Colliers
Engineering & Design

Stormwater Management Report

Alpha Warehouse
Block 100.02, Lots 1, 1.08 and 1.09
Alpha Borough, Warren County, New Jersey

March 1, 2022

Prepared for:

Woodhill Alpha, LLC
100 Passaic Avenue, Suite 240
Fairfield, NJ 07004

Prepared by:



Richard Roseberry, PE
New Jersey Professional Engineer
License No.GE37546

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)
Shelbourne at Hunterdon
53 Frontage Road, Suite 110
Hampton New Jersey 08827
Main: 877 627 3772
Colliersengineering.com
Project No. 19004898B

Colliers Engineering & Design

Table of contents

Introduction 1

Location of Site 1

Soil Characteristics 2

Wetlands 2

Flood Plains 2

Study Areas 3

Existing Drainage: 3

Proposed Drainage: 3

Stormwater Management Methodology 4

EXISTING PEAK FLOWS AND REDUCTIONS: 6

PROPOSED PEAK FLOWS AND REDUCTIONS: 6

Stormwater Management Basins 7

Storm Sewer Design 7

Water Quality 8

Groundwater Recharge 8

Non-Structural Stormwater Management Strategies 8

Soil Erosion and Sediment Control 11

Conclusion 12

Colliers Engineering & Design

Introduction

This Stormwater Management Report is being submitted as part of the development application known as "Preliminary/Final Major Site Plan for Woodhill Alpha, LLC". The site is located on Block 100.02, Lots 1, 1.08 and 1.09, in the Borough of Alpha, Warren County, New Jersey. This report was prepared in accordance with the New Jersey Department of Environmental Protection (NJDEP) regulations and the Alpha Borough stormwater management regulations. The project will disturb approximately 11.02 acres. The purpose of this report is to summarize the stormwater management design as it pertains to the stormwater rules and to provide calculations to support the design. The stormwater management measures proposed for the site have been designed to meet erosion control, groundwater recharge, stormwater runoff quantity and water quality standards as set forth by N.J.A.C. 7:8.

The project consists of demolition of existing residences, barns and wooded areas. The proposed development consists of a 134,400 SF warehouse building including 3,000 SF of office space. In addition, associated car parking, a truck court and trailer staging areas are proposed. The development also proposes site lighting, landscape, storm sewers, sanitary, water, utility laterals and two (2) above-ground detention basins.

Location of Site

The subject property contains approximately 13.54 acres and is located within the Metropolitan Planning Area (PA-1). The property is bounded to the north by New Brunswick; to the south by an auto repair and service building; to the west by Industrial Road; and to the east by Edge Road. Historically, the site contained residences, agricultural barns, cultivated fields, and wooded areas.

Soil Characteristics

The existing soil classifications for the site based on the USDA NRCS Web Soil Survey is shown below.

SOIL SYMBOL, SOIL NAME	HYDROLOGIC SOIL GROUP
FrdAb, Fredon-Halsey complex, 0 to 3 percent slopes	B/D
UdauB, Udorthents-Urban land complex, 0 to 8 percent slopes	D
USHBPB, Urban land-hazen pauling kill complex, 0 to 8 percent slopes	A
wafB, Washington silt loam, 3 to 8 percent slopes	B
wafC, Washington silt loam, 0 to 15 percent slopes	B

Based on the USDA NRCS Web Soil Survey above, the majority of the site consists of A, B & D Hydrologic Soil Groups. The FrdAb soil has B/D hydrologic soil group classification. For calculation purposes, a 'B' type hydrologic group will be assumed for this soil.

Please refer to Appendix A of this report for soils information.

Wetlands

No freshwater wetlands have been identified on site pursuant to the NJDEP GEOWEB website information. The property has previously been issued a LOI "Absence" determination from the NJDEP.

Flood Plains

Based on the Flood Insurance Rate Map for Warren County, New Jersey, Panel Numbers 292 of 358, Map Number 34041C0292E, dated September 29, 2011, the site is not located within any flood hazard area.

Study Areas

The drainage areas utilized to analyze and calculate the stormwater attenuation requirements for this development were established for the entire site including offsite areas based on the existing and proposed topography. The following is a listing of the drainage areas used in this report and a description of their location:

Existing Drainage:

EDA-1A: This drainage area sheet flows to the storm sewer collection system located at the intersection of New Brunswick Avenue and Industrial Drive, which is Point of Analysis A (POA-A) for this site. This drainage area consists of wooded, agricultural, and impervious areas. Pursuant to Alpha Borough Ordinance, all existing drainage areas shall be classified as 'Pasture' for calculation purposes.

EDA-1B: This offsite drainage area sheet flows to the storm sewer collection system located at the intersection of New Brunswick Avenue and Industrial Drive, via conveyance systems originating in Edge Road and traversing New Brunswick Avenue before converging at Point of Analysis A (POA-A) for this site. This offsite drainage area consists of gravel areas within the Edge Road Right of Way.

EDA-2: This drainage area sheet flows to the existing basin located on Lot 1.01, which is Point of Analysis B (POA-B) for the site. For calculation purposes, all existing drainage areas shall be classified as 'Pasture' per Alpha Borough Ordinance.

Proposed Drainage:

PDA-1A: This drainage area discharges to the proposed above-ground detention basin on site. The flow from the basin discharges to the storm sewer collection system located at the intersection of New Brunswick Avenue and Industrial Drive, which is Point of Analysis A (POA-A). This drainage area consists of impervious and grass (open space) areas.

PDA-1B: This drainage area is attenuated through an above-ground basin and consists of open space and roof runoff. The flow from the basin discharges to the existing municipal storm system located at the intersection of New Brunswick Avenue and Industrial Drive, which is Point of Analysis A (POA-A).

PDA-2: This drainage area is attenuated through an above-ground bioretention basin and consists of the truck court and adjacent drive aisles. The flow from the basin ultimately flows to the existing municipal system at POA-A

PDA-3A: Run-off from this area consisting of the proposed parking along the Edge Road and New Brunswick Ave. sides of the building. The drainage is collected via inlets and conveyed to the above ground detention basin. Filterra water quality structures are proposed within the landscape areas to provide pretreatment before reaching the above-ground basin

PDA-3B: This area represents the drainage within the future banked parking area, which will be attenuated through a perforated subsurface detention system. The outfall from this underground detention is conveyed via pipe the proposed above ground basin and ultimately to the existing municipal system at POA-A.

PDA-4A/4B: Both drainage areas will be attenuated through a perforated subsurface detention system and consists primarily of pervious pavement within the trailer staging. The flow from the basin ultimately flows to the existing municipal system at POA-A.

PDA-5: This is the only proposed drainage area that flows to the existing basin located on Lot 1.01, which is Point of Analysis B (POA-B) for the site. This is an undisturbed area and will mimic existing conditions and sheet flow offsite. As this area is not being disturbed and the drainage area is reduced, there are no water quantity rate reduction requirements.

PDA-6 to 10: These drainage areas are limited to areas along the perimeter of the proposed improvements consisting primarily of lawn or landscaping, which flow overland and are collected via onsite or roadside swales or inlets and ultimately flow to POA-A.

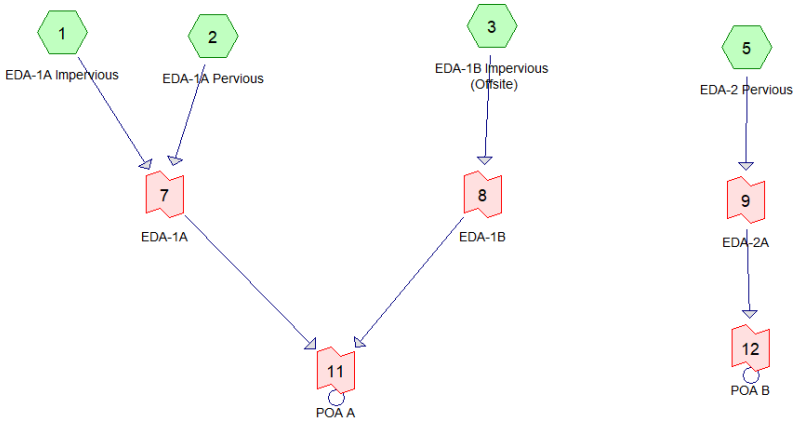
Time of concentration and runoff curve numbers for the above areas have been calculated and are included in the Appendix B calculations.

Stormwater Management Methodology

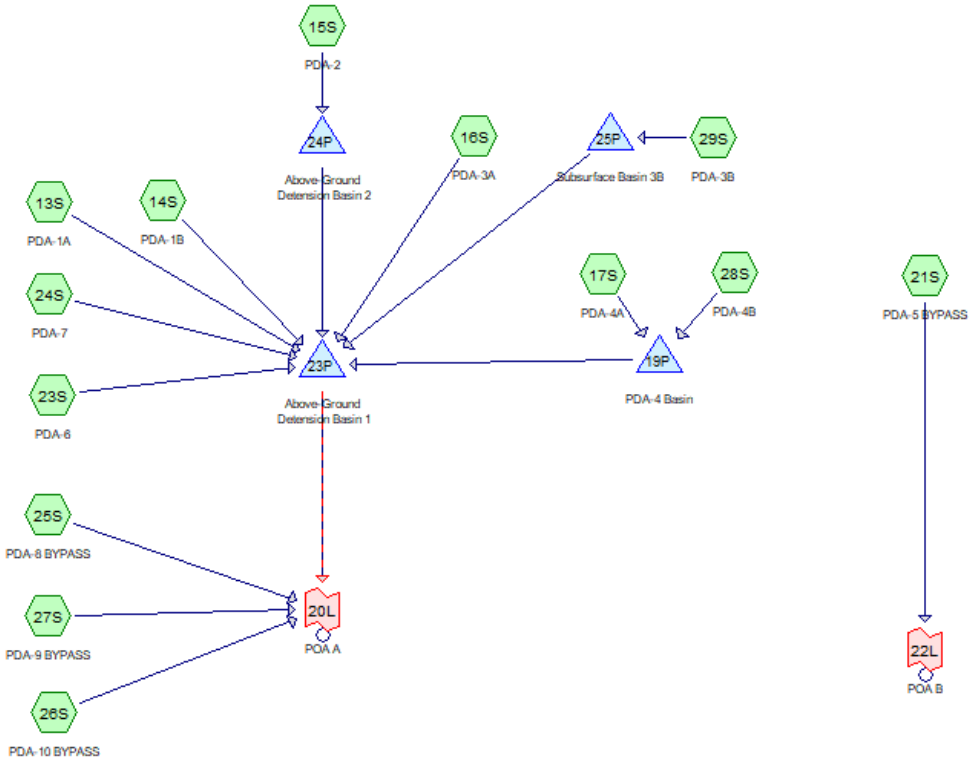
The stormwater runoff resulting from the proposed development must be managed quantitatively in accordance with the Alpha Borough Ordinance and NJDEP requirements.

STORMWATER MANAGEMENT NETWORK DIAGRAM

EXISTING CONDITIONS



PROPOSED CONDITIONS



To meet the NJDEP standards, the stormwater management system must be designed so that the post-development peak runoff rate for the 2-year storm event is 50%, 10-year storm is 75% and 100-

year storm is 80% of the pre-development peak runoff rate from the developed portion of the site. Since the proposed developed portion of the site discharges to Point of Analysis A (POA-A), the existing drainage area EDA-1 is subject to reduction requirements. The tributary drainage area to POA-B is reduced in proposed conditions and undisturbed; therefore, no reduction factors will be required for these areas. One (1) small-scale bioretention basin, (1) above-ground detention basin and two (2) subsurface basins are proposed on site to control the runoff volume generated from the proposed development. A detailed description of this basin will be discussed later in the report.

To evaluate the proposed site for compliance with the above standards, the Soil Conservation Service Unit Hydrograph method and the Hydrocad v10 were utilized. The Unit Hydrograph was utilized for modeling both the existing and proposed conditions. A summary of the results is presented in the following tables:

EXISTING PEAK FLOWS AND REDUCTIONS:

Description	*Notes*	*2 Year Storm*	*10 Year Storm*	*100 Year Storm*
A. Existing Conditions				
Existing Area - to Design Point A		**3.68 cfs**	**6.17 cfs**	**19.59 cfs**
Applied Reductions to Disturbed Areas Design Point A	**50% 75% 80%**	**1.84 cfs**	**4.63 cfs**	**15.67 cfs**
Adjusted Allowable Discharge:		**1.84 cfs**	**4.63 cfs**	**15.67 cfs**
Existing Area - to Design Point B*		**0.02 cfs**	**0.79 cfs**	**5.18 cfs**

PROPOSED PEAK FLOWS AND REDUCTIONS:

Description	*Notes*	*2 Year Storm*	*10 Year Storm*	*100 Year Storm*
B. Proposed Conditions				
Proposed - to Design Point A				
Total Combined Peak Flow Rate to Prop. Design Point A		**1.65 cfs**	**4.20 cfs**	**15.22 cfs**
Meet Required Reductions		**Yes**	**Yes**	**Yes**

* Contributary drainage area to design point 2 is reduced to from 2.52 acres to 2.02 acres of undisturbed land, therefore reductions are not required.

The above tables and analysis demonstrate that the respective post-construction runoff hydrographs for the 2-, 10- and 100-year storm events at the point of analysis have been reduced from the pre-construction runoff hydrographs for the same storm events and the peak flow reductions were met satisfying stormwater quantity standards of the NJDEP and the Borough of Alpha.

Stormwater Management Basins

The proposed stormwater management facilities consist of one (1) small-scale bioretention, one (1) above-ground basin and two (2) subsurface basins. The outlet structure for each basin was designed to attenuate the peak rate of stormwater runoff leaving the site in accordance with the stormwater management requirements discussed earlier. The primary outlet from the basin discharges to the storm sewer collection system located in New Brunswick Avenue.

Safety measures including trash racks, overflow grates and escape provisions have been proposed on the outlet structure for the basin in accordance with Stormwater Management requirements.

The emergency spillway elevation is set at elevation 274.00, above the 100 – yr Water Surface Elevation, of 273.94. The top of berm is set at elevation 275.00. The water surface elevation at the emergency spillway location for 150% of the 100 year storm event is 274.74. Please refer to Appendix F of this report for emergency spillway calculations.

Storm Sewer Design

The storm sewer has been designed in accordance with Alpha Borough requirements. The proposed storm sewer was designed using the Rational Method with a minimum time of concentration of 6 minutes. A weighted 'C' coefficient was used for the inlet areas within each drainage area. The storm sewer was designed to convey the 25-year storm, conservatively assuming 100-year discharges from each basin. The storm sewer downstream of the outlet structure was designed to convey the runoff discharged from the 100–year storm frequency. The storm sewer design calculations can be found in the Appendix D of this report.

Water Quality

NJDEP regulations require that water quality treatment be provided for the proposed motor vehicle surfaces. As of March 2021, all proposed BMPs must also comply with the Green Infrastructure requirements. The water quality standards require that stormwater management measures be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 80% of the anticipated load from the developed site, expressed as an annual average. To meet the Standard, a proposed bioretention basin, with underdrain and Filterra Bioscape – Manufactured Treatment devices which also meets the green infrastructure requirements, and provide a 80% TSS removal rate. Water quality calculations and manufacturer details are included in Appendix C of this report.

Groundwater Recharge

Under New Jersey Stormwater Management Rules, N.J.A.C. 7.8, certain development is exempt from NJDEP groundwater recharge requirements, including projects classified as Urban Redevelopment Area. The proposed development is located within a previously disturbed site within the State Metropolitan Planning Area 1, which qualifies as an Urban Redevelopment.

The 'Stormwater Infiltration Evaluation' report prepared by Maser Consulting P.A. dated April 28, 2017, the infiltration rate at all the five test pit locations (TP1 through TP5) is less than 0.5 in/hr. and does not meet the minimum infiltration rates required by the BMP manual. Therefore, the proposed BMPs have all been designed to function with the assumption that no run-off will be infiltrating. However, the basins have soil bottoms and some infiltration will occur.

Non-Structural Stormwater Management Strategies

In accordance with the New Jersey Stormwater Best Management Practices Manual, and the current stormwater management regulations, the proposed development was designed to incorporate Low Impact Development (LID) techniques to the maximum extent practical. Using the BMP manual as a guide, the following non-structural stormwater management techniques have been applied to the proposed development.

Nonstructural Stormwater Management Strategies (NJAC 7:8-5.3(b))

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

   The proposed development includes grass swales on site that provide natural water quality benefits. Also, the proposed development proposes an above-ground bioretention basin.

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

   Impervious surface coverage has been minimized by providing landscaped islands within the parking area and incorporating an efficient system of circulation and parking. Swales have also been provided in the landscape areas to discharge runoff into the existing storm system. Please refer to the Appendix of this report for swale calculations. As mentioned above, above-ground stormwater basin systems are also proposed for reducing the runoff flow.

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

   The site does not contain any existing drainage features such as wetlands and riparian zones.

4. *Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of Concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed.*

   To the greatest extent practical, the decrease in the pre-construction time of concentration has been minimized. To achieve this, grass swales are proposed on site.

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

   The land disturbance has been minimized on site to the greatest extent practical. The majority of the site disturbance will occur in areas historically disturbed for agricultural activities. These areas are presently cleared and actively farmed.

6. *Minimize soil compaction.*

   Upon final grading, measures may be implemented to either till or scarify the top layer of soil to minimize soil compaction in lawn and Meadow mix areas.

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

   Low maintenance landscaping is proposed throughout the site. Species of plants have been selected that are known to perform well in the specific site conditions with minimum irrigation, fertilizing, and pruning techniques. While some introduced landscape plants are proposed for aesthetic purposes, the plants selected are native or naturalized to areas with similar environmental characteristics and climates.

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

   While an open channel conveyance system is not practical for most of the proposed development, swales are provided to collect the stormwater runoff and discharge into the approved stormwater collection system, where feasible.

9. *Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:*

   i. *Site design features that help to prevent accumulation and to prevent discharge of trash and debris in drainage systems;*

      Eco grates are provided on the upstream inlets from the basins. To minimize the amount of debris that may enter into the stream, the outlet control has been designed

with a trash rack over the discharge orifices. This trash rack will reduce debris from being discharged from the basin to the stream.

ii. *Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and*

The proposed site design is for a warehouse development. The use, storage or transfer of hazardous materials is not anticipated; therefore, this strategy is not applicable.

iii. *When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.*

The applicant intends to apply fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act.

Soil Erosion and Sediment Control

In accordance with the Soil Erosion and Sediment Control Act, soil erosion measures were incorporated into the design and graphically depicted on the Soil Erosion and Sediment Control Plans. These measures include, but are not limited to:

- Silt Fences
- Conduit Outlet Protection
- Stormwater Management Basin
- Stabilized Construction Access
- Topsoil Stockpiles
- Storm Sewer Inlet Protection
- Temporary and Permanent Stabilization

Conduit outlet protection was provided at the outfall into the basin and was designed based upon the 25-year frequency storm event. The tailwater resulting from the 2-year water surface elevation was utilized for the riprap apron calculations. For detailed calculations, refer to the Appendix.

Conclusion

This development will lead to a decrease in total stormwater runoff to the Points of Analyses. Flow reduction is provided through the stormwater management facilities on-site, collecting the proposed runoff in a piped conveyance system, attenuating the flow in the stormwater management basin, and discharging to a storm sewer collection system. The stormwater design is in compliance with the Alpha Borough and NJDEP regulations resulting in required peak discharge rate reductions and meeting the water quality standard and requesting a waiver from groundwater recharge criteria due to its location in the PA-1 planning area. There will be no negative stormwater impacts from this development to the Points of Analyses and the surrounding properties.

Colliers Engineering & Design

Appendix

Colliers Engineering & Design

Appendix A |

Tax Map

USGS Map

Aerial Photograph

Zoning Map

Soils Map

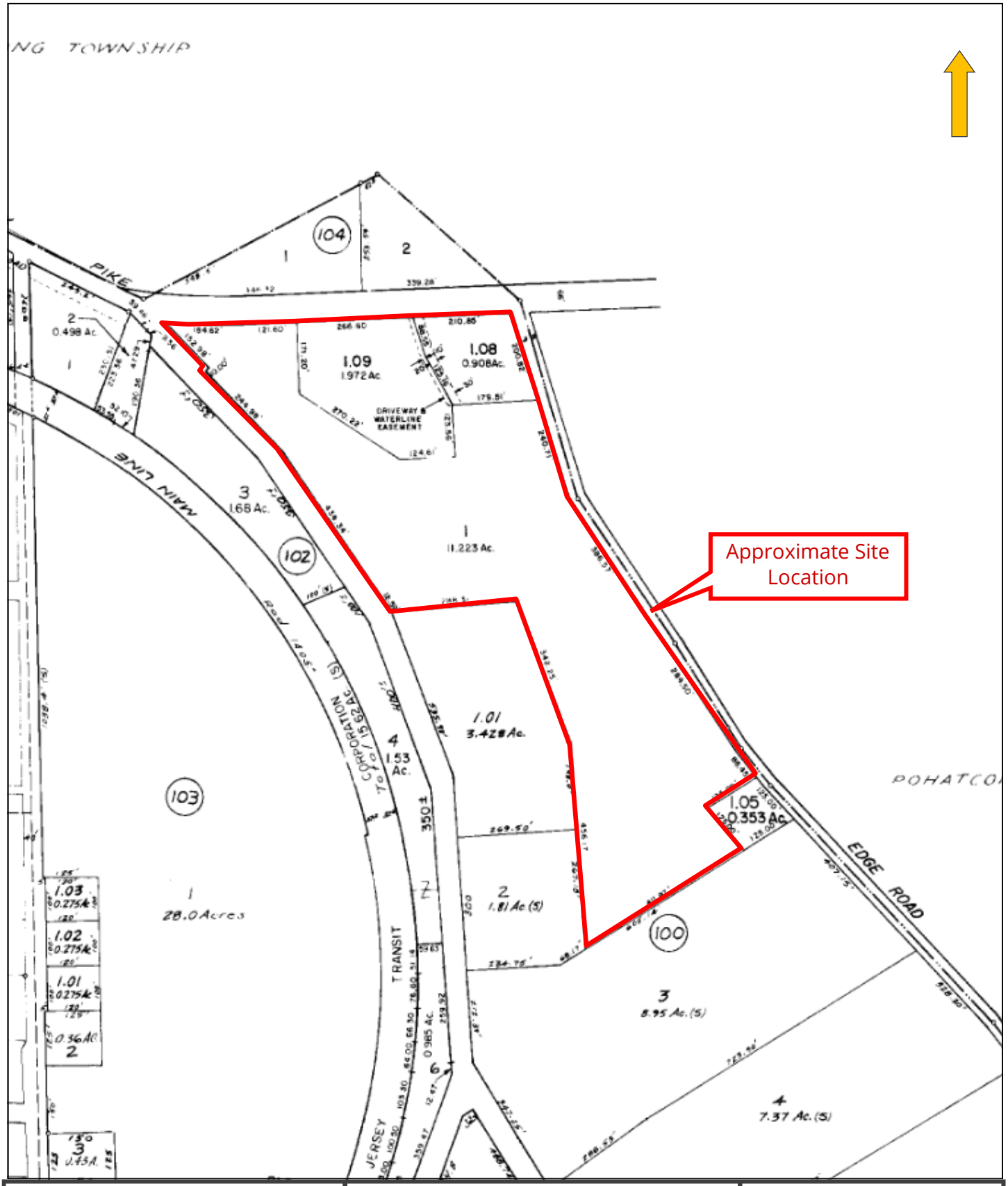
FEMA Map

State Planning Map

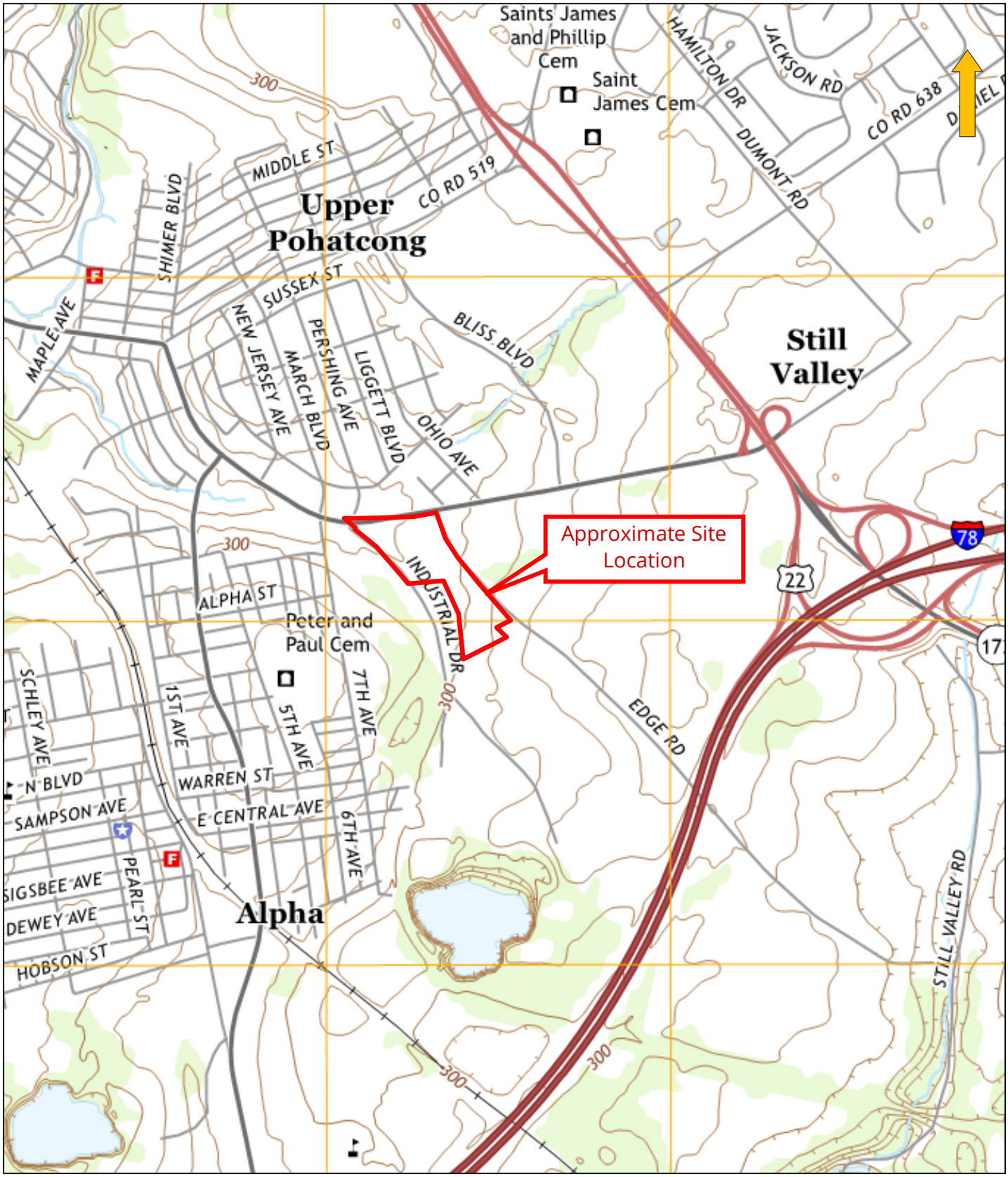
Wetlands and Streams Map

Ground Water Recharge Map

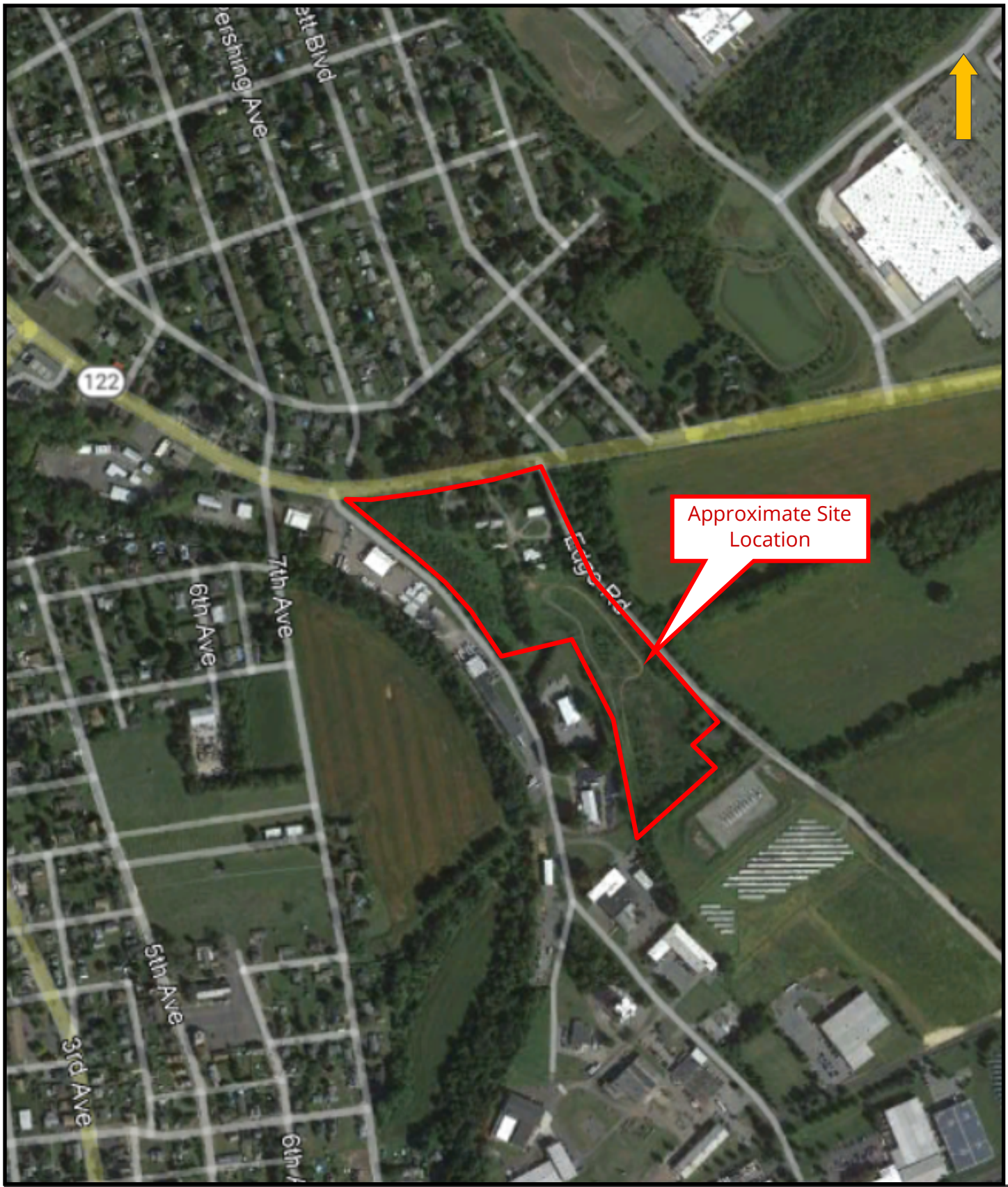
HUC 11, 14 & C1 Waters Map



Colliers Engineering & Design **Clinton Office** 53 Frontage Road Suite 110 Hampton, New Jersey 08827 T: 908 238 0900 F: 908 238 0901	Municipal Tax Map Block 100, Lots 1, 1.08 and 1.09 Borough of Alpha, Warren County, New Jersey Source: Borough of Alpha Tax Maps Sheet 8	Scale: Not to Scale Date: March 1, 2022 CED Project No. 19004898B



Colliers Engineering & Design **Clinton Office** 53 Frontage Road Suite 110 Hampton, New Jersey 08827 T: 908 238 0900 F: 908 238 0901	USGS Map Block 100, Lots 1, 1.08 and 1.09 Borough of Alpha, Warren County, New Jersey Source: U.S. Geological Survey	Scale: Not to Scale Date: March 1, 2022 CED Project No. 19004898B



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

Aerial Map

Block 100, Lots 1, 1.08 and 1.09

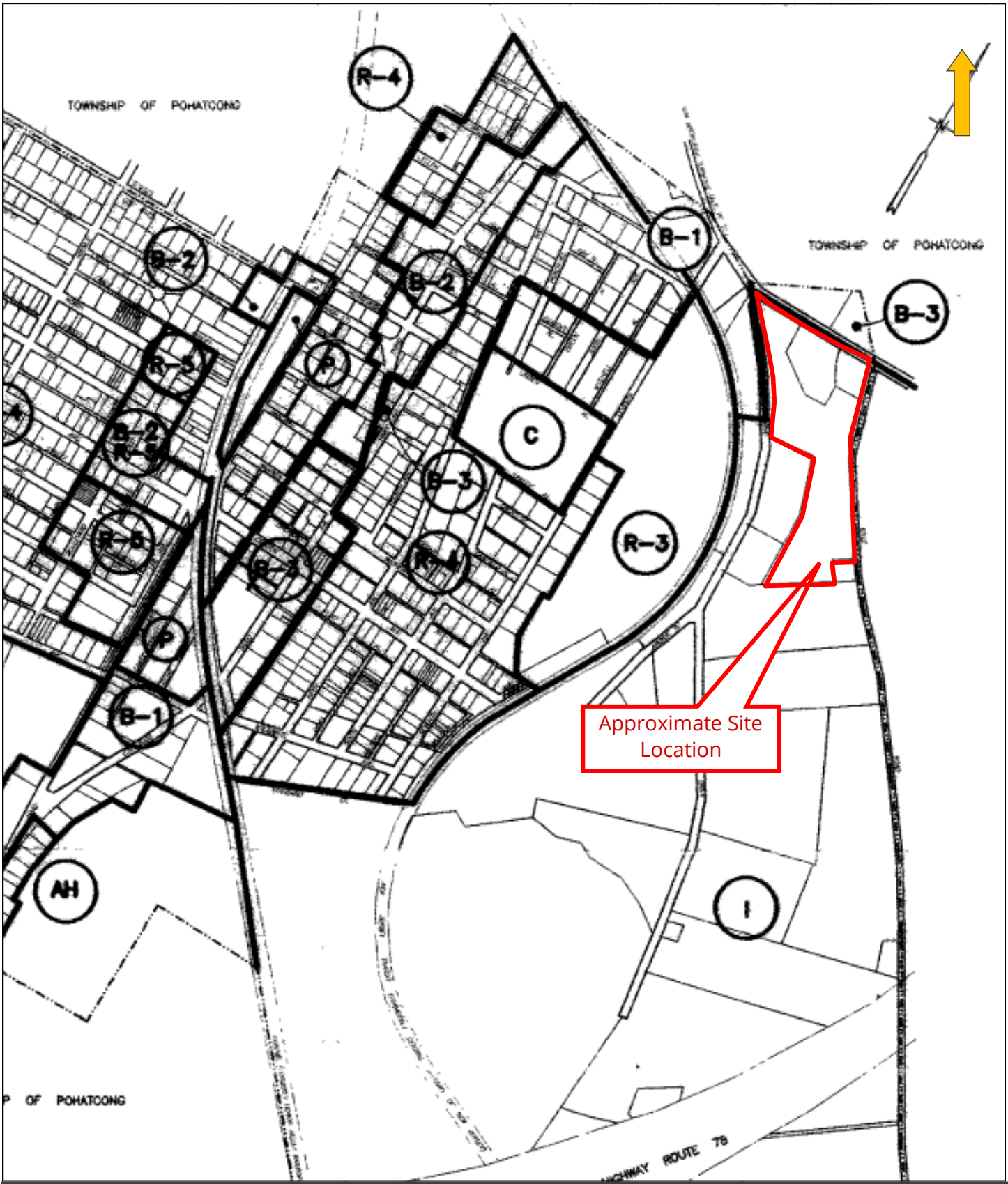
Borough of Alpha, Warren County, New Jersey

Source: Google Earth

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 19004898B



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

Zoning Map

Block 100, Lots 1, 1.08 and 1.09

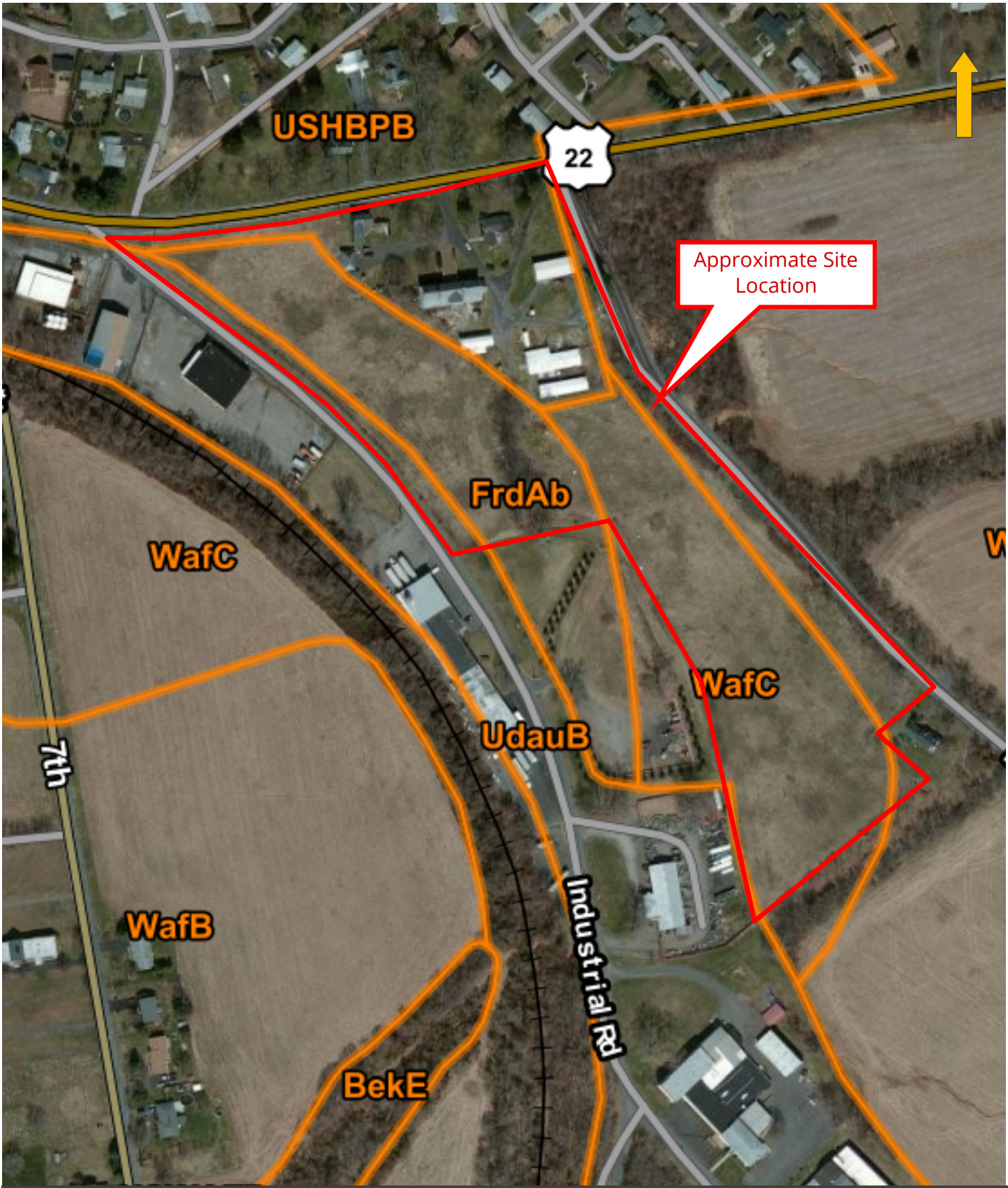
Borough of Alpha, Warren County, New Jersey

Source: Borough of Alpha - Zoning Map

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 19004898B



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

Soil Survey Map

Block 100, Lots 1, 1.08 and 1.09

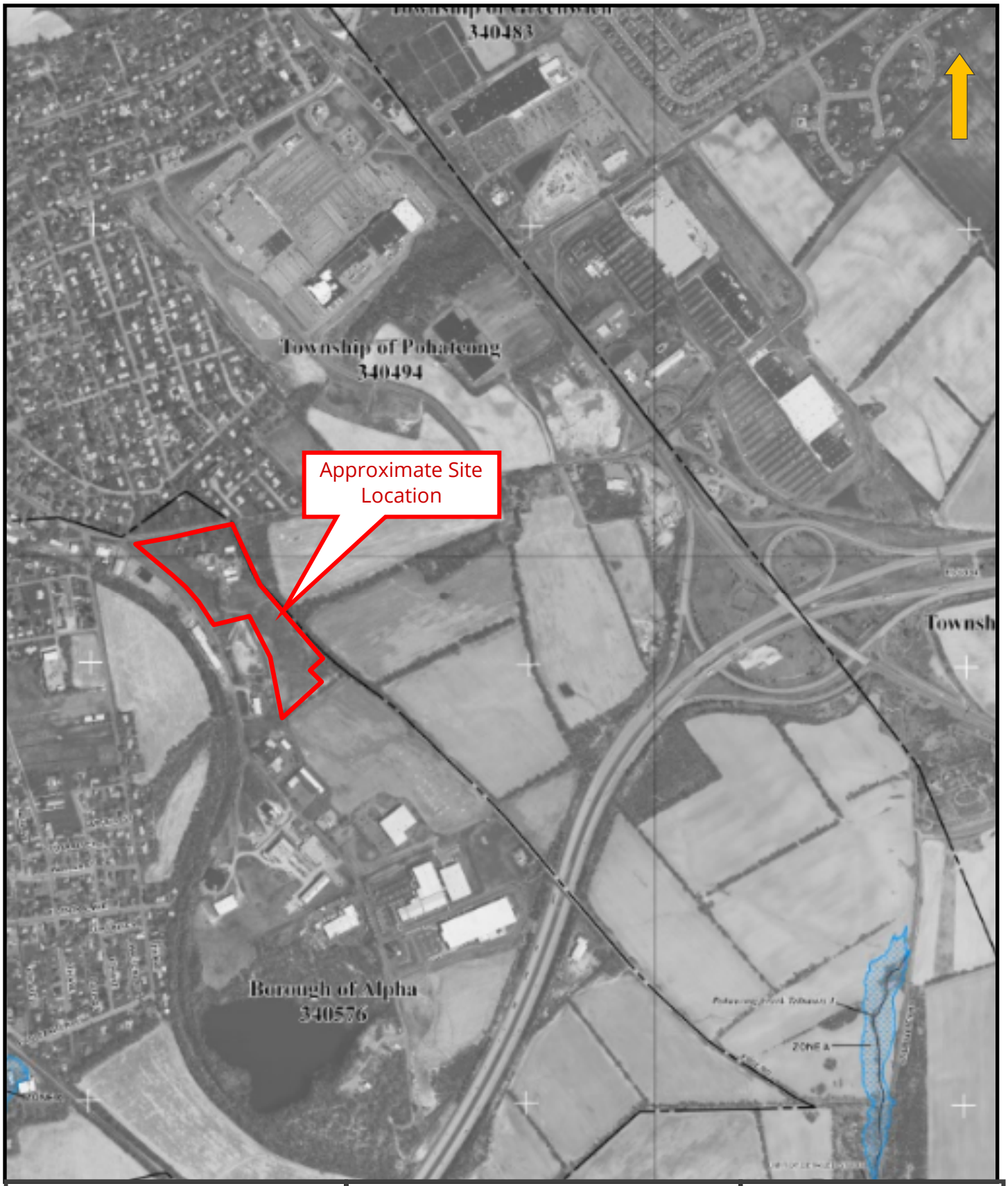
Borough of Alpha, Warren County, New Jersey

