.19	1.46	0.08
19.00	3.21	1.48	0.08
19.50	3.24	1.50	0.07
20.00	3.27	1.52	0.07
20.50	3.29	1.54	0.07
21.00	3.32	1.56	0.07
21.50	3.34	1.58	0.06
22.00	3.37	1.60	0.06
22.50	3.39	1.62	0.06
23.00	3.41	1.64	0.06
23.50	3.43	1.65	0.05
24.00	**3.45**	**1.67**	0.05

Summary for Pond 22P: O-1

Inflow Area = 1.685 ac, 5.92% Impervious, Inflow Depth > 1.70" for 2-Year_Current event
Inflow = 2.66 cfs @ 12.20 hrs, Volume= 0.239 af
Primary = 2.66 cfs @ 12.20 hrs, Volume= 0.239 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 22P: O-1



Hydrograph for Pond 22P: O-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.01		0.01
8.50	0.02		0.02
9.00	0.02		0.02
9.50	0.03		0.03
10.00	0.05		0.05
10.50	0.07		0.07
11.00	0.13		0.13
11.50	0.25		0.25
12.00	**1.01**		**1.01**
12.50	**0.94**		**0.94**
13.00	0.45		0.45
13.50	0.29		0.29
14.00	0.22		0.22
14.50	0.19		0.19
15.00	0.15		0.15
15.50	0.13		0.13
16.00	0.12		0.12
16.50	0.11		0.11
17.00	0.10		0.10
17.50	0.09		0.09
18.00	0.08		0.08
18.50	0.08		0.08
19.00	0.08		0.08
19.50	0.07		0.07
20.00	0.07		0.07
20.50	0.07		0.07
21.00	0.07		0.07
21.50	0.06		0.06
22.00	0.06		0.06
22.50	0.06		0.06
23.00	0.06		0.06
23.50	0.05		0.05
24.00	0.05		0.05

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment24S: PO-DA 7 Runoff Area=73,407 sf 5.92% Impervious Runoff Depth>2.21"
Flow Length=439' Tc=11.6 min CN=WQ Runoff=3.49 cfs 0.310 af

Pond 22P: O-1 Inflow=3.49 cfs 0.310 af
Primary=3.49 cfs 0.310 af

Total Runoff Area = 1.685 ac Runoff Volume = 0.310 af Average Runoff Depth = 2.21"
94.08% Pervious = 1.585 ac 5.92% Impervious = 0.100 ac

Summary for Subcatchment 24S: PO-DA 7

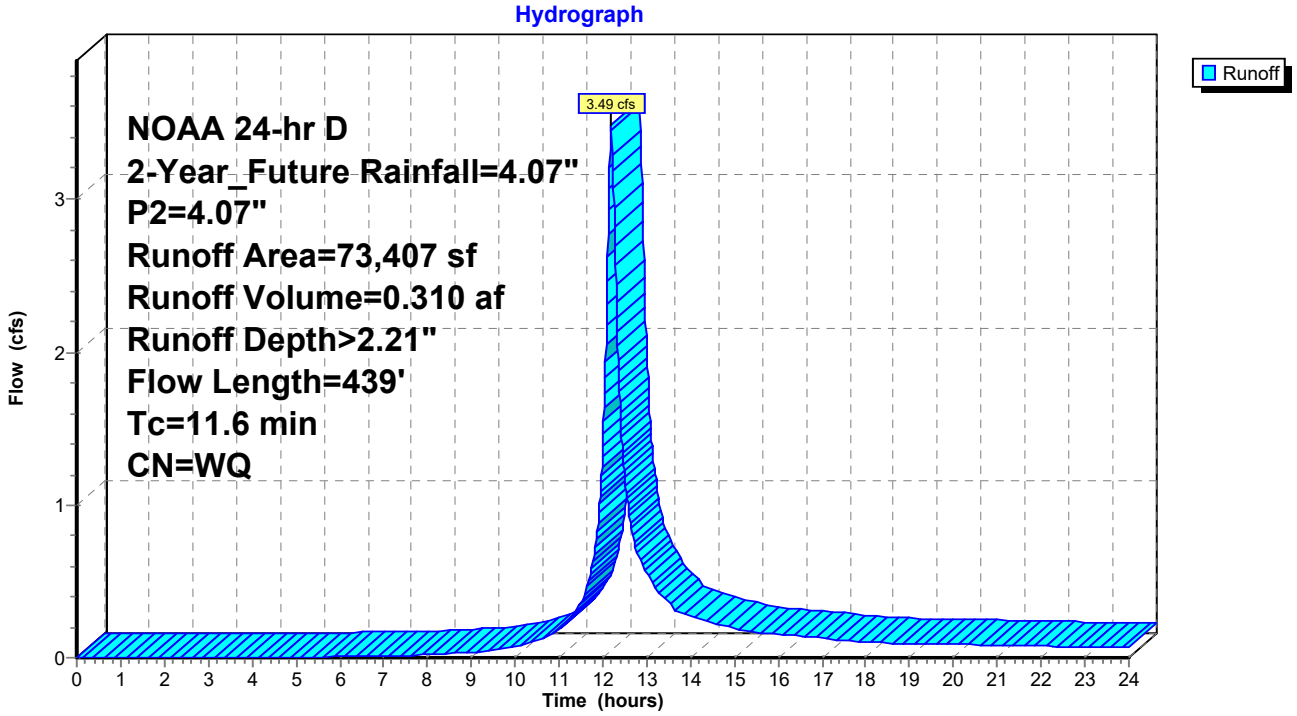
Runoff = 3.49 cfs @ 12.19 hrs, Volume= 0.310 af, Depth> 2.21"
Routed to Pond 22P : O-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	4,346	98	Impervious, Pavement, HSG D
	29,340	80	>75% Grass cover, Good, HSG D
*	22,892	85	Yard Stone/Gravel Pad, HSG D
	16,829	73	Brush, Good, HSG D
	73,407		Weighted Average
	69,061		94.08% Pervious Area
	4,346		5.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	49	0.0791	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
1.9	151	0.0071	1.36		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	239	0.0260	1.13		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	439	Total			

Subcatchment 24S: PO-DA 7



Hydrograph for Subcatchment 24S: PO-DA 7

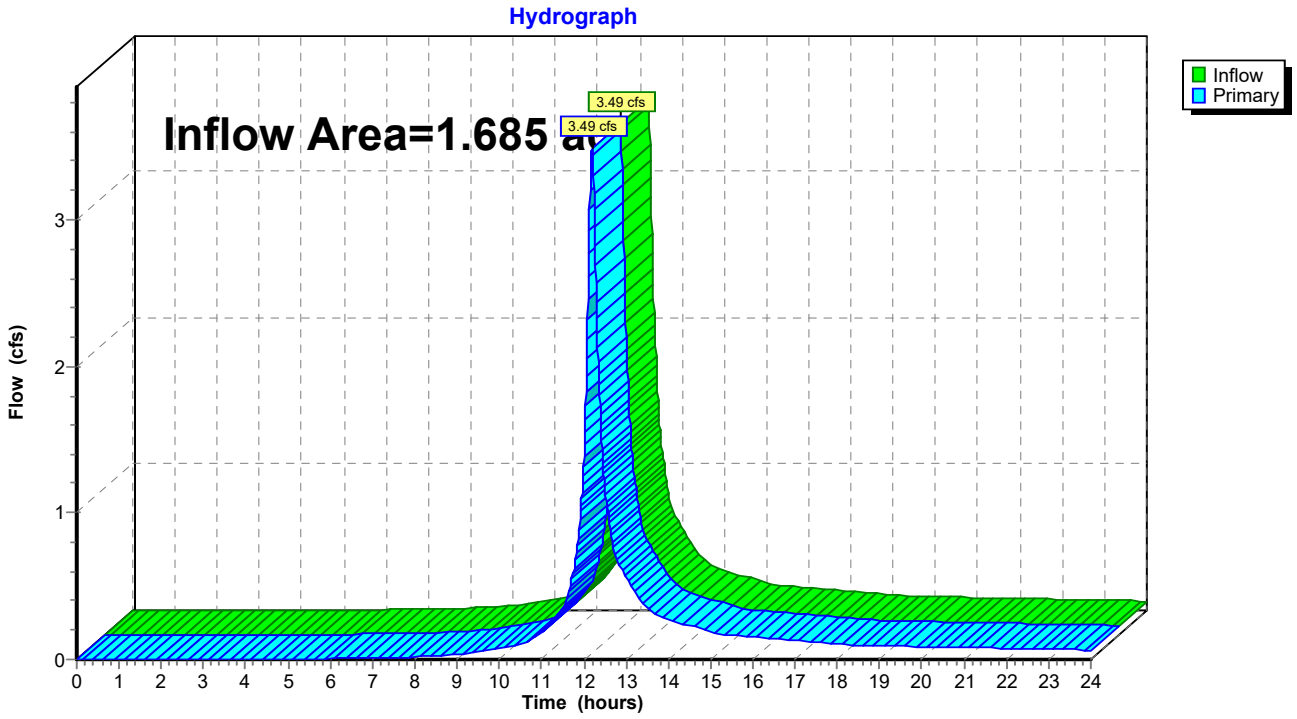
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.00	0.01
7.00	0.43	0.00	0.01
7.50	0.48	0.00	0.01
8.00	0.53	0.00	0.02
8.50	0.58	0.01	0.03
9.00	0.65	0.01	0.04
9.50	0.72	0.02	0.05
10.00	0.81	0.04	0.08
10.50	0.91	0.07	0.11
11.00	1.06	0.12	0.19
11.50	1.29	0.21	0.36
12.00	1.95	0.57	**1.39**
12.50	2.78	1.15	**1.16**
13.00	3.01	1.32	0.56
13.50	3.16	1.44	0.36
14.00	3.26	1.52	0.27
14.50	3.35	1.59	0.23
15.00	3.42	1.65	0.19
15.50	3.49	1.70	0.16
16.00	3.54	1.74	0.15
16.50	3.59	1.78	0.14
17.00	3.64	1.82	0.13
17.50	3.68	1.86	0.12
18.00	3.72	1.89	0.10
18.50	3.76	1.92	0.10
19.00	3.79	1.95	0.09
19.50	3.82	1.97	0.09
20.00	3.86	2.00	0.09
20.50	3.89	2.03	0.09
21.00	3.92	2.05	0.08
21.50	3.95	2.08	0.08
22.00	3.97	2.10	0.08
22.50	4.00	2.12	0.07
23.00	4.02	2.14	0.07
23.50	4.05	2.16	0.07
24.00	**4.07**	**2.18**	0.06

Summary for Pond 22P: O-1

Inflow Area = 1.685 ac, 5.92% Impervious, Inflow Depth > 2.21" for 2-Year_Future event
Inflow = 3.49 cfs @ 12.19 hrs, Volume= 0.310 af
Primary = 3.49 cfs @ 12.19 hrs, Volume= 0.310 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 22P: O-1



Hydrograph for Pond 22P: O-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.02		0.02
8.50	0.03		0.03
9.00	0.04		0.04
9.50	0.05		0.05
10.00	0.08		0.08
10.50	0.11		0.11
11.00	0.19		0.19
11.50	0.36		0.36
12.00	**1.39**		**1.39**
12.50	**1.16**		**1.16**
13.00	0.56		0.56
13.50	0.36		0.36
14.00	0.27		0.27
14.50	0.23		0.23
15.00	0.19		0.19
15.50	0.16		0.16
16.00	0.15		0.15
16.50	0.14		0.14
17.00	0.13		0.13
17.50	0.12		0.12
18.00	0.10		0.10
18.50	0.10		0.10
19.00	0.09		0.09
19.50	0.09		0.09
20.00	0.09		0.09
20.50	0.09		0.09
21.00	0.08		0.08
21.50	0.08		0.08
22.00	0.08		0.08
22.50	0.07		0.07
23.00	0.07		0.07
23.50	0.07		0.07
24.00	0.06		0.06

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment24S: PO-DA 7 Runoff Area=73,407 sf 5.92% Impervious Runoff Depth>3.33"
Flow Length=439' Tc=12.1 min CN=WQ Runoff=5.20 cfs 0.467 af

Pond 22P: O-1 Inflow=5.20 cfs 0.467 af
Primary=5.20 cfs 0.467 af

Total Runoff Area = 1.685 ac Runoff Volume = 0.467 af Average Runoff Depth = 3.33"
94.08% Pervious = 1.585 ac 5.92% Impervious = 0.100 ac

Summary for Subcatchment 24S: PO-DA 7

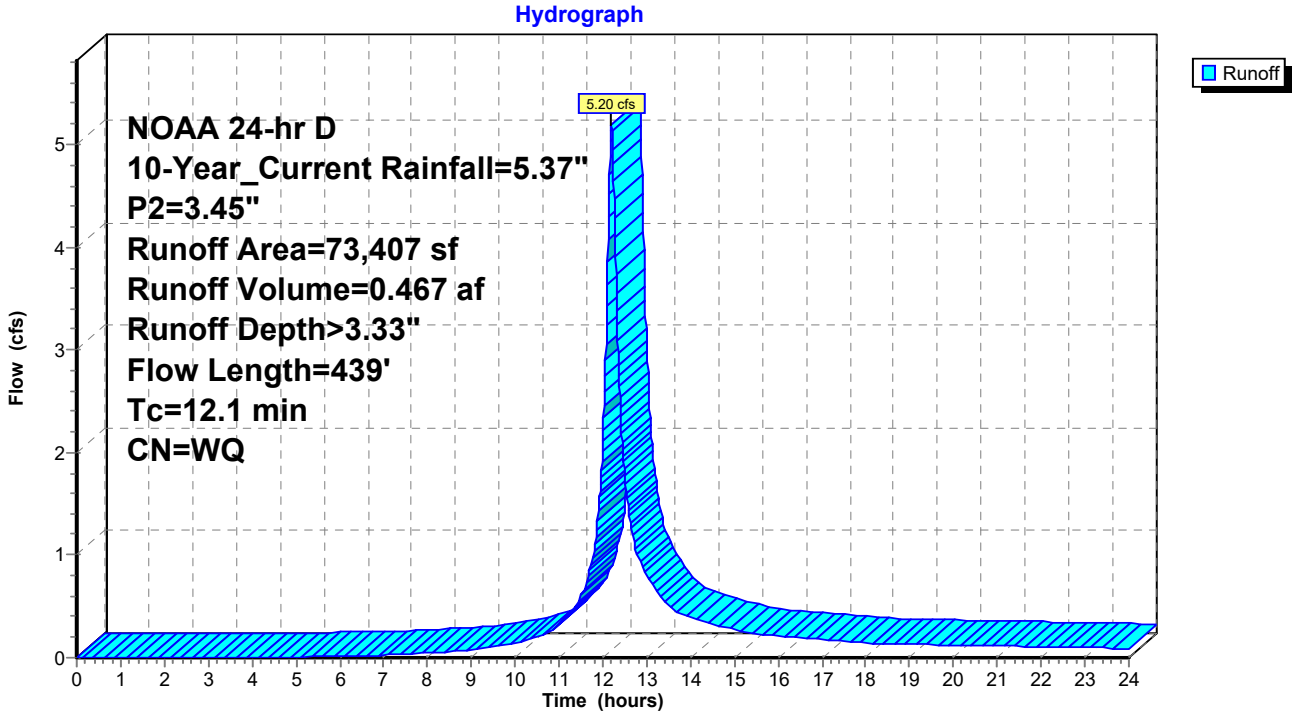
Runoff = 5.20 cfs @ 12.20 hrs, Volume= 0.467 af, Depth> 3.33"
Routed to Pond 22P : O-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	4,346	98	Impervious, Pavement, HSG D
	29,340	80	>75% Grass cover, Good, HSG D
*	22,892	85	Yard Stone/Gravel Pad, HSG D
	16,829	73	Brush, Good, HSG D
	73,407		Weighted Average
	69,061		94.08% Pervious Area
	4,346		5.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	49	0.0791	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
1.9	151	0.0071	1.36		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	239	0.0260	1.13		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
12.1	439	Total			

Subcatchment 24S: PO-DA 7



Hydrograph for Subcatchment 24S: PO-DA 7

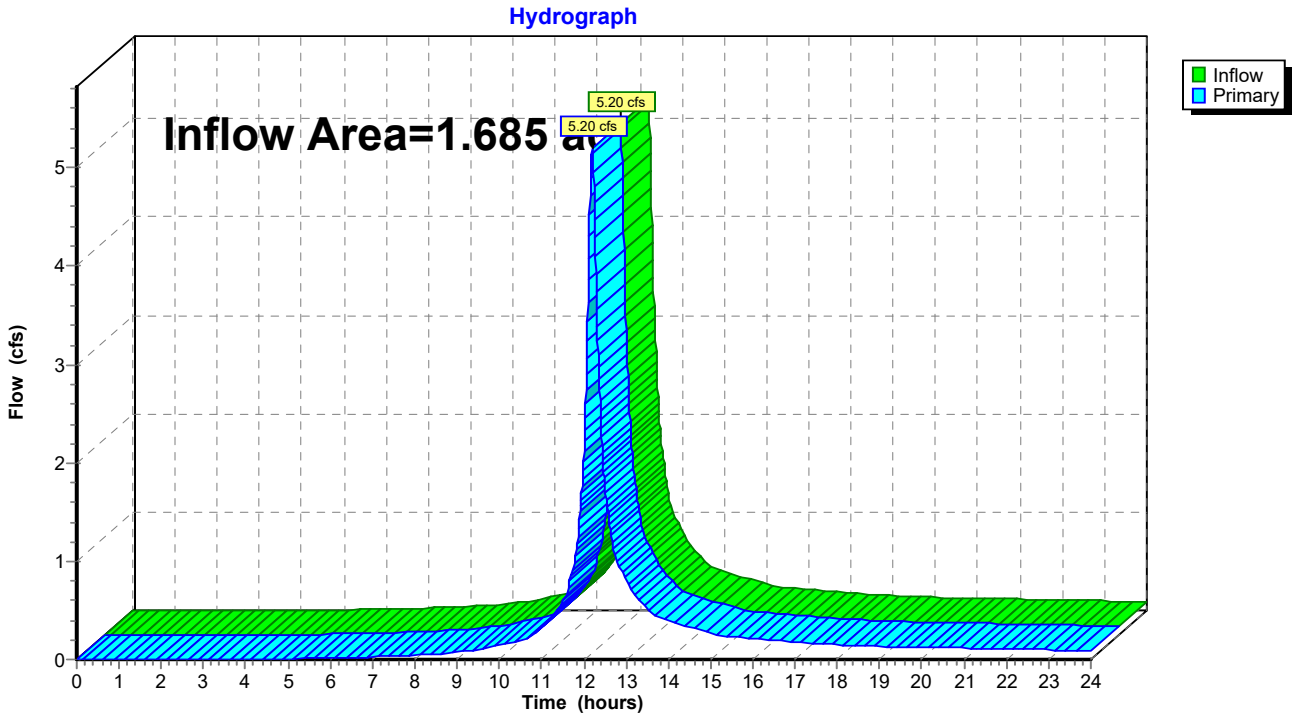
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.00	0.01
5.50	0.41	0.00	0.01
6.00	0.46	0.00	0.01
6.50	0.51	0.00	0.02
7.00	0.57	0.00	0.02
7.50	0.63	0.01	0.03
8.00	0.70	0.02	0.05
8.50	0.77	0.03	0.06
9.00	0.85	0.05	0.07
9.50	0.95	0.08	0.10
10.00	1.06	0.12	0.15
10.50	1.20	0.17	0.20
11.00	1.40	0.26	0.32
11.50	1.70	0.42	0.60
12.00	2.57	0.99	**2.11**
12.50	3.67	1.85	**1.75**
13.00	3.97	2.10	0.81
13.50	4.17	2.26	0.52
14.00	4.31	2.38	0.39
14.50	4.42	2.48	0.33
15.00	4.52	2.56	0.27
15.50	4.60	2.63	0.23
16.00	4.67	2.70	0.22
16.50	4.74	2.76	0.20
17.00	4.80	2.81	0.18
17.50	4.86	2.86	0.17
18.00	4.91	2.91	0.15
18.50	4.96	2.95	0.14
19.00	5.00	2.99	0.13
19.50	5.05	3.03	0.13
20.00	5.09	3.06	0.12
20.50	5.13	3.10	0.12
21.00	5.17	3.13	0.12
21.50	5.21	3.17	0.11
22.00	5.24	3.20	0.11
22.50	5.28	3.23	0.10
23.00	5.31	3.26	0.10
23.50	5.34	3.29	0.09
24.00	**5.37**	**3.31**	0.09

Summary for Pond 22P: O-1

Inflow Area = 1.685 ac, 5.92% Impervious, Inflow Depth > 3.33" for 10-Year_Current event
Inflow = 5.20 cfs @ 12.20 hrs, Volume= 0.467 af
Primary = 5.20 cfs @ 12.20 hrs, Volume= 0.467 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 22P: O-1



Hydrograph for Pond 22P: O-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.02		0.02
7.00	0.02		0.02
7.50	0.03		0.03
8.00	0.05		0.05
8.50	0.06		0.06
9.00	0.07		0.07
9.50	0.10		0.10
10.00	0.15		0.15
10.50	0.20		0.20
11.00	0.32		0.32
11.50	0.60		0.60
12.00	**2.11**		**2.11**
12.50	**1.75**		**1.75**
13.00	0.81		0.81
13.50	0.52		0.52
14.00	0.39		0.39
14.50	0.33		0.33
15.00	0.27		0.27
15.50	0.23		0.23
16.00	0.22		0.22
16.50	0.20		0.20
17.00	0.18		0.18
17.50	0.17		0.17
18.00	0.15		0.15
18.50	0.14		0.14
19.00	0.13		0.13
19.50	0.13		0.13
20.00	0.12		0.12
20.50	0.12		0.12
21.00	0.12		0.12
21.50	0.11		0.11
22.00	0.11		0.11
22.50	0.10		0.10
23.00	0.10		0.10
23.50	0.09		0.09
24.00	0.09		0.09

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment24S: PO-DA 7 Runoff Area=73,407 sf 5.92% Impervious Runoff Depth>4.22"
Flow Length=439' Tc=11.6 min CN=WQ Runoff=6.61 cfs 0.592 af

Pond 22P: O-1 Inflow=6.61 cfs 0.592 af
Primary=6.61 cfs 0.592 af

Total Runoff Area = 1.685 ac Runoff Volume = 0.592 af Average Runoff Depth = 4.22"
94.08% Pervious = 1.585 ac 5.92% Impervious = 0.100 ac

Summary for Subcatchment 24S: PO-DA 7

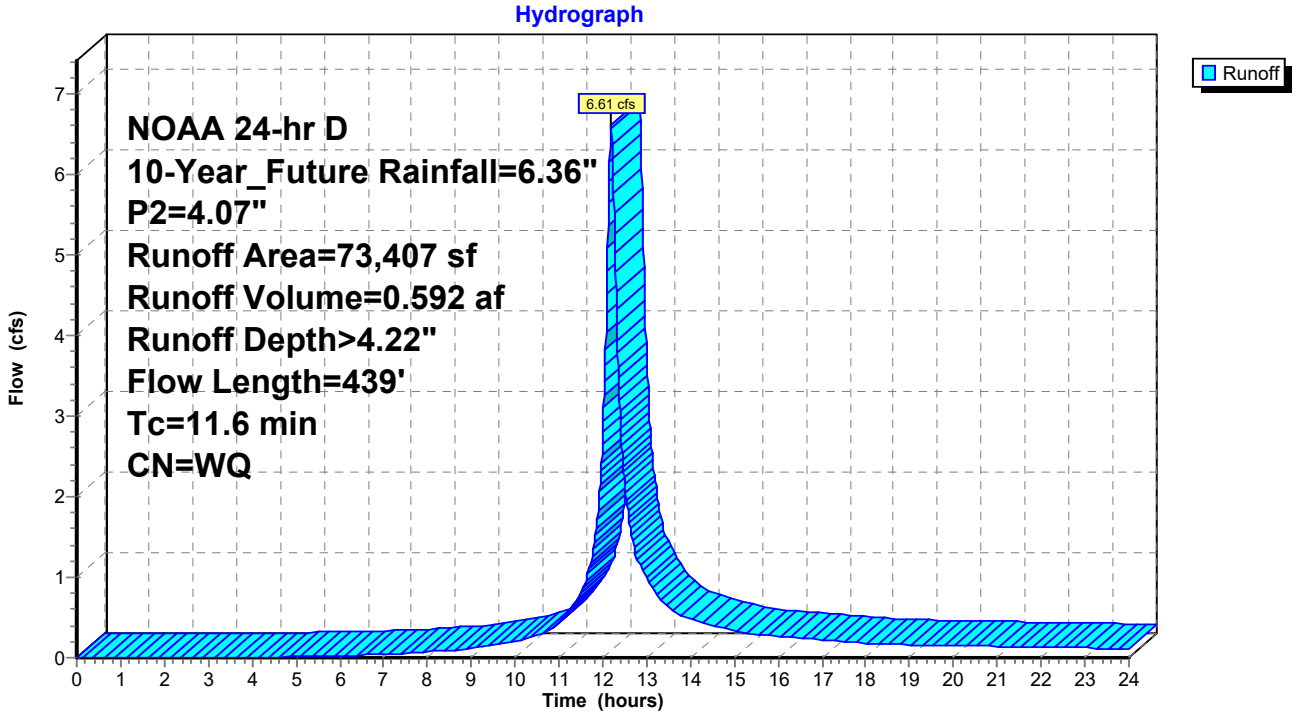
Runoff = 6.61 cfs @ 12.19 hrs, Volume= 0.592 af, Depth> 4.22"
Routed to Pond 22P : O-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	4,346	98	Impervious, Pavement, HSG D
	29,340	80	>75% Grass cover, Good, HSG D
*	22,892	85	Yard Stone/Gravel Pad, HSG D
	16,829	73	Brush, Good, HSG D
	73,407		Weighted Average
	69,061		94.08% Pervious Area
	4,346		5.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	49	0.0791	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
1.9	151	0.0071	1.36		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	239	0.0260	1.13		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	439	Total			

Subcatchment 24S: PO-DA 7



Hydrograph for Subcatchment 24S: PO-DA 7

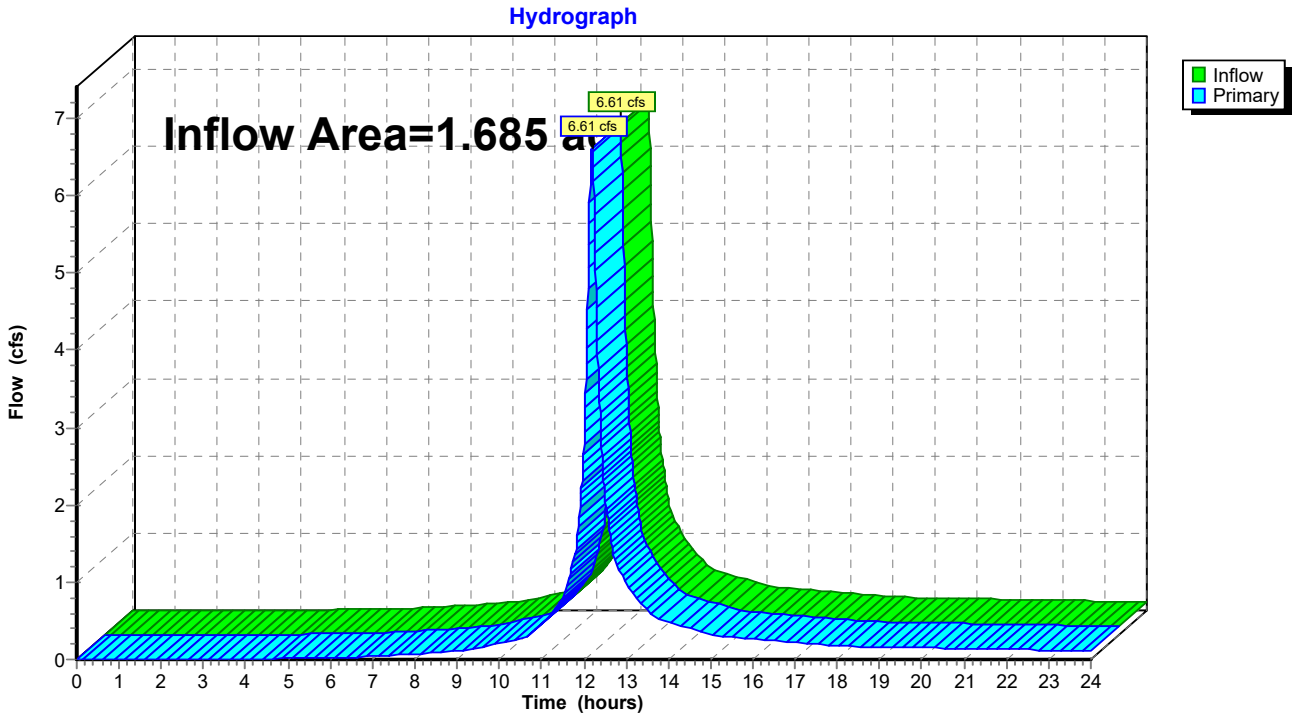
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.33	0.00	0.01
4.50	0.38	0.00	0.01
5.00	0.43	0.00	0.01
5.50	0.49	0.00	0.02
6.00	0.54	0.00	0.02
6.50	0.60	0.01	0.03
7.00	0.67	0.02	0.04
7.50	0.74	0.03	0.05
8.00	0.83	0.05	0.07
8.50	0.91	0.07	0.09
9.00	1.01	0.10	0.11
9.50	1.12	0.14	0.15
10.00	1.26	0.20	0.21
10.50	1.42	0.28	0.28
11.00	1.65	0.40	0.44
11.50	2.02	0.61	0.80
12.00	3.05	1.35	**2.79**
12.50	4.34	2.41	**2.11**
13.00	4.71	2.73	1.00
13.50	4.94	2.93	0.64
14.00	5.10	3.07	0.48
14.50	5.24	3.20	0.40
15.00	5.35	3.30	0.33
15.50	5.45	3.38	0.29
16.00	5.53	3.46	0.26
16.50	5.62	3.54	0.24
17.00	5.69	3.60	0.22
17.50	5.76	3.66	0.20
18.00	5.82	3.72	0.18
18.50	5.87	3.77	0.17
19.00	5.93	3.82	0.16
19.50	5.98	3.86	0.16
20.00	6.03	3.91	0.15
20.50	6.07	3.95	0.15
21.00	6.12	3.99	0.14
21.50	6.16	4.03	0.14
22.00	6.21	4.07	0.13
22.50	6.25	4.11	0.13
23.00	6.29	4.15	0.12
23.50	6.32	4.18	0.11
24.00	**6.36**	**4.21**	0.11

Summary for Pond 22P: O-1

Inflow Area = 1.685 ac, 5.92% Impervious, Inflow Depth > 4.22" for 10-Year_Future event
Inflow = 6.61 cfs @ 12.19 hrs, Volume= 0.592 af
Primary = 6.61 cfs @ 12.19 hrs, Volume= 0.592 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 22P: O-1



Hydrograph for Pond 22P: O-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.02		0.02
6.00	0.02		0.02
6.50	0.03		0.03
7.00	0.04		0.04
7.50	0.05		0.05
8.00	0.07		0.07
8.50	0.09		0.09
9.00	0.11		0.11
9.50	0.15		0.15
10.00	0.21		0.21
10.50	0.28		0.28
11.00	0.44		0.44
11.50	0.80		0.80
12.00	**2.79**		**2.79**
12.50	**2.11**		**2.11**
13.00	1.00		1.00
13.50	0.64		0.64
14.00	0.48		0.48
14.50	0.40		0.40
15.00	0.33		0.33
15.50	0.29		0.29
16.00	0.26		0.26
16.50	0.24		0.24
17.00	0.22		0.22
17.50	0.20		0.20
18.00	0.18		0.18
18.50	0.17		0.17
19.00	0.16		0.16
19.50	0.16		0.16
20.00	0.15		0.15
20.50	0.15		0.15
21.00	0.14		0.14
21.50	0.14		0.14
22.00	0.13		0.13
22.50	0.13		0.13
23.00	0.12		0.12
23.50	0.11		0.11
24.00	0.11		0.11

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment24S: PO-DA 7 Runoff Area=73,407 sf 5.92% Impervious Runoff Depth>6.89"
Flow Length=439' Tc=12.1 min CN=WQ Runoff=10.52 cfs 0.968 af

Pond 22P: O-1 Inflow=10.52 cfs 0.968 af
Primary=10.52 cfs 0.968 af

Total Runoff Area = 1.685 ac Runoff Volume = 0.968 af Average Runoff Depth = 6.89"
94.08% Pervious = 1.585 ac 5.92% Impervious = 0.100 ac

Summary for Subcatchment 24S: PO-DA 7

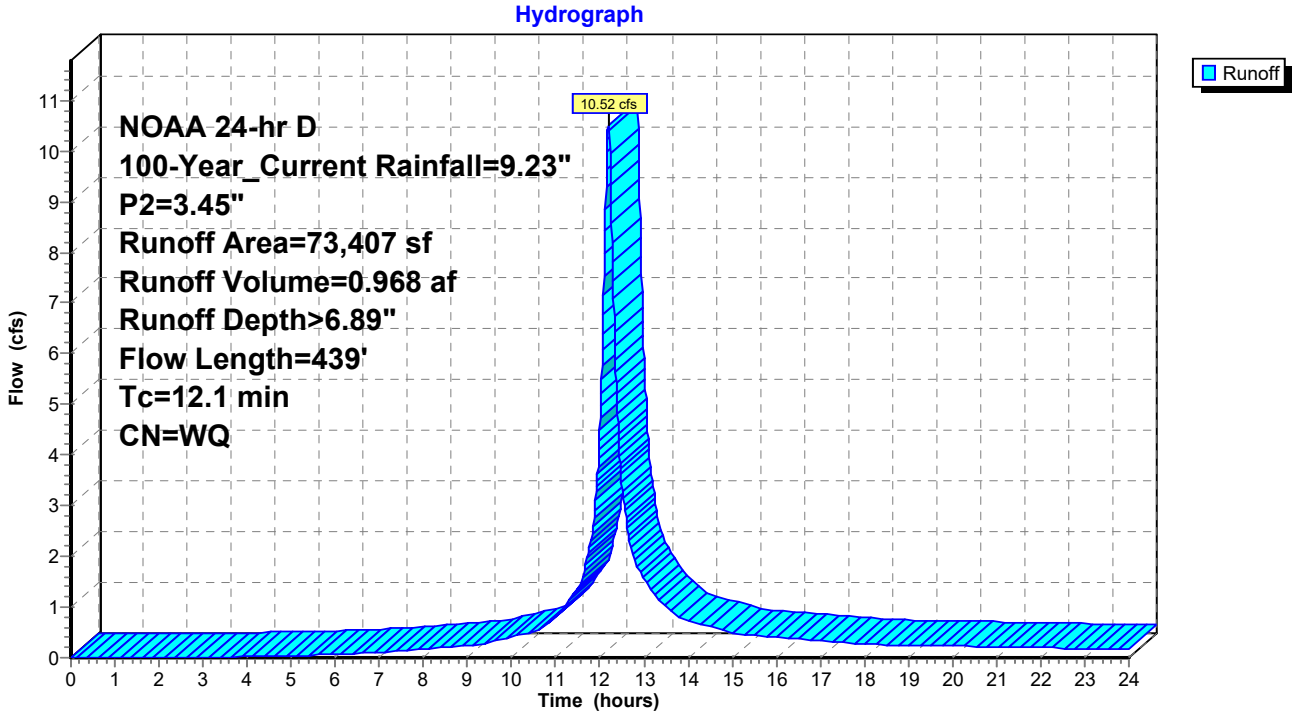
Runoff = 10.52 cfs @ 12.19 hrs, Volume= 0.968 af, Depth> 6.89"
Routed to Pond 22P : O-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	4,346	98	Impervious, Pavement, HSG D
	29,340	80	>75% Grass cover, Good, HSG D
*	22,892	85	Yard Stone/Gravel Pad, HSG D
	16,829	73	Brush, Good, HSG D
	73,407		Weighted Average
	69,061		94.08% Pervious Area
	4,346		5.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	49	0.0791	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
1.9	151	0.0071	1.36		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	239	0.0260	1.13		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
12.1	439	Total			

Subcatchment 24S: PO-DA 7



Hydrograph for Subcatchment 24S: PO-DA 7

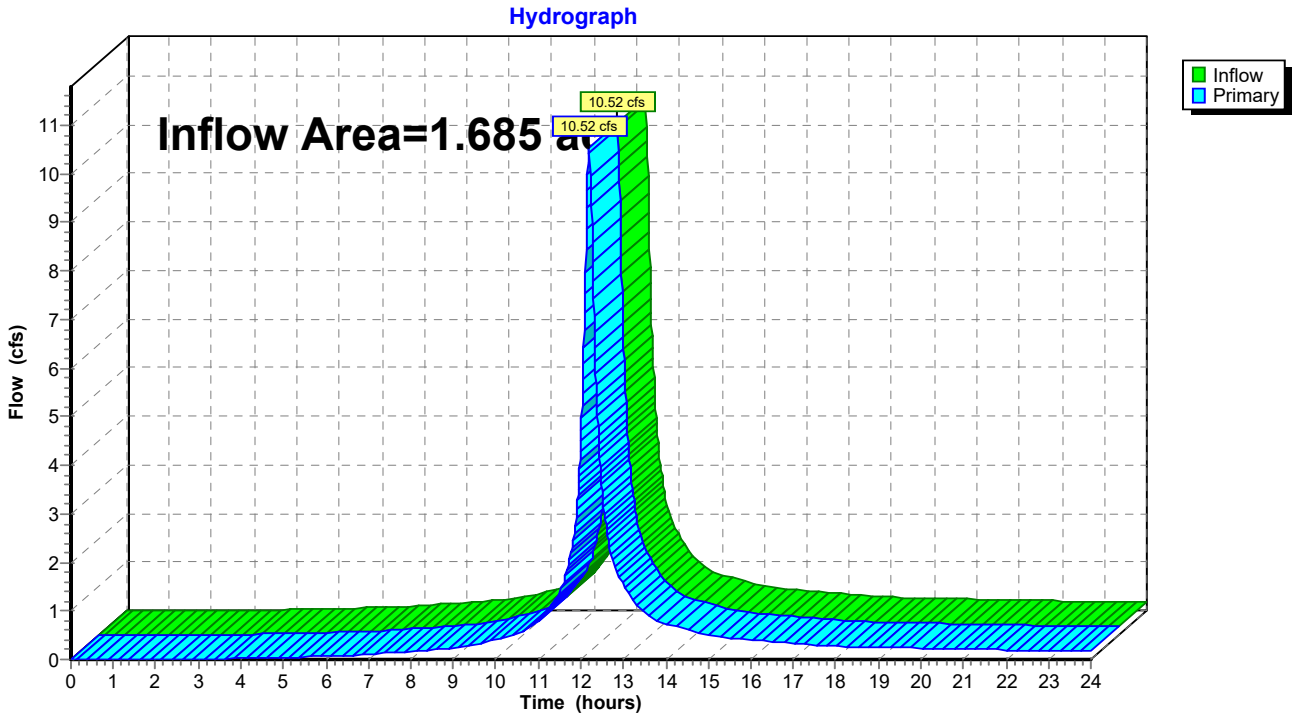
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.01
2.50	0.28	0.00	0.01
3.00	0.35	0.00	0.01
3.50	0.41	0.00	0.01
4.00	0.48	0.00	0.02
4.50	0.56	0.00	0.03
5.00	0.63	0.01	0.04
5.50	0.71	0.02	0.05
6.00	0.79	0.04	0.06
6.50	0.88	0.06	0.08
7.00	0.97	0.09	0.11
7.50	1.08	0.13	0.14
8.00	1.20	0.17	0.17
8.50	1.33	0.23	0.20
9.00	1.46	0.30	0.24
9.50	1.63	0.38	0.31
10.00	1.83	0.50	0.41
10.50	2.07	0.65	0.52
11.00	2.40	0.87	0.80
11.50	2.93	1.26	1.38
12.00	4.42	2.48	**4.50**
12.50	6.30	4.16	**3.41**
13.00	6.83	4.65	1.55
13.50	7.16	4.96	0.99
14.00	7.40	5.18	0.74
14.50	7.60	5.37	0.62
15.00	7.77	5.52	0.51
15.50	7.90	5.65	0.44
16.00	8.03	5.77	0.40
16.50	8.15	5.88	0.37
17.00	8.26	5.99	0.34
17.50	8.35	6.08	0.31
18.00	8.44	6.16	0.27
18.50	8.52	6.24	0.25
19.00	8.60	6.31	0.25
19.50	8.67	6.38	0.24
20.00	8.75	6.45	0.23
20.50	8.82	6.52	0.22
21.00	8.88	6.58	0.21
21.50	8.95	6.64	0.21
22.00	9.01	6.70	0.20
22.50	9.07	6.76	0.19
23.00	9.12	6.81	0.18
23.50	9.18	6.86	0.17
24.00	**9.23**	**6.91**	0.17

Summary for Pond 22P: O-1

Inflow Area = 1.685 ac, 5.92% Impervious, Inflow Depth > 6.89" for 100-Year_Current event
Inflow = 10.52 cfs @ 12.19 hrs, Volume= 0.968 af
Primary = 10.52 cfs @ 12.19 hrs, Volume= 0.968 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 22P: O-1



Hydrograph for Pond 22P: O-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.02		0.02
4.50	0.03		0.03
5.00	0.04		0.04
5.50	0.05		0.05
6.00	0.06		0.06
6.50	0.08		0.08
7.00	0.11		0.11
7.50	0.14		0.14
8.00	0.17		0.17
8.50	0.20		0.20
9.00	0.24		0.24
9.50	0.31		0.31
10.00	0.41		0.41
10.50	0.52		0.52
11.00	0.80		0.80
11.50	1.38		1.38
12.00	**4.50**		**4.50**
12.50	**3.41**		**3.41**
13.00	1.55		1.55
13.50	0.99		0.99
14.00	0.74		0.74
14.50	0.62		0.62
15.00	0.51		0.51
15.50	0.44		0.44
16.00	0.40		0.40
16.50	0.37		0.37
17.00	0.34		0.34
17.50	0.31		0.31
18.00	0.27		0.27
18.50	0.25		0.25
19.00	0.25		0.25
19.50	0.24		0.24
20.00	0.23		0.23
20.50	0.22		0.22
21.00	0.21		0.21
21.50	0.21		0.21
22.00	0.20		0.20
22.50	0.19		0.19
23.00	0.18		0.18
23.50	0.17		0.17
24.00	0.17		0.17

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment24S: PO-DA 7 Runoff Area=73,407 sf 5.92% Impervious Runoff Depth>9.14"
Flow Length=439' Tc=11.6 min CN=WQ Runoff=13.89 cfs 1.284 af

Pond 22P: O-1 Inflow=13.89 cfs 1.284 af
Primary=13.89 cfs 1.284 af

Total Runoff Area = 1.685 ac Runoff Volume = 1.284 af Average Runoff Depth = 9.14"
94.08% Pervious = 1.585 ac 5.92% Impervious = 0.100 ac

Summary for Subcatchment 24S: PO-DA 7

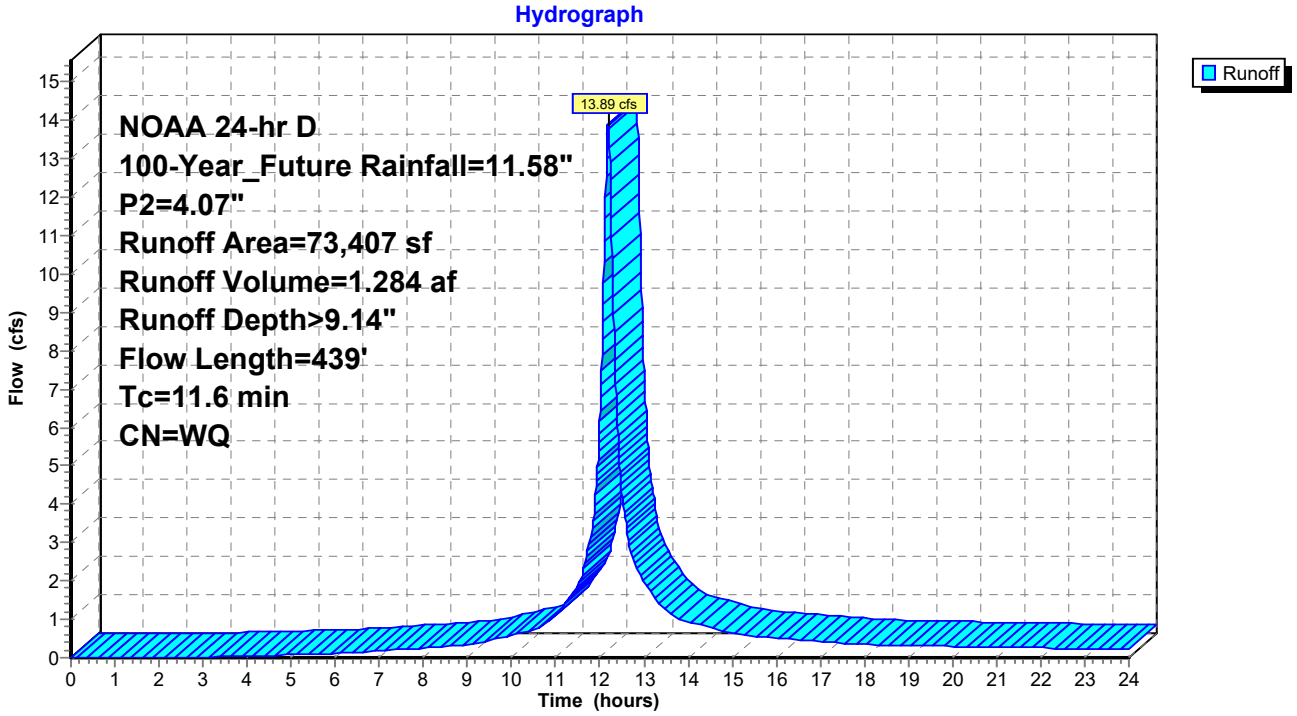
Runoff = 13.89 cfs @ 12.19 hrs, Volume= 1.284 af, Depth> 9.14"
Routed to Pond 22P : O-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	4,346	98	Impervious, Pavement, HSG D
	29,340	80	>75% Grass cover, Good, HSG D
*	22,892	85	Yard Stone/Gravel Pad, HSG D
	16,829	73	Brush, Good, HSG D
	73,407		Weighted Average
	69,061		94.08% Pervious Area
	4,346		5.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	49	0.0791	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
1.9	151	0.0071	1.36		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	239	0.0260	1.13		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	439	Total			

Subcatchment 24S: PO-DA 7



Hydrograph for Subcatchment 24S: PO-DA 7

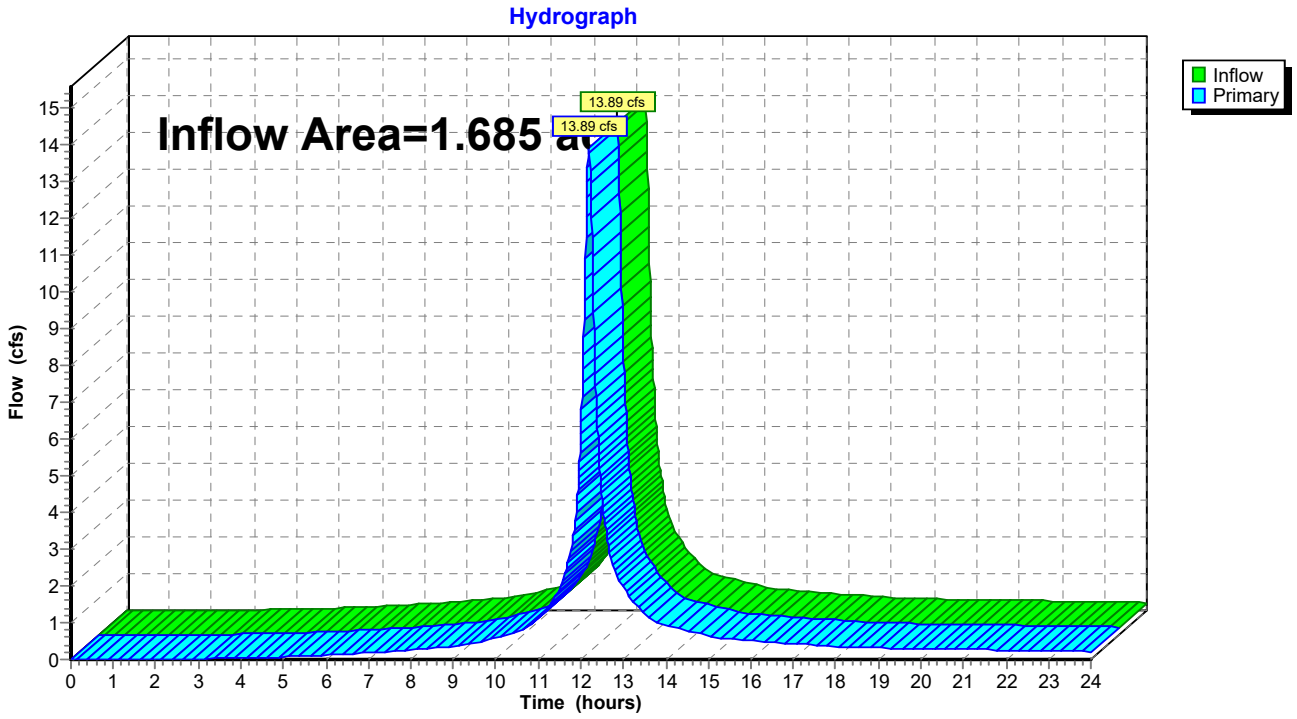
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.01
2.00	0.28	0.00	0.01
2.50	0.36	0.00	0.01
3.00	0.44	0.00	0.02
3.50	0.52	0.00	0.03
4.00	0.61	0.01	0.04
4.50	0.70	0.02	0.06
5.00	0.79	0.04	0.08
5.50	0.89	0.06	0.09
6.00	0.99	0.09	0.11
6.50	1.10	0.13	0.14
7.00	1.22	0.18	0.18
7.50	1.35	0.24	0.22
8.00	1.50	0.32	0.26
8.50	1.66	0.40	0.30
9.00	1.84	0.50	0.35
9.50	2.04	0.63	0.45
10.00	2.30	0.80	0.58
10.50	2.59	1.01	0.73
11.00	3.01	1.32	1.12
11.50	3.67	1.85	1.90
12.00	5.55	3.47	**6.15**
12.50	7.91	5.66	**4.29**
13.00	8.57	6.28	1.99
13.50	8.99	6.68	1.27
14.00	9.28	6.96	0.94
14.50	9.54	7.20	0.80
15.00	9.74	7.40	0.65
15.50	9.92	7.57	0.56
16.00	10.08	7.72	0.52
16.50	10.23	7.86	0.48
17.00	10.36	7.99	0.43
17.50	10.48	8.11	0.39
18.00	10.59	8.22	0.35
18.50	10.69	8.31	0.33
19.00	10.79	8.41	0.31
19.50	10.88	8.50	0.30
20.00	10.97	8.59	0.29
20.50	11.06	8.67	0.28
21.00	11.14	8.75	0.27
21.50	11.22	8.83	0.26
22.00	11.30	8.90	0.25
22.50	11.38	8.98	0.24
23.00	11.45	9.05	0.23
23.50	11.52	9.11	0.22
24.00	**11.58**	**9.17**	0.21

Summary for Pond 22P: O-1

Inflow Area = 1.685 ac, 5.92% Impervious, Inflow Depth > 9.14" for 100-Year_Future event
Inflow = 13.89 cfs @ 12.19 hrs, Volume= 1.284 af
Primary = 13.89 cfs @ 12.19 hrs, Volume= 1.284 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 22P: O-1

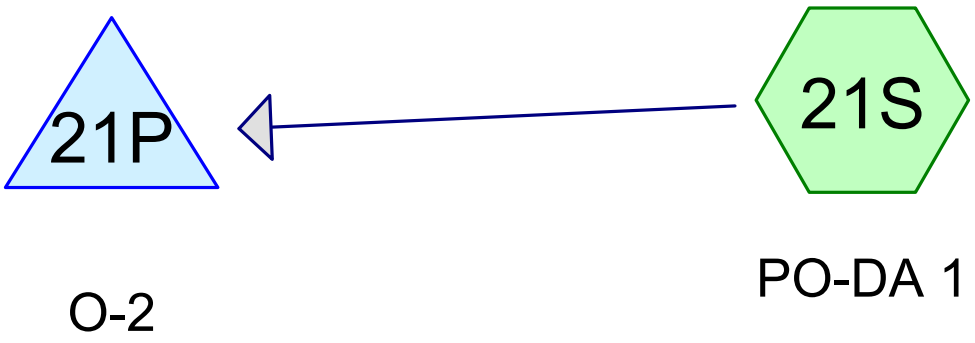


Hydrograph for Pond 22P: O-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.01		0.01
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.02		0.02
3.50	0.03		0.03
4.00	0.04		0.04
4.50	0.06		0.06
5.00	0.08		0.08
5.50	0.09		0.09
6.00	0.11		0.11
6.50	0.14		0.14
7.00	0.18		0.18
7.50	0.22		0.22
8.00	0.26		0.26
8.50	0.30		0.30
9.00	0.35		0.35
9.50	0.45		0.45
10.00	0.58		0.58
10.50	0.73		0.73
11.00	1.12		1.12
11.50	1.90		1.90
12.00	**6.15**		**6.15**
12.50	**4.29**		**4.29**
13.00	1.99		1.99
13.50	1.27		1.27
14.00	0.94		0.94
14.50	0.80		0.80
15.00	0.65		0.65
15.50	0.56		0.56
16.00	0.52		0.52
16.50	0.48		0.48
17.00	0.43		0.43
17.50	0.39		0.39
18.00	0.35		0.35
18.50	0.33		0.33
19.00	0.31		0.31
19.50	0.30		0.30
20.00	0.29		0.29
20.50	0.28		0.28
21.00	0.27		0.27
21.50	0.26		0.26
22.00	0.25		0.25
22.50	0.24		0.24
23.00	0.23		0.23
23.50	0.22		0.22
24.00	0.21		0.21

APPENDIX B.3- PRE-DEVELOPED OUTFALL = O-2

PRE-DEVELOPED:
OUTFALL = O-2



Subcat Reach Pond Link

Routing Diagram for West Orange HydroCAD_Pre
Prepared by Burns & McDonnell, Printed 5/13/2024
HydroCAD® 10.20-4b s/n 08510 © 2023 HydroCAD Software Solutions LLC

West Orange HydroCAD_Pre
Prepared by Burns & McDonnell
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
2	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
3	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
4	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
5	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
6	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.448	80	>75% Grass cover, Good, HSG D (21S)
0.531	73	Brush, Good, HSG D (21S)
0.181	98	Impervious, Pavement, HSG D (21S)
0.053	85	Yard Stone/Gravel Pad, HSG D (21S)
1.212	**80**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.212	HSG D	21S
0.000	Other	
1.212		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.448	0.000	0.448	>75% Grass cover, Good	21S
0.000	0.000	0.000	0.531	0.000	0.531	Brush, Good	21S
0.000	0.000	0.000	0.181	0.000	0.181	Impervious, Pavement	21S
0.000	0.000	0.000	0.053	0.000	0.053	Yard Stone/Gravel Pad	21S
0.000	**0.000**	**0.000**	**1.212**	**0.000**	**1.212**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment21S: PO-DA 1 Runoff Area=52,807 sf 14.94% Impervious Runoff Depth>1.66"
Flow Length=341' Tc=3.7 min CN=WQ Runoff=2.45 cfs 0.167 af

Pond 21P: O-2 Inflow=2.45 cfs 0.167 af
Primary=2.45 cfs 0.167 af

Total Runoff Area = 1.212 ac Runoff Volume = 0.167 af Average Runoff Depth = 1.66"
85.06% Pervious = 1.031 ac 14.94% Impervious = 0.181 ac

Summary for Subcatchment 21S: PO-DA 1

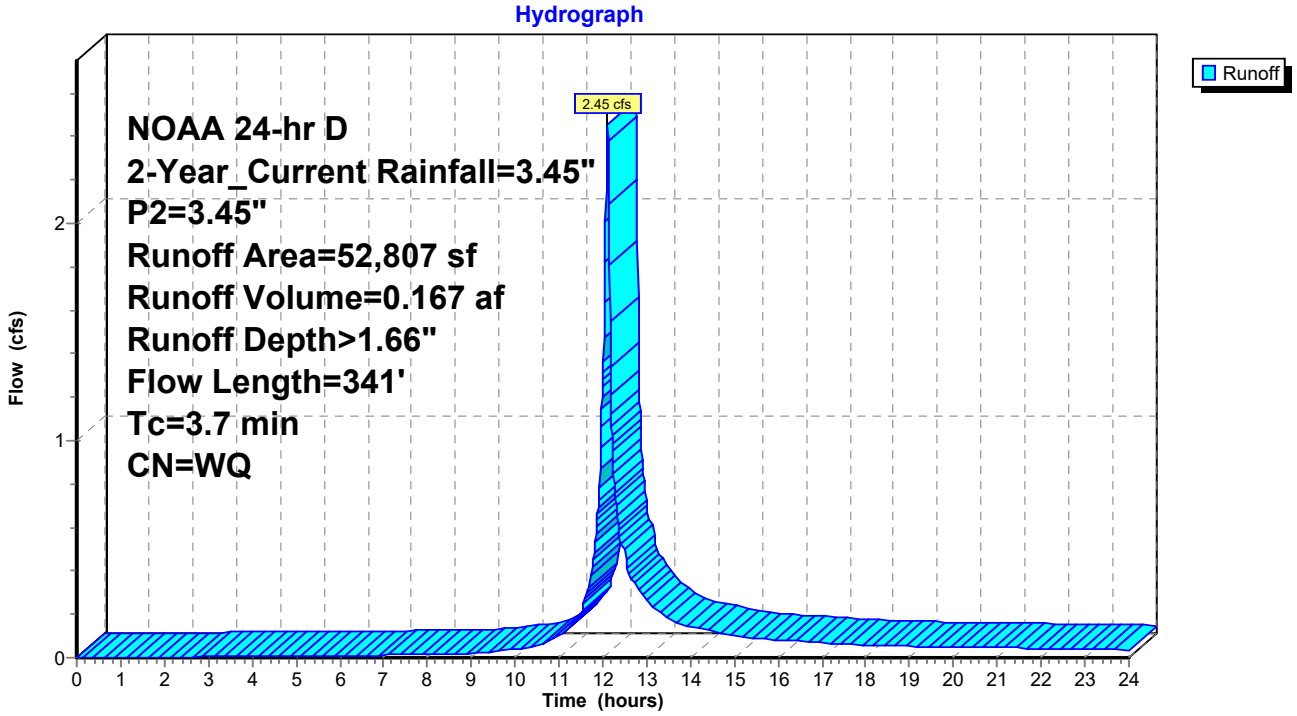
Runoff = 2.45 cfs @ 12.11 hrs, Volume= 0.167 af, Depth> 1.66"
Routed to Pond 21P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	7,888	98	Impervious, Pavement, HSG D
	19,498	80	>75% Grass cover, Good, HSG D
*	2,304	85	Yard Stone/Gravel Pad, HSG D
	23,117	73	Brush, Good, HSG D
	52,807		Weighted Average
	44,919		85.06% Pervious Area
	7,888		14.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	23	0.0352	1.33		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.45"
0.2	31	0.2437	2.47		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.2	287	0.0462	1.50		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.7	341	Total			

Subcatchment 21S: PO-DA 1



Hydrograph for Subcatchment 21S: PO-DA 1

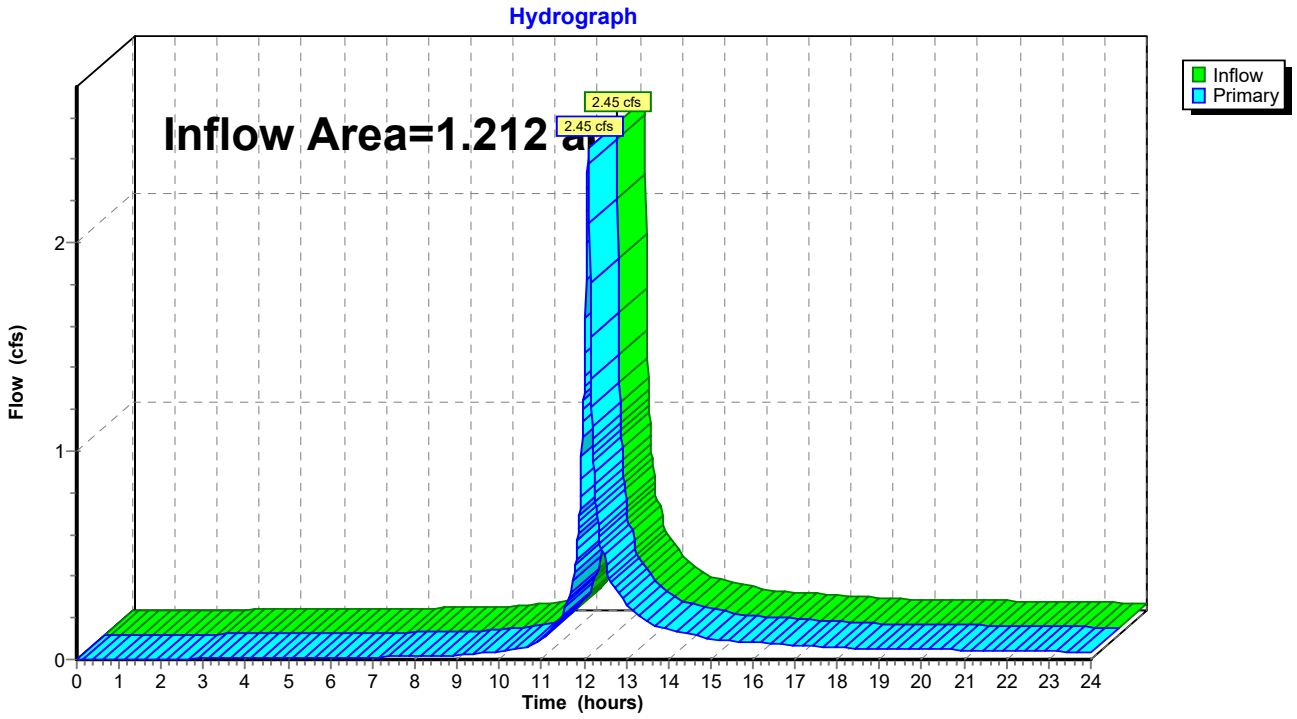
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.01
4.00	0.18	0.00	0.01
4.50	0.21	0.00	0.01
5.00	0.24	0.00	0.01
5.50	0.26	0.00	0.01
6.00	0.29	0.00	0.01
6.50	0.33	0.00	0.01
7.00	0.36	0.00	0.01
7.50	0.40	0.00	0.01
8.00	0.45	0.00	0.02
8.50	0.50	0.00	0.02
9.00	0.55	0.00	0.02
9.50	0.61	0.00	0.03
10.00	0.68	0.01	0.04
10.50	0.77	0.03	0.05
11.00	0.90	0.05	0.10
11.50	1.09	0.11	0.20
12.00	1.65	0.36	**1.28**
12.50	2.36	0.79	**0.50**
13.00	2.55	0.93	0.27
13.50	2.68	1.01	0.18
14.00	2.77	1.08	0.14
14.50	2.84	1.13	0.12
15.00	2.90	1.18	0.10
15.50	2.95	1.22	0.09
16.00	3.00	1.25	0.08
16.50	3.05	1.28	0.08
17.00	3.09	1.32	0.07
17.50	3.12	1.34	0.06
18.00	3.16	1.37	0.06
18.50	3.19	1.39	0.05
19.00	3.21	1.41	0.05
19.50	3.24	1.43	0.05
20.00	3.27	1.46	0.05
20.50	3.29	1.48	0.05
21.00	3.32	1.49	0.05
21.50	3.34	1.51	0.04
22.00	3.37	1.53	0.04
22.50	3.39	1.55	0.04
23.00	3.41	1.57	0.04
23.50	3.43	1.58	0.04
24.00	**3.45**	**1.60**	0.04

Summary for Pond 21P: O-2

Inflow Area = 1.212 ac, 14.94% Impervious, Inflow Depth > 1.66" for 2-Year_Current event
Inflow = 2.45 cfs @ 12.11 hrs, Volume= 0.167 af
Primary = 2.45 cfs @ 12.11 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 21P: O-2



Hydrograph for Pond 21P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.02		0.02
8.50	0.02		0.02
9.00	0.02		0.02
9.50	0.03		0.03
10.00	0.04		0.04
10.50	0.05		0.05
11.00	0.10		0.10
11.50	0.20		0.20
12.00	**1.28**		**1.28**
12.50	**0.50**		**0.50**
13.00	0.27		0.27
13.50	0.18		0.18
14.00	0.14		0.14
14.50	0.12		0.12
15.00	0.10		0.10
15.50	0.09		0.09
16.00	0.08		0.08
16.50	0.08		0.08
17.00	0.07		0.07
17.50	0.06		0.06
18.00	0.06		0.06
18.50	0.05		0.05
19.00	0.05		0.05
19.50	0.05		0.05
20.00	0.05		0.05
20.50	0.05		0.05
21.00	0.05		0.05
21.50	0.04		0.04
22.00	0.04		0.04
22.50	0.04		0.04
23.00	0.04		0.04
23.50	0.04		0.04
24.00	0.04		0.04

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment21S: PO-DA 1 Runoff Area=52,807 sf 14.94% Impervious Runoff Depth>2.15"
Flow Length=341' Tc=3.7 min CN=WQ Runoff=3.19 cfs 0.217 af

Pond 21P: O-2 Inflow=3.19 cfs 0.217 af
Primary=3.19 cfs 0.217 af

Total Runoff Area = 1.212 ac Runoff Volume = 0.217 af Average Runoff Depth = 2.15"
85.06% Pervious = 1.031 ac 14.94% Impervious = 0.181 ac

Summary for Subcatchment 21S: PO-DA 1

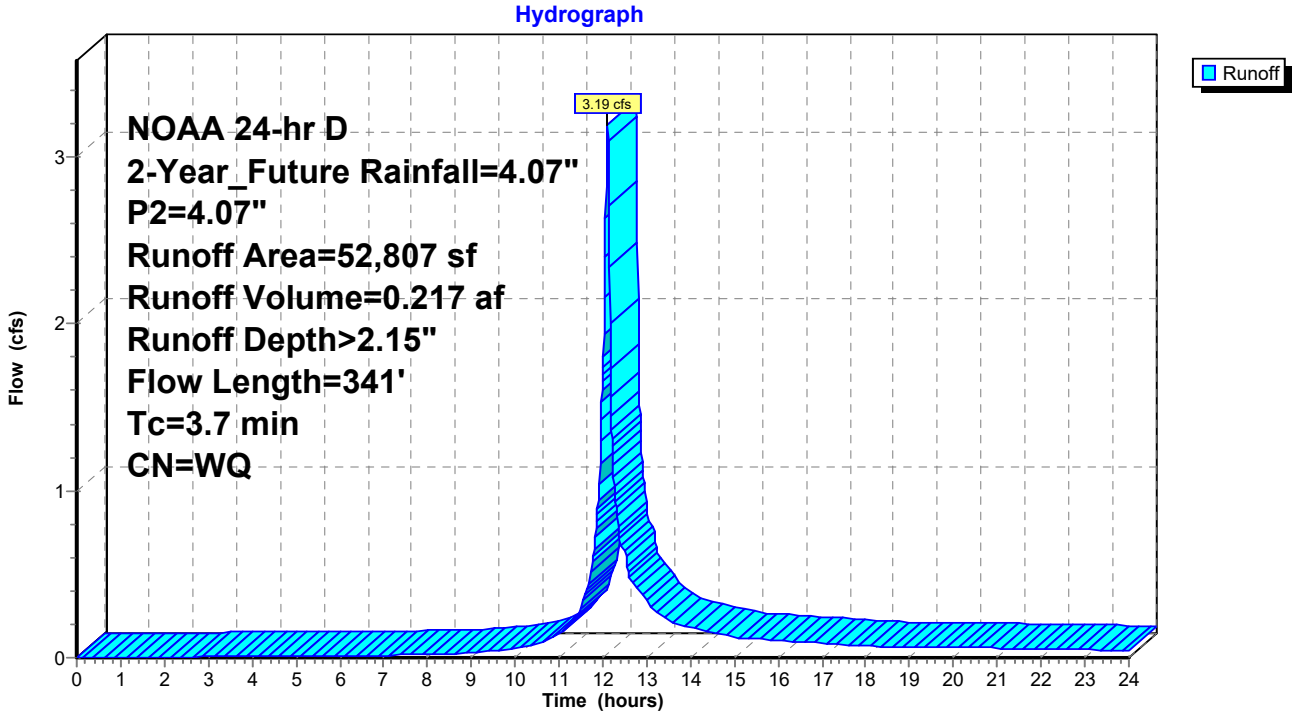
Runoff = 3.19 cfs @ 12.11 hrs, Volume= 0.217 af, Depth> 2.15"
Routed to Pond 21P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	7,888	98	Impervious, Pavement, HSG D
	19,498	80	>75% Grass cover, Good, HSG D
*	2,304	85	Yard Stone/Gravel Pad, HSG D
	23,117	73	Brush, Good, HSG D
	52,807		Weighted Average
	44,919		85.06% Pervious Area
	7,888		14.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	23	0.0352	1.45		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 4.07"
0.2	31	0.2437	2.47		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.2	287	0.0462	1.50		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.7	341	Total			

Subcatchment 21S: PO-DA 1



Hydrograph for Subcatchment 21S: PO-DA 1

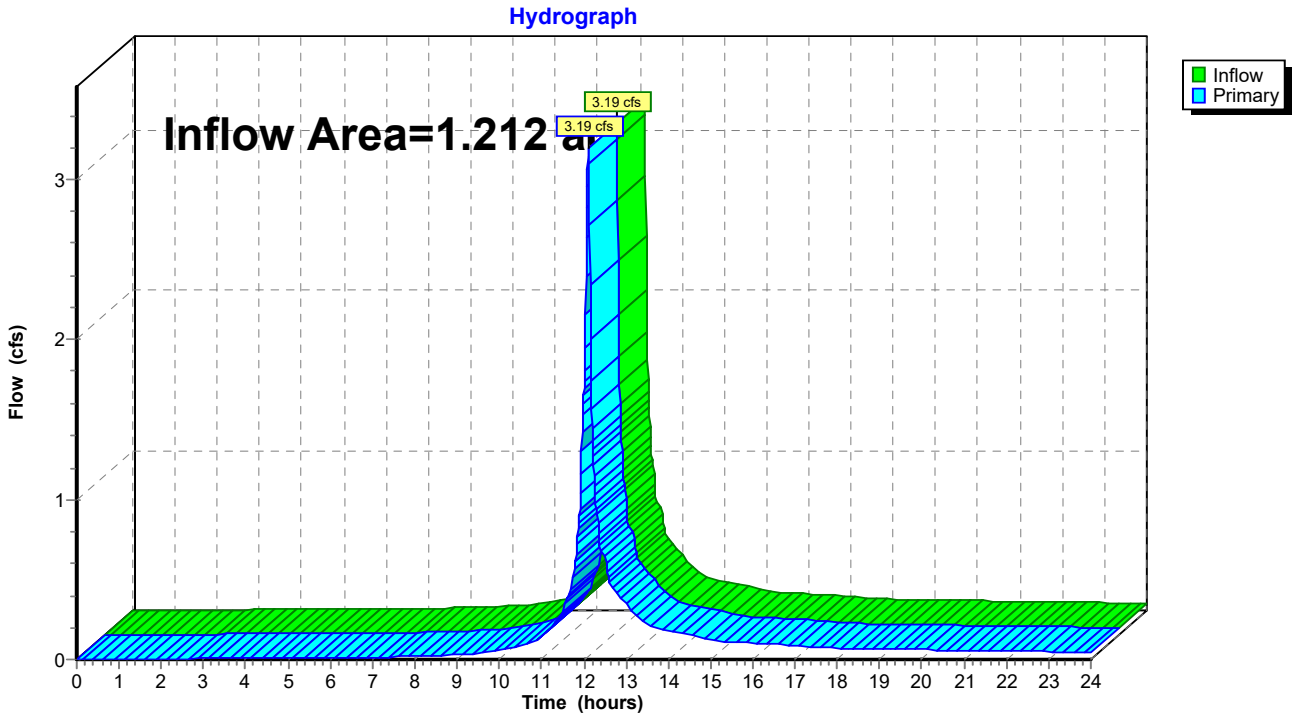
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.01
3.50	0.18	0.00	0.01
4.00	0.21	0.00	0.01
4.50	0.25	0.00	0.01
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.00	0.01
7.00	0.43	0.00	0.01
7.50	0.48	0.00	0.02
8.00	0.53	0.00	0.02
8.50	0.58	0.00	0.02
9.00	0.65	0.01	0.03
9.50	0.72	0.02	0.04
10.00	0.81	0.03	0.06
10.50	0.91	0.06	0.08
11.00	1.06	0.10	0.14
11.50	1.29	0.19	0.28
12.00	1.95	0.53	**1.70**
12.50	2.78	1.09	**0.64**
13.00	3.01	1.26	0.34
13.50	3.16	1.37	0.23
14.00	3.26	1.45	0.18
14.50	3.35	1.52	0.15
15.00	3.42	1.58	0.12
15.50	3.49	1.62	0.11
16.00	3.54	1.67	0.10
16.50	3.59	1.71	0.10
17.00	3.64	1.75	0.09
17.50	3.68	1.78	0.08
18.00	3.72	1.81	0.07
18.50	3.76	1.84	0.07
19.00	3.79	1.87	0.07
19.50	3.82	1.90	0.06
20.00	3.86	1.92	0.06
20.50	3.89	1.95	0.06
21.00	3.92	1.97	0.06
21.50	3.95	2.00	0.05
22.00	3.97	2.02	0.05
22.50	4.00	2.04	0.05
23.00	4.02	2.06	0.05
23.50	4.05	2.08	0.05
24.00	**4.07**	**2.10**	0.04

Summary for Pond 21P: O-2

Inflow Area = 1.212 ac, 14.94% Impervious, Inflow Depth > 2.15" for 2-Year_Future event
Inflow = 3.19 cfs @ 12.11 hrs, Volume= 0.217 af
Primary = 3.19 cfs @ 12.11 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 21P: O-2



Hydrograph for Pond 21P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.02		0.02
8.00	0.02		0.02
8.50	0.02		0.02
9.00	0.03		0.03
9.50	0.04		0.04
10.00	0.06		0.06
10.50	0.08		0.08
11.00	0.14		0.14
11.50	0.28		0.28
12.00	**1.70**		**1.70**
12.50	**0.64**		**0.64**
13.00	0.34		0.34
13.50	0.23		0.23
14.00	0.18		0.18
14.50	0.15		0.15
15.00	0.12		0.12
15.50	0.11		0.11
16.00	0.10		0.10
16.50	0.10		0.10
17.00	0.09		0.09
17.50	0.08		0.08
18.00	0.07		0.07
18.50	0.07		0.07
19.00	0.07		0.07
19.50	0.06		0.06
20.00	0.06		0.06
20.50	0.06		0.06
21.00	0.06		0.06
21.50	0.05		0.05
22.00	0.05		0.05
22.50	0.05		0.05
23.00	0.05		0.05
23.50	0.05		0.05
24.00	0.04		0.04

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment21S: PO-DA 1 Runoff Area=52,807 sf 14.94% Impervious Runoff Depth>3.24"
Flow Length=341' Tc=3.7 min CN=WQ Runoff=4.81 cfs 0.327 af

Pond 21P: O-2 Inflow=4.81 cfs 0.327 af
Primary=4.81 cfs 0.327 af

Total Runoff Area = 1.212 ac Runoff Volume = 0.327 af Average Runoff Depth = 3.24"
85.06% Pervious = 1.031 ac 14.94% Impervious = 0.181 ac

Summary for Subcatchment 21S: PO-DA 1

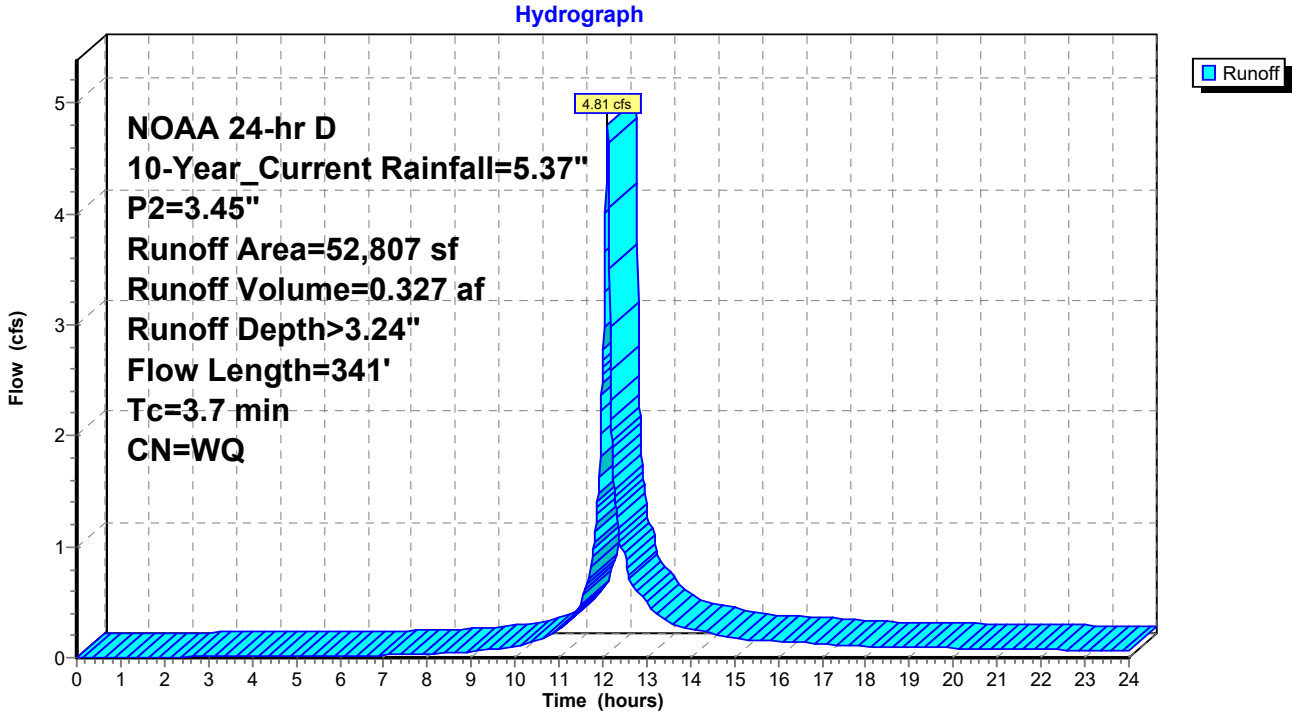
Runoff = 4.81 cfs @ 12.11 hrs, Volume= 0.327 af, Depth> 3.24"
Routed to Pond 21P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	7,888	98	Impervious, Pavement, HSG D
	19,498	80	>75% Grass cover, Good, HSG D
*	2,304	85	Yard Stone/Gravel Pad, HSG D
	23,117	73	Brush, Good, HSG D
	52,807		Weighted Average
	44,919		85.06% Pervious Area
	7,888		14.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	23	0.0352	1.33		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.45"
0.2	31	0.2437	2.47		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.2	287	0.0462	1.50		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.7	341	Total			

Subcatchment 21S: PO-DA 1



Hydrograph for Subcatchment 21S: PO-DA 1

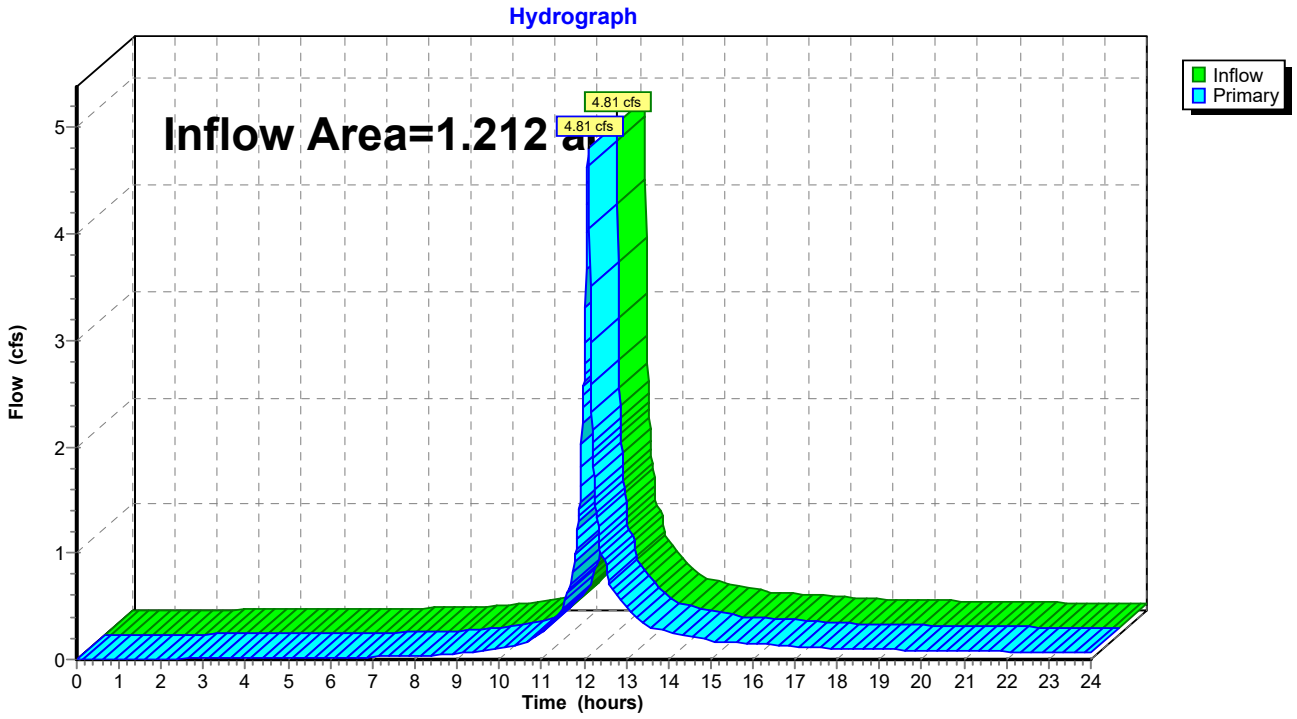
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.01
2.50	0.16	0.00	0.01
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.00	0.01
5.50	0.41	0.00	0.01
6.00	0.46	0.00	0.02
6.50	0.51	0.00	0.02
7.00	0.57	0.00	0.02
7.50	0.63	0.01	0.03
8.00	0.70	0.01	0.04
8.50	0.77	0.03	0.04
9.00	0.85	0.04	0.05
9.50	0.95	0.07	0.08
10.00	1.06	0.10	0.11
10.50	1.20	0.15	0.14
11.00	1.40	0.24	0.25
11.50	1.70	0.39	0.47
12.00	2.57	0.94	**2.62**
12.50	3.67	1.77	**0.93**
13.00	3.97	2.02	0.50
13.50	4.17	2.18	0.33
14.00	4.31	2.30	0.26
14.50	4.42	2.40	0.22
15.00	4.52	2.48	0.18
15.50	4.60	2.55	0.16
16.00	4.67	2.61	0.15
16.50	4.74	2.67	0.14
17.00	4.80	2.72	0.12
17.50	4.86	2.77	0.11
18.00	4.91	2.82	0.10
18.50	4.96	2.86	0.10
19.00	5.00	2.90	0.09
19.50	5.05	2.93	0.09
20.00	5.09	2.97	0.09
20.50	5.13	3.01	0.08
21.00	5.17	3.04	0.08
21.50	5.21	3.07	0.08
22.00	5.24	3.10	0.07
22.50	5.28	3.13	0.07
23.00	5.31	3.16	0.07
23.50	5.34	3.19	0.07
24.00	**5.37**	**3.22**	0.06

Summary for Pond 21P: O-2

Inflow Area = 1.212 ac, 14.94% Impervious, Inflow Depth > 3.24" for 10-Year_Current event
Inflow = 4.81 cfs @ 12.11 hrs, Volume= 0.327 af
Primary = 4.81 cfs @ 12.11 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 21P: O-2



Hydrograph for Pond 21P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.02		0.02
6.50	0.02		0.02
7.00	0.02		0.02
7.50	0.03		0.03
8.00	0.04		0.04
8.50	0.04		0.04
9.00	0.05		0.05
9.50	0.08		0.08
10.00	0.11		0.11
10.50	0.14		0.14
11.00	0.25		0.25
11.50	0.47		0.47
12.00	**2.62**		**2.62**
12.50	**0.93**		**0.93**
13.00	0.50		0.50
13.50	0.33		0.33
14.00	0.26		0.26
14.50	0.22		0.22
15.00	0.18		0.18
15.50	0.16		0.16
16.00	0.15		0.15
16.50	0.14		0.14
17.00	0.12		0.12
17.50	0.11		0.11
18.00	0.10		0.10
18.50	0.10		0.10
19.00	0.09		0.09
19.50	0.09		0.09
20.00	0.09		0.09
20.50	0.08		0.08
21.00	0.08		0.08
21.50	0.08		0.08
22.00	0.07		0.07
22.50	0.07		0.07
23.00	0.07		0.07
23.50	0.07		0.07
24.00	0.06		0.06

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment21S: PO-DA 1 Runoff Area=52,807 sf 14.94% Impervious Runoff Depth>4.11"
Flow Length=341' Tc=3.7 min CN=WQ Runoff=6.07 cfs 0.416 af

Pond 21P: O-2 Inflow=6.07 cfs 0.416 af
Primary=6.07 cfs 0.416 af

Total Runoff Area = 1.212 ac Runoff Volume = 0.416 af Average Runoff Depth = 4.11"
85.06% Pervious = 1.031 ac 14.94% Impervious = 0.181 ac

Summary for Subcatchment 21S: PO-DA 1

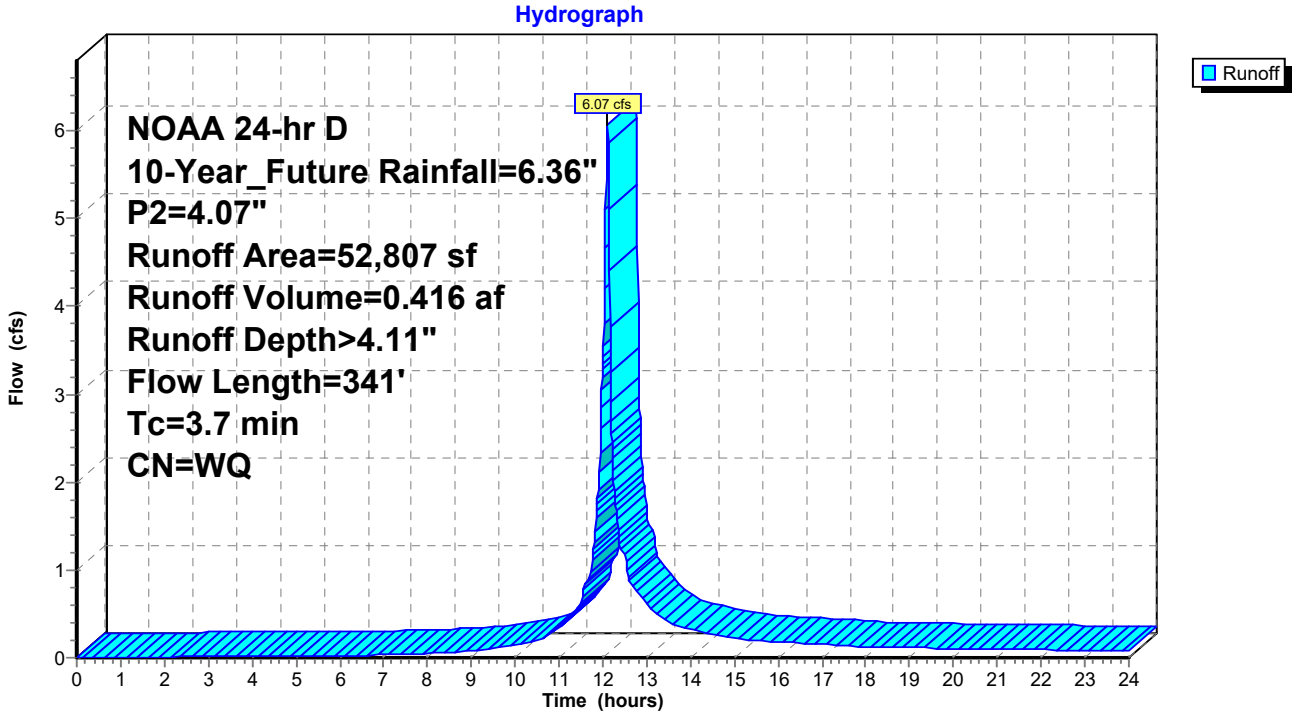
Runoff = 6.07 cfs @ 12.11 hrs, Volume= 0.416 af, Depth> 4.11"
Routed to Pond 21P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	7,888	98	Impervious, Pavement, HSG D
	19,498	80	>75% Grass cover, Good, HSG D
*	2,304	85	Yard Stone/Gravel Pad, HSG D
	23,117	73	Brush, Good, HSG D
	52,807		Weighted Average
	44,919		85.06% Pervious Area
	7,888		14.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	23	0.0352	1.45		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 4.07"
0.2	31	0.2437	2.47		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.2	287	0.0462	1.50		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.7	341	Total			

Subcatchment 21S: PO-DA 1



Hydrograph for Subcatchment 21S: PO-DA 1

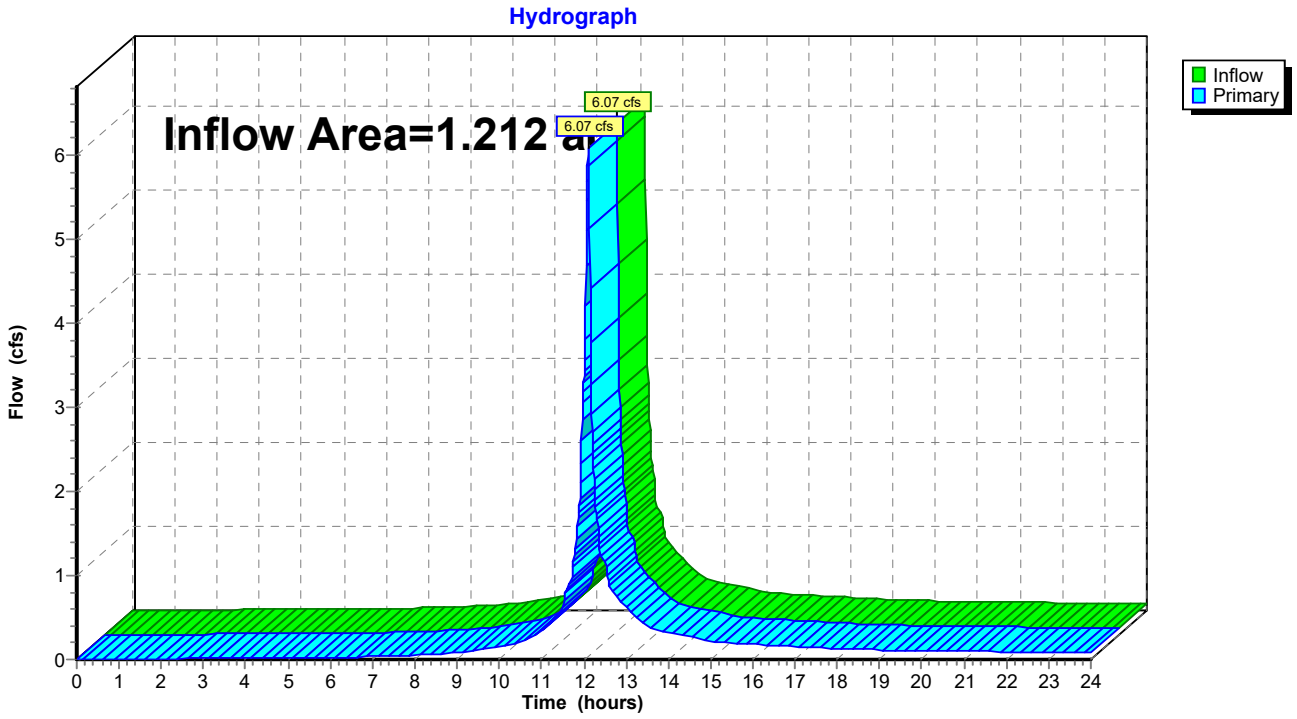
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.01
2.00	0.15	0.00	0.01
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.33	0.00	0.01
4.50	0.38	0.00	0.02
5.00	0.43	0.00	0.02
5.50	0.49	0.00	0.02
6.00	0.54	0.00	0.02
6.50	0.60	0.00	0.03
7.00	0.67	0.01	0.03
7.50	0.74	0.02	0.04
8.00	0.83	0.04	0.05
8.50	0.91	0.06	0.07
9.00	1.01	0.09	0.08
9.50	1.12	0.12	0.11
10.00	1.26	0.18	0.15
10.50	1.42	0.25	0.20
11.00	1.65	0.36	0.34
11.50	2.02	0.57	0.62
12.00	3.05	1.29	**3.36**
12.50	4.34	2.33	**1.16**
13.00	4.71	2.64	0.62
13.50	4.94	2.84	0.40
14.00	5.10	2.98	0.32
14.50	5.24	3.10	0.27
15.00	5.35	3.20	0.22
15.50	5.45	3.29	0.20
16.00	5.53	3.36	0.18
16.50	5.62	3.44	0.17
17.00	5.69	3.50	0.15
17.50	5.76	3.56	0.14
18.00	5.82	3.62	0.12
18.50	5.87	3.67	0.12
19.00	5.93	3.71	0.11
19.50	5.98	3.76	0.11
20.00	6.03	3.81	0.11
20.50	6.07	3.85	0.10
21.00	6.12	3.89	0.10
21.50	6.16	3.93	0.09
22.00	6.21	3.97	0.09
22.50	6.25	4.01	0.09
23.00	6.29	4.04	0.08
23.50	6.32	4.08	0.08
24.00	**6.36**	**4.11**	0.08

Summary for Pond 21P: O-2

Inflow Area = 1.212 ac, 14.94% Impervious, Inflow Depth > 4.11" for 10-Year_Future event
Inflow = 6.07 cfs @ 12.11 hrs, Volume= 0.416 af
Primary = 6.07 cfs @ 12.11 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 21P: O-2



Hydrograph for Pond 21P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.02		0.02
5.00	0.02		0.02
5.50	0.02		0.02
6.00	0.02		0.02
6.50	0.03		0.03
7.00	0.03		0.03
7.50	0.04		0.04
8.00	0.05		0.05
8.50	0.07		0.07
9.00	0.08		0.08
9.50	0.11		0.11
10.00	0.15		0.15
10.50	0.20		0.20
11.00	0.34		0.34
11.50	0.62		0.62
12.00	**3.36**		**3.36**
12.50	**1.16**		**1.16**
13.00	0.62		0.62
13.50	0.40		0.40
14.00	0.32		0.32
14.50	0.27		0.27
15.00	0.22		0.22
15.50	0.20		0.20
16.00	0.18		0.18
16.50	0.17		0.17
17.00	0.15		0.15
17.50	0.14		0.14
18.00	0.12		0.12
18.50	0.12		0.12
19.00	0.11		0.11
19.50	0.11		0.11
20.00	0.11		0.11
20.50	0.10		0.10
21.00	0.10		0.10
21.50	0.09		0.09
22.00	0.09		0.09
22.50	0.09		0.09
23.00	0.08		0.08
23.50	0.08		0.08
24.00	0.08		0.08

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment21S: PO-DA 1 Runoff Area=52,807 sf 14.94% Impervious Runoff Depth>6.76"
Flow Length=341' Tc=3.7 min CN=WQ Runoff=9.80 cfs 0.682 af

Pond 21P: O-2 Inflow=9.80 cfs 0.682 af
Primary=9.80 cfs 0.682 af

Total Runoff Area = 1.212 ac Runoff Volume = 0.682 af Average Runoff Depth = 6.76"
85.06% Pervious = 1.031 ac 14.94% Impervious = 0.181 ac

Summary for Subcatchment 21S: PO-DA 1

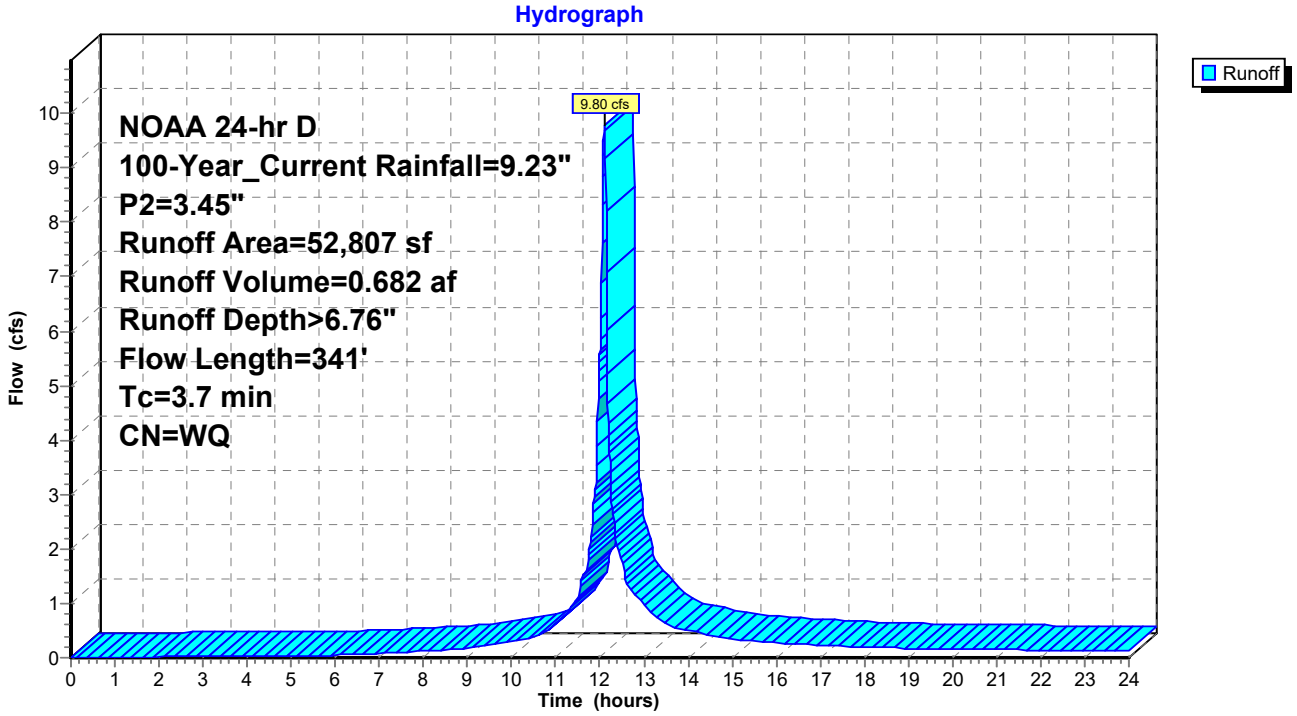
Runoff = 9.80 cfs @ 12.11 hrs, Volume= 0.682 af, Depth> 6.76"
Routed to Pond 21P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	7,888	98	Impervious, Pavement, HSG D
	19,498	80	>75% Grass cover, Good, HSG D
*	2,304	85	Yard Stone/Gravel Pad, HSG D
	23,117	73	Brush, Good, HSG D
	52,807		Weighted Average
	44,919		85.06% Pervious Area
	7,888		14.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	23	0.0352	1.33		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.45"
0.2	31	0.2437	2.47		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.2	287	0.0462	1.50		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.7	341	Total			

Subcatchment 21S: PO-DA 1



Hydrograph for Subcatchment 21S: PO-DA 1

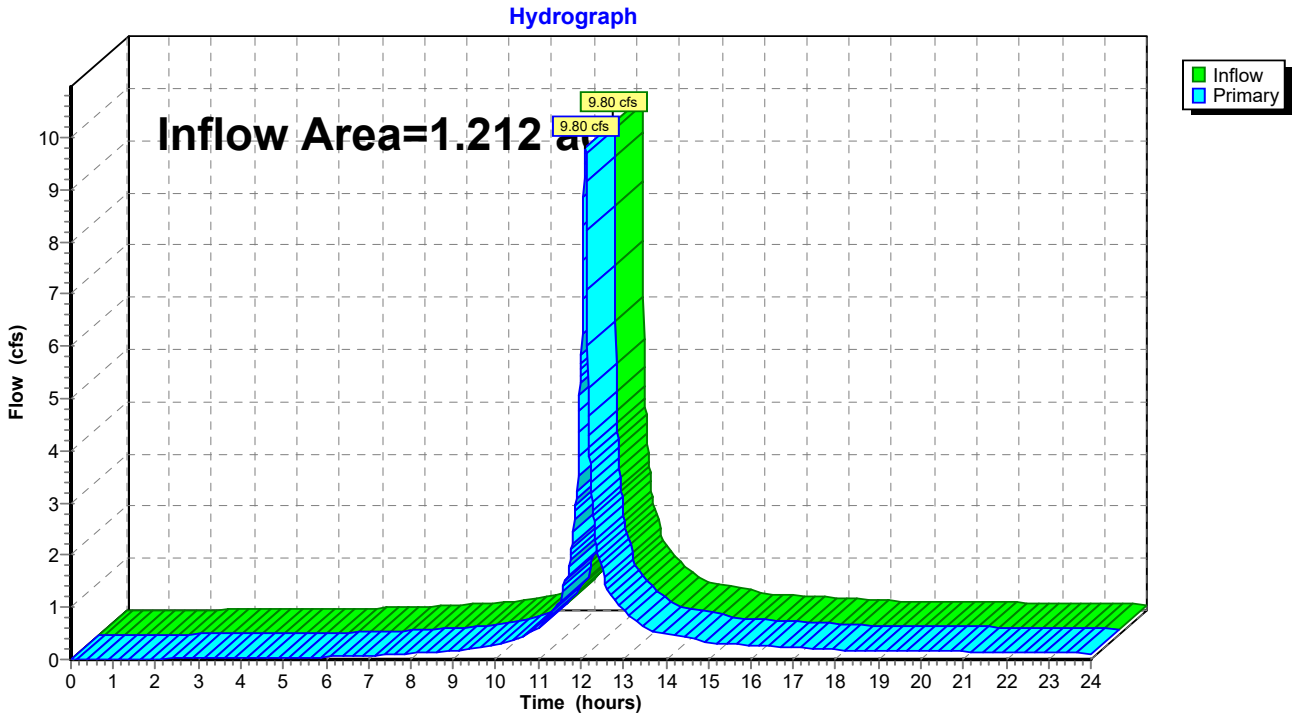
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.02
2.50	0.28	0.00	0.02
3.00	0.35	0.00	0.02
3.50	0.41	0.00	0.02
4.00	0.48	0.00	0.02
4.50	0.56	0.00	0.03
5.00	0.63	0.01	0.03
5.50	0.71	0.02	0.04
6.00	0.79	0.03	0.05
6.50	0.88	0.05	0.06
7.00	0.97	0.08	0.08
7.50	1.08	0.11	0.10
8.00	1.20	0.15	0.12
8.50	1.33	0.21	0.14
9.00	1.46	0.27	0.17
9.50	1.63	0.35	0.23
10.00	1.83	0.46	0.30
10.50	2.07	0.60	0.37
11.00	2.40	0.82	0.61
11.50	2.93	1.19	1.08
12.00	4.42	2.40	**5.55**
12.50	6.30	4.06	**1.83**
13.00	6.83	4.54	0.97
13.50	7.16	4.84	0.63
14.00	7.40	5.07	0.50
14.50	7.60	5.25	0.42
15.00	7.77	5.41	0.34
15.50	7.90	5.54	0.30
16.00	8.03	5.66	0.28
16.50	8.15	5.77	0.26
17.00	8.26	5.87	0.24
17.50	8.35	5.96	0.21
18.00	8.44	6.04	0.19
18.50	8.52	6.12	0.18
19.00	8.60	6.19	0.17
19.50	8.67	6.26	0.17
20.00	8.75	6.33	0.16
20.50	8.82	6.39	0.16
21.00	8.88	6.46	0.15
21.50	8.95	6.52	0.15
22.00	9.01	6.58	0.14
22.50	9.07	6.63	0.13
23.00	9.12	6.69	0.13
23.50	9.18	6.74	0.12
24.00	**9.23**	**6.79**	0.12

Summary for Pond 21P: O-2

Inflow Area = 1.212 ac, 14.94% Impervious, Inflow Depth > 6.76" for 100-Year_Current event
Inflow = 9.80 cfs @ 12.11 hrs, Volume= 0.682 af
Primary = 9.80 cfs @ 12.11 hrs, Volume= 0.682 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 21P: O-2



Hydrograph for Pond 21P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.01		0.01
2.00	0.02		0.02
2.50	0.02		0.02
3.00	0.02		0.02
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.03		0.03
5.00	0.03		0.03
5.50	0.04		0.04
6.00	0.05		0.05
6.50	0.06		0.06
7.00	0.08		0.08
7.50	0.10		0.10
8.00	0.12		0.12
8.50	0.14		0.14
9.00	0.17		0.17
9.50	0.23		0.23
10.00	0.30		0.30
10.50	0.37		0.37
11.00	0.61		0.61
11.50	1.08		1.08
12.00	**5.55**		**5.55**
12.50	**1.83**		**1.83**
13.00	0.97		0.97
13.50	0.63		0.63
14.00	0.50		0.50
14.50	0.42		0.42
15.00	0.34		0.34
15.50	0.30		0.30
16.00	0.28		0.28
16.50	0.26		0.26
17.00	0.24		0.24
17.50	0.21		0.21
18.00	0.19		0.19
18.50	0.18		0.18
19.00	0.17		0.17
19.50	0.17		0.17
20.00	0.16		0.16
20.50	0.16		0.16
21.00	0.15		0.15
21.50	0.15		0.15
22.00	0.14		0.14
22.50	0.13		0.13
23.00	0.13		0.13
23.50	0.12		0.12
24.00	0.12		0.12

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment21S: PO-DA 1 Runoff Area=52,807 sf 14.94% Impervious Runoff Depth>8.99"
Flow Length=341' Tc=3.7 min CN=WQ Runoff=12.86 cfs 0.908 af

Pond 21P: O-2 Inflow=12.86 cfs 0.908 af
Primary=12.86 cfs 0.908 af

Total Runoff Area = 1.212 ac Runoff Volume = 0.908 af Average Runoff Depth = 8.99"
85.06% Pervious = 1.031 ac 14.94% Impervious = 0.181 ac

Summary for Subcatchment 21S: PO-DA 1

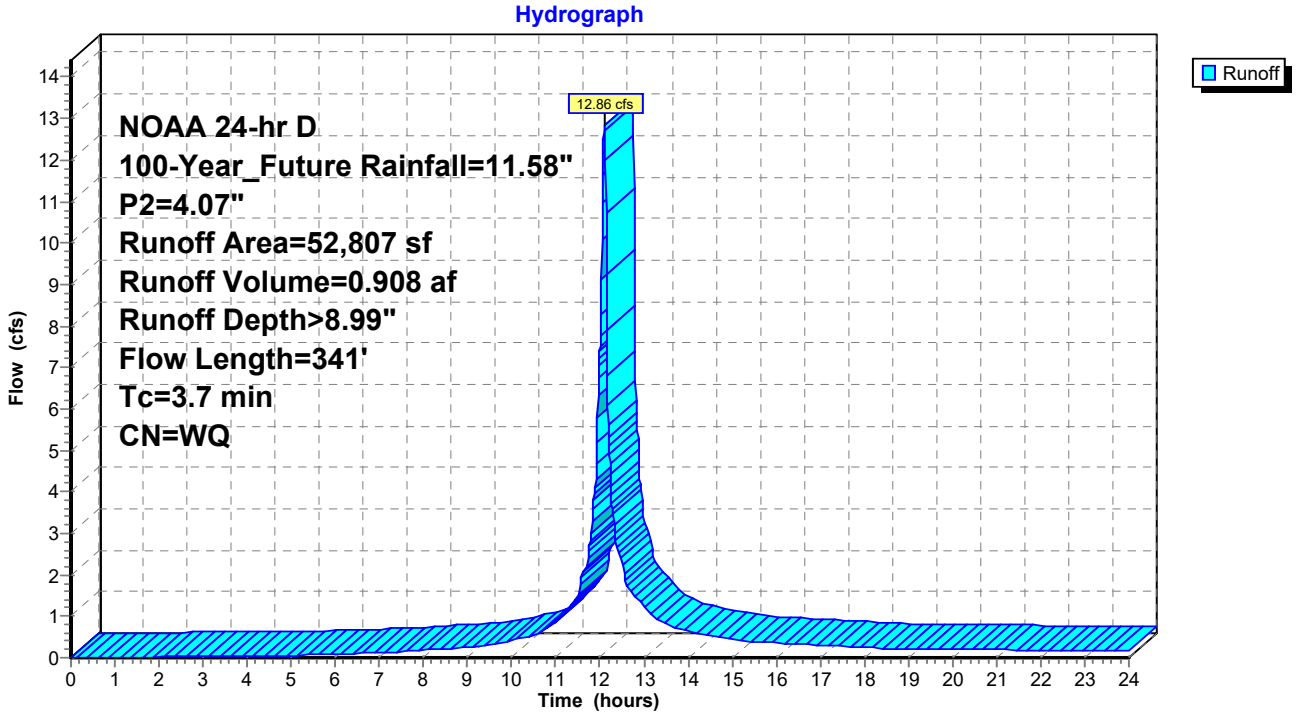
Runoff = 12.86 cfs @ 12.11 hrs, Volume= 0.908 af, Depth> 8.99"
Routed to Pond 21P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	7,888	98	Impervious, Pavement, HSG D
	19,498	80	>75% Grass cover, Good, HSG D
*	2,304	85	Yard Stone/Gravel Pad, HSG D
	23,117	73	Brush, Good, HSG D
	52,807		Weighted Average
	44,919		85.06% Pervious Area
	7,888		14.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	23	0.0352	1.45		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 4.07"
0.2	31	0.2437	2.47		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.2	287	0.0462	1.50		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
3.7	341	Total			

Subcatchment 21S: PO-DA 1



Hydrograph for Subcatchment 21S: PO-DA 1

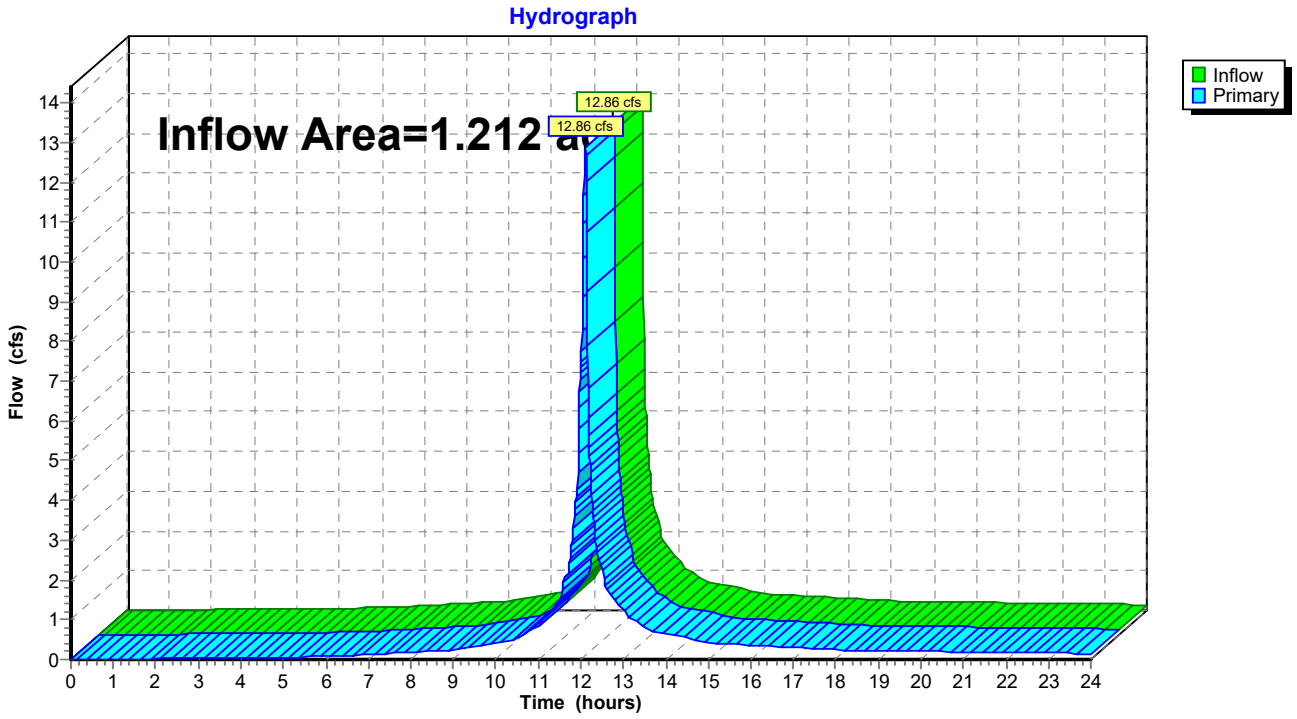
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.02
2.00	0.28	0.00	0.02
2.50	0.36	0.00	0.02
3.00	0.44	0.00	0.03
3.50	0.52	0.00	0.03
4.00	0.61	0.00	0.04
4.50	0.70	0.01	0.05
5.00	0.79	0.03	0.06
5.50	0.89	0.05	0.07
6.00	0.99	0.08	0.08
6.50	1.10	0.12	0.10
7.00	1.22	0.16	0.13
7.50	1.35	0.22	0.15
8.00	1.50	0.29	0.18
8.50	1.66	0.37	0.21
9.00	1.84	0.47	0.25
9.50	2.04	0.59	0.33
10.00	2.30	0.75	0.42
10.50	2.59	0.95	0.53
11.00	3.01	1.26	0.85
11.50	3.67	1.77	1.48
12.00	5.55	3.38	**7.37**
12.50	7.91	5.54	**2.37**
13.00	8.57	6.16	1.25
13.50	8.99	6.56	0.81
14.00	9.28	6.84	0.64
14.50	9.54	7.08	0.54
15.00	9.74	7.28	0.44
15.50	9.92	7.44	0.39
16.00	10.08	7.59	0.36
16.50	10.23	7.74	0.33
17.00	10.36	7.87	0.30
17.50	10.48	7.98	0.27
18.00	10.59	8.09	0.24
18.50	10.69	8.18	0.23
19.00	10.79	8.28	0.22
19.50	10.88	8.37	0.22
20.00	10.97	8.45	0.21
20.50	11.06	8.54	0.20
21.00	11.14	8.62	0.19
21.50	11.22	8.70	0.19
22.00	11.30	8.77	0.18
22.50	11.38	8.84	0.17
23.00	11.45	8.91	0.16
23.50	11.52	8.98	0.16
24.00	**11.58**	**9.04**	0.15

Summary for Pond 21P: O-2

Inflow Area = 1.212 ac, 14.94% Impervious, Inflow Depth > 8.99" for 100-Year_Future event
Inflow = 12.86 cfs @ 12.11 hrs, Volume= 0.908 af
Primary = 12.86 cfs @ 12.11 hrs, Volume= 0.908 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 21P: O-2

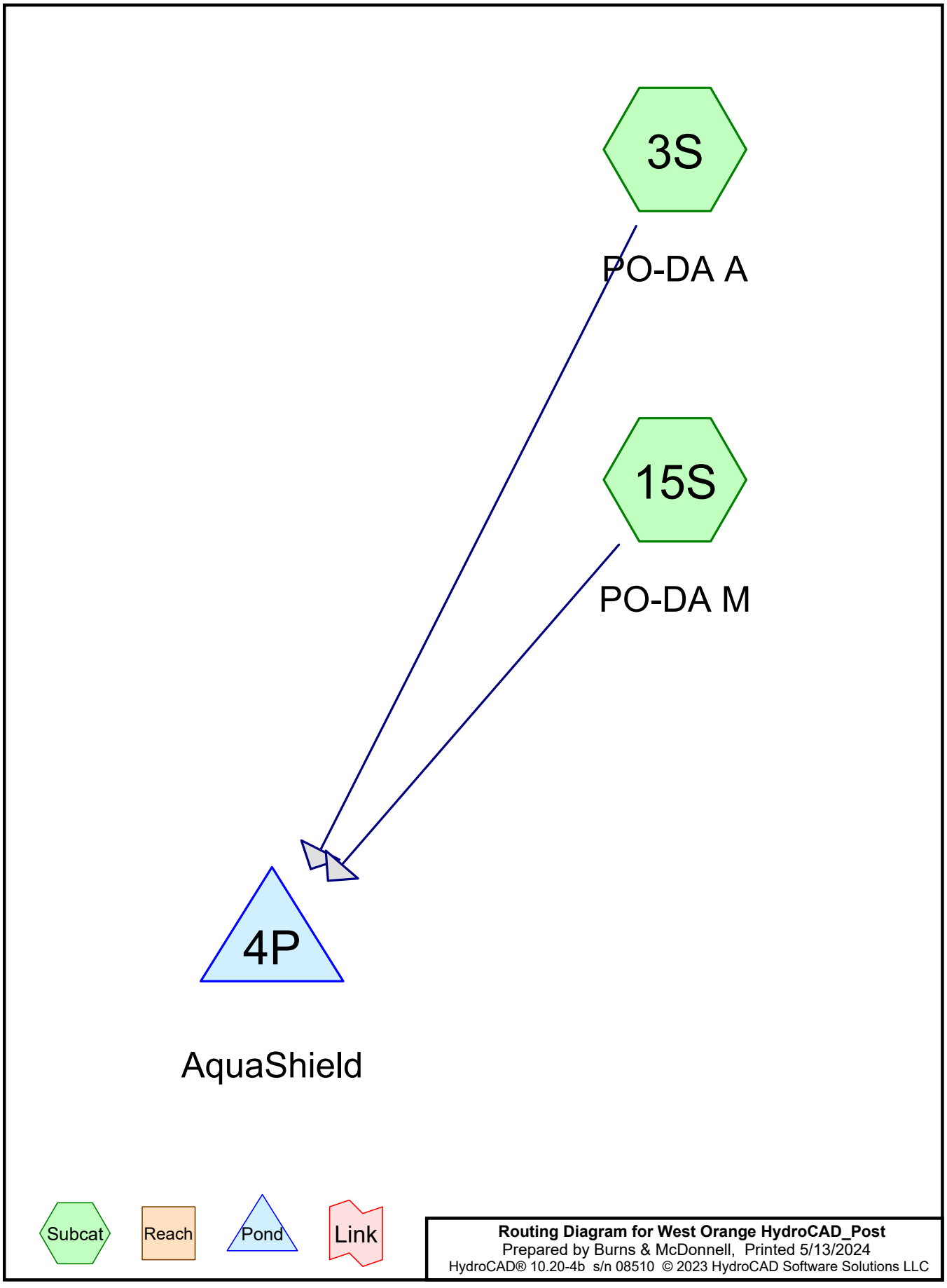


Hydrograph for Pond 21P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.02		0.02
2.00	0.02		0.02
2.50	0.02		0.02
3.00	0.03		0.03
3.50	0.03		0.03
4.00	0.04		0.04
4.50	0.05		0.05
5.00	0.06		0.06
5.50	0.07		0.07
6.00	0.08		0.08
6.50	0.10		0.10
7.00	0.13		0.13
7.50	0.15		0.15
8.00	0.18		0.18
8.50	0.21		0.21
9.00	0.25		0.25
9.50	0.33		0.33
10.00	0.42		0.42
10.50	0.53		0.53
11.00	0.85		0.85
11.50	1.48		1.48
12.00	**7.37**		**7.37**
12.50	**2.37**		**2.37**
13.00	1.25		1.25
13.50	0.81		0.81
14.00	0.64		0.64
14.50	0.54		0.54
15.00	0.44		0.44
15.50	0.39		0.39
16.00	0.36		0.36
16.50	0.33		0.33
17.00	0.30		0.30
17.50	0.27		0.27
18.00	0.24		0.24
18.50	0.23		0.23
19.00	0.22		0.22
19.50	0.22		0.22
20.00	0.21		0.21
20.50	0.20		0.20
21.00	0.19		0.19
21.50	0.19		0.19
22.00	0.18		0.18
22.50	0.17		0.17
23.00	0.16		0.16
23.50	0.16		0.16
24.00	0.15		0.15

APPENDIX B.4- POST-DEVELOPED OUTFALL = O-AQUASHIELD

POST-DEVELOPED:
OUTFALL = O-AQUASHIELD



Routing Diagram for West Orange HydroCAD_Post
Prepared by Burns & McDonnell, Printed 5/13/2024
HydroCAD® 10.20-4b s/n 08510 © 2023 HydroCAD Software Solutions LLC

West Orange HydroCAD_Post
Prepared by Burns & McDonnell
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60 Pond 4P: AquaShield

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	WQ	NJ DEP 2-hr		Default	2.00	1	1.25	2	3.42
2	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
3	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
4	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
5	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
6	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
7	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.327	80	>75% Grass cover, Good, HSG D (3S)
0.339	73	Brush, Good, HSG D (3S)
0.540	98	Impervious, Pavement, HSG D (3S, 15S)
1.015	85	Yard Stone/Gravel Pad, HSG D (3S, 15S)
2.221	**86**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
2.221	HSG D	3S, 15S
0.000	Other	
2.221		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.327	0.000	0.327	>75% Grass cover, Good	3S
0.000	0.000	0.000	0.339	0.000	0.339	Brush, Good	3S
0.000	0.000	0.000	0.540	0.000	0.540	Impervious, Pavement	3S, 15S
0.000	0.000	0.000	1.015	0.000	1.015	Yard Stone/Gravel Pad	3S, 15S
0.000	**0.000**	**0.000**	**2.221**	**0.000**	**2.221**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth=0.33"
Flow Length=491' Tc=18.2 min CN=WQ Runoff=1.06 cfs 0.049 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth=0.84"
Flow Length=180' Slope=0.0160 '/' Tc=8.0 min CN=WQ Runoff=0.96 cfs 0.030 af

Pond 4P: AquaShield Inflow=1.58 cfs 0.079 af
Primary=1.58 cfs 0.079 af

Total Runoff Area = 2.221 ac Runoff Volume = 0.079 af Average Runoff Depth = 0.42"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

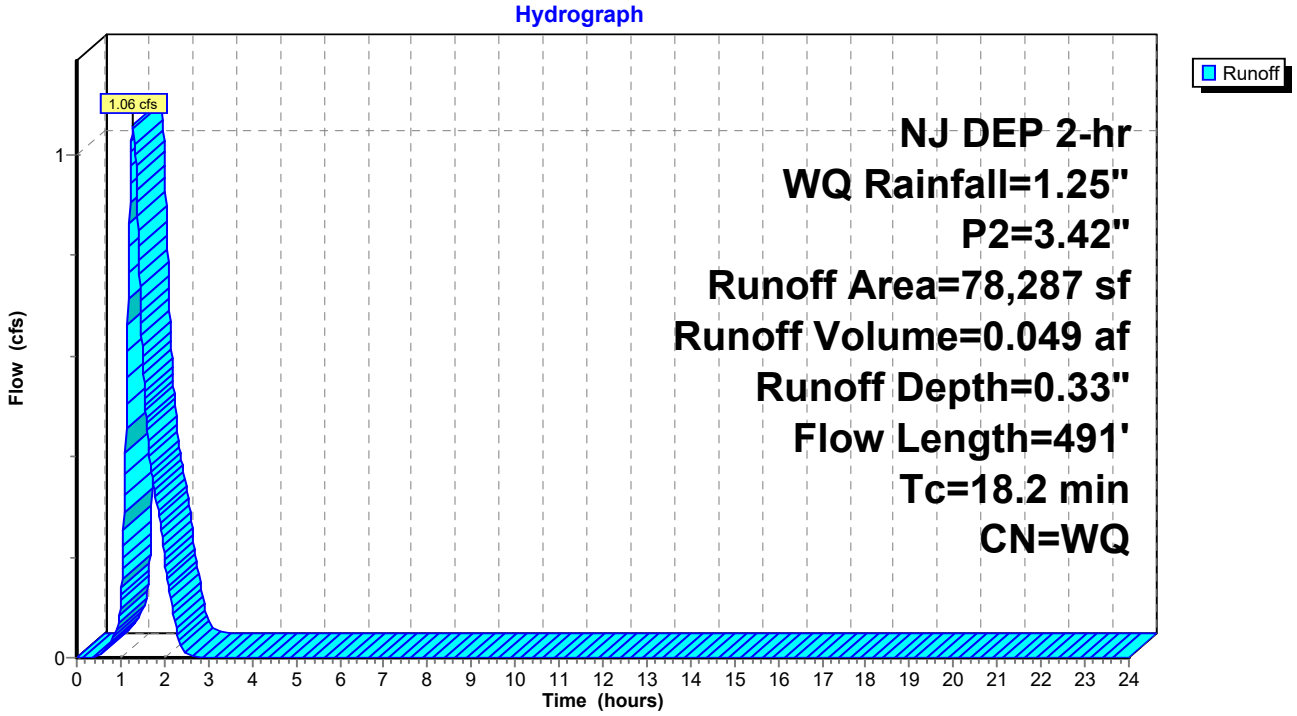
Runoff = 1.06 cfs @ 1.28 hrs, Volume= 0.049 af, Depth= 0.33"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.2	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.02	**0.11**
1.50	1.15	0.20	**0.60**
2.00	**1.25**	**0.24**	0.20
2.50	1.25	0.24	0.01
3.00	1.25	0.24	0.00
3.50	1.25	0.24	0.00
4.00	1.25	0.24	0.00
4.50	1.25	0.24	0.00
5.00	1.25	0.24	0.00
5.50	1.25	0.24	0.00
6.00	1.25	0.24	0.00
6.50	1.25	0.24	0.00
7.00	1.25	0.24	0.00
7.50	1.25	0.24	0.00
8.00	1.25	0.24	0.00
8.50	1.25	0.24	0.00
9.00	1.25	0.24	0.00
9.50	1.25	0.24	0.00
10.00	1.25	0.24	0.00
10.50	1.25	0.24	0.00
11.00	1.25	0.24	0.00
11.50	1.25	0.24	0.00
12.00	1.25	0.24	0.00
12.50	1.25	0.24	0.00
13.00	1.25	0.24	0.00
13.50	1.25	0.24	0.00
14.00	1.25	0.24	0.00
14.50	1.25	0.24	0.00
15.00	1.25	0.24	0.00
15.50	1.25	0.24	0.00
16.00	1.25	0.24	0.00
16.50	1.25	0.24	0.00
17.00	1.25	0.24	0.00
17.50	1.25	0.24	0.00
18.00	1.25	0.24	0.00
18.50	1.25	0.24	0.00
19.00	1.25	0.24	0.00
19.50	1.25	0.24	0.00
20.00	1.25	0.24	0.00
20.50	1.25	0.24	0.00
21.00	1.25	0.24	0.00
21.50	1.25	0.24	0.00
22.00	1.25	0.24	0.00
22.50	1.25	0.24	0.00
23.00	1.25	0.24	0.00
23.50	1.25	0.24	0.00
24.00	1.25	0.24	0.00

Summary for Subcatchment 15S: PO-DA M

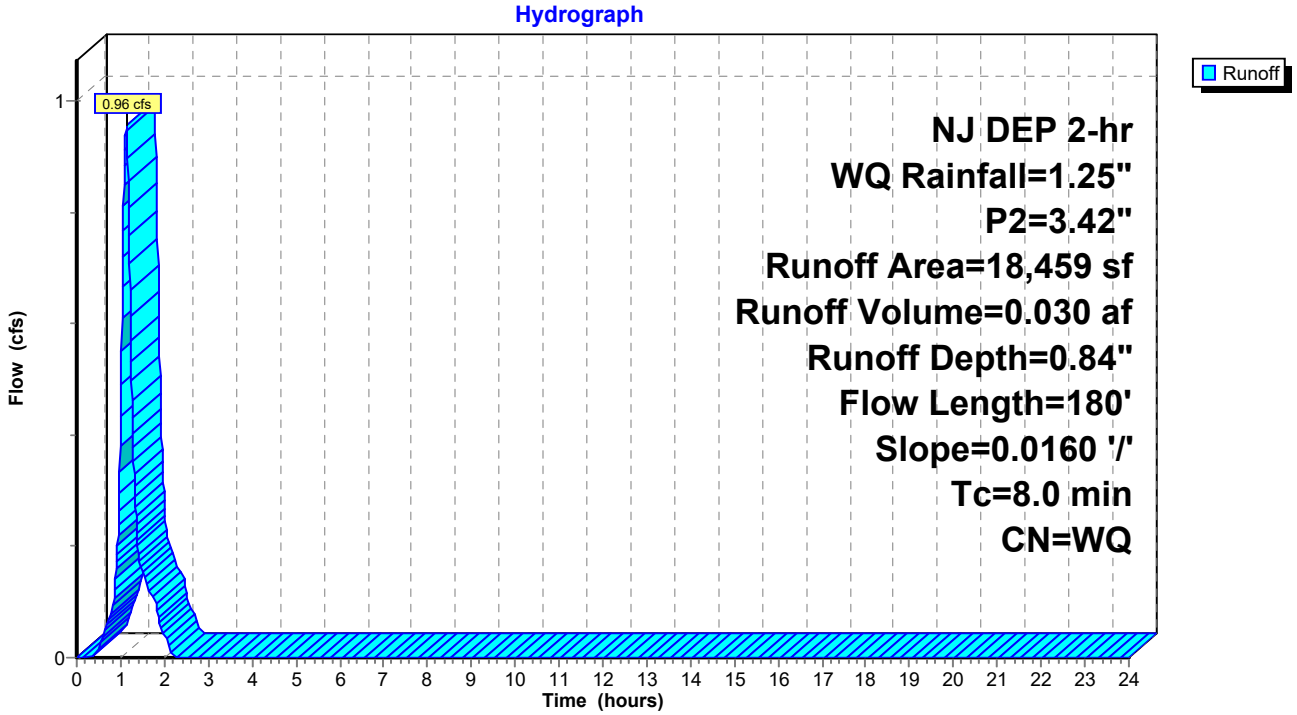
Runoff = 0.96 cfs @ 1.13 hrs, Volume= 0.030 af, Depth= 0.84"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
8.0	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

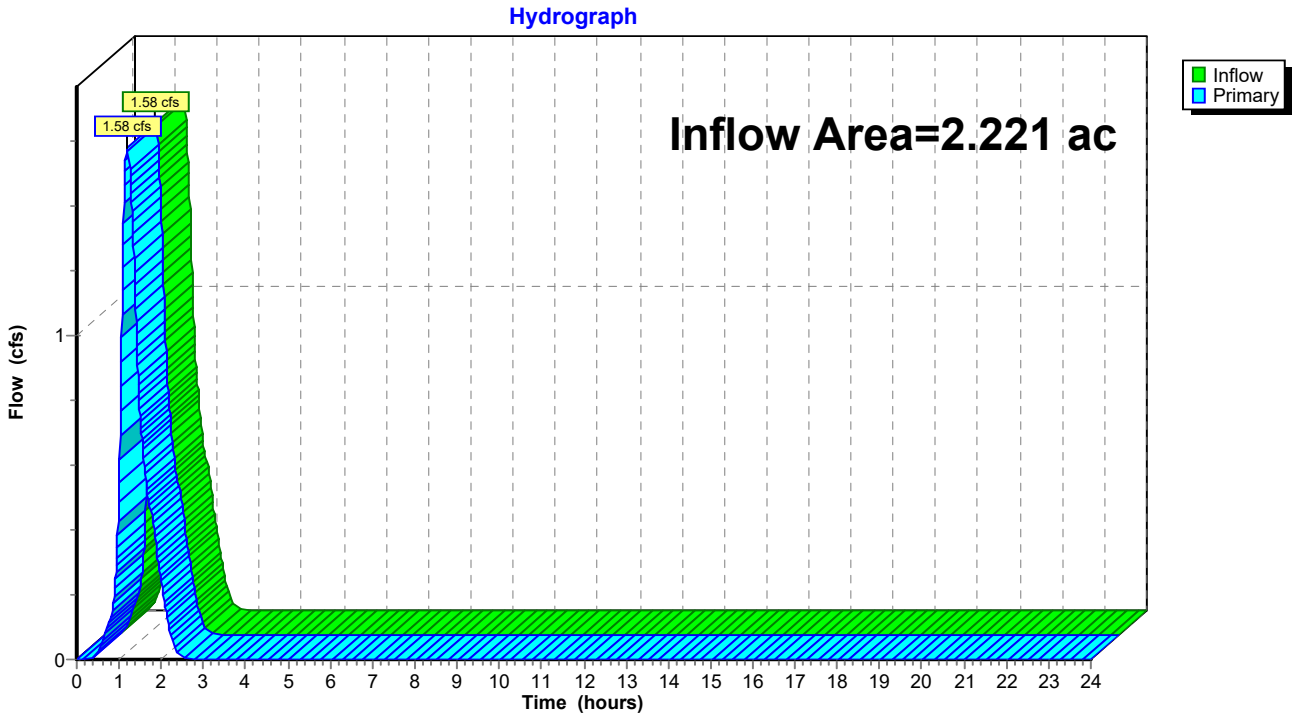
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.02
1.00	0.63	0.26	**0.43**
1.50	1.15	0.69	**0.15**
2.00	**1.25**	**0.78**	0.04
2.50	1.25	0.78	0.00
3.00	1.25	0.78	0.00
3.50	1.25	0.78	0.00
4.00	1.25	0.78	0.00
4.50	1.25	0.78	0.00
5.00	1.25	0.78	0.00
5.50	1.25	0.78	0.00
6.00	1.25	0.78	0.00
6.50	1.25	0.78	0.00
7.00	1.25	0.78	0.00
7.50	1.25	0.78	0.00
8.00	1.25	0.78	0.00
8.50	1.25	0.78	0.00
9.00	1.25	0.78	0.00
9.50	1.25	0.78	0.00
10.00	1.25	0.78	0.00
10.50	1.25	0.78	0.00
11.00	1.25	0.78	0.00
11.50	1.25	0.78	0.00
12.00	1.25	0.78	0.00
12.50	1.25	0.78	0.00
13.00	1.25	0.78	0.00
13.50	1.25	0.78	0.00
14.00	1.25	0.78	0.00
14.50	1.25	0.78	0.00
15.00	1.25	0.78	0.00
15.50	1.25	0.78	0.00
16.00	1.25	0.78	0.00
16.50	1.25	0.78	0.00
17.00	1.25	0.78	0.00
17.50	1.25	0.78	0.00
18.00	1.25	0.78	0.00
18.50	1.25	0.78	0.00
19.00	1.25	0.78	0.00
19.50	1.25	0.78	0.00
20.00	1.25	0.78	0.00
20.50	1.25	0.78	0.00
21.00	1.25	0.78	0.00
21.50	1.25	0.78	0.00
22.00	1.25	0.78	0.00
22.50	1.25	0.78	0.00
23.00	1.25	0.78	0.00
23.50	1.25	0.78	0.00
24.00	1.25	0.78	0.00

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth = 0.42" for WQ event
Inflow = 1.58 cfs @ 1.19 hrs, Volume= 0.079 af
Primary = 1.58 cfs @ 1.19 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield



Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.02		0.02
1.00	**0.55**		**0.55**
1.50	**0.75**		**0.75**
2.00	0.24		0.24
2.50	0.01		0.01
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.00		0.00
11.50	0.00		0.00
12.00	0.00		0.00
12.50	0.00		0.00
13.00	0.00		0.00
13.50	0.00		0.00
14.00	0.00		0.00
14.50	0.00		0.00
15.00	0.00		0.00
15.50	0.00		0.00
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth>1.90"
Flow Length=491' Tc=18.2 min CN=WQ Runoff=2.63 cfs 0.284 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth>2.89"
Flow Length=180' Slope=0.0160 '/' Tc=8.0 min CN=WQ Runoff=1.19 cfs 0.102 af

Pond 4P: AquaShield Inflow=3.34 cfs 0.386 af
Primary=3.34 cfs 0.386 af

Total Runoff Area = 2.221 ac Runoff Volume = 0.386 af Average Runoff Depth = 2.09"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

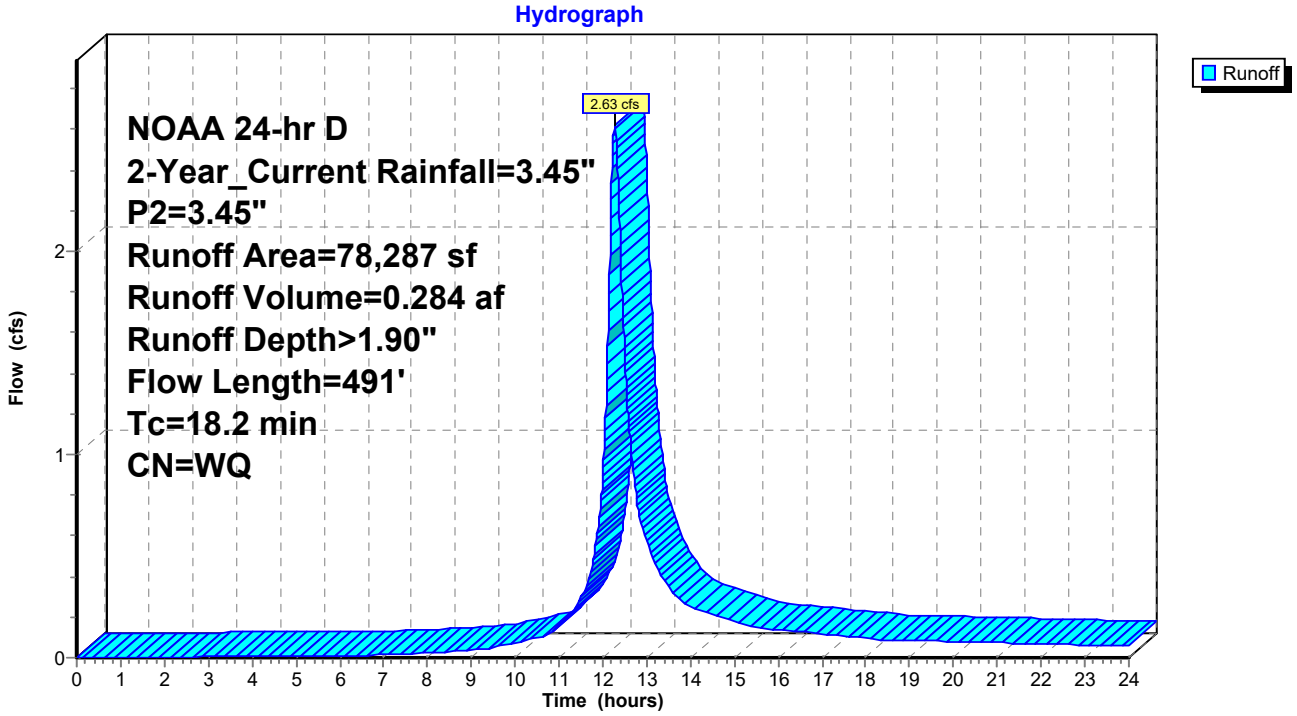
Runoff = 2.63 cfs @ 12.27 hrs, Volume= 0.284 af, Depth> 1.90"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.2	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.01
3.50	0.16	0.00	0.01
4.00	0.18	0.00	0.01
4.50	0.21	0.00	0.01
5.00	0.24	0.00	0.01
5.50	0.26	0.00	0.01
6.00	0.29	0.00	0.01
6.50	0.33	0.00	0.01
7.00	0.36	0.00	0.01
7.50	0.40	0.00	0.02
8.00	0.45	0.00	0.02
8.50	0.50	0.00	0.03
9.00	0.55	0.01	0.04
9.50	0.61	0.02	0.05
10.00	0.68	0.03	0.07
10.50	0.77	0.05	0.10
11.00	0.90	0.09	0.16
11.50	1.09	0.17	0.30
12.00	1.65	0.47	**0.90**
12.50	2.36	0.95	**1.49**
13.00	2.55	1.10	0.57
13.50	2.68	1.19	0.36
14.00	2.77	1.26	0.25
14.50	2.84	1.32	0.22
15.00	2.90	1.37	0.18
15.50	2.95	1.41	0.15
16.00	3.00	1.45	0.14
16.50	3.05	1.48	0.13
17.00	3.09	1.52	0.12
17.50	3.12	1.55	0.11
18.00	3.16	1.57	0.10
18.50	3.19	1.60	0.09
19.00	3.21	1.62	0.09
19.50	3.24	1.64	0.08
20.00	3.27	1.67	0.08
20.50	3.29	1.69	0.08
21.00	3.32	1.71	0.07
21.50	3.34	1.73	0.07
22.00	3.37	1.75	0.07
22.50	3.39	1.77	0.07
23.00	3.41	1.78	0.06
23.50	3.43	1.80	0.06
24.00	**3.45**	**1.82**	0.06

Summary for Subcatchment 15S: PO-DA M

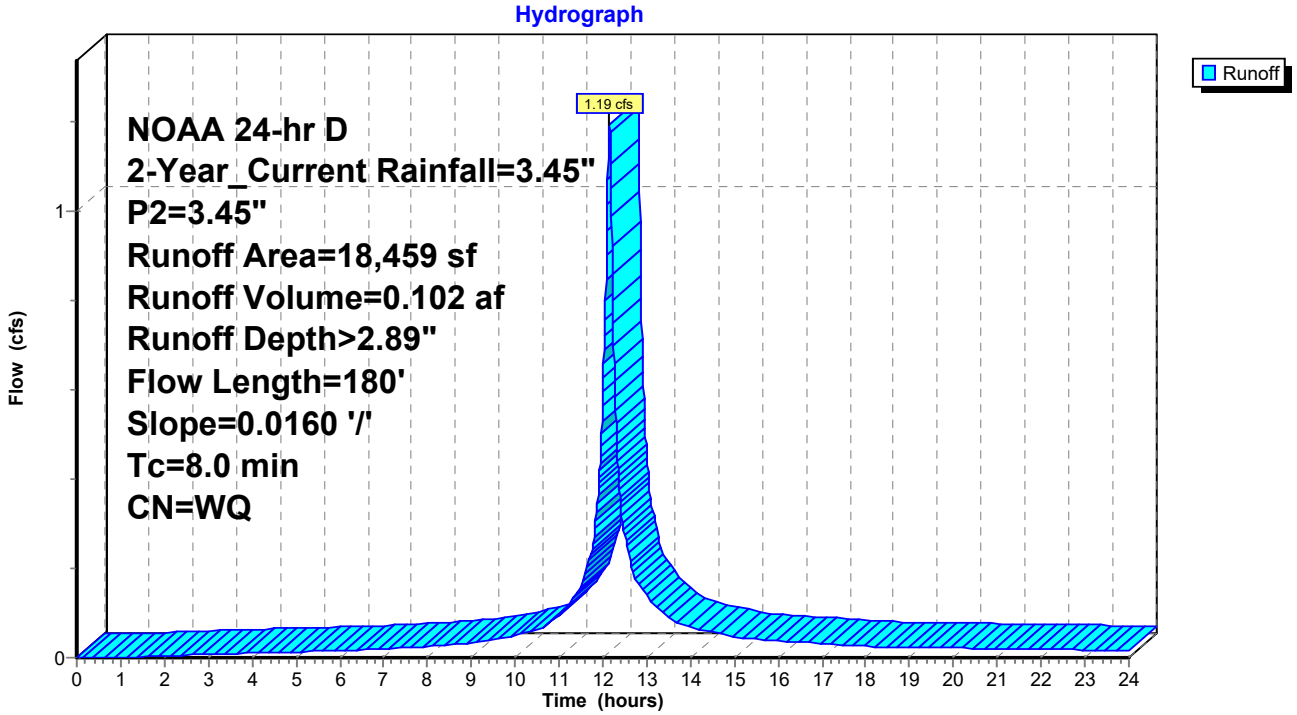
Runoff = 1.19 cfs @ 12.15 hrs, Volume= 0.102 af, Depth> 2.89"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
8.0	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

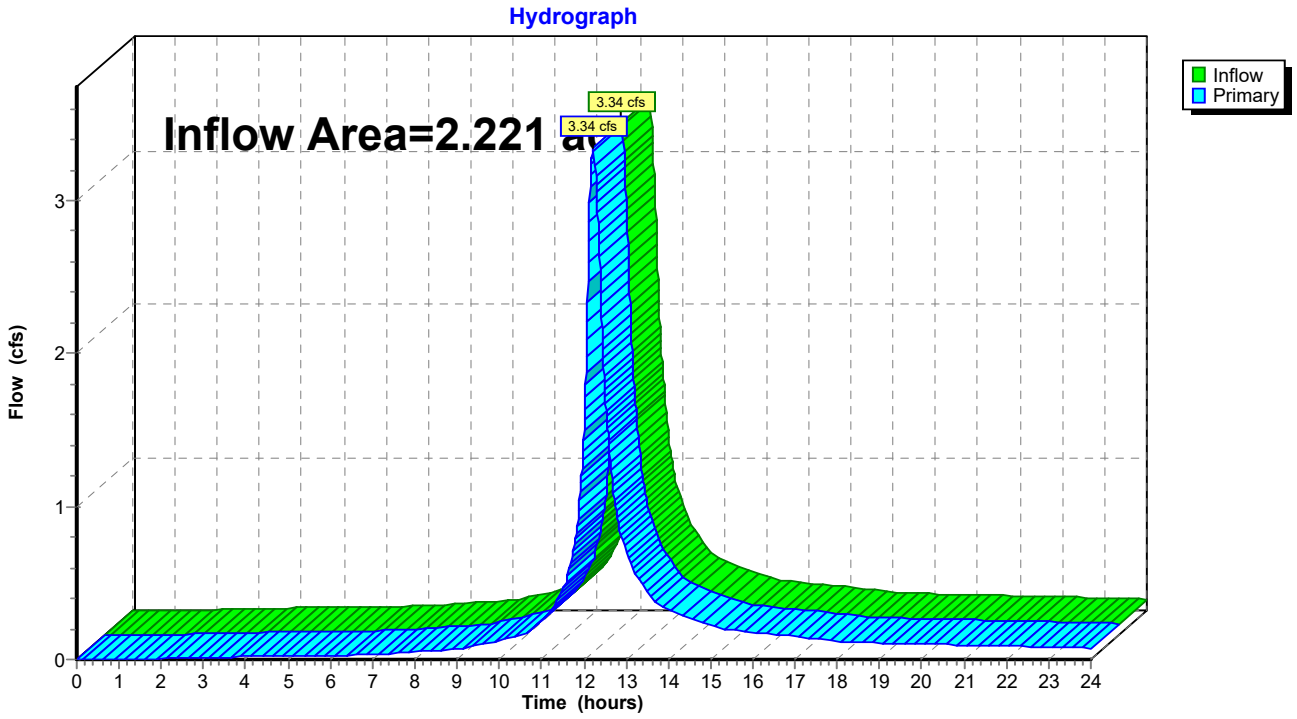
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.01
3.00	0.13	0.00	0.01
3.50	0.16	0.00	0.01
4.00	0.18	0.01	0.01
4.50	0.21	0.02	0.01
5.00	0.24	0.03	0.01
5.50	0.26	0.04	0.01
6.00	0.29	0.05	0.02
6.50	0.33	0.07	0.02
7.00	0.36	0.08	0.02
7.50	0.40	0.11	0.02
8.00	0.45	0.13	0.03
8.50	0.50	0.17	0.03
9.00	0.55	0.20	0.03
9.50	0.61	0.25	0.04
10.00	0.68	0.30	0.05
10.50	0.77	0.37	0.06
11.00	0.90	0.48	0.10
11.50	1.09	0.64	0.16
12.00	1.65	1.15	**0.59**
12.50	2.36	1.82	**0.27**
13.00	2.55	2.01	0.14
13.50	2.68	2.14	0.09
14.00	2.77	2.22	0.07
14.50	2.84	2.29	0.06
15.00	2.90	2.35	0.05
15.50	2.95	2.40	0.04
16.00	3.00	2.45	0.04
16.50	3.05	2.49	0.04
17.00	3.09	2.53	0.03
17.50	3.12	2.57	0.03
18.00	3.16	2.60	0.03
18.50	3.19	2.63	0.02
19.00	3.21	2.66	0.02
19.50	3.24	2.69	0.02
20.00	3.27	2.71	0.02
20.50	3.29	2.74	0.02
21.00	3.32	2.76	0.02
21.50	3.34	2.79	0.02
22.00	3.37	2.81	0.02
22.50	3.39	2.83	0.02
23.00	3.41	2.85	0.02
23.50	3.43	2.87	0.02
24.00	**3.45**	**2.89**	0.02

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth > 2.09" for 2-Year_Current event
Inflow = 3.34 cfs @ 12.22 hrs, Volume= 0.386 af
Primary = 3.34 cfs @ 12.22 hrs, Volume= 0.386 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield



Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.02		0.02
5.00	0.02		0.02
5.50	0.02		0.02
6.00	0.03		0.03
6.50	0.03		0.03
7.00	0.03		0.03
7.50	0.04		0.04
8.00	0.05		0.05
8.50	0.06		0.06
9.00	0.07		0.07
9.50	0.09		0.09
10.00	0.12		0.12
10.50	0.16		0.16
11.00	0.25		0.25
11.50	0.46		0.46
12.00	**1.50**		**1.50**
12.50	**1.76**		**1.76**
13.00	0.71		0.71
13.50	0.45		0.45
14.00	0.32		0.32
14.50	0.27		0.27
15.00	0.23		0.23
15.50	0.19		0.19
16.00	0.18		0.18
16.50	0.16		0.16
17.00	0.15		0.15
17.50	0.14		0.14
18.00	0.12		0.12
18.50	0.11		0.11
19.00	0.11		0.11
19.50	0.11		0.11
20.00	0.10		0.10
20.50	0.10		0.10
21.00	0.10		0.10
21.50	0.09		0.09
22.00	0.09		0.09
22.50	0.08		0.08
23.00	0.08		0.08
23.50	0.08		0.08
24.00	0.07		0.07

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth>2.42"
Flow Length=491' Tc=17.1 min CN=WQ Runoff=3.45 cfs 0.363 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth>3.49"
Flow Length=180' Slope=0.0160 '/' Tc=7.4 min CN=WQ Runoff=1.46 cfs 0.123 af

Pond 4P: AquaShield Inflow=4.32 cfs 0.486 af
Primary=4.32 cfs 0.486 af

Total Runoff Area = 2.221 ac Runoff Volume = 0.486 af Average Runoff Depth = 2.63"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

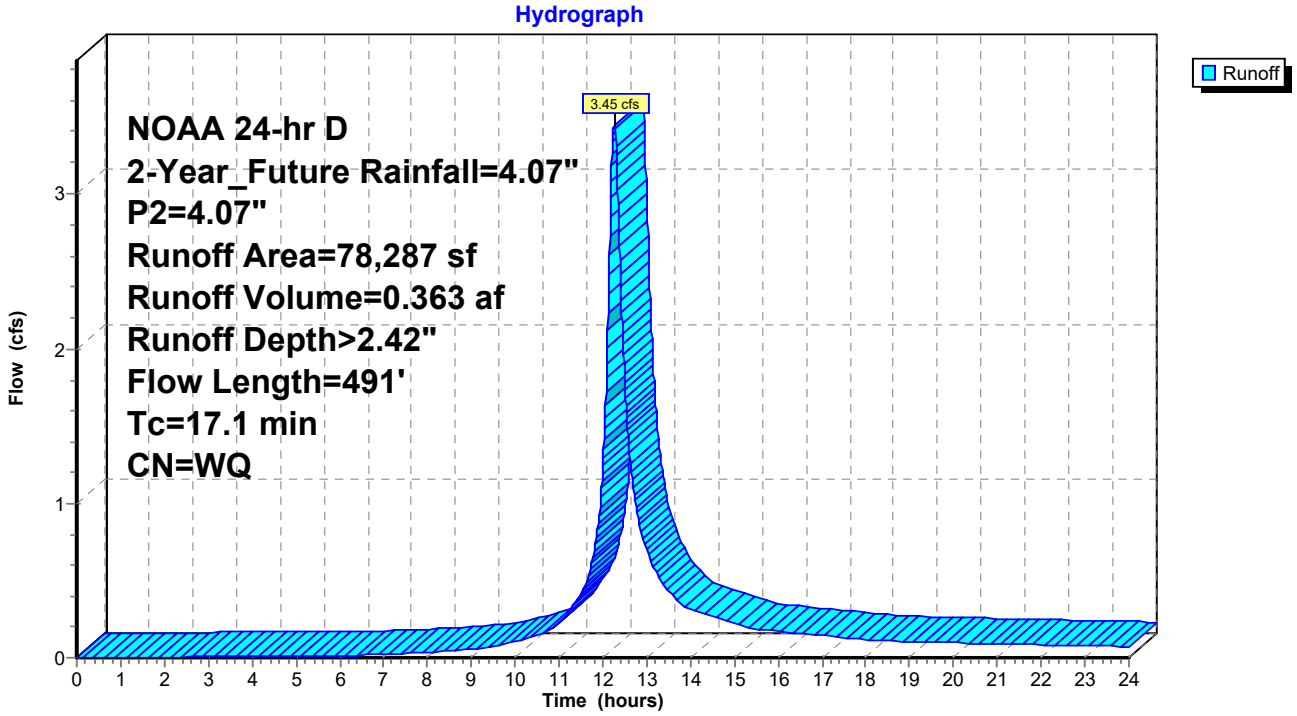
Runoff = 3.45 cfs @ 12.26 hrs, Volume= 0.363 af, Depth> 2.42"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0543	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.1	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.01
3.00	0.15	0.00	0.01
3.50	0.18	0.00	0.01
4.00	0.21	0.00	0.01
4.50	0.25	0.00	0.01
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.00	0.02
7.00	0.43	0.00	0.02
7.50	0.48	0.00	0.03
8.00	0.53	0.01	0.04
8.50	0.58	0.01	0.05
9.00	0.65	0.02	0.06
9.50	0.72	0.04	0.08
10.00	0.81	0.06	0.10
10.50	0.91	0.10	0.14
11.00	1.06	0.16	0.22
11.50	1.29	0.26	0.41
12.00	1.95	0.66	**1.24**
12.50	2.78	1.27	**1.78**
13.00	3.01	1.46	0.69
13.50	3.16	1.58	0.44
14.00	3.26	1.66	0.31
14.50	3.35	1.73	0.27
15.00	3.42	1.80	0.22
15.50	3.49	1.85	0.19
16.00	3.54	1.89	0.17
16.50	3.59	1.94	0.16
17.00	3.64	1.98	0.15
17.50	3.68	2.01	0.13
18.00	3.72	2.05	0.12
18.50	3.76	2.08	0.11
19.00	3.79	2.11	0.11
19.50	3.82	2.13	0.10
20.00	3.86	2.16	0.10
20.50	3.89	2.19	0.10
21.00	3.92	2.21	0.09
21.50	3.95	2.24	0.09
22.00	3.97	2.26	0.08
22.50	4.00	2.28	0.08
23.00	4.02	2.31	0.08
23.50	4.05	2.33	0.07
24.00	**4.07**	**2.35**	0.07

Summary for Subcatchment 15S: PO-DA M

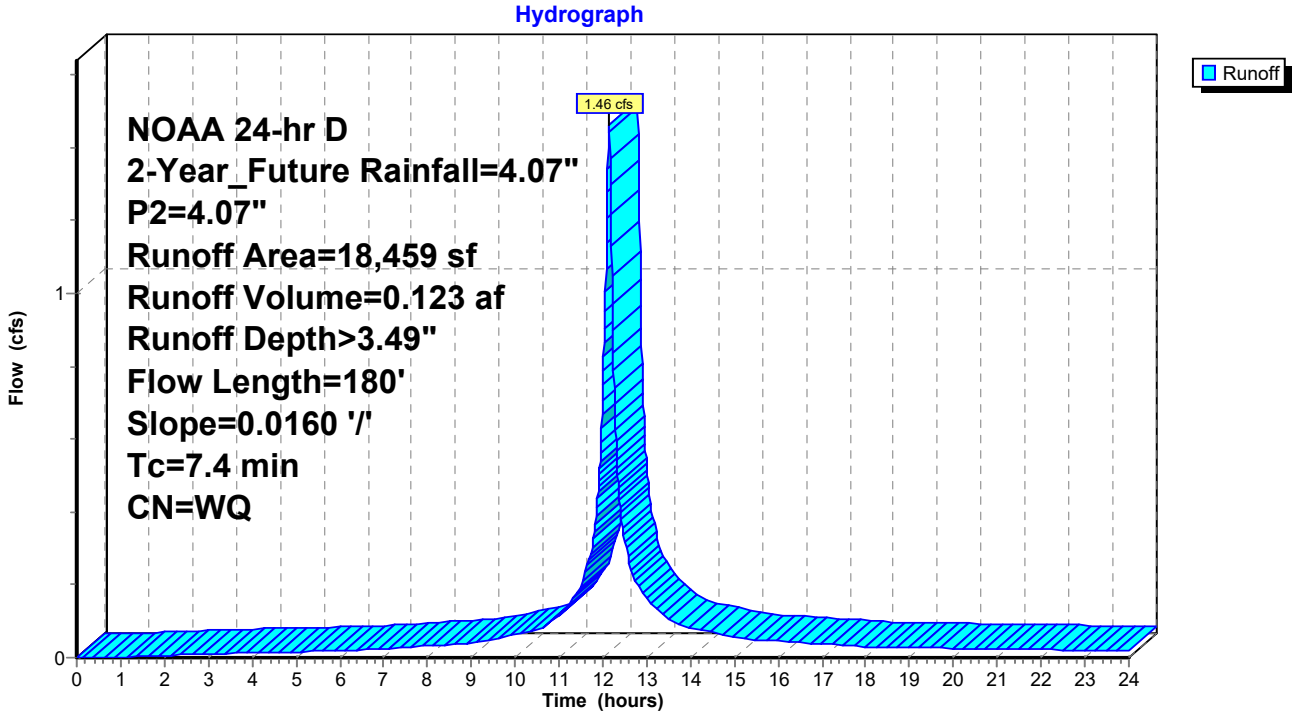
Runoff = 1.46 cfs @ 12.14 hrs, Volume= 0.123 af, Depth> 3.49"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.0160	0.24		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
7.4	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

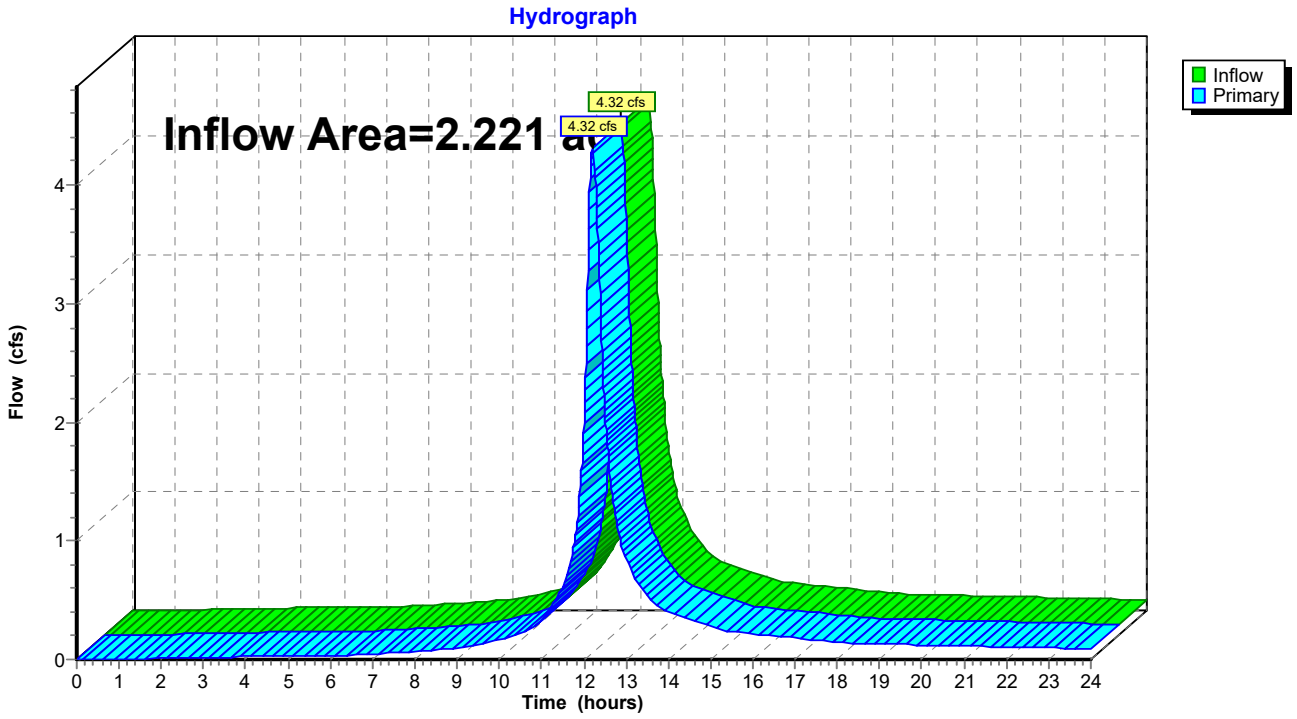
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.01
2.50	0.12	0.00	0.01
3.00	0.15	0.00	0.01
3.50	0.18	0.01	0.01
4.00	0.21	0.02	0.01
4.50	0.25	0.03	0.02
5.00	0.28	0.04	0.02
5.50	0.31	0.06	0.02
6.00	0.35	0.08	0.02
6.50	0.39	0.10	0.02
7.00	0.43	0.12	0.03
7.50	0.48	0.15	0.03
8.00	0.53	0.19	0.03
8.50	0.58	0.23	0.04
9.00	0.65	0.27	0.04
9.50	0.72	0.33	0.05
10.00	0.81	0.40	0.06
10.50	0.91	0.49	0.08
11.00	1.06	0.61	0.12
11.50	1.29	0.82	0.19
12.00	1.95	1.44	**0.75**
12.50	2.78	2.23	**0.32**
13.00	3.01	2.46	0.17
13.50	3.16	2.60	0.11
14.00	3.26	2.71	0.08
14.50	3.35	2.79	0.07
15.00	3.42	2.86	0.06
15.50	3.49	2.92	0.05
16.00	3.54	2.98	0.05
16.50	3.59	3.03	0.04
17.00	3.64	3.08	0.04
17.50	3.68	3.12	0.03
18.00	3.72	3.16	0.03
18.50	3.76	3.19	0.03
19.00	3.79	3.23	0.03
19.50	3.82	3.26	0.03
20.00	3.86	3.29	0.03
20.50	3.89	3.32	0.03
21.00	3.92	3.35	0.02
21.50	3.95	3.38	0.02
22.00	3.97	3.40	0.02
22.50	4.00	3.43	0.02
23.00	4.02	3.45	0.02
23.50	4.05	3.48	0.02
24.00	**4.07**	**3.50**	0.02

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth > 2.63" for 2-Year_Future event
Inflow = 4.32 cfs @ 12.21 hrs, Volume= 0.486 af
Primary = 4.32 cfs @ 12.21 hrs, Volume= 0.486 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield



Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.02		0.02
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.03		0.03
5.00	0.03		0.03
5.50	0.03		0.03
6.00	0.03		0.03
6.50	0.04		0.04
7.00	0.05		0.05
7.50	0.06		0.06
8.00	0.07		0.07
8.50	0.08		0.08
9.00	0.10		0.10
9.50	0.13		0.13
10.00	0.17		0.17
10.50	0.22		0.22
11.00	0.34		0.34
11.50	0.61		0.61
12.00	**1.99**		**1.99**
12.50	**2.10**		**2.10**
13.00	0.86		0.86
13.50	0.54		0.54
14.00	0.40		0.40
14.50	0.33		0.33
15.00	0.28		0.28
15.50	0.23		0.23
16.00	0.22		0.22
16.50	0.20		0.20
17.00	0.18		0.18
17.50	0.17		0.17
18.00	0.15		0.15
18.50	0.14		0.14
19.00	0.13		0.13
19.50	0.13		0.13
20.00	0.12		0.12
20.50	0.12		0.12
21.00	0.12		0.12
21.50	0.11		0.11
22.00	0.11		0.11
22.50	0.10		0.10
23.00	0.10		0.10
23.50	0.09		0.09
24.00	0.09		0.09

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth>3.57"
Flow Length=491' Tc=18.2 min CN=WQ Runoff=4.94 cfs 0.535 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth>4.76"
Flow Length=180' Slope=0.0160 '/' Tc=8.0 min CN=WQ Runoff=1.94 cfs 0.168 af

Pond 4P: AquaShield Inflow=6.09 cfs 0.703 af
Primary=6.09 cfs 0.703 af

Total Runoff Area = 2.221 ac Runoff Volume = 0.703 af Average Runoff Depth = 3.80"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

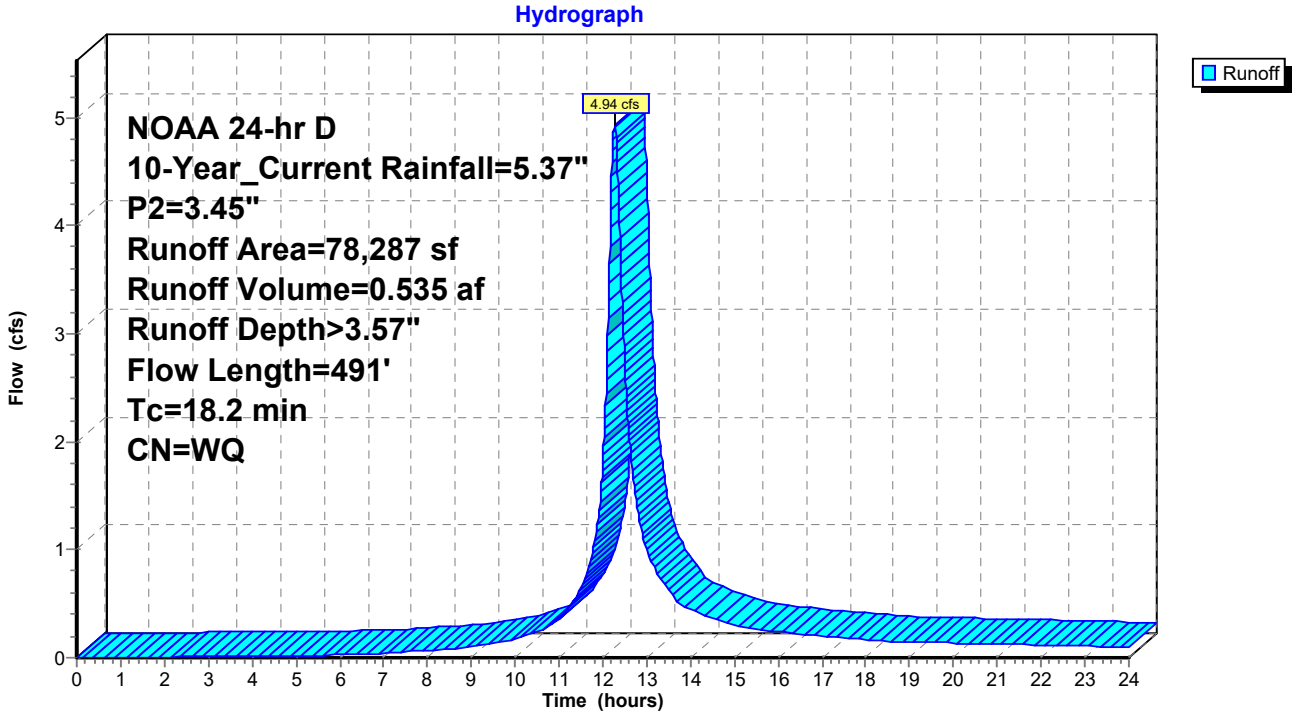
Runoff = 4.94 cfs @ 12.27 hrs, Volume= 0.535 af, Depth> 3.57"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.2	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.01
2.50	0.16	0.00	0.01
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.02
5.00	0.37	0.00	0.02
5.50	0.41	0.00	0.02
6.00	0.46	0.00	0.03
6.50	0.51	0.00	0.03
7.00	0.57	0.01	0.04
7.50	0.63	0.02	0.05
8.00	0.70	0.04	0.07
8.50	0.77	0.05	0.08
9.00	0.85	0.08	0.10
9.50	0.95	0.11	0.13
10.00	1.06	0.16	0.18
10.50	1.20	0.22	0.24
11.00	1.40	0.32	0.37
11.50	1.70	0.50	0.65
12.00	2.57	1.11	**1.81**
12.50	3.67	2.00	**2.72**
13.00	3.97	2.26	1.01
13.50	4.17	2.43	0.62
14.00	4.31	2.55	0.44
14.50	4.42	2.66	0.38
15.00	4.52	2.74	0.31
15.50	4.60	2.81	0.26
16.00	4.67	2.88	0.24
16.50	4.74	2.94	0.22
17.00	4.80	3.00	0.20
17.50	4.86	3.05	0.18
18.00	4.91	3.09	0.17
18.50	4.96	3.14	0.15
19.00	5.00	3.18	0.15
19.50	5.05	3.22	0.14
20.00	5.09	3.25	0.14
20.50	5.13	3.29	0.13
21.00	5.17	3.33	0.13
21.50	5.21	3.36	0.12
22.00	5.24	3.39	0.12
22.50	5.28	3.42	0.11
23.00	5.31	3.45	0.11
23.50	5.34	3.48	0.10
24.00	**5.37**	**3.51**	0.10

Summary for Subcatchment 15S: PO-DA M

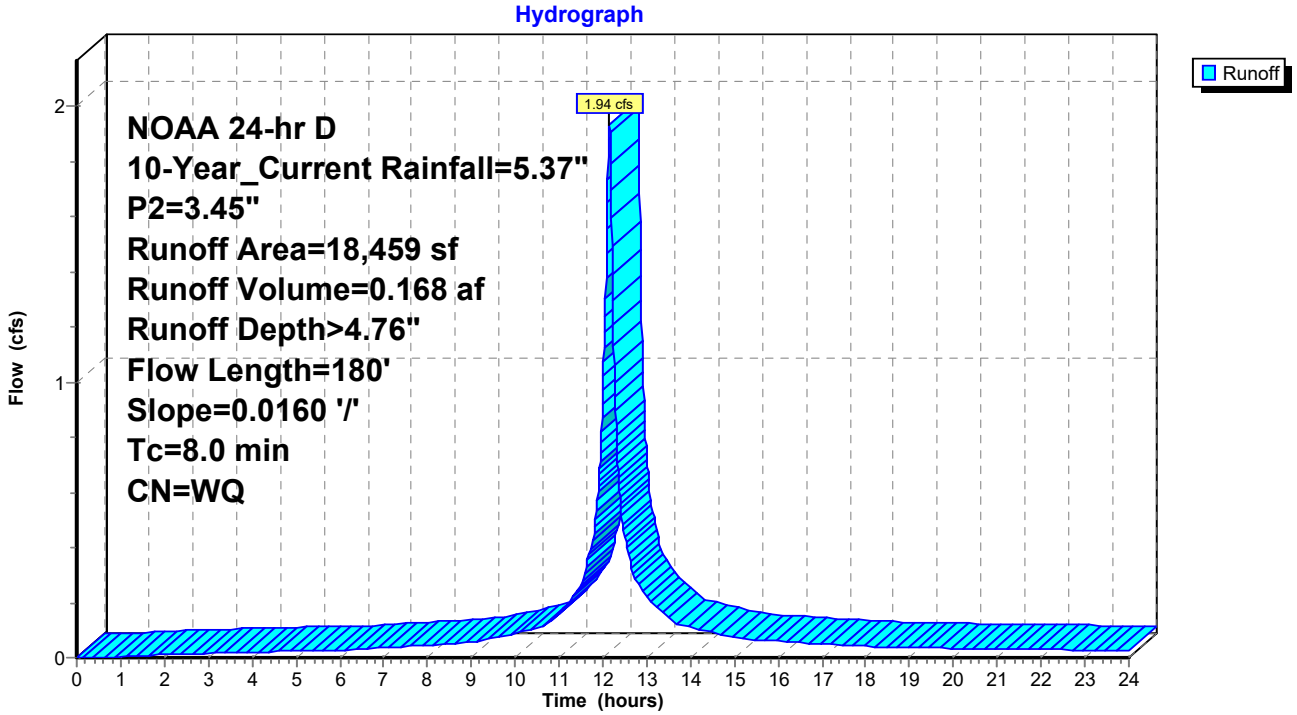
Runoff = 1.94 cfs @ 12.15 hrs, Volume= 0.168 af, Depth> 4.76"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
8.0	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

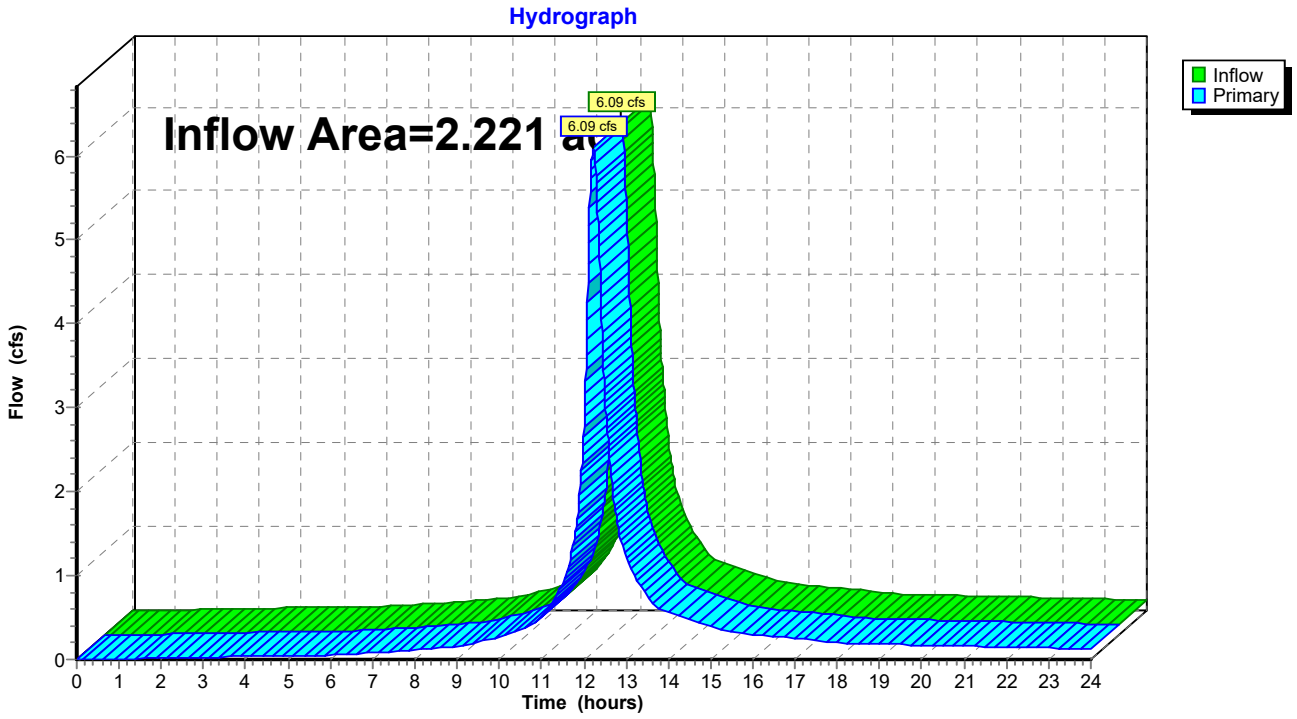
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.01
2.00	0.13	0.00	0.01
2.50	0.16	0.01	0.01
3.00	0.20	0.02	0.02
3.50	0.24	0.03	0.02
4.00	0.28	0.04	0.02
4.50	0.32	0.06	0.02
5.00	0.37	0.09	0.02
5.50	0.41	0.11	0.03
6.00	0.46	0.14	0.03
6.50	0.51	0.18	0.03
7.00	0.57	0.21	0.04
7.50	0.63	0.26	0.04
8.00	0.70	0.31	0.05
8.50	0.77	0.37	0.05
9.00	0.85	0.44	0.06
9.50	0.95	0.52	0.07
10.00	1.06	0.62	0.09
10.50	1.20	0.74	0.11
11.00	1.40	0.92	0.16
11.50	1.70	1.20	0.26
12.00	2.57	2.03	**0.97**
12.50	3.67	3.10	**0.43**
13.00	3.97	3.41	0.22
13.50	4.17	3.60	0.14
14.00	4.31	3.73	0.11
14.50	4.42	3.85	0.09
15.00	4.52	3.94	0.08
15.50	4.60	4.02	0.07
16.00	4.67	4.10	0.06
16.50	4.74	4.16	0.06
17.00	4.80	4.23	0.05
17.50	4.86	4.28	0.05
18.00	4.91	4.33	0.04
18.50	4.96	4.38	0.04
19.00	5.00	4.42	0.04
19.50	5.05	4.47	0.04
20.00	5.09	4.51	0.03
20.50	5.13	4.55	0.03
21.00	5.17	4.59	0.03
21.50	5.21	4.62	0.03
22.00	5.24	4.66	0.03
22.50	5.28	4.69	0.03
23.00	5.31	4.73	0.03
23.50	5.34	4.76	0.03
24.00	**5.37**	**4.79**	0.02

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth > 3.80" for 10-Year_Current event
Inflow = 6.09 cfs @ 12.23 hrs, Volume= 0.703 af
Primary = 6.09 cfs @ 12.23 hrs, Volume= 0.703 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield



Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.02		0.02
2.50	0.02		0.02
3.00	0.03		0.03
3.50	0.03		0.03
4.00	0.03		0.03
4.50	0.04		0.04
5.00	0.04		0.04
5.50	0.05		0.05
6.00	0.05		0.05
6.50	0.06		0.06
7.00	0.08		0.08
7.50	0.10		0.10
8.00	0.11		0.11
8.50	0.13		0.13
9.00	0.16		0.16
9.50	0.21		0.21
10.00	0.27		0.27
10.50	0.34		0.34
11.00	0.53		0.53
11.50	0.91		0.91
12.00	**2.78**		**2.78**
12.50	**3.15**		**3.15**
13.00	1.24		1.24
13.50	0.77		0.77
14.00	0.55		0.55
14.50	0.47		0.47
15.00	0.38		0.38
15.50	0.33		0.33
16.00	0.30		0.30
16.50	0.28		0.28
17.00	0.25		0.25
17.50	0.23		0.23
18.00	0.21		0.21
18.50	0.19		0.19
19.00	0.18		0.18
19.50	0.18		0.18
20.00	0.17		0.17
20.50	0.17		0.17
21.00	0.16		0.16
21.50	0.15		0.15
22.00	0.15		0.15
22.50	0.14		0.14
23.00	0.14		0.14
23.50	0.13		0.13
24.00	0.12		0.12

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth>4.48"
Flow Length=491' Tc=17.1 min CN=WQ Runoff=6.33 cfs 0.671 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth>5.73"
Flow Length=180' Slope=0.0160 '/' Tc=7.4 min CN=WQ Runoff=2.37 cfs 0.202 af

Pond 4P: AquaShield Inflow=7.73 cfs 0.873 af
Primary=7.73 cfs 0.873 af

Total Runoff Area = 2.221 ac Runoff Volume = 0.873 af Average Runoff Depth = 4.72"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

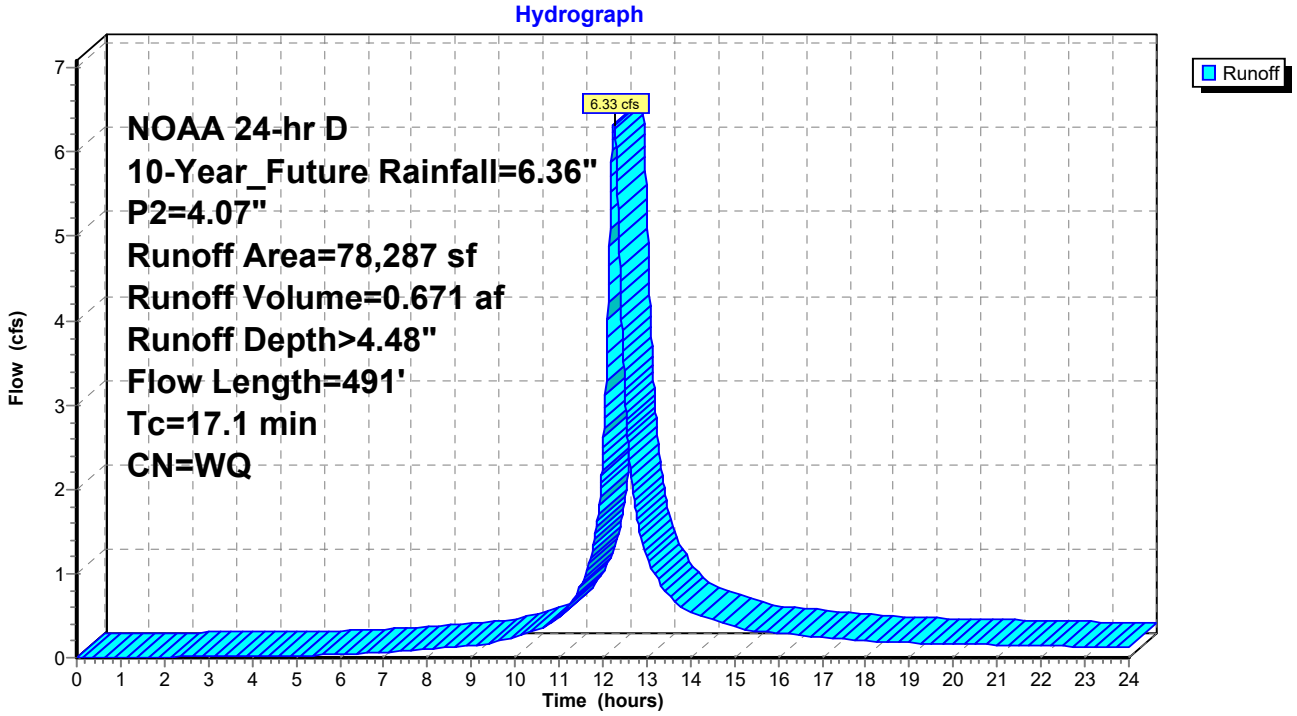
Runoff = 6.33 cfs @ 12.25 hrs, Volume= 0.671 af, Depth> 4.48"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0543	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.1	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.01
2.00	0.15	0.00	0.01
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.02
4.00	0.33	0.00	0.02
4.50	0.38	0.00	0.02
5.00	0.43	0.00	0.03
5.50	0.49	0.00	0.03
6.00	0.54	0.01	0.04
6.50	0.60	0.02	0.05
7.00	0.67	0.03	0.06
7.50	0.74	0.05	0.08
8.00	0.83	0.07	0.10
8.50	0.91	0.10	0.12
9.00	1.01	0.14	0.14
9.50	1.12	0.18	0.19
10.00	1.26	0.25	0.25
10.50	1.42	0.34	0.32
11.00	1.65	0.47	0.49
11.50	2.02	0.71	0.85
12.00	3.05	1.48	**2.40**
12.50	4.34	2.59	**3.19**
13.00	4.71	2.91	1.20
13.50	4.94	3.12	0.75
14.00	5.10	3.26	0.54
14.50	5.24	3.39	0.46
15.00	5.35	3.49	0.37
15.50	5.45	3.58	0.32
16.00	5.53	3.66	0.29
16.50	5.62	3.74	0.27
17.00	5.69	3.80	0.25
17.50	5.76	3.87	0.22
18.00	5.82	3.92	0.20
18.50	5.87	3.97	0.18
19.00	5.93	4.02	0.18
19.50	5.98	4.07	0.17
20.00	6.03	4.12	0.17
20.50	6.07	4.16	0.16
21.00	6.12	4.20	0.15
21.50	6.16	4.24	0.15
22.00	6.21	4.28	0.14
22.50	6.25	4.32	0.14
23.00	6.29	4.36	0.13
23.50	6.32	4.39	0.13
24.00	**6.36**	**4.43**	0.12

Summary for Subcatchment 15S: PO-DA M

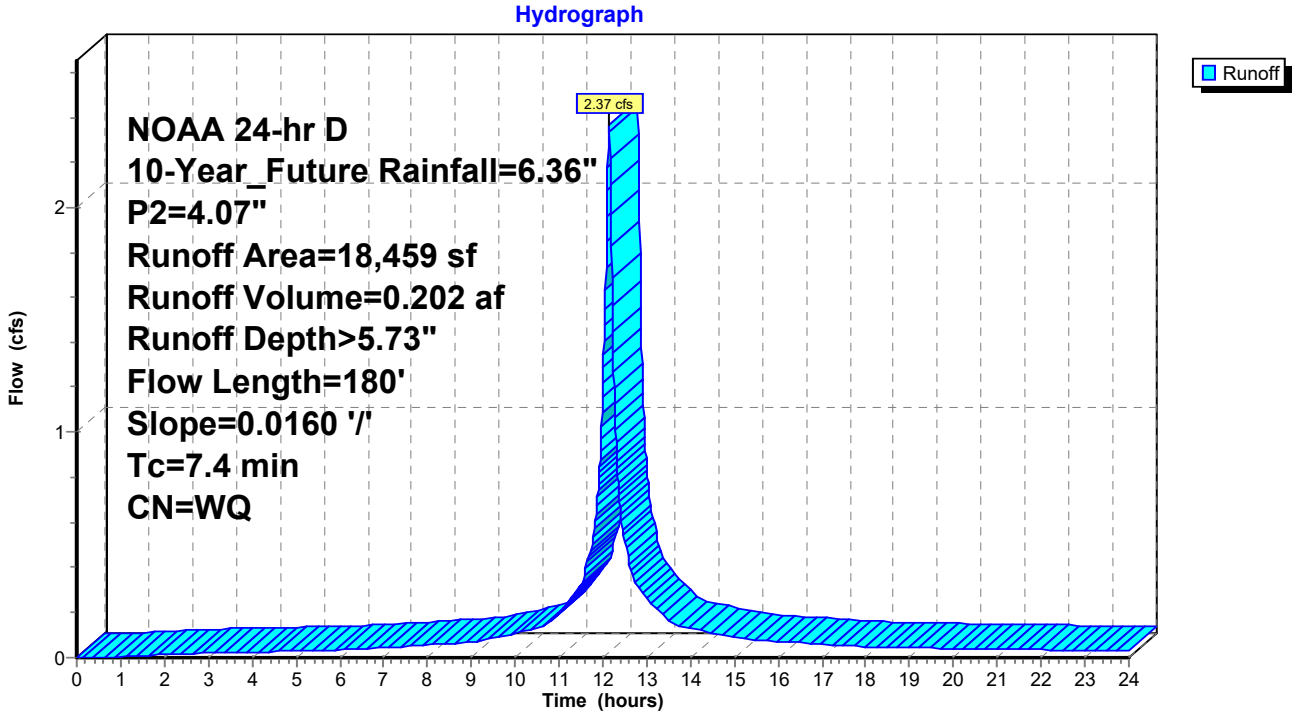
Runoff = 2.37 cfs @ 12.14 hrs, Volume= 0.202 af, Depth> 5.73"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.0160	0.24		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
7.4	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

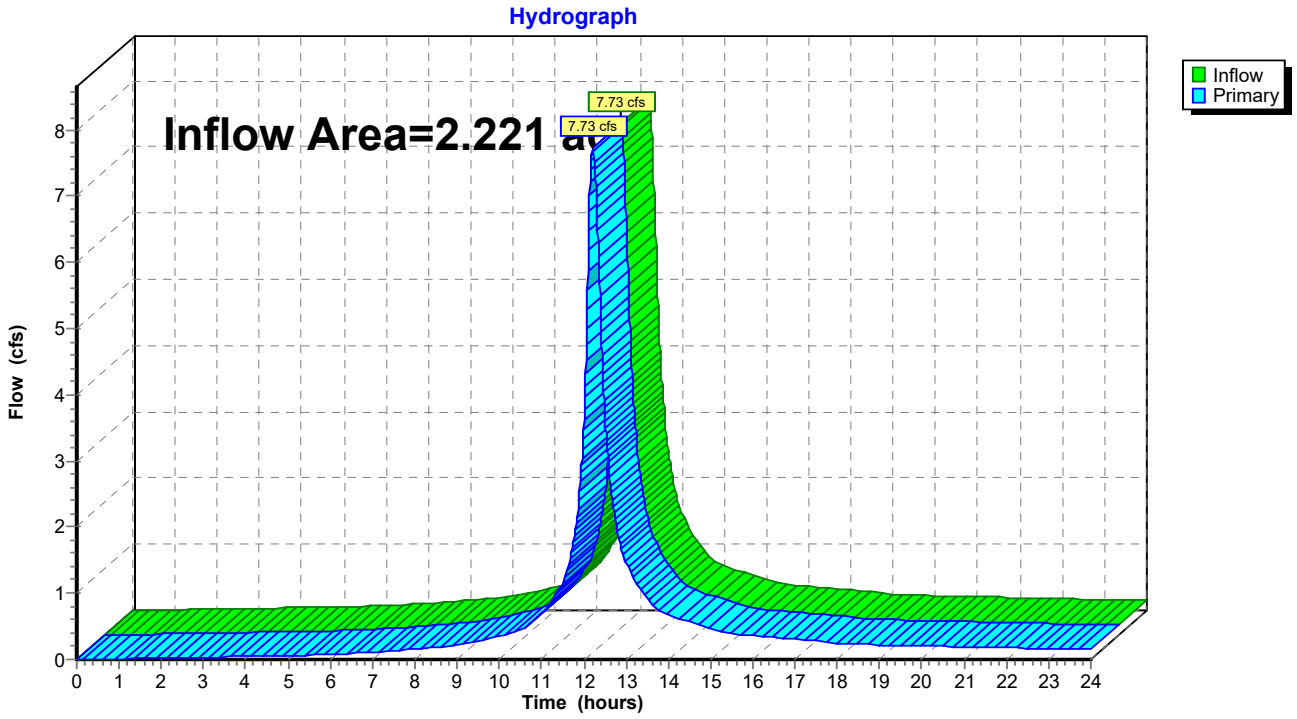
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.01
2.00	0.15	0.00	0.01
2.50	0.20	0.01	0.02
3.00	0.24	0.03	0.02
3.50	0.29	0.05	0.02
4.00	0.33	0.07	0.03
4.50	0.38	0.10	0.03
5.00	0.43	0.13	0.03
5.50	0.49	0.16	0.03
6.00	0.54	0.20	0.03
6.50	0.60	0.24	0.04
7.00	0.67	0.29	0.05
7.50	0.74	0.35	0.05
8.00	0.83	0.42	0.06
8.50	0.91	0.49	0.06
9.00	1.01	0.57	0.07
9.50	1.12	0.67	0.09
10.00	1.26	0.79	0.11
10.50	1.42	0.94	0.13
11.00	1.65	1.16	0.20
11.50	2.02	1.50	0.32
12.00	3.05	2.50	**1.22**
12.50	4.34	3.77	**0.51**
13.00	4.71	4.13	0.27
13.50	4.94	4.36	0.17
14.00	5.10	4.52	0.13
14.50	5.24	4.66	0.11
15.00	5.35	4.77	0.09
15.50	5.45	4.86	0.08
16.00	5.53	4.95	0.07
16.50	5.62	5.03	0.07
17.00	5.69	5.10	0.06
17.50	5.76	5.17	0.05
18.00	5.82	5.23	0.05
18.50	5.87	5.28	0.05
19.00	5.93	5.34	0.04
19.50	5.98	5.39	0.04
20.00	6.03	5.44	0.04
20.50	6.07	5.49	0.04
21.00	6.12	5.53	0.04
21.50	6.16	5.58	0.04
22.00	6.21	5.62	0.04
22.50	6.25	5.66	0.03
23.00	6.29	5.70	0.03
23.50	6.32	5.73	0.03
24.00	**6.36**	**5.77**	0.03

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth > 4.72" for 10-Year_Future event
Inflow = 7.73 cfs @ 12.21 hrs, Volume= 0.873 af
Primary = 7.73 cfs @ 12.21 hrs, Volume= 0.873 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield



Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.02		0.02
2.00	0.02		0.02
2.50	0.03		0.03
3.00	0.04		0.04
3.50	0.04		0.04
4.00	0.04		0.04
4.50	0.05		0.05
5.00	0.06		0.06
5.50	0.06		0.06
6.00	0.07		0.07
6.50	0.09		0.09
7.00	0.11		0.11
7.50	0.13		0.13
8.00	0.16		0.16
8.50	0.18		0.18
9.00	0.21		0.21
9.50	0.28		0.28
10.00	0.36		0.36
10.50	0.45		0.45
11.00	0.69		0.69
11.50	1.17		1.17
12.00	**3.63**		**3.63**
12.50	**3.70**		**3.70**
13.00	1.47		1.47
13.50	0.92		0.92
14.00	0.67		0.67
14.50	0.57		0.57
15.00	0.46		0.46
15.50	0.39		0.39
16.00	0.36		0.36
16.50	0.34		0.34
17.00	0.31		0.31
17.50	0.28		0.28
18.00	0.25		0.25
18.50	0.23		0.23
19.00	0.22		0.22
19.50	0.21		0.21
20.00	0.21		0.21
20.50	0.20		0.20
21.00	0.19		0.19
21.50	0.19		0.19
22.00	0.18		0.18
22.50	0.17		0.17
23.00	0.16		0.16
23.50	0.16		0.16
24.00	0.15		0.15

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth>7.18"
Flow Length=491' Tc=18.2 min CN=WQ Runoff=9.73 cfs 1.076 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth>8.56"
Flow Length=180' Slope=0.0160 '/' Tc=8.0 min CN=WQ Runoff=3.42 cfs 0.302 af

Pond 4P: AquaShield Inflow=11.79 cfs 1.378 af
Primary=11.79 cfs 1.378 af

Total Runoff Area = 2.221 ac Runoff Volume = 1.378 af Average Runoff Depth = 7.45"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

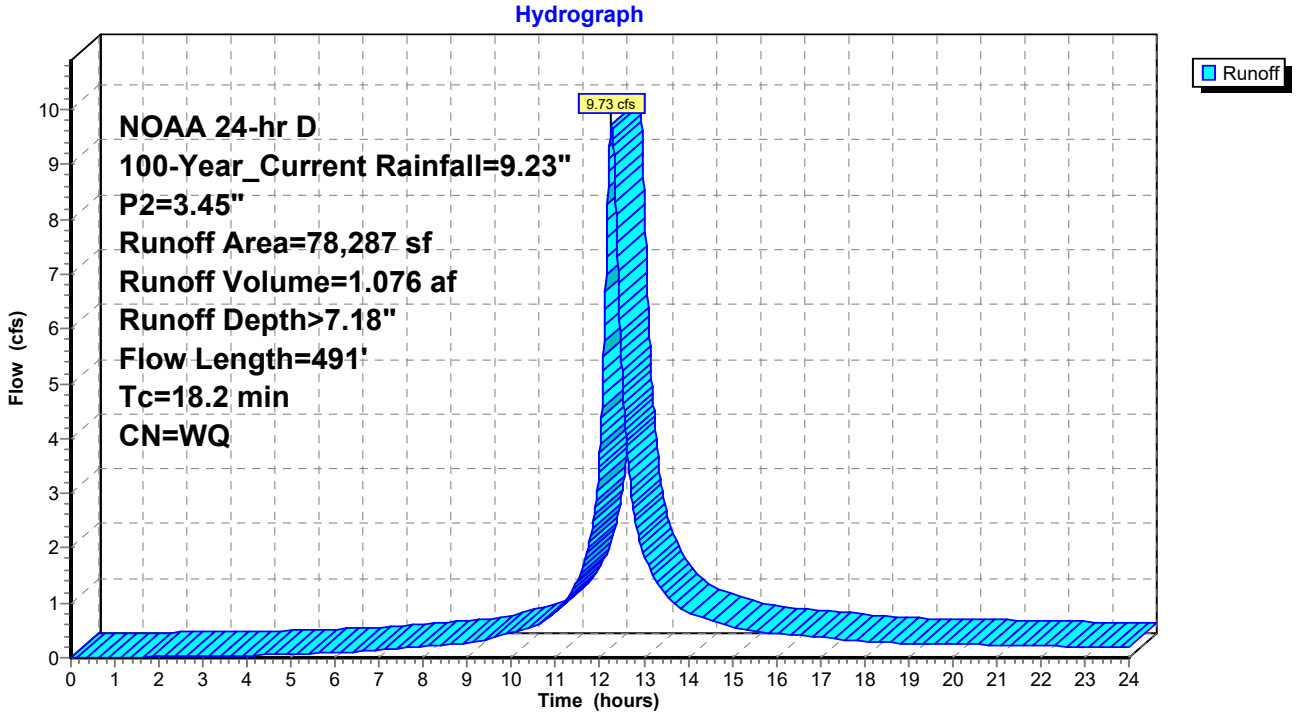
Runoff = 9.73 cfs @ 12.27 hrs, Volume= 1.076 af, Depth> 7.18"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0543	0.12		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.2	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.02
2.50	0.28	0.00	0.02
3.00	0.35	0.00	0.02
3.50	0.41	0.00	0.03
4.00	0.48	0.00	0.04
4.50	0.56	0.01	0.05
5.00	0.63	0.02	0.07
5.50	0.71	0.04	0.08
6.00	0.79	0.06	0.09
6.50	0.88	0.09	0.11
7.00	0.97	0.12	0.14
7.50	1.08	0.17	0.17
8.00	1.20	0.22	0.21
8.50	1.33	0.28	0.24
9.00	1.46	0.36	0.28
9.50	1.63	0.45	0.35
10.00	1.83	0.58	0.46
10.50	2.07	0.74	0.58
11.00	2.40	0.98	0.85
11.50	2.93	1.39	1.43
12.00	4.42	2.66	**3.75**
12.50	6.30	4.37	**5.24**
13.00	6.83	4.87	1.90
13.50	7.16	5.18	1.17
14.00	7.40	5.41	0.83
14.50	7.60	5.60	0.70
15.00	7.77	5.75	0.57
15.50	7.90	5.89	0.48
16.00	8.03	6.01	0.44
16.50	8.15	6.12	0.41
17.00	8.26	6.22	0.37
17.50	8.35	6.32	0.34
18.00	8.44	6.40	0.30
18.50	8.52	6.48	0.28
19.00	8.60	6.55	0.27
19.50	8.67	6.62	0.26
20.00	8.75	6.69	0.25
20.50	8.82	6.76	0.24
21.00	8.88	6.82	0.23
21.50	8.95	6.89	0.22
22.00	9.01	6.94	0.22
22.50	9.07	7.00	0.21
23.00	9.12	7.06	0.20
23.50	9.18	7.11	0.19
24.00	**9.23**	**7.16**	0.18

Summary for Subcatchment 15S: PO-DA M

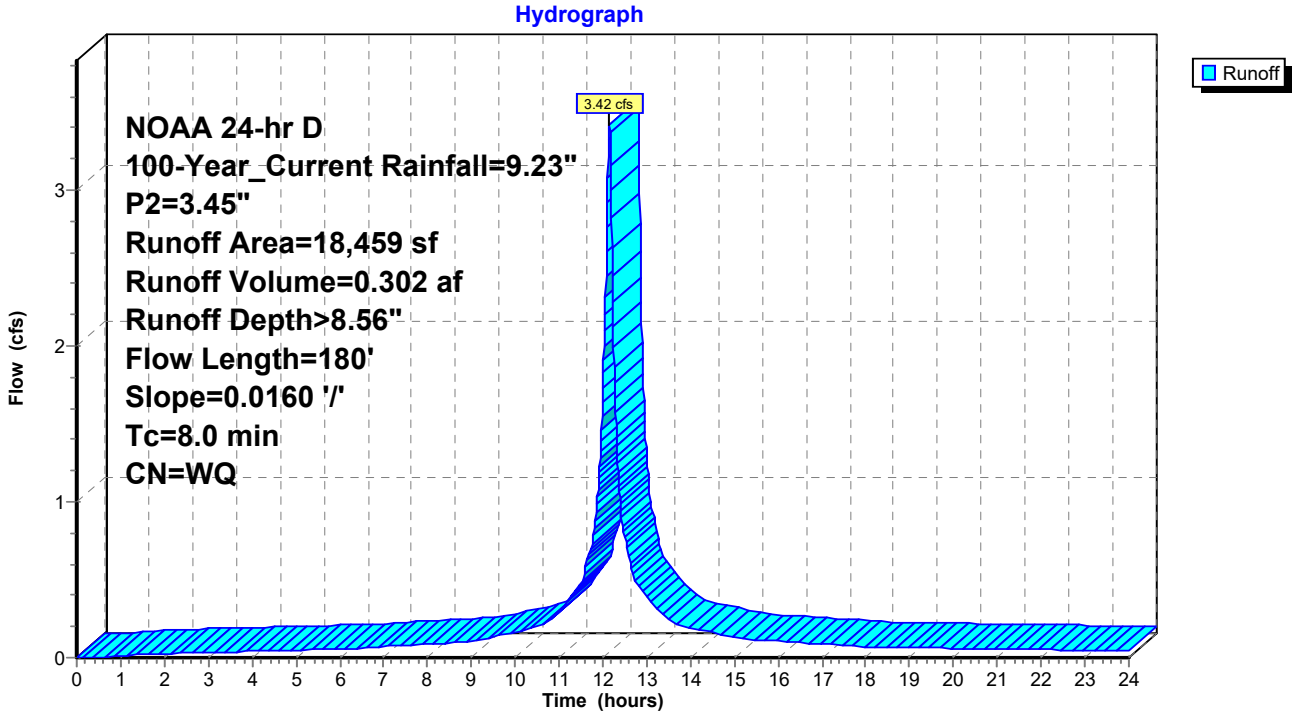
Runoff = 3.42 cfs @ 12.15 hrs, Volume= 0.302 af, Depth> 8.56"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0160	0.22		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
8.0	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

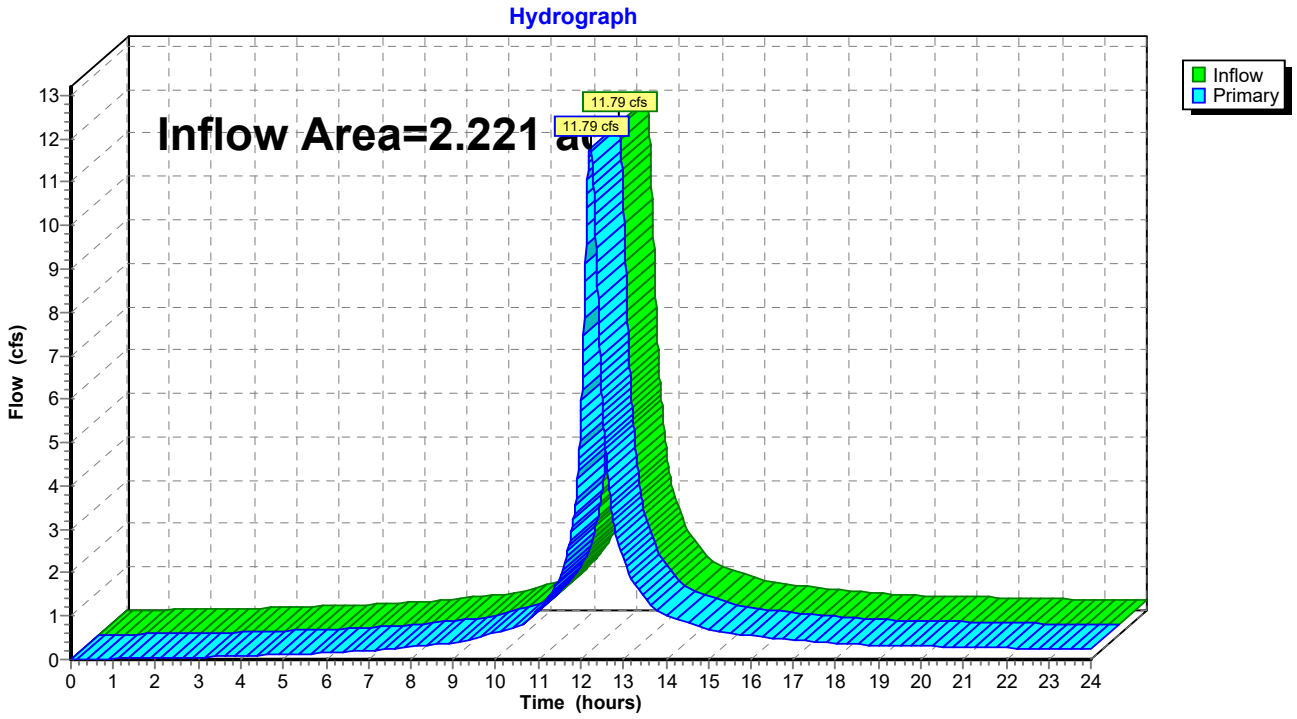
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.01	0.02
2.00	0.22	0.02	0.03
2.50	0.28	0.05	0.03
3.00	0.35	0.08	0.03
3.50	0.41	0.11	0.04
4.00	0.48	0.16	0.04
4.50	0.56	0.21	0.05
5.00	0.63	0.26	0.05
5.50	0.71	0.32	0.05
6.00	0.79	0.39	0.05
6.50	0.88	0.46	0.06
7.00	0.97	0.54	0.07
7.50	1.08	0.63	0.08
8.00	1.20	0.74	0.09
8.50	1.33	0.85	0.10
9.00	1.46	0.98	0.11
9.50	1.63	1.13	0.13
10.00	1.83	1.32	0.16
10.50	2.07	1.55	0.19
11.00	2.40	1.87	0.29
11.50	2.93	2.38	0.48
12.00	4.42	3.85	**1.74**
12.50	6.30	5.71	**0.76**
13.00	6.83	6.24	0.39
13.50	7.16	6.57	0.25
14.00	7.40	6.80	0.19
14.50	7.60	7.00	0.16
15.00	7.77	7.17	0.13
15.50	7.90	7.31	0.11
16.00	8.03	7.43	0.11
16.50	8.15	7.55	0.10
17.00	8.26	7.66	0.09
17.50	8.35	7.75	0.08
18.00	8.44	7.84	0.07
18.50	8.52	7.92	0.07
19.00	8.60	8.00	0.06
19.50	8.67	8.07	0.06
20.00	8.75	8.14	0.06
20.50	8.82	8.21	0.06
21.00	8.88	8.28	0.06
21.50	8.95	8.34	0.05
22.00	9.01	8.41	0.05
22.50	9.07	8.47	0.05
23.00	9.12	8.52	0.05
23.50	9.18	8.58	0.05
24.00	**9.23**	**8.63**	0.04

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth > 7.45" for 100-Year_Current event
Inflow = 11.79 cfs @ 12.23 hrs, Volume= 1.378 af
Primary = 11.79 cfs @ 12.23 hrs, Volume= 1.378 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield



Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.02		0.02
1.50	0.03		0.03
2.00	0.04		0.04
2.50	0.05		0.05
3.00	0.06		0.06
3.50	0.07		0.07
4.00	0.08		0.08
4.50	0.10		0.10
5.00	0.11		0.11
5.50	0.13		0.13
6.00	0.15		0.15
6.50	0.17		0.17
7.00	0.21		0.21
7.50	0.25		0.25
8.00	0.29		0.29
8.50	0.34		0.34
9.00	0.39		0.39
9.50	0.49		0.49
10.00	0.62		0.62
10.50	0.77		0.77
11.00	1.14		1.14
11.50	1.90		1.90
12.00	**5.48**		**5.48**
12.50	**6.00**		**6.00**
13.00	2.29		2.29
13.50	1.42		1.42
14.00	1.02		1.02
14.50	0.86		0.86
15.00	0.70		0.70
15.50	0.59		0.59
16.00	0.55		0.55
16.50	0.51		0.51
17.00	0.46		0.46
17.50	0.42		0.42
18.00	0.37		0.37
18.50	0.34		0.34
19.00	0.33		0.33
19.50	0.32		0.32
20.00	0.31		0.31
20.50	0.30		0.30
21.00	0.29		0.29
21.50	0.28		0.28
22.00	0.27		0.27
22.50	0.26		0.26
23.00	0.25		0.25
23.50	0.23		0.23
24.00	0.22		0.22

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment3S: PO-DA A Runoff Area=78,287 sf 12.62% Impervious Runoff Depth>9.45"
Flow Length=491' Tc=17.1 min CN=WQ Runoff=12.98 cfs 1.415 af

Subcatchment15S: PO-DA M Runoff Area=18,459 sf 73.95% Impervious Runoff Depth>10.90"
Flow Length=180' Slope=0.0160 '/' Tc=7.4 min CN=WQ Runoff=4.42 cfs 0.385 af

Pond 4P: AquaShield Inflow=15.60 cfs 1.800 af
Primary=15.60 cfs 1.800 af

Total Runoff Area = 2.221 ac Runoff Volume = 1.800 af Average Runoff Depth = 9.73"
75.68% Pervious = 1.681 ac 24.32% Impervious = 0.540 ac

Summary for Subcatchment 3S: PO-DA A

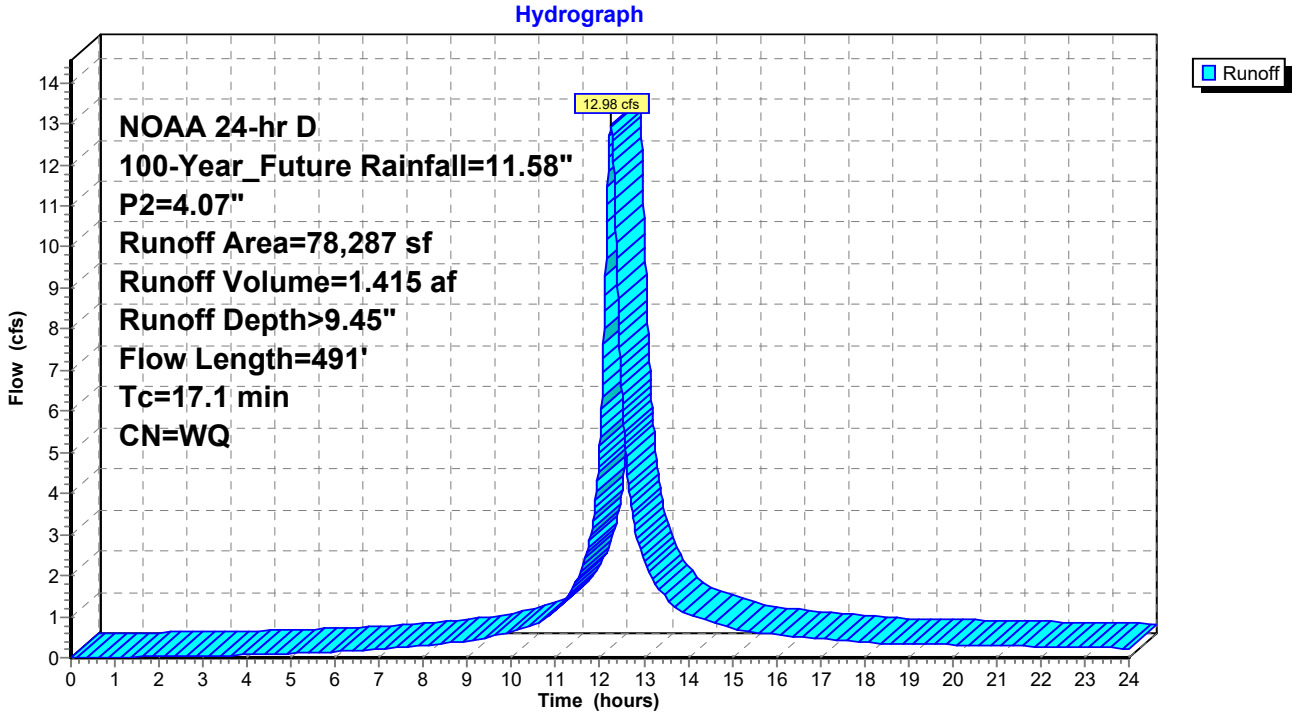
Runoff = 12.98 cfs @ 12.25 hrs, Volume= 1.415 af, Depth> 9.45"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	9,878	98	Impervious, Pavement, HSG D
	14,245	80	>75% Grass cover, Good, HSG D
*	39,395	85	Yard Stone/Gravel Pad, HSG D
	14,769	73	Brush, Good, HSG D
	78,287		Weighted Average
	68,409		87.38% Pervious Area
	9,878		12.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0543	0.13		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.7	67	0.0540	1.63		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
0.1	43	0.2810	8.53		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
3.5	281	0.0069	1.34		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.1	491	Total			

Subcatchment 3S: PO-DA A



Hydrograph for Subcatchment 3S: PO-DA A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.02
2.00	0.28	0.00	0.03
2.50	0.36	0.00	0.03
3.00	0.44	0.00	0.04
3.50	0.52	0.01	0.05
4.00	0.61	0.02	0.07
4.50	0.70	0.04	0.09
5.00	0.79	0.06	0.11
5.50	0.89	0.09	0.13
6.00	0.99	0.13	0.15
6.50	1.10	0.17	0.18
7.00	1.22	0.23	0.22
7.50	1.35	0.30	0.26
8.00	1.50	0.38	0.31
8.50	1.66	0.48	0.35
9.00	1.84	0.59	0.40
9.50	2.04	0.73	0.50
10.00	2.30	0.90	0.65
10.50	2.59	1.13	0.80
11.00	3.01	1.45	1.17
11.50	3.67	2.00	1.95
12.00	5.55	3.67	**5.17**
12.50	7.91	5.89	**6.40**
13.00	8.57	6.52	2.37
13.50	8.99	6.92	1.47
14.00	9.28	7.21	1.05
14.50	9.54	7.45	0.88
15.00	9.74	7.65	0.72
15.50	9.92	7.82	0.61
16.00	10.08	7.98	0.56
16.50	10.23	8.12	0.52
17.00	10.36	8.25	0.47
17.50	10.48	8.37	0.43
18.00	10.59	8.48	0.38
18.50	10.69	8.57	0.35
19.00	10.79	8.67	0.34
19.50	10.88	8.76	0.33
20.00	10.97	8.85	0.32
20.50	11.06	8.93	0.31
21.00	11.14	9.01	0.30
21.50	11.22	9.09	0.28
22.00	11.30	9.17	0.27
22.50	11.38	9.24	0.26
23.00	11.45	9.31	0.25
23.50	11.52	9.38	0.24
24.00	**11.58**	**9.44**	0.23

Summary for Subcatchment 15S: PO-DA M

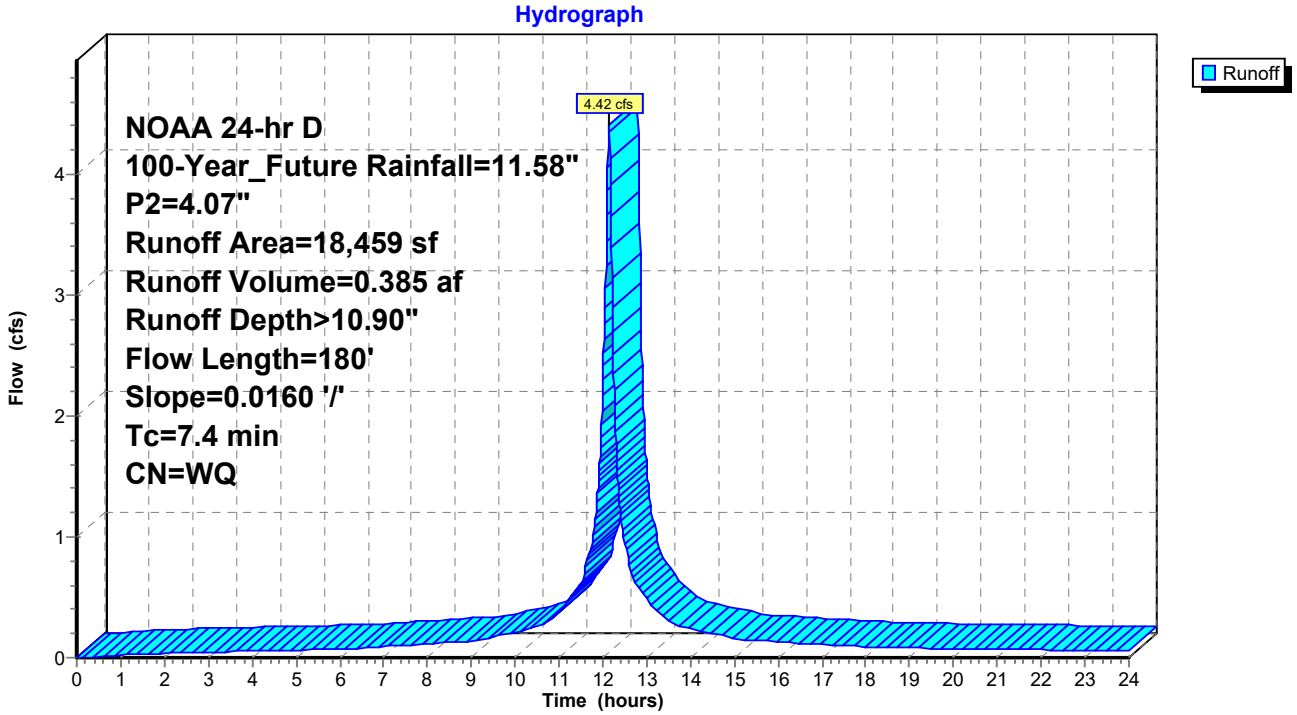
Runoff = 4.42 cfs @ 12.14 hrs, Volume= 0.385 af, Depth>10.90"
Routed to Pond 4P : AquaShield

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	13,651	98	Impervious, Pavement, HSG D
*	4,808	85	Yard Stone/Gravel Pad, HSG D
	18,459		Weighted Average
	4,808		26.05% Pervious Area
	13,651		73.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.0160	0.24		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.5	80	0.0160	2.57		**Shallow Concentrated Flow, Gravel Shallow Concentrated Flow** Paved Kv= 20.3 fps
7.4	180	Total			

Subcatchment 15S: PO-DA M



Hydrograph for Subcatchment 15S: PO-DA M

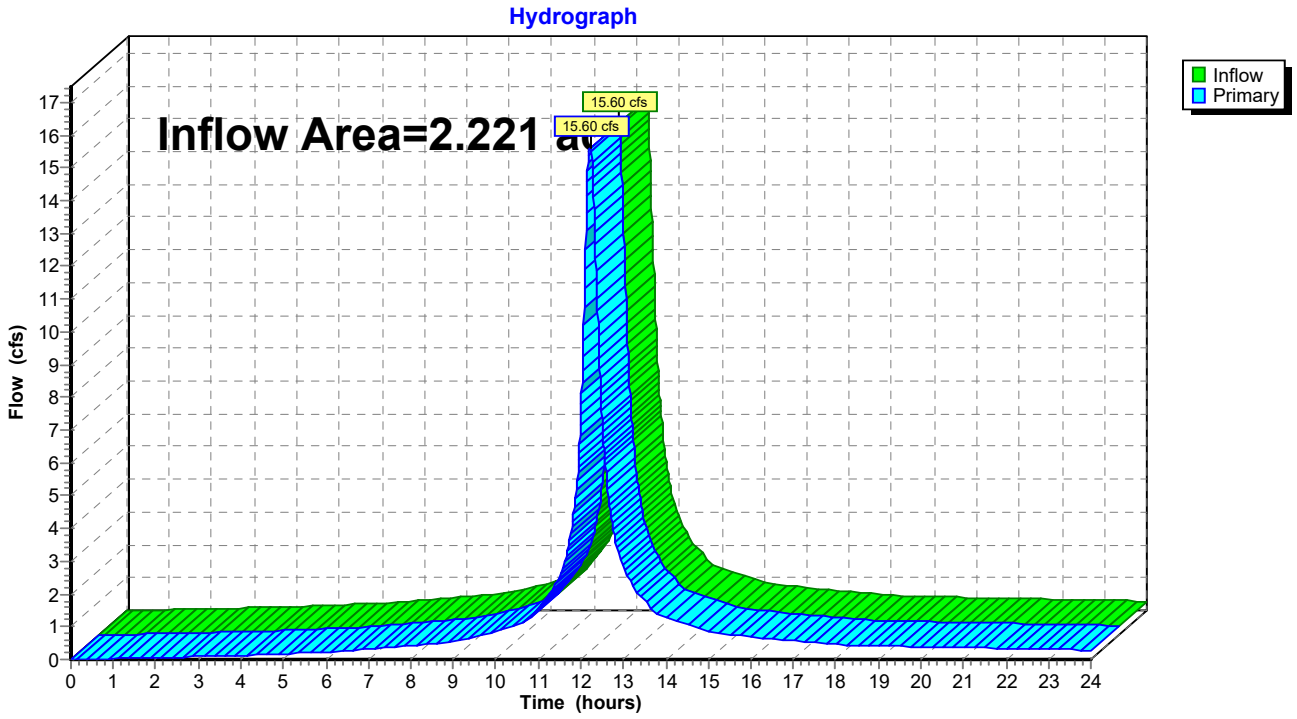
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.02
1.50	0.20	0.02	0.03
2.00	0.28	0.04	0.04
2.50	0.36	0.08	0.04
3.00	0.44	0.13	0.05
3.50	0.52	0.18	0.05
4.00	0.61	0.25	0.06
4.50	0.70	0.31	0.06
5.00	0.79	0.39	0.06
5.50	0.89	0.47	0.07
6.00	0.99	0.55	0.07
6.50	1.10	0.65	0.08
7.00	1.22	0.76	0.09
7.50	1.35	0.88	0.10
8.00	1.50	1.02	0.12
8.50	1.66	1.16	0.13
9.00	1.84	1.33	0.14
9.50	2.04	1.52	0.17
10.00	2.30	1.77	0.21
10.50	2.59	2.05	0.25
11.00	3.01	2.46	0.38
11.50	3.67	3.11	0.61
12.00	5.55	4.96	**2.30**
12.50	7.91	7.31	**0.94**
13.00	8.57	7.97	0.49
13.50	8.99	8.38	0.31
14.00	9.28	8.68	0.24
14.50	9.54	8.93	0.20
15.00	9.74	9.14	0.16
15.50	9.92	9.31	0.14
16.00	10.08	9.47	0.13
16.50	10.23	9.62	0.12
17.00	10.36	9.75	0.11
17.50	10.48	9.88	0.10
18.00	10.59	9.98	0.09
18.50	10.69	10.08	0.08
19.00	10.79	10.18	0.08
19.50	10.88	10.28	0.08
20.00	10.97	10.37	0.08
20.50	11.06	10.45	0.07
21.00	11.14	10.54	0.07
21.50	11.22	10.62	0.07
22.00	11.30	10.69	0.07
22.50	11.38	10.77	0.06
23.00	11.45	10.84	0.06
23.50	11.52	10.91	0.06
24.00	**11.58**	**10.97**	0.05

Summary for Pond 4P: AquaShield

Inflow Area = 2.221 ac, 24.32% Impervious, Inflow Depth > 9.73" for 100-Year_Future event
Inflow = 15.60 cfs @ 12.21 hrs, Volume= 1.800 af
Primary = 15.60 cfs @ 12.21 hrs, Volume= 1.800 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 4P: AquaShield

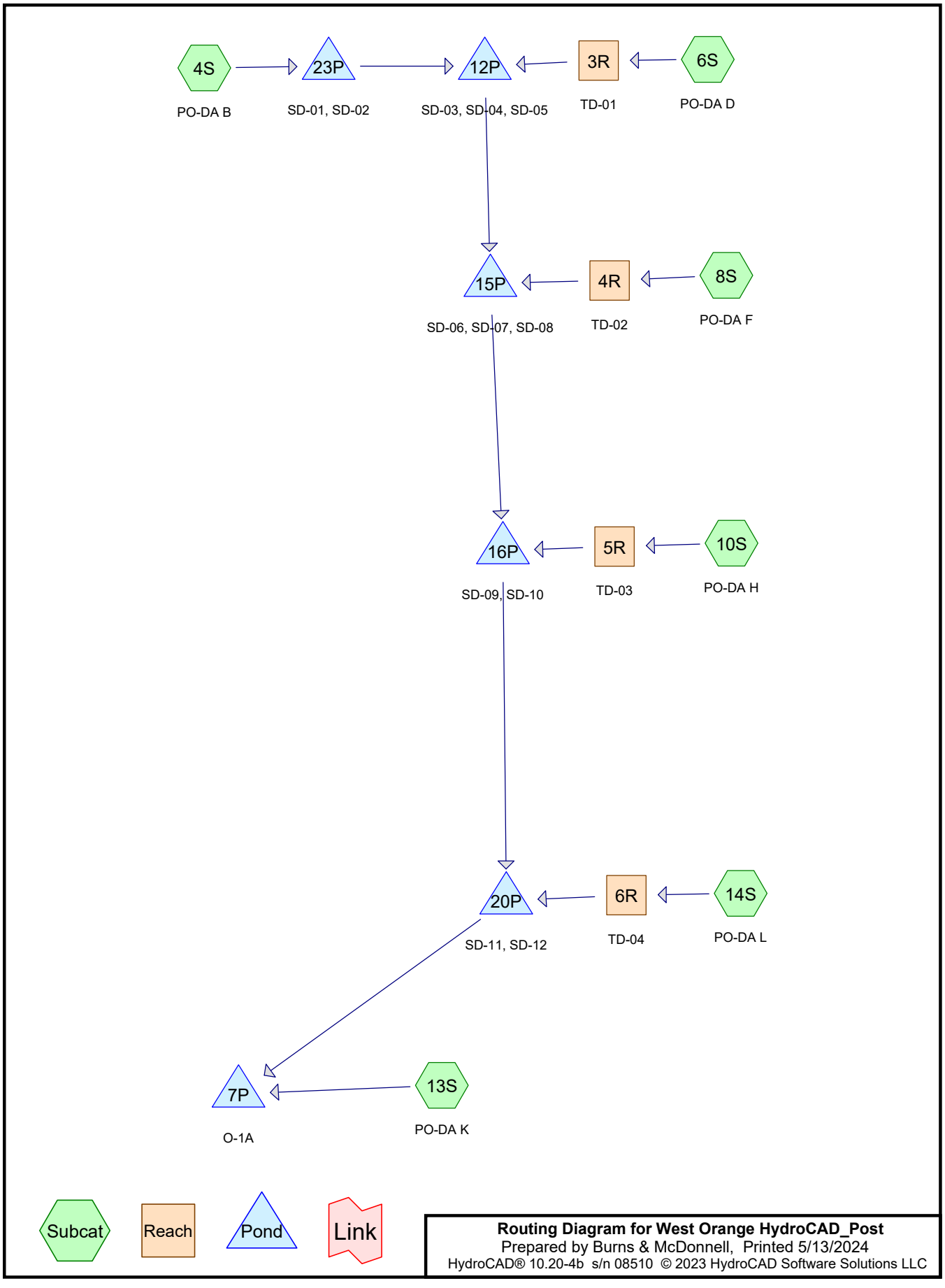


Hydrograph for Pond 4P: AquaShield

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.03		0.03
1.50	0.05		0.05
2.00	0.06		0.06
2.50	0.07		0.07
3.00	0.08		0.08
3.50	0.11		0.11
4.00	0.13		0.13
4.50	0.15		0.15
5.00	0.17		0.17
5.50	0.20		0.20
6.00	0.22		0.22
6.50	0.26		0.26
7.00	0.31		0.31
7.50	0.36		0.36
8.00	0.42		0.42
8.50	0.48		0.48
9.00	0.54		0.54
9.50	0.68		0.68
10.00	0.86		0.86
10.50	1.05		1.05
11.00	1.55		1.55
11.50	2.56		2.56
12.00	**7.47**		**7.47**
12.50	**7.34**		**7.34**
13.00	2.86		2.86
13.50	1.78		1.78
14.00	1.29		1.29
14.50	1.09		1.09
15.00	0.89		0.89
15.50	0.75		0.75
16.00	0.70		0.70
16.50	0.64		0.64
17.00	0.59		0.59
17.50	0.53		0.53
18.00	0.47		0.47
18.50	0.44		0.44
19.00	0.42		0.42
19.50	0.41		0.41
20.00	0.39		0.39
20.50	0.38		0.38
21.00	0.37		0.37
21.50	0.35		0.35
22.00	0.34		0.34
22.50	0.32		0.32
23.00	0.31		0.31
23.50	0.30		0.30
24.00	0.28		0.28

APPENDIX B.5- POST-DEVELOPED OUTFALL = O-1A

POST-DEVELOPED:
OUTFALL = O-1A



West Orange HydroCAD_Post
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166 Subcat 6S: PO-DA D
168 Subcat 8S: PO-DA F
170 Subcat 10S: PO-DA H
172 Subcat 13S: PO-DA K
174 Subcat 14S: PO-DA L
176 Reach 3R: TD-01

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178 Reach 4R: TD-02
180 Reach 5R: TD-03
182 Reach 6R: TD-04
184 Pond 7P: O-1A
186 Pond 12P: SD-03, SD-04, SD-05
189 Pond 15P: SD-06, SD-07, SD-08
192 Pond 16P: SD-09, SD-10
195 Pond 20P: SD-11, SD-12
198 Pond 23P: SD-01, SD-02

100-Year_Current Event
201 Node Listing
203 Subcat 4S: PO-DA B
205 Subcat 6S: PO-DA D
207 Subcat 8S: PO-DA F
209 Subcat 10S: PO-DA H
211 Subcat 13S: PO-DA K
213 Subcat 14S: PO-DA L
215 Reach 3R: TD-01
217 Reach 4R: TD-02
219 Reach 5R: TD-03
221 Reach 6R: TD-04
223 Pond 7P: O-1A
225 Pond 12P: SD-03, SD-04, SD-05
228 Pond 15P: SD-06, SD-07, SD-08
231 Pond 16P: SD-09, SD-10
234 Pond 20P: SD-11, SD-12
237 Pond 23P: SD-01, SD-02

100-Year_Future Event
240 Node Listing
242 Subcat 4S: PO-DA B
244 Subcat 6S: PO-DA D
246 Subcat 8S: PO-DA F
248 Subcat 10S: PO-DA H
250 Subcat 13S: PO-DA K
252 Subcat 14S: PO-DA L
254 Reach 3R: TD-01
256 Reach 4R: TD-02
258 Reach 5R: TD-03
260 Reach 6R: TD-04
262 Pond 7P: O-1A
264 Pond 12P: SD-03, SD-04, SD-05
267 Pond 15P: SD-06, SD-07, SD-08
270 Pond 16P: SD-09, SD-10
273 Pond 20P: SD-11, SD-12
276 Pond 23P: SD-01, SD-02

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	WQ	NJ DEP 2-hr		Default	2.00	1	1.25	2	3.42
2	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
3	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
4	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
5	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
6	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
7	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.212	80	>75% Grass cover, Good, HSG D (4S, 6S, 8S, 10S, 13S, 14S)
1.147	73	Brush, Good, HSG D (4S, 6S, 8S, 10S, 13S, 14S)
0.031	98	Impervious, Pavement, HSG D (13S)
0.019	85	Yard Stone/Gravel Pad, HSG D (4S, 14S)
1.409	**75**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.409	HSG D	4S, 6S, 8S, 10S, 13S, 14S
0.000	Other	
1.409		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.212	0.000	0.212	>75% Grass cover, Good	4S, 6S, 8S, 10S, 13S, 14S
0.000	0.000	0.000	1.147	0.000	1.147	Brush, Good	4S, 6S, 8S, 10S, 13S, 14S
0.000	0.000	0.000	0.031	0.000	0.031	Impervious, Pavement	13S
0.000	0.000	0.000	0.019	0.000	0.019	Yard Stone/Gravel Pad	4S, 14S
0.000	**0.000**	**0.000**	**1.409**	**0.000**	**1.409**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=298' Tc=13.4 min CN=WQ Runoff=0.08 cfs 0.004 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth=0.13"
Flow Length=85' Slope=0.1773 '/' Tc=7.6 min CN=WQ Runoff=0.04 cfs 0.002 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth=0.10"
Flow Length=66' Slope=0.2264 '/' Tc=5.6 min CN=WQ Runoff=0.02 cfs 0.001 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=82' Slope=0.1736 '/' Tc=7.5 min CN=WQ Runoff=0.03 cfs 0.001 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth=0.39"
Flow Length=239' Tc=14.4 min CN=WQ Runoff=0.08 cfs 0.003 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=116' Tc=11.1 min CN=WQ Runoff=0.03 cfs 0.001 af

Reach 3R: TD-01 Avg. Flow Depth=0.02' Max Vel=1.55 fps Inflow=0.04 cfs 0.002 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=0.04 cfs 0.002 af

Reach 4R: TD-02 Avg. Flow Depth=0.01' Max Vel=1.24 fps Inflow=0.02 cfs 0.001 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.02 cfs 0.001 af

Reach 5R: TD-03 Avg. Flow Depth=0.03' Max Vel=0.72 fps Inflow=0.03 cfs 0.001 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=0.03 cfs 0.001 af

Reach 6R: TD-04 Avg. Flow Depth=0.02' Max Vel=1.04 fps Inflow=0.03 cfs 0.001 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=0.03 cfs 0.001 af

Pond 7P: O-1A Inflow=0.18 cfs 0.010 af
Primary=0.18 cfs 0.010 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.07' Storage=5 cf Inflow=0.07 cfs 0.004 af
Outflow=0.07 cfs 0.004 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.05' Storage=2 cf Inflow=0.08 cfs 0.004 af
Outflow=0.08 cfs 0.004 af

Pond 16P: SD-09, SD-10 Peak Elev=592.96' Storage=7 cf Inflow=0.10 cfs 0.006 af
Outflow=0.10 cfs 0.006 af

Pond 20P: SD-11, SD-12 Peak Elev=591.14' Storage=12 cf Inflow=0.11 cfs 0.007 af
Outflow=0.11 cfs 0.007 af

Pond 23P: SD-01, SD-02 Peak Elev=597.15' Storage=85 cf Inflow=0.08 cfs 0.004 af
Outflow=0.05 cfs 0.002 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.012 af Average Runoff Depth = 0.10"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

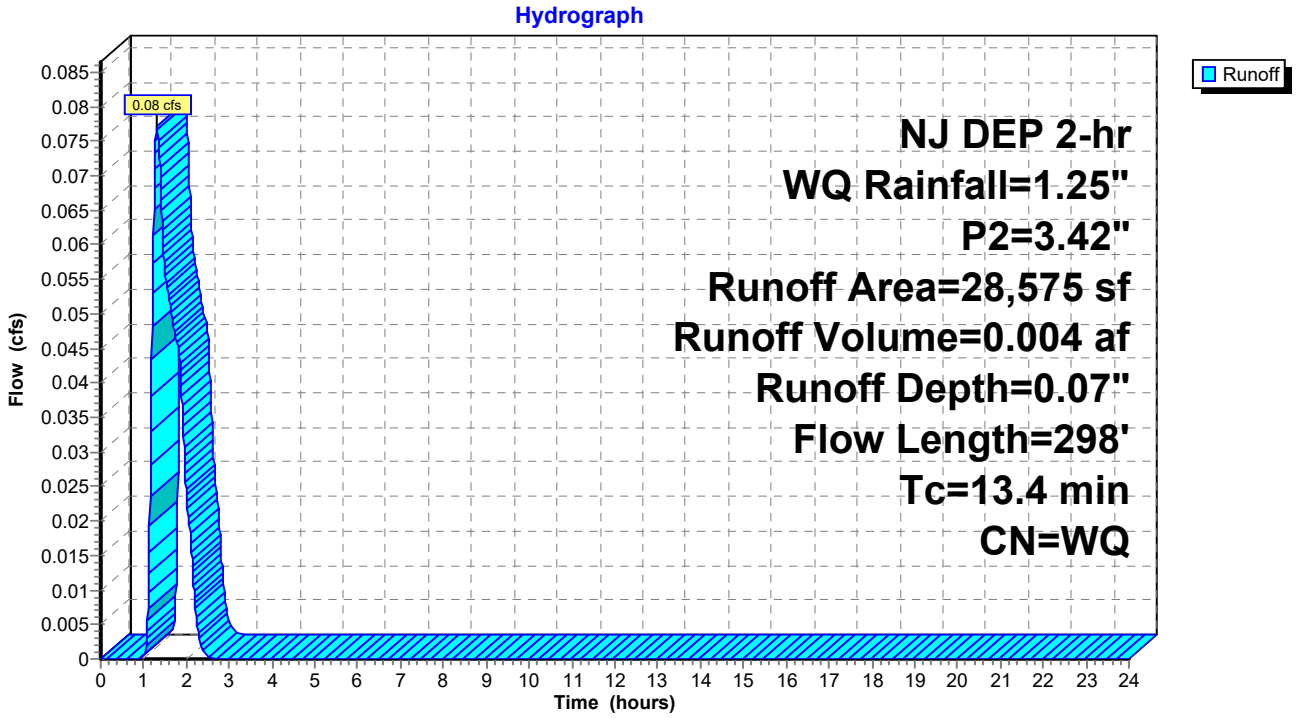
Runoff = 0.08 cfs @ 1.31 hrs, Volume= 0.004 af, Depth= 0.07"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0900	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
13.4	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.00	**0.00**
1.50	1.15	0.05	**0.06**
2.00	**1.25**	**0.07**	0.02
2.50	1.25	0.07	0.00
3.00	1.25	0.07	0.00
3.50	1.25	0.07	0.00
4.00	1.25	0.07	0.00
4.50	1.25	0.07	0.00
5.00	1.25	0.07	0.00
5.50	1.25	0.07	0.00
6.00	1.25	0.07	0.00
6.50	1.25	0.07	0.00
7.00	1.25	0.07	0.00
7.50	1.25	0.07	0.00
8.00	1.25	0.07	0.00
8.50	1.25	0.07	0.00
9.00	1.25	0.07	0.00
9.50	1.25	0.07	0.00
10.00	1.25	0.07	0.00
10.50	1.25	0.07	0.00
11.00	1.25	0.07	0.00
11.50	1.25	0.07	0.00
12.00	1.25	0.07	0.00
12.50	1.25	0.07	0.00
13.00	1.25	0.07	0.00
13.50	1.25	0.07	0.00
14.00	1.25	0.07	0.00
14.50	1.25	0.07	0.00
15.00	1.25	0.07	0.00
15.50	1.25	0.07	0.00
16.00	1.25	0.07	0.00
16.50	1.25	0.07	0.00
17.00	1.25	0.07	0.00
17.50	1.25	0.07	0.00
18.00	1.25	0.07	0.00
18.50	1.25	0.07	0.00
19.00	1.25	0.07	0.00
19.50	1.25	0.07	0.00
20.00	1.25	0.07	0.00
20.50	1.25	0.07	0.00
21.00	1.25	0.07	0.00
21.50	1.25	0.07	0.00
22.00	1.25	0.07	0.00
22.50	1.25	0.07	0.00
23.00	1.25	0.07	0.00
23.50	1.25	0.07	0.00
24.00	1.25	0.07	0.00

Summary for Subcatchment 6S: PO-DA D

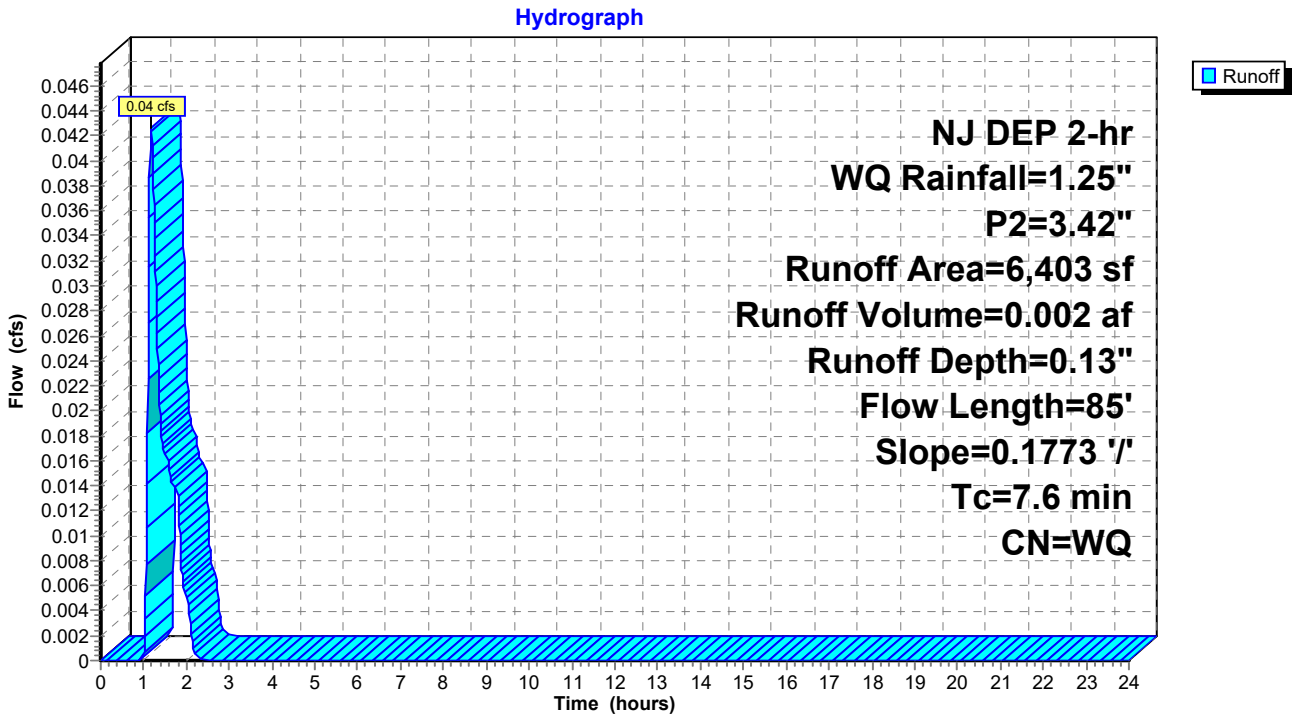
Runoff = 0.04 cfs @ 1.17 hrs, Volume= 0.002 af, Depth= 0.13"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	85	0.1773	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.00	**0.00**
1.50	1.15	0.09	**0.02**
2.00	**1.25**	**0.12**	0.01
2.50	1.25	0.12	0.00
3.00	1.25	0.12	0.00
3.50	1.25	0.12	0.00
4.00	1.25	0.12	0.00
4.50	1.25	0.12	0.00
5.00	1.25	0.12	0.00
5.50	1.25	0.12	0.00
6.00	1.25	0.12	0.00
6.50	1.25	0.12	0.00
7.00	1.25	0.12	0.00
7.50	1.25	0.12	0.00
8.00	1.25	0.12	0.00
8.50	1.25	0.12	0.00
9.00	1.25	0.12	0.00
9.50	1.25	0.12	0.00
10.00	1.25	0.12	0.00
10.50	1.25	0.12	0.00
11.00	1.25	0.12	0.00
11.50	1.25	0.12	0.00
12.00	1.25	0.12	0.00
12.50	1.25	0.12	0.00
13.00	1.25	0.12	0.00
13.50	1.25	0.12	0.00
14.00	1.25	0.12	0.00
14.50	1.25	0.12	0.00
15.00	1.25	0.12	0.00
15.50	1.25	0.12	0.00
16.00	1.25	0.12	0.00
16.50	1.25	0.12	0.00
17.00	1.25	0.12	0.00
17.50	1.25	0.12	0.00
18.00	1.25	0.12	0.00
18.50	1.25	0.12	0.00
19.00	1.25	0.12	0.00
19.50	1.25	0.12	0.00
20.00	1.25	0.12	0.00
20.50	1.25	0.12	0.00
21.00	1.25	0.12	0.00
21.50	1.25	0.12	0.00
22.00	1.25	0.12	0.00
22.50	1.25	0.12	0.00
23.00	1.25	0.12	0.00
23.50	1.25	0.12	0.00
24.00	1.25	0.12	0.00

Summary for Subcatchment 8S: PO-DA F

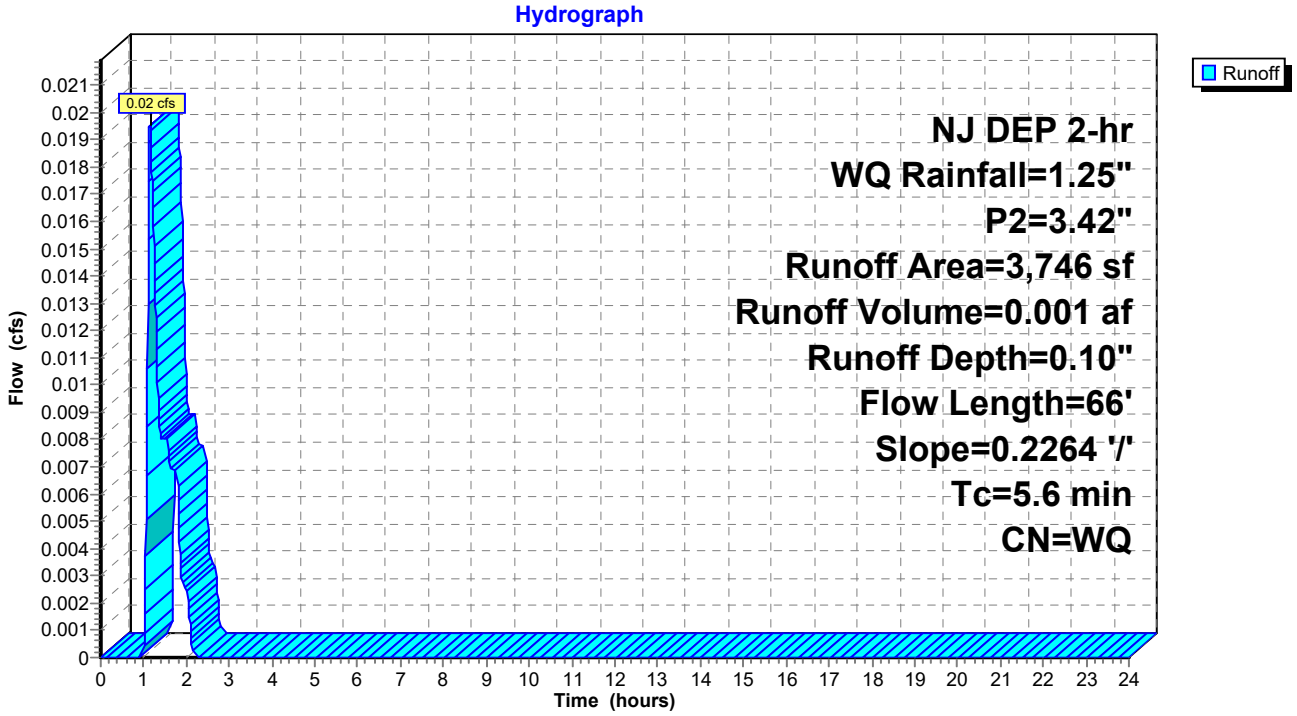
Runoff = 0.02 cfs @ 1.15 hrs, Volume= 0.001 af, Depth= 0.10"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	66	0.2264	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.00	**0.00**
1.50	1.15	0.06	**0.01**
2.00	**1.25**	**0.09**	0.00
2.50	1.25	0.09	0.00
3.00	1.25	0.09	0.00
3.50	1.25	0.09	0.00
4.00	1.25	0.09	0.00
4.50	1.25	0.09	0.00
5.00	1.25	0.09	0.00
5.50	1.25	0.09	0.00
6.00	1.25	0.09	0.00
6.50	1.25	0.09	0.00
7.00	1.25	0.09	0.00
7.50	1.25	0.09	0.00
8.00	1.25	0.09	0.00
8.50	1.25	0.09	0.00
9.00	1.25	0.09	0.00
9.50	1.25	0.09	0.00
10.00	1.25	0.09	0.00
10.50	1.25	0.09	0.00
11.00	1.25	0.09	0.00
11.50	1.25	0.09	0.00
12.00	1.25	0.09	0.00
12.50	1.25	0.09	0.00
13.00	1.25	0.09	0.00
13.50	1.25	0.09	0.00
14.00	1.25	0.09	0.00
14.50	1.25	0.09	0.00
15.00	1.25	0.09	0.00
15.50	1.25	0.09	0.00
16.00	1.25	0.09	0.00
16.50	1.25	0.09	0.00
17.00	1.25	0.09	0.00
17.50	1.25	0.09	0.00
18.00	1.25	0.09	0.00
18.50	1.25	0.09	0.00
19.00	1.25	0.09	0.00
19.50	1.25	0.09	0.00
20.00	1.25	0.09	0.00
20.50	1.25	0.09	0.00
21.00	1.25	0.09	0.00
21.50	1.25	0.09	0.00
22.00	1.25	0.09	0.00
22.50	1.25	0.09	0.00
23.00	1.25	0.09	0.00
23.50	1.25	0.09	0.00
24.00	1.25	0.09	0.00

Summary for Subcatchment 10S: PO-DA H

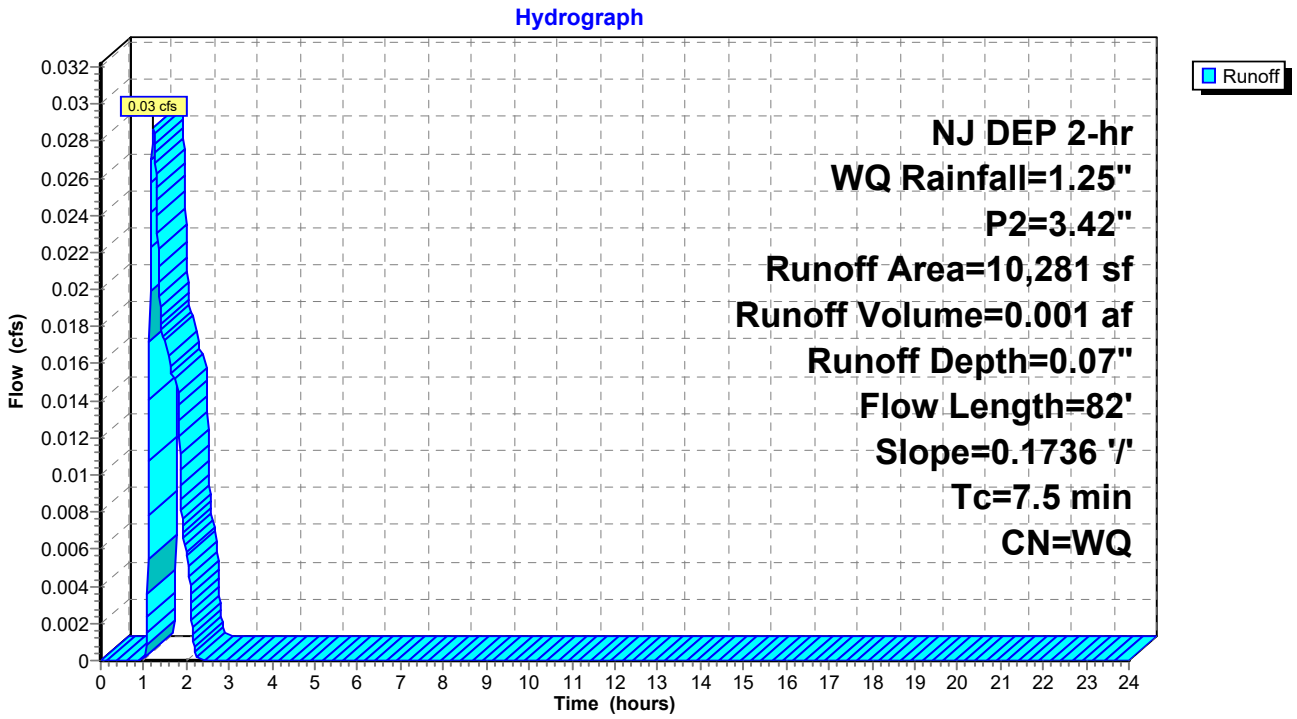
Runoff = 0.03 cfs @ 1.23 hrs, Volume= 0.001 af, Depth= 0.07"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	82	0.1736	0.18		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.00	**0.00**
1.50	1.15	0.04	**0.02**
2.00	**1.25**	**0.06**	0.01
2.50	1.25	0.06	0.00
3.00	1.25	0.06	0.00
3.50	1.25	0.06	0.00
4.00	1.25	0.06	0.00
4.50	1.25	0.06	0.00
5.00	1.25	0.06	0.00
5.50	1.25	0.06	0.00
6.00	1.25	0.06	0.00
6.50	1.25	0.06	0.00
7.00	1.25	0.06	0.00
7.50	1.25	0.06	0.00
8.00	1.25	0.06	0.00
8.50	1.25	0.06	0.00
9.00	1.25	0.06	0.00
9.50	1.25	0.06	0.00
10.00	1.25	0.06	0.00
10.50	1.25	0.06	0.00
11.00	1.25	0.06	0.00
11.50	1.25	0.06	0.00
12.00	1.25	0.06	0.00
12.50	1.25	0.06	0.00
13.00	1.25	0.06	0.00
13.50	1.25	0.06	0.00
14.00	1.25	0.06	0.00
14.50	1.25	0.06	0.00
15.00	1.25	0.06	0.00
15.50	1.25	0.06	0.00
16.00	1.25	0.06	0.00
16.50	1.25	0.06	0.00
17.00	1.25	0.06	0.00
17.50	1.25	0.06	0.00
18.00	1.25	0.06	0.00
18.50	1.25	0.06	0.00
19.00	1.25	0.06	0.00
19.50	1.25	0.06	0.00
20.00	1.25	0.06	0.00
20.50	1.25	0.06	0.00
21.00	1.25	0.06	0.00
21.50	1.25	0.06	0.00
22.00	1.25	0.06	0.00
22.50	1.25	0.06	0.00
23.00	1.25	0.06	0.00
23.50	1.25	0.06	0.00
24.00	1.25	0.06	0.00

Summary for Subcatchment 13S: PO-DA K

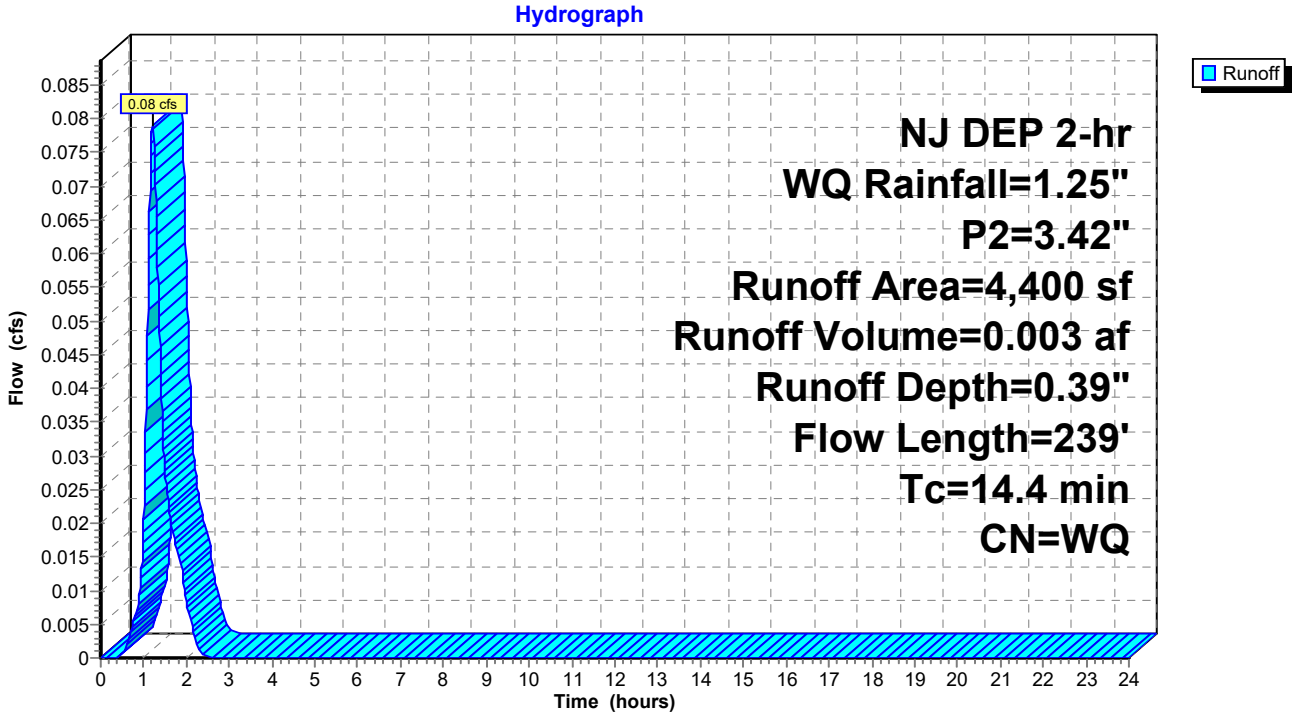
Runoff = 0.08 cfs @ 1.21 hrs, Volume= 0.003 af, Depth= 0.39"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0772	0.14		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
14.4	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.01	**0.02**
1.50	1.15	0.17	**0.03**
2.00	**1.25**	**0.22**	0.01
2.50	1.25	0.22	0.00
3.00	1.25	0.22	0.00
3.50	1.25	0.22	0.00
4.00	1.25	0.22	0.00
4.50	1.25	0.22	0.00
5.00	1.25	0.22	0.00
5.50	1.25	0.22	0.00
6.00	1.25	0.22	0.00
6.50	1.25	0.22	0.00
7.00	1.25	0.22	0.00
7.50	1.25	0.22	0.00
8.00	1.25	0.22	0.00
8.50	1.25	0.22	0.00
9.00	1.25	0.22	0.00
9.50	1.25	0.22	0.00
10.00	1.25	0.22	0.00
10.50	1.25	0.22	0.00
11.00	1.25	0.22	0.00
11.50	1.25	0.22	0.00
12.00	1.25	0.22	0.00
12.50	1.25	0.22	0.00
13.00	1.25	0.22	0.00
13.50	1.25	0.22	0.00
14.00	1.25	0.22	0.00
14.50	1.25	0.22	0.00
15.00	1.25	0.22	0.00
15.50	1.25	0.22	0.00
16.00	1.25	0.22	0.00
16.50	1.25	0.22	0.00
17.00	1.25	0.22	0.00
17.50	1.25	0.22	0.00
18.00	1.25	0.22	0.00
18.50	1.25	0.22	0.00
19.00	1.25	0.22	0.00
19.50	1.25	0.22	0.00
20.00	1.25	0.22	0.00
20.50	1.25	0.22	0.00
21.00	1.25	0.22	0.00
21.50	1.25	0.22	0.00
22.00	1.25	0.22	0.00
22.50	1.25	0.22	0.00
23.00	1.25	0.22	0.00
23.50	1.25	0.22	0.00
24.00	1.25	0.22	0.00

Summary for Subcatchment 14S: PO-DA L

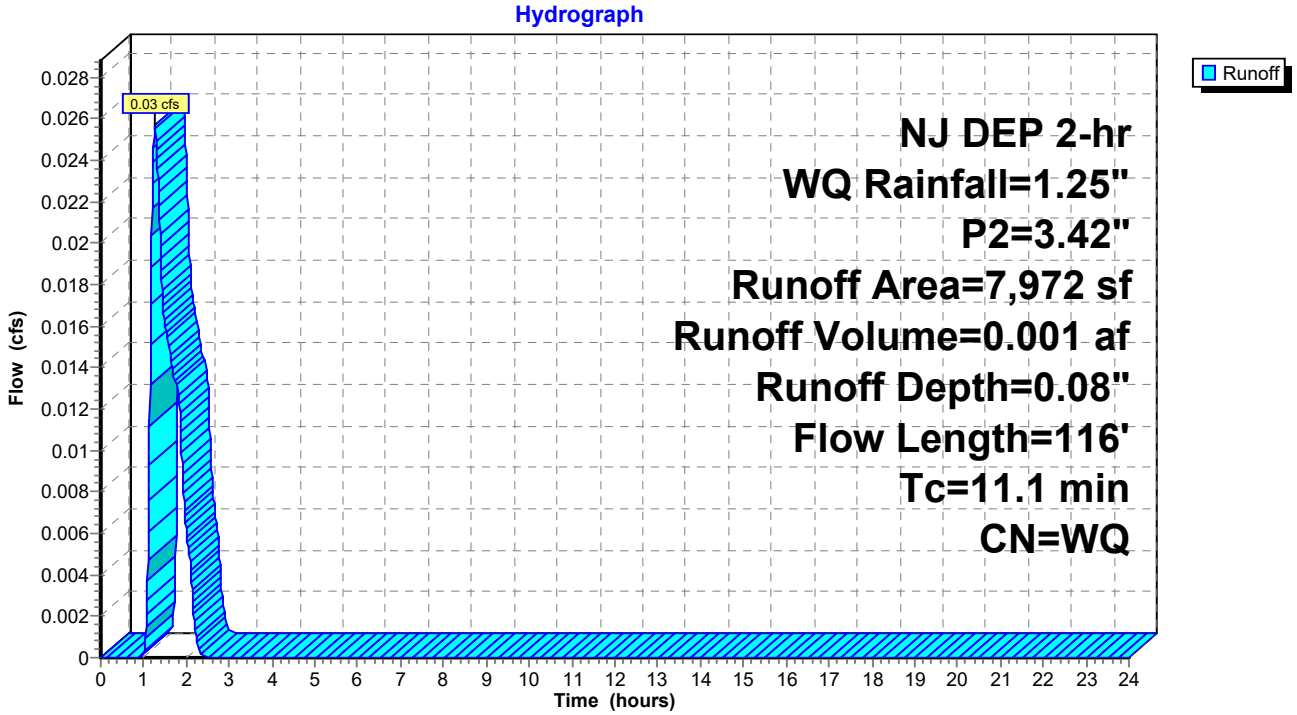
Runoff = 0.03 cfs @ 1.26 hrs, Volume= 0.001 af, Depth= 0.08"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.1003	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.1	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.00	**0.00**
1.50	1.15	0.05	**0.02**
2.00	**1.25**	**0.07**	0.01
2.50	1.25	0.07	0.00
3.00	1.25	0.07	0.00
3.50	1.25	0.07	0.00
4.00	1.25	0.07	0.00
4.50	1.25	0.07	0.00
5.00	1.25	0.07	0.00
5.50	1.25	0.07	0.00
6.00	1.25	0.07	0.00
6.50	1.25	0.07	0.00
7.00	1.25	0.07	0.00
7.50	1.25	0.07	0.00
8.00	1.25	0.07	0.00
8.50	1.25	0.07	0.00
9.00	1.25	0.07	0.00
9.50	1.25	0.07	0.00
10.00	1.25	0.07	0.00
10.50	1.25	0.07	0.00
11.00	1.25	0.07	0.00
11.50	1.25	0.07	0.00
12.00	1.25	0.07	0.00
12.50	1.25	0.07	0.00
13.00	1.25	0.07	0.00
13.50	1.25	0.07	0.00
14.00	1.25	0.07	0.00
14.50	1.25	0.07	0.00
15.00	1.25	0.07	0.00
15.50	1.25	0.07	0.00
16.00	1.25	0.07	0.00
16.50	1.25	0.07	0.00
17.00	1.25	0.07	0.00
17.50	1.25	0.07	0.00
18.00	1.25	0.07	0.00
18.50	1.25	0.07	0.00
19.00	1.25	0.07	0.00
19.50	1.25	0.07	0.00
20.00	1.25	0.07	0.00
20.50	1.25	0.07	0.00
21.00	1.25	0.07	0.00
21.50	1.25	0.07	0.00
22.00	1.25	0.07	0.00
22.50	1.25	0.07	0.00
23.00	1.25	0.07	0.00
23.50	1.25	0.07	0.00
24.00	1.25	0.07	0.00

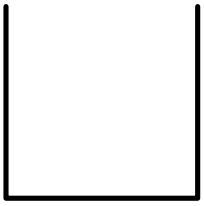
Summary for Reach 3R: TD-01

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth = 0.13" for WQ event
Inflow = 0.04 cfs @ 1.17 hrs, Volume= 0.002 af
Outflow = 0.04 cfs @ 1.18 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.5 min
Routed to Pond 12P : SD-03, SD-04, SD-05

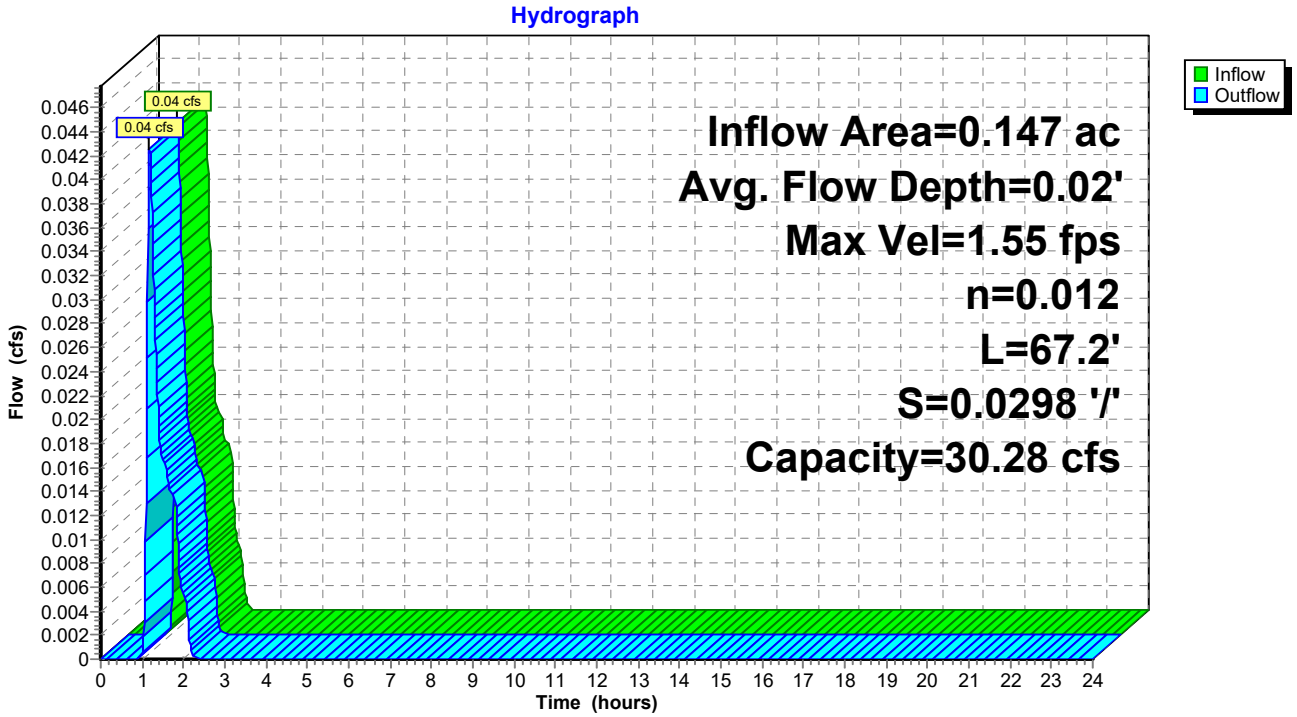
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 1.55 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.9 min

Peak Storage= 2 cf @ 1.18 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'



Reach 3R: TD-01



Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	**0.00**	**0**	**606.00**	**0.00**
1.50	**0.02**	**1**	**606.01**	**0.02**
2.00	0.01	0	606.00	0.01
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.00	0	606.00	0.00
7.50	0.00	0	606.00	0.00
8.00	0.00	0	606.00	0.00
8.50	0.00	0	606.00	0.00
9.00	0.00	0	606.00	0.00
9.50	0.00	0	606.00	0.00
10.00	0.00	0	606.00	0.00
10.50	0.00	0	606.00	0.00
11.00	0.00	0	606.00	0.00
11.50	0.00	0	606.00	0.00
12.00	0.00	0	606.00	0.00
12.50	0.00	0	606.00	0.00
13.00	0.00	0	606.00	0.00
13.50	0.00	0	606.00	0.00
14.00	0.00	0	606.00	0.00
14.50	0.00	0	606.00	0.00
15.00	0.00	0	606.00	0.00
15.50	0.00	0	606.00	0.00
16.00	0.00	0	606.00	0.00
16.50	0.00	0	606.00	0.00
17.00	0.00	0	606.00	0.00
17.50	0.00	0	606.00	0.00
18.00	0.00	0	606.00	0.00
18.50	0.00	0	606.00	0.00
19.00	0.00	0	606.00	0.00
19.50	0.00	0	606.00	0.00
20.00	0.00	0	606.00	0.00
20.50	0.00	0	606.00	0.00
21.00	0.00	0	606.00	0.00
21.50	0.00	0	606.00	0.00
22.00	0.00	0	606.00	0.00
22.50	0.00	0	606.00	0.00
23.00	0.00	0	606.00	0.00
23.50	0.00	0	606.00	0.00
24.00	0.00	0	606.00	0.00

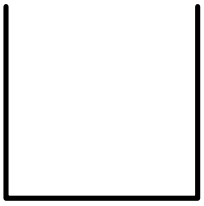
Summary for Reach 4R: TD-02

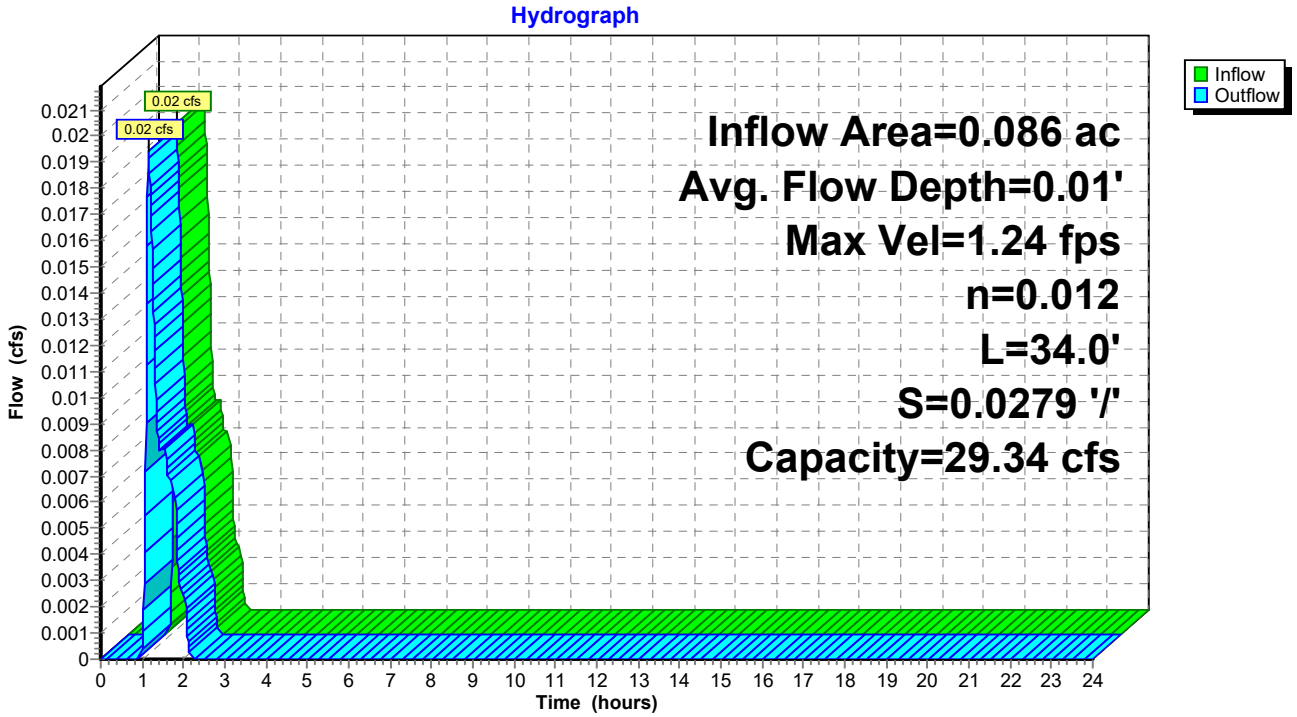
Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth = 0.10" for WQ event
Inflow = 0.02 cfs @ 1.15 hrs, Volume= 0.001 af
Outflow = 0.02 cfs @ 1.15 hrs, Volume= 0.001 af, Atten= 1%, Lag= 0.5 min
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 1.24 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 1.15 hrs
Average Depth at Peak Storage= 0.01' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'





Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	**0.00**	**0**	**604.25**	**0.00**
1.50	**0.01**	**0**	**604.25**	**0.01**
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.00	0	604.25	0.00
8.50	0.00	0	604.25	0.00
9.00	0.00	0	604.25	0.00
9.50	0.00	0	604.25	0.00
10.00	0.00	0	604.25	0.00
10.50	0.00	0	604.25	0.00
11.00	0.00	0	604.25	0.00
11.50	0.00	0	604.25	0.00
12.00	0.00	0	604.25	0.00
12.50	0.00	0	604.25	0.00
13.00	0.00	0	604.25	0.00
13.50	0.00	0	604.25	0.00
14.00	0.00	0	604.25	0.00
14.50	0.00	0	604.25	0.00
15.00	0.00	0	604.25	0.00
15.50	0.00	0	604.25	0.00
16.00	0.00	0	604.25	0.00
16.50	0.00	0	604.25	0.00
17.00	0.00	0	604.25	0.00
17.50	0.00	0	604.25	0.00
18.00	0.00	0	604.25	0.00
18.50	0.00	0	604.25	0.00
19.00	0.00	0	604.25	0.00
19.50	0.00	0	604.25	0.00
20.00	0.00	0	604.25	0.00
20.50	0.00	0	604.25	0.00
21.00	0.00	0	604.25	0.00
21.50	0.00	0	604.25	0.00
22.00	0.00	0	604.25	0.00
22.50	0.00	0	604.25	0.00
23.00	0.00	0	604.25	0.00
23.50	0.00	0	604.25	0.00
24.00	0.00	0	604.25	0.00

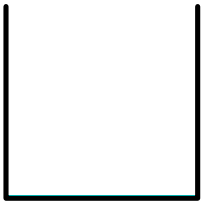
Summary for Reach 5R: TD-03

Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth = 0.07" for WQ event
Inflow = 0.03 cfs @ 1.23 hrs, Volume= 0.001 af
Outflow = 0.03 cfs @ 1.28 hrs, Volume= 0.001 af, Atten= 6%, Lag= 2.9 min
Routed to Pond 16P : SD-09, SD-10

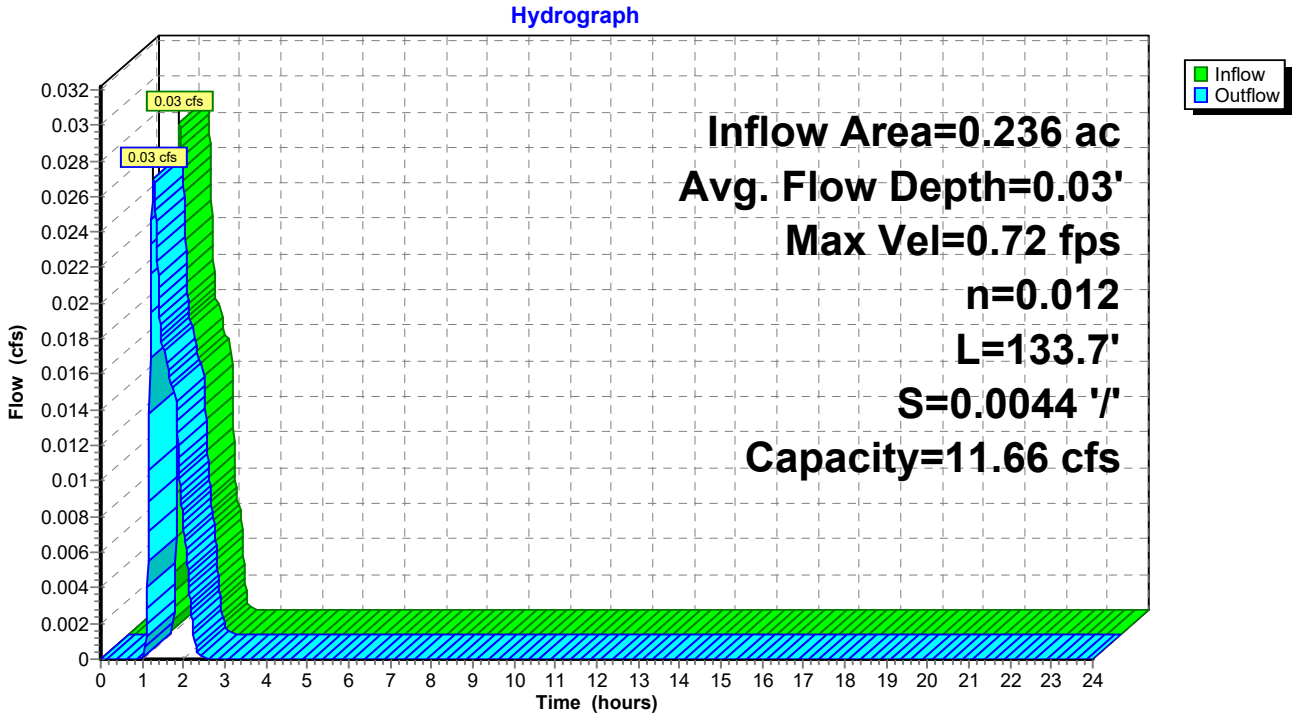
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 0.72 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 4.0 min

Peak Storage= 5 cf @ 1.28 hrs
Average Depth at Peak Storage= 0.03' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'



Reach 5R: TD-03



Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	**0.00**	**0**	**601.81**	**0.00**
1.50	**0.02**	**4**	**601.83**	**0.02**
2.00	0.01	2	601.82	0.01
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	0	601.81	0.00
7.00	0.00	0	601.81	0.00
7.50	0.00	0	601.81	0.00
8.00	0.00	0	601.81	0.00
8.50	0.00	0	601.81	0.00
9.00	0.00	0	601.81	0.00
9.50	0.00	0	601.81	0.00
10.00	0.00	0	601.81	0.00
10.50	0.00	0	601.81	0.00
11.00	0.00	0	601.81	0.00
11.50	0.00	0	601.81	0.00
12.00	0.00	0	601.81	0.00
12.50	0.00	0	601.81	0.00
13.00	0.00	0	601.81	0.00
13.50	0.00	0	601.81	0.00
14.00	0.00	0	601.81	0.00
14.50	0.00	0	601.81	0.00
15.00	0.00	0	601.81	0.00
15.50	0.00	0	601.81	0.00
16.00	0.00	0	601.81	0.00
16.50	0.00	0	601.81	0.00
17.00	0.00	0	601.81	0.00
17.50	0.00	0	601.81	0.00
18.00	0.00	0	601.81	0.00
18.50	0.00	0	601.81	0.00
19.00	0.00	0	601.81	0.00
19.50	0.00	0	601.81	0.00
20.00	0.00	0	601.81	0.00
20.50	0.00	0	601.81	0.00
21.00	0.00	0	601.81	0.00
21.50	0.00	0	601.81	0.00
22.00	0.00	0	601.81	0.00
22.50	0.00	0	601.81	0.00
23.00	0.00	0	601.81	0.00
23.50	0.00	0	601.81	0.00
24.00	0.00	0	601.81	0.00

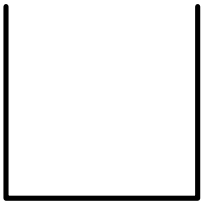
Summary for Reach 6R: TD-04

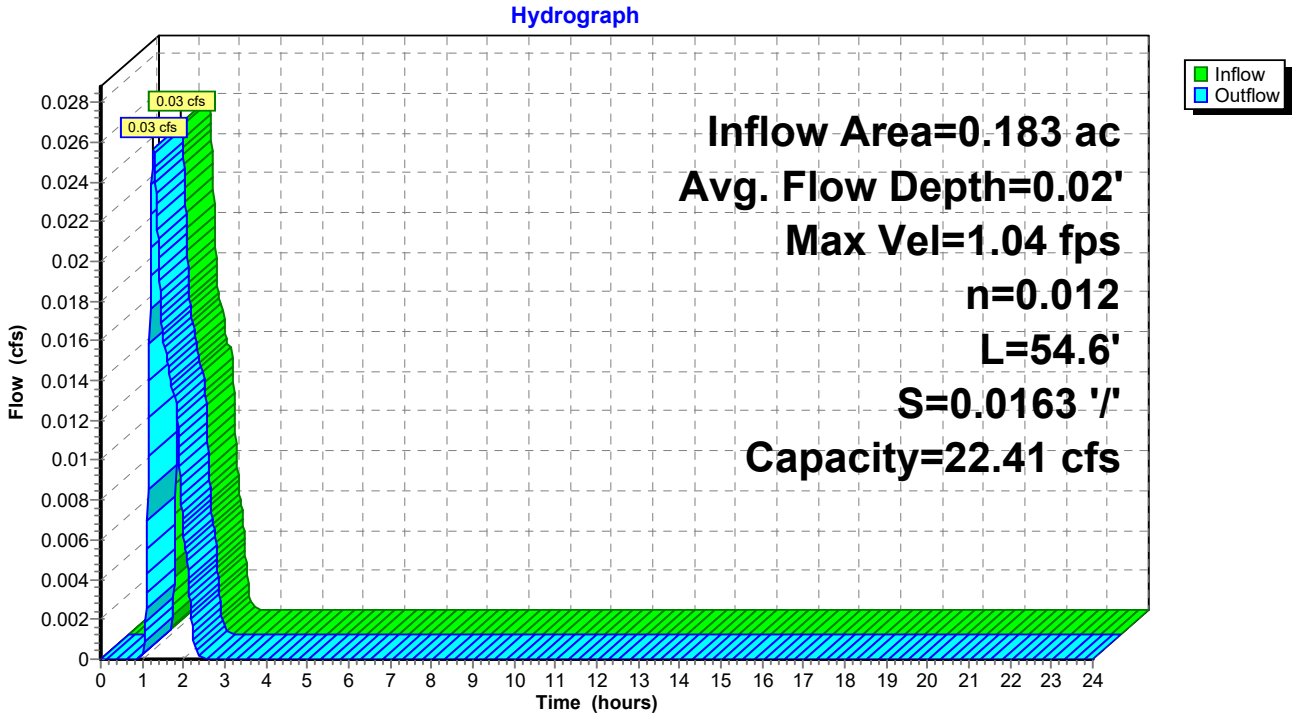
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth = 0.08" for WQ event
Inflow = 0.03 cfs @ 1.26 hrs, Volume= 0.001 af
Outflow = 0.03 cfs @ 1.27 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.4 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 1.04 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 1.0 min

Peak Storage= 1 cf @ 1.27 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

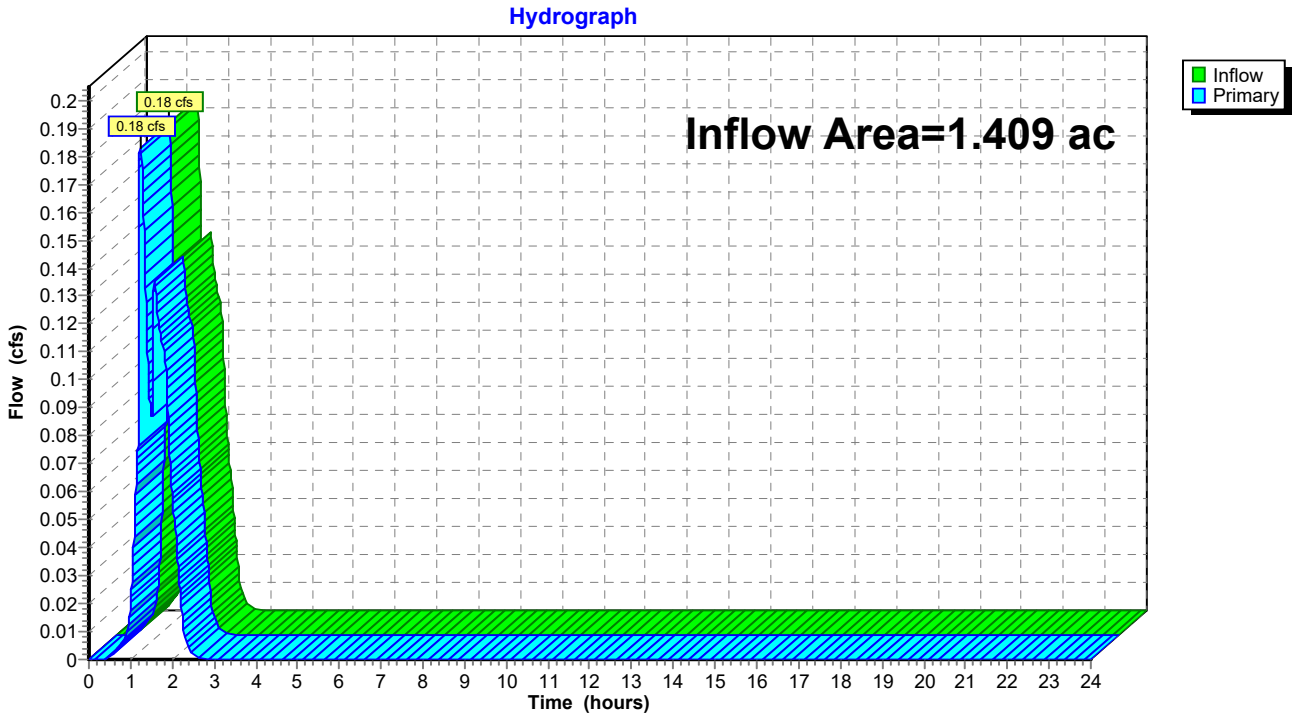
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	**0.00**	**0**	**600.77**	**0.00**
1.50	**0.02**	**1**	**600.78**	**0.02**
2.00	0.01	0	600.77	0.01
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.00	0	600.77	0.00
8.00	0.00	0	600.77	0.00
8.50	0.00	0	600.77	0.00
9.00	0.00	0	600.77	0.00
9.50	0.00	0	600.77	0.00
10.00	0.00	0	600.77	0.00
10.50	0.00	0	600.77	0.00
11.00	0.00	0	600.77	0.00
11.50	0.00	0	600.77	0.00
12.00	0.00	0	600.77	0.00
12.50	0.00	0	600.77	0.00
13.00	0.00	0	600.77	0.00
13.50	0.00	0	600.77	0.00
14.00	0.00	0	600.77	0.00
14.50	0.00	0	600.77	0.00
15.00	0.00	0	600.77	0.00
15.50	0.00	0	600.77	0.00
16.00	0.00	0	600.77	0.00
16.50	0.00	0	600.77	0.00
17.00	0.00	0	600.77	0.00
17.50	0.00	0	600.77	0.00
18.00	0.00	0	600.77	0.00
18.50	0.00	0	600.77	0.00
19.00	0.00	0	600.77	0.00
19.50	0.00	0	600.77	0.00
20.00	0.00	0	600.77	0.00
20.50	0.00	0	600.77	0.00
21.00	0.00	0	600.77	0.00
21.50	0.00	0	600.77	0.00
22.00	0.00	0	600.77	0.00
22.50	0.00	0	600.77	0.00
23.00	0.00	0	600.77	0.00
23.50	0.00	0	600.77	0.00
24.00	0.00	0	600.77	0.00

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth = 0.08" for WQ event
Inflow = 0.18 cfs @ 1.23 hrs, Volume= 0.010 af
Primary = 0.18 cfs @ 1.23 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	**0.02**		**0.02**
1.50	**0.09**		**0.09**
2.00	0.06		0.06
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.00		0.00
11.50	0.00		0.00
12.00	0.00		0.00
12.50	0.00		0.00
13.00	0.00		0.00
13.50	0.00		0.00
14.00	0.00		0.00
14.50	0.00		0.00
15.00	0.00		0.00
15.50	0.00		0.00
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth = 0.05" for WQ event
Inflow = 0.07 cfs @ 1.53 hrs, Volume= 0.004 af
Outflow = 0.07 cfs @ 1.54 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.6 min
Primary = 0.07 cfs @ 1.54 hrs, Volume= 0.004 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.07' @ 1.54 hrs Surf.Area= 20 sf Storage= 5 cf

Plug-Flow detention time= 2.1 min calculated for 0.004 af (98% of inflow)
Center-of-Mass det. time= 1.3 min (100.3 - 99.0)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

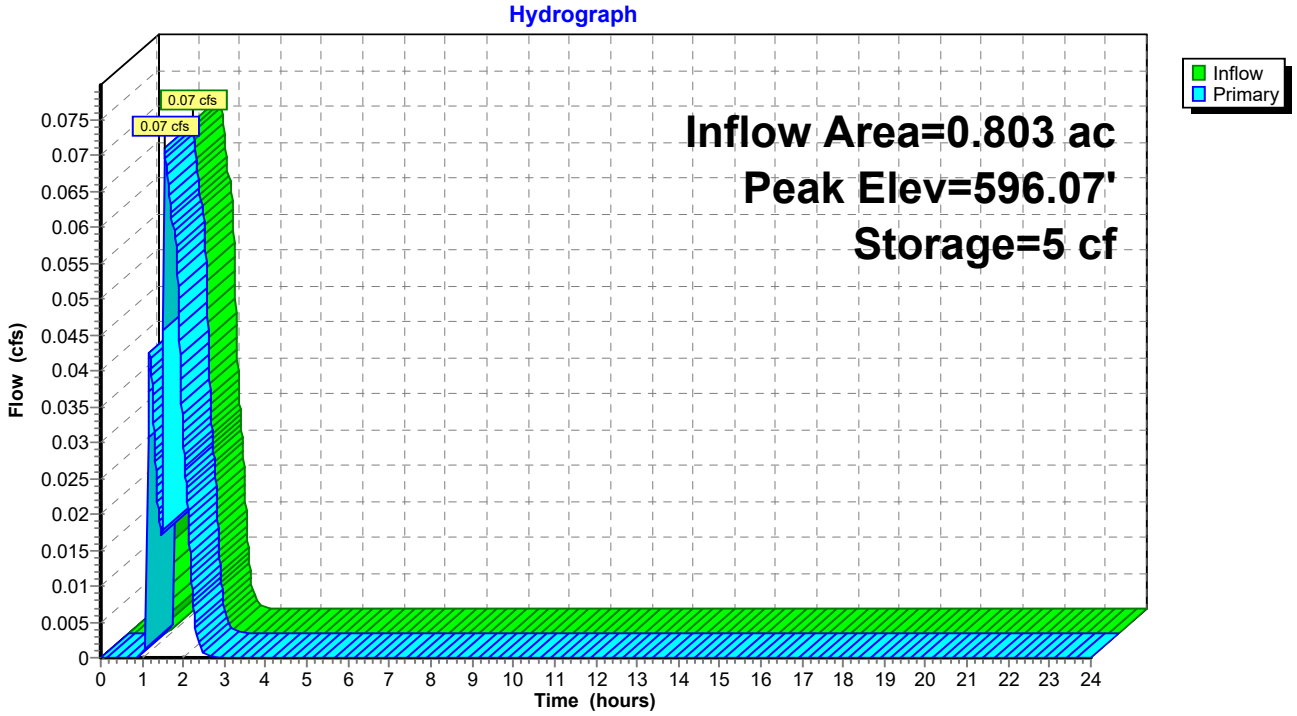
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 1.54 hrs HW=596.07' TW=594.05' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 0.07 cfs @ 1.15 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	**0.02**	**4**	**596.02**	**0.02**
2.00	**0.03**	**4**	**596.03**	**0.03**
2.50	0.00	3	595.97	0.00
3.00	0.00	3	595.96	0.00
3.50	0.00	3	595.96	0.00
4.00	0.00	3	595.96	0.00
4.50	0.00	3	595.96	0.00
5.00	0.00	3	595.96	0.00
5.50	0.00	3	595.96	0.00
6.00	0.00	3	595.96	0.00
6.50	0.00	3	595.96	0.00
7.00	0.00	3	595.96	0.00
7.50	0.00	3	595.96	0.00
8.00	0.00	3	595.96	0.00
8.50	0.00	3	595.96	0.00
9.00	0.00	3	595.96	0.00
9.50	0.00	3	595.96	0.00
10.00	0.00	3	595.96	0.00
10.50	0.00	3	595.96	0.00
11.00	0.00	3	595.96	0.00
11.50	0.00	3	595.96	0.00
12.00	0.00	3	595.96	0.00
12.50	0.00	3	595.96	0.00
13.00	0.00	3	595.96	0.00
13.50	0.00	3	595.96	0.00
14.00	0.00	3	595.96	0.00
14.50	0.00	3	595.96	0.00
15.00	0.00	3	595.96	0.00
15.50	0.00	3	595.96	0.00
16.00	0.00	3	595.96	0.00
16.50	0.00	3	595.96	0.00
17.00	0.00	3	595.96	0.00
17.50	0.00	3	595.96	0.00
18.00	0.00	3	595.96	0.00
18.50	0.00	3	595.96	0.00
19.00	0.00	3	595.96	0.00
19.50	0.00	3	595.96	0.00
20.00	0.00	3	595.96	0.00
20.50	0.00	3	595.96	0.00
21.00	0.00	3	595.96	0.00
21.50	0.00	3	595.96	0.00
22.00	0.00	3	595.96	0.00
22.50	0.00	3	595.96	0.00
23.00	0.00	3	595.96	0.00
23.50	0.00	3	595.96	0.00
24.00	0.00	3	595.96	0.00

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth = 0.06" for WQ event
Inflow = 0.08 cfs @ 1.54 hrs, Volume= 0.004 af
Outflow = 0.08 cfs @ 1.54 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 1.54 hrs, Volume= 0.004 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.05' @ 1.54 hrs Surf.Area= 20 sf Storage= 2 cf

Plug-Flow detention time= 0.9 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (98.4 - 97.9)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

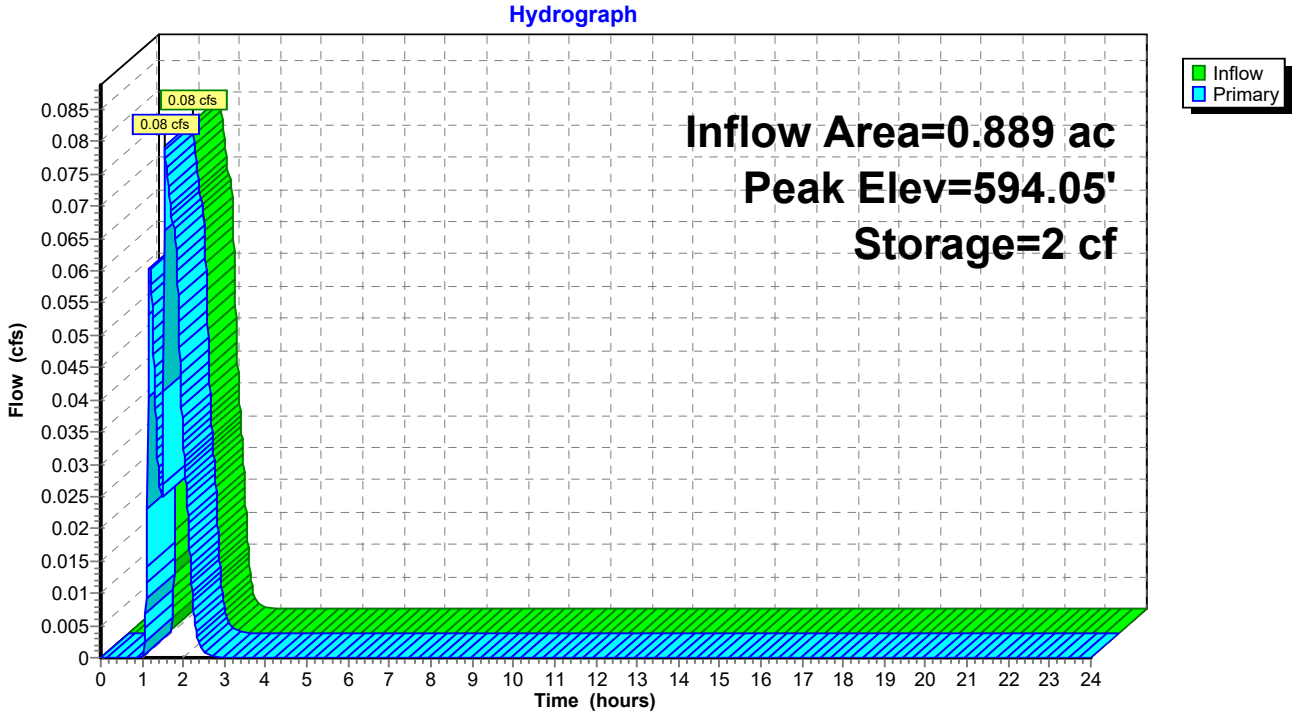
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 1.54 hrs HW=594.05' TW=592.96' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 0.08 cfs @ 1.18 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	**0.02**	**1**	**594.00**	**0.02**
2.00	**0.03**	**1**	**594.01**	**0.03**
2.50	0.00	0	593.94	0.00
3.00	0.00	0	593.93	0.00
3.50	0.00	0	593.93	0.00
4.00	0.00	0	593.93	0.00
4.50	0.00	0	593.93	0.00
5.00	0.00	0	593.93	0.00
5.50	0.00	0	593.93	0.00
6.00	0.00	0	593.93	0.00
6.50	0.00	0	593.93	0.00
7.00	0.00	0	593.93	0.00
7.50	0.00	0	593.93	0.00
8.00	0.00	0	593.93	0.00
8.50	0.00	0	593.93	0.00
9.00	0.00	0	593.93	0.00
9.50	0.00	0	593.93	0.00
10.00	0.00	0	593.93	0.00
10.50	0.00	0	593.93	0.00
11.00	0.00	0	593.93	0.00
11.50	0.00	0	593.93	0.00
12.00	0.00	0	593.93	0.00
12.50	0.00	0	593.93	0.00
13.00	0.00	0	593.93	0.00
13.50	0.00	0	593.93	0.00
14.00	0.00	0	593.93	0.00
14.50	0.00	0	593.93	0.00
15.00	0.00	0	593.93	0.00
15.50	0.00	0	593.93	0.00
16.00	0.00	0	593.93	0.00
16.50	0.00	0	593.93	0.00
17.00	0.00	0	593.93	0.00
17.50	0.00	0	593.93	0.00
18.00	0.00	0	593.93	0.00
18.50	0.00	0	593.93	0.00
19.00	0.00	0	593.93	0.00
19.50	0.00	0	593.93	0.00
20.00	0.00	0	593.93	0.00
20.50	0.00	0	593.93	0.00
21.00	0.00	0	593.93	0.00
21.50	0.00	0	593.93	0.00
22.00	0.00	0	593.93	0.00
22.50	0.00	0	593.93	0.00
23.00	0.00	0	593.93	0.00
23.50	0.00	0	593.93	0.00
24.00	0.00	0	593.93	0.00

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth = 0.06" for WQ event
Inflow = 0.10 cfs @ 1.54 hrs, Volume= 0.006 af
Outflow = 0.10 cfs @ 1.56 hrs, Volume= 0.006 af, Atten= 1%, Lag= 1.3 min
Primary = 0.10 cfs @ 1.56 hrs, Volume= 0.006 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 592.96' @ 1.56 hrs Surf.Area= 34 sf Storage= 7 cf

Plug-Flow detention time= 1.9 min calculated for 0.006 af (99% of inflow)
Center-of-Mass det. time= 1.3 min (98.6 - 97.3)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

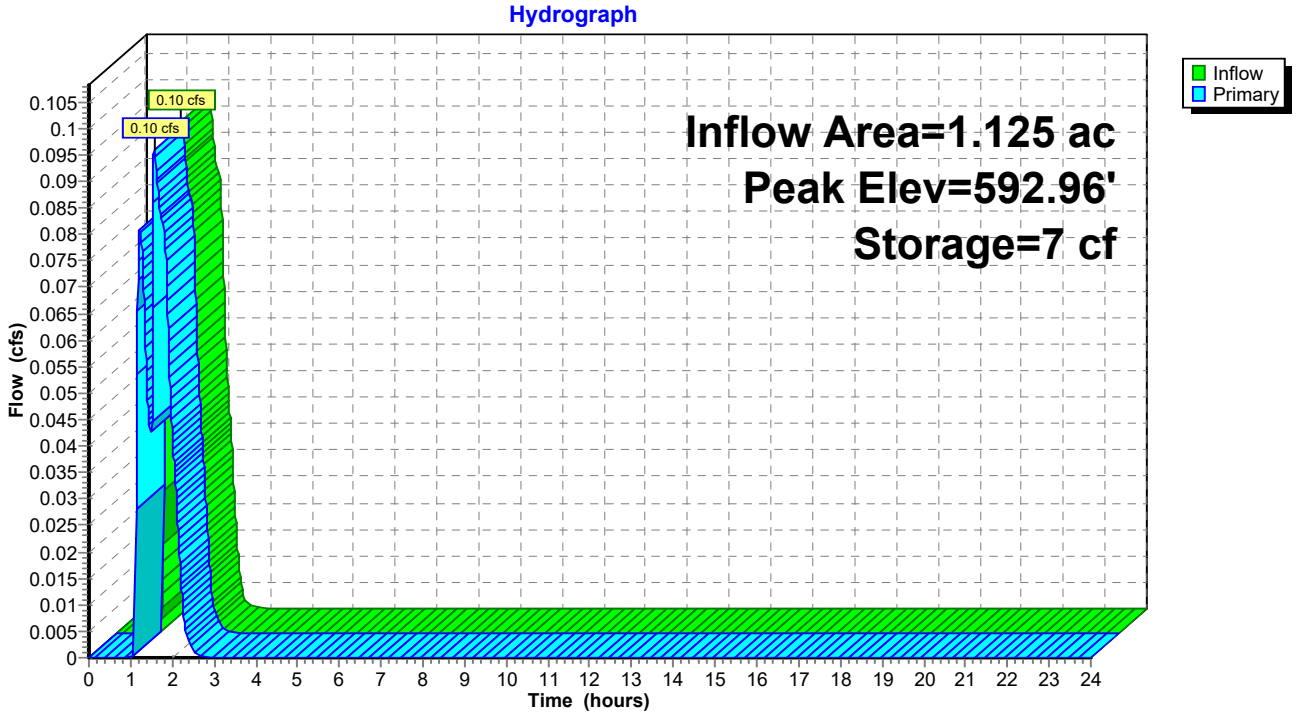
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.10 cfs @ 1.56 hrs HW=592.96' TW=591.14' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 0.10 cfs @ 1.24 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	**0.04**	**6**	**592.92**	**0.04**
2.00	**0.04**	**6**	**592.92**	**0.04**
2.50	0.00	4	592.84	0.00
3.00	0.00	3	592.83	0.00
3.50	0.00	3	592.83	0.00
4.00	0.00	3	592.83	0.00
4.50	0.00	3	592.83	0.00
5.00	0.00	3	592.83	0.00
5.50	0.00	3	592.83	0.00
6.00	0.00	3	592.83	0.00
6.50	0.00	3	592.83	0.00
7.00	0.00	3	592.83	0.00
7.50	0.00	3	592.83	0.00
8.00	0.00	3	592.83	0.00
8.50	0.00	3	592.83	0.00
9.00	0.00	3	592.83	0.00
9.50	0.00	3	592.83	0.00
10.00	0.00	3	592.83	0.00
10.50	0.00	3	592.83	0.00
11.00	0.00	3	592.83	0.00
11.50	0.00	3	592.83	0.00
12.00	0.00	3	592.83	0.00
12.50	0.00	3	592.83	0.00
13.00	0.00	3	592.83	0.00
13.50	0.00	3	592.83	0.00
14.00	0.00	3	592.83	0.00
14.50	0.00	3	592.83	0.00
15.00	0.00	3	592.83	0.00
15.50	0.00	3	592.83	0.00
16.00	0.00	3	592.83	0.00
16.50	0.00	3	592.83	0.00
17.00	0.00	3	592.83	0.00
17.50	0.00	3	592.83	0.00
18.00	0.00	3	592.83	0.00
18.50	0.00	3	592.83	0.00
19.00	0.00	3	592.83	0.00
19.50	0.00	3	592.83	0.00
20.00	0.00	3	592.83	0.00
20.50	0.00	3	592.83	0.00
21.00	0.00	3	592.83	0.00
21.50	0.00	3	592.83	0.00
22.00	0.00	3	592.83	0.00
22.50	0.00	3	592.83	0.00
23.00	0.00	3	592.83	0.00
23.50	0.00	3	592.83	0.00
24.00	0.00	3	592.83	0.00

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth = 0.06" for WQ event
Inflow = 0.11 cfs @ 1.56 hrs, Volume= 0.007 af
Outflow = 0.11 cfs @ 1.56 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
Primary = 0.11 cfs @ 1.56 hrs, Volume= 0.007 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 591.14' @ 1.56 hrs Surf.Area= 22 sf Storage= 12 cf

Plug-Flow detention time= 2.7 min calculated for 0.007 af (97% of inflow)
Center-of-Mass det. time= 1.4 min (98.8 - 97.4)

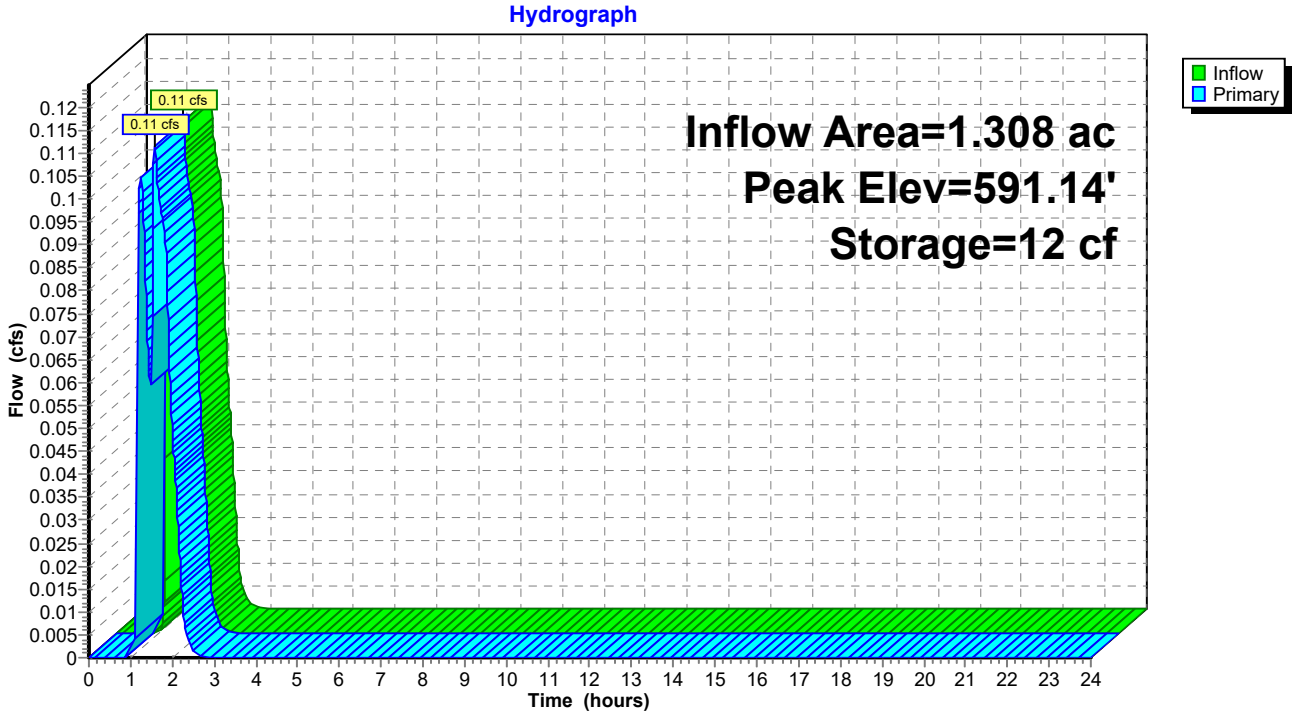
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 1.56 hrs HW=591.14' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 0.11 cfs @ 1.29 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	**0.06**	**11**	**591.10**	**0.06**
2.00	**0.05**	**11**	**591.09**	**0.05**
2.50	0.00	10	591.02	0.00
3.00	0.00	10	591.00	0.00
3.50	0.00	10	591.00	0.00
4.00	0.00	10	591.00	0.00
4.50	0.00	10	591.00	0.00
5.00	0.00	10	591.00	0.00
5.50	0.00	10	591.00	0.00
6.00	0.00	10	591.00	0.00
6.50	0.00	10	591.00	0.00
7.00	0.00	10	591.00	0.00
7.50	0.00	10	591.00	0.00
8.00	0.00	10	591.00	0.00
8.50	0.00	10	591.00	0.00
9.00	0.00	10	591.00	0.00
9.50	0.00	10	591.00	0.00
10.00	0.00	10	591.00	0.00
10.50	0.00	10	591.00	0.00
11.00	0.00	10	591.00	0.00
11.50	0.00	10	591.00	0.00
12.00	0.00	10	591.00	0.00
12.50	0.00	10	591.00	0.00
13.00	0.00	10	591.00	0.00
13.50	0.00	10	591.00	0.00
14.00	0.00	10	591.00	0.00
14.50	0.00	10	591.00	0.00
15.00	0.00	10	591.00	0.00
15.50	0.00	10	591.00	0.00
16.00	0.00	10	591.00	0.00
16.50	0.00	10	591.00	0.00
17.00	0.00	10	591.00	0.00
17.50	0.00	10	591.00	0.00
18.00	0.00	10	591.00	0.00
18.50	0.00	10	591.00	0.00
19.00	0.00	10	591.00	0.00
19.50	0.00	10	591.00	0.00
20.00	0.00	10	591.00	0.00
20.50	0.00	10	591.00	0.00
21.00	0.00	10	591.00	0.00
21.50	0.00	10	591.00	0.00
22.00	0.00	10	591.00	0.00
22.50	0.00	10	591.00	0.00
23.00	0.00	10	591.00	0.00
23.50	0.00	10	591.00	0.00
24.00	0.00	10	591.00	0.00

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth = 0.07" for WQ event
Inflow = 0.08 cfs @ 1.31 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 1.53 hrs, Volume= 0.002 af, Atten= 29%, Lag= 13.0 min
Primary = 0.05 cfs @ 1.53 hrs, Volume= 0.002 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.15' @ 1.53 hrs Surf.Area= 16 sf Storage= 85 cf

Plug-Flow detention time= 27.1 min calculated for 0.002 af (53% of inflow)
Center-of-Mass det. time= 13.8 min (108.0 - 94.2)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

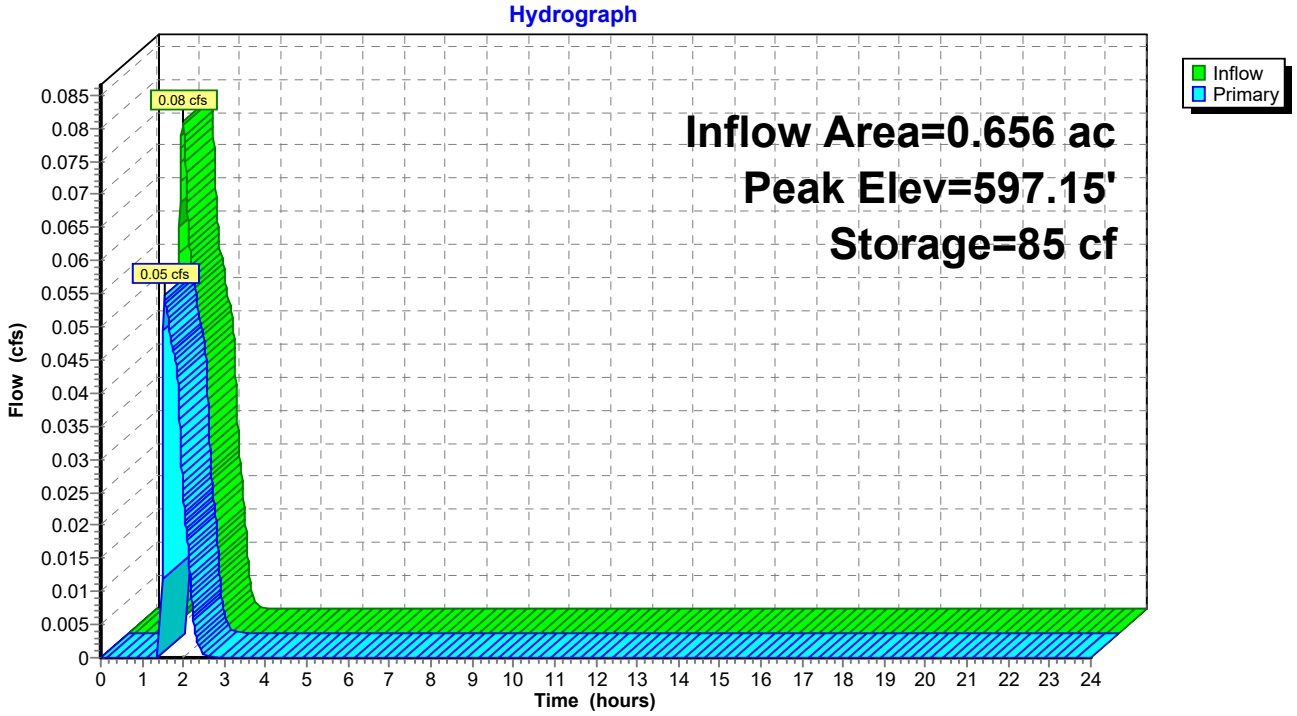
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 1.53 hrs HW=597.15' TW=596.07' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 0.05 cfs @ 1.14 fps)

Pond 23P: SD-01, SD-02



Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	**0.00**	0	591.82	0.00
1.50	**0.06**	**83**	**596.98**	**0.00**
2.00	0.02	**85**	**597.11**	**0.02**
2.50	0.00	84	597.05	0.00
3.00	0.00	84	597.04	0.00
3.50	0.00	84	597.04	0.00
4.00	0.00	84	597.04	0.00
4.50	0.00	84	597.04	0.00
5.00	0.00	84	597.04	0.00
5.50	0.00	84	597.04	0.00
6.00	0.00	84	597.04	0.00
6.50	0.00	84	597.04	0.00
7.00	0.00	84	597.04	0.00
7.50	0.00	84	597.04	0.00
8.00	0.00	84	597.04	0.00
8.50	0.00	84	597.04	0.00
9.00	0.00	84	597.04	0.00
9.50	0.00	84	597.04	0.00
10.00	0.00	84	597.04	0.00
10.50	0.00	84	597.04	0.00
11.00	0.00	84	597.04	0.00
11.50	0.00	84	597.04	0.00
12.00	0.00	84	597.04	0.00
12.50	0.00	84	597.04	0.00
13.00	0.00	84	597.04	0.00
13.50	0.00	84	597.04	0.00
14.00	0.00	84	597.04	0.00
14.50	0.00	84	597.04	0.00
15.00	0.00	84	597.04	0.00
15.50	0.00	84	597.04	0.00
16.00	0.00	84	597.04	0.00
16.50	0.00	84	597.04	0.00
17.00	0.00	84	597.04	0.00
17.50	0.00	84	597.04	0.00
18.00	0.00	84	597.04	0.00
18.50	0.00	84	597.04	0.00
19.00	0.00	84	597.04	0.00
19.50	0.00	84	597.04	0.00
20.00	0.00	84	597.04	0.00
20.50	0.00	84	597.04	0.00
21.00	0.00	84	597.04	0.00
21.50	0.00	84	597.04	0.00
22.00	0.00	84	597.04	0.00
22.50	0.00	84	597.04	0.00
23.00	0.00	84	597.04	0.00
23.50	0.00	84	597.04	0.00
24.00	0.00	84	597.04	0.00

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>1.19"
Flow Length=298' Tc=13.3 min CN=WQ Runoff=0.68 cfs 0.065 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>1.40"
Flow Length=85' Slope=0.1773 '/' Tc=7.6 min CN=WQ Runoff=0.23 cfs 0.017 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>1.29"
Flow Length=66' Slope=0.2264 '/' Tc=5.6 min CN=WQ Runoff=0.13 cfs 0.009 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>1.16"
Flow Length=82' Slope=0.1736 '/' Tc=7.4 min CN=WQ Runoff=0.30 cfs 0.023 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>1.89"
Flow Length=239' Tc=14.3 min CN=WQ Runoff=0.16 cfs 0.016 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>1.22"
Flow Length=116' Tc=11.1 min CN=WQ Runoff=0.21 cfs 0.019 af

Reach 3R: TD-01 Avg. Flow Depth=0.05' Max Vel=2.88 fps Inflow=0.23 cfs 0.017 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=0.23 cfs 0.017 af

Reach 4R: TD-02 Avg. Flow Depth=0.04' Max Vel=2.31 fps Inflow=0.13 cfs 0.009 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.13 cfs 0.009 af

Reach 5R: TD-03 Avg. Flow Depth=0.11' Max Vel=1.75 fps Inflow=0.30 cfs 0.023 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=0.29 cfs 0.023 af

Reach 6R: TD-04 Avg. Flow Depth=0.06' Max Vel=2.32 fps Inflow=0.21 cfs 0.019 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=0.21 cfs 0.019 af

Pond 7P: O-1A Inflow=1.59 cfs 0.146 af
Primary=1.59 cfs 0.146 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.37' Storage=16 cf Inflow=0.86 cfs 0.080 af
Outflow=0.86 cfs 0.080 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.36' Storage=13 cf Inflow=0.95 cfs 0.089 af
Outflow=0.95 cfs 0.089 af

Pond 16P: SD-09, SD-10 Peak Elev=593.33' Storage=27 cf Inflow=1.23 cfs 0.112 af
Outflow=1.23 cfs 0.112 af

Pond 20P: SD-11, SD-12 Peak Elev=591.54' Storage=30 cf Inflow=1.44 cfs 0.131 af
Outflow=1.44 cfs 0.130 af

Pond 23P: SD-01, SD-02 Peak Elev=597.46' Storage=90 cf Inflow=0.68 cfs 0.065 af
Outflow=0.68 cfs 0.063 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.149 af Average Runoff Depth = 1.27"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

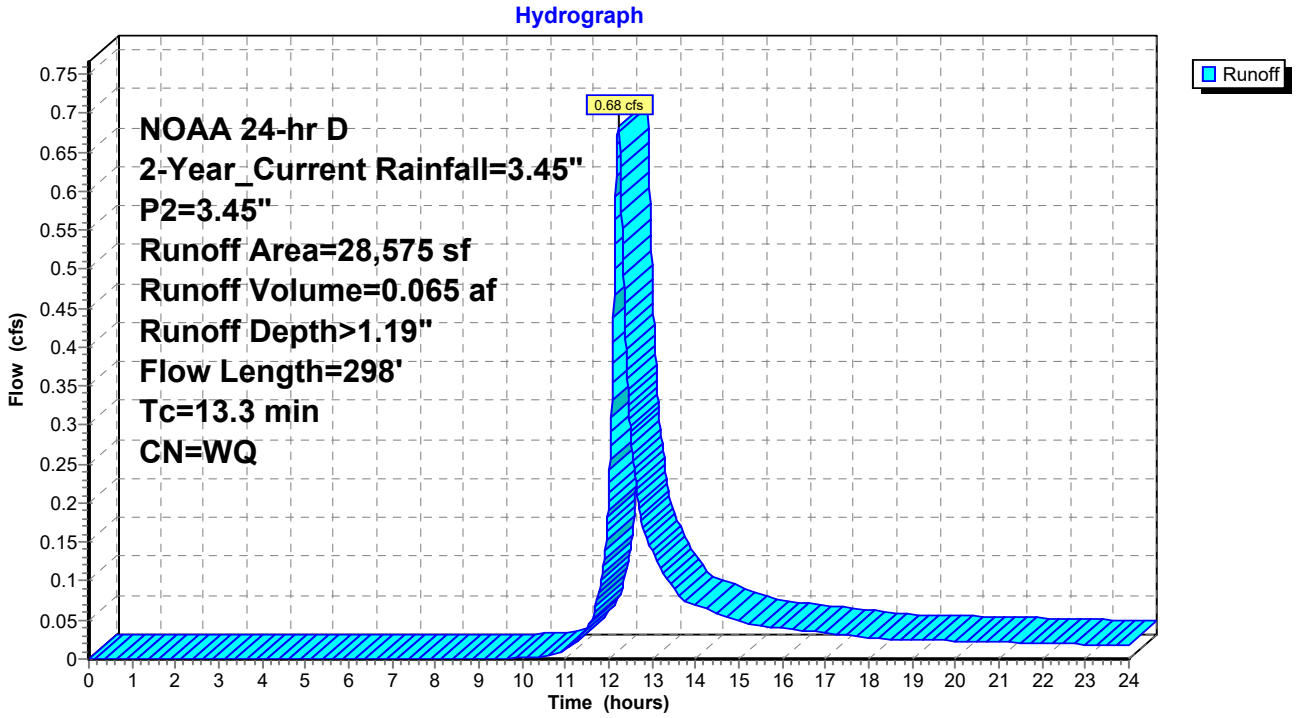
Runoff = 0.68 cfs @ 12.22 hrs, Volume= 0.065 af, Depth> 1.19"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
13.3	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.00	0.00
7.50	0.40	0.00	0.00
8.00	0.45	0.00	0.00
8.50	0.50	0.00	0.00
9.00	0.55	0.00	0.00
9.50	0.61	0.00	0.00
10.00	0.68	0.00	0.00
10.50	0.77	0.00	0.00
11.00	0.90	0.01	0.01
11.50	1.09	0.04	0.04
12.00	1.65	0.20	**0.21**
12.50	2.36	0.53	**0.29**
13.00	2.55	0.64	0.14
13.50	2.68	0.71	0.09
14.00	2.77	0.76	0.07
14.50	2.84	0.81	0.06
15.00	2.90	0.85	0.05
15.50	2.95	0.88	0.04
16.00	3.00	0.91	0.04
16.50	3.05	0.94	0.04
17.00	3.09	0.96	0.03
17.50	3.12	0.99	0.03
18.00	3.16	1.01	0.03
18.50	3.19	1.03	0.03
19.00	3.21	1.05	0.02
19.50	3.24	1.07	0.02
20.00	3.27	1.08	0.02
20.50	3.29	1.10	0.02
21.00	3.32	1.12	0.02
21.50	3.34	1.13	0.02
22.00	3.37	1.15	0.02
22.50	3.39	1.16	0.02
23.00	3.41	1.18	0.02
23.50	3.43	1.19	0.02
24.00	**3.45**	**1.21**	0.02

Summary for Subcatchment 6S: PO-DA D

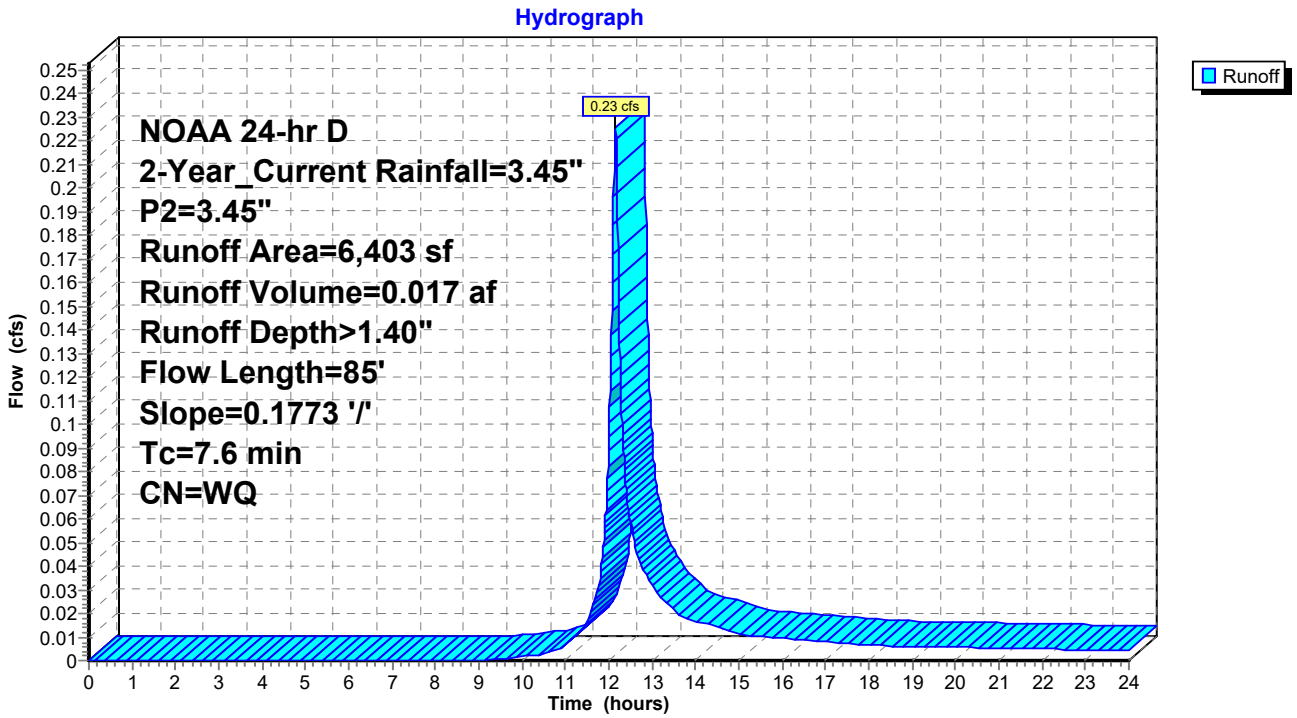
Runoff = 0.23 cfs @ 12.15 hrs, Volume= 0.017 af, Depth> 1.40"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	85	0.1773	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.00	0.00
7.50	0.40	0.00	0.00
8.00	0.45	0.00	0.00
8.50	0.50	0.00	0.00
9.00	0.55	0.00	0.00
9.50	0.61	0.00	0.00
10.00	0.68	0.00	0.00
10.50	0.77	0.01	0.00
11.00	0.90	0.03	0.01
11.50	1.09	0.07	0.02
12.00	1.65	0.28	**0.10**
12.50	2.36	0.65	**0.06**
13.00	2.55	0.77	0.03
13.50	2.68	0.85	0.02
14.00	2.77	0.91	0.02
14.50	2.84	0.96	0.01
15.00	2.90	1.00	0.01
15.50	2.95	1.04	0.01
16.00	3.00	1.07	0.01
16.50	3.05	1.10	0.01
17.00	3.09	1.13	0.01
17.50	3.12	1.16	0.01
18.00	3.16	1.18	0.01
18.50	3.19	1.20	0.01
19.00	3.21	1.22	0.01
19.50	3.24	1.24	0.01
20.00	3.27	1.26	0.01
20.50	3.29	1.28	0.01
21.00	3.32	1.30	0.01
21.50	3.34	1.32	0.01
22.00	3.37	1.33	0.00
22.50	3.39	1.35	0.00
23.00	3.41	1.36	0.00
23.50	3.43	1.38	0.00
24.00	**3.45**	**1.39**	0.00

Summary for Subcatchment 8S: PO-DA F

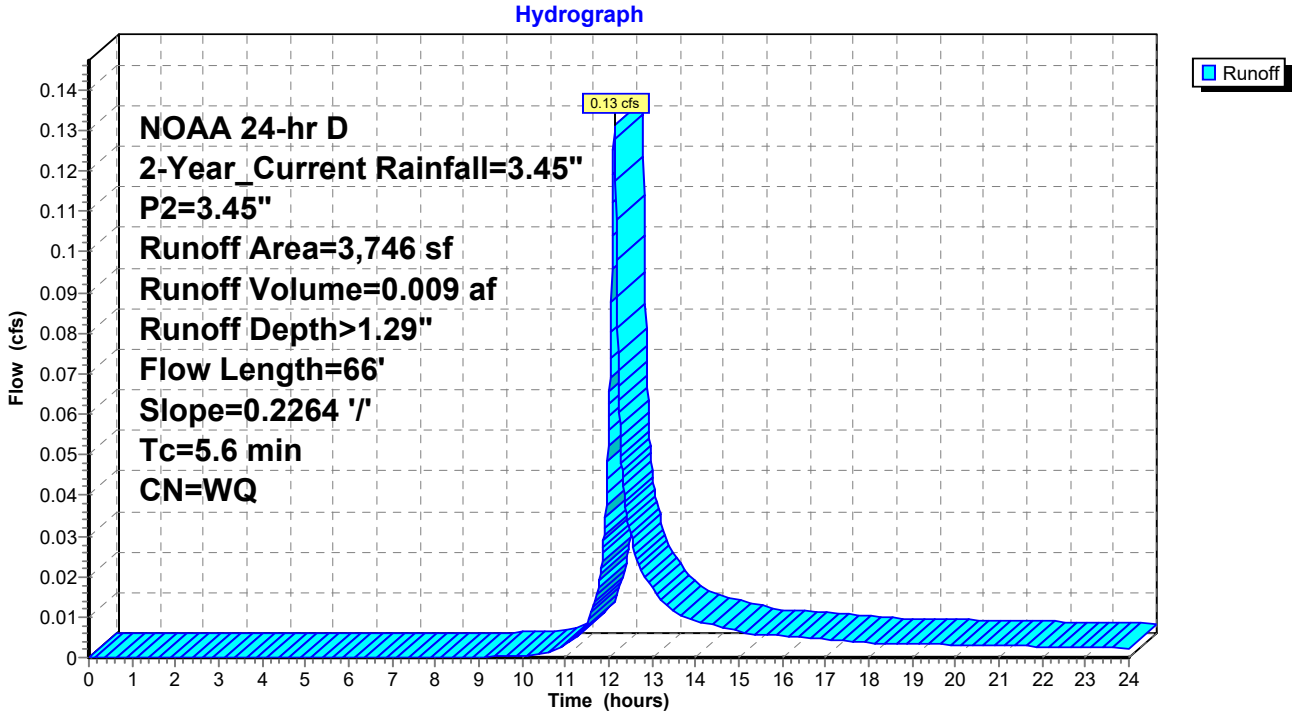
Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.009 af, Depth> 1.29"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	66	0.2264	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.00	0.00
7.50	0.40	0.00	0.00
8.00	0.45	0.00	0.00
8.50	0.50	0.00	0.00
9.00	0.55	0.00	0.00
9.50	0.61	0.00	0.00
10.00	0.68	0.00	0.00
10.50	0.77	0.00	0.00
11.00	0.90	0.01	0.00
11.50	1.09	0.05	0.01
12.00	1.65	0.23	**0.06**
12.50	2.36	0.57	**0.03**
13.00	2.55	0.68	0.02
13.50	2.68	0.76	0.01
14.00	2.77	0.81	0.01
14.50	2.84	0.86	0.01
15.00	2.90	0.90	0.01
15.50	2.95	0.93	0.01
16.00	3.00	0.96	0.01
16.50	3.05	0.99	0.00
17.00	3.09	1.02	0.00
17.50	3.12	1.04	0.00
18.00	3.16	1.06	0.00
18.50	3.19	1.08	0.00
19.00	3.21	1.10	0.00
19.50	3.24	1.12	0.00
20.00	3.27	1.14	0.00
20.50	3.29	1.16	0.00
21.00	3.32	1.18	0.00
21.50	3.34	1.19	0.00
22.00	3.37	1.21	0.00
22.50	3.39	1.22	0.00
23.00	3.41	1.24	0.00
23.50	3.43	1.25	0.00
24.00	**3.45**	**1.27**	0.00

Summary for Subcatchment 10S: PO-DA H

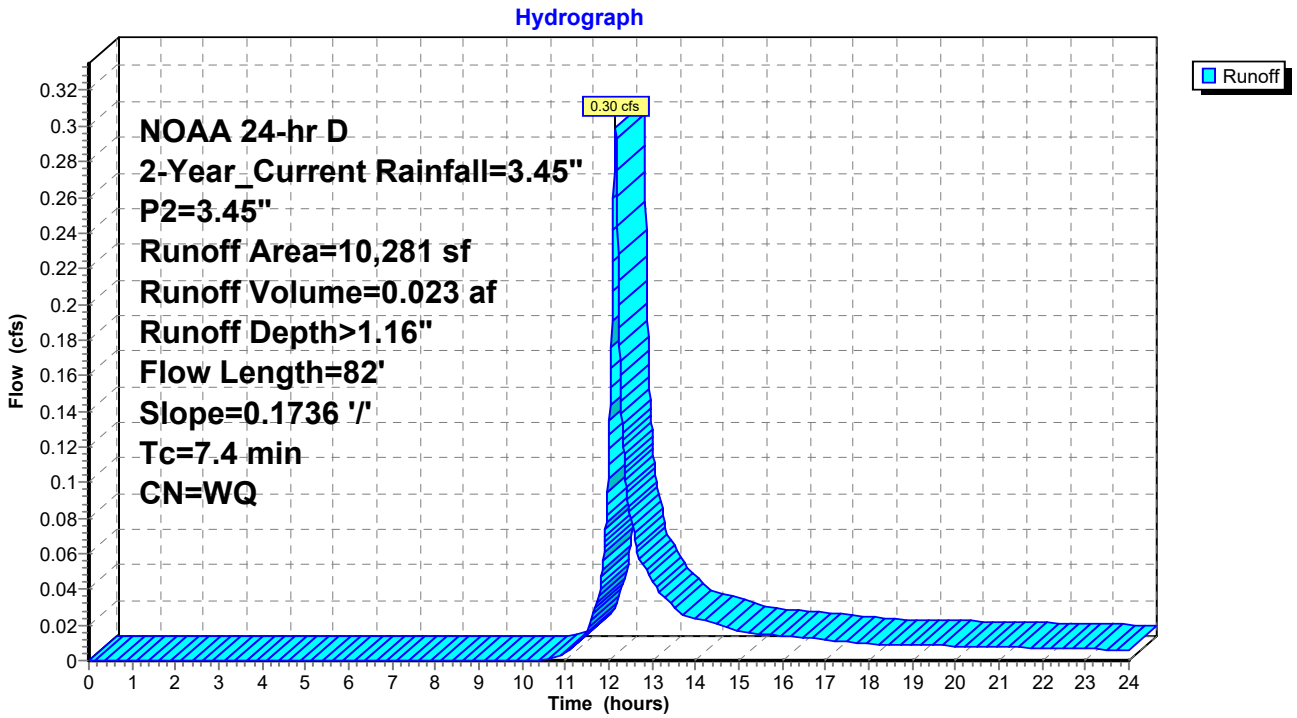
Runoff = 0.30 cfs @ 12.15 hrs, Volume= 0.023 af, Depth> 1.16"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	82	0.1736	0.18		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.00	0.00
7.50	0.40	0.00	0.00
8.00	0.45	0.00	0.00
8.50	0.50	0.00	0.00
9.00	0.55	0.00	0.00
9.50	0.61	0.00	0.00
10.00	0.68	0.00	0.00
10.50	0.77	0.00	0.00
11.00	0.90	0.01	0.00
11.50	1.09	0.03	0.02
12.00	1.65	0.18	**0.12**
12.50	2.36	0.49	**0.08**
13.00	2.55	0.60	0.05
13.50	2.68	0.67	0.03
14.00	2.77	0.72	0.02
14.50	2.84	0.76	0.02
15.00	2.90	0.80	0.02
15.50	2.95	0.83	0.01
16.00	3.00	0.86	0.01
16.50	3.05	0.89	0.01
17.00	3.09	0.91	0.01
17.50	3.12	0.93	0.01
18.00	3.16	0.95	0.01
18.50	3.19	0.97	0.01
19.00	3.21	0.99	0.01
19.50	3.24	1.01	0.01
20.00	3.27	1.03	0.01
20.50	3.29	1.04	0.01
21.00	3.32	1.06	0.01
21.50	3.34	1.08	0.01
22.00	3.37	1.09	0.01
22.50	3.39	1.11	0.01
23.00	3.41	1.12	0.01
23.50	3.43	1.13	0.01
24.00	**3.45**	**1.15**	0.01

Summary for Subcatchment 13S: PO-DA K

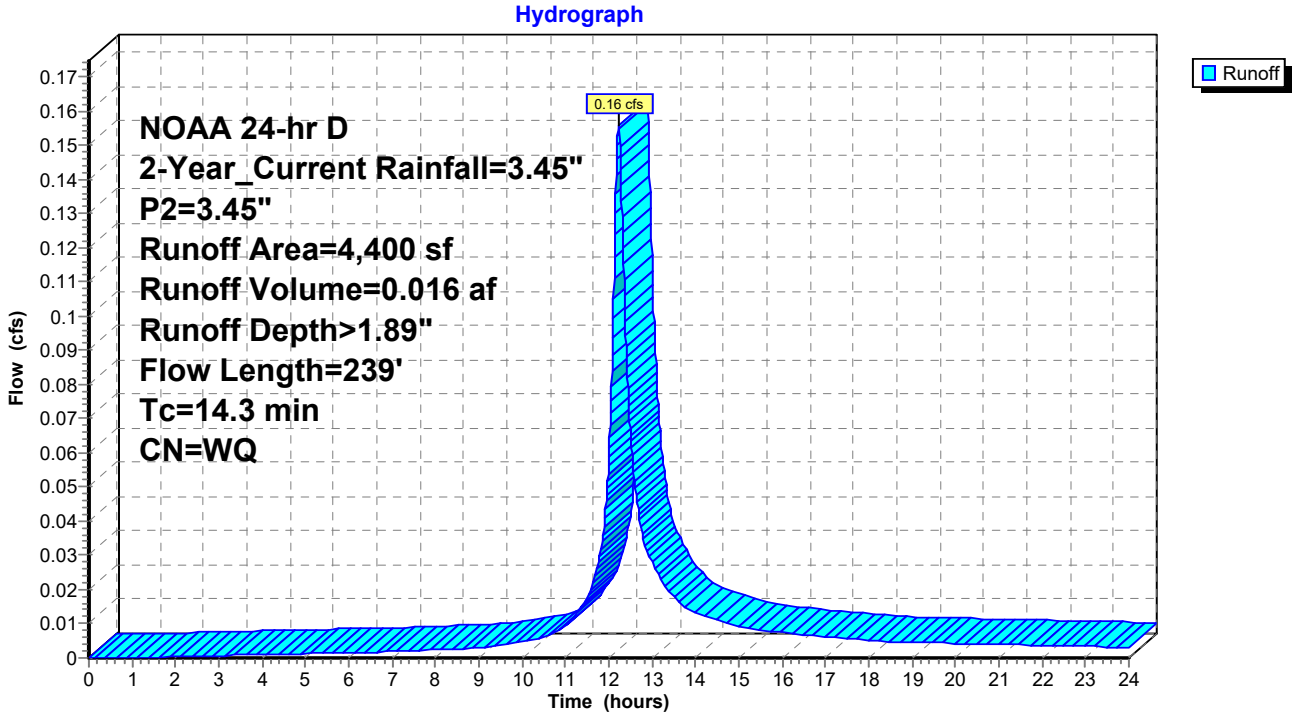
Runoff = 0.16 cfs @ 12.22 hrs, Volume= 0.016 af, Depth> 1.89"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0772	0.14		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
14.3	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.00	0.00
7.50	0.40	0.00	0.00
8.00	0.45	0.00	0.00
8.50	0.50	0.00	0.00
9.00	0.55	0.01	0.00
9.50	0.61	0.01	0.00
10.00	0.68	0.02	0.00
10.50	0.77	0.04	0.01
11.00	0.90	0.08	0.01
11.50	1.09	0.15	0.02
12.00	1.65	0.43	**0.06**
12.50	2.36	0.89	**0.07**
13.00	2.55	1.04	0.03
13.50	2.68	1.13	0.02
14.00	2.77	1.20	0.01
14.50	2.84	1.26	0.01
15.00	2.90	1.30	0.01
15.50	2.95	1.34	0.01
16.00	3.00	1.38	0.01
16.50	3.05	1.42	0.01
17.00	3.09	1.45	0.01
17.50	3.12	1.48	0.01
18.00	3.16	1.50	0.01
18.50	3.19	1.53	0.00
19.00	3.21	1.55	0.00
19.50	3.24	1.57	0.00
20.00	3.27	1.59	0.00
20.50	3.29	1.61	0.00
21.00	3.32	1.64	0.00
21.50	3.34	1.65	0.00
22.00	3.37	1.67	0.00
22.50	3.39	1.69	0.00
23.00	3.41	1.71	0.00
23.50	3.43	1.73	0.00
24.00	**3.45**	**1.74**	0.00

Summary for Subcatchment 14S: PO-DA L

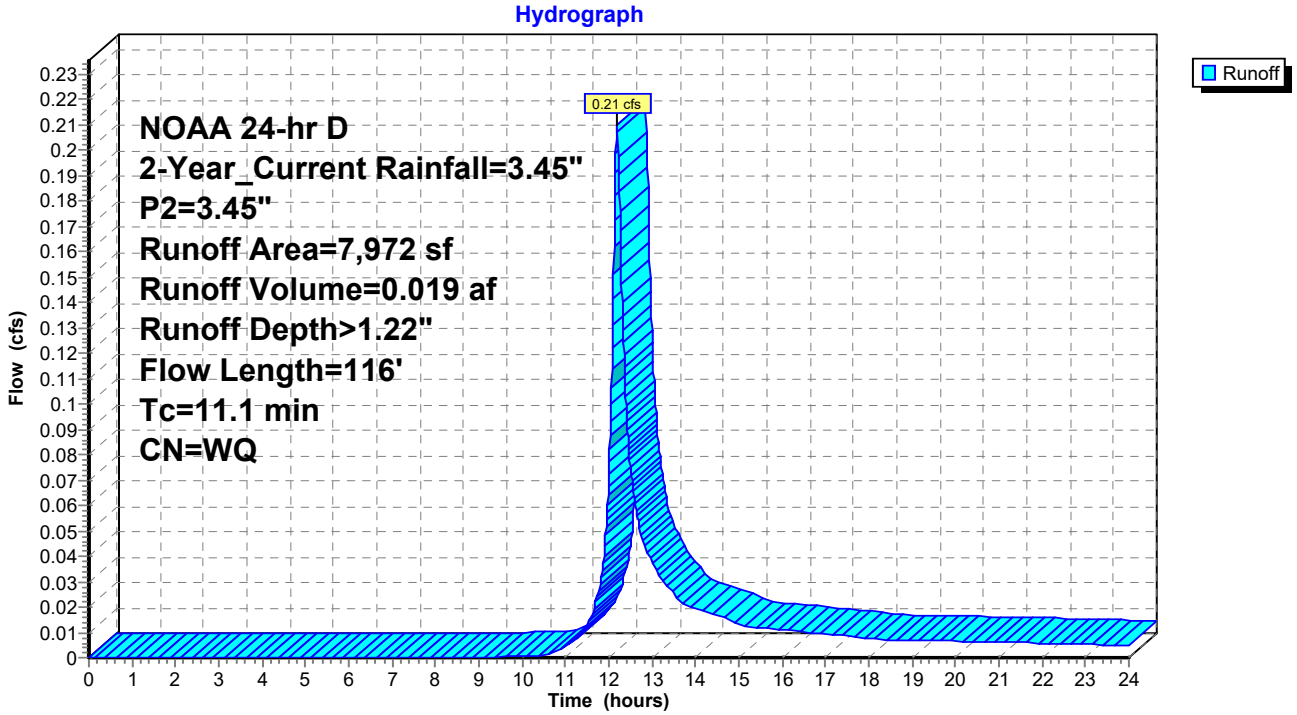
Runoff = 0.21 cfs @ 12.19 hrs, Volume= 0.019 af, Depth> 1.22"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.1003	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.1	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.00	0.00
7.50	0.40	0.00	0.00
8.00	0.45	0.00	0.00
8.50	0.50	0.00	0.00
9.00	0.55	0.00	0.00
9.50	0.61	0.00	0.00
10.00	0.68	0.00	0.00
10.50	0.77	0.00	0.00
11.00	0.90	0.01	0.00
11.50	1.09	0.04	0.01
12.00	1.65	0.20	**0.07**
12.50	2.36	0.53	**0.07**
13.00	2.55	0.64	0.04
13.50	2.68	0.71	0.03
14.00	2.77	0.76	0.02
14.50	2.84	0.81	0.02
15.00	2.90	0.85	0.01
15.50	2.95	0.88	0.01
16.00	3.00	0.91	0.01
16.50	3.05	0.94	0.01
17.00	3.09	0.96	0.01
17.50	3.12	0.99	0.01
18.00	3.16	1.01	0.01
18.50	3.19	1.03	0.01
19.00	3.21	1.05	0.01
19.50	3.24	1.07	0.01
20.00	3.27	1.08	0.01
20.50	3.29	1.10	0.01
21.00	3.32	1.12	0.01
21.50	3.34	1.13	0.01
22.00	3.37	1.15	0.01
22.50	3.39	1.16	0.01
23.00	3.41	1.18	0.01
23.50	3.43	1.19	0.01
24.00	**3.45**	**1.21**	0.00

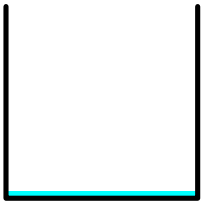
Summary for Reach 3R: TD-01

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 1.40" for 2-Year_Current event
Inflow = 0.23 cfs @ 12.15 hrs, Volume= 0.017 af
Outflow = 0.23 cfs @ 12.15 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 12P : SD-03, SD-04, SD-05

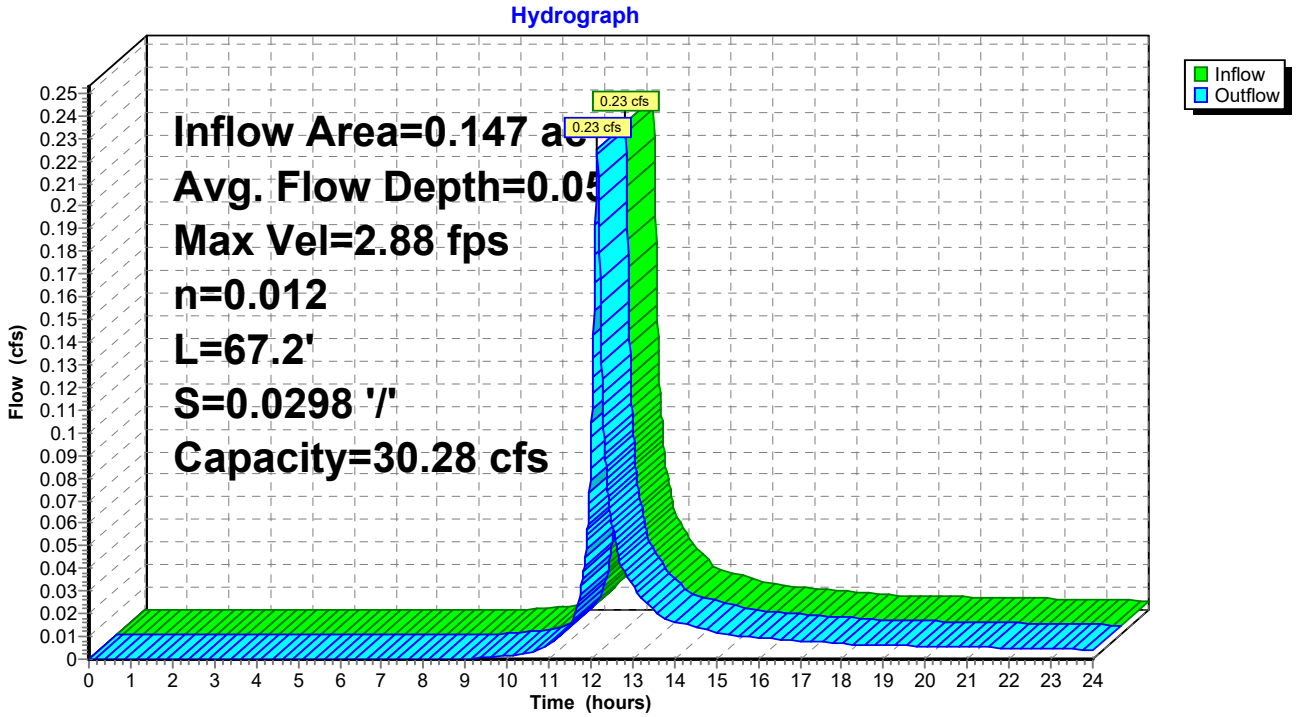
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.88 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'



Reach 3R: TD-01



Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.00	0	606.00	0.00
7.50	0.00	0	606.00	0.00
8.00	0.00	0	606.00	0.00
8.50	0.00	0	606.00	0.00
9.00	0.00	0	606.00	0.00
9.50	0.00	0	606.00	0.00
10.00	0.00	0	606.00	0.00
10.50	0.00	0	606.00	0.00
11.00	0.01	0	606.00	0.01
11.50	0.02	1	606.01	0.02
12.00	**0.10**	**3**	**606.03**	**0.09**
12.50	**0.06**	**2**	**606.02**	**0.06**
13.00	0.03	2	606.02	0.03
13.50	0.02	1	606.01	0.02
14.00	0.02	1	606.01	0.02
14.50	0.01	1	606.01	0.01
15.00	0.01	1	606.01	0.01
15.50	0.01	1	606.01	0.01
16.00	0.01	1	606.01	0.01
16.50	0.01	0	606.00	0.01
17.00	0.01	0	606.00	0.01
17.50	0.01	0	606.00	0.01
18.00	0.01	0	606.00	0.01
18.50	0.01	0	606.00	0.01
19.00	0.01	0	606.00	0.01
19.50	0.01	0	606.00	0.01
20.00	0.01	0	606.00	0.01
20.50	0.01	0	606.00	0.01
21.00	0.01	0	606.00	0.01
21.50	0.01	0	606.00	0.01
22.00	0.00	0	606.00	0.00
22.50	0.00	0	606.00	0.00
23.00	0.00	0	606.00	0.00
23.50	0.00	0	606.00	0.00
24.00	0.00	0	606.00	0.00

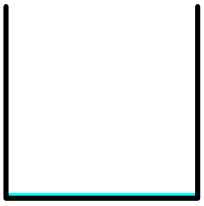
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 1.29" for 2-Year_Current event
Inflow = 0.13 cfs @ 12.13 hrs, Volume= 0.009 af
Outflow = 0.13 cfs @ 12.13 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 15P : SD-06, SD-07, SD-08

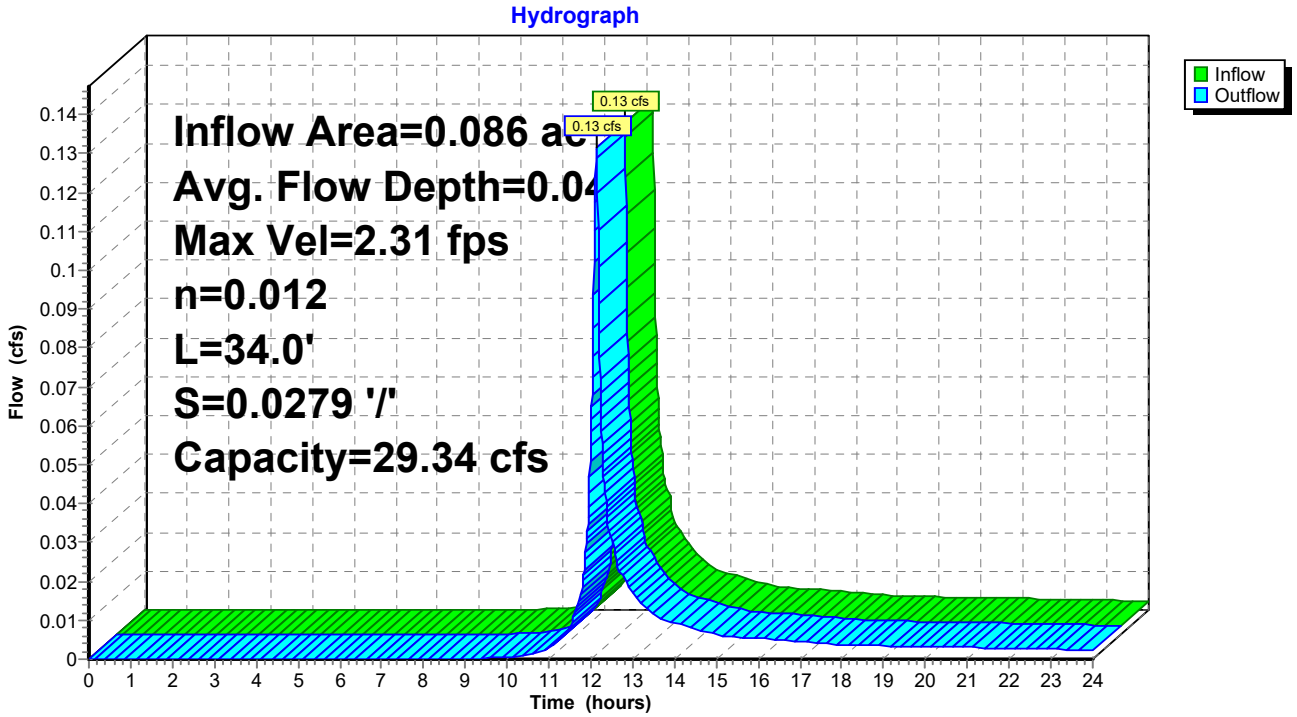
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.31 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.04' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.00	0	604.25	0.00
8.50	0.00	0	604.25	0.00
9.00	0.00	0	604.25	0.00
9.50	0.00	0	604.25	0.00
10.00	0.00	0	604.25	0.00
10.50	0.00	0	604.25	0.00
11.00	0.00	0	604.25	0.00
11.50	0.01	0	604.25	0.01
12.00	**0.06**	**1**	**604.27**	**0.06**
12.50	**0.03**	**1**	**604.27**	**0.03**
13.00	0.02	0	604.26	0.02
13.50	0.01	0	604.26	0.01
14.00	0.01	0	604.25	0.01
14.50	0.01	0	604.25	0.01
15.00	0.01	0	604.25	0.01
15.50	0.01	0	604.25	0.01
16.00	0.01	0	604.25	0.01
16.50	0.00	0	604.25	0.00
17.00	0.00	0	604.25	0.00
17.50	0.00	0	604.25	0.00
18.00	0.00	0	604.25	0.00
18.50	0.00	0	604.25	0.00
19.00	0.00	0	604.25	0.00
19.50	0.00	0	604.25	0.00
20.00	0.00	0	604.25	0.00
20.50	0.00	0	604.25	0.00
21.00	0.00	0	604.25	0.00
21.50	0.00	0	604.25	0.00
22.00	0.00	0	604.25	0.00
22.50	0.00	0	604.25	0.00
23.00	0.00	0	604.25	0.00
23.50	0.00	0	604.25	0.00
24.00	0.00	0	604.25	0.00

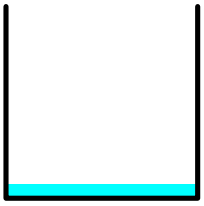
Summary for Reach 5R: TD-03

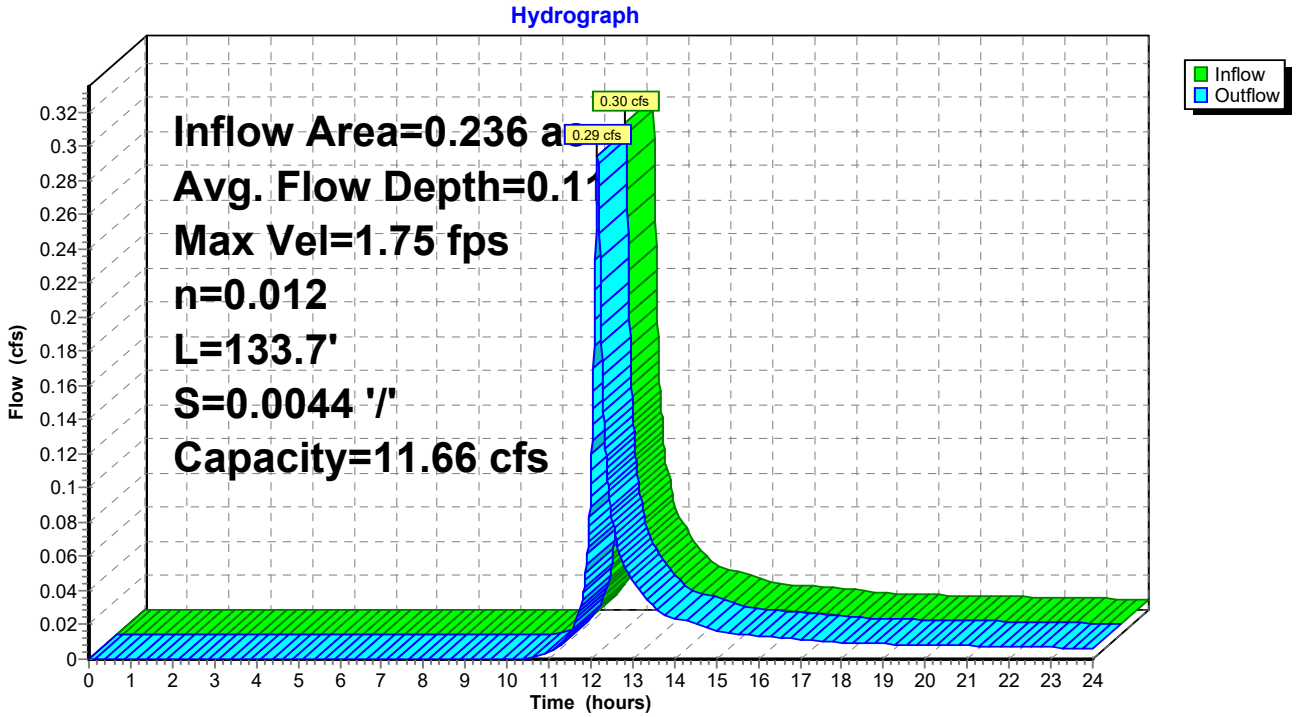
Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 1.16" for 2-Year_Current event
Inflow = 0.30 cfs @ 12.15 hrs, Volume= 0.023 af
Outflow = 0.29 cfs @ 12.16 hrs, Volume= 0.023 af, Atten= 2%, Lag= 0.8 min
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 1.75 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.59 fps, Avg. Travel Time= 3.8 min

Peak Storage= 23 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'





Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	0	601.81	0.00
7.00	0.00	0	601.81	0.00
7.50	0.00	0	601.81	0.00
8.00	0.00	0	601.81	0.00
8.50	0.00	0	601.81	0.00
9.00	0.00	0	601.81	0.00
9.50	0.00	0	601.81	0.00
10.00	0.00	0	601.81	0.00
10.50	0.00	0	601.81	0.00
11.00	0.00	1	601.82	0.00
11.50	0.02	3	601.83	0.01
12.00	**0.12**	**12**	**601.87**	**0.10**
12.50	**0.08**	**10**	**601.86**	**0.08**
13.00	0.05	7	601.85	0.05
13.50	0.03	6	601.84	0.03
14.00	0.02	5	601.83	0.02
14.50	0.02	4	601.83	0.02
15.00	0.02	4	601.83	0.02
15.50	0.01	3	601.83	0.01
16.00	0.01	3	601.83	0.01
16.50	0.01	3	601.83	0.01
17.00	0.01	3	601.83	0.01
17.50	0.01	3	601.82	0.01
18.00	0.01	3	601.82	0.01
18.50	0.01	2	601.82	0.01
19.00	0.01	2	601.82	0.01
19.50	0.01	2	601.82	0.01
20.00	0.01	2	601.82	0.01
20.50	0.01	2	601.82	0.01
21.00	0.01	2	601.82	0.01
21.50	0.01	2	601.82	0.01
22.00	0.01	2	601.82	0.01
22.50	0.01	2	601.82	0.01
23.00	0.01	2	601.82	0.01
23.50	0.01	2	601.82	0.01
24.00	0.01	2	601.82	0.01

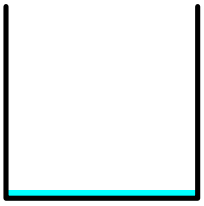
Summary for Reach 6R: TD-04

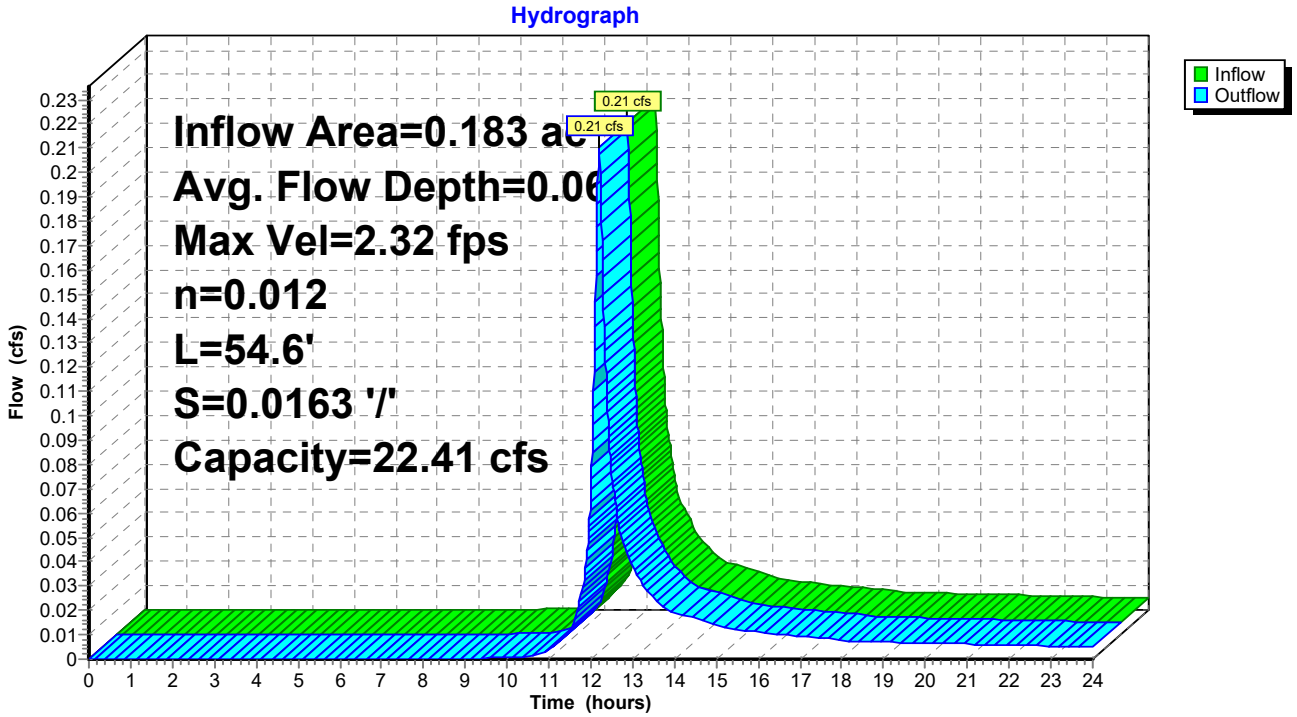
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 1.22" for 2-Year_Current event
Inflow = 0.21 cfs @ 12.19 hrs, Volume= 0.019 af
Outflow = 0.21 cfs @ 12.20 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.32 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 0.9 min

Peak Storage= 5 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.06' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

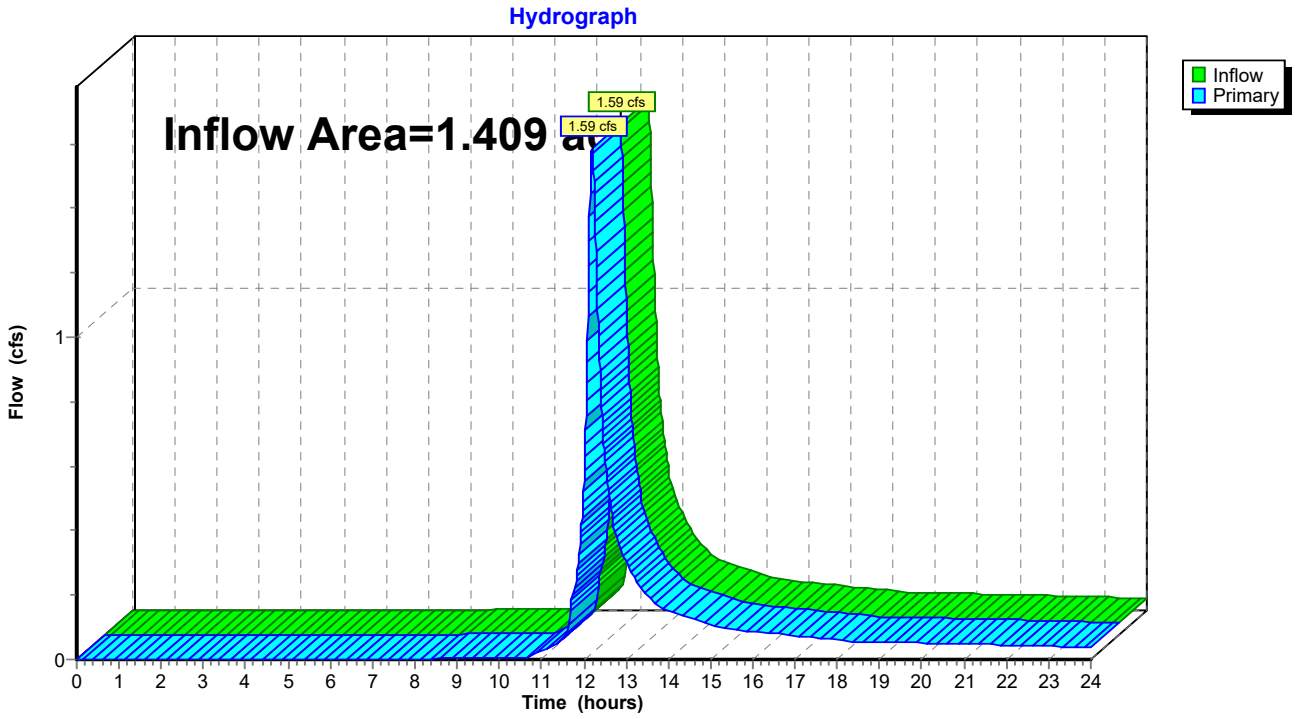
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.00	0	600.77	0.00
8.00	0.00	0	600.77	0.00
8.50	0.00	0	600.77	0.00
9.00	0.00	0	600.77	0.00
9.50	0.00	0	600.77	0.00
10.00	0.00	0	600.77	0.00
10.50	0.00	0	600.77	0.00
11.00	0.00	0	600.77	0.00
11.50	0.01	1	600.78	0.01
12.00	**0.07**	**3**	**600.80**	**0.07**
12.50	**0.07**	**3**	**600.80**	**0.08**
13.00	0.04	2	600.79	0.04
13.50	0.03	1	600.79	0.03
14.00	0.02	1	600.78	0.02
14.50	0.02	1	600.78	0.02
15.00	0.01	1	600.78	0.01
15.50	0.01	1	600.78	0.01
16.00	0.01	1	600.78	0.01
16.50	0.01	1	600.78	0.01
17.00	0.01	1	600.78	0.01
17.50	0.01	0	600.78	0.01
18.00	0.01	0	600.78	0.01
18.50	0.01	0	600.78	0.01
19.00	0.01	0	600.77	0.01
19.50	0.01	0	600.77	0.01
20.00	0.01	0	600.77	0.01
20.50	0.01	0	600.77	0.01
21.00	0.01	0	600.77	0.01
21.50	0.01	0	600.77	0.01
22.00	0.01	0	600.77	0.01
22.50	0.01	0	600.77	0.01
23.00	0.01	0	600.77	0.01
23.50	0.01	0	600.77	0.01
24.00	0.00	0	600.77	0.00

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 1.25" for 2-Year_Current event
Inflow = 1.59 cfs @ 12.19 hrs, Volume= 0.146 af
Primary = 1.59 cfs @ 12.19 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.01		0.01
11.00	0.03		0.03
11.50	0.07		0.07
12.00	**0.55**		**0.55**
12.50	**0.62**		**0.62**
13.00	0.31		0.31
13.50	0.20		0.20
14.00	0.15		0.15
14.50	0.13		0.13
15.00	0.11		0.11
15.50	0.09		0.09
16.00	0.09		0.09
16.50	0.08		0.08
17.00	0.07		0.07
17.50	0.07		0.07
18.00	0.06		0.06
18.50	0.06		0.06
19.00	0.05		0.05
19.50	0.05		0.05
20.00	0.05		0.05
20.50	0.05		0.05
21.00	0.05		0.05
21.50	0.05		0.05
22.00	0.04		0.04
22.50	0.04		0.04
23.00	0.04		0.04
23.50	0.04		0.04
24.00	0.04		0.04

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 1.20" for 2-Year_Current event
Inflow = 0.86 cfs @ 12.20 hrs, Volume= 0.080 af
Outflow = 0.86 cfs @ 12.20 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.3 min
Primary = 0.86 cfs @ 12.20 hrs, Volume= 0.080 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.37' @ 12.20 hrs Surf.Area= 64 sf Storage= 16 cf

Plug-Flow detention time= 1.2 min calculated for 0.080 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (876.5 - 876.0)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

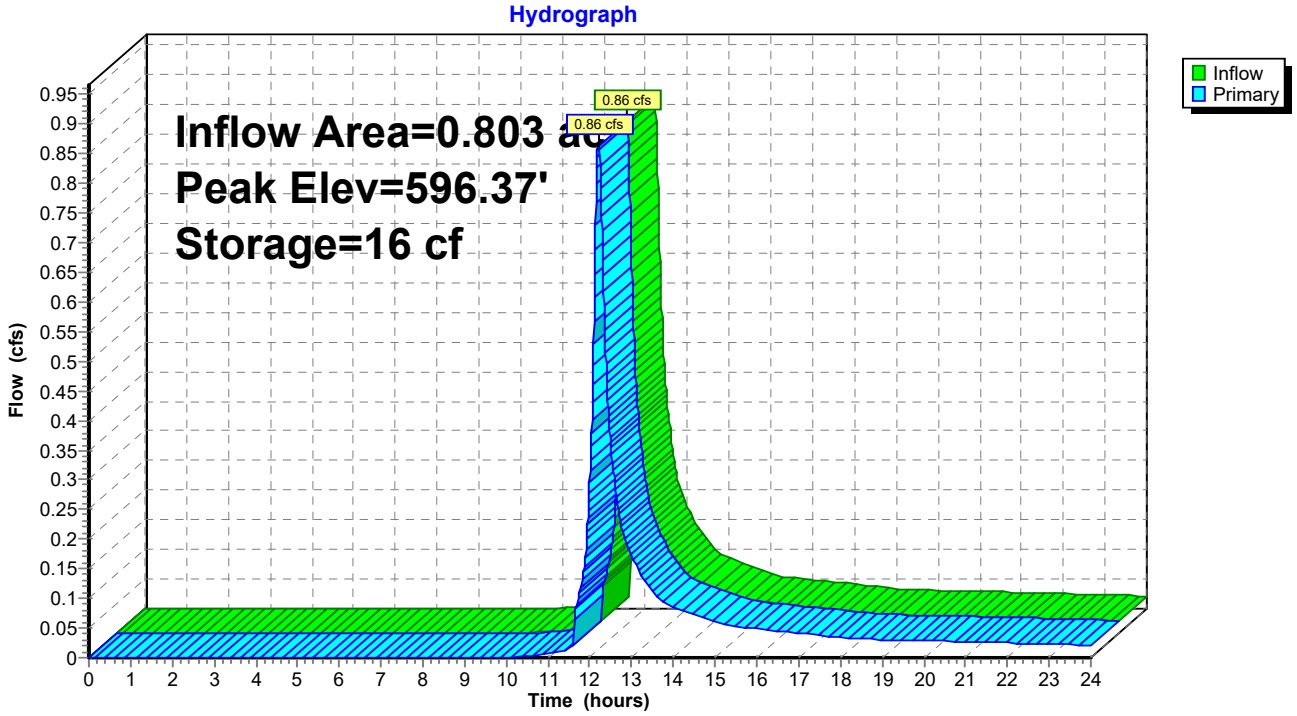
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.86 cfs @ 12.20 hrs HW=596.37' TW=594.36' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 0.86 cfs @ 2.19 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	0	595.71	0.00
4.50	0.00	0	595.71	0.00
5.00	0.00	0	595.71	0.00
5.50	0.00	0	595.71	0.00
6.00	0.00	0	595.71	0.00
6.50	0.00	0	595.71	0.00
7.00	0.00	0	595.71	0.00
7.50	0.00	0	595.71	0.00
8.00	0.00	0	595.71	0.00
8.50	0.00	0	595.71	0.00
9.00	0.00	0	595.72	0.00
9.50	0.00	1	595.79	0.00
10.00	0.00	3	595.94	0.00
10.50	0.00	4	595.98	0.00
11.00	0.01	4	595.99	0.01
11.50	0.02	4	596.01	0.02
12.00	**0.30**	**8**	**596.20**	**0.30**
12.50	**0.35**	**9**	**596.22**	**0.35**
13.00	0.17	7	596.14	0.17
13.50	0.11	6	596.11	0.11
14.00	0.09	5	596.09	0.09
14.50	0.07	5	596.08	0.07
15.00	0.06	5	596.07	0.06
15.50	0.05	5	596.06	0.05
16.00	0.05	5	596.05	0.05
16.50	0.05	5	596.05	0.05
17.00	0.04	5	596.05	0.04
17.50	0.04	5	596.04	0.04
18.00	0.03	4	596.04	0.03
18.50	0.03	4	596.04	0.03
19.00	0.03	4	596.04	0.03
19.50	0.03	4	596.03	0.03
20.00	0.03	4	596.03	0.03
20.50	0.03	4	596.03	0.03
21.00	0.03	4	596.03	0.03
21.50	0.03	4	596.03	0.03
22.00	0.03	4	596.03	0.03
22.50	0.02	4	596.03	0.02
23.00	0.02	4	596.03	0.02
23.50	0.02	4	596.02	0.02
24.00	0.02	4	596.02	0.02

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 1.21" for 2-Year_Current event
Inflow = 0.95 cfs @ 12.19 hrs, Volume= 0.089 af
Outflow = 0.95 cfs @ 12.19 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.2 min
Primary = 0.95 cfs @ 12.19 hrs, Volume= 0.089 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.36' @ 12.19 hrs Surf.Area= 55 sf Storage= 13 cf

Plug-Flow detention time= 0.4 min calculated for 0.089 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (875.3 - 875.1)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

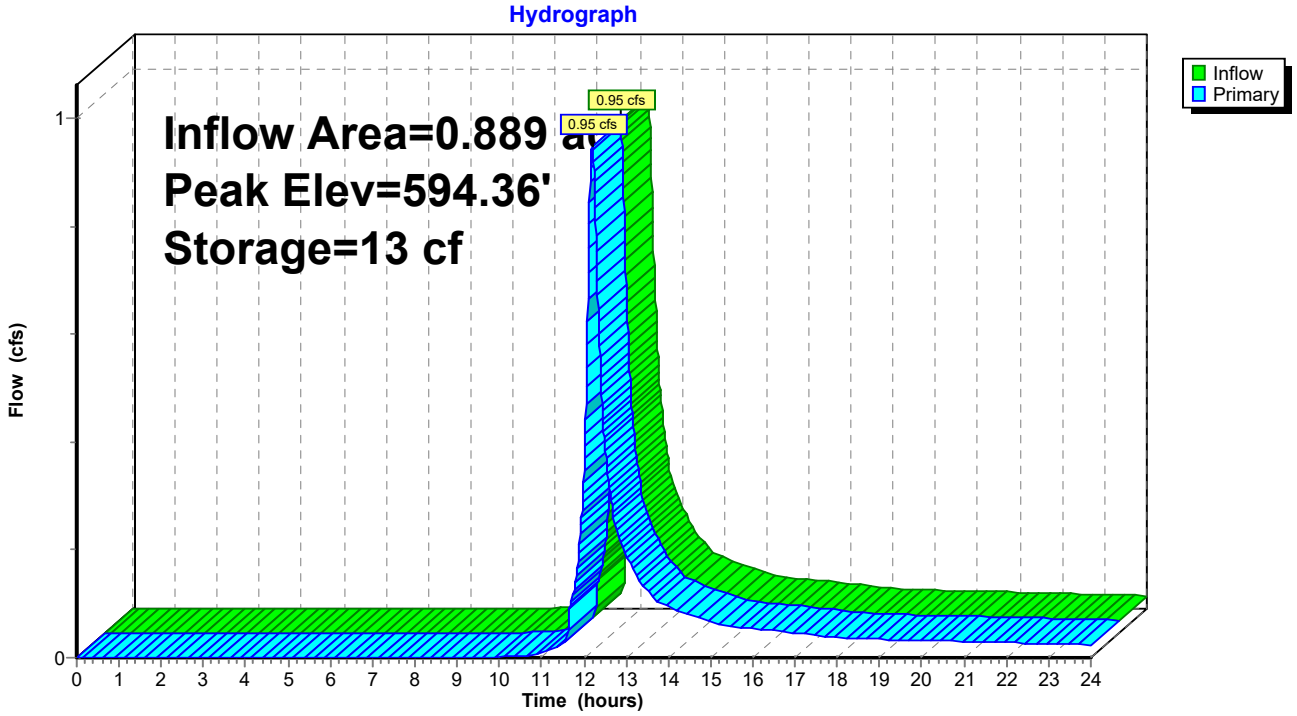
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.95 cfs @ 12.19 hrs HW=594.36' TW=593.33' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 0.95 cfs @ 2.24 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.92	0.00
4.50	0.00	0	593.92	0.00
5.00	0.00	0	593.92	0.00
5.50	0.00	0	593.92	0.00
6.00	0.00	0	593.92	0.00
6.50	0.00	0	593.92	0.00
7.00	0.00	0	593.92	0.00
7.50	0.00	0	593.92	0.00
8.00	0.00	0	593.92	0.00
8.50	0.00	0	593.92	0.00
9.00	0.00	0	593.92	0.00
9.50	0.00	0	593.94	0.00
10.00	0.00	0	593.94	0.00
10.50	0.00	0	593.96	0.00
11.00	0.01	1	593.97	0.01
11.50	0.02	1	594.00	0.02
12.00	**0.35**	**6**	**594.19**	**0.35**
12.50	**0.39**	**6**	**594.20**	**0.39**
13.00	0.19	4	594.12	0.19
13.50	0.13	3	594.08	0.13
14.00	0.09	2	594.06	0.09
14.50	0.08	2	594.05	0.08
15.00	0.07	2	594.04	0.07
15.50	0.06	2	594.03	0.06
16.00	0.05	2	594.03	0.05
16.50	0.05	2	594.03	0.05
17.00	0.05	1	594.02	0.05
17.50	0.04	1	594.02	0.04
18.00	0.04	1	594.01	0.04
18.50	0.04	1	594.01	0.04
19.00	0.03	1	594.01	0.03
19.50	0.03	1	594.01	0.03
20.00	0.03	1	594.01	0.03
20.50	0.03	1	594.01	0.03
21.00	0.03	1	594.00	0.03
21.50	0.03	1	594.00	0.03
22.00	0.03	1	594.00	0.03
22.50	0.03	1	594.00	0.03
23.00	0.03	1	594.00	0.03
23.50	0.02	1	594.00	0.02
24.00	0.02	1	594.00	0.02

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 1.20" for 2-Year_Current event
Inflow = 1.23 cfs @ 12.18 hrs, Volume= 0.112 af
Outflow = 1.23 cfs @ 12.18 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.3 min
Primary = 1.23 cfs @ 12.18 hrs, Volume= 0.112 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 593.33' @ 12.18 hrs Surf.Area= 77 sf Storage= 27 cf

Plug-Flow detention time= 1.1 min calculated for 0.112 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (875.6 - 875.1)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