Source: Web Soil Survey

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 21000693A



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

FEMA FIRM Map

Block 100, Lots 1, 1.08 and 1.09

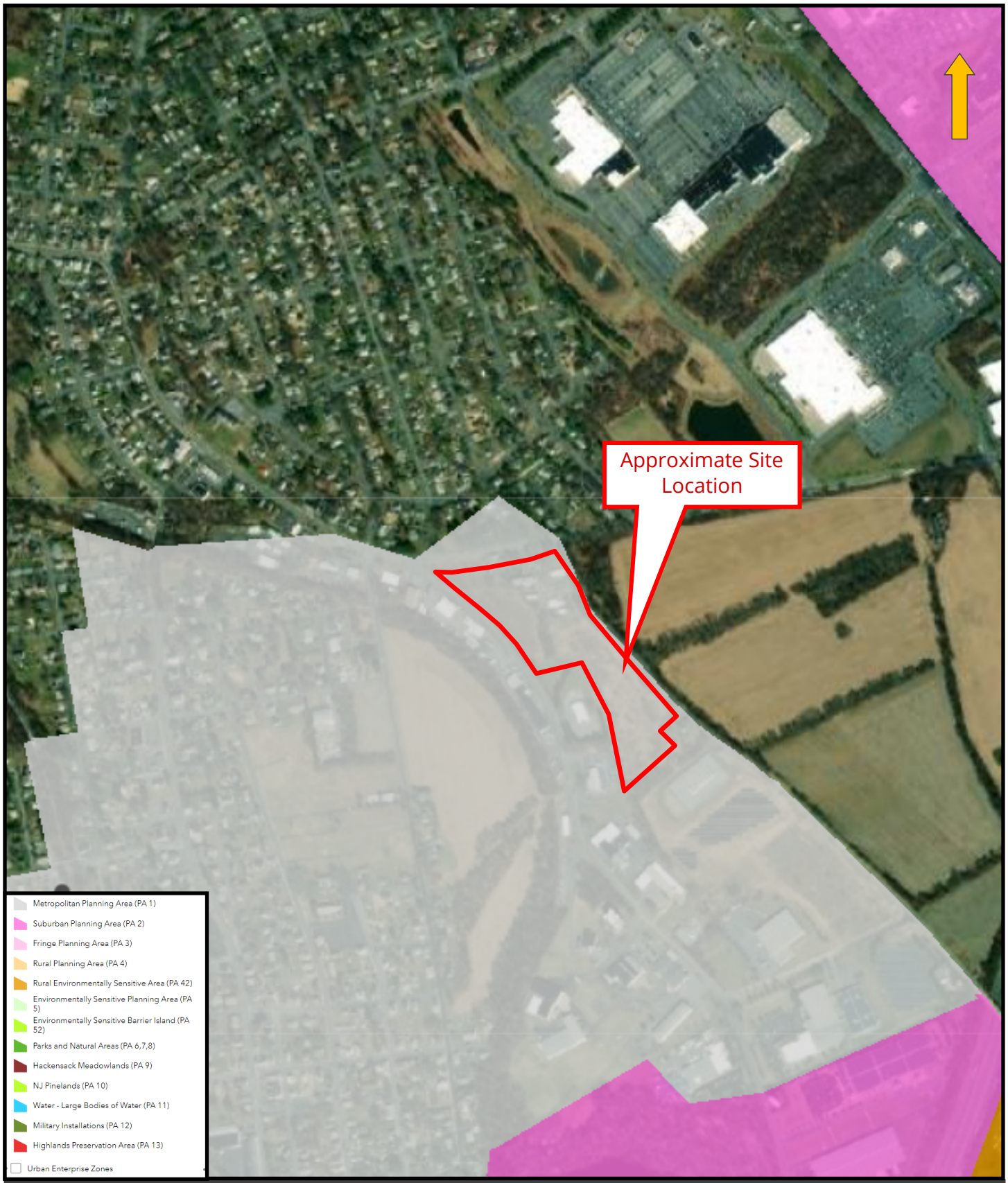
Borough of Alpha, Warren County, New Jersey

Source: FIRM Map No. 34041C0292E dated Effective 9/29/11

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 21000693A



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

State Planning Map

Block 100, Lots 1, 1.08 and 1.09

Borough of Alpha, Warren County, New Jersey

Source: NJ –GeoWeb

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 21000693A



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

Wetlands and Streams Map

Block 100, Lots 1, 1.08 and 1.09

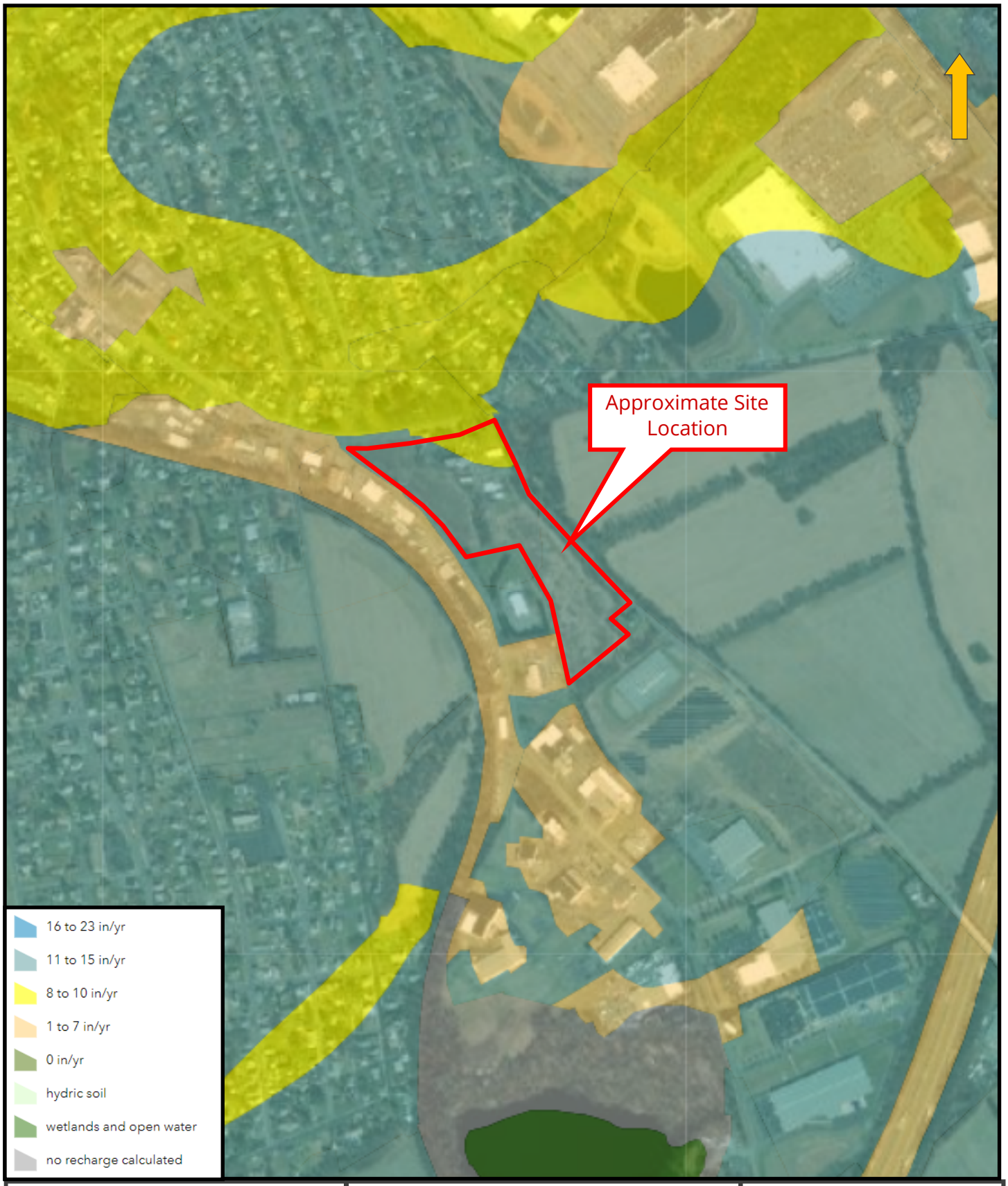
Borough of Alpha, Warren County, New Jersey

Source: NJ-GeoWeb

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 21000693A



Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

Ground Water Recharge Map

Block 100, Lots 1, 1.08 and 1.09

Borough of Alpha, Warren County, New Jersey

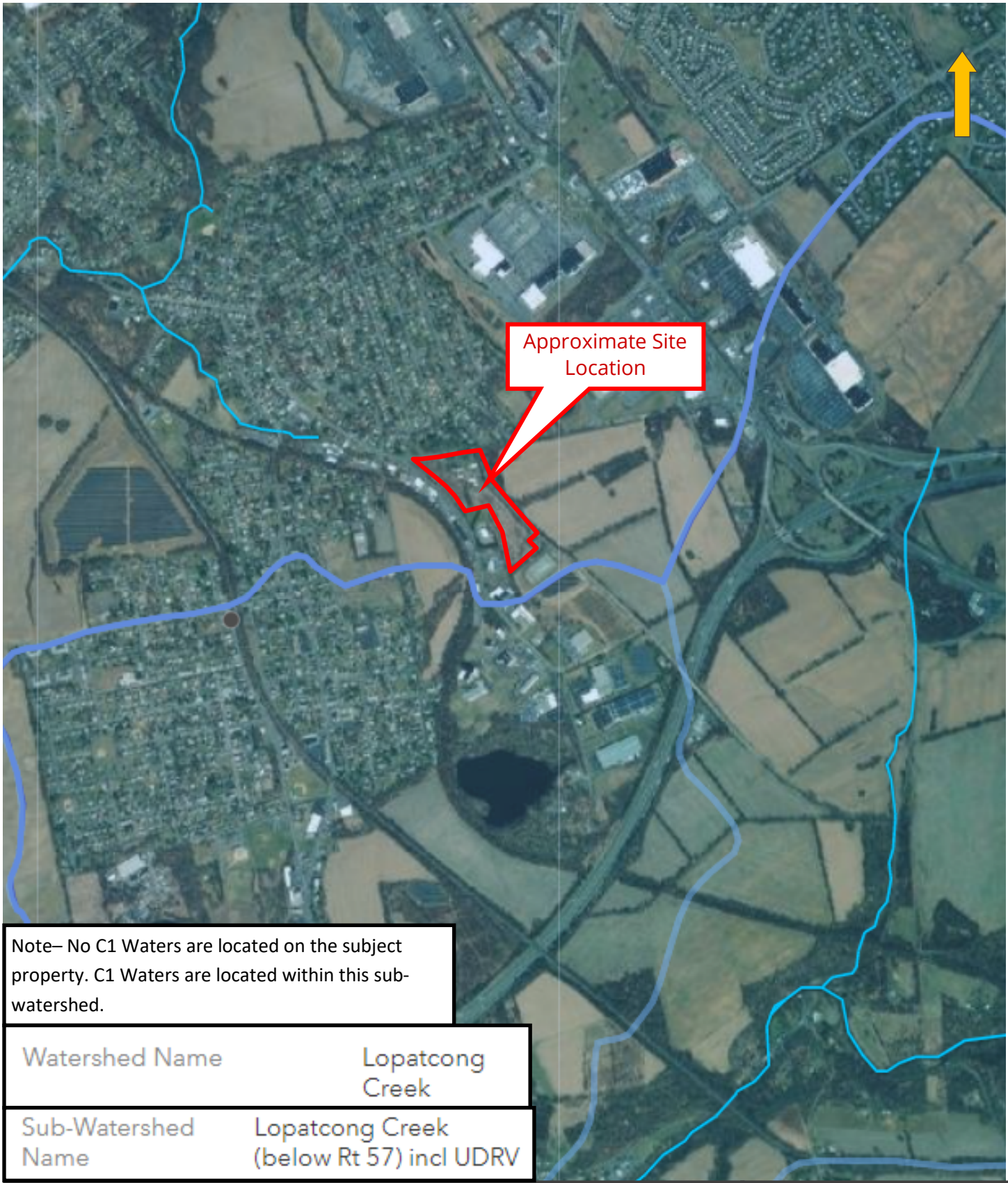
NJ

Source: NJ-GeoWeb

Scale: Not to Scale

Date: March 1, 2022

CED Project No. 21000693A



Note– No C1 Waters are located on the subject property. C1 Waters are located within this sub-watershed.

Watershed Name	Lopatcong Creek
Sub-Watershed Name	Lopatcong Creek (below Rt 57) incl UDRV

Colliers Engineering & Design

Clinton Office
53 Frontage Road
Suite 110
Hampton, New Jersey
08827
T: 908 238 0900
F: 908 238 0901

HUC 11, 14 & C1 Waters Map

Block 100, Lots 1 and 1.09

Borough of Alpha, Warren County, New Jersey

Source: NJ-GeoWeb

Scale: Not to Scale

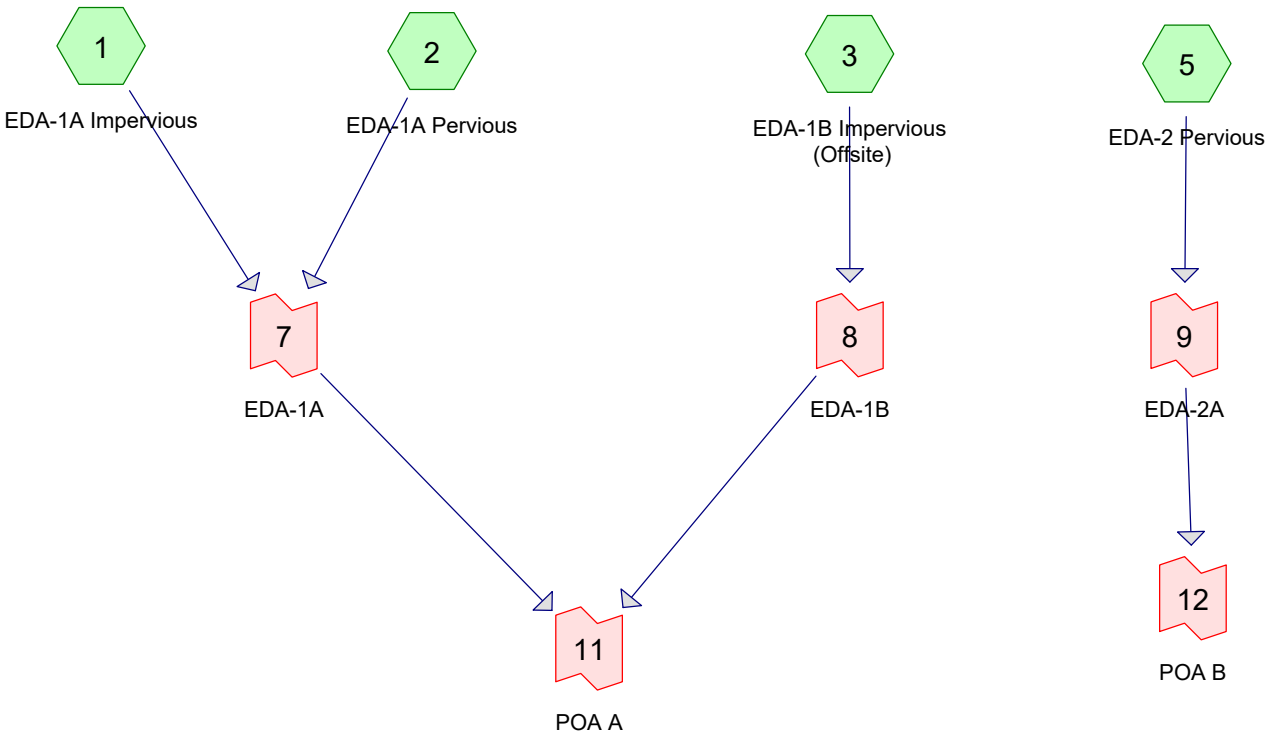
Date: March 1, 2022

CED Project No. 21000693A

Colliers
Engineering
& Design

Appendix B |

Existing and Proposed Conditions Analysis



Subcat Reach Pond Link

Routing Diagram for 220302_Alpha Warehouse Stormwater
Prepared by Colliers Engineering & Design, Printed 3/3/2022
HydroCAD® 10.10-3a s/n 08506 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	NJWQ	NJ DEP 2-hr		Default	2.00	1	1.25	2
2	Alpha 2 yr	NOAA 24-hr	C	Default	24.00	1	2.98	2
3	Alpha 10 yr	NOAA 24-hr	C	Default	24.00	1	4.70	2
4	Alpha 100 yr	NOAA 24-hr	C	Default	24.00	1	7.47	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.100	30	Brush, Good, HSG A (2)
10.060	48	Brush, Good, HSG B (2, 5)
0.600	73	Brush, Good, HSG D (2, 5)
0.180	85	Gravel roads, HSG B (3)
1.090	98	Impervious Surfaces, HSG D (1)
14.030	**51**	**TOTAL AREA**

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA-1A Impervious Runoff Area=1.090 ac 100.00% Impervious Runoff Depth=2.75"
Flow Length=924' Tc=6.8 min CN=0/98 Runoff=3.32 cfs 0.250 af

Subcatchment2: EDA-1A Pervious Runoff Area=10.240 ac 0.00% Impervious Runoff Depth=0.03"
Flow Length=1,342' Tc=13.5 min CN=46/0 Runoff=0.03 cfs 0.028 af

Subcatchment3: EDA-1B Impervious Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=1.57"
Flow Length=1,379' Tc=4.2 min CN=85/0 Runoff=0.40 cfs 0.024 af

Subcatchment5: EDA-2 Pervious Runoff Area=2.520 ac 0.00% Impervious Runoff Depth=0.06"
Flow Length=358' Tc=6.4 min CN=48/0 Runoff=0.02 cfs 0.012 af

Link 7: EDA-1A Inflow=3.32 cfs 0.277 af
Primary=3.32 cfs 0.277 af

Link 8: EDA-1B Inflow=0.40 cfs 0.024 af
Primary=0.40 cfs 0.024 af

Link 9: EDA-2A Inflow=0.02 cfs 0.012 af
Primary=0.02 cfs 0.012 af

Link 11: POA A Inflow=3.68 cfs 0.301 af
Primary=3.68 cfs 0.301 af

Link 12: POA B Inflow=0.02 cfs 0.012 af
Primary=0.02 cfs 0.012 af

Total Runoff Area = 14.030 ac Runoff Volume = 0.313 af Average Runoff Depth = 0.27"
92.23% Pervious = 12.940 ac 7.77% Impervious = 1.090 ac

Summary for Subcatchment 1: EDA-1A Impervious

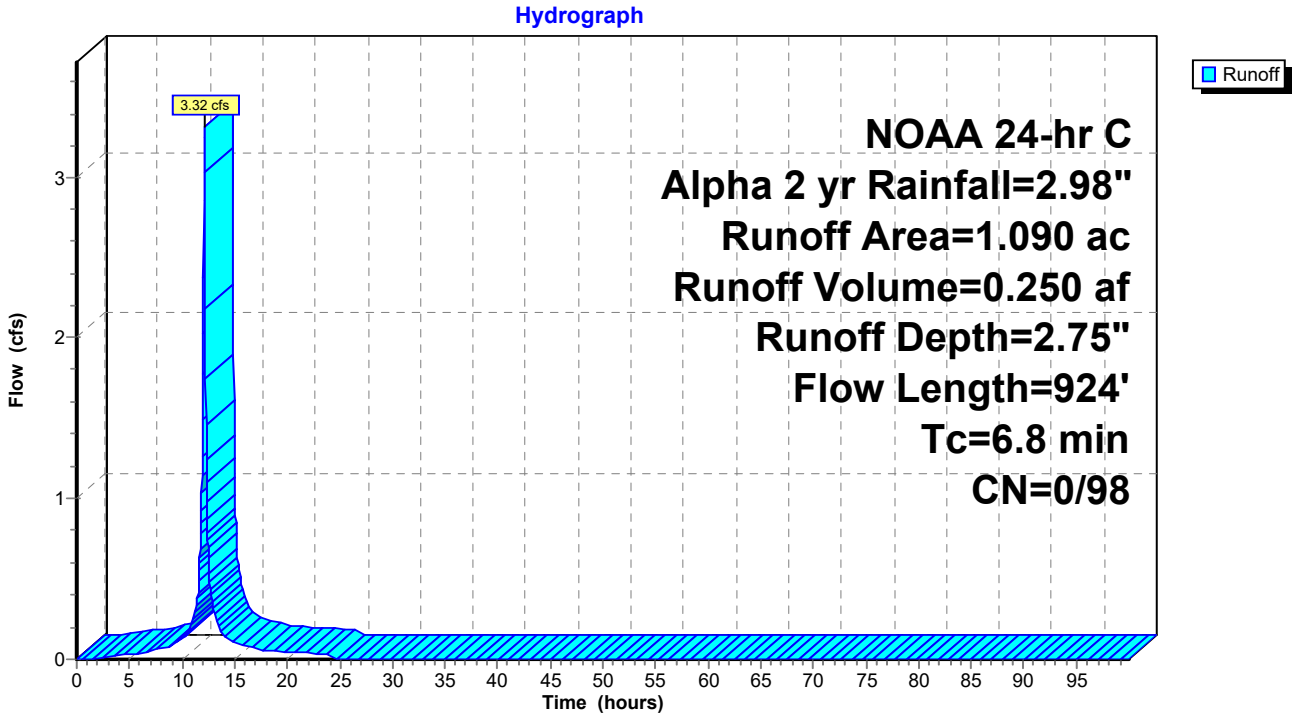
Runoff = 3.32 cfs @ 12.14 hrs, Volume= 0.250 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (ac)	CN	Description
*	1.090	98	Impervious Surfaces, HSG D
	1.090	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.63		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
5.8	824	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.8	924	Total			

Subcatchment 1: EDA-1A Impervious



Hydrograph for Subcatchment 1: EDA-1A Impervious

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.11	0.00	0.02	0.02
6.00	0.24	0.00	0.10	0.04
9.00	0.44	0.00	0.26	0.08
12.00	1.42	0.00	1.20	**1.78**
15.00	2.54	0.00	2.32	**0.10**
18.00	2.74	0.00	2.51	0.05
21.00	2.87	0.00	2.64	0.04
24.00	**2.98**	0.00	**2.75**	0.04
27.00	2.98	0.00	2.75	0.00
30.00	2.98	0.00	2.75	0.00
33.00	2.98	0.00	2.75	0.00
36.00	2.98	0.00	2.75	0.00
39.00	2.98	0.00	2.75	0.00
42.00	2.98	0.00	2.75	0.00
45.00	2.98	0.00	2.75	0.00
48.00	2.98	0.00	2.75	0.00
51.00	2.98	0.00	2.75	0.00
54.00	2.98	0.00	2.75	0.00
57.00	2.98	0.00	2.75	0.00
60.00	2.98	0.00	2.75	0.00
63.00	2.98	0.00	2.75	0.00
66.00	2.98	0.00	2.75	0.00
69.00	2.98	0.00	2.75	0.00
72.00	2.98	0.00	2.75	0.00
75.00	2.98	0.00	2.75	0.00
78.00	2.98	0.00	2.75	0.00
81.00	2.98	0.00	2.75	0.00
84.00	2.98	0.00	2.75	0.00
87.00	2.98	0.00	2.75	0.00
90.00	2.98	0.00	2.75	0.00
93.00	2.98	0.00	2.75	0.00
96.00	2.98	0.00	2.75	0.00
99.00	2.98	0.00	2.75	0.00

Summary for Subcatchment 2: EDA-1A Pervious

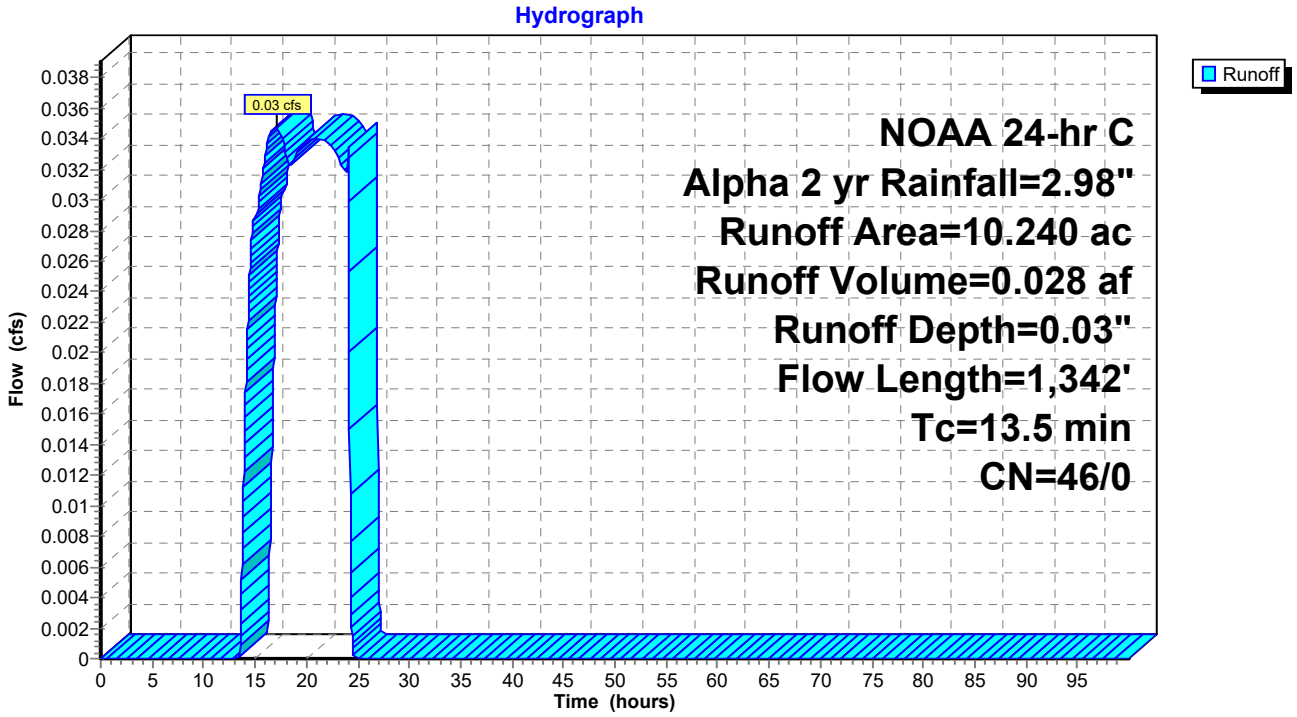
Runoff = 0.03 cfs @ 17.04 hrs, Volume= 0.028 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (ac)	CN	Description
2.100	30	Brush, Good, HSG A
7.590	48	Brush, Good, HSG B
0.550	73	Brush, Good, HSG D
10.240	46	Weighted Average
10.240	46	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0600	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
7.2	1,242	0.0320	2.88		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.5	1,342	Total			

Subcatchment 2: EDA-1A Pervious



Hydrograph for Subcatchment 2: EDA-1A Pervious

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.00	0.00	0.00
15.00	2.54	0.00	0.00	**0.03**
18.00	2.74	0.01	0.00	**0.03**
21.00	2.87	0.02	0.00	0.03
24.00	**2.98**	**0.03**	0.00	0.03
27.00	2.98	0.03	0.00	0.00
30.00	2.98	0.03	0.00	0.00
33.00	2.98	0.03	0.00	0.00
36.00	2.98	0.03	0.00	0.00
39.00	2.98	0.03	0.00	0.00
42.00	2.98	0.03	0.00	0.00
45.00	2.98	0.03	0.00	0.00
48.00	2.98	0.03	0.00	0.00
51.00	2.98	0.03	0.00	0.00
54.00	2.98	0.03	0.00	0.00
57.00	2.98	0.03	0.00	0.00
60.00	2.98	0.03	0.00	0.00
63.00	2.98	0.03	0.00	0.00
66.00	2.98	0.03	0.00	0.00
69.00	2.98	0.03	0.00	0.00
72.00	2.98	0.03	0.00	0.00
75.00	2.98	0.03	0.00	0.00
78.00	2.98	0.03	0.00	0.00
81.00	2.98	0.03	0.00	0.00
84.00	2.98	0.03	0.00	0.00
87.00	2.98	0.03	0.00	0.00
90.00	2.98	0.03	0.00	0.00
93.00	2.98	0.03	0.00	0.00
96.00	2.98	0.03	0.00	0.00
99.00	2.98	0.03	0.00	0.00

Summary for Subcatchment 3: EDA-1B Impervious (Offsite)

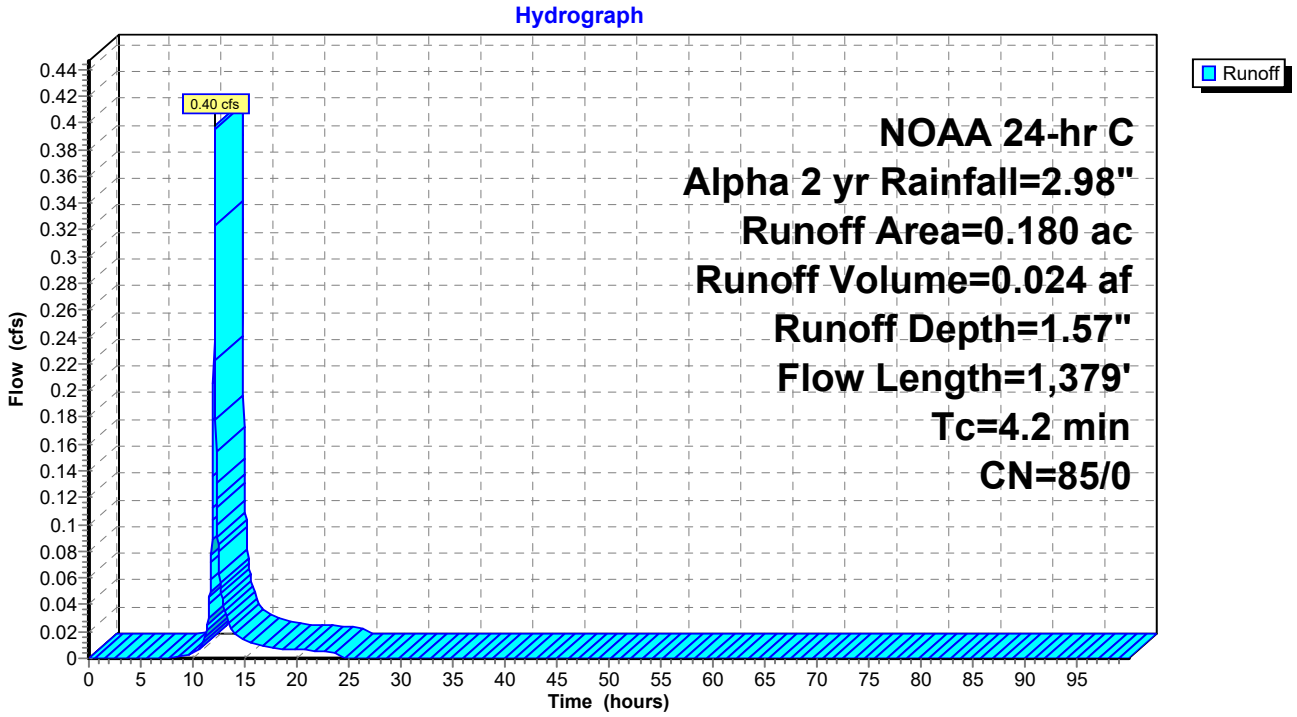
Runoff = 0.40 cfs @ 12.11 hrs, Volume= 0.024 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (ac)	CN	Description
0.180	85	Gravel roads, HSG B
0.180	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0220	1.44		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.2	114	0.0250	9.02	11.06	**Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished
0.2	259	0.0600	19.11	60.03	**Pipe Channel, CMP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished
0.7	574	0.0170	13.33	94.21	**Pipe Channel, DIP Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.9	332	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.2	1,379	Total			

Subcatchment 3: EDA-1B Impervious (Offsite)



Hydrograph for Subcatchment 3: EDA-1B Impervious (Offsite)

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.40	0.00	**0.21**
15.00	2.54	1.21	0.00	**0.01**
18.00	2.74	1.38	0.00	0.01
21.00	2.87	1.48	0.00	0.01
24.00	**2.98**	**1.57**	0.00	0.01
27.00	2.98	1.57	0.00	0.00
30.00	2.98	1.57	0.00	0.00
33.00	2.98	1.57	0.00	0.00
36.00	2.98	1.57	0.00	0.00
39.00	2.98	1.57	0.00	0.00
42.00	2.98	1.57	0.00	0.00
45.00	2.98	1.57	0.00	0.00
48.00	2.98	1.57	0.00	0.00
51.00	2.98	1.57	0.00	0.00
54.00	2.98	1.57	0.00	0.00
57.00	2.98	1.57	0.00	0.00
60.00	2.98	1.57	0.00	0.00
63.00	2.98	1.57	0.00	0.00
66.00	2.98	1.57	0.00	0.00
69.00	2.98	1.57	0.00	0.00
72.00	2.98	1.57	0.00	0.00
75.00	2.98	1.57	0.00	0.00
78.00	2.98	1.57	0.00	0.00
81.00	2.98	1.57	0.00	0.00
84.00	2.98	1.57	0.00	0.00
87.00	2.98	1.57	0.00	0.00
90.00	2.98	1.57	0.00	0.00
93.00	2.98	1.57	0.00	0.00
96.00	2.98	1.57	0.00	0.00
99.00	2.98	1.57	0.00	0.00

Summary for Subcatchment 5: EDA-2 Pervious

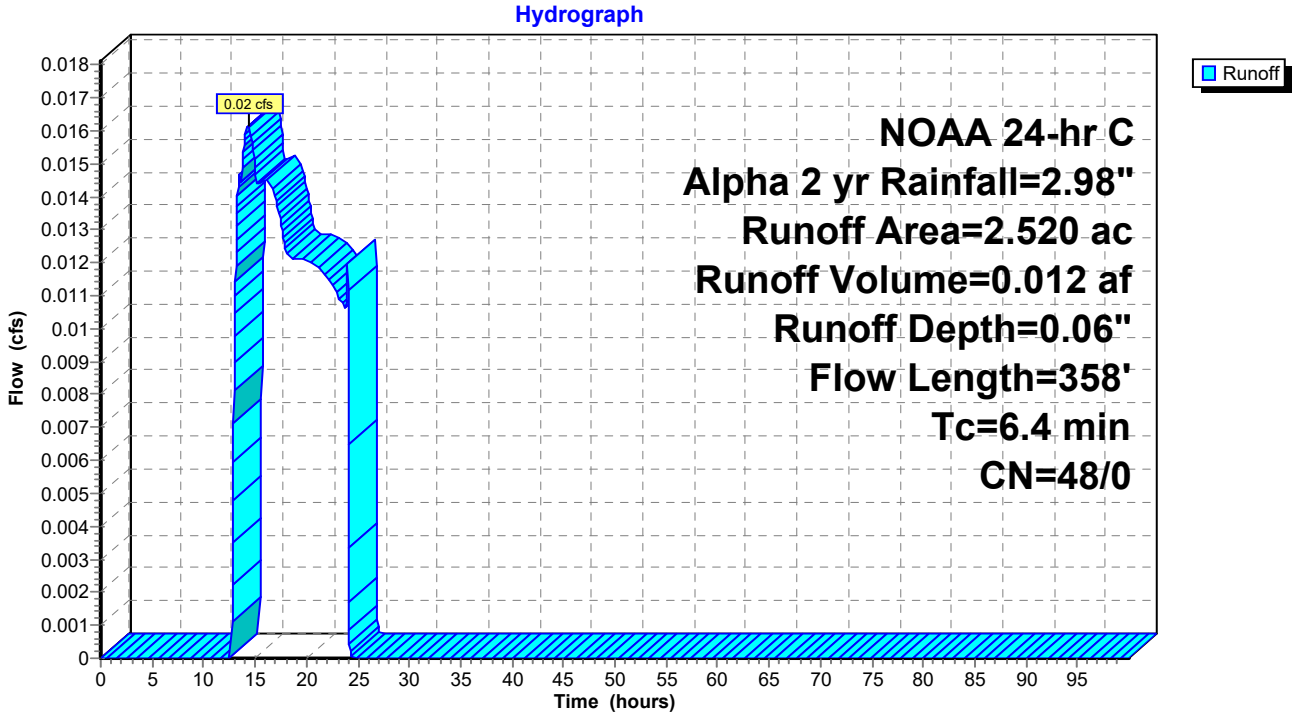
Runoff = 0.02 cfs @ 14.35 hrs, Volume= 0.012 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (ac)	CN	Description
2.470	48	Brush, Good, HSG B
0.050	73	Brush, Good, HSG D
2.520	48	Weighted Average
2.520	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.9	258	0.0860	4.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	358	Total			

Subcatchment 5: EDA-2 Pervious



Hydrograph for Subcatchment 5: EDA-2 Pervious

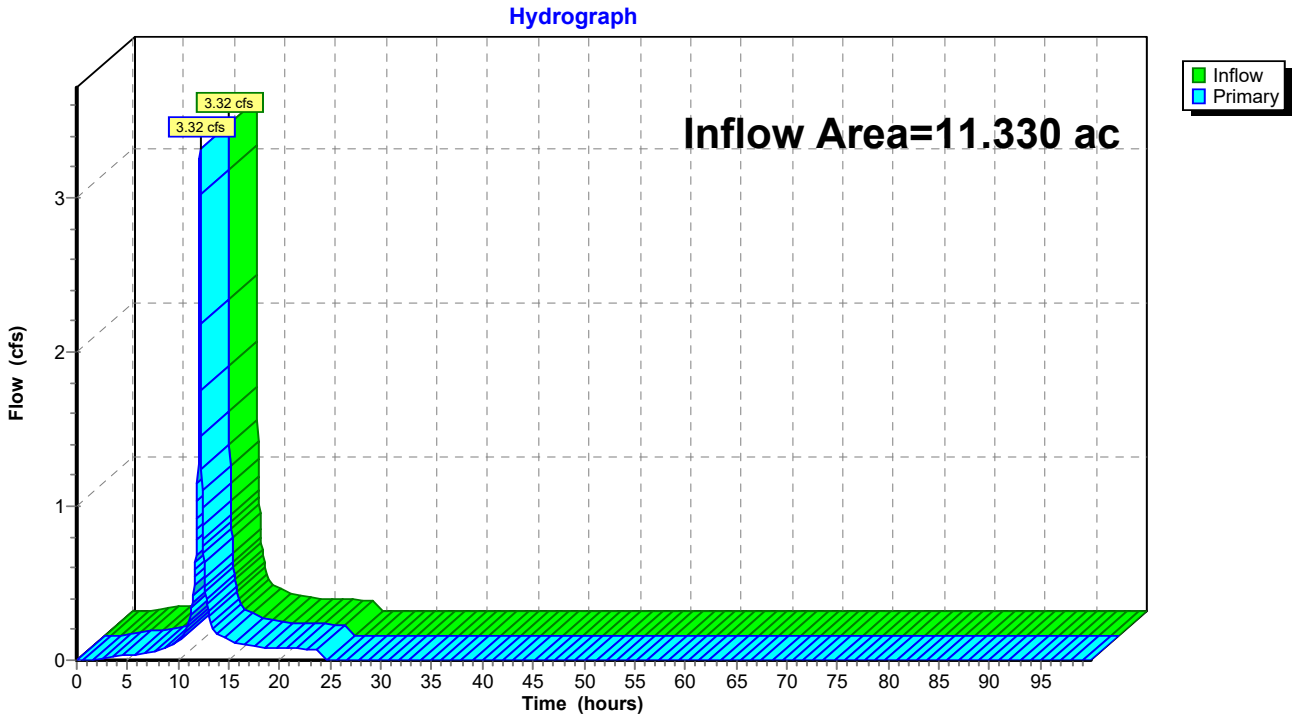
Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.00	0.00	**0.00**
15.00	2.54	0.01	0.00	**0.01**
18.00	2.74	0.03	0.00	0.01
21.00	2.87	0.04	0.00	0.01
24.00	**2.98**	**0.06**	0.00	0.01
27.00	2.98	0.06	0.00	0.00
30.00	2.98	0.06	0.00	0.00
33.00	2.98	0.06	0.00	0.00
36.00	2.98	0.06	0.00	0.00
39.00	2.98	0.06	0.00	0.00
42.00	2.98	0.06	0.00	0.00
45.00	2.98	0.06	0.00	0.00
48.00	2.98	0.06	0.00	0.00
51.00	2.98	0.06	0.00	0.00
54.00	2.98	0.06	0.00	0.00
57.00	2.98	0.06	0.00	0.00
60.00	2.98	0.06	0.00	0.00
63.00	2.98	0.06	0.00	0.00
66.00	2.98	0.06	0.00	0.00
69.00	2.98	0.06	0.00	0.00
72.00	2.98	0.06	0.00	0.00
75.00	2.98	0.06	0.00	0.00
78.00	2.98	0.06	0.00	0.00
81.00	2.98	0.06	0.00	0.00
84.00	2.98	0.06	0.00	0.00
87.00	2.98	0.06	0.00	0.00
90.00	2.98	0.06	0.00	0.00
93.00	2.98	0.06	0.00	0.00
96.00	2.98	0.06	0.00	0.00
99.00	2.98	0.06	0.00	0.00

Summary for Link 7: EDA-1A

Inflow Area = 11.330 ac, 9.62% Impervious, Inflow Depth = 0.29" for Alpha 2 yr event
Inflow = 3.32 cfs @ 12.14 hrs, Volume= 0.277 af
Primary = 3.32 cfs @ 12.14 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 7: EDA-1A



Hydrograph for Link 7: EDA-1A

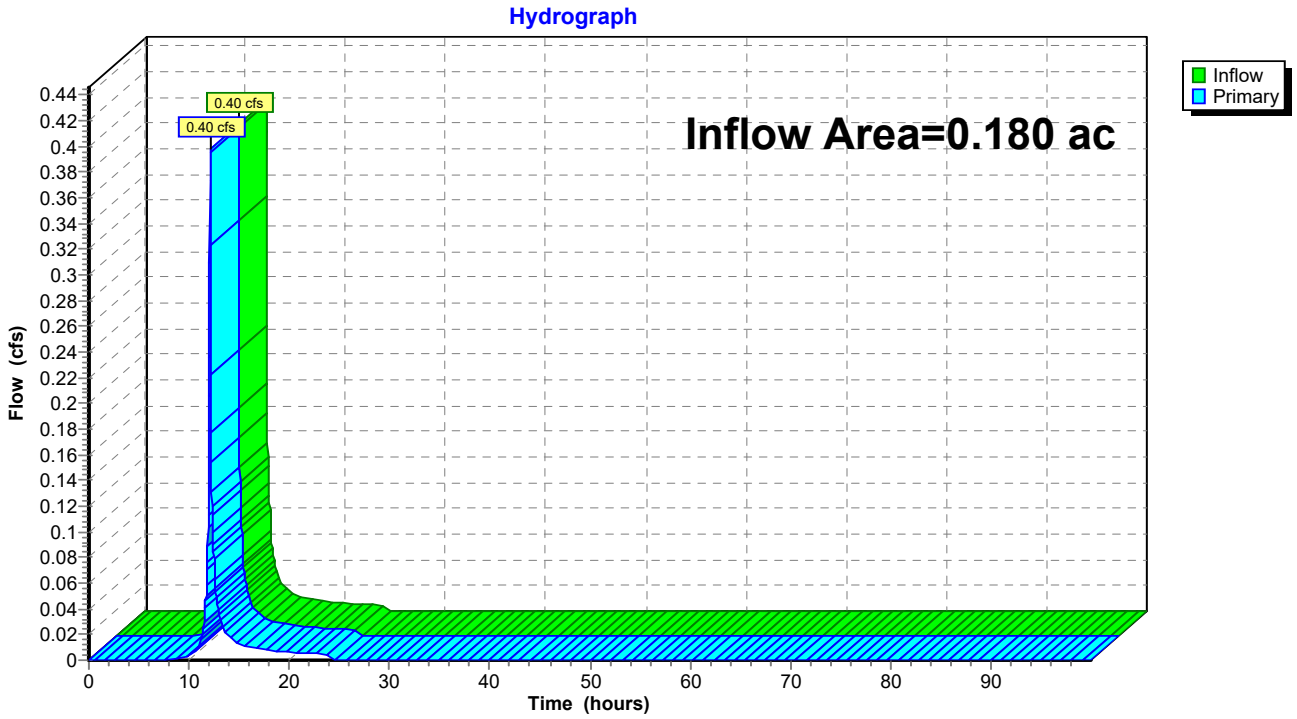
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.02	0.00	0.02	81.00	0.00	0.00	0.00
4.50	0.03	0.00	0.03	82.50	0.00	0.00	0.00
6.00	0.04	0.00	0.04	84.00	0.00	0.00	0.00
7.50	0.06	0.00	0.06	85.50	0.00	0.00	0.00
9.00	0.08	0.00	0.08	87.00	0.00	0.00	0.00
10.50	0.15	0.00	0.15	88.50	0.00	0.00	0.00
12.00	**1.78**	0.00	**1.78**	90.00	0.00	0.00	0.00
13.50	**0.19**	0.00	**0.19**	91.50	0.00	0.00	0.00
15.00	0.13	0.00	0.13	93.00	0.00	0.00	0.00
16.50	0.11	0.00	0.11	94.50	0.00	0.00	0.00
18.00	0.09	0.00	0.09	96.00	0.00	0.00	0.00
19.50	0.08	0.00	0.08	97.50	0.00	0.00	0.00
21.00	0.08	0.00	0.08	99.00	0.00	0.00	0.00
22.50	0.07	0.00	0.07				
24.00	0.07	0.00	0.07				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 8: EDA-1B