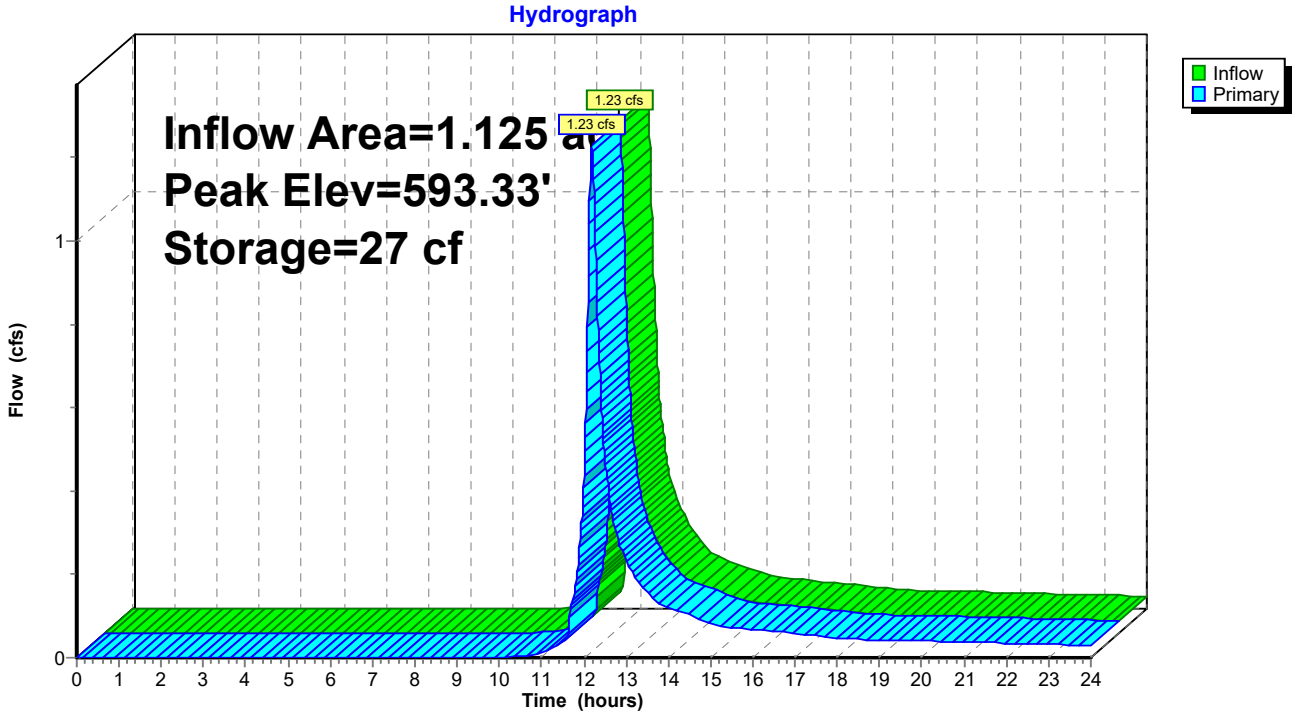
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.23 cfs @ 12.18 hrs HW=593.33' TW=591.54' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 1.23 cfs @ 2.40 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.58	0.00
4.50	0.00	0	592.58	0.00
5.00	0.00	0	592.58	0.00
5.50	0.00	0	592.58	0.00
6.00	0.00	0	592.58	0.00
6.50	0.00	0	592.58	0.00
7.00	0.00	0	592.58	0.00
7.50	0.00	0	592.58	0.00
8.00	0.00	0	592.58	0.00
8.50	0.00	0	592.58	0.00
9.00	0.00	0	592.58	0.00
9.50	0.00	0	592.60	0.00
10.00	0.00	1	592.67	0.00
10.50	0.00	4	592.86	0.00
11.00	0.01	5	592.88	0.01
11.50	0.04	6	592.91	0.04
12.00	**0.45**	**14**	**593.12**	**0.44**
12.50	**0.47**	**14**	**593.13**	**0.48**
13.00	0.24	10	593.04	0.24
13.50	0.16	8	593.00	0.16
14.00	0.12	8	592.98	0.12
14.50	0.10	7	592.97	0.10
15.00	0.08	7	592.95	0.08
15.50	0.07	7	592.95	0.07
16.00	0.07	6	592.94	0.07
16.50	0.06	6	592.94	0.06
17.00	0.06	6	592.93	0.06
17.50	0.05	6	592.93	0.05
18.00	0.05	6	592.92	0.05
18.50	0.04	6	592.92	0.04
19.00	0.04	6	592.92	0.04
19.50	0.04	6	592.92	0.04
20.00	0.04	6	592.92	0.04
20.50	0.04	6	592.91	0.04
21.00	0.04	6	592.91	0.04
21.50	0.04	6	592.91	0.04
22.00	0.04	5	592.91	0.04
22.50	0.03	5	592.91	0.03
23.00	0.03	5	592.91	0.03
23.50	0.03	5	592.91	0.03
24.00	0.03	5	592.90	0.03

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 1.20" for 2-Year_Current event
Inflow = 1.44 cfs @ 12.19 hrs, Volume= 0.131 af
Outflow = 1.44 cfs @ 12.19 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.3 min
Primary = 1.44 cfs @ 12.19 hrs, Volume= 0.130 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 591.54' @ 12.19 hrs Surf.Area= 70 sf Storage= 30 cf

Plug-Flow detention time= 1.7 min calculated for 0.130 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (875.7 - 875.0)

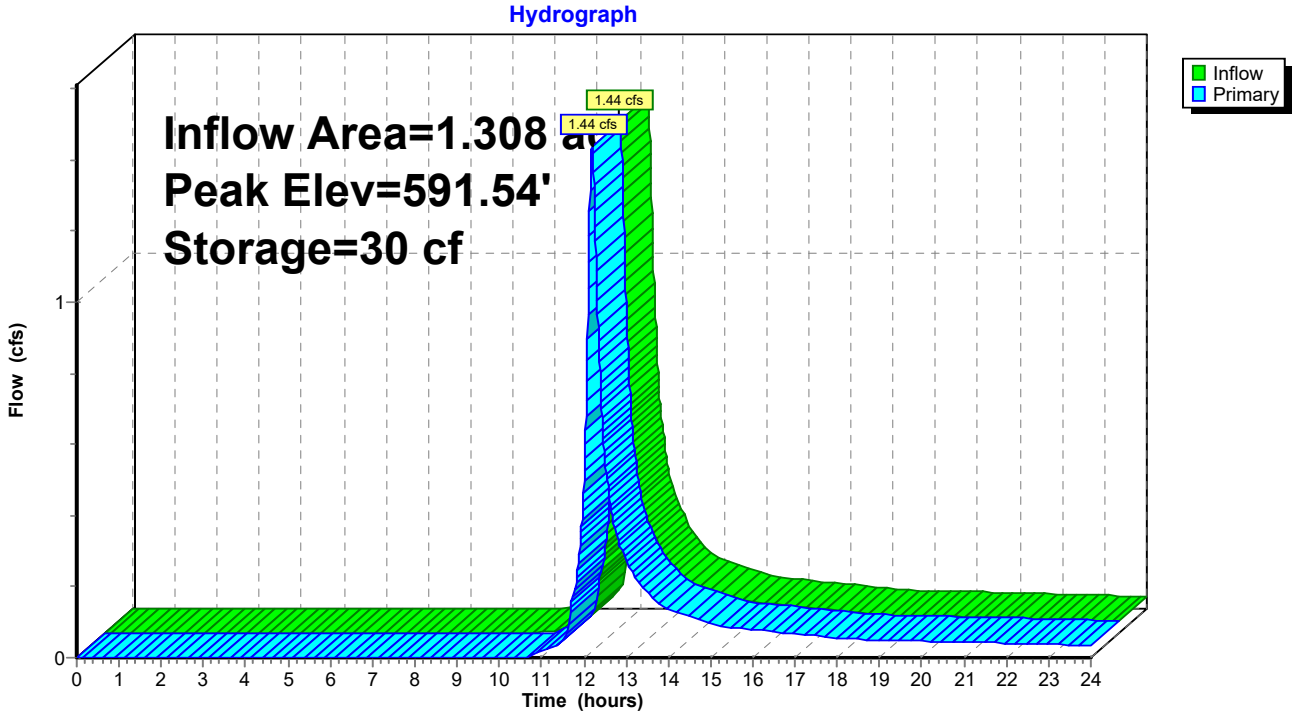
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.44 cfs @ 12.19 hrs HW=591.54' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 1.44 cfs @ 2.50 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.26	0.00
4.00	0.00	0	590.26	0.00
4.50	0.00	0	590.26	0.00
5.00	0.00	0	590.26	0.00
5.50	0.00	0	590.26	0.00
6.00	0.00	0	590.26	0.00
6.50	0.00	0	590.26	0.00
7.00	0.00	0	590.26	0.00
7.50	0.00	0	590.26	0.00
8.00	0.00	0	590.26	0.00
8.50	0.00	0	590.27	0.00
9.00	0.00	0	590.28	0.00
9.50	0.00	1	590.31	0.00
10.00	0.00	1	590.37	0.00
10.50	0.00	5	590.64	0.00
11.00	0.02	10	591.05	0.02
11.50	0.05	11	591.10	0.05
12.00	**0.51**	**17**	**591.31**	**0.49**
12.50	**0.55**	**18**	**591.33**	**0.56**
13.00	0.28	14	591.23	0.28
13.50	0.18	13	591.19	0.18
14.00	0.14	12	591.16	0.14
14.50	0.12	12	591.15	0.12
15.00	0.10	12	591.13	0.10
15.50	0.09	12	591.13	0.09
16.00	0.08	12	591.12	0.08
16.50	0.07	11	591.12	0.07
17.00	0.07	11	591.11	0.07
17.50	0.06	11	591.11	0.06
18.00	0.06	11	591.10	0.06
18.50	0.05	11	591.10	0.05
19.00	0.05	11	591.10	0.05
19.50	0.05	11	591.09	0.05
20.00	0.05	11	591.09	0.05
20.50	0.05	11	591.09	0.05
21.00	0.04	11	591.09	0.04
21.50	0.04	11	591.09	0.04
22.00	0.04	11	591.09	0.04
22.50	0.04	11	591.09	0.04
23.00	0.04	11	591.08	0.04
23.50	0.04	11	591.08	0.04
24.00	0.03	11	591.08	0.03

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 1.19" for 2-Year_Current event
Inflow = 0.68 cfs @ 12.22 hrs, Volume= 0.065 af
Outflow = 0.68 cfs @ 12.22 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.1 min
Primary = 0.68 cfs @ 12.22 hrs, Volume= 0.063 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.46' @ 12.22 hrs Surf.Area= 16 sf Storage= 90 cf

Plug-Flow detention time= 22.6 min calculated for 0.063 af (97% of inflow)
Center-of-Mass det. time= 6.4 min (880.6 - 874.2)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

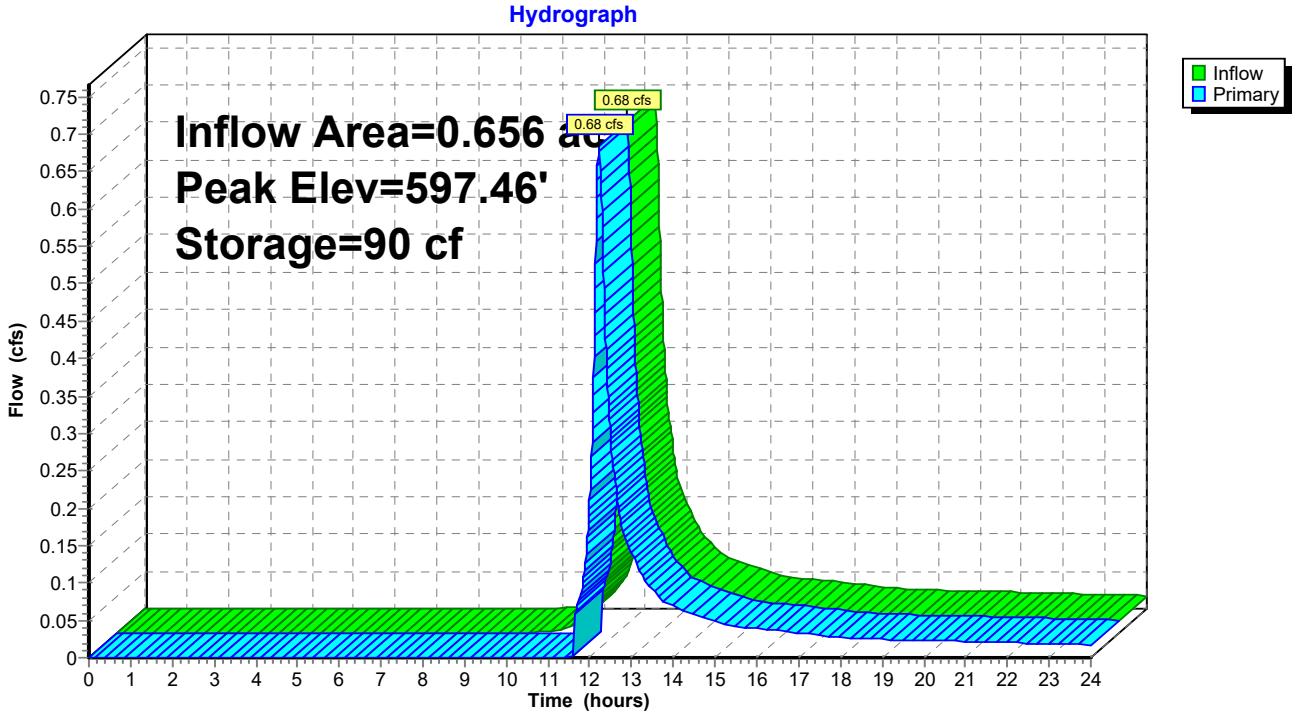
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.68 cfs @ 12.22 hrs HW=597.46' TW=596.37' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 0.68 cfs @ 2.20 fps)

Pond 23P: SD-01, SD-02



Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.82	0.00
3.50	0.00	0	591.82	0.00
4.00	0.00	0	591.82	0.00
4.50	0.00	0	591.82	0.00
5.00	0.00	0	591.82	0.00
5.50	0.00	0	591.82	0.00
6.00	0.00	0	591.82	0.00
6.50	0.00	0	591.82	0.00
7.00	0.00	0	591.82	0.00
7.50	0.00	0	591.82	0.00
8.00	0.00	0	591.83	0.00
8.50	0.00	0	591.85	0.00
9.00	0.00	1	591.87	0.00
9.50	0.00	2	591.93	0.00
10.00	0.00	4	592.04	0.00
10.50	0.00	7	592.24	0.00
11.00	0.01	18	592.94	0.00
11.50	0.04	61	595.65	0.00
12.00	**0.21**	**87**	**597.26**	**0.21**
12.50	**0.29**	**88**	**597.31**	**0.29**
13.00	0.14	86	597.22	0.14
13.50	0.09	86	597.19	0.09
14.00	0.07	86	597.17	0.07
14.50	0.06	85	597.16	0.06
15.00	0.05	85	597.15	0.05
15.50	0.04	85	597.14	0.04
16.00	0.04	85	597.13	0.04
16.50	0.04	85	597.13	0.04
17.00	0.03	85	597.13	0.03
17.50	0.03	85	597.12	0.03
18.00	0.03	85	597.12	0.03
18.50	0.03	85	597.12	0.03
19.00	0.02	85	597.11	0.02
19.50	0.02	85	597.11	0.02
20.00	0.02	85	597.11	0.02
20.50	0.02	85	597.11	0.02
21.00	0.02	85	597.11	0.02
21.50	0.02	85	597.11	0.02
22.00	0.02	85	597.11	0.02
22.50	0.02	85	597.11	0.02
23.00	0.02	85	597.11	0.02
23.50	0.02	85	597.10	0.02
24.00	0.02	85	597.10	0.02

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>1.63"
Flow Length=298' Tc=12.4 min CN=WQ Runoff=0.98 cfs 0.089 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>1.87"
Flow Length=85' Slope=0.1773 '/' Tc=7.0 min CN=WQ Runoff=0.31 cfs 0.023 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>1.75"
Flow Length=66' Slope=0.2264 '/' Tc=5.2 min CN=WQ Runoff=0.18 cfs 0.013 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>1.60"
Flow Length=82' Slope=0.1736 '/' Tc=6.8 min CN=WQ Runoff=0.43 cfs 0.031 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>2.40"
Flow Length=239' Tc=13.4 min CN=WQ Runoff=0.20 cfs 0.020 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>1.66"
Flow Length=116' Tc=10.2 min CN=WQ Runoff=0.30 cfs 0.025 af

Reach 3R: TD-01 Avg. Flow Depth=0.06' Max Vel=3.25 fps Inflow=0.31 cfs 0.023 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=0.31 cfs 0.023 af

Reach 4R: TD-02 Avg. Flow Depth=0.05' Max Vel=2.60 fps Inflow=0.18 cfs 0.013 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.18 cfs 0.013 af

Reach 5R: TD-03 Avg. Flow Depth=0.14' Max Vel=1.99 fps Inflow=0.43 cfs 0.031 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=0.42 cfs 0.031 af

Reach 6R: TD-04 Avg. Flow Depth=0.08' Max Vel=2.66 fps Inflow=0.30 cfs 0.025 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=0.30 cfs 0.025 af

Pond 7P: O-1A Inflow=2.25 cfs 0.199 af
Primary=2.25 cfs 0.199 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.46' Storage=22 cf Inflow=1.23 cfs 0.110 af
Outflow=1.23 cfs 0.110 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.45' Storage=19 cf Inflow=1.36 cfs 0.122 af
Outflow=1.36 cfs 0.122 af

Pond 16P: SD-09, SD-10 Peak Elev=593.43' Storage=36 cf Inflow=1.76 cfs 0.154 af
Outflow=1.76 cfs 0.153 af

Pond 20P: SD-11, SD-12 Peak Elev=591.66' Storage=39 cf Inflow=2.06 cfs 0.179 af
Outflow=2.06 cfs 0.179 af

Pond 23P: SD-01, SD-02 Peak Elev=597.55' Storage=92 cf Inflow=0.98 cfs 0.089 af
Outflow=0.98 cfs 0.087 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.201 af Average Runoff Depth = 1.71"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

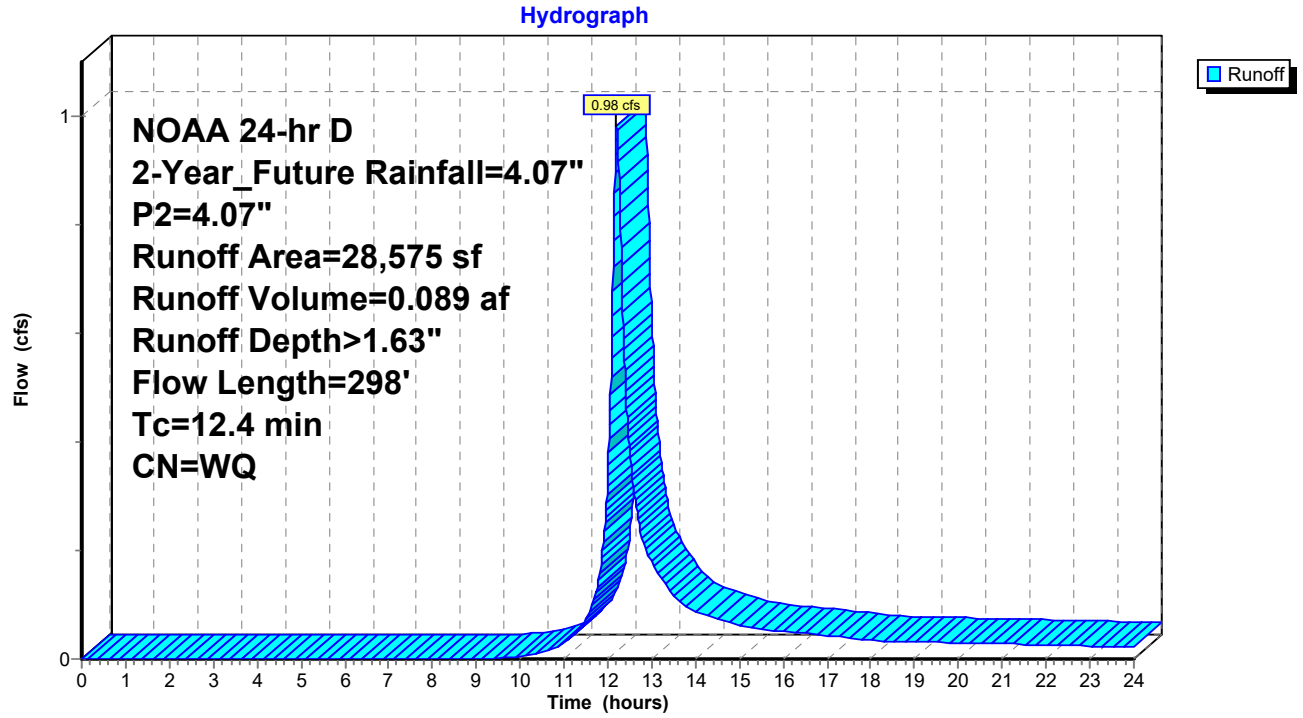
Runoff = 0.98 cfs @ 12.21 hrs, Volume= 0.089 af, Depth> 1.63"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0900	0.16		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
12.4	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.00	0.00
7.00	0.43	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.58	0.00	0.00
9.00	0.65	0.00	0.00
9.50	0.72	0.00	0.00
10.00	0.81	0.00	0.00
10.50	0.91	0.01	0.01
11.00	1.06	0.03	0.03
11.50	1.29	0.08	0.07
12.00	1.95	0.33	**0.34**
12.50	2.78	0.77	**0.37**
13.00	3.01	0.92	0.18
13.50	3.16	1.01	0.12
14.00	3.26	1.08	0.09
14.50	3.35	1.14	0.08
15.00	3.42	1.19	0.06
15.50	3.49	1.23	0.05
16.00	3.54	1.27	0.05
16.50	3.59	1.31	0.05
17.00	3.64	1.34	0.04
17.50	3.68	1.37	0.04
18.00	3.72	1.40	0.04
18.50	3.76	1.42	0.03
19.00	3.79	1.45	0.03
19.50	3.82	1.47	0.03
20.00	3.86	1.49	0.03
20.50	3.89	1.51	0.03
21.00	3.92	1.54	0.03
21.50	3.95	1.56	0.03
22.00	3.97	1.58	0.03
22.50	4.00	1.60	0.02
23.00	4.02	1.61	0.02
23.50	4.05	1.63	0.02
24.00	**4.07**	**1.65**	0.02

Summary for Subcatchment 6S: PO-DA D

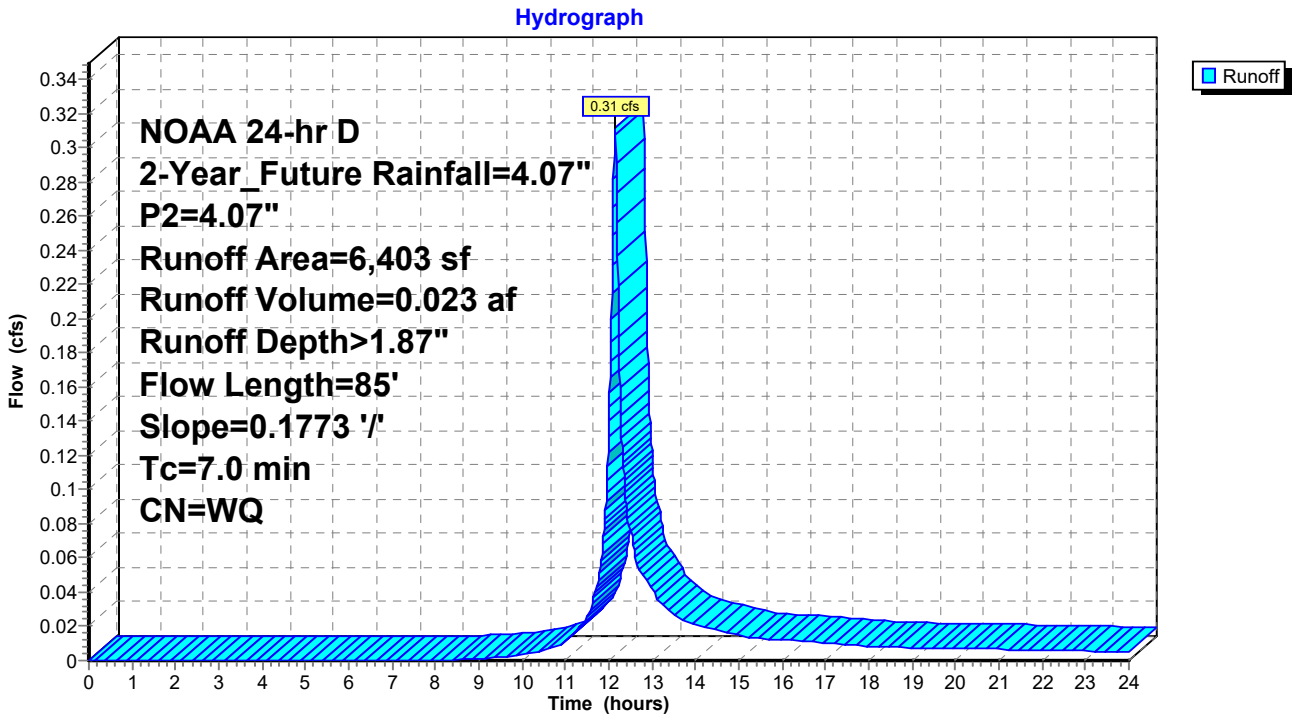
Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 1.87"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	85	0.1773	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.00	0.00
7.00	0.43	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.58	0.00	0.00
9.00	0.65	0.00	0.00
9.50	0.72	0.00	0.00
10.00	0.81	0.01	0.00
10.50	0.91	0.03	0.01
11.00	1.06	0.06	0.01
11.50	1.29	0.13	0.03
12.00	1.95	0.42	**0.14**
12.50	2.78	0.92	**0.08**
13.00	3.01	1.08	0.04
13.50	3.16	1.18	0.03
14.00	3.26	1.26	0.02
14.50	3.35	1.32	0.02
15.00	3.42	1.37	0.01
15.50	3.49	1.42	0.01
16.00	3.54	1.46	0.01
16.50	3.59	1.50	0.01
17.00	3.64	1.54	0.01
17.50	3.68	1.57	0.01
18.00	3.72	1.60	0.01
18.50	3.76	1.62	0.01
19.00	3.79	1.65	0.01
19.50	3.82	1.68	0.01
20.00	3.86	1.70	0.01
20.50	3.89	1.72	0.01
21.00	3.92	1.75	0.01
21.50	3.95	1.77	0.01
22.00	3.97	1.79	0.01
22.50	4.00	1.81	0.01
23.00	4.02	1.83	0.01
23.50	4.05	1.85	0.01
24.00	**4.07**	**1.87**	0.01

Summary for Subcatchment 8S: PO-DA F

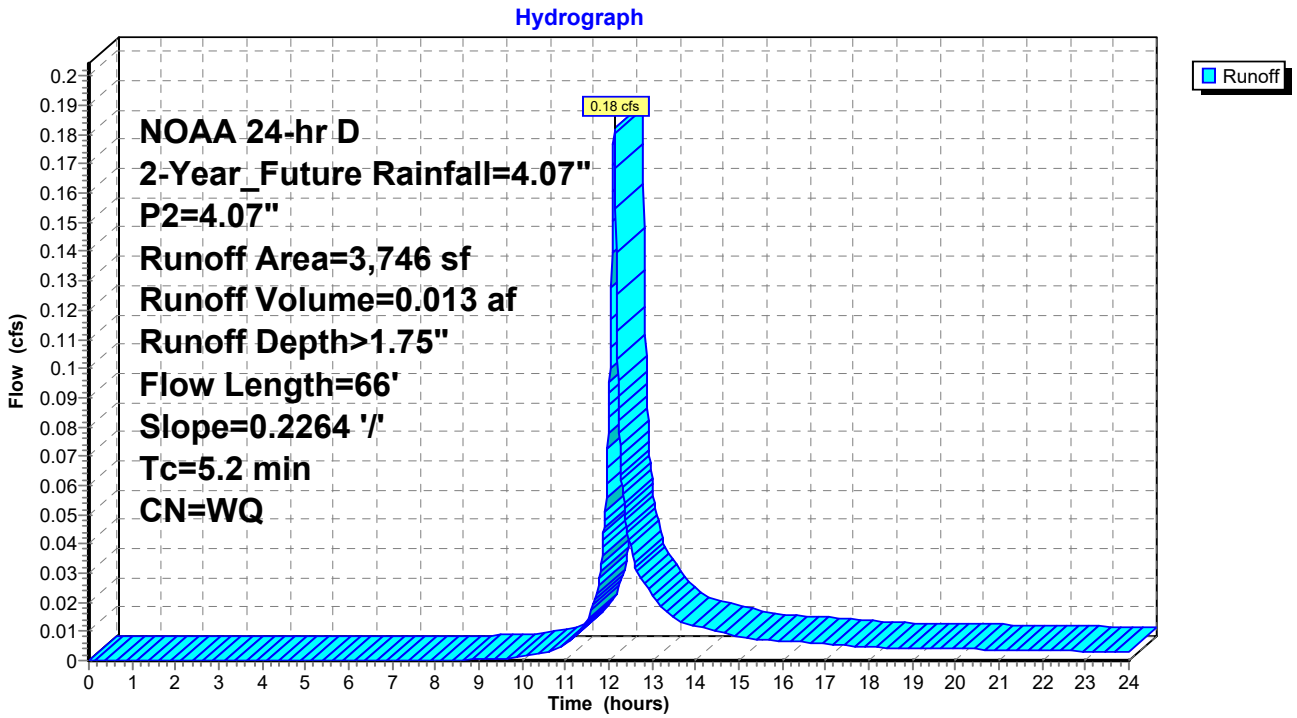
Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.013 af, Depth> 1.75"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	66	0.2264	0.21		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.00	0.00
7.00	0.43	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.58	0.00	0.00
9.00	0.65	0.00	0.00
9.50	0.72	0.00	0.00
10.00	0.81	0.01	0.00
10.50	0.91	0.02	0.00
11.00	1.06	0.04	0.01
11.50	1.29	0.10	0.01
12.00	1.95	0.36	**0.09**
12.50	2.78	0.82	**0.04**
13.00	3.01	0.97	0.02
13.50	3.16	1.07	0.01
14.00	3.26	1.14	0.01
14.50	3.35	1.20	0.01
15.00	3.42	1.25	0.01
15.50	3.49	1.29	0.01
16.00	3.54	1.33	0.01
16.50	3.59	1.37	0.01
17.00	3.64	1.40	0.01
17.50	3.68	1.43	0.01
18.00	3.72	1.46	0.00
18.50	3.76	1.49	0.00
19.00	3.79	1.51	0.00
19.50	3.82	1.54	0.00
20.00	3.86	1.56	0.00
20.50	3.89	1.58	0.00
21.00	3.92	1.60	0.00
21.50	3.95	1.63	0.00
22.00	3.97	1.65	0.00
22.50	4.00	1.67	0.00
23.00	4.02	1.68	0.00
23.50	4.05	1.70	0.00
24.00	**4.07**	**1.72**	0.00

Summary for Subcatchment 10S: PO-DA H

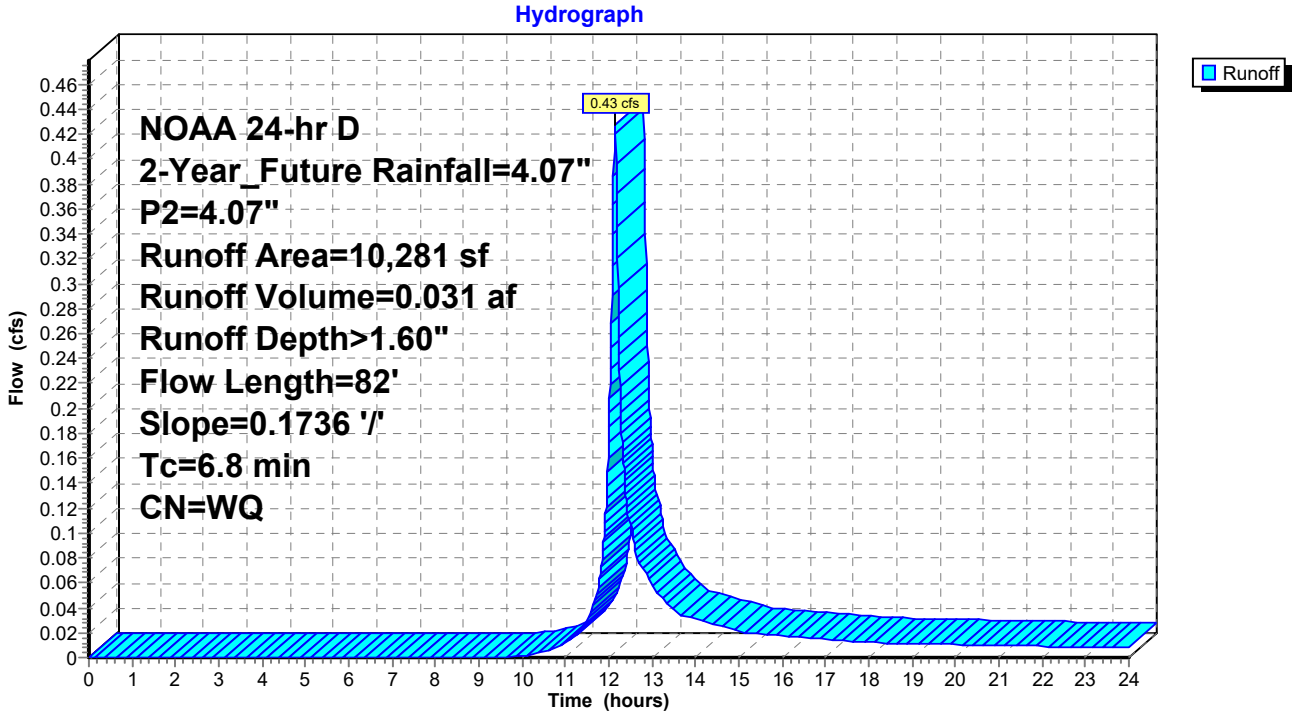
Runoff = 0.43 cfs @ 12.14 hrs, Volume= 0.031 af, Depth> 1.60"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	82	0.1736	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.00	0.00
7.00	0.43	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.58	0.00	0.00
9.00	0.65	0.00	0.00
9.50	0.72	0.00	0.00
10.00	0.81	0.00	0.00
10.50	0.91	0.01	0.00
11.00	1.06	0.03	0.01
11.50	1.29	0.07	0.03
12.00	1.95	0.30	**0.18**
12.50	2.78	0.73	**0.11**
13.00	3.01	0.86	0.06
13.50	3.16	0.96	0.04
14.00	3.26	1.02	0.03
14.50	3.35	1.08	0.03
15.00	3.42	1.13	0.02
15.50	3.49	1.17	0.02
16.00	3.54	1.21	0.02
16.50	3.59	1.24	0.02
17.00	3.64	1.28	0.02
17.50	3.68	1.31	0.01
18.00	3.72	1.33	0.01
18.50	3.76	1.36	0.01
19.00	3.79	1.38	0.01
19.50	3.82	1.40	0.01
20.00	3.86	1.43	0.01
20.50	3.89	1.45	0.01
21.00	3.92	1.47	0.01
21.50	3.95	1.49	0.01
22.00	3.97	1.51	0.01
22.50	4.00	1.53	0.01
23.00	4.02	1.54	0.01
23.50	4.05	1.56	0.01
24.00	**4.07**	**1.58**	0.01

Summary for Subcatchment 13S: PO-DA K

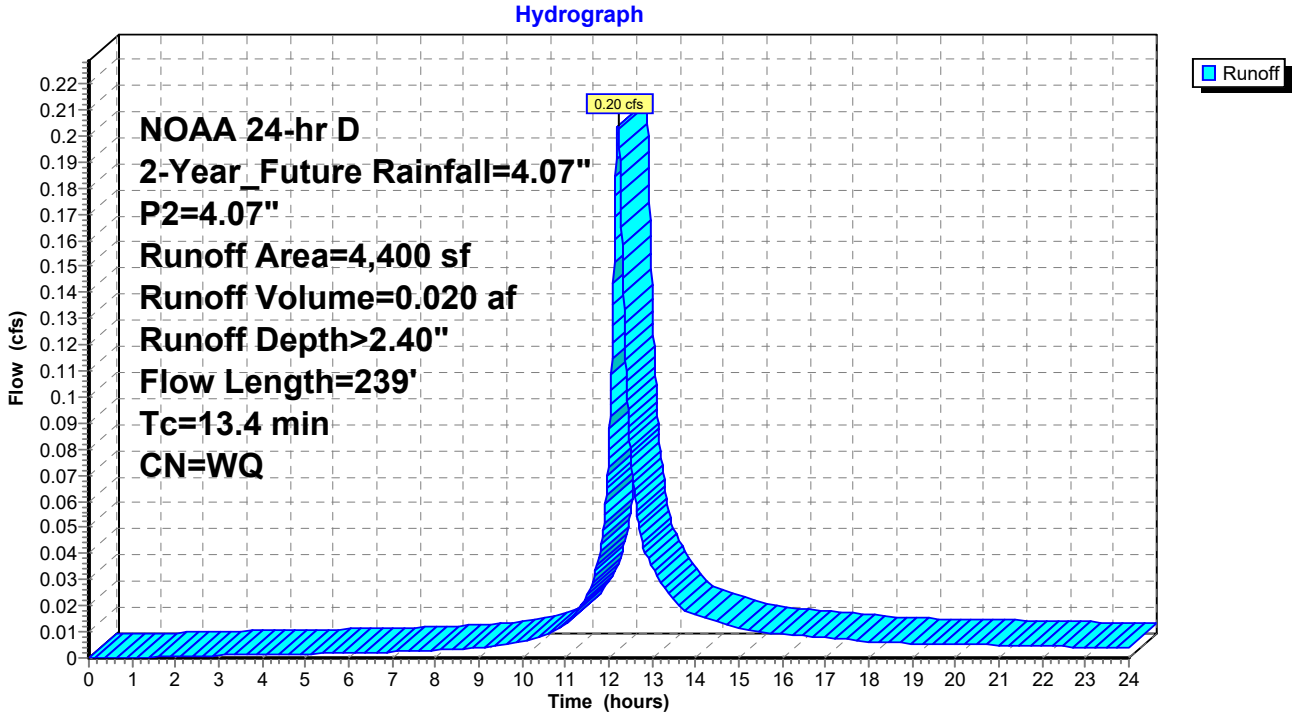
Runoff = 0.20 cfs @ 12.21 hrs, Volume= 0.020 af, Depth> 2.40"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0772	0.15		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
13.4	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.00	0.00
7.00	0.43	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.58	0.01	0.00
9.00	0.65	0.02	0.00
9.50	0.72	0.03	0.00
10.00	0.81	0.05	0.01
10.50	0.91	0.08	0.01
11.00	1.06	0.14	0.01
11.50	1.29	0.24	0.02
12.00	1.95	0.62	**0.08**
12.50	2.78	1.21	**0.08**
13.00	3.01	1.39	0.03
13.50	3.16	1.50	0.02
14.00	3.26	1.59	0.02
14.50	3.35	1.66	0.01
15.00	3.42	1.72	0.01
15.50	3.49	1.77	0.01
16.00	3.54	1.82	0.01
16.50	3.59	1.86	0.01
17.00	3.64	1.90	0.01
17.50	3.68	1.94	0.01
18.00	3.72	1.97	0.01
18.50	3.76	2.00	0.01
19.00	3.79	2.03	0.01
19.50	3.82	2.05	0.01
20.00	3.86	2.08	0.01
20.50	3.89	2.11	0.01
21.00	3.92	2.13	0.00
21.50	3.95	2.16	0.00
22.00	3.97	2.18	0.00
22.50	4.00	2.20	0.00
23.00	4.02	2.22	0.00
23.50	4.05	2.24	0.00
24.00	**4.07**	**2.26**	0.00

Summary for Subcatchment 14S: PO-DA L

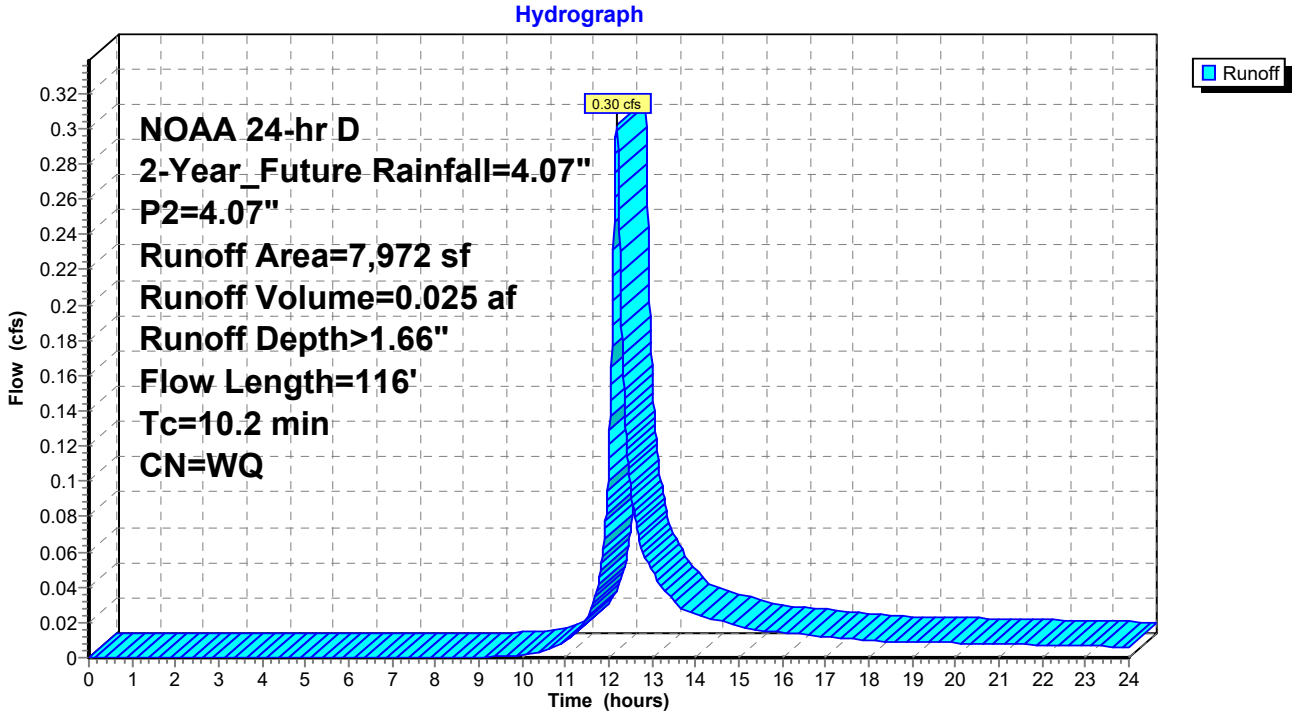
Runoff = 0.30 cfs @ 12.18 hrs, Volume= 0.025 af, Depth> 1.66"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1003	0.17		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
10.2	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.00	0.00
7.00	0.43	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.58	0.00	0.00
9.00	0.65	0.00	0.00
9.50	0.72	0.00	0.00
10.00	0.81	0.00	0.00
10.50	0.91	0.01	0.00
11.00	1.06	0.03	0.01
11.50	1.29	0.08	0.02
12.00	1.95	0.33	**0.11**
12.50	2.78	0.77	**0.10**
13.00	3.01	0.92	0.05
13.50	3.16	1.01	0.03
14.00	3.26	1.08	0.02
14.50	3.35	1.14	0.02
15.00	3.42	1.19	0.02
15.50	3.49	1.23	0.02
16.00	3.54	1.27	0.01
16.50	3.59	1.31	0.01
17.00	3.64	1.34	0.01
17.50	3.68	1.37	0.01
18.00	3.72	1.40	0.01
18.50	3.76	1.42	0.01
19.00	3.79	1.45	0.01
19.50	3.82	1.47	0.01
20.00	3.86	1.49	0.01
20.50	3.89	1.51	0.01
21.00	3.92	1.54	0.01
21.50	3.95	1.56	0.01
22.00	3.97	1.58	0.01
22.50	4.00	1.60	0.01
23.00	4.02	1.61	0.01
23.50	4.05	1.63	0.01
24.00	**4.07**	**1.65**	0.01

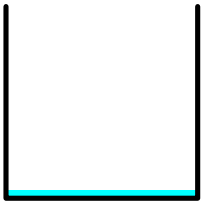
Summary for Reach 3R: TD-01

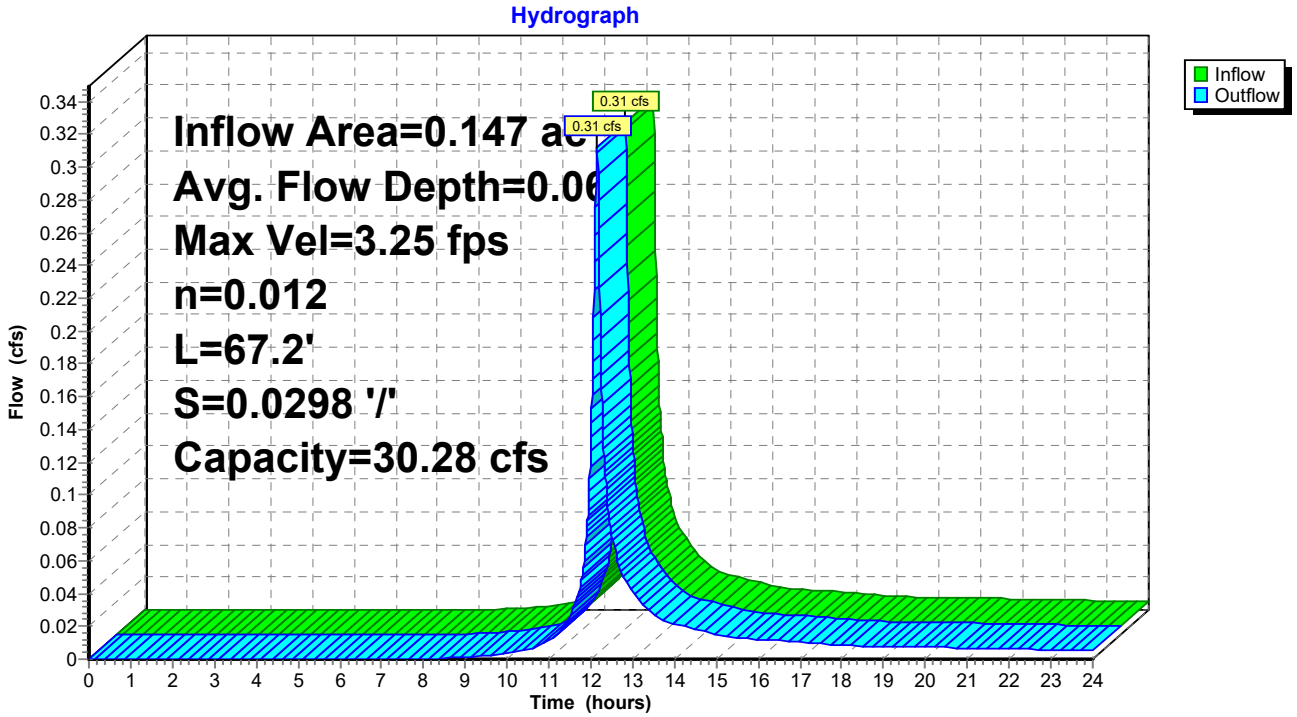
Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 1.87" for 2-Year_Future event
Inflow = 0.31 cfs @ 12.14 hrs, Volume= 0.023 af
Outflow = 0.31 cfs @ 12.15 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.25 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 0.8 min

Peak Storage= 6 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.06' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'





Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.00	0	606.00	0.00
7.50	0.00	0	606.00	0.00
8.00	0.00	0	606.00	0.00
8.50	0.00	0	606.00	0.00
9.00	0.00	0	606.00	0.00
9.50	0.00	0	606.00	0.00
10.00	0.00	0	606.00	0.00
10.50	0.01	0	606.00	0.01
11.00	0.01	1	606.01	0.01
11.50	0.03	1	606.01	0.02
12.00	**0.14**	**4**	**606.04**	**0.14**
12.50	**0.08**	**3**	**606.03**	**0.08**
13.00	0.04	2	606.02	0.04
13.50	0.03	1	606.01	0.03
14.00	0.02	1	606.01	0.02
14.50	0.02	1	606.01	0.02
15.00	0.01	1	606.01	0.01
15.50	0.01	1	606.01	0.01
16.00	0.01	1	606.01	0.01
16.50	0.01	1	606.01	0.01
17.00	0.01	1	606.01	0.01
17.50	0.01	0	606.00	0.01
18.00	0.01	0	606.00	0.01
18.50	0.01	0	606.00	0.01
19.00	0.01	0	606.00	0.01
19.50	0.01	0	606.00	0.01
20.00	0.01	0	606.00	0.01
20.50	0.01	0	606.00	0.01
21.00	0.01	0	606.00	0.01
21.50	0.01	0	606.00	0.01
22.00	0.01	0	606.00	0.01
22.50	0.01	0	606.00	0.01
23.00	0.01	0	606.00	0.01
23.50	0.01	0	606.00	0.01
24.00	0.01	0	606.00	0.01

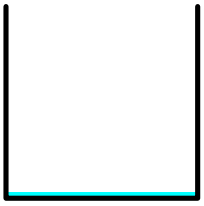
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 1.75" for 2-Year_Future event
Inflow = 0.18 cfs @ 12.13 hrs, Volume= 0.013 af
Outflow = 0.18 cfs @ 12.13 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 15P : SD-06, SD-07, SD-08

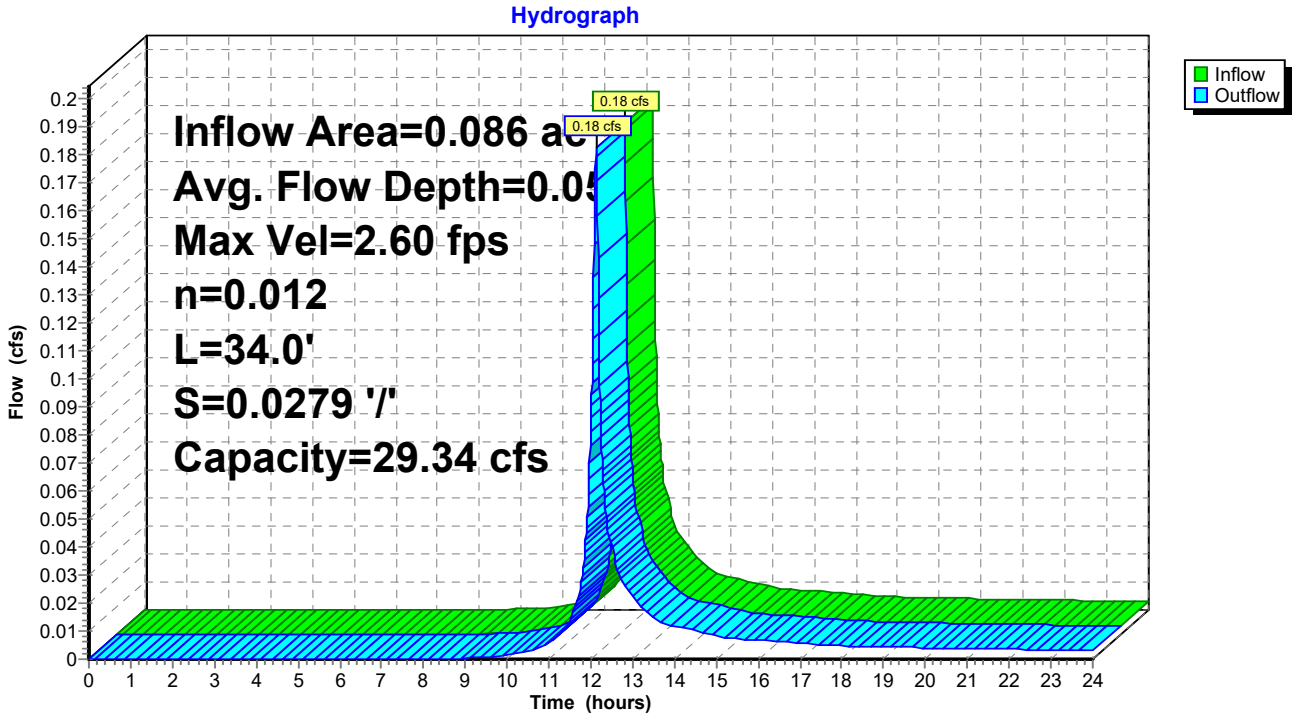
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.60 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.00	0	604.25	0.00
8.50	0.00	0	604.25	0.00
9.00	0.00	0	604.25	0.00
9.50	0.00	0	604.25	0.00
10.00	0.00	0	604.25	0.00
10.50	0.00	0	604.25	0.00
11.00	0.01	0	604.25	0.01
11.50	0.01	0	604.26	0.01
12.00	**0.09**	**2**	**604.28**	**0.09**
12.50	**0.04**	**1**	**604.27**	**0.04**
13.00	0.02	1	604.26	0.02
13.50	0.01	0	604.26	0.01
14.00	0.01	0	604.26	0.01
14.50	0.01	0	604.26	0.01
15.00	0.01	0	604.25	0.01
15.50	0.01	0	604.25	0.01
16.00	0.01	0	604.25	0.01
16.50	0.01	0	604.25	0.01
17.00	0.01	0	604.25	0.01
17.50	0.01	0	604.25	0.01
18.00	0.00	0	604.25	0.00
18.50	0.00	0	604.25	0.00
19.00	0.00	0	604.25	0.00
19.50	0.00	0	604.25	0.00
20.00	0.00	0	604.25	0.00
20.50	0.00	0	604.25	0.00
21.00	0.00	0	604.25	0.00
21.50	0.00	0	604.25	0.00
22.00	0.00	0	604.25	0.00
22.50	0.00	0	604.25	0.00
23.00	0.00	0	604.25	0.00
23.50	0.00	0	604.25	0.00
24.00	0.00	0	604.25	0.00

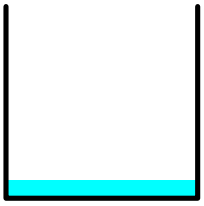
Summary for Reach 5R: TD-03

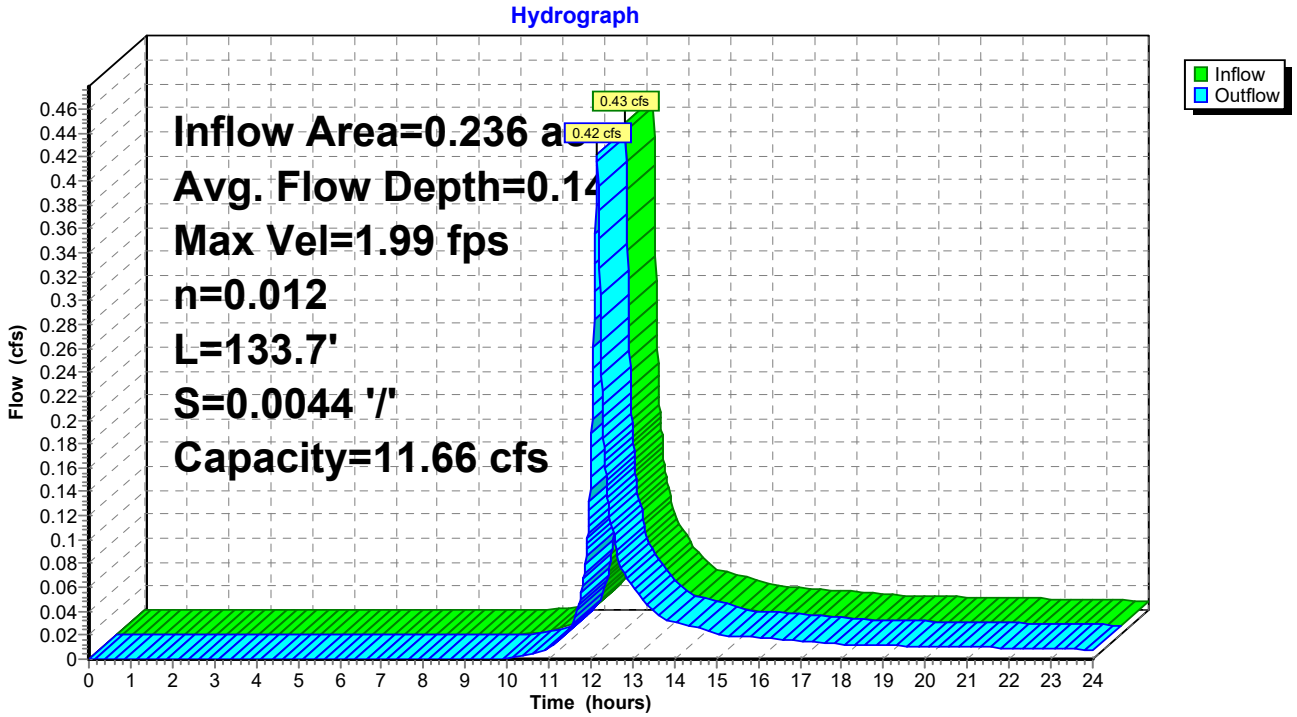
Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 1.60" for 2-Year_Future event
Inflow = 0.43 cfs @ 12.14 hrs, Volume= 0.031 af
Outflow = 0.42 cfs @ 12.15 hrs, Volume= 0.031 af, Atten= 1%, Lag= 0.7 min
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 1.99 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 3.6 min

Peak Storage= 28 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'





Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	0	601.81	0.00
7.00	0.00	0	601.81	0.00
7.50	0.00	0	601.81	0.00
8.00	0.00	0	601.81	0.00
8.50	0.00	0	601.81	0.00
9.00	0.00	0	601.81	0.00
9.50	0.00	0	601.81	0.00
10.00	0.00	0	601.81	0.00
10.50	0.00	1	601.82	0.00
11.00	0.01	3	601.82	0.01
11.50	0.03	5	601.84	0.03
12.00	**0.18**	**16**	**601.89**	**0.17**
12.50	**0.11**	**12**	**601.87**	**0.11**
13.00	0.06	8	601.85	0.06
13.50	0.04	6	601.84	0.04
14.00	0.03	6	601.84	0.03
14.50	0.03	5	601.83	0.03
15.00	0.02	4	601.83	0.02
15.50	0.02	4	601.83	0.02
16.00	0.02	4	601.83	0.02
16.50	0.02	4	601.83	0.02
17.00	0.02	4	601.83	0.02
17.50	0.01	3	601.83	0.01
18.00	0.01	3	601.83	0.01
18.50	0.01	3	601.83	0.01
19.00	0.01	3	601.83	0.01
19.50	0.01	3	601.82	0.01
20.00	0.01	3	601.82	0.01
20.50	0.01	3	601.82	0.01
21.00	0.01	3	601.82	0.01
21.50	0.01	3	601.82	0.01
22.00	0.01	3	601.82	0.01
22.50	0.01	2	601.82	0.01
23.00	0.01	2	601.82	0.01
23.50	0.01	2	601.82	0.01
24.00	0.01	2	601.82	0.01

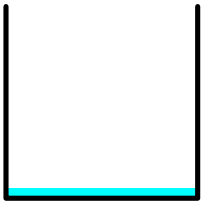
Summary for Reach 6R: TD-04

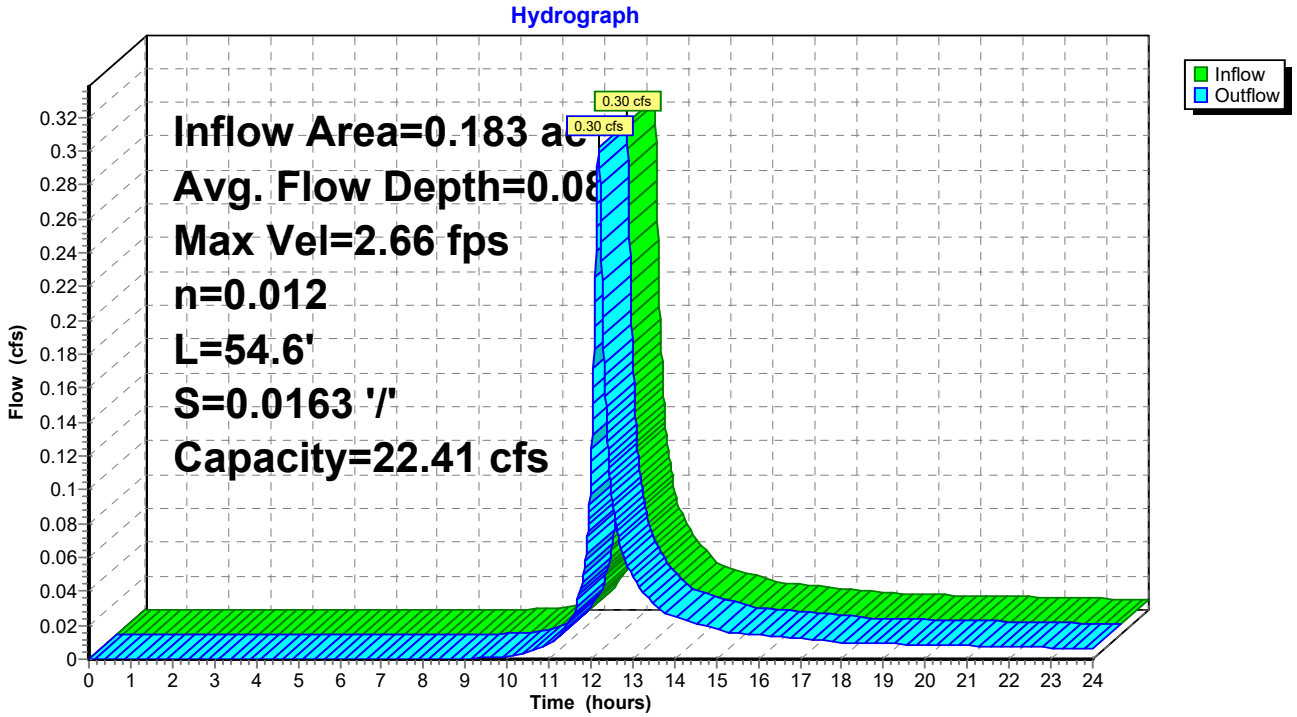
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 1.66" for 2-Year_Future event
Inflow = 0.30 cfs @ 12.18 hrs, Volume= 0.025 af
Outflow = 0.30 cfs @ 12.18 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.66 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 0.9 min

Peak Storage= 6 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

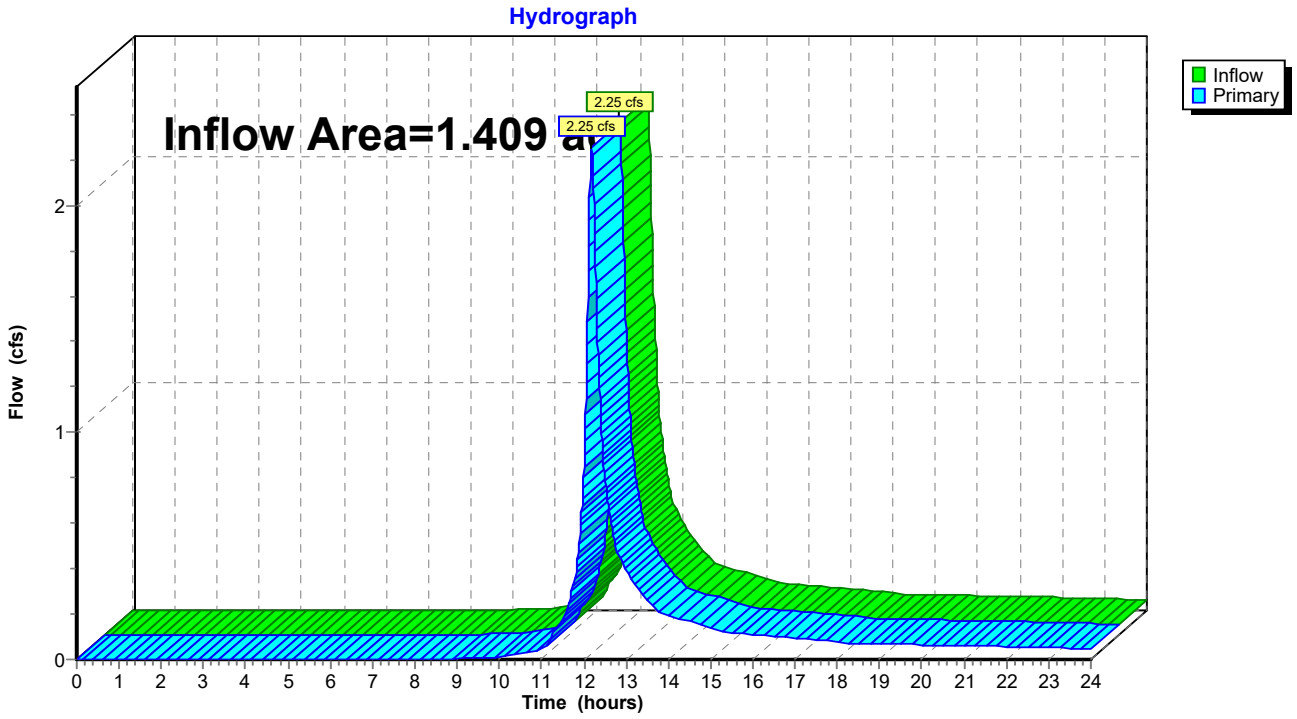
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.00	0	600.77	0.00
8.00	0.00	0	600.77	0.00
8.50	0.00	0	600.77	0.00
9.00	0.00	0	600.77	0.00
9.50	0.00	0	600.77	0.00
10.00	0.00	0	600.77	0.00
10.50	0.00	0	600.77	0.00
11.00	0.01	1	600.78	0.01
11.50	0.02	1	600.79	0.02
12.00	**0.11**	**3**	**600.81**	**0.11**
12.50	**0.10**	**3**	**600.81**	**0.10**
13.00	0.05	2	600.79	0.05
13.50	0.03	2	600.79	0.03
14.00	0.02	1	600.79	0.02
14.50	0.02	1	600.78	0.02
15.00	0.02	1	600.78	0.02
15.50	0.02	1	600.78	0.02
16.00	0.01	1	600.78	0.01
16.50	0.01	1	600.78	0.01
17.00	0.01	1	600.78	0.01
17.50	0.01	1	600.78	0.01
18.00	0.01	1	600.78	0.01
18.50	0.01	1	600.78	0.01
19.00	0.01	1	600.78	0.01
19.50	0.01	0	600.78	0.01
20.00	0.01	0	600.78	0.01
20.50	0.01	0	600.78	0.01
21.00	0.01	0	600.78	0.01
21.50	0.01	0	600.78	0.01
22.00	0.01	0	600.78	0.01
22.50	0.01	0	600.77	0.01
23.00	0.01	0	600.77	0.01
23.50	0.01	0	600.77	0.01
24.00	0.01	0	600.77	0.01

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 1.69" for 2-Year_Future event
Inflow = 2.25 cfs @ 12.18 hrs, Volume= 0.199 af
Primary = 2.25 cfs @ 12.18 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.01		0.01
10.50	0.02		0.02
11.00	0.05		0.05
11.50	0.18		0.18
12.00	**0.85**		**0.85**
12.50	**0.79**		**0.79**
13.00	0.39		0.39
13.50	0.26		0.26
14.00	0.20		0.20
14.50	0.17		0.17
15.00	0.14		0.14
15.50	0.12		0.12
16.00	0.11		0.11
16.50	0.10		0.10
17.00	0.09		0.09
17.50	0.09		0.09
18.00	0.08		0.08
18.50	0.07		0.07
19.00	0.07		0.07
19.50	0.07		0.07
20.00	0.07		0.07
20.50	0.06		0.06
21.00	0.06		0.06
21.50	0.06		0.06
22.00	0.06		0.06
22.50	0.05		0.05
23.00	0.05		0.05
23.50	0.05		0.05
24.00	0.05		0.05

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 1.64" for 2-Year_Future event
Inflow = 1.23 cfs @ 12.19 hrs, Volume= 0.110 af
Outflow = 1.23 cfs @ 12.19 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.2 min
Primary = 1.23 cfs @ 12.19 hrs, Volume= 0.110 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.46' @ 12.19 hrs Surf.Area= 70 sf Storage= 22 cf

Plug-Flow detention time= 1.0 min calculated for 0.110 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (865.1 - 864.6)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

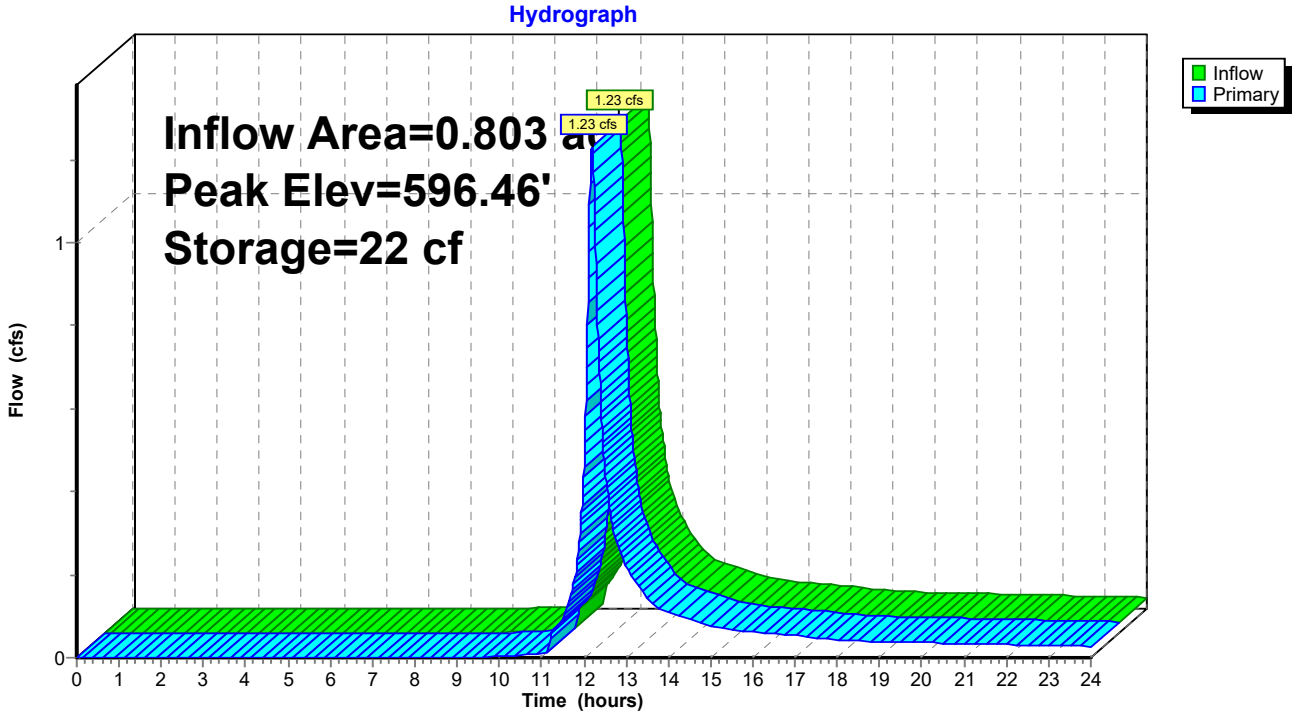
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.23 cfs @ 12.19 hrs HW=596.46' TW=594.45' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 1.23 cfs @ 2.40 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	0	595.71	0.00
4.50	0.00	0	595.71	0.00
5.00	0.00	0	595.71	0.00
5.50	0.00	0	595.71	0.00
6.00	0.00	0	595.71	0.00
6.50	0.00	0	595.71	0.00
7.00	0.00	0	595.71	0.00
7.50	0.00	0	595.71	0.00
8.00	0.00	0	595.71	0.00
8.50	0.00	1	595.76	0.00
9.00	0.00	2	595.86	0.00
9.50	0.00	3	595.98	0.00
10.00	0.00	4	595.98	0.00
10.50	0.01	4	595.99	0.01
11.00	0.01	4	596.01	0.01
11.50	0.10	5	596.09	0.10
12.00	**0.47**	**10**	**596.26**	**0.46**
12.50	**0.45**	**10**	**596.26**	**0.46**
13.00	0.22	7	596.16	0.22
13.50	0.15	6	596.13	0.15
14.00	0.11	6	596.10	0.11
14.50	0.09	5	596.09	0.09
15.00	0.08	5	596.08	0.08
15.50	0.07	5	596.07	0.07
16.00	0.06	5	596.07	0.06
16.50	0.06	5	596.06	0.06
17.00	0.05	5	596.06	0.05
17.50	0.05	5	596.05	0.05
18.00	0.04	5	596.05	0.04
18.50	0.04	5	596.05	0.04
19.00	0.04	5	596.05	0.04
19.50	0.04	5	596.04	0.04
20.00	0.04	4	596.04	0.04
20.50	0.04	4	596.04	0.04
21.00	0.03	4	596.04	0.03
21.50	0.03	4	596.04	0.03
22.00	0.03	4	596.04	0.03
22.50	0.03	4	596.04	0.03
23.00	0.03	4	596.03	0.03
23.50	0.03	4	596.03	0.03
24.00	0.03	4	596.03	0.03

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 1.65" for 2-Year_Future event
Inflow = 1.36 cfs @ 12.18 hrs, Volume= 0.122 af
Outflow = 1.36 cfs @ 12.18 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.3 min
Primary = 1.36 cfs @ 12.18 hrs, Volume= 0.122 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.45' @ 12.18 hrs Surf.Area= 68 sf Storage= 19 cf

Plug-Flow detention time= 0.4 min calculated for 0.122 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (864.1 - 863.8)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

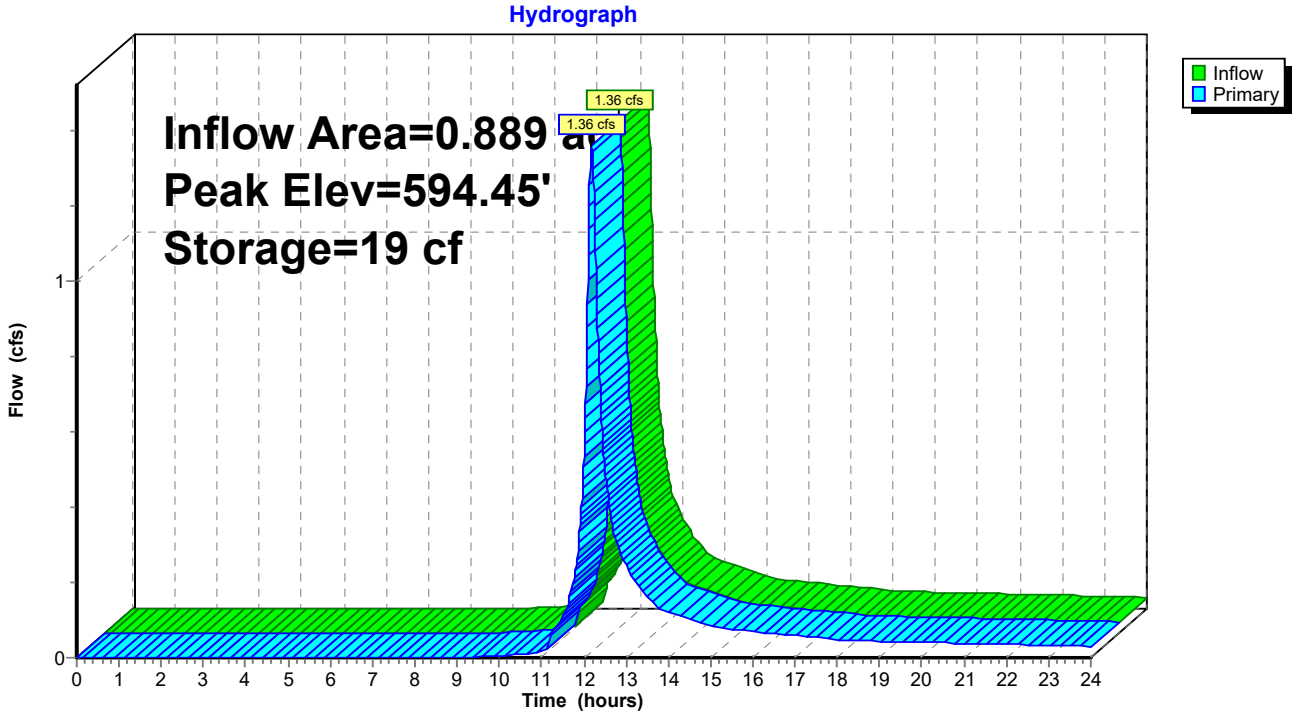
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.35 cfs @ 12.18 hrs HW=594.45' TW=593.43' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 1.35 cfs @ 2.46 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.92	0.00
4.50	0.00	0	593.92	0.00
5.00	0.00	0	593.92	0.00
5.50	0.00	0	593.92	0.00
6.00	0.00	0	593.92	0.00
6.50	0.00	0	593.92	0.00
7.00	0.00	0	593.92	0.00
7.50	0.00	0	593.92	0.00
8.00	0.00	0	593.92	0.00
8.50	0.00	0	593.93	0.00
9.00	0.00	0	593.94	0.00
9.50	0.00	0	593.95	0.00
10.00	0.00	1	593.96	0.00
10.50	0.01	1	593.97	0.01
11.00	0.02	1	593.99	0.02
11.50	0.11	2	594.07	0.11
12.00	**0.55**	**8**	**594.25**	**0.54**
12.50	**0.50**	**7**	**594.24**	**0.50**
13.00	0.25	4	594.15	0.25
13.50	0.16	3	594.10	0.16
14.00	0.12	3	594.08	0.12
14.50	0.10	2	594.07	0.10
15.00	0.09	2	594.06	0.09
15.50	0.08	2	594.05	0.08
16.00	0.07	2	594.04	0.07
16.50	0.06	2	594.04	0.06
17.00	0.06	2	594.03	0.06
17.50	0.05	2	594.03	0.05
18.00	0.05	2	594.02	0.05
18.50	0.05	1	594.02	0.05
19.00	0.04	1	594.02	0.04
19.50	0.04	1	594.02	0.04
20.00	0.04	1	594.02	0.04
20.50	0.04	1	594.02	0.04
21.00	0.04	1	594.01	0.04
21.50	0.04	1	594.01	0.04
22.00	0.04	1	594.01	0.04
22.50	0.03	1	594.01	0.03
23.00	0.03	1	594.01	0.03
23.50	0.03	1	594.01	0.03
24.00	0.03	1	594.00	0.03

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 1.64" for 2-Year_Future event
Inflow = 1.76 cfs @ 12.17 hrs, Volume= 0.154 af
Outflow = 1.76 cfs @ 12.17 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.3 min
Primary = 1.76 cfs @ 12.17 hrs, Volume= 0.153 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 593.43' @ 12.17 hrs Surf.Area= 93 sf Storage= 36 cf

Plug-Flow detention time= 1.0 min calculated for 0.153 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (864.3 - 863.8)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

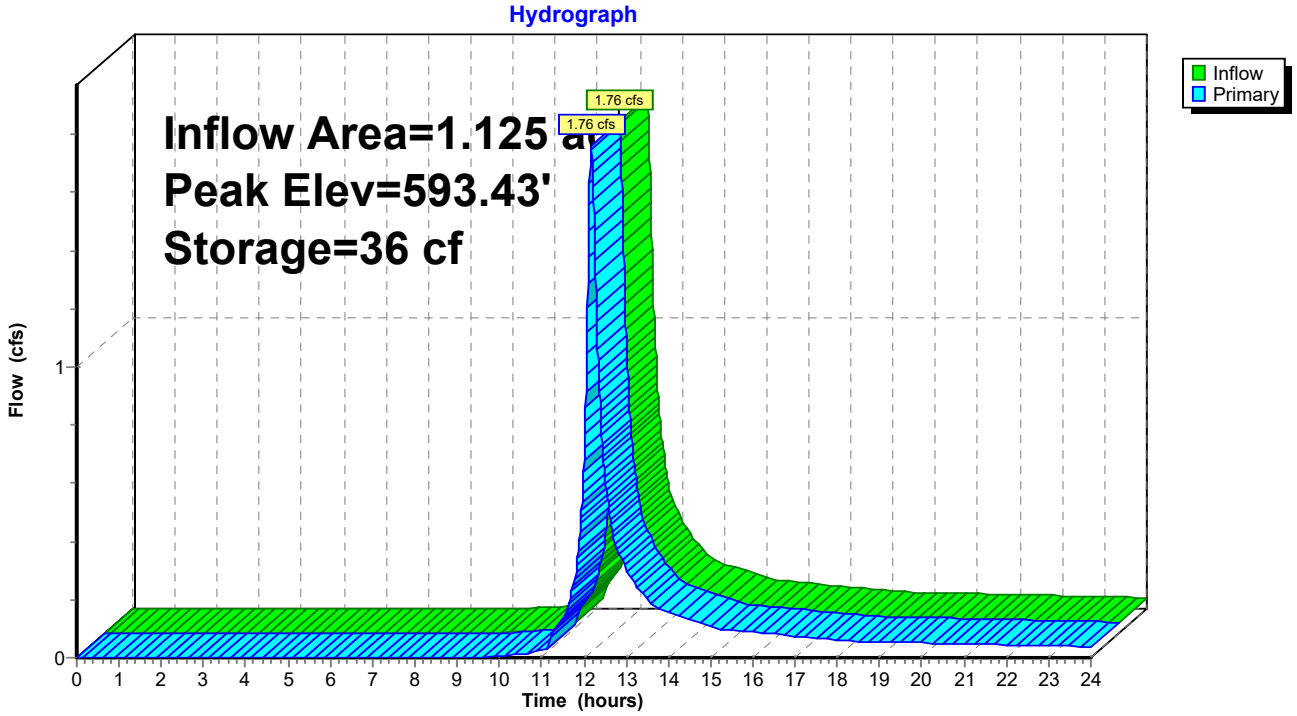
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.76 cfs @ 12.17 hrs HW=593.43' TW=591.66' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 1.76 cfs @ 2.64 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.58	0.00
4.50	0.00	0	592.58	0.00
5.00	0.00	0	592.58	0.00
5.50	0.00	0	592.58	0.00
6.00	0.00	0	592.58	0.00
6.50	0.00	0	592.58	0.00
7.00	0.00	0	592.58	0.00
7.50	0.00	0	592.58	0.00
8.00	0.00	0	592.58	0.00
8.50	0.00	0	592.59	0.00
9.00	0.00	1	592.63	0.00
9.50	0.00	3	592.78	0.00
10.00	0.01	4	592.86	0.01
10.50	0.01	4	592.88	0.01
11.00	0.03	5	592.90	0.03
11.50	0.14	8	592.99	0.13
12.00	**0.70**	**18**	**593.19**	**0.68**
12.50	**0.61**	**17**	**593.18**	**0.61**
13.00	0.31	11	593.07	0.31
13.50	0.20	9	593.03	0.20
14.00	0.15	8	593.00	0.15
14.50	0.13	8	592.99	0.13
15.00	0.11	7	592.97	0.11
15.50	0.09	7	592.96	0.09
16.00	0.09	7	592.96	0.09
16.50	0.08	7	592.95	0.08
17.00	0.07	7	592.95	0.07
17.50	0.07	6	592.94	0.07
18.00	0.06	6	592.94	0.06
18.50	0.06	6	592.93	0.06
19.00	0.06	6	592.93	0.06
19.50	0.05	6	592.93	0.05
20.00	0.05	6	592.93	0.05
20.50	0.05	6	592.93	0.05
21.00	0.05	6	592.92	0.05
21.50	0.05	6	592.92	0.05
22.00	0.05	6	592.92	0.05
22.50	0.04	6	592.92	0.04
23.00	0.04	6	592.92	0.04
23.50	0.04	6	592.92	0.04
24.00	0.04	6	592.91	0.04

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 1.64" for 2-Year_Future event
Inflow = 2.06 cfs @ 12.18 hrs, Volume= 0.179 af
Outflow = 2.06 cfs @ 12.18 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.3 min
Primary = 2.06 cfs @ 12.18 hrs, Volume= 0.179 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 591.66' @ 12.18 hrs Surf.Area= 88 sf Storage= 39 cf

Plug-Flow detention time= 1.4 min calculated for 0.178 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (864.4 - 863.8)

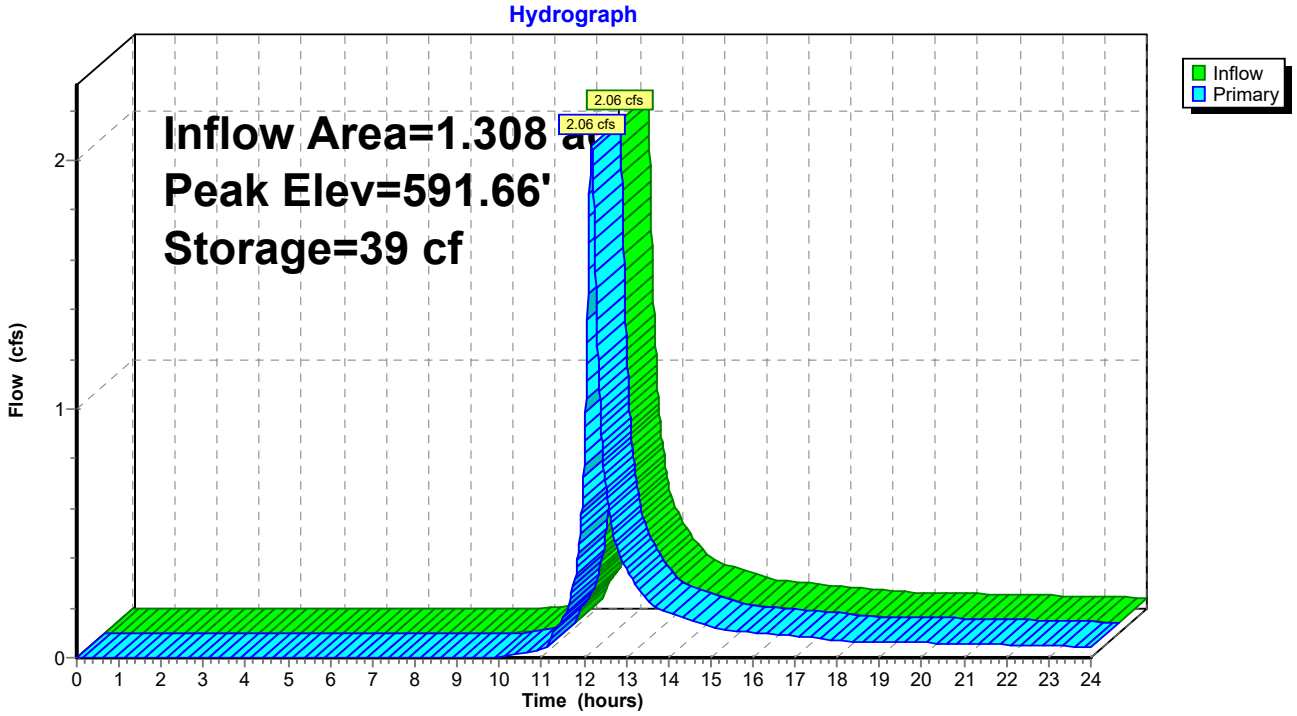
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.06 cfs @ 12.18 hrs HW=591.66' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 2.06 cfs @ 2.76 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.26	0.00
4.00	0.00	0	590.26	0.00
4.50	0.00	0	590.26	0.00
5.00	0.00	0	590.26	0.00
5.50	0.00	0	590.26	0.00
6.00	0.00	0	590.26	0.00
6.50	0.00	0	590.26	0.00
7.00	0.00	0	590.26	0.00
7.50	0.00	0	590.27	0.00
8.00	0.00	0	590.28	0.00
8.50	0.00	1	590.30	0.00
9.00	0.00	1	590.35	0.00
9.50	0.00	2	590.42	0.00
10.00	0.01	9	590.96	0.00
10.50	0.02	10	591.05	0.02
11.00	0.04	11	591.08	0.04
11.50	0.16	13	591.17	0.16
12.00	**0.79**	**20**	**591.39**	**0.77**
12.50	**0.71**	**20**	**591.37**	**0.72**
13.00	0.36	15	591.26	0.36
13.50	0.24	14	591.21	0.24
14.00	0.18	13	591.18	0.18
14.50	0.15	13	591.17	0.15
15.00	0.13	12	591.15	0.13
15.50	0.11	12	591.14	0.11
16.00	0.10	12	591.14	0.10
16.50	0.09	12	591.13	0.09
17.00	0.09	12	591.13	0.09
17.50	0.08	12	591.12	0.08
18.00	0.07	11	591.11	0.07
18.50	0.07	11	591.11	0.07
19.00	0.06	11	591.11	0.06
19.50	0.06	11	591.11	0.06
20.00	0.06	11	591.11	0.06
20.50	0.06	11	591.10	0.06
21.00	0.06	11	591.10	0.06
21.50	0.05	11	591.10	0.05
22.00	0.05	11	591.10	0.05
22.50	0.05	11	591.10	0.05
23.00	0.05	11	591.09	0.05
23.50	0.05	11	591.09	0.05
24.00	0.04	11	591.09	0.04

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 1.63" for 2-Year_Future event
Inflow = 0.98 cfs @ 12.21 hrs, Volume= 0.089 af
Outflow = 0.98 cfs @ 12.21 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.1 min
Primary = 0.98 cfs @ 12.21 hrs, Volume= 0.087 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.55' @ 12.21 hrs Surf.Area= 16 sf Storage= 92 cf

Plug-Flow detention time= 17.3 min calculated for 0.087 af (98% of inflow)
Center-of-Mass det. time= 5.2 min (868.6 - 863.5)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

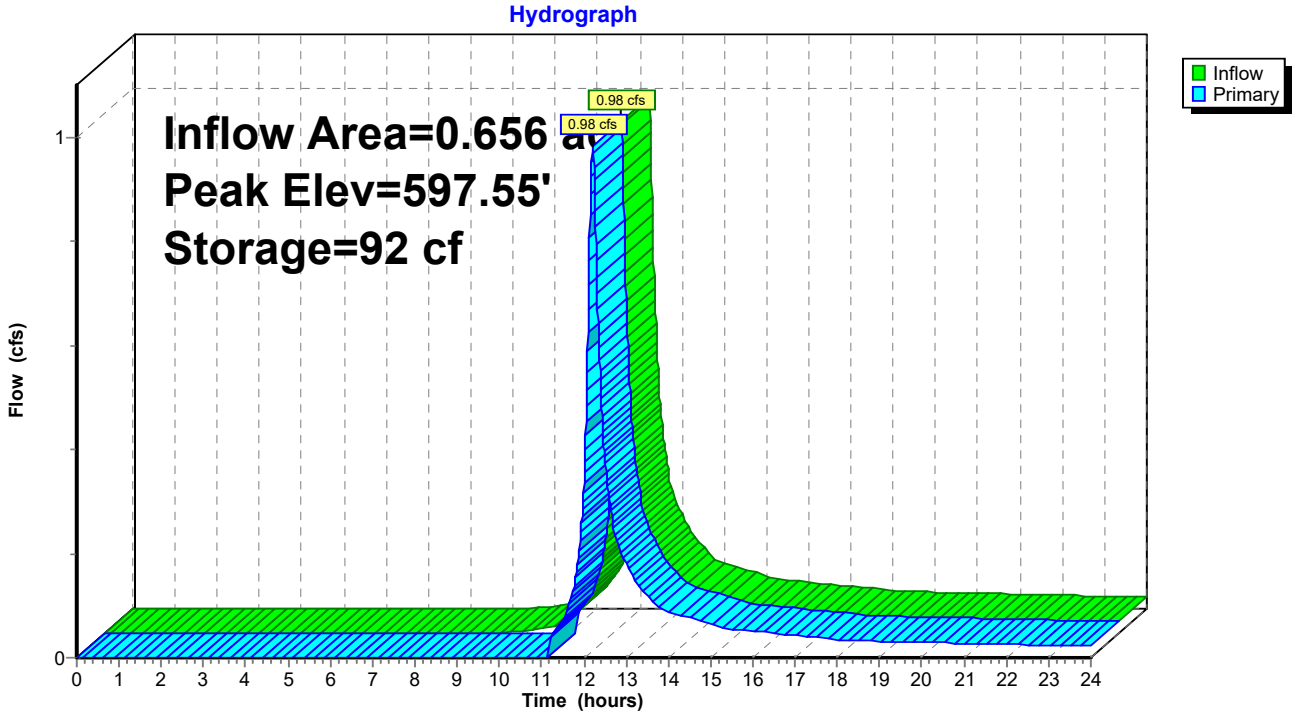
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.98 cfs @ 12.21 hrs HW=597.55' TW=596.46' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 0.98 cfs @ 2.43 fps)

Pond 23P: SD-01, SD-02



Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.82	0.00
3.50	0.00	0	591.82	0.00
4.00	0.00	0	591.82	0.00
4.50	0.00	0	591.82	0.00
5.00	0.00	0	591.82	0.00
5.50	0.00	0	591.82	0.00
6.00	0.00	0	591.82	0.00
6.50	0.00	0	591.82	0.00
7.00	0.00	0	591.83	0.00
7.50	0.00	0	591.84	0.00
8.00	0.00	1	591.86	0.00
8.50	0.00	1	591.91	0.00
9.00	0.00	3	591.99	0.00
9.50	0.00	5	592.12	0.00
10.00	0.00	9	592.38	0.00
10.50	0.01	23	593.27	0.00
11.00	0.03	58	595.45	0.00
11.50	0.07	86	597.17	0.07
12.00	**0.34**	**88**	**597.32**	**0.33**
12.50	**0.37**	**88**	**597.34**	**0.38**
13.00	0.18	87	597.25	0.18
13.50	0.12	86	597.21	0.12
14.00	0.09	86	597.18	0.09
14.50	0.08	86	597.17	0.08
15.00	0.06	85	597.16	0.06
15.50	0.05	85	597.15	0.05
16.00	0.05	85	597.15	0.05
16.50	0.05	85	597.14	0.05
17.00	0.04	85	597.14	0.04
17.50	0.04	85	597.13	0.04
18.00	0.04	85	597.13	0.04
18.50	0.03	85	597.13	0.03
19.00	0.03	85	597.12	0.03
19.50	0.03	85	597.12	0.03
20.00	0.03	85	597.12	0.03
20.50	0.03	85	597.12	0.03
21.00	0.03	85	597.12	0.03
21.50	0.03	85	597.12	0.03
22.00	0.03	85	597.12	0.03
22.50	0.02	85	597.12	0.02
23.00	0.02	85	597.11	0.02
23.50	0.02	85	597.11	0.02
24.00	0.02	85	597.11	0.02

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>2.63"
Flow Length=298' Tc=13.3 min CN=WQ Runoff=1.56 cfs 0.144 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>2.94"
Flow Length=85' Slope=0.1773 '/' Tc=7.6 min CN=WQ Runoff=0.48 cfs 0.036 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>2.78"
Flow Length=66' Slope=0.2264 '/' Tc=5.6 min CN=WQ Runoff=0.29 cfs 0.020 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>2.60"
Flow Length=82' Slope=0.1736 '/' Tc=7.4 min CN=WQ Runoff=0.69 cfs 0.051 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>3.51"
Flow Length=239' Tc=14.3 min CN=WQ Runoff=0.29 cfs 0.030 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>2.67"
Flow Length=116' Tc=11.1 min CN=WQ Runoff=0.47 cfs 0.041 af

Reach 3R: TD-01 Avg. Flow Depth=0.08' Max Vel=3.81 fps Inflow=0.48 cfs 0.036 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=0.48 cfs 0.036 af

Reach 4R: TD-02 Avg. Flow Depth=0.06' Max Vel=3.08 fps Inflow=0.29 cfs 0.020 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.29 cfs 0.020 af

Reach 5R: TD-03 Avg. Flow Depth=0.19' Max Vel=2.35 fps Inflow=0.69 cfs 0.051 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=0.68 cfs 0.051 af

Reach 6R: TD-04 Avg. Flow Depth=0.10' Max Vel=3.15 fps Inflow=0.47 cfs 0.041 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=0.47 cfs 0.041 af

Pond 7P: O-1A Inflow=3.53 cfs 0.319 af
Primary=3.53 cfs 0.319 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.60' Storage=32 cf Inflow=1.95 cfs 0.178 af
Outflow=1.95 cfs 0.178 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.60' Storage=30 cf Inflow=2.14 cfs 0.198 af
Outflow=2.14 cfs 0.198 af

Pond 16P: SD-09, SD-10 Peak Elev=593.61' Storage=54 cf Inflow=2.78 cfs 0.249 af
Outflow=2.78 cfs 0.248 af

Pond 20P: SD-11, SD-12 Peak Elev=591.85' Storage=58 cf Inflow=3.25 cfs 0.289 af
Outflow=3.25 cfs 0.289 af

Pond 23P: SD-01, SD-02 Peak Elev=597.71' Storage=94 cf Inflow=1.56 cfs 0.144 af
Outflow=1.56 cfs 0.142 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.321 af Average Runoff Depth = 2.73"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

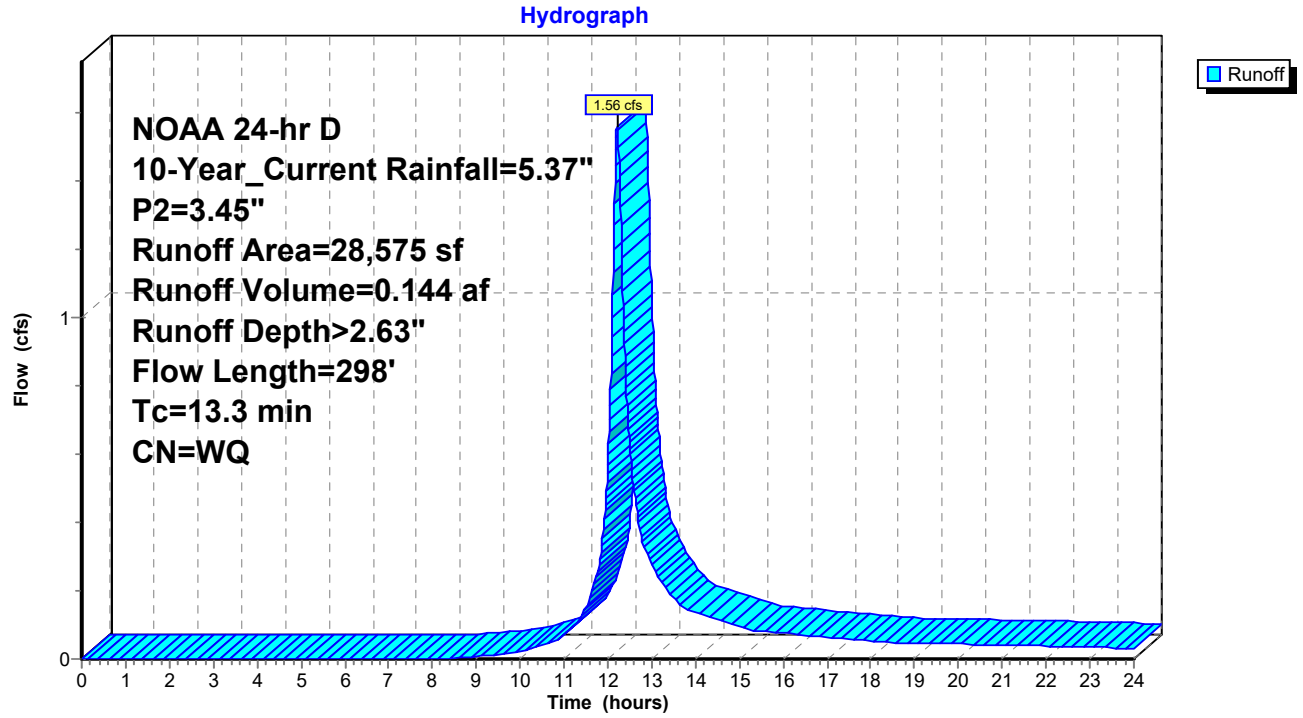
Runoff = 1.56 cfs @ 12.22 hrs, Volume= 0.144 af, Depth> 2.63"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
13.3	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.00	0.00
5.50	0.41	0.00	0.00
6.00	0.46	0.00	0.00
6.50	0.51	0.00	0.00
7.00	0.57	0.00	0.00
7.50	0.63	0.00	0.00
8.00	0.70	0.00	0.00
8.50	0.77	0.00	0.00
9.00	0.85	0.01	0.01
9.50	0.95	0.02	0.01
10.00	1.06	0.03	0.02
10.50	1.20	0.06	0.04
11.00	1.40	0.11	0.07
11.50	1.70	0.22	0.15
12.00	2.57	0.65	**0.57**
12.50	3.67	1.36	**0.62**
13.00	3.97	1.58	0.28
13.50	4.17	1.72	0.18
14.00	4.31	1.82	0.13
14.50	4.42	1.91	0.12
15.00	4.52	1.99	0.09
15.50	4.60	2.05	0.08
16.00	4.67	2.11	0.08
16.50	4.74	2.16	0.07
17.00	4.80	2.21	0.06
17.50	4.86	2.25	0.06
18.00	4.91	2.29	0.05
18.50	4.96	2.33	0.05
19.00	5.00	2.37	0.05
19.50	5.05	2.40	0.05
20.00	5.09	2.43	0.04
20.50	5.13	2.47	0.04
21.00	5.17	2.50	0.04
21.50	5.21	2.53	0.04
22.00	5.24	2.56	0.04
22.50	5.28	2.59	0.04
23.00	5.31	2.61	0.04
23.50	5.34	2.64	0.03
24.00	**5.37**	**2.66**	0.03

Summary for Subcatchment 6S: PO-DA D

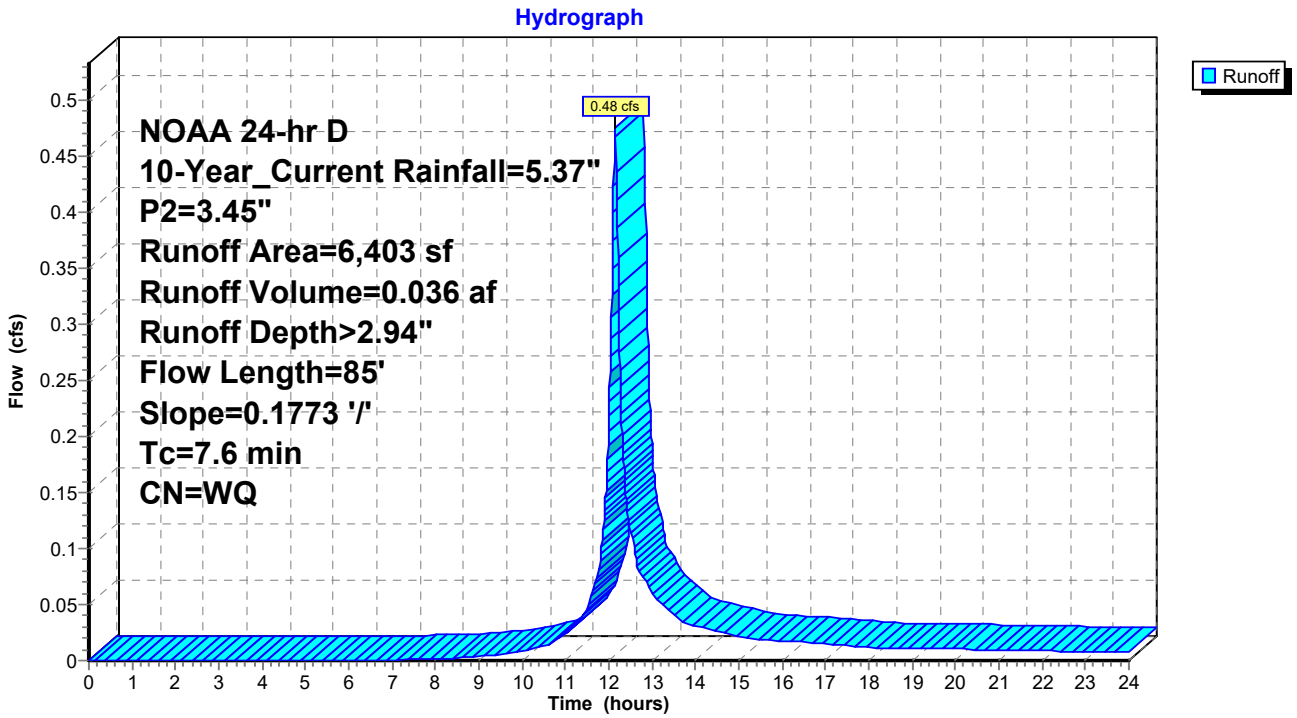
Runoff = 0.48 cfs @ 12.15 hrs, Volume= 0.036 af, Depth> 2.94"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	85	0.1773	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.00	0.00
5.50	0.41	0.00	0.00
6.00	0.46	0.00	0.00
6.50	0.51	0.00	0.00
7.00	0.57	0.00	0.00
7.50	0.63	0.00	0.00
8.00	0.70	0.00	0.00
8.50	0.77	0.01	0.00
9.00	0.85	0.02	0.00
9.50	0.95	0.04	0.01
10.00	1.06	0.06	0.01
10.50	1.20	0.10	0.01
11.00	1.40	0.17	0.02
11.50	1.70	0.30	0.05
12.00	2.57	0.79	**0.22**
12.50	3.67	1.56	**0.11**
13.00	3.97	1.79	0.06
13.50	4.17	1.94	0.04
14.00	4.31	2.05	0.03
14.50	4.42	2.15	0.03
15.00	4.52	2.23	0.02
15.50	4.60	2.29	0.02
16.00	4.67	2.35	0.02
16.50	4.74	2.41	0.02
17.00	4.80	2.46	0.01
17.50	4.86	2.51	0.01
18.00	4.91	2.55	0.01
18.50	4.96	2.59	0.01
19.00	5.00	2.63	0.01
19.50	5.05	2.66	0.01
20.00	5.09	2.70	0.01
20.50	5.13	2.73	0.01
21.00	5.17	2.76	0.01
21.50	5.21	2.80	0.01
22.00	5.24	2.83	0.01
22.50	5.28	2.86	0.01
23.00	5.31	2.88	0.01
23.50	5.34	2.91	0.01
24.00	**5.37**	**2.94**	0.01

Summary for Subcatchment 8S: PO-DA F

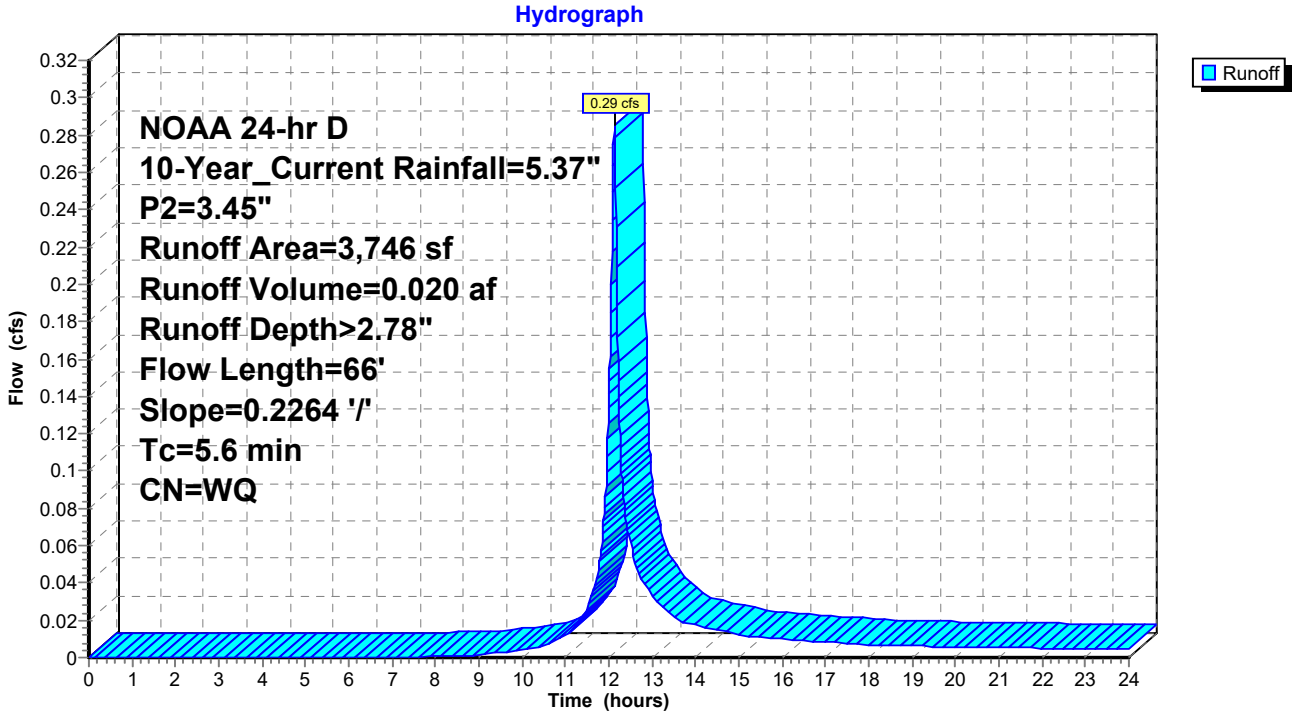
Runoff = 0.29 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 2.78"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	66	0.2264	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.00	0.00
5.50	0.41	0.00	0.00
6.00	0.46	0.00	0.00
6.50	0.51	0.00	0.00
7.00	0.57	0.00	0.00
7.50	0.63	0.00	0.00
8.00	0.70	0.00	0.00
8.50	0.77	0.00	0.00
9.00	0.85	0.01	0.00
9.50	0.95	0.02	0.00
10.00	1.06	0.04	0.00
10.50	1.20	0.07	0.01
11.00	1.40	0.13	0.01
11.50	1.70	0.25	0.03
12.00	2.57	0.69	**0.14**
12.50	3.67	1.42	**0.06**
13.00	3.97	1.65	0.03
13.50	4.17	1.79	0.02
14.00	4.31	1.90	0.02
14.50	4.42	1.99	0.01
15.00	4.52	2.06	0.01
15.50	4.60	2.13	0.01
16.00	4.67	2.19	0.01
16.50	4.74	2.24	0.01
17.00	4.80	2.29	0.01
17.50	4.86	2.34	0.01
18.00	4.91	2.38	0.01
18.50	4.96	2.42	0.01
19.00	5.00	2.45	0.01
19.50	5.05	2.49	0.01
20.00	5.09	2.52	0.01
20.50	5.13	2.55	0.01
21.00	5.17	2.59	0.01
21.50	5.21	2.62	0.01
22.00	5.24	2.65	0.01
22.50	5.28	2.67	0.00
23.00	5.31	2.70	0.00
23.50	5.34	2.73	0.00
24.00	**5.37**	**2.75**	0.00

Summary for Subcatchment 10S: PO-DA H

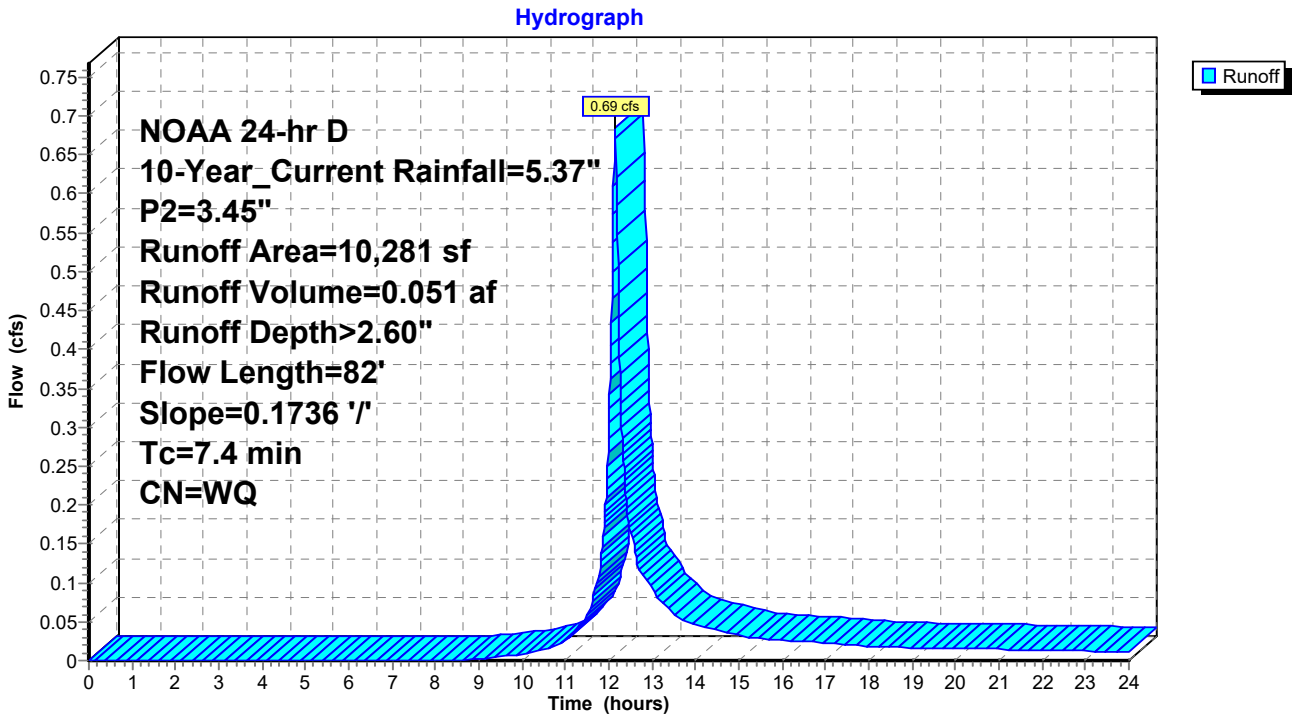
Runoff = 0.69 cfs @ 12.15 hrs, Volume= 0.051 af, Depth> 2.60"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	82	0.1736	0.18		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.00	0.00
5.50	0.41	0.00	0.00
6.00	0.46	0.00	0.00
6.50	0.51	0.00	0.00
7.00	0.57	0.00	0.00
7.50	0.63	0.00	0.00
8.00	0.70	0.00	0.00
8.50	0.77	0.00	0.00
9.00	0.85	0.00	0.00
9.50	0.95	0.01	0.00
10.00	1.06	0.03	0.01
10.50	1.20	0.05	0.01
11.00	1.40	0.10	0.03
11.50	1.70	0.20	0.06
12.00	2.57	0.61	**0.31**
12.50	3.67	1.29	**0.17**
13.00	3.97	1.51	0.09
13.50	4.17	1.65	0.06
14.00	4.31	1.75	0.05
14.50	4.42	1.84	0.04
15.00	4.52	1.91	0.03
15.50	4.60	1.97	0.03
16.00	4.67	2.03	0.03
16.50	4.74	2.08	0.02
17.00	4.80	2.13	0.02
17.50	4.86	2.17	0.02
18.00	4.91	2.21	0.02
18.50	4.96	2.25	0.02
19.00	5.00	2.28	0.02
19.50	5.05	2.32	0.02
20.00	5.09	2.35	0.02
20.50	5.13	2.38	0.02
21.00	5.17	2.41	0.01
21.50	5.21	2.44	0.01
22.00	5.24	2.47	0.01
22.50	5.28	2.50	0.01
23.00	5.31	2.52	0.01
23.50	5.34	2.55	0.01
24.00	**5.37**	**2.57**	0.01

Summary for Subcatchment 13S: PO-DA K

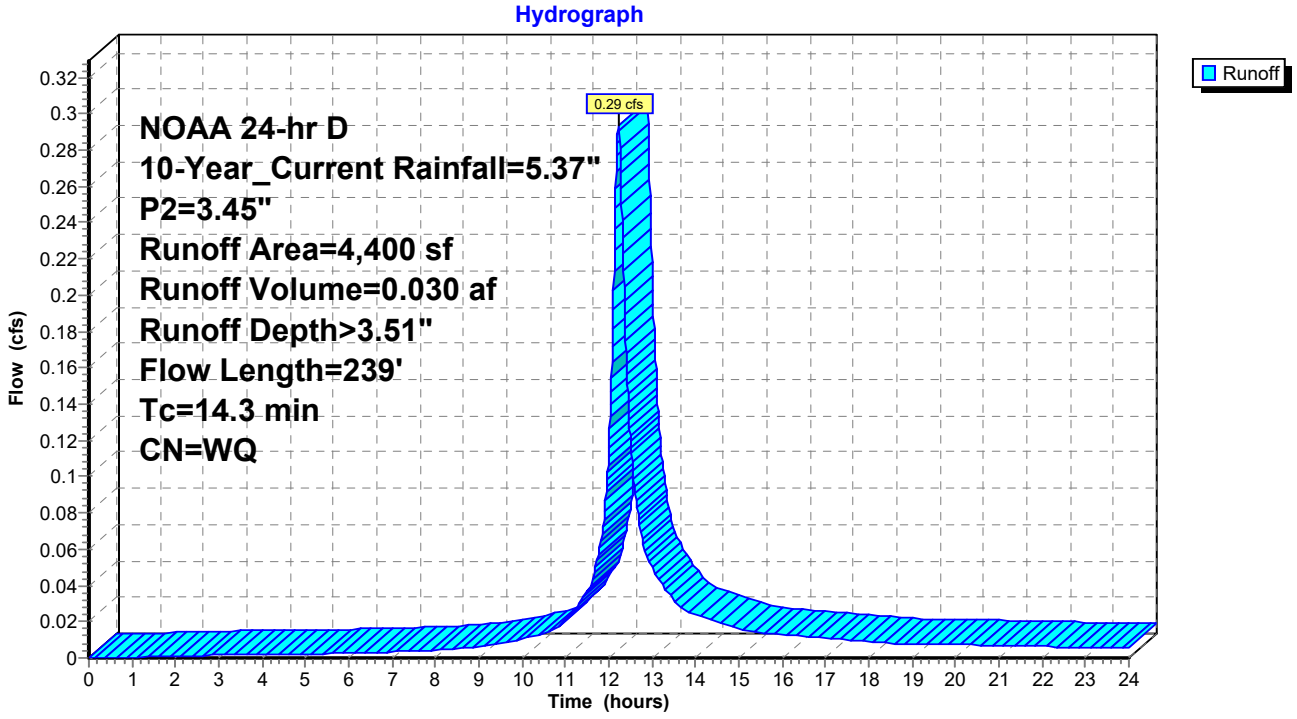
Runoff = 0.29 cfs @ 12.22 hrs, Volume= 0.030 af, Depth> 3.51"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0772	0.14		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
14.3	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.00	0.00
5.50	0.41	0.00	0.00
6.00	0.46	0.00	0.00
6.50	0.51	0.00	0.00
7.00	0.57	0.01	0.00
7.50	0.63	0.02	0.00
8.00	0.70	0.03	0.00
8.50	0.77	0.04	0.01
9.00	0.85	0.07	0.01
9.50	0.95	0.10	0.01
10.00	1.06	0.14	0.01
10.50	1.20	0.20	0.01
11.00	1.40	0.29	0.02
11.50	1.70	0.46	0.04
12.00	2.57	1.05	**0.12**
12.50	3.67	1.92	**0.12**
13.00	3.97	2.18	0.05
13.50	4.17	2.35	0.03
14.00	4.31	2.47	0.02
14.50	4.42	2.57	0.02
15.00	4.52	2.65	0.02
15.50	4.60	2.72	0.01
16.00	4.67	2.79	0.01
16.50	4.74	2.85	0.01
17.00	4.80	2.90	0.01
17.50	4.86	2.95	0.01
18.00	4.91	3.00	0.01
18.50	4.96	3.04	0.01
19.00	5.00	3.08	0.01
19.50	5.05	3.12	0.01
20.00	5.09	3.16	0.01
20.50	5.13	3.19	0.01
21.00	5.17	3.23	0.01
21.50	5.21	3.26	0.01
22.00	5.24	3.30	0.01
22.50	5.28	3.33	0.01
23.00	5.31	3.36	0.01
23.50	5.34	3.38	0.01
24.00	**5.37**	**3.41**	0.01

Summary for Subcatchment 14S: PO-DA L

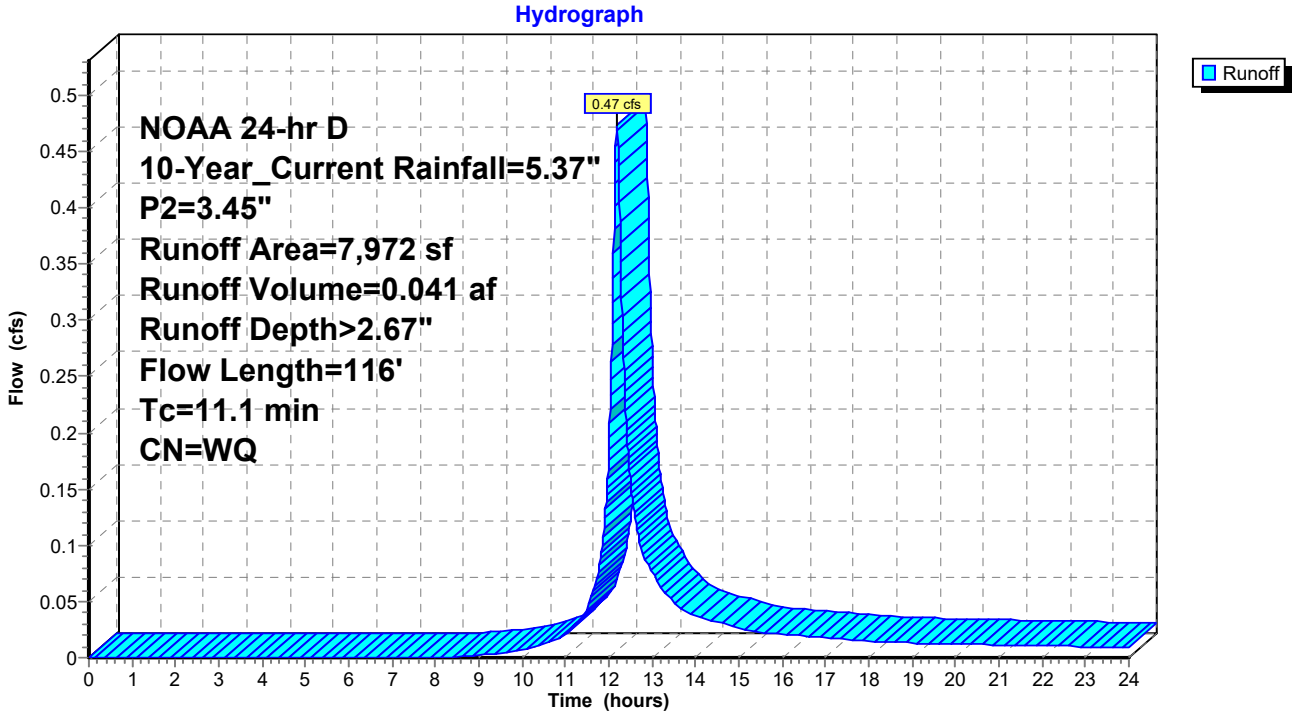
Runoff = 0.47 cfs @ 12.19 hrs, Volume= 0.041 af, Depth> 2.67"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.1003	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.1	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.00	0.00
5.50	0.41	0.00	0.00
6.00	0.46	0.00	0.00
6.50	0.51	0.00	0.00
7.00	0.57	0.00	0.00
7.50	0.63	0.00	0.00
8.00	0.70	0.00	0.00
8.50	0.77	0.00	0.00
9.00	0.85	0.01	0.00
9.50	0.95	0.02	0.00
10.00	1.06	0.03	0.01
10.50	1.20	0.06	0.01
11.00	1.40	0.11	0.02
11.50	1.70	0.22	0.04
12.00	2.57	0.65	**0.19**
12.50	3.67	1.36	**0.15**
13.00	3.97	1.58	0.08
13.50	4.17	1.72	0.05
14.00	4.31	1.82	0.04
14.50	4.42	1.91	0.03
15.00	4.52	1.99	0.03
15.50	4.60	2.05	0.02
16.00	4.67	2.11	0.02
16.50	4.74	2.16	0.02
17.00	4.80	2.21	0.02
17.50	4.86	2.25	0.02
18.00	4.91	2.29	0.01
18.50	4.96	2.33	0.01
19.00	5.00	2.37	0.01
19.50	5.05	2.40	0.01
20.00	5.09	2.43	0.01
20.50	5.13	2.47	0.01
21.00	5.17	2.50	0.01
21.50	5.21	2.53	0.01
22.00	5.24	2.56	0.01
22.50	5.28	2.59	0.01
23.00	5.31	2.61	0.01
23.50	5.34	2.64	0.01
24.00	**5.37**	**2.66**	0.01

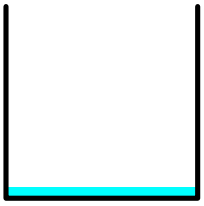
Summary for Reach 3R: TD-01

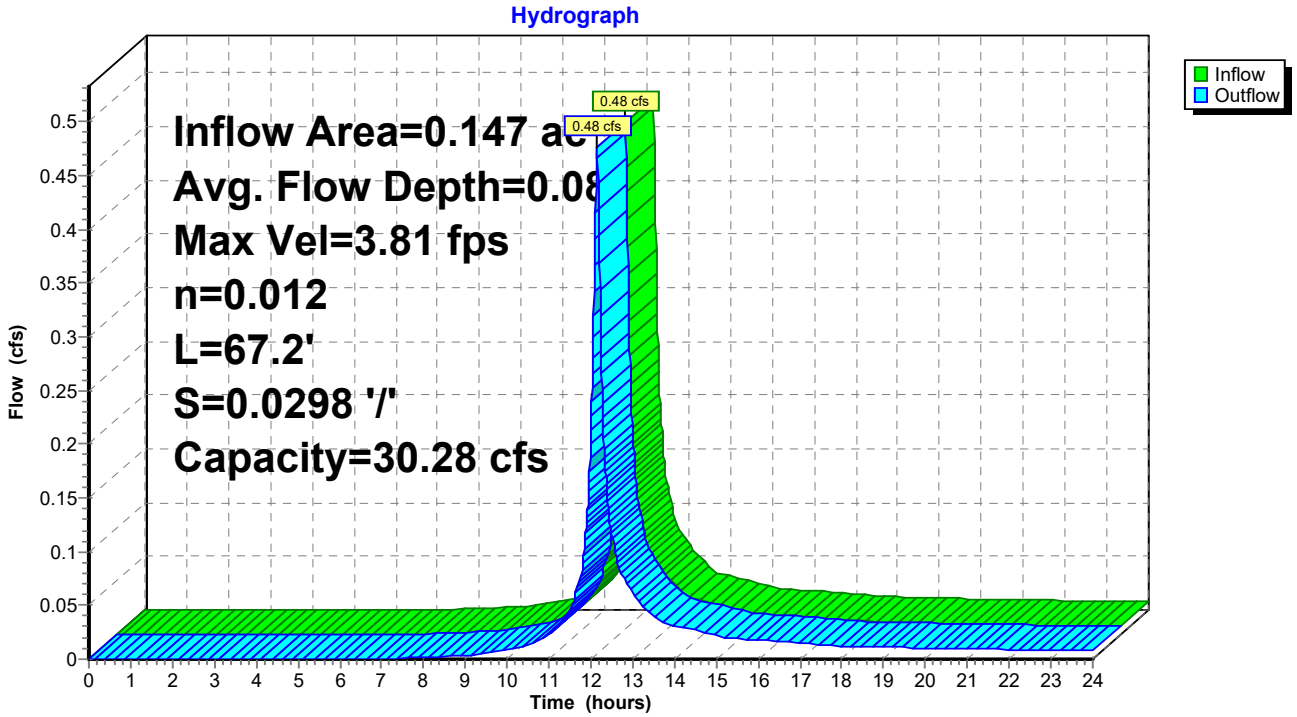
Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 2.94" for 10-Year_Current event
Inflow = 0.48 cfs @ 12.15 hrs, Volume= 0.036 af
Outflow = 0.48 cfs @ 12.15 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.81 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.8 min

Peak Storage= 8 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'





Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.00	0	606.00	0.00
7.50	0.00	0	606.00	0.00
8.00	0.00	0	606.00	0.00
8.50	0.00	0	606.00	0.00
9.00	0.00	0	606.00	0.00
9.50	0.01	0	606.00	0.01
10.00	0.01	0	606.00	0.01
10.50	0.01	1	606.01	0.01
11.00	0.02	1	606.01	0.02
11.50	0.05	2	606.02	0.05
12.00	**0.22**	**5**	**606.05**	**0.21**
12.50	**0.11**	**3**	**606.03**	**0.12**
13.00	0.06	2	606.02	0.06
13.50	0.04	2	606.02	0.04
14.00	0.03	2	606.02	0.03
14.50	0.03	1	606.01	0.03
15.00	0.02	1	606.01	0.02
15.50	0.02	1	606.01	0.02
16.00	0.02	1	606.01	0.02
16.50	0.02	1	606.01	0.02
17.00	0.01	1	606.01	0.01
17.50	0.01	1	606.01	0.01
18.00	0.01	1	606.01	0.01
18.50	0.01	1	606.01	0.01
19.00	0.01	1	606.01	0.01
19.50	0.01	1	606.01	0.01
20.00	0.01	1	606.01	0.01
20.50	0.01	1	606.01	0.01
21.00	0.01	1	606.01	0.01
21.50	0.01	0	606.00	0.01
22.00	0.01	0	606.00	0.01
22.50	0.01	0	606.00	0.01
23.00	0.01	0	606.00	0.01
23.50	0.01	0	606.00	0.01
24.00	0.01	0	606.00	0.01

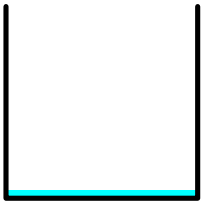
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 2.78" for 10-Year_Current event
Inflow = 0.29 cfs @ 12.13 hrs, Volume= 0.020 af
Outflow = 0.29 cfs @ 12.13 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 15P : SD-06, SD-07, SD-08

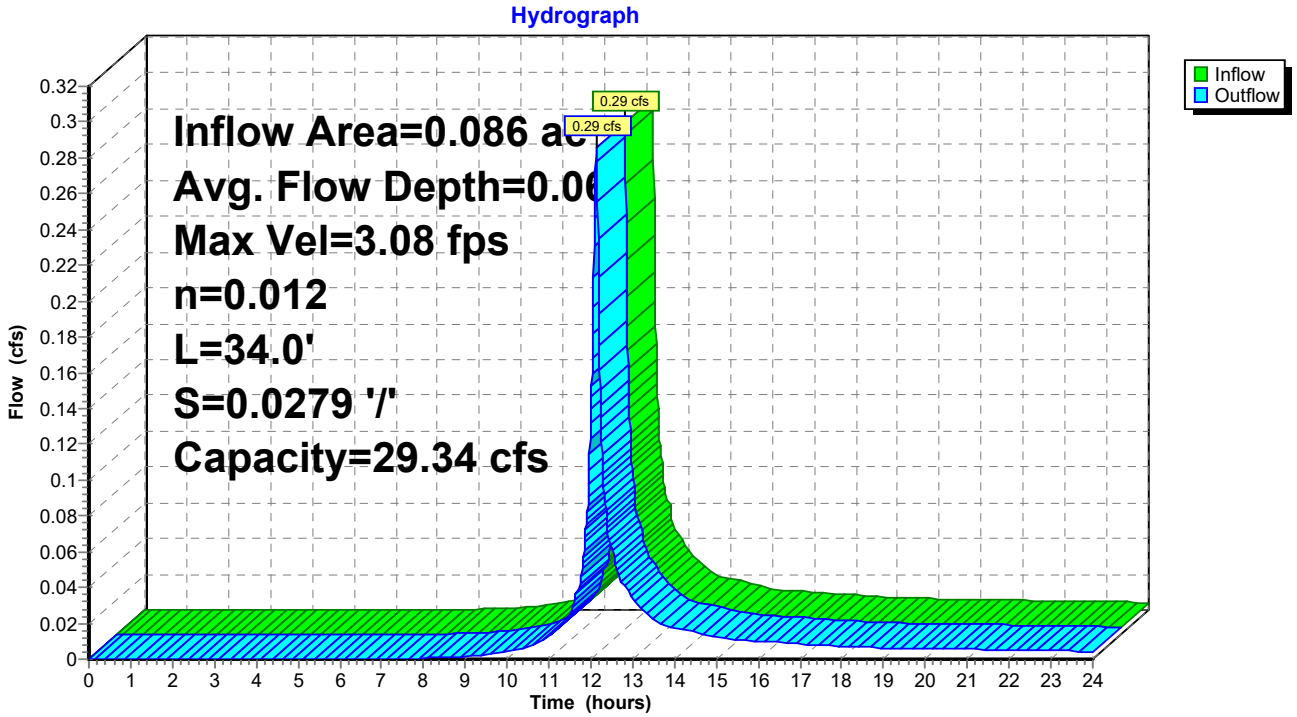
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.08 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.06' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.00	0	604.25	0.00
8.50	0.00	0	604.25	0.00
9.00	0.00	0	604.25	0.00
9.50	0.00	0	604.25	0.00
10.00	0.00	0	604.25	0.00
10.50	0.01	0	604.25	0.01
11.00	0.01	0	604.26	0.01
11.50	0.03	1	604.26	0.02
12.00	**0.14**	**2**	**604.29**	**0.14**
12.50	**0.06**	**1**	**604.27**	**0.06**
13.00	0.03	1	604.27	0.03
13.50	0.02	1	604.26	0.02
14.00	0.02	0	604.26	0.02
14.50	0.01	0	604.26	0.01
15.00	0.01	0	604.26	0.01
15.50	0.01	0	604.26	0.01
16.00	0.01	0	604.26	0.01
16.50	0.01	0	604.25	0.01
17.00	0.01	0	604.25	0.01
17.50	0.01	0	604.25	0.01
18.00	0.01	0	604.25	0.01
18.50	0.01	0	604.25	0.01
19.00	0.01	0	604.25	0.01
19.50	0.01	0	604.25	0.01
20.00	0.01	0	604.25	0.01
20.50	0.01	0	604.25	0.01
21.00	0.01	0	604.25	0.01
21.50	0.01	0	604.25	0.01
22.00	0.01	0	604.25	0.01
22.50	0.00	0	604.25	0.00
23.00	0.00	0	604.25	0.00
23.50	0.00	0	604.25	0.00
24.00	0.00	0	604.25	0.00

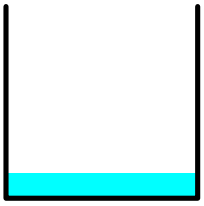
Summary for Reach 5R: TD-03

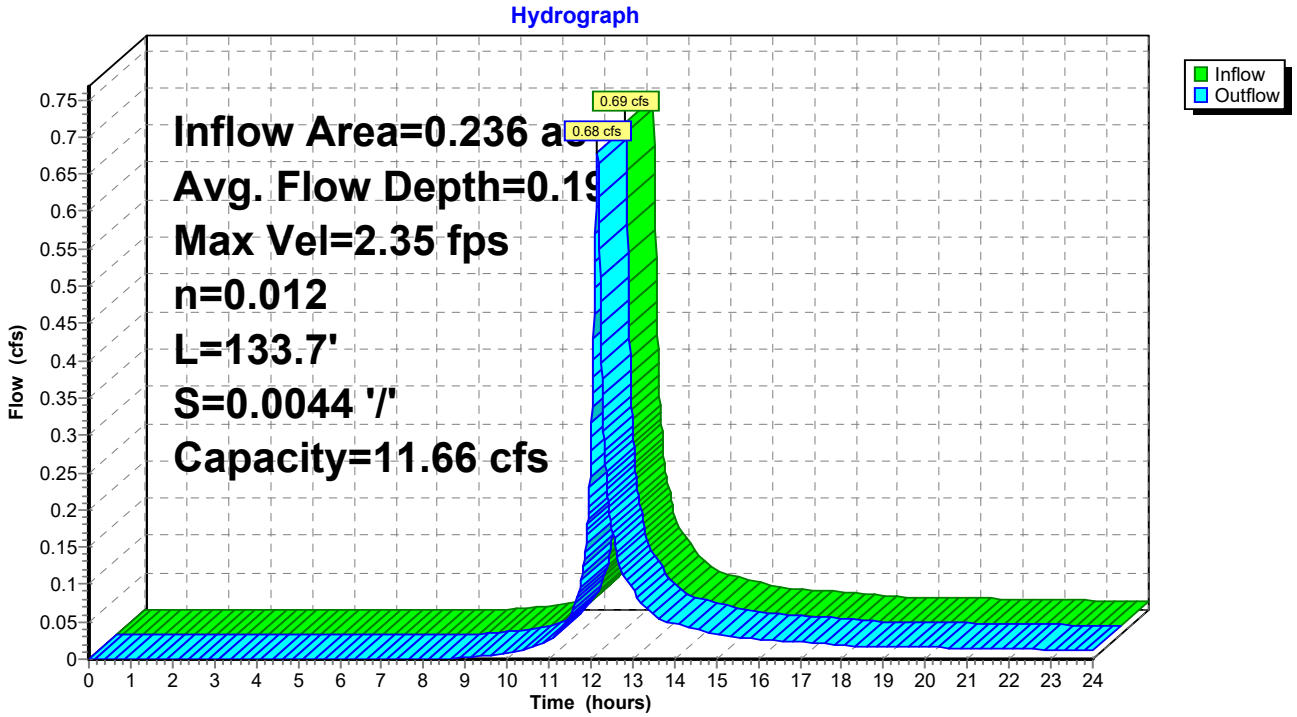
Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 2.60" for 10-Year_Current event
Inflow = 0.69 cfs @ 12.15 hrs, Volume= 0.051 af
Outflow = 0.68 cfs @ 12.16 hrs, Volume= 0.051 af, Atten= 1%, Lag= 0.6 min
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 3.2 min

Peak Storage= 39 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'





Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	0	601.81	0.00
7.00	0.00	0	601.81	0.00
7.50	0.00	0	601.81	0.00
8.00	0.00	0	601.81	0.00
8.50	0.00	0	601.81	0.00
9.00	0.00	1	601.81	0.00
9.50	0.00	1	601.82	0.00
10.00	0.01	2	601.82	0.01
10.50	0.01	3	601.83	0.01
11.00	0.03	5	601.83	0.03
11.50	0.06	8	601.85	0.06
12.00	**0.31**	**22**	**601.92**	**0.28**
12.50	**0.17**	**16**	**601.89**	**0.17**
13.00	0.09	11	601.86	0.09
13.50	0.06	8	601.85	0.06
14.00	0.05	7	601.85	0.05
14.50	0.04	7	601.84	0.04
15.00	0.03	6	601.84	0.03
15.50	0.03	5	601.84	0.03
16.00	0.03	5	601.83	0.03
16.50	0.02	5	601.83	0.02
17.00	0.02	4	601.83	0.02
17.50	0.02	4	601.83	0.02
18.00	0.02	4	601.83	0.02
18.50	0.02	4	601.83	0.02
19.00	0.02	4	601.83	0.02
19.50	0.02	4	601.83	0.02
20.00	0.02	4	601.83	0.02
20.50	0.02	4	601.83	0.02
21.00	0.01	3	601.83	0.01
21.50	0.01	3	601.83	0.01
22.00	0.01	3	601.83	0.01
22.50	0.01	3	601.83	0.01
23.00	0.01	3	601.83	0.01
23.50	0.01	3	601.83	0.01
24.00	0.01	3	601.83	0.01

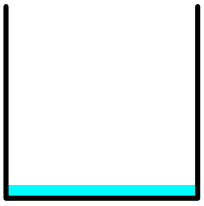
Summary for Reach 6R: TD-04

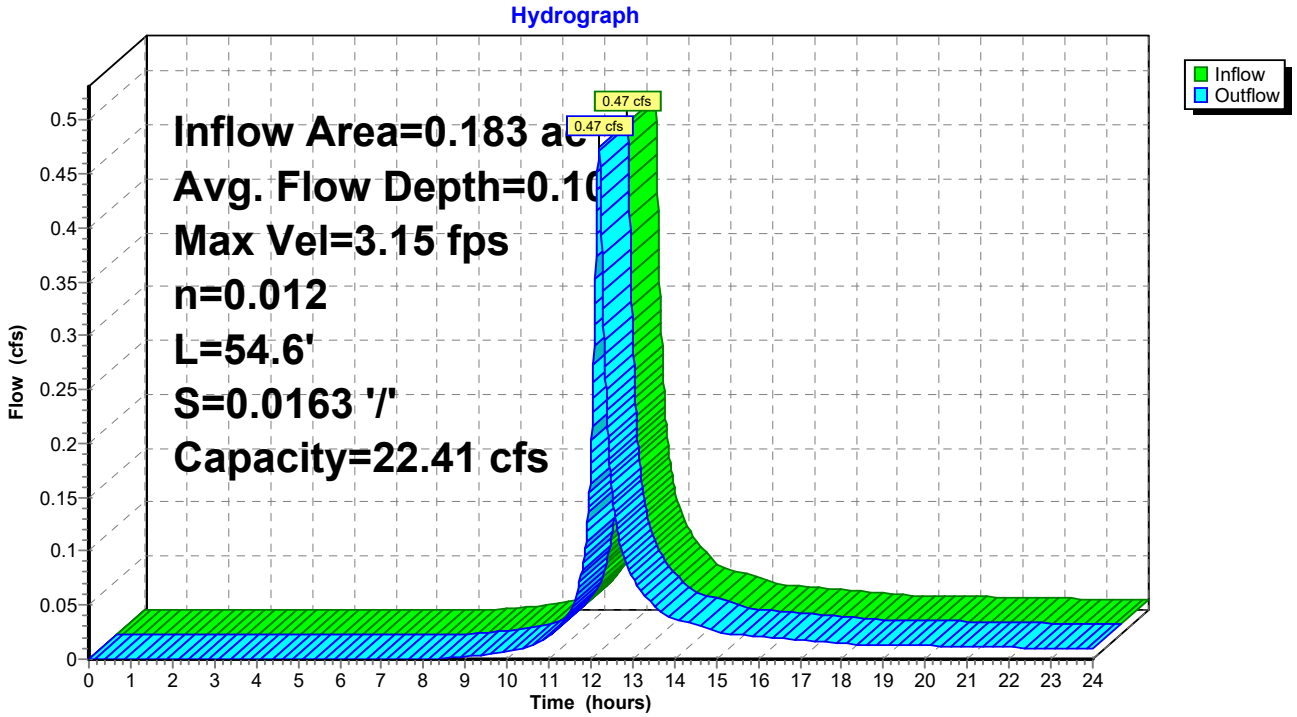
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 2.67" for 10-Year_Current event
Inflow = 0.47 cfs @ 12.19 hrs, Volume= 0.041 af
Outflow = 0.47 cfs @ 12.19 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.15 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 0.8 min

Peak Storage= 8 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

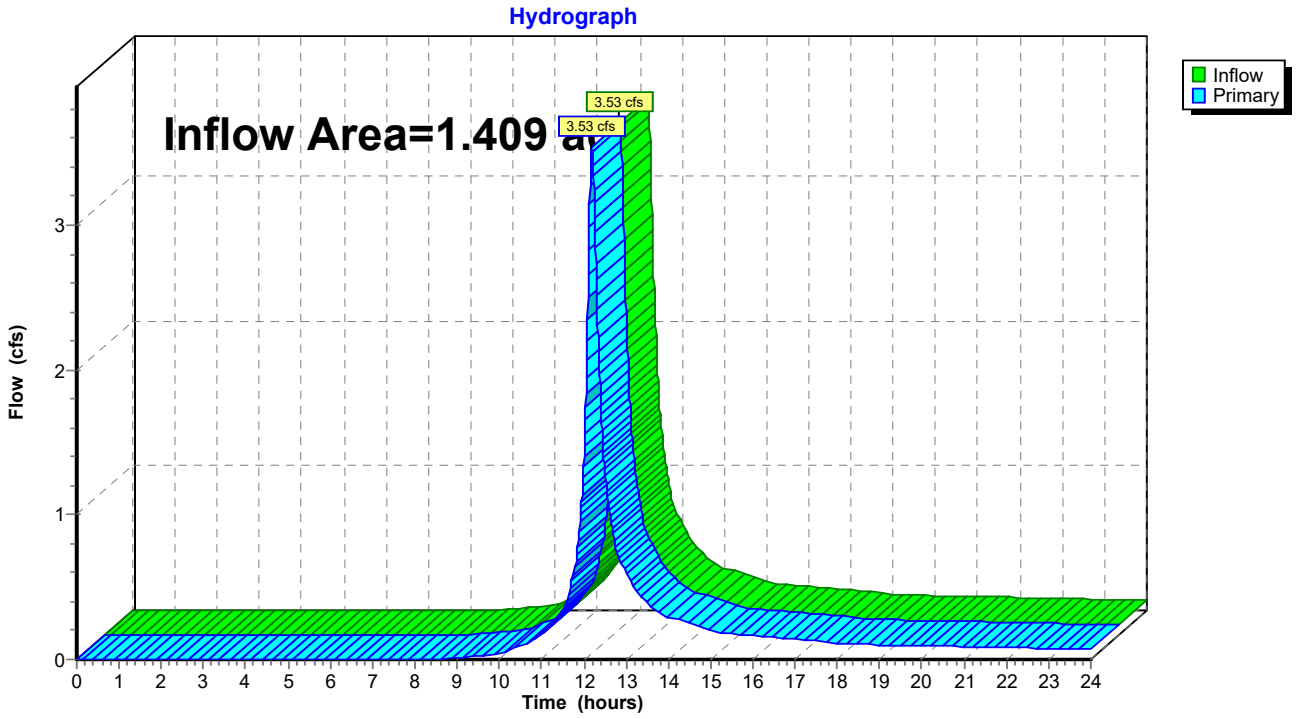
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.00	0	600.77	0.00
8.00	0.00	0	600.77	0.00
8.50	0.00	0	600.77	0.00
9.00	0.00	0	600.77	0.00
9.50	0.00	0	600.77	0.00
10.00	0.01	0	600.78	0.01
10.50	0.01	1	600.78	0.01
11.00	0.02	1	600.78	0.02
11.50	0.04	2	600.79	0.04
12.00	**0.19**	**5**	**600.82**	**0.18**
12.50	**0.15**	**4**	**600.82**	**0.16**
13.00	0.08	3	600.80	0.08
13.50	0.05	2	600.79	0.05
14.00	0.04	2	600.79	0.04
14.50	0.03	2	600.79	0.03
15.00	0.03	1	600.79	0.03
15.50	0.02	1	600.79	0.02
16.00	0.02	1	600.78	0.02
16.50	0.02	1	600.78	0.02
17.00	0.02	1	600.78	0.02
17.50	0.02	1	600.78	0.02
18.00	0.01	1	600.78	0.01
18.50	0.01	1	600.78	0.01
19.00	0.01	1	600.78	0.01
19.50	0.01	1	600.78	0.01
20.00	0.01	1	600.78	0.01
20.50	0.01	1	600.78	0.01
21.00	0.01	1	600.78	0.01
21.50	0.01	1	600.78	0.01
22.00	0.01	1	600.78	0.01
22.50	0.01	1	600.78	0.01
23.00	0.01	1	600.78	0.01
23.50	0.01	1	600.78	0.01
24.00	0.01	1	600.78	0.01

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 2.71" for 10-Year_Current event
Inflow = 3.53 cfs @ 12.19 hrs, Volume= 0.319 af
Primary = 3.53 cfs @ 12.19 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.01		0.01
9.00	0.01		0.01
9.50	0.02		0.02
10.00	0.04		0.04
10.50	0.09		0.09
11.00	0.17		0.17
11.50	0.35		0.35
12.00	**1.40**		**1.40**
12.50	**1.28**		**1.28**
13.00	0.60		0.60
13.50	0.39		0.39
14.00	0.29		0.29
14.50	0.25		0.25
15.00	0.21		0.21
15.50	0.18		0.18
16.00	0.16		0.16
16.50	0.15		0.15
17.00	0.14		0.14
17.50	0.13		0.13
18.00	0.11		0.11
18.50	0.11		0.11
19.00	0.10		0.10
19.50	0.10		0.10
20.00	0.10		0.10
20.50	0.09		0.09
21.00	0.09		0.09
21.50	0.09		0.09
22.00	0.08		0.08
22.50	0.08		0.08
23.00	0.08		0.08
23.50	0.07		0.07
24.00	0.07		0.07

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 2.66" for 10-Year_Current event
Inflow = 1.95 cfs @ 12.19 hrs, Volume= 0.178 af
Outflow = 1.95 cfs @ 12.20 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.3 min
Primary = 1.95 cfs @ 12.20 hrs, Volume= 0.178 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.60' @ 12.20 hrs Surf.Area= 76 sf Storage= 32 cf

Plug-Flow detention time= 0.7 min calculated for 0.178 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (849.8 - 849.4)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

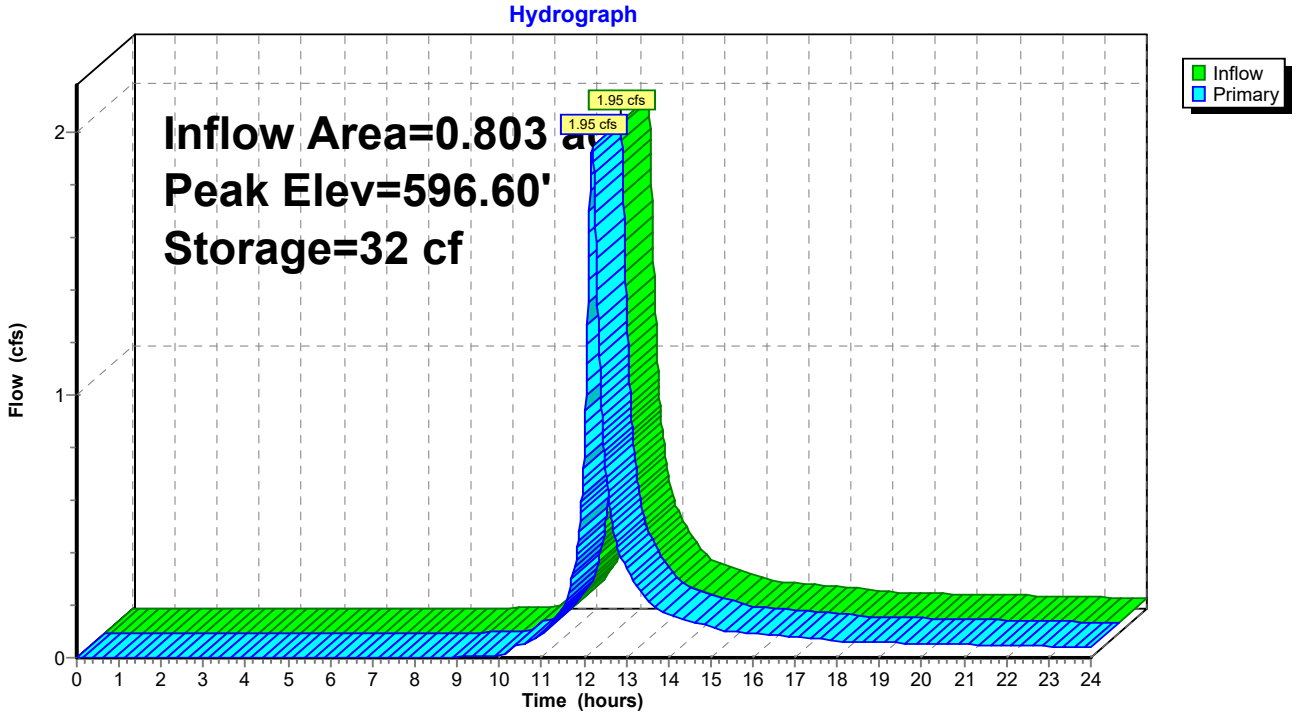
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.94 cfs @ 12.20 hrs HW=596.60' TW=594.60' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 1.94 cfs @ 2.72 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	0	595.71	0.00
4.50	0.00	0	595.71	0.00
5.00	0.00	0	595.71	0.00
5.50	0.00	0	595.71	0.00
6.00	0.00	0	595.71	0.00
6.50	0.00	0	595.71	0.00
7.00	0.00	0	595.73	0.00
7.50	0.00	1	595.82	0.00
8.00	0.00	3	595.98	0.00
8.50	0.00	4	595.98	0.00
9.00	0.00	4	595.99	0.00
9.50	0.01	4	595.99	0.01
10.00	0.01	4	596.00	0.01
10.50	0.05	5	596.06	0.05
11.00	0.09	5	596.09	0.09
11.50	0.19	7	596.15	0.19
12.00	**0.78**	**15**	**596.35**	**0.76**
12.50	**0.73**	**14**	**596.34**	**0.74**
13.00	0.34	9	596.22	0.34
13.50	0.22	7	596.16	0.22
14.00	0.17	6	596.14	0.17
14.50	0.14	6	596.12	0.14
15.00	0.12	6	596.11	0.12
15.50	0.10	6	596.10	0.10
16.00	0.09	5	596.09	0.09
16.50	0.09	5	596.09	0.09
17.00	0.08	5	596.08	0.08
17.50	0.07	5	596.07	0.07
18.00	0.06	5	596.07	0.06
18.50	0.06	5	596.06	0.06
19.00	0.06	5	596.06	0.06
19.50	0.06	5	596.06	0.06
20.00	0.05	5	596.06	0.05
20.50	0.05	5	596.06	0.05
21.00	0.05	5	596.06	0.05
21.50	0.05	5	596.05	0.05
22.00	0.05	5	596.05	0.05
22.50	0.05	5	596.05	0.05
23.00	0.04	5	596.05	0.04
23.50	0.04	5	596.05	0.04
24.00	0.04	5	596.05	0.04

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 2.67" for 10-Year_Current event
Inflow = 2.14 cfs @ 12.18 hrs, Volume= 0.198 af
Outflow = 2.14 cfs @ 12.19 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.3 min
Primary = 2.14 cfs @ 12.19 hrs, Volume= 0.198 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.60' @ 12.19 hrs Surf.Area= 90 sf Storage= 30 cf

Plug-Flow detention time= 0.3 min calculated for 0.198 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (848.9 - 848.7)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

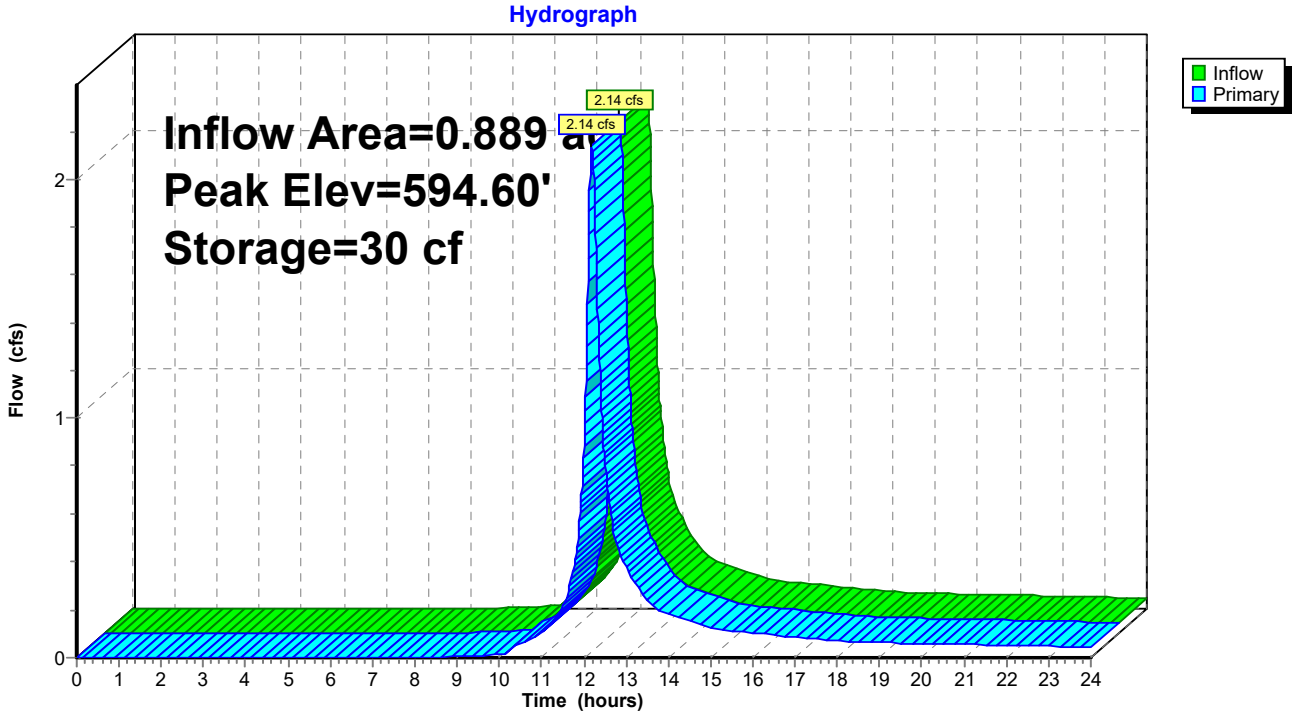
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.13 cfs @ 12.19 hrs HW=594.60' TW=593.61' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 2.13 cfs @ 2.79 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.92	0.00
4.50	0.00	0	593.92	0.00
5.00	0.00	0	593.92	0.00
5.50	0.00	0	593.92	0.00
6.00	0.00	0	593.92	0.00
6.50	0.00	0	593.92	0.00
7.00	0.00	0	593.93	0.00
7.50	0.00	0	593.94	0.00
8.00	0.00	0	593.95	0.00
8.50	0.00	0	593.95	0.00
9.00	0.01	1	593.96	0.00
9.50	0.01	1	593.97	0.01
10.00	0.01	1	593.98	0.01
10.50	0.06	2	594.03	0.06
11.00	0.11	2	594.07	0.10
11.50	0.22	4	594.13	0.22
12.00	**0.90**	**12**	**594.35**	**0.88**
12.50	**0.81**	**12**	**594.33**	**0.81**
13.00	0.38	6	594.20	0.38
13.50	0.25	4	594.15	0.25
14.00	0.18	3	594.12	0.18
14.50	0.16	3	594.10	0.16
15.00	0.13	3	594.08	0.13
15.50	0.11	2	594.07	0.11
16.00	0.10	2	594.07	0.10
16.50	0.10	2	594.06	0.10
17.00	0.09	2	594.06	0.09
17.50	0.08	2	594.05	0.08
18.00	0.07	2	594.04	0.07
18.50	0.07	2	594.04	0.07
19.00	0.06	2	594.04	0.06
19.50	0.06	2	594.04	0.06
20.00	0.06	2	594.04	0.06
20.50	0.06	2	594.03	0.06
21.00	0.06	2	594.03	0.06
21.50	0.05	2	594.03	0.05
22.00	0.05	2	594.03	0.05
22.50	0.05	2	594.03	0.05
23.00	0.05	2	594.02	0.05
23.50	0.05	1	594.02	0.05
24.00	0.04	1	594.02	0.04

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 2.65" for 10-Year_Current event
Inflow = 2.78 cfs @ 12.17 hrs, Volume= 0.249 af
Outflow = 2.78 cfs @ 12.18 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.3 min
Primary = 2.78 cfs @ 12.18 hrs, Volume= 0.248 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 593.61' @ 12.18 hrs Surf.Area= 119 sf Storage= 54 cf

Plug-Flow detention time= 0.8 min calculated for 0.248 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (849.1 - 848.6)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

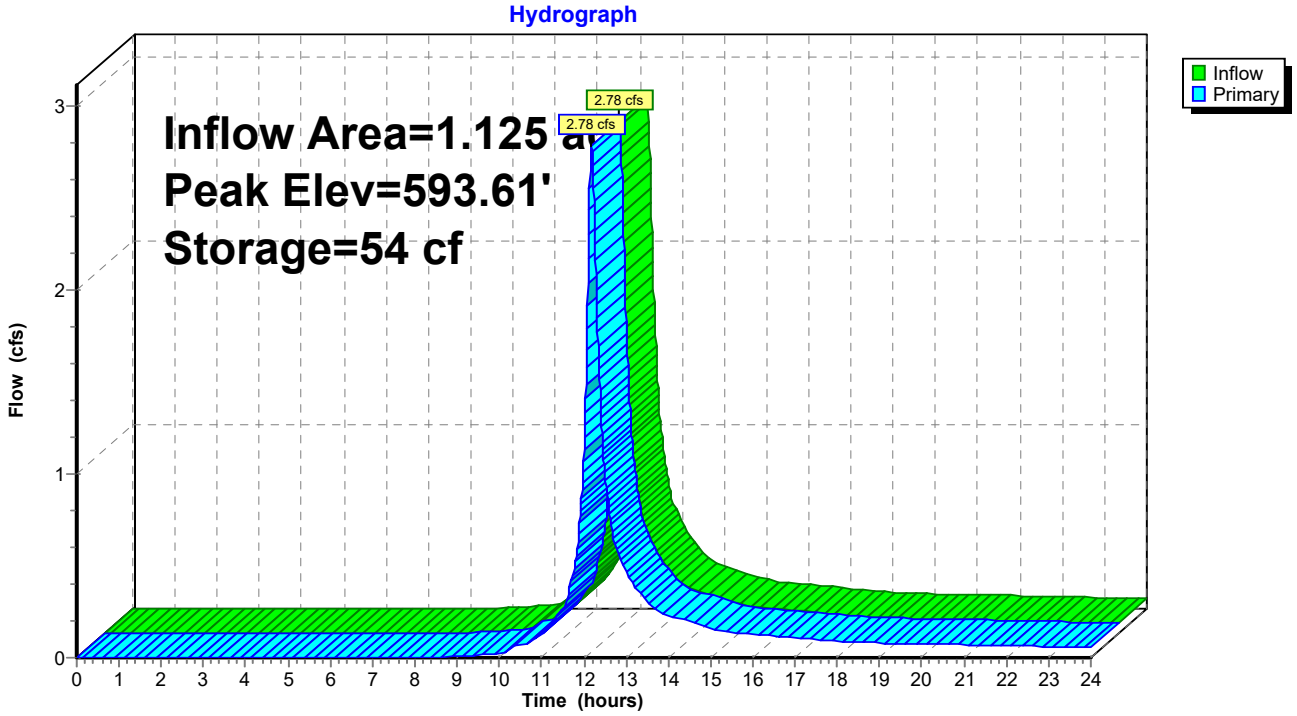
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.78 cfs @ 12.18 hrs HW=593.61' TW=591.85' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 2.78 cfs @ 3.00 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.58	0.00
4.50	0.00	0	592.58	0.00
5.00	0.00	0	592.58	0.00
5.50	0.00	0	592.58	0.00
6.00	0.00	0	592.58	0.00
6.50	0.00	0	592.58	0.00
7.00	0.00	0	592.58	0.00
7.50	0.00	0	592.61	0.00
8.00	0.00	1	592.70	0.00
8.50	0.00	4	592.85	0.00
9.00	0.01	4	592.86	0.01
9.50	0.01	5	592.88	0.01
10.00	0.02	5	592.89	0.02
10.50	0.07	6	592.94	0.07
11.00	0.13	8	592.99	0.13
11.50	0.27	11	593.06	0.27
12.00	**1.16**	**25**	**593.31**	**1.13**
12.50	**0.98**	**23**	**593.27**	**1.00**
13.00	0.47	14	593.13	0.48
13.50	0.31	11	593.07	0.31
14.00	0.23	10	593.04	0.23
14.50	0.20	9	593.02	0.20
15.00	0.16	9	593.00	0.16
15.50	0.14	8	592.99	0.14
16.00	0.13	8	592.99	0.13
16.50	0.12	8	592.98	0.12
17.00	0.11	7	592.97	0.11
17.50	0.10	7	592.97	0.10
18.00	0.09	7	592.96	0.09
18.50	0.08	7	592.95	0.08
19.00	0.08	7	592.95	0.08
19.50	0.08	7	592.95	0.08
20.00	0.08	7	592.95	0.08
20.50	0.07	7	592.95	0.07
21.00	0.07	7	592.94	0.07
21.50	0.07	6	592.94	0.07
22.00	0.07	6	592.94	0.07
22.50	0.06	6	592.94	0.06
23.00	0.06	6	592.94	0.06
23.50	0.06	6	592.93	0.06
24.00	0.06	6	592.93	0.06

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 2.65" for 10-Year_Current event
Inflow = 3.25 cfs @ 12.18 hrs, Volume= 0.289 af
Outflow = 3.25 cfs @ 12.19 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.3 min
Primary = 3.25 cfs @ 12.19 hrs, Volume= 0.289 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 591.85' @ 12.19 hrs Surf.Area= 116 sf Storage= 58 cf

Plug-Flow detention time= 1.0 min calculated for 0.289 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (849.2 - 848.7)

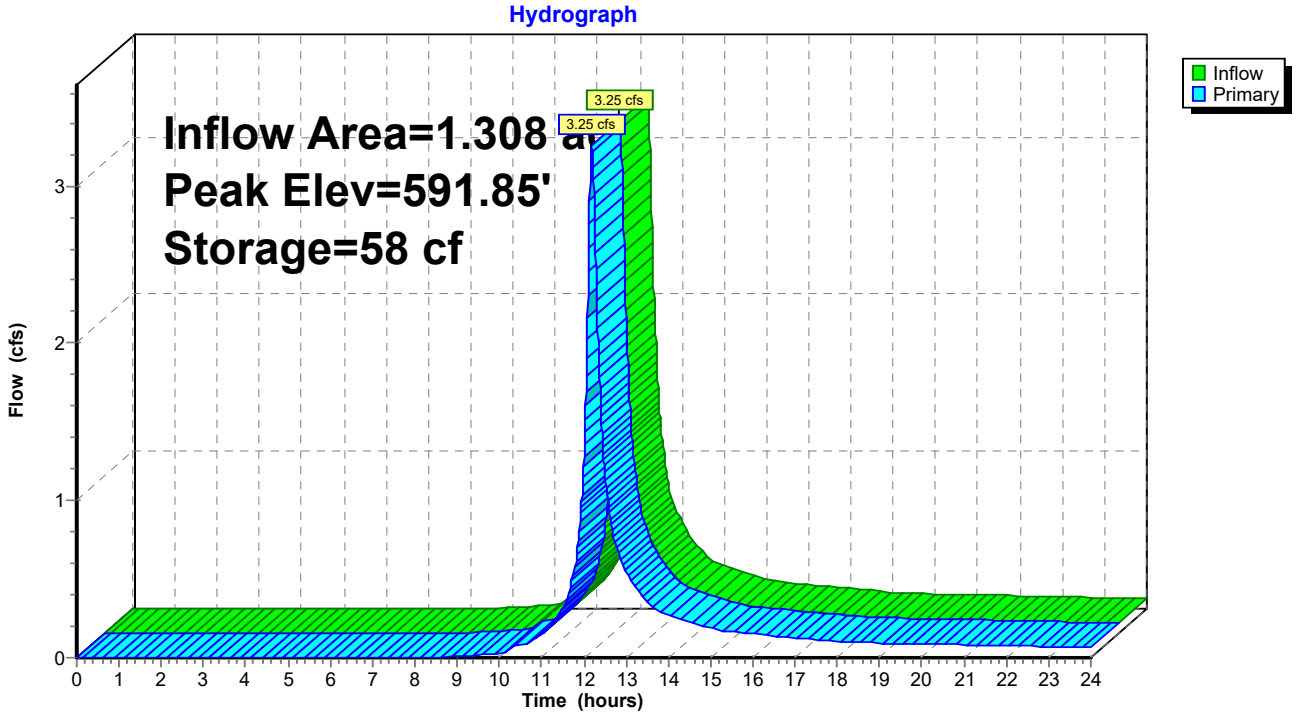
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.25 cfs @ 12.19 hrs HW=591.85' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 3.25 cfs @ 3.14 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.26	0.00
4.00	0.00	0	590.26	0.00
4.50	0.00	0	590.26	0.00
5.00	0.00	0	590.26	0.00
5.50	0.00	0	590.26	0.00
6.00	0.00	0	590.27	0.00
6.50	0.00	0	590.27	0.00
7.00	0.00	0	590.29	0.00
7.50	0.00	1	590.33	0.00
8.00	0.00	2	590.39	0.00
8.50	0.00	5	590.67	0.00
9.00	0.01	10	591.04	0.01
9.50	0.02	10	591.05	0.02
10.00	0.03	11	591.07	0.03
10.50	0.08	12	591.12	0.08
11.00	0.15	13	591.17	0.15
11.50	0.31	15	591.24	0.31
12.00	**1.31**	**27**	**591.51**	**1.28**
12.50	**1.15**	**26**	**591.48**	**1.16**
13.00	0.55	18	591.33	0.55
13.50	0.36	15	591.26	0.36
14.00	0.27	14	591.23	0.27
14.50	0.23	14	591.21	0.23
15.00	0.19	13	591.19	0.19
15.50	0.16	13	591.17	0.16
16.00	0.15	13	591.17	0.15
16.50	0.14	12	591.16	0.14
17.00	0.13	12	591.15	0.13
17.50	0.12	12	591.15	0.12
18.00	0.10	12	591.14	0.10
18.50	0.10	12	591.13	0.10
19.00	0.09	12	591.13	0.09
19.50	0.09	12	591.13	0.09
20.00	0.09	12	591.13	0.09
20.50	0.09	12	591.13	0.09
21.00	0.08	12	591.12	0.08
21.50	0.08	12	591.12	0.08
22.00	0.08	11	591.12	0.08
22.50	0.07	11	591.12	0.07
23.00	0.07	11	591.11	0.07
23.50	0.07	11	591.11	0.07
24.00	0.06	11	591.11	0.06

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 2.63" for 10-Year_Current event
Inflow = 1.56 cfs @ 12.22 hrs, Volume= 0.144 af
Outflow = 1.56 cfs @ 12.22 hrs, Volume= 0.142 af, Atten= 0%, Lag= 0.1 min
Primary = 1.56 cfs @ 12.22 hrs, Volume= 0.142 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.71' @ 12.22 hrs Surf.Area= 16 sf Storage= 94 cf

Plug-Flow detention time= 11.7 min calculated for 0.142 af (99% of inflow)
Center-of-Mass det. time= 4.0 min (852.9 - 849.0)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

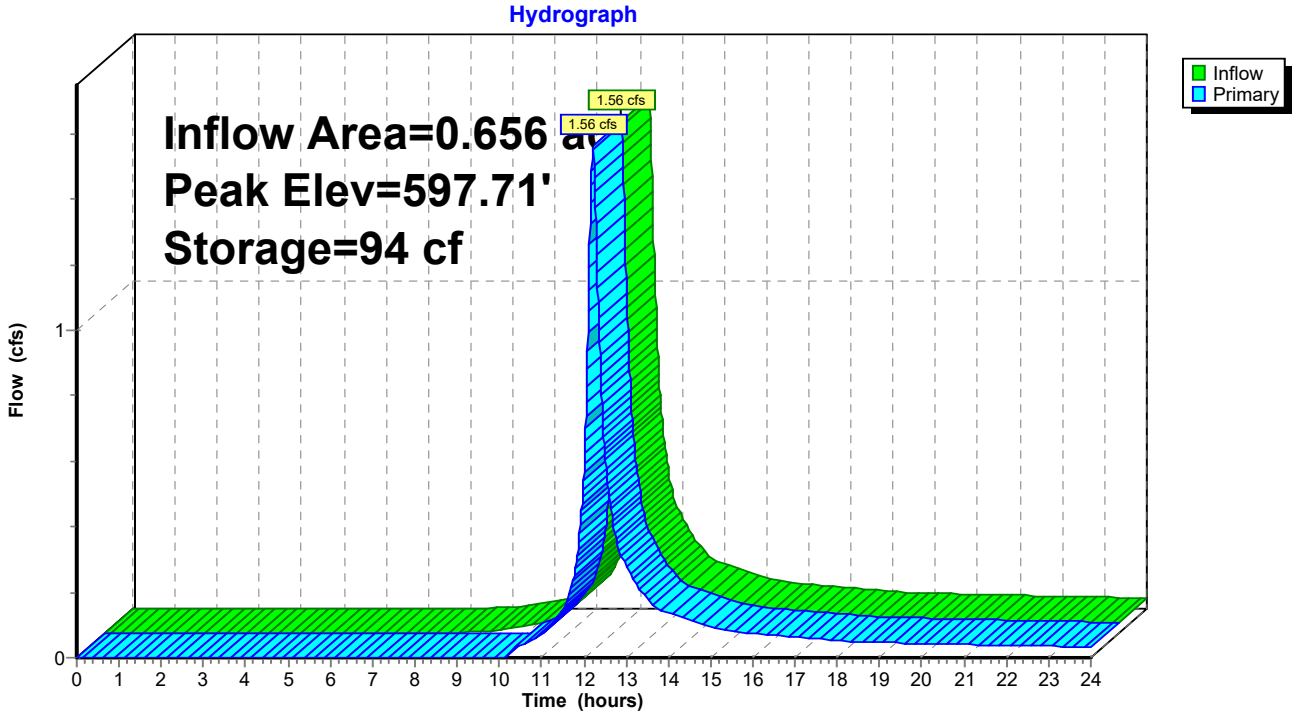
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.56 cfs @ 12.22 hrs HW=597.71' TW=596.59' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 1.56 cfs @ 2.79 fps)

Pond 23P: SD-01, SD-02



Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.82	0.00
3.50	0.00	0	591.82	0.00
4.00	0.00	0	591.82	0.00
4.50	0.00	0	591.82	0.00
5.00	0.00	0	591.82	0.00
5.50	0.00	0	591.82	0.00
6.00	0.00	0	591.83	0.00
6.50	0.00	0	591.85	0.00
7.00	0.00	1	591.89	0.00
7.50	0.00	2	591.96	0.00
8.00	0.00	4	592.08	0.00
8.50	0.00	7	592.25	0.00
9.00	0.01	14	592.71	0.00
9.50	0.01	31	593.78	0.00
10.00	0.02	64	595.85	0.00
10.50	0.04	85	597.13	0.04
11.00	0.07	86	597.17	0.07
11.50	0.15	86	597.23	0.15
12.00	**0.57**	**90**	**597.42**	**0.57**
12.50	**0.62**	**90**	**597.44**	**0.62**
13.00	0.28	88	597.30	0.28
13.50	0.18	87	597.25	0.18
14.00	0.13	86	597.22	0.14
14.50	0.12	86	597.20	0.12
15.00	0.09	86	597.19	0.09
15.50	0.08	86	597.18	0.08
16.00	0.08	86	597.17	0.08
16.50	0.07	86	597.17	0.07
17.00	0.06	85	597.16	0.06
17.50	0.06	85	597.16	0.06
18.00	0.05	85	597.15	0.05
18.50	0.05	85	597.14	0.05
19.00	0.05	85	597.14	0.05
19.50	0.05	85	597.14	0.05
20.00	0.04	85	597.14	0.04
20.50	0.04	85	597.14	0.04
21.00	0.04	85	597.14	0.04
21.50	0.04	85	597.13	0.04
22.00	0.04	85	597.13	0.04
22.50	0.04	85	597.13	0.04
23.00	0.04	85	597.13	0.04
23.50	0.03	85	597.13	0.03
24.00	0.03	85	597.13	0.03

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>3.45"
Flow Length=298' Tc=12.4 min CN=WQ Runoff=2.11 cfs 0.189 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>3.79"
Flow Length=85' Slope=0.1773 '/' Tc=7.0 min CN=WQ Runoff=0.63 cfs 0.046 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>3.62"
Flow Length=66' Slope=0.2264 '/' Tc=5.2 min CN=WQ Runoff=0.38 cfs 0.026 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>3.41"
Flow Length=82' Slope=0.1736 '/' Tc=6.8 min CN=WQ Runoff=0.92 cfs 0.067 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>4.40"
Flow Length=239' Tc=13.4 min CN=WQ Runoff=0.38 cfs 0.037 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>3.50"
Flow Length=116' Tc=10.2 min CN=WQ Runoff=0.64 cfs 0.053 af

Reach 3R: TD-01 Avg. Flow Depth=0.10' Max Vel=4.22 fps Inflow=0.63 cfs 0.046 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=0.63 cfs 0.046 af

Reach 4R: TD-02 Avg. Flow Depth=0.07' Max Vel=3.41 fps Inflow=0.38 cfs 0.026 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.38 cfs 0.026 af

Reach 5R: TD-03 Avg. Flow Depth=0.23' Max Vel=2.61 fps Inflow=0.92 cfs 0.067 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=0.91 cfs 0.067 af

Reach 6R: TD-04 Avg. Flow Depth=0.12' Max Vel=3.52 fps Inflow=0.64 cfs 0.053 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=0.64 cfs 0.053 af

Pond 7P: O-1A Inflow=4.74 cfs 0.416 af
Primary=4.74 cfs 0.416 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.71' Storage=42 cf Inflow=2.62 cfs 0.233 af
Outflow=2.62 cfs 0.233 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.72' Storage=43 cf Inflow=2.88 cfs 0.259 af
Outflow=2.88 cfs 0.259 af

Pond 16P: SD-09, SD-10 Peak Elev=593.76' Storage=73 cf Inflow=3.75 cfs 0.326 af
Outflow=3.75 cfs 0.326 af

Pond 20P: SD-11, SD-12 Peak Elev=592.02' Storage=80 cf Inflow=4.39 cfs 0.379 af
Outflow=4.38 cfs 0.379 af

Pond 23P: SD-01, SD-02 Peak Elev=597.86' Storage=97 cf Inflow=2.11 cfs 0.189 af
Outflow=2.11 cfs 0.187 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.419 af Average Runoff Depth = 3.57"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

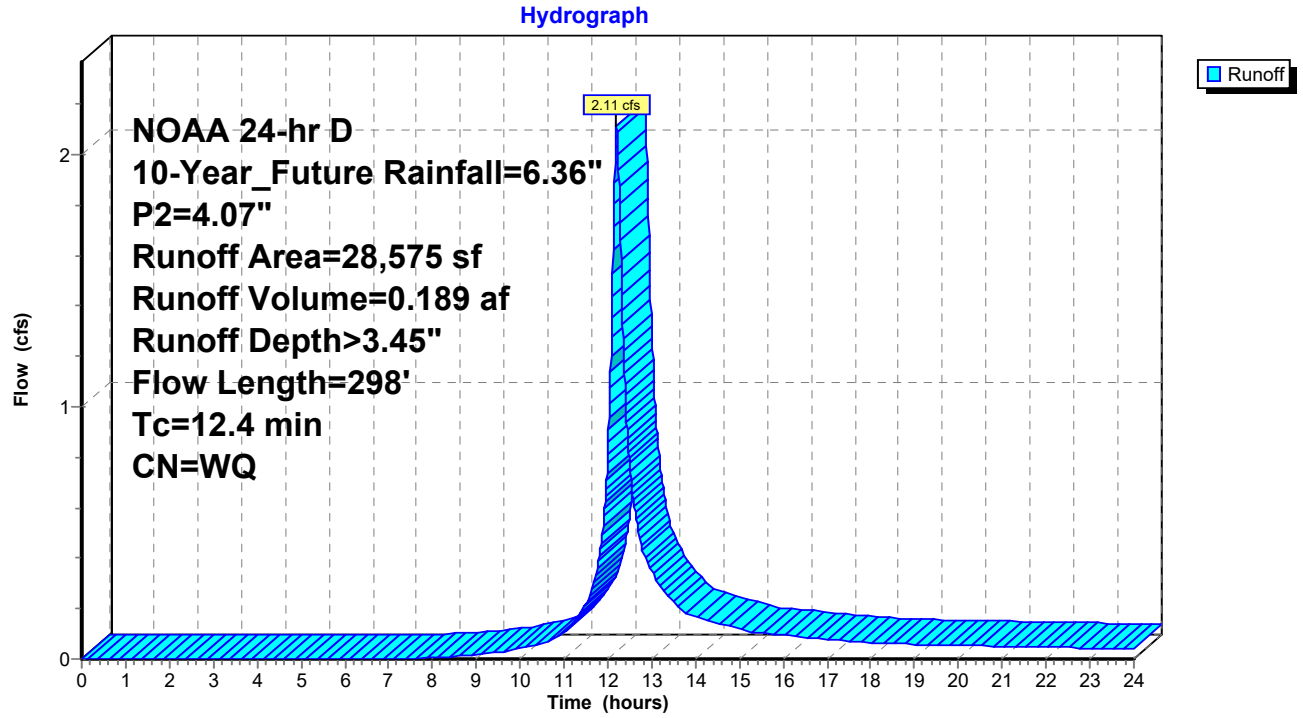
Runoff = 2.11 cfs @ 12.20 hrs, Volume= 0.189 af, Depth> 3.45"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0900	0.16		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
12.4	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.00
4.50	0.38	0.00	0.00
5.00	0.43	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.67	0.00	0.00
7.50	0.74	0.00	0.00
8.00	0.83	0.00	0.01
8.50	0.91	0.01	0.01
9.00	1.01	0.02	0.02
9.50	1.12	0.04	0.03
10.00	1.26	0.08	0.04
10.50	1.42	0.12	0.06
11.00	1.65	0.20	0.11
11.50	2.02	0.36	0.22
12.00	3.05	0.94	**0.82**
12.50	4.34	1.85	**0.75**
13.00	4.71	2.13	0.35
13.50	4.94	2.31	0.23
14.00	5.10	2.44	0.17
14.50	5.24	2.56	0.14
15.00	5.35	2.65	0.12
15.50	5.45	2.73	0.10
16.00	5.53	2.80	0.09
16.50	5.62	2.86	0.09
17.00	5.69	2.93	0.08
17.50	5.76	2.98	0.07
18.00	5.82	3.03	0.06
18.50	5.87	3.08	0.06
19.00	5.93	3.12	0.06
19.50	5.98	3.17	0.06
20.00	6.03	3.21	0.05
20.50	6.07	3.25	0.05
21.00	6.12	3.29	0.05
21.50	6.16	3.32	0.05
22.00	6.21	3.36	0.05
22.50	6.25	3.39	0.05
23.00	6.29	3.43	0.04
23.50	6.32	3.46	0.04
24.00	**6.36**	**3.49**	0.04

Summary for Subcatchment 6S: PO-DA D

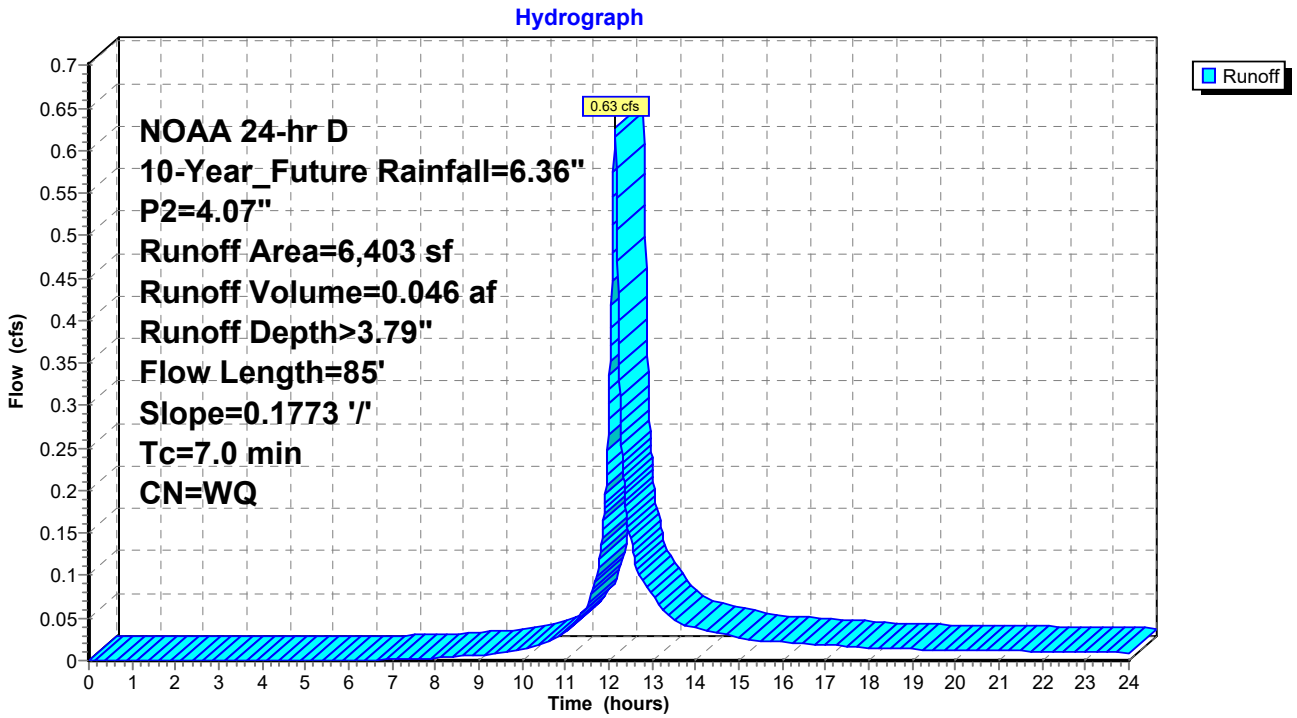
Runoff = 0.63 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 3.79"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	85	0.1773	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.00
4.50	0.38	0.00	0.00
5.00	0.43	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.67	0.00	0.00
7.50	0.74	0.01	0.00
8.00	0.83	0.02	0.00
8.50	0.91	0.03	0.00
9.00	1.01	0.05	0.01
9.50	1.12	0.08	0.01
10.00	1.26	0.12	0.01
10.50	1.42	0.18	0.02
11.00	1.65	0.28	0.03
11.50	2.02	0.46	0.06
12.00	3.05	1.10	**0.30**
12.50	4.34	2.08	**0.14**
13.00	4.71	2.38	0.08
13.50	4.94	2.57	0.05
14.00	5.10	2.71	0.04
14.50	5.24	2.82	0.03
15.00	5.35	2.92	0.03
15.50	5.45	3.00	0.02
16.00	5.53	3.08	0.02
16.50	5.62	3.15	0.02
17.00	5.69	3.21	0.02
17.50	5.76	3.27	0.02
18.00	5.82	3.32	0.01
18.50	5.87	3.37	0.01
19.00	5.93	3.41	0.01
19.50	5.98	3.46	0.01
20.00	6.03	3.50	0.01
20.50	6.07	3.54	0.01
21.00	6.12	3.58	0.01
21.50	6.16	3.62	0.01
22.00	6.21	3.66	0.01
22.50	6.25	3.70	0.01
23.00	6.29	3.73	0.01
23.50	6.32	3.76	0.01
24.00	**6.36**	**3.80**	0.01

Summary for Subcatchment 8S: PO-DA F

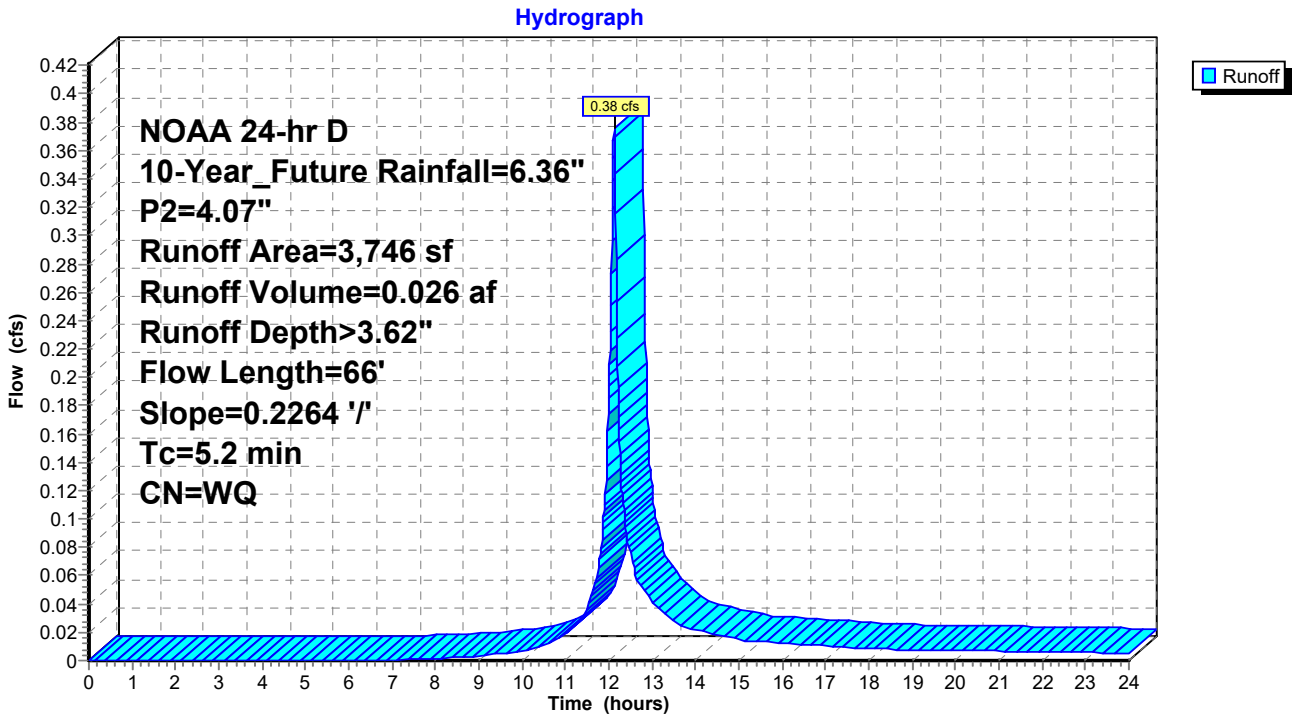
Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af, Depth> 3.62"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	66	0.2264	0.21		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.00
4.50	0.38	0.00	0.00
5.00	0.43	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.67	0.00	0.00
7.50	0.74	0.00	0.00
8.00	0.83	0.01	0.00
8.50	0.91	0.02	0.00
9.00	1.01	0.03	0.00
9.50	1.12	0.05	0.00
10.00	1.26	0.09	0.01
10.50	1.42	0.14	0.01
11.00	1.65	0.23	0.02
11.50	2.02	0.39	0.04
12.00	3.05	0.99	**0.19**
12.50	4.34	1.93	**0.08**
13.00	4.71	2.21	0.04
13.50	4.94	2.40	0.03
14.00	5.10	2.53	0.02
14.50	5.24	2.64	0.02
15.00	5.35	2.74	0.02
15.50	5.45	2.82	0.01
16.00	5.53	2.89	0.01
16.50	5.62	2.96	0.01
17.00	5.69	3.02	0.01
17.50	5.76	3.08	0.01
18.00	5.82	3.13	0.01
18.50	5.87	3.17	0.01
19.00	5.93	3.22	0.01
19.50	5.98	3.26	0.01
20.00	6.03	3.30	0.01
20.50	6.07	3.35	0.01
21.00	6.12	3.38	0.01
21.50	6.16	3.42	0.01
22.00	6.21	3.46	0.01
22.50	6.25	3.49	0.01
23.00	6.29	3.53	0.01
23.50	6.32	3.56	0.01
24.00	**6.36**	**3.59**	0.01

Summary for Subcatchment 10S: PO-DA H

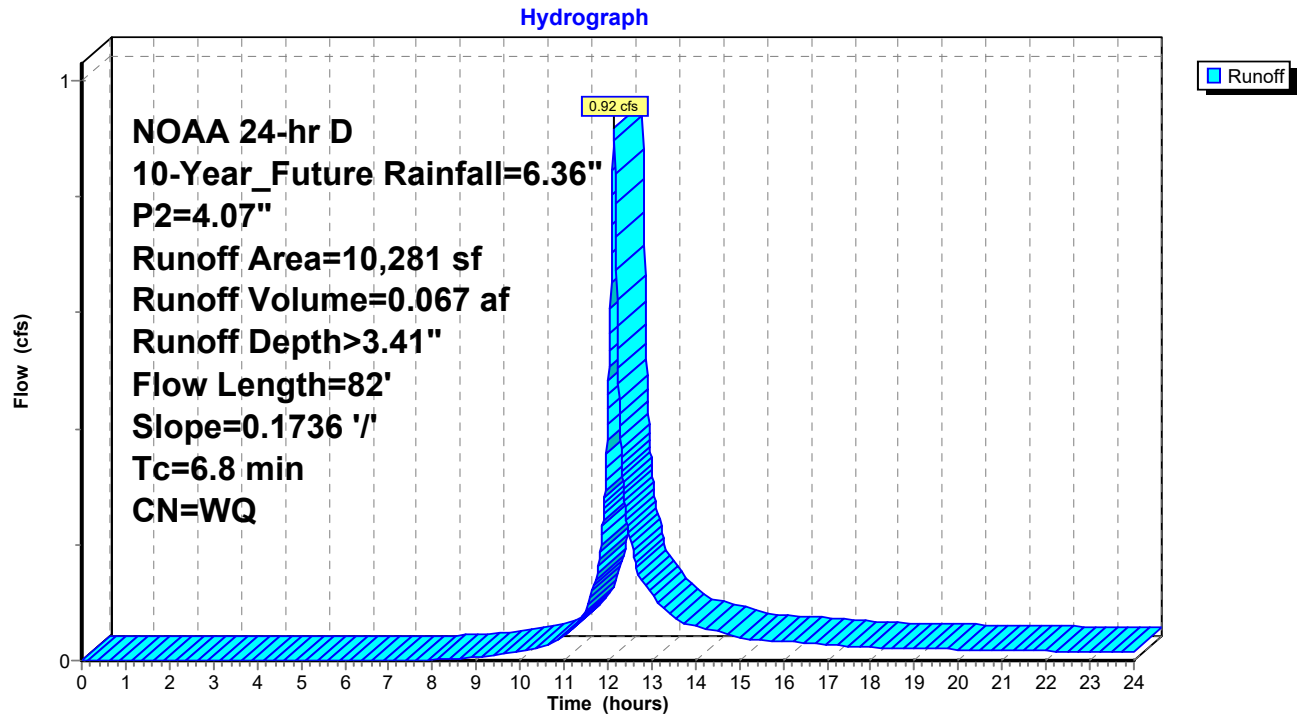
Runoff = 0.92 cfs @ 12.14 hrs, Volume= 0.067 af, Depth> 3.41"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	82	0.1736	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.00
4.50	0.38	0.00	0.00
5.00	0.43	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.67	0.00	0.00
7.50	0.74	0.00	0.00
8.00	0.83	0.00	0.00
8.50	0.91	0.01	0.00
9.00	1.01	0.02	0.01
9.50	1.12	0.04	0.01
10.00	1.26	0.06	0.02
10.50	1.42	0.11	0.02
11.00	1.65	0.18	0.04
11.50	2.02	0.33	0.08
12.00	3.05	0.89	**0.44**
12.50	4.34	1.78	**0.21**
13.00	4.71	2.05	0.12
13.50	4.94	2.23	0.08
14.00	5.10	2.36	0.06
14.50	5.24	2.47	0.05
15.00	5.35	2.56	0.04
15.50	5.45	2.64	0.04
16.00	5.53	2.71	0.03
16.50	5.62	2.77	0.03
17.00	5.69	2.83	0.03
17.50	5.76	2.89	0.03
18.00	5.82	2.94	0.02
18.50	5.87	2.98	0.02
19.00	5.93	3.03	0.02
19.50	5.98	3.07	0.02
20.00	6.03	3.11	0.02
20.50	6.07	3.15	0.02
21.00	6.12	3.19	0.02
21.50	6.16	3.23	0.02
22.00	6.21	3.26	0.02
22.50	6.25	3.30	0.02
23.00	6.29	3.33	0.02
23.50	6.32	3.36	0.01
24.00	**6.36**	**3.39**	0.01

Summary for Subcatchment 13S: PO-DA K

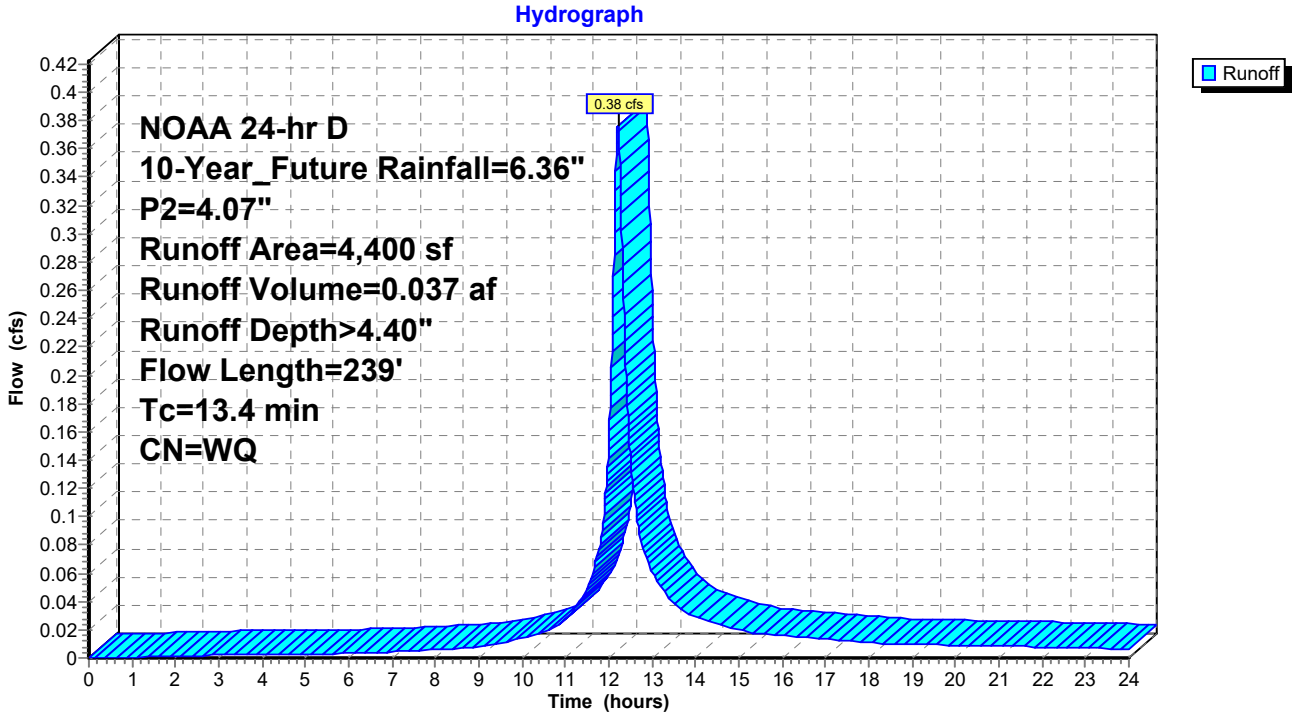
Runoff = 0.38 cfs @ 12.21 hrs, Volume= 0.037 af, Depth> 4.40"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0772	0.15		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
13.4	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.00
4.50	0.38	0.00	0.00
5.00	0.43	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.01	0.00
7.00	0.67	0.02	0.00
7.50	0.74	0.04	0.01
8.00	0.83	0.06	0.01
8.50	0.91	0.08	0.01
9.00	1.01	0.12	0.01
9.50	1.12	0.16	0.01
10.00	1.26	0.22	0.01
10.50	1.42	0.31	0.02
11.00	1.65	0.43	0.03
11.50	2.02	0.66	0.05
12.00	3.05	1.42	**0.15**
12.50	4.34	2.50	**0.14**
13.00	4.71	2.82	0.06
13.50	4.94	3.02	0.04
14.00	5.10	3.17	0.03
14.50	5.24	3.29	0.02
15.00	5.35	3.39	0.02
15.50	5.45	3.48	0.02
16.00	5.53	3.56	0.02
16.50	5.62	3.64	0.01
17.00	5.69	3.70	0.01
17.50	5.76	3.76	0.01
18.00	5.82	3.82	0.01
18.50	5.87	3.87	0.01
19.00	5.93	3.92	0.01
19.50	5.98	3.97	0.01
20.00	6.03	4.01	0.01
20.50	6.07	4.06	0.01
21.00	6.12	4.10	0.01
21.50	6.16	4.14	0.01
22.00	6.21	4.18	0.01
22.50	6.25	4.22	0.01
23.00	6.29	4.25	0.01
23.50	6.32	4.29	0.01
24.00	**6.36**	**4.32**	0.01

Summary for Subcatchment 14S: PO-DA L

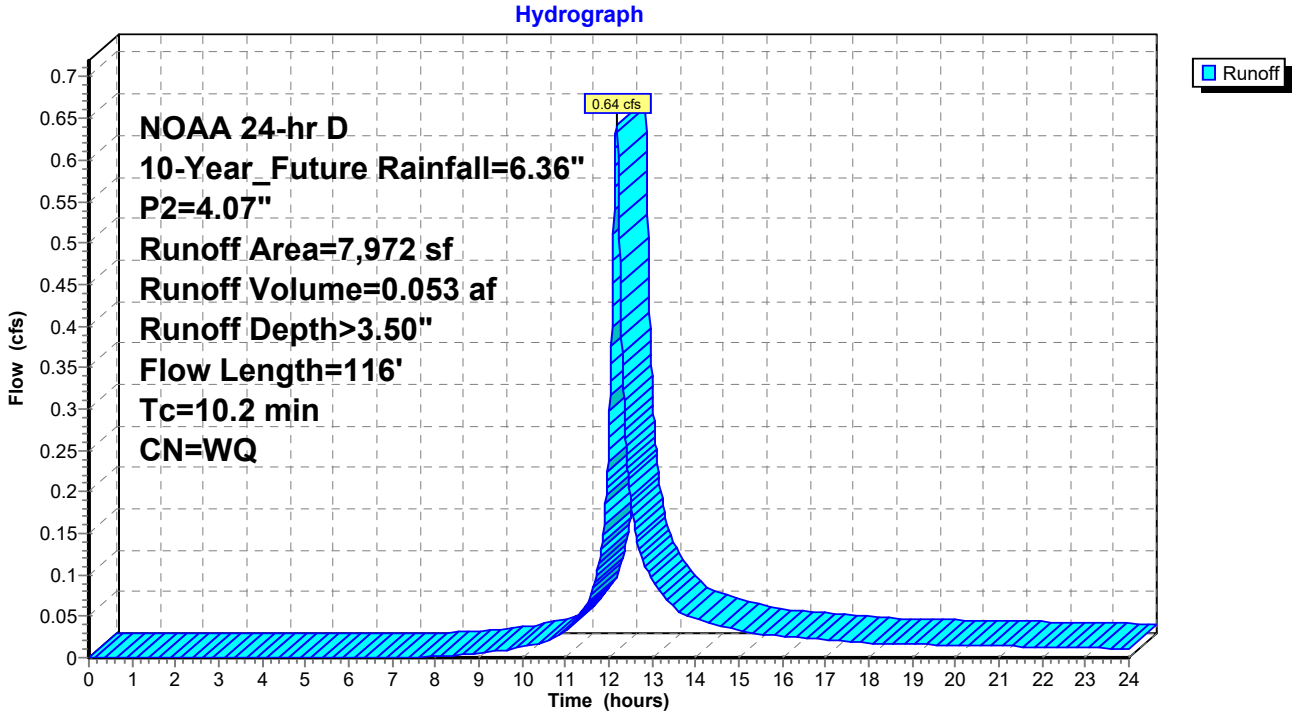
Runoff = 0.64 cfs @ 12.18 hrs, Volume= 0.053 af, Depth> 3.50"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1003	0.17		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
10.2	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.00
4.50	0.38	0.00	0.00
5.00	0.43	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.67	0.00	0.00
7.50	0.74	0.00	0.00
8.00	0.83	0.00	0.00
8.50	0.91	0.01	0.00
9.00	1.01	0.02	0.01
9.50	1.12	0.04	0.01
10.00	1.26	0.08	0.01
10.50	1.42	0.12	0.02
11.00	1.65	0.20	0.03
11.50	2.02	0.36	0.06
12.00	3.05	0.94	**0.27**
12.50	4.34	1.85	**0.19**
13.00	4.71	2.13	0.10
13.50	4.94	2.31	0.06
14.00	5.10	2.44	0.05
14.50	5.24	2.56	0.04
15.00	5.35	2.65	0.03
15.50	5.45	2.73	0.03
16.00	5.53	2.80	0.03
16.50	5.62	2.86	0.02
17.00	5.69	2.93	0.02
17.50	5.76	2.98	0.02
18.00	5.82	3.03	0.02
18.50	5.87	3.08	0.02
19.00	5.93	3.12	0.02
19.50	5.98	3.17	0.02
20.00	6.03	3.21	0.02
20.50	6.07	3.25	0.01
21.00	6.12	3.29	0.01
21.50	6.16	3.32	0.01
22.00	6.21	3.36	0.01
22.50	6.25	3.39	0.01
23.00	6.29	3.43	0.01
23.50	6.32	3.46	0.01
24.00	**6.36**	**3.49**	0.01

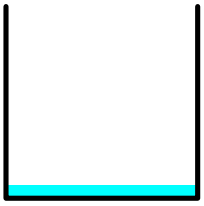
Summary for Reach 3R: TD-01

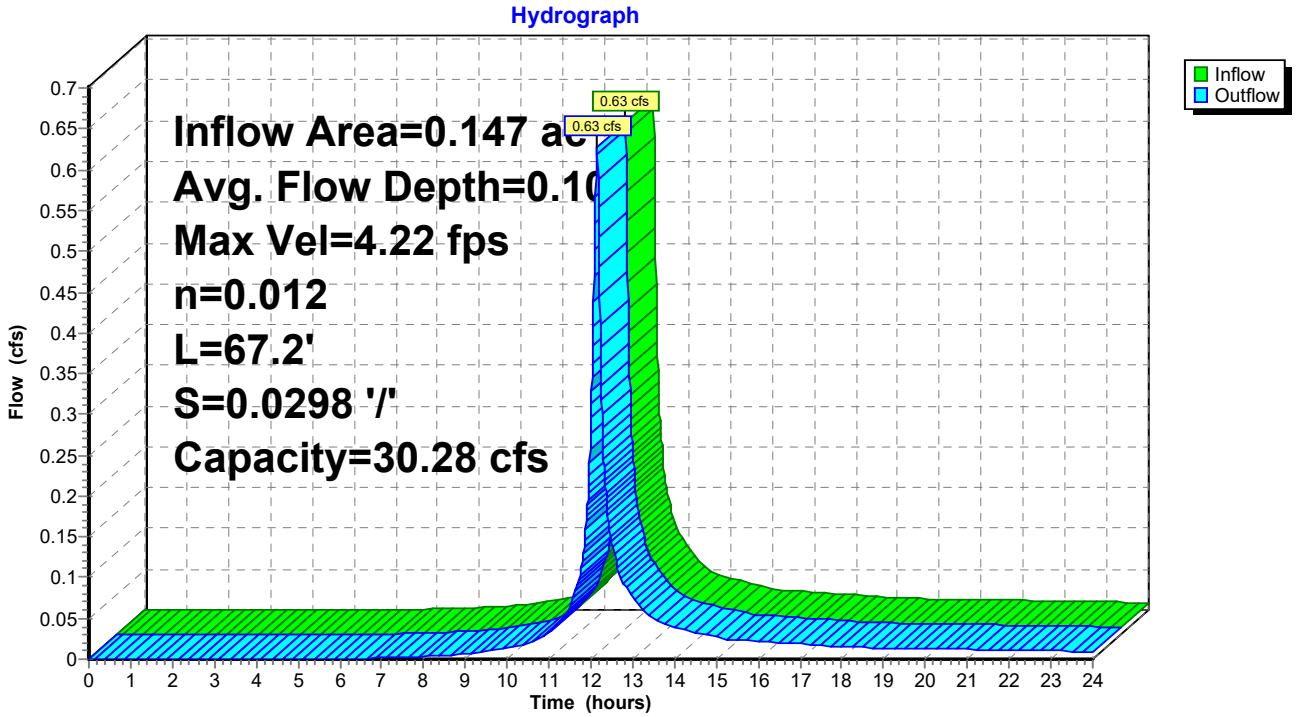
Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 3.79" for 10-Year_Future event
Inflow = 0.63 cfs @ 12.14 hrs, Volume= 0.046 af
Outflow = 0.63 cfs @ 12.14 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 4.22 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'





Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.00	0	606.00	0.00
7.50	0.00	0	606.00	0.00
8.00	0.00	0	606.00	0.00
8.50	0.00	0	606.00	0.00
9.00	0.01	0	606.00	0.01
9.50	0.01	1	606.00	0.01
10.00	0.01	1	606.01	0.01
10.50	0.02	1	606.01	0.02
11.00	0.03	2	606.02	0.03
11.50	0.06	2	606.02	0.06
12.00	**0.30**	**6**	**606.06**	**0.30**
12.50	**0.14**	**4**	**606.04**	**0.14**
13.00	0.08	3	606.03	0.08
13.50	0.05	2	606.02	0.05
14.00	0.04	2	606.02	0.04
14.50	0.03	2	606.02	0.03
15.00	0.03	1	606.01	0.03
15.50	0.02	1	606.01	0.02
16.00	0.02	1	606.01	0.02
16.50	0.02	1	606.01	0.02
17.00	0.02	1	606.01	0.02
17.50	0.02	1	606.01	0.02
18.00	0.01	1	606.01	0.01
18.50	0.01	1	606.01	0.01
19.00	0.01	1	606.01	0.01
19.50	0.01	1	606.01	0.01
20.00	0.01	1	606.01	0.01
20.50	0.01	1	606.01	0.01
21.00	0.01	1	606.01	0.01
21.50	0.01	1	606.01	0.01
22.00	0.01	1	606.01	0.01
22.50	0.01	1	606.01	0.01
23.00	0.01	1	606.01	0.01
23.50	0.01	1	606.00	0.01
24.00	0.01	0	606.00	0.01

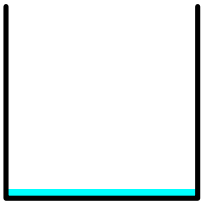
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 3.62" for 10-Year_Future event
Inflow = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af
Outflow = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 15P : SD-06, SD-07, SD-08

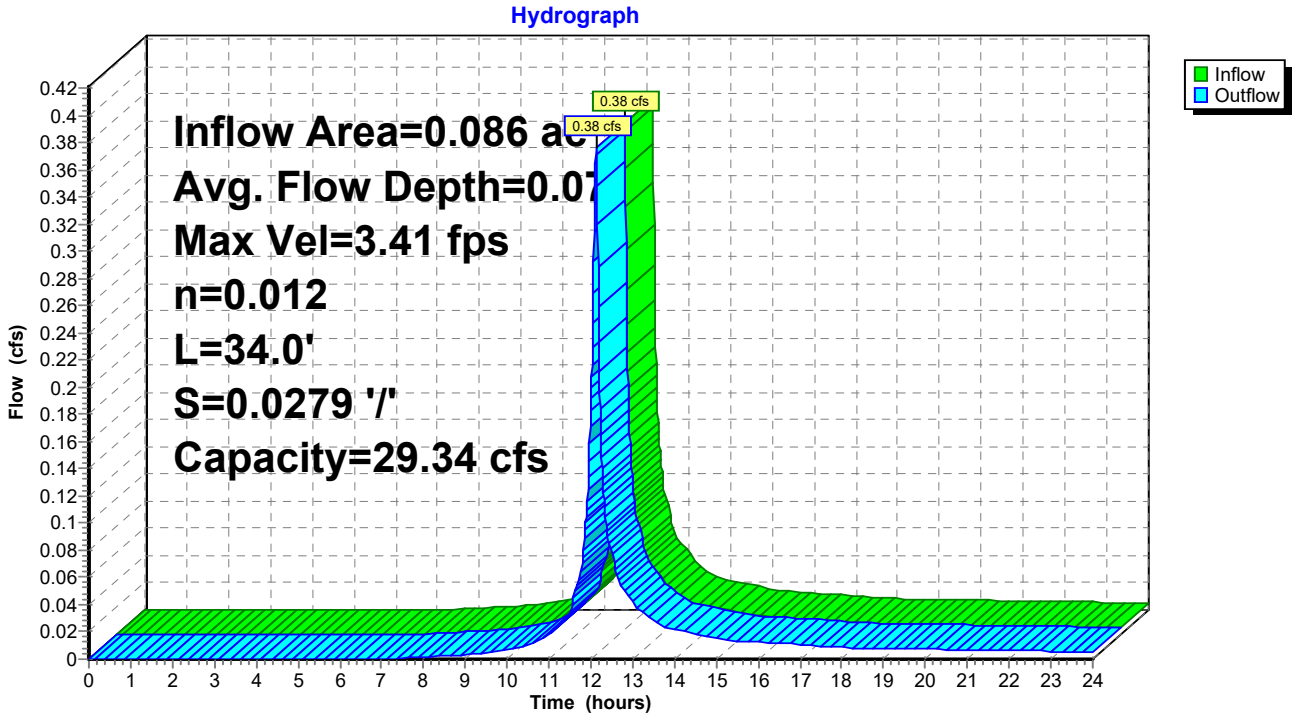
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.41 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.4 min

Peak Storage= 4 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.07' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.00	0	604.25	0.00
8.50	0.00	0	604.25	0.00
9.00	0.00	0	604.25	0.00
9.50	0.00	0	604.25	0.00
10.00	0.01	0	604.25	0.01
10.50	0.01	0	604.26	0.01
11.00	0.02	0	604.26	0.02
11.50	0.04	1	604.27	0.04
12.00	**0.19**	**2**	**604.30**	**0.19**
12.50	**0.08**	**1**	**604.28**	**0.08**
13.00	0.04	1	604.27	0.04
13.50	0.03	1	604.26	0.03
14.00	0.02	1	604.26	0.02
14.50	0.02	1	604.26	0.02
15.00	0.02	0	604.26	0.02
15.50	0.01	0	604.26	0.01
16.00	0.01	0	604.26	0.01
16.50	0.01	0	604.26	0.01
17.00	0.01	0	604.26	0.01
17.50	0.01	0	604.26	0.01
18.00	0.01	0	604.25	0.01
18.50	0.01	0	604.25	0.01
19.00	0.01	0	604.25	0.01
19.50	0.01	0	604.25	0.01
20.00	0.01	0	604.25	0.01
20.50	0.01	0	604.25	0.01
21.00	0.01	0	604.25	0.01
21.50	0.01	0	604.25	0.01
22.00	0.01	0	604.25	0.01
22.50	0.01	0	604.25	0.01
23.00	0.01	0	604.25	0.01
23.50	0.01	0	604.25	0.01
24.00	0.01	0	604.25	0.01

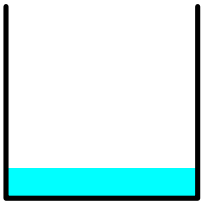
Summary for Reach 5R: TD-03

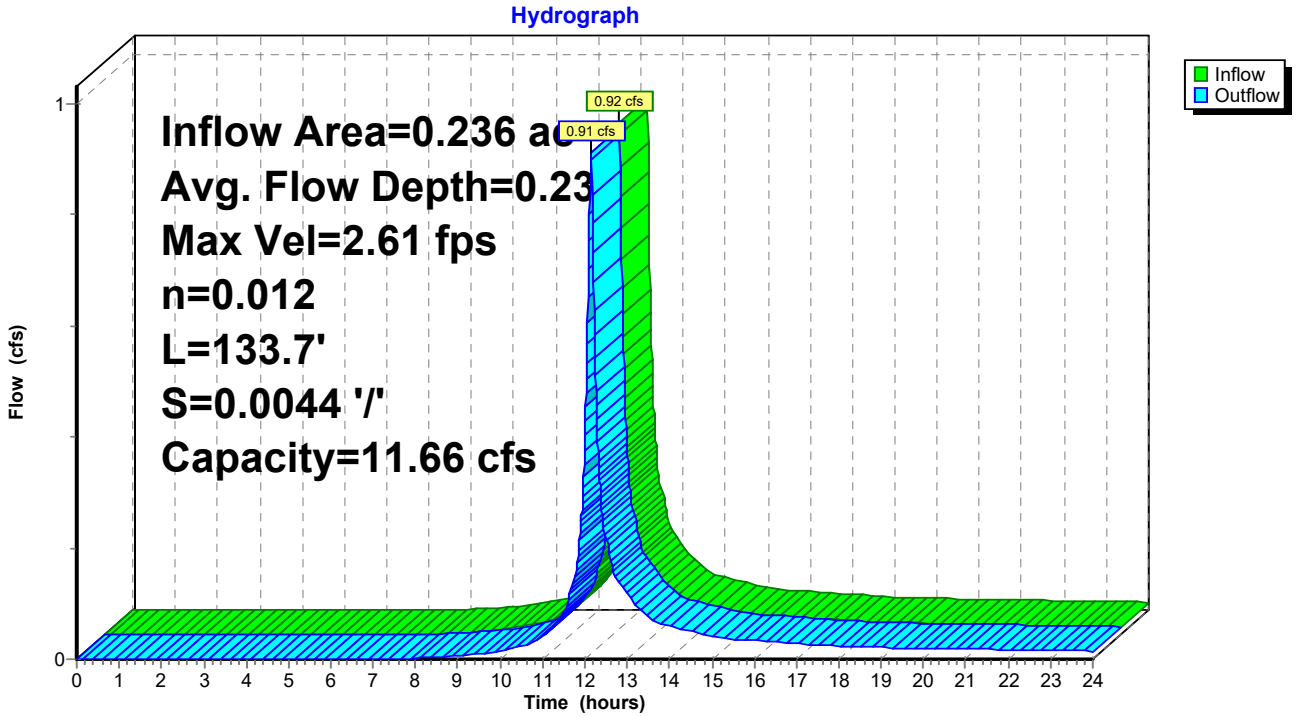
Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 3.41" for 10-Year_Future event
Inflow = 0.92 cfs @ 12.14 hrs, Volume= 0.067 af
Outflow = 0.91 cfs @ 12.15 hrs, Volume= 0.067 af, Atten= 1%, Lag= 0.5 min
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.61 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 3.0 min

Peak Storage= 47 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'





Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	0	601.81	0.00
7.00	0.00	0	601.81	0.00
7.50	0.00	0	601.81	0.00
8.00	0.00	0	601.81	0.00
8.50	0.00	1	601.81	0.00
9.00	0.01	2	601.82	0.01
9.50	0.01	3	601.82	0.01
10.00	0.02	4	601.83	0.02
10.50	0.02	4	601.83	0.02
11.00	0.04	7	601.84	0.04
11.50	0.08	10	601.86	0.08
12.00	**0.44**	**28**	**601.95**	**0.40**
12.50	**0.21**	**18**	**601.90**	**0.22**
13.00	0.12	13	601.87	0.12
13.50	0.08	10	601.86	0.08
14.00	0.06	8	601.85	0.06
14.50	0.05	7	601.85	0.05
15.00	0.04	7	601.84	0.04
15.50	0.04	6	601.84	0.04
16.00	0.03	6	601.84	0.03
16.50	0.03	6	601.84	0.03
17.00	0.03	5	601.84	0.03
17.50	0.03	5	601.83	0.03
18.00	0.02	5	601.83	0.02
18.50	0.02	4	601.83	0.02
19.00	0.02	4	601.83	0.02
19.50	0.02	4	601.83	0.02
20.00	0.02	4	601.83	0.02
20.50	0.02	4	601.83	0.02
21.00	0.02	4	601.83	0.02
21.50	0.02	4	601.83	0.02
22.00	0.02	4	601.83	0.02
22.50	0.02	4	601.83	0.02
23.00	0.02	4	601.83	0.02
23.50	0.01	3	601.83	0.01
24.00	0.01	3	601.83	0.01

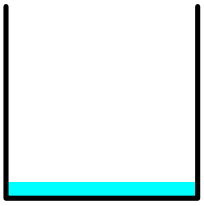
Summary for Reach 6R: TD-04

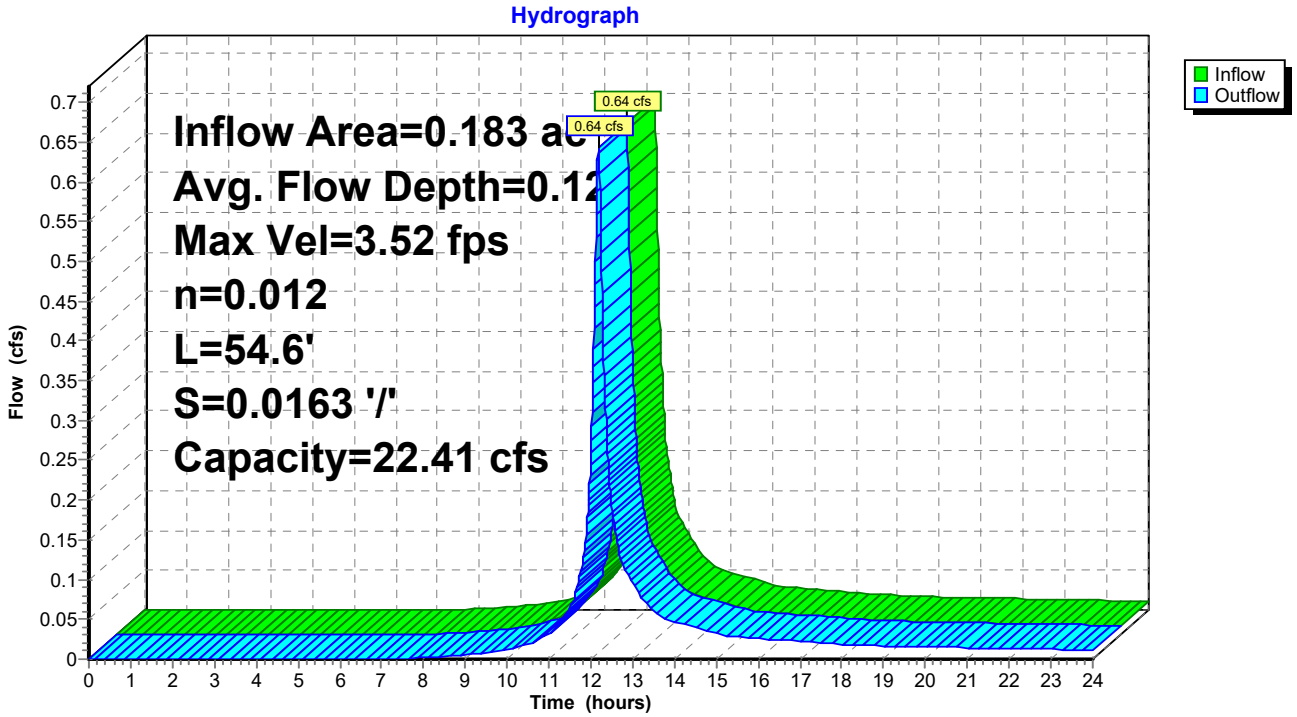
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 3.50" for 10-Year_Future event
Inflow = 0.64 cfs @ 12.18 hrs, Volume= 0.053 af
Outflow = 0.64 cfs @ 12.18 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.52 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

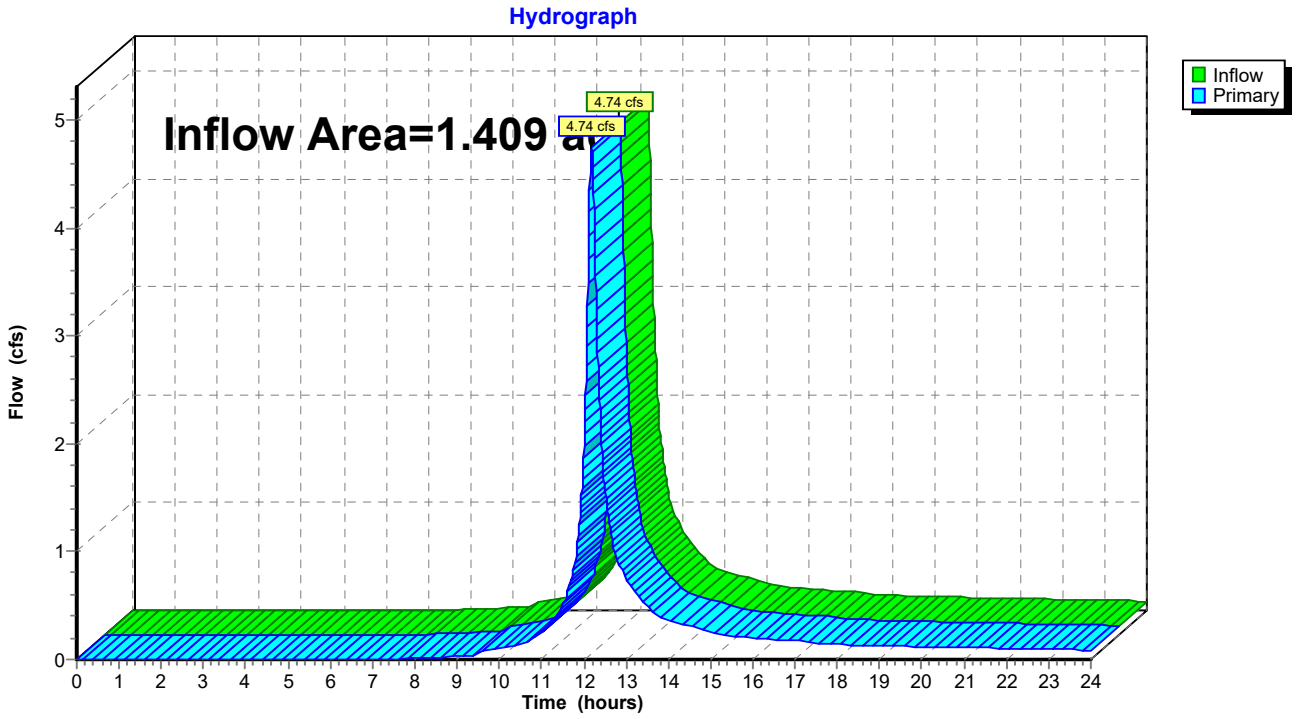
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.00	0	600.77	0.00
8.00	0.00	0	600.77	0.00
8.50	0.00	0	600.77	0.00
9.00	0.01	0	600.77	0.01
9.50	0.01	0	600.78	0.01
10.00	0.01	1	600.78	0.01
10.50	0.02	1	600.78	0.02
11.00	0.03	2	600.79	0.03
11.50	0.06	2	600.80	0.06
12.00	**0.27**	**6**	**600.84**	**0.26**
12.50	**0.19**	**5**	**600.83**	**0.19**
13.00	0.10	3	600.81	0.10
13.50	0.06	2	600.80	0.06
14.00	0.05	2	600.79	0.05
14.50	0.04	2	600.79	0.04
15.00	0.03	2	600.79	0.03
15.50	0.03	1	600.79	0.03
16.00	0.03	1	600.79	0.03
16.50	0.02	1	600.79	0.02
17.00	0.02	1	600.79	0.02
17.50	0.02	1	600.78	0.02
18.00	0.02	1	600.78	0.02
18.50	0.02	1	600.78	0.02
19.00	0.02	1	600.78	0.02
19.50	0.02	1	600.78	0.02
20.00	0.02	1	600.78	0.02
20.50	0.01	1	600.78	0.01
21.00	0.01	1	600.78	0.01
21.50	0.01	1	600.78	0.01
22.00	0.01	1	600.78	0.01
22.50	0.01	1	600.78	0.01
23.00	0.01	1	600.78	0.01
23.50	0.01	1	600.78	0.01
24.00	0.01	1	600.78	0.01

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 3.54" for 10-Year_Future event
Inflow = 4.74 cfs @ 12.18 hrs, Volume= 0.416 af
Primary = 4.74 cfs @ 12.18 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.01		0.01
8.00	0.01		0.01
8.50	0.02		0.02
9.00	0.03		0.03
9.50	0.07		0.07
10.00	0.10		0.10
10.50	0.15		0.15
11.00	0.26		0.26
11.50	0.50		0.50
12.00	**1.98**		**1.98**
12.50	**1.57**		**1.57**
13.00	0.75		0.75
13.50	0.49		0.49
14.00	0.37		0.37
14.50	0.31		0.31
15.00	0.26		0.26
15.50	0.22		0.22
16.00	0.21		0.21
16.50	0.19		0.19
17.00	0.17		0.17
17.50	0.16		0.16
18.00	0.14		0.14
18.50	0.13		0.13
19.00	0.13		0.13
19.50	0.12		0.12
20.00	0.12		0.12
20.50	0.11		0.11
21.00	0.11		0.11
21.50	0.11		0.11
22.00	0.10		0.10
22.50	0.10		0.10
23.00	0.09		0.09
23.50	0.09		0.09
24.00	0.09		0.09

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 3.49" for 10-Year_Future event
Inflow = 2.62 cfs @ 12.18 hrs, Volume= 0.233 af
Outflow = 2.62 cfs @ 12.19 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.2 min
Primary = 2.62 cfs @ 12.19 hrs, Volume= 0.233 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.71' @ 12.19 hrs Surf.Area= 86 sf Storage= 42 cf

Plug-Flow detention time= 0.6 min calculated for 0.233 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (840.4 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

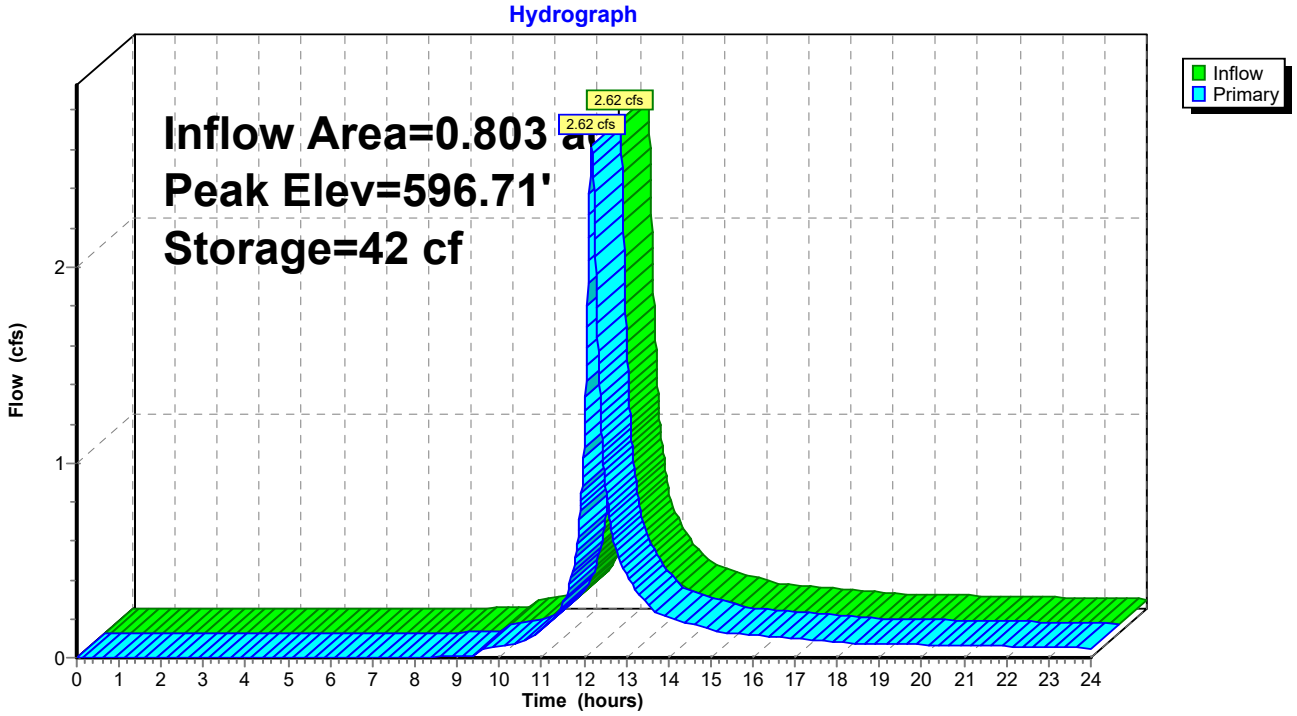
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.62 cfs @ 12.19 hrs HW=596.71' TW=594.72' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 2.62 cfs @ 2.95 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	0	595.71	0.00
4.50	0.00	0	595.71	0.00
5.00	0.00	0	595.71	0.00
5.50	0.00	0	595.71	0.00
6.00	0.00	0	595.72	0.00
6.50	0.00	1	595.78	0.00
7.00	0.00	3	595.92	0.00
7.50	0.00	4	595.98	0.00
8.00	0.00	4	595.98	0.00
8.50	0.00	4	595.99	0.00
9.00	0.01	4	595.99	0.01
9.50	0.04	4	596.04	0.04
10.00	0.06	5	596.06	0.06
10.50	0.08	5	596.08	0.08
11.00	0.14	6	596.12	0.14
11.50	0.28	8	596.19	0.28
12.00	**1.11**	**20**	**596.42**	**1.08**
12.50	**0.90**	**17**	**596.38**	**0.91**
13.00	0.43	10	596.25	0.43
13.50	0.28	8	596.19	0.28
14.00	0.21	7	596.16	0.21
14.50	0.18	7	596.14	0.18
15.00	0.15	6	596.12	0.15
15.50	0.13	6	596.11	0.13
16.00	0.12	6	596.11	0.12
16.50	0.11	6	596.10	0.11
17.00	0.10	6	596.09	0.10
17.50	0.09	5	596.09	0.09
18.00	0.08	5	596.08	0.08
18.50	0.07	5	596.08	0.07
19.00	0.07	5	596.08	0.07
19.50	0.07	5	596.07	0.07
20.00	0.07	5	596.07	0.07
20.50	0.07	5	596.07	0.07
21.00	0.06	5	596.07	0.06
21.50	0.06	5	596.07	0.06
22.00	0.06	5	596.06	0.06
22.50	0.06	5	596.06	0.06
23.00	0.05	5	596.06	0.05
23.50	0.05	5	596.06	0.05
24.00	0.05	5	596.05	0.05

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 3.50" for 10-Year_Future event
Inflow = 2.88 cfs @ 12.17 hrs, Volume= 0.259 af
Outflow = 2.88 cfs @ 12.18 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.3 min
Primary = 2.88 cfs @ 12.18 hrs, Volume= 0.259 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.72' @ 12.18 hrs Surf.Area= 108 sf Storage= 43 cf

Plug-Flow detention time= 0.3 min calculated for 0.259 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (839.6 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

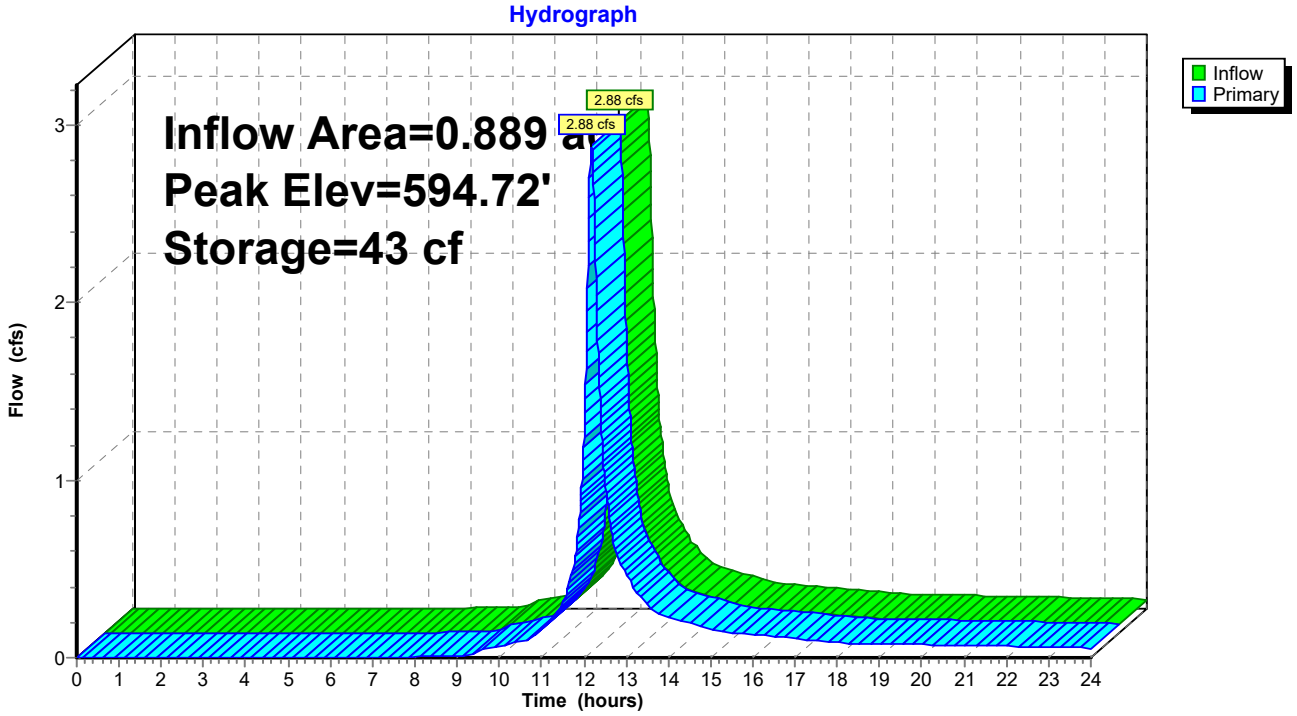
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.88 cfs @ 12.18 hrs HW=594.72' TW=593.75' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 2.88 cfs @ 3.03 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.92	0.00
4.50	0.00	0	593.92	0.00
5.00	0.00	0	593.92	0.00
5.50	0.00	0	593.92	0.00
6.00	0.00	0	593.92	0.00
6.50	0.00	0	593.94	0.00
7.00	0.00	0	593.94	0.00
7.50	0.00	0	593.95	0.00
8.00	0.00	1	593.96	0.00
8.50	0.01	1	593.97	0.01
9.00	0.01	1	593.97	0.01
9.50	0.04	1	594.02	0.04
10.00	0.06	2	594.04	0.06
10.50	0.09	2	594.06	0.09
11.00	0.16	3	594.10	0.16
11.50	0.31	5	594.17	0.31
12.00	**1.27**	**17**	**594.43**	**1.25**
12.50	**0.99**	**14**	**594.37**	**1.00**
13.00	0.47	7	594.23	0.47
13.50	0.31	5	594.17	0.31
14.00	0.23	4	594.14	0.23
14.50	0.20	4	594.12	0.20
15.00	0.16	3	594.10	0.16
15.50	0.14	3	594.09	0.14
16.00	0.13	3	594.08	0.13
16.50	0.12	3	594.08	0.12
17.00	0.11	2	594.07	0.11
17.50	0.10	2	594.07	0.10
18.00	0.09	2	594.06	0.09
18.50	0.08	2	594.05	0.08
19.00	0.08	2	594.05	0.08
19.50	0.08	2	594.05	0.08
20.00	0.07	2	594.05	0.07
20.50	0.07	2	594.05	0.07
21.00	0.07	2	594.04	0.07
21.50	0.07	2	594.04	0.07
22.00	0.06	2	594.04	0.06
22.50	0.06	2	594.04	0.06
23.00	0.06	2	594.03	0.06
23.50	0.06	2	594.03	0.06
24.00	0.05	2	594.03	0.05

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 3.48" for 10-Year_Future event
Inflow = 3.75 cfs @ 12.17 hrs, Volume= 0.326 af
Outflow = 3.75 cfs @ 12.17 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.4 min
Primary = 3.75 cfs @ 12.17 hrs, Volume= 0.326 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 593.76' @ 12.17 hrs Surf.Area= 136 sf Storage= 73 cf

Plug-Flow detention time= 0.7 min calculated for 0.326 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (839.8 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

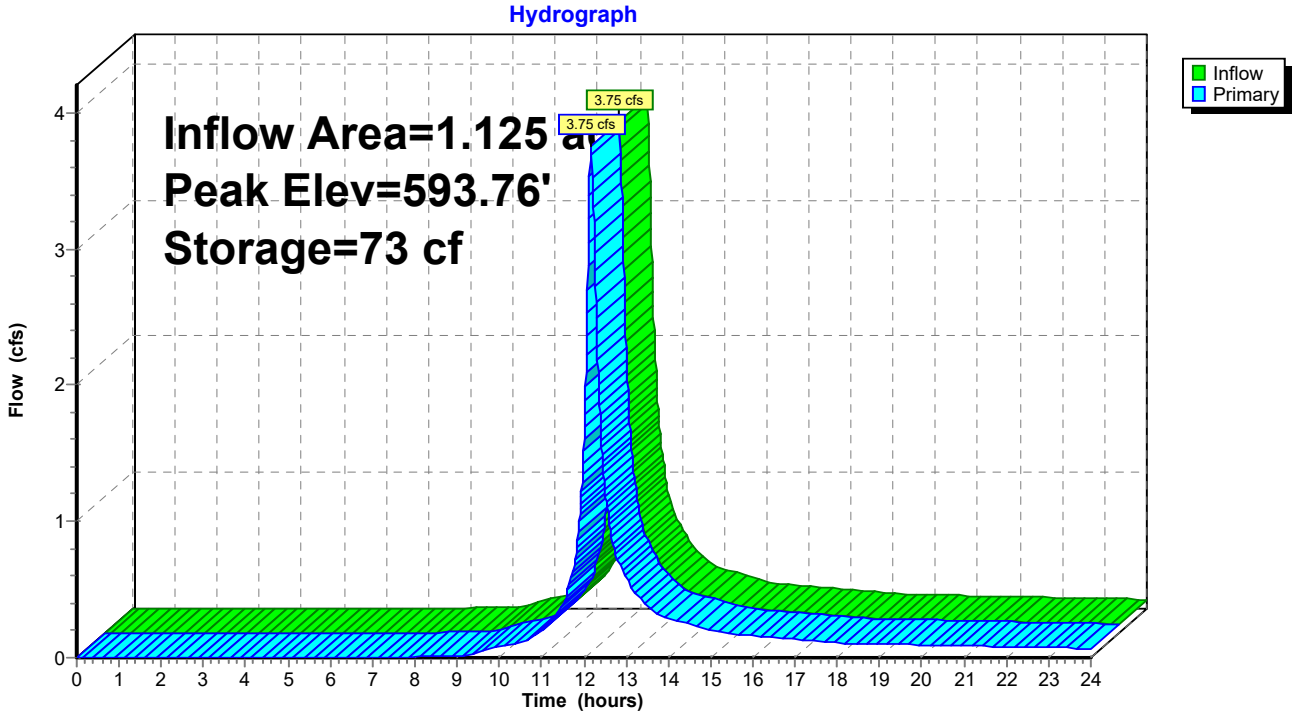
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.74 cfs @ 12.17 hrs HW=593.75' TW=592.01' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 3.74 cfs @ 3.27 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.58	0.00
4.50	0.00	0	592.58	0.00
5.00	0.00	0	592.58	0.00
5.50	0.00	0	592.58	0.00
6.00	0.00	0	592.58	0.00
6.50	0.00	0	592.60	0.00
7.00	0.00	1	592.66	0.00
7.50	0.00	4	592.85	0.00
8.00	0.01	4	592.86	0.01
8.50	0.01	4	592.87	0.01
9.00	0.02	5	592.88	0.01
9.50	0.05	6	592.92	0.05
10.00	0.08	7	592.95	0.08
10.50	0.11	8	592.97	0.11
11.00	0.20	9	593.02	0.20
11.50	0.39	13	593.10	0.39
12.00	**1.65**	**33**	**593.40**	**1.61**
12.50	**1.21**	**27**	**593.33**	**1.22**
13.00	0.59	16	593.17	0.59
13.50	0.38	13	593.10	0.38
14.00	0.29	11	593.06	0.29
14.50	0.25	10	593.05	0.25
15.00	0.20	9	593.02	0.20
15.50	0.18	9	593.01	0.18
16.00	0.16	9	593.00	0.16
16.50	0.15	8	593.00	0.15
17.00	0.14	8	592.99	0.14
17.50	0.12	8	592.98	0.12
18.00	0.11	7	592.97	0.11
18.50	0.10	7	592.97	0.10
19.00	0.10	7	592.97	0.10
19.50	0.10	7	592.96	0.10
20.00	0.09	7	592.96	0.09
20.50	0.09	7	592.96	0.09
21.00	0.09	7	592.96	0.09
21.50	0.08	7	592.96	0.08
22.00	0.08	7	592.95	0.08
22.50	0.08	7	592.95	0.08
23.00	0.07	7	592.95	0.07
23.50	0.07	7	592.94	0.07
24.00	0.07	6	592.94	0.07

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 3.48" for 10-Year_Future event
Inflow = 4.39 cfs @ 12.17 hrs, Volume= 0.379 af
Outflow = 4.38 cfs @ 12.18 hrs, Volume= 0.379 af, Atten= 0%, Lag= 0.3 min
Primary = 4.38 cfs @ 12.18 hrs, Volume= 0.379 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 592.02' @ 12.18 hrs Surf.Area= 141 sf Storage= 80 cf

Plug-Flow detention time= 0.8 min calculated for 0.379 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (839.8 - 839.4)

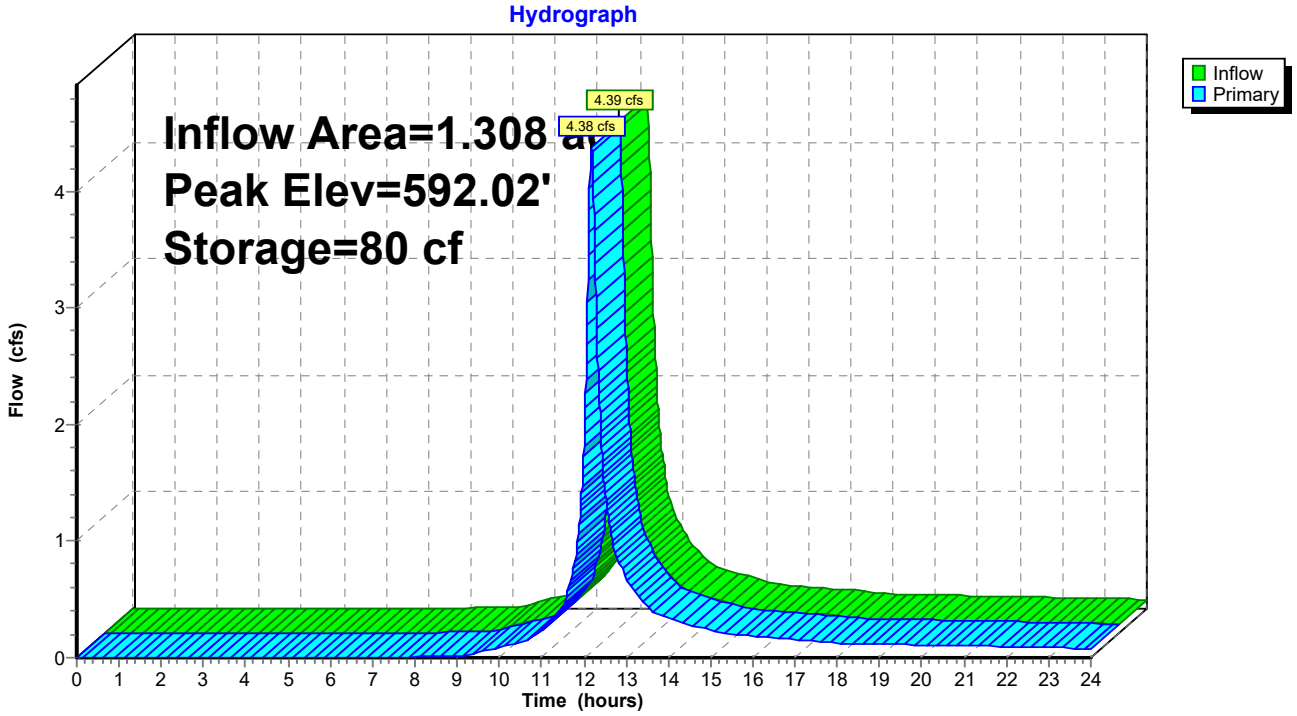
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.38 cfs @ 12.18 hrs HW=592.02' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 4.38 cfs @ 3.43 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.26	0.00
4.00	0.00	0	590.26	0.00
4.50	0.00	0	590.26	0.00
5.00	0.00	0	590.26	0.00
5.50	0.00	0	590.27	0.00
6.00	0.00	0	590.28	0.00
6.50	0.00	1	590.31	0.00
7.00	0.00	1	590.37	0.00
7.50	0.00	3	590.49	0.00
8.00	0.01	10	591.04	0.01
8.50	0.01	10	591.05	0.01
9.00	0.02	10	591.06	0.02
9.50	0.06	11	591.10	0.05
10.00	0.09	12	591.13	0.09
10.50	0.13	12	591.16	0.13
11.00	0.23	14	591.21	0.23
11.50	0.46	16	591.29	0.45
12.00	**1.87**	**35**	**591.62**	**1.82**
12.50	**1.42**	**29**	**591.54**	**1.43**
13.00	0.69	19	591.37	0.69
13.50	0.45	16	591.29	0.45
14.00	0.34	15	591.25	0.34
14.50	0.29	14	591.23	0.29
15.00	0.23	14	591.21	0.24
15.50	0.20	13	591.20	0.20
16.00	0.19	13	591.19	0.19
16.50	0.17	13	591.18	0.17
17.00	0.16	13	591.17	0.16
17.50	0.14	12	591.16	0.14
18.00	0.13	12	591.16	0.13
18.50	0.12	12	591.15	0.12
19.00	0.12	12	591.15	0.12
19.50	0.11	12	591.14	0.11
20.00	0.11	12	591.14	0.11
20.50	0.11	12	591.14	0.11
21.00	0.10	12	591.14	0.10
21.50	0.10	12	591.14	0.10
22.00	0.09	12	591.13	0.09
22.50	0.09	12	591.13	0.09
23.00	0.09	12	591.13	0.09
23.50	0.08	12	591.12	0.08
24.00	0.08	12	591.12	0.08

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 3.45" for 10-Year_Future event
Inflow = 2.11 cfs @ 12.20 hrs, Volume= 0.189 af
Outflow = 2.11 cfs @ 12.20 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.1 min
Primary = 2.11 cfs @ 12.20 hrs, Volume= 0.187 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.86' @ 12.20 hrs Surf.Area= 17 sf Storage= 97 cf

Plug-Flow detention time= 9.5 min calculated for 0.187 af (99% of inflow)
Center-of-Mass det. time= 3.4 min (843.3 - 839.8)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

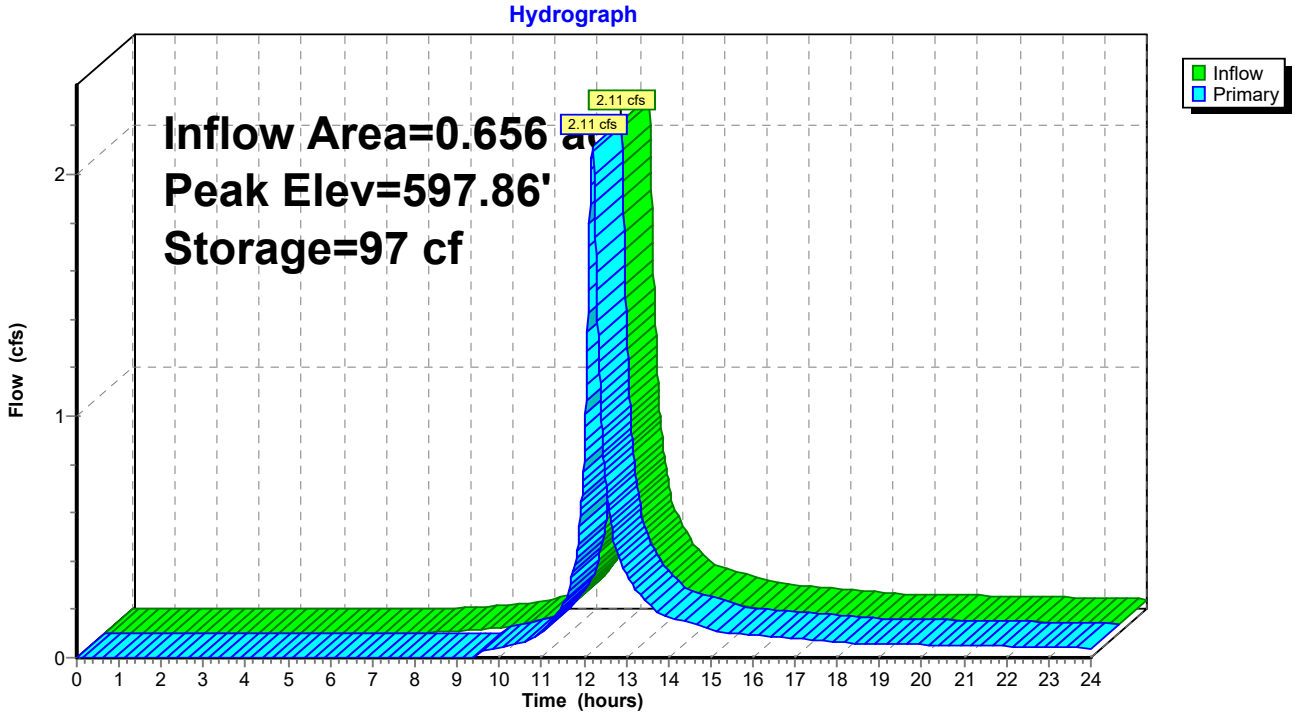
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.11 cfs @ 12.20 hrs HW=597.86' TW=596.71' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 2.11 cfs @ 3.08 fps)

Pond 23P: SD-01, SD-02



Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.82	0.00
3.50	0.00	0	591.82	0.00
4.00	0.00	0	591.82	0.00
4.50	0.00	0	591.82	0.00
5.00	0.00	0	591.83	0.00
5.50	0.00	0	591.84	0.00
6.00	0.00	1	591.87	0.00
6.50	0.00	2	591.93	0.00
7.00	0.00	3	592.03	0.00
7.50	0.00	6	592.18	0.00
8.00	0.01	11	592.51	0.00
8.50	0.01	25	593.39	0.00
9.00	0.02	50	594.93	0.00
9.50	0.03	85	597.12	0.03
10.00	0.04	85	597.14	0.04
10.50	0.06	85	597.16	0.06
11.00	0.11	86	597.20	0.11
11.50	0.22	87	597.27	0.22
12.00	**0.82**	**91**	**597.50**	**0.81**
12.50	**0.75**	**91**	**597.48**	**0.76**
13.00	0.35	88	597.33	0.35
13.50	0.23	87	597.27	0.23
14.00	0.17	87	597.24	0.17
14.50	0.14	86	597.22	0.14
15.00	0.12	86	597.21	0.12
15.50	0.10	86	597.19	0.10
16.00	0.09	86	597.19	0.09
16.50	0.09	86	597.18	0.09
17.00	0.08	86	597.18	0.08
17.50	0.07	86	597.17	0.07
18.00	0.06	85	597.16	0.06
18.50	0.06	85	597.16	0.06
19.00	0.06	85	597.16	0.06
19.50	0.06	85	597.15	0.06
20.00	0.05	85	597.15	0.05
20.50	0.05	85	597.15	0.05
21.00	0.05	85	597.15	0.05
21.50	0.05	85	597.15	0.05
22.00	0.05	85	597.14	0.05
22.50	0.05	85	597.14	0.05
23.00	0.04	85	597.14	0.04
23.50	0.04	85	597.14	0.04
24.00	0.04	85	597.13	0.04

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>5.98"
Flow Length=298' Tc=13.3 min CN=WQ Runoff=3.52 cfs 0.327 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>6.40"
Flow Length=85' Slope=0.1773 '/' Tc=7.6 min CN=WQ Runoff=1.01 cfs 0.078 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>6.19"
Flow Length=66' Slope=0.2264 '/' Tc=5.6 min CN=WQ Runoff=0.62 cfs 0.044 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>5.94"
Flow Length=82' Slope=0.1736 '/' Tc=7.4 min CN=WQ Runoff=1.54 cfs 0.117 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>7.06"
Flow Length=239' Tc=14.3 min CN=WQ Runoff=0.59 cfs 0.059 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>6.04"
Flow Length=116' Tc=11.1 min CN=WQ Runoff=1.06 cfs 0.092 af

Reach 3R: TD-01 Avg. Flow Depth=0.13' Max Vel=5.02 fps Inflow=1.01 cfs 0.078 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=1.01 cfs 0.078 af

Reach 4R: TD-02 Avg. Flow Depth=0.10' Max Vel=4.12 fps Inflow=0.62 cfs 0.044 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.62 cfs 0.044 af

Reach 5R: TD-03 Avg. Flow Depth=0.33' Max Vel=3.09 fps Inflow=1.54 cfs 0.117 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=1.53 cfs 0.117 af

Reach 6R: TD-04 Avg. Flow Depth=0.17' Max Vel=4.21 fps Inflow=1.06 cfs 0.092 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=1.06 cfs 0.092 af

Pond 7P: O-1A Inflow=7.72 cfs 0.716 af
Primary=7.72 cfs 0.716 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.96' Storage=67 cf Inflow=4.29 cfs 0.404 af
Outflow=4.29 cfs 0.403 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.99' Storage=77 cf Inflow=4.69 cfs 0.448 af
Outflow=4.69 cfs 0.448 af

Pond 16P: SD-09, SD-10 Peak Elev=594.10' Storage=123 cf Inflow=6.14 cfs 0.565 af
Outflow=6.13 cfs 0.564 af

Pond 20P: SD-11, SD-12 Peak Elev=592.45' Storage=151 cf Inflow=7.18 cfs 0.656 af
Outflow=7.15 cfs 0.656 af

Pond 23P: SD-01, SD-02 Peak Elev=598.40' Storage=122 cf Inflow=3.52 cfs 0.327 af
Outflow=3.51 cfs 0.325 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.718 af Average Runoff Depth = 6.12"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

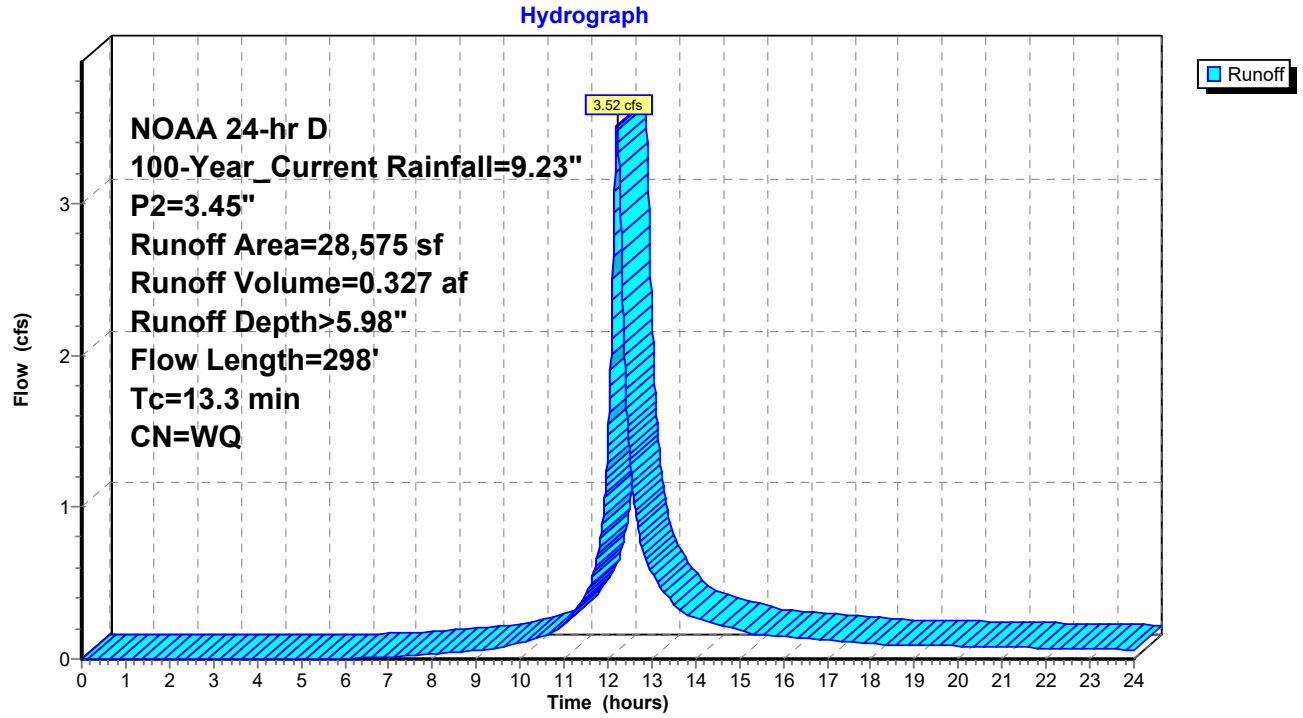
Runoff = 3.52 cfs @ 12.21 hrs, Volume= 0.327 af, Depth> 5.98"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
13.3	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.35	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.48	0.00	0.00
4.50	0.56	0.00	0.00
5.00	0.63	0.00	0.00
5.50	0.71	0.00	0.00
6.00	0.79	0.00	0.00
6.50	0.88	0.01	0.01
7.00	0.97	0.02	0.01
7.50	1.08	0.04	0.02
8.00	1.20	0.06	0.03
8.50	1.33	0.09	0.04
9.00	1.46	0.14	0.06
9.50	1.63	0.19	0.08
10.00	1.83	0.27	0.11
10.50	2.07	0.38	0.14
11.00	2.40	0.55	0.23
11.50	2.93	0.86	0.42
12.00	4.42	1.91	**1.41**
12.50	6.30	3.44	**1.31**
13.00	6.83	3.89	0.58
13.50	7.16	4.18	0.37
14.00	7.40	4.39	0.27
14.50	7.60	4.57	0.23
15.00	7.77	4.72	0.19
15.50	7.90	4.84	0.16
16.00	8.03	4.95	0.15
16.50	8.15	5.06	0.14
17.00	8.26	5.16	0.13
17.50	8.35	5.24	0.11
18.00	8.44	5.32	0.10
18.50	8.52	5.39	0.09
19.00	8.60	5.46	0.09
19.50	8.67	5.53	0.09
20.00	8.75	5.60	0.09
20.50	8.82	5.66	0.08
21.00	8.88	5.72	0.08
21.50	8.95	5.78	0.08
22.00	9.01	5.84	0.07
22.50	9.07	5.89	0.07
23.00	9.12	5.94	0.07
23.50	9.18	5.99	0.06
24.00	**9.23**	**6.04**	0.06

Summary for Subcatchment 6S: PO-DA D

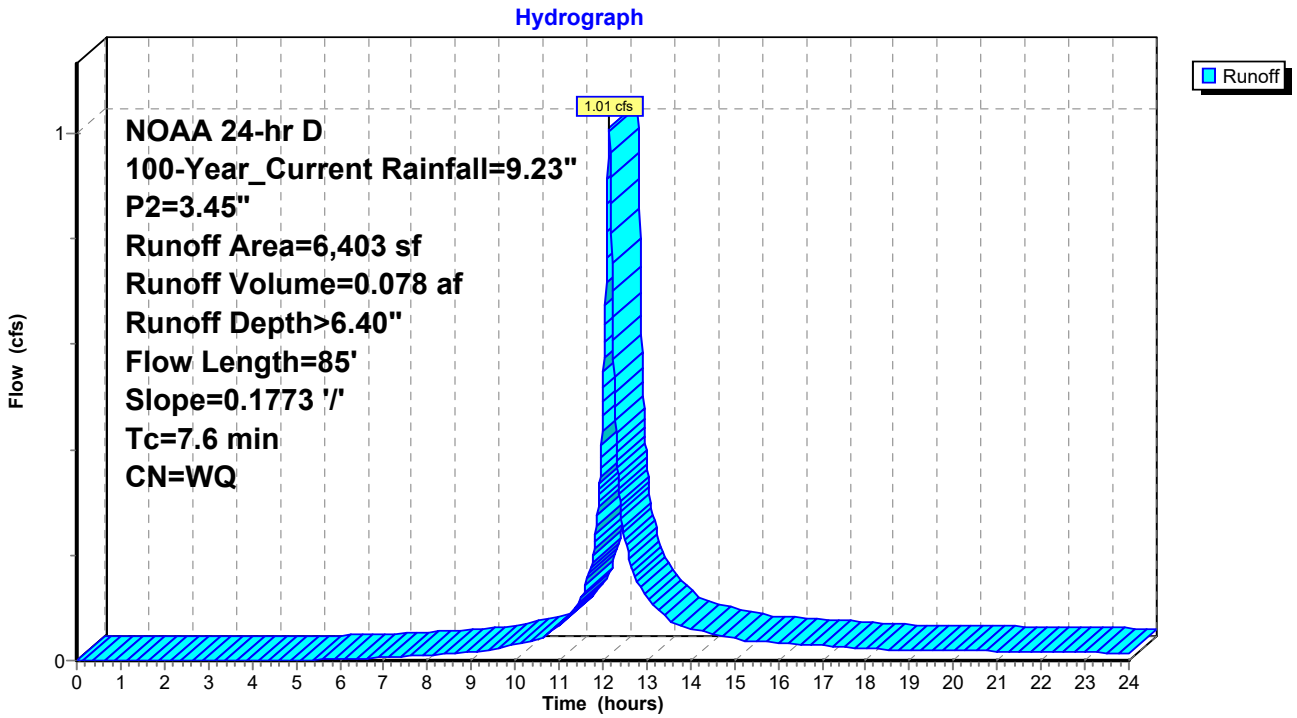
Runoff = 1.01 cfs @ 12.15 hrs, Volume= 0.078 af, Depth> 6.40"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	85	0.1773	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.35	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.48	0.00	0.00
4.50	0.56	0.00	0.00
5.00	0.63	0.00	0.00
5.50	0.71	0.00	0.00
6.00	0.79	0.01	0.00
6.50	0.88	0.02	0.00
7.00	0.97	0.04	0.01
7.50	1.08	0.07	0.01
8.00	1.20	0.10	0.01
8.50	1.33	0.14	0.01
9.00	1.46	0.20	0.02
9.50	1.63	0.26	0.02
10.00	1.83	0.36	0.03
10.50	2.07	0.48	0.04
11.00	2.40	0.68	0.07
11.50	2.93	1.02	0.12
12.00	4.42	2.15	**0.49**
12.50	6.30	3.75	**0.23**
13.00	6.83	4.21	0.12
13.50	7.16	4.51	0.08
14.00	7.40	4.73	0.06
14.50	7.60	4.91	0.05
15.00	7.77	5.06	0.04
15.50	7.90	5.19	0.04
16.00	8.03	5.30	0.03
16.50	8.15	5.41	0.03
17.00	8.26	5.51	0.03
17.50	8.35	5.60	0.03
18.00	8.44	5.68	0.02
18.50	8.52	5.76	0.02
19.00	8.60	5.83	0.02
19.50	8.67	5.90	0.02
20.00	8.75	5.96	0.02
20.50	8.82	6.03	0.02
21.00	8.88	6.09	0.02
21.50	8.95	6.15	0.02
22.00	9.01	6.21	0.02
22.50	9.07	6.26	0.02
23.00	9.12	6.31	0.02
23.50	9.18	6.37	0.01
24.00	**9.23**	**6.41**	0.01

Summary for Subcatchment 8S: PO-DA F

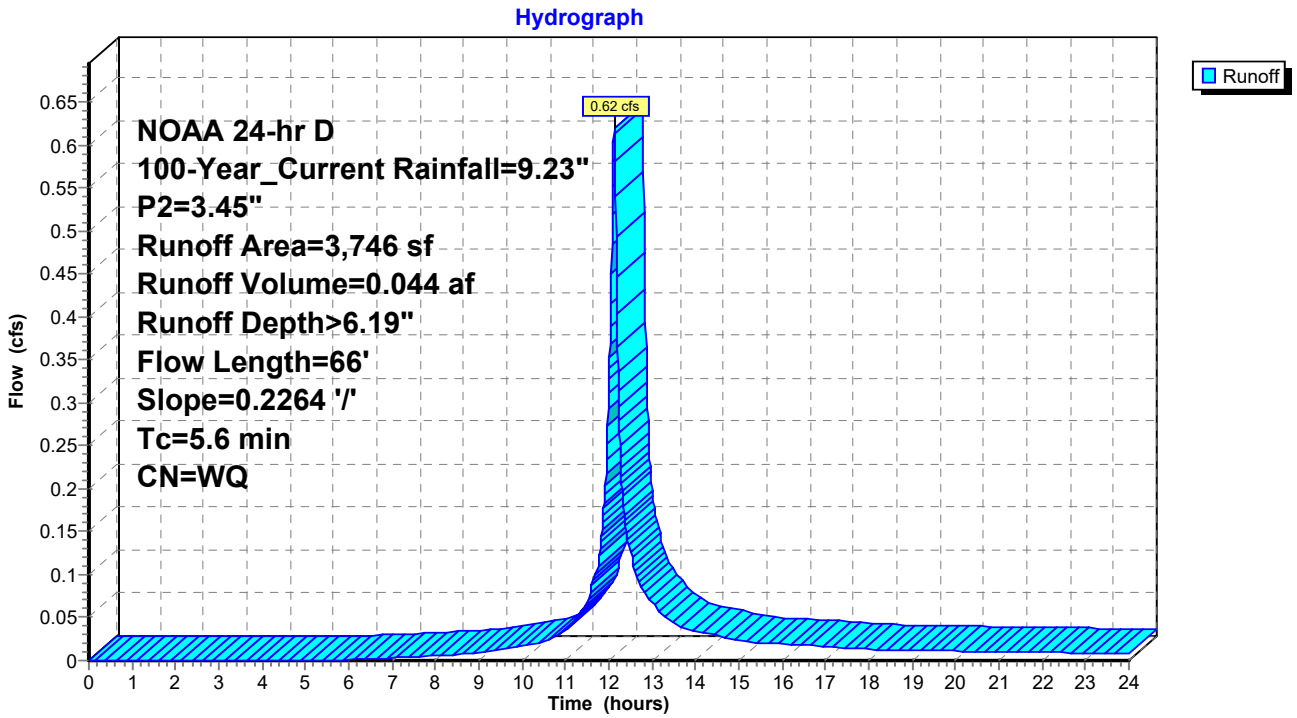
Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.044 af, Depth> 6.19"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	66	0.2264	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.35	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.48	0.00	0.00
4.50	0.56	0.00	0.00
5.00	0.63	0.00	0.00
5.50	0.71	0.00	0.00
6.00	0.79	0.00	0.00
6.50	0.88	0.01	0.00
7.00	0.97	0.03	0.00
7.50	1.08	0.05	0.00
8.00	1.20	0.07	0.01
8.50	1.33	0.11	0.01
9.00	1.46	0.15	0.01
9.50	1.63	0.22	0.01
10.00	1.83	0.30	0.02
10.50	2.07	0.41	0.02
11.00	2.40	0.59	0.04
11.50	2.93	0.91	0.07
12.00	4.42	1.99	**0.33**
12.50	6.30	3.54	**0.13**
13.00	6.83	4.00	0.07
13.50	7.16	4.29	0.04
14.00	7.40	4.50	0.03
14.50	7.60	4.68	0.03
15.00	7.77	4.83	0.02
15.50	7.90	4.96	0.02
16.00	8.03	5.07	0.02
16.50	8.15	5.18	0.02
17.00	8.26	5.27	0.02
17.50	8.35	5.36	0.01
18.00	8.44	5.44	0.01
18.50	8.52	5.51	0.01
19.00	8.60	5.59	0.01
19.50	8.67	5.65	0.01
20.00	8.75	5.72	0.01
20.50	8.82	5.78	0.01
21.00	8.88	5.84	0.01
21.50	8.95	5.90	0.01
22.00	9.01	5.96	0.01
22.50	9.07	6.01	0.01
23.00	9.12	6.07	0.01
23.50	9.18	6.12	0.01
24.00	**9.23**	**6.16**	0.01

Summary for Subcatchment 10S: PO-DA H

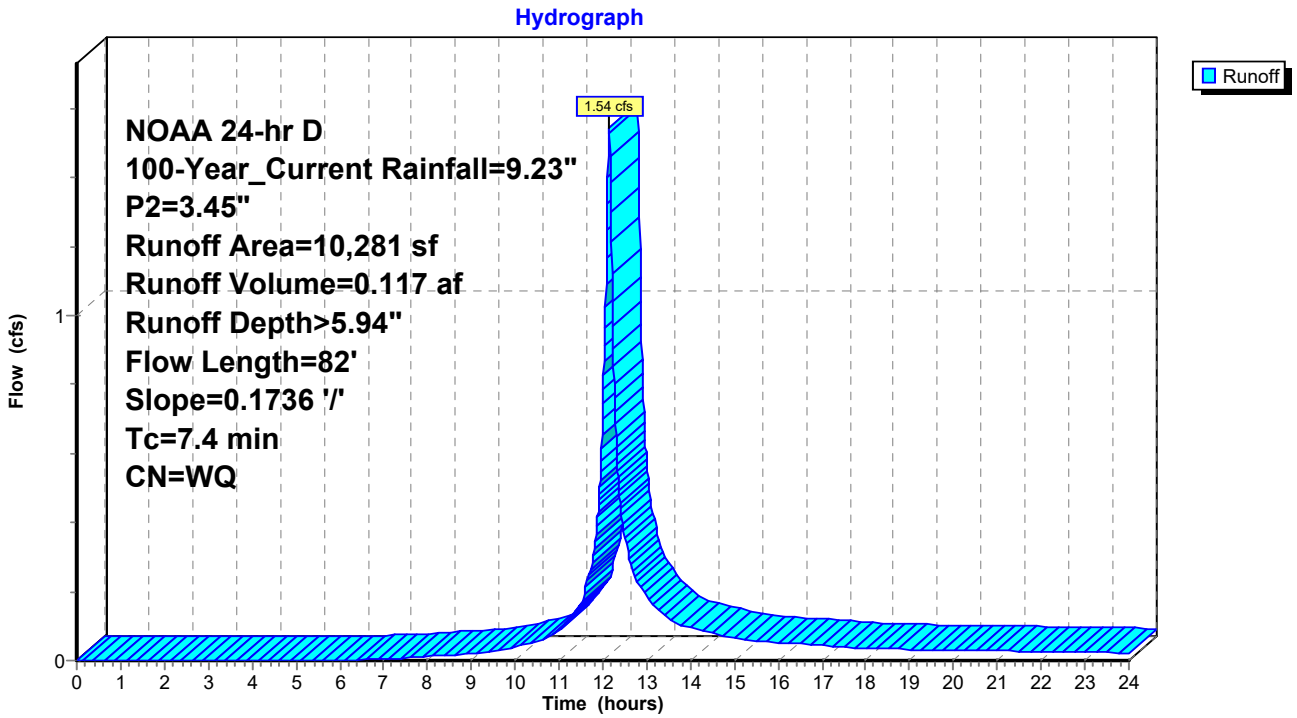
Runoff = 1.54 cfs @ 12.15 hrs, Volume= 0.117 af, Depth> 5.94"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	82	0.1736	0.18		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.35	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.48	0.00	0.00
4.50	0.56	0.00	0.00
5.00	0.63	0.00	0.00
5.50	0.71	0.00	0.00
6.00	0.79	0.00	0.00
6.50	0.88	0.00	0.00
7.00	0.97	0.01	0.01
7.50	1.08	0.03	0.01
8.00	1.20	0.05	0.01
8.50	1.33	0.08	0.02
9.00	1.46	0.12	0.02
9.50	1.63	0.17	0.03
10.00	1.83	0.25	0.04
10.50	2.07	0.35	0.05
11.00	2.40	0.51	0.09
11.50	2.93	0.81	0.17
12.00	4.42	1.84	**0.74**
12.50	6.30	3.34	**0.35**
13.00	6.83	3.79	0.19
13.50	7.16	4.08	0.12
14.00	7.40	4.28	0.09
14.50	7.60	4.46	0.08
15.00	7.77	4.60	0.06
15.50	7.90	4.73	0.06
16.00	8.03	4.84	0.05
16.50	8.15	4.94	0.05
17.00	8.26	5.04	0.04
17.50	8.35	5.13	0.04
18.00	8.44	5.20	0.04
18.50	8.52	5.27	0.03
19.00	8.60	5.34	0.03
19.50	8.67	5.41	0.03
20.00	8.75	5.48	0.03
20.50	8.82	5.54	0.03
21.00	8.88	5.60	0.03
21.50	8.95	5.66	0.03
22.00	9.01	5.71	0.03
22.50	9.07	5.77	0.03
23.00	9.12	5.82	0.02
23.50	9.18	5.87	0.02
24.00	**9.23**	**5.91**	0.02

Summary for Subcatchment 13S: PO-DA K

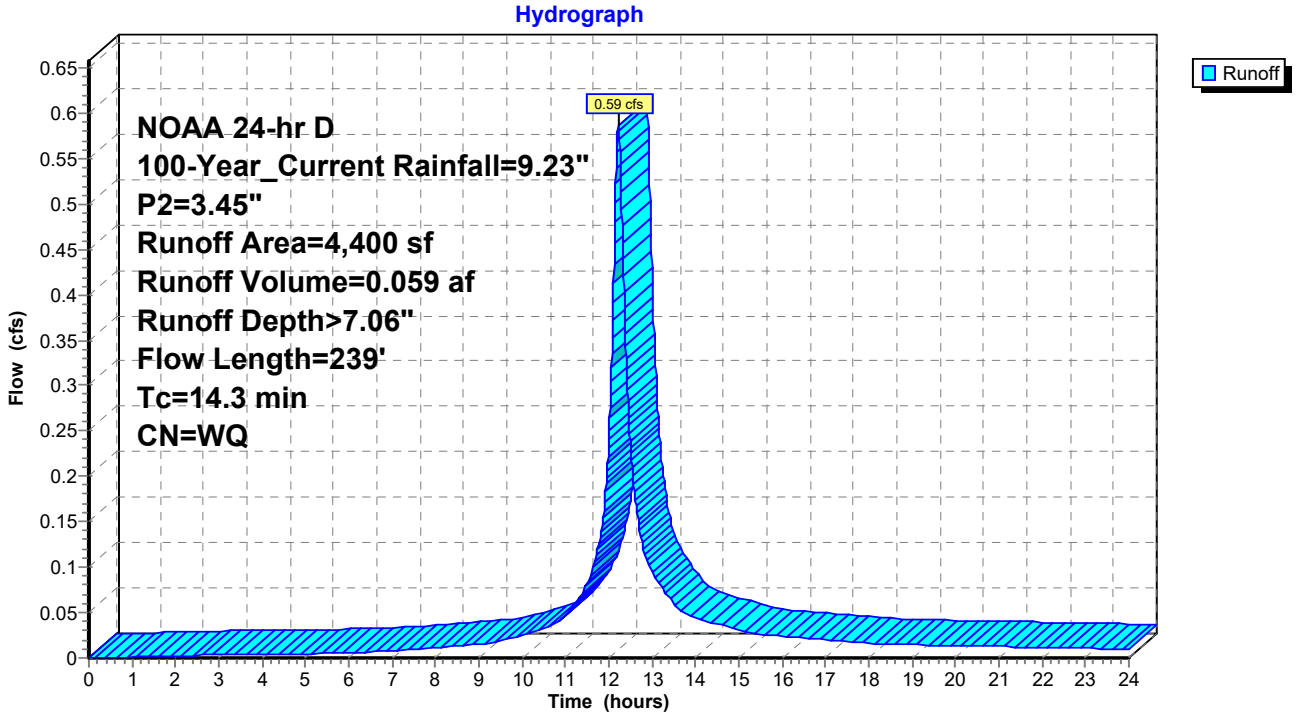
Runoff = 0.59 cfs @ 12.22 hrs, Volume= 0.059 af, Depth> 7.06"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0772	0.14		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
14.3	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.35	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.48	0.00	0.00
4.50	0.56	0.01	0.00
5.00	0.63	0.02	0.00
5.50	0.71	0.03	0.01
6.00	0.79	0.05	0.01
6.50	0.88	0.07	0.01
7.00	0.97	0.10	0.01
7.50	1.08	0.14	0.01
8.00	1.20	0.19	0.01
8.50	1.33	0.26	0.01
9.00	1.46	0.33	0.02
9.50	1.63	0.42	0.02
10.00	1.83	0.54	0.03
10.50	2.07	0.69	0.03
11.00	2.40	0.92	0.05
11.50	2.93	1.32	0.08
12.00	4.42	2.57	**0.24**
12.50	6.30	4.27	**0.23**
13.00	6.83	4.76	0.10
13.50	7.16	5.07	0.06
14.00	7.40	5.29	0.04
14.50	7.60	5.48	0.04
15.00	7.77	5.64	0.03
15.50	7.90	5.77	0.03
16.00	8.03	5.89	0.02
16.50	8.15	6.00	0.02
17.00	8.26	6.10	0.02
17.50	8.35	6.20	0.02
18.00	8.44	6.28	0.02
18.50	8.52	6.36	0.02
19.00	8.60	6.43	0.01
19.50	8.67	6.50	0.01
20.00	8.75	6.57	0.01
20.50	8.82	6.64	0.01
21.00	8.88	6.70	0.01
21.50	8.95	6.76	0.01
22.00	9.01	6.82	0.01
22.50	9.07	6.88	0.01
23.00	9.12	6.93	0.01
23.50	9.18	6.98	0.01
24.00	**9.23**	**7.03**	0.01

Summary for Subcatchment 14S: PO-DA L

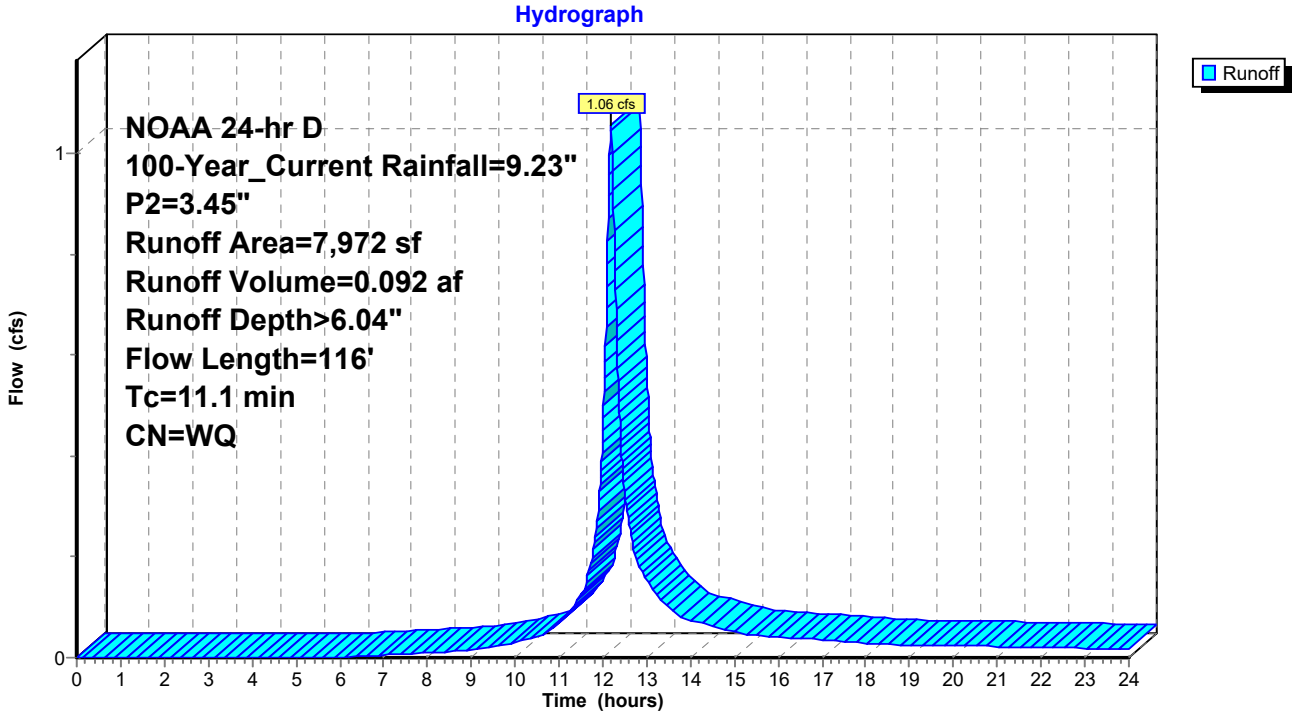
Runoff = 1.06 cfs @ 12.19 hrs, Volume= 0.092 af, Depth> 6.04"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.1003	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.45"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.1	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.35	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.48	0.00	0.00
4.50	0.56	0.00	0.00
5.00	0.63	0.00	0.00
5.50	0.71	0.00	0.00
6.00	0.79	0.00	0.00
6.50	0.88	0.01	0.00
7.00	0.97	0.02	0.00
7.50	1.08	0.04	0.01
8.00	1.20	0.06	0.01
8.50	1.33	0.09	0.01
9.00	1.46	0.14	0.02
9.50	1.63	0.19	0.02
10.00	1.83	0.27	0.03
10.50	2.07	0.38	0.04
11.00	2.40	0.55	0.07
11.50	2.93	0.86	0.12
12.00	4.42	1.91	**0.45**
12.50	6.30	3.44	**0.32**
13.00	6.83	3.89	0.16
13.50	7.16	4.18	0.10
14.00	7.40	4.39	0.08
14.50	7.60	4.57	0.06
15.00	7.77	4.72	0.05
15.50	7.90	4.84	0.05
16.00	8.03	4.95	0.04
16.50	8.15	5.06	0.04
17.00	8.26	5.16	0.04
17.50	8.35	5.24	0.03
18.00	8.44	5.32	0.03
18.50	8.52	5.39	0.03
19.00	8.60	5.46	0.03
19.50	8.67	5.53	0.02
20.00	8.75	5.60	0.02
20.50	8.82	5.66	0.02
21.00	8.88	5.72	0.02
21.50	8.95	5.78	0.02
22.00	9.01	5.84	0.02
22.50	9.07	5.89	0.02
23.00	9.12	5.94	0.02
23.50	9.18	5.99	0.02
24.00	**9.23**	**6.04**	0.02

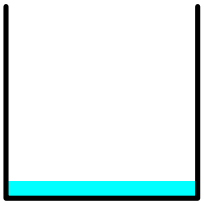
Summary for Reach 3R: TD-01

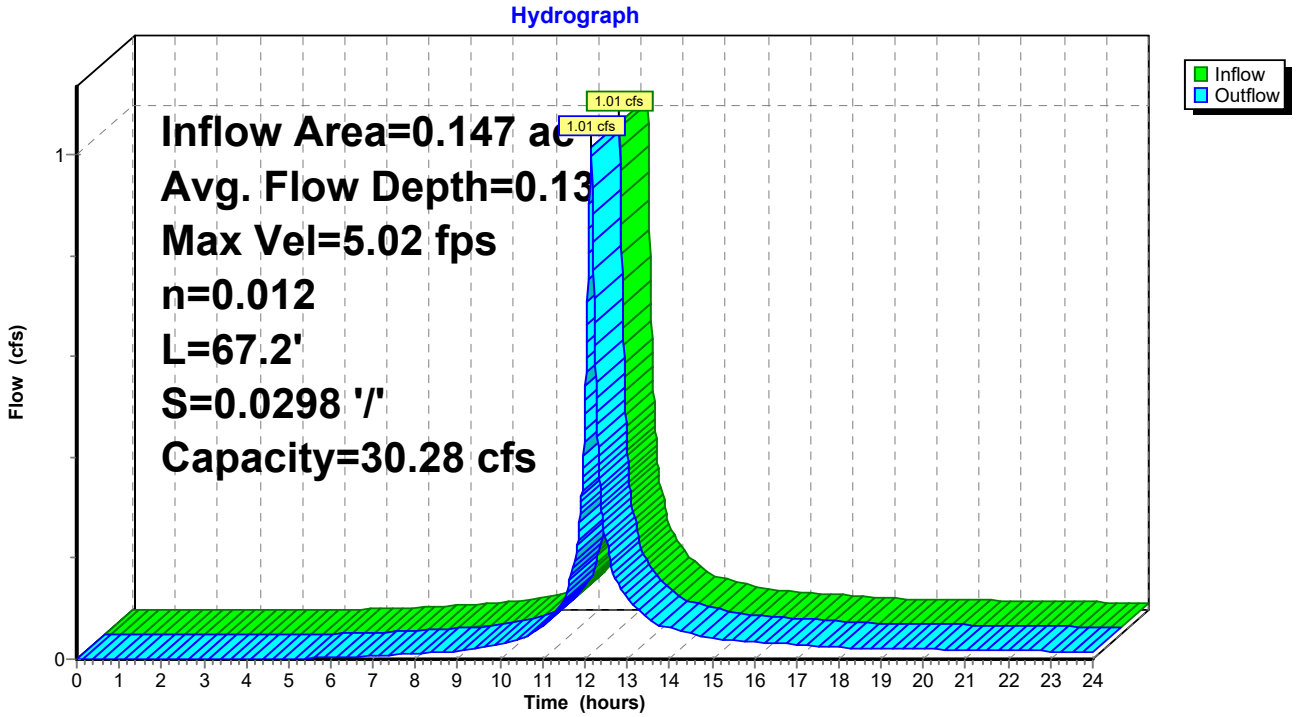
Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 6.40" for 100-Year_Current event
Inflow = 1.01 cfs @ 12.15 hrs, Volume= 0.078 af
Outflow = 1.01 cfs @ 12.15 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 5.02 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.52 fps, Avg. Travel Time= 0.7 min

Peak Storage= 14 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'





Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.01	0	606.00	0.01
7.50	0.01	0	606.00	0.01
8.00	0.01	1	606.01	0.01
8.50	0.01	1	606.01	0.01
9.00	0.02	1	606.01	0.02
9.50	0.02	1	606.01	0.02
10.00	0.03	2	606.02	0.03
10.50	0.04	2	606.02	0.04
11.00	0.07	2	606.02	0.06
11.50	0.12	3	606.03	0.12
12.00	**0.49**	**8**	**606.08**	**0.48**
12.50	**0.23**	**5**	**606.05**	**0.23**
13.00	0.12	4	606.04	0.12
13.50	0.08	3	606.03	0.08
14.00	0.06	2	606.02	0.06
14.50	0.05	2	606.02	0.05
15.00	0.04	2	606.02	0.04
15.50	0.04	2	606.02	0.04
16.00	0.03	2	606.02	0.03
16.50	0.03	2	606.02	0.03
17.00	0.03	2	606.01	0.03
17.50	0.03	1	606.01	0.03
18.00	0.02	1	606.01	0.02
18.50	0.02	1	606.01	0.02
19.00	0.02	1	606.01	0.02
19.50	0.02	1	606.01	0.02
20.00	0.02	1	606.01	0.02
20.50	0.02	1	606.01	0.02
21.00	0.02	1	606.01	0.02
21.50	0.02	1	606.01	0.02
22.00	0.02	1	606.01	0.02
22.50	0.02	1	606.01	0.02
23.00	0.02	1	606.01	0.02
23.50	0.01	1	606.01	0.01
24.00	0.01	1	606.01	0.01

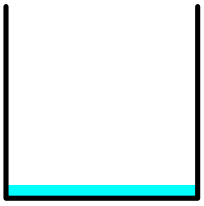
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 6.19" for 100-Year_Current event
Inflow = 0.62 cfs @ 12.13 hrs, Volume= 0.044 af
Outflow = 0.62 cfs @ 12.13 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 15P : SD-06, SD-07, SD-08

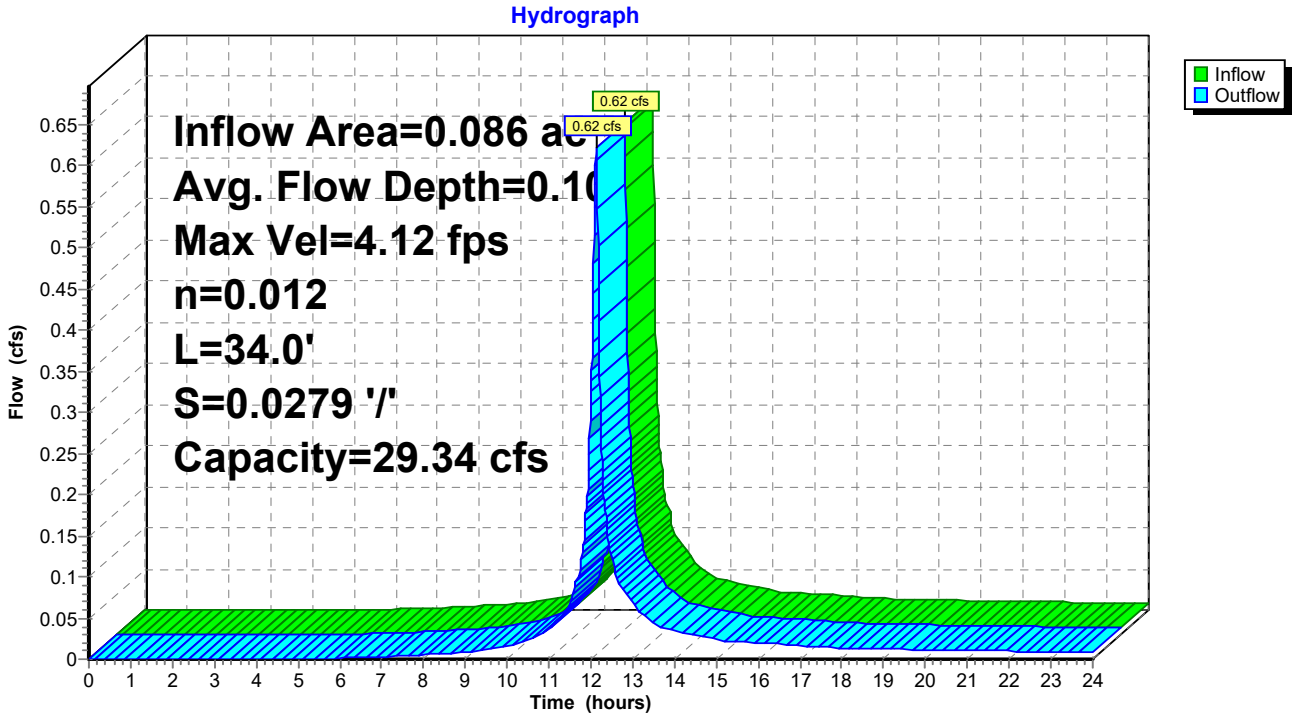
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 4.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 0.4 min

Peak Storage= 5 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.01	0	604.25	0.01
8.50	0.01	0	604.25	0.01
9.00	0.01	0	604.25	0.01
9.50	0.01	0	604.26	0.01
10.00	0.02	0	604.26	0.02
10.50	0.02	1	604.26	0.02
11.00	0.04	1	604.27	0.04
11.50	0.07	1	604.27	0.07
12.00	**0.33**	**3**	**604.32**	**0.33**
12.50	**0.13**	**2**	**604.29**	**0.13**
13.00	0.07	1	604.28	0.07
13.50	0.04	1	604.27	0.04
14.00	0.03	1	604.27	0.03
14.50	0.03	1	604.27	0.03
15.00	0.02	1	604.26	0.02
15.50	0.02	1	604.26	0.02
16.00	0.02	1	604.26	0.02
16.50	0.02	0	604.26	0.02
17.00	0.02	0	604.26	0.02
17.50	0.01	0	604.26	0.01
18.00	0.01	0	604.26	0.01
18.50	0.01	0	604.26	0.01
19.00	0.01	0	604.26	0.01
19.50	0.01	0	604.26	0.01
20.00	0.01	0	604.26	0.01
20.50	0.01	0	604.26	0.01
21.00	0.01	0	604.26	0.01
21.50	0.01	0	604.26	0.01
22.00	0.01	0	604.26	0.01
22.50	0.01	0	604.25	0.01
23.00	0.01	0	604.25	0.01
23.50	0.01	0	604.25	0.01
24.00	0.01	0	604.25	0.01

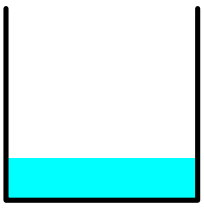
Summary for Reach 5R: TD-03

Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 5.94" for 100-Year_Current event
Inflow = 1.54 cfs @ 12.15 hrs, Volume= 0.117 af
Outflow = 1.53 cfs @ 12.15 hrs, Volume= 0.117 af, Atten= 1%, Lag= 0.5 min
Routed to Pond 16P : SD-09, SD-10

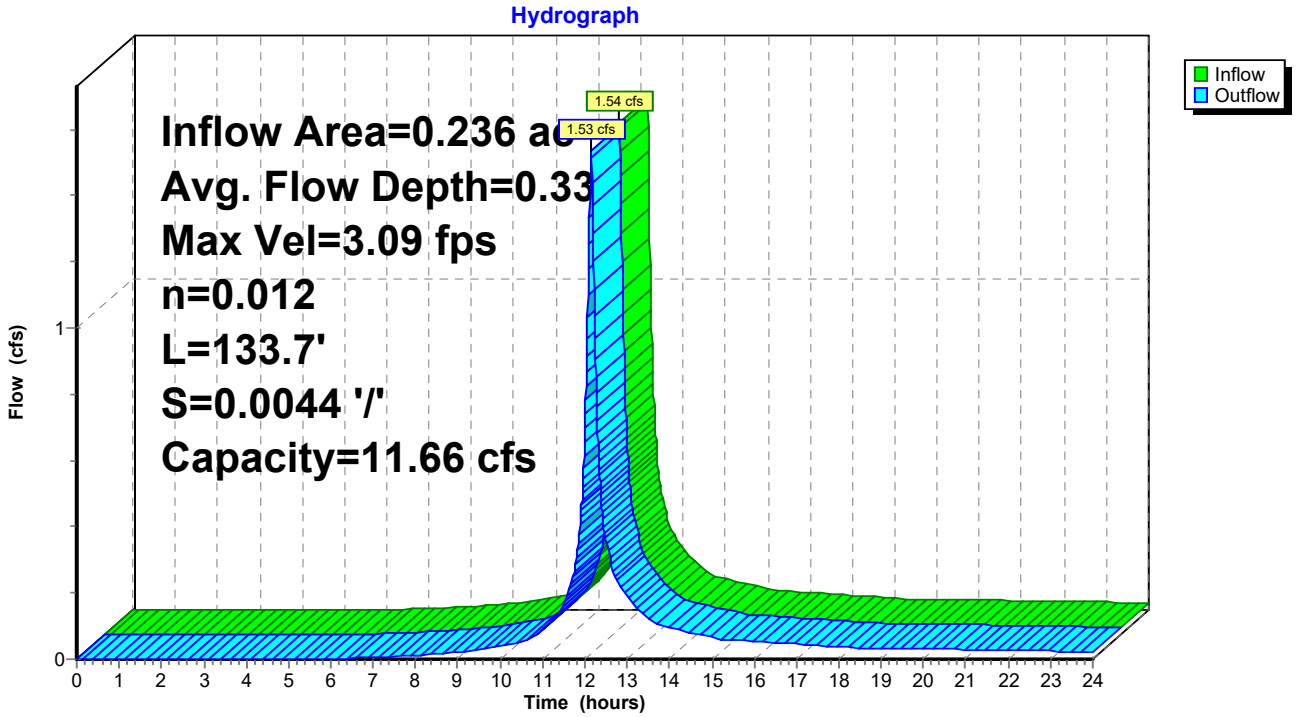
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.09 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 2.6 min

Peak Storage= 66 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'



Reach 5R: TD-03



Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	1	601.81	0.00
7.00	0.01	1	601.82	0.00
7.50	0.01	2	601.82	0.01
8.00	0.01	3	601.83	0.01
8.50	0.02	4	601.83	0.02
9.00	0.02	4	601.83	0.02
9.50	0.03	5	601.84	0.03
10.00	0.04	6	601.84	0.04
10.50	0.05	8	601.85	0.05
11.00	0.09	11	601.86	0.09
11.50	0.17	16	601.89	0.16
12.00	**0.74**	**39**	**602.01**	**0.70**
12.50	**0.35**	**26**	**601.94**	**0.36**
13.00	0.19	17	601.90	0.19
13.50	0.12	13	601.88	0.12
14.00	0.09	11	601.87	0.10
14.50	0.08	10	601.86	0.08
15.00	0.06	9	601.85	0.07
15.50	0.06	8	601.85	0.06
16.00	0.05	8	601.85	0.05
16.50	0.05	7	601.85	0.05
17.00	0.04	7	601.84	0.04
17.50	0.04	7	601.84	0.04
18.00	0.04	6	601.84	0.04
18.50	0.03	6	601.84	0.03
19.00	0.03	6	601.84	0.03
19.50	0.03	6	601.84	0.03
20.00	0.03	5	601.84	0.03
20.50	0.03	5	601.84	0.03
21.00	0.03	5	601.84	0.03
21.50	0.03	5	601.84	0.03
22.00	0.03	5	601.83	0.03
22.50	0.03	5	601.83	0.03
23.00	0.02	5	601.83	0.02
23.50	0.02	5	601.83	0.02
24.00	0.02	4	601.83	0.02

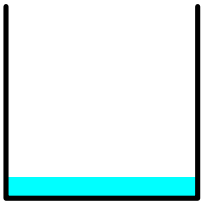
Summary for Reach 6R: TD-04

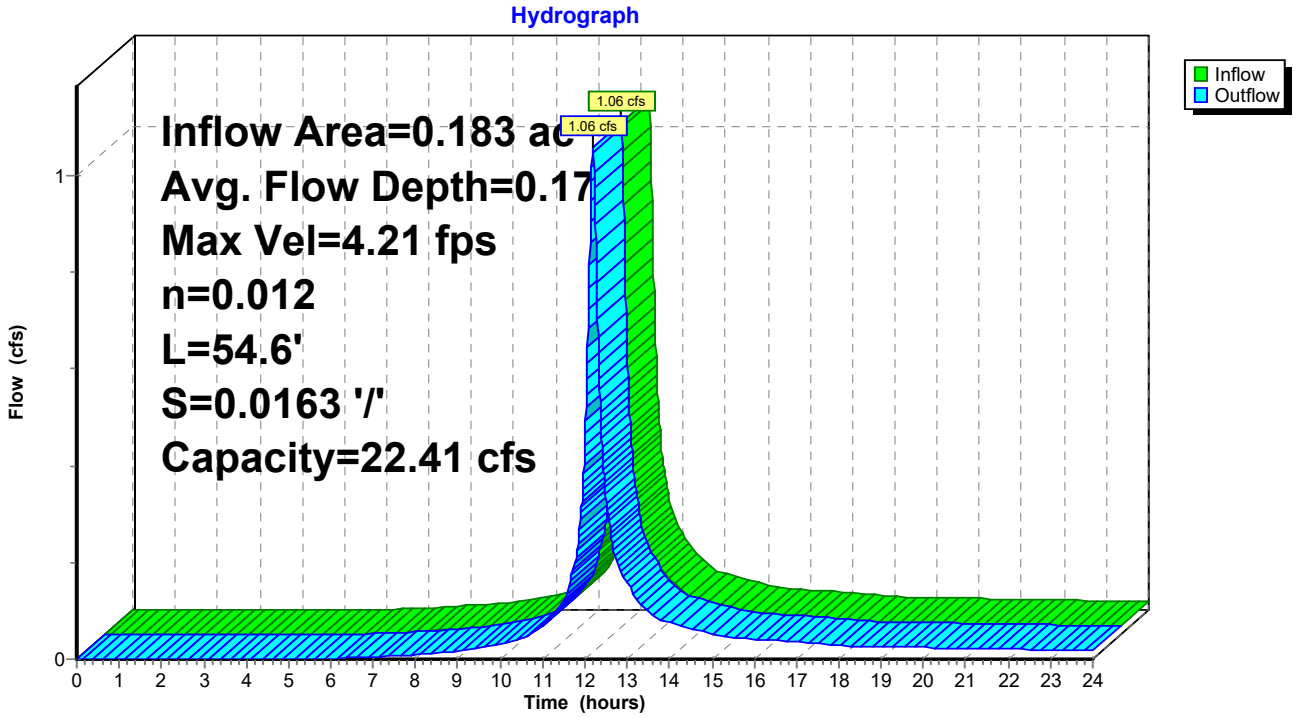
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 6.04" for 100-Year_Current event
Inflow = 1.06 cfs @ 12.19 hrs, Volume= 0.092 af
Outflow = 1.06 cfs @ 12.19 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 4.21 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 0.7 min

Peak Storage= 14 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

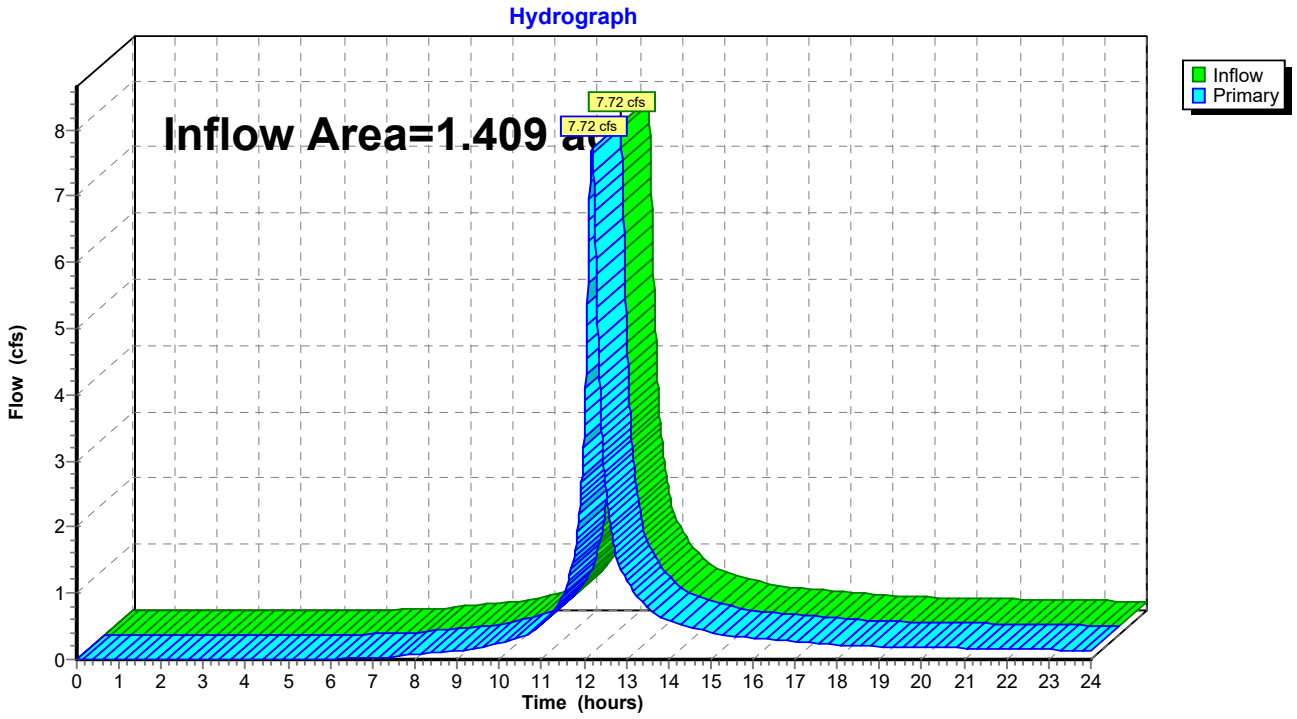
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.01	0	600.77	0.01
8.00	0.01	1	600.78	0.01
8.50	0.01	1	600.78	0.01
9.00	0.02	1	600.78	0.02
9.50	0.02	1	600.79	0.02
10.00	0.03	1	600.79	0.03
10.50	0.04	2	600.79	0.04
11.00	0.07	2	600.80	0.07
11.50	0.12	4	600.81	0.12
12.00	**0.45**	**8**	**600.87**	**0.44**
12.50	**0.32**	**7**	**600.85**	**0.33**
13.00	0.16	4	600.82	0.16
13.50	0.10	3	600.81	0.10
14.00	0.08	3	600.80	0.08
14.50	0.06	2	600.80	0.06
15.00	0.05	2	600.80	0.05
15.50	0.05	2	600.79	0.05
16.00	0.04	2	600.79	0.04
16.50	0.04	2	600.79	0.04
17.00	0.04	2	600.79	0.04
17.50	0.03	2	600.79	0.03
18.00	0.03	1	600.79	0.03
18.50	0.03	1	600.79	0.03
19.00	0.03	1	600.79	0.03
19.50	0.02	1	600.79	0.02
20.00	0.02	1	600.79	0.02
20.50	0.02	1	600.79	0.02
21.00	0.02	1	600.79	0.02
21.50	0.02	1	600.79	0.02
22.00	0.02	1	600.78	0.02
22.50	0.02	1	600.78	0.02
23.00	0.02	1	600.78	0.02
23.50	0.02	1	600.78	0.02
24.00	0.02	1	600.78	0.02

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 6.09" for 100-Year_Current event
Inflow = 7.72 cfs @ 12.19 hrs, Volume= 0.716 af
Primary = 7.72 cfs @ 12.19 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.02		0.02
7.00	0.03		0.03
7.50	0.04		0.04
8.00	0.08		0.08
8.50	0.10		0.10
9.00	0.13		0.13
9.50	0.18		0.18
10.00	0.25		0.25
10.50	0.33		0.33
11.00	0.53		0.53
11.50	0.96		0.96
12.00	**3.36**		**3.36**
12.50	**2.69**		**2.69**
13.00	1.23		1.23
13.50	0.79		0.79
14.00	0.58		0.58
14.50	0.50		0.50
15.00	0.41		0.41
15.50	0.35		0.35
16.00	0.32		0.32
16.50	0.30		0.30
17.00	0.27		0.27
17.50	0.25		0.25
18.00	0.22		0.22
18.50	0.20		0.20
19.00	0.20		0.20
19.50	0.19		0.19
20.00	0.19		0.19
20.50	0.18		0.18
21.00	0.17		0.17
21.50	0.17		0.17
22.00	0.16		0.16
22.50	0.15		0.15
23.00	0.15		0.15
23.50	0.14		0.14
24.00	0.13		0.13

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 6.03" for 100-Year_Current event
Inflow = 4.29 cfs @ 12.20 hrs, Volume= 0.404 af
Outflow = 4.29 cfs @ 12.20 hrs, Volume= 0.403 af, Atten= 0%, Lag= 0.3 min
Primary = 4.29 cfs @ 12.20 hrs, Volume= 0.403 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.96' @ 12.20 hrs Surf.Area= 110 sf Storage= 67 cf

Plug-Flow detention time= 0.5 min calculated for 0.403 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (823.4 - 823.1)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

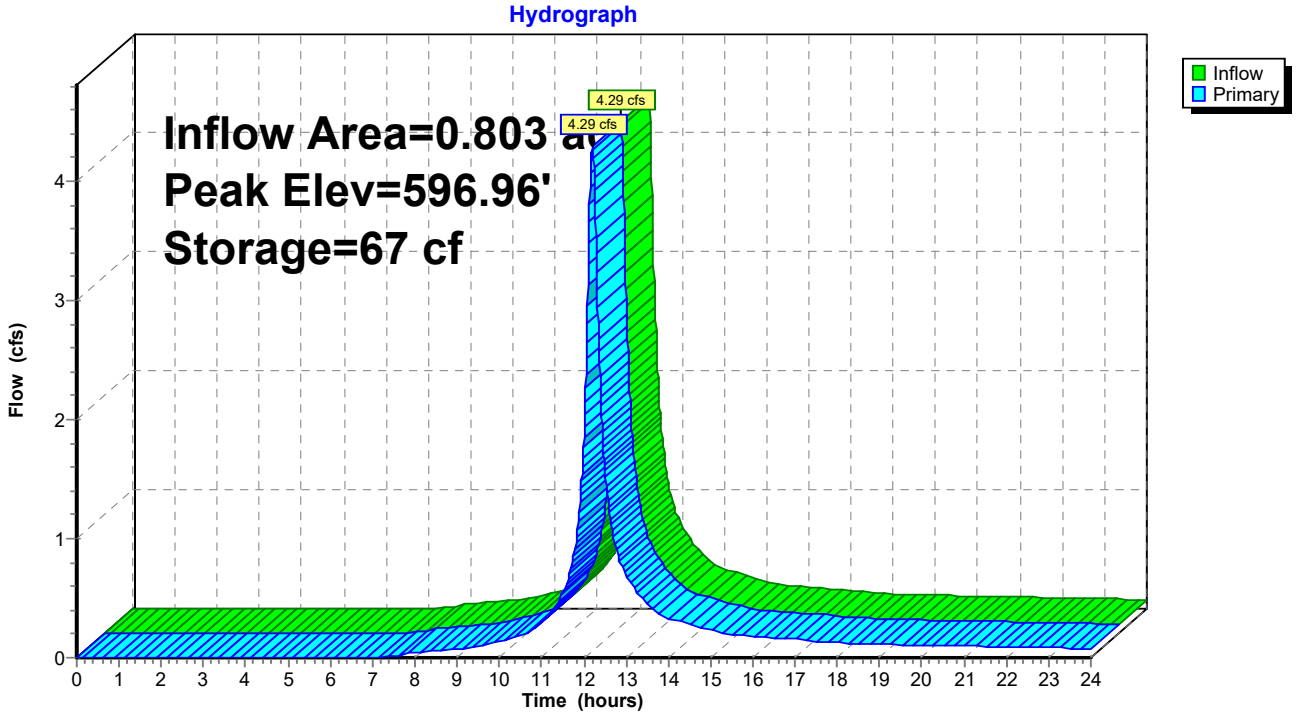
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.29 cfs @ 12.20 hrs HW=596.96' TW=594.99' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 4.29 cfs @ 3.41 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	0	595.71	0.00
4.50	0.00	0	595.72	0.00
5.00	0.00	1	595.82	0.00
5.50	0.00	3	595.98	0.00
6.00	0.00	4	595.98	0.00
6.50	0.00	4	595.99	0.00
7.00	0.01	4	595.99	0.01
7.50	0.01	4	596.00	0.01
8.00	0.04	5	596.05	0.04
8.50	0.06	5	596.06	0.06
9.00	0.07	5	596.07	0.07
9.50	0.10	6	596.10	0.10
10.00	0.14	6	596.12	0.14
10.50	0.18	7	596.15	0.18
11.00	0.30	8	596.20	0.30
11.50	0.54	11	596.28	0.54
12.00	**1.89**	**31**	**596.58**	**1.85**
12.50	**1.55**	**27**	**596.53**	**1.57**
13.00	0.70	14	596.33	0.70
13.50	0.45	10	596.25	0.45
14.00	0.33	9	596.21	0.33
14.50	0.28	8	596.19	0.28
15.00	0.23	7	596.17	0.23
15.50	0.20	7	596.15	0.20
16.00	0.18	7	596.15	0.18
16.50	0.17	7	596.14	0.17
17.00	0.16	6	596.13	0.16
17.50	0.14	6	596.12	0.14
18.00	0.13	6	596.11	0.13
18.50	0.12	6	596.11	0.12
19.00	0.11	6	596.10	0.11
19.50	0.11	6	596.10	0.11
20.00	0.11	6	596.10	0.11
20.50	0.10	6	596.10	0.10
21.00	0.10	6	596.09	0.10
21.50	0.09	5	596.09	0.09
22.00	0.09	5	596.09	0.09
22.50	0.09	5	596.09	0.09
23.00	0.08	5	596.08	0.08
23.50	0.08	5	596.08	0.08
24.00	0.08	5	596.08	0.08

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 6.04" for 100-Year_Current event
Inflow = 4.69 cfs @ 12.18 hrs, Volume= 0.448 af
Outflow = 4.69 cfs @ 12.19 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.4 min
Primary = 4.69 cfs @ 12.19 hrs, Volume= 0.448 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.99' @ 12.19 hrs Surf.Area= 147 sf Storage= 77 cf

Plug-Flow detention time= 0.3 min calculated for 0.448 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (822.7 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

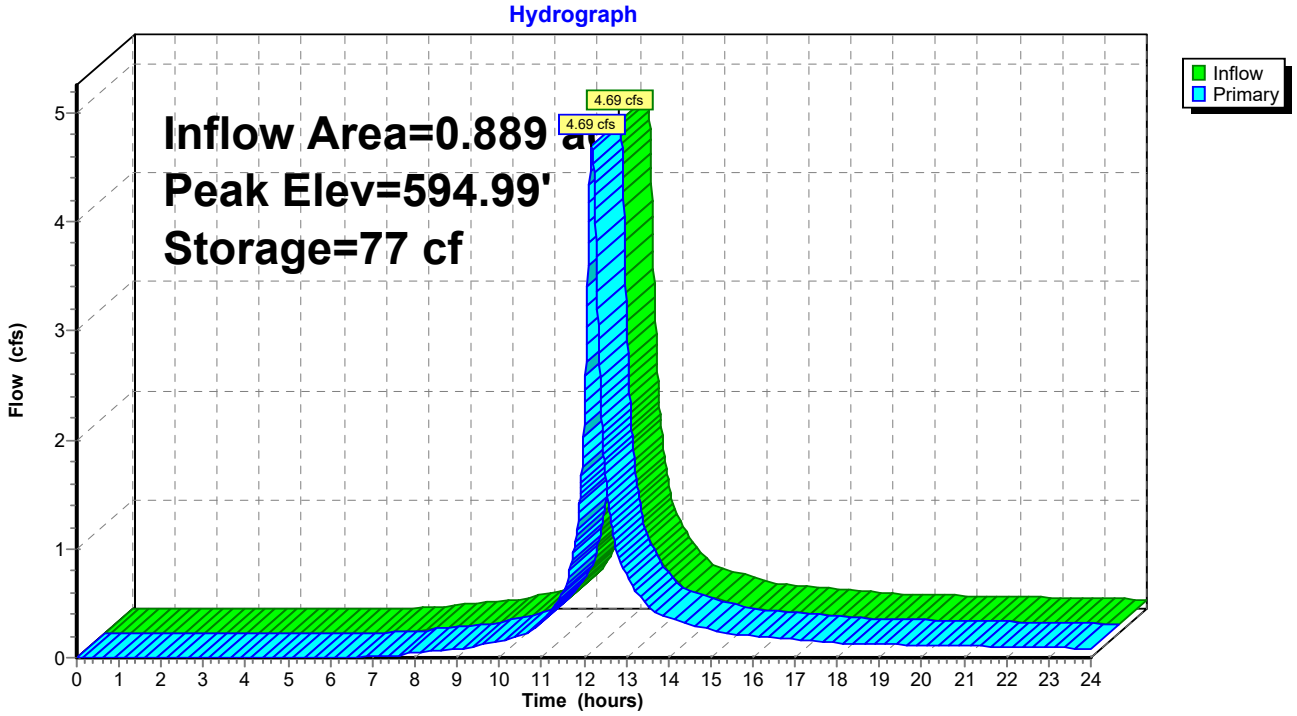
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.69 cfs @ 12.19 hrs HW=594.99' TW=594.10' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 4.69 cfs @ 3.51 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.92	0.00
4.50	0.00	0	593.93	0.00
5.00	0.00	0	593.94	0.00
5.50	0.00	0	593.95	0.00
6.00	0.00	0	593.96	0.00
6.50	0.01	1	593.96	0.01
7.00	0.01	1	593.97	0.01
7.50	0.01	1	593.98	0.01
8.00	0.05	2	594.02	0.05
8.50	0.06	2	594.04	0.06
9.00	0.08	2	594.05	0.08
9.50	0.11	2	594.07	0.11
10.00	0.15	3	594.10	0.15
10.50	0.20	4	594.13	0.20
11.00	0.33	5	594.18	0.33
11.50	0.60	9	594.27	0.60
12.00	**2.18**	**30**	**594.60**	**2.13**
12.50	**1.70**	**24**	**594.52**	**1.71**
13.00	0.77	11	594.32	0.77
13.50	0.49	7	594.24	0.50
14.00	0.37	6	594.19	0.37
14.50	0.31	5	594.17	0.31
15.00	0.26	4	594.15	0.26
15.50	0.22	4	594.13	0.22
16.00	0.20	4	594.13	0.20
16.50	0.19	4	594.12	0.19
17.00	0.17	3	594.11	0.17
17.50	0.16	3	594.10	0.16
18.00	0.14	3	594.09	0.14
18.50	0.13	3	594.08	0.13
19.00	0.13	3	594.08	0.13
19.50	0.12	3	594.08	0.12
20.00	0.12	3	594.08	0.12
20.50	0.11	3	594.07	0.11
21.00	0.11	2	594.07	0.11
21.50	0.10	2	594.07	0.10
22.00	0.10	2	594.07	0.10
22.50	0.10	2	594.06	0.10
23.00	0.09	2	594.06	0.09
23.50	0.09	2	594.06	0.09
24.00	0.08	2	594.05	0.08

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 6.02" for 100-Year_Current event
Inflow = 6.14 cfs @ 12.17 hrs, Volume= 0.565 af
Outflow = 6.13 cfs @ 12.18 hrs, Volume= 0.564 af, Atten= 0%, Lag= 0.4 min
Primary = 6.13 cfs @ 12.18 hrs, Volume= 0.564 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.10' @ 12.18 hrs Surf.Area= 144 sf Storage= 123 cf

Plug-Flow detention time= 0.5 min calculated for 0.564 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (822.7 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

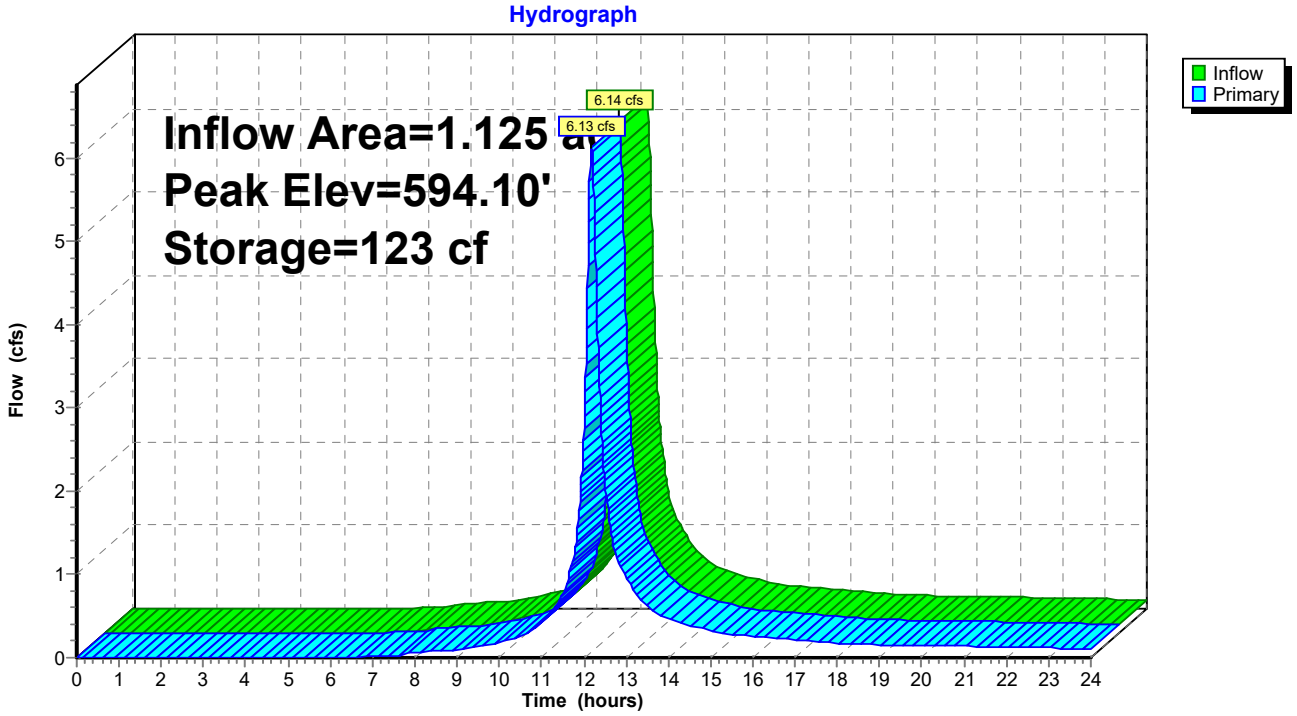
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.13 cfs @ 12.18 hrs HW=594.10' TW=592.44' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 6.13 cfs @ 3.84 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.58	0.00
4.50	0.00	0	592.58	0.00
5.00	0.00	0	592.61	0.00
5.50	0.00	2	592.73	0.00
6.00	0.00	4	592.86	0.00
6.50	0.01	4	592.87	0.01
7.00	0.01	5	592.88	0.01
7.50	0.02	5	592.89	0.02
8.00	0.06	6	592.93	0.06
8.50	0.08	7	592.95	0.08
9.00	0.10	7	592.97	0.10
9.50	0.14	8	592.99	0.14
10.00	0.19	9	593.02	0.19
10.50	0.26	10	593.05	0.26
11.00	0.42	13	593.11	0.42
11.50	0.77	19	593.22	0.76
12.00	**2.83**	**54**	**593.60**	**2.75**
12.50	**2.07**	**42**	**593.49**	**2.10**
13.00	0.97	22	593.27	0.97
13.50	0.62	17	593.18	0.62
14.00	0.46	14	593.13	0.46
14.50	0.39	13	593.10	0.39
15.00	0.32	12	593.08	0.32
15.50	0.28	11	593.06	0.28
16.00	0.26	10	593.05	0.26
16.50	0.24	10	593.04	0.24
17.00	0.22	10	593.03	0.22
17.50	0.20	9	593.02	0.20
18.00	0.18	9	593.01	0.18
18.50	0.16	9	593.00	0.16
19.00	0.16	8	593.00	0.16
19.50	0.15	8	593.00	0.15
20.00	0.15	8	593.00	0.15
20.50	0.14	8	592.99	0.14
21.00	0.14	8	592.99	0.14
21.50	0.13	8	592.99	0.13
22.00	0.13	8	592.98	0.13
22.50	0.12	8	592.98	0.12
23.00	0.12	8	592.98	0.12
23.50	0.11	7	592.97	0.11
24.00	0.11	7	592.97	0.11

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 6.02" for 100-Year_Current event
Inflow = 7.18 cfs @ 12.18 hrs, Volume= 0.656 af
Outflow = 7.15 cfs @ 12.19 hrs, Volume= 0.656 af, Atten= 0%, Lag= 0.6 min
Primary = 7.15 cfs @ 12.19 hrs, Volume= 0.656 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 592.45' @ 12.19 hrs Surf.Area= 188 sf Storage= 151 cf

Plug-Flow detention time= 0.6 min calculated for 0.656 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (822.9 - 822.5)

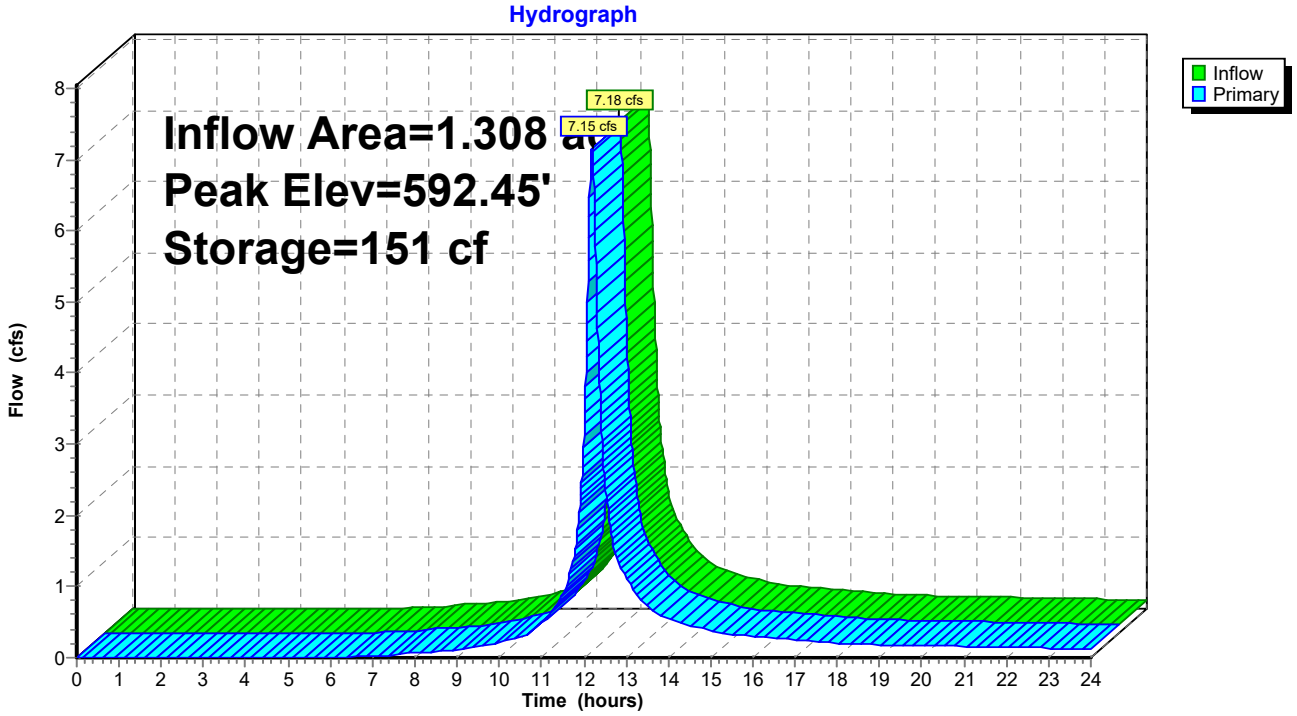
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.15 cfs @ 12.19 hrs HW=592.45' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 7.15 cfs @ 4.09 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.26	0.00
4.00	0.00	0	590.27	0.00
4.50	0.00	0	590.28	0.00
5.00	0.00	1	590.33	0.00
5.50	0.00	2	590.40	0.00
6.00	0.01	7	590.80	0.00
6.50	0.01	10	591.04	0.01
7.00	0.02	10	591.06	0.02
7.50	0.03	11	591.07	0.03
8.00	0.07	11	591.11	0.07
8.50	0.09	12	591.13	0.09
9.00	0.12	12	591.15	0.12
9.50	0.16	13	591.17	0.16
10.00	0.22	13	591.20	0.22
10.50	0.30	14	591.24	0.30
11.00	0.49	17	591.31	0.48
11.50	0.89	22	591.42	0.88
12.00	**3.20**	**56**	**591.83**	**3.12**
12.50	**2.43**	**45**	**591.73**	**2.45**
13.00	1.13	25	591.48	1.13
13.50	0.72	20	591.38	0.73
14.00	0.54	17	591.32	0.54
14.50	0.46	16	591.30	0.46
15.00	0.37	15	591.27	0.37
15.50	0.32	15	591.25	0.32
16.00	0.30	14	591.24	0.30
16.50	0.28	14	591.23	0.28
17.00	0.25	14	591.22	0.25
17.50	0.23	14	591.21	0.23
18.00	0.20	13	591.20	0.20
18.50	0.19	13	591.19	0.19
19.00	0.18	13	591.19	0.18
19.50	0.18	13	591.18	0.18
20.00	0.17	13	591.18	0.17
20.50	0.17	13	591.18	0.17
21.00	0.16	13	591.17	0.16
21.50	0.15	13	591.17	0.15
22.00	0.15	12	591.17	0.15
22.50	0.14	12	591.16	0.14
23.00	0.14	12	591.16	0.14
23.50	0.13	12	591.16	0.13
24.00	0.12	12	591.15	0.12

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 5.98" for 100-Year_Current event
Inflow = 3.52 cfs @ 12.21 hrs, Volume= 0.327 af
Outflow = 3.51 cfs @ 12.22 hrs, Volume= 0.325 af, Atten= 0%, Lag= 0.5 min
Primary = 3.51 cfs @ 12.22 hrs, Volume= 0.325 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.40' @ 12.22 hrs Surf.Area= 78 sf Storage= 122 cf

Plug-Flow detention time= 6.2 min calculated for 0.325 af (99% of inflow)
Center-of-Mass det. time= 2.6 min (826.0 - 823.4)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

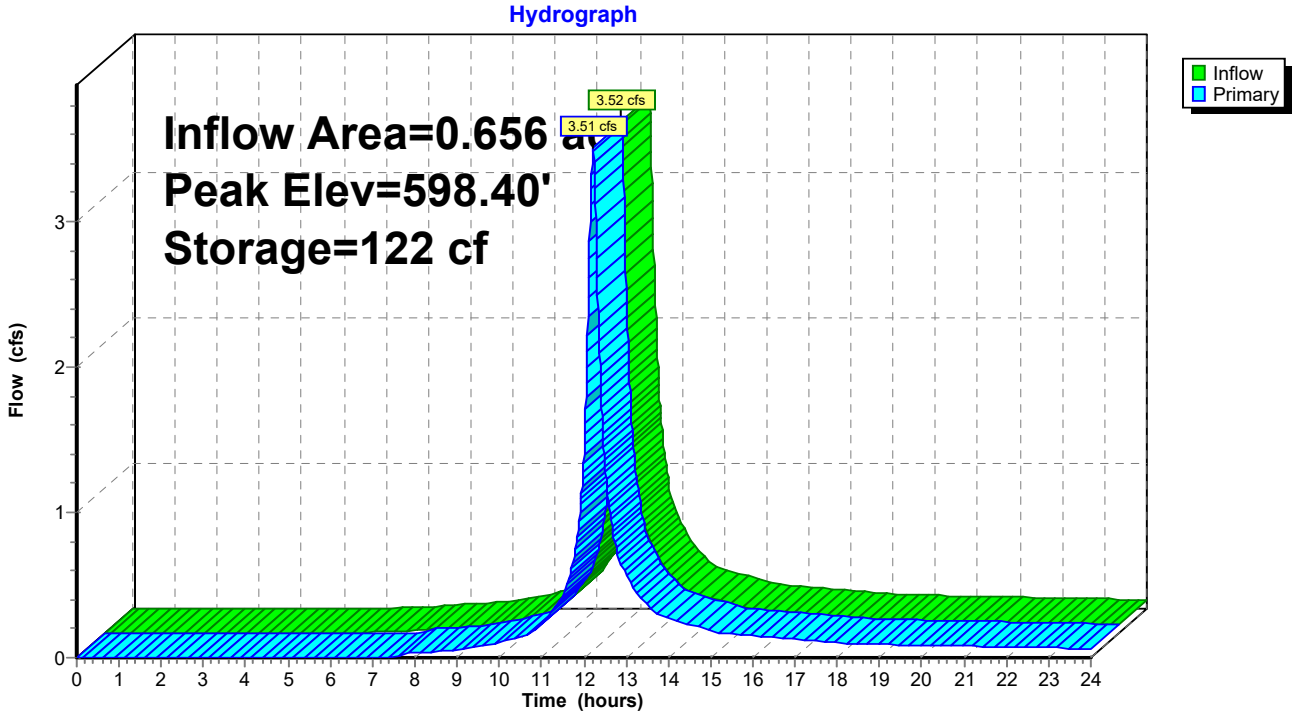
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.51 cfs @ 12.22 hrs HW=598.40' TW=596.96' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 3.51 cfs @ 4.47 fps)

Pond 23P: SD-01, SD-02



Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.82	0.00
3.50	0.00	0	591.82	0.00
4.00	0.00	0	591.84	0.00
4.50	0.00	1	591.87	0.00
5.00	0.00	2	591.95	0.00
5.50	0.00	4	592.09	0.00
6.00	0.00	8	592.30	0.00
6.50	0.01	17	592.90	0.00
7.00	0.01	38	594.19	0.00
7.50	0.02	72	596.32	0.00
8.00	0.03	85	597.13	0.03
8.50	0.04	85	597.14	0.04
9.00	0.06	85	597.15	0.06
9.50	0.08	86	597.17	0.08
10.00	0.11	86	597.20	0.11
10.50	0.14	86	597.22	0.14
11.00	0.23	87	597.28	0.23
11.50	0.42	89	597.36	0.42
12.00	**1.41**	**94**	**597.67**	**1.40**
12.50	**1.31**	**93**	**597.65**	**1.32**
13.00	0.58	90	597.42	0.58
13.50	0.37	88	597.34	0.37
14.00	0.27	88	597.30	0.27
14.50	0.23	87	597.27	0.23
15.00	0.19	87	597.25	0.19
15.50	0.16	87	597.23	0.16
16.00	0.15	87	597.23	0.15
16.50	0.14	86	597.22	0.14
17.00	0.13	86	597.21	0.13
17.50	0.11	86	597.20	0.11
18.00	0.10	86	597.19	0.10
18.50	0.09	86	597.19	0.09
19.00	0.09	86	597.19	0.09
19.50	0.09	86	597.18	0.09
20.00	0.09	86	597.18	0.09
20.50	0.08	86	597.18	0.08
21.00	0.08	86	597.18	0.08
21.50	0.08	86	597.17	0.08
22.00	0.07	86	597.17	0.07
22.50	0.07	86	597.17	0.07
23.00	0.07	86	597.16	0.07
23.50	0.06	85	597.16	0.06
24.00	0.06	85	597.16	0.06

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>8.16"
Flow Length=298' Tc=12.4 min CN=WQ Runoff=4.89 cfs 0.446 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>8.62"
Flow Length=85' Slope=0.1773 '/' Tc=7.0 min CN=WQ Runoff=1.38 cfs 0.106 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>8.39"
Flow Length=66' Slope=0.2264 '/' Tc=5.2 min CN=WQ Runoff=0.84 cfs 0.060 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>8.11"
Flow Length=82' Slope=0.1736 '/' Tc=6.8 min CN=WQ Runoff=2.13 cfs 0.160 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>9.30"
Flow Length=239' Tc=13.4 min CN=WQ Runoff=0.79 cfs 0.078 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>8.22"
Flow Length=116' Tc=10.2 min CN=WQ Runoff=1.47 cfs 0.125 af

Reach 3R: TD-01 Avg. Flow Depth=0.16' Max Vel=5.60 fps Inflow=1.38 cfs 0.106 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=1.37 cfs 0.106 af

Reach 4R: TD-02 Avg. Flow Depth=0.12' Max Vel=4.60 fps Inflow=0.84 cfs 0.060 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.84 cfs 0.060 af

Reach 5R: TD-03 Avg. Flow Depth=0.41' Max Vel=3.41 fps Inflow=2.13 cfs 0.160 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=2.11 cfs 0.159 af

Reach 6R: TD-04 Avg. Flow Depth=0.21' Max Vel=4.72 fps Inflow=1.47 cfs 0.125 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=1.47 cfs 0.125 af

Pond 7P: O-1A Inflow=10.46 cfs 0.972 af
Primary=10.46 cfs 0.972 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=597.18' Storage=91 cf Inflow=5.81 cfs 0.550 af
Outflow=5.81 cfs 0.549 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=595.23' Storage=115 cf Inflow=6.31 cfs 0.609 af
Outflow=6.31 cfs 0.609 af

Pond 16P: SD-09, SD-10 Peak Elev=594.53' Storage=176 cf Inflow=8.29 cfs 0.769 af
Outflow=8.28 cfs 0.769 af

Pond 20P: SD-11, SD-12 Peak Elev=593.05' Storage=256 cf Inflow=9.74 cfs 0.894 af
Outflow=9.69 cfs 0.894 af

Pond 23P: SD-01, SD-02 Peak Elev=599.17' Storage=204 cf Inflow=4.89 cfs 0.446 af
Outflow=4.82 cfs 0.444 af

Total Runoff Area = 1.409 ac Runoff Volume = 0.975 af Average Runoff Depth = 8.30"
97.80% Pervious = 1.378 ac 2.20% Impervious = 0.031 ac

Summary for Subcatchment 4S: PO-DA B

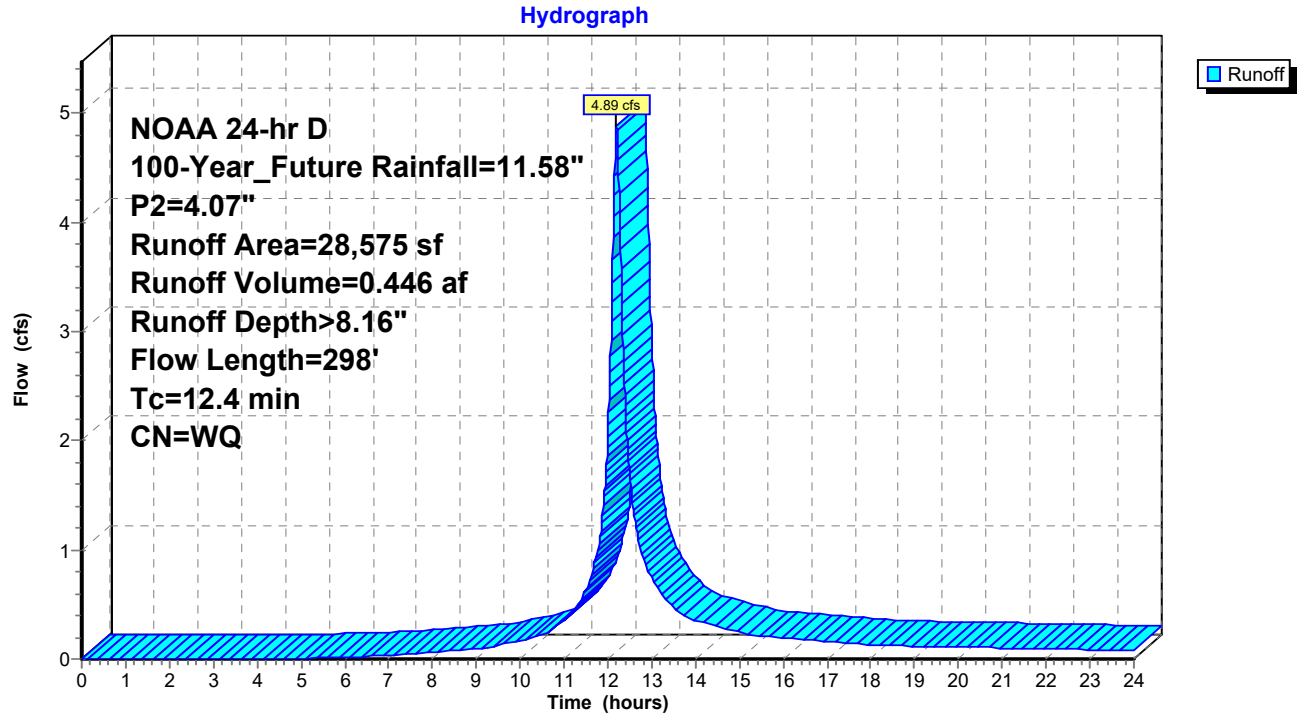
Runoff = 4.89 cfs @ 12.20 hrs, Volume= 0.446 af, Depth> 8.16"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0900	0.16		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
12.4	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.00
2.00	0.28	0.00	0.00
2.50	0.36	0.00	0.00
3.00	0.44	0.00	0.00
3.50	0.52	0.00	0.00
4.00	0.61	0.00	0.00
4.50	0.70	0.00	0.00
5.00	0.79	0.00	0.00
5.50	0.89	0.01	0.01
6.00	0.99	0.02	0.02
6.50	1.10	0.04	0.02
7.00	1.22	0.07	0.04
7.50	1.35	0.10	0.05
8.00	1.50	0.15	0.06
8.50	1.66	0.21	0.08
9.00	1.84	0.28	0.09
9.50	2.04	0.37	0.13
10.00	2.30	0.50	0.17
10.50	2.59	0.66	0.22
11.00	3.01	0.91	0.35
11.50	3.67	1.36	0.62
12.00	5.55	2.81	**2.04**
12.50	7.91	4.84	**1.65**
13.00	8.57	5.44	0.75
13.50	8.99	5.82	0.48
14.00	9.28	6.09	0.35
14.50	9.54	6.32	0.30
15.00	9.74	6.51	0.24
15.50	9.92	6.67	0.21
16.00	10.08	6.82	0.19
16.50	10.23	6.96	0.18
17.00	10.36	7.08	0.16
17.50	10.48	7.19	0.15
18.00	10.59	7.30	0.13
18.50	10.69	7.39	0.12
19.00	10.79	7.48	0.12
19.50	10.88	7.57	0.11
20.00	10.97	7.65	0.11
20.50	11.06	7.73	0.11
21.00	11.14	7.81	0.10
21.50	11.22	7.89	0.10
22.00	11.30	7.96	0.10
22.50	11.38	8.03	0.09
23.00	11.45	8.10	0.09
23.50	11.52	8.16	0.08
24.00	**11.58**	**8.22**	0.08

Summary for Subcatchment 6S: PO-DA D

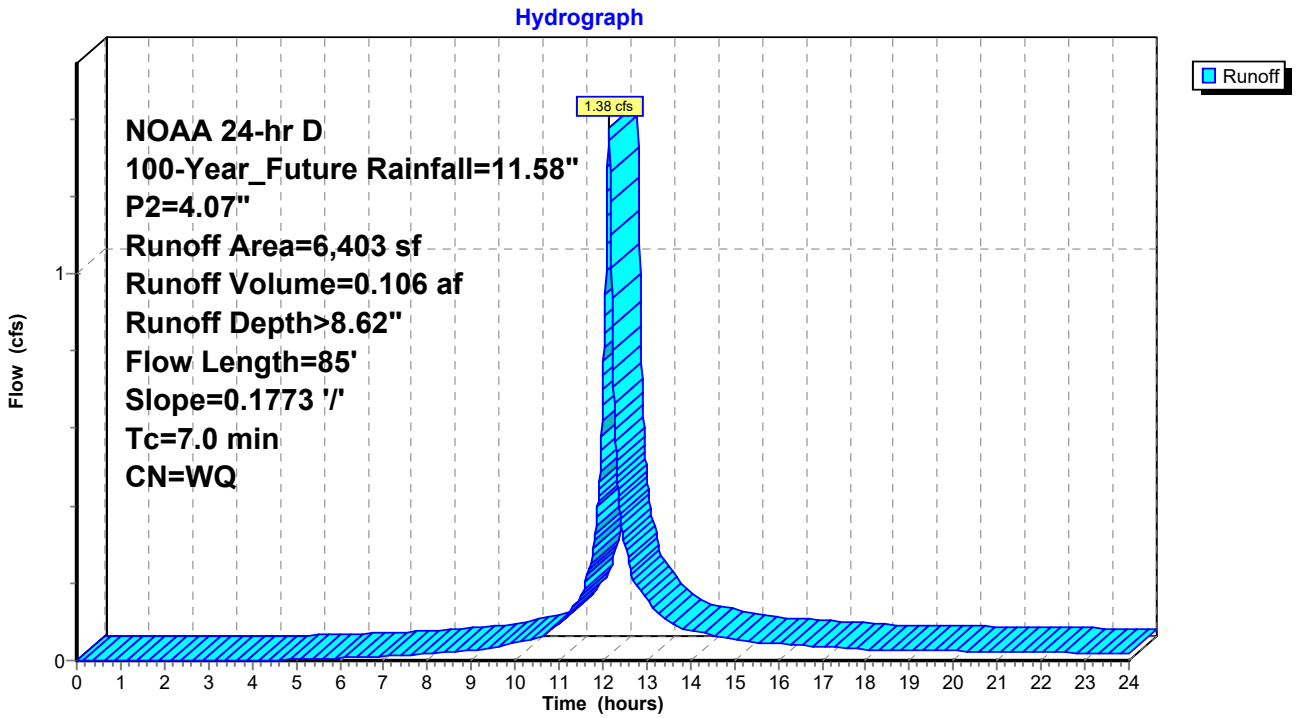
Runoff = 1.38 cfs @ 12.14 hrs, Volume= 0.106 af, Depth> 8.62"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	85	0.1773	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.00
2.00	0.28	0.00	0.00
2.50	0.36	0.00	0.00
3.00	0.44	0.00	0.00
3.50	0.52	0.00	0.00
4.00	0.61	0.00	0.00
4.50	0.70	0.00	0.00
5.00	0.79	0.01	0.00
5.50	0.89	0.03	0.00
6.00	0.99	0.05	0.01
6.50	1.10	0.07	0.01
7.00	1.22	0.11	0.01
7.50	1.35	0.15	0.01
8.00	1.50	0.21	0.02
8.50	1.66	0.28	0.02
9.00	1.84	0.36	0.03
9.50	2.04	0.47	0.03
10.00	2.30	0.62	0.05
10.50	2.59	0.80	0.06
11.00	3.01	1.08	0.09
11.50	3.67	1.56	0.16
12.00	5.55	3.09	**0.70**
12.50	7.91	5.19	**0.30**
13.00	8.57	5.80	0.16
13.50	8.99	6.19	0.10
14.00	9.28	6.46	0.08
14.50	9.54	6.70	0.07
15.00	9.74	6.89	0.05
15.50	9.92	7.06	0.05
16.00	10.08	7.21	0.04
16.50	10.23	7.35	0.04
17.00	10.36	7.48	0.04
17.50	10.48	7.59	0.03
18.00	10.59	7.69	0.03
18.50	10.69	7.79	0.03
19.00	10.79	7.88	0.03
19.50	10.88	7.97	0.03
20.00	10.97	8.06	0.03
20.50	11.06	8.14	0.02
21.00	11.14	8.22	0.02
21.50	11.22	8.30	0.02
22.00	11.30	8.37	0.02
22.50	11.38	8.44	0.02
23.00	11.45	8.51	0.02
23.50	11.52	8.57	0.02
24.00	**11.58**	**8.63**	0.02

Summary for Subcatchment 8S: PO-DA F

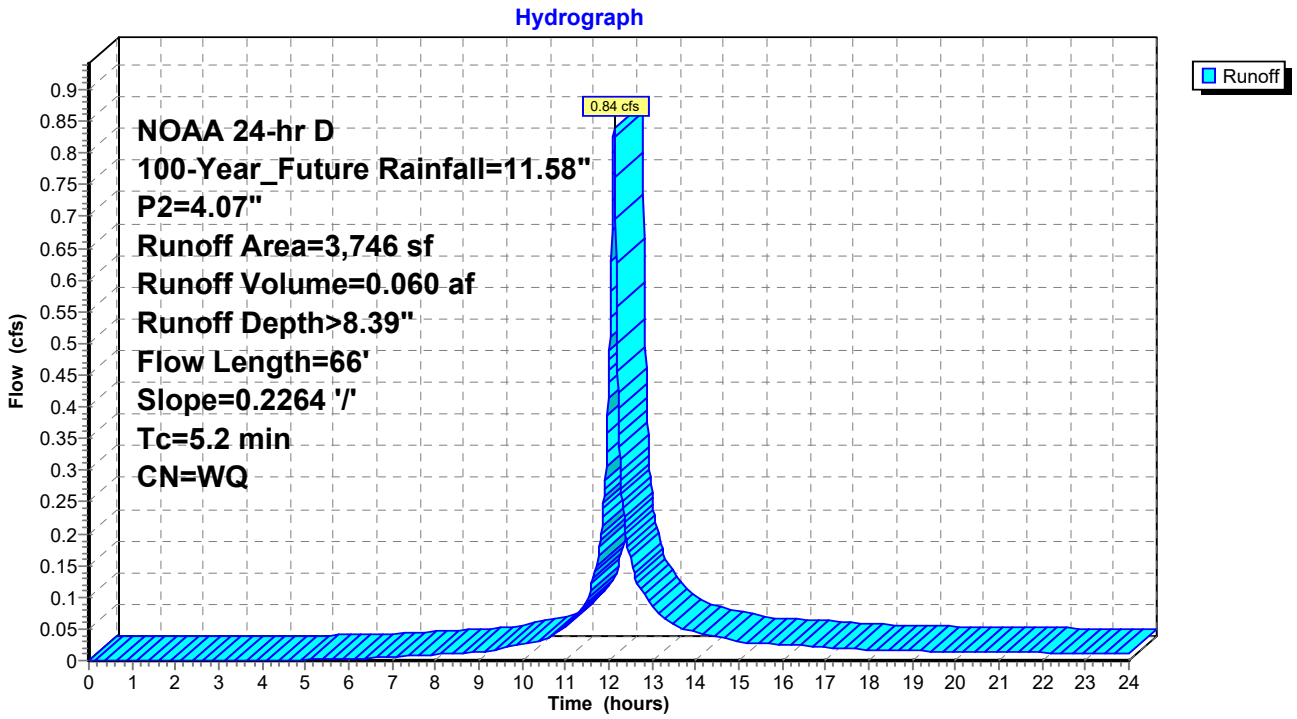
Runoff = 0.84 cfs @ 12.12 hrs, Volume= 0.060 af, Depth> 8.39"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	66	0.2264	0.21		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.00
2.00	0.28	0.00	0.00
2.50	0.36	0.00	0.00
3.00	0.44	0.00	0.00
3.50	0.52	0.00	0.00
4.00	0.61	0.00	0.00
4.50	0.70	0.00	0.00
5.00	0.79	0.00	0.00
5.50	0.89	0.01	0.00
6.00	0.99	0.03	0.00
6.50	1.10	0.05	0.00
7.00	1.22	0.08	0.01
7.50	1.35	0.12	0.01
8.00	1.50	0.17	0.01
8.50	1.66	0.23	0.01
9.00	1.84	0.30	0.01
9.50	2.04	0.40	0.02
10.00	2.30	0.53	0.03
10.50	2.59	0.71	0.03
11.00	3.01	0.97	0.05
11.50	3.67	1.42	0.09
12.00	5.55	2.90	**0.46**
12.50	7.91	4.96	**0.17**
13.00	8.57	5.56	0.09
13.50	8.99	5.94	0.06
14.00	9.28	6.21	0.05
14.50	9.54	6.45	0.04
15.00	9.74	6.64	0.03
15.50	9.92	6.80	0.03
16.00	10.08	6.95	0.03
16.50	10.23	7.09	0.02
17.00	10.36	7.21	0.02
17.50	10.48	7.33	0.02
18.00	10.59	7.43	0.02
18.50	10.69	7.52	0.02
19.00	10.79	7.61	0.02
19.50	10.88	7.70	0.02
20.00	10.97	7.79	0.01
20.50	11.06	7.87	0.01
21.00	11.14	7.95	0.01
21.50	11.22	8.02	0.01
22.00	11.30	8.10	0.01
22.50	11.38	8.17	0.01
23.00	11.45	8.23	0.01
23.50	11.52	8.30	0.01
24.00	**11.58**	**8.36**	0.01

Summary for Subcatchment 10S: PO-DA H

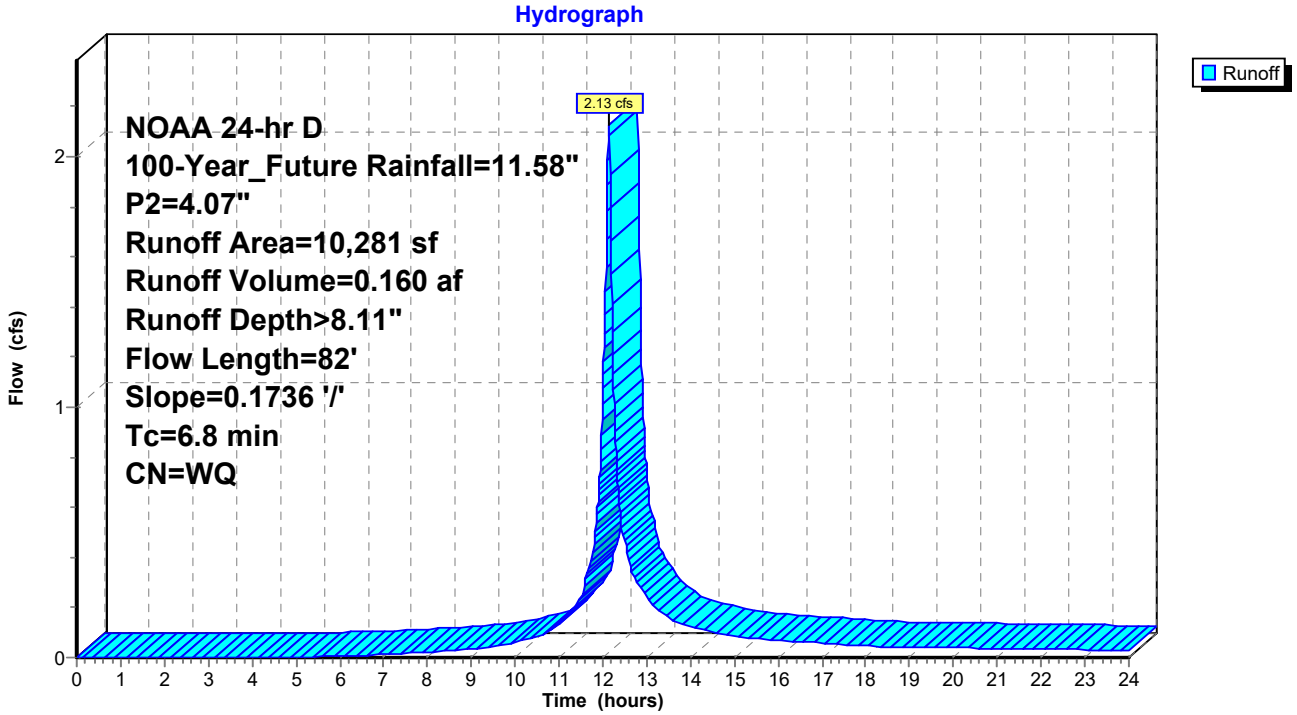
Runoff = 2.13 cfs @ 12.14 hrs, Volume= 0.160 af, Depth> 8.11"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	82	0.1736	0.20		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.00
2.00	0.28	0.00	0.00
2.50	0.36	0.00	0.00
3.00	0.44	0.00	0.00
3.50	0.52	0.00	0.00
4.00	0.61	0.00	0.00
4.50	0.70	0.00	0.00
5.00	0.79	0.00	0.00
5.50	0.89	0.01	0.00
6.00	0.99	0.02	0.01
6.50	1.10	0.03	0.01
7.00	1.22	0.06	0.01
7.50	1.35	0.09	0.02
8.00	1.50	0.13	0.02
8.50	1.66	0.18	0.03
9.00	1.84	0.25	0.03
9.50	2.04	0.34	0.05
10.00	2.30	0.46	0.06
10.50	2.59	0.62	0.08
11.00	3.01	0.86	0.14
11.50	3.67	1.30	0.24
12.00	5.55	2.72	**1.07**
12.50	7.91	4.73	**0.46**
13.00	8.57	5.32	0.24
13.50	8.99	5.69	0.16
14.00	9.28	5.96	0.12
14.50	9.54	6.19	0.10
15.00	9.74	6.38	0.08
15.50	9.92	6.54	0.07
16.00	10.08	6.69	0.07
16.50	10.23	6.82	0.06
17.00	10.36	6.95	0.06
17.50	10.48	7.06	0.05
18.00	10.59	7.16	0.05
18.50	10.69	7.26	0.04
19.00	10.79	7.35	0.04
19.50	10.88	7.43	0.04
20.00	10.97	7.52	0.04
20.50	11.06	7.60	0.04
21.00	11.14	7.68	0.04
21.50	11.22	7.75	0.04
22.00	11.30	7.82	0.03
22.50	11.38	7.89	0.03
23.00	11.45	7.96	0.03
23.50	11.52	8.02	0.03
24.00	**11.58**	**8.08**	0.03

Summary for Subcatchment 13S: PO-DA K

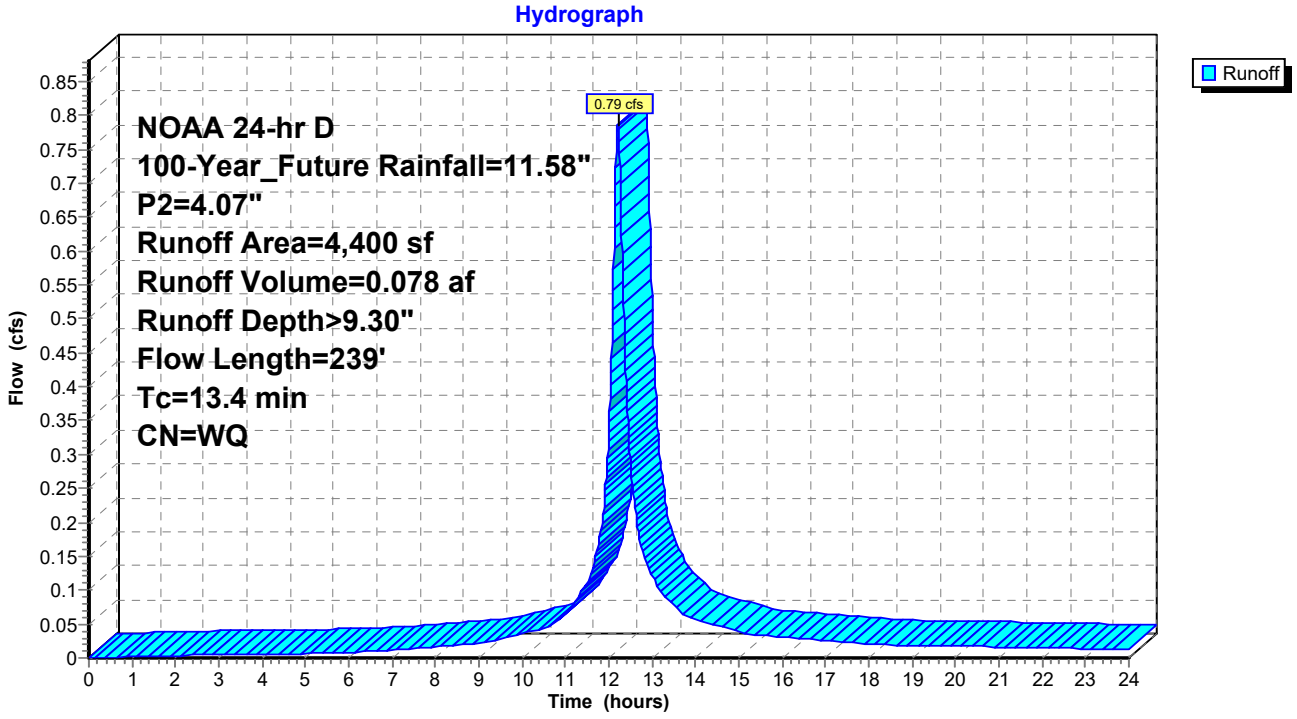
Runoff = 0.79 cfs @ 12.21 hrs, Volume= 0.078 af, Depth> 9.30"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0772	0.15		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
13.4	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.00
2.00	0.28	0.00	0.00
2.50	0.36	0.00	0.00
3.00	0.44	0.00	0.00
3.50	0.52	0.00	0.00
4.00	0.61	0.01	0.01
4.50	0.70	0.03	0.01
5.00	0.79	0.05	0.01
5.50	0.89	0.08	0.01
6.00	0.99	0.11	0.01
6.50	1.10	0.15	0.01
7.00	1.22	0.20	0.01
7.50	1.35	0.27	0.01
8.00	1.50	0.35	0.02
8.50	1.66	0.44	0.02
9.00	1.84	0.54	0.02
9.50	2.04	0.68	0.03
10.00	2.30	0.85	0.04
10.50	2.59	1.07	0.04
11.00	3.01	1.39	0.07
11.50	3.67	1.92	0.11
12.00	5.55	3.57	**0.33**
12.50	7.91	5.77	**0.29**
13.00	8.57	6.40	0.12
13.50	8.99	6.80	0.08
14.00	9.28	7.09	0.06
14.50	9.54	7.33	0.05
15.00	9.74	7.53	0.04
15.50	9.92	7.70	0.03
16.00	10.08	7.85	0.03
16.50	10.23	7.99	0.03
17.00	10.36	8.12	0.03
17.50	10.48	8.24	0.02
18.00	10.59	8.35	0.02
18.50	10.69	8.44	0.02
19.00	10.79	8.54	0.02
19.50	10.88	8.63	0.02
20.00	10.97	8.72	0.02
20.50	11.06	8.80	0.02
21.00	11.14	8.88	0.02
21.50	11.22	8.96	0.02
22.00	11.30	9.04	0.02
22.50	11.38	9.11	0.01
23.00	11.45	9.18	0.01
23.50	11.52	9.24	0.01
24.00	**11.58**	**9.31**	0.01

Summary for Subcatchment 14S: PO-DA L

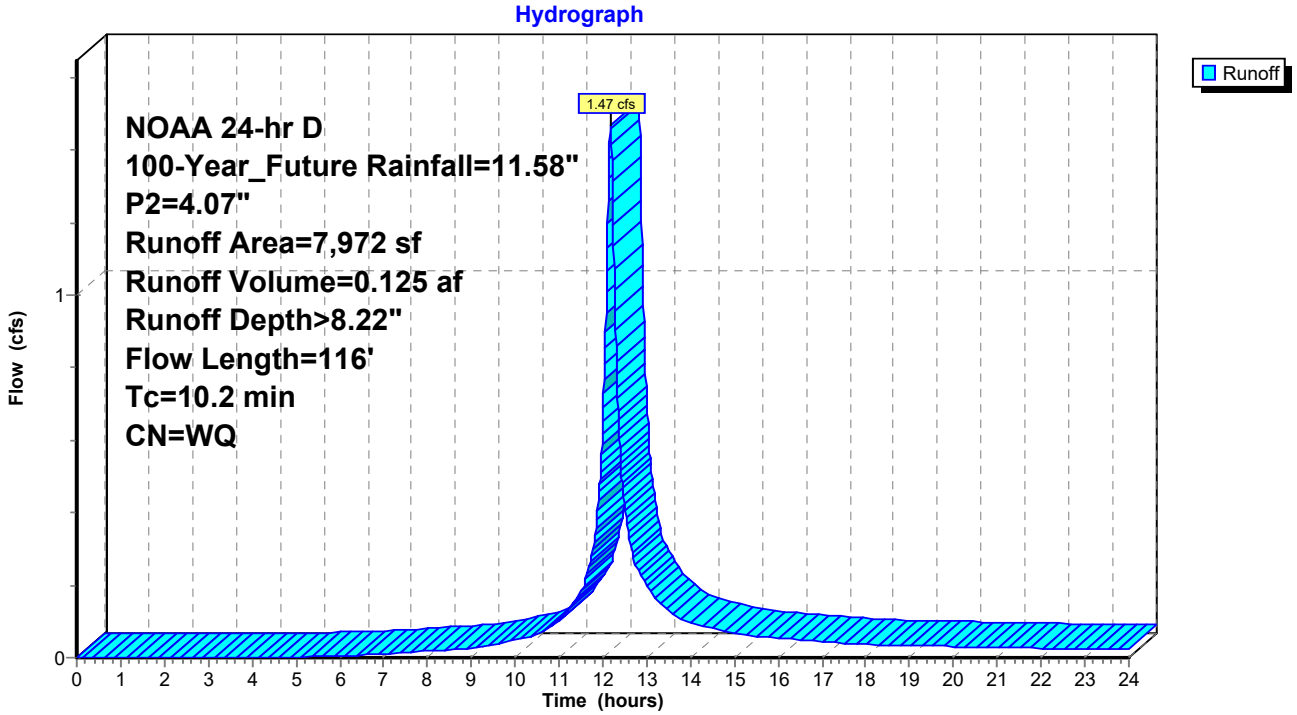
Runoff = 1.47 cfs @ 12.18 hrs, Volume= 0.125 af, Depth> 8.22"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1003	0.17		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 4.07"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
10.2	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.00
2.00	0.28	0.00	0.00
2.50	0.36	0.00	0.00
3.00	0.44	0.00	0.00
3.50	0.52	0.00	0.00
4.00	0.61	0.00	0.00
4.50	0.70	0.00	0.00
5.00	0.79	0.00	0.00
5.50	0.89	0.01	0.00
6.00	0.99	0.02	0.01
6.50	1.10	0.04	0.01
7.00	1.22	0.07	0.01
7.50	1.35	0.10	0.01
8.00	1.50	0.15	0.02
8.50	1.66	0.21	0.02
9.00	1.84	0.28	0.03
9.50	2.04	0.37	0.04
10.00	2.30	0.50	0.05
10.50	2.59	0.66	0.06
11.00	3.01	0.91	0.10
11.50	3.67	1.36	0.18
12.00	5.55	2.81	**0.65**
12.50	7.91	4.84	**0.41**
13.00	8.57	5.44	0.20
13.50	8.99	5.82	0.13
14.00	9.28	6.09	0.10
14.50	9.54	6.32	0.08
15.00	9.74	6.51	0.07
15.50	9.92	6.67	0.06
16.00	10.08	6.82	0.05
16.50	10.23	6.96	0.05
17.00	10.36	7.08	0.05
17.50	10.48	7.19	0.04
18.00	10.59	7.30	0.04
18.50	10.69	7.39	0.03
19.00	10.79	7.48	0.03
19.50	10.88	7.57	0.03
20.00	10.97	7.65	0.03
20.50	11.06	7.73	0.03
21.00	11.14	7.81	0.03
21.50	11.22	7.89	0.03
22.00	11.30	7.96	0.03
22.50	11.38	8.03	0.03
23.00	11.45	8.10	0.02
23.50	11.52	8.16	0.02
24.00	**11.58**	**8.22**	0.02

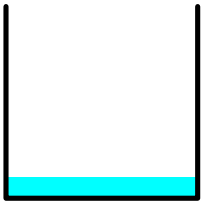
Summary for Reach 3R: TD-01

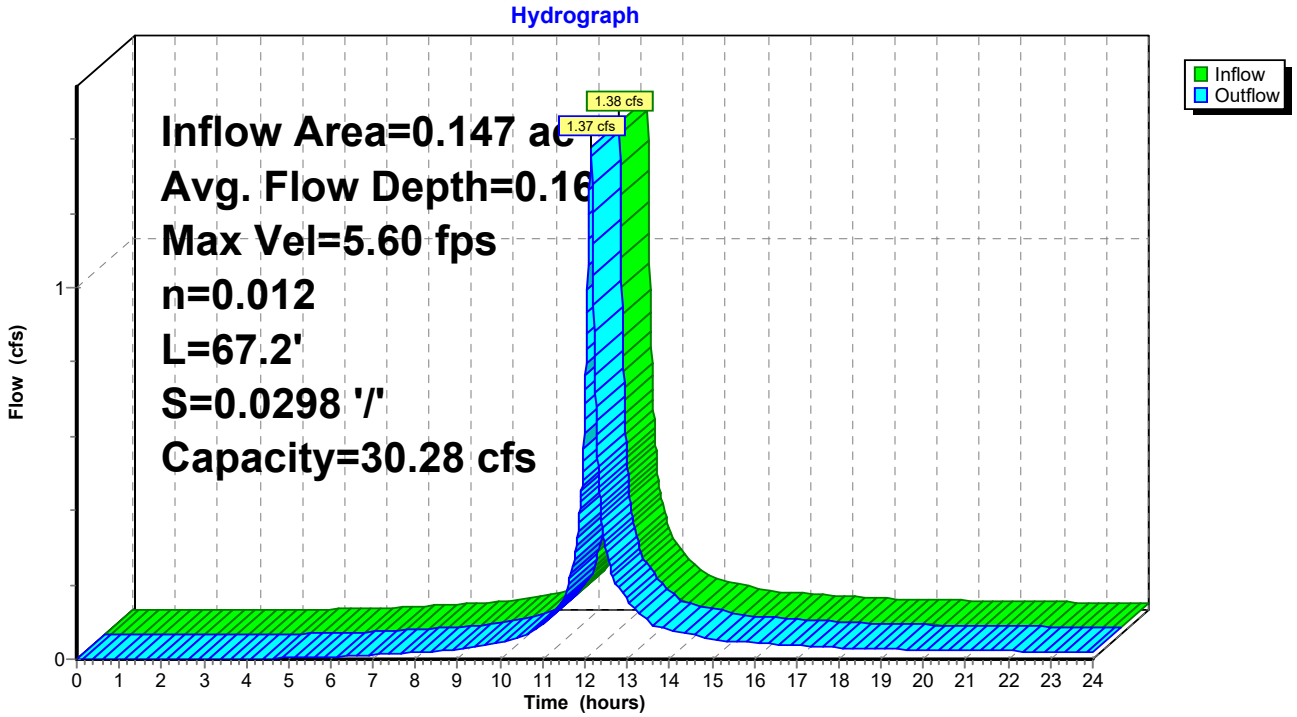
Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 8.62" for 100-Year_Future event
Inflow = 1.38 cfs @ 12.14 hrs, Volume= 0.106 af
Outflow = 1.37 cfs @ 12.14 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 5.60 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 0.7 min

Peak Storage= 16 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'





Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.01	0	606.00	0.01
6.50	0.01	0	606.00	0.01
7.00	0.01	1	606.01	0.01
7.50	0.01	1	606.01	0.01
8.00	0.02	1	606.01	0.02
8.50	0.02	1	606.01	0.02
9.00	0.03	1	606.01	0.03
9.50	0.03	2	606.02	0.03
10.00	0.05	2	606.02	0.05
10.50	0.06	2	606.02	0.06
11.00	0.09	3	606.03	0.09
11.50	0.16	4	606.04	0.16
12.00	**0.70**	**11**	**606.11**	**0.69**
12.50	**0.30**	**6**	**606.06**	**0.30**
13.00	0.16	4	606.04	0.16
13.50	0.10	3	606.03	0.10
14.00	0.08	3	606.03	0.08
14.50	0.07	2	606.02	0.07
15.00	0.05	2	606.02	0.05
15.50	0.05	2	606.02	0.05
16.00	0.04	2	606.02	0.04
16.50	0.04	2	606.02	0.04
17.00	0.04	2	606.02	0.04
17.50	0.03	2	606.02	0.03
18.00	0.03	2	606.02	0.03
18.50	0.03	1	606.01	0.03
19.00	0.03	1	606.01	0.03
19.50	0.03	1	606.01	0.03
20.00	0.03	1	606.01	0.03
20.50	0.02	1	606.01	0.02
21.00	0.02	1	606.01	0.02
21.50	0.02	1	606.01	0.02
22.00	0.02	1	606.01	0.02
22.50	0.02	1	606.01	0.02
23.00	0.02	1	606.01	0.02
23.50	0.02	1	606.01	0.02
24.00	0.02	1	606.01	0.02

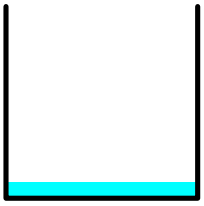
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 8.39" for 100-Year_Future event
Inflow = 0.84 cfs @ 12.12 hrs, Volume= 0.060 af
Outflow = 0.84 cfs @ 12.12 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 15P : SD-06, SD-07, SD-08

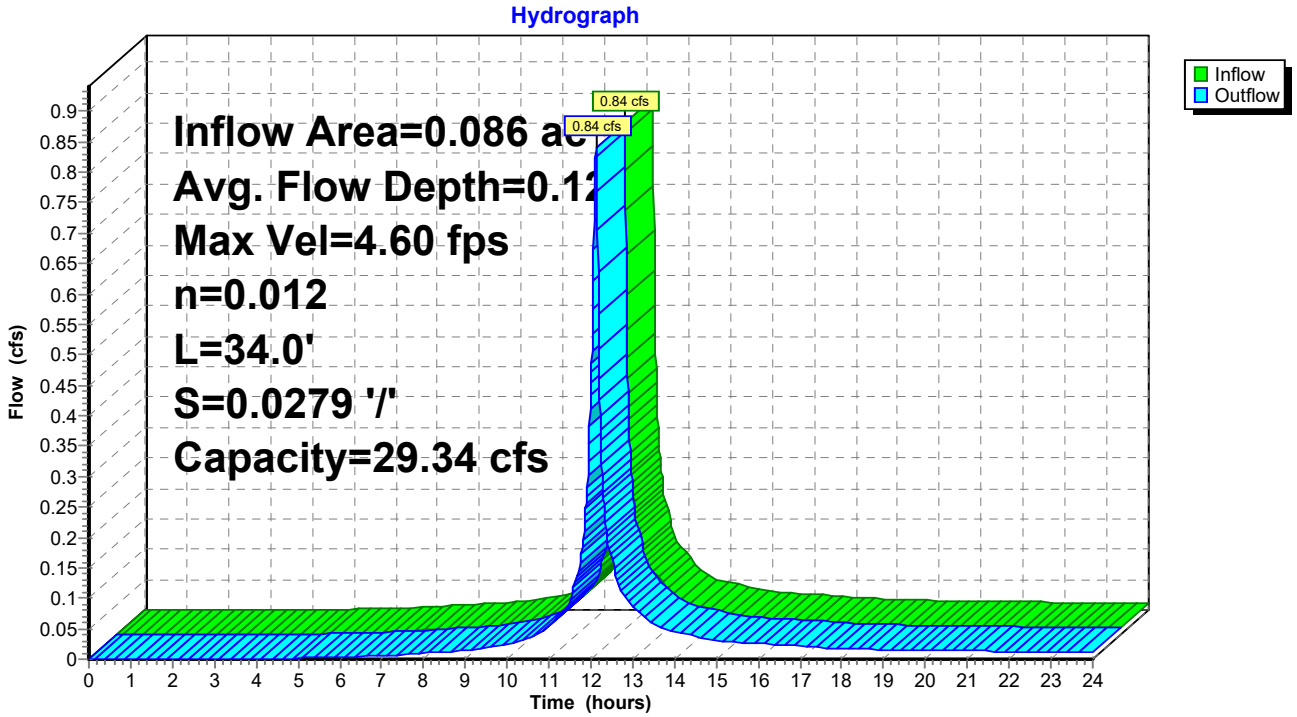
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 4.60 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 0.4 min

Peak Storage= 6 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.01	0	604.25	0.01
7.50	0.01	0	604.25	0.01
8.00	0.01	0	604.26	0.01
8.50	0.01	0	604.26	0.01
9.00	0.01	0	604.26	0.01
9.50	0.02	1	604.26	0.02
10.00	0.03	1	604.26	0.03
10.50	0.03	1	604.27	0.03
11.00	0.05	1	604.27	0.05
11.50	0.09	2	604.28	0.09
12.00	**0.46**	**4**	**604.33**	**0.46**
12.50	**0.17**	**2**	**604.29**	**0.17**
13.00	0.09	2	604.28	0.09
13.50	0.06	1	604.27	0.06
14.00	0.05	1	604.27	0.05
14.50	0.04	1	604.27	0.04
15.00	0.03	1	604.27	0.03
15.50	0.03	1	604.26	0.03
16.00	0.03	1	604.26	0.03
16.50	0.02	1	604.26	0.02
17.00	0.02	1	604.26	0.02
17.50	0.02	1	604.26	0.02
18.00	0.02	0	604.26	0.02
18.50	0.02	0	604.26	0.02
19.00	0.02	0	604.26	0.02
19.50	0.02	0	604.26	0.02
20.00	0.01	0	604.26	0.01
20.50	0.01	0	604.26	0.01
21.00	0.01	0	604.26	0.01
21.50	0.01	0	604.26	0.01
22.00	0.01	0	604.26	0.01
22.50	0.01	0	604.26	0.01
23.00	0.01	0	604.26	0.01
23.50	0.01	0	604.26	0.01
24.00	0.01	0	604.26	0.01

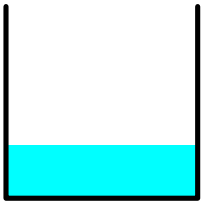
Summary for Reach 5R: TD-03

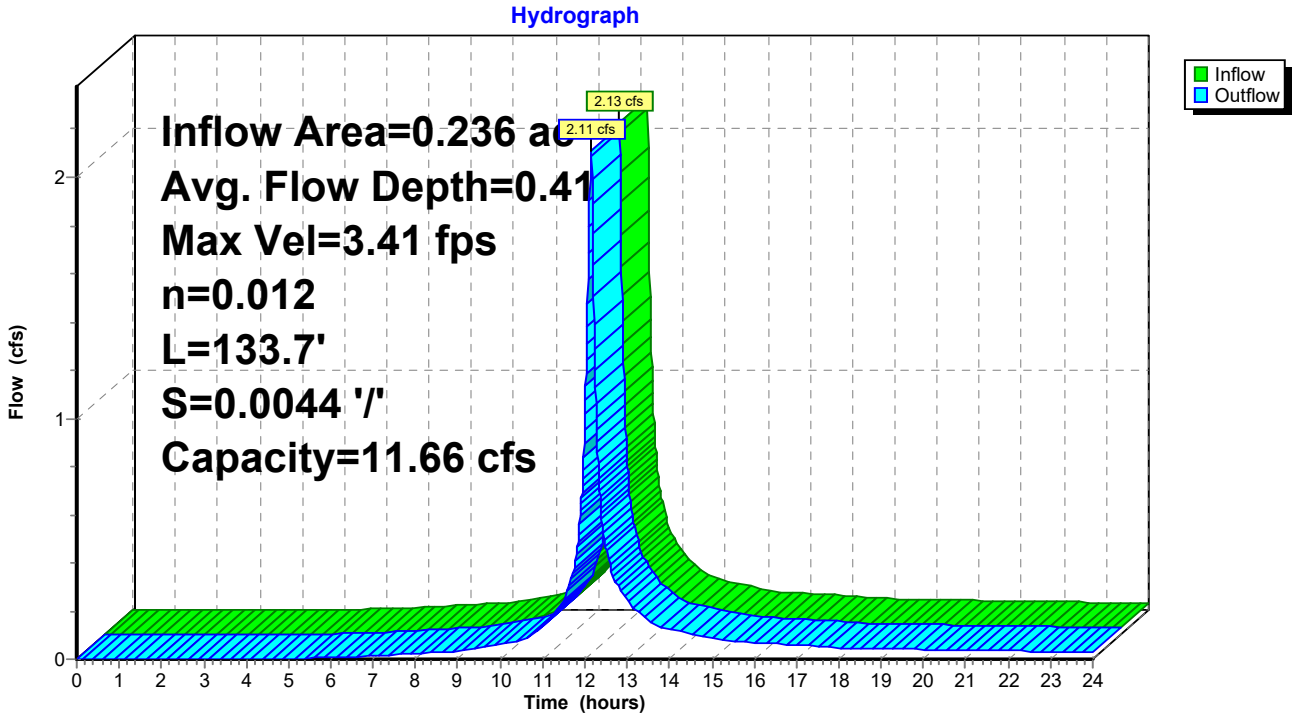
Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 8.11" for 100-Year_Future event
Inflow = 2.13 cfs @ 12.14 hrs, Volume= 0.160 af
Outflow = 2.11 cfs @ 12.15 hrs, Volume= 0.159 af, Atten= 1%, Lag= 0.4 min
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.41 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 2.3 min