Inflow Area = 0.180 ac, 0.00% Impervious, Inflow Depth = 1.57" for Alpha 2 yr event
Inflow = 0.40 cfs @ 12.11 hrs, Volume= 0.024 af
Primary = 0.40 cfs @ 12.11 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 8: EDA-1B



Hydrograph for Link 8: EDA-1B

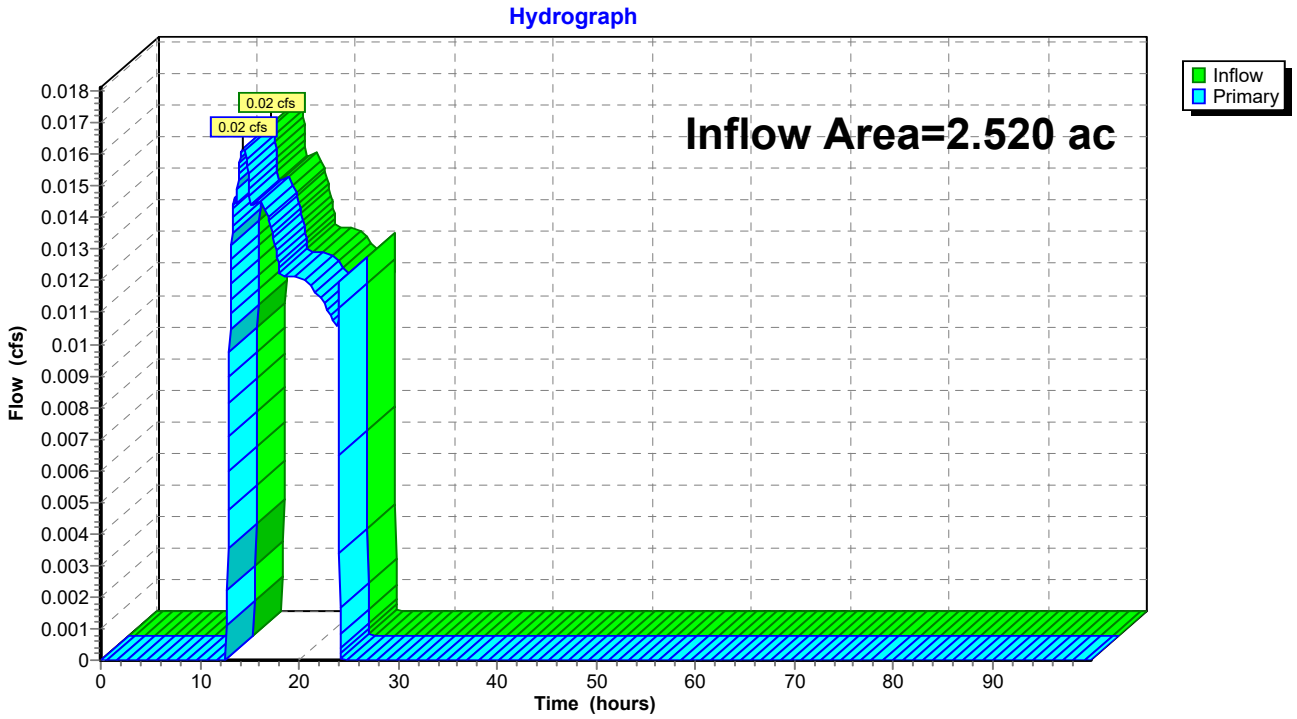
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.01	0.00	0.01	88.50	0.00	0.00	0.00
12.00	**0.21**	0.00	**0.21**	90.00	0.00	0.00	0.00
13.50	**0.02**	0.00	**0.02**	91.50	0.00	0.00	0.00
15.00	0.01	0.00	0.01	93.00	0.00	0.00	0.00
16.50	0.01	0.00	0.01	94.50	0.00	0.00	0.00
18.00	0.01	0.00	0.01	96.00	0.00	0.00	0.00
19.50	0.01	0.00	0.01	97.50	0.00	0.00	0.00
21.00	0.01	0.00	0.01	99.00	0.00	0.00	0.00
22.50	0.01	0.00	0.01				
24.00	0.01	0.00	0.01				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 9: EDA-2A

Inflow Area = 2.520 ac, 0.00% Impervious, Inflow Depth = 0.06" for Alpha 2 yr event
Inflow = 0.02 cfs @ 14.35 hrs, Volume= 0.012 af
Primary = 0.02 cfs @ 14.35 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 9: EDA-2A



Hydrograph for Link 9: EDA-2A

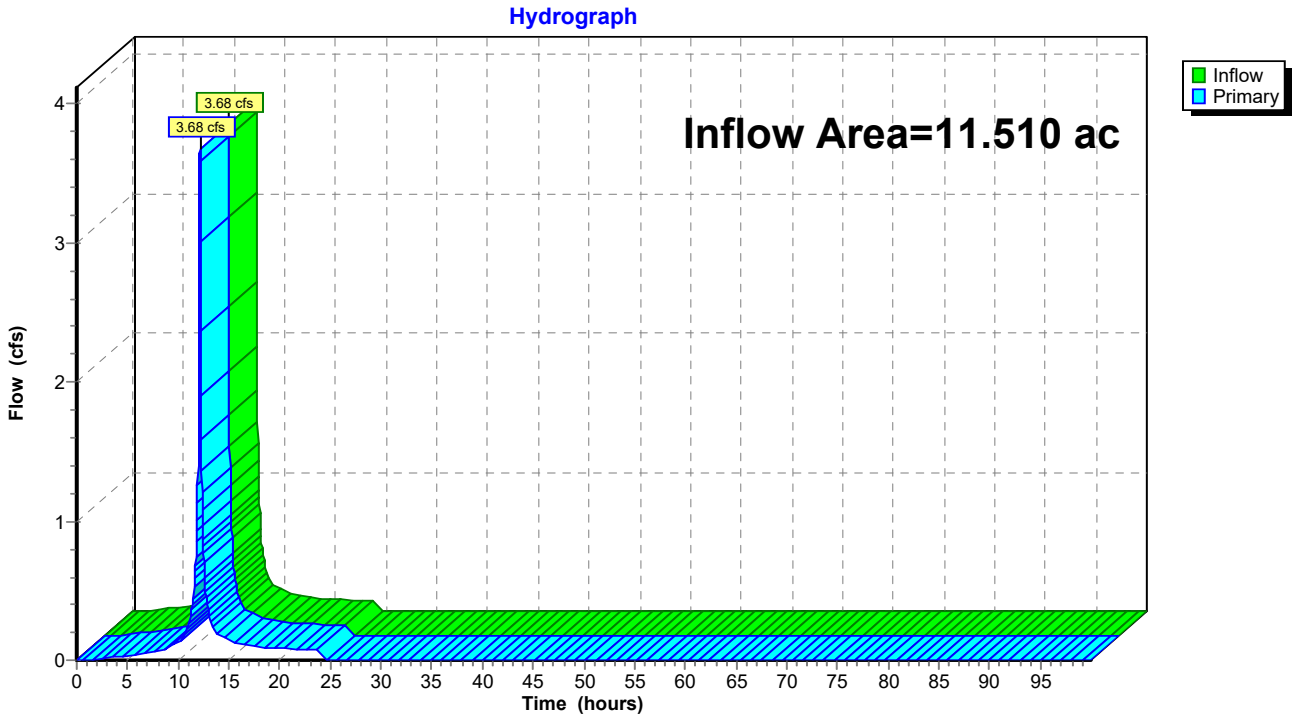
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	0.00	0.00	0.00	90.00	0.00	0.00	0.00
13.50	**0.01**	0.00	**0.01**	91.50	0.00	0.00	0.00
15.00	**0.01**	0.00	**0.01**	93.00	0.00	0.00	0.00
16.50	0.01	0.00	0.01	94.50	0.00	0.00	0.00
18.00	0.01	0.00	0.01	96.00	0.00	0.00	0.00
19.50	0.01	0.00	0.01	97.50	0.00	0.00	0.00
21.00	0.01	0.00	0.01	99.00	0.00	0.00	0.00
22.50	0.01	0.00	0.01				
24.00	0.01	0.00	0.01				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 11: POA A

Inflow Area = 11.510 ac, 9.47% Impervious, Inflow Depth = 0.31" for Alpha 2 yr event
Inflow = 3.68 cfs @ 12.13 hrs, Volume= 0.301 af
Primary = 3.68 cfs @ 12.13 hrs, Volume= 0.301 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 11: POA A



Hydrograph for Link 11: POA A

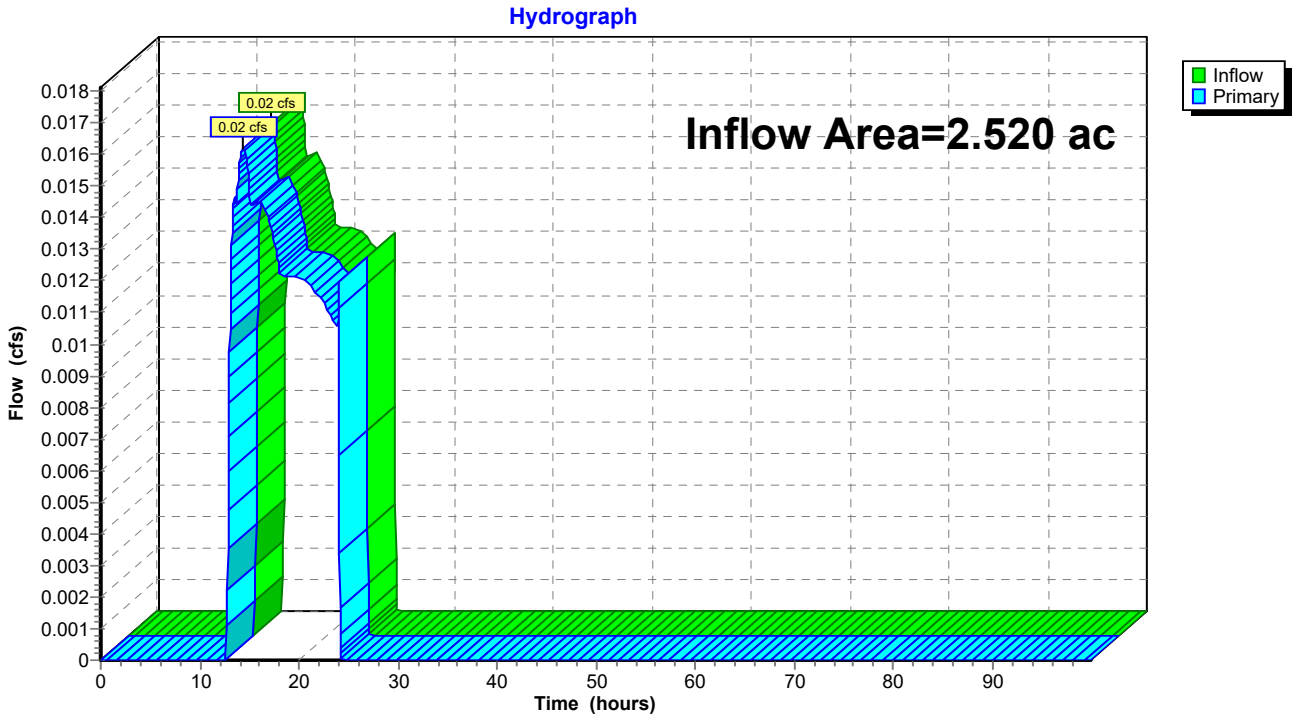
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.02	0.00	0.02	81.00	0.00	0.00	0.00
4.50	0.03	0.00	0.03	82.50	0.00	0.00	0.00
6.00	0.04	0.00	0.04	84.00	0.00	0.00	0.00
7.50	0.06	0.00	0.06	85.50	0.00	0.00	0.00
9.00	0.08	0.00	0.08	87.00	0.00	0.00	0.00
10.50	0.16	0.00	0.16	88.50	0.00	0.00	0.00
12.00	**1.99**	0.00	**1.99**	90.00	0.00	0.00	0.00
13.50	**0.22**	0.00	**0.22**	91.50	0.00	0.00	0.00
15.00	0.14	0.00	0.14	93.00	0.00	0.00	0.00
16.50	0.12	0.00	0.12	94.50	0.00	0.00	0.00
18.00	0.09	0.00	0.09	96.00	0.00	0.00	0.00
19.50	0.09	0.00	0.09	97.50	0.00	0.00	0.00
21.00	0.08	0.00	0.08	99.00	0.00	0.00	0.00
22.50	0.08	0.00	0.08				
24.00	0.08	0.00	0.08				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 12: POA B

Inflow Area = 2.520 ac, 0.00% Impervious, Inflow Depth = 0.06" for Alpha 2 yr event
Inflow = 0.02 cfs @ 14.35 hrs, Volume= 0.012 af
Primary = 0.02 cfs @ 14.35 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 12: POA B



Hydrograph for Link 12: POA B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	0.00	0.00	0.00	90.00	0.00	0.00	0.00
13.50	**0.01**	0.00	**0.01**	91.50	0.00	0.00	0.00
15.00	**0.01**	0.00	**0.01**	93.00	0.00	0.00	0.00
16.50	0.01	0.00	0.01	94.50	0.00	0.00	0.00
18.00	0.01	0.00	0.01	96.00	0.00	0.00	0.00
19.50	0.01	0.00	0.01	97.50	0.00	0.00	0.00
21.00	0.01	0.00	0.01	99.00	0.00	0.00	0.00
22.50	0.01	0.00	0.01				
24.00	0.01	0.00	0.01				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA-1A Impervious Runoff Area=1.090 ac 100.00% Impervious Runoff Depth=4.46"
Flow Length=924' Tc=6.8 min CN=0/98 Runoff=5.28 cfs 0.405 af

Subcatchment2: EDA-1A Pervious Runoff Area=10.240 ac 0.00% Impervious Runoff Depth=0.39"
Flow Length=1,342' Tc=13.5 min CN=46/0 Runoff=1.56 cfs 0.335 af

Subcatchment3: EDA-1B Impervious Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=3.09"
Flow Length=1,379' Tc=4.2 min CN=85/0 Runoff=0.77 cfs 0.046 af

Subcatchment5: EDA-2 Pervious Runoff Area=2.520 ac 0.00% Impervious Runoff Depth=0.48"
Flow Length=358' Tc=6.4 min CN=48/0 Runoff=0.79 cfs 0.101 af

Link 7: EDA-1A Inflow=5.51 cfs 0.740 af
Primary=5.51 cfs 0.740 af

Link 8: EDA-1B Inflow=0.77 cfs 0.046 af
Primary=0.77 cfs 0.046 af

Link 9: EDA-2A Inflow=0.79 cfs 0.101 af
Primary=0.79 cfs 0.101 af

Link 11: POA A Inflow=6.17 cfs 0.787 af
Primary=6.17 cfs 0.787 af

Link 12: POA B Inflow=0.79 cfs 0.101 af
Primary=0.79 cfs 0.101 af

Total Runoff Area = 14.030 ac Runoff Volume = 0.888 af Average Runoff Depth = 0.76"
92.23% Pervious = 12.940 ac 7.77% Impervious = 1.090 ac

Summary for Subcatchment 1: EDA-1A Impervious

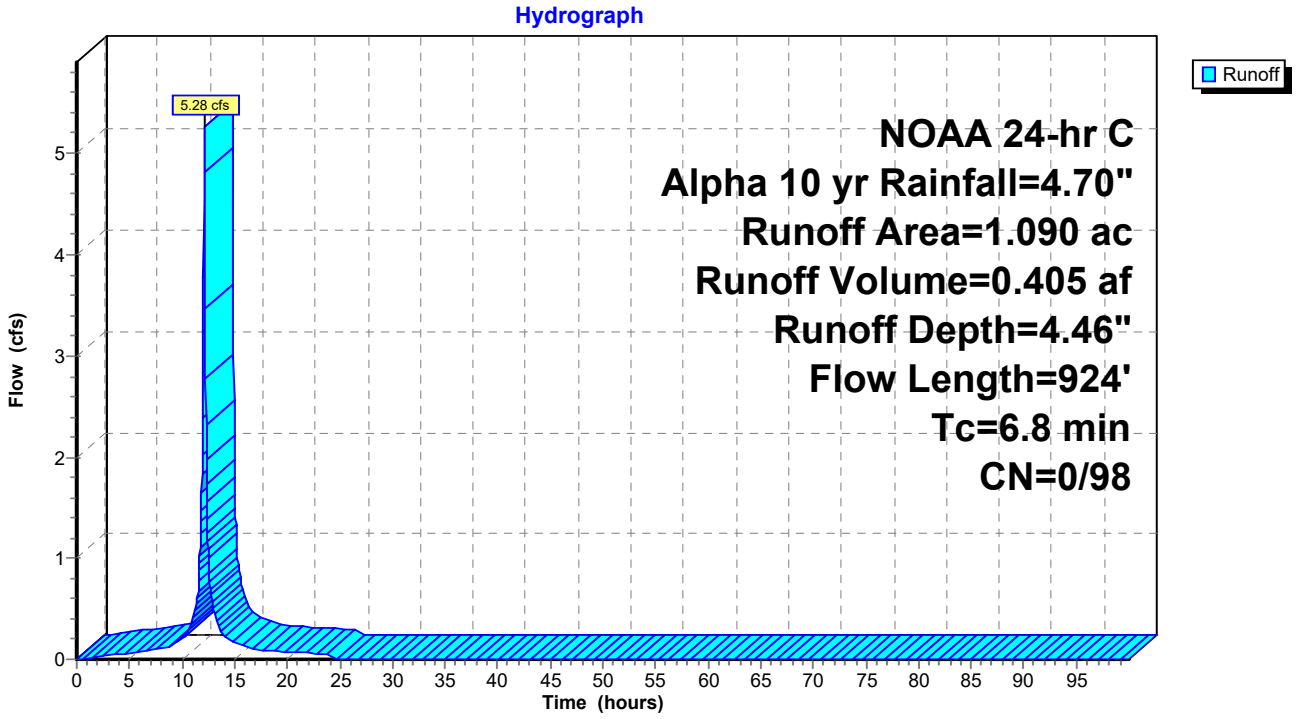
Runoff = 5.28 cfs @ 12.14 hrs, Volume= 0.405 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (ac)	CN	Description
*	1.090	98	Impervious Surfaces, HSG D
	1.090	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.63		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
5.8	824	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.8	924	Total			

Subcatchment 1: EDA-1A Impervious



Hydrograph for Subcatchment 1: EDA-1A Impervious

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.17	0.00	0.05	0.04
6.00	0.37	0.00	0.21	0.07
9.00	0.69	0.00	0.49	0.14
12.00	2.24	0.00	2.01	**2.84**
15.00	4.01	0.00	3.78	**0.16**
18.00	4.33	0.00	4.09	0.09
21.00	4.53	0.00	4.30	0.07
24.00	**4.70**	0.00	**4.46**	0.06
27.00	4.70	0.00	4.46	0.00
30.00	4.70	0.00	4.46	0.00
33.00	4.70	0.00	4.46	0.00
36.00	4.70	0.00	4.46	0.00
39.00	4.70	0.00	4.46	0.00
42.00	4.70	0.00	4.46	0.00
45.00	4.70	0.00	4.46	0.00
48.00	4.70	0.00	4.46	0.00
51.00	4.70	0.00	4.46	0.00
54.00	4.70	0.00	4.46	0.00
57.00	4.70	0.00	4.46	0.00
60.00	4.70	0.00	4.46	0.00
63.00	4.70	0.00	4.46	0.00
66.00	4.70	0.00	4.46	0.00
69.00	4.70	0.00	4.46	0.00
72.00	4.70	0.00	4.46	0.00
75.00	4.70	0.00	4.46	0.00
78.00	4.70	0.00	4.46	0.00
81.00	4.70	0.00	4.46	0.00
84.00	4.70	0.00	4.46	0.00
87.00	4.70	0.00	4.46	0.00
90.00	4.70	0.00	4.46	0.00
93.00	4.70	0.00	4.46	0.00
96.00	4.70	0.00	4.46	0.00
99.00	4.70	0.00	4.46	0.00

Summary for Subcatchment 2: EDA-1A Pervious

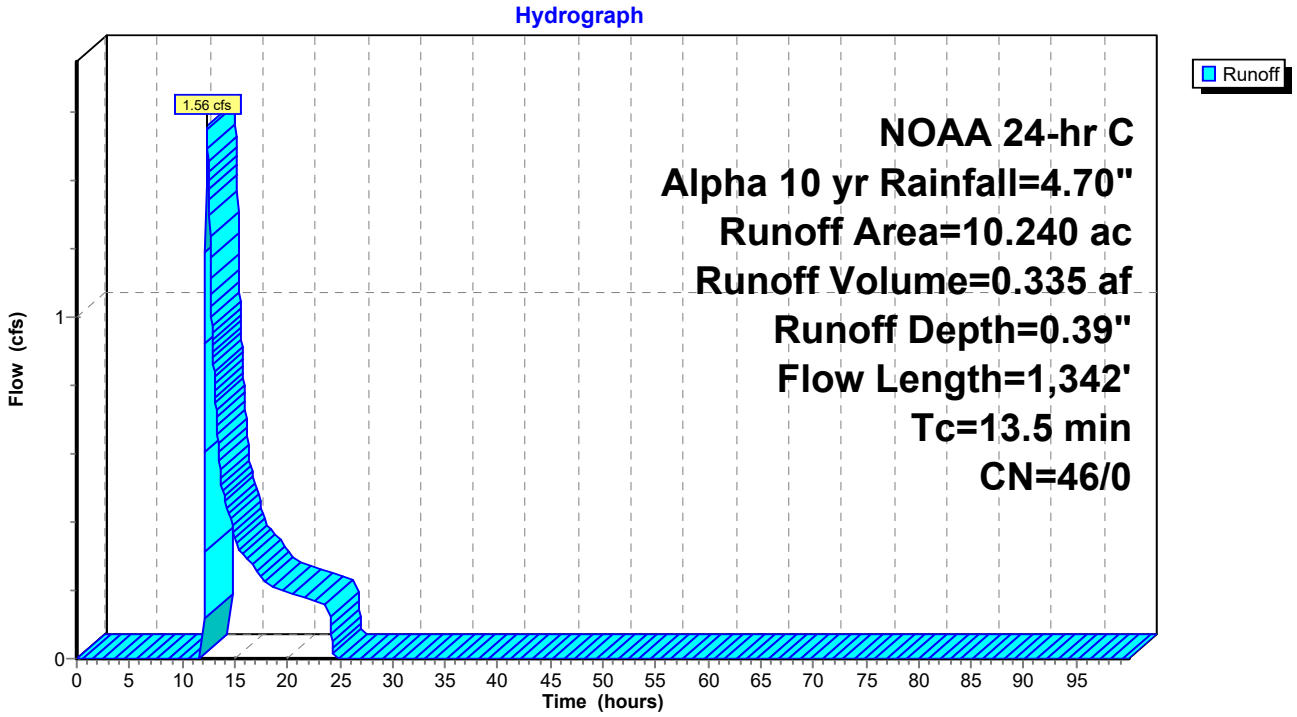
Runoff = 1.56 cfs @ 12.36 hrs, Volume= 0.335 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (ac)	CN	Description
2.100	30	Brush, Good, HSG A
7.590	48	Brush, Good, HSG B
0.550	73	Brush, Good, HSG D
10.240	46	Weighted Average
10.240	46	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0600	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
7.2	1,242	0.0320	2.88		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.5	1,342	Total			

Subcatchment 2: EDA-1A Pervious



Hydrograph for Subcatchment 2: EDA-1A Pervious

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.00	0.00	**0.00**
15.00	4.01	0.21	0.00	**0.36**
18.00	4.33	0.29	0.00	0.22
21.00	4.53	0.34	0.00	0.19
24.00	**4.70**	**0.39**	0.00	0.16
27.00	4.70	0.39	0.00	0.00
30.00	4.70	0.39	0.00	0.00
33.00	4.70	0.39	0.00	0.00
36.00	4.70	0.39	0.00	0.00
39.00	4.70	0.39	0.00	0.00
42.00	4.70	0.39	0.00	0.00
45.00	4.70	0.39	0.00	0.00
48.00	4.70	0.39	0.00	0.00
51.00	4.70	0.39	0.00	0.00
54.00	4.70	0.39	0.00	0.00
57.00	4.70	0.39	0.00	0.00
60.00	4.70	0.39	0.00	0.00
63.00	4.70	0.39	0.00	0.00
66.00	4.70	0.39	0.00	0.00
69.00	4.70	0.39	0.00	0.00
72.00	4.70	0.39	0.00	0.00
75.00	4.70	0.39	0.00	0.00
78.00	4.70	0.39	0.00	0.00
81.00	4.70	0.39	0.00	0.00
84.00	4.70	0.39	0.00	0.00
87.00	4.70	0.39	0.00	0.00
90.00	4.70	0.39	0.00	0.00
93.00	4.70	0.39	0.00	0.00
96.00	4.70	0.39	0.00	0.00
99.00	4.70	0.39	0.00	0.00

Summary for Subcatchment 3: EDA-1B Impervious (Offsite)

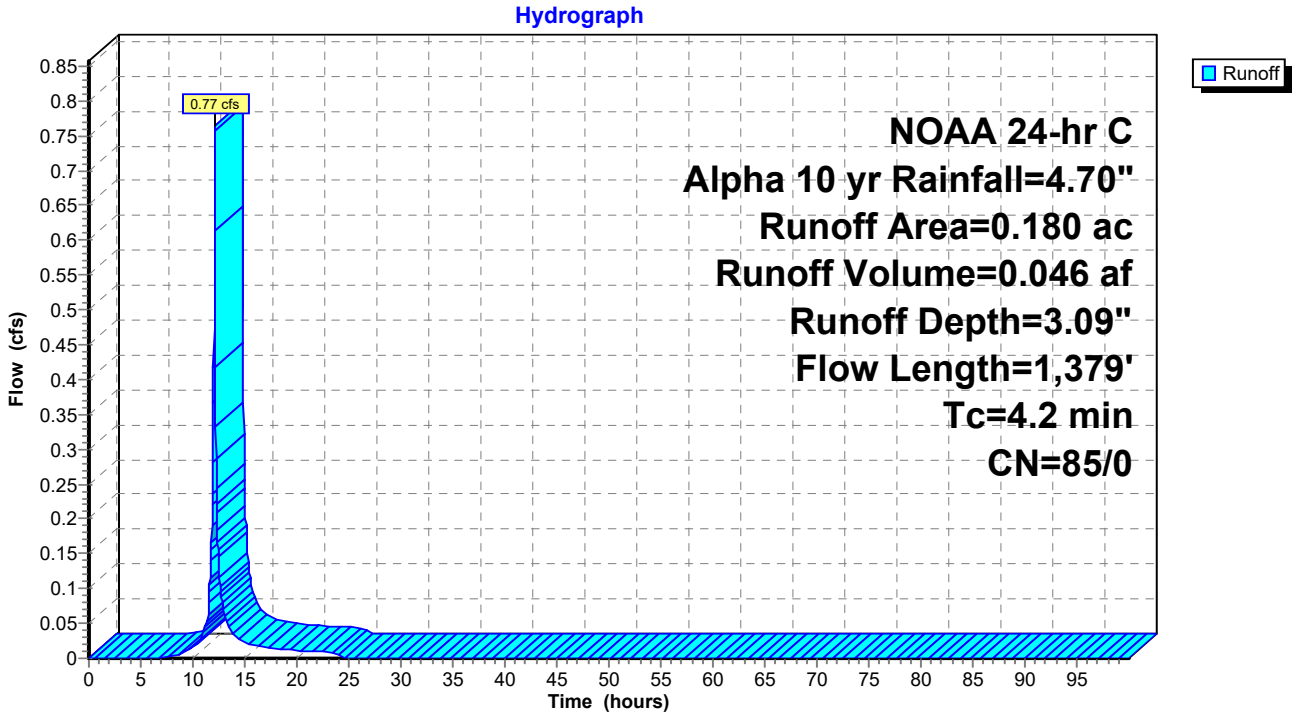
Runoff = 0.77 cfs @ 12.11 hrs, Volume= 0.046 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (ac)	CN	Description
0.180	85	Gravel roads, HSG B
0.180	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0220	1.44		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.2	114	0.0250	9.02	11.06	**Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished
0.2	259	0.0600	19.11	60.03	**Pipe Channel, CMP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished
0.7	574	0.0170	13.33	94.21	**Pipe Channel, DIP Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.9	332	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.2	1,379	Total			

Subcatchment 3: EDA-1B Impervious (Offsite)



Hydrograph for Subcatchment 3: EDA-1B Impervious (Offsite)

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.05	0.00	0.01
12.00	2.24	0.98	0.00	**0.42**
15.00	4.01	2.47	0.00	**0.02**
18.00	4.33	2.75	0.00	0.01
21.00	4.53	2.94	0.00	0.01
24.00	**4.70**	**3.09**	0.00	0.01
27.00	4.70	3.09	0.00	0.00
30.00	4.70	3.09	0.00	0.00
33.00	4.70	3.09	0.00	0.00
36.00	4.70	3.09	0.00	0.00
39.00	4.70	3.09	0.00	0.00
42.00	4.70	3.09	0.00	0.00
45.00	4.70	3.09	0.00	0.00
48.00	4.70	3.09	0.00	0.00
51.00	4.70	3.09	0.00	0.00
54.00	4.70	3.09	0.00	0.00
57.00	4.70	3.09	0.00	0.00
60.00	4.70	3.09	0.00	0.00
63.00	4.70	3.09	0.00	0.00
66.00	4.70	3.09	0.00	0.00
69.00	4.70	3.09	0.00	0.00
72.00	4.70	3.09	0.00	0.00
75.00	4.70	3.09	0.00	0.00
78.00	4.70	3.09	0.00	0.00
81.00	4.70	3.09	0.00	0.00
84.00	4.70	3.09	0.00	0.00
87.00	4.70	3.09	0.00	0.00
90.00	4.70	3.09	0.00	0.00
93.00	4.70	3.09	0.00	0.00
96.00	4.70	3.09	0.00	0.00
99.00	4.70	3.09	0.00	0.00

Summary for Subcatchment 5: EDA-2 Pervious

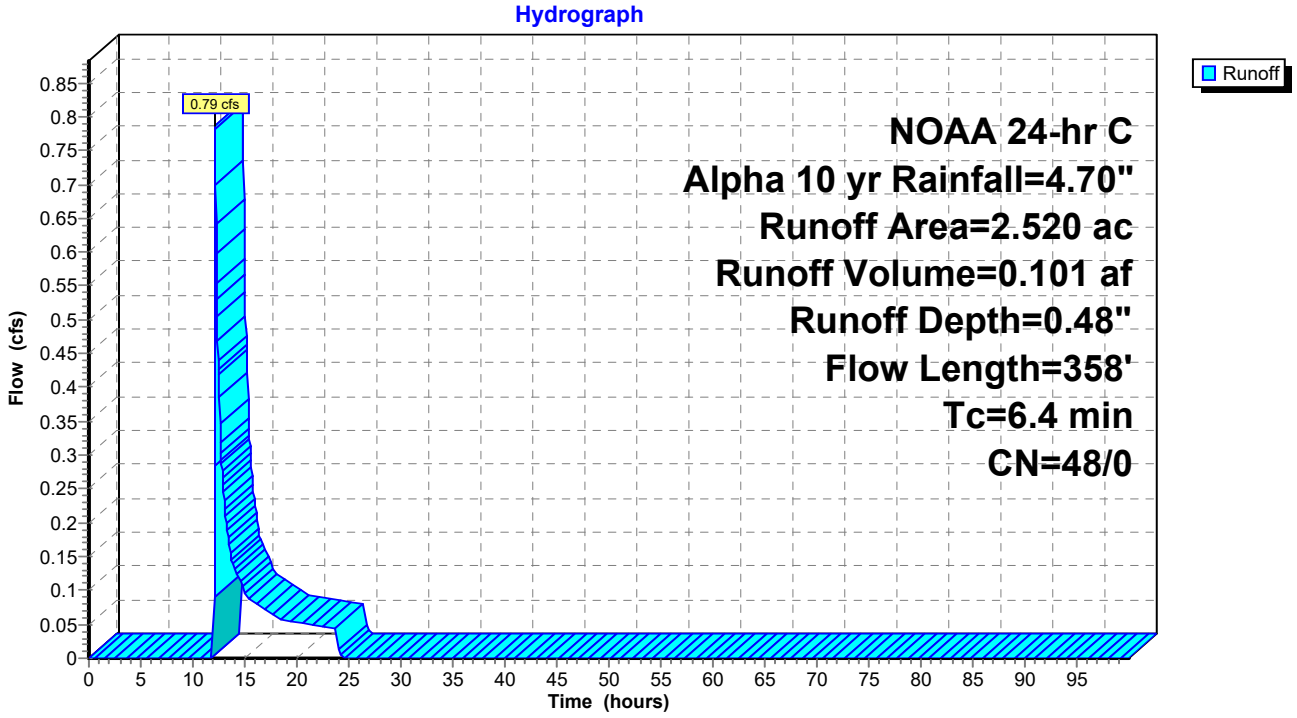
Runoff = 0.79 cfs @ 12.17 hrs, Volume= 0.101 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (ac)	CN	Description
2.470	48	Brush, Good, HSG B
0.050	73	Brush, Good, HSG D
2.520	48	Weighted Average
2.520	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.9	258	0.0860	4.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	358	Total			

Subcatchment 5: EDA-2 Pervious



Hydrograph for Subcatchment 5: EDA-2 Pervious

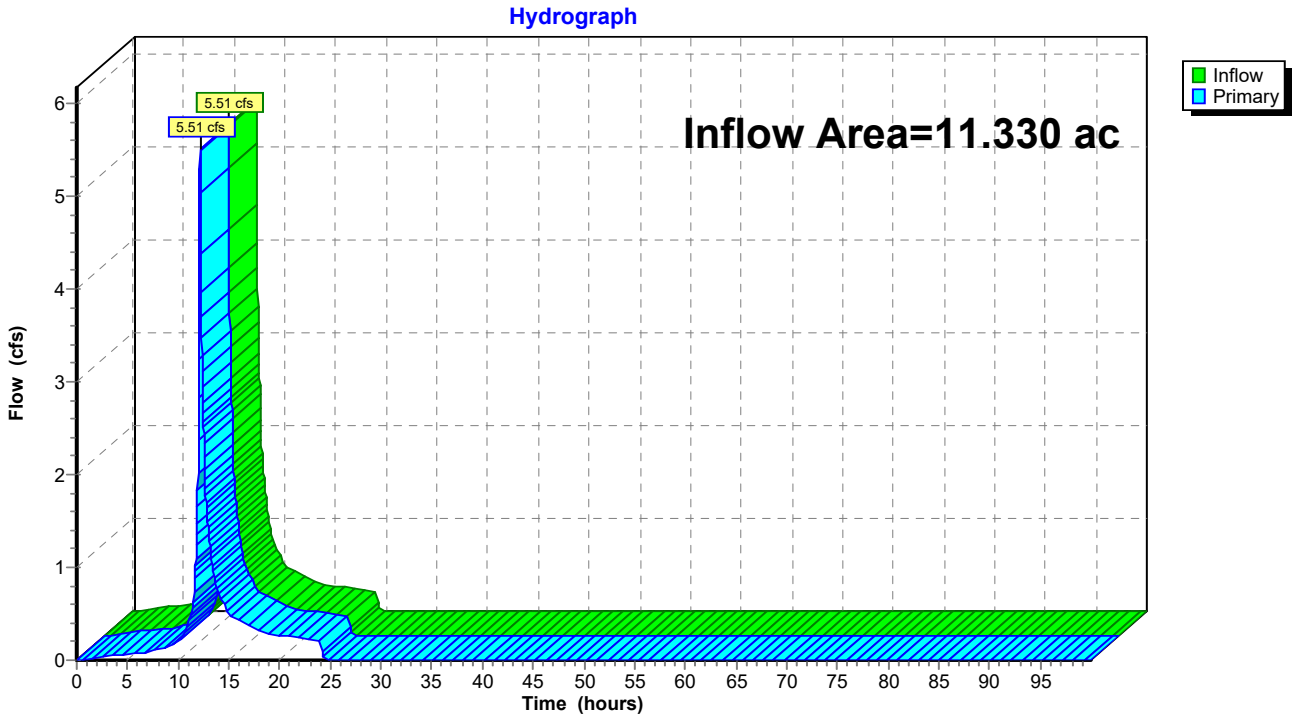
Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.00	0.00	**0.00**
15.00	4.01	0.27	0.00	**0.10**
18.00	4.33	0.36	0.00	0.06
21.00	4.53	0.42	0.00	0.05
24.00	**4.70**	**0.48**	0.00	0.05
27.00	4.70	0.48	0.00	0.00
30.00	4.70	0.48	0.00	0.00
33.00	4.70	0.48	0.00	0.00
36.00	4.70	0.48	0.00	0.00
39.00	4.70	0.48	0.00	0.00
42.00	4.70	0.48	0.00	0.00
45.00	4.70	0.48	0.00	0.00
48.00	4.70	0.48	0.00	0.00
51.00	4.70	0.48	0.00	0.00
54.00	4.70	0.48	0.00	0.00
57.00	4.70	0.48	0.00	0.00
60.00	4.70	0.48	0.00	0.00
63.00	4.70	0.48	0.00	0.00
66.00	4.70	0.48	0.00	0.00
69.00	4.70	0.48	0.00	0.00
72.00	4.70	0.48	0.00	0.00
75.00	4.70	0.48	0.00	0.00
78.00	4.70	0.48	0.00	0.00
81.00	4.70	0.48	0.00	0.00
84.00	4.70	0.48	0.00	0.00
87.00	4.70	0.48	0.00	0.00
90.00	4.70	0.48	0.00	0.00
93.00	4.70	0.48	0.00	0.00
96.00	4.70	0.48	0.00	0.00
99.00	4.70	0.48	0.00	0.00

Summary for Link 7: EDA-1A

Inflow Area = 11.330 ac, 9.62% Impervious, Inflow Depth = 0.78" for Alpha 10 yr event
Inflow = 5.51 cfs @ 12.14 hrs, Volume= 0.740 af
Primary = 5.51 cfs @ 12.14 hrs, Volume= 0.740 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 7: EDA-1A



Hydrograph for Link 7: EDA-1A

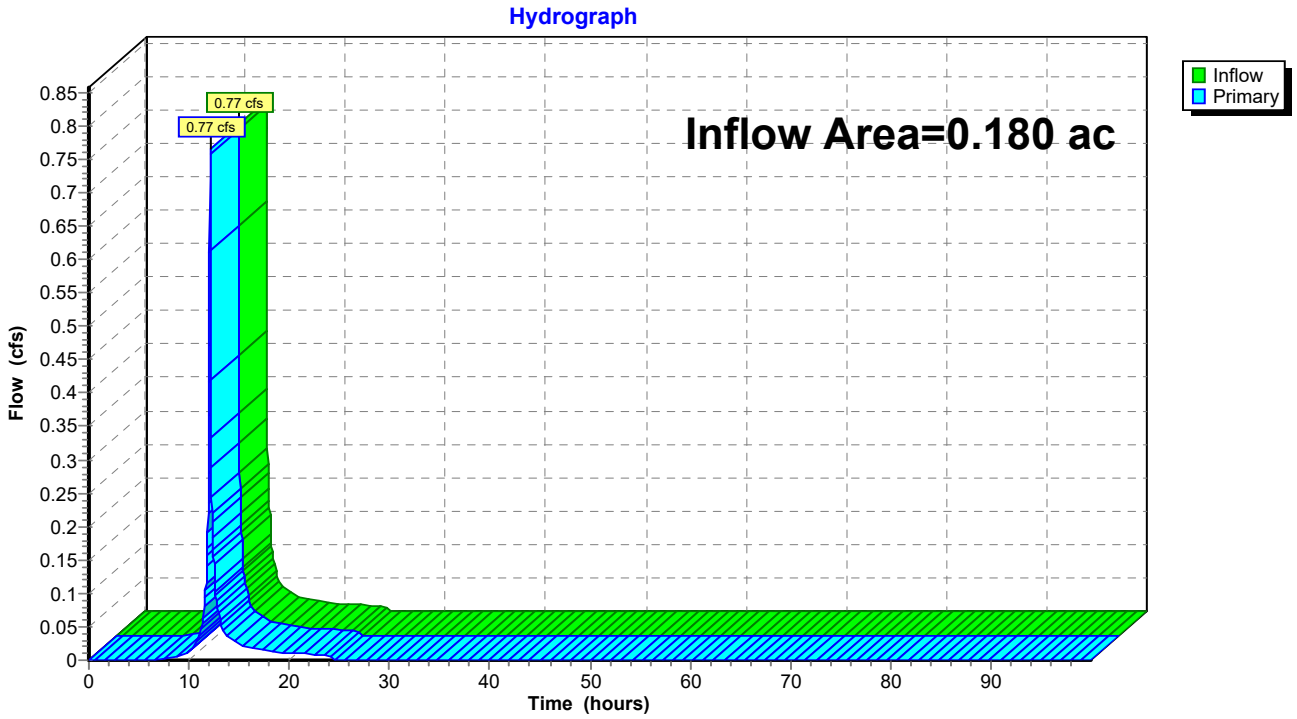
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.02	0.00	0.02	79.50	0.00	0.00	0.00
3.00	0.04	0.00	0.04	81.00	0.00	0.00	0.00
4.50	0.06	0.00	0.06	82.50	0.00	0.00	0.00
6.00	0.07	0.00	0.07	84.00	0.00	0.00	0.00
7.50	0.10	0.00	0.10	85.50	0.00	0.00	0.00
9.00	0.14	0.00	0.14	87.00	0.00	0.00	0.00
10.50	0.25	0.00	0.25	88.50	0.00	0.00	0.00
12.00	**2.84**	0.00	**2.84**	90.00	0.00	0.00	0.00
13.50	**0.92**	0.00	**0.92**	91.50	0.00	0.00	0.00
15.00	0.51	0.00	0.51	93.00	0.00	0.00	0.00
16.50	0.40	0.00	0.40	94.50	0.00	0.00	0.00
18.00	0.31	0.00	0.31	96.00	0.00	0.00	0.00
19.50	0.28	0.00	0.28	97.50	0.00	0.00	0.00
21.00	0.26	0.00	0.26	99.00	0.00	0.00	0.00
22.50	0.23	0.00	0.23				
24.00	0.22	0.00	0.22				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 8: EDA-1B

Inflow Area = 0.180 ac, 0.00% Impervious, Inflow Depth = 3.09" for Alpha 10 yr event
Inflow = 0.77 cfs @ 12.11 hrs, Volume= 0.046 af
Primary = 0.77 cfs @ 12.11 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 8: EDA-1B