Peak Storage= 83 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'





Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	1	601.81	0.00
6.00	0.01	1	601.82	0.01
6.50	0.01	2	601.82	0.01
7.00	0.01	3	601.83	0.01
7.50	0.02	4	601.83	0.02
8.00	0.02	4	601.83	0.02
8.50	0.03	5	601.84	0.03
9.00	0.03	6	601.84	0.03
9.50	0.05	7	601.85	0.05
10.00	0.06	9	601.85	0.06
10.50	0.08	10	601.86	0.08
11.00	0.14	14	601.88	0.13
11.50	0.24	20	601.91	0.24
12.00	**1.07**	**50**	**602.06**	**1.02**
12.50	**0.46**	**30**	**601.96**	**0.47**
13.00	0.24	20	601.91	0.25
13.50	0.16	15	601.89	0.16
14.00	0.12	13	601.88	0.12
14.50	0.10	12	601.87	0.10
15.00	0.08	10	601.86	0.08
15.50	0.07	10	601.86	0.07
16.00	0.07	9	601.86	0.07
16.50	0.06	9	601.85	0.06
17.00	0.06	8	601.85	0.06
17.50	0.05	8	601.85	0.05
18.00	0.05	7	601.85	0.05
18.50	0.04	7	601.84	0.04
19.00	0.04	7	601.84	0.04
19.50	0.04	7	601.84	0.04
20.00	0.04	6	601.84	0.04
20.50	0.04	6	601.84	0.04
21.00	0.04	6	601.84	0.04
21.50	0.04	6	601.84	0.04
22.00	0.03	6	601.84	0.03
22.50	0.03	6	601.84	0.03
23.00	0.03	6	601.84	0.03
23.50	0.03	5	601.84	0.03
24.00	0.03	5	601.84	0.03

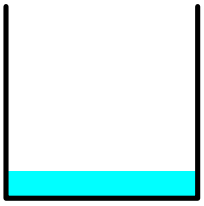
Summary for Reach 6R: TD-04

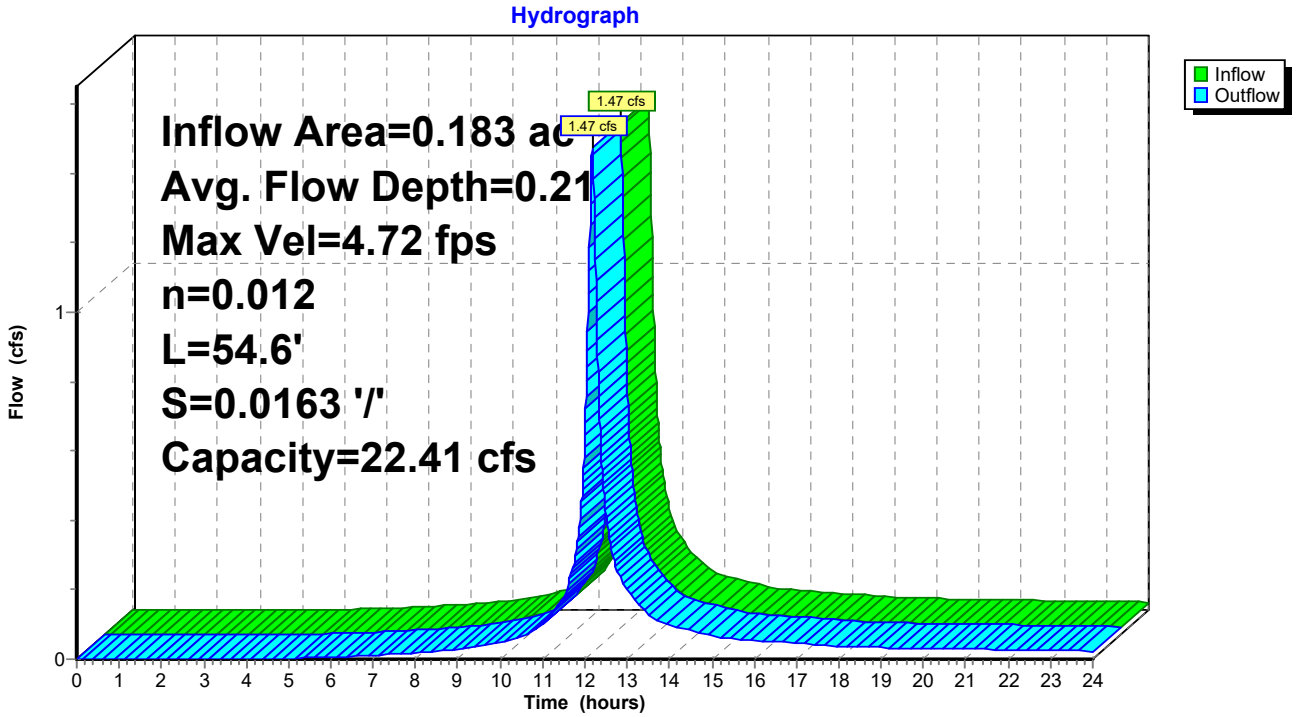
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 8.22" for 100-Year_Future event
Inflow = 1.47 cfs @ 12.18 hrs, Volume= 0.125 af
Outflow = 1.47 cfs @ 12.18 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 4.72 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 0.7 min

Peak Storage= 17 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

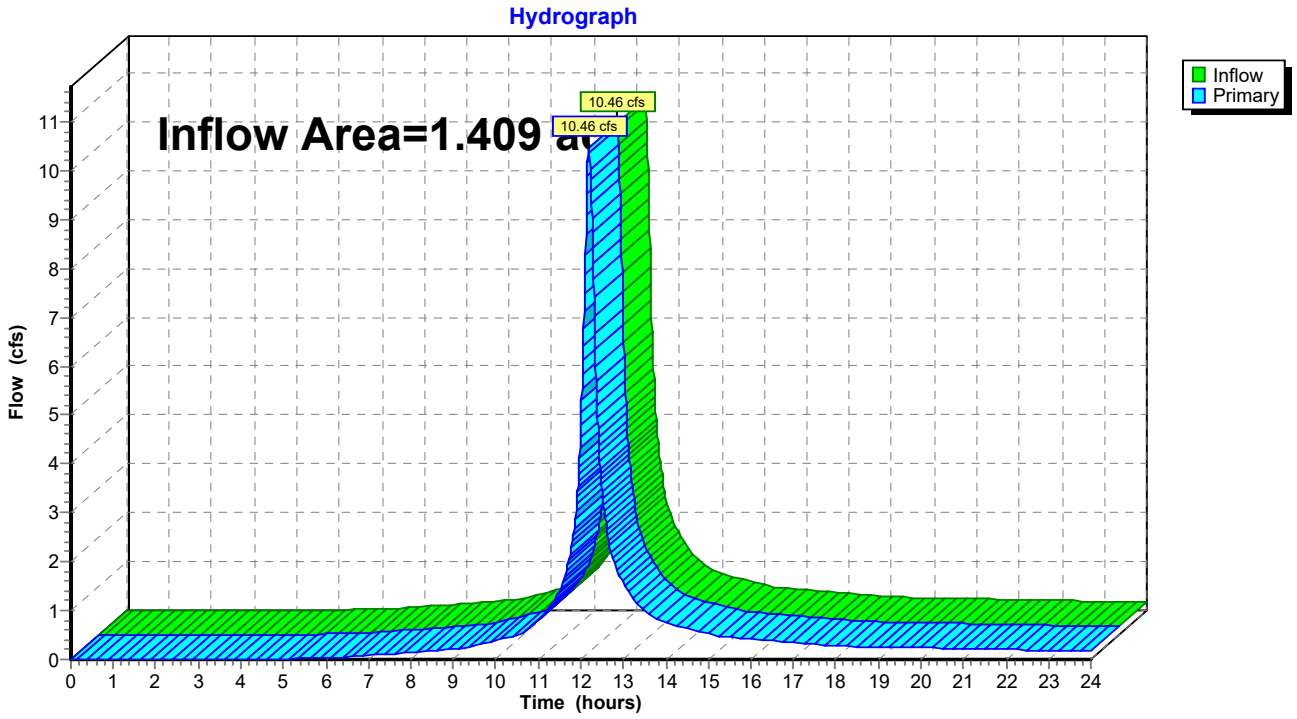
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.01	0	600.77	0.01
6.50	0.01	0	600.78	0.01
7.00	0.01	1	600.78	0.01
7.50	0.01	1	600.78	0.01
8.00	0.02	1	600.78	0.02
8.50	0.02	1	600.79	0.02
9.00	0.03	1	600.79	0.03
9.50	0.04	2	600.79	0.04
10.00	0.05	2	600.79	0.05
10.50	0.06	2	600.80	0.06
11.00	0.10	3	600.81	0.10
11.50	0.18	4	600.82	0.18
12.00	**0.65**	**10**	**600.89**	**0.65**
12.50	**0.41**	**8**	**600.86**	**0.41**
13.00	0.20	5	600.83	0.20
13.50	0.13	4	600.82	0.13
14.00	0.10	3	600.81	0.10
14.50	0.08	3	600.80	0.08
15.00	0.07	2	600.80	0.07
15.50	0.06	2	600.80	0.06
16.00	0.05	2	600.80	0.05
16.50	0.05	2	600.79	0.05
17.00	0.05	2	600.79	0.05
17.50	0.04	2	600.79	0.04
18.00	0.04	2	600.79	0.04
18.50	0.03	2	600.79	0.03
19.00	0.03	2	600.79	0.03
19.50	0.03	2	600.79	0.03
20.00	0.03	1	600.79	0.03
20.50	0.03	1	600.79	0.03
21.00	0.03	1	600.79	0.03
21.50	0.03	1	600.79	0.03
22.00	0.03	1	600.79	0.03
22.50	0.03	1	600.79	0.03
23.00	0.02	1	600.79	0.02
23.50	0.02	1	600.79	0.02
24.00	0.02	1	600.79	0.02

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 8.28" for 100-Year_Future event
Inflow = 10.46 cfs @ 12.18 hrs, Volume= 0.972 af
Primary = 10.46 cfs @ 12.18 hrs, Volume= 0.972 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.02		0.02
6.00	0.03		0.03
6.50	0.04		0.04
7.00	0.09		0.09
7.50	0.11		0.11
8.00	0.15		0.15
8.50	0.18		0.18
9.00	0.22		0.22
9.50	0.29		0.29
10.00	0.39		0.39
10.50	0.50		0.50
11.00	0.79		0.79
11.50	1.39		1.39
12.00	**4.80**		**4.80**
12.50	**3.40**		**3.40**
13.00	1.59		1.59
13.50	1.01		1.01
14.00	0.76		0.76
14.50	0.64		0.64
15.00	0.52		0.52
15.50	0.45		0.45
16.00	0.42		0.42
16.50	0.39		0.39
17.00	0.35		0.35
17.50	0.32		0.32
18.00	0.28		0.28
18.50	0.26		0.26
19.00	0.26		0.26
19.50	0.25		0.25
20.00	0.24		0.24
20.50	0.23		0.23
21.00	0.22		0.22
21.50	0.21		0.21
22.00	0.21		0.21
22.50	0.20		0.20
23.00	0.19		0.19
23.50	0.18		0.18
24.00	0.17		0.17

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 8.21" for 100-Year_Future event
Inflow = 5.81 cfs @ 12.19 hrs, Volume= 0.550 af
Outflow = 5.81 cfs @ 12.20 hrs, Volume= 0.549 af, Atten= 0%, Lag= 0.3 min
Primary = 5.81 cfs @ 12.20 hrs, Volume= 0.549 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.18' @ 12.20 hrs Surf.Area= 108 sf Storage= 91 cf

Plug-Flow detention time= 0.4 min calculated for 0.549 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (813.0 - 812.7)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)** Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)** Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)** Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

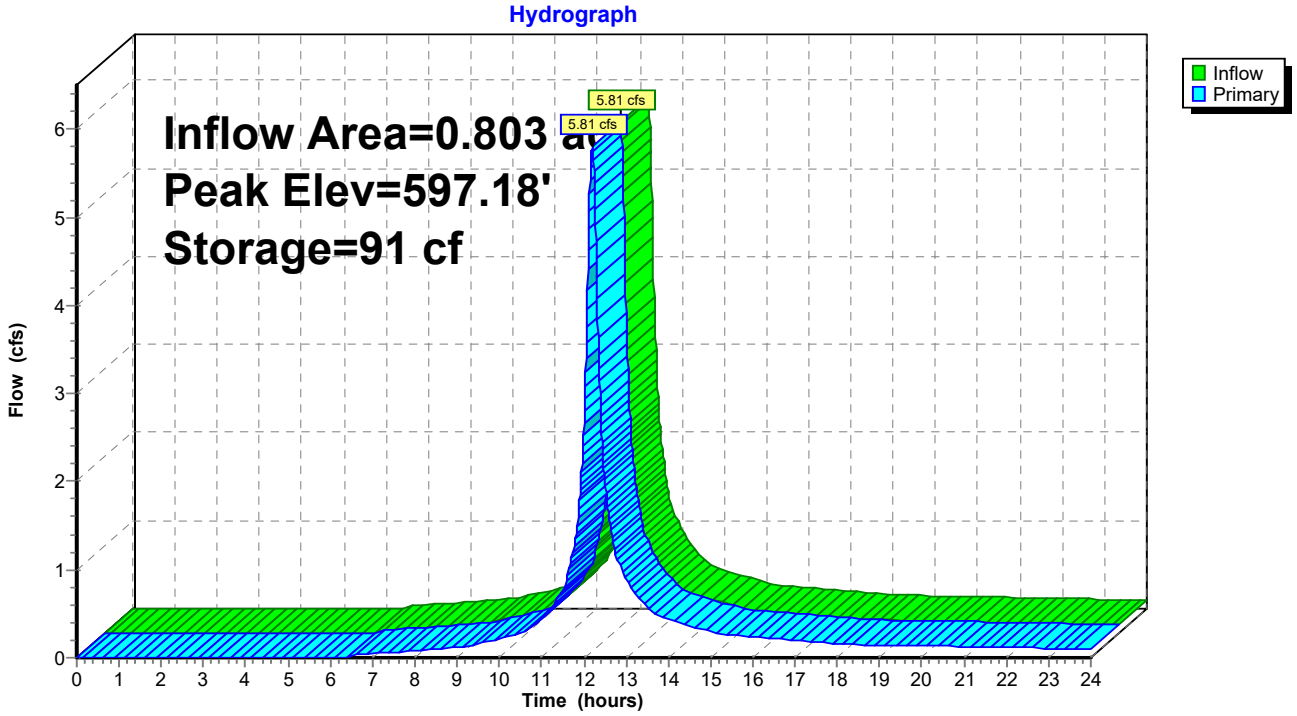
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.80 cfs @ 12.20 hrs HW=597.18' TW=595.23' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 5.80 cfs @ 3.76 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	1	595.78	0.00
4.50	0.00	3	595.97	0.00
5.00	0.00	4	595.98	0.00
5.50	0.00	4	595.99	0.00
6.00	0.01	4	595.99	0.01
6.50	0.01	4	596.00	0.01
7.00	0.05	5	596.05	0.05
7.50	0.06	5	596.07	0.06
8.00	0.08	5	596.08	0.08
8.50	0.10	6	596.10	0.10
9.00	0.12	6	596.11	0.12
9.50	0.16	6	596.13	0.16
10.00	0.22	7	596.16	0.22
10.50	0.28	8	596.19	0.28
11.00	0.44	10	596.25	0.44
11.50	0.78	15	596.35	0.78
12.00	**2.72**	**42**	**596.72**	**2.67**
12.50	**1.96**	**33**	**596.60**	**1.97**
13.00	0.91	17	596.38	0.91
13.50	0.58	12	596.30	0.58
14.00	0.43	10	596.25	0.43
14.50	0.37	9	596.22	0.37
15.00	0.30	8	596.20	0.30
15.50	0.26	8	596.18	0.26
16.00	0.24	7	596.17	0.24
16.50	0.22	7	596.16	0.22
17.00	0.20	7	596.15	0.20
17.50	0.18	7	596.14	0.18
18.00	0.16	6	596.13	0.16
18.50	0.15	6	596.13	0.15
19.00	0.15	6	596.12	0.15
19.50	0.14	6	596.12	0.14
20.00	0.14	6	596.12	0.14
20.50	0.13	6	596.12	0.13
21.00	0.13	6	596.11	0.13
21.50	0.12	6	596.11	0.12
22.00	0.12	6	596.11	0.12
22.50	0.11	6	596.10	0.11
23.00	0.11	6	596.10	0.11
23.50	0.10	6	596.10	0.10
24.00	0.10	6	596.09	0.10

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 8.23" for 100-Year_Future event
Inflow = 6.31 cfs @ 12.18 hrs, Volume= 0.609 af
Outflow = 6.31 cfs @ 12.19 hrs, Volume= 0.609 af, Atten= 0%, Lag= 0.5 min
Primary = 6.31 cfs @ 12.19 hrs, Volume= 0.609 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.23' @ 12.19 hrs Surf.Area= 176 sf Storage= 115 cf

Plug-Flow detention time= 0.3 min calculated for 0.609 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (812.3 - 812.1)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

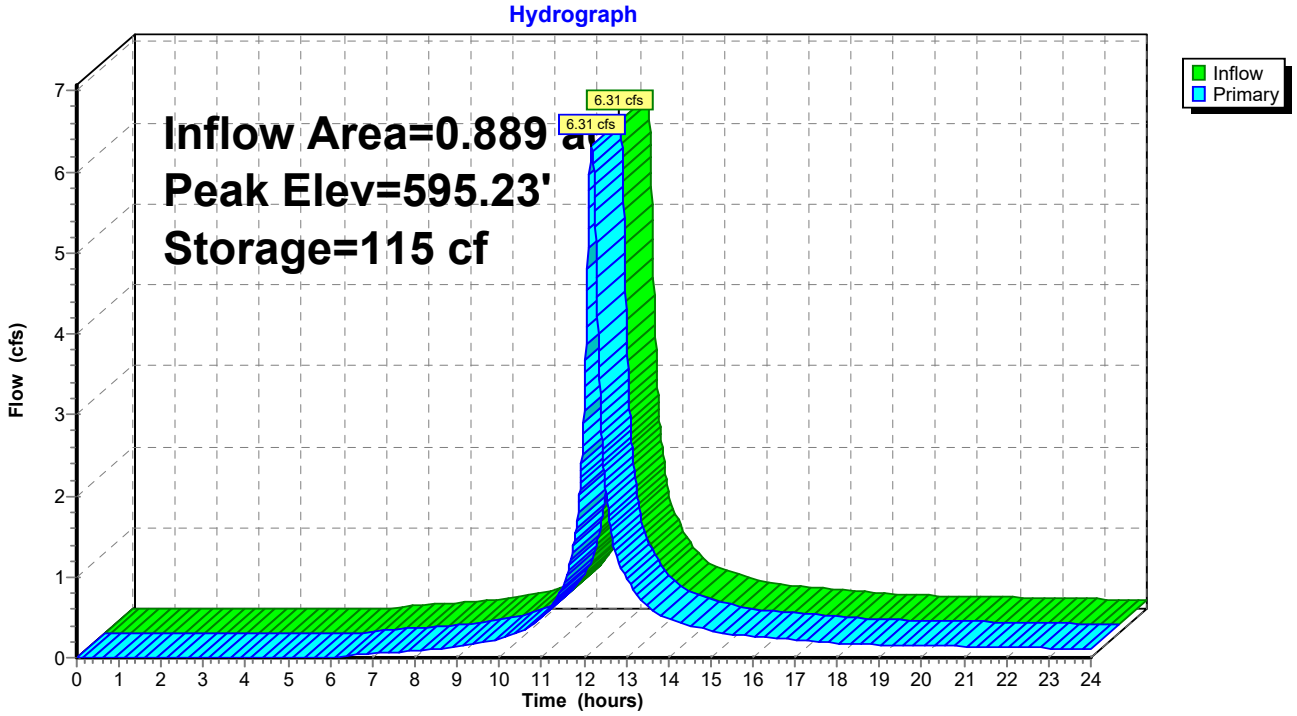
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.30 cfs @ 12.19 hrs HW=595.23' TW=594.50' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 6.30 cfs @ 3.88 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.94	0.00
4.50	0.00	0	593.94	0.00
5.00	0.00	0	593.96	0.00
5.50	0.01	1	593.96	0.01
6.00	0.01	1	593.97	0.01
6.50	0.01	1	593.98	0.01
7.00	0.05	2	594.03	0.05
7.50	0.07	2	594.04	0.07
8.00	0.09	2	594.06	0.09
8.50	0.11	2	594.07	0.11
9.00	0.13	3	594.09	0.13
9.50	0.18	3	594.11	0.18
10.00	0.24	4	594.14	0.24
10.50	0.31	5	594.17	0.31
11.00	0.50	7	594.24	0.49
11.50	0.87	12	594.34	0.87
12.00	**3.12**	**46**	**594.75**	**3.05**
12.50	**2.14**	**31**	**594.61**	**2.16**
13.00	1.00	14	594.38	1.00
13.50	0.64	9	594.28	0.64
14.00	0.48	7	594.23	0.48
14.50	0.40	6	594.21	0.40
15.00	0.33	5	594.18	0.33
15.50	0.28	5	594.16	0.28
16.00	0.26	5	594.15	0.26
16.50	0.24	4	594.14	0.24
17.00	0.22	4	594.13	0.22
17.50	0.20	4	594.12	0.20
18.00	0.18	3	594.11	0.18
18.50	0.17	3	594.11	0.17
19.00	0.16	3	594.10	0.16
19.50	0.16	3	594.10	0.16
20.00	0.15	3	594.10	0.15
20.50	0.15	3	594.09	0.15
21.00	0.14	3	594.09	0.14
21.50	0.14	3	594.09	0.14
22.00	0.13	3	594.09	0.13
22.50	0.12	3	594.08	0.12
23.00	0.12	3	594.08	0.12
23.50	0.11	3	594.08	0.11
24.00	0.11	2	594.07	0.11

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 8.20" for 100-Year_Future event
Inflow = 8.29 cfs @ 12.16 hrs, Volume= 0.769 af
Outflow = 8.28 cfs @ 12.17 hrs, Volume= 0.769 af, Atten= 0%, Lag= 0.4 min
Primary = 8.28 cfs @ 12.17 hrs, Volume= 0.769 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.53' @ 12.17 hrs Surf.Area= 99 sf Storage= 176 cf

Plug-Flow detention time= 0.5 min calculated for 0.769 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (812.4 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

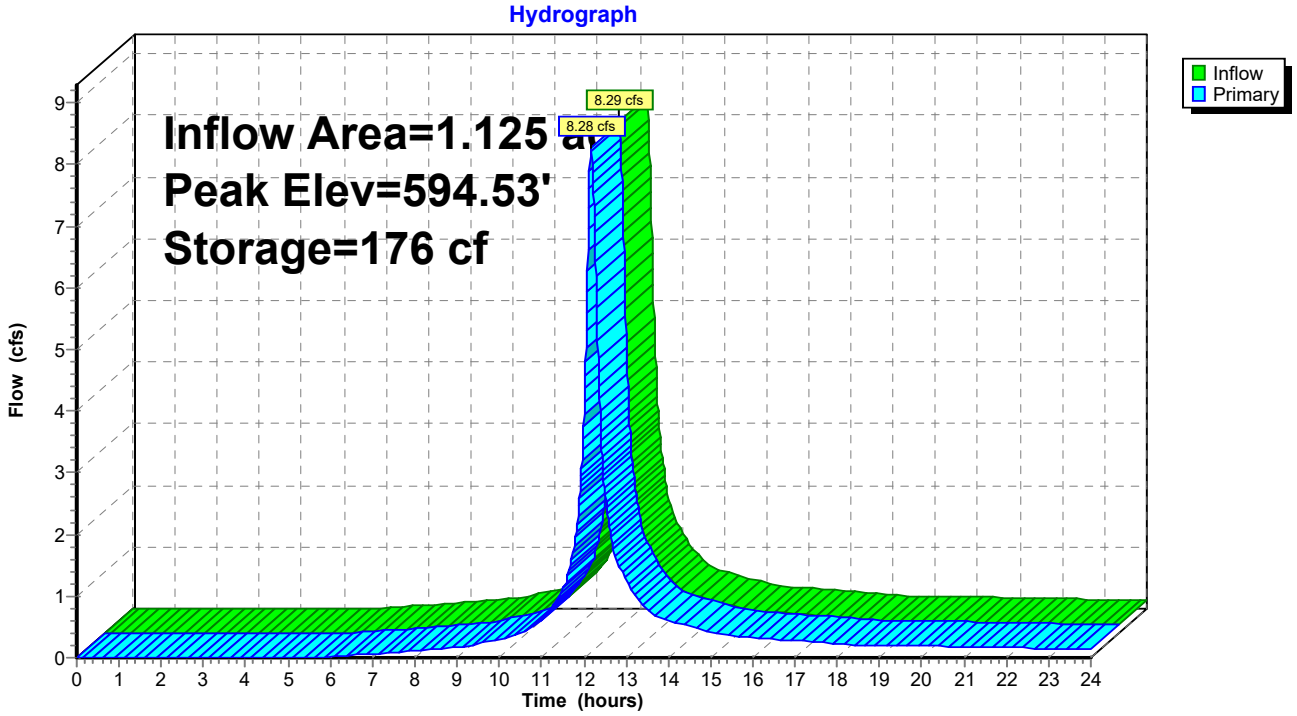
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.28 cfs @ 12.17 hrs HW=594.53' TW=593.03' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 8.28 cfs @ 4.68 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.59	0.00
4.50	0.00	1	592.69	0.00
5.00	0.01	4	592.86	0.00
5.50	0.01	4	592.87	0.01
6.00	0.01	5	592.88	0.01
6.50	0.02	5	592.89	0.02
7.00	0.06	6	592.94	0.06
7.50	0.09	7	592.96	0.09
8.00	0.11	7	592.97	0.11
8.50	0.14	8	592.99	0.14
9.00	0.17	9	593.01	0.17
9.50	0.23	10	593.04	0.23
10.00	0.30	11	593.07	0.30
10.50	0.39	13	593.10	0.39
11.00	0.63	17	593.18	0.62
11.50	1.11	25	593.30	1.10
12.00	**4.07**	**77**	**593.79**	**3.95**
12.50	**2.63**	**52**	**593.59**	**2.66**
13.00	1.25	27	593.33	1.26
13.50	0.80	20	593.23	0.80
14.00	0.60	16	593.17	0.60
14.50	0.51	15	593.14	0.51
15.00	0.41	13	593.11	0.42
15.50	0.36	12	593.09	0.36
16.00	0.33	12	593.08	0.33
16.50	0.31	11	593.07	0.31
17.00	0.28	11	593.06	0.28
17.50	0.25	10	593.05	0.25
18.00	0.23	10	593.04	0.23
18.50	0.21	10	593.03	0.21
19.00	0.20	9	593.03	0.20
19.50	0.20	9	593.02	0.20
20.00	0.19	9	593.02	0.19
20.50	0.18	9	593.02	0.18
21.00	0.18	9	593.01	0.18
21.50	0.17	9	593.01	0.17
22.00	0.16	9	593.00	0.16
22.50	0.16	8	593.00	0.16
23.00	0.15	8	593.00	0.15
23.50	0.14	8	592.99	0.14
24.00	0.14	8	592.99	0.14

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 8.20" for 100-Year_Future event
Inflow = 9.74 cfs @ 12.17 hrs, Volume= 0.894 af
Outflow = 9.69 cfs @ 12.18 hrs, Volume= 0.894 af, Atten= 1%, Lag= 0.7 min
Primary = 9.69 cfs @ 12.18 hrs, Volume= 0.894 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 593.05' @ 12.18 hrs Surf.Area= 141 sf Storage= 256 cf

Plug-Flow detention time= 0.6 min calculated for 0.894 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (812.5 - 812.1)

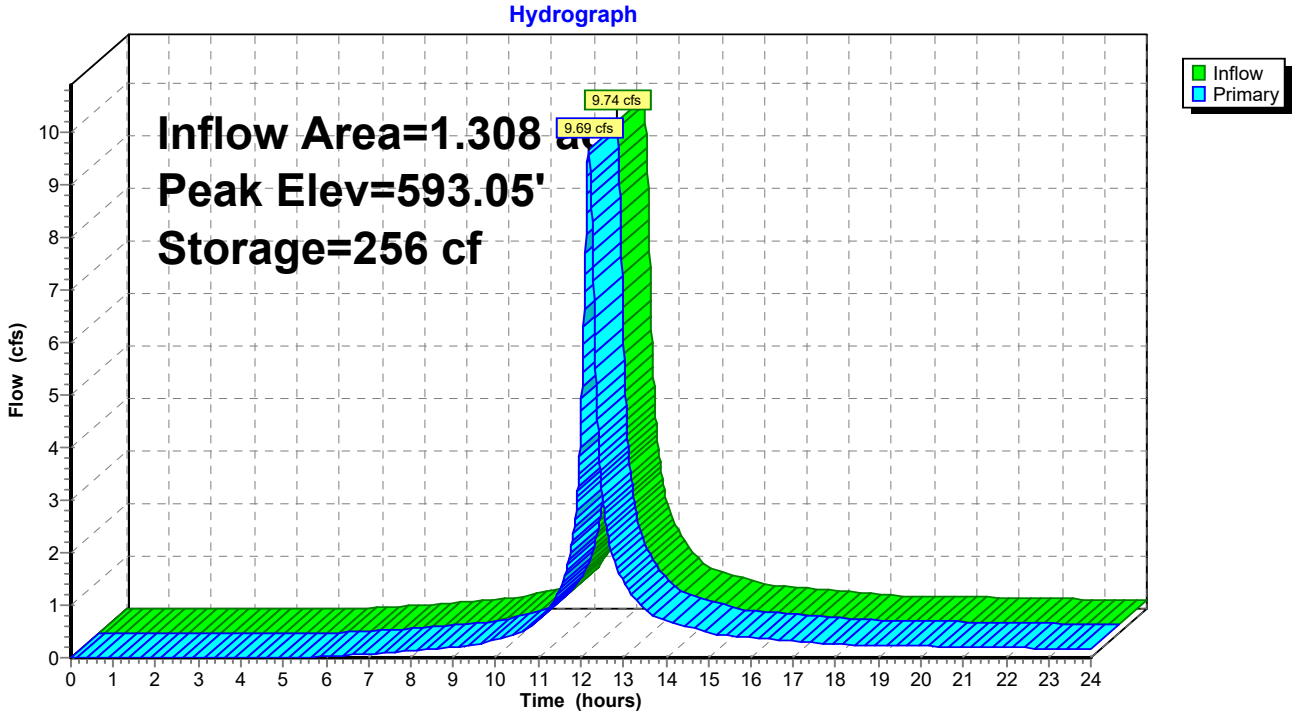
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.68 cfs @ 12.18 hrs HW=593.04' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 9.68 cfs @ 5.48 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.27	0.00
4.00	0.00	1	590.31	0.00
4.50	0.00	2	590.39	0.00
5.00	0.01	7	590.80	0.00
5.50	0.01	10	591.05	0.01
6.00	0.02	10	591.06	0.02
6.50	0.03	11	591.07	0.03
7.00	0.08	11	591.12	0.07
7.50	0.10	12	591.14	0.10
8.00	0.13	12	591.15	0.13
8.50	0.16	13	591.17	0.16
9.00	0.19	13	591.19	0.19
9.50	0.26	14	591.22	0.26
10.00	0.35	15	591.26	0.35
10.50	0.45	16	591.29	0.45
11.00	0.73	20	591.38	0.72
11.50	1.28	27	591.51	1.28
12.00	**4.60**	**82**	**592.03**	**4.46**
12.50	**3.07**	**56**	**591.83**	**3.11**
13.00	1.46	30	591.55	1.46
13.50	0.93	23	591.43	0.94
14.00	0.70	20	591.37	0.70
14.50	0.59	18	591.34	0.59
15.00	0.48	17	591.30	0.48
15.50	0.42	16	591.28	0.42
16.00	0.39	16	591.27	0.39
16.50	0.36	15	591.26	0.36
17.00	0.33	15	591.25	0.33
17.50	0.29	14	591.24	0.29
18.00	0.26	14	591.22	0.26
18.50	0.24	14	591.21	0.25
19.00	0.24	14	591.21	0.24
19.50	0.23	14	591.21	0.23
20.00	0.22	13	591.20	0.22
20.50	0.21	13	591.20	0.21
21.00	0.21	13	591.20	0.21
21.50	0.20	13	591.19	0.20
22.00	0.19	13	591.19	0.19
22.50	0.18	13	591.18	0.18
23.00	0.18	13	591.18	0.18
23.50	0.17	13	591.18	0.17
24.00	0.16	13	591.17	0.16

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 8.16" for 100-Year_Future event
Inflow = 4.89 cfs @ 12.20 hrs, Volume= 0.446 af
Outflow = 4.82 cfs @ 12.22 hrs, Volume= 0.444 af, Atten= 1%, Lag= 1.1 min
Primary = 4.82 cfs @ 12.22 hrs, Volume= 0.444 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 599.17' @ 12.22 hrs Surf.Area= 91 sf Storage= 204 cf

Plug-Flow detention time= 4.9 min calculated for 0.444 af (100% of inflow)
Center-of-Mass det. time= 2.2 min (815.3 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

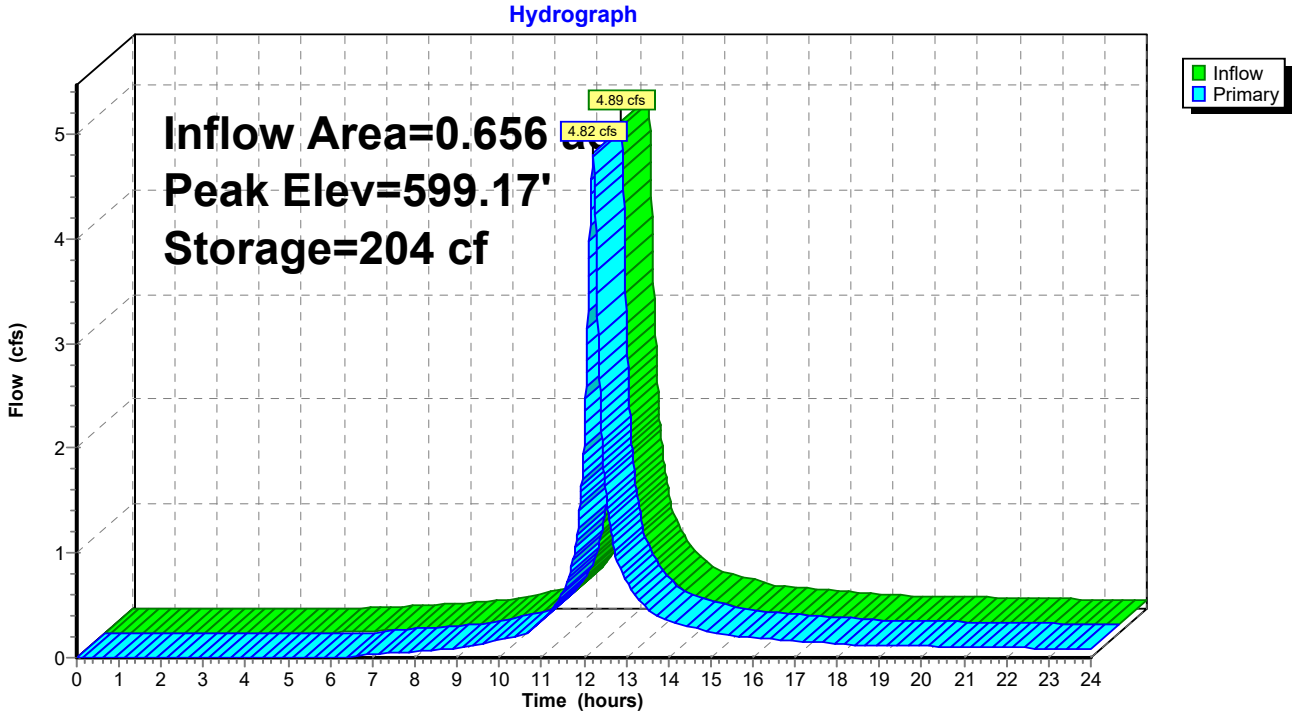
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.82 cfs @ 12.22 hrs HW=599.16' TW=597.17' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 4.82 cfs @ 6.13 fps)

Pond 23P: SD-01, SD-02

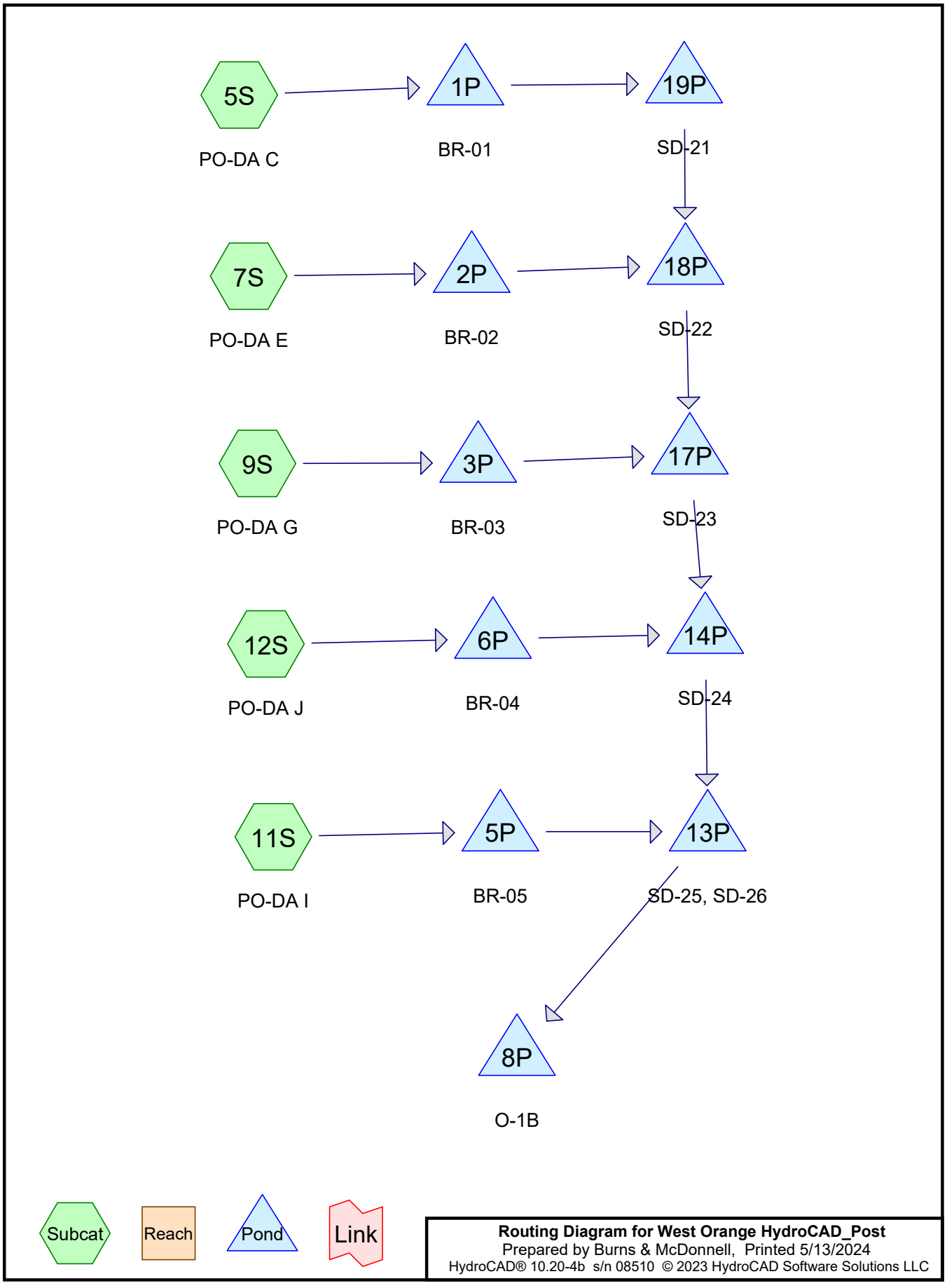


Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.83	0.00
3.50	0.00	0	591.85	0.00
4.00	0.00	2	591.92	0.00
4.50	0.00	4	592.07	0.00
5.00	0.00	8	592.31	0.00
5.50	0.01	20	593.04	0.00
6.00	0.02	43	594.52	0.00
6.50	0.02	80	596.81	0.00
7.00	0.04	85	597.13	0.04
7.50	0.05	85	597.14	0.05
8.00	0.06	85	597.16	0.06
8.50	0.08	86	597.17	0.08
9.00	0.09	86	597.19	0.09
9.50	0.13	86	597.21	0.13
10.00	0.17	87	597.24	0.17
10.50	0.22	87	597.27	0.22
11.00	0.35	88	597.33	0.35
11.50	0.62	90	597.44	0.62
12.00	**2.04**	**96**	**597.83**	**2.03**
12.50	**1.65**	**95**	**597.74**	**1.66**
13.00	0.75	91	597.48	0.75
13.50	0.48	89	597.38	0.48
14.00	0.35	88	597.33	0.35
14.50	0.30	88	597.31	0.30
15.00	0.24	87	597.28	0.24
15.50	0.21	87	597.26	0.21
16.00	0.19	87	597.25	0.19
16.50	0.18	87	597.25	0.18
17.00	0.16	87	597.24	0.16
17.50	0.15	86	597.23	0.15
18.00	0.13	86	597.22	0.13
18.50	0.12	86	597.21	0.12
19.00	0.12	86	597.21	0.12
19.50	0.11	86	597.20	0.11
20.00	0.11	86	597.20	0.11
20.50	0.11	86	597.20	0.11
21.00	0.10	86	597.19	0.10
21.50	0.10	86	597.19	0.10
22.00	0.10	86	597.19	0.10
22.50	0.09	86	597.19	0.09
23.00	0.09	86	597.18	0.09
23.50	0.08	86	597.18	0.08
24.00	0.08	86	597.18	0.08

APPENDIX B.6- POST-DEVELOPED OUTFALL = O-1B

POST-DEVELOPED:
OUTFALL = O-1B



Routing Diagram for West Orange HydroCAD_Post
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West Orange HydroCAD_Post
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95 Subcat 11S: PO-DA I
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151 Pond 6P: BR-04
154 Pond 8P: O-1B
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159 Pond 14P: SD-24
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10-Year_Future Event

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173 Subcat 9S: PO-DA G
175 Subcat 11S: PO-DA I
177 Subcat 12S: PO-DA J
179 Pond 1P: BR-01
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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	WQ	NJ DEP 2-hr		Default	2.00	1	1.25	2	3.42
2	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
3	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
4	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
5	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
6	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
7	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.291	80	>75% Grass cover, Good, HSG D (5S, 7S, 9S, 11S, 12S)
0.511	98	Impervious, Pavement, HSG D (5S, 7S, 9S, 11S, 12S)
1.062	85	Yard Stone/Gravel Pad, HSG D (5S, 7S, 9S, 11S, 12S)
1.863	**88**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.863	HSG D	5S, 7S, 9S, 11S, 12S
0.000	Other	
1.863		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.291	0.000	0.291	>75% Grass cover, Good	5S, 7S, 9S, 11S, 12S
0.000	0.000	0.000	0.511	0.000	0.511	Impervious, Pavement	5S, 7S, 9S, 11S, 12S
0.000	0.000	0.000	1.062	0.000	1.062	Yard Stone/Gravel Pad	5S, 7S, 9S, 11S, 12S
0.000	**0.000**	**0.000**	**1.863**	**0.000**	**1.863**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	13P	580.44	580.15	29.4	0.0099	0.011	0.0	18.0	0.0	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth=0.42"
Flow Length=164' Tc=18.6 min CN=WQ Runoff=0.44 cfs 0.020 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth=0.52"
Flow Length=175' Tc=15.6 min CN=WQ Runoff=0.37 cfs 0.015 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth=0.49"
Flow Length=175' Tc=23.4 min CN=WQ Runoff=0.31 cfs 0.016 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth=0.48"
Flow Length=120' Tc=6.5 min CN=WQ Runoff=0.33 cfs 0.010 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth=0.55"
Flow Length=96' Slope=0.0336 '/' Tc=5.4 min CN=WQ Runoff=0.50 cfs 0.015 af

Pond 1P: BR-01 Peak Elev=596.68' Storage=487 cf Inflow=0.44 cfs 0.020 af
Outflow=0.12 cfs 0.020 af

Pond 2P: BR-02 Peak Elev=598.55' Storage=357 cf Inflow=0.37 cfs 0.015 af
Outflow=0.11 cfs 0.015 af

Pond 3P: BR-03 Peak Elev=594.44' Storage=405 cf Inflow=0.31 cfs 0.016 af
Outflow=0.10 cfs 0.016 af

Pond 5P: BR-05 Peak Elev=594.16' Storage=233 cf Inflow=0.33 cfs 0.010 af
Outflow=0.08 cfs 0.010 af

Pond 6P: BR-04 Peak Elev=595.04' Storage=410 cf Inflow=0.50 cfs 0.015 af
Outflow=0.08 cfs 0.014 af

Pond 8P: O-1B Inflow=0.48 cfs 0.074 af
Primary=0.48 cfs 0.074 af

Pond 13P: SD-25, SD-26 Peak Elev=580.74' Storage=0.000 af Inflow=0.48 cfs 0.074 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=0.48 cfs 0.074 af

Pond 14P: SD-24 Peak Elev=585.17' Storage=0.000 af Inflow=0.41 cfs 0.065 af
Outflow=0.41 cfs 0.065 af

Pond 17P: SD-23 Peak Elev=587.06' Storage=0.000 af Inflow=0.33 cfs 0.050 af
Outflow=0.33 cfs 0.050 af

Pond 18P: SD-22 Peak Elev=588.69' Storage=0.000 af Inflow=0.23 cfs 0.035 af
Outflow=0.23 cfs 0.035 af

Pond 19P: SD-21 Peak Elev=590.78' Storage=0.000 af Inflow=0.12 cfs 0.020 af
Outflow=0.12 cfs 0.020 af

Total Runoff Area = 1.863 ac Runoff Volume = 0.075 af Average Runoff Depth = 0.48"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

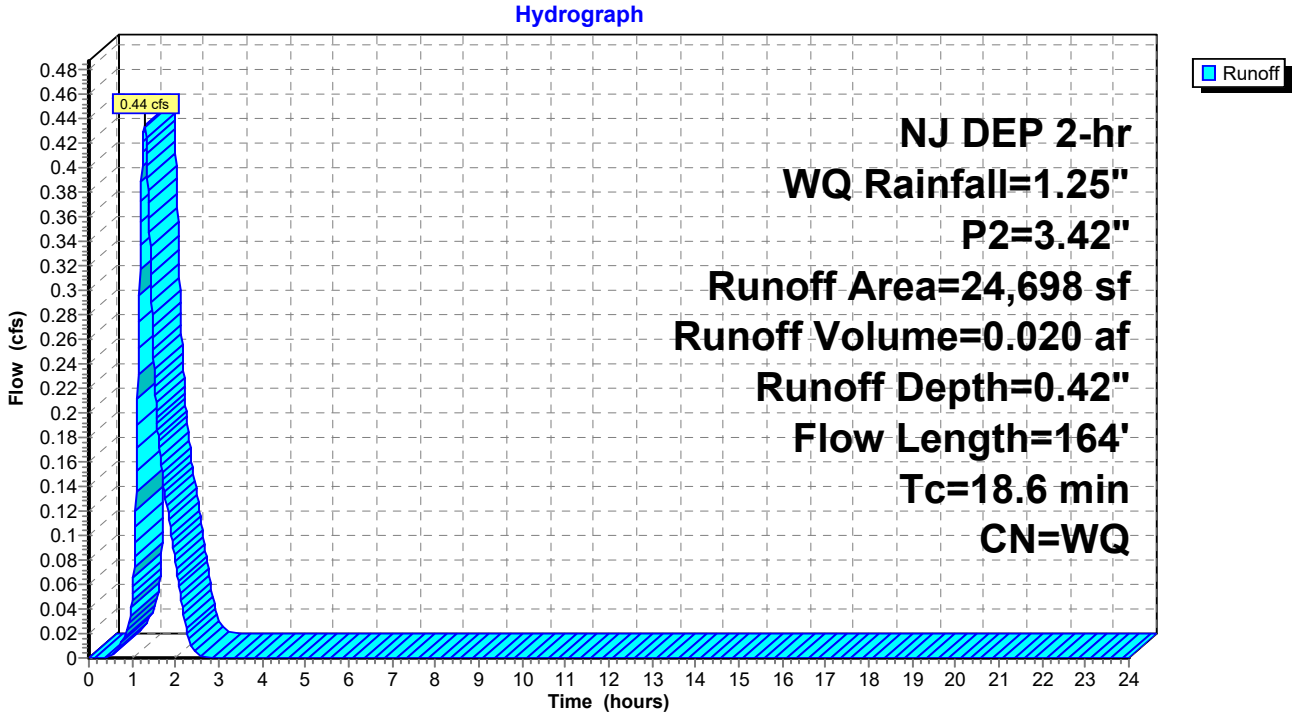
Runoff = 0.44 cfs @ 1.29 hrs, Volume= 0.020 af, Depth= 0.42"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0018	0.09		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.6	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.06	**0.05**
1.50	1.15	0.31	**0.24**
2.00	**1.25**	**0.37**	0.08
2.50	1.25	0.37	0.00
3.00	1.25	0.37	0.00
3.50	1.25	0.37	0.00
4.00	1.25	0.37	0.00
4.50	1.25	0.37	0.00
5.00	1.25	0.37	0.00
5.50	1.25	0.37	0.00
6.00	1.25	0.37	0.00
6.50	1.25	0.37	0.00
7.00	1.25	0.37	0.00
7.50	1.25	0.37	0.00
8.00	1.25	0.37	0.00
8.50	1.25	0.37	0.00
9.00	1.25	0.37	0.00
9.50	1.25	0.37	0.00
10.00	1.25	0.37	0.00
10.50	1.25	0.37	0.00
11.00	1.25	0.37	0.00
11.50	1.25	0.37	0.00
12.00	1.25	0.37	0.00
12.50	1.25	0.37	0.00
13.00	1.25	0.37	0.00
13.50	1.25	0.37	0.00
14.00	1.25	0.37	0.00
14.50	1.25	0.37	0.00
15.00	1.25	0.37	0.00
15.50	1.25	0.37	0.00
16.00	1.25	0.37	0.00
16.50	1.25	0.37	0.00
17.00	1.25	0.37	0.00
17.50	1.25	0.37	0.00
18.00	1.25	0.37	0.00
18.50	1.25	0.37	0.00
19.00	1.25	0.37	0.00
19.50	1.25	0.37	0.00
20.00	1.25	0.37	0.00
20.50	1.25	0.37	0.00
21.00	1.25	0.37	0.00
21.50	1.25	0.37	0.00
22.00	1.25	0.37	0.00
22.50	1.25	0.37	0.00
23.00	1.25	0.37	0.00
23.50	1.25	0.37	0.00
24.00	1.25	0.37	0.00

Summary for Subcatchment 7S: PO-DA E

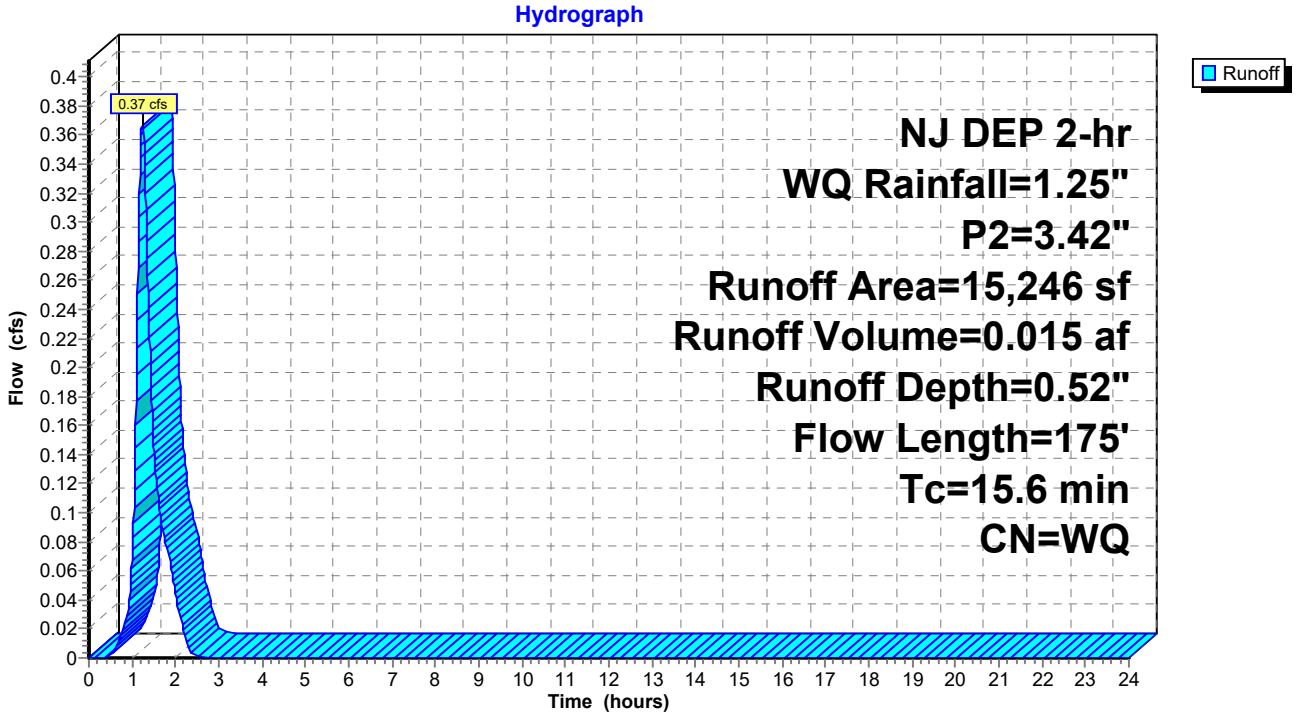
Runoff = 0.37 cfs @ 1.23 hrs, Volume= 0.015 af, Depth= 0.52"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0030	0.11		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
15.6	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.07	**0.07**
1.50	1.15	0.34	**0.15**
2.00	**1.25**	**0.41**	0.04
2.50	1.25	0.41	0.00
3.00	1.25	0.41	0.00
3.50	1.25	0.41	0.00
4.00	1.25	0.41	0.00
4.50	1.25	0.41	0.00
5.00	1.25	0.41	0.00
5.50	1.25	0.41	0.00
6.00	1.25	0.41	0.00
6.50	1.25	0.41	0.00
7.00	1.25	0.41	0.00
7.50	1.25	0.41	0.00
8.00	1.25	0.41	0.00
8.50	1.25	0.41	0.00
9.00	1.25	0.41	0.00
9.50	1.25	0.41	0.00
10.00	1.25	0.41	0.00
10.50	1.25	0.41	0.00
11.00	1.25	0.41	0.00
11.50	1.25	0.41	0.00
12.00	1.25	0.41	0.00
12.50	1.25	0.41	0.00
13.00	1.25	0.41	0.00
13.50	1.25	0.41	0.00
14.00	1.25	0.41	0.00
14.50	1.25	0.41	0.00
15.00	1.25	0.41	0.00
15.50	1.25	0.41	0.00
16.00	1.25	0.41	0.00
16.50	1.25	0.41	0.00
17.00	1.25	0.41	0.00
17.50	1.25	0.41	0.00
18.00	1.25	0.41	0.00
18.50	1.25	0.41	0.00
19.00	1.25	0.41	0.00
19.50	1.25	0.41	0.00
20.00	1.25	0.41	0.00
20.50	1.25	0.41	0.00
21.00	1.25	0.41	0.00
21.50	1.25	0.41	0.00
22.00	1.25	0.41	0.00
22.50	1.25	0.41	0.00
23.00	1.25	0.41	0.00
23.50	1.25	0.41	0.00
24.00	1.25	0.41	0.00

Summary for Subcatchment 9S: PO-DA G

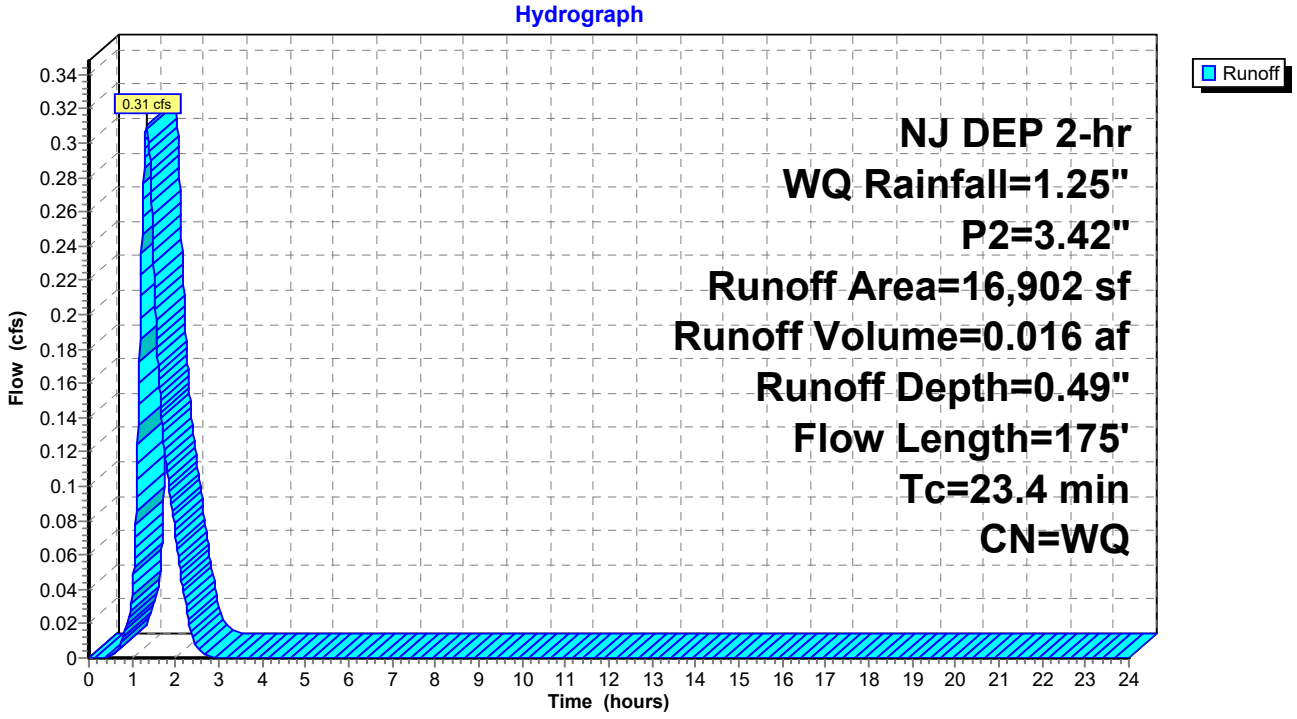
Runoff = 0.31 cfs @ 1.33 hrs, Volume= 0.016 af, Depth= 0.49"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0010	0.07		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
23.4	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.07	**0.04**
1.50	1.15	0.34	**0.23**
2.00	**1.25**	**0.41**	0.07
2.50	1.25	0.41	0.01
3.00	1.25	0.41	0.00
3.50	1.25	0.41	0.00
4.00	1.25	0.41	0.00
4.50	1.25	0.41	0.00
5.00	1.25	0.41	0.00
5.50	1.25	0.41	0.00
6.00	1.25	0.41	0.00
6.50	1.25	0.41	0.00
7.00	1.25	0.41	0.00
7.50	1.25	0.41	0.00
8.00	1.25	0.41	0.00
8.50	1.25	0.41	0.00
9.00	1.25	0.41	0.00
9.50	1.25	0.41	0.00
10.00	1.25	0.41	0.00
10.50	1.25	0.41	0.00
11.00	1.25	0.41	0.00
11.50	1.25	0.41	0.00
12.00	1.25	0.41	0.00
12.50	1.25	0.41	0.00
13.00	1.25	0.41	0.00
13.50	1.25	0.41	0.00
14.00	1.25	0.41	0.00
14.50	1.25	0.41	0.00
15.00	1.25	0.41	0.00
15.50	1.25	0.41	0.00
16.00	1.25	0.41	0.00
16.50	1.25	0.41	0.00
17.00	1.25	0.41	0.00
17.50	1.25	0.41	0.00
18.00	1.25	0.41	0.00
18.50	1.25	0.41	0.00
19.00	1.25	0.41	0.00
19.50	1.25	0.41	0.00
20.00	1.25	0.41	0.00
20.50	1.25	0.41	0.00
21.00	1.25	0.41	0.00
21.50	1.25	0.41	0.00
22.00	1.25	0.41	0.00
22.50	1.25	0.41	0.00
23.00	1.25	0.41	0.00
23.50	1.25	0.41	0.00
24.00	1.25	0.41	0.00

Summary for Subcatchment 11S: PO-DA I

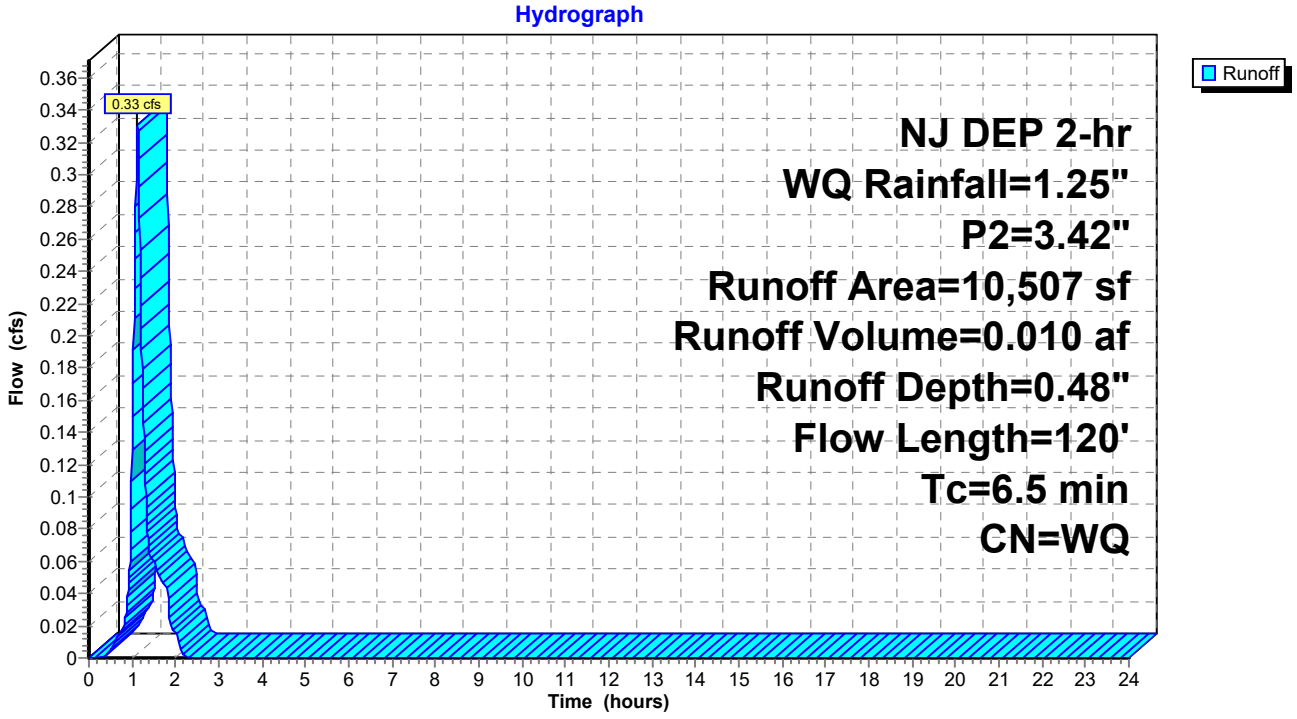
Runoff = 0.33 cfs @ 1.13 hrs, Volume= 0.010 af, Depth= 0.48"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0237	0.26		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.5	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.00
1.00	0.63	0.07	**0.13**
1.50	1.15	0.34	**0.06**
2.00	**1.25**	**0.41**	0.02
2.50	1.25	0.41	0.00
3.00	1.25	0.41	0.00
3.50	1.25	0.41	0.00
4.00	1.25	0.41	0.00
4.50	1.25	0.41	0.00
5.00	1.25	0.41	0.00
5.50	1.25	0.41	0.00
6.00	1.25	0.41	0.00
6.50	1.25	0.41	0.00
7.00	1.25	0.41	0.00
7.50	1.25	0.41	0.00
8.00	1.25	0.41	0.00
8.50	1.25	0.41	0.00
9.00	1.25	0.41	0.00
9.50	1.25	0.41	0.00
10.00	1.25	0.41	0.00
10.50	1.25	0.41	0.00
11.00	1.25	0.41	0.00
11.50	1.25	0.41	0.00
12.00	1.25	0.41	0.00
12.50	1.25	0.41	0.00
13.00	1.25	0.41	0.00
13.50	1.25	0.41	0.00
14.00	1.25	0.41	0.00
14.50	1.25	0.41	0.00
15.00	1.25	0.41	0.00
15.50	1.25	0.41	0.00
16.00	1.25	0.41	0.00
16.50	1.25	0.41	0.00
17.00	1.25	0.41	0.00
17.50	1.25	0.41	0.00
18.00	1.25	0.41	0.00
18.50	1.25	0.41	0.00
19.00	1.25	0.41	0.00
19.50	1.25	0.41	0.00
20.00	1.25	0.41	0.00
20.50	1.25	0.41	0.00
21.00	1.25	0.41	0.00
21.50	1.25	0.41	0.00
22.00	1.25	0.41	0.00
22.50	1.25	0.41	0.00
23.00	1.25	0.41	0.00
23.50	1.25	0.41	0.00
24.00	1.25	0.41	0.00

Summary for Subcatchment 12S: PO-DA J

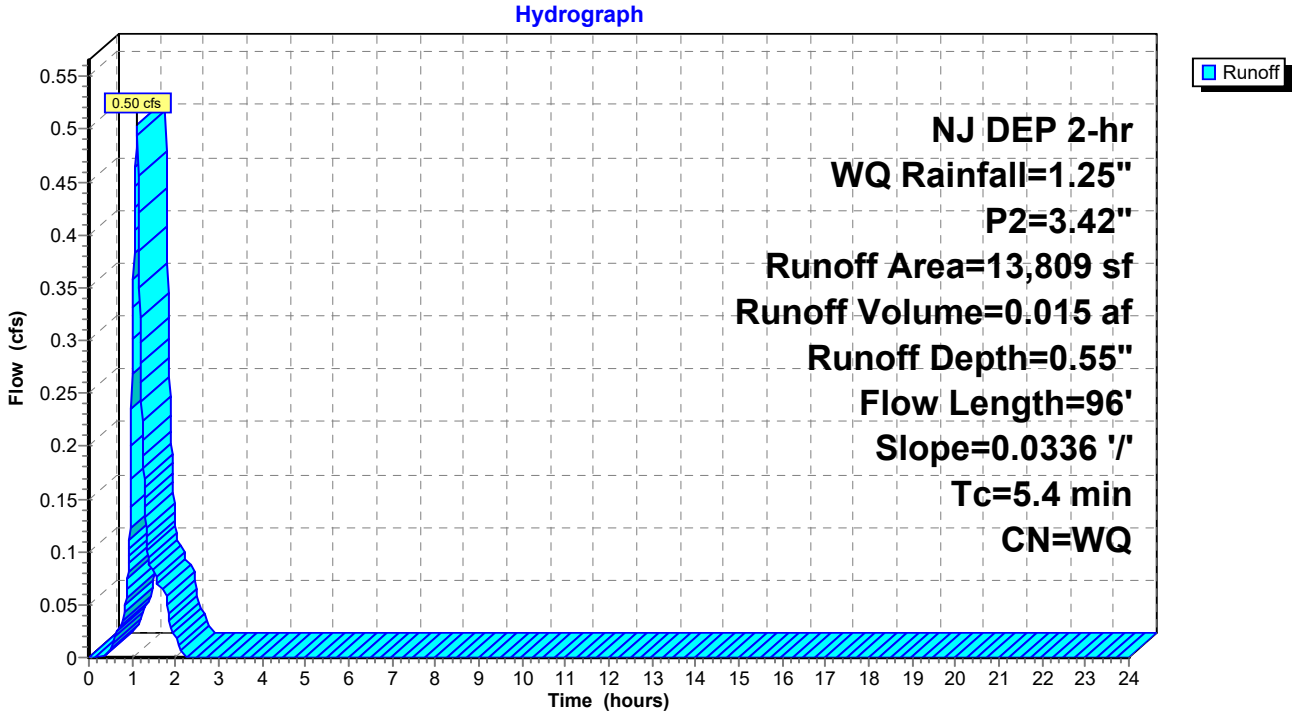
Runoff = 0.50 cfs @ 1.11 hrs, Volume= 0.015 af, Depth= 0.55"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	96	0.0336	0.30		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.01
1.00	0.63	0.09	**0.27**
1.50	1.15	0.38	**0.08**
2.00	**1.25**	**0.45**	0.02
2.50	1.25	0.45	0.00
3.00	1.25	0.45	0.00
3.50	1.25	0.45	0.00
4.00	1.25	0.45	0.00
4.50	1.25	0.45	0.00
5.00	1.25	0.45	0.00
5.50	1.25	0.45	0.00
6.00	1.25	0.45	0.00
6.50	1.25	0.45	0.00
7.00	1.25	0.45	0.00
7.50	1.25	0.45	0.00
8.00	1.25	0.45	0.00
8.50	1.25	0.45	0.00
9.00	1.25	0.45	0.00
9.50	1.25	0.45	0.00
10.00	1.25	0.45	0.00
10.50	1.25	0.45	0.00
11.00	1.25	0.45	0.00
11.50	1.25	0.45	0.00
12.00	1.25	0.45	0.00
12.50	1.25	0.45	0.00
13.00	1.25	0.45	0.00
13.50	1.25	0.45	0.00
14.00	1.25	0.45	0.00
14.50	1.25	0.45	0.00
15.00	1.25	0.45	0.00
15.50	1.25	0.45	0.00
16.00	1.25	0.45	0.00
16.50	1.25	0.45	0.00
17.00	1.25	0.45	0.00
17.50	1.25	0.45	0.00
18.00	1.25	0.45	0.00
18.50	1.25	0.45	0.00
19.00	1.25	0.45	0.00
19.50	1.25	0.45	0.00
20.00	1.25	0.45	0.00
20.50	1.25	0.45	0.00
21.00	1.25	0.45	0.00
21.50	1.25	0.45	0.00
22.00	1.25	0.45	0.00
22.50	1.25	0.45	0.00
23.00	1.25	0.45	0.00
23.50	1.25	0.45	0.00
24.00	1.25	0.45	0.00

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth = 0.42" for WQ event
Inflow = 0.44 cfs @ 1.29 hrs, Volume= 0.020 af
Outflow = 0.12 cfs @ 1.80 hrs, Volume= 0.020 af, Atten= 71%, Lag= 30.6 min
Primary = 0.12 cfs @ 1.80 hrs, Volume= 0.020 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.68' @ 1.80 hrs Surf.Area= 1,759 sf Storage= 487 cf

Plug-Flow detention time= 64.5 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 64.2 min (151.6 - 87.4)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

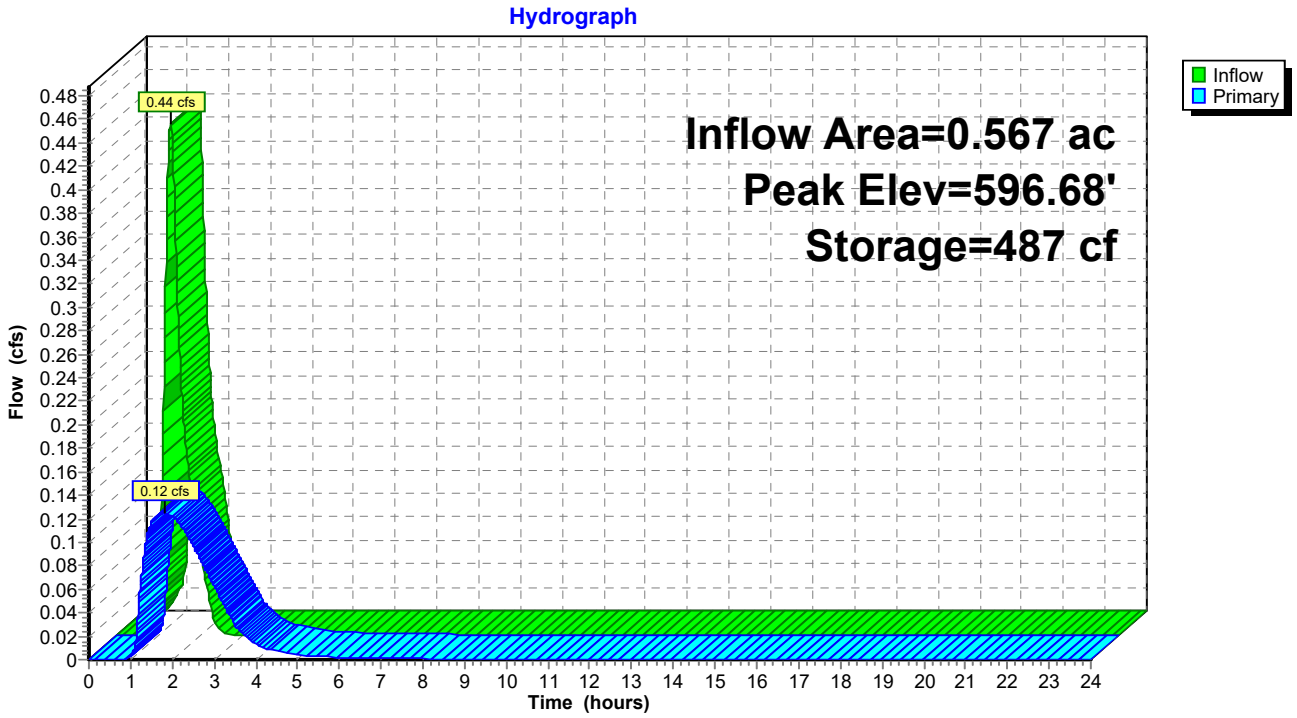
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 1.80 hrs HW=596.68' TW=590.78' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 0.12 cfs of 8.12 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.12 cfs @ 3.66 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	**0.05**	26	596.04	0.00
1.50	**0.24**	**436**	**596.61**	**0.12**
2.00	0.08	**471**	**596.66**	**0.12**
2.50	0.00	325	596.45	0.10
3.00	0.00	182	596.25	0.06
3.50	0.00	99	596.14	0.03
4.00	0.00	62	596.09	0.01
4.50	0.00	44	596.06	0.01
5.00	0.00	34	596.05	0.00
5.50	0.00	28	596.04	0.00
6.00	0.00	23	596.03	0.00
6.50	0.00	20	596.03	0.00
7.00	0.00	17	596.02	0.00
7.50	0.00	16	596.02	0.00
8.00	0.00	14	596.02	0.00
8.50	0.00	13	596.02	0.00
9.00	0.00	12	596.02	0.00
9.50	0.00	11	596.02	0.00
10.00	0.00	10	596.01	0.00
10.50	0.00	9	596.01	0.00
11.00	0.00	9	596.01	0.00
11.50	0.00	8	596.01	0.00
12.00	0.00	8	596.01	0.00
12.50	0.00	7	596.01	0.00
13.00	0.00	7	596.01	0.00
13.50	0.00	7	596.01	0.00
14.00	0.00	6	596.01	0.00
14.50	0.00	6	596.01	0.00
15.00	0.00	6	596.01	0.00
15.50	0.00	5	596.01	0.00
16.00	0.00	5	596.01	0.00
16.50	0.00	5	596.01	0.00
17.00	0.00	5	596.01	0.00
17.50	0.00	5	596.01	0.00
18.00	0.00	5	596.01	0.00
18.50	0.00	4	596.01	0.00
19.00	0.00	4	596.01	0.00
19.50	0.00	4	596.01	0.00
20.00	0.00	4	596.01	0.00
20.50	0.00	4	596.01	0.00
21.00	0.00	4	596.01	0.00
21.50	0.00	4	596.01	0.00
22.00	0.00	4	596.01	0.00
22.50	0.00	3	596.00	0.00
23.00	0.00	3	596.00	0.00
23.50	0.00	3	596.00	0.00
24.00	0.00	3	596.00	0.00

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth = 0.52" for WQ event
Inflow = 0.37 cfs @ 1.23 hrs, Volume= 0.015 af
Outflow = 0.11 cfs @ 1.60 hrs, Volume= 0.015 af, Atten= 70%, Lag= 22.0 min
Primary = 0.11 cfs @ 1.60 hrs, Volume= 0.015 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.55' @ 1.60 hrs Surf.Area= 1,578 sf Storage= 357 cf

Plug-Flow detention time= 56.9 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 57.2 min (139.9 - 82.7)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

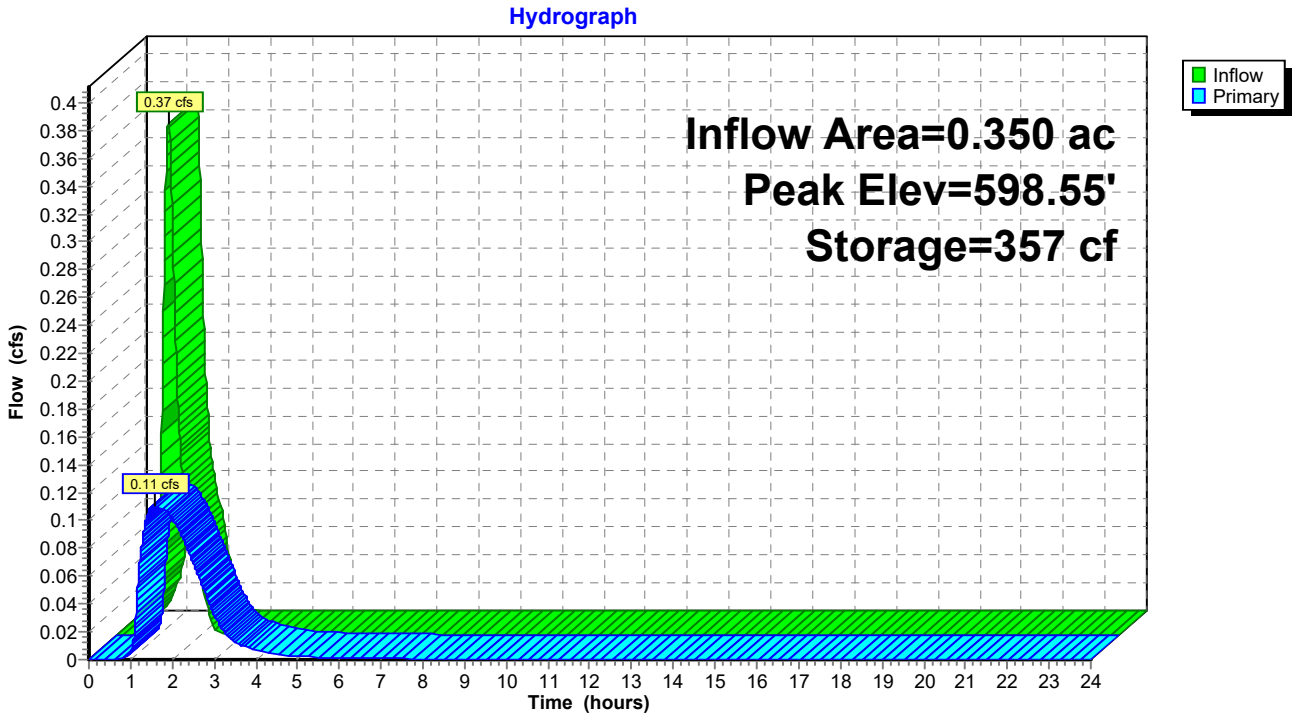
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 1.60 hrs HW=598.55' TW=588.68' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 0.11 cfs of 10.50 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.11 cfs @ 3.23 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	**0.07**	35	598.05	0.01
1.50	**0.15**	**352**	**598.55**	**0.11**
2.00	0.04	**313**	**598.48**	**0.10**
2.50	0.00	184	598.28	0.07
3.00	0.00	93	598.14	0.03
3.50	0.00	56	598.09	0.01
4.00	0.00	38	598.06	0.01
4.50	0.00	29	598.05	0.00
5.00	0.00	23	598.04	0.00
5.50	0.00	19	598.03	0.00
6.00	0.00	17	598.03	0.00
6.50	0.00	14	598.02	0.00
7.00	0.00	13	598.02	0.00
7.50	0.00	11	598.02	0.00
8.00	0.00	10	598.02	0.00
8.50	0.00	10	598.01	0.00
9.00	0.00	9	598.01	0.00
9.50	0.00	8	598.01	0.00
10.00	0.00	8	598.01	0.00
10.50	0.00	7	598.01	0.00
11.00	0.00	7	598.01	0.00
11.50	0.00	6	598.01	0.00
12.00	0.00	6	598.01	0.00
12.50	0.00	6	598.01	0.00
13.00	0.00	5	598.01	0.00
13.50	0.00	5	598.01	0.00
14.00	0.00	5	598.01	0.00
14.50	0.00	5	598.01	0.00
15.00	0.00	4	598.01	0.00
15.50	0.00	4	598.01	0.00
16.00	0.00	4	598.01	0.00
16.50	0.00	4	598.01	0.00
17.00	0.00	4	598.01	0.00
17.50	0.00	4	598.01	0.00
18.00	0.00	4	598.01	0.00
18.50	0.00	3	598.01	0.00
19.00	0.00	3	598.01	0.00
19.50	0.00	3	598.01	0.00
20.00	0.00	3	598.00	0.00
20.50	0.00	3	598.00	0.00
21.00	0.00	3	598.00	0.00
21.50	0.00	3	598.00	0.00
22.00	0.00	3	598.00	0.00
22.50	0.00	3	598.00	0.00
23.00	0.00	3	598.00	0.00
23.50	0.00	3	598.00	0.00
24.00	0.00	3	598.00	0.00

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth = 0.49" for WQ event
Inflow = 0.31 cfs @ 1.33 hrs, Volume= 0.016 af
Outflow = 0.10 cfs @ 1.87 hrs, Volume= 0.016 af, Atten= 69%, Lag= 32.4 min
Primary = 0.10 cfs @ 1.87 hrs, Volume= 0.016 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.44' @ 1.87 hrs Surf.Area= 2,175 sf Storage= 405 cf

Plug-Flow detention time= 78.2 min calculated for 0.016 af (99% of inflow)
Center-of-Mass det. time= 78.2 min (168.5 - 90.3)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

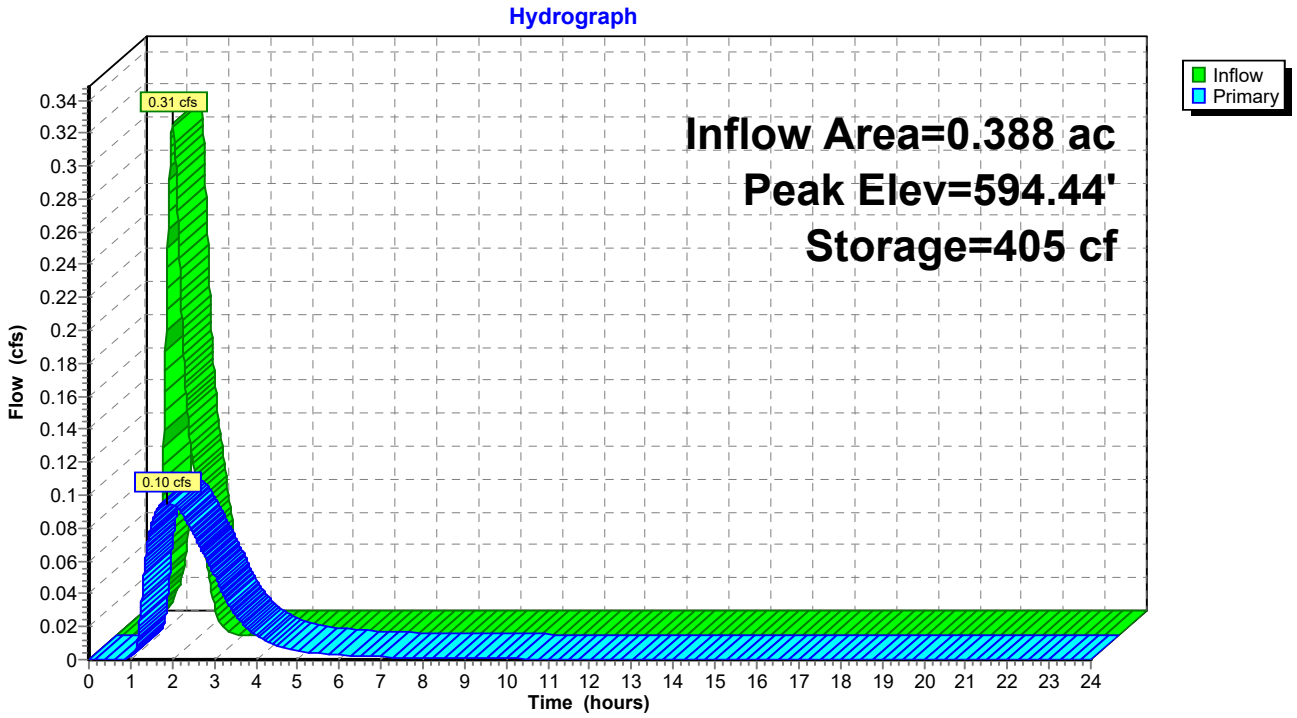
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.10 cfs @ 1.87 hrs HW=594.44' TW=587.06' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.10 cfs of 14.01 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.10 cfs @ 2.79 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	**0.04**	22	594.02	0.00
1.50	**0.23**	**333**	**594.36**	**0.08**
2.00	0.07	**400**	**594.43**	**0.09**
2.50	0.01	302	594.32	0.08
3.00	0.00	190	594.20	0.05
3.50	0.00	120	594.13	0.03
4.00	0.00	83	594.09	0.01
4.50	0.00	63	594.07	0.01
5.00	0.00	50	594.06	0.01
5.50	0.00	41	594.05	0.00
6.00	0.00	35	594.04	0.00
6.50	0.00	30	594.03	0.00
7.00	0.00	27	594.03	0.00
7.50	0.00	24	594.03	0.00
8.00	0.00	21	594.02	0.00
8.50	0.00	19	594.02	0.00
9.00	0.00	18	594.02	0.00
9.50	0.00	16	594.02	0.00
10.00	0.00	15	594.02	0.00
10.50	0.00	14	594.02	0.00
11.00	0.00	13	594.02	0.00
11.50	0.00	13	594.01	0.00
12.00	0.00	12	594.01	0.00
12.50	0.00	11	594.01	0.00
13.00	0.00	11	594.01	0.00
13.50	0.00	10	594.01	0.00
14.00	0.00	10	594.01	0.00
14.50	0.00	9	594.01	0.00
15.00	0.00	9	594.01	0.00
15.50	0.00	8	594.01	0.00
16.00	0.00	8	594.01	0.00
16.50	0.00	8	594.01	0.00
17.00	0.00	8	594.01	0.00
17.50	0.00	7	594.01	0.00
18.00	0.00	7	594.01	0.00
18.50	0.00	7	594.01	0.00
19.00	0.00	7	594.01	0.00
19.50	0.00	6	594.01	0.00
20.00	0.00	6	594.01	0.00
20.50	0.00	6	594.01	0.00
21.00	0.00	6	594.01	0.00
21.50	0.00	6	594.01	0.00
22.00	0.00	6	594.01	0.00
22.50	0.00	5	594.01	0.00
23.00	0.00	5	594.01	0.00
23.50	0.00	5	594.01	0.00
24.00	0.00	5	594.01	0.00

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth = 0.48" for WQ event
Inflow = 0.33 cfs @ 1.13 hrs, Volume= 0.010 af
Outflow = 0.08 cfs @ 1.35 hrs, Volume= 0.010 af, Atten= 75%, Lag= 13.4 min
Primary = 0.08 cfs @ 1.35 hrs, Volume= 0.010 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.16' @ 1.35 hrs Surf.Area= 1,575 sf Storage= 233 cf

Plug-Flow detention time= 58.5 min calculated for 0.010 af (99% of inflow)
Center-of-Mass det. time= 58.2 min (132.9 - 74.7)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

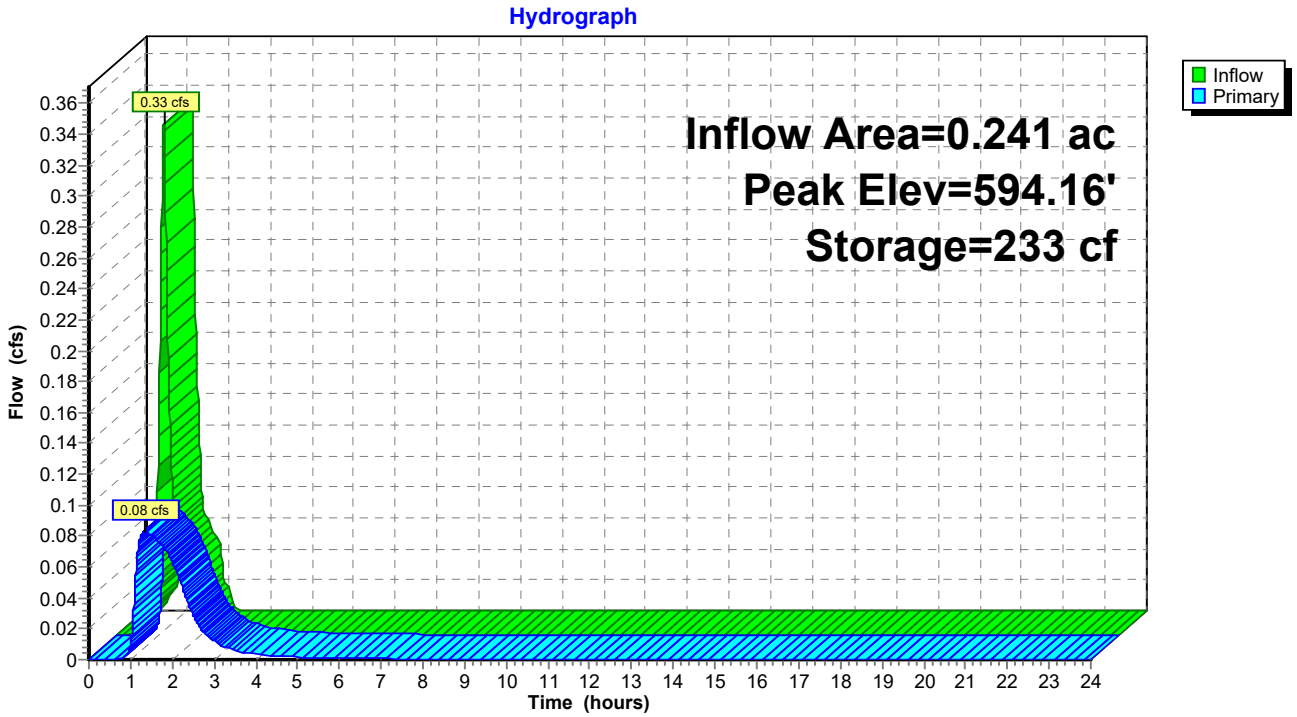
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 1.35 hrs HW=594.16' TW=580.72' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.08 cfs of 25.21 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.08 cfs @ 2.43 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	1	593.80	0.00
1.00	**0.13**	**46**	**593.87**	**0.01**
1.50	**0.06**	**224**	**594.15**	**0.08**
2.00	0.02	164	594.05	0.06
2.50	0.00	86	593.93	0.03
3.00	0.00	52	593.88	0.01
3.50	0.00	37	593.86	0.01
4.00	0.00	28	593.84	0.00
4.50	0.00	23	593.84	0.00
5.00	0.00	19	593.83	0.00
5.50	0.00	16	593.83	0.00
6.00	0.00	14	593.82	0.00
6.50	0.00	13	593.82	0.00
7.00	0.00	11	593.82	0.00
7.50	0.00	10	593.82	0.00
8.00	0.00	9	593.81	0.00
8.50	0.00	9	593.81	0.00
9.00	0.00	8	593.81	0.00
9.50	0.00	7	593.81	0.00
10.00	0.00	7	593.81	0.00
10.50	0.00	7	593.81	0.00
11.00	0.00	6	593.81	0.00
11.50	0.00	6	593.81	0.00
12.00	0.00	6	593.81	0.00
12.50	0.00	5	593.81	0.00
13.00	0.00	5	593.81	0.00
13.50	0.00	5	593.81	0.00
14.00	0.00	5	593.81	0.00
14.50	0.00	4	593.81	0.00
15.00	0.00	4	593.81	0.00
15.50	0.00	4	593.81	0.00
16.00	0.00	4	593.81	0.00
16.50	0.00	4	593.81	0.00
17.00	0.00	4	593.81	0.00
17.50	0.00	4	593.81	0.00
18.00	0.00	3	593.81	0.00
18.50	0.00	3	593.81	0.00
19.00	0.00	3	593.81	0.00
19.50	0.00	3	593.80	0.00
20.00	0.00	3	593.80	0.00
20.50	0.00	3	593.80	0.00
21.00	0.00	3	593.80	0.00
21.50	0.00	3	593.80	0.00
22.00	0.00	3	593.80	0.00
22.50	0.00	3	593.80	0.00
23.00	0.00	3	593.80	0.00
23.50	0.00	3	593.80	0.00
24.00	0.00	2	593.80	0.00

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth = 0.55" for WQ event
Inflow = 0.50 cfs @ 1.11 hrs, Volume= 0.015 af
Outflow = 0.08 cfs @ 1.54 hrs, Volume= 0.014 af, Atten= 84%, Lag= 25.9 min
Primary = 0.08 cfs @ 1.54 hrs, Volume= 0.014 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.04' @ 1.54 hrs Surf.Area= 2,894 sf Storage= 410 cf

Plug-Flow detention time= 101.6 min calculated for 0.014 af (99% of inflow)
Center-of-Mass det. time= 100.9 min (173.5 - 72.6)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

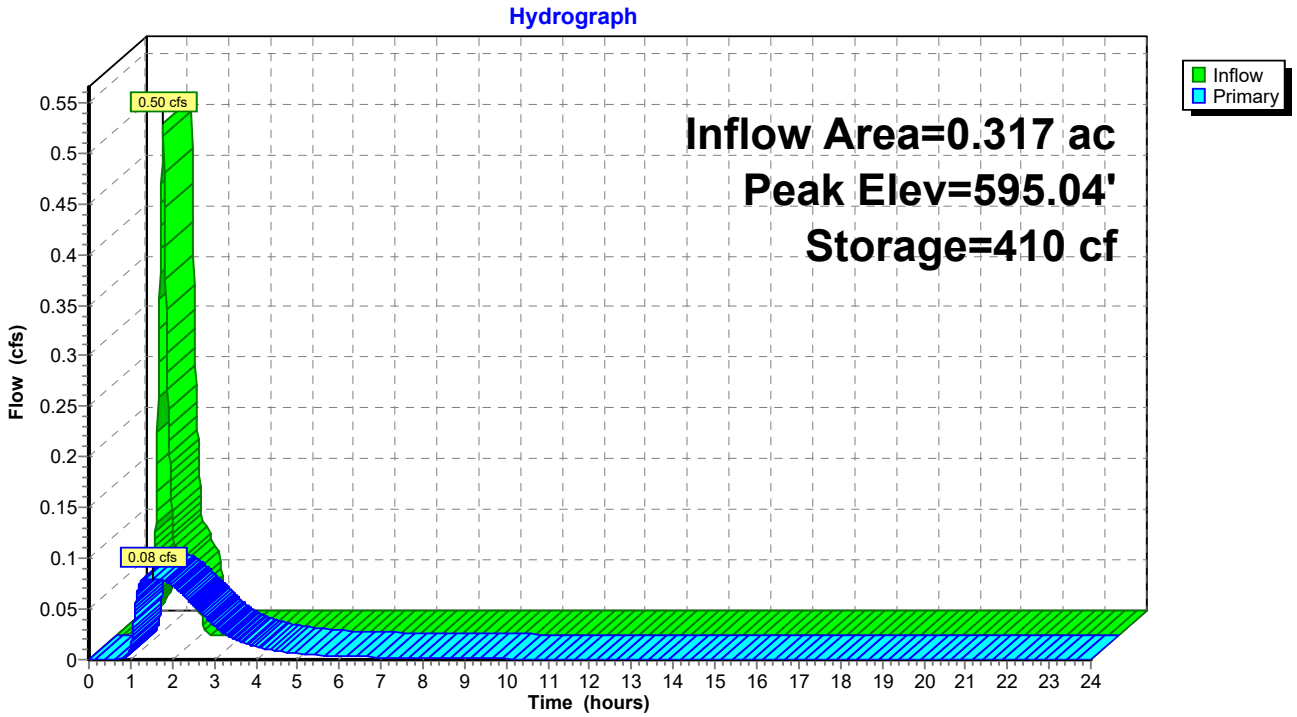
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 1.54 hrs HW=595.04' TW=585.17' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.08 cfs of 16.59 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.08 cfs @ 2.35 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

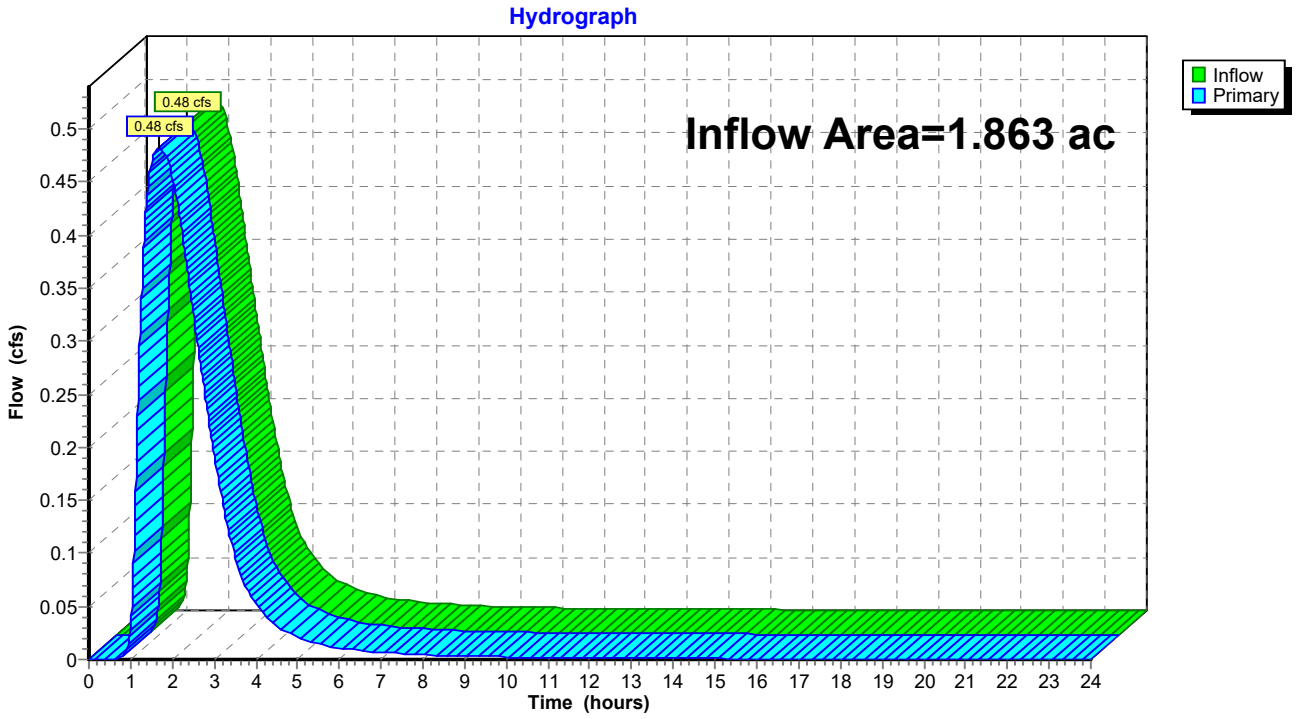
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.01	2	594.70	0.00
1.00	**0.27**	96	594.78	0.01
1.50	**0.08**	**410**	**595.04**	**0.08**
2.00	0.02	**365**	**595.00**	**0.07**
2.50	0.00	256	594.91	0.05
3.00	0.00	176	594.85	0.03
3.50	0.00	129	594.81	0.02
4.00	0.00	100	594.78	0.01
4.50	0.00	81	594.77	0.01
5.00	0.00	68	594.76	0.01
5.50	0.00	58	594.75	0.00
6.00	0.00	51	594.74	0.00
6.50	0.00	45	594.74	0.00
7.00	0.00	40	594.73	0.00
7.50	0.00	36	594.73	0.00
8.00	0.00	33	594.73	0.00
8.50	0.00	31	594.73	0.00
9.00	0.00	28	594.72	0.00
9.50	0.00	26	594.72	0.00
10.00	0.00	25	594.72	0.00
10.50	0.00	23	594.72	0.00
11.00	0.00	22	594.72	0.00
11.50	0.00	20	594.72	0.00
12.00	0.00	19	594.72	0.00
12.50	0.00	18	594.72	0.00
13.00	0.00	18	594.72	0.00
13.50	0.00	17	594.71	0.00
14.00	0.00	16	594.71	0.00
14.50	0.00	15	594.71	0.00
15.00	0.00	15	594.71	0.00
15.50	0.00	14	594.71	0.00
16.00	0.00	14	594.71	0.00
16.50	0.00	13	594.71	0.00
17.00	0.00	13	594.71	0.00
17.50	0.00	12	594.71	0.00
18.00	0.00	12	594.71	0.00
18.50	0.00	12	594.71	0.00
19.00	0.00	11	594.71	0.00
19.50	0.00	11	594.71	0.00
20.00	0.00	11	594.71	0.00
20.50	0.00	10	594.71	0.00
21.00	0.00	10	594.71	0.00
21.50	0.00	10	594.71	0.00
22.00	0.00	9	594.71	0.00
22.50	0.00	9	594.71	0.00
23.00	0.00	9	594.71	0.00
23.50	0.00	9	594.71	0.00
24.00	0.00	9	594.71	0.00

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 0.48" for WQ event
Inflow = 0.48 cfs @ 1.68 hrs, Volume= 0.074 af
Primary = 0.48 cfs @ 1.68 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.03		0.03
1.50	**0.47**		**0.47**
2.00	**0.45**		**0.45**
2.50	0.33		0.33
3.00	0.19		0.19
3.50	0.10		0.10
4.00	0.05		0.05
4.50	0.03		0.03
5.00	0.02		0.02
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.00		0.00
11.50	0.00		0.00
12.00	0.00		0.00
12.50	0.00		0.00
13.00	0.00		0.00
13.50	0.00		0.00
14.00	0.00		0.00
14.50	0.00		0.00
15.00	0.00		0.00
15.50	0.00		0.00
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 0.48" for WQ event
Inflow = 0.48 cfs @ 1.68 hrs, Volume= 0.074 af
Outflow = 0.48 cfs @ 1.68 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 1.68 hrs, Volume= 0.074 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 580.74' @ 1.68 hrs Surf.Area= 0.000 ac Storage= 0.000 af

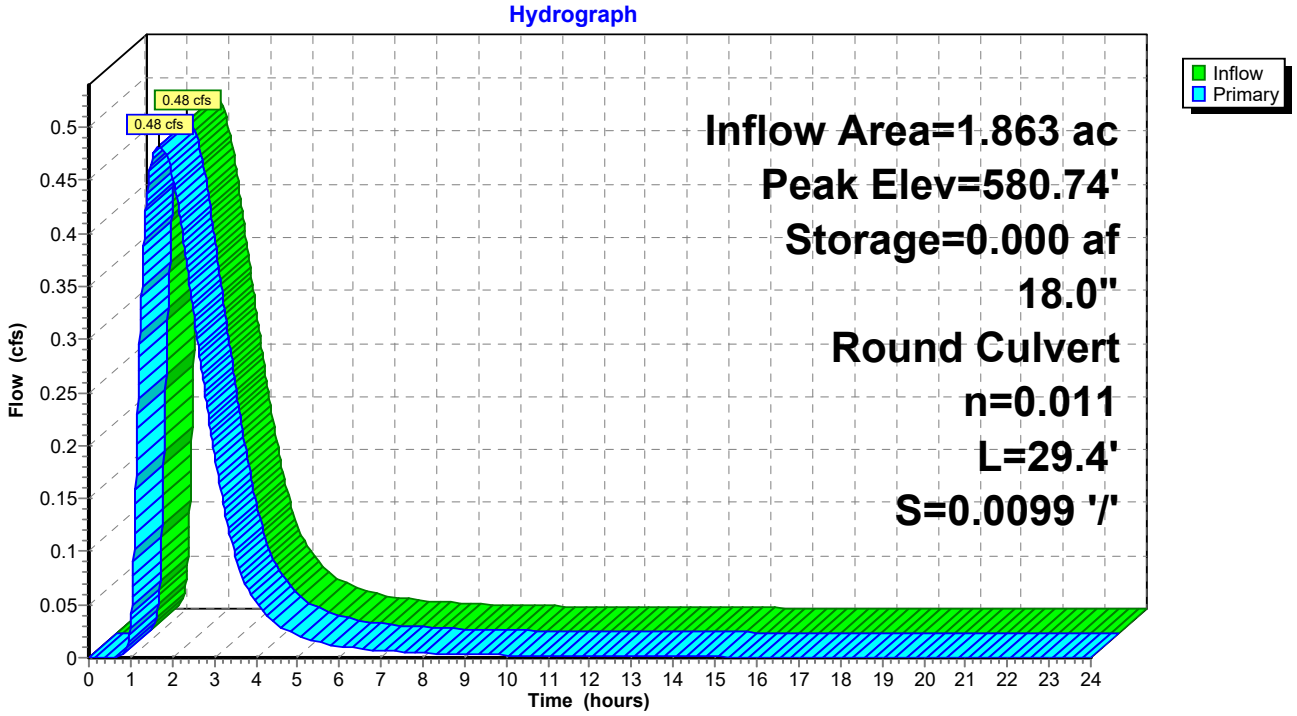
Plug-Flow detention time= 0.1 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (154.8 - 154.8)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=0.48 cfs @ 1.68 hrs HW=580.74' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Inlet Controls 0.48 cfs @ 1.88 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.03	0.000	580.69	0.03
1.50	**0.47**	**0.000**	**580.74**	**0.47**
2.00	**0.45**	**0.000**	**580.74**	**0.45**
2.50	0.33	0.000	580.69	0.33
3.00	0.19	0.000	580.69	0.19
3.50	0.10	0.000	580.69	0.10
4.00	0.05	0.000	580.69	0.05
4.50	0.03	0.000	580.69	0.03
5.00	0.02	0.000	580.69	0.02
5.50	0.01	0.000	580.69	0.01
6.00	0.01	0.000	580.69	0.01
6.50	0.01	0.000	580.69	0.01
7.00	0.01	0.000	580.69	0.01
7.50	0.01	0.000	580.69	0.01
8.00	0.00	0.000	580.69	0.00
8.50	0.00	0.000	580.69	0.00
9.00	0.00	0.000	580.69	0.00
9.50	0.00	0.000	580.69	0.00
10.00	0.00	0.000	580.69	0.00
10.50	0.00	0.000	580.69	0.00
11.00	0.00	0.000	580.69	0.00
11.50	0.00	0.000	580.69	0.00
12.00	0.00	0.000	580.69	0.00
12.50	0.00	0.000	580.69	0.00
13.00	0.00	0.000	580.69	0.00
13.50	0.00	0.000	580.69	0.00
14.00	0.00	0.000	580.69	0.00
14.50	0.00	0.000	580.69	0.00
15.00	0.00	0.000	580.69	0.00
15.50	0.00	0.000	580.69	0.00
16.00	0.00	0.000	580.69	0.00
16.50	0.00	0.000	580.69	0.00
17.00	0.00	0.000	580.69	0.00
17.50	0.00	0.000	580.69	0.00
18.00	0.00	0.000	580.69	0.00
18.50	0.00	0.000	580.69	0.00
19.00	0.00	0.000	580.69	0.00
19.50	0.00	0.000	580.69	0.00
20.00	0.00	0.000	580.69	0.00
20.50	0.00	0.000	580.69	0.00
21.00	0.00	0.000	580.69	0.00
21.50	0.00	0.000	580.69	0.00
22.00	0.00	0.000	580.69	0.00
22.50	0.00	0.000	580.69	0.00
23.00	0.00	0.000	580.69	0.00
23.50	0.00	0.000	580.69	0.00
24.00	0.00	0.000	580.69	0.00

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 0.48" for WQ event
Inflow = 0.41 cfs @ 1.74 hrs, Volume= 0.065 af
Outflow = 0.41 cfs @ 1.74 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.1 min
Primary = 0.41 cfs @ 1.74 hrs, Volume= 0.065 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.17' @ 1.74 hrs Surf.Area= 0.000 ac Storage= 0.000 af

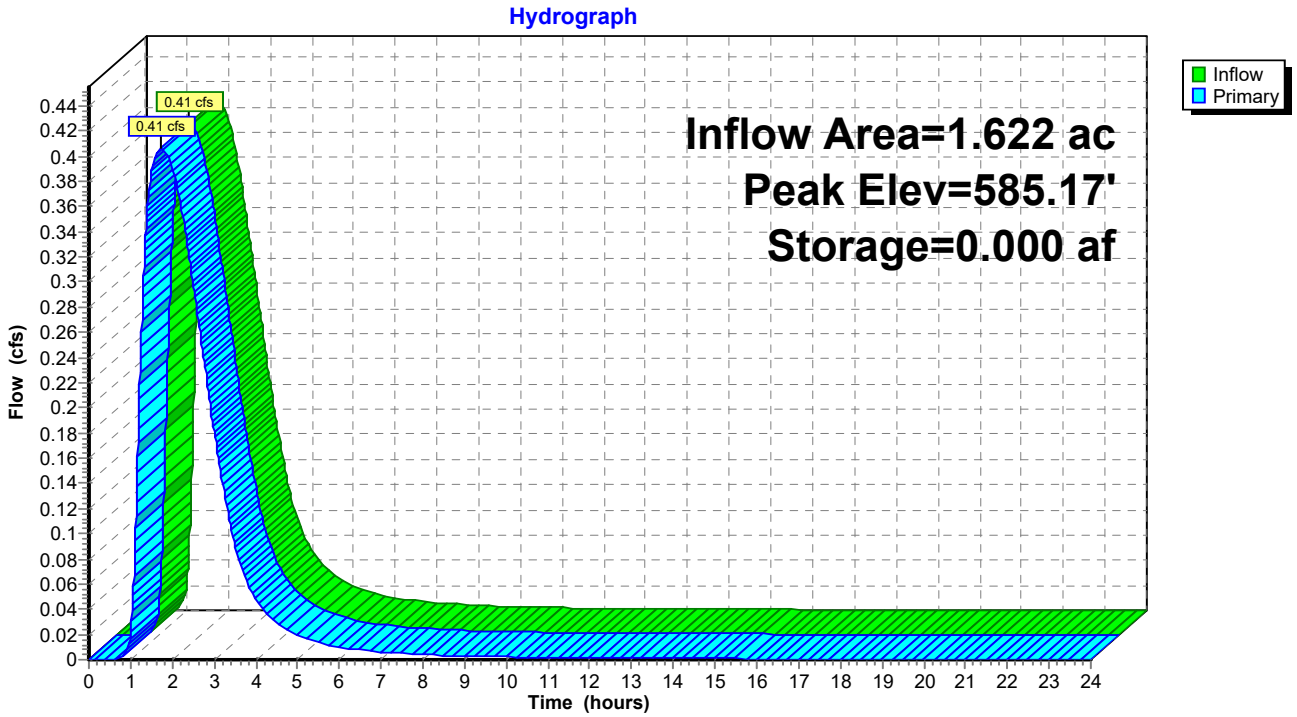
Plug-Flow detention time= 0.1 min calculated for 0.065 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (158.0 - 157.9)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 1.74 hrs HW=585.17' TW=580.74' (Dynamic Tailwater)
↑**1=SD-24** (Orifice Controls 0.41 cfs @ 1.85 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.02	0.000	584.95	0.02
1.50	**0.39**	**0.000**	**585.17**	**0.39**
2.00	**0.39**	**0.000**	**585.17**	**0.39**
2.50	0.30	0.000	585.13	0.30
3.00	0.18	0.000	585.07	0.18
3.50	0.09	0.000	585.02	0.09
4.00	0.05	0.000	584.98	0.05
4.50	0.03	0.000	584.96	0.03
5.00	0.02	0.000	584.94	0.02
5.50	0.01	0.000	584.93	0.01
6.00	0.01	0.000	584.92	0.01
6.50	0.01	0.000	584.92	0.01
7.00	0.01	0.000	584.91	0.01
7.50	0.00	0.000	584.91	0.00
8.00	0.00	0.000	584.91	0.00
8.50	0.00	0.000	584.91	0.00
9.00	0.00	0.000	584.90	0.00
9.50	0.00	0.000	584.90	0.00
10.00	0.00	0.000	584.90	0.00
10.50	0.00	0.000	584.90	0.00
11.00	0.00	0.000	584.90	0.00
11.50	0.00	0.000	584.90	0.00
12.00	0.00	0.000	584.90	0.00
12.50	0.00	0.000	584.90	0.00
13.00	0.00	0.000	584.89	0.00
13.50	0.00	0.000	584.89	0.00
14.00	0.00	0.000	584.89	0.00
14.50	0.00	0.000	584.89	0.00
15.00	0.00	0.000	584.89	0.00
15.50	0.00	0.000	584.89	0.00
16.00	0.00	0.000	584.89	0.00
16.50	0.00	0.000	584.89	0.00
17.00	0.00	0.000	584.89	0.00
17.50	0.00	0.000	584.89	0.00
18.00	0.00	0.000	584.89	0.00
18.50	0.00	0.000	584.89	0.00
19.00	0.00	0.000	584.89	0.00
19.50	0.00	0.000	584.89	0.00
20.00	0.00	0.000	584.89	0.00
20.50	0.00	0.000	584.89	0.00
21.00	0.00	0.000	584.89	0.00
21.50	0.00	0.000	584.89	0.00
22.00	0.00	0.000	584.89	0.00
22.50	0.00	0.000	584.89	0.00
23.00	0.00	0.000	584.89	0.00
23.50	0.00	0.000	584.89	0.00
24.00	0.00	0.000	584.89	0.00

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 0.46" for WQ event
Inflow = 0.33 cfs @ 1.76 hrs, Volume= 0.050 af
Outflow = 0.33 cfs @ 1.76 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.1 min
Primary = 0.33 cfs @ 1.76 hrs, Volume= 0.050 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.06' @ 1.76 hrs Surf.Area= 0.000 ac Storage= 0.000 af

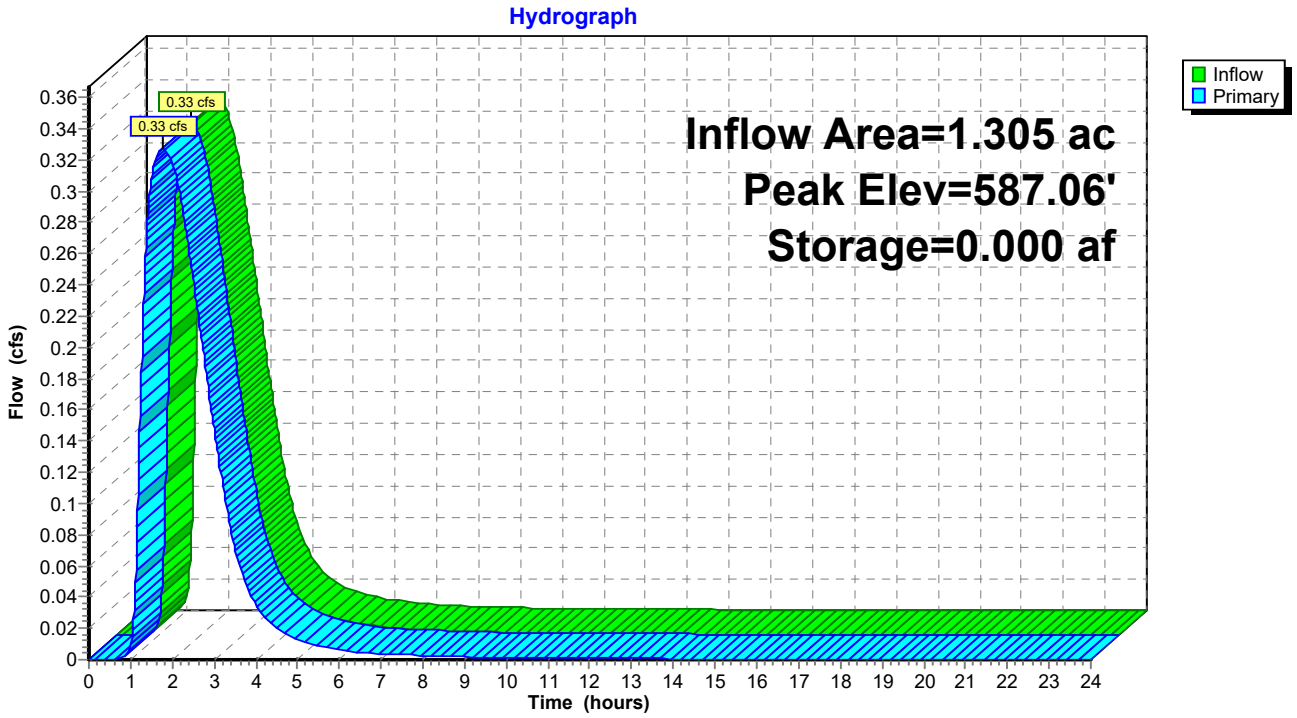
Plug-Flow detention time= 0.1 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (153.5 - 153.5)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 1.76 hrs HW=587.06' TW=585.17' (Dynamic Tailwater)
└**1=SD-23** (Orifice Controls 0.33 cfs @ 1.75 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.01	0.000	586.84	0.01
1.50	**0.31**	**0.000**	**587.05**	**0.31**
2.00	**0.32**	**0.000**	**587.06**	**0.32**
2.50	0.24	0.000	587.03	0.24
3.00	0.15	0.000	586.97	0.15
3.50	0.07	0.000	586.92	0.07
4.00	0.03	0.000	586.88	0.04
4.50	0.02	0.000	586.86	0.02
5.00	0.01	0.000	586.85	0.01
5.50	0.01	0.000	586.84	0.01
6.00	0.01	0.000	586.84	0.01
6.50	0.00	0.000	586.83	0.00
7.00	0.00	0.000	586.83	0.00
7.50	0.00	0.000	586.82	0.00
8.00	0.00	0.000	586.82	0.00
8.50	0.00	0.000	586.82	0.00
9.00	0.00	0.000	586.82	0.00
9.50	0.00	0.000	586.82	0.00
10.00	0.00	0.000	586.82	0.00
10.50	0.00	0.000	586.81	0.00
11.00	0.00	0.000	586.81	0.00
11.50	0.00	0.000	586.81	0.00
12.00	0.00	0.000	586.81	0.00
12.50	0.00	0.000	586.81	0.00
13.00	0.00	0.000	586.81	0.00
13.50	0.00	0.000	586.81	0.00
14.00	0.00	0.000	586.81	0.00
14.50	0.00	0.000	586.81	0.00
15.00	0.00	0.000	586.81	0.00
15.50	0.00	0.000	586.81	0.00
16.00	0.00	0.000	586.81	0.00
16.50	0.00	0.000	586.81	0.00
17.00	0.00	0.000	586.81	0.00
17.50	0.00	0.000	586.81	0.00
18.00	0.00	0.000	586.81	0.00
18.50	0.00	0.000	586.81	0.00
19.00	0.00	0.000	586.81	0.00
19.50	0.00	0.000	586.81	0.00
20.00	0.00	0.000	586.81	0.00
20.50	0.00	0.000	586.81	0.00
21.00	0.00	0.000	586.81	0.00
21.50	0.00	0.000	586.81	0.00
22.00	0.00	0.000	586.81	0.00
22.50	0.00	0.000	586.81	0.00
23.00	0.00	0.000	586.81	0.00
23.50	0.00	0.000	586.81	0.00
24.00	0.00	0.000	586.81	0.00

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 0.45" for WQ event
Inflow = 0.23 cfs @ 1.70 hrs, Volume= 0.035 af
Outflow = 0.23 cfs @ 1.70 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.1 min
Primary = 0.23 cfs @ 1.70 hrs, Volume= 0.035 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 588.69' @ 1.70 hrs Surf.Area= 0.000 ac Storage= 0.000 af

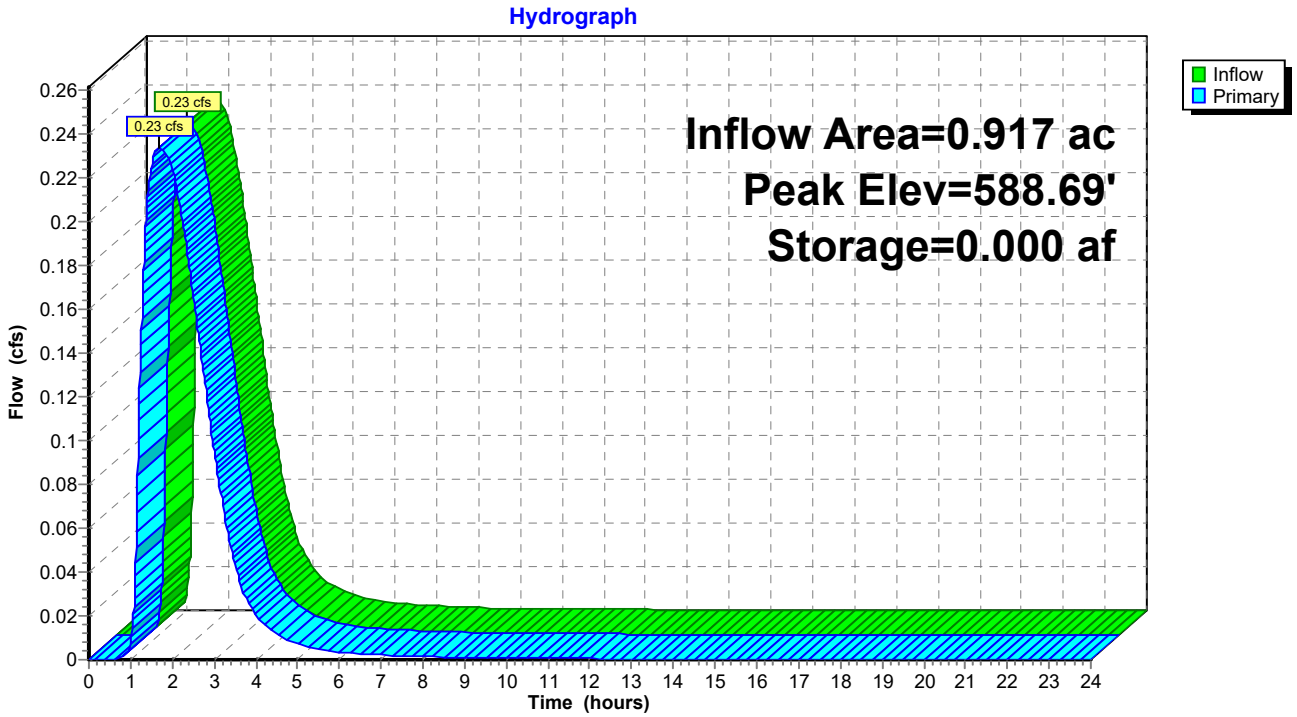
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (146.6 - 146.6)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 1.70 hrs HW=588.69' TW=587.06' (Dynamic Tailwater)
↳**1=SD-22** (Orifice Controls 0.23 cfs @ 1.65 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.01	0.000	588.49	0.01
1.50	**0.23**	**0.000**	**588.68**	**0.23**
2.00	**0.22**	**0.000**	**588.68**	**0.22**
2.50	0.17	0.000	588.65	0.17
3.00	0.10	0.000	588.60	0.10
3.50	0.04	0.000	588.55	0.04
4.00	0.02	0.000	588.52	0.02
4.50	0.01	0.000	588.50	0.01
5.00	0.01	0.000	588.49	0.01
5.50	0.00	0.000	588.48	0.00
6.00	0.00	0.000	588.48	0.00
6.50	0.00	0.000	588.47	0.00
7.00	0.00	0.000	588.47	0.00
7.50	0.00	0.000	588.47	0.00
8.00	0.00	0.000	588.47	0.00
8.50	0.00	0.000	588.47	0.00
9.00	0.00	0.000	588.46	0.00
9.50	0.00	0.000	588.46	0.00
10.00	0.00	0.000	588.46	0.00
10.50	0.00	0.000	588.46	0.00
11.00	0.00	0.000	588.46	0.00
11.50	0.00	0.000	588.46	0.00
12.00	0.00	0.000	588.46	0.00
12.50	0.00	0.000	588.46	0.00
13.00	0.00	0.000	588.46	0.00
13.50	0.00	0.000	588.46	0.00
14.00	0.00	0.000	588.46	0.00
14.50	0.00	0.000	588.46	0.00
15.00	0.00	0.000	588.46	0.00
15.50	0.00	0.000	588.46	0.00
16.00	0.00	0.000	588.46	0.00
16.50	0.00	0.000	588.46	0.00
17.00	0.00	0.000	588.46	0.00
17.50	0.00	0.000	588.46	0.00
18.00	0.00	0.000	588.46	0.00
18.50	0.00	0.000	588.46	0.00
19.00	0.00	0.000	588.46	0.00
19.50	0.00	0.000	588.46	0.00
20.00	0.00	0.000	588.46	0.00
20.50	0.00	0.000	588.45	0.00
21.00	0.00	0.000	588.45	0.00
21.50	0.00	0.000	588.45	0.00
22.00	0.00	0.000	588.45	0.00
22.50	0.00	0.000	588.45	0.00
23.00	0.00	0.000	588.45	0.00
23.50	0.00	0.000	588.45	0.00
24.00	0.00	0.000	588.45	0.00

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 0.42" for WQ event
Inflow = 0.12 cfs @ 1.80 hrs, Volume= 0.020 af
Outflow = 0.12 cfs @ 1.80 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.1 min
Primary = 0.12 cfs @ 1.80 hrs, Volume= 0.020 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.78' @ 1.80 hrs Surf.Area= 0.000 ac Storage= 0.000 af

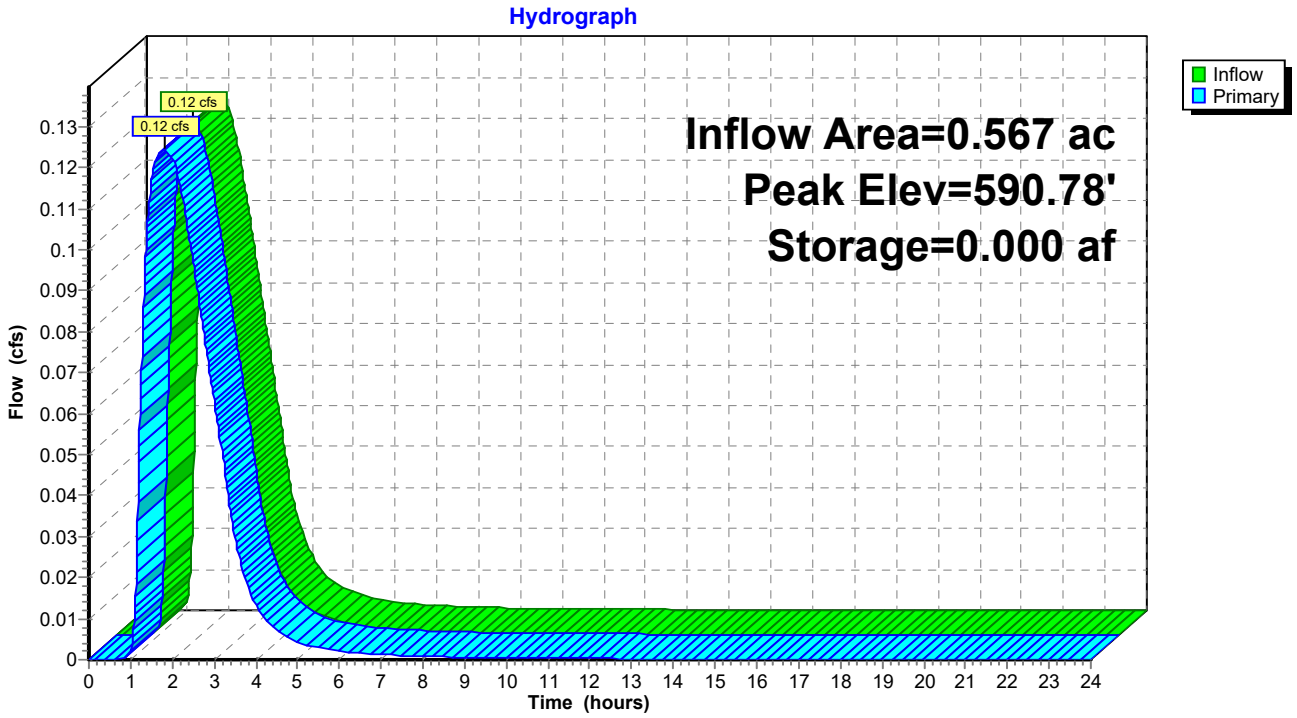
Plug-Flow detention time= 0.0 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (151.7 - 151.6)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 1.80 hrs HW=590.78' TW=588.69' (Dynamic Tailwater)
1=SD-21 (Orifice Controls 0.12 cfs @ 1.41 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.63	0.00
1.50	**0.12**	**0.000**	**590.77**	**0.12**
2.00	**0.12**	**0.000**	**590.78**	**0.12**
2.50	0.10	0.000	590.76	0.10
3.00	0.06	0.000	590.73	0.06
3.50	0.03	0.000	590.69	0.03
4.00	0.01	0.000	590.66	0.01
4.50	0.01	0.000	590.65	0.01
5.00	0.00	0.000	590.64	0.00
5.50	0.00	0.000	590.64	0.00
6.00	0.00	0.000	590.63	0.00
6.50	0.00	0.000	590.63	0.00
7.00	0.00	0.000	590.63	0.00
7.50	0.00	0.000	590.62	0.00
8.00	0.00	0.000	590.62	0.00
8.50	0.00	0.000	590.62	0.00
9.00	0.00	0.000	590.62	0.00
9.50	0.00	0.000	590.62	0.00
10.00	0.00	0.000	590.62	0.00
10.50	0.00	0.000	590.62	0.00
11.00	0.00	0.000	590.62	0.00
11.50	0.00	0.000	590.62	0.00
12.00	0.00	0.000	590.62	0.00
12.50	0.00	0.000	590.62	0.00
13.00	0.00	0.000	590.62	0.00
13.50	0.00	0.000	590.62	0.00
14.00	0.00	0.000	590.62	0.00
14.50	0.00	0.000	590.62	0.00
15.00	0.00	0.000	590.62	0.00
15.50	0.00	0.000	590.62	0.00
16.00	0.00	0.000	590.62	0.00
16.50	0.00	0.000	590.61	0.00
17.00	0.00	0.000	590.61	0.00
17.50	0.00	0.000	590.61	0.00
18.00	0.00	0.000	590.61	0.00
18.50	0.00	0.000	590.61	0.00
19.00	0.00	0.000	590.61	0.00
19.50	0.00	0.000	590.61	0.00
20.00	0.00	0.000	590.61	0.00
20.50	0.00	0.000	590.61	0.00
21.00	0.00	0.000	590.61	0.00
21.50	0.00	0.000	590.61	0.00
22.00	0.00	0.000	590.61	0.00
22.50	0.00	0.000	590.61	0.00
23.00	0.00	0.000	590.61	0.00
23.50	0.00	0.000	590.61	0.00
24.00	0.00	0.000	590.61	0.00

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>2.14"
Flow Length=164' Tc=18.5 min CN=WQ Runoff=0.93 cfs 0.101 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>2.31"
Flow Length=175' Tc=15.6 min CN=WQ Runoff=0.65 cfs 0.067 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>2.26"
Flow Length=175' Tc=23.3 min CN=WQ Runoff=0.59 cfs 0.073 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>2.25"
Flow Length=120' Tc=6.5 min CN=WQ Runoff=0.59 cfs 0.045 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>2.35"
Flow Length=96' Slope=0.0336 '/' Tc=5.4 min CN=WQ Runoff=0.83 cfs 0.062 af

Pond 1P: BR-01 Peak Elev=598.20' Storage=1,470 cf Inflow=0.93 cfs 0.101 af
Outflow=0.24 cfs 0.099 af

Pond 2P: BR-02 Peak Elev=599.40' Storage=874 cf Inflow=0.65 cfs 0.067 af
Outflow=0.19 cfs 0.066 af

Pond 3P: BR-03 Peak Elev=595.19' Storage=1,059 cf Inflow=0.59 cfs 0.073 af
Outflow=0.17 cfs 0.071 af

Pond 5P: BR-05 Peak Elev=594.69' Storage=567 cf Inflow=0.59 cfs 0.045 af
Outflow=0.15 cfs 0.044 af

Pond 6P: BR-04 Peak Elev=595.53' Storage=970 cf Inflow=0.83 cfs 0.062 af
Outflow=0.14 cfs 0.060 af

Pond 8P: O-1B Inflow=0.87 cfs 0.341 af
Primary=0.87 cfs 0.341 af

Pond 13P: SD-25, SD-26 Peak Elev=580.86' Storage=0.000 af Inflow=0.87 cfs 0.341 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=0.87 cfs 0.341 af

Pond 14P: SD-24 Peak Elev=585.28' Storage=0.000 af Inflow=0.73 cfs 0.296 af
Outflow=0.73 cfs 0.296 af

Pond 17P: SD-23 Peak Elev=587.16' Storage=0.000 af Inflow=0.59 cfs 0.237 af
Outflow=0.59 cfs 0.237 af

Pond 18P: SD-22 Peak Elev=588.77' Storage=0.000 af Inflow=0.42 cfs 0.166 af
Outflow=0.42 cfs 0.166 af

Pond 19P: SD-21 Peak Elev=590.85' Storage=0.000 af Inflow=0.24 cfs 0.099 af
Outflow=0.24 cfs 0.099 af

Total Runoff Area = 1.863 ac Runoff Volume = 0.349 af Average Runoff Depth = 2.25"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

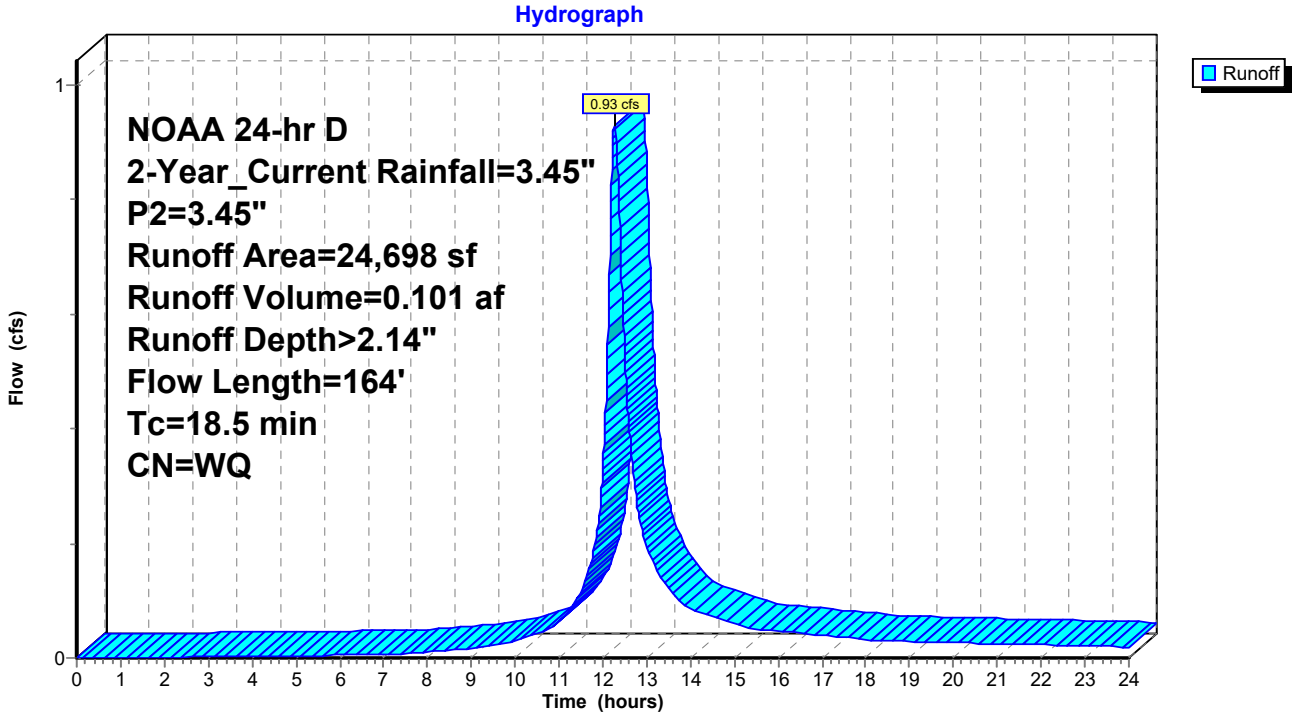
Runoff = 0.93 cfs @ 12.27 hrs, Volume= 0.101 af, Depth> 2.14"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0018	0.09		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.5	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.01
7.00	0.36	0.00	0.01
7.50	0.40	0.01	0.01
8.00	0.45	0.01	0.01
8.50	0.50	0.02	0.01
9.00	0.55	0.04	0.02
9.50	0.61	0.05	0.02
10.00	0.68	0.08	0.03
10.50	0.77	0.11	0.04
11.00	0.90	0.17	0.06
11.50	1.09	0.28	0.12
12.00	1.65	0.64	**0.33**
12.50	2.36	1.19	**0.53**
13.00	2.55	1.36	0.20
13.50	2.68	1.46	0.12
14.00	2.77	1.54	0.09
14.50	2.84	1.60	0.07
15.00	2.90	1.65	0.06
15.50	2.95	1.70	0.05
16.00	3.00	1.74	0.05
16.50	3.05	1.78	0.04
17.00	3.09	1.81	0.04
17.50	3.12	1.85	0.04
18.00	3.16	1.88	0.03
18.50	3.19	1.90	0.03
19.00	3.21	1.93	0.03
19.50	3.24	1.95	0.03
20.00	3.27	1.98	0.03
20.50	3.29	2.00	0.03
21.00	3.32	2.02	0.03
21.50	3.34	2.04	0.02
22.00	3.37	2.06	0.02
22.50	3.39	2.08	0.02
23.00	3.41	2.10	0.02
23.50	3.43	2.12	0.02
24.00	**3.45**	**2.14**	0.02

Summary for Subcatchment 7S: PO-DA E

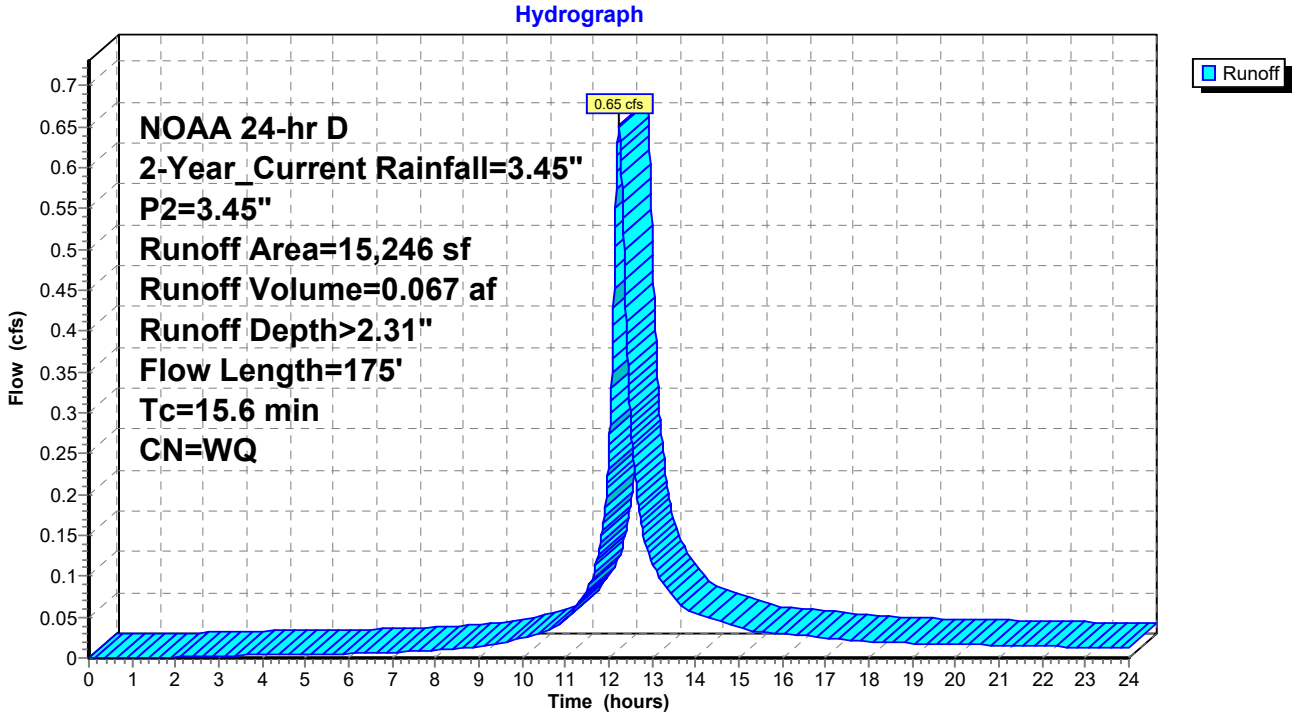
Runoff = 0.65 cfs @ 12.23 hrs, Volume= 0.067 af, Depth> 2.31"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0030	0.11		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
15.6	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.01
6.50	0.33	0.00	0.01
7.00	0.36	0.01	0.01
7.50	0.40	0.01	0.01
8.00	0.45	0.02	0.01
8.50	0.50	0.03	0.01
9.00	0.55	0.05	0.01
9.50	0.61	0.07	0.02
10.00	0.68	0.10	0.02
10.50	0.77	0.13	0.03
11.00	0.90	0.20	0.05
11.50	1.09	0.31	0.08
12.00	1.65	0.69	**0.25**
12.50	2.36	1.26	**0.29**
13.00	2.55	1.43	0.12
13.50	2.68	1.53	0.07
14.00	2.77	1.61	0.05
14.50	2.84	1.68	0.05
15.00	2.90	1.73	0.04
15.50	2.95	1.78	0.03
16.00	3.00	1.82	0.03
16.50	3.05	1.86	0.03
17.00	3.09	1.90	0.02
17.50	3.12	1.93	0.02
18.00	3.16	1.96	0.02
18.50	3.19	1.98	0.02
19.00	3.21	2.01	0.02
19.50	3.24	2.03	0.02
20.00	3.27	2.06	0.02
20.50	3.29	2.08	0.02
21.00	3.32	2.11	0.02
21.50	3.34	2.13	0.02
22.00	3.37	2.15	0.01
22.50	3.39	2.17	0.01
23.00	3.41	2.19	0.01
23.50	3.43	2.21	0.01
24.00	**3.45**	**2.22**	0.01

Summary for Subcatchment 9S: PO-DA G

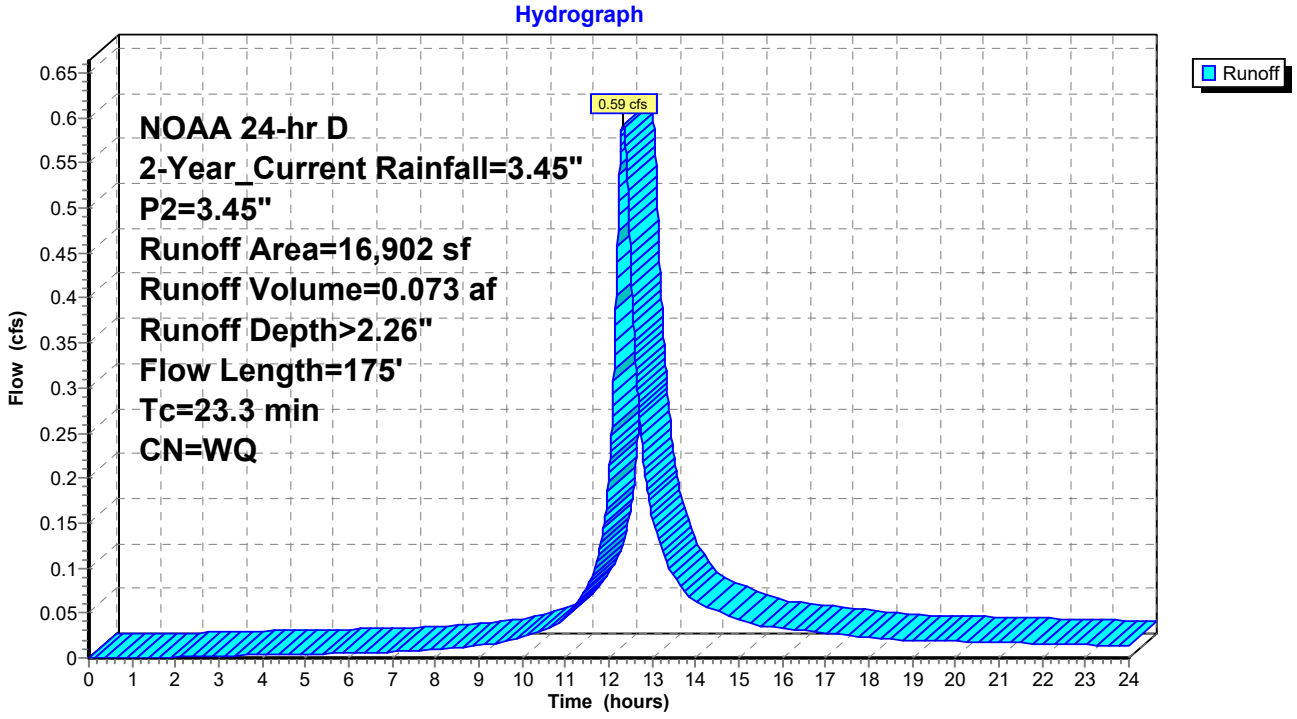
Runoff = 0.59 cfs @ 12.33 hrs, Volume= 0.073 af, Depth> 2.26"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	100	0.0010	0.07		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
23.3	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.01
6.50	0.33	0.00	0.01
7.00	0.36	0.01	0.01
7.50	0.40	0.01	0.01
8.00	0.45	0.02	0.01
8.50	0.50	0.03	0.01
9.00	0.55	0.05	0.01
9.50	0.61	0.07	0.02
10.00	0.68	0.10	0.02
10.50	0.77	0.13	0.03
11.00	0.90	0.20	0.05
11.50	1.09	0.31	0.08
12.00	1.65	0.69	**0.20**
12.50	2.36	1.26	**0.45**
13.00	2.55	1.43	0.16
13.50	2.68	1.53	0.09
14.00	2.77	1.61	0.06
14.50	2.84	1.68	0.05
15.00	2.90	1.73	0.04
15.50	2.95	1.78	0.04
16.00	3.00	1.82	0.03
16.50	3.05	1.86	0.03
17.00	3.09	1.90	0.03
17.50	3.12	1.93	0.03
18.00	3.16	1.96	0.02
18.50	3.19	1.98	0.02
19.00	3.21	2.01	0.02
19.50	3.24	2.03	0.02
20.00	3.27	2.06	0.02
20.50	3.29	2.08	0.02
21.00	3.32	2.11	0.02
21.50	3.34	2.13	0.02
22.00	3.37	2.15	0.02
22.50	3.39	2.17	0.02
23.00	3.41	2.19	0.01
23.50	3.43	2.21	0.01
24.00	**3.45**	**2.22**	0.01

Summary for Subcatchment 11S: PO-DA I

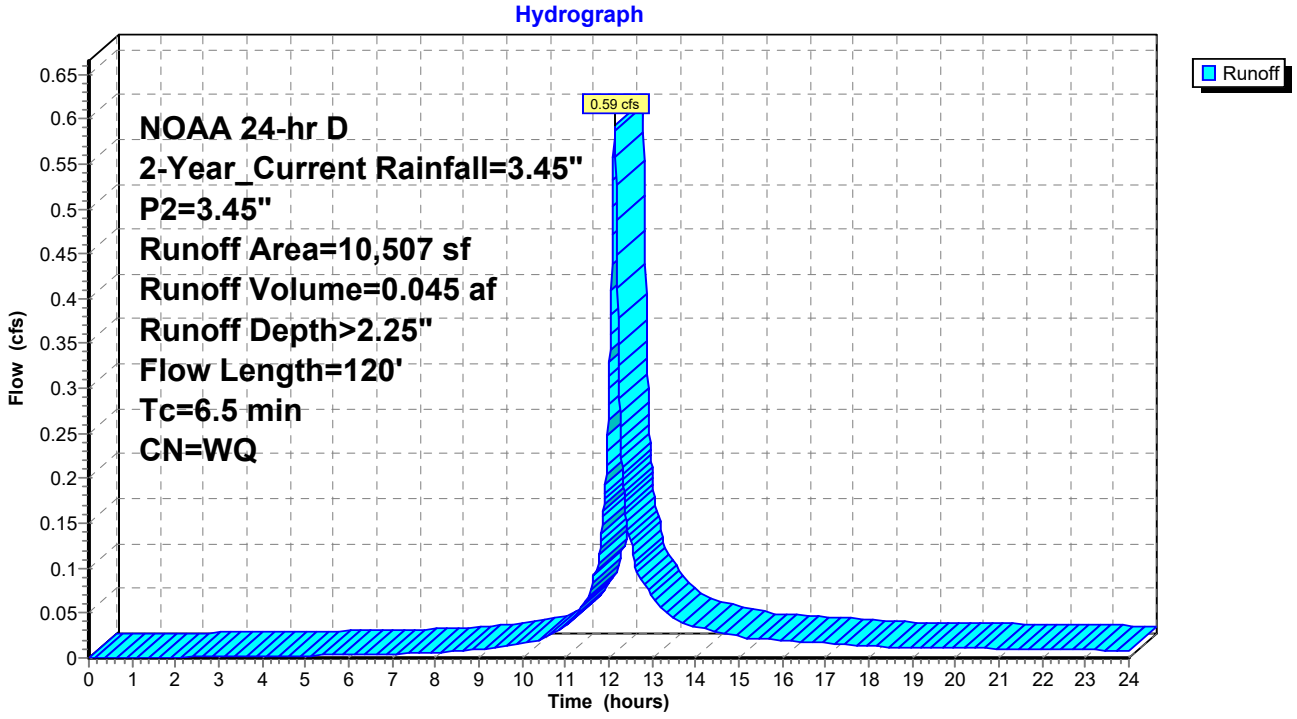
Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 2.25"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0237	0.26		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.5	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.00
5.50	0.26	0.00	0.00
6.00	0.29	0.00	0.00
6.50	0.33	0.00	0.00
7.00	0.36	0.01	0.00
7.50	0.40	0.01	0.01
8.00	0.45	0.02	0.01
8.50	0.50	0.03	0.01
9.00	0.55	0.05	0.01
9.50	0.61	0.07	0.01
10.00	0.68	0.10	0.02
10.50	0.77	0.13	0.02
11.00	0.90	0.20	0.04
11.50	1.09	0.31	0.06
12.00	1.65	0.69	**0.30**
12.50	2.36	1.26	**0.13**
13.00	2.55	1.43	0.07
13.50	2.68	1.53	0.04
14.00	2.77	1.61	0.04
14.50	2.84	1.68	0.03
15.00	2.90	1.73	0.02
15.50	2.95	1.78	0.02
16.00	3.00	1.82	0.02
16.50	3.05	1.86	0.02
17.00	3.09	1.90	0.02
17.50	3.12	1.93	0.01
18.00	3.16	1.96	0.01
18.50	3.19	1.98	0.01
19.00	3.21	2.01	0.01
19.50	3.24	2.03	0.01
20.00	3.27	2.06	0.01
20.50	3.29	2.08	0.01
21.00	3.32	2.11	0.01
21.50	3.34	2.13	0.01
22.00	3.37	2.15	0.01
22.50	3.39	2.17	0.01
23.00	3.41	2.19	0.01
23.50	3.43	2.21	0.01
24.00	**3.45**	**2.22**	0.01

Summary for Subcatchment 12S: PO-DA J

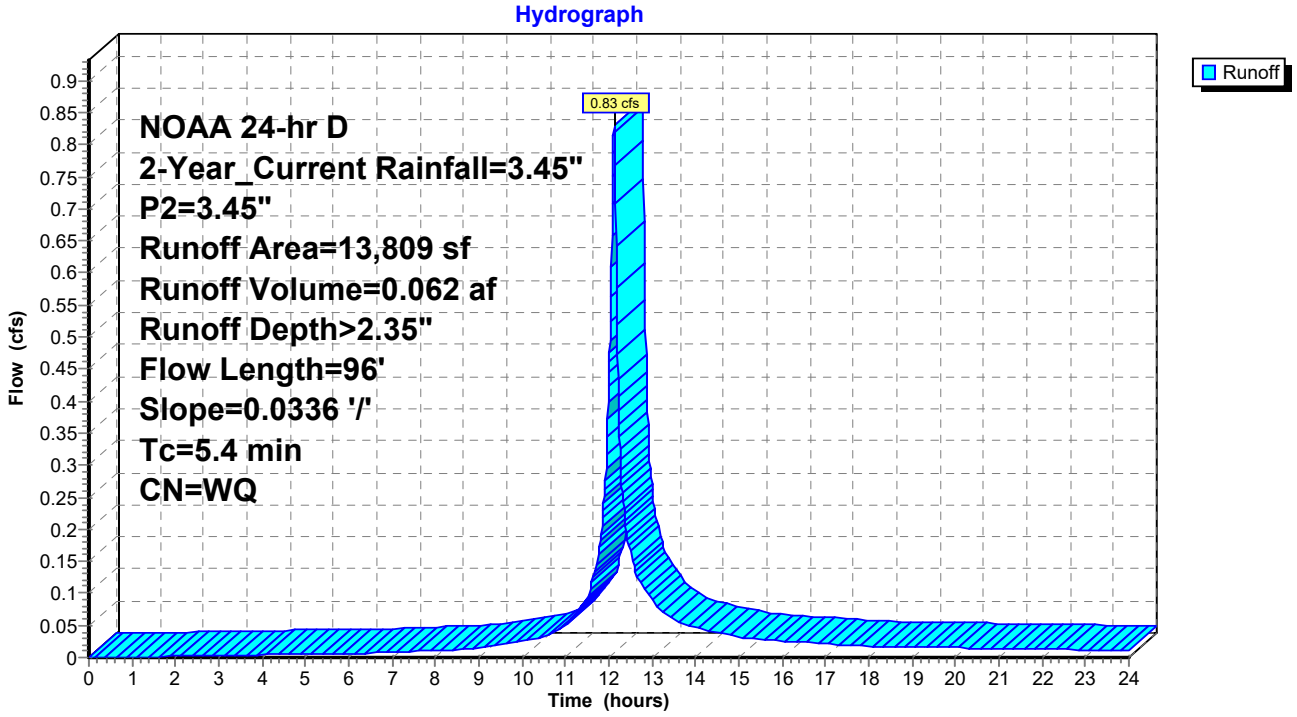
Runoff = 0.83 cfs @ 12.13 hrs, Volume= 0.062 af, Depth> 2.35"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	96	0.0336	0.30		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.00
4.00	0.18	0.00	0.00
4.50	0.21	0.00	0.00
5.00	0.24	0.00	0.01
5.50	0.26	0.00	0.01
6.00	0.29	0.00	0.01
6.50	0.33	0.00	0.01
7.00	0.36	0.01	0.01
7.50	0.40	0.02	0.01
8.00	0.45	0.03	0.01
8.50	0.50	0.04	0.01
9.00	0.55	0.06	0.01
9.50	0.61	0.08	0.02
10.00	0.68	0.11	0.03
10.50	0.77	0.16	0.03
11.00	0.90	0.22	0.05
11.50	1.09	0.34	0.09
12.00	1.65	0.75	**0.44**
12.50	2.36	1.33	**0.17**
13.00	2.55	1.50	0.09
13.50	2.68	1.61	0.06
14.00	2.77	1.69	0.05
14.50	2.84	1.76	0.04
15.00	2.90	1.81	0.03
15.50	2.95	1.86	0.03
16.00	3.00	1.90	0.03
16.50	3.05	1.94	0.02
17.00	3.09	1.98	0.02
17.50	3.12	2.01	0.02
18.00	3.16	2.04	0.02
18.50	3.19	2.07	0.02
19.00	3.21	2.09	0.02
19.50	3.24	2.12	0.02
20.00	3.27	2.14	0.02
20.50	3.29	2.17	0.01
21.00	3.32	2.19	0.01
21.50	3.34	2.21	0.01
22.00	3.37	2.23	0.01
22.50	3.39	2.26	0.01
23.00	3.41	2.27	0.01
23.50	3.43	2.29	0.01
24.00	**3.45**	**2.31**	0.01

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 2.14" for 2-Year_Current event
Inflow = 0.93 cfs @ 12.27 hrs, Volume= 0.101 af
Outflow = 0.24 cfs @ 12.86 hrs, Volume= 0.099 af, Atten= 74%, Lag= 35.1 min
Primary = 0.24 cfs @ 12.86 hrs, Volume= 0.099 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.20' @ 12.86 hrs Surf.Area= 5,277 sf Storage= 1,470 cf

Plug-Flow detention time= 76.9 min calculated for 0.099 af (98% of inflow)
Center-of-Mass det. time= 66.2 min (888.6 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

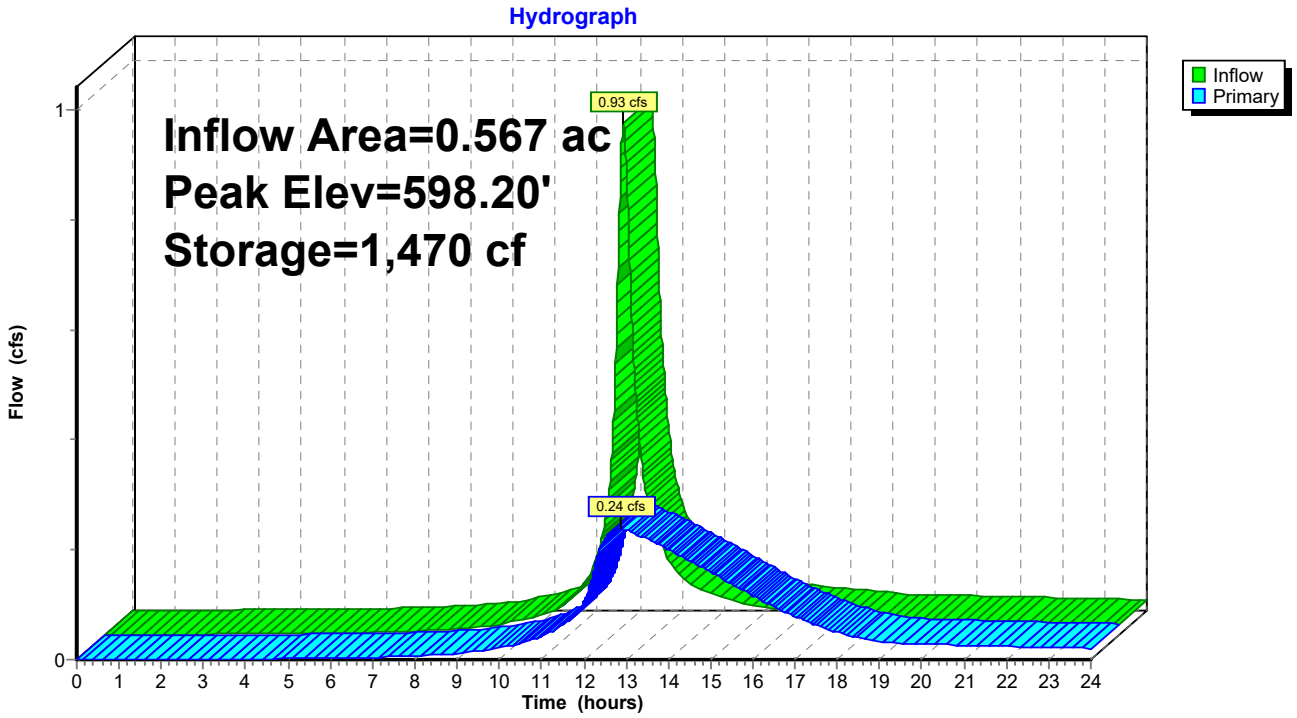
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 12.86 hrs HW=598.20' TW=590.85' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 0.24 cfs of 9.37 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.24 cfs @ 6.98 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.00	0	596.00	0.00
1.50	0.00	0	596.00	0.00
2.00	0.00	1	596.00	0.00
2.50	0.00	4	596.01	0.00
3.00	0.00	7	596.01	0.00
3.50	0.00	11	596.02	0.00
4.00	0.00	15	596.02	0.00
4.50	0.00	19	596.03	0.00
5.00	0.00	23	596.03	0.00
5.50	0.00	26	596.04	0.00
6.00	0.00	29	596.04	0.00
6.50	0.01	31	596.04	0.00
7.00	0.01	34	596.05	0.00
7.50	0.01	38	596.05	0.01
8.00	0.01	43	596.06	0.01
8.50	0.01	50	596.07	0.01
9.00	0.02	58	596.08	0.01
9.50	0.02	68	596.09	0.02
10.00	0.03	82	596.11	0.02
10.50	0.04	100	596.14	0.03
11.00	0.06	126	596.17	0.04
11.50	0.12	186	596.26	0.06
12.00	**0.33**	374	596.52	0.11
12.50	**0.53**	**1,317**	**597.89**	**0.22**
13.00	0.20	**1,459**	**598.18**	**0.24**
13.50	0.12	1,326	597.90	0.22
14.00	0.09	1,129	597.60	0.20
14.50	0.07	930	597.31	0.18
15.00	0.06	745	597.05	0.16
15.50	0.05	576	596.81	0.14
16.00	0.05	435	596.61	0.12
16.50	0.04	325	596.45	0.10
17.00	0.04	242	596.34	0.08
17.50	0.04	183	596.25	0.06
18.00	0.03	143	596.20	0.05
18.50	0.03	118	596.16	0.04
19.00	0.03	106	596.15	0.03
19.50	0.03	100	596.14	0.03
20.00	0.03	96	596.13	0.03
20.50	0.03	93	596.13	0.03
21.00	0.03	91	596.13	0.03
21.50	0.02	89	596.12	0.03
22.00	0.02	87	596.12	0.02
22.50	0.02	85	596.12	0.02
23.00	0.02	83	596.12	0.02
23.50	0.02	81	596.11	0.02
24.00	0.02	79	596.11	0.02

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 2.31" for 2-Year_Current event
Inflow = 0.65 cfs @ 12.23 hrs, Volume= 0.067 af
Outflow = 0.19 cfs @ 12.69 hrs, Volume= 0.066 af, Atten= 71%, Lag= 27.1 min
Primary = 0.19 cfs @ 12.69 hrs, Volume= 0.066 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 599.40' @ 12.69 hrs Surf.Area= 3,156 sf Storage= 874 cf

Plug-Flow detention time= 62.1 min calculated for 0.066 af (98% of inflow)
Center-of-Mass det. time= 50.8 min (857.8 - 807.1)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

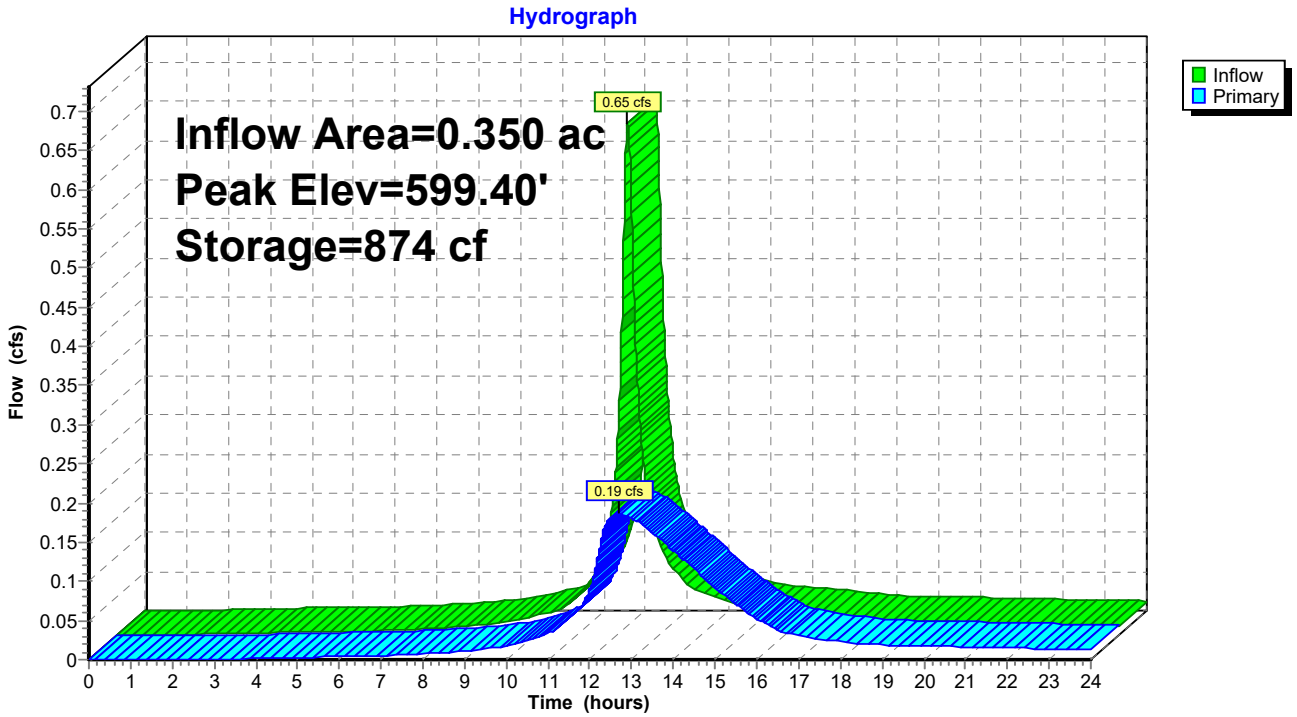
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.19 cfs @ 12.69 hrs HW=599.40' TW=588.77' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 0.19 cfs of 11.06 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.19 cfs @ 5.48 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.00	0	598.00	0.00
1.50	0.00	0	598.00	0.00
2.00	0.00	2	598.00	0.00
2.50	0.00	4	598.01	0.00
3.00	0.00	8	598.01	0.00
3.50	0.00	12	598.02	0.00
4.00	0.00	17	598.03	0.00
4.50	0.00	20	598.03	0.00
5.00	0.00	24	598.04	0.00
5.50	0.00	27	598.04	0.00
6.00	0.01	29	598.05	0.00
6.50	0.01	32	598.05	0.00
7.00	0.01	34	598.05	0.01
7.50	0.01	37	598.06	0.01
8.00	0.01	41	598.06	0.01
8.50	0.01	46	598.07	0.01
9.00	0.01	51	598.08	0.01
9.50	0.02	57	598.09	0.01
10.00	0.02	66	598.10	0.02
10.50	0.03	78	598.12	0.02
11.00	0.05	96	598.15	0.03
11.50	0.08	135	598.21	0.05
12.00	**0.25**	260	598.40	0.09
12.50	**0.29**	**843**	**599.35**	**0.18**
13.00	0.12	**829**	**599.32**	**0.18**
13.50	0.07	687	599.08	0.16
14.00	0.05	527	598.82	0.14
14.50	0.05	387	598.60	0.12
15.00	0.04	274	598.42	0.09
15.50	0.03	189	598.29	0.07
16.00	0.03	134	598.21	0.05
16.50	0.03	104	598.16	0.04
17.00	0.02	90	598.14	0.03
17.50	0.02	82	598.13	0.03
18.00	0.02	76	598.12	0.02
18.50	0.02	72	598.11	0.02
19.00	0.02	69	598.11	0.02
19.50	0.02	67	598.10	0.02
20.00	0.02	65	598.10	0.02
20.50	0.02	64	598.10	0.02
21.00	0.02	63	598.10	0.02
21.50	0.02	61	598.09	0.02
22.00	0.01	60	598.09	0.02
22.50	0.01	59	598.09	0.01
23.00	0.01	58	598.09	0.01
23.50	0.01	56	598.09	0.01
24.00	0.01	55	598.08	0.01

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 2.26" for 2-Year_Current event
Inflow = 0.59 cfs @ 12.33 hrs, Volume= 0.073 af
Outflow = 0.17 cfs @ 12.94 hrs, Volume= 0.071 af, Atten= 71%, Lag= 36.5 min
Primary = 0.17 cfs @ 12.94 hrs, Volume= 0.071 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.19' @ 12.94 hrs Surf.Area= 2,175 sf Storage= 1,059 cf

Plug-Flow detention time= 84.2 min calculated for 0.071 af (97% of inflow)
Center-of-Mass det. time= 68.7 min (884.5 - 815.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

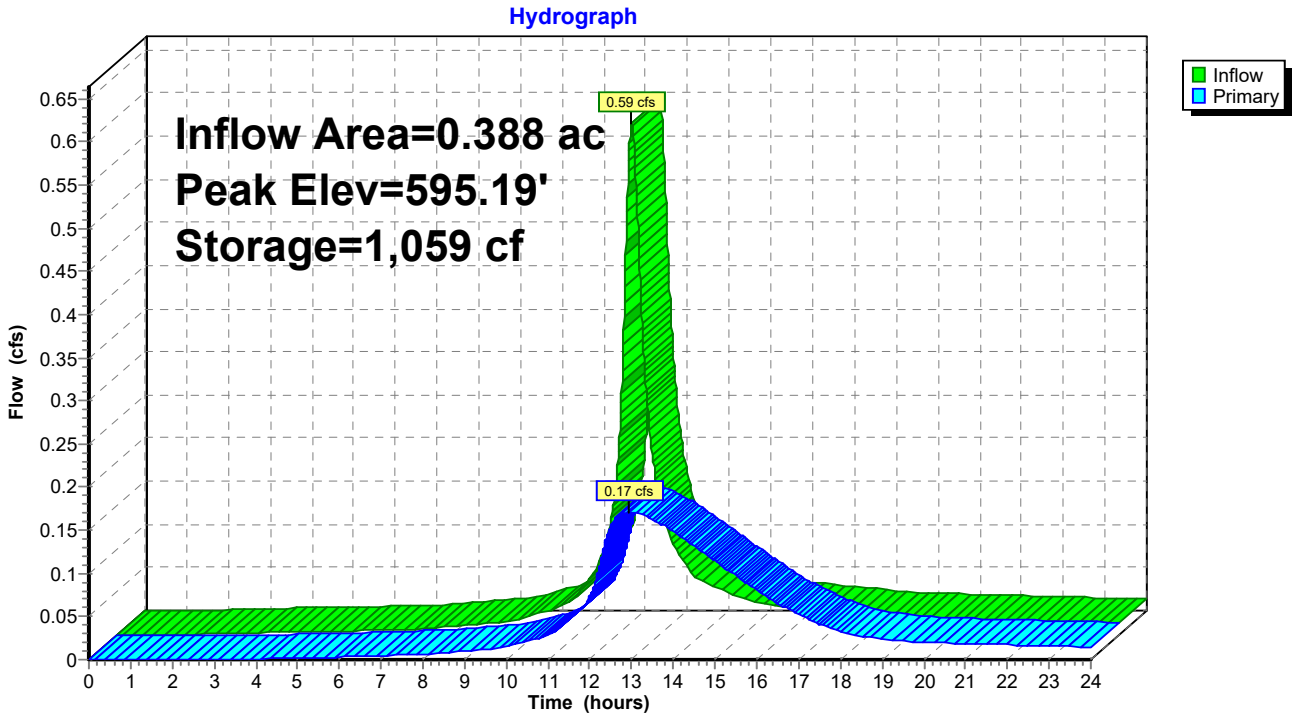
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 12.94 hrs HW=595.19' TW=587.16' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.17 cfs of 14.92 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.17 cfs @ 5.02 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	0	594.00	0.00
1.50	0.00	0	594.00	0.00
2.00	0.00	1	594.00	0.00
2.50	0.00	4	594.00	0.00
3.00	0.00	7	594.01	0.00
3.50	0.00	12	594.01	0.00
4.00	0.00	17	594.02	0.00
4.50	0.00	22	594.02	0.00
5.00	0.00	27	594.03	0.00
5.50	0.00	31	594.04	0.00
6.00	0.01	35	594.04	0.00
6.50	0.01	39	594.04	0.00
7.00	0.01	43	594.05	0.00
7.50	0.01	47	594.05	0.01
8.00	0.01	53	594.06	0.01
8.50	0.01	59	594.07	0.01
9.00	0.01	66	594.07	0.01
9.50	0.02	75	594.08	0.01
10.00	0.02	87	594.10	0.02
10.50	0.03	103	594.11	0.02
11.00	0.05	125	594.14	0.03
11.50	0.08	168	594.18	0.05
12.00	**0.20**	282	594.30	0.07
12.50	**0.45**	**885**	**594.99**	**0.15**
13.00	0.16	**1,057**	**595.19**	**0.17**
13.50	0.09	969	595.09	0.16
14.00	0.06	823	594.92	0.15
14.50	0.05	674	594.75	0.13
15.00	0.04	538	594.59	0.11
15.50	0.04	418	594.46	0.10
16.00	0.03	321	594.34	0.08
16.50	0.03	247	594.26	0.07
17.00	0.03	194	594.21	0.05
17.50	0.03	157	594.17	0.04
18.00	0.02	134	594.15	0.03
18.50	0.02	120	594.13	0.03
19.00	0.02	111	594.12	0.02
19.50	0.02	105	594.11	0.02
20.00	0.02	101	594.11	0.02
20.50	0.02	98	594.11	0.02
21.00	0.02	96	594.10	0.02
21.50	0.02	93	594.10	0.02
22.00	0.02	91	594.10	0.02
22.50	0.02	89	594.10	0.02
23.00	0.01	87	594.10	0.02
23.50	0.01	85	594.09	0.02
24.00	0.01	83	594.09	0.01

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 2.25" for 2-Year_Current event
Inflow = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af
Outflow = 0.15 cfs @ 12.42 hrs, Volume= 0.044 af, Atten= 76%, Lag= 17.0 min
Primary = 0.15 cfs @ 12.42 hrs, Volume= 0.044 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.69' @ 12.42 hrs Surf.Area= 1,575 sf Storage= 567 cf

Plug-Flow detention time= 59.1 min calculated for 0.044 af (98% of inflow)
Center-of-Mass det. time= 45.5 min (849.4 - 803.9)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

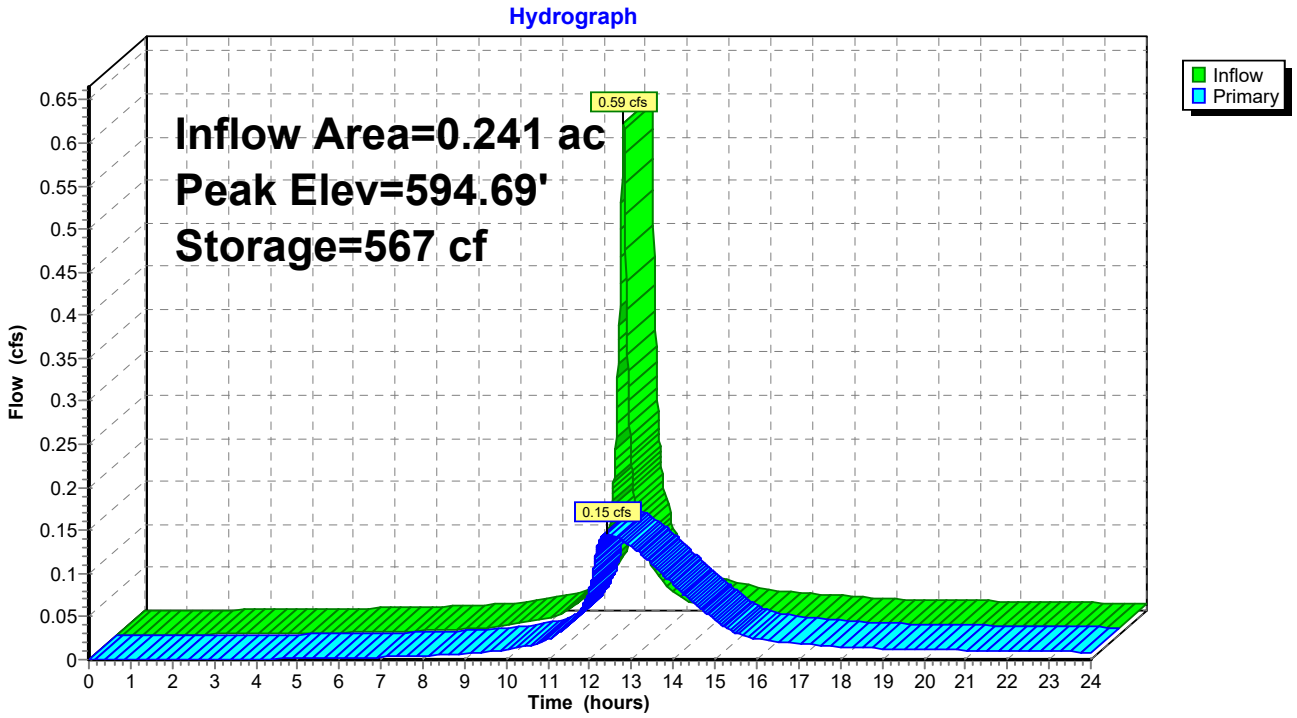
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 12.42 hrs HW=594.69' TW=580.84' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.15 cfs of 25.96 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.15 cfs @ 4.27 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	0	593.80	0.00
1.50	0.00	0	593.80	0.00
2.00	0.00	1	593.80	0.00
2.50	0.00	3	593.81	0.00
3.00	0.00	6	593.81	0.00
3.50	0.00	8	593.81	0.00
4.00	0.00	11	593.82	0.00
4.50	0.00	14	593.82	0.00
5.00	0.00	17	593.83	0.00
5.50	0.00	19	593.83	0.00
6.00	0.00	21	593.83	0.00
6.50	0.00	23	593.84	0.00
7.00	0.00	25	593.84	0.00
7.50	0.01	28	593.84	0.00
8.00	0.01	31	593.85	0.00
8.50	0.01	35	593.85	0.01
9.00	0.01	39	593.86	0.01
9.50	0.01	44	593.87	0.01
10.00	0.02	52	593.88	0.01
10.50	0.02	62	593.90	0.02
11.00	0.04	77	593.92	0.02
11.50	0.06	109	593.97	0.04
12.00	**0.30**	**236**	**594.16**	**0.08**
12.50	**0.13**	**564**	**594.68**	**0.15**
13.00	0.07	477	594.55	0.13
13.50	0.04	359	594.36	0.11
14.00	0.04	250	594.19	0.09
14.50	0.03	171	594.06	0.07
15.00	0.02	119	593.98	0.05
15.50	0.02	91	593.94	0.03
16.00	0.02	79	593.92	0.02
16.50	0.02	72	593.91	0.02
17.00	0.02	67	593.90	0.02
17.50	0.01	64	593.90	0.02
18.00	0.01	60	593.89	0.02
18.50	0.01	57	593.89	0.01
19.00	0.01	55	593.89	0.01
19.50	0.01	54	593.88	0.01
20.00	0.01	53	593.88	0.01
20.50	0.01	51	593.88	0.01
21.00	0.01	50	593.88	0.01
21.50	0.01	49	593.88	0.01
22.00	0.01	48	593.88	0.01
22.50	0.01	47	593.87	0.01
23.00	0.01	46	593.87	0.01
23.50	0.01	45	593.87	0.01
24.00	0.01	44	593.87	0.01

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 2.35" for 2-Year_Current event
Inflow = 0.83 cfs @ 12.13 hrs, Volume= 0.062 af
Outflow = 0.14 cfs @ 12.59 hrs, Volume= 0.060 af, Atten= 83%, Lag= 27.8 min
Primary = 0.14 cfs @ 12.59 hrs, Volume= 0.060 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.53' @ 12.59 hrs Surf.Area= 2,894 sf Storage= 970 cf

Plug-Flow detention time= 101.8 min calculated for 0.060 af (96% of inflow)
Center-of-Mass det. time= 80.3 min (874.6 - 794.2)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

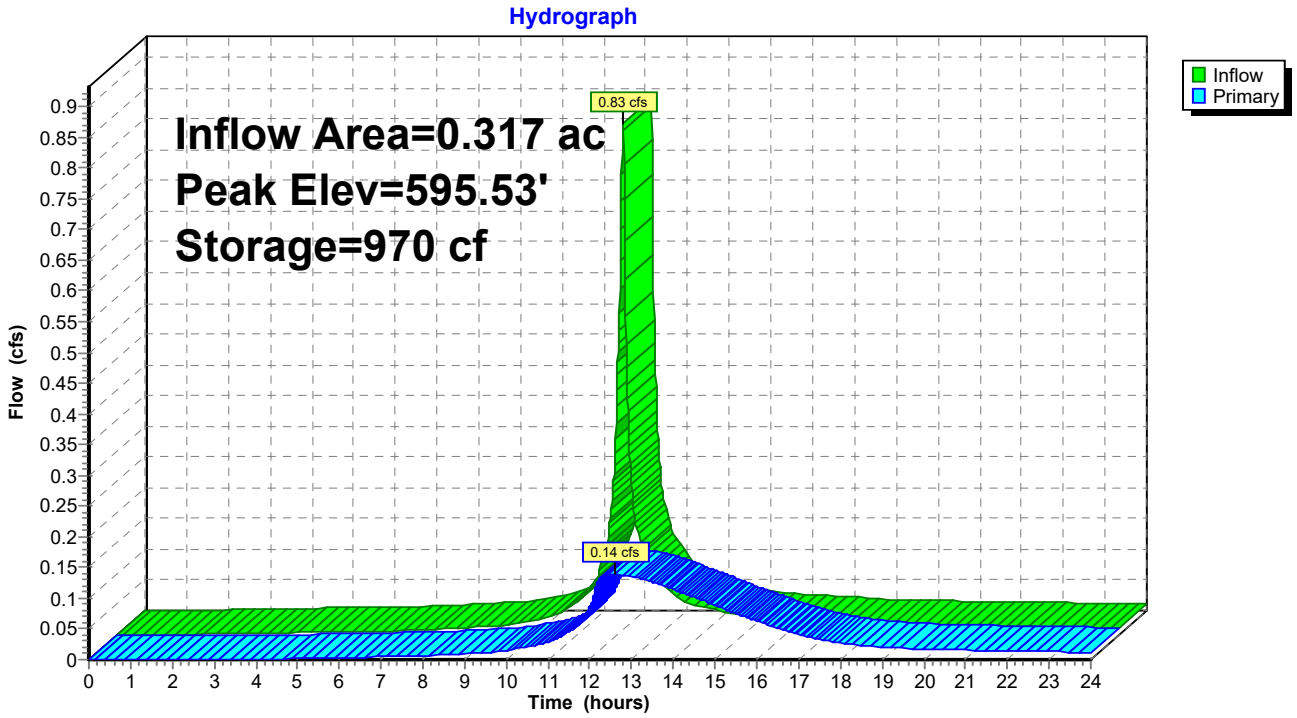
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 12.59 hrs HW=595.53' TW=585.28' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.14 cfs of 17.10 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.14 cfs @ 4.09 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

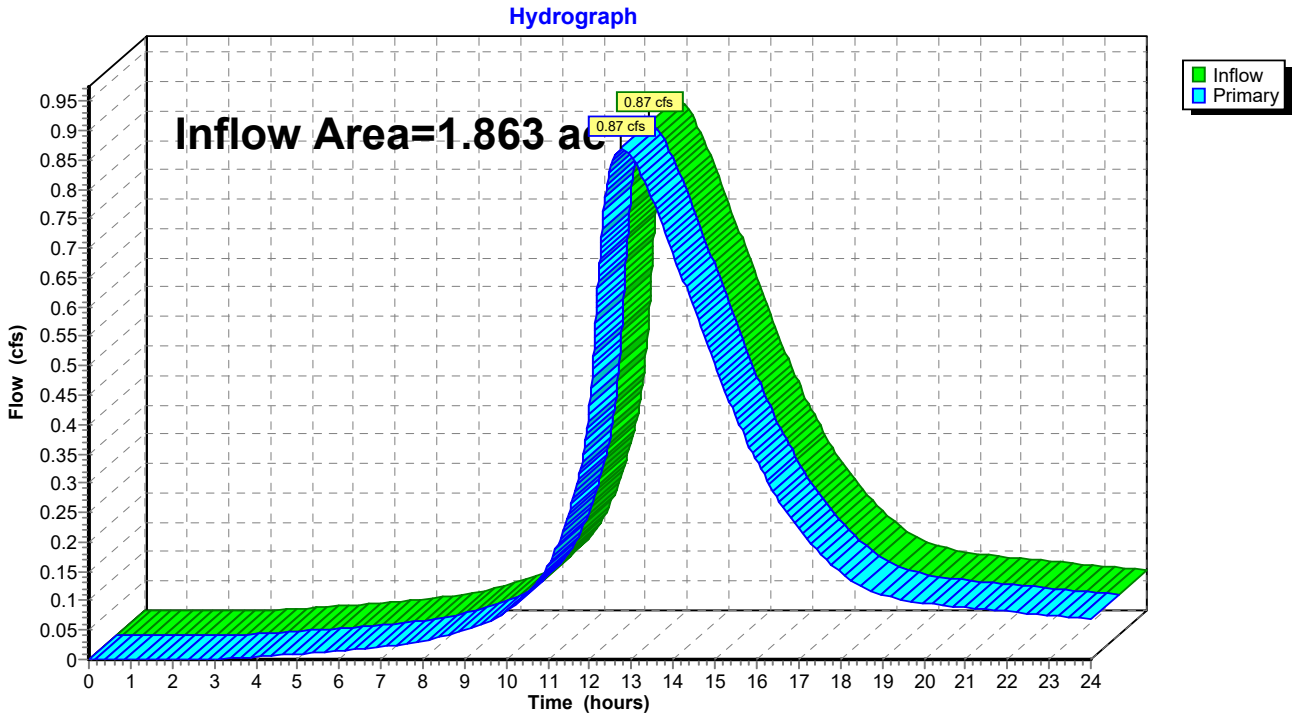
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.00	0	594.70	0.00
1.50	0.00	1	594.70	0.00
2.00	0.00	3	594.70	0.00
2.50	0.00	6	594.71	0.00
3.00	0.00	11	594.71	0.00
3.50	0.00	16	594.71	0.00
4.00	0.00	22	594.72	0.00
4.50	0.00	28	594.72	0.00
5.00	0.01	35	594.73	0.00
5.50	0.01	40	594.73	0.00
6.00	0.01	46	594.74	0.00
6.50	0.01	51	594.74	0.00
7.00	0.01	57	594.75	0.00
7.50	0.01	64	594.75	0.01
8.00	0.01	71	594.76	0.01
8.50	0.01	78	594.77	0.01
9.00	0.01	86	594.77	0.01
9.50	0.02	97	594.78	0.01
10.00	0.03	112	594.79	0.02
10.50	0.03	130	594.81	0.02
11.00	0.05	161	594.83	0.03
11.50	0.09	221	594.88	0.05
12.00	**0.44**	446	595.07	0.09
12.50	**0.17**	**964**	**595.52**	**0.14**
13.00	0.09	**929**	**595.49**	**0.14**
13.50	0.06	823	595.40	0.13
14.00	0.05	697	595.29	0.11
14.50	0.04	580	595.19	0.10
15.00	0.03	472	595.10	0.09
15.50	0.03	377	595.01	0.08
16.00	0.03	302	594.95	0.06
16.50	0.02	244	594.90	0.05
17.00	0.02	201	594.87	0.04
17.50	0.02	173	594.84	0.03
18.00	0.02	153	594.83	0.03
18.50	0.02	139	594.82	0.02
19.00	0.02	130	594.81	0.02
19.50	0.02	123	594.80	0.02
20.00	0.02	119	594.80	0.02
20.50	0.01	115	594.80	0.02
21.00	0.01	112	594.79	0.02
21.50	0.01	109	594.79	0.02
22.00	0.01	107	594.79	0.01
22.50	0.01	104	594.79	0.01
23.00	0.01	102	594.79	0.01
23.50	0.01	99	594.78	0.01
24.00	0.01	97	594.78	0.01

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 2.19" for 2-Year_Current event
Inflow = 0.87 cfs @ 12.76 hrs, Volume= 0.341 af
Primary = 0.87 cfs @ 12.76 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.02		0.02
6.50	0.02		0.02
7.00	0.02		0.02
7.50	0.03		0.03
8.00	0.03		0.03
8.50	0.04		0.04
9.00	0.05		0.05
9.50	0.06		0.06
10.00	0.08		0.08
10.50	0.11		0.11
11.00	0.16		0.16
11.50	0.25		0.25
12.00	0.44		0.44
12.50	**0.84**		**0.84**
13.00	**0.86**		**0.86**
13.50	0.78		0.78
14.00	0.69		0.69
14.50	0.60		0.60
15.00	0.50		0.50
15.50	0.41		0.41
16.00	0.34		0.34
16.50	0.27		0.27
17.00	0.22		0.22
17.50	0.18		0.18
18.00	0.15		0.15
18.50	0.12		0.12
19.00	0.11		0.11
19.50	0.10		0.10
20.00	0.10		0.10
20.50	0.09		0.09
21.00	0.09		0.09
21.50	0.09		0.09
22.00	0.08		0.08
22.50	0.08		0.08
23.00	0.08		0.08
23.50	0.07		0.07
24.00	0.07		0.07

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 2.19" for 2-Year_Current event
Inflow = 0.87 cfs @ 12.76 hrs, Volume= 0.341 af
Outflow = 0.87 cfs @ 12.76 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min
Primary = 0.87 cfs @ 12.76 hrs, Volume= 0.341 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 580.86' @ 12.76 hrs Surf.Area= 0.000 ac Storage= 0.000 af

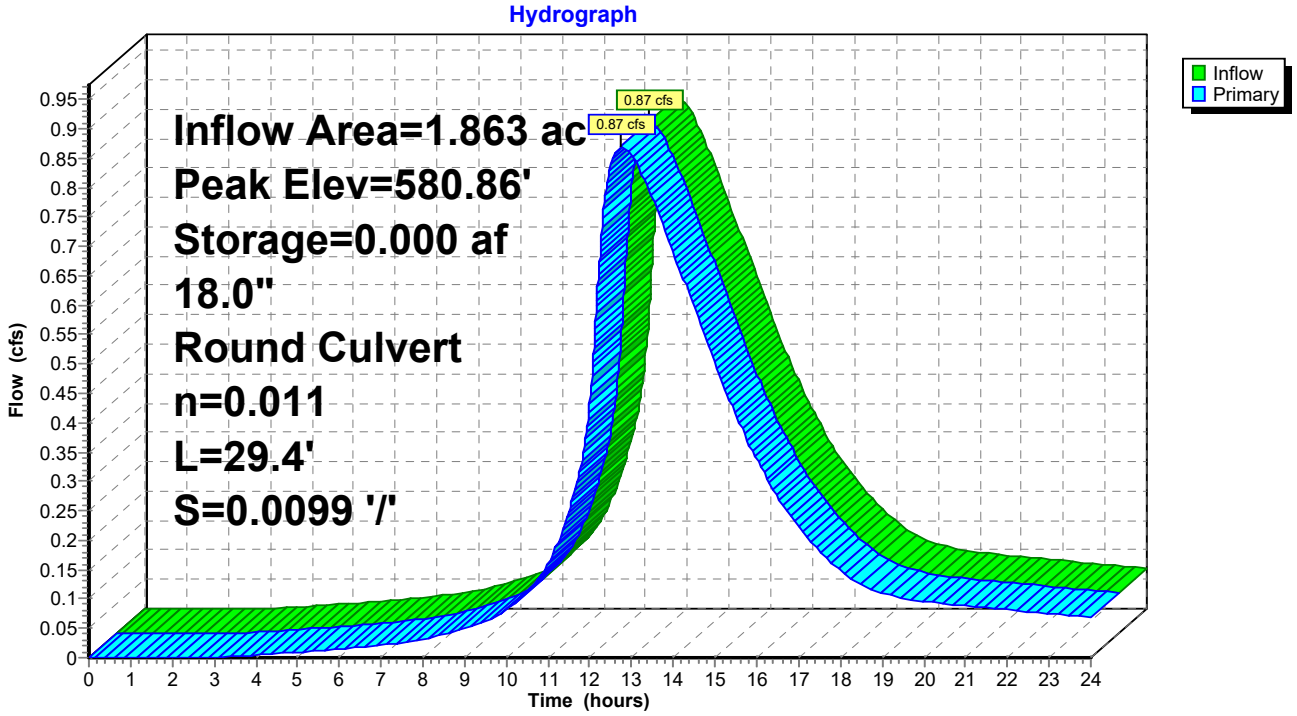
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (874.4 - 874.4)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=0.87 cfs @ 12.76 hrs HW=580.86' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 0.87 cfs @ 3.22 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.00	0.000	580.69	0.00
2.00	0.00	0.000	580.69	0.00
2.50	0.00	0.000	580.69	0.00
3.00	0.00	0.000	580.69	0.00
3.50	0.00	0.000	580.69	0.00
4.00	0.00	0.000	580.69	0.00
4.50	0.01	0.000	580.69	0.01
5.00	0.01	0.000	580.69	0.01
5.50	0.01	0.000	580.69	0.01
6.00	0.02	0.000	580.69	0.02
6.50	0.02	0.000	580.69	0.02
7.00	0.02	0.000	580.69	0.02
7.50	0.03	0.000	580.69	0.03
8.00	0.03	0.000	580.69	0.03
8.50	0.04	0.000	580.69	0.04
9.00	0.05	0.000	580.69	0.05
9.50	0.06	0.000	580.69	0.06
10.00	0.08	0.000	580.69	0.08
10.50	0.11	0.000	580.69	0.11
11.00	0.16	0.000	580.69	0.16
11.50	0.25	0.000	580.69	0.25
12.00	0.44	0.000	580.73	0.44
12.50	**0.84**	**0.000**	**580.85**	**0.84**
13.00	**0.86**	**0.000**	**580.86**	**0.86**
13.50	0.78	0.000	580.84	0.78
14.00	0.69	0.000	580.81	0.69
14.50	0.60	0.000	580.78	0.60
15.00	0.50	0.000	580.75	0.50
15.50	0.41	0.000	580.72	0.41
16.00	0.34	0.000	580.70	0.34
16.50	0.27	0.000	580.69	0.27
17.00	0.22	0.000	580.69	0.22
17.50	0.18	0.000	580.69	0.18
18.00	0.15	0.000	580.69	0.15
18.50	0.12	0.000	580.69	0.12
19.00	0.11	0.000	580.69	0.11
19.50	0.10	0.000	580.69	0.10
20.00	0.10	0.000	580.69	0.10
20.50	0.09	0.000	580.69	0.09
21.00	0.09	0.000	580.69	0.09
21.50	0.09	0.000	580.69	0.09
22.00	0.08	0.000	580.69	0.08
22.50	0.08	0.000	580.69	0.08
23.00	0.08	0.000	580.69	0.08
23.50	0.07	0.000	580.69	0.07
24.00	0.07	0.000	580.69	0.07

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 2.19" for 2-Year_Current event
Inflow = 0.73 cfs @ 12.81 hrs, Volume= 0.296 af
Outflow = 0.73 cfs @ 12.81 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.1 min
Primary = 0.73 cfs @ 12.81 hrs, Volume= 0.296 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.28' @ 12.81 hrs Surf.Area= 0.001 ac Storage= 0.000 af

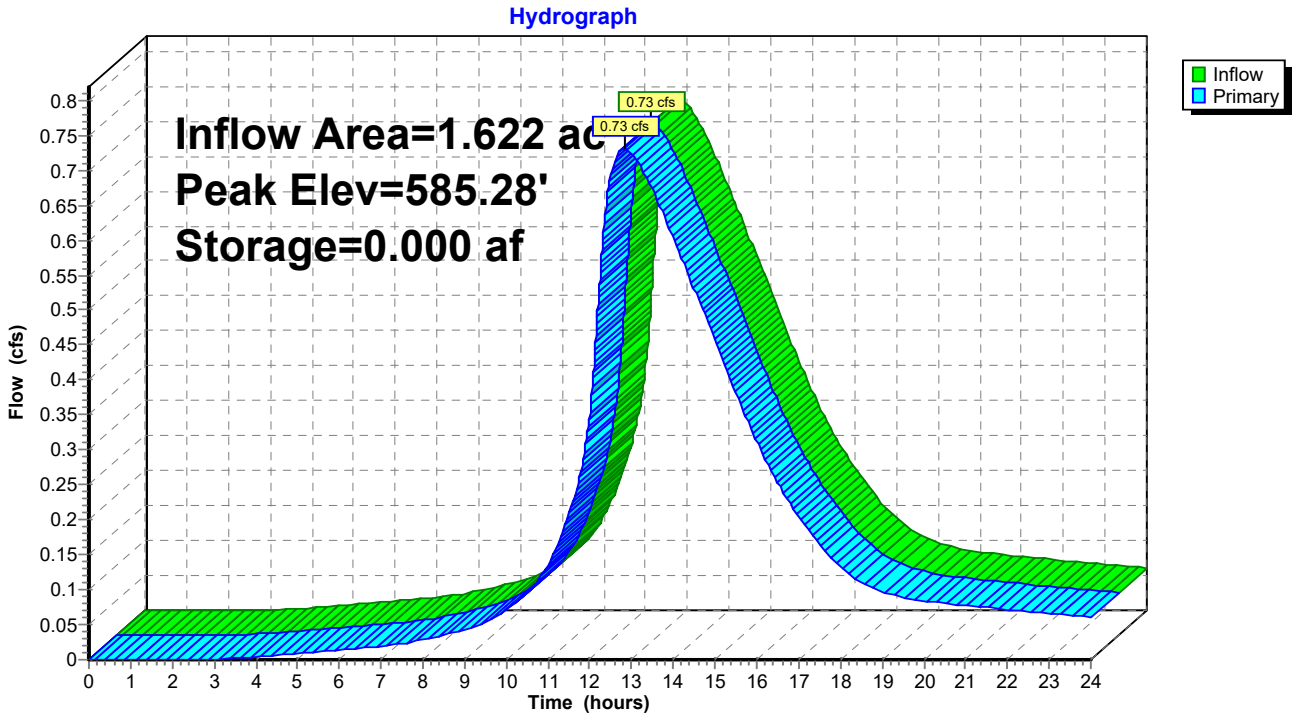
Plug-Flow detention time= 0.1 min calculated for 0.296 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (878.1 - 878.0)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.73 cfs @ 12.81 hrs HW=585.28' TW=580.86' (Dynamic Tailwater)
↑—**1=SD-24** (Orifice Controls 0.73 cfs @ 2.16 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.88	0.00
1.50	0.00	0.000	584.88	0.00
2.00	0.00	0.000	584.88	0.00
2.50	0.00	0.000	584.89	0.00
3.00	0.00	0.000	584.89	0.00
3.50	0.00	0.000	584.90	0.00
4.00	0.00	0.000	584.91	0.00
4.50	0.01	0.000	584.91	0.01
5.00	0.01	0.000	584.92	0.01
5.50	0.01	0.000	584.93	0.01
6.00	0.01	0.000	584.93	0.01
6.50	0.02	0.000	584.94	0.02
7.00	0.02	0.000	584.94	0.02
7.50	0.02	0.000	584.95	0.02
8.00	0.03	0.000	584.95	0.03
8.50	0.03	0.000	584.96	0.03
9.00	0.04	0.000	584.97	0.04
9.50	0.05	0.000	584.98	0.05
10.00	0.07	0.000	585.00	0.07
10.50	0.10	0.000	585.02	0.10
11.00	0.14	0.000	585.05	0.14
11.50	0.21	0.000	585.09	0.21
12.00	0.35	0.000	585.15	0.35
12.50	**0.69**	**0.000**	**585.27**	**0.69**
13.00	**0.72**	**0.000**	**585.28**	**0.72**
13.50	0.67	0.000	585.26	0.67
14.00	0.60	0.000	585.24	0.60
14.50	0.53	0.000	585.22	0.53
15.00	0.46	0.000	585.19	0.46
15.50	0.38	0.000	585.16	0.38
16.00	0.31	0.000	585.14	0.31
16.50	0.25	0.000	585.11	0.25
17.00	0.20	0.000	585.09	0.20
17.50	0.16	0.000	585.06	0.16
18.00	0.13	0.000	585.05	0.13
18.50	0.11	0.000	585.03	0.11
19.00	0.10	0.000	585.02	0.10
19.50	0.09	0.000	585.01	0.09
20.00	0.08	0.000	585.01	0.08
20.50	0.08	0.000	585.01	0.08
21.00	0.08	0.000	585.01	0.08
21.50	0.07	0.000	585.00	0.07
22.00	0.07	0.000	585.00	0.07
22.50	0.07	0.000	585.00	0.07
23.00	0.07	0.000	585.00	0.07
23.50	0.06	0.000	584.99	0.06
24.00	0.06	0.000	584.99	0.06

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 2.18" for 2-Year_Current event
Inflow = 0.59 cfs @ 12.83 hrs, Volume= 0.237 af
Outflow = 0.59 cfs @ 12.83 hrs, Volume= 0.237 af, Atten= 0%, Lag= 0.1 min
Primary = 0.59 cfs @ 12.83 hrs, Volume= 0.237 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.16' @ 12.83 hrs Surf.Area= 0.000 ac Storage= 0.000 af

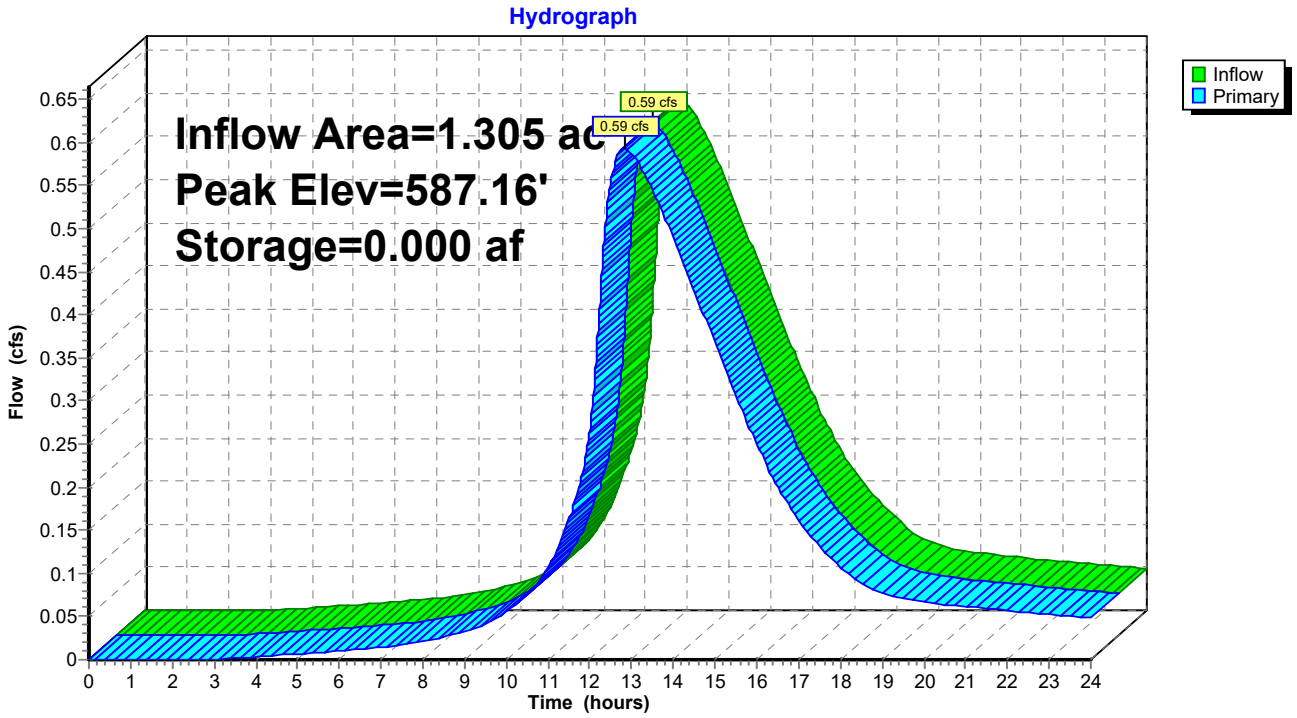
Plug-Flow detention time= 0.1 min calculated for 0.237 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (878.9 - 878.9)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.59 cfs @ 12.83 hrs HW=587.16' TW=585.28' (Dynamic Tailwater)
↑—**1=SD-23** (Orifice Controls 0.59 cfs @ 2.04 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.80	0.00
1.50	0.00	0.000	586.80	0.00
2.00	0.00	0.000	586.80	0.00
2.50	0.00	0.000	586.81	0.00
3.00	0.00	0.000	586.81	0.00
3.50	0.00	0.000	586.82	0.00
4.00	0.00	0.000	586.82	0.00
4.50	0.00	0.000	586.83	0.00
5.00	0.01	0.000	586.84	0.01
5.50	0.01	0.000	586.84	0.01
6.00	0.01	0.000	586.85	0.01
6.50	0.01	0.000	586.85	0.01
7.00	0.01	0.000	586.85	0.01
7.50	0.02	0.000	586.86	0.02
8.00	0.02	0.000	586.86	0.02
8.50	0.03	0.000	586.87	0.03
9.00	0.03	0.000	586.88	0.03
9.50	0.04	0.000	586.89	0.04
10.00	0.06	0.000	586.91	0.06
10.50	0.08	0.000	586.92	0.08
11.00	0.11	0.000	586.95	0.11
11.50	0.16	0.000	586.98	0.16
12.00	0.27	0.000	587.04	0.27
12.50	**0.56**	**0.000**	**587.15**	**0.56**
13.00	**0.59**	**0.000**	**587.16**	**0.59**
13.50	0.55	0.000	587.14	0.55
14.00	0.49	0.000	587.12	0.49
14.50	0.43	0.000	587.10	0.43
15.00	0.37	0.000	587.08	0.37
15.50	0.31	0.000	587.05	0.31
16.00	0.25	0.000	587.03	0.25
16.50	0.20	0.000	587.00	0.20
17.00	0.16	0.000	586.98	0.16
17.50	0.13	0.000	586.96	0.13
18.00	0.11	0.000	586.95	0.11
18.50	0.09	0.000	586.93	0.09
19.00	0.08	0.000	586.92	0.08
19.50	0.07	0.000	586.92	0.07
20.00	0.07	0.000	586.92	0.07
20.50	0.06	0.000	586.91	0.06
21.00	0.06	0.000	586.91	0.06
21.50	0.06	0.000	586.91	0.06
22.00	0.06	0.000	586.91	0.06
22.50	0.05	0.000	586.91	0.05
23.00	0.05	0.000	586.90	0.05
23.50	0.05	0.000	586.90	0.05
24.00	0.05	0.000	586.90	0.05

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 2.17" for 2-Year_Current event
Inflow = 0.42 cfs @ 12.79 hrs, Volume= 0.166 af
Outflow = 0.42 cfs @ 12.79 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.1 min
Primary = 0.42 cfs @ 12.79 hrs, Volume= 0.166 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 588.77' @ 12.79 hrs Surf.Area= 0.000 ac Storage= 0.000 af

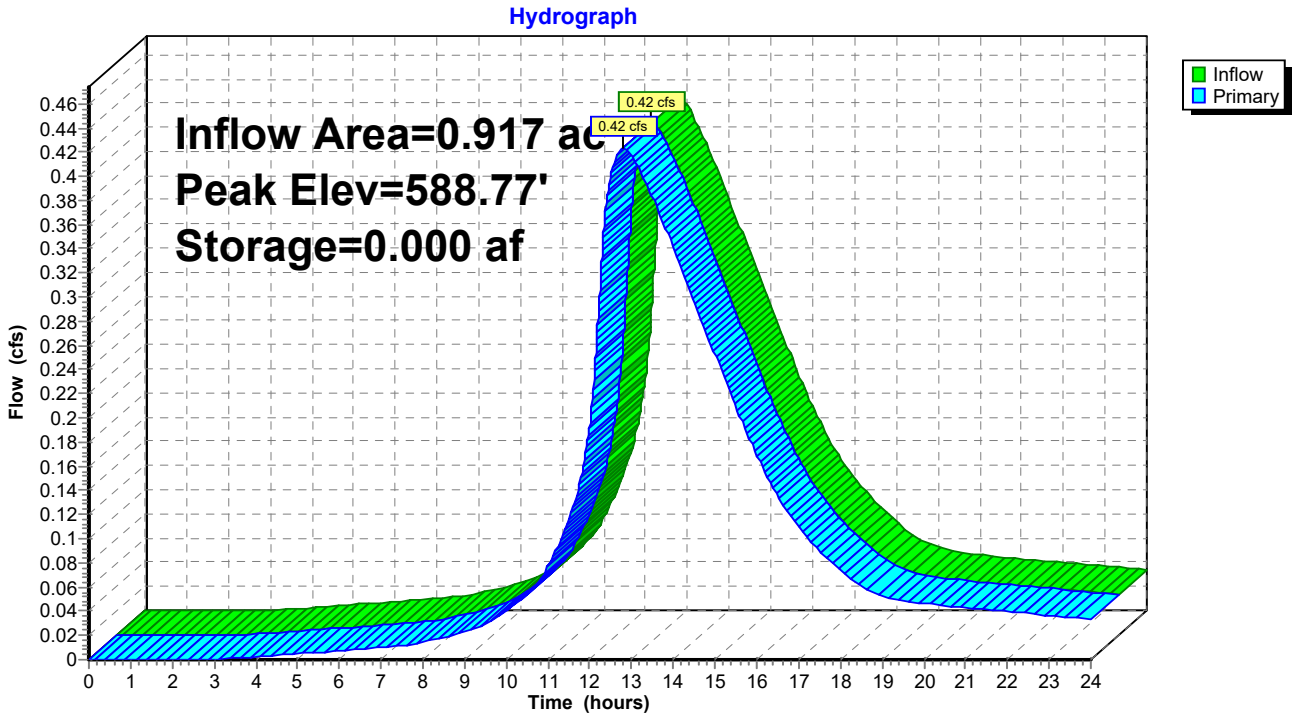
Plug-Flow detention time= 0.1 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (876.4 - 876.4)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.42 cfs @ 12.79 hrs HW=588.77' TW=587.16' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 0.42 cfs @ 1.93 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.45	0.00
1.50	0.00	0.000	588.45	0.00
2.00	0.00	0.000	588.45	0.00
2.50	0.00	0.000	588.46	0.00
3.00	0.00	0.000	588.46	0.00
3.50	0.00	0.000	588.47	0.00
4.00	0.00	0.000	588.47	0.00
4.50	0.00	0.000	588.48	0.00
5.00	0.00	0.000	588.48	0.00
5.50	0.01	0.000	588.49	0.01
6.00	0.01	0.000	588.49	0.01
6.50	0.01	0.000	588.49	0.01
7.00	0.01	0.000	588.50	0.01
7.50	0.01	0.000	588.50	0.01
8.00	0.01	0.000	588.51	0.01
8.50	0.02	0.000	588.51	0.02
9.00	0.02	0.000	588.52	0.02
9.50	0.03	0.000	588.53	0.03
10.00	0.04	0.000	588.55	0.04
10.50	0.05	0.000	588.56	0.05
11.00	0.08	0.000	588.58	0.08
11.50	0.12	0.000	588.61	0.12
12.00	0.20	0.000	588.66	0.19
12.50	**0.40**	**0.000**	**588.76**	**0.40**
13.00	**0.42**	**0.000**	**588.77**	**0.42**
13.50	0.38	0.000	588.76	0.38
14.00	0.34	0.000	588.74	0.34
14.50	0.30	0.000	588.72	0.30
15.00	0.25	0.000	588.70	0.25
15.50	0.21	0.000	588.67	0.21
16.00	0.17	0.000	588.65	0.17
16.50	0.14	0.000	588.63	0.14
17.00	0.11	0.000	588.61	0.11
17.50	0.09	0.000	588.59	0.09
18.00	0.07	0.000	588.58	0.07
18.50	0.06	0.000	588.57	0.06
19.00	0.05	0.000	588.56	0.05
19.50	0.05	0.000	588.56	0.05
20.00	0.05	0.000	588.55	0.05
20.50	0.04	0.000	588.55	0.04
21.00	0.04	0.000	588.55	0.04
21.50	0.04	0.000	588.55	0.04
22.00	0.04	0.000	588.54	0.04
22.50	0.04	0.000	588.54	0.04
23.00	0.04	0.000	588.54	0.04
23.50	0.04	0.000	588.54	0.04
24.00	0.03	0.000	588.54	0.03

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 2.11" for 2-Year_Current event
Inflow = 0.24 cfs @ 12.86 hrs, Volume= 0.099 af
Outflow = 0.24 cfs @ 12.86 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.1 min
Primary = 0.24 cfs @ 12.86 hrs, Volume= 0.099 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.85' @ 12.86 hrs Surf.Area= 0.000 ac Storage= 0.000 af

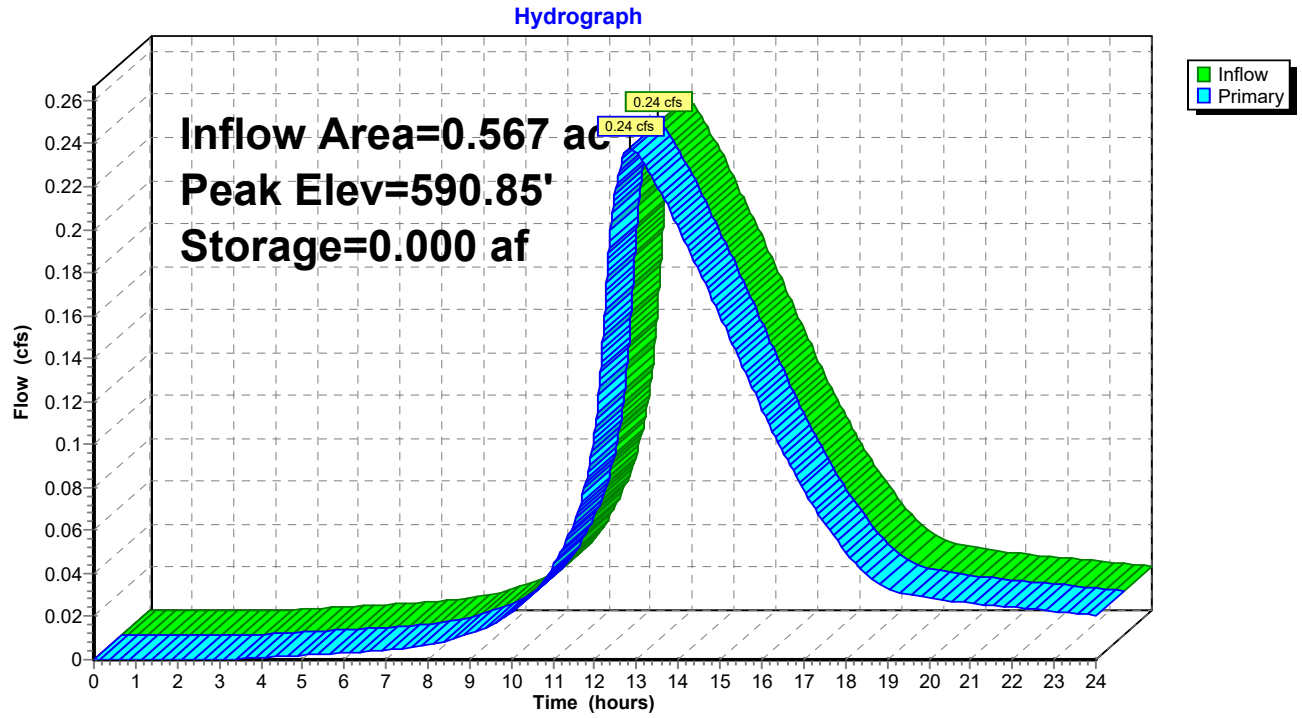
Plug-Flow detention time= 0.1 min calculated for 0.099 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (888.7 - 888.6)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 12.86 hrs HW=590.85' TW=588.77' (Dynamic Tailwater)
↑—**1=SD-21** (Orifice Controls 0.24 cfs @ 1.66 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.61	0.00
2.00	0.00	0.000	590.61	0.00
2.50	0.00	0.000	590.61	0.00
3.00	0.00	0.000	590.62	0.00
3.50	0.00	0.000	590.62	0.00
4.00	0.00	0.000	590.62	0.00
4.50	0.00	0.000	590.63	0.00
5.00	0.00	0.000	590.63	0.00
5.50	0.00	0.000	590.63	0.00
6.00	0.00	0.000	590.64	0.00
6.50	0.00	0.000	590.64	0.00
7.00	0.00	0.000	590.64	0.00
7.50	0.01	0.000	590.64	0.01
8.00	0.01	0.000	590.65	0.01
8.50	0.01	0.000	590.66	0.01
9.00	0.01	0.000	590.66	0.01
9.50	0.02	0.000	590.67	0.02
10.00	0.02	0.000	590.68	0.02
10.50	0.03	0.000	590.69	0.03
11.00	0.04	0.000	590.71	0.04
11.50	0.06	0.000	590.73	0.06
12.00	0.11	0.000	590.77	0.11
12.50	**0.22**	**0.000**	**590.84**	**0.22**
13.00	**0.24**	**0.000**	**590.85**	**0.24**
13.50	0.22	0.000	590.84	0.22
14.00	0.20	0.000	590.83	0.20
14.50	0.18	0.000	590.82	0.18
15.00	0.16	0.000	590.80	0.16
15.50	0.14	0.000	590.79	0.14
16.00	0.12	0.000	590.77	0.12
16.50	0.10	0.000	590.76	0.10
17.00	0.08	0.000	590.74	0.08
17.50	0.06	0.000	590.73	0.06
18.00	0.05	0.000	590.72	0.05
18.50	0.04	0.000	590.70	0.04
19.00	0.03	0.000	590.70	0.03
19.50	0.03	0.000	590.69	0.03
20.00	0.03	0.000	590.69	0.03
20.50	0.03	0.000	590.69	0.03
21.00	0.03	0.000	590.69	0.03
21.50	0.03	0.000	590.69	0.03
22.00	0.02	0.000	590.68	0.02
22.50	0.02	0.000	590.68	0.02
23.00	0.02	0.000	590.68	0.02
23.50	0.02	0.000	590.68	0.02
24.00	0.02	0.000	590.68	0.02

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>2.70"
Flow Length=164' Tc=17.1 min CN=WQ Runoff=1.21 cfs 0.128 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>2.87"
Flow Length=175' Tc=14.4 min CN=WQ Runoff=0.84 cfs 0.084 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>2.82"
Flow Length=175' Tc=21.5 min CN=WQ Runoff=0.77 cfs 0.091 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>2.81"
Flow Length=120' Tc=6.0 min CN=WQ Runoff=0.75 cfs 0.056 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>2.91"
Flow Length=96' Slope=0.0336 '/' Tc=4.9 min CN=WQ Runoff=1.05 cfs 0.077 af

Pond 1P: BR-01 Peak Elev=599.34' Storage=1,902 cf Inflow=1.21 cfs 0.128 af
Outflow=0.30 cfs 0.125 af

Pond 2P: BR-02 Peak Elev=600.04' Storage=1,120 cf Inflow=0.84 cfs 0.084 af
Outflow=0.23 cfs 0.082 af

Pond 3P: BR-03 Peak Elev=595.56' Storage=1,373 cf Inflow=0.77 cfs 0.091 af
Outflow=0.20 cfs 0.089 af

Pond 5P: BR-05 Peak Elev=594.95' Storage=729 cf Inflow=0.75 cfs 0.056 af
Outflow=0.17 cfs 0.055 af

Pond 6P: BR-04 Peak Elev=595.75' Storage=1,229 cf Inflow=1.05 cfs 0.077 af
Outflow=0.16 cfs 0.074 af

Pond 8P: O-1B Inflow=1.04 cfs 0.427 af
Primary=1.04 cfs 0.427 af

Pond 13P: SD-25, SD-26 Peak Elev=580.90' Storage=0.000 af Inflow=1.04 cfs 0.427 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=1.04 cfs 0.427 af

Pond 14P: SD-24 Peak Elev=585.32' Storage=0.000 af Inflow=0.88 cfs 0.371 af
Outflow=0.88 cfs 0.371 af

Pond 17P: SD-23 Peak Elev=587.20' Storage=0.000 af Inflow=0.72 cfs 0.297 af
Outflow=0.72 cfs 0.297 af

Pond 18P: SD-22 Peak Elev=588.81' Storage=0.000 af Inflow=0.52 cfs 0.208 af
Outflow=0.52 cfs 0.208 af

Pond 19P: SD-21 Peak Elev=590.88' Storage=0.000 af Inflow=0.30 cfs 0.125 af
Outflow=0.30 cfs 0.125 af

Total Runoff Area = 1.863 ac Runoff Volume = 0.436 af Average Runoff Depth = 2.81"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

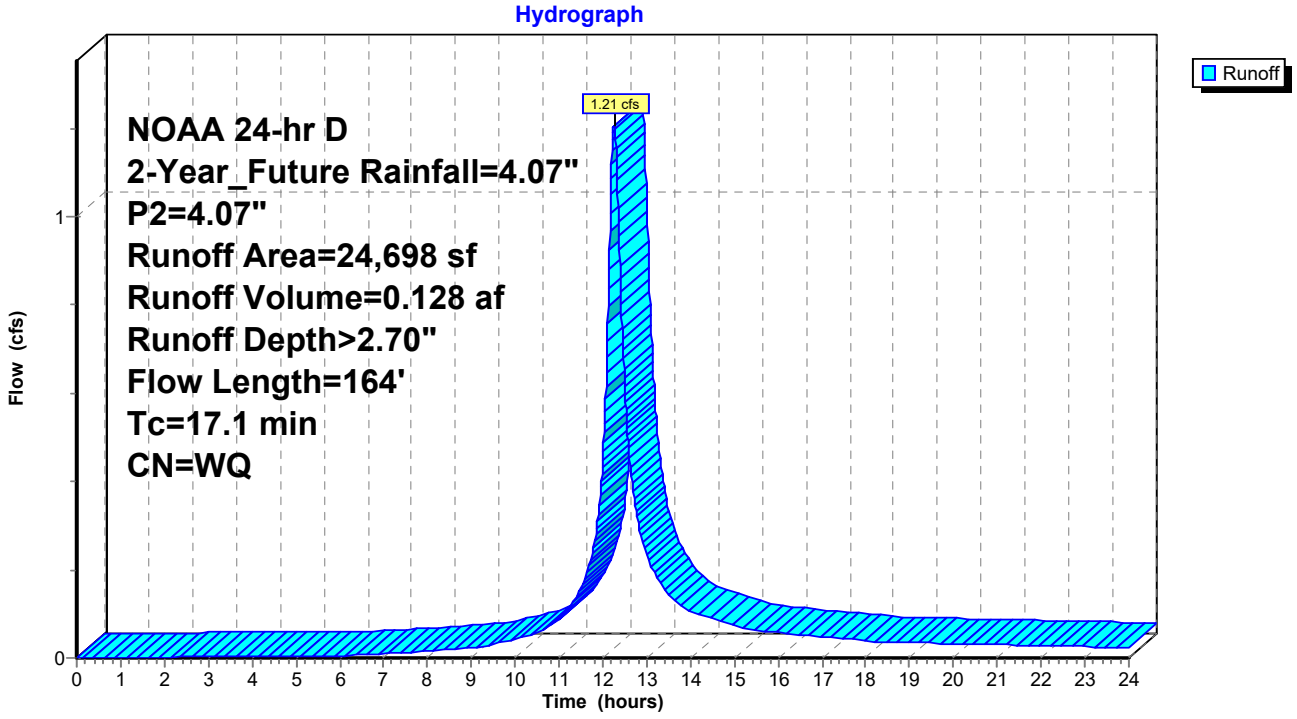
Runoff = 1.21 cfs @ 12.25 hrs, Volume= 0.128 af, Depth> 2.70"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0018	0.10		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.1	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.00	0.01
7.00	0.43	0.01	0.01
7.50	0.48	0.02	0.01
8.00	0.53	0.03	0.02
8.50	0.58	0.05	0.02
9.00	0.65	0.07	0.02
9.50	0.72	0.09	0.03
10.00	0.81	0.13	0.04
10.50	0.91	0.18	0.06
11.00	1.06	0.26	0.09
11.50	1.29	0.40	0.16
12.00	1.95	0.87	**0.45**
12.50	2.78	1.55	**0.61**
13.00	3.01	1.75	0.23
13.50	3.16	1.88	0.15
14.00	3.26	1.97	0.11
14.50	3.35	2.05	0.09
15.00	3.42	2.11	0.07
15.50	3.49	2.17	0.06
16.00	3.54	2.22	0.06
16.50	3.59	2.27	0.05
17.00	3.64	2.31	0.05
17.50	3.68	2.35	0.04
18.00	3.72	2.38	0.04
18.50	3.76	2.42	0.04
19.00	3.79	2.45	0.03
19.50	3.82	2.48	0.03
20.00	3.86	2.51	0.03
20.50	3.89	2.53	0.03
21.00	3.92	2.56	0.03
21.50	3.95	2.59	0.03
22.00	3.97	2.61	0.03
22.50	4.00	2.64	0.03
23.00	4.02	2.66	0.03
23.50	4.05	2.68	0.02
24.00	**4.07**	**2.70**	0.02

Summary for Subcatchment 7S: PO-DA E

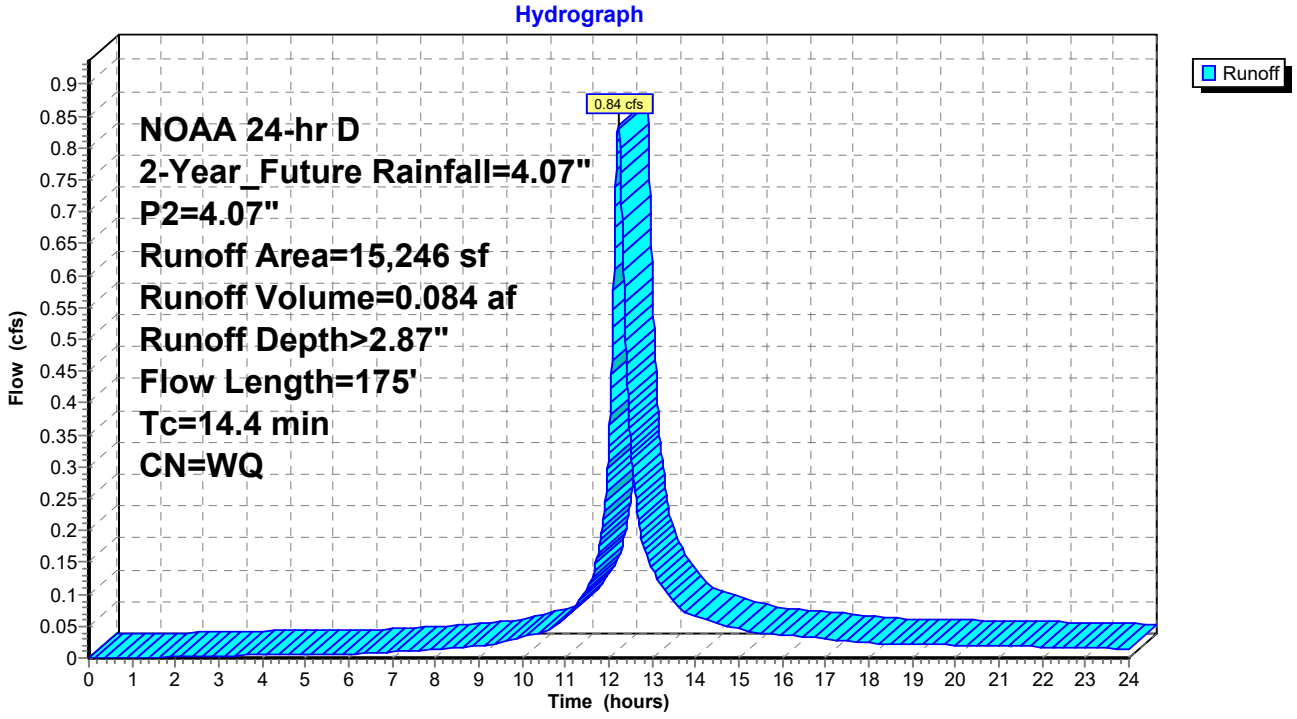
Runoff = 0.84 cfs @ 12.22 hrs, Volume= 0.084 af, Depth> 2.87"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0030	0.12		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
14.4	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.01
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.01	0.01
7.00	0.43	0.02	0.01
7.50	0.48	0.03	0.01
8.00	0.53	0.04	0.01
8.50	0.58	0.06	0.02
9.00	0.65	0.08	0.02
9.50	0.72	0.11	0.02
10.00	0.81	0.15	0.03
10.50	0.91	0.20	0.04
11.00	1.06	0.29	0.06
11.50	1.29	0.43	0.11
12.00	1.95	0.93	**0.33**
12.50	2.78	1.62	**0.34**
13.00	3.01	1.83	0.14
13.50	3.16	1.96	0.09
14.00	3.26	2.05	0.07
14.50	3.35	2.13	0.06
15.00	3.42	2.20	0.05
15.50	3.49	2.26	0.04
16.00	3.54	2.31	0.04
16.50	3.59	2.35	0.03
17.00	3.64	2.40	0.03
17.50	3.68	2.44	0.03
18.00	3.72	2.47	0.02
18.50	3.76	2.50	0.02
19.00	3.79	2.54	0.02
19.50	3.82	2.57	0.02
20.00	3.86	2.60	0.02
20.50	3.89	2.62	0.02
21.00	3.92	2.65	0.02
21.50	3.95	2.68	0.02
22.00	3.97	2.70	0.02
22.50	4.00	2.73	0.02
23.00	4.02	2.75	0.02
23.50	4.05	2.77	0.02
24.00	**4.07**	**2.79**	0.01

Summary for Subcatchment 9S: PO-DA G

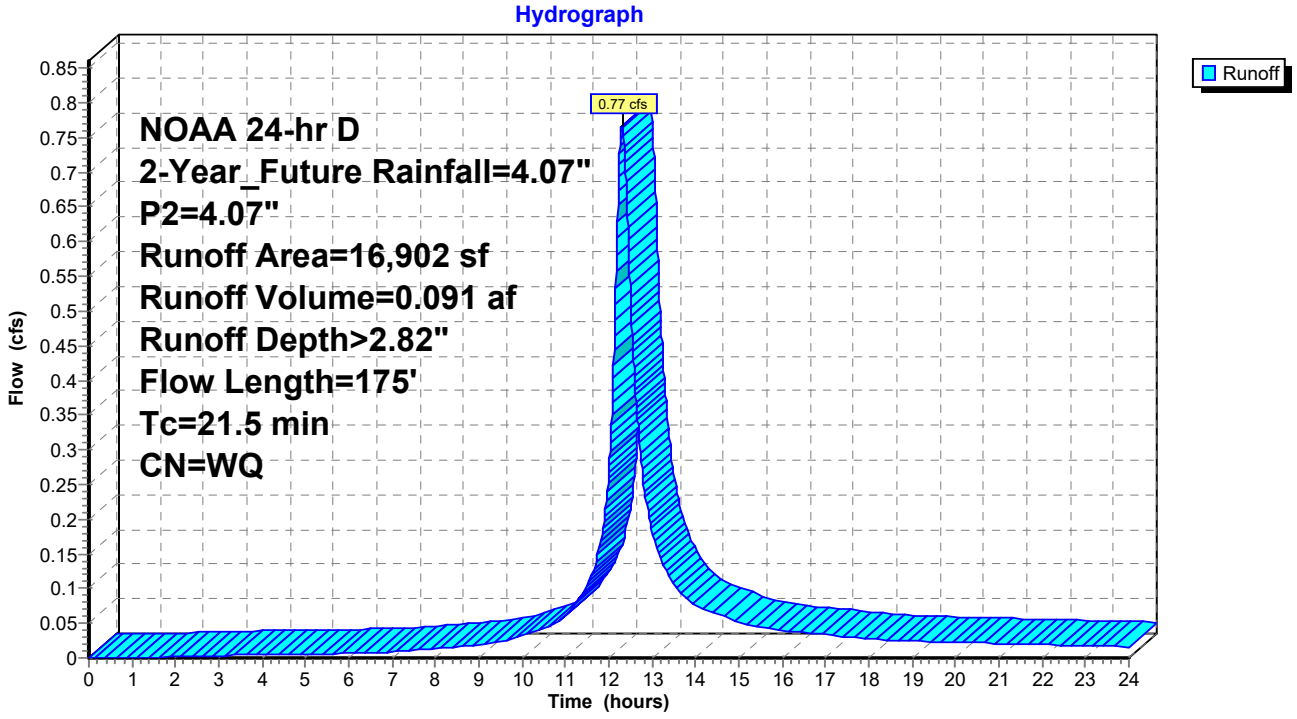
Runoff = 0.77 cfs @ 12.30 hrs, Volume= 0.091 af, Depth> 2.82"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.8	100	0.0010	0.08		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
21.5	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.01
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.01	0.01
7.00	0.43	0.02	0.01
7.50	0.48	0.03	0.01
8.00	0.53	0.04	0.01
8.50	0.58	0.06	0.02
9.00	0.65	0.08	0.02
9.50	0.72	0.11	0.02
10.00	0.81	0.15	0.03
10.50	0.91	0.20	0.04
11.00	1.06	0.29	0.06
11.50	1.29	0.43	0.11
12.00	1.95	0.93	**0.27**
12.50	2.78	1.62	**0.52**
13.00	3.01	1.83	0.18
13.50	3.16	1.96	0.11
14.00	3.26	2.05	0.08
14.50	3.35	2.13	0.06
15.00	3.42	2.20	0.05
15.50	3.49	2.26	0.04
16.00	3.54	2.31	0.04
16.50	3.59	2.35	0.04
17.00	3.64	2.40	0.03
17.50	3.68	2.44	0.03
18.00	3.72	2.47	0.03
18.50	3.76	2.50	0.03
19.00	3.79	2.54	0.02
19.50	3.82	2.57	0.02
20.00	3.86	2.60	0.02
20.50	3.89	2.62	0.02
21.00	3.92	2.65	0.02
21.50	3.95	2.68	0.02
22.00	3.97	2.70	0.02
22.50	4.00	2.73	0.02
23.00	4.02	2.75	0.02
23.50	4.05	2.77	0.02
24.00	**4.07**	**2.79**	0.02

Summary for Subcatchment 11S: PO-DA I

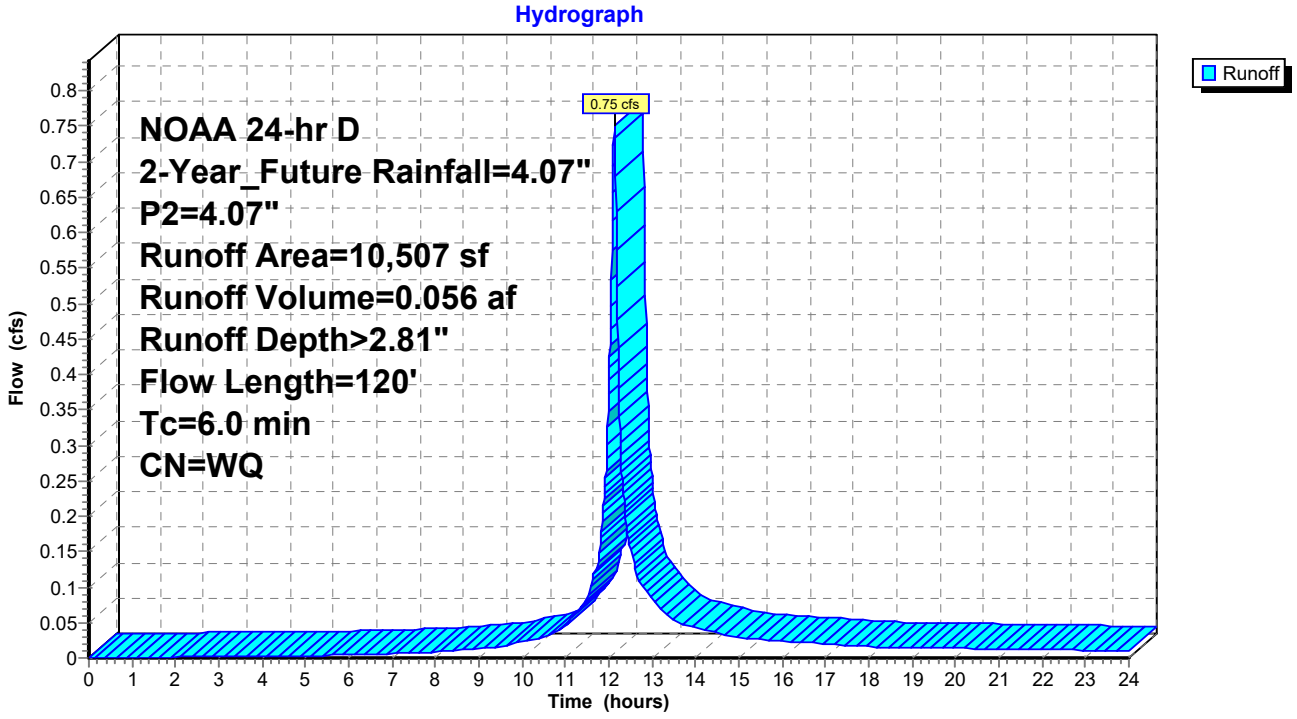
Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.056 af, Depth> 2.81"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0237	0.28		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.0	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.00
4.50	0.25	0.00	0.00
5.00	0.28	0.00	0.00
5.50	0.31	0.00	0.00
6.00	0.35	0.00	0.00
6.50	0.39	0.01	0.00
7.00	0.43	0.02	0.01
7.50	0.48	0.03	0.01
8.00	0.53	0.04	0.01
8.50	0.58	0.06	0.01
9.00	0.65	0.08	0.01
9.50	0.72	0.11	0.02
10.00	0.81	0.15	0.02
10.50	0.91	0.20	0.03
11.00	1.06	0.29	0.05
11.50	1.29	0.43	0.08
12.00	1.95	0.93	**0.39**
12.50	2.78	1.62	**0.16**
13.00	3.01	1.83	0.08
13.50	3.16	1.96	0.05
14.00	3.26	2.05	0.04
14.50	3.35	2.13	0.04
15.00	3.42	2.20	0.03
15.50	3.49	2.26	0.03
16.00	3.54	2.31	0.02
16.50	3.59	2.35	0.02
17.00	3.64	2.40	0.02
17.50	3.68	2.44	0.02
18.00	3.72	2.47	0.02
18.50	3.76	2.50	0.02
19.00	3.79	2.54	0.01
19.50	3.82	2.57	0.01
20.00	3.86	2.60	0.01
20.50	3.89	2.62	0.01
21.00	3.92	2.65	0.01
21.50	3.95	2.68	0.01
22.00	3.97	2.70	0.01
22.50	4.00	2.73	0.01
23.00	4.02	2.75	0.01
23.50	4.05	2.77	0.01
24.00	**4.07**	**2.79**	0.01

Summary for Subcatchment 12S: PO-DA J

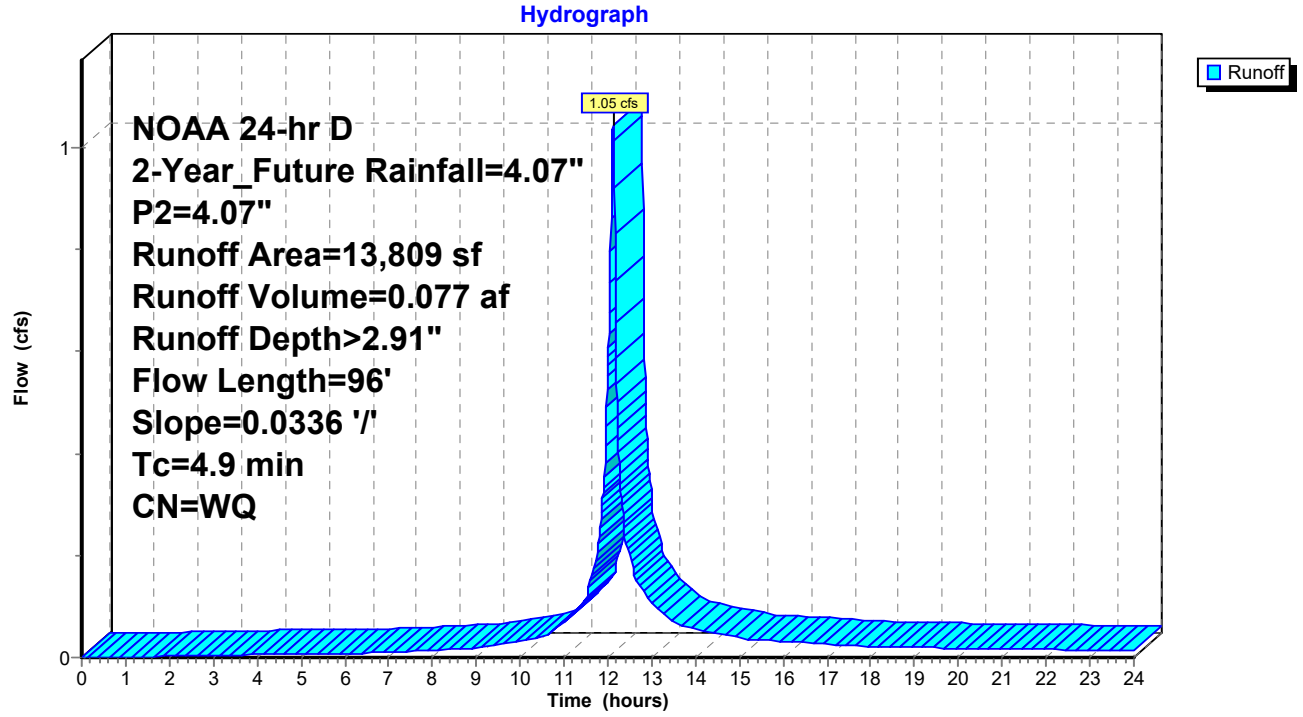
Runoff = 1.05 cfs @ 12.12 hrs, Volume= 0.077 af, Depth> 2.91"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	96	0.0336	0.32		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.15	0.00	0.00
3.50	0.18	0.00	0.00
4.00	0.21	0.00	0.01
4.50	0.25	0.00	0.01
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.01	0.01
6.50	0.39	0.01	0.01
7.00	0.43	0.02	0.01
7.50	0.48	0.04	0.01
8.00	0.53	0.05	0.01
8.50	0.58	0.07	0.02
9.00	0.65	0.10	0.02
9.50	0.72	0.13	0.03
10.00	0.81	0.17	0.03
10.50	0.91	0.23	0.04
11.00	1.06	0.32	0.07
11.50	1.29	0.48	0.12
12.00	1.95	0.99	**0.57**
12.50	2.78	1.70	**0.21**
13.00	3.01	1.91	0.11
13.50	3.16	2.04	0.07
14.00	3.26	2.14	0.06
14.50	3.35	2.22	0.05
15.00	3.42	2.29	0.04
15.50	3.49	2.34	0.03
16.00	3.54	2.40	0.03
16.50	3.59	2.44	0.03
17.00	3.64	2.49	0.03
17.50	3.68	2.53	0.02
18.00	3.72	2.56	0.02
18.50	3.76	2.60	0.02
19.00	3.79	2.63	0.02
19.50	3.82	2.66	0.02
20.00	3.86	2.69	0.02
20.50	3.89	2.72	0.02
21.00	3.92	2.74	0.02
21.50	3.95	2.77	0.02
22.00	3.97	2.80	0.02
22.50	4.00	2.82	0.02
23.00	4.02	2.85	0.01
23.50	4.05	2.87	0.01
24.00	**4.07**	**2.89**	0.01

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 2.70" for 2-Year_Future event
Inflow = 1.21 cfs @ 12.25 hrs, Volume= 0.128 af
Outflow = 0.30 cfs @ 12.82 hrs, Volume= 0.125 af, Atten= 76%, Lag= 34.1 min
Primary = 0.30 cfs @ 12.82 hrs, Volume= 0.125 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 599.34' @ 12.82 hrs Surf.Area= 5,277 sf Storage= 1,902 cf

Plug-Flow detention time= 81.4 min calculated for 0.125 af (98% of inflow)
Center-of-Mass det. time= 71.8 min (887.5 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

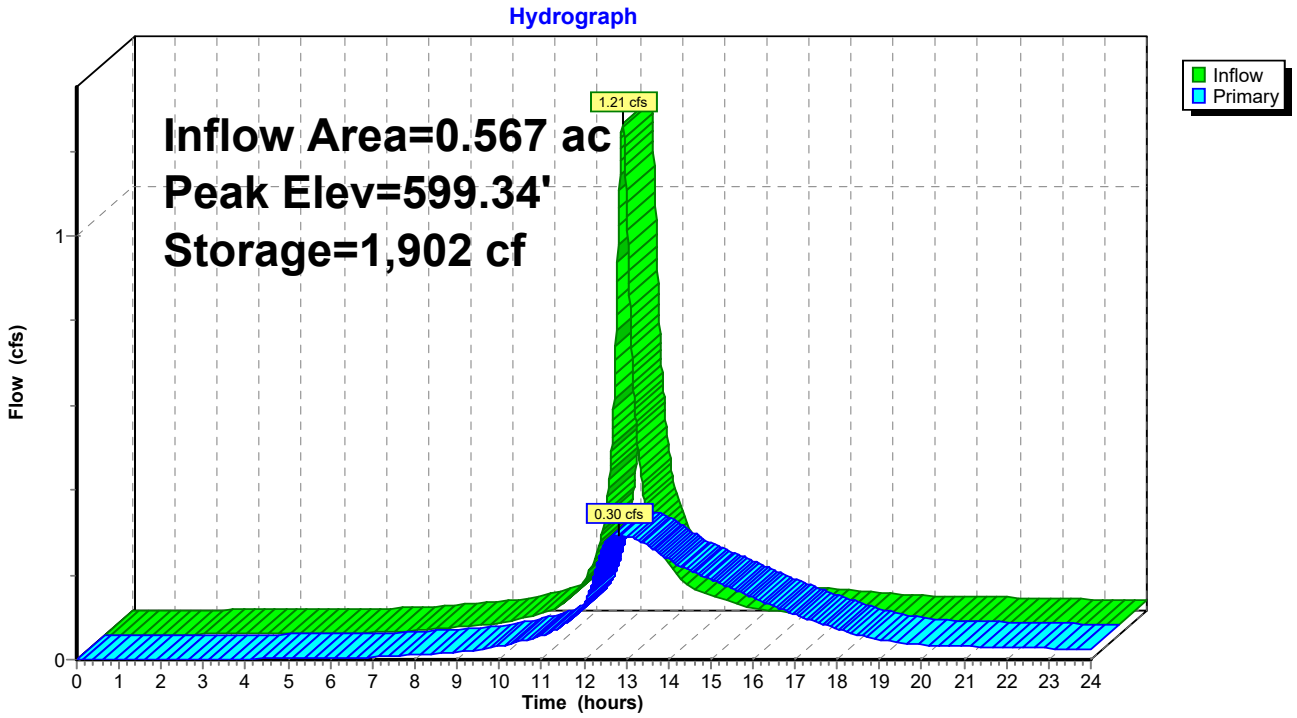
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 12.82 hrs HW=599.34' TW=590.88' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 0.30 cfs of 10.19 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.30 cfs @ 8.66 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.00	0	596.00	0.00
1.50	0.00	1	596.00	0.00
2.00	0.00	3	596.00	0.00
2.50	0.00	6	596.01	0.00
3.00	0.00	11	596.02	0.00
3.50	0.00	15	596.02	0.00
4.00	0.00	20	596.03	0.00
4.50	0.00	25	596.03	0.00
5.00	0.01	28	596.04	0.00
5.50	0.01	32	596.04	0.00
6.00	0.01	34	596.05	0.00
6.50	0.01	37	596.05	0.01
7.00	0.01	41	596.06	0.01
7.50	0.01	48	596.07	0.01
8.00	0.02	56	596.08	0.01
8.50	0.02	65	596.09	0.01
9.00	0.02	75	596.10	0.02
9.50	0.03	86	596.12	0.02
10.00	0.04	104	596.14	0.03
10.50	0.06	126	596.17	0.04
11.00	0.09	162	596.22	0.06
11.50	0.16	252	596.35	0.08
12.00	**0.45**	520	596.73	0.13
12.50	**0.61**	**1,748**	**598.93**	**0.28**
13.00	0.23	**1,881**	**599.28**	**0.29**
13.50	0.15	1,705	598.82	0.27
14.00	0.11	1,466	598.20	0.24
14.50	0.09	1,240	597.77	0.21
15.00	0.07	1,024	597.45	0.19
15.50	0.06	821	597.16	0.17
16.00	0.06	645	596.91	0.15
16.50	0.05	498	596.70	0.13
17.00	0.05	379	596.53	0.11
17.50	0.04	286	596.40	0.09
18.00	0.04	216	596.30	0.07
18.50	0.04	167	596.23	0.06
19.00	0.03	136	596.19	0.05
19.50	0.03	119	596.17	0.04
20.00	0.03	111	596.15	0.04
20.50	0.03	106	596.15	0.03
21.00	0.03	103	596.14	0.03
21.50	0.03	100	596.14	0.03
22.00	0.03	98	596.14	0.03
22.50	0.03	96	596.13	0.03
23.00	0.03	93	596.13	0.03
23.50	0.02	91	596.13	0.03
24.00	0.02	88	596.12	0.02

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 2.87" for 2-Year_Future event
Inflow = 0.84 cfs @ 12.22 hrs, Volume= 0.084 af
Outflow = 0.23 cfs @ 12.66 hrs, Volume= 0.082 af, Atten= 73%, Lag= 26.7 min
Primary = 0.23 cfs @ 12.66 hrs, Volume= 0.082 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 600.04' @ 12.66 hrs Surf.Area= 4,734 sf Storage= 1,120 cf

Plug-Flow detention time= 64.4 min calculated for 0.082 af (98% of inflow)
Center-of-Mass det. time= 54.2 min (855.8 - 801.6)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

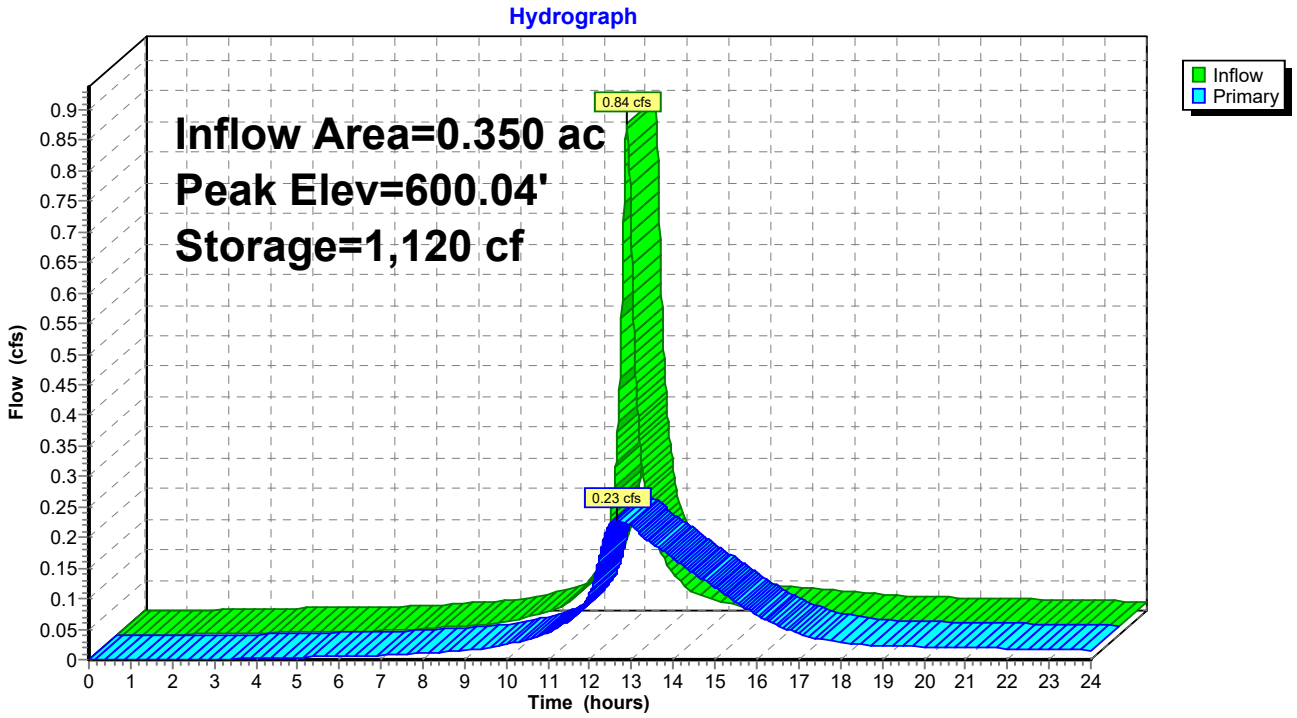
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 12.66 hrs HW=600.04' TW=588.81' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 0.23 cfs of 11.47 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.23 cfs @ 6.70 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.00	0	598.00	0.00
1.50	0.00	1	598.00	0.00
2.00	0.00	3	598.01	0.00
2.50	0.00	7	598.01	0.00
3.00	0.00	12	598.02	0.00
3.50	0.00	17	598.03	0.00
4.00	0.00	22	598.03	0.00
4.50	0.01	26	598.04	0.00
5.00	0.01	29	598.05	0.00
5.50	0.01	32	598.05	0.00
6.00	0.01	34	598.05	0.01
6.50	0.01	36	598.06	0.01
7.00	0.01	40	598.06	0.01
7.50	0.01	44	598.07	0.01
8.00	0.01	49	598.08	0.01
8.50	0.02	55	598.09	0.01
9.00	0.02	61	598.09	0.02
9.50	0.02	69	598.11	0.02
10.00	0.03	80	598.12	0.03
10.50	0.04	94	598.15	0.03
11.00	0.06	117	598.18	0.04
11.50	0.11	171	598.26	0.07
12.00	**0.33**	347	598.54	0.11
12.50	**0.34**	**1,091**	**599.96**	**0.22**
13.00	0.14	**1,059**	**599.86**	**0.22**
13.50	0.09	894	599.43	0.19
14.00	0.07	709	599.12	0.17
14.50	0.06	541	598.85	0.14
15.00	0.05	398	598.62	0.12
15.50	0.04	282	598.44	0.09
16.00	0.04	198	598.30	0.07
16.50	0.03	144	598.22	0.06
17.00	0.03	112	598.17	0.04
17.50	0.03	96	598.15	0.03
18.00	0.02	87	598.13	0.03
18.50	0.02	80	598.12	0.03
19.00	0.02	77	598.12	0.02
19.50	0.02	74	598.11	0.02
20.00	0.02	73	598.11	0.02
20.50	0.02	71	598.11	0.02
21.00	0.02	70	598.11	0.02
21.50	0.02	68	598.11	0.02
22.00	0.02	67	598.10	0.02
22.50	0.02	65	598.10	0.02
23.00	0.02	64	598.10	0.02
23.50	0.02	62	598.10	0.02
24.00	0.01	61	598.09	0.02

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 2.82" for 2-Year_Future event
Inflow = 0.77 cfs @ 12.30 hrs, Volume= 0.091 af
Outflow = 0.20 cfs @ 12.94 hrs, Volume= 0.089 af, Atten= 74%, Lag= 38.4 min
Primary = 0.20 cfs @ 12.94 hrs, Volume= 0.089 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.56' @ 12.94 hrs Surf.Area= 4,350 sf Storage= 1,373 cf

Plug-Flow detention time= 89.2 min calculated for 0.089 af (98% of inflow)
Center-of-Mass det. time= 75.3 min (885.0 - 809.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

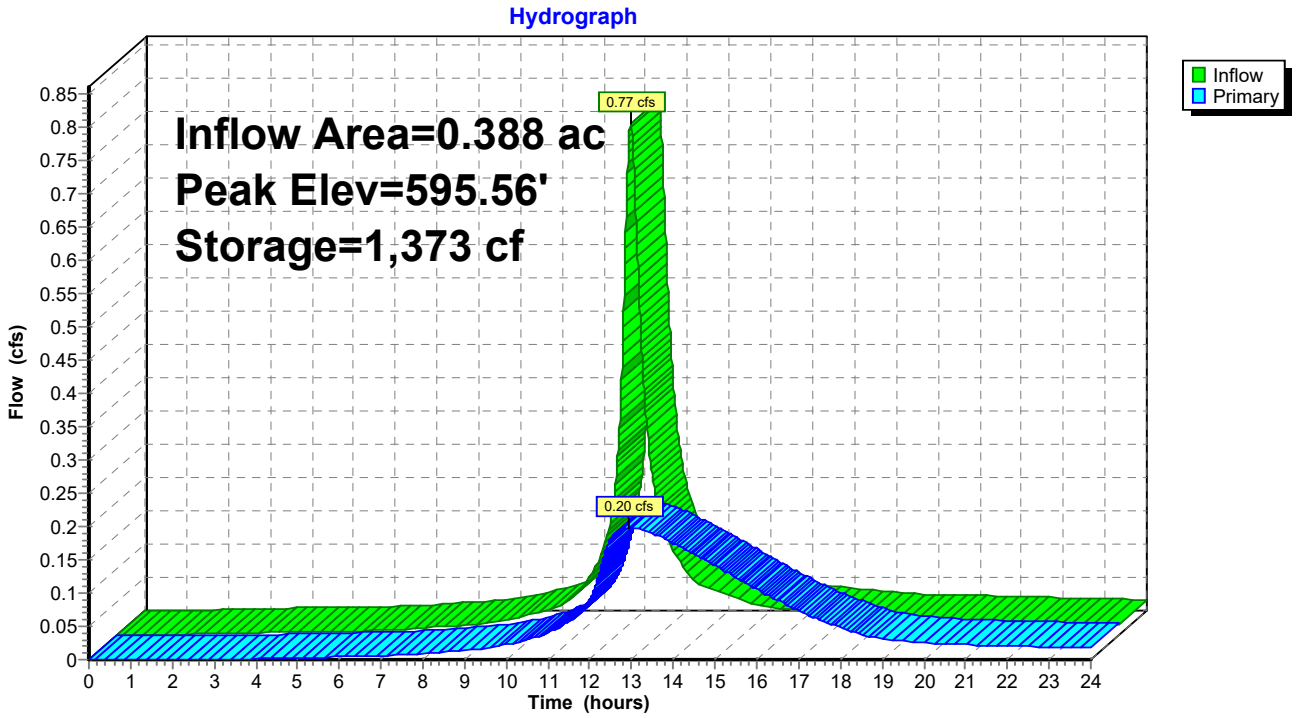
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 12.94 hrs HW=595.56' TW=587.20' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.20 cfs of 15.34 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.20 cfs @ 5.80 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	0	594.00	0.00
1.50	0.00	0	594.00	0.00
2.00	0.00	3	594.00	0.00
2.50	0.00	7	594.01	0.00
3.00	0.00	12	594.01	0.00
3.50	0.00	17	594.02	0.00
4.00	0.00	23	594.03	0.00
4.50	0.01	29	594.03	0.00
5.00	0.01	34	594.04	0.00
5.50	0.01	39	594.04	0.00
6.00	0.01	43	594.05	0.00
6.50	0.01	47	594.05	0.01
7.00	0.01	51	594.06	0.01
7.50	0.01	58	594.06	0.01
8.00	0.01	65	594.07	0.01
8.50	0.02	73	594.08	0.01
9.00	0.02	82	594.09	0.01
9.50	0.02	92	594.10	0.02
10.00	0.03	107	594.12	0.02
10.50	0.04	127	594.14	0.03
11.00	0.06	154	594.17	0.04
11.50	0.11	213	594.23	0.06
12.00	**0.27**	375	594.41	0.09
12.50	**0.52**	**1,175**	**595.32**	**0.18**
13.00	0.18	**1,372**	**595.55**	**0.20**
13.50	0.11	1,273	595.44	0.19
14.00	0.08	1,105	595.24	0.18
14.50	0.06	928	595.04	0.16
15.00	0.05	762	594.85	0.14
15.50	0.04	608	594.67	0.12
16.00	0.04	476	594.52	0.11
16.50	0.04	370	594.40	0.09
17.00	0.03	287	594.31	0.07
17.50	0.03	225	594.24	0.06
18.00	0.03	179	594.19	0.05
18.50	0.03	148	594.16	0.04
19.00	0.02	131	594.14	0.03
19.50	0.02	121	594.13	0.03
20.00	0.02	115	594.12	0.03
20.50	0.02	110	594.12	0.02
21.00	0.02	107	594.12	0.02
21.50	0.02	104	594.11	0.02
22.00	0.02	102	594.11	0.02
22.50	0.02	100	594.11	0.02
23.00	0.02	97	594.11	0.02
23.50	0.02	95	594.10	0.02
24.00	0.02	92	594.10	0.02

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 2.81" for 2-Year_Future event
Inflow = 0.75 cfs @ 12.13 hrs, Volume= 0.056 af
Outflow = 0.17 cfs @ 12.44 hrs, Volume= 0.055 af, Atten= 78%, Lag= 18.6 min
Primary = 0.17 cfs @ 12.44 hrs, Volume= 0.055 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.95' @ 12.44 hrs Surf.Area= 1,575 sf Storage= 729 cf

Plug-Flow detention time= 60.5 min calculated for 0.055 af (98% of inflow)
Center-of-Mass det. time= 48.2 min (846.9 - 798.7)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

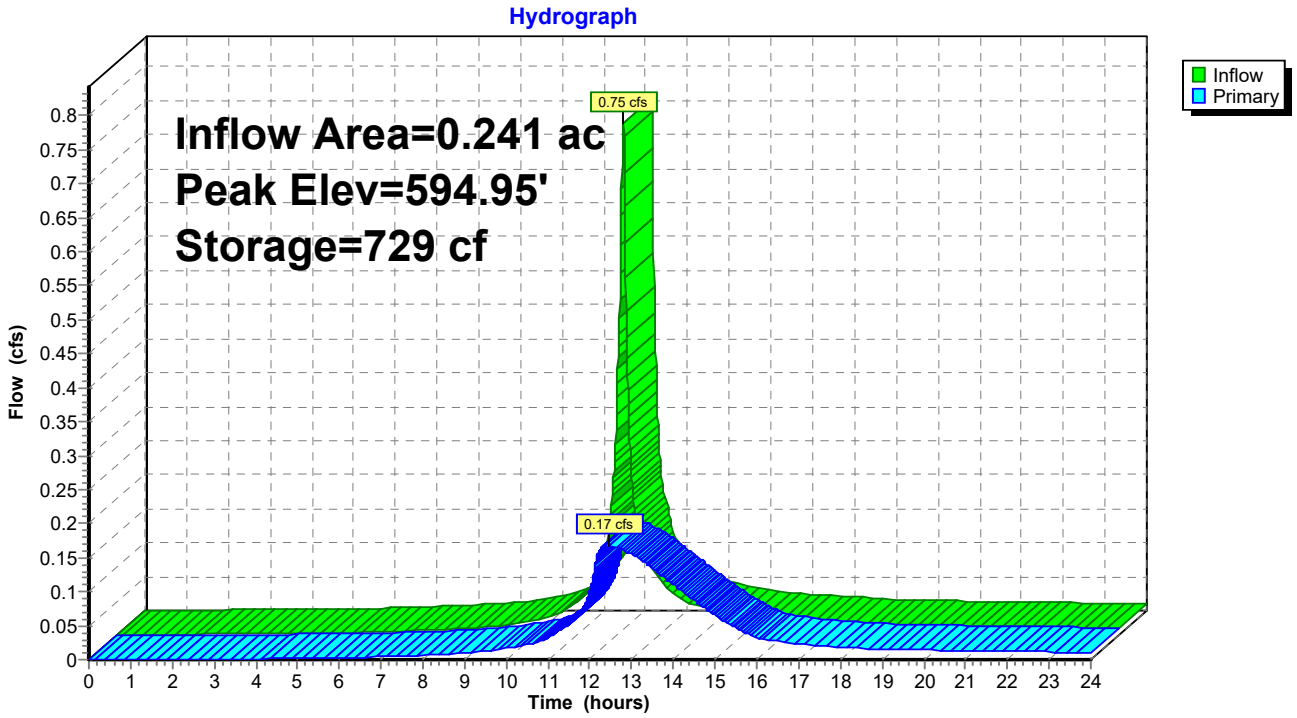
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 12.44 hrs HW=594.95' TW=580.89' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.17 cfs of 26.32 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.17 cfs @ 4.92 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	0	593.80	0.00
1.50	0.00	1	593.80	0.00
2.00	0.00	3	593.80	0.00
2.50	0.00	5	593.81	0.00
3.00	0.00	8	593.81	0.00
3.50	0.00	12	593.82	0.00
4.00	0.00	15	593.82	0.00
4.50	0.00	18	593.83	0.00
5.00	0.00	21	593.83	0.00
5.50	0.00	23	593.84	0.00
6.00	0.00	25	593.84	0.00
6.50	0.00	27	593.84	0.00
7.00	0.01	30	593.85	0.00
7.50	0.01	34	593.85	0.01
8.00	0.01	38	593.86	0.01
8.50	0.01	42	593.87	0.01
9.00	0.01	47	593.87	0.01
9.50	0.02	54	593.88	0.01
10.00	0.02	63	593.90	0.02
10.50	0.03	74	593.91	0.02
11.00	0.05	93	593.94	0.03
11.50	0.08	134	594.01	0.05
12.00	**0.39**	**308**	**594.28**	**0.10**
12.50	**0.16**	**728**	**594.95**	**0.17**
13.00	0.08	635	594.80	0.16
13.50	0.05	495	594.58	0.13
14.00	0.04	359	594.36	0.11
14.50	0.04	251	594.19	0.09
15.00	0.03	172	594.06	0.07
15.50	0.03	120	593.99	0.05
16.00	0.02	94	593.95	0.03
16.50	0.02	83	593.93	0.03
17.00	0.02	76	593.92	0.02
17.50	0.02	71	593.91	0.02
18.00	0.02	67	593.90	0.02
18.50	0.02	63	593.90	0.02
19.00	0.01	61	593.89	0.02
19.50	0.01	60	593.89	0.02
20.00	0.01	58	593.89	0.01
20.50	0.01	57	593.89	0.01
21.00	0.01	56	593.89	0.01
21.50	0.01	55	593.89	0.01
22.00	0.01	54	593.88	0.01
22.50	0.01	53	593.88	0.01
23.00	0.01	51	593.88	0.01
23.50	0.01	50	593.88	0.01
24.00	0.01	49	593.88	0.01

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 2.91" for 2-Year_Future event
Inflow = 1.05 cfs @ 12.12 hrs, Volume= 0.077 af
Outflow = 0.16 cfs @ 12.61 hrs, Volume= 0.074 af, Atten= 85%, Lag= 29.2 min
Primary = 0.16 cfs @ 12.61 hrs, Volume= 0.074 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.75' @ 12.61 hrs Surf.Area= 2,894 sf Storage= 1,229 cf

Plug-Flow detention time= 105.6 min calculated for 0.074 af (97% of inflow)
Center-of-Mass det. time= 86.2 min (876.0 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

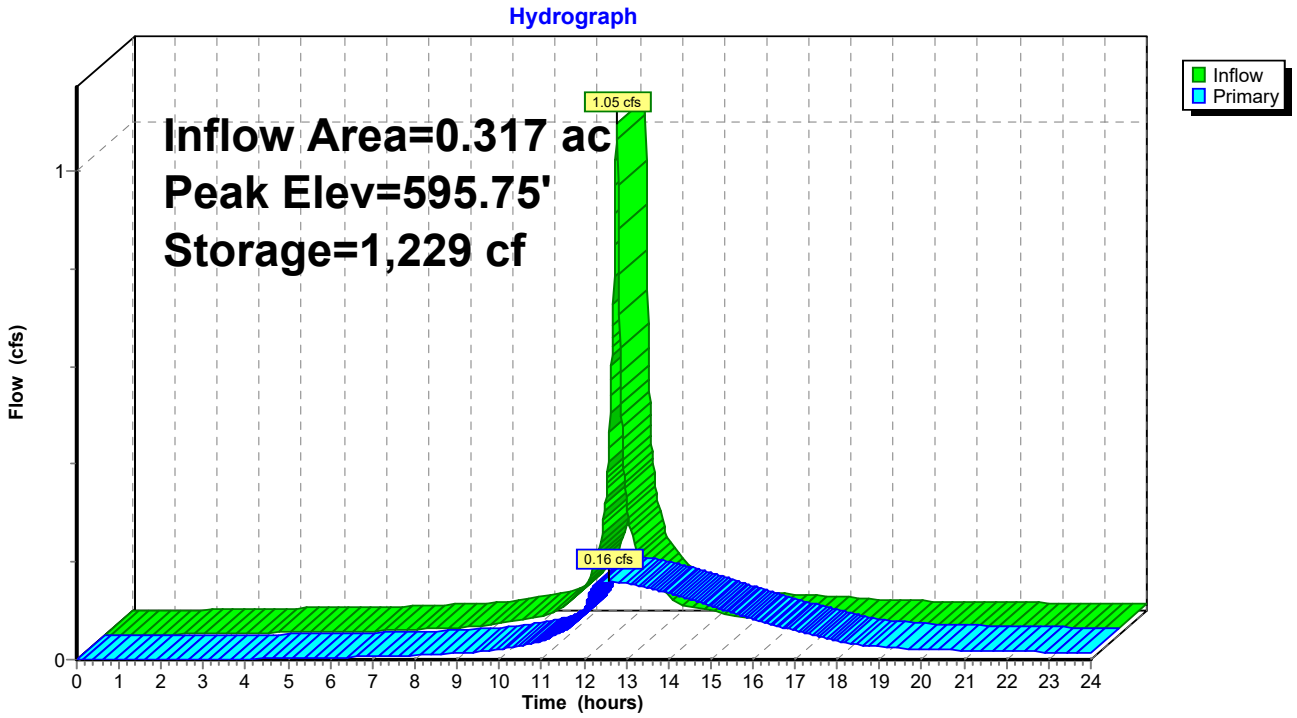
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 12.61 hrs HW=595.75' TW=585.32' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.16 cfs of 17.32 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.16 cfs @ 4.68 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

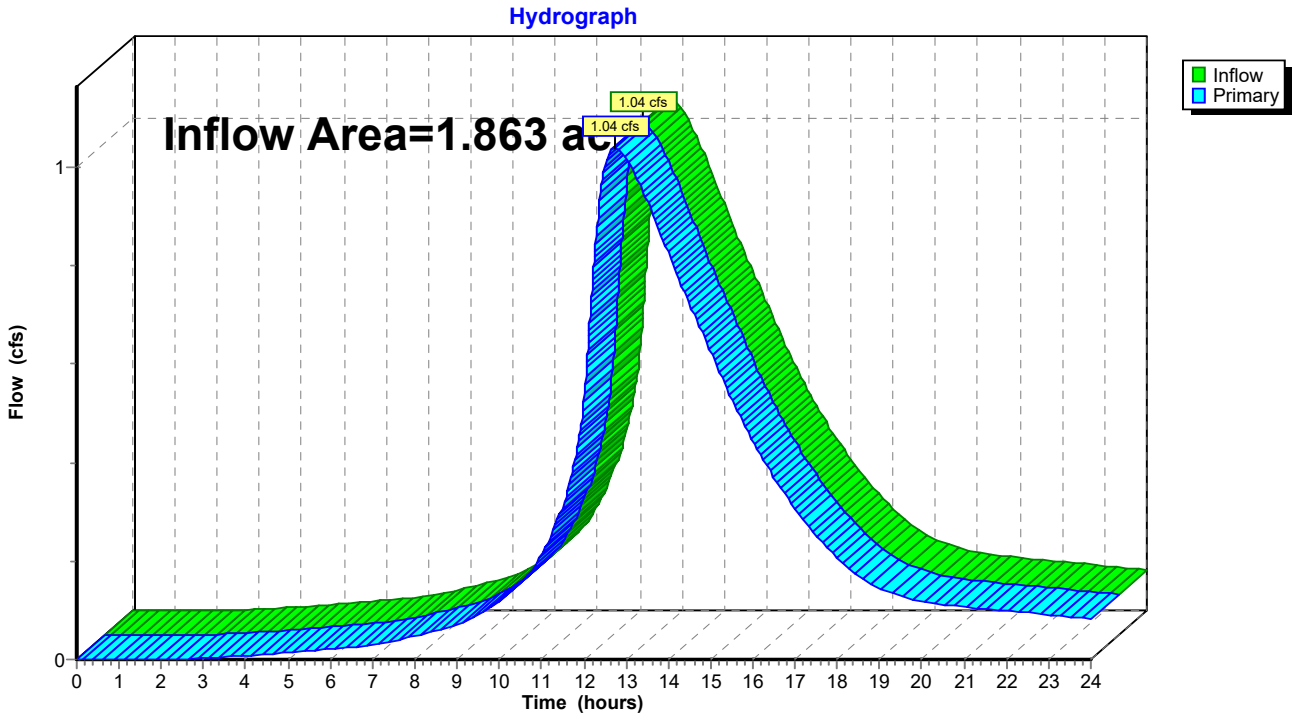
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.00	0	594.70	0.00
1.50	0.00	1	594.70	0.00
2.00	0.00	5	594.70	0.00
2.50	0.00	10	594.71	0.00
3.00	0.00	16	594.71	0.00
3.50	0.00	23	594.72	0.00
4.00	0.01	30	594.73	0.00
4.50	0.01	37	594.73	0.00
5.00	0.01	44	594.74	0.00
5.50	0.01	50	594.74	0.00
6.00	0.01	56	594.75	0.00
6.50	0.01	62	594.75	0.01
7.00	0.01	68	594.76	0.01
7.50	0.01	76	594.76	0.01
8.00	0.01	84	594.77	0.01
8.50	0.02	93	594.78	0.01
9.00	0.02	103	594.79	0.01
9.50	0.03	116	594.80	0.02
10.00	0.03	134	594.81	0.02
10.50	0.04	156	594.83	0.03
11.00	0.07	193	594.86	0.04
11.50	0.12	270	594.93	0.06
12.00	**0.57**	571	595.18	0.10
12.50	**0.21**	**1,219**	**595.74**	**0.16**
13.00	0.11	**1,192**	**595.72**	**0.16**
13.50	0.07	1,076	595.62	0.15
14.00	0.06	930	595.49	0.14
14.50	0.05	790	595.37	0.12
15.00	0.04	657	595.25	0.11
15.50	0.03	535	595.15	0.10
16.00	0.03	432	595.06	0.08
16.50	0.03	348	594.99	0.07
17.00	0.03	282	594.93	0.06
17.50	0.02	230	594.89	0.05
18.00	0.02	192	594.86	0.04
18.50	0.02	167	594.84	0.03
19.00	0.02	151	594.83	0.03
19.50	0.02	141	594.82	0.02
20.00	0.02	134	594.81	0.02
20.50	0.02	129	594.81	0.02
21.00	0.02	125	594.81	0.02
21.50	0.02	122	594.80	0.02
22.00	0.02	118	594.80	0.02
22.50	0.02	116	594.80	0.02
23.00	0.01	113	594.80	0.02
23.50	0.01	110	594.79	0.02
24.00	0.01	107	594.79	0.01

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 2.75" for 2-Year_Future event
Inflow = 1.04 cfs @ 12.74 hrs, Volume= 0.427 af
Primary = 1.04 cfs @ 12.74 hrs, Volume= 0.427 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.02		0.02
6.00	0.02		0.02
6.50	0.03		0.03
7.00	0.03		0.03
7.50	0.04		0.04
8.00	0.05		0.05
8.50	0.06		0.06
9.00	0.07		0.07
9.50	0.09		0.09
10.00	0.12		0.12
10.50	0.16		0.16
11.00	0.21		0.21
11.50	0.31		0.31
12.00	0.53		0.53
12.50	**1.00**		**1.00**
13.00	**1.02**		**1.02**
13.50	0.93		0.93
14.00	0.83		0.83
14.50	0.72		0.72
15.00	0.63		0.63
15.50	0.53		0.53
16.00	0.44		0.44
16.50	0.37		0.37
17.00	0.31		0.31
17.50	0.25		0.25
18.00	0.21		0.21
18.50	0.17		0.17
19.00	0.14		0.14
19.50	0.13		0.13
20.00	0.12		0.12
20.50	0.11		0.11
21.00	0.11		0.11
21.50	0.10		0.10
22.00	0.10		0.10
22.50	0.09		0.09
23.00	0.09		0.09
23.50	0.09		0.09
24.00	0.08		0.08

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 2.75" for 2-Year_Future event
Inflow = 1.04 cfs @ 12.74 hrs, Volume= 0.427 af
Outflow = 1.04 cfs @ 12.74 hrs, Volume= 0.427 af, Atten= 0%, Lag= 0.0 min
Primary = 1.04 cfs @ 12.74 hrs, Volume= 0.427 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 580.90' @ 12.74 hrs Surf.Area= 0.000 ac Storage= 0.000 af

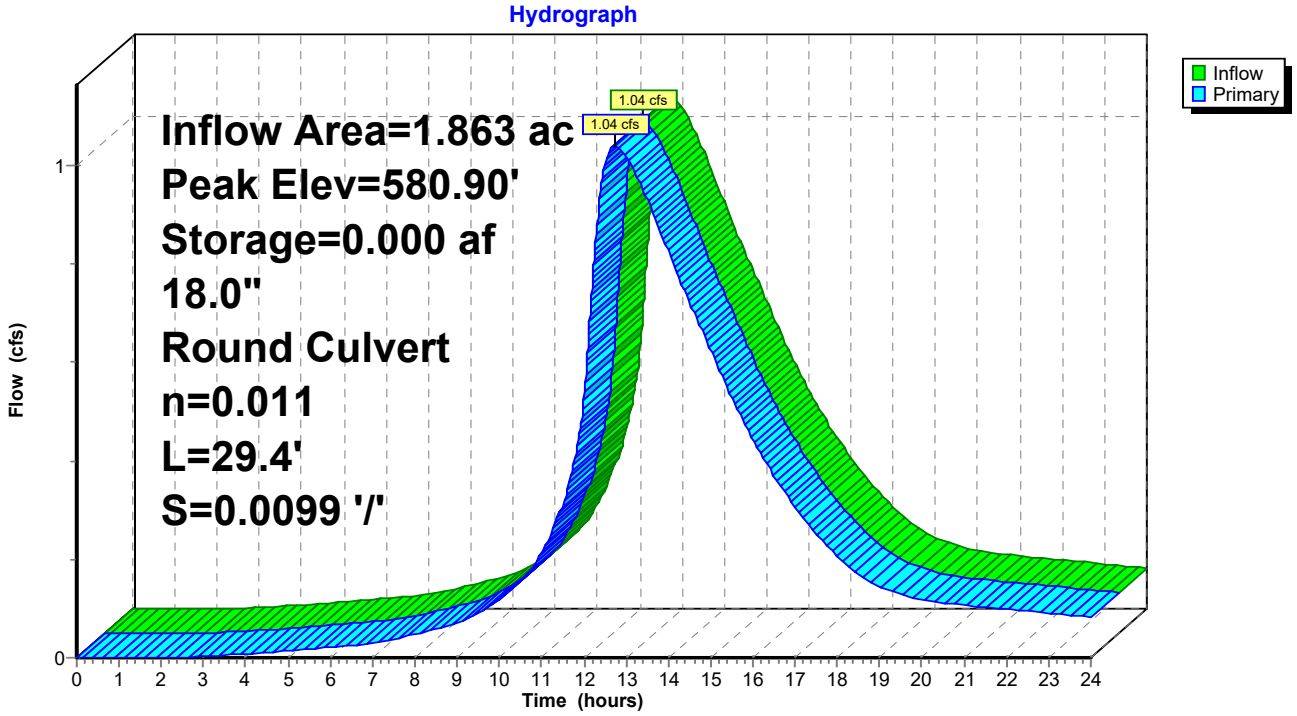
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (873.7 - 873.7)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=1.04 cfs @ 12.74 hrs HW=580.90' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 1.04 cfs @ 3.33 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.00	0.000	580.69	0.00
2.00	0.00	0.000	580.69	0.00
2.50	0.00	0.000	580.69	0.00
3.00	0.00	0.000	580.69	0.00
3.50	0.00	0.000	580.69	0.00
4.00	0.01	0.000	580.69	0.01
4.50	0.01	0.000	580.69	0.01
5.00	0.01	0.000	580.69	0.01
5.50	0.02	0.000	580.69	0.02
6.00	0.02	0.000	580.69	0.02
6.50	0.03	0.000	580.69	0.03
7.00	0.03	0.000	580.69	0.03
7.50	0.04	0.000	580.69	0.04
8.00	0.05	0.000	580.69	0.05
8.50	0.06	0.000	580.69	0.06
9.00	0.07	0.000	580.69	0.07
9.50	0.09	0.000	580.69	0.09
10.00	0.12	0.000	580.69	0.12
10.50	0.16	0.000	580.69	0.16
11.00	0.21	0.000	580.69	0.21
11.50	0.31	0.000	580.69	0.31
12.00	0.53	0.000	580.76	0.53
12.50	**1.01**	**0.000**	**580.90**	**1.00**
13.00	**1.02**	**0.000**	**580.90**	**1.02**
13.50	0.93	0.000	580.88	0.93
14.00	0.83	0.000	580.85	0.83
14.50	0.72	0.000	580.82	0.72
15.00	0.63	0.000	580.79	0.63
15.50	0.53	0.000	580.76	0.53
16.00	0.44	0.000	580.73	0.44
16.50	0.37	0.000	580.71	0.37
17.00	0.31	0.000	580.69	0.31
17.50	0.25	0.000	580.69	0.25
18.00	0.21	0.000	580.69	0.21
18.50	0.17	0.000	580.69	0.17
19.00	0.14	0.000	580.69	0.14
19.50	0.13	0.000	580.69	0.13
20.00	0.12	0.000	580.69	0.12
20.50	0.11	0.000	580.69	0.11
21.00	0.11	0.000	580.69	0.11
21.50	0.10	0.000	580.69	0.10
22.00	0.10	0.000	580.69	0.10
22.50	0.09	0.000	580.69	0.09
23.00	0.09	0.000	580.69	0.09
23.50	0.09	0.000	580.69	0.09
24.00	0.08	0.000	580.69	0.08

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 2.75" for 2-Year_Future event
Inflow = 0.88 cfs @ 12.78 hrs, Volume= 0.371 af
Outflow = 0.88 cfs @ 12.78 hrs, Volume= 0.371 af, Atten= 0%, Lag= 0.1 min
Primary = 0.88 cfs @ 12.78 hrs, Volume= 0.371 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.32' @ 12.78 hrs Surf.Area= 0.001 ac Storage= 0.000 af

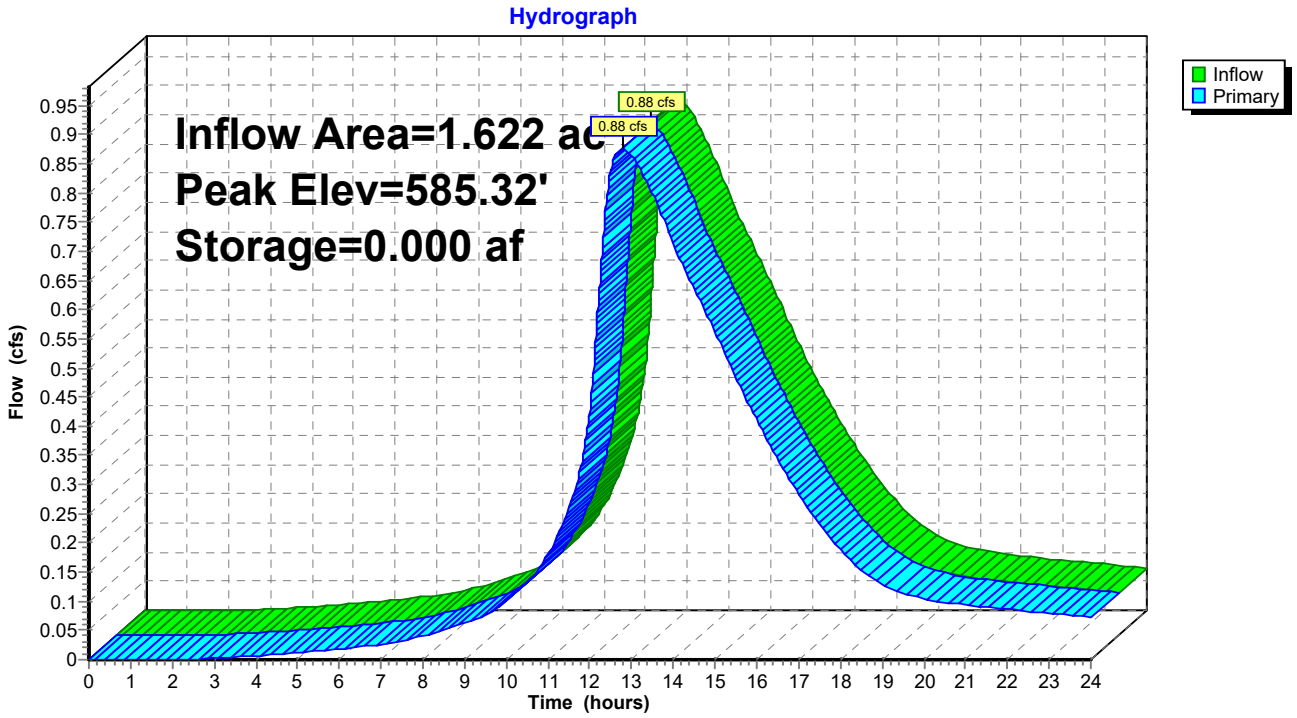
Plug-Flow detention time= 0.1 min calculated for 0.371 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (877.7 - 877.6)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.88 cfs @ 12.78 hrs HW=585.32' TW=580.90' (Dynamic Tailwater)
↑—**1=SD-24** (Orifice Controls 0.88 cfs @ 2.26 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.88	0.00
1.50	0.00	0.000	584.88	0.00
2.00	0.00	0.000	584.89	0.00
2.50	0.00	0.000	584.89	0.00
3.00	0.00	0.000	584.90	0.00
3.50	0.00	0.000	584.91	0.00
4.00	0.01	0.000	584.92	0.01
4.50	0.01	0.000	584.92	0.01
5.00	0.01	0.000	584.93	0.01
5.50	0.02	0.000	584.94	0.02
6.00	0.02	0.000	584.94	0.02
6.50	0.02	0.000	584.95	0.02
7.00	0.03	0.000	584.95	0.03
7.50	0.03	0.000	584.96	0.03
8.00	0.04	0.000	584.97	0.04
8.50	0.05	0.000	584.98	0.05
9.00	0.06	0.000	584.99	0.06
9.50	0.08	0.000	585.01	0.08
10.00	0.10	0.000	585.02	0.10
10.50	0.13	0.000	585.05	0.13
11.00	0.18	0.000	585.07	0.18
11.50	0.26	0.000	585.11	0.26
12.00	0.43	0.000	585.18	0.43
12.50	**0.84**	**0.000**	**585.31**	**0.84**
13.00	**0.87**	**0.000**	**585.32**	**0.87**
13.50	0.80	0.000	585.30	0.80
14.00	0.71	0.000	585.28	0.71
14.50	0.64	0.000	585.25	0.64
15.00	0.56	0.000	585.23	0.56
15.50	0.48	0.000	585.20	0.48
16.00	0.41	0.000	585.18	0.41
16.50	0.34	0.000	585.15	0.34
17.00	0.28	0.000	585.12	0.28
17.50	0.23	0.000	585.10	0.23
18.00	0.19	0.000	585.08	0.19
18.50	0.15	0.000	585.06	0.15
19.00	0.13	0.000	585.04	0.13
19.50	0.11	0.000	585.03	0.11
20.00	0.10	0.000	585.03	0.10
20.50	0.10	0.000	585.02	0.10
21.00	0.09	0.000	585.02	0.09
21.50	0.09	0.000	585.02	0.09
22.00	0.09	0.000	585.01	0.09
22.50	0.08	0.000	585.01	0.08
23.00	0.08	0.000	585.01	0.08
23.50	0.08	0.000	585.00	0.08
24.00	0.07	0.000	585.00	0.07

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 2.73" for 2-Year_Future event
Inflow = 0.72 cfs @ 12.79 hrs, Volume= 0.297 af
Outflow = 0.72 cfs @ 12.79 hrs, Volume= 0.297 af, Atten= 0%, Lag= 0.1 min
Primary = 0.72 cfs @ 12.79 hrs, Volume= 0.297 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.20' @ 12.79 hrs Surf.Area= 0.001 ac Storage= 0.000 af

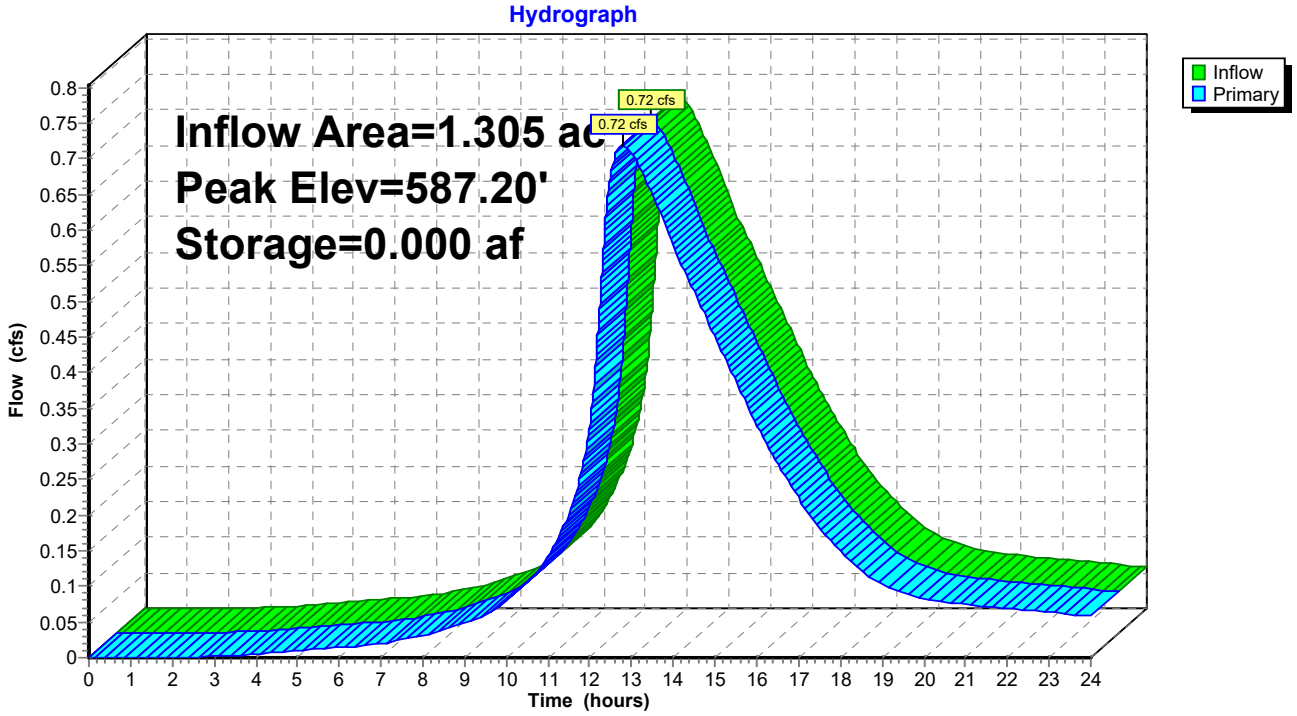
Plug-Flow detention time= 0.1 min calculated for 0.297 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (878.1 - 878.0)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.72 cfs @ 12.79 hrs HW=587.20' TW=585.32' (Dynamic Tailwater)
↑—**1=SD-23** (Orifice Controls 0.72 cfs @ 2.14 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.80	0.00
1.50	0.00	0.000	586.80	0.00
2.00	0.00	0.000	586.80	0.00
2.50	0.00	0.000	586.81	0.00
3.00	0.00	0.000	586.82	0.00
3.50	0.00	0.000	586.82	0.00
4.00	0.01	0.000	586.83	0.01
4.50	0.01	0.000	586.84	0.01
5.00	0.01	0.000	586.84	0.01
5.50	0.01	0.000	586.85	0.01
6.00	0.01	0.000	586.85	0.01
6.50	0.02	0.000	586.86	0.02
7.00	0.02	0.000	586.86	0.02
7.50	0.02	0.000	586.87	0.02
8.00	0.03	0.000	586.88	0.03
8.50	0.04	0.000	586.89	0.04
9.00	0.05	0.000	586.90	0.05
9.50	0.06	0.000	586.91	0.06
10.00	0.08	0.000	586.93	0.08
10.50	0.11	0.000	586.95	0.11
11.00	0.14	0.000	586.97	0.14
11.50	0.20	0.000	587.01	0.20
12.00	0.33	0.000	587.06	0.33
12.50	**0.68**	**0.000**	**587.19**	**0.68**
13.00	**0.71**	**0.000**	**587.19**	**0.71**
13.50	0.65	0.000	587.18	0.65
14.00	0.58	0.000	587.15	0.58
14.50	0.51	0.000	587.13	0.51
15.00	0.45	0.000	587.11	0.45
15.50	0.39	0.000	587.09	0.39
16.00	0.33	0.000	587.06	0.33
16.50	0.27	0.000	587.04	0.27
17.00	0.22	0.000	587.02	0.22
17.50	0.18	0.000	586.99	0.18
18.00	0.15	0.000	586.98	0.15
18.50	0.12	0.000	586.96	0.12
19.00	0.10	0.000	586.94	0.10
19.50	0.09	0.000	586.94	0.09
20.00	0.08	0.000	586.93	0.08
20.50	0.08	0.000	586.93	0.08
21.00	0.07	0.000	586.92	0.07
21.50	0.07	0.000	586.92	0.07
22.00	0.07	0.000	586.92	0.07
22.50	0.07	0.000	586.92	0.07
23.00	0.06	0.000	586.91	0.06
23.50	0.06	0.000	586.91	0.06
24.00	0.06	0.000	586.91	0.06

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 2.72" for 2-Year_Future event
Inflow = 0.52 cfs @ 12.74 hrs, Volume= 0.208 af
Outflow = 0.52 cfs @ 12.74 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.1 min
Primary = 0.52 cfs @ 12.74 hrs, Volume= 0.208 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 588.81' @ 12.74 hrs Surf.Area= 0.000 ac Storage= 0.000 af

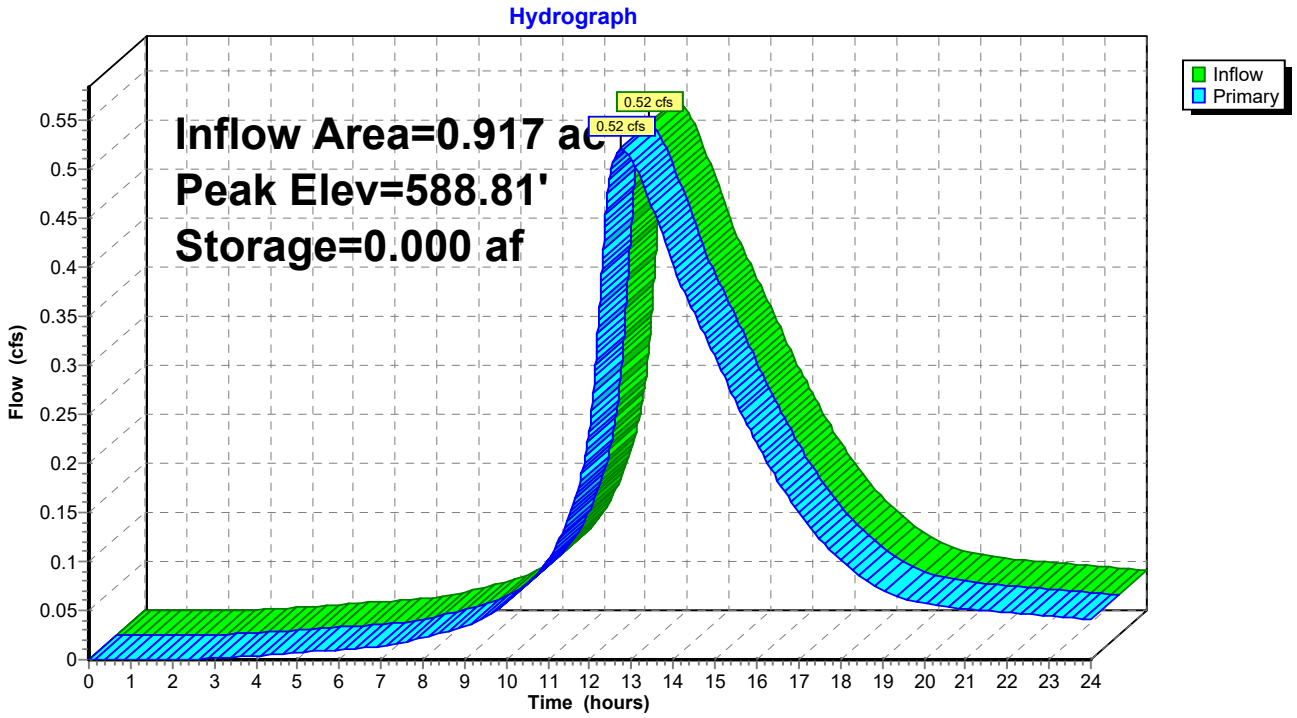
Plug-Flow detention time= 0.1 min calculated for 0.208 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (875.0 - 875.0)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.52 cfs @ 12.74 hrs HW=588.81' TW=587.20' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 0.52 cfs @ 2.04 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.45	0.00
1.50	0.00	0.000	588.45	0.00
2.00	0.00	0.000	588.45	0.00
2.50	0.00	0.000	588.46	0.00
3.00	0.00	0.000	588.47	0.00
3.50	0.00	0.000	588.47	0.00
4.00	0.00	0.000	588.48	0.00
4.50	0.01	0.000	588.48	0.01
5.00	0.01	0.000	588.49	0.01
5.50	0.01	0.000	588.49	0.01
6.00	0.01	0.000	588.50	0.01
6.50	0.01	0.000	588.50	0.01
7.00	0.01	0.000	588.51	0.01
7.50	0.02	0.000	588.51	0.02
8.00	0.02	0.000	588.52	0.02
8.50	0.03	0.000	588.53	0.03
9.00	0.03	0.000	588.54	0.03
9.50	0.04	0.000	588.55	0.04
10.00	0.06	0.000	588.56	0.06
10.50	0.08	0.000	588.58	0.08
11.00	0.10	0.000	588.60	0.10
11.50	0.15	0.000	588.63	0.15
12.00	0.24	0.000	588.69	0.24
12.50	**0.50**	**0.000**	**588.80**	**0.50**
13.00	**0.51**	**0.000**	**588.81**	**0.51**
13.50	0.46	0.000	588.79	0.46
14.00	0.40	0.000	588.76	0.40
14.50	0.35	0.000	588.74	0.35
15.00	0.31	0.000	588.72	0.31
15.50	0.26	0.000	588.70	0.26
16.00	0.22	0.000	588.68	0.22
16.50	0.18	0.000	588.66	0.18
17.00	0.15	0.000	588.64	0.15
17.50	0.12	0.000	588.62	0.12
18.00	0.10	0.000	588.60	0.10
18.50	0.08	0.000	588.59	0.08
19.00	0.07	0.000	588.58	0.07
19.50	0.06	0.000	588.57	0.06
20.00	0.06	0.000	588.56	0.06
20.50	0.05	0.000	588.56	0.05
21.00	0.05	0.000	588.56	0.05
21.50	0.05	0.000	588.56	0.05
22.00	0.05	0.000	588.55	0.05
22.50	0.05	0.000	588.55	0.05
23.00	0.04	0.000	588.55	0.04
23.50	0.04	0.000	588.55	0.04
24.00	0.04	0.000	588.55	0.04

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 2.66" for 2-Year_Future event
Inflow = 0.30 cfs @ 12.82 hrs, Volume= 0.125 af
Outflow = 0.30 cfs @ 12.82 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.1 min
Primary = 0.30 cfs @ 12.82 hrs, Volume= 0.125 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.88' @ 12.82 hrs Surf.Area= 0.000 ac Storage= 0.000 af

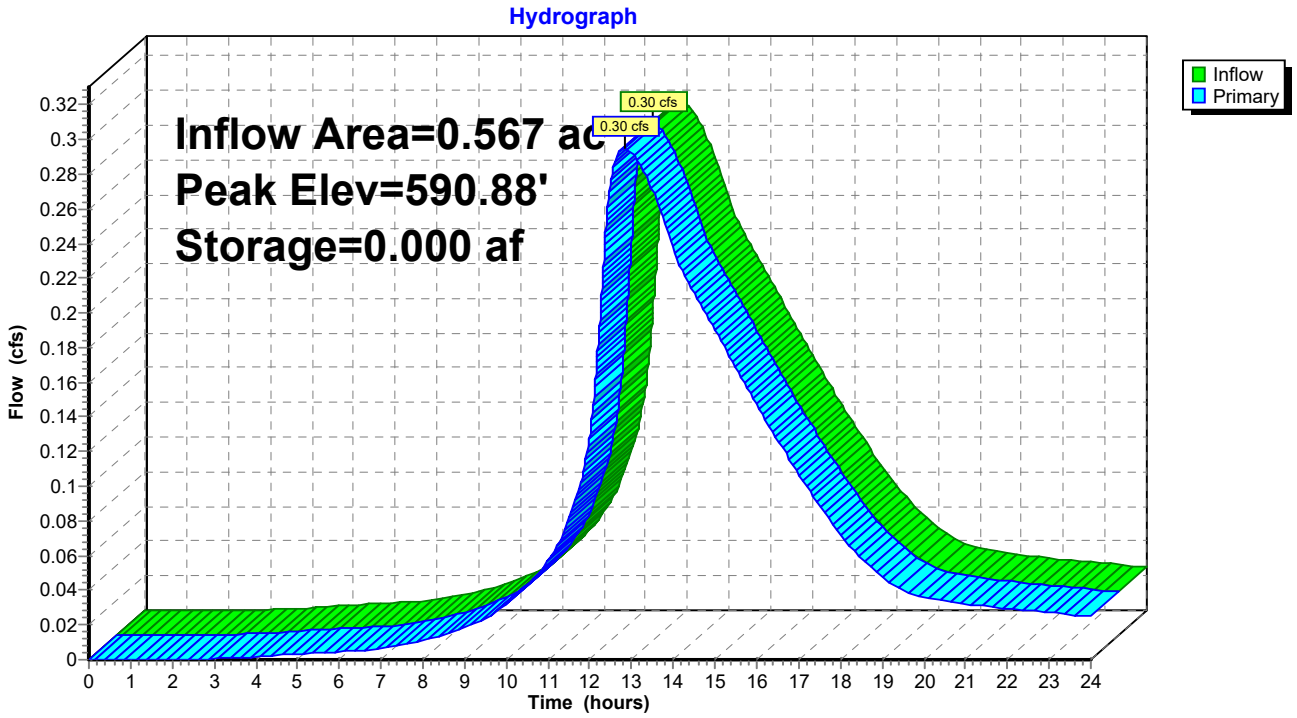
Plug-Flow detention time= 0.1 min calculated for 0.125 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (887.5 - 887.5)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 12.82 hrs HW=590.88' TW=588.81' (Dynamic Tailwater)
↑—**1=SD-21** (Orifice Controls 0.30 cfs @ 1.76 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.61	0.00
2.00	0.00	0.000	590.61	0.00
2.50	0.00	0.000	590.62	0.00
3.00	0.00	0.000	590.62	0.00
3.50	0.00	0.000	590.62	0.00
4.00	0.00	0.000	590.63	0.00
4.50	0.00	0.000	590.63	0.00
5.00	0.00	0.000	590.64	0.00
5.50	0.00	0.000	590.64	0.00
6.00	0.00	0.000	590.64	0.00
6.50	0.01	0.000	590.64	0.01
7.00	0.01	0.000	590.65	0.01
7.50	0.01	0.000	590.65	0.01
8.00	0.01	0.000	590.66	0.01
8.50	0.01	0.000	590.67	0.01
9.00	0.02	0.000	590.67	0.02
9.50	0.02	0.000	590.68	0.02
10.00	0.03	0.000	590.70	0.03
10.50	0.04	0.000	590.71	0.04
11.00	0.06	0.000	590.72	0.06
11.50	0.08	0.000	590.75	0.08
12.00	0.13	0.000	590.78	0.13
12.50	**0.28**	**0.000**	**590.87**	**0.28**
13.00	**0.29**	**0.000**	**590.88**	**0.29**
13.50	0.27	0.000	590.86	0.27
14.00	0.24	0.000	590.85	0.24
14.50	0.21	0.000	590.83	0.21
15.00	0.19	0.000	590.82	0.19
15.50	0.17	0.000	590.81	0.17
16.00	0.15	0.000	590.80	0.15
16.50	0.13	0.000	590.78	0.13
17.00	0.11	0.000	590.77	0.11
17.50	0.09	0.000	590.75	0.09
18.00	0.07	0.000	590.74	0.07
18.50	0.06	0.000	590.73	0.06
19.00	0.05	0.000	590.71	0.05
19.50	0.04	0.000	590.71	0.04
20.00	0.04	0.000	590.70	0.04
20.50	0.03	0.000	590.70	0.03
21.00	0.03	0.000	590.70	0.03
21.50	0.03	0.000	590.69	0.03
22.00	0.03	0.000	590.69	0.03
22.50	0.03	0.000	590.69	0.03
23.00	0.03	0.000	590.69	0.03
23.50	0.03	0.000	590.69	0.03
24.00	0.02	0.000	590.68	0.02

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>3.90"
Flow Length=164' Tc=18.5 min CN=WQ Runoff=1.67 cfs 0.184 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>4.08"
Flow Length=175' Tc=15.6 min CN=WQ Runoff=1.14 cfs 0.119 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>4.02"
Flow Length=175' Tc=23.3 min CN=WQ Runoff=1.05 cfs 0.130 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>4.02"
Flow Length=120' Tc=6.5 min CN=WQ Runoff=1.04 cfs 0.081 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>4.12"
Flow Length=96' Slope=0.0336 '/' Tc=5.4 min CN=WQ Runoff=1.44 cfs 0.109 af

Pond 1P: BR-01 Peak Elev=600.08' Storage=2,990 cf Inflow=1.67 cfs 0.184 af
Outflow=0.33 cfs 0.182 af

Pond 2P: BR-02 Peak Elev=601.13' Storage=1,649 cf Inflow=1.14 cfs 0.119 af
Outflow=0.33 cfs 0.117 af

Pond 3P: BR-03 Peak Elev=596.66' Storage=2,048 cf Inflow=1.05 cfs 0.130 af
Outflow=0.26 cfs 0.127 af

Pond 5P: BR-05 Peak Elev=595.55' Storage=1,100 cf Inflow=1.04 cfs 0.081 af
Outflow=0.21 cfs 0.079 af

Pond 6P: BR-04 Peak Elev=596.26' Storage=1,813 cf Inflow=1.44 cfs 0.109 af
Outflow=0.20 cfs 0.106 af

Pond 8P: O-1B Inflow=1.31 cfs 0.612 af
Primary=1.31 cfs 0.612 af

Pond 13P: SD-25, SD-26 Peak Elev=580.97' Storage=0.000 af Inflow=1.31 cfs 0.612 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=1.31 cfs 0.612 af

Pond 14P: SD-24 Peak Elev=585.38' Storage=0.000 af Inflow=1.10 cfs 0.532 af
Outflow=1.10 cfs 0.532 af

Pond 17P: SD-23 Peak Elev=587.25' Storage=0.000 af Inflow=0.90 cfs 0.426 af
Outflow=0.90 cfs 0.426 af

Pond 18P: SD-22 Peak Elev=588.86' Storage=0.000 af Inflow=0.65 cfs 0.299 af
Outflow=0.65 cfs 0.299 af

Pond 19P: SD-21 Peak Elev=590.89' Storage=0.000 af Inflow=0.33 cfs 0.182 af
Outflow=0.33 cfs 0.182 af

Total Runoff Area = 1.863 ac Runoff Volume = 0.623 af Average Runoff Depth = 4.01"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

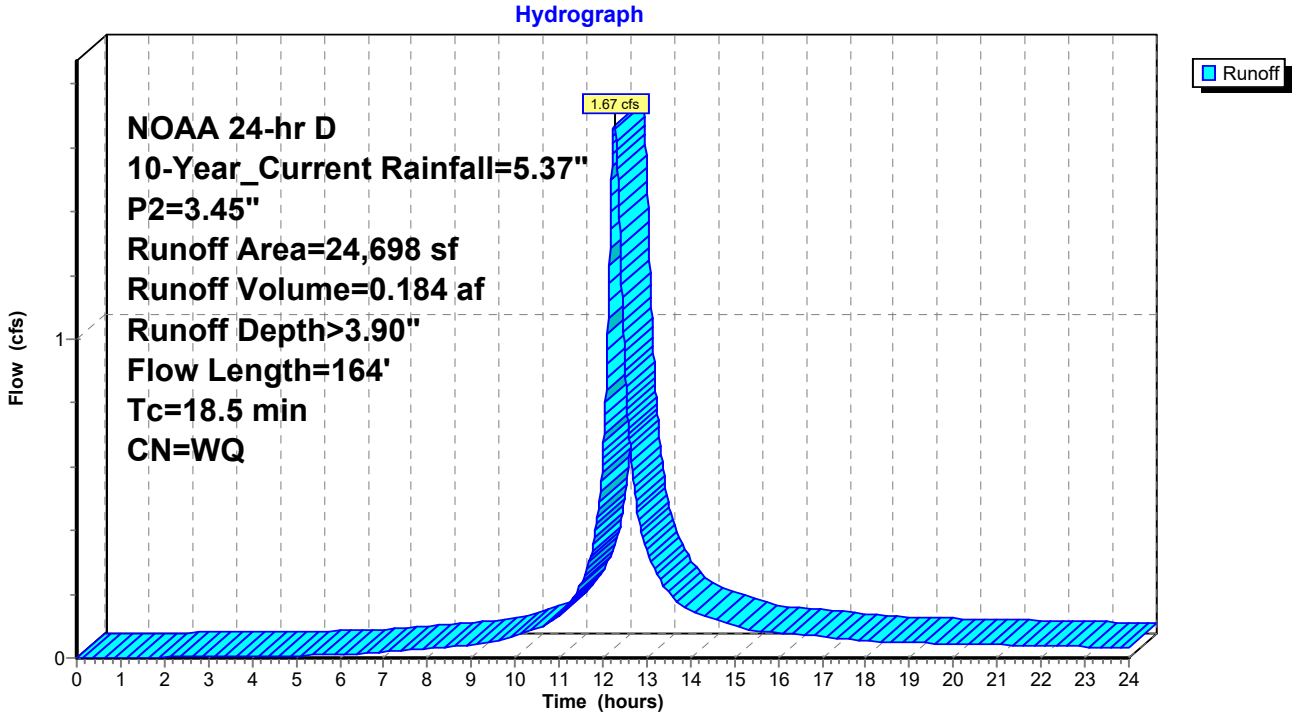
Runoff = 1.67 cfs @ 12.27 hrs, Volume= 0.184 af, Depth> 3.90"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0018	0.09		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.5	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.00	0.01
5.50	0.41	0.01	0.01
6.00	0.46	0.02	0.01
6.50	0.51	0.03	0.01
7.00	0.57	0.04	0.02
7.50	0.63	0.06	0.02
8.00	0.70	0.08	0.03
8.50	0.77	0.11	0.04
9.00	0.85	0.15	0.04
9.50	0.95	0.20	0.05
10.00	1.06	0.26	0.07
10.50	1.20	0.34	0.09
11.00	1.40	0.46	0.14
11.50	1.70	0.68	0.23
12.00	2.57	1.37	**0.63**
12.50	3.67	2.33	**0.93**
13.00	3.97	2.61	0.34
13.50	4.17	2.79	0.21
14.00	4.31	2.92	0.15
14.50	4.42	3.03	0.12
15.00	4.52	3.12	0.10
15.50	4.60	3.19	0.09
16.00	4.67	3.26	0.08
16.50	4.74	3.32	0.07
17.00	4.80	3.38	0.07
17.50	4.86	3.44	0.06
18.00	4.91	3.48	0.05
18.50	4.96	3.53	0.05
19.00	5.00	3.57	0.05
19.50	5.05	3.61	0.05
20.00	5.09	3.65	0.04
20.50	5.13	3.69	0.04
21.00	5.17	3.73	0.04
21.50	5.21	3.76	0.04
22.00	5.24	3.79	0.04
22.50	5.28	3.83	0.04
23.00	5.31	3.86	0.04
23.50	5.34	3.89	0.03
24.00	**5.37**	**3.92**	0.03

Summary for Subcatchment 7S: PO-DA E

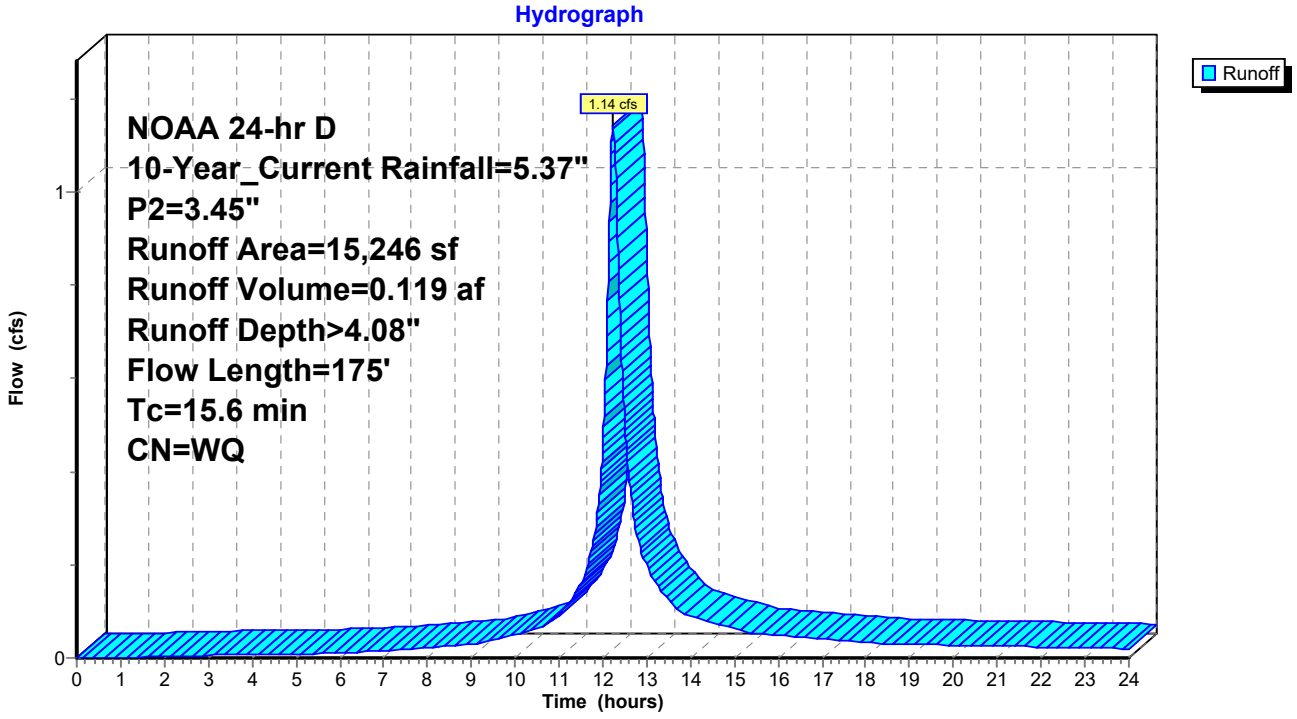
Runoff = 1.14 cfs @ 12.23 hrs, Volume= 0.119 af, Depth> 4.08"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0030	0.11		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
15.6	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.01	0.01
5.50	0.41	0.01	0.01
6.00	0.46	0.02	0.01
6.50	0.51	0.03	0.01
7.00	0.57	0.05	0.02
7.50	0.63	0.07	0.02
8.00	0.70	0.10	0.02
8.50	0.77	0.13	0.03
9.00	0.85	0.17	0.03
9.50	0.95	0.22	0.04
10.00	1.06	0.29	0.05
10.50	1.20	0.38	0.06
11.00	1.40	0.51	0.09
11.50	1.70	0.73	0.16
12.00	2.57	1.44	**0.46**
12.50	3.67	2.42	**0.50**
13.00	3.97	2.70	0.20
13.50	4.17	2.88	0.13
14.00	4.31	3.01	0.09
14.50	4.42	3.12	0.08
15.00	4.52	3.21	0.06
15.50	4.60	3.29	0.05
16.00	4.67	3.36	0.05
16.50	4.74	3.42	0.05
17.00	4.80	3.48	0.04
17.50	4.86	3.54	0.04
18.00	4.91	3.58	0.03
18.50	4.96	3.63	0.03
19.00	5.00	3.67	0.03
19.50	5.05	3.71	0.03
20.00	5.09	3.75	0.03
20.50	5.13	3.79	0.03
21.00	5.17	3.83	0.03
21.50	5.21	3.86	0.02
22.00	5.24	3.90	0.02
22.50	5.28	3.93	0.02
23.00	5.31	3.96	0.02
23.50	5.34	3.99	0.02
24.00	**5.37**	**4.02**	0.02

Summary for Subcatchment 9S: PO-DA G

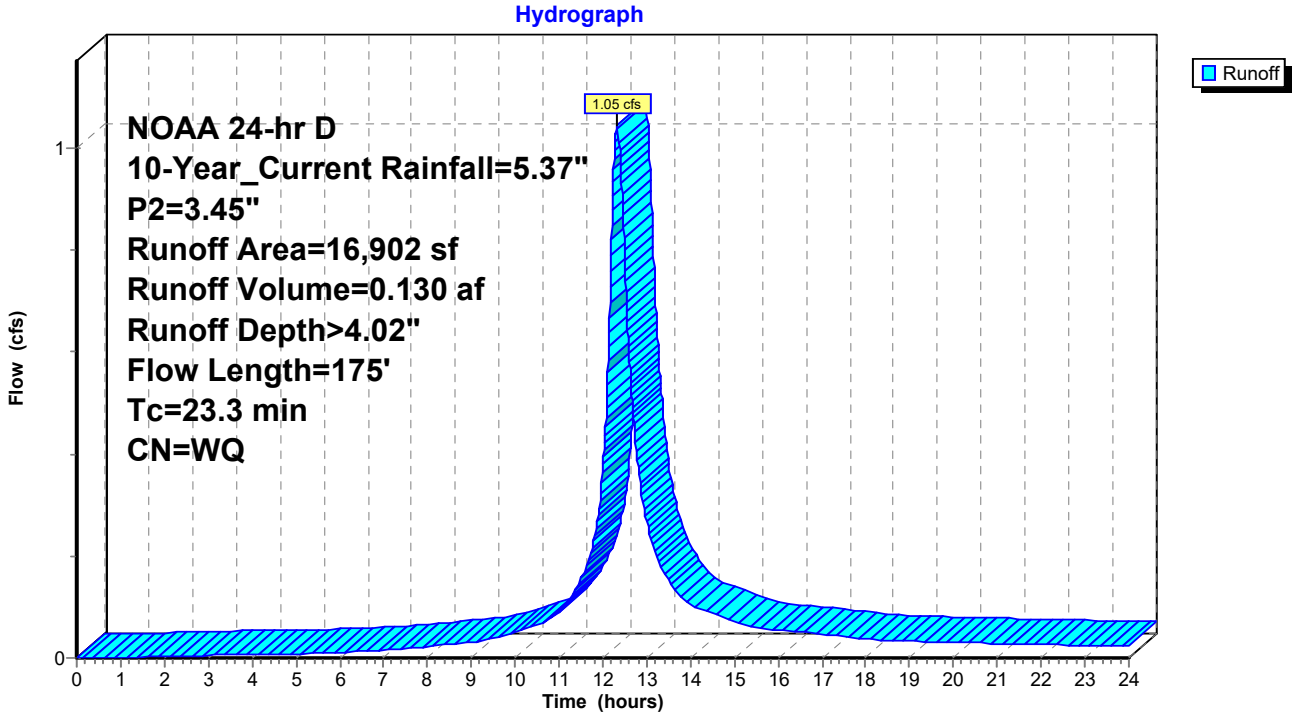
Runoff = 1.05 cfs @ 12.33 hrs, Volume= 0.130 af, Depth> 4.02"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	100	0.0010	0.07		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
23.3	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.01	0.01
5.50	0.41	0.01	0.01
6.00	0.46	0.02	0.01
6.50	0.51	0.03	0.01
7.00	0.57	0.05	0.02
7.50	0.63	0.07	0.02
8.00	0.70	0.10	0.02
8.50	0.77	0.13	0.03
9.00	0.85	0.17	0.03
9.50	0.95	0.22	0.04
10.00	1.06	0.29	0.05
10.50	1.20	0.38	0.06
11.00	1.40	0.51	0.09
11.50	1.70	0.73	0.15
12.00	2.57	1.44	**0.37**
12.50	3.67	2.42	**0.78**
13.00	3.97	2.70	0.27
13.50	4.17	2.88	0.15
14.00	4.31	3.01	0.11
14.50	4.42	3.12	0.09
15.00	4.52	3.21	0.07
15.50	4.60	3.29	0.06
16.00	4.67	3.36	0.06
16.50	4.74	3.42	0.05
17.00	4.80	3.48	0.05
17.50	4.86	3.54	0.04
18.00	4.91	3.58	0.04
18.50	4.96	3.63	0.03
19.00	5.00	3.67	0.03
19.50	5.05	3.71	0.03
20.00	5.09	3.75	0.03
20.50	5.13	3.79	0.03
21.00	5.17	3.83	0.03
21.50	5.21	3.86	0.03
22.00	5.24	3.90	0.03
22.50	5.28	3.93	0.03
23.00	5.31	3.96	0.02
23.50	5.34	3.99	0.02
24.00	**5.37**	**4.02**	0.02

Summary for Subcatchment 11S: PO-DA I

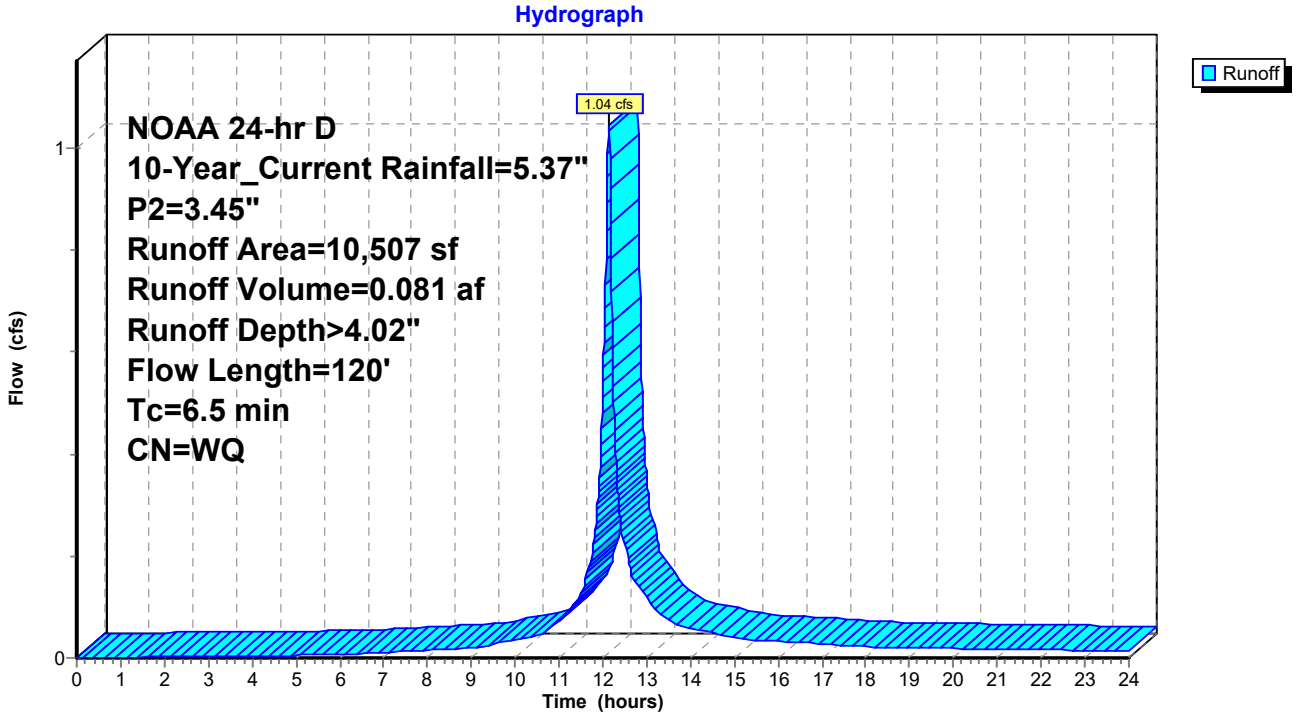
Runoff = 1.04 cfs @ 12.14 hrs, Volume= 0.081 af, Depth> 4.02"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0237	0.26		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.5	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.00
3.00	0.20	0.00	0.00
3.50	0.24	0.00	0.00
4.00	0.28	0.00	0.00
4.50	0.32	0.00	0.00
5.00	0.37	0.01	0.01
5.50	0.41	0.01	0.01
6.00	0.46	0.02	0.01
6.50	0.51	0.03	0.01
7.00	0.57	0.05	0.01
7.50	0.63	0.07	0.01
8.00	0.70	0.10	0.02
8.50	0.77	0.13	0.02
9.00	0.85	0.17	0.02
9.50	0.95	0.22	0.03
10.00	1.06	0.29	0.04
10.50	1.20	0.38	0.04
11.00	1.40	0.51	0.07
11.50	1.70	0.73	0.12
12.00	2.57	1.44	**0.54**
12.50	3.67	2.42	**0.22**
13.00	3.97	2.70	0.12
13.50	4.17	2.88	0.08
14.00	4.31	3.01	0.06
14.50	4.42	3.12	0.05
15.00	4.52	3.21	0.04
15.50	4.60	3.29	0.04
16.00	4.67	3.36	0.03
16.50	4.74	3.42	0.03
17.00	4.80	3.48	0.03
17.50	4.86	3.54	0.02
18.00	4.91	3.58	0.02
18.50	4.96	3.63	0.02
19.00	5.00	3.67	0.02
19.50	5.05	3.71	0.02
20.00	5.09	3.75	0.02
20.50	5.13	3.79	0.02
21.00	5.17	3.83	0.02
21.50	5.21	3.86	0.02
22.00	5.24	3.90	0.02
22.50	5.28	3.93	0.02
23.00	5.31	3.96	0.01
23.50	5.34	3.99	0.01
24.00	**5.37**	**4.02**	0.01

Summary for Subcatchment 12S: PO-DA J

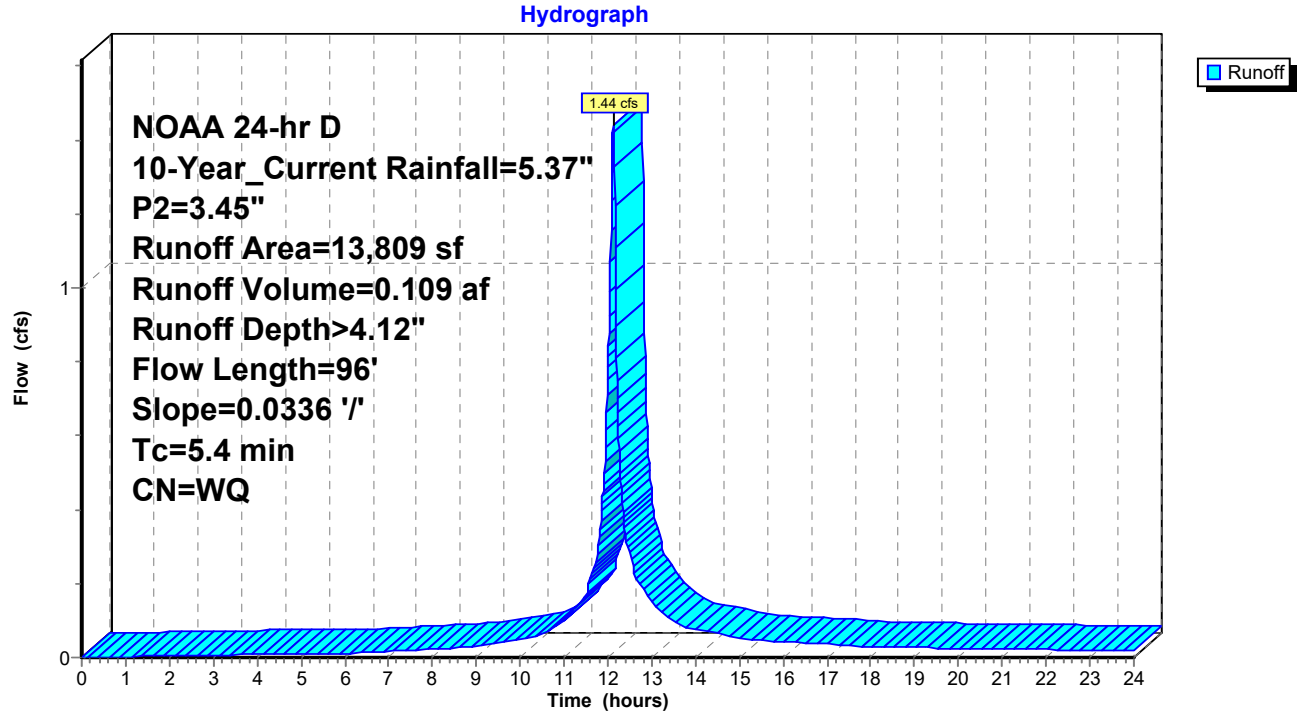
Runoff = 1.44 cfs @ 12.12 hrs, Volume= 0.109 af, Depth> 4.12"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	96	0.0336	0.30		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.00
2.50	0.16	0.00	0.01
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.01	0.01
5.50	0.41	0.02	0.01
6.00	0.46	0.03	0.01
6.50	0.51	0.05	0.01
7.00	0.57	0.07	0.02
7.50	0.63	0.09	0.02
8.00	0.70	0.12	0.02
8.50	0.77	0.16	0.03
9.00	0.85	0.20	0.03
9.50	0.95	0.25	0.04
10.00	1.06	0.33	0.05
10.50	1.20	0.42	0.06
11.00	1.40	0.55	0.10
11.50	1.70	0.79	0.17
12.00	2.57	1.52	**0.79**
12.50	3.67	2.51	**0.29**
13.00	3.97	2.80	0.15
13.50	4.17	2.98	0.10
14.00	4.31	3.11	0.08
14.50	4.42	3.22	0.06
15.00	4.52	3.31	0.05
15.50	4.60	3.39	0.05
16.00	4.67	3.46	0.04
16.50	4.74	3.53	0.04
17.00	4.80	3.58	0.04
17.50	4.86	3.64	0.03
18.00	4.91	3.69	0.03
18.50	4.96	3.73	0.03
19.00	5.00	3.77	0.03
19.50	5.05	3.82	0.03
20.00	5.09	3.86	0.02
20.50	5.13	3.90	0.02
21.00	5.17	3.93	0.02
21.50	5.21	3.97	0.02
22.00	5.24	4.00	0.02
22.50	5.28	4.04	0.02
23.00	5.31	4.07	0.02
23.50	5.34	4.10	0.02
24.00	**5.37**	**4.13**	0.02

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 3.90" for 10-Year_Current event
Inflow = 1.67 cfs @ 12.27 hrs, Volume= 0.184 af
Outflow = 0.33 cfs @ 13.03 hrs, Volume= 0.182 af, Atten= 80%, Lag= 45.6 min
Primary = 0.33 cfs @ 13.03 hrs, Volume= 0.182 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 600.08' @ 13.03 hrs Surf.Area= 5,277 sf Storage= 2,990 cf

Plug-Flow detention time= 98.9 min calculated for 0.182 af (99% of inflow)
Center-of-Mass det. time= 90.8 min (898.3 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

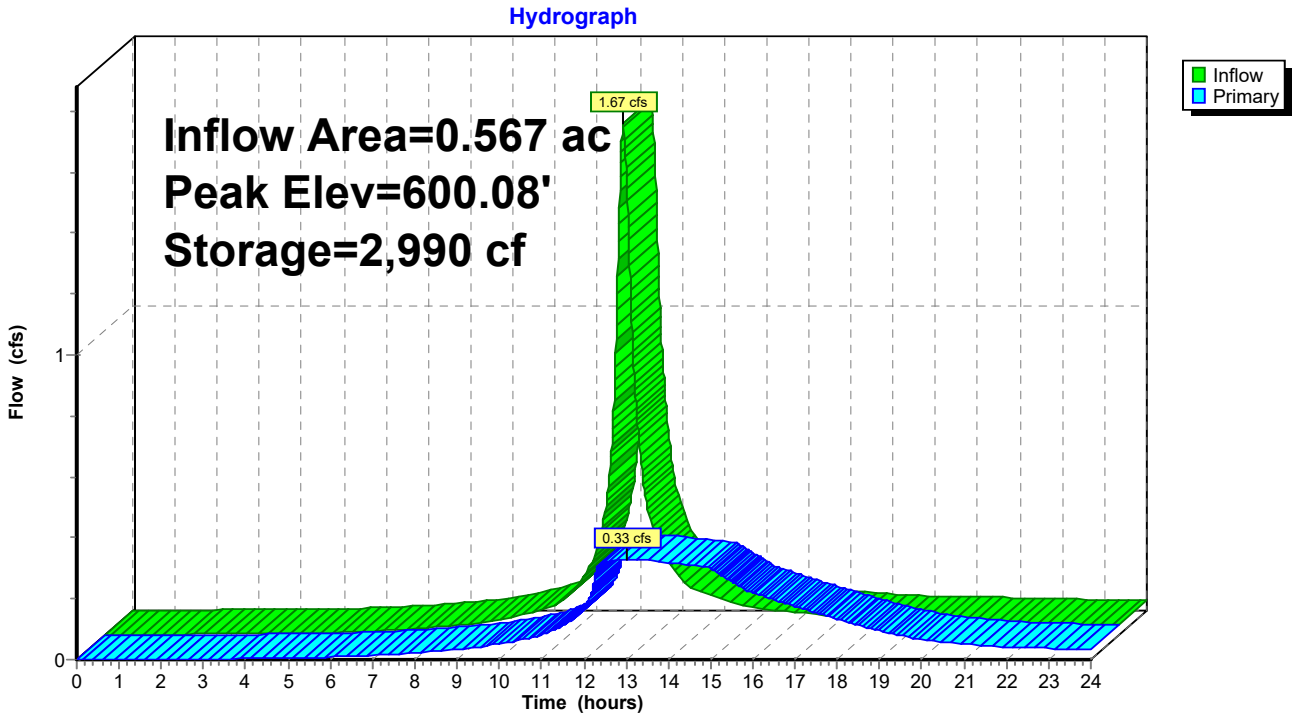
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 13.03 hrs HW=600.08' TW=590.89' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 0.33 cfs of 10.70 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.33 cfs @ 9.60 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.00	0	596.00	0.00
1.50	0.00	2	596.00	0.00
2.00	0.00	6	596.01	0.00
2.50	0.00	12	596.02	0.00
3.00	0.00	18	596.03	0.00
3.50	0.01	24	596.03	0.00
4.00	0.01	30	596.04	0.00
4.50	0.01	34	596.05	0.00
5.00	0.01	38	596.05	0.01
5.50	0.01	42	596.06	0.01
6.00	0.01	47	596.07	0.01
6.50	0.01	54	596.08	0.01
7.00	0.02	62	596.09	0.01
7.50	0.02	72	596.10	0.02
8.00	0.03	84	596.12	0.02
8.50	0.04	96	596.13	0.03
9.00	0.04	108	596.15	0.03
9.50	0.05	123	596.17	0.04
10.00	0.07	149	596.21	0.05
10.50	0.09	189	596.26	0.06
11.00	0.14	254	596.35	0.08
11.50	0.23	403	596.56	0.11
12.00	**0.63**	812	597.14	0.17
12.50	**0.93**	2,597	599.86	0.32
13.00	0.34	**2,989**	**600.08**	**0.33**
13.50	0.21	**2,876**	**600.02**	**0.32**
14.00	0.15	2,606	599.86	0.32
14.50	0.12	2,284	599.68	0.31
15.00	0.10	1,936	599.43	0.30
15.50	0.09	1,602	598.55	0.26
16.00	0.08	1,325	597.90	0.22
16.50	0.07	1,087	597.54	0.20
17.00	0.07	879	597.24	0.17
17.50	0.06	698	596.98	0.15
18.00	0.05	543	596.76	0.13
18.50	0.05	414	596.58	0.11
19.00	0.05	315	596.44	0.09
19.50	0.05	244	596.34	0.08
20.00	0.04	195	596.27	0.07
20.50	0.04	163	596.23	0.06
21.00	0.04	143	596.20	0.05
21.50	0.04	131	596.18	0.05
22.00	0.04	123	596.17	0.04
22.50	0.04	118	596.16	0.04
23.00	0.04	114	596.16	0.04
23.50	0.03	111	596.15	0.04
24.00	0.03	107	596.15	0.03

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 4.08" for 10-Year_Current event
Inflow = 1.14 cfs @ 12.23 hrs, Volume= 0.119 af
Outflow = 0.33 cfs @ 12.67 hrs, Volume= 0.117 af, Atten= 71%, Lag= 26.3 min
Primary = 0.33 cfs @ 12.67 hrs, Volume= 0.117 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 601.13' @ 12.67 hrs Surf.Area= 4,734 sf Storage= 1,649 cf

Plug-Flow detention time= 68.8 min calculated for 0.117 af (99% of inflow)
Center-of-Mass det. time= 60.1 min (855.1 - 794.9)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

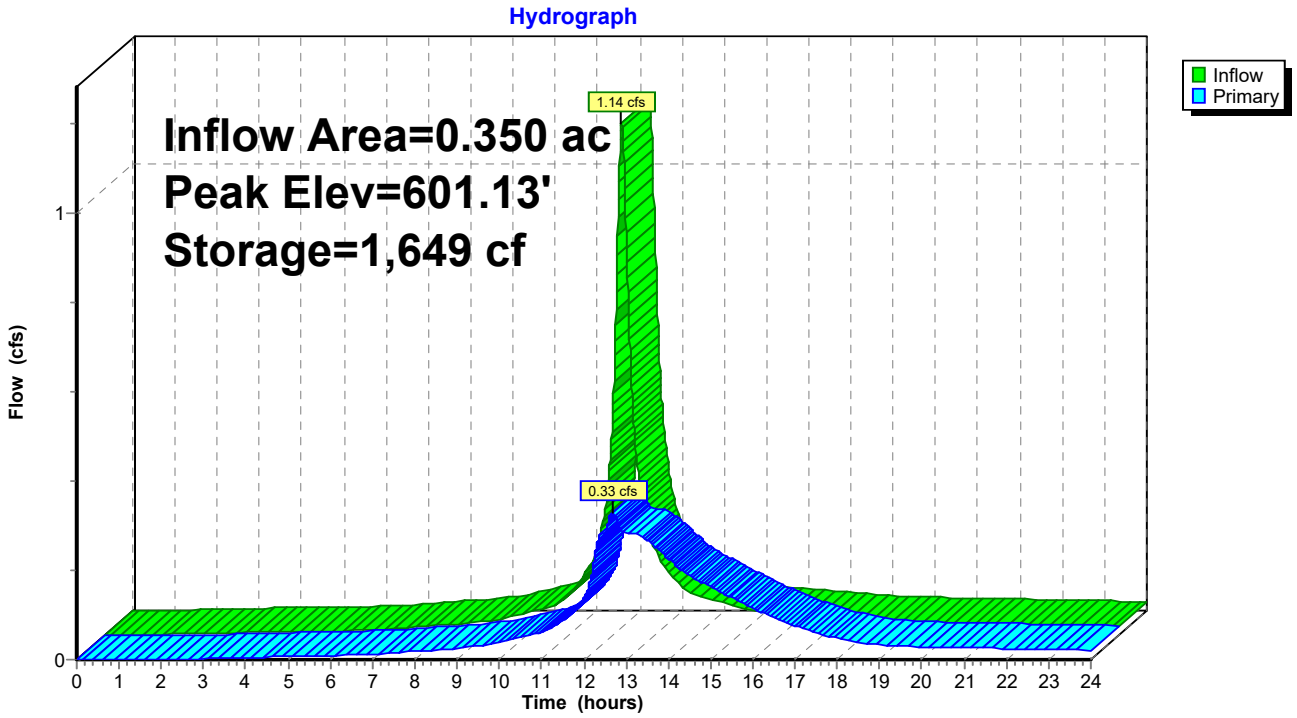
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 12.67 hrs HW=601.13' TW=588.86' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 0.33 cfs of 12.12 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.29 cfs @ 8.37 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.04 cfs @ 0.53 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.00	0	598.00	0.00
1.50	0.00	2	598.00	0.00
2.00	0.00	7	598.01	0.00
2.50	0.00	14	598.02	0.00
3.00	0.01	20	598.03	0.00
3.50	0.01	26	598.04	0.00
4.00	0.01	31	598.05	0.00
4.50	0.01	35	598.05	0.01
5.00	0.01	38	598.06	0.01
5.50	0.01	41	598.06	0.01
6.00	0.01	44	598.07	0.01
6.50	0.01	48	598.08	0.01
7.00	0.02	54	598.08	0.01
7.50	0.02	60	598.09	0.02
8.00	0.02	67	598.10	0.02
8.50	0.03	74	598.11	0.02
9.00	0.03	82	598.13	0.03
9.50	0.04	92	598.14	0.03
10.00	0.05	107	598.17	0.04
10.50	0.06	128	598.20	0.05
11.00	0.09	164	598.25	0.06
11.50	0.16	253	598.39	0.09
12.00	**0.46**	516	598.81	0.14
12.50	**0.50**	**1,590**	**601.09**	**0.28**
13.00	0.20	**1,585**	**601.09**	**0.28**
13.50	0.13	1,366	600.76	0.27
14.00	0.09	1,107	600.01	0.23
14.50	0.08	887	599.42	0.19
15.00	0.06	695	599.10	0.16
15.50	0.05	525	598.82	0.14
16.00	0.05	388	598.60	0.12
16.50	0.05	283	598.44	0.09
17.00	0.04	208	598.32	0.08
17.50	0.04	156	598.24	0.06
18.00	0.03	123	598.19	0.05
18.50	0.03	104	598.16	0.04
19.00	0.03	95	598.15	0.03
19.50	0.03	90	598.14	0.03
20.00	0.03	88	598.13	0.03
20.50	0.03	85	598.13	0.03
21.00	0.03	84	598.13	0.03
21.50	0.02	82	598.13	0.03
22.00	0.02	80	598.12	0.02
22.50	0.02	78	598.12	0.02
23.00	0.02	76	598.12	0.02
23.50	0.02	74	598.11	0.02
24.00	0.02	72	598.11	0.02

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 4.02" for 10-Year_Current event
Inflow = 1.05 cfs @ 12.33 hrs, Volume= 0.130 af
Outflow = 0.26 cfs @ 13.01 hrs, Volume= 0.127 af, Atten= 75%, Lag= 41.2 min
Primary = 0.26 cfs @ 13.01 hrs, Volume= 0.127 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.66' @ 13.01 hrs Surf.Area= 6,525 sf Storage= 2,048 cf

Plug-Flow detention time= 99.0 min calculated for 0.127 af (98% of inflow)
Center-of-Mass det. time= 87.1 min (890.4 - 803.4)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

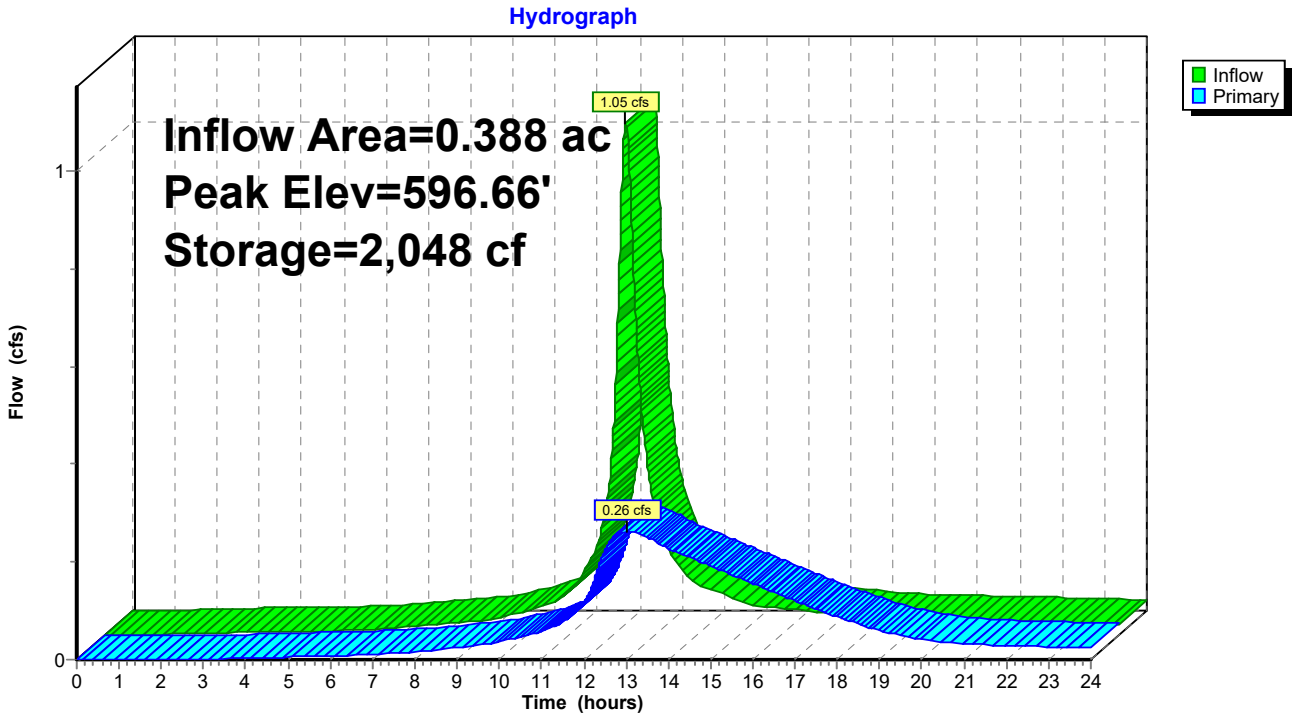
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.26 cfs @ 13.01 hrs HW=596.66' TW=587.24' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.26 cfs of 16.55 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.26 cfs @ 7.70 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	0	594.00	0.00
1.50	0.00	2	594.00	0.00
2.00	0.00	6	594.01	0.00
2.50	0.00	13	594.01	0.00
3.00	0.01	20	594.02	0.00
3.50	0.01	28	594.03	0.00
4.00	0.01	35	594.04	0.00
4.50	0.01	42	594.05	0.00
5.00	0.01	47	594.05	0.01
5.50	0.01	52	594.06	0.01
6.00	0.01	58	594.06	0.01
6.50	0.01	63	594.07	0.01
7.00	0.02	71	594.08	0.01
7.50	0.02	80	594.09	0.01
8.00	0.02	90	594.10	0.02
8.50	0.03	101	594.11	0.02
9.00	0.03	113	594.12	0.02
9.50	0.04	126	594.14	0.03
10.00	0.05	146	594.16	0.04
10.50	0.06	174	594.19	0.05
11.00	0.09	215	594.23	0.06
11.50	0.15	309	594.33	0.08
12.00	**0.37**	550	594.61	0.12
12.50	**0.78**	1,683	595.94	0.22
13.00	0.27	**2,048**	**596.66**	**0.26**
13.50	0.15	**1,945**	**596.45**	**0.25**
14.00	0.11	1,741	596.01	0.23
14.50	0.09	1,521	595.74	0.21
15.00	0.07	1,304	595.47	0.19
15.50	0.06	1,092	595.23	0.17
16.00	0.06	899	595.01	0.16
16.50	0.05	729	594.81	0.14
17.00	0.05	584	594.65	0.12
17.50	0.04	462	594.51	0.10
18.00	0.04	362	594.39	0.09
18.50	0.03	282	594.30	0.07
19.00	0.03	224	594.24	0.06
19.50	0.03	184	594.20	0.05
20.00	0.03	158	594.17	0.04
20.50	0.03	143	594.15	0.04
21.00	0.03	134	594.14	0.03
21.50	0.03	128	594.14	0.03
22.00	0.03	124	594.13	0.03
22.50	0.03	120	594.13	0.03
23.00	0.02	117	594.13	0.03
23.50	0.02	114	594.12	0.03
24.00	0.02	111	594.12	0.02

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 4.02" for 10-Year_Current event
Inflow = 1.04 cfs @ 12.14 hrs, Volume= 0.081 af
Outflow = 0.21 cfs @ 12.55 hrs, Volume= 0.079 af, Atten= 80%, Lag= 24.6 min
Primary = 0.21 cfs @ 12.55 hrs, Volume= 0.079 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 595.55' @ 12.55 hrs Surf.Area= 3,150 sf Storage= 1,100 cf

Plug-Flow detention time= 65.1 min calculated for 0.079 af (98% of inflow)
Center-of-Mass det. time= 54.8 min (845.9 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

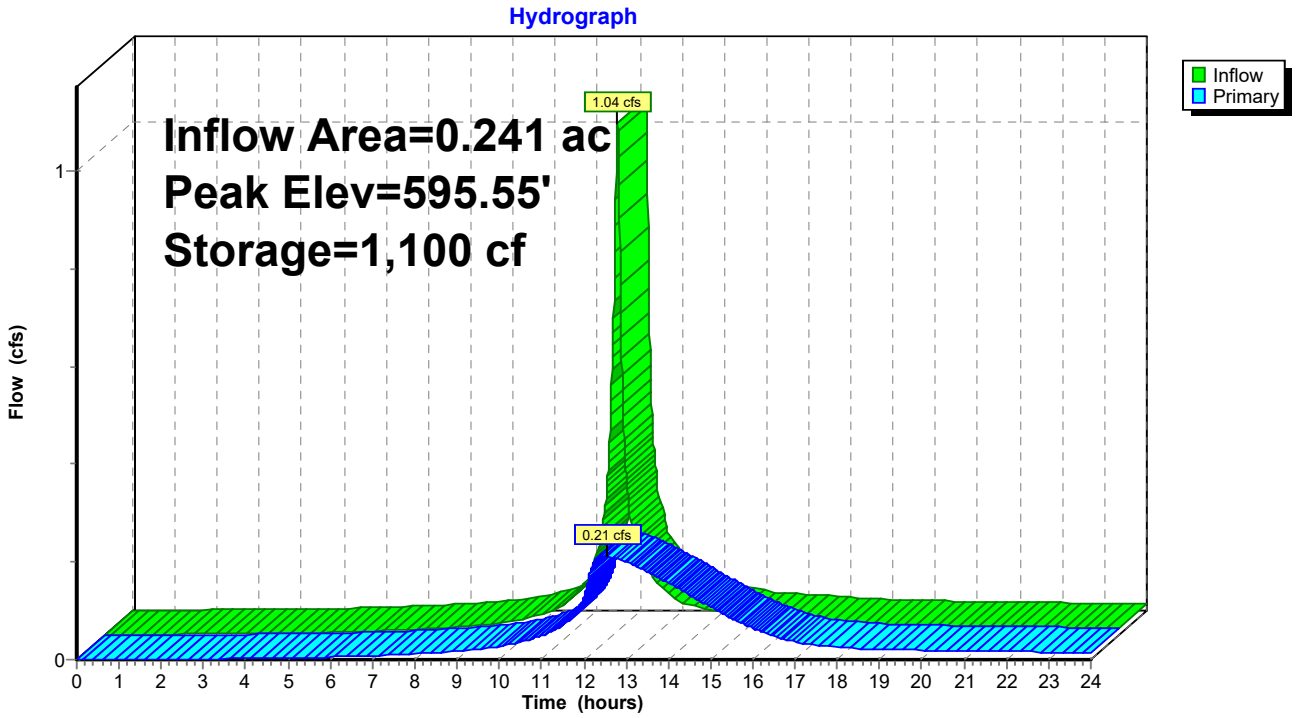
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 12.55 hrs HW=595.55' TW=580.96' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.21 cfs of 27.14 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.21 cfs @ 6.18 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	0	593.80	0.00
1.50	0.00	2	593.80	0.00
2.00	0.00	5	593.81	0.00
2.50	0.00	10	593.82	0.00
3.00	0.00	14	593.82	0.00
3.50	0.00	18	593.83	0.00
4.00	0.00	22	593.83	0.00
4.50	0.00	25	593.84	0.00
5.00	0.01	28	593.84	0.00
5.50	0.01	31	593.85	0.00
6.00	0.01	34	593.85	0.01
6.50	0.01	37	593.86	0.01
7.00	0.01	41	593.86	0.01
7.50	0.01	47	593.87	0.01
8.00	0.02	52	593.88	0.01
8.50	0.02	58	593.89	0.01
9.00	0.02	64	593.90	0.02
9.50	0.03	73	593.91	0.02
10.00	0.04	85	593.93	0.03
10.50	0.04	99	593.95	0.04
11.00	0.07	126	593.99	0.05
11.50	0.12	191	594.09	0.07
12.00	**0.54**	453	594.51	0.13
12.50	**0.22**	**1,099**	**595.55**	**0.21**
13.00	0.12	**1,006**	**595.39**	**0.20**
13.50	0.08	832	595.11	0.18
14.00	0.06	645	594.81	0.16
14.50	0.05	483	594.56	0.13
15.00	0.04	347	594.34	0.11
15.50	0.04	240	594.17	0.08
16.00	0.03	168	594.06	0.06
16.50	0.03	124	593.99	0.05
17.00	0.03	100	593.95	0.04
17.50	0.02	89	593.94	0.03
18.00	0.02	81	593.93	0.03
18.50	0.02	76	593.92	0.02
19.00	0.02	73	593.91	0.02
19.50	0.02	71	593.91	0.02
20.00	0.02	69	593.91	0.02
20.50	0.02	68	593.91	0.02
21.00	0.02	66	593.90	0.02
21.50	0.02	65	593.90	0.02
22.00	0.02	64	593.90	0.02
22.50	0.02	62	593.90	0.02
23.00	0.01	61	593.89	0.02
23.50	0.01	59	593.89	0.02
24.00	0.01	58	593.89	0.01

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 4.12" for 10-Year_Current event
Inflow = 1.44 cfs @ 12.12 hrs, Volume= 0.109 af
Outflow = 0.20 cfs @ 12.71 hrs, Volume= 0.106 af, Atten= 86%, Lag= 35.1 min
Primary = 0.20 cfs @ 12.71 hrs, Volume= 0.106 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.26' @ 12.71 hrs Surf.Area= 5,788 sf Storage= 1,813 cf

Plug-Flow detention time= 115.9 min calculated for 0.106 af (97% of inflow)
Center-of-Mass det. time= 99.3 min (882.6 - 783.3)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

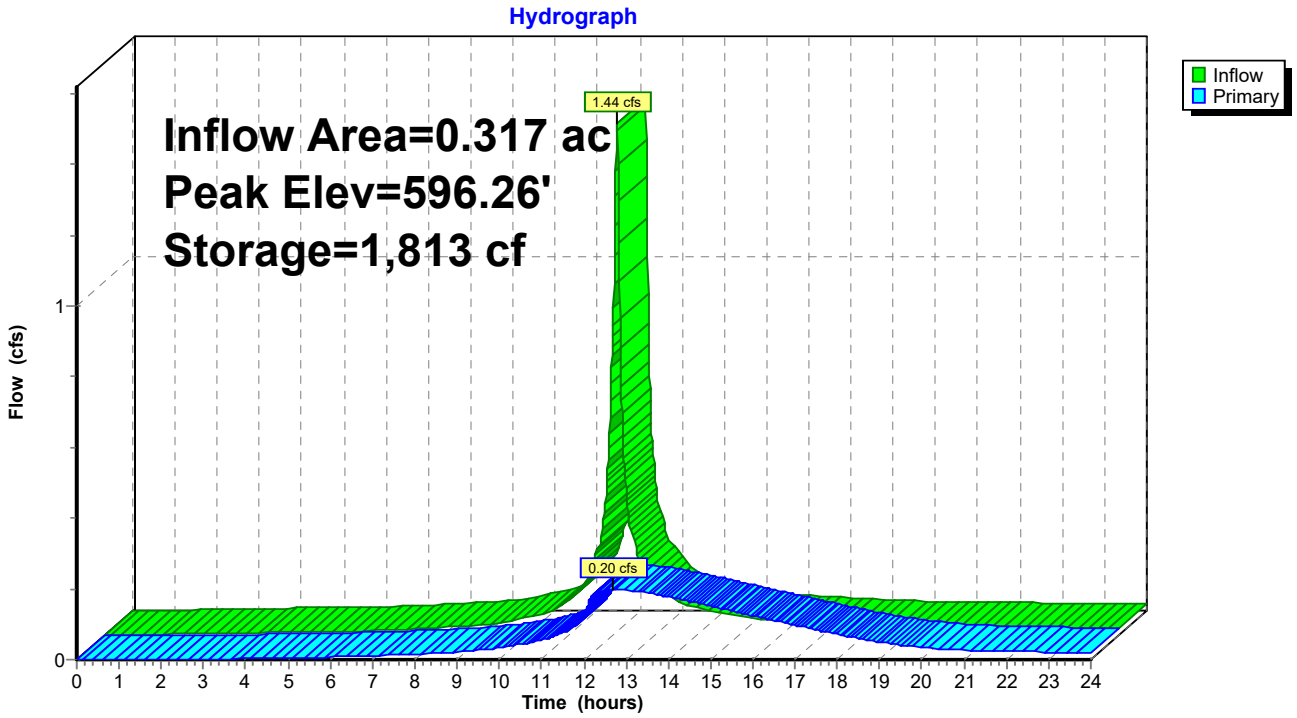
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 12.71 hrs HW=596.26' TW=585.38' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.20 cfs of 17.83 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.20 cfs @ 5.80 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

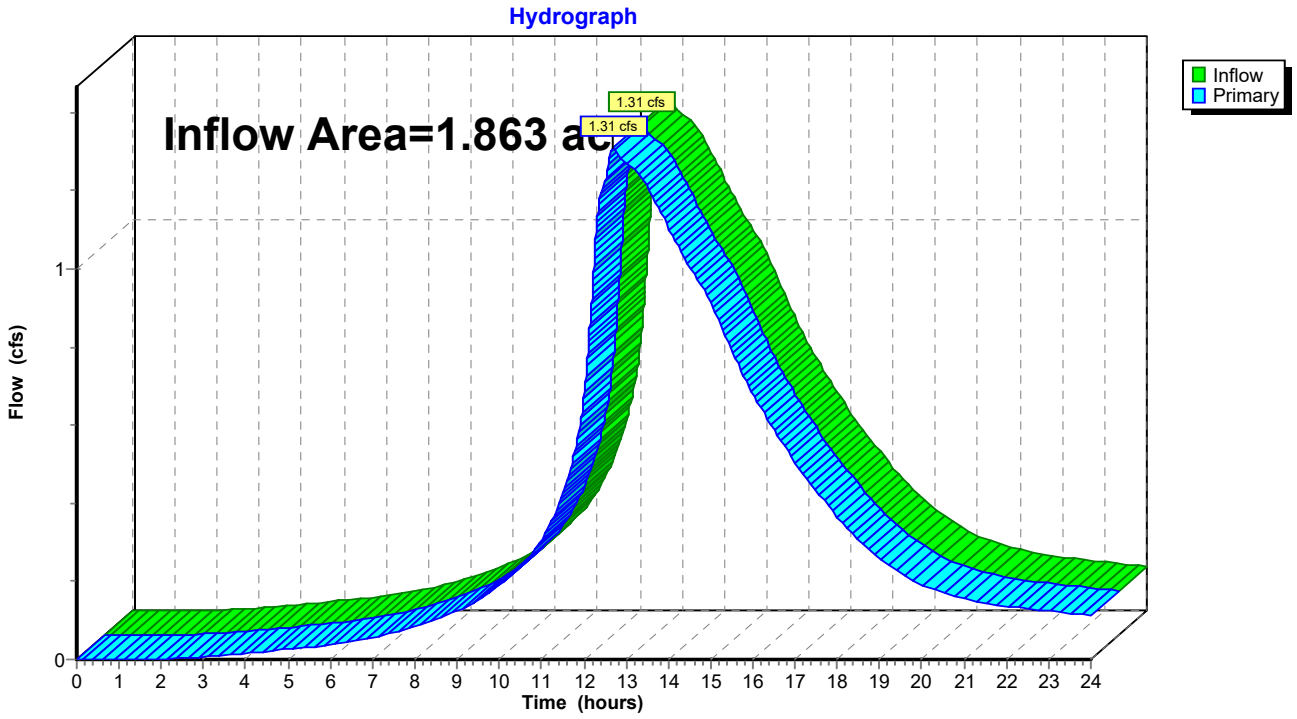
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.00	0	594.70	0.00
1.50	0.00	4	594.70	0.00
2.00	0.00	10	594.71	0.00
2.50	0.01	18	594.72	0.00
3.00	0.01	28	594.72	0.00
3.50	0.01	37	594.73	0.00
4.00	0.01	46	594.74	0.00
4.50	0.01	54	594.75	0.00
5.00	0.01	62	594.75	0.01
5.50	0.01	69	594.76	0.01
6.00	0.01	76	594.76	0.01
6.50	0.01	83	594.77	0.01
7.00	0.02	92	594.78	0.01
7.50	0.02	102	594.79	0.01
8.00	0.02	113	594.80	0.02
8.50	0.03	125	594.81	0.02
9.00	0.03	138	594.82	0.02
9.50	0.04	155	594.83	0.03
10.00	0.05	179	594.85	0.03
10.50	0.06	209	594.87	0.04
11.00	0.10	263	594.92	0.06
11.50	0.17	384	595.02	0.08
12.00	**0.79**	819	595.40	0.13
12.50	**0.29**	**1,784**	**596.23**	**0.20**
13.00	0.15	**1,790**	**596.24**	**0.20**
13.50	0.10	1,663	596.12	0.19
14.00	0.08	1,485	595.97	0.18
14.50	0.06	1,305	595.82	0.17
15.00	0.05	1,126	595.66	0.15
15.50	0.05	953	595.51	0.14
16.00	0.04	798	595.38	0.12
16.50	0.04	661	595.26	0.11
17.00	0.04	542	595.16	0.10
17.50	0.03	441	595.07	0.08
18.00	0.03	356	595.00	0.07
18.50	0.03	288	594.94	0.06
19.00	0.03	237	594.90	0.05
19.50	0.03	202	594.87	0.04
20.00	0.02	179	594.85	0.03
20.50	0.02	165	594.84	0.03
21.00	0.02	155	594.83	0.03
21.50	0.02	148	594.82	0.03
22.00	0.02	143	594.82	0.02
22.50	0.02	139	594.82	0.02
23.00	0.02	135	594.81	0.02
23.50	0.02	131	594.81	0.02
24.00	0.02	128	594.81	0.02

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 3.94" for 10-Year_Current event
Inflow = 1.31 cfs @ 12.70 hrs, Volume= 0.612 af
Primary = 1.31 cfs @ 12.70 hrs, Volume= 0.612 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.02		0.02
4.50	0.02		0.02
5.00	0.03		0.03
5.50	0.03		0.03
6.00	0.04		0.04
6.50	0.05		0.05
7.00	0.06		0.06
7.50	0.07		0.07
8.00	0.09		0.09
8.50	0.10		0.10
9.00	0.13		0.13
9.50	0.15		0.15
10.00	0.19		0.19
10.50	0.24		0.24
11.00	0.31		0.31
11.50	0.42		0.42
12.00	0.67		0.67
12.50	**1.23**		**1.23**
13.00	**1.27**		**1.27**
13.50	1.21		1.21
14.00	1.11		1.11
14.50	1.01		1.01
15.00	0.92		0.92
15.50	0.79		0.79
16.00	0.68		0.68
16.50	0.59		0.59
17.00	0.51		0.51
17.50	0.43		0.43
18.00	0.37		0.37
18.50	0.31		0.31
19.00	0.26		0.26
19.50	0.22		0.22
20.00	0.19		0.19
20.50	0.17		0.17
21.00	0.16		0.16
21.50	0.15		0.15
22.00	0.14		0.14
22.50	0.13		0.13
23.00	0.12		0.12
23.50	0.12		0.12
24.00	0.11		0.11

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 3.94" for 10-Year_Current event
Inflow = 1.31 cfs @ 12.70 hrs, Volume= 0.612 af
Outflow = 1.31 cfs @ 12.70 hrs, Volume= 0.612 af, Atten= 0%, Lag= 0.1 min
Primary = 1.31 cfs @ 12.70 hrs, Volume= 0.612 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 580.97' @ 12.70 hrs Surf.Area= 0.000 ac Storage= 0.000 af

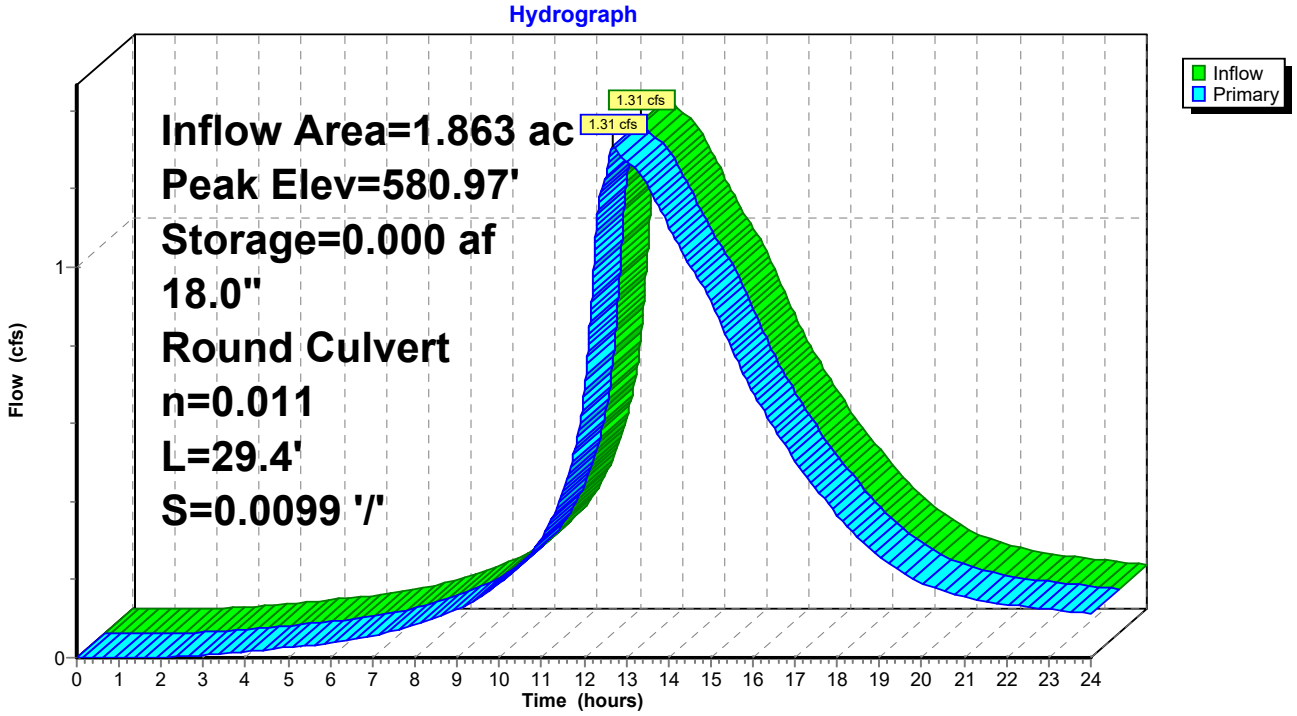
Plug-Flow detention time= 0.0 min calculated for 0.612 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (879.0 - 879.0)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=1.31 cfs @ 12.70 hrs HW=580.97' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 1.31 cfs @ 3.49 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.00	0.000	580.69	0.00
2.00	0.00	0.000	580.69	0.00
2.50	0.00	0.000	580.69	0.00
3.00	0.01	0.000	580.69	0.01
3.50	0.01	0.000	580.69	0.01
4.00	0.02	0.000	580.69	0.02
4.50	0.02	0.000	580.69	0.02
5.00	0.03	0.000	580.69	0.03
5.50	0.03	0.000	580.69	0.03
6.00	0.04	0.000	580.69	0.04
6.50	0.05	0.000	580.69	0.05
7.00	0.06	0.000	580.69	0.06
7.50	0.07	0.000	580.69	0.07
8.00	0.09	0.000	580.69	0.09
8.50	0.10	0.000	580.69	0.10
9.00	0.13	0.000	580.69	0.13
9.50	0.15	0.000	580.69	0.15
10.00	0.19	0.000	580.69	0.19
10.50	0.24	0.000	580.69	0.24
11.00	0.31	0.000	580.69	0.31
11.50	0.42	0.000	580.72	0.42
12.00	0.67	0.000	580.80	0.67
12.50	**1.23**	**0.000**	**580.95**	**1.23**
13.00	**1.27**	**0.000**	**580.96**	**1.27**
13.50	1.21	0.000	580.95	1.21
14.00	1.11	0.000	580.92	1.11
14.50	1.01	0.000	580.90	1.01
15.00	0.92	0.000	580.87	0.92
15.50	0.79	0.000	580.84	0.79
16.00	0.68	0.000	580.81	0.68
16.50	0.59	0.000	580.78	0.59
17.00	0.51	0.000	580.75	0.51
17.50	0.43	0.000	580.73	0.43
18.00	0.37	0.000	580.70	0.37
18.50	0.31	0.000	580.69	0.31
19.00	0.26	0.000	580.69	0.26
19.50	0.22	0.000	580.69	0.22
20.00	0.19	0.000	580.69	0.19
20.50	0.17	0.000	580.69	0.17
21.00	0.16	0.000	580.69	0.16
21.50	0.15	0.000	580.69	0.15
22.00	0.14	0.000	580.69	0.14
22.50	0.13	0.000	580.69	0.13
23.00	0.12	0.000	580.69	0.12
23.50	0.12	0.000	580.69	0.12
24.00	0.11	0.000	580.69	0.11

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 3.94" for 10-Year_Current event
Inflow = 1.10 cfs @ 12.70 hrs, Volume= 0.532 af
Outflow = 1.10 cfs @ 12.71 hrs, Volume= 0.532 af, Atten= 0%, Lag= 0.1 min
Primary = 1.10 cfs @ 12.71 hrs, Volume= 0.532 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.38' @ 12.71 hrs Surf.Area= 0.001 ac Storage= 0.000 af

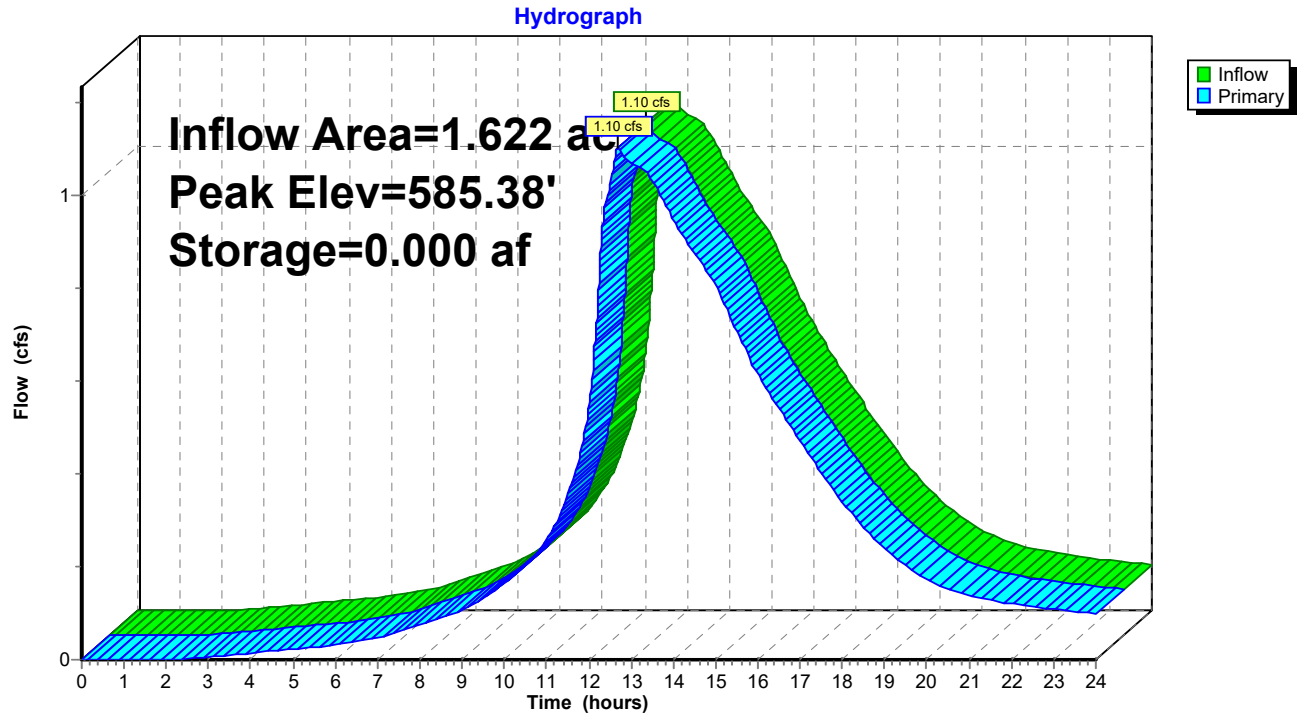
Plug-Flow detention time= 0.1 min calculated for 0.532 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (883.9 - 883.9)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.10 cfs @ 12.71 hrs HW=585.38' TW=580.97' (Dynamic Tailwater)
↑—**1=SD-24** (Orifice Controls 1.10 cfs @ 2.41 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.88	0.00
1.50	0.00	0.000	584.88	0.00
2.00	0.00	0.000	584.89	0.00
2.50	0.00	0.000	584.90	0.00
3.00	0.01	0.000	584.91	0.01
3.50	0.01	0.000	584.92	0.01
4.00	0.01	0.000	584.93	0.01
4.50	0.02	0.000	584.94	0.02
5.00	0.02	0.000	584.95	0.02
5.50	0.03	0.000	584.95	0.03
6.00	0.03	0.000	584.96	0.03
6.50	0.04	0.000	584.97	0.04
7.00	0.05	0.000	584.98	0.05
7.50	0.06	0.000	584.99	0.06
8.00	0.07	0.000	585.00	0.07
8.50	0.09	0.000	585.02	0.09
9.00	0.11	0.000	585.03	0.11
9.50	0.13	0.000	585.04	0.13
10.00	0.16	0.000	585.06	0.16
10.50	0.21	0.000	585.09	0.21
11.00	0.26	0.000	585.11	0.26
11.50	0.35	0.000	585.15	0.35
12.00	0.55	0.000	585.22	0.54
12.50	**1.02**	**0.000**	**585.36**	**1.02**
13.00	**1.07**	**0.000**	**585.37**	**1.07**
13.50	1.03	0.000	585.36	1.03
14.00	0.95	0.000	585.34	0.95
14.50	0.87	0.000	585.32	0.87
15.00	0.81	0.000	585.30	0.81
15.50	0.71	0.000	585.27	0.71
16.00	0.62	0.000	585.25	0.62
16.50	0.54	0.000	585.22	0.54
17.00	0.47	0.000	585.20	0.47
17.50	0.40	0.000	585.17	0.40
18.00	0.34	0.000	585.15	0.34
18.50	0.28	0.000	585.12	0.28
19.00	0.24	0.000	585.10	0.24
19.50	0.20	0.000	585.08	0.20
20.00	0.17	0.000	585.07	0.17
20.50	0.15	0.000	585.06	0.15
21.00	0.14	0.000	585.05	0.14
21.50	0.13	0.000	585.04	0.13
22.00	0.12	0.000	585.04	0.12
22.50	0.11	0.000	585.03	0.11
23.00	0.11	0.000	585.03	0.11
23.50	0.10	0.000	585.03	0.10
24.00	0.10	0.000	585.02	0.10

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 3.92" for 10-Year_Current event
Inflow = 0.90 cfs @ 12.70 hrs, Volume= 0.426 af
Outflow = 0.90 cfs @ 12.70 hrs, Volume= 0.426 af, Atten= 0%, Lag= 0.1 min
Primary = 0.90 cfs @ 12.70 hrs, Volume= 0.426 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.25' @ 12.70 hrs Surf.Area= 0.001 ac Storage= 0.000 af

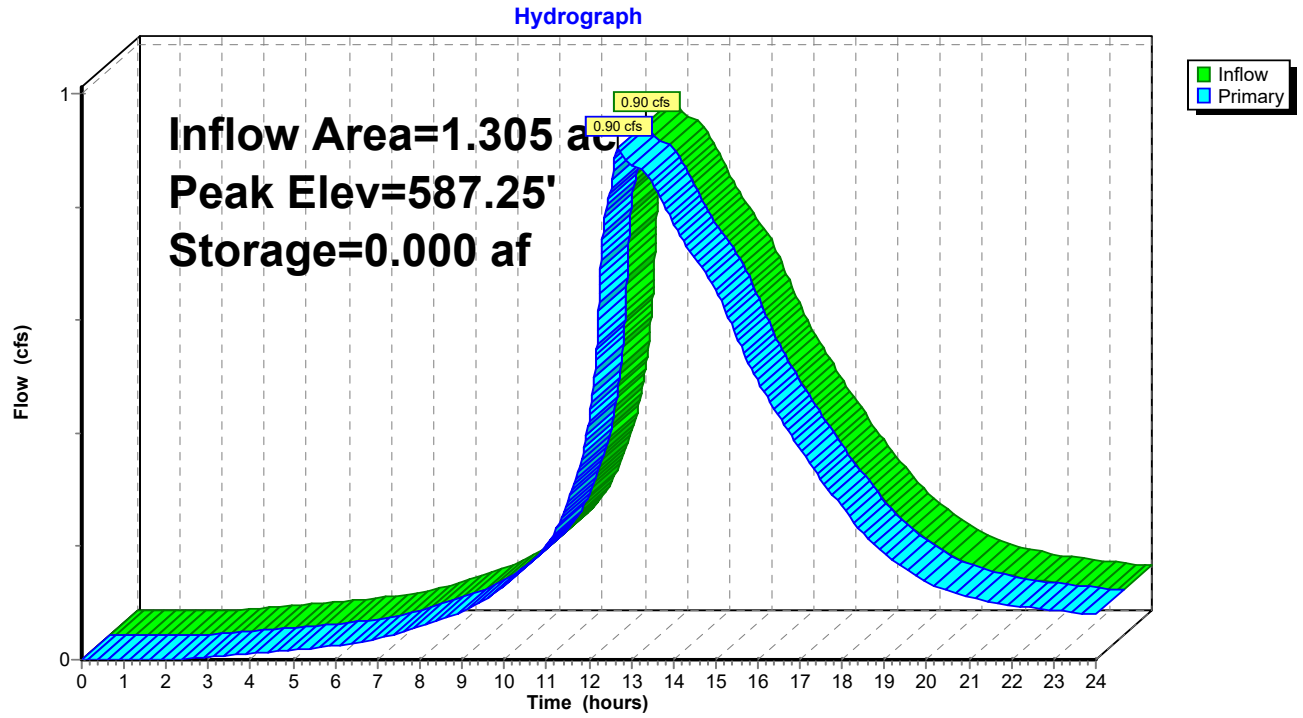
Plug-Flow detention time= 0.1 min calculated for 0.426 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (884.2 - 884.1)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.90 cfs @ 12.70 hrs HW=587.25' TW=585.38' (Dynamic Tailwater)
↑—**1=SD-23** (Orifice Controls 0.90 cfs @ 2.28 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.80	0.00
1.50	0.00	0.000	586.80	0.00
2.00	0.00	0.000	586.81	0.00
2.50	0.00	0.000	586.82	0.00
3.00	0.00	0.000	586.83	0.00
3.50	0.01	0.000	586.84	0.01
4.00	0.01	0.000	586.85	0.01
4.50	0.01	0.000	586.85	0.01
5.00	0.02	0.000	586.86	0.02
5.50	0.02	0.000	586.86	0.02
6.00	0.02	0.000	586.87	0.02
6.50	0.03	0.000	586.88	0.03
7.00	0.04	0.000	586.89	0.04
7.50	0.05	0.000	586.90	0.05
8.00	0.06	0.000	586.91	0.06
8.50	0.07	0.000	586.92	0.07
9.00	0.09	0.000	586.93	0.09
9.50	0.10	0.000	586.95	0.10
10.00	0.13	0.000	586.96	0.13
10.50	0.16	0.000	586.98	0.16
11.00	0.20	0.000	587.00	0.20
11.50	0.28	0.000	587.04	0.28
12.00	0.42	0.000	587.10	0.42
12.50	**0.82**	**0.000**	**587.23**	**0.82**
13.00	**0.87**	**0.000**	**587.24**	**0.87**
13.50	0.84	0.000	587.23	0.84
14.00	0.77	0.000	587.21	0.77
14.50	0.71	0.000	587.19	0.71
15.00	0.66	0.000	587.18	0.66
15.50	0.57	0.000	587.15	0.57
16.00	0.49	0.000	587.13	0.49
16.50	0.43	0.000	587.10	0.43
17.00	0.37	0.000	587.08	0.37
17.50	0.32	0.000	587.06	0.32
18.00	0.27	0.000	587.04	0.27
18.50	0.22	0.000	587.02	0.22
19.00	0.19	0.000	587.00	0.19
19.50	0.16	0.000	586.98	0.16
20.00	0.14	0.000	586.97	0.14
20.50	0.12	0.000	586.96	0.12
21.00	0.11	0.000	586.95	0.11
21.50	0.10	0.000	586.94	0.10
22.00	0.10	0.000	586.94	0.10
22.50	0.09	0.000	586.94	0.09
23.00	0.09	0.000	586.93	0.09
23.50	0.08	0.000	586.93	0.08
24.00	0.08	0.000	586.93	0.08

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 3.91" for 10-Year_Current event
Inflow = 0.65 cfs @ 12.68 hrs, Volume= 0.299 af
Outflow = 0.65 cfs @ 12.68 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.1 min
Primary = 0.65 cfs @ 12.68 hrs, Volume= 0.299 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 588.86' @ 12.68 hrs Surf.Area= 0.000 ac Storage= 0.000 af

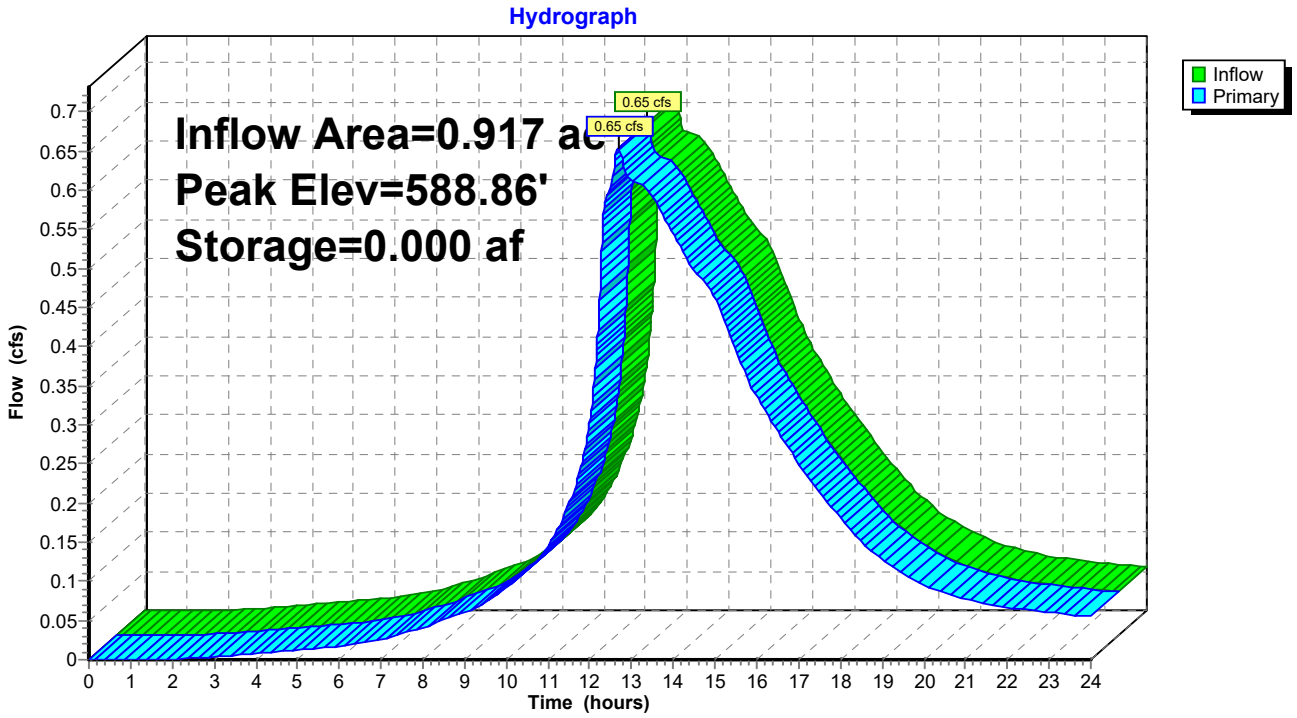
Plug-Flow detention time= 0.1 min calculated for 0.299 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (881.4 - 881.3)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.65 cfs @ 12.68 hrs HW=588.86' TW=587.25' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 0.65 cfs @ 2.17 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.45	0.00
1.50	0.00	0.000	588.45	0.00
2.00	0.00	0.000	588.46	0.00
2.50	0.00	0.000	588.47	0.00
3.00	0.00	0.000	588.48	0.00
3.50	0.01	0.000	588.49	0.01
4.00	0.01	0.000	588.49	0.01
4.50	0.01	0.000	588.50	0.01
5.00	0.01	0.000	588.50	0.01
5.50	0.01	0.000	588.51	0.01
6.00	0.02	0.000	588.51	0.02
6.50	0.02	0.000	588.52	0.02
7.00	0.03	0.000	588.53	0.03
7.50	0.03	0.000	588.54	0.03
8.00	0.04	0.000	588.55	0.04
8.50	0.05	0.000	588.56	0.05
9.00	0.06	0.000	588.57	0.06
9.50	0.07	0.000	588.58	0.07
10.00	0.09	0.000	588.60	0.09
10.50	0.12	0.000	588.61	0.11
11.00	0.14	0.000	588.63	0.14
11.50	0.20	0.000	588.67	0.20
12.00	0.30	0.000	588.72	0.30
12.50	**0.60**	**0.000**	**588.84**	**0.60**
13.00	**0.61**	**0.000**	**588.84**	**0.61**
13.50	0.59	0.000	588.84	0.59
14.00	0.54	0.000	588.82	0.54
14.50	0.50	0.000	588.80	0.50
15.00	0.46	0.000	588.79	0.46
15.50	0.40	0.000	588.76	0.40
16.00	0.34	0.000	588.74	0.34
16.50	0.29	0.000	588.71	0.29
17.00	0.25	0.000	588.69	0.25
17.50	0.21	0.000	588.68	0.21
18.00	0.18	0.000	588.66	0.18
18.50	0.15	0.000	588.64	0.15
19.00	0.13	0.000	588.62	0.13
19.50	0.11	0.000	588.61	0.11
20.00	0.10	0.000	588.60	0.10
20.50	0.09	0.000	588.59	0.09
21.00	0.08	0.000	588.58	0.08
21.50	0.07	0.000	588.58	0.07
22.00	0.07	0.000	588.57	0.07
22.50	0.06	0.000	588.57	0.06
23.00	0.06	0.000	588.57	0.06
23.50	0.06	0.000	588.56	0.06
24.00	0.06	0.000	588.56	0.06

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 3.84" for 10-Year_Current event
Inflow = 0.33 cfs @ 13.03 hrs, Volume= 0.182 af
Outflow = 0.33 cfs @ 13.03 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.1 min
Primary = 0.33 cfs @ 13.03 hrs, Volume= 0.182 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.89' @ 13.03 hrs Surf.Area= 0.000 ac Storage= 0.000 af

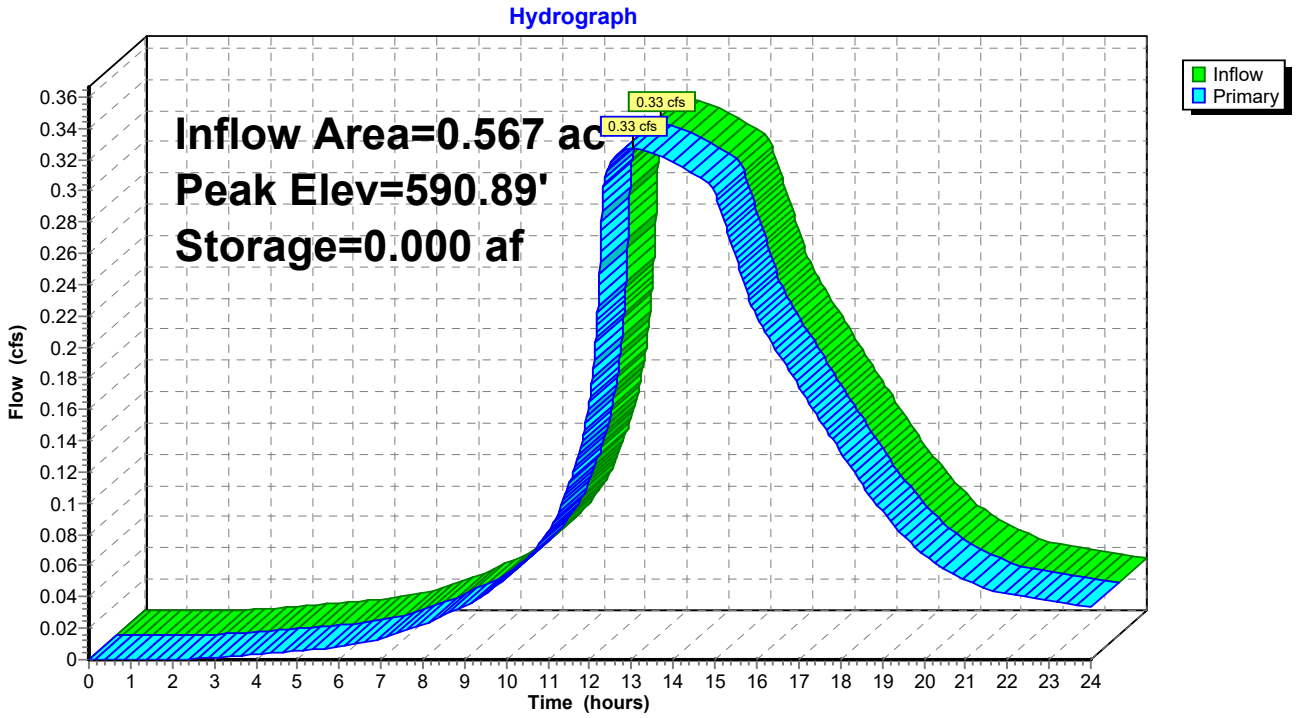
Plug-Flow detention time= 0.1 min calculated for 0.182 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (898.3 - 898.3)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 13.03 hrs HW=590.89' TW=588.84' (Dynamic Tailwater)
↑**1=SD-21** (Orifice Controls 0.33 cfs @ 1.81 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.61	0.00
2.00	0.00	0.000	590.62	0.00
2.50	0.00	0.000	590.62	0.00
3.00	0.00	0.000	590.63	0.00
3.50	0.00	0.000	590.63	0.00
4.00	0.00	0.000	590.64	0.00
4.50	0.00	0.000	590.64	0.00
5.00	0.01	0.000	590.64	0.01
5.50	0.01	0.000	590.65	0.01
6.00	0.01	0.000	590.65	0.01
6.50	0.01	0.000	590.66	0.01
7.00	0.01	0.000	590.66	0.01
7.50	0.02	0.000	590.67	0.02
8.00	0.02	0.000	590.68	0.02
8.50	0.03	0.000	590.69	0.03
9.00	0.03	0.000	590.70	0.03
9.50	0.04	0.000	590.71	0.04
10.00	0.05	0.000	590.72	0.05
10.50	0.06	0.000	590.73	0.06
11.00	0.08	0.000	590.75	0.08
11.50	0.11	0.000	590.77	0.11
12.00	0.17	0.000	590.81	0.17
12.50	0.32	0.000	590.89	0.32
13.00	**0.33**	**0.000**	**590.89**	**0.33**
13.50	**0.32**	**0.000**	**590.89**	**0.32**
14.00	0.32	0.000	590.89	0.32
14.50	0.31	0.000	590.88	0.31
15.00	0.30	0.000	590.88	0.30
15.50	0.26	0.000	590.86	0.26
16.00	0.22	0.000	590.84	0.22
16.50	0.20	0.000	590.83	0.20
17.00	0.17	0.000	590.81	0.17
17.50	0.15	0.000	590.80	0.15
18.00	0.13	0.000	590.79	0.13
18.50	0.11	0.000	590.77	0.11
19.00	0.09	0.000	590.76	0.09
19.50	0.08	0.000	590.74	0.08
20.00	0.07	0.000	590.73	0.07
20.50	0.06	0.000	590.72	0.06
21.00	0.05	0.000	590.72	0.05
21.50	0.05	0.000	590.71	0.05
22.00	0.04	0.000	590.71	0.04
22.50	0.04	0.000	590.70	0.04
23.00	0.04	0.000	590.70	0.04
23.50	0.04	0.000	590.70	0.04
24.00	0.03	0.000	590.70	0.03

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>4.83"
Flow Length=164' Tc=17.1 min CN=WQ Runoff=2.13 cfs 0.228 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>5.03"
Flow Length=175' Tc=14.4 min CN=WQ Runoff=1.44 cfs 0.147 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>4.96"
Flow Length=175' Tc=21.5 min CN=WQ Runoff=1.34 cfs 0.160 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>4.96"
Flow Length=120' Tc=6.0 min CN=WQ Runoff=1.30 cfs 0.100 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>5.06"
Flow Length=96' Slope=0.0336 '/' Tc=4.9 min CN=WQ Runoff=1.79 cfs 0.134 af

Pond 1P: BR-01 Peak Elev=600.58' Storage=3,860 cf Inflow=2.13 cfs 0.228 af
Outflow=0.42 cfs 0.225 af

Pond 2P: BR-02 Peak Elev=601.23' Storage=1,812 cf Inflow=1.44 cfs 0.147 af
Outflow=0.74 cfs 0.145 af

Pond 3P: BR-03 Peak Elev=597.57' Storage=2,589 cf Inflow=1.34 cfs 0.160 af
Outflow=0.31 cfs 0.158 af

Pond 5P: BR-05 Peak Elev=596.23' Storage=1,394 cf Inflow=1.30 cfs 0.100 af
Outflow=0.25 cfs 0.098 af

Pond 6P: BR-04 Peak Elev=596.69' Storage=2,285 cf Inflow=1.79 cfs 0.134 af
Outflow=0.23 cfs 0.131 af

Pond 8P: O-1B Inflow=1.81 cfs 0.756 af
Primary=1.81 cfs 0.756 af

Pond 13P: SD-25, SD-26 Peak Elev=581.08' Storage=0.000 af Inflow=1.81 cfs 0.756 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=1.81 cfs 0.756 af

Pond 14P: SD-24 Peak Elev=585.49' Storage=0.000 af Inflow=1.56 cfs 0.658 af
Outflow=1.56 cfs 0.658 af

Pond 17P: SD-23 Peak Elev=587.36' Storage=0.000 af Inflow=1.34 cfs 0.528 af
Outflow=1.34 cfs 0.528 af

Pond 18P: SD-22 Peak Elev=588.99' Storage=0.000 af Inflow=1.08 cfs 0.370 af
Outflow=1.08 cfs 0.370 af

Pond 19P: SD-21 Peak Elev=590.93' Storage=0.000 af Inflow=0.42 cfs 0.225 af
Outflow=0.42 cfs 0.225 af

Total Runoff Area = 1.863 ac Runoff Volume = 0.769 af Average Runoff Depth = 4.95"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

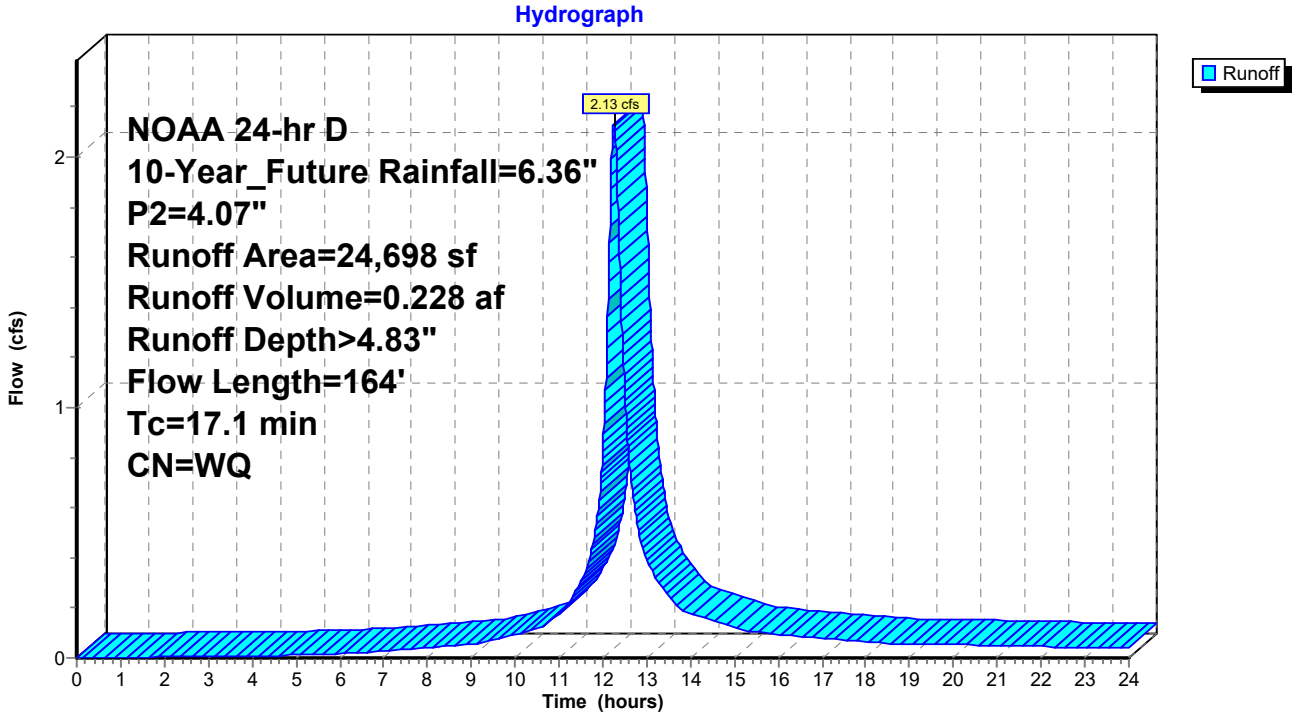
Runoff = 2.13 cfs @ 12.25 hrs, Volume= 0.228 af, Depth> 4.83"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0018	0.10		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.1	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.33	0.00	0.01
4.50	0.38	0.00	0.01
5.00	0.43	0.01	0.01
5.50	0.49	0.02	0.01
6.00	0.54	0.03	0.02
6.50	0.60	0.05	0.02
7.00	0.67	0.07	0.03
7.50	0.74	0.10	0.03
8.00	0.83	0.14	0.04
8.50	0.91	0.18	0.05
9.00	1.01	0.23	0.06
9.50	1.12	0.29	0.07
10.00	1.26	0.38	0.09
10.50	1.42	0.48	0.12
11.00	1.65	0.64	0.18
11.50	2.02	0.92	0.30
12.00	3.05	1.78	**0.83**
12.50	4.34	2.95	**1.06**
13.00	4.71	3.29	0.40
13.50	4.94	3.51	0.25
14.00	5.10	3.66	0.18
14.50	5.24	3.79	0.15
15.00	5.35	3.90	0.12
15.50	5.45	3.99	0.10
16.00	5.53	4.07	0.10
16.50	5.62	4.15	0.09
17.00	5.69	4.22	0.08
17.50	5.76	4.29	0.07
18.00	5.82	4.34	0.07
18.50	5.87	4.39	0.06
19.00	5.93	4.45	0.06
19.50	5.98	4.49	0.06
20.00	6.03	4.54	0.05
20.50	6.07	4.59	0.05
21.00	6.12	4.63	0.05
21.50	6.16	4.68	0.05
22.00	6.21	4.72	0.05
22.50	6.25	4.75	0.04
23.00	6.29	4.79	0.04
23.50	6.32	4.83	0.04
24.00	**6.36**	**4.86**	0.04

Summary for Subcatchment 7S: PO-DA E

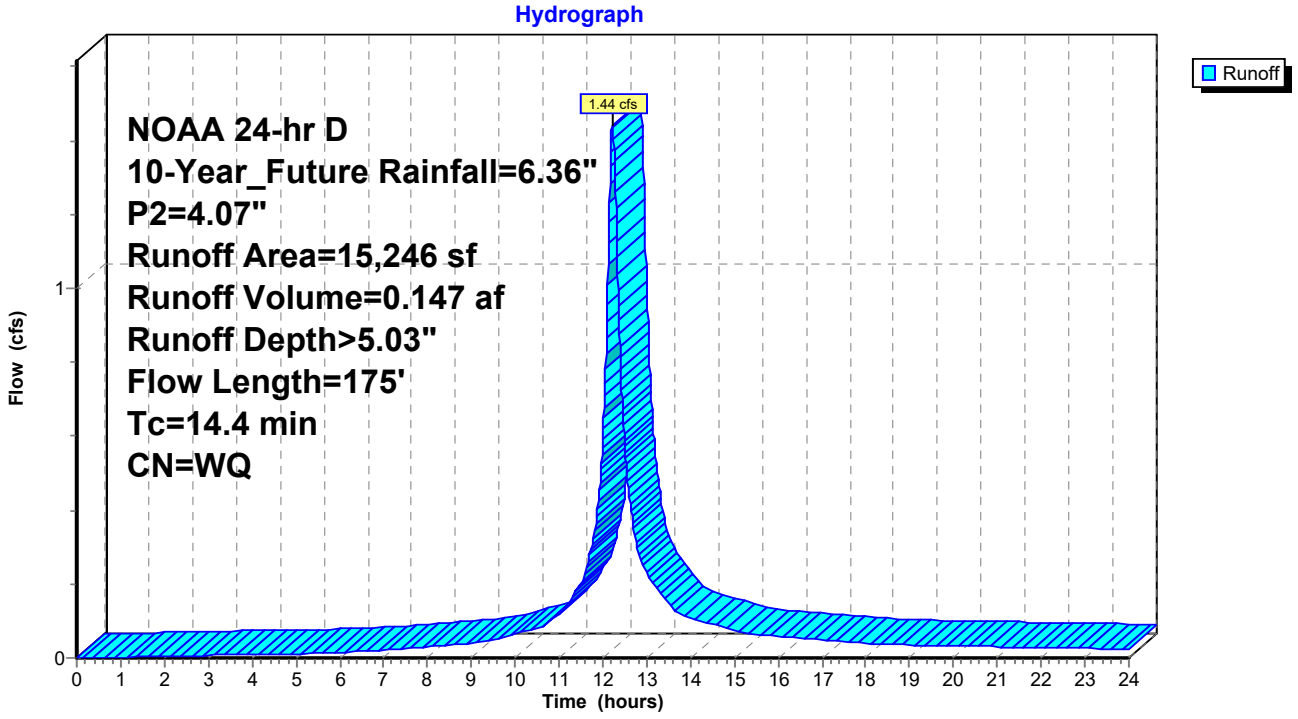
Runoff = 1.44 cfs @ 12.22 hrs, Volume= 0.147 af, Depth> 5.03"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0030	0.12		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
14.4	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.33	0.00	0.01
4.50	0.38	0.01	0.01
5.00	0.43	0.02	0.01
5.50	0.49	0.03	0.01
6.00	0.54	0.04	0.01
6.50	0.60	0.06	0.02
7.00	0.67	0.09	0.02
7.50	0.74	0.12	0.03
8.00	0.83	0.16	0.03
8.50	0.91	0.20	0.04
9.00	1.01	0.26	0.04
9.50	1.12	0.33	0.05
10.00	1.26	0.42	0.07
10.50	1.42	0.53	0.08
11.00	1.65	0.69	0.12
11.50	2.02	0.98	0.20
12.00	3.05	1.86	**0.59**
12.50	4.34	3.05	**0.57**
13.00	4.71	3.39	0.23
13.50	4.94	3.61	0.15
14.00	5.10	3.76	0.11
14.50	5.24	3.90	0.09
15.00	5.35	4.00	0.07
15.50	5.45	4.09	0.06
16.00	5.53	4.18	0.06
16.50	5.62	4.26	0.05
17.00	5.69	4.33	0.05
17.50	5.76	4.39	0.04
18.00	5.82	4.45	0.04
18.50	5.87	4.50	0.04
19.00	5.93	4.55	0.04
19.50	5.98	4.60	0.03
20.00	6.03	4.65	0.03
20.50	6.07	4.70	0.03
21.00	6.12	4.74	0.03
21.50	6.16	4.78	0.03
22.00	6.21	4.83	0.03
22.50	6.25	4.87	0.03
23.00	6.29	4.90	0.03
23.50	6.32	4.94	0.03
24.00	**6.36**	**4.97**	0.02

Summary for Subcatchment 9S: PO-DA G

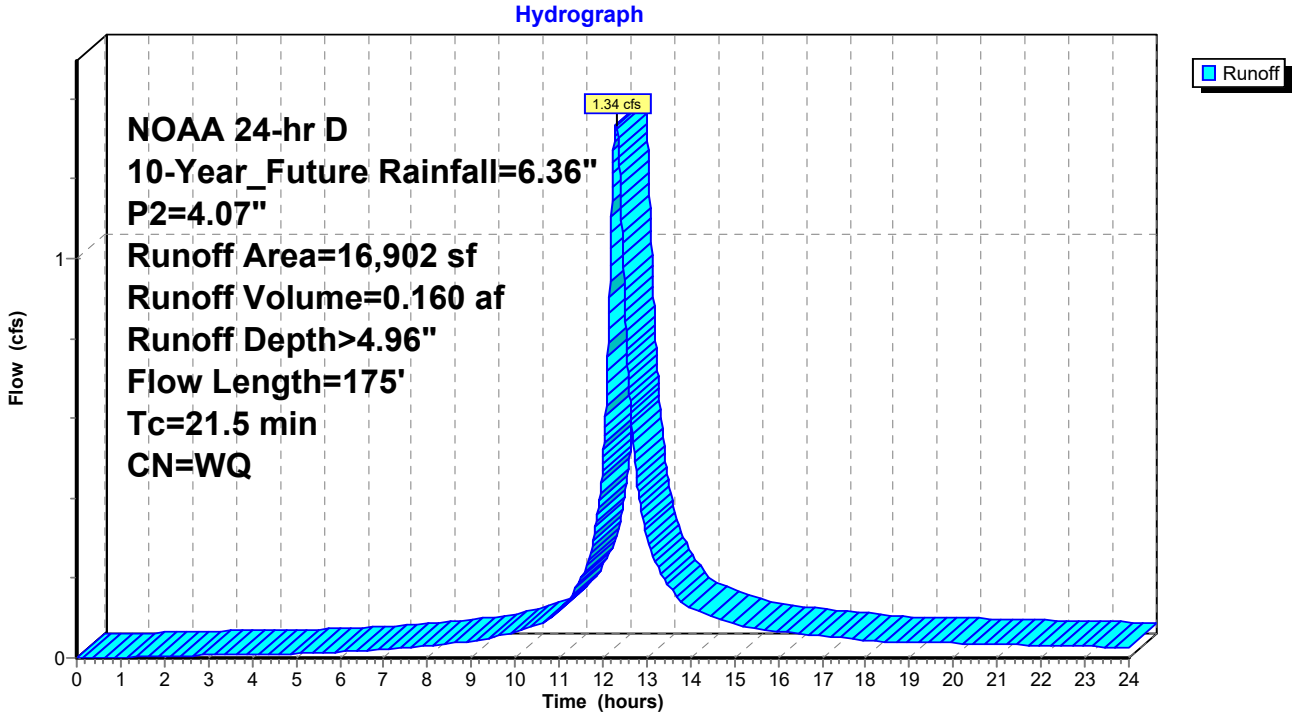
Runoff = 1.34 cfs @ 12.30 hrs, Volume= 0.160 af, Depth> 4.96"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.8	100	0.0010	0.08		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
21.5	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.33	0.00	0.01
4.50	0.38	0.01	0.01
5.00	0.43	0.02	0.01
5.50	0.49	0.03	0.01
6.00	0.54	0.04	0.01
6.50	0.60	0.06	0.02
7.00	0.67	0.09	0.02
7.50	0.74	0.12	0.03
8.00	0.83	0.16	0.03
8.50	0.91	0.20	0.04
9.00	1.01	0.26	0.04
9.50	1.12	0.33	0.05
10.00	1.26	0.42	0.07
10.50	1.42	0.53	0.08
11.00	1.65	0.69	0.12
11.50	2.02	0.98	0.20
12.00	3.05	1.86	**0.49**
12.50	4.34	3.05	**0.89**
13.00	4.71	3.39	0.31
13.50	4.94	3.61	0.18
14.00	5.10	3.76	0.13
14.50	5.24	3.90	0.10
15.00	5.35	4.00	0.09
15.50	5.45	4.09	0.07
16.00	5.53	4.18	0.07
16.50	5.62	4.26	0.06
17.00	5.69	4.33	0.06
17.50	5.76	4.39	0.05
18.00	5.82	4.45	0.05
18.50	5.87	4.50	0.04
19.00	5.93	4.55	0.04
19.50	5.98	4.60	0.04
20.00	6.03	4.65	0.04
20.50	6.07	4.70	0.04
21.00	6.12	4.74	0.03
21.50	6.16	4.78	0.03
22.00	6.21	4.83	0.03
22.50	6.25	4.87	0.03
23.00	6.29	4.90	0.03
23.50	6.32	4.94	0.03
24.00	**6.36**	**4.97**	0.03

Summary for Subcatchment 11S: PO-DA I

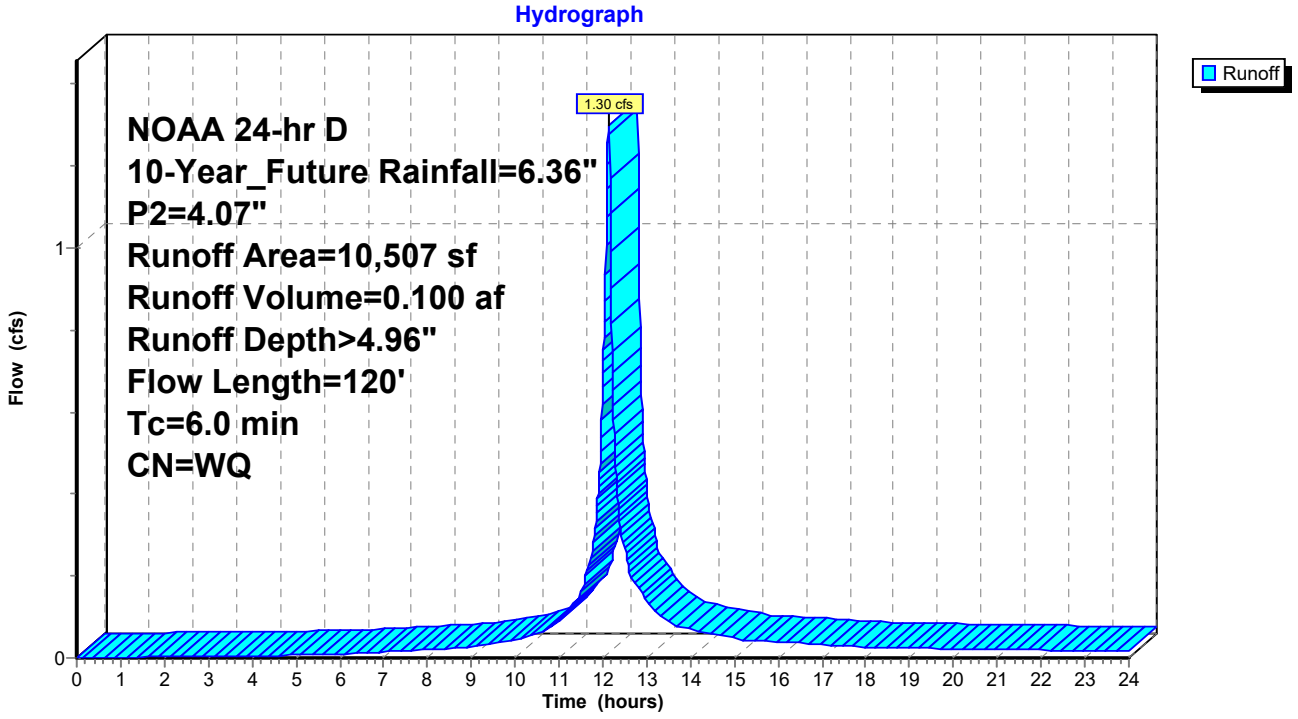
Runoff = 1.30 cfs @ 12.13 hrs, Volume= 0.100 af, Depth> 4.96"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0237	0.28		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.0	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.33	0.00	0.01
4.50	0.38	0.01	0.01
5.00	0.43	0.02	0.01
5.50	0.49	0.03	0.01
6.00	0.54	0.04	0.01
6.50	0.60	0.06	0.01
7.00	0.67	0.09	0.01
7.50	0.74	0.12	0.02
8.00	0.83	0.16	0.02
8.50	0.91	0.20	0.02
9.00	1.01	0.26	0.03
9.50	1.12	0.33	0.04
10.00	1.26	0.42	0.05
10.50	1.42	0.53	0.06
11.00	1.65	0.69	0.09
11.50	2.02	0.98	0.16
12.00	3.05	1.86	**0.70**
12.50	4.34	3.05	**0.26**
13.00	4.71	3.39	0.14
13.50	4.94	3.61	0.09
14.00	5.10	3.76	0.07
14.50	5.24	3.90	0.06
15.00	5.35	4.00	0.05
15.50	5.45	4.09	0.04
16.00	5.53	4.18	0.04
16.50	5.62	4.26	0.04
17.00	5.69	4.33	0.03
17.50	5.76	4.39	0.03
18.00	5.82	4.45	0.03
18.50	5.87	4.50	0.03
19.00	5.93	4.55	0.02
19.50	5.98	4.60	0.02
20.00	6.03	4.65	0.02
20.50	6.07	4.70	0.02
21.00	6.12	4.74	0.02
21.50	6.16	4.78	0.02
22.00	6.21	4.83	0.02
22.50	6.25	4.87	0.02
23.00	6.29	4.90	0.02
23.50	6.32	4.94	0.02
24.00	**6.36**	**4.97**	0.02

Summary for Subcatchment 12S: PO-DA J

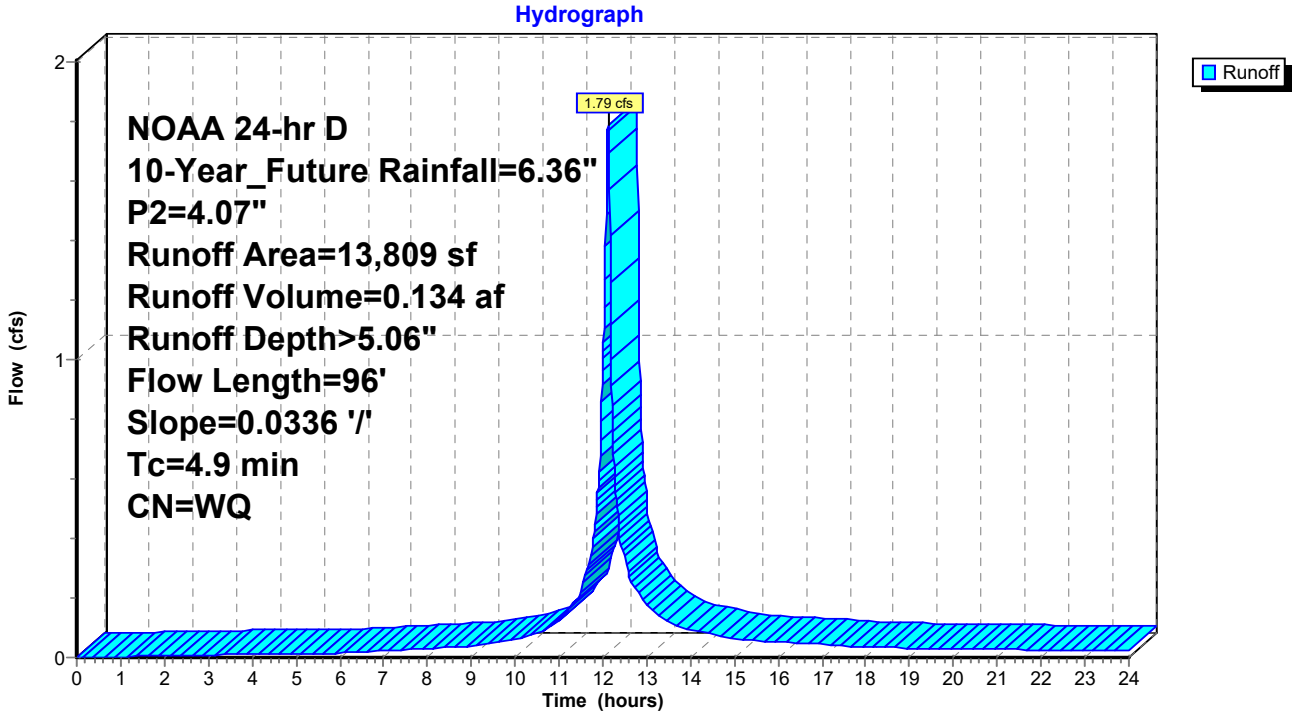
Runoff = 1.79 cfs @ 12.12 hrs, Volume= 0.134 af, Depth> 5.06"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	96	0.0336	0.32		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.01
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.33	0.01	0.01
4.50	0.38	0.01	0.01
5.00	0.43	0.02	0.01
5.50	0.49	0.04	0.01
6.00	0.54	0.06	0.01
6.50	0.60	0.08	0.02
7.00	0.67	0.11	0.02
7.50	0.74	0.14	0.03
8.00	0.83	0.18	0.03
8.50	0.91	0.23	0.03
9.00	1.01	0.29	0.04
9.50	1.12	0.36	0.05
10.00	1.26	0.46	0.06
10.50	1.42	0.57	0.08
11.00	1.65	0.75	0.13
11.50	2.02	1.04	0.21
12.00	3.05	1.94	**1.00**
12.50	4.34	3.15	**0.34**
13.00	4.71	3.49	0.18
13.50	4.94	3.71	0.12
14.00	5.10	3.87	0.09
14.50	5.24	4.00	0.08
15.00	5.35	4.11	0.06
15.50	5.45	4.20	0.06
16.00	5.53	4.29	0.05
16.50	5.62	4.36	0.05
17.00	5.69	4.44	0.04
17.50	5.76	4.50	0.04
18.00	5.82	4.56	0.03
18.50	5.87	4.61	0.03
19.00	5.93	4.66	0.03
19.50	5.98	4.71	0.03
20.00	6.03	4.76	0.03
20.50	6.07	4.81	0.03
21.00	6.12	4.85	0.03
21.50	6.16	4.90	0.03
22.00	6.21	4.94	0.03
22.50	6.25	4.98	0.02
23.00	6.29	5.01	0.02
23.50	6.32	5.05	0.02
24.00	**6.36**	**5.08**	0.02

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 4.83" for 10-Year_Future event
Inflow = 2.13 cfs @ 12.25 hrs, Volume= 0.228 af
Outflow = 0.42 cfs @ 12.96 hrs, Volume= 0.225 af, Atten= 80%, Lag= 42.3 min
Primary = 0.42 cfs @ 12.96 hrs, Volume= 0.225 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 600.58' @ 12.96 hrs Surf.Area= 5,277 sf Storage= 3,860 cf

Plug-Flow detention time= 113.5 min calculated for 0.225 af (99% of inflow)
Center-of-Mass det. time= 105.9 min (906.8 - 801.0)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

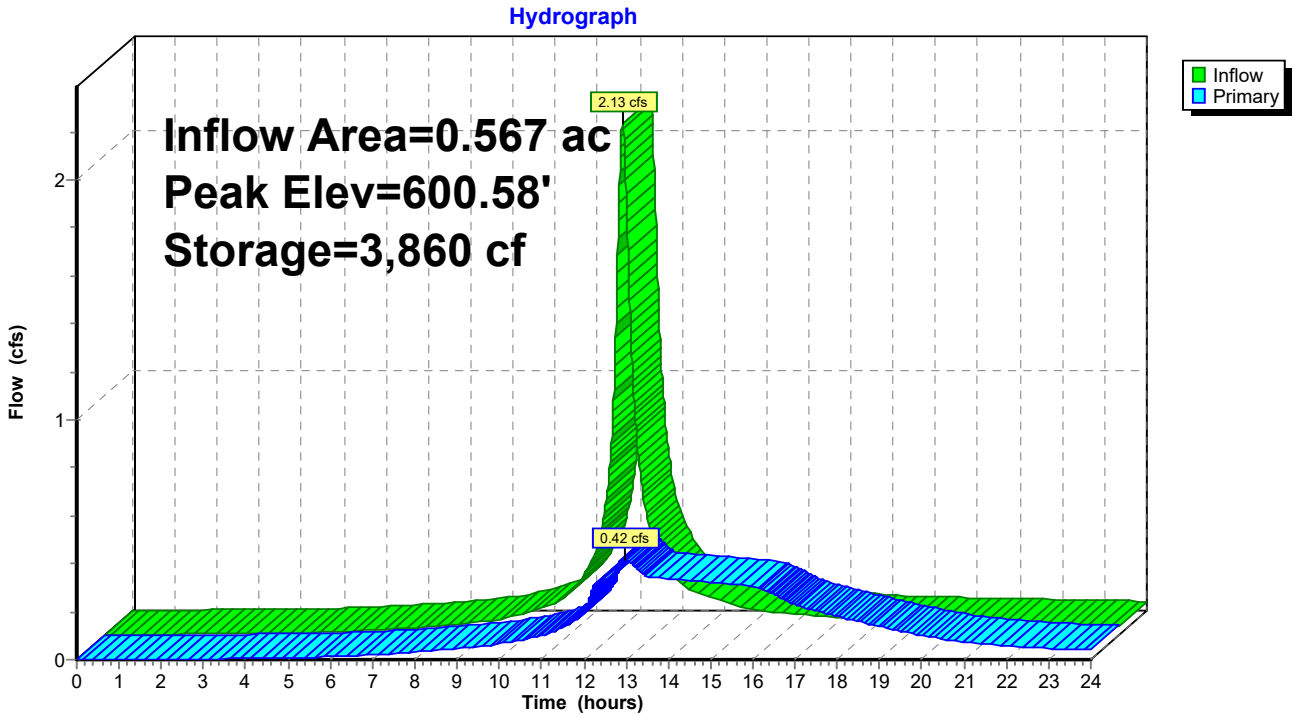
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.42 cfs @ 12.96 hrs HW=600.58' TW=590.93' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 0.42 cfs of 11.03 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.35 cfs @ 10.18 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.07 cfs @ 0.90 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.00	0	596.00	0.00
1.50	0.00	4	596.01	0.00
2.00	0.00	10	596.01	0.00
2.50	0.01	17	596.02	0.00
3.00	0.01	24	596.03	0.00
3.50	0.01	31	596.04	0.00
4.00	0.01	37	596.05	0.01
4.50	0.01	41	596.06	0.01
5.00	0.01	47	596.07	0.01
5.50	0.01	54	596.07	0.01
6.00	0.02	61	596.09	0.01
6.50	0.02	70	596.10	0.02
7.00	0.03	80	596.11	0.02
7.50	0.03	92	596.13	0.03
8.00	0.04	106	596.15	0.03
8.50	0.05	120	596.17	0.04
9.00	0.06	135	596.19	0.05
9.50	0.07	157	596.22	0.06
10.00	0.09	197	596.27	0.07
10.50	0.12	255	596.35	0.08
11.00	0.18	350	596.49	0.10
11.50	0.30	559	596.78	0.14
12.00	**0.83**	1,120	597.59	0.20
12.50	**1.06**	**3,414**	**600.32**	**0.34**
13.00	0.40	**3,859**	**600.58**	**0.42**
13.50	0.25	3,733	600.51	0.35
14.00	0.18	3,486	600.36	0.34
14.50	0.15	3,174	600.19	0.33
15.00	0.12	2,828	599.99	0.32
15.50	0.10	2,453	599.78	0.31
16.00	0.10	2,074	599.56	0.31
16.50	0.09	1,713	598.84	0.27
17.00	0.08	1,414	598.06	0.23
17.50	0.07	1,162	597.65	0.20
18.00	0.07	940	597.33	0.18
18.50	0.06	744	597.05	0.16
19.00	0.06	582	596.82	0.14
19.50	0.06	452	596.63	0.12
20.00	0.05	352	596.49	0.10
20.50	0.05	278	596.39	0.09
21.00	0.05	225	596.31	0.07
21.50	0.05	188	596.26	0.06
22.00	0.05	164	596.23	0.06
22.50	0.04	148	596.20	0.05
23.00	0.04	136	596.19	0.05
23.50	0.04	128	596.18	0.04
24.00	0.04	122	596.17	0.04

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 5.03" for 10-Year_Future event
Inflow = 1.44 cfs @ 12.22 hrs, Volume= 0.147 af
Outflow = 0.74 cfs @ 12.42 hrs, Volume= 0.145 af, Atten= 48%, Lag= 12.4 min
Primary = 0.74 cfs @ 12.42 hrs, Volume= 0.145 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 601.23' @ 12.42 hrs Surf.Area= 4,734 sf Storage= 1,812 cf

Plug-Flow detention time= 64.0 min calculated for 0.145 af (99% of inflow)
Center-of-Mass det. time= 56.1 min (845.5 - 789.4)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

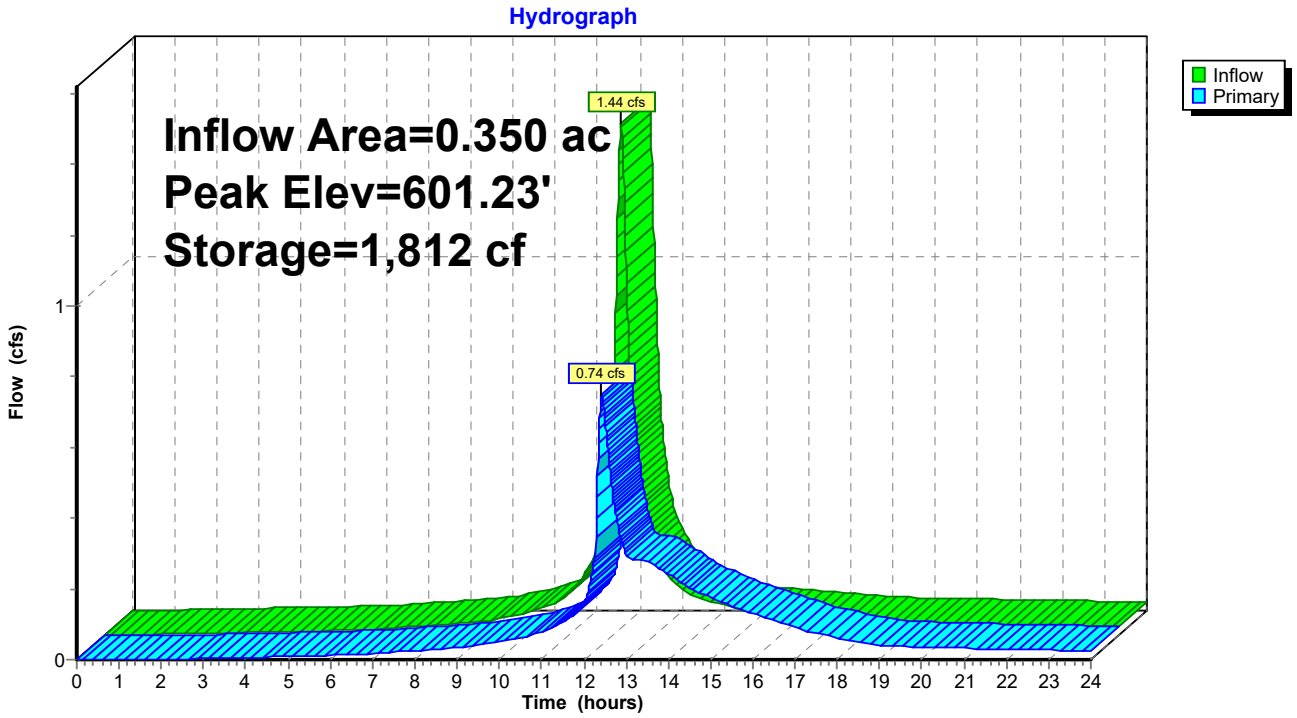
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.74 cfs @ 12.42 hrs HW=601.23' TW=588.99' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 0.74 cfs of 12.18 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.29 cfs @ 8.51 fps)
  └─**3=Water Quantity (Elevation H)** (Orifice Controls 0.45 cfs @ 1.16 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.00	1	598.00	0.00
1.50	0.00	4	598.01	0.00
2.00	0.00	11	598.02	0.00
2.50	0.01	19	598.03	0.00
3.00	0.01	26	598.04	0.00
3.50	0.01	33	598.05	0.00
4.00	0.01	37	598.06	0.01
4.50	0.01	41	598.06	0.01
5.00	0.01	45	598.07	0.01
5.50	0.01	49	598.08	0.01
6.00	0.01	54	598.08	0.01
6.50	0.02	58	598.09	0.01
7.00	0.02	65	598.10	0.02
7.50	0.03	73	598.11	0.02
8.00	0.03	81	598.12	0.03
8.50	0.04	89	598.14	0.03
9.00	0.04	98	598.15	0.04
9.50	0.05	110	598.17	0.04
10.00	0.07	131	598.20	0.05
10.50	0.08	161	598.25	0.06
11.00	0.12	213	598.33	0.08
11.50	0.20	335	598.52	0.11
12.00	**0.59**	**693**	**599.09**	**0.16**
12.50	**0.57**	**1,793**	**601.22**	**0.68**
13.00	0.23	1,626	601.11	0.30
13.50	0.15	1,451	601.00	0.28
14.00	0.11	1,202	600.28	0.24
14.50	0.09	981	599.64	0.20
15.00	0.07	791	599.26	0.18
15.50	0.06	618	598.97	0.15
16.00	0.06	473	598.74	0.13
16.50	0.05	358	598.56	0.11
17.00	0.05	270	598.42	0.09
17.50	0.04	205	598.31	0.08
18.00	0.04	159	598.24	0.06
18.50	0.04	128	598.20	0.05
19.00	0.04	111	598.17	0.04
19.50	0.03	103	598.16	0.04
20.00	0.03	99	598.15	0.04
20.50	0.03	96	598.15	0.03
21.00	0.03	93	598.14	0.03
21.50	0.03	91	598.14	0.03
22.00	0.03	89	598.14	0.03
22.50	0.03	87	598.13	0.03
23.00	0.03	85	598.13	0.03
23.50	0.03	82	598.13	0.03
24.00	0.02	80	598.12	0.03

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 4.96" for 10-Year_Future event
Inflow = 1.34 cfs @ 12.30 hrs, Volume= 0.160 af
Outflow = 0.31 cfs @ 13.01 hrs, Volume= 0.158 af, Atten= 77%, Lag= 42.2 min
Primary = 0.31 cfs @ 13.01 hrs, Volume= 0.158 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.57' @ 13.01 hrs Surf.Area= 6,525 sf Storage= 2,589 cf

Plug-Flow detention time= 104.8 min calculated for 0.157 af (98% of inflow)
Center-of-Mass det. time= 93.8 min (891.1 - 797.2)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

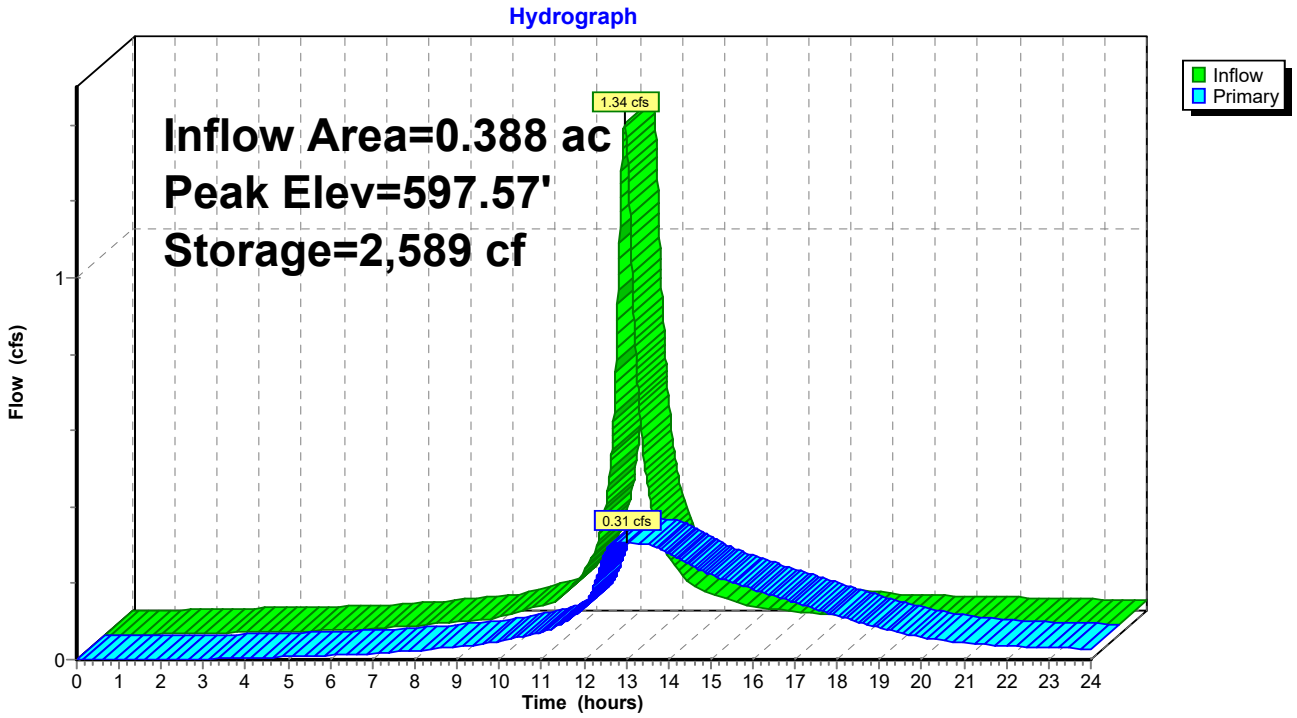
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.31 cfs @ 13.01 hrs HW=597.57' TW=587.28' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.31 cfs of 17.48 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.31 cfs @ 8.96 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	0	594.00	0.00
1.50	0.00	3	594.00	0.00
2.00	0.00	10	594.01	0.00
2.50	0.01	18	594.02	0.00
3.00	0.01	28	594.03	0.00
3.50	0.01	36	594.04	0.00
4.00	0.01	44	594.05	0.00
4.50	0.01	51	594.06	0.01
5.00	0.01	57	594.06	0.01
5.50	0.01	64	594.07	0.01
6.00	0.01	71	594.08	0.01
6.50	0.02	78	594.09	0.01
7.00	0.02	87	594.10	0.02
7.50	0.03	98	594.11	0.02
8.00	0.03	111	594.12	0.02
8.50	0.04	124	594.13	0.03
9.00	0.04	137	594.15	0.03
9.50	0.05	153	594.16	0.04
10.00	0.07	179	594.19	0.05
10.50	0.08	218	594.23	0.06
11.00	0.12	278	594.30	0.07
11.50	0.20	408	594.44	0.10
12.00	**0.49**	739	594.82	0.14
12.50	**0.89**	2,203	596.99	0.28
13.00	0.31	**2,589**	**597.57**	**0.31**
13.50	0.18	**2,463**	**597.51**	**0.30**
14.00	0.13	2,204	596.99	0.28
14.50	0.10	1,934	596.42	0.25
15.00	0.09	1,683	595.94	0.22
15.50	0.07	1,441	595.64	0.20
16.00	0.07	1,216	595.37	0.18
16.50	0.06	1,014	595.14	0.17
17.00	0.06	834	594.93	0.15
17.50	0.05	677	594.75	0.13
18.00	0.05	541	594.60	0.12
18.50	0.04	426	594.46	0.10
19.00	0.04	336	594.36	0.08
19.50	0.04	269	594.29	0.07
20.00	0.04	221	594.24	0.06
20.50	0.04	187	594.20	0.05
21.00	0.03	165	594.18	0.04
21.50	0.03	151	594.16	0.04
22.00	0.03	143	594.15	0.04
22.50	0.03	137	594.15	0.03
23.00	0.03	132	594.14	0.03
23.50	0.03	128	594.14	0.03
24.00	0.03	124	594.13	0.03

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 4.96" for 10-Year_Future event
Inflow = 1.30 cfs @ 12.13 hrs, Volume= 0.100 af
Outflow = 0.25 cfs @ 12.55 hrs, Volume= 0.098 af, Atten= 81%, Lag= 25.2 min
Primary = 0.25 cfs @ 12.55 hrs, Volume= 0.098 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.23' @ 12.55 hrs Surf.Area= 4,725 sf Storage= 1,394 cf

Plug-Flow detention time= 68.6 min calculated for 0.098 af (98% of inflow)
Center-of-Mass det. time= 59.3 min (845.1 - 785.8)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

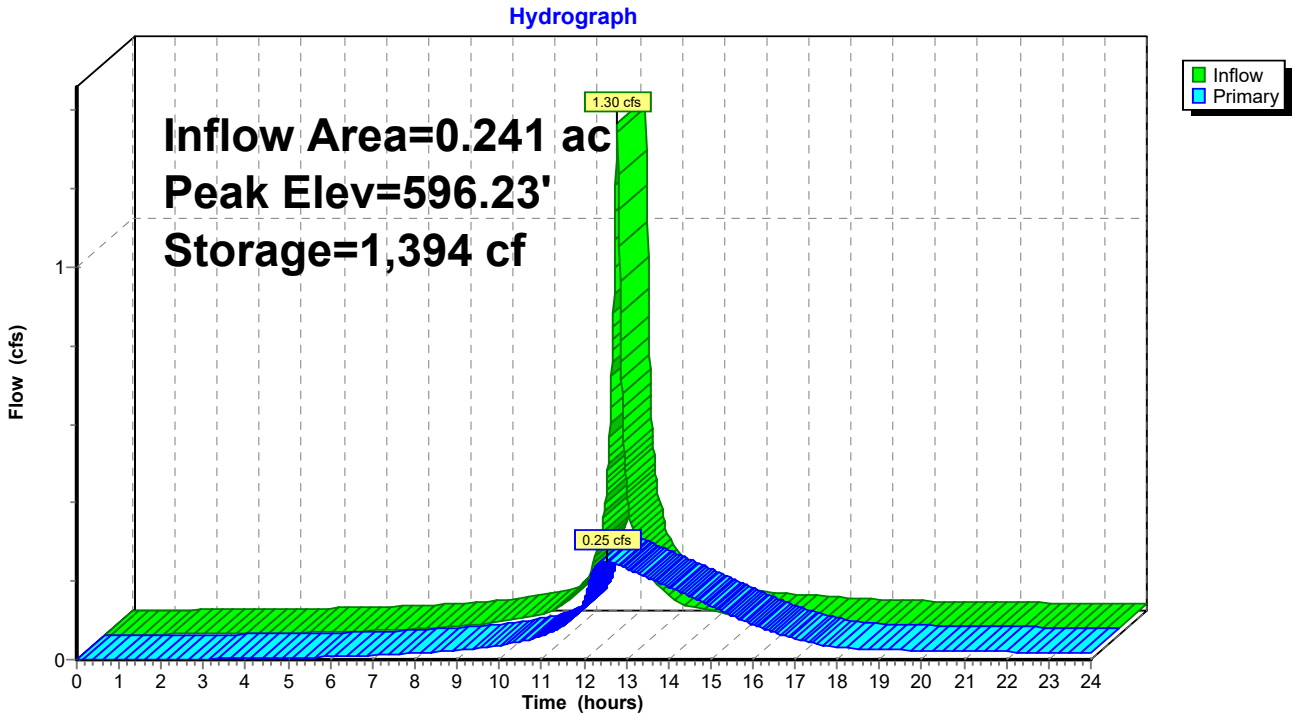
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.25 cfs @ 12.55 hrs HW=596.23' TW=581.06' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.25 cfs of 28.03 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.25 cfs @ 7.34 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	1	593.80	0.00
1.50	0.00	4	593.81	0.00
2.00	0.00	8	593.81	0.00
2.50	0.00	13	593.82	0.00
3.00	0.00	19	593.83	0.00
3.50	0.00	23	593.84	0.00
4.00	0.01	27	593.84	0.00
4.50	0.01	30	593.85	0.00
5.00	0.01	34	593.85	0.01
5.50	0.01	37	593.86	0.01
6.00	0.01	41	593.86	0.01
6.50	0.01	45	593.87	0.01
7.00	0.01	51	593.88	0.01
7.50	0.02	57	593.89	0.01
8.00	0.02	63	593.90	0.02
8.50	0.02	70	593.91	0.02
9.00	0.03	77	593.92	0.02
9.50	0.04	87	593.93	0.03
10.00	0.05	101	593.96	0.04
10.50	0.06	119	593.98	0.05
11.00	0.09	156	594.04	0.06
11.50	0.16	245	594.18	0.09
12.00	**0.70**	593	594.73	0.15
12.50	**0.26**	**1,392**	**596.22**	**0.25**
13.00	0.14	**1,288**	**595.92**	**0.23**
13.50	0.09	1,093	595.54	0.21
14.00	0.07	878	595.18	0.19
14.50	0.06	683	594.87	0.16
15.00	0.05	511	594.60	0.14
15.50	0.04	367	594.37	0.11
16.00	0.04	260	594.20	0.09
16.50	0.04	186	594.09	0.07
17.00	0.03	137	594.01	0.05
17.50	0.03	109	593.97	0.04
18.00	0.03	94	593.95	0.03
18.50	0.03	86	593.93	0.03
19.00	0.02	82	593.93	0.03
19.50	0.02	79	593.92	0.02
20.00	0.02	77	593.92	0.02
20.50	0.02	75	593.92	0.02
21.00	0.02	74	593.91	0.02
21.50	0.02	72	593.91	0.02
22.00	0.02	71	593.91	0.02
22.50	0.02	69	593.91	0.02
23.00	0.02	67	593.90	0.02
23.50	0.02	66	593.90	0.02
24.00	0.02	64	593.90	0.02

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 5.06" for 10-Year_Future event
Inflow = 1.79 cfs @ 12.12 hrs, Volume= 0.134 af
Outflow = 0.23 cfs @ 12.77 hrs, Volume= 0.131 af, Atten= 87%, Lag= 39.0 min
Primary = 0.23 cfs @ 12.77 hrs, Volume= 0.131 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.69' @ 12.77 hrs Surf.Area= 5,788 sf Storage= 2,285 cf

Plug-Flow detention time= 124.3 min calculated for 0.130 af (98% of inflow)
Center-of-Mass det. time= 109.1 min (887.9 - 778.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

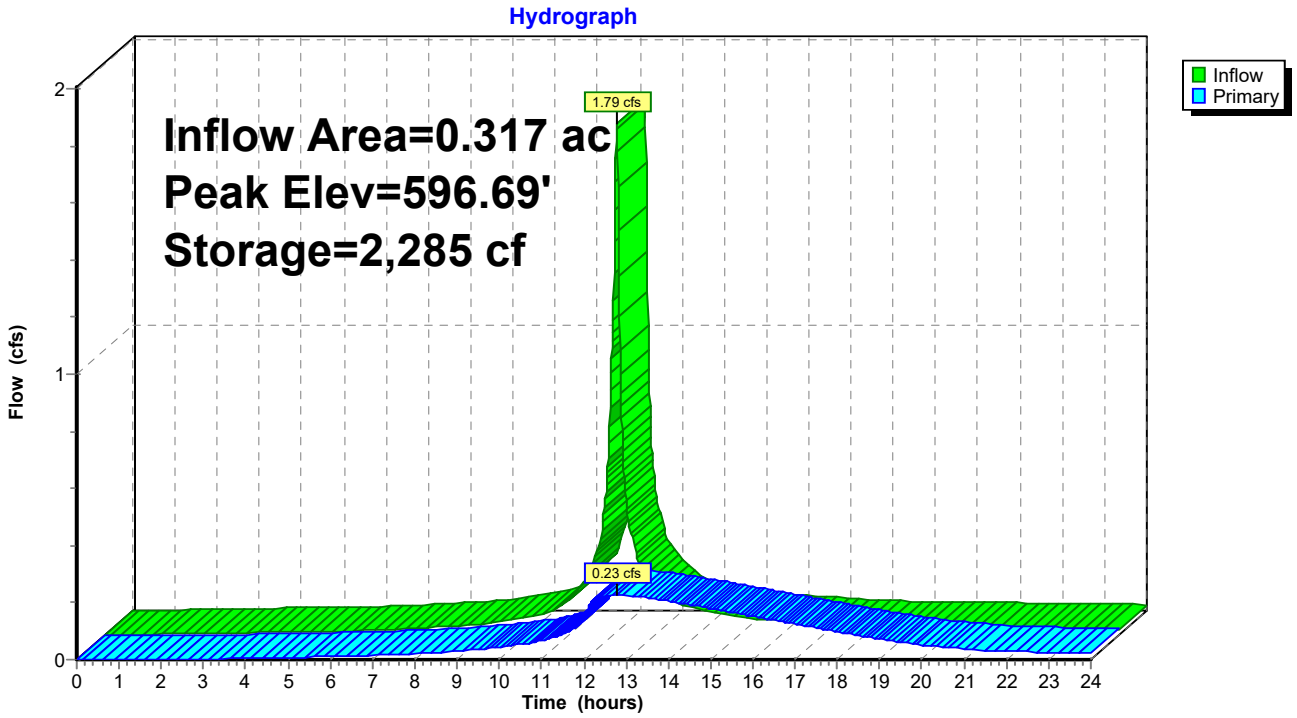
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 12.77 hrs HW=596.69' TW=585.43' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.23 cfs of 18.25 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.23 cfs @ 6.62 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

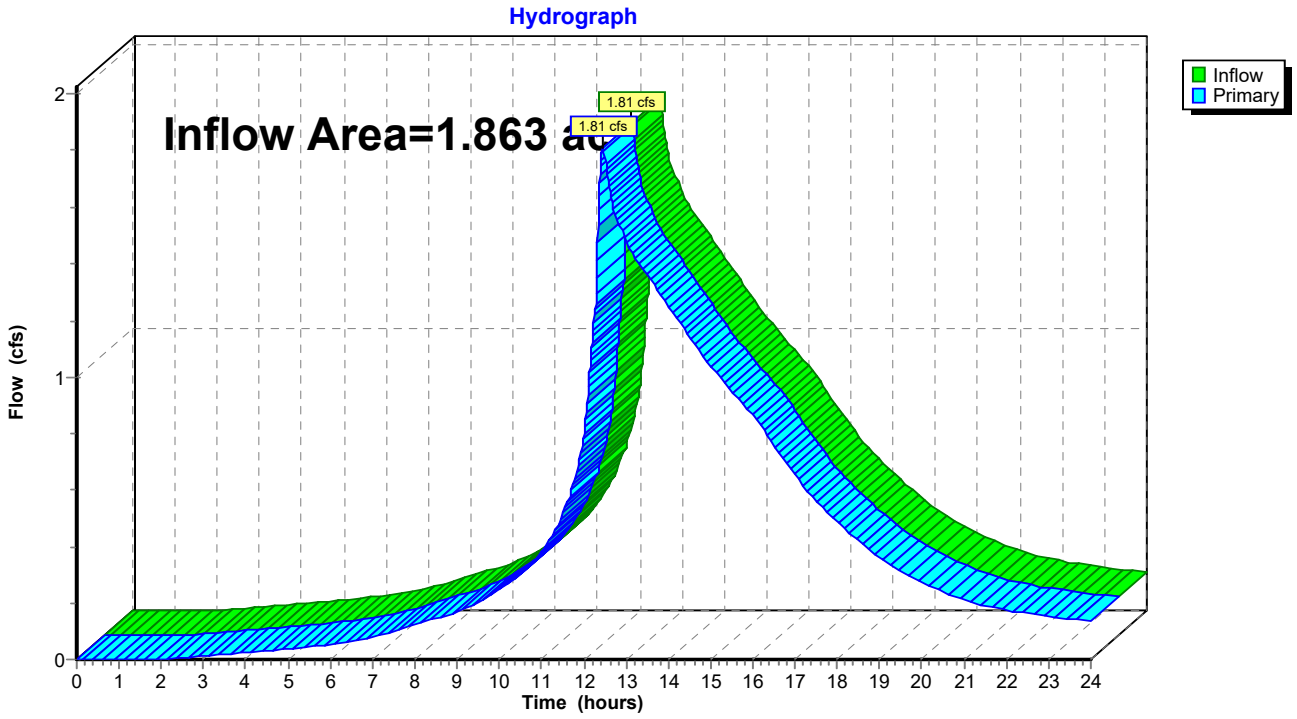
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.00	1	594.70	0.00
1.50	0.00	7	594.71	0.00
2.00	0.01	16	594.71	0.00
2.50	0.01	26	594.72	0.00
3.00	0.01	37	594.73	0.00
3.50	0.01	48	594.74	0.00
4.00	0.01	58	594.75	0.00
4.50	0.01	67	594.76	0.01
5.00	0.01	75	594.76	0.01
5.50	0.01	83	594.77	0.01
6.00	0.01	91	594.78	0.01
6.50	0.02	99	594.78	0.01
7.00	0.02	110	594.79	0.02
7.50	0.03	122	594.80	0.02
8.00	0.03	136	594.81	0.02
8.50	0.03	150	594.83	0.03
9.00	0.04	164	594.84	0.03
9.50	0.05	184	594.85	0.04
10.00	0.06	214	594.88	0.04
10.50	0.08	253	594.91	0.05
11.00	0.13	326	594.97	0.07
11.50	0.21	487	595.11	0.09
12.00	**1.00**	1,056	595.60	0.15
12.50	**0.34**	**2,241**	**596.65**	**0.22**
13.00	0.18	**2,268**	**596.68**	**0.22**
13.50	0.12	2,133	596.55	0.22
14.00	0.09	1,936	596.37	0.21
14.50	0.08	1,732	596.18	0.19
15.00	0.06	1,523	596.00	0.18
15.50	0.06	1,318	595.83	0.17
16.00	0.05	1,129	595.66	0.15
16.50	0.05	957	595.51	0.14
17.00	0.04	803	595.38	0.12
17.50	0.04	665	595.26	0.11
18.00	0.03	544	595.16	0.10
18.50	0.03	441	595.07	0.08
19.00	0.03	359	595.00	0.07
19.50	0.03	295	594.95	0.06
20.00	0.03	247	594.91	0.05
20.50	0.03	213	594.88	0.04
21.00	0.03	190	594.86	0.04
21.50	0.03	175	594.85	0.03
22.00	0.03	165	594.84	0.03
22.50	0.02	157	594.83	0.03
23.00	0.02	152	594.83	0.03
23.50	0.02	147	594.82	0.03
24.00	0.02	142	594.82	0.02

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 4.87" for 10-Year_Future event
Inflow = 1.81 cfs @ 12.45 hrs, Volume= 0.756 af
Primary = 1.81 cfs @ 12.45 hrs, Volume= 0.756 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.03		0.03
5.00	0.04		0.04
5.50	0.05		0.05
6.00	0.05		0.05
6.50	0.07		0.07
7.00	0.08		0.08
7.50	0.10		0.10
8.00	0.12		0.12
8.50	0.15		0.15
9.00	0.17		0.17
9.50	0.20		0.20
10.00	0.25		0.25
10.50	0.30		0.30
11.00	0.38		0.38
11.50	0.51		0.51
12.00	**0.79**		**0.79**
12.50	**1.78**		**1.78**
13.00	1.48		1.48
13.50	1.36		1.36
14.00	1.25		1.25
14.50	1.14		1.14
15.00	1.04		1.04
15.50	0.95		0.95
16.00	0.86		0.86
16.50	0.76		0.76
17.00	0.65		0.65
17.50	0.56		0.56
18.00	0.49		0.49
18.50	0.42		0.42
19.00	0.36		0.36
19.50	0.31		0.31
20.00	0.27		0.27
20.50	0.24		0.24
21.00	0.21		0.21
21.50	0.19		0.19
22.00	0.17		0.17
22.50	0.16		0.16
23.00	0.15		0.15
23.50	0.14		0.14
24.00	0.14		0.14

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 4.87" for 10-Year_Future event
Inflow = 1.81 cfs @ 12.45 hrs, Volume= 0.756 af
Outflow = 1.81 cfs @ 12.45 hrs, Volume= 0.756 af, Atten= 0%, Lag= 0.1 min
Primary = 1.81 cfs @ 12.45 hrs, Volume= 0.756 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 581.08' @ 12.45 hrs Surf.Area= 0.001 ac Storage= 0.000 af

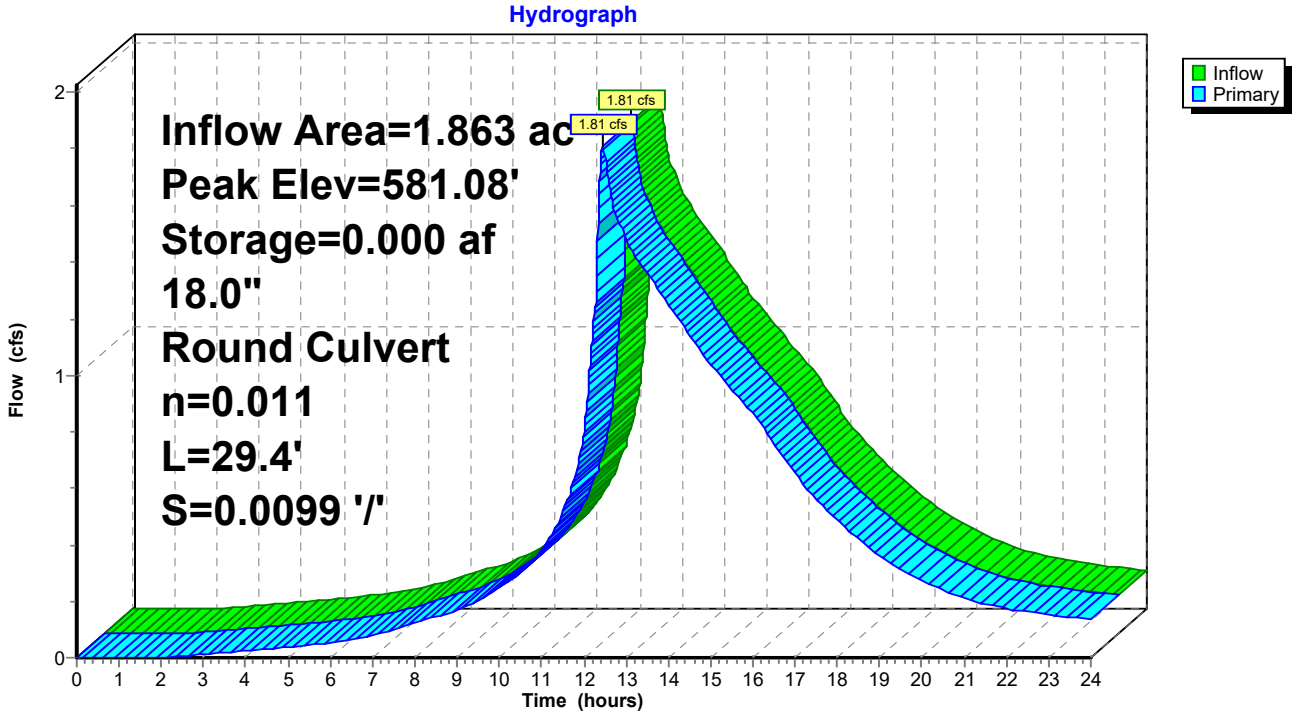
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (880.7 - 880.7)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=1.81 cfs @ 12.45 hrs HW=581.08' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 1.81 cfs @ 3.72 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.00	0.000	580.69	0.00
2.00	0.00	0.000	580.69	0.00
2.50	0.01	0.000	580.69	0.01
3.00	0.01	0.000	580.69	0.01
3.50	0.02	0.000	580.69	0.02
4.00	0.02	0.000	580.69	0.02
4.50	0.03	0.000	580.69	0.03
5.00	0.04	0.000	580.69	0.04
5.50	0.05	0.000	580.69	0.05
6.00	0.05	0.000	580.69	0.05
6.50	0.07	0.000	580.69	0.07
7.00	0.08	0.000	580.69	0.08
7.50	0.10	0.000	580.69	0.10
8.00	0.12	0.000	580.69	0.12
8.50	0.15	0.000	580.69	0.15
9.00	0.17	0.000	580.69	0.17
9.50	0.20	0.000	580.69	0.20
10.00	0.25	0.000	580.69	0.25
10.50	0.30	0.000	580.69	0.30
11.00	0.38	0.000	580.71	0.38
11.50	0.51	0.000	580.75	0.51
12.00	**0.79**	**0.000**	**580.84**	**0.79**
12.50	**1.78**	**0.000**	**581.07**	**1.78**
13.00	1.48	0.000	581.01	1.48
13.50	1.36	0.000	580.98	1.36
14.00	1.25	0.000	580.96	1.25
14.50	1.14	0.000	580.93	1.14
15.00	1.04	0.000	580.90	1.04
15.50	0.95	0.000	580.88	0.95
16.00	0.86	0.000	580.86	0.86
16.50	0.76	0.000	580.83	0.76
17.00	0.65	0.000	580.80	0.65
17.50	0.56	0.000	580.77	0.56
18.00	0.49	0.000	580.75	0.49
18.50	0.42	0.000	580.72	0.42
19.00	0.36	0.000	580.70	0.36
19.50	0.31	0.000	580.69	0.31
20.00	0.27	0.000	580.69	0.27
20.50	0.24	0.000	580.69	0.24
21.00	0.21	0.000	580.69	0.21
21.50	0.19	0.000	580.69	0.19
22.00	0.17	0.000	580.69	0.17
22.50	0.16	0.000	580.69	0.16
23.00	0.15	0.000	580.69	0.15
23.50	0.14	0.000	580.69	0.14
24.00	0.14	0.000	580.69	0.14

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 4.87" for 10-Year_Future event
Inflow = 1.56 cfs @ 12.44 hrs, Volume= 0.658 af
Outflow = 1.56 cfs @ 12.45 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.1 min
Primary = 1.56 cfs @ 12.45 hrs, Volume= 0.658 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.49' @ 12.45 hrs Surf.Area= 0.001 ac Storage= 0.000 af

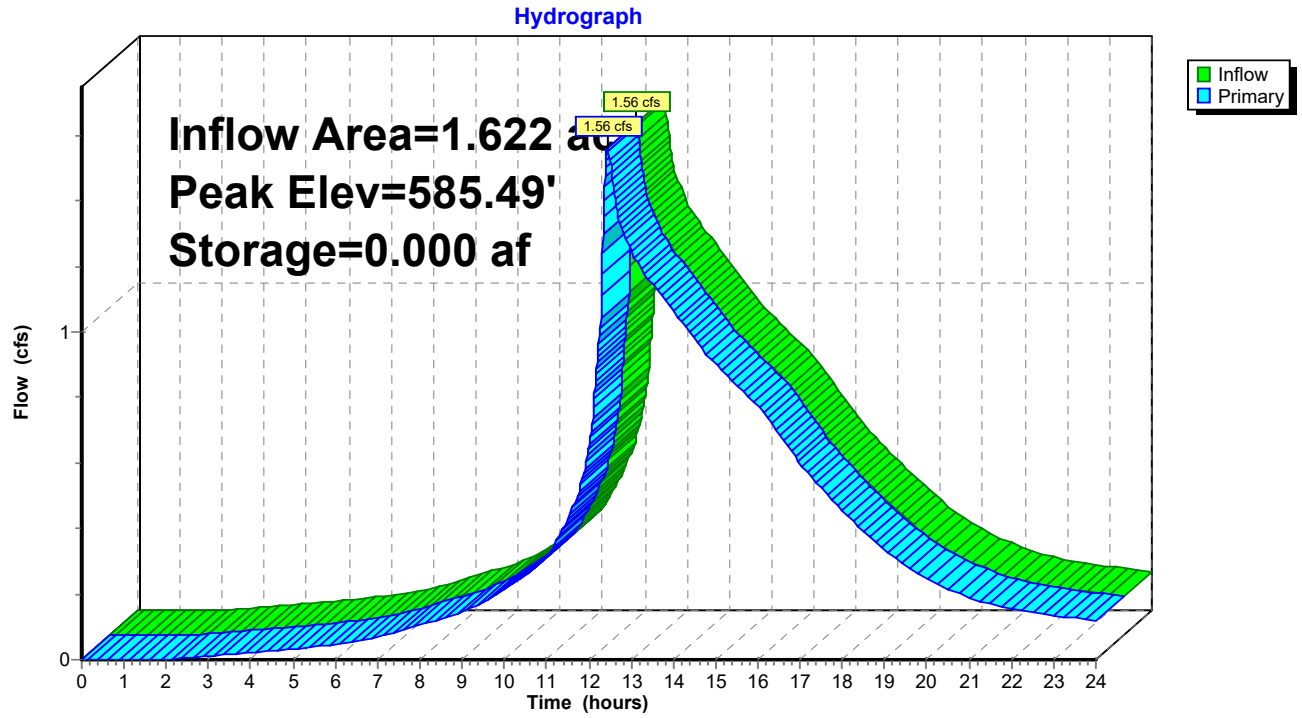
Plug-Flow detention time= 0.1 min calculated for 0.658 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (886.0 - 885.9)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.56 cfs @ 12.45 hrs HW=585.48' TW=581.08' (Dynamic Tailwater)
↑—**1=SD-24** (Orifice Controls 1.56 cfs @ 2.65 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.88	0.00
1.50	0.00	0.000	584.89	0.00
2.00	0.00	0.000	584.90	0.00
2.50	0.00	0.000	584.91	0.00
3.00	0.01	0.000	584.92	0.01
3.50	0.02	0.000	584.93	0.02
4.00	0.02	0.000	584.94	0.02
4.50	0.03	0.000	584.95	0.03
5.00	0.03	0.000	584.96	0.03
5.50	0.04	0.000	584.97	0.04
6.00	0.05	0.000	584.98	0.05
6.50	0.06	0.000	584.99	0.06
7.00	0.07	0.000	585.00	0.07
7.50	0.09	0.000	585.01	0.09
8.00	0.10	0.000	585.03	0.10
8.50	0.13	0.000	585.04	0.13
9.00	0.15	0.000	585.05	0.15
9.50	0.17	0.000	585.07	0.17
10.00	0.21	0.000	585.09	0.21
10.50	0.26	0.000	585.11	0.26
11.00	0.32	0.000	585.14	0.32
11.50	0.43	0.000	585.18	0.43
12.00	**0.65**	**0.000**	**585.25**	**0.65**
12.50	**1.53**	**0.000**	**585.48**	**1.53**
13.00	1.25	0.000	585.41	1.25
13.50	1.15	0.000	585.39	1.15
14.00	1.07	0.000	585.37	1.07
14.50	0.98	0.000	585.35	0.98
15.00	0.90	0.000	585.33	0.90
15.50	0.84	0.000	585.31	0.84
16.00	0.77	0.000	585.29	0.77
16.50	0.69	0.000	585.27	0.69
17.00	0.60	0.000	585.24	0.60
17.50	0.52	0.000	585.22	0.52
18.00	0.46	0.000	585.19	0.46
18.50	0.39	0.000	585.17	0.39
19.00	0.34	0.000	585.15	0.34
19.50	0.29	0.000	585.13	0.29
20.00	0.25	0.000	585.11	0.25
20.50	0.22	0.000	585.09	0.22
21.00	0.19	0.000	585.08	0.19
21.50	0.17	0.000	585.07	0.17
22.00	0.15	0.000	585.06	0.15
22.50	0.14	0.000	585.05	0.14
23.00	0.13	0.000	585.05	0.13
23.50	0.13	0.000	585.04	0.13
24.00	0.12	0.000	585.04	0.12

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 4.85" for 10-Year_Future event
Inflow = 1.34 cfs @ 12.44 hrs, Volume= 0.528 af
Outflow = 1.34 cfs @ 12.44 hrs, Volume= 0.528 af, Atten= 0%, Lag= 0.1 min
Primary = 1.34 cfs @ 12.44 hrs, Volume= 0.528 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.36' @ 12.44 hrs Surf.Area= 0.001 ac Storage= 0.000 af

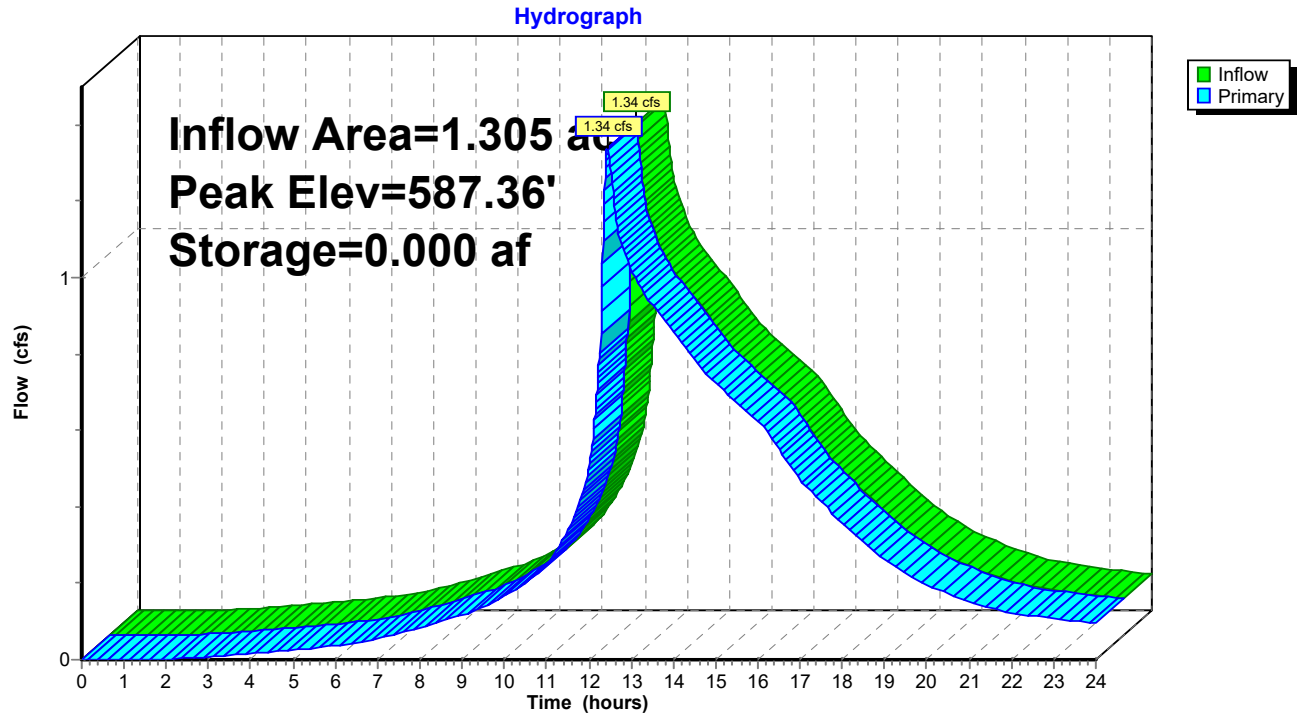
Plug-Flow detention time= 0.1 min calculated for 0.528 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (885.5 - 885.4)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.34 cfs @ 12.44 hrs HW=587.36' TW=585.48' (Dynamic Tailwater)
↳**1=SD-23** (Orifice Controls 1.34 cfs @ 2.54 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.80	0.00
1.50	0.00	0.000	586.81	0.00
2.00	0.00	0.000	586.82	0.00
2.50	0.00	0.000	586.83	0.00
3.00	0.01	0.000	586.84	0.01
3.50	0.01	0.000	586.85	0.01
4.00	0.02	0.000	586.86	0.02
4.50	0.02	0.000	586.86	0.02
5.00	0.02	0.000	586.87	0.02
5.50	0.03	0.000	586.88	0.03
6.00	0.04	0.000	586.89	0.04
6.50	0.04	0.000	586.89	0.04
7.00	0.05	0.000	586.91	0.05
7.50	0.07	0.000	586.92	0.07
8.00	0.08	0.000	586.93	0.08
8.50	0.10	0.000	586.94	0.10
9.00	0.12	0.000	586.95	0.12
9.50	0.14	0.000	586.97	0.14
10.00	0.17	0.000	586.99	0.17
10.50	0.20	0.000	587.00	0.20
11.00	0.25	0.000	587.03	0.25
11.50	0.34	0.000	587.07	0.34
12.00	**0.50**	**0.000**	**587.13**	**0.50**
12.50	**1.30**	**0.000**	**587.35**	**1.30**
13.00	1.02	0.000	587.28	1.02
13.50	0.93	0.000	587.26	0.93
14.00	0.86	0.000	587.24	0.86
14.50	0.78	0.000	587.22	0.79
15.00	0.72	0.000	587.20	0.72
15.50	0.67	0.000	587.18	0.67
16.00	0.62	0.000	587.17	0.62
16.50	0.55	0.000	587.14	0.55
17.00	0.47	0.000	587.12	0.47
17.50	0.41	0.000	587.10	0.41
18.00	0.36	0.000	587.08	0.36
18.50	0.31	0.000	587.05	0.31
19.00	0.26	0.000	587.04	0.26
19.50	0.23	0.000	587.02	0.23
20.00	0.20	0.000	587.00	0.20
20.50	0.17	0.000	586.99	0.17
21.00	0.15	0.000	586.98	0.15
21.50	0.14	0.000	586.97	0.14
22.00	0.12	0.000	586.96	0.12
22.50	0.11	0.000	586.95	0.11
23.00	0.11	0.000	586.95	0.11
23.50	0.10	0.000	586.94	0.10
24.00	0.10	0.000	586.94	0.10

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 4.84" for 10-Year_Future event
Inflow = 1.08 cfs @ 12.43 hrs, Volume= 0.370 af
Outflow = 1.08 cfs @ 12.43 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.1 min
Primary = 1.08 cfs @ 12.43 hrs, Volume= 0.370 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 588.99' @ 12.43 hrs Surf.Area= 0.001 ac Storage= 0.000 af

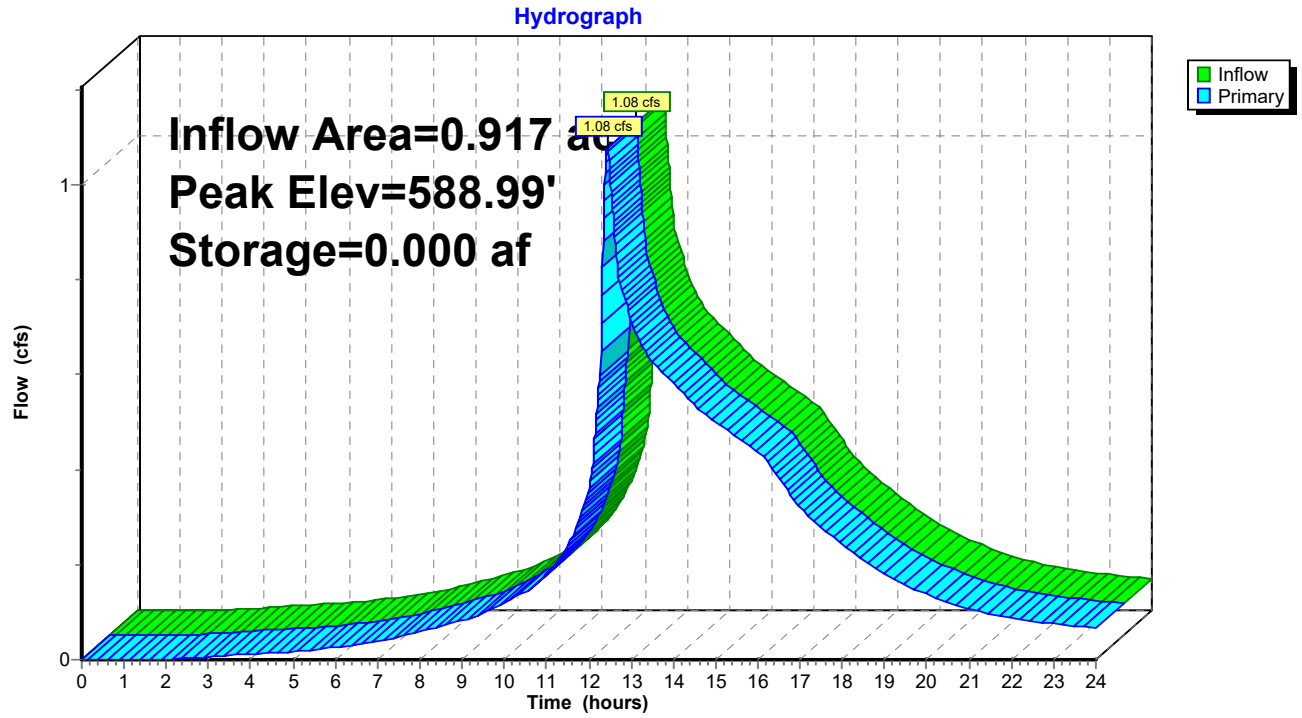
Plug-Flow detention time= 0.1 min calculated for 0.370 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (883.0 - 882.9)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.08 cfs @ 12.43 hrs HW=588.99' TW=587.35' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 1.08 cfs @ 2.50 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.45	0.00
1.50	0.00	0.000	588.46	0.00
2.00	0.00	0.000	588.46	0.00
2.50	0.00	0.000	588.48	0.00
3.00	0.01	0.000	588.49	0.01
3.50	0.01	0.000	588.49	0.01
4.00	0.01	0.000	588.50	0.01
4.50	0.01	0.000	588.51	0.01
5.00	0.02	0.000	588.51	0.02
5.50	0.02	0.000	588.52	0.02
6.00	0.03	0.000	588.53	0.03
6.50	0.03	0.000	588.53	0.03
7.00	0.04	0.000	588.54	0.04
7.50	0.05	0.000	588.55	0.05
8.00	0.06	0.000	588.57	0.06
8.50	0.07	0.000	588.58	0.07
9.00	0.08	0.000	588.59	0.08
9.50	0.10	0.000	588.60	0.10
10.00	0.12	0.000	588.62	0.12
10.50	0.14	0.000	588.63	0.14
11.00	0.18	0.000	588.66	0.18
11.50	0.24	0.000	588.69	0.24
12.00	**0.36**	**0.000**	**588.75**	**0.36**
12.50	**1.02**	**0.000**	**588.97**	**1.02**
13.00	0.71	0.000	588.88	0.72
13.50	0.63	0.000	588.85	0.63
14.00	0.58	0.000	588.83	0.58
14.50	0.53	0.000	588.82	0.54
15.00	0.50	0.000	588.80	0.50
15.50	0.47	0.000	588.79	0.47
16.00	0.44	0.000	588.78	0.44
16.50	0.38	0.000	588.76	0.38
17.00	0.32	0.000	588.73	0.32
17.50	0.28	0.000	588.71	0.28
18.00	0.24	0.000	588.69	0.24
18.50	0.21	0.000	588.67	0.21
19.00	0.18	0.000	588.66	0.18
19.50	0.16	0.000	588.64	0.16
20.00	0.14	0.000	588.63	0.14
20.50	0.12	0.000	588.62	0.12
21.00	0.11	0.000	588.61	0.11
21.50	0.10	0.000	588.60	0.10
22.00	0.09	0.000	588.59	0.09
22.50	0.08	0.000	588.59	0.08
23.00	0.08	0.000	588.58	0.08
23.50	0.07	0.000	588.58	0.07
24.00	0.07	0.000	588.57	0.07

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 4.77" for 10-Year_Future event
Inflow = 0.42 cfs @ 12.96 hrs, Volume= 0.225 af
Outflow = 0.42 cfs @ 12.96 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.1 min
Primary = 0.42 cfs @ 12.96 hrs, Volume= 0.225 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.93' @ 12.96 hrs Surf.Area= 0.000 ac Storage= 0.000 af

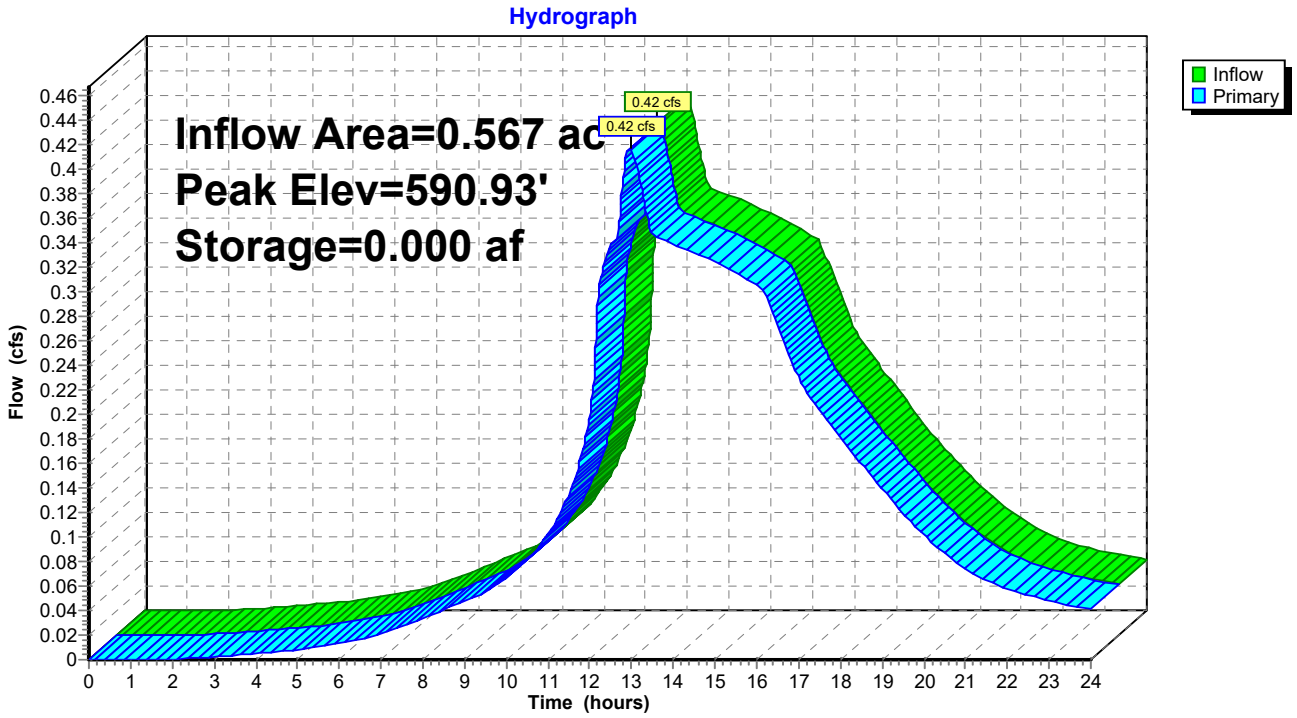
Plug-Flow detention time= 0.1 min calculated for 0.225 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (906.9 - 906.8)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.42 cfs @ 12.96 hrs HW=590.93' TW=588.88' (Dynamic Tailwater)
↑—**1=SD-21** (Orifice Controls 0.42 cfs @ 1.93 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.61	0.00
2.00	0.00	0.000	590.62	0.00
2.50	0.00	0.000	590.63	0.00
3.00	0.00	0.000	590.63	0.00
3.50	0.00	0.000	590.64	0.00
4.00	0.01	0.000	590.64	0.01
4.50	0.01	0.000	590.65	0.01
5.00	0.01	0.000	590.65	0.01
5.50	0.01	0.000	590.66	0.01
6.00	0.01	0.000	590.66	0.01
6.50	0.02	0.000	590.67	0.02
7.00	0.02	0.000	590.68	0.02
7.50	0.03	0.000	590.69	0.03
8.00	0.03	0.000	590.70	0.03
8.50	0.04	0.000	590.71	0.04
9.00	0.05	0.000	590.71	0.05
9.50	0.06	0.000	590.72	0.06
10.00	0.07	0.000	590.73	0.07
10.50	0.08	0.000	590.75	0.08
11.00	0.10	0.000	590.76	0.10
11.50	0.14	0.000	590.79	0.14
12.00	0.20	0.000	590.83	0.20
12.50	**0.34**	**0.000**	**590.90**	**0.34**
13.00	**0.42**	**0.000**	**590.93**	**0.42**
13.50	0.35	0.000	590.90	0.35
14.00	0.34	0.000	590.90	0.34
14.50	0.33	0.000	590.89	0.33
15.00	0.32	0.000	590.89	0.32
15.50	0.31	0.000	590.89	0.31
16.00	0.31	0.000	590.88	0.31
16.50	0.27	0.000	590.87	0.27
17.00	0.23	0.000	590.84	0.23
17.50	0.20	0.000	590.83	0.20
18.00	0.18	0.000	590.82	0.18
18.50	0.16	0.000	590.80	0.16
19.00	0.14	0.000	590.79	0.14
19.50	0.12	0.000	590.78	0.12
20.00	0.10	0.000	590.76	0.10
20.50	0.09	0.000	590.75	0.09
21.00	0.07	0.000	590.74	0.07
21.50	0.06	0.000	590.73	0.06
22.00	0.06	0.000	590.72	0.06
22.50	0.05	0.000	590.72	0.05
23.00	0.05	0.000	590.71	0.05
23.50	0.04	0.000	590.71	0.04
24.00	0.04	0.000	590.71	0.04

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>7.59"
Flow Length=164' Tc=18.5 min CN=WQ Runoff=3.18 cfs 0.359 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>7.80"
Flow Length=175' Tc=15.6 min CN=WQ Runoff=2.14 cfs 0.228 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>7.72"
Flow Length=175' Tc=23.3 min CN=WQ Runoff=1.97 cfs 0.250 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>7.73"
Flow Length=120' Tc=6.5 min CN=WQ Runoff=1.96 cfs 0.155 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>7.84"
Flow Length=96' Slope=0.0336 '/' Tc=5.4 min CN=WQ Runoff=2.68 cfs 0.207 af

Pond 1P: BR-01 Peak Elev=601.35' Storage=5,218 cf Inflow=3.18 cfs 0.359 af
Outflow=1.24 cfs 0.354 af

Pond 2P: BR-02 Peak Elev=601.42' Storage=2,112 cf Inflow=2.14 cfs 0.228 af
Outflow=1.85 cfs 0.225 af

Pond 3P: BR-03 Peak Elev=598.43' Storage=4,464 cf Inflow=1.97 cfs 0.250 af
Outflow=0.34 cfs 0.246 af

Pond 5P: BR-05 Peak Elev=597.66' Storage=2,328 cf Inflow=1.96 cfs 0.155 af
Outflow=0.32 cfs 0.154 af

Pond 6P: BR-04 Peak Elev=598.36' Storage=3,691 cf Inflow=2.68 cfs 0.207 af
Outflow=0.32 cfs 0.203 af

Pond 8P: O-1B Inflow=3.61 cfs 1.181 af
Primary=3.61 cfs 1.181 af

Pond 13P: SD-25, SD-26 Peak Elev=581.41' Storage=0.000 af Inflow=3.61 cfs 1.181 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=3.61 cfs 1.181 af

Pond 14P: SD-24 Peak Elev=585.82' Storage=0.001 af Inflow=3.29 cfs 1.028 af
Outflow=3.29 cfs 1.028 af

Pond 17P: SD-23 Peak Elev=587.69' Storage=0.001 af Inflow=2.99 cfs 0.825 af
Outflow=2.99 cfs 0.825 af

Pond 18P: SD-22 Peak Elev=589.45' Storage=0.001 af Inflow=2.68 cfs 0.579 af
Outflow=2.68 cfs 0.579 af

Pond 19P: SD-21 Peak Elev=591.19' Storage=0.000 af Inflow=1.24 cfs 0.354 af
Outflow=1.24 cfs 0.354 af

Total Runoff Area = 1.863 ac Runoff Volume = 1.199 af Average Runoff Depth = 7.72"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

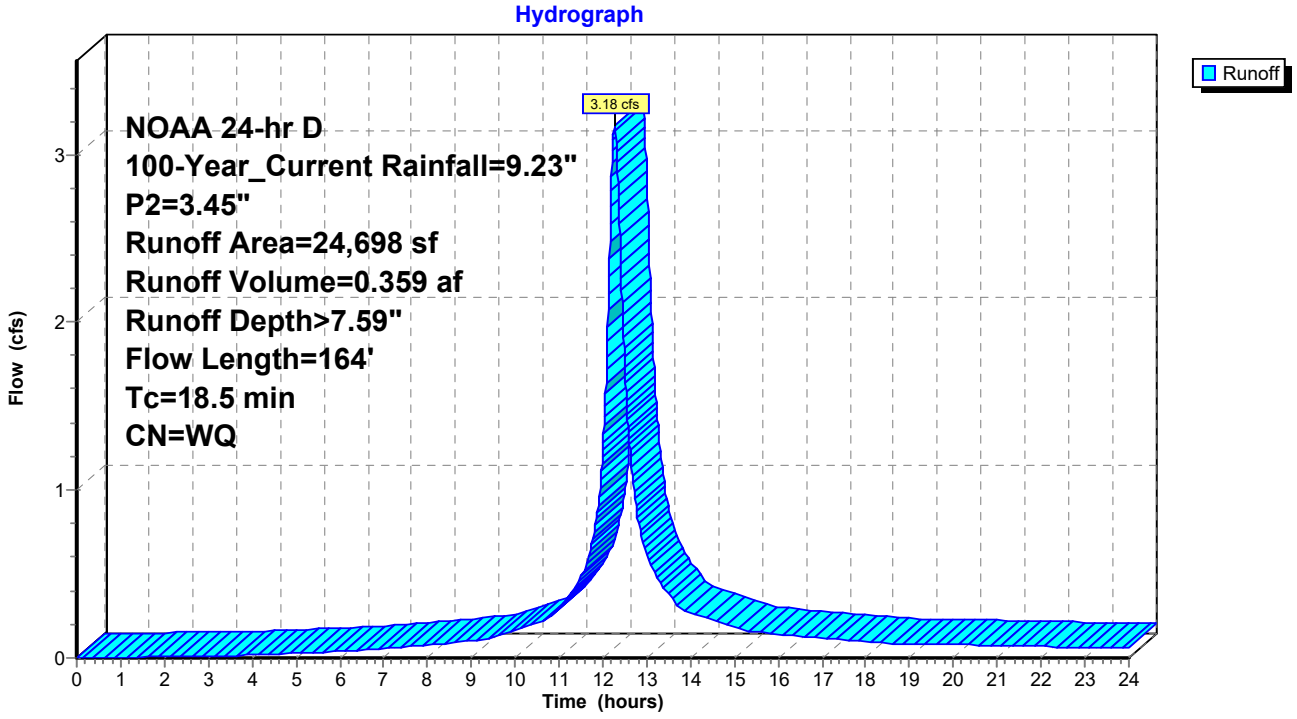
Runoff = 3.18 cfs @ 12.27 hrs, Volume= 0.359 af, Depth> 7.59"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0018	0.09		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.5	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.01
2.50	0.28	0.00	0.01
3.00	0.35	0.00	0.01
3.50	0.41	0.01	0.01
4.00	0.48	0.02	0.02
4.50	0.56	0.04	0.02
5.00	0.63	0.06	0.03
5.50	0.71	0.09	0.03
6.00	0.79	0.12	0.04
6.50	0.88	0.16	0.05
7.00	0.97	0.21	0.06
7.50	1.08	0.27	0.07
8.00	1.20	0.34	0.08
8.50	1.33	0.42	0.09
9.00	1.46	0.51	0.10
9.50	1.63	0.63	0.13
10.00	1.83	0.77	0.16
10.50	2.07	0.96	0.20
11.00	2.40	1.23	0.29
11.50	2.93	1.67	0.49
12.00	4.42	3.03	**1.24**
12.50	6.30	4.81	**1.74**
13.00	6.83	5.32	0.62
13.50	7.16	5.64	0.38
14.00	7.40	5.87	0.27
14.50	7.60	6.06	0.22
15.00	7.77	6.22	0.18
15.50	7.90	6.36	0.15
16.00	8.03	6.48	0.14
16.50	8.15	6.60	0.13
17.00	8.26	6.70	0.12
17.50	8.35	6.80	0.11
18.00	8.44	6.88	0.10
18.50	8.52	6.96	0.09
19.00	8.60	7.03	0.09
19.50	8.67	7.11	0.08
20.00	8.75	7.18	0.08
20.50	8.82	7.25	0.08
21.00	8.88	7.31	0.07
21.50	8.95	7.37	0.07
22.00	9.01	7.43	0.07
22.50	9.07	7.49	0.07
23.00	9.12	7.55	0.06
23.50	9.18	7.60	0.06
24.00	**9.23**	**7.65**	0.06

Summary for Subcatchment 7S: PO-DA E

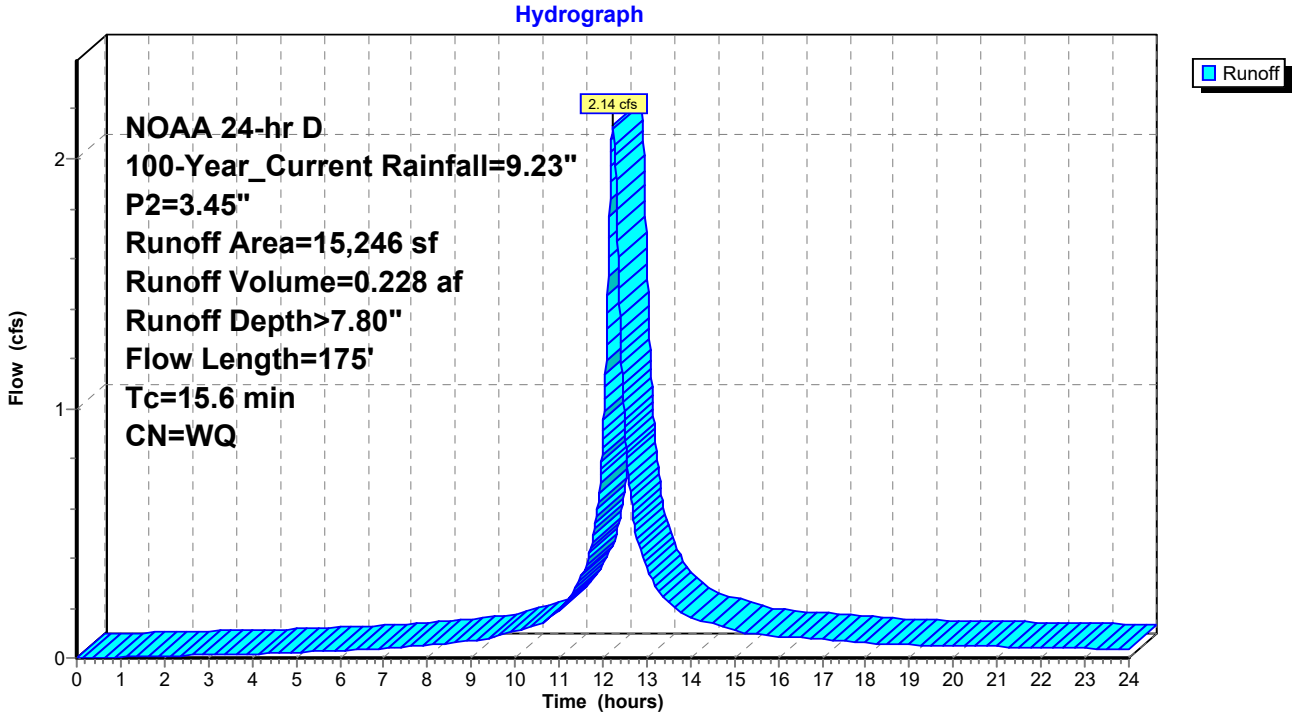
Runoff = 2.14 cfs @ 12.23 hrs, Volume= 0.228 af, Depth> 7.80"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0030	0.11		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
15.6	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.01
2.50	0.28	0.00	0.01
3.00	0.35	0.00	0.01
3.50	0.41	0.01	0.01
4.00	0.48	0.03	0.02
4.50	0.56	0.05	0.02
5.00	0.63	0.07	0.02
5.50	0.71	0.11	0.03
6.00	0.79	0.14	0.03
6.50	0.88	0.18	0.03
7.00	0.97	0.24	0.04
7.50	1.08	0.30	0.05
8.00	1.20	0.37	0.05
8.50	1.33	0.46	0.06
9.00	1.46	0.56	0.07
9.50	1.63	0.68	0.09
10.00	1.83	0.83	0.11
10.50	2.07	1.02	0.13
11.00	2.40	1.30	0.19
11.50	2.93	1.75	0.32
12.00	4.42	3.12	**0.88**
12.50	6.30	4.92	**0.93**
13.00	6.83	5.43	0.36
13.50	7.16	5.75	0.23
14.00	7.40	5.98	0.16
14.50	7.60	6.18	0.14
15.00	7.77	6.34	0.11
15.50	7.90	6.47	0.09
16.00	8.03	6.60	0.09
16.50	8.15	6.71	0.08
17.00	8.26	6.82	0.07
17.50	8.35	6.92	0.07
18.00	8.44	7.00	0.06
18.50	8.52	7.08	0.05
19.00	8.60	7.15	0.05
19.50	8.67	7.23	0.05
20.00	8.75	7.30	0.05
20.50	8.82	7.37	0.05
21.00	8.88	7.43	0.05
21.50	8.95	7.50	0.04
22.00	9.01	7.56	0.04
22.50	9.07	7.61	0.04
23.00	9.12	7.67	0.04
23.50	9.18	7.72	0.04
24.00	**9.23**	**7.77**	0.04

Summary for Subcatchment 9S: PO-DA G

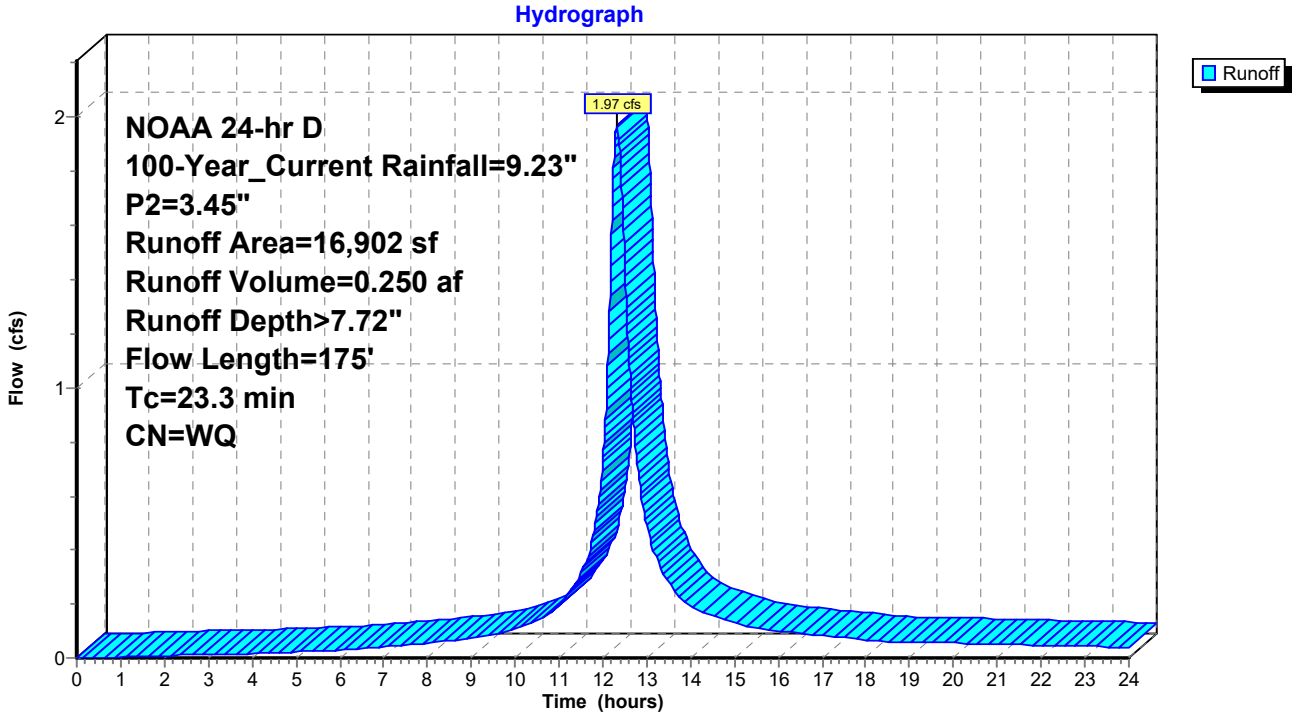
Runoff = 1.97 cfs @ 12.32 hrs, Volume= 0.250 af, Depth> 7.72"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	100	0.0010	0.07		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
23.3	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.01
2.50	0.28	0.00	0.01
3.00	0.35	0.00	0.01
3.50	0.41	0.01	0.01
4.00	0.48	0.03	0.02
4.50	0.56	0.05	0.02
5.00	0.63	0.07	0.02
5.50	0.71	0.11	0.03
6.00	0.79	0.14	0.03
6.50	0.88	0.18	0.03
7.00	0.97	0.24	0.04
7.50	1.08	0.30	0.05
8.00	1.20	0.37	0.06
8.50	1.33	0.46	0.06
9.00	1.46	0.56	0.07
9.50	1.63	0.68	0.09
10.00	1.83	0.83	0.11
10.50	2.07	1.02	0.14
11.00	2.40	1.30	0.19
11.50	2.93	1.75	0.31
12.00	4.42	3.12	**0.72**
12.50	6.30	4.92	**1.45**
13.00	6.83	5.43	0.49
13.50	7.16	5.75	0.28
14.00	7.40	5.98	0.19
14.50	7.60	6.18	0.16
15.00	7.77	6.34	0.13
15.50	7.90	6.47	0.11
16.00	8.03	6.60	0.10
16.50	8.15	6.71	0.09
17.00	8.26	6.82	0.08
17.50	8.35	6.92	0.08
18.00	8.44	7.00	0.07
18.50	8.52	7.08	0.06
19.00	8.60	7.15	0.06
19.50	8.67	7.23	0.06
20.00	8.75	7.30	0.06
20.50	8.82	7.37	0.05
21.00	8.88	7.43	0.05
21.50	8.95	7.50	0.05
22.00	9.01	7.56	0.05
22.50	9.07	7.61	0.05
23.00	9.12	7.67	0.04
23.50	9.18	7.72	0.04
24.00	**9.23**	**7.77**	0.04

Summary for Subcatchment 11S: PO-DA I

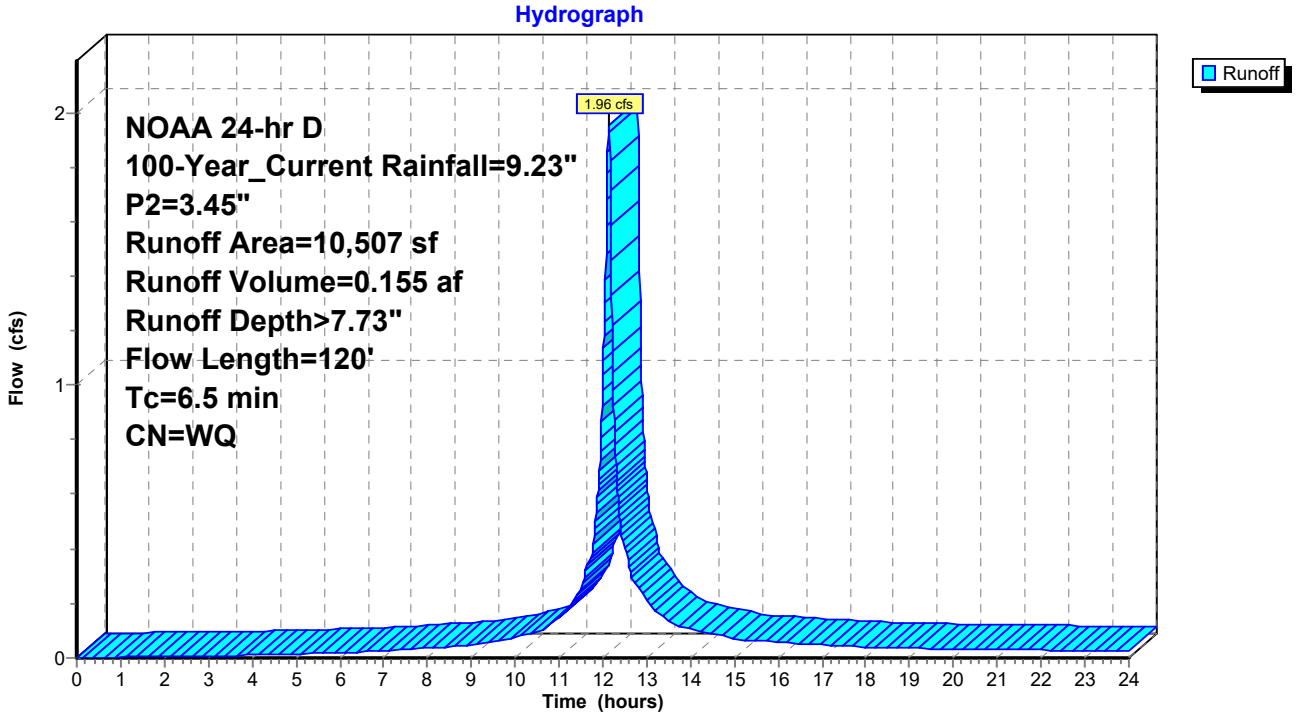
Runoff = 1.96 cfs @ 12.13 hrs, Volume= 0.155 af, Depth> 7.73"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0237	0.26		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.5	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.01
2.50	0.28	0.00	0.01
3.00	0.35	0.00	0.01
3.50	0.41	0.01	0.01
4.00	0.48	0.03	0.01
4.50	0.56	0.05	0.01
5.00	0.63	0.07	0.01
5.50	0.71	0.11	0.02
6.00	0.79	0.14	0.02
6.50	0.88	0.18	0.02
7.00	0.97	0.24	0.03
7.50	1.08	0.30	0.03
8.00	1.20	0.37	0.04
8.50	1.33	0.46	0.04
9.00	1.46	0.56	0.05
9.50	1.63	0.68	0.06
10.00	1.83	0.83	0.08
10.50	2.07	1.02	0.09
11.00	2.40	1.30	0.15
11.50	2.93	1.75	0.25
12.00	4.42	3.12	**1.04**
12.50	6.30	4.92	**0.40**
13.00	6.83	5.43	0.21
13.50	7.16	5.75	0.14
14.00	7.40	5.98	0.11
14.50	7.60	6.18	0.09
15.00	7.77	6.34	0.07
15.50	7.90	6.47	0.06
16.00	8.03	6.60	0.06
16.50	8.15	6.71	0.05
17.00	8.26	6.82	0.05
17.50	8.35	6.92	0.04
18.00	8.44	7.00	0.04
18.50	8.52	7.08	0.04
19.00	8.60	7.15	0.04
19.50	8.67	7.23	0.03
20.00	8.75	7.30	0.03
20.50	8.82	7.37	0.03
21.00	8.88	7.43	0.03
21.50	8.95	7.50	0.03
22.00	9.01	7.56	0.03
22.50	9.07	7.61	0.03
23.00	9.12	7.67	0.03
23.50	9.18	7.72	0.03
24.00	**9.23**	**7.77**	0.02

Summary for Subcatchment 12S: PO-DA J

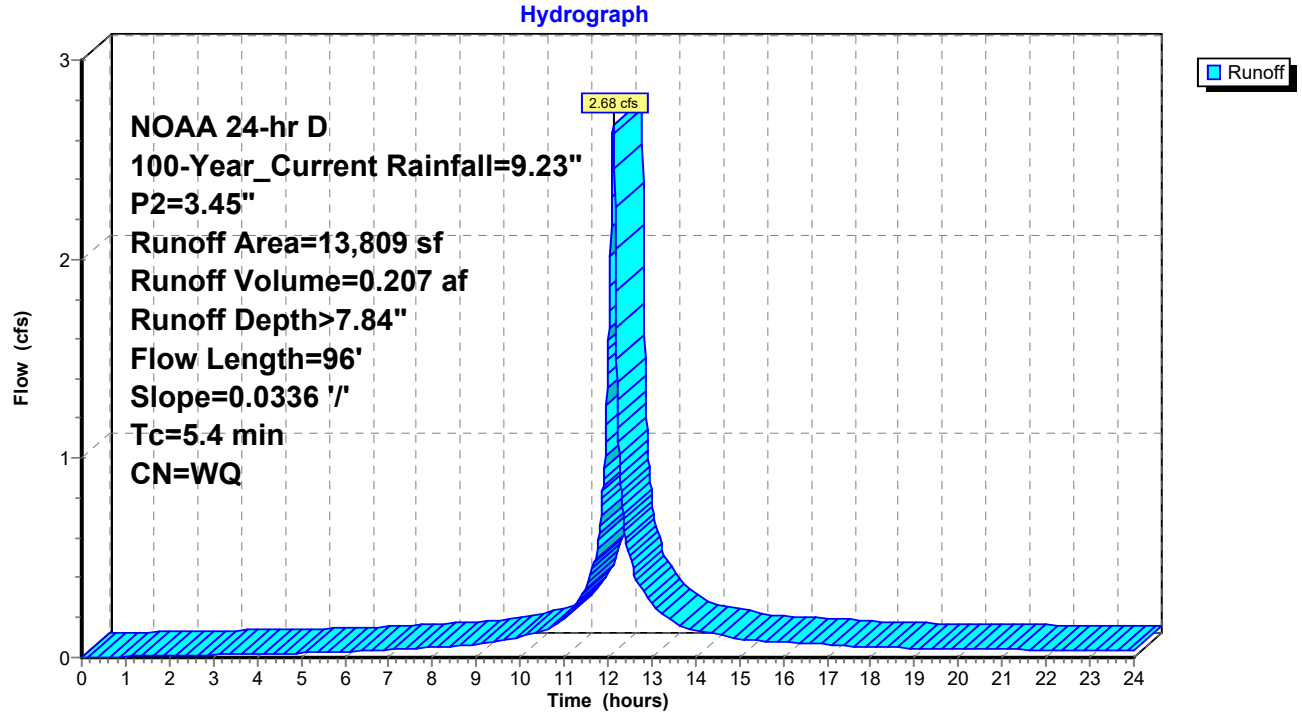
Runoff = 2.68 cfs @ 12.12 hrs, Volume= 0.207 af, Depth> 7.84"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	96	0.0336	0.30		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.01
2.50	0.28	0.00	0.01
3.00	0.35	0.01	0.01
3.50	0.41	0.02	0.02
4.00	0.48	0.04	0.02
4.50	0.56	0.06	0.02
5.00	0.63	0.09	0.02
5.50	0.71	0.13	0.03
6.00	0.79	0.16	0.03
6.50	0.88	0.21	0.03
7.00	0.97	0.27	0.04
7.50	1.08	0.34	0.05
8.00	1.20	0.41	0.05
8.50	1.33	0.50	0.06
9.00	1.46	0.60	0.07
9.50	1.63	0.73	0.08
10.00	1.83	0.89	0.11
10.50	2.07	1.08	0.13
11.00	2.40	1.37	0.20
11.50	2.93	1.83	0.34
12.00	4.42	3.22	**1.49**
12.50	6.30	5.03	**0.52**
13.00	6.83	5.54	0.27
13.50	7.16	5.87	0.18
14.00	7.40	6.10	0.14
14.50	7.60	6.30	0.12
15.00	7.77	6.46	0.09
15.50	7.90	6.59	0.08
16.00	8.03	6.72	0.08
16.50	8.15	6.83	0.07
17.00	8.26	6.94	0.06
17.50	8.35	7.04	0.06
18.00	8.44	7.12	0.05
18.50	8.52	7.20	0.05
19.00	8.60	7.28	0.05
19.50	8.67	7.35	0.05
20.00	8.75	7.42	0.04
20.50	8.82	7.49	0.04
21.00	8.88	7.55	0.04
21.50	8.95	7.62	0.04
22.00	9.01	7.68	0.04
22.50	9.07	7.74	0.04
23.00	9.12	7.79	0.03
23.50	9.18	7.85	0.03
24.00	**9.23**	**7.90**	0.03

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 7.59" for 100-Year_Current event
Inflow = 3.18 cfs @ 12.27 hrs, Volume= 0.359 af
Outflow = 1.24 cfs @ 12.62 hrs, Volume= 0.354 af, Atten= 61%, Lag= 21.1 min
Primary = 1.24 cfs @ 12.62 hrs, Volume= 0.354 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 601.35' @ 12.62 hrs Surf.Area= 5,277 sf Storage= 5,218 cf

Plug-Flow detention time= 99.5 min calculated for 0.354 af (99% of inflow)
Center-of-Mass det. time= 91.3 min (881.9 - 790.6)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

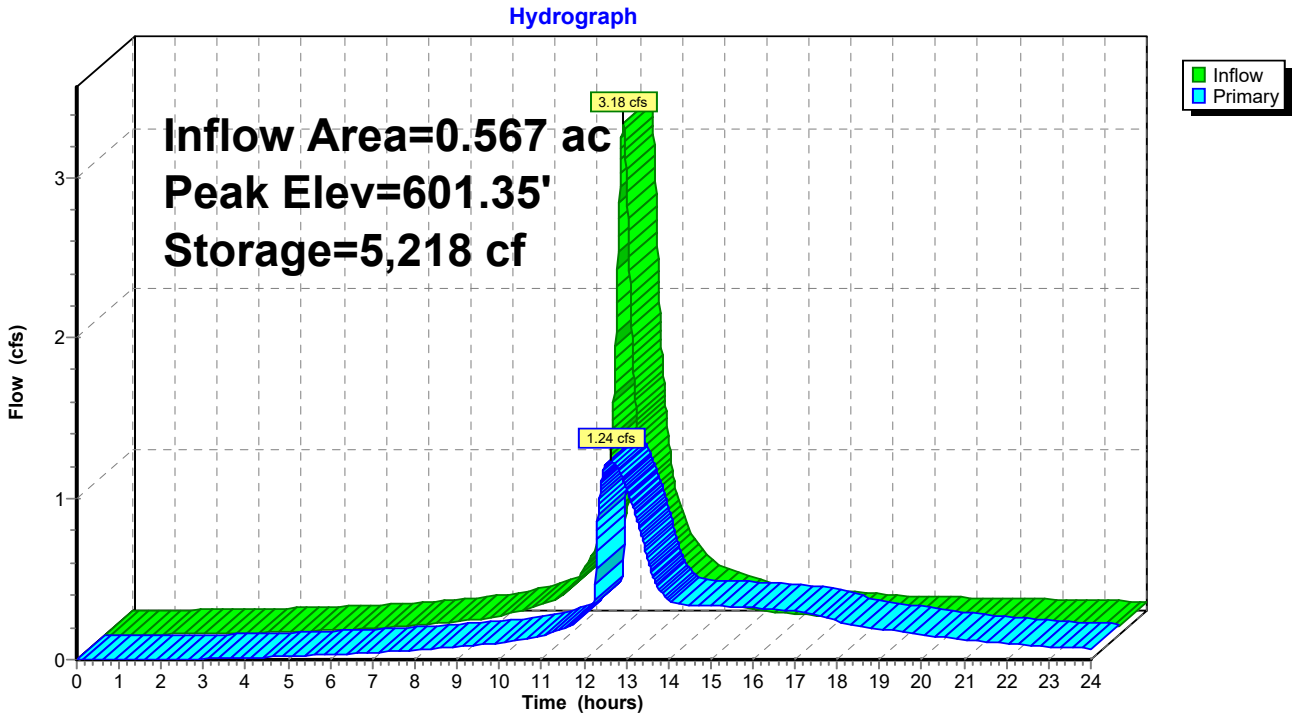
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.24 cfs @ 12.62 hrs HW=601.35' TW=591.19' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 1.24 cfs of 11.52 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.38 cfs @ 11.03 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.87 cfs @ 4.15 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.00	2	596.00	0.00
1.50	0.01	10	596.01	0.00
2.00	0.01	20	596.03	0.00
2.50	0.01	31	596.04	0.00
3.00	0.01	40	596.06	0.01
3.50	0.01	48	596.07	0.01
4.00	0.02	58	596.08	0.01
4.50	0.02	69	596.10	0.02
5.00	0.03	81	596.11	0.02
5.50	0.03	93	596.13	0.03
6.00	0.04	104	596.14	0.03
6.50	0.05	115	596.16	0.04
7.00	0.06	131	596.18	0.05
7.50	0.07	152	596.21	0.05
8.00	0.08	178	596.25	0.06
8.50	0.09	210	596.29	0.07
9.00	0.10	248	596.34	0.08
9.50	0.13	298	596.41	0.09
10.00	0.16	381	596.53	0.11
10.50	0.20	500	596.70	0.13
11.00	0.29	681	596.96	0.15
11.50	0.49	1,054	597.49	0.19
12.00	**1.24**	1,955	599.48	0.30
12.50	**1.74**	**5,115**	**601.29**	**1.20**
13.00	0.62	**4,778**	**601.10**	**1.07**
13.50	0.38	4,075	600.70	0.64
14.00	0.27	3,792	600.54	0.37
14.50	0.22	3,608	600.43	0.34
15.00	0.18	3,366	600.30	0.34
15.50	0.15	3,067	600.13	0.33
16.00	0.14	2,749	599.95	0.32
16.50	0.13	2,423	599.76	0.31
17.00	0.12	2,092	599.57	0.31
17.50	0.11	1,766	598.98	0.28
18.00	0.10	1,485	598.24	0.24
18.50	0.09	1,247	597.78	0.21
19.00	0.09	1,041	597.47	0.19
19.50	0.08	865	597.22	0.17
20.00	0.08	716	597.01	0.16
20.50	0.08	592	596.83	0.14
21.00	0.07	490	596.69	0.13
21.50	0.07	409	596.57	0.11
22.00	0.07	344	596.48	0.10
22.50	0.07	294	596.41	0.09
23.00	0.06	256	596.35	0.08
23.50	0.06	226	596.31	0.07
24.00	0.06	203	596.28	0.07

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 7.80" for 100-Year_Current event
Inflow = 2.14 cfs @ 12.23 hrs, Volume= 0.228 af
Outflow = 1.85 cfs @ 12.31 hrs, Volume= 0.225 af, Atten= 14%, Lag= 5.0 min
Primary = 1.85 cfs @ 12.31 hrs, Volume= 0.225 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 601.42' @ 12.31 hrs Surf.Area= 4,734 sf Storage= 2,112 cf

Plug-Flow detention time= 55.0 min calculated for 0.225 af (99% of inflow)
Center-of-Mass det. time= 48.3 min (829.1 - 780.7)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

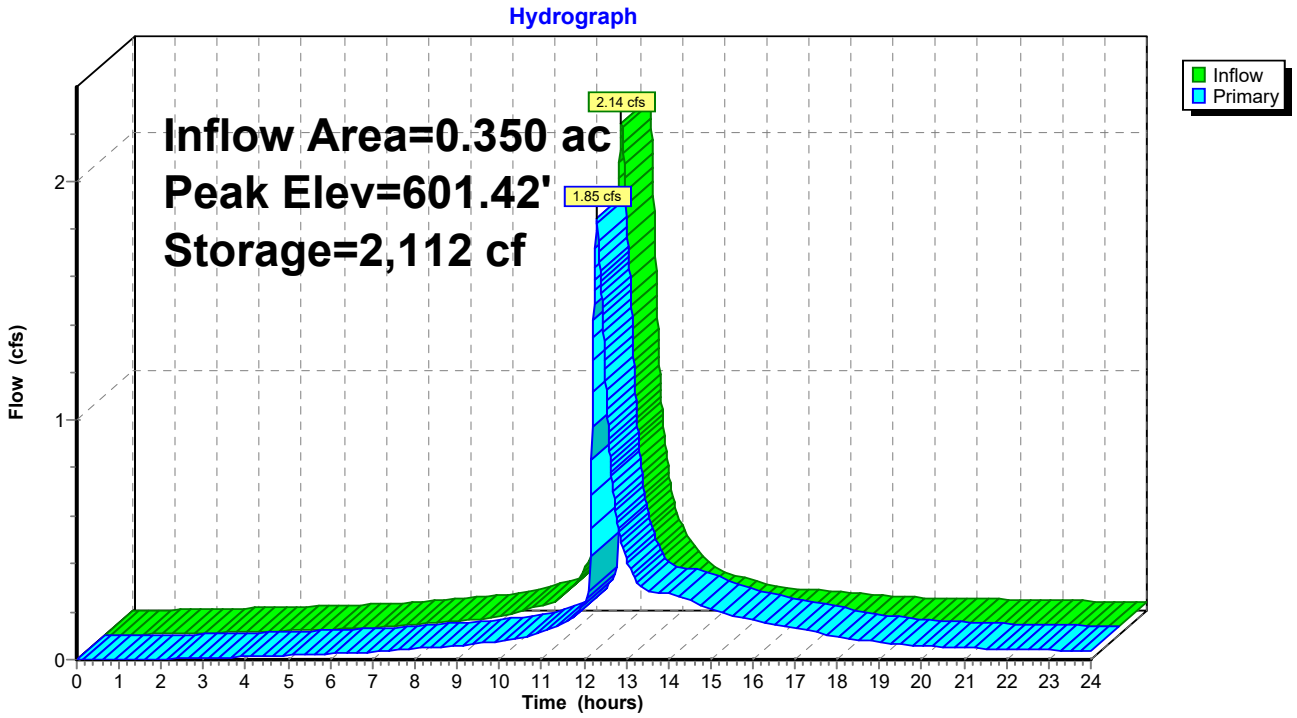
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.85 cfs @ 12.31 hrs HW=601.42' TW=589.40' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 1.85 cfs of 12.30 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.30 cfs @ 8.77 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 1.39 cfs @ 2.22 fps)
  └─**4=Overflow Grate (Elevation I)** (Weir Controls 0.16 cfs @ 0.47 fps)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.00	3	598.00	0.00
1.50	0.01	12	598.02	0.00
2.00	0.01	23	598.04	0.00
2.50	0.01	34	598.05	0.01
3.00	0.01	42	598.07	0.01
3.50	0.01	48	598.07	0.01
4.00	0.02	55	598.08	0.01
4.50	0.02	61	598.09	0.02
5.00	0.02	68	598.10	0.02
5.50	0.03	74	598.11	0.02
6.00	0.03	80	598.12	0.03
6.50	0.03	87	598.13	0.03
7.00	0.04	96	598.15	0.03
7.50	0.05	107	598.17	0.04
8.00	0.05	120	598.18	0.05
8.50	0.06	134	598.21	0.05
9.00	0.07	151	598.23	0.06
9.50	0.09	176	598.27	0.07
10.00	0.11	220	598.34	0.08
10.50	0.13	281	598.43	0.09
11.00	0.19	379	598.59	0.11
11.50	0.32	596	598.93	0.15
12.00	**0.88**	**1,170**	**600.19**	**0.24**
12.50	**0.93**	**1,947**	**601.32**	**1.26**
13.00	0.36	1,697	601.16	0.42
13.50	0.23	1,603	601.10	0.28
14.00	0.16	1,432	600.95	0.28
14.50	0.14	1,229	600.36	0.25
15.00	0.11	1,039	599.81	0.21
15.50	0.09	865	599.38	0.19
16.00	0.09	713	599.13	0.17
16.50	0.08	583	598.91	0.15
17.00	0.07	472	598.74	0.13
17.50	0.07	378	598.59	0.11
18.00	0.06	301	598.47	0.10
18.50	0.05	239	598.37	0.08
19.00	0.05	195	598.30	0.07
19.50	0.05	167	598.26	0.06
20.00	0.05	149	598.23	0.06
20.50	0.05	137	598.21	0.05
21.00	0.05	128	598.20	0.05
21.50	0.04	122	598.19	0.05
22.00	0.04	117	598.18	0.05
22.50	0.04	113	598.17	0.04
23.00	0.04	109	598.17	0.04
23.50	0.04	106	598.16	0.04
24.00	0.04	102	598.16	0.04

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 7.72" for 100-Year_Current event
Inflow = 1.97 cfs @ 12.32 hrs, Volume= 0.250 af
Outflow = 0.34 cfs @ 13.29 hrs, Volume= 0.246 af, Atten= 83%, Lag= 58.1 min
Primary = 0.34 cfs @ 13.29 hrs, Volume= 0.246 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.43' @ 13.29 hrs Surf.Area= 6,525 sf Storage= 4,464 cf

Plug-Flow detention time= 138.7 min calculated for 0.246 af (98% of inflow)
Center-of-Mass det. time= 128.2 min (916.9 - 788.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

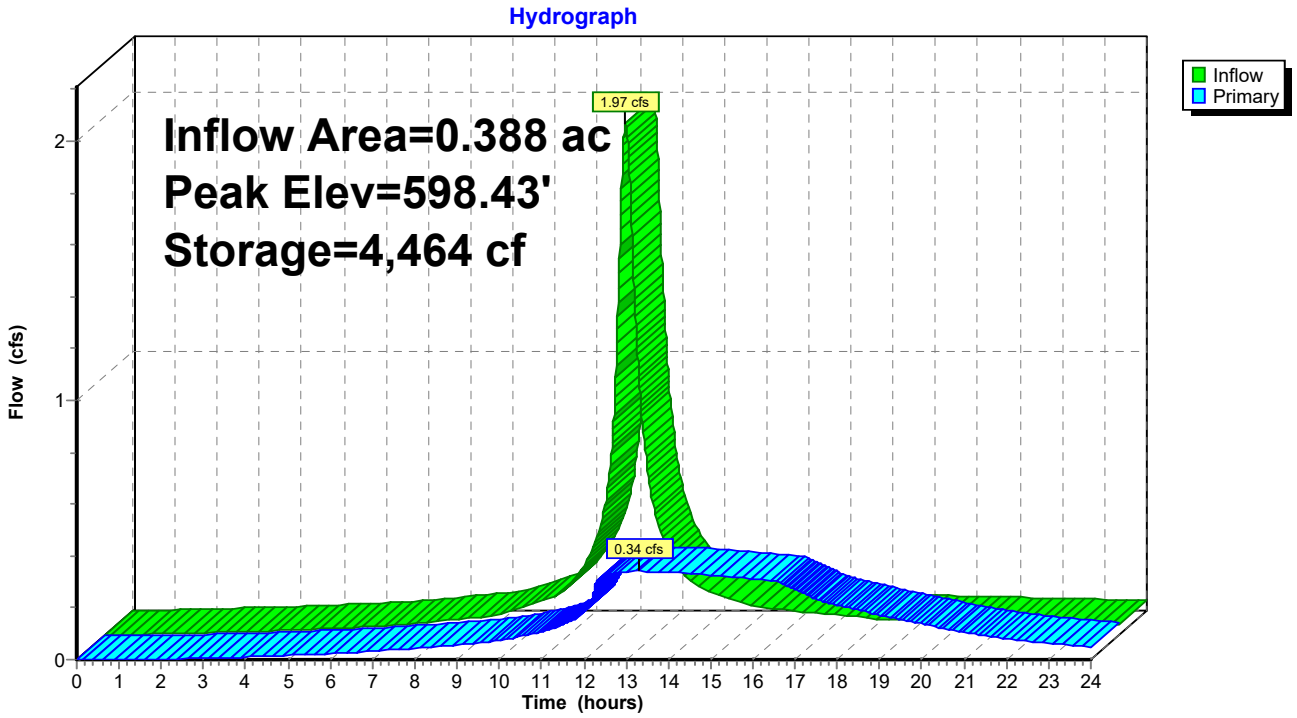
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.34 cfs @ 13.29 hrs HW=598.43' TW=587.39' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.34 cfs of 18.32 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.34 cfs @ 10.01 fps)
  ├─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	2	594.00	0.00
1.50	0.01	9	594.01	0.00
2.00	0.01	22	594.02	0.00
2.50	0.01	35	594.04	0.00
3.00	0.01	47	594.05	0.01
3.50	0.01	58	594.06	0.01
4.00	0.02	68	594.08	0.01
4.50	0.02	79	594.09	0.01
5.00	0.02	90	594.10	0.02
5.50	0.03	100	594.11	0.02
6.00	0.03	111	594.12	0.02
6.50	0.03	121	594.13	0.03
7.00	0.04	134	594.14	0.03
7.50	0.05	150	594.16	0.04
8.00	0.06	168	594.18	0.05
8.50	0.06	189	594.20	0.05
9.00	0.07	214	594.23	0.06
9.50	0.09	245	594.26	0.07
10.00	0.11	298	594.32	0.08
10.50	0.14	375	594.41	0.09
11.00	0.19	487	594.53	0.11
11.50	0.31	713	594.79	0.14
12.00	**0.72**	1,248	595.41	0.19
12.50	**1.45**	3,490	597.98	0.32
13.00	0.49	**4,393**	**598.40**	**0.34**
13.50	0.28	**4,439**	**598.42**	**0.34**
14.00	0.19	4,238	598.33	0.34
14.50	0.16	3,948	598.19	0.33
15.00	0.13	3,616	598.04	0.33
15.50	0.11	3,248	597.87	0.32
16.00	0.10	2,868	597.70	0.31
16.50	0.09	2,486	597.52	0.30
17.00	0.08	2,124	596.82	0.27
17.50	0.08	1,812	596.16	0.24
18.00	0.07	1,542	595.76	0.21
18.50	0.06	1,295	595.46	0.19
19.00	0.06	1,076	595.21	0.17
19.50	0.06	886	594.99	0.15
20.00	0.06	725	594.81	0.14
20.50	0.05	590	594.65	0.12
21.00	0.05	479	594.53	0.11
21.50	0.05	391	594.42	0.09
22.00	0.05	322	594.35	0.08
22.50	0.05	271	594.29	0.07
23.00	0.04	232	594.25	0.06
23.50	0.04	204	594.22	0.06
24.00	0.04	182	594.20	0.05

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 7.73" for 100-Year_Current event
Inflow = 1.96 cfs @ 12.13 hrs, Volume= 0.155 af
Outflow = 0.32 cfs @ 12.62 hrs, Volume= 0.154 af, Atten= 84%, Lag= 29.0 min
Primary = 0.32 cfs @ 12.62 hrs, Volume= 0.154 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.66' @ 12.62 hrs Surf.Area= 4,725 sf Storage= 2,328 cf

Plug-Flow detention time= 79.7 min calculated for 0.153 af (99% of inflow)
Center-of-Mass det. time= 72.1 min (848.2 - 776.1)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

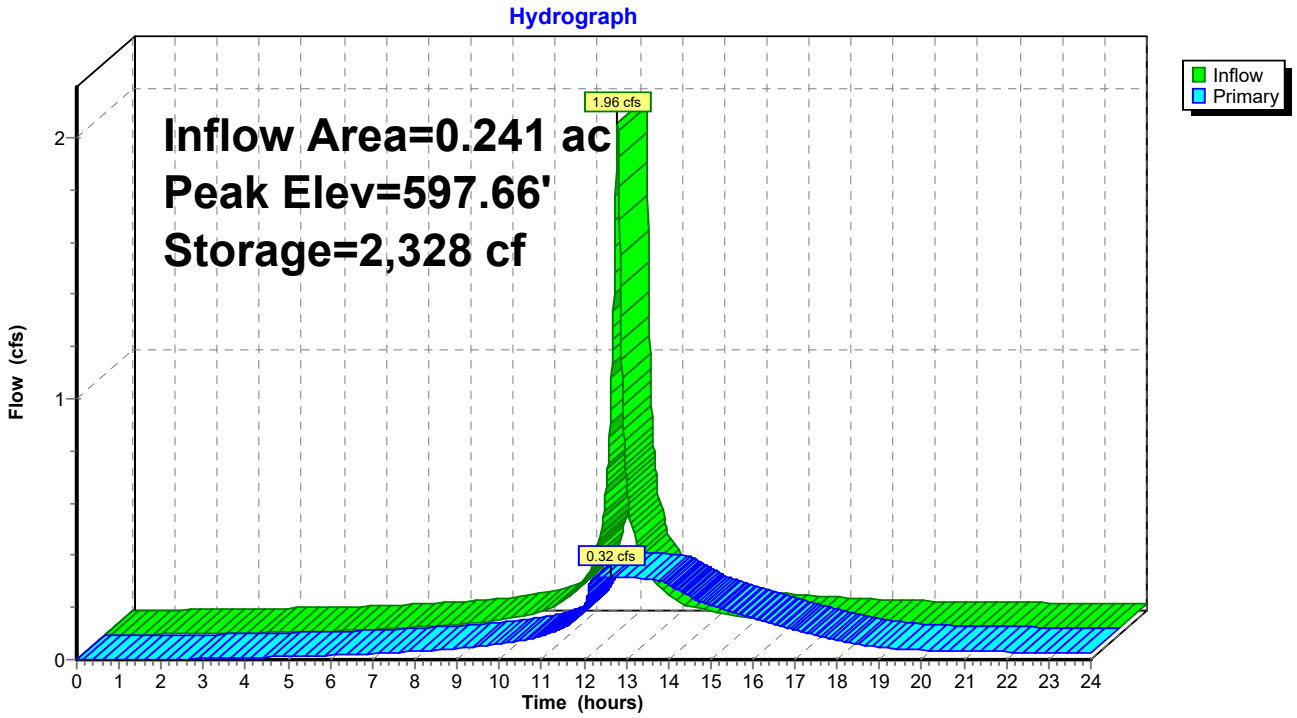
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.32 cfs @ 12.62 hrs HW=597.66' TW=581.32' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.32 cfs of 29.82 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.32 cfs @ 9.33 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	3	593.80	0.00
1.50	0.00	9	593.81	0.00
2.00	0.01	17	593.83	0.00
2.50	0.01	24	593.84	0.00
3.00	0.01	30	593.85	0.00
3.50	0.01	35	593.86	0.01
4.00	0.01	41	593.86	0.01
4.50	0.01	47	593.87	0.01
5.00	0.01	52	593.88	0.01
5.50	0.02	57	593.89	0.01
6.00	0.02	62	593.90	0.02
6.50	0.02	68	593.91	0.02
7.00	0.03	76	593.92	0.02
7.50	0.03	84	593.93	0.03
8.00	0.04	93	593.94	0.03
8.50	0.04	102	593.96	0.04
9.00	0.05	111	593.97	0.04
9.50	0.06	127	594.00	0.05
10.00	0.08	154	594.04	0.06
10.50	0.09	191	594.09	0.07
11.00	0.15	263	594.21	0.09
11.50	0.25	426	594.47	0.12
12.00	**1.04**	992	595.37	0.20
12.50	**0.40**	**2,306**	**597.65**	**0.32**
13.00	0.21	**2,245**	**597.61**	**0.32**
13.50	0.14	1,988	597.45	0.31
14.00	0.11	1,654	596.99	0.29
14.50	0.09	1,352	596.11	0.24
15.00	0.07	1,093	595.54	0.21
15.50	0.06	860	595.15	0.18
16.00	0.06	662	594.84	0.16
16.50	0.05	500	594.58	0.14
17.00	0.05	370	594.38	0.11
17.50	0.04	270	594.22	0.09
18.00	0.04	198	594.10	0.07
18.50	0.04	149	594.03	0.06
19.00	0.04	121	593.99	0.05
19.50	0.03	107	593.97	0.04
20.00	0.03	100	593.95	0.04
20.50	0.03	97	593.95	0.03
21.00	0.03	94	593.94	0.03
21.50	0.03	91	593.94	0.03
22.00	0.03	89	593.94	0.03
22.50	0.03	87	593.93	0.03
23.00	0.03	85	593.93	0.03
23.50	0.03	82	593.93	0.03
24.00	0.02	80	593.92	0.03

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 7.84" for 100-Year_Current event
Inflow = 2.68 cfs @ 12.12 hrs, Volume= 0.207 af
Outflow = 0.32 cfs @ 12.85 hrs, Volume= 0.203 af, Atten= 88%, Lag= 43.8 min
Primary = 0.32 cfs @ 12.85 hrs, Volume= 0.203 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.36' @ 12.85 hrs Surf.Area= 8,682 sf Storage= 3,691 cf

Plug-Flow detention time= 142.5 min calculated for 0.203 af (98% of inflow)
Center-of-Mass det. time= 128.8 min (899.1 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

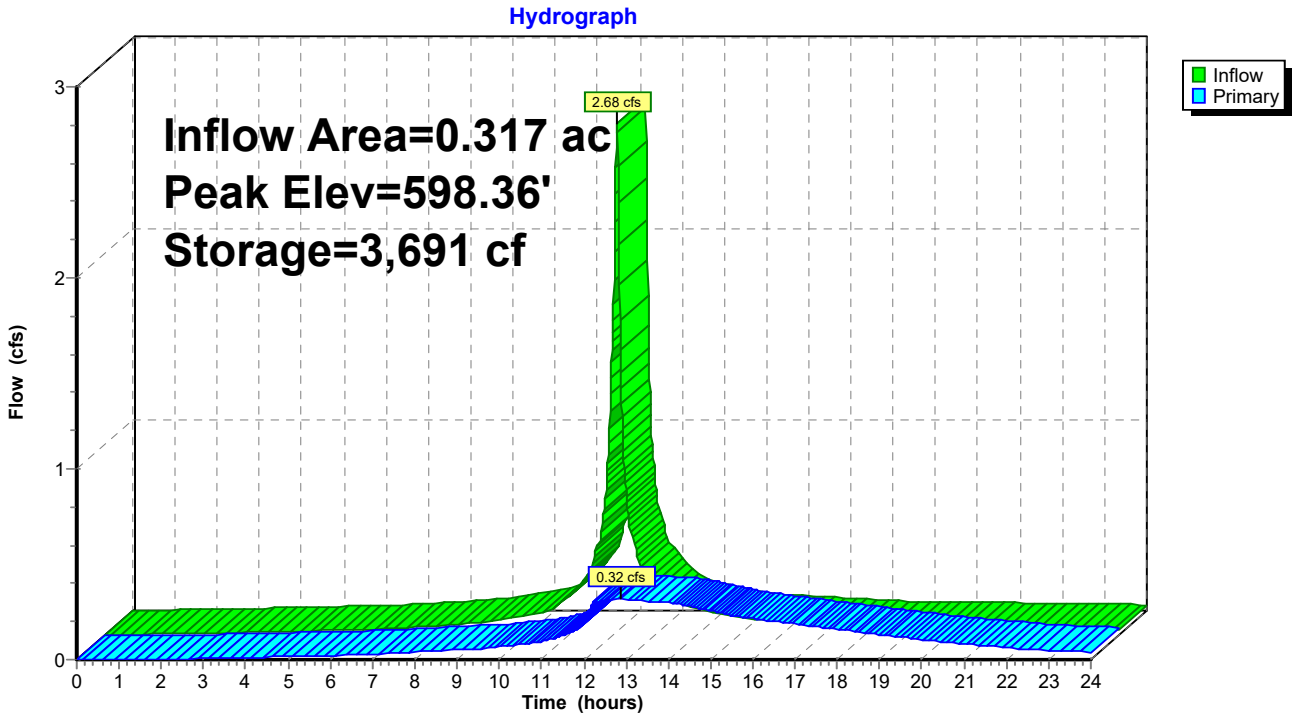
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.32 cfs @ 12.85 hrs HW=598.36' TW=585.65' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.32 cfs of 19.78 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.31 cfs @ 9.08 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.01 cfs @ 0.77 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

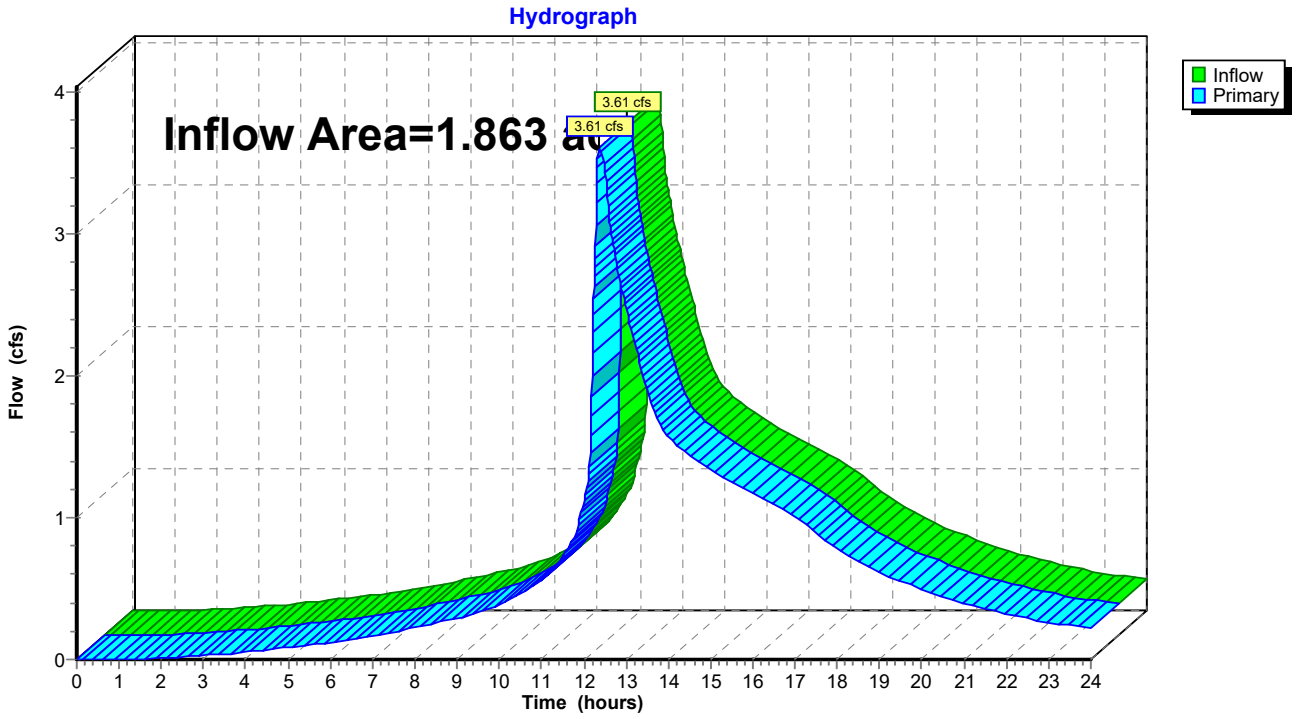
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.01	5	594.70	0.00
1.50	0.01	17	594.71	0.00
2.00	0.01	32	594.73	0.00
2.50	0.01	48	594.74	0.00
3.00	0.01	63	594.75	0.01
3.50	0.02	77	594.77	0.01
4.00	0.02	90	594.78	0.01
4.50	0.02	102	594.79	0.01
5.00	0.02	114	594.80	0.02
5.50	0.03	125	594.81	0.02
6.00	0.03	136	594.81	0.02
6.50	0.03	148	594.82	0.03
7.00	0.04	163	594.84	0.03
7.50	0.05	180	594.85	0.03
8.00	0.05	199	594.87	0.04
8.50	0.06	219	594.88	0.05
9.00	0.07	242	594.90	0.05
9.50	0.08	278	594.93	0.06
10.00	0.11	334	594.98	0.07
10.50	0.13	410	595.04	0.08
11.00	0.20	544	595.16	0.10
11.50	0.34	821	595.40	0.13
12.00	**1.49**	1,720	596.17	0.19
12.50	**0.52**	**3,595**	**598.32**	**0.31**
13.00	0.27	**3,680**	**598.35**	**0.32**
13.50	0.18	3,515	598.30	0.31
14.00	0.14	3,242	598.20	0.30
14.50	0.12	2,946	597.74	0.28
15.00	0.09	2,651	597.27	0.26
15.50	0.08	2,367	596.82	0.23
16.00	0.08	2,110	596.53	0.22
16.50	0.07	1,868	596.31	0.20
17.00	0.06	1,641	596.11	0.19
17.50	0.06	1,427	595.92	0.17
18.00	0.05	1,227	595.75	0.16
18.50	0.05	1,043	595.59	0.15
19.00	0.05	881	595.45	0.13
19.50	0.05	740	595.33	0.12
20.00	0.04	619	595.22	0.11
20.50	0.04	517	595.13	0.09
21.00	0.04	433	595.06	0.08
21.50	0.04	365	595.00	0.07
22.00	0.04	311	594.96	0.06
22.50	0.04	269	594.92	0.06
23.00	0.03	237	594.90	0.05
23.50	0.03	212	594.88	0.04
24.00	0.03	196	594.86	0.04

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 7.61" for 100-Year_Current event
Inflow = 3.61 cfs @ 12.36 hrs, Volume= 1.181 af
Primary = 3.61 cfs @ 12.36 hrs, Volume= 1.181 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.01		0.01
2.50	0.02		0.02
3.00	0.03		0.03
3.50	0.04		0.04
4.00	0.05		0.05
4.50	0.07		0.07
5.00	0.09		0.09
5.50	0.10		0.10
6.00	0.12		0.12
6.50	0.14		0.14
7.00	0.16		0.16
7.50	0.19		0.19
8.00	0.23		0.23
8.50	0.26		0.26
9.00	0.29		0.29
9.50	0.33		0.33
10.00	0.39		0.39
10.50	0.46		0.46
11.00	0.56		0.56
11.50	0.73		0.73
12.00	**1.11**		**1.11**
12.50	**3.45**		**3.45**
13.00	2.48		2.48
13.50	1.89		1.89
14.00	1.58		1.58
14.50	1.45		1.45
15.00	1.34		1.34
15.50	1.25		1.25
16.00	1.17		1.17
16.50	1.10		1.10
17.00	1.01		1.01
17.50	0.89		0.89
18.00	0.78		0.78
18.50	0.69		0.69
19.00	0.62		0.62
19.50	0.55		0.55
20.00	0.49		0.49
20.50	0.44		0.44
21.00	0.40		0.40
21.50	0.36		0.36
22.00	0.32		0.32
22.50	0.29		0.29
23.00	0.26		0.26
23.50	0.24		0.24
24.00	0.22		0.22

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 7.61" for 100-Year_Current event
Inflow = 3.61 cfs @ 12.36 hrs, Volume= 1.181 af
Outflow = 3.61 cfs @ 12.36 hrs, Volume= 1.181 af, Atten= 0%, Lag= 0.1 min
Primary = 3.61 cfs @ 12.36 hrs, Volume= 1.181 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 581.41' @ 12.36 hrs Surf.Area= 0.001 ac Storage= 0.000 af

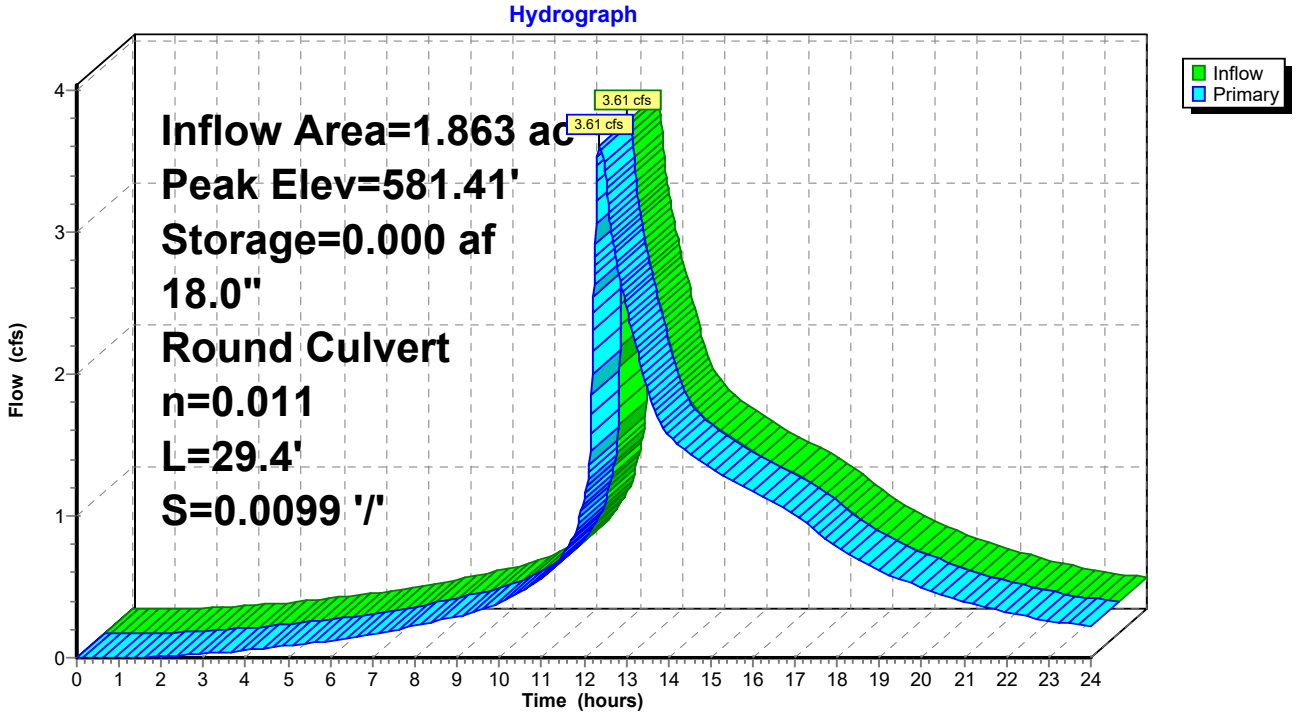
Plug-Flow detention time= 0.0 min calculated for 1.181 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (877.9 - 877.9)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=3.61 cfs @ 12.36 hrs HW=581.41' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 3.61 cfs @ 4.25 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.00	0.000	580.69	0.00
2.00	0.01	0.000	580.69	0.01
2.50	0.02	0.000	580.69	0.02
3.00	0.03	0.000	580.69	0.03
3.50	0.04	0.000	580.69	0.04
4.00	0.05	0.000	580.69	0.05
4.50	0.07	0.000	580.69	0.07
5.00	0.09	0.000	580.69	0.09
5.50	0.10	0.000	580.69	0.10
6.00	0.12	0.000	580.69	0.12
6.50	0.14	0.000	580.69	0.14
7.00	0.16	0.000	580.69	0.16
7.50	0.19	0.000	580.69	0.19
8.00	0.23	0.000	580.69	0.23
8.50	0.26	0.000	580.69	0.26
9.00	0.29	0.000	580.69	0.29
9.50	0.33	0.000	580.69	0.33
10.00	0.39	0.000	580.71	0.39
10.50	0.46	0.000	580.74	0.46
11.00	0.56	0.000	580.77	0.56
11.50	0.73	0.000	580.82	0.73
12.00	**1.11**	**0.000**	**580.92**	**1.11**
12.50	**3.44**	**0.000**	**581.38**	**3.45**
13.00	2.48	0.000	581.21	2.48
13.50	1.89	0.000	581.10	1.89
14.00	1.58	0.000	581.03	1.58
14.50	1.45	0.000	581.00	1.45
15.00	1.34	0.000	580.98	1.34
15.50	1.25	0.000	580.96	1.25
16.00	1.17	0.000	580.94	1.17
16.50	1.10	0.000	580.92	1.10
17.00	1.01	0.000	580.90	1.01
17.50	0.89	0.000	580.87	0.89
18.00	0.78	0.000	580.84	0.78
18.50	0.69	0.000	580.81	0.69
19.00	0.62	0.000	580.79	0.62
19.50	0.55	0.000	580.77	0.55
20.00	0.49	0.000	580.75	0.49
20.50	0.44	0.000	580.73	0.44
21.00	0.40	0.000	580.72	0.40
21.50	0.36	0.000	580.70	0.36
22.00	0.32	0.000	580.69	0.32
22.50	0.29	0.000	580.69	0.29
23.00	0.26	0.000	580.69	0.26
23.50	0.24	0.000	580.69	0.24
24.00	0.22	0.000	580.69	0.22

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 7.60" for 100-Year_Current event
Inflow = 3.29 cfs @ 12.36 hrs, Volume= 1.028 af
Outflow = 3.29 cfs @ 12.36 hrs, Volume= 1.028 af, Atten= 0%, Lag= 0.2 min
Primary = 3.29 cfs @ 12.36 hrs, Volume= 1.028 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.82' @ 12.36 hrs Surf.Area= 0.002 ac Storage= 0.001 af

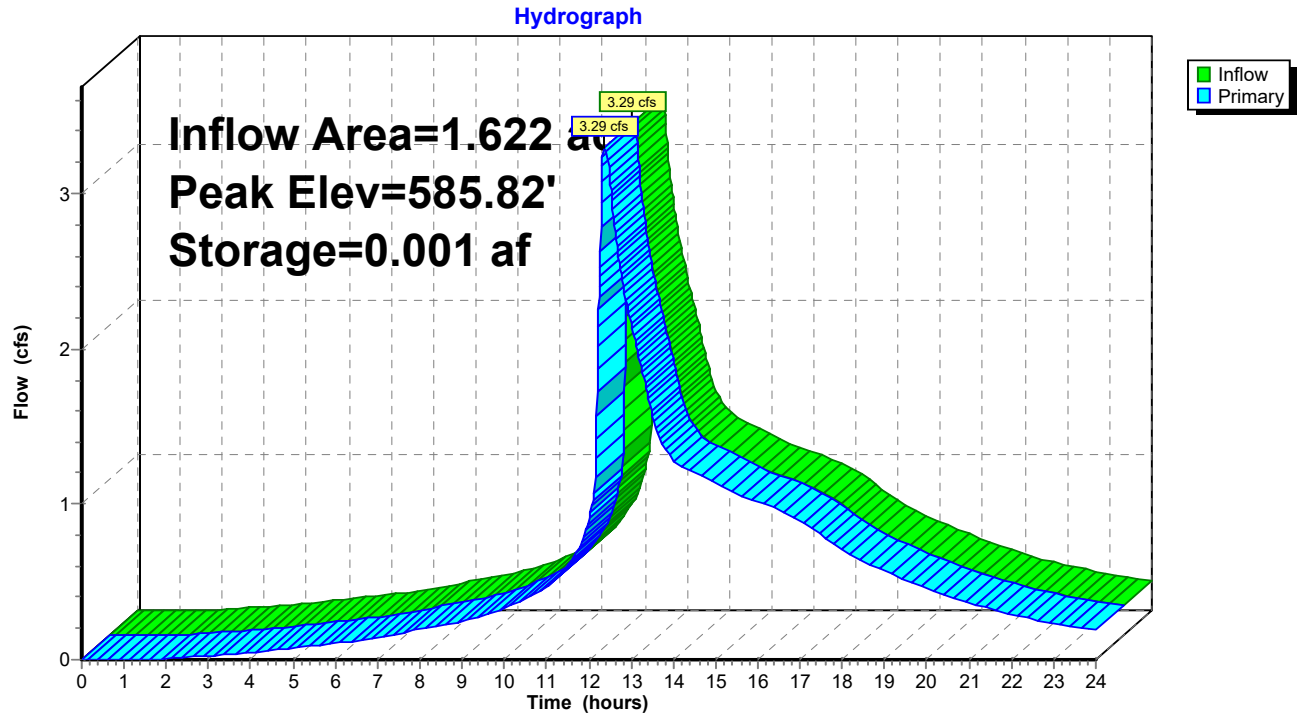
Plug-Flow detention time= 0.1 min calculated for 1.027 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (882.3 - 882.2)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.29 cfs @ 12.36 hrs HW=585.82' TW=581.41' (Dynamic Tailwater)
↑—**1=SD-24** (Orifice Controls 3.29 cfs @ 3.31 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.88	0.00
1.50	0.00	0.000	584.90	0.00
2.00	0.01	0.000	584.92	0.01
2.50	0.02	0.000	584.93	0.02
3.00	0.02	0.000	584.95	0.02
3.50	0.03	0.000	584.96	0.03
4.00	0.05	0.000	584.98	0.05
4.50	0.06	0.000	584.99	0.06
5.00	0.07	0.000	585.00	0.07
5.50	0.09	0.000	585.01	0.09
6.00	0.10	0.000	585.03	0.10
6.50	0.12	0.000	585.04	0.12
7.00	0.14	0.000	585.05	0.14
7.50	0.17	0.000	585.07	0.17
8.00	0.19	0.000	585.08	0.19
8.50	0.22	0.000	585.09	0.22
9.00	0.25	0.000	585.11	0.25
9.50	0.28	0.000	585.12	0.28
10.00	0.33	0.000	585.14	0.33
10.50	0.39	0.000	585.17	0.39
11.00	0.47	0.000	585.20	0.47
11.50	0.60	0.000	585.24	0.60
12.00	**0.91**	**0.000**	**585.33**	**0.91**
12.50	**3.12**	**0.001**	**585.79**	**3.13**
13.00	2.16	0.000	585.61	2.16
13.50	1.58	0.000	585.49	1.58
14.00	1.29	0.000	585.42	1.29
14.50	1.20	0.000	585.40	1.20
15.00	1.13	0.000	585.39	1.13
15.50	1.07	0.000	585.37	1.07
16.00	1.01	0.000	585.36	1.01
16.50	0.97	0.000	585.35	0.97
17.00	0.89	0.000	585.33	0.89
17.50	0.80	0.000	585.30	0.80
18.00	0.71	0.000	585.27	0.71
18.50	0.63	0.000	585.25	0.63
19.00	0.57	0.000	585.23	0.57
19.50	0.51	0.000	585.21	0.51
20.00	0.46	0.000	585.19	0.46
20.50	0.41	0.000	585.18	0.41
21.00	0.37	0.000	585.16	0.37
21.50	0.33	0.000	585.14	0.33
22.00	0.29	0.000	585.13	0.29
22.50	0.26	0.000	585.11	0.26
23.00	0.24	0.000	585.10	0.24
23.50	0.21	0.000	585.09	0.21
24.00	0.20	0.000	585.08	0.20

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 7.59" for 100-Year_Current event
Inflow = 2.99 cfs @ 12.35 hrs, Volume= 0.825 af
Outflow = 2.99 cfs @ 12.36 hrs, Volume= 0.825 af, Atten= 0%, Lag= 0.2 min
Primary = 2.99 cfs @ 12.36 hrs, Volume= 0.825 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.69' @ 12.36 hrs Surf.Area= 0.001 ac Storage= 0.001 af

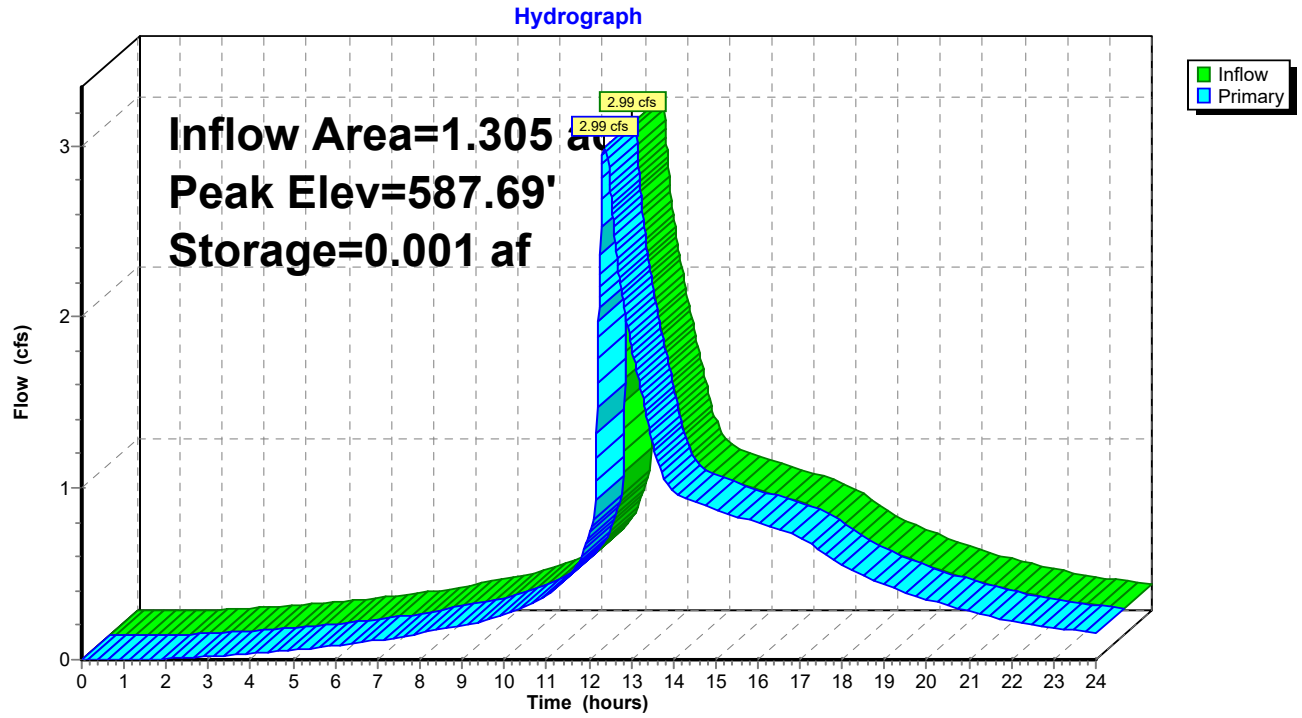
Plug-Flow detention time= 0.1 min calculated for 0.825 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (878.1 - 878.0)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.99 cfs @ 12.36 hrs HW=587.69' TW=585.82' (Dynamic Tailwater)
↑—**1=SD-23** (Orifice Controls 2.99 cfs @ 3.21 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.80	0.00
1.50	0.00	0.000	586.82	0.00
2.00	0.01	0.000	586.83	0.01
2.50	0.01	0.000	586.85	0.01
3.00	0.02	0.000	586.86	0.02
3.50	0.03	0.000	586.87	0.03
4.00	0.03	0.000	586.88	0.03
4.50	0.05	0.000	586.90	0.05
5.00	0.06	0.000	586.91	0.06
5.50	0.07	0.000	586.92	0.07
6.00	0.08	0.000	586.93	0.08
6.50	0.09	0.000	586.94	0.09
7.00	0.11	0.000	586.95	0.11
7.50	0.13	0.000	586.96	0.13
8.00	0.15	0.000	586.98	0.15
8.50	0.17	0.000	586.99	0.17
9.00	0.20	0.000	587.00	0.20
9.50	0.22	0.000	587.02	0.22
10.00	0.26	0.000	587.03	0.26
10.50	0.31	0.000	587.06	0.31
11.00	0.37	0.000	587.08	0.37
11.50	0.48	0.000	587.12	0.48
12.00	**0.72**	**0.000**	**587.20**	**0.72**
12.50	**2.80**	**0.001**	**587.65**	**2.81**
13.00	1.84	0.000	587.46	1.84
13.50	1.27	0.000	587.34	1.27
14.00	0.99	0.000	587.27	0.99
14.50	0.92	0.000	587.25	0.92
15.00	0.88	0.000	587.24	0.88
15.50	0.83	0.000	587.23	0.83
16.00	0.80	0.000	587.22	0.80
16.50	0.76	0.000	587.21	0.77
17.00	0.71	0.000	587.19	0.71
17.50	0.63	0.000	587.17	0.63
18.00	0.55	0.000	587.14	0.55
18.50	0.49	0.000	587.12	0.49
19.00	0.44	0.000	587.11	0.44
19.50	0.39	0.000	587.09	0.39
20.00	0.35	0.000	587.07	0.35
20.50	0.31	0.000	587.06	0.32
21.00	0.28	0.000	587.04	0.28
21.50	0.25	0.000	587.03	0.25
22.00	0.23	0.000	587.02	0.23
22.50	0.20	0.000	587.01	0.20
23.00	0.19	0.000	587.00	0.19
23.50	0.17	0.000	586.99	0.17
24.00	0.16	0.000	586.98	0.16

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 7.58" for 100-Year_Current event
Inflow = 2.68 cfs @ 12.34 hrs, Volume= 0.579 af
Outflow = 2.68 cfs @ 12.35 hrs, Volume= 0.579 af, Atten= 0%, Lag= 0.5 min
Primary = 2.68 cfs @ 12.35 hrs, Volume= 0.579 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 589.45' @ 12.35 hrs Surf.Area= 0.001 ac Storage= 0.001 af

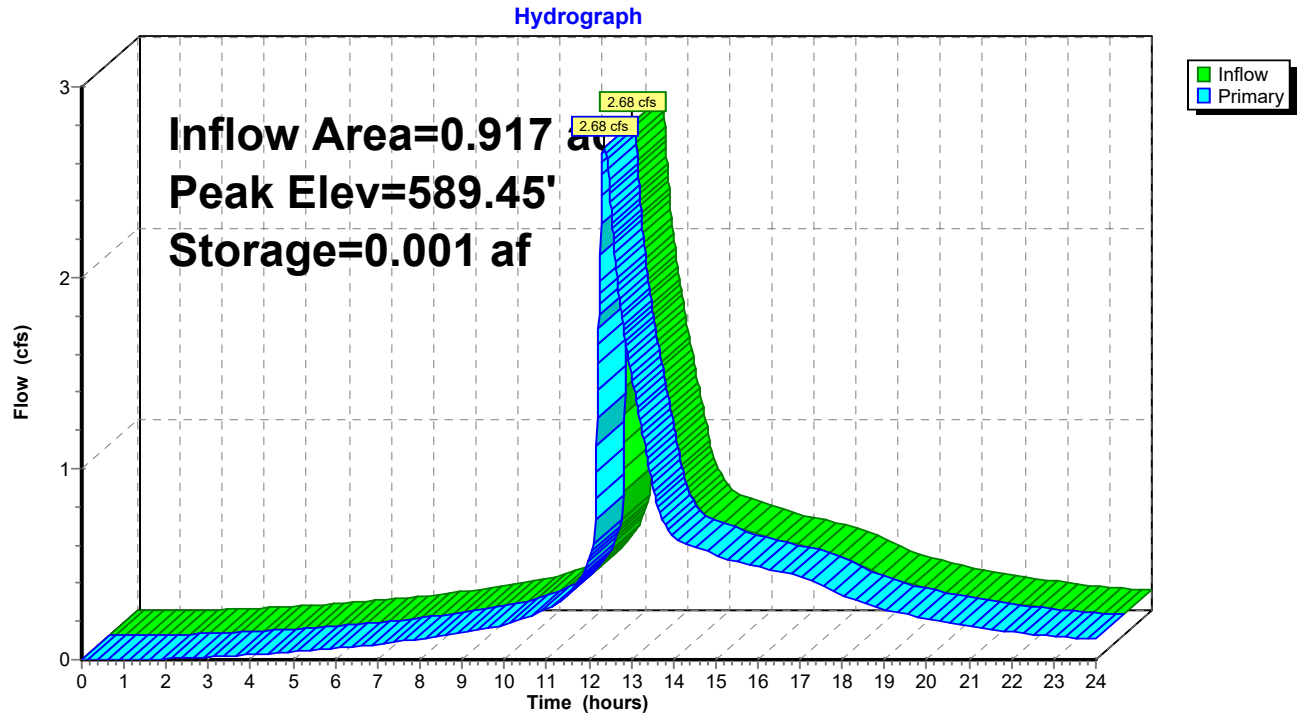
Plug-Flow detention time= 0.1 min calculated for 0.579 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (861.5 - 861.4)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.68 cfs @ 12.35 hrs HW=589.45' TW=587.69' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 2.68 cfs @ 3.41 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.45	0.00
1.50	0.00	0.000	588.47	0.00
2.00	0.00	0.000	588.48	0.00
2.50	0.01	0.000	588.49	0.01
3.00	0.01	0.000	588.51	0.01
3.50	0.02	0.000	588.51	0.02
4.00	0.02	0.000	588.52	0.02
4.50	0.03	0.000	588.54	0.03
5.00	0.04	0.000	588.55	0.04
5.50	0.05	0.000	588.56	0.05
6.00	0.06	0.000	588.56	0.06
6.50	0.07	0.000	588.57	0.07
7.00	0.08	0.000	588.59	0.08
7.50	0.09	0.000	588.60	0.09
8.00	0.11	0.000	588.61	0.11
8.50	0.12	0.000	588.62	0.12
9.00	0.14	0.000	588.63	0.14
9.50	0.16	0.000	588.64	0.16
10.00	0.19	0.000	588.66	0.19
10.50	0.22	0.000	588.68	0.22
11.00	0.27	0.000	588.70	0.27
11.50	0.34	0.000	588.74	0.34
12.00	**0.54**	**0.000**	**588.82**	**0.54**
12.50	**2.46**	**0.001**	**589.37**	**2.47**
13.00	1.49	0.000	589.10	1.50
13.50	0.93	0.000	588.94	0.93
14.00	0.65	0.000	588.86	0.65
14.50	0.59	0.000	588.83	0.59
15.00	0.55	0.000	588.82	0.55
15.50	0.51	0.000	588.81	0.51
16.00	0.49	0.000	588.80	0.49
16.50	0.46	0.000	588.79	0.46
17.00	0.44	0.000	588.78	0.44
17.50	0.39	0.000	588.76	0.39
18.00	0.34	0.000	588.74	0.34
18.50	0.30	0.000	588.72	0.30
19.00	0.26	0.000	588.70	0.26
19.50	0.24	0.000	588.69	0.24
20.00	0.21	0.000	588.68	0.21
20.50	0.19	0.000	588.66	0.19
21.00	0.18	0.000	588.65	0.18
21.50	0.16	0.000	588.64	0.16
22.00	0.15	0.000	588.63	0.15
22.50	0.13	0.000	588.63	0.13
23.00	0.12	0.000	588.62	0.12
23.50	0.11	0.000	588.61	0.11
24.00	0.11	0.000	588.61	0.11

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 7.49" for 100-Year_Current event
Inflow = 1.24 cfs @ 12.62 hrs, Volume= 0.354 af
Outflow = 1.24 cfs @ 12.62 hrs, Volume= 0.354 af, Atten= 0%, Lag= 0.1 min
Primary = 1.24 cfs @ 12.62 hrs, Volume= 0.354 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 591.19' @ 12.62 hrs Surf.Area= 0.001 ac Storage= 0.000 af

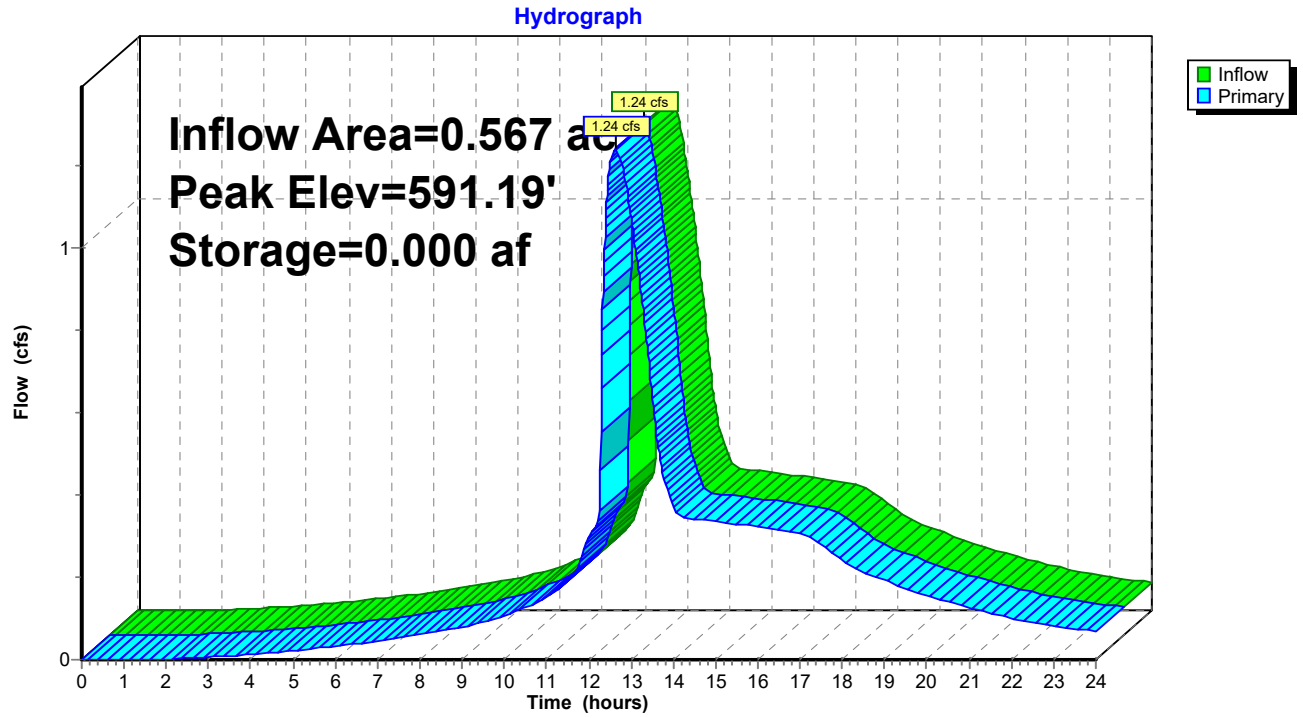
Plug-Flow detention time= 0.1 min calculated for 0.354 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (882.0 - 881.9)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.24 cfs @ 12.62 hrs HW=591.19' TW=589.26' (Dynamic Tailwater)
↑**1=SD-21** (Orifice Controls 1.24 cfs @ 2.60 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.62	0.00
2.00	0.00	0.000	590.63	0.00
2.50	0.00	0.000	590.64	0.00
3.00	0.01	0.000	590.65	0.01
3.50	0.01	0.000	590.65	0.01
4.00	0.01	0.000	590.66	0.01
4.50	0.02	0.000	590.67	0.02
5.00	0.02	0.000	590.68	0.02
5.50	0.03	0.000	590.69	0.03
6.00	0.03	0.000	590.70	0.03
6.50	0.04	0.000	590.70	0.04
7.00	0.05	0.000	590.71	0.05
7.50	0.05	0.000	590.72	0.05
8.00	0.06	0.000	590.73	0.06
8.50	0.07	0.000	590.74	0.07
9.00	0.08	0.000	590.75	0.08
9.50	0.09	0.000	590.76	0.09
10.00	0.11	0.000	590.77	0.11
10.50	0.13	0.000	590.78	0.13
11.00	0.15	0.000	590.80	0.15
11.50	0.19	0.000	590.82	0.19
12.00	0.30	0.000	590.88	0.30
12.50	**1.20**	**0.000**	**591.18**	**1.20**
13.00	**1.07**	**0.000**	**591.15**	**1.07**
13.50	0.64	0.000	591.01	0.64
14.00	0.37	0.000	590.91	0.37
14.50	0.34	0.000	590.90	0.34
15.00	0.34	0.000	590.90	0.34
15.50	0.33	0.000	590.89	0.33
16.00	0.32	0.000	590.89	0.32
16.50	0.31	0.000	590.89	0.31
17.00	0.31	0.000	590.88	0.31
17.50	0.28	0.000	590.87	0.28
18.00	0.24	0.000	590.85	0.24
18.50	0.21	0.000	590.83	0.21
19.00	0.19	0.000	590.82	0.19
19.50	0.17	0.000	590.81	0.17
20.00	0.16	0.000	590.80	0.16
20.50	0.14	0.000	590.79	0.14
21.00	0.13	0.000	590.78	0.13
21.50	0.11	0.000	590.77	0.11
22.00	0.10	0.000	590.76	0.10
22.50	0.09	0.000	590.75	0.09
23.00	0.08	0.000	590.75	0.08
23.50	0.07	0.000	590.74	0.07
24.00	0.07	0.000	590.74	0.07

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>9.89"
Flow Length=164' Tc=17.1 min CN=WQ Runoff=4.23 cfs 0.467 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>10.10"
Flow Length=175' Tc=14.4 min CN=WQ Runoff=2.83 cfs 0.295 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>10.02"
Flow Length=175' Tc=21.5 min CN=WQ Runoff=2.63 cfs 0.324 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>10.03"
Flow Length=120' Tc=6.0 min CN=WQ Runoff=2.55 cfs 0.202 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>10.15"
Flow Length=96' Slope=0.0336 '/' Tc=4.9 min CN=WQ Runoff=3.49 cfs 0.268 af

Pond 1P: BR-01 Peak Elev=602.16' Storage=6,639 cf Inflow=4.23 cfs 0.467 af
Outflow=1.65 cfs 0.460 af

Pond 2P: BR-02 Peak Elev=601.47' Storage=2,187 cf Inflow=2.83 cfs 0.295 af
Outflow=2.78 cfs 0.292 af

Pond 3P: BR-03 Peak Elev=599.05' Storage=5,822 cf Inflow=2.63 cfs 0.324 af
Outflow=0.50 cfs 0.317 af

Pond 5P: BR-05 Peak Elev=598.22' Storage=3,203 cf Inflow=2.55 cfs 0.202 af
Outflow=0.35 cfs 0.200 af

Pond 6P: BR-04 Peak Elev=598.73' Storage=4,782 cf Inflow=3.49 cfs 0.268 af
Outflow=0.44 cfs 0.261 af

Pond 8P: O-1B Inflow=5.00 cfs 1.530 af
Primary=5.00 cfs 1.530 af

Pond 13P: SD-25, SD-26 Peak Elev=581.63' Storage=0.001 af Inflow=5.00 cfs 1.530 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=5.00 cfs 1.530 af

Pond 14P: SD-24 Peak Elev=586.13' Storage=0.001 af Inflow=4.68 cfs 1.331 af
Outflow=4.67 cfs 1.331 af

Pond 17P: SD-23 Peak Elev=587.94' Storage=0.001 af Inflow=4.27 cfs 1.069 af
Outflow=4.26 cfs 1.069 af

Pond 18P: SD-22 Peak Elev=590.04' Storage=0.001 af Inflow=3.95 cfs 0.752 af
Outflow=3.95 cfs 0.752 af

Pond 19P: SD-21 Peak Elev=591.31' Storage=0.000 af Inflow=1.65 cfs 0.460 af
Outflow=1.65 cfs 0.460 af

Total Runoff Area = 1.863 ac Runoff Volume = 1.556 af Average Runoff Depth = 10.02"
72.59% Pervious = 1.353 ac 27.41% Impervious = 0.511 ac

Summary for Subcatchment 5S: PO-DA C

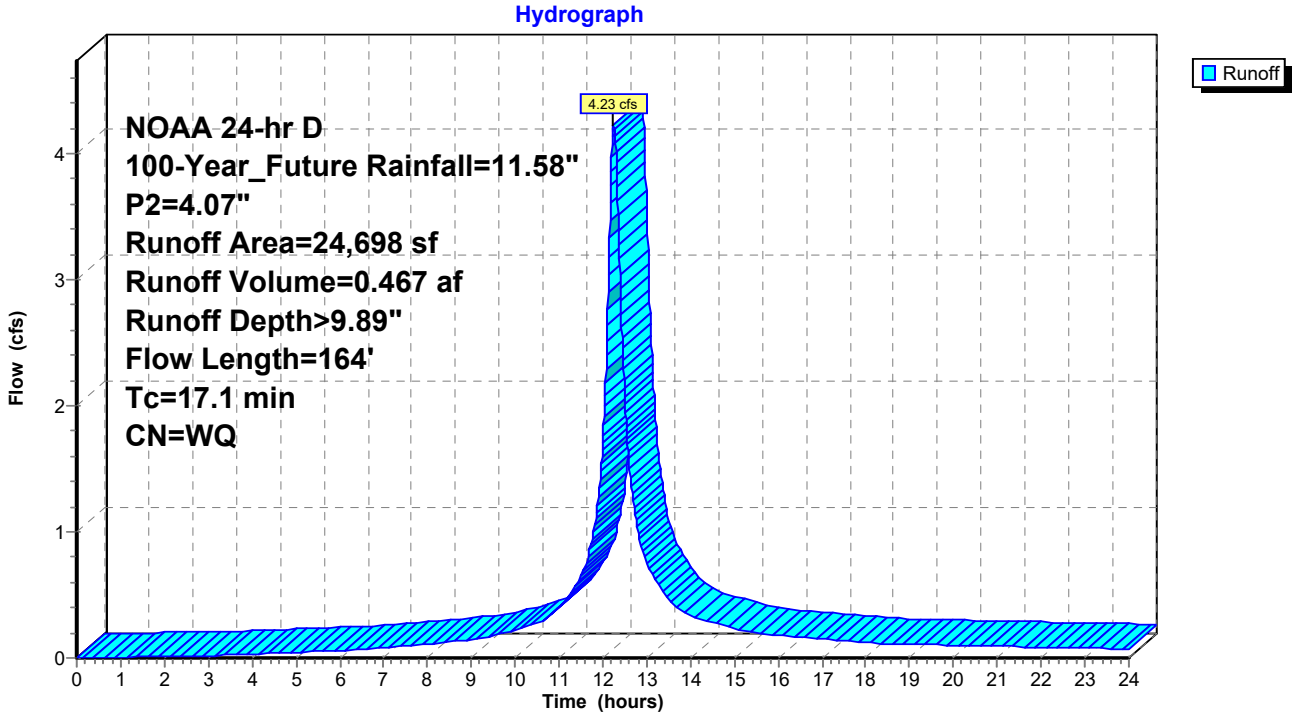
Runoff = 4.23 cfs @ 12.25 hrs, Volume= 0.467 af, Depth> 9.89"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0018	0.10		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
17.1	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.01
2.00	0.28	0.00	0.01
2.50	0.36	0.00	0.01
3.00	0.44	0.01	0.02
3.50	0.52	0.03	0.02
4.00	0.61	0.05	0.03
4.50	0.70	0.08	0.04
5.00	0.79	0.12	0.05
5.50	0.89	0.17	0.05
6.00	0.99	0.22	0.06
6.50	1.10	0.28	0.07
7.00	1.22	0.35	0.08
7.50	1.35	0.44	0.10
8.00	1.50	0.54	0.11
8.50	1.66	0.65	0.13
9.00	1.84	0.78	0.14
9.50	2.04	0.94	0.18
10.00	2.30	1.14	0.23
10.50	2.59	1.39	0.28
11.00	3.01	1.75	0.40
11.50	3.67	2.34	0.65
12.00	5.55	4.09	**1.71**
12.50	7.91	6.36	**2.07**
13.00	8.57	7.01	0.76
13.50	8.99	7.41	0.47
14.00	9.28	7.70	0.34
14.50	9.54	7.95	0.28
15.00	9.74	8.15	0.23
15.50	9.92	8.32	0.20
16.00	10.08	8.48	0.18
16.50	10.23	8.63	0.17
17.00	10.36	8.76	0.15
17.50	10.48	8.88	0.14
18.00	10.59	8.99	0.12
18.50	10.69	9.09	0.11
19.00	10.79	9.18	0.11
19.50	10.88	9.27	0.11
20.00	10.97	9.36	0.10
20.50	11.06	9.45	0.10
21.00	11.14	9.53	0.09
21.50	11.22	9.61	0.09
22.00	11.30	9.69	0.09
22.50	11.38	9.76	0.08
23.00	11.45	9.83	0.08
23.50	11.52	9.90	0.08
24.00	**11.58**	**9.96**	0.07

Summary for Subcatchment 7S: PO-DA E

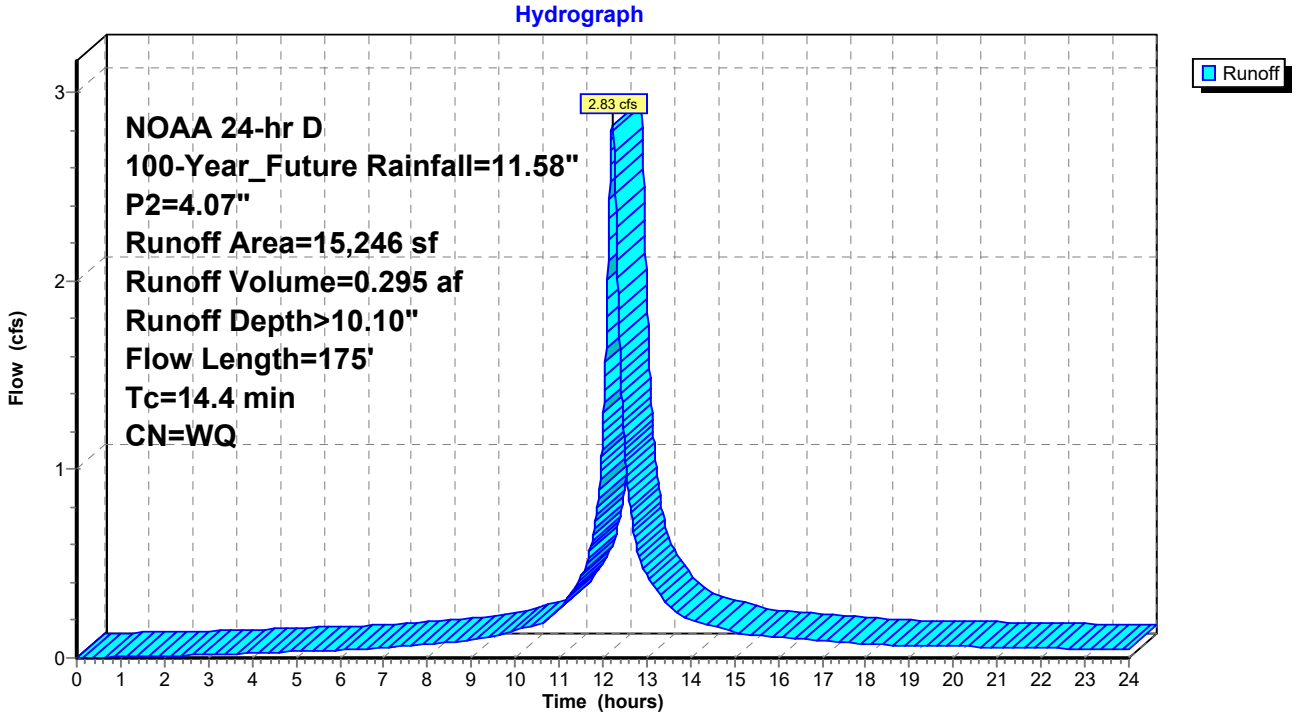
Runoff = 2.83 cfs @ 12.21 hrs, Volume= 0.295 af, Depth>10.10"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0030	0.12		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
14.4	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.01
2.00	0.28	0.00	0.01
2.50	0.36	0.00	0.01
3.00	0.44	0.02	0.02
3.50	0.52	0.04	0.02
4.00	0.61	0.07	0.03
4.50	0.70	0.10	0.03
5.00	0.79	0.14	0.03
5.50	0.89	0.19	0.04
6.00	0.99	0.25	0.04
6.50	1.10	0.31	0.05
7.00	1.22	0.39	0.06
7.50	1.35	0.48	0.07
8.00	1.50	0.58	0.07
8.50	1.66	0.70	0.08
9.00	1.84	0.84	0.09
9.50	2.04	1.00	0.12
10.00	2.30	1.21	0.15
10.50	2.59	1.46	0.18
11.00	3.01	1.83	0.26
11.50	3.67	2.43	0.43
12.00	5.55	4.19	**1.20**
12.50	7.91	6.48	**1.10**
13.00	8.57	7.13	0.45
13.50	8.99	7.53	0.28
14.00	9.28	7.83	0.20
14.50	9.54	8.08	0.17
15.00	9.74	8.28	0.14
15.50	9.92	8.45	0.12
16.00	10.08	8.61	0.11
16.50	10.23	8.75	0.10
17.00	10.36	8.89	0.09
17.50	10.48	9.01	0.08
18.00	10.59	9.11	0.08
18.50	10.69	9.21	0.07
19.00	10.79	9.31	0.07
19.50	10.88	9.40	0.06
20.00	10.97	9.49	0.06
20.50	11.06	9.58	0.06
21.00	11.14	9.66	0.06
21.50	11.22	9.74	0.06
22.00	11.30	9.82	0.05
22.50	11.38	9.89	0.05
23.00	11.45	9.96	0.05
23.50	11.52	10.03	0.05
24.00	**11.58**	**10.09**	0.04

Summary for Subcatchment 9S: PO-DA G

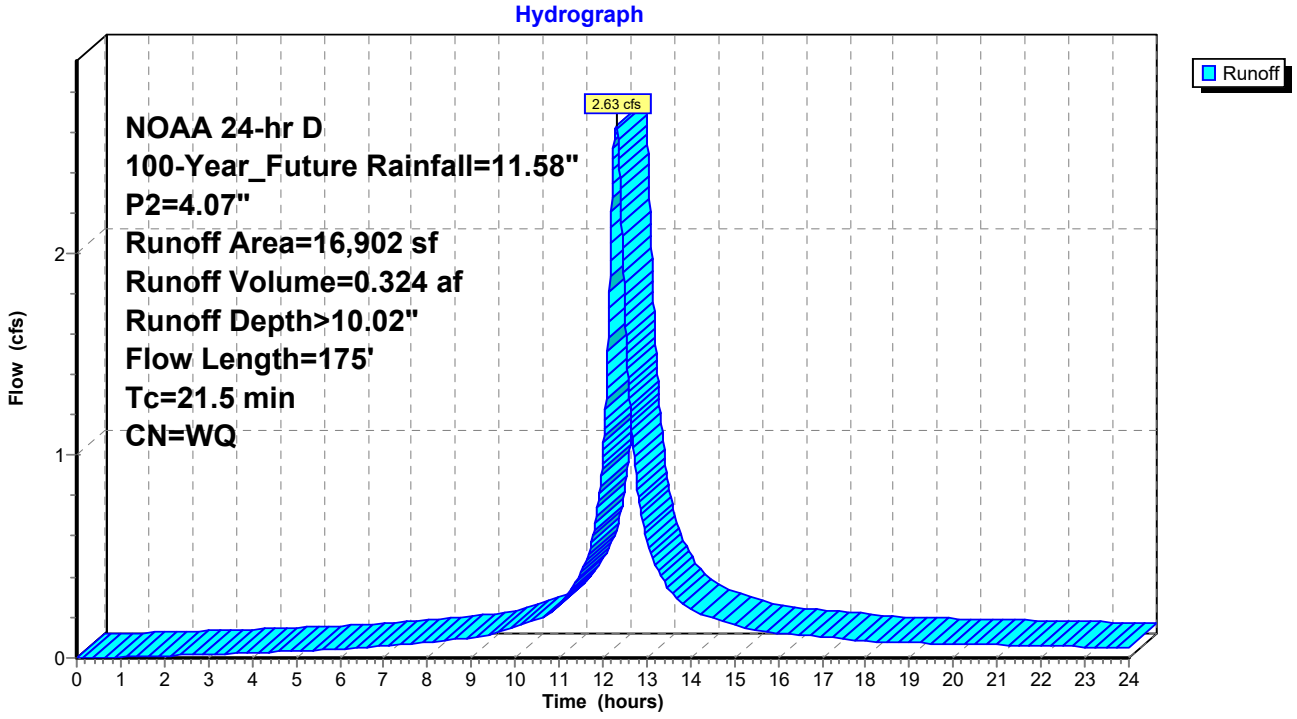
Runoff = 2.63 cfs @ 12.30 hrs, Volume= 0.324 af, Depth>10.02"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.8	100	0.0010	0.08		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
21.5	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.01
2.00	0.28	0.00	0.01
2.50	0.36	0.00	0.01
3.00	0.44	0.02	0.02
3.50	0.52	0.04	0.02
4.00	0.61	0.07	0.03
4.50	0.70	0.10	0.03
5.00	0.79	0.14	0.03
5.50	0.89	0.19	0.04
6.00	0.99	0.25	0.04
6.50	1.10	0.31	0.05
7.00	1.22	0.39	0.06
7.50	1.35	0.48	0.07
8.00	1.50	0.58	0.08
8.50	1.66	0.70	0.09
9.00	1.84	0.84	0.10
9.50	2.04	1.00	0.12
10.00	2.30	1.21	0.15
10.50	2.59	1.46	0.19
11.00	3.01	1.83	0.26
11.50	3.67	2.43	0.42
12.00	5.55	4.19	**0.99**
12.50	7.91	6.48	**1.74**
13.00	8.57	7.13	0.59
13.50	8.99	7.53	0.34
14.00	9.28	7.83	0.24
14.50	9.54	8.08	0.20
15.00	9.74	8.28	0.16
15.50	9.92	8.45	0.14
16.00	10.08	8.61	0.12
16.50	10.23	8.75	0.12
17.00	10.36	8.89	0.11
17.50	10.48	9.01	0.10
18.00	10.59	9.11	0.09
18.50	10.69	9.21	0.08
19.00	10.79	9.31	0.07
19.50	10.88	9.40	0.07
20.00	10.97	9.49	0.07
20.50	11.06	9.58	0.07
21.00	11.14	9.66	0.07
21.50	11.22	9.74	0.06
22.00	11.30	9.82	0.06
22.50	11.38	9.89	0.06
23.00	11.45	9.96	0.06
23.50	11.52	10.03	0.05
24.00	**11.58**	**10.09**	0.05

Summary for Subcatchment 11S: PO-DA I

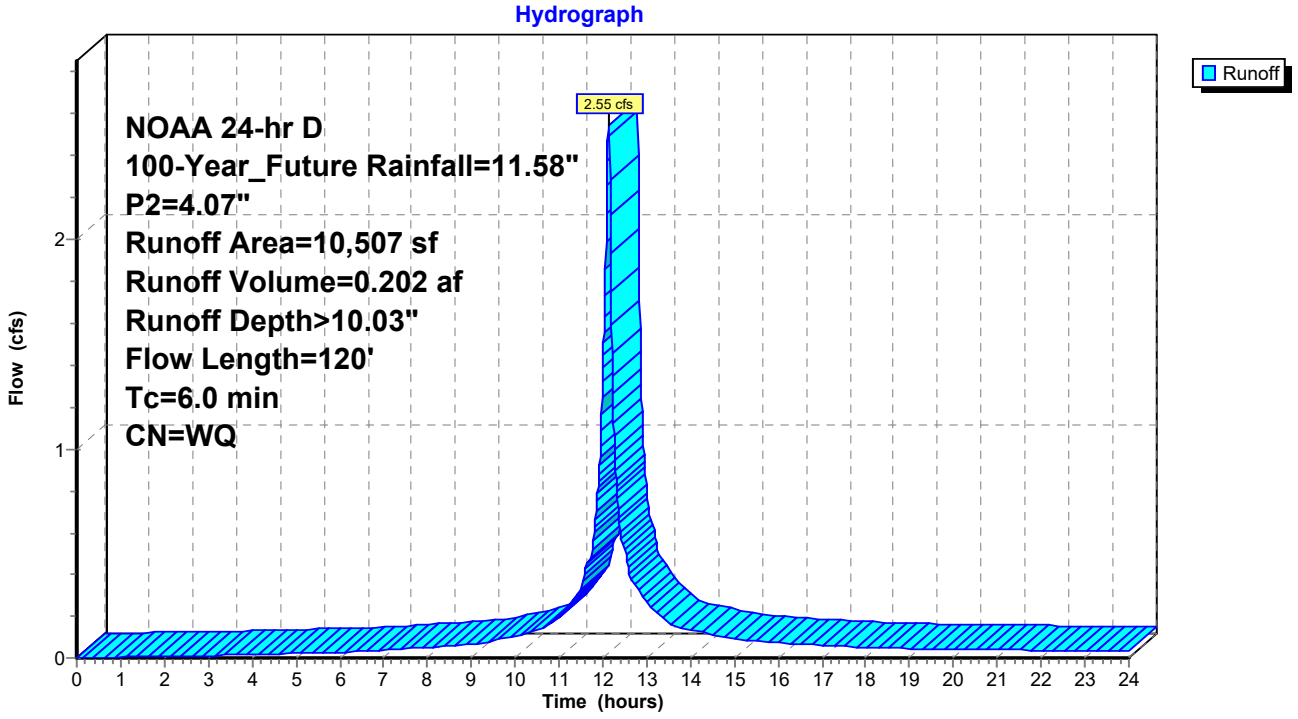
Runoff = 2.55 cfs @ 12.13 hrs, Volume= 0.202 af, Depth>10.03"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0237	0.28		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.0	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.00
1.50	0.20	0.00	0.01
2.00	0.28	0.00	0.01
2.50	0.36	0.00	0.01
3.00	0.44	0.02	0.01
3.50	0.52	0.04	0.01
4.00	0.61	0.07	0.02
4.50	0.70	0.10	0.02
5.00	0.79	0.14	0.02
5.50	0.89	0.19	0.03
6.00	0.99	0.25	0.03
6.50	1.10	0.31	0.03
7.00	1.22	0.39	0.04
7.50	1.35	0.48	0.05
8.00	1.50	0.58	0.05
8.50	1.66	0.70	0.06
9.00	1.84	0.84	0.07
9.50	2.04	1.00	0.08
10.00	2.30	1.21	0.11
10.50	2.59	1.46	0.13
11.00	3.01	1.83	0.20
11.50	3.67	2.43	0.33
12.00	5.55	4.19	**1.39**
12.50	7.91	6.48	**0.51**
13.00	8.57	7.13	0.27
13.50	8.99	7.53	0.17
14.00	9.28	7.83	0.13
14.50	9.54	8.08	0.11
15.00	9.74	8.28	0.09
15.50	9.92	8.45	0.08
16.00	10.08	8.61	0.07
16.50	10.23	8.75	0.07
17.00	10.36	8.89	0.06
17.50	10.48	9.01	0.06
18.00	10.59	9.11	0.05
18.50	10.69	9.21	0.05
19.00	10.79	9.31	0.05
19.50	10.88	9.40	0.04
20.00	10.97	9.49	0.04
20.50	11.06	9.58	0.04
21.00	11.14	9.66	0.04
21.50	11.22	9.74	0.04
22.00	11.30	9.82	0.04
22.50	11.38	9.89	0.04
23.00	11.45	9.96	0.03
23.50	11.52	10.03	0.03
24.00	**11.58**	**10.09**	0.03

Summary for Subcatchment 12S: PO-DA J

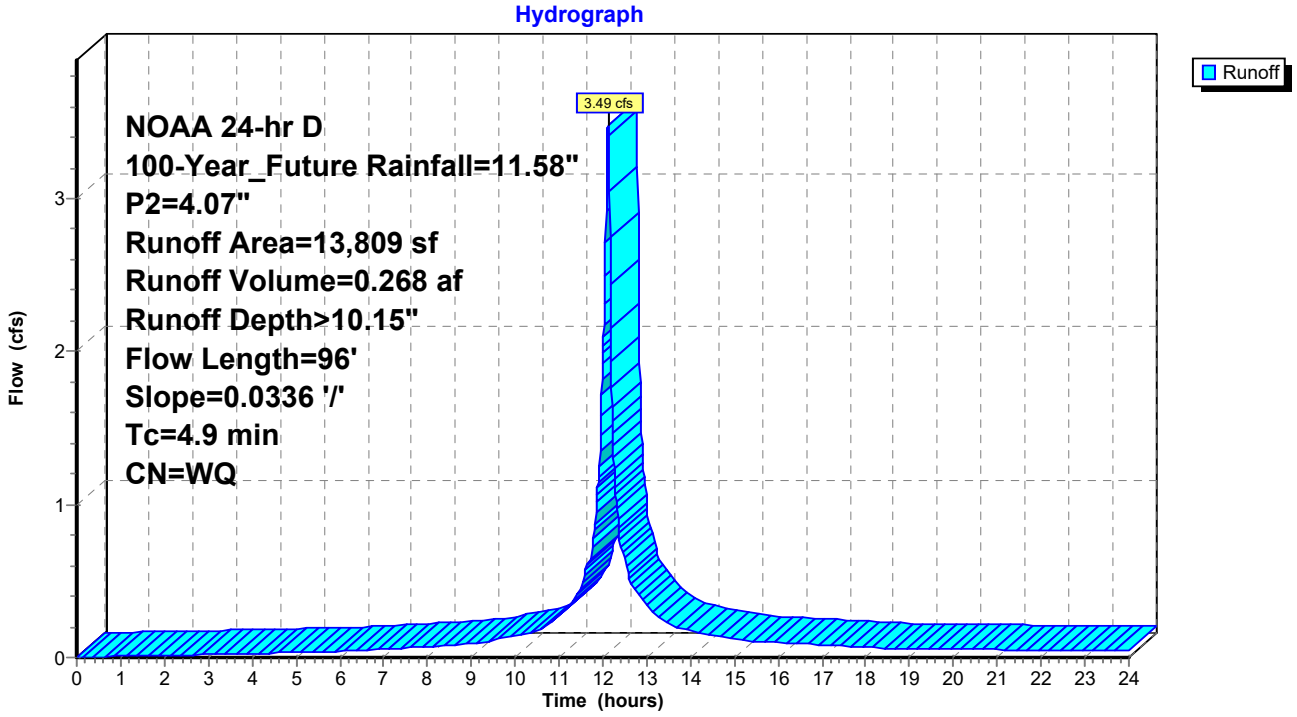
Runoff = 3.49 cfs @ 12.12 hrs, Volume= 0.268 af, Depth>10.15"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	96	0.0336	0.32		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.01
2.00	0.28	0.00	0.01
2.50	0.36	0.01	0.02
3.00	0.44	0.03	0.02
3.50	0.52	0.05	0.02
4.00	0.61	0.08	0.03
4.50	0.70	0.12	0.03
5.00	0.79	0.17	0.03
5.50	0.89	0.22	0.04
6.00	0.99	0.28	0.04
6.50	1.10	0.35	0.05
7.00	1.22	0.43	0.05
7.50	1.35	0.52	0.06
8.00	1.50	0.63	0.07
8.50	1.66	0.76	0.08
9.00	1.84	0.89	0.09
9.50	2.04	1.06	0.11
10.00	2.30	1.28	0.14
10.50	2.59	1.54	0.17
11.00	3.01	1.91	0.27
11.50	3.67	2.52	0.44
12.00	5.55	4.30	**1.99**
12.50	7.91	6.60	**0.66**
13.00	8.57	7.25	0.35
13.50	8.99	7.66	0.22
14.00	9.28	7.95	0.18
14.50	9.54	8.20	0.15
15.00	9.74	8.40	0.12
15.50	9.92	8.57	0.11
16.00	10.08	8.73	0.10
16.50	10.23	8.88	0.09
17.00	10.36	9.01	0.08
17.50	10.48	9.13	0.07
18.00	10.59	9.24	0.07
18.50	10.69	9.34	0.06
19.00	10.79	9.43	0.06
19.50	10.88	9.53	0.06
20.00	10.97	9.62	0.06
20.50	11.06	9.70	0.05
21.00	11.14	9.79	0.05
21.50	11.22	9.87	0.05
22.00	11.30	9.94	0.05
22.50	11.38	10.02	0.05
23.00	11.45	10.09	0.04
23.50	11.52	10.15	0.04
24.00	**11.58**	**10.22**	0.04

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 9.89" for 100-Year_Future event
Inflow = 4.23 cfs @ 12.25 hrs, Volume= 0.467 af
Outflow = 1.65 cfs @ 12.58 hrs, Volume= 0.460 af, Atten= 61%, Lag= 19.6 min
Primary = 1.65 cfs @ 12.58 hrs, Volume= 0.460 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 602.16' @ 12.58 hrs Surf.Area= 5,277 sf Storage= 6,639 cf

Plug-Flow detention time= 94.9 min calculated for 0.460 af (98% of inflow)
Center-of-Mass det. time= 85.2 min (868.2 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

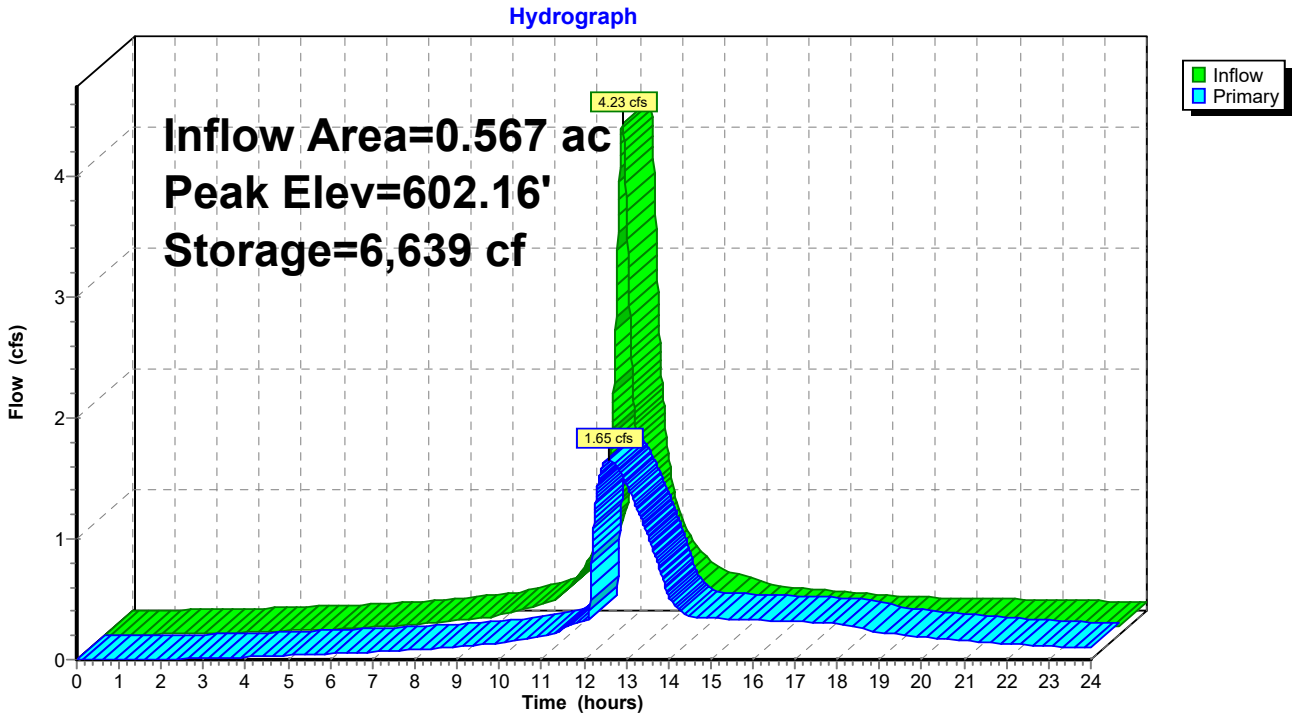
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.65 cfs @ 12.58 hrs HW=602.16' TW=591.31' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 1.65 cfs of 12.01 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.40 cfs @ 11.85 fps)
  └─**3=Water Quantity (Elevation H)** (Orifice Controls 1.25 cfs @ 6.00 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.01	5	596.01	0.00
1.50	0.01	16	596.02	0.00
2.00	0.01	30	596.04	0.00
2.50	0.01	42	596.06	0.01
3.00	0.02	53	596.07	0.01
3.50	0.02	67	596.09	0.02
4.00	0.03	83	596.11	0.02
4.50	0.04	98	596.14	0.03
5.00	0.05	113	596.16	0.04
5.50	0.05	127	596.18	0.04
6.00	0.06	142	596.20	0.05
6.50	0.07	160	596.22	0.06
7.00	0.08	187	596.26	0.06
7.50	0.10	223	596.31	0.07
8.00	0.11	268	596.37	0.08
8.50	0.13	321	596.45	0.10
9.00	0.14	382	596.53	0.11
9.50	0.18	462	596.65	0.12
10.00	0.23	590	596.83	0.14
10.50	0.28	769	597.08	0.16
11.00	0.40	1,038	597.47	0.19
11.50	0.65	1,571	598.47	0.25
12.00	**1.71**	2,835	599.99	0.32
12.50	**2.07**	**6,584**	**602.13**	**1.64**
13.00	0.76	**5,892**	**601.73**	**1.45**
13.50	0.47	4,706	601.06	1.04
14.00	0.34	3,983	600.65	0.53
14.50	0.28	3,776	600.53	0.36
15.00	0.23	3,616	600.44	0.34
15.50	0.20	3,383	600.31	0.34
16.00	0.18	3,121	600.16	0.33
16.50	0.17	2,843	600.00	0.32
17.00	0.15	2,552	599.83	0.32
17.50	0.14	2,248	599.66	0.31
18.00	0.12	1,932	599.41	0.30
18.50	0.11	1,638	598.64	0.26
19.00	0.11	1,398	598.02	0.23
19.50	0.11	1,199	597.71	0.21
20.00	0.10	1,027	597.45	0.19
20.50	0.10	878	597.24	0.17
21.00	0.09	750	597.06	0.16
21.50	0.09	641	596.90	0.15
22.00	0.09	549	596.77	0.13
22.50	0.08	472	596.66	0.12
23.00	0.08	408	596.57	0.11
23.50	0.08	356	596.50	0.10
24.00	0.07	313	596.43	0.09

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 10.10" for 100-Year_Future event
Inflow = 2.83 cfs @ 12.21 hrs, Volume= 0.295 af
Outflow = 2.78 cfs @ 12.24 hrs, Volume= 0.292 af, Atten= 2%, Lag= 1.6 min
Primary = 2.78 cfs @ 12.24 hrs, Volume= 0.292 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 601.47' @ 12.24 hrs Surf.Area= 4,734 sf Storage= 2,187 cf

Plug-Flow detention time= 50.9 min calculated for 0.292 af (99% of inflow)
Center-of-Mass det. time= 44.7 min (819.0 - 774.3)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

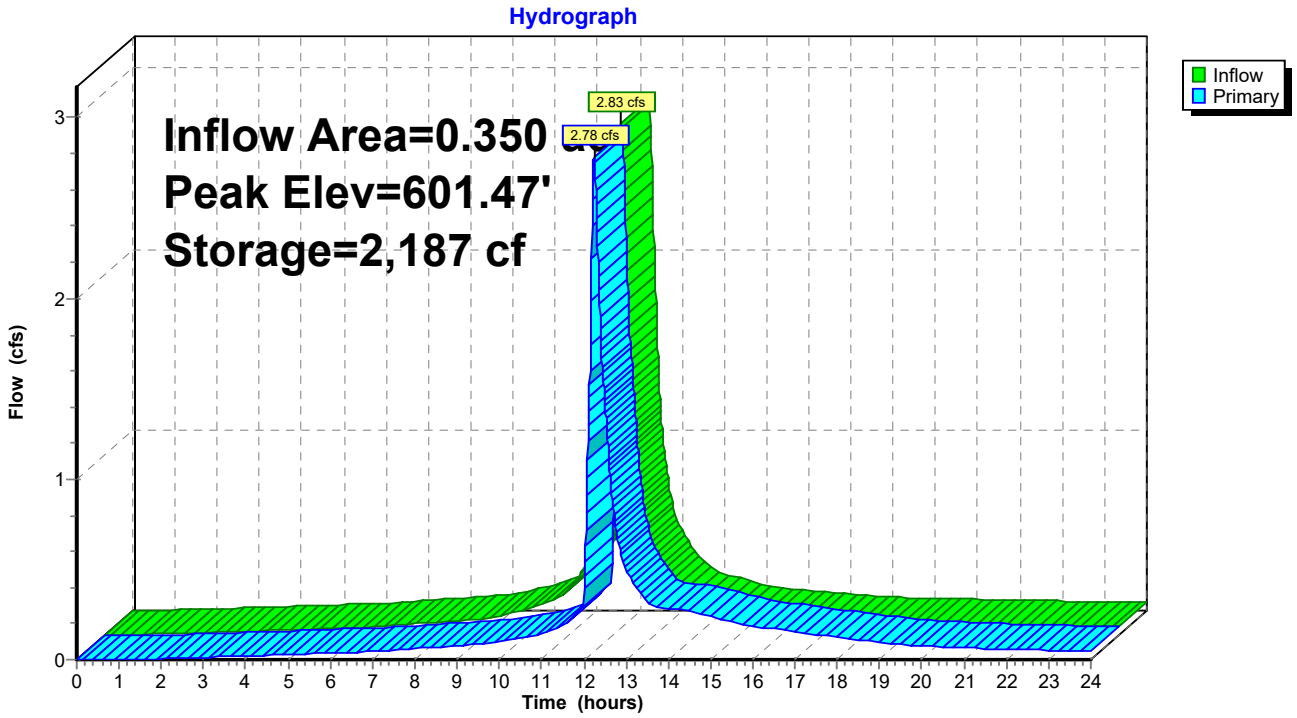
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.78 cfs @ 12.24 hrs HW=601.47' TW=589.99' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 2.78 cfs of 12.32 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.30 cfs @ 8.83 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 1.54 cfs @ 2.46 fps)
  └─**4=Overflow Grate (Elevation I)** (Weir Controls 0.94 cfs @ 0.86 fps)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.01	6	598.01	0.00
1.50	0.01	19	598.03	0.00
2.00	0.01	33	598.05	0.01
2.50	0.01	45	598.07	0.01
3.00	0.02	54	598.08	0.01
3.50	0.02	63	598.10	0.02
4.00	0.03	71	598.11	0.02
4.50	0.03	80	598.12	0.02
5.00	0.03	88	598.14	0.03
5.50	0.04	95	598.15	0.03
6.00	0.04	103	598.16	0.04
6.50	0.05	111	598.17	0.04
7.00	0.06	124	598.19	0.05
7.50	0.07	141	598.22	0.05
8.00	0.07	162	598.25	0.06
8.50	0.08	186	598.29	0.07
9.00	0.09	214	598.33	0.08
9.50	0.12	253	598.39	0.09
10.00	0.15	319	598.49	0.10
10.50	0.18	412	598.64	0.12
11.00	0.26	558	598.87	0.14
11.50	0.43	869	599.39	0.19
12.00	**1.20**	**1,656**	**601.13**	**0.34**
12.50	**1.10**	**2,007**	**601.35**	**1.44**
13.00	0.45	1,732	601.18	0.51
13.50	0.28	1,645	601.13	0.32
14.00	0.20	1,541	601.06	0.28
14.50	0.17	1,379	600.80	0.27
15.00	0.14	1,200	600.28	0.24
15.50	0.12	1,023	599.76	0.21
16.00	0.11	875	599.40	0.19
16.50	0.10	745	599.18	0.17
17.00	0.09	629	598.99	0.15
17.50	0.08	525	598.82	0.14
18.00	0.08	432	598.67	0.12
18.50	0.07	351	598.55	0.11
19.00	0.07	290	598.45	0.10
19.50	0.06	245	598.38	0.09
20.00	0.06	213	598.33	0.08
20.50	0.06	191	598.29	0.07
21.00	0.06	174	598.27	0.07
21.50	0.06	162	598.25	0.06
22.00	0.05	152	598.23	0.06
22.50	0.05	143	598.22	0.06
23.00	0.05	136	598.21	0.05
23.50	0.05	129	598.20	0.05
24.00	0.04	123	598.19	0.05

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 10.02" for 100-Year_Future event
Inflow = 2.63 cfs @ 12.30 hrs, Volume= 0.324 af
Outflow = 0.50 cfs @ 13.12 hrs, Volume= 0.317 af, Atten= 81%, Lag= 49.4 min
Primary = 0.50 cfs @ 13.12 hrs, Volume= 0.317 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 599.05' @ 13.12 hrs Surf.Area= 6,525 sf Storage= 5,822 cf

Plug-Flow detention time= 150.2 min calculated for 0.317 af (98% of inflow)
Center-of-Mass det. time= 137.0 min (918.6 - 781.6)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

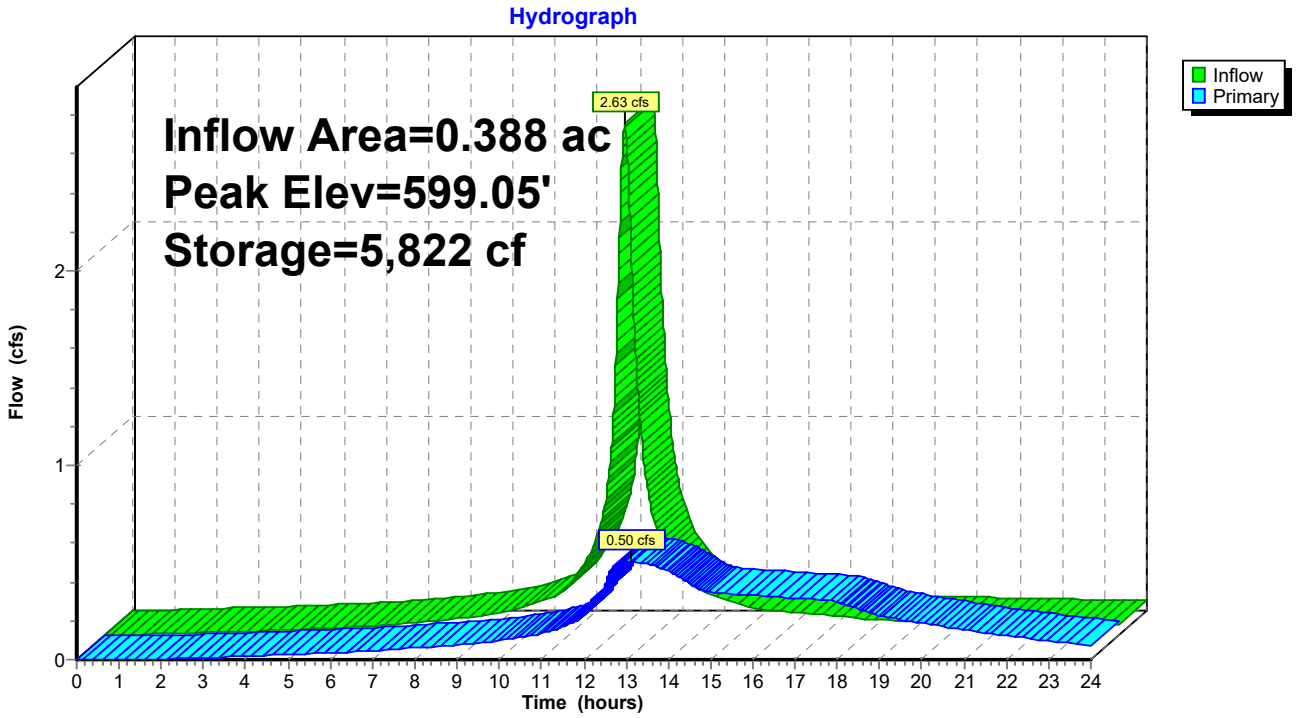
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.50 cfs @ 13.12 hrs HW=599.05' TW=587.56' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.50 cfs of 18.91 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.37 cfs @ 10.71 fps)
  └─**3=Water Quantity (Elevation H)** (Orifice Controls 0.14 cfs @ 3.22 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	4	594.00	0.00
1.50	0.01	17	594.02	0.00
2.00	0.01	33	594.04	0.00
2.50	0.01	49	594.05	0.01
3.00	0.02	63	594.07	0.01
3.50	0.02	78	594.09	0.01
4.00	0.03	92	594.10	0.02
4.50	0.03	106	594.12	0.02
5.00	0.03	120	594.13	0.03
5.50	0.04	132	594.14	0.03
6.00	0.04	145	594.16	0.04
6.50	0.05	157	594.17	0.04
7.00	0.06	175	594.19	0.05
7.50	0.07	198	594.21	0.05
8.00	0.08	227	594.24	0.06
8.50	0.09	262	594.28	0.07
9.00	0.10	302	594.32	0.08
9.50	0.12	352	594.38	0.09
10.00	0.15	432	594.47	0.10
10.50	0.19	546	594.60	0.12
11.00	0.26	711	594.79	0.14
11.50	0.42	1,040	595.17	0.17
12.00	**0.99**	1,802	596.14	0.23
12.50	**1.74**	4,861	598.61	0.37
13.00	0.59	**5,804**	**599.05**	**0.50**
13.50	0.34	**5,704**	**599.00**	**0.49**
14.00	0.24	5,353	598.84	0.46
14.50	0.20	4,972	598.66	0.39
15.00	0.16	4,639	598.51	0.35
15.50	0.14	4,291	598.35	0.34
16.00	0.12	3,922	598.18	0.33
16.50	0.12	3,548	598.01	0.32
17.00	0.11	3,169	597.83	0.32
17.50	0.10	2,786	597.66	0.31
18.00	0.09	2,399	597.41	0.30
18.50	0.08	2,041	596.65	0.26
19.00	0.07	1,739	596.01	0.23
19.50	0.07	1,482	595.69	0.21
20.00	0.07	1,255	595.42	0.19
20.50	0.07	1,056	595.19	0.17
21.00	0.07	882	594.99	0.15
21.50	0.06	734	594.82	0.14
22.00	0.06	608	594.67	0.12
22.50	0.06	504	594.55	0.11
23.00	0.06	419	594.46	0.10
23.50	0.05	351	594.38	0.09
24.00	0.05	298	594.32	0.08

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 10.03" for 100-Year_Future event
Inflow = 2.55 cfs @ 12.13 hrs, Volume= 0.202 af
Outflow = 0.35 cfs @ 12.72 hrs, Volume= 0.200 af, Atten= 86%, Lag= 35.4 min
Primary = 0.35 cfs @ 12.72 hrs, Volume= 0.200 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.22' @ 12.72 hrs Surf.Area= 4,725 sf Storage= 3,203 cf

Plug-Flow detention time= 94.7 min calculated for 0.200 af (99% of inflow)
Center-of-Mass det. time= 87.9 min (857.7 - 769.9)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

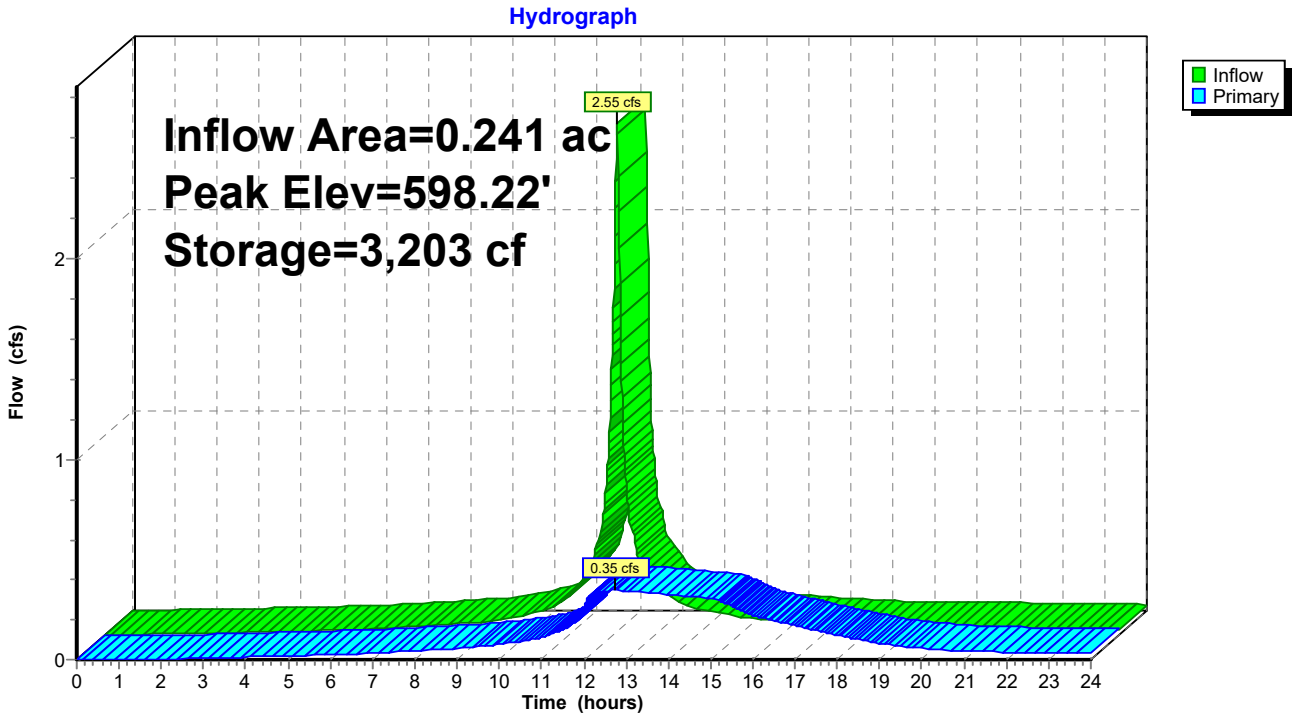
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.35 cfs @ 12.72 hrs HW=598.22' TW=581.43' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.35 cfs of 30.49 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.34 cfs @ 10.00 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.01 cfs @ 0.41 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	5	593.81	0.00
1.50	0.01	14	593.82	0.00
2.00	0.01	24	593.84	0.00
2.50	0.01	32	593.85	0.00
3.00	0.01	39	593.86	0.01
3.50	0.01	47	593.87	0.01
4.00	0.02	54	593.88	0.01
4.50	0.02	61	593.90	0.02
5.00	0.02	68	593.91	0.02
5.50	0.03	74	593.91	0.02
6.00	0.03	79	593.92	0.02
6.50	0.03	86	593.93	0.03
7.00	0.04	95	593.95	0.03
7.50	0.05	106	593.96	0.04
8.00	0.05	117	593.98	0.05
8.50	0.06	130	594.00	0.05
9.00	0.07	145	594.02	0.06
9.50	0.08	170	594.06	0.07
10.00	0.11	212	594.13	0.08
10.50	0.13	269	594.22	0.09
11.00	0.20	374	594.38	0.11
11.50	0.33	606	594.75	0.15
12.00	**1.39**	1,390	596.22	0.25
12.50	**0.51**	**3,144**	**598.18**	**0.34**
13.00	0.27	**3,167**	**598.19**	**0.34**
13.50	0.17	2,946	598.05	0.33
14.00	0.13	2,618	597.84	0.33
14.50	0.11	2,262	597.62	0.32
15.00	0.09	1,886	597.38	0.31
15.50	0.08	1,513	596.58	0.27
16.00	0.07	1,214	595.74	0.22
16.50	0.07	966	595.32	0.20
17.00	0.06	755	594.99	0.17
17.50	0.06	576	594.70	0.15
18.00	0.05	428	594.47	0.12
18.50	0.05	313	594.29	0.10
19.00	0.05	232	594.16	0.08
19.50	0.04	178	594.07	0.07
20.00	0.04	145	594.02	0.06
20.50	0.04	126	593.99	0.05
21.00	0.04	115	593.98	0.04
21.50	0.04	108	593.97	0.04
22.00	0.04	104	593.96	0.04
22.50	0.04	101	593.96	0.04
23.00	0.03	98	593.95	0.04
23.50	0.03	95	593.95	0.03
24.00	0.03	92	593.94	0.03

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 10.15" for 100-Year_Future event
Inflow = 3.49 cfs @ 12.12 hrs, Volume= 0.268 af
Outflow = 0.44 cfs @ 12.74 hrs, Volume= 0.261 af, Atten= 87%, Lag= 37.2 min
Primary = 0.44 cfs @ 12.74 hrs, Volume= 0.261 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 598.73' @ 12.74 hrs Surf.Area= 8,682 sf Storage= 4,782 cf

Plug-Flow detention time= 148.4 min calculated for 0.261 af (98% of inflow)
Center-of-Mass det. time= 132.9 min (897.7 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

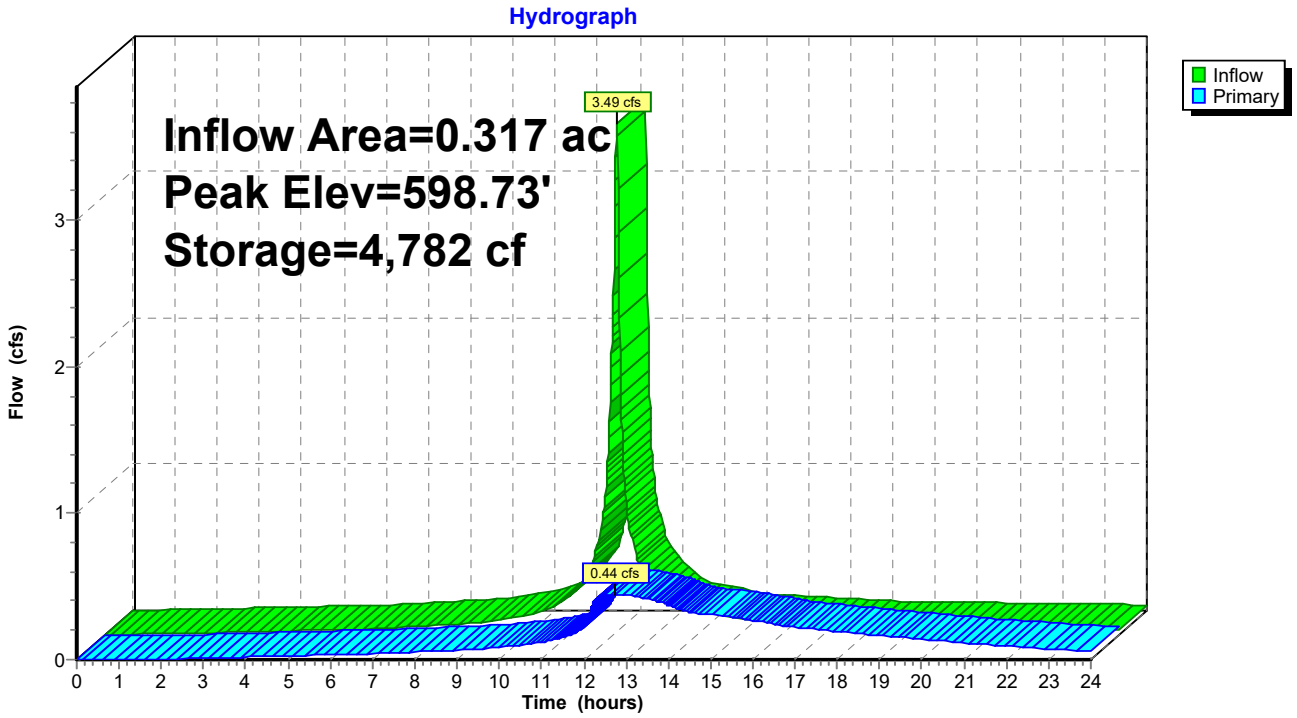
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.44 cfs @ 12.74 hrs HW=598.73' TW=585.83' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.44 cfs of 20.11 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.33 cfs @ 9.55 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.12 cfs @ 2.76 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

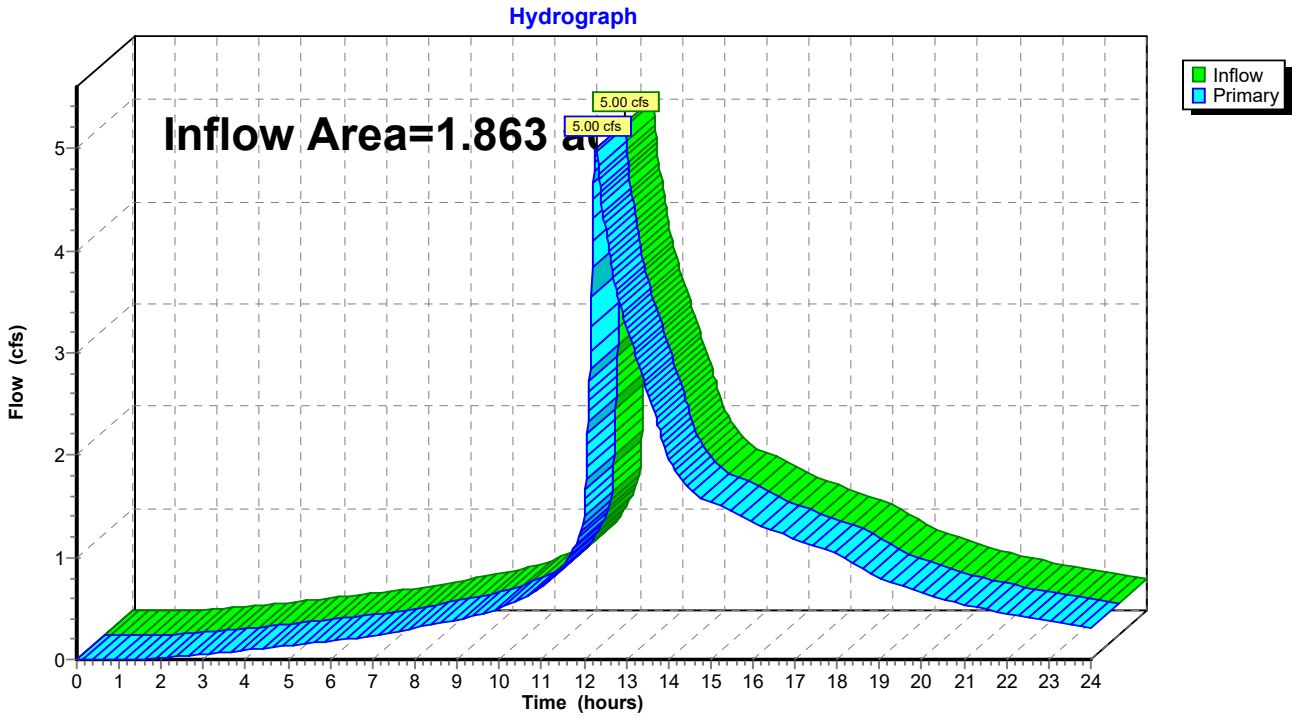
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.01	10	594.71	0.00
1.50	0.01	28	594.72	0.00
2.00	0.01	48	594.74	0.00
2.50	0.02	67	594.76	0.01
3.00	0.02	85	594.77	0.01
3.50	0.02	101	594.79	0.01
4.00	0.03	117	594.80	0.02
4.50	0.03	132	594.81	0.02
5.00	0.03	147	594.82	0.03
5.50	0.04	160	594.83	0.03
6.00	0.04	172	594.84	0.03
6.50	0.05	187	594.86	0.04
7.00	0.05	206	594.87	0.04
7.50	0.06	229	594.89	0.05
8.00	0.07	256	594.91	0.05
8.50	0.08	288	594.94	0.06
9.00	0.09	324	594.97	0.07
9.50	0.11	378	595.01	0.08
10.00	0.14	461	595.09	0.09
10.50	0.17	572	595.18	0.10
11.00	0.27	762	595.35	0.12
11.50	0.44	1,147	595.68	0.15
12.00	**1.99**	2,374	596.83	0.23
12.50	**0.66**	**4,710**	**598.71**	**0.44**
13.00	0.35	**4,736**	**598.72**	**0.44**
13.50	0.22	4,460	598.62	0.42
14.00	0.18	4,091	598.50	0.37
14.50	0.15	3,757	598.38	0.33
15.00	0.12	3,435	598.27	0.31
15.50	0.11	3,092	597.97	0.29
16.00	0.10	2,772	597.46	0.27
16.50	0.09	2,481	597.00	0.24
17.00	0.08	2,219	596.63	0.22
17.50	0.07	1,972	596.40	0.21
18.00	0.07	1,737	596.19	0.19
18.50	0.06	1,516	596.00	0.18
19.00	0.06	1,316	595.82	0.17
19.50	0.06	1,136	595.67	0.15
20.00	0.06	975	595.53	0.14
20.50	0.05	834	595.41	0.13
21.00	0.05	711	595.30	0.12
21.50	0.05	604	595.21	0.10
22.00	0.05	514	595.13	0.09
22.50	0.05	439	595.07	0.08
23.00	0.04	377	595.01	0.08
23.50	0.04	326	594.97	0.07
24.00	0.04	286	594.94	0.06

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 9.86" for 100-Year_Future event
Inflow = 5.00 cfs @ 12.29 hrs, Volume= 1.530 af
Primary = 5.00 cfs @ 12.29 hrs, Volume= 1.530 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.02		0.02
2.50	0.03		0.03
3.00	0.05		0.05
3.50	0.07		0.07
4.00	0.09		0.09
4.50	0.11		0.11
5.00	0.14		0.14
5.50	0.16		0.16
6.00	0.18		0.18
6.50	0.21		0.21
7.00	0.24		0.24
7.50	0.27		0.27
8.00	0.31		0.31
8.50	0.35		0.35
9.00	0.39		0.39
9.50	0.43		0.43
10.00	0.51		0.51
10.50	0.59		0.59
11.00	0.70		0.70
11.50	0.91		0.91
12.00	**1.35**		**1.35**
12.50	**4.26**		**4.26**
13.00	3.26		3.26
13.50	2.62		2.62
14.00	1.98		1.98
14.50	1.67		1.67
15.00	1.54		1.54
15.50	1.45		1.45
16.00	1.34		1.34
16.50	1.26		1.26
17.00	1.18		1.18
17.50	1.11		1.11
18.00	1.04		1.04
18.50	0.91		0.91
19.00	0.80		0.80
19.50	0.72		0.72
20.00	0.65		0.65
20.50	0.59		0.59
21.00	0.54		0.54
21.50	0.49		0.49
22.00	0.45		0.45
22.50	0.41		0.41
23.00	0.37		0.37
23.50	0.34		0.34
24.00	0.31		0.31

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 9.86" for 100-Year_Future event
Inflow = 5.00 cfs @ 12.29 hrs, Volume= 1.530 af
Outflow = 5.00 cfs @ 12.29 hrs, Volume= 1.530 af, Atten= 0%, Lag= 0.2 min
Primary = 5.00 cfs @ 12.29 hrs, Volume= 1.530 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 581.63' @ 12.29 hrs Surf.Area= 0.002 ac Storage= 0.001 af

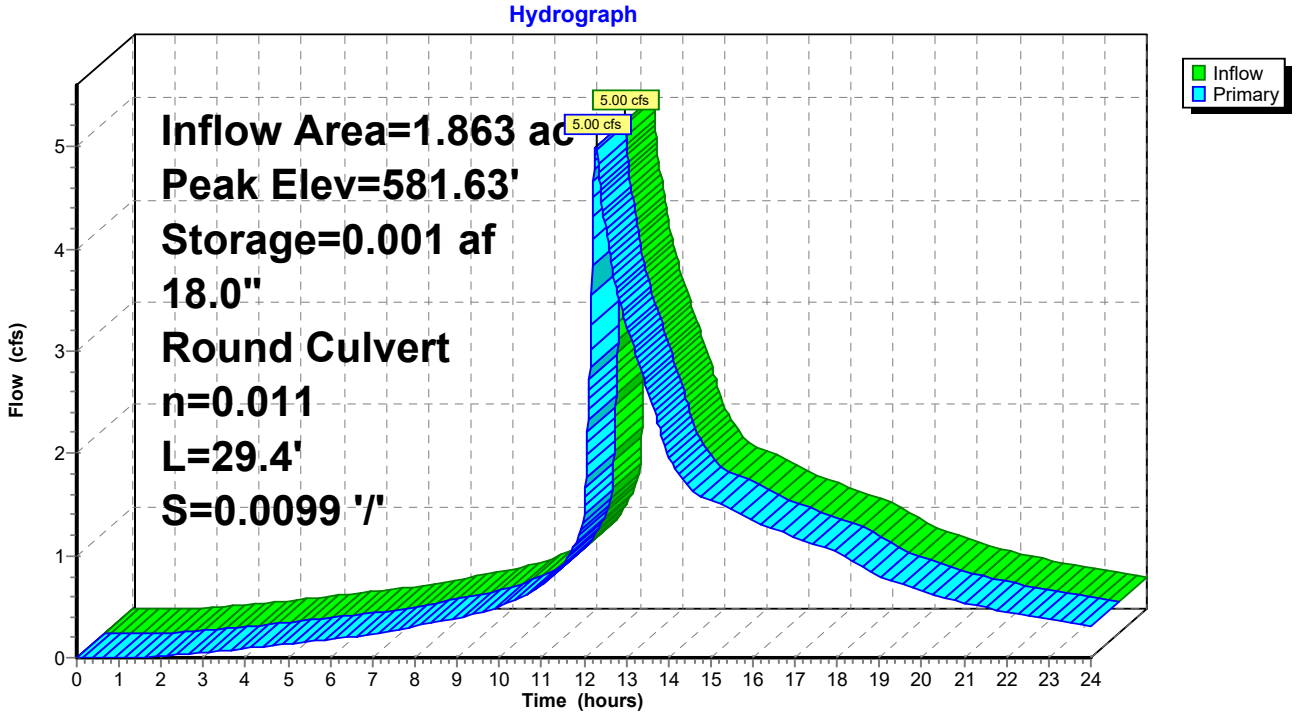
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (873.2 - 873.1)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=5.00 cfs @ 12.29 hrs HW=581.63' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 5.00 cfs @ 4.54 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.01	0.000	580.69	0.01
2.00	0.02	0.000	580.69	0.02
2.50	0.03	0.000	580.69	0.03
3.00	0.05	0.000	580.69	0.05
3.50	0.07	0.000	580.69	0.07
4.00	0.09	0.000	580.69	0.09
4.50	0.11	0.000	580.69	0.11
5.00	0.14	0.000	580.69	0.14
5.50	0.16	0.000	580.69	0.16
6.00	0.18	0.000	580.69	0.18
6.50	0.21	0.000	580.69	0.21
7.00	0.24	0.000	580.69	0.24
7.50	0.27	0.000	580.69	0.27
8.00	0.31	0.000	580.69	0.31
8.50	0.35	0.000	580.70	0.35
9.00	0.39	0.000	580.71	0.39
9.50	0.43	0.000	580.73	0.43
10.00	0.51	0.000	580.75	0.51
10.50	0.59	0.000	580.78	0.59
11.00	0.71	0.000	580.81	0.70
11.50	0.91	0.000	580.87	0.91
12.00	**1.35**	**0.000**	**580.98**	**1.35**
12.50	**4.26**	**0.000**	**581.52**	**4.26**
13.00	3.26	0.000	581.35	3.26
13.50	2.62	0.000	581.24	2.62
14.00	1.98	0.000	581.11	1.98
14.50	1.67	0.000	581.05	1.67
15.00	1.54	0.000	581.02	1.54
15.50	1.45	0.000	581.00	1.45
16.00	1.34	0.000	580.98	1.34
16.50	1.26	0.000	580.96	1.26
17.00	1.18	0.000	580.94	1.18
17.50	1.11	0.000	580.92	1.11
18.00	1.04	0.000	580.90	1.04
18.50	0.91	0.000	580.87	0.91
19.00	0.80	0.000	580.84	0.80
19.50	0.72	0.000	580.82	0.72
20.00	0.65	0.000	580.80	0.65
20.50	0.59	0.000	580.78	0.59
21.00	0.54	0.000	580.76	0.54
21.50	0.49	0.000	580.75	0.49
22.00	0.45	0.000	580.73	0.45
22.50	0.41	0.000	580.72	0.41
23.00	0.37	0.000	580.71	0.37
23.50	0.34	0.000	580.70	0.34
24.00	0.31	0.000	580.69	0.31

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 9.85" for 100-Year_Future event
Inflow = 4.68 cfs @ 12.28 hrs, Volume= 1.331 af
Outflow = 4.67 cfs @ 12.29 hrs, Volume= 1.331 af, Atten= 0%, Lag= 0.5 min
Primary = 4.67 cfs @ 12.29 hrs, Volume= 1.331 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 586.13' @ 12.29 hrs Surf.Area= 0.002 ac Storage= 0.001 af

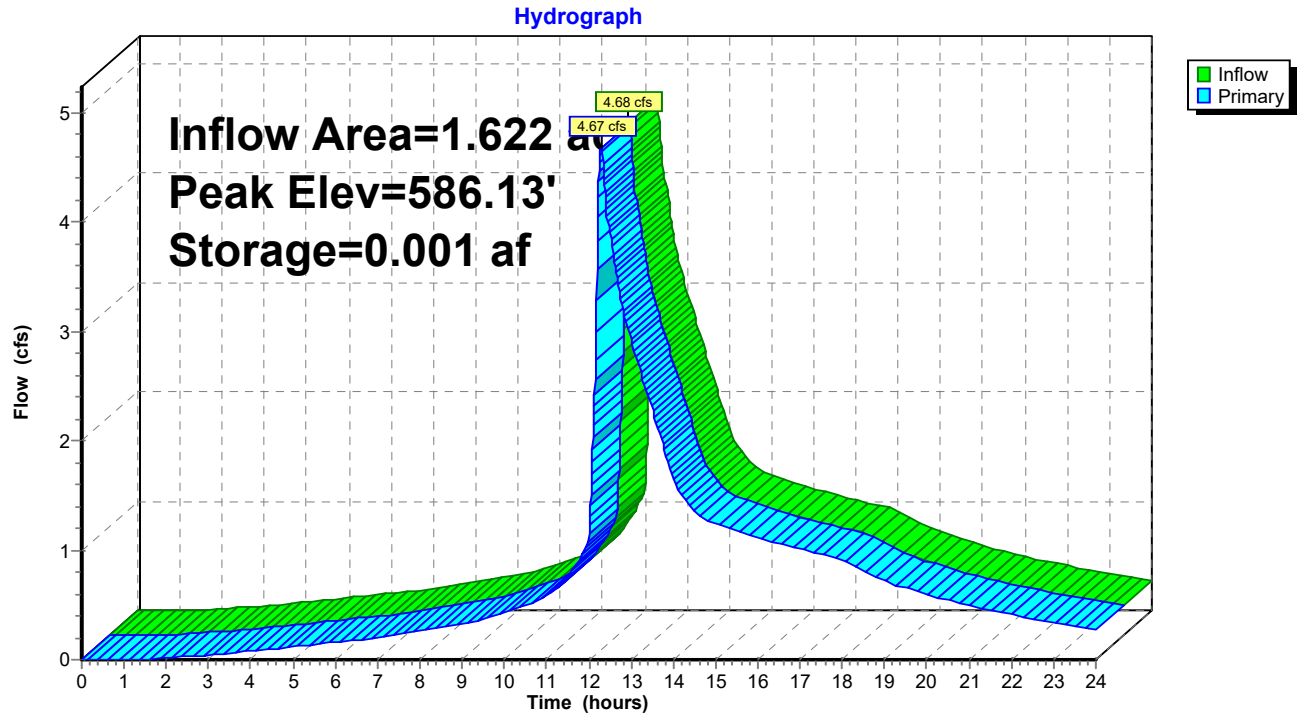
Plug-Flow detention time= 0.1 min calculated for 1.331 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (875.5 - 875.4)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.67 cfs @ 12.29 hrs HW=586.13' TW=581.63' (Dynamic Tailwater)
↑—**1=SD-24** (Orifice Controls 4.67 cfs @ 3.80 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.89	0.00
1.50	0.00	0.000	584.91	0.00
2.00	0.01	0.000	584.93	0.01
2.50	0.03	0.000	584.95	0.03
3.00	0.04	0.000	584.97	0.04
3.50	0.06	0.000	584.99	0.06
4.00	0.08	0.000	585.01	0.08
4.50	0.10	0.000	585.02	0.10
5.00	0.12	0.000	585.04	0.12
5.50	0.14	0.000	585.05	0.14
6.00	0.16	0.000	585.06	0.16
6.50	0.18	0.000	585.07	0.18
7.00	0.20	0.000	585.09	0.20
7.50	0.23	0.000	585.10	0.23
8.00	0.26	0.000	585.11	0.26
8.50	0.29	0.000	585.13	0.29
9.00	0.33	0.000	585.14	0.33
9.50	0.37	0.000	585.16	0.37
10.00	0.43	0.000	585.18	0.43
10.50	0.50	0.000	585.21	0.50
11.00	0.59	0.000	585.24	0.59
11.50	0.76	0.000	585.29	0.76
12.00	**1.11**	**0.000**	**585.38**	**1.10**
12.50	**3.91**	**0.001**	**585.95**	**3.92**
13.00	2.92	0.001	585.75	2.92
13.50	2.28	0.000	585.63	2.29
14.00	1.65	0.000	585.51	1.65
14.50	1.35	0.000	585.44	1.35
15.00	1.23	0.000	585.41	1.23
15.50	1.18	0.000	585.40	1.18
16.00	1.12	0.000	585.38	1.12
16.50	1.06	0.000	585.37	1.06
17.00	1.01	0.000	585.36	1.01
17.50	0.97	0.000	585.35	0.97
18.00	0.91	0.000	585.33	0.91
18.50	0.81	0.000	585.30	0.81
19.00	0.72	0.000	585.28	0.72
19.50	0.65	0.000	585.26	0.65
20.00	0.60	0.000	585.24	0.60
20.50	0.54	0.000	585.22	0.54
21.00	0.50	0.000	585.21	0.50
21.50	0.45	0.000	585.19	0.45
22.00	0.41	0.000	585.18	0.41
22.50	0.37	0.000	585.16	0.37
23.00	0.34	0.000	585.15	0.34
23.50	0.31	0.000	585.13	0.31
24.00	0.28	0.000	585.12	0.28

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 9.83" for 100-Year_Future event
Inflow = 4.27 cfs @ 12.27 hrs, Volume= 1.069 af
Outflow = 4.26 cfs @ 12.28 hrs, Volume= 1.069 af, Atten= 0%, Lag= 0.3 min
Primary = 4.26 cfs @ 12.28 hrs, Volume= 1.069 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.94' @ 12.28 hrs Surf.Area= 0.002 ac Storage= 0.001 af

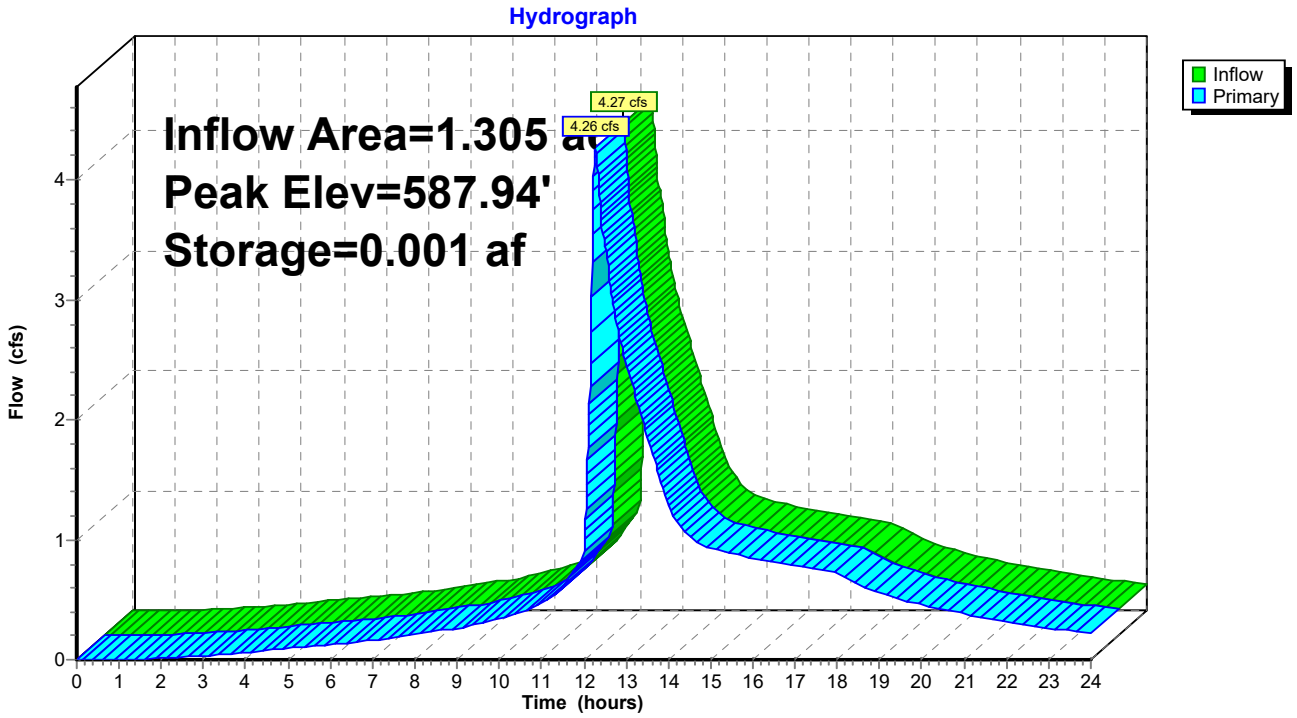
Plug-Flow detention time= 0.1 min calculated for 1.069 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (869.9 - 869.8)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.26 cfs @ 12.28 hrs HW=587.94' TW=586.13' (Dynamic Tailwater)
↑—**1=SD-23** (Orifice Controls 4.26 cfs @ 3.63 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.81	0.00
1.50	0.00	0.000	586.83	0.00
2.00	0.01	0.000	586.85	0.01
2.50	0.02	0.000	586.87	0.02
3.00	0.03	0.000	586.88	0.03
3.50	0.04	0.000	586.90	0.04
4.00	0.06	0.000	586.91	0.06
4.50	0.08	0.000	586.93	0.08
5.00	0.09	0.000	586.94	0.09
5.50	0.11	0.000	586.95	0.11
6.00	0.12	0.000	586.96	0.12
6.50	0.14	0.000	586.97	0.14
7.00	0.16	0.000	586.98	0.16
7.50	0.18	0.000	586.99	0.18
8.00	0.21	0.000	587.01	0.21
8.50	0.23	0.000	587.02	0.23
9.00	0.26	0.000	587.03	0.26
9.50	0.29	0.000	587.05	0.29
10.00	0.34	0.000	587.07	0.34
10.50	0.40	0.000	587.09	0.40
11.00	0.47	0.000	587.12	0.47
11.50	0.61	0.000	587.16	0.61
12.00	**0.89**	**0.000**	**587.24**	**0.88**
12.50	**3.47**	**0.001**	**587.78**	**3.47**
13.00	2.47	0.000	587.59	2.47
13.50	1.86	0.000	587.47	1.87
14.00	1.27	0.000	587.34	1.28
14.50	1.03	0.000	587.28	1.03
15.00	0.93	0.000	587.26	0.93
15.50	0.89	0.000	587.24	0.89
16.00	0.85	0.000	587.23	0.85
16.50	0.82	0.000	587.23	0.82
17.00	0.79	0.000	587.22	0.79
17.50	0.76	0.000	587.21	0.76
18.00	0.72	0.000	587.20	0.72
18.50	0.63	0.000	587.17	0.63
19.00	0.55	0.000	587.14	0.55
19.50	0.50	0.000	587.13	0.50
20.00	0.46	0.000	587.11	0.46
20.50	0.42	0.000	587.10	0.42
21.00	0.38	0.000	587.08	0.38
21.50	0.35	0.000	587.07	0.35
22.00	0.32	0.000	587.06	0.32
22.50	0.29	0.000	587.05	0.29
23.00	0.26	0.000	587.03	0.26
23.50	0.24	0.000	587.02	0.24
24.00	0.22	0.000	587.01	0.22

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 9.84" for 100-Year_Future event
Inflow = 3.95 cfs @ 12.26 hrs, Volume= 0.752 af
Outflow = 3.95 cfs @ 12.27 hrs, Volume= 0.752 af, Atten= 0%, Lag= 0.5 min
Primary = 3.95 cfs @ 12.27 hrs, Volume= 0.752 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.04' @ 12.27 hrs Surf.Area= 0.001 ac Storage= 0.001 af

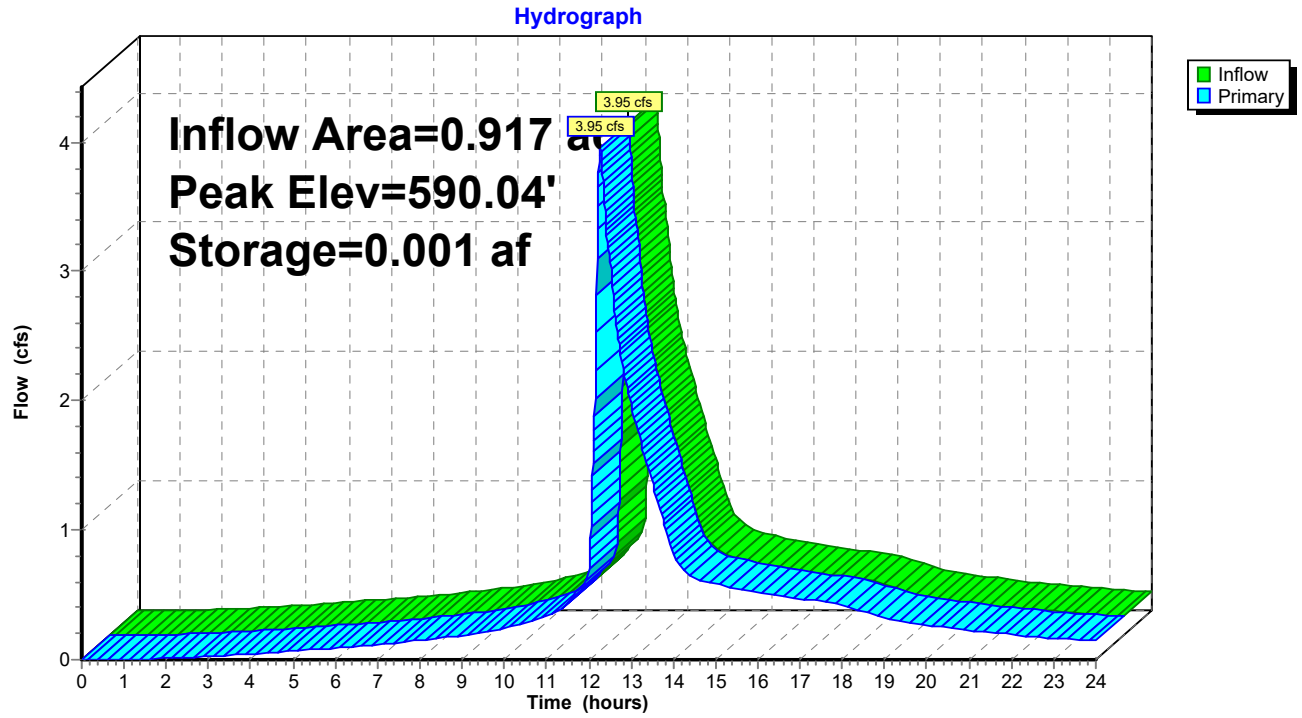
Plug-Flow detention time= 0.1 min calculated for 0.752 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (849.2 - 849.1)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.95 cfs @ 12.27 hrs HW=590.04' TW=587.94' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 3.95 cfs @ 5.02 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.46	0.00
1.50	0.00	0.000	588.48	0.00
2.00	0.01	0.000	588.49	0.01
2.50	0.02	0.000	588.51	0.02
3.00	0.02	0.000	588.52	0.02
3.50	0.03	0.000	588.53	0.03
4.00	0.04	0.000	588.55	0.04
4.50	0.05	0.000	588.56	0.05
5.00	0.07	0.000	588.57	0.07
5.50	0.08	0.000	588.58	0.08
6.00	0.09	0.000	588.59	0.09
6.50	0.10	0.000	588.60	0.10
7.00	0.11	0.000	588.61	0.11
7.50	0.13	0.000	588.62	0.13
8.00	0.15	0.000	588.64	0.15
8.50	0.17	0.000	588.65	0.17
9.00	0.19	0.000	588.66	0.19
9.50	0.21	0.000	588.67	0.21
10.00	0.24	0.000	588.69	0.24
10.50	0.28	0.000	588.71	0.28
11.00	0.34	0.000	588.73	0.34
11.50	0.44	0.000	588.78	0.44
12.00	**0.66**	**0.000**	**588.86**	**0.65**
12.50	**3.08**	**0.001**	**589.62**	**3.09**
13.00	1.96	0.000	589.23	1.97
13.50	1.37	0.000	589.07	1.37
14.00	0.82	0.000	588.91	0.82
14.50	0.63	0.000	588.85	0.63
15.00	0.58	0.000	588.83	0.58
15.50	0.55	0.000	588.82	0.55
16.00	0.52	0.000	588.81	0.52
16.50	0.49	0.000	588.80	0.49
17.00	0.47	0.000	588.79	0.47
17.50	0.45	0.000	588.78	0.45
18.00	0.42	0.000	588.77	0.42
18.50	0.37	0.000	588.75	0.37
19.00	0.32	0.000	588.73	0.32
19.50	0.29	0.000	588.72	0.29
20.00	0.27	0.000	588.70	0.27
20.50	0.25	0.000	588.69	0.25
21.00	0.23	0.000	588.68	0.23
21.50	0.21	0.000	588.67	0.21
22.00	0.19	0.000	588.66	0.19
22.50	0.18	0.000	588.65	0.18
23.00	0.17	0.000	588.65	0.17
23.50	0.15	0.000	588.64	0.15
24.00	0.14	0.000	588.63	0.14

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 9.74" for 100-Year_Future event
Inflow = 1.65 cfs @ 12.58 hrs, Volume= 0.460 af
Outflow = 1.65 cfs @ 12.58 hrs, Volume= 0.460 af, Atten= 0%, Lag= 0.2 min
Primary = 1.65 cfs @ 12.58 hrs, Volume= 0.460 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 591.31' @ 12.58 hrs Surf.Area= 0.001 ac Storage= 0.000 af

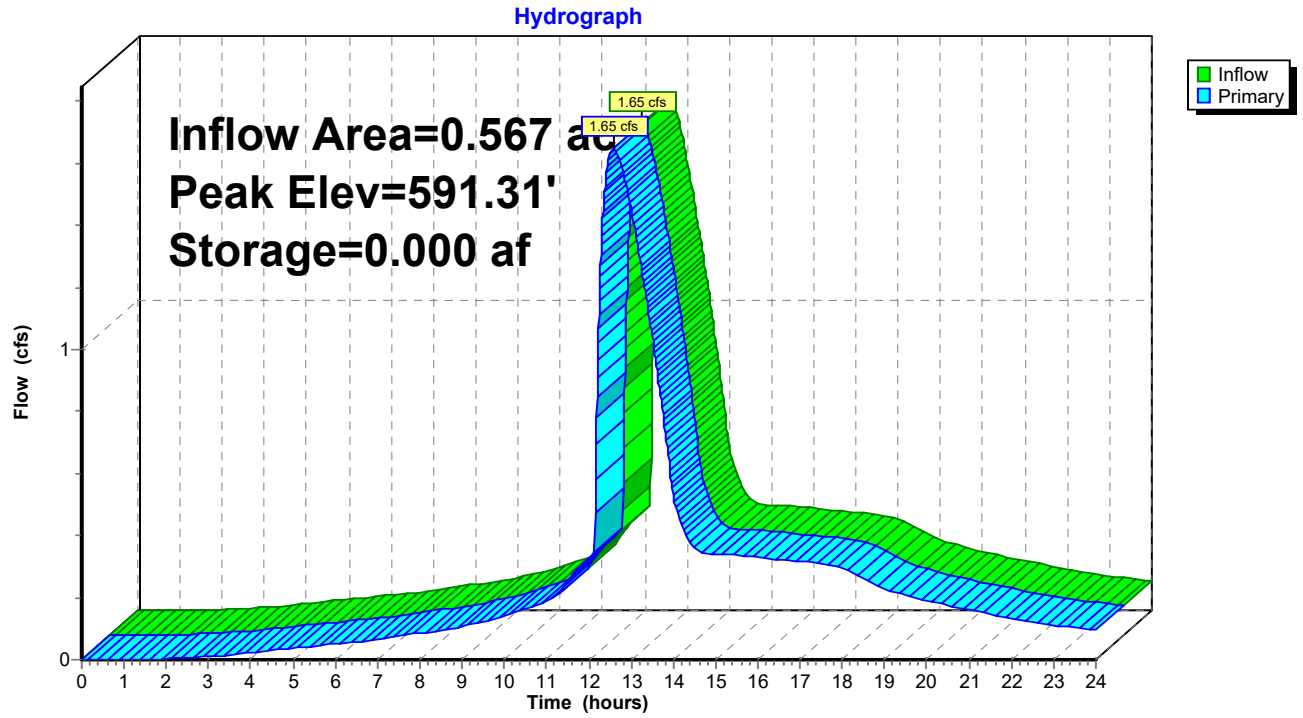
Plug-Flow detention time= 0.1 min calculated for 0.460 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (868.3 - 868.2)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.65 cfs @ 12.58 hrs HW=591.31' TW=589.51' (Dynamic Tailwater)
↑**1=SD-21** (Orifice Controls 1.65 cfs @ 2.84 fps)

Pond 19P: SD-21

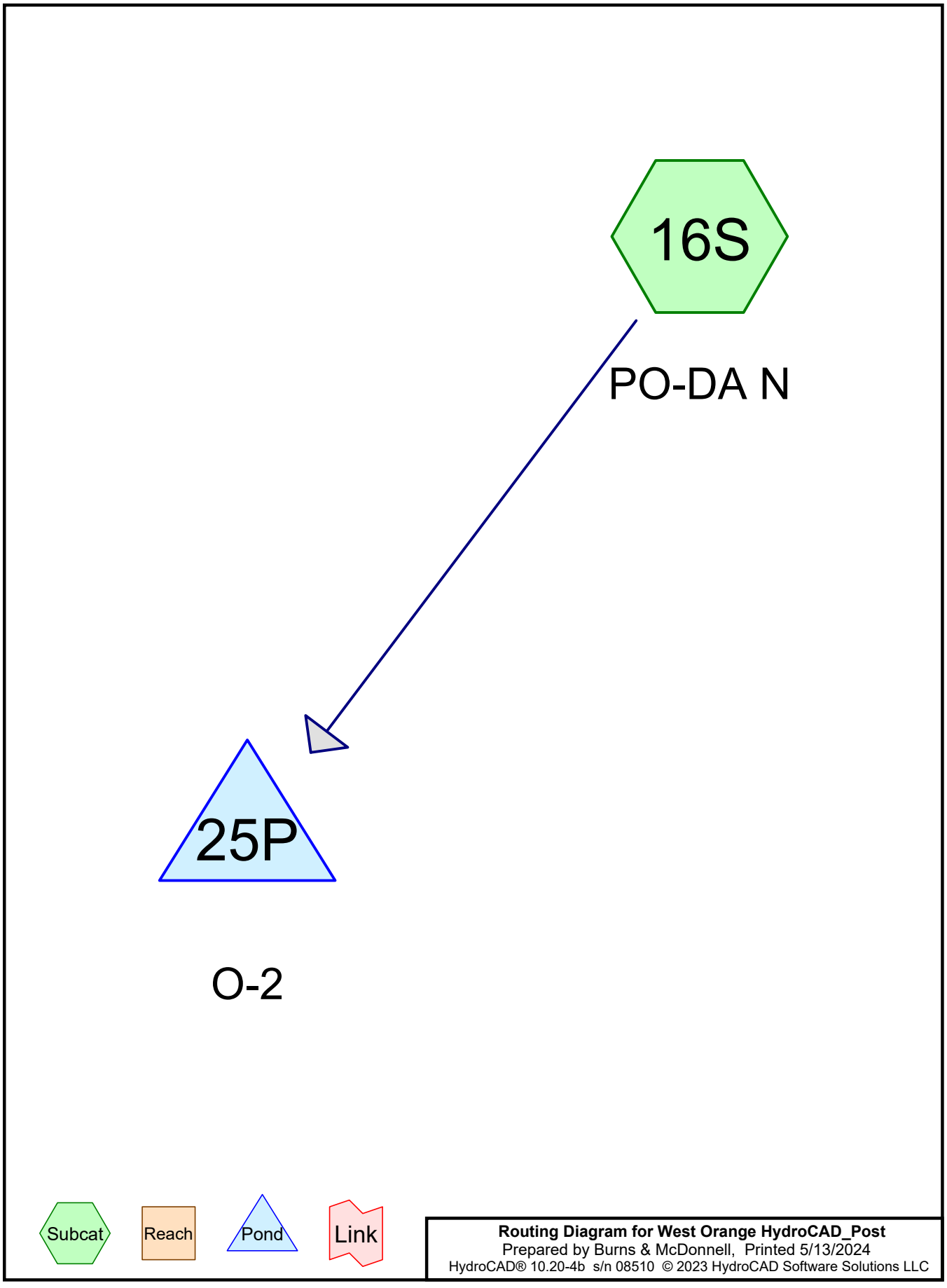


Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.63	0.00
2.00	0.00	0.000	590.64	0.00
2.50	0.01	0.000	590.65	0.01
3.00	0.01	0.000	590.66	0.01
3.50	0.02	0.000	590.67	0.02
4.00	0.02	0.000	590.68	0.02
4.50	0.03	0.000	590.69	0.03
5.00	0.04	0.000	590.70	0.04
5.50	0.04	0.000	590.71	0.04
6.00	0.05	0.000	590.72	0.05
6.50	0.06	0.000	590.72	0.06
7.00	0.06	0.000	590.73	0.06
7.50	0.07	0.000	590.74	0.07
8.00	0.08	0.000	590.75	0.08
8.50	0.10	0.000	590.76	0.10
9.00	0.11	0.000	590.77	0.11
9.50	0.12	0.000	590.78	0.12
10.00	0.14	0.000	590.79	0.14
10.50	0.16	0.000	590.81	0.16
11.00	0.19	0.000	590.82	0.19
11.50	0.25	0.000	590.86	0.25
12.00	0.32	0.000	590.89	0.32
12.50	**1.64**	**0.000**	**591.30**	**1.64**
13.00	**1.45**	**0.000**	**591.25**	**1.46**
13.50	1.04	0.000	591.14	1.04
14.00	0.53	0.000	590.97	0.53
14.50	0.36	0.000	590.91	0.36
15.00	0.34	0.000	590.90	0.34
15.50	0.34	0.000	590.90	0.34
16.00	0.33	0.000	590.89	0.33
16.50	0.32	0.000	590.89	0.32
17.00	0.32	0.000	590.89	0.32
17.50	0.31	0.000	590.88	0.31
18.00	0.30	0.000	590.88	0.30
18.50	0.26	0.000	590.86	0.26
19.00	0.23	0.000	590.84	0.23
19.50	0.21	0.000	590.83	0.21
20.00	0.19	0.000	590.82	0.19
20.50	0.17	0.000	590.81	0.17
21.00	0.16	0.000	590.80	0.16
21.50	0.15	0.000	590.80	0.15
22.00	0.13	0.000	590.79	0.13
22.50	0.12	0.000	590.78	0.12
23.00	0.11	0.000	590.77	0.11
23.50	0.10	0.000	590.76	0.10
24.00	0.09	0.000	590.76	0.09

APPENDIX B.7- POST-DEVELOPED OUTFALL = O-2

POST-DEVELOPED:
OUTFALL = O-2



Routing Diagram for West Orange HydroCAD_Post
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5 Ground Covers (selected nodes)

WQ Event
6 Node Listing
7 Subcat 16S: PO-DA N
10 Pond 25P: O-2

2-Year_Current Event
12 Node Listing
13 Subcat 16S: PO-DA N
16 Pond 25P: O-2

2-Year_Future Event
18 Node Listing
19 Subcat 16S: PO-DA N
22 Pond 25P: O-2

10-Year_Current Event
24 Node Listing
25 Subcat 16S: PO-DA N
28 Pond 25P: O-2

10-Year_Future Event
30 Node Listing
31 Subcat 16S: PO-DA N
34 Pond 25P: O-2

100-Year_Current Event
36 Node Listing
37 Subcat 16S: PO-DA N
40 Pond 25P: O-2

100-Year_Future Event
42 Node Listing
43 Subcat 16S: PO-DA N
46 Pond 25P: O-2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	WQ	NJ DEP 2-hr		Default	2.00	1	1.25	2	3.42
2	2-Year_Current	NOAA 24-hr	D	Default	24.00	1	3.45	2	3.45
3	2-Year_Future	NOAA 24-hr	D	Default	24.00	1	4.07	2	4.07
4	10-Year_Current	NOAA 24-hr	D	Default	24.00	1	5.37	2	3.45
5	10-Year_Future	NOAA 24-hr	D	Default	24.00	1	6.36	2	4.07
6	100-Year_Current	NOAA 24-hr	D	Default	24.00	1	9.23	2	3.45
7	100-Year_Future	NOAA 24-hr	D	Default	24.00	1	11.58	2	4.07

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.428	80	>75% Grass cover, Good, HSG D (16S)
0.528	73	Brush, Good, HSG D (16S)
0.210	98	Impervious, Pavement, HSG D (16S)
0.153	85	Yard Stone/Gravel Pad, HSG D (16S)
1.319	**81**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.319	HSG D	16S
0.000	Other	
1.319		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.428	0.000	0.428	>75% Grass cover, Good	16S
0.000	0.000	0.000	0.528	0.000	0.528	Brush, Good	16S
0.000	0.000	0.000	0.210	0.000	0.210	Impervious, Pavement	16S
0.000	0.000	0.000	0.153	0.000	0.153	Yard Stone/Gravel Pad	16S
0.000	**0.000**	**0.000**	**1.319**	**0.000**	**1.319**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth=0.28"
Flow Length=452' Tc=11.6 min CN=WQ Runoff=0.79 cfs 0.031 af

Pond 25P: O-2 Inflow=0.79 cfs 0.031 af
Primary=0.79 cfs 0.031 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.031 af Average Runoff Depth = 0.28"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

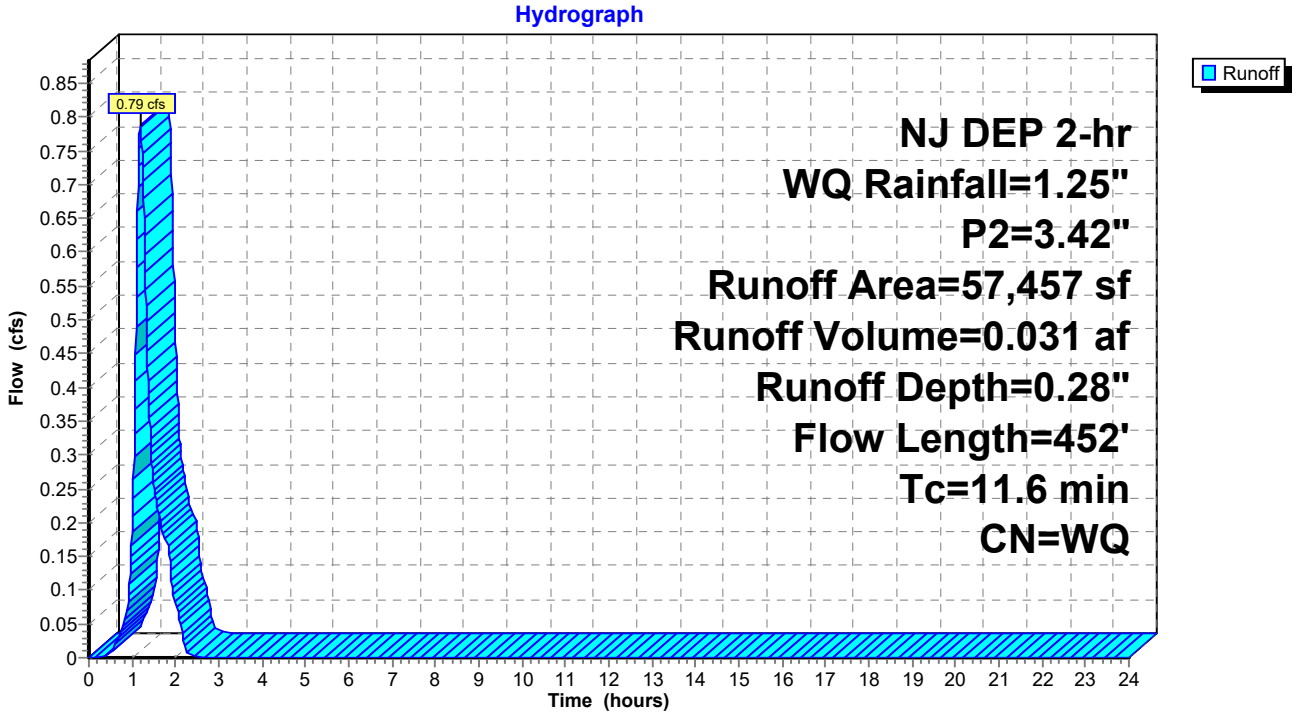
Runoff = 0.79 cfs @ 1.19 hrs, Volume= 0.031 af, Depth= 0.28"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=3.42"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0139	0.21		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

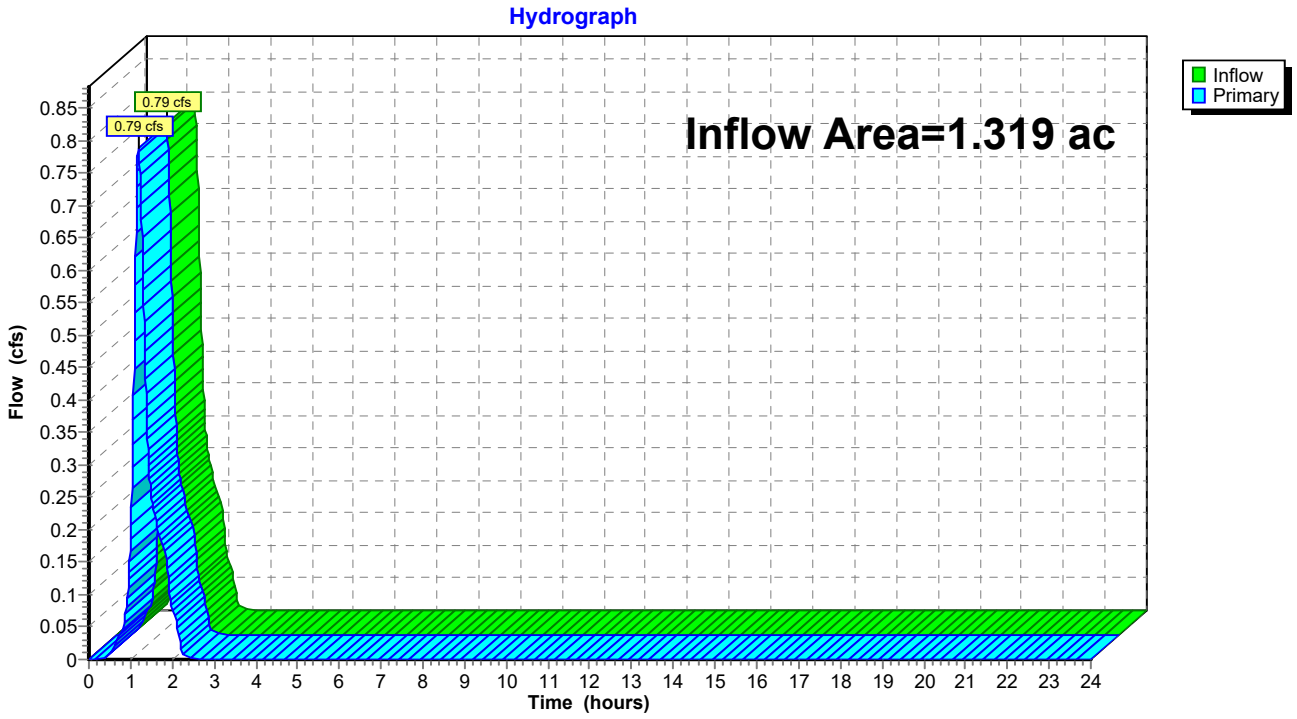
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.10	0.00	0.01
1.00	0.63	0.01	**0.19**
1.50	1.15	0.15	**0.25**
2.00	**1.25**	**0.20**	0.08
2.50	1.25	0.20	0.00
3.00	1.25	0.20	0.00
3.50	1.25	0.20	0.00
4.00	1.25	0.20	0.00
4.50	1.25	0.20	0.00
5.00	1.25	0.20	0.00
5.50	1.25	0.20	0.00
6.00	1.25	0.20	0.00
6.50	1.25	0.20	0.00
7.00	1.25	0.20	0.00
7.50	1.25	0.20	0.00
8.00	1.25	0.20	0.00
8.50	1.25	0.20	0.00
9.00	1.25	0.20	0.00
9.50	1.25	0.20	0.00
10.00	1.25	0.20	0.00
10.50	1.25	0.20	0.00
11.00	1.25	0.20	0.00
11.50	1.25	0.20	0.00
12.00	1.25	0.20	0.00
12.50	1.25	0.20	0.00
13.00	1.25	0.20	0.00
13.50	1.25	0.20	0.00
14.00	1.25	0.20	0.00
14.50	1.25	0.20	0.00
15.00	1.25	0.20	0.00
15.50	1.25	0.20	0.00
16.00	1.25	0.20	0.00
16.50	1.25	0.20	0.00
17.00	1.25	0.20	0.00
17.50	1.25	0.20	0.00
18.00	1.25	0.20	0.00
18.50	1.25	0.20	0.00
19.00	1.25	0.20	0.00
19.50	1.25	0.20	0.00
20.00	1.25	0.20	0.00
20.50	1.25	0.20	0.00
21.00	1.25	0.20	0.00
21.50	1.25	0.20	0.00
22.00	1.25	0.20	0.00
22.50	1.25	0.20	0.00
23.00	1.25	0.20	0.00
23.50	1.25	0.20	0.00
24.00	1.25	0.20	0.00

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth = 0.28" for WQ event
Inflow = 0.79 cfs @ 1.19 hrs, Volume= 0.031 af
Primary = 0.79 cfs @ 1.19 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2



Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.01		0.01
1.00	**0.19**		**0.19**
1.50	**0.25**		**0.25**
2.00	0.08		0.08
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.00		0.00
11.50	0.00		0.00
12.00	0.00		0.00
12.50	0.00		0.00
13.00	0.00		0.00
13.50	0.00		0.00
14.00	0.00		0.00
14.50	0.00		0.00
15.00	0.00		0.00
15.50	0.00		0.00
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth>1.71"
Flow Length=452' Tc=11.6 min CN=WQ Runoff=2.06 cfs 0.188 af

Pond 25P: O-2 Inflow=2.06 cfs 0.188 af
Primary=2.06 cfs 0.188 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.188 af Average Runoff Depth = 1.71"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

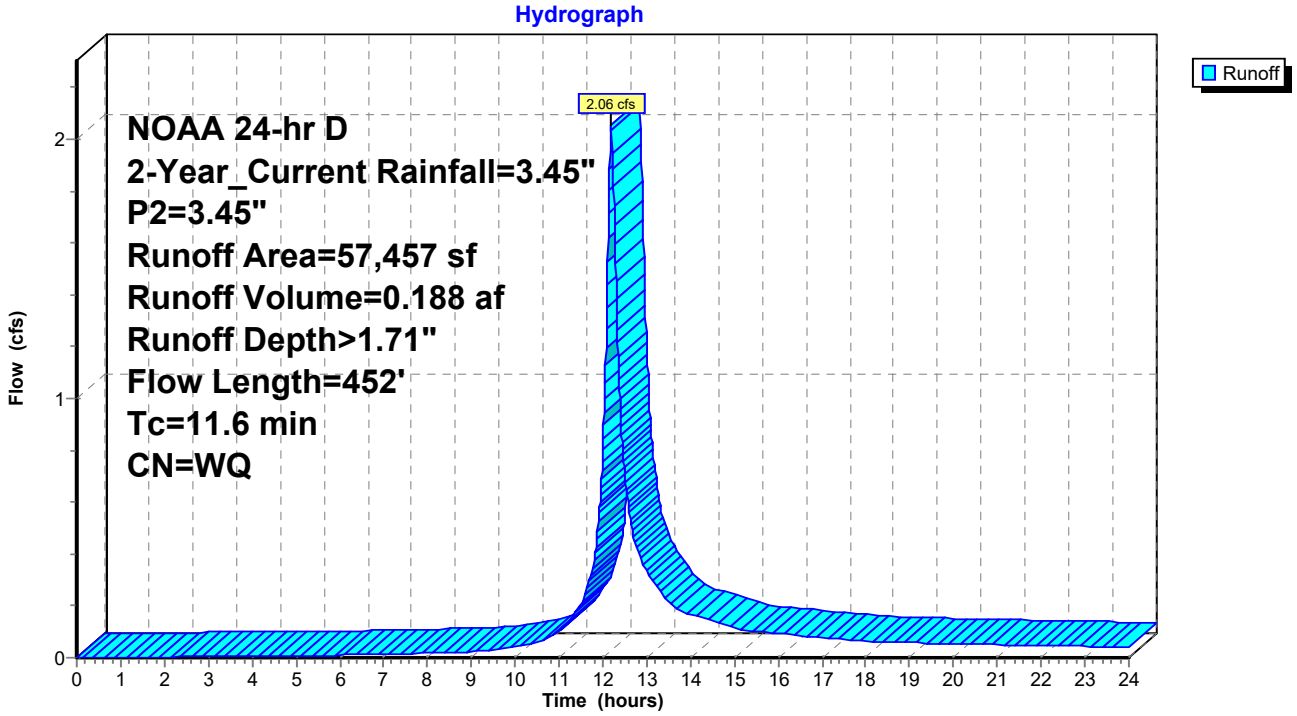
Runoff = 2.06 cfs @ 12.19 hrs, Volume= 0.188 af, Depth> 1.71"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Current Rainfall=3.45", P2=3.45"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0139	0.21		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

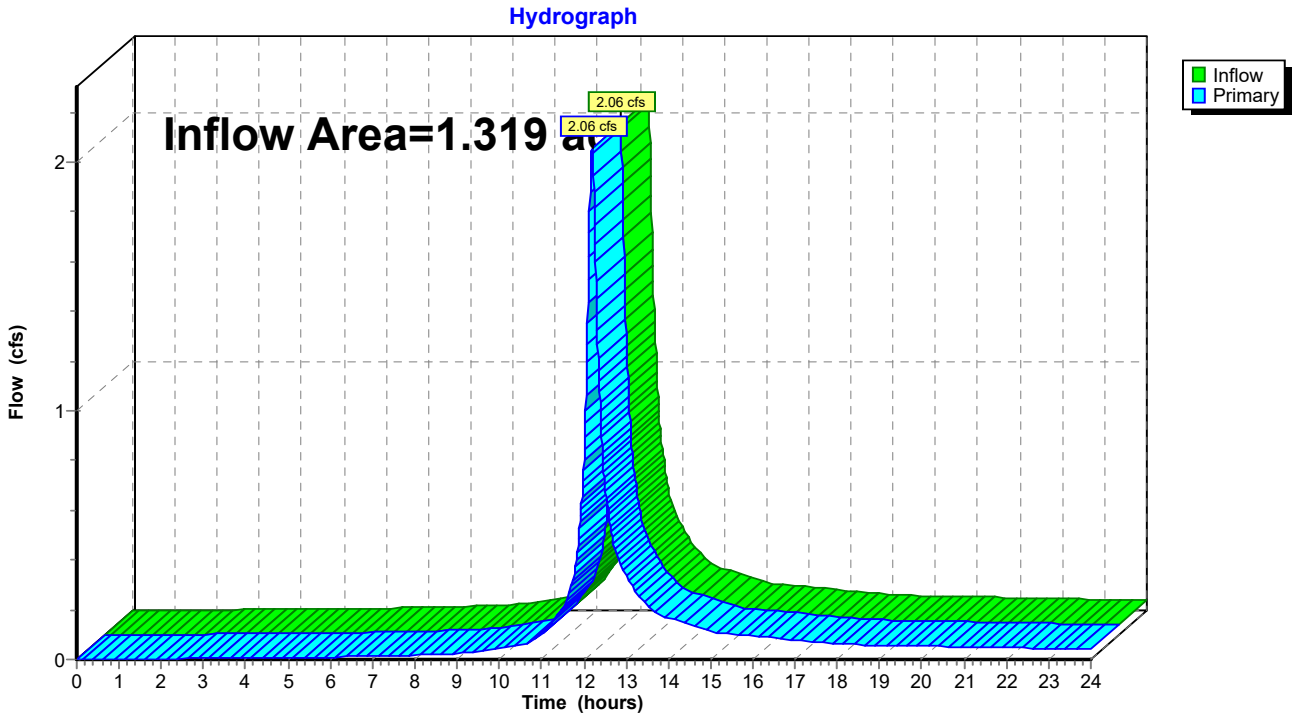
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.11	0.00	0.00
3.00	0.13	0.00	0.00
3.50	0.16	0.00	0.01
4.00	0.18	0.00	0.01
4.50	0.21	0.00	0.01
5.00	0.24	0.00	0.01
5.50	0.26	0.00	0.01
6.00	0.29	0.00	0.01
6.50	0.33	0.00	0.01
7.00	0.36	0.00	0.01
7.50	0.40	0.00	0.02
8.00	0.45	0.00	0.02
8.50	0.50	0.00	0.02
9.00	0.55	0.00	0.02
9.50	0.61	0.01	0.03
10.00	0.68	0.02	0.04
10.50	0.77	0.03	0.06
11.00	0.90	0.07	0.10
11.50	1.09	0.13	0.20
12.00	1.65	0.40	**0.80**
12.50	2.36	0.84	**0.70**
13.00	2.55	0.98	0.34
13.50	2.68	1.07	0.22
14.00	2.77	1.14	0.17
14.50	2.84	1.19	0.14
15.00	2.90	1.24	0.12
15.50	2.95	1.28	0.10
16.00	3.00	1.32	0.09
16.50	3.05	1.35	0.09
17.00	3.09	1.38	0.08
17.50	3.12	1.41	0.07
18.00	3.16	1.43	0.06
18.50	3.19	1.46	0.06
19.00	3.21	1.48	0.06
19.50	3.24	1.50	0.06
20.00	3.27	1.52	0.05
20.50	3.29	1.54	0.05
21.00	3.32	1.56	0.05
21.50	3.34	1.58	0.05
22.00	3.37	1.60	0.05
22.50	3.39	1.62	0.05
23.00	3.41	1.64	0.04
23.50	3.43	1.65	0.04
24.00	**3.45**	**1.67**	0.04

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth > 1.71" for 2-Year_Current event
Inflow = 2.06 cfs @ 12.19 hrs, Volume= 0.188 af
Primary = 2.06 cfs @ 12.19 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2



Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.02		0.02
8.00	0.02		0.02
8.50	0.02		0.02
9.00	0.02		0.02
9.50	0.03		0.03
10.00	0.04		0.04
10.50	0.06		0.06
11.00	0.10		0.10
11.50	0.20		0.20
12.00	**0.80**		**0.80**
12.50	**0.70**		**0.70**
13.00	0.34		0.34
13.50	0.22		0.22
14.00	0.17		0.17
14.50	0.14		0.14
15.00	0.12		0.12
15.50	0.10		0.10
16.00	0.09		0.09
16.50	0.09		0.09
17.00	0.08		0.08
17.50	0.07		0.07
18.00	0.06		0.06
18.50	0.06		0.06
19.00	0.06		0.06
19.50	0.06		0.06
20.00	0.05		0.05
20.50	0.05		0.05
21.00	0.05		0.05
21.50	0.05		0.05
22.00	0.05		0.05
22.50	0.05		0.05
23.00	0.04		0.04
23.50	0.04		0.04
24.00	0.04		0.04

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth>2.21"
Flow Length=452' Tc=11.0 min CN=WQ Runoff=2.75 cfs 0.243 af

Pond 25P: O-2 Inflow=2.75 cfs 0.243 af
Primary=2.75 cfs 0.243 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.243 af Average Runoff Depth = 2.21"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

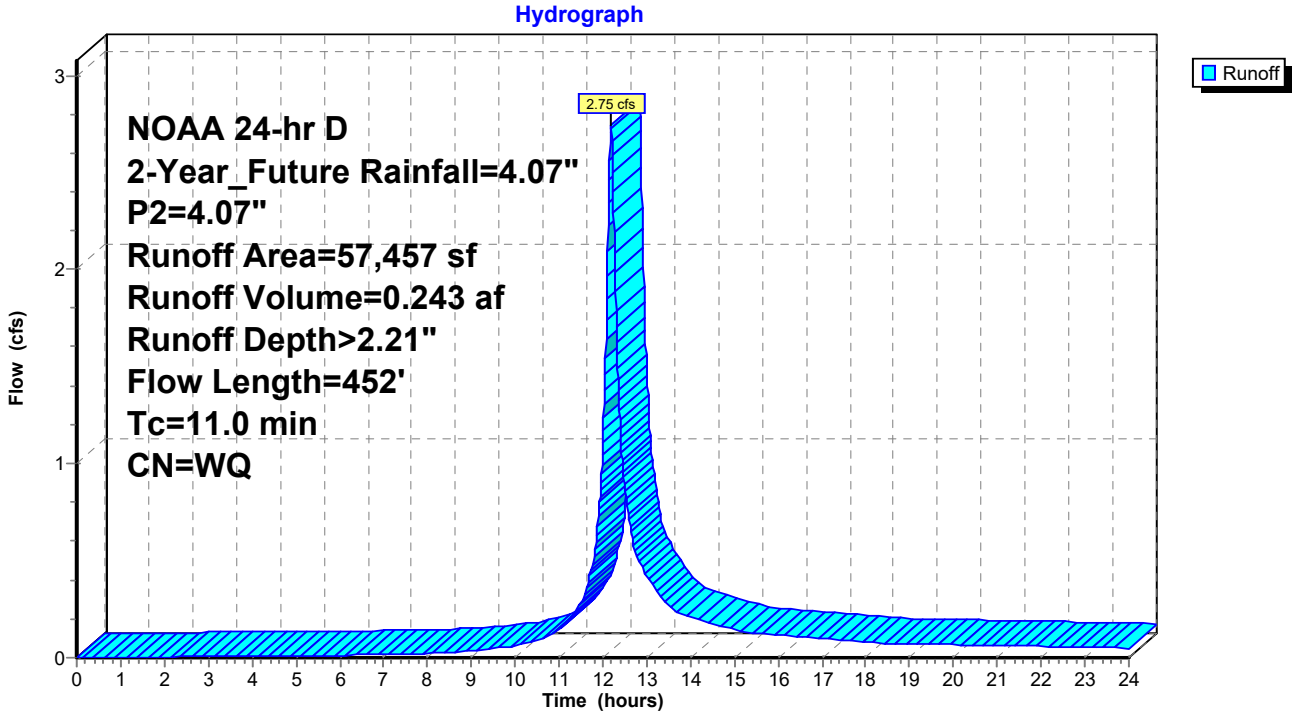
Runoff = 2.75 cfs @ 12.19 hrs, Volume= 0.243 af, Depth> 2.21"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 2-Year_Future Rainfall=4.07", P2=4.07"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0139	0.23		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.0	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

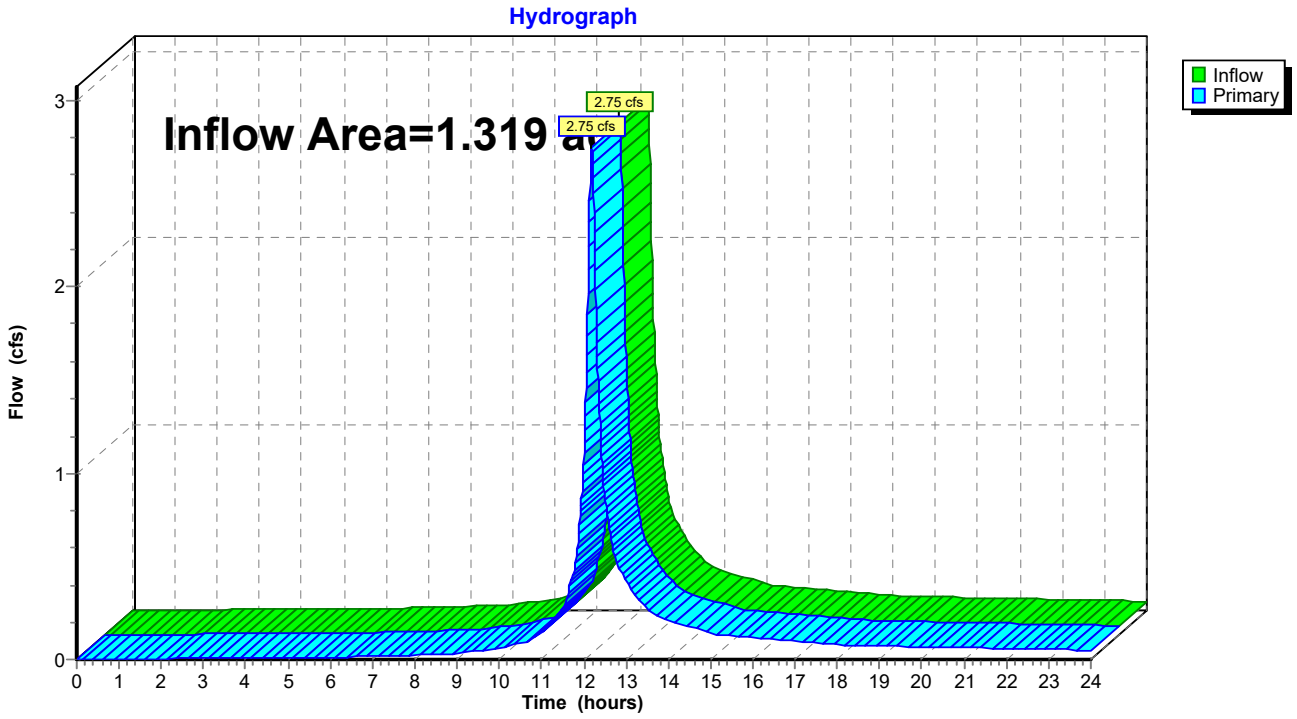
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.10	0.00	0.00
2.50	0.12	0.00	0.01
3.00	0.15	0.00	0.01
3.50	0.18	0.00	0.01
4.00	0.21	0.00	0.01
4.50	0.25	0.00	0.01
5.00	0.28	0.00	0.01
5.50	0.31	0.00	0.01
6.00	0.35	0.00	0.01
6.50	0.39	0.00	0.01
7.00	0.43	0.00	0.02
7.50	0.48	0.00	0.02
8.00	0.53	0.00	0.02
8.50	0.58	0.01	0.03
9.00	0.65	0.01	0.03
9.50	0.72	0.02	0.05
10.00	0.81	0.04	0.06
10.50	0.91	0.07	0.09
11.00	1.06	0.12	0.15
11.50	1.29	0.21	0.28
12.00	1.95	0.57	**1.11**
12.50	2.78	1.15	**0.86**
13.00	3.01	1.32	0.42
13.50	3.16	1.44	0.28
14.00	3.26	1.52	0.21
14.50	3.35	1.59	0.18
15.00	3.42	1.65	0.14
15.50	3.49	1.70	0.13
16.00	3.54	1.74	0.12
16.50	3.59	1.78	0.11
17.00	3.64	1.82	0.10
17.50	3.68	1.86	0.09
18.00	3.72	1.89	0.08
18.50	3.76	1.92	0.07
19.00	3.79	1.95	0.07
19.50	3.82	1.97	0.07
20.00	3.86	2.00	0.07
20.50	3.89	2.03	0.07
21.00	3.92	2.05	0.06
21.50	3.95	2.08	0.06
22.00	3.97	2.10	0.06
22.50	4.00	2.12	0.06
23.00	4.02	2.14	0.05
23.50	4.05	2.16	0.05
24.00	**4.07**	**2.18**	0.05

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth > 2.21" for 2-Year_Future event
Inflow = 2.75 cfs @ 12.19 hrs, Volume= 0.243 af
Primary = 2.75 cfs @ 12.19 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2



Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.02		0.02
7.50	0.02		0.02
8.00	0.02		0.02
8.50	0.03		0.03
9.00	0.03		0.03
9.50	0.05		0.05
10.00	0.06		0.06
10.50	0.09		0.09
11.00	0.15		0.15
11.50	0.28		0.28
12.00	**1.11**		**1.11**
12.50	**0.86**		**0.86**
13.00	0.42		0.42
13.50	0.28		0.28
14.00	0.21		0.21
14.50	0.18		0.18
15.00	0.14		0.14
15.50	0.13		0.13
16.00	0.12		0.12
16.50	0.11		0.11
17.00	0.10		0.10
17.50	0.09		0.09
18.00	0.08		0.08
18.50	0.07		0.07
19.00	0.07		0.07
19.50	0.07		0.07
20.00	0.07		0.07
20.50	0.07		0.07
21.00	0.06		0.06
21.50	0.06		0.06
22.00	0.06		0.06
22.50	0.06		0.06
23.00	0.05		0.05
23.50	0.05		0.05
24.00	0.05		0.05

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth>3.31"
Flow Length=452' Tc=11.6 min CN=WQ Runoff=4.02 cfs 0.364 af

Pond 25P: O-2 Inflow=4.02 cfs 0.364 af
Primary=4.02 cfs 0.364 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.364 af Average Runoff Depth = 3.31"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

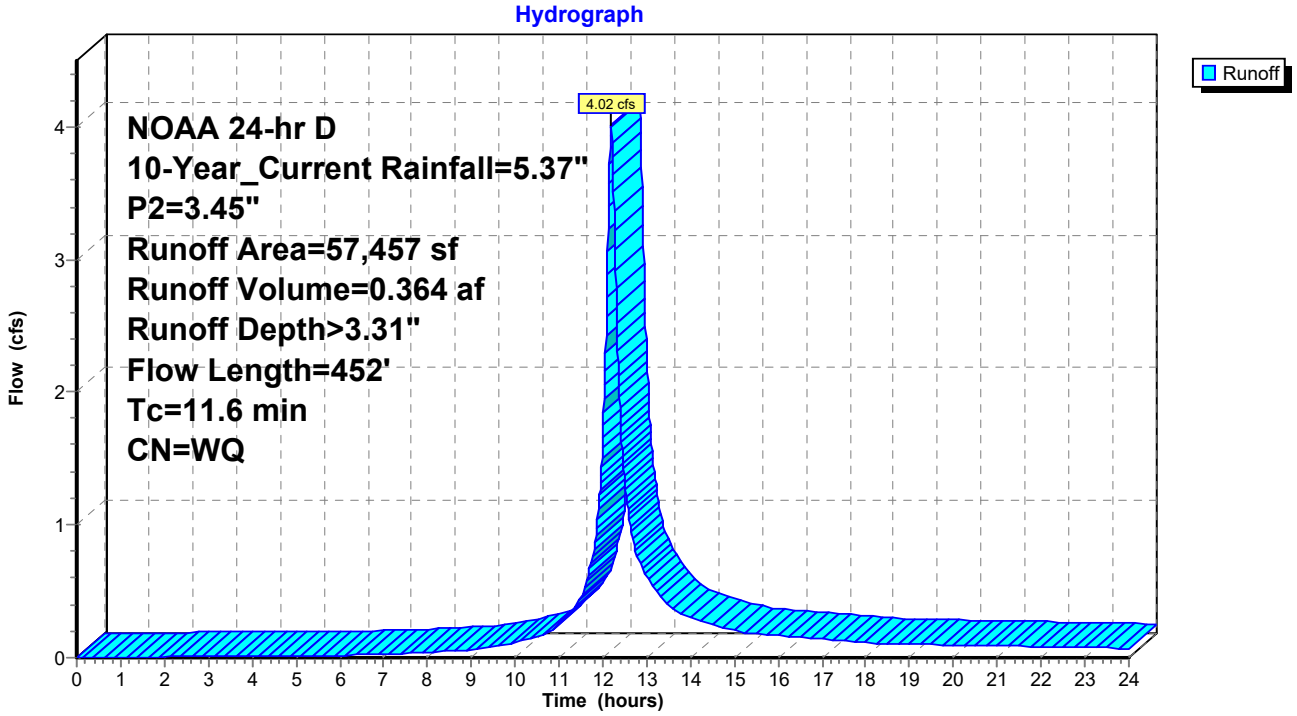
Runoff = 4.02 cfs @ 12.19 hrs, Volume= 0.364 af, Depth> 3.31"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Current Rainfall=5.37", P2=3.45"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0139	0.21		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

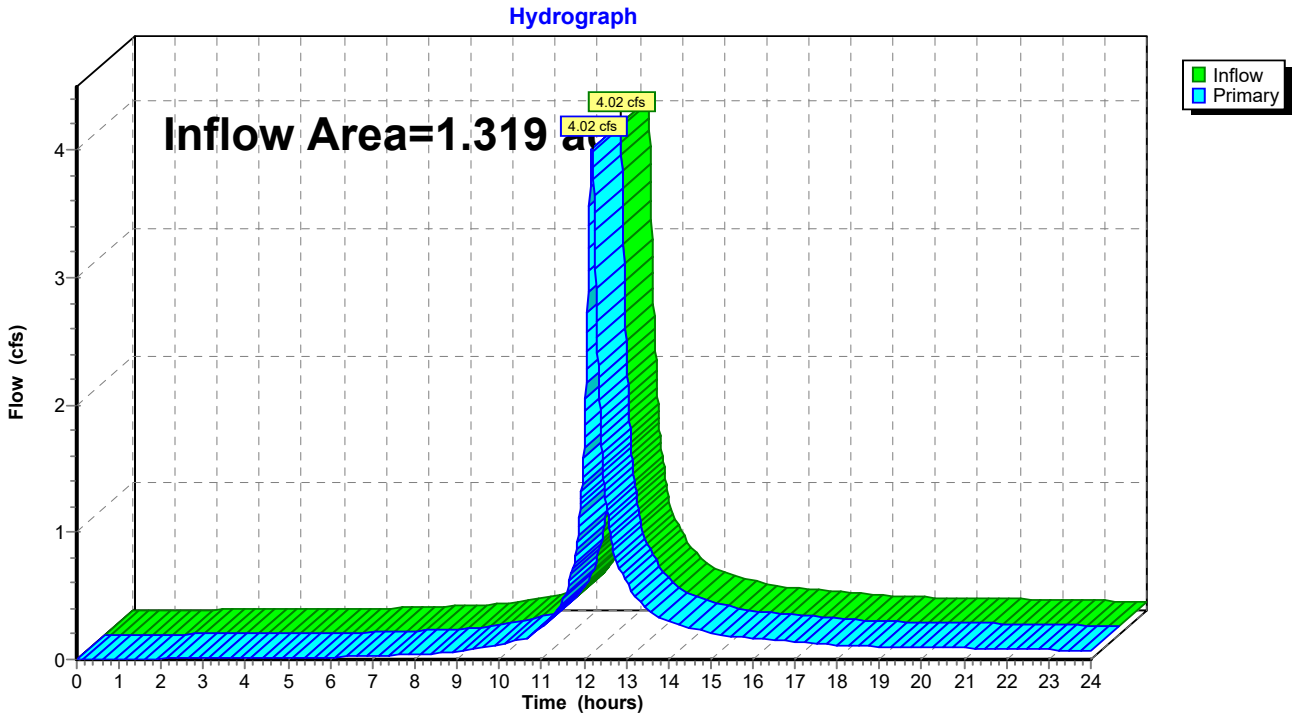
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.13	0.00	0.01
2.50	0.16	0.00	0.01
3.00	0.20	0.00	0.01
3.50	0.24	0.00	0.01
4.00	0.28	0.00	0.01
4.50	0.32	0.00	0.01
5.00	0.37	0.00	0.02
5.50	0.41	0.00	0.02
6.00	0.46	0.00	0.02
6.50	0.51	0.00	0.02
7.00	0.57	0.00	0.03
7.50	0.63	0.01	0.03
8.00	0.70	0.02	0.04
8.50	0.77	0.03	0.05
9.00	0.85	0.05	0.06
9.50	0.95	0.08	0.08
10.00	1.06	0.12	0.12
10.50	1.20	0.17	0.16
11.00	1.40	0.26	0.25
11.50	1.70	0.42	0.46
12.00	2.57	0.99	**1.66**
12.50	3.67	1.85	**1.31**
13.00	3.97	2.10	0.62
13.50	4.17	2.26	0.40
14.00	4.31	2.38	0.30
14.50	4.42	2.48	0.25
15.00	4.52	2.56	0.21
15.50	4.60	2.63	0.18
16.00	4.67	2.70	0.17
16.50	4.74	2.76	0.15
17.00	4.80	2.81	0.14
17.50	4.86	2.86	0.13
18.00	4.91	2.91	0.11
18.50	4.96	2.95	0.11
19.00	5.00	2.99	0.10
19.50	5.05	3.03	0.10
20.00	5.09	3.06	0.10
20.50	5.13	3.10	0.09
21.00	5.17	3.13	0.09
21.50	5.21	3.17	0.09
22.00	5.24	3.20	0.08
22.50	5.28	3.23	0.08
23.00	5.31	3.26	0.08
23.50	5.34	3.29	0.07
24.00	**5.37**	**3.31**	0.07

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth > 3.31" for 10-Year_Current event
Inflow = 4.02 cfs @ 12.19 hrs, Volume= 0.364 af
Primary = 4.02 cfs @ 12.19 hrs, Volume= 0.364 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2



Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.02		0.02
5.50	0.02		0.02
6.00	0.02		0.02
6.50	0.02		0.02
7.00	0.03		0.03
7.50	0.03		0.03
8.00	0.04		0.04
8.50	0.05		0.05
9.00	0.06		0.06
9.50	0.08		0.08
10.00	0.12		0.12
10.50	0.16		0.16
11.00	0.25		0.25
11.50	0.46		0.46
12.00	**1.66**		**1.66**
12.50	**1.31**		**1.31**
13.00	0.62		0.62
13.50	0.40		0.40
14.00	0.30		0.30
14.50	0.25		0.25
15.00	0.21		0.21
15.50	0.18		0.18
16.00	0.17		0.17
16.50	0.15		0.15
17.00	0.14		0.14
17.50	0.13		0.13
18.00	0.11		0.11
18.50	0.11		0.11
19.00	0.10		0.10
19.50	0.10		0.10
20.00	0.10		0.10
20.50	0.09		0.09
21.00	0.09		0.09
21.50	0.09		0.09
22.00	0.08		0.08
22.50	0.08		0.08
23.00	0.08		0.08
23.50	0.07		0.07
24.00	0.07		0.07

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth>4.19"
Flow Length=452' Tc=11.0 min CN=WQ Runoff=5.21 cfs 0.461 af

Pond 25P: O-2 Inflow=5.21 cfs 0.461 af
Primary=5.21 cfs 0.461 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.461 af Average Runoff Depth = 4.19"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

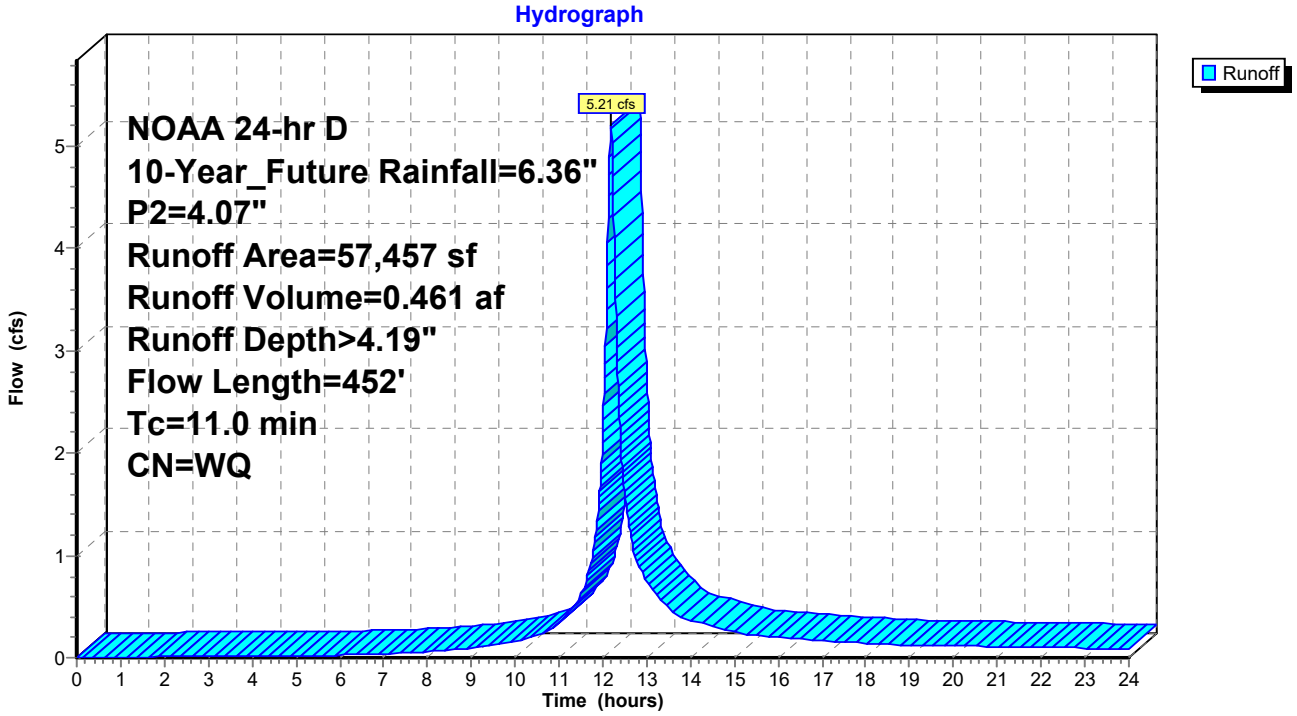
Runoff = 5.21 cfs @ 12.18 hrs, Volume= 0.461 af, Depth> 4.19"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 10-Year_Future Rainfall=6.36", P2=4.07"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0139	0.23		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.0	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

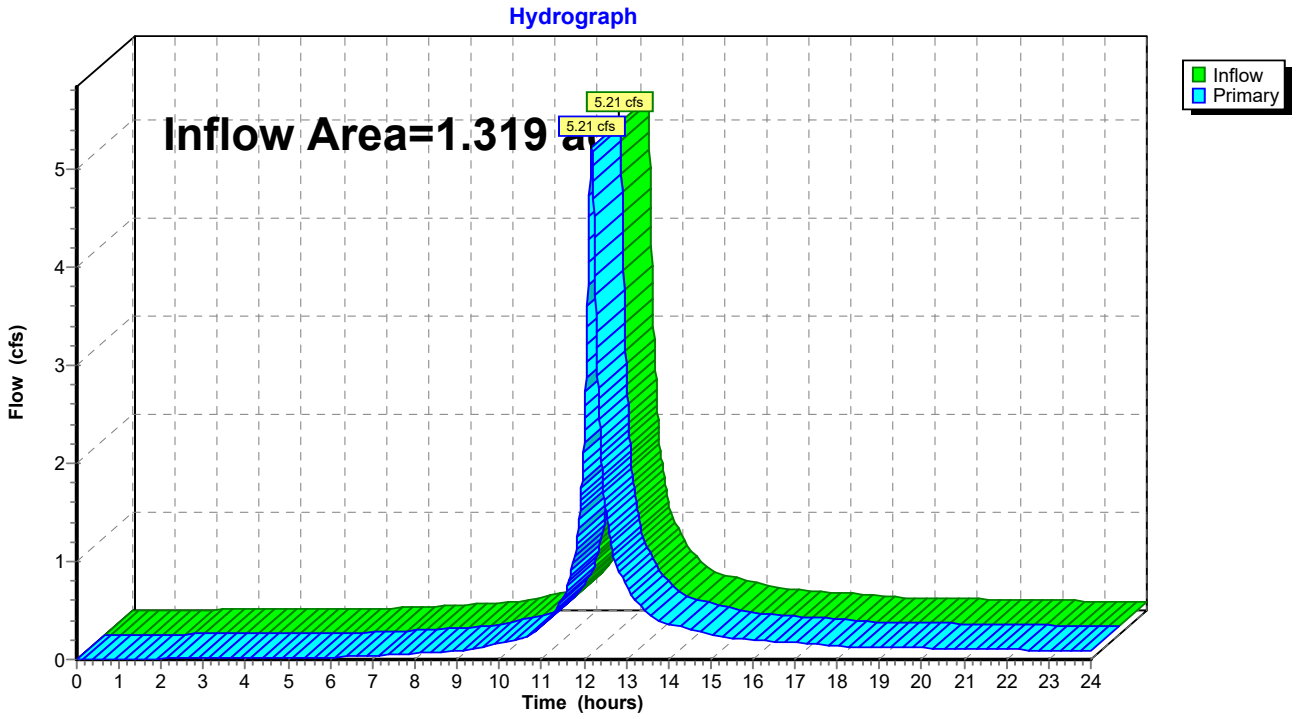
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.01
2.00	0.15	0.00	0.01
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.02
4.00	0.33	0.00	0.02
4.50	0.38	0.00	0.02
5.00	0.43	0.00	0.02
5.50	0.49	0.00	0.02
6.00	0.54	0.00	0.03
6.50	0.60	0.01	0.03
7.00	0.67	0.02	0.04
7.50	0.74	0.03	0.05
8.00	0.83	0.05	0.06
8.50	0.91	0.07	0.07
9.00	1.01	0.10	0.09
9.50	1.12	0.14	0.12
10.00	1.26	0.20	0.16
10.50	1.42	0.28	0.21
11.00	1.65	0.40	0.34
11.50	2.02	0.61	0.62
12.00	3.05	1.35	**2.21**
12.50	4.34	2.41	**1.57**
13.00	4.71	2.73	0.76
13.50	4.94	2.93	0.49
14.00	5.10	3.07	0.37
14.50	5.24	3.20	0.31
15.00	5.35	3.30	0.25
15.50	5.45	3.38	0.22
16.00	5.53	3.46	0.20
16.50	5.62	3.54	0.19
17.00	5.69	3.60	0.17
17.50	5.76	3.66	0.16
18.00	5.82	3.72	0.14
18.50	5.87	3.77	0.13
19.00	5.93	3.82	0.13
19.50	5.98	3.86	0.12
20.00	6.03	3.91	0.12
20.50	6.07	3.95	0.11
21.00	6.12	3.99	0.11
21.50	6.16	4.03	0.11
22.00	6.21	4.07	0.10
22.50	6.25	4.11	0.10
23.00	6.29	4.15	0.09
23.50	6.32	4.18	0.09
24.00	**6.36**	**4.21**	0.08

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth > 4.19" for 10-Year_Future event
Inflow = 5.21 cfs @ 12.18 hrs, Volume= 0.461 af
Primary = 5.21 cfs @ 12.18 hrs, Volume= 0.461 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2



Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.01		0.01
2.00	0.01		0.01
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.02		0.02
5.00	0.02		0.02
5.50	0.02		0.02
6.00	0.03		0.03
6.50	0.03		0.03
7.00	0.04		0.04
7.50	0.05		0.05
8.00	0.06		0.06
8.50	0.07		0.07
9.00	0.09		0.09
9.50	0.12		0.12
10.00	0.16		0.16
10.50	0.21		0.21
11.00	0.34		0.34
11.50	0.62		0.62
12.00	**2.21**		**2.21**
12.50	**1.57**		**1.57**
13.00	0.76		0.76
13.50	0.49		0.49
14.00	0.37		0.37
14.50	0.31		0.31
15.00	0.25		0.25
15.50	0.22		0.22
16.00	0.20		0.20
16.50	0.19		0.19
17.00	0.17		0.17
17.50	0.16		0.16
18.00	0.14		0.14
18.50	0.13		0.13
19.00	0.13		0.13
19.50	0.12		0.12
20.00	0.12		0.12
20.50	0.11		0.11
21.00	0.11		0.11
21.50	0.11		0.11
22.00	0.10		0.10
22.50	0.10		0.10
23.00	0.09		0.09
23.50	0.09		0.09
24.00	0.08		0.08

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth>6.84"
Flow Length=452' Tc=11.6 min CN=WQ Runoff=8.18 cfs 0.752 af

Pond 25P: O-2 Inflow=8.18 cfs 0.752 af
Primary=8.18 cfs 0.752 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.752 af Average Runoff Depth = 6.84"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

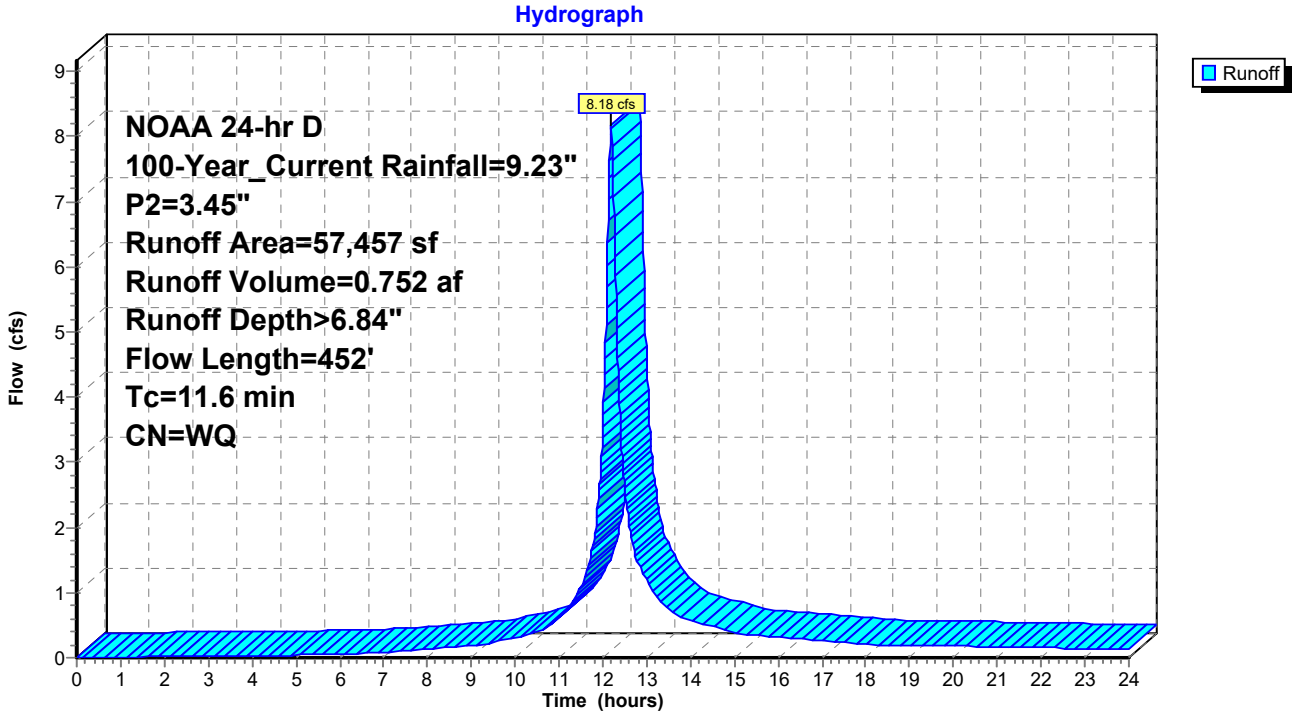
Runoff = 8.18 cfs @ 12.19 hrs, Volume= 0.752 af, Depth> 6.84"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Current Rainfall=9.23", P2=3.45"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0139	0.21		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.45"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.6	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

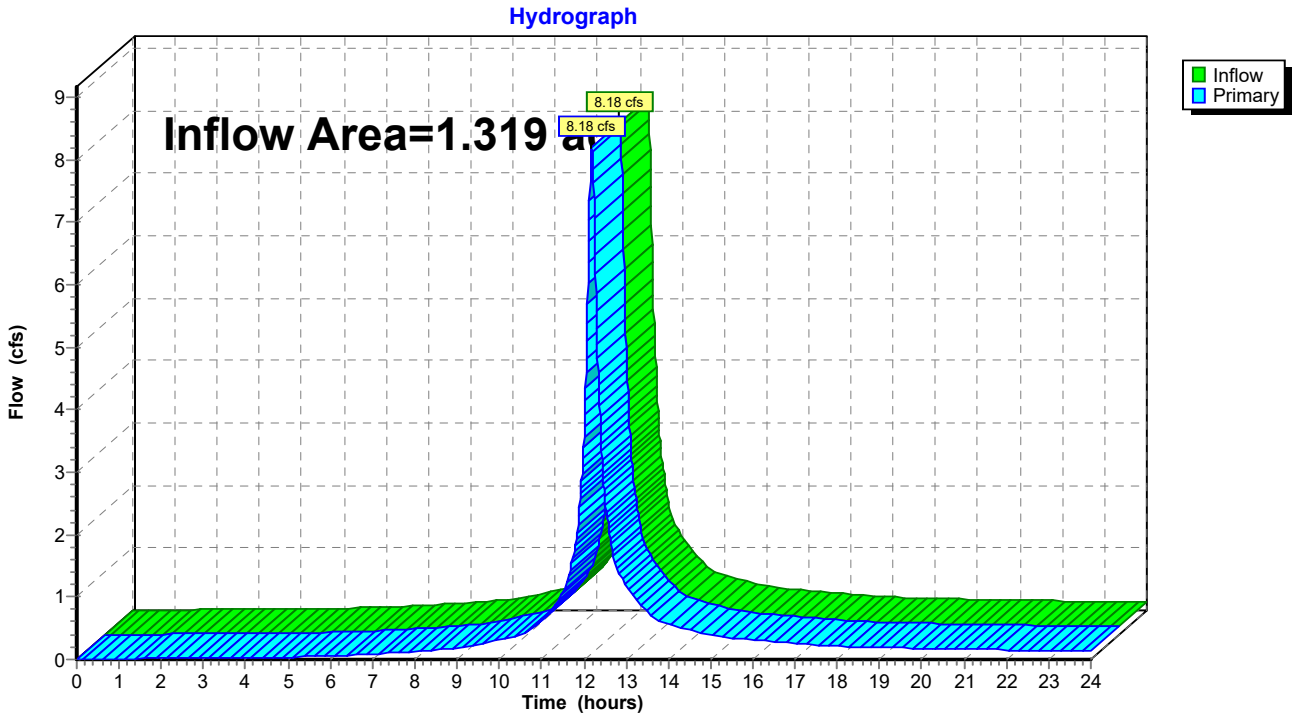
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.11	0.00	0.01
1.50	0.16	0.00	0.01
2.00	0.22	0.00	0.02
2.50	0.28	0.00	0.02
3.00	0.35	0.00	0.02
3.50	0.41	0.00	0.03
4.00	0.48	0.00	0.03
4.50	0.56	0.00	0.03
5.00	0.63	0.01	0.04
5.50	0.71	0.02	0.05
6.00	0.79	0.04	0.05
6.50	0.88	0.06	0.07
7.00	0.97	0.09	0.09
7.50	1.08	0.13	0.11
8.00	1.20	0.17	0.13
8.50	1.33	0.23	0.16
9.00	1.46	0.30	0.18
9.50	1.63	0.38	0.24
10.00	1.83	0.50	0.31
10.50	2.07	0.65	0.40
11.00	2.40	0.87	0.62
11.50	2.93	1.26	1.07
12.00	4.42	2.48	**3.56**
12.50	6.30	4.16	**2.56**
13.00	6.83	4.65	1.19
13.50	7.16	4.96	0.76
14.00	7.40	5.18	0.57
14.50	7.60	5.37	0.48
15.00	7.77	5.52	0.39
15.50	7.90	5.65	0.34
16.00	8.03	5.77	0.31
16.50	8.15	5.88	0.29
17.00	8.26	5.99	0.26
17.50	8.35	6.08	0.24
18.00	8.44	6.16	0.21
18.50	8.52	6.24	0.20
19.00	8.60	6.31	0.19
19.50	8.67	6.38	0.19
20.00	8.75	6.45	0.18
20.50	8.82	6.52	0.17
21.00	8.88	6.58	0.17
21.50	8.95	6.64	0.16
22.00	9.01	6.70	0.15
22.50	9.07	6.76	0.15
23.00	9.12	6.81	0.14
23.50	9.18	6.86	0.13
24.00	**9.23**	**6.91**	0.13

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth > 6.84" for 100-Year_Current event
Inflow = 8.18 cfs @ 12.19 hrs, Volume= 0.752 af
Primary = 8.18 cfs @ 12.19 hrs, Volume= 0.752 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2



Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.01		0.01
2.00	0.02		0.02
2.50	0.02		0.02
3.00	0.02		0.02
3.50	0.03		0.03
4.00	0.03		0.03
4.50	0.03		0.03
5.00	0.04		0.04
5.50	0.05		0.05
6.00	0.05		0.05
6.50	0.07		0.07
7.00	0.09		0.09
7.50	0.11		0.11
8.00	0.13		0.13
8.50	0.16		0.16
9.00	0.18		0.18
9.50	0.24		0.24
10.00	0.31		0.31
10.50	0.40		0.40
11.00	0.62		0.62
11.50	1.07		1.07
12.00	**3.56**		**3.56**
12.50	**2.56**		**2.56**
13.00	1.19		1.19
13.50	0.76		0.76
14.00	0.57		0.57
14.50	0.48		0.48
15.00	0.39		0.39
15.50	0.34		0.34
16.00	0.31		0.31
16.50	0.29		0.29
17.00	0.26		0.26
17.50	0.24		0.24
18.00	0.21		0.21
18.50	0.20		0.20
19.00	0.19		0.19
19.50	0.19		0.19
20.00	0.18		0.18
20.50	0.17		0.17
21.00	0.17		0.17
21.50	0.16		0.16
22.00	0.15		0.15
22.50	0.15		0.15
23.00	0.14		0.14
23.50	0.13		0.13
24.00	0.13		0.13

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment16S: PO-DA N Runoff Area=57,457 sf 15.92% Impervious Runoff Depth>9.08"
Flow Length=452' Tc=11.0 min CN=WQ Runoff=11.03 cfs 0.998 af

Pond 25P: O-2 Inflow=11.03 cfs 0.998 af
Primary=11.03 cfs 0.998 af

Total Runoff Area = 1.319 ac Runoff Volume = 0.998 af Average Runoff Depth = 9.08"
84.08% Pervious = 1.109 ac 15.92% Impervious = 0.210 ac

Summary for Subcatchment 16S: PO-DA N

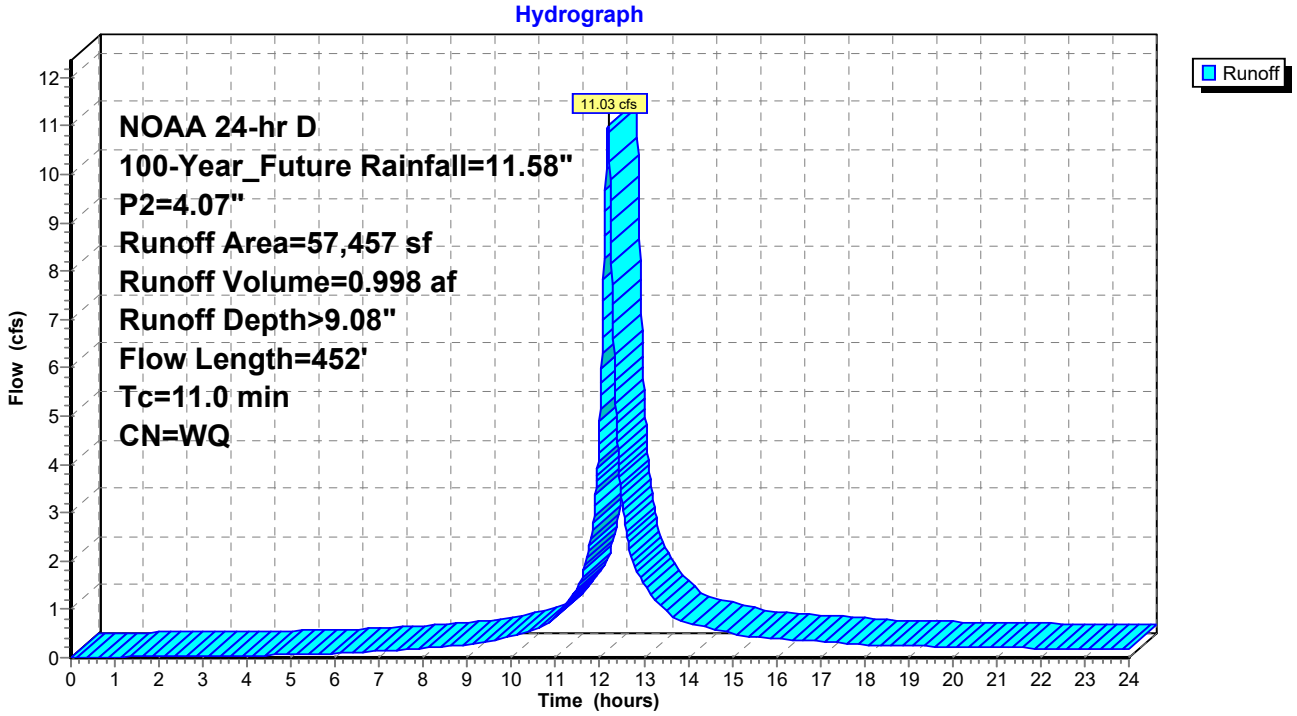
Runoff = 11.03 cfs @ 12.18 hrs, Volume= 0.998 af, Depth> 9.08"
Routed to Pond 25P : O-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 100-Year_Future Rainfall=11.58", P2=4.07"

	Area (sf)	CN	Description
	9,148	98	Impervious, Pavement, HSG D
	18,644	80	>75% Grass cover, Good, HSG D
*	6,665	85	Yard Stone/Gravel Pad, HSG D
	23,000	73	Brush, Good, HSG D
	57,457		Weighted Average
	48,309		84.08% Pervious Area
	9,148		15.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0139	0.23		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 4.07"
0.1	19	0.0480	3.53		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
0.2	28	0.2178	2.33		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
3.4	305	0.0468	1.51		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.0	452	Total			

Subcatchment 16S: PO-DA N



Hydrograph for Subcatchment 16S: PO-DA N

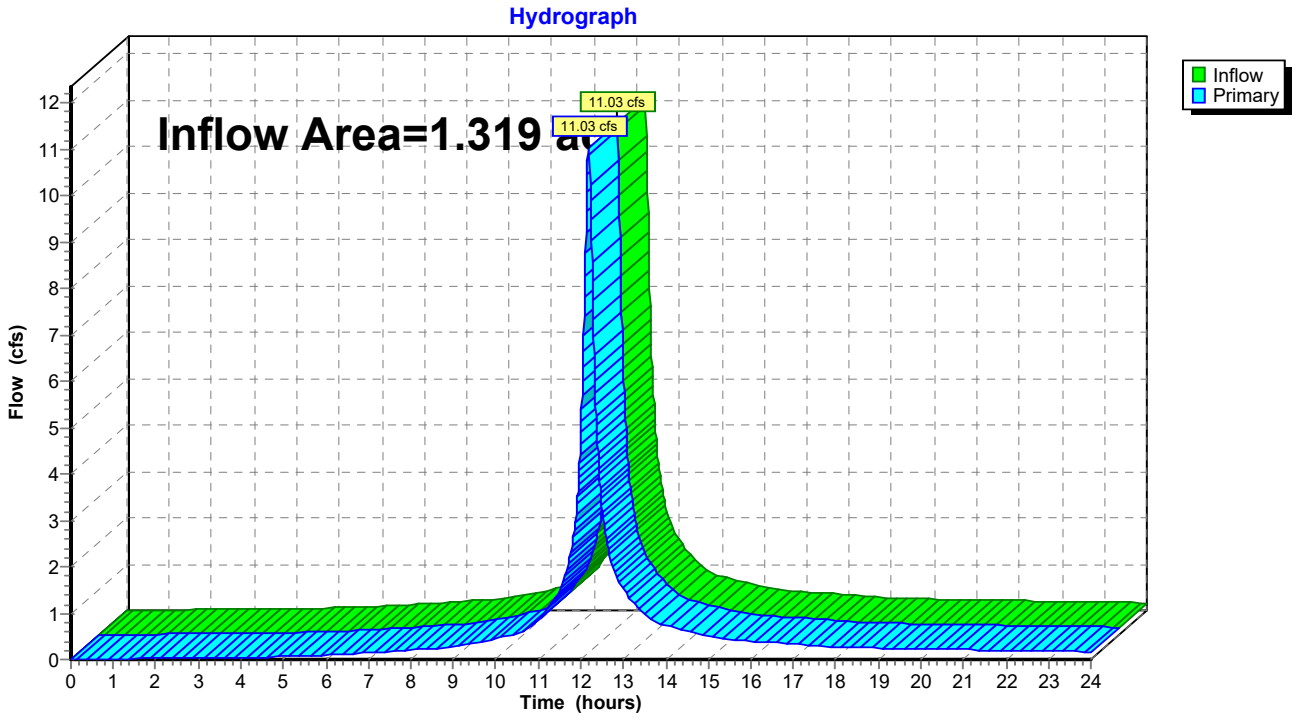
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.06	0.00	0.00
1.00	0.13	0.00	0.01
1.50	0.20	0.00	0.02
2.00	0.28	0.00	0.02
2.50	0.36	0.00	0.03
3.00	0.44	0.00	0.03
3.50	0.52	0.00	0.04
4.00	0.61	0.01	0.04
4.50	0.70	0.02	0.05
5.00	0.79	0.04	0.06
5.50	0.89	0.06	0.08
6.00	0.99	0.09	0.09
6.50	1.10	0.13	0.11
7.00	1.22	0.18	0.14
7.50	1.35	0.24	0.17
8.00	1.50	0.32	0.20
8.50	1.66	0.40	0.23
9.00	1.84	0.50	0.27
9.50	2.04	0.63	0.35
10.00	2.30	0.80	0.45
10.50	2.59	1.01	0.56
11.00	3.01	1.32	0.86
11.50	3.67	1.85	1.47
12.00	5.55	3.47	**4.90**
12.50	7.91	5.66	**3.21**
13.00	8.57	6.28	1.53
13.50	8.99	6.68	0.98
14.00	9.28	6.96	0.73
14.50	9.54	7.20	0.62
15.00	9.74	7.40	0.50
15.50	9.92	7.57	0.43
16.00	10.08	7.72	0.40
16.50	10.23	7.86	0.37
17.00	10.36	7.99	0.34
17.50	10.48	8.11	0.30
18.00	10.59	8.22	0.27
18.50	10.69	8.31	0.25
19.00	10.79	8.41	0.25
19.50	10.88	8.50	0.24
20.00	10.97	8.59	0.23
20.50	11.06	8.67	0.22
21.00	11.14	8.75	0.21
21.50	11.22	8.83	0.21
22.00	11.30	8.90	0.20
22.50	11.38	8.98	0.19
23.00	11.45	9.05	0.18
23.50	11.52	9.11	0.17
24.00	**11.58**	**9.17**	0.16

Summary for Pond 25P: O-2

Inflow Area = 1.319 ac, 15.92% Impervious, Inflow Depth > 9.08" for 100-Year_Future event
Inflow = 11.03 cfs @ 12.18 hrs, Volume= 0.998 af
Primary = 11.03 cfs @ 12.18 hrs, Volume= 0.998 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 25P: O-2

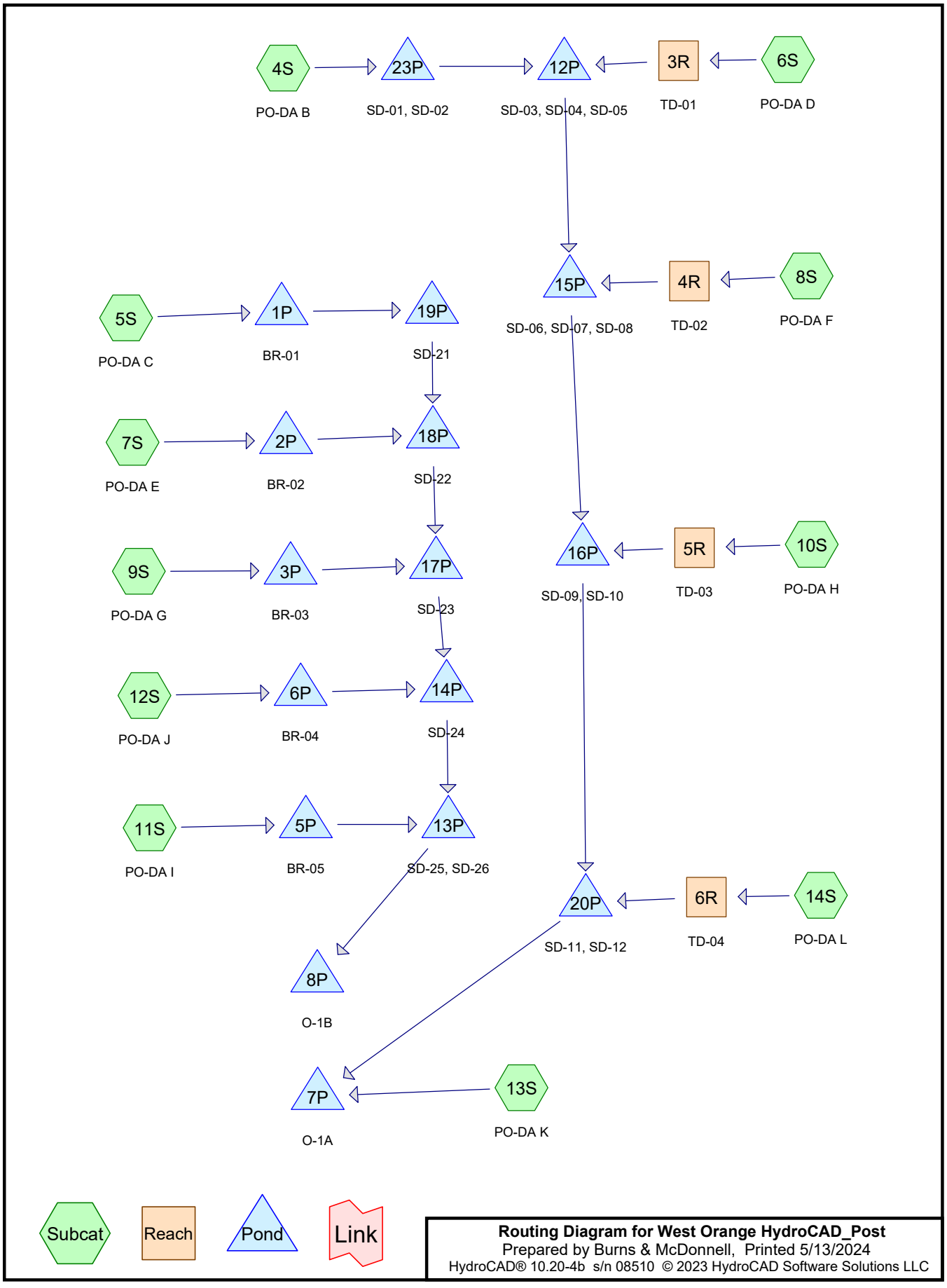


Hydrograph for Pond 25P: O-2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.01		0.01
1.50	0.02		0.02
2.00	0.02		0.02
2.50	0.03		0.03
3.00	0.03		0.03
3.50	0.04		0.04
4.00	0.04		0.04
4.50	0.05		0.05
5.00	0.06		0.06
5.50	0.08		0.08
6.00	0.09		0.09
6.50	0.11		0.11
7.00	0.14		0.14
7.50	0.17		0.17
8.00	0.20		0.20
8.50	0.23		0.23
9.00	0.27		0.27
9.50	0.35		0.35
10.00	0.45		0.45
10.50	0.56		0.56
11.00	0.86		0.86
11.50	1.47		1.47
12.00	**4.90**		**4.90**
12.50	**3.21**		**3.21**
13.00	1.53		1.53
13.50	0.98		0.98
14.00	0.73		0.73
14.50	0.62		0.62
15.00	0.50		0.50
15.50	0.43		0.43
16.00	0.40		0.40
16.50	0.37		0.37
17.00	0.34		0.34
17.50	0.30		0.30
18.00	0.27		0.27
18.50	0.25		0.25
19.00	0.25		0.25
19.50	0.24		0.24
20.00	0.23		0.23
20.50	0.22		0.22
21.00	0.21		0.21
21.50	0.21		0.21
22.00	0.20		0.20
22.50	0.19		0.19
23.00	0.18		0.18
23.50	0.17		0.17
24.00	0.16		0.16

APPENDIX B.8- POST-DEVELOPED STORMWATER CONVEYANCE = 25-YEAR

POST-DEVELOPED:
STORMWATER CONVEYANCE (25-YEAR)



Routing Diagram for West Orange HydroCAD_Post
Prepared by Burns & McDonnell, Printed 5/13/2024
HydroCAD® 10.20-4b s/n 08510 © 2023 HydroCAD Software Solutions LLC

West Orange HydroCAD_Post
Prepared by Burns & McDonnell
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78 Pond 20P: SD-11, SD-12
81 Pond 23P: SD-01, SD-02

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	25-Year	NOAA 24-hr	D	Default	24.00	1	6.44	2	3.42

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.503	80	>75% Grass cover, Good, HSG D (4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S)
1.147	73	Brush, Good, HSG D (4S, 6S, 8S, 10S, 13S, 14S)
0.542	98	Impervious, Pavement, HSG D (5S, 7S, 9S, 11S, 12S, 13S)
1.081	85	Yard Stone/Gravel Pad, HSG D (4S, 5S, 7S, 9S, 11S, 12S, 14S)
3.272	**82**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.272	HSG D	4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S
0.000	Other	
3.272		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.503	0.000	0.503	>75% Grass cover, Good	4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S
0.000	0.000	0.000	1.147	0.000	1.147	Brush, Good	4S, 6S, 8S, 10S, 13S, 14S
0.000	0.000	0.000	0.542	0.000	0.542	Impervious, Pavement	5S, 7S, 9S, 11S, 12S, 13S
0.000	0.000	0.000	1.081	0.000	1.081	Yard Stone/Gravel Pad	4S, 5S, 7S, 9S, 11S, 12S, 14S
0.000	**0.000**	**0.000**	**3.272**	**0.000**	**3.272**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	13P	580.44	580.15	29.4	0.0099	0.011	0.0	18.0	0.0	

Time span=0.00-24.00 hrs, dt=0.0100 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment4S: PO-DA B Runoff Area=28,575 sf 0.00% Impervious Runoff Depth>3.52"
Flow Length=298' Tc=13.4 min CN=WQ Runoff=2.09 cfs 0.192 af

Subcatchment5S: PO-DA C Runoff Area=24,698 sf 17.46% Impervious Runoff Depth>4.91"
Flow Length=164' Tc=18.6 min CN=WQ Runoff=2.09 cfs 0.232 af

Subcatchment6S: PO-DA D Runoff Area=6,403 sf 0.00% Impervious Runoff Depth>3.86"
Flow Length=85' Slope=0.1773 '/' Tc=7.6 min CN=WQ Runoff=0.62 cfs 0.047 af

Subcatchment7S: PO-DA E Runoff Area=15,246 sf 31.71% Impervious Runoff Depth>5.10"
Flow Length=175' Tc=15.6 min CN=WQ Runoff=1.42 cfs 0.149 af

Subcatchment8S: PO-DA F Runoff Area=3,746 sf 0.00% Impervious Runoff Depth>3.69"
Flow Length=66' Slope=0.2264 '/' Tc=5.6 min CN=WQ Runoff=0.38 cfs 0.026 af

Subcatchment9S: PO-DA G Runoff Area=16,902 sf 28.87% Impervious Runoff Depth>5.03"
Flow Length=175' Tc=23.4 min CN=WQ Runoff=1.30 cfs 0.163 af

Subcatchment10S: PO-DA H Runoff Area=10,281 sf 0.00% Impervious Runoff Depth>3.48"
Flow Length=82' Slope=0.1736 '/' Tc=7.5 min CN=WQ Runoff=0.92 cfs 0.068 af

Subcatchment11S: PO-DA I Runoff Area=10,507 sf 27.64% Impervious Runoff Depth>5.03"
Flow Length=120' Tc=6.5 min CN=WQ Runoff=1.30 cfs 0.101 af

Subcatchment12S: PO-DA J Runoff Area=13,809 sf 38.48% Impervious Runoff Depth>5.14"
Flow Length=96' Slope=0.0336 '/' Tc=5.4 min CN=WQ Runoff=1.79 cfs 0.136 af

Subcatchment13S: PO-DA K Runoff Area=4,400 sf 30.68% Impervious Runoff Depth>4.47"
Flow Length=239' Tc=14.4 min CN=WQ Runoff=0.37 cfs 0.038 af

Subcatchment14S: PO-DA L Runoff Area=7,972 sf 0.00% Impervious Runoff Depth>3.56"
Flow Length=116' Tc=11.1 min CN=WQ Runoff=0.63 cfs 0.054 af

Reach 3R: TD-01 Avg. Flow Depth=0.10' Max Vel=4.21 fps Inflow=0.62 cfs 0.047 af
n=0.012 L=67.2' S=0.0298 '/' Capacity=30.28 cfs Outflow=0.62 cfs 0.047 af

Reach 4R: TD-02 Avg. Flow Depth=0.07' Max Vel=3.42 fps Inflow=0.38 cfs 0.026 af
n=0.012 L=34.0' S=0.0279 '/' Capacity=29.34 cfs Outflow=0.38 cfs 0.026 af

Reach 5R: TD-03 Avg. Flow Depth=0.23' Max Vel=2.60 fps Inflow=0.92 cfs 0.068 af
n=0.012 L=133.7' S=0.0044 '/' Capacity=11.66 cfs Outflow=0.91 cfs 0.068 af

Reach 6R: TD-04 Avg. Flow Depth=0.12' Max Vel=3.49 fps Inflow=0.63 cfs 0.054 af
n=0.012 L=54.6' S=0.0163 '/' Capacity=22.41 cfs Outflow=0.63 cfs 0.054 af

Pond 1P: BR-01 Peak Elev=600.60' Storage=3,897 cf Inflow=2.09 cfs 0.232 af
Outflow=0.45 cfs 0.229 af

Pond 2P: BR-02 Peak Elev=601.23' Storage=1,818 cf Inflow=1.42 cfs 0.149 af
Outflow=0.77 cfs 0.147 af

Pond 3P: BR-03 Peak Elev=597.59' Storage=2,630 cf Inflow=1.30 cfs 0.163 af
Outflow=0.31 cfs 0.160 af

Pond 5P: BR-05 Peak Elev=596.30' Storage=1,417 cf Inflow=1.30 cfs 0.101 af
Outflow=0.25 cfs 0.100 af

Pond 6P: BR-04 Peak Elev=596.75' Storage=2,324 cf Inflow=1.79 cfs 0.136 af
Outflow=0.23 cfs 0.132 af

Pond 7P: O-1A Inflow=4.68 cfs 0.424 af
Primary=4.68 cfs 0.424 af

Pond 8P: O-1B Inflow=1.83 cfs 0.768 af
Primary=1.83 cfs 0.768 af

Pond 12P: SD-03, SD-04, SD-05 Peak Elev=596.71' Storage=41 cf Inflow=2.59 cfs 0.238 af
Outflow=2.58 cfs 0.238 af

Pond 13P: SD-25, SD-26 Peak Elev=581.08' Storage=0.000 af Inflow=1.83 cfs 0.768 af
18.0" Round Culvert n=0.011 L=29.4' S=0.0099 '/' Outflow=1.83 cfs 0.768 af

Pond 14P: SD-24 Peak Elev=585.49' Storage=0.000 af Inflow=1.58 cfs 0.668 af
Outflow=1.58 cfs 0.668 af

Pond 15P: SD-06, SD-07, SD-08 Peak Elev=594.72' Storage=42 cf Inflow=2.84 cfs 0.264 af
Outflow=2.83 cfs 0.264 af

Pond 16P: SD-09, SD-10 Peak Elev=593.75' Storage=72 cf Inflow=3.71 cfs 0.332 af
Outflow=3.70 cfs 0.332 af

Pond 17P: SD-23 Peak Elev=587.36' Storage=0.000 af Inflow=1.36 cfs 0.536 af
Outflow=1.36 cfs 0.536 af

Pond 18P: SD-22 Peak Elev=588.99' Storage=0.000 af Inflow=1.10 cfs 0.376 af
Outflow=1.10 cfs 0.376 af

Pond 19P: SD-21 Peak Elev=590.94' Storage=0.000 af Inflow=0.45 cfs 0.229 af
Outflow=0.45 cfs 0.229 af

Pond 20P: SD-11, SD-12 Peak Elev=592.01' Storage=79 cf Inflow=4.33 cfs 0.387 af
Outflow=4.32 cfs 0.386 af

Pond 23P: SD-01, SD-02 Peak Elev=597.85' Storage=96 cf Inflow=2.09 cfs 0.192 af
Outflow=2.09 cfs 0.190 af

Total Runoff Area = 3.272 ac Runoff Volume = 1.207 af Average Runoff Depth = 4.43"
83.45% Pervious = 2.731 ac 16.55% Impervious = 0.542 ac

Summary for Subcatchment 4S: PO-DA B

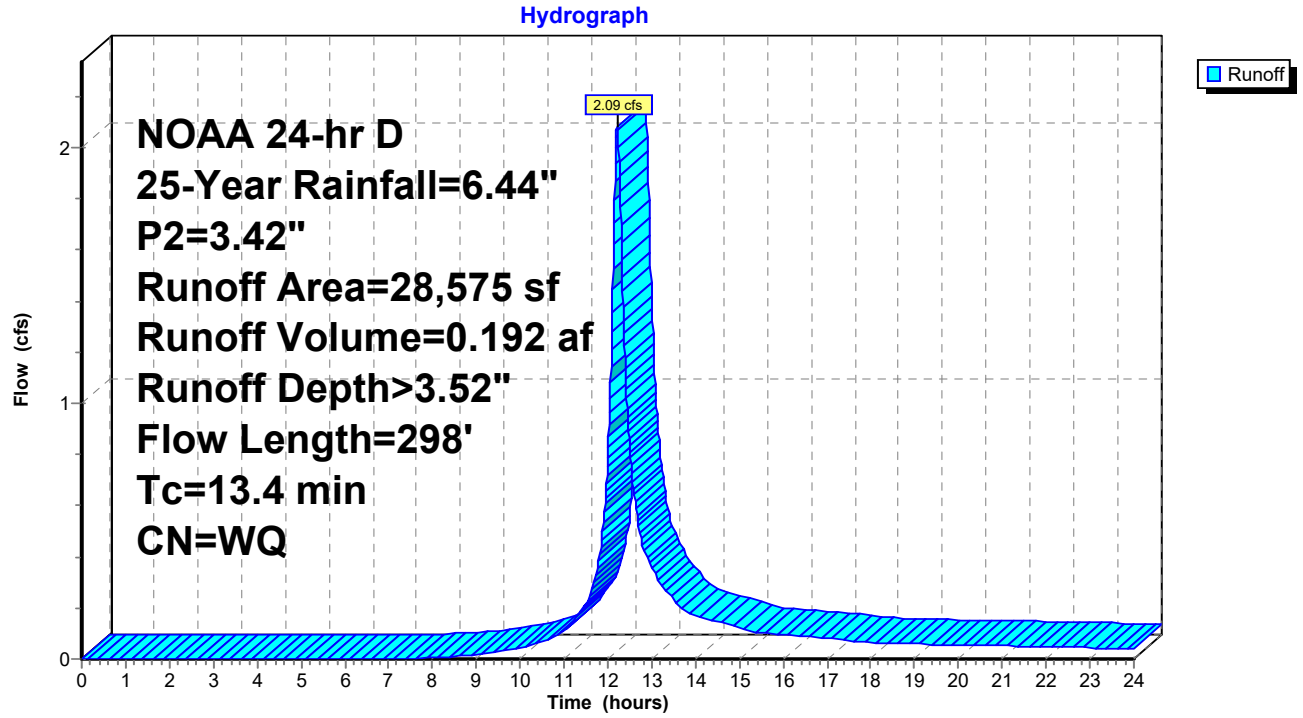
Runoff = 2.09 cfs @ 12.22 hrs, Volume= 0.192 af, Depth> 3.52"
Routed to Pond 23P : SD-01, SD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	1,873	80	>75% Grass cover, Good, HSG D
*	610	85	Yard Stone/Gravel Pad, HSG D
	26,092	73	Brush, Good, HSG D
	28,575		Weighted Average
	28,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0900	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
0.3	64	0.1920	3.07		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.7	134	0.0094	1.34	8.07	**Channel Flow, North Channel** Area= 6.0 sf Perim= 9.3' r= 0.65' n= 0.080 Earth, long dense weeds
13.4	298	Total			

Subcatchment 4S: PO-DA B



Hydrograph for Subcatchment 4S: PO-DA B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.00	0.00
6.50	0.61	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.75	0.00	0.00
8.00	0.84	0.00	0.01
8.50	0.93	0.01	0.01
9.00	1.02	0.03	0.02
9.50	1.14	0.05	0.03
10.00	1.28	0.08	0.04
10.50	1.44	0.13	0.06
11.00	1.67	0.21	0.11
11.50	2.04	0.37	0.22
12.00	3.09	0.96	**0.79**
12.50	4.40	1.89	**0.81**
13.00	4.77	2.18	0.36
13.50	5.00	2.36	0.23
14.00	5.16	2.50	0.17
14.50	5.30	2.61	0.15
15.00	5.42	2.70	0.12
15.50	5.51	2.78	0.10
16.00	5.60	2.86	0.10
16.50	5.69	2.92	0.09
17.00	5.76	2.99	0.08
17.50	5.83	3.04	0.07
18.00	5.89	3.09	0.07
18.50	5.95	3.14	0.06
19.00	6.00	3.18	0.06
19.50	6.05	3.23	0.06
20.00	6.10	3.27	0.06
20.50	6.15	3.31	0.05
21.00	6.20	3.35	0.05
21.50	6.24	3.39	0.05
22.00	6.29	3.43	0.05
22.50	6.33	3.46	0.05
23.00	6.37	3.50	0.04
23.50	6.40	3.53	0.04
24.00	**6.44**	**3.56**	0.04

Summary for Subcatchment 5S: PO-DA C

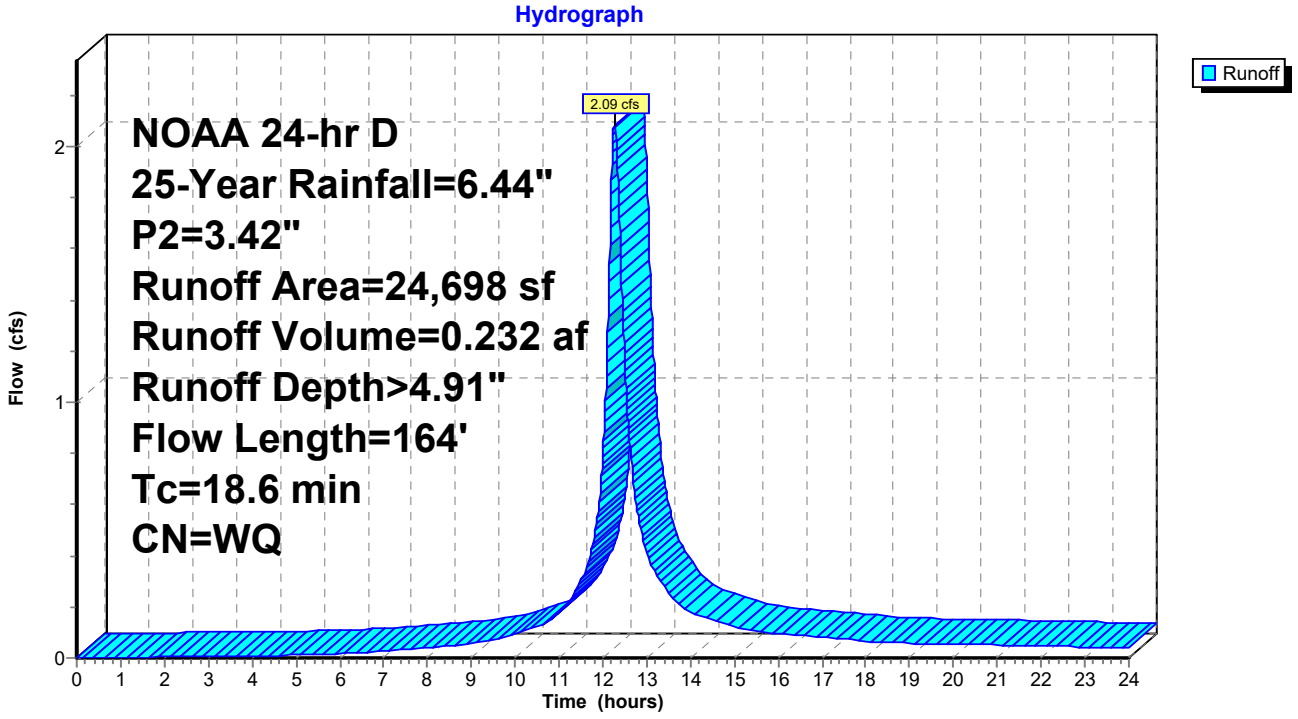
Runoff = 2.09 cfs @ 12.26 hrs, Volume= 0.232 af, Depth> 4.91"
Routed to Pond 1P : BR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	4,312	98	Impervious, Pavement, HSG D
	2,396	80	>75% Grass cover, Good, HSG D
*	17,990	85	Yard Stone/Gravel Pad, HSG D
	24,698		Weighted Average
	20,386		82.54% Pervious Area
	4,312		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0018	0.09		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.6	64	0.0106	1.66		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
18.6	164	Total			

Subcatchment 5S: PO-DA C



Hydrograph for Subcatchment 5S: PO-DA C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.34	0.00	0.01
4.50	0.39	0.01	0.01
5.00	0.44	0.01	0.01
5.50	0.49	0.02	0.01
6.00	0.55	0.04	0.02
6.50	0.61	0.05	0.02
7.00	0.68	0.08	0.03
7.50	0.75	0.11	0.03
8.00	0.84	0.14	0.04
8.50	0.93	0.18	0.05
9.00	1.02	0.24	0.06
9.50	1.14	0.30	0.07
10.00	1.28	0.39	0.10
10.50	1.44	0.50	0.12
11.00	1.67	0.66	0.18
11.50	2.04	0.94	0.30
12.00	3.09	1.81	**0.79**
12.50	4.40	3.00	**1.16**
13.00	4.77	3.35	0.42
13.50	5.00	3.57	0.26
14.00	5.16	3.72	0.18
14.50	5.30	3.85	0.15
15.00	5.42	3.96	0.13
15.50	5.51	4.05	0.10
16.00	5.60	4.14	0.10
16.50	5.69	4.22	0.09
17.00	5.76	4.29	0.08
17.50	5.83	4.35	0.07
18.00	5.89	4.41	0.07
18.50	5.95	4.47	0.06
19.00	6.00	4.52	0.06
19.50	6.05	4.57	0.06
20.00	6.10	4.62	0.05
20.50	6.15	4.66	0.05
21.00	6.20	4.71	0.05
21.50	6.24	4.75	0.05
22.00	6.29	4.79	0.05
22.50	6.33	4.83	0.05
23.00	6.37	4.87	0.04
23.50	6.40	4.90	0.04
24.00	**6.44**	**4.94**	0.04