Hydrograph for Link 8: EDA-1B

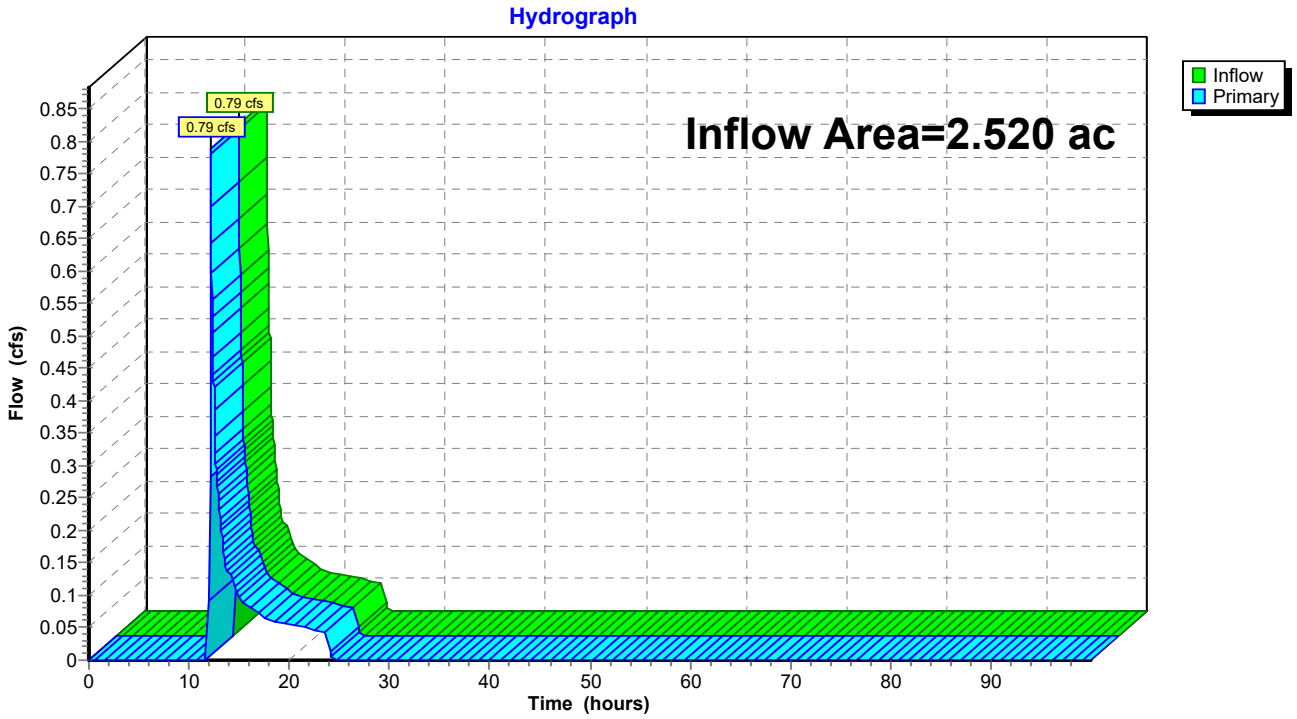
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.01	0.00	0.01	87.00	0.00	0.00	0.00
10.50	0.02	0.00	0.02	88.50	0.00	0.00	0.00
12.00	**0.42**	0.00	**0.42**	90.00	0.00	0.00	0.00
13.50	**0.04**	0.00	**0.04**	91.50	0.00	0.00	0.00
15.00	0.02	0.00	0.02	93.00	0.00	0.00	0.00
16.50	0.02	0.00	0.02	94.50	0.00	0.00	0.00
18.00	0.01	0.00	0.01	96.00	0.00	0.00	0.00
19.50	0.01	0.00	0.01	97.50	0.00	0.00	0.00
21.00	0.01	0.00	0.01	99.00	0.00	0.00	0.00
22.50	0.01	0.00	0.01				
24.00	0.01	0.00	0.01				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 9: EDA-2A

Inflow Area = 2.520 ac, 0.00% Impervious, Inflow Depth = 0.48" for Alpha 10 yr event
Inflow = 0.79 cfs @ 12.17 hrs, Volume= 0.101 af
Primary = 0.79 cfs @ 12.17 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 9: EDA-2A



Hydrograph for Link 9: EDA-2A

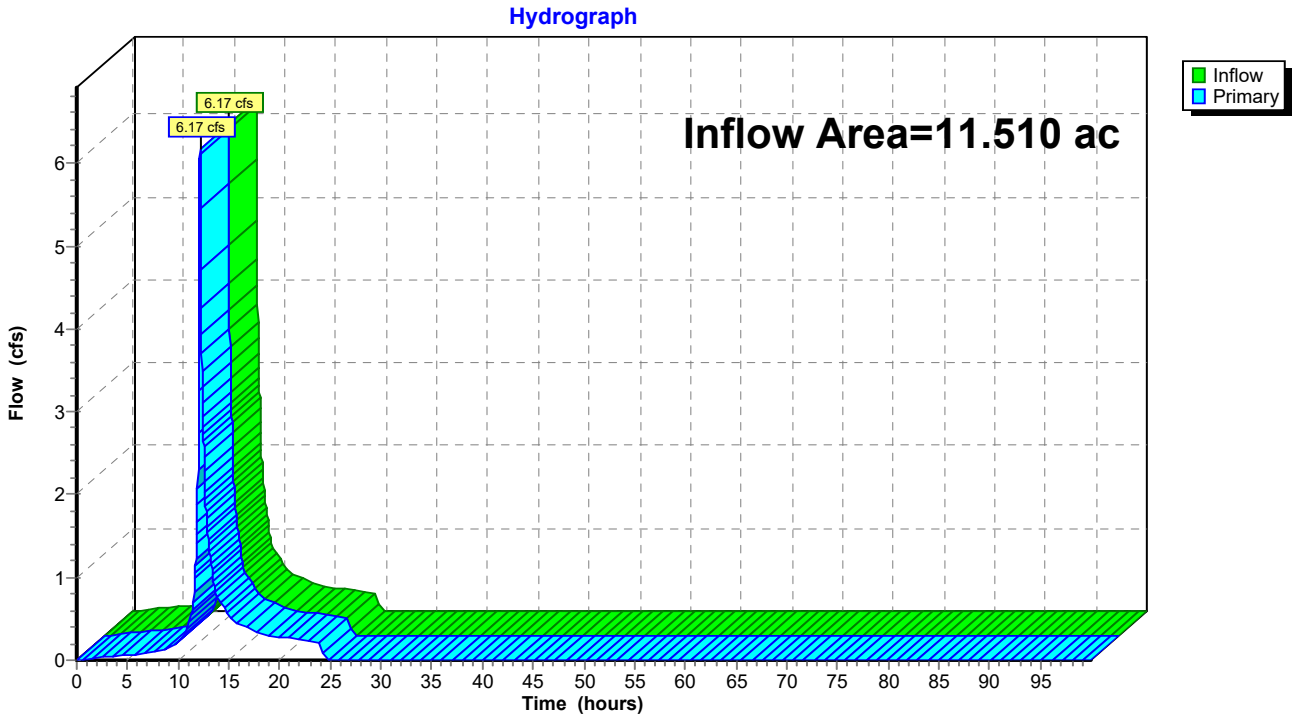
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**0.00**	0.00	**0.00**	90.00	0.00	0.00	0.00
13.50	**0.16**	0.00	**0.16**	91.50	0.00	0.00	0.00
15.00	0.10	0.00	0.10	93.00	0.00	0.00	0.00
16.50	0.08	0.00	0.08	94.50	0.00	0.00	0.00
18.00	0.06	0.00	0.06	96.00	0.00	0.00	0.00
19.50	0.06	0.00	0.06	97.50	0.00	0.00	0.00
21.00	0.05	0.00	0.05	99.00	0.00	0.00	0.00
22.50	0.05	0.00	0.05				
24.00	0.05	0.00	0.05				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 11: POA A

Inflow Area = 11.510 ac, 9.47% Impervious, Inflow Depth = 0.82" for Alpha 10 yr event
Inflow = 6.17 cfs @ 12.14 hrs, Volume= 0.787 af
Primary = 6.17 cfs @ 12.14 hrs, Volume= 0.787 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 11: POA A



Hydrograph for Link 11: POA A

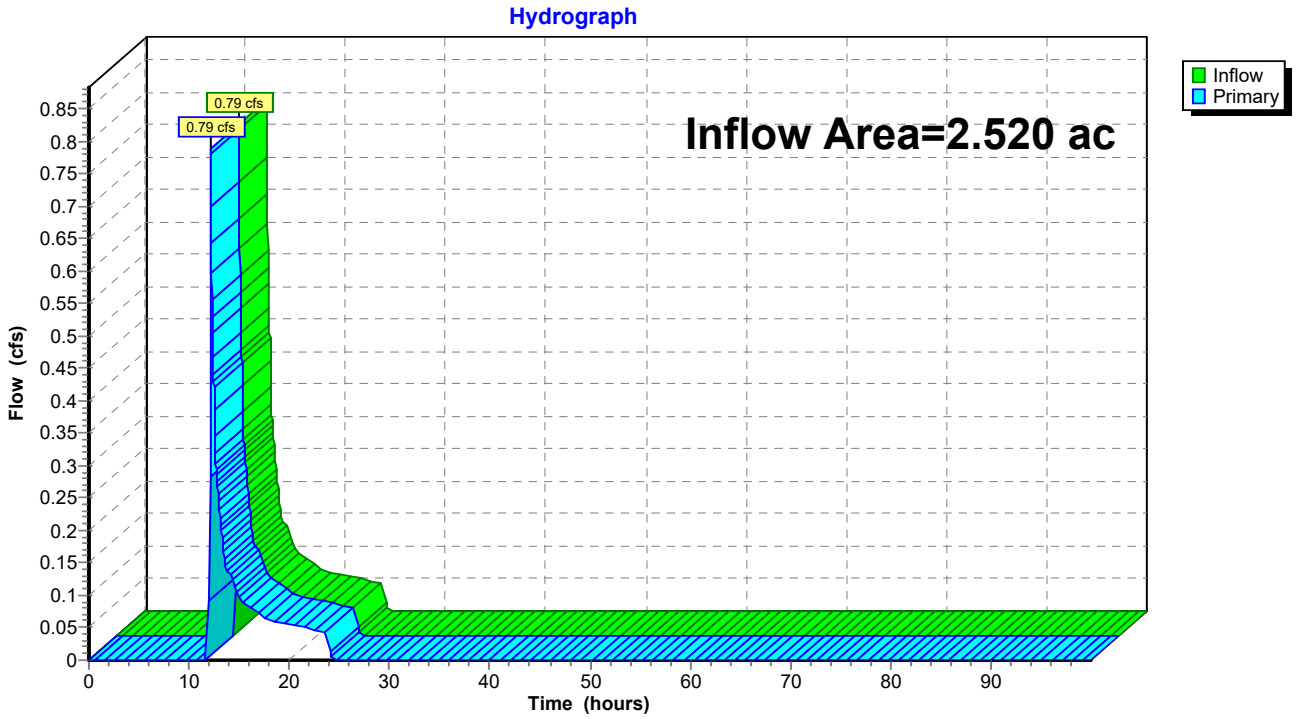
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.02	0.00	0.02	79.50	0.00	0.00	0.00
3.00	0.04	0.00	0.04	81.00	0.00	0.00	0.00
4.50	0.06	0.00	0.06	82.50	0.00	0.00	0.00
6.00	0.07	0.00	0.07	84.00	0.00	0.00	0.00
7.50	0.11	0.00	0.11	85.50	0.00	0.00	0.00
9.00	0.14	0.00	0.14	87.00	0.00	0.00	0.00
10.50	0.27	0.00	0.27	88.50	0.00	0.00	0.00
12.00	**3.26**	0.00	**3.26**	90.00	0.00	0.00	0.00
13.50	**0.96**	0.00	**0.96**	91.50	0.00	0.00	0.00
15.00	0.53	0.00	0.53	93.00	0.00	0.00	0.00
16.50	0.41	0.00	0.41	94.50	0.00	0.00	0.00
18.00	0.32	0.00	0.32	96.00	0.00	0.00	0.00
19.50	0.29	0.00	0.29	97.50	0.00	0.00	0.00
21.00	0.27	0.00	0.27	99.00	0.00	0.00	0.00
22.50	0.24	0.00	0.24				
24.00	0.23	0.00	0.23				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 12: POA B

Inflow Area = 2.520 ac, 0.00% Impervious, Inflow Depth = 0.48" for Alpha 10 yr event
Inflow = 0.79 cfs @ 12.17 hrs, Volume= 0.101 af
Primary = 0.79 cfs @ 12.17 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 12: POA B



Hydrograph for Link 12: POA B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**0.00**	0.00	**0.00**	90.00	0.00	0.00	0.00
13.50	**0.16**	0.00	**0.16**	91.50	0.00	0.00	0.00
15.00	0.10	0.00	0.10	93.00	0.00	0.00	0.00
16.50	0.08	0.00	0.08	94.50	0.00	0.00	0.00
18.00	0.06	0.00	0.06	96.00	0.00	0.00	0.00
19.50	0.06	0.00	0.06	97.50	0.00	0.00	0.00
21.00	0.05	0.00	0.05	99.00	0.00	0.00	0.00
22.50	0.05	0.00	0.05				
24.00	0.05	0.00	0.05				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA-1A Impervious Runoff Area=1.090 ac 100.00% Impervious Runoff Depth=7.23"
Flow Length=924' Tc=6.8 min CN=0/98 Runoff=8.42 cfs 0.657 af

Subcatchment2: EDA-1A Pervious Runoff Area=10.240 ac 0.00% Impervious Runoff Depth=1.56"
Flow Length=1,342' Tc=13.5 min CN=46/0 Runoff=13.51 cfs 1.328 af

Subcatchment3: EDA-1B Impervious Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=5.70"
Flow Length=1,379' Tc=4.2 min CN=85/0 Runoff=1.36 cfs 0.086 af

Subcatchment5: EDA-2 Pervious Runoff Area=2.520 ac 0.00% Impervious Runoff Depth=1.74"
Flow Length=358' Tc=6.4 min CN=48/0 Runoff=5.18 cfs 0.366 af

Link 7: EDA-1A Inflow=18.90 cfs 1.985 af
Primary=18.90 cfs 1.985 af

Link 8: EDA-1B Inflow=1.36 cfs 0.086 af
Primary=1.36 cfs 0.086 af

Link 9: EDA-2A Inflow=5.18 cfs 0.366 af
Primary=5.18 cfs 0.366 af

Link 11: POA A Inflow=19.59 cfs 2.070 af
Primary=19.59 cfs 2.070 af

Link 12: POA B Inflow=5.18 cfs 0.366 af
Primary=5.18 cfs 0.366 af

Total Runoff Area = 14.030 ac Runoff Volume = 2.436 af Average Runoff Depth = 2.08"
92.23% Pervious = 12.940 ac 7.77% Impervious = 1.090 ac

Summary for Subcatchment 1: EDA-1A Impervious

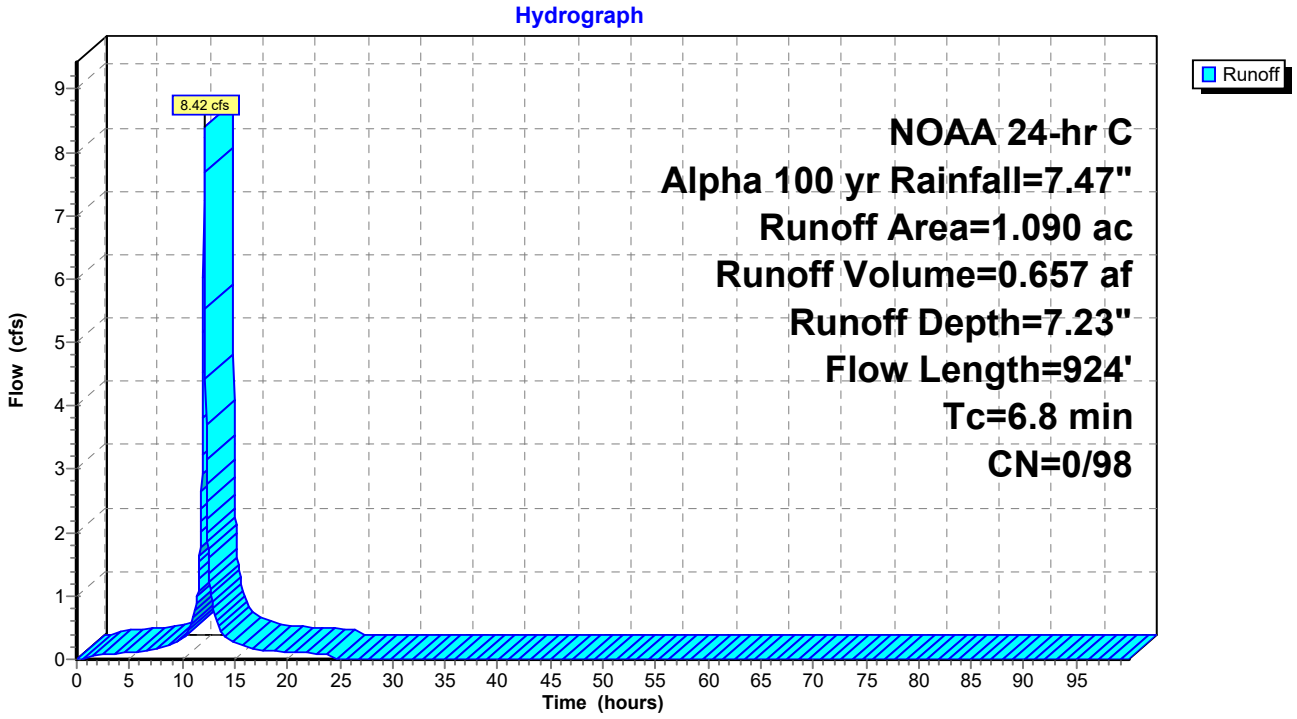
Runoff = 8.42 cfs @ 12.14 hrs, Volume= 0.657 af, Depth= 7.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (ac)	CN	Description
*	1.090	98	Impervious Surfaces, HSG D
	1.090	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.63		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
5.8	824	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.8	924	Total			

Subcatchment 1: EDA-1A Impervious



Hydrograph for Subcatchment 1: EDA-1A Impervious

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.26	0.00	0.12	0.08
6.00	0.59	0.00	0.40	0.12
9.00	1.09	0.00	0.88	0.22
12.00	3.56	0.00	3.33	**4.54**
15.00	6.38	0.00	6.14	**0.25**
18.00	6.88	0.00	6.64	0.14
21.00	7.21	0.00	6.97	0.11
24.00	**7.47**	0.00	**7.23**	0.10
27.00	7.47	0.00	7.23	0.00
30.00	7.47	0.00	7.23	0.00
33.00	7.47	0.00	7.23	0.00
36.00	7.47	0.00	7.23	0.00
39.00	7.47	0.00	7.23	0.00
42.00	7.47	0.00	7.23	0.00
45.00	7.47	0.00	7.23	0.00
48.00	7.47	0.00	7.23	0.00
51.00	7.47	0.00	7.23	0.00
54.00	7.47	0.00	7.23	0.00
57.00	7.47	0.00	7.23	0.00
60.00	7.47	0.00	7.23	0.00
63.00	7.47	0.00	7.23	0.00
66.00	7.47	0.00	7.23	0.00
69.00	7.47	0.00	7.23	0.00
72.00	7.47	0.00	7.23	0.00
75.00	7.47	0.00	7.23	0.00
78.00	7.47	0.00	7.23	0.00
81.00	7.47	0.00	7.23	0.00
84.00	7.47	0.00	7.23	0.00
87.00	7.47	0.00	7.23	0.00
90.00	7.47	0.00	7.23	0.00
93.00	7.47	0.00	7.23	0.00
96.00	7.47	0.00	7.23	0.00
99.00	7.47	0.00	7.23	0.00

Summary for Subcatchment 2: EDA-1A Pervious

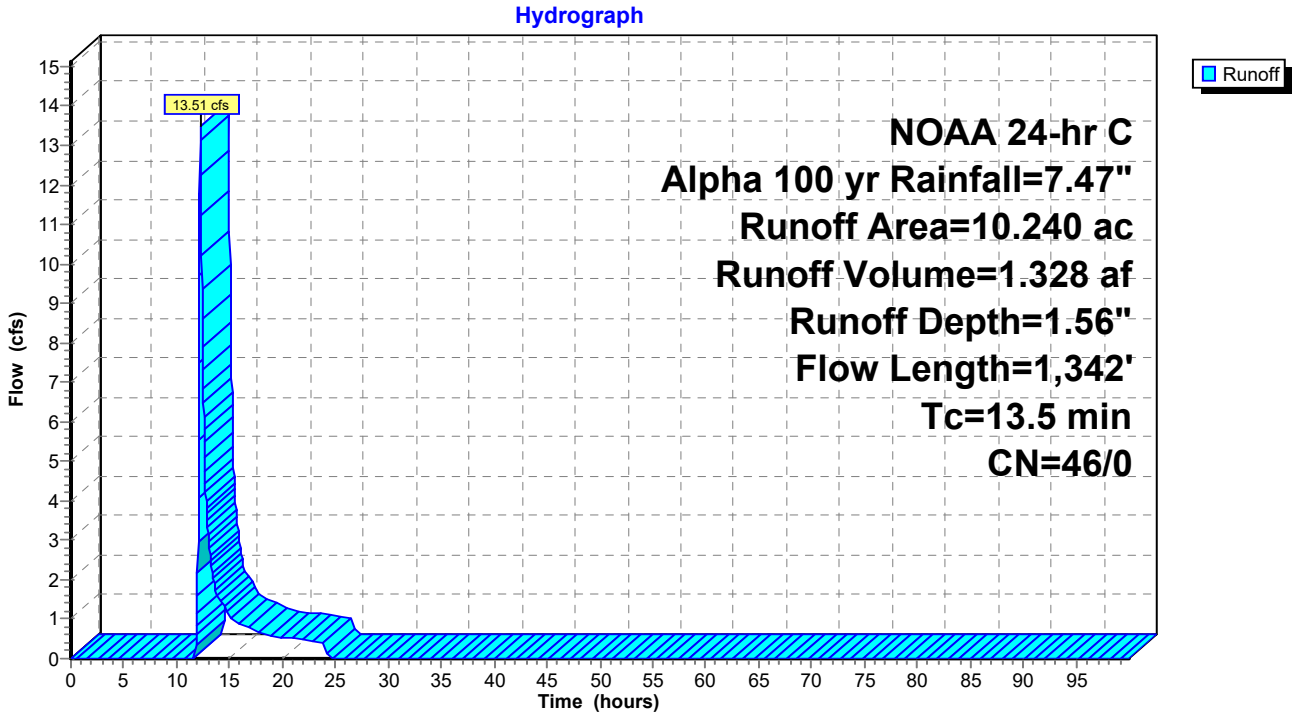
Runoff = 13.51 cfs @ 12.24 hrs, Volume= 1.328 af, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (ac)	CN	Description
2.100	30	Brush, Good, HSG A
7.590	48	Brush, Good, HSG B
0.550	73	Brush, Good, HSG D
10.240	46	Weighted Average
10.240	46	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0600	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
7.2	1,242	0.0320	2.88		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.5	1,342	Total			

Subcatchment 2: EDA-1A Pervious



Hydrograph for Subcatchment 2: EDA-1A Pervious

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.11	0.00	**2.19**
15.00	6.38	1.03	0.00	**1.09**
18.00	6.88	1.26	0.00	0.63
21.00	7.21	1.42	0.00	0.51
24.00	**7.47**	**1.56**	0.00	0.42
27.00	7.47	1.56	0.00	0.00
30.00	7.47	1.56	0.00	0.00
33.00	7.47	1.56	0.00	0.00
36.00	7.47	1.56	0.00	0.00
39.00	7.47	1.56	0.00	0.00
42.00	7.47	1.56	0.00	0.00
45.00	7.47	1.56	0.00	0.00
48.00	7.47	1.56	0.00	0.00
51.00	7.47	1.56	0.00	0.00
54.00	7.47	1.56	0.00	0.00
57.00	7.47	1.56	0.00	0.00
60.00	7.47	1.56	0.00	0.00
63.00	7.47	1.56	0.00	0.00
66.00	7.47	1.56	0.00	0.00
69.00	7.47	1.56	0.00	0.00
72.00	7.47	1.56	0.00	0.00
75.00	7.47	1.56	0.00	0.00
78.00	7.47	1.56	0.00	0.00
81.00	7.47	1.56	0.00	0.00
84.00	7.47	1.56	0.00	0.00
87.00	7.47	1.56	0.00	0.00
90.00	7.47	1.56	0.00	0.00
93.00	7.47	1.56	0.00	0.00
96.00	7.47	1.56	0.00	0.00
99.00	7.47	1.56	0.00	0.00

Summary for Subcatchment 3: EDA-1B Impervious (Offsite)

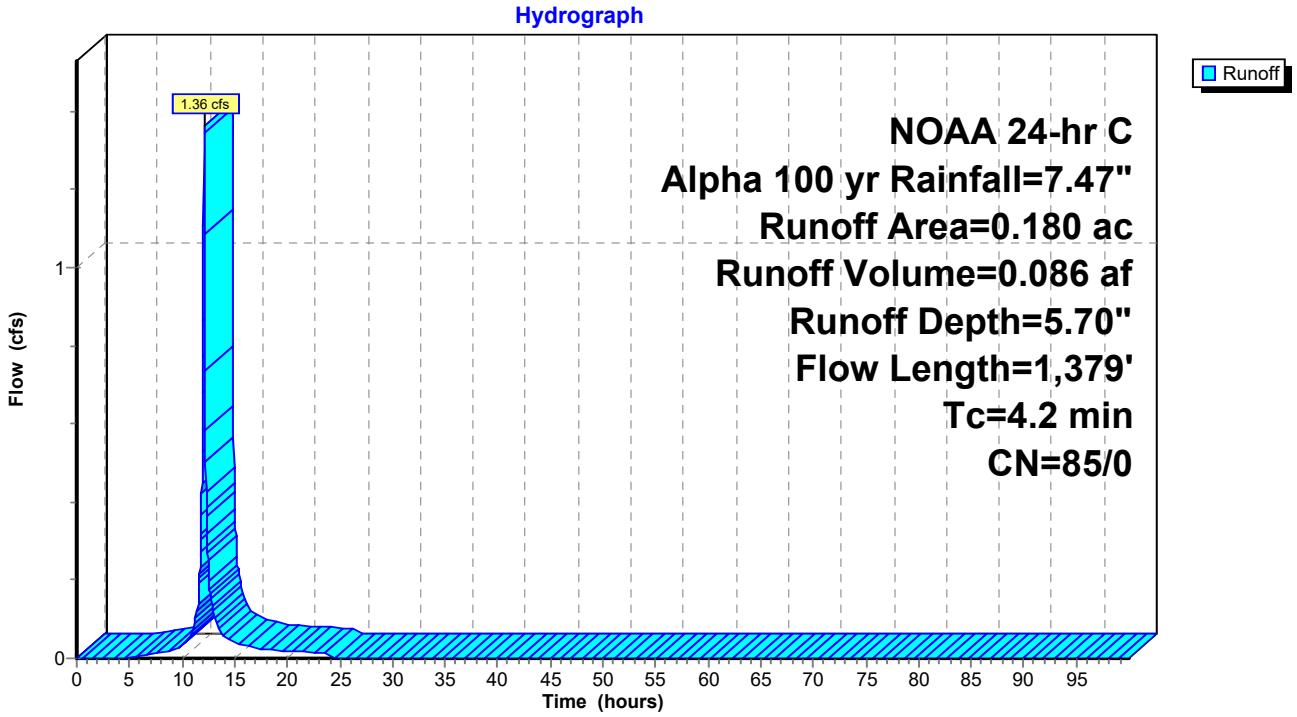
Runoff = 1.36 cfs @ 12.11 hrs, Volume= 0.086 af, Depth= 5.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (ac)	CN	Description
0.180	85	Gravel roads, HSG B
0.180	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0220	1.44		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.2	114	0.0250	9.02	11.06	**Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished
0.2	259	0.0600	19.11	60.03	**Pipe Channel, CMP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished
0.7	574	0.0170	13.33	94.21	**Pipe Channel, DIP Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.9	332	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.2	1,379	Total			

Subcatchment 3: EDA-1B Impervious (Offsite)



Hydrograph for Subcatchment 3: EDA-1B Impervious (Offsite)

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.03	0.00	0.00
9.00	1.09	0.22	0.00	0.02
12.00	3.56	2.07	0.00	**0.77**
15.00	6.38	4.66	0.00	**0.04**
18.00	6.88	5.14	0.00	0.02
21.00	7.21	5.45	0.00	0.02
24.00	**7.47**	**5.70**	0.00	0.02
27.00	7.47	5.70	0.00	0.00
30.00	7.47	5.70	0.00	0.00
33.00	7.47	5.70	0.00	0.00
36.00	7.47	5.70	0.00	0.00
39.00	7.47	5.70	0.00	0.00
42.00	7.47	5.70	0.00	0.00
45.00	7.47	5.70	0.00	0.00
48.00	7.47	5.70	0.00	0.00
51.00	7.47	5.70	0.00	0.00
54.00	7.47	5.70	0.00	0.00
57.00	7.47	5.70	0.00	0.00
60.00	7.47	5.70	0.00	0.00
63.00	7.47	5.70	0.00	0.00
66.00	7.47	5.70	0.00	0.00
69.00	7.47	5.70	0.00	0.00
72.00	7.47	5.70	0.00	0.00
75.00	7.47	5.70	0.00	0.00
78.00	7.47	5.70	0.00	0.00
81.00	7.47	5.70	0.00	0.00
84.00	7.47	5.70	0.00	0.00
87.00	7.47	5.70	0.00	0.00
90.00	7.47	5.70	0.00	0.00
93.00	7.47	5.70	0.00	0.00
96.00	7.47	5.70	0.00	0.00
99.00	7.47	5.70	0.00	0.00

Summary for Subcatchment 5: EDA-2 Pervious

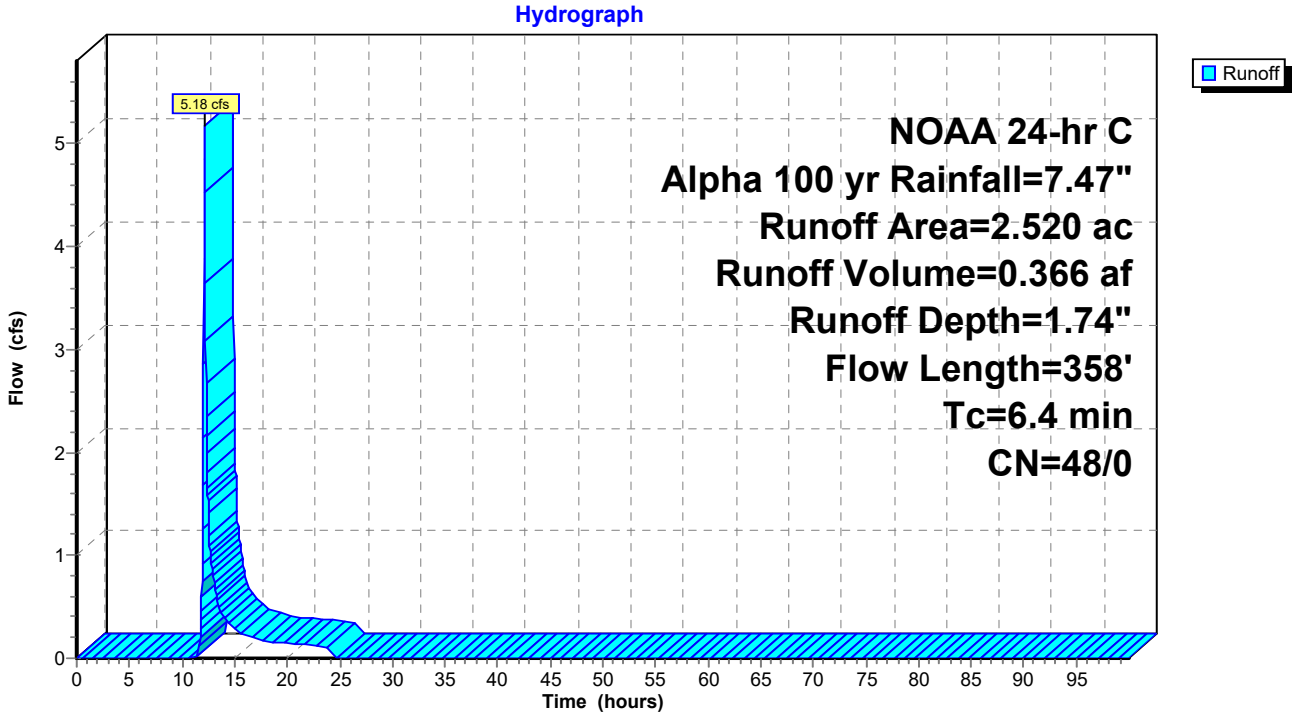
Runoff = 5.18 cfs @ 12.15 hrs, Volume= 0.366 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (ac)	CN	Description
2.470	48	Brush, Good, HSG B
0.050	73	Brush, Good, HSG D
2.520	48	Weighted Average
2.520	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.9	258	0.0860	4.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	358	Total			

Subcatchment 5: EDA-2 Pervious



Hydrograph for Subcatchment 5: EDA-2 Pervious

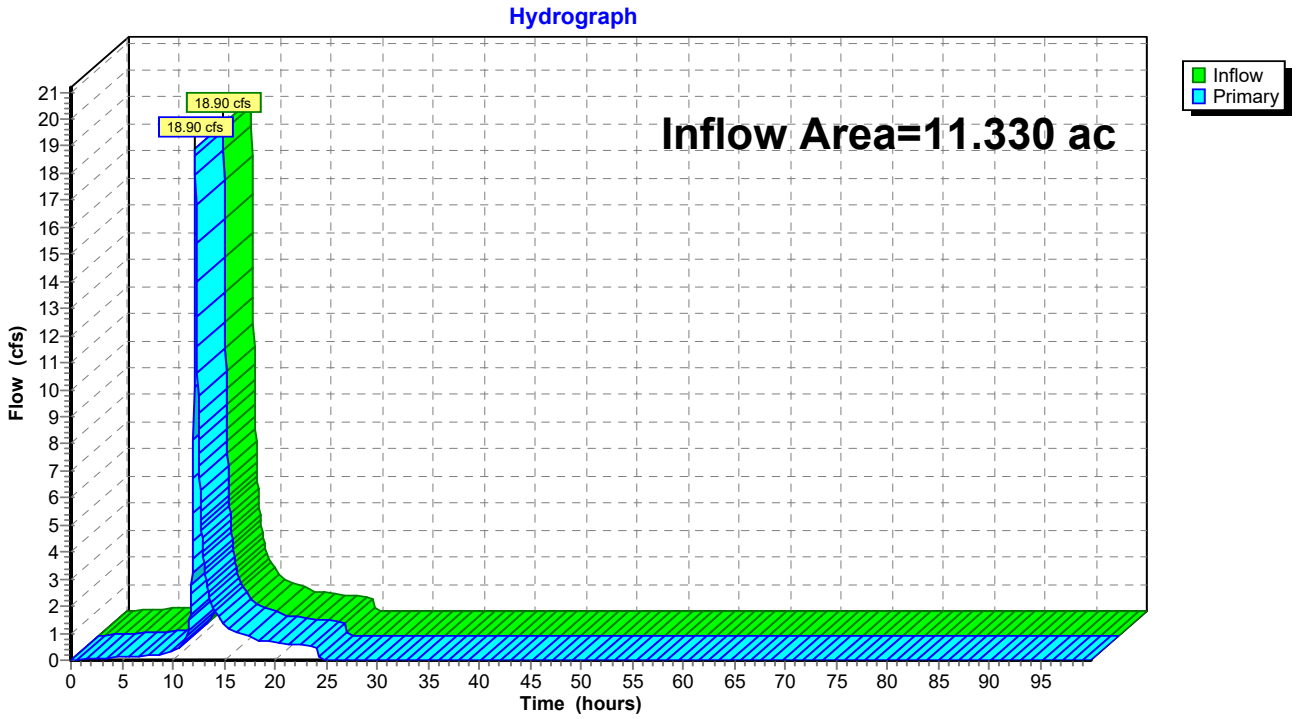
Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.16	0.00	**1.69**
15.00	6.38	1.18	0.00	**0.28**
18.00	6.88	1.43	0.00	0.16
21.00	7.21	1.60	0.00	0.13
24.00	**7.47**	**1.74**	0.00	0.12
27.00	7.47	1.74	0.00	0.00
30.00	7.47	1.74	0.00	0.00
33.00	7.47	1.74	0.00	0.00
36.00	7.47	1.74	0.00	0.00
39.00	7.47	1.74	0.00	0.00
42.00	7.47	1.74	0.00	0.00
45.00	7.47	1.74	0.00	0.00
48.00	7.47	1.74	0.00	0.00
51.00	7.47	1.74	0.00	0.00
54.00	7.47	1.74	0.00	0.00
57.00	7.47	1.74	0.00	0.00
60.00	7.47	1.74	0.00	0.00
63.00	7.47	1.74	0.00	0.00
66.00	7.47	1.74	0.00	0.00
69.00	7.47	1.74	0.00	0.00
72.00	7.47	1.74	0.00	0.00
75.00	7.47	1.74	0.00	0.00
78.00	7.47	1.74	0.00	0.00
81.00	7.47	1.74	0.00	0.00
84.00	7.47	1.74	0.00	0.00
87.00	7.47	1.74	0.00	0.00
90.00	7.47	1.74	0.00	0.00
93.00	7.47	1.74	0.00	0.00
96.00	7.47	1.74	0.00	0.00
99.00	7.47	1.74	0.00	0.00

Summary for Link 7: EDA-1A

Inflow Area = 11.330 ac, 9.62% Impervious, Inflow Depth = 2.10" for Alpha 100 yr event
Inflow = 18.90 cfs @ 12.19 hrs, Volume= 1.985 af
Primary = 18.90 cfs @ 12.19 hrs, Volume= 1.985 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 7: EDA-1A



Hydrograph for Link 7: EDA-1A

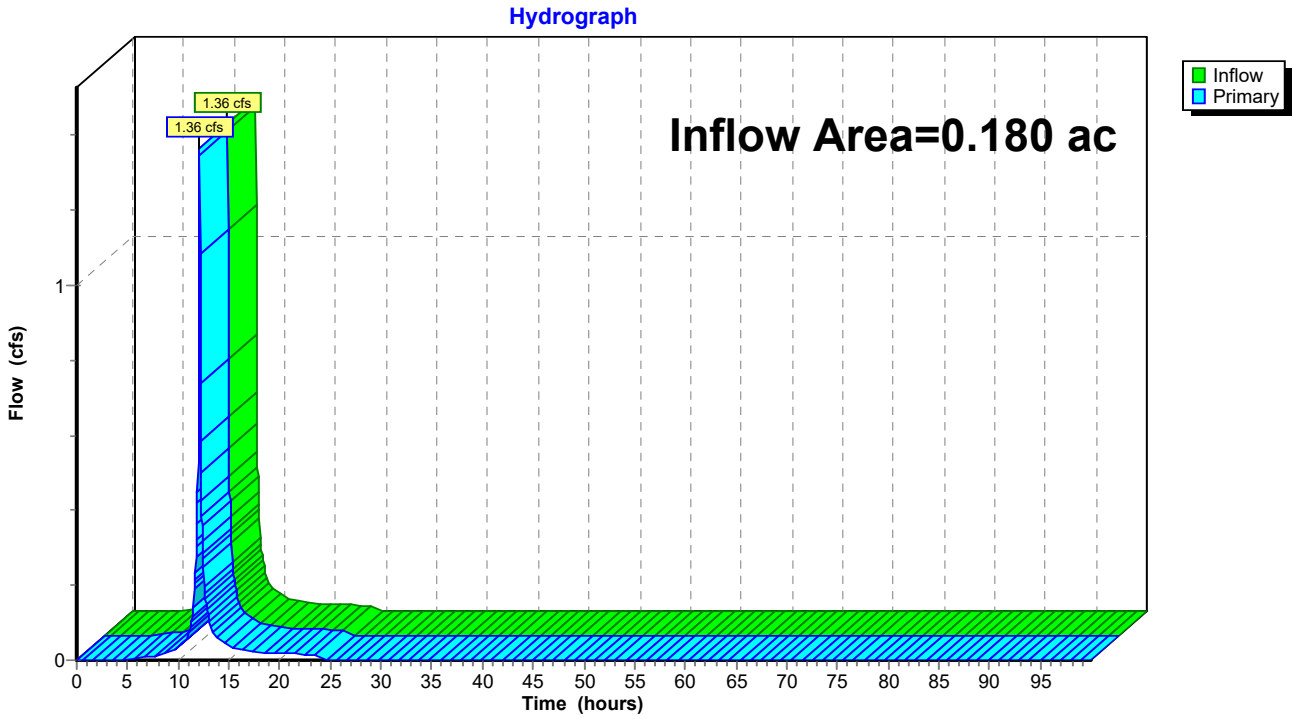
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.04	0.00	0.04	79.50	0.00	0.00	0.00
3.00	0.08	0.00	0.08	81.00	0.00	0.00	0.00
4.50	0.10	0.00	0.10	82.50	0.00	0.00	0.00
6.00	0.12	0.00	0.12	84.00	0.00	0.00	0.00
7.50	0.17	0.00	0.17	85.50	0.00	0.00	0.00
9.00	0.22	0.00	0.22	87.00	0.00	0.00	0.00
10.50	0.40	0.00	0.40	88.50	0.00	0.00	0.00
12.00	**6.73**	0.00	**6.73**	90.00	0.00	0.00	0.00
13.50	**2.53**	0.00	**2.53**	91.50	0.00	0.00	0.00
15.00	1.34	0.00	1.34	93.00	0.00	0.00	0.00
16.50	1.01	0.00	1.01	94.50	0.00	0.00	0.00
18.00	0.77	0.00	0.77	96.00	0.00	0.00	0.00
19.50	0.68	0.00	0.68	97.50	0.00	0.00	0.00
21.00	0.62	0.00	0.62	99.00	0.00	0.00	0.00
22.50	0.56	0.00	0.56				
24.00	0.52	0.00	0.52				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 8: EDA-1B

Inflow Area = 0.180 ac, 0.00% Impervious, Inflow Depth = 5.70" for Alpha 100 yr event
Inflow = 1.36 cfs @ 12.11 hrs, Volume= 0.086 af
Primary = 1.36 cfs @ 12.11 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 8: EDA-1B



Hydrograph for Link 8: EDA-1B

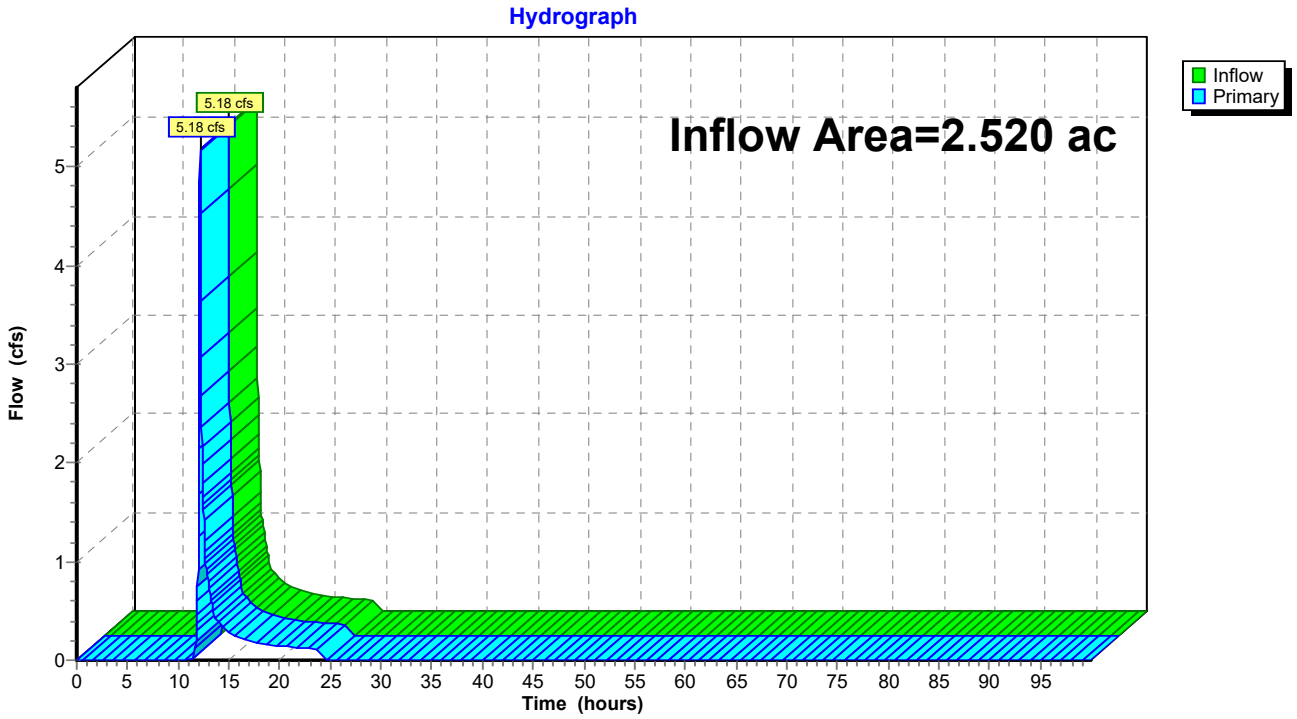
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.01	0.00	0.01	85.50	0.00	0.00	0.00
9.00	0.02	0.00	0.02	87.00	0.00	0.00	0.00
10.50	0.04	0.00	0.04	88.50	0.00	0.00	0.00
12.00	**0.77**	0.00	**0.77**	90.00	0.00	0.00	0.00
13.50	**0.07**	0.00	**0.07**	91.50	0.00	0.00	0.00
15.00	0.04	0.00	0.04	93.00	0.00	0.00	0.00
16.50	0.03	0.00	0.03	94.50	0.00	0.00	0.00
18.00	0.02	0.00	0.02	96.00	0.00	0.00	0.00
19.50	0.02	0.00	0.02	97.50	0.00	0.00	0.00
21.00	0.02	0.00	0.02	99.00	0.00	0.00	0.00
22.50	0.02	0.00	0.02				
24.00	0.02	0.00	0.02				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 9: EDA-2A