Summary for Subcatchment 6S: PO-DA D

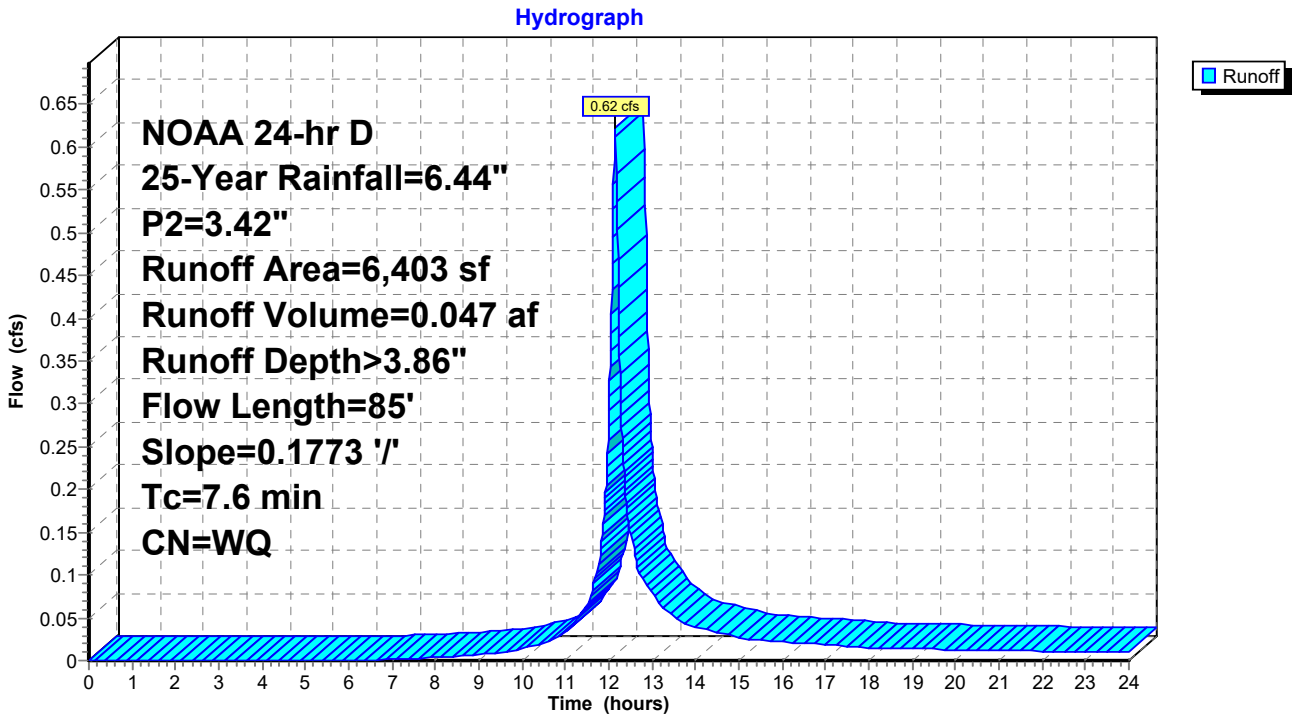
Runoff = 0.62 cfs @ 12.15 hrs, Volume= 0.047 af, Depth> 3.86"
Routed to Reach 3R : TD-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

Area (sf)	CN	Description
3,659	80	>75% Grass cover, Good, HSG D
2,744	73	Brush, Good, HSG D
6,403		Weighted Average
6,403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	85	0.1773	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"

Subcatchment 6S: PO-DA D



Hydrograph for Subcatchment 6S: PO-DA D

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.00	0.00
6.50	0.61	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.75	0.01	0.00
8.00	0.84	0.02	0.00
8.50	0.93	0.03	0.00
9.00	1.02	0.05	0.01
9.50	1.14	0.08	0.01
10.00	1.28	0.13	0.01
10.50	1.44	0.19	0.02
11.00	1.67	0.29	0.03
11.50	2.04	0.47	0.06
12.00	3.09	1.13	**0.29**
12.50	4.40	2.13	**0.15**
13.00	4.77	2.43	0.08
13.50	5.00	2.62	0.05
14.00	5.16	2.76	0.04
14.50	5.30	2.88	0.03
15.00	5.42	2.98	0.03
15.50	5.51	3.06	0.02
16.00	5.60	3.14	0.02
16.50	5.69	3.21	0.02
17.00	5.76	3.27	0.02
17.50	5.83	3.33	0.02
18.00	5.89	3.38	0.02
18.50	5.95	3.43	0.01
19.00	6.00	3.48	0.01
19.50	6.05	3.52	0.01
20.00	6.10	3.57	0.01
20.50	6.15	3.61	0.01
21.00	6.20	3.65	0.01
21.50	6.24	3.69	0.01
22.00	6.29	3.73	0.01
22.50	6.33	3.77	0.01
23.00	6.37	3.80	0.01
23.50	6.40	3.83	0.01
24.00	**6.44**	**3.87**	0.01

Summary for Subcatchment 7S: PO-DA E

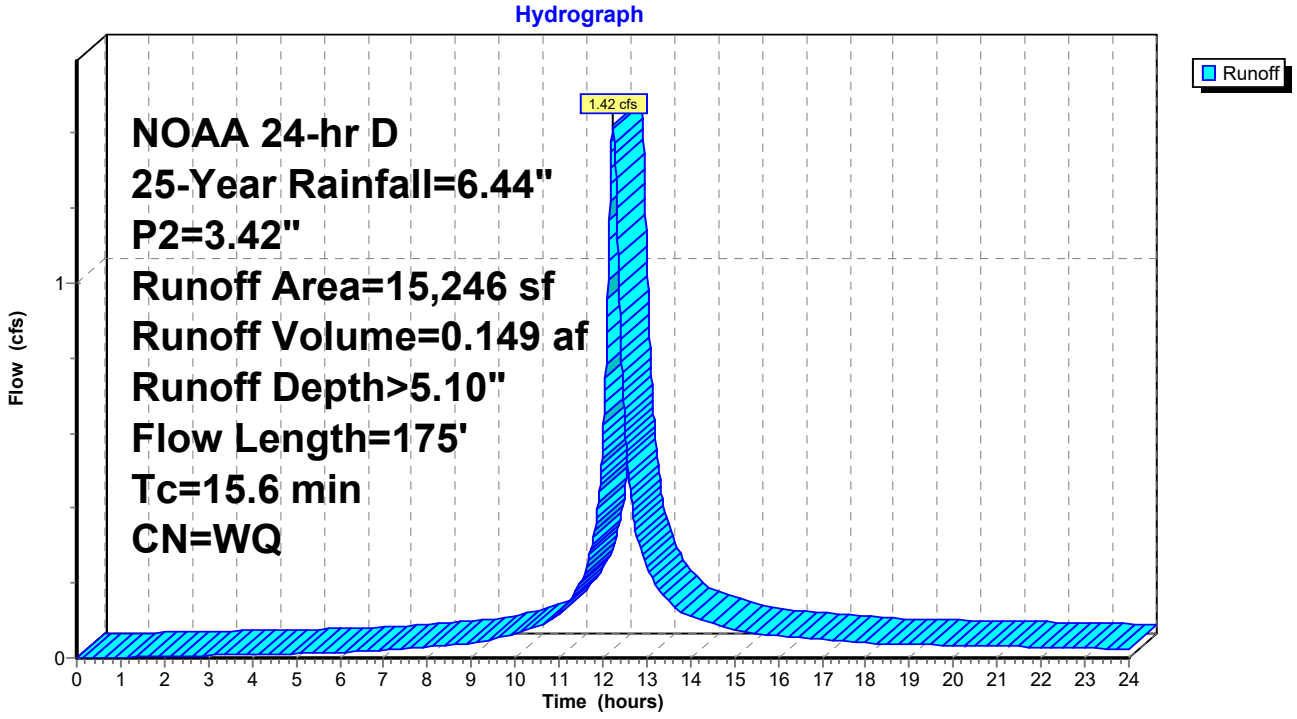
Runoff = 1.42 cfs @ 12.23 hrs, Volume= 0.149 af, Depth> 5.10"
Routed to Pond 2P : BR-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	4,835	98	Impervious, Pavement, HSG D
	2,047	80	>75% Grass cover, Good, HSG D
*	8,364	85	Yard Stone/Gravel Pad, HSG D
	15,246		Weighted Average
	10,411		68.29% Pervious Area
	4,835		31.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0030	0.11		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
1.0	75	0.0055	1.19		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
15.6	175	Total			

Subcatchment 7S: PO-DA E



Hydrograph for Subcatchment 7S: PO-DA E

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.34	0.00	0.01
4.50	0.39	0.01	0.01
5.00	0.44	0.02	0.01
5.50	0.49	0.03	0.01
6.00	0.55	0.05	0.02
6.50	0.61	0.07	0.02
7.00	0.68	0.09	0.02
7.50	0.75	0.13	0.03
8.00	0.84	0.16	0.03
8.50	0.93	0.21	0.04
9.00	1.02	0.27	0.04
9.50	1.14	0.33	0.05
10.00	1.28	0.43	0.07
10.50	1.44	0.54	0.08
11.00	1.67	0.71	0.12
11.50	2.04	1.00	0.20
12.00	3.09	1.89	**0.57**
12.50	4.40	3.10	**0.62**
13.00	4.77	3.45	0.24
13.50	5.00	3.67	0.15
14.00	5.16	3.82	0.11
14.50	5.30	3.96	0.09
15.00	5.42	4.07	0.08
15.50	5.51	4.16	0.06
16.00	5.60	4.25	0.06
16.50	5.69	4.32	0.06
17.00	5.76	4.40	0.05
17.50	5.83	4.46	0.05
18.00	5.89	4.52	0.04
18.50	5.95	4.57	0.04
19.00	6.00	4.63	0.04
19.50	6.05	4.68	0.04
20.00	6.10	4.72	0.03
20.50	6.15	4.77	0.03
21.00	6.20	4.82	0.03
21.50	6.24	4.86	0.03
22.00	6.29	4.90	0.03
22.50	6.33	4.94	0.03
23.00	6.37	4.98	0.03
23.50	6.40	5.02	0.03
24.00	**6.44**	**5.05**	0.02

Summary for Subcatchment 8S: PO-DA F

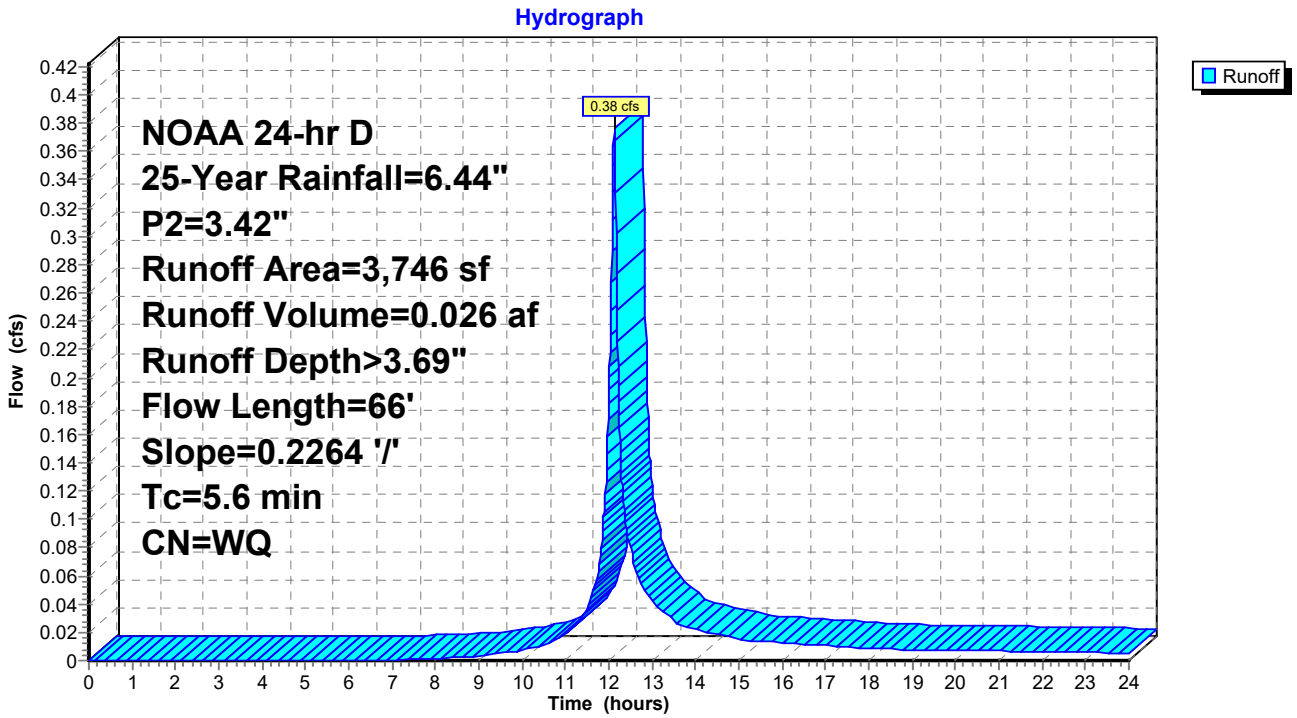
Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af, Depth> 3.69"
Routed to Reach 4R : TD-02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

Area (sf)	CN	Description
1,220	80	>75% Grass cover, Good, HSG D
2,526	73	Brush, Good, HSG D
3,746		Weighted Average
3,746		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	66	0.2264	0.19		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"

Subcatchment 8S: PO-DA F



Hydrograph for Subcatchment 8S: PO-DA F

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.00	0.00
6.50	0.61	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.75	0.00	0.00
8.00	0.84	0.01	0.00
8.50	0.93	0.02	0.00
9.00	1.02	0.03	0.00
9.50	1.14	0.06	0.01
10.00	1.28	0.09	0.01
10.50	1.44	0.15	0.01
11.00	1.67	0.23	0.02
11.50	2.04	0.40	0.04
12.00	3.09	1.02	**0.19**
12.50	4.40	1.97	**0.08**
13.00	4.77	2.26	0.04
13.50	5.00	2.45	0.03
14.00	5.16	2.58	0.02
14.50	5.30	2.70	0.02
15.00	5.42	2.79	0.02
15.50	5.51	2.87	0.01
16.00	5.60	2.95	0.01
16.50	5.69	3.02	0.01
17.00	5.76	3.08	0.01
17.50	5.83	3.14	0.01
18.00	5.89	3.19	0.01
18.50	5.95	3.24	0.01
19.00	6.00	3.28	0.01
19.50	6.05	3.33	0.01
20.00	6.10	3.37	0.01
20.50	6.15	3.41	0.01
21.00	6.20	3.45	0.01
21.50	6.24	3.49	0.01
22.00	6.29	3.53	0.01
22.50	6.33	3.56	0.01
23.00	6.37	3.60	0.01
23.50	6.40	3.63	0.01
24.00	**6.44**	**3.66**	0.01

Summary for Subcatchment 9S: PO-DA G

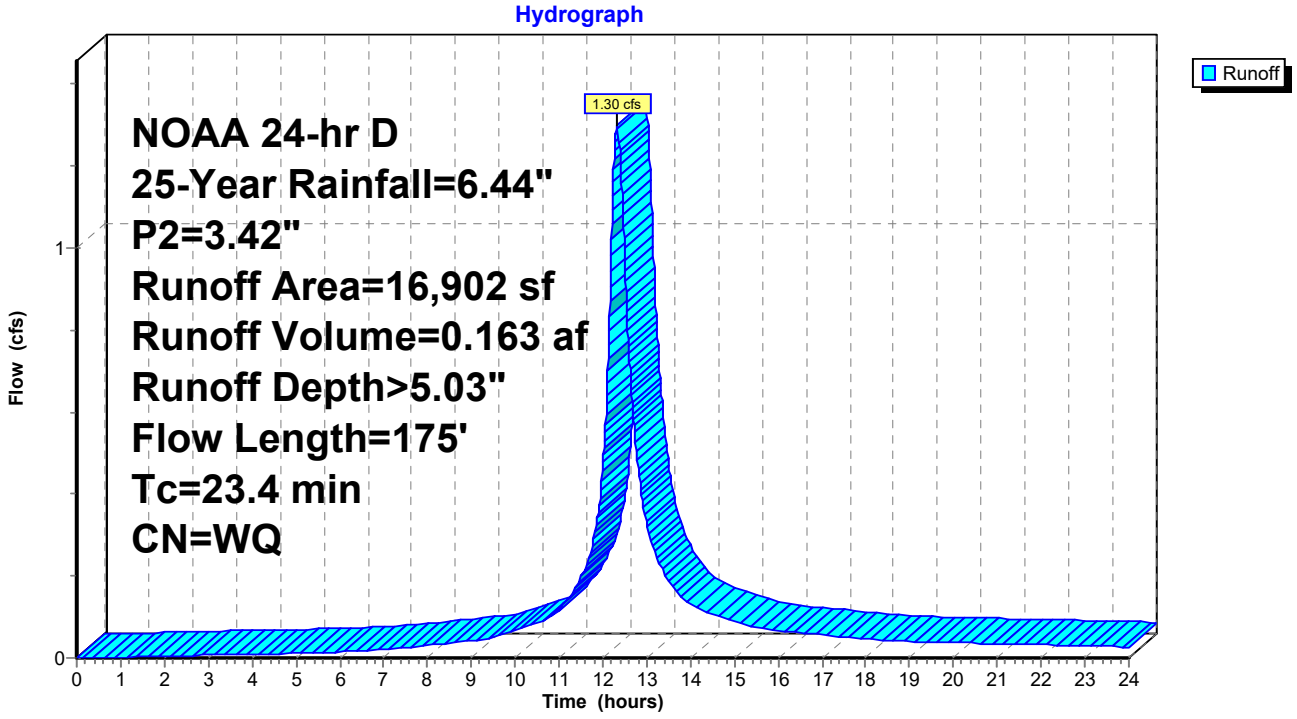
Runoff = 1.30 cfs @ 12.33 hrs, Volume= 0.163 af, Depth> 5.03"
Routed to Pond 3P : BR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	4,879	98	Impervious, Pavement, HSG D
	2,788	80	>75% Grass cover, Good, HSG D
*	9,235	85	Yard Stone/Gravel Pad, HSG D
	16,902		Weighted Average
	12,023		71.13% Pervious Area
	4,879		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0010	0.07		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.7	75	0.0121	1.77		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
23.4	175	Total			

Subcatchment 9S: PO-DA G



Hydrograph for Subcatchment 9S: PO-DA G

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.34	0.00	0.01
4.50	0.39	0.01	0.01
5.00	0.44	0.02	0.01
5.50	0.49	0.03	0.01
6.00	0.55	0.05	0.02
6.50	0.61	0.07	0.02
7.00	0.68	0.09	0.02
7.50	0.75	0.13	0.03
8.00	0.84	0.16	0.03
8.50	0.93	0.21	0.04
9.00	1.02	0.27	0.04
9.50	1.14	0.33	0.05
10.00	1.28	0.43	0.07
10.50	1.44	0.54	0.08
11.00	1.67	0.71	0.12
11.50	2.04	1.00	0.20
12.00	3.09	1.89	**0.47**
12.50	4.40	3.10	**0.97**
13.00	4.77	3.45	0.33
13.50	5.00	3.67	0.19
14.00	5.16	3.82	0.13
14.50	5.30	3.96	0.11
15.00	5.42	4.07	0.09
15.50	5.51	4.16	0.07
16.00	5.60	4.25	0.07
16.50	5.69	4.32	0.06
17.00	5.76	4.40	0.06
17.50	5.83	4.46	0.05
18.00	5.89	4.52	0.05
18.50	5.95	4.57	0.04
19.00	6.00	4.63	0.04
19.50	6.05	4.68	0.04
20.00	6.10	4.72	0.04
20.50	6.15	4.77	0.04
21.00	6.20	4.82	0.04
21.50	6.24	4.86	0.03
22.00	6.29	4.90	0.03
22.50	6.33	4.94	0.03
23.00	6.37	4.98	0.03
23.50	6.40	5.02	0.03
24.00	**6.44**	**5.05**	0.03

Summary for Subcatchment 10S: PO-DA H

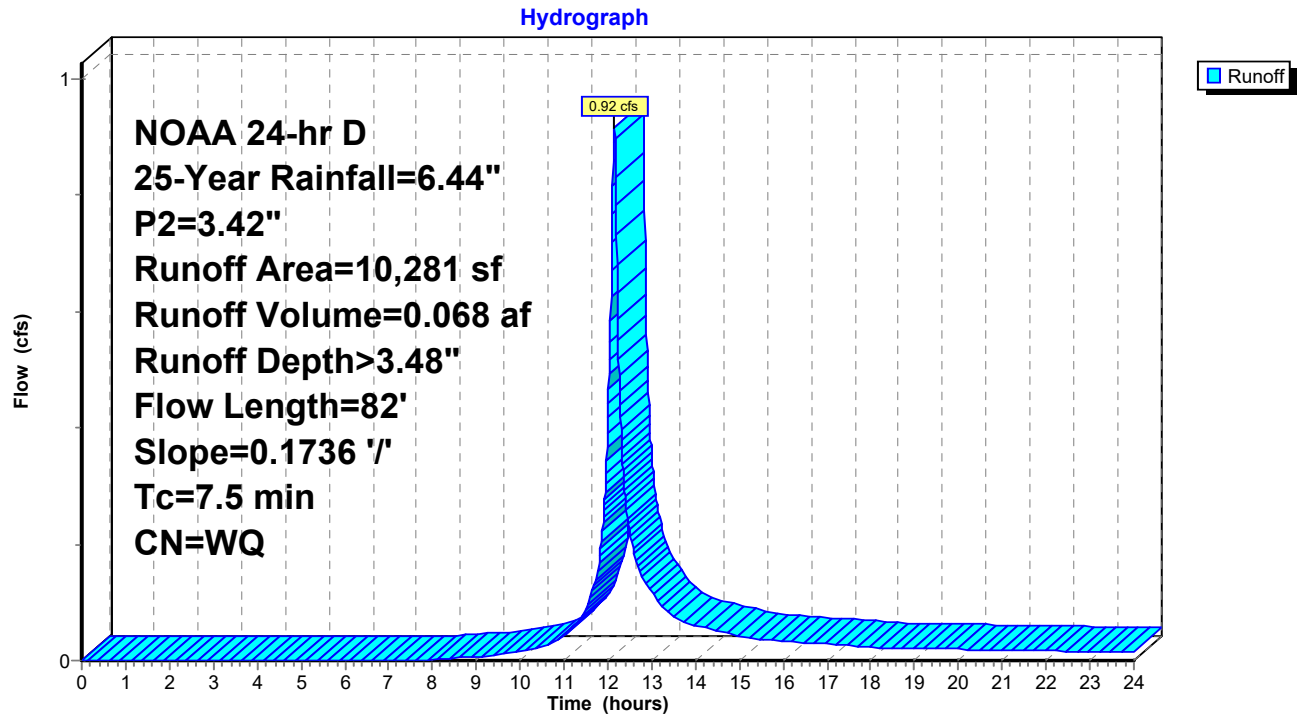
Runoff = 0.92 cfs @ 12.15 hrs, Volume= 0.068 af, Depth> 3.48"
Routed to Reach 5R : TD-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

Area (sf)	CN	Description
436	80	>75% Grass cover, Good, HSG D
9,845	73	Brush, Good, HSG D
10,281		Weighted Average
10,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	82	0.1736	0.18		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"

Subcatchment 10S: PO-DA H



Hydrograph for Subcatchment 10S: PO-DA H

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.00	0.00
6.50	0.61	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.75	0.00	0.00
8.00	0.84	0.00	0.00
8.50	0.93	0.01	0.00
9.00	1.02	0.02	0.01
9.50	1.14	0.04	0.01
10.00	1.28	0.07	0.02
10.50	1.44	0.11	0.02
11.00	1.67	0.19	0.04
11.50	2.04	0.34	0.09
12.00	3.09	0.91	**0.42**
12.50	4.40	1.82	**0.22**
13.00	4.77	2.10	0.12
13.50	5.00	2.28	0.08
14.00	5.16	2.41	0.06
14.50	5.30	2.52	0.05
15.00	5.42	2.61	0.04
15.50	5.51	2.69	0.04
16.00	5.60	2.76	0.03
16.50	5.69	2.83	0.03
17.00	5.76	2.89	0.03
17.50	5.83	2.95	0.03
18.00	5.89	3.00	0.02
18.50	5.95	3.04	0.02
19.00	6.00	3.09	0.02
19.50	6.05	3.13	0.02
20.00	6.10	3.17	0.02
20.50	6.15	3.21	0.02
21.00	6.20	3.25	0.02
21.50	6.24	3.29	0.02
22.00	6.29	3.33	0.02
22.50	6.33	3.36	0.02
23.00	6.37	3.39	0.02
23.50	6.40	3.43	0.01
24.00	**6.44**	**3.46**	0.01

Summary for Subcatchment 11S: PO-DA I

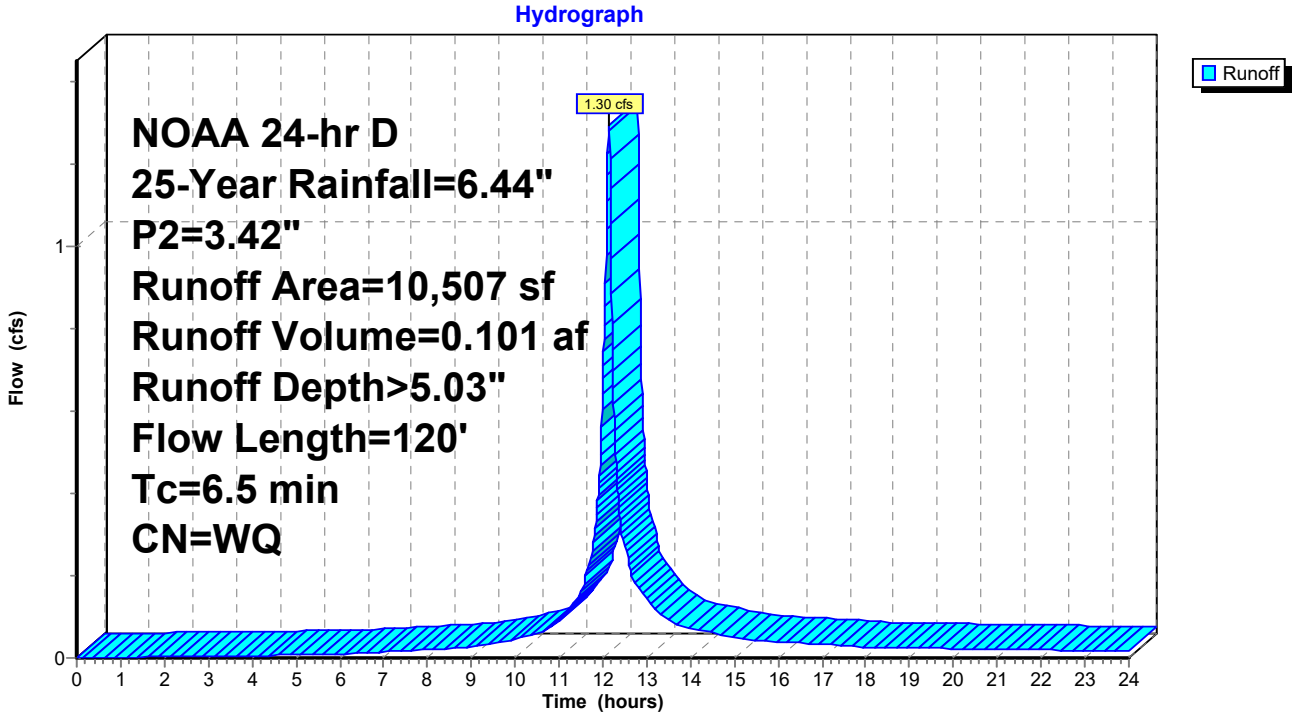
Runoff = 1.30 cfs @ 12.13 hrs, Volume= 0.101 af, Depth> 5.03"
Routed to Pond 5P : BR-05

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	2,904	98	Impervious, Pavement, HSG D
	1,737	80	>75% Grass cover, Good, HSG D
*	5,866	85	Yard Stone/Gravel Pad, HSG D
	10,507		Weighted Average
	7,603		72.36% Pervious Area
	2,904		27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0237	0.26		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"
0.1	20	0.0320	2.88		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.5	120	Total			

Subcatchment 11S: PO-DA I



Hydrograph for Subcatchment 11S: PO-DA I

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.01
4.00	0.34	0.00	0.01
4.50	0.39	0.01	0.01
5.00	0.44	0.02	0.01
5.50	0.49	0.03	0.01
6.00	0.55	0.05	0.01
6.50	0.61	0.07	0.01
7.00	0.68	0.09	0.01
7.50	0.75	0.13	0.02
8.00	0.84	0.16	0.02
8.50	0.93	0.21	0.02
9.00	1.02	0.27	0.03
9.50	1.14	0.33	0.04
10.00	1.28	0.43	0.05
10.50	1.44	0.54	0.06
11.00	1.67	0.71	0.09
11.50	2.04	1.00	0.16
12.00	3.09	1.89	**0.68**
12.50	4.40	3.10	**0.27**
13.00	4.77	3.45	0.14
13.50	5.00	3.67	0.09
14.00	5.16	3.82	0.07
14.50	5.30	3.96	0.06
15.00	5.42	4.07	0.05
15.50	5.51	4.16	0.04
16.00	5.60	4.25	0.04
16.50	5.69	4.32	0.04
17.00	5.76	4.40	0.03
17.50	5.83	4.46	0.03
18.00	5.89	4.52	0.03
18.50	5.95	4.57	0.03
19.00	6.00	4.63	0.02
19.50	6.05	4.68	0.02
20.00	6.10	4.72	0.02
20.50	6.15	4.77	0.02
21.00	6.20	4.82	0.02
21.50	6.24	4.86	0.02
22.00	6.29	4.90	0.02
22.50	6.33	4.94	0.02
23.00	6.37	4.98	0.02
23.50	6.40	5.02	0.02
24.00	**6.44**	**5.05**	0.02

Summary for Subcatchment 12S: PO-DA J

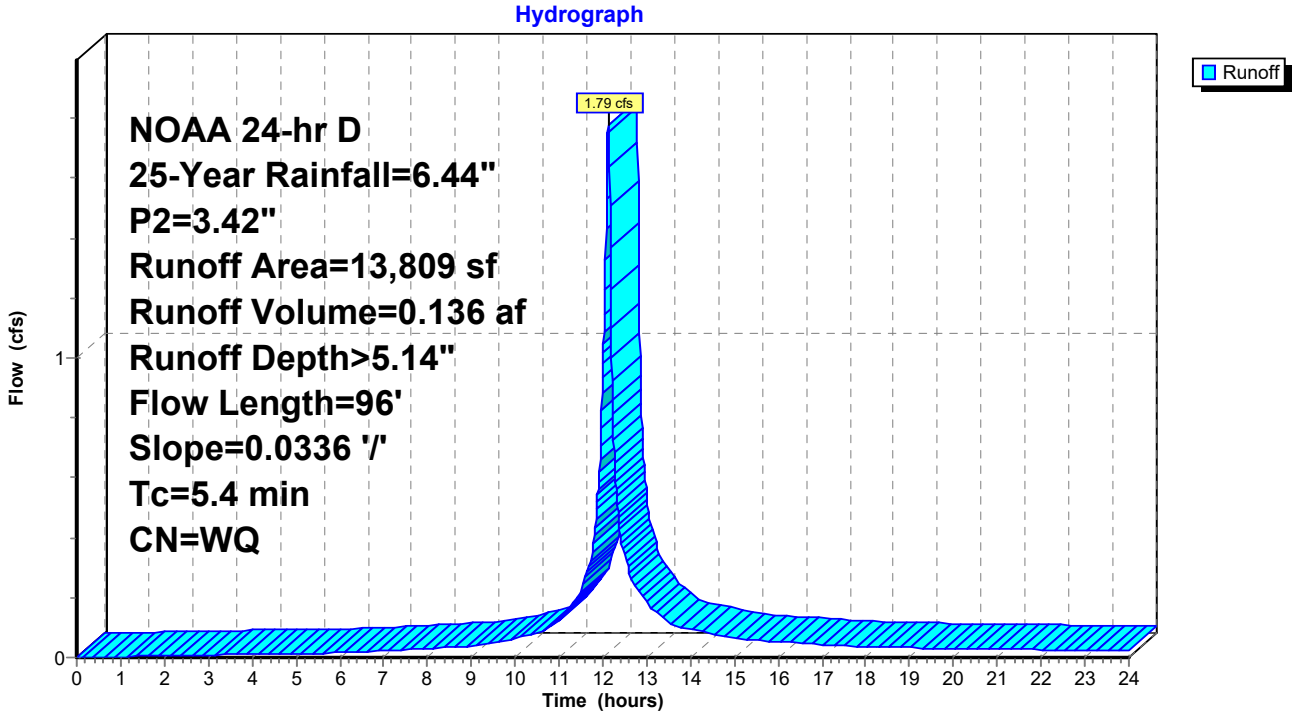
Runoff = 1.79 cfs @ 12.12 hrs, Volume= 0.136 af, Depth> 5.14"
Routed to Pond 6P : BR-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	5,314	98	Impervious, Pavement, HSG D
	3,703	80	>75% Grass cover, Good, HSG D
*	4,792	85	Yard Stone/Gravel Pad, HSG D
	13,809		Weighted Average
	8,495		61.52% Pervious Area
	5,314		38.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	96	0.0336	0.30		**Sheet Flow, Gravel Sheet Flow** n= 0.100 P2= 3.42"

Subcatchment 12S: PO-DA J



Hydrograph for Subcatchment 12S: PO-DA J

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.01
2.50	0.20	0.00	0.01
3.00	0.24	0.00	0.01
3.50	0.29	0.00	0.01
4.00	0.34	0.01	0.01
4.50	0.39	0.01	0.01
5.00	0.44	0.03	0.01
5.50	0.49	0.04	0.01
6.00	0.55	0.06	0.02
6.50	0.61	0.08	0.02
7.00	0.68	0.11	0.02
7.50	0.75	0.15	0.03
8.00	0.84	0.19	0.03
8.50	0.93	0.24	0.03
9.00	1.02	0.30	0.04
9.50	1.14	0.37	0.05
10.00	1.28	0.47	0.06
10.50	1.44	0.59	0.08
11.00	1.67	0.76	0.13
11.50	2.04	1.06	0.22
12.00	3.09	1.98	**0.98**
12.50	4.40	3.20	**0.35**
13.00	4.77	3.55	0.19
13.50	5.00	3.77	0.12
14.00	5.16	3.93	0.09
14.50	5.30	4.06	0.08
15.00	5.42	4.17	0.06
15.50	5.51	4.27	0.06
16.00	5.60	4.35	0.05
16.50	5.69	4.43	0.05
17.00	5.76	4.50	0.04
17.50	5.83	4.57	0.04
18.00	5.89	4.63	0.04
18.50	5.95	4.68	0.03
19.00	6.00	4.74	0.03
19.50	6.05	4.79	0.03
20.00	6.10	4.83	0.03
20.50	6.15	4.88	0.03
21.00	6.20	4.93	0.03
21.50	6.24	4.97	0.03
22.00	6.29	5.01	0.03
22.50	6.33	5.05	0.02
23.00	6.37	5.09	0.02
23.50	6.40	5.13	0.02
24.00	**6.44**	**5.16**	0.02

Summary for Subcatchment 13S: PO-DA K

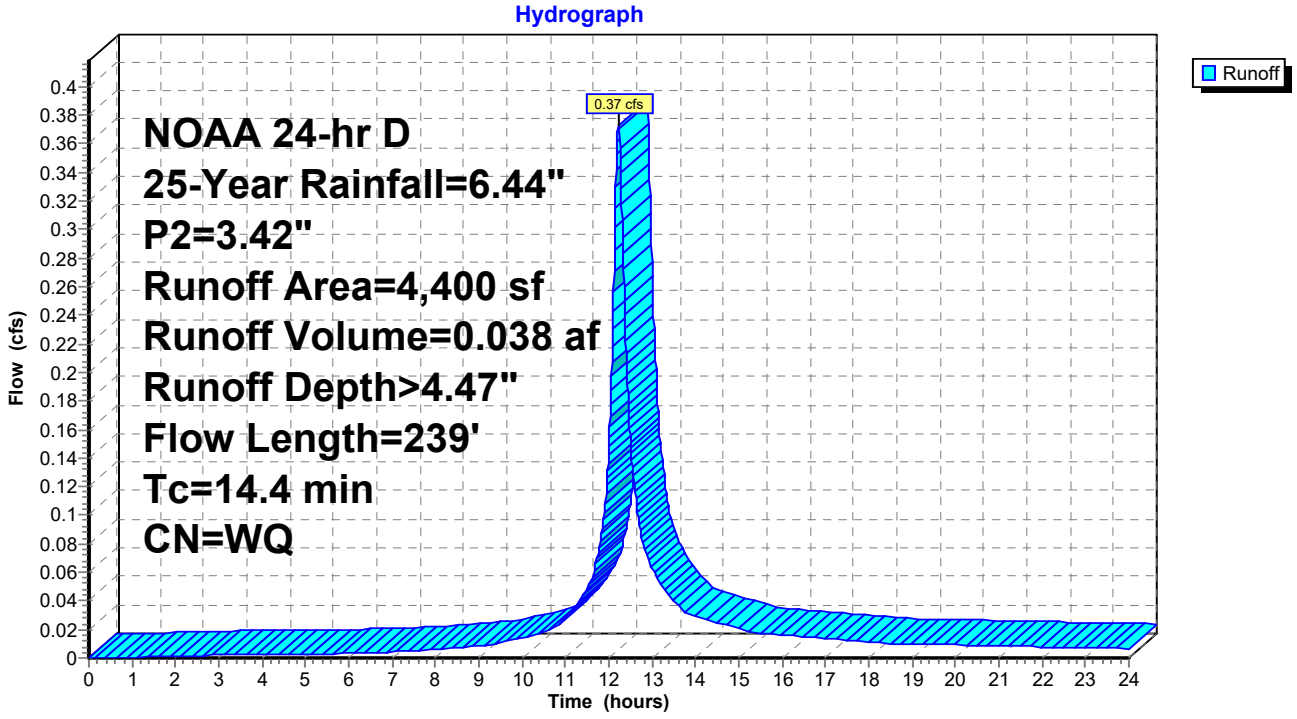
Runoff = 0.37 cfs @ 12.22 hrs, Volume= 0.038 af, Depth> 4.47"
Routed to Pond 7P : O-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

Area (sf)	CN	Description
1,350	98	Impervious, Pavement, HSG D
1,133	80	>75% Grass cover, Good, HSG D
1,917	73	Brush, Good, HSG D
4,400		Weighted Average
3,050		69.32% Pervious Area
1,350		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0772	0.14		**Sheet Flow, Woodland Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
2.3	139	0.0424	1.03		**Shallow Concentrated Flow, Shallow Concentrated Flow** Woodland Kv= 5.0 fps
14.4	239	Total			

Subcatchment 13S: PO-DA K



Hydrograph for Subcatchment 13S: PO-DA K

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.01	0.00
6.50	0.61	0.01	0.00
7.00	0.68	0.02	0.00
7.50	0.75	0.04	0.01
8.00	0.84	0.06	0.01
8.50	0.93	0.09	0.01
9.00	1.02	0.12	0.01
9.50	1.14	0.17	0.01
10.00	1.28	0.23	0.01
10.50	1.44	0.31	0.02
11.00	1.67	0.44	0.03
11.50	2.04	0.68	0.05
12.00	3.09	1.45	**0.15**
12.50	4.40	2.55	**0.15**
13.00	4.77	2.87	0.06
13.50	5.00	3.08	0.04
14.00	5.16	3.23	0.03
14.50	5.30	3.35	0.02
15.00	5.42	3.46	0.02
15.50	5.51	3.54	0.02
16.00	5.60	3.62	0.02
16.50	5.69	3.70	0.01
17.00	5.76	3.77	0.01
17.50	5.83	3.83	0.01
18.00	5.89	3.89	0.01
18.50	5.95	3.94	0.01
19.00	6.00	3.99	0.01
19.50	6.05	4.03	0.01
20.00	6.10	4.08	0.01
20.50	6.15	4.13	0.01
21.00	6.20	4.17	0.01
21.50	6.24	4.21	0.01
22.00	6.29	4.25	0.01
22.50	6.33	4.29	0.01
23.00	6.37	4.33	0.01
23.50	6.40	4.36	0.01
24.00	**6.44**	**4.39**	0.01

Summary for Subcatchment 14S: PO-DA L

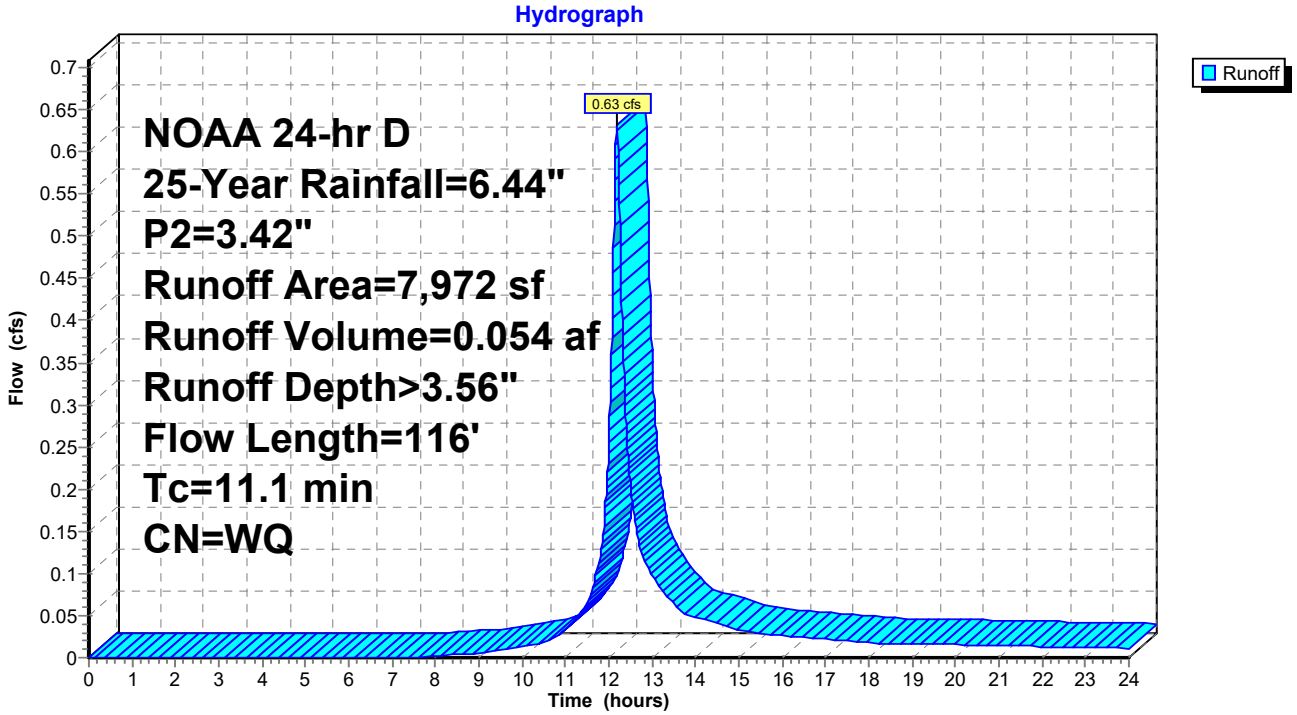
Runoff = 0.63 cfs @ 12.19 hrs, Volume= 0.054 af, Depth> 3.56"
Routed to Reach 6R : TD-04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
NOAA 24-hr D 25-Year Rainfall=6.44", P2=3.42"

	Area (sf)	CN	Description
	915	80	>75% Grass cover, Good, HSG D
*	218	85	Yard Stone/Gravel Pad, HSG D
	6,839	73	Brush, Good, HSG D
	7,972		Weighted Average
	7,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.1003	0.15		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 3.42"
0.2	16	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
11.1	116	Total			

Subcatchment 14S: PO-DA L



Hydrograph for Subcatchment 14S: PO-DA L

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.00	0.00
6.50	0.61	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.75	0.00	0.00
8.00	0.84	0.00	0.00
8.50	0.93	0.01	0.00
9.00	1.02	0.03	0.01
9.50	1.14	0.05	0.01
10.00	1.28	0.08	0.01
10.50	1.44	0.13	0.02
11.00	1.67	0.21	0.03
11.50	2.04	0.37	0.07
12.00	3.09	0.96	**0.26**
12.50	4.40	1.89	**0.20**
13.00	4.77	2.18	0.10
13.50	5.00	2.36	0.06
14.00	5.16	2.50	0.05
14.50	5.30	2.61	0.04
15.00	5.42	2.70	0.03
15.50	5.51	2.78	0.03
16.00	5.60	2.86	0.03
16.50	5.69	2.92	0.02
17.00	5.76	2.99	0.02
17.50	5.83	3.04	0.02
18.00	5.89	3.09	0.02
18.50	5.95	3.14	0.02
19.00	6.00	3.18	0.02
19.50	6.05	3.23	0.02
20.00	6.10	3.27	0.02
20.50	6.15	3.31	0.02
21.00	6.20	3.35	0.01
21.50	6.24	3.39	0.01
22.00	6.29	3.43	0.01
22.50	6.33	3.46	0.01
23.00	6.37	3.50	0.01
23.50	6.40	3.53	0.01
24.00	**6.44**	**3.56**	0.01

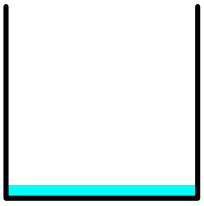
Summary for Reach 3R: TD-01

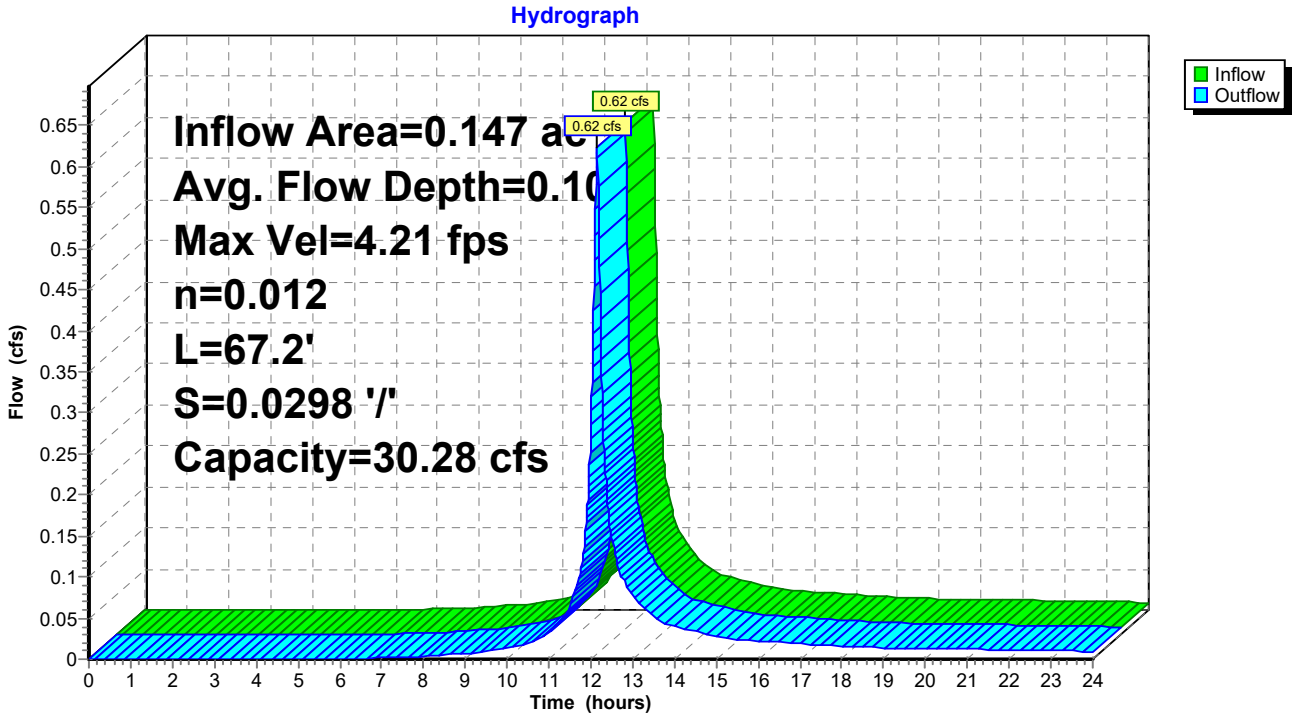
Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth > 3.86" for 25-Year event
Inflow = 0.62 cfs @ 12.15 hrs, Volume= 0.047 af
Outflow = 0.62 cfs @ 12.15 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 4.21 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 30.28 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 67.2' Slope= 0.0298 '/'
Inlet Invert= 606.00', Outlet Invert= 604.00'





Hydrograph for Reach 3R: TD-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	606.00	0.00
0.50	0.00	0	606.00	0.00
1.00	0.00	0	606.00	0.00
1.50	0.00	0	606.00	0.00
2.00	0.00	0	606.00	0.00
2.50	0.00	0	606.00	0.00
3.00	0.00	0	606.00	0.00
3.50	0.00	0	606.00	0.00
4.00	0.00	0	606.00	0.00
4.50	0.00	0	606.00	0.00
5.00	0.00	0	606.00	0.00
5.50	0.00	0	606.00	0.00
6.00	0.00	0	606.00	0.00
6.50	0.00	0	606.00	0.00
7.00	0.00	0	606.00	0.00
7.50	0.00	0	606.00	0.00
8.00	0.00	0	606.00	0.00
8.50	0.00	0	606.00	0.00
9.00	0.01	0	606.00	0.01
9.50	0.01	1	606.01	0.01
10.00	0.01	1	606.01	0.01
10.50	0.02	1	606.01	0.02
11.00	0.03	2	606.02	0.03
11.50	0.06	2	606.02	0.06
12.00	**0.29**	**6**	**606.06**	**0.29**
12.50	**0.15**	**4**	**606.04**	**0.15**
13.00	0.08	3	606.03	0.08
13.50	0.05	2	606.02	0.05
14.00	0.04	2	606.02	0.04
14.50	0.03	2	606.02	0.03
15.00	0.03	1	606.01	0.03
15.50	0.02	1	606.01	0.02
16.00	0.02	1	606.01	0.02
16.50	0.02	1	606.01	0.02
17.00	0.02	1	606.01	0.02
17.50	0.02	1	606.01	0.02
18.00	0.02	1	606.01	0.02
18.50	0.01	1	606.01	0.01
19.00	0.01	1	606.01	0.01
19.50	0.01	1	606.01	0.01
20.00	0.01	1	606.01	0.01
20.50	0.01	1	606.01	0.01
21.00	0.01	1	606.01	0.01
21.50	0.01	1	606.01	0.01
22.00	0.01	1	606.01	0.01
22.50	0.01	1	606.01	0.01
23.00	0.01	1	606.01	0.01
23.50	0.01	1	606.01	0.01
24.00	0.01	0	606.00	0.01

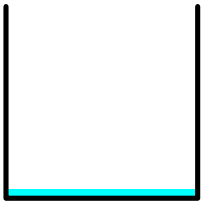
Summary for Reach 4R: TD-02

Inflow Area = 0.086 ac, 0.00% Impervious, Inflow Depth > 3.69" for 25-Year event
Inflow = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af
Outflow = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.1 min
Routed to Pond 15P : SD-06, SD-07, SD-08

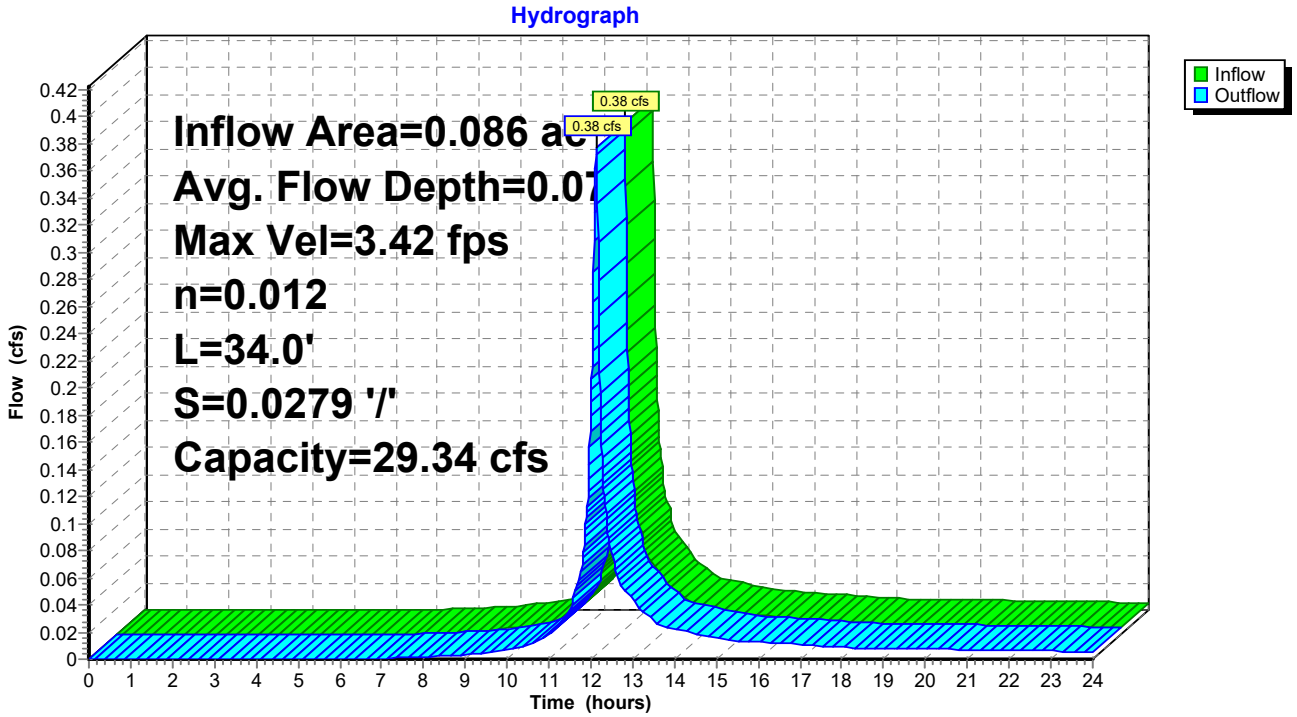
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.4 min

Peak Storage= 4 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.07' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 29.34 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 34.0' Slope= 0.0279 '/'
Inlet Invert= 604.25', Outlet Invert= 603.30'



Reach 4R: TD-02



Hydrograph for Reach 4R: TD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	604.25	0.00
0.50	0.00	0	604.25	0.00
1.00	0.00	0	604.25	0.00
1.50	0.00	0	604.25	0.00
2.00	0.00	0	604.25	0.00
2.50	0.00	0	604.25	0.00
3.00	0.00	0	604.25	0.00
3.50	0.00	0	604.25	0.00
4.00	0.00	0	604.25	0.00
4.50	0.00	0	604.25	0.00
5.00	0.00	0	604.25	0.00
5.50	0.00	0	604.25	0.00
6.00	0.00	0	604.25	0.00
6.50	0.00	0	604.25	0.00
7.00	0.00	0	604.25	0.00
7.50	0.00	0	604.25	0.00
8.00	0.00	0	604.25	0.00
8.50	0.00	0	604.25	0.00
9.00	0.00	0	604.25	0.00
9.50	0.01	0	604.25	0.00
10.00	0.01	0	604.25	0.01
10.50	0.01	0	604.26	0.01
11.00	0.02	1	604.26	0.02
11.50	0.04	1	604.27	0.04
12.00	**0.19**	**2**	**604.30**	**0.19**
12.50	**0.08**	**1**	**604.28**	**0.08**
13.00	0.04	1	604.27	0.04
13.50	0.03	1	604.27	0.03
14.00	0.02	1	604.26	0.02
14.50	0.02	1	604.26	0.02
15.00	0.02	0	604.26	0.02
15.50	0.01	0	604.26	0.01
16.00	0.01	0	604.26	0.01
16.50	0.01	0	604.26	0.01
17.00	0.01	0	604.26	0.01
17.50	0.01	0	604.26	0.01
18.00	0.01	0	604.25	0.01
18.50	0.01	0	604.25	0.01
19.00	0.01	0	604.25	0.01
19.50	0.01	0	604.25	0.01
20.00	0.01	0	604.25	0.01
20.50	0.01	0	604.25	0.01
21.00	0.01	0	604.25	0.01
21.50	0.01	0	604.25	0.01
22.00	0.01	0	604.25	0.01
22.50	0.01	0	604.25	0.01
23.00	0.01	0	604.25	0.01
23.50	0.01	0	604.25	0.01
24.00	0.01	0	604.25	0.01

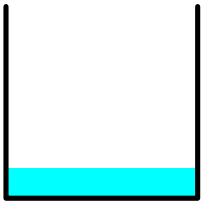
Summary for Reach 5R: TD-03

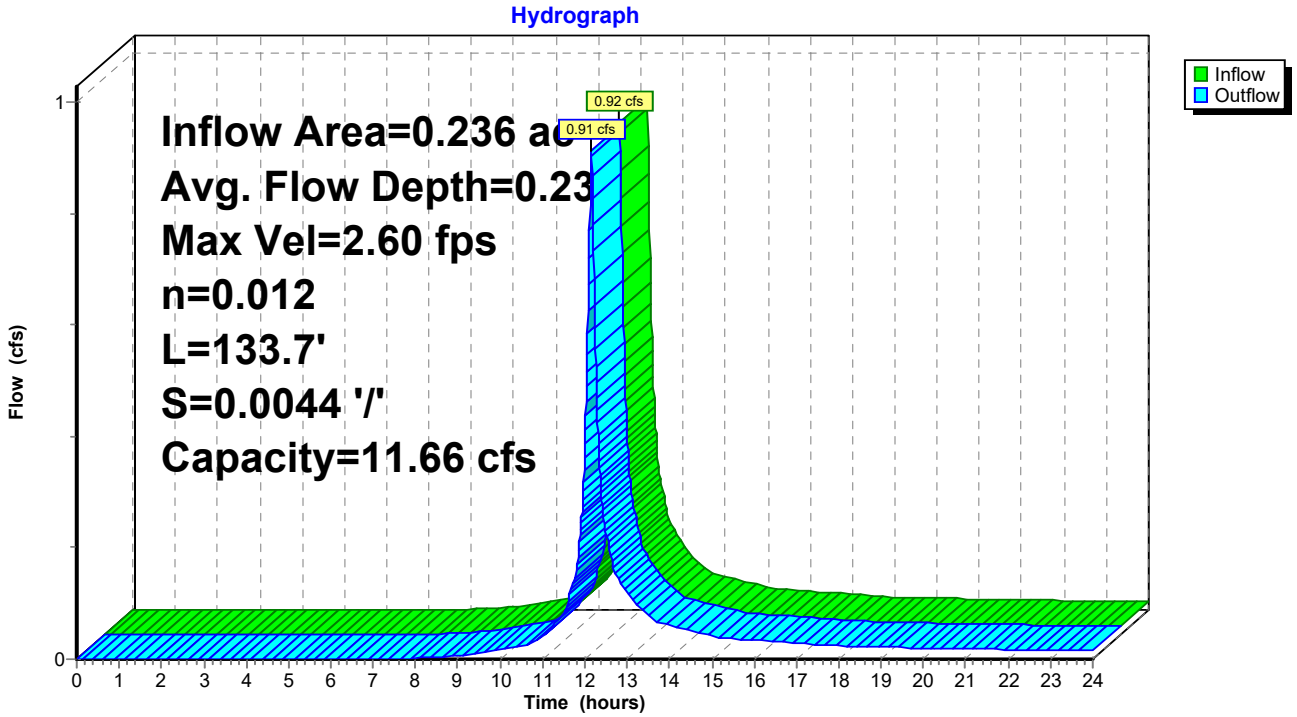
Inflow Area = 0.236 ac, 0.00% Impervious, Inflow Depth > 3.48" for 25-Year event
Inflow = 0.92 cfs @ 12.15 hrs, Volume= 0.068 af
Outflow = 0.91 cfs @ 12.16 hrs, Volume= 0.068 af, Atten= 1%, Lag= 0.6 min
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 2.60 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 2.9 min

Peak Storage= 47 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 11.66 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 133.7' Slope= 0.0044 '/'
Inlet Invert= 601.81', Outlet Invert= 601.22'





Hydrograph for Reach 5R: TD-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	601.81	0.00
0.50	0.00	0	601.81	0.00
1.00	0.00	0	601.81	0.00
1.50	0.00	0	601.81	0.00
2.00	0.00	0	601.81	0.00
2.50	0.00	0	601.81	0.00
3.00	0.00	0	601.81	0.00
3.50	0.00	0	601.81	0.00
4.00	0.00	0	601.81	0.00
4.50	0.00	0	601.81	0.00
5.00	0.00	0	601.81	0.00
5.50	0.00	0	601.81	0.00
6.00	0.00	0	601.81	0.00
6.50	0.00	0	601.81	0.00
7.00	0.00	0	601.81	0.00
7.50	0.00	0	601.81	0.00
8.00	0.00	0	601.81	0.00
8.50	0.00	1	601.81	0.00
9.00	0.01	2	601.82	0.01
9.50	0.01	3	601.82	0.01
10.00	0.02	4	601.83	0.02
10.50	0.02	5	601.83	0.02
11.00	0.04	7	601.84	0.04
11.50	0.09	10	601.86	0.08
12.00	**0.42**	**27**	**601.94**	**0.39**
12.50	**0.22**	**19**	**601.90**	**0.22**
13.00	0.12	13	601.87	0.12
13.50	0.08	10	601.86	0.08
14.00	0.06	8	601.85	0.06
14.50	0.05	8	601.85	0.05
15.00	0.04	7	601.84	0.04
15.50	0.04	6	601.84	0.04
16.00	0.03	6	601.84	0.03
16.50	0.03	6	601.84	0.03
17.00	0.03	5	601.84	0.03
17.50	0.03	5	601.83	0.03
18.00	0.02	5	601.83	0.02
18.50	0.02	4	601.83	0.02
19.00	0.02	4	601.83	0.02
19.50	0.02	4	601.83	0.02
20.00	0.02	4	601.83	0.02
20.50	0.02	4	601.83	0.02
21.00	0.02	4	601.83	0.02
21.50	0.02	4	601.83	0.02
22.00	0.02	4	601.83	0.02
22.50	0.02	4	601.83	0.02
23.00	0.02	4	601.83	0.02
23.50	0.01	4	601.83	0.02
24.00	0.01	3	601.83	0.01

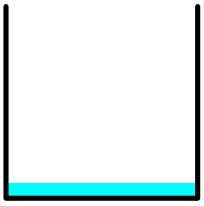
Summary for Reach 6R: TD-04

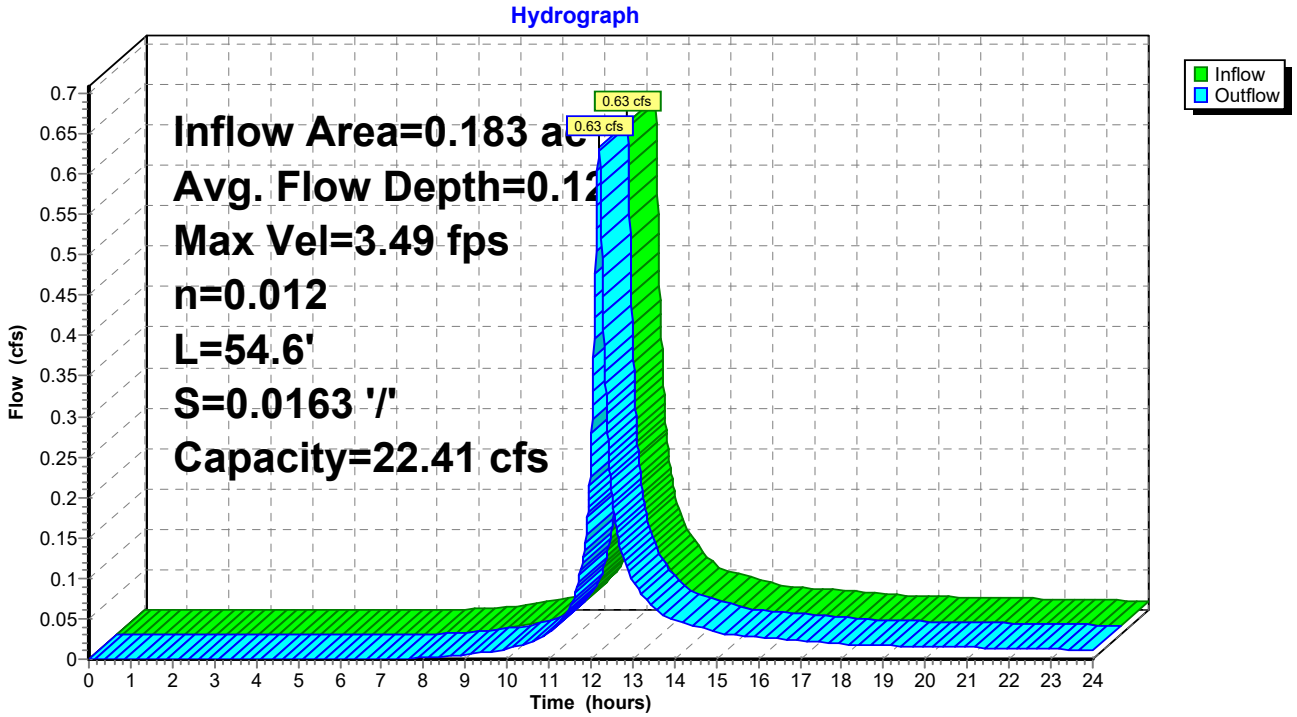
Inflow Area = 0.183 ac, 0.00% Impervious, Inflow Depth > 3.56" for 25-Year event
Inflow = 0.63 cfs @ 12.19 hrs, Volume= 0.054 af
Outflow = 0.63 cfs @ 12.19 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Max. Velocity= 3.49 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 2.3 sf, Capacity= 22.41 cfs

1.50' x 1.50' deep channel, n= 0.012 Concrete pipe, finished
Length= 54.6' Slope= 0.0163 '/'
Inlet Invert= 600.77', Outlet Invert= 599.88'





Hydrograph for Reach 6R: TD-04

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	600.77	0.00
0.50	0.00	0	600.77	0.00
1.00	0.00	0	600.77	0.00
1.50	0.00	0	600.77	0.00
2.00	0.00	0	600.77	0.00
2.50	0.00	0	600.77	0.00
3.00	0.00	0	600.77	0.00
3.50	0.00	0	600.77	0.00
4.00	0.00	0	600.77	0.00
4.50	0.00	0	600.77	0.00
5.00	0.00	0	600.77	0.00
5.50	0.00	0	600.77	0.00
6.00	0.00	0	600.77	0.00
6.50	0.00	0	600.77	0.00
7.00	0.00	0	600.77	0.00
7.50	0.00	0	600.77	0.00
8.00	0.00	0	600.77	0.00
8.50	0.00	0	600.77	0.00
9.00	0.01	0	600.77	0.01
9.50	0.01	0	600.78	0.01
10.00	0.01	1	600.78	0.01
10.50	0.02	1	600.78	0.02
11.00	0.03	2	600.79	0.03
11.50	0.07	2	600.80	0.06
12.00	**0.26**	**6**	**600.84**	**0.25**
12.50	**0.20**	**5**	**600.83**	**0.20**
13.00	0.10	3	600.81	0.10
13.50	0.06	2	600.80	0.06
14.00	0.05	2	600.79	0.05
14.50	0.04	2	600.79	0.04
15.00	0.03	2	600.79	0.03
15.50	0.03	1	600.79	0.03
16.00	0.03	1	600.79	0.03
16.50	0.02	1	600.79	0.02
17.00	0.02	1	600.79	0.02
17.50	0.02	1	600.78	0.02
18.00	0.02	1	600.78	0.02
18.50	0.02	1	600.78	0.02
19.00	0.02	1	600.78	0.02
19.50	0.02	1	600.78	0.02
20.00	0.02	1	600.78	0.02
20.50	0.02	1	600.78	0.02
21.00	0.01	1	600.78	0.01
21.50	0.01	1	600.78	0.01
22.00	0.01	1	600.78	0.01
22.50	0.01	1	600.78	0.01
23.00	0.01	1	600.78	0.01
23.50	0.01	1	600.78	0.01
24.00	0.01	1	600.78	0.01

Summary for Pond 1P: BR-01

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 4.91" for 25-Year event
Inflow = 2.09 cfs @ 12.26 hrs, Volume= 0.232 af
Outflow = 0.45 cfs @ 12.95 hrs, Volume= 0.229 af, Atten= 79%, Lag= 40.9 min
Primary = 0.45 cfs @ 12.95 hrs, Volume= 0.229 af
Routed to Pond 19P : SD-21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 600.60' @ 12.95 hrs Surf.Area= 5,277 sf Storage= 3,897 cf

Plug-Flow detention time= 113.2 min calculated for 0.229 af (99% of inflow)
Center-of-Mass det. time= 105.6 min (907.4 - 801.7)

Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	5,850 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	597.50'	330 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 880 cf Overall x 37.5% Voids
#3	596.00'	1,051 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,639 cf Overall - 11 cf Embedded = 2,627 cf x 40.0% Voids
#4	596.00'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 127.3' S= 0.0001 '/'
		7,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,759	0.0	0	0
599.50	1,759	21.7	573	573
602.50	1,759	100.0	5,277	5,850

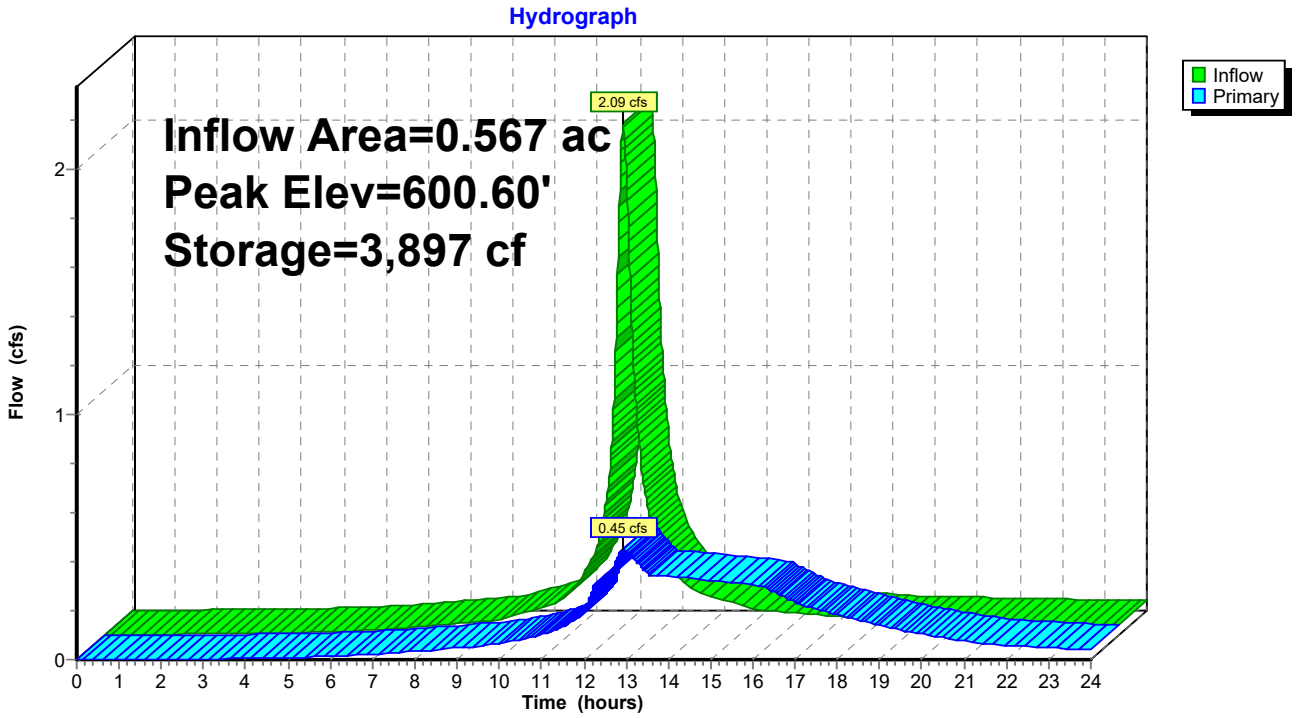
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.50	1,759	0	0
598.00	1,759	880	880

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	1,759	0	0
597.50	1,759	2,639	2,639

Device	Routing	Invert	Outlet Devices
#1	Primary	591.57'	**12.0" Vert. SD-21 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	596.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	600.50'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	602.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.45 cfs @ 12.95 hrs HW=600.60' TW=590.94' (Dynamic Tailwater)
└─**1=SD-21 Outlet (Elevation F)** (Passes 0.45 cfs of 11.04 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.35 cfs @ 10.21 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.10 cfs @ 1.01 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 1P: BR-01



Hydrograph for Pond 1P: BR-01

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	596.00	0.00
0.50	0.00	0	596.00	0.00
1.00	0.00	0	596.00	0.00
1.50	0.00	4	596.01	0.00
2.00	0.00	10	596.01	0.00
2.50	0.01	17	596.02	0.00
3.00	0.01	25	596.03	0.00
3.50	0.01	31	596.04	0.00
4.00	0.01	37	596.05	0.01
4.50	0.01	41	596.06	0.01
5.00	0.01	47	596.07	0.01
5.50	0.01	54	596.08	0.01
6.00	0.02	62	596.09	0.01
6.50	0.02	70	596.10	0.02
7.00	0.03	81	596.11	0.02
7.50	0.03	93	596.13	0.03
8.00	0.04	107	596.15	0.03
8.50	0.05	121	596.17	0.04
9.00	0.06	137	596.19	0.05
9.50	0.07	159	596.22	0.06
10.00	0.10	199	596.27	0.07
10.50	0.12	258	596.36	0.08
11.00	0.18	352	596.49	0.10
11.50	0.30	558	596.78	0.14
12.00	**0.79**	1,101	597.56	0.20
12.50	**1.16**	**3,390**	**600.31**	**0.34**
13.00	0.42	**3,894**	**600.60**	**0.44**
13.50	0.26	3,758	600.52	0.35
14.00	0.18	3,520	600.38	0.34
14.50	0.15	3,214	600.21	0.33
15.00	0.13	2,872	600.02	0.32
15.50	0.10	2,499	599.80	0.32
16.00	0.10	2,121	599.59	0.31
16.50	0.09	1,756	598.95	0.28
17.00	0.08	1,449	598.15	0.23
17.50	0.07	1,194	597.70	0.21
18.00	0.07	968	597.37	0.18
18.50	0.06	770	597.08	0.16
19.00	0.06	603	596.85	0.14
19.50	0.06	470	596.66	0.12
20.00	0.05	366	596.51	0.10
20.50	0.05	289	596.40	0.09
21.00	0.05	233	596.32	0.08
21.50	0.05	195	596.27	0.07
22.00	0.05	169	596.23	0.06
22.50	0.05	151	596.21	0.05
23.00	0.04	139	596.19	0.05
23.50	0.04	130	596.18	0.05
24.00	0.04	124	596.17	0.04

Summary for Pond 2P: BR-02

Inflow Area = 0.350 ac, 31.71% Impervious, Inflow Depth > 5.10" for 25-Year event
Inflow = 1.42 cfs @ 12.23 hrs, Volume= 0.149 af
Outflow = 0.77 cfs @ 12.44 hrs, Volume= 0.147 af, Atten= 46%, Lag= 12.4 min
Primary = 0.77 cfs @ 12.44 hrs, Volume= 0.147 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 601.23' @ 12.44 hrs Surf.Area= 4,734 sf Storage= 1,818 cf

Plug-Flow detention time= 63.7 min calculated for 0.147 af (99% of inflow)
Center-of-Mass det. time= 55.8 min (845.9 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	599.50'	1,303 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	599.00'	296 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 789 cf Overall x 37.5% Voids
#3	598.00'	627 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 1,578 cf Overall - 12 cf Embedded = 1,566 cf x 40.0% Voids
#4	598.00'	12 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 133.4' S= 0.0001 '/'
		2,237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.50	1,578	0.0	0	0
601.00	1,578	21.7	514	514
601.50	1,578	100.0	789	1,303

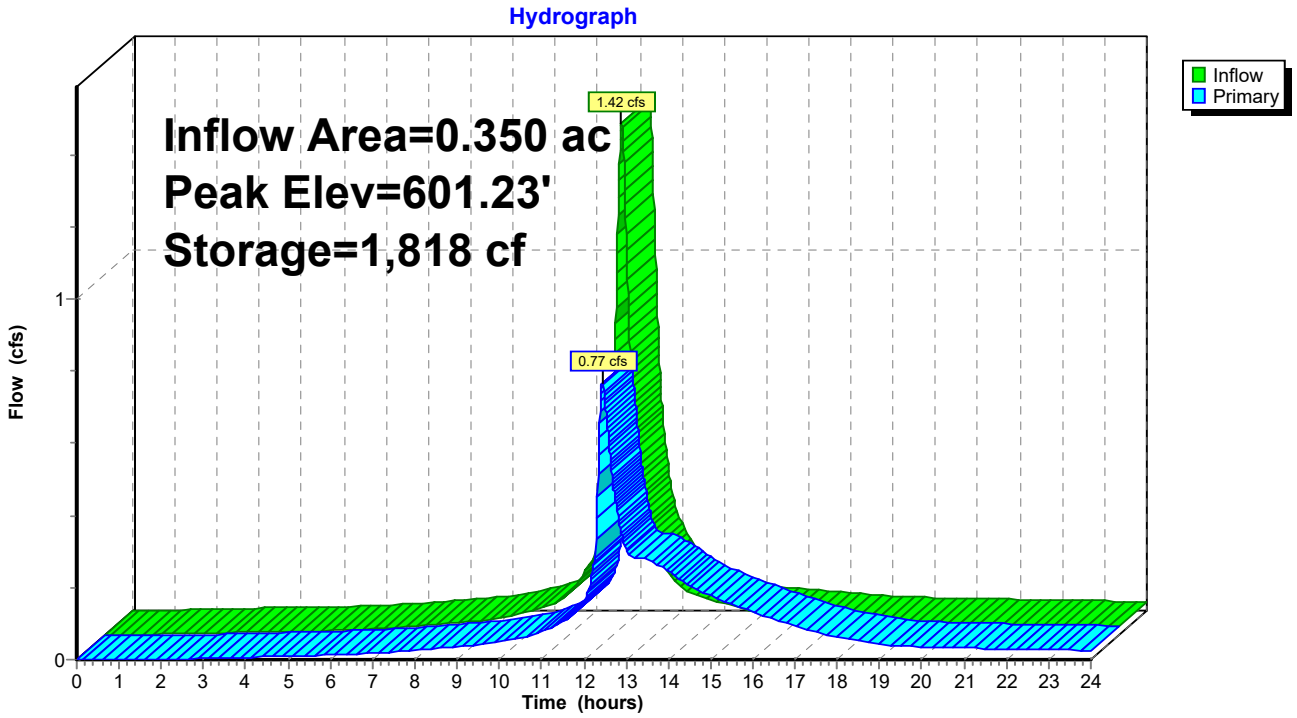
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	1,578	0	0
599.50	1,578	789	789

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.00	1,578	0	0
599.00	1,578	1,578	1,578

Device	Routing	Invert	Outlet Devices
#1	Primary	590.35'	**12.0" Vert. SD-22 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	598.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	601.10'	**36.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.40'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.77 cfs @ 12.44 hrs HW=601.23' TW=588.99' (Dynamic Tailwater)
└─**1=SD-22 Outlet (Elevation F)** (Passes 0.77 cfs of 12.19 cfs potential flow)
  ├─**2=Water Quatity (Elevation G)** (Orifice Controls 0.29 cfs @ 8.52 fps)
  ├─**3=Water Quantity (Elevation H)** (Orifice Controls 0.48 cfs @ 1.18 fps)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 2P: BR-02



Hydrograph for Pond 2P: BR-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	598.00	0.00
0.50	0.00	0	598.00	0.00
1.00	0.00	1	598.00	0.00
1.50	0.00	4	598.01	0.00
2.00	0.00	11	598.02	0.00
2.50	0.01	19	598.03	0.00
3.00	0.01	27	598.04	0.00
3.50	0.01	33	598.05	0.01
4.00	0.01	38	598.06	0.01
4.50	0.01	42	598.06	0.01
5.00	0.01	46	598.07	0.01
5.50	0.01	50	598.08	0.01
6.00	0.02	54	598.08	0.01
6.50	0.02	59	598.09	0.01
7.00	0.02	66	598.10	0.02
7.50	0.03	73	598.11	0.02
8.00	0.03	82	598.13	0.03
8.50	0.04	90	598.14	0.03
9.00	0.04	99	598.15	0.04
9.50	0.05	111	598.17	0.04
10.00	0.07	132	598.20	0.05
10.50	0.08	162	598.25	0.06
11.00	0.12	214	598.33	0.08
11.50	0.20	336	598.52	0.11
12.00	**0.57**	**683**	**599.08**	**0.16**
12.50	**0.62**	**1,805**	**601.23**	**0.72**
13.00	0.24	1,634	601.12	0.31
13.50	0.15	1,467	601.01	0.28
14.00	0.11	1,220	600.34	0.25
14.50	0.09	997	599.68	0.21
15.00	0.08	806	599.28	0.18
15.50	0.06	632	598.99	0.15
16.00	0.06	485	598.76	0.13
16.50	0.06	369	598.57	0.11
17.00	0.05	278	598.43	0.09
17.50	0.05	211	598.32	0.08
18.00	0.04	164	598.25	0.06
18.50	0.04	131	598.20	0.05
19.00	0.04	113	598.17	0.04
19.50	0.04	104	598.16	0.04
20.00	0.03	100	598.15	0.04
20.50	0.03	97	598.15	0.03
21.00	0.03	94	598.15	0.03
21.50	0.03	92	598.14	0.03
22.00	0.03	90	598.14	0.03
22.50	0.03	88	598.13	0.03
23.00	0.03	85	598.13	0.03
23.50	0.03	83	598.13	0.03
24.00	0.02	81	598.12	0.03

Summary for Pond 3P: BR-03

Inflow Area = 0.388 ac, 28.87% Impervious, Inflow Depth > 5.03" for 25-Year event
Inflow = 1.30 cfs @ 12.33 hrs, Volume= 0.163 af
Outflow = 0.31 cfs @ 13.06 hrs, Volume= 0.160 af, Atten= 76%, Lag= 43.7 min
Primary = 0.31 cfs @ 13.06 hrs, Volume= 0.160 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.59' @ 13.06 hrs Surf.Area= 6,525 sf Storage= 2,630 cf

Plug-Flow detention time= 105.4 min calculated for 0.160 af (98% of inflow)
Center-of-Mass det. time= 94.6 min (893.0 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	8,864 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.50'	408 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,088 cf Overall x 37.5% Voids
#3	594.00'	1,305 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 3,263 cf Overall x 40.0% Voids
#4	594.00'	22 cf	**4.0" Round Pipe Storage** L= 254.1' S= 0.0001 '/'
		10,599 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	2,175	0.0	0	0
597.50	2,175	21.7	708	708
601.25	2,175	100.0	8,156	8,864

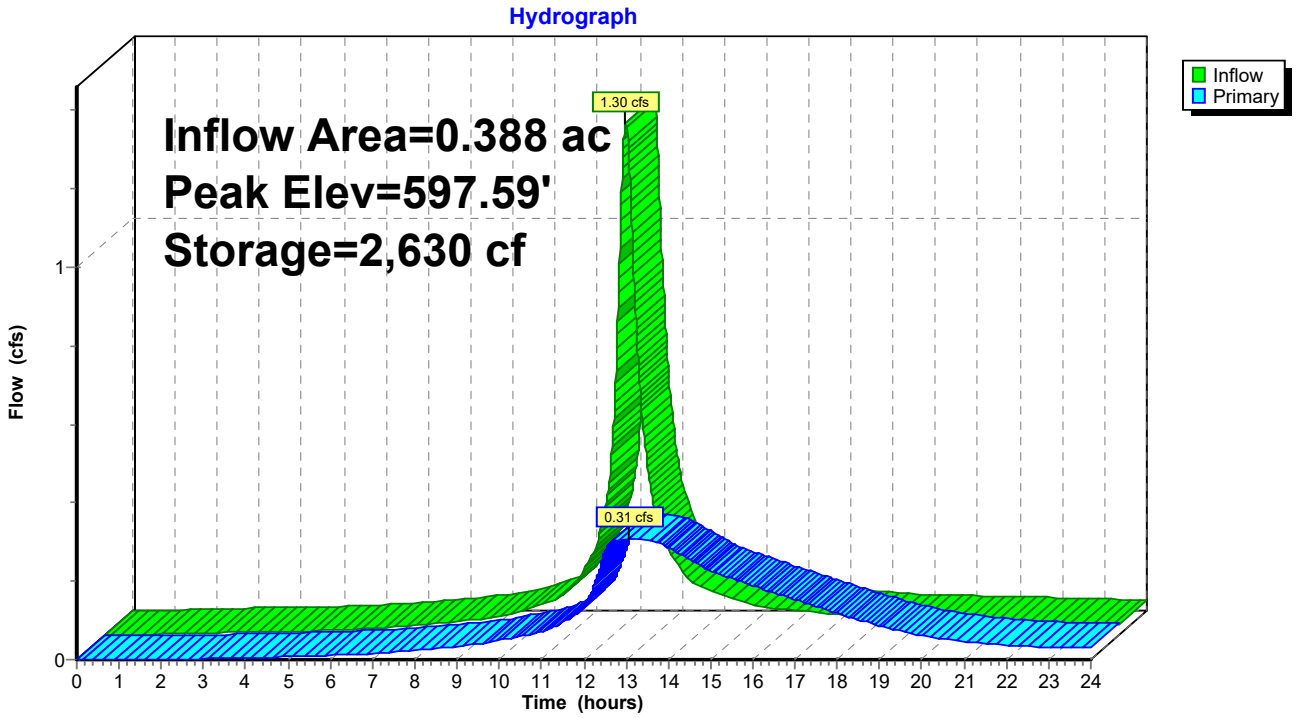
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.50	2,175	0	0
596.00	2,175	1,088	1,088

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.00	2,175	0	0
595.50	2,175	3,263	3,263

Device	Routing	Invert	Outlet Devices
#1	Primary	588.19'	**15.0" Vert. SD-23 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.00'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.50'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	601.15'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.31 cfs @ 13.06 hrs HW=597.59' TW=587.28' (Dynamic Tailwater)
└─**1=SD-23 Outlet (Elevation F)** (Passes 0.31 cfs of 17.50 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.31 cfs @ 8.98 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 3P: BR-03



Hydrograph for Pond 3P: BR-03

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.00	0.00
0.50	0.00	0	594.00	0.00
1.00	0.00	0	594.00	0.00
1.50	0.00	3	594.00	0.00
2.00	0.00	10	594.01	0.00
2.50	0.01	18	594.02	0.00
3.00	0.01	28	594.03	0.00
3.50	0.01	37	594.04	0.00
4.00	0.01	44	594.05	0.00
4.50	0.01	51	594.06	0.01
5.00	0.01	58	594.06	0.01
5.50	0.01	65	594.07	0.01
6.00	0.02	71	594.08	0.01
6.50	0.02	79	594.09	0.01
7.00	0.02	88	594.10	0.02
7.50	0.03	99	594.11	0.02
8.00	0.03	111	594.12	0.02
8.50	0.04	125	594.13	0.03
9.00	0.04	138	594.15	0.03
9.50	0.05	154	594.17	0.04
10.00	0.07	180	594.19	0.05
10.50	0.08	219	594.23	0.06
11.00	0.12	279	594.30	0.07
11.50	0.20	406	594.44	0.10
12.00	**0.47**	724	594.81	0.14
12.50	**0.97**	2,156	596.89	0.27
13.00	0.33	**2,627**	**597.58**	**0.31**
13.50	0.19	**2,524**	**597.54**	**0.30**
14.00	0.13	2,267	597.13	0.29
14.50	0.11	1,991	596.54	0.26
15.00	0.09	1,733	596.00	0.23
15.50	0.07	1,488	595.70	0.21
16.00	0.07	1,259	595.42	0.19
16.50	0.06	1,052	595.18	0.17
17.00	0.06	868	594.97	0.15
17.50	0.05	706	594.79	0.14
18.00	0.05	566	594.63	0.12
18.50	0.04	447	594.49	0.10
19.00	0.04	352	594.38	0.09
19.50	0.04	281	594.30	0.07
20.00	0.04	230	594.25	0.06
20.50	0.04	194	594.21	0.05
21.00	0.04	170	594.18	0.05
21.50	0.03	155	594.17	0.04
22.00	0.03	145	594.16	0.04
22.50	0.03	138	594.15	0.03
23.00	0.03	133	594.14	0.03
23.50	0.03	129	594.14	0.03
24.00	0.03	125	594.14	0.03

Summary for Pond 5P: BR-05

Inflow Area = 0.241 ac, 27.64% Impervious, Inflow Depth > 5.03" for 25-Year event
Inflow = 1.30 cfs @ 12.13 hrs, Volume= 0.101 af
Outflow = 0.25 cfs @ 12.56 hrs, Volume= 0.100 af, Atten= 80%, Lag= 25.2 min
Primary = 0.25 cfs @ 12.56 hrs, Volume= 0.100 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.30' @ 12.56 hrs Surf.Area= 4,725 sf Storage= 1,417 cf

Plug-Flow detention time= 68.8 min calculated for 0.100 af (99% of inflow)
Center-of-Mass det. time= 59.6 min (845.5 - 785.9)

Volume	Invert	Avail.Storage	Storage Description
#1	595.80'	4,371 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	595.30'	295 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 788 cf Overall x 37.5% Voids
#3	593.80'	941 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 2,363 cf Overall - 11 cf Embedded = 2,352 cf x 40.0% Voids
#4	593.80'	11 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 125.2' S= 0.0001 '/'
		5,618 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.80	1,575	0.0	0	0
597.30	1,575	21.7	513	513
599.75	1,575	100.0	3,859	4,371

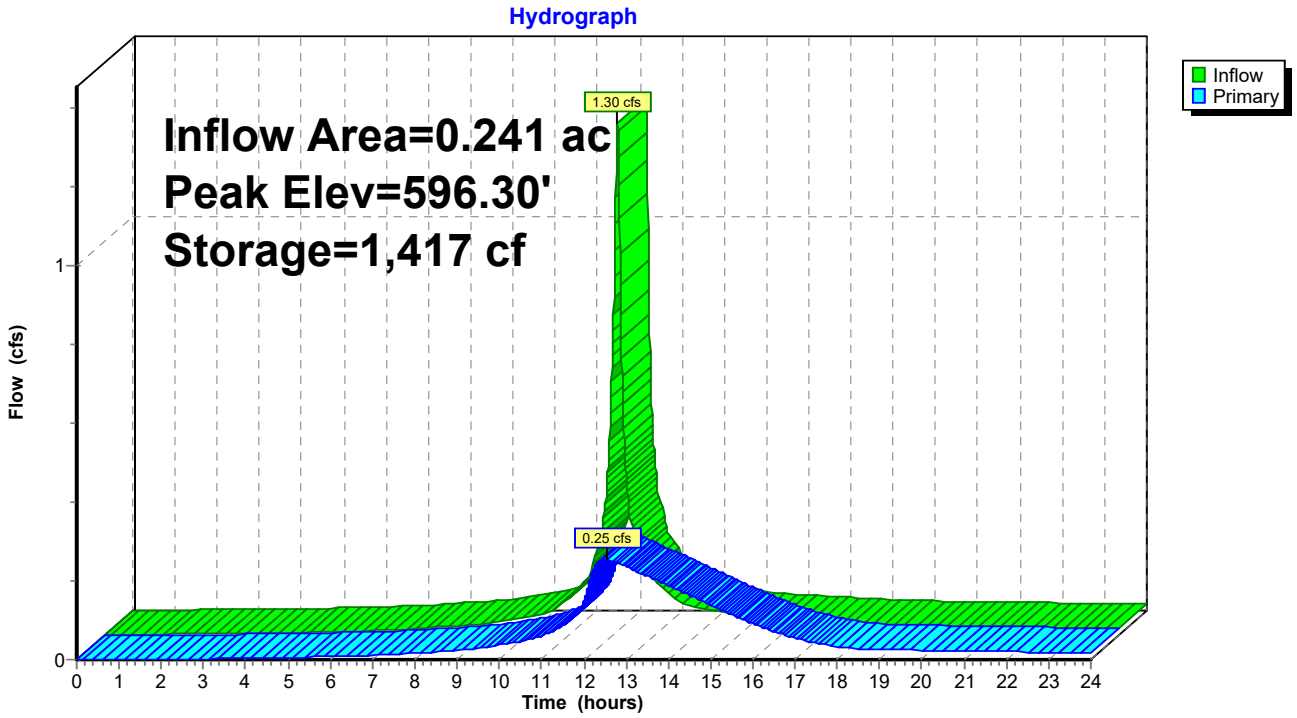
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.30	1,575	0	0
595.80	1,575	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.80	1,575	0	0
595.30	1,575	2,363	2,363

Device	Routing	Invert	Outlet Devices
#1	Primary	584.63'	**18.0" Vert. SD-25 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	593.80'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.20'	**12.0" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.25 cfs @ 12.56 hrs HW=596.30' TW=581.07' (Dynamic Tailwater)
└─**1=SD-25 Outlet (Elevation F)** (Passes 0.25 cfs of 28.11 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.25 cfs @ 7.45 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 5P: BR-05



Hydrograph for Pond 5P: BR-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.80	0.00
0.50	0.00	0	593.80	0.00
1.00	0.00	1	593.80	0.00
1.50	0.00	4	593.81	0.00
2.00	0.00	8	593.81	0.00
2.50	0.00	14	593.82	0.00
3.00	0.00	19	593.83	0.00
3.50	0.01	23	593.84	0.00
4.00	0.01	27	593.84	0.00
4.50	0.01	31	593.85	0.00
5.00	0.01	34	593.85	0.01
5.50	0.01	38	593.86	0.01
6.00	0.01	41	593.86	0.01
6.50	0.01	46	593.87	0.01
7.00	0.01	51	593.88	0.01
7.50	0.02	57	593.89	0.01
8.00	0.02	64	593.90	0.02
8.50	0.02	71	593.91	0.02
9.00	0.03	78	593.92	0.02
9.50	0.04	87	593.94	0.03
10.00	0.05	102	593.96	0.04
10.50	0.06	120	593.99	0.05
11.00	0.09	157	594.04	0.06
11.50	0.16	248	594.18	0.09
12.00	**0.68**	591	594.73	0.15
12.50	**0.27**	**1,415**	**596.29**	**0.25**
13.00	0.14	**1,312**	**595.99**	**0.24**
13.50	0.09	1,117	595.58	0.21
14.00	0.07	899	595.22	0.19
14.50	0.06	702	594.90	0.16
15.00	0.05	527	594.63	0.14
15.50	0.04	380	594.39	0.11
16.00	0.04	270	594.22	0.09
16.50	0.04	192	594.10	0.07
17.00	0.03	142	594.02	0.06
17.50	0.03	112	593.97	0.04
18.00	0.03	95	593.95	0.03
18.50	0.03	87	593.93	0.03
19.00	0.02	82	593.93	0.03
19.50	0.02	80	593.92	0.03
20.00	0.02	78	593.92	0.02
20.50	0.02	76	593.92	0.02
21.00	0.02	74	593.92	0.02
21.50	0.02	73	593.91	0.02
22.00	0.02	71	593.91	0.02
22.50	0.02	70	593.91	0.02
23.00	0.02	68	593.91	0.02
23.50	0.02	66	593.90	0.02
24.00	0.02	65	593.90	0.02

Summary for Pond 6P: BR-04

Inflow Area = 0.317 ac, 38.48% Impervious, Inflow Depth > 5.14" for 25-Year event
Inflow = 1.79 cfs @ 12.12 hrs, Volume= 0.136 af
Outflow = 0.23 cfs @ 12.78 hrs, Volume= 0.132 af, Atten= 87%, Lag= 39.1 min
Primary = 0.23 cfs @ 12.78 hrs, Volume= 0.132 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.75' @ 12.78 hrs Surf.Area= 8,682 sf Storage= 2,324 cf

Plug-Flow detention time= 125.0 min calculated for 0.132 af (98% of inflow)
Center-of-Mass det. time= 109.8 min (888.7 - 778.9)

Volume	Invert	Avail.Storage	Storage Description
#1	596.70'	5,428 cf	**Filter Media Layer (Prismatic)** Listed below (Recalc)
#2	596.20'	543 cf	**Sand Layer (Prismatic)** Listed below (Recalc) 1,447 cf Overall x 37.5% Voids
#3	594.70'	1,727 cf	**Gravel Layer (Prismatic)** Listed below (Recalc) 4,341 cf Overall - 24 cf Embedded = 4,317 cf x 40.0% Voids
#4	594.70'	24 cf	**4.0" Round 4" Underdrain Pipe** Inside #3 L= 271.7' S= 0.0001 '/'
		7,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.70	2,894	0.0	0	0
598.20	2,894	21.7	942	942
599.75	2,894	100.0	4,486	5,428

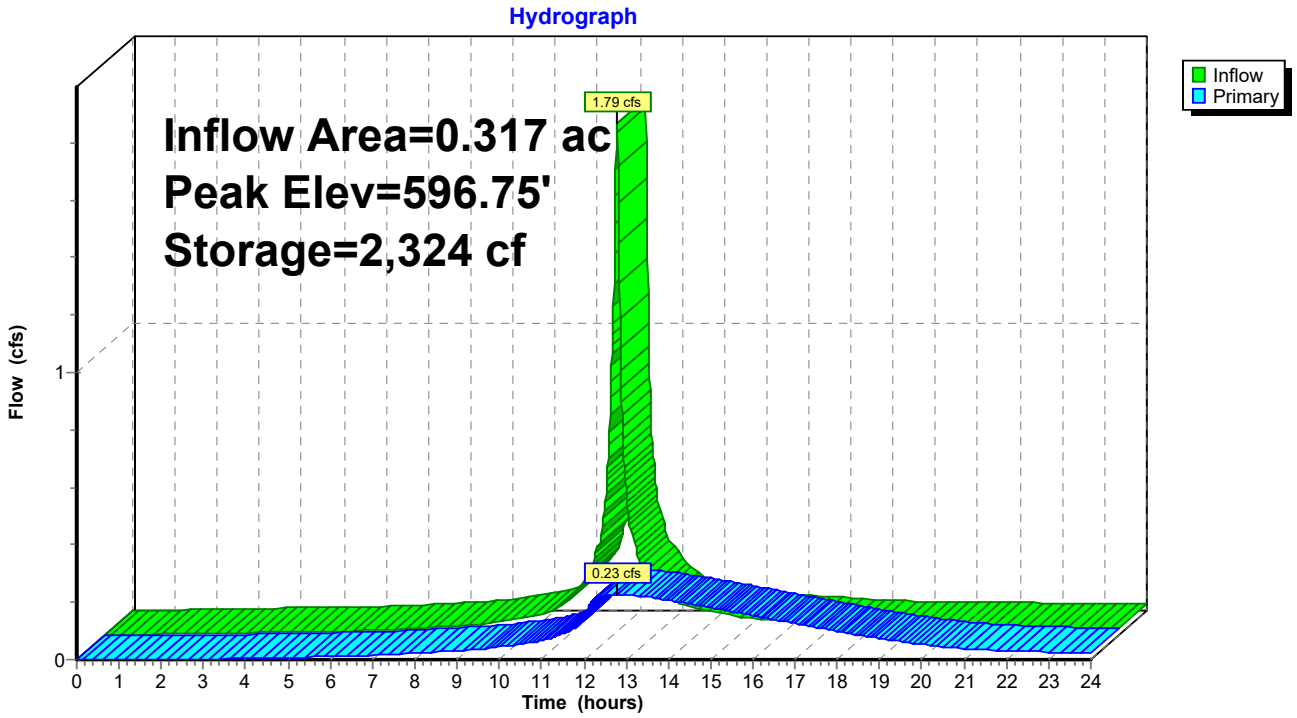
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.20	2,894	0	0
596.70	2,894	1,447	1,447

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
594.70	2,894	0	0
596.20	2,894	4,341	4,341

Device	Routing	Invert	Outlet Devices
#1	Primary	586.53'	**15.0" Vert. SD-24 Outlet (Elevation F)** C= 0.600 Limited to weir flow at low heads
#2	Device 1	594.70'	**2.5" Vert. Water Quatity (Elevation G)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	598.30'	**2.5" W x 2.5" H Vert. Water Quantity (Elevation H)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	599.65'	**48.0" x 48.0" Horiz. Overflow Grate (Elevation I)** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 12.78 hrs HW=596.75' TW=585.44' (Dynamic Tailwater)
└─**1=SD-24 Outlet (Elevation F)** (Passes 0.23 cfs of 18.30 cfs potential flow)
  └─**2=Water Quatity (Elevation G)** (Orifice Controls 0.23 cfs @ 6.71 fps)
  └─**3=Water Quantity (Elevation H)** (Controls 0.00 cfs)
  └─**4=Overflow Grate (Elevation I)** (Controls 0.00 cfs)

Pond 6P: BR-04



Hydrograph for Pond 6P: BR-04

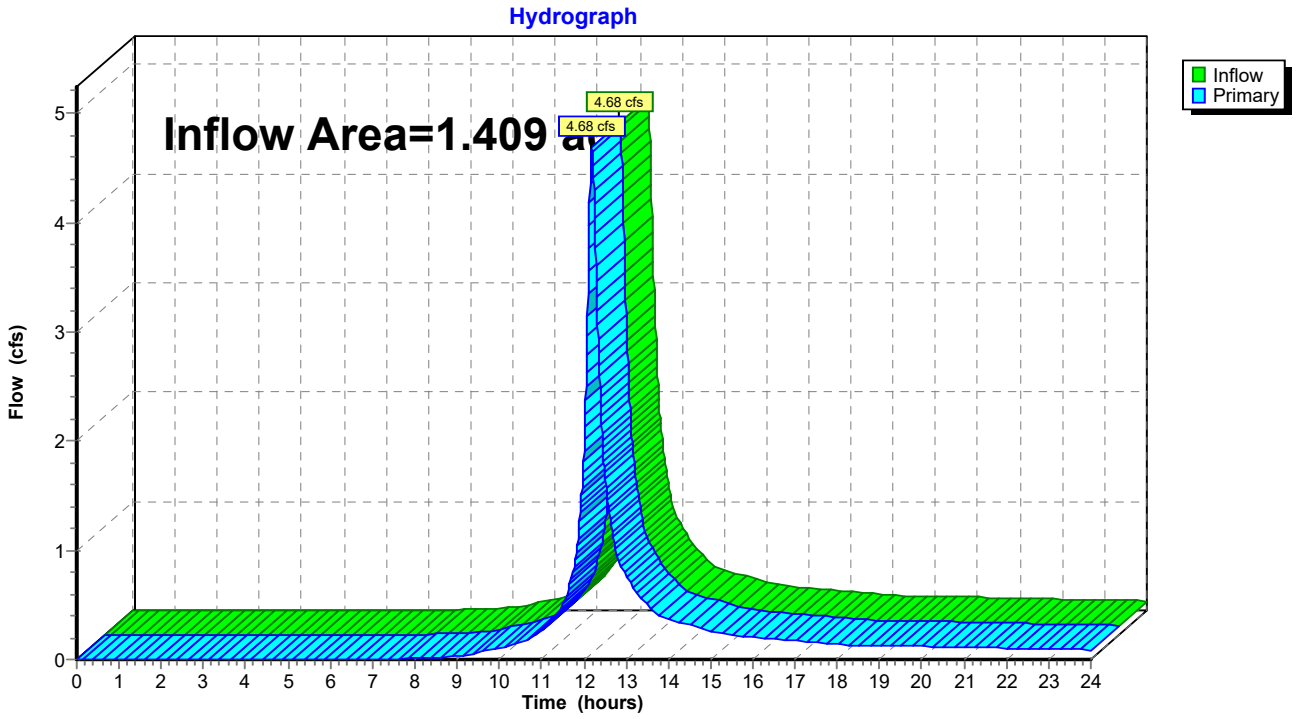
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	594.70	0.00
0.50	0.00	0	594.70	0.00
1.00	0.00	1	594.70	0.00
1.50	0.00	7	594.71	0.00
2.00	0.01	16	594.71	0.00
2.50	0.01	26	594.72	0.00
3.00	0.01	38	594.73	0.00
3.50	0.01	49	594.74	0.00
4.00	0.01	59	594.75	0.00
4.50	0.01	68	594.76	0.01
5.00	0.01	76	594.76	0.01
5.50	0.01	84	594.77	0.01
6.00	0.02	92	594.78	0.01
6.50	0.02	101	594.78	0.01
7.00	0.02	111	594.79	0.02
7.50	0.03	124	594.80	0.02
8.00	0.03	137	594.82	0.02
8.50	0.03	151	594.83	0.03
9.00	0.04	166	594.84	0.03
9.50	0.05	186	594.86	0.04
10.00	0.06	217	594.88	0.05
10.50	0.08	256	594.91	0.05
11.00	0.13	330	594.97	0.07
11.50	0.22	492	595.11	0.09
12.00	**0.98**	1,052	595.60	0.15
12.50	**0.35**	**2,275**	**596.68**	**0.22**
13.00	0.19	**2,307**	**596.72**	**0.23**
13.50	0.12	2,174	596.59	0.22
14.00	0.09	1,976	596.41	0.21
14.50	0.08	1,770	596.22	0.20
15.00	0.06	1,559	596.03	0.18
15.50	0.06	1,351	595.86	0.17
16.00	0.05	1,160	595.69	0.15
16.50	0.05	985	595.54	0.14
17.00	0.04	828	595.40	0.13
17.50	0.04	687	595.28	0.11
18.00	0.04	563	595.17	0.10
18.50	0.03	457	595.08	0.09
19.00	0.03	372	595.01	0.07
19.50	0.03	305	594.95	0.06
20.00	0.03	255	594.91	0.05
20.50	0.03	219	594.88	0.05
21.00	0.03	194	594.86	0.04
21.50	0.03	178	594.85	0.03
22.00	0.03	167	594.84	0.03
22.50	0.02	159	594.83	0.03
23.00	0.02	153	594.83	0.03
23.50	0.02	148	594.82	0.03
24.00	0.02	143	594.82	0.02

Summary for Pond 7P: O-1A

Inflow Area = 1.409 ac, 2.20% Impervious, Inflow Depth > 3.61" for 25-Year event
Inflow = 4.68 cfs @ 12.19 hrs, Volume= 0.424 af
Primary = 4.68 cfs @ 12.19 hrs, Volume= 0.424 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 7P: O-1A



Hydrograph for Pond 7P: O-1A

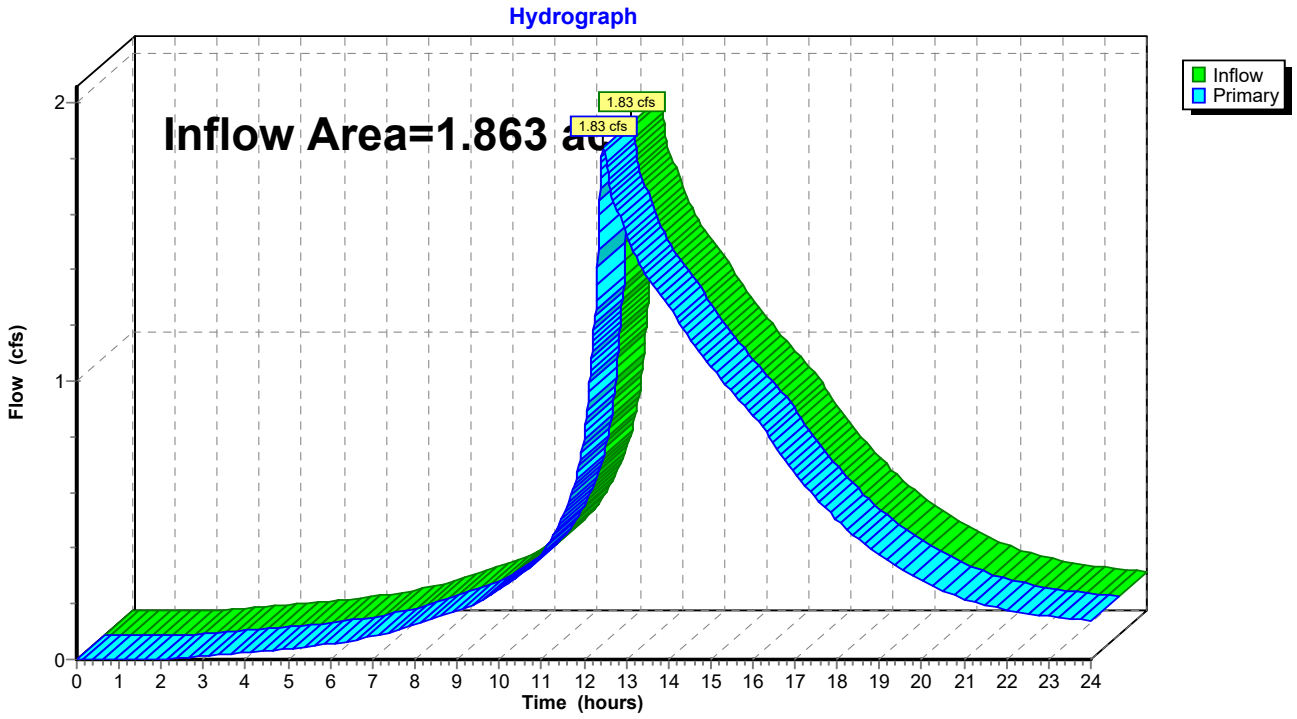
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.01		0.01
8.00	0.01		0.01
8.50	0.02		0.02
9.00	0.03		0.03
9.50	0.07		0.07
10.00	0.11		0.11
10.50	0.15		0.15
11.00	0.26		0.26
11.50	0.51		0.51
12.00	**1.92**		**1.92**
12.50	**1.67**		**1.67**
13.00	0.78		0.78
13.50	0.50		0.50
14.00	0.37		0.37
14.50	0.32		0.32
15.00	0.26		0.26
15.50	0.23		0.23
16.00	0.21		0.21
16.50	0.19		0.19
17.00	0.18		0.18
17.50	0.16		0.16
18.00	0.14		0.14
18.50	0.13		0.13
19.00	0.13		0.13
19.50	0.12		0.12
20.00	0.12		0.12
20.50	0.12		0.12
21.00	0.11		0.11
21.50	0.11		0.11
22.00	0.10		0.10
22.50	0.10		0.10
23.00	0.10		0.10
23.50	0.09		0.09
24.00	0.09		0.09

Summary for Pond 8P: O-1B

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 4.95" for 25-Year event
Inflow = 1.83 cfs @ 12.46 hrs, Volume= 0.768 af
Primary = 1.83 cfs @ 12.46 hrs, Volume= 0.768 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs

Pond 8P: O-1B



Hydrograph for Pond 8P: O-1B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.02		0.02
4.00	0.02		0.02
4.50	0.03		0.03
5.00	0.04		0.04
5.50	0.05		0.05
6.00	0.06		0.06
6.50	0.07		0.07
7.00	0.08		0.08
7.50	0.10		0.10
8.00	0.12		0.12
8.50	0.15		0.15
9.00	0.17		0.17
9.50	0.20		0.20
10.00	0.25		0.25
10.50	0.30		0.30
11.00	0.38		0.38
11.50	0.51		0.51
12.00	**0.79**		**0.79**
12.50	**1.82**		**1.82**
13.00	1.53		1.53
13.50	1.37		1.37
14.00	1.27		1.27
14.50	1.16		1.16
15.00	1.05		1.05
15.50	0.96		0.96
16.00	0.87		0.87
16.50	0.77		0.77
17.00	0.66		0.66
17.50	0.58		0.58
18.00	0.50		0.50
18.50	0.43		0.43
19.00	0.37		0.37
19.50	0.32		0.32
20.00	0.28		0.28
20.50	0.25		0.25
21.00	0.22		0.22
21.50	0.19		0.19
22.00	0.18		0.18
22.50	0.17		0.17
23.00	0.16		0.16
23.50	0.15		0.15
24.00	0.14		0.14

Summary for Pond 12P: SD-03, SD-04, SD-05

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 3.55" for 25-Year event
Inflow = 2.59 cfs @ 12.19 hrs, Volume= 0.238 af
Outflow = 2.58 cfs @ 12.20 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.2 min
Primary = 2.58 cfs @ 12.20 hrs, Volume= 0.238 af
Routed to Pond 15P : SD-06, SD-07, SD-08

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 596.71' @ 12.20 hrs Surf.Area= 85 sf Storage= 41 cf

Plug-Flow detention time= 0.6 min calculated for 0.238 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (840.5 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	603.40'	8 cf	**12.0" Round SD-03** L= 10.0' S= 0.0100 '/'
#2	596.79'	79 cf	**MH-02 (Prismatic)**Listed below (Recalc)
#3	596.56'	16 cf	**12.0" Round SD-04** L= 20.0' S= 0.0100 '/'
#4	596.31'	86 cf	**MH-03 (Prismatic)**Listed below (Recalc)
#5	595.95'	64 cf	**18.0" Round SD-05** L= 36.0' S= 0.0100 '/'
#6	595.71'	93 cf	**MH-04 (Prismatic)**Listed below (Recalc)
		346 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.79	13	0	0
602.90	13	79	79

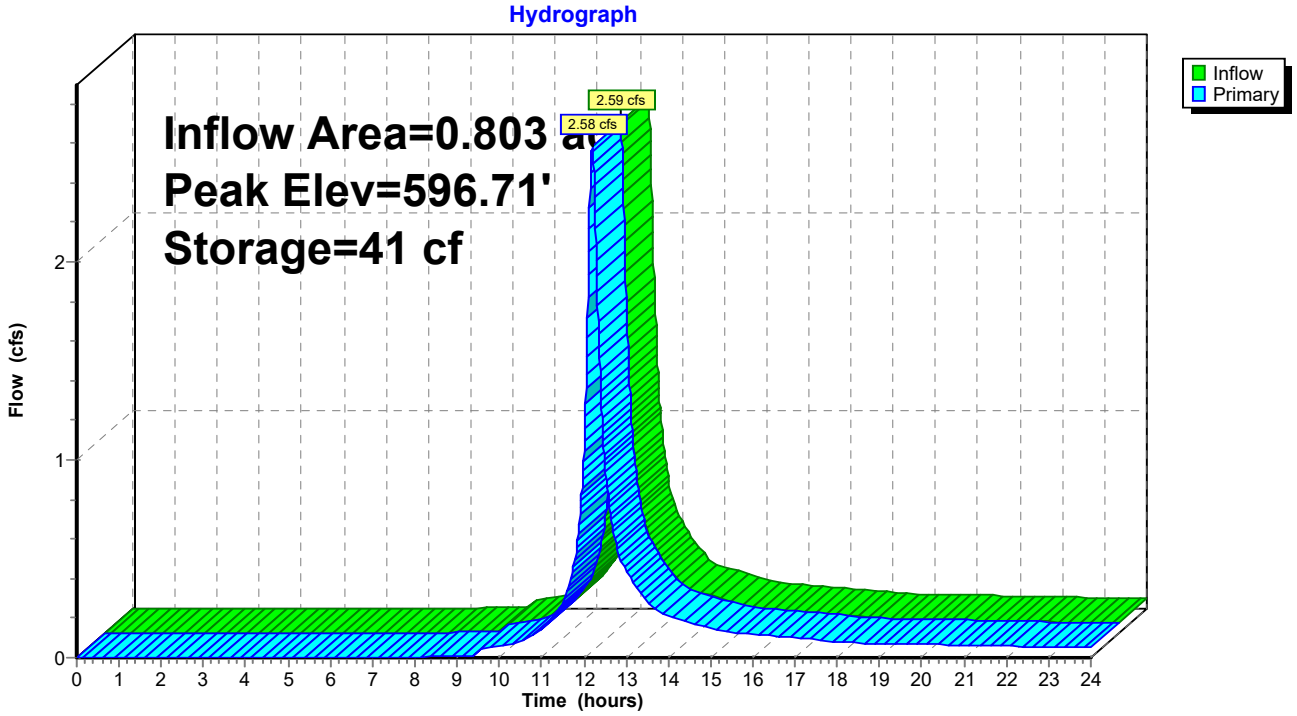
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.31	13	0	0
602.90	13	86	86

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.71	13	0	0
602.90	13	93	93

Device	Routing	Invert	Outlet Devices
#1	Primary	595.96'	**18.0" Vert. SD-05** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.58 cfs @ 12.20 hrs HW=596.71' TW=594.72' (Dynamic Tailwater)
↑—**1=SD-05** (Orifice Controls 2.58 cfs @ 2.94 fps)

Pond 12P: SD-03, SD-04, SD-05



Hydrograph for Pond 12P: SD-03, SD-04, SD-05

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	595.71	0.00
0.50	0.00	0	595.71	0.00
1.00	0.00	0	595.71	0.00
1.50	0.00	0	595.71	0.00
2.00	0.00	0	595.71	0.00
2.50	0.00	0	595.71	0.00
3.00	0.00	0	595.71	0.00
3.50	0.00	0	595.71	0.00
4.00	0.00	0	595.71	0.00
4.50	0.00	0	595.71	0.00
5.00	0.00	0	595.71	0.00
5.50	0.00	0	595.71	0.00
6.00	0.00	0	595.72	0.00
6.50	0.00	1	595.79	0.00
7.00	0.00	3	595.94	0.00
7.50	0.00	4	595.98	0.00
8.00	0.00	4	595.98	0.00
8.50	0.00	4	595.99	0.00
9.00	0.01	4	595.99	0.01
9.50	0.04	5	596.04	0.04
10.00	0.06	5	596.06	0.06
10.50	0.08	5	596.08	0.08
11.00	0.14	6	596.12	0.14
11.50	0.28	8	596.19	0.28
12.00	**1.07**	**19**	**596.42**	**1.05**
12.50	**0.96**	**18**	**596.40**	**0.97**
13.00	0.44	10	596.25	0.44
13.50	0.29	8	596.19	0.29
14.00	0.21	7	596.16	0.21
14.50	0.18	7	596.14	0.18
15.00	0.15	6	596.13	0.15
15.50	0.13	6	596.11	0.13
16.00	0.12	6	596.11	0.12
16.50	0.11	6	596.10	0.11
17.00	0.10	6	596.10	0.10
17.50	0.09	5	596.09	0.09
18.00	0.08	5	596.08	0.08
18.50	0.08	5	596.08	0.08
19.00	0.07	5	596.08	0.07
19.50	0.07	5	596.07	0.07
20.00	0.07	5	596.07	0.07
20.50	0.07	5	596.07	0.07
21.00	0.06	5	596.07	0.06
21.50	0.06	5	596.07	0.06
22.00	0.06	5	596.06	0.06
22.50	0.06	5	596.06	0.06
23.00	0.05	5	596.06	0.05
23.50	0.05	5	596.06	0.05
24.00	0.05	5	596.06	0.05

Summary for Pond 13P: SD-25, SD-26

Inflow Area = 1.863 ac, 27.41% Impervious, Inflow Depth > 4.95" for 25-Year event
Inflow = 1.83 cfs @ 12.46 hrs, Volume= 0.768 af
Outflow = 1.83 cfs @ 12.46 hrs, Volume= 0.768 af, Atten= 0%, Lag= 0.1 min
Primary = 1.83 cfs @ 12.46 hrs, Volume= 0.768 af
Routed to Pond 8P : O-1B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 581.08' @ 12.46 hrs Surf.Area= 0.001 ac Storage= 0.000 af

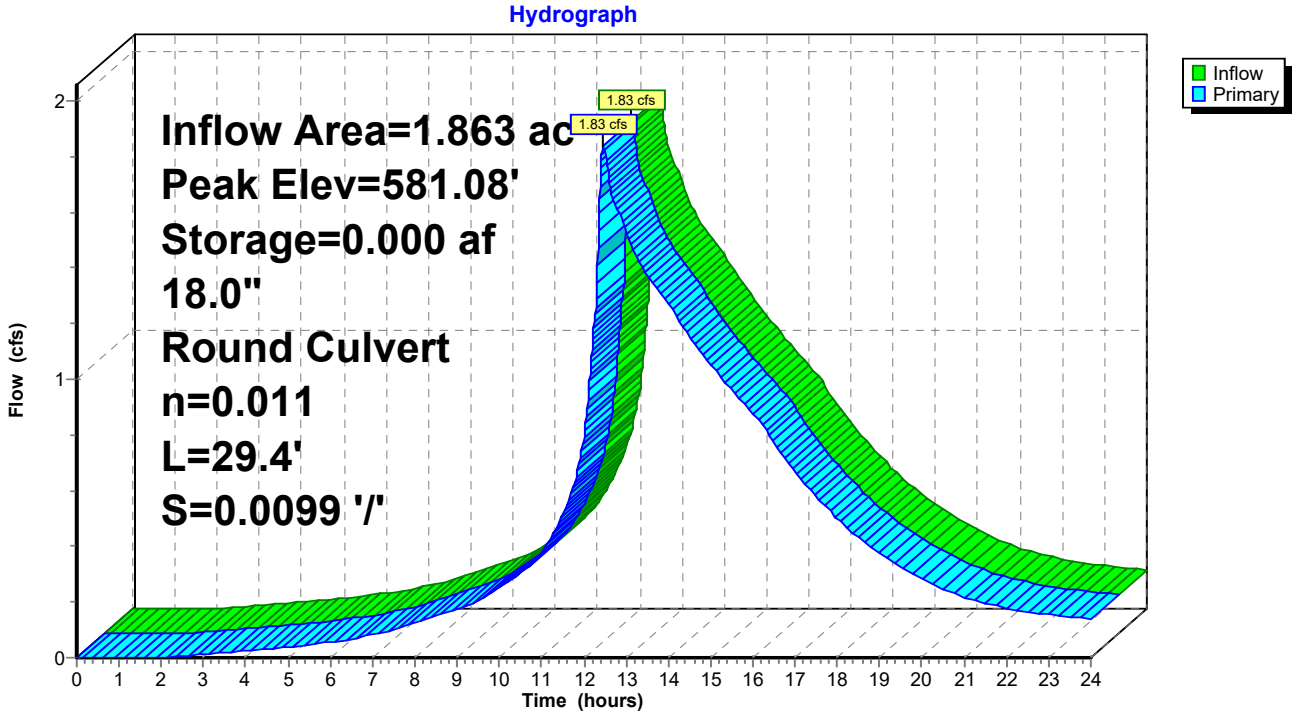
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (881.5 - 881.5)

Volume	Invert	Avail.Storage	Storage Description
#1	580.69'	0.007 af	**15.0" Round SD-25** L= 262.4' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.44'	**18.0" Round SD-26** L= 29.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 580.44' / 580.15' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=1.83 cfs @ 12.46 hrs HW=581.08' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-26** (Barrel Controls 1.83 cfs @ 3.73 fps)

Pond 13P: SD-25, SD-26



Hydrograph for Pond 13P: SD-25, SD-26

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	580.69	0.00
0.50	0.00	0.000	580.69	0.00
1.00	0.00	0.000	580.69	0.00
1.50	0.00	0.000	580.69	0.00
2.00	0.00	0.000	580.69	0.00
2.50	0.01	0.000	580.69	0.01
3.00	0.01	0.000	580.69	0.01
3.50	0.02	0.000	580.69	0.02
4.00	0.02	0.000	580.69	0.02
4.50	0.03	0.000	580.69	0.03
5.00	0.04	0.000	580.69	0.04
5.50	0.05	0.000	580.69	0.05
6.00	0.06	0.000	580.69	0.06
6.50	0.07	0.000	580.69	0.07
7.00	0.08	0.000	580.69	0.08
7.50	0.10	0.000	580.69	0.10
8.00	0.12	0.000	580.69	0.12
8.50	0.15	0.000	580.69	0.15
9.00	0.17	0.000	580.69	0.17
9.50	0.20	0.000	580.69	0.20
10.00	0.25	0.000	580.69	0.25
10.50	0.31	0.000	580.69	0.30
11.00	0.38	0.000	580.71	0.38
11.50	0.51	0.000	580.75	0.51
12.00	**0.79**	**0.000**	**580.84**	**0.79**
12.50	**1.82**	**0.000**	**581.08**	**1.82**
13.00	1.53	0.000	581.02	1.53
13.50	1.37	0.000	580.98	1.37
14.00	1.27	0.000	580.96	1.27
14.50	1.16	0.000	580.93	1.16
15.00	1.05	0.000	580.91	1.05
15.50	0.96	0.000	580.88	0.96
16.00	0.87	0.000	580.86	0.87
16.50	0.77	0.000	580.83	0.77
17.00	0.66	0.000	580.80	0.66
17.50	0.58	0.000	580.78	0.58
18.00	0.50	0.000	580.75	0.50
18.50	0.43	0.000	580.73	0.43
19.00	0.37	0.000	580.71	0.37
19.50	0.32	0.000	580.69	0.32
20.00	0.28	0.000	580.69	0.28
20.50	0.25	0.000	580.69	0.25
21.00	0.22	0.000	580.69	0.22
21.50	0.19	0.000	580.69	0.19
22.00	0.18	0.000	580.69	0.18
22.50	0.17	0.000	580.69	0.17
23.00	0.16	0.000	580.69	0.16
23.50	0.15	0.000	580.69	0.15
24.00	0.14	0.000	580.69	0.14

Summary for Pond 14P: SD-24

Inflow Area = 1.622 ac, 27.37% Impervious, Inflow Depth > 4.94" for 25-Year event
Inflow = 1.58 cfs @ 12.46 hrs, Volume= 0.668 af
Outflow = 1.58 cfs @ 12.46 hrs, Volume= 0.668 af, Atten= 0%, Lag= 0.1 min
Primary = 1.58 cfs @ 12.46 hrs, Volume= 0.668 af
Routed to Pond 13P : SD-25, SD-26

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 585.49' @ 12.46 hrs Surf.Area= 0.001 ac Storage= 0.000 af

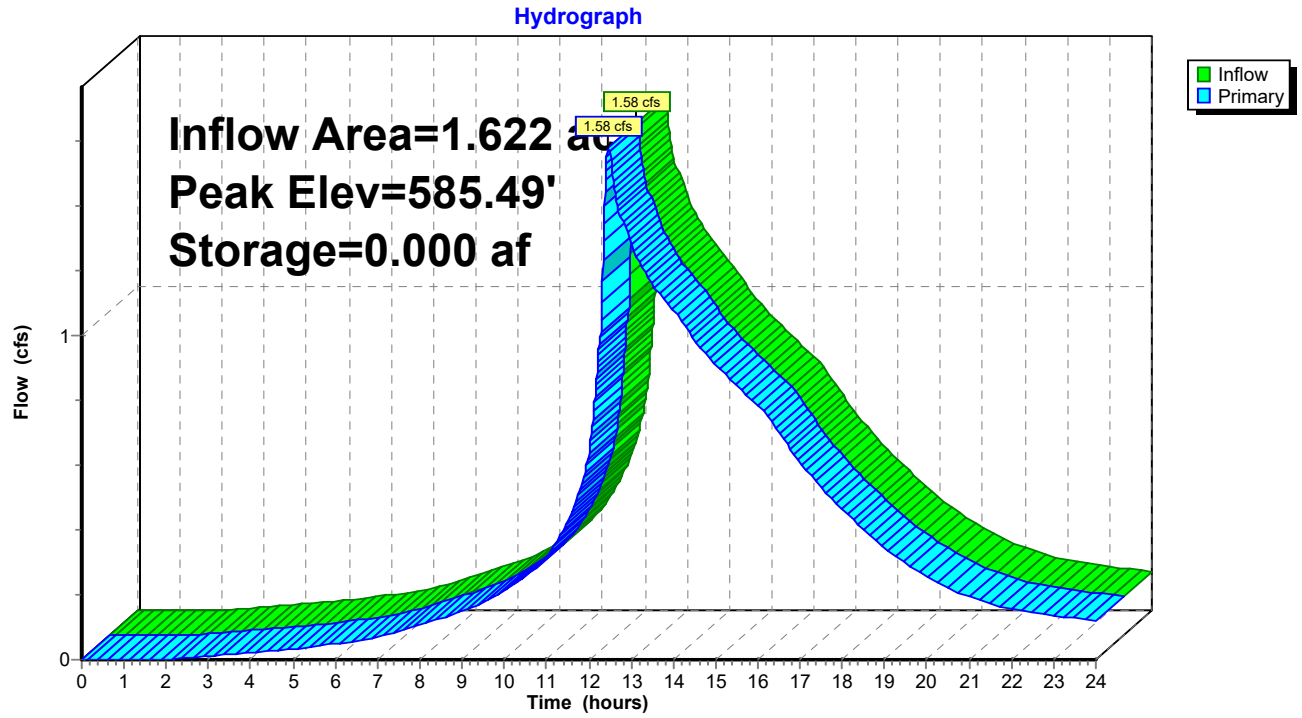
Plug-Flow detention time= 0.1 min calculated for 0.668 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (886.9 - 886.8)

Volume	Invert	Avail.Storage	Storage Description
#1	584.88'	0.003 af	**15.0" Round SD-24** L= 111.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	584.88'	**15.0" Vert. SD-24** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.58 cfs @ 12.46 hrs HW=585.49' TW=581.08' (Dynamic Tailwater)
1=SD-24 (Orifice Controls 1.58 cfs @ 2.66 fps)

Pond 14P: SD-24



Hydrograph for Pond 14P: SD-24

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	584.88	0.00
0.50	0.00	0.000	584.88	0.00
1.00	0.00	0.000	584.88	0.00
1.50	0.00	0.000	584.89	0.00
2.00	0.00	0.000	584.90	0.00
2.50	0.00	0.000	584.91	0.00
3.00	0.01	0.000	584.92	0.01
3.50	0.02	0.000	584.94	0.02
4.00	0.02	0.000	584.94	0.02
4.50	0.03	0.000	584.95	0.03
5.00	0.03	0.000	584.96	0.03
5.50	0.04	0.000	584.97	0.04
6.00	0.05	0.000	584.98	0.05
6.50	0.06	0.000	584.99	0.06
7.00	0.07	0.000	585.00	0.07
7.50	0.09	0.000	585.01	0.09
8.00	0.11	0.000	585.03	0.11
8.50	0.13	0.000	585.04	0.13
9.00	0.15	0.000	585.05	0.15
9.50	0.17	0.000	585.07	0.17
10.00	0.21	0.000	585.09	0.21
10.50	0.26	0.000	585.11	0.26
11.00	0.32	0.000	585.14	0.32
11.50	0.43	0.000	585.18	0.43
12.00	**0.64**	**0.000**	**585.25**	**0.64**
12.50	**1.56**	**0.000**	**585.49**	**1.56**
13.00	1.29	0.000	585.42	1.29
13.50	1.16	0.000	585.39	1.16
14.00	1.08	0.000	585.37	1.08
14.50	0.99	0.000	585.35	0.99
15.00	0.91	0.000	585.33	0.91
15.50	0.85	0.000	585.31	0.85
16.00	0.78	0.000	585.30	0.78
16.50	0.70	0.000	585.27	0.70
17.00	0.61	0.000	585.24	0.61
17.50	0.53	0.000	585.22	0.53
18.00	0.47	0.000	585.20	0.47
18.50	0.40	0.000	585.17	0.40
19.00	0.35	0.000	585.15	0.35
19.50	0.30	0.000	585.13	0.30
20.00	0.26	0.000	585.11	0.26
20.50	0.22	0.000	585.10	0.22
21.00	0.19	0.000	585.08	0.19
21.50	0.17	0.000	585.07	0.17
22.00	0.16	0.000	585.06	0.16
22.50	0.15	0.000	585.05	0.15
23.00	0.14	0.000	585.05	0.14
23.50	0.13	0.000	585.04	0.13
24.00	0.12	0.000	585.04	0.12

Summary for Pond 15P: SD-06, SD-07, SD-08

Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth > 3.56" for 25-Year event
Inflow = 2.84 cfs @ 12.18 hrs, Volume= 0.264 af
Outflow = 2.83 cfs @ 12.19 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.3 min
Primary = 2.83 cfs @ 12.19 hrs, Volume= 0.264 af
Routed to Pond 16P : SD-09, SD-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 594.72' @ 12.19 hrs Surf.Area= 107 sf Storage= 42 cf

Plug-Flow detention time= 0.3 min calculated for 0.264 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (839.7 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	602.69'	8 cf	**12.0" Round SD-06** L= 10.0' S= 0.0100 '/'
#2	595.52'	117 cf	**MH-04 (Prismatic)**Listed below (Recalc)
#3	595.50'	35 cf	**18.0" Round SD-07** L= 20.0' S= 0.0100 '/'
#4	593.92'	118 cf	**MH-05 (Prismatic)**Listed below (Recalc)
#5	593.93'	233 cf	**18.0" Round SD-08** L= 132.0' S= 0.0100 '/'
		511 cf	Total Available Storage

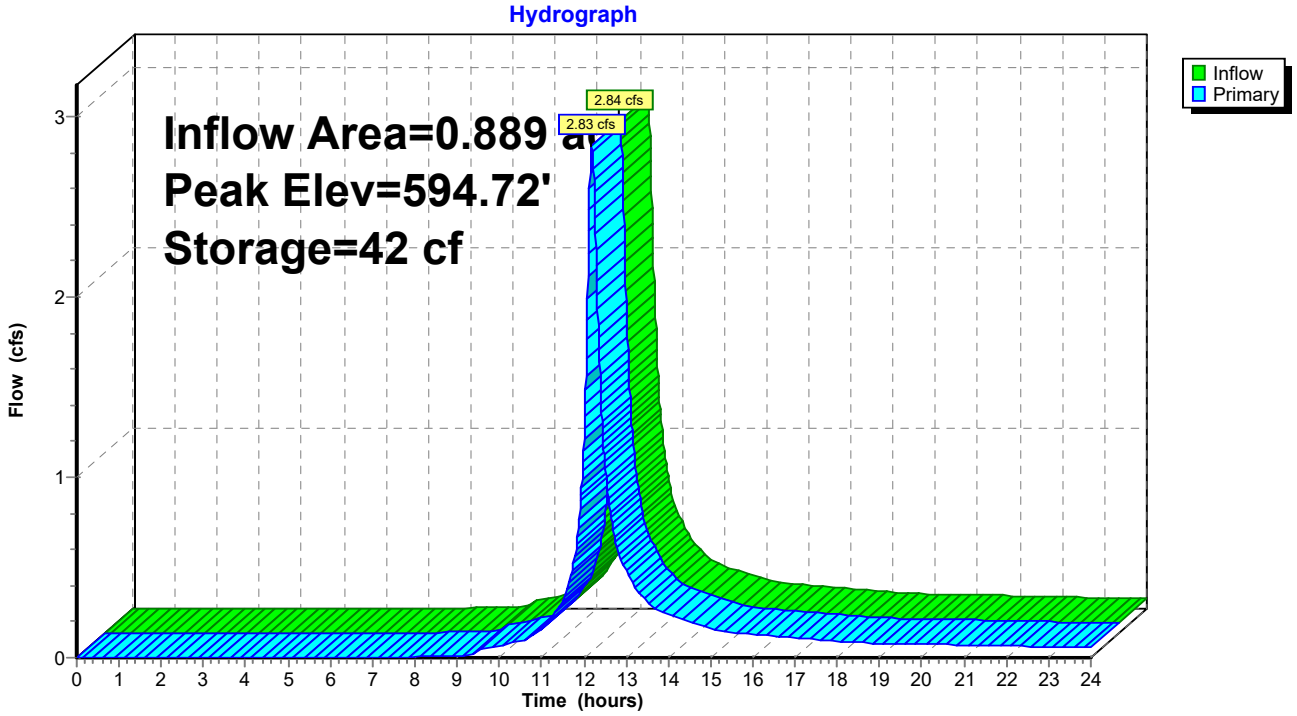
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
595.52	13	0	0
604.53	13	117	117

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.92	13	0	0
602.98	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	593.93'	**18.0" Vert. SD-08** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.83 cfs @ 12.19 hrs HW=594.72' TW=593.75' (Dynamic Tailwater)
↑—**1=SD-08** (Orifice Controls 2.83 cfs @ 3.02 fps)

Pond 15P: SD-06, SD-07, SD-08



Hydrograph for Pond 15P: SD-06, SD-07, SD-08

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	593.92	0.00
0.50	0.00	0	593.92	0.00
1.00	0.00	0	593.92	0.00
1.50	0.00	0	593.92	0.00
2.00	0.00	0	593.92	0.00
2.50	0.00	0	593.92	0.00
3.00	0.00	0	593.92	0.00
3.50	0.00	0	593.92	0.00
4.00	0.00	0	593.92	0.00
4.50	0.00	0	593.92	0.00
5.00	0.00	0	593.92	0.00
5.50	0.00	0	593.92	0.00
6.00	0.00	0	593.92	0.00
6.50	0.00	0	593.94	0.00
7.00	0.00	0	593.94	0.00
7.50	0.00	0	593.95	0.00
8.00	0.00	1	593.96	0.00
8.50	0.01	1	593.97	0.01
9.00	0.01	1	593.97	0.01
9.50	0.04	1	594.02	0.04
10.00	0.07	2	594.04	0.07
10.50	0.09	2	594.06	0.09
11.00	0.16	3	594.10	0.16
11.50	0.32	5	594.17	0.31
12.00	**1.24**	**17**	**594.42**	**1.21**
12.50	**1.05**	**15**	**594.39**	**1.06**
13.00	0.49	7	594.24	0.49
13.50	0.31	5	594.17	0.32
14.00	0.24	4	594.14	0.24
14.50	0.20	4	594.12	0.20
15.00	0.16	3	594.11	0.16
15.50	0.14	3	594.09	0.14
16.00	0.13	3	594.09	0.13
16.50	0.12	3	594.08	0.12
17.00	0.11	2	594.07	0.11
17.50	0.10	2	594.07	0.10
18.00	0.09	2	594.06	0.09
18.50	0.08	2	594.05	0.08
19.00	0.08	2	594.05	0.08
19.50	0.08	2	594.05	0.08
20.00	0.08	2	594.05	0.08
20.50	0.07	2	594.05	0.07
21.00	0.07	2	594.04	0.07
21.50	0.07	2	594.04	0.07
22.00	0.07	2	594.04	0.07
22.50	0.06	2	594.04	0.06
23.00	0.06	2	594.04	0.06
23.50	0.06	2	594.03	0.06
24.00	0.06	2	594.03	0.06

Summary for Pond 16P: SD-09, SD-10

Inflow Area = 1.125 ac, 0.00% Impervious, Inflow Depth > 3.55" for 25-Year event
Inflow = 3.71 cfs @ 12.17 hrs, Volume= 0.332 af
Outflow = 3.70 cfs @ 12.18 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.4 min
Primary = 3.70 cfs @ 12.18 hrs, Volume= 0.332 af
Routed to Pond 20P : SD-11, SD-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 593.75' @ 12.18 hrs Surf.Area= 136 sf Storage= 72 cf

Plug-Flow detention time= 0.7 min calculated for 0.332 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (839.8 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	600.62'	8 cf	**12.0" Round SD-09** L= 10.0' S= 0.0100 '/'
#2	592.83'	123 cf	**MH-06 (Prismatic)**Listed below (Recalc)
#3	592.83'	148 cf	**18.0" Round SD-10** L= 84.0' S= 0.0100 '/'
#4	592.58'	127 cf	**MH-07 (Prismatic)**Listed below (Recalc)
		407 cf	Total Available Storage

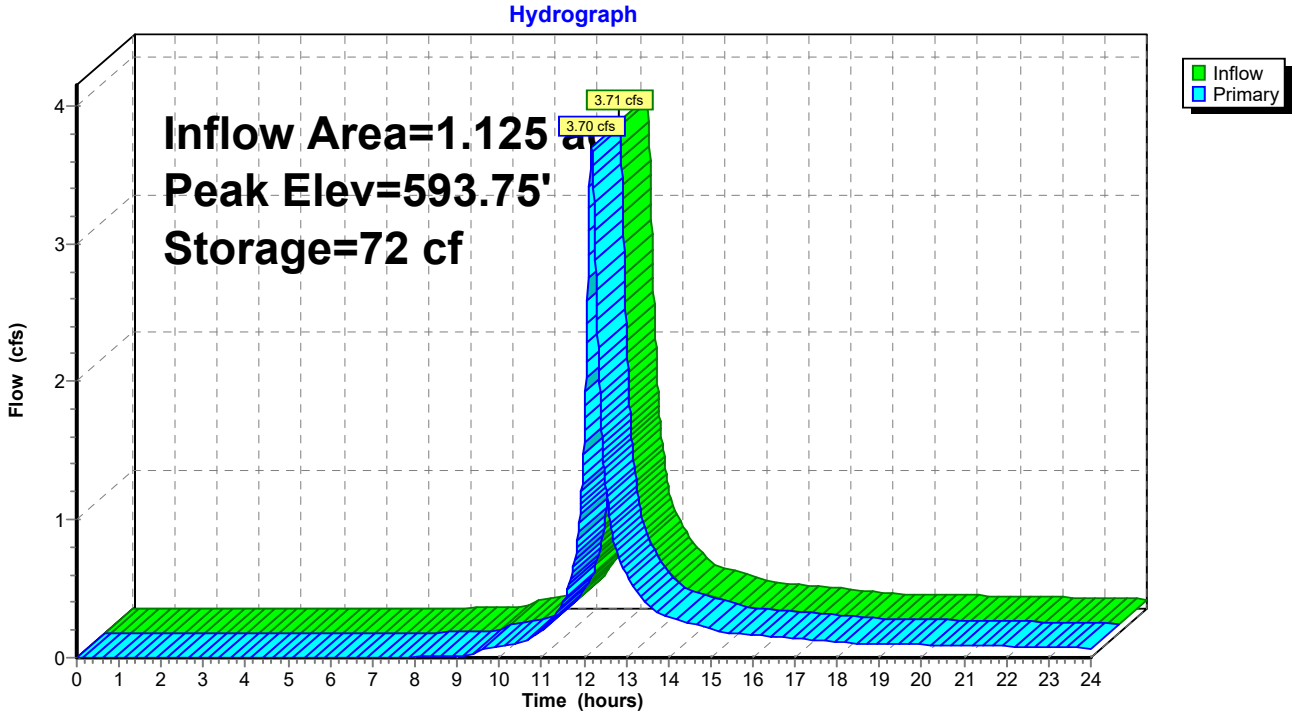
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.83	13	0	0
602.32	13	123	123

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.58	13	0	0
602.35	13	127	127

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**18.0" Vert. SD-10** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.70 cfs @ 12.18 hrs HW=593.75' TW=592.01' (Dynamic Tailwater)
↑—**1=SD-10** (Orifice Controls 3.70 cfs @ 3.26 fps)

Pond 16P: SD-09, SD-10



Hydrograph for Pond 16P: SD-09, SD-10

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	592.58	0.00
0.50	0.00	0	592.58	0.00
1.00	0.00	0	592.58	0.00
1.50	0.00	0	592.58	0.00
2.00	0.00	0	592.58	0.00
2.50	0.00	0	592.58	0.00
3.00	0.00	0	592.58	0.00
3.50	0.00	0	592.58	0.00
4.00	0.00	0	592.58	0.00
4.50	0.00	0	592.58	0.00
5.00	0.00	0	592.58	0.00
5.50	0.00	0	592.58	0.00
6.00	0.00	0	592.58	0.00
6.50	0.00	0	592.60	0.00
7.00	0.00	1	592.67	0.00
7.50	0.00	4	592.85	0.00
8.00	0.01	4	592.86	0.01
8.50	0.01	4	592.87	0.01
9.00	0.02	5	592.88	0.02
9.50	0.05	6	592.93	0.05
10.00	0.08	7	592.95	0.08
10.50	0.12	8	592.98	0.12
11.00	0.20	9	593.02	0.20
11.50	0.40	13	593.10	0.40
12.00	**1.60**	**32**	**593.39**	**1.56**
12.50	**1.29**	**28**	**593.34**	**1.30**
13.00	0.61	17	593.17	0.61
13.50	0.39	13	593.10	0.40
14.00	0.30	11	593.07	0.30
14.50	0.25	10	593.05	0.25
15.00	0.21	9	593.03	0.21
15.50	0.18	9	593.01	0.18
16.00	0.17	9	593.01	0.17
16.50	0.15	8	593.00	0.15
17.00	0.14	8	592.99	0.14
17.50	0.13	8	592.98	0.13
18.00	0.11	8	592.98	0.11
18.50	0.11	7	592.97	0.11
19.00	0.10	7	592.97	0.10
19.50	0.10	7	592.97	0.10
20.00	0.10	7	592.96	0.10
20.50	0.09	7	592.96	0.09
21.00	0.09	7	592.96	0.09
21.50	0.09	7	592.96	0.09
22.00	0.08	7	592.95	0.08
22.50	0.08	7	592.95	0.08
23.00	0.08	7	592.95	0.08
23.50	0.07	7	592.95	0.07
24.00	0.07	6	592.94	0.07

Summary for Pond 17P: SD-23

Inflow Area = 1.305 ac, 24.67% Impervious, Inflow Depth > 4.93" for 25-Year event
Inflow = 1.36 cfs @ 12.45 hrs, Volume= 0.536 af
Outflow = 1.36 cfs @ 12.46 hrs, Volume= 0.536 af, Atten= 0%, Lag= 0.1 min
Primary = 1.36 cfs @ 12.46 hrs, Volume= 0.536 af
Routed to Pond 14P : SD-24

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 587.36' @ 12.46 hrs Surf.Area= 0.001 ac Storage= 0.000 af

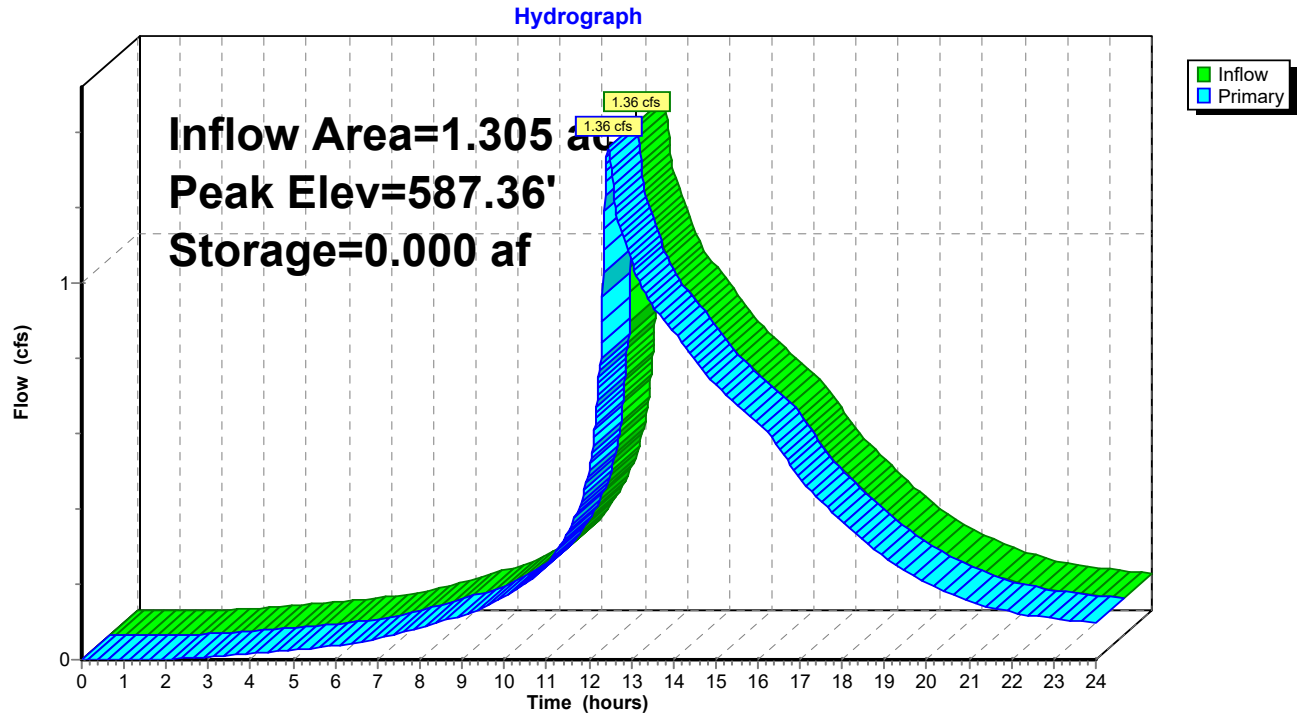
Plug-Flow detention time= 0.1 min calculated for 0.536 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (886.4 - 886.3)

Volume	Invert	Avail.Storage	Storage Description
#1	586.80'	0.003 af	**15.0" Round SD-23** L= 93.7' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	586.80'	**15.0" Vert. SD-23** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.36 cfs @ 12.46 hrs HW=587.36' TW=585.49' (Dynamic Tailwater)
↑—**1=SD-23** (Orifice Controls 1.36 cfs @ 2.55 fps)

Pond 17P: SD-23



Hydrograph for Pond 17P: SD-23

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	586.80	0.00
0.50	0.00	0.000	586.80	0.00
1.00	0.00	0.000	586.80	0.00
1.50	0.00	0.000	586.81	0.00
2.00	0.00	0.000	586.82	0.00
2.50	0.00	0.000	586.83	0.00
3.00	0.01	0.000	586.84	0.01
3.50	0.01	0.000	586.85	0.01
4.00	0.02	0.000	586.86	0.02
4.50	0.02	0.000	586.86	0.02
5.00	0.02	0.000	586.87	0.02
5.50	0.03	0.000	586.88	0.03
6.00	0.04	0.000	586.89	0.04
6.50	0.04	0.000	586.90	0.04
7.00	0.06	0.000	586.91	0.06
7.50	0.07	0.000	586.92	0.07
8.00	0.08	0.000	586.93	0.08
8.50	0.10	0.000	586.94	0.10
9.00	0.12	0.000	586.96	0.12
9.50	0.14	0.000	586.97	0.14
10.00	0.17	0.000	586.99	0.17
10.50	0.20	0.000	587.01	0.20
11.00	0.25	0.000	587.03	0.25
11.50	0.34	0.000	587.07	0.34
12.00	**0.50**	**0.000**	**587.13**	**0.50**
12.50	**1.33**	**0.000**	**587.36**	**1.34**
13.00	1.06	0.000	587.29	1.06
13.50	0.94	0.000	587.26	0.94
14.00	0.87	0.000	587.24	0.87
14.50	0.80	0.000	587.22	0.80
15.00	0.73	0.000	587.20	0.73
15.50	0.68	0.000	587.18	0.68
16.00	0.63	0.000	587.17	0.63
16.50	0.56	0.000	587.15	0.56
17.00	0.48	0.000	587.12	0.48
17.50	0.42	0.000	587.10	0.42
18.00	0.37	0.000	587.08	0.37
18.50	0.32	0.000	587.06	0.32
19.00	0.27	0.000	587.04	0.27
19.50	0.23	0.000	587.02	0.23
20.00	0.20	0.000	587.01	0.20
20.50	0.18	0.000	586.99	0.18
21.00	0.16	0.000	586.98	0.16
21.50	0.14	0.000	586.97	0.14
22.00	0.13	0.000	586.96	0.13
22.50	0.12	0.000	586.95	0.12
23.00	0.11	0.000	586.95	0.11
23.50	0.10	0.000	586.94	0.10
24.00	0.10	0.000	586.94	0.10

Summary for Pond 18P: SD-22

Inflow Area = 0.917 ac, 22.90% Impervious, Inflow Depth > 4.92" for 25-Year event
Inflow = 1.10 cfs @ 12.44 hrs, Volume= 0.376 af
Outflow = 1.10 cfs @ 12.44 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.1 min
Primary = 1.10 cfs @ 12.44 hrs, Volume= 0.376 af
Routed to Pond 17P : SD-23

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 588.99' @ 12.44 hrs Surf.Area= 0.001 ac Storage= 0.000 af

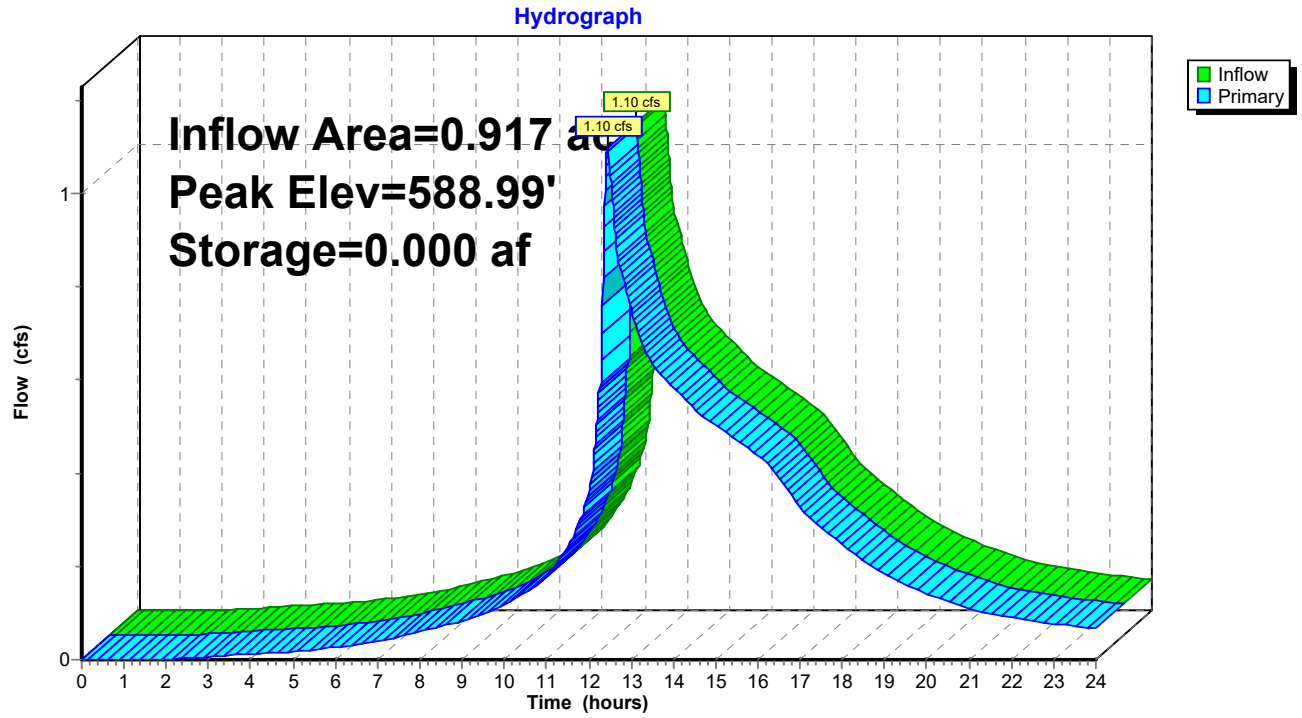
Plug-Flow detention time= 0.1 min calculated for 0.376 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (883.4 - 883.4)

Volume	Invert	Avail.Storage	Storage Description
#1	588.45'	0.002 af	**12.0" Round SD-22** L= 127.3' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.45'	**12.0" Vert. SD-22** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.10 cfs @ 12.44 hrs HW=588.99' TW=587.36' (Dynamic Tailwater)
↑—**1=SD-22** (Orifice Controls 1.10 cfs @ 2.51 fps)

Pond 18P: SD-22



Hydrograph for Pond 18P: SD-22

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	588.45	0.00
0.50	0.00	0.000	588.45	0.00
1.00	0.00	0.000	588.45	0.00
1.50	0.00	0.000	588.46	0.00
2.00	0.00	0.000	588.46	0.00
2.50	0.00	0.000	588.48	0.00
3.00	0.01	0.000	588.49	0.01
3.50	0.01	0.000	588.49	0.01
4.00	0.01	0.000	588.50	0.01
4.50	0.01	0.000	588.51	0.01
5.00	0.02	0.000	588.51	0.02
5.50	0.02	0.000	588.52	0.02
6.00	0.03	0.000	588.53	0.03
6.50	0.03	0.000	588.53	0.03
7.00	0.04	0.000	588.54	0.04
7.50	0.05	0.000	588.56	0.05
8.00	0.06	0.000	588.57	0.06
8.50	0.07	0.000	588.58	0.07
9.00	0.08	0.000	588.59	0.08
9.50	0.10	0.000	588.60	0.10
10.00	0.12	0.000	588.62	0.12
10.50	0.14	0.000	588.63	0.14
11.00	0.18	0.000	588.66	0.18
11.50	0.24	0.000	588.69	0.24
12.00	**0.36**	**0.000**	**588.75**	**0.36**
12.50	**1.06**	**0.000**	**588.98**	**1.06**
13.00	0.75	0.000	588.89	0.75
13.50	0.63	0.000	588.85	0.63
14.00	0.58	0.000	588.83	0.58
14.50	0.54	0.000	588.82	0.54
15.00	0.50	0.000	588.80	0.50
15.50	0.47	0.000	588.79	0.47
16.00	0.44	0.000	588.78	0.44
16.50	0.39	0.000	588.76	0.39
17.00	0.33	0.000	588.73	0.33
17.50	0.28	0.000	588.71	0.28
18.00	0.25	0.000	588.69	0.25
18.50	0.21	0.000	588.68	0.21
19.00	0.18	0.000	588.66	0.18
19.50	0.16	0.000	588.64	0.16
20.00	0.14	0.000	588.63	0.14
20.50	0.12	0.000	588.62	0.12
21.00	0.11	0.000	588.61	0.11
21.50	0.10	0.000	588.60	0.10
22.00	0.09	0.000	588.59	0.09
22.50	0.08	0.000	588.59	0.08
23.00	0.08	0.000	588.58	0.08
23.50	0.07	0.000	588.58	0.07
24.00	0.07	0.000	588.57	0.07

Summary for Pond 19P: SD-21

Inflow Area = 0.567 ac, 17.46% Impervious, Inflow Depth > 4.85" for 25-Year event
Inflow = 0.45 cfs @ 12.95 hrs, Volume= 0.229 af
Outflow = 0.45 cfs @ 12.95 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.1 min
Primary = 0.45 cfs @ 12.95 hrs, Volume= 0.229 af
Routed to Pond 18P : SD-22

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 590.94' @ 12.95 hrs Surf.Area= 0.000 ac Storage= 0.000 af

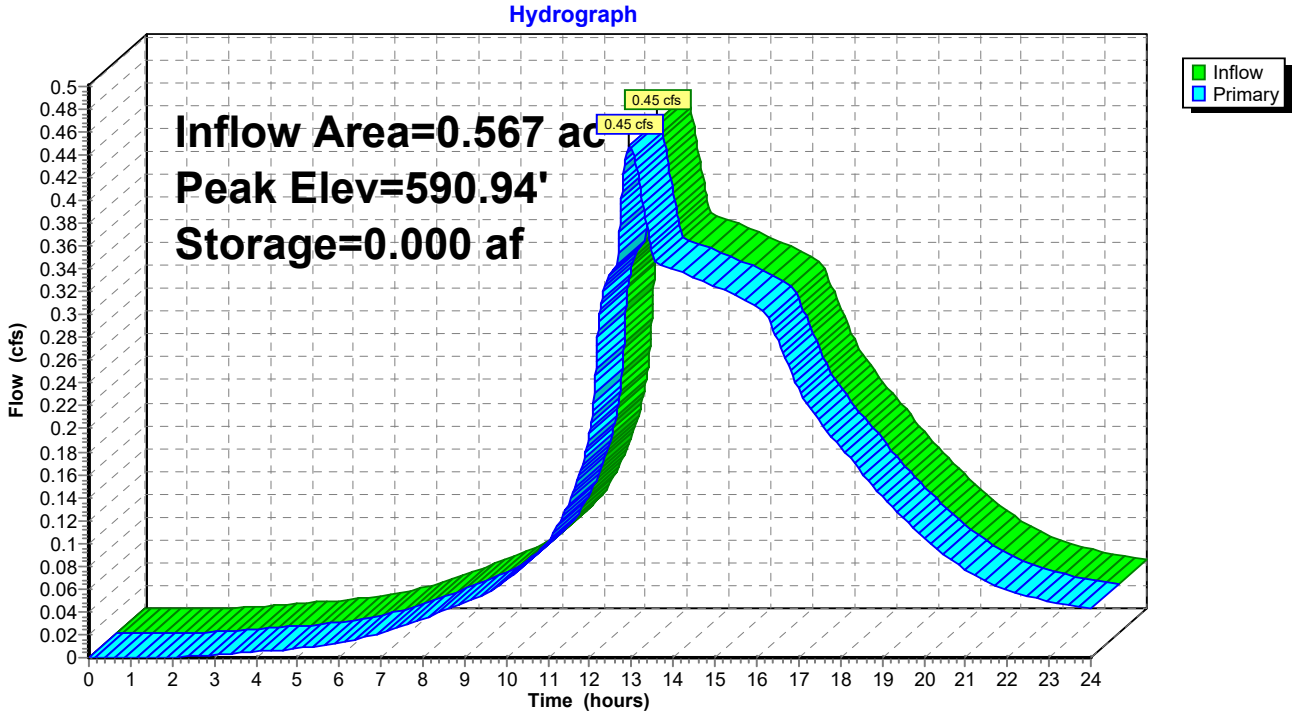
Plug-Flow detention time= 0.1 min calculated for 0.229 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (907.4 - 907.4)

Volume	Invert	Avail.Storage	Storage Description
#1	590.61'	0.001 af	**12.0" Round SD-21** L= 64.5' S= 0.0150 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	590.61'	**12.0" Vert. SD-21** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.45 cfs @ 12.95 hrs HW=590.94' TW=588.90' (Dynamic Tailwater)
↑—**1=SD-21** (Orifice Controls 0.45 cfs @ 1.96 fps)

Pond 19P: SD-21



Hydrograph for Pond 19P: SD-21

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	590.61	0.00
0.50	0.00	0.000	590.61	0.00
1.00	0.00	0.000	590.61	0.00
1.50	0.00	0.000	590.61	0.00
2.00	0.00	0.000	590.62	0.00
2.50	0.00	0.000	590.63	0.00
3.00	0.00	0.000	590.63	0.00
3.50	0.00	0.000	590.64	0.00
4.00	0.01	0.000	590.64	0.01
4.50	0.01	0.000	590.65	0.01
5.00	0.01	0.000	590.65	0.01
5.50	0.01	0.000	590.66	0.01
6.00	0.01	0.000	590.66	0.01
6.50	0.02	0.000	590.67	0.02
7.00	0.02	0.000	590.68	0.02
7.50	0.03	0.000	590.69	0.03
8.00	0.03	0.000	590.70	0.03
8.50	0.04	0.000	590.71	0.04
9.00	0.05	0.000	590.71	0.05
9.50	0.06	0.000	590.72	0.06
10.00	0.07	0.000	590.73	0.07
10.50	0.08	0.000	590.75	0.08
11.00	0.10	0.000	590.76	0.10
11.50	0.14	0.000	590.79	0.14
12.00	0.20	0.000	590.83	0.20
12.50	**0.34**	**0.000**	**590.90**	**0.34**
13.00	**0.44**	**0.000**	**590.94**	**0.45**
13.50	0.35	0.000	590.90	0.35
14.00	0.34	0.000	590.90	0.34
14.50	0.33	0.000	590.89	0.33
15.00	0.32	0.000	590.89	0.32
15.50	0.32	0.000	590.89	0.32
16.00	0.31	0.000	590.88	0.31
16.50	0.28	0.000	590.87	0.28
17.00	0.23	0.000	590.85	0.23
17.50	0.21	0.000	590.83	0.21
18.00	0.18	0.000	590.82	0.18
18.50	0.16	0.000	590.81	0.16
19.00	0.14	0.000	590.79	0.14
19.50	0.12	0.000	590.78	0.12
20.00	0.10	0.000	590.77	0.10
20.50	0.09	0.000	590.75	0.09
21.00	0.08	0.000	590.74	0.08
21.50	0.07	0.000	590.73	0.07
22.00	0.06	0.000	590.73	0.06
22.50	0.05	0.000	590.72	0.05
23.00	0.05	0.000	590.72	0.05
23.50	0.05	0.000	590.71	0.05
24.00	0.04	0.000	590.71	0.04

Summary for Pond 20P: SD-11, SD-12

Inflow Area = 1.308 ac, 0.00% Impervious, Inflow Depth > 3.55" for 25-Year event
Inflow = 4.33 cfs @ 12.18 hrs, Volume= 0.387 af
Outflow = 4.32 cfs @ 12.19 hrs, Volume= 0.386 af, Atten= 0%, Lag= 0.3 min
Primary = 4.32 cfs @ 12.19 hrs, Volume= 0.386 af
Routed to Pond 7P : O-1A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 592.01' @ 12.19 hrs Surf.Area= 139 sf Storage= 79 cf

Plug-Flow detention time= 0.8 min calculated for 0.386 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (839.9 - 839.4)

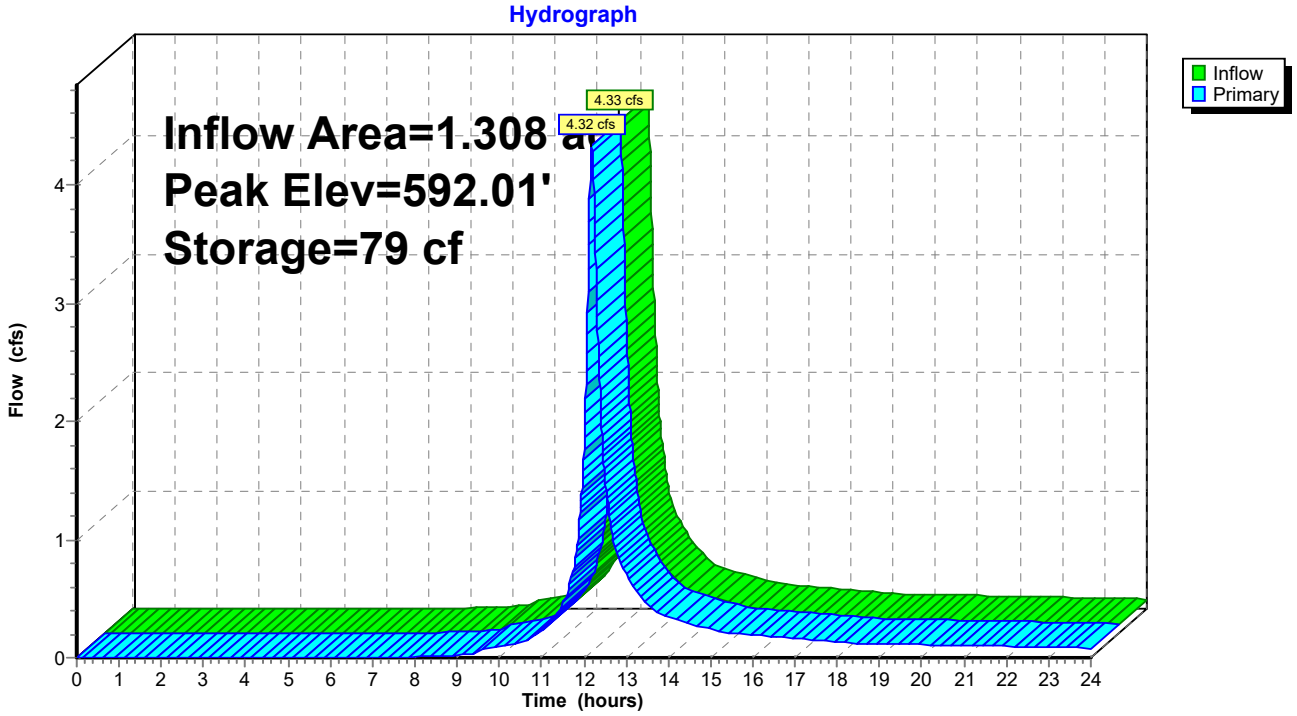
Volume	Invert	Avail.Storage	Storage Description
#1	600.17'	8 cf	**12.0" Round SD-11** L= 10.0' S= 0.0100 '/'
#2	591.00'	277 cf	**18.0" Round SD-12** L= 157.0' S= 0.0100 '/'
#3	590.26'	83 cf	**MH-08 (Existing) (Prismatic)** Listed below (Recalc)
		368 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.26	13	0	0
596.63	13	83	83

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**18.0" Vert. SD-12** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.32 cfs @ 12.19 hrs HW=592.01' TW=0.00' (Dynamic Tailwater)
↑—**1=SD-12** (Orifice Controls 4.32 cfs @ 3.42 fps)

Pond 20P: SD-11, SD-12



Hydrograph for Pond 20P: SD-11, SD-12

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	590.26	0.00
0.50	0.00	0	590.26	0.00
1.00	0.00	0	590.26	0.00
1.50	0.00	0	590.26	0.00
2.00	0.00	0	590.26	0.00
2.50	0.00	0	590.26	0.00
3.00	0.00	0	590.26	0.00
3.50	0.00	0	590.26	0.00
4.00	0.00	0	590.26	0.00
4.50	0.00	0	590.26	0.00
5.00	0.00	0	590.26	0.00
5.50	0.00	0	590.27	0.00
6.00	0.00	0	590.28	0.00
6.50	0.00	1	590.32	0.00
7.00	0.00	1	590.37	0.00
7.50	0.00	4	590.54	0.00
8.00	0.01	10	591.04	0.01
8.50	0.01	10	591.05	0.01
9.00	0.02	10	591.06	0.02
9.50	0.06	11	591.11	0.06
10.00	0.09	12	591.13	0.09
10.50	0.13	12	591.16	0.13
11.00	0.24	14	591.21	0.23
11.50	0.46	16	591.30	0.46
12.00	**1.81**	**34**	**591.61**	**1.77**
12.50	**1.51**	**31**	**591.56**	**1.52**
13.00	0.71	20	591.37	0.71
13.50	0.46	16	591.30	0.46
14.00	0.34	15	591.26	0.34
14.50	0.29	14	591.24	0.29
15.00	0.24	14	591.21	0.24
15.50	0.21	13	591.20	0.21
16.00	0.19	13	591.19	0.19
16.50	0.18	13	591.18	0.18
17.00	0.16	13	591.17	0.16
17.50	0.15	12	591.17	0.15
18.00	0.13	12	591.16	0.13
18.50	0.12	12	591.15	0.12
19.00	0.12	12	591.15	0.12
19.50	0.12	12	591.15	0.12
20.00	0.11	12	591.14	0.11
20.50	0.11	12	591.14	0.11
21.00	0.10	12	591.14	0.10
21.50	0.10	12	591.14	0.10
22.00	0.10	12	591.13	0.10
22.50	0.09	12	591.13	0.09
23.00	0.09	12	591.13	0.09
23.50	0.08	12	591.12	0.08
24.00	0.08	12	591.12	0.08

Summary for Pond 23P: SD-01, SD-02

Inflow Area = 0.656 ac, 0.00% Impervious, Inflow Depth > 3.52" for 25-Year event
Inflow = 2.09 cfs @ 12.22 hrs, Volume= 0.192 af
Outflow = 2.09 cfs @ 12.22 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.1 min
Primary = 2.09 cfs @ 12.22 hrs, Volume= 0.190 af
Routed to Pond 12P : SD-03, SD-04, SD-05

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.0100 hrs
Peak Elev= 597.85' @ 12.22 hrs Surf.Area= 17 sf Storage= 96 cf

Plug-Flow detention time= 9.3 min calculated for 0.190 af (99% of inflow)
Center-of-Mass det. time= 3.4 min (843.4 - 840.0)

Volume	Invert	Avail.Storage	Storage Description
#1	602.00'	5,354,109 cf	**Drainage Ditch Storage (Irregular)** Listed below (Recalc)
#2	591.82'	163 cf	**CB-1 (Prismatic)** Listed below (Recalc)
#3	598.38'	25 cf	**12.0" Round SD-01** L= 31.6' S= 0.0100 '/'
#4	598.06'	118 cf	**MH-01 (Prismatic)** Listed below (Recalc)
#5	597.81'	61 cf	**12.0" Round SD-02** L= 78.0' S= 0.0100 '/'
		5,354,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
602.00	696,960	16.0	0	0	696,960
603.00	12,422,876	130.1	5,354,109	5,354,109	698,289

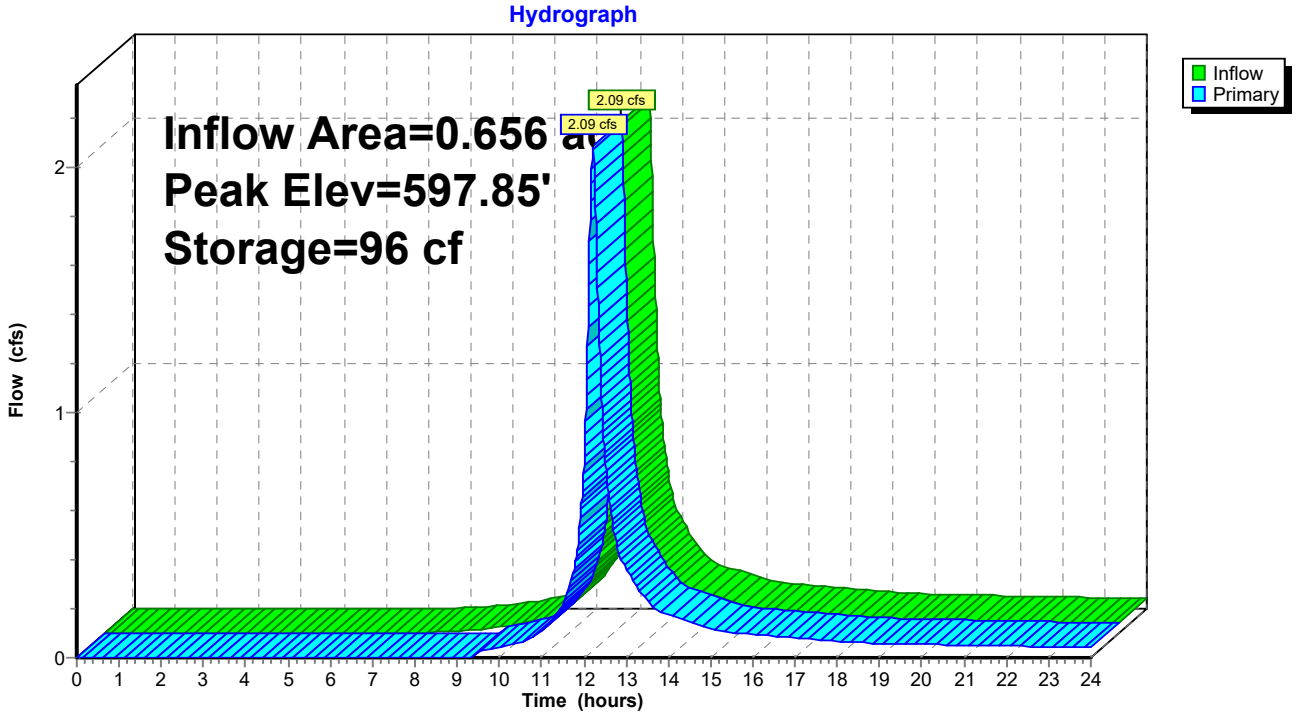
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.82	16	0	0
602.00	16	163	163

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
598.06	13	0	0
607.15	13	118	118

Device	Routing	Invert	Outlet Devices
#1	Primary	597.04'	**12.0" Vert. SD-02** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.08 cfs @ 12.22 hrs HW=597.85' TW=596.70' (Dynamic Tailwater)
↑—**1=SD-02** (Orifice Controls 2.08 cfs @ 3.06 fps)

Pond 23P: SD-01, SD-02

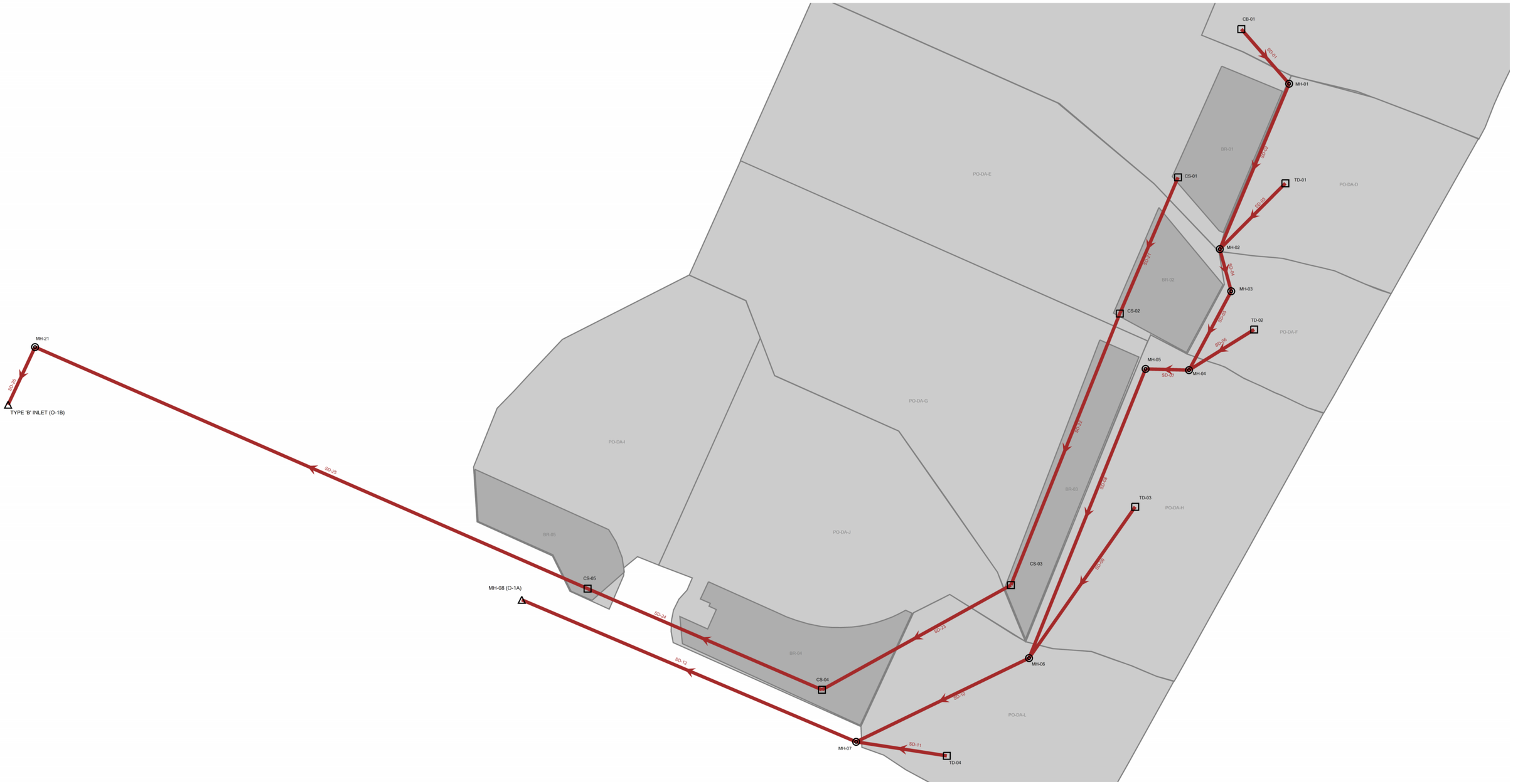


Hydrograph for Pond 23P: SD-01, SD-02

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	591.82	0.00
0.50	0.00	0	591.82	0.00
1.00	0.00	0	591.82	0.00
1.50	0.00	0	591.82	0.00
2.00	0.00	0	591.82	0.00
2.50	0.00	0	591.82	0.00
3.00	0.00	0	591.82	0.00
3.50	0.00	0	591.82	0.00
4.00	0.00	0	591.82	0.00
4.50	0.00	0	591.82	0.00
5.00	0.00	0	591.83	0.00
5.50	0.00	0	591.84	0.00
6.00	0.00	1	591.87	0.00
6.50	0.00	2	591.93	0.00
7.00	0.00	4	592.04	0.00
7.50	0.00	6	592.20	0.00
8.00	0.01	12	592.57	0.00
8.50	0.01	27	593.50	0.00
9.00	0.02	53	595.12	0.00
9.50	0.03	85	597.12	0.03
10.00	0.04	85	597.14	0.04
10.50	0.06	85	597.16	0.06
11.00	0.11	86	597.20	0.11
11.50	0.22	87	597.27	0.22
12.00	**0.79**	**91**	**597.49**	**0.78**
12.50	**0.81**	**91**	**597.50**	**0.82**
13.00	0.36	88	597.34	0.36
13.50	0.23	87	597.28	0.23
14.00	0.17	87	597.24	0.17
14.50	0.15	86	597.23	0.15
15.00	0.12	86	597.21	0.12
15.50	0.10	86	597.19	0.10
16.00	0.10	86	597.19	0.10
16.50	0.09	86	597.18	0.09
17.00	0.08	86	597.18	0.08
17.50	0.07	86	597.17	0.07
18.00	0.07	85	597.16	0.07
18.50	0.06	85	597.16	0.06
19.00	0.06	85	597.16	0.06
19.50	0.06	85	597.15	0.06
20.00	0.06	85	597.15	0.06
20.50	0.05	85	597.15	0.05
21.00	0.05	85	597.15	0.05
21.50	0.05	85	597.15	0.05
22.00	0.05	85	597.14	0.05
22.50	0.05	85	597.14	0.05
23.00	0.04	85	597.14	0.04
23.50	0.04	85	597.14	0.04
24.00	0.04	85	597.14	0.04

APPENDIX C - CIVILSTORM OUTPUT

Scenario: 25-Year



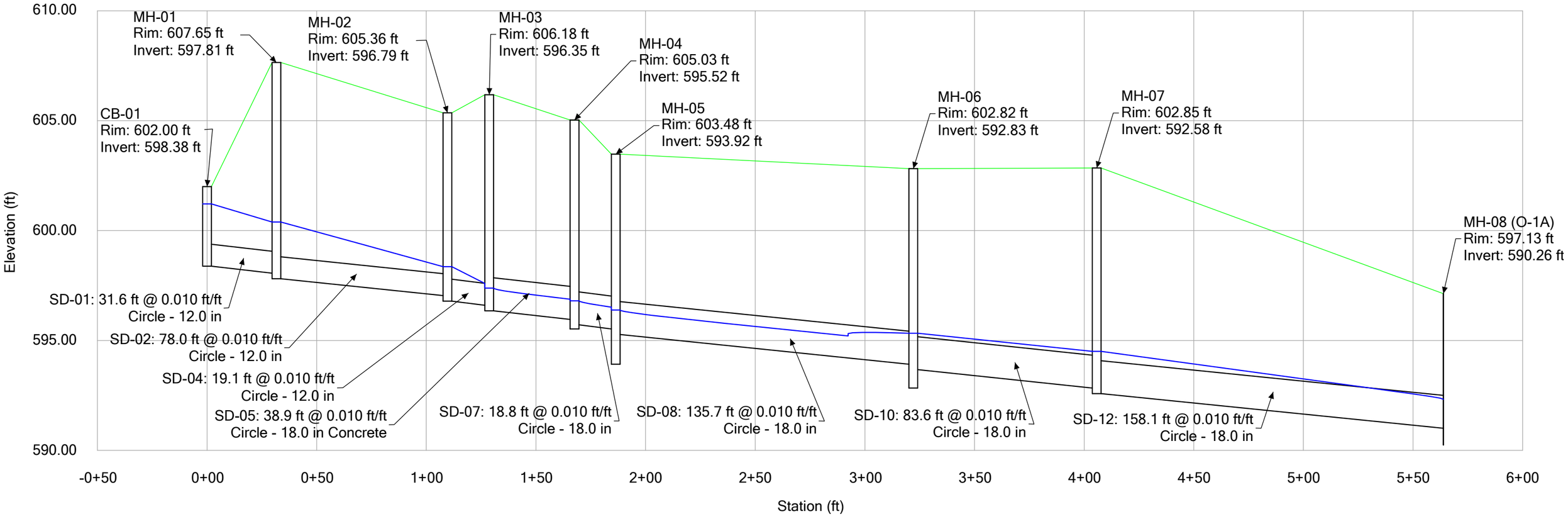
FlexTable: Conduit Table

25-YR STORM EVENT

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Elevation Ground (Start) (ft)	Invert (Start) (ft)	Elevation Ground (Stop) (ft)	Invert (Stop) (ft)	Manning's n	Slope (Calculated) (ft/ft)	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
SD-01	CB-01	MH-01	12.0	31.6	602.00	598.38	607.65	598.06	0.013	0.010	5.75	7.32	3.58	601.22	600.39
SD-02	MH-01	MH-02	12.0	78.0	607.65	597.81	605.36	597.04	0.013	0.010	5.75	7.32	3.54	600.39	598.36
SD-03	TD-01	MH-02	12.0	5.0	607.00	604.00	605.36	603.95	0.013	0.010	1.40	4.27	3.56	604.50	604.40
SD-04	MH-02	MH-03	12.0	19.1	605.36	596.79	606.18	596.60	0.013	0.010	7.15	9.10	3.56	598.36	597.58
SD-05	MH-03	MH-04	18.0	38.9	606.18	596.35	605.03	595.96	0.013	0.010	7.15	6.40	10.52	597.39	596.87
SD-06	TD-02	MH-04	12.0	5.0	606.25	603.30	605.03	603.25	0.013	0.010	0.83	3.70	3.56	603.68	603.59
SD-07	MH-04	MH-05	18.0	18.8	605.03	595.71	603.48	595.52	0.013	0.010	7.98	6.57	10.56	596.80	596.51
SD-08	MH-05	MH-06	18.0	135.7	603.48	595.27	602.82	593.92	0.013	0.010	8.22	6.56	10.48	596.38	595.33
SD-09	TD-03	MH-06	12.0	5.0	603.81	601.22	602.82	601.17	0.013	0.010	2.20	4.77	3.56	601.85	601.76
SD-10	MH-06	MH-07	18.0	83.6	602.82	593.67	602.85	592.83	0.013	0.010	10.42	5.90	10.53	595.33	594.51
SD-11	TD-04	MH-07	12.0	5.0	602.77	599.88	602.85	599.83	0.013	0.010	1.75	4.52	3.56	600.44	600.34
SD-12	MH-07	MH-08 (O-1A)	18.0	158.1	602.85	592.58	597.13	591.00	0.013	0.010	12.17	6.89	10.50	594.51	592.32
SD-21	CS-01	CS-02	12.0	64.5	602.40	591.58	601.40	590.61	0.013	0.015	5.07	6.46	4.37	602.28	600.97
SD-22	CS-02	CS-03	12.0	127.3	601.40	590.36	601.15	588.45	0.013	0.015	7.85	9.99	4.36	600.97	594.79
SD-23	CS-03	CS-04	15.0	93.7	601.15	588.20	599.65	586.80	0.013	0.015	9.18	7.48	7.89	594.79	592.90
SD-24	CS-04	CS-05	15.0	111.3	599.65	586.55	599.65	584.88	0.013	0.015	10.20	8.31	7.91	592.90	590.13
SD-25	CS-05	MH-21	15.0	262.4	599.65	584.63	587.55	580.69	0.013	0.015	11.42	9.31	7.92	590.13	581.90
SD-26	MH-21	TYPE 'B' INLET (O-1B)	18.0	29.4	587.55	580.44	586.03	580.00	0.013	0.015	11.42	8.21	12.84	581.73	581.13

Profile Report
Engineering Profile - CB-01 to MH-08 (O-1A) (2024-05-02_West Orange.stsw)

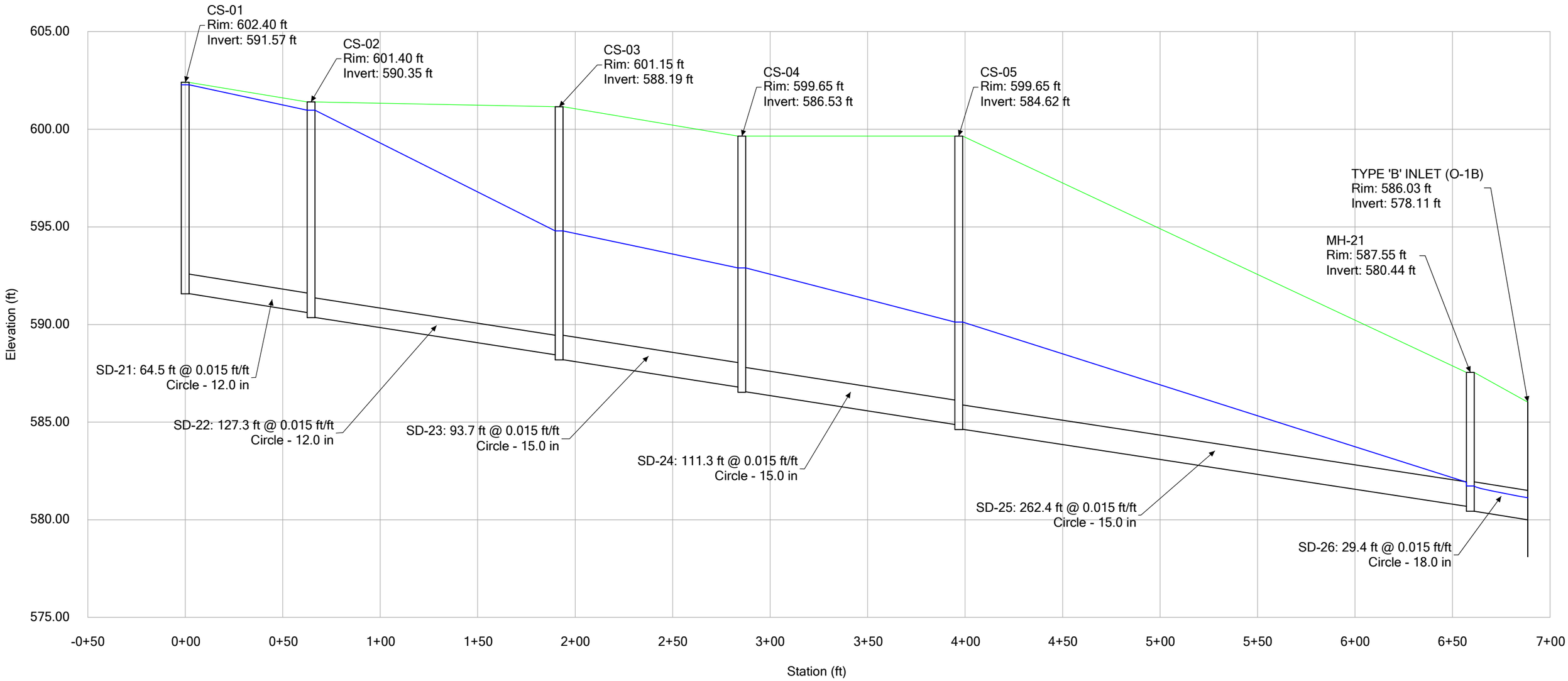
25-YR STORM EVENT



Profile Report

Engineering Profile - CS-01 to TYPE 'B' INLET (O-1B) (2024-05-02_West Orange.stsw)

25-YR STORM EVENT



APPENDIX D - STORMWATER MAINTENANCE PLAN & FIELD MANUAL

Stormwater Management Measures
Maintenance Plan & Field Manuals

Development Name: PSE&G West Orange Switching Station

Address: 325 Mount Pleasant Avenue

Block(s) / Lot(s): Block 155, Lot 26.01

City, County: West Orange Township, Essex County

Party Responsible for Maintenance:

Public Service Electricity & Gas

Address: _____

Contact Person(s):_____ Phone:_____

Prepared by: Michael Blake, PE Date: April 30, 2024

This plan is recorded in

Deed Book # _____ Page # ____ with Essex County Clerk on Date _____

Last Revised on 4 / 30 / 2024

NOTE

This Maintenance Plan is intended to be editable and adjustable in accordance with the design of stormwater management measures, the site conditions, and the special needs of responsible party. The Engineer should supplement information and best management practice to assist the responsible party to perform maintenance.

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Basic Design Information ..... **Error! Bookmark not defined.**
Visual Aid for Pervious Paving System Inspection ..... **Error! Bookmark not defined.**
Reference Documents ..... **Error! Bookmark not defined.**
Inspection Checklist / Maintenance Actions ..... **Error! Bookmark not defined.**
Preventative Maintenance Record ..... **Error! Bookmark not defined.**
Corrective Maintenance Record ..... **Error! Bookmark not defined.**
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Part II- Field Manuals and Maintenance Records

Field Manual for Small-Scale Bioretention Ponds with Underdrains

Maintenance Logs and Inspection Records

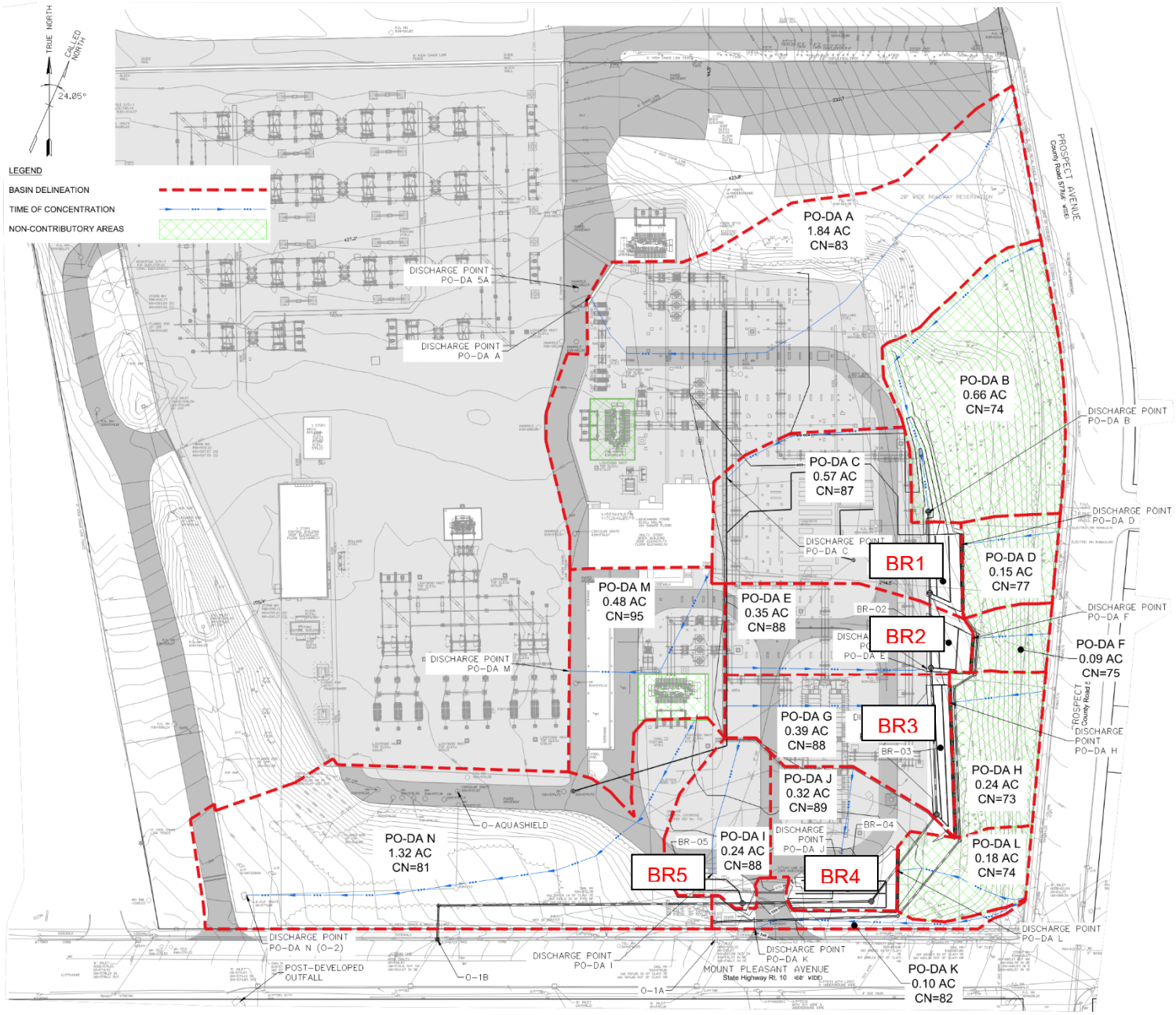
Part I- Maintenance Plan

List of Stormwater Management Measures

The stormwater management measures incorporated into this development are listed below. The corresponding Field Manuals for the stormwater management measures are located in Part II of the Maintenance Plan.

Type of Stormwater Management Measure	BMP No.	Location Description	State Plane Coordinates / Lat., Long.
Bioretention System with Underdrains	BR-01	Northeast Area	Northing: XXXXXX.11 Easting: XXXXXX.23
Bioretention System with Underdrains	BR-02	Middle east Area	Northing: XXXXXX.11 Easting: XXXXXX.23
Bioretention System with Underdrains	BR-03	Southeast Area	Northing: XXXXXX.11 Easting: XXXXXX.23
Bioretention System with Underdrains	BR-04	South Area	Northing: XXXXXX.11 Easting: XXXXXX.23
Bioretention System with Underdrains	BR-05	Southwest Area	Northing: XXXXXX.11 Easting: XXXXXX.23

Location Map



No.	Type of Stormwater Management Measure
BR-01	Bioretention System with Underdrains (Northeast Area)
BR-02	Bioretention System with Underdrains (Middle East Area)
BR-03	Bioretention System with Underdrains (Southeast Area)
BR-04	Bioretention System with Underdrains (South Area)
BR-05	Bioretention System with Underdrains (Southwest Area)

Description of Stormwater Management Measures

Small Scale Bioretention System with Underdrains

Design Storms including Adjustment Factors for Current and Future Events:

Design Purposes:

- Water Quality 1.25 inches in 2 hours
- 2-year storm - 3.42 inches
- 10-year storm - 5.20 inches
- 100-year storm – 8.71 inches
- Current 2-year storm – 3.45 inches
- Current 10-year storm - 5.36 inches
- Current 100-year storm – 9.23 inches
- Future 2-year storm – 4.07 inches
- Future 10-year storm – 6.34 inches
- Future 100-year storm - 11.58 inches

Preventative and Corrective Maintenance Action Plan

As per N.J.A.C. 7:8-5.8(b) & (e), preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including, but not limited to, repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

The maintenance of access points to the stormwater management measures shall be in accordance with the following:

- all components of the stormwater management measures must be readily accessible for inspection and maintenance;
- trees, shrubs, and underbrush must be pruned or trimmed as necessary to maintain access to the stormwater management measures via provided gravel paths outside of the station perimeter walls to allow for the inspection and control of mosquito breeding.

Preventative Maintenance Actions

The frequency of the preventative maintenance actions listed here is adopted from Chapter 9, BMP Manual of Structural Stormwater Management Measures. Design engineer and responsible party should adjust the frequency of preventative maintenance actions according to the situations of the stormwater management measures in the development.

Frequency	Preventative Maintenance Actions	Stormwater Measures/ No.
Quarterly	Sediment, trash and debris removal, inspecting of manholes and Outlet Control Structures and associated grates/screens/ trash racks.	Bioretention System with Underdrains
Semi-Annually	Vegetation quality inspection (one per growing and one per non-growing seasons); Inspection of planting bed (twice a year);	Bioretention System with Underdrains
Annual	Basic Structural Inspection; Cleaning and verifying Infiltration Rate; Vegetation erosion, scour and unwanted growth inspection	Bioretention System with Underdrains
Unscheduled	Debris and sediment inspections after every 1" or greater rain event; trimming.	Bioretention System with Underdrains

Corrective Maintenance Actions

Depending on many factors, such as the performance of preventative maintenance actions, weather, or unexpected incidents, corrective maintenance requirements may not be precisely anticipated; however, a list of potential corrective maintenance actions is shown below.

Potential Corrective Maintenance Actions	Stormwater Management Measures/No.
Example of corrective maintenance tasks - Repair/replacement of damaged PVC items - CCTV for inspection of piping - Backflush of the underdrain - Sediment and trash removal in filtration media - Removal of any blockages or debris build-up in the bioretention basin	Bioretention System with Underdrains
Example of corrective maintenance tasks - Evaluate storage bed components & groundwater levels - Removal of mud or sediment from filtration media - Removal of unwanted vegetation	Bioretention System with Underdrains

Inspection and Logs of All Preventative and Corrective Maintenance

As per N.J.A.C. 7:8-5.8(f), the person responsible for maintenance shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

As per NJDEP BMP Manual Ch. 8 (Feb, 2004), a maintenance plan shall include a schedule of regular inspections and tasks, and detailed logs of all preventative and corrective maintenance performed on the stormwater management measure, including all maintenance-related work orders. The person with maintenance responsibility must retain and, upon request, make available the maintenance plan and associated logs and other records for review by a public entity with administrative, health, environmental, or safety authority over the site.

Inspection Checklists in the Field Manual for the stormwater management measures on this site include:

- Field Manual for Small-Scale Bioretention Systems with Underdrains

The logs of all inspections, and both preventative and corrective maintenance performed should be attached in the "**Maintenance Logs and Inspection Records**" section. See Part II of the Maintenance Plan

Maintenance Personnel, Equipment, Tools, and Supplies

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include equipment, tools, and supplies necessary to perform the various preventative and corrective maintenance tasks specified in the plan. Sources of specialized, proprietary, and nonstandard equipment, tools, and supplies should also be provided.

Maintenance Personnel/Equipment/Tools/Supplies

Personnel/Equipment/Tools Name	Quantity
General maintenance crew	1
Debris removal tools	2
Crow bar	2
Tape measure	1

Specialized, proprietary or nonstandard equipment, tools and supplies, if applicable

Name of the specialized, proprietary or nonstandard equipment, tools and supplies	Source
JetVac truck (w/ high pressure nozzle)	DigVac Rentals
Vacuum Sweeper	DigVac Rentals
Infiltration Testing	?????

*For instructions on how to perform maintenance and cleaning on the underground detention basin see the respective Maintenance Guide in the Documents section of the report.

Cost Estimate

Cost Overview

Cost Type	Cost	Details
General cost for quarterly maintenance (sediment, trash, and debris removal)	$1,045	Table A
General cost for annual maintenance	$2,255	Table B
General cost for unscheduled maintenance	$500	Table C
Total cost	**$3,800**	

Table A: General cost for quarterly maintenance

Cost Type	Required Quantity	Unit Price	Cost
Personnel			
Crew-Site Cleanup	1	$500	$500
Equipment			
Truck	1	$200	$200
Services			
Disposal	1	$250	$250
Subtotal	$950		
Overhead	$95		
Total Cost	**$1,045**		

Table B: General cost – annual maintenance

Cost Type	Required Quantity	Unit Price	Cost
Personnel			
Crew-Site Cleanup	1	$500	$500
Crew-Inspection	1	$200	$200
Equipment			
Vacuum Truck	1	$700	$700
CCTV Camera	1	$400	$400
Services			
Disposal	1	$250	$250
Infiltration Testing	1	$500	$500
Subtotal	$2,550		
Overhead	$205		
Total Cost	**$2,755**		

Table C: General cost – unscheduled maintenance in a year

Cost Type	Required Quantity	Unit Price	Cost
Personnel			
Crew	1	$100	$500
Visits	5		
Subtotal	$500		
Overhead	N/A		
Total Cost	**$500**		

Training Plan and Records

As per NJDEP BMP Manual Ch. 8 (February 2004), maintenance training begins with a basic description of the purpose and function of the overall stormwater management measure and its major components. Such understanding will enable maintenance personnel to provide more effective component maintenance and more readily detect maintenance-related problems. Depending on the size, character, location, and components of each stormwater management measure, maintenance personnel may also require training in specialized inspection and maintenance tasks and/or the operation and care of specialized maintenance equipment. Training should also be provided in the need for and use of all required safety equipment and procedures.

I. Training Plan

Types of Training

- Mandatory Stormwater Management Basic Training and Field Manual Usage Training for new maintenance crews
- Occupational Safety Training

Content of Training

- **Stormwater Management Basic Training**
    - Purposes and Functions of BMPs
        - NJDEP Stormwater BMP Manual, Chapter Nine: Structural Stormwater Management Measures

More training information is available at NJ Stormwater.org (http://www.nj.gov/dep/stormwater/training.htm)

- Field Manual Usage Training
- Equipment and Tools Operation Training
- Occupational Safety Training

II. Training Records

Class Title:

Date:

Contact Name:

	Name(first, last) (Print)	Signature	Employee ID
1			
2			
3			
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25			

Annual Evaluation of the Effectiveness of the Plan

As per N.J.A.C. 7:8-5.8(g), the person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

The responsible party should evaluate the effectiveness of the maintenance plan by comparing the maintenance plan with the actual performance of the maintenance. The items to evaluate may include, but not limited to,

- Whether the inspections have been performed as scheduled;
- Whether the preventive maintenance has been performed as scheduled;
- Whether the frequency of preventative maintenance needs to increase or decrease;
- Whether the planned resources were enough to perform the maintenance;
- Whether the repairs were completed on time;
- Whether the actual cost was consistent with the estimated cost;
- Whether the inspection, maintenance, and repair records have been kept.

If actual performance of those items has been deviated from the maintenance plan, the responsible party should find the causes and implement solutions in a revised maintenance plan.

Annual Evaluation Records

Evaluator(s)	Date of Evaluation	Decision
		__Maintain current version OR __Revise current version Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)
		__Maintain current version OR __Revise current version Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)
		__Maintain current version OR __Revise current version Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)

Evaluator(s)	Date of Evaluation	Decision
		__Maintain current version OR __Revise current version Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)
		__Maintain current version OR __Revise current version Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)
		__Maintain current version OR __Revise current version Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)

Documents

Devices/Tools/Equipment Operation and Maintenance Manual and Warranties

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), maintenance, repair, and replacement instructions for specialized, proprietary, and nonstandard equipment, tools, supplies, manufacturers' product instructions, and user manuals should be included in this Maintenance Plan.

Part II- Field Manuals

Attachment of Field Manuals
for Stormwater Management Measures on this Site

As per N.J.A.C. 7:8-5.8(b)&(e), preventative and corrective maintenance shall be performed to maintain the function of stormwater management measures, including repair or replacement of the structure; removal of sediment, debris or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; repair or replacement of non-vegetated linings, and removal of rodent/wildlife and repair/restoration to damaged affected areas caused by them.

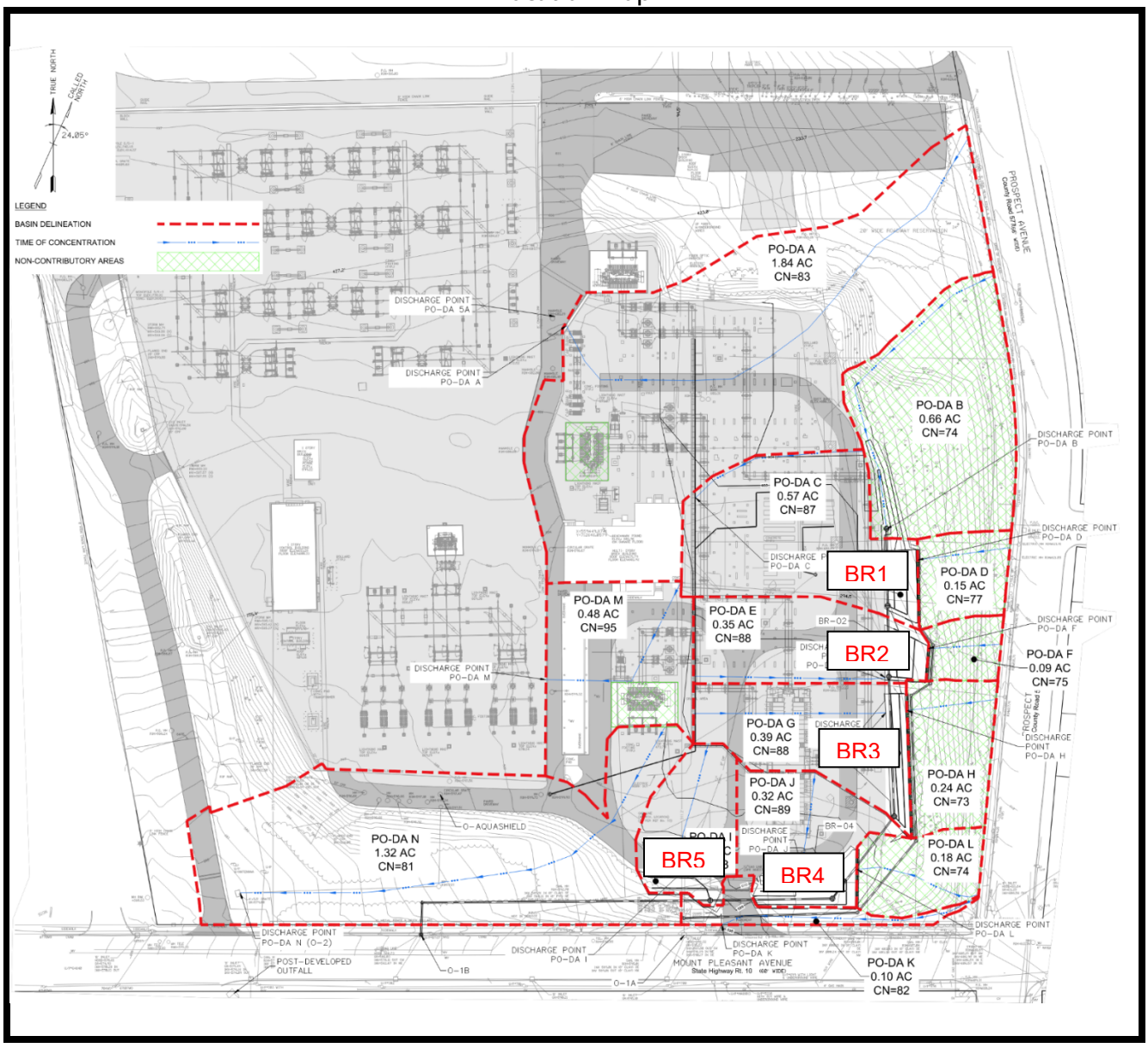
Each Field Manual attached to this Maintenance Plan is a separate document pertaining to one specific stormwater management measure and should be used by inspections and maintenance crews in order to carry out the maintenance work required by N.J.A.C. 7:8-5.8(e). Design engineers should prepare the field manuals in accordance with the design of each measure and the specific requirements of the site. See the sample field manuals for further guidance.

Bioretention System
Basin #BR1, BR2, BR3, BR4 and BR5 on the Location Map

Development Name: PSE&G West Orange Switching Station

Township, County: West Orange Township, Essex County

Location Map



NOTE

This Field Manual is intended to be editable and adjustable in accordance with the design of stormwater management measures, the site conditions, and the special needs of responsible party. The Engineer should supplement information and best management practice to assist the responsible party to perform maintenance.

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Bioretention System Overview

Functionality

Bioretention systems are used to remove a wide range of pollutants, such as suspended solids, nutrients, metals, hydrocarbons, and bacteria from stormwater runoff. They can also be used to reduce peak runoff rates and increase stormwater infiltration when designed as a multi-stage, multi-function facility.

A bioretention system can be configured as either a bioretention basin or a longer, narrower bioretention swale. In general, a bioretention basin has a flat bottom while a bioretention swale may have sloping bottom. Runoff storage depths above the soil bed surface are typically shallow. The TSS removal rate for bioretention systems is 80 or 90 percent, depending upon the thickness of the soil planting bed and the type of vegetation grown in the bed.

Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.

Type of BMP – Dry Basin / Infiltration

A bioretention system is a type of **dry** basin. Dry basins must fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. The design drain time shall be closely monitored to ensure that potential failure is recognized early.

A bioretention system with infiltration can also be designed for extended detention, in which case it will attenuate peak flows from storms larger than the Water Quality Design Storm.

Basic Design Information

Northeast Bioretention (BR-01)

Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is 30.00 hours.
3. Due to the water-tight retaining walled and clay lined bottom basin the bioretention is located inside, along with underdrains in the gravel layer, the seasonal high-water is not required to have a foot of separation.
4. Due to the water-tight retaining walled and clay lined bottom basin the bioretention is located inside, along with underdrains in the gravel layer, the field soil permeability is not a factor in the design.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.4 inches in 24 hours	5.2 inches In 24 hours	8.7 inches In 24 hours
Runoff Volume (ac-ft)	0.011 ac-ft	0.043 ac-ft	0.056 ac-ft	0.089 ac-ft
Peak Flow Rate (cfs)	0.12 cfs	0.37 cfs	1.52 cfs	2.86 cfs
Water Surface Elevation (feet)	597.68	599.60	600.37	602.39

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. _____N/A_____ feet (if applicable).

Basin Configuration Targets

1. Pretreatment is not provided. A concrete outlet structure is used.
2. Planting Soil Bed
    - The depth of the soil planting bed is 3.0 feet.

- Mixture of the planting soil consists of 85-95% of sand, with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3% to 7%. (775423r0)
- The pH of the planting soil should be in the range of 5.5 and 6.5.
- Filter fabric is not placed along the sides of the soil planting bed.
- The system is designed with a planting soil permeability rate of 1 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (MM) / (DD) / (YYYY)).
-

3. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	Orifice	2.5″ DIA	162.50
Orifice	Orifice	12″ DIA	164.50
Outlet Pipe	Outlet Pipe	18″ DIA	162.50
(Other)			

4. Vegetation
   - The vegetation type to be used in this bioretention system is site-tolerant grasses. A Landscaping Plan should be included in the Reference Documents section of this field manual.

For a bioretention system designed with an underdrain, the following also applies.

5. Underdrain
   - The perforated laterals are ____6____ inches in diameter, at a slope of 0.50%.
   - There are 4 lateral pipes in the basin. Each lateral is approximately 12 feet long.
   - The perforations are 0.25 inches in diameter and designed per ASTM D2729.
   - The gravel layer surrounding the underdrain consists of 3 inches of gravel above the underdrain and 3 inches of gravel below the underdrain.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.
5. The system of pop-up drainage emitters and perforated dispersion pipes shall be inspected for blockages when the bioretention basins are inspected.

Western Internal Bioretention (1B)

Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is 27.50 hours.
3. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the seasonal high-water table does not exceed beyond 1' in elevation above the inside bottom of the bioretention cell.
4. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the field soil permeability is not a factor in the design.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.4 inches in 24 hours	5.2 inches In 24 hours	8.7 inches In 24 hours
Runoff Volume (ac-ft)	0.007 ac-ft	0.029 ac-ft	0.050 ac-ft	0.092 ac-ft
Peak Flow Rate (cfs)	0.26 cfs	0.40 cfs	0.67 cfs	1.20 cfs
Water Surface Elevation (feet)	165.20	165.21	166.04	166.76

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. _____N/A_____ feet (if applicable).

Basin Configuration Targets

1. Pretreatment is not provided. A concrete outlet structure is used.
2. Planting Soil Bed
    - The depth of the soil planting bed is 3.13 feet.
    - Mixture of the planting soil consists of 85-95% of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3 % to 7%.
    - The pH of the planting soil should be in the range of 5.5 and 6.5.

- Filter fabric is not placed along the sides of the soil planting bed.
- The system is designed with a planting soil permeability rate of 1 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (MM) / (DD) / (YYYY)).

3. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	Orifice	2.5″ DIA	164.87
Orifice	Orifice	12″ DIA	166.40
Outlet Pipe	Outlet Pipe	18″ DIA	164.87
(Other)	(Other)		

4. Vegetation
   - The vegetation type to be used in this bioretention system is site-tolerant grasses. A Landscaping Plan should be included in the Reference Documents section of this field manual.

For a bioretention system designed with an underdrain, the following also applies.

5. Underdrain
   - The perforated laterals are ____4____ inches in diameter, at a slope of 0.50%.
   - There are 4 lateral pipes in the basin. Each lateral is approximately 25 feet long.
   - The perforations are 0.25 inches in diameter and designed per ASTM D2729.
   - The gravel layer surrounding the underdrain consists of 3 inches of gravel above the underdrain and 3 inches of gravel below the underdrain.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.
5. The system of pop-up drainage emitters and perforated dispersion pipes shall be inspected for blockages when the bioretention basins are inspected.

Central Bioretention (1C)

Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is 27.50 hours.
3. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the seasonal high-water table does not exceed beyond 1' in elevation above the inside bottom of the bioretention cell.
4. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the field soil permeability is not a factor in the design.

Hydraulic Design Targets

3. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.4 inches in 24 hours	5.2 inches In 24 hours	8.7 inches In 24 hours
Runoff Volume (ac-ft)	0.017 ac-ft	0.062 ac-ft	0.102 ac-ft	0.182 ac-ft
Peak Flow Rate (cfs)	0.61 cfs	0.88 cfs	1.42 cfs	2.48 cfs
Water Surface Elevation (feet)	165.01	165.71	166.79	167.49

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

4. The emergency spillway is at EL. _____N/A_____ feet (if applicable).

Basin Configuration Targets

1. Pretreatment is not provided. A concrete outlet structure is used.
2. Planting Soil Bed
    - The depth of the soil planting bed is 4 feet.
    - Mixture of the planting soil consists of 85-95% of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3% to 7%.
    - The pH of the planting soil should be in the range of 5.5 and 6.5.
    - Filter fabric is not placed along the sides of the soil planting bed.

- The system is designed with a planting soil permeability rate of 1 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (MM) / (DD) / (YYYY)).

3. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	Orifice	2.5″ DIA	164.00
Orifice	Orifice	9″ DIA	166.50
Outlet Pipe	Outlet Pipe	18″ DIA	164.00
(Other)			

4. Vegetation
   - The vegetation type to be used in this bioretention system is site-tolerant grasses. A Landscaping Plan should be included in the Reference Documents section of this field manual.

For a bioretention system designed with an underdrain, the following also applies.

5. Underdrain
   - The perforated laterals are ____6____ inches in diameter, at a slope of 0.50%.
   - There are 4 lateral pipes in the basin. Each lateral is approximately 25 feet long.
   - The perforations are 0.25 inches in diameter and designed per ASTM D2729.
   - The gravel layer surrounding the underdrain consists of 3 inches of gravel above the underdrain and 3 inches of gravel below the underdrain.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.
5. The system of pop-up drainage emitters and perforated dispersion pipes shall be inspected for blockages when the bioretention basins are inspected.

Eastern Internal Bioretention (1D)

Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is 27.50 hours.
3. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the seasonal high-water table does not exceed beyond 1' in elevation above the inside bottom of the bioretention cell.
4. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the field soil permeability is not a factor in the design.

Hydraulic Design Targets

5. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.4 inches in 24 hours	5.2 inches In 24 hours	8.7 inches In 24 hours
Runoff Volume (ac-ft)	0.034 ac-ft	0.126 ac-ft	0.209 ac-ft	0.358 ac-ft
Peak Flow Rate (cfs)	1.10 cfs	1.53 cfs	2.51 cfs	4.41 cfs
Water Surface Elevation (feet)	166.37	167.54	168.02	168.60

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

6. The emergency spillway is at EL. _____N/A_____ feet (if applicable).

Basin Configuration Targets

6. Pretreatment is not provided. A concrete outlet structure is used.
7. Planting Soil Bed
    - The depth of the soil planting bed is 4.5 feet.
    - Mixture of the planting soil consists of 85-95% of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3% to 7%.
    - The pH of the planting soil should be in the range of 5.5 and 6.5.
    - Filter fabric is not placed along the sides of the soil planting bed.
    - The system is designed with a planting soil permeability rate of 1 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (MM) / (DD) / (YYYY)).
8. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	Orifice	2.5″ DIA	164.75
Orifice	Orifice	12″ DIA	167.25
Outlet Pipe	Outlet Pipe	18″ DIA	164.75
(Other)			

9. Vegetation
    - The vegetation type to be used in this bioretention system is site-tolerant grasses. A Landscaping Plan should be included in the Reference Documents section of this field manual.

For a bioretention system designed with an underdrain, the following also applies.

10. Underdrain
    - The perforated laterals are ____6____ inches in diameter, at a slope of 0.50%.
    - There are 4 lateral pipes in the basin. Each lateral is approximately 25 feet long.
    - The perforations are 0.25 inches in diameter and designed per ASTM D2729.
    - The gravel layer surrounding the underdrain consists of 3 inches of gravel above the underdrain and 3 inches of gravel below the underdrain.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.
5. The system of pop-up drainage emitters and perforated dispersion pipes shall be inspected for blockages when the bioretention basins are inspected.

Northwestern Bioretention (2B)

Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is 27.50 hours.
3. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the seasonal high-water table does not exceed beyond 1' in elevation above the inside bottom of the bioretention cell.
4. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the field soil permeability is not a factor in the design.

Hydraulic Design Targets

7. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.4 inches in 24 hours	5.2 inches In 24 hours	8.7 inches In 24 hours
Runoff Volume (ac-ft)	0.013 ac-ft	0.055 ac-ft	0.095 ac-ft	0.175 ac-ft
Peak Flow Rate (cfs)	0.48 cfs	0.81 cfs	1.36 cfs	2.44 cfs
Water Surface Elevation (feet)	171.42	172.17	172.38	172.66

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

8. The emergency spillway is at EL. _____N/A_____ feet (if applicable).

Basin Configuration Targets

1. Pretreatment is not provided. A concrete outlet structure is used.
2. Planting Soil Bed
    - The depth of the soil planting bed is 3.34 feet.
    - Mixture of the planting soil consists of 85-95% of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3% to 7%.
    - The pH of the planting soil should be in the range of 5.5 and 6.5.
    - Filter fabric is not placed along the sides of the soil planting bed.

- The system is designed with a planting soil permeability rate of 1 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (MM) / (DD) / (YYYY)).

3. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	Orifice	2.5″ DIA	170.33
Orifice	Orifice	12″ DIA	171.83
Outlet Pipe	Outlet Pipe	12″ DIA	170.33
(Other)			

4. Vegetation
   - The vegetation type to be used in this bioretention system is site-tolerant grasses. A Landscaping Plan should be included in the Reference Documents section of this field manual.

For a bioretention system designed with an underdrain, the following also applies.

5. Underdrain (Leave Blank)
   - The perforated laterals are ____4____ inches in diameter, at a slope of 0.50%.
   - There are 4 lateral pipes in the basin. Each lateral is approximately 6 feet long.
   - The perforations are 0.25 inches in diameter and designed per ASTM D2729.
   - The gravel layer surrounding the underdrain consists of 3 inches of gravel above the underdrain and 3 inches of gravel below the underdrain.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.
5. The system of pop-up drainage emitters and perforated dispersion pipes shall be inspected for blockages when the bioretention basins are inspected.

Northern Bioretention (2C)

Hydrology Design Targets

1. The bioretention system is designed as an online system.
2. The design drain time is 27.50 hours.
3. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the seasonal high-water table does not exceed beyond 1' in elevation above the inside bottom of the bioretention cell.
4. Due to the water-tight, concrete cell the bioretention is located inside, along with underdrains in the gravel layer, the field soil permeability is not a factor in the design.

Hydraulic Design Targets

9. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.4 inches in 24 hours	5.2 inches In 24 hours	8.7 inches In 24 hours
Runoff Volume (ac-ft)	0.006 ac-ft	0.029 ac-ft	0.050 ac-ft	0.093 ac-ft
Peak Flow Rate (cfs)	0.22 cfs	0.37 cfs	0.64 cfs	1.16 cfs
Water Surface Elevation (feet)	171.73	172.26	173.23	173.83

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

10. The emergency spillway is at EL. _____N/A_____ feet (if applicable).

Basin Configuration Targets

6. Pretreatment is not provided. A concrete outlet structure is used.
7. Planting Soil Bed
    - The depth of the soil planting bed is 4.5 feet.
    - Mixture of the planting soil consists of 85-95% of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3% to 7%.
    - The pH of the planting soil should be in the range of 5.5 and 6.5.
    - Filter fabric is not placed along the sides of the soil planting bed.
    - The system is designed with a planting soil permeability rate of 1 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (MM) / (DD) / (YYYY)).
8. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	Orifice	2.5″ DIA	171.25
Orifice	Orifice	9″ DIA	173.25
Outlet Pipe	Outlet Pipe	12″ DIA	171.25
(Other)			

9. Vegetation
    - The vegetation type to be used in this bioretention system is site-tolerant grasses. A Landscaping Plan should be included in the Reference Documents section of this field manual.

For a bioretention system designed with an underdrain, the following also applies.

10. Underdrain (Leave Blank)
    - The perforated laterals are ____6____ inches in diameter, at a slope of 0.50%.
    - There are 4 lateral pipes in the basin. Each lateral is approximately 6 feet long.
    - The perforations are 0.25 inches in diameter and designed per ASTM D2729.
    - The gravel layer surrounding the underdrain consists of 3 inches of gravel above the underdrain and 3 inches of gravel below the underdrain.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.
5. The system of pop-up drainage emitters and perforated dispersion pipes shall be inspected for blockages when the bioretention basins are inspected.

Visual Aid for Bioretention System Inspection

Reference Documents

Documents to be placed in this field manual should include the following:

- As-built Drawings with Drainage Plans
- Soil Boring Logs
- Permeability Test (Pre-construction)
- Permeability Test (Post-construction)

Attach Reference Documents Here

Inspection Checklist / Maintenance Actions
Bioretention System

Checklist (circle one)**:** Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date:** _____

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

The inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
A1 Pretreatment (Forebay)	1	Scouring or erosion is present at inlet structure and/or riprap apron	Y__ N__	Check the flow diversion device before the inlet pipe and whether the bypass flow channel is clogged Work Order # _____
	2	Clogged pipes or excessive sediment in the forebay	Y__ N__	Remove sediment or debris
	3	Damaged outlet structure (e.g., cracking, subsidence, spalling, erosion, or deterioration)	Y__ N__	Repair or replace the outlet structure Work Order # _____
A2 Pretreatment (MTD)	1	MTD inspection (if installed)	Y__ N__	(If a MTD is used for pretreatment, see Maintenance Manual Provided by the manufacturer)
A3 Pretreatment (Structural BMP)	1	BMP inspection	Y__ N__	(See BMP No. _____ Field Manual)
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
B Basin Bed	1	Standing water is present after the design drain time The observed drain time is approximately _____ hours.	Y__ N__	Recheck to determine if there is standing water after 72 hours If standing water is present longer than 5 days, report to mosquito commission. Remove any sediment buildup Check the soil permeability Till the soil bed with rotary tiller or disc harrow Replace the planting soil, if necessary Work Order # _____
	2	Excessive sediment, silt, or trash accumulation on basin bed	Y__ N__	Clean pretreatment system Remove silt, sediment, and trash
	3	Erosion or channelization is present	Y__ N__	Check whether the flow bypass or diversion device is clogged Re-grade the infiltration bed Work Order # _____
	4	Animal burrows/rodents are present	Y__ N__	Pest control Work Order # _____
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
B Basin Bed	5	Uneven bed	Y__ N__	Use light equipment to resurface the bed Work Order # _____
	6	Evidence of sinkholes or subsidence	Y__ N__	Monitor for sinkhole development
	7	Pop-up Drainage Emitters and perforated drainage pipes	Y__ N__	Open Pop-up drainage emitters and inspect for blockages, remove blockages if found
C Vegetation	1	Large spot(s) showing bare soil	Y__ N__	Vegetative cover must be maintained at 85%. Revegetate the entire basin if 50% or more vegetation has been lost. Check Landscaping plan for guidance (if available) Work Order # _____
	2	Invasive plants are present	Y__ N__	Remove the invasive plants and restore the vegetation in accordance with the landscaping plan Work Order # _____
	3	The vegetation in the basin has been mowed or removed	Y__ N__	Revegetate the system in accordance with the vegetation plan Work Order # _____ Note: The vegetation in a bioretention system should **not** be mowed or removed

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
Note:				
D Bioretention System Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__	Check for excessive overland runoff flow through the embankment. Check for any sink hole development Direct the overland runoff to the forebay or pretreatment area Restabilize the bank Work Order # _____
	2	Overgrown perimeter vegetation	Y__ N__	Mow the vegetation on the perimeter of the embankment Work Order # _____ Note: Mowing of vegetation should only take place in the area **outside** the basin. Dense vegetation must be maintained in the basin.
E Outlet	1	Trash or debris accumulation more than 20%	Y__ N__	Clean and remove Determine source of trash and address to reduce future maintenance costs or basin failure
	2	Trash rack is damaged or rusted greater than 50% Trash rack is bent, loose, or missing parts	Y__ N__	Repair or replace trash rack Work Order #_____

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__	Repair or replace component Work Order #_____
	4	Discharge pipe apron is eroded or scoured	Y__ N__	Restabilize the discharge riprap apron Work Order #_____
Note:				
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary Work Order #_____
	2	Damaged structure	Y__ N__	Repair Work Order #_____
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace Work Order #_____
	2	Gate: missing gate or lock	Y__ N__	Repair or replace Work Order #_____
	3	Sign/plate: tiled, missing, or faded	Y__ N__	Repair or replace Work Order #_____

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__	Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order #_____
Note:				

Follow Up Items (Component No. / Inspection Item No.):
_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____ _____ _____
Inspector Name **Signature** **Date**

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance.

Preventative Maintenance Record

Corresponding Checklist No. _____
Component No._____, Inspection Item No._____

Work Logs

Activities	Components	Date Completed
Sediment/debris removal **Sediment removal should be taken place when the basin is thoroughly dry.**	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Bioretention System Embankment and Side Slopes	
	E – Outlet	
Vegetation removal	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	

Vegetation is removed by _____ (type of equipment) with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure. The fertilizer applied is _____ (type), and _____ (quantity per usage) is applied _____ (frequency of use).

Debris, sediment, and trash are handled (onsite / by _____ (contractor name) to disposal site _____). (See Part I: Maintenance Plan – Disposal Plan Section)

Crew member:_____/_____ **Date:** _____
(name/ signature)

Supervisor:_____/_____ **Date:** _____
(name/ signature)

File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record

1. **Work Order # _____ Date Issued _____**

2. **Issue to be resolved:**

3. The issue was from **Corresponding Checklist _____, Component No. _____, Inspection Item No.____.**

4. **Required Actions**

Actions	Planned Date	Date Completed
Install new bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Repair riprap apron with 100 cubic yards of aggregate		
Revegetate		

5. **Responsible person(s):**
   _____

6. **Special requirements**
   - Time of the season or weather condition :_____
   - Tools/equipment:_____
   - Subcontractor (name or specific type):_____

Approved by _____/_____ **Date** _____
(name/signature)

Verification of completion by _____/_____ **Date** _____
(name/signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.

APPENDIX E - SUBSURFACE INVESTIGATION



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January 17, 2023
File No. 26.0092704.00

PSE&G
80 Park Plaza, T-13
P.O. Box 570
Newark, New Jersey 07101

Attention: Mr. Matthew Cieri
Civil Project Engineer

Report Addendum
Supplemental Test Pits and Permeability Testing
West Orange Switching Station Lifecycle Project
West Orange, Essex County, New Jersey
PSE&G

Introduction

This report addendum presents the results of five additional test pits and related permeability testing performed for the West Orange Switching Station Lifecycle Project at the West Orange Switching Station located at 341 Mount Pleasant Avenue in West Orange, Essex County, New Jersey. The subject site is identified as Block 155, Lot 26.01 on the local tax map.

Background Information

GZA previously performed a subsurface investigation for the proposed Lifecycle project, the results of which was presented in our report dated August 8, 2022. Following completion of the investigation, five additional stormwater test pits were requested along the eastern edge of the site and are the subject of this addendum.

Discussion

On January 4th through January 6th, 2023, our representative visited the site and observed the excavation of the five requested additional test pits which have been identified as TP-201 through TP-205. The test pits were excavated by PSE&G's contractor (Furino & Sons) and extended to depths of approximately 6 feet to 10 feet beneath the existing surface levels (bgs). The approximate test pit locations are shown along with the prior explorations on the Plot Plan, Plate 1. Detailed descriptions of the encountered subsurface conditions are presented on the Logs of Test Pits, Plates 2A through 2E.

Test Pit 201 encountered 4-inches of gravel at the ground surface, while the other four test pits encountered 1 to 4 inches of topsoil at the ground surface. Silty and sandy clay loam or loam fill materials were encountered in Test Pits 201, 204, and 205. The fill was

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underlain by buried topsoil in Test Pits 204 and 205. The fill and buried topsoil extended to depths of approximately 2 to 4.5-feet bgs.

Native soils consisting primarily of silts and clays with occasional silty sand layers were encountered below the fill and surface materials and extended to the underlying basalt bedrock in Test Pit 201 to Test Pit 205 at which point refusal to further excavation was encountered. The native soils in Test Pit 205 extended to the maximum reach of the excavator, 10 feet bgs.

Groundwater seepage was observed in Test Pit 201 and 204 at depths of 6 feet and 7 feet respectively, atop of or within 1 foot of the underlying bedrock. Groundwater levels will vary based on seasonal changes.

Permeability Test Results

Field single ring infiltration tests were initiated at approximately 3.5 to 4 feet bgs in the test pits. In addition, tube samples were collected from each test pit for laboratory tube permeameter permeability testing.

The results of the field single ring infiltration and laboratory tube permeameter tests are presented in the table below and are shown on the appropriate exploration logs. The infiltration test rates from the single ring tests were used to calculate a permeability rate using the formula provided in Chapter 12 of the NJDEP BMP manual.

Summary of Permeability Test Results				
Exploration No.	Test Depth (ft, bgs)	Permeability (in/hr.) (1)	USDA Description of Soil Tested	Type of Test Performed
TP-201	1.5	<0.06	Loam Fill	Tube Permeameter
TP-201	6	>20	Loamy Sand	Tube Permeameter
TP-202	1.5	0.2	Sandy Clay Loam	Tube Permeameter
TP-202	4	<0.06	Clay Loam	Tube Permeameter
TP-202	4	<0.06	Clay Loam	Single Ring
TP-203	2	0.2	Silt Loam	Tube Permeameter
TP-203	4	<0.06	Silty Clay Loam	Single Ring
TP-203	5	0.1	Clay	Tube Permeameter
TP-204	4	<0.06	Silt Loam	Single Ring
TP-204	4	<0.06	Silt Loam	Tube Permeameter
TP-204	6	<0.06	Clay Loam	Tube Permeameter
TP-204	8	<0.06	Clay Loam	Tube Permeameter
TP-205	3.7	<0.06	Silt Loam Topsoil/Fill	Single Ring
TP-205	4	<0.06	Silt Loam Topsoil/Fill	Tube Permeameter
TP-205	5	<0.06	Loam	Single Ring
TP-205	7	<0.06	Clay Loam	Tube Permeameter

(1) Slowest of two test replicates reported for laboratory tube permeameter tests.

Other than the thin (1') sandy layer directly above the bedrock in Test Pit 201, all other soil permeability tests were in relatively fine grained soils and indicated very slow permeability rates and are considered restrictive and not conducive to infiltration. Note that a single ring and laboratory tube permeameter test performed in Test Pit 201 at a depth of 4 feet were omitted as the results did not appear consistent with the loam soils encountered at this level and appeared to be in disturbed materials.

Based on the results of the additional testing, it does not appear that the natural soils above the rock are conducive to infiltration.

The following Plates are attached and complete this report addendum:

Plate 1 - Plot Plan
Plates 2A through 2E - Logs of Test Pits

Respectfully submitted,

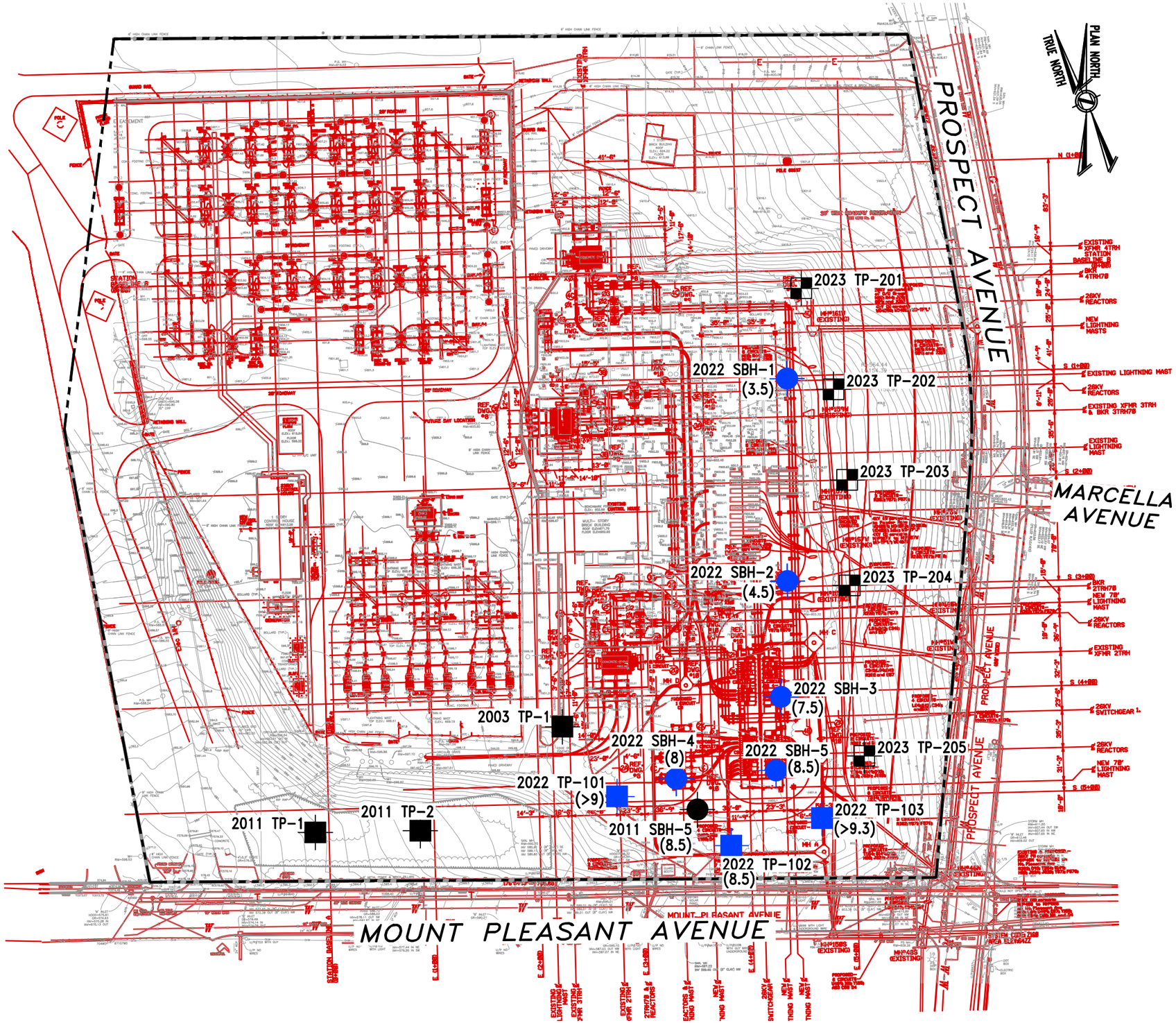
GZA GeoEnvironmental, Inc.

Christopher D. McLaughlin, P.E.
Senior Project Manager

Mark R. Denno, P.E.
Principal

Robert E. Schwankert, P.E.
Consultant/Reviewer

CDM:MRD/cdm
(1 copy submitted via email)



KEY:

2022 TP-101
NUMBER AND APPROXIMATE LOCATION OF TEST PITS COMPLETED FOR THIS STUDY

2022 SHB-1
NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR A PRIOR STUDY

2022 TP-101
NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR A PRIOR STUDY

2003/2011 TP-1
NUMBER AND APPROXIMATE LOCATION OF EXISTING TEST PITS DATA FROM PRIOR REPORTS

2011 SBH-5
NUMBER AND APPROXIMATE LOCATION OF BORING FROM A PRIOR REPORT

(3.5) APPROXIMATE DEPTH IN FEET TO BOTTOM OF FILL/POSSIBLE TOPSOIL BELOW THE EXISTING GROUND SURFACE

NOTES:

1. This drawing is part of GZA GeoEnvironmental, Inc. Report No. 26.0092704.00 and should be read together with the report for complete evaluation.

2. General layout was obtained from three drawings prepared by PSE&G, the first 2 entitled "Existing Conditions Plan (Sheets 1 & 2 of 2" dated 3/16/17, scale 1"= 30' and another entitled "West Orange Switching Station 230/26/4KV Outdoor Substation Key Plan" dated last revised 7/19/22 (no original date given) scale 1"= 30'.

REV. #	DESCRIPTION	DATE
1	ADDED SUPPLEMENTAL STORMWATER TEST PITS	12/28/22

PLOT PLAN

WEST ORANGE SWITCHING STATION
WEST ORANGE, NEW JERSEY
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JOB NO.	FILE NO.
26.0092704.00	-

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	KT	7/6/22	1"= 100'	1

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G

West Orange, NJ

EXPLORATION NO.: TP-201
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Alex Avelar
Contractor: Furino and Sons, Inc.
Operator: Matt

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +605
Final Test Pit Depth (ft.): 6
Date Start - Finish: 1/6/2023 - 1/6/2023

Type of Excavator: Track Excavator
Excavator Model: CAT 305E

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
1/6/23		6	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
			0-4	4" of 3/4" Clean gravel			
1	S1, T1	1.5	4-24	Fill - Dark yellowish brown (10YR, 3/4) loam, 15% gravel, moderate medium crumb, moist, cemented, abrupt smooth boundary, few fine to medium roots	1		
2					2		
3			24-60	Yellowish brown (10YR, 5/6) loam, 15% gravel, 15% cobbles, moderate medium crumb, moist, cemented, gradual smooth boundary	3		
4	S2, T2	4			4		
5					5		
6	S3, T3	6	60-72	Dark yellowish brown (7.5YR, 4/4) loamy sand, 20% gravel, moderate medium crumb, moist, friable, few fine faint light gray (10YR, 7/2) mottles encountered throughout layer Excavator refusal atop basalt rock at 6'	6		
7				End of exploration at 6 feet. Isolated groundwater seepage encountered @ 6'			
8				Single ring attempted @ 4' however soils appeared disturbed and test results were not considered to be representative of the natural soils.			
9							
10				Tube Permeameter Test Results: <0.06 in/hr @ 1.5' >20 in/hr @ 6'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 2A

3B - MTA TEST PIT USDA; 1/17/2023; 10:21:02 AM

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange, NJ

EXPLORATION NO.: TP-202
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Alex Avelar
Contractor: Furino and Sons, Inc.
Operator: Matt

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +606
Final Test Pit Depth (ft.): 10
Date Start - Finish: 1/5/2023 - 1/5/2023

Type of Excavator: Track Excavator
Excavator Model: CAT 305E

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
1/5/23		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1.5	0-1	1" of Leaf litter and topsoil	1		
2			1-24	Reddish brown (5YR, 4/3) sandy clay loam, 10% gravel, moderate medium crumb, moist, friable, clear smooth boundary, few fine roots	2		
3				Reddish brown (5YR, 4/3) clay loam, 15% gravel, moderate medium subangular blocky, moist, friable, gradual smooth boundary	3		
4	S2, T2	4	24-78		4		
5					5		
6					6		
7				Reddish brown (5YR, 4/3) clay, 10% gravel, 5% cobbles, moderate medium subangular blocky, moist, firm	7		
8	S3, T3	8	78-120		8		
9					9		
10				Excavator refusal atop basalt rock at 10'	10		
11				End of exploration at 10 feet. Groundwater not encountered			
12				Single Ring Permeability Test Results: Failed to drain during presoak = <0.06 in/hr @ 4 ft.			
13				Tube Permeameter Test Results: 0.2 in/hr @ 1.5' <0.06 in/hr @ 4'			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 2B

3B - MTA TEST PIT USDA; 1/17/2023; 10:21:02 AM

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange, NJ

EXPLORATION NO.: TP-203
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Alex Avelar
Contractor: Furino and Sons, Inc.
Operator: Matt

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +605
Final Test Pit Depth (ft.): 10
Date Start - Finish: 1/5/2023 - 1/5/2023

Type of Excavator: Track Excavator
Excavator Model: CAT 305E

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
1/5/23		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
			0-2	2" of Leaf litter and topsoil			
1			2-32	Dark reddish brown (5YR, 3/4) silt loam, 15% gravel, moderate medium crumb, moist, friable, clear smooth boundary, few fine to medium roots	1		
2	S1, T1	2			2		
3			32-60	Reddish brown (2.5YR, 4/3) silty clay loam, 10% gravel, 5% cobbles, moderate medium subangular blocky, wet, friable, clear smooth boundary	3		
4	S2, T2	4			4		
5	S3, T3	5			5		
6			60-120	Reddish brown (2.5YR, 4/3) clay, 10% gravel, 5% cobbles, massive, wet, friable	6		
7					7		
8					8		
9					9		
10				Excavator refusal atop basalt rock at 10'	10		
11				End of exploration at 10 feet. Groundwater not encountered Single Ring Permeability Test Results: Failed to drain during presoak = <0.06 in/hr @ 4 ft. Tube Permeameter Test Results: 0.2 in/hr @ 2' 0.1 in/hr @ 5'			
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 2C

3B - MTA TEST PIT USDA; 1/17/2023; 10:21:03 AM

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange, NJ

EXPLORATION NO.: TP-204
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Alex Avelar
Contractor: Furino and Sons, Inc.
Operator: Matt

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +604

Final Test Pit Depth (ft.): 8
Date Start - Finish: 1/4/2023 - 1/4/2023

Type of Excavator: Track Excavator
Excavator Model: CAT 305E

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
1/4/23		7	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
0	S1, T1	0.5	0-2	2" of Leaf litter and topsoil	0		
			2-8	Fill - Reddish brown (5YR, 4/3) sandy clay loam, 25% gravel, moderate medium crumb, moist, firm, abrupt irregular boundary, few fine to medium roots			
1					1		
2			8-41	Topsoil/Fill - Dark brown (7.5YR, 3/3) loam, 15% gravel, moderate medium crumb, moist, friable, common fine to medium roots	2		
3	S2, T2	3			3		
4	S3, T3	4		Reddish brown (5YR, 4/4) silt loam, 15% gravel, moderate medium crumb, wet, friable, abrupt wavy boundary	4		
5			41-66		5		
6	S4, T4	6		Reddish brown (5YR, 4/3) clay loam, 15% gravel, moderate medium crumb, wet, friable	6		
7			66-96		7		
8	S5, T5	8		- excavator refusal atop boulder or possible basalt bedrock @ 8 ft.	8		
9				End of exploration at 8 feet. Rapid groundwater seepage encountered @ 7'			
10				Single Ring Permeability Test Results: Failed to drain during presoak = <0.06 in/hr @ 4 ft.			
11				Tube Permeameter Test Results: <0.06 in/hr @ 4' <0.06 in/hr @ 6' <0.06 in/hr @ 8'			
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 2D

3B - MTA TEST PIT USDA; 1/17/2023; 10:21:03 AM

TEST PIT LOG

GZA GeoEnvironmental, Inc.
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PSE&G
West Orange, NJ

EXPLORATION NO.: TP-205
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Alex Avelar
Contractor: Furino and Sons, Inc.
Operator: Matt

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +603
Final Test Pit Depth (ft.): 10
Date Start - Finish: 1/4/2023 - 1/4/2023

Type of Excavator: Track Excavator
Excavator Model: CAT 305E

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
1/4/23		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-3	Topsoil/Fill - Dark yellowish brown (10YR, 3/6) loam, 5% gravel, moderate medium crumb, moist, friable, clear, common fine to medium roots	1		
2	S1, T1	2	3-32	Fill - Brown (7.5YR, 4/4) silty clay loam, 15% gravel, moderate medium subangular blocky, moist, friable, abrupt irregular boundary, few fine roots	2		
3			32-53	Topsoil/Fill - Dark brown (7.5YR, 3/4) silt loam, 10% gravel, massive, wet, friable, clear irregular boundary	3		
4	S2, T2	4			4		
5	S3, T3	5	53-84	Brown (2.5YR, 4/3) loam, 15% gravel, moderate medium crumb, friable	5		
6					6		
7	S4, T4	7			7		
8			84-120	Reddish brown (5YR, 4/4) clay loam, 15% gravel, moderate medium subangular blocky, moist, friable	8		
9					9		
10					10		
11				End of exploration at 10 feet. Groundwater not encountered Single Ring Permeability Test Results: Failed to drain during presoak = <0.06 in/hr @ 3.7 ft. Failed to drain during presoak = <0.06 in/hr @ 5 ft. Tube Permeameter Test Results: <0.06 in/hr @ 4' <0.06 in/hr @ 7'			
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 2E

3B - MTA TEST PIT USDA; 1/17/2023; 10:21:04 AM

Proactive by Design



SUBSURFACE INVESTIGATION

WEST ORANGE SWITCHING STATION LIFECYCLE PROJECT

West Orange, Essex County, New Jersey

PSE&G

August 8, 2022
File No. 26.0092704.00

PREPARED FOR:
PSE&G
80 Park Plaza
Newark, NJ 07101

GZA GeoEnvironmental Inc.
117 Canal Road | South Bound Brook, NJ 08880
732-356-340

32 Offices Nationwide
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August 8, 2022
File No. 26.0092704.00

PSE&G
80 Park Plaza
Newark, New Jersey 07101

Attention: Mr. Matthew Cieri
Civil Project Engineer

Report
Subsurface Investigation
West Orange Switching Station Lifecycle Project
West Orange, Essex County, New Jersey
PSE&G

Introduction

This report presents the results of a subsurface investigation performed by GZA GeoEnvironmental, Inc. (GZA) for improvements to the West Orange switching station located at 341 Mount Pleasant Avenue in West Orange, Essex County, New Jersey. The subject site is identified as Block 155, Lot 26.01 on the local tax map and is shown on the Site Location Map, Plate 1. Our work was performed in general accordance with our proposal dated May 13, 2022.

Proposed Construction

The Lifecycle project would reportedly consist of installation of a new 26kV switchgear and associated structures and equipment at the existing switching station. No other details were provided.

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Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil and groundwater conditions by performance of the five (5) requested test borings and three (3) test pits;

2) estimate the relevant geotechnical engineering properties of the encountered materials;

3) evaluate the site foundation requirements considering the anticipated construction and encountered subsurface conditions;

4) recommend appropriate types of foundations for support of the proposed equipment, and provide geotechnical-related foundation design and installation criteria, including an estimate of the Site Class as defined by the International Building Code 2018, New Jersey Edition, for seismic design purposes;

5) perform field permeability/percolation tests and/or collect tube samples for laboratory permeability testing at each test pit, if appropriate;

6) obtain samples from depths of approximately 3 and 8 feet from the three test pit locations and submit them to Geotherm USA for thermal resistivity testing;

7) arrange for a field resistivity survey to be performed at locations to be identified in the future; and

8) discuss appropriate earthwork considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish these purposes, a subsurface exploration program consisting of five supervised test borings and three supervised test pits was performed. Prior to advancing the test borings, the areas were initially scanned with ground-penetrating radar. The boring locations were then hand excavated to about 3 feet prior to the start of sampling. The test borings were advanced through the hand excavations using mud-rotary drilling equipment mounted on an ATV drill rig and extended to depths of approximately 15 to 30 feet below the existing ground surface (bgs) at which point refusal was

encountered. Approximately 10 feet of rock core was then obtained from each of the borings. The test pits were excavated using a Komatsu PC 45MR track excavator provided by a PSE&G subcontractor (Furino & Sons) and extended to depths of approximately 5 to 9.5 feet bgs. The approximate locations of the explorations performed for this study and two nearby test pits from a prior study performed at the station are shown on the Plot Plan, Plate 2.

All field work was performed under the direct technical observation of representatives from GZA. Our representatives located the explorations in the field relative to existing surface features, maintained continuous logs of the explorations as the work proceeded and supervised the soil and rock sampling operations. After hand excavating to 3 feet for the borings, soil samples suitable for identification purposes were extracted from the borings at closely spaced intervals in general accordance with the procedures of the Standard Penetration Test (ASTM D-1586). Ten feet of rock was cored at each boring location using an NX-size core barrel which extracts a core approximately 2 inches in diameter. Upon completion, the borings were grouted. Photographs of the rock cores are presented in Appendix I.

In addition, our representative collected representative bulk and relatively undisturbed tube samples from the various strata encountered in the test pits. Single ring infiltration tests were initiated within the upper 3 to 3.3 feet in the test pits to obtain information for stormwater design purposes. Three-inch diameter tubes were collected from each test pit at approximate depths of 3 and 8 feet for geothermal testing. After the test pits were completed, they were backfilled using the excavated materials.

Detailed descriptions of the encountered subsurface conditions are presented on the Test Boring Logs, Plates 3A through 3E and Test Pit Logs, Plates 4A through 4C. The soil samples obtained from the test

borings were visually described in general accordance with the Unified Soil Classification System shown on Plate 5, while the soils encountered in the test pit excavations were described using the USDA Soil Classification Chart (typically used for stormwater purposes) shown on Plate 6. The rock type and general quality of the rock samples from the cores obtained in the borings are visually described in accordance with the Engineering Rock Classification and Core Description Chart shown on Plate 7.

All soil and rock samples were brought to our office where they were further examined in our soil mechanics laboratory. A geotechnical laboratory testing program consisting of mechanical grain-size analyses, natural moisture content determinations, tube permeameter permeability, and soil box resistivity tests were performed on selected samples to assist in estimating and evaluation of their engineering properties. The results of the mechanical grain-size tests are presented on Plates 8A and 8B, Gradation Curves. The results of the natural moisture content determinations and laboratory tube permeameter permeability tests are shown on the appropriate boring and test pit logs.

In addition, three samples of the near surface soils were submitted to an NJDEP certified laboratory to perform testing for pH, sulfates, chloride ion, electric resistivity, redox potential, and sulfides. The results of the chemical tests and GZA soil box resistivity tests are presented on Plate 9.

Rock core samples were also submitted to an independent laboratory for unconfined compressive strength testing, the results of which are attached in Appendix II.

In addition, GZA sent samples collected for geothermal testing to an outside laboratory, Geotherm USA. The geothermal report is attached as Appendix III to this report. As discussed with the engineering team,

the field resistivity testing will be performed at a later date and the results submitted as an addendum to this report.

The results of our field explorations and laboratory testing programs have provided the basis for our engineering analyses and design recommendations. The following discussions of our findings and recommendations are subject to the Limitations attached as Appendix IV to this report.

Site Conditions

Surface Features: The subject site is the existing fenced-in West Orange Switching Station. The station is bound by Mt. Pleasant Avenue (State Route 10) to the south and Prospect Avenue to the east. A medical office complex is located to the west, and an LA Fitness and additional medical office building is located to the north of the station. Marion substation is located at the northwest corner of the station. The station contains various electrical equipment, control houses and other improvements typical of PSE&G stations, however the proposed improvement area would be located at the southeast corner of the site, within unimproved lawn and wooded areas.

Topographic information provided to us indicates that the site generally slopes steeply downward from Mt. Pleasant Avenue and Prospect Avenue into the site where grades generally level off and gradually slope downward towards the existing station equipment which is established near Elevation +599 feet to +603 feet.

Subsurface Conditions: The subsurface conditions encountered in the explorations performed for this study consisted of the following generalized strata, listed in order of increasing depth:

1) Surface Materials: A layer of crushed stone on the order of 10 to 12 inches in thickness was encountered at test boring SBH-1 and SBH-2. At the remaining three explorations, 8 to 11 inches of topsoil was encountered. The test pits were all performed within the lawn areas and encountered 6 to 20 inches of topsoil at the ground surface.

2) Fill: The surface materials were underlain by clayey silt and silty sand fill in the borings which extended to depths on the order of 2.5 feet to 8 feet below the existing surface grades. Fill and possible fill was also encountered in the three test pits and extended the full depth explored in the test pits. A layer of buried topsoil was encountered at the base of the fill in SBH-2, SBH-3, and SBH-5.

3) Clayey Silts and Silty Clays: The surface materials, fill and buried topsoil, where present were underlain by stiff clayey silts and silty clays. The silts and clays typically extended to depths of about 15 to 24 feet below the ground surface in the explorations to the underlying weathered basalt bedrock except for SBH-3 and SBH-4.

4) Clayey Sands: The silts and clays in SBH-3 and SBH-4 were generally underlain by medium dense to very dense clayey or silty sands at about 15 feet below the ground surface The clayey sands extending to depths ranging from about 25 to 28 feet below grade. Gravel, cobbles, boulders or weathered rock were encountered in the deeper portions of this layer and may represent weathered bedrock.

5) Decomposed and Weathered Basalt Bedrock: The clayey sands and/or clays and silts were typically underlain by decomposed/weathered and fractured basalt bedrock.

Groundwater seepage was encountered in the three test pits at depths ranging from 4 to 9 feet below the ground surface. Groundwater levels were not recorded in the soil borings as the borings used rotary wash techniques which use water to facilitate the drilling, however, water levels were estimated to be between 10 to 15 feet in the borings based on review of the soil samples. Groundwater was also encountered at 7 feet below the ground surface in a prior boring (SBH-5) from our 2011 sutyd, and is also shown on the Plot Plan. Groundwater seepage conditions should be expected to vary seasonally.

Note that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature and other factors occurring since the time measurements were made.

Findings and Recommendations

General: Based on the results of our study, it is our opinion that:

1) The existing fill materials and buried topsoil, where present, cannot be relied upon, in their current condition, to provide direct support for the foundations for the proposed station improvements. Following the site preparation procedures described in subsequent sections of this report, the proposed lightly loaded improvements could be supported by conventional shallow foundations which derive their support from the undisturbed natural soils or controlled compacted fill installed after removal of the existing fill. Foundations may be designed for maximum net allowable bearing pressures of up to 4,000 pounds per square foot. The undisturbed natural soils and properly placed and compacted controlled fill would also provide adequate support for the control building floor slab and other slabs. Any lightning masts, towers or H-frames and any other structures subject to high lateral loads could be supported by either drilled shaft foundations or conventional spread foundations set at depths necessary to accommodate overturning forces.

2) Groundwater seepage was encountered at depths ranging from approximately 4 to 9 feet in the test pits at the time of this study and estimated to be near about 10 feet in several borings. As such, construction dewatering could be required, especially during the removal and replacement of existing fill materials. The site contractor should be responsible to provide whatever means and methods are necessary to dewater excavations and maintain control of surface runoff during construction.

3) The predominately near surface silty and clayey soils, which would represent the bulk of the excavated materials, would generally be poorly suited for reuse as fill or backfill as they would be highly susceptible to moisture-related stability and compaction problems.

The following sections of this report present further discussion of each of these items.

Site Preparation and Earthwork: Site preparation activities should initially include the removal of any existing equipment, utilities, or improvements that are not incorporated in the Lifecycle project. Following

any demolition, the existing fill and any buried topsoil should be removed to the surface of the natural soils. The fill and buried topsoil in our recent explorations extended to depths ranging from 2.5 to 9 feet bgs. Based on our explorations, it is likely that excavations necessary to reach the plan foundation levels may not extend completely below the fill and buried topsoil into the natural soils. In areas where existing fill remains at the plan foundation bottom level, it should be removed to the surface of the natural bearing soils. Once it is confirmed that all existing fill materials have been removed, the foundations could be lowered to bear directly on the natural soils or the excavations backfilled with controlled compacted fill or crushed stone to the bottom of the foundation in accordance with the Suggested Foundation Overexcavation Detail presented on Plate 9. Excavations could be performed in a mass excavation, or depending on the proximity of other improvements, could be excavated in a series of isolated excavations.

Following excavation of the fill materials and buried topsoil, the exposed natural subgrade soils should be observed by a qualified geotechnical engineer to confirm that all unsuitable soils have been removed. When excavations for new foundations are performed adjacent to existing foundations, the new foundations should be located so that a line drawn between the lower edges of adjoining footings shall not have a slope steeper than 30 degrees with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported.

If some fill is left in-place in areas where new improvements are not proposed, in order to reduce the risk of excessive settlement in these areas, the existing fill should be proofrolled and recompacted to a relatively dense and stable condition and if observed, soft areas could be selectively excavated and replaced with

controlled compacted fill to achieve the final desired subgrades. However, it should be understood that if existing fill is left in-place, even with a recompacted subgrade, some post-construction settlement could potentially be experienced.

Controlled compacted fill or backfill should consist of dry, suitable portions of the excavated on-site soils or imported granular soils placed under the observation of the inspecting geotechnical engineer. The near surface excavated fill is expected to consist primarily of silts and clays with occasional sandier zones. The sandier soils, if encountered, would be considered suitable for reuse as controlled compacted fill and backfill provided they are at and maintained at moisture contents which would allow them to be properly compacted. The silty and clayey soils would be poorly suited for reuse due to their moisture sensitive nature. Variations in the nature and composition of the fill materials present at the site should be anticipated. A determination regarding the suitability of excavated fill materials for reuse as structural backfill adjacent to the foundations should be made at the time of construction by a qualified geotechnical engineer. Weathered basalt was encountered at depths ranging from about 15 to 28 feet below the ground surface and as such would not be a concern for the anticipated shallow foundations.

Imported fill, if required, should consist of uncontaminated relatively well-graded sand and gravel soils containing less than 15 percent by weight of material passing a U.S. Standard No. 200 sieve and a maximum particle size of 4 inches. Documentation of the environmental quality of the fill should include a written certification from the fill supplier stating that the fill is virgin material from a commercial or non-commercial source.

Any controlled compacted fill and backfill should be placed at appropriate moisture contents and in layers of no more than 12 inches in loose thickness. All controlled fill and backfill should be compacted to at least 95 percent of its maximum dry density as determined by the ASTM D-1557 test procedure. Backfill placed and compacted using manual equipment in confined areas such as foundation or utility trench excavations should be spread in layers of 6 to 8 inches or less in loose thickness as necessary to achieve the required compaction.

Construction excavations should be performed in accordance with the applicable safety codes, including the latest OSHA Excavation Regulations. Based on the soils encountered in the test pits and borings, it is our opinion that the natural soils and fill are typical of Type "C" soils as defined by the OSHA Excavation Regulations. It should be the contractor's responsibility to evaluate and provide a properly designed excavation support system, maintain safe excavations at all times, and prevent undermining of or damage to nearby existing structures and equipment to remain, if any. The contractor should be responsible for any damage caused by their work.

Shallow Foundation Design Criteria: Following the site preparation procedures outlined above, it is our recommendation that equipment may be supported by conventional spread foundations that derive their support from the undisturbed natural soils, controlled compacted fill or stone backfill placed over the undisturbed natural soils in accordance with our above recommendations. Foundations for the proposed new improvements could be designed to impose maximum allowable net bearing pressures of up to 4,000 pounds per square foot. All foundations should extend to a depth of at least 3 feet below the adjacent finished exterior grade to provide frost protection.

As previously indicated, when excavations for new foundations are performed adjacent to any existing foundations or other improvements to remain, if any, the new foundations should be located so that a line drawn between the lower edges of adjoining footings shall not have a slope steeper than 30 degrees with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported.

Uplift loads may be resisted by the weight of the foundation, structure and soil within a prism defined by extending a line up and out from the edge of the foundation at an angle of 20 degrees from vertical. A total unit weight of 125 pounds per cubic foot could be assumed for the natural granular soils, excavated sandy fill, if any, or imported granular fill as previously specified to be used as backfill, provided the materials are compacted to at least 95 percent of their ASTM D-1557 maximum dry density. Horizontal loads may be resisted by friction between the concrete and soil, and passive pressure. An ultimate coefficient of friction of 0.35 for sliding may be assumed between the foundation concrete and the near surface silts and clays prevalent at the site. The coefficient of friction could be increased to 0.55 if crushed stone is provided below the foundations. Assuming the backfill is compacted as recommended, passive pressures may be calculated assuming a friction angle of 34 degrees (K_p = 3.5) and unit weight of 125 pounds per cubic foot. The designer should account for potential loss of support from freeze-thaw effects or future adjacent excavation if relying on passive pressures for shallow foundations. As such, we recommend that passive pressures be discounted for the upper two feet of soils due to potential disturbance.

It is our opinion that foundations designed and installed in accordance with our recommendations would experience post-construction settlements of 3/4 of 1 inch, or less.

Seismic Considerations: Based on the regional geology, the subsurface conditions encountered in the explorations at the site and published geologic information, it is our opinion that the foundations for the proposed improvements can be designed using a Site Class "C" as determined by the International Building Code 2018, New Jersey Edition.

Concrete Slab Design Criteria: Following the previously described site preparation procedures, any at-grade concrete slabs could be supported by the controlled compacted fill installed atop the natural soils. Due to potential variations within the existing fill materials, the existing fill would not be suitable for direct slab support and should be removed and replaced as necessary. We recommend that a minimum 6-inch-thick layer of porous fill consisting of clean 3/4-inch stone be placed beneath the slabs to provide a capillary break between the subgrade soils and the bottom of the concrete, and to help provide a stable working base during construction. A subgrade modulus of 150 pounds per cubic inch (pci) would be appropriate for design of slabs established atop the native clayey and silty soils, while a modulus of 200 pci would be appropriate for design of slabs established atop properly placed granular controlled compacted fill.

We estimate that maximum post-construction settlements of lightly loaded slabs will be less than 1/4 of 1 inch. More heavily loaded transformer pads (if any are proposed) could experience greater total settlements which are estimated to be about 1 inch or less but could be confirmed when loads are available.

Lateral Earth Pressures: If required, excavation support systems, below grade structures or site retaining walls should be designed to resist lateral earth pressures imposed by the adjacent soils, as well as surcharge loads due to adjacent equipment, traffic, floor slabs or foundation loads, etc. We estimate that the following soil parameters could be used to design these systems:

Soil Type	***Total Unit Weight (pcf)***	***Angle of Internal Friction (degrees)***	***Cohesion (psf)***	***Active Earth Pressure Coefficient (K_a)***
Existing sandy and clayey fill materials	120	30	0	0.333
Clean ¾" crushed stone backfill	105	38	0	0.238
Natural silty and clayey sands or imported granular controlled compacted fill	125	34	0	0.282
Natural sandy silts and clays	120	26	2,000	0.390

We do not recommend that any silty or clayey soil be used as backfill adjacent to below-grade walls as they are relatively poorly draining and may impose higher lateral pressures. Excavated sands, silty sand or imported granular materials as previously specified would be better suited for this use.

Stormwater Management Design: As part of our work, we were requested to perform three test pits and permeability tests. The logs of the test pits (TP-101 through TP-103) have been provided in USDA format for stormwater design purposes. In addition, single ring field infiltration tests were initiated at

each test pit location within the existing fill materials at about 3 to 3.3-feet below the ground surface. At each location, the test failed to drain during the presoak period resulting in failed tests. Laboratory tube permeameter permeability tests were also performed on tube samples obtained from the test pits. The tube permeameter tests indicate that the clay loam and silt loam fill materials were relatively impermeable, with occasional permeable loam fill layers. The single ring infiltration and tube permeameter tests are summarized on the individual test pit logs.

Chemical Testing: Three samples of the near surface soils were submitted to an NJDEP certified laboratory to determine pH, sulfates, chloride ion, electrical resistivity, redox potential, and sulfides. The test results pH are summarized on Plate 9.

Based on American Concrete Institute ACI 318 guidelines, sulfate levels of less than 1,000 parts per million (ppm) indicate a negligible exposure for corrosion of concrete, and ACI recommends the use of Type I cement. The sulfate test results ranged from 34.9 to 90.2 ppm. The USDA guidelines indicate a pH of less than 5.5 for sandy soils or 5.0 for fine-grained soils are considered to have a high risk of corrosion potential for concrete. The pH test result ranged from 3.44 to 5.58. Therefore, based on the results of the tests, we would recommend that Type II cement be used.

In order to evaluate the risk of uncoated ductile iron pipe to corrosion, the AWWA takes five parameters into consideration including electrical resistivity, pH, redox potential, sulfides and moisture content. Each category is assigned a point value, and if the total points are 10 or higher, that indicates the soil is corrosive to ductile iron pipe and protection is needed. The samples tested in SBH-1 and SBH-2 resulted

in a total of one point for each sample, while Boring SBH-5 resulted in a total of 5 points. Therefore, the testing indicates the soils have a low potential for corrosion to ductile iron.

Please contact us if you have any questions regarding this report.

The following Plates and Appendices are attached and complete this report:

Plate 1 - Site Location Map
Plate 2 - Plot Plan
Plate 3A through 3E - Test Borings Logs
Plate 4A through 4C - Test Pits Logs
Plate 5 - Unified Soil Classification System
Plate 6 - USDA Soil Textural Triangle
Plate 7 – Engineering Rock Classification Chart
Plates 8A and 8B - Gradation Curves
Plate 9 - Summary of Chemical and Soil Box Resistivity Tests
Plate 10 - Suggested Foundation Overexcavation Detail
Appendix I - Geotherm Test Results
Appendix II – Rock Core Photographs
Appendix III – Rock Core Compression Test Results
Appendix IV - Limitations

Respectfully submitted,

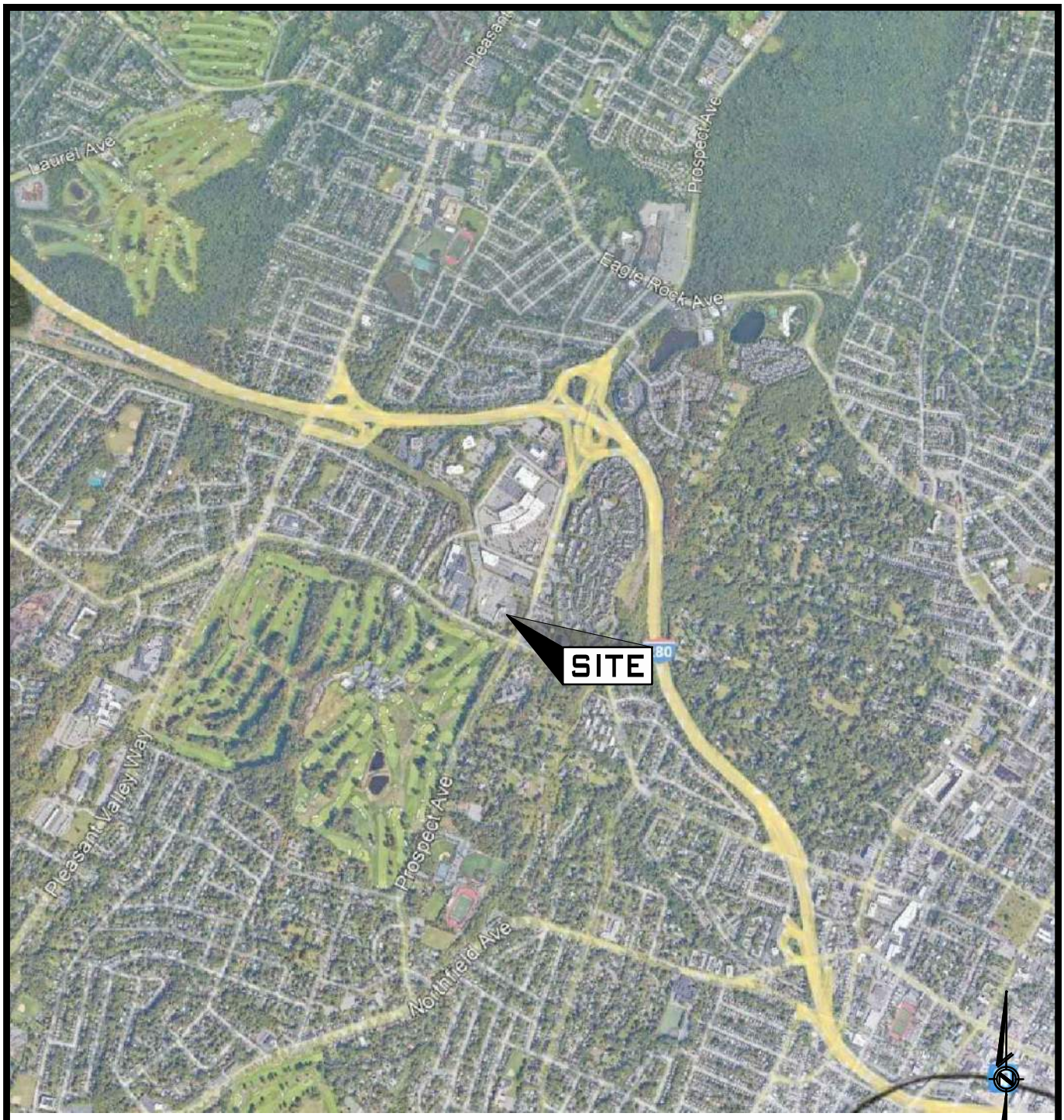
GZA GeoEnvironmental, Inc.

Christopher D. McLaughlin, P.E.
Senior Project Manager

Mark R. Denno, P.E.
Principal

Robert E. Schwankert, P.E.
Consultant/Reviewer

CDM:MRD/cdm
(1 copy submitted via email)



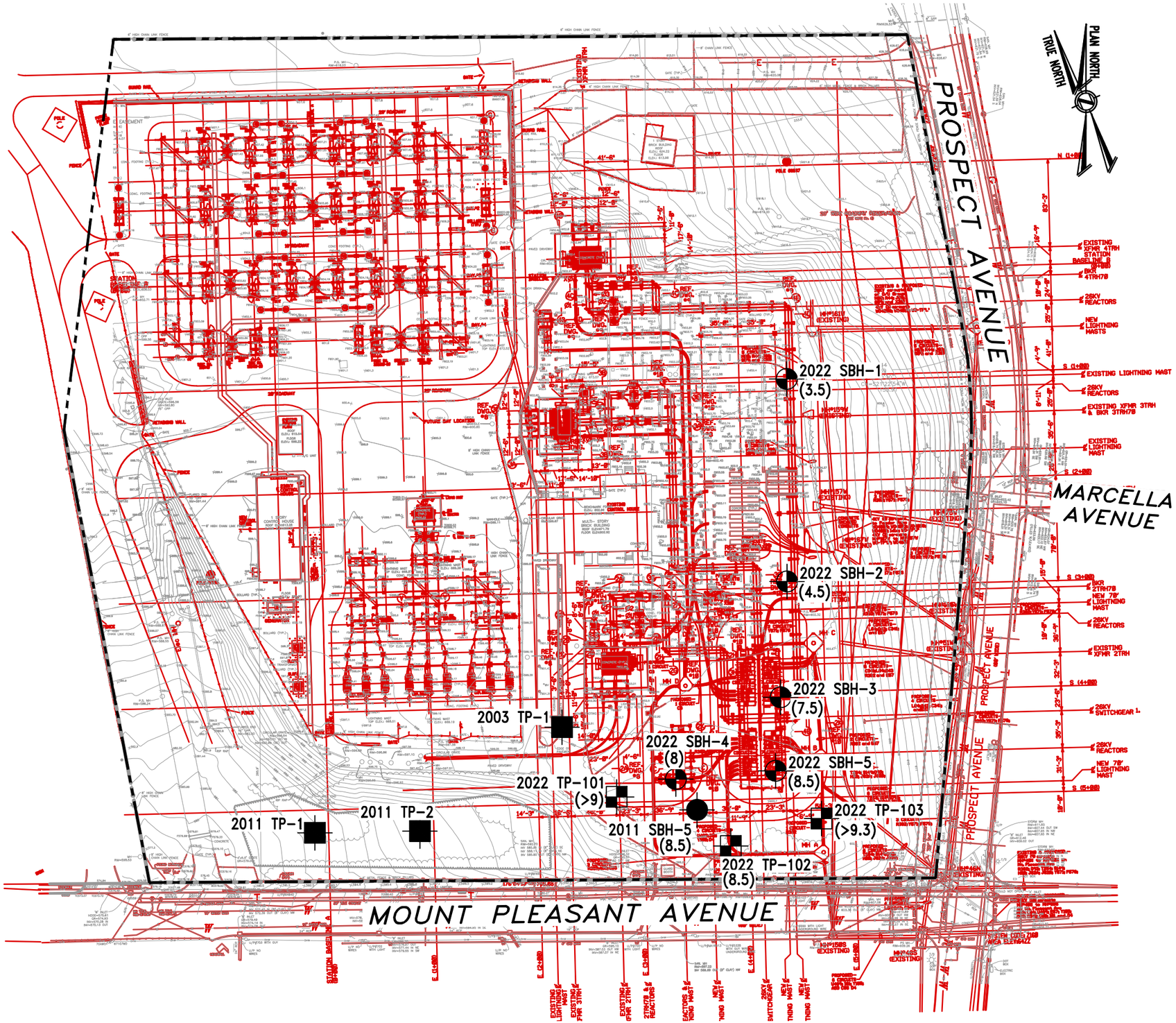
Aerial Photo courtesy of Google Earth Pro

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SITE LOCATION MAP

WEST ORANGE SWITCHING STATION
WEST ORANGE, NEW JERSEY
PSE&G

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
26.0092704.00	–	VJD	KT	7/6/22	1"=2,000'	1



KEY:

2022 SBH-1
NUMBER AND APPROXIMATE LOCATION OF BORINGS COMPLETED FOR THIS STUDY

2022 TP-101
NUMBER AND APPROXIMATE LOCATION OF TEST PITS COMPLETED FOR THIS STUDY

2003/2011 TP-1
NUMBER AND APPROXIMATE LOCATION OF EXISTING TEST PITS DATA FROM PREVIOUS REPORTS

2011 SBH-5
NUMBER AND APPROXIMATE LOCATION OF BORING FROM A PRIOR REPORT

(3.5) APPROXIMATE DEPTH IN FEET TO BOTTOM OF FILL/POSSIBLE TOPSOIL BELOW THE EXISTING GROUND SURFACE

NOTES:

1. This drawing is part of GZA GeoEnvironmental, Inc. Report No. 26.0092704.00 and should be read together with the report for complete evaluation.

2. General layout was obtained from three drawings prepared by PSE&G, the first 2 entitled "Existing Conditions Plan (Sheets 1 & 2 of 2" dated 3/16/17, scale 1"= 30' and another entitled "West Orange Switching Station 230/26/4KV Outdoor Substation Key Plan" dated last revised 7/19/22 (no original date given) scale 1"= 30'.

PLOT PLAN

WEST ORANGE SWITCHING STATION
WEST ORANGE, NEW JERSEY
PSE&G

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JOB NO.	FILE NO.
26.0092704.00	-

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	KT	7/6/22	1"= 100'	2

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange

EXPLORATION NO.: SBH-1
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Juan Matallana
Drilling Co.: Craig Test Borings, Inc.
Driller: Bryan

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Mud Rotary

Boring Location: See Plan
Ground Surface Elev. (ft.): 602.5
Date Start - Finish: 6/29/2022 - 6/29/2022
Final Boring Depth (ft.): 25

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 6
Rock Core Size: 2

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
6/29/22		NR	

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
							10" Crushed stone			
	S1	1.5	*				Fill - Reddish brown silt, and fine to coarse sand, trace fine gravel (very moist)(medium dense)		19.3	*
	S2	3-5	14 19 19 38	38			Brown clayey silt, and fine to medium sand, little fine gravel (very moist)(hard)		18.5	
5	S3	5-7	33 27 23 24	50				5		
	S4	7-9	44 100/3"	100+			- grading with some fine to coarse gravel, cobbles and boulders			
	S5	9-11	37 75 134 120	100+		ML				
10	S6	11-12.1	30 75 100/2"	100+				10		
15								15		
							Gray fractured basalt, fair quality, very close to close joint spacing ROCK CORE RUN NO. 1: 15' to 20' REC = 95% RQD = 53% ROCK CORE RUN NO. 2: 20' to 25' REC = 100% RQD = 68%			
20								20		
25								25		
							End of exploration at 25 feet.			
30										
35										

REMARKS

* - Hand dug to 3'

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:08:19 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	**PSE&G** **West Orange**	**EXPLORATION NO.: SBH-2** **SHEET: 1 of 1** **PROJECT NO: 26.0092704.00** **REVIEWED BY: Chris McLaughlin**

Logged By: Juan Matallana	**Type of Rig:** Track Rig	**Boring Location:** See Plan **Final Boring Depth (ft.):** 30
Drilling Co.: Craig Test Borings, Inc.	**Rig Model:** CME 55LC	**Ground Surface Elev. (ft.):** 602.5
Driller: Bryan	**Drilling Method:** Mud Rotary	**Date Start - Finish:** 6/29/2022 - 6/29/2022

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 6 **Rock Core Size:** 2

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S1	1	*				12" Crushed stone			
			4 4				Fill - Reddish brown silt, and fine to medium sand, trace fine gravel (moist)			*
	S2	2-4	3 3	7			Buried Topsoil - Very dark brown silty clay, trace fine sand (slight organic odor) (wet)(medium)		23.9	
			5 5							
5	S3	4-6	5 6	10		CL	Gray silty clay, little fine sand (very moist)(stiff)	5	19.4	
			8 9				Brown silty clay, some fine to coarse sand, trace fine gravel (very moist)(very stiff)			
	S4	6-8	10 16	19						
			20 5							
	S5	8-10	7 10	12						
10			2 2					10		
	S6	10-12	3 4	5			- grading (wet)(medium)			
						CL				
			7 16							
15	S7	15-16.2	100/2"	100+			- sampler refusal atop cobbles/boulders	15		
20								20		
					5.8		Gray fractured basalt, very poor quality, very close joint spacing			
					6.5		ROCK CORE RUN NO. 1: 20' to 25'			
					7.1		REC = 85%			
					8.0		RQD = 13%			
25					14.2			25		
					4.2		ROCK CORE RUN NO. 2: 25' to 30'			
					4.1		REC = 100%			
					5.8		RQD = 58%			
					5.1		- grading to fair quality, close joint spacing			
30					4.3			30		
							End of exploration at 30 feet.			
35										

REMARKS

* - Hand dug to 2.5'

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:08:20 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange

EXPLORATION NO.: SBH-3
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Juan Matallana
Drilling Co.: Craig Test Borings, Inc.
Driller: Bryan

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Mud Rotary

Boring Location: See Plan
Ground Surface Elev. (ft.): 602.5
Date Start - Finish: 6/28/2022 - 6/28/2022
Final Boring Depth (ft.): 35

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 6
Rock Core Size: 2

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S1	1	*				11" Topsoil		14.5	*
							Fill - Reddish brown silt, and fine to medium sand, trace fine gravel, trace roots (moist)			
	S2	3	*							*
			4 3							
5	S3	4-6	3 3	6			Fill - Reddish brown clayey silt, and fine to medium sand, trace fine gravel (wet)(medium)	5	20.8	
			4 3							
	S4	6-8	3 3	6					21.7	
			9 9				Buried Topsoil - Dark gray silty clay, and fine to medium sand, trace fine gravel, trace organics (slight organic odor) (very moist)(medium)			
	S5	8-10	9 7	18					17.2	
10			11 9			CL		10		
	S6	10-12	8 8	17			Reddish brown silty clay, and fine to medium sand, little fine to coarse gravel (moist to wet)(very stiff)			
15			13 7					15		
	S7	15-17	10 8	17			Reddish brown fine to medium sand, and clayey silt (wet)(medium dense)			
20	S8	20-20.2	100/2"			SM	- sampler refusal atop cobbles/boulders	20		
25					12.0		Gray fractured basalt, poor quality, very close joint spacing	25		
					9.8		ROCK CORE RUN NO. 1: 25' to 30'			
					12.0		REC = 100%			
					9.6		RQD = 48%			
30					9.3			30		
					11.3		ROCK CORE RUN NO. 2: 30' to 35'			
					11.1		REC = 28%			
					12.0		RQD = 0%			
					12.5		- grading to very poor quality			
35					10.7			35		
							End of exploration at 35 feet.			

REMARKS

* - Hand dug to 4'
* - Hand dug to 4'

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:08:21 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange

EXPLORATION NO.: SBH-4
SHEET: 1 of 2
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Juan Matallana
Drilling Co.: Craig Test Borings, Inc.
Driller: Bryan

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Mud Rotary

Boring Location: See Plan
Final Boring Depth (ft.): 45
Ground Surface Elev. (ft.): 600.5
Date Start - Finish: 6/27/2022 - 6/27/2022

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 6
Rock Core Size: 2

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
6/27/22			

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
							8" Topsoil			
	S1	2	*				Fill - Reddish brown fine to medium sand, and silt, trace fine gravel (moist)		11.3	*
	S2	3	*						12.3	
5	S3	4-6	6 4 4 4	8			Fill - Brown clayey silt, some fine to coarse sand, trace fine gravel (moist)(medium to stiff)	5	15.3	
	S4	6-8	6 4 3 2	7						
	S5	8-10	2 15 11 6	26		CL	Gray-brown silty clay, some fine to medium sand, trace fine gravel (wet)(very stiff)		21.5	
10	S6	10-12	5 7 8 8	15		ML	Brown clayey silt, little fine to medium sand, trace fine gravel (wet)(stiff)	10		
15	S7	15-17	3 4 5 3	9		SM	Reddish brown fine to coarse sand, some clayey silt, little fine to coarse gravel (wet)(loose)	15		
20	S8	20-22	10 22 20 11	42			- grading (dense)	20		
25	S9	25-27	24 59 60 66	100+		SM	Dark yellowish brown fine to coarse sand, and silt, trace fine gravel (wet)(very dense)	25		
30	S10	30-30.8	125 100/3"	100+		GP	Gray-brown fine to coarse gravel, little fine to coarse sand, little silt (weathered basalt)(wet)(very dense)	30		
35								35		

REMARKS

* - Hand dug to 4'

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:08:21 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G West Orange	EXPLORATION NO.: SBH-4 SHEET: 2 of 2 PROJECT NO: 26.0092704.00 REVIEWED BY: Chris McLaughlin

Logged By: Juan Matallana	**Type of Rig:** Track Rig	**Boring Location:** See Plan **Final Boring Depth (ft.):** 45
Drilling Co.: Craig Test Borings, Inc.	**Rig Model:** CME 55LC	**Ground Surface Elev. (ft.):** 600.5
Driller: Bryan	**Drilling Method:** Mud Rotary	**Date Start - Finish:** 6/27/2022 - 6/27/2022

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 6 **Rock Core Size:** 2

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
6/27/22			

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
40	S11	35-35.2	100/2"	100+	5.8 5.3 7.6 6.2 6.0 4.7 6.6 5.5 6.1 7.9		Gray fractured basalt, good quality, very close to close joint spacing ROCK CORE RUN NO. 1: 35' to 40' REC = 92% RQD = 78% ROCK CORE RUN NO. 2: 40' to 45' REC = 100% RQD = 76%	40		
45							End of exploration at 45 feet.	45		
50										
55										
60										
65										
70										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:08:22 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
West Orange

EXPLORATION NO.: SBH-5
SHEET: 1 of 1
PROJECT NO: 26.0092704.00
REVIEWED BY: Chris McLaughlin

Logged By: Juan Matallana
Drilling Co.: Craig Test Borings, Inc.
Driller: Bryan

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Mud Rotary

Boring Location: See Plan
Ground Surface Elev. (ft.): 601.5
Date Start - Finish: 6/28/2022 - 6/28/2022
Final Boring Depth (ft.): 35

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 6
Rock Core Size: 2

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
6/27/22			

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
							11" Topsoil			
	S1	2	*				Fill - Reddish brown clayey silt, and fine to medium sand, trace fine gravel, trace roots (moist)		14.9	*
	S2	3	*							
5	S3	4-6	9 9 10 6	19			Fill - Reddish brown fine to coarse sand, and silt, little fine gravel (moist)(medium dense)	5	10.8	
	S4	6-8	4 4 3 3	7			Buried Topsoil - Very dark brown silty clay, trace fine sand, trace organics (slight organic odor) (moist)(medium)		16.6	
	S5	8-10	9 10 10 10	20					15.4	
10	S6	10-12	12 14 14 15	28			Brown clayey silt, some fine to medium sand, trace fine gravel (very moist)(very stiff)	10		
15	S7	15-17	7 7 8 10	15		ML		15		
	S8	17-19	17 12 15 12	27						
20								20		
	S9	23-23.2	100/2"	100+			- sampler refusal atop bedrock			
25					11.8 7.5 10.1 10.7		Gray fractured basalt, fair quality, very close to close joint spacing ROCK CORE RUN NO. 1: 25' to 30' REC = 100% RQD = 51%	25		
30					9.0 7.5 6.1 4.1		ROCK CORE RUN NO. 2: 30' to 35' REC = 92% RQD = 75% - grading to fair-good quality	30		
35					4.2 4.1			35		

REMARKS

* - Hand dug to 4'

End of exploration at 35 feet.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3E

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:08:22 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G West Orange, NJ	EXPLORATION NO.: TP-101 SHEET: 1 of 1 PROJECT NO: 26.0092704.00 REVIEWED BY: Chris McLaughlin

Logged By: Wesley Swanson	**Type of Rig:** Track Excavator	**Boring Location:** See Plan	**Final Boring Depth (ft.):** 9.5
Drilling Co.: Furino & Sons	**Rig Model:** Komatsu PC45	**Ground Surface Elev. (ft.):** +601	
Driller: Charlie	**Drilling Method:**	**Date Start - Finish:** 5/31/2022 - 5/31/2022	

Hammer Type: Donut
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): **Rock Core Size:**

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
5/31/22		8	

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
							Topsoil - Dark yellowish brown (10YR, 3/4) loam, 15% gravel, 10% cobbles, moderate medium subangular blocky to crumb, slightly moist, friable, clear wavy boundary, common fine to medium roots			
							Fill - Yellowish red (5YR, 4/6) sandy loam, 20% gravel, 10% cobbles, moderate medium subangular blocky to crumb, moist, friable, clear wavy boundary			
5							Fill - Dark reddish brown (5YR, 3/4) silty clay, 15% gravel, 5% cobbles, moderate medium subangular blocky, moist, friable, clear wavy boundary	5		
							Fill - Very dark gray (5Y, 3/1) clay, 10% gravel, 10% cobbles, moderate medium subangular blocky, moist to wet, firm			
10							End of exploration at 9.5 feet. Slight groundwater seepage encountered @ 8' Single Ring Test Results: Failed to drain during presoak @ 3' Tube Permeameter Test Results: <0.06 in/hr @ 6.5' <0.06 in/hr @ 9'			
15										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:13:53 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G West Orange, NJ	EXPLORATION NO.: TP-102 SHEET: 1 of 1 PROJECT NO: 26.0092704.00 REVIEWED BY: Chris McLaughlin

Logged By: Wesley Swanson	**Type of Rig:** Track Excavator	**Boring Location:** See Plan	**Final Boring Depth (ft.):** 5
Drilling Co.: Furino & Sons	**Rig Model:** Komatsu PC45	**Ground Surface Elev. (ft.):** +599	
Driller: Charlie	**Drilling Method:**	**Date Start - Finish:** 5/31/2022 - 5/31/2022	

Hammer Type: Donut			
Hammer Weight (lb.): 140	**Hammer Fall (in.):** 30		
Auger or Casing O.D./I.D Dia (in.):	**Rock Core Size:**		

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/31/22		4	

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
							Topsoil - Dark brown (7.5YR, 3/3) silty clay, 5% gravel, moderate medium crumb, moist, friable, clear wavy boundary, common fine to medium to coarse roots			
							Possible Fill - Reddish brown (7.5YR, 4/3) loam, 15% gravel, 10% cobbles, weak medium crumb, slightly moist, friable, clear wavy boundary, few fine roots			
							Possible Fill - Reddish brown (5YR, 4/4) silt loam, 15% gravel, 10% cobbles, moderate medium subangular blocky, moist, friable, clear wavy boundary			
5							Reddish brown (5YR, 4/4) sandy loam, 15% gravel, 25% cobbles, moderate medium subangular blocky, wet, friable	5		
							End of exploration at 5 feet. Moderate groundwater seepage encountered @ 4' Single Ring Test Results: Failed to drain during presoak @ 3' Sidewalls collapsing below 4' Tube Permeameter Test Results: 0.6 in/hr @ 1' 0.5 in/hr @ 4.5'			
10										
15										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:13:53 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	**PSE&G** **West Orange, NJ**	**EXPLORATION NO.: TP-103** **SHEET: 1 of 1** **PROJECT NO: 26.0092704.00** **REVIEWED BY: Chris McLaughlin**

Logged By: Wesley Swanson	**Type of Rig:** Track Excavator	**Boring Location:** See Plan	**Final Boring Depth (ft.):** 9.3
Drilling Co.: Furino & Sons	**Rig Model:** Komatsu PC45	**Ground Surface Elev. (ft.):** +601.5	
Driller: Charlie	**Drilling Method:**	**Date Start - Finish:** 5/31/2022 - 5/31/2022	

Hammer Type: Donut
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): **Rock Core Size:**

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
5/31/22		9	

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
							Topsoil - Dark reddish brown (5YR, 3/3) silty clay, 5% gravel, moderate medium crumb, moist, friable, clear wavy boundary, common fine to medium roots			
							Fill - Dark reddish brown (5YR, 3/3) silt loam, 10% gravel, 10% cobbles, moderate medium subangular blocky, moist, friable, few fine roots			
5							Fill - Greenish gray (10Y, 6/1) clay, 5% gravel, 5% cobbles, 5% stone/boulders, moderate medium subangular blocky, moist, firm, to cemented, clear wavy boundary	5		
							Fill - Dark brown (10YR, 3/3) silty clay loam, 10% gravel, 5% cobbles, moderate medium subangular blocky to crumb, moist, friable			
10							End of exploration at 9.3 feet. Slight groundwater seepage encountered @ 9' Single Ring Test Results: Failed to drain during presoak @ 3.3' Tube Permeameter Test Results: 0.5 in/hr @ 6' 0.4 in/hr @ 9'			
15										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

2 - MTA BORING LOG WITH CORES; 8/8/2022; 11:13:53 AM

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than 50% of material is LARGER than No. 200 Sieve	GRAVEL & GRAVELLY SOILS More than 50% of coarse fraction RETAINED on No. 4 Sieve	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS More than 50% of coarse fraction PASSING a No. 4 Sieve	CLEAN SAND (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.
			SP	Poorly-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS More than 50% of material is SMALLER than No. 200 Sieve.	SILTS AND CLAYS	Liquid limit LESS than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS	Liquid limit GREATER than 50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic contents

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

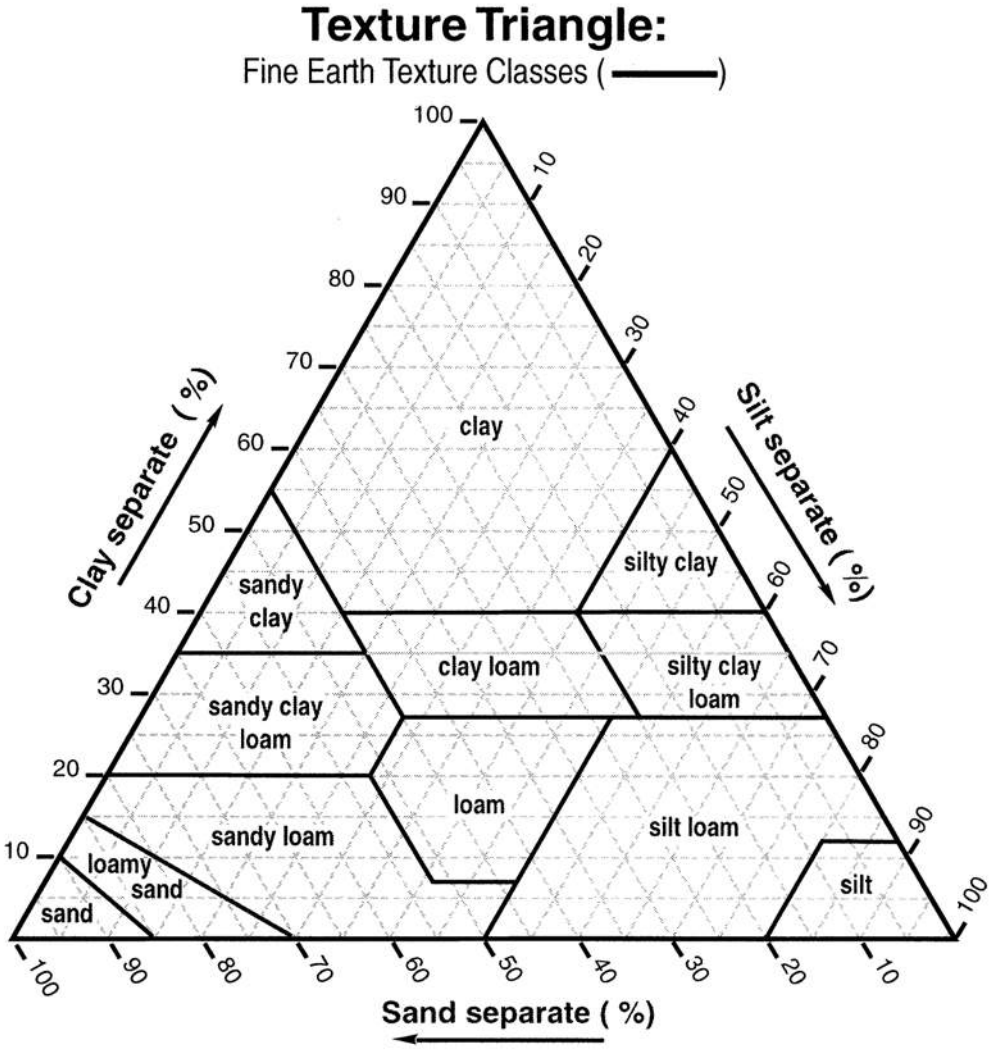
GRADATION*		COMPACTNESS* sand and/or gravel		CONSISTENCY* clay and/or silt	
% Finer by Weight		Relative Density		Range of Shearing Strength in Pounds per Square Foot	
Trace	0% to 10%	Loose	0% to 40%	Very Soft	less than 250
Little	10% to 20%	Medium Dense	40% to 70%	Soft	250 to 500
Some	20% to 35%	Dense	70% to 90%	Medium	500 to 1000
And	35% to 50%	Very Dense	90% to 100%	Stiff	1000 to 2000
				Very Stiff	2000 to 4000
				Hard	Greater than 4000

**Values are from laboratory or field test data, where applicable. When no testing was performed, values are estimated.*

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

PLATE 5



USDA SOIL CLASSIFICATION SYSTEM

ENGINEERING ROCK CLASSIFICATION
AND CORE DESCRIPTION CHART (1)

DESCRIPTIVE TERMINOLOGY FOR JOINT SPACING

Description Term	Spacing of Joints
Very Close	Less than 2 inches
Close	2 inches to 1 foot
Moderately Close	1 foot to 3 feet
Wide	3 feet to 10 feet
Very Wide	Greater than 10 feet

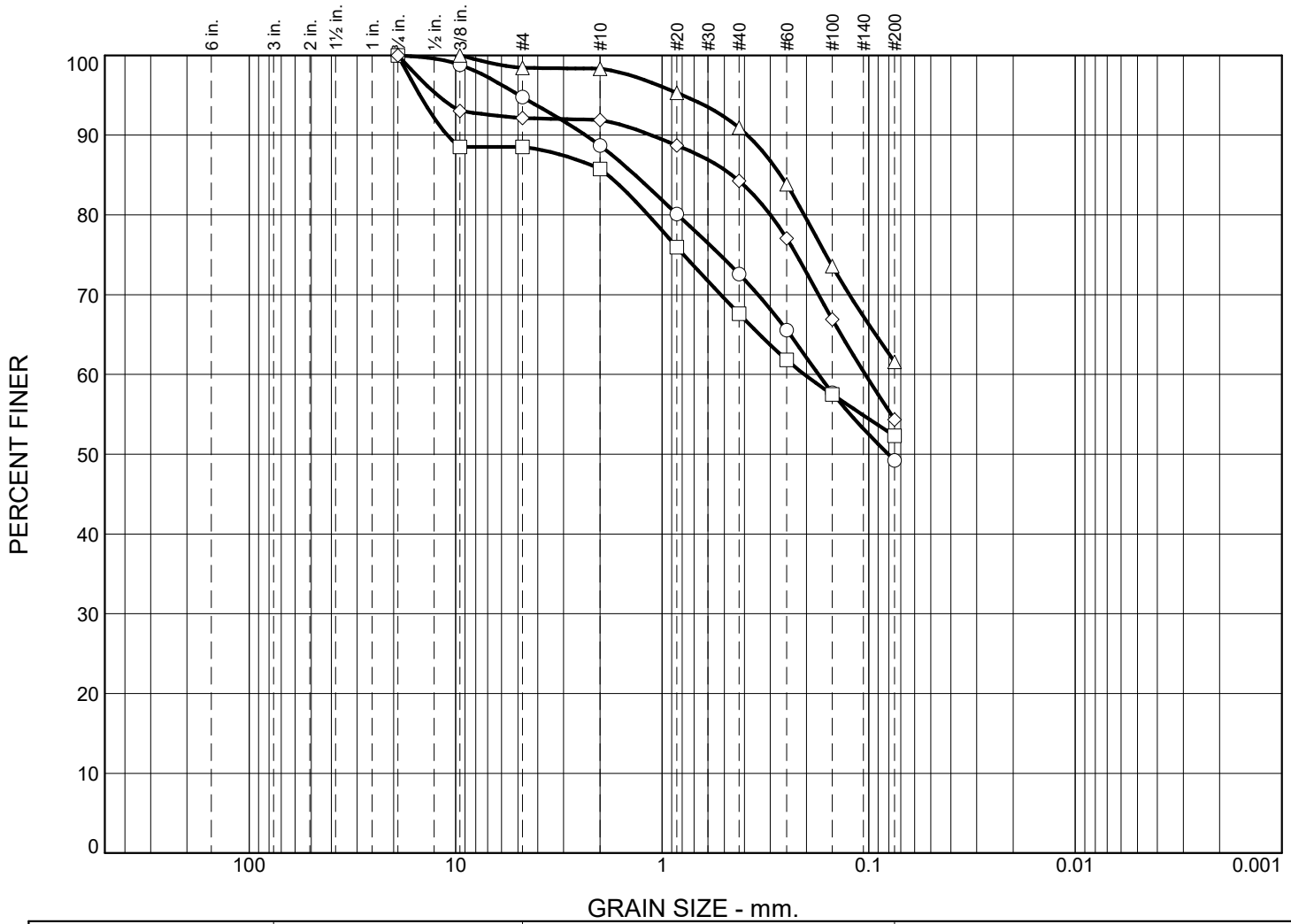
RELATIONSHIP OF RQD AND ROCK QUALITY

Rock Quality Designation (RQD) (2)	Description of Rock Quality
0 – 25%	Very Poor
25 – 50%	Poor
50 – 75%	Fair
75 – 90%	Good
90 – 100%	Excellent

(1) Core description system is based on a suggested system proposed in the ASCE Rock Mechanics Seminar in April and May of 1968 entitled "Geologic Considerations of Rock Mechanics" as presented by Don V. Deere.

(2) "Rock Quality Designation" is defined as a modified core recovery ratio which considers only pieces of core that are at least 4 inches long. Obvious features induced by drilling are ignored in this system.

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.2	6.1	16.1	23.4	49.2	
□	0.0	0.0	11.5	2.7	18.2	15.3	52.3	
△	0.0	0.0	1.6	0.1	7.4	29.3	61.6	
◇	0.0	0.0	7.9	0.2	7.6	30.0	54.3	

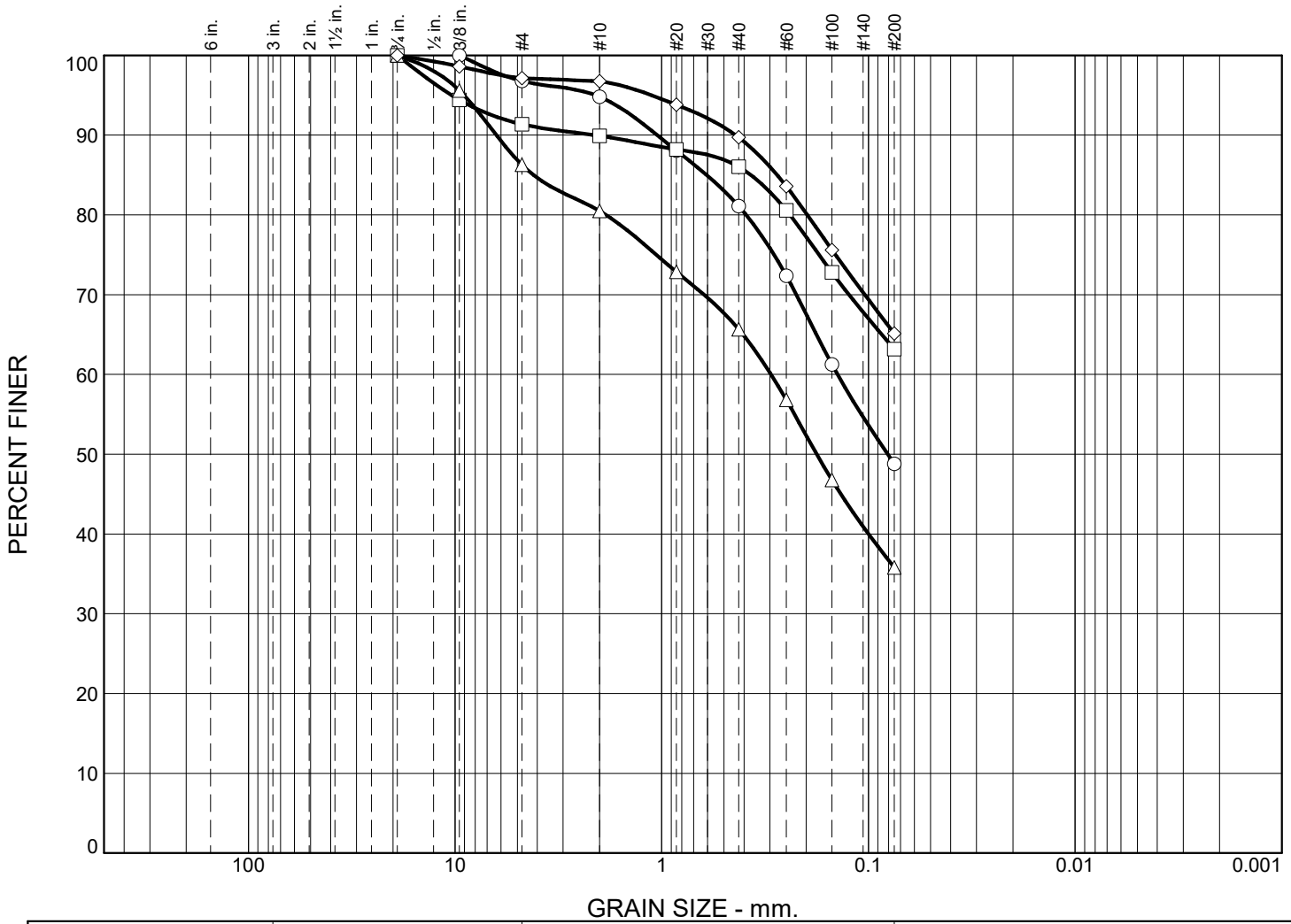
SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SBH-1	S1	1.5	Silt, and fine to coarse Sand, trace fine Gravel (MC=19.3%)	Fill
□	SBH-1	S2	3-5	Clayey Silt, and f to m Sand, little f Gravel (MC=18.5%)	ML
△	SBH-3	S3	4-6	Clayey Silt, and f to m Sand, trace f Gravel (MC=20.8%)	Fill
◇	SBH-3	S4B	6-8	Silty Clay, and f to m Sand, trace f Gravel (MC=17.2%)	CL

Melick-Tully & Associates
a Division of GZA GeoEnvironmental, Inc.
South Bound Brook, NJ

Client: PSE&G
Project: West Orange Switching Station Lifecycle Projet - West Orange, NJ
Project No.: 26.0092704.00 **Plate** 8A

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.2	2.0	13.7	32.3	48.8	
□	0.0	0.0	8.6	1.5	3.9	22.8	63.2	
△	0.0	0.0	13.7	5.8	14.8	29.9	35.8	
◇	0.0	0.0	2.9	0.3	7.1	24.6	65.1	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SBH-4	S1	2	Fine to medium Sand, and Silt, trace fine Gravel (MC=11.3%)	Fill
□	SBH-4	S5A	8-10	Silty Clay, some f to m Sand, trace f Gravel (MC=21.5%)	CL
△	SBH-5	S3	4-6	Fine to coarse Sand, and Silt, little fine Gravel (MC=10.8%)	Fill
◇	SBH-5	S5	8-10	Clayey Silt, some f to m Sand, trace f Gravel (MC=15.4%)	ML

Melick-Tully & Associates
a Division of GZA GeoEnvironmental, Inc.
South Bound Brook, NJ

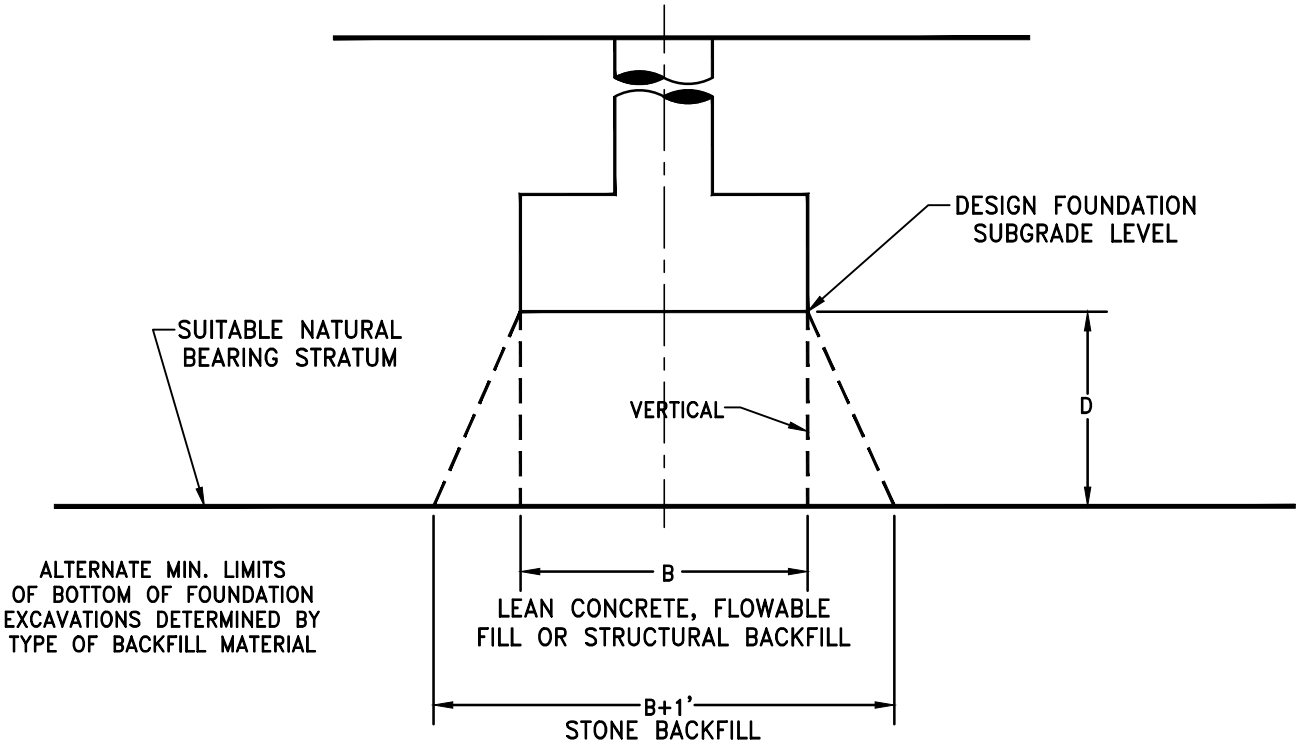
Client: PSE&G
Project: West Orange Switching Station Lifecycle Projet - West Orange, NJ
Project No.: 26.0092704.00 **Plate** 8B

Summary of Chemical Testing and Soil Box Testing
Proposed West Orange Switching Station Lifecycle Project
West Orange, Essex County, New Jersey
PSE&G

Summary of Soil Box Tests			
Exploration Number	**Approximate Depth (ft.)**	**Generalized Soil Description**	**Resistivity (ohm-cm)**
SBH-1	3-5	Sandy Clayey Silt	5,960
SBH-1	9-11	Sandy Clayey Silt	3,640
SBH-3	1	Sandy Silt Fill	18,500
SBH-3	4-6	Sandy Clayey Silt Fill	8,940
SBH-3	8-10	Sandy Silty Clay	6,010
SBH-4	2	Silty Sand Fill	15,300
SBH-4	4-6	Sandy Clayey Silt Fill	10,900
SBH-4	8-10	Sandy Silty Clay	1,540

Exploration Number	**Approximate Depth (ft.)**	**Generalized Soil Description**	**Chloride Ion (ppm)**	**pH**	**Sulfates (ppm)**	**Sulfides (ppm)**	**Redox Potential (mV)**	**Electrical Resistivity (ohm-cm)**
SBH-1	1.5	Sandy Silt Fill	99.4	5.30	54.4	ND	199	4,300
SBH-2	2	Sandy Silt Fill	38.8	5.58	90.2	ND	204	6,000
SBH-5	3	Sandy Clayey Silt Fill	4.12	3.44	34.9	ND	196	44,000

**ND= Analyzed for but not detected*



SUGGESTED FOUNDATION OVEREXCAVATION DETAIL

NOT TO SCALE

NOTES:

1. B = Width of foundation.
2. D = Depth of overexcavation of unsuitable materials below bottom of foundation subgrade to surface of suitable bearing stratum.
3. Lean Concrete: Minimum 2,000 psi.
4. Stone Backfill: Clean 3/4 inch crushed stone or washed gravel; separate stone from adjacent soils on sides and bottom using filter fabric (Mirafi 140, or equivalent).
5. Structural Fill Backfill: Approved granular soils spread in lifts on the order of 6 to 8 inches in loose thickness and compacted to at least 95 percent of maximum dry density as determined by the ASTM D1557 test procedure.

APPENDIX I

Geotherm Test Results

21239 FM529 Rd., Bldg. F
Cypress, TX 77433
Tel: 281-985-9344
Fax: 832-427-1752
info@geothermusa.com
http://www.geothermusa.com

June 16, 2022

Melick Tully and Associates
117 Canal Road
South Bound, NJ 08880
Attn: Chis McLaughlin, P.E.

Re: Thermal Analysis of Native Soil Samples
West Orange Switching Station – West Orange, NJ (Project No. 26009270400)

The following is the report of thermal dryout characterization tests conducted on the five (5) tube samples of native soil from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The tube samples were tested 'as received'. The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 to 3.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

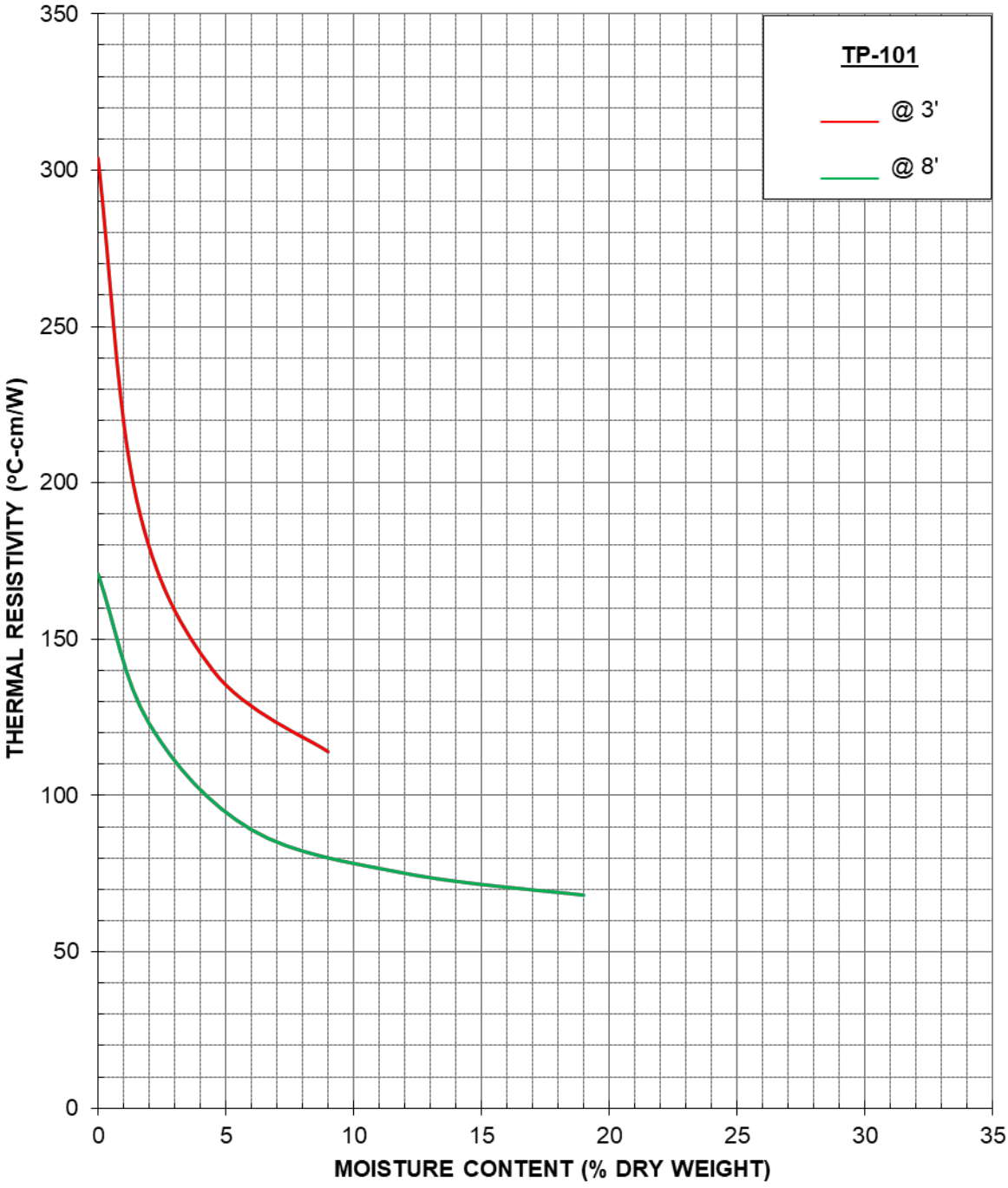
Sample ID	Depth (ft)	Description (Melick Tully)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
			Wet	Dry		
TP-101	3	Sandy Loam (Fill)	114	304	9	88
	8	Sandy Clay (Fill)	68	171	19	110
TP-102	3	Silt Loam	65	182	16	109
TP-103	3	Silt Loam	105	263	13	90
	8	Silty Clay Loam	99	323	15	85

Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Nimesh Patel

THERMAL DRYOUT CURVES



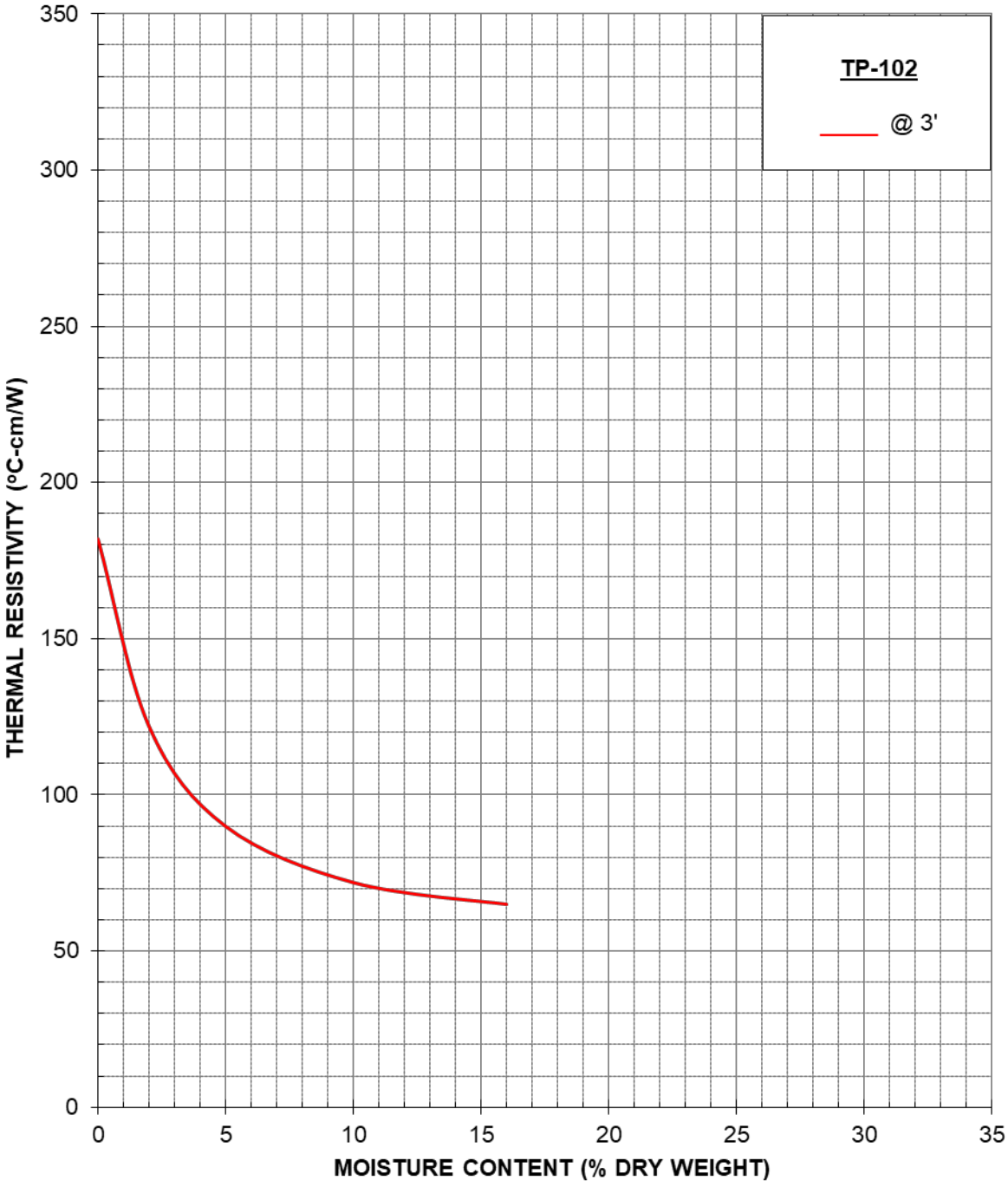
Melick Tully and Associates (Project No. 26009270400)

West Orange Switching Station – West Orange, NJ

Thermal Analysis of Native Soil Samples

June 2022 **Figure 1**

THERMAL DRYOUT CURVE



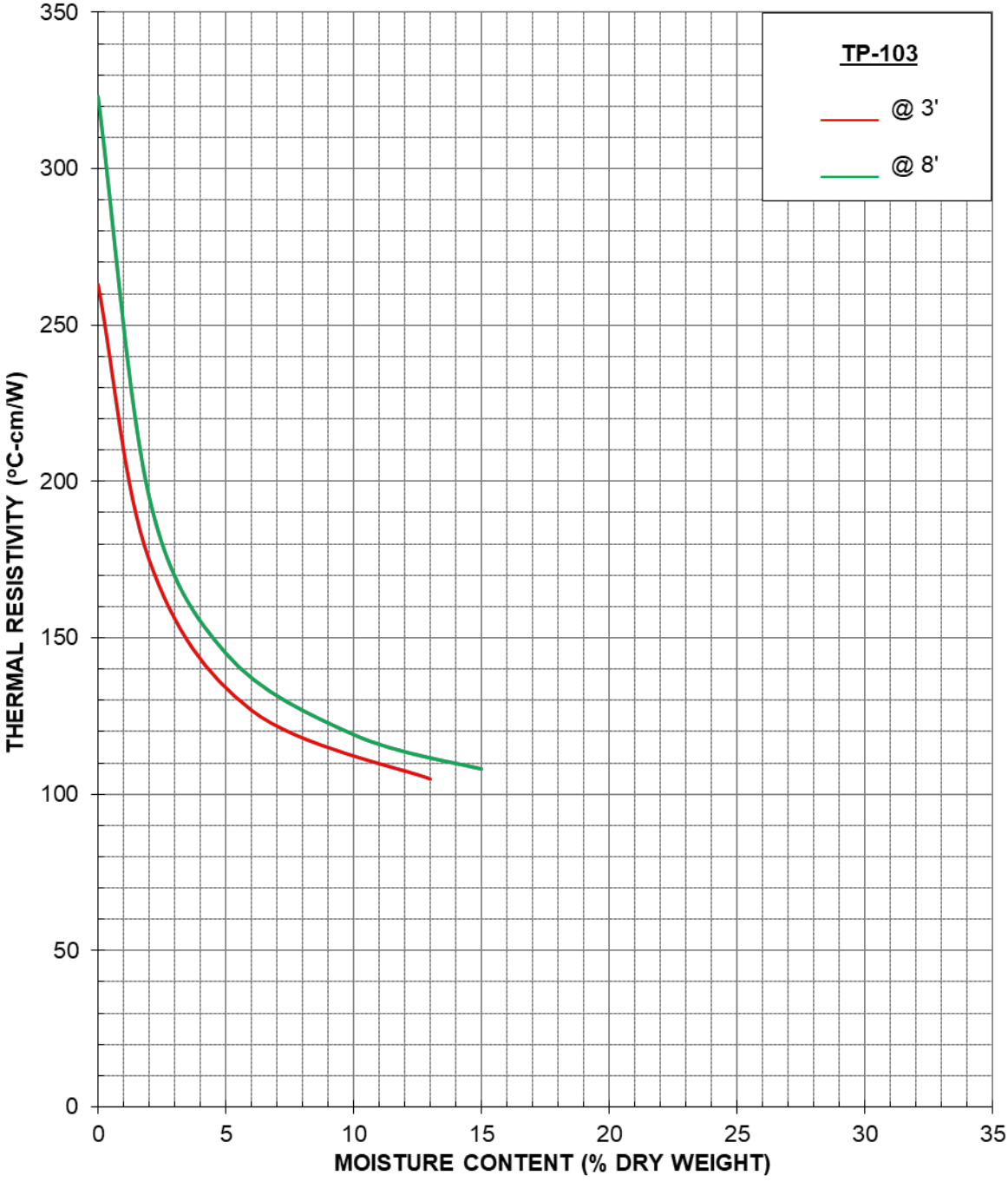
Melick Tully and Associates (Project No. 26009270400)

West Orange Switching Station – West Orange, NJ

Thermal Analysis of Native Soil Samples

June 2022 **Figure 2**

THERMAL DRYOUT CURVES



Melick Tully and Associates (Project No. 26009270400)

West Orange Switching Station – West Orange, NJ

Thermal Analysis of Native Soil Samples

June 2022 **Figure 3**

APPENDIX II

Rock Core Photographs

Rock Core Photographs

Proposed West Orange Switching Station Lifecycle Project

West Orange, Essex County, New Jersey

PSE&G



Rock Core Box Key:

Boring SBH-1 Run 1 – 15’-20’, REC: 95%, RQD: 53%

Boring SBH-1 Run 2 – 20’-25’, REC: 100%, RQD: 68%

Empty

Empty

Rock Core Photographs

Proposed West Orange Switching Station Lifecycle Project

West Orange, Essex County, New Jersey

PSE&G



Rock Core Box Key:

SBH-5 Run 1 – 25’-30’, REC: 100%, RQD: 51%

SBH-5 Run 2 – 30’-35’, REC: 92%, RQD: 75%

SBH-3 Run 1 – 25’-30’, REC: 100%, RQD: 98%

SBH-3 Run 2 – 30’-35’, REC: 28%, RQD: 0%

Rock Core Photographs

Proposed West Orange Switching Station Lifecycle Project

West Orange, Essex County, New Jersey

PSE&G



Rock Core Box Key:

SBH-4 Run 1 – 35’-40’, REC: 92%, RQD: 78%

SBH-4 Run 2 – 40’-45’, REC: 100%, RQD: 76%

SBH-2 Run 1 – 20’-25’, REC: 85%, RQD: 13%

SBH-2 Run 2 – 25’-30’, REC: 100%, RQD: 58%

APPENDIX III

Rock Core Compression Test Results

TerraSense

45H Commerce Way, Totowa, NJ 07512
973.812.1818
terrasenselab.com

07/26/22
TerraSense Project Number: 22009432A

Kim Tully
Project Manager
GZA
117 Canal Road
South Bound Brook, NJ 08880

Dear Ms. Tully:

Re: Laboratory Test Results for 92704.00 – PSE&G West Orange

The purpose of this letter is to present the results of the laboratory tests performed on the samples delivered to the TerraSense laboratory on 07/11/22. Testing was performed based on your assignment also dated 07/11/22.

Test Results
Test results are reported on the accompanying test pages.

Test Comments
Testing was performed in general accordance with ASTM or other methods as listed on the test pages. Deviations from the test standards are noted on these pages.

Limitations
Our professional services for this project have been performed in accordance with generally accepted engineering practices; no other warranty, expressed or implied, is made.

Sample Disposition
If we do not receive other instructions from you within thirty days, this material will be disposed.

If you have any questions concerning the test results reported in this letter, please call us.
Sincerely,

Drew Mazujian
Project Manager

Attachment: (4 sheets)

7930-temp Drew

LABORATORY TEST ASSIGNMENT AND TRACKING SHEET

Client Project Number: 92704.00 Task Number: _____ Assigned by: Kim Tully Office: GZA Date Assigned: 7/11/22

Project Name: PSE&G West Orange Assignment Number: _____ Due Date: 7/25/22

Any known or suspected contamination of the material (yes or no)? _____ If yes, HASP required for testing to proceed.

SAMPLE IDENTIFICATION				INDEX TESTS											ENGINEERING PROPERTY TESTS												
Exploration (1) Number	Run Number	Sample (2) Depth (ft)	Sample Type (3)	Visual Classification D2488 VC	Moh's Hardness Mo	Water Content D2216 w	Unit Weight UW	Saturated Water Content (absorption/apparent porosity) w_{sat}	Bulk Specific Gravity Gb	Porosity Po	Rebound hardness (Schmidt Hammer) R_H	Cerchar Abrasion Index D7625 CA			Slake Durability D4644 SL	Brazilian Splitting Tensile test D2967	Direct Tensile Test D2936	Point Load Test	Unconfined Compression D7012 UCr	Unconfined Compression with Modulus D7012 Ucm	Direct Shear D5607 Normal Stresses	Triaxial Strength D7012 Normal Stresses	Permeability with Air D4525 Normal Stresses	
B1	SBH-4		RC																X							
B5	SBH-1		RC																X							

NOTES: 1. Exploration Number = designation for boring, test pit, etc. 2. Give range or average depth. 3. See details

Key: Test Status Key (shown by symbol or letter key): Guide to Test Specifications and Instructions

	1	TEST ASSIGNED	X	1	TEST IN PROGRESS	X	1
	1	TEST COMPLETED	X	1	TEST FINALIZED		

Relinquished by:	Date:	Received by:	Track#	Date:	Received at lab by: AG	Date: 7/11/22

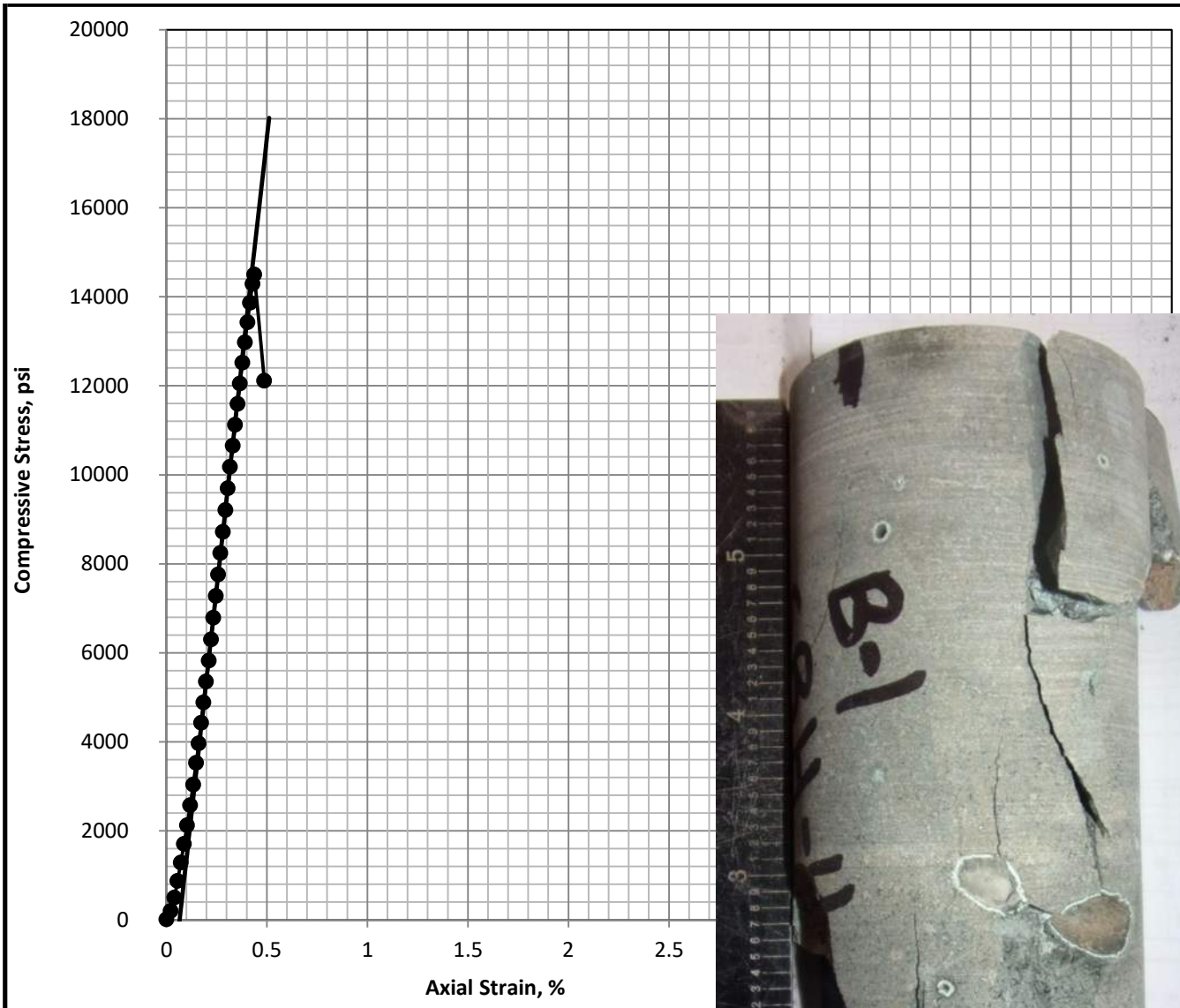
TerraSense, LLC
45H Commerce Way, Totowa, NJ 07512
(973)-812-1818

GZA #92704.00
PSE&G West Orange
SUMMARY OF ROCK TESTING

SAMPLE IDENTIFICATION		STATE PROPERTIES			ENGINEERING PROPERTY TESTS				REMARKS
Boring	Run	WATER CONTENT (1) (%)	TOTAL UNIT WGT. (pcf)	DRY UNIT WGT. (pcf)	TEST TYPE (2)	UNCONFINED COMPRESSION TESTS (ASTM D7012)			
						COMPRESSIVE STRENGTH (psi)	AXIAL STRAIN @ FAILURE (%)	ESTIMATED (5) ELASTIC MODULUS (psi)	
B-1	SBH-4	1.8	168	165	UC	14500	0.37	4E+06	
B-5	SBH-1	1.8	169	166	UC	17530	0.45	4E+06	

Notes: (1) Water contents determined after trimming and shearing.
(2) Test Type Abbreviations: UC: Unconfined Compression test with estimated elastic moduli determination
(5) Modulus estimated based on corrected gross deformations.

TerraSense
45H Commerce Way
Totowa, NJ 07512



FAILURE PHOTO

Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
1.77	168	165	4.446	1.967

Specimen meets ASTM D4543 shape tolerances

Test Summary

Strain Rate (%/min)	Corrected Strain to Peak (%)	q_u (psi)	Estimated (shown) Elastic Modulus (psi)
0.09	0.37	14500	4E+06

Test by: JS
Test Date: Jul-18-22
Reviewed by: DM

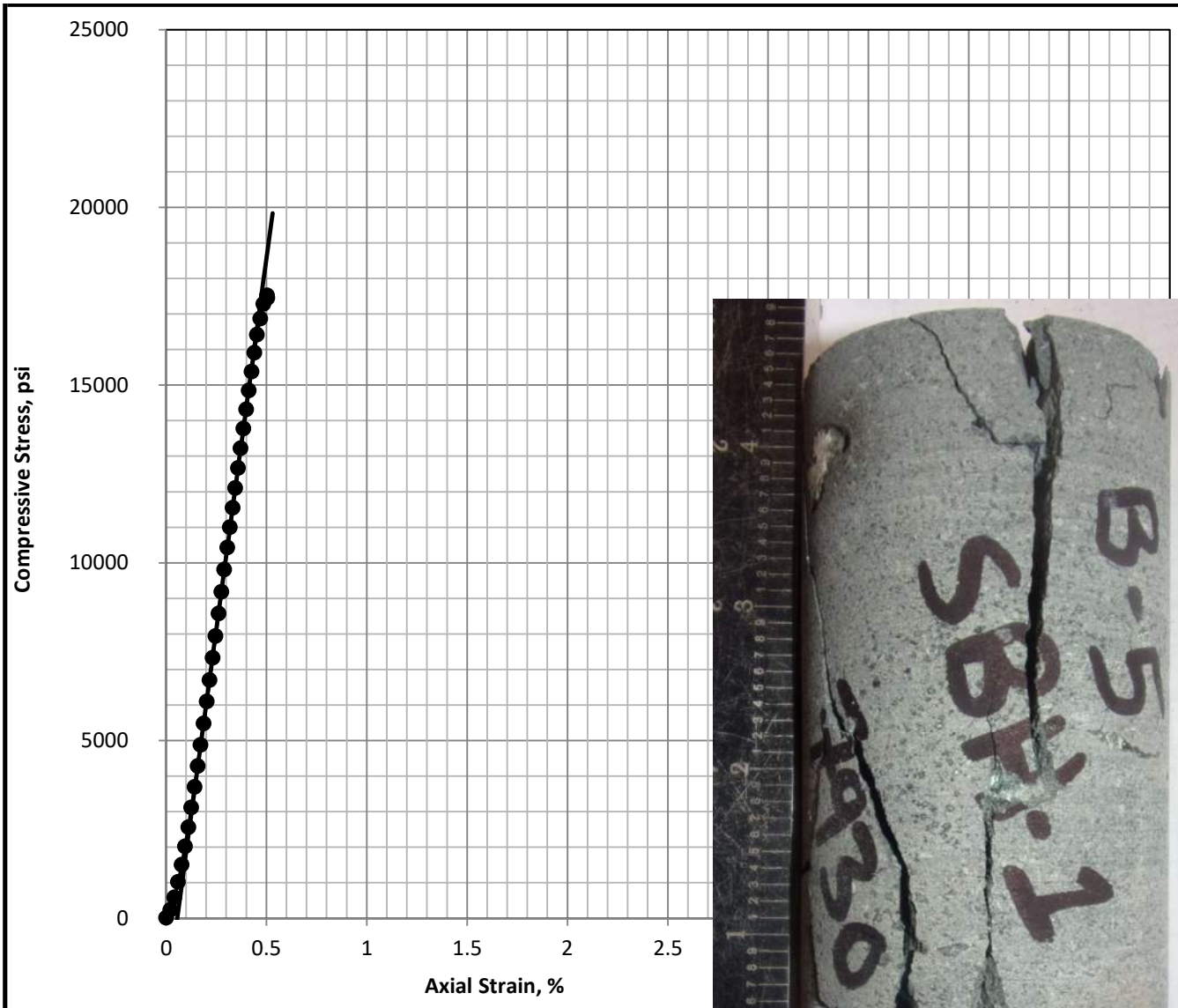
GZA
Project # 92704.00

TerraSense
Project # 22009432A

PSE&G West Orange

COMPRESSIVE STRESS VS STRAIN
UNCONFINED COMPRESSIVE STRENGTH TEST

Boring: B-1 Run: SBH-4



FAILURE PHOTO

Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
1.79	169	166	4.422	1.965

Specimen meets ASTM D4543 shape tolerances

Test Summary

Strain Rate (%/min)	Corrected Strain Strain to Peak (%)	q_u (psi)	Estimated (shown) Elastic Modulus (psi)
0.09	0.45	17530	4E+06

Test by: JS
Test Date: Jul-18-22
Reviewed by: DM

GZA
Project # 92704.00

TerraSense
Project # 22009432A

PSE&G West Orange

COMPRESSIVE STRESS VS STRAIN
UNCONFINED COMPRESSIVE STRENGTH TEST

Boring: B-5 Run: SBH-1

APPENDIX IV

Limitations

APPENDIX IV

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape and compass measurement from existing site features. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us by the PSE&G. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of PSE&G for specific application to the design of the proposed West Orange Switching Station Lifecycle Project. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from five widely-spaced test borings and three test pit excavations performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil and foundation engineering report was prepared for the project by GZA GeoEnvironmental, Inc. (GZA) for design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that GZA be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

APPENDIX F - REFERENCE MATERIALS

STORMWATER MANAGEMENT REPORT

PUBLIC SERVICE ELECTRIC AND GAS COMPANY, WEST ORANGE SWITCHING STATION EXPANSION

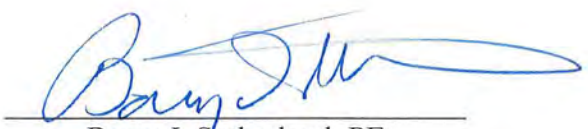
TOWNSHIP OF WEST ORANGE, NJ

PREPARED FOR:

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
NEWARK, NJ

PREPARED BY:

TRC ENGINEERS, INC
57 WILLOW STREET
MILBURN, NJ 07041
TEL: 973-564-6006



Barry J. Sutherland, PE
NJ License No. 29135

MARCH 2012

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Appendices

Appendix A – NRCS Soils Data and Information
Appendix B – Pre-Development Drainage Area Plan
Appendix C – Pre-Development HydroCad Results
Appendix D – Post Development Drainage Area Plan
Appendix E – Post Development HydroCad Results
Appendix F – Aqua-Swirl/Aqua-Filter Specifications

Section I: Introduction

1. Scope of Report

The purpose of this report is to present the drainage analysis and erosion and sediment control plan for the proposed West Orange Switching Station expansion project located in the Township of West Orange, Essex County, New Jersey. The project will result in a total disturbance of approximately 10.3 acres, including construction laydown, and a net decrease in impervious surface area of approximately 0.36 acres when the proposed buildings, foundations, paved roads, and gravel road areas are included. The proposed project will require compliance with the stormwater quality requirements of the NJDEP Stormwater Regulations. Note that the proposed secondary containment areas for new transformers are considered non-contributory areas. This documentation is provided for review by the approving agencies.

Section II: Project Information

1. Project Description

Public Service Electric and Gas Company (PSE&G) is proposing to expand the West Orange Switching Station to increase transmission system reliability and to provide electrical service enhancements to address anticipated regional customer loads. The proposed expansion at the West Orange Switching Station will allow for station operation at 230 kV, rather than at 138 kV under its current configuration. This will include replacing the existing 138kV equipment with a new three bay breaker and a 230kV switching station. This includes installing three 230kV line positions to replace the S-1319, T-1320 and Y-1351 lines, three 230/11/26kV LTC transformers, three 3000A line disconnect switches, eleven 230kV dead-tank circuit breakers, twenty 4000A breaker disconnect switches, seven 3000A transformer/cable/capacitor disconnect switches, and a new 230kV-150MVAR capacitor bank with three Live Tank Circuit Breakers. The 230kV equipment will be installed in an area within the existing property fence. The 26kV Bus connections from the new transformers will connect with the existing 26kV bus. The station service will consist of two new 750kVA station service transformers fed from the 11kV tertiary of transformers T4 & T3, two main breakers and one tie breaker and one new 750 kW generator. New line relay protection, bus protection, transformer protection, capacitor protection and breaker failure relaying will be installed in a new control house for the 230kV Switching Station will be installed. The existing 138kV line positions and associated equipment will be removed. Existing primary, secondary and breaker failure relay panels will be removed.

A USGS location map of the site and surrounding area is included as Figure 1 and an aerial photograph of the Project vicinity illustrating the existing switching station and proposed switching station expansion area is included as Figure 2. The property borders Mount Pleasant Avenue to the north, Prospect Avenue to the west, and an office building parking lot to the east. It is currently accessible via a main access road off Mount

Pleasant Avenue, a smaller access road off the same road for PSE&G employees at the southern end, and an access road off Prospect Avenue.

Table I-1 provides a cross reference listing for the design plans and specifications for the West Orange Switching Station.

Table I-1
List of Drawings for the Proposed West Orange Switching Station Expansion

Drawing No.	Drawing Title
331307	Bus Plan
331308	Sections and Details
331309	Grading Plan
331310	Grading Details
331311	Soil Erosion & Sediment Control Plan
331312	Soil Erosion & Sediment Control Notes and Details
331313	Plan View
331314	Site Details
331315	Foundation Plan
331318	Sections & Details – Sheet 7
331320	Removal Plan
331450	Lighting Distribution Plan
331456	Sections & Details – Sheet 2
331457	Sections & Details – Sheet 3
331458	Sections & Details – Sheet 4
331459	Sections & Details – Sheet 5
331460	Sections & Details – Sheet 6
334554	Lighting Distribution Layout
341555	Gate and Station Road Location Plan
341558	Fence Modifications
341559	Double Swing Gate & Fence Details
341560	Drainage Details
341561	Drainage Details – Aqua Swirl Concentrator
341562	Drainage Details – Aqua Filter
341602	Top Plan

Figure 1 – Site Location Map

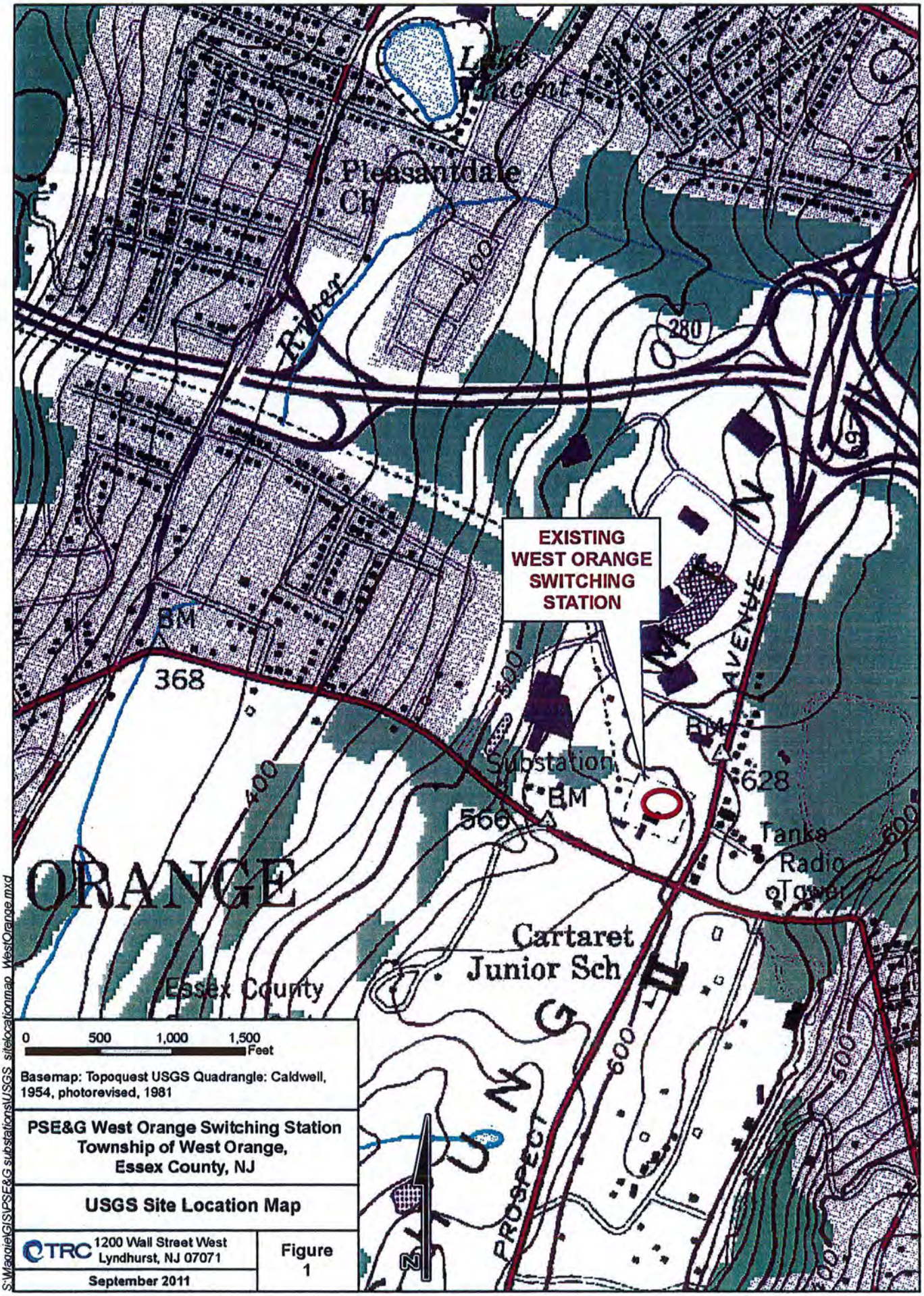
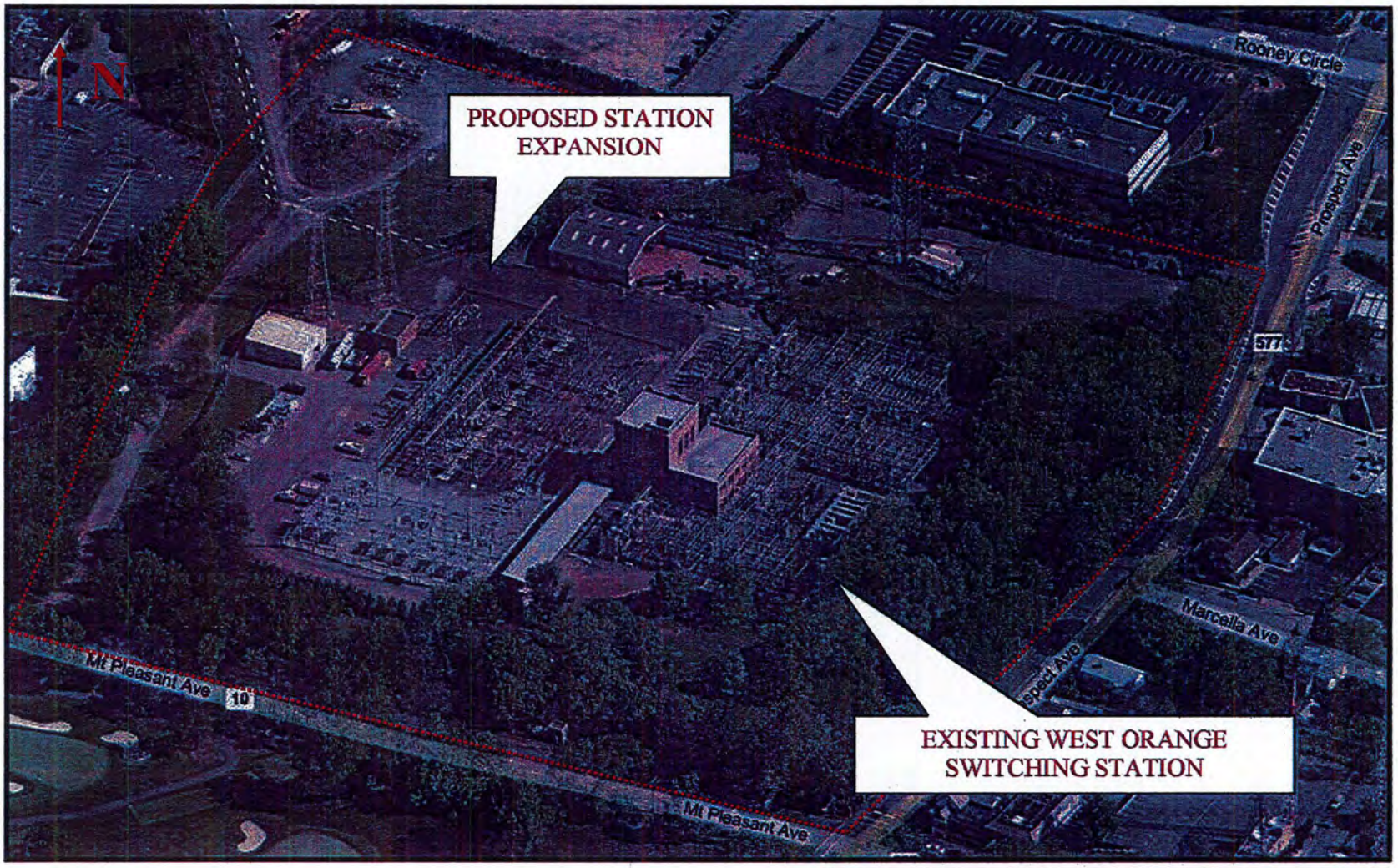

EXISTING
WEST ORANGE
SWITCHING
STATION
Pleasantdale
Ch
River
280
BM
368
400
500
600
Substation
BM
566
628
Tanka
Radio
Tower
ORANGE
Essex County
Cartaret
Junior Sch
PROSPECT
AVENUE
0
500
1,000
1,500
Feet
Basemap: Topoquest USGS Quadrangle: Caldwell, 1954, photorevised, 1981
PSE&G West Orange Switching Station
Township of West Orange,
Essex County, NJ
USGS Site Location Map
TRC
1200 Wall Street West
Lyndhurst, NJ 07071
Figure
1
September 2011
S:\Maggie\GIS\PSE&G substations\USGS_sitelocationmap_WestOrange.mxd

Figure 2 – Site Aerial



PSE&G West Orange Switching Station
Township of West Orange, NJ

Figure 2: Aerial Photograph

Source: Bing Maps, 2010, NAVTEQ 2010

TRC

2. Soil Types

Review of the Natural Resource Conservation Service (NRCS) Web Soil Survey data and information indicates that there are six (6) principal soil types present in the site vicinity. Table II-1 provides a tabular listing of soil types present and summarizes their hydrologic characteristics. A copy of the NRCS Soils Map and other key soil characteristics are included in Appendix A.

Table II-1
Table of Soil Characteristics

Map Unit	Soil Name	Water Table (cm)	Depth to Restrictive Layer (cm)	Hydrologic Soils Group	Slope
BogBc	Boonton loam, 0 to 8% slopes, extremely stony	>200	76	C	0-8%
BogCc	Boonton loam, 8 to 15% slopes, extremely stony	>200	76	C	8-15%
DuuB	Dunellen – Urban land, Dunellen substratum complex, 0 to 8 % slopes	>200	>200	A	0-8%
UdbonB	Udorthents, Boonton substratum, 0 to 8 % slopes	>200	>200	D	0-8%
URBONB	Urban Land, Boonton substratum, 0 to 8% slopes	>200	>200	N/A	0-8%
USBONB	Urban Land, Boonton substratum-Boonton complex, 0 to 8% slopes	>200	>200	N/A	0-8%

The existing West Orange Switching Station, as well as the proposed expansion area, is located within soils designated by the NRCS as Urban-Boonton substratum soils (URBONB) and Urban-Boonton substratum-Boonton complex soils (USBONB) with 0-8% slopes. Urban soils are described by the NRCS as soils where 80 percent of the surface is covered by asphalt, concrete, buildings, or other impervious areas. Although the NRCS does not assign a hydrologic soil group to urban soils, to be conservative and to reflect the low infiltration capacity at the site, runoff curve numbers (i.e., CN values) corresponding to hydrologic soils group "D" were assigned to the various cover types identified within the area of interest.

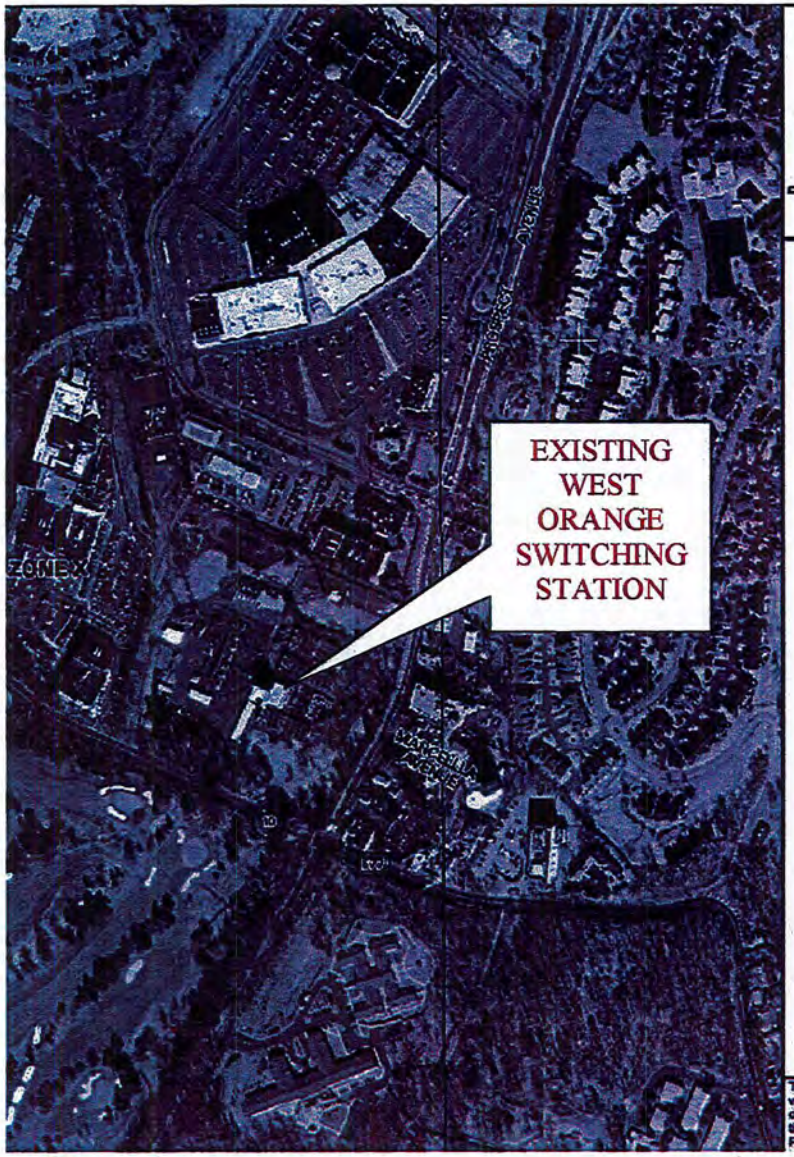
The geotechnical report provided in Appendix A also shows a solid clay layer underlying the site which shows that there is not much infiltration capacity. Surface materials in Borings SBH-1 and 2 are underlain by clayey sand and sandy clay fill which extend to depths on the order of two and one-half feet below existing grades. At SBH-5, loose clayey silts and clayey sands were encountered to about nine feet that likely represent fill materials from past site grading activities.

3. Water Resources

As shown on the USGS Quadrangle Map (Figure 1), on a regional basis runoff from the site drains in a southwesterly direction and ultimately discharges into an unnamed tributary to the Rahway River. The current water quality classification for the Rahway River is FW2-NT.

Review of the Flood Insurance Rate Map (Figure 3) for West Orange Township (panel No. 34013C0092F), indicates that the site and proposed expansion area are not located within the 100-year floodplain.

Figure 3 – FEMA Map



MAP SCALE 1" = 500'

250 0 500 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0092F

FIRM

FLOOD INSURANCE RATE MAP

ESSEX COUNTY,
NEW JERSEY
(ALL JURISDICTIONS)

PANEL 92 OF 200

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ROSELAND, BOROUGH OF	340120	0092	F
WEST ORANGE, TOWNSHIP OF	340167	0092	F
LIVINGSTON, TOWNSHIP OF	340140	0092	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
34013C0092F

EFFECTIVE DATE:
JUNE 4, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

PSE&G West Orange Switching Station
Township of West Orange, NJ

Figure 3: FEMA Map

Map Source: FEMA Flood Insurance Rate Map, 34013C0092F

TRC

Section III: Stormwater Management

1. Non-Structural Controls

The Township of West Orange requires a stormwater management plan be submitted for all land development projects. Further, that flood control, groundwater recharge and pollutant reduction aspects of the plan consider non-structural or low-impact techniques before relying on structural Best Management Practices (BMPs). In accordance with Section 25-29.4 e(2), the following non-structural stormwater management strategies have been incorporated into the stormwater management plan for the site.

[1] Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.

The proposed expansion is located within the existing property boundary. Due to the extent of grading that will take place during construction, silt fencing and straw bale barriers, and other temporary erosion and sediment control measures will be used. In addition, retaining walls will be constructed in a few areas of the site. These areas include the north side of the switching station pad expansion, west of the new transformer containment area just north of the existing control building, and a parcel of land surrounding the existing microwave building in the northeast corner of the site.

[2] Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.

The net change in impervious surface coverage (i.e., the net change in surfaces covered by gravel access roads, gravel parking areas and other structures) will be a decrease of 15,833 square feet, or approximately 0.36 acres. To the maximum extent practicable, new structures located on the existing switching station pad will be disconnected from adjacent impervious surfaces, as most existing and proposed impervious surfaces drain to the yard stone surface of the switching station pad. The yard stone surface will consist of a 4-inch layer of loose 3/4" crushed stone and will not be subject to routine vehicular traffic. When placed on nearly level surfaces, voids within the 4-inch crushed stone layer must fill prior to the start of surface runoff. Therefore, unlike gravel drives and parking areas, the available storage capacity of the yard stone cover modifies the runoff characteristics for this land cover type.

[3] Maximize the protection of natural drainage features and vegetation.

As indicated above, the expansion project will fall within the boundaries of the existing switching station. Drainage from the existing switching station discharges through a culvert under Mount Pleasant Avenue. The grass area used for temporary laydown during construction will be revegetated (i.e., returned to grass conditions). However, because of grading activities to allow for the expansion of the switching station pad, trees at the southern end of the existing pad will be cleared. This area will be replaced by a meadow surface. Noting that the new transformer secondary containment structures will

be operated on an inspect and release basis and will not be discharged during major storm events, the net change in impervious surface area coverage will be a decrease of 15,833 square feet or approximately 0.36 acres.

[4] Minimize the decrease in the time of concentration from preconstruction to post construction.

By maintaining relatively flat slopes across the yard stone surface coupled with placement of a 4-inch layer of 3/4-inch crushed stone, reductions in the time of concentration have been minimized.

[5] Minimize land disturbance including clearing and grading.

The area encompassed by the limit of disturbance will total approximately 10.3 acres. This includes a laydown area, which will also fall within the boundaries of the existing switching station. However, due to the proposed expansion of the switching station, grading will be required. Soil erosion controls will be implemented and retaining walls will be constructed to control soil erosion.

[6] Minimize soil compaction.

Soil compaction will be required for the installation of new foundations, which require structural support, and for construction of the expansion area. Areas targeted for revegetation will be scarified prior to revegetation.

[7] Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.

The project will not result in the creation of new landscaped areas. Existing landscaped areas falling outside the limits of the switching station expansion area will be returned to predevelopment conditions. As such, the need for fertilizers and pesticides has also been minimized.

[8] Provide vegetated open channel conveyance systems discharging into and through stable vegetated areas.

A series of bioretention basins and natural drainage swales will be constructed west of the switching station pad expansion area to maintain stable vegetated areas.

[9] Provide other source controls to prevent or minimize the use or exposure of pollutants at the site.

Secondary containment will be provided for the new 230 kV transformers. Discharge from the containment sumps will be on an inspect and release basis. If transformer oil is suspected to be present in the sumps for any reason, the liquid contents of the sumps will be transported for off-site disposal at an appropriately licensed treatment facility.

2. Analysis of Pre-Development Stormwater Runoff

This section presents hydrologic data and information to demonstrate that peak stormwater runoff flows under post development conditions will not exceed those under pre-development conditions during the 2-year, 10-year, and 100-year, 24-hour rainfall events.

The analysis was performed using the methodology described in Technical Release No. 55, Urban Hydrology for Small Watersheds, published by the United States Department of Agriculture, Soil Conservation Service, dated June 1986. Hydrologic modeling was performed using HydroCad stormwater software developed by HydroCAD Software Solutions LLC.

Pre-development runoff rates were determined by subdividing the drainage area into nine smaller drainage areas by land use. Existing land uses are listed in Table III-1. The Pre-Development Drainage Area Plan is included in Appendix B.

Table III-1
Pre Development Drainage Areas[1, 2, 3]

LAND USE	EX-DA1 (ft^2)	EX-DA2 (ft^2)	EX-DA3 (ft^2)	EX-DA4 (ft^2)	EX-DA5 (ft^2)	EX-DA6 (ft^2)	EX-DA7 (ft^2)	EX-DA8 (ft^2)	EX-DA 9A (ft^2)	EX-DA 9B (ft^2)
Impervious (Foundations)	11158	4190	3042	31370	17517	9501	805	15912	1344	24703
Gravel Road	661	0	35019	5072	0	8481	2198	0	0	0
Gravel	0	0	29686	12803	0	0	0	0	0	670
Yard Stone	0	0	0	8134	0	43082	10157	29261	20580	20336
Meadow	0	0	26372	0	0	0	0	0	0	0
Grass	53293	10038	30906	21568	2694	57041	86177	1535	0	0
Brush	14189	3705	0	0	0	27592	5402	0	0	0
Non-Contributory	0	0	0	0	0	1964	0	982	0	0
Total	79301	17933	125025	78947	20211	147661	104739	47690	21924	45709

1) See Appendix B – Pre-Development Drainage Area Plan
2) The total area within the Limit of Disturbance is 10.3 acres or 448,819 ft^2. The total area within the Drainage Area is 15.8 acres or 686,140 ft^2.
3) The existing transformer secondary containment basin was assumed to be non-contributory under pre-development conditions.

Rainfall totals for each event were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for West Orange, NJ and are summarized in Table III-2.

Table III-2
Precipitation Frequency Estimates with 90% Confidence Intervals (inches)[1]

Duration	Average Recurrence Interval (years)		
	2 year	10 year	100 year
24-hours	3.42 inches	5.21 inches	8.72 inches

1) NOAA Atlas 14, Volume 2, Version 3, West Orange, NJ

For each drainage area, time of concentration (Tc) was determined using the hydraulically longest flow path. The flow path for the drainage area was extended to "Analysis Point A," where drainage from the site reaches an existing catch basin, which then carries flow to an unnamed tributary of the Rahway River. The Tc flow paths are identified on the Pre-Development Drainage Area Plan. Curve numbers (CNs) were generated based on hydrologic soil group and land use cover type. The yard stone surface of the switching station pad, which will consist of a 4-inch thick layer of loosely packed 3/4-inch crushed stone, was assigned a CN value of 85 to reflect available storage capacity within the yard stone prior to the initiation of surface runoff.

HydroCad output for pre-development conditions for the 2-year, 10-year, and 100-year, 24-hour storm events is included in Appendix C. Pre-development runoff rates and volumes are summarized in Table III-3.

Table III-3
Pre-Development Runoff Rates and Volumes at Analysis Point A

Storm Event	Runoff Volume (acre-ft)	Peak Runoff Rate (cfs)
2-year, 24-hour	2.684	23.25
10-year, 24-hour	4.777	41.95
100-year, 24-hour	9.133	79.82
NJDEP	0.541	10.16

3. Analysis of Post-Development Stormwater Runoff

Post-development runoff rates were determined by subdividing the drainage area into nine smaller drainage areas by land use. The Post-Development Drainage Area Plan is included in Appendix D.

The new secondary containment areas for the transformers were determined to be a non-contributory area during a storm event, since they will be operated on and inspect and release basis. As such, it was excluded from the post development runoff calculations. Thus, the total drainage area under post-development conditions is 689,600 square feet. Proposed land use within the drainage area is summarized in Table III-4.

Table III-4
Post Development Drainage Areas

LAND USE	PO-DA1 (ft^2)	PO-DA1A (ft^2)	PO-DA1B (ft^2)	PO-DA1C (ft^2)	PO-DA 2 (ft^2)	PO-DA 3A (ft^2)	PO-DA 3B (ft^2)
Impervious (Foundations)	11168	2107	1769	4402	0	0	5785
Gravel Road	0	0	0	0	0	10141	1111
Gravel	0	0	0	0	0	0	0
Yard Stone	0	0	0	0	0	0	0
Meadow	8088	10364	6795	5534	19890	10571	3792
Grass	38971	0	0	0	9261	0	0
Brush	0	0	0	0	0	0	0
Non-contributory	0	0	0	0	0	0	0
Total	58227	12471	8564	9936	29151	20712	10688

LAND USE	PO-DA 4 (ft^2)	PO-DA 5A (ft^2)	PO-DA 5B (ft^2)	PO-DA 6 (ft^2)	PO-DA 7 (ft^2)	PO-DA 8 (ft^2)
Impervious (Foundations)	4334	15734	16509	13009	1868	10980
Gravel Road	5398	0	0	0	0	0
Gravel	0	0	6800	0	0	0
Yard Stone	0	0	0	47083	14410	5243
Meadow	15808	7713	0	853	0	0
Grass	14366	8318	2441	39774	72265	0
Brush	0	0	0	22963	5406	0
Non-contributory	0	2364	0	4135	0	3173
Total	39906	34129	25750	127817	93949	19396

LAND USE	PO-DA 9A (ft^2)	PO-DA 9B (ft^2)	PO-DA 9C (ft^2)	PO-DA 9D (ft^2)
Impervious (Foundations)	650	5504	1117	1192
Gravel Road	1367	6361	18457	16177
Gravel	0	0	0	0
Yard Stone	46220	30963	33086	37810
Meadow	0	0	0	0
Grass	0	0	0	0
Brush	0	0	0	0
Non-contributory	0	0	0	0
Total	48237	42828	52660	55179

As in the pre-development analysis, the time of concentration (Tc) was determined using the hydraulically longest flow path. The Tc flow paths within the area of disturbance are identified on the Post Development Drainage Area Plan located in Appendix D. Tc flow paths under post-development conditions were also extended to "Analysis Point A." HydroCad output under Post-Development conditions for the 2-year, 10-year, and 100-year, 24 hour storm events is included in Appendix E and summarized in Table III-5.

Table III-5
Post-Development Runoff Rates and Volumes at Analysis Point A

Storm Event	Runoff Volume (acre-ft)	Peak Runoff Rate (cfs)
2-year, 24-hour	2.379	21.97
10-year, 24-hour	4.371	39.70
100-year, 24-hour	8.685	75.50
NJDEP	0.460	9.30

Table III-6 provides a comparison between pre-development and post-development runoff conditions for each design storm. As shown in Table III-6, projected peak runoff rates and volumes under post development conditions are expected to be less than under pre-development conditions for each storm event.

Table III-6
Pre and Post Development Total Runoff Volumes and Peak Rates

Storm Event	Pre – Total Discharge		Post – Total Discharge	
	Volume [acre-ft]	Peak Runoff [cfs]	Volume [acre-ft]	Peak Runoff [cfs]
2-year, 24-hour	2.684	23.25	2.379	21.97
10-year, 24-hour	4.777	41.95	4.371	39.70
100-year, 24-hour	9.133	79.82	8.685	75.50
NJDEP	0.541	10.16	0.460	9.30

Figure 4 shows the pre and post-development hydrographs for the 2-year, 24-hour, 10-year, 24-hour, and 100-year, 24-hour storms at Analysis Point A. The graphs show that runoff flows under post-development conditions do not exceed at any point in time those under pre-development conditions.

Table III-6 shows that the 2-year, 24 hour peak runoff for the post development is less than predevelopment. Therefore, at a minimum, 100 percent of the average annual pre-construction groundwater recharge for the site has been maintained.

Figure 4 – Hydrograph Overlays

Figure 4 - West Orange Switching Station
Pre- and Post-Development Hydrographs for the 2-Year, 24-Hour Storm Event

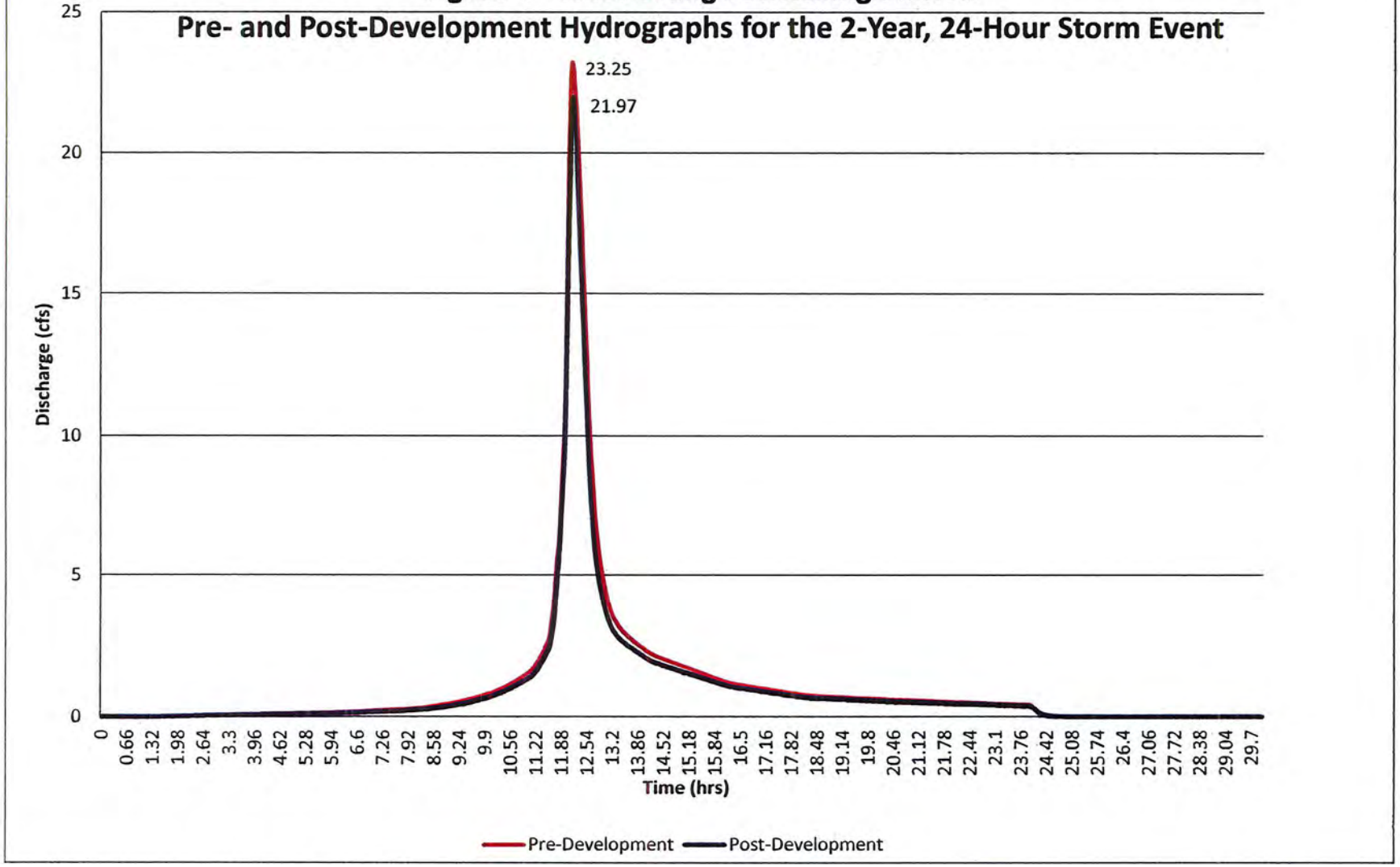


Figure 4 - West Orange Switching Station
Pre- and Post-Development Hydrographs for the 10-Year, 24-Hour Storm Event

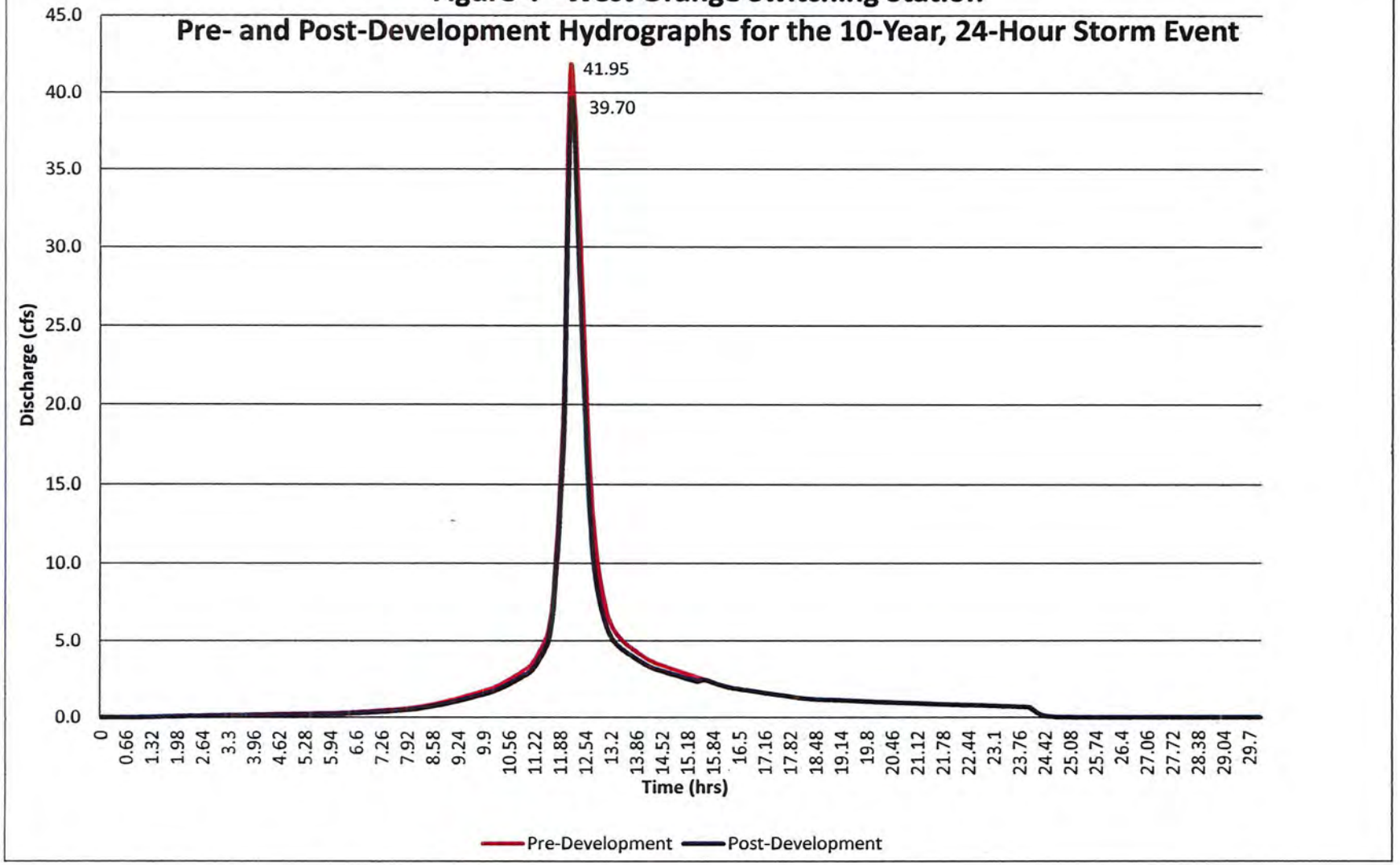
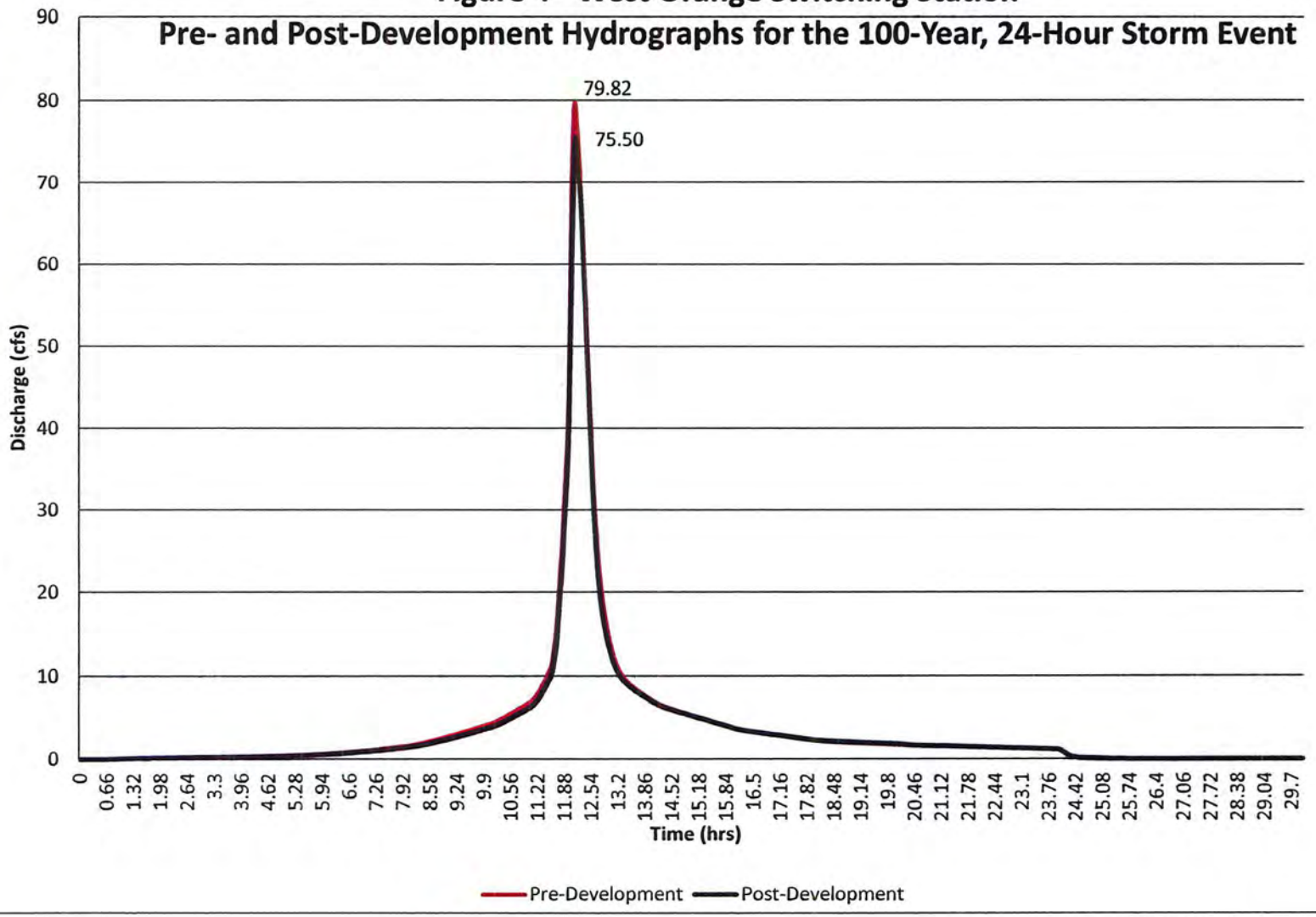


Figure 4 - West Orange Switching Station

Pre- and Post-Development Hydrographs for the 100-Year, 24-Hour Storm Event



4. Stormwater Quality Requirements

For Major Development sites, NJDEP requires 80% TSS reduction for the NJDEP water quality storm event (1.25 inches over 2 hours). To demonstrate compliance with the water quality requirement NJDEP has adopted TSS removal rates for each of the Best Management Practices in the Chapter 9 of the NJDEP Stormwater BMP Manual. TRC has selected the AquaFilter/AquaSwirl manufactured treatment device for the NJDEP water quality storm. The system, manufactured by AquaShield Inc., is certified by NJDEP with a TSS removal rate for the AquaFilte/Aquaswirl is 80%. The system is to be installed under the access road south of MH-12 to filter out sediments collected in stormwater flows from the east side of the existing station. See Appendix F for detailed spec sheets from AquaShield Inc., regarding the system.