Inflow Area = 2.520 ac, 0.00% Impervious, Inflow Depth = 1.74" for Alpha 100 yr event
Inflow = 5.18 cfs @ 12.15 hrs, Volume= 0.366 af
Primary = 5.18 cfs @ 12.15 hrs, Volume= 0.366 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 9: EDA-2A



Hydrograph for Link 9: EDA-2A

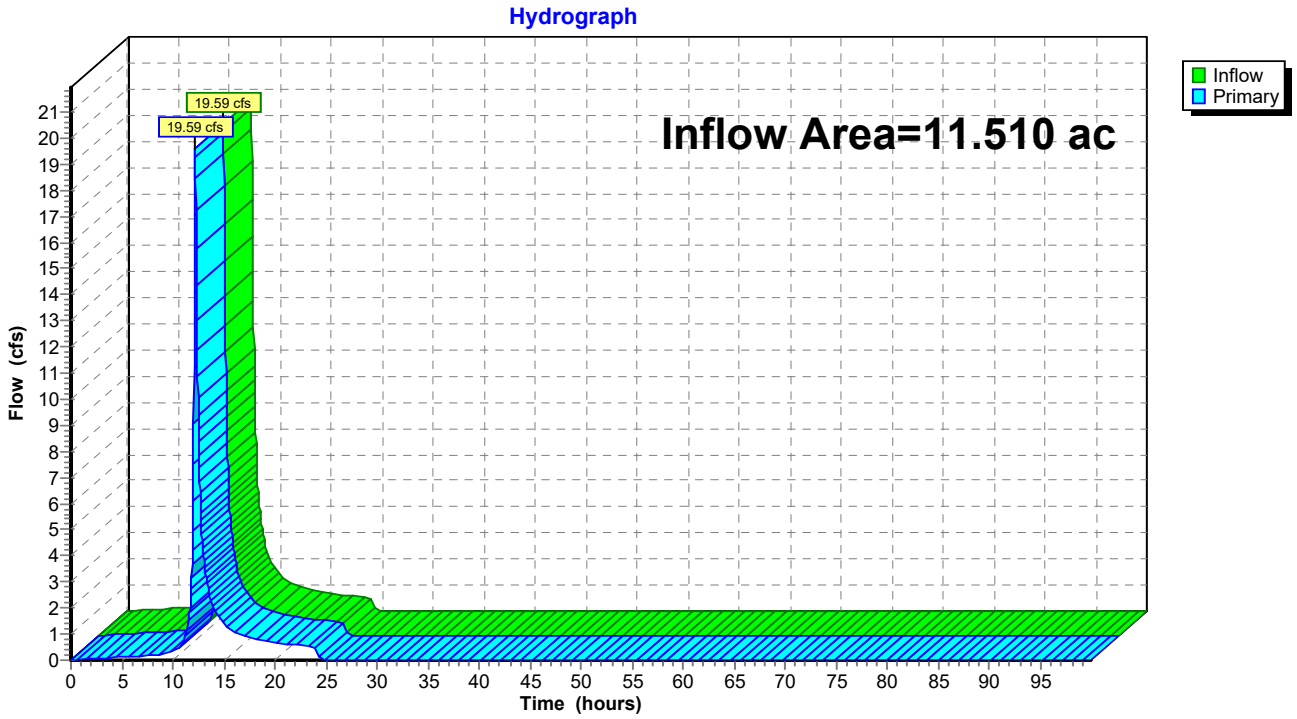
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**1.69**	0.00	**1.69**	90.00	0.00	0.00	0.00
13.50	**0.50**	0.00	**0.50**	91.50	0.00	0.00	0.00
15.00	0.28	0.00	0.28	93.00	0.00	0.00	0.00
16.50	0.21	0.00	0.21	94.50	0.00	0.00	0.00
18.00	0.16	0.00	0.16	96.00	0.00	0.00	0.00
19.50	0.15	0.00	0.15	97.50	0.00	0.00	0.00
21.00	0.13	0.00	0.13	99.00	0.00	0.00	0.00
22.50	0.12	0.00	0.12				
24.00	0.12	0.00	0.12				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 11: POA A

Inflow Area = 11.510 ac, 9.47% Impervious, Inflow Depth = 2.16" for Alpha 100 yr event
Inflow = 19.59 cfs @ 12.18 hrs, Volume= 2.070 af
Primary = 19.59 cfs @ 12.18 hrs, Volume= 2.070 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 11: POA A



Hydrograph for Link 11: POA A

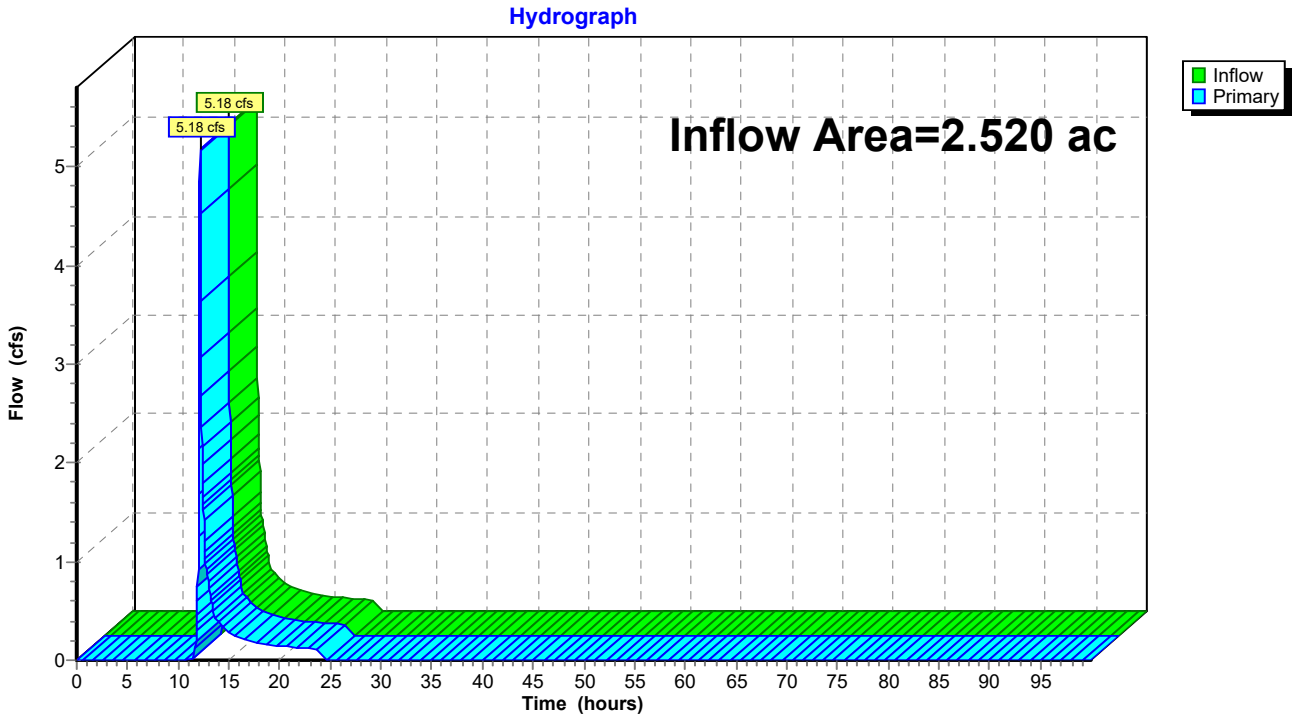
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.04	0.00	0.04	79.50	0.00	0.00	0.00
3.00	0.08	0.00	0.08	81.00	0.00	0.00	0.00
4.50	0.11	0.00	0.11	82.50	0.00	0.00	0.00
6.00	0.13	0.00	0.13	84.00	0.00	0.00	0.00
7.50	0.18	0.00	0.18	85.50	0.00	0.00	0.00
9.00	0.24	0.00	0.24	87.00	0.00	0.00	0.00
10.50	0.45	0.00	0.45	88.50	0.00	0.00	0.00
12.00	**7.50**	0.00	**7.50**	90.00	0.00	0.00	0.00
13.50	**2.61**	0.00	**2.61**	91.50	0.00	0.00	0.00
15.00	1.38	0.00	1.38	93.00	0.00	0.00	0.00
16.50	1.04	0.00	1.04	94.50	0.00	0.00	0.00
18.00	0.79	0.00	0.79	96.00	0.00	0.00	0.00
19.50	0.70	0.00	0.70	97.50	0.00	0.00	0.00
21.00	0.64	0.00	0.64	99.00	0.00	0.00	0.00
22.50	0.58	0.00	0.58				
24.00	0.53	0.00	0.53				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 12: POA B

Inflow Area = 2.520 ac, 0.00% Impervious, Inflow Depth = 1.74" for Alpha 100 yr event
Inflow = 5.18 cfs @ 12.15 hrs, Volume= 0.366 af
Primary = 5.18 cfs @ 12.15 hrs, Volume= 0.366 af, Atten= 0%, Lag= 0.0 min

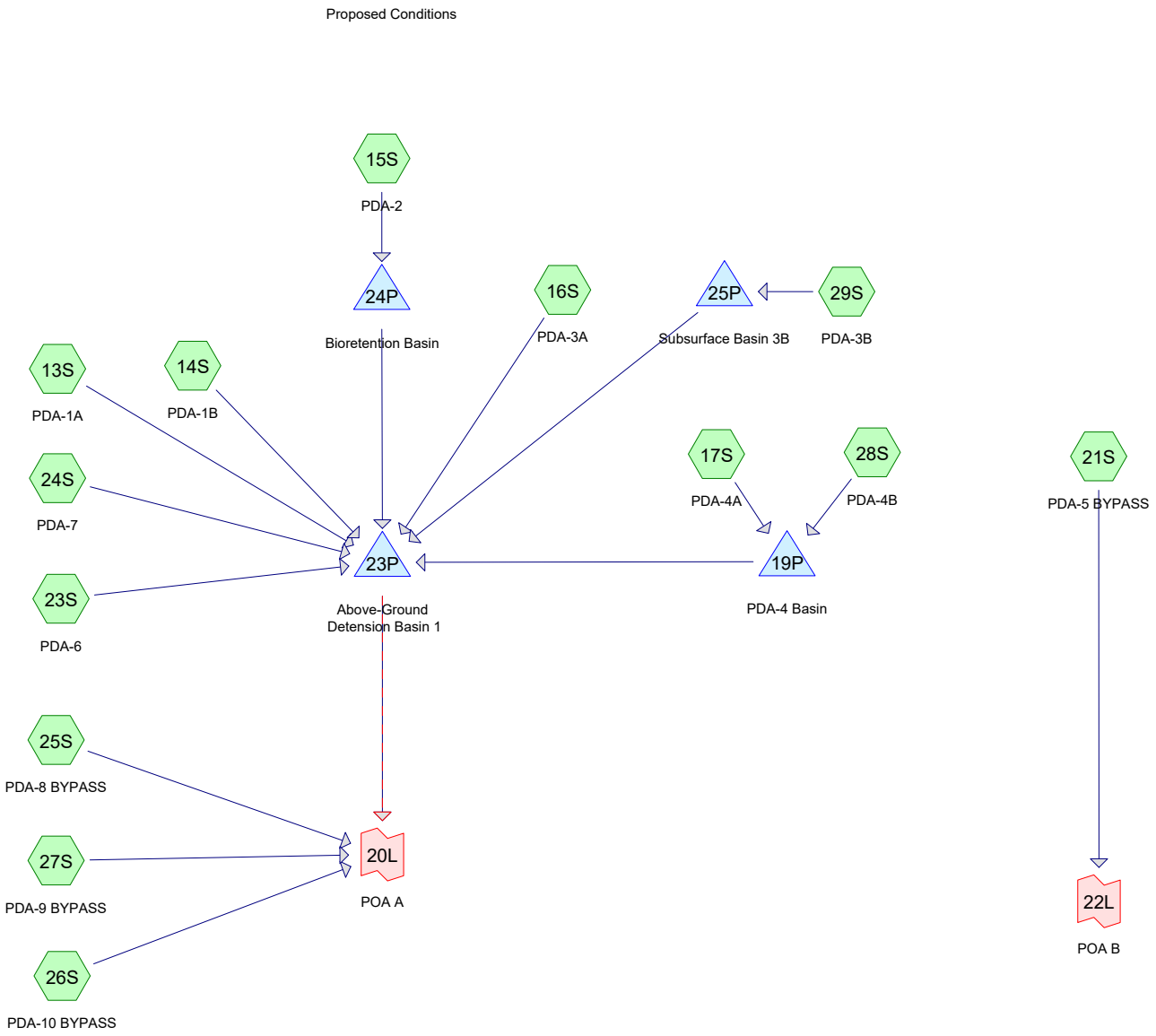
Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 12: POA B



Hydrograph for Link 12: POA B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**1.69**	0.00	**1.69**	90.00	0.00	0.00	0.00
13.50	**0.50**	0.00	**0.50**	91.50	0.00	0.00	0.00
15.00	0.28	0.00	0.28	93.00	0.00	0.00	0.00
16.50	0.21	0.00	0.21	94.50	0.00	0.00	0.00
18.00	0.16	0.00	0.16	96.00	0.00	0.00	0.00
19.50	0.15	0.00	0.15	97.50	0.00	0.00	0.00
21.00	0.13	0.00	0.13	99.00	0.00	0.00	0.00
22.50	0.12	0.00	0.12				
24.00	0.12	0.00	0.12				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				



Subcat Reach Pond Link

Routing Diagram for 220302_Alpha Warehouse Stormwater
Prepared by Colliers Engineering & Design, Printed 3/29/2022
HydroCAD® 10.10-3a s/n 08506 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	NJWQ	NJ DEP 2-hr		Default	2.00	1	1.25	2
2	Alpha 2 yr	NOAA 24-hr	C	Default	24.00	1	2.98	2
3	Alpha 10 yr	NOAA 24-hr	C	Default	24.00	1	4.70	2
4	Alpha 100 yr	NOAA 24-hr	C	Default	24.00	1	7.47	2
5	Alpha 100yr + 50%	NOAA 24-hr	C	Default	24.00	1	11.20	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.629	39	>75% Grass cover, Good, HSG A (13S, 15S, 16S, 25S, 29S)
2.861	61	>75% Grass cover, Good, HSG B (13S, 15S, 17S, 24S, 25S, 26S, 28S, 29S)
0.328	80	>75% Grass cover, Good, HSG D (13S, 15S, 26S, 27S)
0.076	98	Asphalt Pavement (28S)
2.902	48	Brush, Good, HSG B (21S, 23S, 24S)
0.049	73	Brush, Good, HSG D (21S)
0.062	98	Concrete Sidewalk (16S, 29S)
0.443	98	Future Pervious Pavement (29S)
0.052	98	Future Sidewalk (29S)
0.782	98	Heavy Duty Asphalt (17S)
0.709	98	Pavement (16S, 25S, 27S)
0.613	98	Pervious Pavement (17S, 28S)
4.550	98	Unconnected pavement, HSG B (14S, 15S)
14.057	**77**	**TOTAL AREA**

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment13S: PDA-1A Runoff Area=39,498 sf 0.00% Impervious Runoff Depth=0.14"
Flow Length=145' Tc=5.7 min CN=53/0 Runoff=0.03 cfs 0.011 af

Subcatchment14S: PDA-1B Runoff Area=134,400 sf 100.00% Impervious Runoff Depth=2.75"
Flow Length=888' Slope=0.0200 '/' Tc=3.3 min CN=0/98 Runoff=10.38 cfs 0.707 af

Subcatchment15S: PDA-2 Runoff Area=102,736 sf 62.11% Impervious Runoff Depth=1.88"
Flow Length=710' Tc=10.4 min CN=64/98 Runoff=4.26 cfs 0.370 af

Subcatchment16S: PDA-3A Runoff Area=34,643 sf 92.27% Impervious Runoff Depth=2.54"
Flow Length=174' Slope=0.0400 '/' Tc=1.2 min CN=39/98 Runoff=2.65 cfs 0.168 af

Subcatchment17S: PDA-4A Runoff Area=65,506 sf 92.02% Impervious Runoff Depth=2.56"
Flow Length=538' Tc=3.4 min CN=61/98 Runoff=4.68 cfs 0.321 af

Subcatchment21S: PDA-5 BYPASS Runoff Area=91,311 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=358' Tc=6.4 min CN=49/0 Runoff=0.02 cfs 0.012 af

Subcatchment23S: PDA-6 Runoff Area=9,055 sf 0.00% Impervious Runoff Depth=0.06"
Tc=6.0 min CN=48/0 Runoff=0.00 cfs 0.001 af

Subcatchment24S: PDA-7 Runoff Area=1.287 ac 0.00% Impervious Runoff Depth=0.17"
Flow Length=1,280' Tc=8.1 min CN=54/0 Runoff=0.06 cfs 0.018 af

Subcatchment25S: PDA-8 BYPASS Runoff Area=16,940 sf 4.17% Impervious Runoff Depth=0.22"
Flow Length=165' Slope=0.0400 '/' Tc=7.7 min CN=51/98 Runoff=0.05 cfs 0.007 af

Subcatchment26S: PDA-10 BYPASS Runoff Area=16,173 sf 0.00% Impervious Runoff Depth=0.54"
Flow Length=505' Tc=7.7 min CN=66/0 Runoff=0.20 cfs 0.017 af

Subcatchment27S: PDA-9 BYPASS Runoff Area=3,056 sf 28.14% Impervious Runoff Depth=1.66"
Tc=6.0 min CN=80/98 Runoff=0.14 cfs 0.010 af

Subcatchment28S: PDA-4B Runoff Area=9,389 sf 40.88% Impervious Runoff Depth=1.33"
Flow Length=93' Tc=2.4 min CN=61/98 Runoff=0.34 cfs 0.024 af

Subcatchment29S: PDA-3B Runoff Area=33,557 sf 64.48% Impervious Runoff Depth=1.88"
Flow Length=300' Tc=4.0 min CN=59/98 Runoff=1.72 cfs 0.121 af

Pond 19P: PDA-4 Basin Peak Elev=288.14' Storage=6,106 cf Inflow=5.02 cfs 0.344 af
Outflow=1.31 cfs 0.316 af

Pond 23P: Above-Ground Detension Peak Elev=271.06' Storage=31,305 cf Inflow=14.29 cfs 1.587 af
Primary=1.62 cfs 1.587 af Secondary=0.00 cfs 0.000 af Outflow=1.62 cfs 1.587 af

Pond 24P: Bioretention Basin Peak Elev=276.67' Storage=9,070 cf Inflow=4.26 cfs 0.370 af
Outflow=0.87 cfs 0.253 af

Pond 25P: Subsurface Basin 3B Peak Elev=285.03' Storage=1,543 cf Inflow=1.72 cfs 0.121 af
Outflow=0.85 cfs 0.114 af

Link 20L: POA A Inflow=1.65 cfs 1.621 af
Primary=1.65 cfs 1.621 af

Link 22L: POA B Inflow=0.02 cfs 0.012 af
Primary=0.02 cfs 0.012 af

Total Runoff Area = 14.057 ac Runoff Volume = 1.785 af Average Runoff Depth = 1.52"
48.15% Pervious = 6.769 ac 51.85% Impervious = 7.288 ac

Summary for Subcatchment 13S: PDA-1A

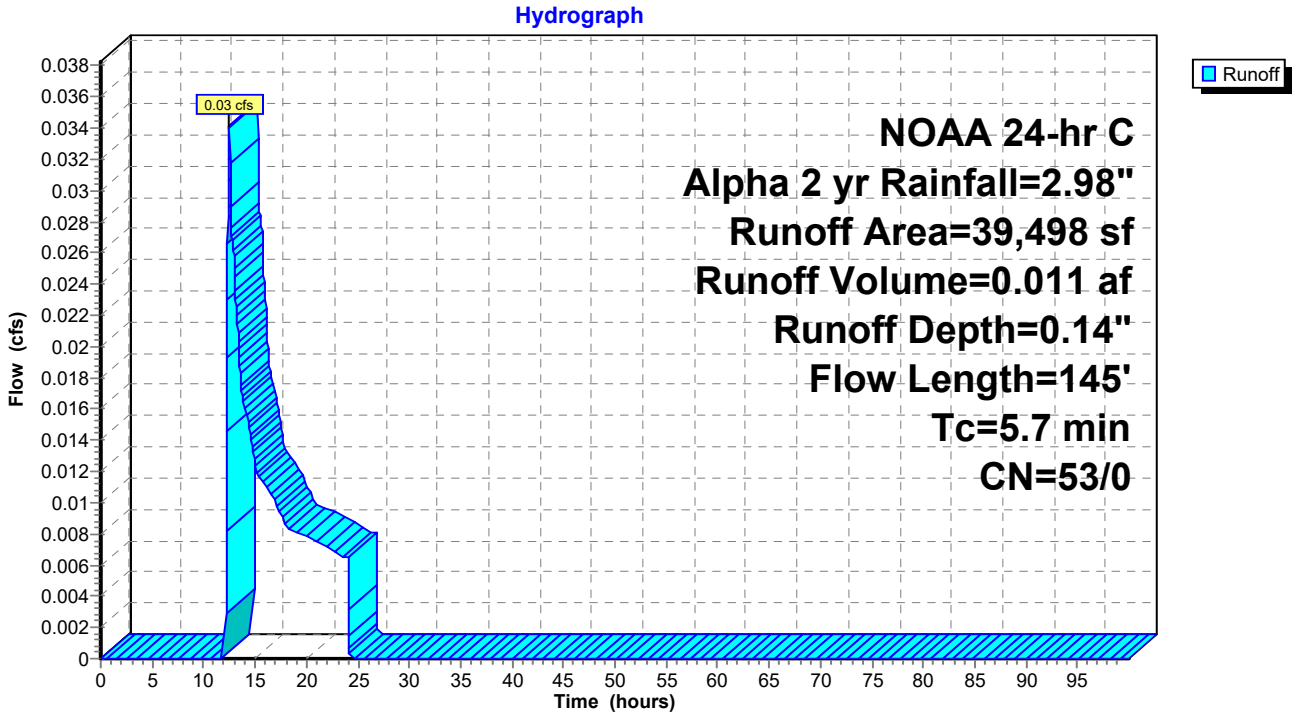
Runoff = 0.03 cfs @ 12.53 hrs, Volume= 0.011 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (sf)	CN	Description
1,134	80	>75% Grass cover, Good, HSG D
22,773	61	>75% Grass cover, Good, HSG B
15,591	39	>75% Grass cover, Good, HSG A
39,498	53	Weighted Average
39,498	53	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.1	45	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.7	145	Total			

Subcatchment 13S: PDA-1A



Hydrograph for Subcatchment 13S: PDA-1A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.00	0.00	**0.00**
15.00	2.54	0.06	0.00	**0.01**
18.00	2.74	0.10	0.00	0.01
21.00	2.87	0.12	0.00	0.01
24.00	**2.98**	**0.14**	0.00	0.01
27.00	2.98	0.14	0.00	0.00
30.00	2.98	0.14	0.00	0.00
33.00	2.98	0.14	0.00	0.00
36.00	2.98	0.14	0.00	0.00
39.00	2.98	0.14	0.00	0.00
42.00	2.98	0.14	0.00	0.00
45.00	2.98	0.14	0.00	0.00
48.00	2.98	0.14	0.00	0.00
51.00	2.98	0.14	0.00	0.00
54.00	2.98	0.14	0.00	0.00
57.00	2.98	0.14	0.00	0.00
60.00	2.98	0.14	0.00	0.00
63.00	2.98	0.14	0.00	0.00
66.00	2.98	0.14	0.00	0.00
69.00	2.98	0.14	0.00	0.00
72.00	2.98	0.14	0.00	0.00
75.00	2.98	0.14	0.00	0.00
78.00	2.98	0.14	0.00	0.00
81.00	2.98	0.14	0.00	0.00
84.00	2.98	0.14	0.00	0.00
87.00	2.98	0.14	0.00	0.00
90.00	2.98	0.14	0.00	0.00
93.00	2.98	0.14	0.00	0.00
96.00	2.98	0.14	0.00	0.00
99.00	2.98	0.14	0.00	0.00

Summary for Subcatchment 14S: PDA-1B

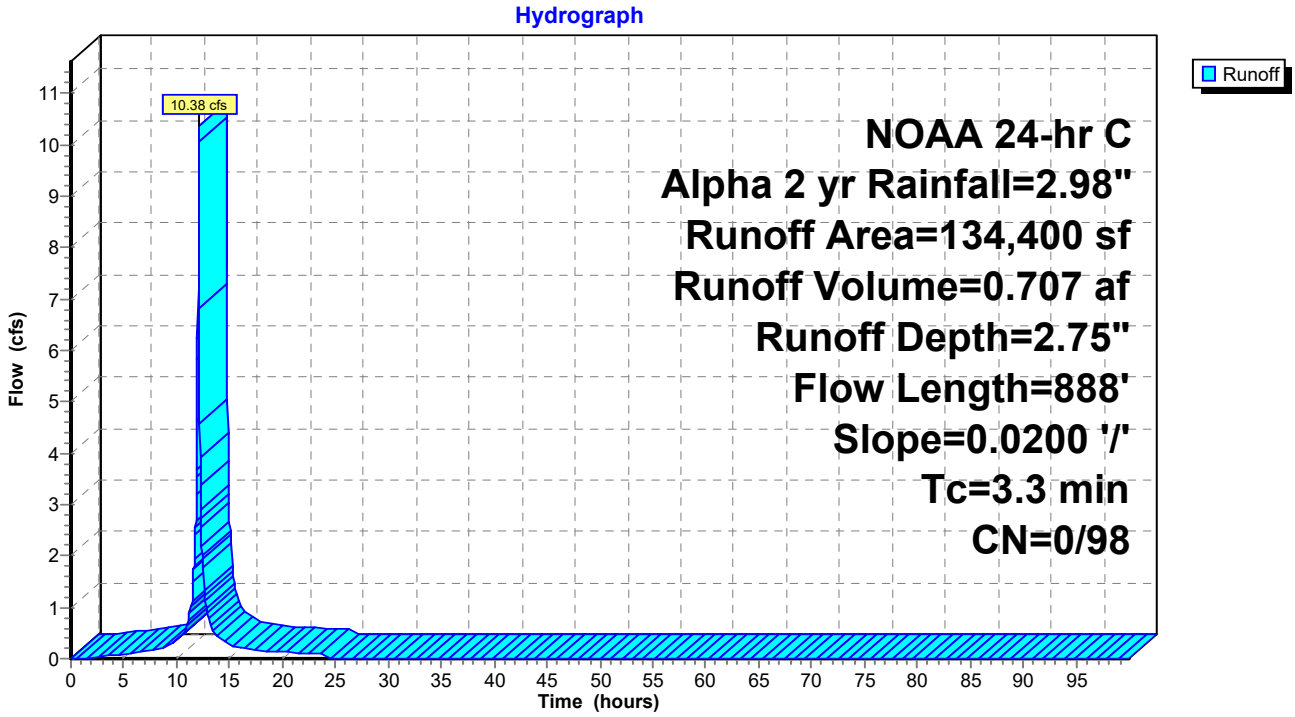
Runoff = 10.38 cfs @ 12.10 hrs, Volume= 0.707 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (sf)	CN	Description
134,400	98	Unconnected pavement, HSG B
134,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.24"
1.2	210	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	578	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
3.3	888	Total			

Subcatchment 14S: PDA-1B



Hydrograph for Subcatchment 14S: PDA-1B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.11	0.00	0.02	0.05
6.00	0.24	0.00	0.10	0.11
9.00	0.44	0.00	0.26	0.23
12.00	1.42	0.00	1.20	**6.24**
15.00	2.54	0.00	2.32	**0.27**
18.00	2.74	0.00	2.51	0.15
21.00	2.87	0.00	2.64	0.12
24.00	**2.98**	0.00	**2.75**	0.12
27.00	2.98	0.00	2.75	0.00
30.00	2.98	0.00	2.75	0.00
33.00	2.98	0.00	2.75	0.00
36.00	2.98	0.00	2.75	0.00
39.00	2.98	0.00	2.75	0.00
42.00	2.98	0.00	2.75	0.00
45.00	2.98	0.00	2.75	0.00
48.00	2.98	0.00	2.75	0.00
51.00	2.98	0.00	2.75	0.00
54.00	2.98	0.00	2.75	0.00
57.00	2.98	0.00	2.75	0.00
60.00	2.98	0.00	2.75	0.00
63.00	2.98	0.00	2.75	0.00
66.00	2.98	0.00	2.75	0.00
69.00	2.98	0.00	2.75	0.00
72.00	2.98	0.00	2.75	0.00
75.00	2.98	0.00	2.75	0.00
78.00	2.98	0.00	2.75	0.00
81.00	2.98	0.00	2.75	0.00
84.00	2.98	0.00	2.75	0.00
87.00	2.98	0.00	2.75	0.00
90.00	2.98	0.00	2.75	0.00
93.00	2.98	0.00	2.75	0.00
96.00	2.98	0.00	2.75	0.00
99.00	2.98	0.00	2.75	0.00

Summary for Subcatchment 15S: PDA-2

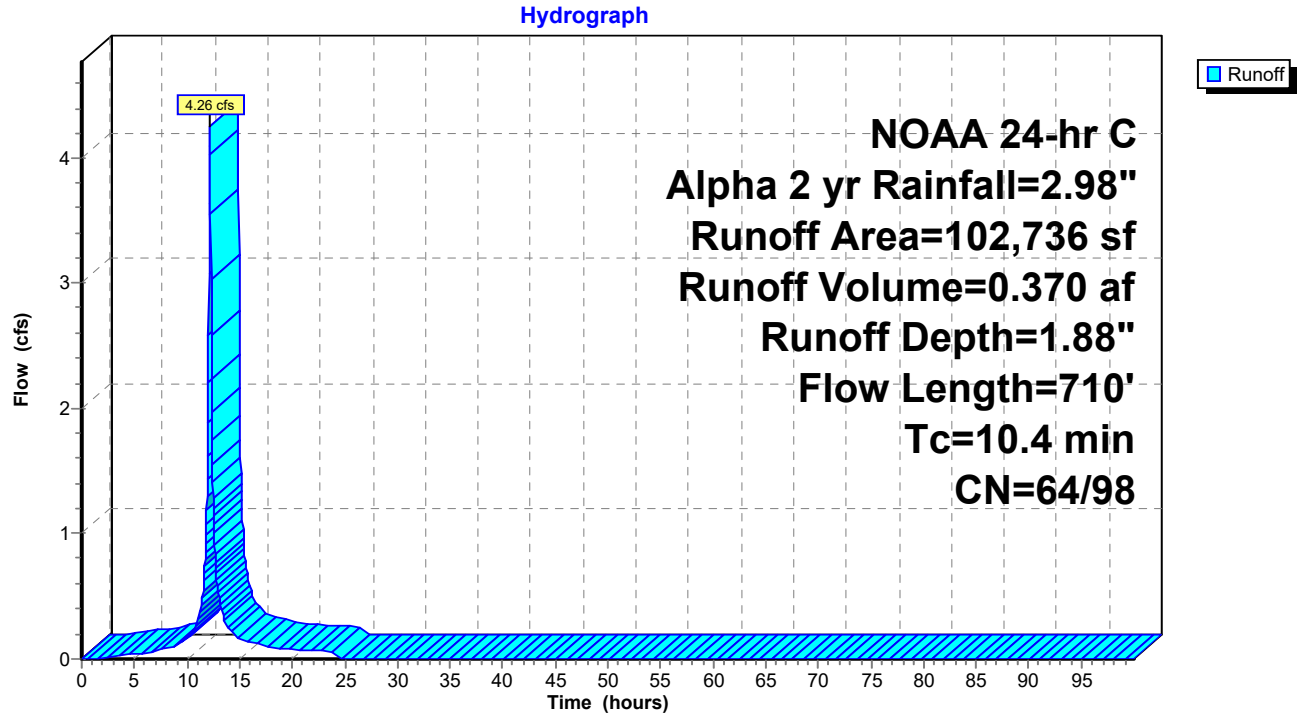
Runoff = 4.26 cfs @ 12.18 hrs, Volume= 0.370 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (sf)	CN	Description
63,805	98	Unconnected pavement, HSG B
6,975	80	>75% Grass cover, Good, HSG D
788	39	>75% Grass cover, Good, HSG A
31,168	61	>75% Grass cover, Good, HSG B
102,736	85	Weighted Average
38,931	64	37.89% Pervious Area
63,805	98	62.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0550	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.1	210	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	400	0.0200	8.41	14.86	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
10.4	710	Total			

Subcatchment 15S: PDA-2



Hydrograph for Subcatchment 15S: PDA-2

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.11	0.00	0.02	0.02
6.00	0.24	0.00	0.10	0.05
9.00	0.44	0.00	0.26	0.11
12.00	1.42	0.01	1.20	**1.89**
15.00	2.54	0.29	2.32	**0.17**
18.00	2.74	0.36	2.51	0.09
21.00	2.87	0.42	2.64	0.07
24.00	**2.98**	**0.46**	**2.75**	0.06
27.00	2.98	0.46	2.75	0.00
30.00	2.98	0.46	2.75	0.00
33.00	2.98	0.46	2.75	0.00
36.00	2.98	0.46	2.75	0.00
39.00	2.98	0.46	2.75	0.00
42.00	2.98	0.46	2.75	0.00
45.00	2.98	0.46	2.75	0.00
48.00	2.98	0.46	2.75	0.00
51.00	2.98	0.46	2.75	0.00
54.00	2.98	0.46	2.75	0.00
57.00	2.98	0.46	2.75	0.00
60.00	2.98	0.46	2.75	0.00
63.00	2.98	0.46	2.75	0.00
66.00	2.98	0.46	2.75	0.00
69.00	2.98	0.46	2.75	0.00
72.00	2.98	0.46	2.75	0.00
75.00	2.98	0.46	2.75	0.00
78.00	2.98	0.46	2.75	0.00
81.00	2.98	0.46	2.75	0.00
84.00	2.98	0.46	2.75	0.00
87.00	2.98	0.46	2.75	0.00
90.00	2.98	0.46	2.75	0.00
93.00	2.98	0.46	2.75	0.00
96.00	2.98	0.46	2.75	0.00
99.00	2.98	0.46	2.75	0.00

Summary for Subcatchment 16S: PDA-3A

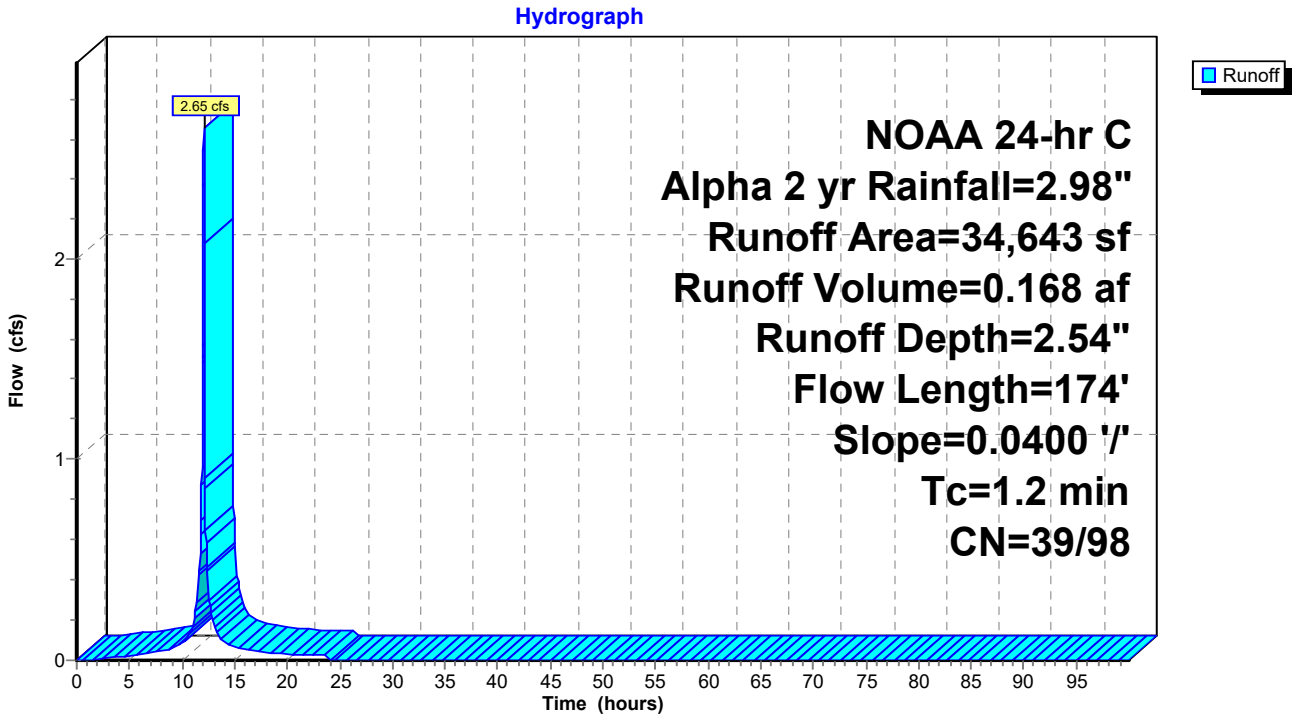
Runoff = 2.65 cfs @ 12.08 hrs, Volume= 0.168 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (sf)	CN	Description
*	2,646	98	Concrete Sidewalk
*	29,318	98	Pavement
	2,679	39	>75% Grass cover, Good, HSG A
	34,643	93	Weighted Average
	2,679	39	7.73% Pervious Area
	31,964	98	92.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0400	1.83		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.3	74	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	174	Total			

Subcatchment 16S: PDA-3A



Hydrograph for Subcatchment 16S: PDA-3A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.11	0.00	0.02	0.01
6.00	0.24	0.00	0.10	0.03
9.00	0.44	0.00	0.26	0.05
12.00	1.42	0.00	1.20	**1.57**
15.00	2.54	0.00	2.32	**0.06**
18.00	2.74	0.00	2.51	0.04
21.00	2.87	0.00	2.64	0.03
24.00	**2.98**	0.00	**2.75**	0.03
27.00	2.98	0.00	2.75	0.00
30.00	2.98	0.00	2.75	0.00
33.00	2.98	0.00	2.75	0.00
36.00	2.98	0.00	2.75	0.00
39.00	2.98	0.00	2.75	0.00
42.00	2.98	0.00	2.75	0.00
45.00	2.98	0.00	2.75	0.00
48.00	2.98	0.00	2.75	0.00
51.00	2.98	0.00	2.75	0.00
54.00	2.98	0.00	2.75	0.00
57.00	2.98	0.00	2.75	0.00
60.00	2.98	0.00	2.75	0.00
63.00	2.98	0.00	2.75	0.00
66.00	2.98	0.00	2.75	0.00
69.00	2.98	0.00	2.75	0.00
72.00	2.98	0.00	2.75	0.00
75.00	2.98	0.00	2.75	0.00
78.00	2.98	0.00	2.75	0.00
81.00	2.98	0.00	2.75	0.00
84.00	2.98	0.00	2.75	0.00
87.00	2.98	0.00	2.75	0.00
90.00	2.98	0.00	2.75	0.00
93.00	2.98	0.00	2.75	0.00
96.00	2.98	0.00	2.75	0.00
99.00	2.98	0.00	2.75	0.00

Summary for Subcatchment 17S: PDA-4A

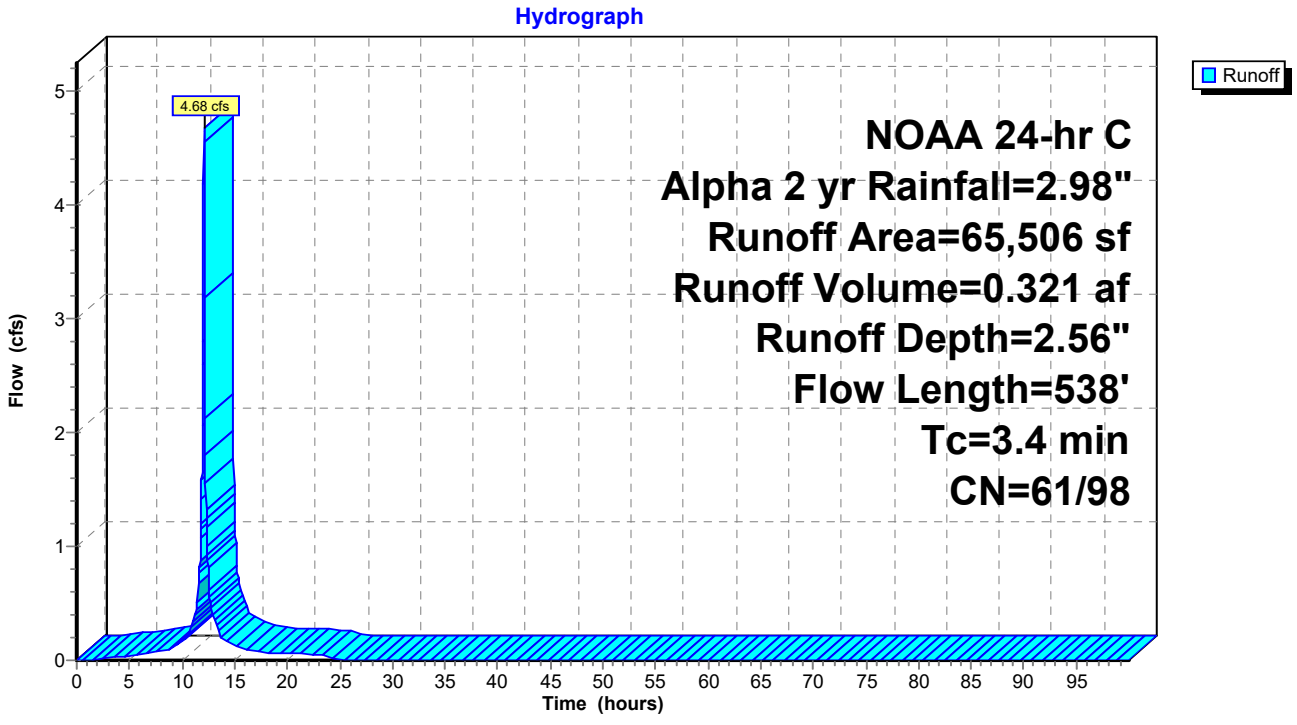
Runoff = 4.68 cfs @ 12.10 hrs, Volume= 0.321 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (sf)	CN	Description
*	34,074	98	Heavy Duty Asphalt
*	26,203	98	Pervious Pavement
	5,229	61	>75% Grass cover, Good, HSG B
	65,506	95	Weighted Average
	5,229	61	7.98% Pervious Area
	60,277	98	92.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0422	1.87		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.5	438	0.0207	2.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	538	Total			