In addition, a series of bioretention basins will be placed alongside the main access road directly west of the new pad to provide an 80% TSS removal rate. The basins will allow sediments from the stormwater to settle out before stormwater flows reach CB #1.

Section IV: Stormwater Maintenance Schedule

The stormwater management system for the proposed West Orange Switching Station Expansion Project will consist of monitoring the Aqua-Swirl/Aqua-Filter system, inspection of the transformer secondary containment area and insuring that yard stone surfaces remain in place. Maintenance activities will include the following:

1. Refer to Appendix F for maintenance of the Aqua-Swirl/Aqua-Filter system.
2. After every storm event exceeding one inch (1") of rainfall: PSE&G shall inspect to determine that basins drain completely within seventy-two (72) hours after the storm event. If stored water fails to infiltrate seventy-two (72) hours after the end of the storm, corrective measures shall be investigated and taken as required. Remove sediment and encrusted build up avoiding mixing with native topsoil, rake or till by light equipment to restore detention capacity of particular areas.
3. Once per month (or sooner as seasonal growth necessitates): PSE&G shall remove litter and debris from the basin area, and then mow top, banks and bottom to maintain a height of between 2 to 6 inches collecting and disposing all clippings off-site.
4. Four times per year (quarterly): PSE&G shall inspect stormwater basins for clogging, debris and sediment accumulation – remove as needed. Check for signs of damage to structures and erosion of banks and bottom – repair as needed. Observe for signs of petroleum contamination – remediate as needed.
5. Once per year: PSE&G shall inspect basins for undesirable plant growth such as trees, woody vegetation, weeds, etc., and remove as necessary.
6. PSE&G will inspect the yard stone surface of the switching station pad on a monthly basis to ensure it remains in place. Any evidence of off-site erosion will be corrected prior to the next expected rainfall event.

Section V: Soil Erosion and Sediment Control

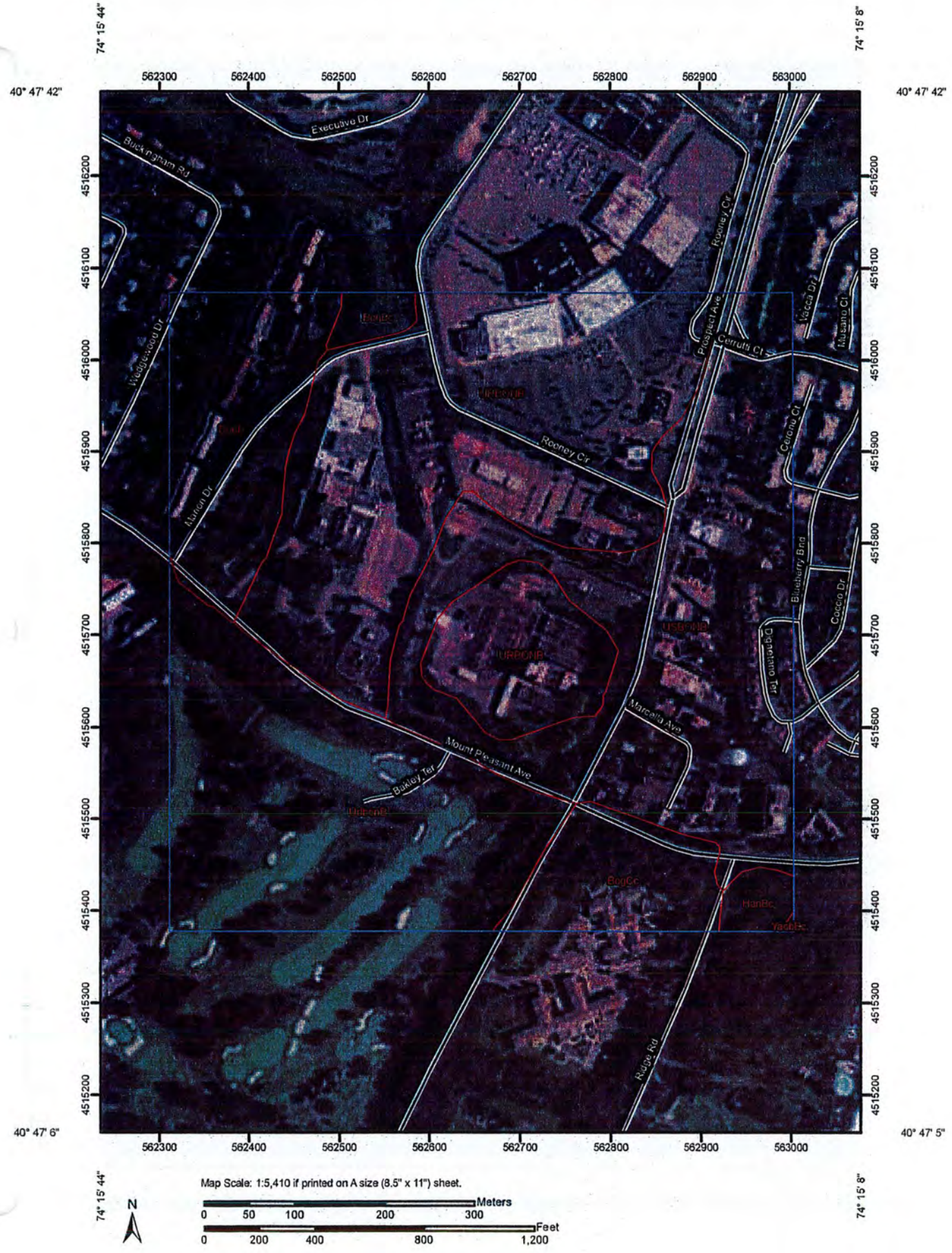
During construction, the potential for soil erosion and sedimentation will be controlled through the use of temporary soil erosion and sediment control measures. This will include silt fencing, straw bale barriers and stabilized construction entrances. The soil erosion and sediment control plan is shown on Drawing No. 331311 entitled "Soil Erosion & Sediment Control Plan." Erosion and sediment control notes are included on Drawing No. 3313310 entitled "Soil Erosion & Sediment Control Notes and Details". The soil erosion and sediment control measures will minimize the downstream erosion hazard by controlling runoff at its source, minimize runoff from disturbed areas and de-concentrate stormwater runoff.

Section VI: Conclusion

The West Orange Switching Station Expansion Project will disturb approximate 10.3 acres of land located within the existing switching station pad and transmission line ROW. It is TRC's professional opinion that the proposed improvements to the site have been designed in accordance with these requirements and can be constructed without negatively impacting offsite drainage characteristics.

Appendix A – NRCS Soils Data and Information

Soil Map—Essex County, New Jersey



MAP LEGEND

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

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:5,410 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

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

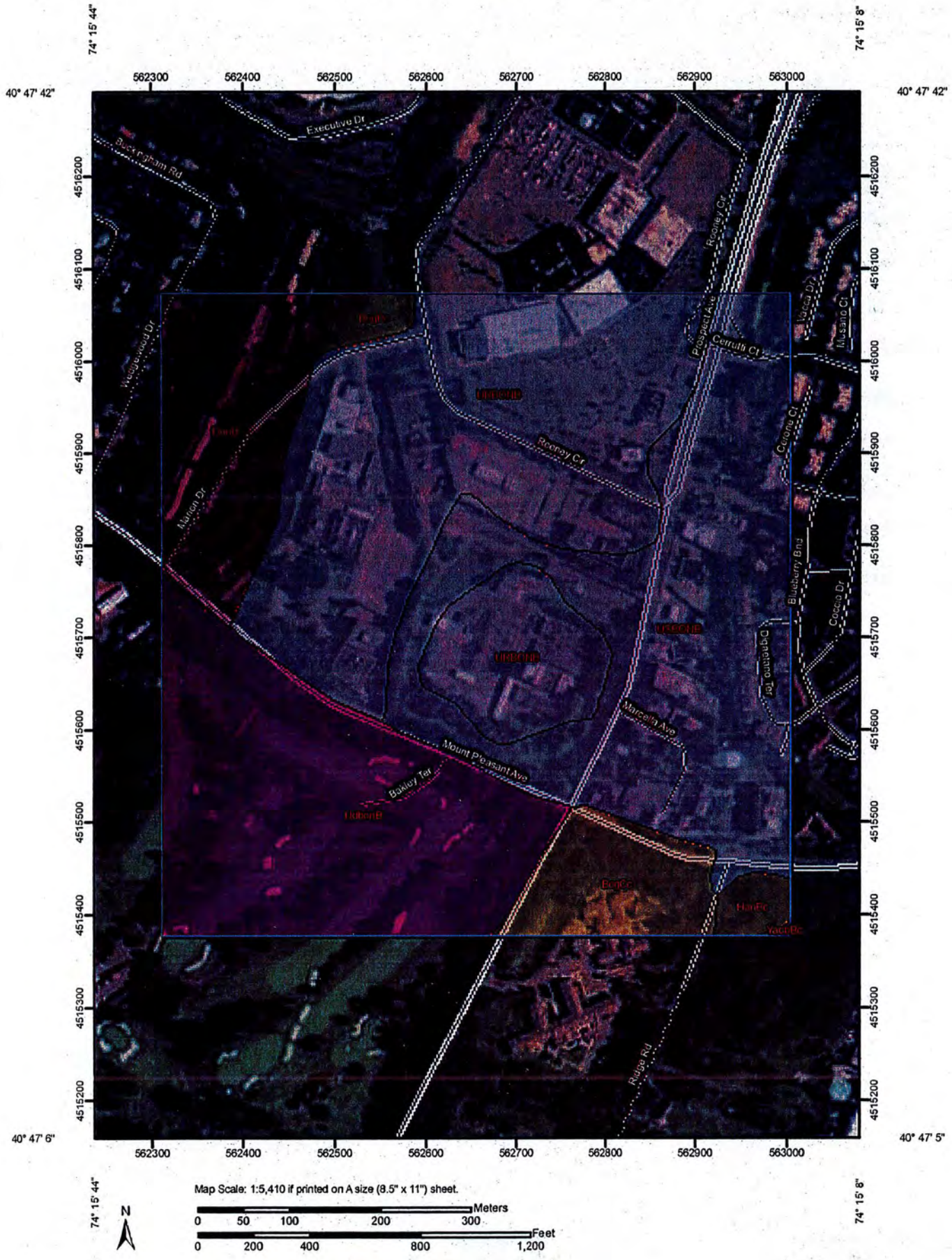
Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

Date(s) aerial images were photographed: 8/13/2006; 8/5/2006

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

Map Unit Legend

Essex County, New Jersey (NJ013)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	1.1	0.9%
BogCc	Boonton loam, 8 to 15 percent slopes, extremely stony	6.3	5.3%
DuuB	Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes	11.7	9.8%
HanBc	Haledon silt loam, 0 to 8 percent slopes, extremely stony	1.2	1.0%
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	26.0	21.8%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes	40.0	33.5%
USBONB	Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes	32.9	27.6%
YaobBc	Yalesville - Boonton - Holyoke complex, 0 to 8 percent slopes, extremely stony	0.0	0.0%
Totals for Area of Interest		**119.1**	**100.0%**


74° 15' 44"
74° 15' 8"
40° 47' 42"
40° 47' 6"
40° 47' 5"
562300
562400
562500
562600
562700
562800
562900
563000
4516200
4516100
4516000
4515900
4515800
4515700
4515600
4515500
4515400
4515300
4515200
Executive Dr
Buckingham Rd
Ridgewood Dr
Mahon Dr
Roorey Ct
Prospect Ave
Cerrulli Ct
Varca Dr
Musano Ct
Corona Ct
Blueberry Bnd
Cocco Dr
Capretto Ter
Marcella Ave
Mount Pleasant Ave
Bailey Ter
Ridge Rd
UrbanB
UrbanE
BonCa
HanBc
YacBc
Map Scale: 1:5,410 if printed on A size (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1,200

MAP LEGEND

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

Soils
- Soil Map Units

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

Political Features
- Cities

Water Features
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:5,410 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

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

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

Date(s) aerial images were photographed: 8/13/2006; 8/5/2006

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Essex County, New Jersey (NJ013)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	C	1.1	0.9%
BogCc	Boonton loam, 8 to 15 percent slopes, extremely stony	C	6.3	5.3%
DuuB	Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes	A	11.7	9.8%
HanBc	Haledon silt loam, 0 to 8 percent slopes, extremely stony	C	1.2	1.0%
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	D	26.0	21.8%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes		40.0	33.5%
USBONB	Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes		32.9	27.6%
YaobBc	Yalesville - Boonton - Holyoke complex, 0 to 8 percent slopes, extremely stony	B	0.0	0.0%
Totals for Area of Interest			**119.1**	**100.0%**

Description

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

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

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

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

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

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

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

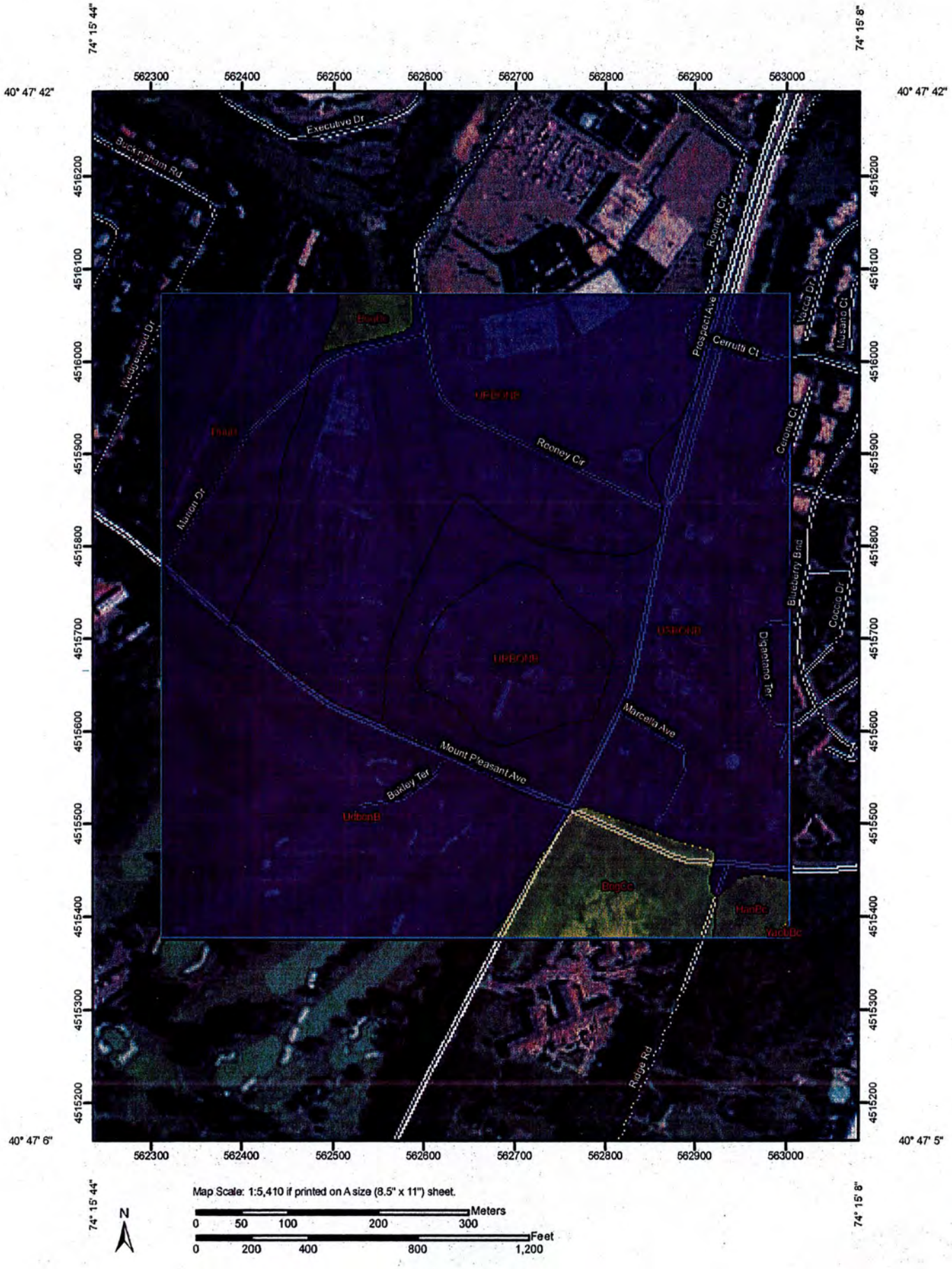
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Depth to Any Soil Restrictive Layer—Essex County, New Jersey



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:5,410 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

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

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

Date(s) aerial images were photographed: 8/13/2006; 8/5/2006

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

Depth to Any Soil Restrictive Layer

Depth to Any Soil Restrictive Layer— Summary by Map Unit — Essex County, New Jersey (NJ013)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	76	1.1	0.9%
BogCc	Boonton loam, 8 to 15 percent slopes, extremely stony	76	6.3	5.3%
DuuB	Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes	>200	11.7	9.8%
HanBc	Haledon silt loam, 0 to 8 percent slopes, extremely stony	75	1.2	1.0%
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	>200	26.0	21.8%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes	>200	40.0	33.5%
USBONB	Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes	>200	32.9	27.6%
YaobBc	Yalesville - Boonton - Holyoke complex, 0 to 8 percent slopes, extremely stony	81	0.0	0.0%
Totals for Area of Interest			119.1	100.0%

Description

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "> 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

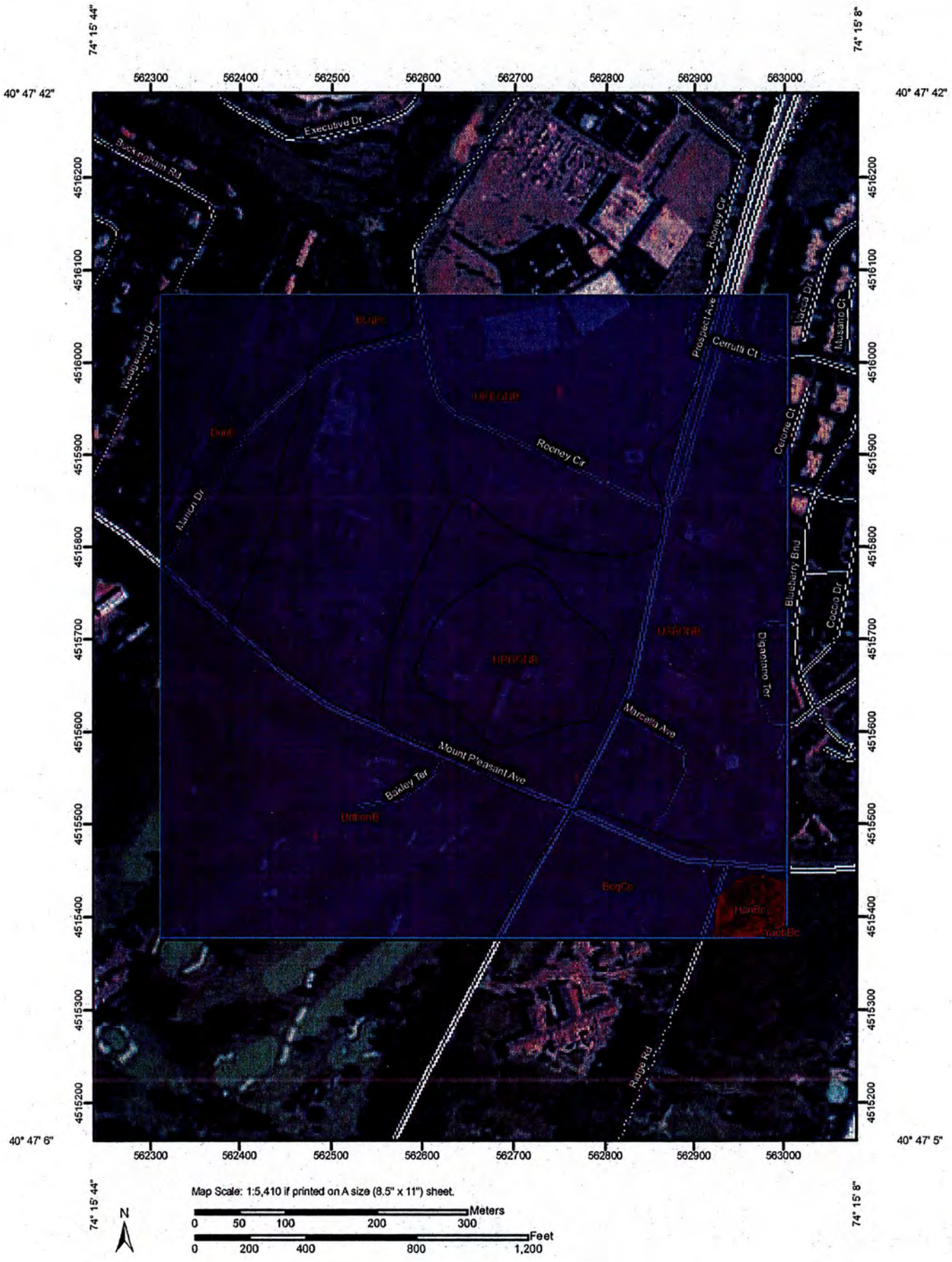
Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No


74° 15' 44"
74° 15' 8"
40° 47' 42"
40° 47' 6"
40° 47' 5"
562300
562400
562500
562600
562700
562800
562900
563000
4516200
4516100
4516000
4515900
4515800
4515700
4515600
4515500
4515400
4515300
4515200
Executive Dr
Buckingham Rd
Rooney Cir
Prospect Ave
Cerruti Ct
Vacca Dr
Mussano Ct
Woodcrest Dr
Rooney Cir
Cerone Ct
Munch Dr
Blueberry Bnd
Cocoa Dr
Dellarocco Ter
Marcella Ave
Mount Pleasant Ave
Bailey Ter
Ridge Rd
BcgBc
DunB
UrbCnB
UrbDnB
UrbCnB
UdlbnB
BcgCc
HanBc
YadBc
Map Scale: 1:5,410 if printed on A size (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1,200

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:5,410 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

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

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

Date(s) aerial images were photographed: 8/13/2006; 8/5/2006

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

Depth to Water Table

Depth to Water Table— Summary by Map Unit — Essex County, New Jersey (NJ013)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	>200	1.1	0.9%
BogCc	Boonton loam, 8 to 15 percent slopes, extremely stony	>200	6.3	5.3%
DuuB	Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes	>200	11.7	9.8%
HanBc	Haledon silt loam, 0 to 8 percent slopes, extremely stony	20	1.2	1.0%
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	>200	26.0	21.8%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes	>200	40.0	33.5%
USBONB	Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes	>200	32.9	27.6%
YaobBc	Yalesville - Boonton - Holyoke complex, 0 to 8 percent slopes, extremely stony	>200	0.0	0.0%
Totals for Area of Interest			**119.1**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features– Essex County, New Jersey									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
BogBc—Boonton loam, 0 to 8 percent slopes, extremely stony									
Boonton, extremely stony	Fragipan	20-36	10-46	Noncemented	0	0	Moderate	Moderate	High
BogCc—Boonton loam, 8 to 15 percent slopes, extremely stony									
Boonton, extremely stony	Fragipan	20-36	10-46	Noncemented	0	0	Moderate	Moderate	High
DuuB—Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes									
Dunellen		—	—		0	0	Moderate	Low	Moderate
Urban land, dunellen substratum		—	—		0	0	Moderate	Low	Moderate
HanBc—Haledon silt loam, 0 to 8 percent slopes, extremely stony									
Haledon, extremely stony	Fragipan	24-36	6-40	Noncemented	0	0	High	Moderate	Moderate

Soil Features– Essex County, New Jersey									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
UdbonB—Udorthents, Boonton substratum, 0 to 8 percent slopes									
Udorthents, boonton substratum		—	—		0	0	Moderate	Moderate	High
URBONB—Urban land, Boonton substratum, 0 to 8 percent slopes									
Urban land, boonton substratum		—	—		0	0	Moderate	Moderate	High
USBONB—Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes									
Urban land, boonton substratum		—	—		0	0	Moderate	Moderate	High
Boonton	Fragipan	20-36	10-46	Noncemented	0	0	Moderate	Moderate	High

Soil Features– Essex County, New Jersey									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
YaobBc—Yalesville - Boonton - Holyoke complex, 0 to 8 percent slopes, extremely stony									
Yalesville, extremely stony	Lithic bedrock	20-40	0-0	Strongly cemented	0	0	Moderate	Low	Moderate
Boonton, extremely stony	Fragipan	20-36	10-46	Noncemented	0	0	Moderate	Moderate	High
Holyoke, extremely stony	Lithic bedrock	10-20	0-0	Strongly cemented	0	0	Moderate	Low	High

Data Source Information

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
BogBc—Boonton loam, 0 to 8 percent slopes, extremely stony												
Boonton, extremely stony	0-1	*Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	1-3	*Highly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	3-5	*Loam	ML, SC-SM, CL-ML	A-4	0	0	100	100	91-97	60-66	22-31	3-8
	5-8	*Silt loam	SC-SM, CL-ML, ML	A-4	0	0	70-100	70-100	63-96	47-73	22-32	3-8
	8-17	*Silt loam	ML, CL-ML	A-4	0	0	81-100	81-100	73-96	52-71	19-25	3-8
	17-30	*Silt loam, Gravelly fine sandy loam, gravelly silt loam	CL, CL-ML, SC-SM	A-4	0	0	84-100	84-100	76-97	59-77	20-27	5-10
	30-40	*Gravelly fine sandy loam	SC, SC-SM, CL, CL-ML	A-4, A-2	0	0	70-100	70-100	60-91	32-53	20-27	4-9
	40-47	*Fine sandy loam, Gravelly sandy loam, fine sandy loam	SC-SM, CL, CL-ML, SC	A-2, A-4	0	0-7	76-100	76-100	66-94	34-52	20-27	4-9
	47-58	*Loamy sand	SM	A-2-4	0	0	79-100	79-100	67-90	20-31	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	0-7	78-100	78-100	65-89	21-31	0-21	NP-4

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
BogCc—Boonton loam, 8 to 15 percent slopes, extremely stony												
Boonton, extremely stony	0-1	*Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	1-3	*Highly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	3-5	*Loam	ML, SC-SM, CL-ML	A-4	0	0	100	100	91-97	60-66	22-31	3-8
	5-8	*Silt loam	ML, SC-SM, CL-ML	A-4	0	0	70-100	70-100	63-96	47-73	22-32	3-8
	8-17	*Silt loam	ML, CL-ML	A-4	0	0	81-100	81-100	73-96	52-71	19-25	3-8
	17-30	*Silt loam, Gravelly fine sandy loam, gravelly silt loam	SC-SM, CL, CL-ML	A-4	0	0	84-100	84-100	76-97	59-77	20-27	5-10
	30-40	*Gravelly fine sandy loam	SC, SC-SM, CL, CL-ML	A-2, A-4	0	0	70-100	70-100	60-91	32-53	20-27	4-9
	40-47	*Fine sandy loam, Gravelly sandy loam, fine sandy loam	SC, SC-SM, CL, CL-ML	A-4, A-2	0	0-7	76-100	76-100	66-94	34-52	20-27	4-9
	47-58	*Loamy sand	SM	A-2-4	0	0	79-100	79-100	67-90	20-31	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	0-7	78-100	78-100	65-89	21-31	0-21	NP-4

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
DuuB—Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes												
Dunellen	0-8	*Sandy loam	SC, SM	A-2-4, A-4, A-2	0	0-1	94-100	69-100	47-82	21-44	20-39	2-13
	8-14	*Sandy loam	SM, SC	A-4, A-2, A-2-4	0	0-1	94-100	69-100	47-82	21-44	20-39	2-13
	14-20	*Sandy loam, Loam, gravelly sandy loam	SC-SM, SM, SC	A-4, A-1, A-2, A-2-4	0	0-1	95-100	58-100	42-85	20-48	17-31	2-12
	20-31	*Sandy loam, Loam, gravelly sandy loam	SM, SC, SC-SM	A-1, A-2, A-2-4, A-4	0	0-1	95-100	58-100	42-85	20-48	17-31	2-12
	31-42	*Sandy loam, Loam, gravelly sandy loam	SM, SC, SC-SM	A-2-4, A-4, A-1, A-2	0	0-1	95-100	58-100	42-85	20-48	17-31	2-12
	42-70	*Stratified gravelly sand to sand to loamy sand	SM, SP-SM	A-1, A-2	0	0-10	70-80	40-65	30-55	10-25	15-20	NP
Urban land, dunellen substratum	0-12	*Material	—	—	—	—	—	—	—	—	—	—
	12-31	*Sandy loam, Loam, gravelly sandy loam	SC-SM, SM, SC	A-2-4, A-4, A-1, A-2	0	0-1	95-100	58-100	42-85	20-48	17-31	2-12
	31-42	*Sandy loam, Loam, gravelly sandy loam	SM, SC, SC-SM	A-2, A-2-4, A-4, A-1	0	0-1	95-100	58-100	42-85	20-48	17-31	2-12
	42-70	*Loamy sand	SC-SM, SC, SM	A-2-4, A-2	0	0-8	75-91	42-89	31-75	7-24	17-28	2-10

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HanBc—Haledon silt loam, 0 to 8 percent slopes, extremely stony												
Haledon, extremely stony	0-2	*Moderately decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	2-8	*Silt loam	CL, CL-ML, ML	A-4	0	0-10	84-90	72-90	66-88	53-72	26-37	7-12
	8-15	*Silt loam	SC-SM, CL, CL-ML	A-4	0	0-16	86-100	61-100	54-95	44-78	23-31	7-12
	15-22	*Silt loam	CL, CL-ML, SC-SM, SC	A-4	0	0-14	87-100	65-100	58-95	48-80	23-31	7-12
	22-27	*Loam	SC, CL, SC-SM	A-2, A-6	0	0-14	83-100	61-100	48-89	33-65	19-31	3-12
	27-30	*Loam	SC-SM, SC, CL	A-2, A-2-4, A-4	0	0-14	83-100	61-100	48-90	33-65	19-31	3-12
	30-60	*Gravelly fine sandy loam, Sandy loam, loam	SC-SM, SM	A-2, A-4, A-2-4	0	0-10	80-89	59-89	52-84	27-45	17-24	2-6
UdbonB—Udorthents, Boonton substratum, 0 to 8 percent slopes												
Udorthents, boonton substratum	0-12	*Loam	CL-ML	A-4	0	0	100	90-97	75-97	52-76	22-43	3-18
	12-58	*Loamy sand	SM	A-2-4	0	0	85-88	85-88	72-79	22-27	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	3-5	83-86	83-86	69-76	22-27	0-21	NP-4

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
URBONB—Urban land, Boonton substratum, 0 to 8 percent slopes												
Urban land, boonton substratum	0-12	*Material	—	—	—	—	—	—	—	—	—	—
	12-47	*Silt loam, Gravelly fine sandy loam, gravelly silt loam	SC-SM, CL, CL-ML	A-4	0	0	95-98	95-98	85-95	67-76	20-27	5-10
	47-58	*Loamy sand	SM	A-2-4	0	0	85-88	85-88	72-79	22-27	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	3-5	83-86	83-86	69-76	22-27	0-21	NP-4

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
USBONB—Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes												
Urban land, boonton substratum	0-12	*Material	—	—	—	—	—	—	—	—	—	—
	12-47	*Silt loam, Gravelly fine sandy loam, gravelly silt loam	CL, CL-ML, SC-SM	A-4	0	0	95-98	95-98	85-95	67-76	20-27	5-10
	47-58	*Loamy sand	SM	A-2-4	0	0	85-88	85-88	72-79	22-27	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	3-5	83-86	83-86	69-76	22-27	0-21	NP-4
Boonton	0-5	*Loam	SC-SM, CL-ML, ML	A-4	0	0	100	100	91-97	60-66	22-31	3-8
	5-8	*Silt loam	CL-ML, ML	A-4	0	0	70-73	70-73	65-72	47-54	22-32	3-8
	8-17	*Silt loam	CL-ML	A-4	0	0	92-96	92-96	83-92	60-68	19-25	3-8
	17-30	*Silt loam, Gravelly fine sandy loam, gravelly silt loam	CL, CL-ML, SC-SM	A-4	0	0	95-98	95-98	85-95	67-76	20-27	5-10
	30-40	*Gravelly fine sandy loam	SC, SC-SM	A-2, A-4	0	0	76-79	76-79	64-72	35-42	20-27	4-9
	40-47	*Fine sandy loam, Gravelly sandy loam, fine sandy loam	SC, SC-SM	A-4	0	1-4	82-86	82-86	72-81	37-45	20-27	4-9
	47-58	*Loamy sand	SM	A-2-4	0	0	85-88	85-88	72-79	22-27	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	3-5	83-86	83-86	69-76	22-27	0-21	NP-4

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
YaobBc—Yalesville - Boonton - Holyoke complex, 0 to 8 percent slopes, extremely stony												
Yalesville, extremely stony	0-1	*Highly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	1-5	*Loam	ML, CL, SM	A-4, A-6	0	0-5	84-94	64-94	51-85	37-64	18-43	4-15
	5-19	*Fine sandy loam, Loam, gravelly loam	SM, SC, GM	A-1-b, A-2, A-4, A-2-6, A-6	0	0-7	67-94	29-94	21-78	11-47	17-40	3-12
	19-31	*Fine sandy loam, Loam	GM, SM, SC	A-1-a, A-2, A-2-4, A-2-6, A-6	0	0-7	69-95	34-95	24-79	13-48	17-40	3-12
	31-32	*Fine sandy loam, Loam	GP-GM, SM, SC, GM	A-1-a, A-2, A-2-4	0	0-11	58-91	13-91	11-88	4-40	17-40	3-12

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	>32	*Bedrock	—	—	—	—	—	—	—	—	—	—
Boonton, extremely stony	0-1	*Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	1-3	*Highly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	3-5	*Loam	CL-ML, ML, SC-SM	A-4	0	0	100	100	91-97	60-66	22-31	3-8
	5-8	*Gravelly loam	GC-GM	A-4	0	0	66-70	66-70	60-67	43-49	22-31	3-8
	8-17	*Silt loam	CL-ML	A-4	0	0	92-96	92-96	83-92	60-68	19-25	3-8
	17-30	*Silt loam, Gravelly fine sandy loam, gravelly silt loam	CL-ML, SC-SM, CL	A-4	0	0	95-98	95-98	85-95	67-76	20-27	5-10
	30-40	*Gravelly fine sandy loam	SC, SC-SM	A-2, A-4	0	0	76-79	76-79	64-72	35-42	20-27	4-9
	40-47	*Fine sandy loam, Gravelly sandy loam, fine sandy loam	SC, SC-SM	A-4	0	1-4	82-86	82-86	72-81	37-45	20-27	4-9
	47-58	*Loamy sand	SM	A-2-4	0	0	85-88	85-88	72-79	22-27	0-21	NP-4
	58-72	*Loamy sand	SM	A-2-4	0	3-5	83-86	83-86	69-76	22-27	0-21	NP-4
Holyoke, extremely stony	0-1	*Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	1-3	*Highly decomposed plant material	PT	A-8	0	0	100	100	100	100	0-0	NP
	3-5	*Loam	SC-SM, CL, SM, CL-ML	A-4	0	0-9	76-95	42-95	37-95	22-66	23-43	4-17
	5-14	*Loam	CL-ML, CL, SC	A-4	0	0-9	69-95	44-95	37-95	23-65	18-36	4-17

Engineering Properties– Essex County, New Jersey												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	14-18	*Loam	CL, SC, CL-ML	A-4	0	0-8	74-96	53-96	46-96	28-67	18-36	4-17
	>18	*Bedrock	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

REPORT
SUBSURFACE INVESTIGATION REPORT

NORTH CENTRAL RELIABILITY PROJECT
PROPOSED WEST ORANGE SWITCHING STATION IMPROVEMENTS
WEST ORANGE, ESSEX COUNTY, NEW JERSEY
PSE&G

May 17, 2011

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Attention: **Mr. Thomas Brauchle**

Report
Subsurface Investigation
North Central Reliability Project
Proposed West Orange Switching Station Improvements
West Orange, Essex County, New Jersey
PSE&G

Introduction

This report presents the results of a subsurface investigation performed by Melick-Tully and Associates, P.C. (MTA) for the proposed improvements at the West Orange Switching Station in West Orange, Essex County, New Jersey. The site is located in the northwest quadrant formed by the intersection of Mount Pleasant and Prospect Avenues. The general location of the site is shown on the Site Location Map, Plate 1.

Proposed Construction

Conceptual information conveyed to us indicates that the existing substation would be expanded and as such, five test borings were performed at locations selected by URS to develop foundation design criteria. Based on our experience on PSE&G projects where favorable soil

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conditions exist within the substations, the majority of lightly loaded equipment and new improvements are typically supported on conventional shallow foundations.

Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil, and groundwater conditions at or as close as possible to the five requested boring locations identified to us;

2) estimate the relevant geotechnical engineering properties of the encountered materials;

3) evaluate the site foundation requirements considering the anticipated structural loads and encountered subsurface conditions;

4) recommend an appropriate type of foundation(s) for support of the proposed equipment, and provide geotechnical-related foundation design and installation criteria, including an estimate of the Site Class as defined by the International Building Code 2009, New Jersey Edition, for seismic design purposes;

5) estimate the post-construction settlements of the recommended foundation system; and

6) discuss appropriate earthwork considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish these purposes, a subsurface investigation comprised of five test borings and two test pits were performed at the site. At the request of PSE&G, the boring and test pit locations were first scanned using ground penetrating radar and then the first three feet at each boring location was manually excavated to confirm that no utilities were present. Borings SBH-1, 3 and 5 were moved slightly due to utility conflicts. Following the manual excavations, the test borings were advanced using truck-mounted drilling equipment (Mobile B-59) and extended to depths ranging from approximately 13 to 27 feet below the existing surface grades. Two test pits were also performed in the southwest portion of the station were a stormwater management basin is being considered. The test pits were excavated using a rubber tire backhoe and extended to depths

ranging from 13 to 14 feet below grade. The locations of the test borings and test pits performed for this study are shown on the Plot Plan, Plate 2. In addition MTA has previously performed test pits within the switching station. Copies of the previous exploration logs and plans showing their approximate locations are attached in Appendix I.

All field work was performed under the direct technical supervision of a representative from MTA. Our representative located the test borings in the field from existing surface features and maintained continuous logs of the explorations as the work proceeded. After hand excavating for the first three feet, continuous split spoon samples were obtained to 15 feet below grade and at five foot intervals thereafter in general accordance with the procedures of the Standard Penetration Test (ASTM D-1586).

Detailed descriptions of the encountered subsurface conditions are presented on the Logs of Borings, Plates 3A through 3E. The results of the test pits are presented on Plates 4A and 4B. The soils encountered in the borings were visually classified in general accordance with the procedures of the Unified Soil Classification System shown on Plate 5A, while the soils in the test pits were described in accordance with the USDA Soil Classification System presented on Plate 5B.

All soil samples obtained from the borings and test pits performed for this study were brought to our office where they were further examined by a project manager in our soil mechanics laboratory. Laboratory tests consisting of natural moisture content determinations (ASTM D-2216), grain-size analyses (ASTM D-422), Atterberg Limits determinations (ASTM D-2318), soil box resistivity tests (ASTM G-187) and pH tests (ASTM G-51) were performed on selected samples to aid in their engineering classification and evaluation. The results of the moisture content tests are indicated on the individual test boring logs, while the mechanical grain-size analyses are shown on the Gradation Curves, Plates 6A and 6B. The results of the Atterberg limits determinations are

shown on Plate 7. The results of the soil box and pH tests are presented on Plate 8. In addition, selected soil samples were submitted to an NJDEP certified laboratory to perform testing for chloride ion and soluble sulfate. The results of these tests are also presented on Plate 8.

Two test pits and field pit bail permeability tests were performed in the southwestern portion of the improvement areas. In addition two in-place percolation tests were attempted at depths of three and one-half feet, however no visible drop in the water levels were observed. Tube samples of the upper soils were also obtained that were subjected to laboratory tube permeameter testing. Further discussions of the testing will be presented later in this report.

The results of our field explorations and the laboratory testing program have provided the basis for our engineering analyses and design recommendations. The following discussions of our findings and recommendations are subject to the limitations attached as Appendix II to this report.

General Site Geology

The West Orange Switching Station is located in the Piedmont Geomorphic Province of the Appalachian Mountain System. The Piedmont Province is characterized by Mesozoic sedimentary rock interbedded with basaltic lava flows and diabase intrusions.

According to the NJDEP-GIS, I-Map webpage, the substation is underlain by basalt bedrock of the Orange Mountain Formation. The surficial geology is identified as being the Rahway Glacial Till. The Rahway is a gravelly silty sand to sandy silt with cobbles and boulders. The NJDOT Geotechnical Data Management Website reports that about 70 borings are present within one-half mile of the site. The borings were generally performed along the Route 280 alignments to the north of the switching station. These borings show till over bedrock at variable depths. The logs can be viewed from the website: www.state.nj.us/transportation/refdata/geologic/map.shtm.

Site Conditions

Surface Features: The subject site is a fenced switching station with existing equipment at the surface, on-site buildings and below-grade utilities. Topographic information shown on the plans provided to us indicates the surface grades range from about +615 to +630 feet in the northern portions of the site and slope downward to the south and southwest to a low of about +580 feet in the southwest corner of the site adjacent to Mt. Pleasant Avenue.

Subsurface Conditions: The subsurface conditions encountered in the test borings performed for this study consisted of the following generalized strata, listed in order of increasing depth:

1) Surface Materials: A thin layer of crushed stone on the order of two inches in thickness was encountered at test boring SBH-1. At SBH-2 the surface materials were comprised of a three inch thick asphalt layer which was underlain by about eight inches of stone. At SBH-3 and 4, a light grass cover over the underlying natural soils was present and at SBH-5, six inches of topsoil was encountered.

2) Fill: The surface materials were underlain by clayey sand and sandy clay fill in Borings SBH-1 and 2 which extended to depths on the order of two and one-half feet below the existing surface grades. At SBH-5, loose clayey silts and clayey sands were encountered to about nine feet that likely represent fill materials from past site grading activities.

3) Clayey Silt and Silty Clay: The surface materials and fill where present were underlain by stiff clayey silts and silty clays that extended to about 3 to 13 feet below grade.

4) Clayey Sands: The silts and clays were generally underlain by medium dense to very dense clayey or silty sands extending to depths ranging from about 9 to 23 feet below grade. The clayey sand soils were typically medium dense to dense in relative density. Loose soils were observed in Boring SBH-5 at a depth of about 13 feet.

5) Decomposed and Weathered Basalt Bedrock: The clayey sands were typically underlain by decomposed and weathered basalt bedrock. At SBH-2 decomposed sandstone bedrock as observed above the basalt bedrock at about 9 to 13 feet below grade.

The area of the test pits is a depressed area which appears to receive surface runoff from the higher areas of the site. At the test pits performed in the southwest portion of the site, a layer of topsoil on the order of ten to twelve inches in thickness was present typically underlain by sandy clay loam soils. In Test Pit 2, a layer of silty clay was observed at 11 to 13 feet followed by loamy sand/sandy loam.

Groundwater seepage was observed in borings SBH-2, 4 and 5 at depths ranging from approximately 7 to 14 feet below grade at the completion of the drilling. Light seepage was observed in the test pits at depths of about 1 to 2.5 feet below grade with moderate to rapid seepage observed at depths of 11.5 and 13 feet. Soil mottling was observed in the test pits at depths on the order of one to one and one-half feet below grade.

A subsurface profile depicting the generalized subsurface conditions is presented on Plate 9.

Findings and Recommendations

General: Based on the subsurface conditions encountered in the borings performed for this study, it is our opinion that the existing near surface fill where present is not suitable for direct support of new structures on spread foundations due to the unknown nature of the placement and compaction of the material. Further, the SPT blow counts indicate the fill to be loose in relative density to about eight feet in Boring SBH-5. Therefore, any existing fill extending below the foundations should be completely removed to the surface of the undisturbed natural soils and the foundations established directly on the natural soils, or the excavations could be backfilled to conventional foundation levels with clean crushed stone. The new structures could then be supported on conventional spread foundations that would derive their support from the undisturbed natural soil or crushed stone backfill and could be designed to impose maximum allowable net bearing pressures of up to 4,000 pounds per square foot.

Site Preparation and Earthwork: Site preparation activities within the area of the improvements should include the excavation of the existing fill materials to the surface of the natural soils. The fill materials observed in our recent explorations typically extended to depths of approximately two and one half feet in SBH-1 and 2 to nine feet below the surface in SBH-5. As such, it is likely that the fill would extend to below conventional foundation levels in some portions of the site and would have to be removed. However, variations in the depth to the bottom of the fill soils should be anticipated between the exploration locations. After removal of any existing fill below the new foundations, crushed stone backfill could be installed to reach the design bottom of footing levels. If crushed stone backfill is used, the excavation should be widened on all sides one foot laterally for each two foot depth of overexcavation. A graphic representation of the overexcavation limits is presented on the Suggested Foundation Overexcavation Detail shown on Plate 10.

Groundwater was encountered in the borings at depths ranging from approximately 7 to 14 feet below grade at the time of our study. However, perched seepage was observed as shallow as one foot in the test pits and could also be present trapped within the fill or at the interface of the fill and natural soils. As such temporary control of seepage and surface runoff will likely be required during construction. It is anticipated that seepage could be controlled by pumping from a series of sumps. If deeper excavations extend below the observed groundwater levels, more formal dewatering methods could be necessary such as wellpoints or temporary wells. It should be the contractor's responsibility to provide whatever labor and equipment is necessary to control seepage. If seepage is not properly controlled, the natural subgrade soils will likely become softened and disturbed, and additional overexcavation could be required. We also recommend that the site be graded during construction to prevent surface water from entering the site excavations.

Temporary construction excavations should comply with the most recent OSHA Excavation Guidelines (29 CFR Part 1926) assuming that the existing fill materials and natural clay sands soils prevalent at the site are Type "C" soils. The guidelines indicate for Type "C" soils, simple excavations less than 20 feet in depth shall have a maximum allowable slope of 1.5 horizontal to 1 vertical. Sloughing of the excavation sidewalls could occur and flattening of the slopes or use of plates, sheets, trench boxes or other types of temporary excavation support may be required to minimize the size of the excavations or to prevent undermining of adjacent equipment. It should be the contractor's responsibility to evaluate and provide a properly designed excavation support system, maintain safe excavations at all times and prevent undermining of existing structures and equipment.

The near surface excavated fill is expected to consist primarily of clayey sand and silts and clays. The sandier soils would be considered suitable for reuse as controlled compacted fill and backfill provided they are at and maintained at moisture contents which would allow them to be properly compacted. Any encountered clayey soils would be poorly suited for reuse due to their moisture sensitive nature. Variations in the nature and composition of the fill materials present at the site should be anticipated. A determination regarding the suitability of excavated fill materials for reuse as structural backfill adjacent to the foundations should be made at the time of construction by a qualified geotechnical engineer. Occasional cobbles and boulders were encountered and weathered basalt was encountered at nine feet in SBH-2 and as shallow as five feet in a previous test pit performed by MTA. As such, large excavation equipment with rock teeth could be required to penetrate the surface of the weathered basalt if excavations extend to these levels.

Following excavation of the fill materials the exposed natural subgrade soils should be observed by a qualified geotechnical engineer to confirm that all softened or disturbed soils or deleterious materials have been removed. If excavations required to remove fill extend below the design foundation levels, as expected in some areas, the excavations could be backfilled with crushed stone to the design bottom of foundation levels. When excavations for new foundations are performed adjacent to existing foundations, the new foundations should be located so that a line drawn between the lower edges of adjoining footings shall not have a slope steeper than 30 degrees with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported.

Backfill around the foundations should consist of approved granular soils, on-site or imported, that are free of debris and deleterious materials, and which are at moisture contents suitable for compaction to the required densities. Any imported fill materials should consist of uncontaminated, granular soils containing less than 15 percent by weight of material passing a U.S. Standard No. 200 sieve and having a maximum particle size of four inches. NJDOT dense graded aggregate or recycled concrete could be used for this purpose. The backfill should be spread in layers on the order of twelve inches or less in loose thickness and should be uniformly compacted to at least 95 percent of its maximum dry density as determined by the ASTM D-1557 test procedure.

Shallow Foundation Design Criteria: It is our recommendation that the new equipment be supported by conventional spread foundations that derive their support from the undisturbed natural soils or stone backfill placed over the undisturbed natural soils in accordance with our above recommendations. Foundations for the proposed new improvements could be designed to impose maximum allowable net bearing pressures of up to 4,000 pounds per square foot. We recommend all foundation bearing soils be observed by a qualified geotechnical engineer to confirm that

adequate bearing materials are present. All foundations should extend to a depth of at least three feet below the adjacent finished exterior grade to provide frost protection.

Uplift loads may be resisted by the weight of the foundation, structure and soil within a prism defined by extending a line up and out from the edge of the foundation at an angle of 20 degrees from vertical. A total unit weight of 125 pounds per cubic foot could be assumed for the natural granular soils, excavated sandy fill, or imported granular fill as previously specified to be used as backfill, provided the materials are compacted to at least 95 percent of their ASTM D-1557 maximum dry density. Horizontal loads may be resisted by friction between the concrete and soil, and passive pressure. An ultimate coefficient of friction of 0.35 for sliding may be assumed between the foundation concrete and the silts and clays and the clayey sand soils. The coefficient of friction could be increased to 0.55 if crushed stone is provided below the foundations. Assuming the backfill is compacted as recommended, passive pressures may be calculated assuming a friction angle of 32 degrees ($K_p = 3.25$) and unit weight of 125 pounds per cubic foot. The designer should account for potential loss of support from freeze-thaw effects or future adjacent excavation if relying on passive pressures for shallow foundations. As such, we recommend that passive pressures be discounted for the upper two feet of soils due to potential disturbance. A subgrade modulus of 150 pounds per cubic inch would be appropriate for design of slabs supported by the natural clayey sand soils while a subgrade modulus of 200 pci could be used for imported granular soils as previously specified which are compacted to at least 95 percent of their ASTM D-1557 maximum dry density.

Post-construction foundation settlements were estimated using the loads provided to us which are attached as Plate 11 and estimating a footing size based on the recommended bearing pressure of 4,000 pounds per square foot. As the site soils consist primarily of granular materials,

the majority of the settlement is expected to occur rapidly, practically upon application of load. Based on the information provided to us, it is our opinion that the lightly loaded foundations designed and installed in accordance with our recommendations would experience post construction settlements of about one-half of one inch. Information provided to us indicates that the transformers could weigh as much as 500 kips and would be supported on a mat with dimensions of 12 feet by 15 feet resulting in an applied pressure of about 2,800 pounds per square foot. The transformer pad would experience total settlements which are estimated to be about three-quarters of one inch. Calculations are presented in Appendix III.

Seismic Design Criteria: Based on the results of our explorations and our review of the regional geology, it is our opinion that seismic design of the proposed improvements could be based on Site Class "C" as defined in the International Building Code 2009, New Jersey Edition.

Lateral Earth Pressures: If required, excavation support systems, below grade structures or site retaining walls should be designed to resist lateral earth pressures imposed by the adjacent soils, as well as surcharge loads due to adjacent equipment, traffic, floor slabs or foundation loads, etc. We estimate that the following soil parameters could be used to design these systems:

Soil Type	***Total Unit Weight (pcf)***	***Angle of Internal Friction (degrees)***	***Cohesion (psf)***	***Active Earth Pressure Coefficient (K_a)***
Existing sandy and clayey fill materials	120	30	0	0.333
Clean ¾" crushed stone backfill	105	38	0	0.238
Natural silty and clayey sands or imported granular controlled compacted fill	125	34	0	0.307

Corrosivity and pH Testing: Five samples of the soils in close proximity to the anticipated levels for shallow foundations (±2 to 2.5 feet) were submitted to an NJDEP certified laboratory and were subjected to laboratory tests to determine chloride, and sulfate levels to evaluate their potential

for corrosion of below grade concrete. Also, several samples of the soils were subjected to pH testing. The results of these tests are attached on Plate 8. Sulfates were not detected to the method detection limit in any of the samples. Chlorides were detected in SBH-1 and SBH-2 at concentrations of 52.4 and 103 parts per million and not detected to the method detection limit in the remaining samples. The pH test results ranged from 4.7 to 7.4.

Based on American Concrete Institute (ACI) 318 guidelines, sulfate levels of less than 1000 parts per million indicate a negligible exposure for corrosion of concrete and ACI recommends the use of Type I cement. However, United States Department of Agriculture (USDA) guidelines indicate sandy soils with a pH of <5.5 are considered to have a high risk of corrosion potential and soils with a pH of 5.5 to 6.5 are considered to have a moderate risk of corrosion potential for concrete. Therefore, it may be prudent to use Type II cement in the construction which would provide at least a moderate resistance to attack.

Pavement Design Criteria: Immediately prior to pavement construction, all exposed subgrades should be recompacted to a dense and stable consistency, and the upper twelve inches of the subgrade soils should be recompacted to at least 95 percent of the maximum dry density as determined by ASTM D-1557 test procedure. Any subgrade materials that cannot be compacted to the required densities should be excavated to stable subgrade materials and replaced with granular controlled compacted fill.

Following compaction, new pavements may be supported by the recompacted existing near surface silty sand fill soils or by controlled compacted granular fill. Pavement subgrades consisting of the silty sand fill materials would provide a "medium" subgrade support condition for pavements, with an estimated California Bearing Ratio (CBR) value of approximately seven percent. No traffic data was provided to us. We have assumed areas would be subjected to sporadic automobile and

light truck traffic and recommend the following generalized flexible asphalt pavement and aggregate sections be used.

Pavement Type	*Surface Course (inches)*	*Base Course (inches)*	*NJDOT Dense Graded Aggregate (inches)*
Bituminous Asphalt	2	2	4
Aggregate only	-	-	15

If provided with more specific traffic loading, we would be pleased to reevaluate these general sections.

Soil Permeability Testing: Two test pits were excavated in the area being considered for stormwater management. At these locations, in-place field percolation tests were initiated at three and one-half feet below grade at each test pit and experienced little or no water movement and seepage began to emanate around the test levels after the start of the testing. Additionally, our representative collected tube samples of the near surface soils which were subjected to laboratory tube permeameter testing, the results of which also exhibited low permeability rates of less than 0.2 inches per hour. Since groundwater seepage was encountered in the test pits, our representative also performed field pit bail permeability tests in each of the test pits to estimate the permeability of the subsoils below the seepage levels. Based on the measured inflow and assuming a stabilized water level equal to the observed soil mottling levels encountered in the test pits, permeability rates of 1.6 inches per hour and 0.3 inches per hour were recorded at depths of 11.5 to 13.5 feet below grade in Test Pits 1 and 2, respectively. The low permeability rates and high soil mottling levels and seepage levels should be considered when evaluating the type of stormwater management system which may be appropriate at the site.

Please contact us if you have any questions regarding this report.

The following Plates and Appendices are attached and complete this report:

Plate 1 – Site Location Map
Plate 2 – Plot Plan
Plates 3A through 3E – Logs of Borings
Plates 4A and 4B – Logs of Test Pits
Plate 5A – Unified Soil Classification System
Plate 5B – USDA Soil Classification System
Plates 6A and 6B – Gradation Curves
Plate 7 – Atterberg Limits Determinations
Plate 8 – Soil Box, pH, Sulfate and Chloride Test Results
Plate 9 – Subsurface Profile
Plate 10 – Suggested Foundation Overexcavation Detail
Plate 11 – Equipment/Structure Loads
Appendix I – Previous explorations by MTA within the West Orange Station
Appendix II – Limitations
Appendix III – Post-Construction Settlement Calculations

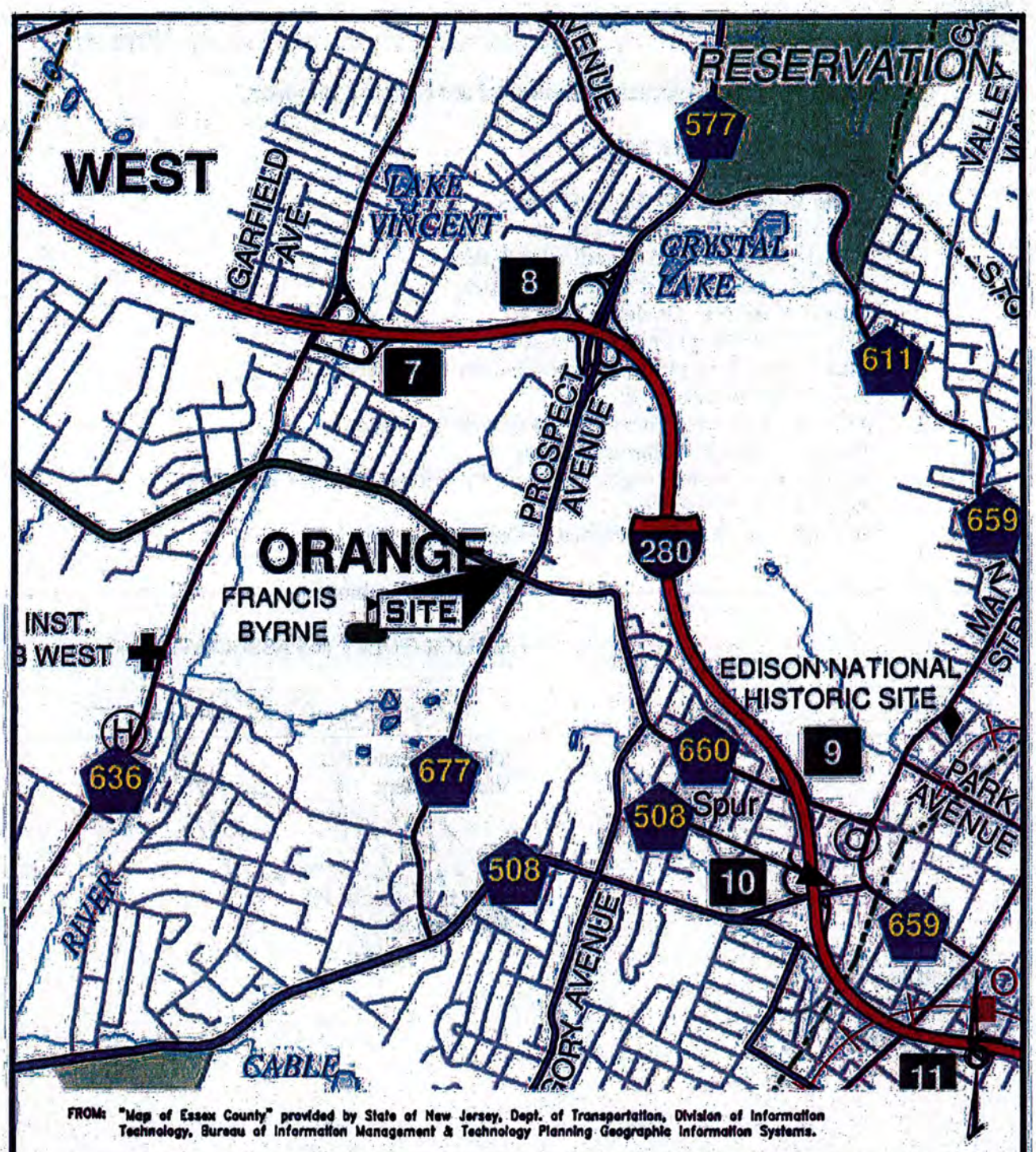
Respectfully submitted,

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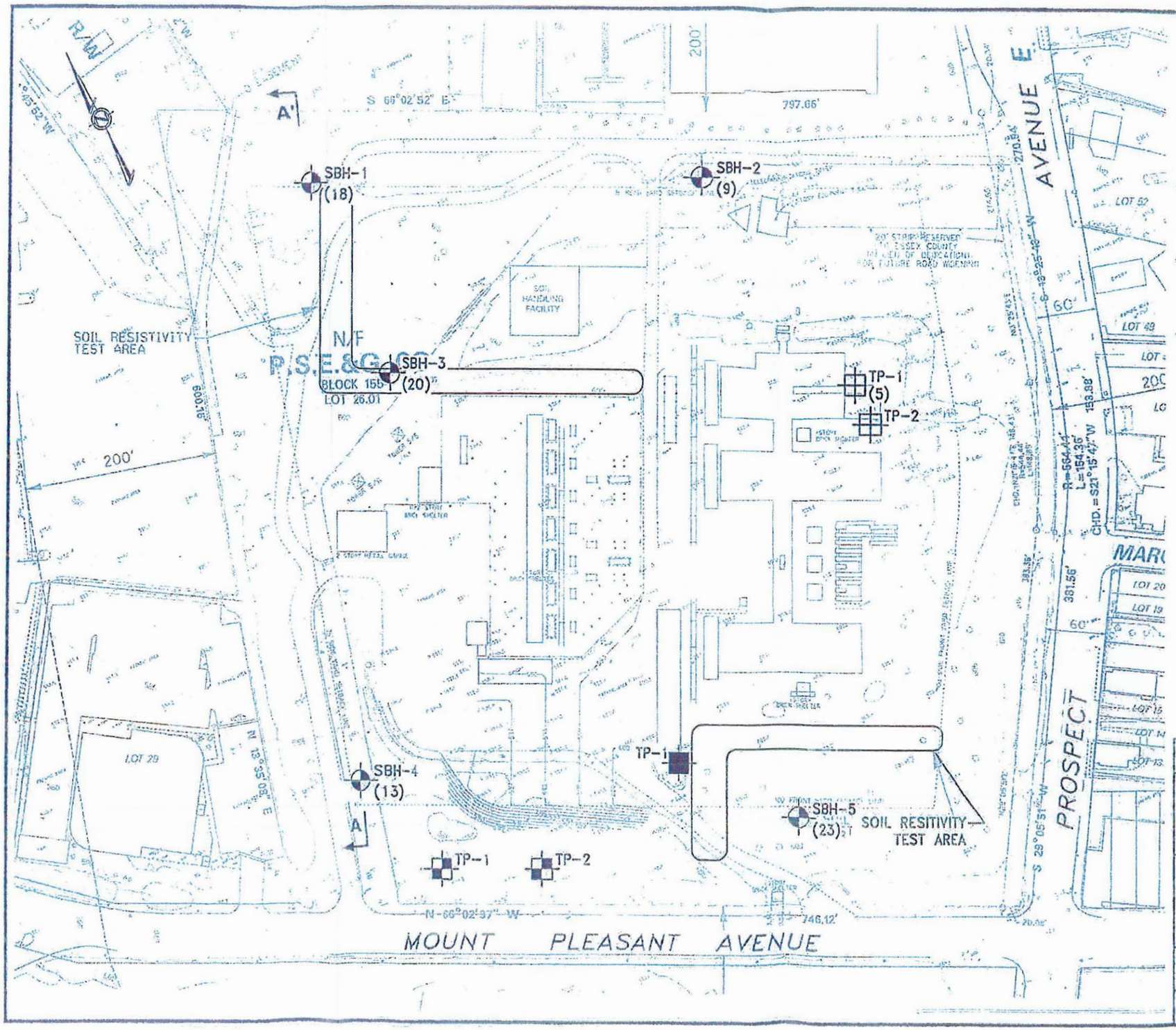
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117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

SITE LOCATION MAP

W. ORANGE SWITCHING STA. IMPROVEMENTS
LIVINGSTON, NEW JERSEY
PSE&G

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
5165-243*1D	24898	VJD	MRD	4-20-11	1"=2,000'	1



KEY:

SBH-1 — NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY

TP-1 — NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

TP-1 — NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED IN 2003

TP-1 — NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED IN 2002

(18) — DEPTH IN FEET TO SURFACE OF DECOMPOSED AND WEATHERED BEDROCK

A' / A — INDICATES NAME, APPROXIMATE LOCATION AND DIRECTION OF SUBSURFACE PROFILE

NOTES:

1. This drawing is part of Melick–Tully and Associates, P.C. Report No. 5165-243*1D and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by PSE&G, entitled "Inside Plant–Proposed Test Boring locations West Orange Switching Station" dated 12-21-10 (revised 3-22-11), not to scale.

PLOT PLAN

W. ORANGE SWITCHING STA. IMPROVEMENTS
WEST ORANGE, NEW JERSEY
PSE&G

MELICK–TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	FILE NO.
5165-243*1D	24898

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	MRD	5-18-11	1"=100'	2

DRILLING COMPANY: GDI
DRILLER: Mike Granese
DRILL RIG: Mobile B-59
MTA FIELD ENG. Kim Tully
JOB NUMBER: 5165-243*1D

LOG OF BORING

BORING NO. SBH-1
SURFACE ELEVATION: +614 ft (±)

N: 713235.8
E: 559248.1
WATER LEVEL: Not enc
COMPLETION DATE: 4/14/11

DEPTH (ft.)	SAMPLES	RECOVERY (IN.)	BLOW COUNTS PER 6 IN.	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
				*			2" Stone	
				*			FILL - Brownish gray clayey silt, some fine to medium sand (moist)	
						ML	Yellow-brown clayey silt, little fine to medium sand (moist)	
	S1	12	10 10 14 16	24				
5	S2	5	16 23 20 11	43	13.0		Red-brown fine to coarse sand, some silty clay, trace gravel (moist)(medium dense to dense)	5
	S3	12	20 17 19 17	36		SC		
	S4	3	16 16 24 35	40				
10					15.9		- grading to and silty clay	10
	S5	3	36 37	51				
	S6		14 100/5" 100/1"	100/1"			- auger refusal @ 13' on possible cobbles and boulders, moved hole 5' south and augered to 17' with hollow-stem augers	
15							- roller bit from 17' to 20'	15
							Highly weathered and fractured basalt	
20				50/0"			-auger refusal @ 20'	20
25							Boring completed @ 20' *Hand excavated to 3'	25
30								30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 3A

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

DRILLING COMPANY: GDI
DRILLER: Mike Granese
DRILL RIG: Mobile B-59
MTA FIELD ENG. Kim Tully
JOB NUMBER: 5165-243*1D

LOG OF BORING

BORING NO. SBH-2
SURFACE ELEVATION: +613.5 ft (±)

N: 712981.5
E: 559610.8
WATER LEVEL: 13'
COMPLETION DATE: 4/14/11

DEPTH (ft.)	SAMPLES	RECOVERY (IN.)	BLOW COUNTS PER 6 IN.	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
				*			3" Asphalt over 8" stone	
				*			FILL - Dark gray fine to coarse sand, some silt, trace fine gravel	
				*		ML	FILL - Brown clayey silt, some fine to coarse sand (moist)	
	S1	17	3 5 7 10	12				
5	S2	12	11 14 17 14	31	16.4	CL	Yellow-brown clayey silt, little fine to medium sand (moist)(stiff)	5
	S3	12	18 19 18 15	37	13.4	SC	Reddish brown silty clay, and fine to medium sand, trace fine gravel (moist)(stiff to hard)	
10	S4	6	45 100/3"	100/3"			Red-brown fine to coarse sand, and silty clay, trace fine gravel (moist)(dense)	10
	S5	4	23 100/5"	100/5"			Highly weathered sandstone (moist)(dense)	
	S6	4	100/5"	100/5"				
	S7	12	12 33 58 100/1"	88			Highly weathered and decomposed basalt - (wet) @ 13'	
15	S8		100/3"	100/3"			- auger refusal @ 16'-3"	15
20								20
							Boring completed @ 16'-3" Groundwater encountered @ 13' *Hand excavated to 3'	
25								25
30								30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 3B

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

DRILLING COMPANY: GDI
DRILLER: Mike Granese
DRILL RIG: Mobile B-59
MTA FIELD ENG. Kim Tully
JOB NUMBER: 5165-243*1D

LOG OF BORING

BORING NO. SBH-3
SURFACE ELEVATION: +606 ft (±)

N: 712933.0
E: 559245.1
WATER LEVEL: Not enc
COMPLETION DATE: 4/15/11

DEPTH (ft.)	SAMPLES	RECOVERY (IN.)	BLOW COUNTS PER 6 IN.	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
				* * *		CL	Red-brown and yellow-brown silty clay, some fine to medium sand (moist) LL = 34%, PL = 20%	
5	S1	12	6 7 11 10	18		SC	Red-brown fine to coarse sand, and silty clay, trace fine gravel (very moist)(medium dense)	5
	S2	18	8 10 10 11	20				
	S3	10	12 12 10 10	22	18.5			
10	S4	12	6 9 18 11	27				10
	S5	12	11 18 13 13	31		SM/ML	Yellow-brown fine to medium sand, and clayey silt - with occasional layers of yellow-brown clayey silt, little fine to medium sand (wet)(stiff) LL = 47%, PL = 33%	
	S6	0	7 9	24				
15	S7		15 21		33.6			15
20	S8	12	21 24 30 46	54			Highly decomposed basalt (moist)(very dense)	20
25	S9	22	14 40 66 100/4"	106				25
30							Boring completed @ 26'-10" Groundwater not encountered *Hand excavated to 3'	30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 3C

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

DRILLING COMPANY: GDI
DRILLER: Mike Granese
DRILL RIG: Mobile B-59
MTA FIELD ENG. Kim Tully
JOB NUMBER: 5165-243*1D

LOG OF BORING

BORING NO. SBH-4
SURFACE ELEVATION: +583 ft (±)

N: 712575.8
E: 559055.7
WATER LEVEL: 14'
COMPLETION DATE: 4/15/11

DEPTH (ft.)	SAMPLES	RECOVERY (IN.)	BLOW COUNTS PER 6 IN.	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
				* * *		ML	Yellow-brown clayey silt, little fine to medium sand (moist)	
5	S1	12	11 12 13 13	25	12.6	SC	Red-brown fine to coarse sand, and silty clay (moist)(medium dense to dense)	5
	S2	18	6 26 14 11	40				
	S3	12	20 17 12 10	29				
10	S4	12	7 13 14 22	27	13.0		- weathered basalt fragments	10
	S5	4	40 50 22 12	72				
	S6	12	6 6 9 16	15			Highly decomposed basalt - hard drilling @ 15'	
15								15
20	S7	1	100/0"	100/0"				20
25	S8		100/2"	100/2"			Boring completed @ 25' Groundwater encountered @ 14' *Hand excavated to 3'	25
30								30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 3D

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

DRILLING COMPANY: GDI
DRILLER: Mike Granese
DRILL RIG: Mobile B-59
MTA FIELD ENG. Kim Tully
JOB NUMBER: 5165-243*1D

LOG OF BORING

BORING NO. SBH-5
SURFACE ELEVATION: +601 ft (±)

N: 712364.6
E: 559443.4
WATER LEVEL: 7'
COMPLETION DATE: 4/14/11

DEPTH (ft.)	SAMPLES	RECOVERY (IN.)	BLOW COUNTS PER 6 IN.	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
				* * *			6" Topsoil POSSIBLE FILL - Yellow-brown clayey silt, little fine to coarse sand (moist)	
5	S1	6	2 2 2 3	4	21.5		POSSIBLE FILL - Yellow-brown fine to coarse sand, and silty clay, trace gravel (moist)(loose)	5
	S2	7	1 3 3 4	6				
	S3	12	3 4 7 4	11				
10	S4	18	4 4 18 21	22	21.5	CL	Light gray silty clay, little fine to medium sand (wet)(stiff) LL = 30%, PL = 18%	10
	S5	12	19 22 21 14	43	12.2	CL	Red-brown silty clay, and fine to coarse sand, trace gravel (wet)(very stiff to hard)	
15	S6	12	4 4 4 5	8	15.0	SC	Red-brown fine to medium sand, and silty clay, trace gravel (wet)(loose to medium dense)	15
20	S7	1	10 10 14 10	24			- grading to fine to coarse sand, little silty clay, little gravel (wet)(medium dense)	20
25	S8	4	100/4"	100/4"			Highly weathered basalt	25
							Boring completed @ 25'-4" Groundwater encountered @ 7' *Hand excavated to 3'	
30								30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 3E

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

EXCAVATING COMPANY: Heritage
OPERATOR: Jeff Berking
EXCAVATOR: Rubber tire hoe
MTA FIELD ENG. Phil Pickering
JOB NUMBER: 5165-243*1D

LOG OF TEST PIT

TEST PIT NO. 1
SURFACE ELEVATION: +583 ft (±)

N: 712462.2
E: 559096.6
WATER LEVEL: *
COMPLETION DATE: 4/14/11

DEPTH (ft.)	SAMPLES	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH (ft.)
			0-12	Topsoil - Brown (10YR, 4/3) sandy clay loam, moderate medium subangular blocky, moist to wet, friable, clear wavy boundary, common fine to medium roots	
	S1		12-40	Reddish brown (5YR, 4/3) sandy clay loam, 5% gravel, moderate medium angular blocky, wet, friable, common medium distinct yellowish brown (10YR, 5/6) mottles	
	S2			Dark reddish brown (2.5YR, 3/4) sandy clay loam, 15% gravel, 10% cobbles, at 5.5' moderate medium angular blocky, moist, friable, gradual wavy boundary, few fine distinct gray (10YR, 6/1) mottles	
5					5
	S3		40-156		
10					10
				Test pit completed @ 13'	
15				*Light seepage @ 1; 2.5' and 7'	15
				*Rapid groundwater seepage encountered @ 11'-6"	
				Soil mottling @ 1'	
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 4A

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

EXCAVATING COMPANY: Heritage
OPERATOR: Jeff Berking
EXCAVATOR: Rubber tire hoe
MTA FIELD ENG. Phil Pickering
JOB NUMBER: 5165-243*1D

LOG OF TEST PIT

TEST PIT NO. 2
SURFACE ELEVATION: +588 ft (±)

N: 712422.8
E: 559185.8
WATER LEVEL: *
COMPLETION DATE: 4/14/11

DEPTH (ft.)	SAMPLES	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH (ft.)
			0-10	TOPSOIL - Dark grayish brown (10YR, 4/2) sandy clay loam, weak medium crumb, wet, loose, abrupt wavy boundary, few fine to medium roots	
			10-24	Brown (10YR, 4/3) sandy clay loam, 5% gravel, moderate medium angular blocky, wet, friable, clear wavy boundary, few fine to medium roots, many coarse prominent brownish yellow (10YR, 6/8) mottles @ 18" to 24"	
5	S1		24-132	Dark reddish brown (2.5YR, 3/4) sandy clay loam, 5% gravel, 10% cobbles, 5% boulders, moderate medium angular blocky, moist, friable to firm, few medium distinct gray (19YR, 6/1) mottles throughout	5
10			132-156	Yellowish brown (10YR, 5/8) silty clay loam, moderate medium angular blocky, moist to wet, friable, common medium prominent gray (10YR, 6/1) and strong brown (7.5YR, 5/18) mottles	10
	S2		156-168	Dark yellowish brown (10YR, 4/6) loamy sand/ sandy loam, moderate medium granular (wet)	
15				Test pit completed @ 14' *Moderate groundwater seepage encountered @ 13' *Light groundwater seepage encountered @ 2'	15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: mrd/mh 5/11

Sheet: 1 of 1 PLATE: 4B

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than 50% of material is LARGER than No. 200 Sieve	GRAVEL & GRAVELLY SOILS More than 50% of coarse fraction RETAINED on No. 4 Sieve	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS More than 50% of coarse fraction PASSING a No. 4 Sieve	CLEAN SAND (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.
			SP	Poorly-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS More than 50% of material is SMALLER than No. 200 Sieve.	SILTS AND CLAYS	Liquid limit LESS than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS	Liquid limit GREATER than 50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic contents

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADATION*	COMPACTNESS* sand and/or gravel	CONSISTENCY* clay and/or silt
% Finer by Weight	Relative Density	Range of Shearing Strength in Pounds per Square Foot

Trace	0% to 10%	Loose	0% to 40%	Very Soft	less than 250
Little	10% to 20%	Medium Dense	40% to 70%	Soft	250 to 500
Some	20% to 35%	Dense	70% to 90%	Medium	500 to 1000
And	35% to 50%	Very Dense	90% to 100%	Stiff	1000 to 2000
				Very Stiff	2000 to 4000
				Hard	Greater than 4000

**Values are from laboratory or field test data, where applicable. When no testing was performed, values are estimated.*

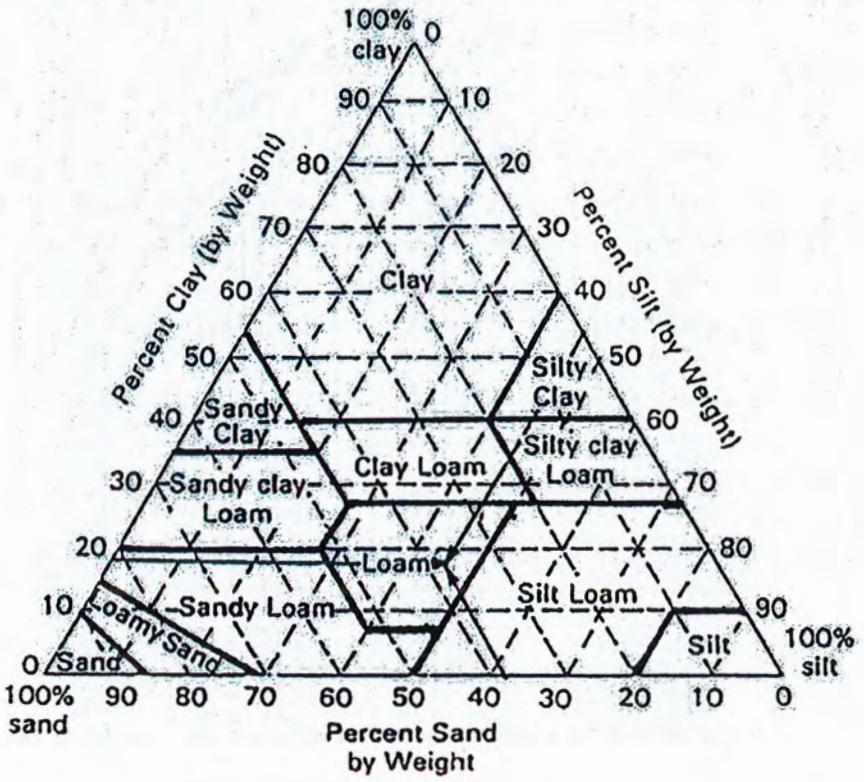
UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

REVISIONS BY _____ DATE _____

BY _____ DATE _____ FILE _____

CHECKED BY _____

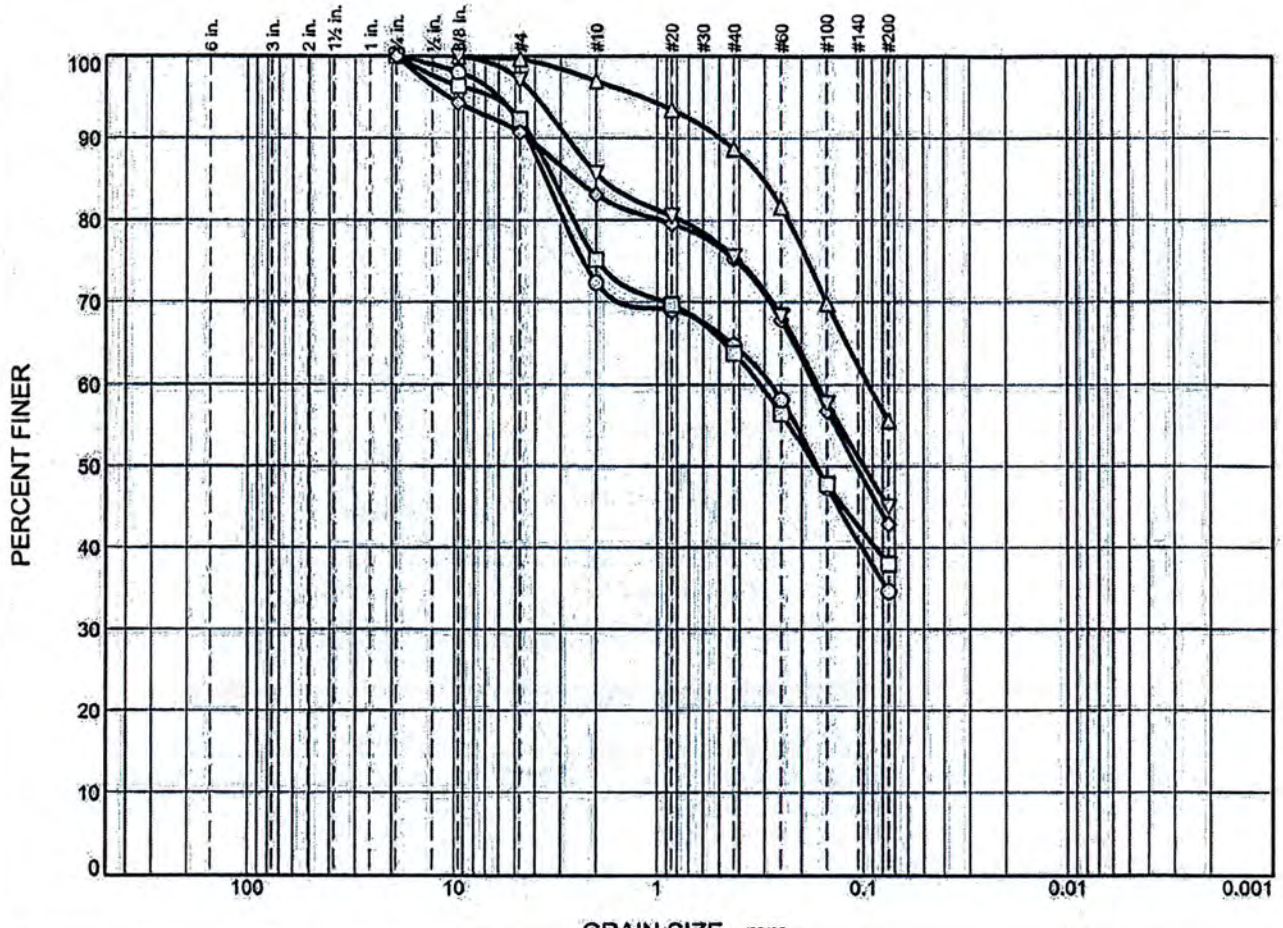


USDA SOIL CLASSIFICATION SYSTEM

(REFERENCE: U.S. DEPT. OF AGRICULTURE HANDBOOK 18)

PLATE 5B

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	8.4	19.3	7.6	30.1	34.6
□	0.0	0.0	7.7	17.2	11.3	25.8	38.0
△	0.0	0.0	0.3	2.8	8.2	33.2	55.5
◇	0.0	0.0	9.4	7.6	7.8	32.3	42.9
▽	0.0	0.0	2.9	11.5	10.1	30.4	45.1

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SBH-1	S-4	5	F-c Sand, some Silty Clay, trace fine Gravel. (MC=13.0%)	SC
□	SBH-1	S-7	12	F-c Sand, and Silty Clay, trace fine Gravel. (MC=15.9%)	SC
△	SBH-2	S-4B	5	Silty Clay, and f-m Sand, trace fine Gravel.(MC=16.4%)	CL
◇	SBH-2	S-6A	8	F-c Sand, and Silty Clay, trace fine Gravel. (MC=13.4%)	SC
▽	SBH-3	S-3A	8	F-c Sand, and Silty Clay, trace fine Gravel. (MC=18.5%)	SC

Melick-Tully & Associates, P.C.

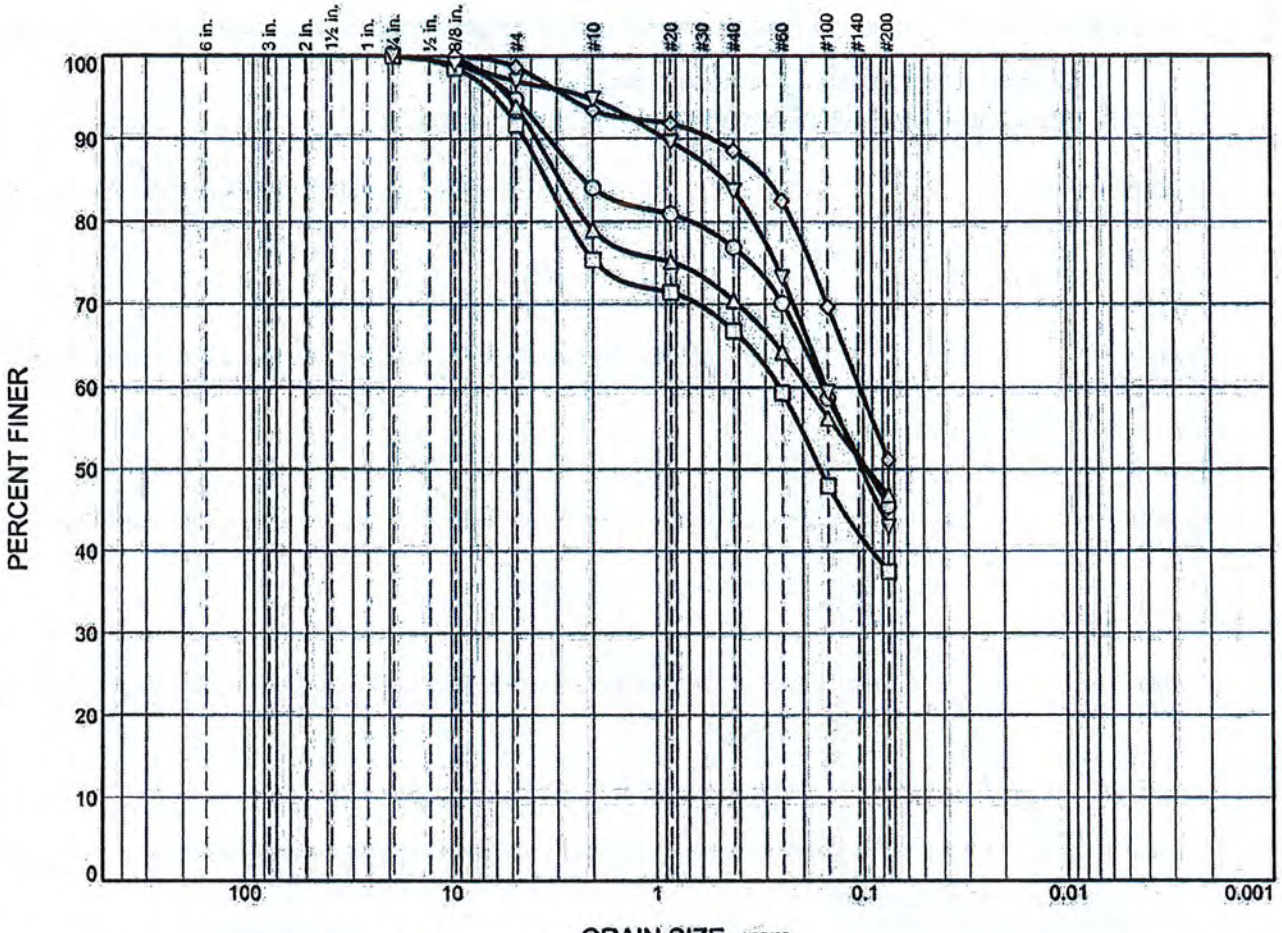
South Bound Brook, NJ

Client: PSE&G

Project: West Orange Switching Station Improvements, West Orange, NJ

Project No.: 5165-243 **Plate** 6A

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	5.3	10.7	7.1	31.4	45.5
□	0.0	0.0	8.3	16.4	8.5	29.3	37.5
△	0.0	0.0	6.2	14.8	8.6	23.5	46.9
◇	0.0	0.0	1.4	5.2	4.9	37.4	51.1
▽	0.0	0.0	3.1	2.2	11.1	40.6	43.0

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SBH-4	S-4A	5	F-c Sand, and Silty Clay, trace fine Gravel. (MC=12.6%)	SC
□	SBH-4	S-6A	10	F-c Sand, and Silty Clay, trace fine Gravel. (MC=13.0%)	SC
△	SBH-5	S-2	4	F-c Sand, and Silty Clay, trace fine Gravel. (MC=21.5%)	Possible Fill
◇	SBH-5	S-5C	11	Silty Clay, and f-c Sand, trace fine Gravel. (MC=12.2%)	CL
▽	SBH-5	S-7	14	F-m Sand, and Silty Clay, trace fine Gravel. (MC=15.0%)	SC

Melick-Tully & Associates, P.C.

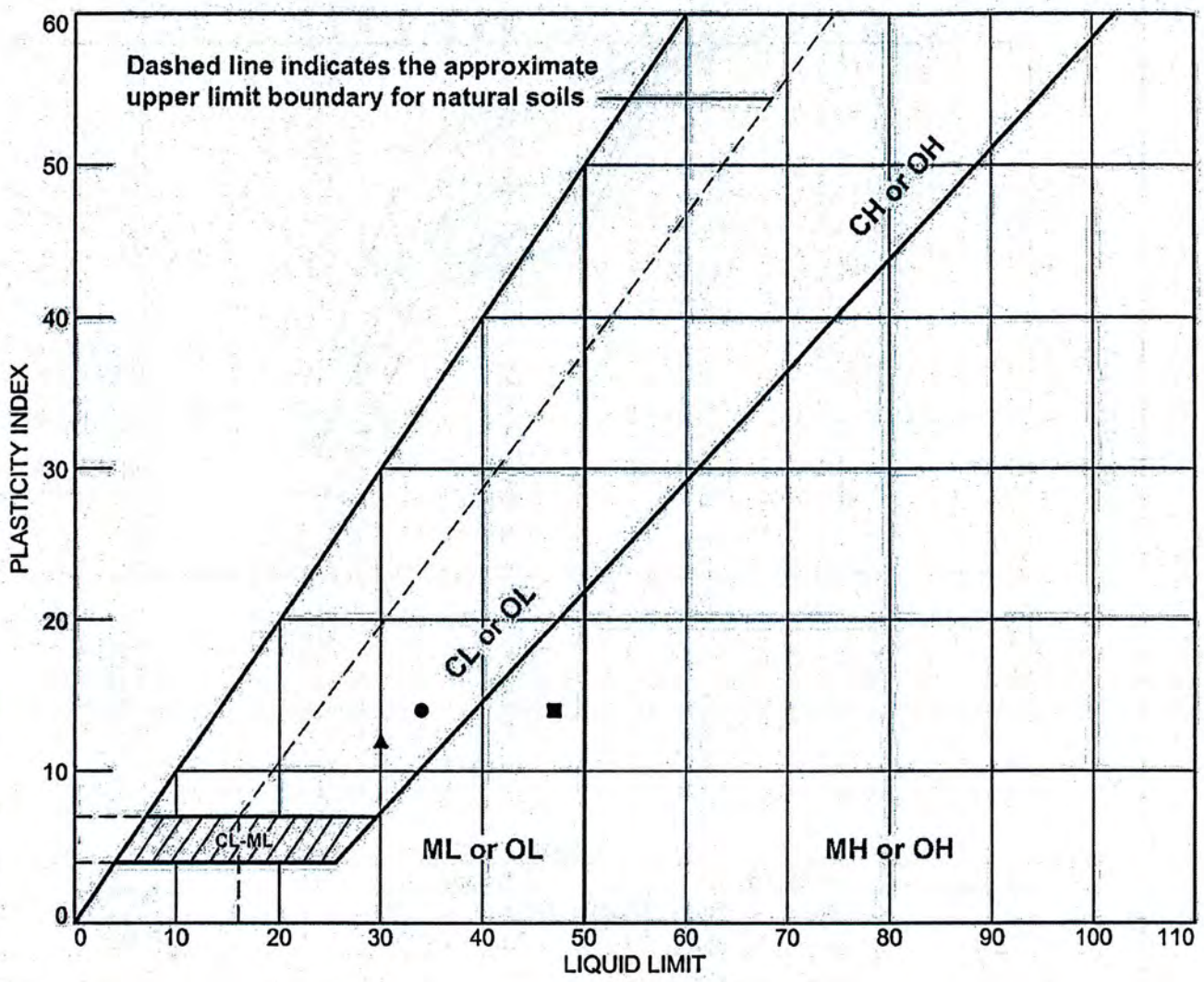
South Bound Brook, NJ

Client: PSE&G

Project: West Orange Switching Station Improvements, West Orange, NJ

Project No.: 5165-243 **Plate** 6B

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SBH-3	S-2A	3	17.1	20	34	14	CL
■	SBH-3	S-7A	15	33.6	33	47	14	ML
▲	SBH-5	S-4B	9	21.5	18	30	12	CL

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

Client: PSE&G

Project: West Orange Switching Station Improvements, West Orange, NJ

Project No.: 5165-243

Plate 7

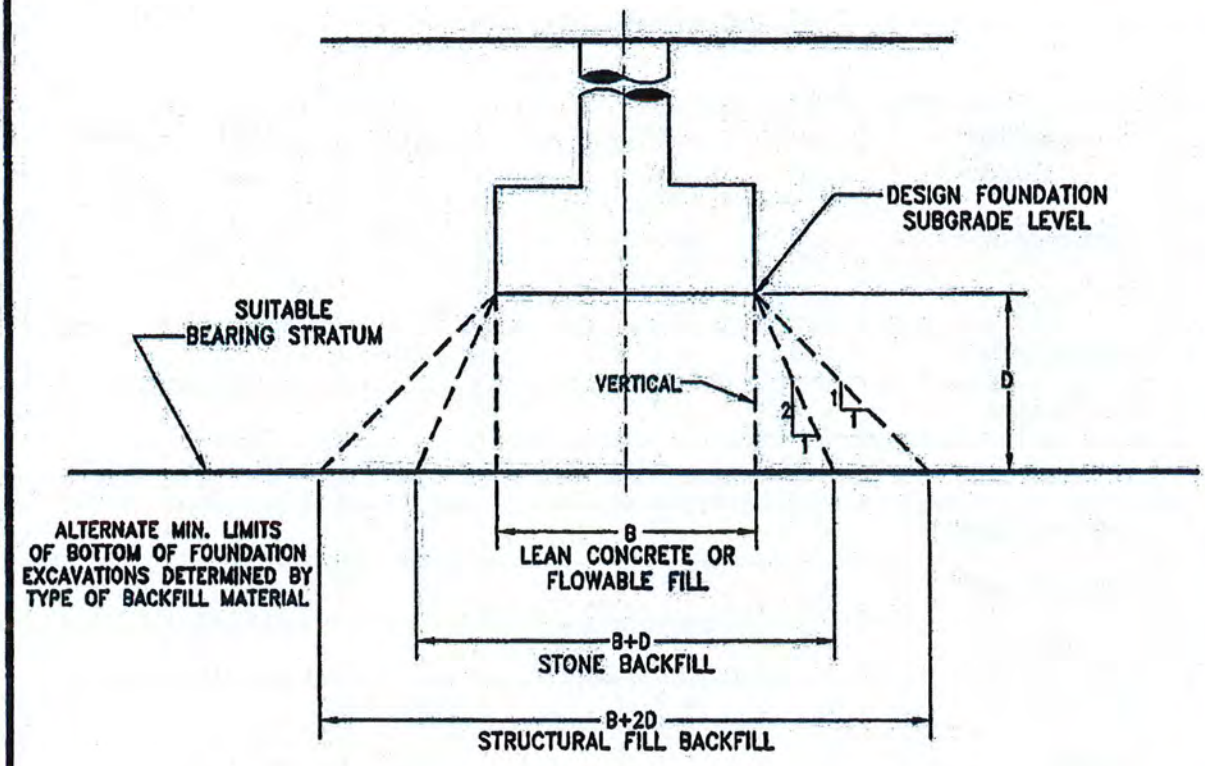
Summary of pH, Sulfate and Chloride Ion Testing
Proposed West Orange Switching Improvements
West Orange, Essex County, New Jersey
PSE&G

Summary of Soil Box and pH Testing				
Boring	**Depth**	**Soil Type**	**Resistivity[1] ohm-cm**	**pH**
SBH-1	3	Clayey Silt	7,180	4.7
SBH-1	5	Clayey Sand	8,700	5.0
SBH-1	9	Clayey Sand	4,750	5.2
SBH-1	12	Clayey Sand	1,200	5.3
SBH-2	3	Clayey Silt	7,280	5.6
SBH-2	5	Silty Clay	7,440	5.3
SBH-2	6	Silty Clay	6,740	5.0
SBH-2	8	Clayey Sand	7,460	5.3
SBH-3	3	Silty Clay/Clayey Sand	9,620	5.4
SBH-3	5	Clayey Sand	10,300	5.4
SBH-3	8	Clayey Sand	6,440	5.8
SBH-3	10	Clayey Sand	5,630	6.3
SBH-3	15	Silty Sand with Clayey Silt Layers	2,290	6.2
SBH-3	20	Highly Decomposed Basalt	2,850	6.2
SBH-3	25	Highly Decomposed Basalt	5,730	6.4
SBH-4	3	Clayey Silt/Clayey Sand	5,230	6.4
SBH-4	5	Clayey Sand	6,010	6.7
SBH-4	10	Clayey Sand	7,370	6.9
SBH-4	14	Highly Decomposed Basalt	1,360	6.8
SBH-5	4	Clayey Sand Fill	10,700	6.9
SBH-5	8	Clayey Sand Fill	7,950	6.8
SBH-5	10	Silty Clay	2,040	6.6
SBH-5	11	Silty Clay	--	6.9
SBH-5	14	Clayey Sand	2,100	6.9
SBH-5	20	Clayey Sand	3,120	7.4
SBH-5	25	Highly Weathered Basalt	3,620	7.4
TP-1	3	Clayey Sand	--	7.2
TP-2	3	Clayey Sand	--	7.2

[1]Soil box test performed at in-situ moisture

Summary of Sulfate and Chloride Ion Testing				
Boring	**Depth**	**Soil Type**	**Sulfate (ppm)**	**Chloride (ppm)**
SBH-1	2.5	Clayey Silt	ND	52.4
SBH-2	2.5	Clayey Silt	ND	103
SBH-3	2	Silty Clay	ND	ND
SBH-4	2	Clayey Silt	ND	ND
SBH-5	2	Clayey Silt	ND	ND

ND = Analyzed for but not detected at the method detection limit



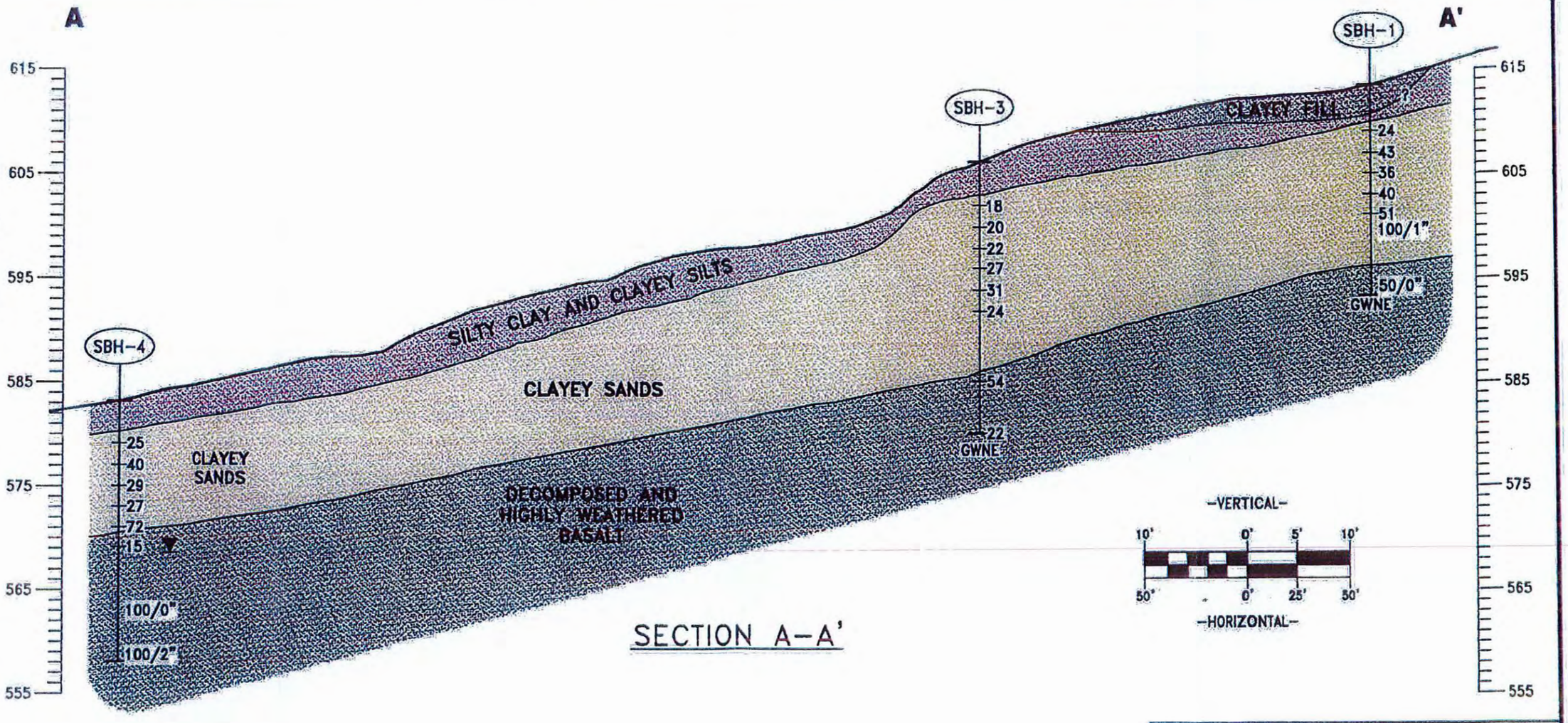
SUGGESTED FOUNDATION OVEREXCAVATION DETAIL

NOT TO SCALE

NOTES:

1. B = Width of foundation.
2. D = Depth of overexcavation of unsuitable materials below bottom of foundation subgrade to surface of suitable bearing stratum.
3. Lean Concrete or Flowable Fill: Minimum 500 psi.
4. Stone Backfill: Clean 3/4 inch crushed stone.
5. Structural Fill Backfill: Approved granular soils spread in lifts and compacted to at least 95 percent of maximum dry density as determined by the ASTM D1557 test procedure.
6. Stone and Structural Backfill alternates are not acceptable where excavations extend below adjacent foundations.

PLATE 10



SECTION A–A'

KEY:

- SBH-1 — BORING NUMBER AND LOCATION
- 8 — STANDARD PENETRATION RESISTANCE BLOWS/FT.
- ▼ — GROUNDWATER ELEVATION
- 100/5" — PENETRATION RESISTANCE IN BLOWS/INCH.
- GWNE — GROUNDWATER NOT ENCOUNTERED

NOTES:

1. This drawing is part of Melick–Tully and Associates, Inc. Report No. 5165–243*1D and should be read together with the report for complete evaluation.
2. The stratification lines are based upon interpolations between widely spaced test borings and thus represent the approximate boundaries between soil types. Actual transitions may vary from those shown.
3. Stratum designations are generalized. See report for descriptions of each stratum and the test boring logs for detailed descriptions at specific locations.

SUBSURFACE PROFILE A–A'

W. ORANGE SWITCHING STA. IMPROVEMENTS
LIVINGSTON, NEW JERSEY
PSE&G

MELICK–TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	FILE NO.
5165-243*1D	24898

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	MRD	5-16-11	AS NOTED	8

EQUIPMENT / STRUCTURE LOADS

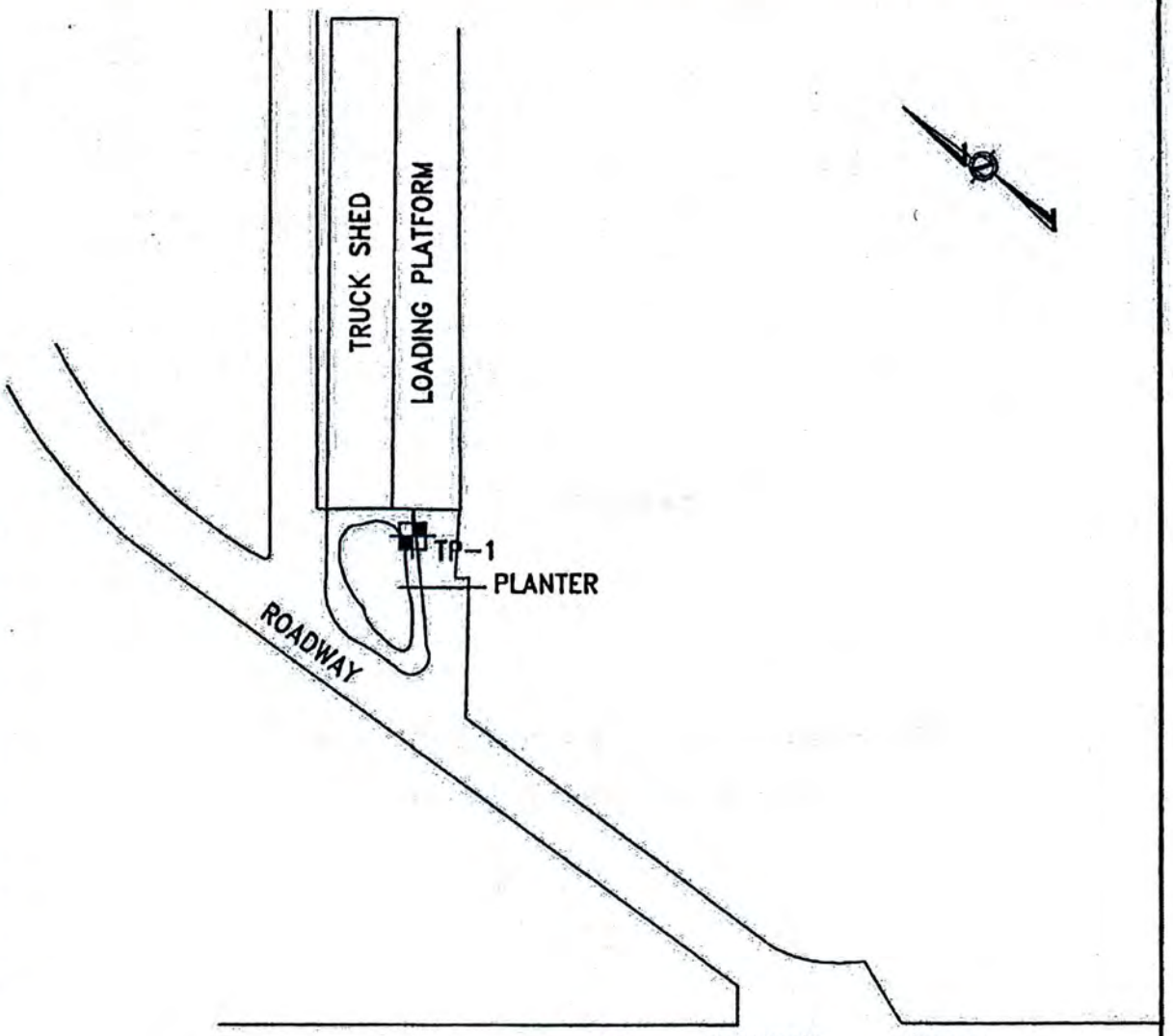
#	Equipment Structure	Fz kips	Fx kips	Fy kips	My kip-ft	Mx kip-ft	Mz kip-ft
1	Frame (A or H)	50	20	1	500	10	-
2	Control Building	100	9.6	24	-	-	-
3	Capacitor Bank	6	2	-	25	-	-
4	Circuit Breaker	5	2	-	15	-	-
5	CCVT	6	2	-	32	-	-
6	Disconnect Switch	5	2	1	24	6	-
7	GIS Building Wall	8	1.5	1.5	24	-	-
8	Ground Switch	5	1	-	10	-	-
9	Lightning Mast	3	2	-	200	-	-
10	Low Bus	2	1	1	35	15	-
11	High Bus	5	2	2	70	30	-
12	Pothead	10	4	1	80	15	-
13	Sound Wall	0.1	1.5	-	15	-	-
14	Surge Arrester	2	1	1	7	1	-
15	Transformer - HV	500	100	-	-	-	-
16	Transformer - LV	250	50	-	-	-	-

NOTES:

1. The loads are preliminary, approximate, estimated, and do not include foundation concrete weight. These loads are unfactored for service condition. Final loads will vary based on actual equipment and structural configurations.
2. Coordinate Z-axis is vertical, X-axis is transverse and Y-axis is longitudinal. Forces Fx and Fy, and Moments Mx and My shall be assumed to act simultaneously. Moment Mz about vertical axis will cause torsion. Force Fz is primarily weight of the equipment or structure.
3. Transformer weight assumed to be supported by 12 feet wide and 15 feet long block foundation.
4. Control building assumed supported on 16 feet wide by 40 feet long pad.
5. GIS building wall and sound wall load unit is kips per linear foot.

APPENDIX I

Previous Explorations performed by MTA at the West Orange Switching Station



TP-1

NUMBER AND APPROXIMATE LOCATION OF TEST PIT PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 5165-078*1G and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by PSE&G Engineering, entitled "Plant Roadway & Track Layout," dated 2/28/03, scale 1"=30'.

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

PLOT PLAN

PROPOSED BULK NITROGEN SYSTEM
WEST ORANGE, NEW JERSEY
PSE&G SWITCHING STATION

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
5165-078*1G	14069	CRP	PR	9-16-03	1"=50'	2

LOG OF TEST PIT

TEST PIT NO: 1

COMPLETION DATE: 9/11/03
JOB NUMBER: 5165-078*1G

SURFACE ELEVATION: +97 ft (±)

WATER LEVEL: *
READING DATE: 9/11/03

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1			10" Topsoil	
	S2	12.4		FILL - Red-brown fine to medium sand, and silt, little fine to coarse gravel, with wood and asphalt fragments (very moist)(dense)	
	S3			PROBABLE FILL - Red-brown clayey silt, some fine to medium sand, little fine gravel, with occasional cobbles (mottled)(moist)(stiff to very stiff)	
	S4	14.4			
5	S5				5
	S6	19.5	ML	Dark brown clayey silt, little fine to medium sand, little fine gravel, with roots and occasional cobbles (very moist)(very stiff)	
10	S7		ML/SM	Red-brown silt, some fine to medium sand, little fine to coarse gravel, with occasional cobbles (very moist)(very stiff)	10
				Test pit completed @ 11.5'	
				*Groundwater not encountered	
				Perched water seepage @ 4.5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: pr/mh 09/03

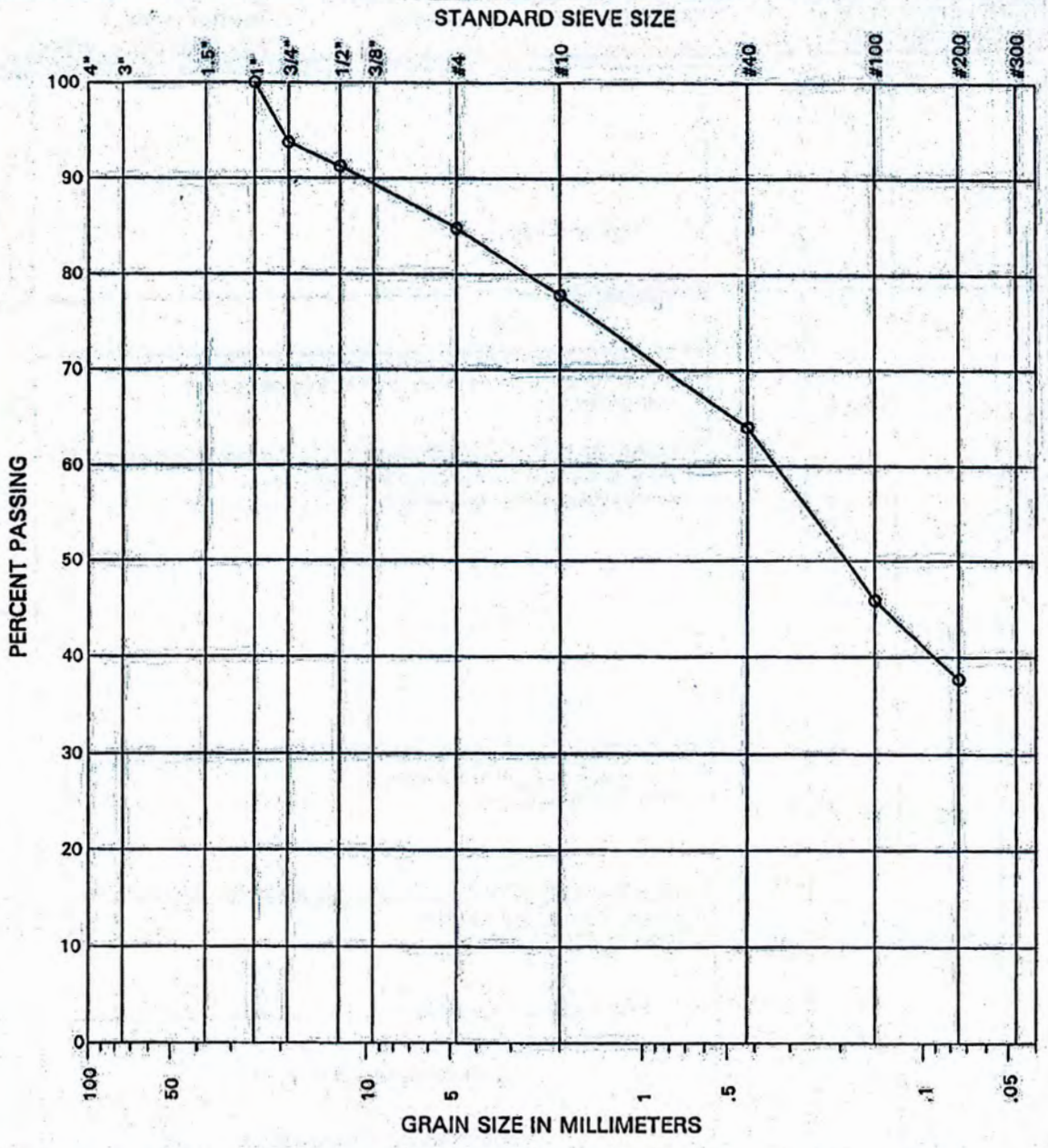
Sheet: 1 of 1 PLATE: 3A

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

UMBER 5165-078

UNIFIED SOIL CLASSIFICATION

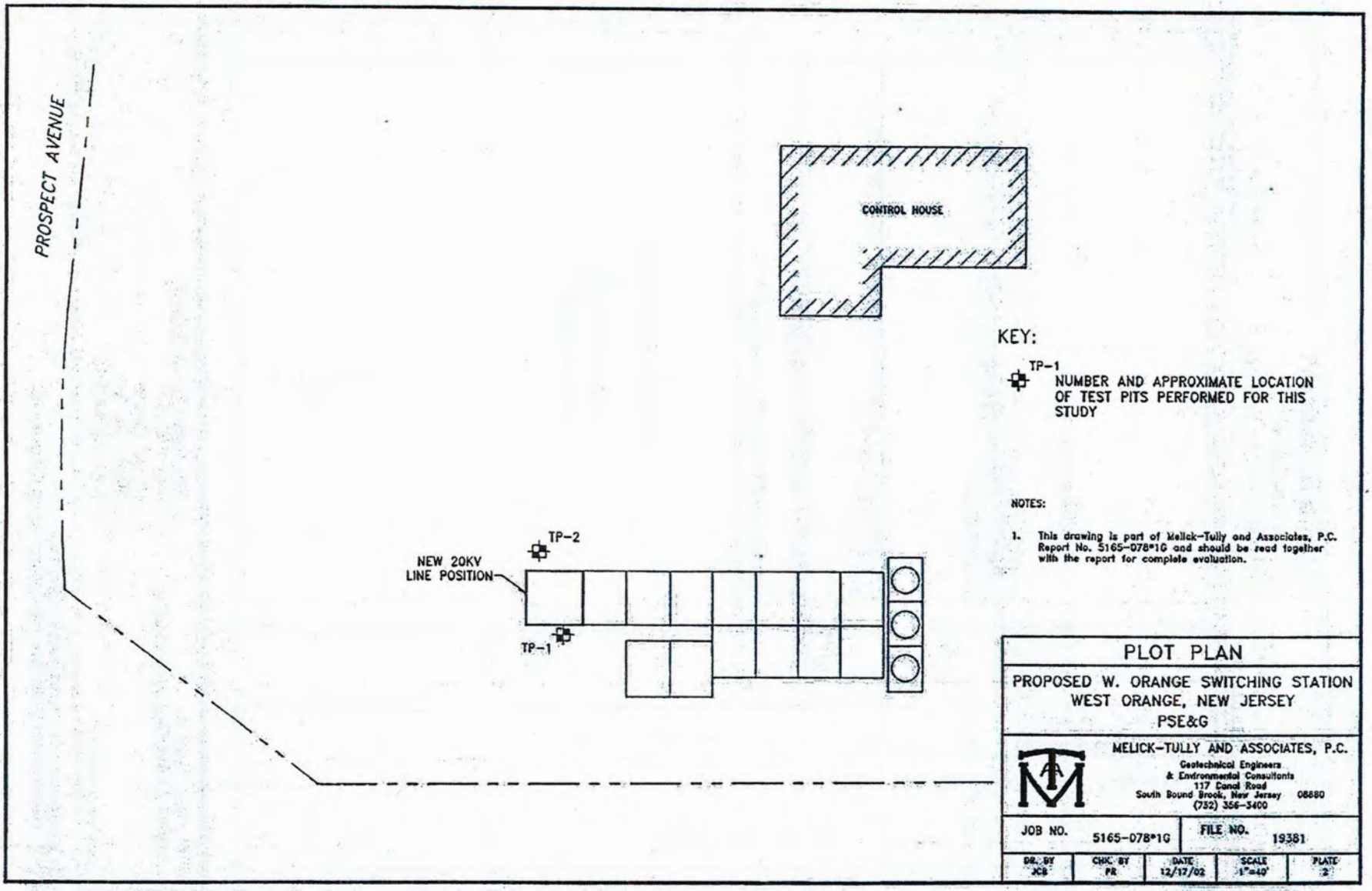
COBBLES & BOULDERS	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



EXPLORATION/IDENTIFICATION:	DEPTH/SOURCE:			
TP-1	S-2, 2'			
LINE SYMBOL:	MOISTURE CONTENT (%):	LIQUID LIMIT (%):	PLASTIC LIMIT (%):	USCS SYMBOL:
	12.4	----	----	FILL

USCS CLASSIFICATION:
FINE TO MEDIUM SAND,AND SILT,LITTLE FINE TO COARSE GRAVEL

GRADATION CURVE



KEY:

TP-1
NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 5165-078*1G and should be read together with the report for complete evaluation.

PLOT PLAN

PROPOSED W. ORANGE SWITCHING STATION
WEST ORANGE, NEW JERSEY
PSE&G

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	FILE NO.
5165-078*1G	19381

DR. BY	CHK. BY	DATE	SCALE	PLATE
JCB	PR	12/17/02	1"=40'	2

LOG OF TEST PIT

TEST PIT NO: 1

COMPLETION DATE: 12/11/02 | SURFACE ELEVATION: + 113 ft (±) | WATER LEVEL: 5'

JOB NUMBER: 5165-078*1G | READING DATE: 12/11/02

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Crushed stone	
	S1	10	ML	Brown silt, little fine to medium sand, little fine to coarse gravel (moist)(very stiff)	
	S2	12	GM	Brown fine to coarse gravel, some fine to coarse sand, trace silt (very moist)(dense)	
5				Gray-brown weathered/fractured basalt - refusal with CAT 416B backhoe @ 5'-3"	5
				Test pit completed @ 5'-3" Groundwater seepage encountered @ 5'	
10					10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: pr/mh 12/02

Sheet: 1 of 1 PLATE: 3A

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 2

COMPLETION DATE: 12/11/02
JOB NUMBER: 5165-078*1G

SURFACE ELEVATION: + 113 ft (±)

WATER LEVEL: 8'
READING DATE: 12/11/02

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Crushed stone	
	S1	13		Red-brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)	
				- grading to brown fine to coarse sand, some silt, little fine to coarse gravel (very moist)(medium dense to dense)	
	S2	25	SM		
5					5
	S3	40		- grading to little silt, with weathered basalt fragments (wet)(dense)	
10					10
				Test pit completed @ 9'	
				Groundwater seepage encountered @ 8'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: pr/mh 12/02

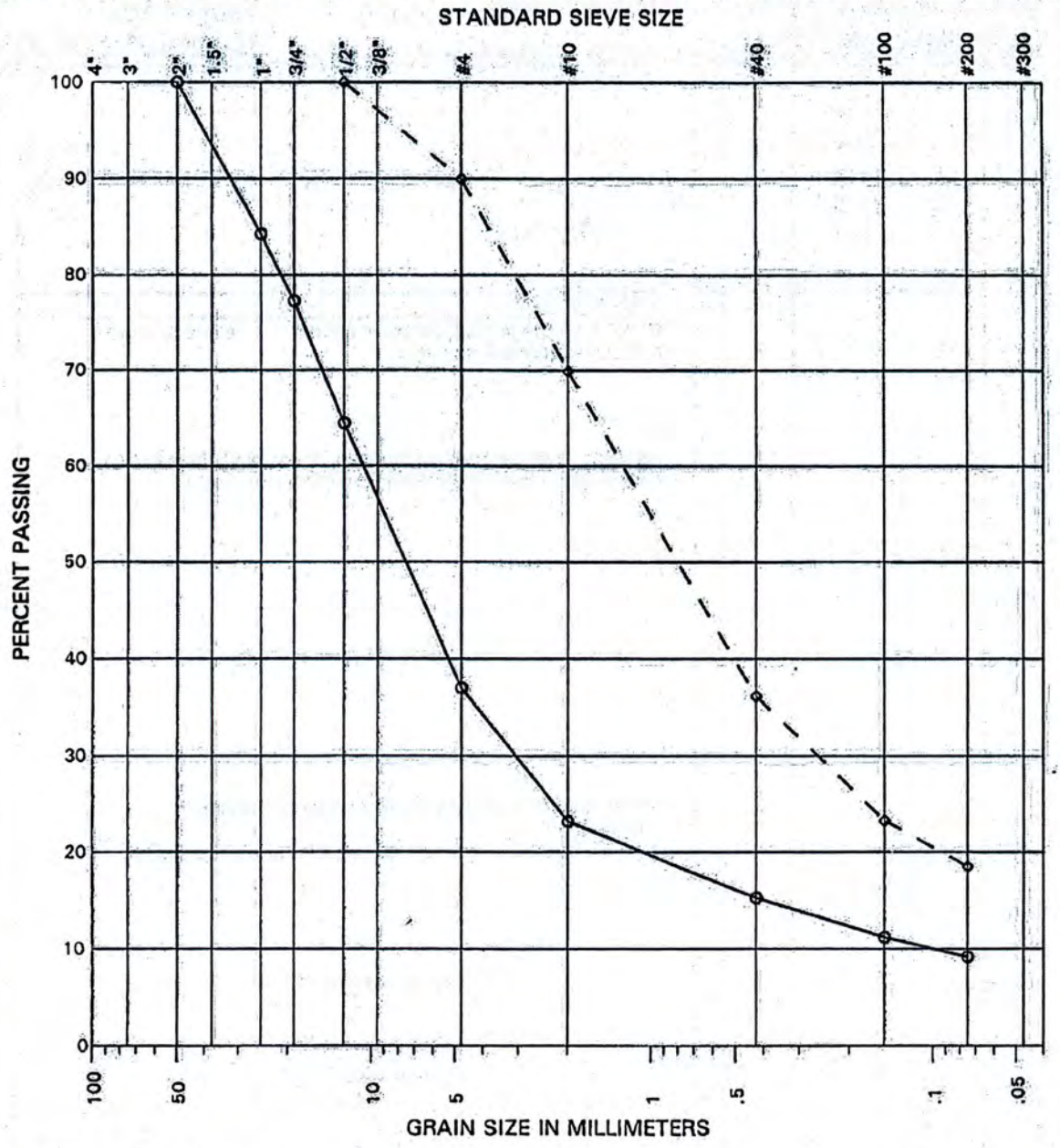
Sheet: 1 of 1 PLATE: 3B

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

JOB NUMBER 5166-078

UNIFIED SOIL CLASSIFICATION

COBBLES & BOULDERS	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



EXPLORATION/IDENTIFICATION:	DEPTH/SOURCE:			
TP #1	S-2, 3'			
LINE SYMBOL:	MOISTURE CONTENT (%):	LIQUID LIMIT (%):	PLASTIC LIMIT (%):	USCS SYMBOL:
○——○	12.1	----	----	GM
USCS CLASSIFICATION:				
FINE TO COARSE GRAVEL,SOME FINE TO COARSE SAND,TRACE SILT				
EXPLORATION/IDENTIFICATION:	DEPTH/SOURCE:			
TP #2	S-3, 8.5'			
LINE SYMBOL:	MOISTURE CONTENT (%):	LIQUID LIMIT (%):	PLASTIC LIMIT (%):	USCS SYMBOL:
◇— — — —◇	39.6	----	----	SM
USCS CLASSIFICATION:				
FINE TO COARSE SAND,LITTLE SILT,LITTLE FINE GRAVEL				

GRADATION CURVES

MELICK - TULLY AND ASSOCIATES, P.C. PLATE 5

APPENDIX II

Limitations

APPENDIX II

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape measurement from existing surface features shown on the plans provided to us. Elevations of the explorations were approximately determined by interpolation between contours shown on the plans provided to us. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of PSE&G for specific application to the design of the proposed West Orange Switching Station Improvements. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from five widely-spaced test borings and two test pits performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil and foundation engineering report was prepared for the project by Melick-Tully and Associates, P.C. for design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that Melick-Tully and Associates, P.C. be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

APPENDIX III

Post-Construction Settlement Calculations

5165-243*1D
PSEG
West Orange Switching Station Improvements
West Orange, Essex County, New Jersey

Immediate Settlement Analysis

Analysis description: Typical 4x4 footing with 4 ksf load

Definition and entry of variables:

B =	4	least lateral dimension of footing (ft.)
L =	4	longest lateral dimension of footing (ft.)
L/B =	1	
α =	1.1	From Figure 3.23 in Das
α_r =	0.8	From Figure 3.23 in Das
μ =	0.3	Poisson's ratio
q_o =	4	intensity of contact pressure (ksf)
E_s =	368	Young's Modulus (ksf)
c =	0	cohesion (psf)
N =	23	Avg SPT "N" value from borings

Values or value ranges for Poisson's ratio μ

Type of soil	μ
Clay, saturated	0.4–0.5
Clay, unsaturated	0.1–0.3
Sandy clay	0.2–0.3
Silt	0.3 0.35
Sand, gravelly sand	−0.1–1.00
commonly used	0.3–0.4
Rock	0.1–0.4 (depends somewhat on type of rock)
Loess	0.1–0.3
Ice	0.36
Concrete	0.15

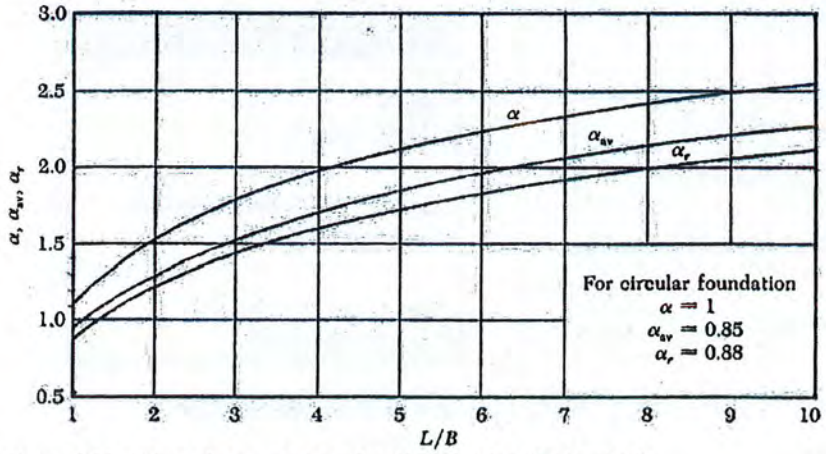


Figure 3.23 Values of α, α_{av}, and α_r—Eqs. (3.62), (3.63), (3.66), (3.67)

E_s correlations

Sands:
E_s = 8N (tsf)

Clays (normally consolidated)
E_s = 250c to 500c

Clays (overconsolidated)
E_s = 750c to 1000c

Average N for SBH-3 to ±11'
Ave N=23
(8)23=184 TSF

Calculate settlement

Assume Rigid foundation

$$\Delta H = \frac{Bq_o}{E_s}\left(1-\mu^2\right)\alpha_r$$

ΔH = 0.38 "

Sources:

Values of α:	Principles of Foundation Engineering by Das, 2nd Edition, p. 157
Values of μ:	Foundation Analysis & Design by Bowles, 4th Edition, p. 100
ΔH formula:	Principles of Foundation Engineering by Das, 2nd Edition, p. 156
Es formulas:	Principles of Foundation Engineering by Das, 2nd Edition, p. 161

5165-243*1D
PSEG
West Orange Switching Station Improvements
West Orange, Essex County, New Jersey

Immediate Settlement Analysis

Analysis description: 12'x15' Transformer pad with 2.8 ksf load

Definition and entry of variables:

B =	12	least lateral dimension of footing (ft.)
L =	15	longest lateral dimension of footing (ft.)
L/B =	1.25	
α =	1.2	From Figure 3.23 in Das
α_r =	0.9	From Figure 3.23 in Das
μ =	0.3	Poisson's ratio
q_o =	2.8	intensity of contact pressure (ksf)
E_s =	448	Young's Modulus (ksf)
c =	0	cohesion (psf)
N =	28	Avg SPT "N" value from borings

Values or value ranges for Poisson's ratio μ

Type of soil	μ
Clay, saturated	0.4–0.5
Clay, unsaturated	0.1–0.3
Sandy clay	0.2–0.3
Silt	0.3–0.35
Sand, gravelly sand	−0.1–1.00
commonly used	0.3–0.4
Rock	0.1–0.4 (depends somewhat on type of rock)
Loess	0.1–0.3
Ice	0.36
Concrete	0.15

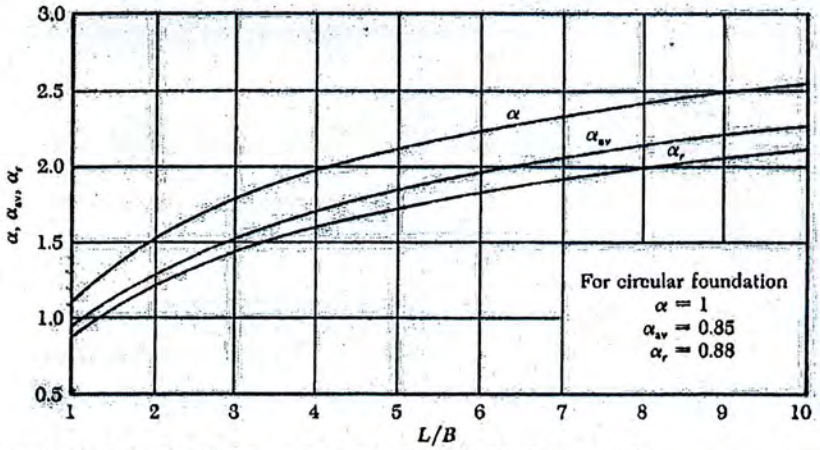


Figure 3.23 Values of α, α_{av}, and α_r—Eqs. (3.62), (3.63), (3.66), (3.67)

E_s correlations

Sands:
E_s = 8N (tsf)

Clays (normally consolidated)
E_s = 250c to 500c

Clays (overconsolidated)
E_s = 750c to 1000c

Ave of N for SBH-3 to 25'
Ave N =30

(8)28=224 TSF

Calculate settlement

Assume rigid foundation

$$\Delta H = \frac{B q_o}{E_s}\left(1-\mu^2\right)\alpha_r$$

ΔH = 0.74 "

Sources:

Values of α:	Principles of Foundation Engineering by Das, 2nd Edition, p. 157
Values of μ:	Foundation Analysis & Design by Bowles, 4th Edition, p. 100
ΔH formula:	Principles of Foundation Engineering by Das, 2nd Edition, p. 156
Es formulas:	Principles of Foundation Engineering by Das, 2nd Edition, p. 161

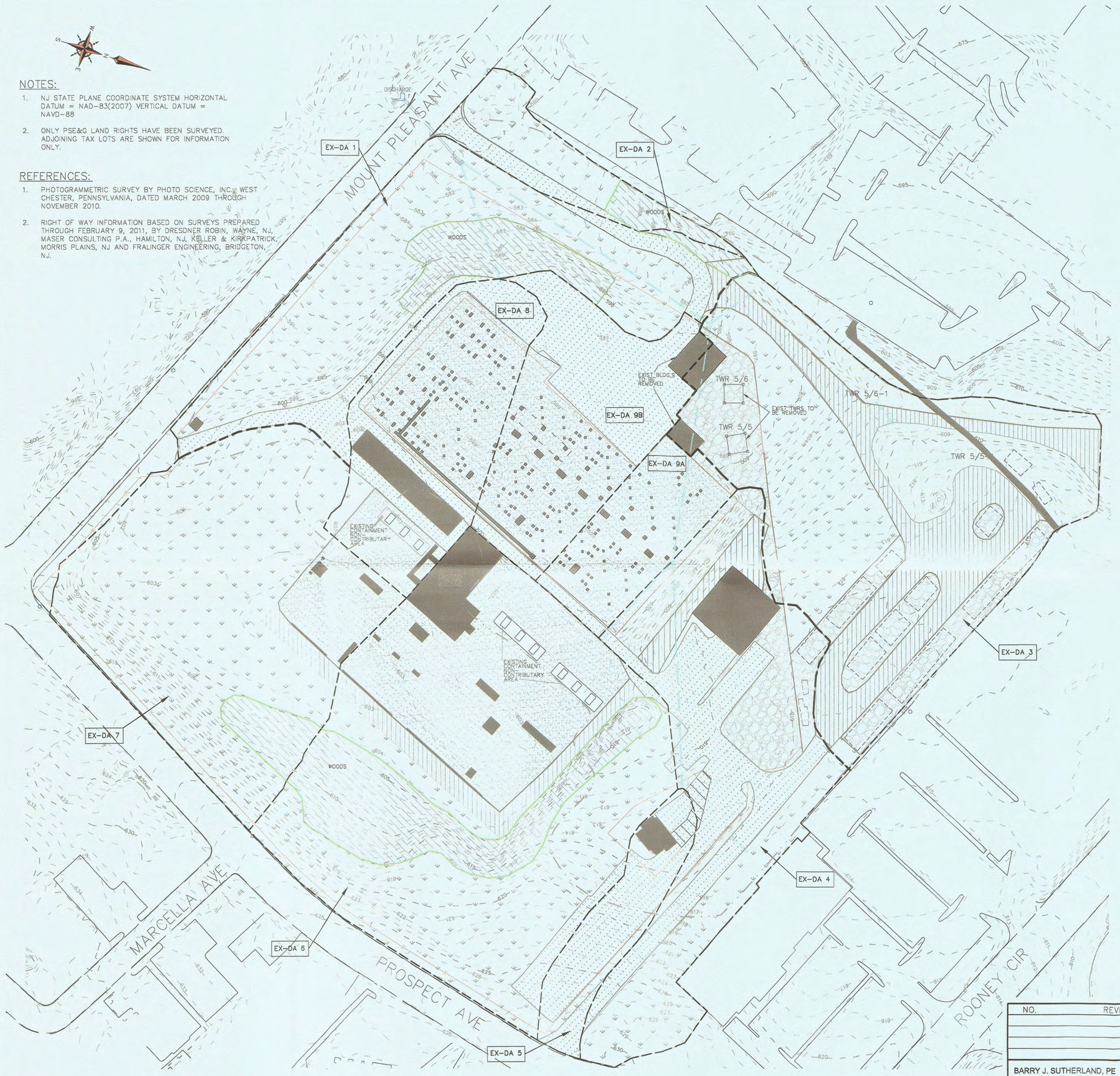
Appendix B - Pre-Development Drainage Area Plan

NOTES:

1. NJ STATE PLANE COORDINATE SYSTEM HORIZONTAL DATUM = NAD-83(2007) VERTICAL DATUM = NAVD-88
2. ONLY PSE&G LAND RIGHTS HAVE BEEN SURVEYED. ADJOINING TAX LOTS ARE SHOWN FOR INFORMATION ONLY.

REFERENCES:

1. PHOTOGRAMMETRIC SURVEY BY PHOTO SCIENCE, INC., WEST CHESTER, PENNSYLVANIA, DATED MARCH 2009 THROUGH NOVEMBER 2010.
2. RIGHT OF WAY INFORMATION BASED ON SURVEYS PREPARED THROUGH FEBRUARY 9, 2011, BY DRESDNER ROBIN, WAYNE, NJ, MASER CONSULTING P.A., HAMILTON, NJ, KELLER & KIRKPATRICK, MORRIS PLAINS, NJ AND FRALINGER ENGINEERING, BRIDGETON, NJ.



LEGEND

- ROSELAND-METUCHEN R/W LINE
- ADJOINING PROPERTY LINE
- EASEMENT LINE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- EXISTING FENCE LINE
- LIMIT OF DISTURBANCE
- DRAINAGE AREA
- EXISTING GRASS SURFACE
- EXISTING MEADOW SURFACE
- EXISTING BRUSH SURFACE
- EXISTING GRAVEL DRIVE SURFACE
- EXISTING GRAVEL SURFACE
- EXISTING YARD STONE SURFACE
- IMPERVIOUS SURFACE (BUILDINGS & FOUNDATIONS)
- EXISTING PAVED SURFACE
- DRAINAGE INLET

PRE-DEVELOPMENT SURFACE AREA COVER TYPE SUMMARY

Areas calculated within the Drainage Area Line:

IMPERVIOUS	
PAVED ROADS, BUILDINGS & FOUNDATIONS	119,542 SF
GRAVEL ROADS	51,431 SF
GRAVEL	43,159 SF
YARD STONE	131,550 SF
MEADOW	26,372 SF
GRASS	263,252 SF
BRUSH	50,888 SF
NON-CONTRIBUTORY	9,248 SF
TOTAL AREA	
w/ NON-CONTRIBUTORY	689,140 SF
w/o NON-CONTRIBUTORY	686,194 SF

40 0 40 80 160

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

NO.	REVISION	DATE

BARRY J. SUTHERLAND, PE
NEW JERSEY PROFESSIONAL ENGINEER GE 29135

Date

APPLICANT: PSE&G
80 PARK PLACE
NEWARK, NJ 07102-4194

TRC Engineers Inc.
57 E. WILLOW STREET
MILLBURN, NEW JERSEY 07041
PHONE NO. (973) 564-6006
FAX NO. (973) 564-6131
Certificate of Authorization #24GA28047100

WEST ORANGE SWITCHING STATION

TOWNSHIP OF WEST ORANGE, ESSEX COUNTY, NEW JERSEY

TITLE:

PRE-DEVELOPMENT SURFACE COVER TYPE PLAN

Project No.: 182614	Scale: AS SHOWN
Drawn By: JS	Date: 12/ 20/ 2011
Checked By: BJS	Drawing No.: APPENDIX B-1

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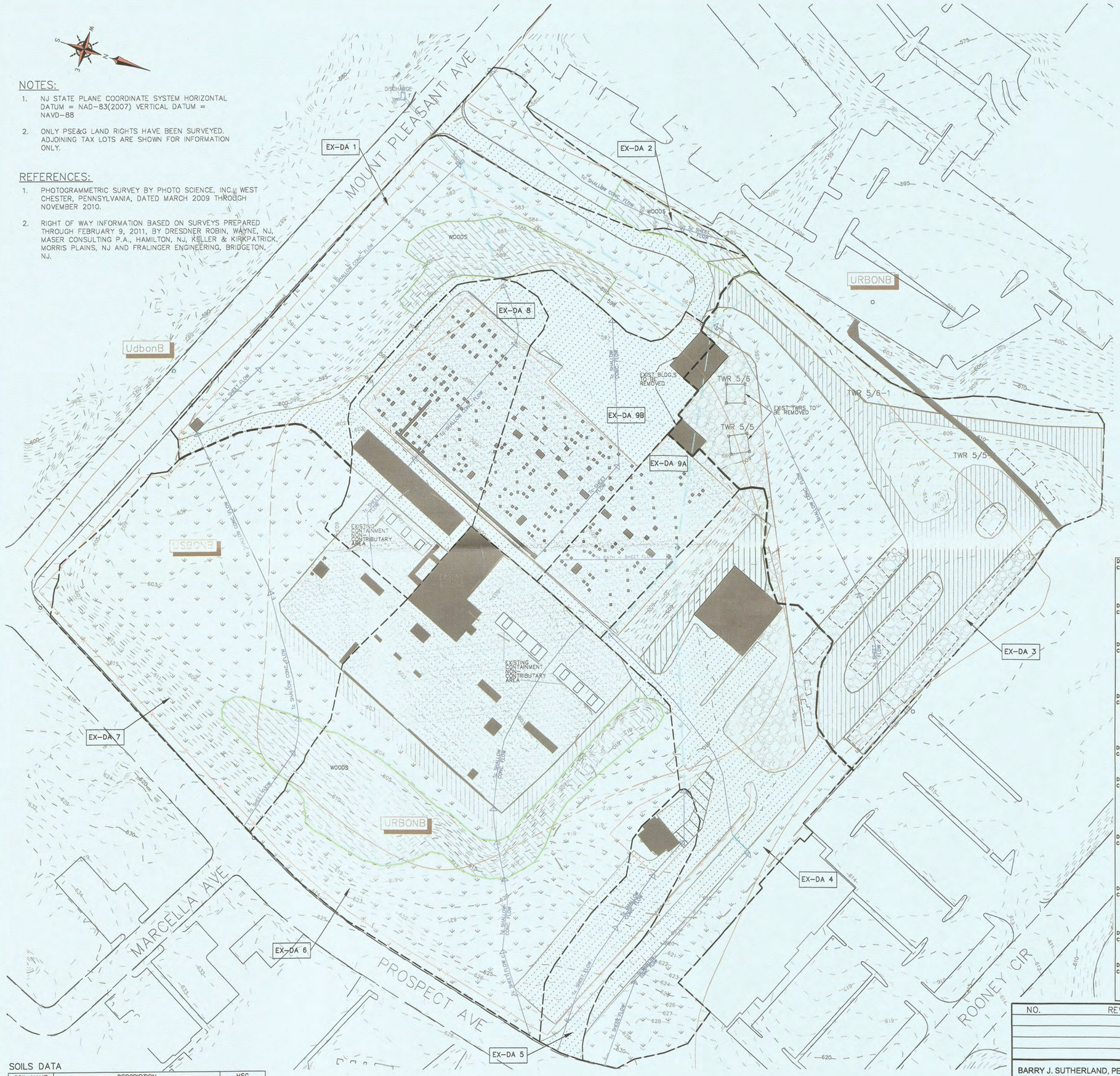
C.A.D.D. UPDATE: __/__/__
PLOT DATE: $$$date$$$*
$$$$$filename$$$$$*

NOTES:

1. NJ STATE PLANE COORDINATE SYSTEM HORIZONTAL DATUM = NAD-83(2007) VERTICAL DATUM = NAVD-88
2. ONLY PSE&G LAND RIGHTS HAVE BEEN SURVEYED. ADJOINING TAX LOTS ARE SHOWN FOR INFORMATION ONLY.

REFERENCES:

1. PHOTOGRAMMETRIC SURVEY BY PHOTO SCIENCE, INC. OF WEST CHESTER, PENNSYLVANIA, DATED MARCH 2009 THROUGH NOVEMBER 2010.
2. RIGHT OF WAY INFORMATION BASED ON SURVEYS PREPARED THROUGH FEBRUARY 9, 2011, BY DRESDNER ROBIN, WAYNE, NJ, MASER CONSULTING P.A., HAMILTON, NJ, KELLER & KIRKPATRICK, MORRIS PLAINS, NJ AND FRALINGER ENGINEERING, BRIDGETON, NJ.



LEGEND

- ROSELAND-METUCHEN R/W LINE
- ADJOINING PROPERTY LINE
- EASEMENT LINE
- 600 — EXISTING MAJOR CONTOUR LINE
- 599 — EXISTING MINOR CONTOUR LINE
- EXISTING FENCE LINE
- LIMIT OF DISTURBANCE
- DRAINAGE AREA
- EXISTING GRASS SURFACE
- EXISTING MEADOW SURFACE
- EXISTING BRUSH SURFACE
- EXISTING GRAVEL DRIVE SURFACE
- EXISTING GRAVEL SURFACE
- EXISTING YARD STONE SURFACE
- IMPERVIOUS SURFACE (BUILDINGS & FOUNDATIONS)
- EXISTING PAVED SURFACE
- DRAINAGE INLET
- SOILS
- URBONB — SOIL DESIGNATION

PRE-DEVELOPMENT DRAINAGE AREA SUMMARY

Areas calculated within the Drainage Area Line:

IMPERVIOUS PAVED ROADS, BUILDINGS & FOUNDATIONS	119,542 SF
GRAVEL ROADS	51,431 SF
GRAVEL	43,159 SF
YARD STONE	131,550 SF
MEADOW	26,372 SF
GRASS	263,252 SF
BRUSH	50,888 SF
NON-CONTRIBUTORY	9,248 SF
TOTAL AREA w/ NON-CONTRIBUTORY	689,140 SF
w/o NON-CONTRIBUTORY	686,194 SF

DRAINAGE AREA EX-DA 1	
Composite CN = 81, Tc Path = 18.2 min	
Impervious	11158
Gravel Road	661
Grass	53293
Brush	14189
Total	79301
DRAINAGE AREA EX-DA 2	
Composite CN = 83, Tc Path = 22.9 min	
Impervious	4190
Grass	10038
Brush	3705
Total	17933
DRAINAGE AREA EX-DA 3	
Composite CN = 88, Tc Path = 5.6 min	
Impervious	3042
Gravel Road	35019
Gravel	29686
Grass	30906
Meadow	26372
Total	125025
DRAINAGE AREA EX-DA 4	
Composite CN = 91, Tc Path = 14.2 min	
Impervious	31370
Gravel Road	5072
Gravel	12803
Yard stone	8134
Grass	21566
Total	78947
DRAINAGE AREA EX-DA 5	
Composite CN = 96, Tc Path = 1.8 min	
Impervious	17517
Grass	2694
Total	20211
DRAINAGE AREA EX-DA 6	
Composite CN = 82, Tc Path = 16.9 min	
Impervious	9501
Gravel Road	8481
Yard stone	43082
Grass	57041
Brush	27592
Non-Contributory	1964
Total	147661
DRAINAGE AREA EX-DA 7	
Composite CN = 81, Tc Path = 7.7 min	
Impervious	805
Gravel Road	2198
Yard stone	10157
Grass	86177
Brush	5402
Total	104739
DRAINAGE AREA EX-DA 8	
Composite CN = 89, Tc Path = 28.4 min	
Impervious	15912
Yard stone	29261
Grass	1535
Non-Contributory	982
Total	47690
DRAINAGE AREA EX-DA 9A	
Composite CN = 86, Tc Path = 31.4 min	
Impervious	1344
Yard stone	20580
Total	21924
DRAINAGE AREA EX-DA 9B	
Composite CN = 92, Tc Path = 31.0 min	
Impervious	24703
Gravel	670
Yard stone	20336
Total	45709

ANALYSIS POINT "A" TABLE		
STORM EVENT	VOLUME (AF)	PEAK FLOW (CFS)
2 YR	2.684	23.25
10 YR	4.777	41.95
100 YR	9.133	79.82
NJDEP	0.541	10.16

40 0 40 80 160

SOILS DATA

SOIL NAME	DESCRIPTION	HSG
UdbonB	UDORTHENTS, BOONTON SUBSTRATUM, 0 to 8% SLOPES	"D" HSG
URBONB	URBAN LAND, BOONTON SUBSTRATUM, 0 to 8% SLOPES	---
USBONB	URBAN LAND, BOONTON SUBSTRATUM-BOONTON COMPLEX, 0 to 8% SLOPES	---

SOIL INFORMATION OBTAINED FROM NATURAL RESOURCE CONSERVATION SERVICES (NRCS) U.S. DEPARTMENT OF AGRICULTURE, WEB SOIL SURVEY, SOIL MAP FOR UNION COUNTY, NEW JERSEY.

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

NO.	REVISION	DATE

BARRY J. SUTHERLAND, PE
NEW JERSEY PROFESSIONAL ENGINEER GE 29135

Date

APPLICANT: PSE&G
80 PARK PLACE
NEWARK, NJ 07102-4194

TRC Engineers Inc.
57 E. WILLOW STREET
MILLBURN, NEW JERSEY 07041
PHONE NO. (973) 564-6006
FAX NO. (973) 564-6131
Certificate of Authorization #24GA28047100

WEST ORANGE SWITCHING STATION

TOWNSHIP OF WEST ORANGE, ESSEX COUNTY, NEW JERSEY

TITLE:

PRE-DEVELOPMENT DRAINAGE AREA PLAN

Project No.: 182614	Scale: AS SHOWN
Drawn By: JS	Date: 02/ 09/ 2012
Checked By: BJS	Drawing No.: APPENDIX B-2

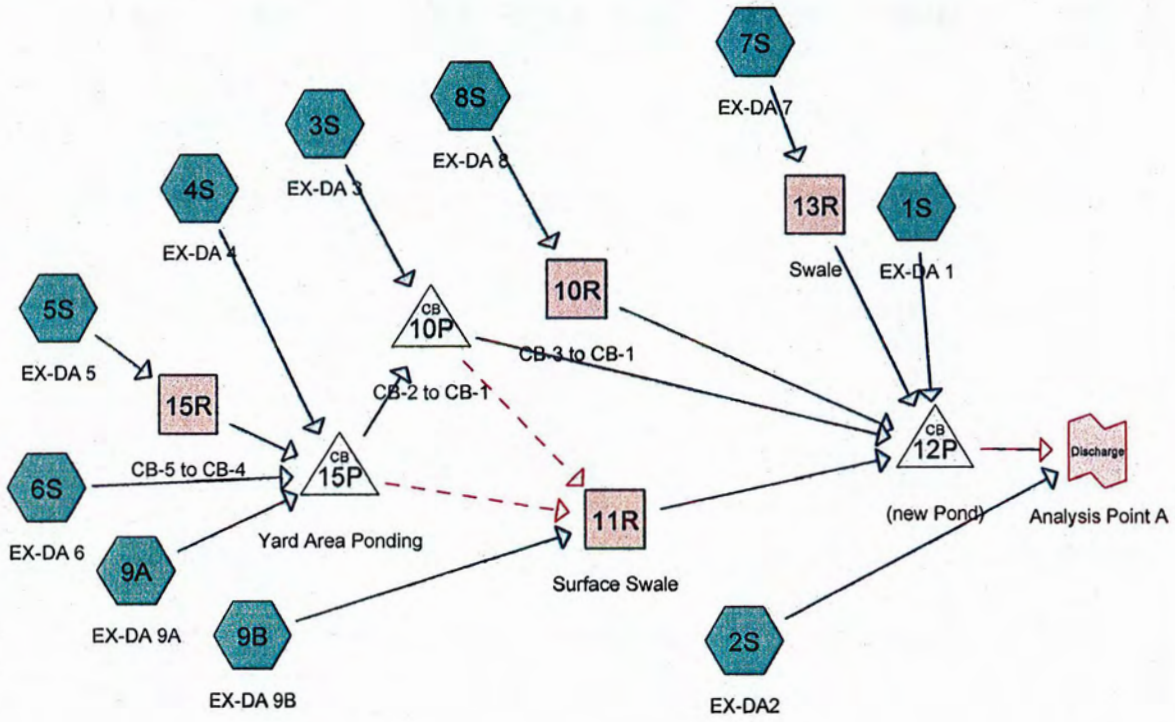
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C.A.D.D. UPDATE: --/--/--

PLOT DATE: $$$dot$$$

$$$$$filename$$$$$

Appendix C – Pre-Development HydroCad Results



Subcat Reach Pond Link

Drainage Diagram for Pre-Development West Orange with ponds 2
Prepared by TRC Engineers, Inc., Printed 3/4/2012
HydroCAD® 9.10 s/n 06401 © 2009 HydroCAD Software Solutions LLC

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	10R	592.92	578.50	140.0	0.1030	0.025	12.0	0.0	0.0
2	15R	610.00	596.25	245.0	0.0561	0.025	12.0	0.0	0.0
3	10P	590.00	578.00	330.0	0.0364	0.025	12.0	0.0	0.0
4	12P	576.00	574.00	90.0	0.0222	0.011	24.0	0.0	0.0
5	15P	594.92	590.25	220.0	0.0212	0.025	12.0	0.0	0.0

Summary for Subcatchment 1S: EX-DA 1

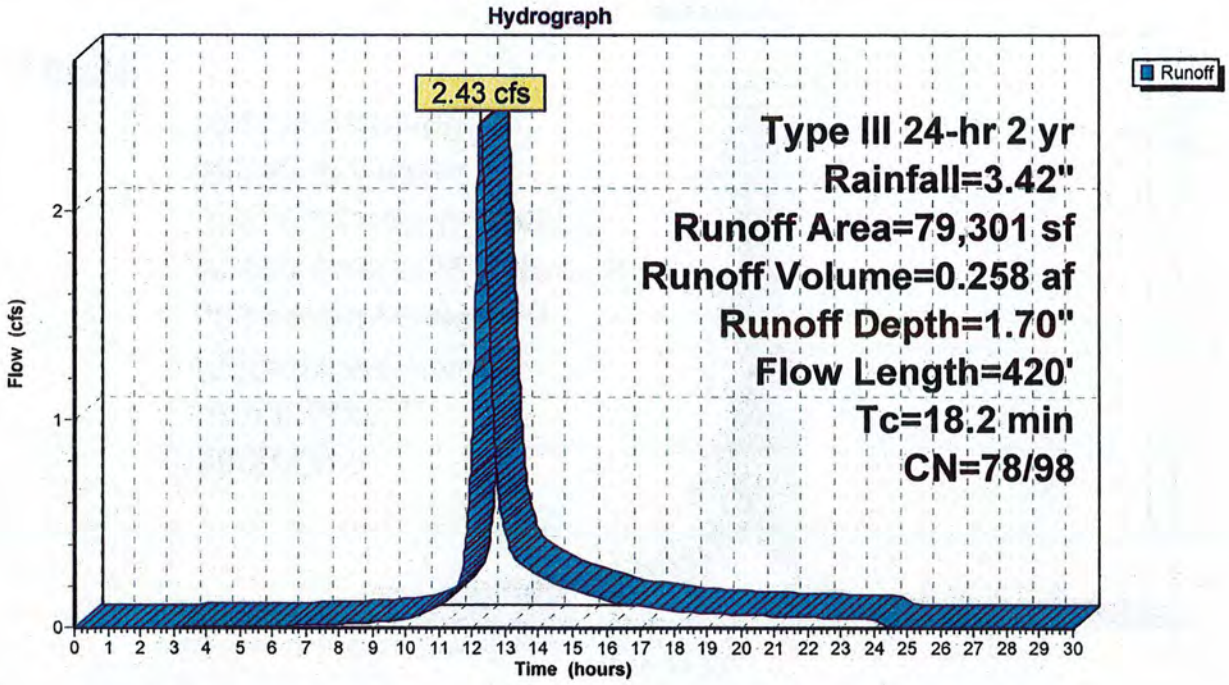
Runoff = 2.43 cfs @ 12.25 hrs, Volume= 0.258 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	11,158	98	Paved road, HSG D
*	661	98	Gravel road, HSG D
	53,293	79	Woods/grass comb., Good, HSG D
	14,189	73	Brush, Good, HSG D
	79,301	81	Weighted Average
	67,482	78	85.10% Pervious Area
	11,819	98	14.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1S: EX-DA 1



Summary for Subcatchment 2S: EX-DA2

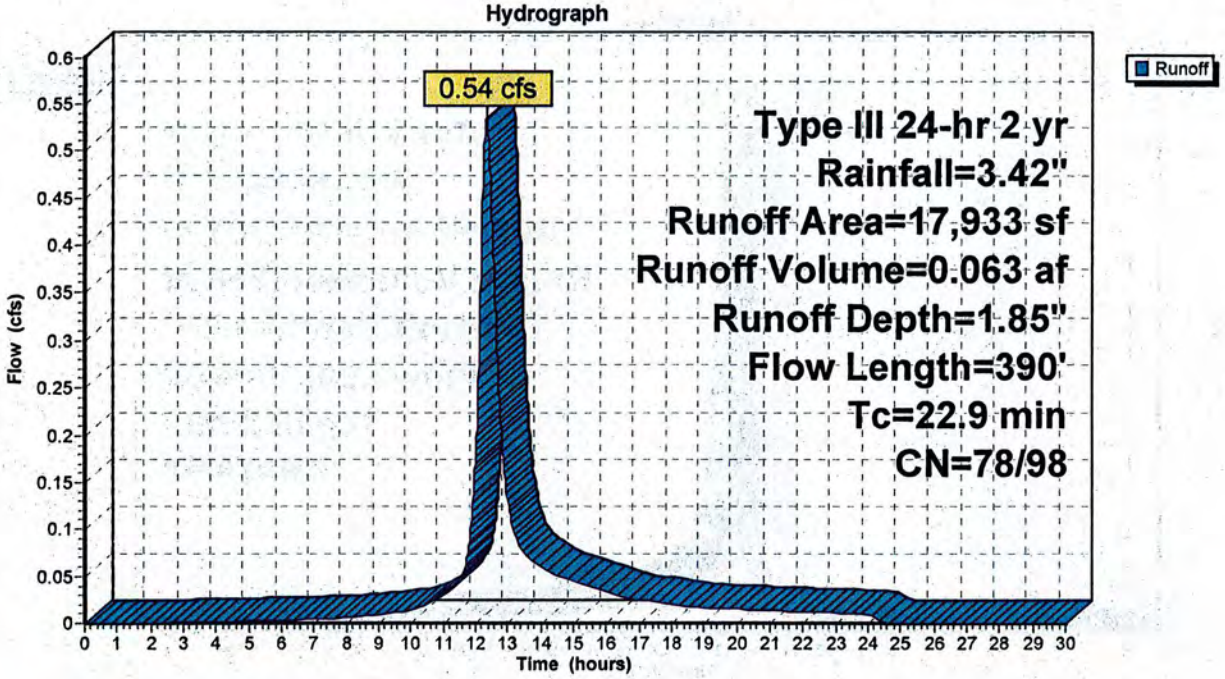
Runoff = 0.54 cfs @ 12.32 hrs, Volume= 0.063 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	4,190	98	Paved road, HSG D
*	10,038	80	Grass, Good, HSG D
	3,705	73	Brush, Good, HSG D
	17,933	83	Weighted Average
	13,743	78	76.64% Pervious Area
	4,190	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.42"
1.1	240	0.0630	3.76		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
22.9	390	Total			

Subcatchment 2S: EX-DA2



Summary for Subcatchment 3S: EX-DA 3

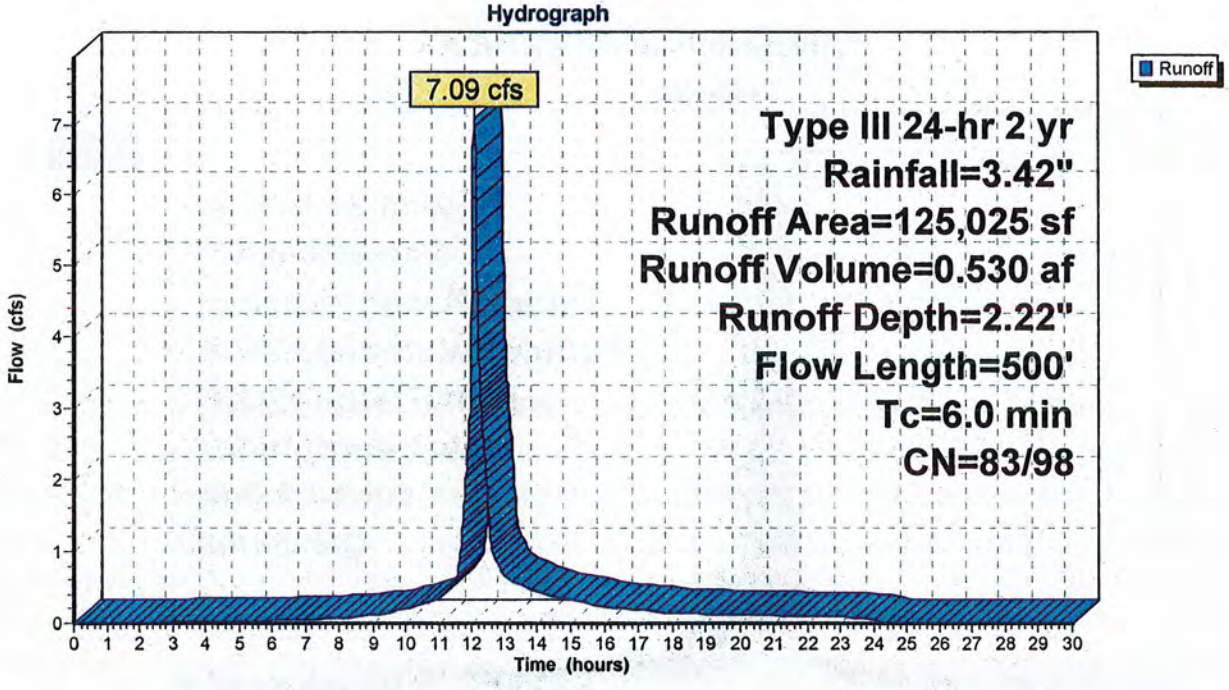
Runoff = 7.09 cfs @ 12.09 hrs, Volume= 0.530 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	3,042	98	Impervious, HSG D
*	35,019	98	Gravel road, HSG D
*	29,686	91	Gravel, HSG D
*	30,906	80	Grass, Good, HSG D
	26,372	78	Meadow, non-grazed, HSG D
	125,025	88	Weighted Average
	86,964	83	69.56% Pervious Area
	38,061	98	30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	150	0.0070	0.63		**Sheet Flow, Gravel Storage Area** n= 0.020 P2= 3.42"
1.6	350	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.6	500	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: EX-DA 3



Summary for Subcatchment 4S: EX-DA 4

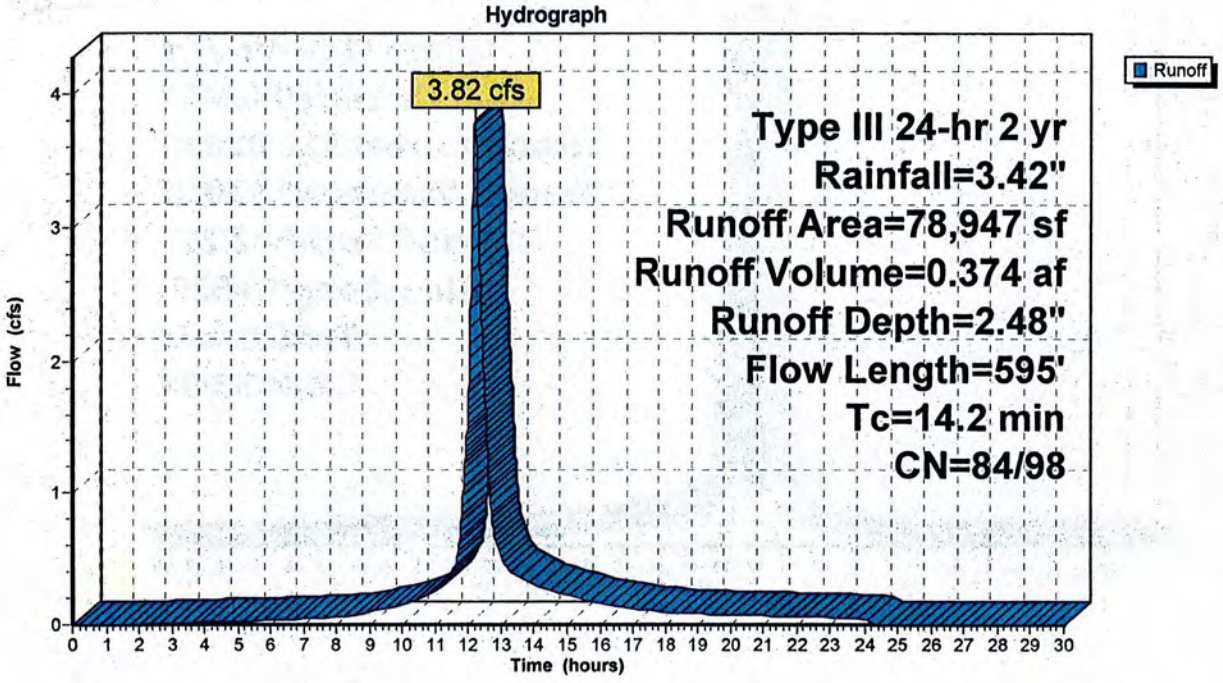
Runoff = 3.82 cfs @ 12.19 hrs, Volume= 0.374 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	31,370	98	Paved road, HSG D
*	5,072	98	Gravel road, HSG D
*	12,803	91	Gravel, HSG D
*	8,134	85	Yard stone, HSG D
*	21,568	80	Grass, Good, HSG D
	78,947	91	Weighted Average
	42,505	84	53.84% Pervious Area
	36,442	98	46.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	150	0.0600	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.7	135	0.0460	3.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	310	0.0470	4.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
14.2	595	Total			

Subcatchment 4S: EX-DA 4



Summary for Subcatchment 5S: EX-DA 5

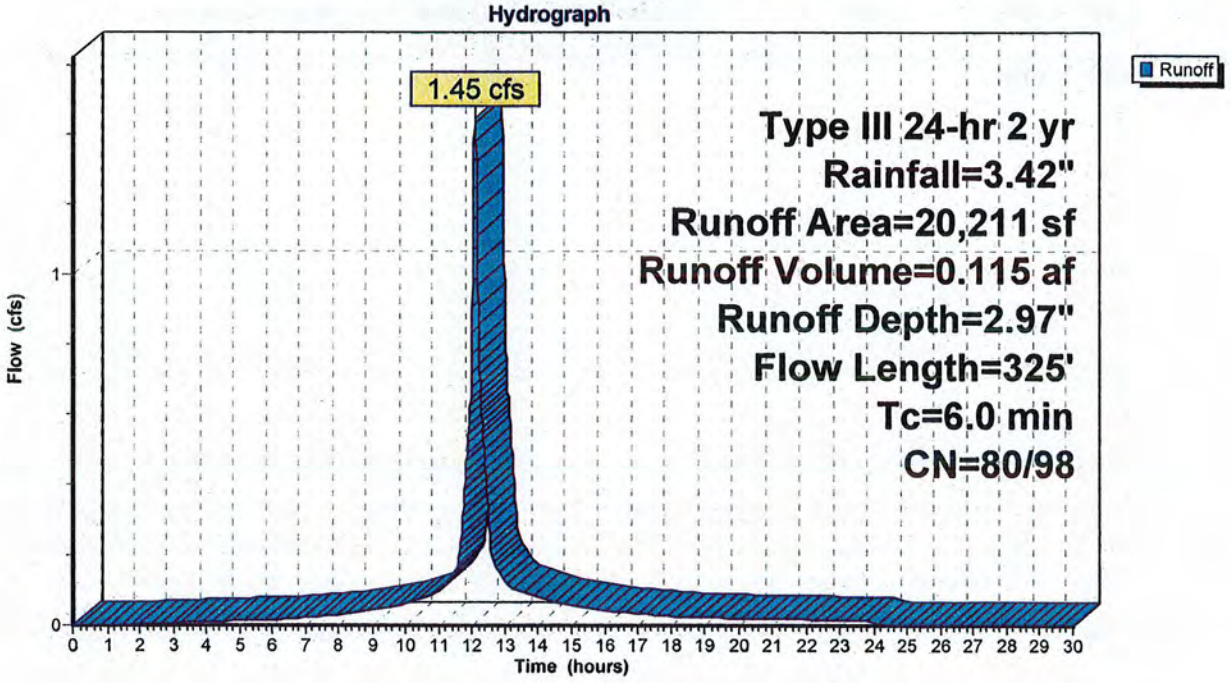
Runoff = 1.45 cfs @ 12.08 hrs, Volume= 0.115 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	17,517	98	Paved road, HSG D
*	2,694	80	Grass cover, Good, HSG D
	20,211	96	Weighted Average
	2,694	80	13.33% Pervious Area
	17,517	98	86.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0570	2.16		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	120	0.0790	5.71		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	50	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	55	0.0320	3.63		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	325	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5S: EX-DA 5



Summary for Subcatchment 6S: EX-DA 6

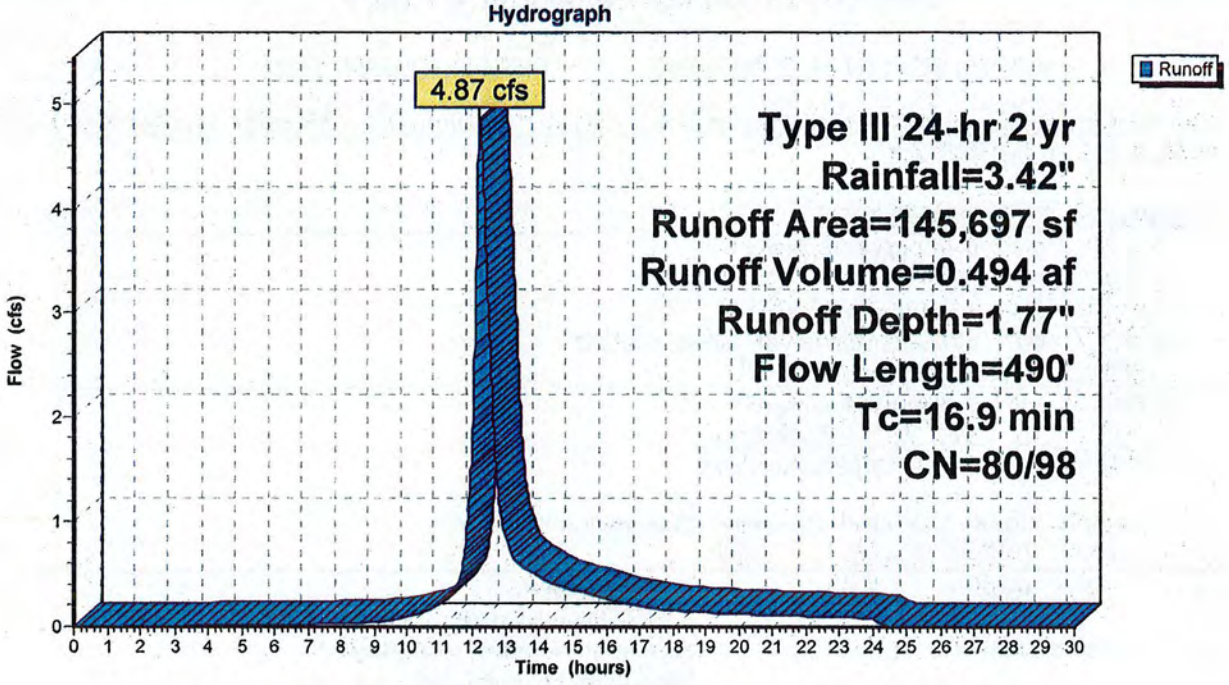
Runoff = 4.87 cfs @ 12.23 hrs, Volume= 0.494 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	9,501	98	Paved road, HSG D
*	8,481	98	Gravel road, HSG D
*	43,082	85	Yard stone, HSG D
*	57,041	80	Grass cover, Good, HSG D
	27,592	73	Brush, Good, HSG D
	145,697	82	Weighted Average
	127,715	80	87.66% Pervious Area
	17,982	98	12.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	150	0.0500	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.1	30	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	240	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
16.9	490	Total			

Subcatchment 6S: EX-DA 6



Summary for Subcatchment 7S: EX-DA 7

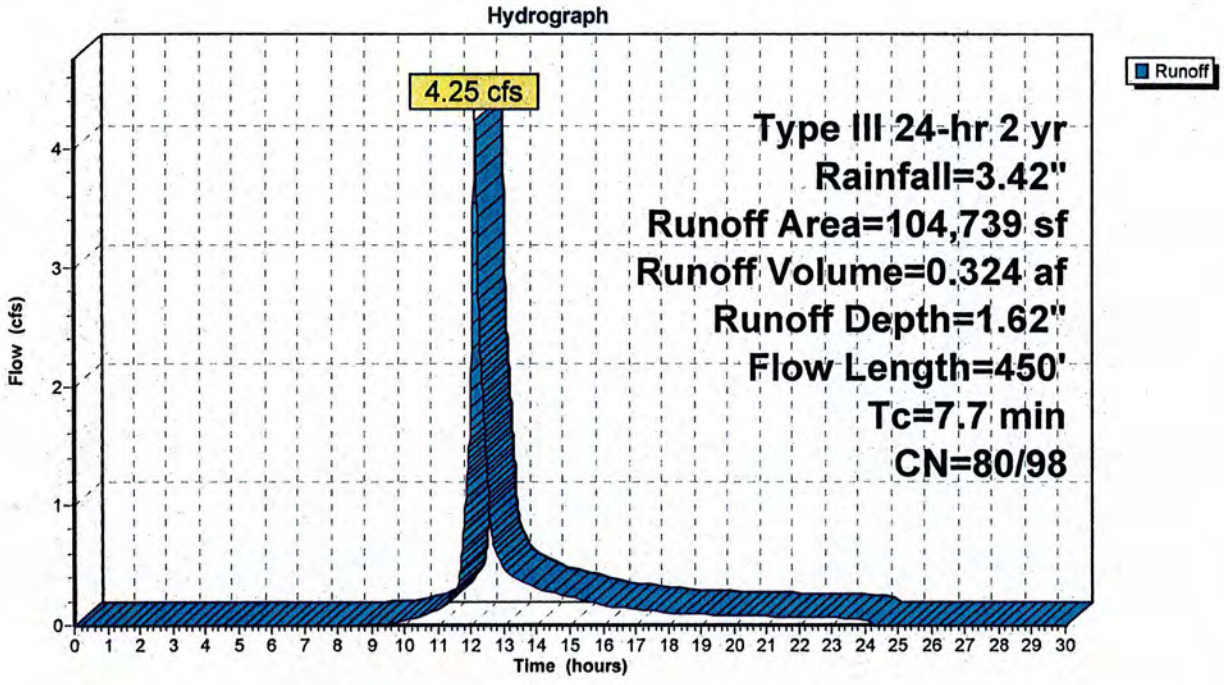
Runoff = 4.25 cfs @ 12.11 hrs, Volume= 0.324 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	805	98	Impervious, HSG D
*	2,198	98	Gravel road, HSG D
*	10,157	85	Yard stone, HSG D
	86,177	80	>75% Grass cover, Good, HSG D
	5,402	73	Brush, Good, HSG D
	104,739	81	Weighted Average
	101,736	80	97.13% Pervious Area
	3,003	98	2.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7S: EX-DA 7



Summary for Subcatchment 8S: EX-DA 8

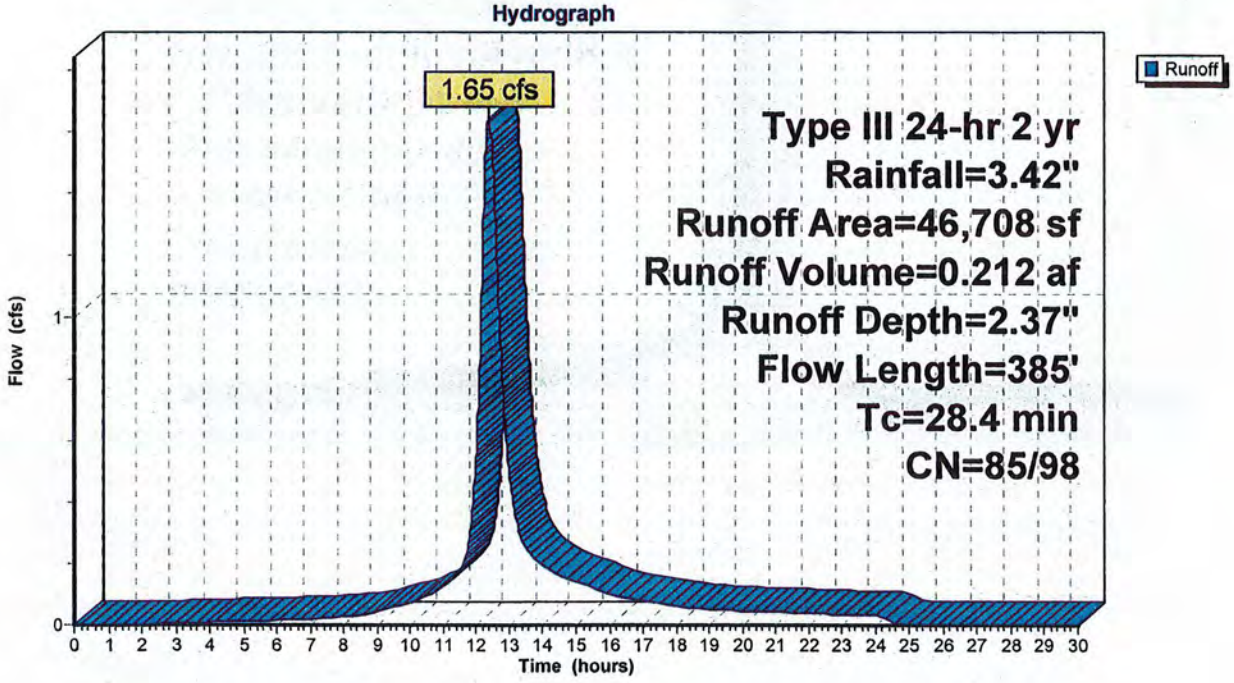
Runoff = 1.65 cfs @ 12.40 hrs, Volume= 0.212 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	15,912	98	Impervious, HSG D
*	29,261	85	Yard stone, HSG D
*	1,535	80	Grass, Good, HSG D
	46,708	89	Weighted Average
	30,796	85	65.93% Pervious Area
	15,912	98	34.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	80	0.0030	0.05		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"
0.5	80	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	165	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
0.2	60	0.0580	4.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
28.4	385	Total			

Subcatchment 8S: EX-DA 8



Summary for Subcatchment 9A: EX-DA 9A

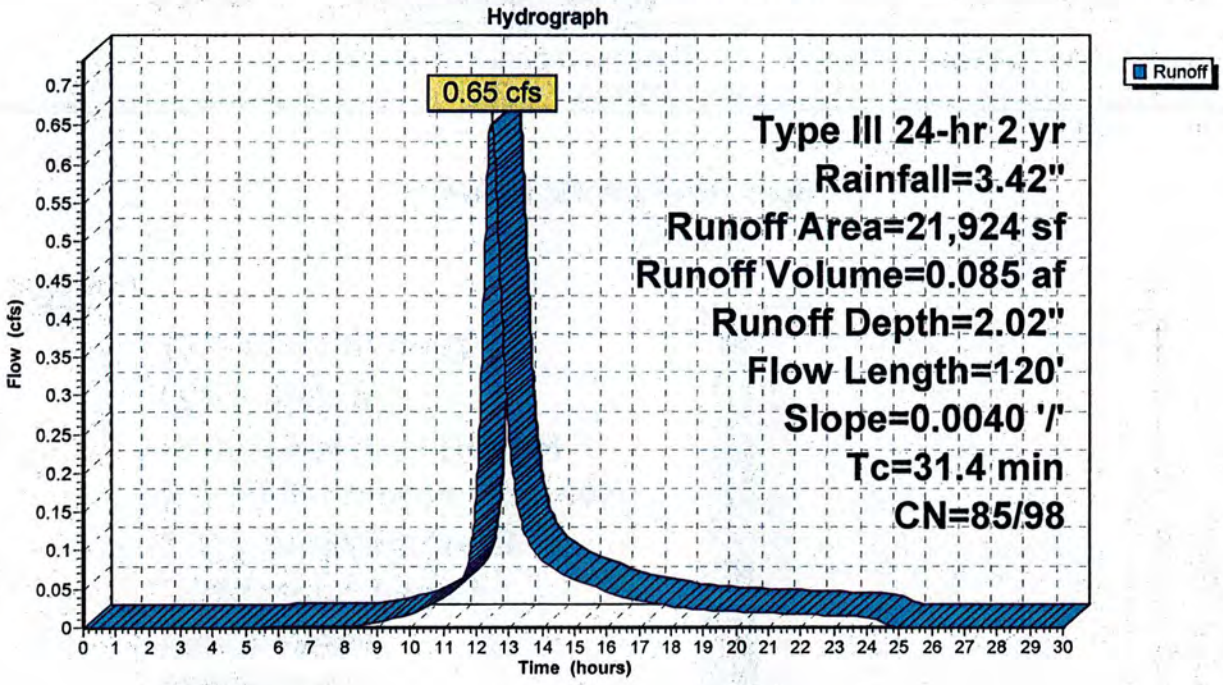
Runoff = 0.65 cfs @ 12.45 hrs, Volume= 0.085 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	1,344	98	Paved road, HSG D
*	20,580	85	Yard stone, HSG D
	21,924	86	Weighted Average
	20,580	85	93.87% Pervious Area
	1,344	98	6.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.4	120	0.0040	0.06		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"

Subcatchment 9A: EX-DA 9A



Summary for Subcatchment 9B: EX-DA 9B

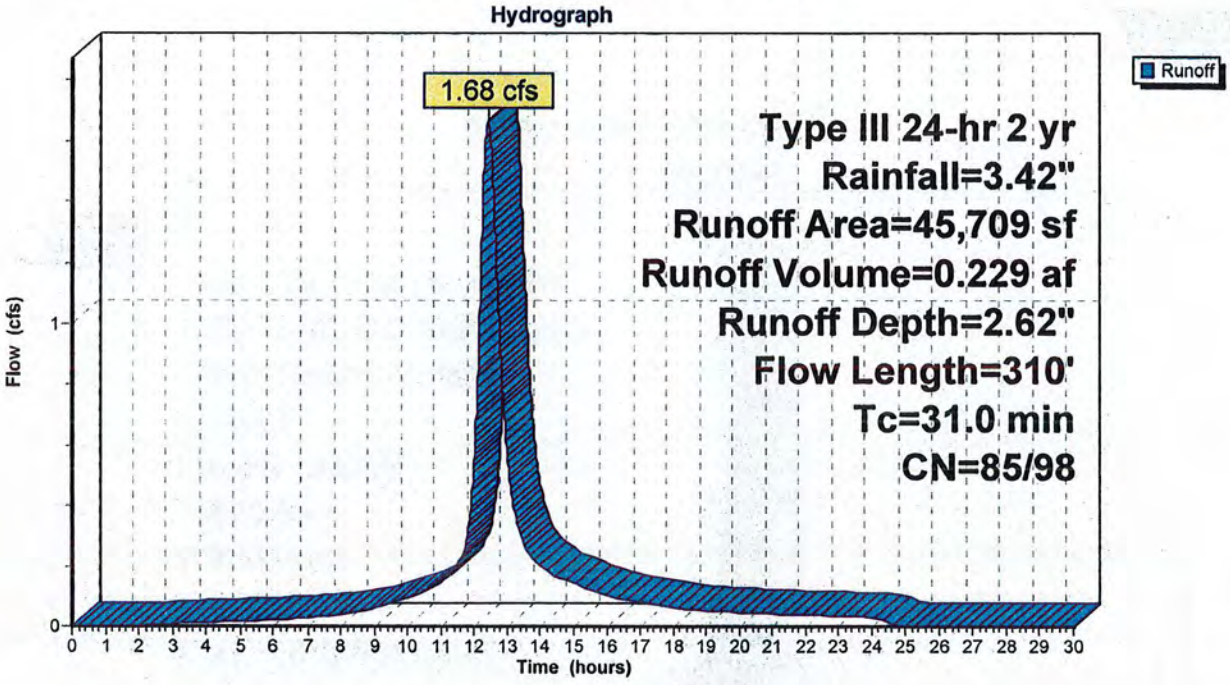
Runoff = 1.68 cfs @ 12.43 hrs, Volume= 0.229 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	24,703	98	Impervious, HSG D
*	670	91	Gravel, HSG D
*	20,336	85	Yard stone, HSG D
	45,709	92	Weighted Average
	21,006	85	45.96% Pervious Area
	24,703	98	54.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	150	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.0	160	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.0	310	Total			

Subcatchment 9B: EX-DA 9B



Summary for Reach 10R: CB-3 to CB-1

[52] Hint: Inlet/Outlet conditions not evaluated

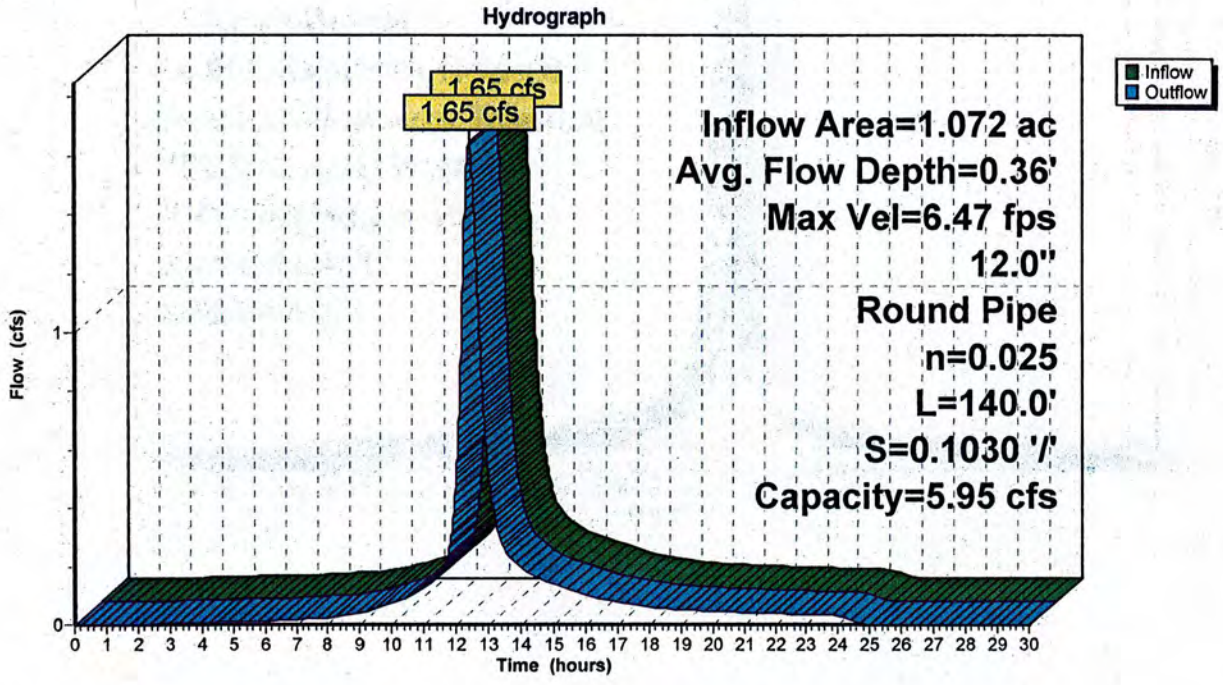
Inflow Area = 1.072 ac, 34.07% Impervious, Inflow Depth = 2.37" for 2 yr event
Inflow = 1.65 cfs @ 12.40 hrs, Volume= 0.212 af
Outflow = 1.65 cfs @ 12.40 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 6.47 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 1.0 min

Peak Storage= 36 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.95 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 140.0' Slope= 0.1030 '/'
Inlet Invert= 592.92', Outlet Invert= 578.50'





Summary for Reach 11R: Surface Swale

Inflow Area = 1.049 ac, 54.04% Impervious, Inflow Depth = 7.06" for 2 yr event
Inflow = 12.19 cfs @ 12.13 hrs, Volume= 0.617 af
Outflow = 12.12 cfs @ 12.14 hrs, Volume= 0.617 af, Atten= 1%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.95 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 5.9 min

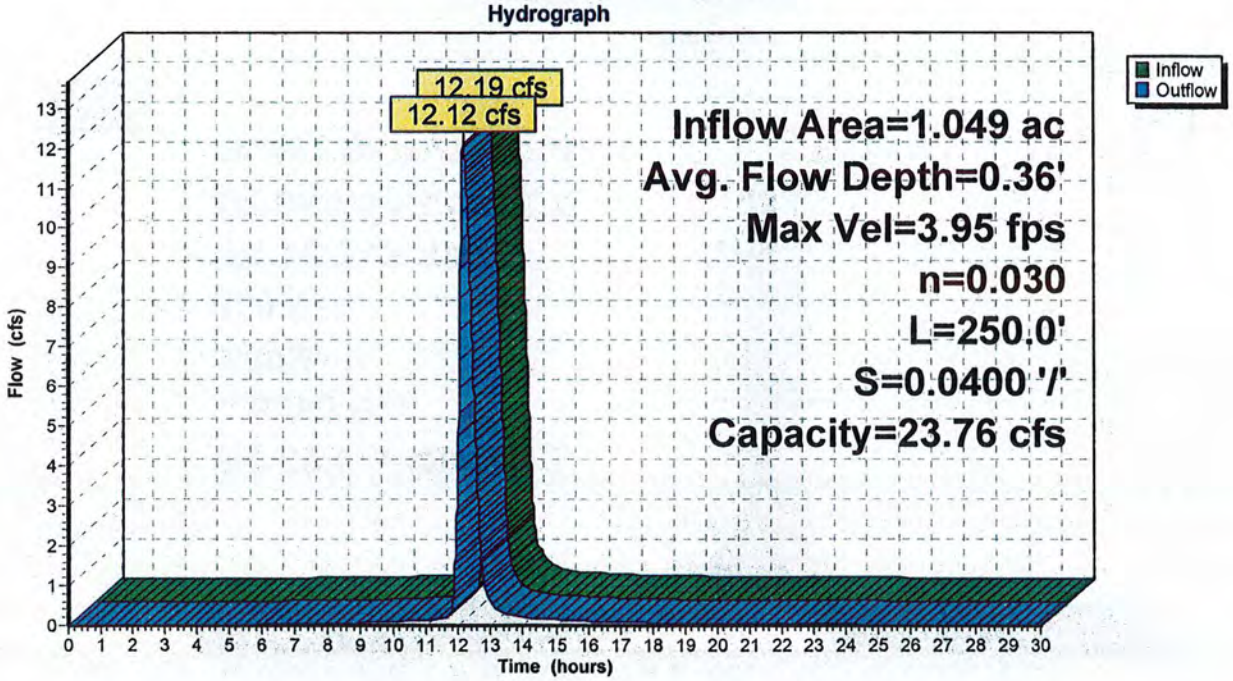
Peak Storage= 767 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 23.76 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 250.0' Slope= 0.0400 '/'
Inlet Invert= 590.00', Outlet Invert= 580.00'



‡

Reach 11R: Surface Swale



Summary for Reach 13R: Swale

Inflow Area = 2.404 ac, 2.87% Impervious, Inflow Depth = 1.62" for 2 yr event
Inflow = 4.25 cfs @ 12.11 hrs, Volume= 0.324 af
Outflow = 4.07 cfs @ 12.14 hrs, Volume= 0.324 af, Atten= 4%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.94 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 10.0 min

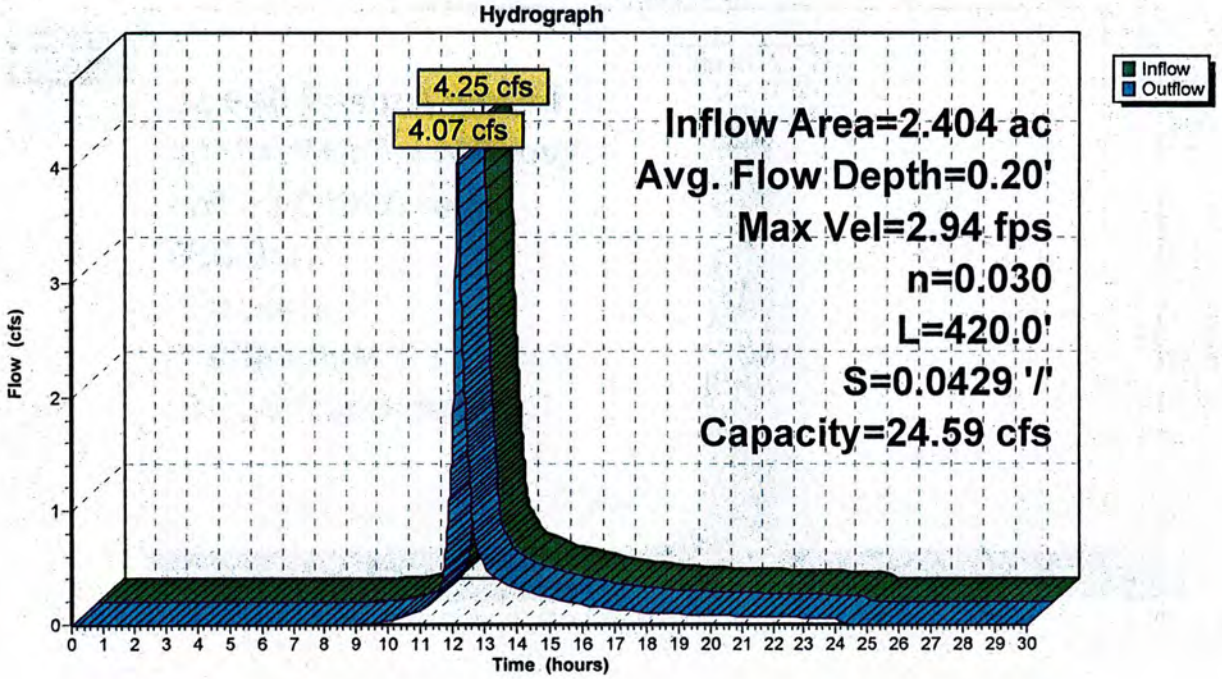
Peak Storage= 580 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡

Reach 13R: Swale



Summary for Reach 15R: CB-5 to CB-4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.464 ac, 86.67% Impervious, Inflow Depth = 2.97" for 2 yr event
Inflow = 1.45 cfs @ 12.08 hrs, Volume= 0.115 af
Outflow = 1.44 cfs @ 12.09 hrs, Volume= 0.115 af, Atten= 1%, Lag= 0.6 min

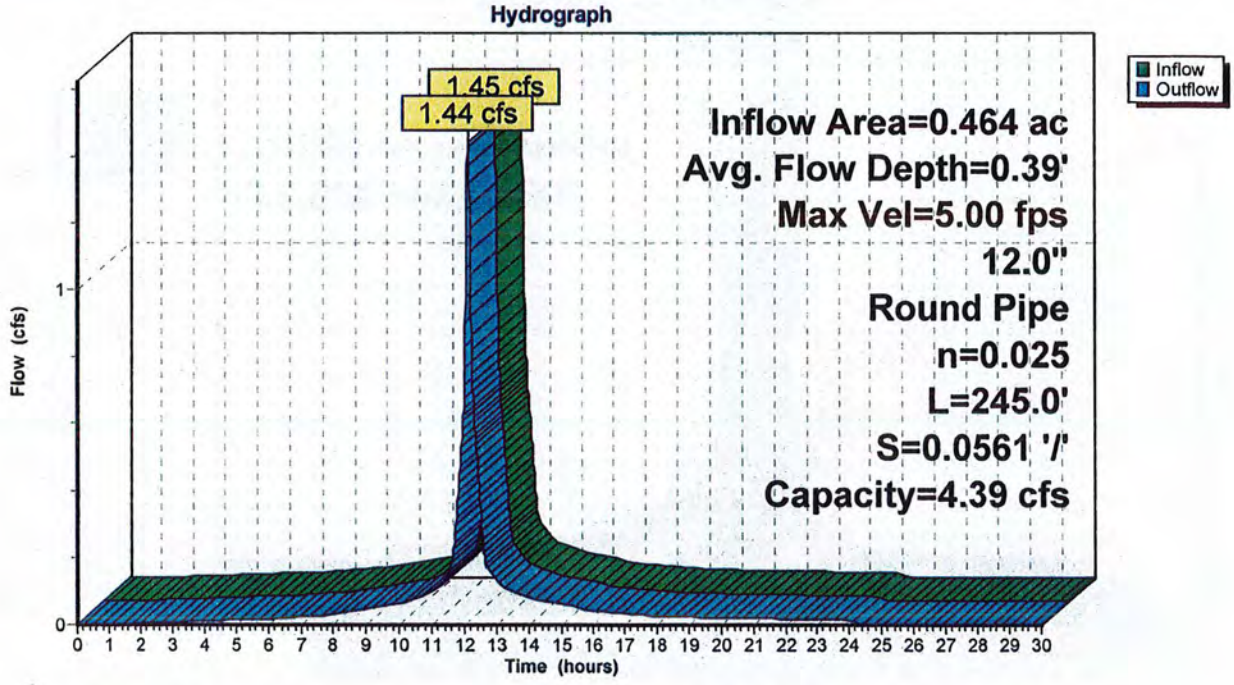
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.00 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.64 fps, Avg. Travel Time= 2.5 min

Peak Storage= 70 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.39 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 245.0' Slope= 0.0561 '/'
Inlet Invert= 610.00', Outlet Invert= 596.25'



Reach 15R: CB-5 to CB-4



Summary for Pond 10P: CB-2 to CB-1

[57] Hint: Peaked at 593.94' (Flood elevation advised)

Inflow Area =	8.995 ac,	28.42% Impervious,	Inflow Depth =	1.81"	for 2 yr event
Inflow =	9.82 cfs @	12.09 hrs, Volume=	1.357 af		
Outflow =	9.82 cfs @	12.09 hrs, Volume=	1.357 af,	Atten= 0%,	Lag= 0.0 min
Primary =	3.84 cfs @	12.09 hrs, Volume=	1.210 af		
Secondary =	5.98 cfs @	12.09 hrs, Volume=	0.146 af		

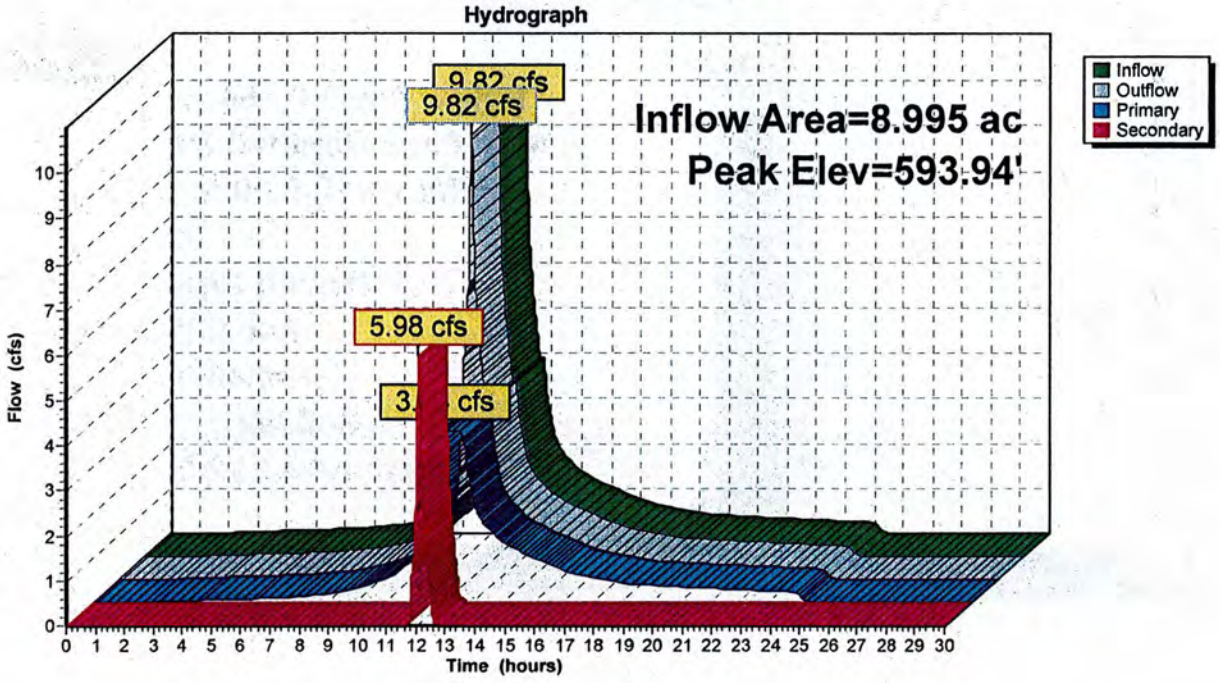
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 593.94' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	590.00'	**12.0" Round Culvert** L= 330.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 590.00' / 578.00' S= 0.0364 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	593.75'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.84 cfs @ 12.09 hrs HW=593.94' TW=578.83' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.84 cfs @ 4.89 fps)

Secondary OutFlow Max=5.97 cfs @ 12.09 hrs HW=593.94' TW=590.34' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 5.97 cfs @ 1.07 fps)

Pond 10P: CB-2 to CB-1



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 579.29' (Flood elevation advised)
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.51' @ 12.15 hrs

Inflow Area =	15.341 ac,	24.96% Impervious,	Inflow Depth =	2.05"	for 2 yr event
Inflow =	22.88 cfs @	12.15 hrs,	Volume=	2.621 af	
Outflow =	22.88 cfs @	12.15 hrs,	Volume=	2.621 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.88 cfs @	12.15 hrs,	Volume=	2.621 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

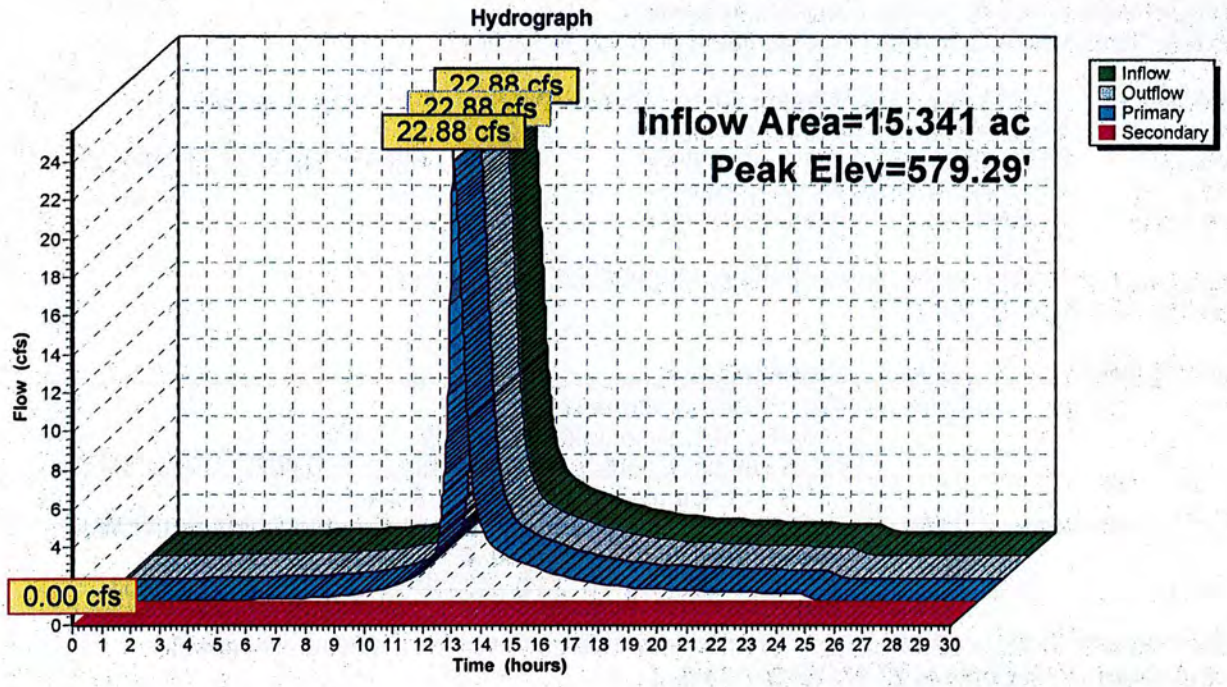
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 579.29' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=22.87 cfs @ 12.15 hrs HW=579.29' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 22.87 cfs @ 7.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=576.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: (new Pond)



Summary for Pond 15P: Yard Area Ponding

[57] Hint: Peaked at 599.09' (Flood elevation advised)
[62] Hint: Exceeded Reach 15R OUTLET depth by 2.63' @ 12.60 hrs

Inflow Area =	6.124 ac,	27.47% Impervious,	Inflow Depth =	2.09"	for 2 yr event
Inflow =	9.84 cfs @	12.20 hrs,	Volume=	1.068 af	
Outflow =	9.84 cfs @	12.20 hrs,	Volume=	1.068 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.06 cfs @	12.70 hrs,	Volume=	0.827 af	
Secondary =	7.09 cfs @	12.20 hrs,	Volume=	0.242 af	

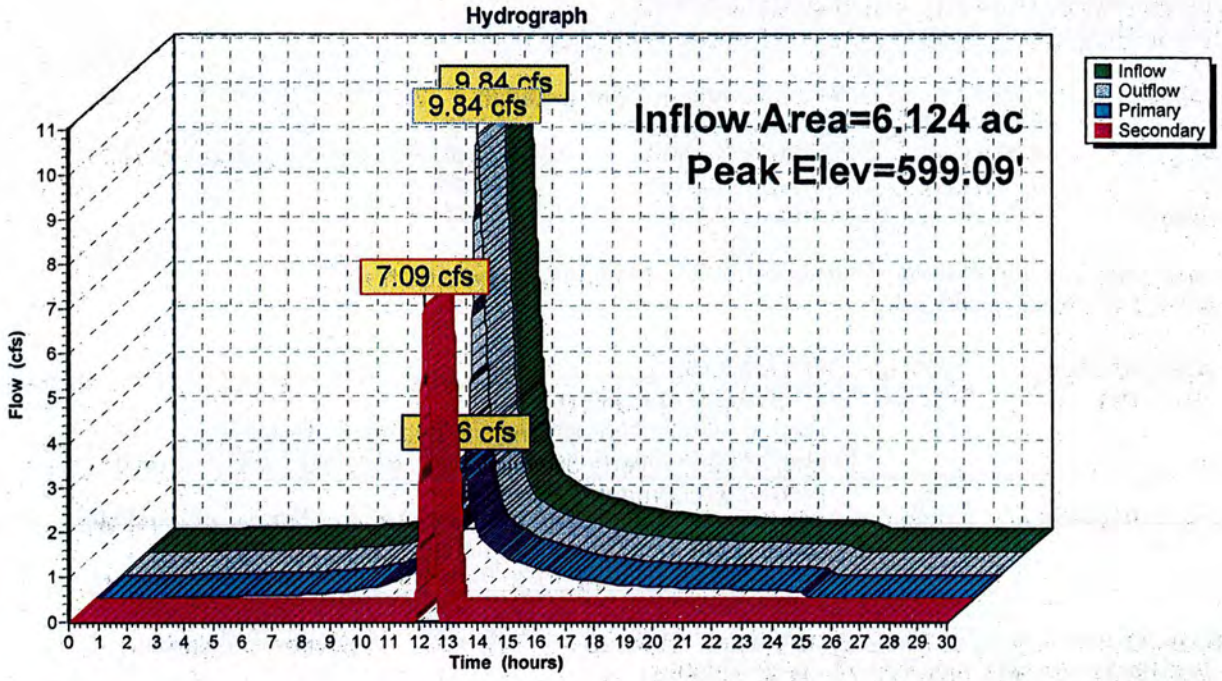
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.09' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	594.92'	**12.0" Round Culvert** L= 220.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 594.92' / 590.25' S= 0.0212 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	599.00'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.75 cfs @ 12.70 hrs HW=598.97' TW=593.76' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.75 cfs @ 3.50 fps)

Secondary OutFlow Max=7.09 cfs @ 12.20 hrs HW=599.09' TW=590.35' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 7.09 cfs @ 0.76 fps)

Pond 15P: Yard Area Ponding

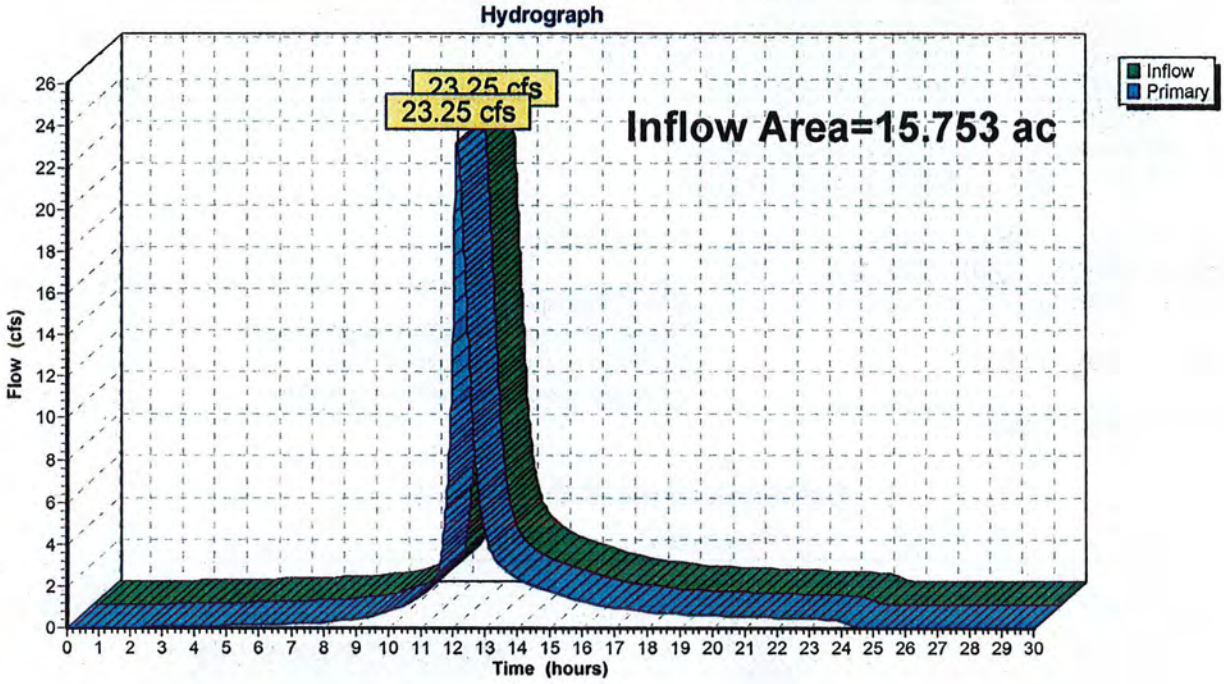


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.753 ac, 24.92% Impervious, Inflow Depth = 2.04" for 2 yr event
Inflow = 23.25 cfs @ 12.15 hrs, Volume= 2.684 af
Primary = 23.25 cfs @ 12.15 hrs, Volume= 2.684 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Summary for Subcatchment 1S: EX-DA 1

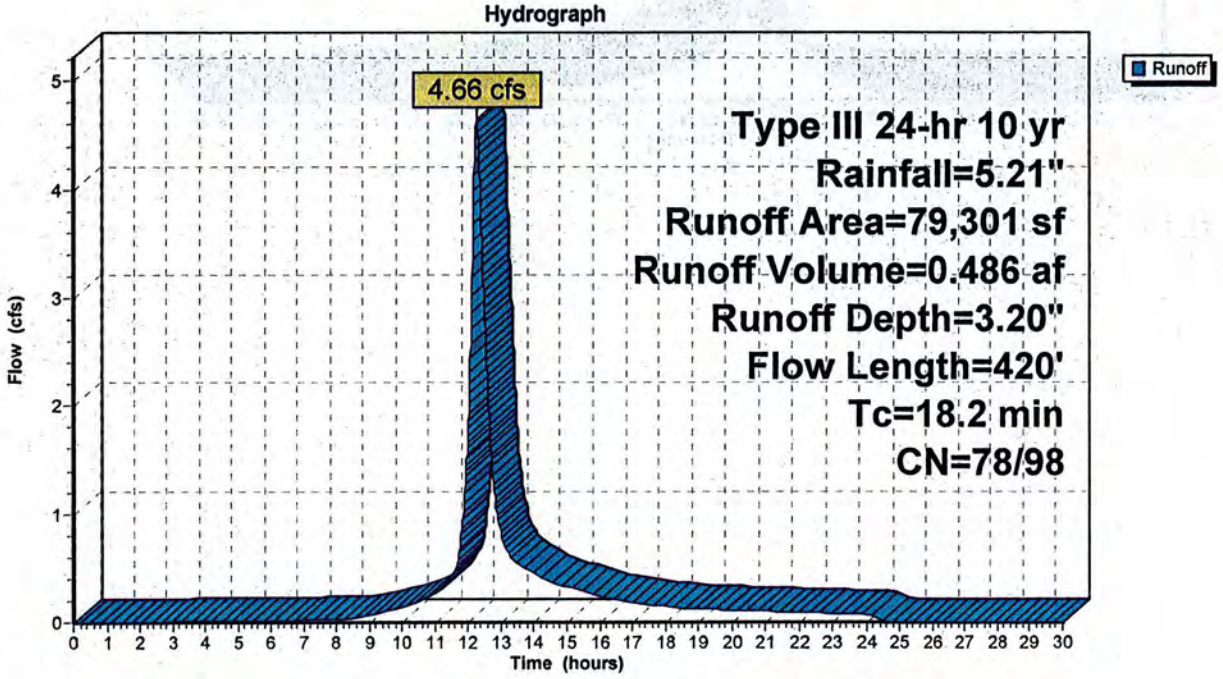
Runoff = 4.66 cfs @ 12.24 hrs, Volume= 0.486 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	11,158	98	Paved road, HSG D
*	661	98	Gravel road, HSG D
	53,293	79	Woods/grass comb., Good, HSG D
	14,189	73	Brush, Good, HSG D
	79,301	81	Weighted Average
	67,482	78	85.10% Pervious Area
	11,819	98	14.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1S: EX-DA 1



Summary for Subcatchment 2S: EX-DA2

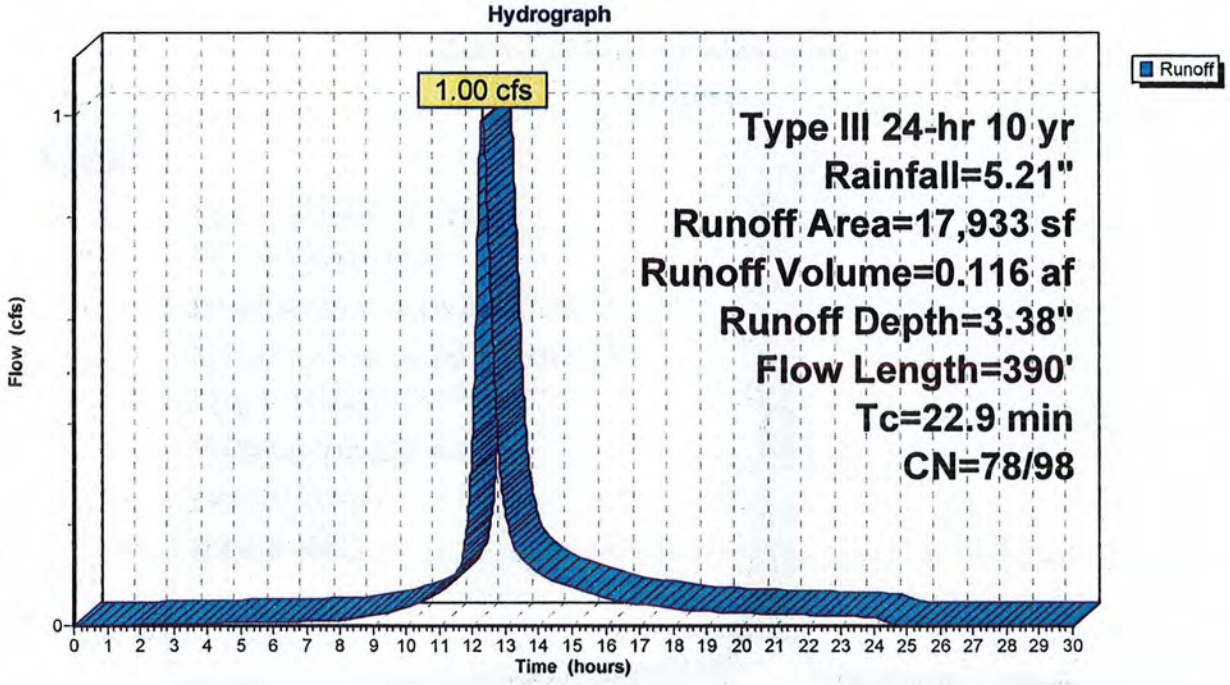
Runoff = 1.00 cfs @ 12.31 hrs, Volume= 0.116 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	4,190	98	Paved road, HSG D
*	10,038	80	Grass, Good, HSG D
	3,705	73	Brush, Good, HSG D
	17,933	83	Weighted Average
	13,743	78	76.64% Pervious Area
	4,190	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.42"
1.1	240	0.0630	3.76		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
22.9	390	Total			

Subcatchment 2S: EX-DA2



Summary for Subcatchment 3S: EX-DA 3

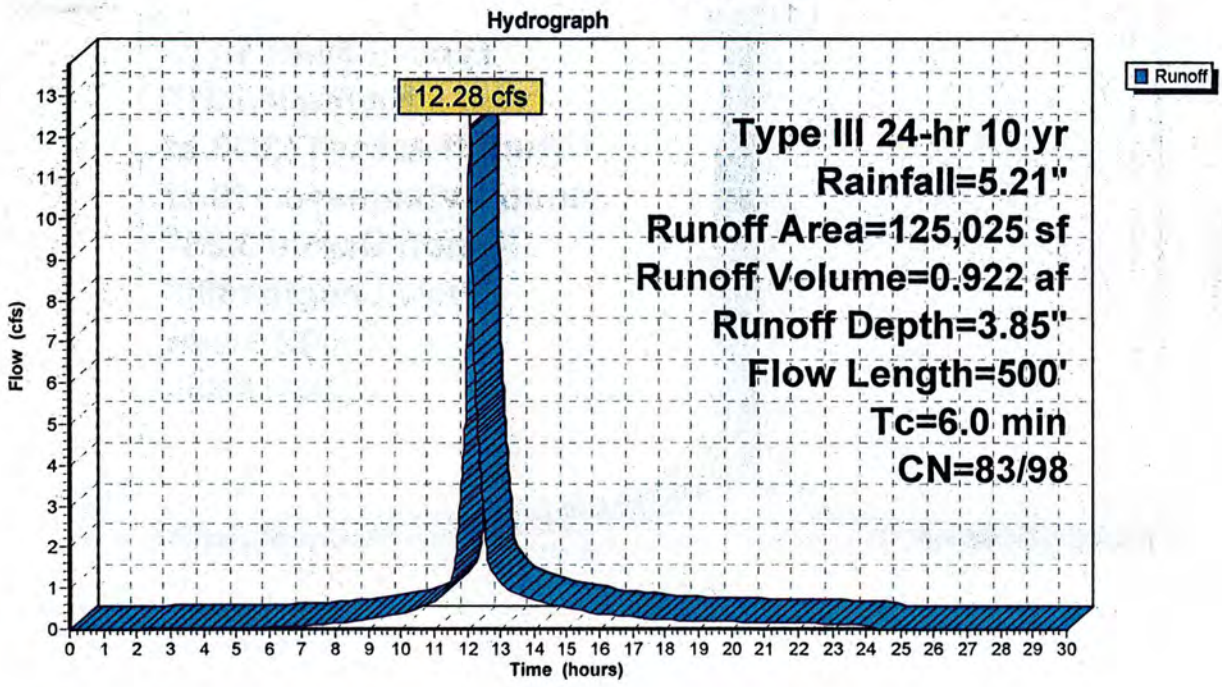
Runoff = 12.28 cfs @ 12.09 hrs, Volume= 0.922 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	3,042	98	Impervious, HSG D
*	35,019	98	Gravel road, HSG D
*	29,686	91	Gravel, HSG D
*	30,906	80	Grass, Good, HSG D
	26,372	78	Meadow, non-grazed, HSG D
	125,025	88	Weighted Average
	86,964	83	69.56% Pervious Area
	38,061	98	30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	150	0.0070	0.63		**Sheet Flow, Gravel Storage Area** n= 0.020 P2= 3.42"
1.6	350	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.6	500	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: EX-DA 3



Summary for Subcatchment 4S: EX-DA 4

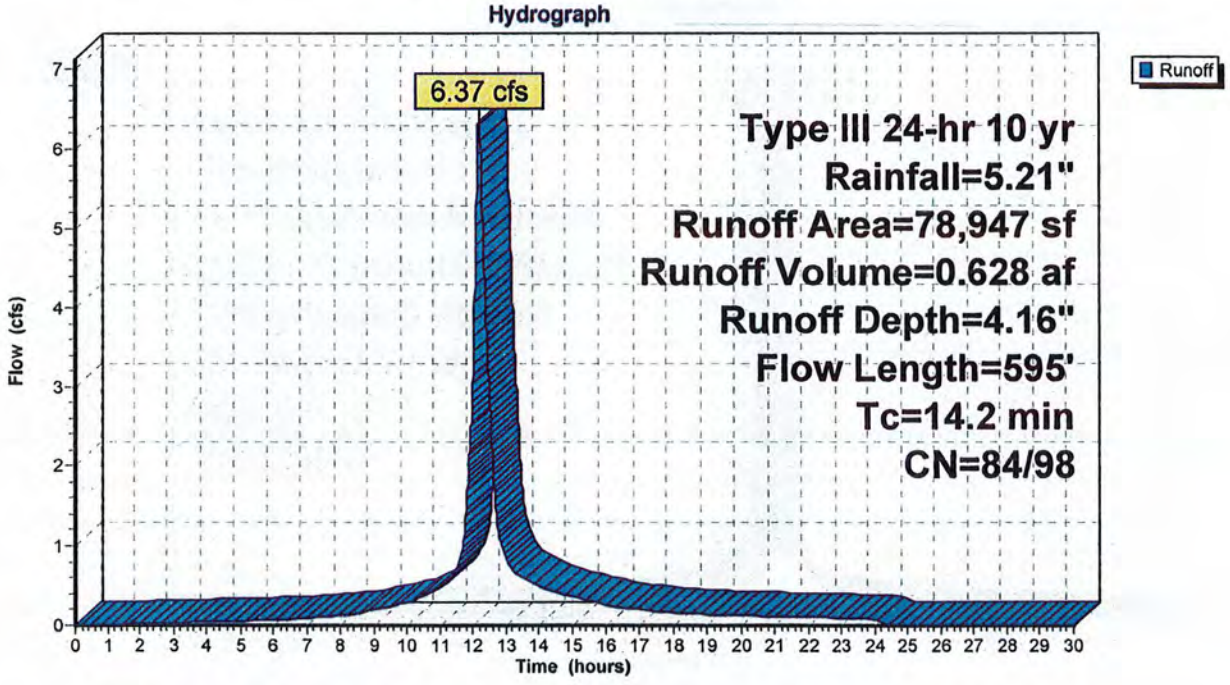
Runoff = 6.37 cfs @ 12.19 hrs, Volume= 0.628 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	31,370	98	Paved road, HSG D
*	5,072	98	Gravel road, HSG D
*	12,803	91	Gravel, HSG D
*	8,134	85	Yard stone, HSG D
*	21,568	80	Grass, Good, HSG D
	78,947	91	Weighted Average
	42,505	84	53.84% Pervious Area
	36,442	98	46.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	150	0.0600	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.7	135	0.0460	3.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	310	0.0470	4.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
14.2	595	Total			

Subcatchment 4S: EX-DA 4



Summary for Subcatchment 5S: EX-DA 5

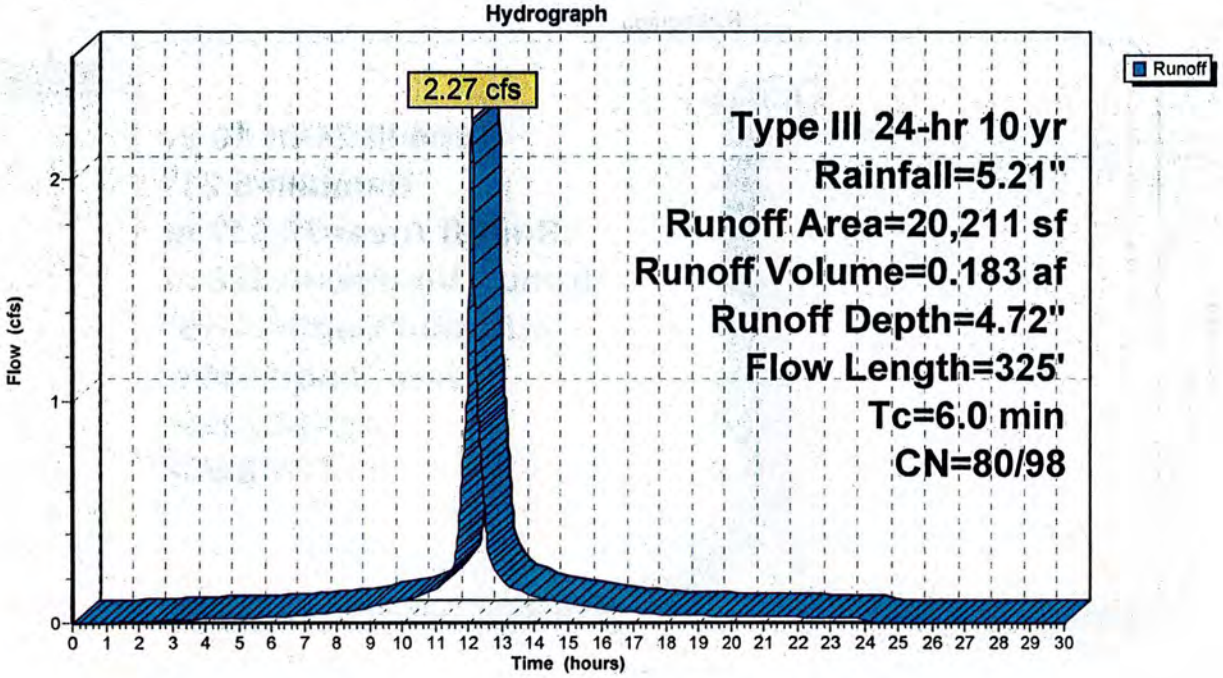
Runoff = 2.27 cfs @ 12.08 hrs, Volume= 0.183 af, Depth= 4.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	17,517	98	Paved road, HSG D
*	2,694	80	Grass cover, Good, HSG D
	20,211	96	Weighted Average
	2,694	80	13.33% Pervious Area
	17,517	98	86.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0570	2.16		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	120	0.0790	5.71		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	50	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	55	0.0320	3.63		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	325	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5S: EX-DA 5



Summary for Subcatchment 6S: EX-DA 6

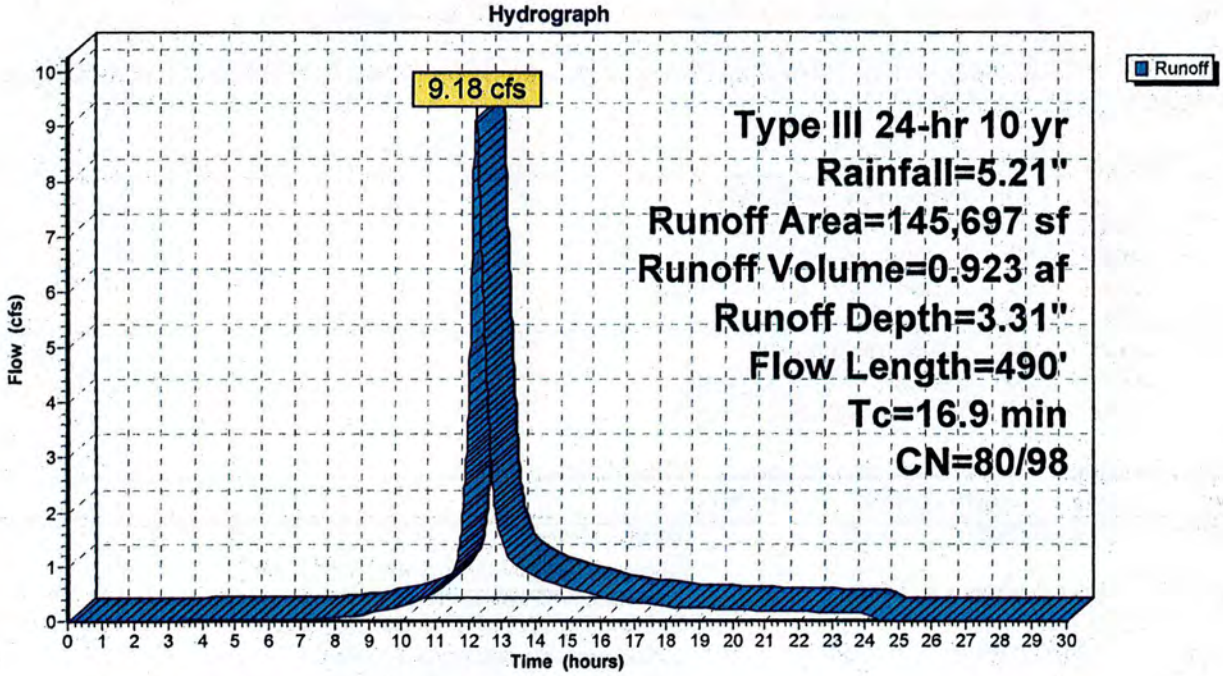
Runoff = 9.18 cfs @ 12.23 hrs, Volume= 0.923 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	9,501	98	Paved road, HSG D
*	8,481	98	Gravel road, HSG D
*	43,082	85	Yard stone, HSG D
*	57,041	80	Grass cover, Good, HSG D
	27,592	73	Brush, Good, HSG D
	145,697	82	Weighted Average
	127,715	80	87.66% Pervious Area
	17,982	98	12.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	150	0.0500	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.1	30	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	240	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
16.9	490	Total			

Subcatchment 6S: EX-DA 6



Summary for Subcatchment 7S: EX-DA 7

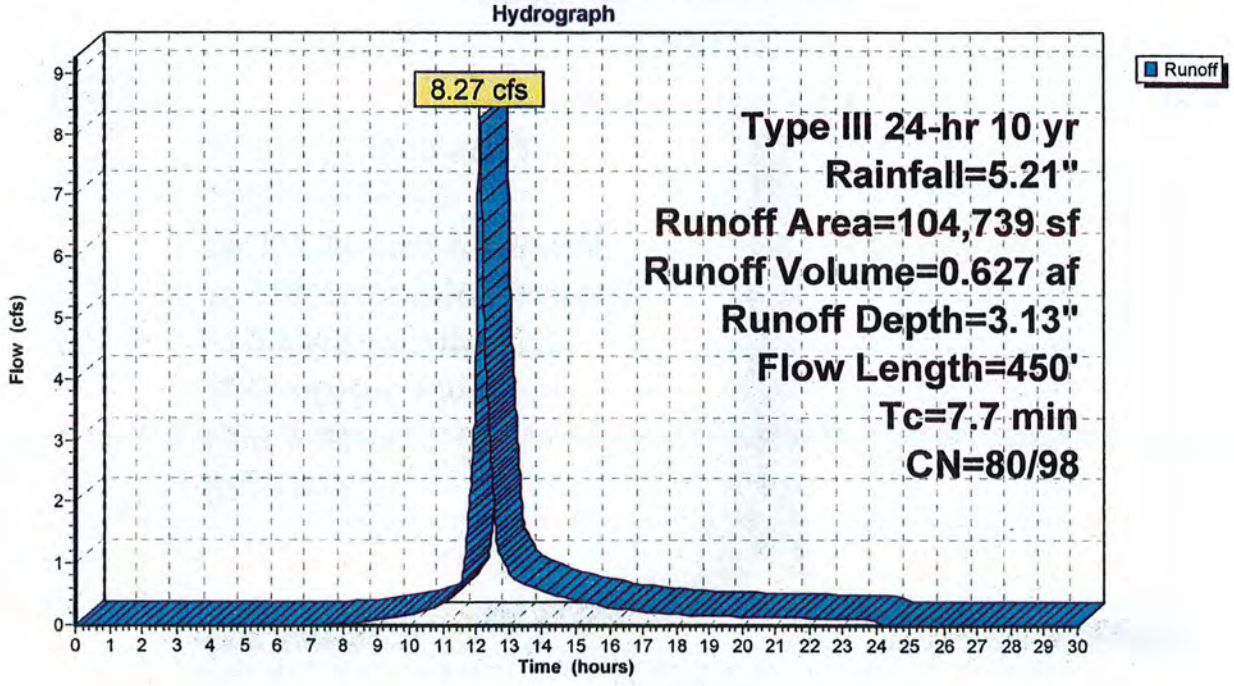
Runoff = 8.27 cfs @ 12.11 hrs, Volume= 0.627 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	805	98	Impervious, HSG D
*	2,198	98	Gravel road, HSG D
*	10,157	85	Yard stone, HSG D
	86,177	80	>75% Grass cover, Good, HSG D
	5,402	73	Brush, Good, HSG D
	104,739	81	Weighted Average
	101,736	80	97.13% Pervious Area
	3,003	98	2.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7S: EX-DA 7



Summary for Subcatchment 8S: EX-DA 8

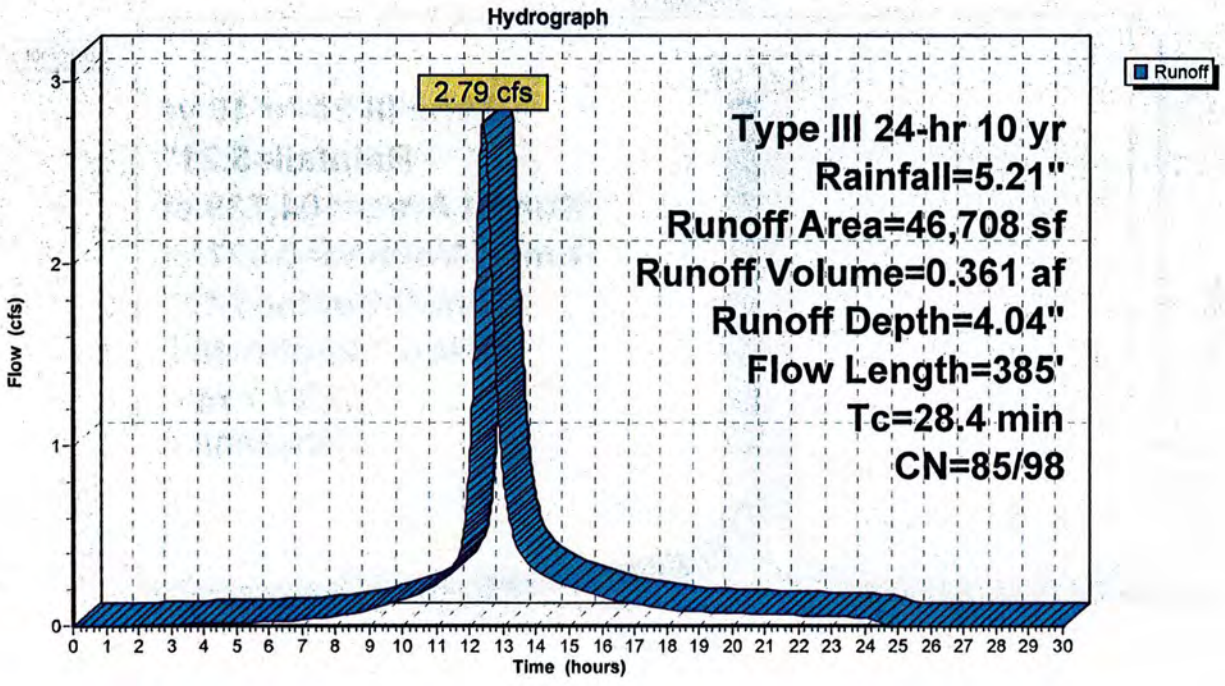
Runoff = 2.79 cfs @ 12.38 hrs, Volume= 0.361 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	15,912	98	Impervious, HSG D
*	29,261	85	Yard stone, HSG D
*	1,535	80	Grass, Good, HSG D
	46,708	89	Weighted Average
	30,796	85	65.93% Pervious Area
	15,912	98	34.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	80	0.0030	0.05		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"
0.5	80	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	165	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
0.2	60	0.0580	4.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
28.4	385	Total			

Subcatchment 8S: EX-DA 8



Summary for Subcatchment 9A: EX-DA 9A

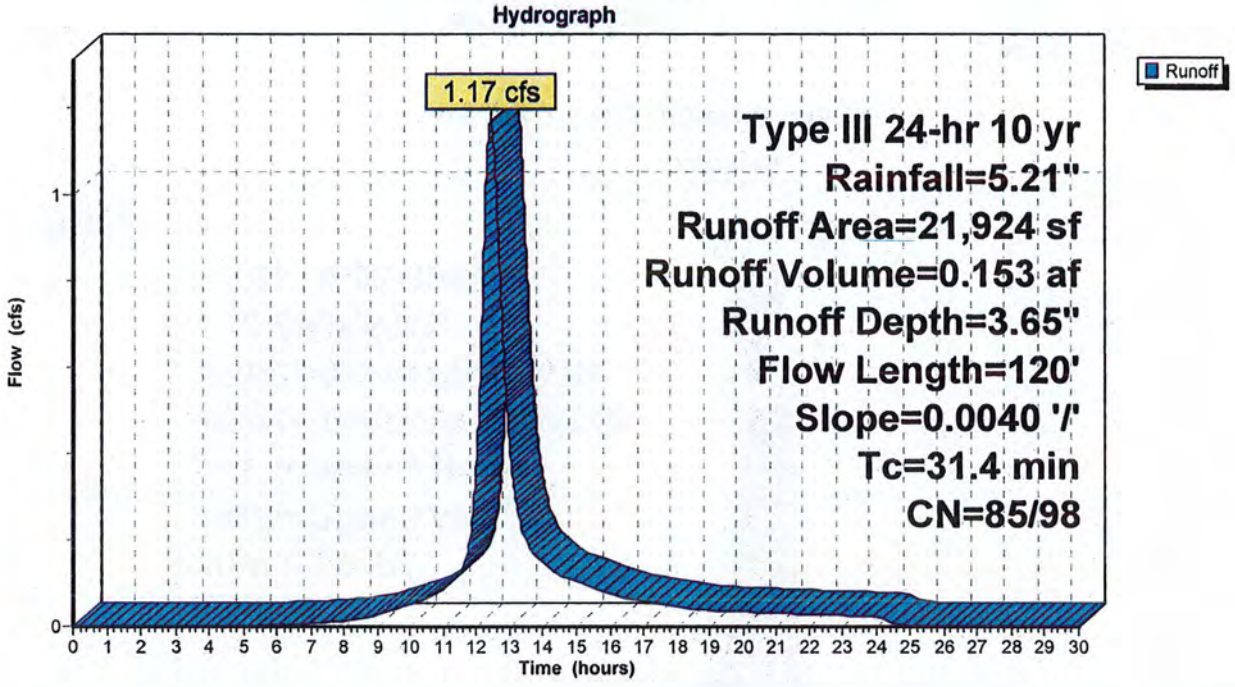
Runoff = 1.17 cfs @ 12.42 hrs, Volume= 0.153 af, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	1,344	98	Paved road, HSG D
*	20,580	85	Yard stone, HSG D
	21,924	86	Weighted Average
	20,580	85	93.87% Pervious Area
	1,344	98	6.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.4	120	0.0040	0.06		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"

Subcatchment 9A: EX-DA 9A



Summary for Subcatchment 9B: EX-DA 9B

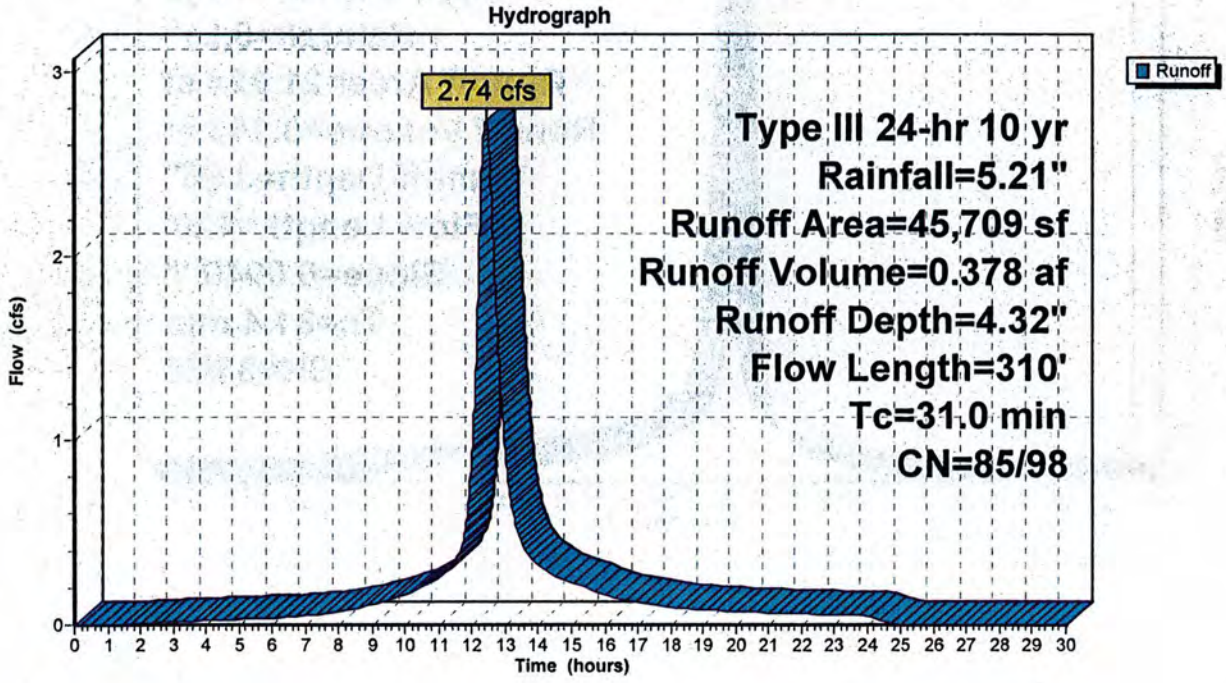
Runoff = 2.74 cfs @ 12.43 hrs, Volume= 0.378 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	24,703	98	Impervious, HSG D
*	670	91	Gravel, HSG D
*	20,336	85	Yard stone, HSG D
	45,709	92	Weighted Average
	21,006	85	45.96% Pervious Area
	24,703	98	54.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	150	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.0	160	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.0	310	Total			

Subcatchment 9B: EX-DA 9B



Summary for Reach 10R: CB-3 to CB-1

[52] Hint: Inlet/Outlet conditions not evaluated

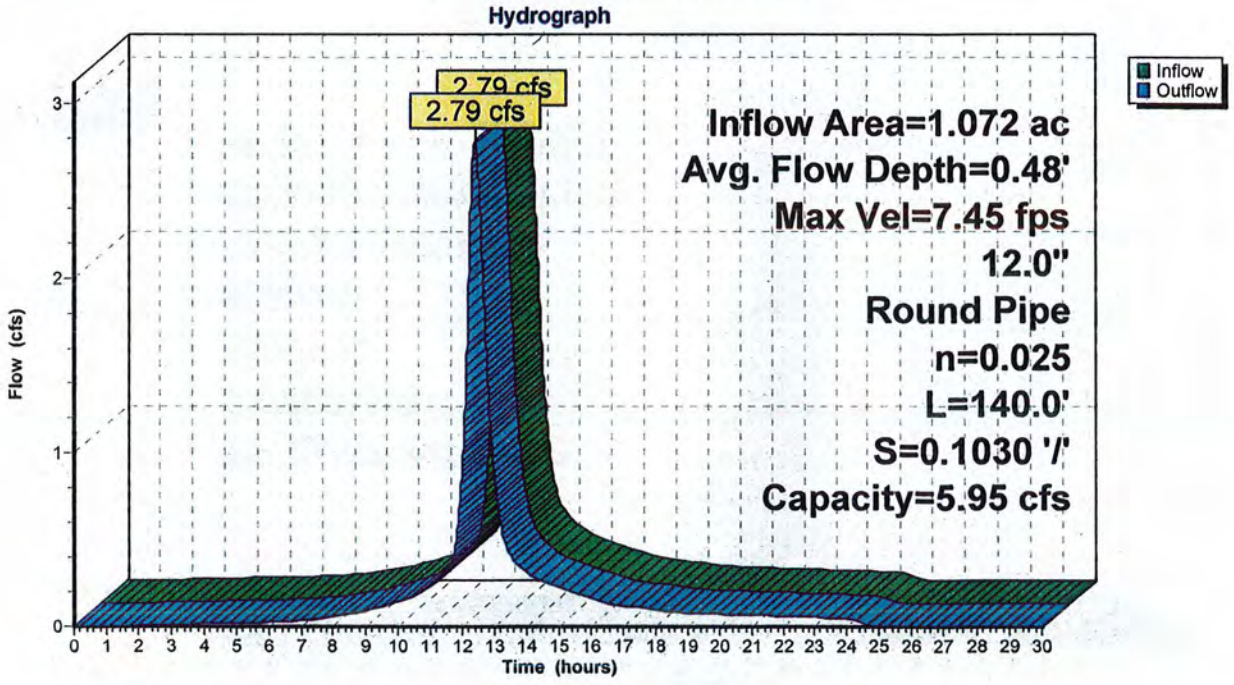
Inflow Area = 1.072 ac, 34.07% Impervious, Inflow Depth = 4.04" for 10 yr event
Inflow = 2.79 cfs @ 12.38 hrs, Volume= 0.361 af
Outflow = 2.79 cfs @ 12.38 hrs, Volume= 0.361 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.45 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.71 fps, Avg. Travel Time= 0.9 min

Peak Storage= 52 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.95 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 140.0' Slope= 0.1030 '/'
Inlet Invert= 592.92', Outlet Invert= 578.50'





Summary for Reach 11R: Surface Swale

[55] Hint: Peak inflow is 102% of Manning's capacity

Inflow Area = 1.049 ac, 54.04% Impervious, Inflow Depth = 15.29" for 10 yr event
Inflow = 24.29 cfs @ 12.13 hrs, Volume= 1.337 af
Outflow = 24.21 cfs @ 12.14 hrs, Volume= 1.337 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.78 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 4.8 min

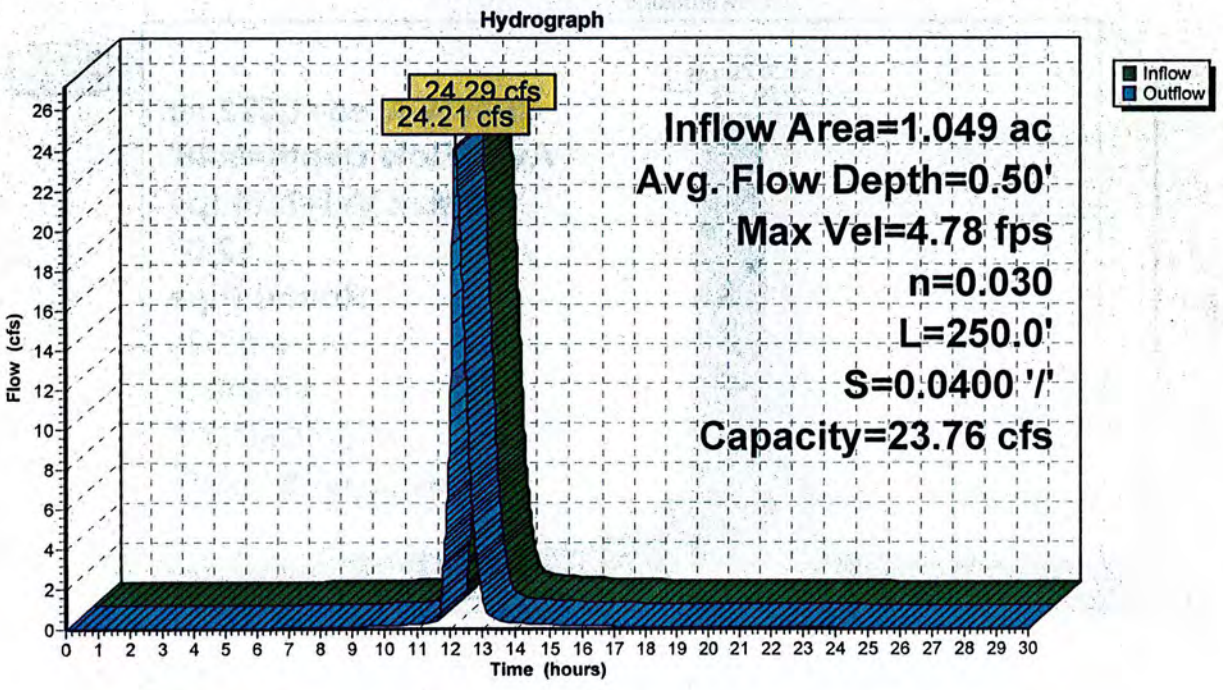
Peak Storage= 1,267 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 23.76 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 250.0' Slope= 0.0400 '/'
Inlet Invert= 590.00', Outlet Invert= 580.00'



‡

Reach 11R: Surface Swale



Summary for Reach 13R: Swale

Inflow Area = 2.404 ac, 2.87% Impervious, Inflow Depth = 3.13" for 10 yr event
Inflow = 8.27 cfs @ 12.11 hrs, Volume= 0.627 af
Outflow = 8.02 cfs @ 12.13 hrs, Volume= 0.627 af, Atten= 3%, Lag= 1.4 min

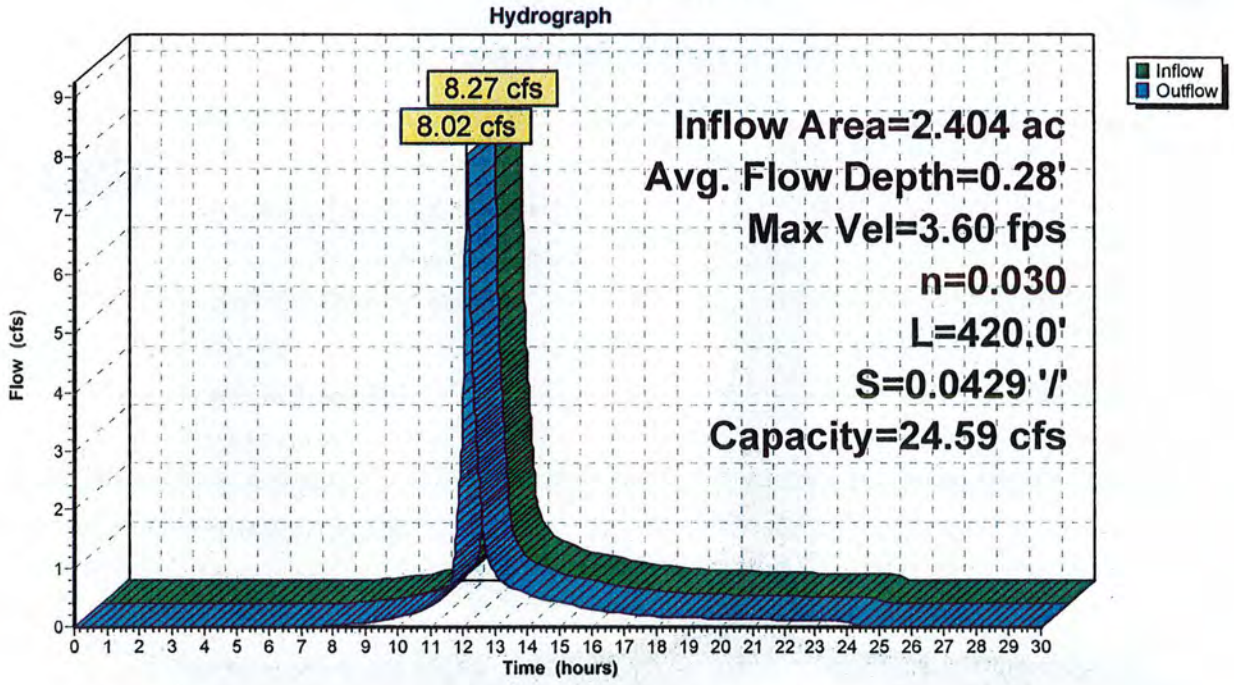
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.60 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 8.1 min

Peak Storage= 935 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡



Summary for Reach 15R: CB-5 to CB-4

[52] Hint: Inlet/Outlet conditions not evaluated

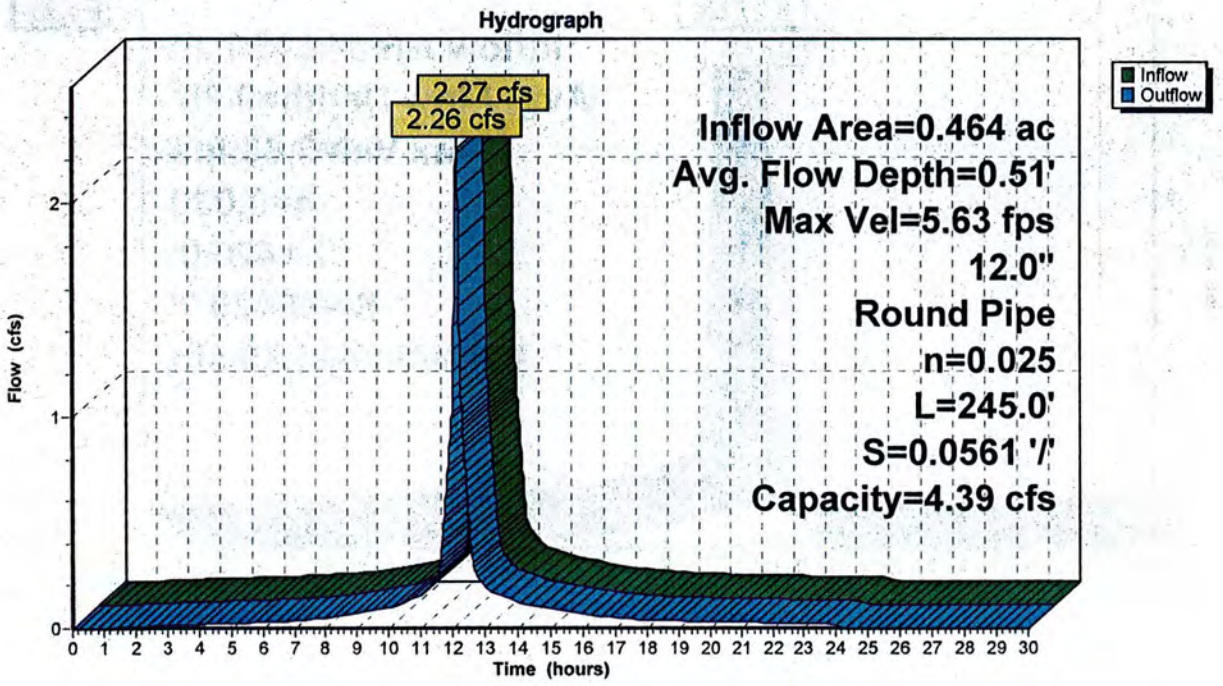
Inflow Area = 0.464 ac, 86.67% Impervious, Inflow Depth = 4.72" for 10 yr event
Inflow = 2.27 cfs @ 12.08 hrs, Volume= 0.183 af
Outflow = 2.26 cfs @ 12.09 hrs, Volume= 0.183 af, Atten= 1%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.63 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 2.2 min

Peak Storage= 98 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.39 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 245.0' Slope= 0.0561 '/'
Inlet Invert= 610.00', Outlet Invert= 596.25'





Summary for Pond 10P: CB-2 to CB-1

[57] Hint: Peaked at 594.03' (Flood elevation advised)

Inflow Area =	8.995 ac,	28.42% Impervious,	Inflow Depth =	2.92"	for 10 yr event
Inflow =	15.00 cfs @	12.09 hrs,	Volume=	2.188 af	
Outflow =	15.00 cfs @	12.09 hrs,	Volume=	2.188 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.84 cfs @	11.99 hrs,	Volume=	1.849 af	
Secondary =	11.29 cfs @	12.09 hrs,	Volume=	0.339 af	

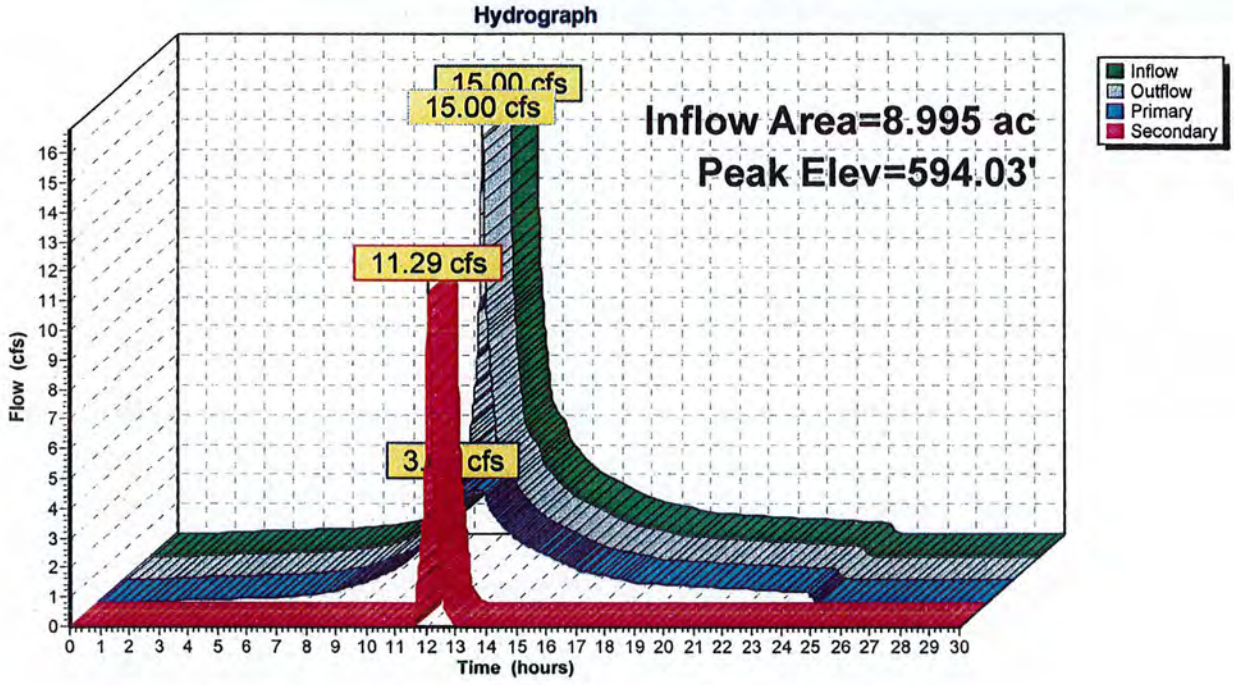
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.03' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	590.00'	**12.0" Round Culvert** L= 330.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 590.00' / 578.00' S= 0.0364 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	593.75'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.84 cfs @ 11.99 hrs HW=593.93' TW=578.95' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.84 cfs @ 4.89 fps)

Secondary OutFlow Max=11.27 cfs @ 12.09 hrs HW=594.03' TW=590.48' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 11.27 cfs @ 1.34 fps)

Pond 10P: CB-2 to CB-1



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 580.14' (Flood elevation advised)
[62] Hint: Exceeded Reach 10R OUTLET depth by 1.30' @ 12.10 hrs
[61] Hint: Exceeded Reach 11R outlet invert by 0.14' @ 12.15 hrs
[61] Hint: Exceeded Reach 13R outlet invert by 0.14' @ 12.15 hrs

Inflow Area =	15.341 ac,	24.96% Impervious,	Inflow Depth =	3.65" for 10 yr event
Inflow =	41.26 cfs @	12.15 hrs, Volume=	4.661 af	
Outflow =	41.26 cfs @	12.15 hrs, Volume=	4.661 af,	Atten= 0%, Lag= 0.0 min
Primary =	26.82 cfs @	12.15 hrs, Volume=	4.366 af	
Secondary =	14.44 cfs @	12.15 hrs, Volume=	0.295 af	

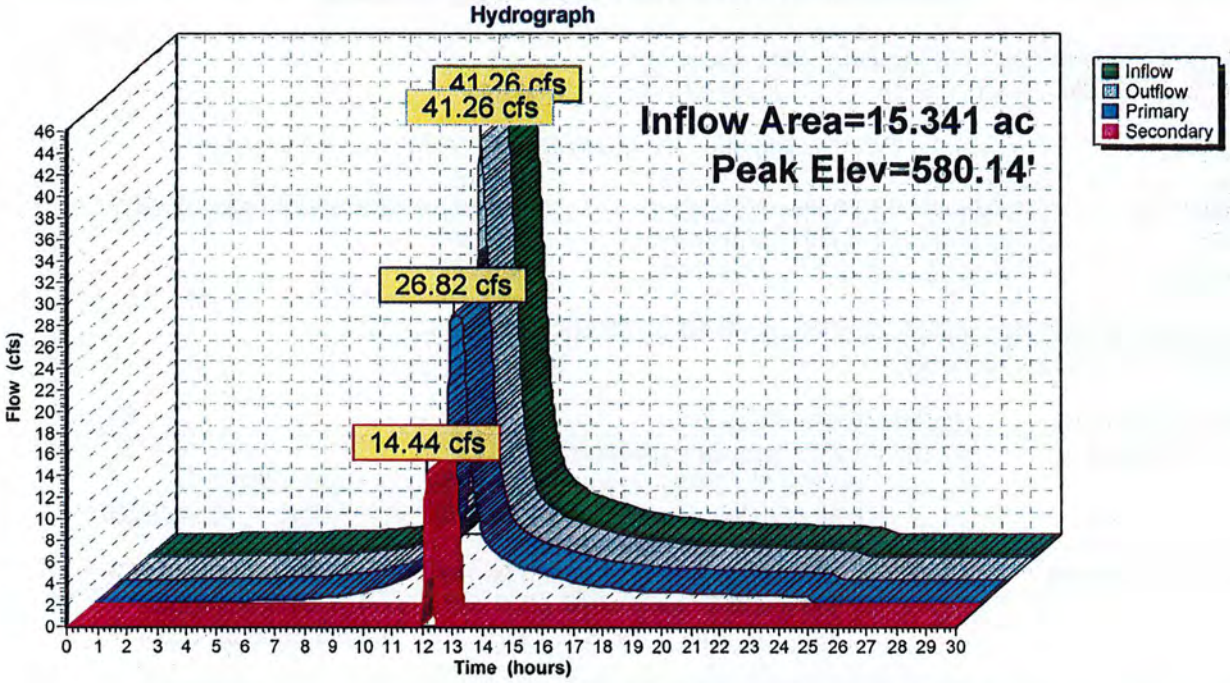
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 580.14' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=26.82 cfs @ 12.15 hrs HW=580.14' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 26.82 cfs @ 8.54 fps)

Secondary OutFlow Max=14.42 cfs @ 12.15 hrs HW=580.14' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 14.42 cfs @ 1.01 fps)

Pond 12P: (new Pond)



Summary for Pond 15P: Yard Area Ponding

[57] Hint: Peaked at 599.15' (Flood elevation advised)
[62] Hint: Exceeded Reach 15R OUTLET depth by 2.64' @ 12.62 hrs

Inflow Area =	6.124 ac,	27.47% Impervious,	Inflow Depth =	3.70"	for 10 yr event
Inflow =	17.49 cfs @	12.20 hrs, Volume=	1.887 af		
Outflow =	17.49 cfs @	12.20 hrs, Volume=	1.887 af,	Atten= 0%,	Lag= 0.0 min
Primary =	2.76 cfs @	12.59 hrs, Volume=	1.266 af		
Secondary =	14.74 cfs @	12.20 hrs, Volume=	0.621 af		

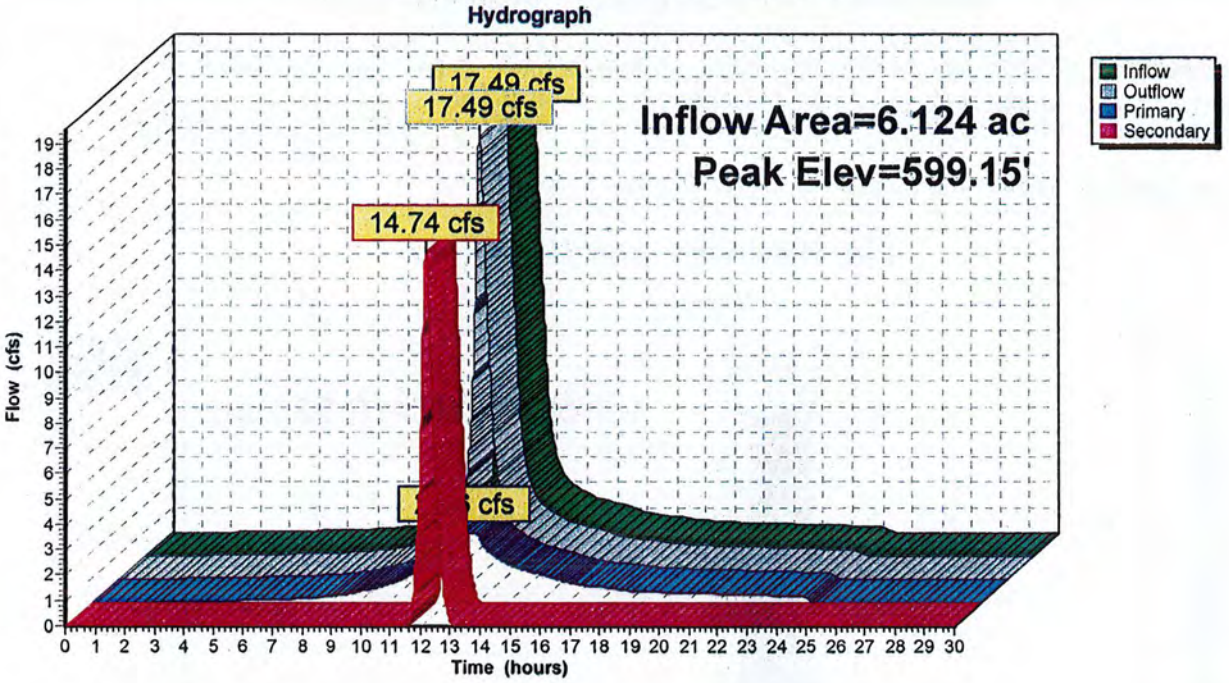
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.15' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	594.92'	**12.0" Round Culvert** L= 220.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 594.92' / 590.25' S= 0.0212 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	599.00'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.76 cfs @ 12.59 hrs HW=599.07' TW=593.80' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.76 cfs @ 3.52 fps)

Secondary OutFlow Max=14.73 cfs @ 12.20 hrs HW=599.15' TW=590.49' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 14.73 cfs @ 0.97 fps)

Pond 15P: Yard Area Ponding

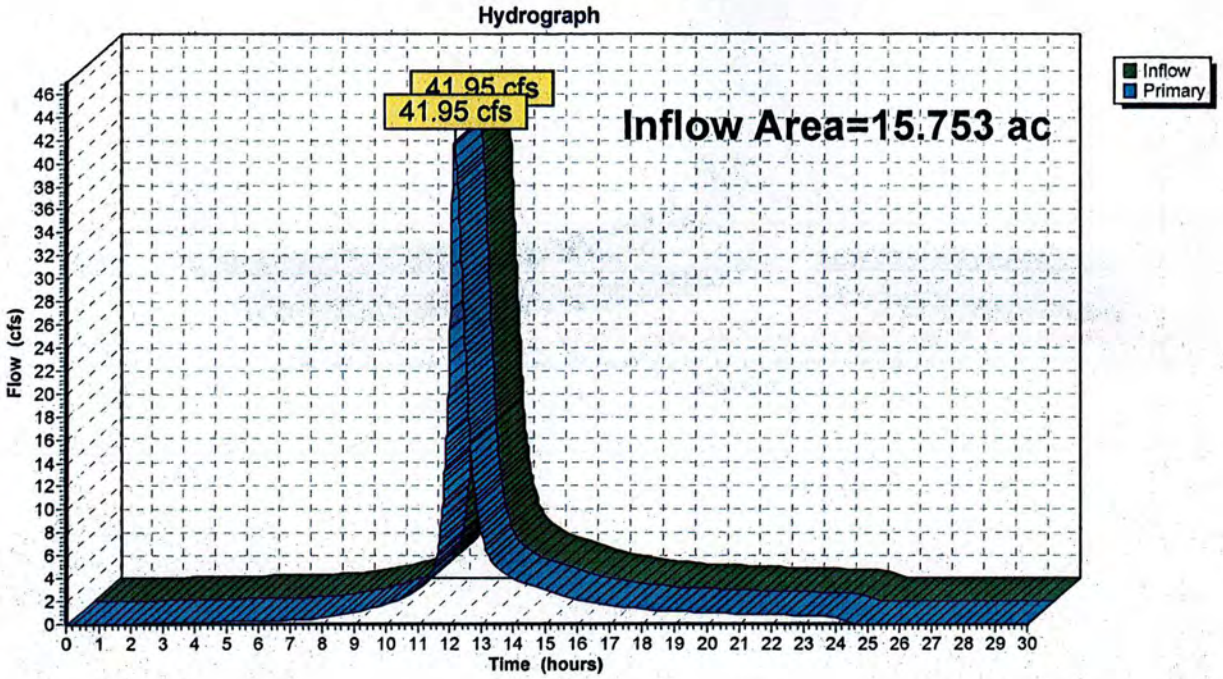


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.753 ac, 24.92% Impervious, Inflow Depth = 3.64" for 10 yr event
Inflow = 41.95 cfs @ 12.15 hrs, Volume= 4.777 af
Primary = 41.95 cfs @ 12.15 hrs, Volume= 4.777 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Summary for Subcatchment 1S: EX-DA 1

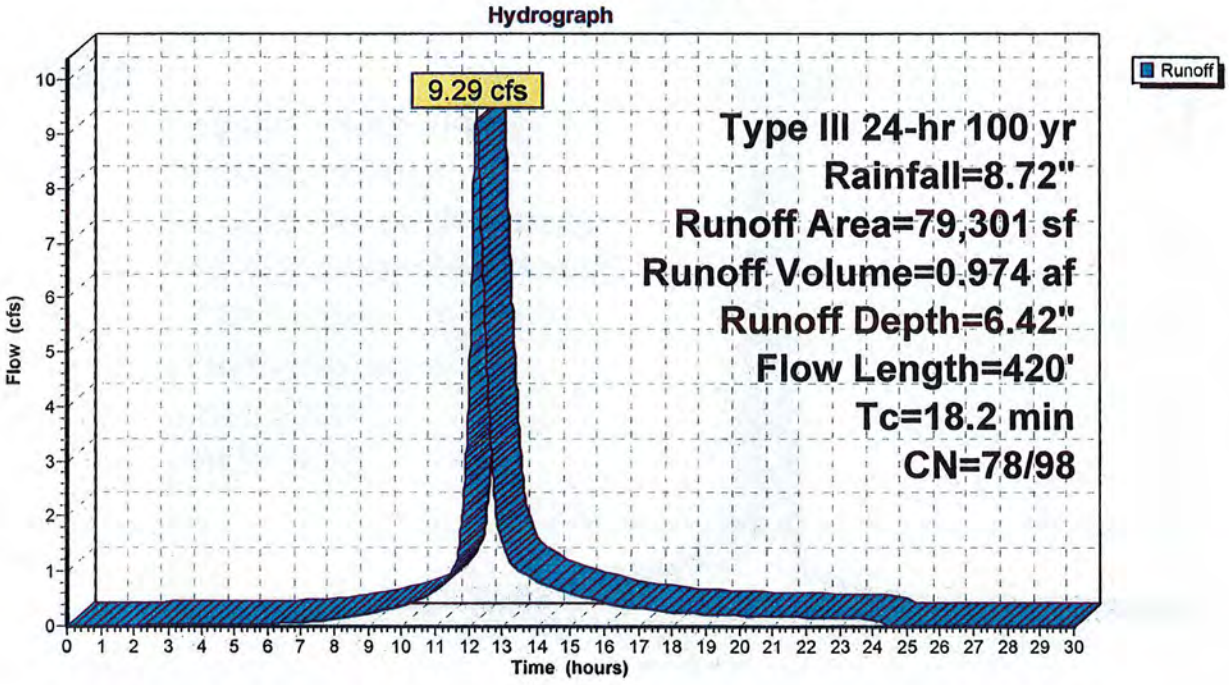
Runoff = 9.29 cfs @ 12.24 hrs, Volume= 0.974 af, Depth= 6.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	11,158	98	Paved road, HSG D
*	661	98	Gravel road, HSG D
	53,293	79	Woods/grass comb., Good, HSG D
	14,189	73	Brush, Good, HSG D
	79,301	81	Weighted Average
	67,482	78	85.10% Pervious Area
	11,819	98	14.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1S: EX-DA 1



Summary for Subcatchment 2S: EX-DA2

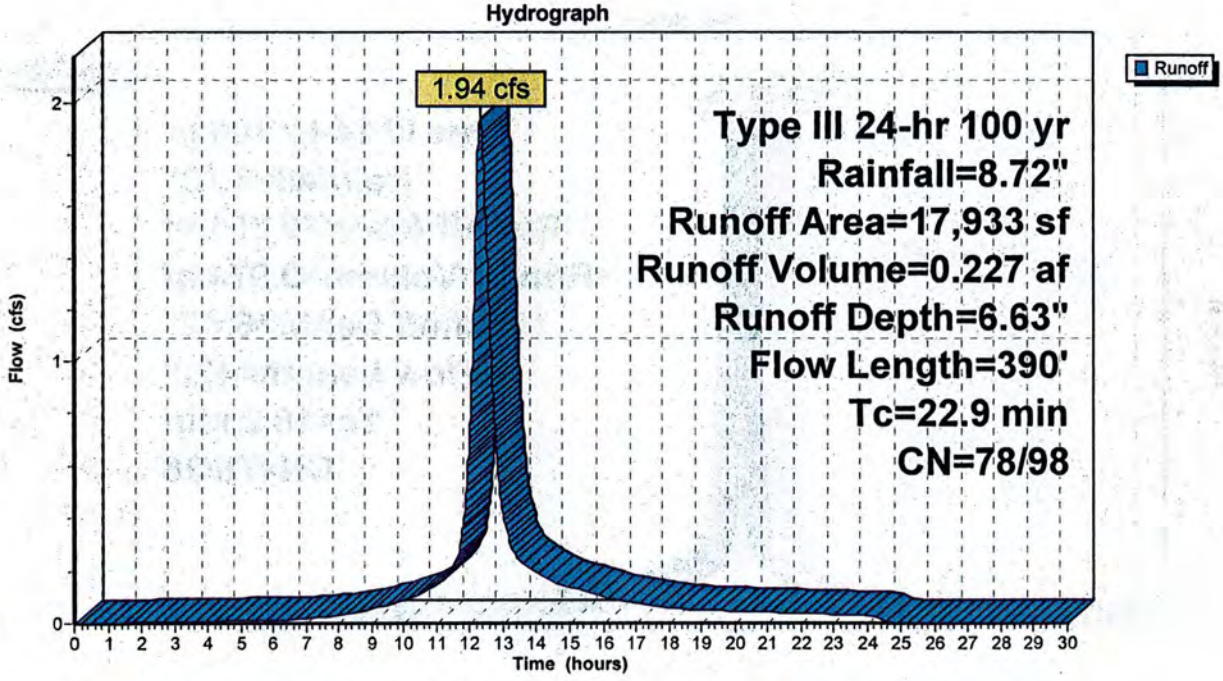
Runoff = 1.94 cfs @ 12.30 hrs, Volume= 0.227 af, Depth= 6.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	4,190	98	Paved road, HSG D
*	10,038	80	Grass, Good, HSG D
	3,705	73	Brush, Good, HSG D
	17,933	83	Weighted Average
	13,743	78	76.64% Pervious Area
	4,190	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.42"
1.1	240	0.0630	3.76		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
22.9	390	Total			

Subcatchment 2S: EX-DA2



Summary for Subcatchment 3S: EX-DA 3

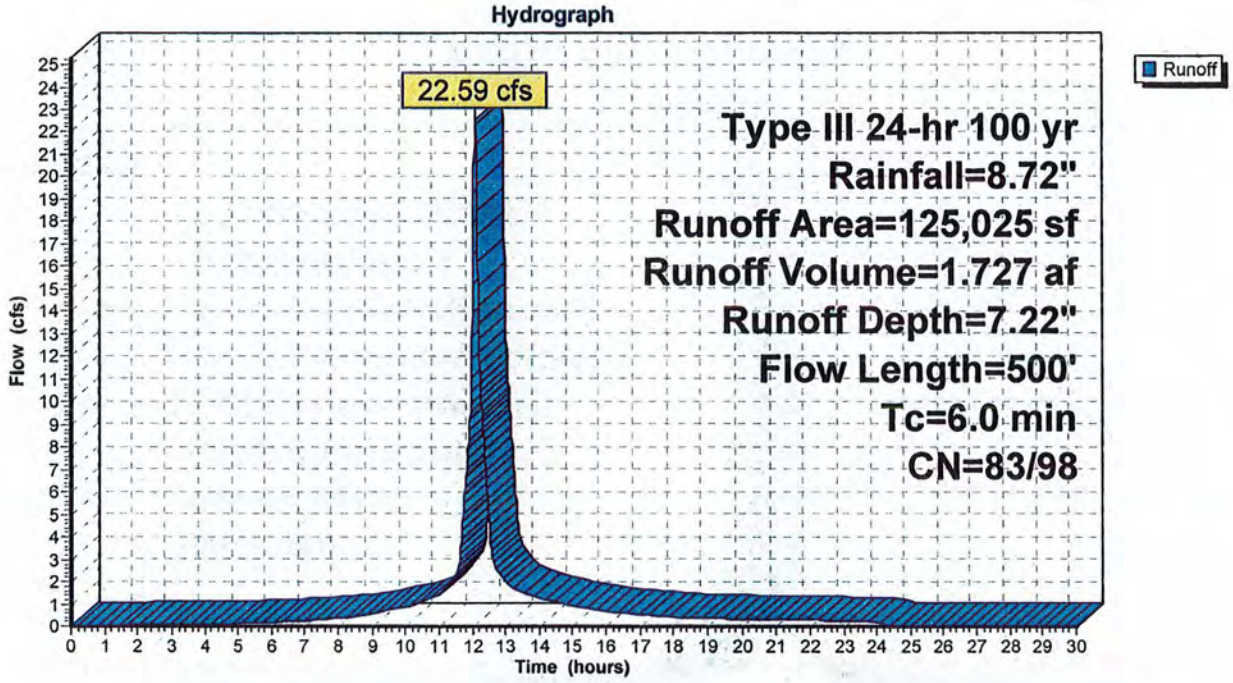
Runoff = 22.59 cfs @ 12.08 hrs, Volume= 1.727 af, Depth= 7.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	3,042	98	Impervious, HSG D
*	35,019	98	Gravel road, HSG D
*	29,686	91	Gravel, HSG D
*	30,906	80	Grass, Good, HSG D
	26,372	78	Meadow, non-grazed, HSG D
	125,025	88	Weighted Average
	86,964	83	69.56% Pervious Area
	38,061	98	30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	150	0.0070	0.63		**Sheet Flow, Gravel Storage Area** n= 0.020 P2= 3.42"
1.6	350	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.6	500	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: EX-DA 3



Summary for Subcatchment 4S: EX-DA 4

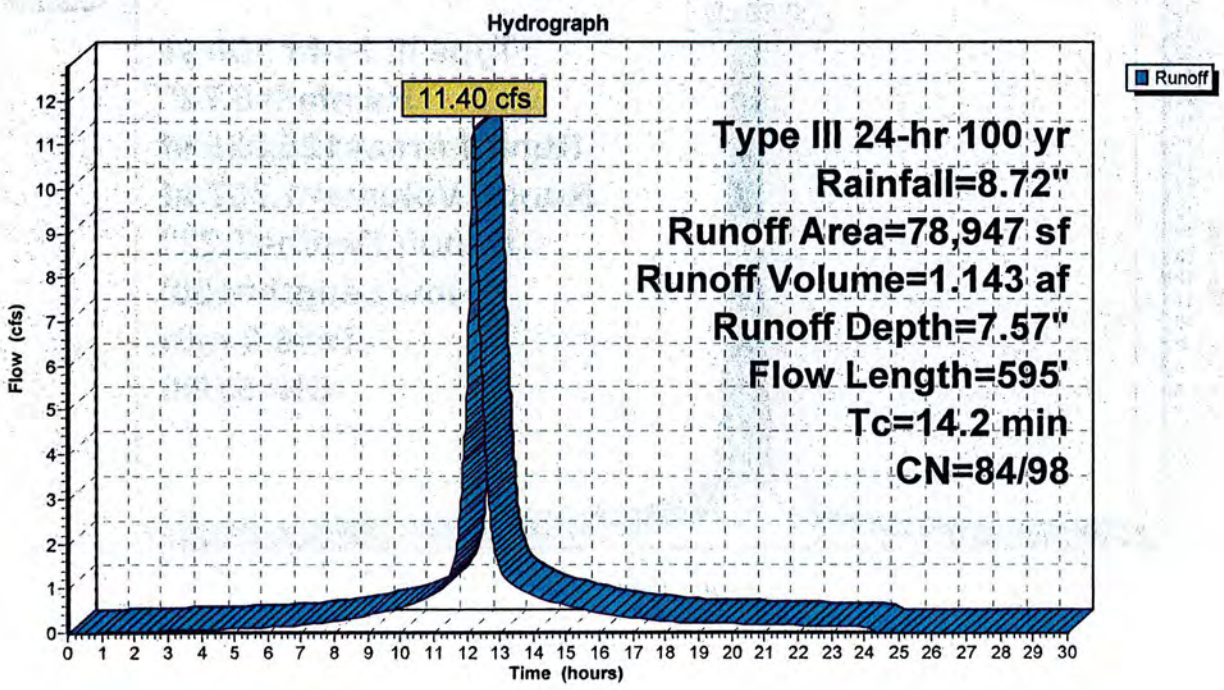
Runoff = 11.40 cfs @ 12.19 hrs, Volume= 1.143 af, Depth= 7.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	31,370	98	Paved road, HSG D
*	5,072	98	Gravel road, HSG D
*	12,803	91	Gravel, HSG D
*	8,134	85	Yard stone, HSG D
*	21,568	80	Grass, Good, HSG D
	78,947	91	Weighted Average
	42,505	84	53.84% Pervious Area
	36,442	98	46.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	150	0.0600	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.7	135	0.0460	3.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	310	0.0470	4.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
14.2	595	Total			

Subcatchment 4S: EX-DA 4



Summary for Subcatchment 5S: EX-DA 5

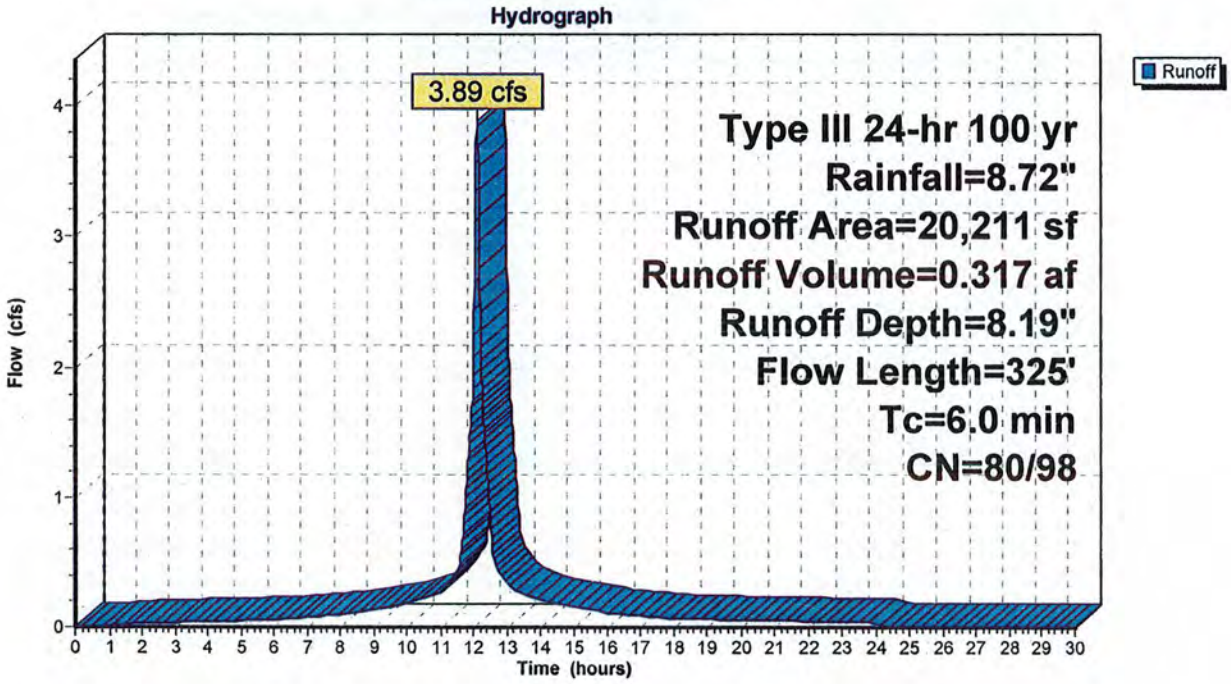
Runoff = 3.89 cfs @ 12.08 hrs, Volume= 0.317 af, Depth= 8.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	17,517	98	Paved road, HSG D
*	2,694	80	Grass cover, Good, HSG D
	20,211	96	Weighted Average
	2,694	80	13.33% Pervious Area
	17,517	98	86.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0570	2.16		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	120	0.0790	5.71		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	50	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	55	0.0320	3.63		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	325	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5S: EX-DA 5



Summary for Subcatchment 6S: EX-DA 6

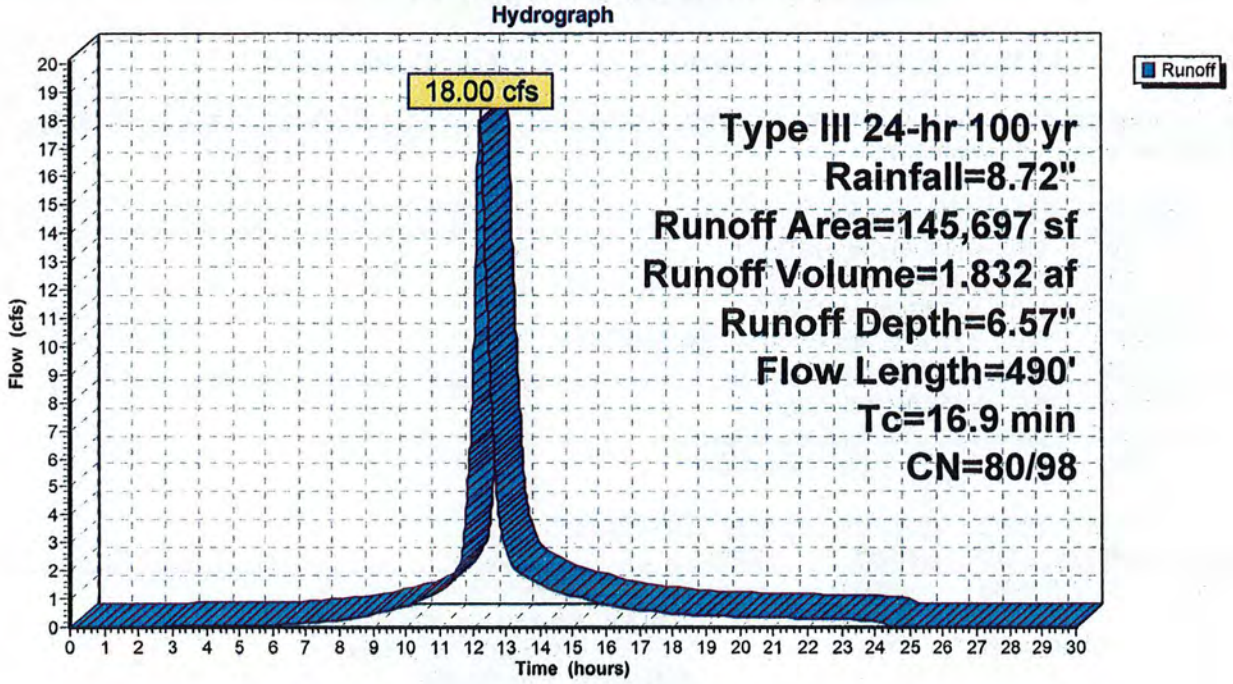
Runoff = 18.00 cfs @ 12.22 hrs, Volume= 1.832 af, Depth= 6.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	9,501	98	Paved road, HSG D
*	8,481	98	Gravel road, HSG D
*	43,082	85	Yard stone, HSG D
*	57,041	80	Grass cover, Good, HSG D
	27,592	73	Brush, Good, HSG D
	145,697	82	Weighted Average
	127,715	80	87.66% Pervious Area
	17,982	98	12.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	150	0.0500	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.1	30	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	240	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
16.9	490	Total			

Subcatchment 6S: EX-DA 6



Summary for Subcatchment 7S: EX-DA 7

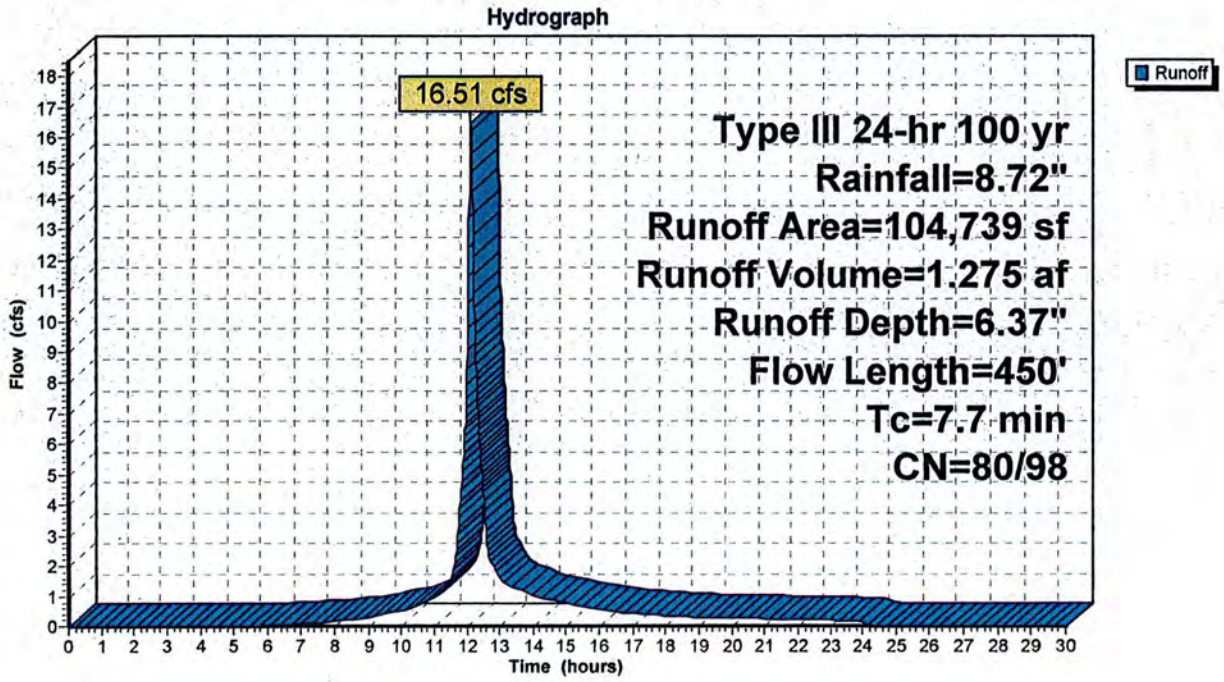
Runoff = 16.51 cfs @ 12.11 hrs, Volume= 1.275 af, Depth= 6.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	805	98	Impervious, HSG D
*	2,198	98	Gravel road, HSG D
*	10,157	85	Yard stone, HSG D
	86,177	80	>75% Grass cover, Good, HSG D
	5,402	73	Brush, Good, HSG D
	104,739	81	Weighted Average
	101,736	80	97.13% Pervious Area
	3,003	98	2.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7S: EX-DA 7



Summary for Subcatchment 8S: EX-DA 8

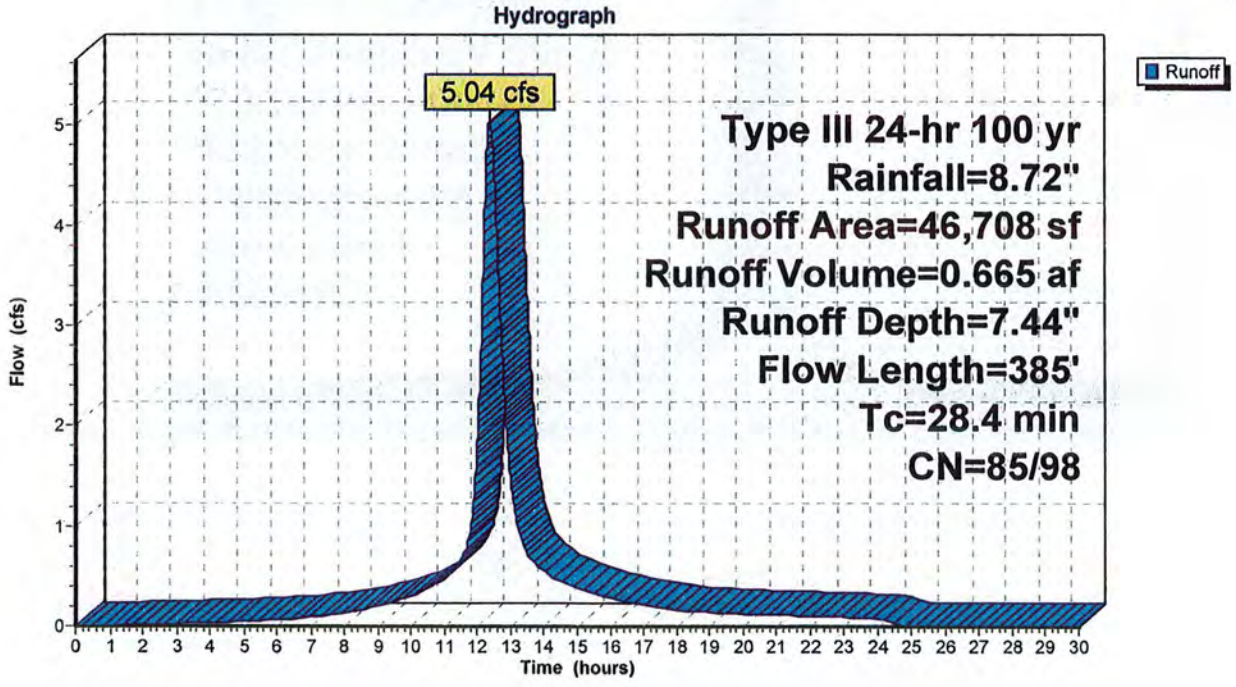
Runoff = 5.04 cfs @ 12.37 hrs, Volume= 0.665 af, Depth= 7.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	15,912	98	Impervious, HSG D
*	29,261	85	Yard stone, HSG D
*	1,535	80	Grass, Good, HSG D
	46,708	89	Weighted Average
	30,796	85	65.93% Pervious Area
	15,912	98	34.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	80	0.0030	0.05		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"
0.5	80	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	165	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
0.2	60	0.0580	4.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
28.4	385	Total			

Subcatchment 8S: EX-DA 8



Summary for Subcatchment 9A: EX-DA 9A

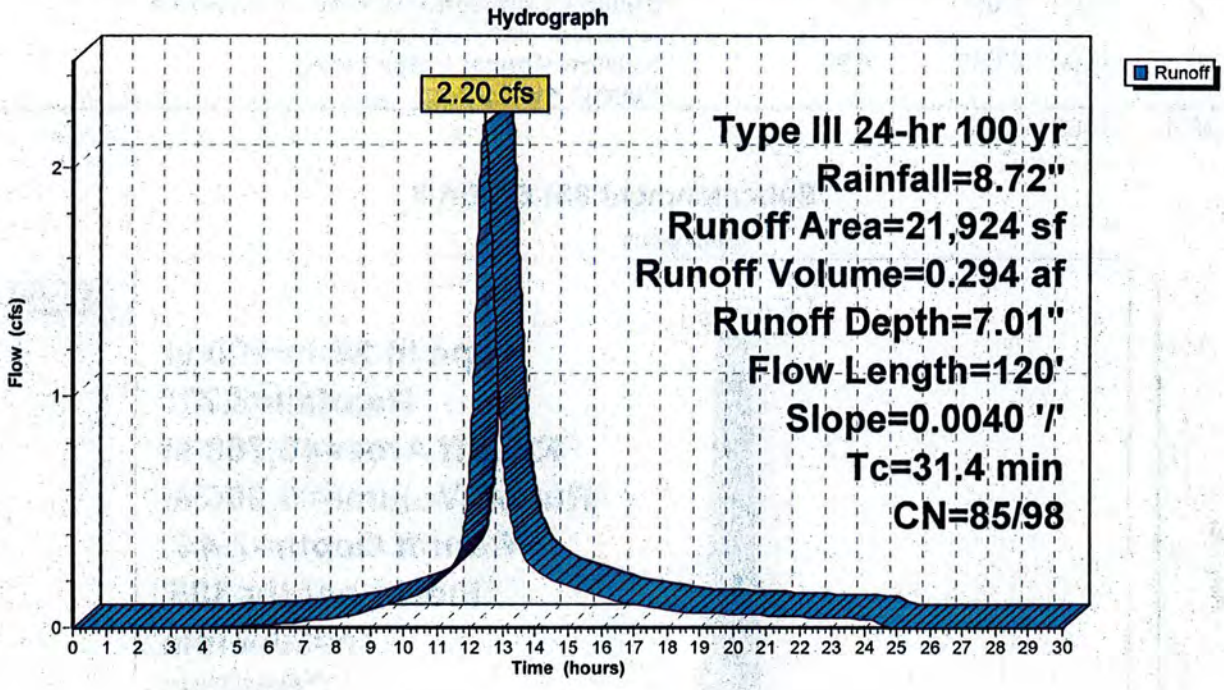
Runoff = 2.20 cfs @ 12.42 hrs, Volume= 0.294 af, Depth= 7.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	1,344	98	Paved road, HSG D
*	20,580	85	Yard stone, HSG D
	21,924	86	Weighted Average
	20,580	85	93.87% Pervious Area
	1,344	98	6.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.4	120	0.0040	0.06		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"

Subcatchment 9A: EX-DA 9A



Summary for Subcatchment 9B: EX-DA 9B

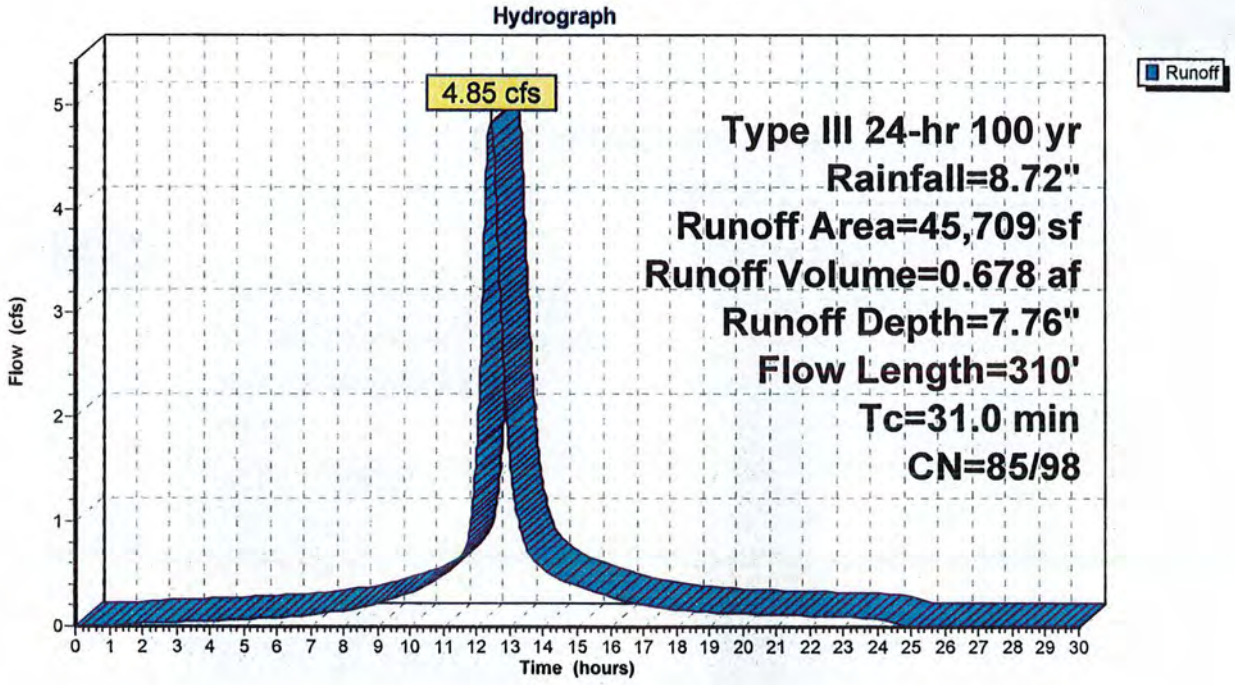
Runoff = 4.85 cfs @ 12.40 hrs, Volume= 0.678 af, Depth= 7.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	24,703	98	Impervious, HSG D
*	670	91	Gravel, HSG D
*	20,336	85	Yard stone, HSG D
	45,709	92	Weighted Average
	21,006	85	45.96% Pervious Area
	24,703	98	54.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	150	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.0	160	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.0	310	Total			

Subcatchment 9B: EX-DA 9B



Summary for Reach 10R: CB-3 to CB-1

[52] Hint: Inlet/Outlet conditions not evaluated

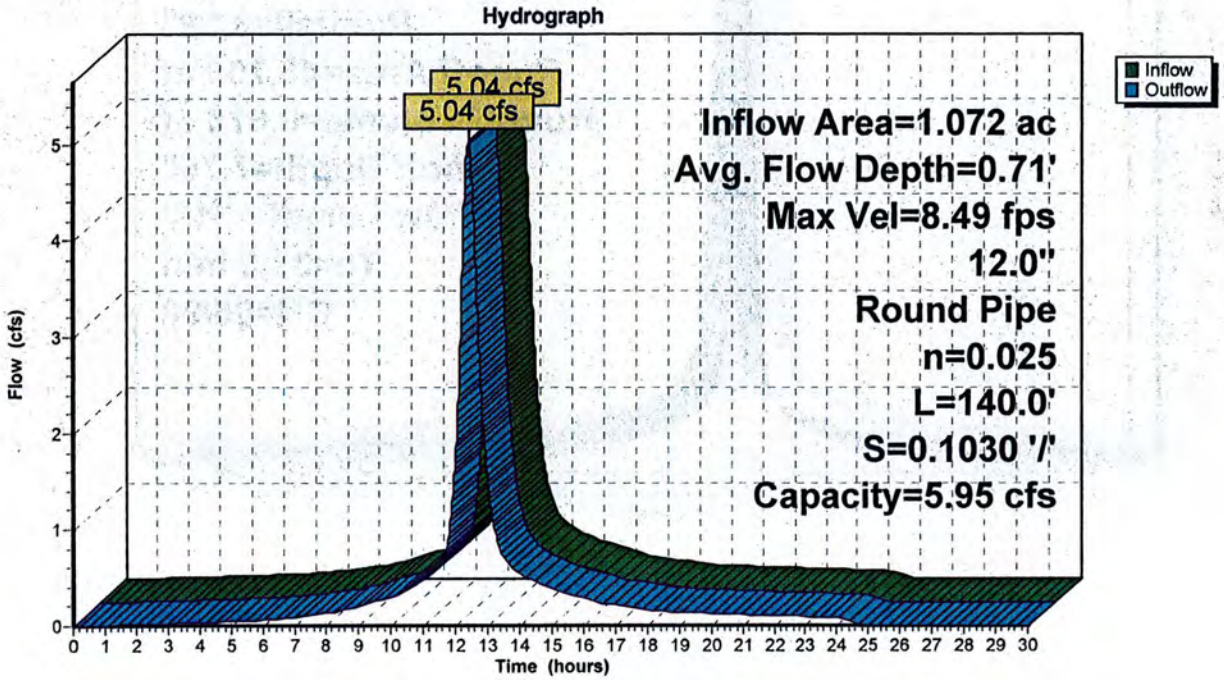
Inflow Area = 1.072 ac, 34.07% Impervious, Inflow Depth = 7.44" for 100 yr event
Inflow = 5.04 cfs @ 12.37 hrs, Volume= 0.665 af
Outflow = 5.04 cfs @ 12.38 hrs, Volume= 0.665 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 8.49 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.25 fps, Avg. Travel Time= 0.7 min

Peak Storage= 83 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.95 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 140.0' Slope= 0.1030 '/'
Inlet Invert= 592.92', Outlet Invert= 578.50'





Summary for Reach 11R: Surface Swale

[91] Warning: Storage range exceeded by 0.25'
[55] Hint: Peak inflow is 204% of Manning's capacity

Inflow Area = 1.049 ac, 54.04% Impervious, Inflow Depth = 34.77" for 100 yr event
Inflow = 48.37 cfs @ 12.12 hrs, Volume= 3.041 af
Outflow = 48.23 cfs @ 12.14 hrs, Volume= 3.041 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.50 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 3.7 min

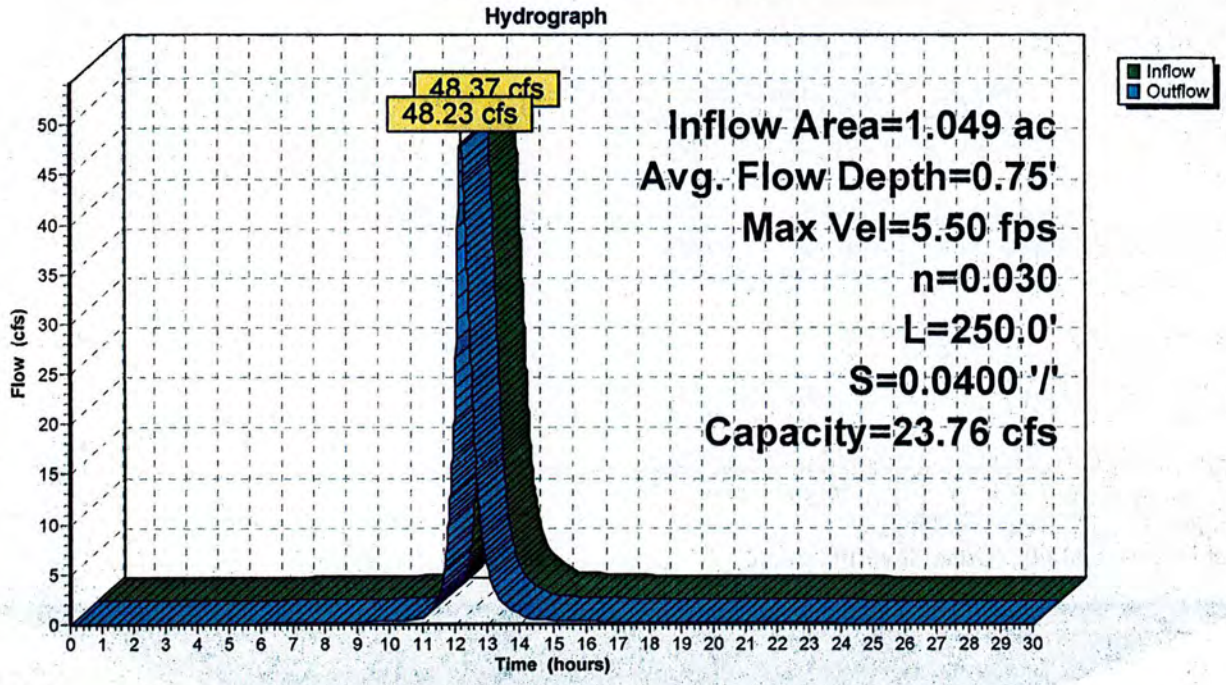
Peak Storage= 2,192 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 23.76 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 250.0' Slope= 0.0400 '/'
Inlet Invert= 590.00', Outlet Invert= 580.00'



‡

Reach 11R: Surface Swale



Summary for Reach 13R: Swale

Inflow Area = 2.404 ac, 2.87% Impervious, Inflow Depth = 6.37" for 100 yr event
Inflow = 16.51 cfs @ 12.11 hrs, Volume= 1.275 af
Outflow = 16.15 cfs @ 12.13 hrs, Volume= 1.275 af, Atten= 2%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.38 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 6.3 min

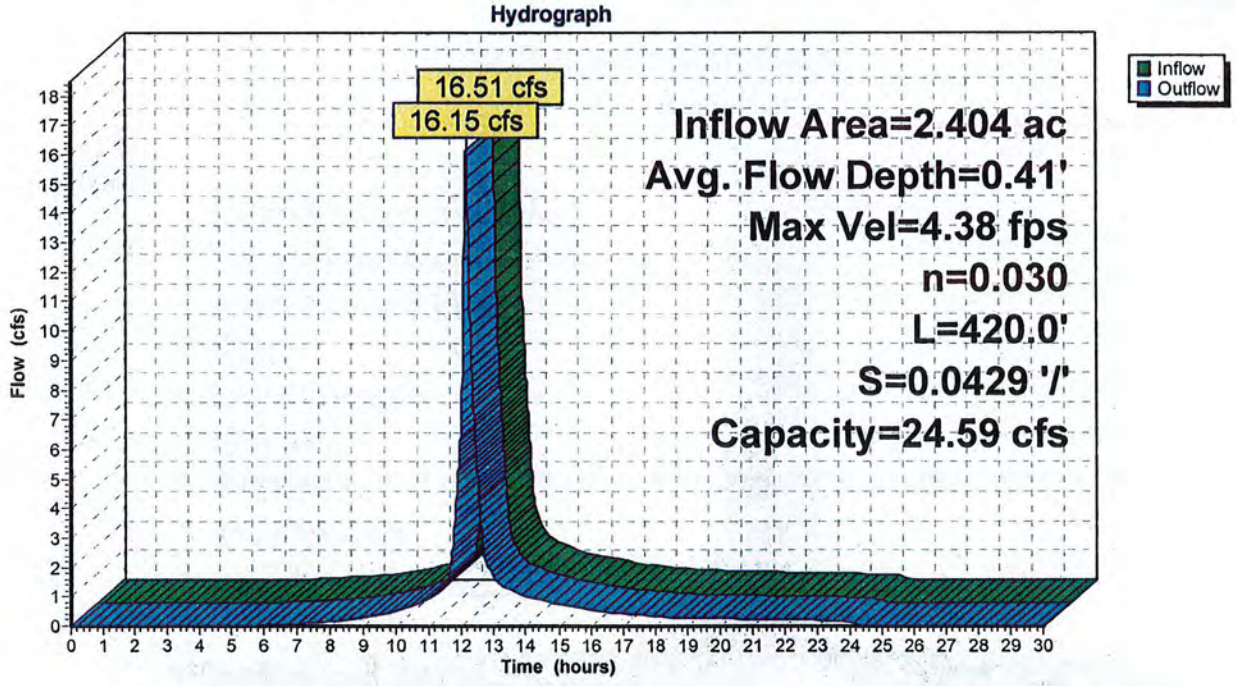
Peak Storage= 1,546 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡

Reach 13R: Swale



Summary for Reach 15R: CB-5 to CB-4

[52] Hint: Inlet/Outlet conditions not evaluated

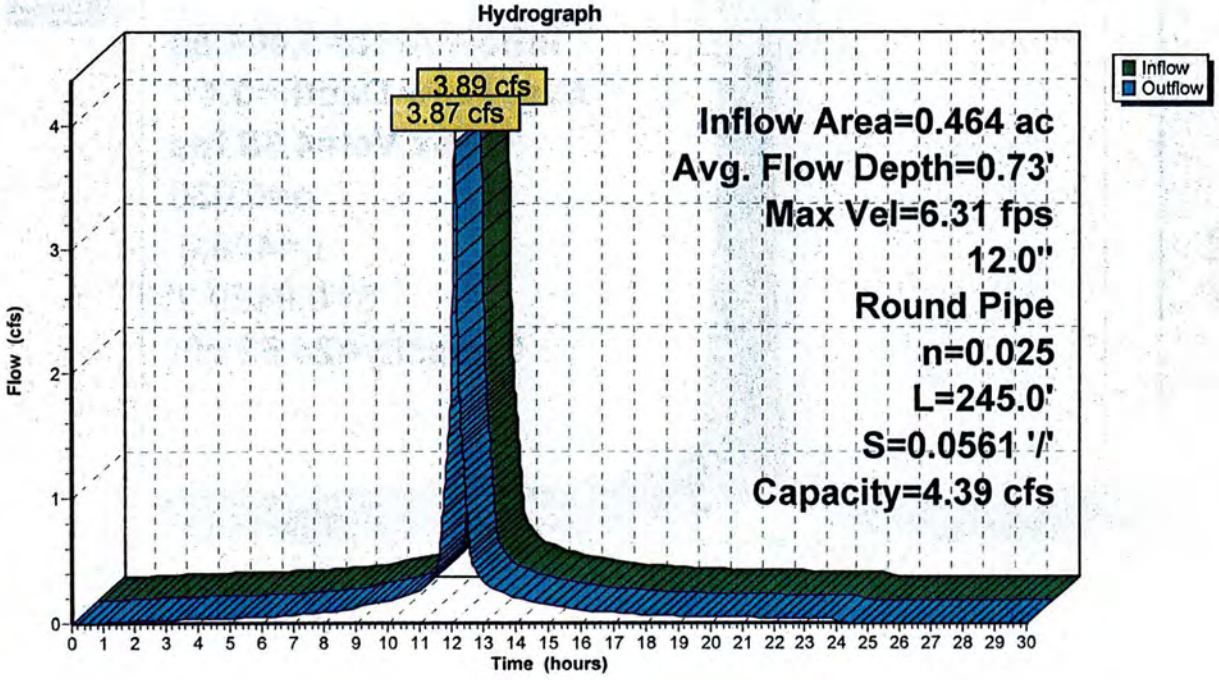
Inflow Area = 0.464 ac, 86.67% Impervious, Inflow Depth = 8.19" for 100 yr event
Inflow = 3.89 cfs @ 12.08 hrs, Volume= 0.317 af
Outflow = 3.87 cfs @ 12.09 hrs, Volume= 0.317 af, Atten= 1%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 6.31 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.21 fps, Avg. Travel Time= 1.8 min

Peak Storage= 150 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.39 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 245.0' Slope= 0.0561 '/'
Inlet Invert= 610.00', Outlet Invert= 596.25'





Summary for Pond 10P: CB-2 to CB-1

[57] Hint: Peaked at 594.18' (Flood elevation advised)

Inflow Area =	8.995 ac,	28.42% Impervious,	Inflow Depth =	5.02"	for 100 yr event
Inflow =	25.29 cfs @	12.08 hrs, Volume=	3.764 af		
Outflow =	25.29 cfs @	12.08 hrs, Volume=	3.764 af,	Atten= 0%,	Lag= 0.0 min
Primary =	3.84 cfs @	11.78 hrs, Volume=	2.950 af		
Secondary =	21.58 cfs @	12.08 hrs, Volume=	0.814 af		

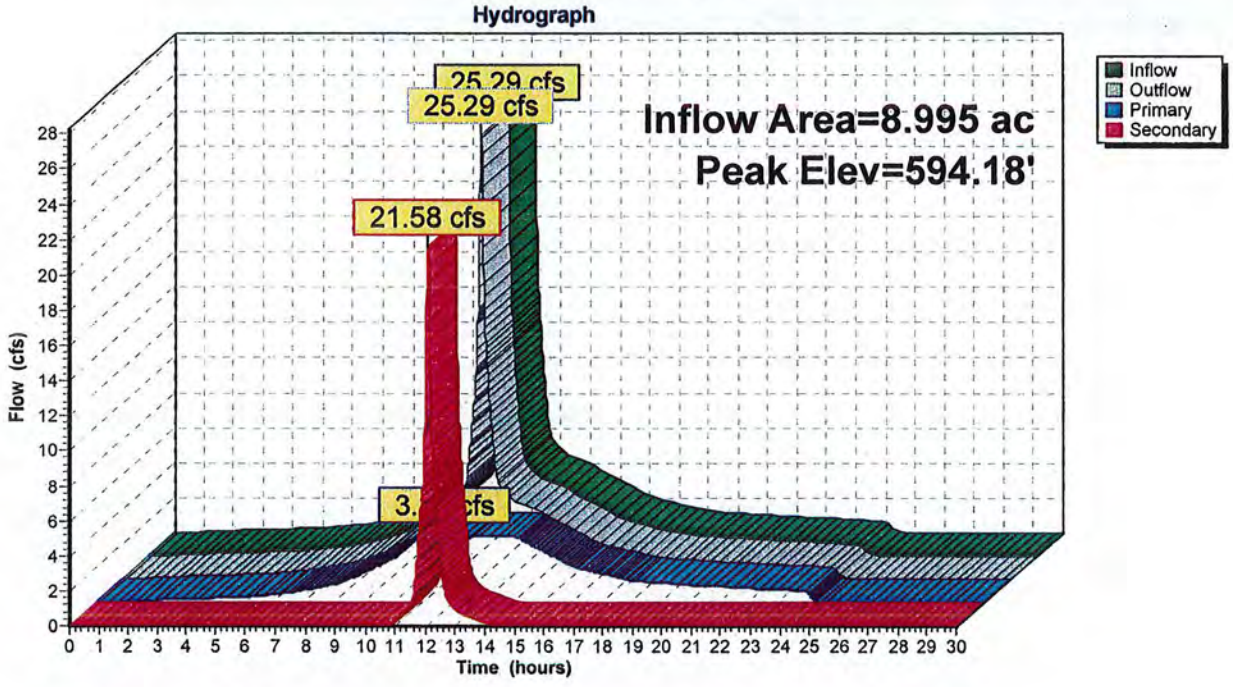
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.18' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	590.00'	**12.0" Round Culvert** L= 330.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 590.00' / 578.00' S= 0.0364 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	593.75'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.84 cfs @ 11.78 hrs HW=593.91' TW=578.85' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.84 cfs @ 4.89 fps)

Secondary OutFlow Max=21.54 cfs @ 12.08 hrs HW=594.18' TW=590.71' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 21.54 cfs @ 1.68 fps)

Pond 10P: CB-2 to CB-1



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 580.33' (Flood elevation advised)
[62] Hint: Exceeded Reach 10R OUTLET depth by 1.35' @ 12.09 hrs
[61] Hint: Exceeded Reach 11R outlet invert by 0.33' @ 12.14 hrs
[61] Hint: Exceeded Reach 13R outlet invert by 0.33' @ 12.14 hrs

Inflow Area =	15.341 ac,	24.96% Impervious,	Inflow Depth =	6.97" for 100 yr event
Inflow =	78.45 cfs @	12.14 hrs, Volume=	8.905 af	
Outflow =	78.45 cfs @	12.14 hrs, Volume=	8.905 af,	Atten= 0%, Lag= 0.0 min
Primary =	27.60 cfs @	12.14 hrs, Volume=	7.240 af	
Secondary =	50.85 cfs @	12.14 hrs, Volume=	1.665 af	

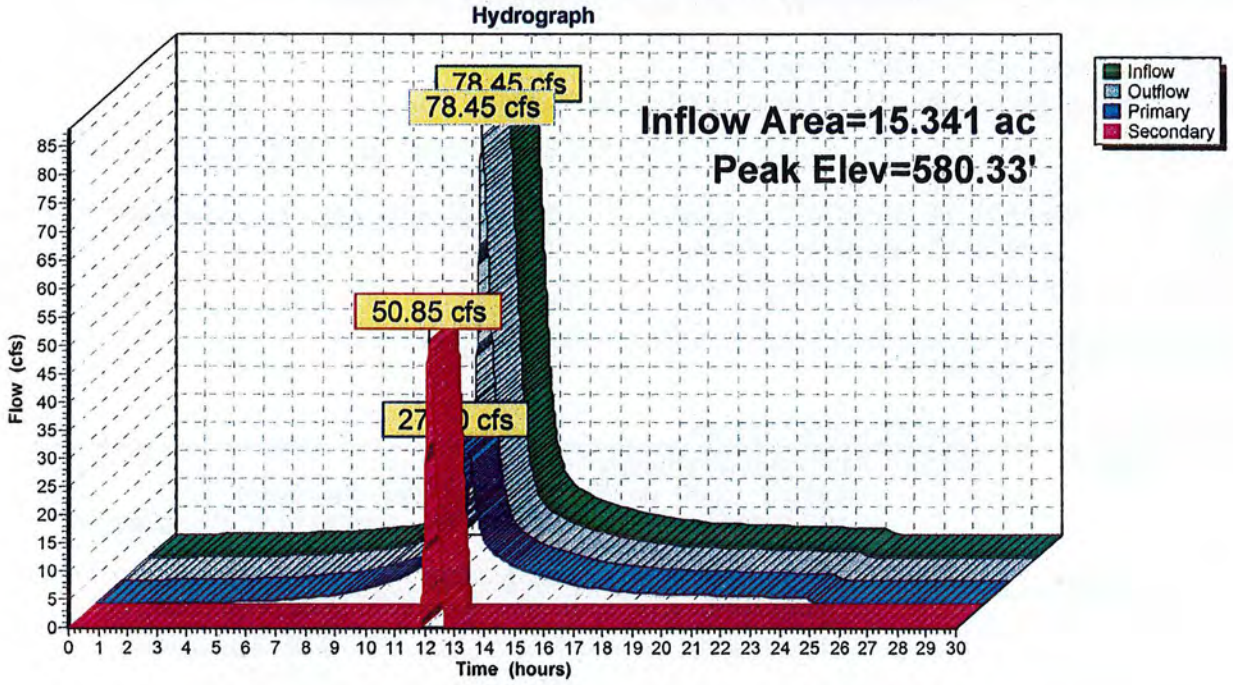
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 580.33' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=27.60 cfs @ 12.14 hrs HW=580.33' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 27.60 cfs @ 8.79 fps)

Secondary OutFlow Max=50.81 cfs @ 12.14 hrs HW=580.33' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 50.81 cfs @ 1.54 fps)

Pond 12P: (new Pond)



Summary for Pond 15P: Yard Area Ponding

[57] Hint: Peaked at 599.24' (Flood elevation advised)
[62] Hint: Exceeded Reach 15R OUTLET depth by 2.63' @ 12.61 hrs

Inflow Area =	6.124 ac,	27.47% Impervious,	Inflow Depth =	7.03"	for 100 yr event
Inflow =	32.90 cfs @	12.20 hrs,	Volume=	3.585 af	
Outflow =	32.90 cfs @	12.20 hrs,	Volume=	3.585 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.76 cfs @	12.59 hrs,	Volume=	2.037 af	
Secondary =	30.16 cfs @	12.20 hrs,	Volume=	1.548 af	

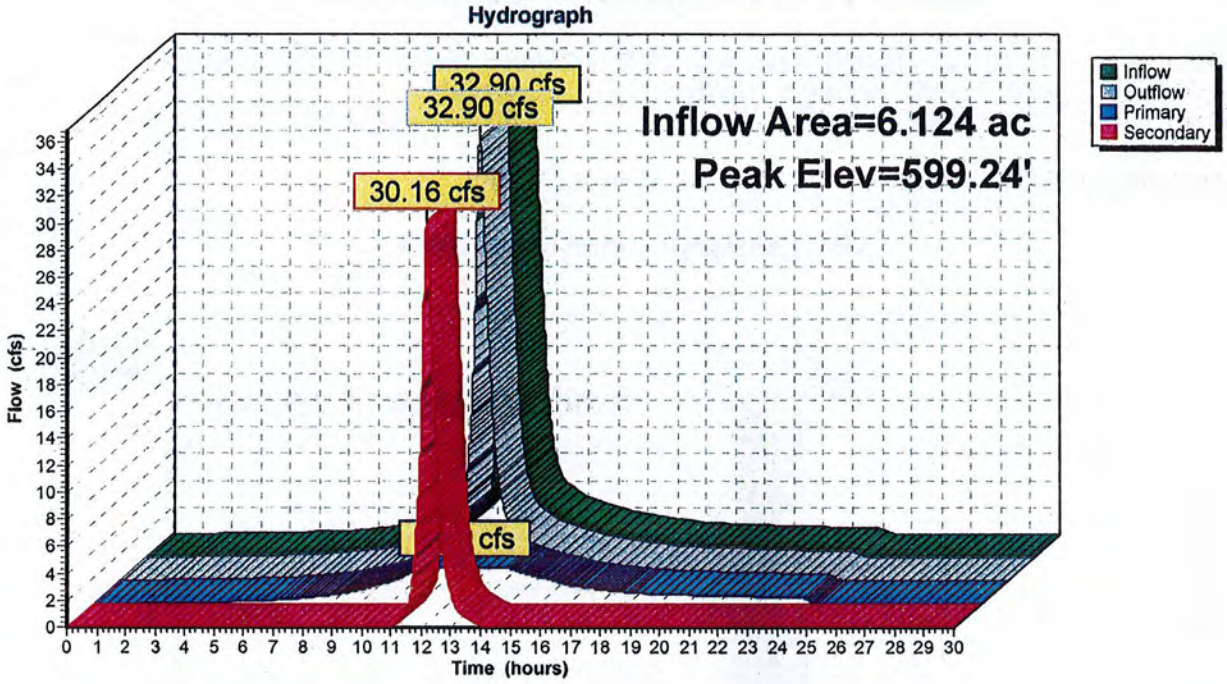
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.24' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	594.92'	**12.0" Round Culvert** L= 220.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 594.92' / 590.25' S= 0.0212 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	599.00'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.76 cfs @ 12.59 hrs HW=599.12' TW=593.85' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.76 cfs @ 3.52 fps)

Secondary OutFlow Max=30.15 cfs @ 12.20 hrs HW=599.24' TW=590.73' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 30.15 cfs @ 1.24 fps)

Pond 15P: Yard Area Ponding

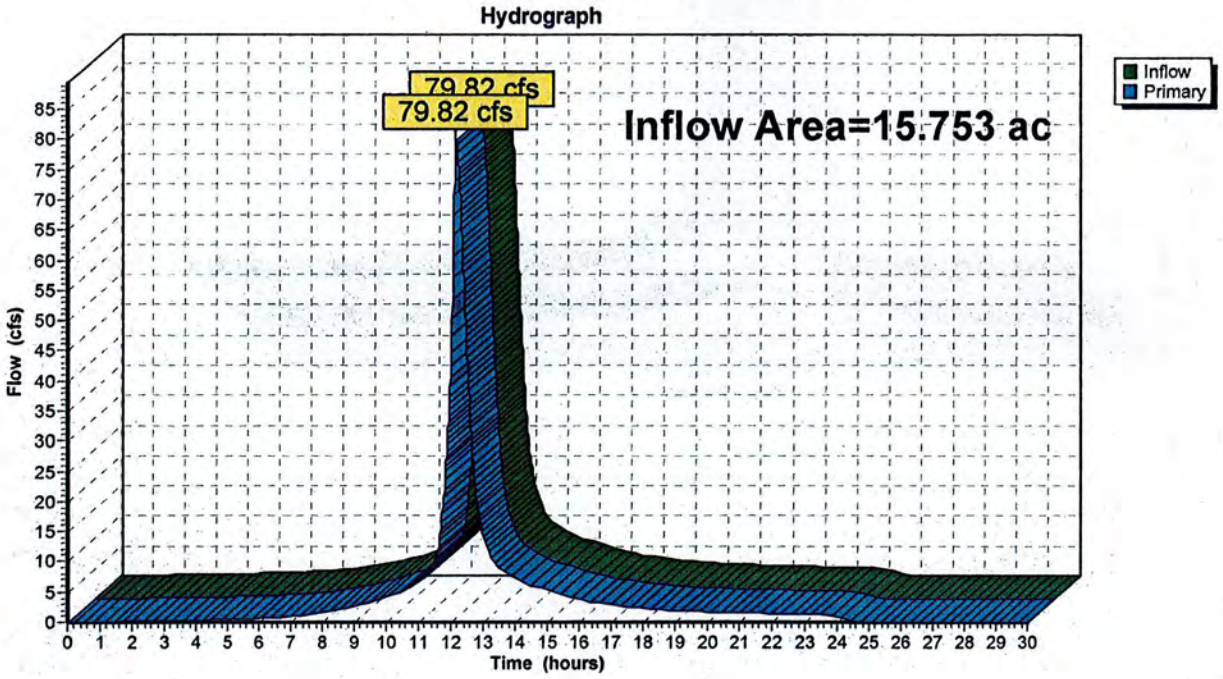


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.753 ac, 24.92% Impervious, Inflow Depth = 6.96" for 100 yr event
Inflow = 79.82 cfs @ 12.14 hrs, Volume= 9.133 af
Primary = 79.82 cfs @ 12.14 hrs, Volume= 9.133 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Summary for Subcatchment 1S: EX-DA 1

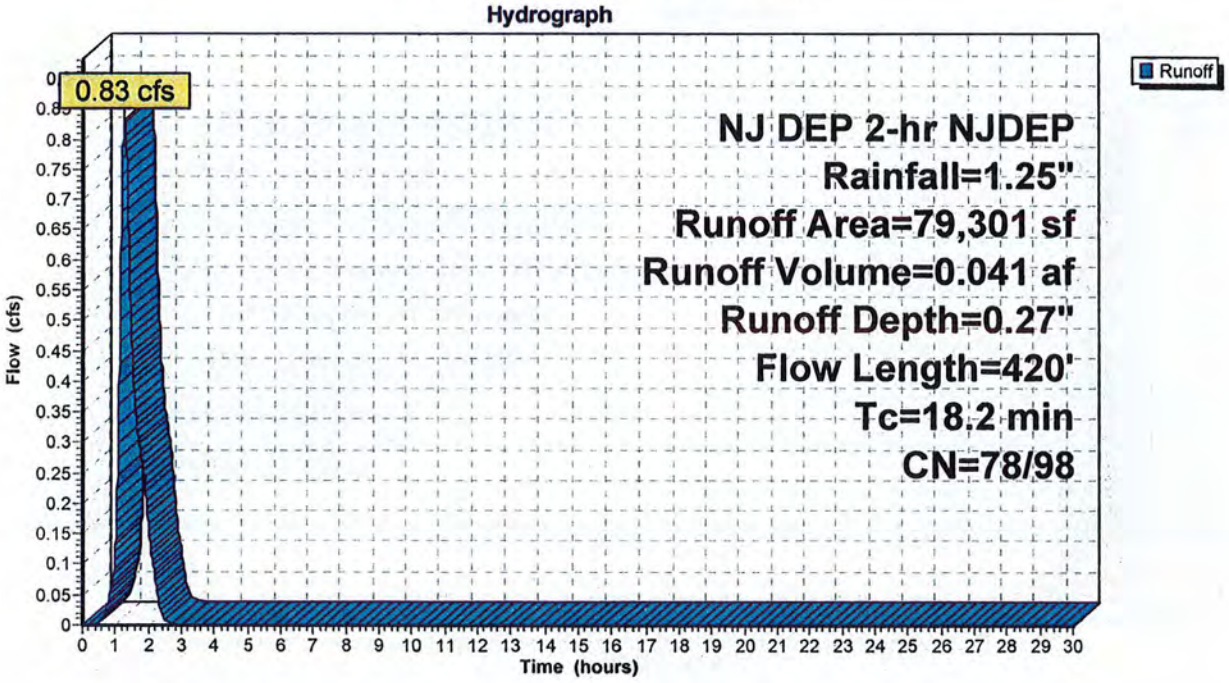
Runoff = 0.83 cfs @ 1.29 hrs, Volume= 0.041 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	11,158	98	Paved road, HSG D
*	661	98	Gravel road, HSG D
	53,293	79	Woods/grass comb., Good, HSG D
	14,189	73	Brush, Good, HSG D
	79,301	81	Weighted Average
	67,482	78	85.10% Pervious Area
	11,819	98	14.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1S: EX-DA 1



Summary for Subcatchment 2S: EX-DA2

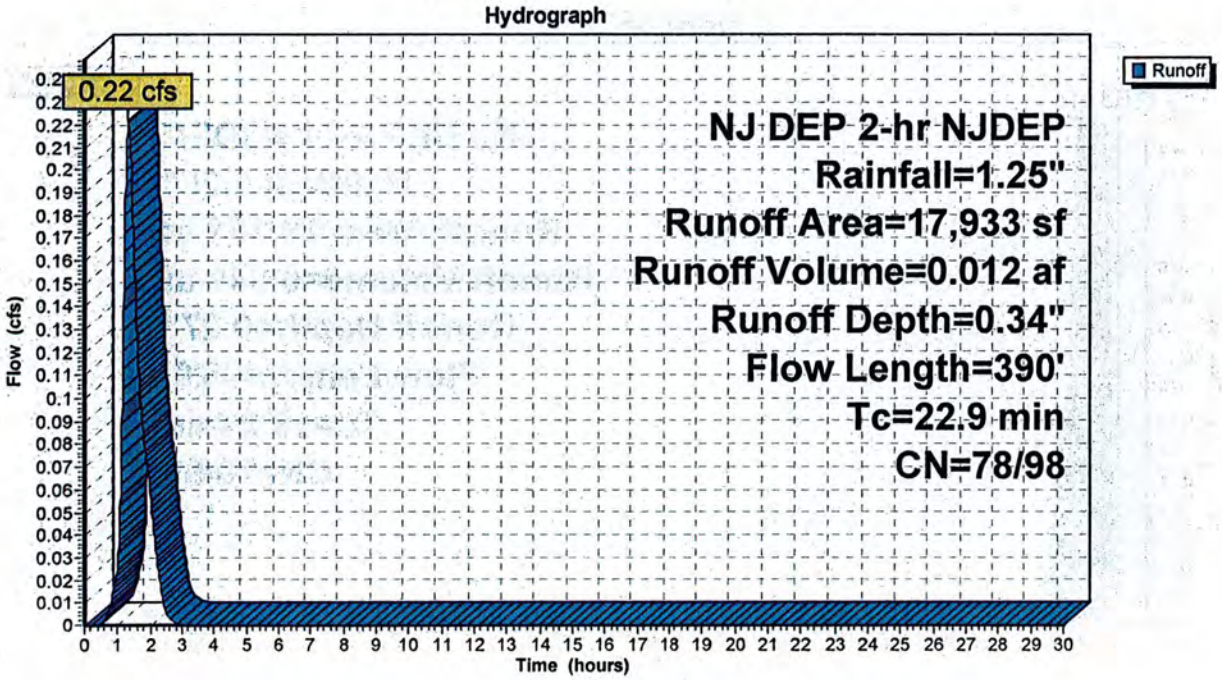
Runoff = 0.22 cfs @ 1.34 hrs, Volume= 0.012 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	4,190	98	Paved road, HSG D
*	10,038	80	Grass, Good, HSG D
	3,705	73	Brush, Good, HSG D
	17,933	83	Weighted Average
	13,743	78	76.64% Pervious Area
	4,190	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.42"
1.1	240	0.0630	3.76		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
22.9	390	Total			

Subcatchment 2S: EX-DA2



Summary for Subcatchment 3S: EX-DA 3

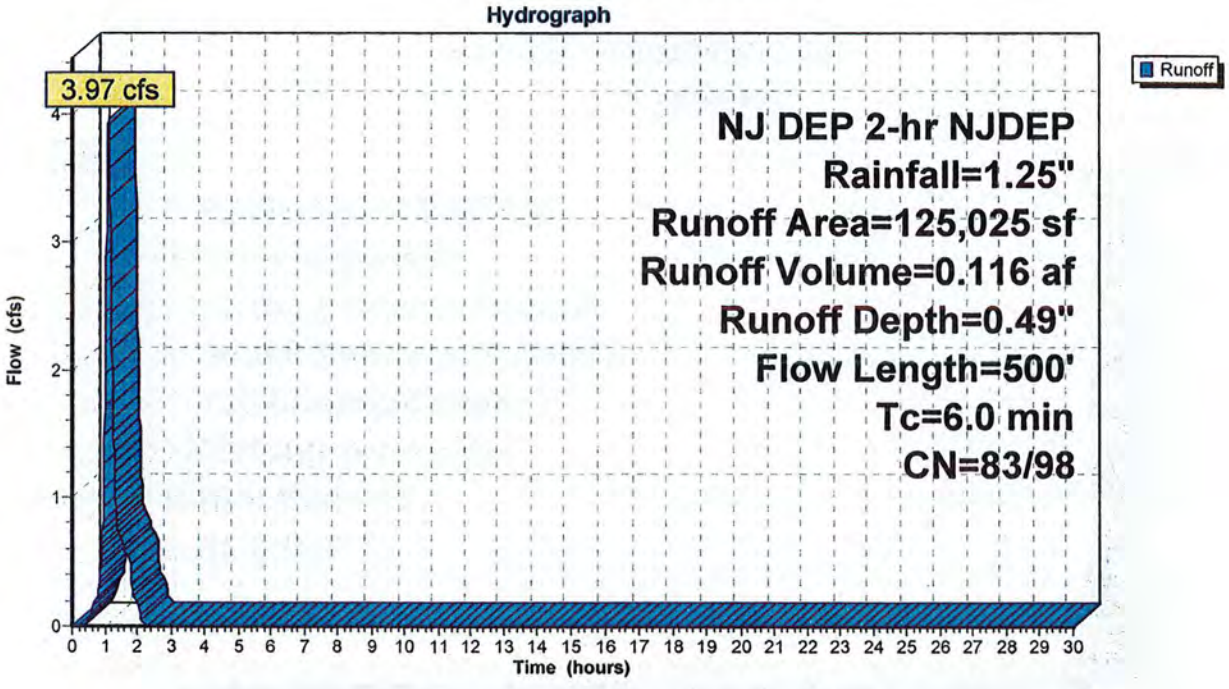
Runoff = 3.97 cfs @ 1.12 hrs, Volume= 0.116 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	3,042	98	Impervious, HSG D
*	35,019	98	Gravel road, HSG D
*	29,686	91	Gravel, HSG D
*	30,906	80	Grass, Good, HSG D
	26,372	78	Meadow, non-grazed, HSG D
	125,025	88	Weighted Average
	86,964	83	69.56% Pervious Area
	38,061	98	30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	150	0.0070	0.63		**Sheet Flow, Gravel Storage Area** n= 0.020 P2= 3.42"
1.6	350	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.6	500	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: EX-DA 3



Summary for Subcatchment 4S: EX-DA 4

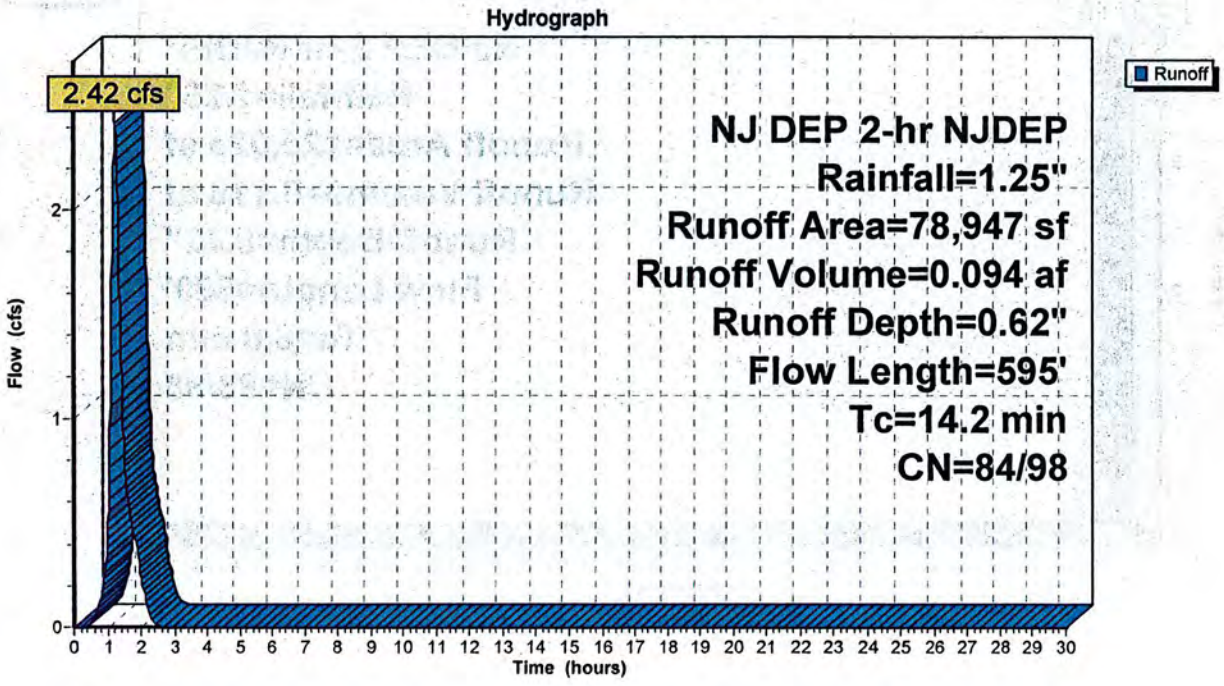
Runoff = 2.42 cfs @ 1.21 hrs, Volume= 0.094 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	31,370	98	Paved road, HSG D
*	5,072	98	Gravel road, HSG D
*	12,803	91	Gravel, HSG D
*	8,134	85	Yard stone, HSG D
*	21,568	80	Grass, Good, HSG D
	78,947	91	Weighted Average
	42,505	84	53.84% Pervious Area
	36,442	98	46.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	150	0.0600	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.7	135	0.0460	3.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	310	0.0470	4.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
14.2	595	Total			

Subcatchment 4S: EX-DA 4



Summary for Subcatchment 5S: EX-DA 5

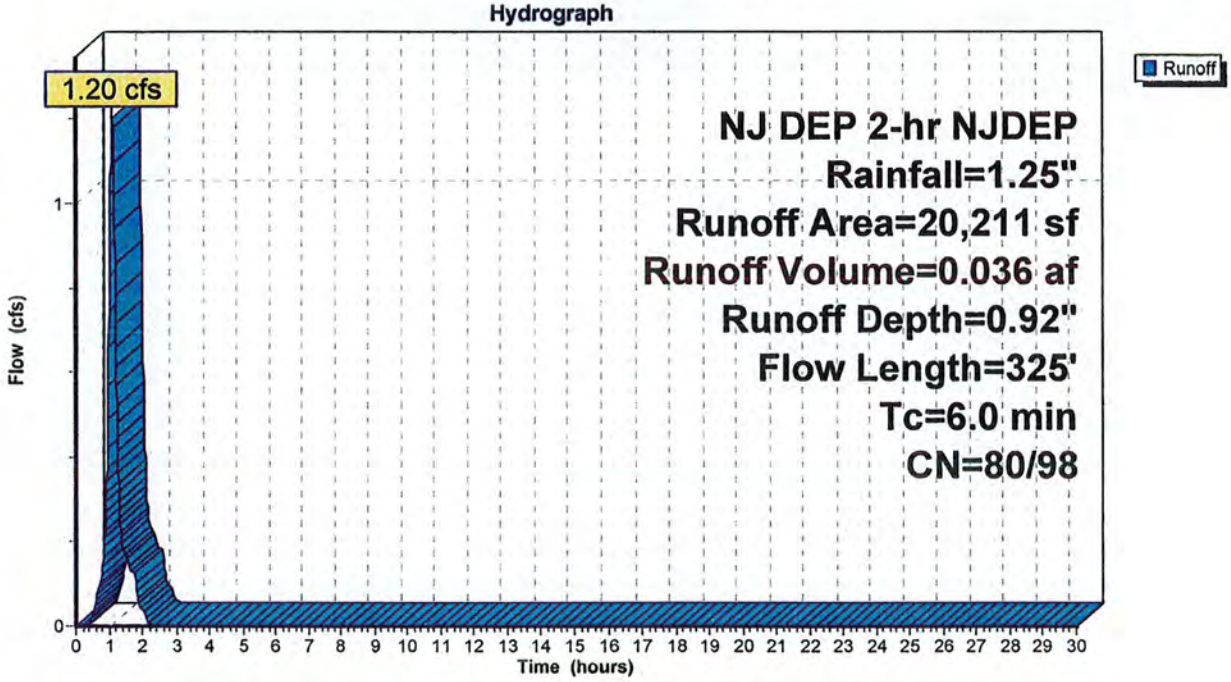
Runoff = 1.20 cfs @ 1.11 hrs, Volume= 0.036 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	17,517	98	Paved road, HSG D
*	2,694	80	Grass cover, Good, HSG D
	20,211	96	Weighted Average
	2,694	80	13.33% Pervious Area
	17,517	98	86.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0570	2.16		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	120	0.0790	5.71		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	50	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	55	0.0320	3.63		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8	325	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5S: EX-DA 5



Summary for Subcatchment 6S: EX-DA 6

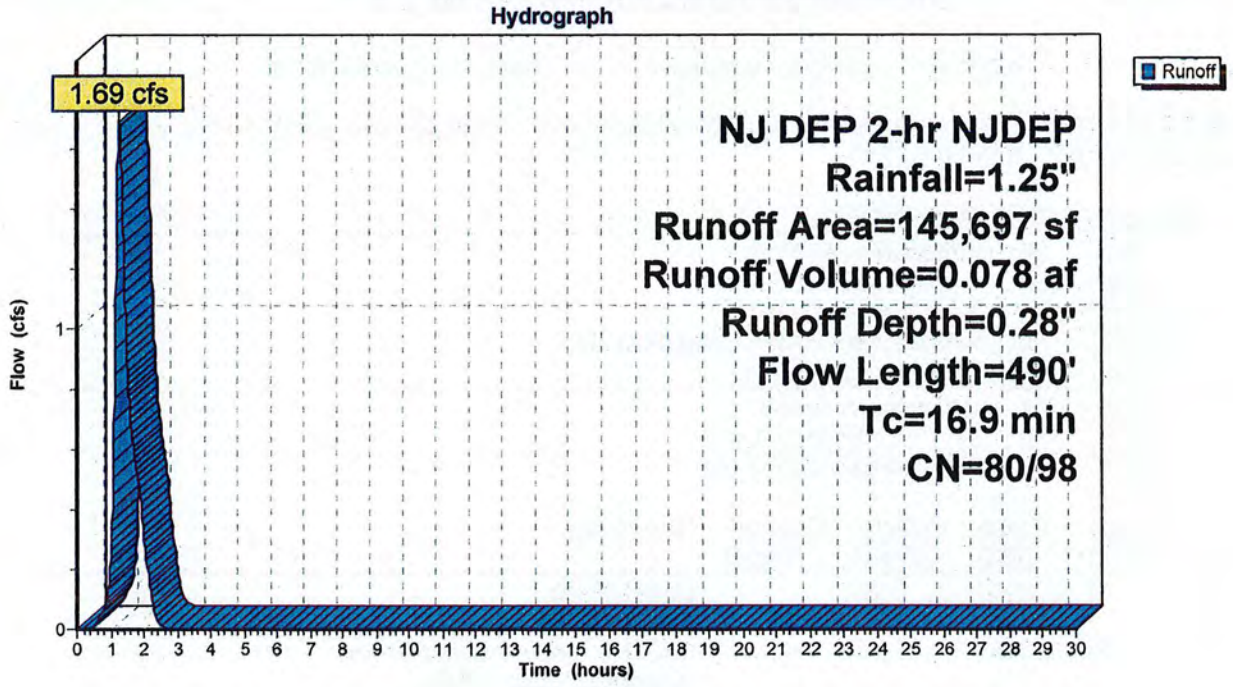
Runoff = 1.69 cfs @ 1.28 hrs, Volume= 0.078 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	9,501	98	Paved road, HSG D
*	8,481	98	Gravel road, HSG D
*	43,082	85	Yard stone, HSG D
*	57,041	80	Grass cover, Good, HSG D
	27,592	73	Brush, Good, HSG D
	145,697	82	Weighted Average
	127,715	80	87.66% Pervious Area
	17,982	98	12.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	150	0.0500	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.1	30	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	240	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
16.9	490	Total			

Subcatchment 6S: EX-DA 6



Summary for Subcatchment 7S: EX-DA 7

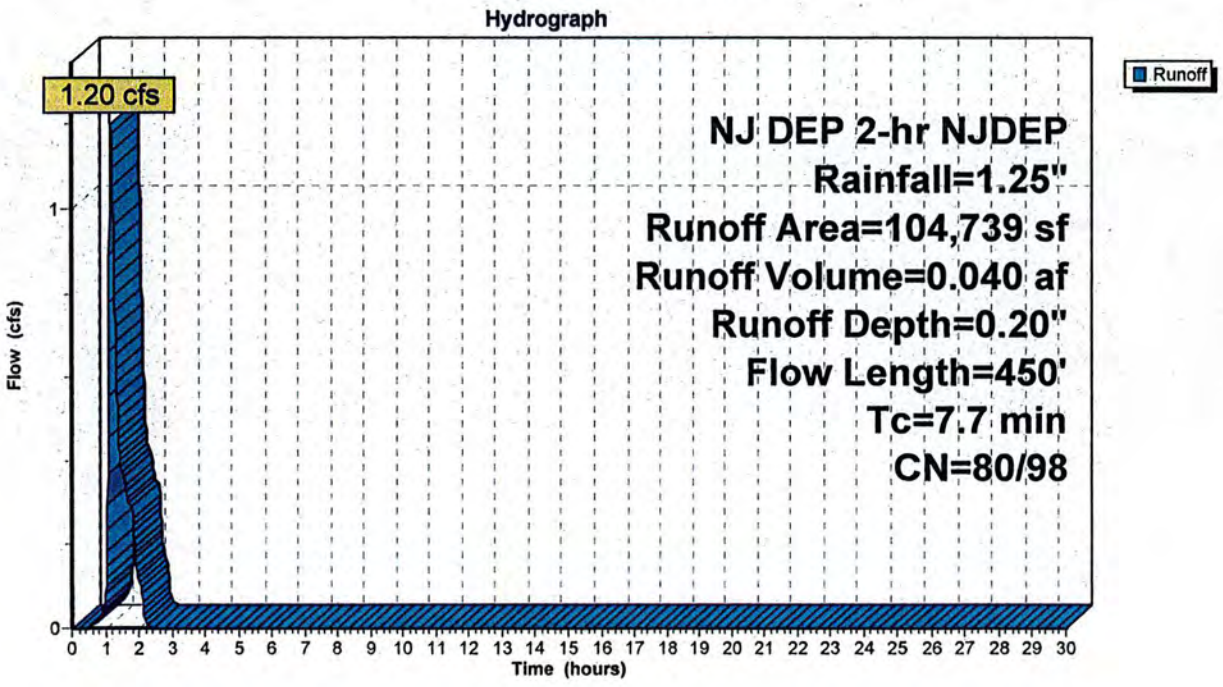
Runoff = 1.20 cfs @ 1.16 hrs, Volume= 0.040 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	805	98	Impervious, HSG D
*	2,198	98	Gravel road, HSG D
*	10,157	85	Yard stone, HSG D
	86,177	80	>75% Grass cover, Good, HSG D
	5,402	73	Brush, Good, HSG D
	104,739	81	Weighted Average
	101,736	80	97.13% Pervious Area
	3,003	98	2.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7S: EX-DA 7



Summary for Subcatchment 8S: EX-DA 8

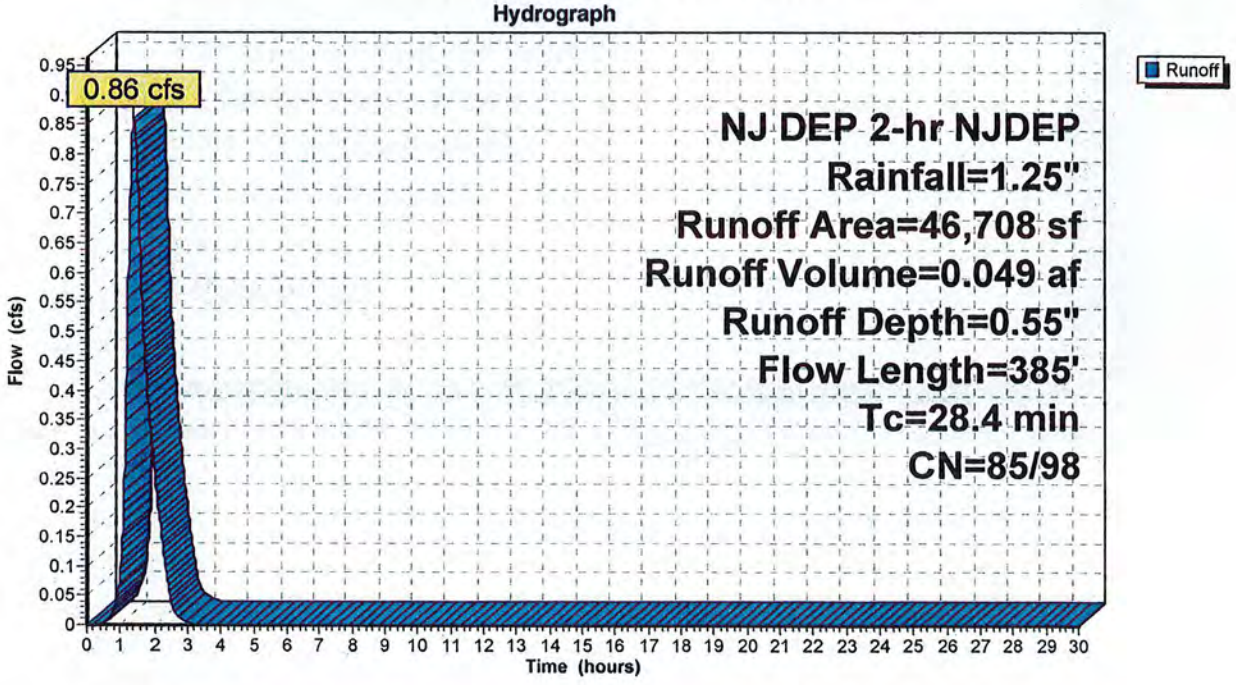
Runoff = 0.86 cfs @ 1.41 hrs, Volume= 0.049 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	15,912	98	Impervious, HSG D
*	29,261	85	Yard stone, HSG D
*	1,535	80	Grass, Good, HSG D
	46,708	89	Weighted Average
	30,796	85	65.93% Pervious Area
	15,912	98	34.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	80	0.0030	0.05		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"
0.5	80	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	165	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
0.2	60	0.0580	4.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
28.4	385	Total			

Subcatchment 8S: EX-DA 8



Summary for Subcatchment 9A: EX-DA 9A

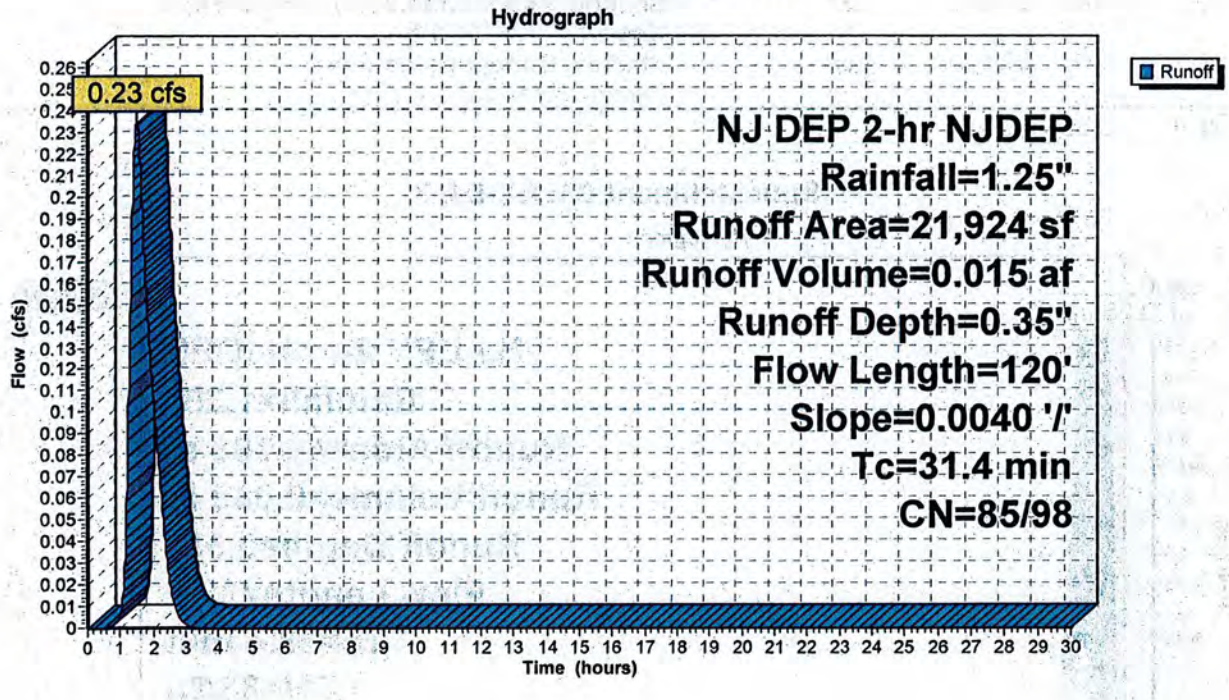
Runoff = 0.23 cfs @ 1.50 hrs, Volume= 0.015 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	1,344	98	Paved road, HSG D
*	20,580	85	Yard stone, HSG D
	21,924	86	Weighted Average
	20,580	85	93.87% Pervious Area
	1,344	98	6.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.4	120	0.0040	0.06		**Sheet Flow, Yard stone** n= 0.250 P2= 3.42"

Subcatchment 9A: EX-DA 9A



Summary for Subcatchment 9B: EX-DA 9B

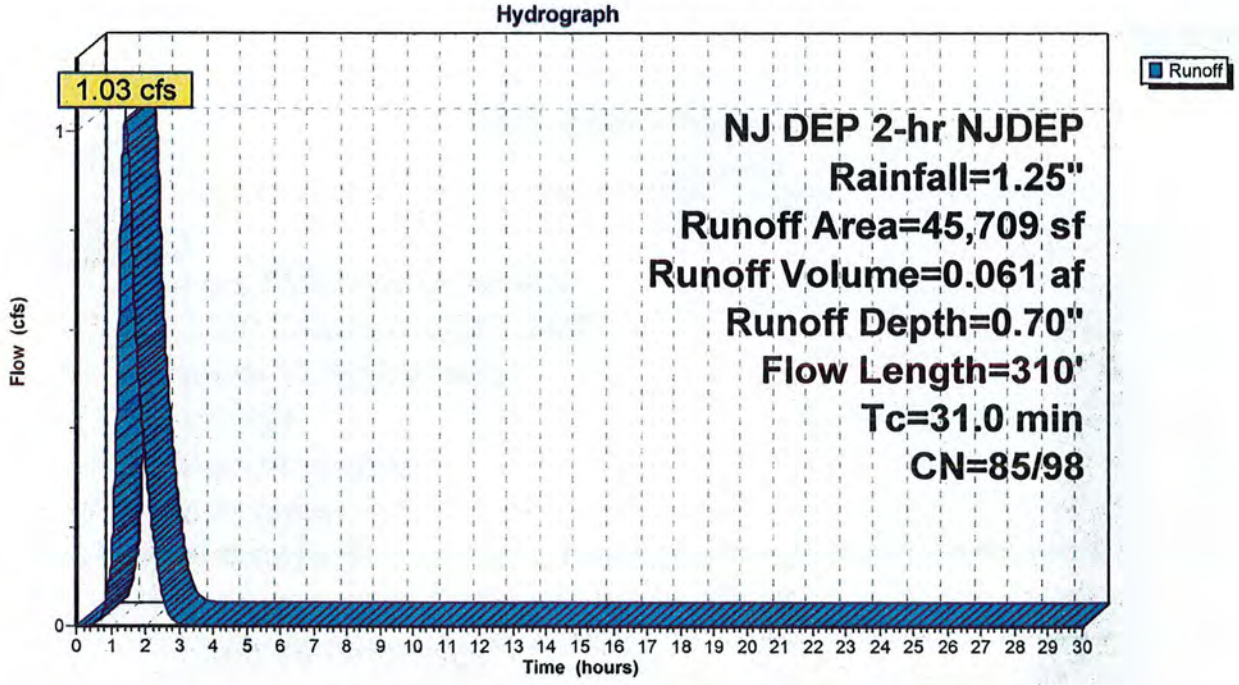
Runoff = 1.03 cfs @ 1.42 hrs, Volume= 0.061 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	24,703	98	Impervious, HSG D
*	670	91	Gravel, HSG D
*	20,336	85	Yard stone, HSG D
	45,709	92	Weighted Average
	21,006	85	45.96% Pervious Area
	24,703	98	54.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	150	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.0	160	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.0	310	Total			

Subcatchment 9B: EX-DA 9B



Summary for Reach 10R: CB-3 to CB-1

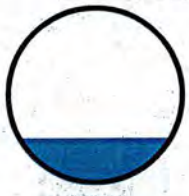
[52] Hint: Inlet/Outlet conditions not evaluated

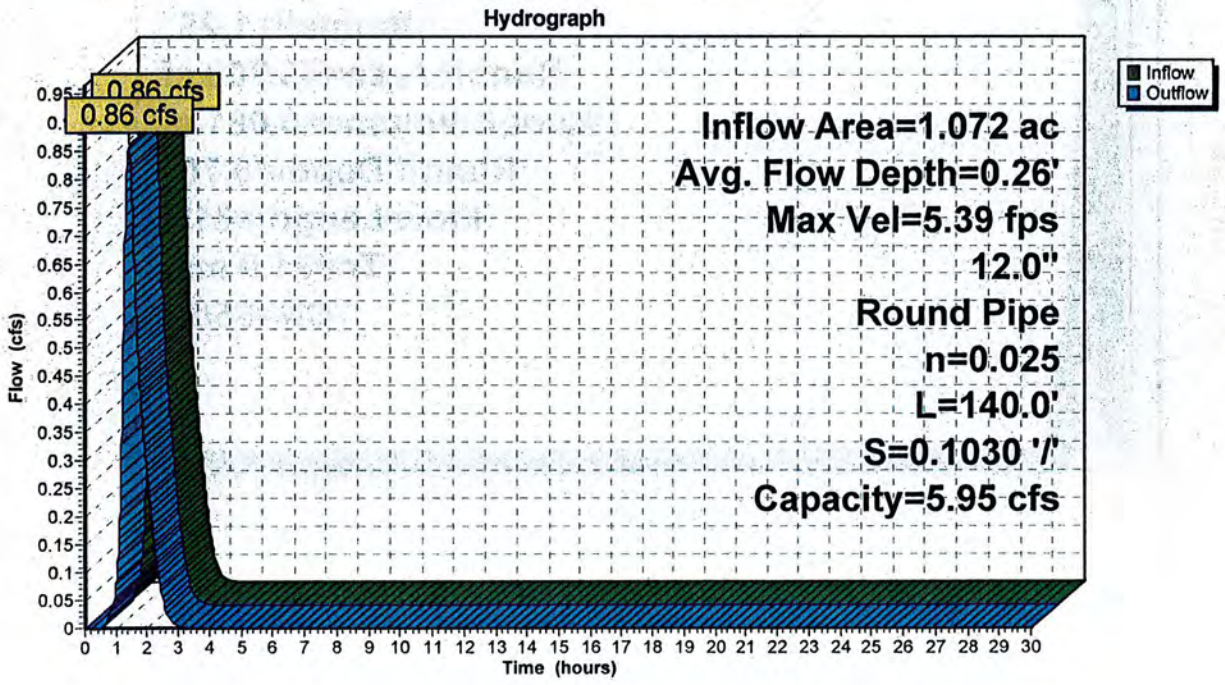
Inflow Area = 1.072 ac, 34.07% Impervious, Inflow Depth = 0.55" for NJDEP event
Inflow = 0.86 cfs @ 1.41 hrs, Volume= 0.049 af
Outflow = 0.86 cfs @ 1.42 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.39 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.61 fps, Avg. Travel Time= 0.9 min

Peak Storage= 22 cf @ 1.42 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.95 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 140.0' Slope= 0.1030 '/'
Inlet Invert= 592.92', Outlet Invert= 578.50'





Summary for Reach 11R: Surface Swale

Inflow Area = 1.049 ac, 54.04% Impervious, Inflow Depth = 1.49" for NJDEP event
Inflow = 4.45 cfs @ 1.14 hrs, Volume= 0.131 af
Outflow = 4.31 cfs @ 1.16 hrs, Volume= 0.131 af, Atten= 3%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.93 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 5.1 min

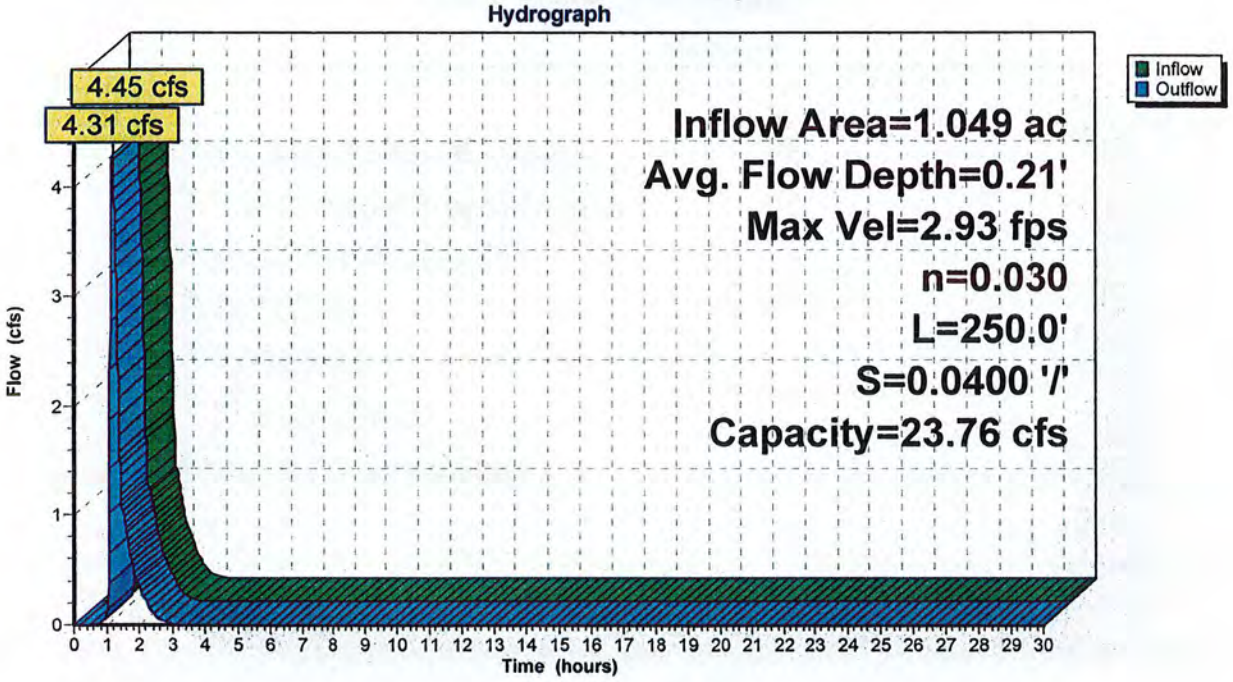
Peak Storage= 368 cf @ 1.16 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 23.76 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 250.0' Slope= 0.0400 '/'
Inlet Invert= 590.00', Outlet Invert= 580.00'



‡

Reach 11R: Surface Swale



Summary for Reach 13R: Swale

Inflow Area = 2.404 ac, 2.87% Impervious, Inflow Depth = 0.20" for NJDEP event
Inflow = 1.20 cfs @ 1.16 hrs, Volume= 0.040 af
Outflow = 1.06 cfs @ 1.21 hrs, Volume= 0.040 af, Atten= 12%, Lag= 3.0 min

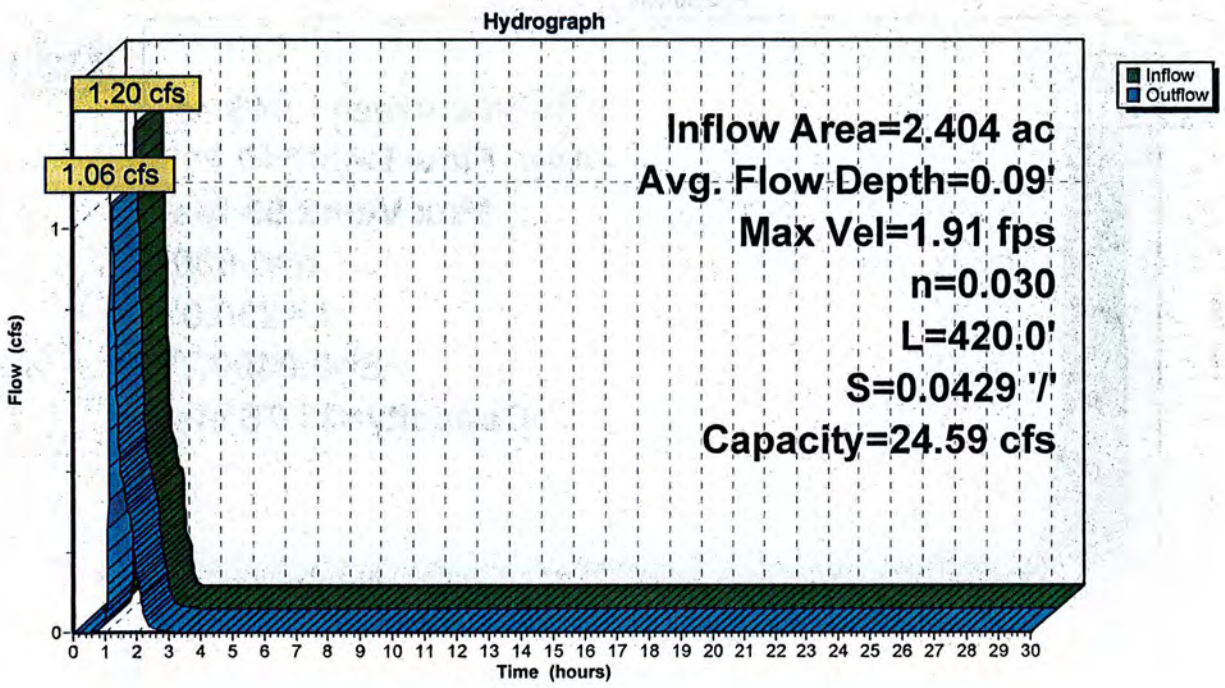
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.91 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 12.0 min

Peak Storage= 232 cf @ 1.21 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Short grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡



Summary for Reach 15R: CB-5 to CB-4

[52] Hint: Inlet/Outlet conditions not evaluated

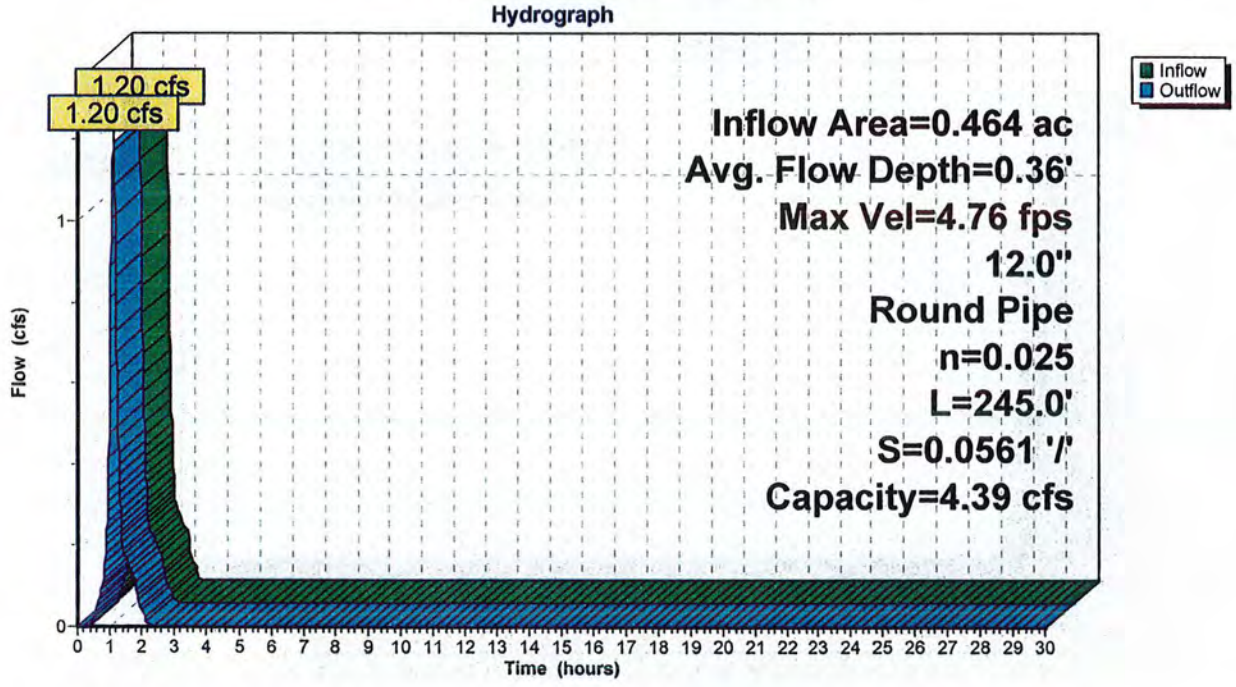
Inflow Area = 0.464 ac, 86.67% Impervious, Inflow Depth = 0.92" for NJDEP event
Inflow = 1.20 cfs @ 1.11 hrs, Volume= 0.036 af
Outflow = 1.20 cfs @ 1.12 hrs, Volume= 0.036 af, Atten= 1%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.76 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.10 fps, Avg. Travel Time= 1.9 min

Peak Storage= 62 cf @ 1.12 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.39 cfs

12.0" Round Pipe
n= 0.025 Corrugated metal
Length= 245.0' Slope= 0.0561 '/'
Inlet Invert= 610.00', Outlet Invert= 596.25'





Summary for Pond 10P: CB-2 to CB-1

[57] Hint: Peaked at 593.86' (Flood elevation advised)

Inflow Area =	8.995 ac,	28.42% Impervious,	Inflow Depth =	0.41"	for NJDEP event
Inflow =	6.70 cfs @	1.12 hrs, Volume=	0.307 af		
Outflow =	6.70 cfs @	1.12 hrs, Volume=	0.307 af,	Atten= 0%,	Lag= 0.0 min
Primary =	3.83 cfs @	1.12 hrs, Volume=	0.269 af		
Secondary =	2.87 cfs @	1.12 hrs, Volume=	0.037 af		

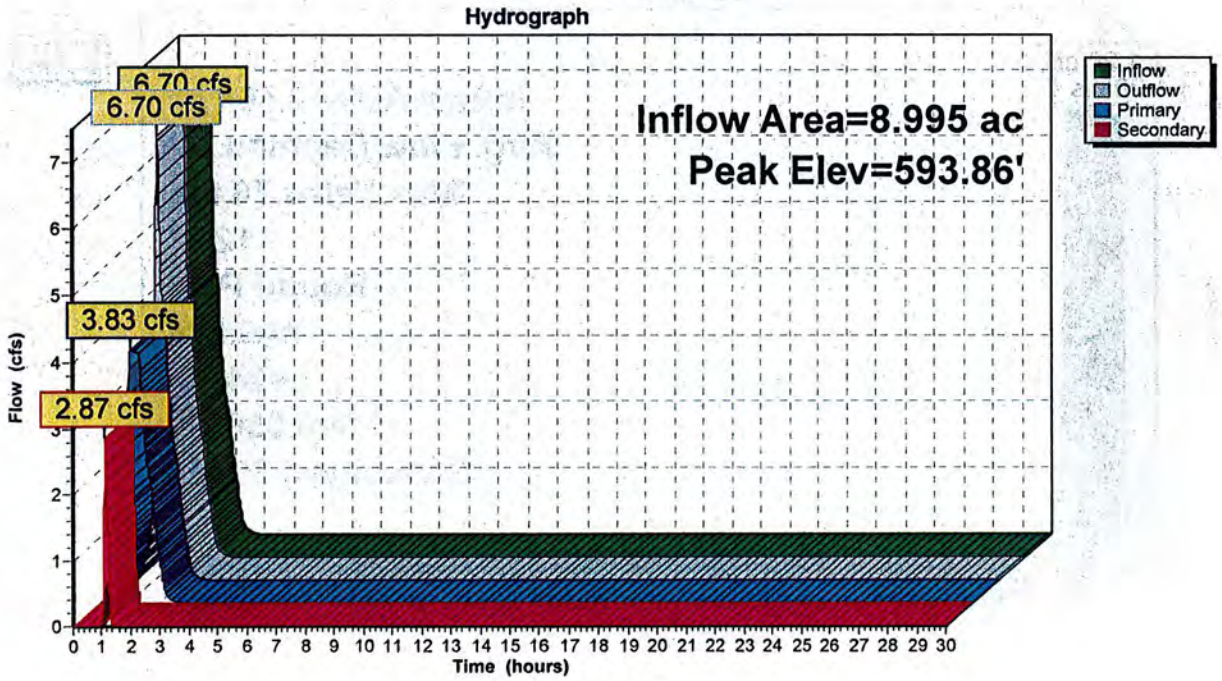
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 593.86' @ 1.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	590.00'	**12.0" Round Culvert** L= 330.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 590.00' / 578.00' S= 0.0364 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	593.75'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.83 cfs @ 1.12 hrs HW=593.86' TW=577.32' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.83 cfs @ 4.88 fps)

Secondary OutFlow Max=2.87 cfs @ 1.12 hrs HW=593.86' TW=590.19' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.87 cfs @ 0.84 fps)

Pond 10P: CB-2 to CB-1



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 577.45' (Flood elevation advised)

Inflow Area =	15.341 ac,	24.96% Impervious,	Inflow Depth =	0.41" for NJDEP event
Inflow =	10.02 cfs @	1.18 hrs, Volume=	0.530 af	
Outflow =	10.02 cfs @	1.18 hrs, Volume=	0.530 af,	Atten= 0%, Lag= 0.0 min
Primary =	10.02 cfs @	1.18 hrs, Volume=	0.530 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

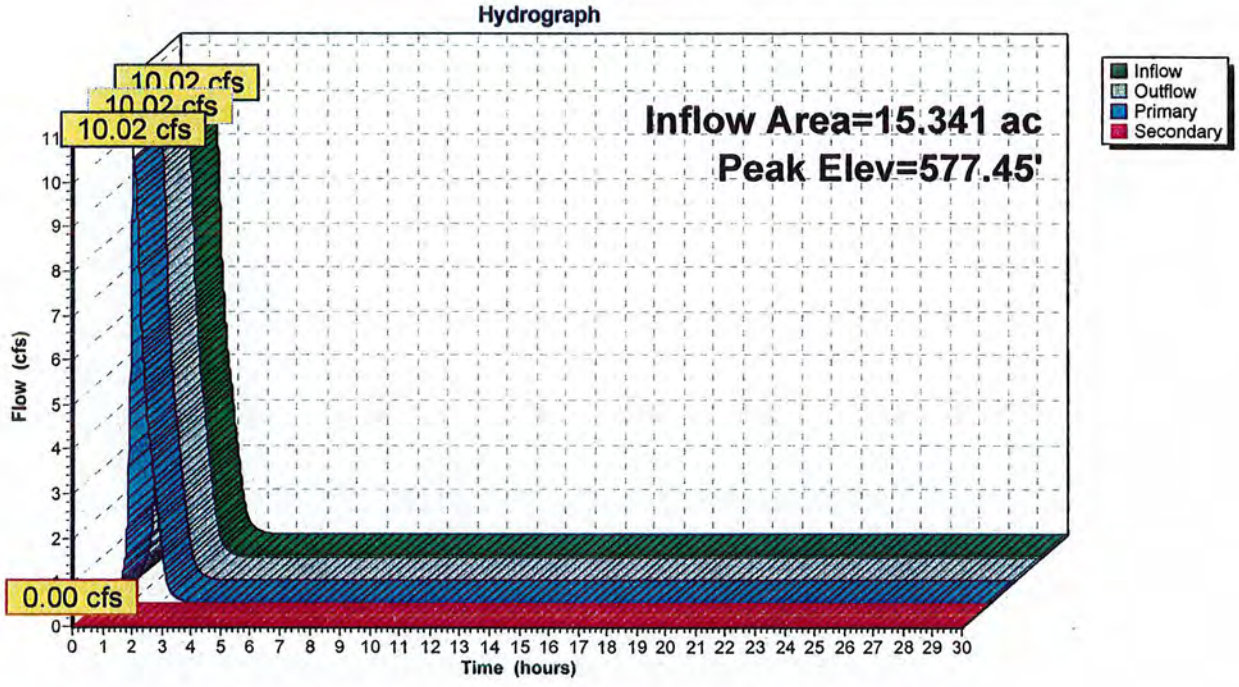
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 577.45' @ 1.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=10.02 cfs @ 1.18 hrs HW=577.45' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 10.02 cfs @ 4.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=576.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: (new Pond)



Summary for Pond 15P: Yard Area Ponding

[57] Hint: Peaked at 599.04' (Flood elevation advised)
[62] Hint: Exceeded Reach 15R OUTLET depth by 2.60' @ 1.35 hrs

Inflow Area =	6.124 ac,	27.47% Impervious,	Inflow Depth =	0.44"	for NJDEP event
Inflow =	4.67 cfs @	1.22 hrs,	Volume=	0.222 af	
Outflow =	4.67 cfs @	1.22 hrs,	Volume=	0.222 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.18 cfs @	1.37 hrs,	Volume=	0.191 af	
Secondary =	1.92 cfs @	1.22 hrs,	Volume=	0.032 af	

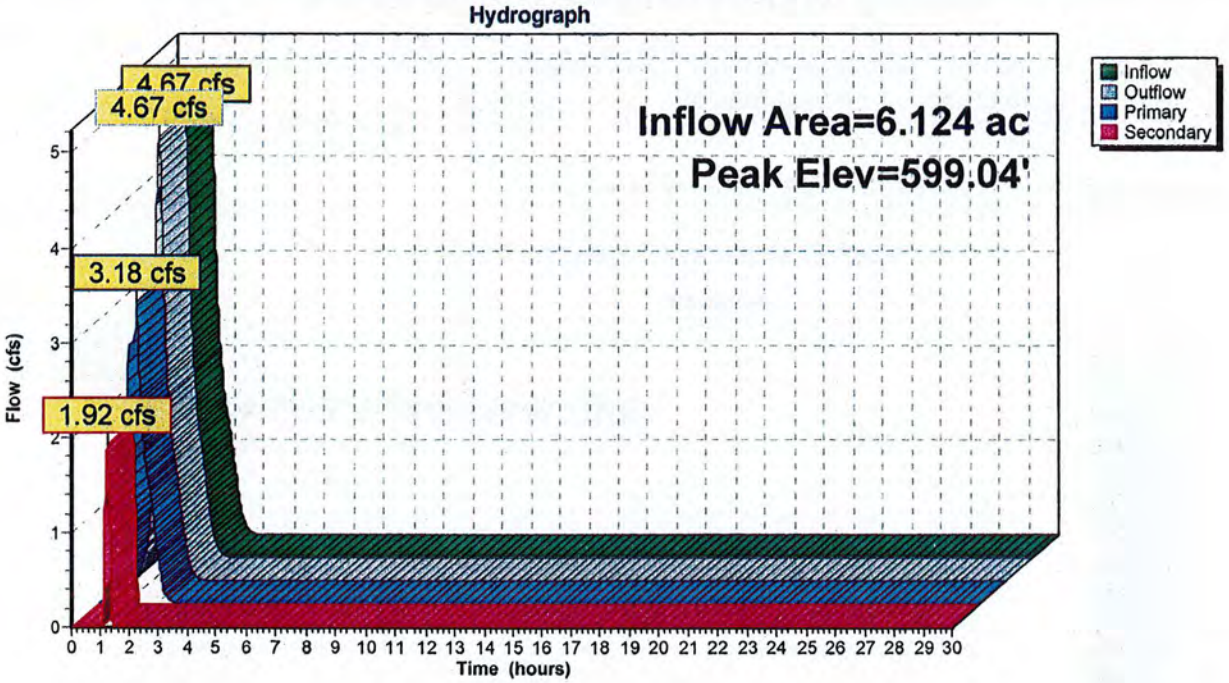
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.04' @ 1.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	594.92'	**12.0" Round Culvert** L= 220.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 594.92' / 590.25' S= 0.0212 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	599.00'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.75 cfs @ 1.37 hrs HW=598.98' TW=593.77' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.75 cfs @ 3.50 fps)

Secondary OutFlow Max=1.92 cfs @ 1.22 hrs HW=599.04' TW=590.19' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.92 cfs @ 0.49 fps)

Pond 15P: Yard Area Ponding

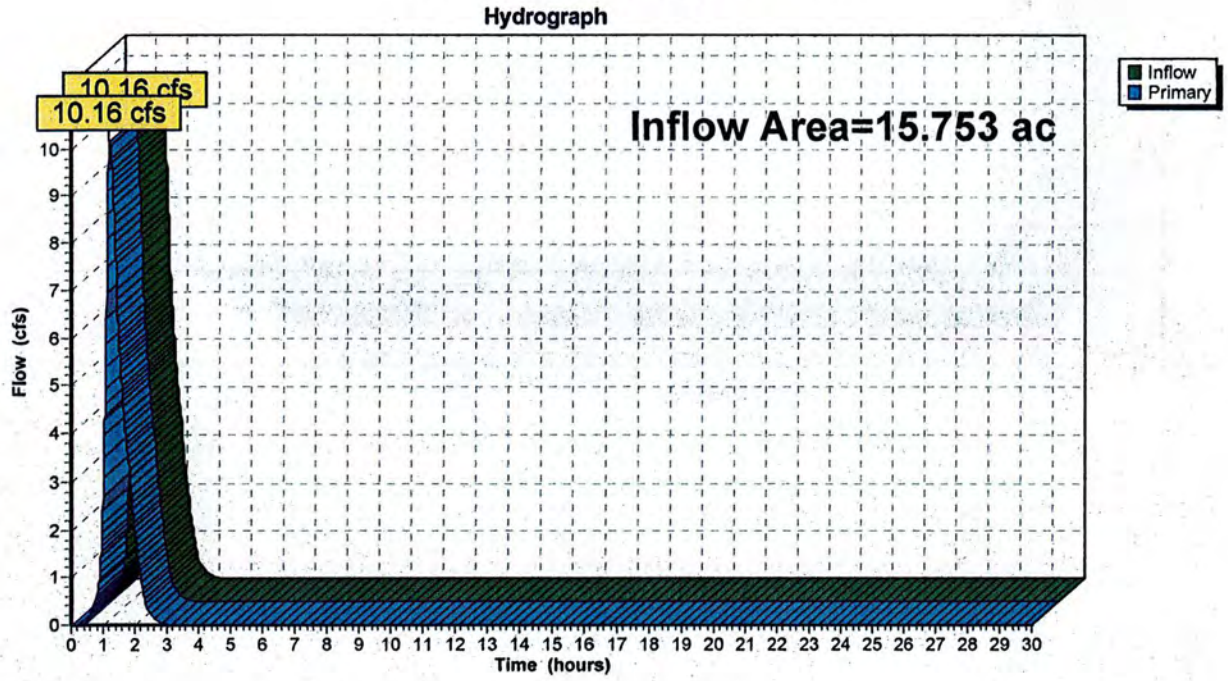


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.753 ac, 24.92% Impervious, Inflow Depth = 0.41" for NJDEP event
Inflow = 10.16 cfs @ 1.19 hrs, Volume= 0.541 af
Primary = 10.16 cfs @ 1.19 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



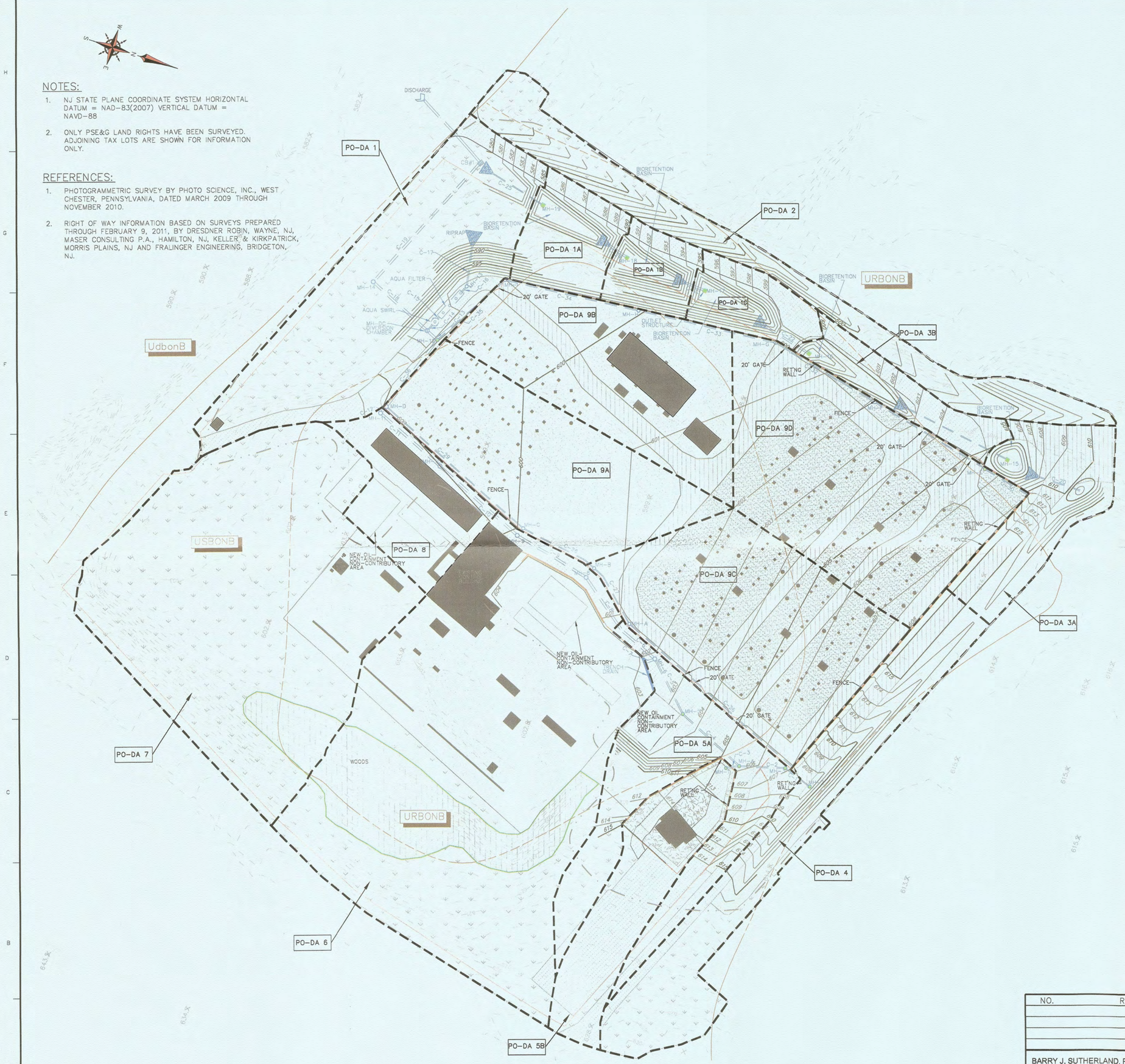
Appendix D – Post Development Drainage Area Plan

NOTES:

1. NJ STATE PLANE COORDINATE SYSTEM HORIZONTAL DATUM = NAD-83(2007) VERTICAL DATUM = NAVD-88
2. ONLY PSE&G LAND RIGHTS HAVE BEEN SURVEYED. ADJOINING TAX LOTS ARE SHOWN FOR INFORMATION ONLY.