Subcatchment 17S: PDA-4A



Hydrograph for Subcatchment 17S: PDA-4A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.11	0.00	0.02	0.02
6.00	0.24	0.00	0.10	0.05
9.00	0.44	0.00	0.26	0.10
12.00	1.42	0.00	1.20	**2.79**
15.00	2.54	0.21	2.32	**0.13**
18.00	2.74	0.27	2.51	0.07
21.00	2.87	0.32	2.64	0.06
24.00	**2.98**	**0.36**	**2.75**	0.05
27.00	2.98	0.36	2.75	0.00
30.00	2.98	0.36	2.75	0.00
33.00	2.98	0.36	2.75	0.00
36.00	2.98	0.36	2.75	0.00
39.00	2.98	0.36	2.75	0.00
42.00	2.98	0.36	2.75	0.00
45.00	2.98	0.36	2.75	0.00
48.00	2.98	0.36	2.75	0.00
51.00	2.98	0.36	2.75	0.00
54.00	2.98	0.36	2.75	0.00
57.00	2.98	0.36	2.75	0.00
60.00	2.98	0.36	2.75	0.00
63.00	2.98	0.36	2.75	0.00
66.00	2.98	0.36	2.75	0.00
69.00	2.98	0.36	2.75	0.00
72.00	2.98	0.36	2.75	0.00
75.00	2.98	0.36	2.75	0.00
78.00	2.98	0.36	2.75	0.00
81.00	2.98	0.36	2.75	0.00
84.00	2.98	0.36	2.75	0.00
87.00	2.98	0.36	2.75	0.00
90.00	2.98	0.36	2.75	0.00
93.00	2.98	0.36	2.75	0.00
96.00	2.98	0.36	2.75	0.00
99.00	2.98	0.36	2.75	0.00

Summary for Subcatchment 21S: PDA-5 BYPASS

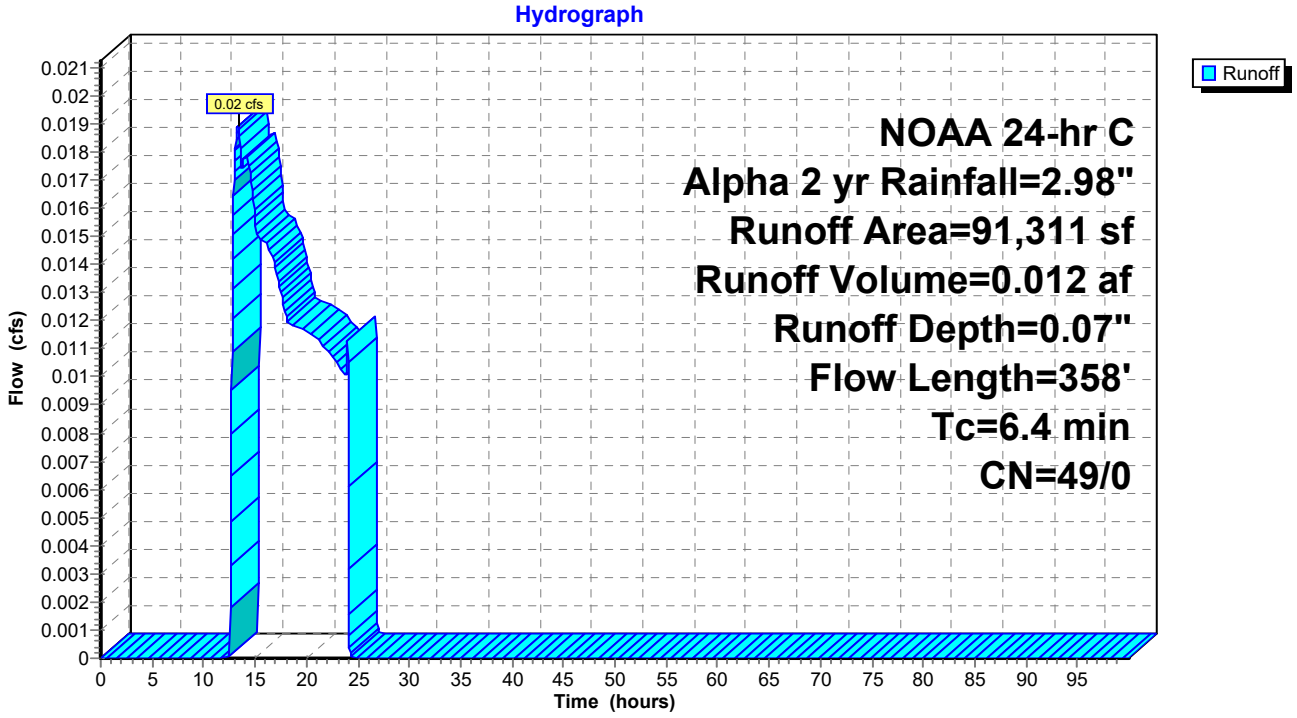
Runoff = 0.02 cfs @ 13.35 hrs, Volume= 0.012 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (sf)	CN	Description
2,125	73	Brush, Good, HSG D
89,186	48	Brush, Good, HSG B
91,311	49	Weighted Average
91,311	49	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.24"
0.9	258	0.0860	4.72		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.4	358	Total			

Subcatchment 21S: PDA-5 BYPASS



Hydrograph for Subcatchment 21S: PDA-5 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.00	0.00	**0.00**
15.00	2.54	0.02	0.00	**0.02**
18.00	2.74	0.04	0.00	0.01
21.00	2.87	0.06	0.00	0.01
24.00	**2.98**	**0.07**	0.00	0.01
27.00	2.98	0.07	0.00	0.00
30.00	2.98	0.07	0.00	0.00
33.00	2.98	0.07	0.00	0.00
36.00	2.98	0.07	0.00	0.00
39.00	2.98	0.07	0.00	0.00
42.00	2.98	0.07	0.00	0.00
45.00	2.98	0.07	0.00	0.00
48.00	2.98	0.07	0.00	0.00
51.00	2.98	0.07	0.00	0.00
54.00	2.98	0.07	0.00	0.00
57.00	2.98	0.07	0.00	0.00
60.00	2.98	0.07	0.00	0.00
63.00	2.98	0.07	0.00	0.00
66.00	2.98	0.07	0.00	0.00
69.00	2.98	0.07	0.00	0.00
72.00	2.98	0.07	0.00	0.00
75.00	2.98	0.07	0.00	0.00
78.00	2.98	0.07	0.00	0.00
81.00	2.98	0.07	0.00	0.00
84.00	2.98	0.07	0.00	0.00
87.00	2.98	0.07	0.00	0.00
90.00	2.98	0.07	0.00	0.00
93.00	2.98	0.07	0.00	0.00
96.00	2.98	0.07	0.00	0.00
99.00	2.98	0.07	0.00	0.00

Summary for Subcatchment 23S: PDA-6

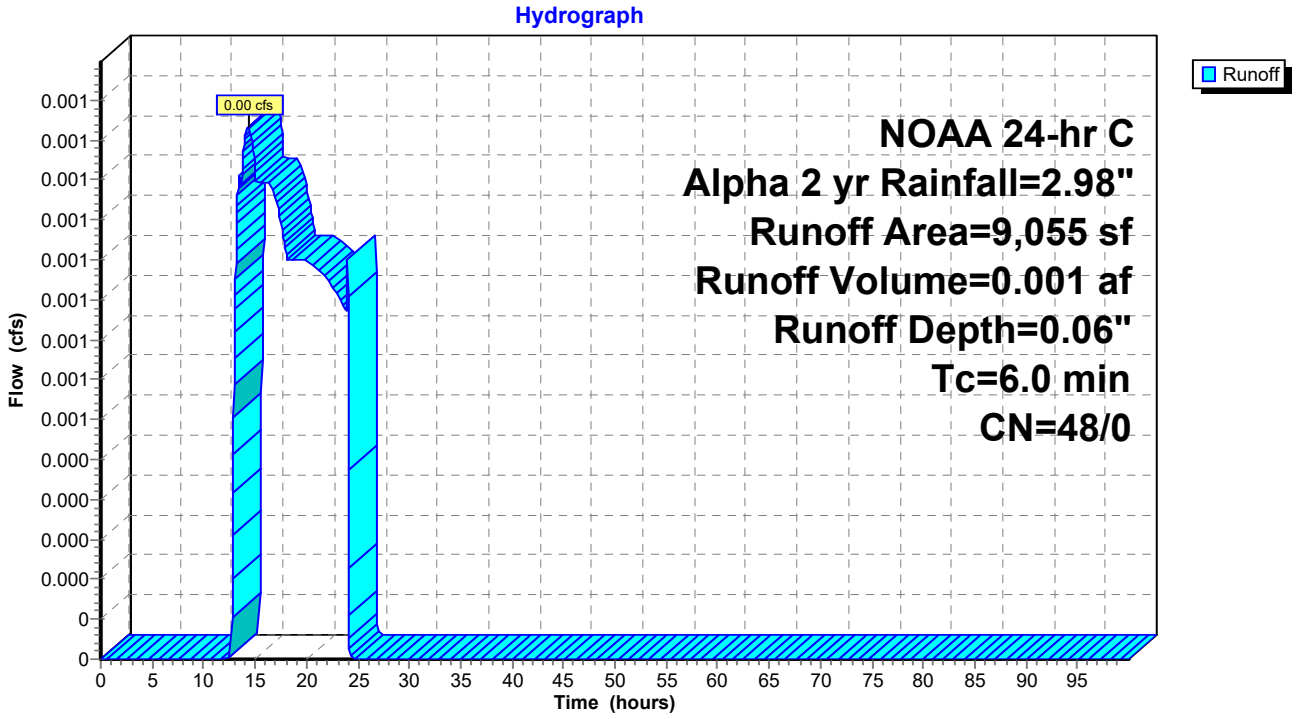
Runoff = 0.00 cfs @ 14.34 hrs, Volume= 0.001 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (sf)	CN	Description
9,055	48	Brush, Good, HSG B
9,055	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 23S: PDA-6



Hydrograph for Subcatchment 23S: PDA-6

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.00	0.00	**0.00**
15.00	2.54	0.01	0.00	**0.00**
18.00	2.74	0.03	0.00	0.00
21.00	2.87	0.04	0.00	0.00
24.00	**2.98**	**0.06**	0.00	0.00
27.00	2.98	0.06	0.00	0.00
30.00	2.98	0.06	0.00	0.00
33.00	2.98	0.06	0.00	0.00
36.00	2.98	0.06	0.00	0.00
39.00	2.98	0.06	0.00	0.00
42.00	2.98	0.06	0.00	0.00
45.00	2.98	0.06	0.00	0.00
48.00	2.98	0.06	0.00	0.00
51.00	2.98	0.06	0.00	0.00
54.00	2.98	0.06	0.00	0.00
57.00	2.98	0.06	0.00	0.00
60.00	2.98	0.06	0.00	0.00
63.00	2.98	0.06	0.00	0.00
66.00	2.98	0.06	0.00	0.00
69.00	2.98	0.06	0.00	0.00
72.00	2.98	0.06	0.00	0.00
75.00	2.98	0.06	0.00	0.00
78.00	2.98	0.06	0.00	0.00
81.00	2.98	0.06	0.00	0.00
84.00	2.98	0.06	0.00	0.00
87.00	2.98	0.06	0.00	0.00
90.00	2.98	0.06	0.00	0.00
93.00	2.98	0.06	0.00	0.00
96.00	2.98	0.06	0.00	0.00
99.00	2.98	0.06	0.00	0.00

Summary for Subcatchment 24S: PDA-7

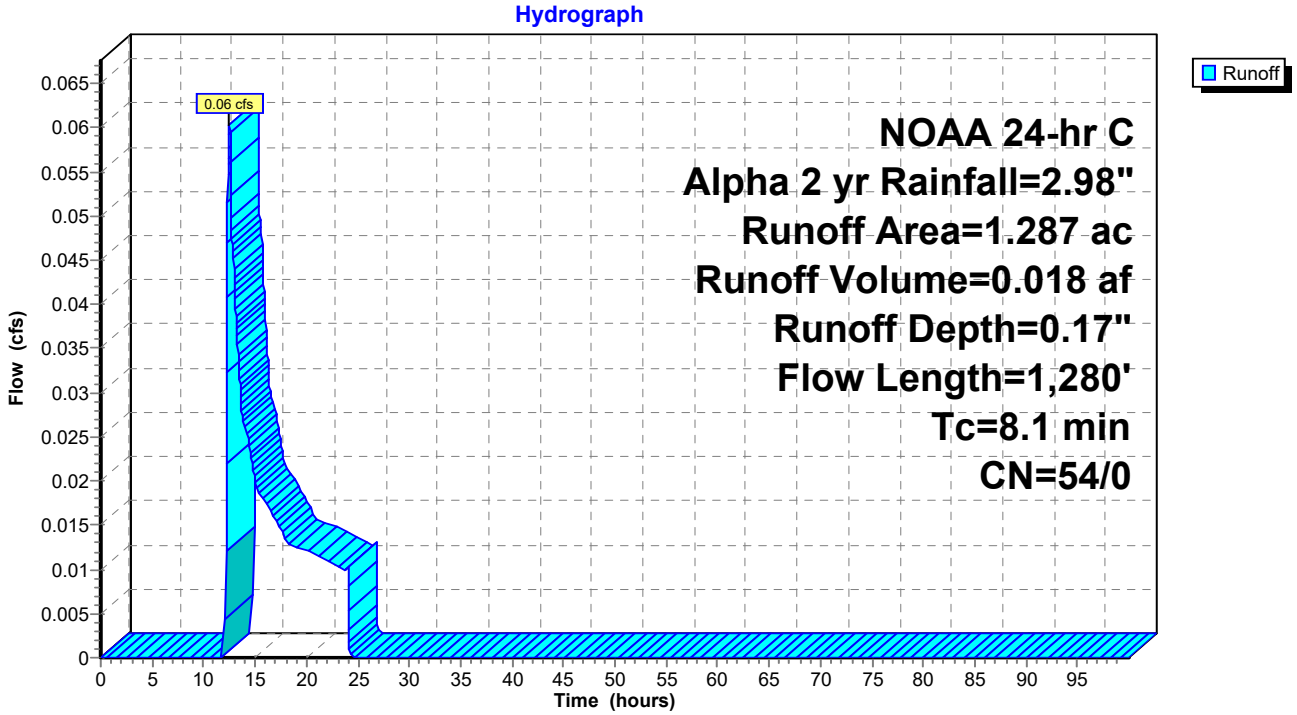
Runoff = 0.06 cfs @ 12.54 hrs, Volume= 0.018 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (ac)	CN	Description
0.647	48	Brush, Good, HSG B
0.640	61	>75% Grass cover, Good, HSG B
1.287	54	Weighted Average
1.287	54	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	173	0.0783	4.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	1,007	0.0205	8.44	6.63	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
8.1	1,280	Total			

Subcatchment 24S: PDA-7



Hydrograph for Subcatchment 24S: PDA-7

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.00	0.00	**0.00**
15.00	2.54	0.08	0.00	**0.02**
18.00	2.74	0.11	0.00	0.01
21.00	2.87	0.14	0.00	0.01
24.00	**2.98**	**0.17**	0.00	0.01
27.00	2.98	0.17	0.00	0.00
30.00	2.98	0.17	0.00	0.00
33.00	2.98	0.17	0.00	0.00
36.00	2.98	0.17	0.00	0.00
39.00	2.98	0.17	0.00	0.00
42.00	2.98	0.17	0.00	0.00
45.00	2.98	0.17	0.00	0.00
48.00	2.98	0.17	0.00	0.00
51.00	2.98	0.17	0.00	0.00
54.00	2.98	0.17	0.00	0.00
57.00	2.98	0.17	0.00	0.00
60.00	2.98	0.17	0.00	0.00
63.00	2.98	0.17	0.00	0.00
66.00	2.98	0.17	0.00	0.00
69.00	2.98	0.17	0.00	0.00
72.00	2.98	0.17	0.00	0.00
75.00	2.98	0.17	0.00	0.00
78.00	2.98	0.17	0.00	0.00
81.00	2.98	0.17	0.00	0.00
84.00	2.98	0.17	0.00	0.00
87.00	2.98	0.17	0.00	0.00
90.00	2.98	0.17	0.00	0.00
93.00	2.98	0.17	0.00	0.00
96.00	2.98	0.17	0.00	0.00
99.00	2.98	0.17	0.00	0.00

Summary for Subcatchment 25S: PDA-8 BYPASS

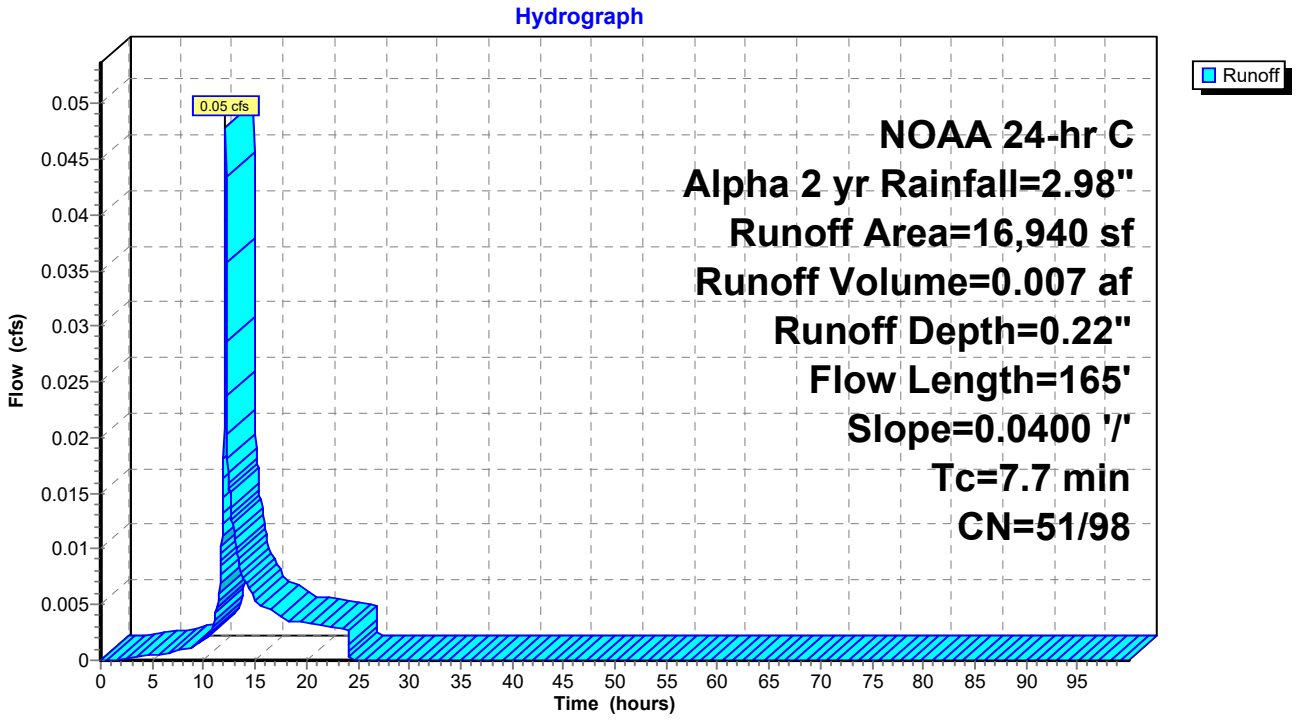
Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.007 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (sf)	CN	Description
*	706	98	Pavement
	7,396	39	>75% Grass cover, Good, HSG A
	8,838	61	>75% Grass cover, Good, HSG B
	16,940	53	Weighted Average
	16,234	51	95.83% Pervious Area
	706	98	4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0400	0.23		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.3	65	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	165	Total			

Subcatchment 25S: PDA-8 BYPASS



Hydrograph for Subcatchment 25S: PDA-8 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.11	0.00	0.02	0.00
6.00	0.24	0.00	0.10	0.00
9.00	0.44	0.00	0.26	0.00
12.00	1.42	0.00	1.20	**0.02**
15.00	2.54	0.04	2.32	**0.01**
18.00	2.74	0.06	2.51	0.00
21.00	2.87	0.09	2.64	0.00
24.00	**2.98**	**0.11**	**2.75**	0.00
27.00	2.98	0.11	2.75	0.00
30.00	2.98	0.11	2.75	0.00
33.00	2.98	0.11	2.75	0.00
36.00	2.98	0.11	2.75	0.00
39.00	2.98	0.11	2.75	0.00
42.00	2.98	0.11	2.75	0.00
45.00	2.98	0.11	2.75	0.00
48.00	2.98	0.11	2.75	0.00
51.00	2.98	0.11	2.75	0.00
54.00	2.98	0.11	2.75	0.00
57.00	2.98	0.11	2.75	0.00
60.00	2.98	0.11	2.75	0.00
63.00	2.98	0.11	2.75	0.00
66.00	2.98	0.11	2.75	0.00
69.00	2.98	0.11	2.75	0.00
72.00	2.98	0.11	2.75	0.00
75.00	2.98	0.11	2.75	0.00
78.00	2.98	0.11	2.75	0.00
81.00	2.98	0.11	2.75	0.00
84.00	2.98	0.11	2.75	0.00
87.00	2.98	0.11	2.75	0.00
90.00	2.98	0.11	2.75	0.00
93.00	2.98	0.11	2.75	0.00
96.00	2.98	0.11	2.75	0.00
99.00	2.98	0.11	2.75	0.00

Summary for Subcatchment 26S: PDA-10 BYPASS

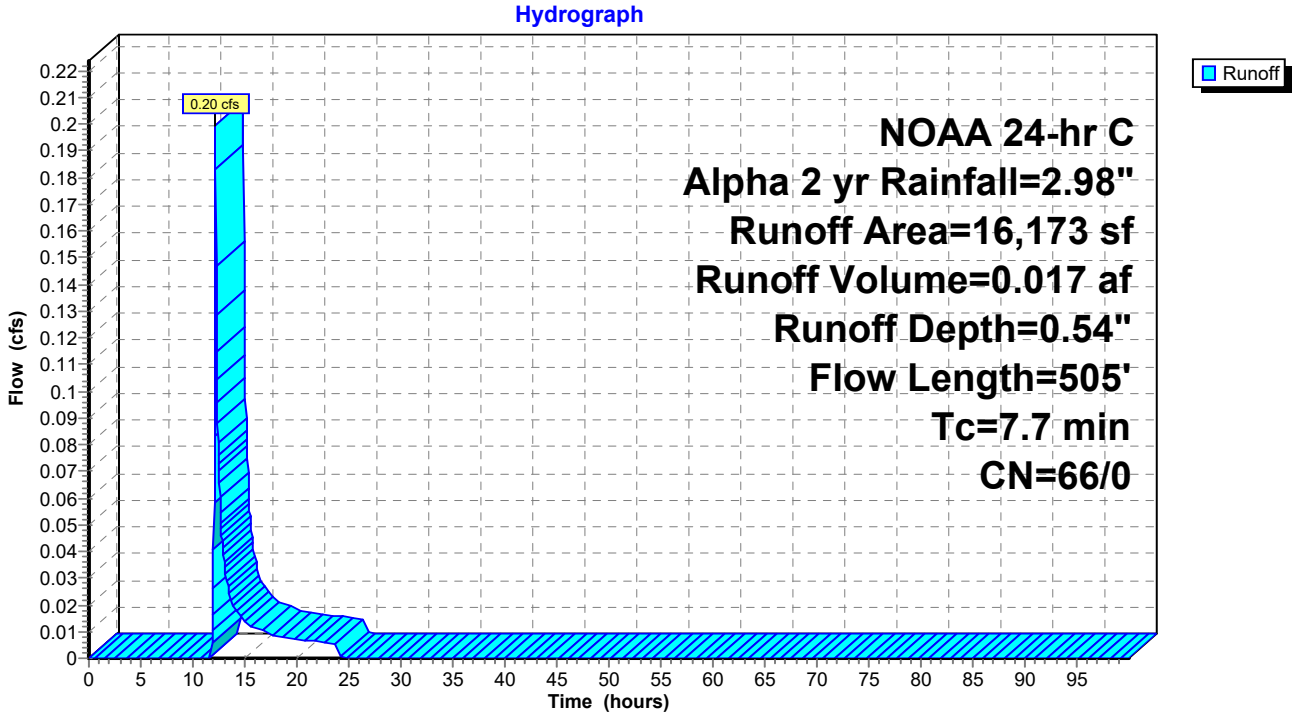
Runoff = 0.20 cfs @ 12.16 hrs, Volume= 0.017 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

Area (sf)	CN	Description
12,210	61	>75% Grass cover, Good, HSG B
3,963	80	>75% Grass cover, Good, HSG D
16,173	66	Weighted Average
16,173	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	81	0.0990	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.4	424	0.0170	2.10		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	505	Total			

Subcatchment 26S: PDA-10 BYPASS



Hydrograph for Subcatchment 26S: PDA-10 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.11	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
9.00	0.44	0.00	0.00	0.00
12.00	1.42	0.03	0.00	**0.04**
15.00	2.54	0.34	0.00	**0.01**
18.00	2.74	0.43	0.00	0.01
21.00	2.87	0.49	0.00	0.01
24.00	**2.98**	**0.54**	0.00	0.01
27.00	2.98	0.54	0.00	0.00
30.00	2.98	0.54	0.00	0.00
33.00	2.98	0.54	0.00	0.00
36.00	2.98	0.54	0.00	0.00
39.00	2.98	0.54	0.00	0.00
42.00	2.98	0.54	0.00	0.00
45.00	2.98	0.54	0.00	0.00
48.00	2.98	0.54	0.00	0.00
51.00	2.98	0.54	0.00	0.00
54.00	2.98	0.54	0.00	0.00
57.00	2.98	0.54	0.00	0.00
60.00	2.98	0.54	0.00	0.00
63.00	2.98	0.54	0.00	0.00
66.00	2.98	0.54	0.00	0.00
69.00	2.98	0.54	0.00	0.00
72.00	2.98	0.54	0.00	0.00
75.00	2.98	0.54	0.00	0.00
78.00	2.98	0.54	0.00	0.00
81.00	2.98	0.54	0.00	0.00
84.00	2.98	0.54	0.00	0.00
87.00	2.98	0.54	0.00	0.00
90.00	2.98	0.54	0.00	0.00
93.00	2.98	0.54	0.00	0.00
96.00	2.98	0.54	0.00	0.00
99.00	2.98	0.54	0.00	0.00

Summary for Subcatchment 27S: PDA-9 BYPASS

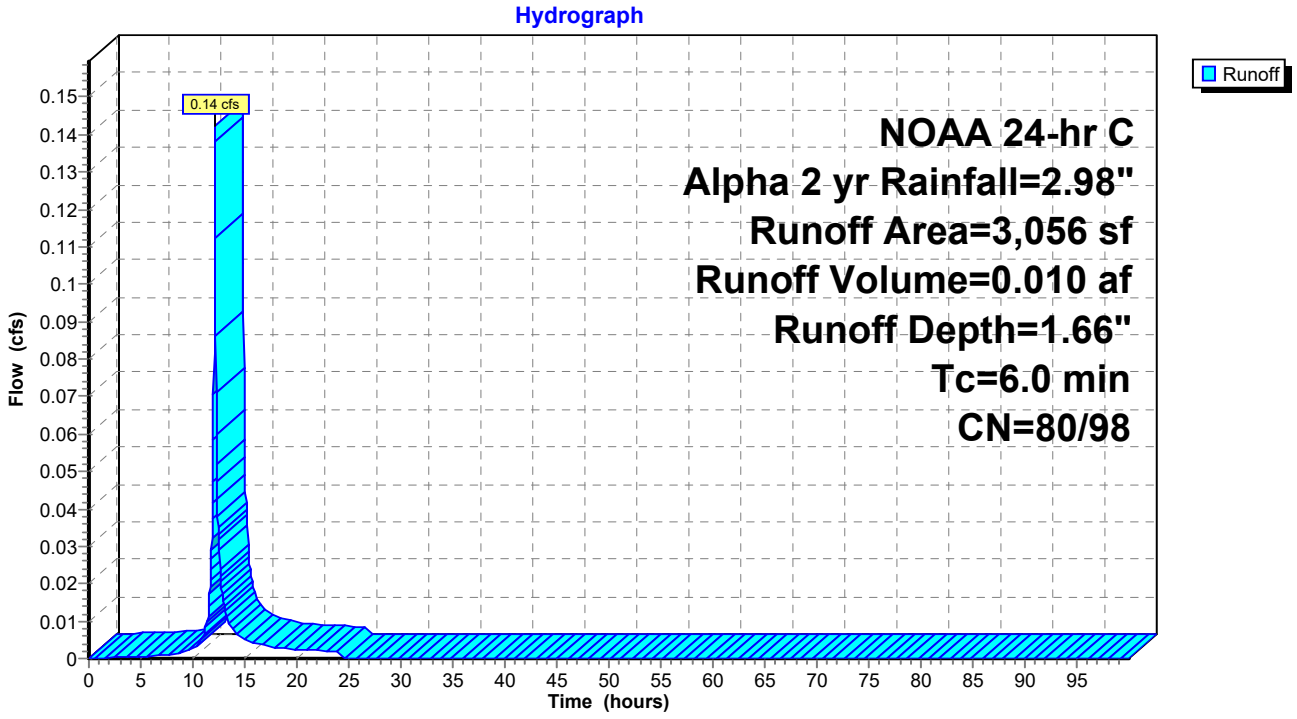
Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (sf)	CN	Description
*	860	98	Pavement
	2,196	80	>75% Grass cover, Good, HSG D
	3,056	85	Weighted Average
	2,196	80	71.86% Pervious Area
	860	98	28.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 27S: PDA-9 BYPASS



Hydrograph for Subcatchment 27S: PDA-9 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.11	0.00	0.02	0.00
6.00	0.24	0.00	0.10	0.00
9.00	0.44	0.00	0.26	0.00
12.00	1.42	0.25	1.20	**0.07**
15.00	2.54	0.92	2.32	**0.00**
18.00	2.74	1.06	2.51	0.00
21.00	2.87	1.16	2.64	0.00
24.00	**2.98**	**1.24**	**2.75**	0.00
27.00	2.98	1.24	2.75	0.00
30.00	2.98	1.24	2.75	0.00
33.00	2.98	1.24	2.75	0.00
36.00	2.98	1.24	2.75	0.00
39.00	2.98	1.24	2.75	0.00
42.00	2.98	1.24	2.75	0.00
45.00	2.98	1.24	2.75	0.00
48.00	2.98	1.24	2.75	0.00
51.00	2.98	1.24	2.75	0.00
54.00	2.98	1.24	2.75	0.00
57.00	2.98	1.24	2.75	0.00
60.00	2.98	1.24	2.75	0.00
63.00	2.98	1.24	2.75	0.00
66.00	2.98	1.24	2.75	0.00
69.00	2.98	1.24	2.75	0.00
72.00	2.98	1.24	2.75	0.00
75.00	2.98	1.24	2.75	0.00
78.00	2.98	1.24	2.75	0.00
81.00	2.98	1.24	2.75	0.00
84.00	2.98	1.24	2.75	0.00
87.00	2.98	1.24	2.75	0.00
90.00	2.98	1.24	2.75	0.00
93.00	2.98	1.24	2.75	0.00
96.00	2.98	1.24	2.75	0.00
99.00	2.98	1.24	2.75	0.00

Summary for Subcatchment 28S: PDA-4B

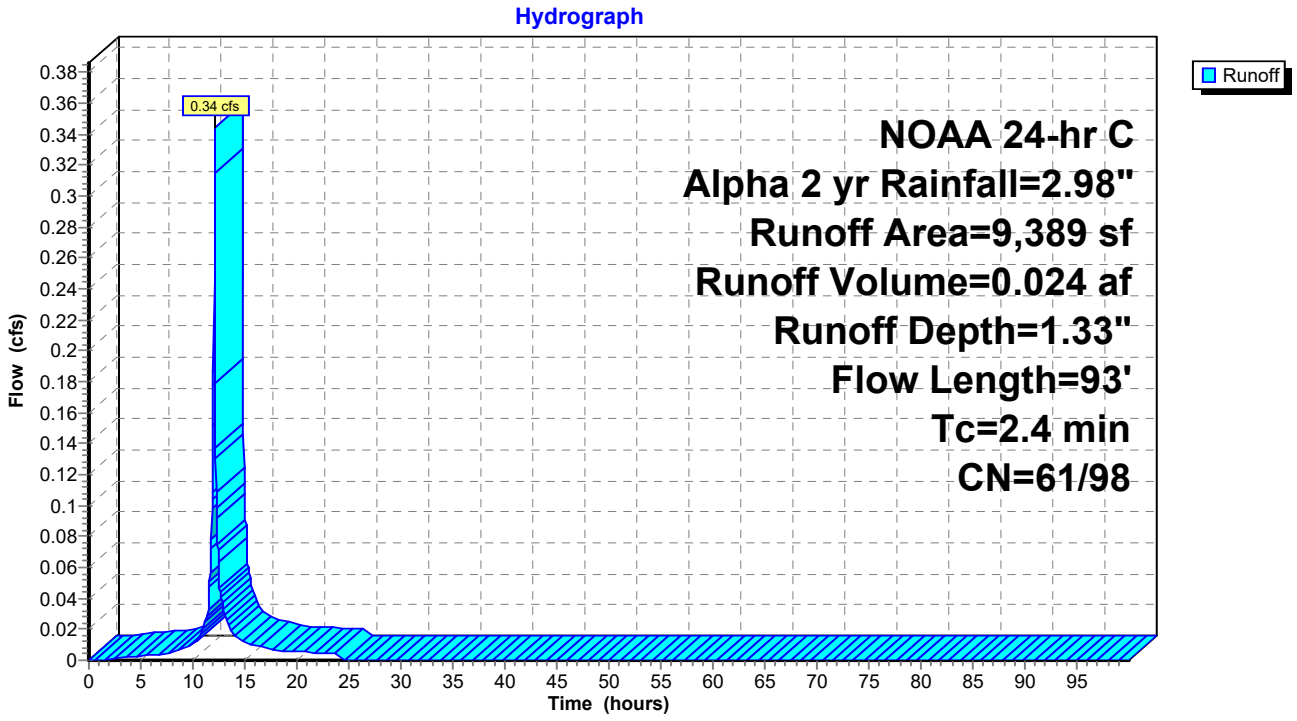
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (sf)	CN	Description
	5,551	61	>75% Grass cover, Good, HSG B
*	3,331	98	Asphalt Pavement
*	507	98	Pervious Pavement
	9,389	76	Weighted Average
	5,551	61	59.12% Pervious Area
	3,838	98	40.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	32	0.1334	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	61	0.0360	1.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.4	93	Total			

Subcatchment 28S: PDA-4B



Hydrograph for Subcatchment 28S: PDA-4B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.11	0.00	0.02	0.00
6.00	0.24	0.00	0.10	0.00
9.00	0.44	0.00	0.26	0.01
12.00	1.42	0.00	1.20	**0.19**
15.00	2.54	0.21	2.32	**0.01**
18.00	2.74	0.27	2.51	0.01
21.00	2.87	0.32	2.64	0.01
24.00	**2.98**	**0.36**	**2.75**	0.01
27.00	2.98	0.36	2.75	0.00
30.00	2.98	0.36	2.75	0.00
33.00	2.98	0.36	2.75	0.00
36.00	2.98	0.36	2.75	0.00
39.00	2.98	0.36	2.75	0.00
42.00	2.98	0.36	2.75	0.00
45.00	2.98	0.36	2.75	0.00
48.00	2.98	0.36	2.75	0.00
51.00	2.98	0.36	2.75	0.00
54.00	2.98	0.36	2.75	0.00
57.00	2.98	0.36	2.75	0.00
60.00	2.98	0.36	2.75	0.00
63.00	2.98	0.36	2.75	0.00
66.00	2.98	0.36	2.75	0.00
69.00	2.98	0.36	2.75	0.00
72.00	2.98	0.36	2.75	0.00
75.00	2.98	0.36	2.75	0.00
78.00	2.98	0.36	2.75	0.00
81.00	2.98	0.36	2.75	0.00
84.00	2.98	0.36	2.75	0.00
87.00	2.98	0.36	2.75	0.00
90.00	2.98	0.36	2.75	0.00
93.00	2.98	0.36	2.75	0.00
96.00	2.98	0.36	2.75	0.00
99.00	2.98	0.36	2.75	0.00

Summary for Subcatchment 29S: PDA-3B

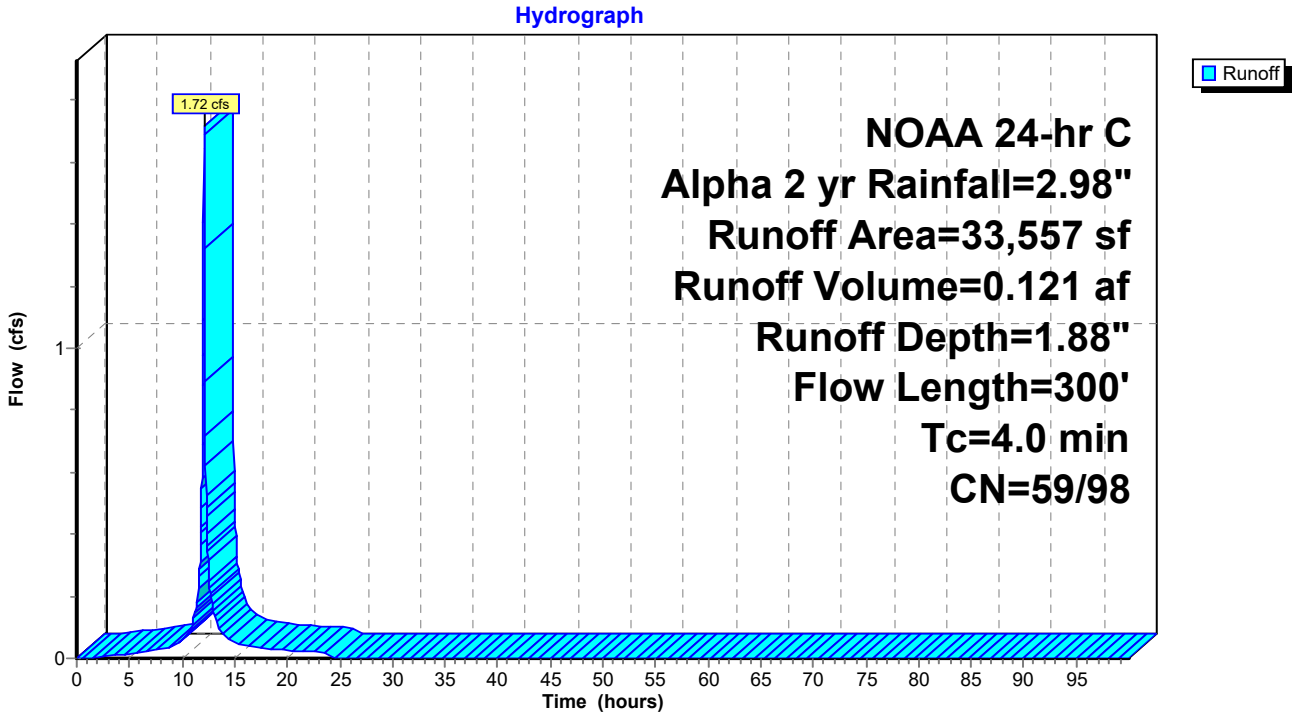
Runoff = 1.72 cfs @ 12.11 hrs, Volume= 0.121 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 2 yr Rainfall=2.98"

	Area (sf)	CN	Description
*	75	98	Concrete Sidewalk
	10,980	61	>75% Grass cover, Good, HSG B
*	2,280	98	Future Sidewalk
*	19,281	98	Future Pervious Pavement
	941	39	>75% Grass cover, Good, HSG A
	33,557	84	Weighted Average
	11,921	59	35.52% Pervious Area
	21,636	98	64.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.2	50	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	200	0.0060	3.51	2.76	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.0	300	Total			

Subcatchment 29S: PDA-3B



Hydrograph for Subcatchment 29S: PDA-3B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.11	0.00	0.02	0.01
6.00	0.24	0.00	0.10	0.02
9.00	0.44	0.00	0.26	0.04
12.00	1.42	0.00	1.20	**0.98**
15.00	2.54	0.16	2.32	**0.05**
18.00	2.74	0.22	2.51	0.03
21.00	2.87	0.26	2.64	0.02
24.00	**2.98**	**0.30**	**2.75**	0.02
27.00	2.98	0.30	2.75	0.00
30.00	2.98	0.30	2.75	0.00
33.00	2.98	0.30	2.75	0.00
36.00	2.98	0.30	2.75	0.00
39.00	2.98	0.30	2.75	0.00
42.00	2.98	0.30	2.75	0.00
45.00	2.98	0.30	2.75	0.00
48.00	2.98	0.30	2.75	0.00
51.00	2.98	0.30	2.75	0.00
54.00	2.98	0.30	2.75	0.00
57.00	2.98	0.30	2.75	0.00
60.00	2.98	0.30	2.75	0.00
63.00	2.98	0.30	2.75	0.00
66.00	2.98	0.30	2.75	0.00
69.00	2.98	0.30	2.75	0.00
72.00	2.98	0.30	2.75	0.00
75.00	2.98	0.30	2.75	0.00
78.00	2.98	0.30	2.75	0.00
81.00	2.98	0.30	2.75	0.00
84.00	2.98	0.30	2.75	0.00
87.00	2.98	0.30	2.75	0.00
90.00	2.98	0.30	2.75	0.00
93.00	2.98	0.30	2.75	0.00
96.00	2.98	0.30	2.75	0.00
99.00	2.98	0.30	2.75	0.00

Summary for Pond 19P: PDA-4 Basin

Inflow Area = 1.719 ac, 85.61% Impervious, Inflow Depth = 2.40" for Alpha 2 yr event
Inflow = 5.02 cfs @ 12.10 hrs, Volume= 0.344 af
Outflow = 1.31 cfs @ 12.31 hrs, Volume= 0.316 af, Atten= 74%, Lag= 12.7 min
Primary = 1.31 cfs @ 12.31 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 288.14' @ 12.31 hrs Surf.Area= 6,248 sf Storage= 6,106 cf

Plug-Flow detention time= 154.6 min calculated for 0.316 af (92% of inflow)
Center-of-Mass det. time= 110.1 min (870.4 - 760.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	286.25'	6,536 cf	**36.97'W x 169.00'L x 4.00'H Field A** 24,988 cf Overall - 8,648 cf Embedded = 16,340 cf x 40.0% Voids
#2A	286.75'	6,605 cf	**ADS N-12 30"** x 64 Inside #1 Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf 64 Chambers in 8 Rows 33.97' Header x 4.90 sf x 2 = 332.9 cf Inside
		13,141 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	286.75'	**24.0" Round Culvert** L= 62.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 286.75' / 285.60' S= 0.0184 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	286.75'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	287.75'	**9.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.31 cfs @ 12.31 hrs HW=288.14' (Free Discharge)
└**1=Culvert** (Passes 1.31 cfs of 11.75 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.71 cfs @ 5.24 fps)
└**3=Orifice/Grate** (Orifice Controls 0.60 cfs @ 2.01 fps)

Pond 19P: PDA-4 Basin - Chamber Wizard Field A

Chamber Model = ADS N-12 30" (ADS N-12® Pipe)
Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf
Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf

36.0" Wide + 17.1" Spacing = 53.1" C-C Row Spacing

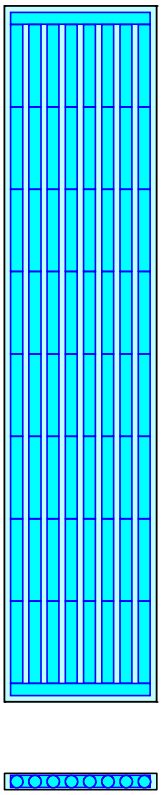
8 Chambers/Row x 20.00' Long +3.00' Header x 2 = 166.00' Row Length +18.0" End Stone x 2 = 169.00' Base Length
8 Rows x 36.0" Wide + 17.1" Spacing x 7 + 18.0" Side Stone x 2 = 36.97' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

64 Chambers x 98.0 cf + 33.97' Header x 4.90 sf x 2 = 6,604.9 cf Chamber Storage
64 Chambers x 128.3 cf + 33.97' Header x 6.41 sf x 2 = 8,644.6 cf Displacement

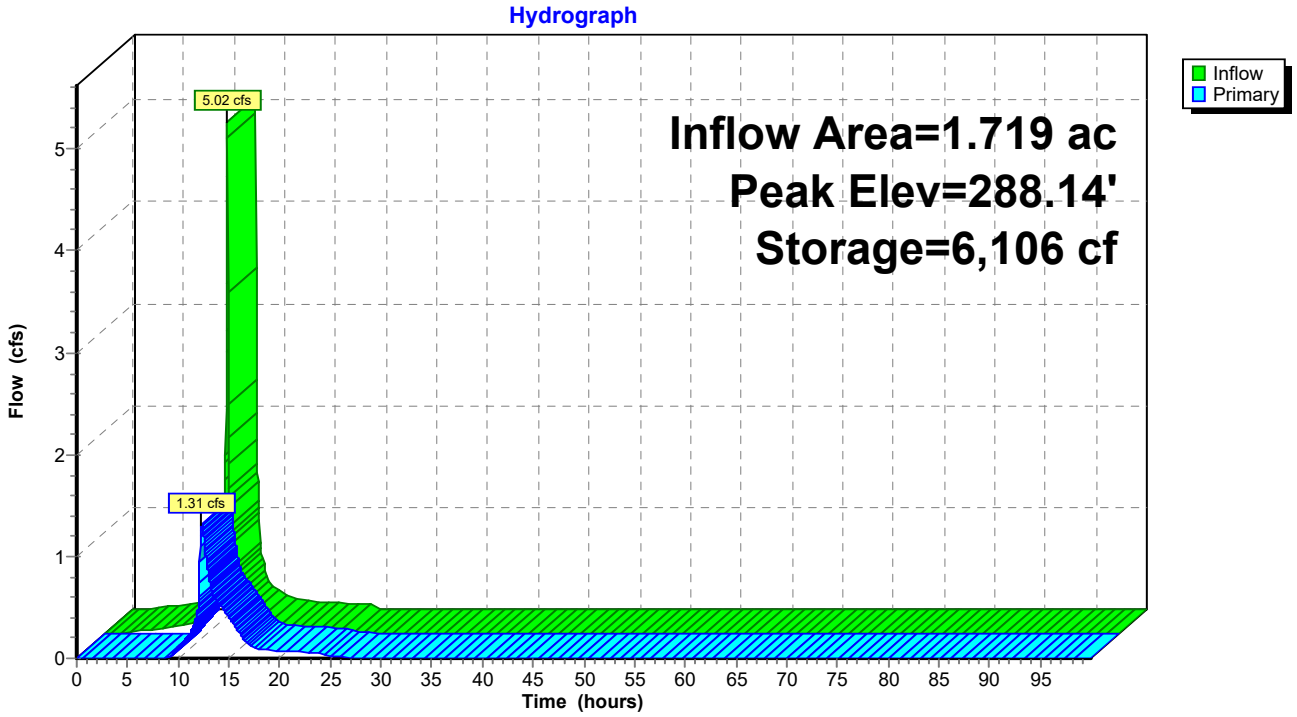
24,988.4 cf Field - 8,644.6 cf Chambers = 16,343.9 cf Stone x 40.0% Voids = 6,537.5 cf Stone Storage

Chamber Storage + Stone Storage = 13,142.5 cf = 0.302 af
Overall Storage Efficiency = 52.6%
Overall System Size = 169.00' x 36.97' x 4.00'

64 Chambers
925.5 cy Field
605.3 cy Stone



Pond 19P: PDA-4 Basin



Hydrograph for Pond 19P: PDA-4 Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	286.25	0.00
3.00	0.02	78	286.28	0.00
6.00	0.05	501	286.45	0.00
9.00	0.11	1,365	286.80	0.01
12.00	**2.98**	**3,877**	**287.62**	**0.53**
15.00	**0.14**	**2,786**	**287.34**	**0.41**
18.00	0.08	1,636	286.94	0.09
21.00	0.06	1,575	286.91	0.06
24.00	0.06	1,543	286.89	0.05
27.00	0.00	1,353	286.80	0.01
30.00	0.00	1,312	286.78	0.00
33.00	0.00	1,296	286.77	0.00
36.00	0.00	1,285	286.76	0.00
39.00	0.00	1,277	286.76	0.00
42.00	0.00	1,271	286.76	0.00
45.00	0.00	1,266	286.76	0.00
48.00	0.00	1,262	286.76	0.00
51.00	0.00	1,259	286.75	0.00
54.00	0.00	1,257	286.75	0.00
57.00	0.00	1,255	286.75	0.00
60.00	0.00	1,254	286.75	0.00
63.00	0.00	1,253	286.75	0.00
66.00	0.00	1,252	286.75	0.00
69.00	0.00	1,252	286.75	0.00
72.00	0.00	1,251	286.75	0.00
75.00	0.00	1,251	286.75	0.00
78.00	0.00	1,251	286.75	0.00
81.00	0.00	1,250	286.75	0.00
84.00	0.00	1,250	286.75	0.00
87.00	0.00	1,250	286.75	0.00
90.00	0.00	1,250	286.75	0.00
93.00	0.00	1,250	286.75	0.00
96.00	0.00	1,250	286.75	0.00
99.00	0.00	1,250	286.75	0.00

Summary for Pond 23P: Above-Ground Detension Basin 1

Inflow Area = 11.131 ac, 65.16% Impervious, Inflow Depth = 1.71" for Alpha 2 yr event
Inflow = 14.29 cfs @ 12.09 hrs, Volume= 1.587 af
Outflow = 1.62 cfs @ 14.17 hrs, Volume= 1.587 af, Atten= 89%, Lag= 124.7 min
Primary = 1.62 cfs @ 14.17 hrs, Volume= 1.587 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 271.06' @ 14.17 hrs Surf.Area= 16,523 sf Storage= 31,305 cf

Plug-Flow detention time= 282.5 min calculated for 1.587 af (100% of inflow)
Center-of-Mass det. time= 282.9 min (1,106.8 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	269.00'	107,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

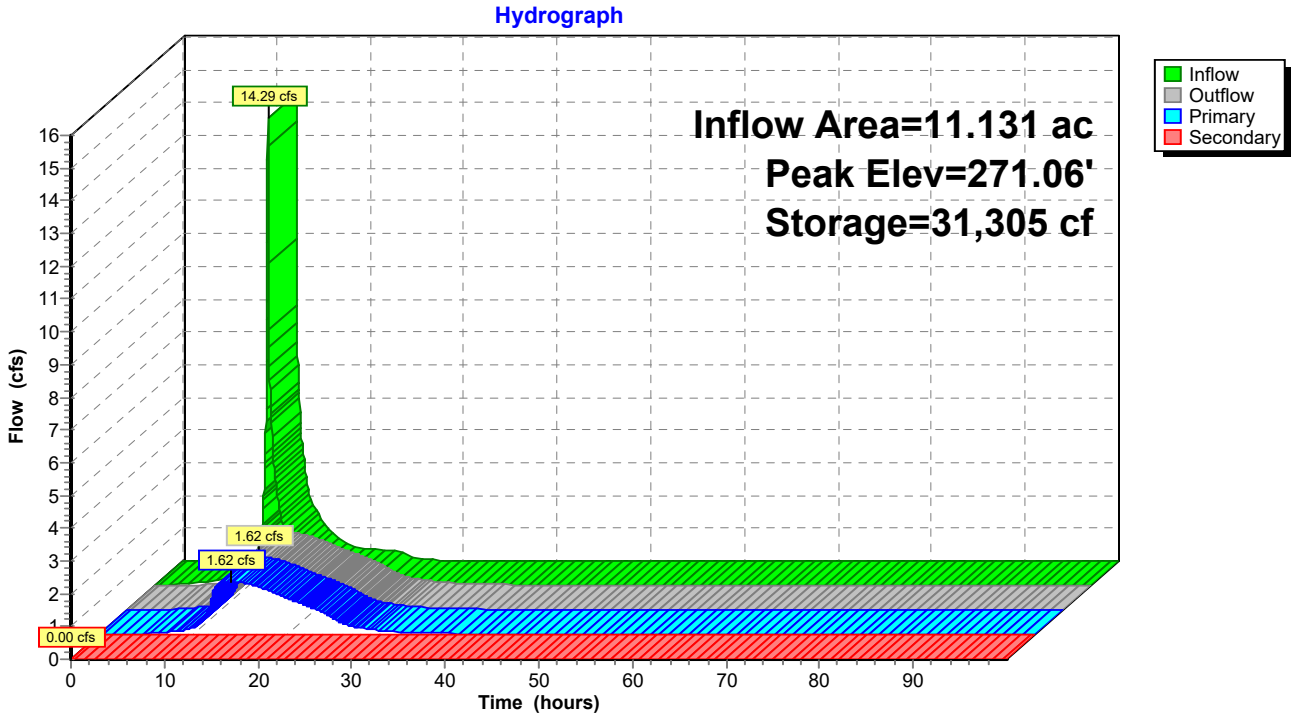
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
269.00	13,838	0	0
270.00	15,109	14,474	14,474
271.00	16,434	15,772	30,245
272.00	17,813	17,124	47,369
273.00	19,247	18,530	65,899
274.00	20,735	19,991	85,890
275.00	22,277	21,506	107,396

Device	Routing	Invert	Outlet Devices
#1	Primary	268.90'	**24.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 268.90' / 267.60' S= 0.0245 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	269.00'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	271.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	272.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	273.75'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	274.00'	**20.0' 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=1.62 cfs @ 14.17 hrs HW=271.06' (Free Discharge)
└─**1=Culvert** (Passes 1.62 cfs of 20.40 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 1.62 cfs @ 6.48 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=269.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 23P: Above-Ground Detension Basin 1



Hydrograph for Pond 23P: Above-Ground Detension Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	269.00	0.00	0.00	**0.00**
3.00	0.06	192	269.01	0.01	0.01	0.00
6.00	0.14	1,097	269.08	0.04	0.04	0.00
9.00	0.32	2,618	269.19	0.13	0.13	0.00
12.00	**8.66**	**13,337**	**269.92**	**0.98**	**0.98**	0.00
15.00	**1.19**	**30,677**	**271.03**	**1.60**	**1.60**	0.00
18.00	0.47	22,626	270.53	1.36	1.36	0.00
21.00	0.35	14,072	269.97	1.02	1.02	0.00
24.00	0.30	8,284	269.58	0.68	0.68	0.00
27.00	0.03	4,207	269.30	0.26	0.26	0.00
30.00	0.01	2,465	269.18	0.12	0.12	0.00
33.00	0.01	1,608	269.12	0.06	0.06	0.00
36.00	0.00	1,119	269.08	0.04	0.04	0.00
39.00	0.00	822	269.06	0.02	0.02	0.00
42.00	0.00	619	269.04	0.02	0.02	0.00
45.00	0.00	464	269.03	0.01	0.01	0.00
48.00	0.00	347	269.03	0.01	0.01	0.00
51.00	0.00	259	269.02	0.01	0.01	0.00
54.00	0.00	194	269.01	0.01	0.01	0.00
57.00	0.00	144	269.01	0.00	0.00	0.00
60.00	0.00	108	269.01	0.00	0.00	0.00
63.00	0.00	80	269.01	0.00	0.00	0.00
66.00	0.00	60	269.00	0.00	0.00	0.00
69.00	0.00	45	269.00	0.00	0.00	0.00
72.00	0.00	34	269.00	0.00	0.00	0.00
75.00	0.00	25	269.00	0.00	0.00	0.00
78.00	0.00	19	269.00	0.00	0.00	0.00
81.00	0.00	14	269.00	0.00	0.00	0.00
84.00	0.00	11	269.00	0.00	0.00	0.00
87.00	0.00	8	269.00	0.00	0.00	0.00
90.00	0.00	6	269.00	0.00	0.00	0.00
93.00	0.00	5	269.00	0.00	0.00	0.00
96.00	0.00	3	269.00	0.00	0.00	0.00
99.00	0.00	3	269.00	0.00	0.00	0.00

Summary for Pond 24P: Bioretention Basin

Inflow Area = 2.358 ac, 62.11% Impervious, Inflow Depth = 1.88" for Alpha 2 yr event
Inflow = 4.26 cfs @ 12.18 hrs, Volume= 0.370 af
Outflow = 0.87 cfs @ 12.65 hrs, Volume= 0.253 af, Atten= 80%, Lag= 28.2 min
Primary = 0.87 cfs @ 12.65 hrs, Volume= 0.253 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 276.67' @ 12.65 hrs Surf.Area= 6,388 sf Storage= 9,070 cf

Plug-Flow detention time= 300.4 min calculated for 0.253 af (68% of inflow)
Center-of-Mass det. time= 196.2 min (973.6 - 777.4)

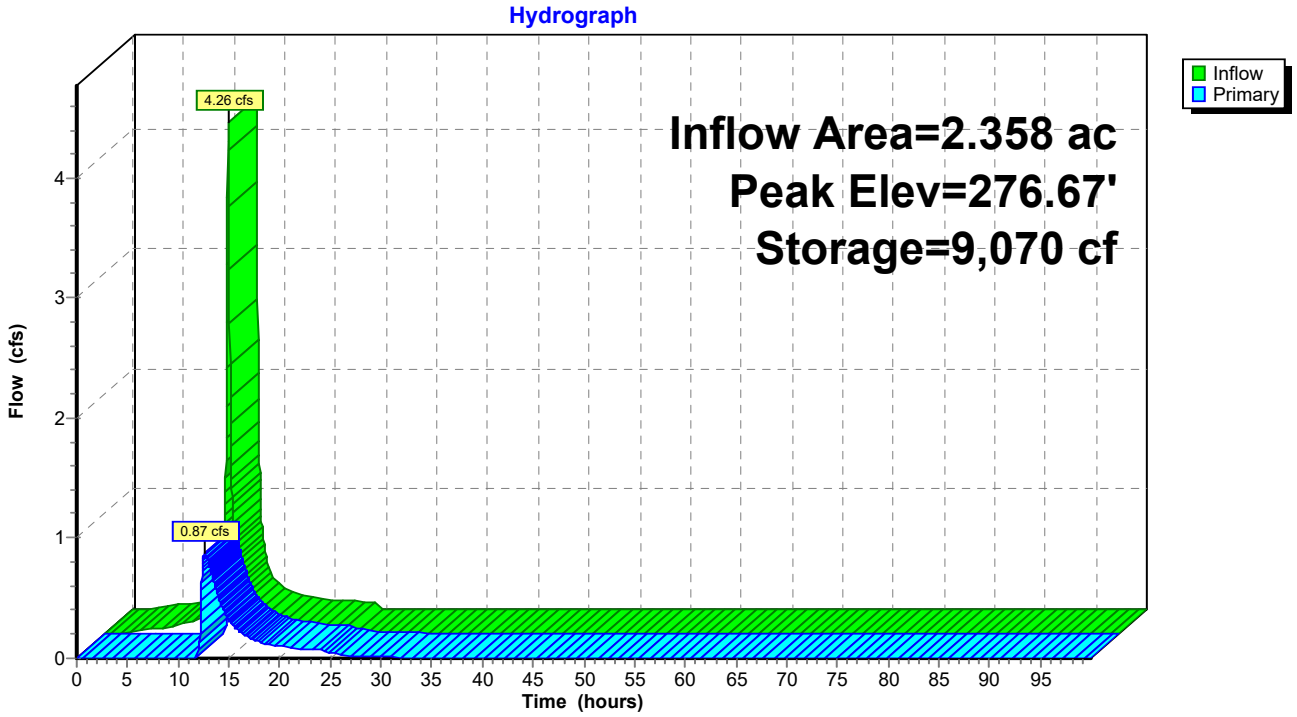
Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	37,747 cf	**Bioretention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	4,537	0	0
276.00	5,615	5,076	5,076
277.00	6,776	6,196	11,272
278.00	8,064	7,420	18,692
279.00	9,490	8,777	27,469
280.00	11,066	10,278	37,747

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 72.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 272.00' / 269.50' S= 0.0347 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	276.00'	**6.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.87 cfs @ 12.65 hrs HW=276.67' (Free Discharge)
└**1=Culvert** (Passes 0.87 cfs of 21.05 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.87 cfs @ 2.62 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 24P: Bioretention Basin



Hydrograph for Pond 24P: Bioretention Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	275.00	0.00
3.00	0.02	69	275.02	0.00
6.00	0.05	478	275.10	0.00
9.00	0.11	1,320	275.28	0.00
12.00	**1.89**	**4,986**	**275.98**	**0.00**
15.00	**0.17**	**7,062**	**276.34**	**0.32**
18.00	0.09	6,185	276.19	0.14
21.00	0.07	5,899	276.14	0.09
24.00	0.06	5,764	276.12	0.07
27.00	0.00	5,374	276.05	0.02
30.00	0.00	5,226	276.03	0.01
33.00	0.00	5,151	276.01	0.00
36.00	0.00	5,114	276.01	0.00
39.00	0.00	5,095	276.00	0.00
42.00	0.00	5,086	276.00	0.00
45.00	0.00	5,081	276.00	0.00
48.00	0.00	5,078	276.00	0.00
51.00	0.00	5,077	276.00	0.00
54.00	0.00	5,077	276.00	0.00
57.00	0.00	5,076	276.00	0.00
60.00	0.00	5,076	276.00	0.00
63.00	0.00	5,076	276.00	0.00
66.00	0.00	5,076	276.00	0.00
69.00	0.00	5,076	276.00	0.00
72.00	0.00	5,076	276.00	0.00
75.00	0.00	5,076	276.00	0.00
78.00	0.00	5,076	276.00	0.00
81.00	0.00	5,076	276.00	0.00
84.00	0.00	5,076	276.00	0.00
87.00	0.00	5,076	276.00	0.00
90.00	0.00	5,076	276.00	0.00
93.00	0.00	5,076	276.00	0.00
96.00	0.00	5,076	276.00	0.00
99.00	0.00	5,076	276.00	0.00

Summary for Pond 25P: Subsurface Basin 3B

Inflow Area = 0.770 ac, 64.48% Impervious, Inflow Depth = 1.88" for Alpha 2 yr event
Inflow = 1.72 cfs @ 12.11 hrs, Volume= 0.121 af
Outflow = 0.85 cfs @ 12.19 hrs, Volume= 0.114 af, Atten= 51%, Lag= 5.0 min
Primary = 0.85 cfs @ 12.19 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 285.03' @ 12.19 hrs Surf.Area= 2,166 sf Storage= 1,543 cf

Plug-Flow detention time= 101.2 min calculated for 0.114 af (95% of inflow)
Center-of-Mass det. time= 68.9 min (836.5 - 767.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.67'	1,658 cf	**17.80'W x 121.67'L x 3.00'H Field A** 6,497 cf Overall - 2,353 cf Embedded = 4,144 cf x 40.0% Voids
#2A	284.00'	1,860 cf	**ADS N-12 24"** x 30 Inside #1 Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf 30 Chambers in 5 Rows
		3,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	284.00'	**24.0" Round Culvert** L= 21.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 284.00' / 283.00' S= 0.0476 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	284.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	285.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.85 cfs @ 12.19 hrs HW=285.03' (Free Discharge)
└**1=Culvert** (Passes 0.85 cfs of 7.01 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 4.57 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 2.43 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.53 fps)

Pond 25P: Subsurface Basin 3B - Chamber Wizard Field A

Chamber Model = ADS N-12 24" (ADS N-12® Pipe)
Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf
Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf

28.0" Wide + 13.4" Spacing = 41.4" C-C Row Spacing

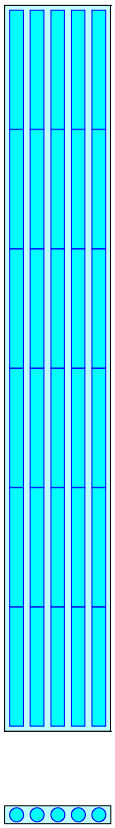
6 Chambers/Row x 20.00' Long = 120.00' Row Length +10.0" End Stone x 2 = 121.67' Base Length
5 Rows x 28.0" Wide + 13.4" Spacing x 4 + 10.0" Side Stone x 2 = 17.80' Base Width
4.0" Stone Base + 28.0" Chamber Height + 4.0" Stone Cover = 3.00' Field Height

30 Chambers x 62.0 cf = 1,860.0 cf Chamber Storage
30 Chambers x 78.4 cf = 2,352.8 cf Displacement

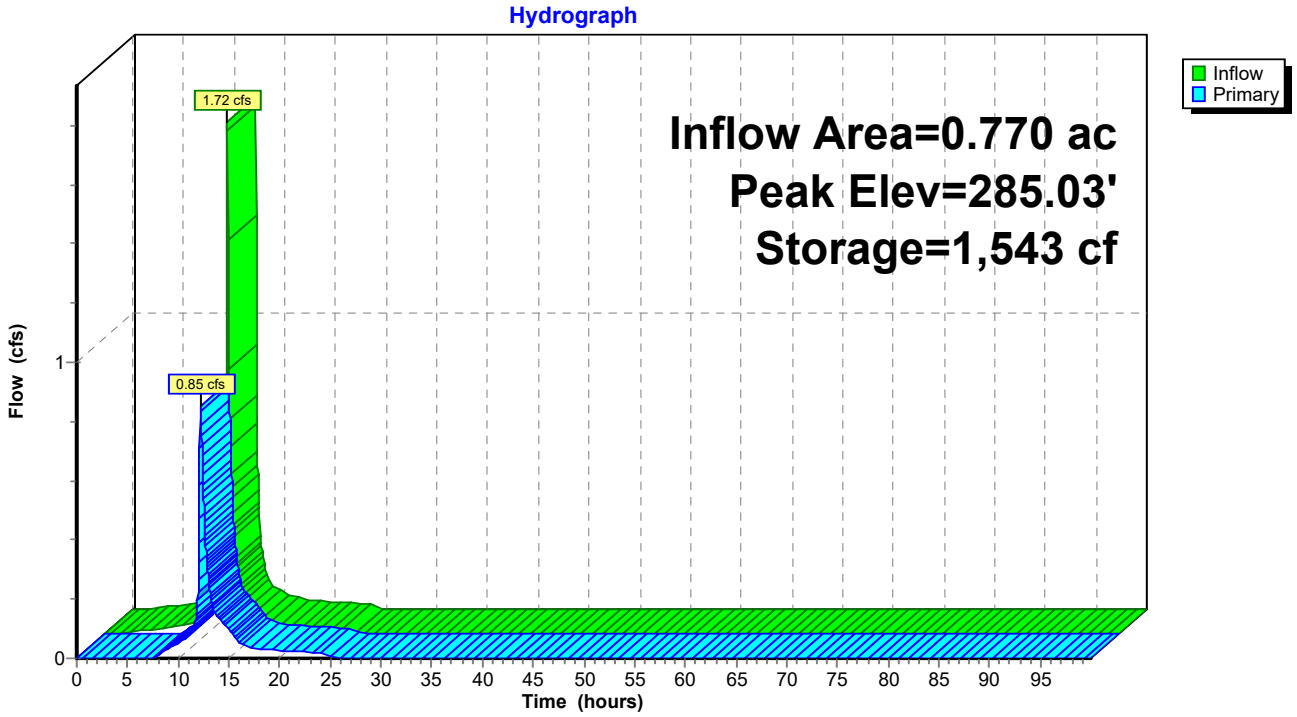
6,497.2 cf Field - 2,352.8 cf Chambers = 4,144.4 cf Stone x 40.0% Voids = 1,657.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,517.8 cf = 0.081 af
Overall Storage Efficiency = 54.1%
Overall System Size = 121.67' x 17.80' x 3.00'

30 Chambers
240.6 cy Field
153.5 cy Stone



Pond 25P: Subsurface Basin 3B



Hydrograph for Pond 25P: Subsurface Basin 3B

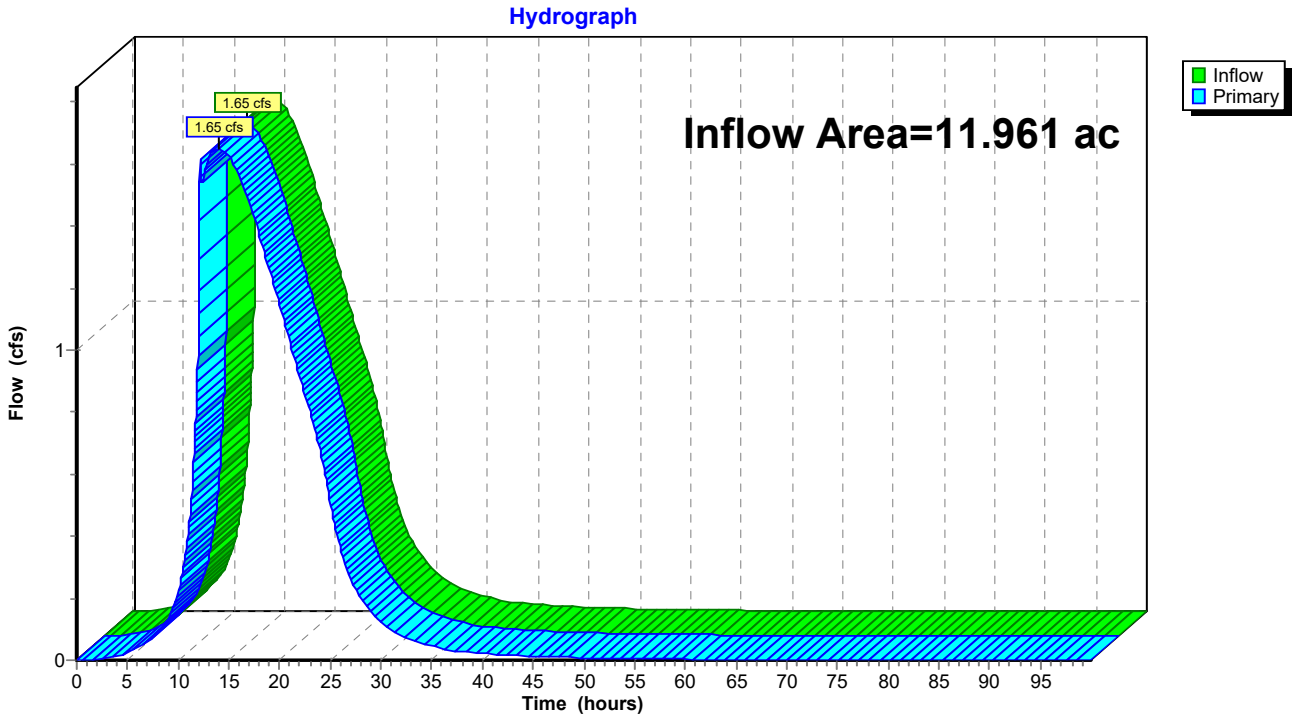
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	283.67	0.00
3.00	0.01	26	283.70	0.00
6.00	0.02	168	283.86	0.00
9.00	0.04	378	284.13	0.03
12.00	**0.98**	**1,049**	**284.70**	**0.32**
15.00	**0.05**	**513**	**284.29**	**0.10**
18.00	0.03	378	284.13	0.03
21.00	0.02	366	284.11	0.02
24.00	0.02	358	284.10	0.02
27.00	0.00	305	284.02	0.00
30.00	0.00	296	284.01	0.00
33.00	0.00	291	284.01	0.00
36.00	0.00	290	284.00	0.00
39.00	0.00	289	284.00	0.00
42.00	0.00	289	284.00	0.00
45.00	0.00	288	284.00	0.00
48.00	0.00	288	284.00	0.00
51.00	0.00	288	284.00	0.00
54.00	0.00	288	284.00	0.00
57.00	0.00	288	284.00	0.00
60.00	0.00	287	284.00	0.00
63.00	0.00	287	284.00	0.00
66.00	0.00	287	284.00	0.00
69.00	0.00	287	284.00	0.00
72.00	0.00	287	284.00	0.00
75.00	0.00	287	284.00	0.00
78.00	0.00	287	284.00	0.00
81.00	0.00	287	284.00	0.00
84.00	0.00	287	284.00	0.00
87.00	0.00	287	284.00	0.00
90.00	0.00	286	284.00	0.00
93.00	0.00	286	284.00	0.00
96.00	0.00	286	284.00	0.00
99.00	0.00	286	284.00	0.00

Summary for Link 20L: POA A

Inflow Area = 11.961 ac, 60.94% Impervious, Inflow Depth = 1.63" for Alpha 2 yr event
Inflow = 1.65 cfs @ 14.04 hrs, Volume= 1.621 af
Primary = 1.65 cfs @ 14.04 hrs, Volume= 1.621 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 20L: POA A



Hydrograph for Link 20L: POA A

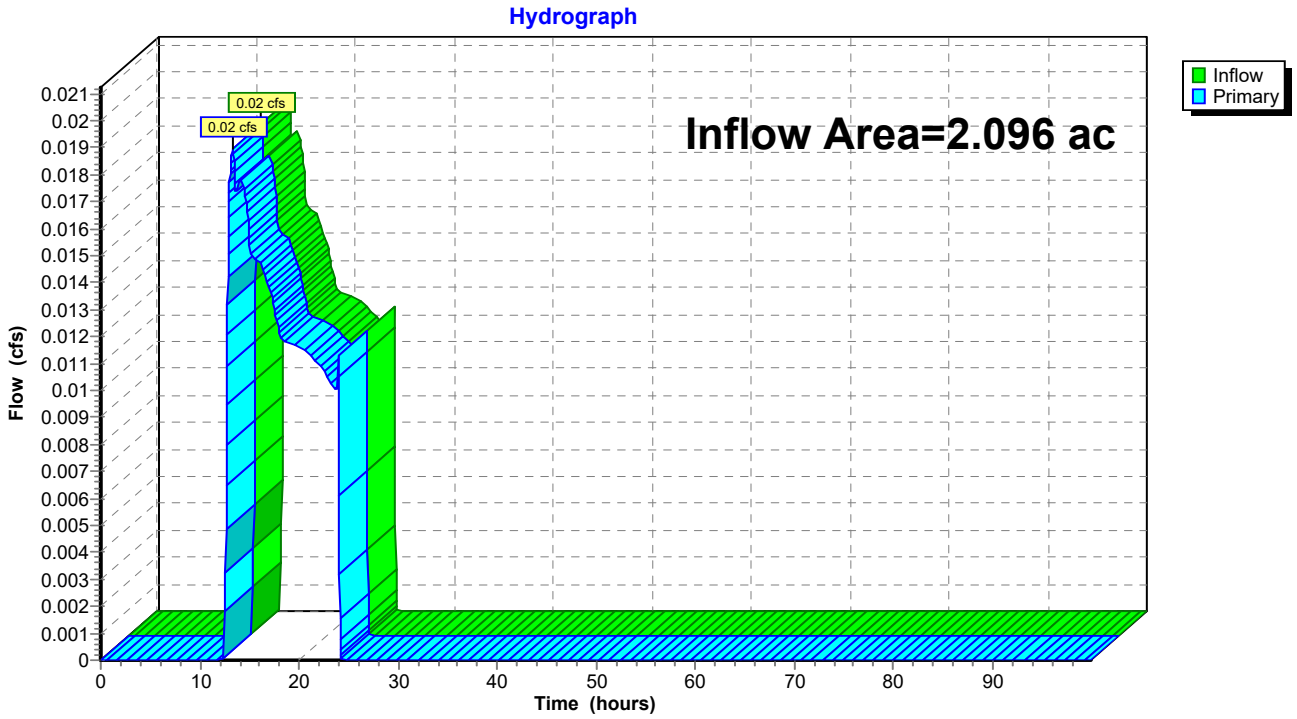
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.01	0.00	0.01	81.00	0.00	0.00	0.00
4.50	0.02	0.00	0.02	82.50	0.00	0.00	0.00
6.00	0.04	0.00	0.04	84.00	0.00	0.00	0.00
7.50	0.07	0.00	0.07	85.50	0.00	0.00	0.00
9.00	0.13	0.00	0.13	87.00	0.00	0.00	0.00
10.50	0.29	0.00	0.29	88.50	0.00	0.00	0.00
12.00	1.12	0.00	1.12	90.00	0.00	0.00	0.00
13.50	**1.65**	0.00	**1.65**	91.50	0.00	0.00	0.00
15.00	**1.63**	0.00	**1.63**	93.00	0.00	0.00	0.00
16.50	1.52	0.00	1.52	94.50	0.00	0.00	0.00
18.00	1.37	0.00	1.37	96.00	0.00	0.00	0.00
19.50	1.20	0.00	1.20	97.50	0.00	0.00	0.00
21.00	1.03	0.00	1.03	99.00	0.00	0.00	0.00
22.50	0.86	0.00	0.86				
24.00	0.69	0.00	0.69				
25.50	0.43	0.00	0.43				
27.00	0.26	0.00	0.26				
28.50	0.17	0.00	0.17				
30.00	0.12	0.00	0.12				
31.50	0.09	0.00	0.09				
33.00	0.06	0.00	0.06				
34.50	0.05	0.00	0.05				
36.00	0.04	0.00	0.04				
37.50	0.03	0.00	0.03				
39.00	0.02	0.00	0.02				
40.50	0.02	0.00	0.02				
42.00	0.02	0.00	0.02				
43.50	0.02	0.00	0.02				
45.00	0.01	0.00	0.01				
46.50	0.01	0.00	0.01				
48.00	0.01	0.00	0.01				
49.50	0.01	0.00	0.01				
51.00	0.01	0.00	0.01				
52.50	0.01	0.00	0.01				
54.00	0.01	0.00	0.01				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 22L: POA B

Inflow Area = 2.096 ac, 0.00% Impervious, Inflow Depth = 0.07" for Alpha 2 yr event
Inflow = 0.02 cfs @ 13.35 hrs, Volume= 0.012 af
Primary = 0.02 cfs @ 13.35 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 22L: POA B



Hydrograph for Link 22L: POA B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**0.00**	0.00	**0.00**	90.00	0.00	0.00	0.00
13.50	**0.02**	0.00	**0.02**	91.50	0.00	0.00	0.00
15.00	0.02	0.00	0.02	93.00	0.00	0.00	0.00
16.50	0.01	0.00	0.01	94.50	0.00	0.00	0.00
18.00	0.01	0.00	0.01	96.00	0.00	0.00	0.00
19.50	0.01	0.00	0.01	97.50	0.00	0.00	0.00
21.00	0.01	0.00	0.01	99.00	0.00	0.00	0.00
22.50	0.01	0.00	0.01				
24.00	0.01	0.00	0.01				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment13S: PDA-1A Runoff Area=39,498 sf 0.00% Impervious Runoff Depth=0.73"
Flow Length=145' Tc=5.7 min CN=53/0 Runoff=0.67 cfs 0.055 af

Subcatchment14S: PDA-1B Runoff Area=134,400 sf 100.00% Impervious Runoff Depth=4.46"
Flow Length=888' Slope=0.0200 '/' Tc=3.3 min CN=0/98 Runoff=16.50 cfs 1.148 af

Subcatchment15S: PDA-2 Runoff Area=102,736 sf 62.11% Impervious Runoff Depth=3.30"
Flow Length=710' Tc=10.4 min CN=64/98 Runoff=7.56 cfs 0.648 af

Subcatchment16S: PDA-3A Runoff Area=34,643 sf 92.27% Impervious Runoff Depth=4.13"
Flow Length=174' Slope=0.0400 '/' Tc=1.2 min CN=39/98 Runoff=4.22 cfs 0.274 af

Subcatchment17S: PDA-4A Runoff Area=65,506 sf 92.02% Impervious Runoff Depth=4.20"
Flow Length=538' Tc=3.4 min CN=61/98 Runoff=7.57 cfs 0.527 af

Subcatchment21S: PDA-5 BYPASS Runoff Area=91,311 sf 0.00% Impervious Runoff Depth=0.53"
Flow Length=358' Tc=6.4 min CN=49/0 Runoff=0.82 cfs 0.092 af

Subcatchment23S: PDA-6 Runoff Area=9,055 sf 0.00% Impervious Runoff Depth=0.48"
Tc=6.0 min CN=48/0 Runoff=0.07 cfs 0.008 af

Subcatchment24S: PDA-7 Runoff Area=1.287 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=1,280' Tc=8.1 min CN=54/0 Runoff=0.94 cfs 0.084 af

Subcatchment25S: PDA-8 BYPASS Runoff Area=16,940 sf 4.17% Impervious Runoff Depth=0.78"
Flow Length=165' Slope=0.0400 '/' Tc=7.7 min CN=51/98 Runoff=0.26 cfs 0.025 af

Subcatchment26S: PDA-10 BYPASS Runoff Area=16,173 sf 0.00% Impervious Runoff Depth=1.53"
Flow Length=505' Tc=7.7 min CN=66/0 Runoff=0.68 cfs 0.047 af

Subcatchment27S: PDA-9 BYPASS Runoff Area=3,056 sf 28.14% Impervious Runoff Depth=3.15"
Tc=6.0 min CN=80/98 Runoff=0.27 cfs 0.018 af

Subcatchment28S: PDA-4B Runoff Area=9,389 sf 40.88% Impervious Runoff Depth=2.53"
Flow Length=93' Tc=2.4 min CN=61/98 Runoff=0.69 cfs 0.045 af

Subcatchment29S: PDA-3B Runoff Area=33,557 sf 64.48% Impervious Runoff Depth=3.26"
Flow Length=300' Tc=4.0 min CN=59/98 Runoff=3.04 cfs 0.209 af

Pond 19P: PDA-4 Basin Peak Elev=288.72' Storage=8,612 cf Inflow=8.26 cfs 0.572 af
Outflow=3.17 cfs 0.543 af

Pond 23P: Above-Ground Detension Peak Elev=272.44' Storage=55,302 cf Inflow=26.24 cfs 2.846 af
Primary=4.07 cfs 2.846 af Secondary=0.00 cfs 0.000 af Outflow=4.07 cfs 2.846 af

Pond 24P: Bioretention Basin Peak Elev=277.30' Storage=13,385 cf Inflow=7.56 cfs 0.648 af
Outflow=2.66 cfs 0.532 af

Pond 25P: Subsurface Basin 3B Peak Elev=285.39' Storage=2,096 cf Inflow=3.04 cfs 0.209 af
Outflow=2.00 cfs 0.203 af

Link 20L: POA A Inflow=4.20 cfs 2.937 af
Primary=4.20 cfs 2.937 af

Link 22L: POA B Inflow=0.82 cfs 0.092 af
Primary=0.82 cfs 0.092 af

Total Runoff Area = 14.057 ac Runoff Volume = 3.181 af Average Runoff Depth = 2.72"
48.15% Pervious = 6.769 ac 51.85% Impervious = 7.288 ac

Summary for Subcatchment 13S: PDA-1A

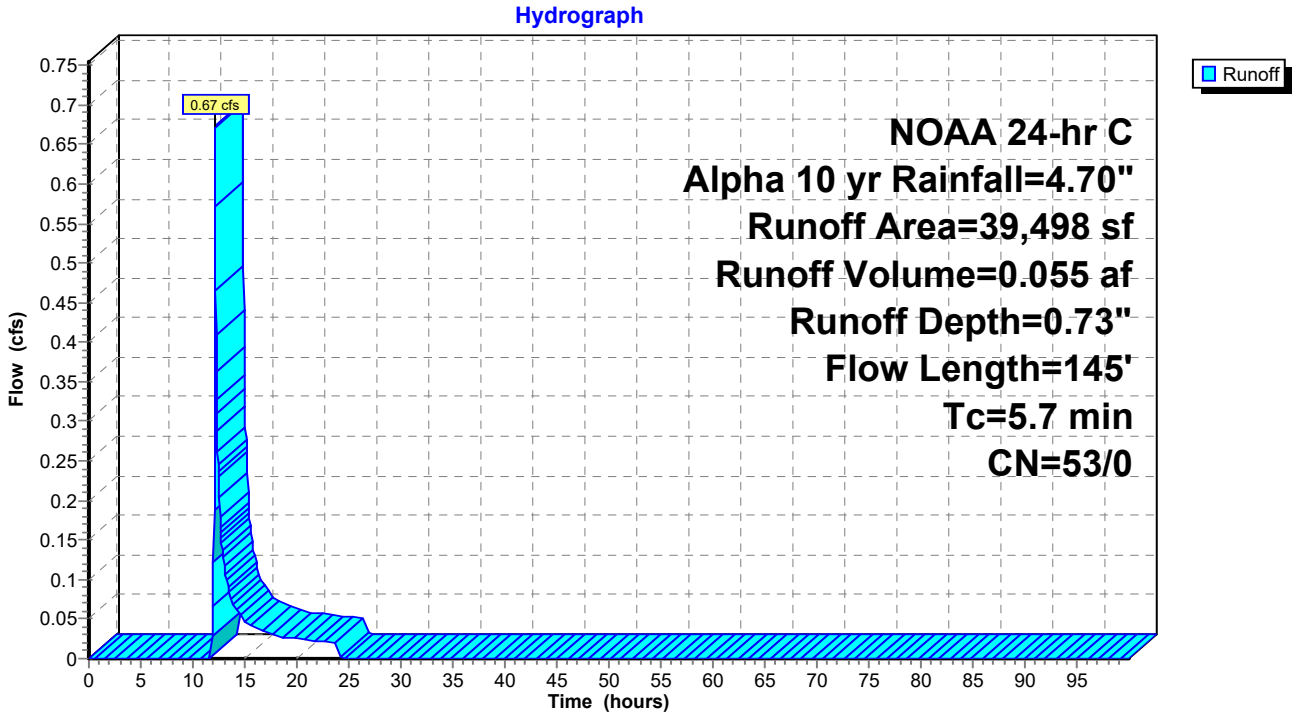
Runoff = 0.67 cfs @ 12.14 hrs, Volume= 0.055 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (sf)	CN	Description
1,134	80	>75% Grass cover, Good, HSG D
22,773	61	>75% Grass cover, Good, HSG B
15,591	39	>75% Grass cover, Good, HSG A
39,498	53	Weighted Average
39,498	53	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.1	45	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.7	145	Total			

Subcatchment 13S: PDA-1A



Hydrograph for Subcatchment 13S: PDA-1A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.02	0.00	**0.12**
15.00	4.01	0.45	0.00	**0.05**
18.00	4.33	0.57	0.00	0.03
21.00	4.53	0.66	0.00	0.02
24.00	**4.70**	**0.73**	0.00	0.02
27.00	4.70	0.73	0.00	0.00
30.00	4.70	0.73	0.00	0.00
33.00	4.70	0.73	0.00	0.00
36.00	4.70	0.73	0.00	0.00
39.00	4.70	0.73	0.00	0.00
42.00	4.70	0.73	0.00	0.00
45.00	4.70	0.73	0.00	0.00
48.00	4.70	0.73	0.00	0.00
51.00	4.70	0.73	0.00	0.00
54.00	4.70	0.73	0.00	0.00
57.00	4.70	0.73	0.00	0.00
60.00	4.70	0.73	0.00	0.00
63.00	4.70	0.73	0.00	0.00
66.00	4.70	0.73	0.00	0.00
69.00	4.70	0.73	0.00	0.00
72.00	4.70	0.73	0.00	0.00
75.00	4.70	0.73	0.00	0.00
78.00	4.70	0.73	0.00	0.00
81.00	4.70	0.73	0.00	0.00
84.00	4.70	0.73	0.00	0.00
87.00	4.70	0.73	0.00	0.00
90.00	4.70	0.73	0.00	0.00
93.00	4.70	0.73	0.00	0.00
96.00	4.70	0.73	0.00	0.00
99.00	4.70	0.73	0.00	0.00