REFERENCES:

1. PHOTOGRAMMETRIC SURVEY BY PHOTO SCIENCE, INC., WEST CHESTER, PENNSYLVANIA, DATED MARCH 2009 THROUGH NOVEMBER 2010.
2. RIGHT OF WAY INFORMATION BASED ON SURVEYS PREPARED THROUGH FEBRUARY 9, 2011, BY DRESDNER ROBIN, WAYNE, NJ, MASER CONSULTING P.A., HAMILTON, NJ, KELLER & KIRKPATRICK, MORRIS PLAINS, NJ AND FRALINGER ENGINEERING, BRIDGETON, NJ.



LEGEND

- ROSELAND-METUCHEN R/W LINE
- ADJOINING PROPERTY LINE
- EASEMENT LINE
- EXISTING CONTOUR LINE
- 600 NEW MAJOR CONTOUR LINE
- 601 NEW MINOR CONTOUR LINE
- EXISTING FENCE LINE
- NEW FENCE LINE
- LIMIT OF DISTURBANCE
- DRAINAGE AREA
- GRASS SURFACE
- MEADOW SURFACE
- BRUSH SURFACE
- GRAVEL DRIVE SURFACE
- GRAVEL SURFACE
- YARD STONE SURFACE
- PAVED SURFACE
- IMPERVIOUS SURFACE BUILDINGS & FOUNDATIONS
- EXISTING DRAINAGE INLET
- NEW MANHOLE (CLEAN-OUT)
- NEW MANHOLE (CATCH BASIN)
- SOILS
- URBONB – SOIL DESIGNATION

POST-DEVELOPMENT SURFACE COVER TYPE SUMMARY

Areas calculated within the Drainage Area Line:

IMPERVIOUS	
PAVED ROADS, BUILDINGS & FOUNDATIONS	96,128 SF
GRAVEL ROADS	59,102 SF
GRAVEL	6,800 SF
YARD STONE	214,815 SF
MEADOW	89,408 SF
GRASS	185,396 SF
BRUSH	28,369 SF
NON-CONTRIBUTORY	9,672 SF
TOTAL AREA	
w/ NON-CONTRIBUTORY	689,600 SF
w/o NON-CONTRIBUTORY	679,928 SF

40 0 40 80 160

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NOT FOR CONSTRUCTION

NO.	REVISION	DATE

BARRY J. SUTHERLAND, PE
NEW JERSEY PROFESSIONAL ENGINEER GE 29135

Date

APPLICANT: PSE&G
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NEWARK, NJ 07102-4194

TRC Engineers Inc.
57 E. WILLOW STREET
MILLBURN, NEW JERSEY 07041
PHONE NO. (973) 564-6006
FAX NO. (973) 564-6131
Certificate of Authorization #24GA28047100

WEST ORANGE SWITCHING STATION

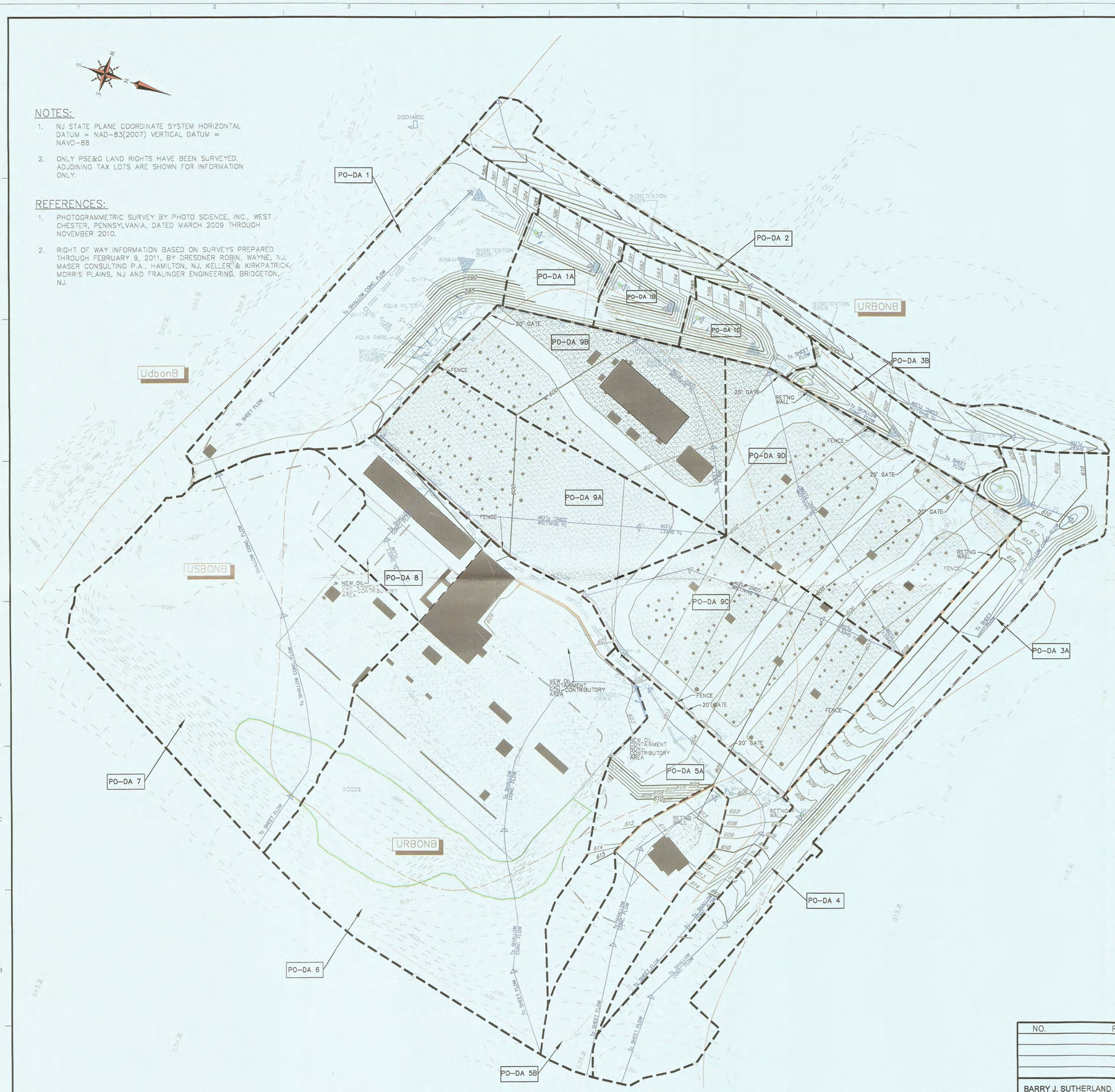
TOWNSHIP OF WEST ORANGE, ESSEX COUNTY, NEW JERSEY

TITLE:
POST-DEVELOPMENT SURFACE COVER TYPE PLAN

Project No.: 182614	Scale: AS SHOWN
Drawn By: JS	Date: 03/ 12/ 2012
Checked By: BJS	Drawing No.: APPENDIX D-1

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FILE: T:\E_CAD\182614_west orange\email_march12_2012\postdev_surface area_03 12 12.dwg



NOTES:

1. NJ STATE PLANE COORDINATE SYSTEM HORIZONTAL DATUM = NAD-83(2007) VERTICAL DATUM = NAVD-88
2. ONLY PSE&G LAND RIGHTS HAVE BEEN SURVEYED. ADJOINING TAX LOTS ARE SHOWN FOR INFORMATION ONLY.

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LEGEND

- ROSELAND-METUCHEN R/W LINE
- ADJOINING PROPERTY LINE
- EASEMENT LINE
- 595 – EXISTING CONTOUR LINE
- 600 – NEW MAJOR CONTOUR LINE
- 601 – NEW MINOR CONTOUR LINE
- EXISTING FENCE LINE
- NEW FENCE LINE
- LIMIT OF DISTURBANCE
- DRAINAGE AREA
- GRASS SURFACE
- MEADOW SURFACE
- BRUSH SURFACE
- GRAVEL DRIVE SURFACE
- GRAVEL SURFACE
- YARD STONE SURFACE
- PAVED SURFACE
- IMPERVIOUS SURFACE BUILDINGS & FOUNDATIONS
- EXISTING DRAINAGE INLET
- NEW MANHOLE (CLEAN-OUT)
- NEW MANHOLE (CATCH BASIN)
- SOILS
- URBONB – SOIL DESIGNATION

DRAINAGE AREA PO-DA1
Composite CN = 83, Tc Path = 18.2 min

Impervious	11168
Grass	38971
Meadow	8088
	58227

DRAINAGE AREA PO-DA1A
Composite CN = 81, Tc Path = 4.7 min

Impervious	2107
Meadow	10364
	12471

DRAINAGE AREA PO-DA1B
Composite CN = 82, Tc Path = 2.7 min

Impervious	1769
Meadow	6795
	8564

DRAINAGE AREA PO-DA1C
Composite CN = 87, Tc Path = 1.0 min

Impervious	4402
Meadow	5534
	9936

DRAINAGE AREA PO-DA2
Composite CN = 79, Tc Path = 17.6 min

Grass	9261
Meadow	19890
	29151

DRAINAGE AREA PO-DA3A
Composite CN = 86, Tc Path = 14.5 min

Gravel Road	10141
Meadow	10571
	20712

DRAINAGE AREA PO-DA3B
Composite CN = 91, Tc Path = 2.1 min

Impervious	5785
Gravel Road	1111
Meadow	3792
	10688

DRAINAGE AREA PO-DA4
Composite CN = 84, Tc Path = 10.8 min

Impervious	4334
Gravel Road	5398
Grass	14366
Meadow	15808
	39906

DRAINAGE AREA PO-DA5A
Composite CN = 88, Tc Path = 2.5 min

Impervious	15734
Grass	8318
Meadow	7713
Noncontributory	2384
	34129

DRAINAGE AREA PO-DA5B
Composite CN = 94, Tc Path = 1.9 min

Impervious	16508
Gravel	6800
Grass	2441
	25750

DRAINAGE AREA PO-DA6
Composite CN = 82, Tc Path = 14.3 min

Impervious	13009
Yard stone	47083
Grass	39774
Meadow	853
Brush	22983
Noncontributory	4135
	127817

DRAINAGE AREA PO-DA7
Composite CN = 81, Tc Path = 7.7 min

Impervious	1888
Yard stone	14410
Grass	72285
Brush	5408
	93949

DRAINAGE AREA PO-DA8
Composite CN = 94, Tc Path = 31.7 min

Impervious	10980
Yard stone	5249
Noncontributory	3173
	19398

DRAINAGE AREA PO-DA9A
Composite CN = 86, Tc Path = 28.5 min

Impervious	650
Gravel Road	1367
Yard stone	46220
	48237

DRAINAGE AREA PO-DA9B
Composite CN = 89, Tc Path = 21.5 min

Impervious	5504
Gravel Road	8361
Yard stone	30963
	42828

DRAINAGE AREA PO-DA9C
Composite CN = 90, Tc Path = 15.0 min

Impervious	1117
Gravel Road	18457
Yard stone	33086
	52660

DRAINAGE AREA PO-DA9D
Composite CN = 89, Tc Path = 14.5 min

Impervious	1192
Gravel Road	16177
Yard stone	37810
	55179

POST-DEVELOPMENT DRAINAGE AREA SUMMARY

Areas calculated within the Drainage Area Line:

IMPERVIOUS	
PAVED ROADS, BUILDINGS & FOUNDATIONS	96,128 SF
GRAVEL ROADS	59,102 SF
GRAVEL	6,800 SF
YARD STONE	214,815 SF
MEADOW	89,408 SF
GRASS	185,396 SF
BRUSH	28,369 SF
NON-CONTRIBUTORY	9,672 SF
TOTAL AREA	
w/ NON-CONTRIBUTORY	689,600 SF
w/o NON-CONTRIBUTORY	679,928 SF

ANALYSIS POINT "A" TABLE

STORM EVENT	VOLUME (AF)	PEAK FLOW (CFS)
2 YR	2.379	21.97
10 YR	4.371	39.70
100 YR	8.685	75.50
NJDEP	0.460	9.30

40 0 40 80 160

APPLICANT: PSE&G
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WEST ORANGE SWITCHING STATION

TOWNSHIP OF WEST ORANGE, ESSEX COUNTY, NEW JERSEY

NO.	REVISION	DATE

BARRY J. SUTHERLAND, PE
NEW JERSEY PROFESSIONAL ENGINEER GE 29135

Date

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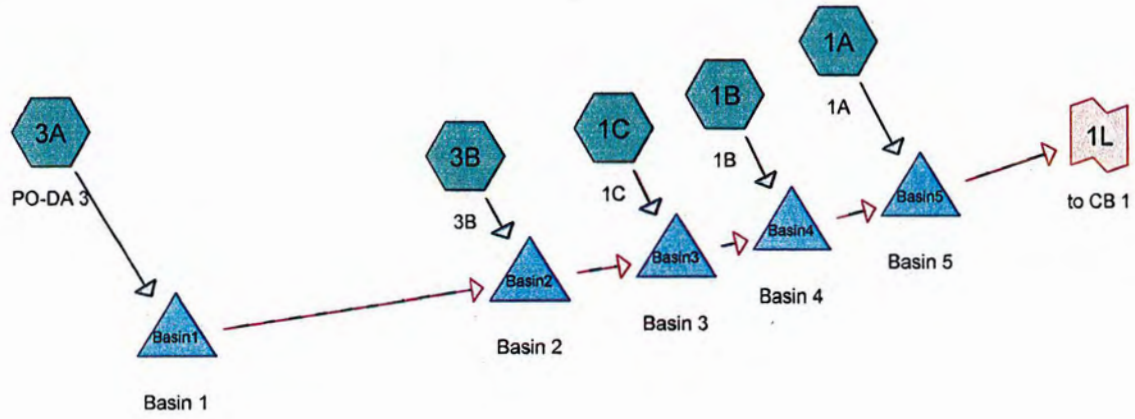
TITLE:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Project No.: 182614	Scale: AS SHOWN
Drawn By: JS	Date: 03/ 12/ 2012
Checked By: BJS	Drawing No.: APPENDIX D-2

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THIS DRAWING REFERENCES BUT IS NOT LINKED TO: T:\E_CAD\182614_west orange\EMAIL 3-14-12\West Orange areas_01 17 12-2.xls
FILE: T:\E_CAD\182614_west orange\EMAIL 3-14-12\postdev_drainage_03 12 12.dwg

Appendix E – Post Development HydroCad Results



Subcat Reach Pond Link

Drainage Diagram for Post Development West Orange A_03 01 12
Prepared by TRC Engineers, Inc., Printed 3/14/2012
HydroCAD® 9.10 s/n 06401 © 2009 HydroCAD Software Solutions LLC

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	3A	0.00	0.00	50.0	0.0200	0.020	15.0	0.0	0.0
2	Basin1	601.00	600.00	140.0	0.0071	0.020	15.0	0.0	0.0
3	Basin2	594.00	592.00	78.0	0.0256	0.020	12.0	0.0	0.0
4	Basin3	590.50	589.50	47.0	0.0213	0.020	15.0	0.0	0.0
5	Basin4	585.00	584.00	37.0	0.0270	0.020	15.0	0.0	0.0
6	Basin5	580.50	580.00	65.0	0.0077	0.020	15.0	0.0	0.0

Summary for Subcatchment 1A: 1A

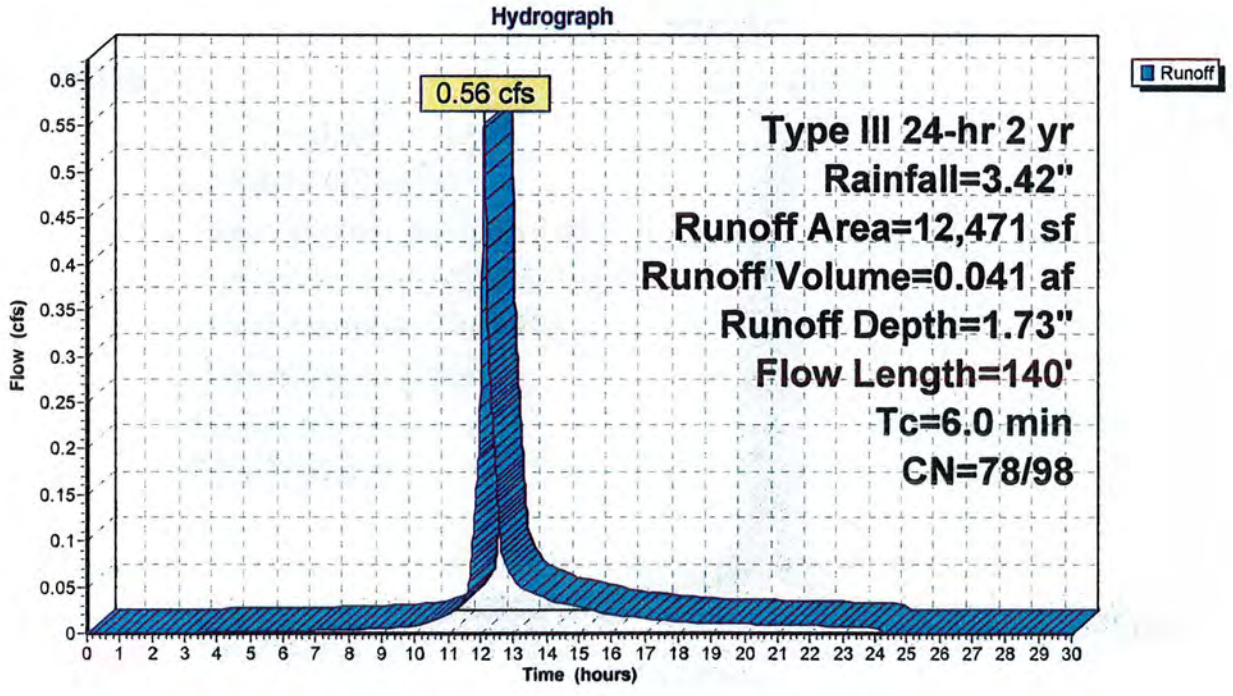
Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	2,107	98	Impervious, HSG D
	10,364	78	Meadow, non-grazed, HSG D
	12,471	81	Weighted Average
	10,364	78	83.10% Pervious Area
	2,107	98	16.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	70	0.1860	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.4	70	0.0429	3.11		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.7	140	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1A: 1A



Summary for Subcatchment 1B: 1B

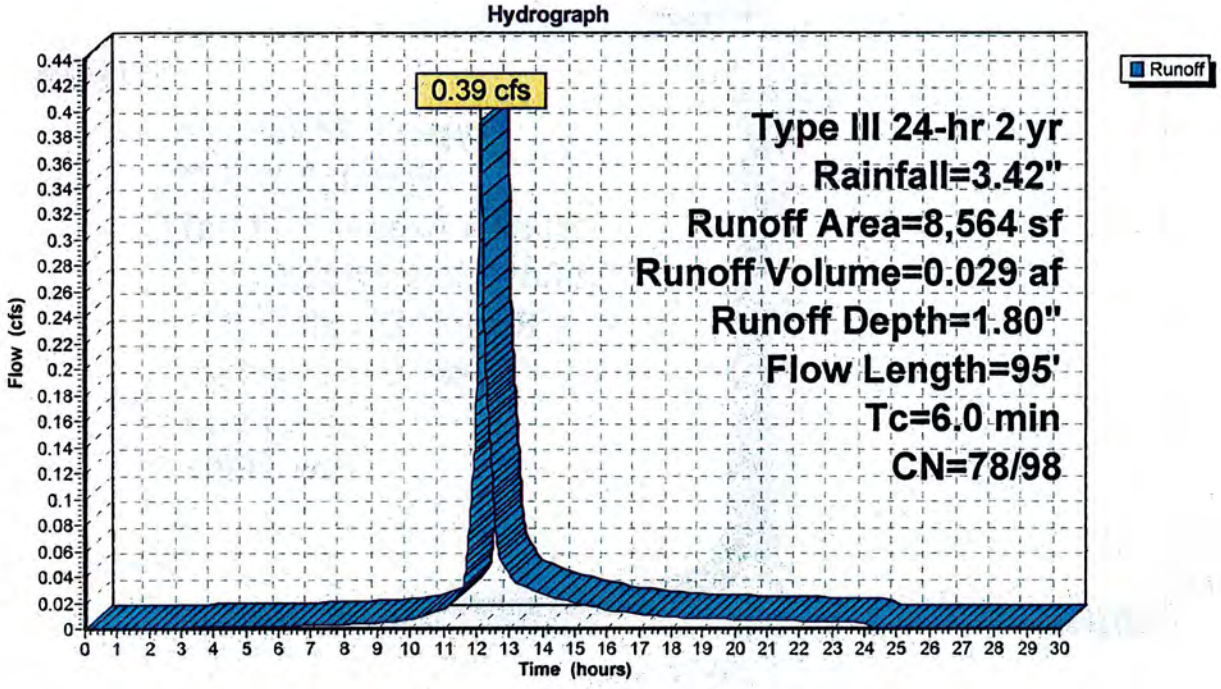
Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	1,769	98	Impervious, HSG D
	6,795	78	Meadow, non-grazed, HSG D
	8,564	82	Weighted Average
	6,795	78	79.34% Pervious Area
	1,769	98	20.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	40	0.2500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	55	0.0360	2.85		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.7	95	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1B: 1B



Summary for Subcatchment 1C: 1C

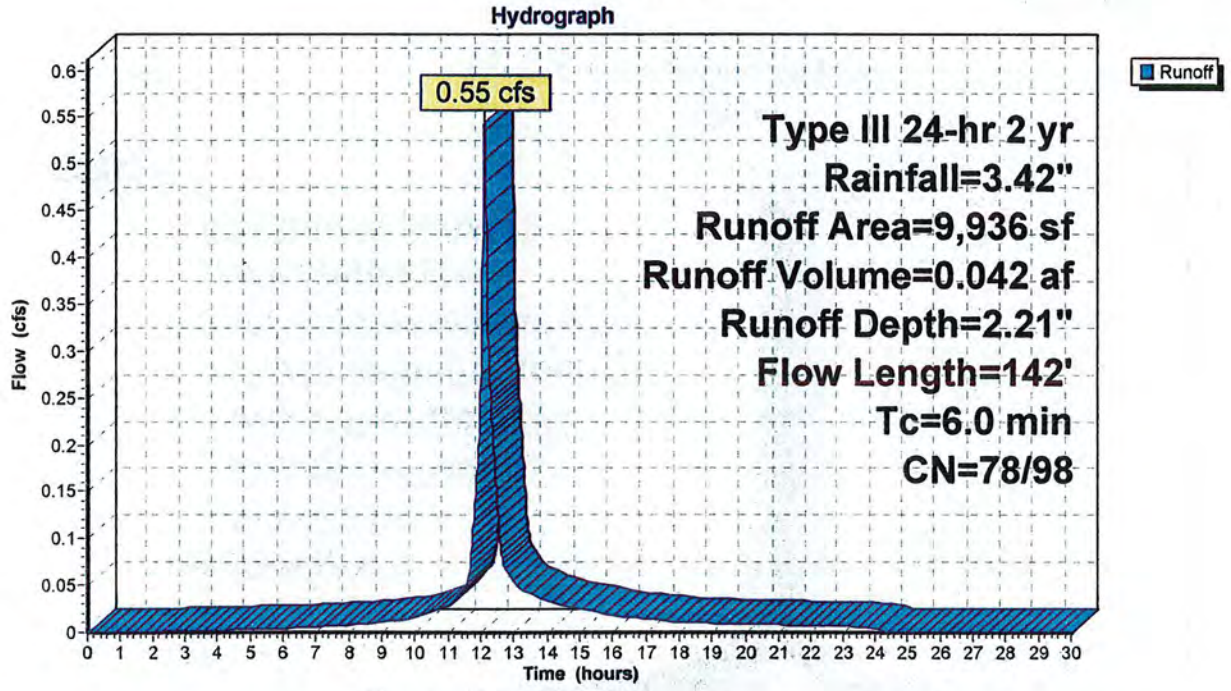
Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	4,402	98	Impervious, HSG D
	5,534	78	Meadow, non-grazed, HSG D
	9,936	87	Weighted Average
	5,534	78	55.70% Pervious Area
	4,402	98	44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.46		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	92	0.0666	3.87		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	142	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1C: 1C



Summary for Subcatchment 3A: PO-DA 3

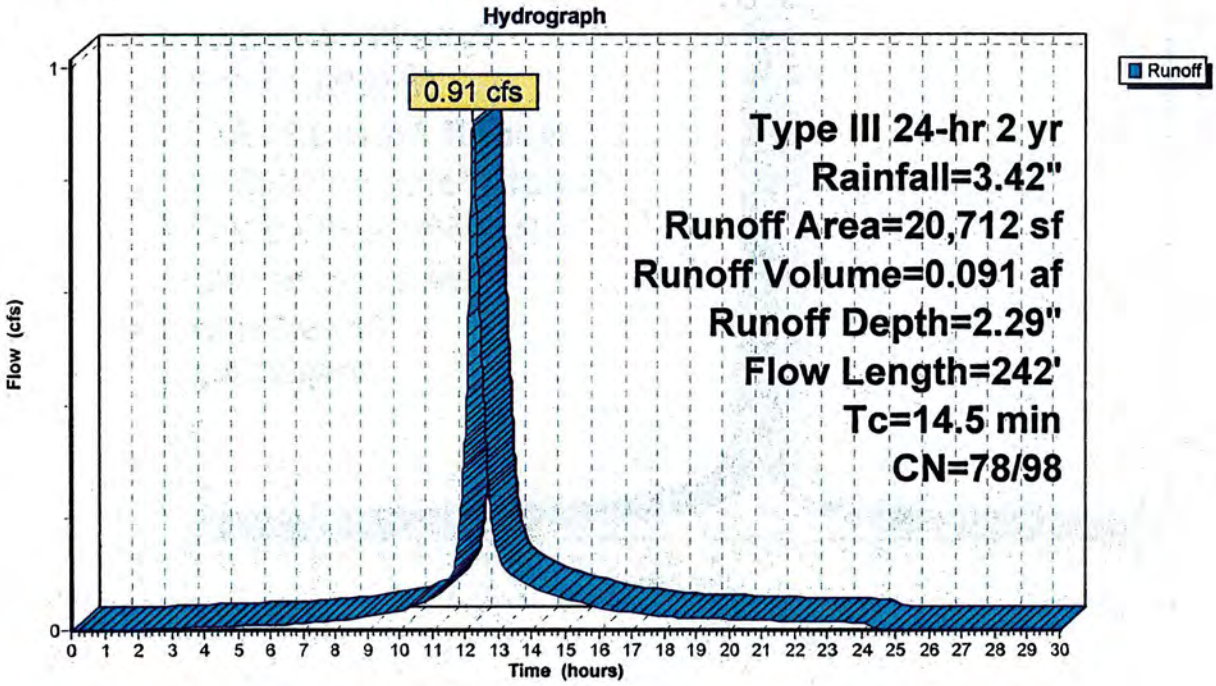
Runoff = 0.91 cfs @ 12.20 hrs, Volume= 0.091 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	10,141	98	Gravel road, HSG D
	10,571	78	Meadow, non-grazed, HSG D
	20,712	88	Weighted Average
	10,571	78	51.04% Pervious Area
	10,141	98	48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	92	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	50	0.0200	4.84	5.94	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.020 Corrugated PE, corrugated interior
14.5	242	Total			

Subcatchment 3A: PO-DA 3



Summary for Subcatchment 3B: 3B

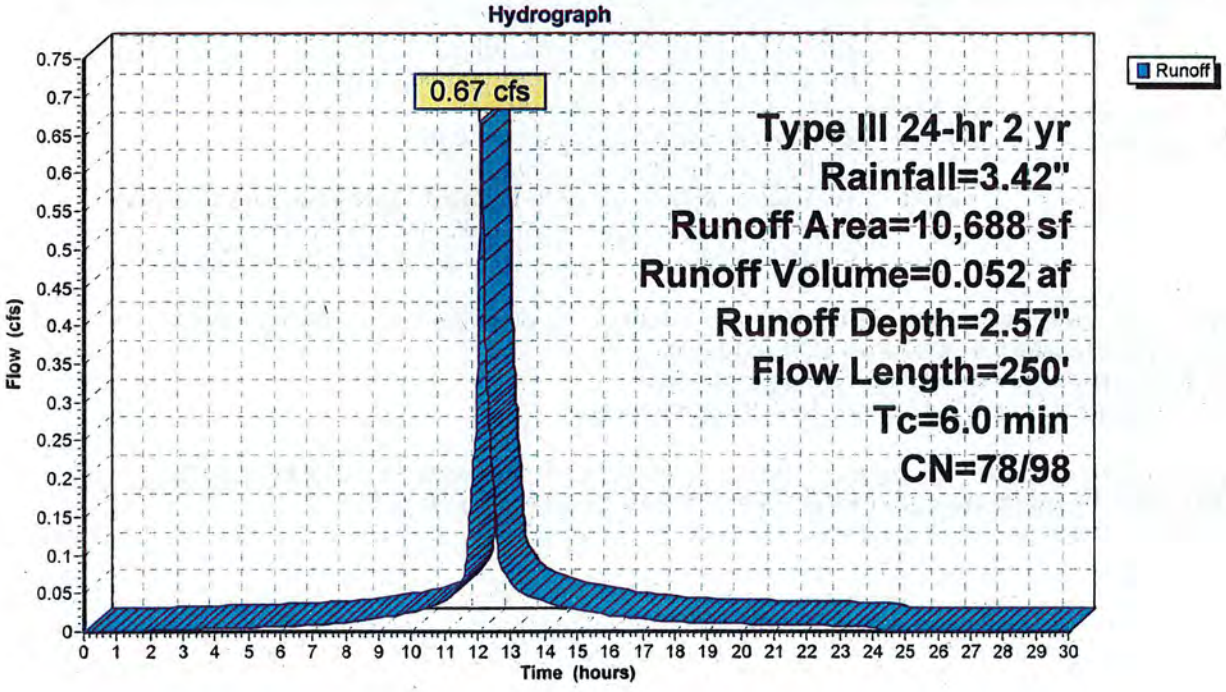
Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	5,785	98	Impervious, HSG D
*	1,111	98	Gravel Road, HSG D
	3,792	78	Meadow, non-grazed, HSG D
	10,688	91	Weighted Average
	3,792	78	35.48% Pervious Area
	6,896	98	64.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.8	150	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.1	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3B: 3B



Summary for Pond Basin1: Basin 1

Inflow Area = 0.475 ac, 48.96% Impervious, Inflow Depth = 2.29" for 2 yr event
Inflow = 0.91 cfs @ 12.20 hrs, Volume= 0.091 af
Outflow = 0.52 cfs @ 12.43 hrs, Volume= 0.056 af, Atten= 42%, Lag= 13.8 min
Primary = 0.12 cfs @ 12.43 hrs, Volume= 0.045 af
Secondary = 0.41 cfs @ 12.43 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.81' @ 12.43 hrs Surf.Area= 1,280 sf Storage= 1,900 cf

Plug-Flow detention time= 221.8 min calculated for 0.056 af (62% of inflow)
Center-of-Mass det. time= 111.9 min (903.7 - 791.9)

Volume	Invert	Avail.Storage	Storage Description
#1	602.50'	2,496 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

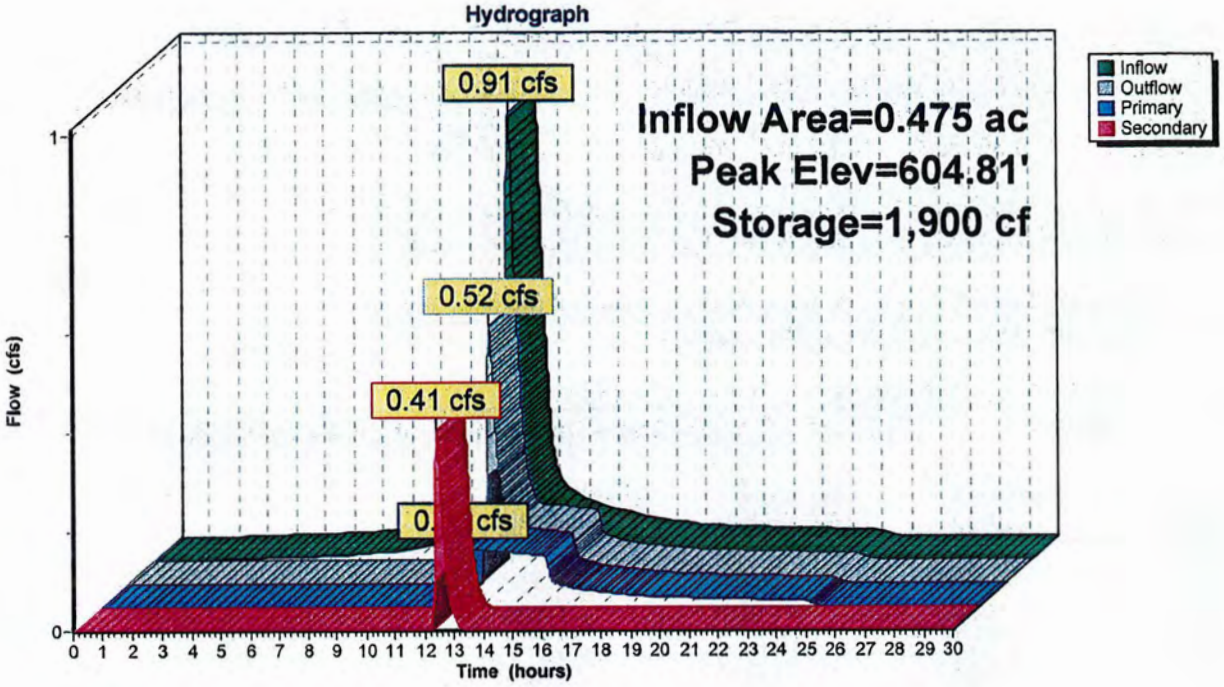
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
602.50	120	0	0
603.25	755	328	328
604.25	1,067	911	1,239
605.25	1,446	1,257	2,496

Device	Routing	Invert	Outlet Devices
#1	Primary	601.00'	**15.0" Round Culvert** L= 140.0' Ke= 0.500 Inlet / Outlet Invert= 601.00' / 600.00' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	603.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	604.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	604.75'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.12 cfs @ 12.43 hrs HW=604.81' TW=598.48' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.12 cfs of 6.12 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 0.12 cfs @ 5.34 fps)
↑—**3=Grate** (Passes 0.12 cfs of 4.58 cfs potential flow)

Secondary OutFlow Max=0.41 cfs @ 12.43 hrs HW=604.81' TW=598.48' (Dynamic Tailwater)
↑—**4=Broad-Crested Rectangular Weir** (Weir Controls 0.41 cfs @ 0.65 fps)

Pond Basin1: Basin 1



Summary for Pond Basin2: Basin 2

Inflow Area = 0.721 ac, 54.26% Impervious, Inflow Depth = 1.81" for 2 yr event
Inflow = 0.72 cfs @ 12.41 hrs, Volume= 0.109 af
Outflow = 0.58 cfs @ 12.52 hrs, Volume= 0.087 af, Atten= 20%, Lag= 6.5 min
Primary = 0.23 cfs @ 12.52 hrs, Volume= 0.080 af
Secondary = 0.35 cfs @ 12.52 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.56' @ 12.52 hrs Surf.Area= 1,018 sf Storage= 1,426 cf

Plug-Flow detention time= 147.5 min calculated for 0.087 af (80% of inflow)
Center-of-Mass det. time= 67.9 min (908.5 - 840.5)

Volume	Invert	Avail.Storage	Storage Description
#1	596.25'	4,191 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

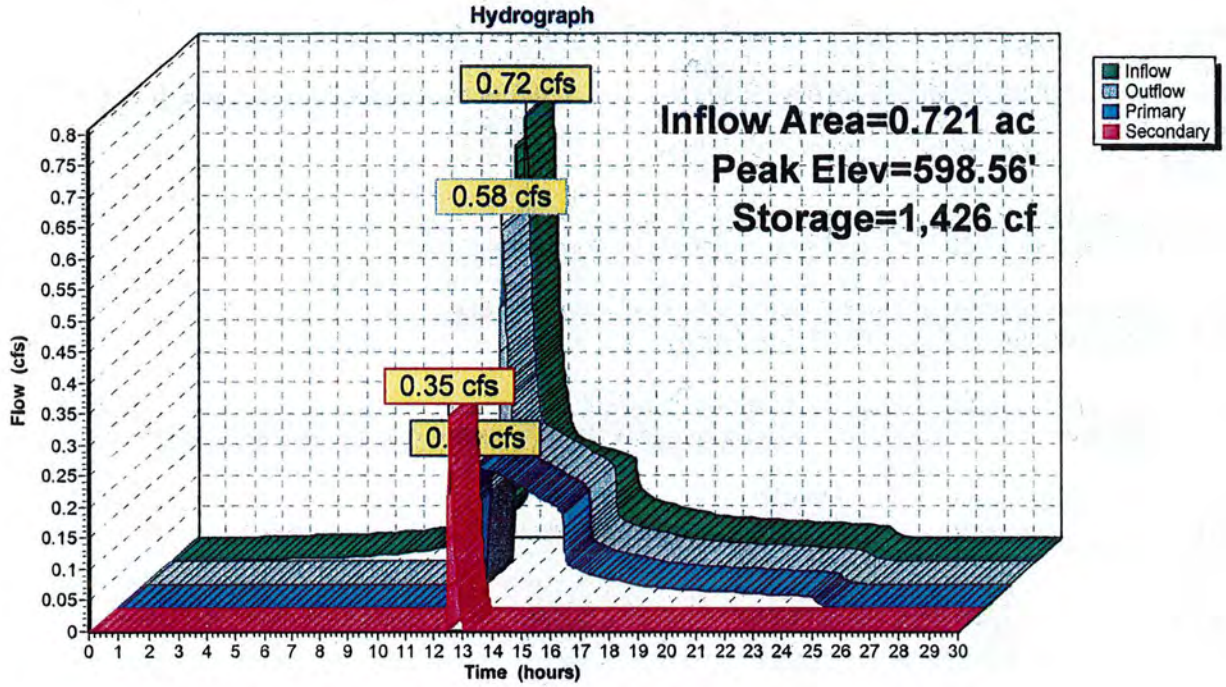
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.25	319	0	0
597.25	536	428	428
598.25	878	707	1,135
599.25	1,335	1,107	2,241
600.25	2,565	1,950	4,191

Device	Routing	Invert	Outlet Devices
#1	Primary	594.00'	**12.0" Round Culvert** L= 78.0' Ke= 0.500 Inlet / Outlet Invert= 594.00' / 592.00' S= 0.0256 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	597.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	598.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	598.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.23 cfs @ 12.52 hrs HW=598.56' TW=593.19' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.23 cfs of 5.41 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 0.23 cfs @ 4.65 fps)
↑—**3=Grate** (Passes 0.23 cfs of 10.87 cfs potential flow)

Secondary OutFlow Max=0.35 cfs @ 12.52 hrs HW=598.56' TW=593.19' (Dynamic Tailwater)
↑—**4=Broad-Crested Rectangular Weir** (Weir Controls 0.35 cfs @ 0.61 fps)

Pond Basin2: Basin 2



Summary for Pond Basin3: Basin 3

Inflow Area = 0.949 ac, 51.87% Impervious, Inflow Depth = 1.64" for 2 yr event
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 0.129 af
Outflow = 0.09 cfs @ 15.69 hrs, Volume= 0.034 af, Atten= 87%, Lag= 215.8 min
Primary = 0.09 cfs @ 15.69 hrs, Volume= 0.034 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.52' @ 15.69 hrs Surf.Area= 2,543 sf Storage= 4,231 cf

Plug-Flow detention time= 452.8 min calculated for 0.033 af (26% of inflow)
Center-of-Mass det. time= 275.2 min (1,144.4 - 869.2)

Volume	Invert	Avail.Storage	Storage Description
#1	592.00'	5,523 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

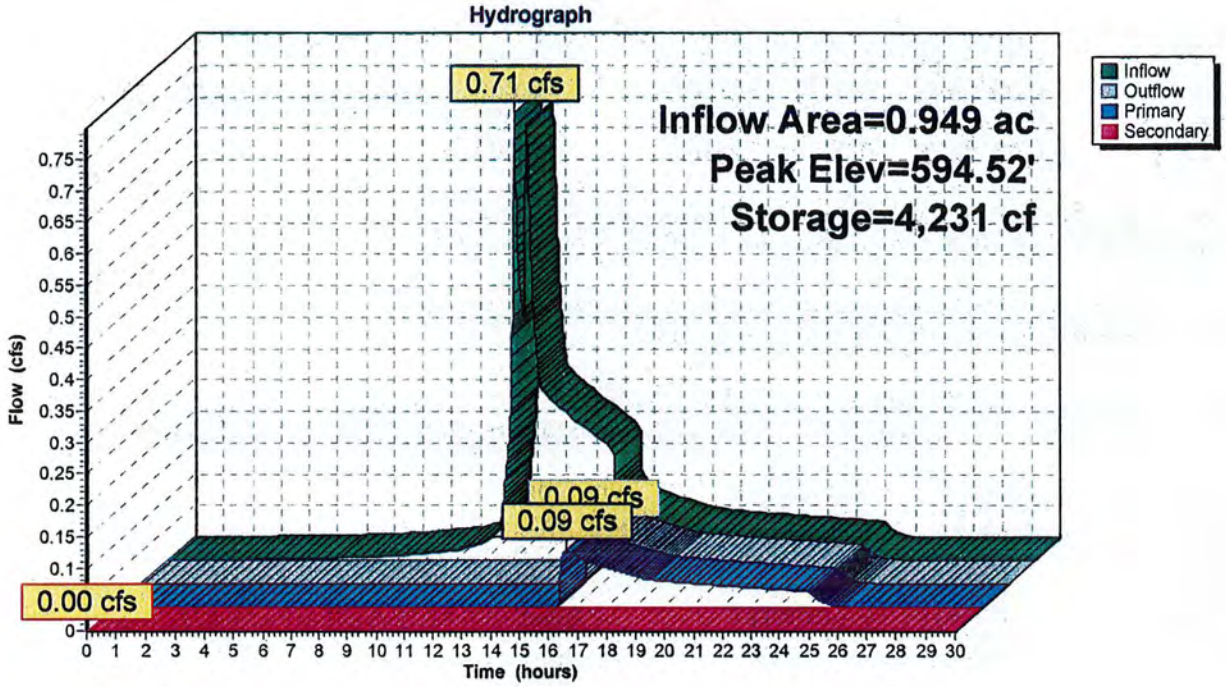
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.00	1,026	0	0
593.00	1,392	1,209	1,209
594.00	2,181	1,787	2,996
595.00	2,873	2,527	5,523

Device	Routing	Invert	Outlet Devices
#1	Primary	590.50'	**15.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 590.50' / 589.50' S= 0.0213 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	593.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	594.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	594.75'	**14.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.09 cfs @ 15.69 hrs HW=594.52' TW=587.90' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.09 cfs of 9.45 cfs potential flow)
↑—**2=Orifice** (Passes 0.09 cfs of 0.10 cfs potential flow)
↑—**3=Grate** (Weir Controls 0.09 cfs @ 0.50 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.00' TW=587.00' (Dynamic Tailwater)
↑—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin3: Basin 3



Summary for Pond Basin4: Basin 4

Inflow Area = 1.146 ac, 46.51% Impervious, Inflow Depth = 0.66" for 2 yr event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.063 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 588.87' @ 30.00 hrs Surf.Area= 1,946 sf Storage= 2,743 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	587.00'	5,305 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

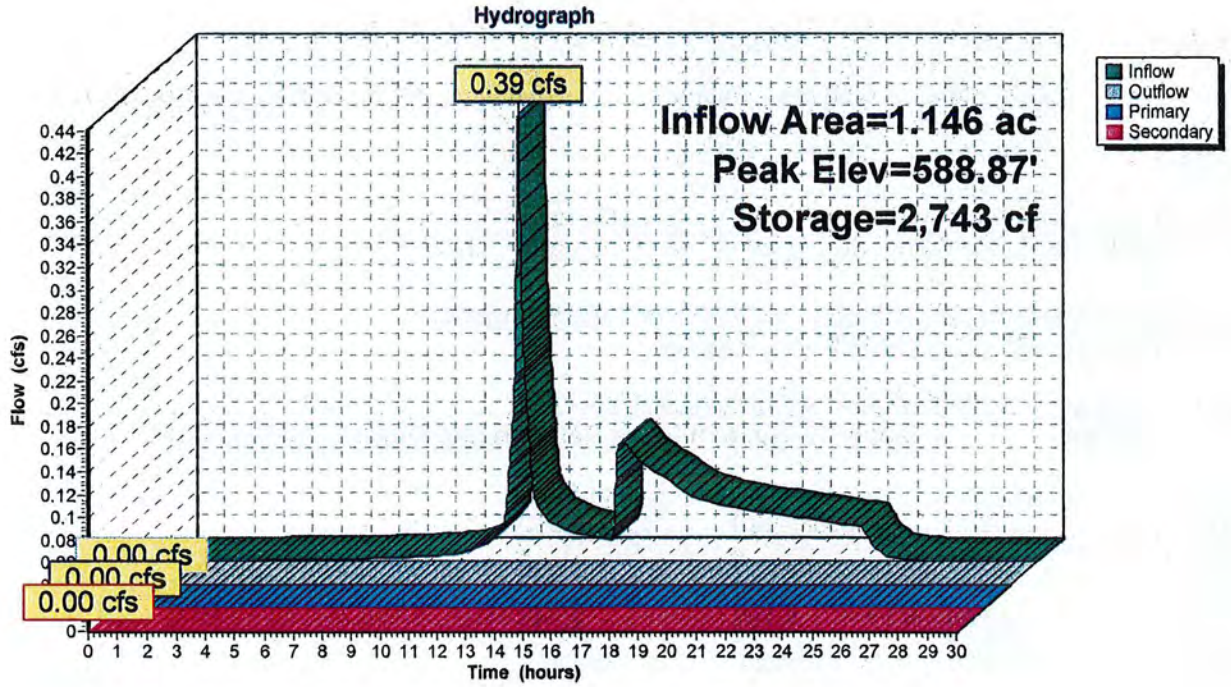
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
587.00	1,002	0	0
588.00	1,498	1,250	1,250
589.00	2,015	1,757	3,007
590.00	2,582	2,299	5,305

Device	Routing	Invert	Outlet Devices
#1	Primary	585.00'	**15.0" Round Culvert** L= 37.0' Ke= 0.500 Inlet / Outlet Invert= 585.00' / 584.00' S= 0.0270 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	588.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	589.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	589.75'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=587.00' TW=582.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.00 cfs of 6.92 cfs potential flow)
↑—**2=Orifice** (Controls 0.00 cfs)
↑—**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=587.00' TW=582.00' (Dynamic Tailwater)
↑—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin4: Basin 4



Summary for Pond Basin5: Basin 5

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 0.35" for 2 yr event
Inflow = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 583.51' @ 24.34 hrs Surf.Area= 1,788 sf Storage= 1,800 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	582.00'	5,308 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

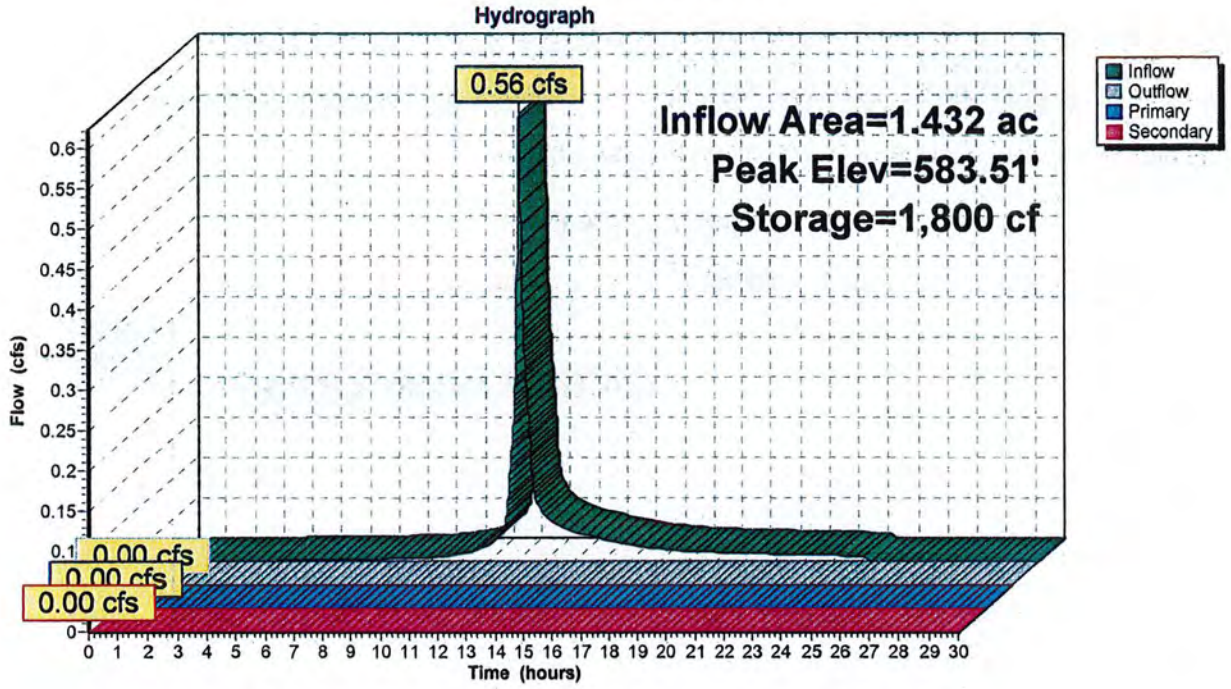
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
582.00	431	0	0
583.00	1,497	964	964
584.00	2,068	1,783	2,747
585.00	3,055	2,562	5,308

Device	Routing	Invert	Outlet Devices
#1	Primary	580.50'	**15.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 580.50' / 580.00' S= 0.0077 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	584.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	585.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 12.0' Crest Height

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=582.00' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 4.19 cfs potential flow)
↑**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=582.00' TW=0.00' (Dynamic Tailwater)
↑**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin5: Basin 5

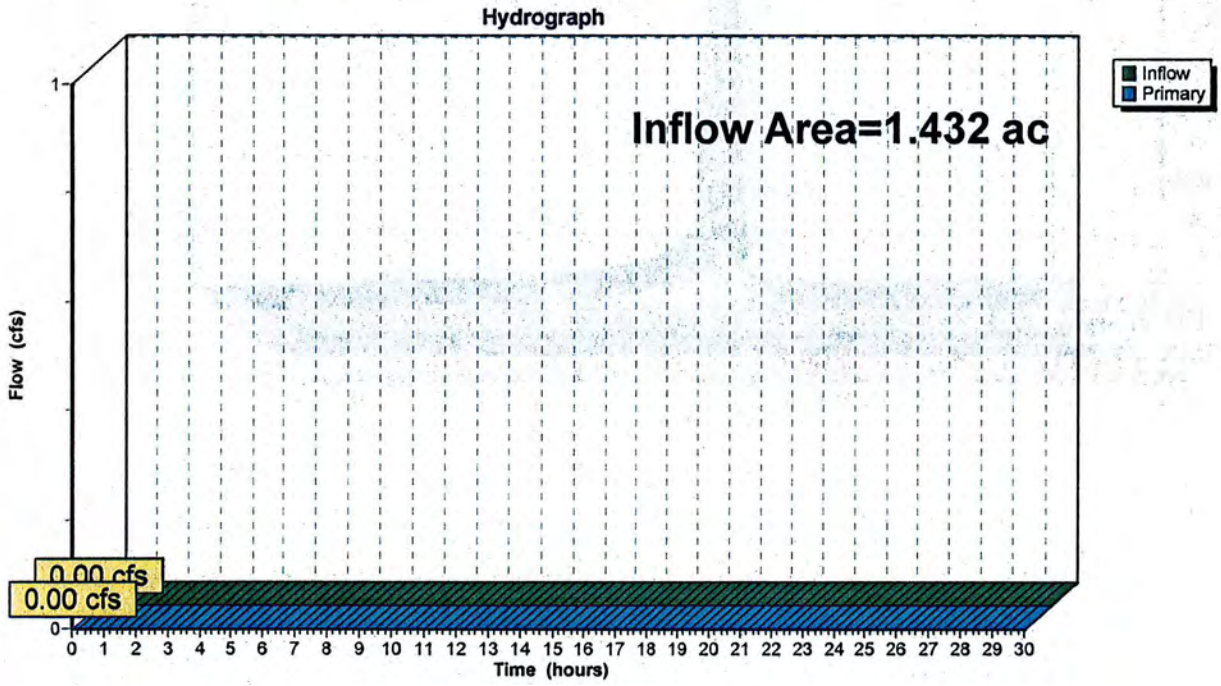


Summary for Link 1L: to CB 1

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 1L: to CB 1



Summary for Subcatchment 1A: 1A

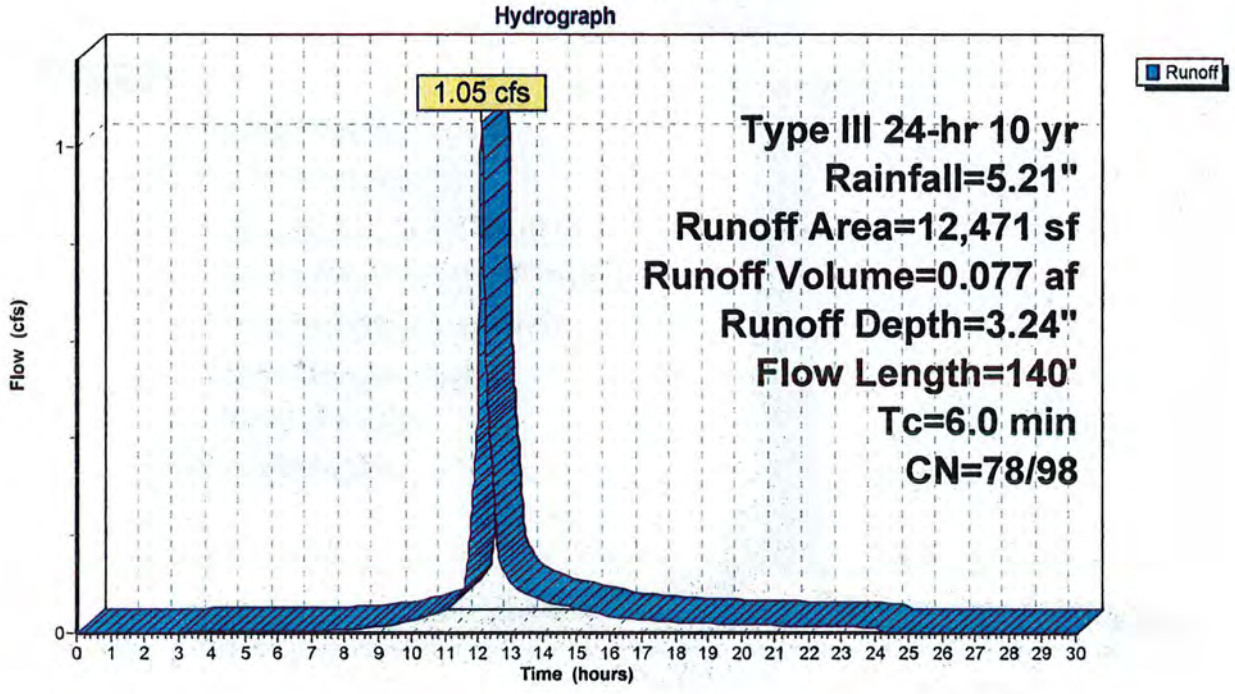
Runoff = 1.05 cfs @ 12.09 hrs, Volume= 0.077 af, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	2,107	98	Impervious, HSG D
	10,364	78	Meadow, non-grazed, HSG D
	12,471	81	Weighted Average
	10,364	78	83.10% Pervious Area
	2,107	98	16.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	70	0.1860	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.4	70	0.0429	3.11		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.7	140	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1A: 1A



Summary for Subcatchment 1B: 1B

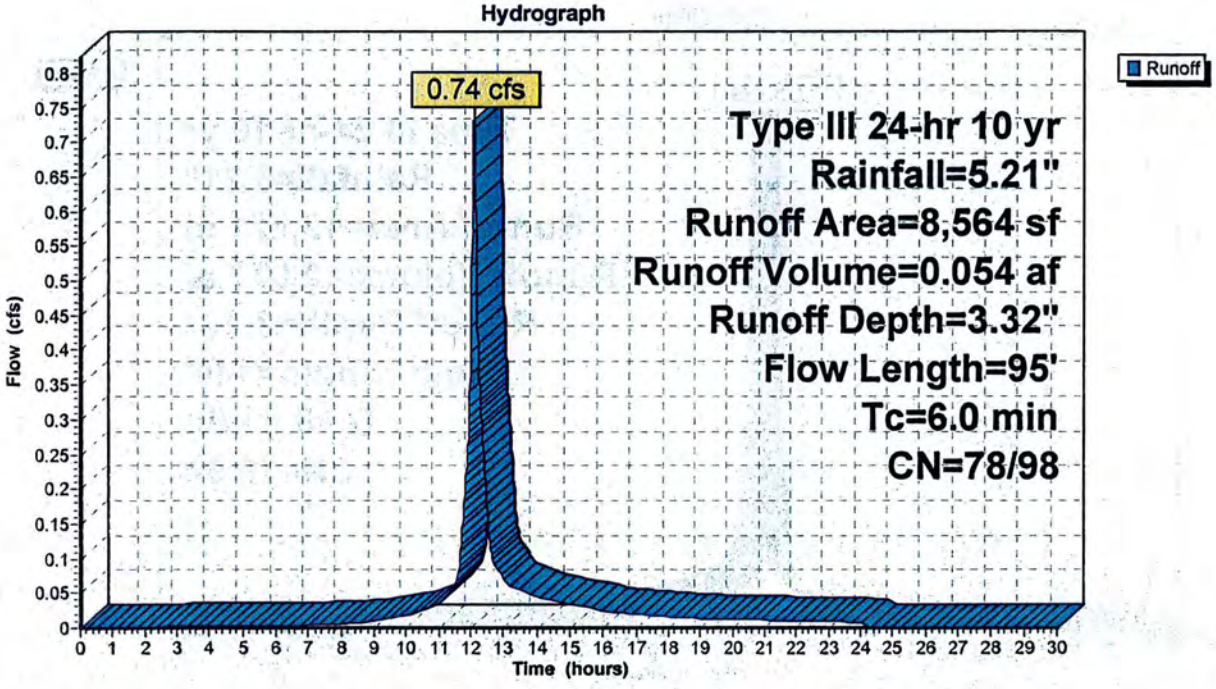
Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.054 af, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	1,769	98	Impervious, HSG D
	6,795	78	Meadow, non-grazed, HSG D
	8,564	82	Weighted Average
	6,795	78	79.34% Pervious Area
	1,769	98	20.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	40	0.2500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	55	0.0360	2.85		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.7	95	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1B: 1B



Summary for Subcatchment 1C: 1C

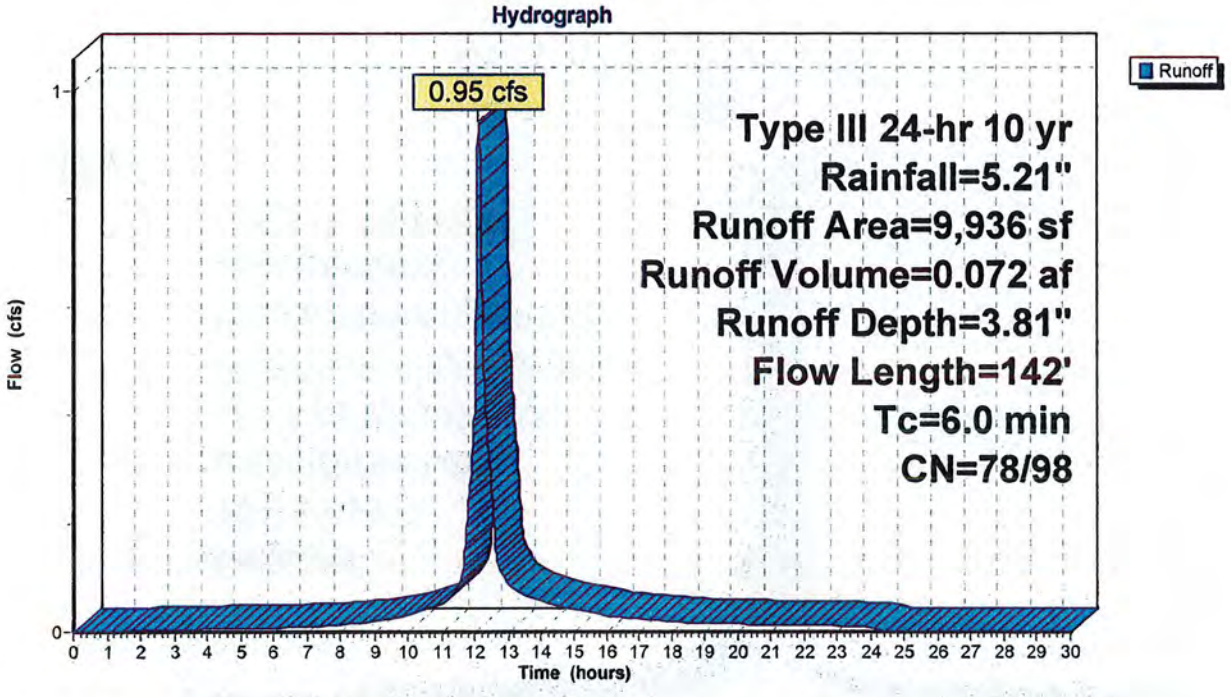
Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.072 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	4,402	98	Impervious, HSG D
	5,534	78	Meadow, non-grazed, HSG D
	9,936	87	Weighted Average
	5,534	78	55.70% Pervious Area
	4,402	98	44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.46		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	92	0.0666	3.87		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	142	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1C: 1C



Summary for Subcatchment 3A: PO-DA 3

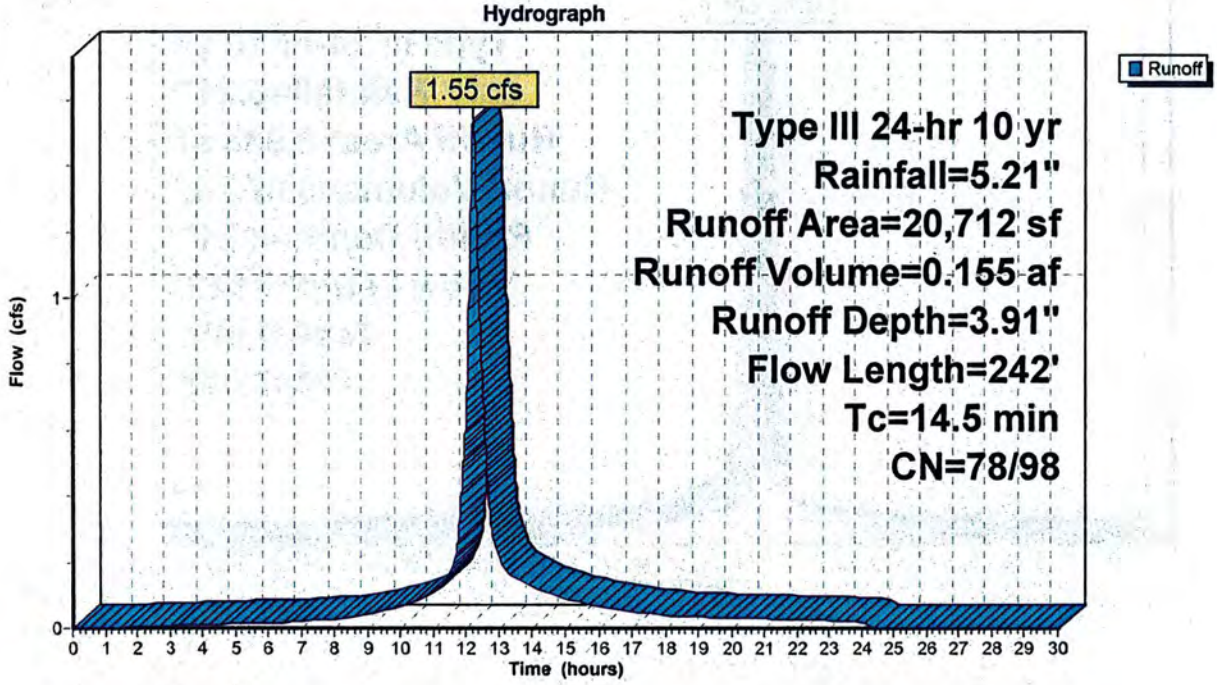
Runoff = 1.55 cfs @ 12.19 hrs, Volume= 0.155 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	10,141	98	Gravel road, HSG D
	10,571	78	Meadow, non-grazed, HSG D
	20,712	88	Weighted Average
	10,571	78	51.04% Pervious Area
	10,141	98	48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	92	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	50	0.0200	4.84	5.94	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.020 Corrugated PE, corrugated interior
14.5	242	Total			

Subcatchment 3A: PO-DA 3



Summary for Subcatchment 3B: 3B

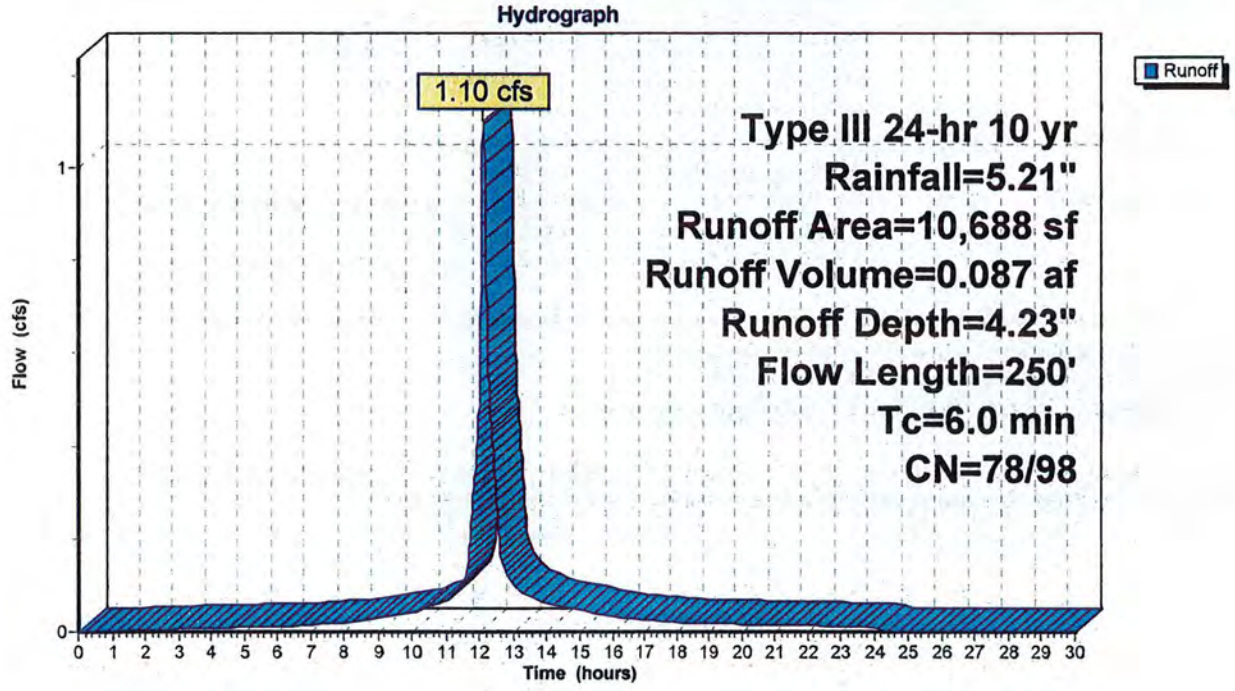
Runoff = 1.10 cfs @ 12.08 hrs, Volume= 0.087 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	5,785	98	Impervious, HSG D
*	1,111	98	Gravel Road, HSG D
	3,792	78	Meadow, non-grazed, HSG D
	10,688	91	Weighted Average
	3,792	78	35.48% Pervious Area
	6,896	98	64.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.8	150	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.1	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3B: 3B



Summary for Pond Basin1: Basin 1

Inflow Area = 0.475 ac, 48.96% Impervious, Inflow Depth = 3.91" for 10 yr event
Inflow = 1.55 cfs @ 12.19 hrs, Volume= 0.155 af
Outflow = 1.52 cfs @ 12.22 hrs, Volume= 0.120 af, Atten= 2%, Lag= 1.5 min
Primary = 0.12 cfs @ 12.22 hrs, Volume= 0.065 af
Secondary = 1.40 cfs @ 12.22 hrs, Volume= 0.055 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.89' @ 12.22 hrs Surf.Area= 1,311 sf Storage= 2,005 cf

Plug-Flow detention time= 161.0 min calculated for 0.120 af (77% of inflow)
Center-of-Mass det. time= 77.5 min (862.1 - 784.6)

Volume	Invert	Avail.Storage	Storage Description
#1	602.50'	2,496 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

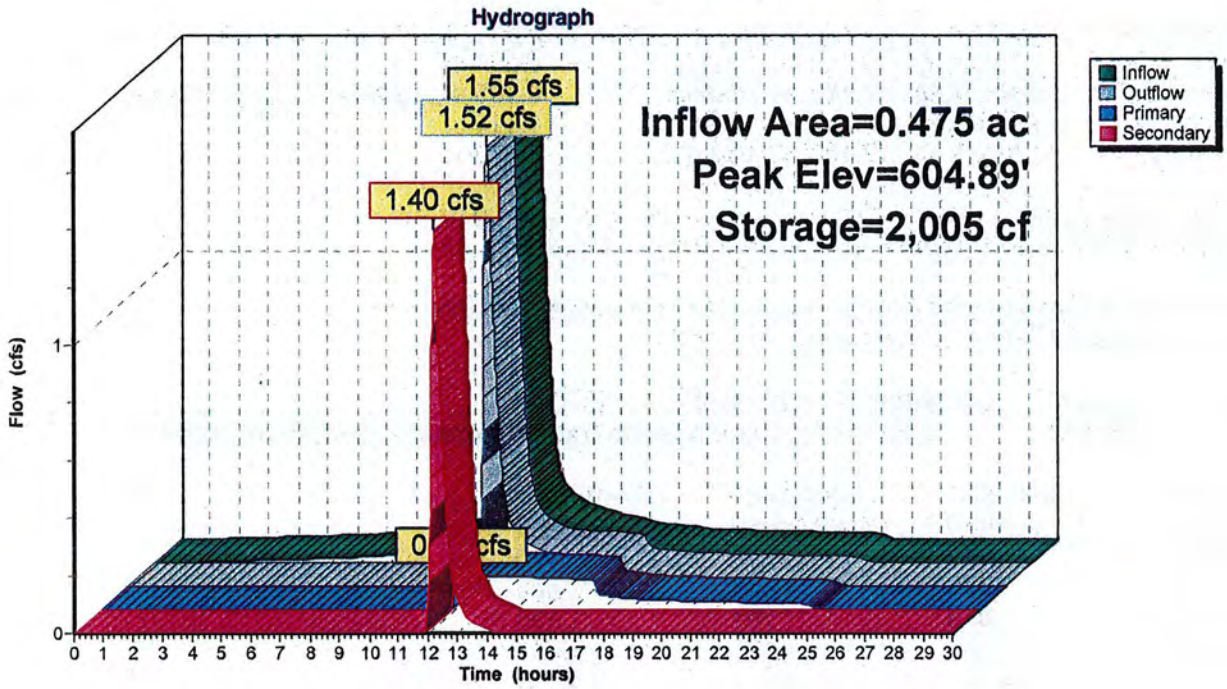
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
602.50	120	0	0
603.25	755	328	328
604.25	1,067	911	1,239
605.25	1,446	1,257	2,496

Device	Routing	Invert	Outlet Devices
#1	Primary	601.00'	**15.0" Round Culvert** L= 140.0' Ke= 0.500 Inlet / Outlet Invert= 601.00' / 600.00' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	603.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	604.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	604.75'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.12 cfs @ 12.22 hrs HW=604.89' TW=598.67' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 6.19 cfs potential flow)
↑**2=Orifice** (Orifice Controls 0.12 cfs @ 5.51 fps)
↑**3=Grate** (Passes 0.12 cfs of 6.46 cfs potential flow)

Secondary OutFlow Max=1.40 cfs @ 12.22 hrs HW=604.89' TW=598.67' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Weir Controls 1.40 cfs @ 0.97 fps)

Pond Basin1: Basin 1



Summary for Pond Basin2: Basin 2

Inflow Area = 0.721 ac, 54.26% Impervious, Inflow Depth = 3.44" for 10 yr event
Inflow = 2.16 cfs @ 12.15 hrs, Volume= 0.207 af
Outflow = 2.15 cfs @ 12.18 hrs, Volume= 0.185 af, Atten= 1%, Lag= 1.7 min
Primary = 0.24 cfs @ 12.18 hrs, Volume= 0.115 af
Secondary = 1.91 cfs @ 12.18 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.68' @ 12.18 hrs Surf.Area= 1,073 sf Storage= 1,551 cf

Plug-Flow detention time= 93.0 min calculated for 0.185 af (90% of inflow)
Center-of-Mass det. time= 43.5 min (865.4 - 821.9)

Volume	Invert	Avail.Storage	Storage Description
#1	596.25'	4,191 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

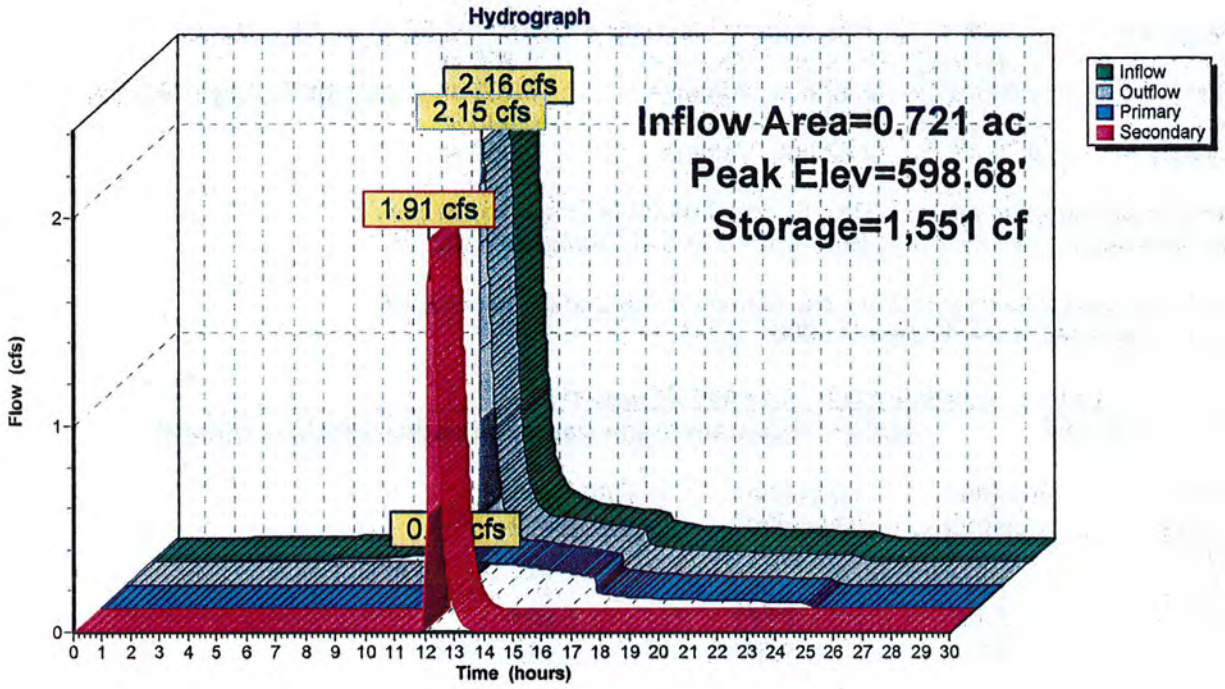
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.25	319	0	0
597.25	536	428	428
598.25	878	707	1,135
599.25	1,335	1,107	2,241
600.25	2,565	1,950	4,191

Device	Routing	Invert	Outlet Devices
#1	Primary	594.00'	**12.0" Round Culvert** L= 78.0' Ke= 0.500 Inlet / Outlet Invert= 594.00' / 592.00' S= 0.0256 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	597.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	598.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	598.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.24 cfs @ 12.18 hrs HW=598.68' TW=593.76' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.24 cfs of 5.17 cfs potential flow)
↑**2=Orifice** (Orifice Controls 0.24 cfs @ 4.94 fps)
↑**3=Grate** (Passes 0.24 cfs of 14.56 cfs potential flow)

Secondary OutFlow Max=1.91 cfs @ 12.18 hrs HW=598.68' TW=593.76' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Weir Controls 1.91 cfs @ 1.08 fps)

Pond Basin2: Basin 2



Summary for Pond Basin3: Basin 3

Inflow Area = 0.949 ac, 51.87% Impervious, Inflow Depth = 3.26" for 10 yr event
Inflow = 2.86 cfs @ 12.14 hrs, Volume= 0.258 af
Outflow = 0.88 cfs @ 12.62 hrs, Volume= 0.162 af, Atten= 69%, Lag= 29.0 min
Primary = 0.12 cfs @ 12.62 hrs, Volume= 0.096 af
Secondary = 0.76 cfs @ 12.62 hrs, Volume= 0.067 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.82' @ 12.62 hrs Surf.Area= 2,745 sf Storage= 5,003 cf

Plug-Flow detention time= 235.5 min calculated for 0.162 af (63% of inflow)
Center-of-Mass det. time= 125.4 min (966.9 - 841.5)

Volume	Invert	Avail.Storage	Storage Description
#1	592.00'	5,523 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

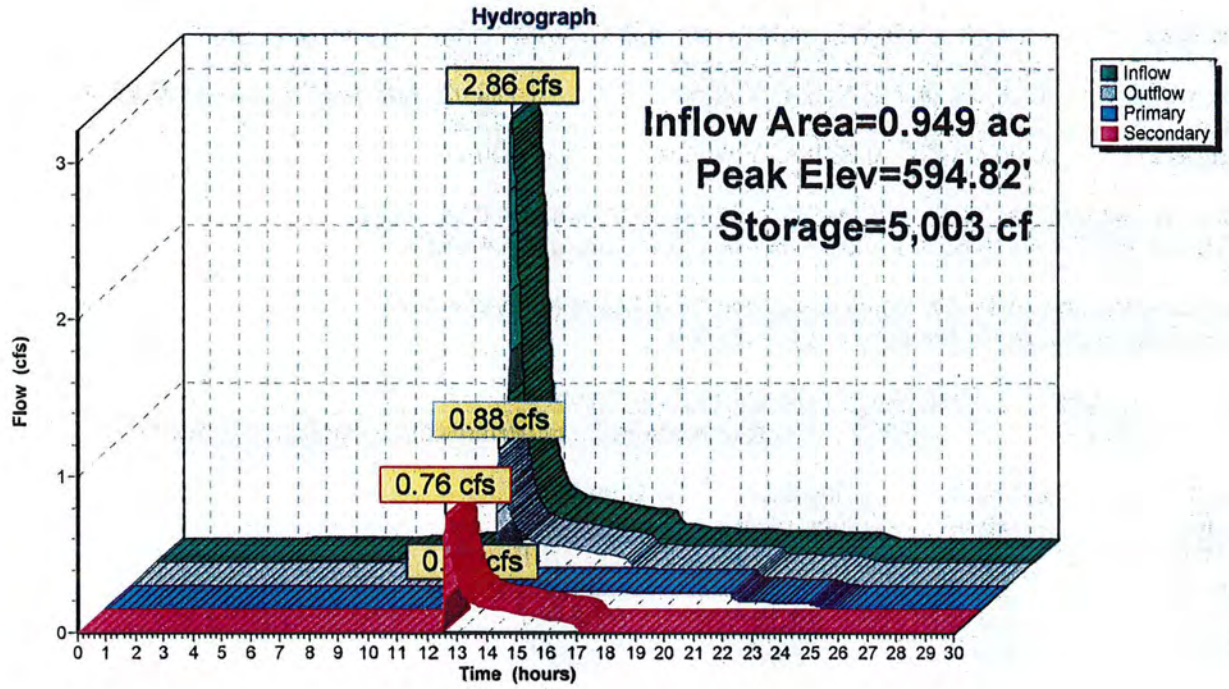
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.00	1,026	0	0
593.00	1,392	1,209	1,209
594.00	2,181	1,787	2,996
595.00	2,873	2,527	5,523

Device	Routing	Invert	Outlet Devices
#1	Primary	590.50'	**15.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 590.50' / 589.50' S= 0.0213 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	593.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	594.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	594.75'	**14.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.12 cfs @ 12.62 hrs HW=594.81' TW=588.31' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 9.81 cfs potential flow)
↑**2=Orifice** (Orifice Controls 0.12 cfs @ 5.34 fps)
↑**3=Grate** (Passes 0.12 cfs of 4.62 cfs potential flow)

Secondary OutFlow Max=0.76 cfs @ 12.62 hrs HW=594.81' TW=588.31' (Dynamic Tailwater)
↑**4=Sharp-Crested Rectangular Weir** (Weir Controls 0.76 cfs @ 0.83 fps)

Pond Basin3: Basin 3



Summary for Pond Basin4: Basin 4

Inflow Area = 1.146 ac, 46.51% Impervious, Inflow Depth = 2.27" for 10 yr event
Inflow = 0.98 cfs @ 12.62 hrs, Volume= 0.217 af
Outflow = 0.24 cfs @ 15.83 hrs, Volume= 0.123 af, Atten= 76%, Lag= 192.9 min
Primary = 0.24 cfs @ 15.83 hrs, Volume= 0.123 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 589.65' @ 15.83 hrs Surf.Area= 2,385 sf Storage= 4,442 cf

Plug-Flow detention time= 290.0 min calculated for 0.123 af (57% of inflow)
Center-of-Mass det. time= 146.5 min (1,071.8 - 925.3)

Volume	Invert	Avail.Storage	Storage Description
#1	587.00'	5,305 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

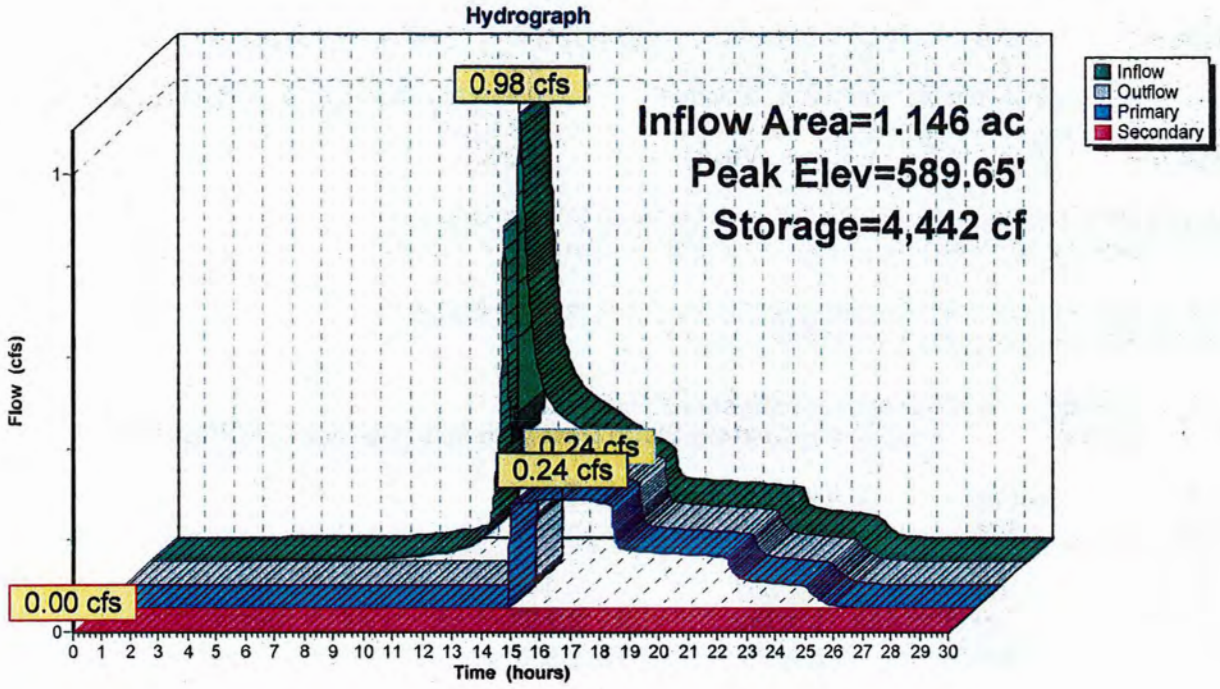
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
587.00	1,002	0	0
588.00	1,498	1,250	1,250
589.00	2,015	1,757	3,007
590.00	2,582	2,299	5,305

Device	Routing	Invert	Outlet Devices
#1	Primary	585.00'	**15.0" Round Culvert** L= 37.0' Ke= 0.500 Inlet / Outlet Invert= 585.00' / 584.00' S= 0.0270 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	588.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	589.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	589.75'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.24 cfs @ 15.83 hrs HW=589.65' TW=584.55' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.24 cfs of 10.98 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 0.24 cfs @ 4.88 fps)
↑—**3=Grate** (Passes 0.24 cfs of 1.56 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=587.00' TW=582.00' (Dynamic Tailwater)
↑—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin4: Basin 4



Summary for Pond Basin5: Basin 5

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 1.68" for 10 yr event
Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.200 af
Outflow = 0.28 cfs @ 15.95 hrs, Volume= 0.110 af, Atten= 74%, Lag= 231.5 min
Primary = 0.28 cfs @ 15.95 hrs, Volume= 0.110 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 584.55' @ 15.95 hrs Surf.Area= 2,609 sf Storage= 4,028 cf

Plug-Flow detention time= 324.6 min calculated for 0.110 af (55% of inflow)
Center-of-Mass det. time= 165.4 min (1,134.1 - 968.7)

Volume	Invert	Avail.Storage	Storage Description
#1	582.00'	5,308 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

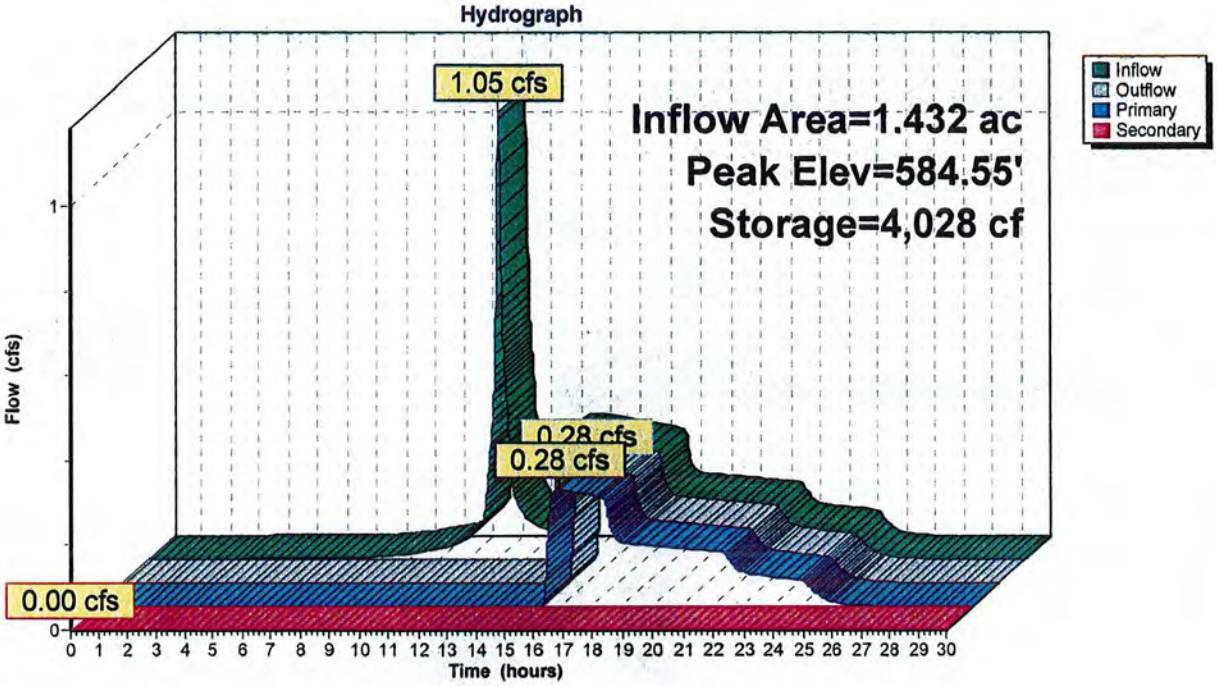
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
582.00	431	0	0
583.00	1,497	964	964
584.00	2,068	1,783	2,747
585.00	3,055	2,562	5,308

Device	Routing	Invert	Outlet Devices
#1	Primary	580.50'	**15.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 580.50' / 580.00' S= 0.0077 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	584.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	585.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 12.0' Crest Height

Primary OutFlow Max=0.28 cfs @ 15.95 hrs HW=584.55' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.28 cfs of 7.93 cfs potential flow)
↑—**2=Grate** (Weir Controls 0.28 cfs @ 0.72 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=582.00' TW=0.00' (Dynamic Tailwater)
↑—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin5: Basin 5

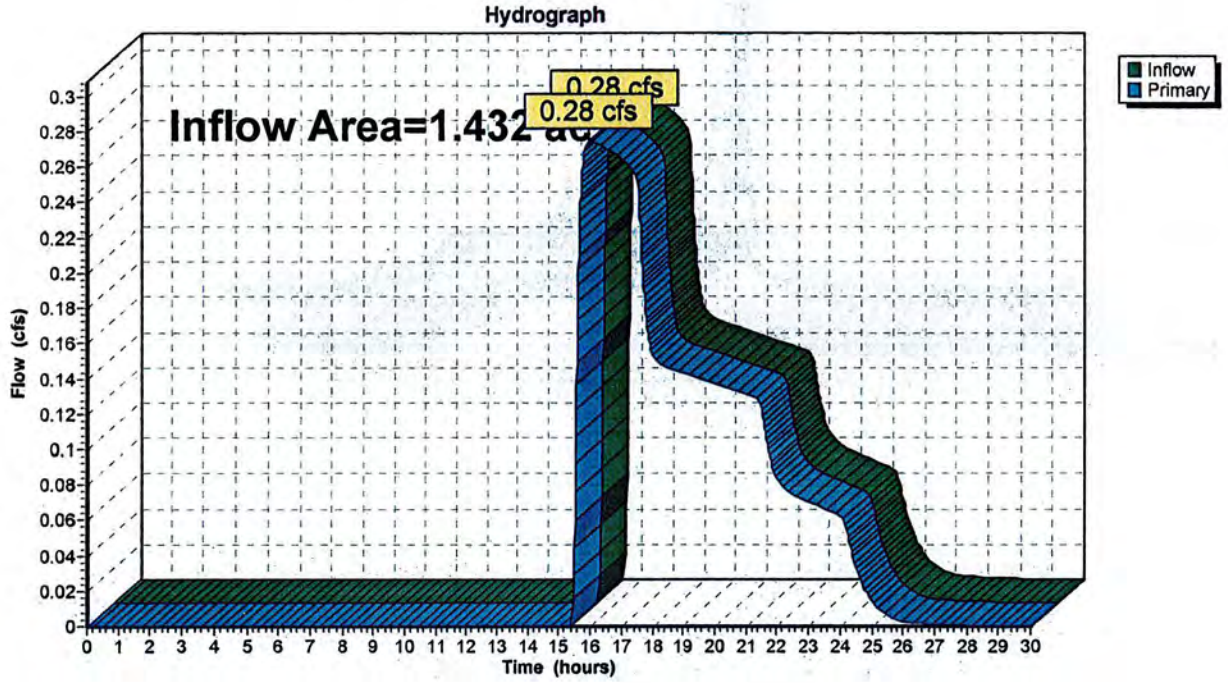


Summary for Link 1L: to CB 1

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth > 0.93" for 10 yr event
Inflow = 0.28 cfs @ 15.95 hrs, Volume= 0.110 af
Primary = 0.28 cfs @ 15.95 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 1L: to CB 1



Summary for Subcatchment 1A: 1A

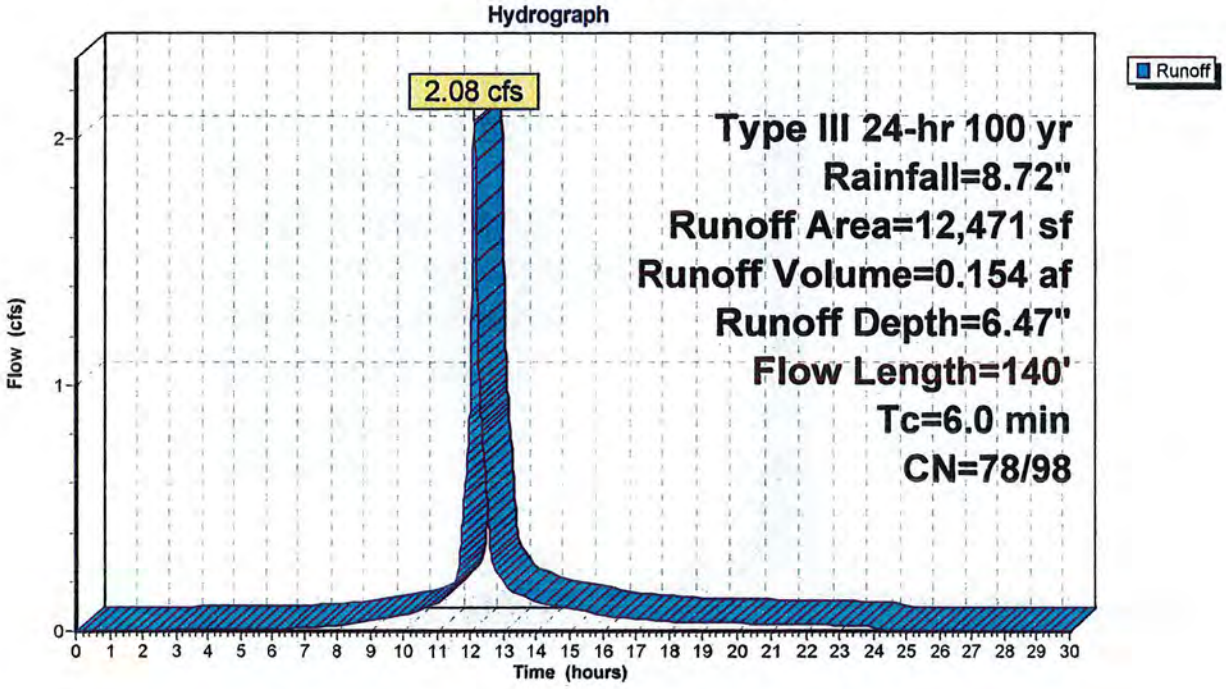
Runoff = 2.08 cfs @ 12.09 hrs, Volume= 0.154 af, Depth= 6.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	2,107	98	Impervious, HSG D
	10,364	78	Meadow, non-grazed, HSG D
	12,471	81	Weighted Average
	10,364	78	83.10% Pervious Area
	2,107	98	16.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	70	0.1860	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.4	70	0.0429	3.11		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.7	140	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1A: 1A



Summary for Subcatchment 1B: 1B

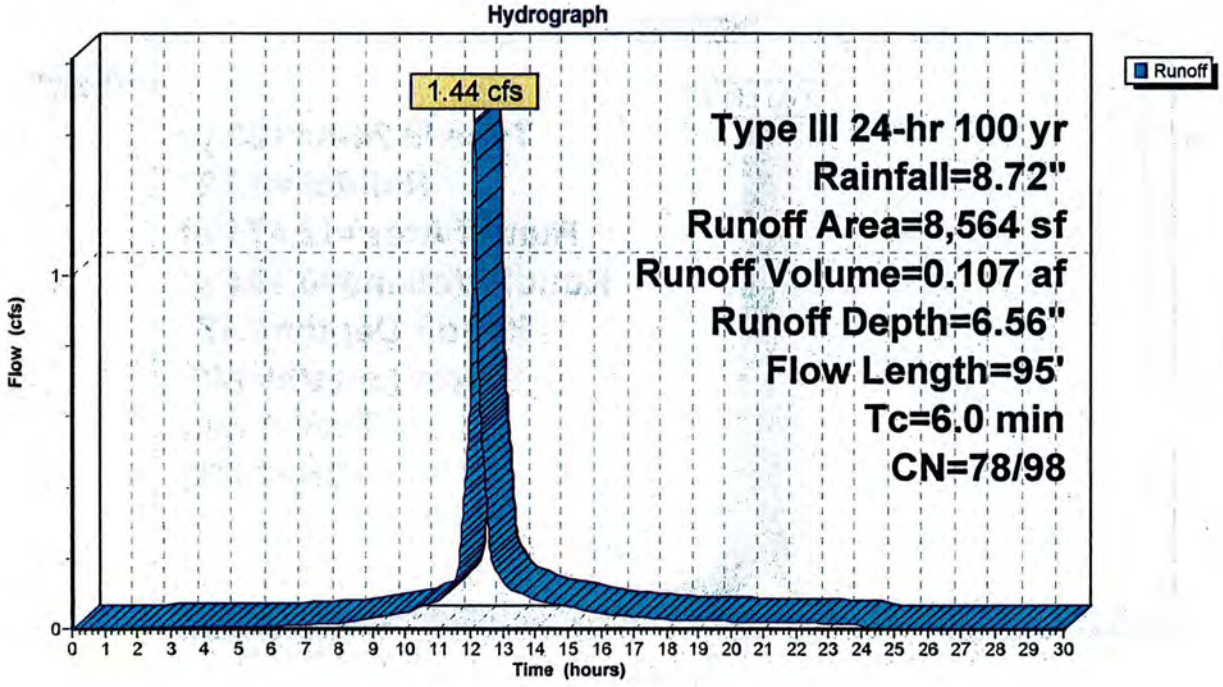
Runoff = 1.44 cfs @ 12.09 hrs, Volume= 0.107 af, Depth= 6.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	1,769	98	Impervious, HSG D
	6,795	78	Meadow, non-grazed, HSG D
	8,564	82	Weighted Average
	6,795	78	79.34% Pervious Area
	1,769	98	20.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	40	0.2500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	55	0.0360	2.85		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.7	95	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1B: 1B



Summary for Subcatchment 1C: 1C

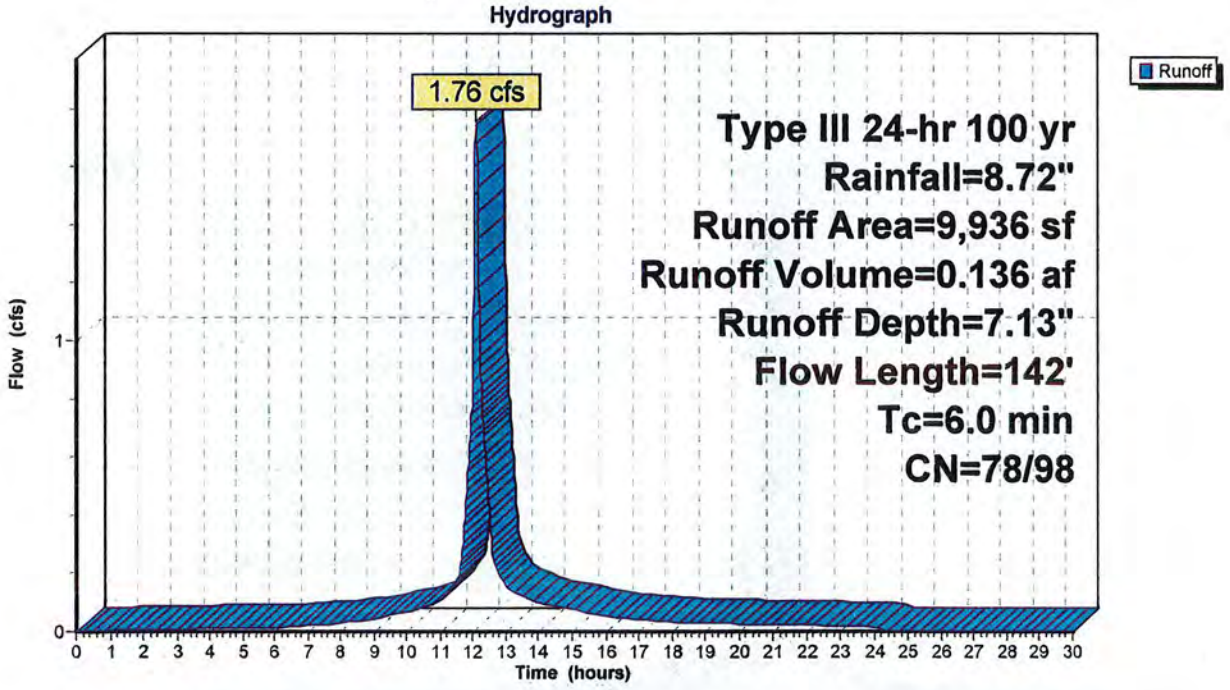
Runoff = 1.76 cfs @ 12.08 hrs, Volume= 0.136 af, Depth= 7.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	4,402	98	Impervious, HSG D
	5,534	78	Meadow, non-grazed, HSG D
	9,936	87	Weighted Average
	5,534	78	55.70% Pervious Area
	4,402	98	44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.46		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	92	0.0666	3.87		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	142	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1C: 1C



Summary for Subcatchment 3A: PO-DA 3

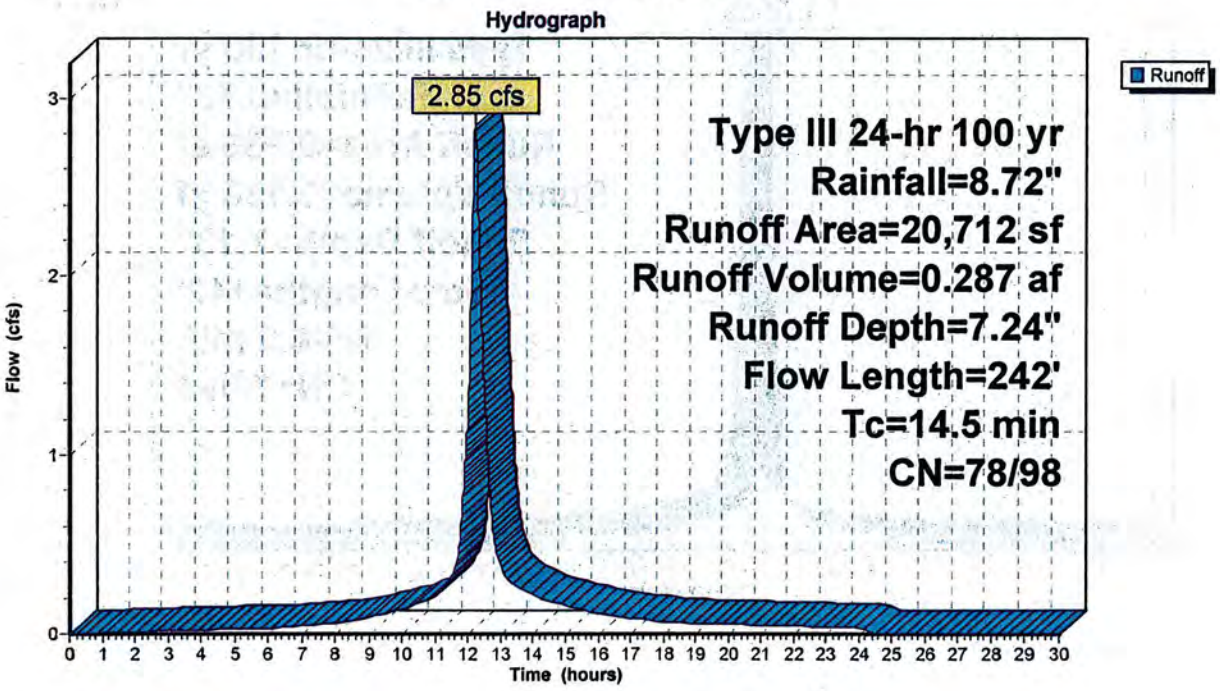
Runoff = 2.85 cfs @ 12.19 hrs, Volume= 0.287 af, Depth= 7.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	10,141	98	Gravel road, HSG D
	10,571	78	Meadow, non-grazed, HSG D
	20,712	88	Weighted Average
	10,571	78	51.04% Pervious Area
	10,141	98	48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	92	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	50	0.0200	4.84	5.94	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.020 Corrugated PE, corrugated interior
14.5	242	Total			

Subcatchment 3A: PO-DA 3



Summary for Subcatchment 3B: 3B

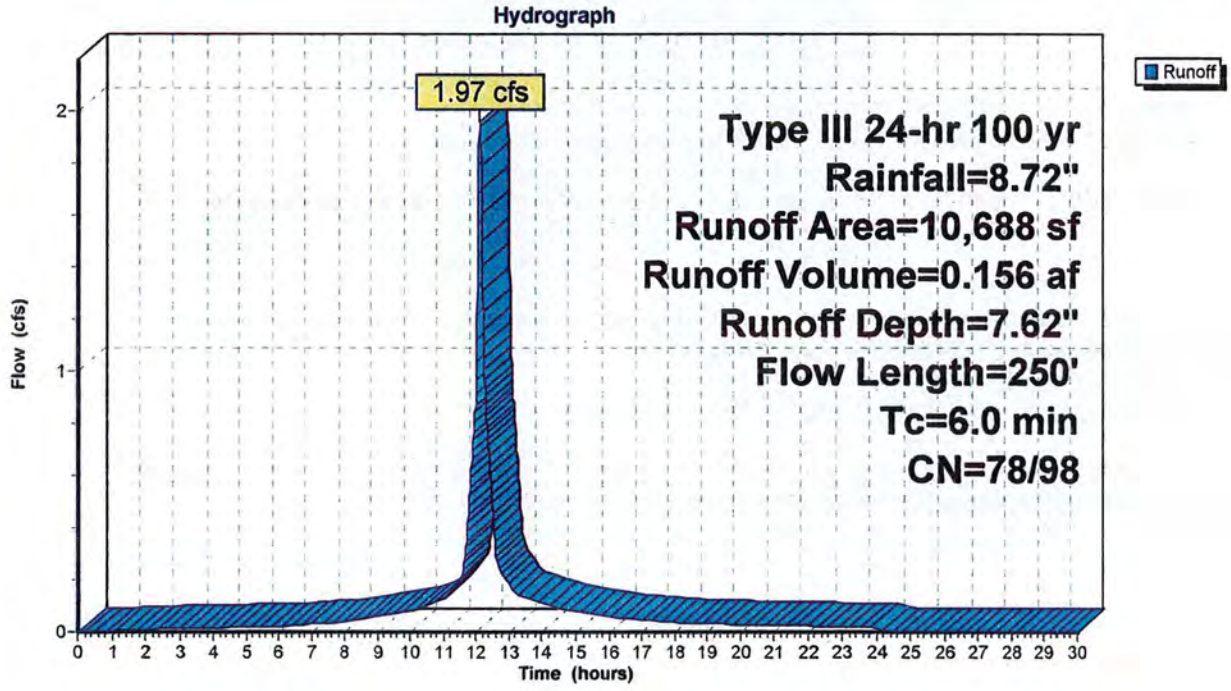
Runoff = 1.97 cfs @ 12.08 hrs, Volume= 0.156 af, Depth= 7.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	5,785	98	Impervious, HSG D
*	1,111	98	Gravel Road, HSG D
	3,792	78	Meadow, non-grazed, HSG D
	10,688	91	Weighted Average
	3,792	78	35.48% Pervious Area
	6,896	98	64.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.8	150	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.1	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3B: 3B



Summary for Pond Basin1: Basin 1

Inflow Area = 0.475 ac, 48.96% Impervious, Inflow Depth = 7.24" for 100 yr event
Inflow = 2.85 cfs @ 12.19 hrs, Volume= 0.287 af
Outflow = 2.82 cfs @ 12.21 hrs, Volume= 0.252 af, Atten= 1%, Lag= 1.2 min
Primary = 0.12 cfs @ 12.21 hrs, Volume= 0.100 af
Secondary = 2.70 cfs @ 12.21 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.97' @ 12.21 hrs Surf.Area= 1,341 sf Storage= 2,108 cf

Plug-Flow detention time= 114.5 min calculated for 0.252 af (88% of inflow)
Center-of-Mass det. time= 57.5 min (832.9 - 775.4)

Volume	Invert	Avail.Storage	Storage Description
#1	602.50'	2,496 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

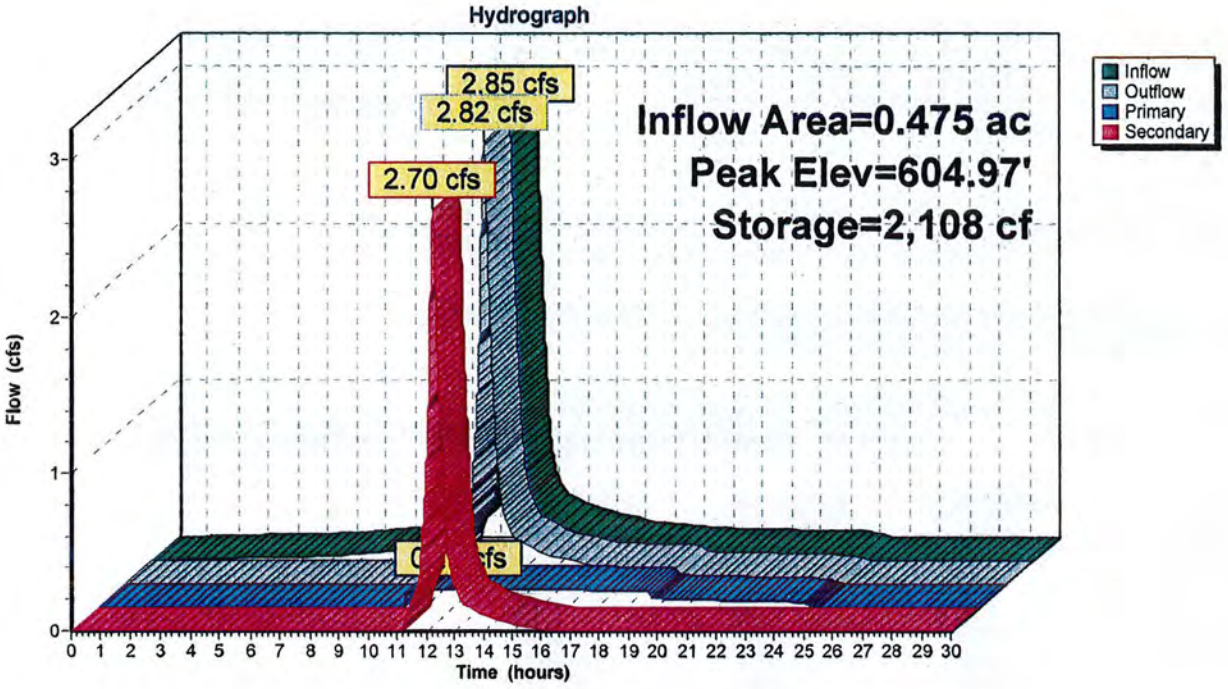
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
602.50	120	0	0
603.25	755	328	328
604.25	1,067	911	1,239
605.25	1,446	1,257	2,496

Device	Routing	Invert	Outlet Devices
#1	Primary	601.00'	**15.0" Round Culvert** L= 140.0' Ke= 0.500 Inlet / Outlet Invert= 601.00' / 600.00' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	603.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	604.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	604.75'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.12 cfs @ 12.21 hrs HW=604.97' TW=598.77' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 6.25 cfs potential flow)
↑**2=Orifice** (Orifice Controls 0.12 cfs @ 5.67 fps)
↑**3=Grate** (Passes 0.12 cfs of 8.48 cfs potential flow)

Secondary OutFlow Max=2.69 cfs @ 12.21 hrs HW=604.97' TW=598.77' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Weir Controls 2.69 cfs @ 1.21 fps)

Pond Basin1: Basin 1



Summary for Pond Basin2: Basin 2

Inflow Area = 0.721 ac, 54.26% Impervious, Inflow Depth = 6.79" for 100 yr event
Inflow = 4.03 cfs @ 12.14 hrs, Volume= 0.408 af
Outflow = 4.02 cfs @ 12.16 hrs, Volume= 0.387 af, Atten= 0%, Lag= 1.1 min
Primary = 0.25 cfs @ 12.16 hrs, Volume= 0.179 af
Secondary = 3.76 cfs @ 12.16 hrs, Volume= 0.208 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.78' @ 12.16 hrs Surf.Area= 1,119 sf Storage= 1,660 cf

Plug-Flow detention time= 59.8 min calculated for 0.387 af (95% of inflow)
Center-of-Mass det. time= 31.1 min (835.5 - 804.4)

Volume	Invert	Avail.Storage	Storage Description
#1	596.25'	4,191 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

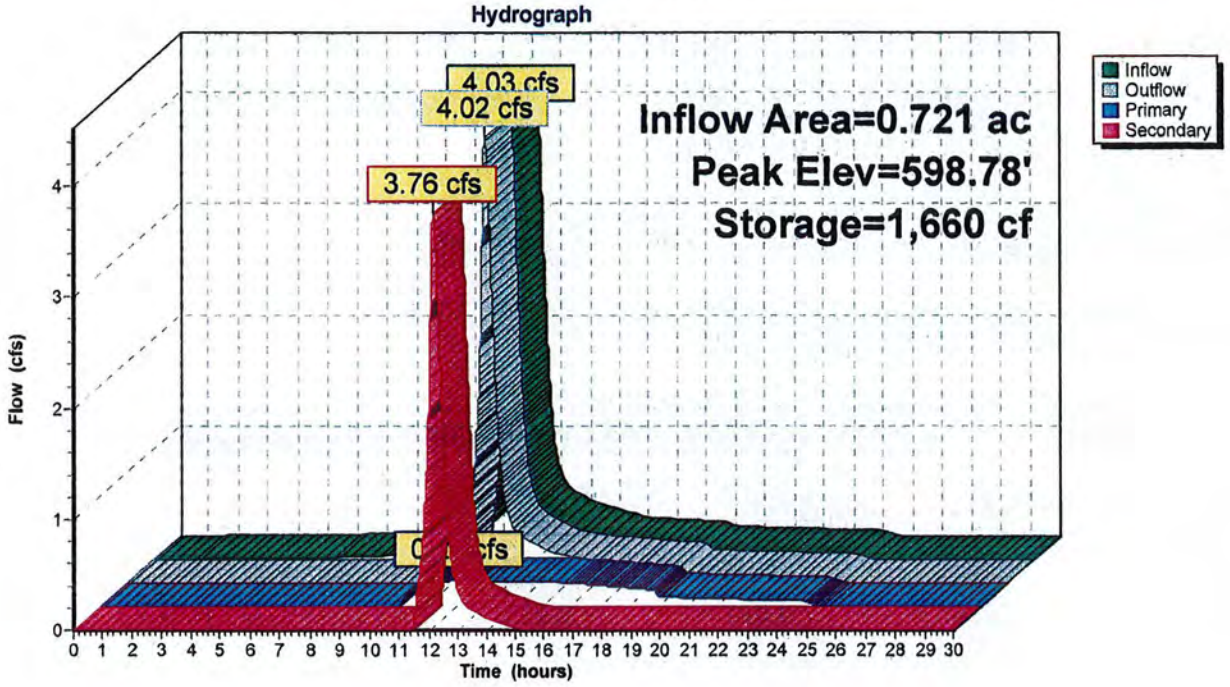
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.25	319	0	0
597.25	536	428	428
598.25	878	707	1,135
599.25	1,335	1,107	2,241
600.25	2,565	1,950	4,191

Device	Routing	Invert	Outlet Devices
#1	Primary	594.00'	**12.0" Round Culvert** L= 78.0' Ke= 0.500 Inlet / Outlet Invert= 594.00' / 592.00' S= 0.0256 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	597.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	598.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	598.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.25 cfs @ 12.16 hrs HW=598.78' TW=594.99' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.25 cfs of 4.54 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 0.25 cfs @ 5.17 fps)
↑—**3=Grate** (Passes 0.25 cfs of 16.97 cfs potential flow)

Secondary OutFlow Max=3.76 cfs @ 12.16 hrs HW=598.78' TW=594.99' (Dynamic Tailwater)
↑—**4=Broad-Crested Rectangular Weir** (Weir Controls 3.76 cfs @ 1.36 fps)

Pond Basin2: Basin 2



Summary for Pond Basin3: Basin 3

Inflow Area = 0.949 ac, 51.87% Impervious, Inflow Depth = 6.61" for 100 yr event
Inflow = 5.54 cfs @ 12.11 hrs, Volume= 0.522 af
Outflow = 5.39 cfs @ 12.15 hrs, Volume= 0.427 af, Atten= 3%, Lag= 2.0 min
Primary = 0.12 cfs @ 12.15 hrs, Volume= 0.122 af
Secondary = 5.26 cfs @ 12.15 hrs, Volume= 0.304 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.99' @ 12.15 hrs Surf.Area= 2,864 sf Storage= 5,484 cf

Plug-Flow detention time= 137.9 min calculated for 0.427 af (82% of inflow)
Center-of-Mass det. time= 64.9 min (883.5 - 818.6)

Volume	Invert	Avail.Storage	Storage Description
#1	592.00'	5,523 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

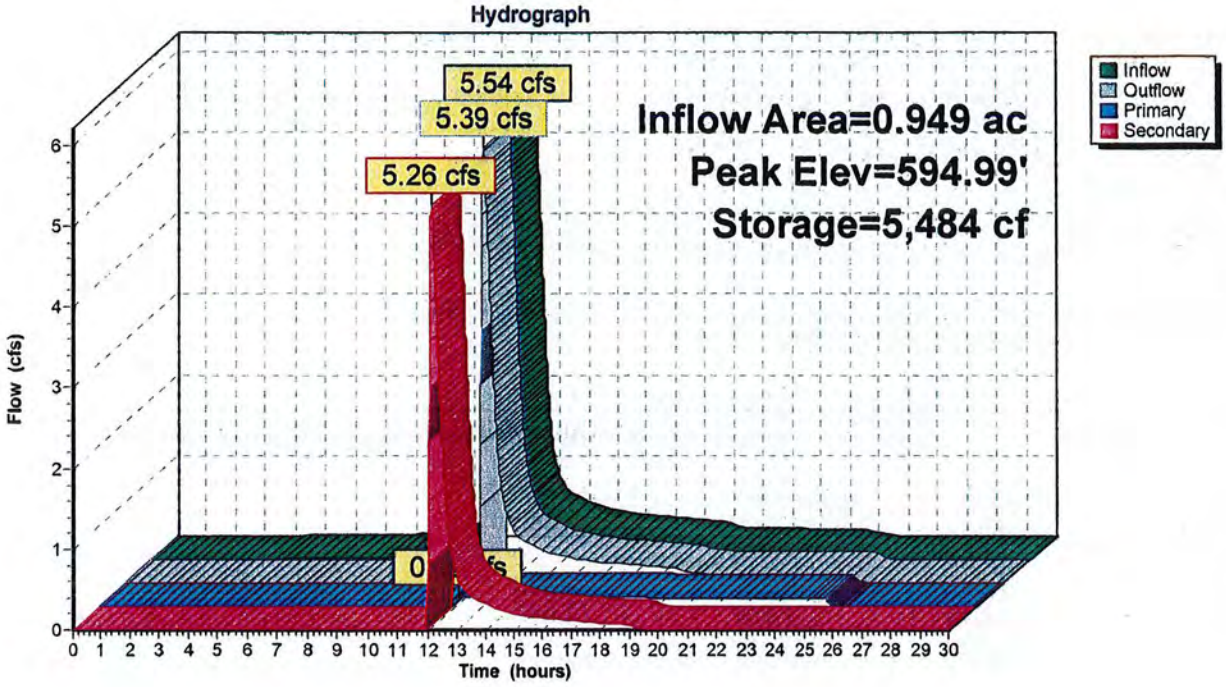
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.00	1,026	0	0
593.00	1,392	1,209	1,209
594.00	2,181	1,787	2,996
595.00	2,873	2,527	5,523

Device	Routing	Invert	Outlet Devices
#1	Primary	590.50'	**15.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 590.50' / 589.50' S= 0.0213 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	593.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	594.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	594.75'	**14.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.12 cfs @ 12.15 hrs HW=594.99' TW=589.40' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 10.02 cfs potential flow)
↑**2=Orifice** (Orifice Controls 0.12 cfs @ 5.70 fps)
↑**3=Grate** (Passes 0.12 cfs of 8.88 cfs potential flow)

Secondary OutFlow Max=5.26 cfs @ 12.15 hrs HW=594.99' TW=589.40' (Dynamic Tailwater)
↑**4=Sharp-Crested Rectangular Weir** (Weir Controls 5.26 cfs @ 1.59 fps)

Pond Basin3: Basin 3



Summary for Pond Basin4: Basin 4

Inflow Area = 1.146 ac, 46.51% Impervious, Inflow Depth = 5.59" for 100 yr event
Inflow = 6.59 cfs @ 12.13 hrs, Volume= 0.534 af
Outflow = 5.24 cfs @ 12.27 hrs, Volume= 0.440 af, Atten= 21%, Lag= 8.4 min
Primary = 0.28 cfs @ 12.27 hrs, Volume= 0.218 af
Secondary = 4.96 cfs @ 12.27 hrs, Volume= 0.222 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 590.00' @ 12.27 hrs Surf.Area= 2,582 sf Storage= 5,305 cf

Plug-Flow detention time= 133.0 min calculated for 0.440 af (82% of inflow)
Center-of-Mass det. time= 52.9 min (916.9 - 864.1)

Volume	Invert	Avail.Storage	Storage Description
#1	587.00'	5,305 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

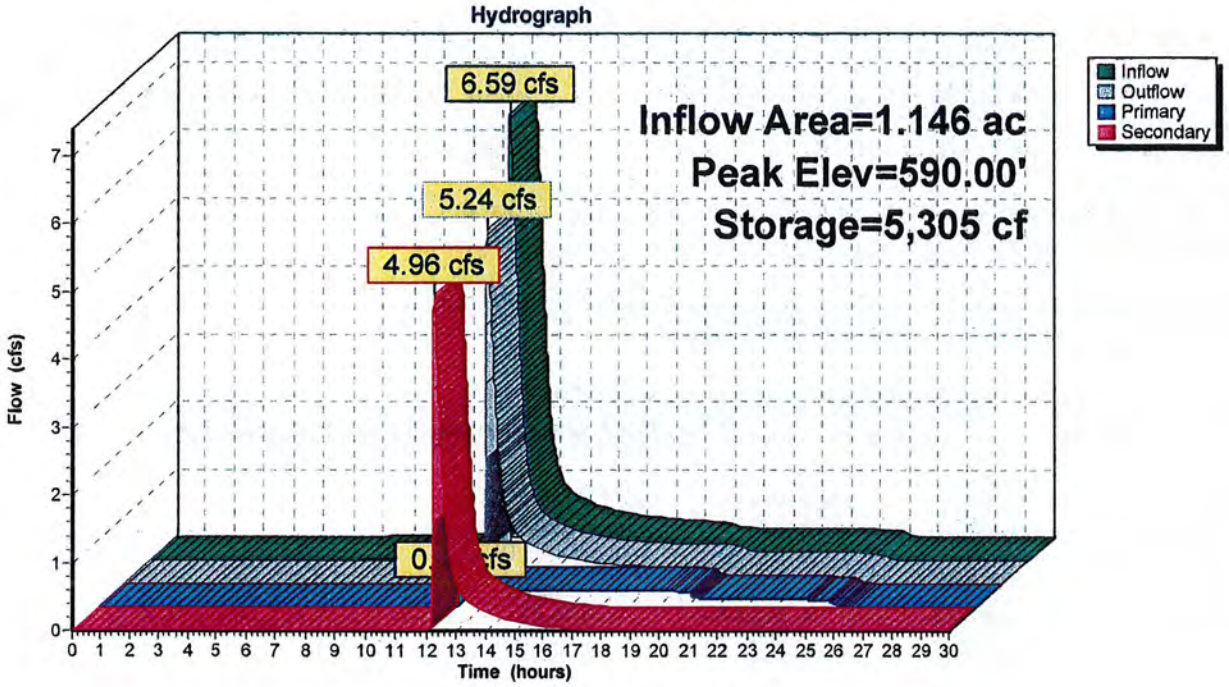
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
587.00	1,002	0	0
588.00	1,498	1,250	1,250
589.00	2,015	1,757	3,007
590.00	2,582	2,299	5,305

Device	Routing	Invert	Outlet Devices
#1	Primary	585.00'	**15.0" Round Culvert** L= 37.0' Ke= 0.500 Inlet / Outlet Invert= 585.00' / 584.00' S= 0.0270 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	588.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	589.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	589.75'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.28 cfs @ 12.27 hrs HW=590.00' TW=584.73' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.28 cfs of 11.41 cfs potential flow)
↑**2=Orifice** (Orifice Controls 0.28 cfs @ 5.65 fps)
↑**3=Grate** (Passes 0.28 cfs of 9.30 cfs potential flow)

Secondary OutFlow Max=4.96 cfs @ 12.27 hrs HW=590.00' TW=584.73' (Dynamic Tailwater)
↑**4=Sharp-Crested Rectangular Weir** (Weir Controls 4.96 cfs @ 1.65 fps)

Pond Basin4: Basin 4



Summary for Pond Basin5: Basin 5

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 4.98" for 100 yr event
Inflow = 6.17 cfs @ 12.27 hrs, Volume= 0.595 af
Outflow = 5.34 cfs @ 12.35 hrs, Volume= 0.505 af, Atten= 13%, Lag= 5.0 min
Primary = 5.34 cfs @ 12.35 hrs, Volume= 0.505 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 584.85' @ 12.35 hrs Surf.Area= 2,904 sf Storage= 4,851 cf

Plug-Flow detention time= 113.7 min calculated for 0.505 af (85% of inflow)
Center-of-Mass det. time= 41.7 min (925.7 - 884.0)

Volume	Invert	Avail.Storage	Storage Description
#1	582.00'	5,308 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

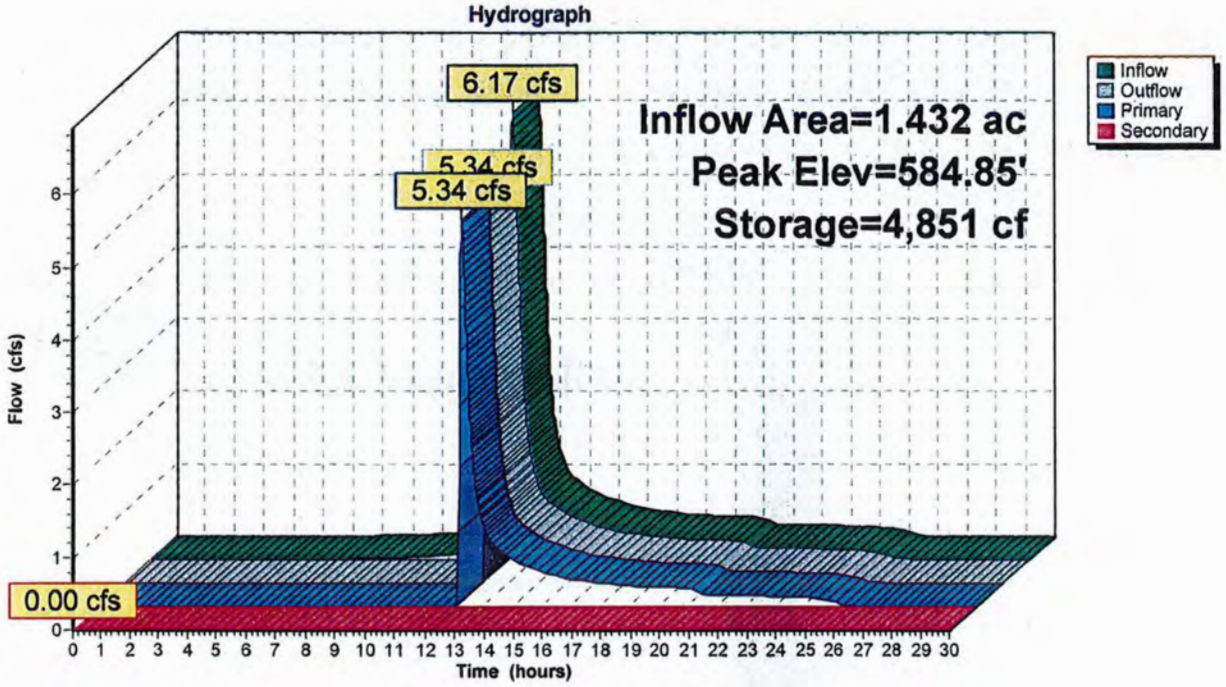
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
582.00	431	0	0
583.00	1,497	964	964
584.00	2,068	1,783	2,747
585.00	3,055	2,562	5,308

Device	Routing	Invert	Outlet Devices
#1	Primary	580.50'	**15.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 580.50' / 580.00' S= 0.0077 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	584.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	585.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 12.0' Crest Height

Primary OutFlow Max=5.34 cfs @ 12.35 hrs HW=584.85' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 5.34 cfs of 8.28 cfs potential flow)
↑—**2=Grate** (Weir Controls 5.34 cfs @ 1.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=582.00' TW=0.00' (Dynamic Tailwater)
↑—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin5: Basin 5

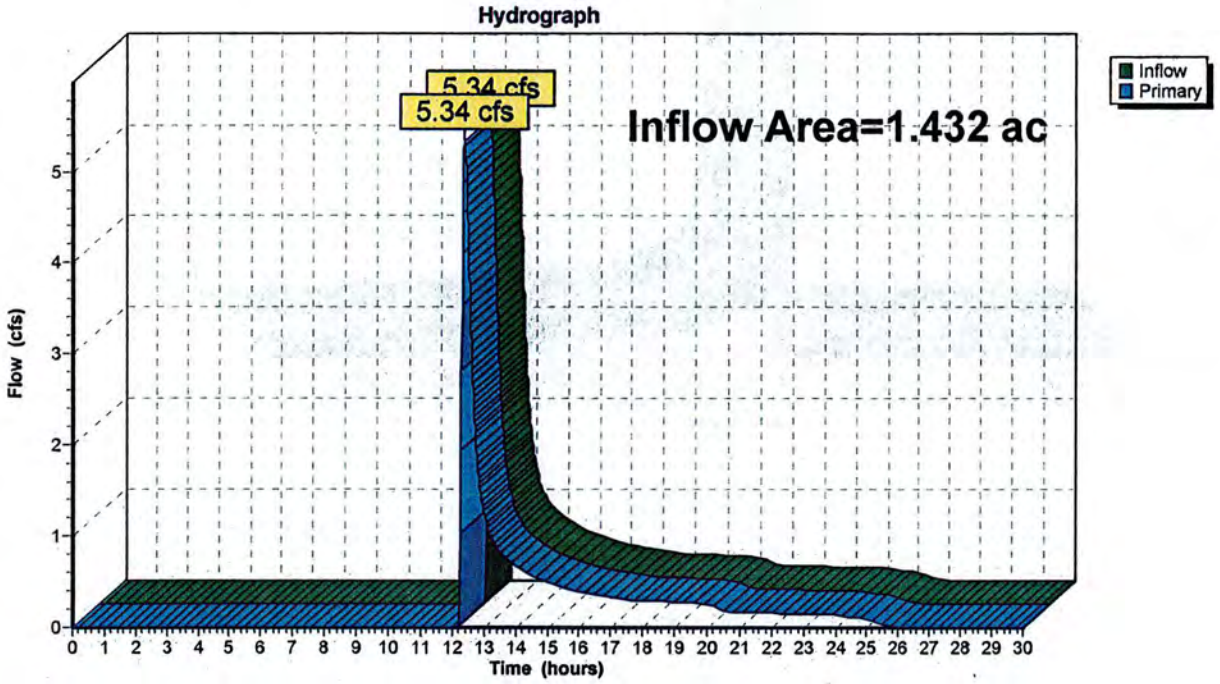


Summary for Link 1L: to CB 1

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 4.23" for 100 yr event
Inflow = 5.34 cfs @ 12.35 hrs, Volume= 0.505 af
Primary = 5.34 cfs @ 12.35 hrs, Volume= 0.505 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 1L: to CB 1



Summary for Subcatchment 1A: 1A

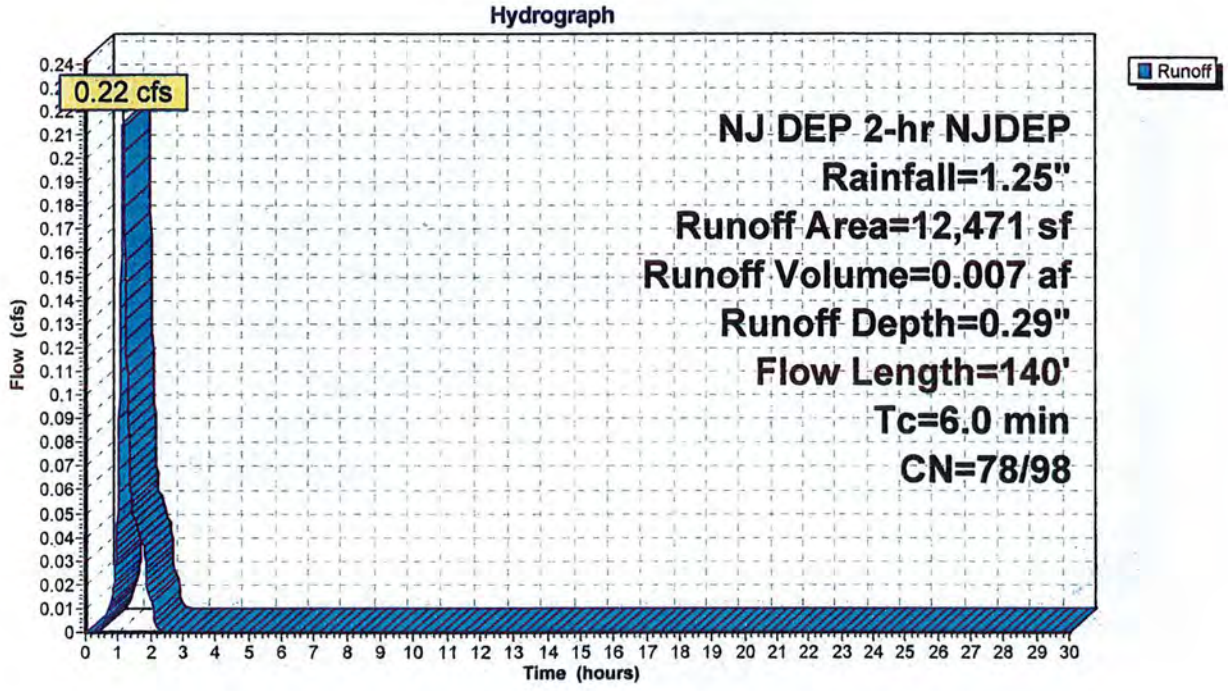
Runoff = 0.22 cfs @ 1.13 hrs, Volume= 0.007 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	2,107	98	Impervious, HSG D
	10,364	78	Meadow, non-grazed, HSG D
	12,471	81	Weighted Average
	10,364	78	83.10% Pervious Area
	2,107	98	16.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	70	0.1860	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.4	70	0.0429	3.11		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.7	140	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1A: 1A



Summary for Subcatchment 1B: 1B

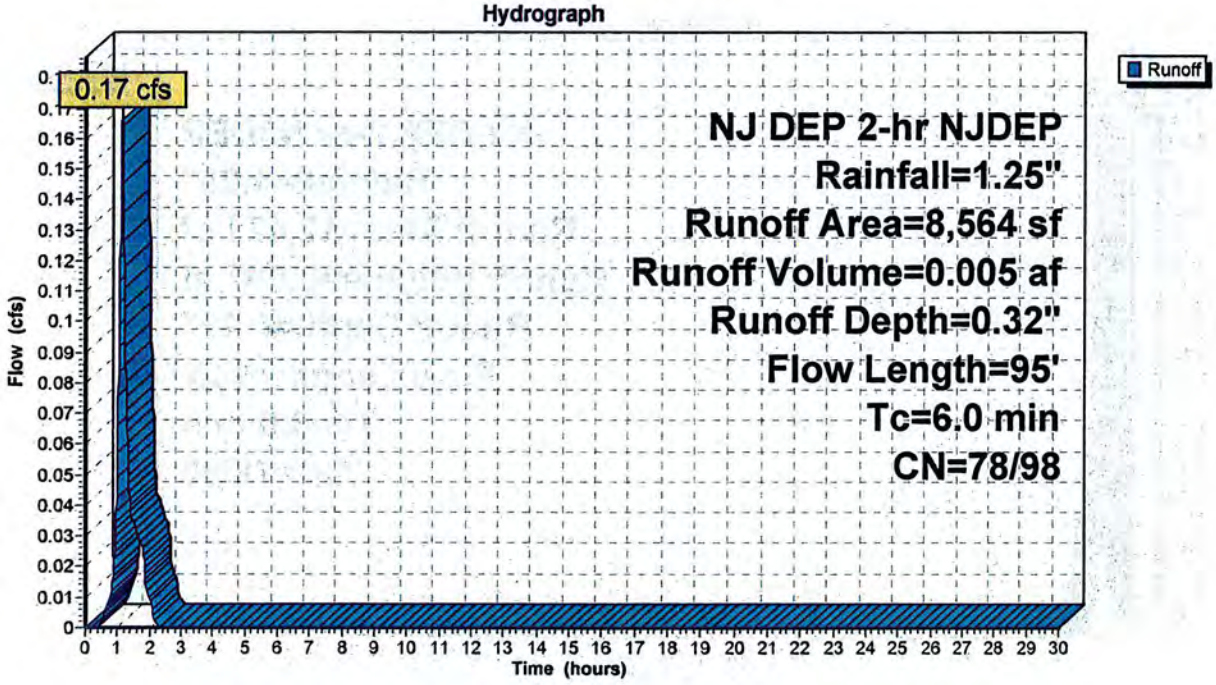
Runoff = 0.17 cfs @ 1.13 hrs, Volume= 0.005 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	1,769	98	Impervious, HSG D
	6,795	78	Meadow, non-grazed, HSG D
	8,564	82	Weighted Average
	6,795	78	79.34% Pervious Area
	1,769	98	20.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	40	0.2500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	55	0.0360	2.85		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.7	95	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1B: 1B



Summary for Subcatchment 1C: 1C

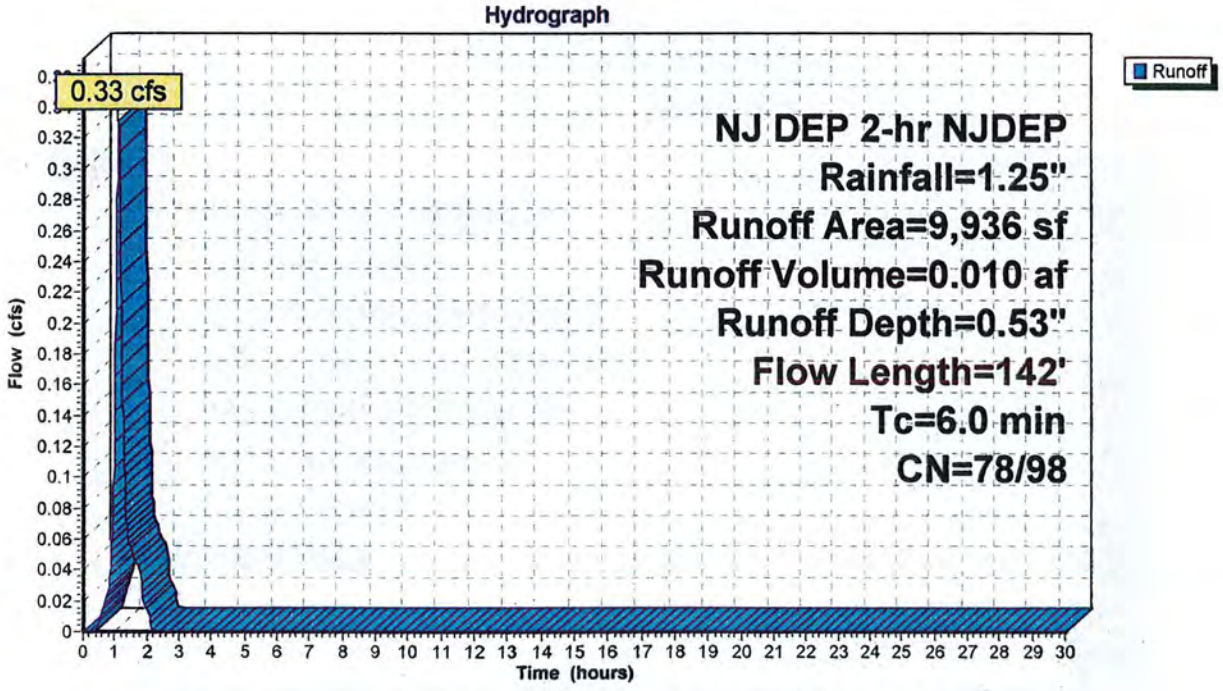
Runoff = 0.33 cfs @ 1.12 hrs, Volume= 0.010 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	4,402	98	Impervious, HSG D
	5,534	78	Meadow, non-grazed, HSG D
	9,936	87	Weighted Average
	5,534	78	55.70% Pervious Area
	4,402	98	44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.46		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.4	92	0.0666	3.87		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	142	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1C: 1C



Summary for Subcatchment 3A: PO-DA 3

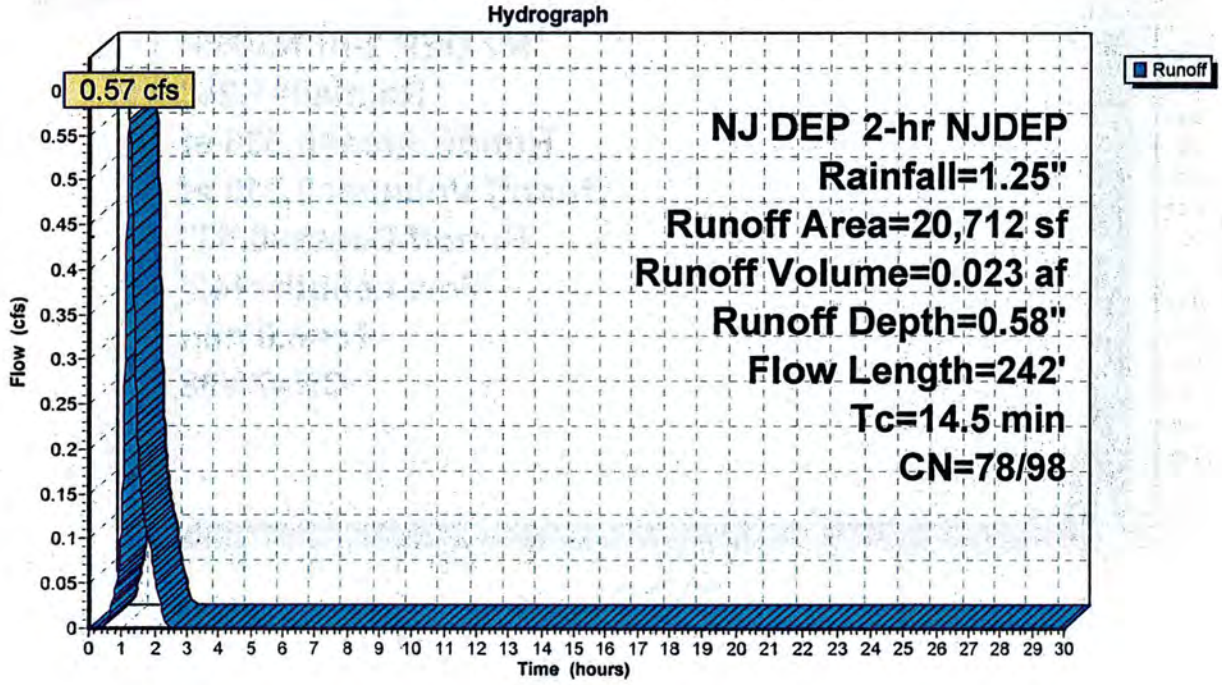
Runoff = 0.57 cfs @ 1.21 hrs, Volume= 0.023 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	10,141	98	Gravel road, HSG D
	10,571	78	Meadow, non-grazed, HSG D
	20,712	88	Weighted Average
	10,571	78	51.04% Pervious Area
	10,141	98	48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	92	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	50	0.0200	4.84	5.94	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.020 Corrugated PE, corrugated interior
14.5	242	Total			

Subcatchment 3A: PO-DA 3



Summary for Subcatchment 3B: 3B

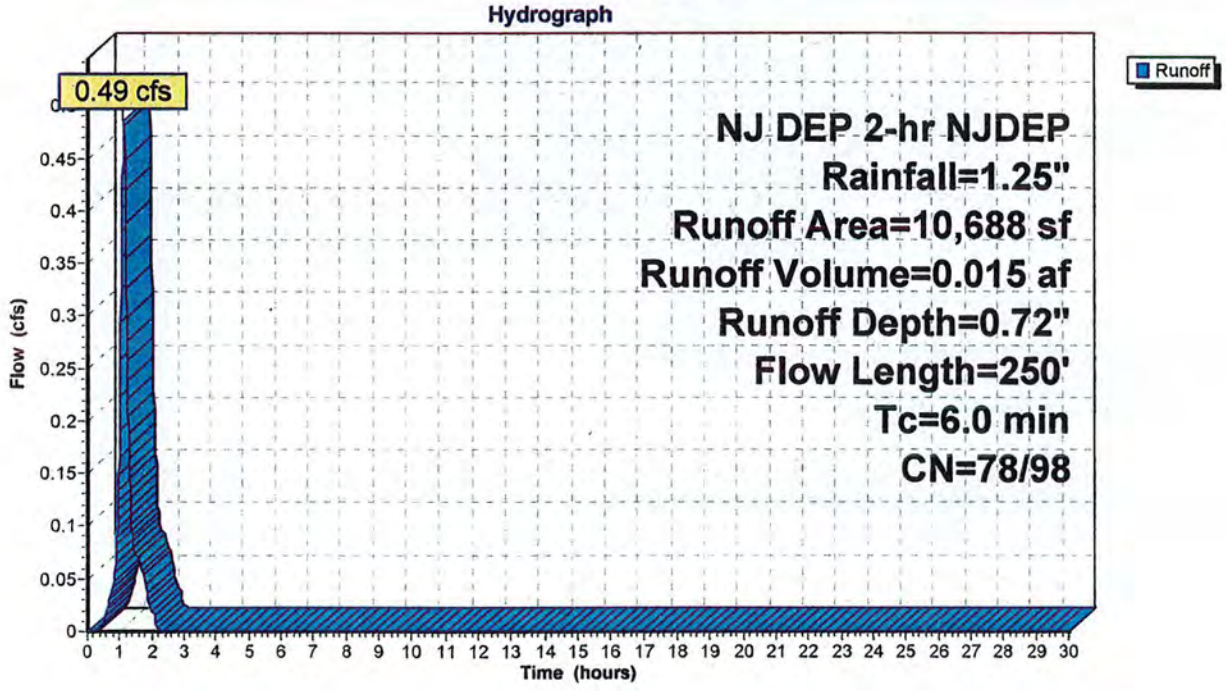
Runoff = 0.49 cfs @ 1.11 hrs, Volume= 0.015 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	5,785	98	Impervious, HSG D
*	1,111	98	Gravel Road, HSG D
	3,792	78	Meadow, non-grazed, HSG D
	10,688	91	Weighted Average
	3,792	78	35.48% Pervious Area
	6,896	98	64.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.8	150	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.1	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3B: 3B



Summary for Pond Basin1: Basin 1

Inflow Area = 0.475 ac, 48.96% Impervious, Inflow Depth = 0.58" for NJDEP event
Inflow = 0.57 cfs @ 1.21 hrs, Volume= 0.023 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.01' @ 2.85 hrs Surf.Area= 992 sf Storage= 992 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	602.50'	2,496 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

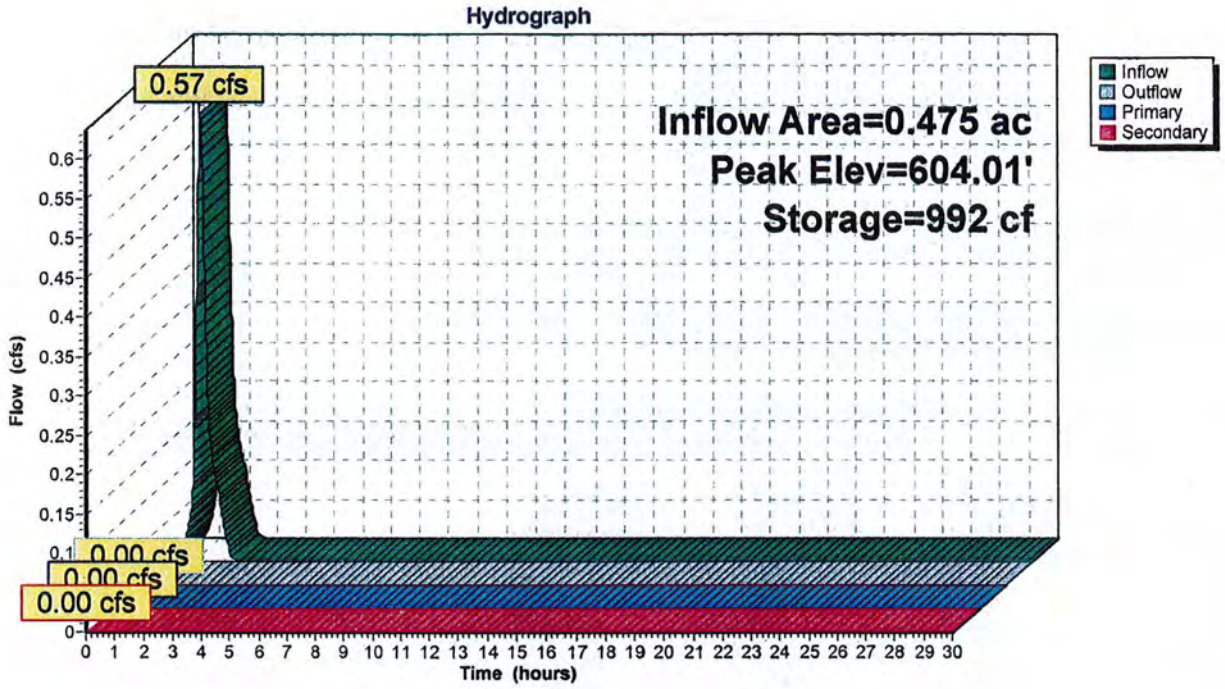
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
602.50	120	0	0
603.25	755	328	328
604.25	1,067	911	1,239
605.25	1,446	1,257	2,496

Device	Routing	Invert	Outlet Devices
#1	Primary	601.00'	**15.0" Round Culvert** L= 140.0' Ke= 0.500 Inlet / Outlet Invert= 601.00' / 600.00' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	603.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	604.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	604.75'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=602.50' TW=596.25' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 3.97 cfs potential flow)
↑**2=Orifice** (Controls 0.00 cfs)
↑**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=602.50' TW=596.25' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin1: Basin 1



Summary for Pond Basin2: Basin 2

Inflow Area = 0.721 ac, 54.26% Impervious, Inflow Depth = 0.24" for NJDEP event
Inflow = 0.49 cfs @ 1.11 hrs, Volume= 0.015 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 597.60' @ 2.34 hrs Surf.Area= 656 sf Storage= 637 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	596.25'	4,191 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

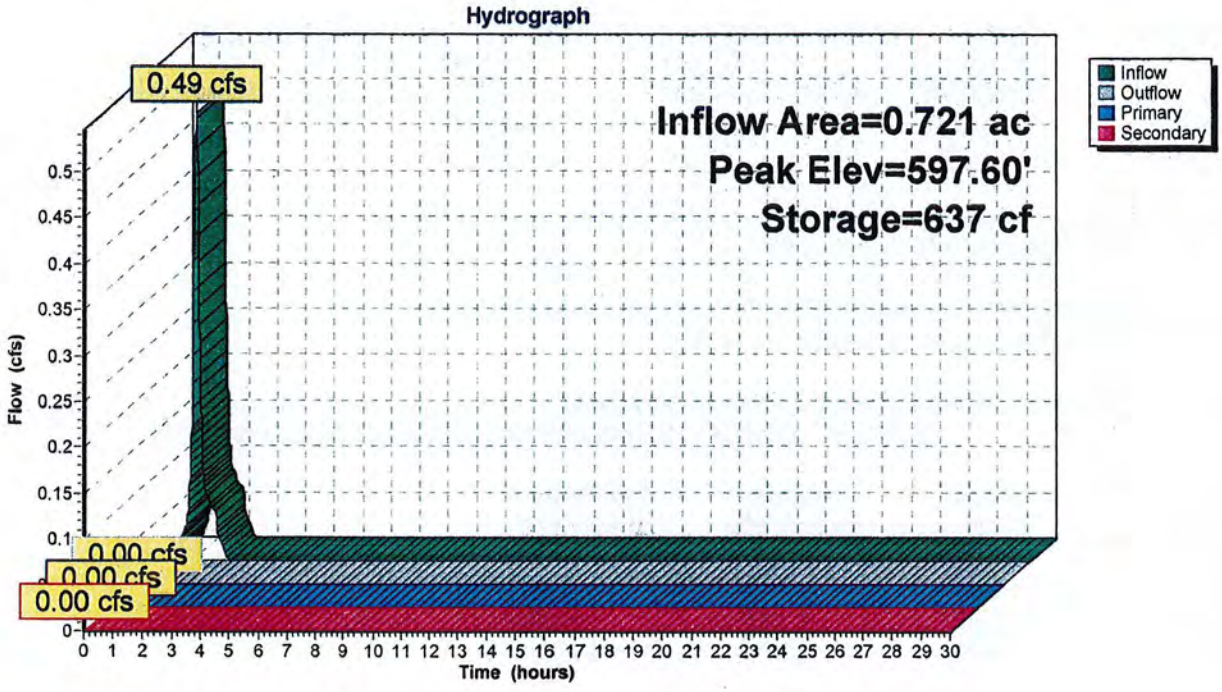
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.25	319	0	0
597.25	536	428	428
598.25	878	707	1,135
599.25	1,335	1,107	2,241
600.25	2,565	1,950	4,191

Device	Routing	Invert	Outlet Devices
#1	Primary	594.00'	**12.0" Round Culvert** L= 78.0' Ke= 0.500 Inlet / Outlet Invert= 594.00' / 592.00' S= 0.0256 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	597.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	598.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	598.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=596.25' TW=592.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 4.21 cfs potential flow)
↑**2=Orifice** (Controls 0.00 cfs)
↑**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=596.25' TW=592.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin2: Basin 2



Summary for Pond Basin3: Basin 3

Inflow Area = 0.949 ac, 51.87% Impervious, Inflow Depth = 0.13" for NJDEP event
Inflow = 0.33 cfs @ 1.12 hrs, Volume= 0.010 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 592.40' @ 2.34 hrs Surf.Area= 1,173 sf Storage= 441 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	592.00'	5,523 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

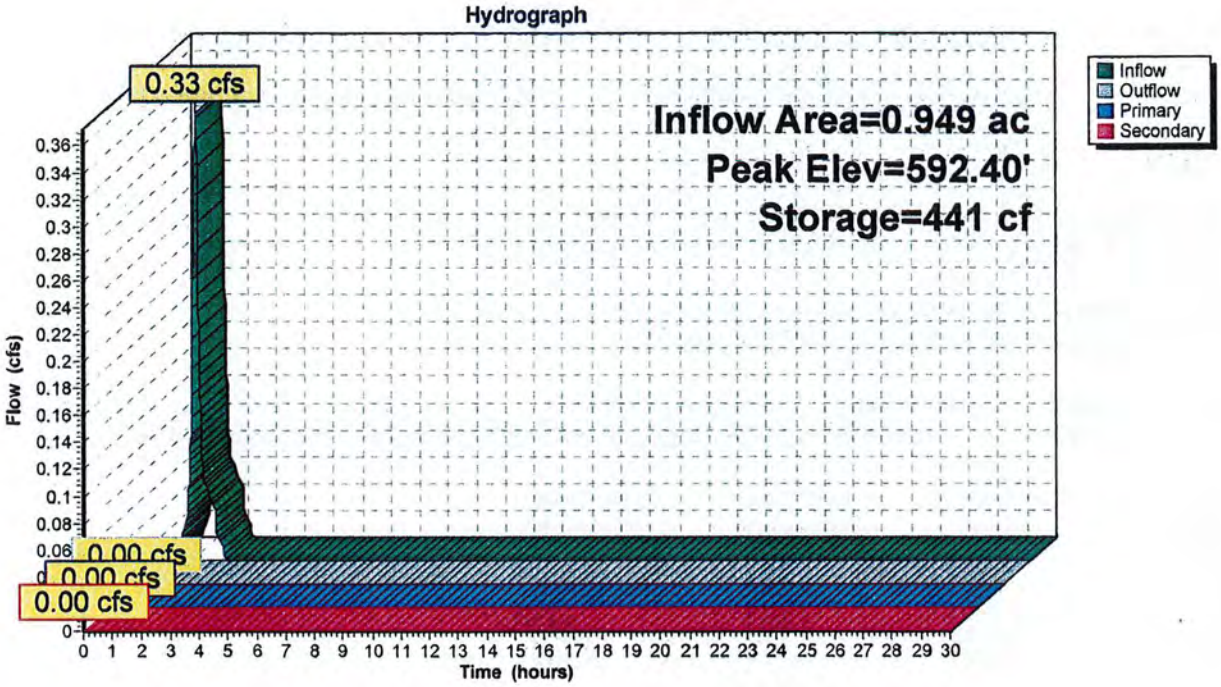
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.00	1,026	0	0
593.00	1,392	1,209	1,209
594.00	2,181	1,787	2,996
595.00	2,873	2,527	5,523

Device	Routing	Invert	Outlet Devices
#1	Primary	590.50'	**15.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 590.50' / 589.50' S= 0.0213 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	593.50'	**2.0" Vert. Orifice** C= 0.600
#3	Device 2	594.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	594.75'	**14.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.00' TW=587.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.00 cfs of 5.53 cfs potential flow)
↑—**2=Orifice** (Controls 0.00 cfs)
↑—**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=592.00' TW=587.00' (Dynamic Tailwater)
↑—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin3: Basin 3



Summary for Pond Basin4: Basin 4

Inflow Area = 1.146 ac, 46.51% Impervious, Inflow Depth = 0.05" for NJDEP event
Inflow = 0.17 cfs @ 1.13 hrs, Volume= 0.005 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 587.22' @ 2.34 hrs Surf.Area= 1,109 sf Storage= 228 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	587.00'	5,305 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

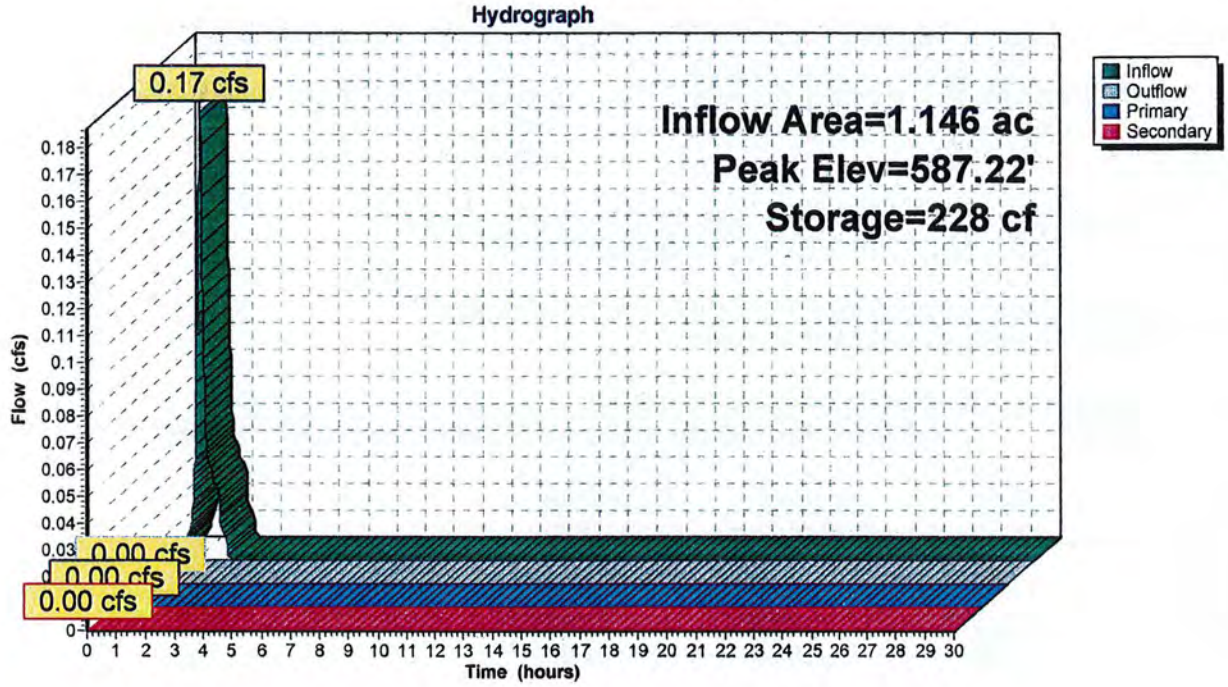
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
587.00	1,002	0	0
588.00	1,498	1,250	1,250
589.00	2,015	1,757	3,007
590.00	2,582	2,299	5,305

Device	Routing	Invert	Outlet Devices
#1	Primary	585.00'	**15.0" Round Culvert** L= 37.0' Ke= 0.500 Inlet / Outlet Invert= 585.00' / 584.00' S= 0.0270 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	588.50'	**3.0" Vert. Orifice** C= 0.600
#3	Device 2	589.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	589.75'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 10.0' Crest Height

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=587.00' TW=582.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 6.92 cfs potential flow)
↑**2=Orifice** (Controls 0.00 cfs)
↑**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=587.00' TW=582.00' (Dynamic Tailwater)
↑**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin4: Basin 4



Summary for Pond Basin5: Basin 5

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 0.06" for NJDEP event
Inflow = 0.22 cfs @ 1.13 hrs, Volume= 0.007 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 582.45' @ 2.34 hrs Surf.Area= 906 sf Storage= 298 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	582.00'	5,308 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

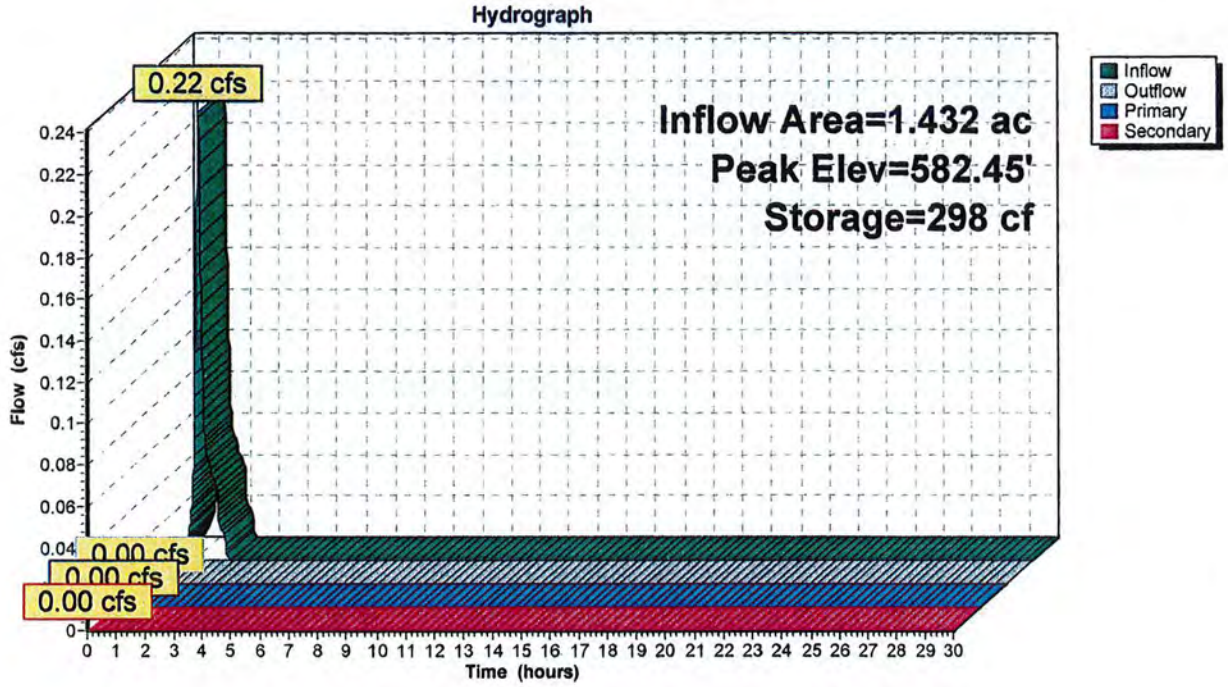
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
582.00	431	0	0
583.00	1,497	964	964
584.00	2,068	1,783	2,747
585.00	3,055	2,562	5,308

Device	Routing	Invert	Outlet Devices
#1	Primary	580.50'	**15.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 580.50' / 580.00' S= 0.0077 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	584.50'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	585.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 12.0' Crest Height

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=582.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.00 cfs of 4.19 cfs potential flow)
↑—**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=582.00' TW=0.00' (Dynamic Tailwater)
↑—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Basin5: Basin 5

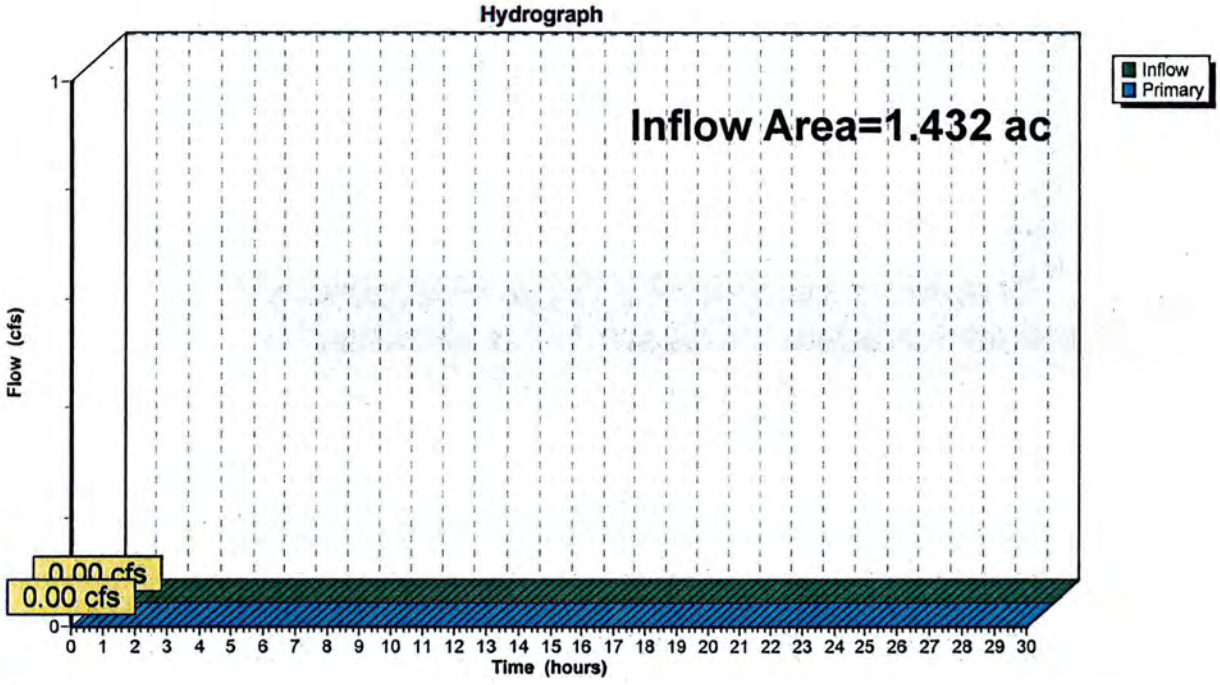


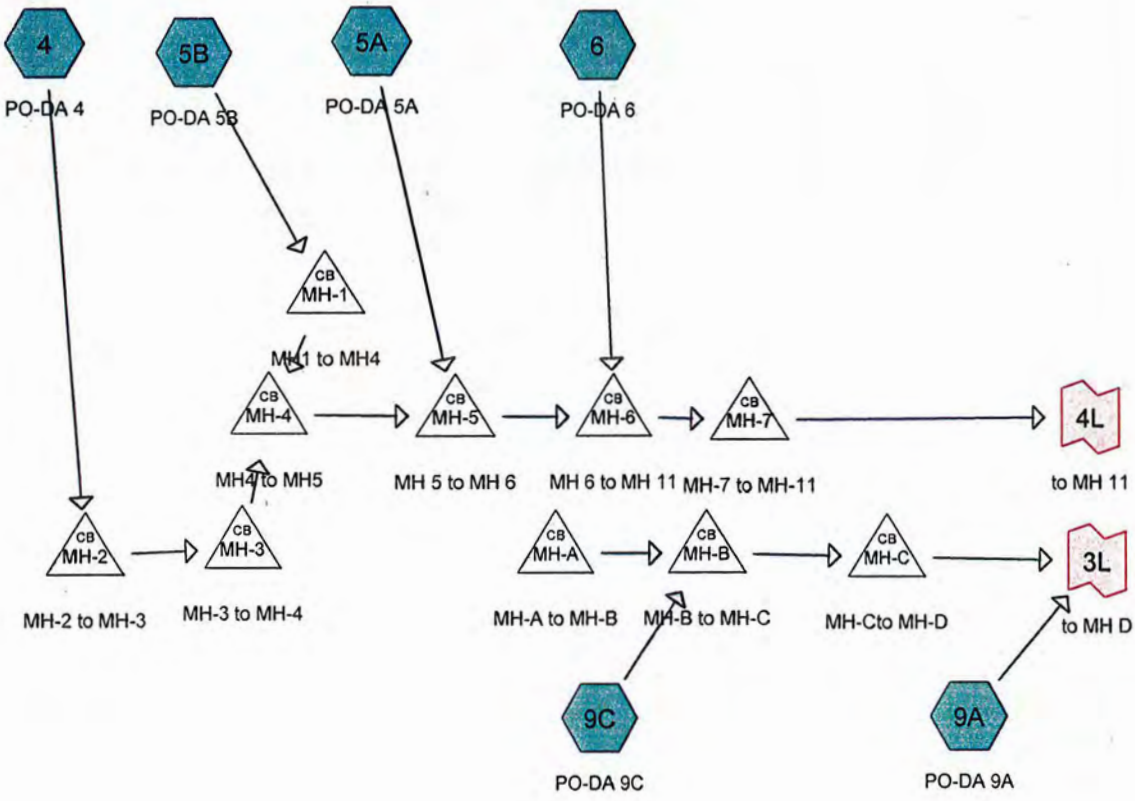
Summary for Link 1L: to CB 1

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 0.00" for NJDEP event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 1L: to CB 1





Subcat Reach Pond Link

Drainage Diagram for Post Development West Orange B_03 01 12
Prepared by TRC Engineers, Inc., Printed 3/14/2012
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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	MH-1	603.20	602.20	15.0	0.0667	0.020	12.0	0.0	0.0
2	MH-2	604.00	603.20	34.0	0.0235	0.020	12.0	0.0	0.0
3	MH-3	603.20	602.20	50.0	0.0200	0.020	12.0	0.0	0.0
4	MH-4	602.20	599.90	85.0	0.0271	0.020	18.0	0.0	0.0
5	MH-5	599.90	597.60	66.0	0.0348	0.020	18.0	0.0	0.0
6	MH-6	597.60	596.50	45.0	0.0244	0.020	18.0	0.0	0.0
7	MH-7	596.50	592.80	360.0	0.0103	0.020	30.0	0.0	0.0
8	MH-A	599.00	598.00	74.0	0.0135	0.020	12.0	0.0	0.0
9	MH-B	598.00	597.00	92.0	0.0109	0.020	12.0	0.0	0.0
10	MH-C	597.00	592.70	205.0	0.0210	0.020	12.0	0.0	0.0

Summary for Subcatchment 4: PO-DA 4

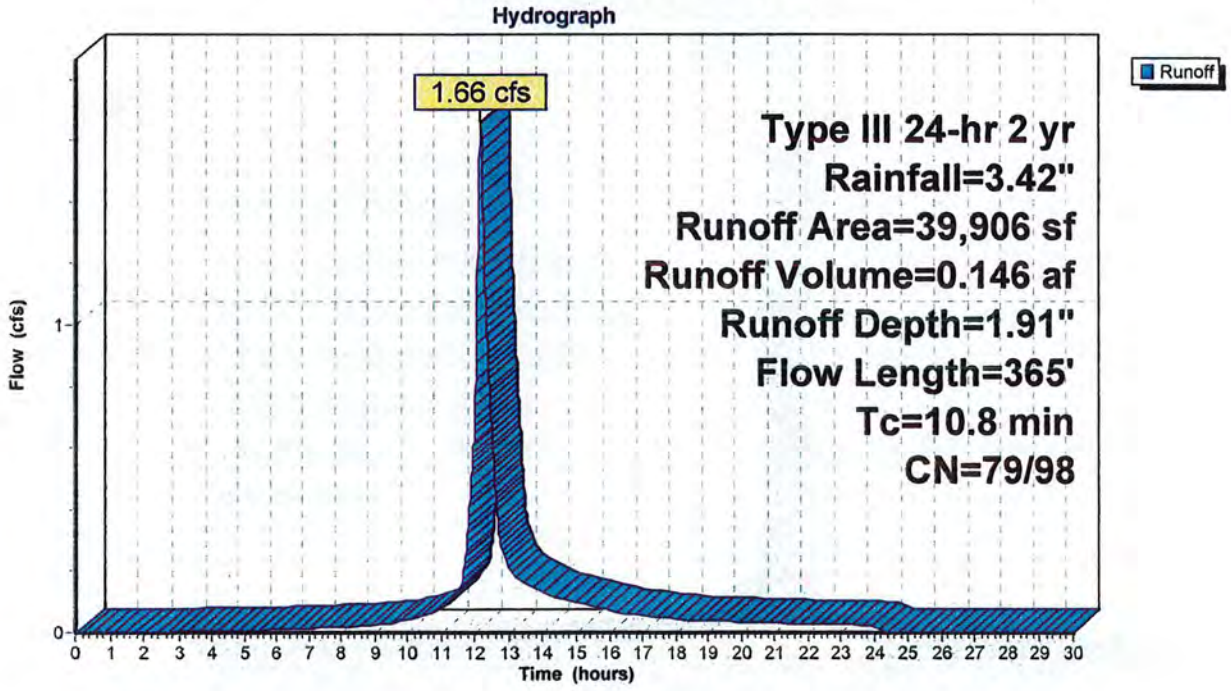
Runoff = 1.66 cfs @ 12.15 hrs, Volume= 0.146 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	4,334	98	Impervious, HSG D
*	5,398	98	Gravel road, HSG D
*	14,366	80	Grass cover, Good, HSG D
	15,808	78	Meadow, non-grazed, HSG D
	39,906	84	Weighted Average
	30,174	79	75.61% Pervious Area
	9,732	98	24.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	120	0.0830	4.32		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	145	0.0480	3.29		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
10.8	365	Total			

Subcatchment 4: PO-DA 4



Summary for Subcatchment 5A: PO-DA 5A

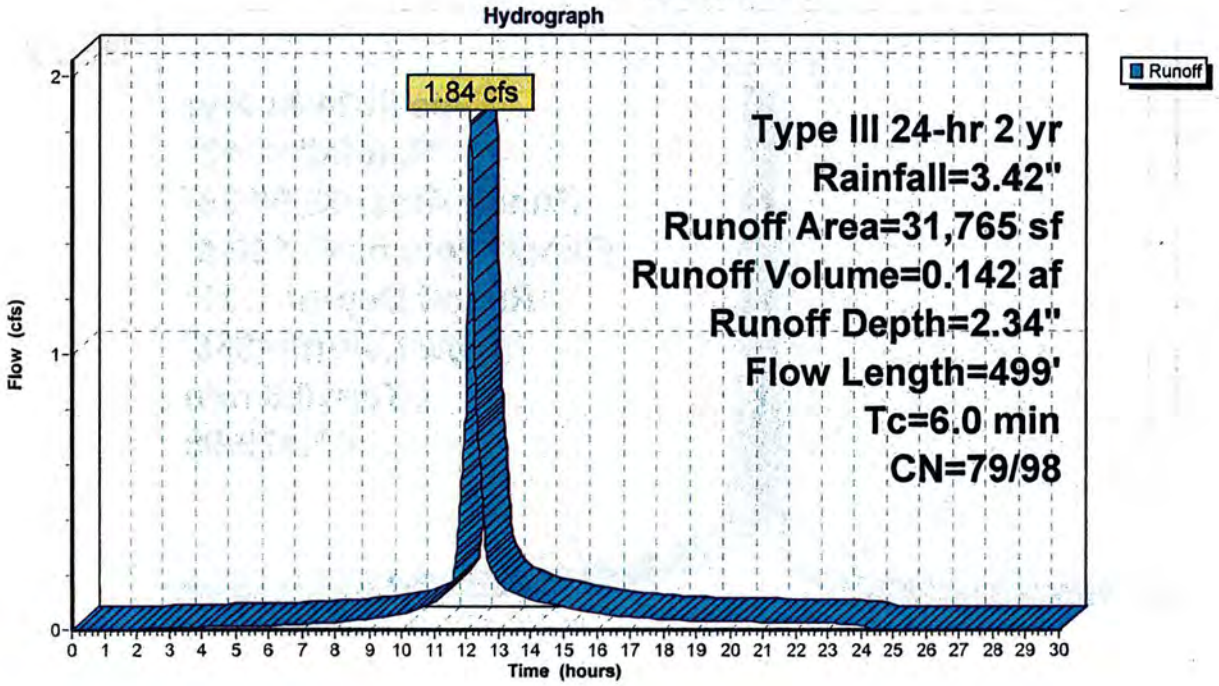
Runoff = 1.84 cfs @ 12.09 hrs, Volume= 0.142 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	15,734	98	Impervious, HSG D
*	8,318	80	Grass cover, Good, HSG D
	7,713	78	Meadow, non-grazed, HSG D
	31,765	88	Weighted Average
	16,031	79	50.47% Pervious Area
	15,734	98	49.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	150	0.0730	2.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.5	135	0.0590	4.93		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	180	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	34	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	499	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5A: PO-DA 5A



Summary for Subcatchment 5B: PO-DA 5B

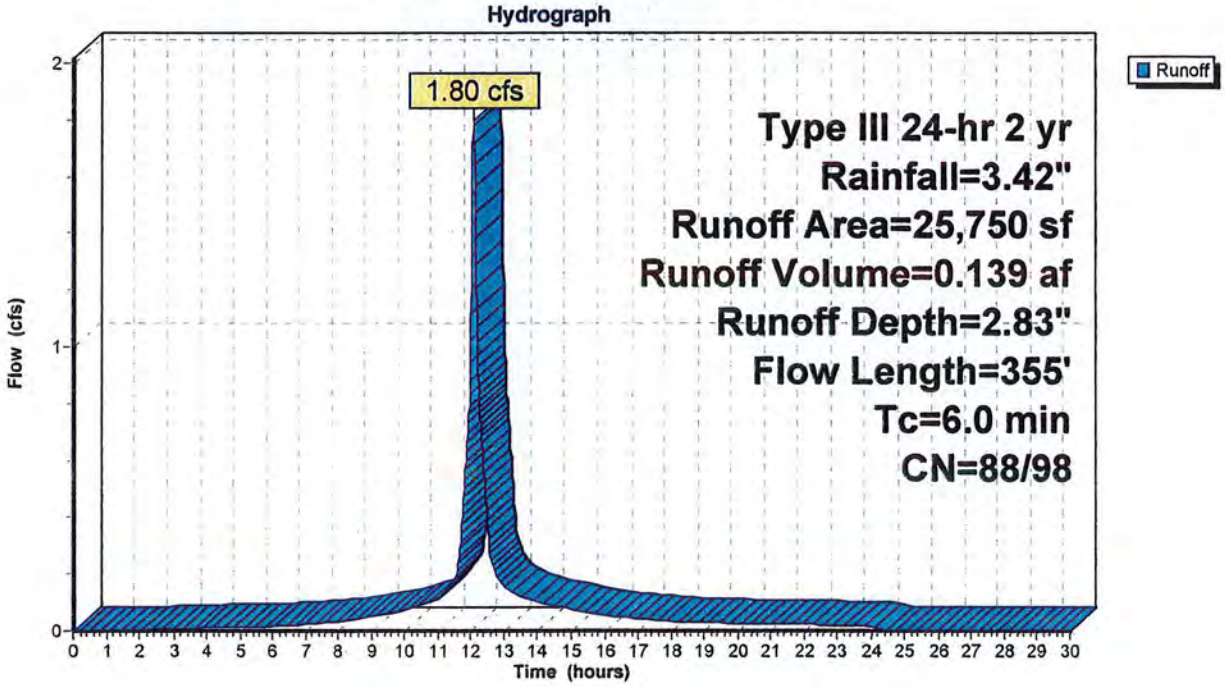
Runoff = 1.80 cfs @ 12.08 hrs, Volume= 0.139 af, Depth= 2.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	16,509	98	Impervious, HSG D
*	6,800	91	Gravel, HSG D
*	2,441	80	Grass cover, HSG D
	25,750	94	Weighted Average
	9,241	88	35.89% Pervious Area
	16,509	98	64.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	150	0.0530	2.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.3	110	0.0680	5.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	95	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5B: PO-DA 5B



Summary for Subcatchment 6: PO-DA 6

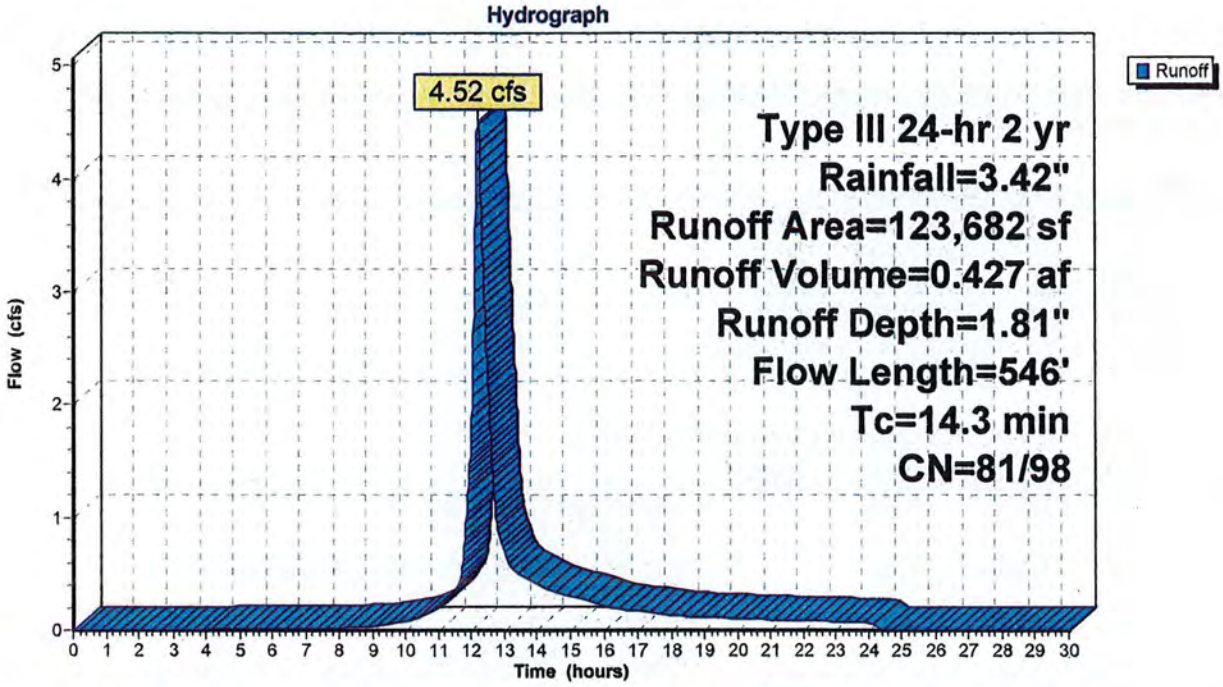
Runoff = 4.52 cfs @ 12.19 hrs, Volume= 0.427 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	13,009	98	Impervious, HSG D
*	47,083	85	Yard stone, HSG D
*	39,774	80	Grass cover, Good, HSG D
	853	78	Meadow, non-grazed, HSG D
	22,963	73	Brush, Good, HSG D
	123,682	82	Weighted Average
	110,673	81	89.48% Pervious Area
	13,009	98	10.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	80	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.0	296	0.0060	1.25		**Shallow Concentrated Flow, Yard stone** Unpaved Kv= 16.1 fps
14.3	546	Total			

Subcatchment 6: PO-DA 6



Summary for Subcatchment 9A: PO-DA 9A

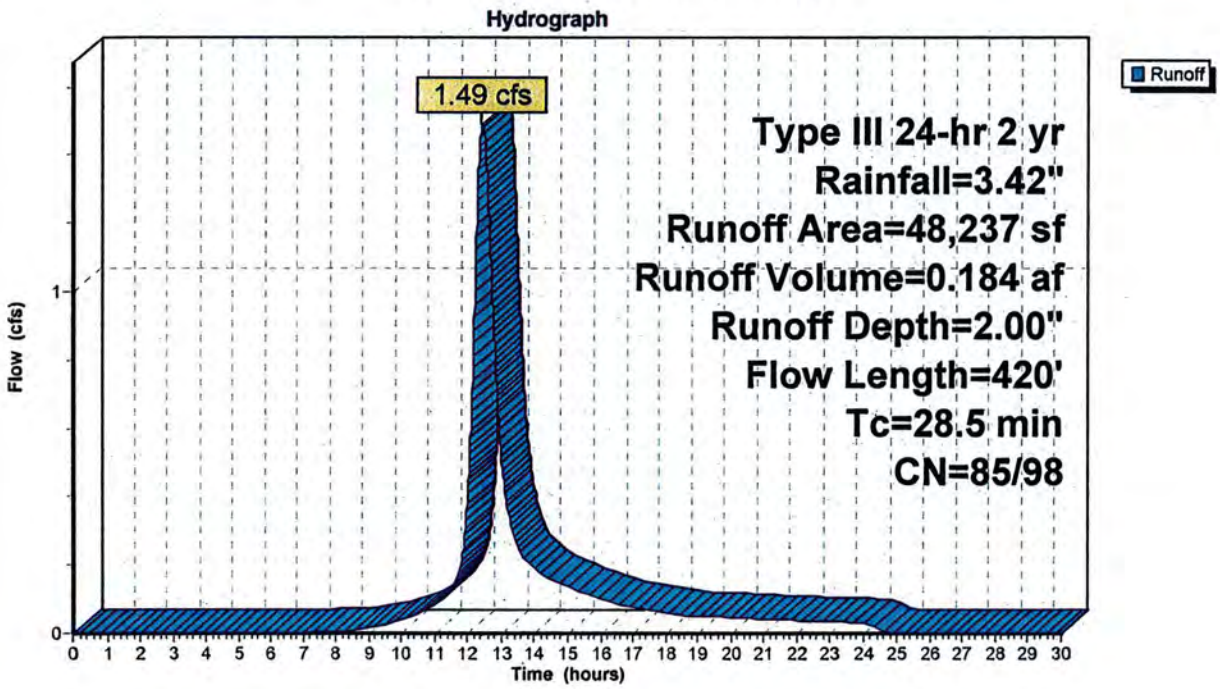
Runoff = 1.49 cfs @ 12.39 hrs, Volume= 0.184 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	650	98	Impervious, HSG D
*	1,367	98	Gravel road, HSG D
*	46,220	85	Yard stone, HSG D
	48,237	86	Weighted Average
	46,220	85	95.82% Pervious Area
	2,017	98	4.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
2.5	190	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
4.3	130	0.0010	0.51		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
28.5	420	Total			

Subcatchment 9A: PO-DA 9A



Summary for Subcatchment 9C: PO-DA 9C

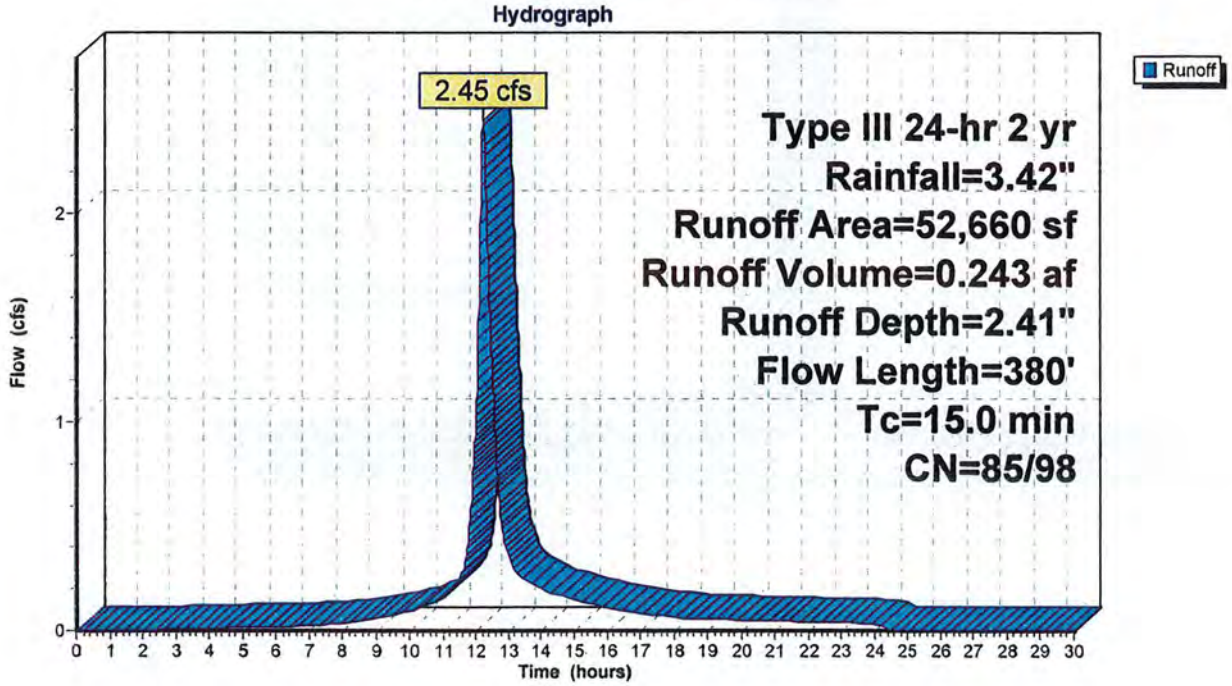
Runoff = 2.45 cfs @ 12.20 hrs, Volume= 0.243 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	1,117	98	Impervious, HSG D
*	18,457	98	Gravel road, HSG D
*	33,086	85	Yard stone, HSG D
	52,660	90	Weighted Average
	33,086	85	62.83% Pervious Area
	19,574	98	37.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.1	160	0.0220	2.39		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.3	120	0.0085	1.48		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
15.0	380	Total			

Subcatchment 9C: PO-DA 9C



Summary for Pond MH-1: MH1 to MH4

[57] Hint: Peaked at 603.93' (Flood elevation advised)

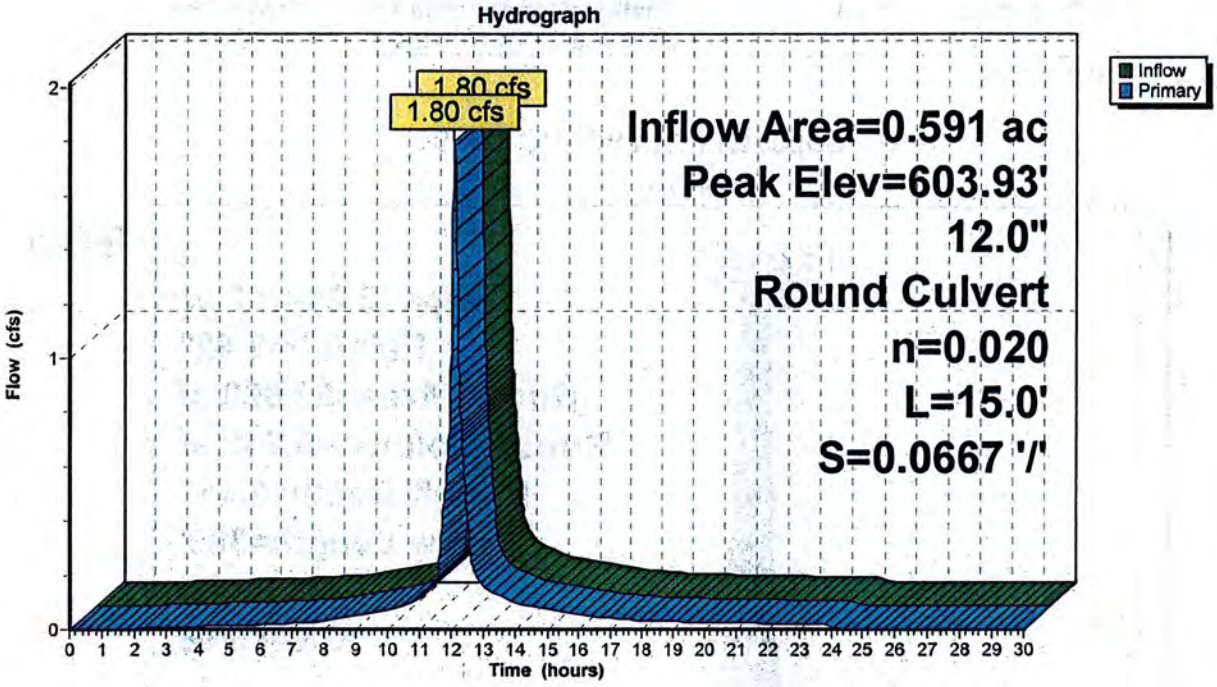
Inflow Area = 0.591 ac, 64.11% Impervious, Inflow Depth = 2.83" for 2 yr event
Inflow = 1.80 cfs @ 12.08 hrs, Volume= 0.139 af
Outflow = 1.80 cfs @ 12.08 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min
Primary = 1.80 cfs @ 12.08 hrs, Volume= 0.139 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 603.93' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0667 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.80 cfs @ 12.08 hrs HW=603.93' TW=603.04' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 1.80 cfs @ 2.92 fps)

Pond MH-1: MH1 to MH4



Summary for Pond MH-2: MH-2 to MH-3

[57] Hint: Peaked at 604.75' (Flood elevation advised)

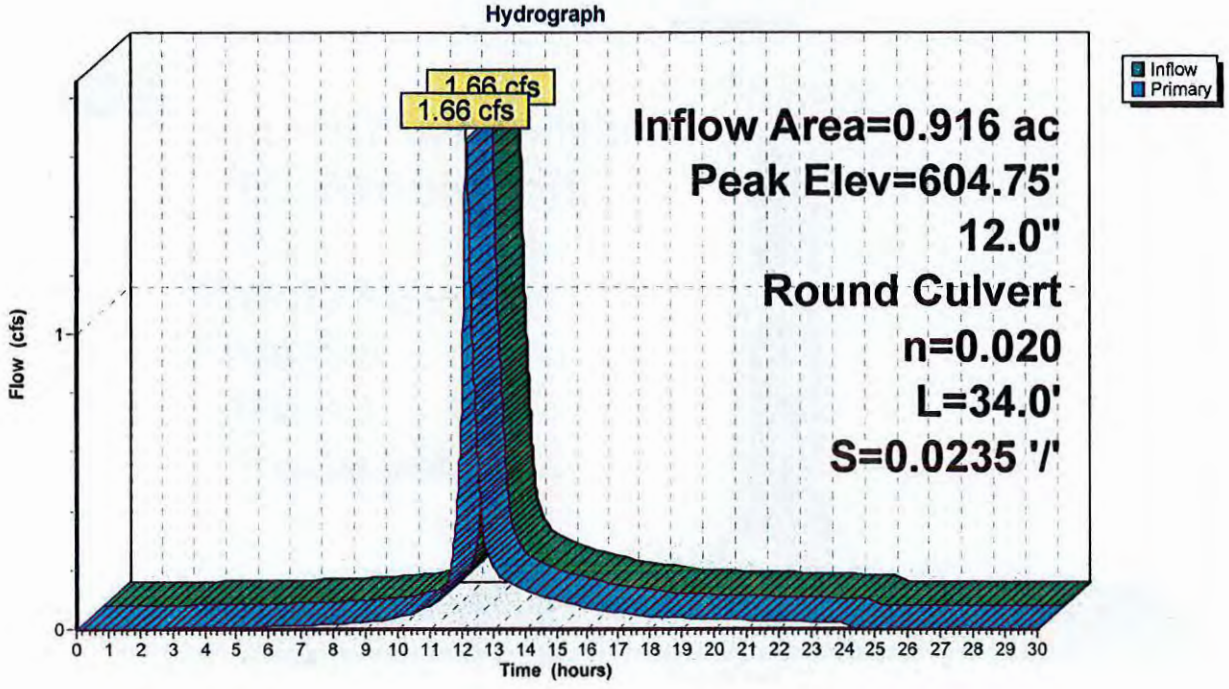
Inflow Area =	0.916 ac,	24.39% Impervious,	Inflow Depth =	1.91"	for 2 yr event
Inflow =	1.66 cfs @	12.15 hrs, Volume=	0.146 af		
Outflow =	1.66 cfs @	12.15 hrs, Volume=	0.146 af,	Atten= 0%,	Lag= 0.0 min
Primary =	1.66 cfs @	12.15 hrs, Volume=	0.146 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.75' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	604.00'	**12.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 604.00' / 603.20' S= 0.0235 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.66 cfs @ 12.15 hrs HW=604.75' TW=603.97' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.66 cfs @ 3.65 fps)

Pond MH-2: MH-2 to MH-3



Summary for Pond MH-3: MH-3 to MH-4

[57] Hint: Peaked at 603.97' (Flood elevation advised)

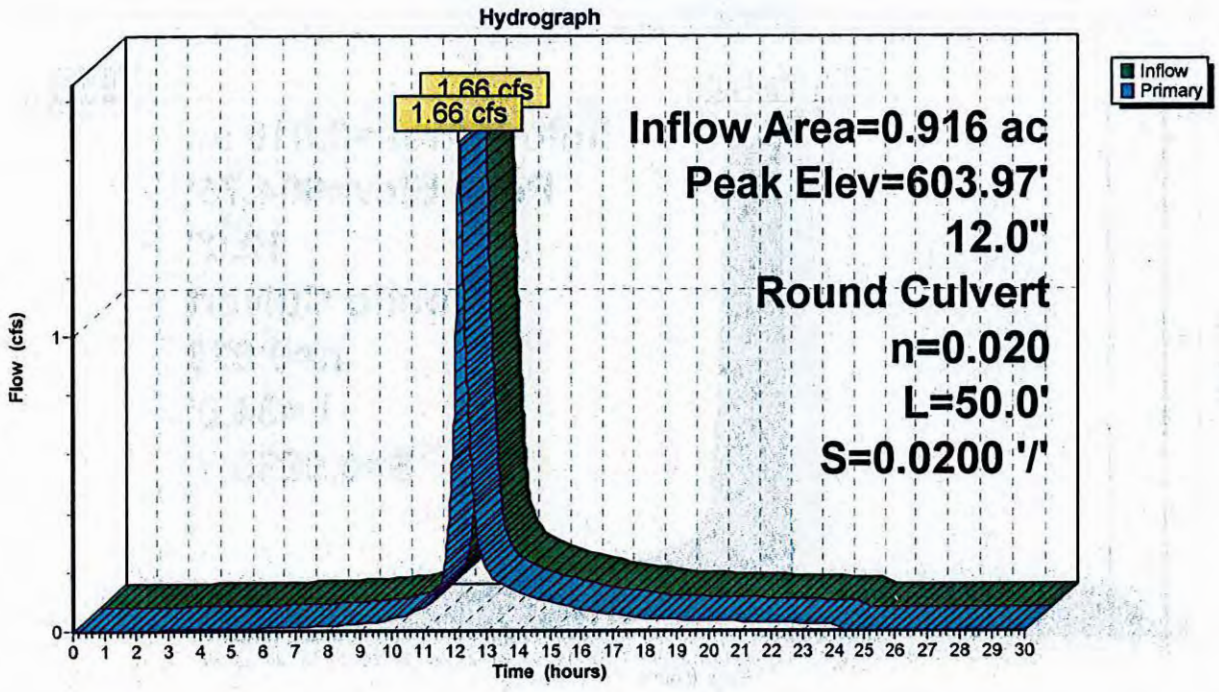
Inflow Area =	0.916 ac, 24.39% Impervious, Inflow Depth =	1.91"	for 2 yr event	
Inflow =	1.66 cfs @	12.15 hrs, Volume=	0.146 af	
Outflow =	1.66 cfs @	12.15 hrs, Volume=	0.146 af, Atten= 0%, Lag= 0.0 min	
Primary =	1.66 cfs @	12.15 hrs, Volume=	0.146 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 603.97' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.66 cfs @ 12.15 hrs HW=603.97' TW=603.02' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.66 cfs @ 3.56 fps)

Pond MH-3: MH-3 to MH-4



Summary for Pond MH-4: MH4 to MH5

[57] Hint: Peaked at 603.05' (Flood elevation advised)

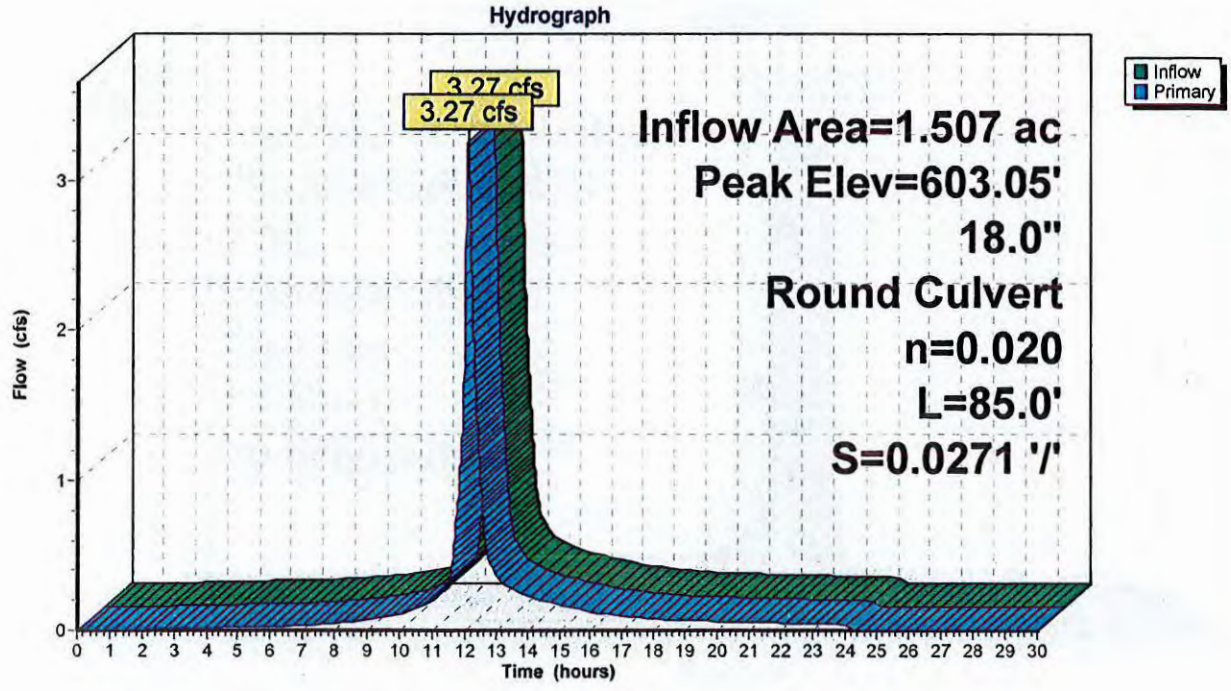
Inflow Area =	1.507 ac,	39.97% Impervious,	Inflow Depth =	2.27" for 2 yr event
Inflow =	3.27 cfs @	12.11 hrs, Volume=	0.286 af	
Outflow =	3.27 cfs @	12.11 hrs, Volume=	0.286 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.27 cfs @	12.11 hrs, Volume=	0.286 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 603.05' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	602.20'	**18.0" Round Culvert** L= 85.0' Ke= 0.500 Inlet / Outlet Invert= 602.20' / 599.90' S= 0.0271 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.26 cfs @ 12.11 hrs HW=603.05' TW=601.01' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.26 cfs @ 3.14 fps)

Pond MH-4: MH4 to MH5



Summary for Pond MH-5: MH 5 to MH 6

[57] Hint: Peaked at 601.02' (Flood elevation advised)

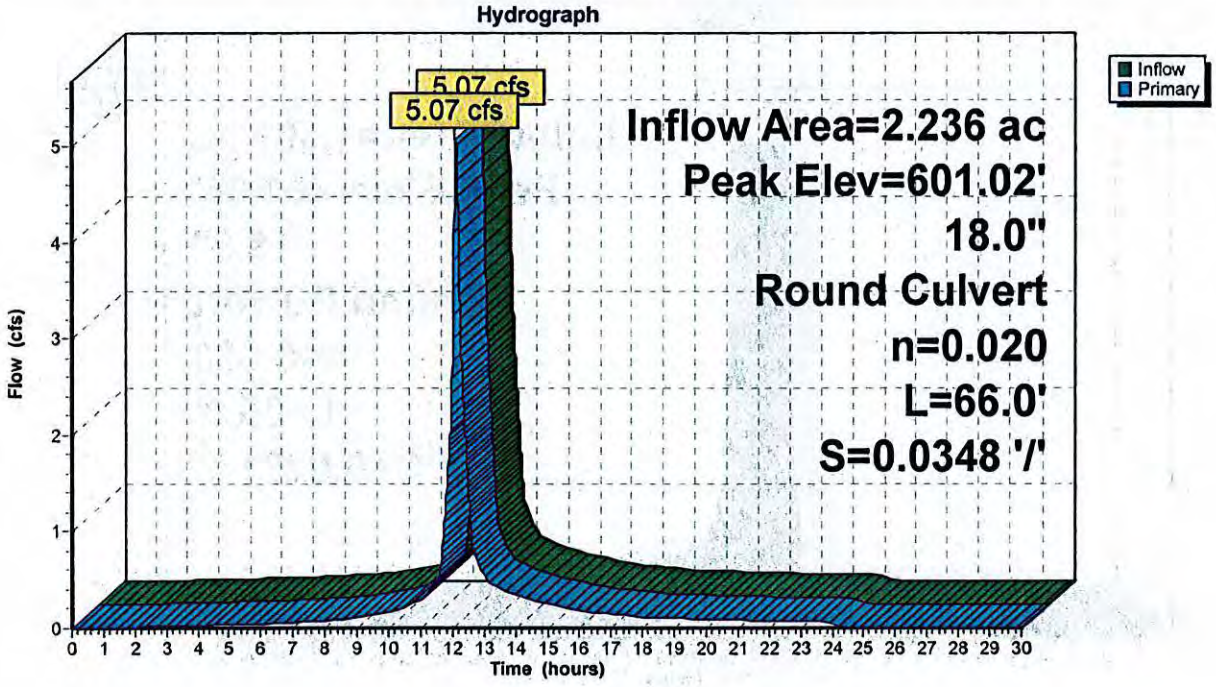
Inflow Area = 2.236 ac, 43.09% Impervious, Inflow Depth = 2.29" for 2 yr event
Inflow = 5.07 cfs @ 12.10 hrs, Volume= 0.428 af
Outflow = 5.07 cfs @ 12.10 hrs, Volume= 0.428 af, Atten= 0%, Lag= 0.0 min
Primary = 5.07 cfs @ 12.10 hrs, Volume= 0.428 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 601.02' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.90'	**18.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 599.90' / 597.60' S= 0.0348 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.07 cfs @ 12.10 hrs HW=601.02' TW=599.33' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.07 cfs @ 3.60 fps)

Pond MH-5: MH 5 to MH 6



Summary for Pond MH-6: MH 6 to MH 11

[57] Hint: Peaked at 599.41' (Flood elevation advised)

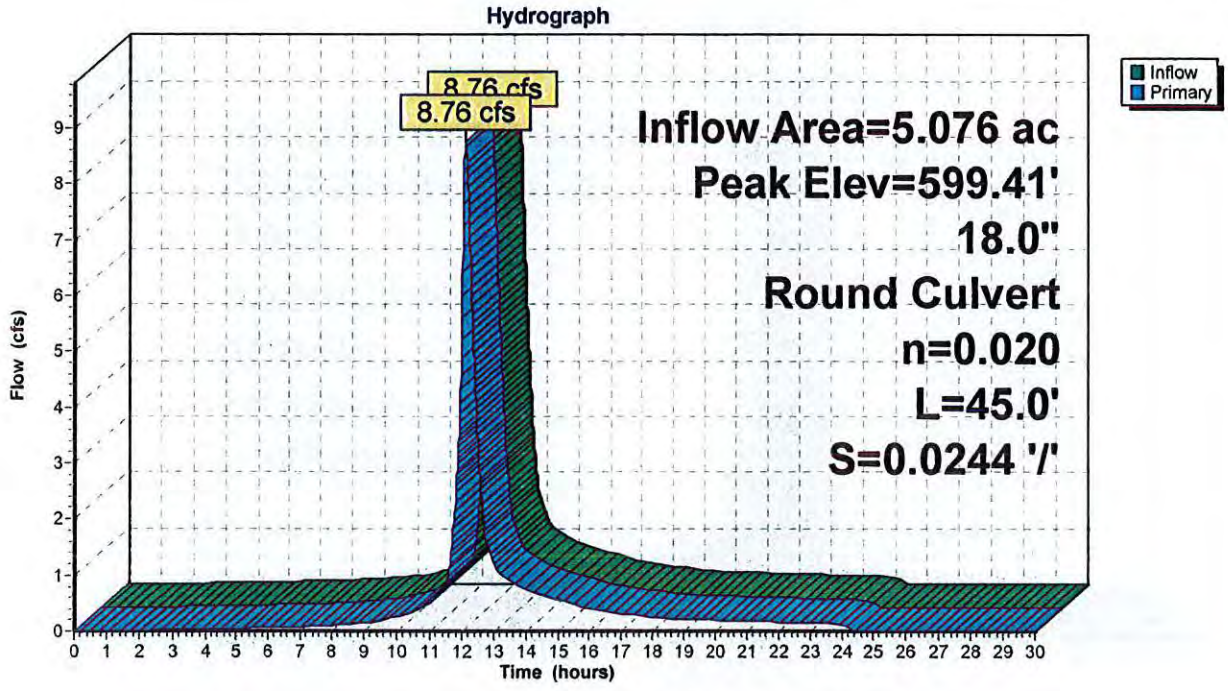
Inflow Area =	5.076 ac,	24.87% Impervious,	Inflow Depth =	2.02" for 2 yr event
Inflow =	8.76 cfs @	12.13 hrs, Volume=	0.855 af	
Outflow =	8.76 cfs @	12.13 hrs, Volume=	0.855 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.76 cfs @	12.13 hrs, Volume=	0.855 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.41' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.60'	**18.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 597.60' / 596.50' S= 0.0244 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.75 cfs @ 12.13 hrs HW=599.41' TW=597.83' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 8.75 cfs @ 4.95 fps)

Pond MH-6: MH 6 to MH 11



Summary for Pond MH-7: MH-7 to MH-11

[57] Hint: Peaked at 597.83' (Flood elevation advised)

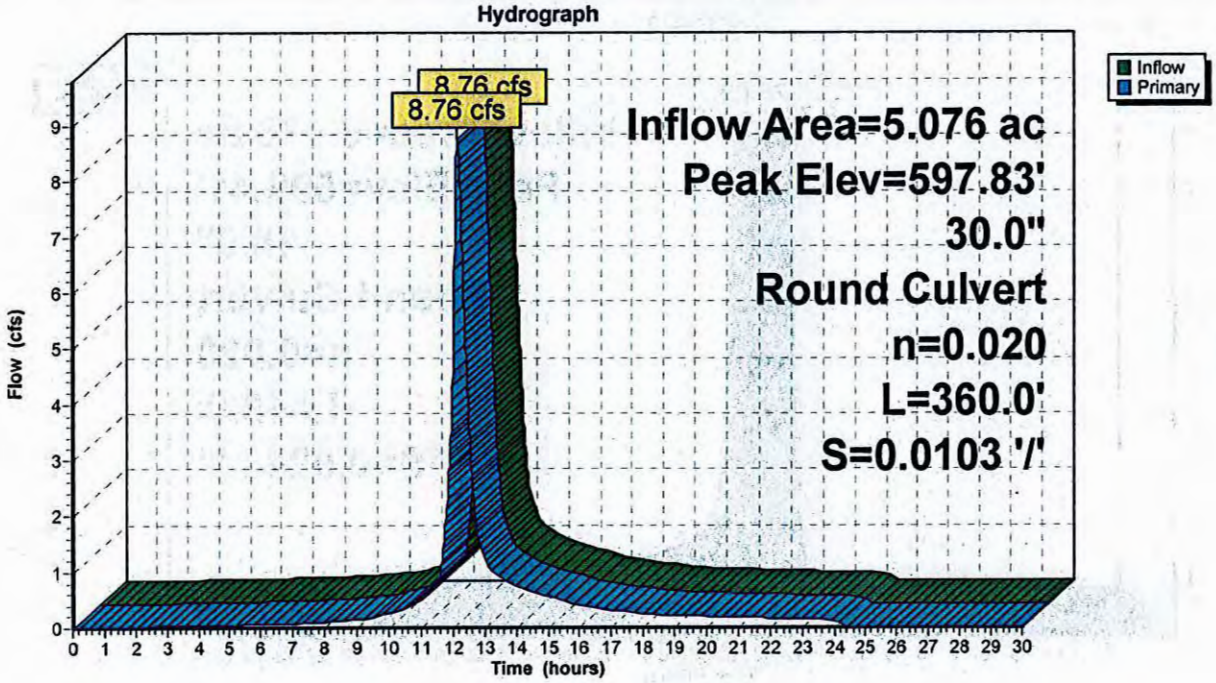
Inflow Area =	5.076 ac,	24.87% Impervious,	Inflow Depth =	2.02" for 2 yr event
Inflow =	8.76 cfs @	12.13 hrs, Volume=	0.855 af	
Outflow =	8.76 cfs @	12.13 hrs, Volume=	0.855 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.76 cfs @	12.13 hrs, Volume=	0.855 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 597.83' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**30.0" Round Culvert** L= 360.0' Ke= 0.500 Inlet / Outlet Invert= 596.50' / 592.80' S= 0.0103 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.75 cfs @ 12.13 hrs HW=597.83' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 8.75 cfs @ 4.81 fps)

Pond MH-7: MH-7 to MH-11



Summary for Pond MH-A: MH-A to MH-B

[43] Hint: Has no inflow (Outflow=Zero)

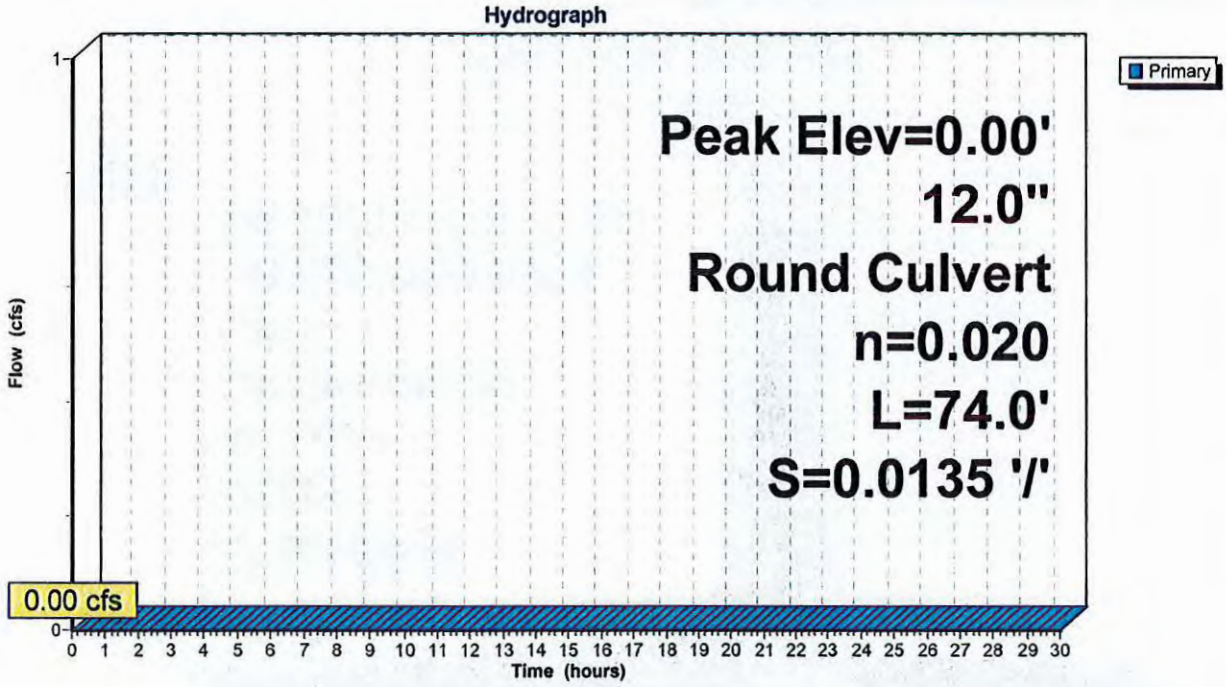
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 0.00' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**12.0" Round Culvert** L= 74.0' Ke= 0.500 Inlet / Outlet Invert= 599.00' / 598.00' S= 0.0135 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=598.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond MH-A: MH-A to MH-B



Summary for Pond MH-B: MH-B to MH-C

[57] Hint: Peaked at 599.15' (Flood elevation advised)

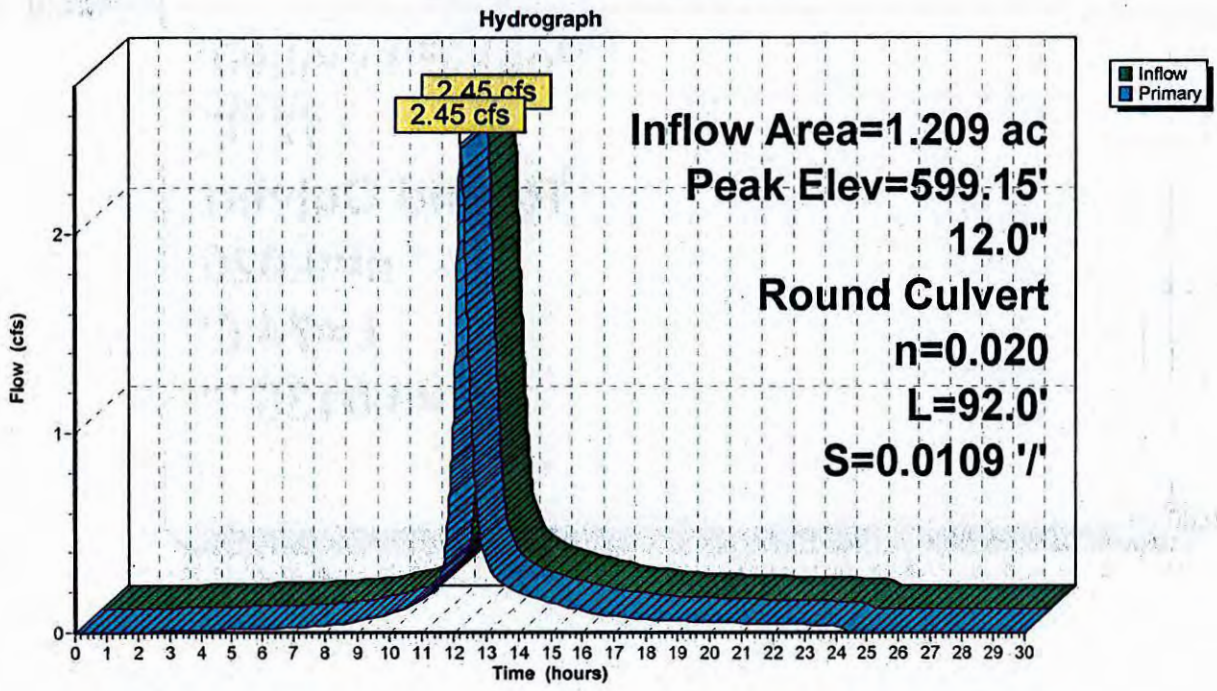
Inflow Area = 1.209 ac, 37.17% Impervious, Inflow Depth = 2.41" for 2 yr event
Inflow = 2.45 cfs @ 12.20 hrs, Volume= 0.243 af
Outflow = 2.45 cfs @ 12.20 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min
Primary = 2.45 cfs @ 12.20 hrs, Volume= 0.243 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.15' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**12.0" Round Culvert** L= 92.0' Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.00' S= 0.0109 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.45 cfs @ 12.20 hrs HW=599.14' TW=597.91' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.45 cfs @ 3.41 fps)

Pond MH-B: MH-B to MH-C



Summary for Pond MH-C: MH-Cto MH-D

[57] Hint: Peaked at 597.91' (Flood elevation advised)

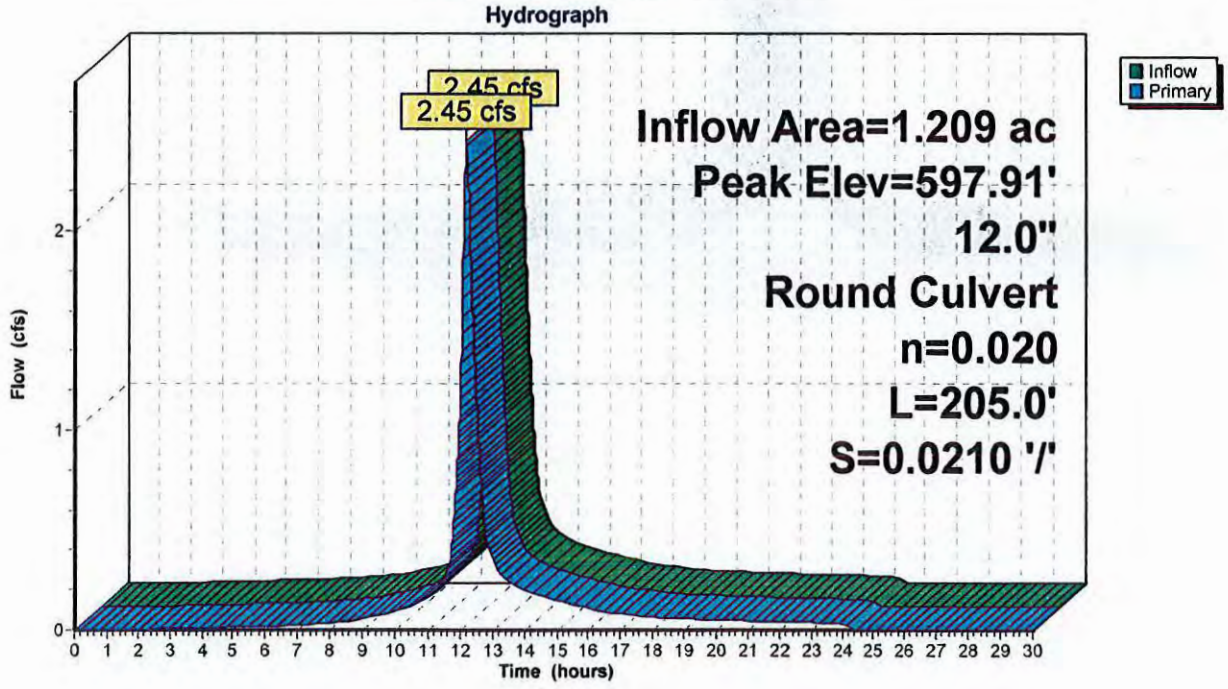
Inflow Area =	1.209 ac,	37.17% Impervious,	Inflow Depth =	2.41" for 2 yr event
Inflow =	2.45 cfs @	12.20 hrs, Volume=	0.243 af	
Outflow =	2.45 cfs @	12.20 hrs, Volume=	0.243 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.45 cfs @	12.20 hrs, Volume=	0.243 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 597.91' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 592.70' S= 0.0210 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.45 cfs @ 12.20 hrs HW=597.91' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.45 cfs @ 3.26 fps)

Pond MH-C: MH-Cto MH-D

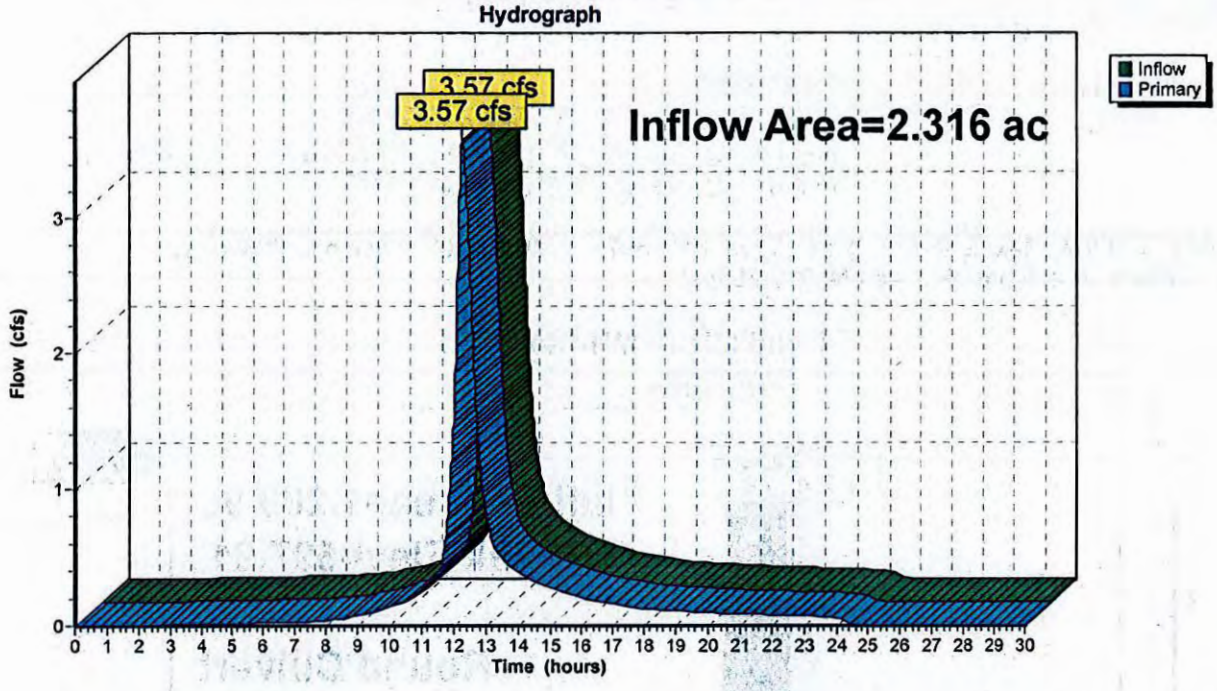


Summary for Link 3L: to MH D

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 2.21" for 2 yr event
Inflow = 3.57 cfs @ 12.24 hrs, Volume= 0.427 af
Primary = 3.57 cfs @ 12.24 hrs, Volume= 0.427 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: to MH D

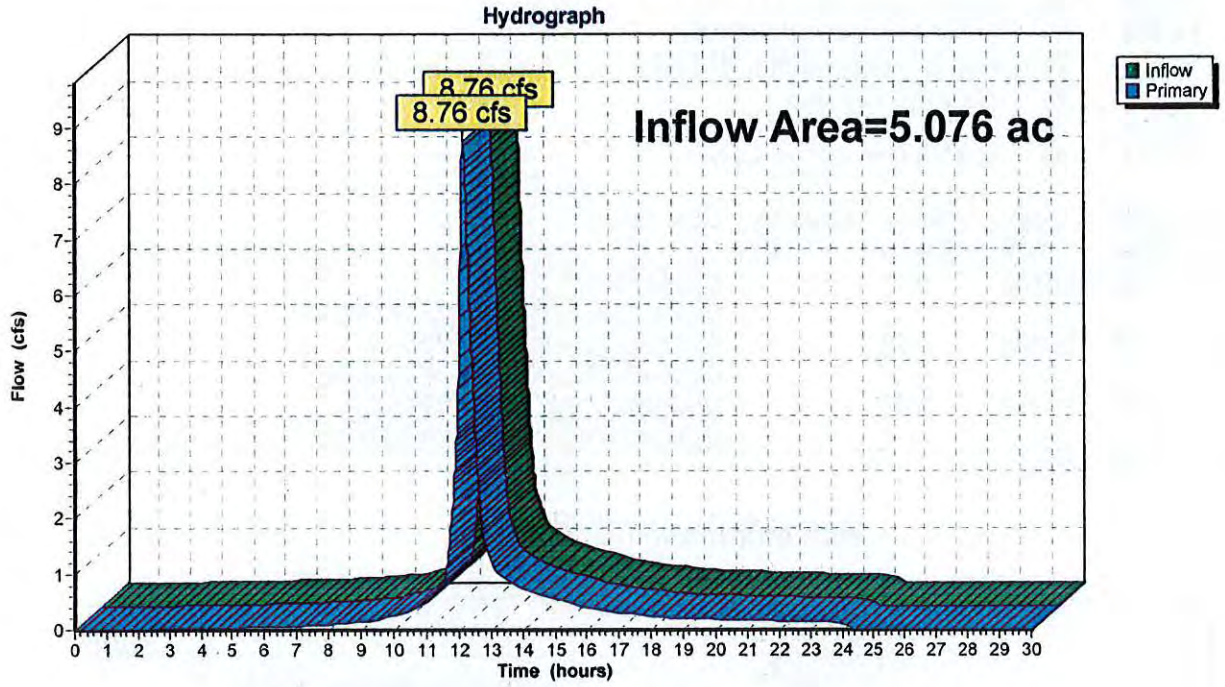


Summary for Link 4L: to MH 11

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 2.02" for 2 yr event
Inflow = 8.76 cfs @ 12.13 hrs, Volume= 0.855 af
Primary = 8.76 cfs @ 12.13 hrs, Volume= 0.855 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4L: to MH 11



Summary for Subcatchment 4: PO-DA 4

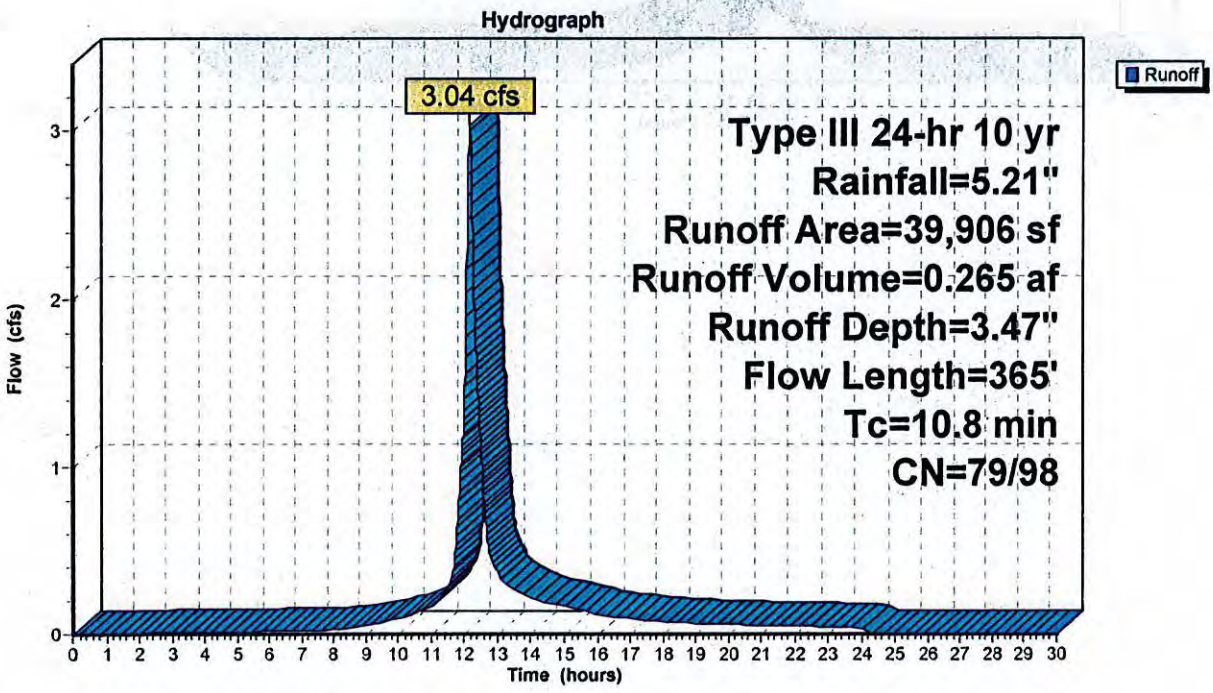
Runoff = 3.04 cfs @ 12.15 hrs, Volume= 0.265 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	4,334	98	Impervious, HSG D
*	5,398	98	Gravel road, HSG D
*	14,366	80	Grass cover, Good, HSG D
	15,808	78	Meadow, non-grazed, HSG D
	39,906	84	Weighted Average
	30,174	79	75.61% Pervious Area
	9,732	98	24.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	120	0.0830	4.32		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	145	0.0480	3.29		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
10.8	365	Total			

Subcatchment 4: PO-DA 4



Summary for Subcatchment 5A: PO-DA 5A

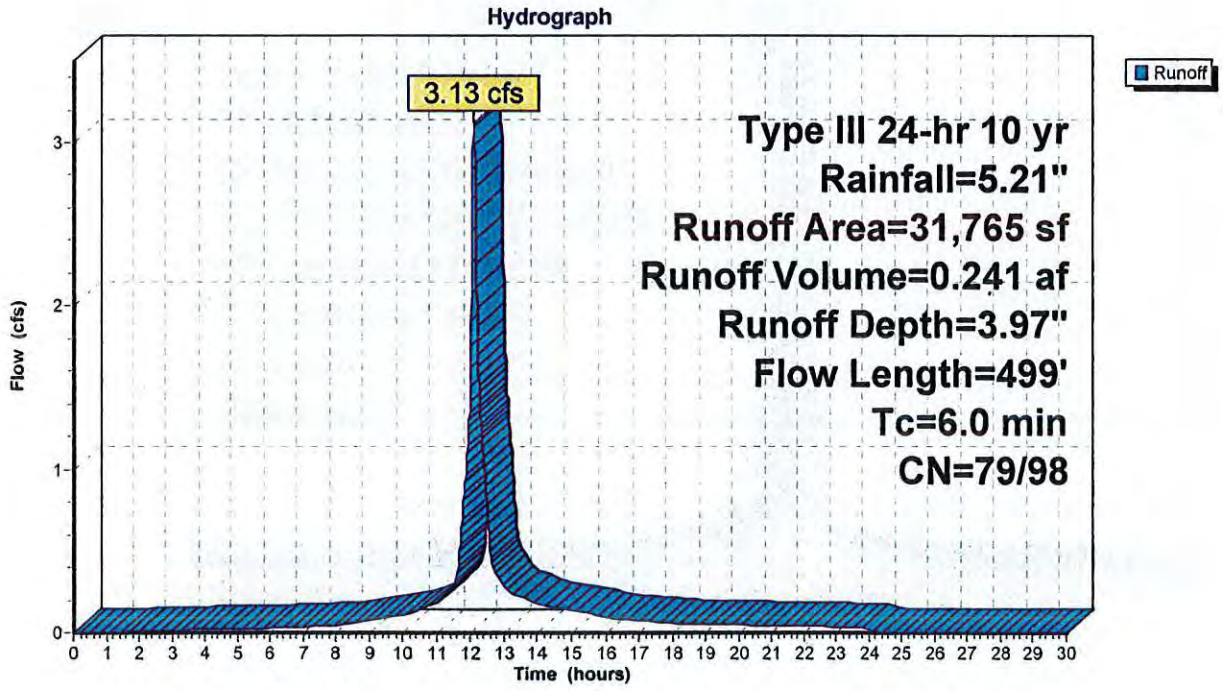
Runoff = 3.13 cfs @ 12.09 hrs, Volume= 0.241 af, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	15,734	98	Impervious, HSG D
*	8,318	80	Grass cover, Good, HSG D
	7,713	78	Meadow, non-grazed, HSG D
	31,765	88	Weighted Average
	16,031	79	50.47% Pervious Area
	15,734	98	49.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	150	0.0730	2.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.5	135	0.0590	4.93		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	180	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	34	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	499	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5A: PO-DA 5A



Summary for Subcatchment 5B: PO-DA 5B

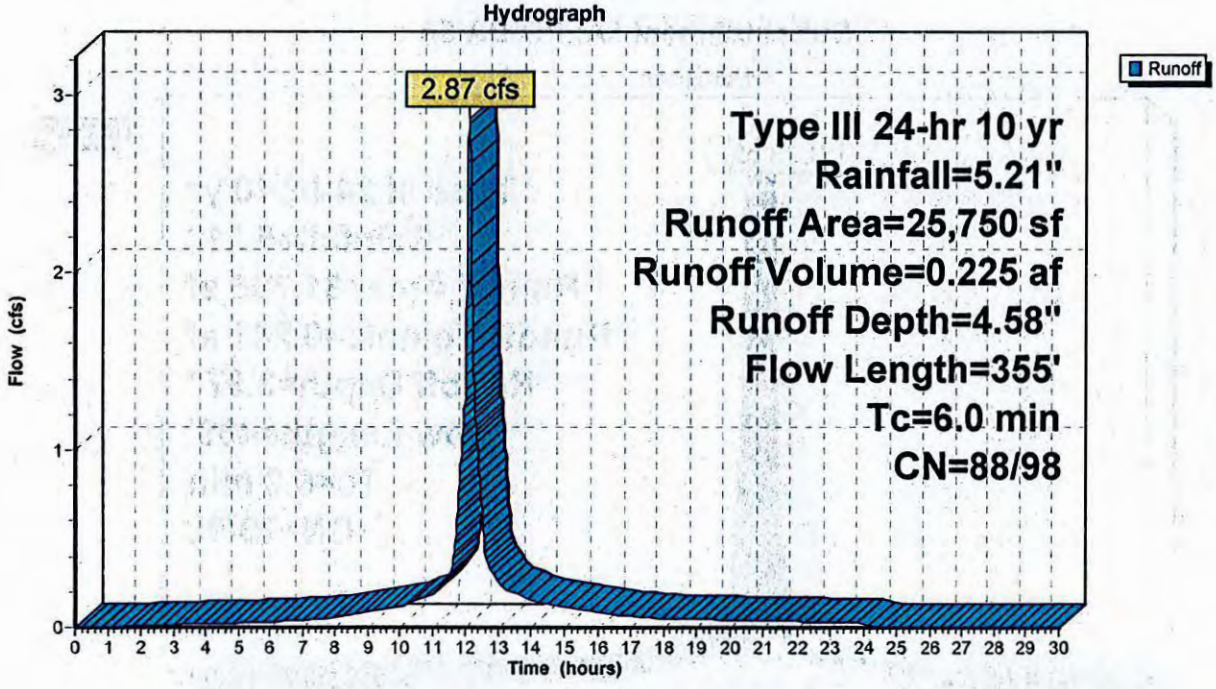
Runoff = 2.87 cfs @ 12.08 hrs, Volume= 0.225 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	16,509	98	Impervious, HSG D
*	6,800	91	Gravel, HSG D
*	2,441	80	Grass cover, HSG D
	25,750	94	Weighted Average
	9,241	88	35.89% Pervious Area
	16,509	98	64.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	150	0.0530	2.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.3	110	0.0680	5.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	95	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5B: PO-DA 5B



Summary for Subcatchment 6: PO-DA 6

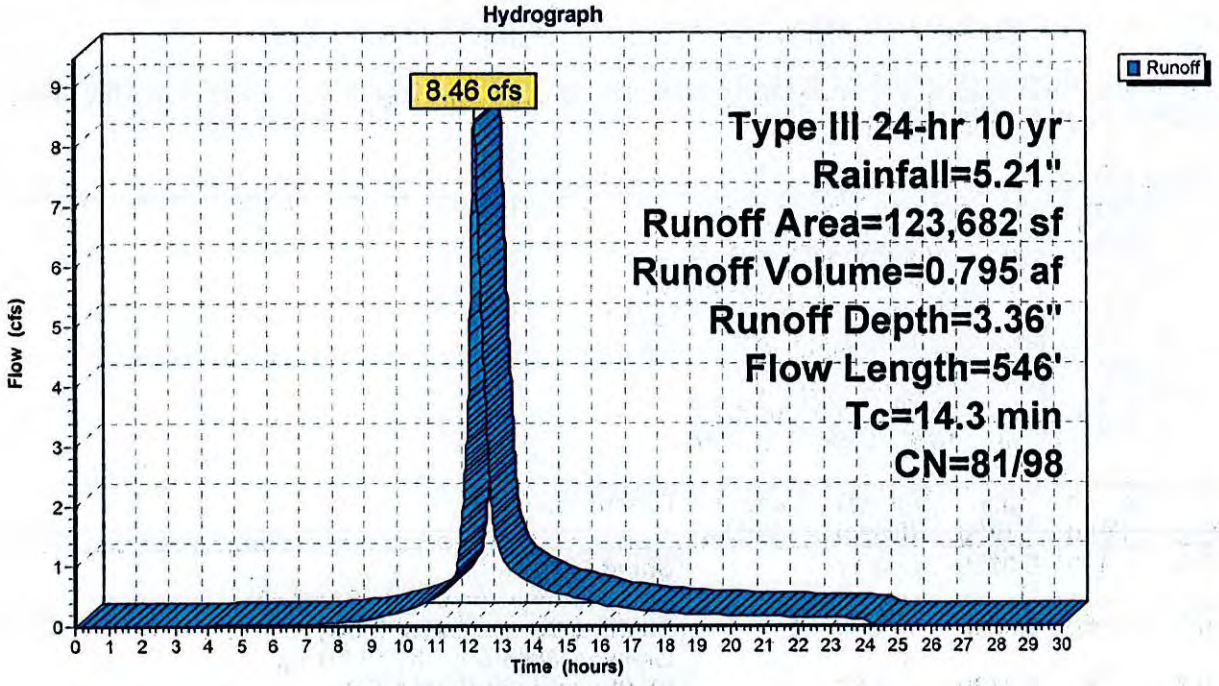
Runoff = 8.46 cfs @ 12.19 hrs, Volume= 0.795 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	13,009	98	Impervious, HSG D
*	47,083	85	Yard stone, HSG D
*	39,774	80	Grass cover, Good, HSG D
	853	78	Meadow, non-grazed, HSG D
	22,963	73	Brush, Good, HSG D
	123,682	82	Weighted Average
	110,673	81	89.48% Pervious Area
	13,009	98	10.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	80	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.0	296	0.0060	1.25		**Shallow Concentrated Flow, Yard stone** Unpaved Kv= 16.1 fps
14.3	546	Total			

Subcatchment 6: PO-DA 6



Summary for Subcatchment 9A: PO-DA 9A

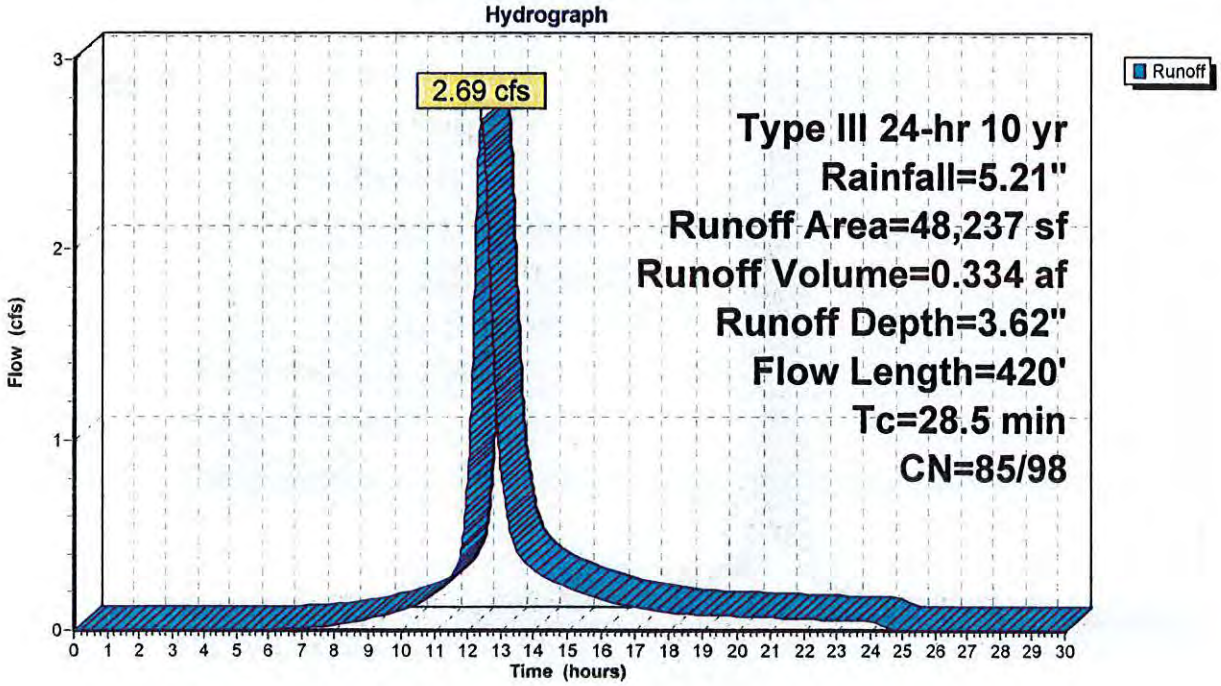
Runoff = 2.69 cfs @ 12.38 hrs, Volume= 0.334 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	650	98	Impervious, HSG D
*	1,367	98	Gravel road, HSG D
*	46,220	85	Yard stone, HSG D
	48,237	86	Weighted Average
	46,220	85	95.82% Pervious Area
	2,017	98	4.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
2.5	190	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
4.3	130	0.0010	0.51		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
28.5	420	Total			

Subcatchment 9A: PO-DA 9A



Summary for Subcatchment 9C: PO-DA 9C

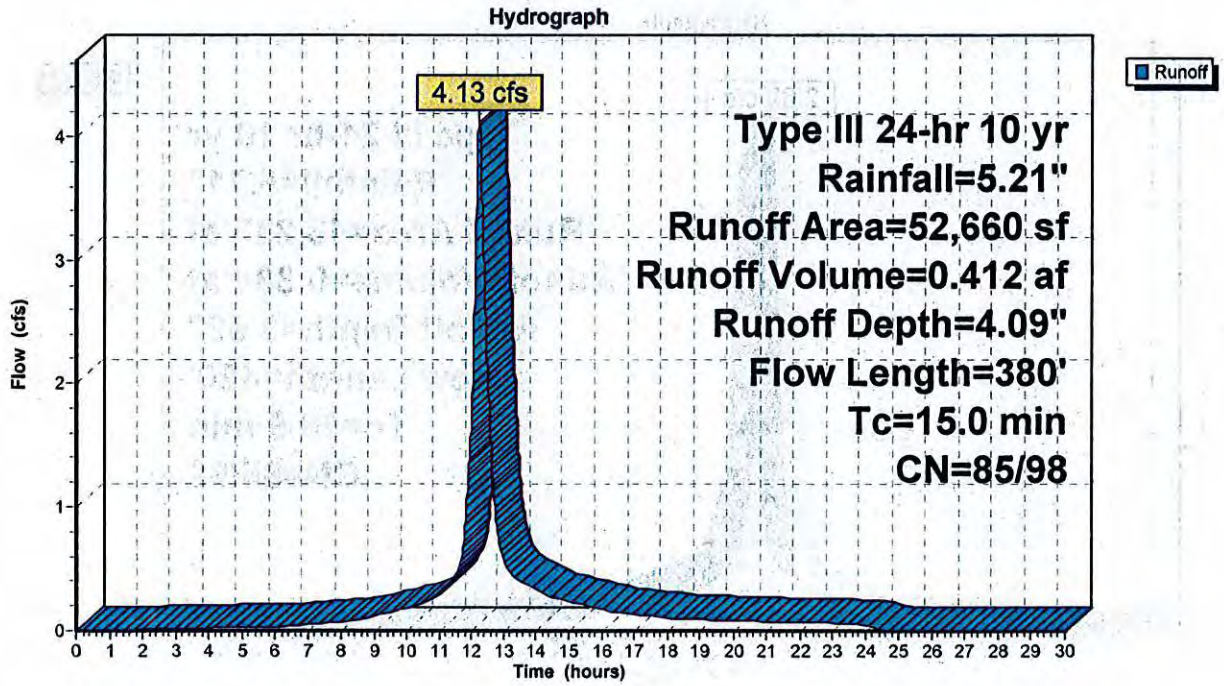
Runoff = 4.13 cfs @ 12.20 hrs, Volume= 0.412 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	1,117	98	Impervious, HSG D
*	18,457	98	Gravel road, HSG D
*	33,086	85	Yard stone, HSG D
	52,660	90	Weighted Average
	33,086	85	62.83% Pervious Area
	19,574	98	37.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.1	160	0.0220	2.39		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.3	120	0.0085	1.48		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
15.0	380	Total			

Subcatchment 9C: PO-DA 9C



Summary for Pond MH-1: MH1 to MH4

[57] Hint: Peaked at 605.29' (Flood elevation advised)

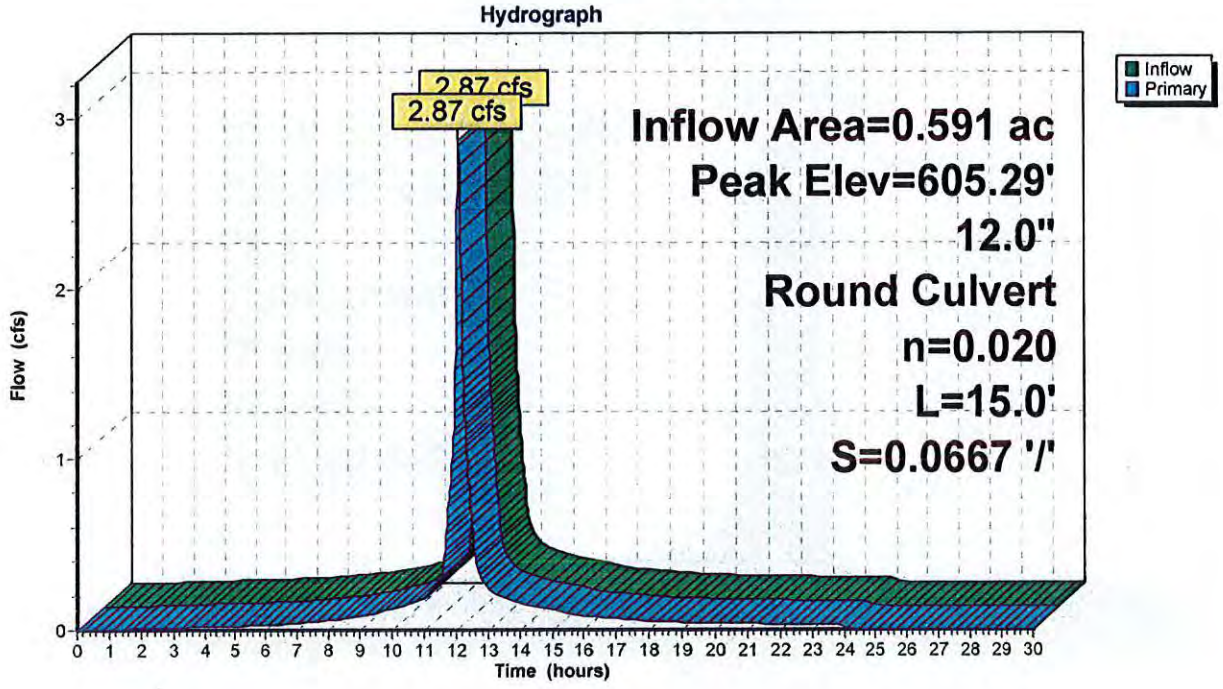
Inflow Area = 0.591 ac, 64.11% Impervious, Inflow Depth = 4.58" for 10 yr event
Inflow = 2.87 cfs @ 12.08 hrs, Volume= 0.225 af
Outflow = 2.87 cfs @ 12.08 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min
Primary = 2.87 cfs @ 12.08 hrs, Volume= 0.225 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 605.29' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0667 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.72 cfs @ 12.08 hrs HW=604.43' TW=603.91' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.72 cfs @ 3.46 fps)

Pond MH-1: MH1 to MH4



Summary for Pond MH-2: MH-2 to MH-3

[57] Hint: Peaked at 606.92' (Flood elevation advised)

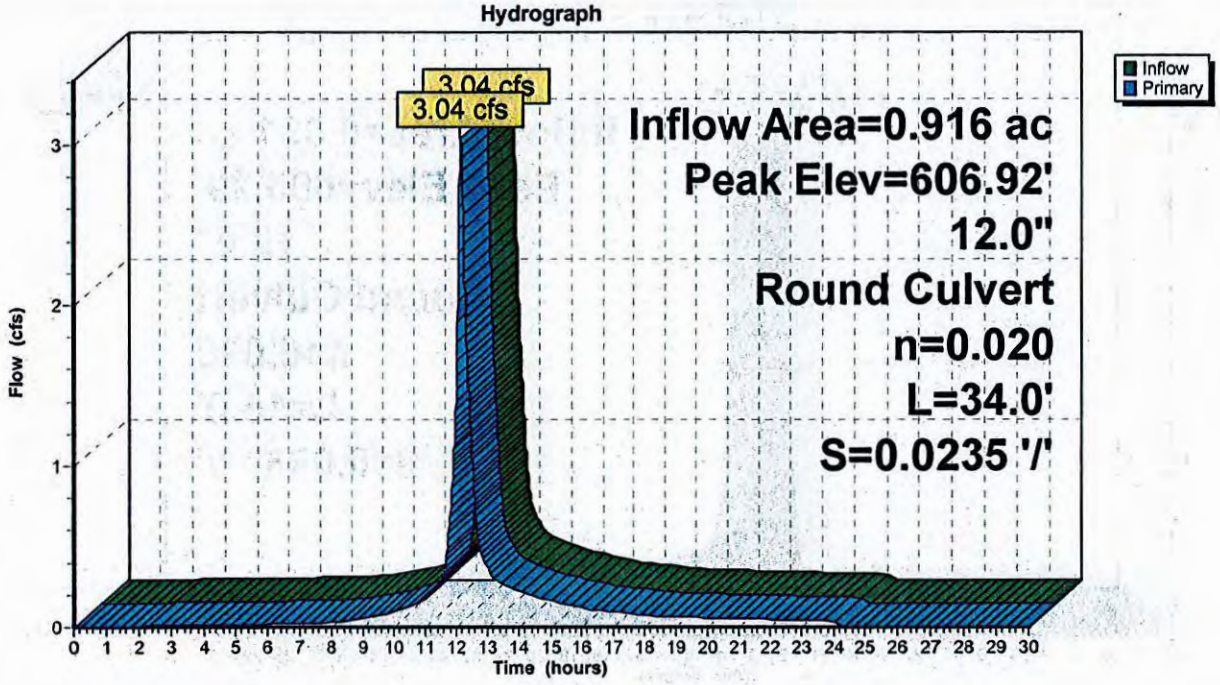
Inflow Area =	0.916 ac, 24.39% Impervious,	Inflow Depth =	3.47"	for 10 yr event
Inflow =	3.04 cfs @ 12.15 hrs,	Volume=	0.265 af	
Outflow =	3.04 cfs @ 12.15 hrs,	Volume=	0.265 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.04 cfs @ 12.15 hrs,	Volume=	0.265 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 606.92' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	604.00'	**12.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 604.00' / 603.20' S= 0.0235 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.08 cfs @ 12.15 hrs HW=606.87' TW=605.90' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.08 cfs @ 3.92 fps)

Pond MH-2: MH-2 to MH-3



Summary for Pond MH-3: MH-3 to MH-4

[57] Hint: Peaked at 606.03' (Flood elevation advised)

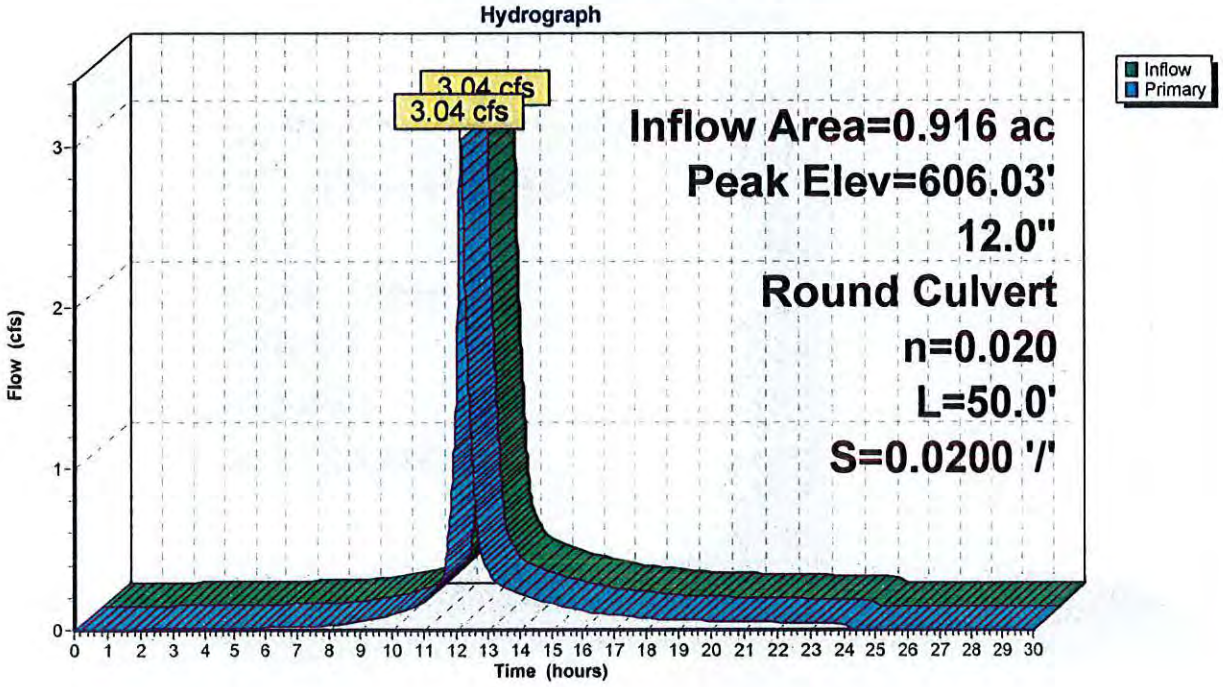
Inflow Area = 0.916 ac, 24.39% Impervious, Inflow Depth = 3.47" for 10 yr event
Inflow = 3.04 cfs @ 12.15 hrs, Volume= 0.265 af
Outflow = 3.04 cfs @ 12.15 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
Primary = 3.04 cfs @ 12.15 hrs, Volume= 0.265 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 606.03' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.16 cfs @ 12.15 hrs HW=605.90' TW=604.59' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.16 cfs @ 4.02 fps)

Pond MH-3: MH-3 to MH-4



Summary for Pond MH-4: MH4 to MH5

[57] Hint: Peaked at 604.78' (Flood elevation advised)

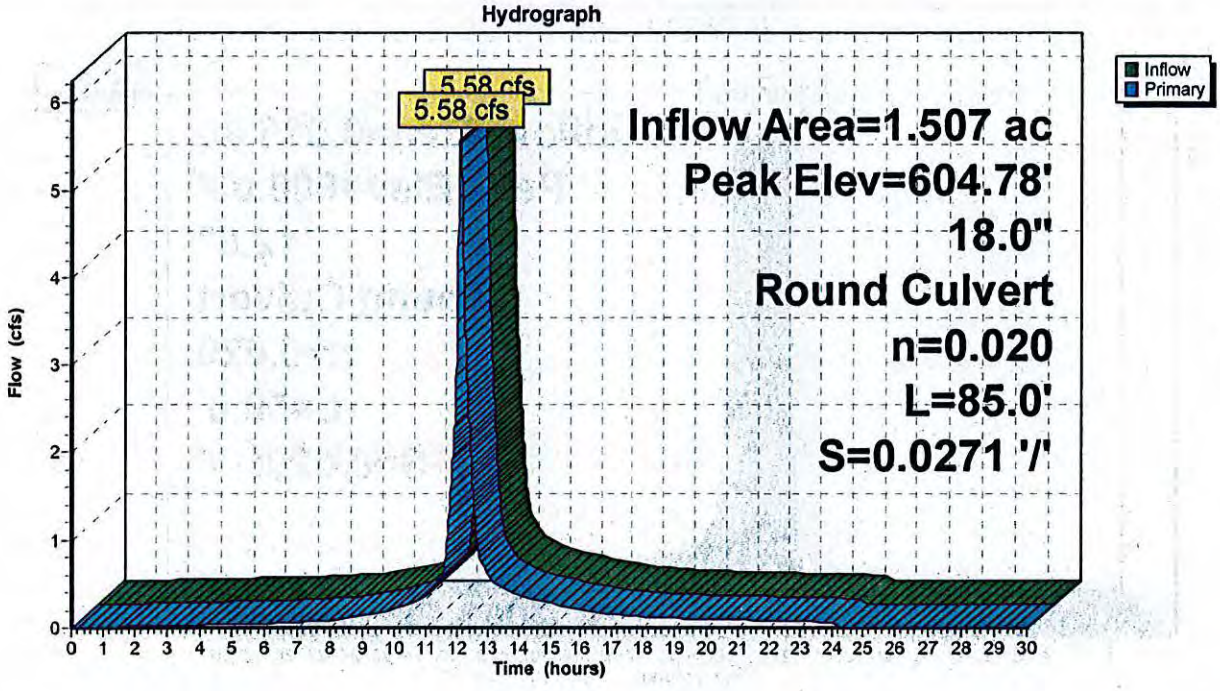
Inflow Area = 1.507 ac, 39.97% Impervious, Inflow Depth = 3.90" for 10 yr event
Inflow = 5.58 cfs @ 12.11 hrs, Volume= 0.490 af
Outflow = 5.58 cfs @ 12.11 hrs, Volume= 0.490 af, Atten= 0%, Lag= 0.0 min
Primary = 5.58 cfs @ 12.11 hrs, Volume= 0.490 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.78' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	602.20'	**18.0" Round Culvert** L= 85.0' Ke= 0.500 Inlet / Outlet Invert= 602.20' / 599.90' S= 0.0271 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.03 cfs @ 12.11 hrs HW=604.65' TW=603.99' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.03 cfs @ 2.84 fps)

Pond MH-4: MH4 to MH5



Summary for Pond MH-5: MH 5 to MH 6

[57] Hint: Peaked at 604.07' (Flood elevation advised)

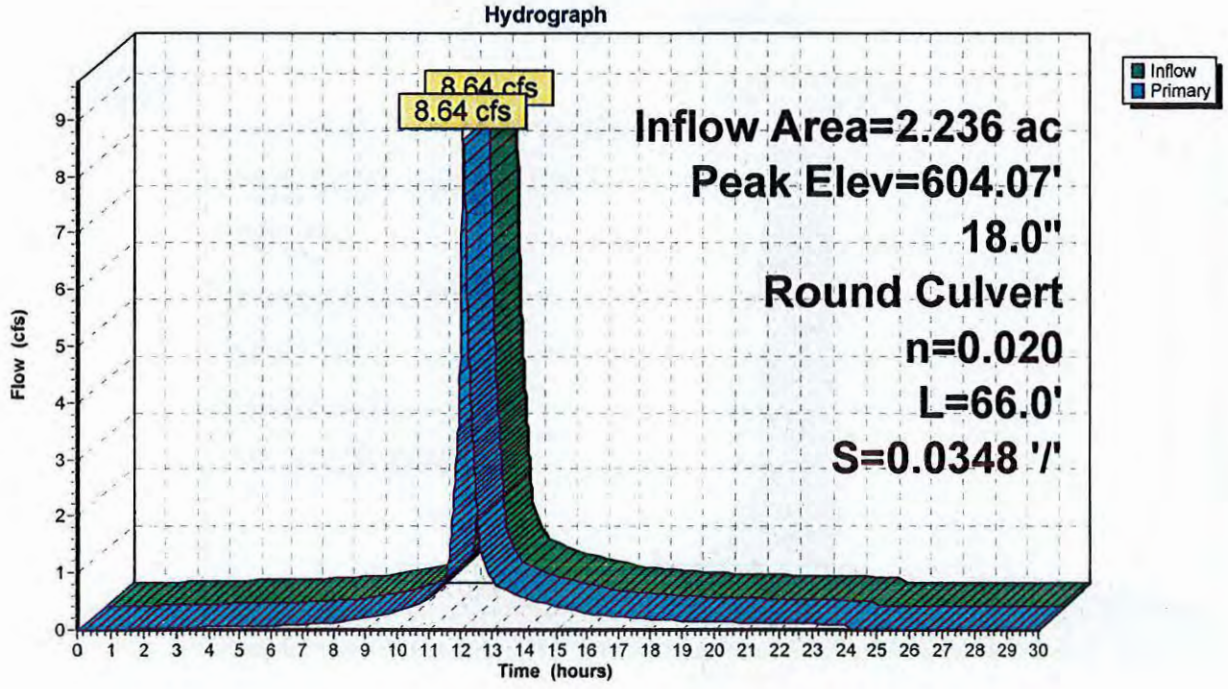
Inflow Area =	2.236 ac,	43.09% Impervious,	Inflow Depth =	3.92" for 10 yr event
Inflow =	8.64 cfs @	12.10 hrs, Volume=	0.731 af	
Outflow =	8.64 cfs @	12.10 hrs, Volume=	0.731 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.64 cfs @	12.10 hrs, Volume=	0.731 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.07' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.90'	**18.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 599.90' / 597.60' S= 0.0348 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.55 cfs @ 12.10 hrs HW=603.81' TW=602.23' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 8.55 cfs @ 4.84 fps)

Pond MH-5: MH 5 to MH 6



Summary for Pond MH-6: MH 6 to MH 11

[57] Hint: Peaked at 602.60' (Flood elevation advised)

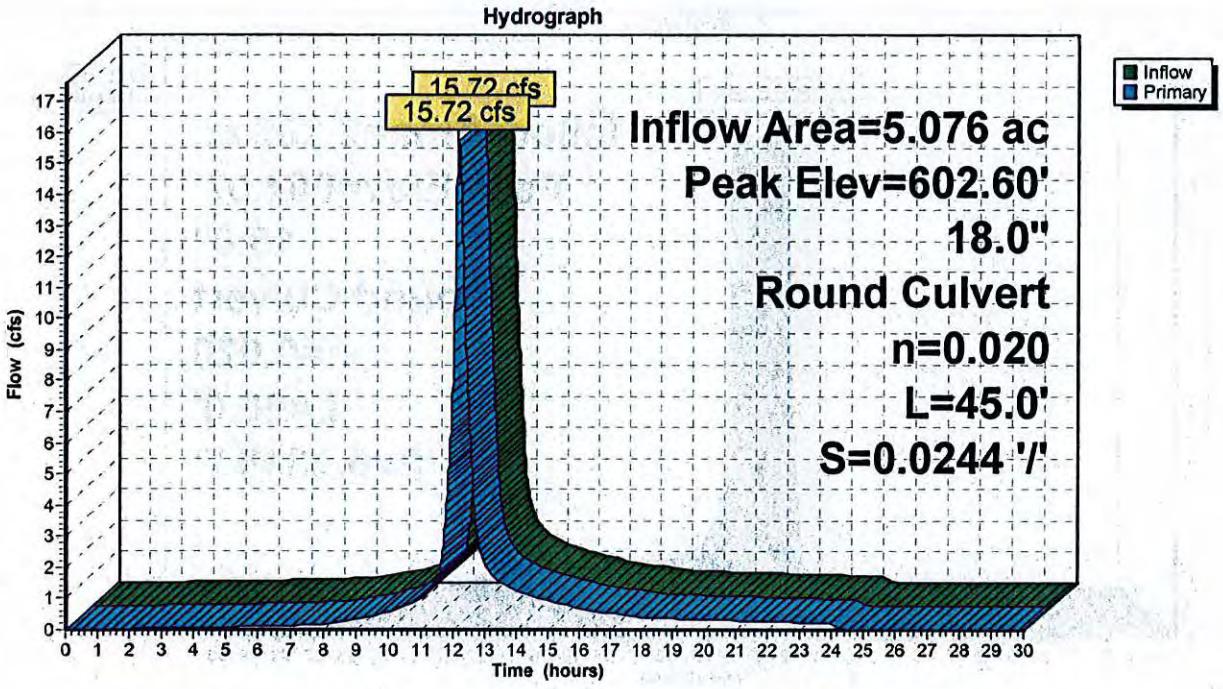
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 3.61" for 10 yr event
Inflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af
Outflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af, Atten= 0%, Lag= 0.0 min
Primary = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 602.60' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.60'	**18.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 597.60' / 596.50' S= 0.0244 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=15.71 cfs @ 12.14 hrs HW=602.60' TW=598.37' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 15.71 cfs @ 8.89 fps)

Pond MH-6: MH 6 to MH 11



Summary for Pond MH-7: MH-7 to MH-11

[57] Hint: Peaked at 598.37' (Flood elevation advised)

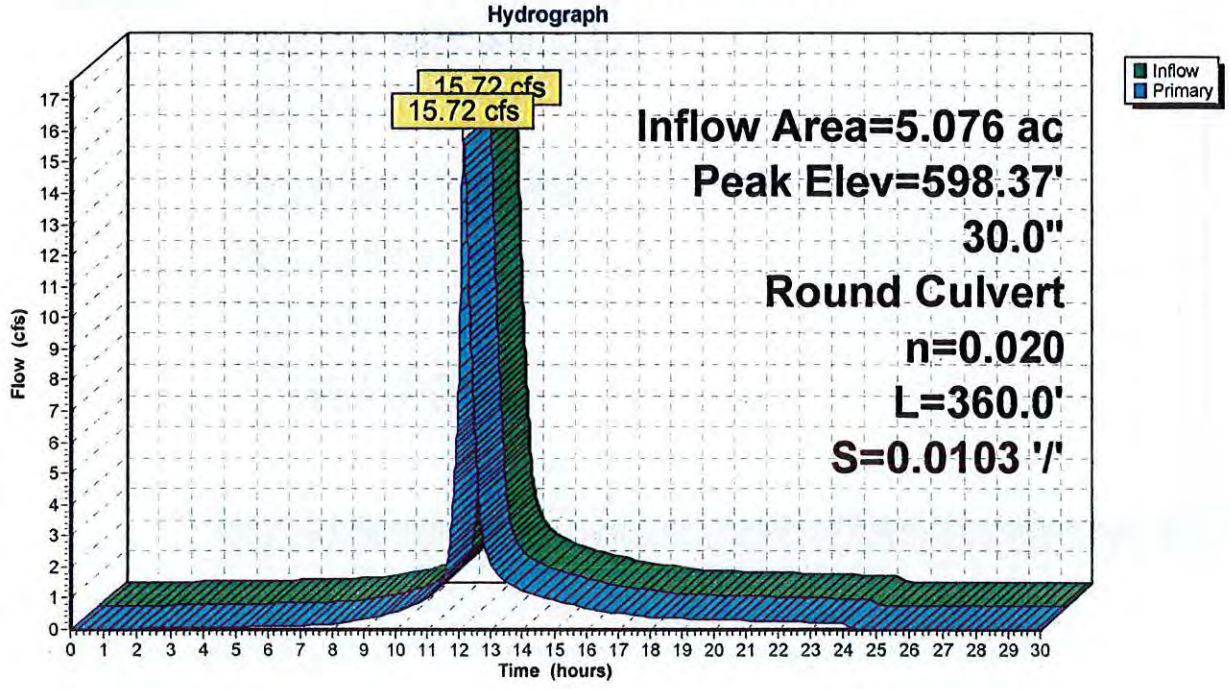
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 3.61" for 10 yr event
Inflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af
Outflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af, Atten= 0%, Lag= 0.0 min
Primary = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.37' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**30.0" Round Culvert** L= 360.0' Ke= 0.500 Inlet / Outlet Invert= 596.50' / 592.80' S= 0.0103 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=15.71 cfs @ 12.14 hrs HW=598.37' TW=0.00' (Dynamic Tailwater)
↳**1=Culvert** (Barrel Controls 15.71 cfs @ 5.55 fps)

Pond MH-7: MH-7 to MH-11



Summary for Pond MH-A: MH-A to MH-B

[43] Hint: Has no inflow (Outflow=Zero)

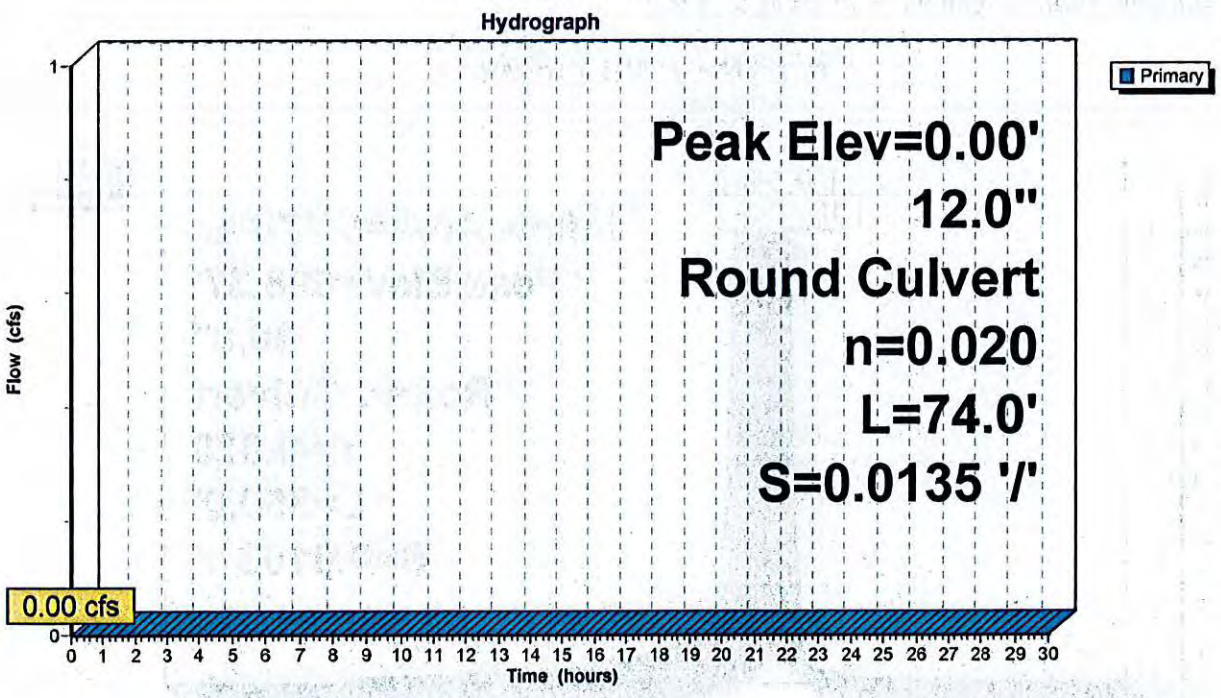
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 0.00' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**12.0" Round Culvert** L= 74.0' Ke= 0.500 Inlet / Outlet Invert= 599.00' / 598.00' S= 0.0135 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=598.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond MH-A: MH-A to MH-B



Summary for Pond MH-B: MH-B to MH-C

[57] Hint: Peaked at 604.45' (Flood elevation advised)

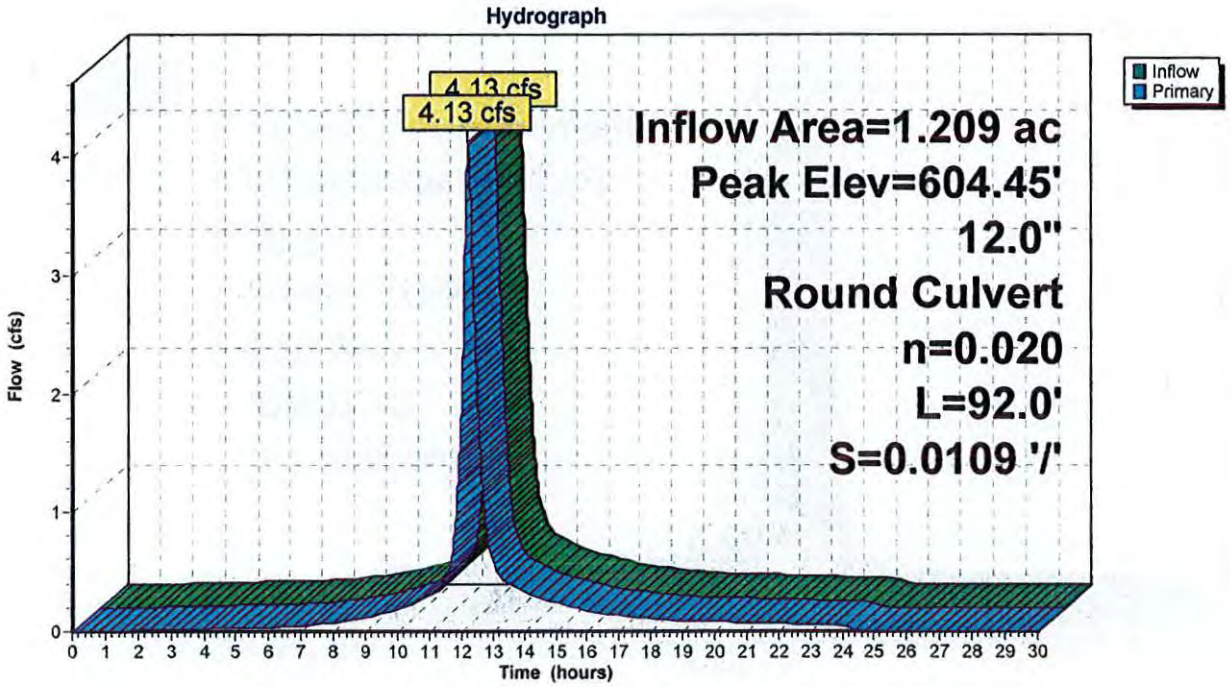
Inflow Area =	1.209 ac,	37.17% Impervious,	Inflow Depth =	4.09"	for 10 yr event
Inflow =	4.13 cfs @	12.20 hrs, Volume=	0.412 af		
Outflow =	4.13 cfs @	12.20 hrs, Volume=	0.412 af,	Atten= 0%,	Lag= 0.0 min
Primary =	4.13 cfs @	12.20 hrs, Volume=	0.412 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.45' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**12.0" Round Culvert** L= 92.0' Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.00' S= 0.0109 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.13 cfs @ 12.20 hrs HW=604.45' TW=600.87' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 4.13 cfs @ 5.25 fps)

Pond MH-B: MH-B to MH-C



Summary for Pond MH-C: MH-Cto MH-D

[57] Hint: Peaked at 600.88' (Flood elevation advised)

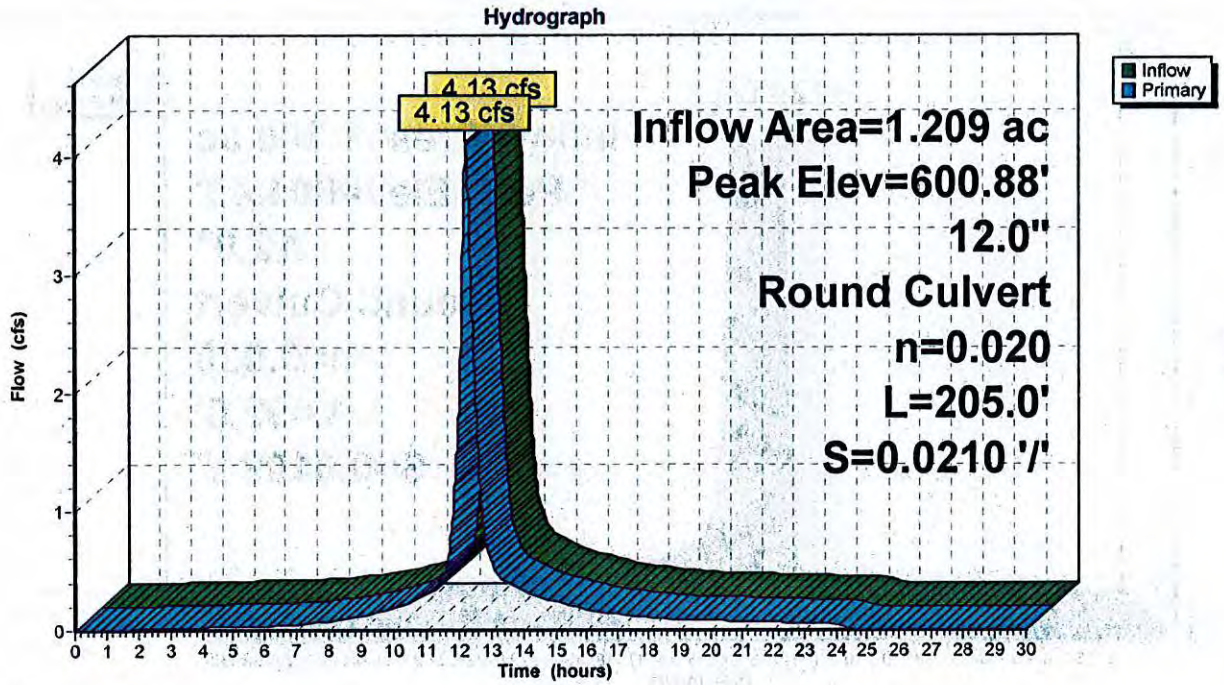
Inflow Area =	1.209 ac,	37.17% Impervious,	Inflow Depth =	4.09"	for 10 yr event
Inflow =	4.13 cfs @	12.20 hrs, Volume=	0.412 af		
Outflow =	4.13 cfs @	12.20 hrs, Volume=	0.412 af,	Atten= 0%,	Lag= 0.0 min
Primary =	4.13 cfs @	12.20 hrs, Volume=	0.412 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 600.88' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 592.70' S= 0.0210 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.13 cfs @ 12.20 hrs HW=600.87' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.13 cfs @ 5.25 fps)

Pond MH-C: MH-Cto MH-D

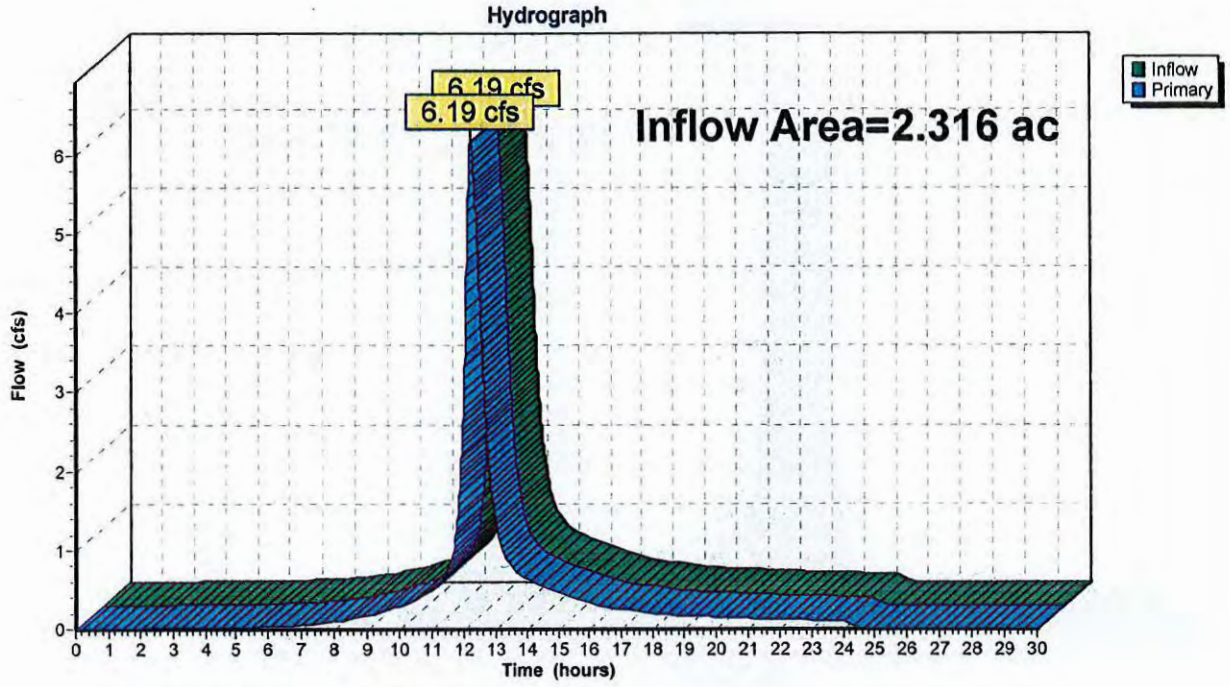


Summary for Link 3L: to MH D

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 3.86" for 10 yr event
Inflow = 6.19 cfs @ 12.24 hrs, Volume= 0.746 af
Primary = 6.19 cfs @ 12.24 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: to MH D

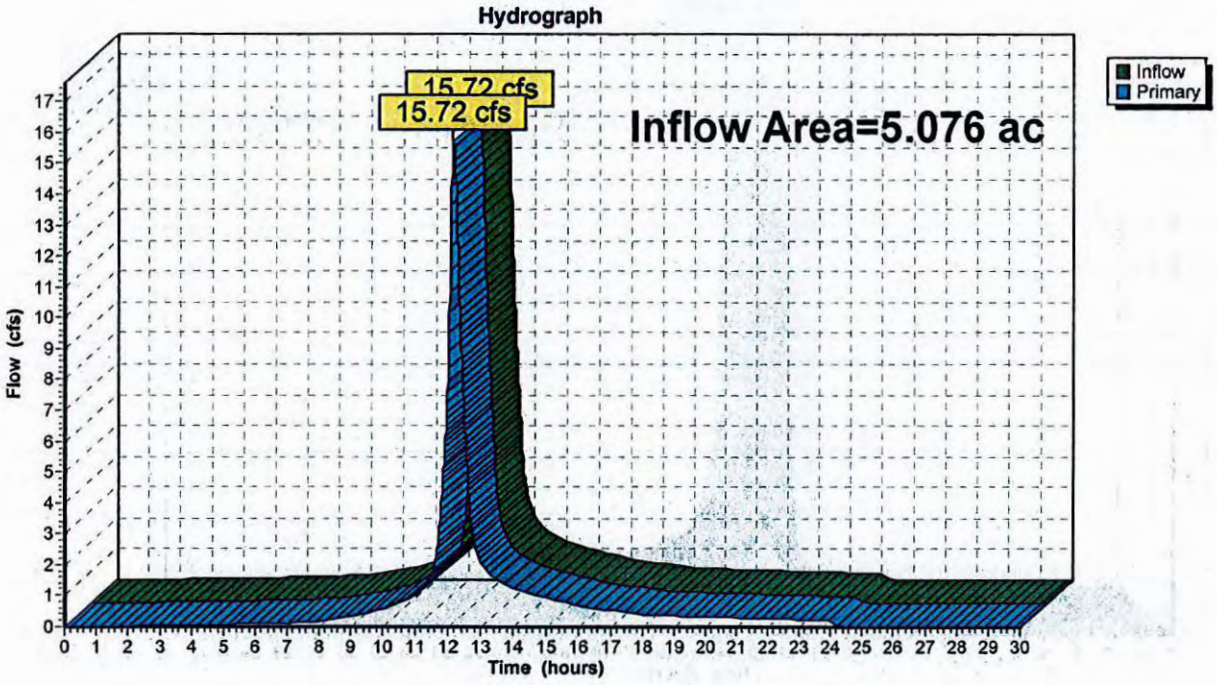


Summary for Link 4L: to MH 11

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 3.61" for 10 yr event
Inflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af
Primary = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4L: to MH 11



Summary for Subcatchment 4: PO-DA 4

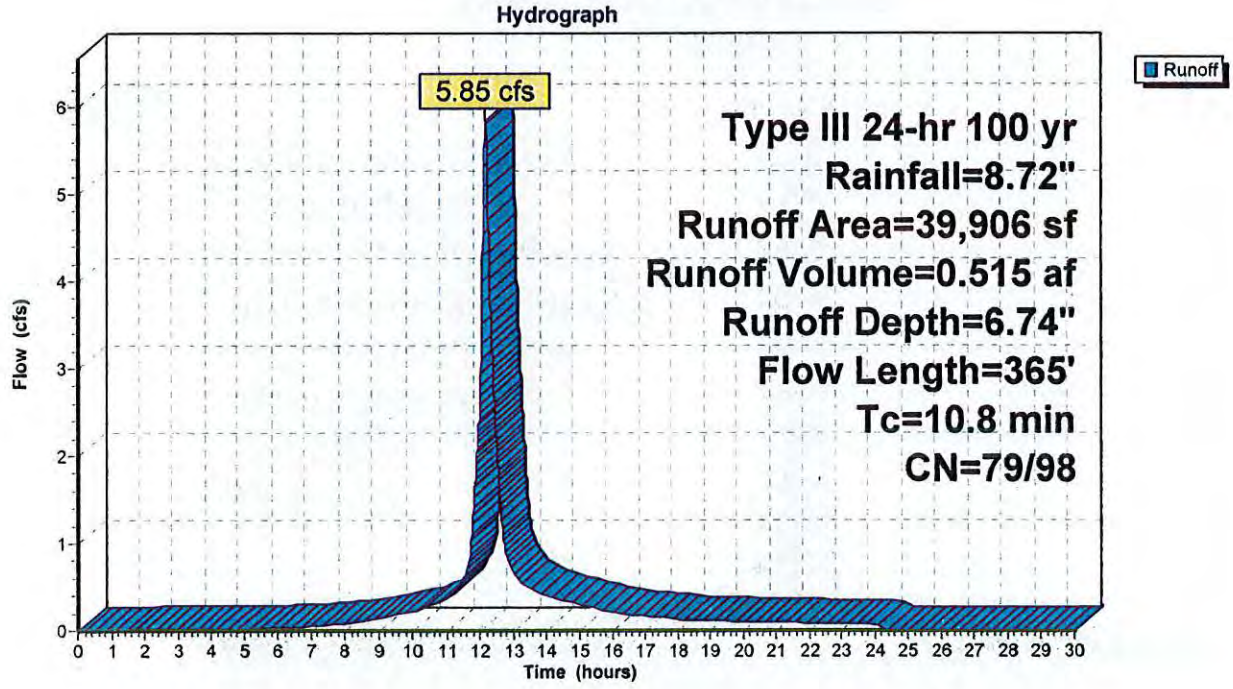
Runoff = 5.85 cfs @ 12.15 hrs, Volume= 0.515 af, Depth= 6.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	4,334	98	Impervious, HSG D
*	5,398	98	Gravel road, HSG D
*	14,366	80	Grass cover, Good, HSG D
	15,808	78	Meadow, non-grazed, HSG D
	39,906	84	Weighted Average
	30,174	79	75.61% Pervious Area
	9,732	98	24.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	120	0.0830	4.32		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	145	0.0480	3.29		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
10.8	365	Total			

Subcatchment 4: PO-DA 4



Summary for Subcatchment 5A: PO-DA 5A

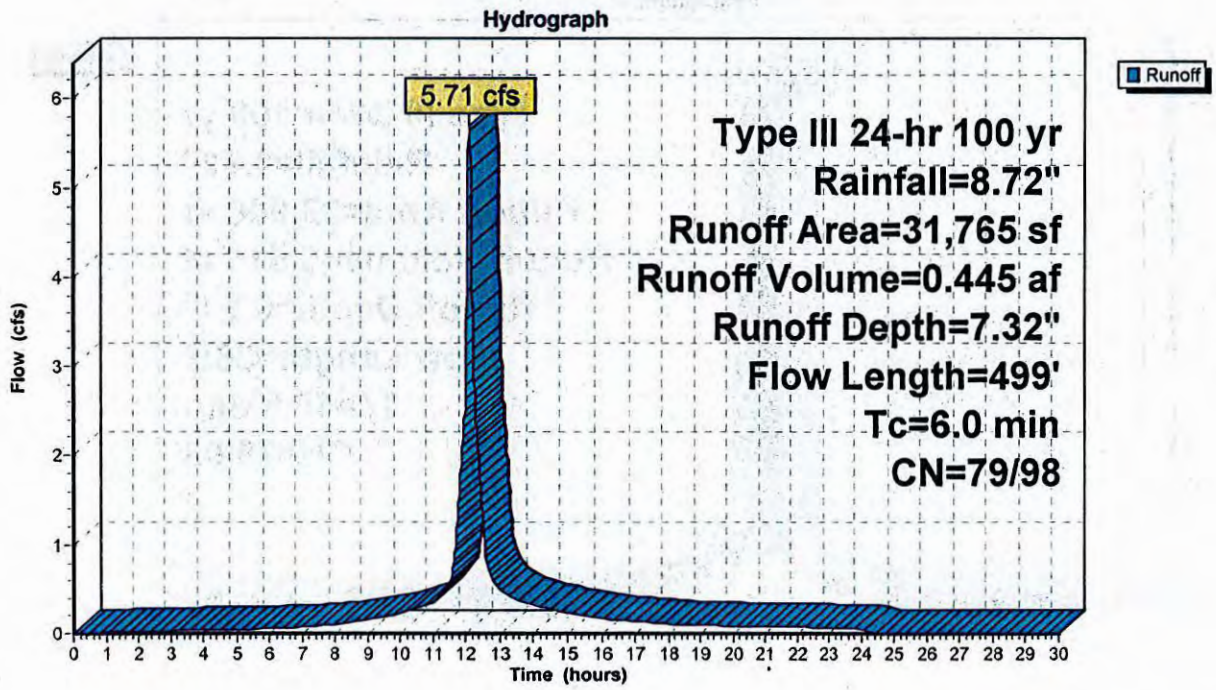
Runoff = 5.71 cfs @ 12.08 hrs, Volume= 0.445 af, Depth= 7.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	15,734	98	Impervious, HSG D
*	8,318	80	Grass cover, Good, HSG D
	7,713	78	Meadow, non-grazed, HSG D
	31,765	88	Weighted Average
	16,031	79	50.47% Pervious Area
	15,734	98	49.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	150	0.0730	2.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.5	135	0.0590	4.93		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	180	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	34	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	499	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5A: PO-DA 5A



Summary for Subcatchment 5B: PO-DA 5B

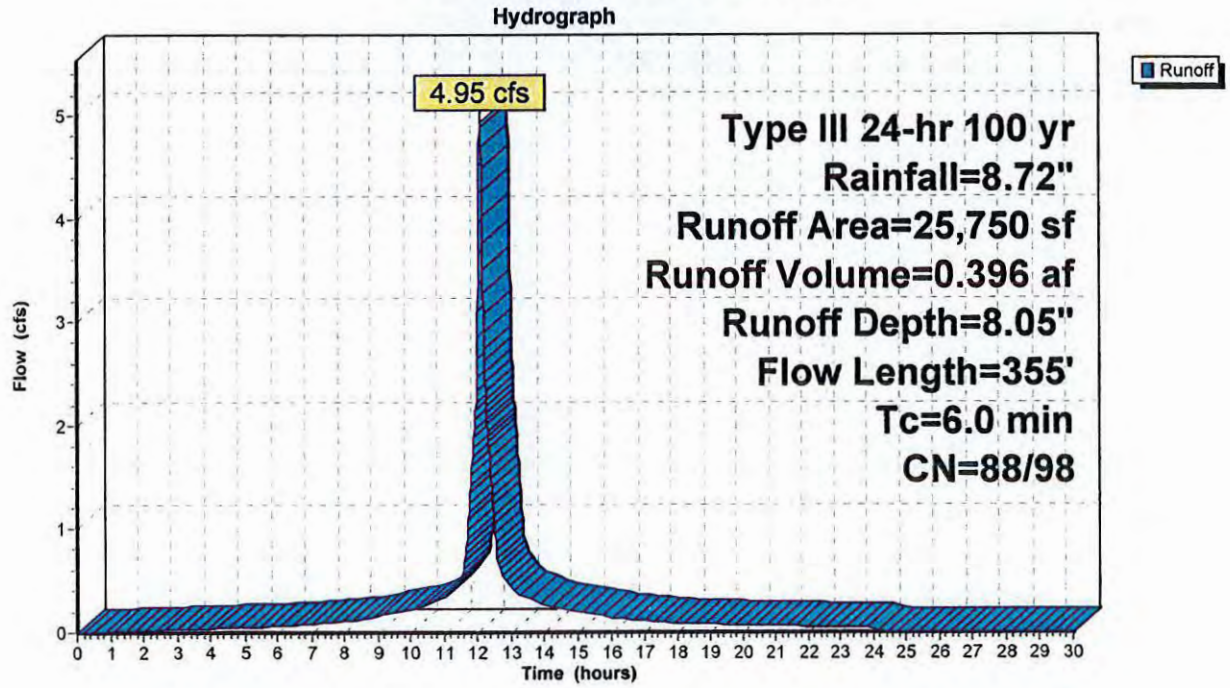
Runoff = 4.95 cfs @ 12.08 hrs, Volume= 0.396 af, Depth= 8.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	16,509	98	Impervious, HSG D
*	6,800	91	Gravel, HSG D
*	2,441	80	Grass cover, HSG D
	25,750	94	Weighted Average
	9,241	88	35.89% Pervious Area
	16,509	98	64.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	150	0.0530	2.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.3	110	0.0680	5.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	95	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5B: PO-DA 5B



Summary for Subcatchment 6: PO-DA 6

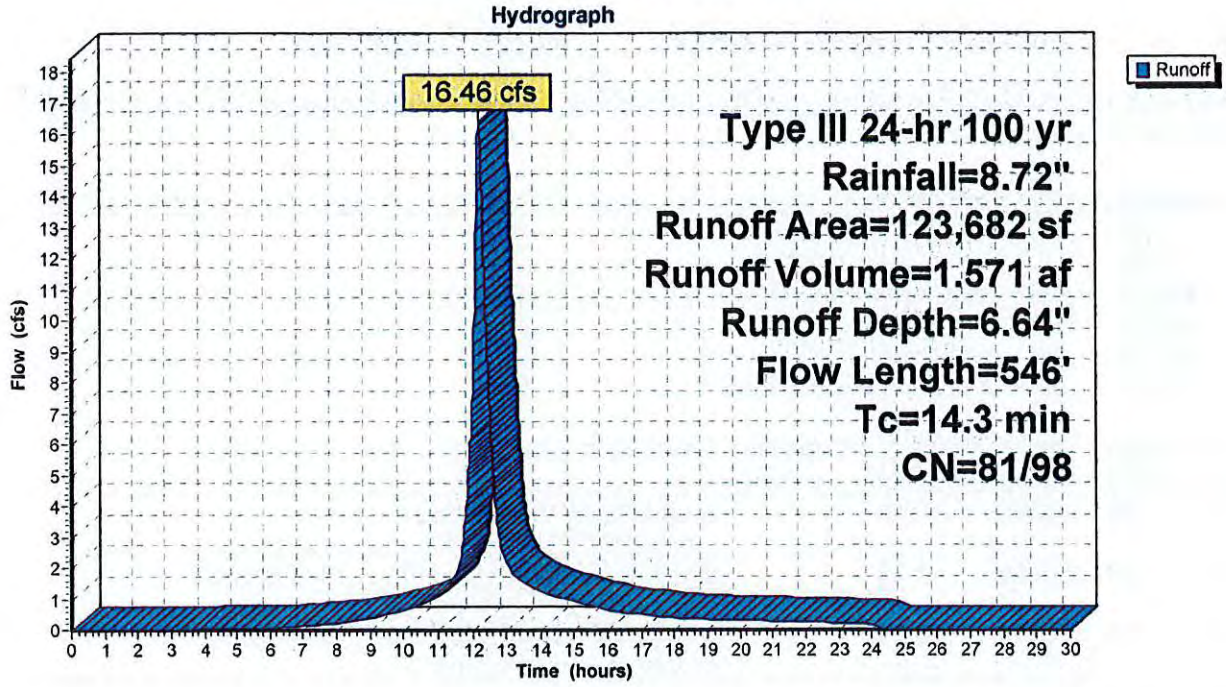
Runoff = 16.46 cfs @ 12.19 hrs, Volume= 1.571 af, Depth= 6.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	13,009	98	Impervious, HSG D
*	47,083	85	Yard stone, HSG D
*	39,774	80	Grass cover, Good, HSG D
	853	78	Meadow, non-grazed, HSG D
	22,963	73	Brush, Good, HSG D
	123,682	82	Weighted Average
	110,673	81	89.48% Pervious Area
	13,009	98	10.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	80	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.0	296	0.0060	1.25		**Shallow Concentrated Flow, Yard stone** Unpaved Kv= 16.1 fps
14.3	546	Total			

Subcatchment 6: PO-DA 6



Summary for Subcatchment 9A: PO-DA 9A

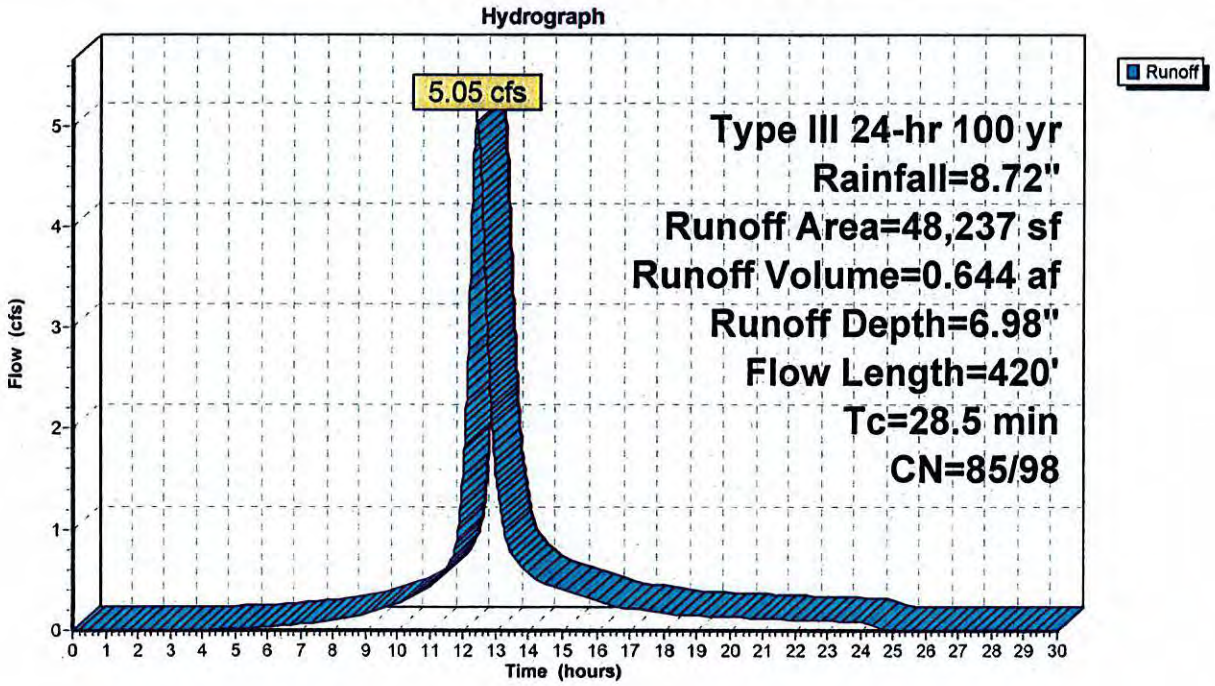
Runoff = 5.05 cfs @ 12.38 hrs, Volume= 0.644 af, Depth= 6.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	650	98	Impervious, HSG D
*	1,367	98	Gravel road, HSG D
*	46,220	85	Yard stone, HSG D
	48,237	86	Weighted Average
	46,220	85	95.82% Pervious Area
	2,017	98	4.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
2.5	190	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
4.3	130	0.0010	0.51		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
28.5	420	Total			

Subcatchment 9A: PO-DA 9A



Summary for Subcatchment 9C: PO-DA 9C

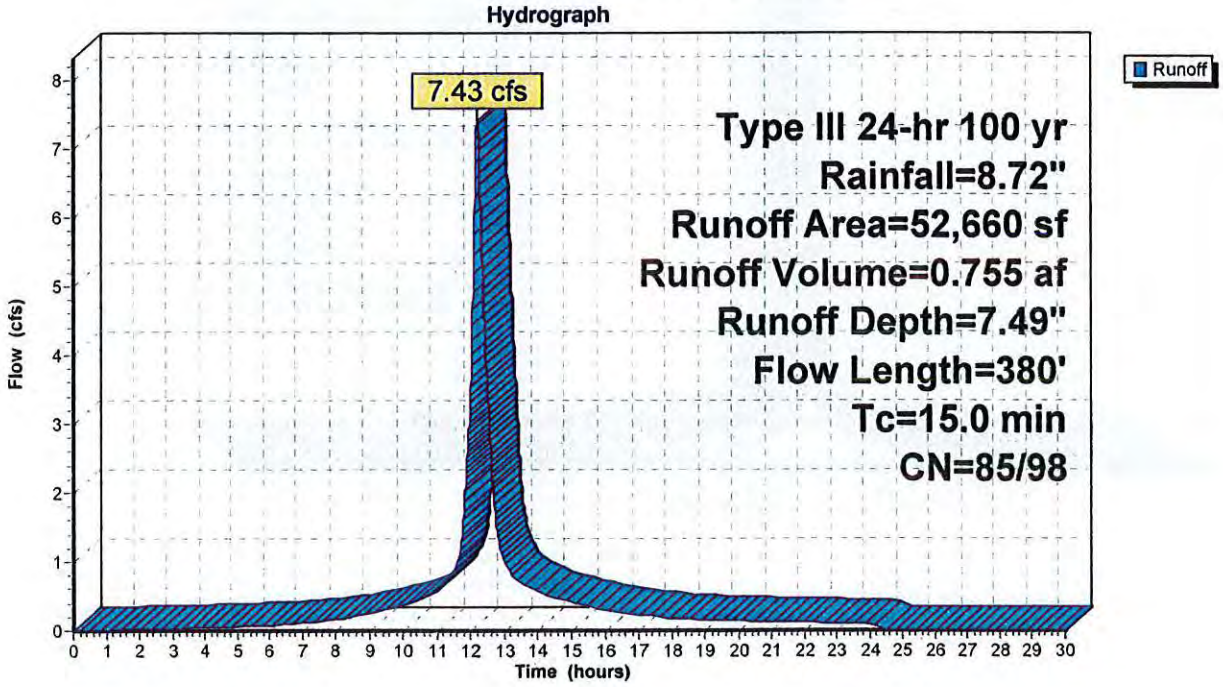
Runoff = 7.43 cfs @ 12.20 hrs, Volume= 0.755 af, Depth= 7.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	1,117	98	Impervious, HSG D
*	18,457	98	Gravel road, HSG D
*	33,086	85	Yard stone, HSG D
	52,660	90	Weighted Average
	33,086	85	62.83% Pervious Area
	19,574	98	37.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.1	160	0.0220	2.39		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.3	120	0.0085	1.48		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
15.0	380	Total			

Subcatchment 9C: PO-DA 9C



Summary for Pond MH-1: MH1 to MH4

[57] Hint: Peaked at 624.62' (Flood elevation advised)

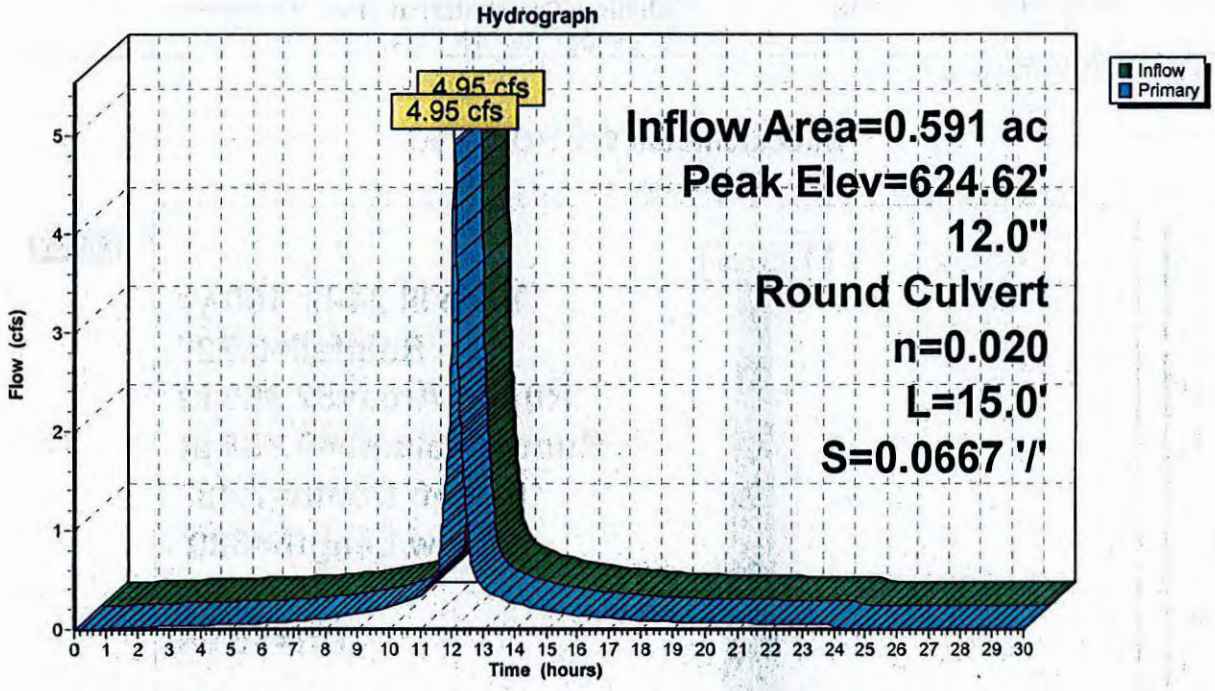
Inflow Area = 0.591 ac, 64.11% Impervious, Inflow Depth = 8.05" for 100 yr event
Inflow = 4.95 cfs @ 12.08 hrs, Volume= 0.396 af
Outflow = 4.95 cfs @ 12.08 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min
Primary = 4.95 cfs @ 12.08 hrs, Volume= 0.396 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 624.62' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0667 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.40 cfs @ 12.08 hrs HW=620.34' TW=618.98' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.40 cfs @ 5.60 fps)

Pond MH-1: MH1 to MH4



Summary for Pond MH-2: MH-2 to MH-3

[57] Hint: Peaked at 631.11' (Flood elevation advised)

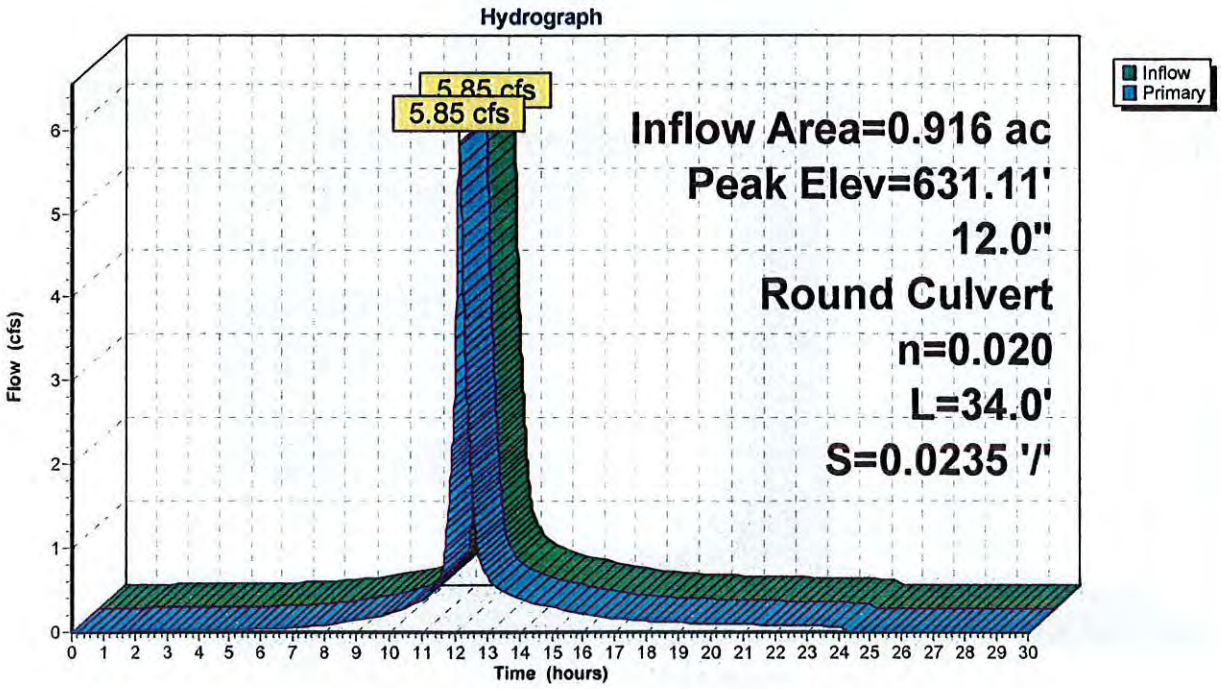
Inflow Area =	0.916 ac,	24.39% Impervious,	Inflow Depth =	6.74" for 100 yr event
Inflow =	5.85 cfs @	12.15 hrs, Volume=	0.515 af	
Outflow =	5.85 cfs @	12.15 hrs, Volume=	0.515 af,	Atten= 0%, Lag= 0.0 min
Primary =	5.85 cfs @	12.15 hrs, Volume=	0.515 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 631.11' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	604.00'	**12.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 604.00' / 603.20' S= 0.0235 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.88 cfs @ 12.15 hrs HW=631.01' TW=627.50' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.88 cfs @ 7.49 fps)

Pond MH-2: MH-2 to MH-3



Summary for Pond MH-3: MH-3 to MH-4

[57] Hint: Peaked at 627.76' (Flood elevation advised)

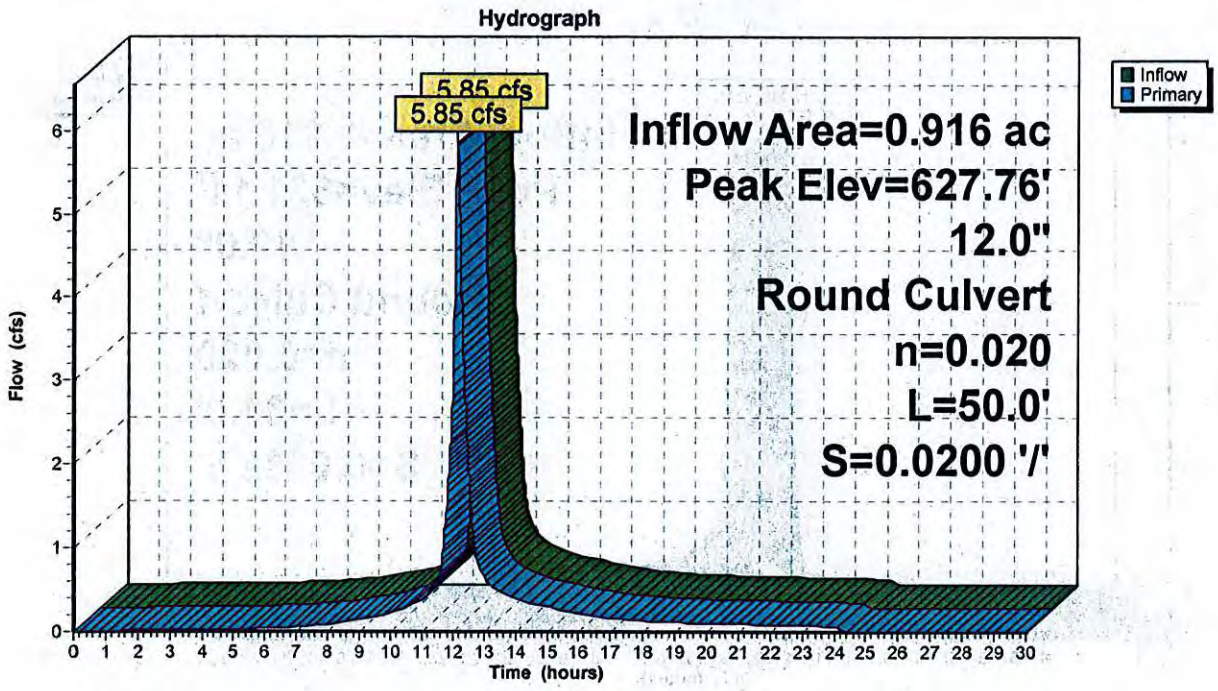
Inflow Area =	0.916 ac, 24.39% Impervious,	Inflow Depth =	6.74"	for 100 yr event
Inflow =	5.85 cfs @ 12.15 hrs, Volume=	0.515 af		
Outflow =	5.85 cfs @ 12.15 hrs, Volume=	0.515 af,	Atten= 0%,	Lag= 0.0 min
Primary =	5.85 cfs @ 12.15 hrs, Volume=	0.515 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 627.76' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=6.04 cfs @ 12.15 hrs HW=627.50' TW=622.71' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 6.04 cfs @ 7.69 fps)

Pond MH-3: MH-3 to MH-4



Summary for Pond MH-4: MH4 to MH5

[57] Hint: Peaked at 623.16' (Flood elevation advised)

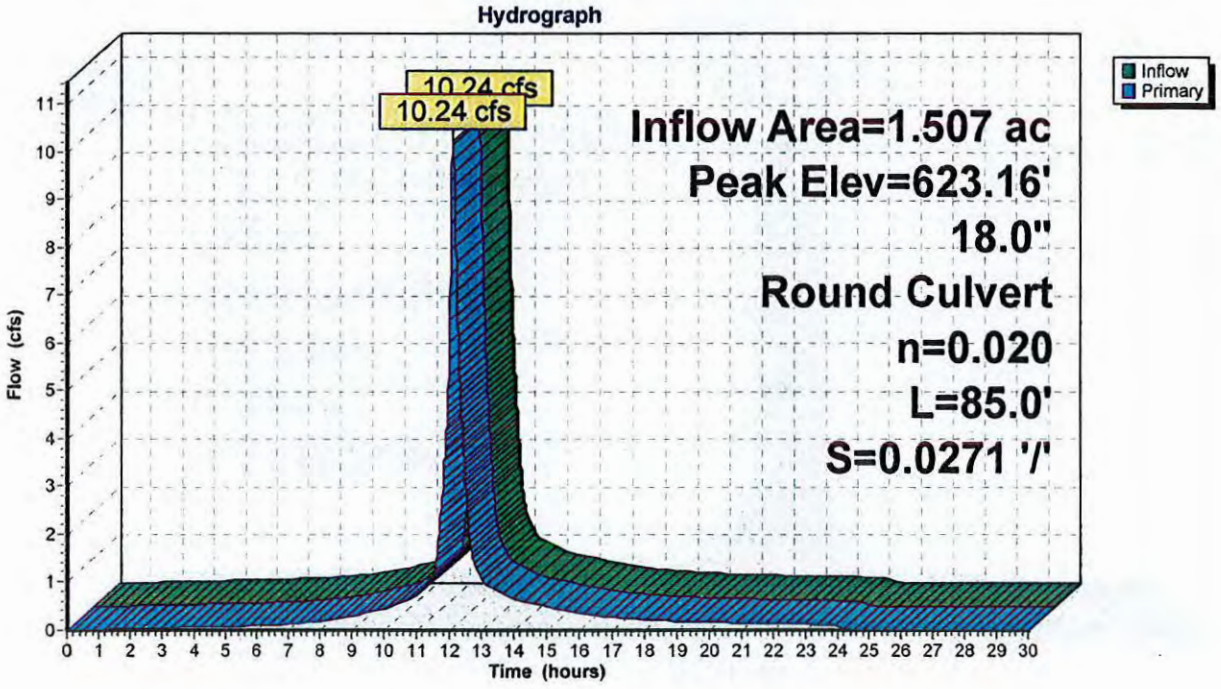
Inflow Area = 1.507 ac, 39.97% Impervious, Inflow Depth = 7.25" for 100 yr event
Inflow = 10.24 cfs @ 12.11 hrs, Volume= 0.911 af
Outflow = 10.24 cfs @ 12.11 hrs, Volume= 0.911 af, Atten= 0%, Lag= 0.0 min
Primary = 10.24 cfs @ 12.11 hrs, Volume= 0.911 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 623.16' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	602.20'	**18.0" Round Culvert** L= 85.0' Ke= 0.500 Inlet / Outlet Invert= 602.20' / 599.90' S= 0.0271 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=9.17 cfs @ 12.11 hrs HW=621.82' TW=619.65' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 9.17 cfs @ 5.19 fps)

Pond MH-4: MH4 to MH5



Summary for Pond MH-5: MH 5 to MH 6

[57] Hint: Peaked at 620.74' (Flood elevation advised)

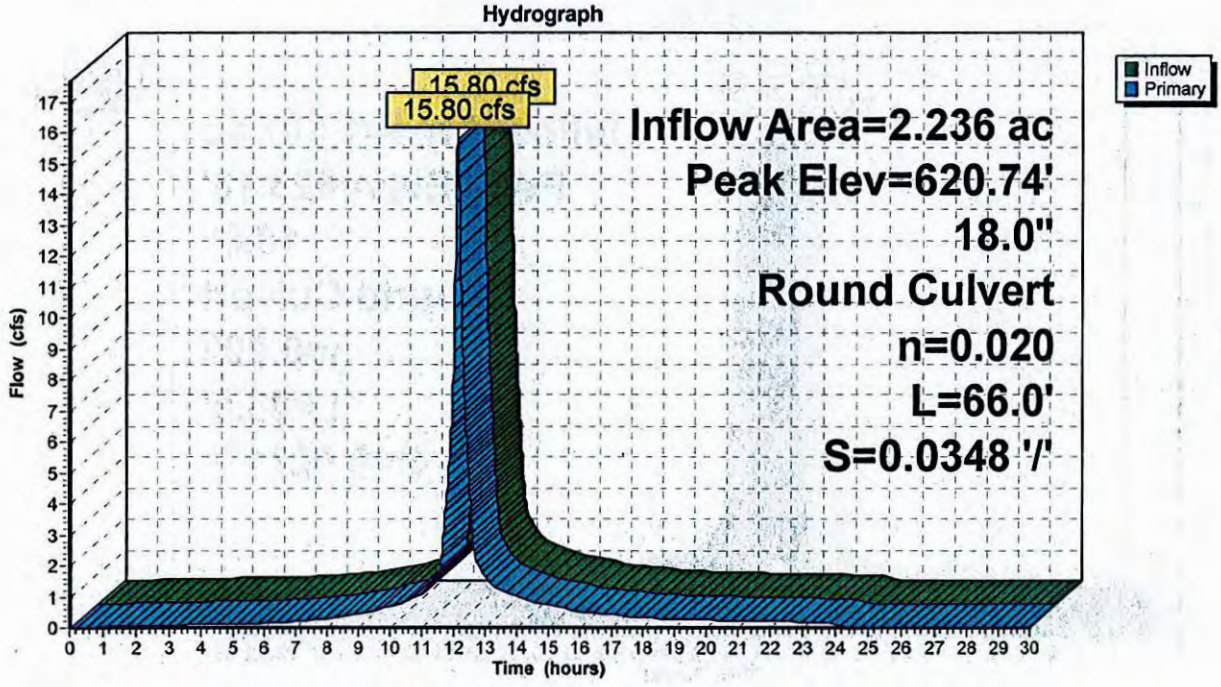
Inflow Area = 2.236 ac, 43.09% Impervious, Inflow Depth = 7.28" for 100 yr event
Inflow = 15.80 cfs @ 12.10 hrs, Volume= 1.356 af
Outflow = 15.80 cfs @ 12.10 hrs, Volume= 1.356 af, Atten= 0%, Lag= 0.0 min
Primary = 15.80 cfs @ 12.10 hrs, Volume= 1.356 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 620.74' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.90'	**18.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 599.90' / 597.60' S= 0.0348 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=15.56 cfs @ 12.10 hrs HW=618.88' TW=613.63' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 15.56 cfs @ 8.81 fps)

Pond MH-5: MH 5 to MH 6



Summary for Pond MH-6: MH 6 to MH 11

[57] Hint: Peaked at 615.92' (Flood elevation advised)

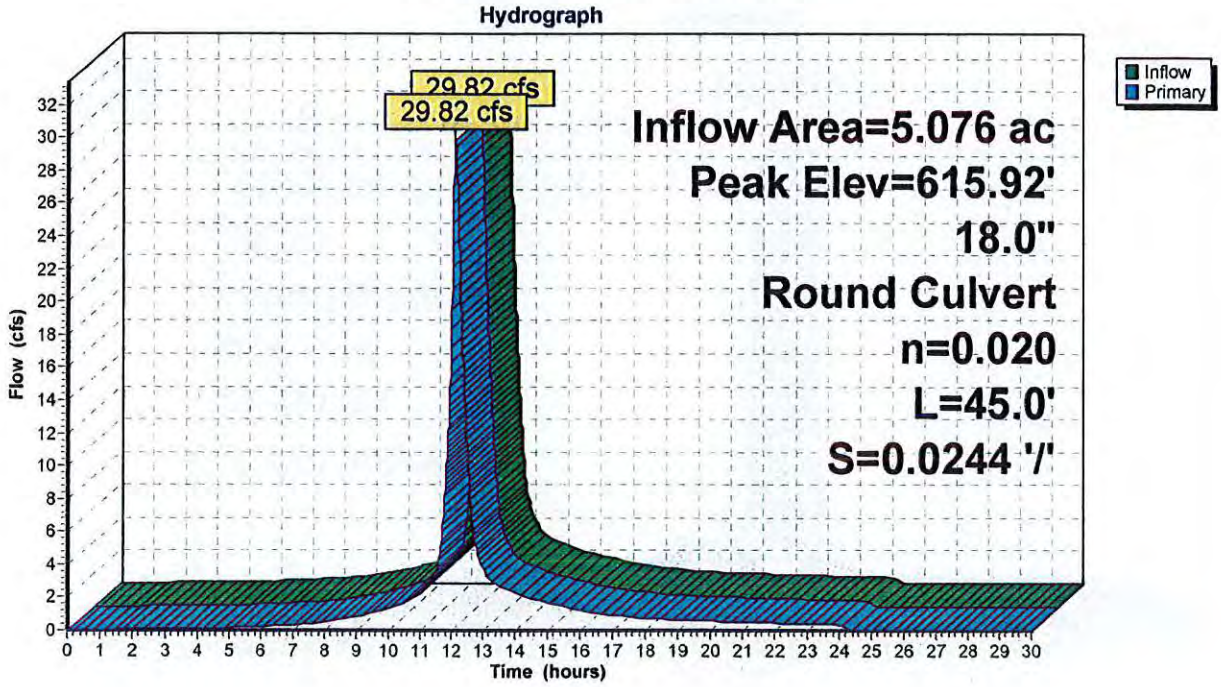
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 6.92" for 100 yr event
Inflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af
Outflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af, Atten= 0%, Lag= 0.0 min
Primary = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 615.92' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.60'	**18.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 597.60' / 596.50' S= 0.0244 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=29.80 cfs @ 12.14 hrs HW=615.90' TW=600.67' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 29.80 cfs @ 16.86 fps)

Pond MH-6: MH 6 to MH 11



Summary for Pond MH-7: MH-7 to MH-11

[57] Hint: Peaked at 600.68' (Flood elevation advised)

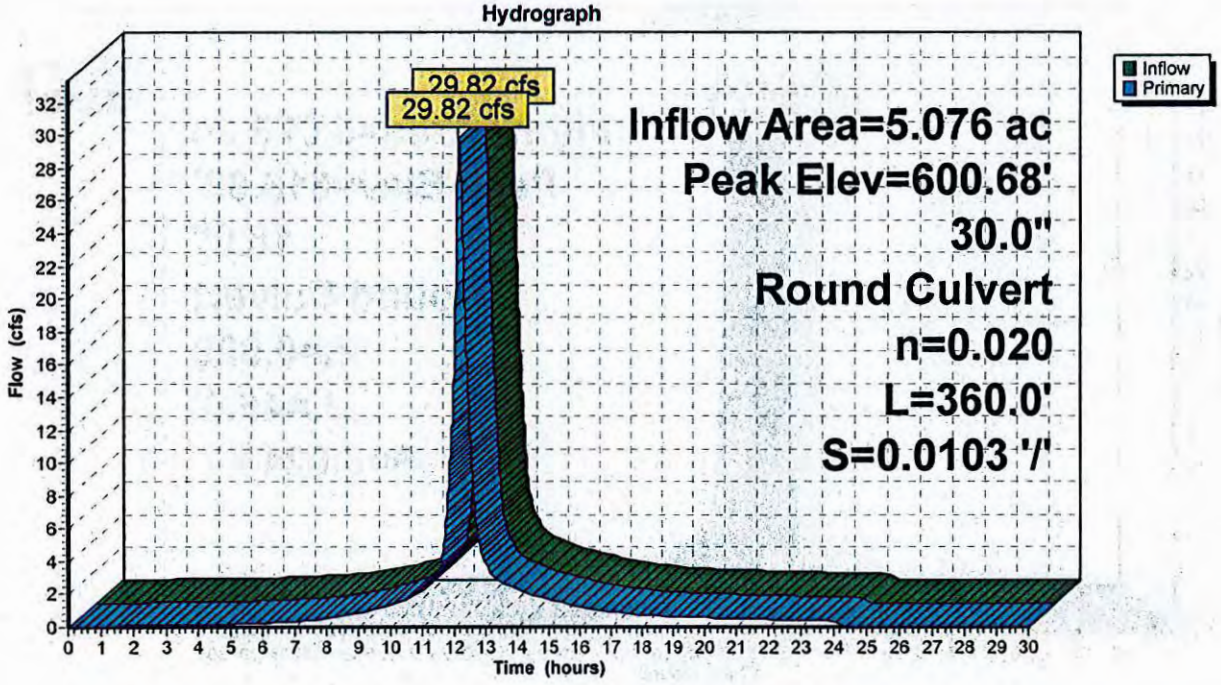
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 6.92" for 100 yr event
Inflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af
Outflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af, Atten= 0%, Lag= 0.0 min
Primary = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 600.68' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**30.0" Round Culvert** L= 360.0' Ke= 0.500 Inlet / Outlet Invert= 596.50' / 592.80' S= 0.0103 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=29.80 cfs @ 12.14 hrs HW=600.67' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 29.80 cfs @ 6.07 fps)

Pond MH-7: MH-7 to MH-11



Summary for Pond MH-A: MH-A to MH-B

[43] Hint: Has no inflow (Outflow=Zero)

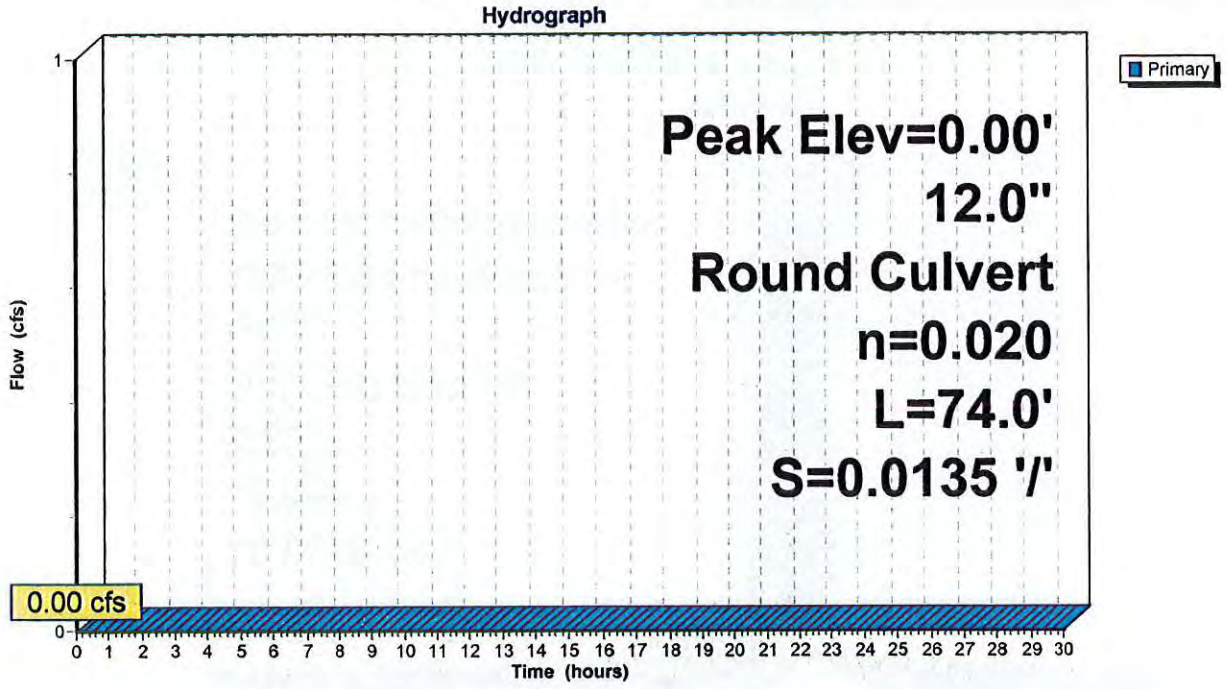
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 0.00' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**12.0" Round Culvert** L= 74.0' Ke= 0.500 Inlet / Outlet Invert= 599.00' / 598.00' S= 0.0135 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=598.00' (Dynamic Tailwater)
↳**1=Culvert** (Controls 0.00 cfs)

Pond MH-A: MH-A to MH-B



Summary for Pond MH-B: MH-B to MH-C

[57] Hint: Peaked at 628.54' (Flood elevation advised)

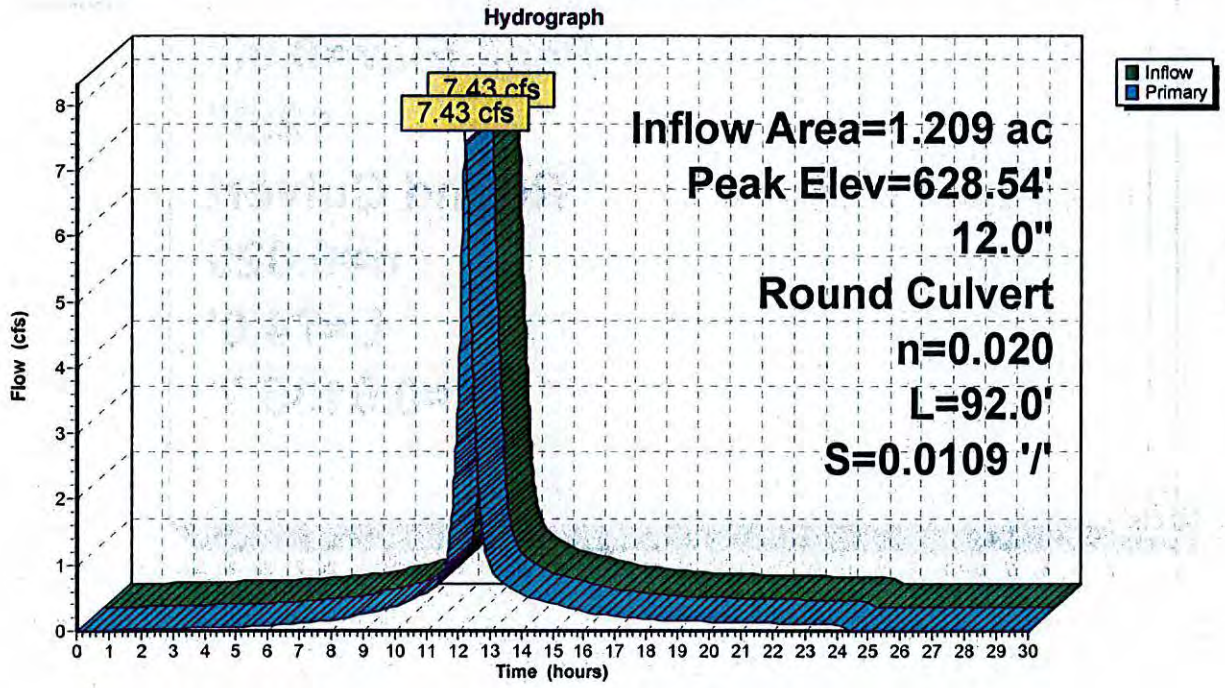
Inflow Area = 1.209 ac, 37.17% Impervious, Inflow Depth = 7.49" for 100 yr event
Inflow = 7.43 cfs @ 12.20 hrs, Volume= 0.755 af
Outflow = 7.43 cfs @ 12.20 hrs, Volume= 0.755 af, Atten= 0%, Lag= 0.0 min
Primary = 7.43 cfs @ 12.20 hrs, Volume= 0.755 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 628.54' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**12.0" Round Culvert** L= 92.0' Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.00' S= 0.0109 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.43 cfs @ 12.20 hrs HW=628.50' TW=616.93' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 7.43 cfs @ 9.46 fps)

Pond MH-B: MH-B to MH-C



Summary for Pond MH-C: MH-Cto MH-D

[57] Hint: Peaked at 616.95' (Flood elevation advised)

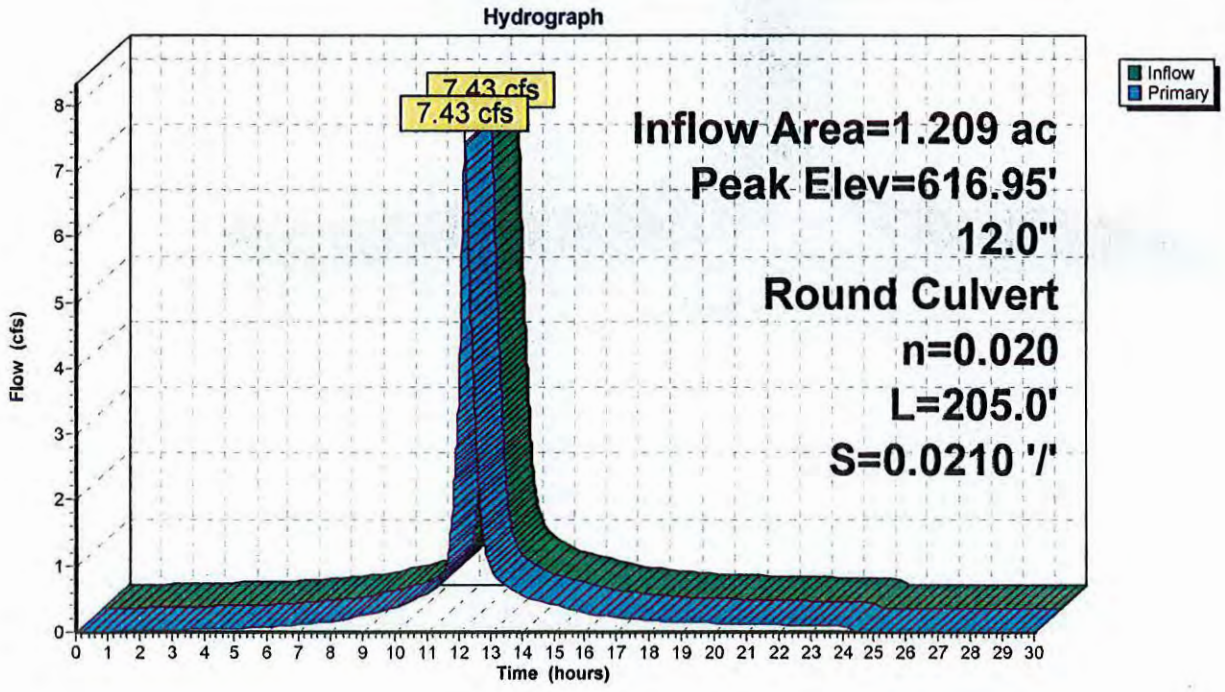
Inflow Area =	1.209 ac,	37.17% Impervious,	Inflow Depth =	7.49"	for 100 yr event
Inflow =	7.43 cfs @	12.20 hrs, Volume=	0.755 af		
Outflow =	7.43 cfs @	12.20 hrs, Volume=	0.755 af,	Atten= 0%,	Lag= 0.0 min
Primary =	7.43 cfs @	12.20 hrs, Volume=	0.755 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 616.95' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 592.70' S= 0.0210 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.43 cfs @ 12.20 hrs HW=616.93' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 7.43 cfs @ 9.46 fps)

Pond MH-C: MH-Cto MH-D

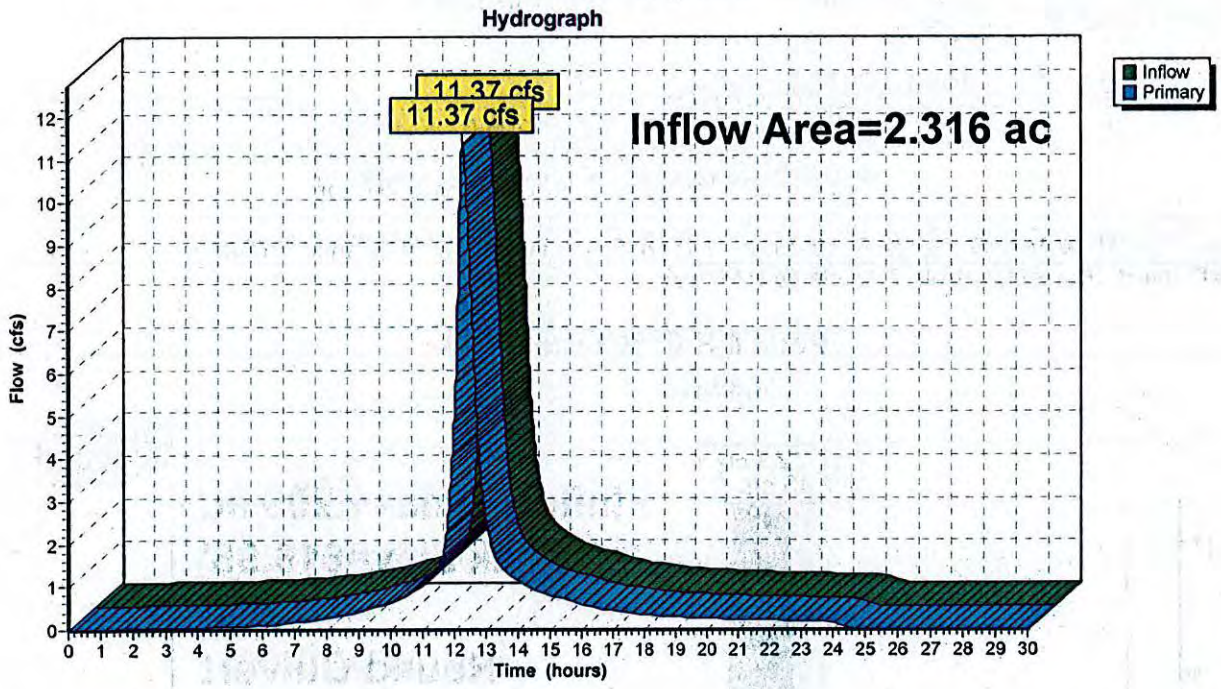


Summary for Link 3L: to MH D

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 7.25" for 100 yr event
Inflow = 11.37 cfs @ 12.23 hrs, Volume= 1.399 af
Primary = 11.37 cfs @ 12.23 hrs, Volume= 1.399 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: to MH D

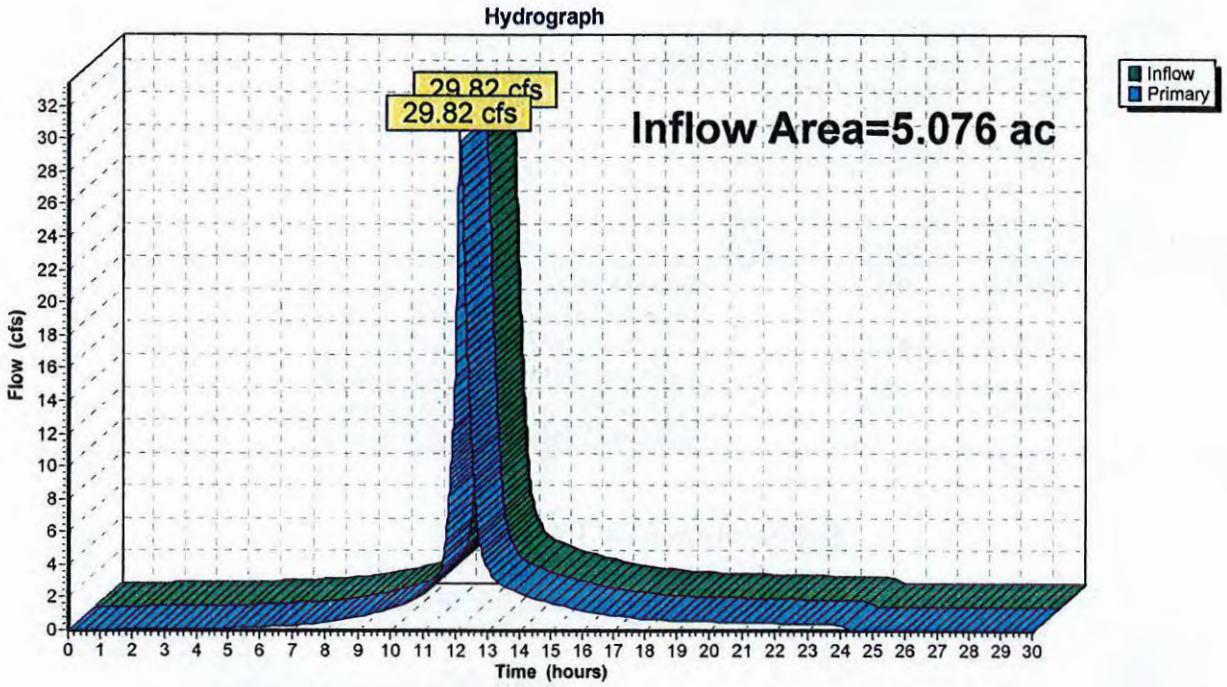


Summary for Link 4L: to MH 11

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 6.92" for 100 yr event
Inflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af
Primary = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4L: to MH 11



Summary for Subcatchment 4: PO-DA 4

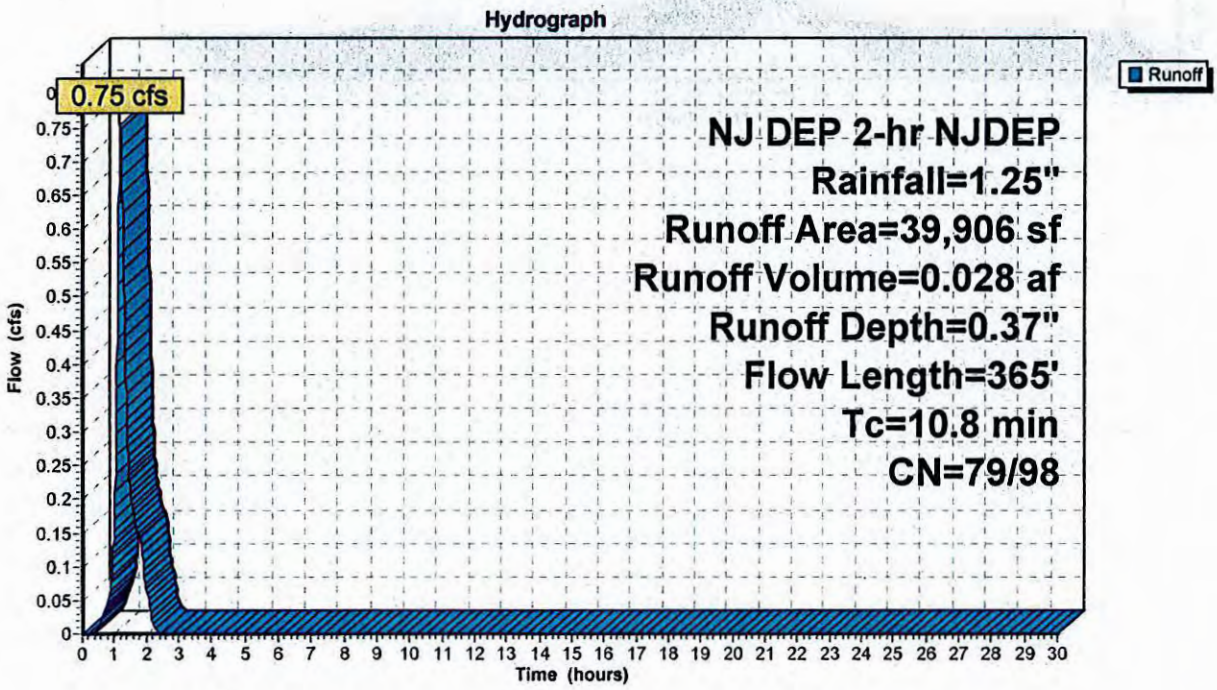
Runoff = 0.75 cfs @ 1.18 hrs, Volume= 0.028 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	4,334	98	Impervious, HSG D
*	5,398	98	Gravel road, HSG D
*	14,366	80	Grass cover, Good, HSG D
	15,808	78	Meadow, non-grazed, HSG D
	39,906	84	Weighted Average
	30,174	79	75.61% Pervious Area
	9,732	98	24.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.5	120	0.0830	4.32		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	145	0.0480	3.29		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
10.8	365	Total			

Subcatchment 4: PO-DA 4



Summary for Subcatchment 5A: PO-DA 5A

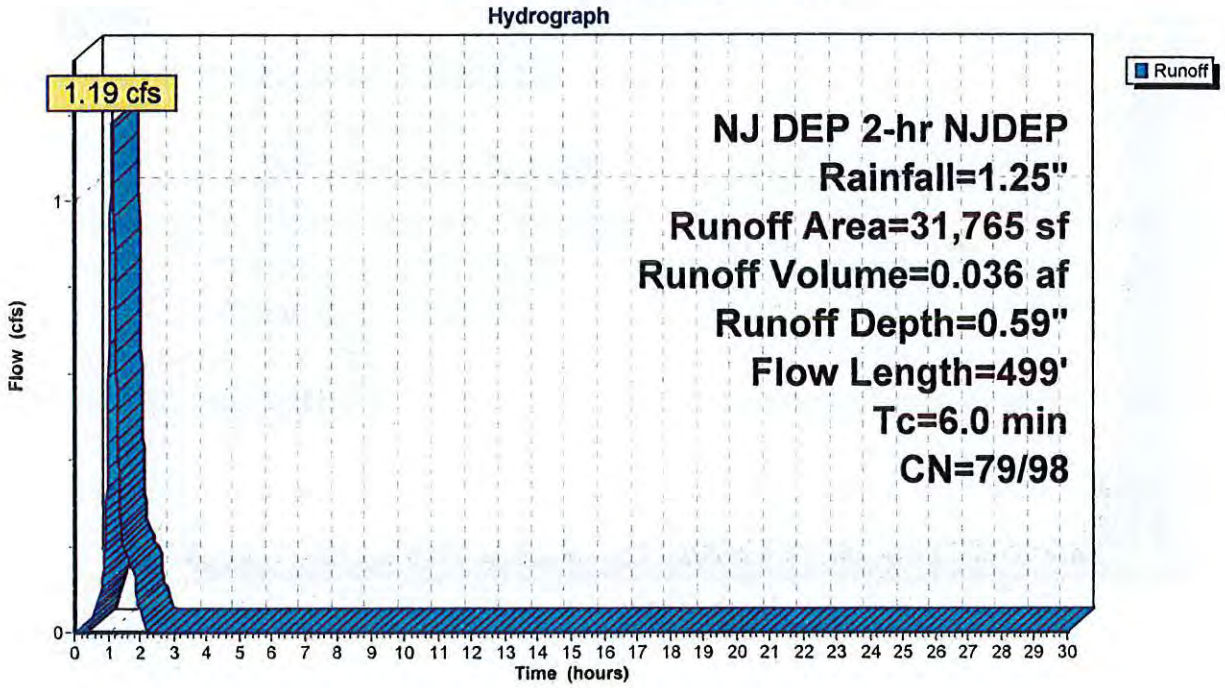
Runoff = 1.19 cfs @ 1.12 hrs, Volume= 0.036 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	15,734	98	Impervious, HSG D
*	8,318	80	Grass cover, Good, HSG D
	7,713	78	Meadow, non-grazed, HSG D
	31,765	88	Weighted Average
	16,031	79	50.47% Pervious Area
	15,734	98	49.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	150	0.0730	2.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.5	135	0.0590	4.93		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	180	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	34	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	499	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5A: PO-DA 5A



Summary for Subcatchment 5B: PO-DA 5B

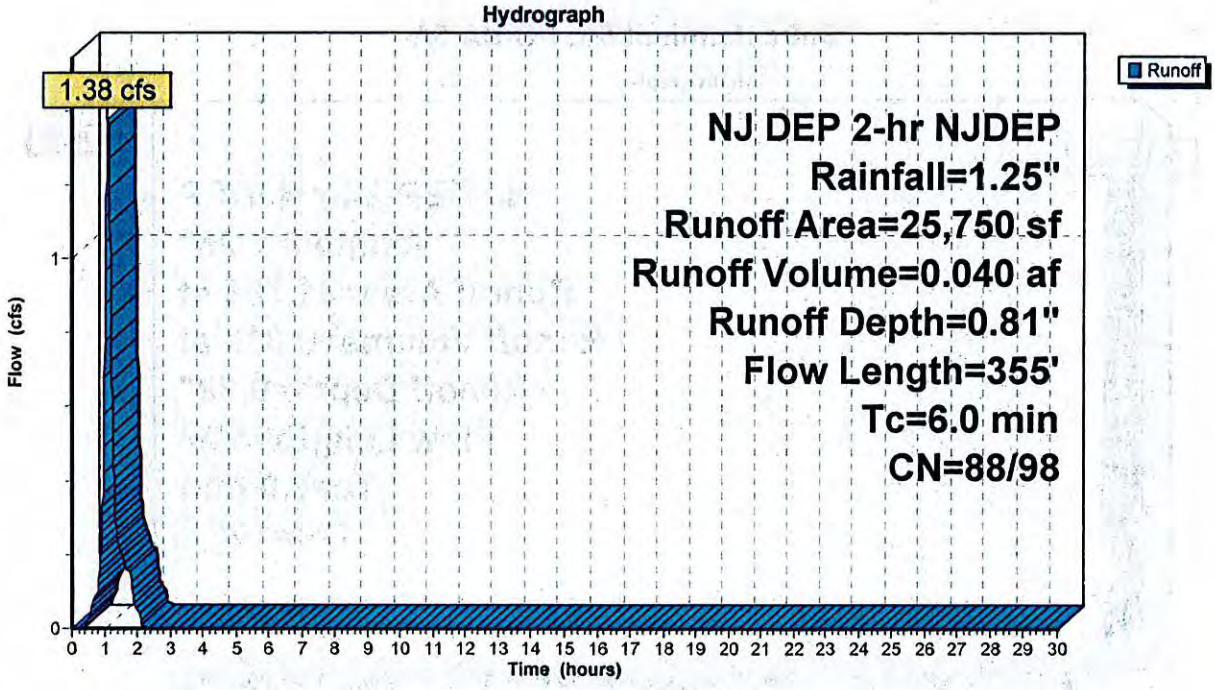
Runoff = 1.38 cfs @ 1.11 hrs, Volume= 0.040 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	16,509	98	Impervious, HSG D
*	6,800	91	Gravel, HSG D
*	2,441	80	Grass cover, HSG D
	25,750	94	Weighted Average
	9,241	88	35.89% Pervious Area
	16,509	98	64.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	150	0.0530	2.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.42"
0.3	110	0.0680	5.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	95	0.0260	3.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.9	355	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 5B: PO-DA 5B



Summary for Subcatchment 6: PO-DA 6

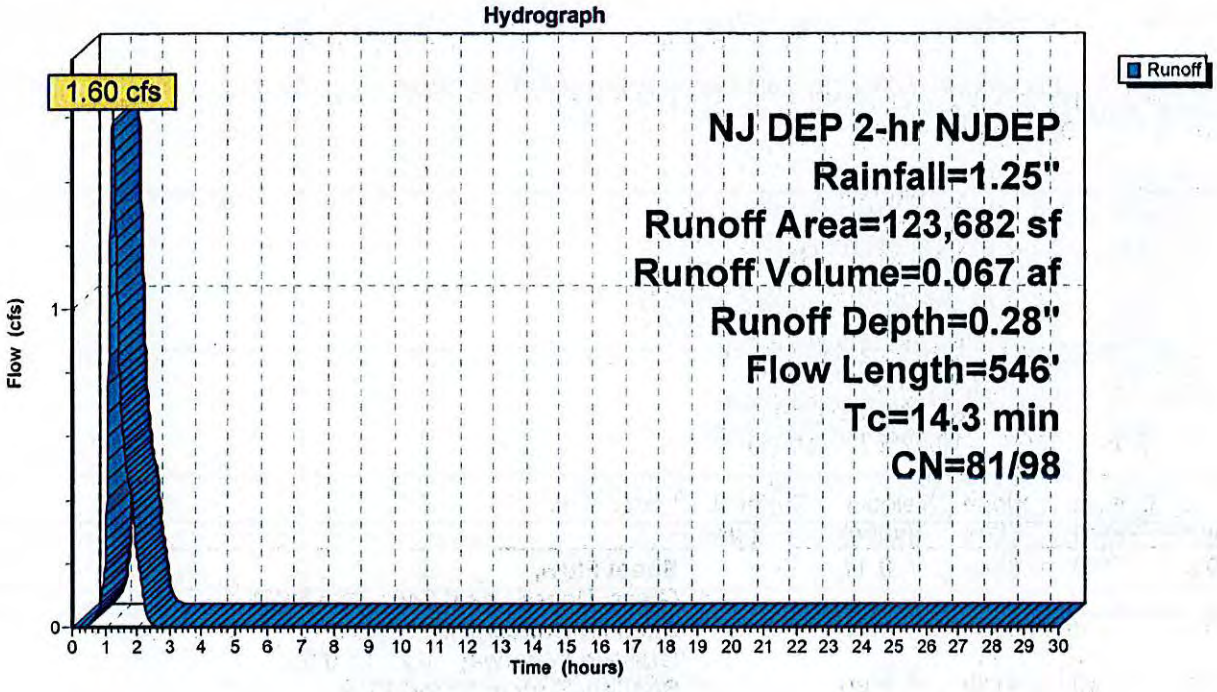
Runoff = 1.60 cfs @ 1.24 hrs, Volume= 0.067 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	13,009	98	Impervious, HSG D
*	47,083	85	Yard stone, HSG D
*	39,774	80	Grass cover, Good, HSG D
	853	78	Meadow, non-grazed, HSG D
	22,963	73	Brush, Good, HSG D
	123,682	82	Weighted Average
	110,673	81	89.48% Pervious Area
	13,009	98	10.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	80	0.0880	4.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	40	0.3130	2.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0330	2.92		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.0	296	0.0060	1.25		**Shallow Concentrated Flow, Yard stone** Unpaved Kv= 16.1 fps
14.3	546	Total			

Subcatchment 6: PO-DA 6



Summary for Subcatchment 9A: PO-DA 9A

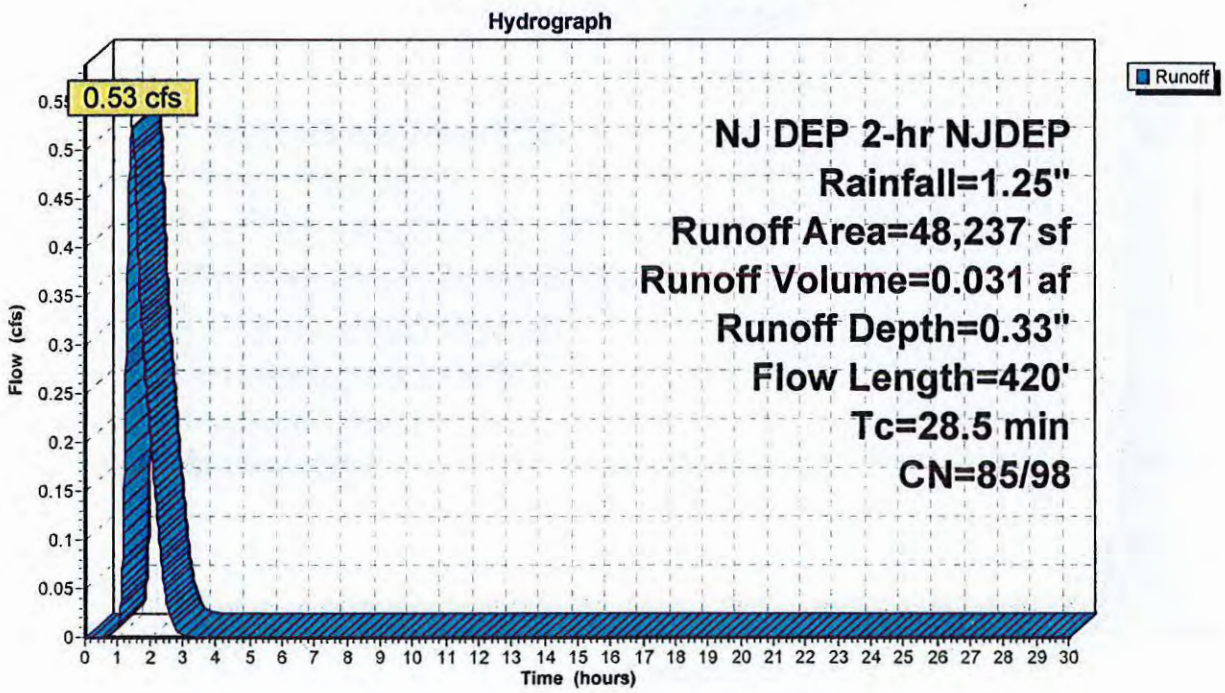
Runoff = 0.53 cfs @ 1.43 hrs, Volume= 0.031 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	650	98	Impervious, HSG D
*	1,367	98	Gravel road, HSG D
*	46,220	85	Yard stone, HSG D
	48,237	86	Weighted Average
	46,220	85	95.82% Pervious Area
	2,017	98	4.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0070	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
2.5	190	0.0060	1.25		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
4.3	130	0.0010	0.51		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
28.5	420	Total			

Subcatchment 9A: PO-DA 9A



Summary for Subcatchment 9C: PO-DA 9C

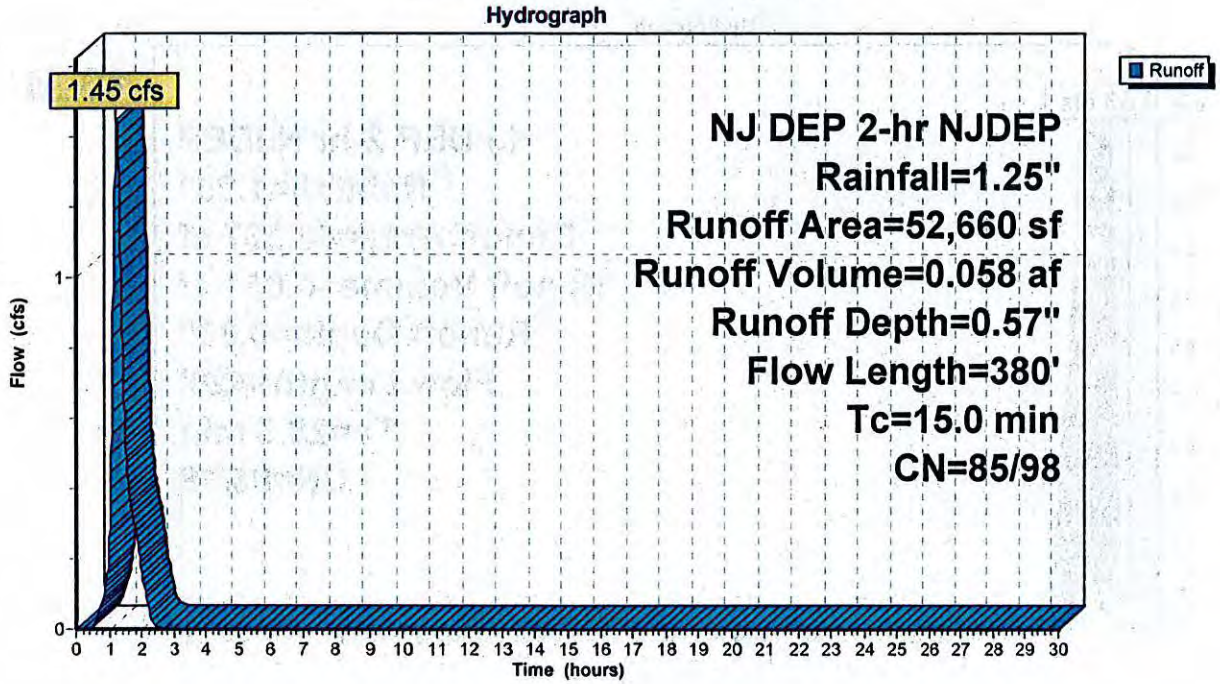
Runoff = 1.45 cfs @ 1.22 hrs, Volume= 0.058 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	1,117	98	Impervious, HSG D
*	18,457	98	Gravel road, HSG D
*	33,086	85	Yard stone, HSG D
	52,660	90	Weighted Average
	33,086	85	62.83% Pervious Area
	19,574	98	37.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.1	160	0.0220	2.39		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.3	120	0.0085	1.48		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
15.0	380	Total			

Subcatchment 9C: PO-DA 9C



Summary for Pond MH-1: MH1 to MH4

[57] Hint: Peaked at 603.82' (Flood elevation advised)

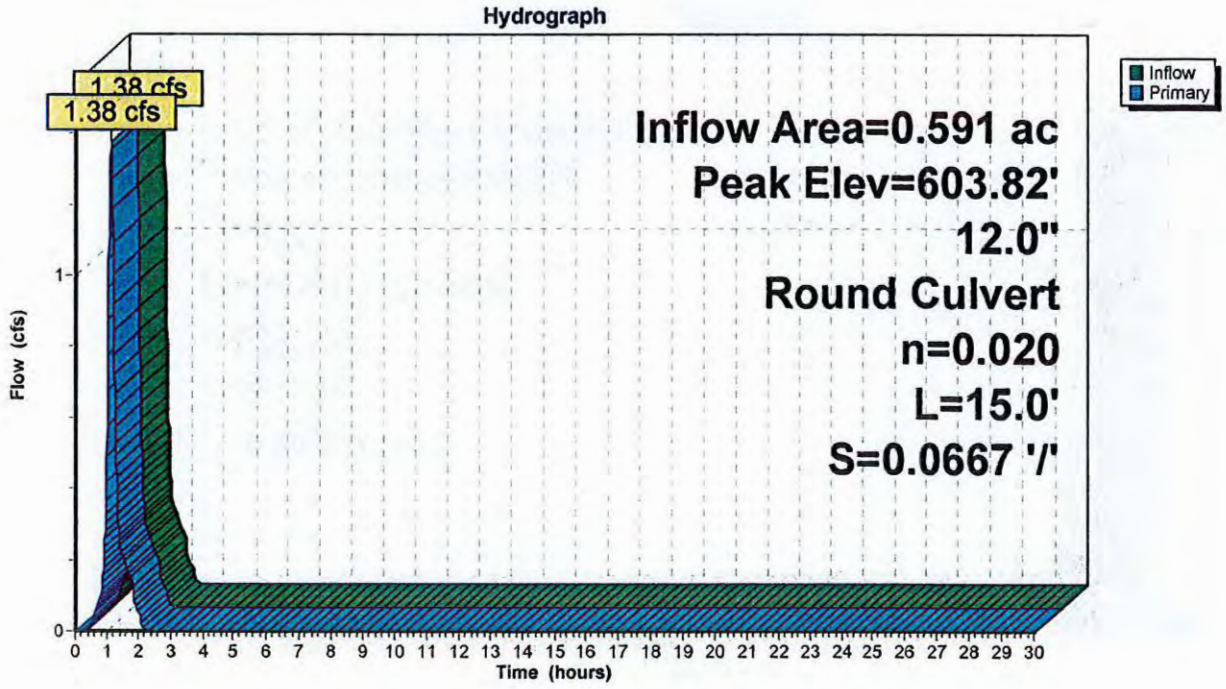
Inflow Area =	0.591 ac,	64.11% Impervious,	Inflow Depth =	0.81"	for NJDEP event
Inflow =	1.38 cfs @	1.11 hrs, Volume=	0.040 af		
Outflow =	1.38 cfs @	1.11 hrs, Volume=	0.040 af,	Atten= 0%,	Lag= 0.0 min
Primary =	1.38 cfs @	1.11 hrs, Volume=	0.040 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 603.82' @ 1.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0667 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.37 cfs @ 1.11 hrs HW=603.82' TW=602.84' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 1.37 cfs @ 2.68 fps)

Pond MH-1: MH1 to MH4



Summary for Pond MH-2: MH-2 to MH-3

[57] Hint: Peaked at 604.46' (Flood elevation advised)

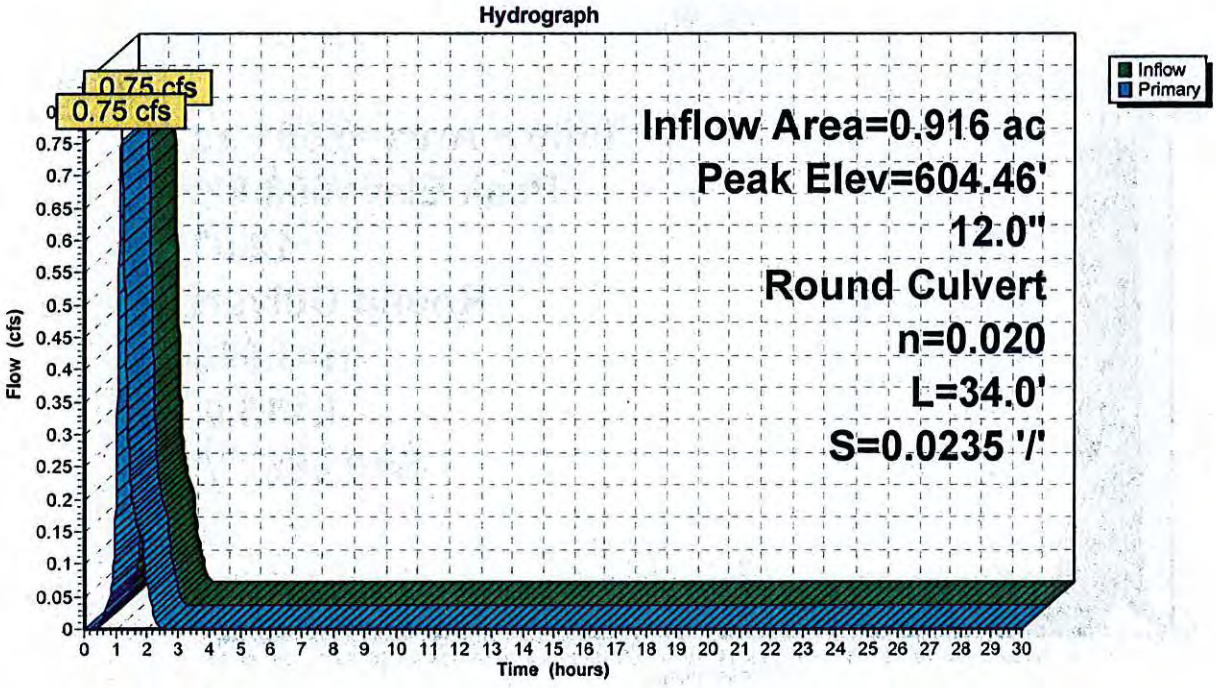
Inflow Area = 0.916 ac, 24.39% Impervious, Inflow Depth = 0.37" for NJDEP event
Inflow = 0.75 cfs @ 1.18 hrs, Volume= 0.028 af
Outflow = 0.75 cfs @ 1.18 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.75 cfs @ 1.18 hrs, Volume= 0.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.46' @ 1.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	604.00'	**12.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 604.00' / 603.20' S= 0.0235 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.76 cfs @ 1.18 hrs HW=604.46' TW=603.68' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.76 cfs @ 3.14 fps)

Pond MH-2: MH-2 to MH-3



Summary for Pond MH-3: MH-3 to MH-4

[57] Hint: Peaked at 603.68' (Flood elevation advised)

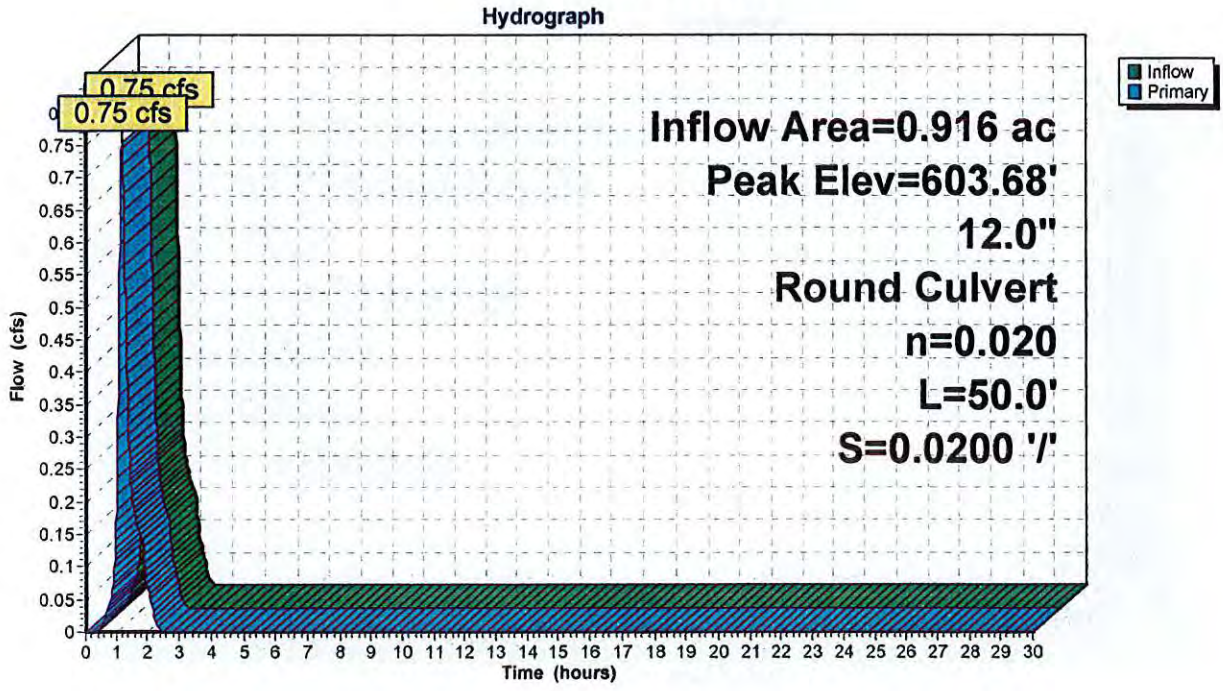
Inflow Area =	0.916 ac,	24.39% Impervious,	Inflow Depth =	0.37"	for NJDEP event
Inflow =	0.75 cfs @	1.18 hrs, Volume=	0.028 af		
Outflow =	0.75 cfs @	1.18 hrs, Volume=	0.028 af,	Atten= 0%,	Lag= 0.0 min
Primary =	0.75 cfs @	1.18 hrs, Volume=	0.028 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 603.68' @ 1.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	603.20'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 603.20' / 602.20' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.75 cfs @ 1.18 hrs HW=603.68' TW=602.79' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 0.75 cfs @ 2.96 fps)

Pond MH-3: MH-3 to MH-4



Summary for Pond MH-4: MH4 to MH5

[57] Hint: Peaked at 602.85' (Flood elevation advised)

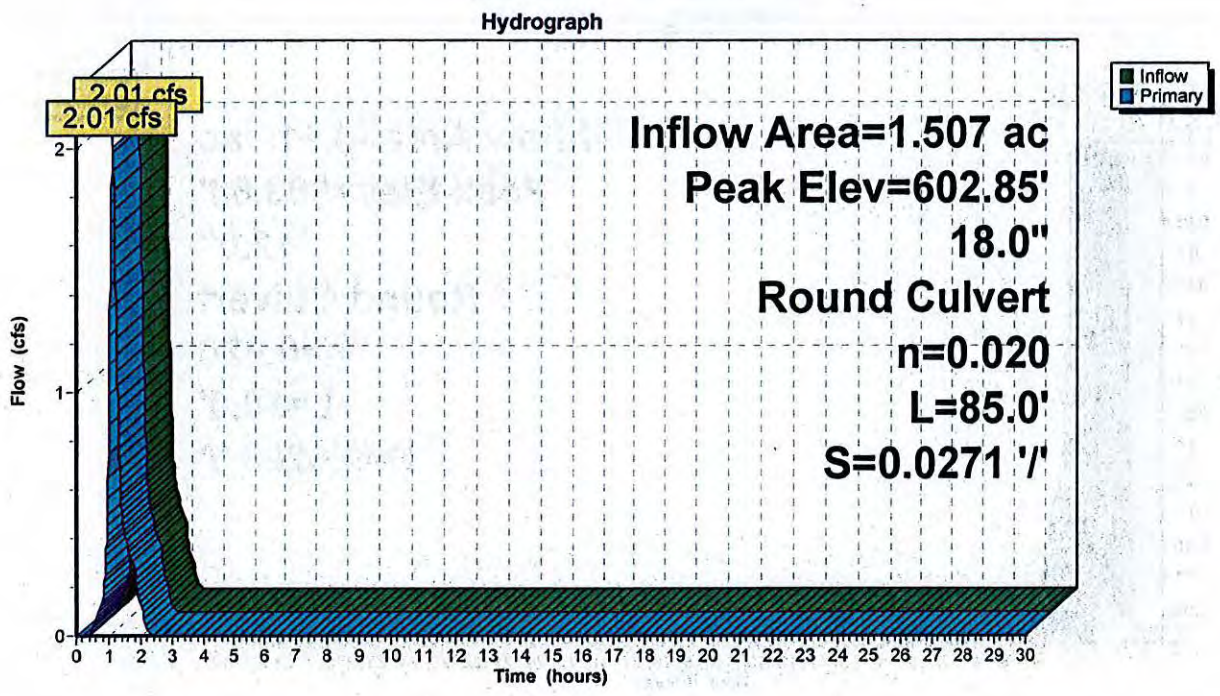
Inflow Area =	1.507 ac,	39.97% Impervious,	Inflow Depth =	0.54" for NJDEP event
Inflow =	2.01 cfs @	1.12 hrs, Volume=	0.068 af	
Outflow =	2.01 cfs @	1.12 hrs, Volume=	0.068 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.01 cfs @	1.12 hrs, Volume=	0.068 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 602.85' @ 1.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	602.20'	**18.0" Round Culvert** L= 85.0' Ke= 0.500 Inlet / Outlet Invert= 602.20' / 599.90' S= 0.0271 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.00 cfs @ 1.12 hrs HW=602.85' TW=600.74' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.00 cfs @ 2.74 fps)

Pond MH-4: MH4 to MH5



Summary for Pond MH-5: MH 5 to MH 6

[57] Hint: Peaked at 600.74' (Flood elevation advised)

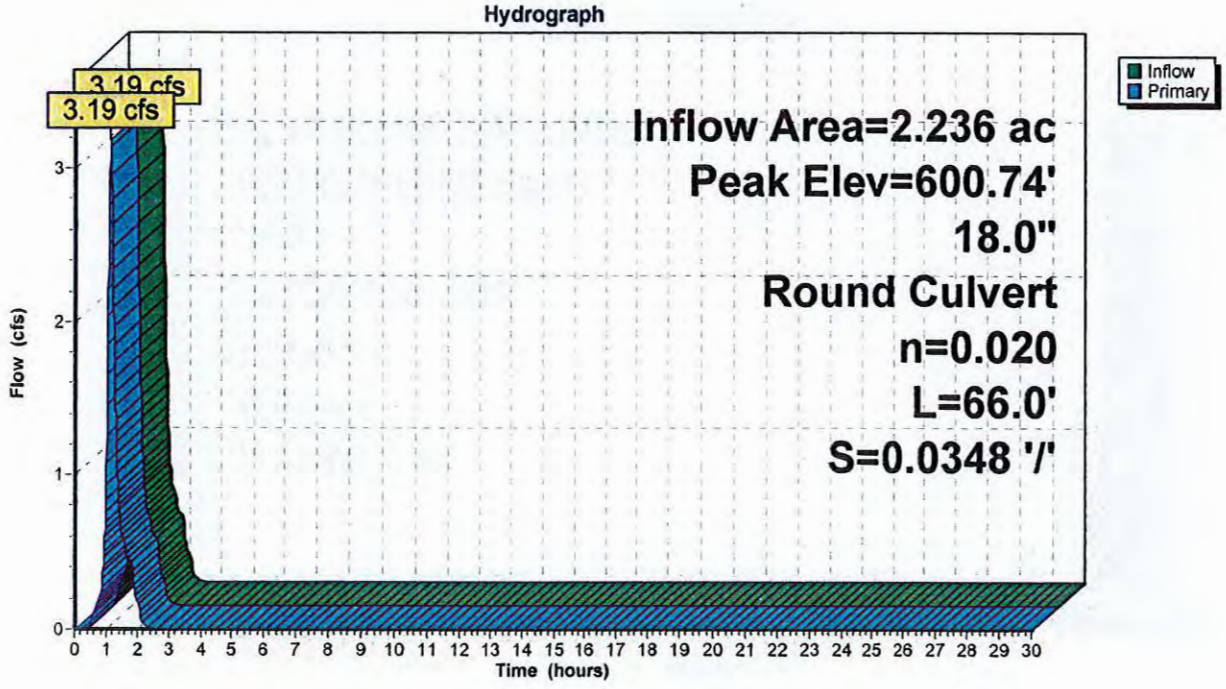
Inflow Area =	2.236 ac,	43.09% Impervious,	Inflow Depth =	0.56"	for NJDEP event
Inflow =	3.19 cfs @	1.12 hrs, Volume=	0.104 af		
Outflow =	3.19 cfs @	1.12 hrs, Volume=	0.104 af,	Atten= 0%,	Lag= 0.0 min
Primary =	3.19 cfs @	1.12 hrs, Volume=	0.104 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 600.74' @ 1.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.90'	**18.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 599.90' / 597.60' S= 0.0348 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.19 cfs @ 1.12 hrs HW=600.74' TW=598.58' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 3.19 cfs @ 3.12 fps)

Pond MH-5: MH 5 to MH 6



Summary for Pond MH-6: MH 6 to MH 11

[57] Hint: Peaked at 598.59' (Flood elevation advised)

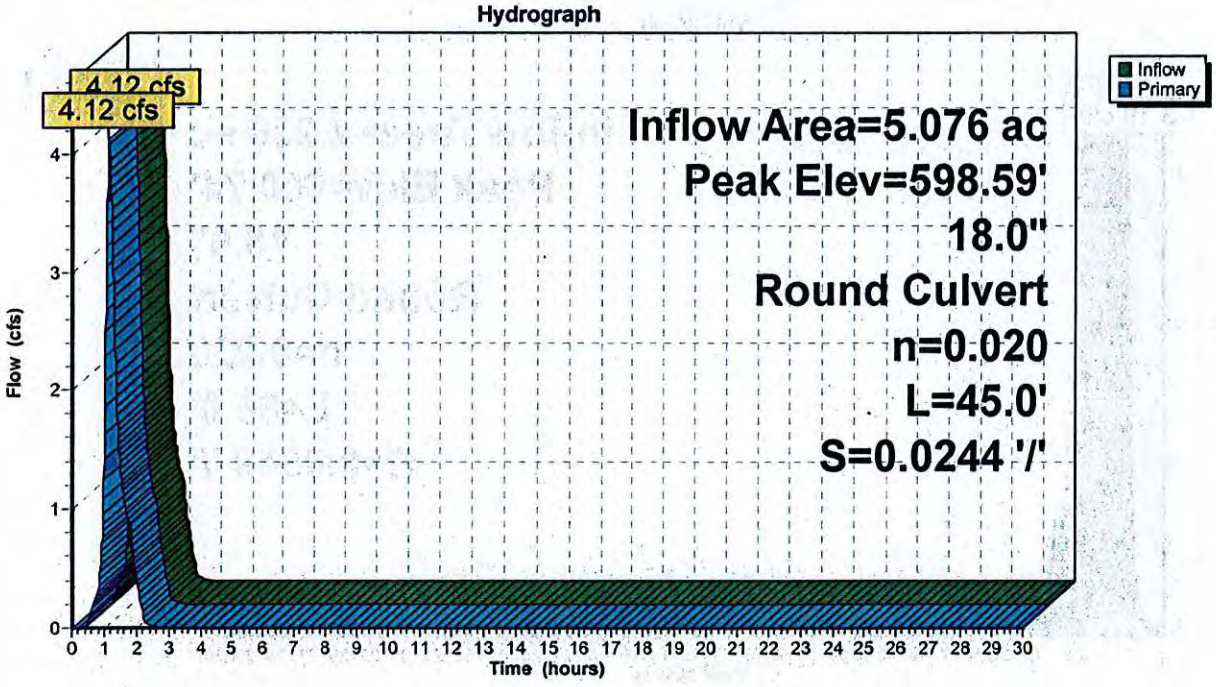
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 0.40" for NJDEP event
Inflow = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af
Outflow = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min
Primary = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.59' @ 1.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.60'	**18.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 597.60' / 596.50' S= 0.0244 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.12 cfs @ 1.14 hrs HW=598.59' TW=597.39' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.12 cfs @ 4.72 fps)

Pond MH-6: MH 6 to MH 11



Summary for Pond MH-7: MH-7 to MH-11

[57] Hint: Peaked at 597.39' (Flood elevation advised)

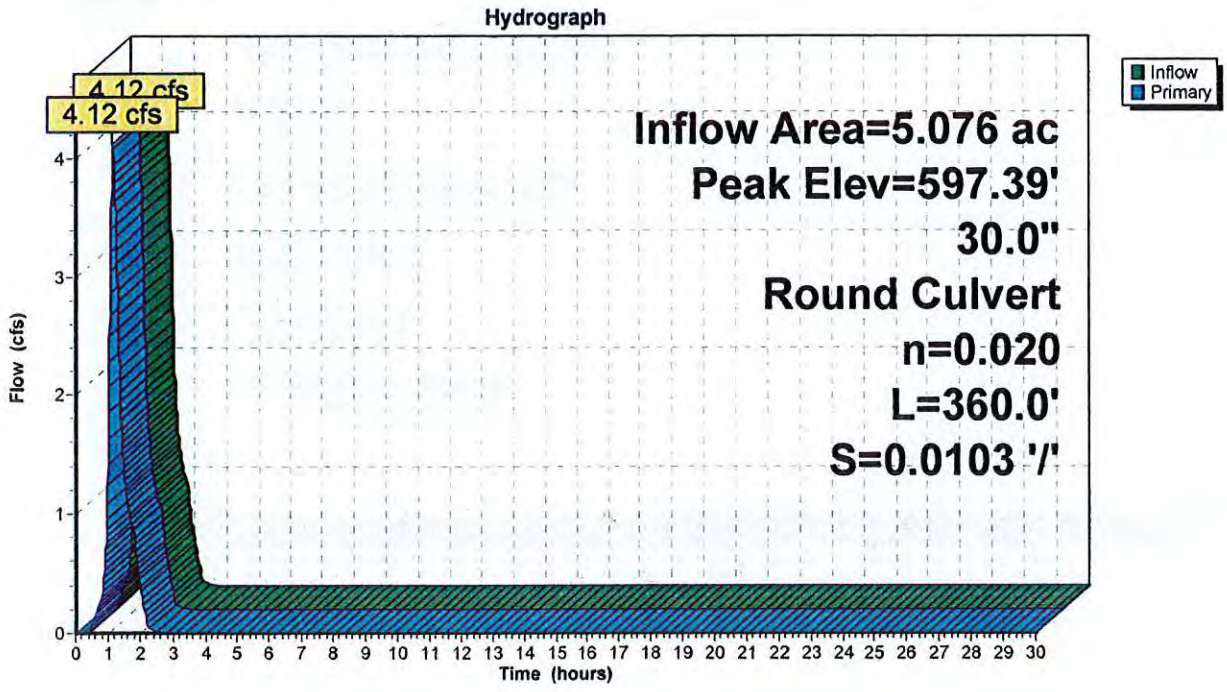
Inflow Area =	5.076 ac,	24.87% Impervious,	Inflow Depth =	0.40"	for NJDEP event
Inflow =	4.12 cfs @	1.14 hrs, Volume=	0.171 af		
Outflow =	4.12 cfs @	1.14 hrs, Volume=	0.171 af,	Atten= 0%,	Lag= 0.0 min
Primary =	4.12 cfs @	1.14 hrs, Volume=	0.171 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 597.39' @ 1.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**30.0" Round Culvert** L= 360.0' Ke= 0.500 Inlet / Outlet Invert= 596.50' / 592.80' S= 0.0103 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.12 cfs @ 1.14 hrs HW=597.39' TW=0.00' (Dynamic Tailwater)
↳**1=Culvert** (Barrel Controls 4.12 cfs @ 3.92 fps)

Pond MH-7: MH-7 to MH-11



Summary for Pond MH-A: MH-A to MH-B

[43] Hint: Has no inflow (Outflow=Zero)

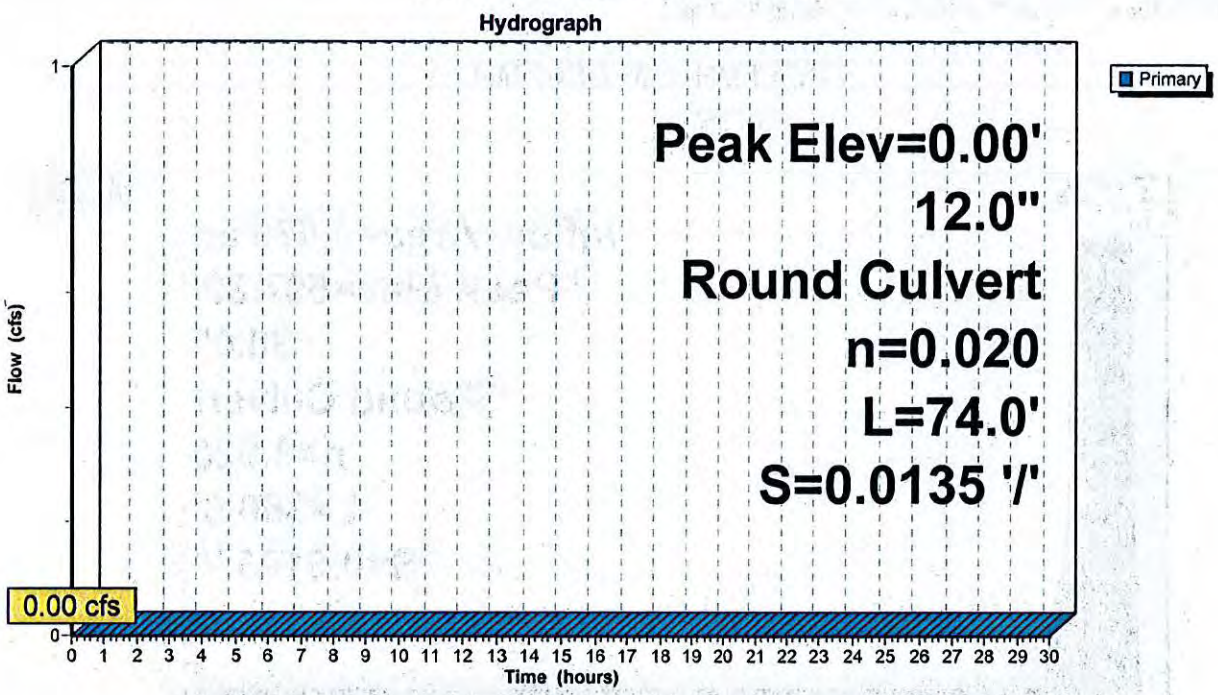
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 0.00' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**12.0" Round Culvert** L= 74.0' Ke= 0.500 Inlet / Outlet Invert= 599.00' / 598.00' S= 0.0135 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=598.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond MH-A: MH-A to MH-B



Summary for Pond MH-B: MH-B to MH-C

[57] Hint: Peaked at 598.77' (Flood elevation advised)

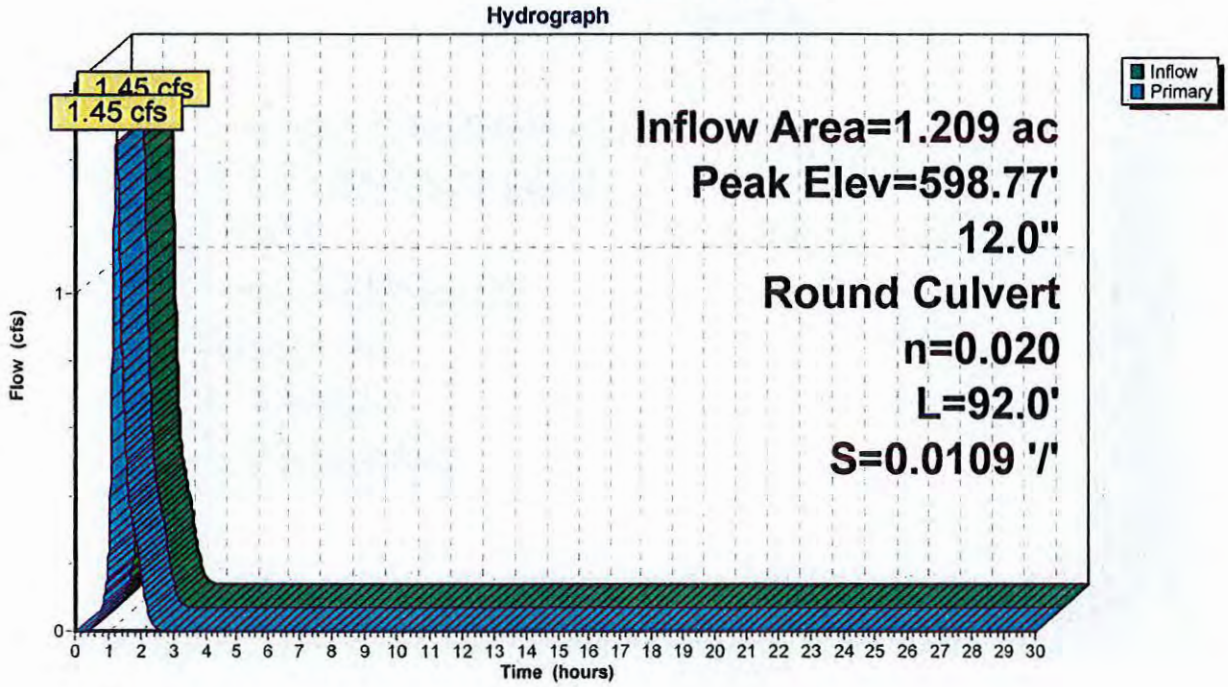
Inflow Area =	1.209 ac,	37.17% Impervious,	Inflow Depth =	0.57"	for NJDEP event
Inflow =	1.45 cfs @	1.22 hrs, Volume=	0.058 af		
Outflow =	1.45 cfs @	1.22 hrs, Volume=	0.058 af,	Atten= 0%,	Lag= 0.0 min
Primary =	1.45 cfs @	1.22 hrs, Volume=	0.058 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.77' @ 1.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**12.0" Round Culvert** L= 92.0' Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.00' S= 0.0109 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.45 cfs @ 1.22 hrs HW=598.77' TW=597.64' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 1.45 cfs @ 3.09 fps)

Pond MH-B: MH-B to MH-C



Summary for Pond MH-C: MH-Cto MH-D

[57] Hint: Peaked at 597.64' (Flood elevation advised)

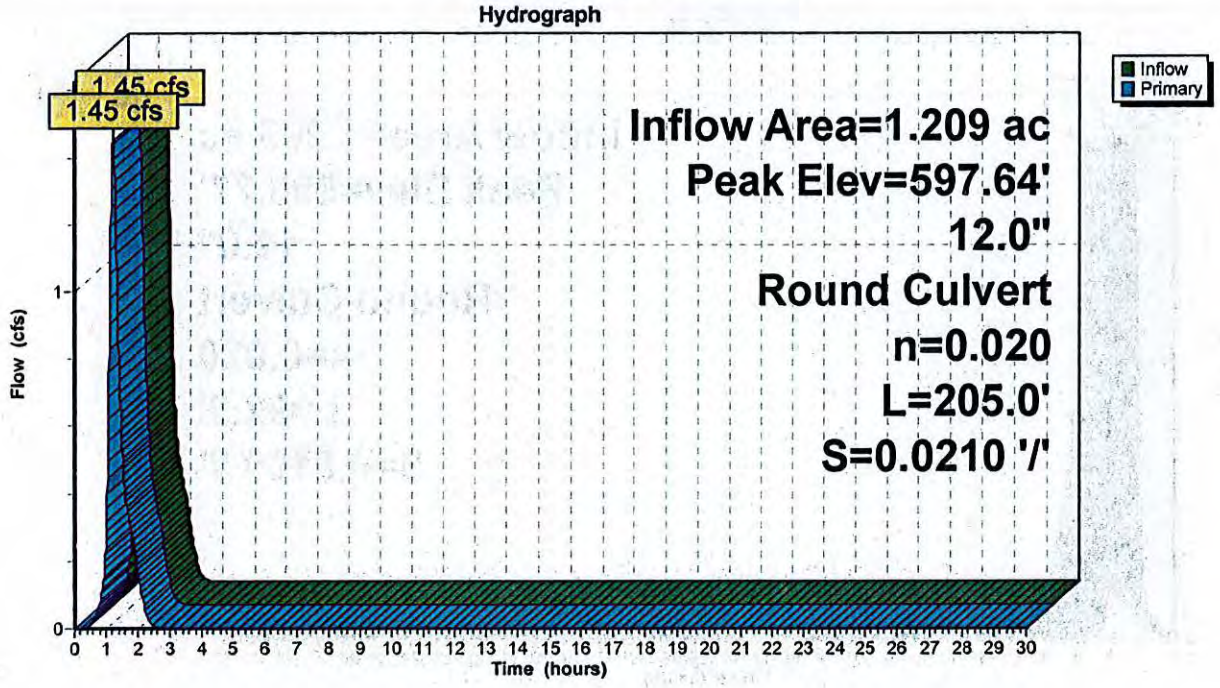
Inflow Area = 1.209 ac, 37.17% Impervious, Inflow Depth = 0.57" for NJDEP event
Inflow = 1.45 cfs @ 1.22 hrs, Volume= 0.058 af
Outflow = 1.45 cfs @ 1.22 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 1.22 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 597.64' @ 1.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 592.70' S= 0.0210 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.45 cfs @ 1.22 hrs HW=597.64' TW=0.00' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 1.45 cfs @ 2.73 fps)

Pond MH-C: MH-Cto MH-D

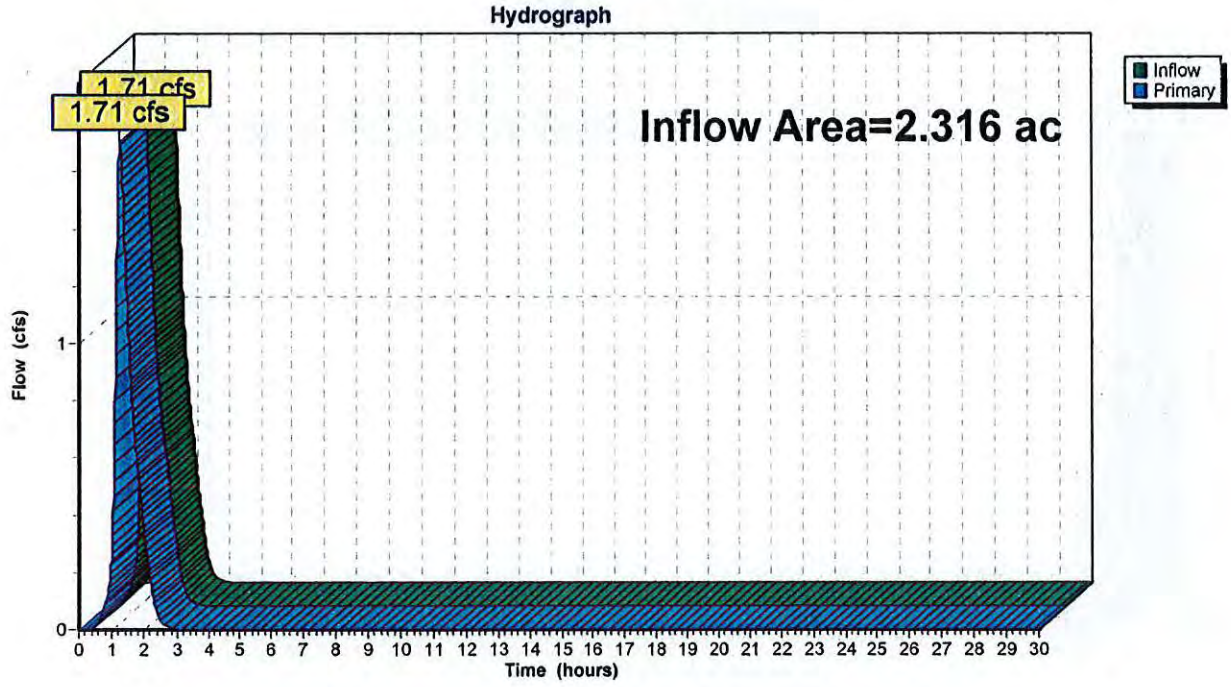


Summary for Link 3L: to MH D

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 0.46" for NJDEP event
Inflow = 1.71 cfs @ 1.25 hrs, Volume= 0.089 af
Primary = 1.71 cfs @ 1.25 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: to MH D

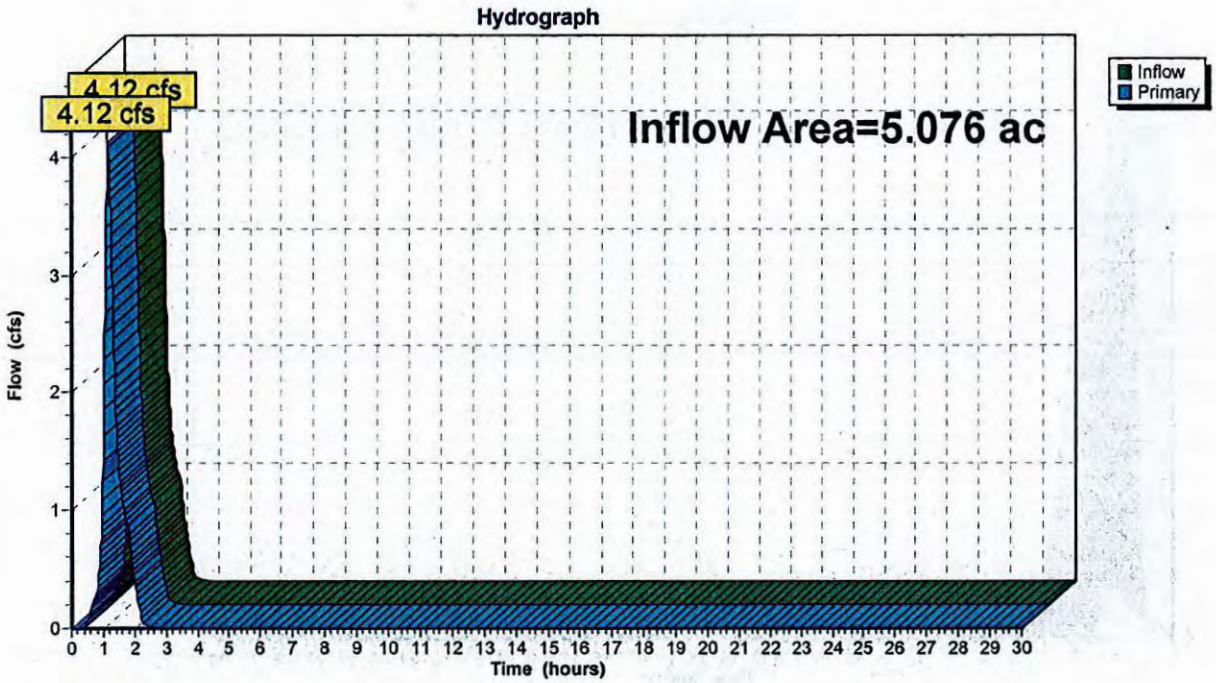


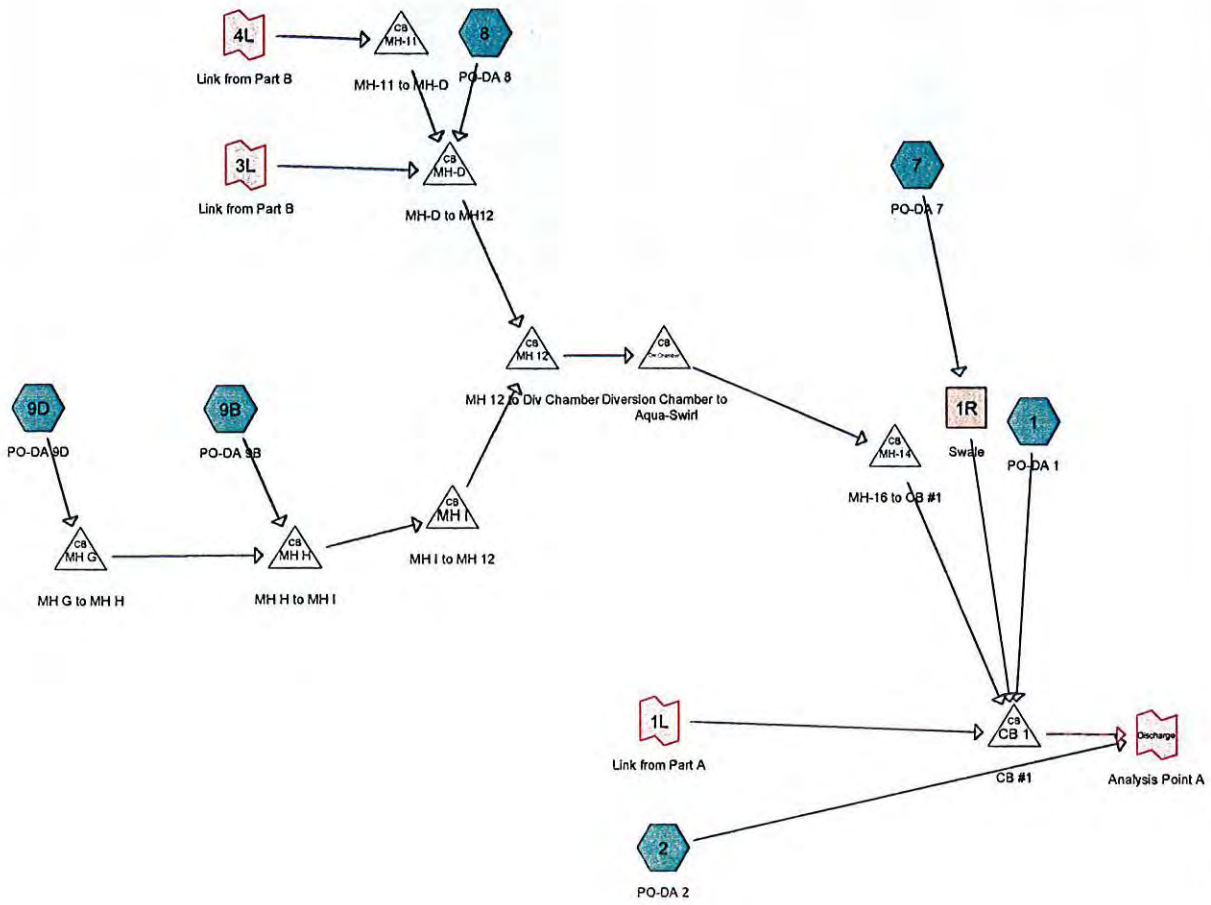
Summary for Link 4L: to MH 11

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 0.40" for NJDEP event
Inflow = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af
Primary = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4L: to MH 11





Subcat Reach Pond Link

Drainage Diagram for Post Development West Orange C_03 01 12
Prepared by TRC Engineers, Inc., Printed 3/14/2012
HydroCAD® 9.10 s/n 06401 © 2009 HydroCAD Software Solutions LLC

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	2	0.00	0.00	190.0	0.0100	0.013	24.0	0.0	0.0
2	CB 1	576.00	574.00	90.0	0.0222	0.011	24.0	0.0	0.0
3	Div Chamber	591.60	588.00	88.0	0.0409	0.020	30.0	0.0	0.0
4	MH 12	591.70	591.60	10.0	0.0100	0.020	30.0	0.0	0.0
5	MH G	598.50	597.50	159.0	0.0063	0.020	12.0	0.0	0.0
6	MH H	597.00	595.50	154.0	0.0097	0.020	12.0	0.0	0.0
7	MH I	595.50	594.50	91.0	0.0110	0.020	12.0	0.0	0.0
8	MH-11	592.80	592.70	7.0	0.0143	0.020	30.0	0.0	0.0
9	MH-14	588.00	576.00	174.0	0.0690	0.020	30.0	0.0	0.0
10	MH-D	592.70	591.70	90.0	0.0111	0.020	30.0	0.0	0.0

Summary for Subcatchment 1: PO-DA 1

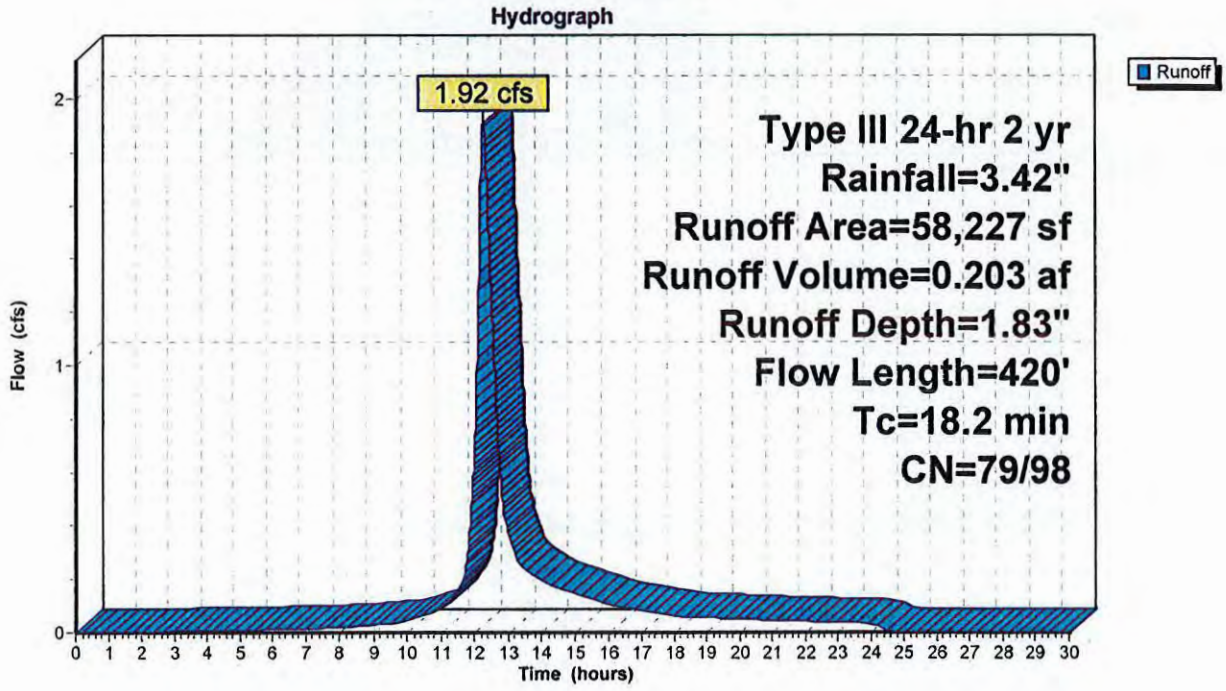
Runoff = 1.92 cfs @ 12.25 hrs, Volume= 0.203 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	11,168	98	Impervious, HSG D
	38,971	79	Woods/grass comb., Good, HSG D
	8,088	78	Meadow, non-grazed, HSG D
	58,227	83	Weighted Average
	47,059	79	80.82% Pervious Area
	11,168	98	19.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1: PO-DA 1



Summary for Subcatchment 2: PO-DA 2

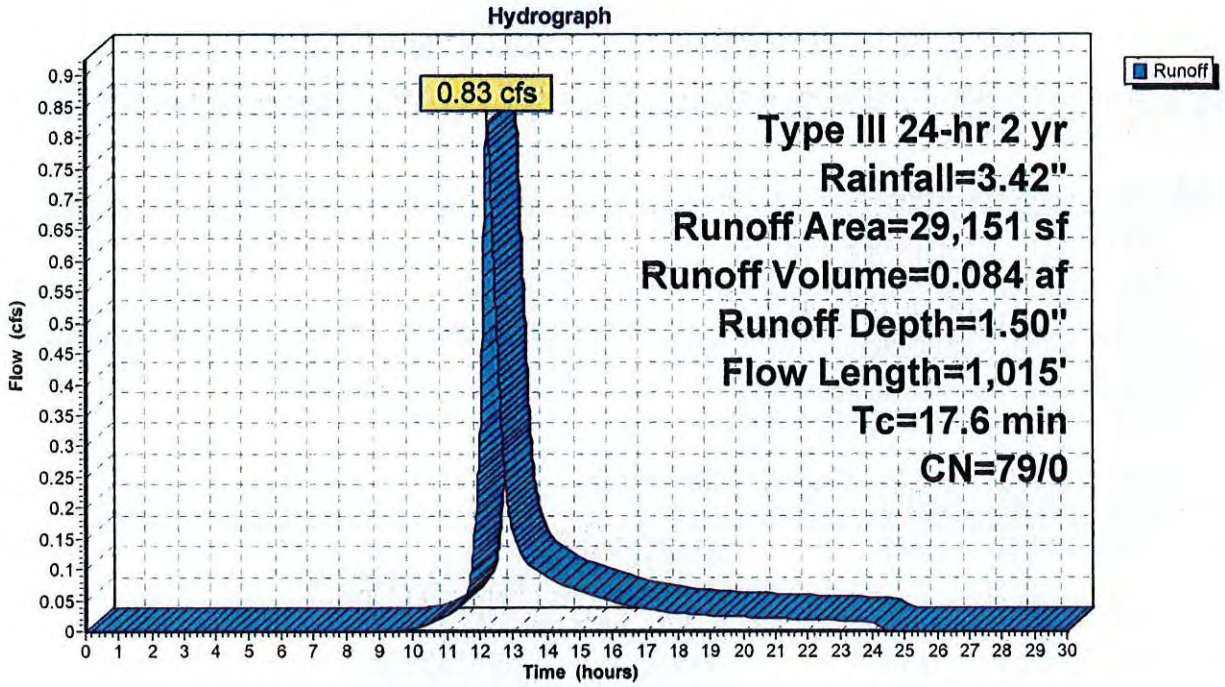
Runoff = 0.83 cfs @ 12.25 hrs, Volume= 0.084 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG D
*	0	98	Gravel road, HSG D
*	9,261	80	Grass, Good, HSG D
	19,890	78	Meadow, non-grazed, HSG D
	29,151	79	Weighted Average
	29,151	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	120	0.0400	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	75	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	140	0.0070	1.25		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	130	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.7	360	0.0540	3.49		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	190	0.0100	7.20	22.62	**Pipe Channel, Culvert to Discharge** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
17.6	1,015	Total			

Subcatchment 2: PO-DA 2



Summary for Subcatchment 7: PO-DA 7

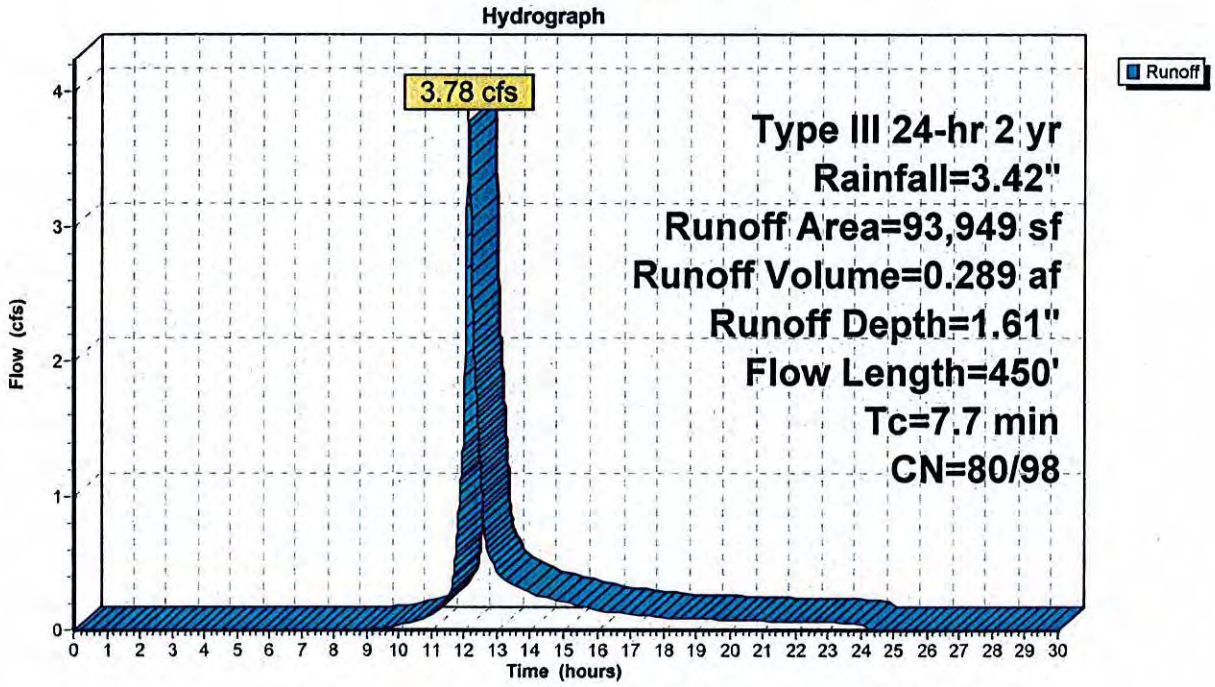
Runoff = 3.78 cfs @ 12.11 hrs, Volume= 0.289 af, Depth= 1.61"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	1,868	98	Impervious, HSG D
*	14,410	85	Yard stone, HSG D
*	72,265	80	Grass , Good, HSG D
	5,406	73	Brush, Good, HSG D
	93,949	81	Weighted Average
	92,081	80	98.01% Pervious Area
	1,868	98	1.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7: PO-DA 7



Summary for Subcatchment 8: PO-DA 8

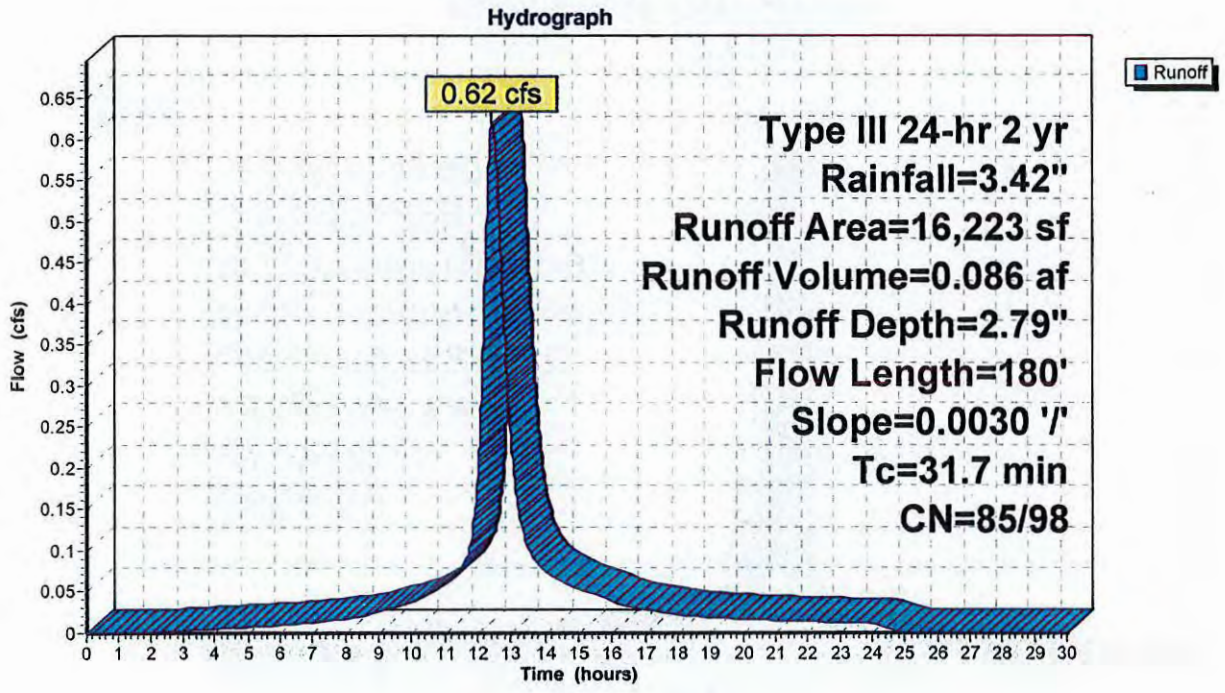
Runoff = 0.62 cfs @ 12.43 hrs, Volume= 0.086 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	10,980	98	Impervious, HSG D
*	5,243	85	Yard stone, HSG D
	16,223	94	Weighted Average
	5,243	85	32.32% Pervious Area
	10,980	98	67.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	100	0.0030	0.05		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.2	80	0.0030	1.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.7	180	Total			

Subcatchment 8: PO-DA 8



Summary for Subcatchment 9B: PO-DA 9B

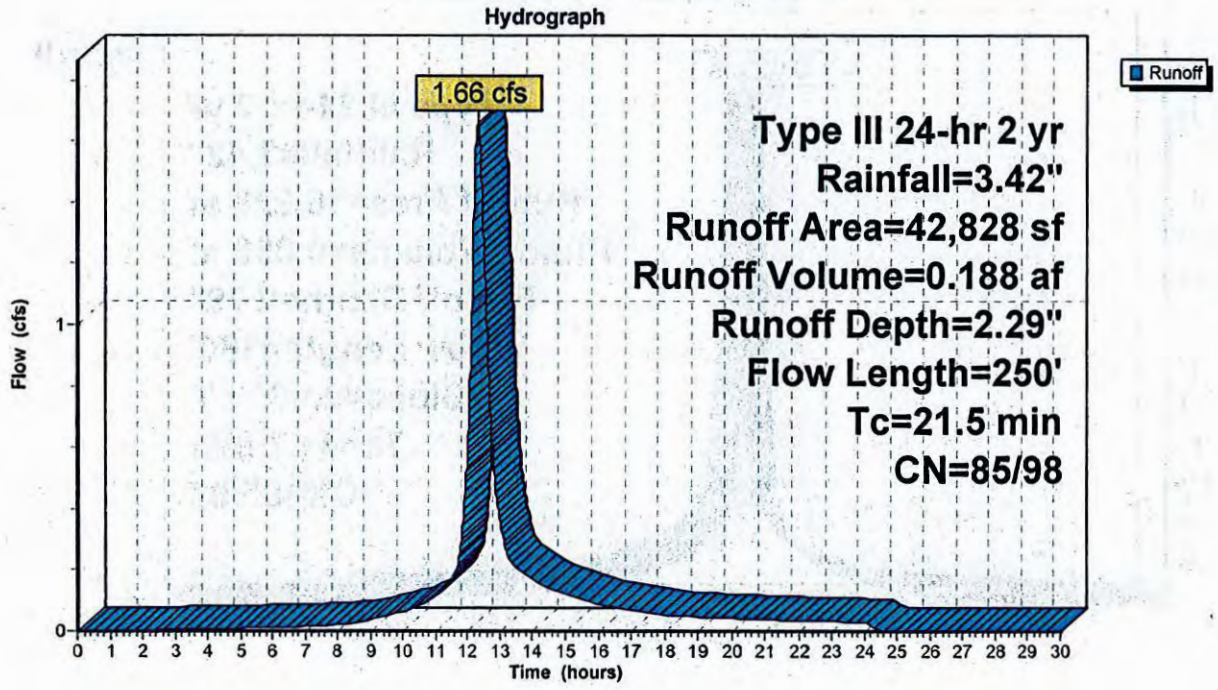
Runoff = 1.66 cfs @ 12.30 hrs, Volume= 0.188 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	5,504	98	Impervious, HSG D
*	6,361	98	Gravel road, HSG D
*	30,963	85	Yard stone, HSG D
	42,828	89	Weighted Average
	30,963	85	72.30% Pervious Area
	11,865	98	27.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	100	0.0090	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.9	150	0.0066	1.31		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
21.5	250	Total			

Subcatchment 9B: PO-DA 9B



Summary for Subcatchment 9D: PO-DA 9D

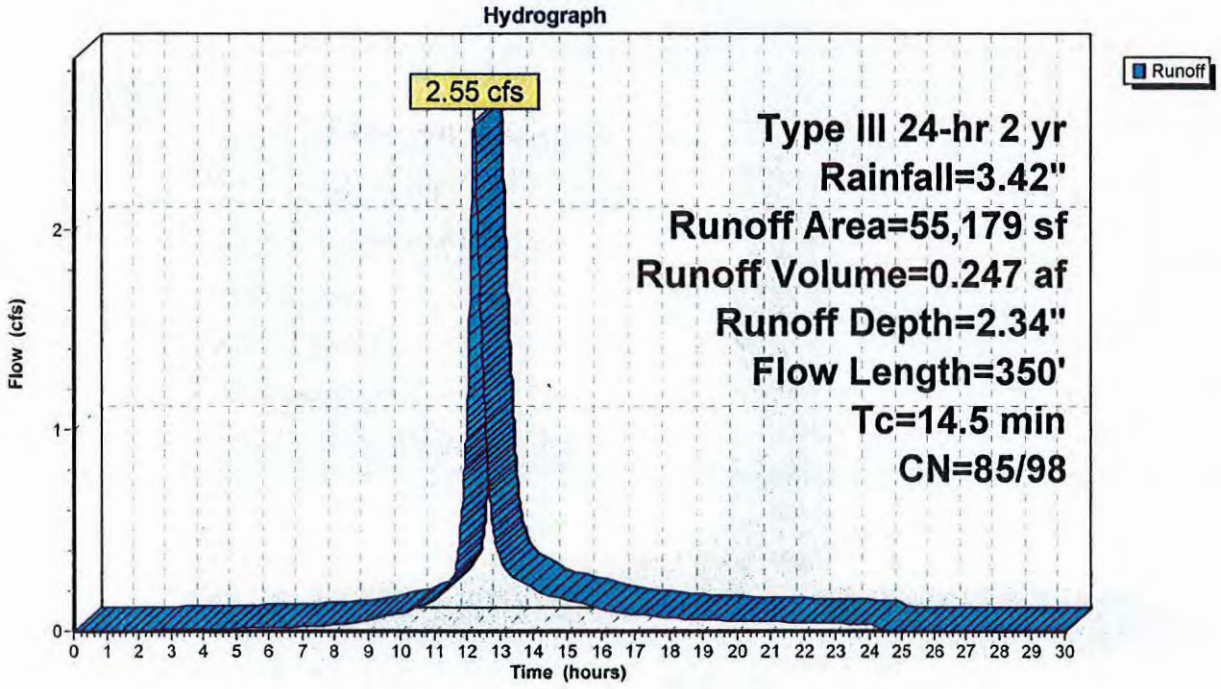
Runoff = 2.55 cfs @ 12.20 hrs, Volume= 0.247 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.42"

	Area (sf)	CN	Description
*	1,192	98	Impervious, HSG D
*	16,177	98	Gravel road, HSG D
*	37,810	85	Yard Stone, HSG D
	55,179	89	Weighted Average
	37,810	85	68.52% Pervious Area
	17,369	98	31.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
0.8	120	0.0270	2.65		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.1	130	0.0140	1.90		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
14.5	350	Total			

Subcatchment 9D: PO-DA 9D



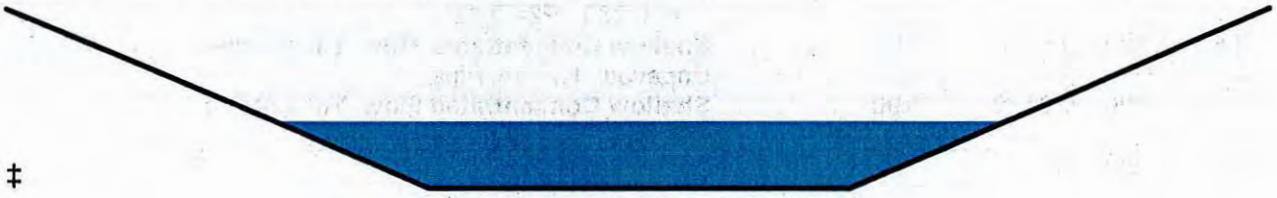
Summary for Reach 1R: Swale

Inflow Area = 2.157 ac, 1.99% Impervious, Inflow Depth = 1.61" for 2 yr event
Inflow = 3.78 cfs @ 12.11 hrs, Volume= 0.289 af
Outflow = 3.61 cfs @ 12.14 hrs, Volume= 0.289 af, Atten= 4%, Lag= 1.7 min

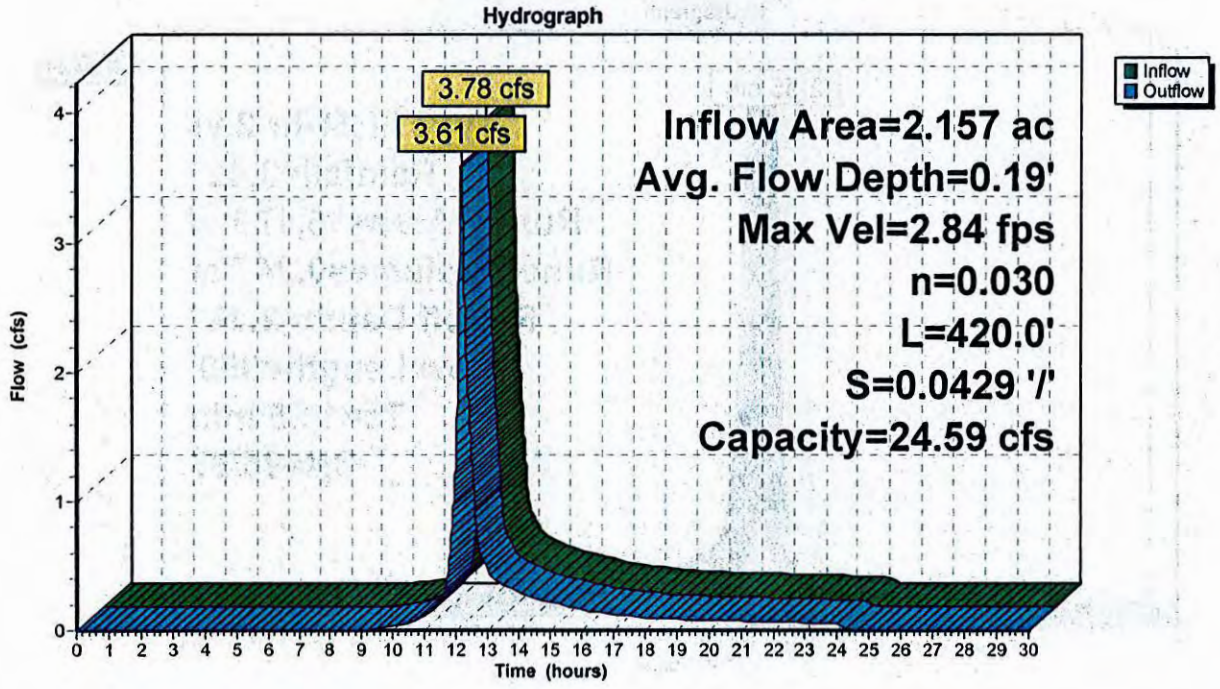
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.84 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 10.3 min

Peak Storage= 534 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡



Summary for Pond CB 1: CB #1

[57] Hint: Peaked at 578.97' (Flood elevation advised)

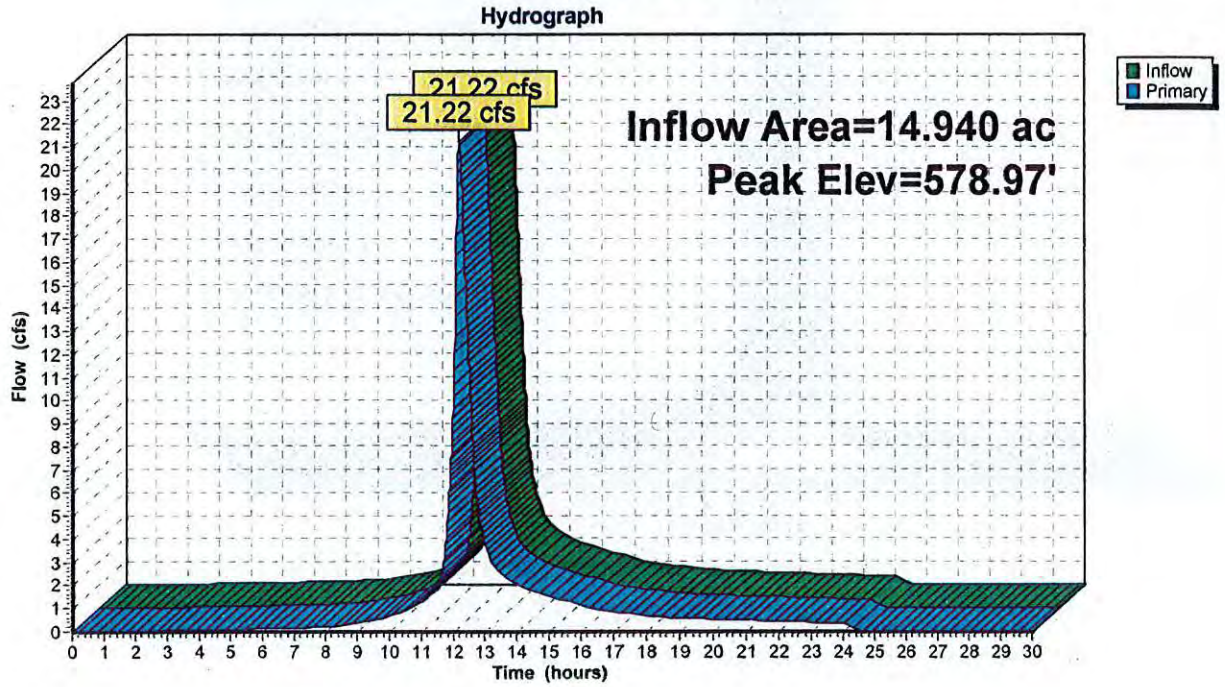
Inflow Area = 14.940 ac, 23.84% Impervious, Inflow Depth = 1.84" for 2 yr event
Inflow = 21.22 cfs @ 12.18 hrs, Volume= 2.295 af
Outflow = 21.22 cfs @ 12.18 hrs, Volume= 2.295 af, Atten= 0%, Lag= 0.0 min
Primary = 21.22 cfs @ 12.18 hrs, Volume= 2.295 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 578.97' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011
#2	Primary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=21.22 cfs @ 12.18 hrs HW=578.97' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 21.22 cfs @ 6.75 fps)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CB 1: CB #1



Summary for Pond Div Chamber: Diversion Chamber to Aqua-Swirl

[57] Hint: Peaked at 593.32' (Flood elevation advised)

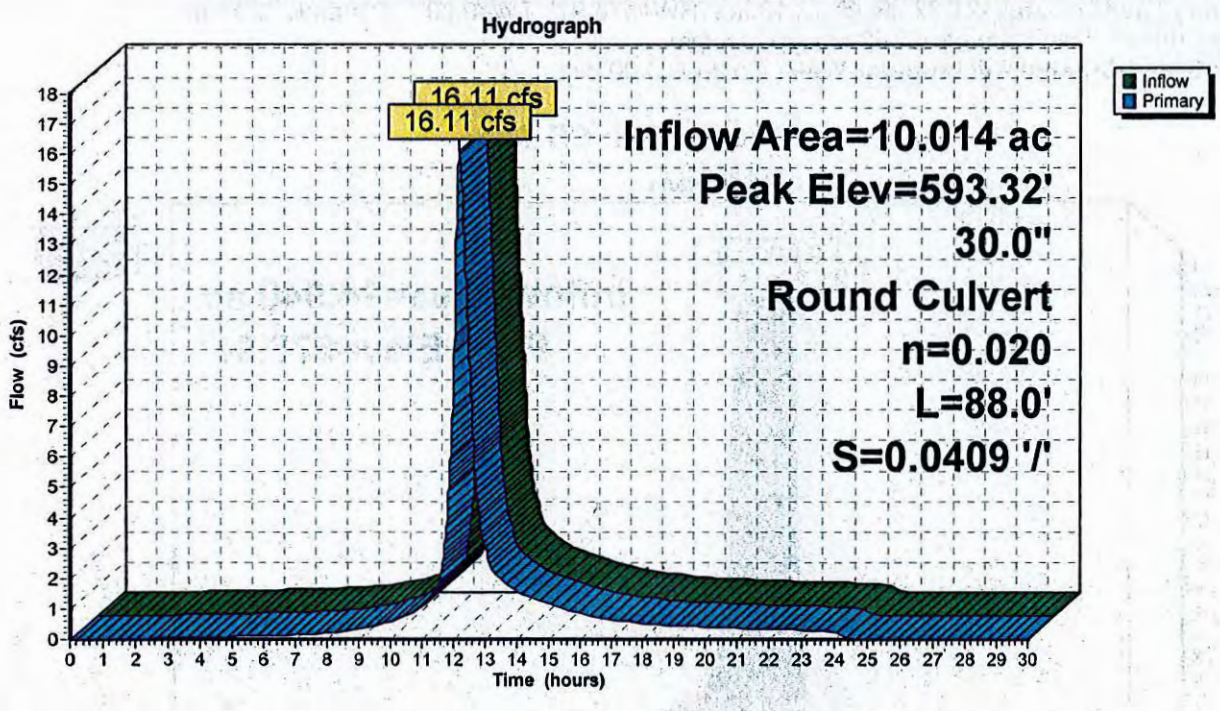
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 2.16" for 2 yr event
Inflow = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af
Outflow = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af, Atten= 0%, Lag= 0.0 min
Primary = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 593.32' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.60'	**30.0" Round Culvert** L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 591.60' / 588.00' S= 0.0409 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=16.11 cfs @ 12.18 hrs HW=593.32' TW=589.72' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 16.11 cfs @ 4.47 fps)

Pond Div Chamber: Diversion Chamber to Aqua-Swirl



Summary for Pond MH 12: MH 12 to Div Chamber

[57] Hint: Peaked at 593.90' (Flood elevation advised)

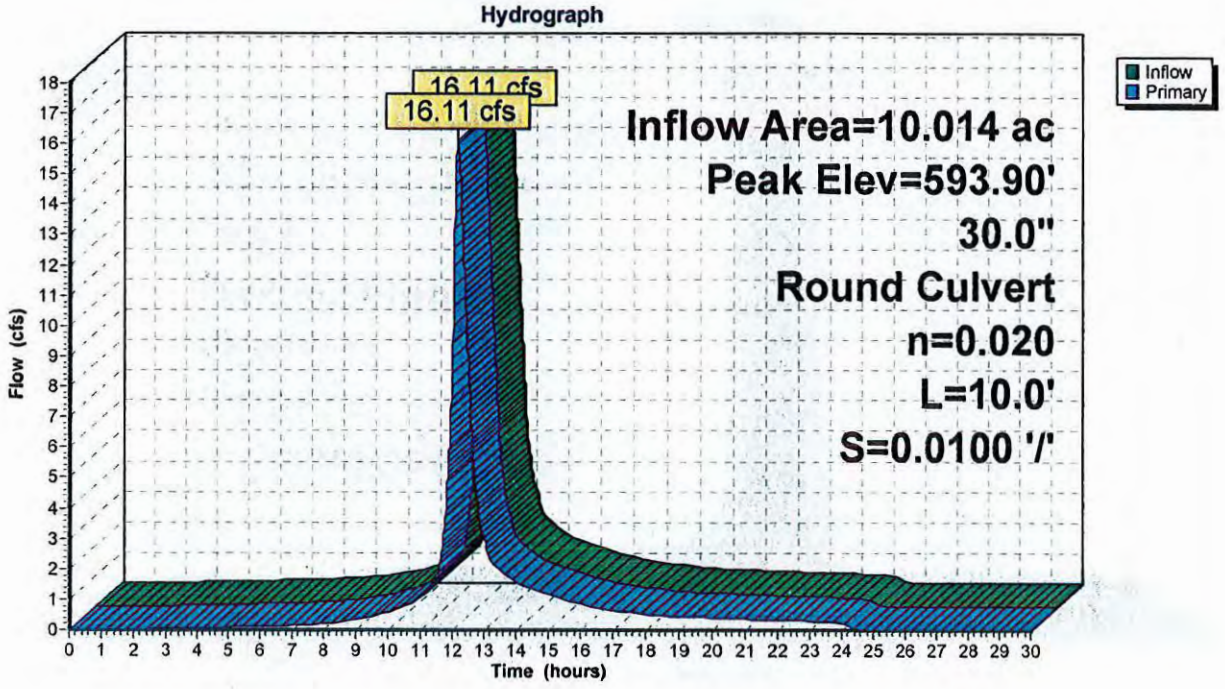
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 2.16" for 2 yr event
Inflow = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af
Outflow = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af, Atten= 0%, Lag= 0.0 min
Primary = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 593.90' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.70'	**30.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 591.70' / 591.60' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=16.11 cfs @ 12.18 hrs HW=593.90' TW=593.32' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 16.11 cfs @ 4.69 fps)

Pond MH 12: MH 12 to Div Chamber



Summary for Pond MH G: MH G to MH H

[57] Hint: Peaked at 606.35' (Flood elevation advised)

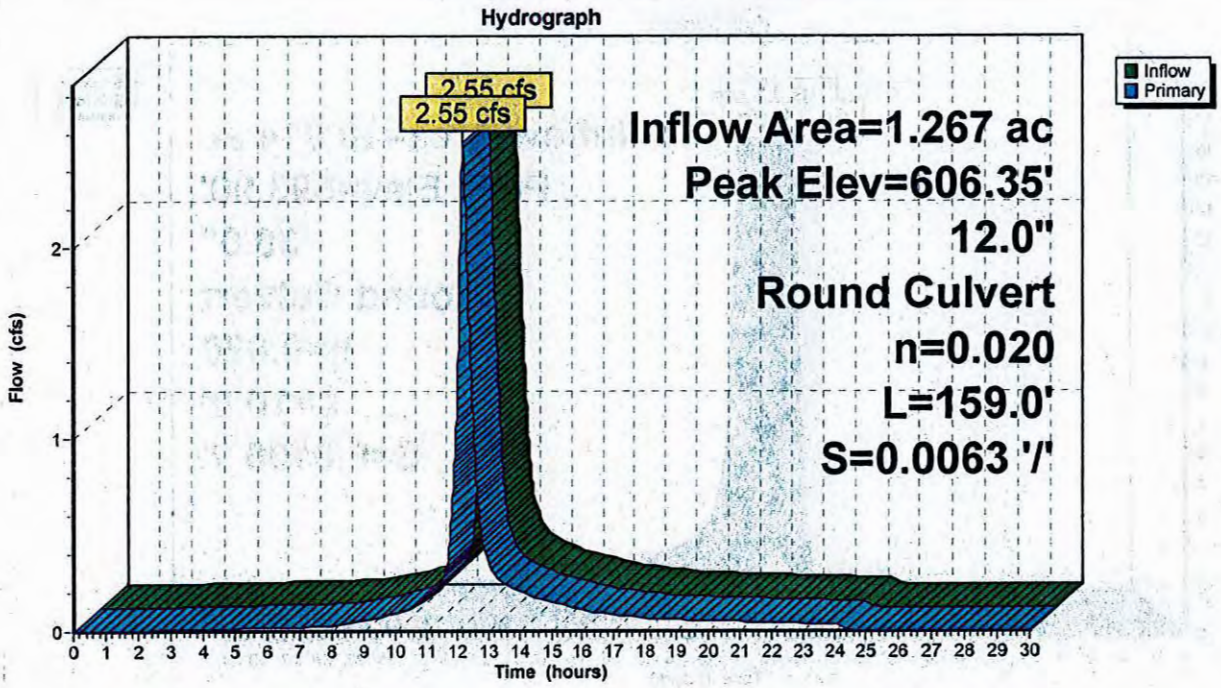
Inflow Area =	1.267 ac,	31.48% Impervious,	Inflow Depth =	2.34" for 2 yr event
Inflow =	2.55 cfs @	12.20 hrs, Volume=	0.247 af	
Outflow =	2.55 cfs @	12.20 hrs, Volume=	0.247 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.55 cfs @	12.20 hrs, Volume=	0.247 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 606.35' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.50'	**12.0" Round Culvert** L= 159.0' Ke= 0.500 Inlet / Outlet Invert= 598.50' / 597.50' S= 0.0063 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.49 cfs @ 12.20 hrs HW=606.13' TW=604.04' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.49 cfs @ 3.17 fps)

Pond MH G: MH G to MH H



Summary for Pond MH H: MH H to MH I

[57] Hint: Peaked at 604.26' (Flood elevation advised)

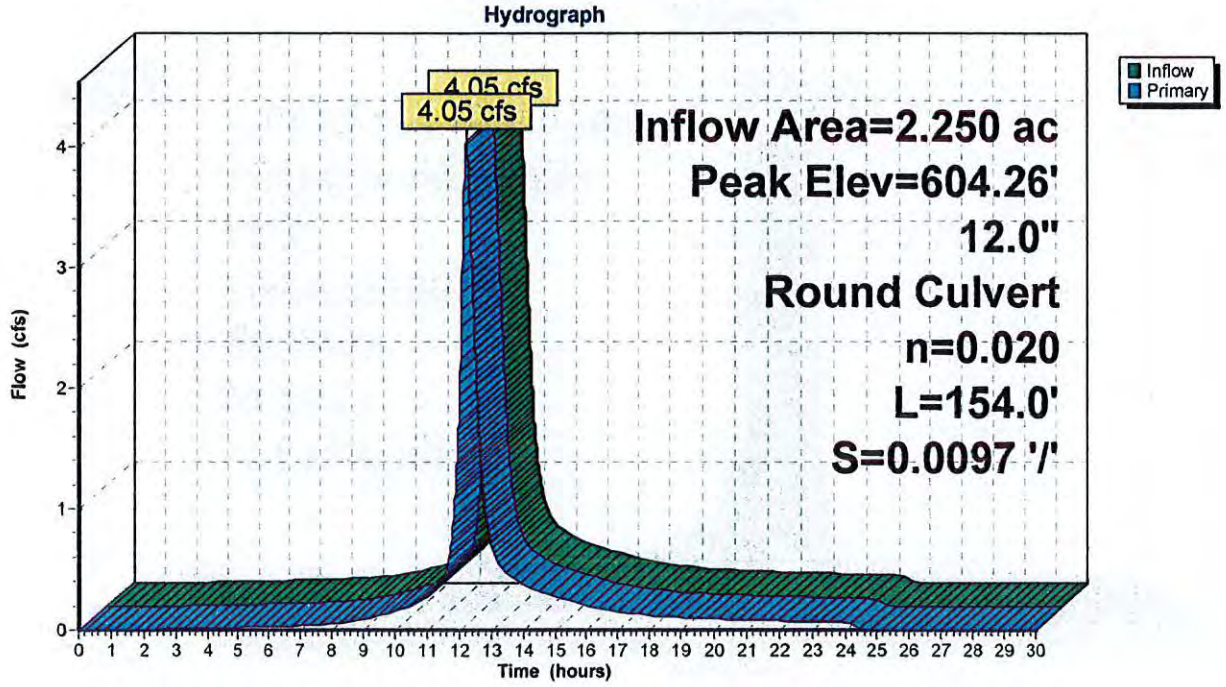
Inflow Area =	2.250 ac, 29.83% Impervious, Inflow Depth =	2.32"	for 2 yr event	
Inflow =	4.05 cfs @	12.22 hrs, Volume=	0.434 af	
Outflow =	4.05 cfs @	12.22 hrs, Volume=	0.434 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.05 cfs @	12.22 hrs, Volume=	0.434 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 604.26' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 154.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 595.50' S= 0.0097 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.05 cfs @ 12.22 hrs HW=604.26' TW=598.91' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.05 cfs @ 5.16 fps)

Pond MH H: MH H to MH I



Summary for Pond MH I: MH I to MH 12

[57] Hint: Peaked at 598.91' (Flood elevation advised)

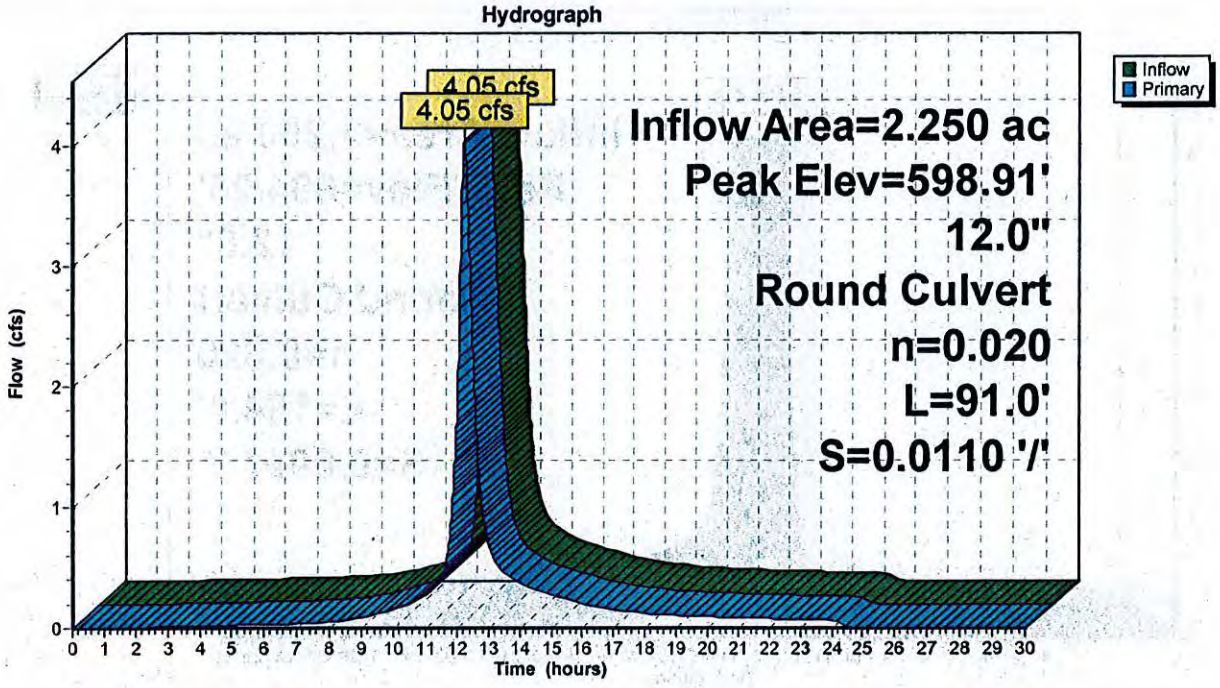
Inflow Area =	2.250 ac, 29.83% Impervious, Inflow Depth =	2.32"	for 2 yr event	
Inflow =	4.05 cfs @	12.22 hrs, Volume=	0.434 af	
Outflow =	4.05 cfs @	12.22 hrs, Volume=	0.434 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.05 cfs @	12.22 hrs, Volume=	0.434 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	595.50'	**12.0" Round Culvert** L= 91.0' Ke= 0.500 Inlet / Outlet Invert= 595.50' / 594.50' S= 0.0110 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.05 cfs @ 12.22 hrs HW=598.91' TW=593.87' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.05 cfs @ 5.16 fps)

Pond MH I: MH I to MH 12



Summary for Pond MH-11: MH-11 to MH-D

[57] Hint: Peaked at 594.87' (Flood elevation advised)

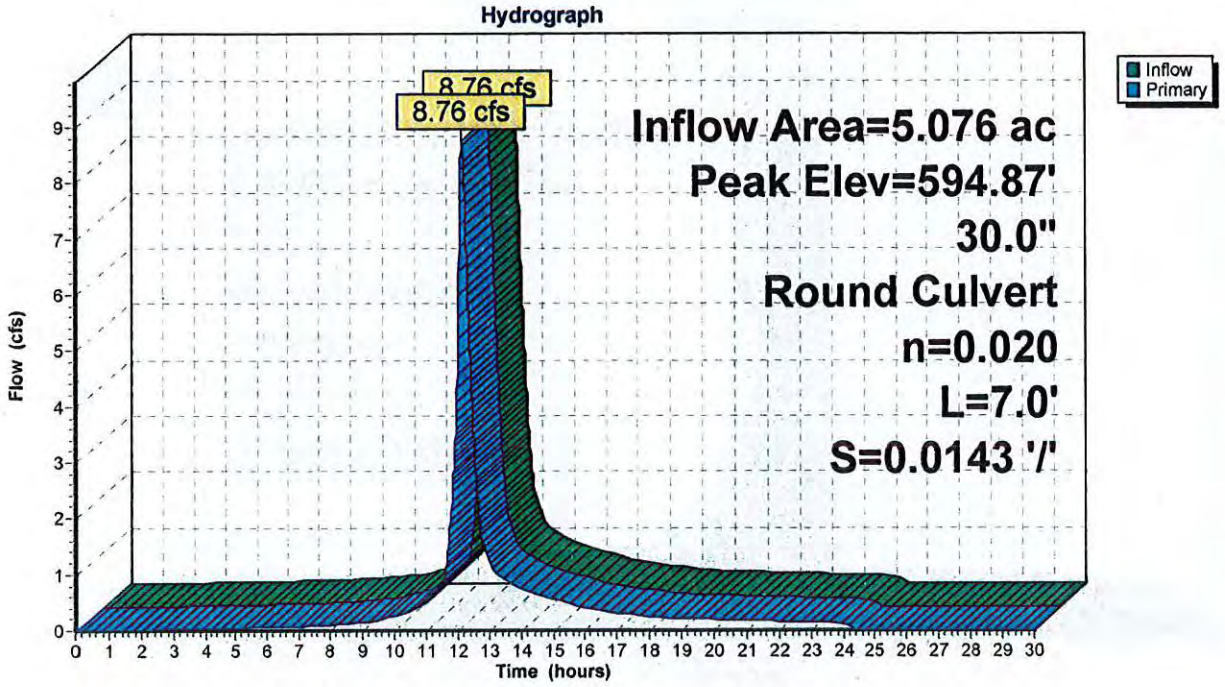
Inflow Area =	5.076 ac,	24.87% Impervious,	Inflow Depth =	2.02" for 2 yr event
Inflow =	8.76 cfs @	12.13 hrs, Volume=	0.855 af	
Outflow =	8.76 cfs @	12.13 hrs, Volume=	0.855 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.76 cfs @	12.13 hrs, Volume=	0.855 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.87' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.80'	**30.0" Round Culvert** L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 592.80' / 592.70' S= 0.0143 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.61 cfs @ 12.13 hrs HW=594.84' TW=594.65' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 8.61 cfs @ 2.74 fps)

Pond MH-11: MH-11 to MH-D



Summary for Pond MH-14: MH-16 to CB #1

[57] Hint: Peaked at 589.72' (Flood elevation advised)

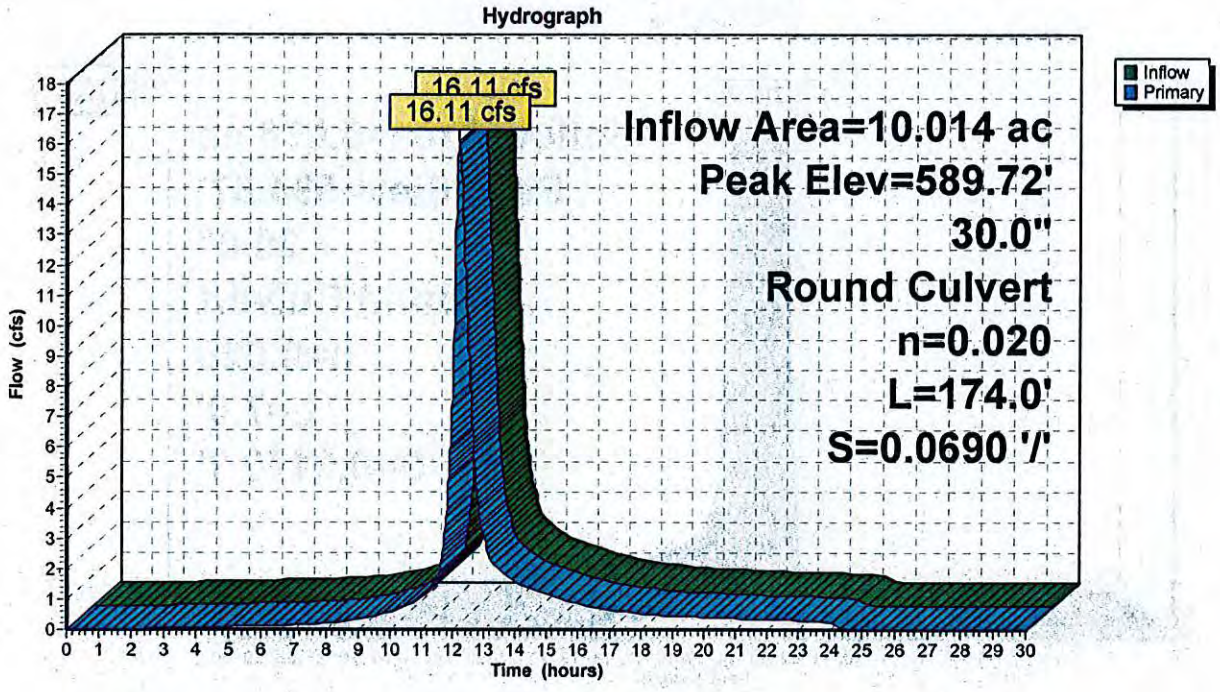
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 2.16" for 2 yr event
Inflow = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af
Outflow = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af, Atten= 0%, Lag= 0.0 min
Primary = 16.11 cfs @ 12.18 hrs, Volume= 1.803 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 589.72' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	588.00'	**30.0" Round Culvert** L= 174.0' Ke= 0.500 Inlet / Outlet Invert= 588.00' / 576.00' S= 0.0690 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=16.11 cfs @ 12.18 hrs HW=589.72' TW=578.96' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 16.11 cfs @ 4.47 fps)

Pond MH-14: MH-16 to CB #1



Summary for Pond MH-D: MH-D to MH12

[57] Hint: Peaked at 594.69' (Flood elevation advised)

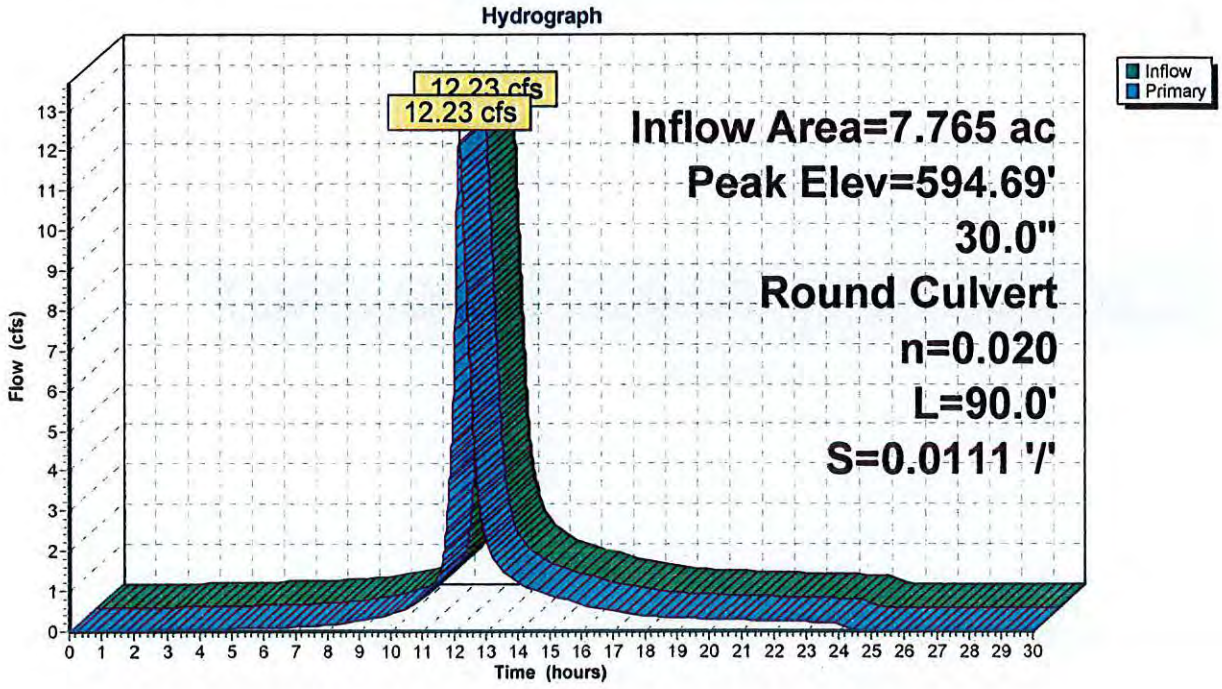
Inflow Area = 7.765 ac, 25.89% Impervious, Inflow Depth = 2.12" for 2 yr event
Inflow = 12.23 cfs @ 12.16 hrs, Volume= 1.369 af
Outflow = 12.23 cfs @ 12.16 hrs, Volume= 1.369 af, Atten= 0%, Lag= 0.0 min
Primary = 12.23 cfs @ 12.16 hrs, Volume= 1.369 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.69' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.70'	**30.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 592.70' / 591.70' S= 0.0111 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=12.19 cfs @ 12.16 hrs HW=594.69' TW=593.89' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 12.19 cfs @ 4.00 fps)

Pond MH-D: MH-D to MH12



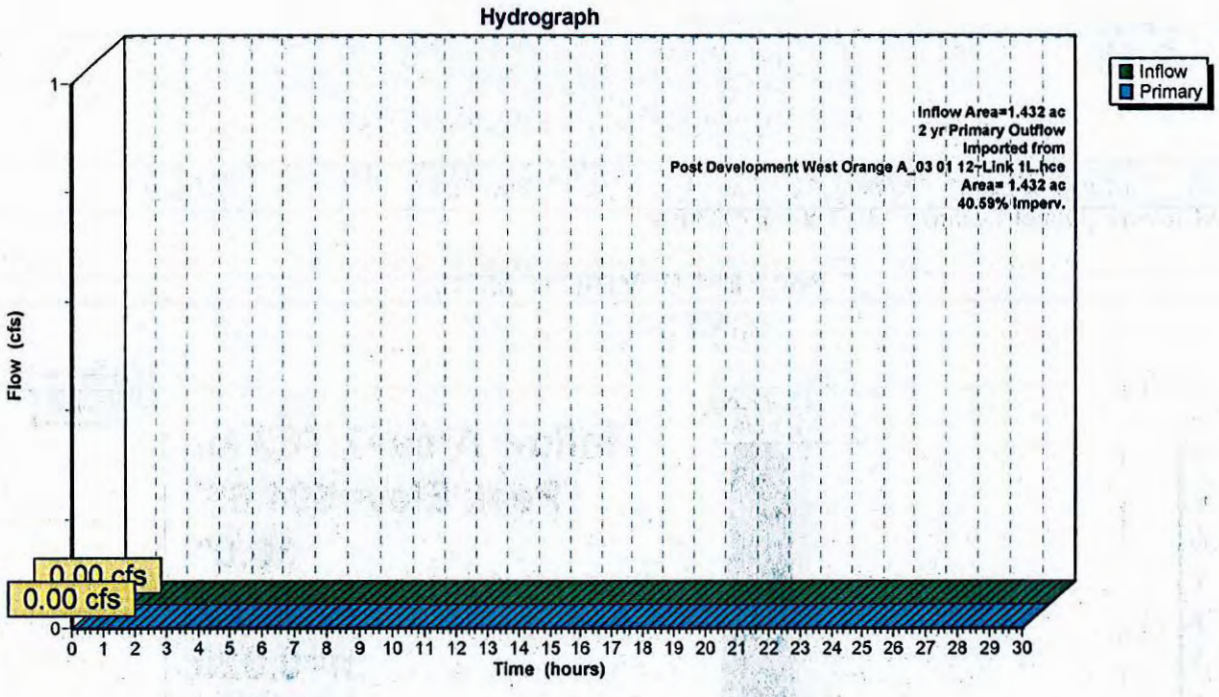
Summary for Link 1L: Link from Part A

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

2 yr Primary Outflow Imported from Post Development West Orange A_03 01 12~Link 1L.hce

Link 1L: Link from Part A



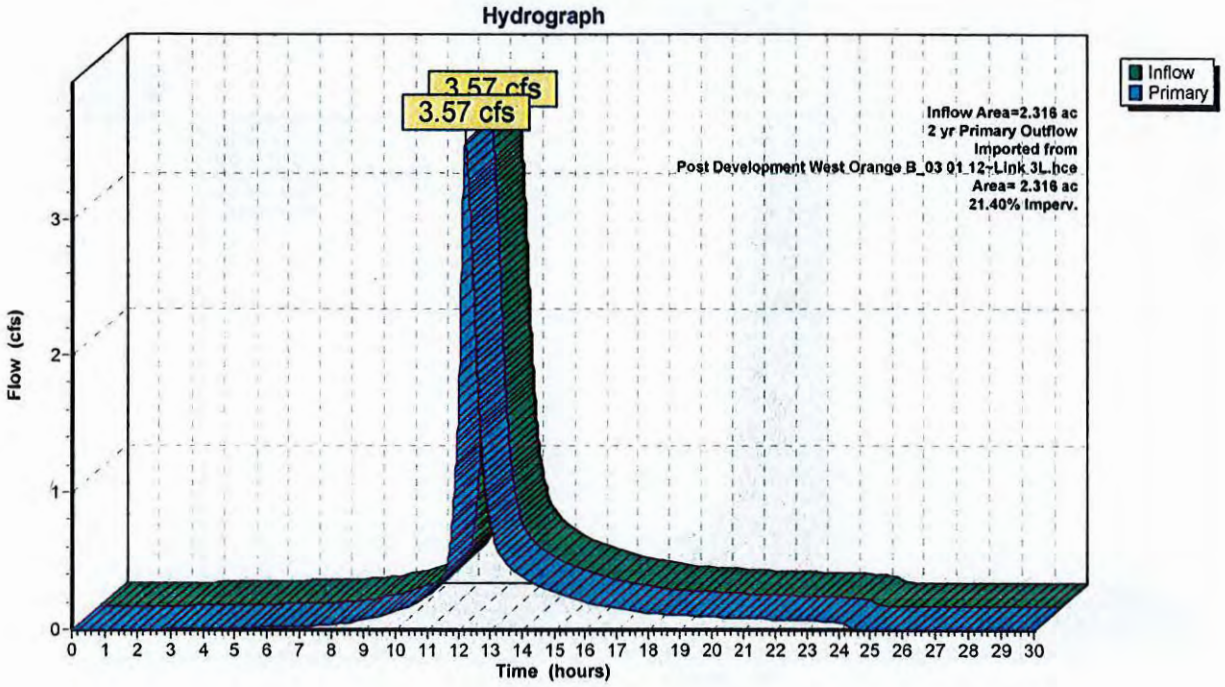
Summary for Link 3L: Link from Part B

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 2.21" for 2 yr event
Inflow = 3.57 cfs @ 12.24 hrs, Volume= 0.427 af
Primary = 3.57 cfs @ 12.24 hrs, Volume= 0.427 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

2 yr Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 3L.hce

Link 3L: Link from Part B



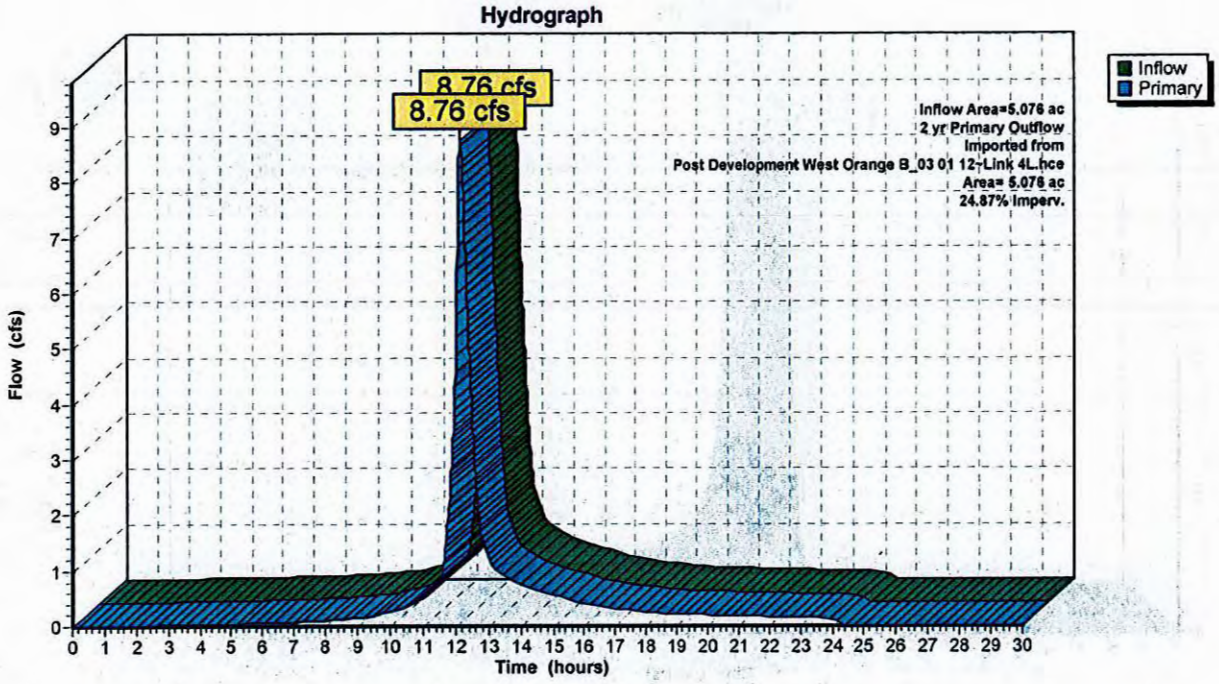
Summary for Link 4L: Link from Part B

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 2.02" for 2 yr event
Inflow = 8.76 cfs @ 12.13 hrs, Volume= 0.855 af
Primary = 8.76 cfs @ 12.13 hrs, Volume= 0.855 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

2 yr Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 4L.hce

Link 4L: Link from Part B

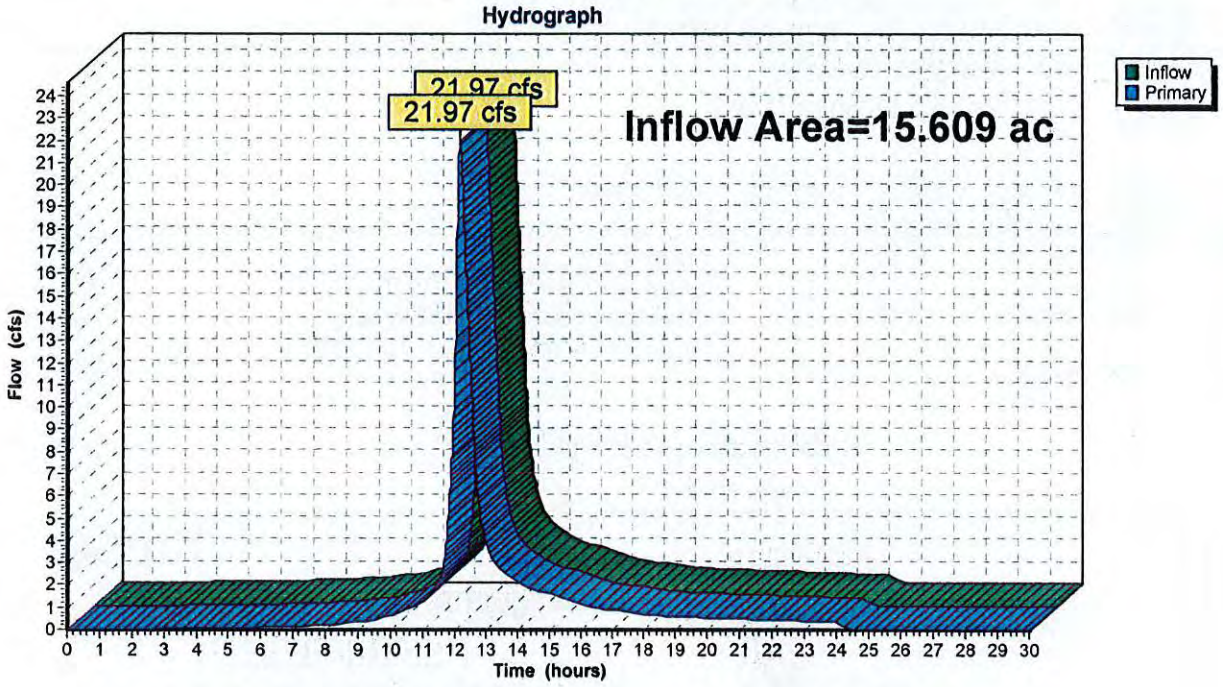


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.609 ac, 22.82% Impervious, Inflow Depth = 1.83" for 2 yr event
Inflow = 21.97 cfs @ 12.18 hrs, Volume= 2.379 af
Primary = 21.97 cfs @ 12.18 hrs, Volume= 2.379 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Summary for Subcatchment 1: PO-DA 1

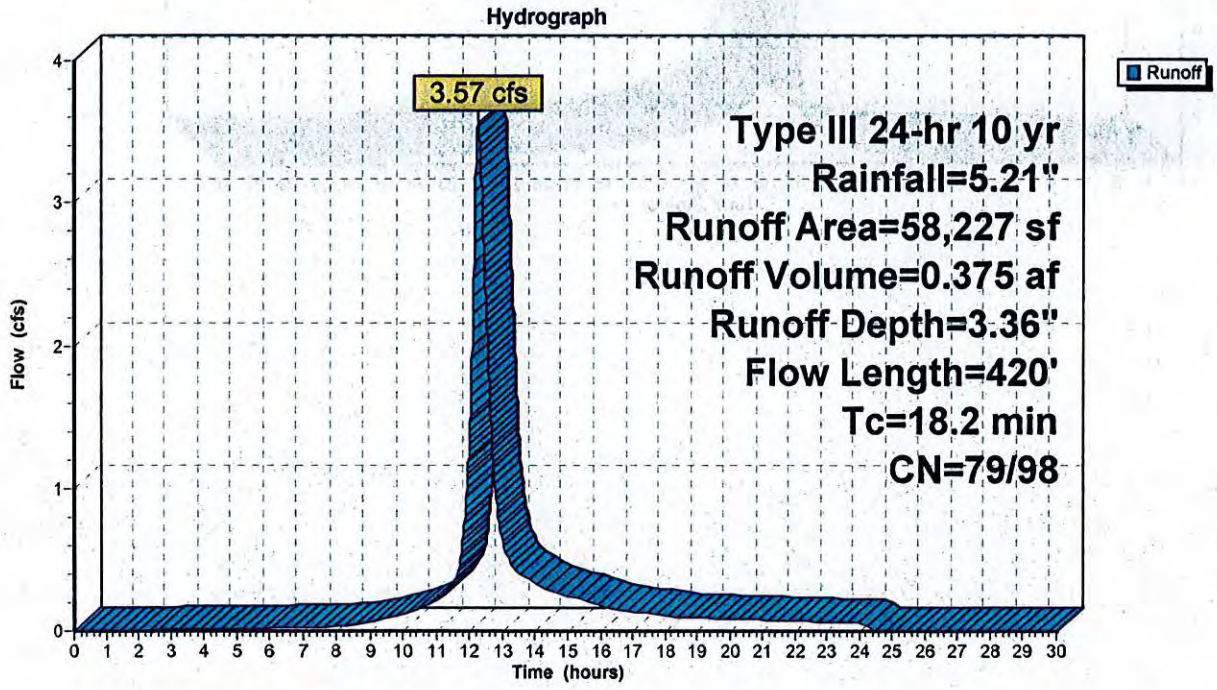
Runoff = 3.57 cfs @ 12.24 hrs, Volume= 0.375 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	11,168	98	Impervious, HSG D
	38,971	79	Woods/grass comb., Good, HSG D
	8,088	78	Meadow, non-grazed, HSG D
	58,227	83	Weighted Average
	47,059	79	80.82% Pervious Area
	11,168	98	19.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1: PO-DA 1



Summary for Subcatchment 2: PO-DA 2

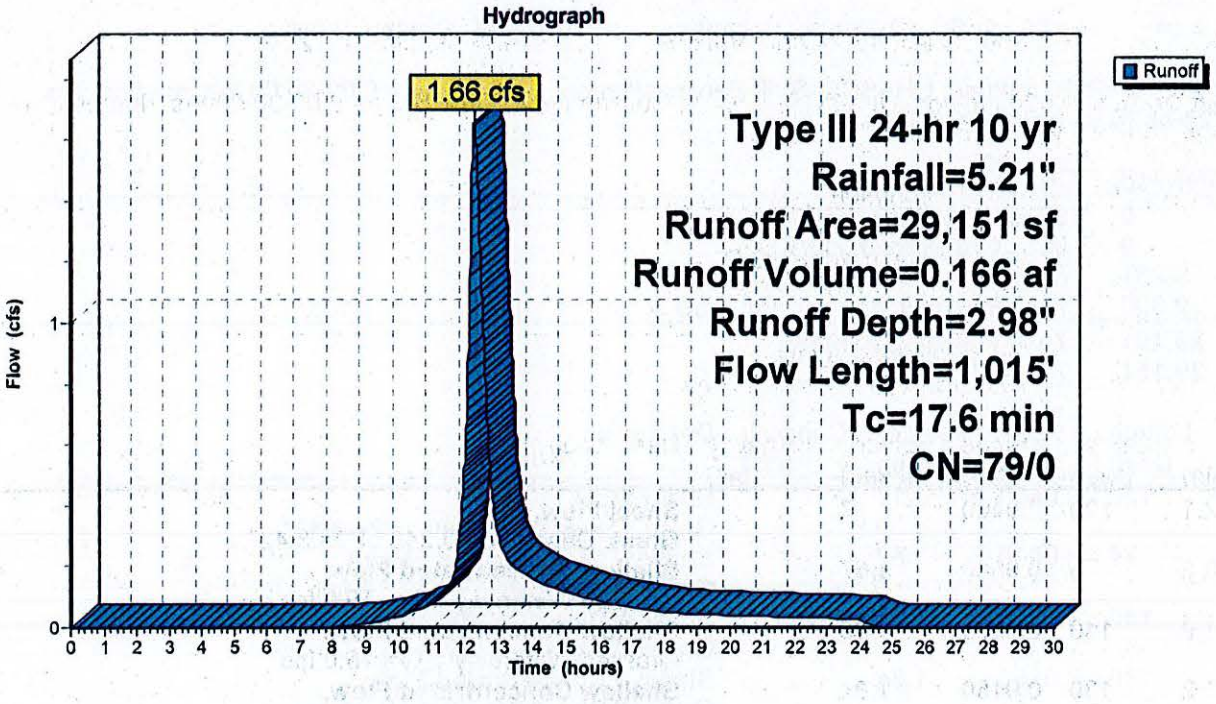
Runoff = 1.66 cfs @ 12.24 hrs, Volume= 0.166 af, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG D
*	0	98	Gravel road, HSG D
*	9,261	80	Grass, Good, HSG D
	19,890	78	Meadow, non-grazed, HSG D
	29,151	79	Weighted Average
	29,151	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	120	0.0400	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	75	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	140	0.0070	1.25		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	130	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.7	360	0.0540	3.49		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	190	0.0100	7.20	22.62	**Pipe Channel, Culvert to Discharge** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
17.6	1,015	Total			

Subcatchment 2: PO-DA 2



Summary for Subcatchment 7: PO-DA 7

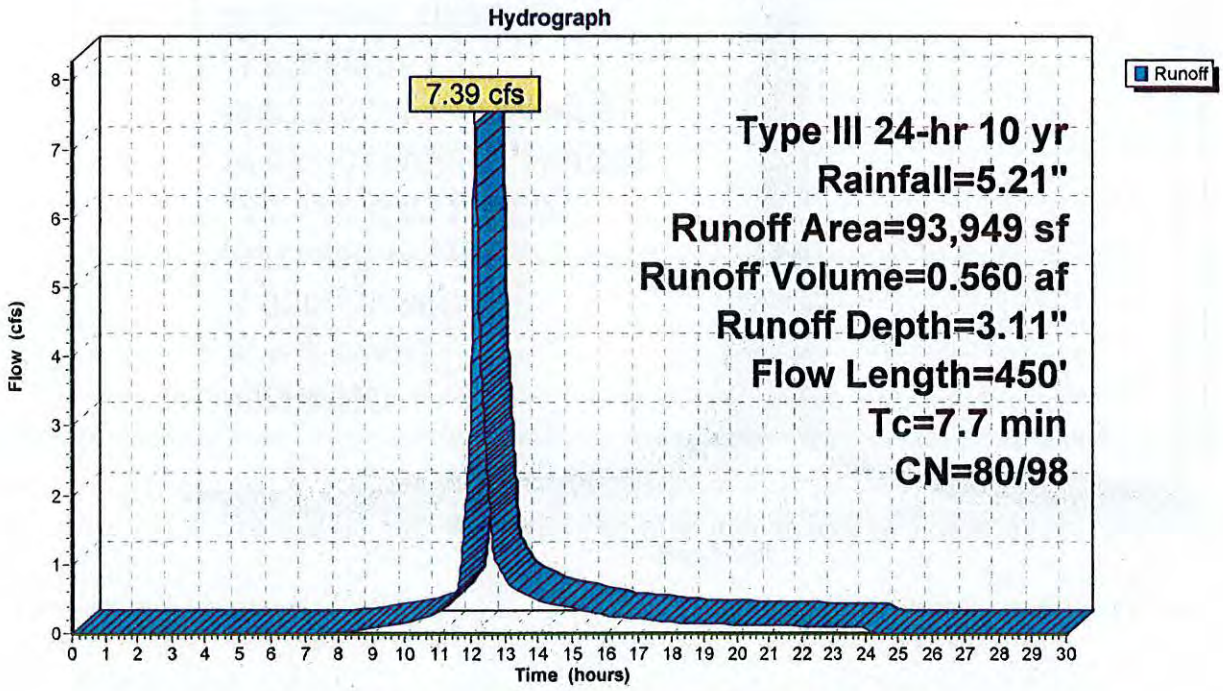
Runoff = 7.39 cfs @ 12.11 hrs, Volume= 0.560 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	1,868	98	Impervious, HSG D
*	14,410	85	Yard stone, HSG D
*	72,265	80	Grass , Good, HSG D
	5,406	73	Brush, Good, HSG D
	93,949	81	Weighted Average
	92,081	80	98.01% Pervious Area
	1,868	98	1.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7: PO-DA 7



Summary for Subcatchment 8: PO-DA 8

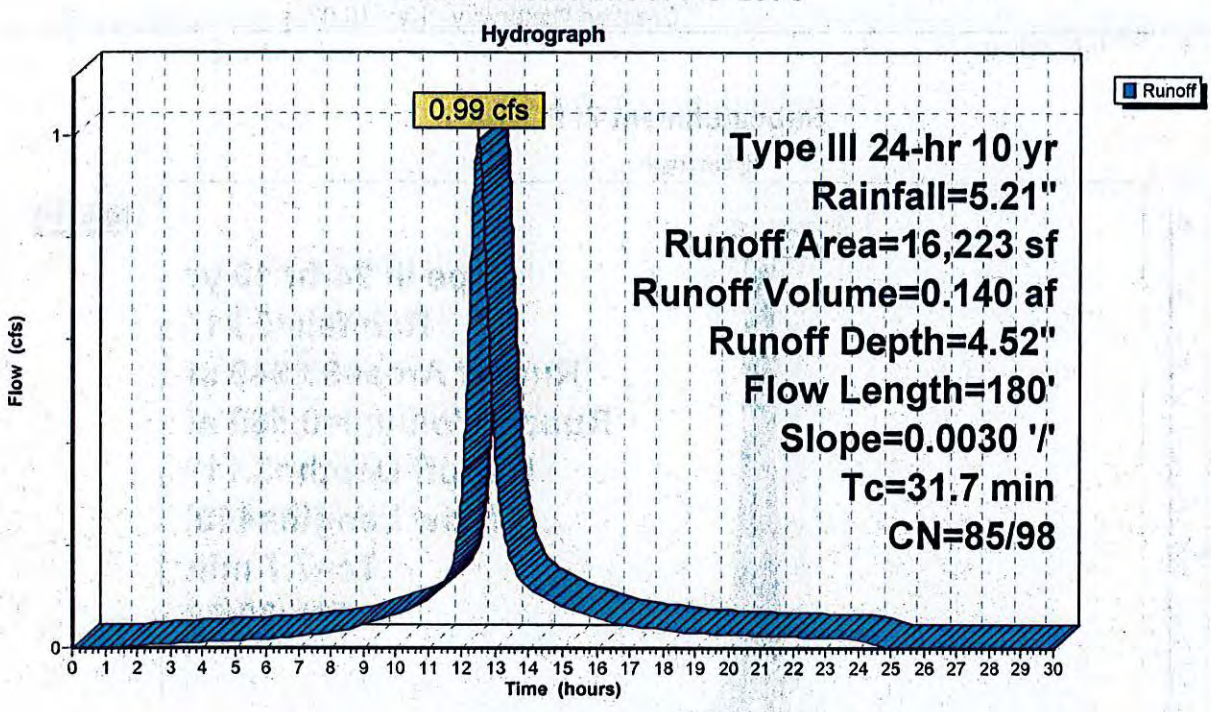
Runoff = 0.99 cfs @ 12.43 hrs, Volume= 0.140 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	10,980	98	Impervious, HSG D
*	5,243	85	Yard stone, HSG D
	16,223	94	Weighted Average
	5,243	85	32.32% Pervious Area
	10,980	98	67.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	100	0.0030	0.05		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.2	80	0.0030	1.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.7	180	Total			

Subcatchment 8: PO-DA 8



Summary for Subcatchment 9B: PO-DA 9B

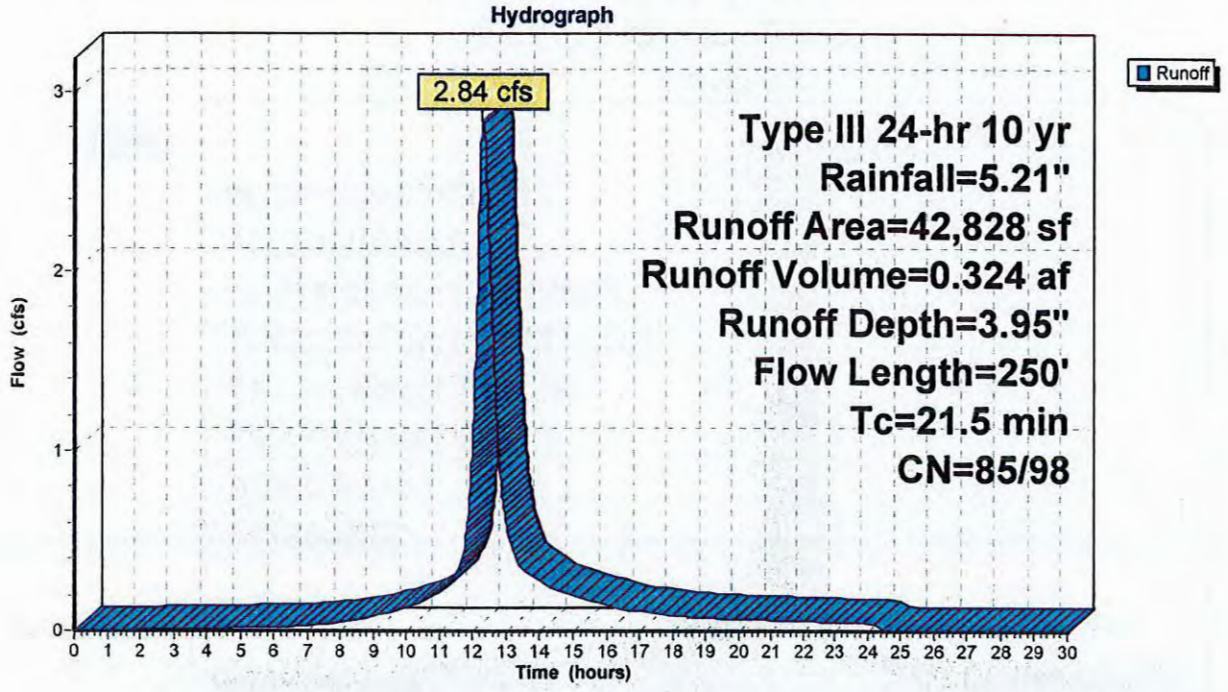
Runoff = 2.84 cfs @ 12.29 hrs, Volume= 0.324 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	5,504	98	Impervious, HSG D
*	6,361	98	Gravel road, HSG D
*	30,963	85	Yard stone, HSG D
	42,828	89	Weighted Average
	30,963	85	72.30% Pervious Area
	11,865	98	27.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	100	0.0090	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.9	150	0.0066	1.31		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
21.5	250	Total			

Subcatchment 9B: PO-DA 9B



Summary for Subcatchment 9D: PO-DA 9D

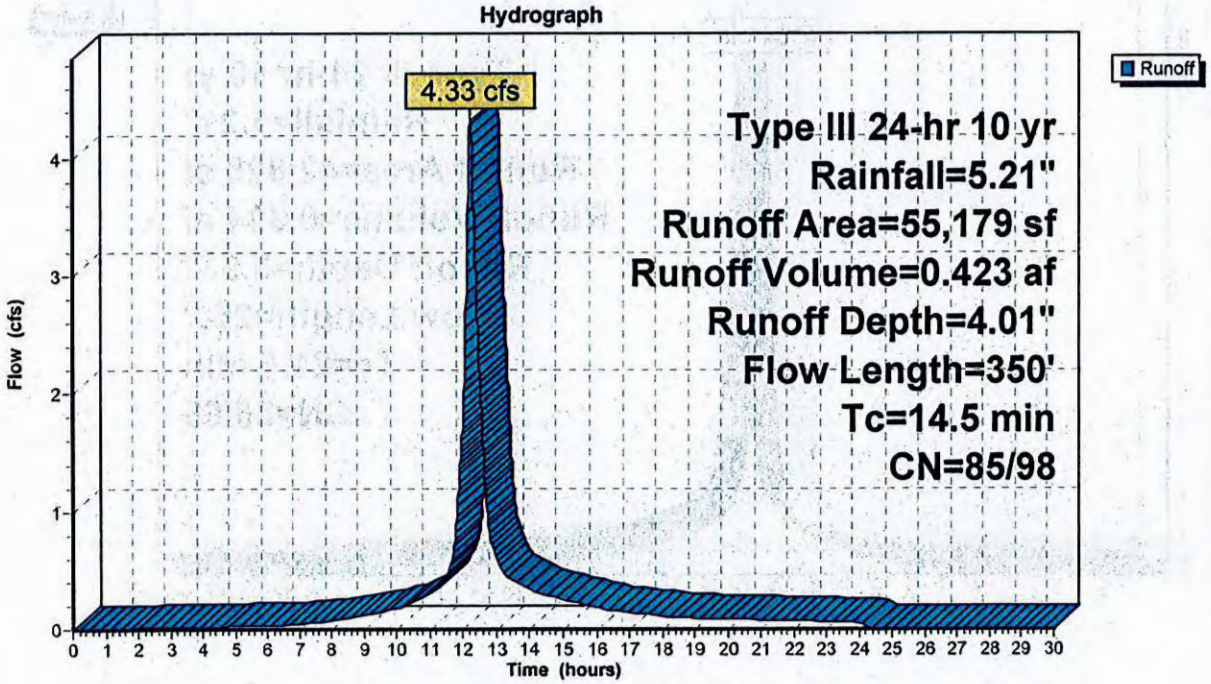
Runoff = 4.33 cfs @ 12.19 hrs, Volume= 0.423 af, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.21"

	Area (sf)	CN	Description
*	1,192	98	Impervious, HSG D
*	16,177	98	Gravel road, HSG D
*	37,810	85	Yard Stone, HSG D
	55,179	89	Weighted Average
	37,810	85	68.52% Pervious Area
	17,369	98	31.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
0.8	120	0.0270	2.65		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.1	130	0.0140	1.90		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
14.5	350	Total			

Subcatchment 9D: PO-DA 9D



Summary for Reach 1R: Swale

Inflow Area = 2.157 ac, 1.99% Impervious, Inflow Depth = 3.11" for 10 yr event
Inflow = 7.39 cfs @ 12.11 hrs, Volume= 0.560 af
Outflow = 7.15 cfs @ 12.13 hrs, Volume= 0.560 af, Atten= 3%, Lag= 1.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.48 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 8.4 min

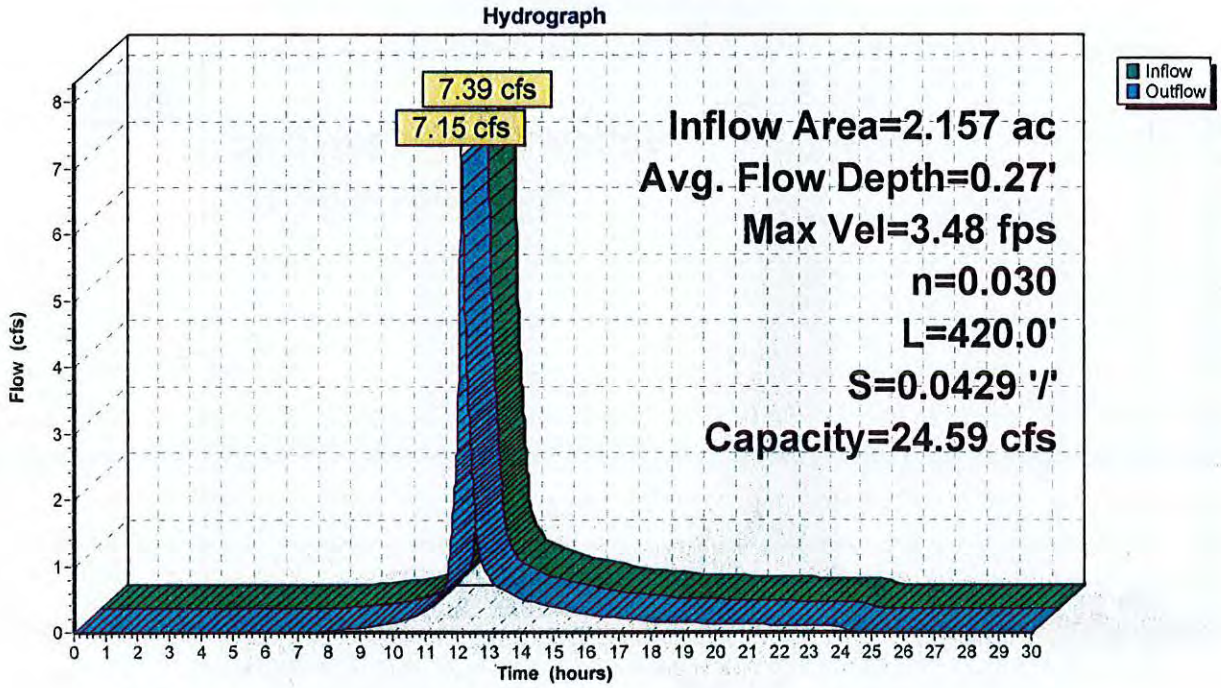
Peak Storage= 863 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡

Reach 1R: Swale



Summary for Pond CB 1: CB #1

[57] Hint: Peaked at 580.12' (Flood elevation advised)
[61] Hint: Exceeded Reach 1R outlet invert by 0.12' @ 12.17 hrs

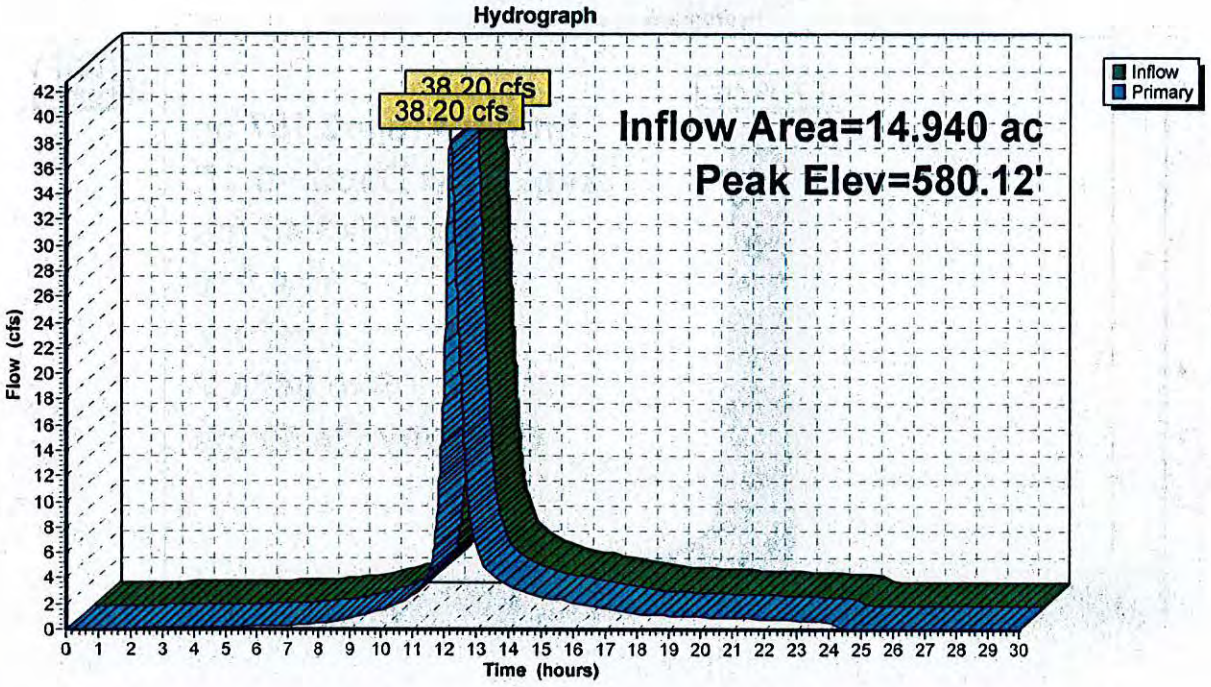
Inflow Area =	14.940 ac,	23.84% Impervious,	Inflow Depth =	3.38"	for 10 yr event
Inflow =	38.20 cfs @	12.17 hrs, Volume=	4.205 af		
Outflow =	38.20 cfs @	12.17 hrs, Volume=	4.205 af,	Atten= 0%,	Lag= 0.0 min
Primary =	38.20 cfs @	12.17 hrs, Volume=	4.205 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 580.12' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011
#2	Primary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=38.20 cfs @ 12.17 hrs HW=580.12' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 26.73 cfs @ 8.51 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 11.47 cfs @ 0.94 fps)

Pond CB 1: CB #1



Summary for Pond Div Chamber: Diversion Chamber to Aqua-Swirl

[57] Hint: Peaked at 594.29' (Flood elevation advised)

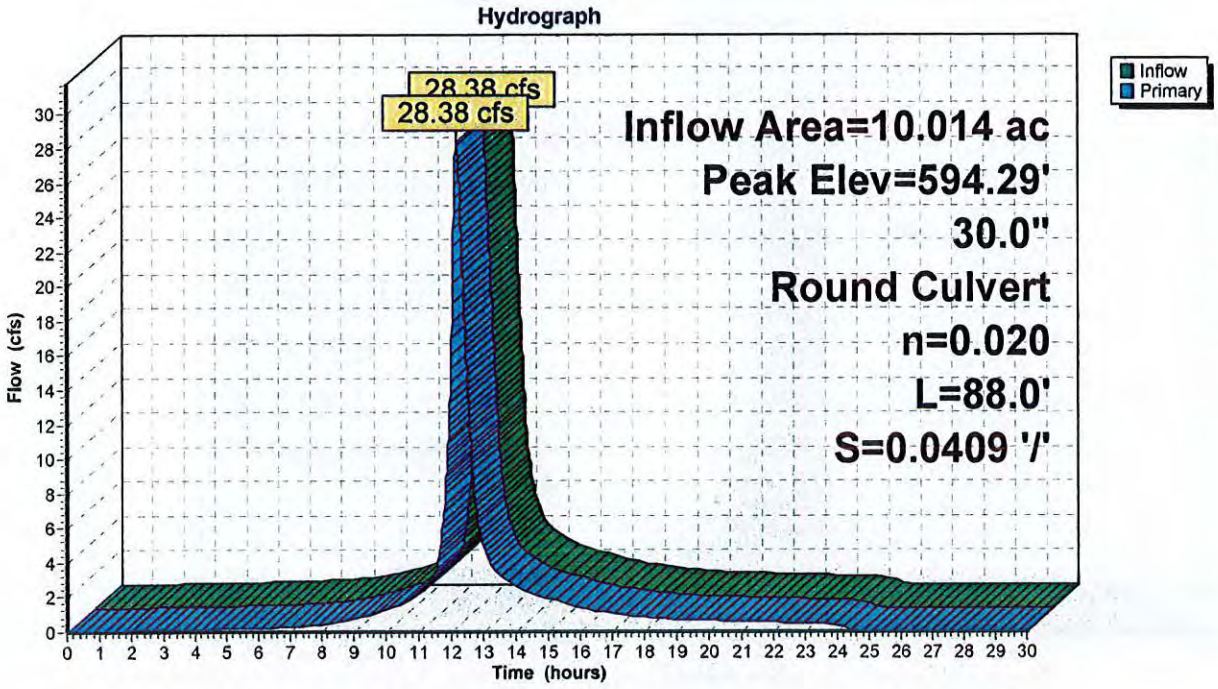
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 3.79" for 10 yr event
Inflow = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af
Outflow = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af, Atten= 0%, Lag= 0.0 min
Primary = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.29' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.60'	**30.0" Round Culvert** L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 591.60' / 588.00' S= 0.0409 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=28.38 cfs @ 12.18 hrs HW=594.29' TW=590.69' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 28.38 cfs @ 5.78 fps)

Pond Div Chamber: Diversion Chamber to Aqua-Swirl



Summary for Pond MH 12: MH 12 to Div Chamber

[57] Hint: Peaked at 595.73' (Flood elevation advised)

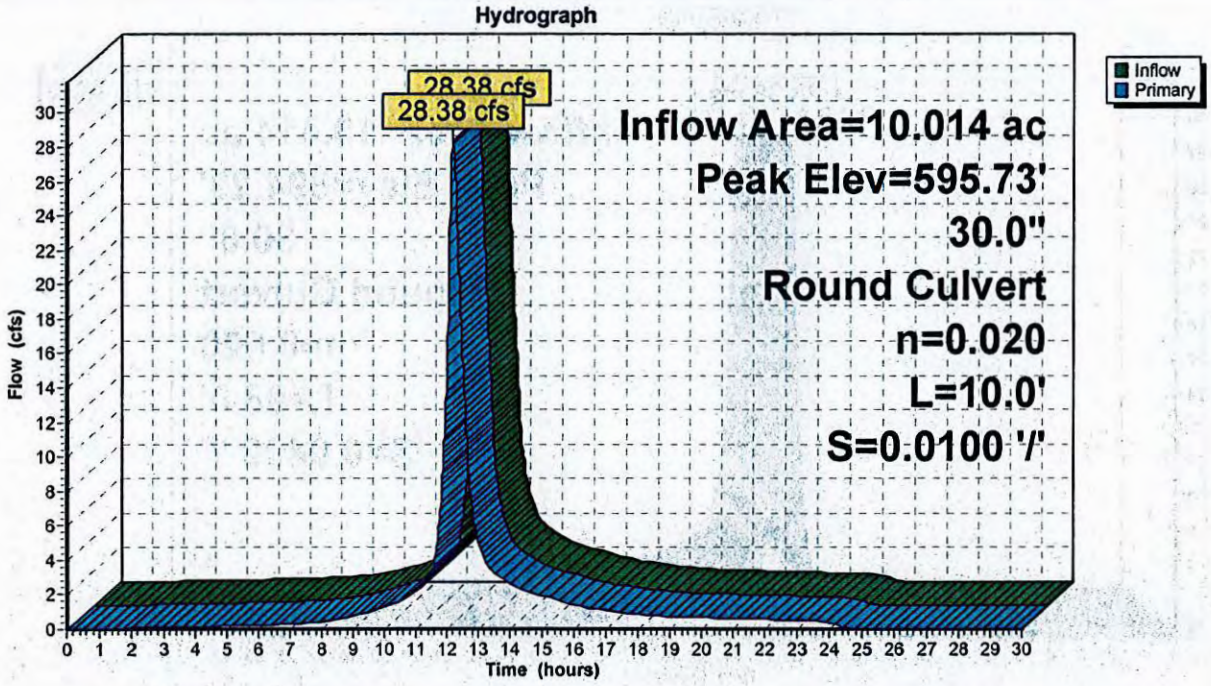
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 3.79" for 10 yr event
Inflow = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af
Outflow = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af, Atten= 0%, Lag= 0.0 min
Primary = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 595.73' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.70'	**30.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 591.70' / 591.60' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=28.38 cfs @ 12.18 hrs HW=595.73' TW=594.29' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 28.38 cfs @ 5.78 fps)

Pond MH 12: MH 12 to Div Chamber



Summary for Pond MH G: MH G to MH H

[57] Hint: Peaked at 627.33' (Flood elevation advised)

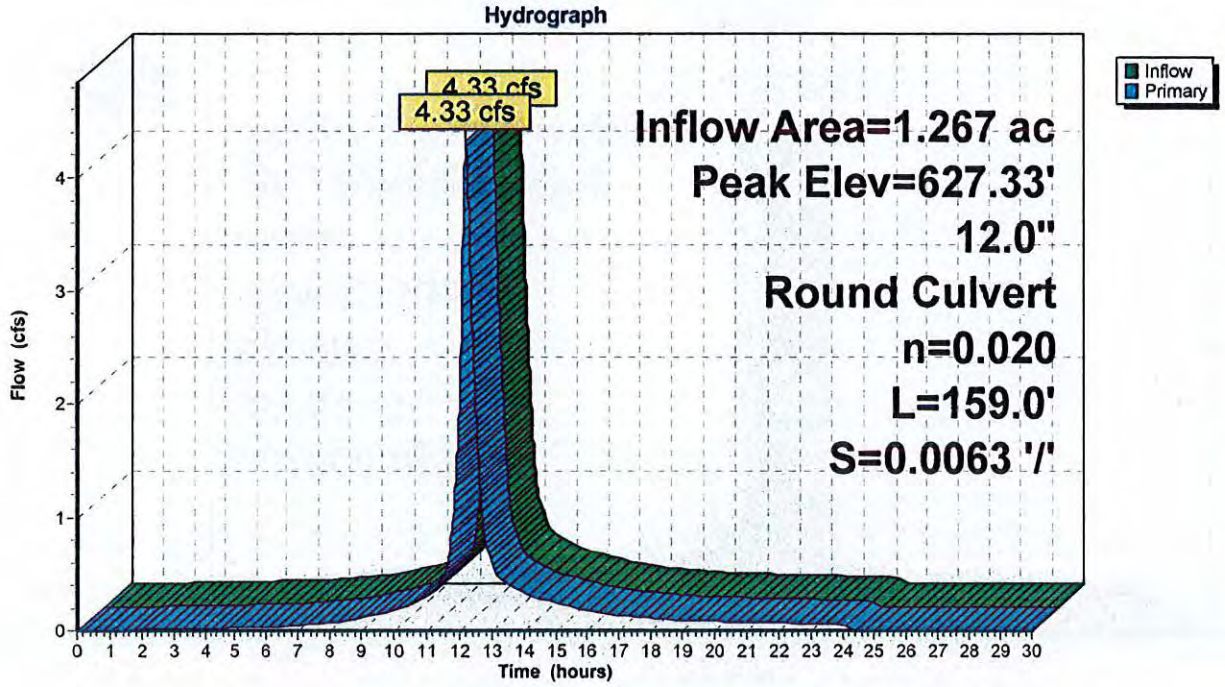
Inflow Area =	1.267 ac,	31.48% Impervious,	Inflow Depth =	4.01" for 10 yr event
Inflow =	4.33 cfs @	12.19 hrs, Volume=	0.423 af	
Outflow =	4.33 cfs @	12.19 hrs, Volume=	0.423 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.33 cfs @	12.19 hrs, Volume=	0.423 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 627.33' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.50'	**12.0" Round Culvert** L= 159.0' Ke= 0.500 Inlet / Outlet Invert= 598.50' / 597.50' S= 0.0063 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.24 cfs @ 12.19 hrs HW=626.73' TW=620.70' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.24 cfs @ 5.40 fps)

Pond MH G: MH G to MH H



Summary for Pond MH H: MH H to MH I

[57] Hint: Peaked at 621.24' (Flood elevation advised)

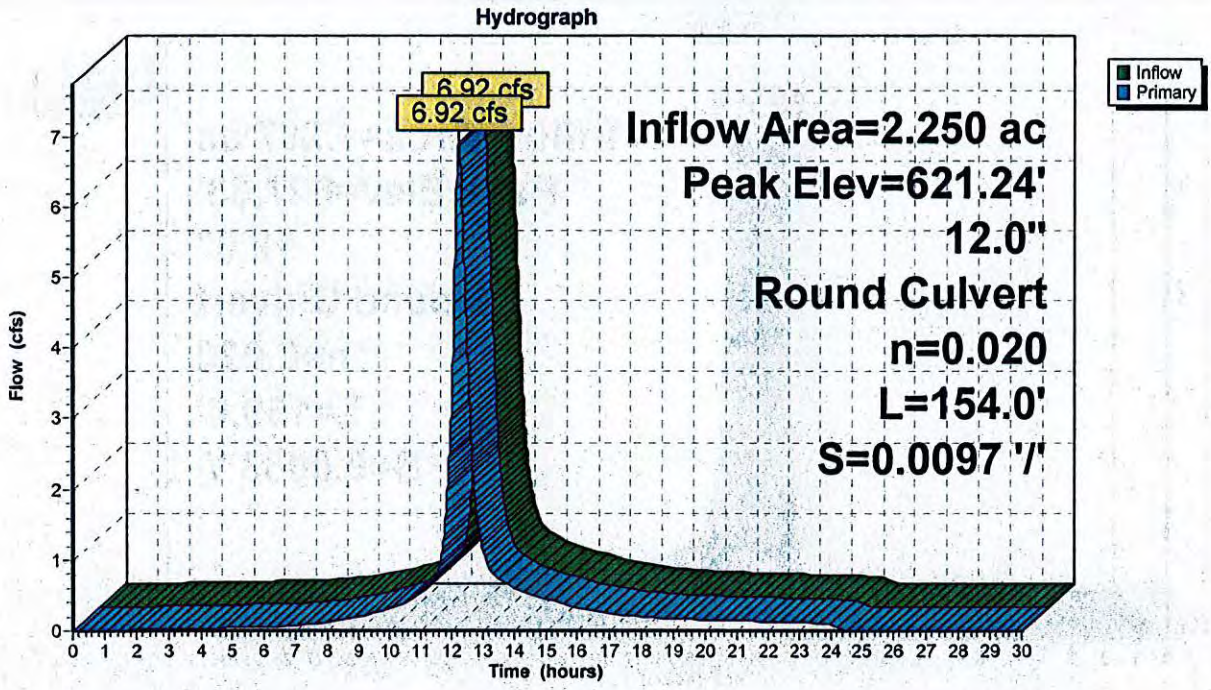
Inflow Area =	2.250 ac,	29.83% Impervious,	Inflow Depth =	3.98" for 10 yr event
Inflow =	6.92 cfs @	12.22 hrs, Volume=	0.747 af	
Outflow =	6.92 cfs @	12.22 hrs, Volume=	0.747 af,	Atten= 0%, Lag= 0.0 min
Primary =	6.92 cfs @	12.22 hrs, Volume=	0.747 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 621.24' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 154.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 595.50' S= 0.0097 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=6.92 cfs @ 12.22 hrs HW=621.23' TW=605.60' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 6.92 cfs @ 8.82 fps)

Pond MH H: MH H to MH I



Summary for Pond MH I: MH I to MH 12

[57] Hint: Peaked at 605.63' (Flood elevation advised)

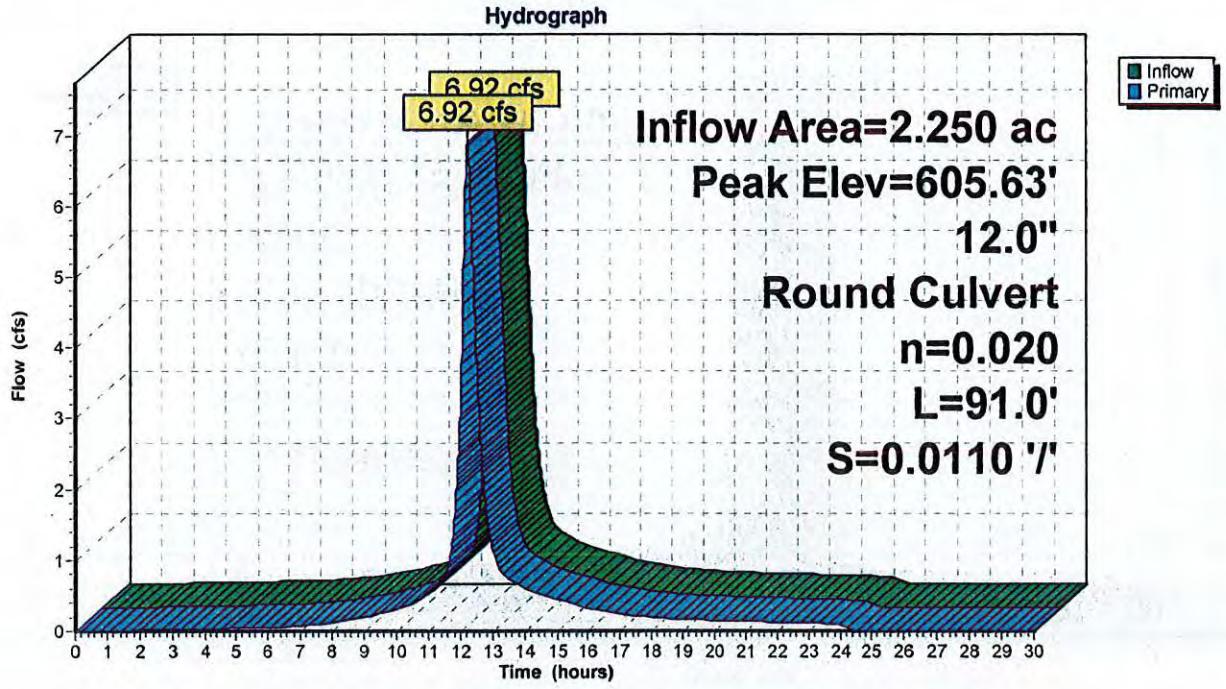
Inflow Area =	2.250 ac,	29.83% Impervious,	Inflow Depth =	3.98" for 10 yr event
Inflow =	6.92 cfs @	12.22 hrs, Volume=	0.747 af	
Outflow =	6.92 cfs @	12.22 hrs, Volume=	0.747 af,	Atten= 0%, Lag= 0.0 min
Primary =	6.92 cfs @	12.22 hrs, Volume=	0.747 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 605.63' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	595.50'	**12.0" Round Culvert** L= 91.0' Ke= 0.500 Inlet / Outlet Invert= 595.50' / 594.50' S= 0.0110 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=6.93 cfs @ 12.22 hrs HW=605.60' TW=595.62' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 6.93 cfs @ 8.82 fps)

Pond MH I: MH I to MH 12



Summary for Pond MH-11: MH-11 to MH-D

[57] Hint: Peaked at 597.18' (Flood elevation advised)

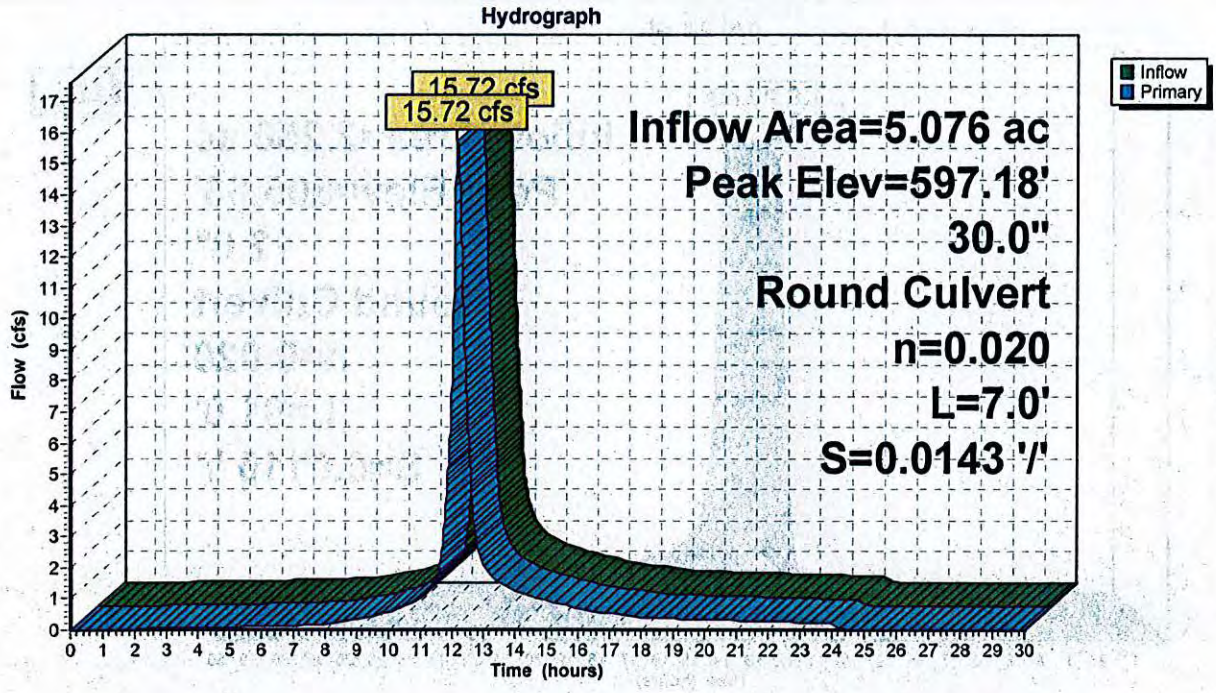
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 3.61" for 10 yr event
Inflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af
Outflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af, Atten= 0%, Lag= 0.0 min
Primary = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 597.18' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.80'	**30.0" Round Culvert** L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 592.80' / 592.70' S= 0.0143 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.84 cfs @ 12.14 hrs HW=596.92' TW=596.53' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 14.84 cfs @ 3.02 fps)

Pond MH-11: MH-11 to MH-D



Summary for Pond MH-14: MH-16 to CB #1

[57] Hint: Peaked at 590.69' (Flood elevation advised)

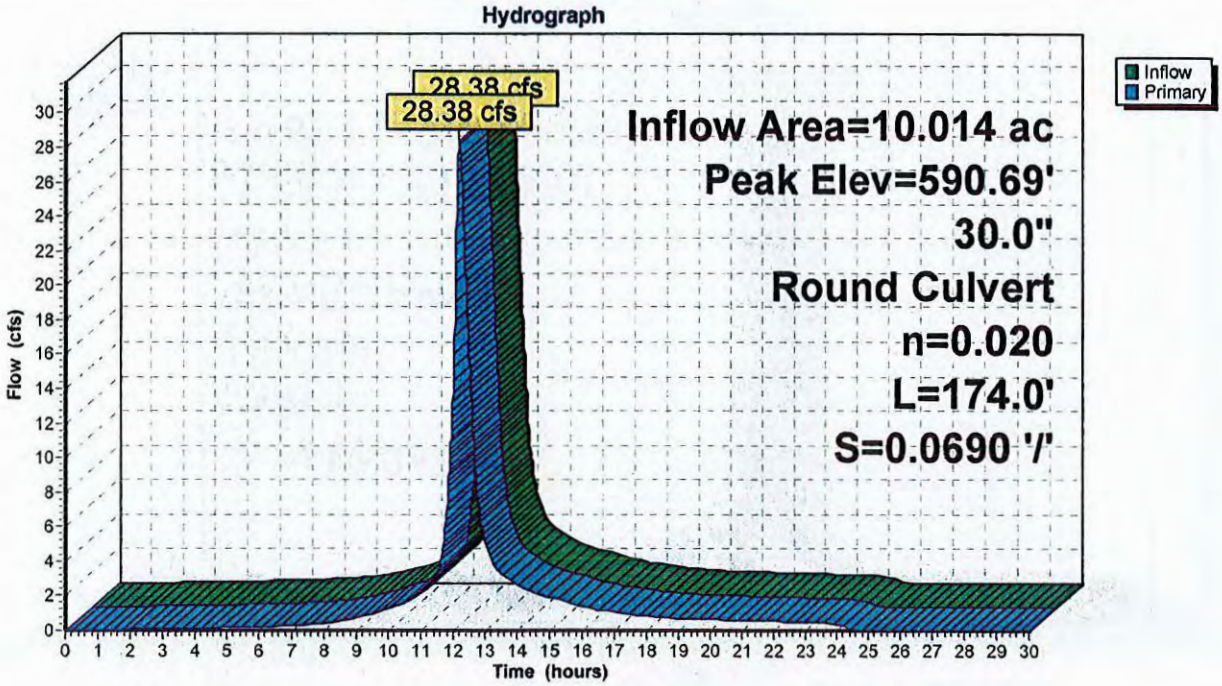
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 3.79" for 10 yr event
Inflow = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af
Outflow = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af, Atten= 0%, Lag= 0.0 min
Primary = 28.38 cfs @ 12.18 hrs, Volume= 3.160 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 590.69' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	588.00'	**30.0" Round Culvert** L= 174.0' Ke= 0.500 Inlet / Outlet Invert= 588.00' / 576.00' S= 0.0690 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=28.38 cfs @ 12.18 hrs HW=590.69' TW=580.12' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 28.38 cfs @ 5.78 fps)

Pond MH-14: MH-16 to CB #1



Summary for Pond MH-D: MH-D to MH12

[57] Hint: Peaked at 596.78' (Flood elevation advised)

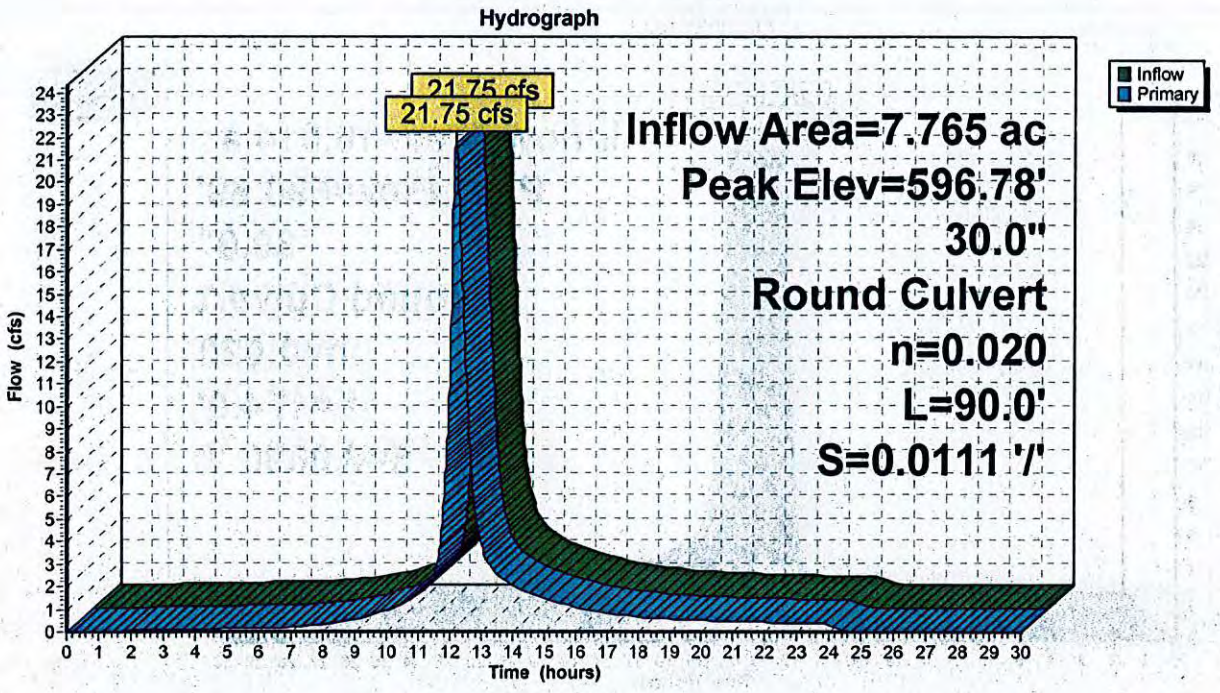
Inflow Area = 7.765 ac, 25.89% Impervious, Inflow Depth = 3.73" for 10 yr event
Inflow = 21.75 cfs @ 12.16 hrs, Volume= 2.413 af
Outflow = 21.75 cfs @ 12.16 hrs, Volume= 2.413 af, Atten= 0%, Lag= 0.0 min
Primary = 21.75 cfs @ 12.16 hrs, Volume= 2.413 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 596.78' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.70'	**30.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 592.70' / 591.70' S= 0.0111 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=21.53 cfs @ 12.16 hrs HW=596.74' TW=595.70' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 21.53 cfs @ 4.39 fps)

Pond MH-D: MH-D to MH12



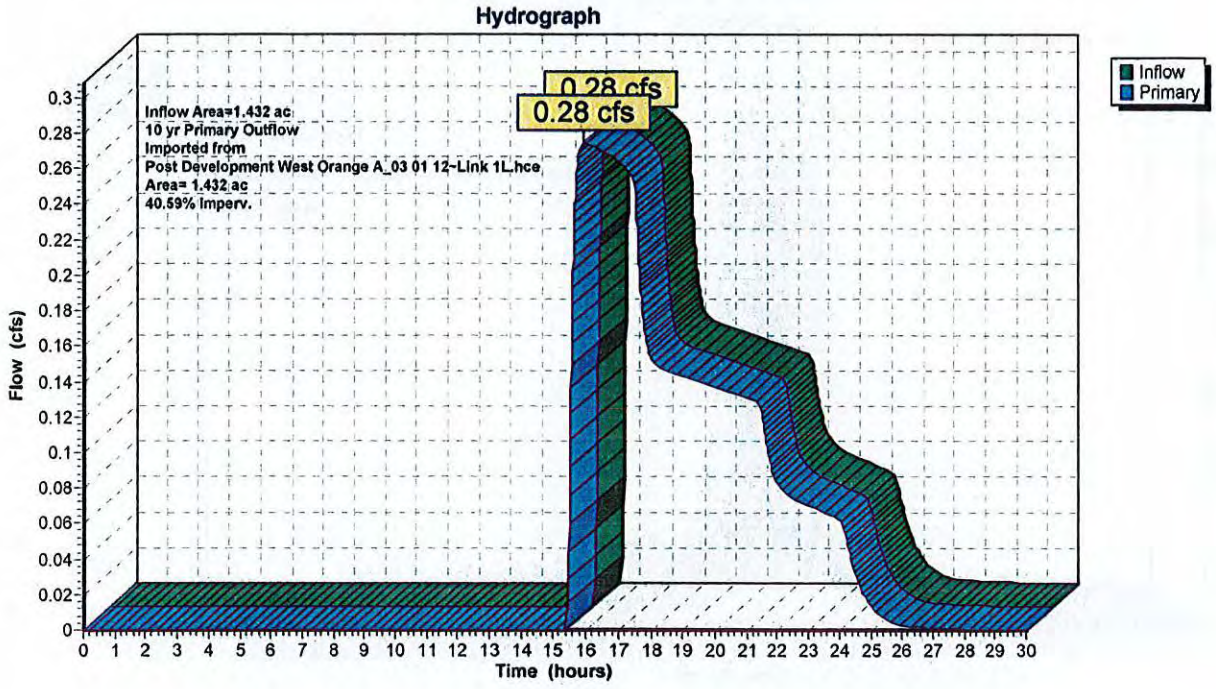
Summary for Link 1L: Link from Part A

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth > 0.93" for 10 yr event
Inflow = 0.28 cfs @ 15.95 hrs, Volume= 0.110 af
Primary = 0.28 cfs @ 15.95 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

10 yr Primary Outflow Imported from Post Development West Orange A_03 01 12~Link 1L.hce

Link 1L: Link from Part A



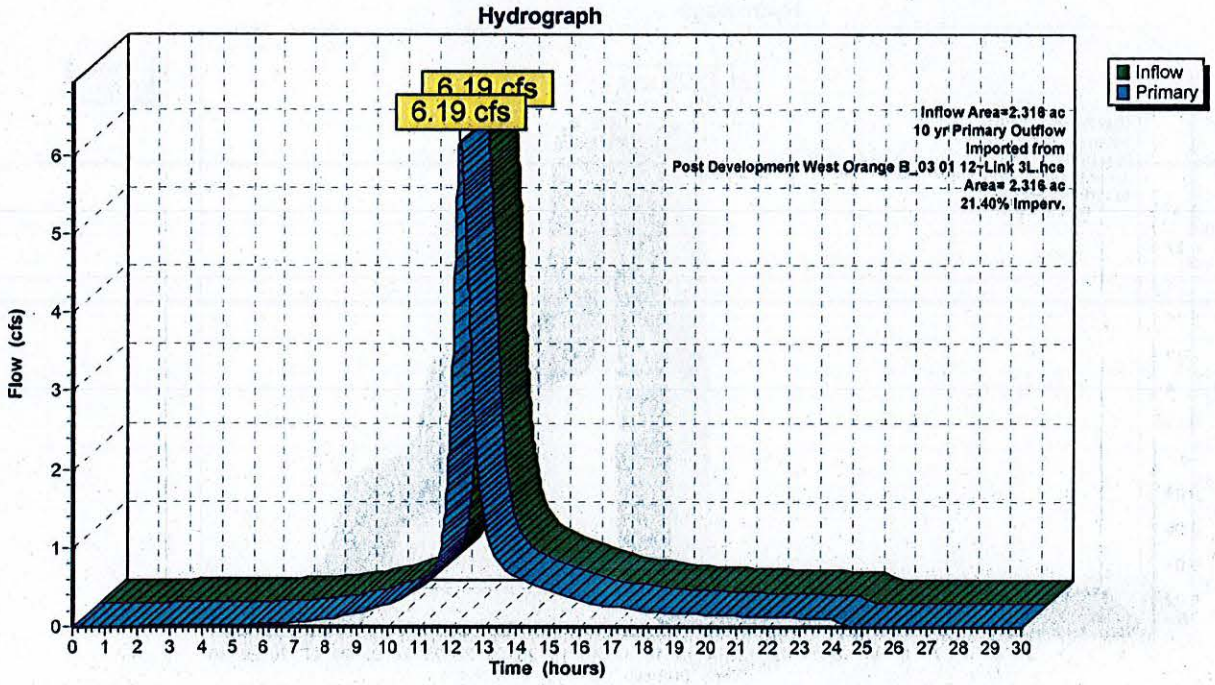
Summary for Link 3L: Link from Part B

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 3.86" for 10 yr event
Inflow = 6.19 cfs @ 12.24 hrs, Volume= 0.746 af
Primary = 6.19 cfs @ 12.24 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

10 yr Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 3L.hce

Link 3L: Link from Part B



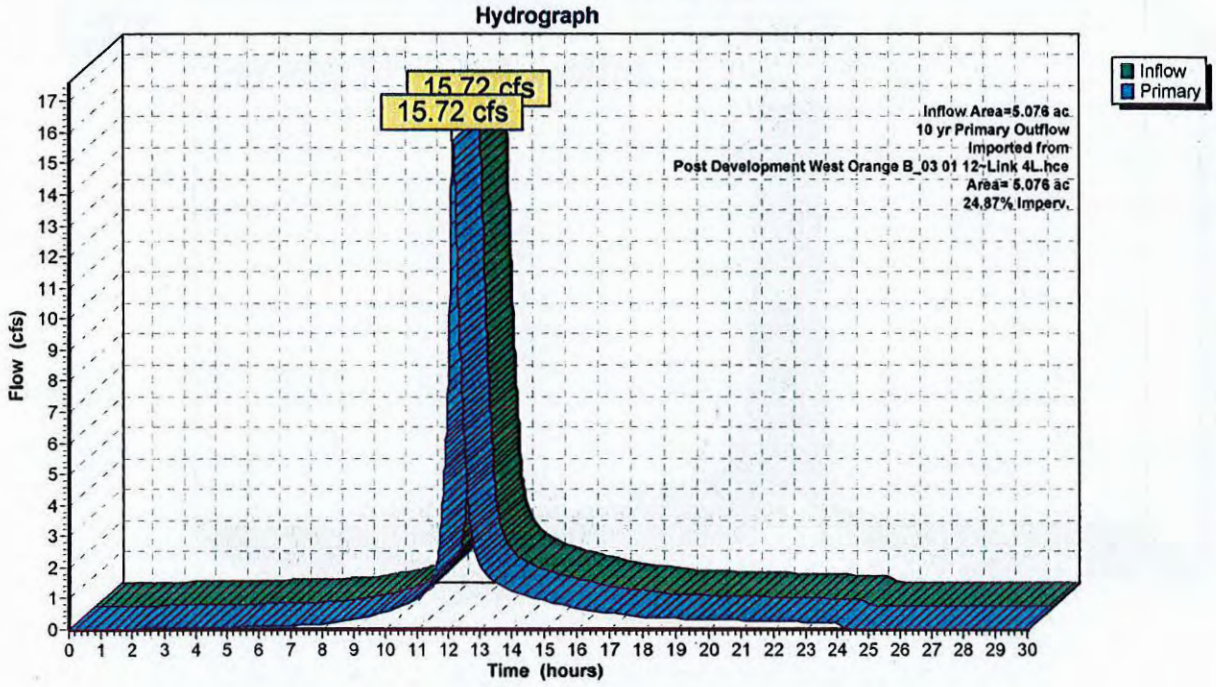
Summary for Link 4L: Link from Part B

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 3.61" for 10 yr event
Inflow = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af
Primary = 15.72 cfs @ 12.14 hrs, Volume= 1.527 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

10 yr Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 4L.hce

Link 4L: Link from Part B

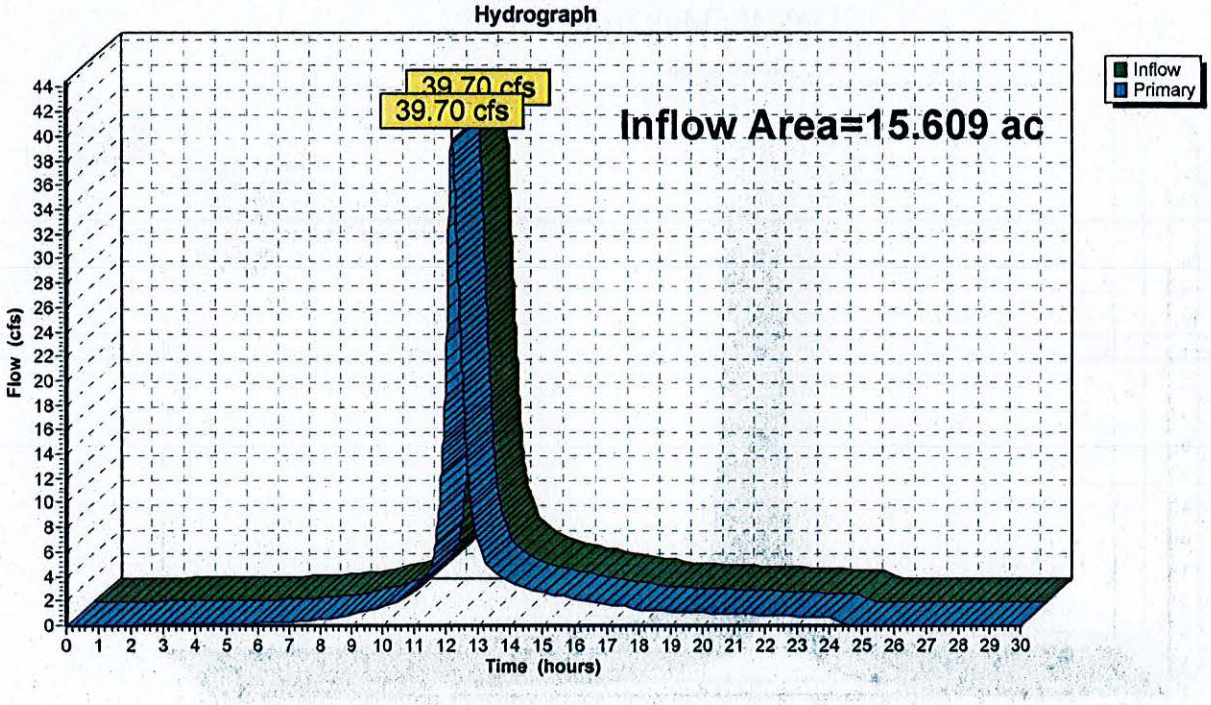


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.609 ac, 22.82% Impervious, Inflow Depth = 3.36" for 10 yr event
Inflow = 39.70 cfs @ 12.17 hrs, Volume= 4.371 af
Primary = 39.70 cfs @ 12.17 hrs, Volume= 4.371 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Summary for Subcatchment 1: PO-DA 1

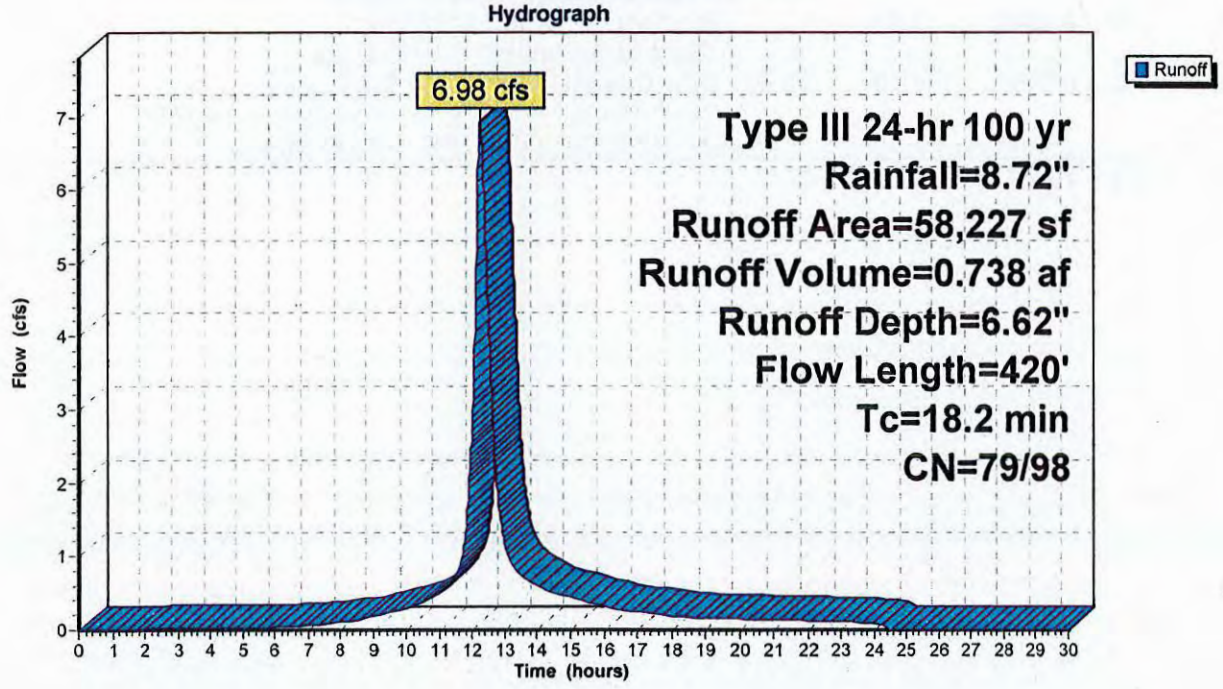
Runoff = 6.98 cfs @ 12.24 hrs, Volume= 0.738 af, Depth= 6.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	11,168	98	Impervious, HSG D
	38,971	79	Woods/grass comb., Good, HSG D
	8,088	78	Meadow, non-grazed, HSG D
	58,227	83	Weighted Average
	47,059	79	80.82% Pervious Area
	11,168	98	19.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1: PO-DA 1



Summary for Subcatchment 2: PO-DA 2

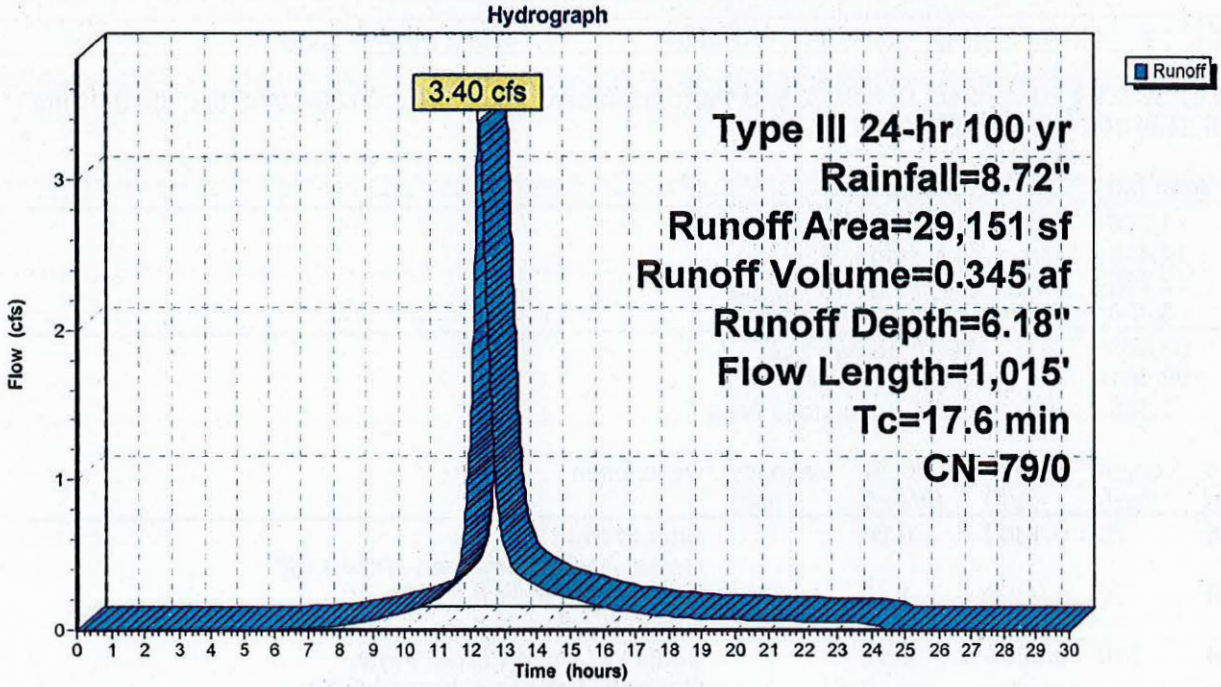
Runoff = 3.40 cfs @ 12.23 hrs, Volume= 0.345 af, Depth= 6.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG D
*	0	98	Gravel road, HSG D
*	9,261	80	Grass, Good, HSG D
	19,890	78	Meadow, non-grazed, HSG D
	29,151	79	Weighted Average
	29,151	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	120	0.0400	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	75	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	140	0.0070	1.25		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	130	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.7	360	0.0540	3.49		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	190	0.0100	7.20	22.62	**Pipe Channel, Culvert to Discharge** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
17.6	1,015	Total			

Subcatchment 2: PO-DA 2



Summary for Subcatchment 7: PO-DA 7

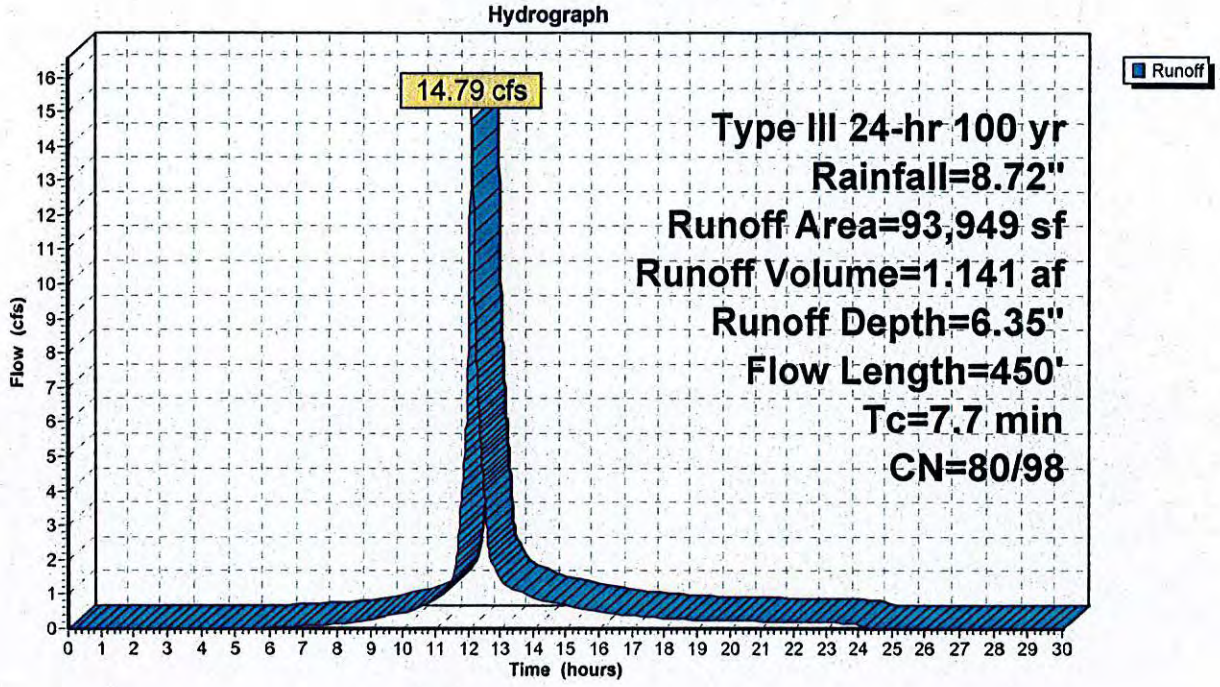
Runoff = 14.79 cfs @ 12.11 hrs, Volume= 1.141 af, Depth= 6.35"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	1,868	98	Impervious, HSG D
*	14,410	85	Yard stone, HSG D
*	72,265	80	Grass , Good, HSG D
	5,406	73	Brush, Good, HSG D
	93,949	81	Weighted Average
	92,081	80	98.01% Pervious Area
	1,868	98	1.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7: PO-DA 7



Summary for Subcatchment 8: PO-DA 8

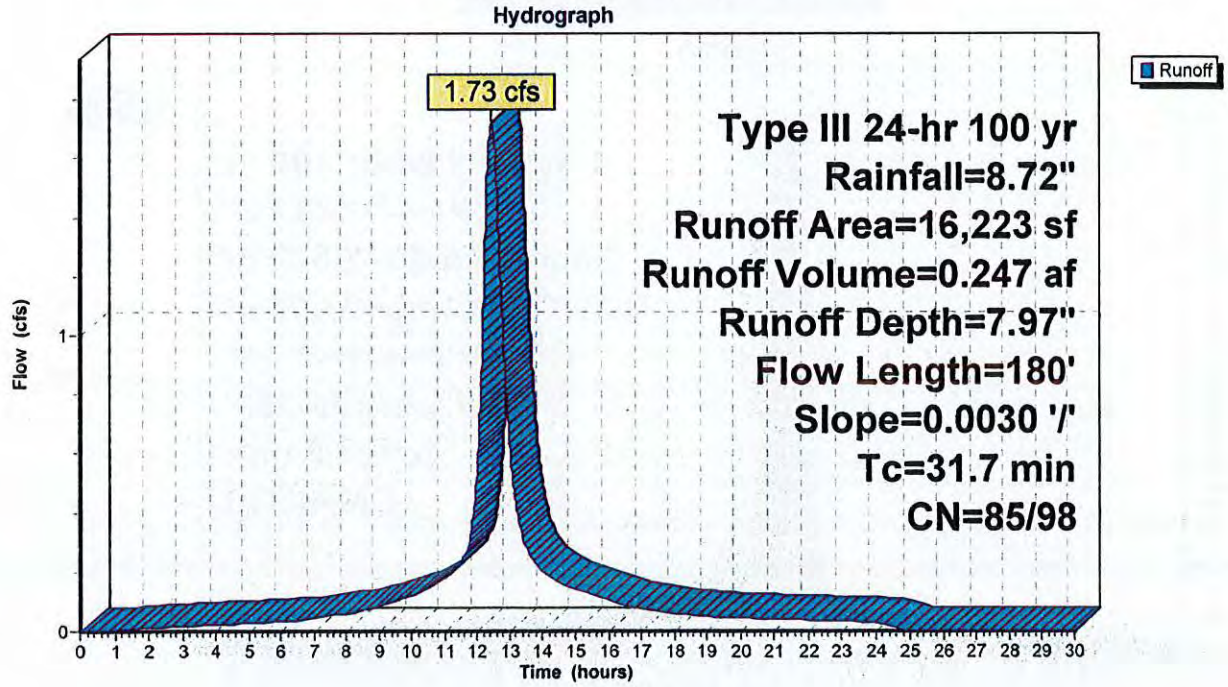
Runoff = 1.73 cfs @ 12.43 hrs, Volume= 0.247 af, Depth= 7.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	10,980	98	Impervious, HSG D
*	5,243	85	Yard stone, HSG D
	16,223	94	Weighted Average
	5,243	85	32.32% Pervious Area
	10,980	98	67.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	100	0.0030	0.05		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.2	80	0.0030	1.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.7	180	Total			

Subcatchment 8: PO-DA 8



Summary for Subcatchment 9B: PO-DA 9B

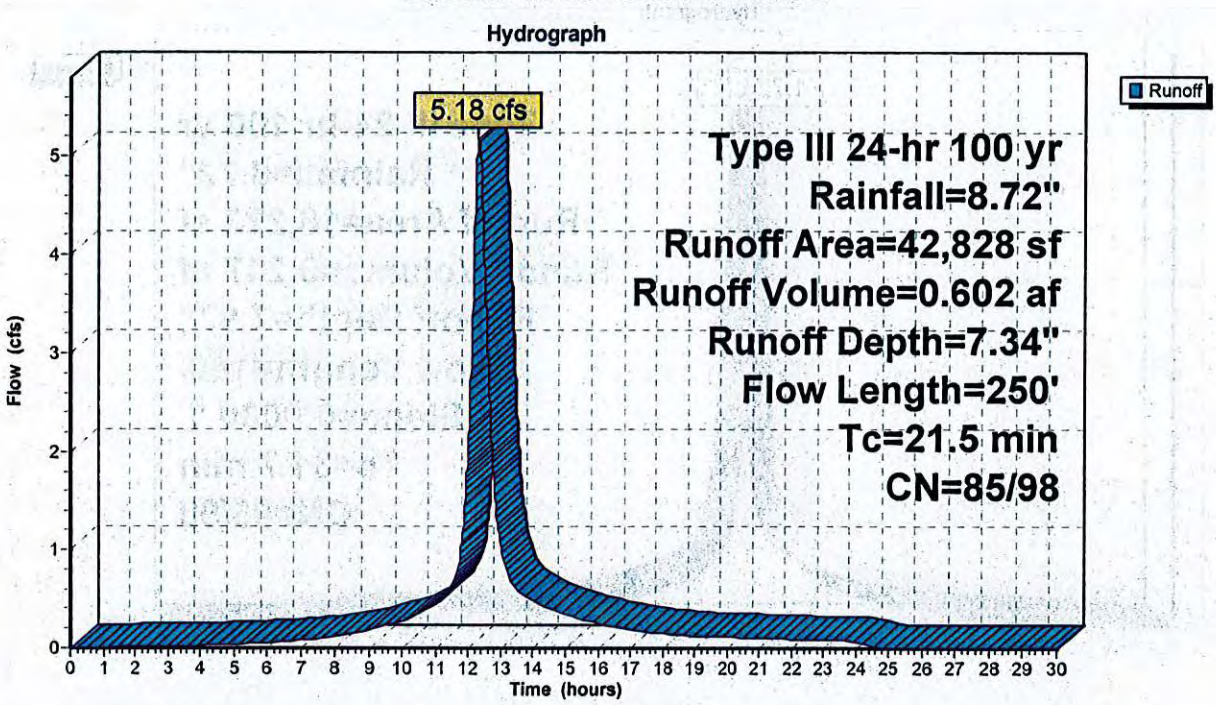
Runoff = 5.18 cfs @ 12.28 hrs, Volume= 0.602 af, Depth= 7.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	5,504	98	Impervious, HSG D
*	6,361	98	Gravel road, HSG D
*	30,963	85	Yard stone, HSG D
	42,828	89	Weighted Average
	30,963	85	72.30% Pervious Area
	11,865	98	27.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	100	0.0090	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.9	150	0.0066	1.31		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
21.5	250	Total			

Subcatchment 9B: PO-DA 9B



Summary for Subcatchment 9D: PO-DA 9D

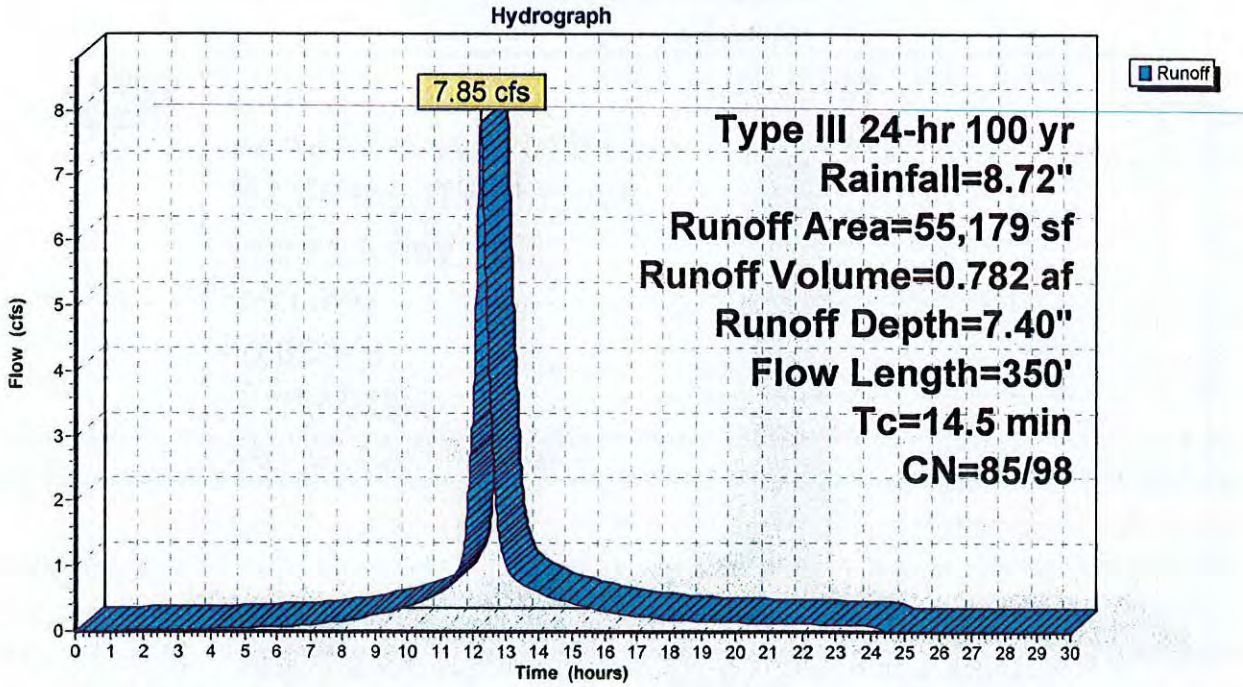
Runoff = 7.85 cfs @ 12.19 hrs, Volume= 0.782 af, Depth= 7.40"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.72"

	Area (sf)	CN	Description
*	1,192	98	Impervious, HSG D
*	16,177	98	Gravel road, HSG D
*	37,810	85	Yard Stone, HSG D
	55,179	89	Weighted Average
	37,810	85	68.52% Pervious Area
	17,369	98	31.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
0.8	120	0.0270	2.65		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.1	130	0.0140	1.90		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
14.5	350	Total			

Subcatchment 9D: PO-DA 9D



Summary for Reach 1R: Swale

Inflow Area = 2.157 ac, 1.99% Impervious, Inflow Depth = 6.35" for 100 yr event
Inflow = 14.79 cfs @ 12.11 hrs, Volume= 1.141 af
Outflow = 14.44 cfs @ 12.13 hrs, Volume= 1.141 af, Atten= 2%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.25 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 6.5 min

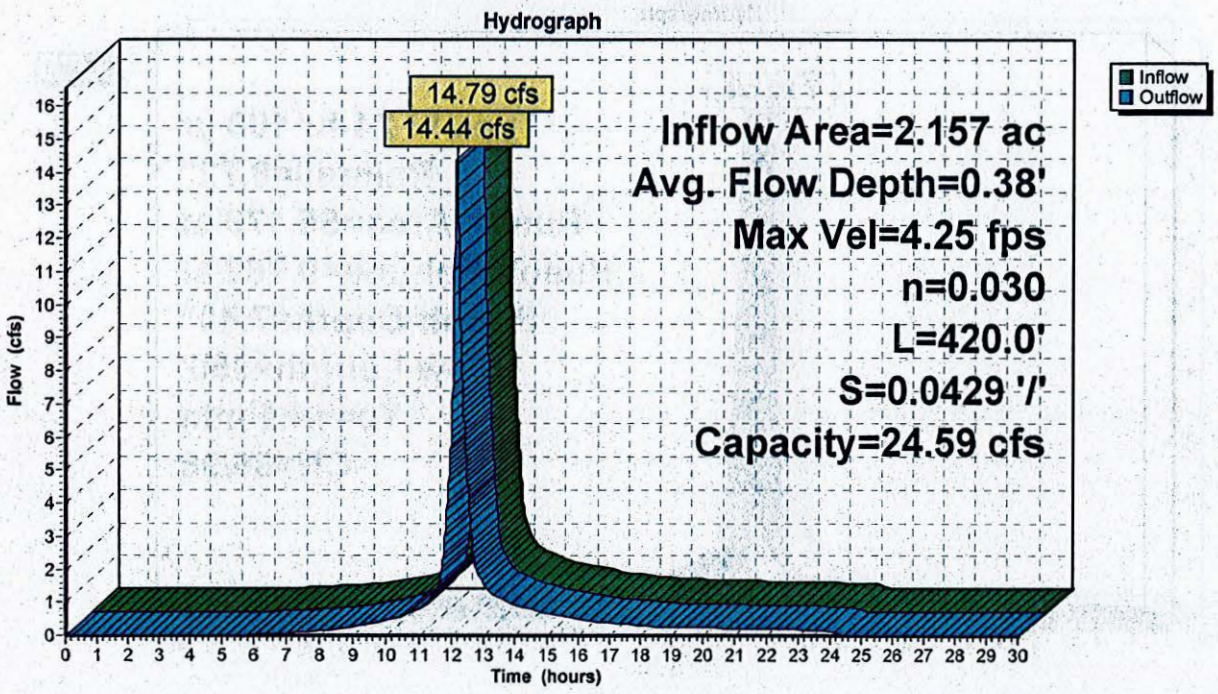
Peak Storage= 1,427 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡

Reach 1R: Swale



Summary for Pond CB 1: CB #1

[57] Hint: Peaked at 580.30' (Flood elevation advised)
[61] Hint: Exceeded Reach 1R outlet invert by 0.30' @ 12.16 hrs

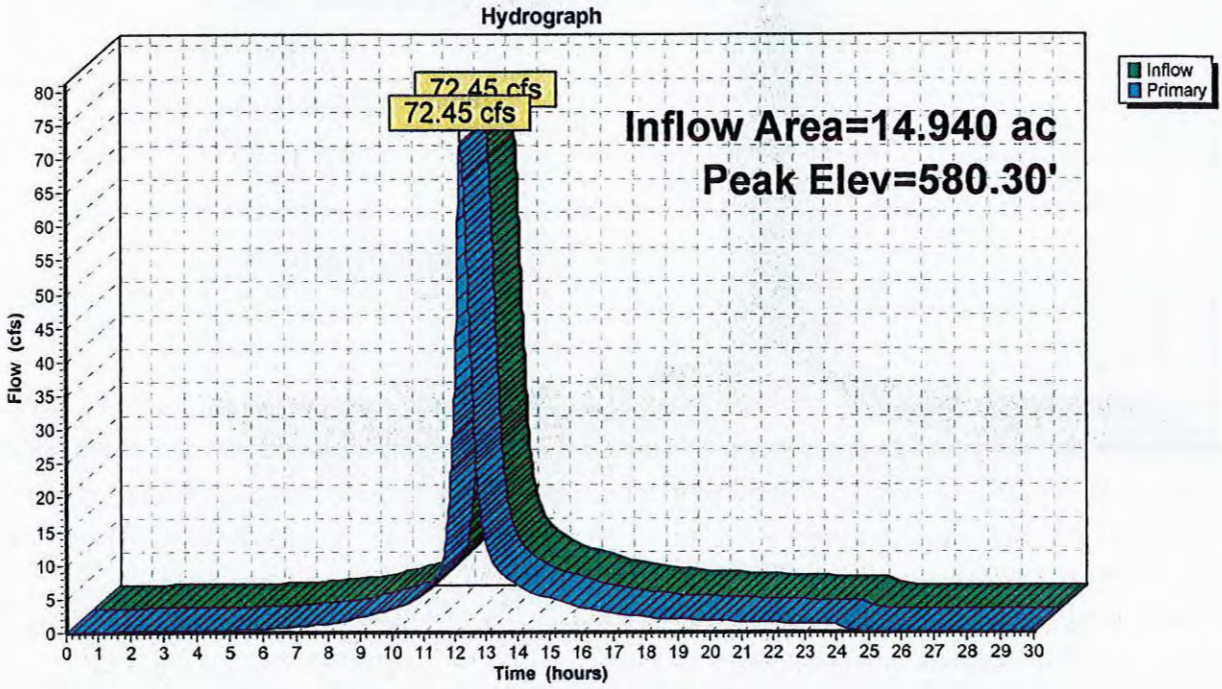
Inflow Area = 14.940 ac, 23.84% Impervious, Inflow Depth = 6.70" for 100 yr event
Inflow = 72.45 cfs @ 12.16 hrs, Volume= 8.340 af
Outflow = 72.45 cfs @ 12.16 hrs, Volume= 8.340 af, Atten= 0%, Lag= 0.0 min
Primary = 72.45 cfs @ 12.16 hrs, Volume= 8.340 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 580.30' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011
#2	Primary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=72.43 cfs @ 12.16 hrs HW=580.30' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 27.49 cfs @ 8.75 fps)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 44.93 cfs @ 1.48 fps)

Pond CB 1: CB #1



Summary for Pond Div Chamber: Diversion Chamber to Aqua-Swirl

[57] Hint: Peaked at 600.46' (Flood elevation advised)

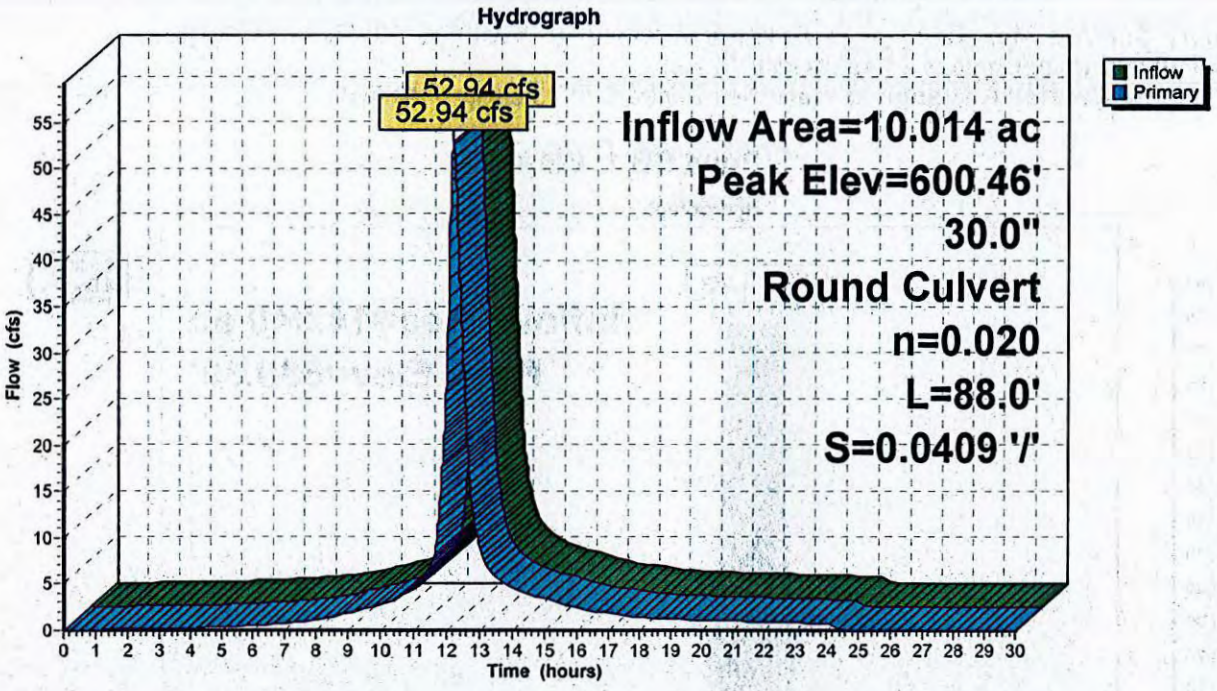
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 7.14" for 100 yr event
Inflow = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af
Outflow = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af, Atten= 0%, Lag= 0.0 min
Primary = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 600.46' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.60'	**30.0" Round Culvert** L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 591.60' / 588.00' S= 0.0409 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=52.94 cfs @ 12.18 hrs HW=600.46' TW=594.27' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 52.94 cfs @ 10.78 fps)

Pond Div Chamber: Diversion Chamber to Aqua-Swirl



Summary for Pond MH 12: MH 12 to Div Chamber

[57] Hint: Peaked at 605.47' (Flood elevation advised)

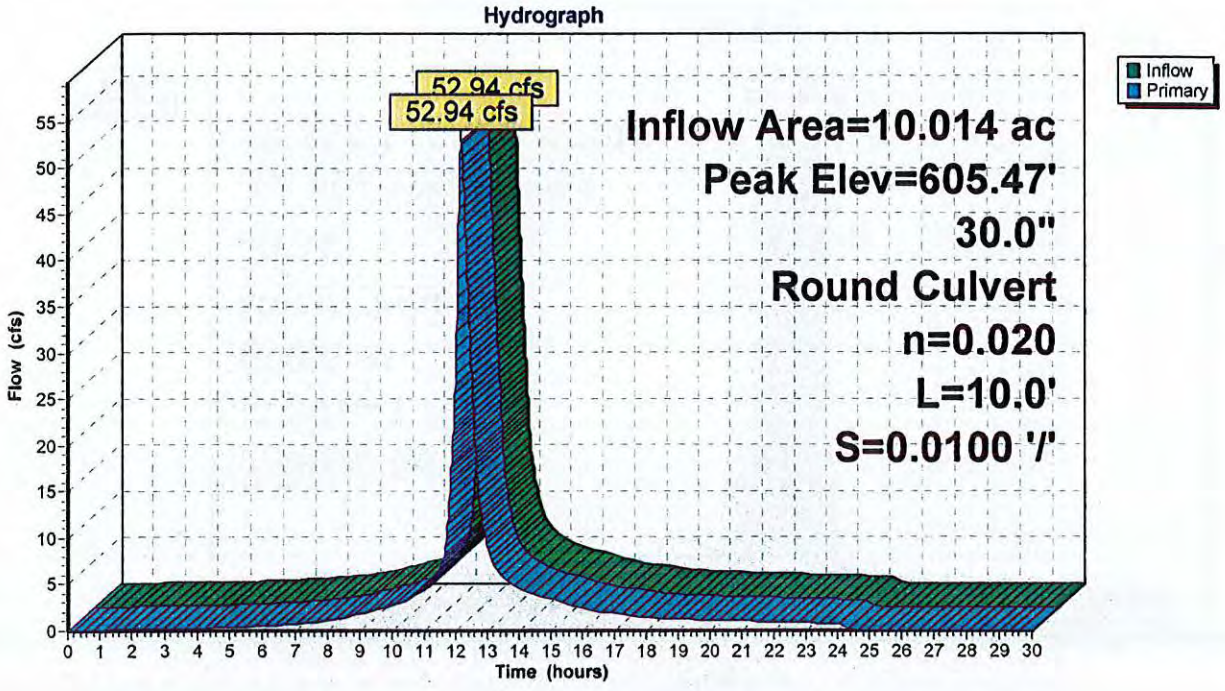
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 7.14" for 100 yr event
Inflow = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af
Outflow = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af, Atten= 0%, Lag= 0.0 min
Primary = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 605.47' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.70'	**30.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 591.70' / 591.60' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=52.85 cfs @ 12.18 hrs HW=605.46' TW=600.46' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 52.85 cfs @ 10.77 fps)

Pond MH 12: MH 12 to Div Chamber



Summary for Pond MH G: MH G to MH H

[57] Hint: Peaked at 709.77' (Flood elevation advised)

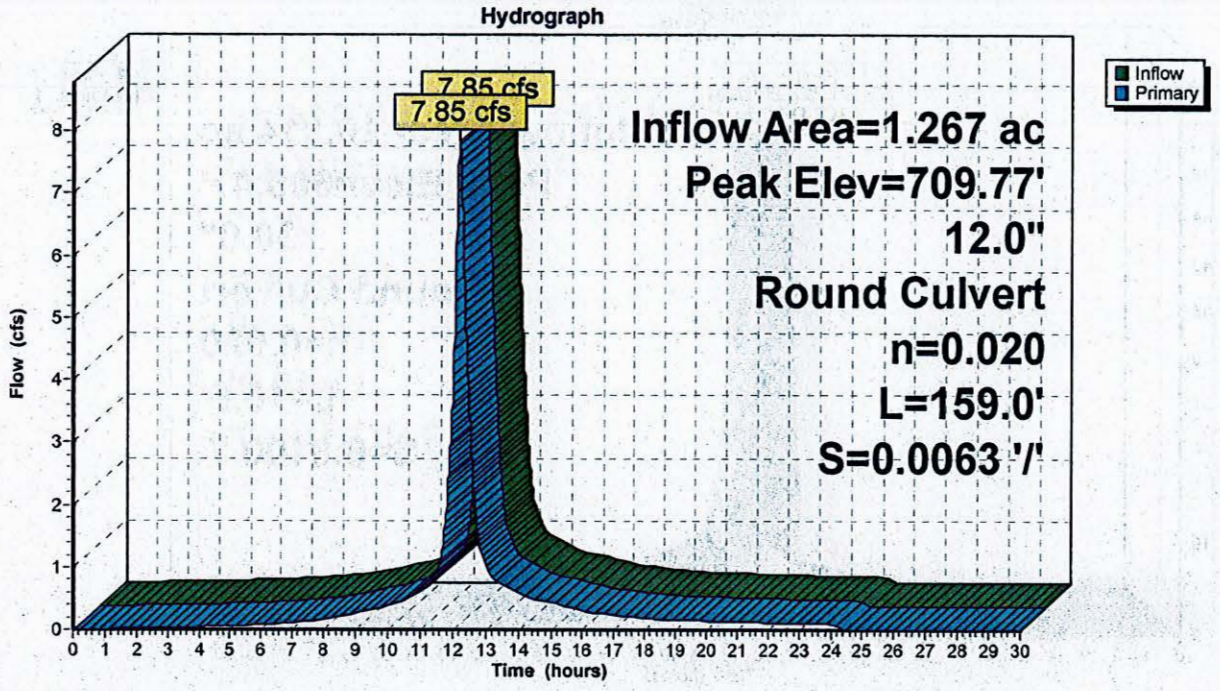
Inflow Area =	1.267 ac,	31.48% Impervious,	Inflow Depth =	7.40" for 100 yr event
Inflow =	7.85 cfs @	12.19 hrs, Volume=	0.782 af	
Outflow =	7.85 cfs @	12.19 hrs, Volume=	0.782 af,	Atten= 0%, Lag= 0.0 min
Primary =	7.85 cfs @	12.19 hrs, Volume=	0.782 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 709.77' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.50'	**12.0" Round Culvert** L= 159.0' Ke= 0.500 Inlet / Outlet Invert= 598.50' / 597.50' S= 0.0063 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.69 cfs @ 12.19 hrs HW=707.89' TW=688.07' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 7.69 cfs @ 9.79 fps)

Pond MH G: MH G to MH H



Summary for Pond MH H: MH H to MH I

[57] Hint: Peaked at 689.75' (Flood elevation advised)

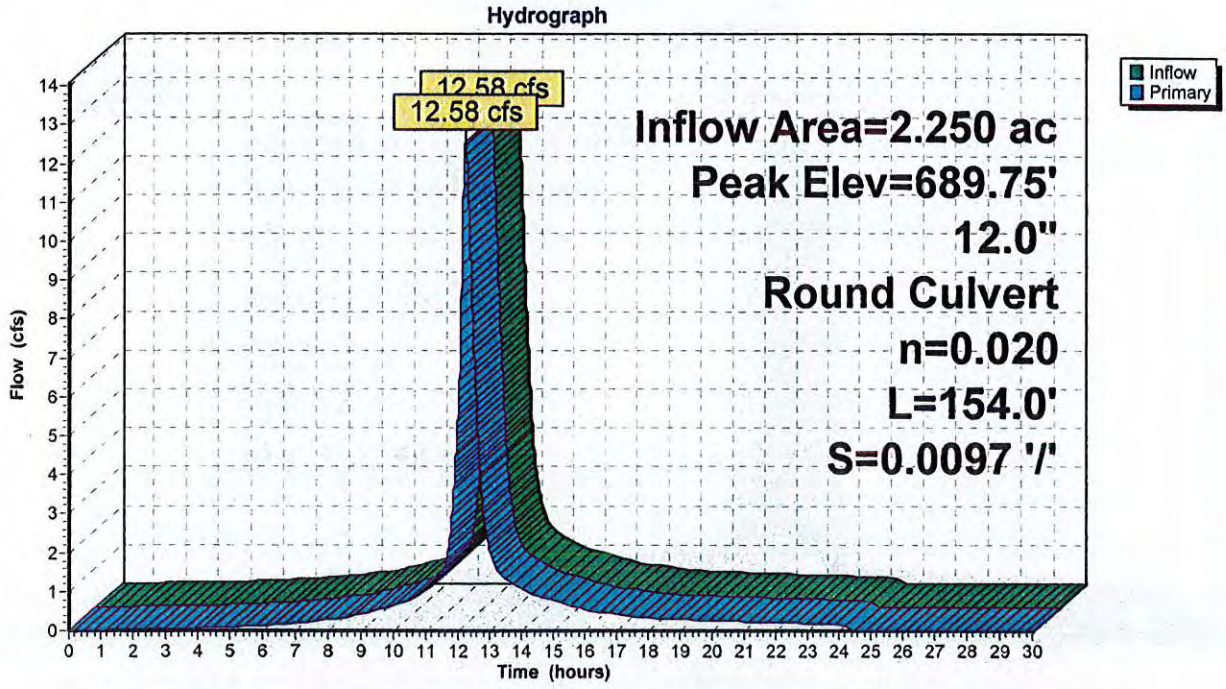
Inflow Area = 2.250 ac, 29.83% Impervious, Inflow Depth = 7.38" for 100 yr event
Inflow = 12.58 cfs @ 12.21 hrs, Volume= 1.383 af
Outflow = 12.58 cfs @ 12.21 hrs, Volume= 1.383 af, Atten= 0%, Lag= 0.0 min
Primary = 12.58 cfs @ 12.21 hrs, Volume= 1.383 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 689.75' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 154.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 595.50' S= 0.0097 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=12.59 cfs @ 12.21 hrs HW=689.63' TW=637.94' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 12.59 cfs @ 16.04 fps)

Pond MH H: MH H to MH I



Summary for Pond MH I: MH I to MH 12

[57] Hint: Peaked at 638.08' (Flood elevation advised)

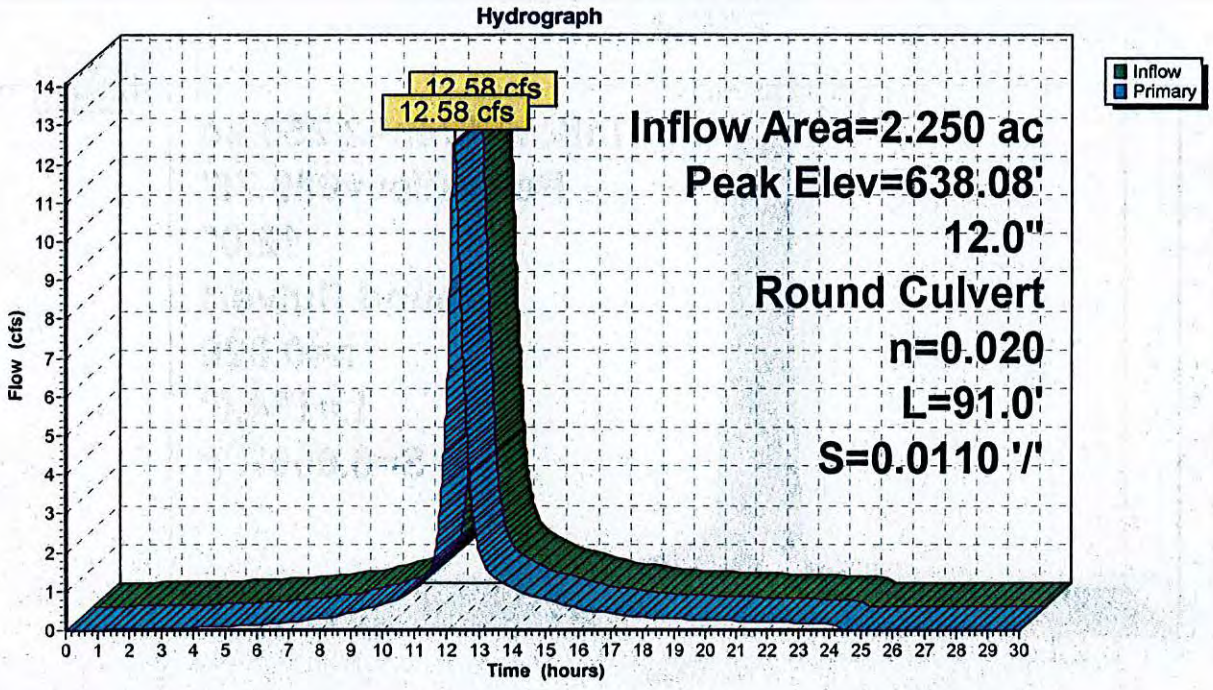
Inflow Area = 2.250 ac, 29.83% Impervious, Inflow Depth = 7.38" for 100 yr event
Inflow = 12.58 cfs @ 12.21 hrs, Volume= 1.383 af
Outflow = 12.58 cfs @ 12.21 hrs, Volume= 1.383 af, Atten= 0%, Lag= 0.0 min
Primary = 12.58 cfs @ 12.21 hrs, Volume= 1.383 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 638.08' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	595.50'	**12.0" Round Culvert** L= 91.0' Ke= 0.500 Inlet / Outlet Invert= 595.50' / 594.50' S= 0.0110 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=12.60 cfs @ 12.21 hrs HW=637.94' TW=604.94' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 12.60 cfs @ 16.04 fps)

Pond MH I: MH I to MH 12



Summary for Pond MH-11: MH-11 to MH-D

[57] Hint: Peaked at 610.58' (Flood elevation advised)

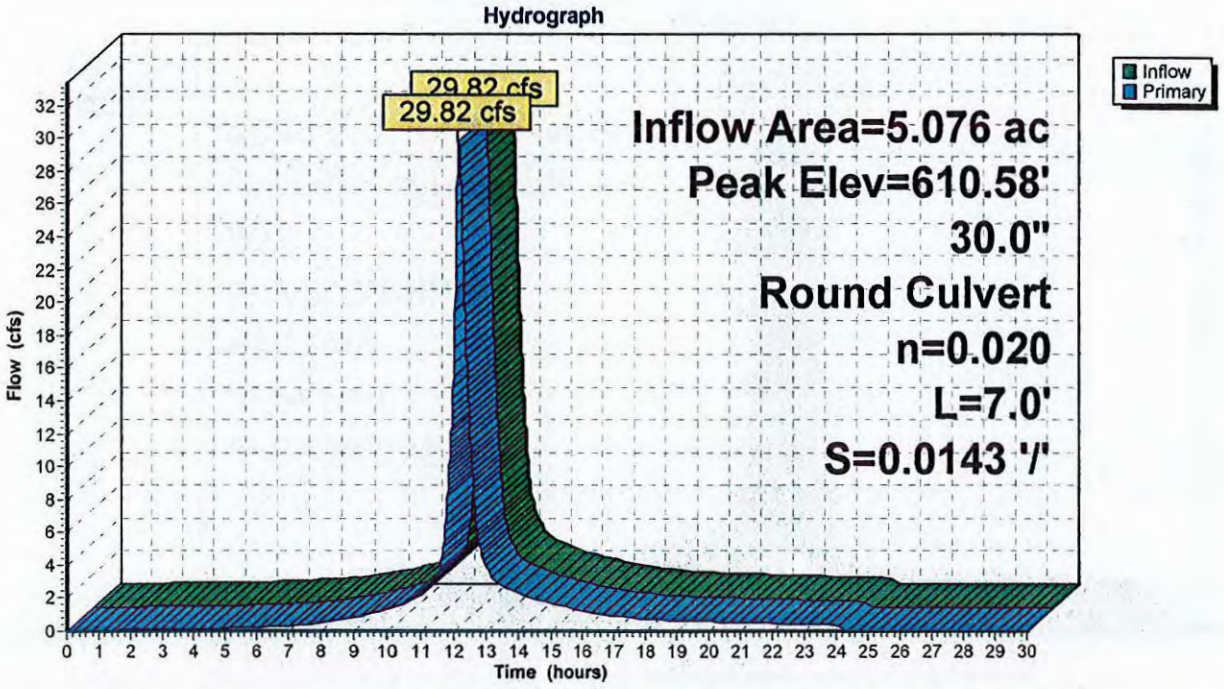
Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 6.92" for 100 yr event
Inflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af
Outflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af, Atten= 0%, Lag= 0.0 min
Primary = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 610.58' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.80'	**30.0" Round Culvert** L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 592.80' / 592.70' S= 0.0143 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=26.30 cfs @ 12.14 hrs HW=609.07' TW=607.83' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 26.30 cfs @ 5.36 fps)

Pond MH-11: MH-11 to MH-D



Summary for Pond MH-14: MH-16 to CB #1

[57] Hint: Peaked at 594.27' (Flood elevation advised)

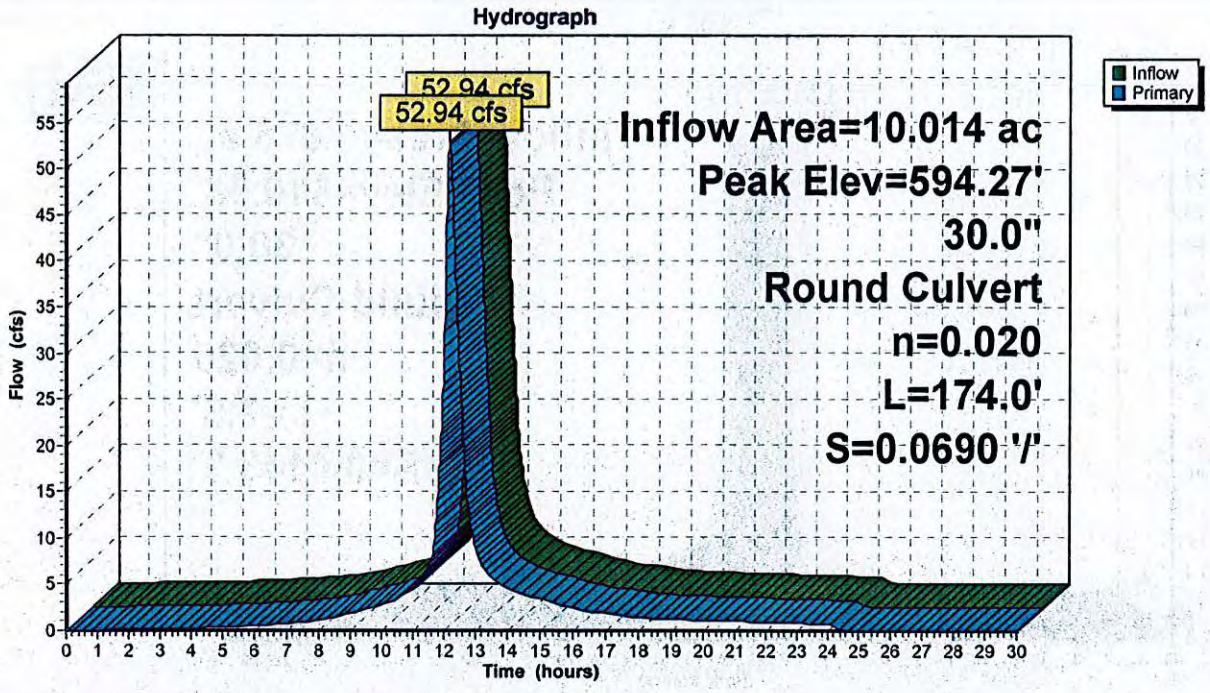
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 7.14" for 100 yr event
Inflow = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af
Outflow = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af, Atten= 0%, Lag= 0.0 min
Primary = 52.94 cfs @ 12.18 hrs, Volume= 5.957 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.27' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	588.00'	**30.0" Round Culvert** L= 174.0' Ke= 0.500 Inlet / Outlet Invert= 588.00' / 576.00' S= 0.0690 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=52.94 cfs @ 12.18 hrs HW=594.27' TW=580.30' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 52.94 cfs @ 10.78 fps)

Pond MH-14: MH-16 to CB #1



Summary for Pond MH-D: MH-D to MH12

[57] Hint: Peaked at 609.15' (Flood elevation advised)

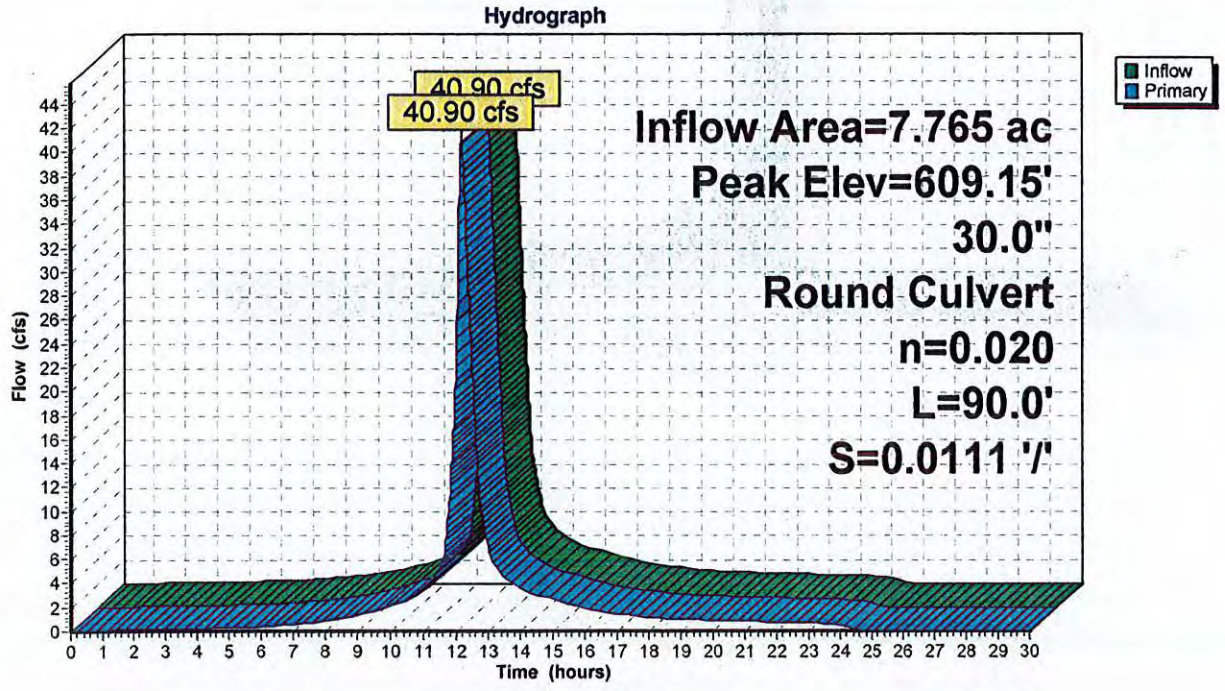
Inflow Area = 7.765 ac, 25.89% Impervious, Inflow Depth = 7.07" for 100 yr event
Inflow = 40.90 cfs @ 12.16 hrs, Volume= 4.573 af
Outflow = 40.90 cfs @ 12.16 hrs, Volume= 4.573 af, Atten= 0%, Lag= 0.0 min
Primary = 40.90 cfs @ 12.16 hrs, Volume= 4.573 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 609.15' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.70'	**30.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 592.70' / 591.70' S= 0.0111 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=40.41 cfs @ 12.16 hrs HW=608.90' TW=605.25' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 40.41 cfs @ 8.23 fps)

Pond MH-D: MH-D to MH12



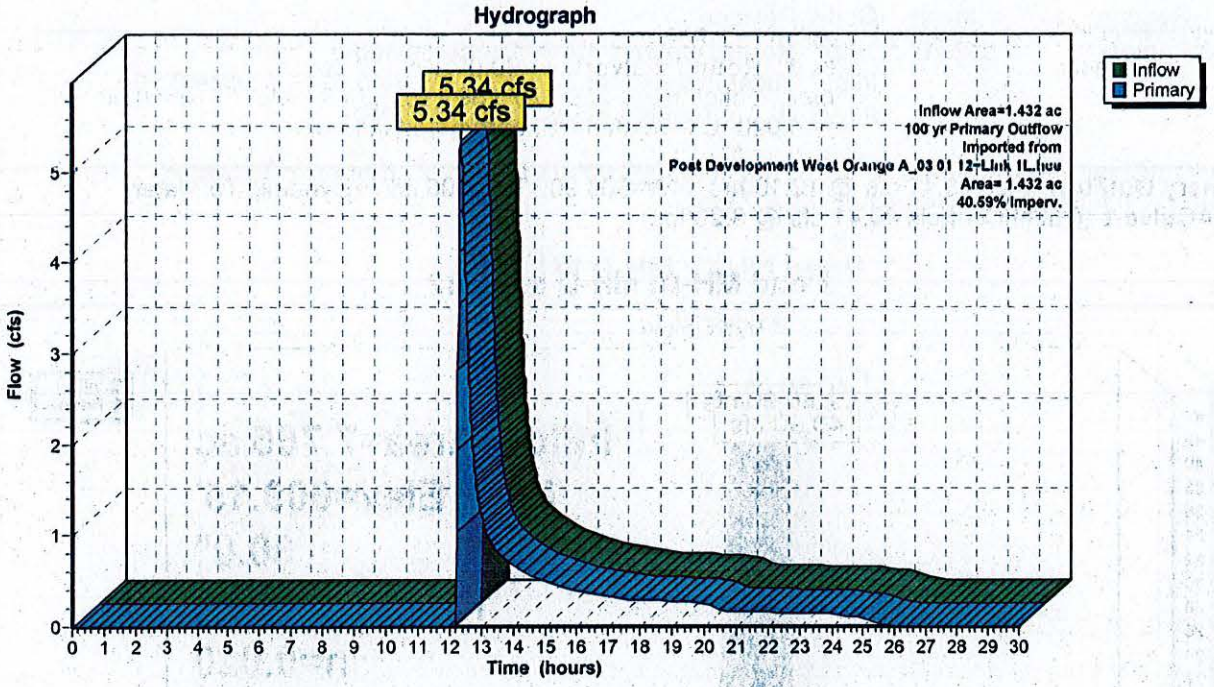
Summary for Link 1L: Link from Part A

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 4.23" for 100 yr event
Inflow = 5.34 cfs @ 12.35 hrs, Volume= 0.505 af
Primary = 5.34 cfs @ 12.35 hrs, Volume= 0.505 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

100 yr Primary Outflow Imported from Post Development West Orange A_03 01 12~Link 1L.hce

Link 1L: Link from Part A



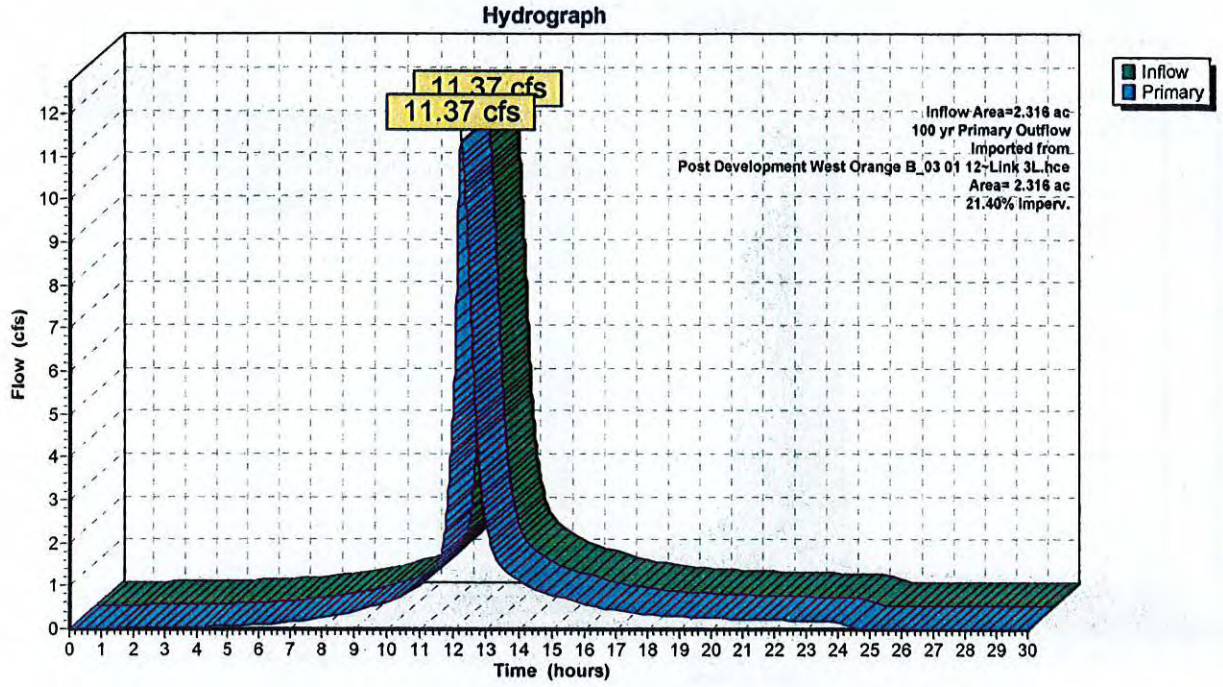
Summary for Link 3L: Link from Part B

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 7.25" for 100 yr event
Inflow = 11.37 cfs @ 12.23 hrs, Volume= 1.399 af
Primary = 11.37 cfs @ 12.23 hrs, Volume= 1.399 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

100 yr Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 3L.hce

Link 3L: Link from Part B



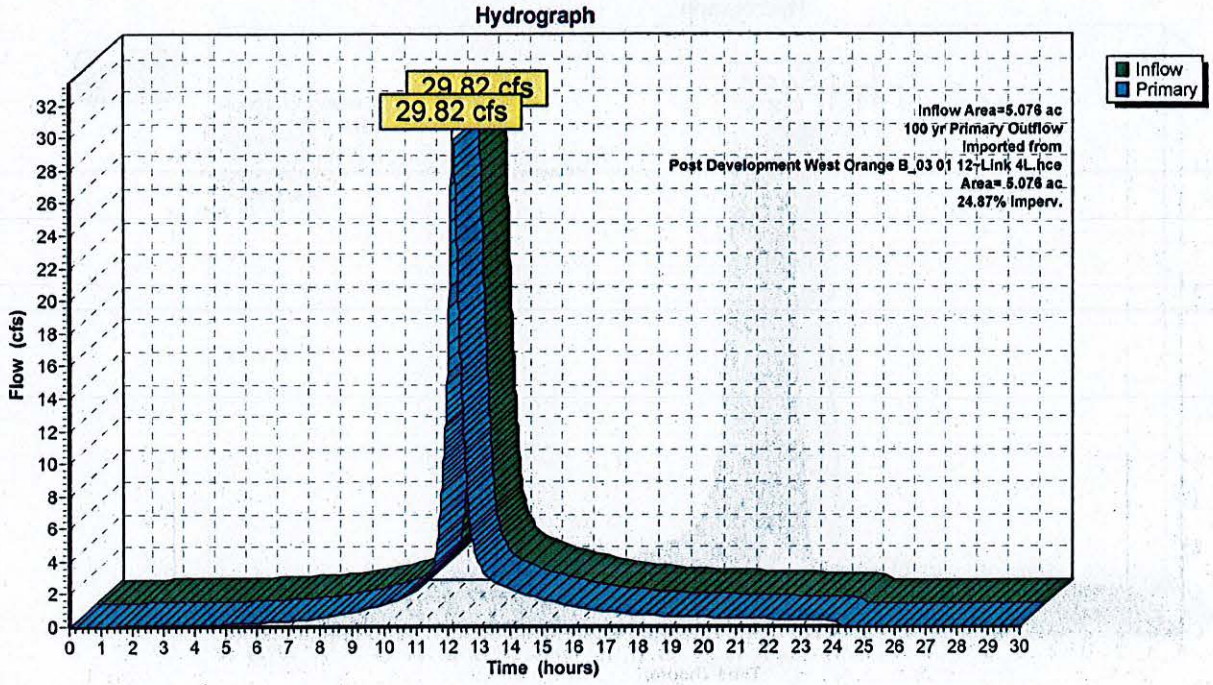
Summary for Link 4L: Link from Part B

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 6.92" for 100 yr event
Inflow = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af
Primary = 29.82 cfs @ 12.14 hrs, Volume= 2.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

100 yr Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 4L.hce

Link 4L: Link from Part B

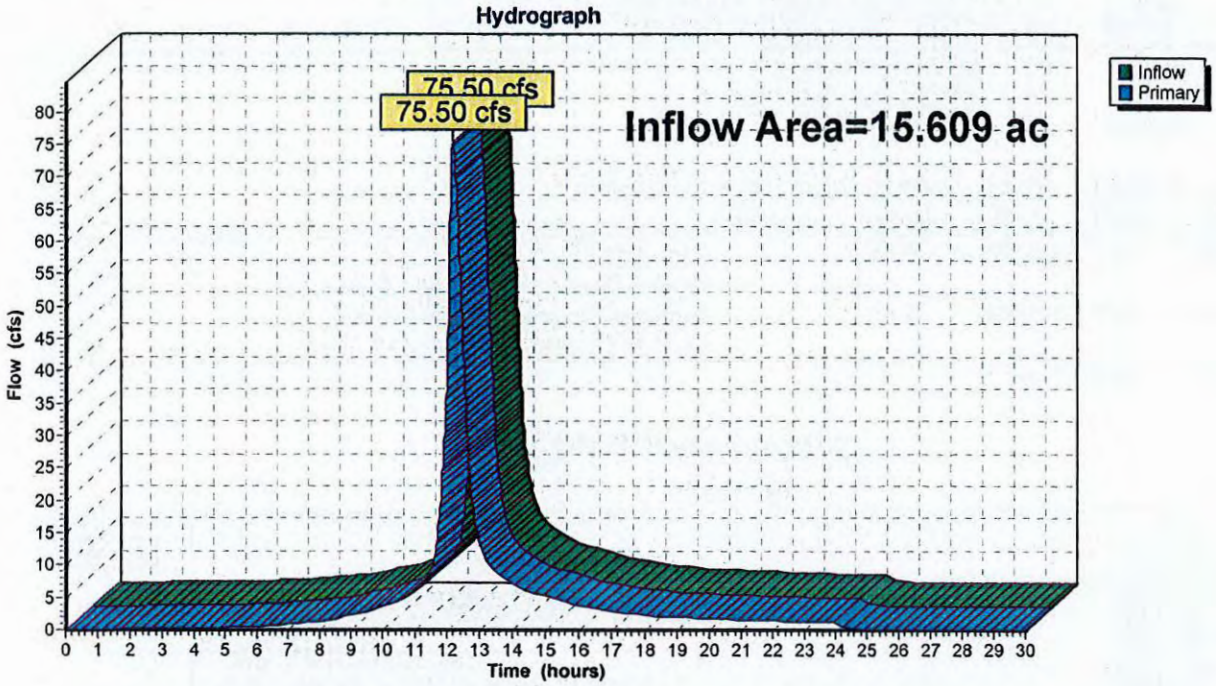


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.609 ac, 22.82% Impervious, Inflow Depth = 6.68" for 100 yr event
Inflow = 75.50 cfs @ 12.16 hrs, Volume= 8.685 af
Primary = 75.50 cfs @ 12.16 hrs, Volume= 8.685 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Summary for Subcatchment 1: PO-DA 1

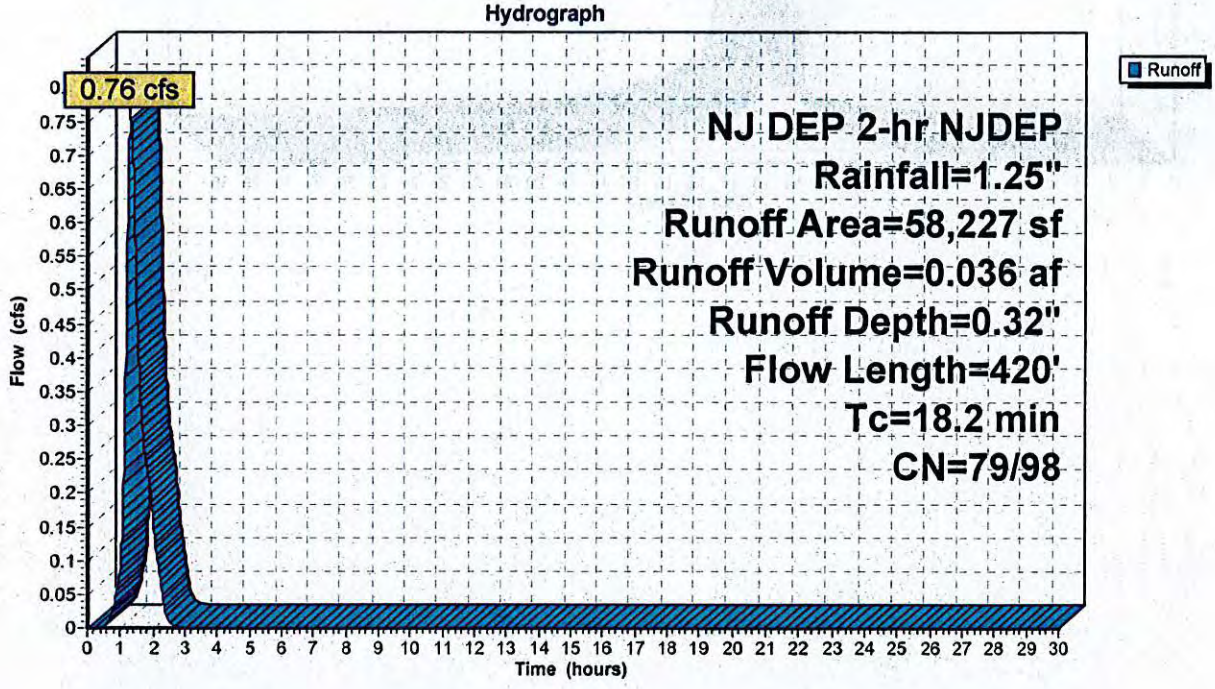
Runoff = 0.76 cfs @ 1.28 hrs, Volume= 0.036 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	11,168	98	Impervious, HSG D
	38,971	79	Woods/grass comb., Good, HSG D
	8,088	78	Meadow, non-grazed, HSG D
	58,227	83	Weighted Average
	47,059	79	80.82% Pervious Area
	11,168	98	19.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0270	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
1.3	270	0.0520	3.42		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.2	420	Total			

Subcatchment 1: PO-DA 1



Summary for Subcatchment 2: PO-DA 2

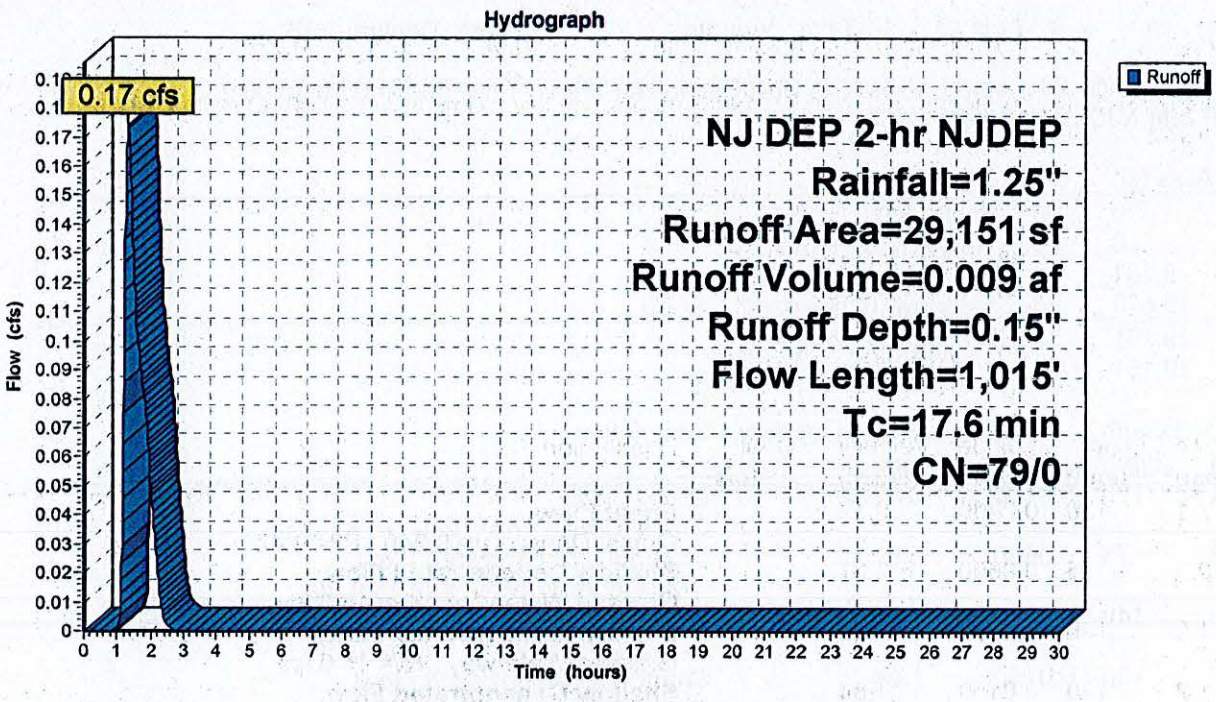
Runoff = 0.17 cfs @ 1.33 hrs, Volume= 0.009 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG D
*	0	98	Gravel road, HSG D
*	9,261	80	Grass, Good, HSG D
	19,890	78	Meadow, non-grazed, HSG D
	29,151	79	Weighted Average
	29,151	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	120	0.0400	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.3	75	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	140	0.0070	1.25		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.2	130	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.7	360	0.0540	3.49		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	190	0.0100	7.20	22.62	**Pipe Channel, Culvert to Discharge** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
17.6	1,015	Total			

Subcatchment 2: PO-DA 2



Summary for Subcatchment 7: PO-DA 7

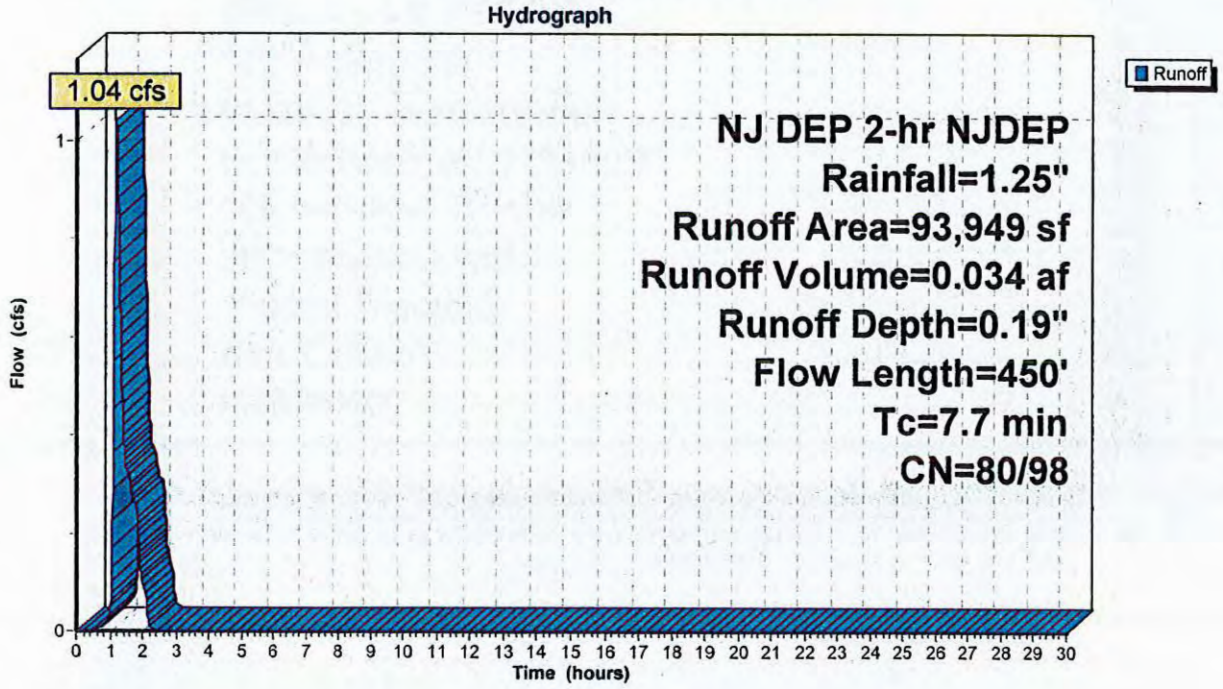
Runoff = 1.04 cfs @ 1.16 hrs, Volume= 0.034 af, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	1,868	98	Impervious, HSG D
*	14,410	85	Yard stone, HSG D
*	72,265	80	Grass , Good, HSG D
	5,406	73	Brush, Good, HSG D
	93,949	81	Weighted Average
	92,081	80	98.01% Pervious Area
	1,868	98	1.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	70	0.1600	0.26		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.42"
0.8	70	0.0857	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	310	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.7	450	Total			

Subcatchment 7: PO-DA 7



Summary for Subcatchment 8: PO-DA 8

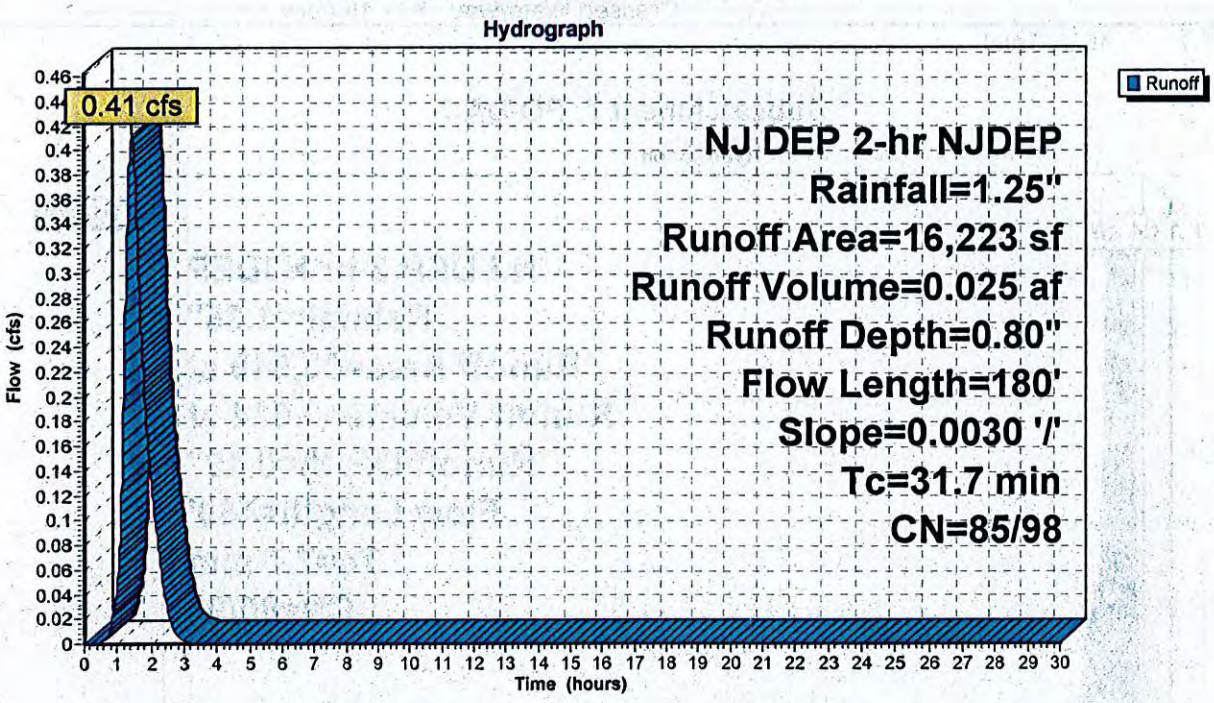
Runoff = 0.41 cfs @ 1.44 hrs, Volume= 0.025 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	10,980	98	Impervious, HSG D
*	5,243	85	Yard stone, HSG D
	16,223	94	Weighted Average
	5,243	85	32.32% Pervious Area
	10,980	98	67.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	100	0.0030	0.05		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.2	80	0.0030	1.11		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
31.7	180	Total			

Subcatchment 8: PO-DA 8



Summary for Subcatchment 9B: PO-DA 9B

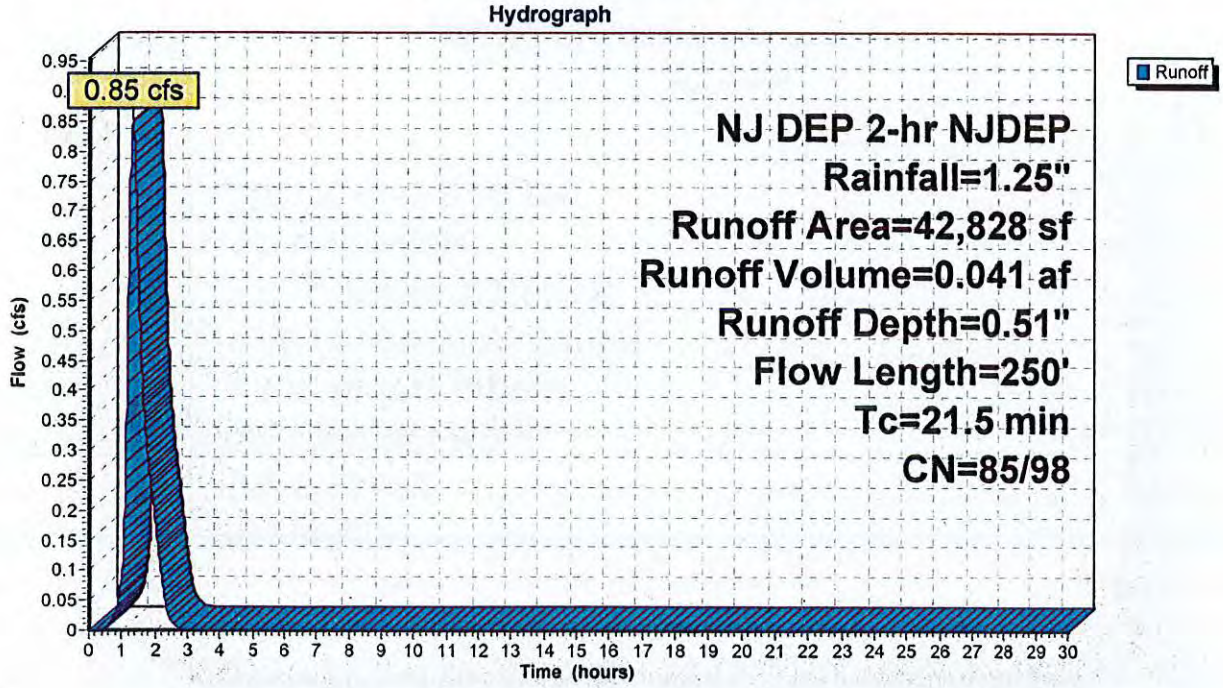
Runoff = 0.85 cfs @ 1.31 hrs, Volume= 0.041 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	5,504	98	Impervious, HSG D
*	6,361	98	Gravel road, HSG D
*	30,963	85	Yard stone, HSG D
	42,828	89	Weighted Average
	30,963	85	72.30% Pervious Area
	11,865	98	27.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	100	0.0090	0.08		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
1.9	150	0.0066	1.31		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
21.5	250	Total			

Subcatchment 9B: PO-DA 9B



Summary for Subcatchment 9D: PO-DA 9D

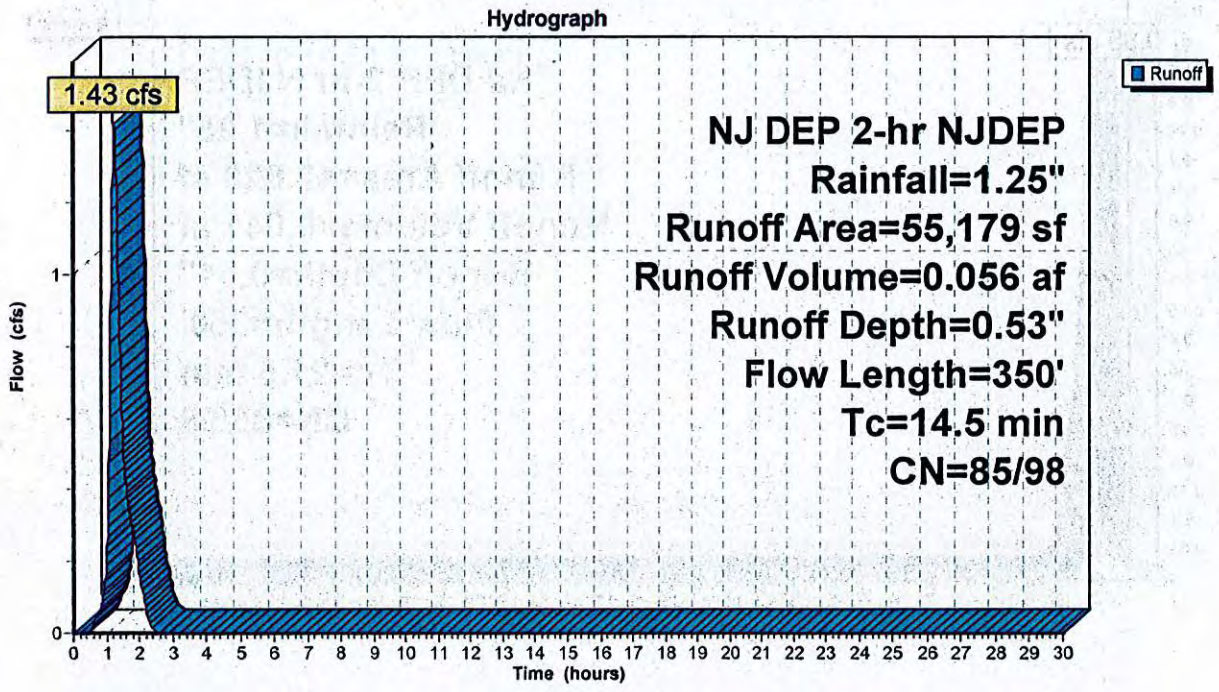
Runoff = 1.43 cfs @ 1.22 hrs, Volume= 0.056 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr NJDEP Rainfall=1.25"

	Area (sf)	CN	Description
*	1,192	98	Impervious, HSG D
*	16,177	98	Gravel road, HSG D
*	37,810	85	Yard Stone, HSG D
	55,179	89	Weighted Average
	37,810	85	68.52% Pervious Area
	17,369	98	31.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0270	0.13		**Sheet Flow, Yard Stone** n= 0.250 P2= 3.42"
0.8	120	0.0270	2.65		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
1.1	130	0.0140	1.90		**Shallow Concentrated Flow, Yard Stone** Unpaved Kv= 16.1 fps
14.5	350	Total			

Subcatchment 9D: PO-DA 9D



Summary for Reach 1R: Swale

Inflow Area = 2.157 ac, 1.99% Impervious, Inflow Depth = 0.19" for NJDEP event
Inflow = 1.04 cfs @ 1.16 hrs, Volume= 0.034 af
Outflow = 0.90 cfs @ 1.22 hrs, Volume= 0.034 af, Atten= 13%, Lag= 3.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.81 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 12.5 min

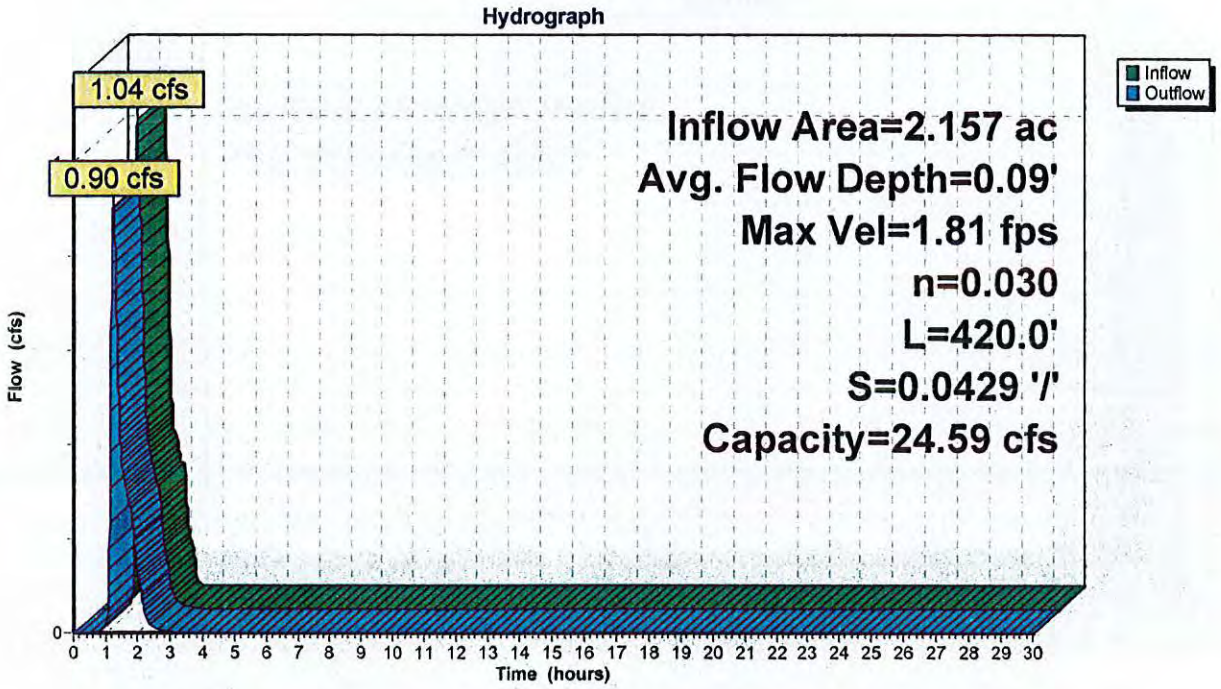
Peak Storage= 209 cf @ 1.22 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 24.59 cfs

5.00' x 0.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 420.0' Slope= 0.0429 '/'
Inlet Invert= 598.00', Outlet Invert= 580.00'



‡

Reach 1R: Swale



Summary for Pond CB 1: CB #1

[57] Hint: Peaked at 577.37' (Flood elevation advised)

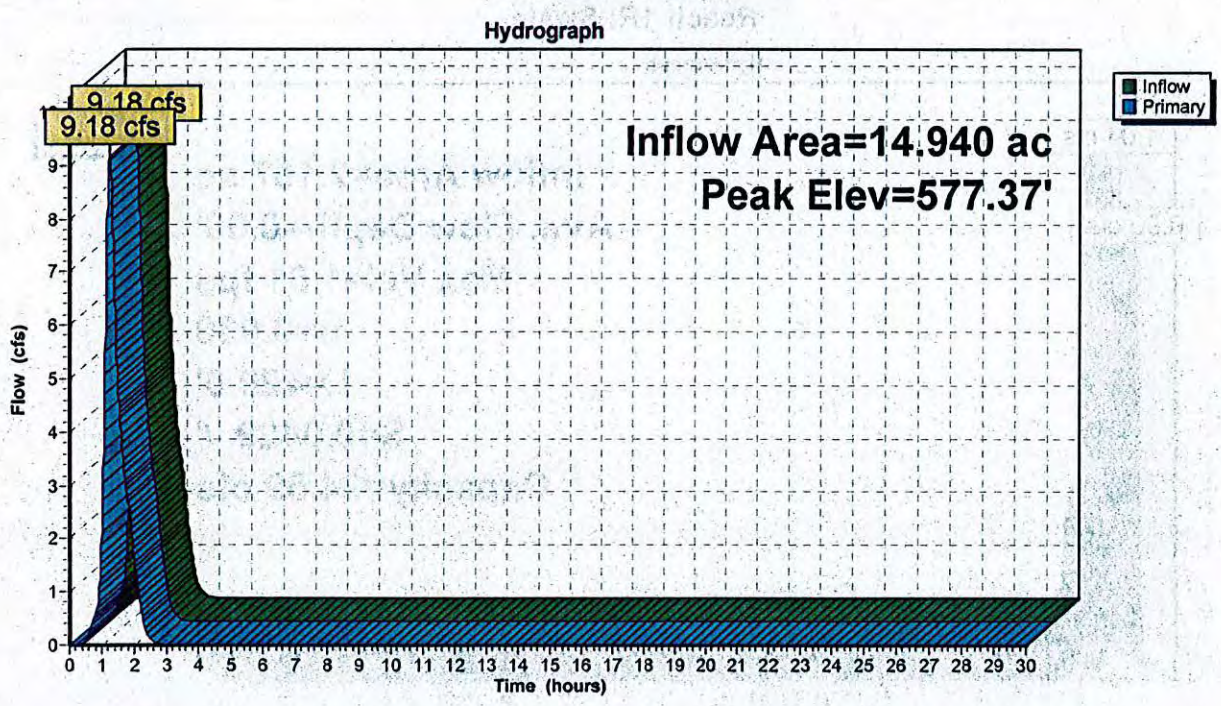
Inflow Area = 14.940 ac, 23.84% Impervious, Inflow Depth = 0.36" for NJDEP event
Inflow = 9.18 cfs @ 1.22 hrs, Volume= 0.452 af
Outflow = 9.18 cfs @ 1.22 hrs, Volume= 0.452 af, Atten= 0%, Lag= 0.0 min
Primary = 9.18 cfs @ 1.22 hrs, Volume= 0.452 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 577.37' @ 1.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	576.00'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 576.00' / 574.00' S= 0.0222 '/' Cc= 0.900 n= 0.011
#2	Primary	580.00'	**100.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.18 cfs @ 1.22 hrs HW=577.37' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 9.18 cfs @ 3.99 fps)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CB 1: CB #1



Summary for Pond Div Chamber: Diversion Chamber to Aqua-Swirl

[57] Hint: Peaked at 592.71' (Flood elevation advised)

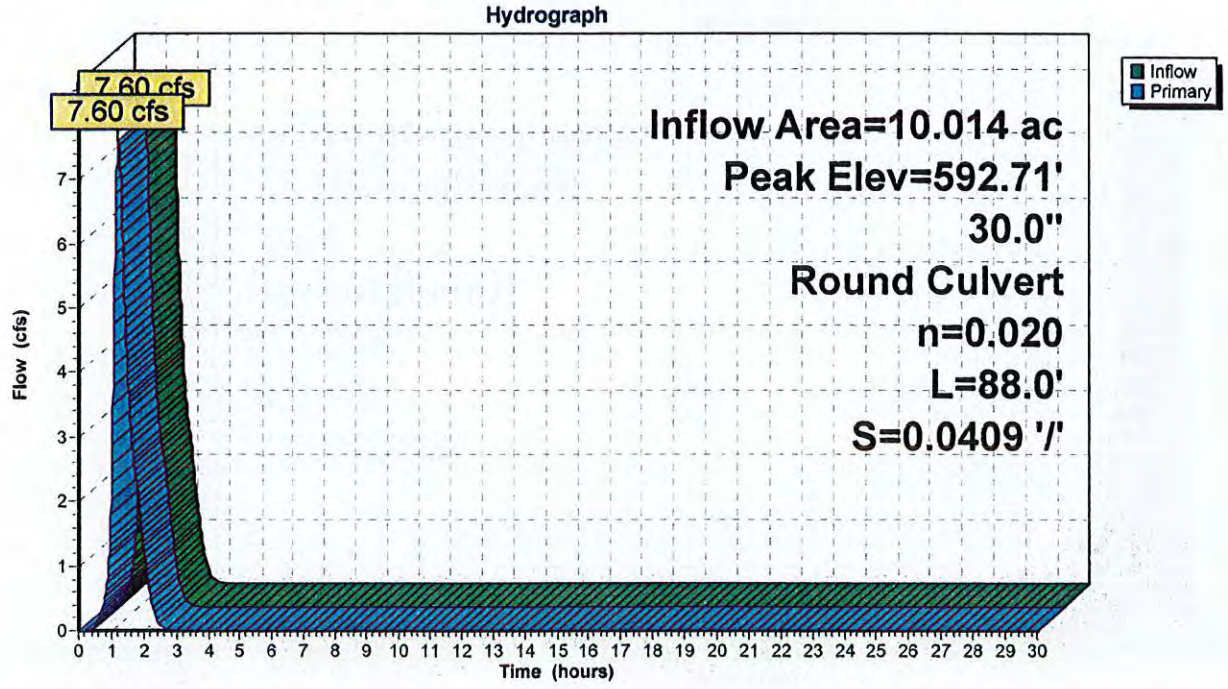
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 0.46" for NJDEP event
Inflow = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af
Outflow = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min
Primary = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 592.71' @ 1.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.60'	**30.0" Round Culvert** L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 591.60' / 588.00' S= 0.0409 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.60 cfs @ 1.21 hrs HW=592.71' TW=589.11' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 7.60 cfs @ 3.59 fps)

Pond Div Chamber: Diversion Chamber to Aqua-Swirl



Summary for Pond MH 12: MH 12 to Div Chamber

[57] Hint: Peaked at 593.11' (Flood elevation advised)

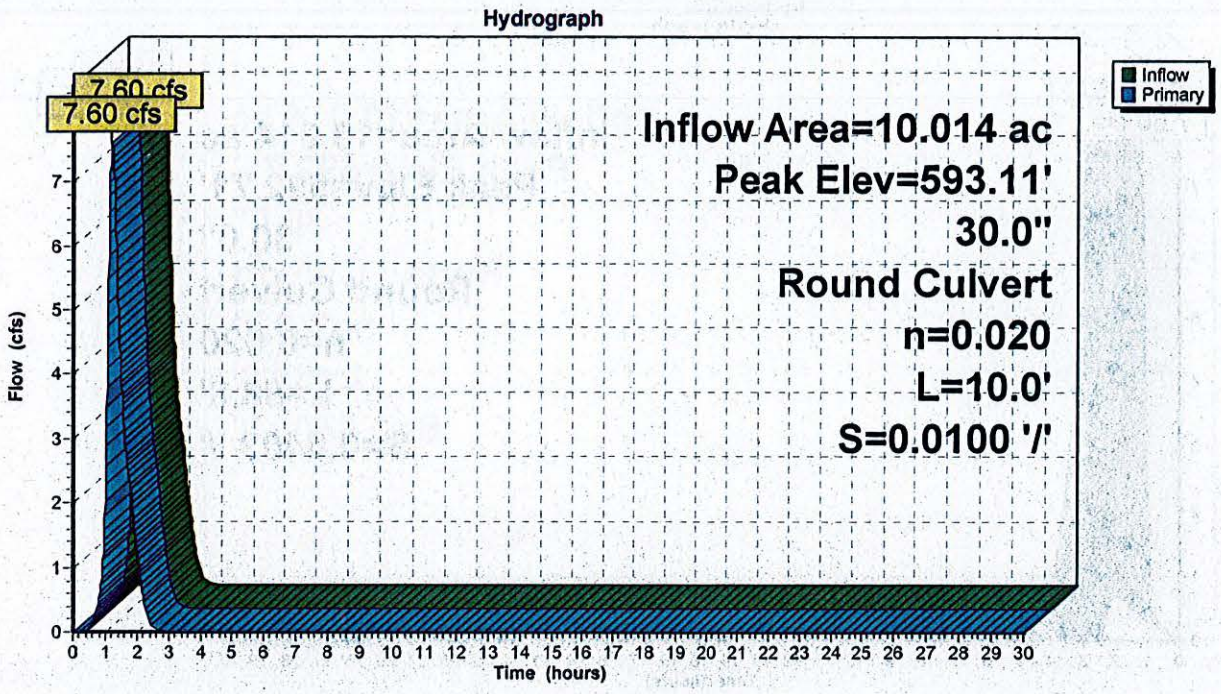
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 0.46" for NJDEP event
Inflow = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af
Outflow = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min
Primary = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 593.11' @ 1.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	591.70'	**30.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 591.70' / 591.60' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.60 cfs @ 1.21 hrs HW=593.11' TW=592.71' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 7.60 cfs @ 3.83 fps)

Pond MH 12: MH 12 to Div Chamber



Summary for Pond MH G: MH G to MH H

[57] Hint: Peaked at 599.37' (Flood elevation advised)

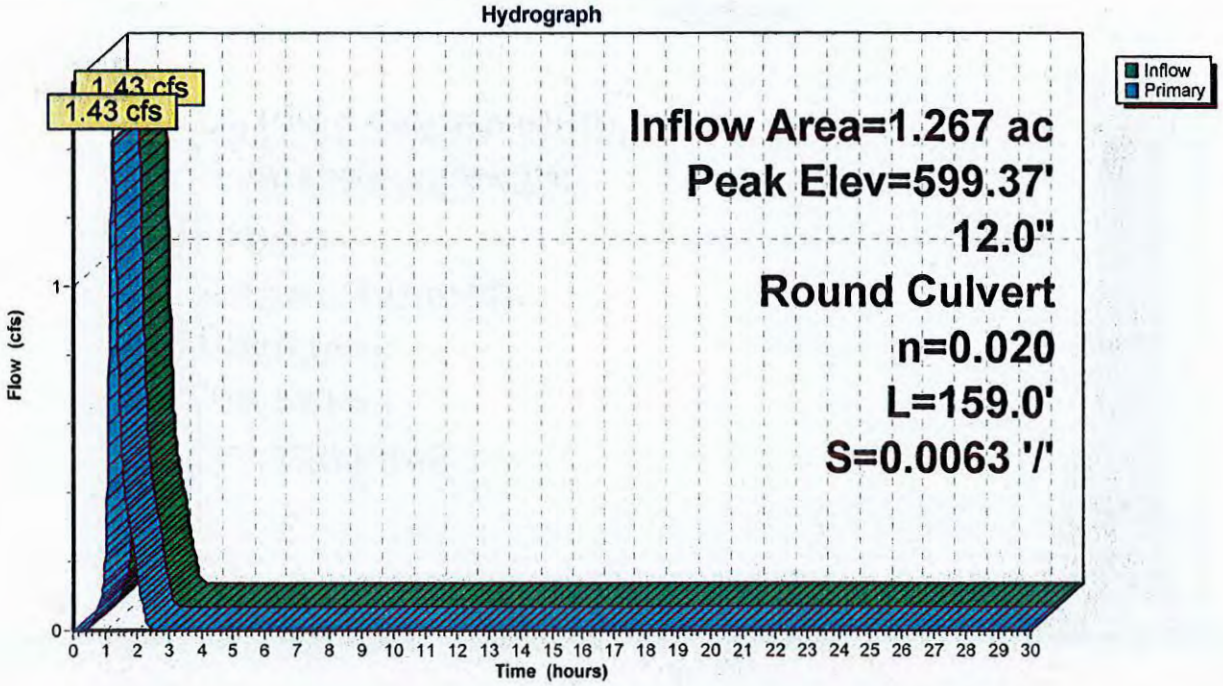
Inflow Area =	1.267 ac,	31.48% Impervious,	Inflow Depth =	0.53"	for NJDEP event
Inflow =	1.43 cfs @	1.22 hrs,	Volume=	0.056 af	
Outflow =	1.43 cfs @	1.22 hrs,	Volume=	0.056 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.43 cfs @	1.22 hrs,	Volume=	0.056 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 599.37' @ 1.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	598.50'	**12.0" Round Culvert** L= 159.0' Ke= 0.500 Inlet / Outlet Invert= 598.50' / 597.50' S= 0.0063 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.42 cfs @ 1.22 hrs HW=599.37' TW=598.06' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 1.42 cfs @ 2.64 fps)

Pond MH G: MH G to MH H



Summary for Pond MH H: MH H to MH I

[57] Hint: Peaked at 598.09' (Flood elevation advised)

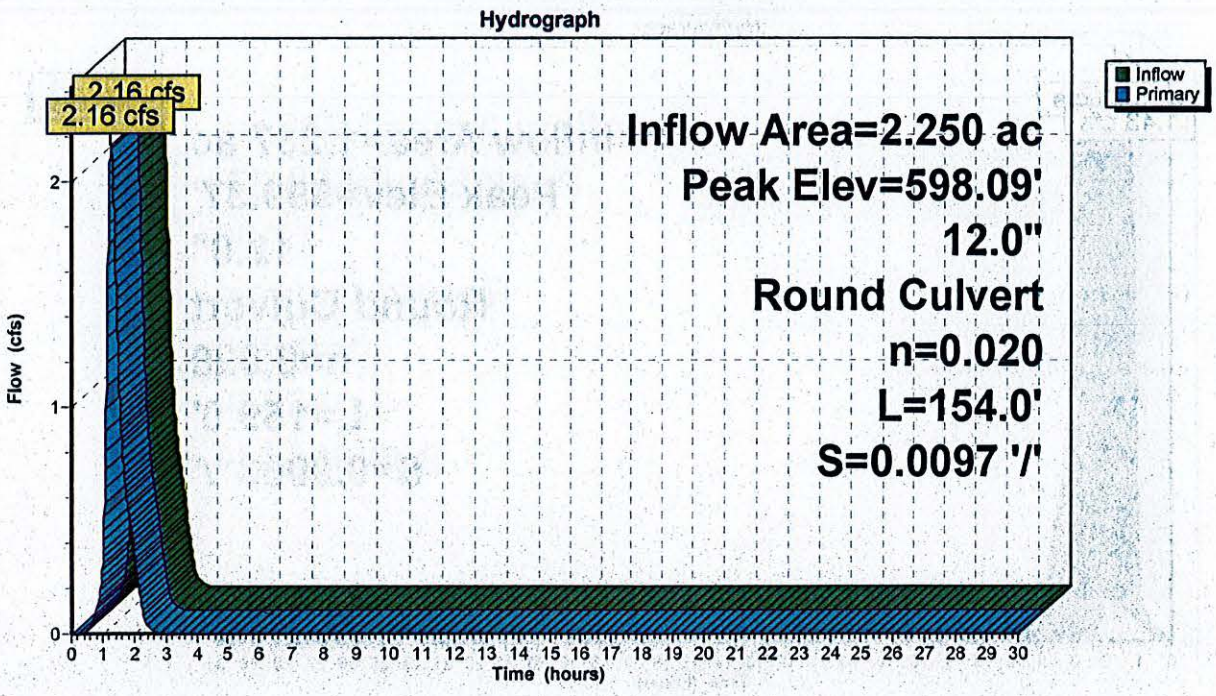
Inflow Area = 2.250 ac, 29.83% Impervious, Inflow Depth = 0.52" for NJDEP event
Inflow = 2.16 cfs @ 1.25 hrs, Volume= 0.098 af
Outflow = 2.16 cfs @ 1.25 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
Primary = 2.16 cfs @ 1.25 hrs, Volume= 0.098 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.09' @ 1.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**12.0" Round Culvert** L= 154.0' Ke= 0.500 Inlet / Outlet Invert= 597.00' / 595.50' S= 0.0097 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.16 cfs @ 1.25 hrs HW=598.09' TW=596.49' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.16 cfs @ 3.16 fps)

Pond MH H: MH H to MH I



Summary for Pond MH I: MH I to MH 12

[57] Hint: Peaked at 596.49' (Flood elevation advised)

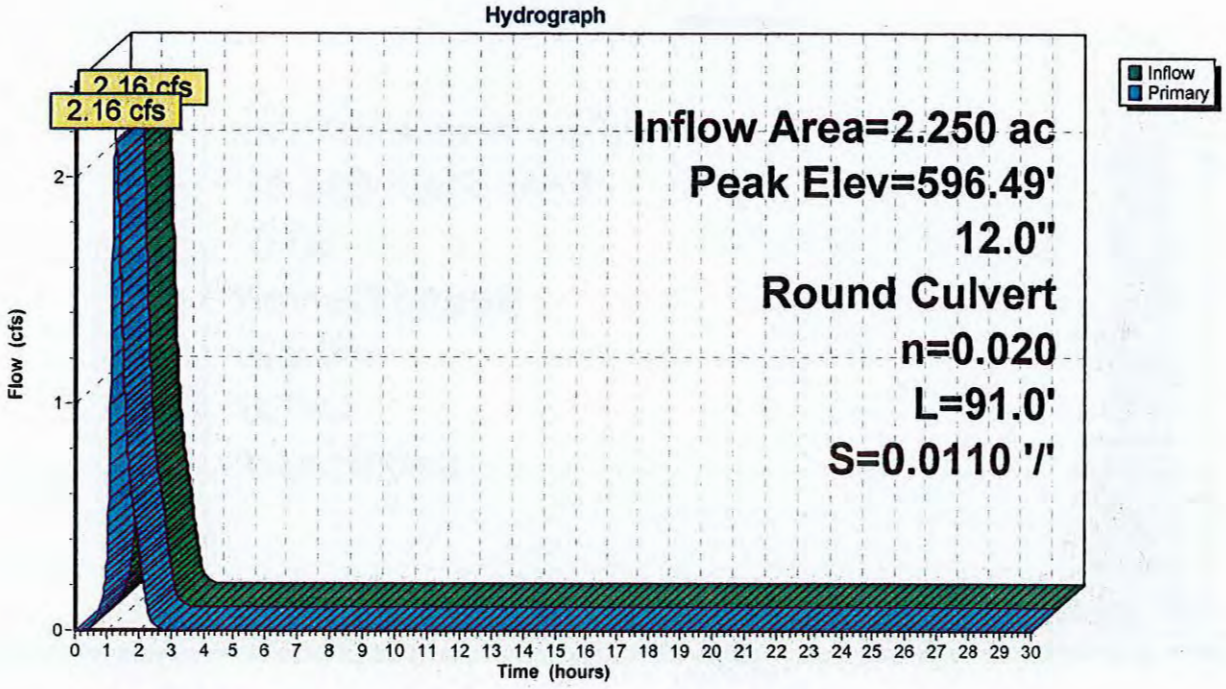
Inflow Area =	2.250 ac,	29.83% Impervious,	Inflow Depth =	0.52"	for NJDEP event
Inflow =	2.16 cfs @	1.25 hrs, Volume=	0.098 af		
Outflow =	2.16 cfs @	1.25 hrs, Volume=	0.098 af,	Atten= 0%,	Lag= 0.0 min
Primary =	2.16 cfs @	1.25 hrs, Volume=	0.098 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 596.49' @ 1.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	595.50'	**12.0" Round Culvert** L= 91.0' Ke= 0.500 Inlet / Outlet Invert= 595.50' / 594.50' S= 0.0110 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.16 cfs @ 1.25 hrs HW=596.49' TW=593.10' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 2.16 cfs @ 3.45 fps)

Pond MH I: MH I to MH 12



Summary for Pond MH-11: MH-11 to MH-D

[57] Hint: Peaked at 594.04' (Flood elevation advised)

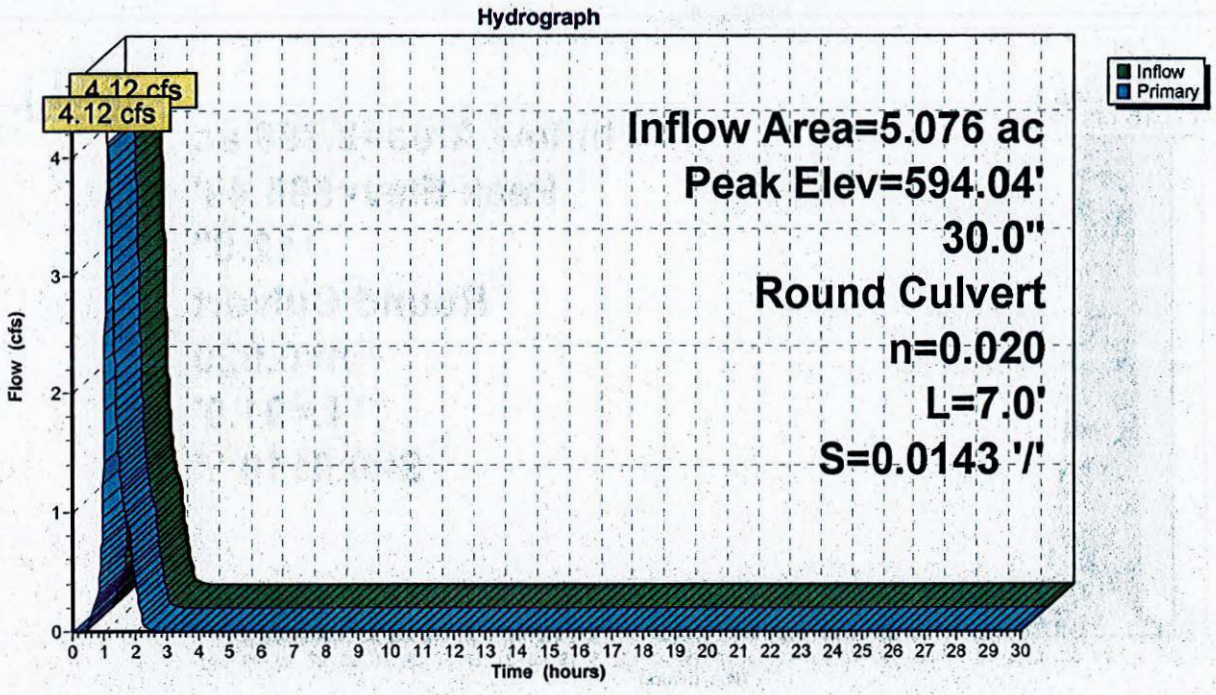
Inflow Area =	5.076 ac,	24.87% Impervious,	Inflow Depth =	0.40"	for NJDEP event
Inflow =	4.12 cfs @	1.14 hrs, Volume=	0.171 af		
Outflow =	4.12 cfs @	1.14 hrs, Volume=	0.171 af,	Atten= 0%,	Lag= 0.0 min
Primary =	4.12 cfs @	1.14 hrs, Volume=	0.171 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 594.04' @ 1.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.80'	**30.0" Round Culvert** L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 592.80' / 592.70' S= 0.0143 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.07 cfs @ 1.14 hrs HW=594.03' TW=593.87' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.07 cfs @ 2.47 fps)

Pond MH-11: MH-11 to MH-D



Summary for Pond MH-14: MH-16 to CB #1

[57] Hint: Peaked at 589.11' (Flood elevation advised)

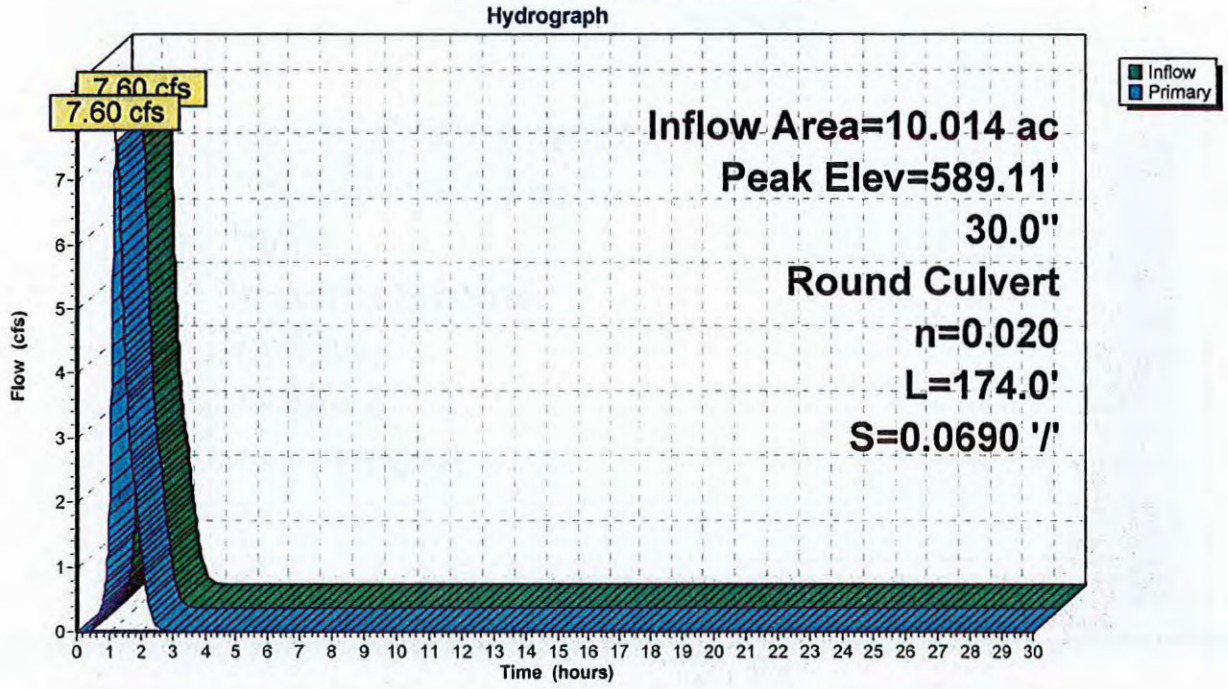
Inflow Area = 10.014 ac, 26.77% Impervious, Inflow Depth = 0.46" for NJDEP event
Inflow = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af
Outflow = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min
Primary = 7.60 cfs @ 1.21 hrs, Volume= 0.382 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 589.11' @ 1.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	588.00'	**30.0" Round Culvert** L= 174.0' Ke= 0.500 Inlet / Outlet Invert= 588.00' / 576.00' S= 0.0690 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.60 cfs @ 1.21 hrs HW=589.11' TW=577.37' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 7.60 cfs @ 3.59 fps)

Pond MH-14: MH-16 to CB #1



Summary for Pond MH-D: MH-D to MH12

[57] Hint: Peaked at 593.90' (Flood elevation advised)

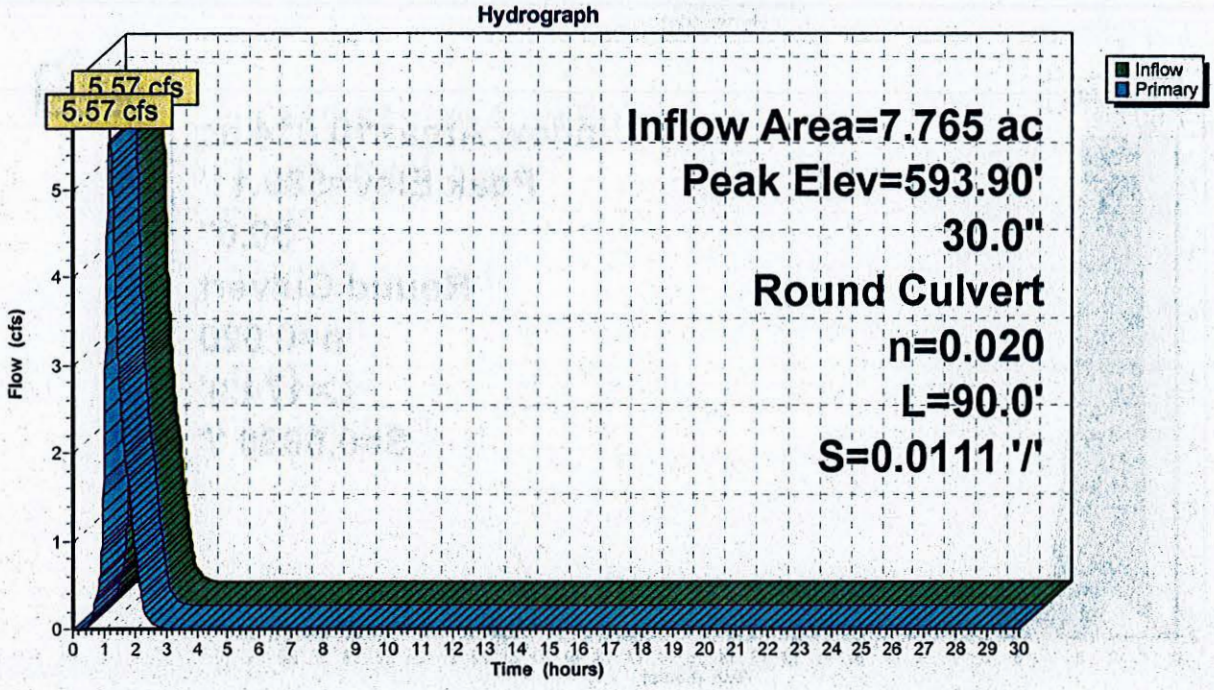
Inflow Area =	7.765 ac,	25.89% Impervious,	Inflow Depth =	0.44"	for NJDEP event
Inflow =	5.57 cfs @	1.18 hrs,	Volume=	0.284 af	
Outflow =	5.57 cfs @	1.18 hrs,	Volume=	0.284 af,	Atten= 0%, Lag= 0.0 min
Primary =	5.57 cfs @	1.18 hrs,	Volume=	0.284 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 593.90' @ 1.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	592.70'	**30.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 592.70' / 591.70' S= 0.0111 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.56 cfs @ 1.18 hrs HW=593.90' TW=593.10' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.56 cfs @ 3.50 fps)

Pond MH-D: MH-D to MH12



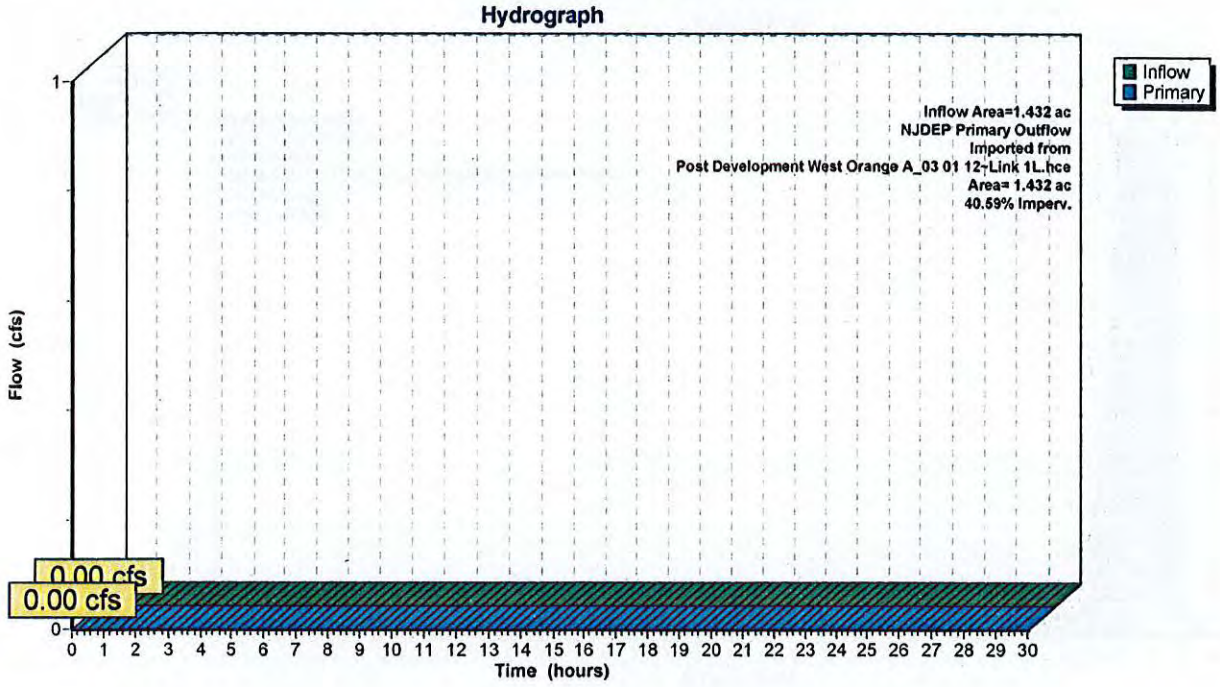
Summary for Link 1L: Link from Part A

Inflow Area = 1.432 ac, 40.59% Impervious, Inflow Depth = 0.00" for NJDEP event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

NJDEP Primary Outflow Imported from Post Development West Orange A_03 01 12~Link 1L.hce

Link 1L: Link from Part A



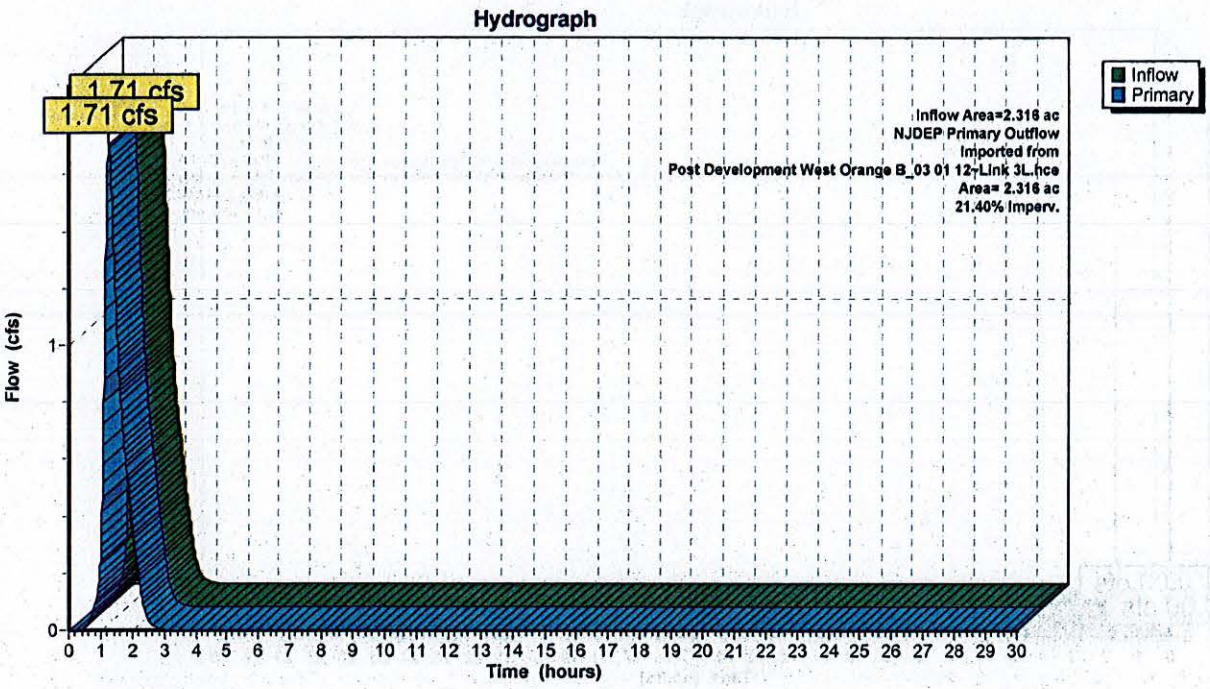
Summary for Link 3L: Link from Part B

Inflow Area = 2.316 ac, 21.40% Impervious, Inflow Depth = 0.46" for NJDEP event
Inflow = 1.71 cfs @ 1.25 hrs, Volume= 0.089 af
Primary = 1.71 cfs @ 1.25 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

NJDEP Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 3L.hce

Link 3L: Link from Part B



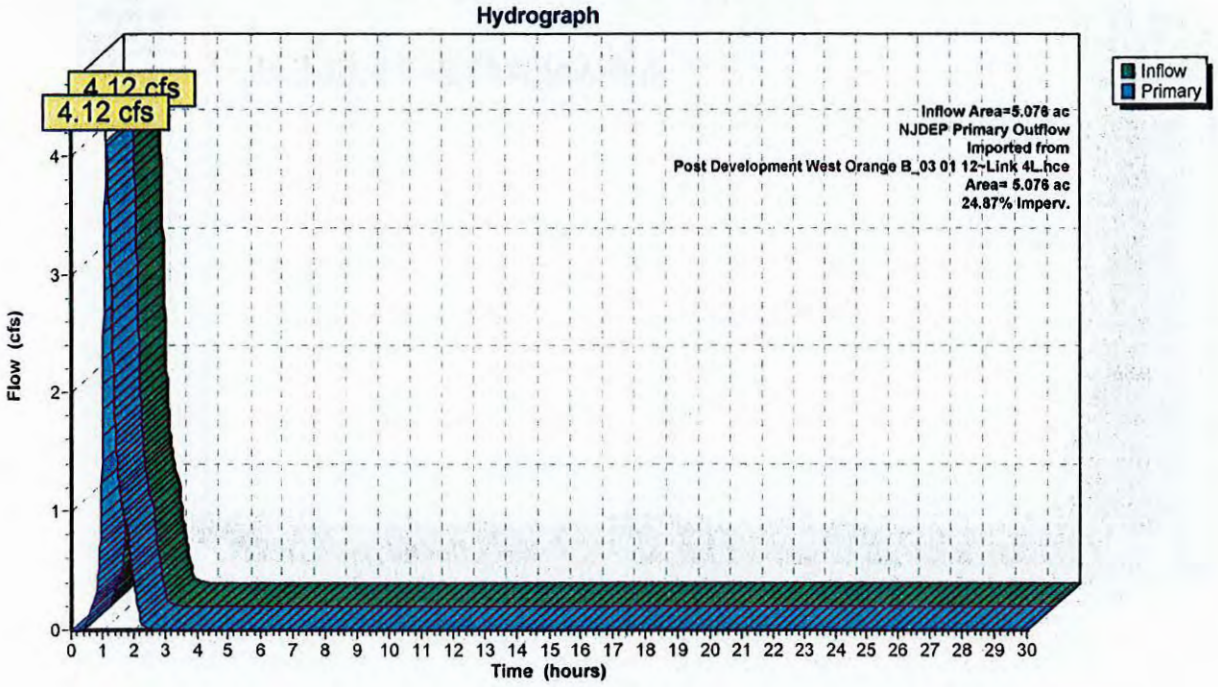
Summary for Link 4L: Link from Part B

Inflow Area = 5.076 ac, 24.87% Impervious, Inflow Depth = 0.40" for NJDEP event
Inflow = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af
Primary = 4.12 cfs @ 1.14 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

NJDEP Primary Outflow Imported from Post Development West Orange B_03 01 12~Link 4L.hce

Link 4L: Link from Part B

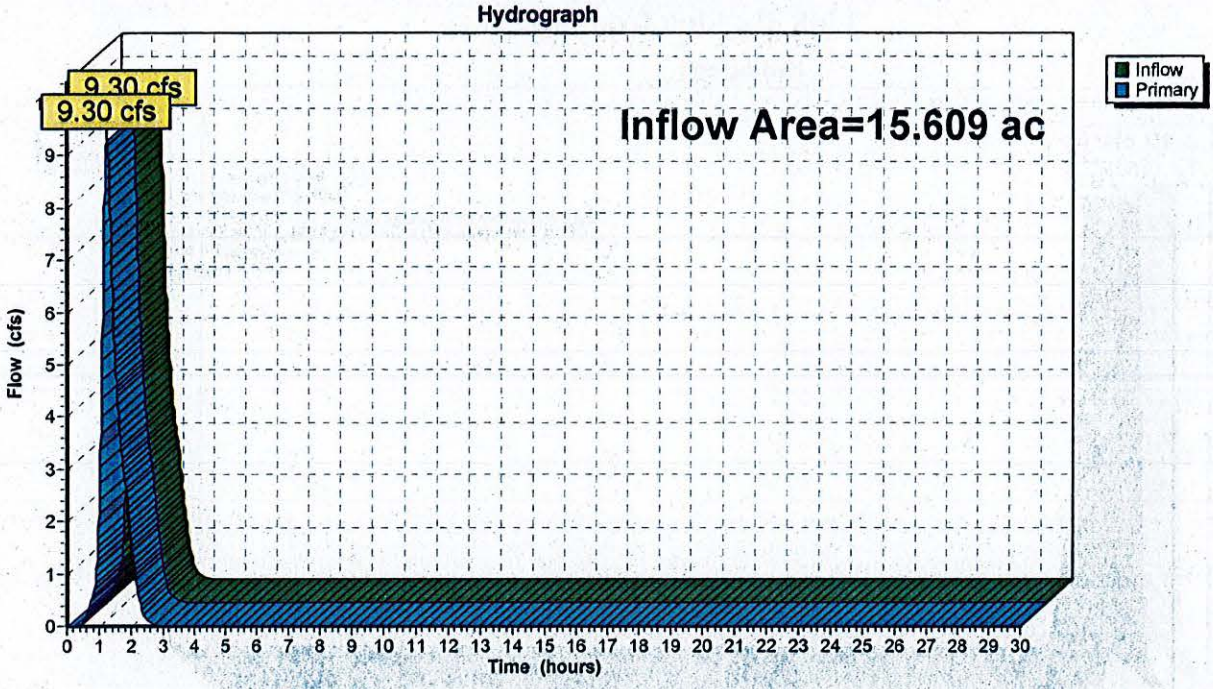


Summary for Link Discharge: Analysis Point A

Inflow Area = 15.609 ac, 22.82% Impervious, Inflow Depth = 0.35" for NJDEP event
Inflow = 9.30 cfs @ 1.22 hrs, Volume= 0.460 af
Primary = 9.30 cfs @ 1.22 hrs, Volume= 0.460 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Discharge: Analysis Point A



Appendix F – AquaSwirl/AquaFilter Specifications

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
401-02B
Bureau of Nonpoint Pollution Control
Division of Water Quality
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

September 1, 2011

Mark B. Miller, P.G.
AquaShield, Inc.
2705 Kanasita Drive
Chattanooga, Tennessee 37343

Re: MTD Laboratory Test Certification for the Aqua-Filter by AquaShield, Inc.

Effective Date: September 1, 2011
Expiration Date: September 1, 2013
TSS Removal Rate: 80%

Dear Mr. Miller:

The Stormwater Management Rules at N.J.A.C. 7:8 allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards provided that the pollutant removal rates have been verified by New Jersey Corporation for Advanced Technology, NJCAT, and certified by the New Jersey Department of Environmental Protection (NJDEP).

The certification process was revised through the "Transition for Manufactured Treatment Devices," dated July 15, 2011. NJDEP has determined that Aqua-Filter by AquaShield, Inc. is consistent with the criteria under *A. Manufactured Treatment Devices with Interim Certifications*. Therefore, **NJDEP certifies the use of the coarse perlite media filtration cartridge of the Aqua-Filter by AquaShield, Inc. with an 80% TSS removal rate, provided that the project design is consistent with the following conditions:**

1. The various models and associated water quality flow capacities shall be sized for the peak flow of the New Jersey Water Quality Design Storm per N.J.A.C. 7:8-5.

2. The peak inflow of the Water Quality Design Storm is limited to 0.01 cfs per square foot of filter area. The maximum inflow area per square foot of filter area is limited to 0.01 acres of impervious area. Note: One row of filter media is typically 12 ft^2.

3. Sufficient draindown cartridges must be placed in any system to ensure that the draindown time for the Water Quality Design Storm does not exceed thirty-six (36) hours.

4. The Aqua-Filter is certified as an off-line system. Any flow above the New Jersey Water Quality Design Storm must be bypassed around the system.

5. A pre-treatment device, such as the Aqua-Swirl, must be used as part of the treatment train. Any manufactured treatment device utilized for pre-treatment must be certified with a minimum of 50% TSS removal rate. Sediment storage capacity shall be determined by the pre-treatment device.

6. If the Water Quality Design Storm is controlled by upstream detention / attenuation for 12 hours or more, the pre-treatment requirement of condition 5 is met.

7. The maintenance plan for the sites using this device shall incorporate at a minimum, the maintenance requirements for the Aqua-Filter shown attached.

In addition to the attached, any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8, must include a detailed maintenance plan. The detailed maintenance plan must include all of the items identified in Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual.

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules, N.J.A.C. 7:8, are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,

Ed Frankel

Ed Frankel, P.P., Acting Bureau Chief
Bureau of Nonpoint Pollution Control

C: Richard S. Magee, NJCAT
Chron file

AquaShield
STORMWATER TREATMENT SOLUTIONS

Aqua-Filter™
Stormwater Filtration System

Inspection and Maintenance Manual

AquaShield, Inc.
2705 Kanasita Drive, Chattanooga, TN 37343
Phone: (423) 870-8888
Fax: (423) 826-2112
Email: info@aquashieldinc.com

AquaShield™, Inc. Table of Contents

Introduction / Installation / Maintenance

- **Introduction to AquaShield™ Stormwater Treatment Systems**
- **Operation of the Aqua-Filter™ Stormwater Treatment System**
- **Installation of the Aqua-Filter™ System**
- **Inspection & Maintenance of the Aqua-Filter™ System**
- **Appendix**

2705 Kanasita Drive, Hixson, Tennessee 37343
Phone (423) 870-8888 Fax (423) 870-2112
www.AquaShieldInc.com

AquaShield™, Inc
Stormwater Treatment Solutions

The highest priority of AquaShield™, Inc. (AquaShield™) is to protect waterways by providing stormwater treatment solutions to businesses across the world. These solutions have a reliable foundation based on over 20 years of water treatment experience.

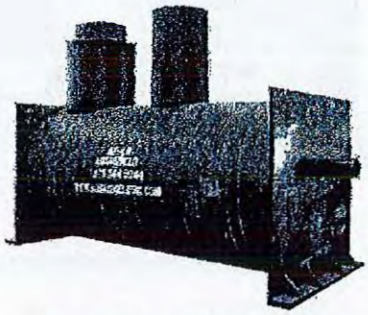
Local regulators, engineers, and contractors have praised the AquaShield™ systems for their simple design and ease of installation. All the systems are fabricated from High-Density Polyethylene (HDPE), and contractors prefer the quick and simple installation of our structures that saves them money.

The AquaShield™ line of patented stormwater treatment products provide for high levels of stormwater treatment:

- The ***Aqua-Swirl™ Stormwater Treatment System*** is a hydrodynamic separator, which provides a highly effective means for the removal of TSS (fine to coarse sediment), floating debris and free-oil.
- The ***Aqua-Filter™ Stormwater Filtration System*** is an in-line stormwater filtration system capable of gross contaminant removal, and the removal of fine sediments, waterborne hydrocarbons, heavy metals (i.e. zinc) and nutrients such as phosphorous and nitrogen.



Aqua-Swirl™ Stormwater Treatment System

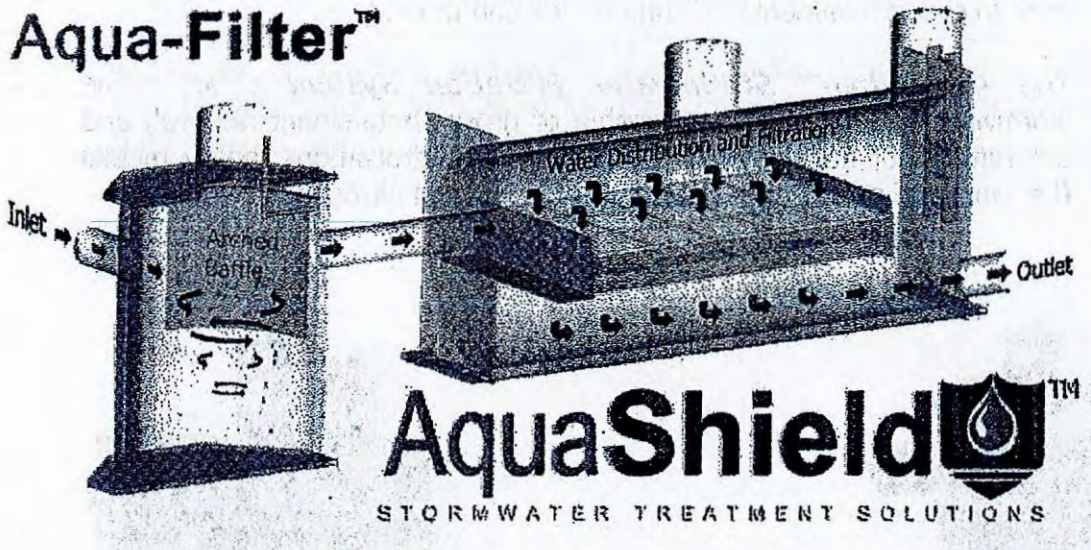


Aqua-Filter™ Stormwater Filtration System

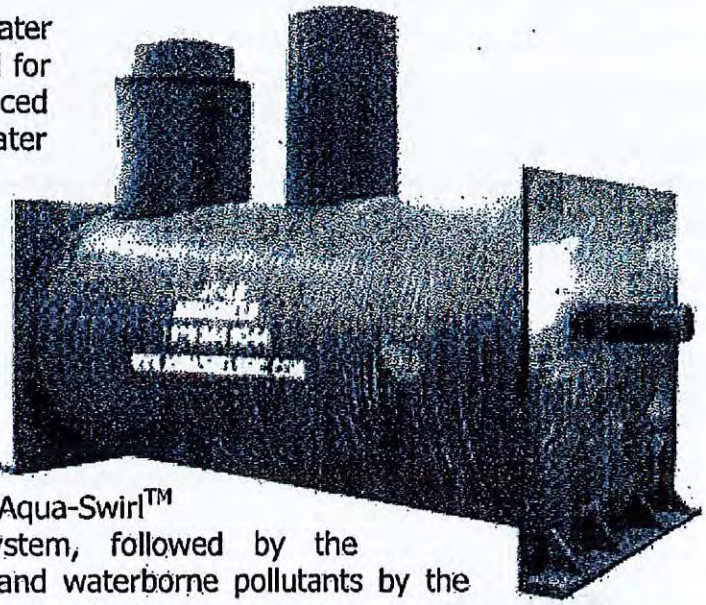
Aqua-Filter™ Stormwater Filtration System

The *Aqua-Filter™* Stormwater Filtration System is designed for projects that require advanced treatment for stormwater that discharges to sensitive receiving waters. Each system is custom engineered for site-specific needs.

The patented *Aqua-Filter™* filtration system utilizes a unique "treatment-train" approach. The system includes an *AquaSwirl™* designed for gross contaminant removal, which pre-treats stormwater before entering the filtration chamber. A variety of natural filter media are used in the filtration chamber to complete the treatment process by polishing the stormwater, and removing greater than 80% of fine-grained sediments and waterborne pollutants.



Aqua-Filter™
Stormwater Filtration Systems



The Aqua-Filter™ Stormwater Filtration System is designed for sites that require advanced treatment of runoff stormwater that may discharge into sensitive receiving waters.

Each Aqua-Filter™ system is custom engineered and utilizes a unique approach for pollutant removal. This patented configuration begins with the removal of gross pollutants by the Aqua-Swirl™ Stormwater Treatment System, followed by the removal of fine sediments and waterborne pollutants by the filtration chamber.

The Aqua-Filter™ is not only unique because of its modular design, and HDPE construction, but also because of the ease of installation. The system can be designed for new construction projects or be retrofit for existing storm drainage structures.

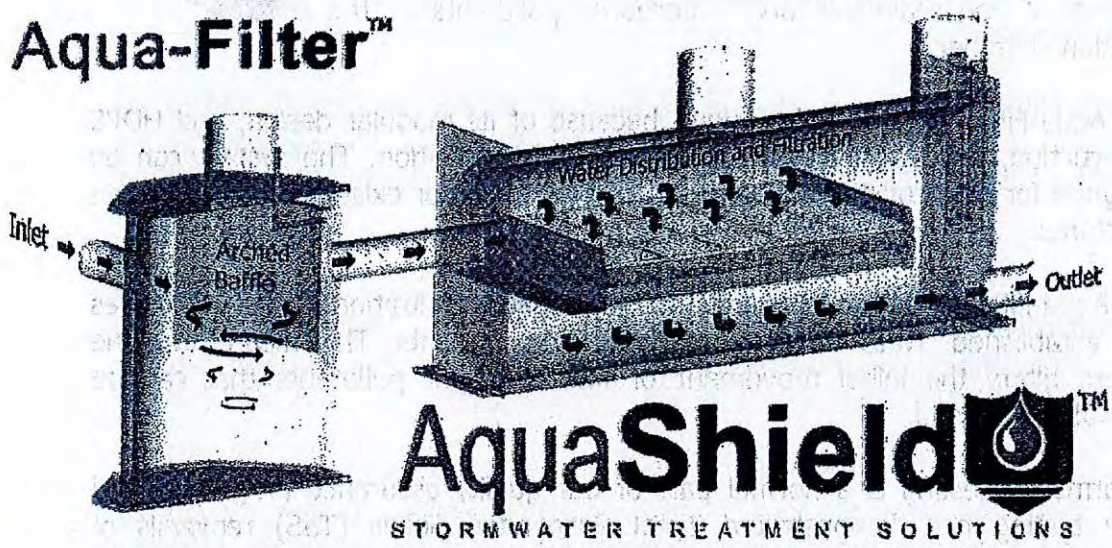
The Aqua-Filter™ system is engineered such that the filtration capacity complies with established "water quality treatment" requirements. This means that the system filters the initial movement of fine sediment pollutants that can be particularly harmful.

Performance testing is a normal part of our quality assurance program. Third party testing has demonstrated Total Suspended Solids (TSS) removals of greater than 80% and the effective removal of additional pollutants including hydrocarbons (i.e. light and heavy oils and grease), phosphorus, and various heavy metals (i.e. copper, zinc). See the "Performance and Testing" Section for details.

System Operation

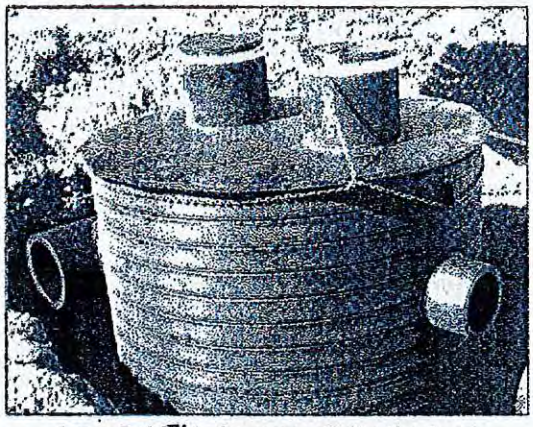
The Aqua-Filter™ Stormwater Filtration System operates under gravitational and hydrodynamic forces with no moving parts or valves, which simplifies the treatment process. The Aqua-Filter™ system also normally operates in an off-line configuration as recommended by the Center for Watershed Protection and most municipalities; fully treating the more frequent 6-month to 1-year design storms (or roughly 90% - 95% of the annual rainfall on a given site). Larger, more intermittent storm events (i.e. 10-year or 25-year) are treated in the Aqua-Swirl™, and the peak over-flow is permitted to partially bypass the filter media internally beneath the filter bed, avoiding the need for external diversion chambers.

The unique Aqua-Filter™ treatment method is illustrated in the drawing shown below and described in the following steps.



Step 1: Pretreatment

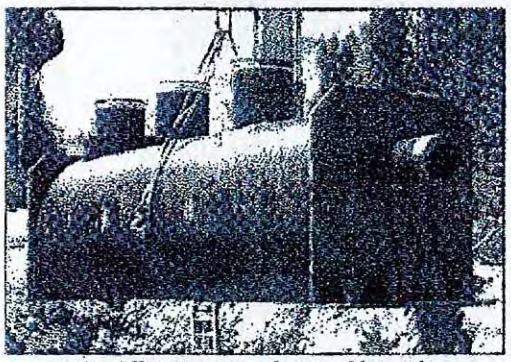
Peripheral pre-treatment of stormwater is not necessary when using the Aqua-Filter™ Stormwater Filtration System. In fact, each Aqua-Filter™ is custom engineered to utilize a unique treatment sequence where both the coarse- and fine- grained pollutants are removed.



Aqua-Swirl™ to be connected to the Aqua-Filter™ Stormwater Filtration System

This sequence begins with the Aqua-Swirl™ Stormwater Treatment System designed to target the removal of TSS and free-floating oil and debris. The addition of the Aqua-Swirl™ allows larger debris to settle before filtration and increases filtration effectiveness.

Step 2: Filtration



Aqua-Filter™ system lowered into place

The filtration chamber in the Aqua-Filter™ is designed to refine and enhance the stormwater quality prior to discharge into sensitive receiving waters. The peak filtration flow rate is based on the calculated "water quality treatment" requirements desired for the site. The Sizing Chart provided later in this Section indicates the peak filtration flow rate for the specific Aqua-Filter™ model.

As the pre-treated water enters the filtration chamber, it is evenly distributed across the filter bed and allowed to permeate through the filter media. The filter media are contained in individual sections, which are layered in a pattern to avoid short-circuiting.

Aqua-Filter™ Filter Media

The natural filter media used for filtration are capable of removing the remaining waterborne pollutants such as oils, grease, fine silts and clays, nutrients (nitrogen, phosphorus), and heavy metals (copper, lead, zinc). The most commonly used media is medium-grained perlite. Other filter media, such as zeolite, granulated activated carbon, leaf compost, and various media blends are available.

HDPE AquaShield™ Products Installation



Throughout this section and in our individual product specifications, references will be made to specific ASTM standards for the manufacturing and the installation of the AquaShield™ products. Quality control is a high priority within AquaShield™. That is why all of the patented products are fabricated, inspected and tested before leaving for the job site. The AquaShield™ systems are a modular design and constructed to facilitate the installation process. Because each system is constructed of High-Density Polyethylene (HDPE), even the largest units can be off-loaded and installed without the use of a crane or other special lifting equipment.



Lifting cable for installation

Lifting cables are provided on each Aqua-Swirl™ and Aqua-Filter™, allowing an excavator or backhoe to maneuver and position the system. Furthermore, the systems can be stored on the job site following off-loading to accommodate changing schedules.

Stub-outs for the inlet and outlet are part of the modular design of the Aqua-Swirl™ and Aqua-Filter™, which allows the contractor to attach the pipes to the inlet and outlet of the Stormwater Treatment System with couplings. Typically, an AquaShield™ representative is present on-site to assist in the installation process.

Both the Aqua-Swirl™ and the Aqua-Filter™ come with risers and custom manhole frames and covers. Delivery is typically less than four weeks from final approval of shop drawings.

Aqua-Swirl™ Installation

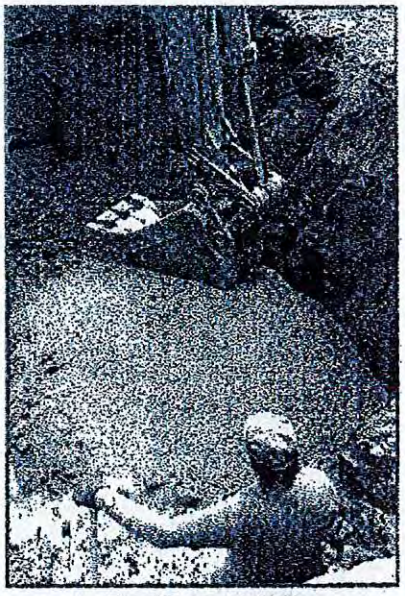
Routine installation steps for the Aqua-Swirl™ units involve preparation and excavation of the area that is to contain the Aqua-Swirl™. This includes grading, leveling, and compacting the base material before lowering the unit into the excavation and connecting the Aqua-Swirl™ inlet and outlet stub-outs with appropriate pipe couplings.

Prior to shipping, the purchasing contractor provides written confirmation to install AquaShield™ products in accordance with manufacturer's specifications.

Step 1 – Excavation and Bedding

The trench and trench bottom shall be constructed in accordance with ASTM D 2321, 6, Trench Excavation, and Section 7, Installation. The excavation pit is best positioned slightly offset of the center line of the incoming drain pipe trench because of the tangential inlet pipe connecting to the Aqua-Swirl™.

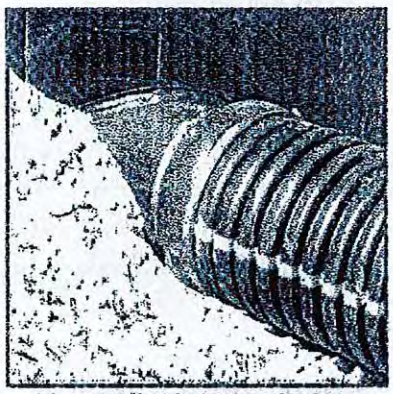
The Aqua-Swirl™ shall be installed on a stable base consisting of 12 inches of Class I stone materials (angular, crushed stone or rock, crushed gravel; large void content, containing little or no fines) as defined by ASTM D 2321, Section 5, Materials; and, compacted to 95% proctor density. All required safety precautions for Aqua-Swirl™ installation are the responsibility of the contractor.



On-site excavation

Step 2 – Pipe Connection Devices

Couplings to and from the Aqua-Swirl™ shall be supplied by the contractor and shall be Fernco®, Mission™ or equal type flexible boot with stainless steel tension bands or equal. Using a metal sheer guard will protect the flexible connector.

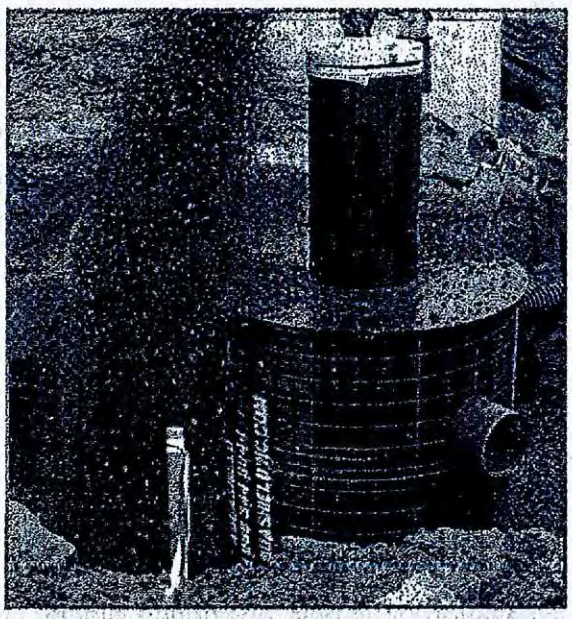


The coupling between the Aqua-Swirl™ and the pipe

Step 3 – Backfill Requirements

Backfill materials shall be Class I or II stone materials, (well graded gravels, gravelly sands; content, containing little or no fines) as defined by ASTM D 2321, Section 5, Materials; and, compacted to 90% proctor density. Class I materials are preferred. Backfill and bedding materials shall be free of debris. Backfilling shall conform to ASTM F 1759, Section 4.2, "Design Assumptions".

Backfill shall extend at least 3.5 feet beyond the edge of the Aqua-Swirl™ and for the full height to sub-grade and extend laterally to undisturbed soils.



Class I backfill material around the Aqua-Swirl™

Sufficient backfill shall be placed over components prior to using heavy compaction or construction equipment to prevent damage. Support shall be provided for vertical risers as commonly found at service connections, cleanouts, and drop manholes to preclude vertical or lateral movement.

Step 4 – Traffic Loading

A reinforced concrete pad shall be placed over the entire Aqua-Swirl™ when subject to H-20 (or greater) traffic loading. The pad shall extend no less than 12 inches beyond the outside diameter of the Aqua-Swirl™.

A professional engineer shall provide final approval of the design of the concrete pad and the calculations must be included in the submittal. Traffic rated foundry rims and covers shall be installed such that no contact is made between the HDPE access riser and cast iron frame.



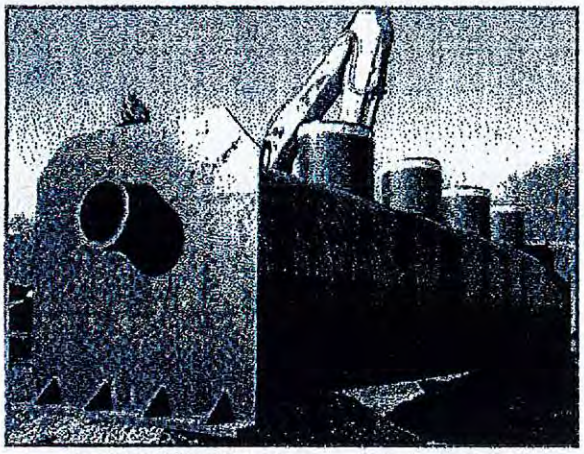
A reinforced concrete pad for H-20 traffic loading

Step 5 – Non-Traffic Loading

Bollards shall be placed around access risers in non-traffic areas to prevent inadvertent loading by maintenance vehicles.

Aqua-Filter™ Installation

Normal installation steps for the Aqua-Filter™ units involve preparation and excavation of the area that is to contain the Aqua-Filter™. This includes grading, leveling and compacting the base material before lowering the unit into the excavation and connecting the Aqua-Filter™ inlet and outlet stub-outs with appropriate pipe couplings. Prior to shipping, the purchasing contractor provides written confirmation to install AquaShield™ products in accordance with manufacturer's specifications.



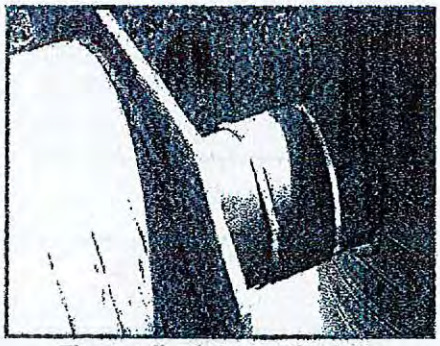
An Aqua-Filter™ system ready to be installed

Step 1 – Excavation and Bedding

The trench and trench bottom shall be constructed in accordance with ASTM D 2321, Section 6, Trench Excavation, and Section 7, Installation. The HDPE filtration system shall be installed on a stable base consisting of 12-inches of Class I stone materials (angular, crushed stone or rock, crushed gravel; large void content, containing little or no fines) as defined by ASTM D 2321, Section 5, Materials, and compacted to 95% proctor density. Additional bedding shall be tamped around the "under-center" of the filter chamber up to the springline to provide adequate support. All required safety precautions for the system installation are the responsibility of the contractor.

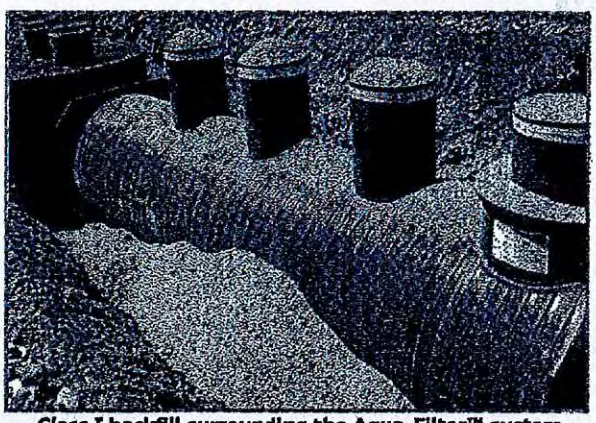
Step 2 – Pipe Connection Devices

Couplings to and from the Aqua-Filter™ shall be supplied by the contractor and shall be Fernco®, Mission™ or equal type flexible boot with stainless steel tension bands or equal. A metal sheer guard should be used when available. The manufacturer shall supply the coupling to connect the Aqua-Swirl™ to the filtration chamber.



The coupling between the Aqua-Swirl™ and the filtration chamber of the Aqua-Filter™ system

Step 3 – Backfill Requirements

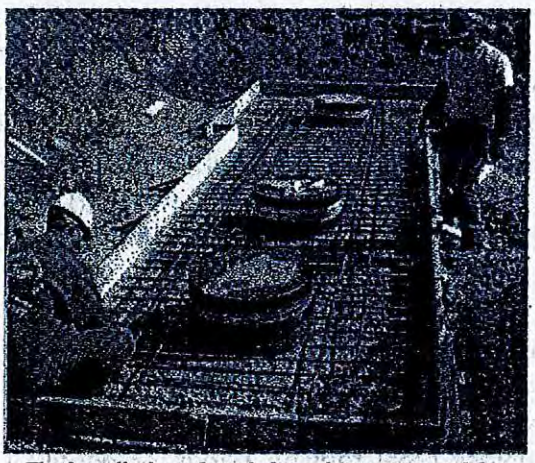


Class I backfill surrounding the Aqua-Filter™ system

Backfill materials shall be Class I or II stone materials, (well graded gravels, gravelly sands; containing little or no fines) as defined by ASTM D 2321, Section 5, Materials, and compacted to 90% proctor density. Class I materials are preferred. Backfill and bedding materials shall be free of debris. Backfilling shall conform to ASTM F 1759, Section 4.2, "Design Assumptions". Backfill shall extend at least 3.5 feet beyond the edge of the stormwater filtration system and for the full height to sub-grade and extend laterally to undisturbed soils.

Sufficient backfill shall be placed over components prior to using heavy compaction or construction equipment to prevent damage. Support shall be provided for vertical risers as commonly found at service connections, cleanouts, and drop manholes to preclude vertical or lateral movement.

Step 4 – Traffic Loading



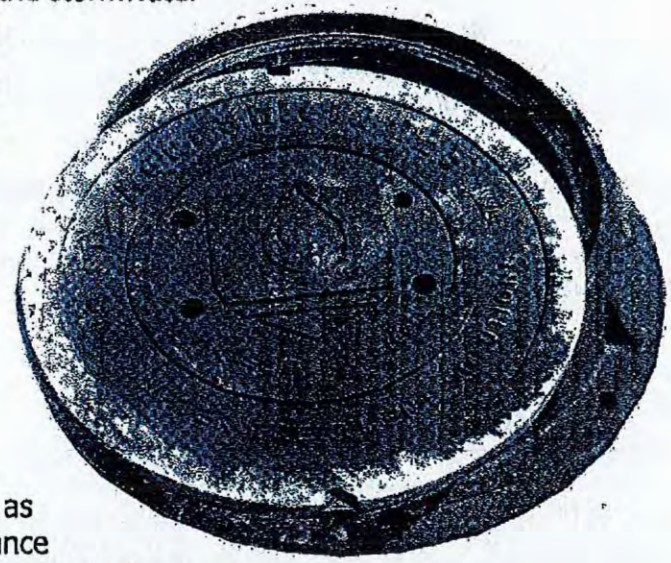
The installation of a reinforced concrete pad for H20 traffic loading

A reinforced concrete pad shall be placed over the entire system when subject to H-20 (or greater) traffic loading. The pad shall extend no less than 12 inches beyond the outside diameter of the Aqua-Swirl™ and filtration chamber on all sides. A professional engineer shall provide final approval of the design of the concrete pad and the calculations must be included in the submittal. Traffic rated foundry rims and covers shall be installed such that no contact is made with access risers.

Step 5 – Non-Traffic Loading

Bollards shall be placed around access risers in non-traffic areas to prevent inadvertent loading by maintenance vehicles.

AquaShield™ Product System Maintenance



The long-term performance of the stormwater treatment structures (including manufactured systems, ponds, swales, etc.), and the effective protection of receiving waters, depends on a consistent maintenance plan. Inspection and maintenance functions are simple and easy for the AquaShield™ Stormwater Treatment Systems allowing all inspections to be performed from the surface. An AquaShield™ field representative will be available as needed to assist local maintenance personnel in the field. Please contact us for a copy of a product-specific "Inspection and Maintenance Manual".

It is important that a routine inspection and maintenance program be established for each unit based on (1) the volume or load of the contaminants of concern, (2) the frequency of releases of contaminants at the facility or location, and (3) the nature of the area being drained.

In order to ensure that our systems are being maintained properly, AquaShield™ offers a maintenance solution to all of our customers. We will arrange to have maintenance performed.



Inspection

All AquaShield™ products can be inspected from the surface, eliminating the need to enter the systems to determine when cleanout should be performed.

In most cases, AquaShield™ recommends a quarterly inspection of the Stormwater Treatment Systems for the first year of operation to develop an appropriate schedule of maintenance.

Based on experience of the system's first year in operation, we recommend that the inspection schedule be revised to reflect the site-specific conditions encountered. Typically, the inspection schedule for subsequent years is reduced to semi-annual inspection.

Aqua-Swirl™ Maintenance

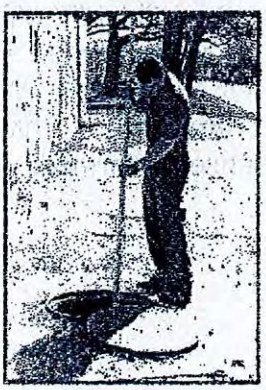
The Aqua-Swirl™ has been designed to minimize and simplify the inspection and maintenance process. The system can be inspected and maintained completely from the surface, thereby eliminating the need for confined space entry.

Furthermore, the entire structure (specifically, the floor) is accessible for visual inspection from the surface. There are no areas of the structure that are blocked from visual inspection or periodic cleaning.

Inspection of any free-floating oil and floatable debris can be directly observed and maintained through the manhole access provided directly over the swirl chamber.

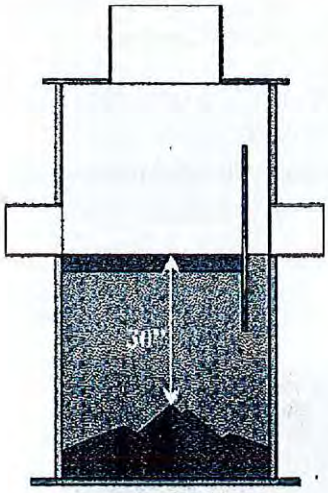
Aqua-Swirl™ Inspection Procedure

To inspect the Aqua-Swirl™, a hook is needed to remove the manhole cover. AquaShield™ provides a customized manhole cover with our logo to make it easy for maintenance crews to locate the system in the field. We also provide a permanent metal information plate attached inside the access riser, which provides our contact information, the Aqua-Swirl™ model size, and serial number.



Sediment inspection using a stadia rod

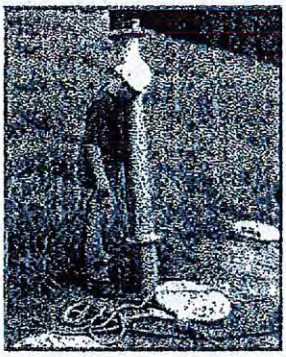
The only tools needed to inspect the Aqua-Swirl™ system are a flashlight and a measuring device such as a stadia rod or pole. Given the tremendous accessibility provided, floating oil and debris can be observed directly from the surface. Sediment depths can easily be determined by lowering a measuring device to the top of the sediment pile and to the surface of the water. When the sediment pile is within 30 to 36 inches of the water surface, the system should be maintained.



It should be noted that in order to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the *top* of the sediment pile. The finer sediment at the top of the pile, typically offers less resistance to the measuring device than the larger particles.

Aqua-Swirl™ Cleanout Procedure

Clean out of the Aqua-Swirl™ is simple. Free-floating oil and floatable debris can be observed and removed directly through the 30-inch service access provided.



Vacuum truck cleans the Aqua-Swirl™

A vacuum truck can be used to remove the accumulated sediment and debris. It is important to note that the entire sediment storage area can be reached with a vacuum hose from the surface (reaching all the sides).

Disposal of the material is typically treated in the same fashion as catch basin cleanouts. AquaShield™ recommends that all materials removed be handled and disposed of in accordance with local and state requirements.

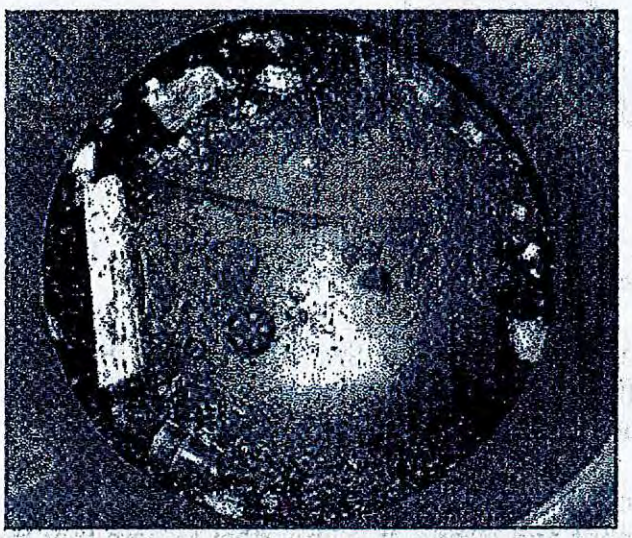
Inspection Data Sheets are provided in the Appendix of this Manual.

Aqua-Filter™ Maintenance

Proper maintenance of the Aqua-Filter™ system is needed for the unit to operate efficiently. Typically, inspection of the Aqua-Swirl™ pretreatment chamber and the filtration chamber should be performed on a quarterly basis. Information gathered during the first year of service can be used to create a maintenance plan appropriate for the site.

Aqua-Swirl™ Pretreatment Chamber

The Aqua-Swirl™ is easily inspected from the surface. Floating debris and free oil can be observed along with the captured stormwater by removing the manhole cover. Sediment depth is determined by lowering a measuring device (e.g. stadia rod) to the top of the sediment pile.



Floatable debris in the Aqua-Swirl™

When the sediment pile is within 30 to 36 inches from the water surface, cleaning is required. Typically, a vacuum truck is used to first remove the captured floating materials from the water's surface before lowering the vac-hose into the accumulated sediment pile for its removal.

For more detail regarding the inspection and maintenance of the pretreatment chamber, please see the previous Section on the Aqua-Swirl™ Inspection and Maintenance.

Aqua-Filter™ Filtration Chamber

The filter media is also easily observed from the surface. Manhole covers are spaced over the entire filtration bed to provide easy access. AquaShield™ provides a customized manhole cover with our logo to make it easy for maintenance crews to locate the system in the field.

Initially, the filter media is light tan or white in color. When the media color turns black, it has become saturated due to pollutant loading and requires replacement. Call toll free (888) 344-9044 to order replacement filters.



A permanent ladder provides access to filter chamber

An entry riser provides direct access into the filtration chamber with a permanent ladder welded into the downstream section of the chamber. This additional access allows for the vacuuming of any standing water and an unobstructed walkway to the downstream side of the filter bed.

Replacement of the filtration media typically requires entry into the filtration chamber by one of a two-member maintenance crew. Confined space entry precautions should be taken by the maintenance crew when removing and replacing the filters.

The spent filter containers are normally retrieved from the filter chamber by a second crewmember at the surface through the multiple 30-inch risers spaced across the top of the filter bed. In addition, the filter containers can be accessed directly from within the filtration chamber via a vertical removable panel at the rear of the filter bed.

The center row of the filtration bed has been fitted with one inch thick removable fiberglass grate panels. This allows for a six-foot tall walkway down the center of the chamber, providing easy access to the full length of the filtration chamber.



Grate panels (shown) or cargo netting cover the filter media

Rows of removable side grates are positioned on both sides of the center row. After the center grate panel has been removed, the filter media can be lifted from these side grate panels.

After the removable sides have been loaded with replacement filter containers, the removable center grates are repositioned and locked in place. New filters are installed in a criss-cross manner to prevent short-circuiting (see Appendix).

Filter Media Disposal

The filter media does not allow captured contaminants to be released once absorbed into the material. This is a unique quality of the Aqua-Filter™, allowing superior performance under extreme conditions.

The spent filters and sediment generally do not require any special treatment or handling for disposal. The filtration media can be recycled as fuel material, or sent to a subtitle D landfill. AquaShield™ recommends that all materials removed during the maintenance process be handled and disposed of in accordance with local and state requirements.



Spent filter media can be recycled or sent to a landfill

Inspection Data Sheets are provided in the Appendix of this Manual.

APPENDIX

CARGO NETTING INSTALLATION

Cargo netting is used to secure filter containers in place after containers are installed in the appropriate orientation within the filtration chamber (see filter container installation instructions).

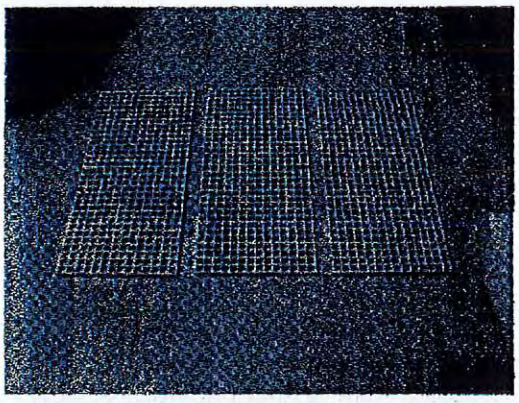
Cargo netting is placed on top of the top course of filter containers and stretched into place using heavy duty cable ties (provided). The netting is cable tied to HDPE anchor blocks and attached to the side walls of the filtration chamber (see drawing).

It is important to install the netting in such a way as to both cover the entire surface area of the containers while stretching netting snuggly to minimize the containers movement under high flow conditions.

Netting installation is complete when all surface area of filter containers are covered with netting and netting is secured with cable ties to anchor blocks.

For any questions related to installing filter containers or netting, please call AquaShield, Inc. (888) 344-9044.

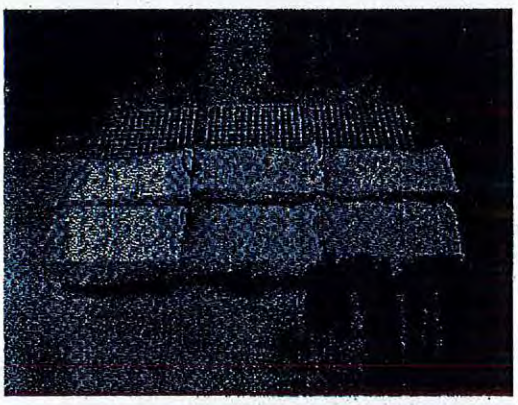
INSTALLATION INSTRUCTIONS FOR AQUASHIELD FILTER CONTAINERS



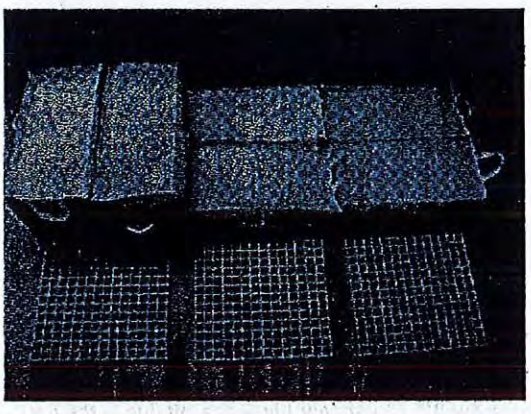
(1) Bottom Grates found in chamber



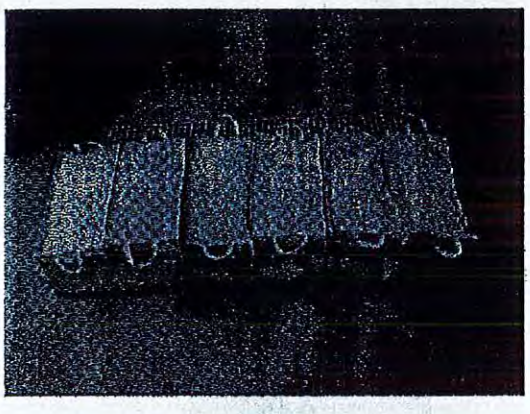
(2) First row first course



(3) Second row



(4) Second course started



(5) Second course complete

Repeat process for each additional row and course.

Cargo netting shall be stretched over top course of filter containers and secured in place with heavy duty cable ties rated at 350 lbs minimum.

Aqua-Filter™
Inspection and Maintenance Manual for BMP Owners

(Note: Attach certifications for local regulatory authority including any applicable fees.)

Site and Owner Information

Site Name: _____ Change in ownership since last inspection' Y N

Owner Name: _____

Owner Address: _____

Owner Phone Number: _____

Emergency Phone Number: _____

Location: _____

Date: _____

Time: _____

Inspector Name: _____

Maintenance Items

Inspection - Aqua-Swirl™ (pretreatment)

Floatable Debris and Oil

1. Remove manhole lid to expose liquid surface of Aqua-Swirl™.
2. Remove floatable debris with basket or net if any present.
3. If oil is present, measure its depth. Clean liquids from system if 1/2" or more oil is present (see "Cleaning" Figure 5).

Note: Water in an Aqua-Swirl™ can appear black like oil due to the dark body of the surrounding structure. Oil appears darker than water in the system and is usually accompanied by debris (e.g. Styrofoam, etc.) with obvious signs of oil stains. The depth of oil can be measured with an oil/water interface probe, a stadia rod with water phylic paste, a coliwasa, or by simply collecting a representative sample with a jar attached to a rod.

Sediment Accumulation

Make measurements as follows (see Figures 1 and 2):

1. Lower measuring device (i.e. stadia rod) into Aqua-Swirl™ throught service access provided. (See Figure 2)
2. Record distance to top fo sediment pile (in): _____
3. Record distance to top of water (in): _____
4. Calculate distance to sediment minus distance to water (in): _____
5. Schedule cleaning if value in step 4 is 30" or less. (See Figure 5).

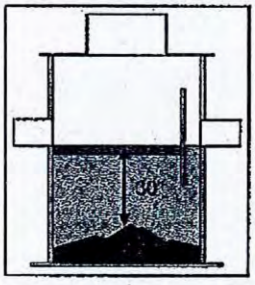


Figure 1



Figure 2

Inspection - Aqua-Filter™ (continued)

1. Remove manhole lids to expose filter bed of media and access ladder.
2. Enter filtration chamber through access riser. (note: water will be present at very minimal depths prior to cleanout during the inspection)
3. Remove bulkhead door as shown in Figure 3.
4. Remove filter grate covers/cargo nets and filters through manway risers along the chamber.
5. Visually inspect the filter medial noting the color and saturation of contaminents (TSS, oils, grease, etc.)
6. If media is dark brown to black, the media is fully spent and should be replaced. (See Figure 4).
7. Contact AquaShield™ Maintenance Department for replacement bags at 888-344-9044.
8. Schedule cleaning (See "Cleaning" Figure 5).



Figure 3



Figure 4

Inspection (continued)

Diversion Structures

If a diversion structure is present on the site, this should be inspected for the following items.

1. Inspect weir or other structure for structural decay or damage. Weirs are more susceptible to damage than off-set piping and should be checked to confirm that they are not crumbling, in the case of concrete or brick weirs, or decaying if a steel weir was used.
2. Inspect diversion structure and by-pass piping for signs of structural damage or blockage from debris or sediment accumulation.
3. Measure elevations on diversion weir or piping to ensure it is consistent with site plan design.
4. Inspect downstream structure in diversion system for signs of blockage or structural failure.

Cleaning

Schedule cleaning with local vactor company or AquaShield™'s Maintenance Department to remove sediments, oils, and other floatable pollutants with a vactor trailer. The spent filters and sediment generally do not require any special treatment or handling for disposal. The filter media can be recycled as fuel material, sent to a subtitle D landfill. AquaShield recommends that all materials removed during the maintenance process be handled and disposed of in accordance with local and state requirements.

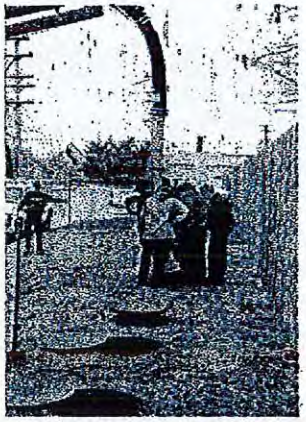


Figure 5

Maintenance Schedule

During Construction

Inspect the Aqua-Filter™ every three months and clean the system as needed. The Aqua-Filter™ should be inspected and cleaned at the end of construction regardless of whether it has reached its sediment or oil storage capacity.

First Year Post-Construction

Inspect the Aqua-Filter™ every three months and clean the system as needed.
Inspect and clean the system once annually regardless of whether it has reached its sediment or floatable pollutant storage capacity.

Second and Subsequent Years Post-Construction

If the Aqua-Filter™ did not reach full sediment or floatable pollutant capacity in the First Year Post-Construction, the system can be inspected and cleaned once annually.

If the Aqua-Filter™ reached full sediment or floatable pollutant capacity in less than 12 months in the First Year Post-Construction, the system should be inspected once every six months and cleaned as needed. The Aqua-Filter™ should be cleaned annually regardless of whether it reaches its sediment or floatable pollutant capacity.

Bypass Structures

Bypass structures should be inspected whenever the Aqua-Filter™ is inspected and maintained as needed.

Maintenance Company Information

Company Name: _____

Street Address: _____

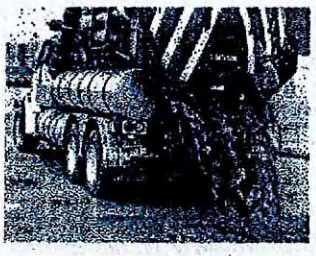
City, State, Zip: _____

Contact: _____

Office Phone: _____

Mobile Phone: _____

Pager: _____



Activity Log

Date of cleaning: _____ (Next inspection should be 3 months from this date for the first year).

Time of cleaning: _____

Date of next inspection: _____

Floatable debris present (Y/N)? _____

Oil present (Y/N)? _____ Oil depth (inches): _____

Structural Conditions and Comments

structural damage? Y N Where? _____

Any evidence of structural wear? Y N Where? _____

Odors present? Y N Describe: _____

Any plugging? Y N Describe: _____

NOTES

Additional Comments and/or Actions to Be Taken	Time Frame

NOTES:

1. Attach site plan showing Aqua-Filter™ location.

2. Attach detail drawing showing Aqua-Filter™ dimensions and model number.

3. If a diversion structure is used, attach details showing basic design and elevations.

Aqua-Filter™

TABULAR MAINTENANCE SCHEDULE

Date Construction Started: _____

Date Construction Ended: _____

During Construction

Activity	Month 1	2	3	4	5	6	7	8	9	10	11	12
Inspect and Clean as Needed			X			X			X			X
Inspect Bypass Structures (if applicable) and Maintain As Needed			X			X			X			X
Clean System*												X*

* The Aqua-Filter™ should be cleaned once a year regardless of whether it has reached full pollutant storage capacity. In addition, the system should be cleaned at the end of construction regardless of whether it has reach full pollutant storage capacity.

First Year Post-Construction

Activity	Month 1	2	3	4	5	6	7	8	9	10	11	12
Inspect and Clean as Needed			X			X			X			X
Inspect Bypass Structures (if applicable) and Maintain As Needed			X			X			X			X
Clean System*												X*

* The Aqua-Filter™ should be cleaned once a year regardless of whether it has reached full pollutant storage capacity.

Second and Subsequent Years Post-Construction

Activity	Month 1	2	3	4	5	6	7	8	9	10	11	12
Inspect and Clean as Needed*												X*
Inspect Bypass Structures (if applicable) and Maintain As Needed												X*
Clean System*												X*

*If the Aqua-Filter™ did not reach full sediment or floatable pollutant capacity in the First Year Post-Construction, the system can be inspected and cleaned once annually.

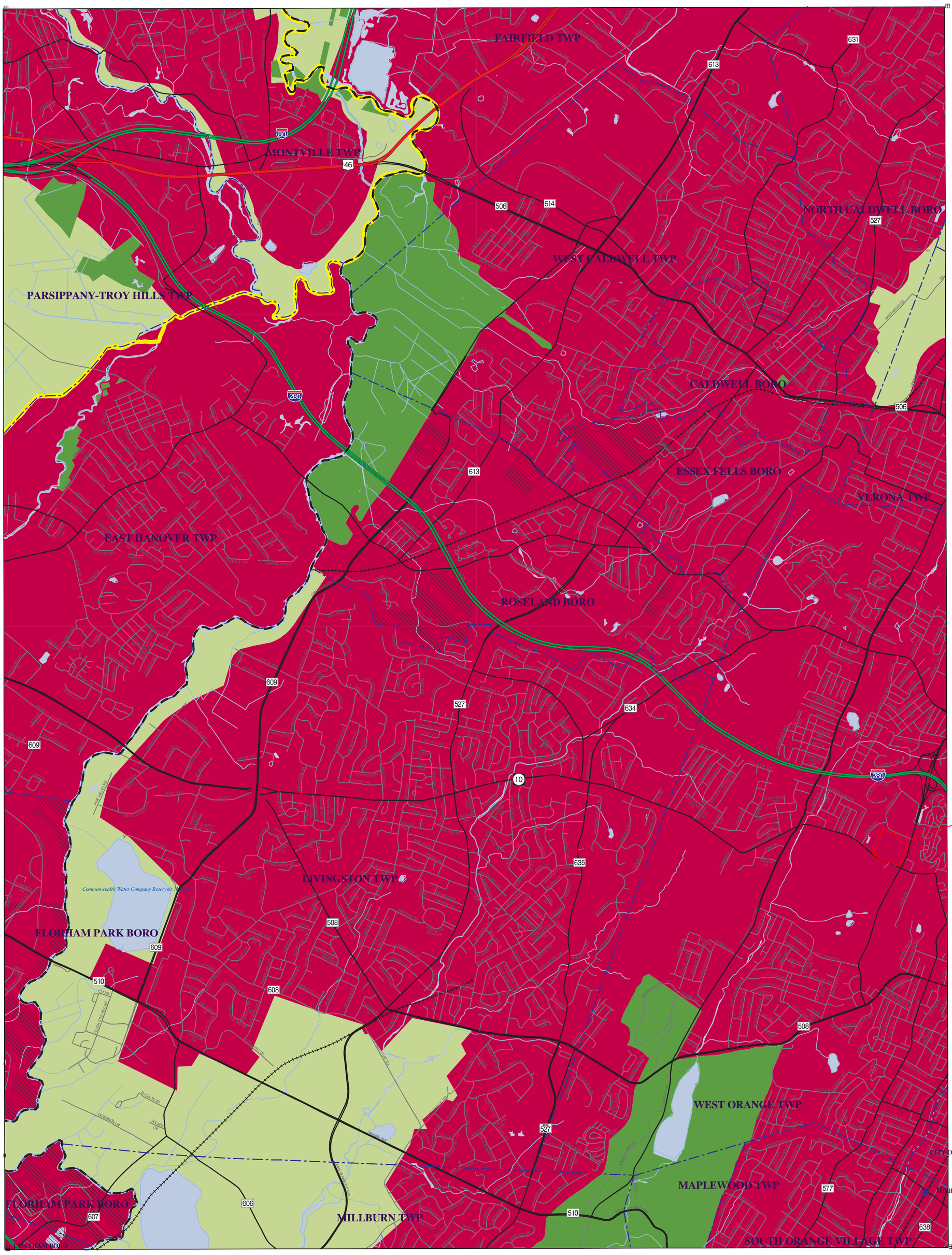
If the Aqua-Filter™ reached full sediment or floatable pollutant capacity in less than 12 months in the First Year Post-Construction, the system should be inspected once every six months (more frequently if past history warrants) and cleaned as needed. The Aqua-Filter™ should be cleaned annually regardless of whether it reaches its sediment or floatable pollutant capacity.

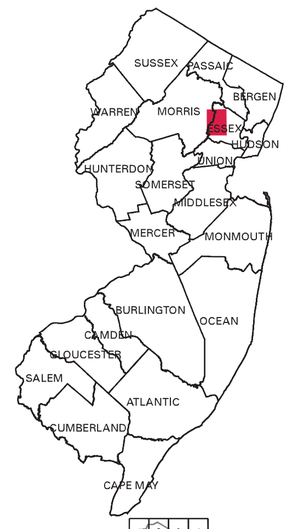
POLICY MAP
of the
New Jersey State Development and Redevelopment Plan

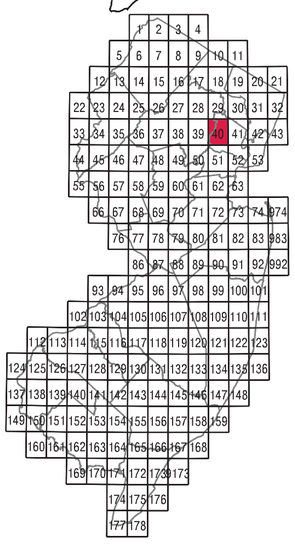
The State Plan is not itself a regulation but a statement of State policy that has been adopted by the State Planning Commission pursuant to statute to guide State, regional and local agencies in the exercise of their statutory authority.

NEW JERSEY
STATE PLANNING COMMISSION
December 2, 2008

Map prepared by the New Jersey Office of Smart Growth. Map was developed in part using digital data from the New Jersey Department of Environmental Protection, New Jersey Department of Transportation and the New Jersey Pinelands Commission. New Jersey State Plane Coordinate System. North American Datum 1983 (NAD83). ⊞ Denotes NAD27.







U C - Urban Center
D R - Designated Regional Center
P R - Proposed Regional Center
I R - Identified Regional Center
D T - Designated Town
P T - Proposed Town
I T - Identified Town
D V - Designated Village
P V - Proposed Village
I V - Identified Village
D H - Designated Hamlet
P H - Proposed Hamlet
I H - Identified Hamlet

N

- Urban Complex
- Metropolitan Planning Area
- Suburban Planning Area
- Fringe Planning Area
- Rural Planning Area
- Rural/Env.Sensitive Plannng Area
- Env. Sensitive Planning Area
- Env. Sens./Barrier Is. Planning Area
- Parks & Natural Areas
- Military Installations
- Hackensack Meadowlands
- Water
- Critical Environmental Site
- Historic & Cultural Site
- Node
- Core
- Endorsed Plan
- Center
- Municipal Boundary
- County Boundary
- CAFRA Boundary
- Interstate & Toll Roads
- US & State Roads
- Rail Lines & Commuter Stations
- Highlands Planning Area
- Highlands Preservation Area
- Protection
- Conservation
- Conservation Constrained
- Existing Communuity
- Existing Communuity Constrained
- Lake Community
- Wildlife Management
- State Designated Pinelands Area- (2007)
- Pinelands Regional Growth Area
- Pinelands Town
- Pinelands Village
- Pinelands Rural Development Area
- Pinelands Agricultural Production Area
- Pinelands Special Agricultural Area
- Pinelands Forest & Preservation Area
- Pinelands Military & Federal

I certify that this quadrangle of the State Plan Policy Map was adopted and approved by the New Jersey State Planning Commission on March 1, 2001.

Benjamin L. Spinelli, Secretary

SCALE 1:24000

1 .5 0 1 MILE

1 .5 0 1 KILOMETER

CALDWELL, NJ

40

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Essex County, New Jersey

PSE&G - West Orange Switching Station



December 8, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,440 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 18, Aug 29, 2022

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

Date(s) aerial images were photographed: May 9, 2020—Oct 15, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	0.1	0.4%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes	8.2	48.2%
USBONB	Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes	8.7	51.4%
Totals for Area of Interest		**17.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Essex County, New Jersey

UdbonB—Udorthents, Boonton substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: w8r1
Elevation: 50 to 660 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, boonton substratum, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Boonton Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy material transported by human activity

Typical profile

A - 0 to 12 inches: loam
CBt1 - 12 to 58 inches: loamy sand
CBt2 - 58 to 72 inches: loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Boonton

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

URBONB—Urban land, Boonton substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: w9cn
Elevation: 50 to 500 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton substratum: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Boonton Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

H1 - 0 to 12 inches: material
H2 - 12 to 47 inches: silt loam
2CBt1 - 47 to 58 inches: loamy sand
2CBt2 - 58 to 72 inches: loamy sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked
Hydrologic Soil Group: NOT LISTED, ASSUME HSG D

Minor Components

Boonton

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Udorthents, boonton substratum

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank, upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

USBONB—Urban land, Boonton substratum - Boonton complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: w9c1
Elevation: 0 to 520 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 213 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton substratum: 60 percent
Boonton and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Boonton Substratum

Setting

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Asphalt over supraglacial meltout till

Typical profile

M - 0 to 12 inches: material
2^C - 12 to 47 inches: gravelly sandy loam
3CBt1 - 47 to 58 inches: loamy sand
3CBt2 - 58 to 72 inches: loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Boonton

Setting

Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Red coarse-loamy till derived from sedimentary rock

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: loam
Bt - 4 to 28 inches: sandy loam
Btx - 28 to 51 inches: sandy loam
BC - 51 to 72 inches: sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to fragipan
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: About 28 to 59 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Udorthents, boonton substratum

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank, upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

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NOAA Atlas 14, Volume 2, Version 3
Location name: West Orange, New Jersey, USA*
Latitude: 40.7897°, Longitude: -74.2564°
Elevation: 602 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.336** (0.307-0.369)	**0.401** (0.367-0.440)	**0.474** (0.433-0.520)	**0.527** (0.479-0.577)	**0.592** (0.537-0.648)	**0.640** (0.578-0.701)	**0.685** (0.616-0.750)	**0.725** (0.648-0.795)	**0.776** (0.687-0.852)	**0.813** (0.714-0.895)
10-min	**0.534** (0.488-0.586)	**0.638** (0.583-0.700)	**0.757** (0.691-0.831)	**0.840** (0.764-0.921)	**0.940** (0.853-1.03)	**1.01** (0.913-1.11)	**1.08** (0.971-1.18)	**1.14** (1.02-1.25)	**1.22** (1.08-1.34)	**1.27** (1.12-1.40)
15-min	**0.666** (0.608-0.731)	**0.801** (0.732-0.878)	**0.953** (0.870-1.05)	**1.06** (0.962-1.16)	**1.19** (1.08-1.30)	**1.28** (1.15-1.40)	**1.36** (1.22-1.49)	**1.44** (1.28-1.57)	**1.53** (1.36-1.68)	**1.59** (1.40-1.75)
30-min	**0.909** (0.831-0.998)	**1.10** (1.01-1.21)	**1.35** (1.23-1.48)	**1.52** (1.39-1.67)	**1.75** (1.58-1.92)	**1.91** (1.72-2.09)	**2.07** (1.86-2.27)	**2.22** (1.98-2.43)	**2.41** (2.14-2.65)	**2.55** (2.24-2.81)
60-min	**1.13** (1.03-1.24)	**1.38** (1.26-1.51)	**1.72** (1.57-1.89)	**1.98** (1.80-2.17)	**2.32** (2.10-2.54)	**2.58** (2.33-2.83)	**2.84** (2.55-3.11)	**3.10** (2.77-3.40)	**3.45** (3.05-3.79)	**3.71** (3.26-4.09)
2-hr	**1.39** (1.26-1.52)	**1.69** (1.54-1.86)	**2.14** (1.95-2.35)	**2.49** (2.26-2.74)	**2.98** (2.69-3.26)	**3.38** (3.03-3.70)	**3.78** (3.37-4.15)	**4.22** (3.73-4.62)	**4.81** (4.21-5.28)	**5.29** (4.58-5.81)
3-hr	**1.55** (1.42-1.70)	**1.89** (1.73-2.08)	**2.39** (2.19-2.63)	**2.79** (2.54-3.06)	**3.34** (3.02-3.66)	**3.78** (3.40-4.14)	**4.24** (3.79-4.64)	**4.72** (4.18-5.17)	**5.39** (4.72-5.91)	**5.93** (5.14-6.50)
6-hr	**2.00** (1.84-2.19)	**2.43** (2.23-2.66)	**3.08** (2.81-3.36)	**3.60** (3.28-3.92)	**4.34** (3.93-4.73)	**4.97** (4.46-5.40)	**5.63** (5.01-6.12)	**6.35** (5.59-6.89)	**7.37** (6.40-8.02)	**8.22** (7.06-8.96)
12-hr	**2.49** (2.28-2.74)	**3.03** (2.77-3.33)	**3.85** (3.51-4.23)	**4.54** (4.13-4.97)	**5.56** (5.00-6.06)	**6.43** (5.74-7.00)	**7.37** (6.51-8.01)	**8.42** (7.34-9.15)	**9.96** (8.52-10.8)	**11.3** (9.49-12.3)
24-hr	**2.82** (2.61-3.07)	**3.42** (3.16-3.72)	**4.38** (4.05-4.76)	**5.20** (4.79-5.65)	**6.44** (5.89-6.98)	**7.52** (6.82-8.14)	**8.71** (7.82-9.44)	**10.0** (8.92-10.9)	**12.1** (10.5-13.1)	**13.8** (11.8-15.1)
2-day	**3.33** (3.08-3.63)	**4.04** (3.73-4.39)	**5.15** (4.76-5.61)	**6.09** (5.60-6.62)	**7.46** (6.82-8.10)	**8.63** (7.84-9.37)	**9.90** (8.92-10.8)	**11.3** (10.1-12.3)	**13.4** (11.7-14.7)	**15.1** (13.1-16.6)
3-day	**3.51** (3.24-3.80)	**4.24** (3.93-4.60)	**5.39** (4.99-5.86)	**6.35** (5.85-6.89)	**7.74** (7.09-8.38)	**8.91** (8.11-9.66)	**10.2** (9.19-11.0)	**11.5** (10.3-12.6)	**13.6** (11.9-14.8)	**15.2** (13.3-16.8)
4-day	**3.68** (3.41-3.98)	**4.45** (4.13-4.82)	**5.64** (5.22-6.10)	**6.61** (6.11-7.16)	**8.02** (7.36-8.67)	**9.19** (8.38-9.94)	**10.4** (9.46-11.3)	**11.8** (10.6-12.8)	**13.8** (12.2-15.0)	**15.4** (13.5-16.9)
7-day	**4.35** (4.05-4.69)	**5.22** (4.87-5.64)	**6.50** (6.04-7.00)	**7.54** (6.99-8.12)	**9.04** (8.33-9.73)	**10.3** (9.42-11.1)	**11.6** (10.6-12.5)	**13.0** (11.7-14.1)	**15.0** (13.4-16.4)	**16.7** (14.7-18.3)
10-day	**4.99** (4.66-5.36)	**5.96** (5.58-6.41)	**7.30** (6.82-7.84)	**8.40** (7.82-9.01)	**9.94** (9.21-10.7)	**11.2** (10.3-12.0)	**12.5** (11.5-13.5)	**14.0** (12.7-15.1)	**15.9** (14.3-17.3)	**17.5** (15.5-19.2)
20-day	**6.75** (6.34-7.19)	**8.01** (7.52-8.53)	**9.56** (8.97-10.2)	**10.8** (10.1-11.5)	**12.4** (11.6-13.2)	**13.7** (12.7-14.6)	**15.0** (13.9-16.0)	**16.3** (15.0-17.5)	**18.1** (16.5-19.5)	**19.4** (17.6-21.0)
30-day	**8.41** (7.95-8.89)	**9.92** (9.38-10.5)	**11.6** (11.0-12.3)	**12.9** (12.2-13.6)	**14.5** (13.7-15.4)	**15.8** (14.8-16.8)	**17.1** (16.0-18.1)	**18.3** (17.0-19.4)	**19.8** (18.3-21.2)	**20.9** (19.3-22.5)
45-day	**10.7** (10.1-11.3)	**12.5** (11.9-13.2)	**14.5** (13.7-15.3)	**15.9** (15.1-16.8)	**17.8** (16.8-18.8)	**19.2** (18.1-20.3)	**20.5** (19.3-21.7)	**21.8** (20.5-23.1)	**23.5** (21.9-24.9)	**24.6** (22.9-26.3)
60-day	**12.8** (12.2-13.5)	**15.0** (14.3-15.8)	**17.2** (16.3-18.1)	**18.8** (17.8-19.7)	**20.7** (19.7-21.9)	**22.2** (21.0-23.4)	**23.6** (22.2-24.8)	**24.8** (23.4-26.2)	**26.4** (24.7-27.9)	**27.4** (25.6-29.2)

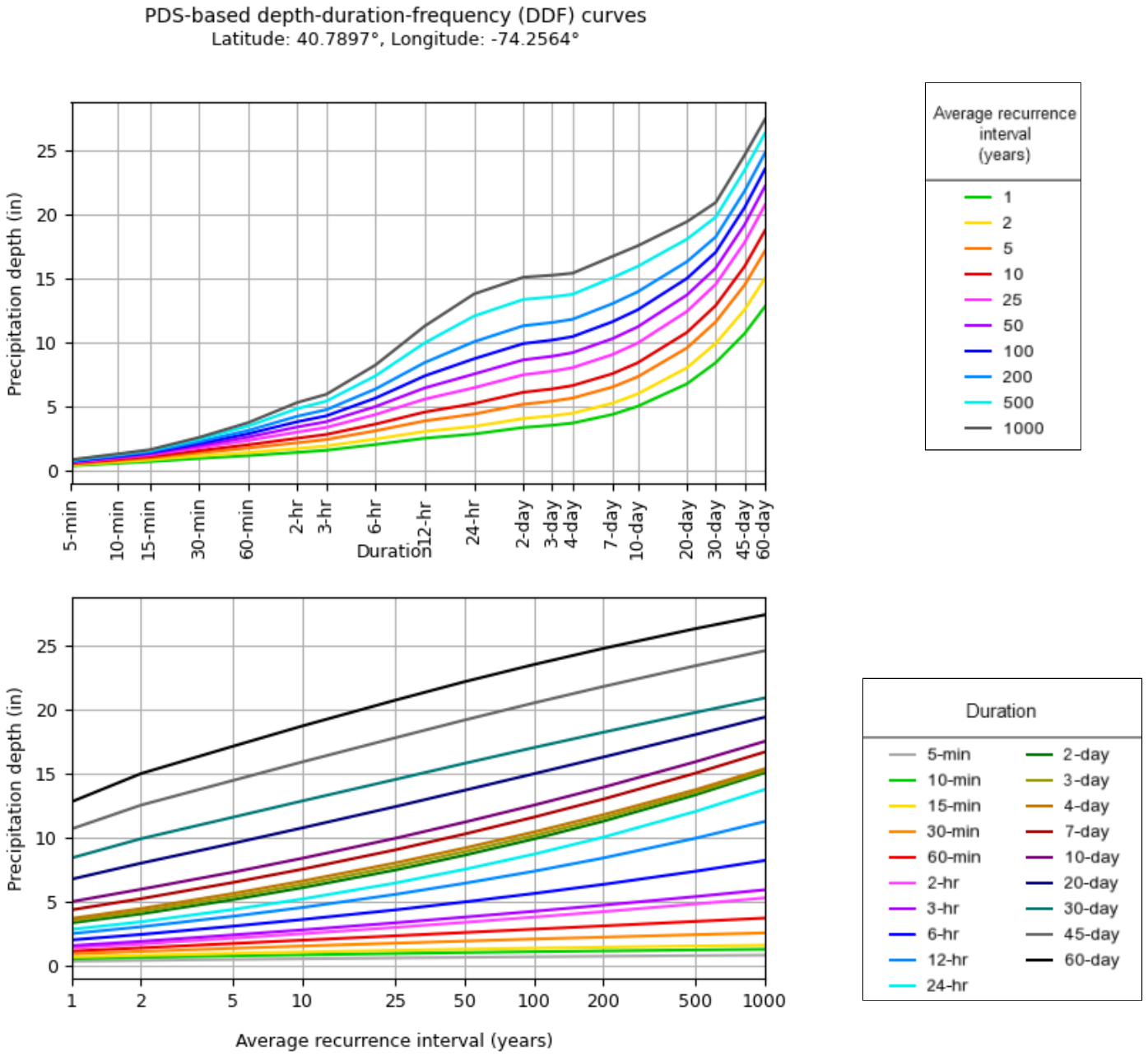
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



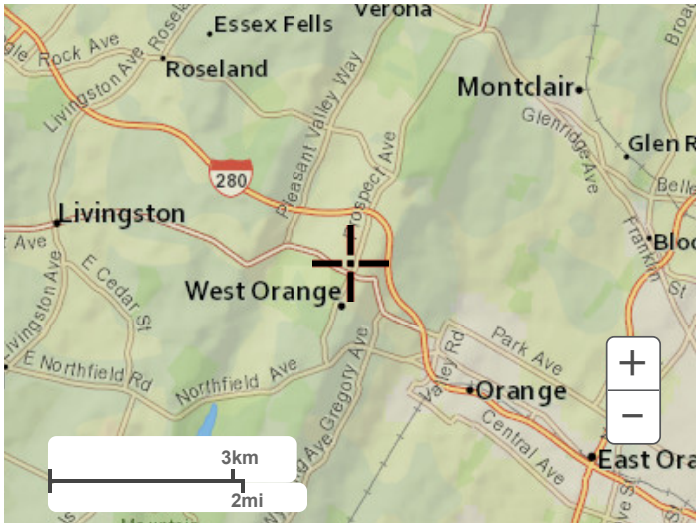
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Fri Aug 11 14:13:32 2023

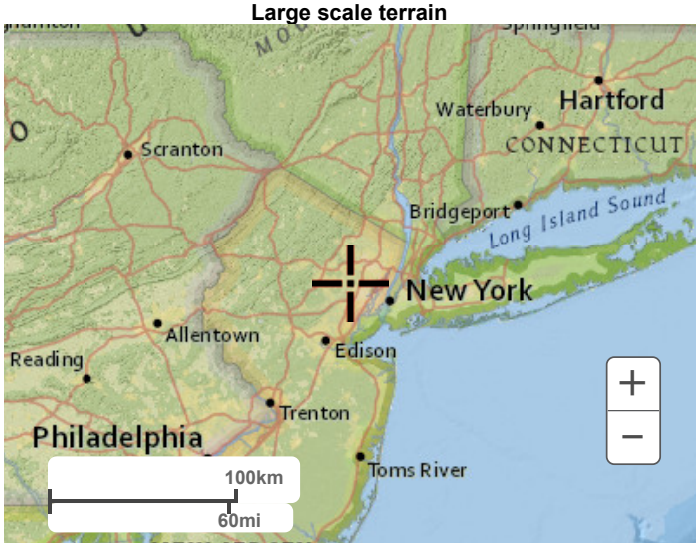
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



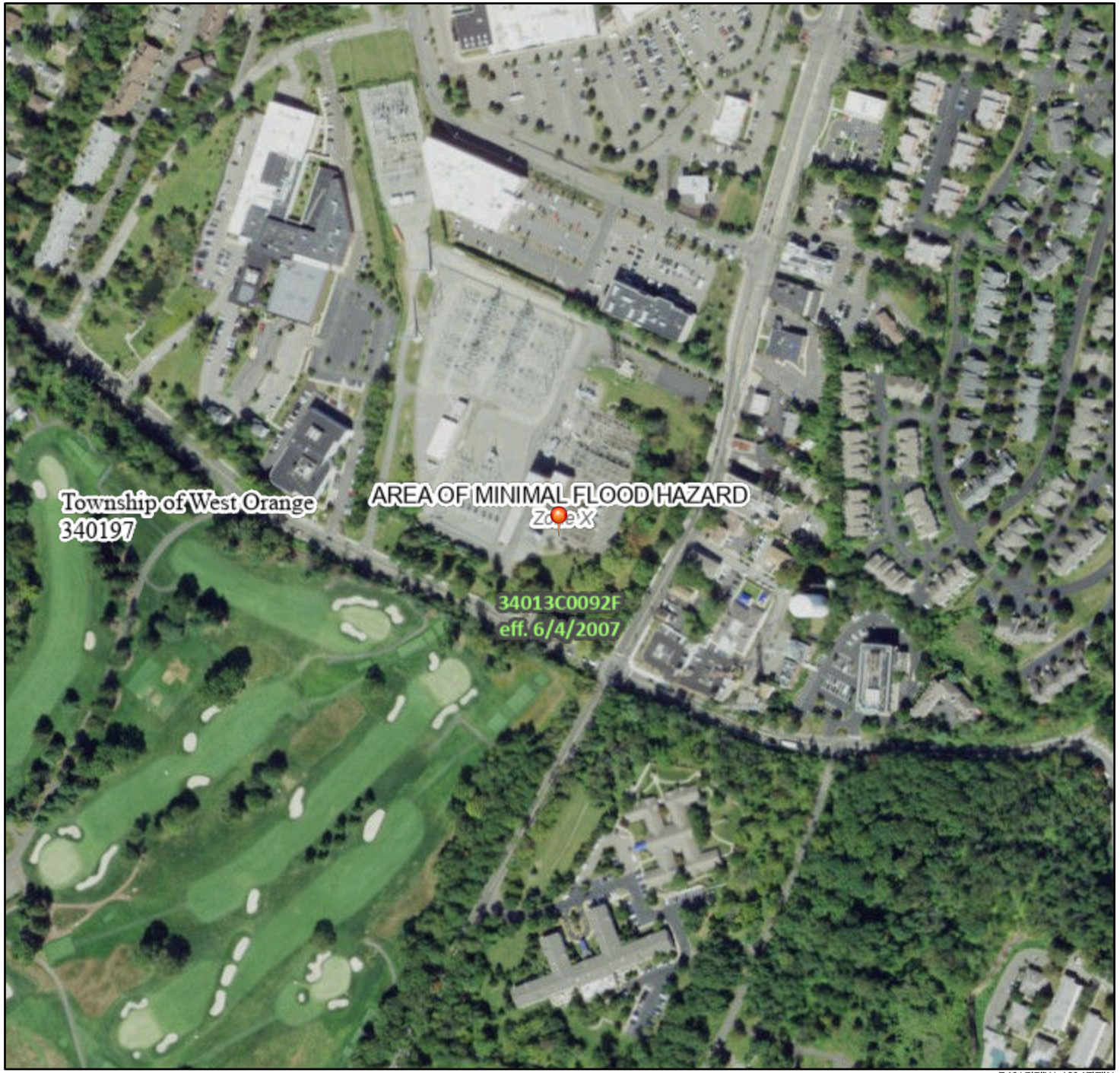
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Questions?: HDSC.Questions@noaa.gov

Disclaimer

National Flood Hazard Layer FIRMette

74°15'43"W 40°47'35"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

74°15'5"W 40°47'7"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/18/2023 at 2:29 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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