Summary for Subcatchment 14S: PDA-1B

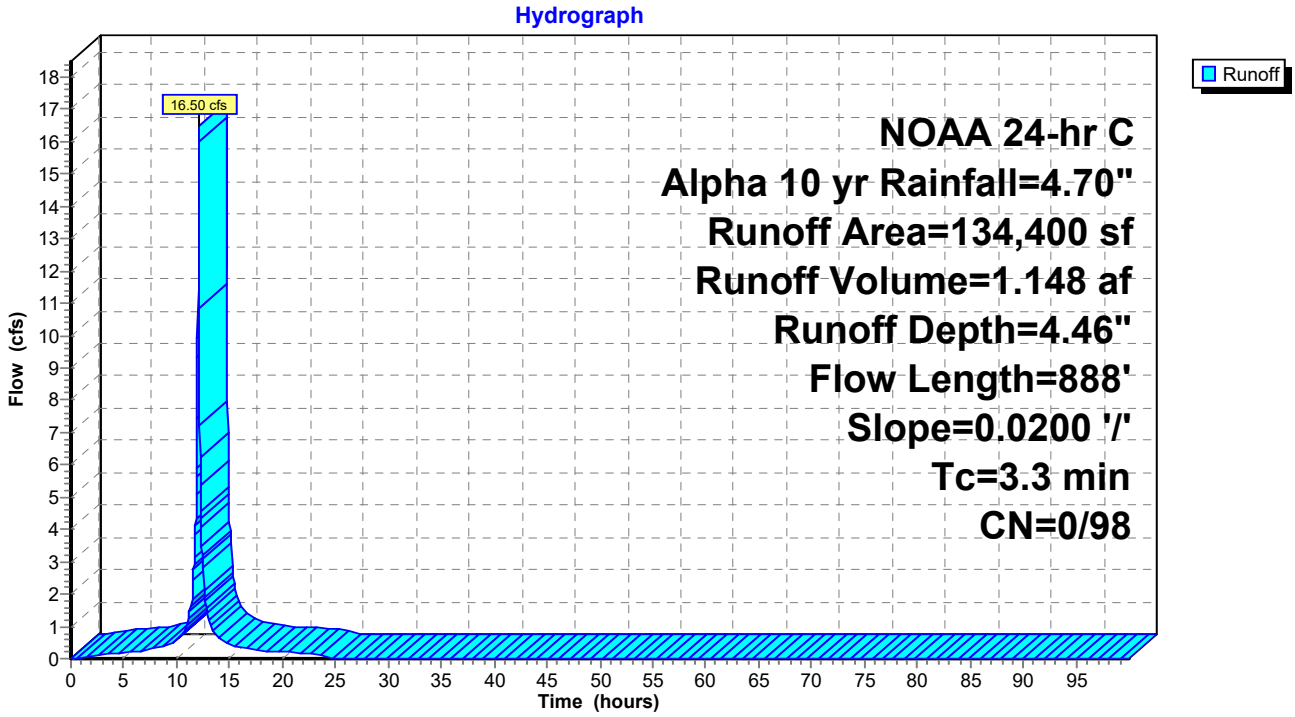
Runoff = 16.50 cfs @ 12.10 hrs, Volume= 1.148 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (sf)	CN	Description
134,400	98	Unconnected pavement, HSG B
134,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.24"
1.2	210	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	578	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
3.3	888	Total			

Subcatchment 14S: PDA-1B



Hydrograph for Subcatchment 14S: PDA-1B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.17	0.00	0.05	0.12
6.00	0.37	0.00	0.21	0.20
9.00	0.69	0.00	0.49	0.39
12.00	2.24	0.00	2.01	**9.94**
15.00	4.01	0.00	3.78	**0.43**
18.00	4.33	0.00	4.09	0.24
21.00	4.53	0.00	4.30	0.19
24.00	**4.70**	0.00	**4.46**	0.18
27.00	4.70	0.00	4.46	0.00
30.00	4.70	0.00	4.46	0.00
33.00	4.70	0.00	4.46	0.00
36.00	4.70	0.00	4.46	0.00
39.00	4.70	0.00	4.46	0.00
42.00	4.70	0.00	4.46	0.00
45.00	4.70	0.00	4.46	0.00
48.00	4.70	0.00	4.46	0.00
51.00	4.70	0.00	4.46	0.00
54.00	4.70	0.00	4.46	0.00
57.00	4.70	0.00	4.46	0.00
60.00	4.70	0.00	4.46	0.00
63.00	4.70	0.00	4.46	0.00
66.00	4.70	0.00	4.46	0.00
69.00	4.70	0.00	4.46	0.00
72.00	4.70	0.00	4.46	0.00
75.00	4.70	0.00	4.46	0.00
78.00	4.70	0.00	4.46	0.00
81.00	4.70	0.00	4.46	0.00
84.00	4.70	0.00	4.46	0.00
87.00	4.70	0.00	4.46	0.00
90.00	4.70	0.00	4.46	0.00
93.00	4.70	0.00	4.46	0.00
96.00	4.70	0.00	4.46	0.00
99.00	4.70	0.00	4.46	0.00

Summary for Subcatchment 15S: PDA-2

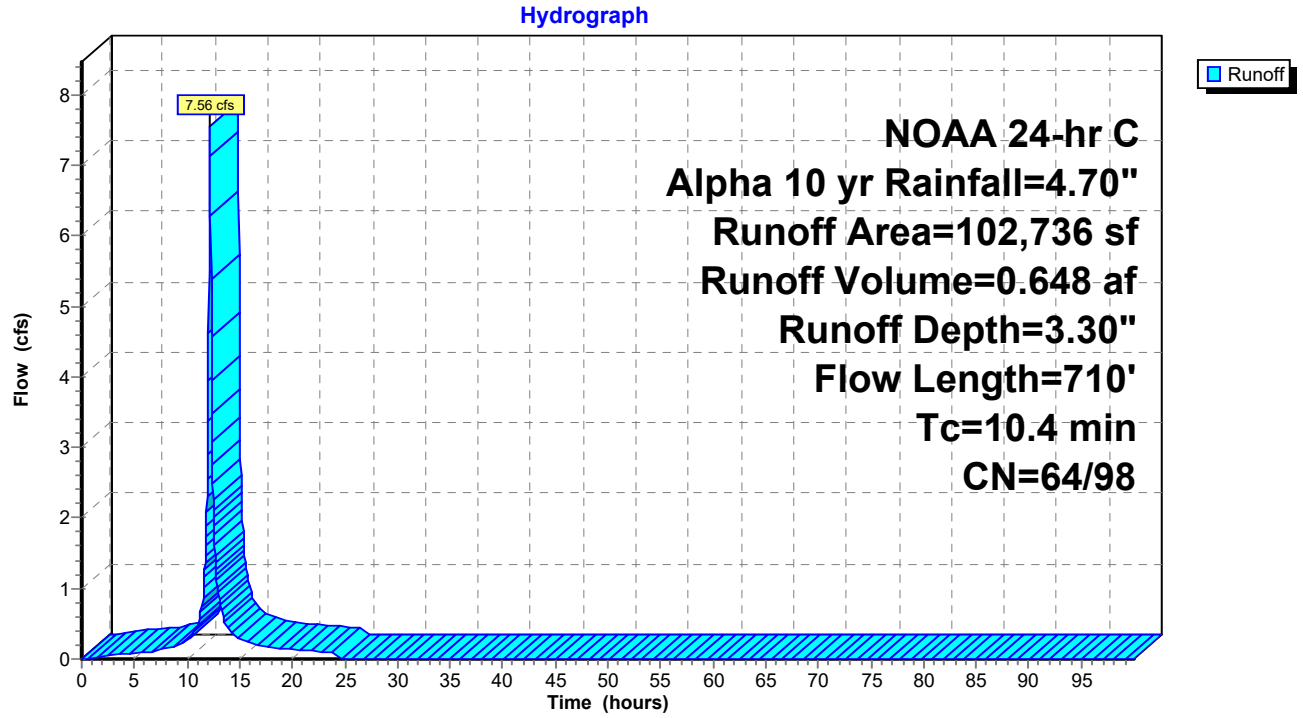
Runoff = 7.56 cfs @ 12.18 hrs, Volume= 0.648 af, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (sf)	CN	Description
63,805	98	Unconnected pavement, HSG B
6,975	80	>75% Grass cover, Good, HSG D
788	39	>75% Grass cover, Good, HSG A
31,168	61	>75% Grass cover, Good, HSG B
102,736	85	Weighted Average
38,931	64	37.89% Pervious Area
63,805	98	62.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0550	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.1	210	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	400	0.0200	8.41	14.86	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
10.4	710	Total			

Subcatchment 15S: PDA-2



Hydrograph for Subcatchment 15S: PDA-2

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.05
6.00	0.37	0.00	0.21	0.09
9.00	0.69	0.00	0.49	0.18
12.00	2.24	0.18	2.01	**3.37**
15.00	4.01	0.98	3.78	**0.29**
18.00	4.33	1.16	4.09	0.16
21.00	4.53	1.29	4.30	0.13
24.00	**4.70**	**1.39**	**4.46**	0.10
27.00	4.70	1.39	4.46	0.00
30.00	4.70	1.39	4.46	0.00
33.00	4.70	1.39	4.46	0.00
36.00	4.70	1.39	4.46	0.00
39.00	4.70	1.39	4.46	0.00
42.00	4.70	1.39	4.46	0.00
45.00	4.70	1.39	4.46	0.00
48.00	4.70	1.39	4.46	0.00
51.00	4.70	1.39	4.46	0.00
54.00	4.70	1.39	4.46	0.00
57.00	4.70	1.39	4.46	0.00
60.00	4.70	1.39	4.46	0.00
63.00	4.70	1.39	4.46	0.00
66.00	4.70	1.39	4.46	0.00
69.00	4.70	1.39	4.46	0.00
72.00	4.70	1.39	4.46	0.00
75.00	4.70	1.39	4.46	0.00
78.00	4.70	1.39	4.46	0.00
81.00	4.70	1.39	4.46	0.00
84.00	4.70	1.39	4.46	0.00
87.00	4.70	1.39	4.46	0.00
90.00	4.70	1.39	4.46	0.00
93.00	4.70	1.39	4.46	0.00
96.00	4.70	1.39	4.46	0.00
99.00	4.70	1.39	4.46	0.00

Summary for Subcatchment 16S: PDA-3A

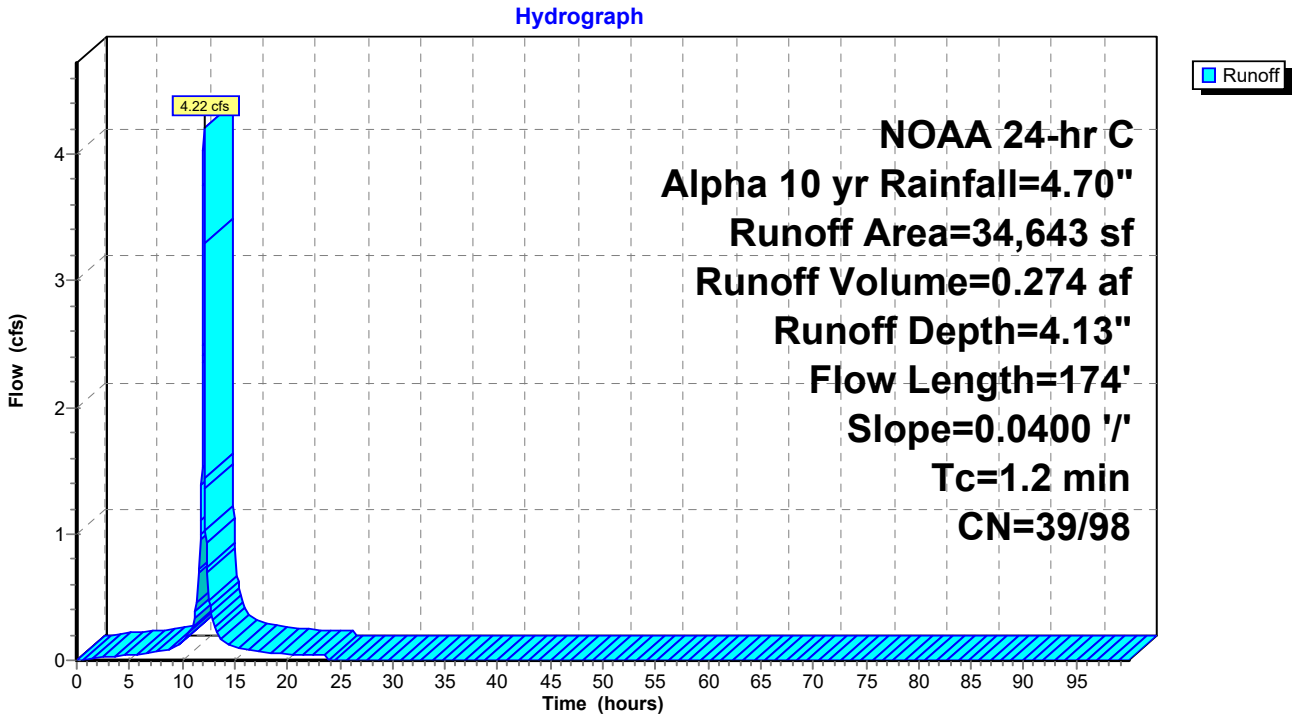
Runoff = 4.22 cfs @ 12.08 hrs, Volume= 0.274 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (sf)	CN	Description
*	2,646	98	Concrete Sidewalk
*	29,318	98	Pavement
	2,679	39	>75% Grass cover, Good, HSG A
	34,643	93	Weighted Average
	2,679	39	7.73% Pervious Area
	31,964	98	92.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0400	1.83		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.3	74	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	174	Total			

Subcatchment 16S: PDA-3A



Hydrograph for Subcatchment 16S: PDA-3A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.03
6.00	0.37	0.00	0.21	0.05
9.00	0.69	0.00	0.49	0.09
12.00	2.24	0.00	2.01	**2.50**
15.00	4.01	0.05	3.78	**0.10**
18.00	4.33	0.09	4.09	0.06
21.00	4.53	0.12	4.30	0.05
24.00	**4.70**	**0.14**	**4.46**	0.04
27.00	4.70	0.14	4.46	0.00
30.00	4.70	0.14	4.46	0.00
33.00	4.70	0.14	4.46	0.00
36.00	4.70	0.14	4.46	0.00
39.00	4.70	0.14	4.46	0.00
42.00	4.70	0.14	4.46	0.00
45.00	4.70	0.14	4.46	0.00
48.00	4.70	0.14	4.46	0.00
51.00	4.70	0.14	4.46	0.00
54.00	4.70	0.14	4.46	0.00
57.00	4.70	0.14	4.46	0.00
60.00	4.70	0.14	4.46	0.00
63.00	4.70	0.14	4.46	0.00
66.00	4.70	0.14	4.46	0.00
69.00	4.70	0.14	4.46	0.00
72.00	4.70	0.14	4.46	0.00
75.00	4.70	0.14	4.46	0.00
78.00	4.70	0.14	4.46	0.00
81.00	4.70	0.14	4.46	0.00
84.00	4.70	0.14	4.46	0.00
87.00	4.70	0.14	4.46	0.00
90.00	4.70	0.14	4.46	0.00
93.00	4.70	0.14	4.46	0.00
96.00	4.70	0.14	4.46	0.00
99.00	4.70	0.14	4.46	0.00

Summary for Subcatchment 17S: PDA-4A

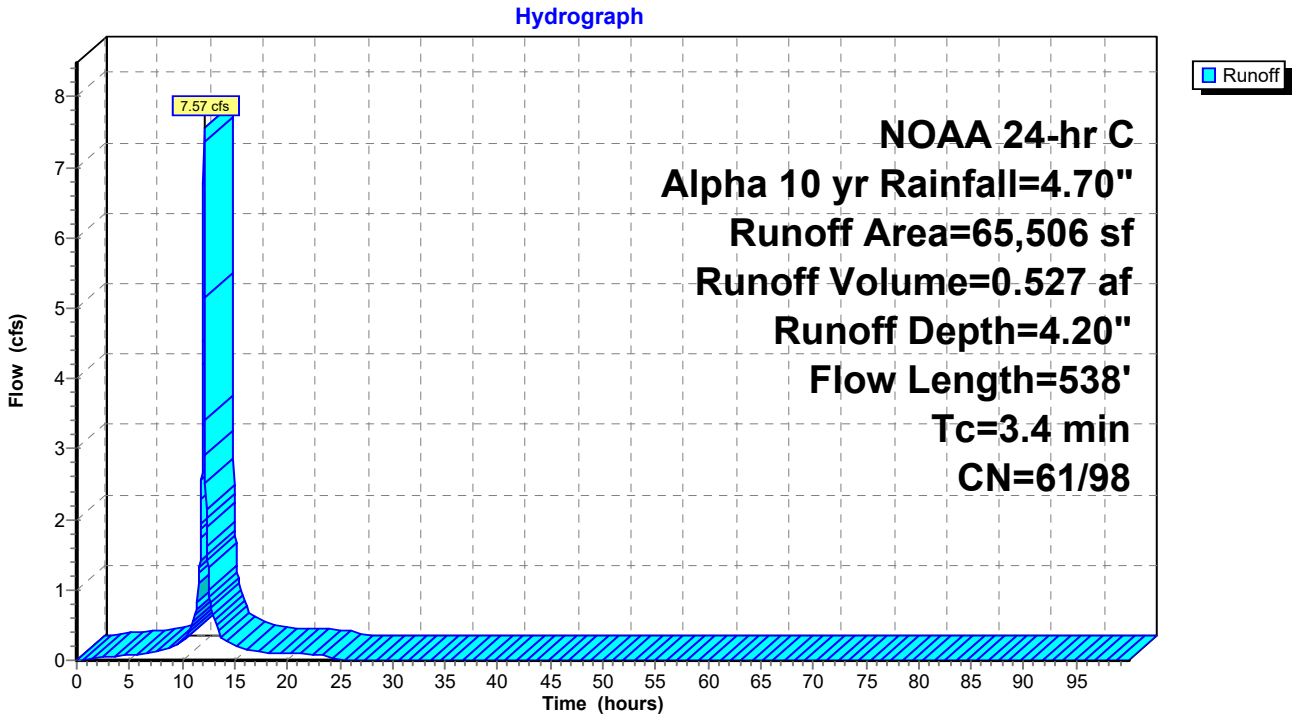
Runoff = 7.57 cfs @ 12.10 hrs, Volume= 0.527 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (sf)	CN	Description
*	34,074	98	Heavy Duty Asphalt
*	26,203	98	Pervious Pavement
	5,229	61	>75% Grass cover, Good, HSG B
	65,506	95	Weighted Average
	5,229	61	7.98% Pervious Area
	60,277	98	92.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0422	1.87		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.5	438	0.0207	2.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	538	Total			

Subcatchment 17S: PDA-4A



Hydrograph for Subcatchment 17S: PDA-4A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.05
6.00	0.37	0.00	0.21	0.09
9.00	0.69	0.00	0.49	0.17
12.00	2.24	0.13	2.01	**4.53**
15.00	4.01	0.82	3.78	**0.20**
18.00	4.33	0.98	4.09	0.11
21.00	4.53	1.10	4.30	0.09
24.00	**4.70**	**1.19**	**4.46**	0.09
27.00	4.70	1.19	4.46	0.00
30.00	4.70	1.19	4.46	0.00
33.00	4.70	1.19	4.46	0.00
36.00	4.70	1.19	4.46	0.00
39.00	4.70	1.19	4.46	0.00
42.00	4.70	1.19	4.46	0.00
45.00	4.70	1.19	4.46	0.00
48.00	4.70	1.19	4.46	0.00
51.00	4.70	1.19	4.46	0.00
54.00	4.70	1.19	4.46	0.00
57.00	4.70	1.19	4.46	0.00
60.00	4.70	1.19	4.46	0.00
63.00	4.70	1.19	4.46	0.00
66.00	4.70	1.19	4.46	0.00
69.00	4.70	1.19	4.46	0.00
72.00	4.70	1.19	4.46	0.00
75.00	4.70	1.19	4.46	0.00
78.00	4.70	1.19	4.46	0.00
81.00	4.70	1.19	4.46	0.00
84.00	4.70	1.19	4.46	0.00
87.00	4.70	1.19	4.46	0.00
90.00	4.70	1.19	4.46	0.00
93.00	4.70	1.19	4.46	0.00
96.00	4.70	1.19	4.46	0.00
99.00	4.70	1.19	4.46	0.00

Summary for Subcatchment 21S: PDA-5 BYPASS

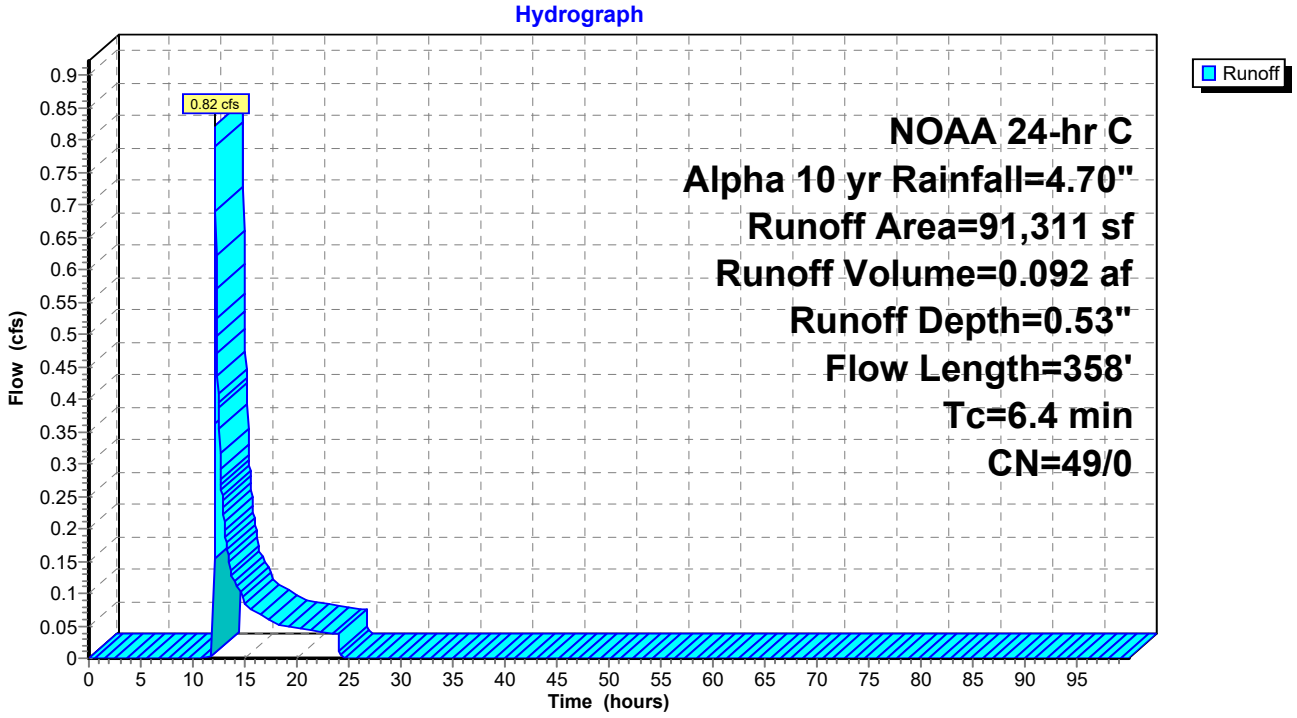
Runoff = 0.82 cfs @ 12.16 hrs, Volume= 0.092 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (sf)	CN	Description
2,125	73	Brush, Good, HSG D
89,186	48	Brush, Good, HSG B
91,311	49	Weighted Average
91,311	49	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.24"
0.9	258	0.0860	4.72		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.4	358	Total			

Subcatchment 21S: PDA-5 BYPASS



Hydrograph for Subcatchment 21S: PDA-5 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.00	0.00	**0.01**
15.00	4.01	0.30	0.00	**0.09**
18.00	4.33	0.40	0.00	0.05
21.00	4.53	0.47	0.00	0.05
24.00	**4.70**	**0.53**	0.00	0.04
27.00	4.70	0.53	0.00	0.00
30.00	4.70	0.53	0.00	0.00
33.00	4.70	0.53	0.00	0.00
36.00	4.70	0.53	0.00	0.00
39.00	4.70	0.53	0.00	0.00
42.00	4.70	0.53	0.00	0.00
45.00	4.70	0.53	0.00	0.00
48.00	4.70	0.53	0.00	0.00
51.00	4.70	0.53	0.00	0.00
54.00	4.70	0.53	0.00	0.00
57.00	4.70	0.53	0.00	0.00
60.00	4.70	0.53	0.00	0.00
63.00	4.70	0.53	0.00	0.00
66.00	4.70	0.53	0.00	0.00
69.00	4.70	0.53	0.00	0.00
72.00	4.70	0.53	0.00	0.00
75.00	4.70	0.53	0.00	0.00
78.00	4.70	0.53	0.00	0.00
81.00	4.70	0.53	0.00	0.00
84.00	4.70	0.53	0.00	0.00
87.00	4.70	0.53	0.00	0.00
90.00	4.70	0.53	0.00	0.00
93.00	4.70	0.53	0.00	0.00
96.00	4.70	0.53	0.00	0.00
99.00	4.70	0.53	0.00	0.00

Summary for Subcatchment 23S: PDA-6

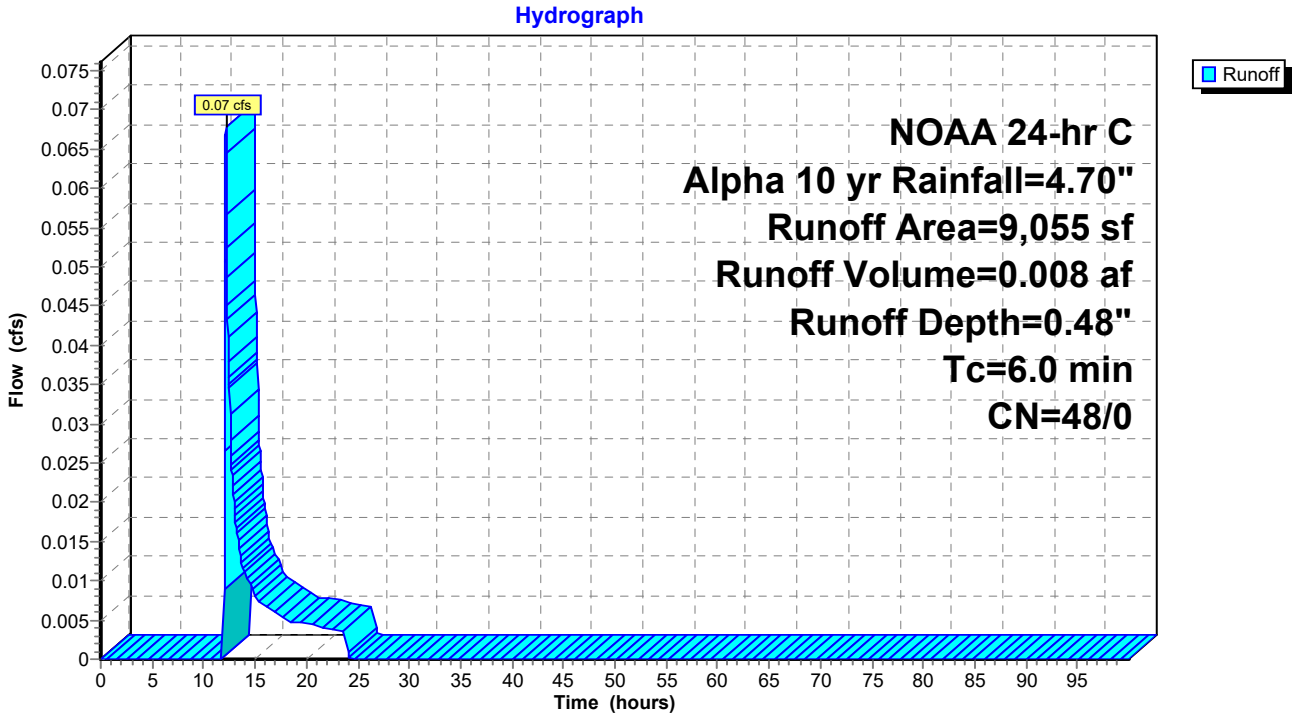
Runoff = 0.07 cfs @ 12.16 hrs, Volume= 0.008 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (sf)	CN	Description
9,055	48	Brush, Good, HSG B
9,055	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 23S: PDA-6



Hydrograph for Subcatchment 23S: PDA-6

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.00	0.00	**0.00**
15.00	4.01	0.27	0.00	**0.01**
18.00	4.33	0.36	0.00	0.00
21.00	4.53	0.42	0.00	0.00
24.00	**4.70**	**0.48**	0.00	0.00
27.00	4.70	0.48	0.00	0.00
30.00	4.70	0.48	0.00	0.00
33.00	4.70	0.48	0.00	0.00
36.00	4.70	0.48	0.00	0.00
39.00	4.70	0.48	0.00	0.00
42.00	4.70	0.48	0.00	0.00
45.00	4.70	0.48	0.00	0.00
48.00	4.70	0.48	0.00	0.00
51.00	4.70	0.48	0.00	0.00
54.00	4.70	0.48	0.00	0.00
57.00	4.70	0.48	0.00	0.00
60.00	4.70	0.48	0.00	0.00
63.00	4.70	0.48	0.00	0.00
66.00	4.70	0.48	0.00	0.00
69.00	4.70	0.48	0.00	0.00
72.00	4.70	0.48	0.00	0.00
75.00	4.70	0.48	0.00	0.00
78.00	4.70	0.48	0.00	0.00
81.00	4.70	0.48	0.00	0.00
84.00	4.70	0.48	0.00	0.00
87.00	4.70	0.48	0.00	0.00
90.00	4.70	0.48	0.00	0.00
93.00	4.70	0.48	0.00	0.00
96.00	4.70	0.48	0.00	0.00
99.00	4.70	0.48	0.00	0.00

Summary for Subcatchment 24S: PDA-7

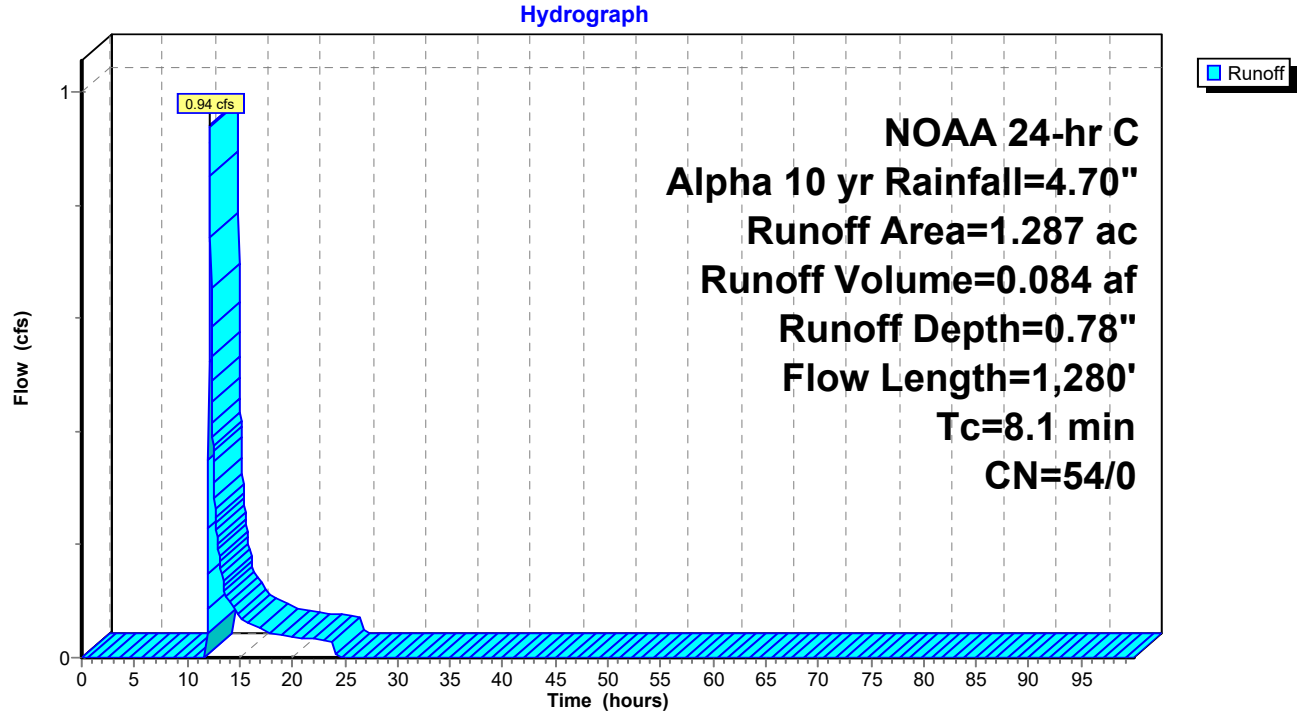
Runoff = 0.94 cfs @ 12.17 hrs, Volume= 0.084 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (ac)	CN	Description
0.647	48	Brush, Good, HSG B
0.640	61	>75% Grass cover, Good, HSG B
1.287	54	Weighted Average
1.287	54	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	173	0.0783	4.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	1,007	0.0205	8.44	6.63	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
8.1	1,280	Total			

Subcatchment 24S: PDA-7



Hydrograph for Subcatchment 24S: PDA-7

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.03	0.00	**0.15**
15.00	4.01	0.49	0.00	**0.07**
18.00	4.33	0.62	0.00	0.04
21.00	4.53	0.71	0.00	0.04
24.00	**4.70**	**0.78**	0.00	0.03
27.00	4.70	0.78	0.00	0.00
30.00	4.70	0.78	0.00	0.00
33.00	4.70	0.78	0.00	0.00
36.00	4.70	0.78	0.00	0.00
39.00	4.70	0.78	0.00	0.00
42.00	4.70	0.78	0.00	0.00
45.00	4.70	0.78	0.00	0.00
48.00	4.70	0.78	0.00	0.00
51.00	4.70	0.78	0.00	0.00
54.00	4.70	0.78	0.00	0.00
57.00	4.70	0.78	0.00	0.00
60.00	4.70	0.78	0.00	0.00
63.00	4.70	0.78	0.00	0.00
66.00	4.70	0.78	0.00	0.00
69.00	4.70	0.78	0.00	0.00
72.00	4.70	0.78	0.00	0.00
75.00	4.70	0.78	0.00	0.00
78.00	4.70	0.78	0.00	0.00
81.00	4.70	0.78	0.00	0.00
84.00	4.70	0.78	0.00	0.00
87.00	4.70	0.78	0.00	0.00
90.00	4.70	0.78	0.00	0.00
93.00	4.70	0.78	0.00	0.00
96.00	4.70	0.78	0.00	0.00
99.00	4.70	0.78	0.00	0.00

Summary for Subcatchment 25S: PDA-8 BYPASS

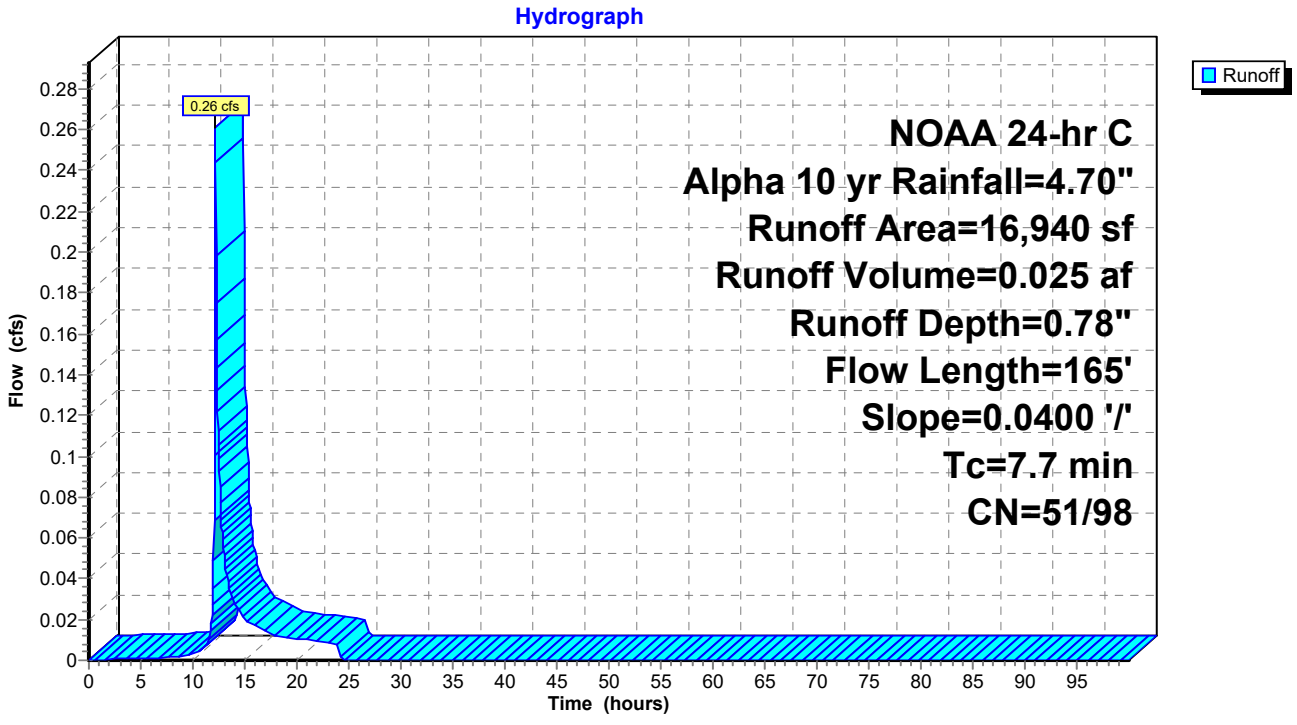
Runoff = 0.26 cfs @ 12.17 hrs, Volume= 0.025 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (sf)	CN	Description
*	706	98	Pavement
	7,396	39	>75% Grass cover, Good, HSG A
	8,838	61	>75% Grass cover, Good, HSG B
	16,940	53	Weighted Average
	16,234	51	95.83% Pervious Area
	706	98	4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0400	0.23		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.3	65	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	165	Total			

Subcatchment 25S: PDA-8 BYPASS



Hydrograph for Subcatchment 25S: PDA-8 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.00
6.00	0.37	0.00	0.21	0.00
9.00	0.69	0.00	0.49	0.00
12.00	2.24	0.01	2.01	**0.05**
15.00	4.01	0.37	3.78	**0.02**
18.00	4.33	0.48	4.09	0.01
21.00	4.53	0.56	4.30	0.01
24.00	**4.70**	**0.62**	**4.46**	0.01
27.00	4.70	0.62	4.46	0.00
30.00	4.70	0.62	4.46	0.00
33.00	4.70	0.62	4.46	0.00
36.00	4.70	0.62	4.46	0.00
39.00	4.70	0.62	4.46	0.00
42.00	4.70	0.62	4.46	0.00
45.00	4.70	0.62	4.46	0.00
48.00	4.70	0.62	4.46	0.00
51.00	4.70	0.62	4.46	0.00
54.00	4.70	0.62	4.46	0.00
57.00	4.70	0.62	4.46	0.00
60.00	4.70	0.62	4.46	0.00
63.00	4.70	0.62	4.46	0.00
66.00	4.70	0.62	4.46	0.00
69.00	4.70	0.62	4.46	0.00
72.00	4.70	0.62	4.46	0.00
75.00	4.70	0.62	4.46	0.00
78.00	4.70	0.62	4.46	0.00
81.00	4.70	0.62	4.46	0.00
84.00	4.70	0.62	4.46	0.00
87.00	4.70	0.62	4.46	0.00
90.00	4.70	0.62	4.46	0.00
93.00	4.70	0.62	4.46	0.00
96.00	4.70	0.62	4.46	0.00
99.00	4.70	0.62	4.46	0.00

Summary for Subcatchment 26S: PDA-10 BYPASS

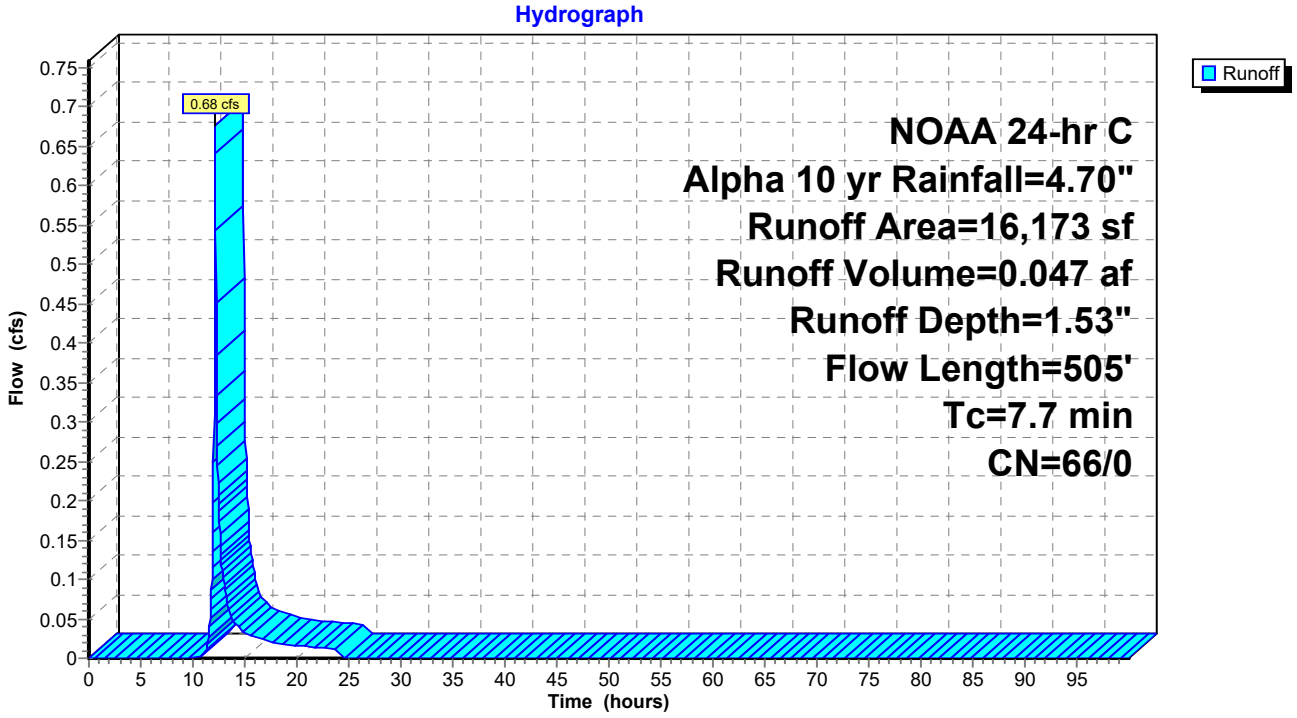
Runoff = 0.68 cfs @ 12.15 hrs, Volume= 0.047 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

Area (sf)	CN	Description
12,210	61	>75% Grass cover, Good, HSG B
3,963	80	>75% Grass cover, Good, HSG D
16,173	66	Weighted Average
16,173	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	81	0.0990	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.4	424	0.0170	2.10		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	505	Total			

Subcatchment 26S: PDA-10 BYPASS



Hydrograph for Subcatchment 26S: PDA-10 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.17	0.00	0.00	0.00
6.00	0.37	0.00	0.00	0.00
9.00	0.69	0.00	0.00	0.00
12.00	2.24	0.23	0.00	**0.25**
15.00	4.01	1.09	0.00	**0.03**
18.00	4.33	1.29	0.00	0.02
21.00	4.53	1.42	0.00	0.02
24.00	**4.70**	**1.53**	0.00	0.01
27.00	4.70	1.53	0.00	0.00
30.00	4.70	1.53	0.00	0.00
33.00	4.70	1.53	0.00	0.00
36.00	4.70	1.53	0.00	0.00
39.00	4.70	1.53	0.00	0.00
42.00	4.70	1.53	0.00	0.00
45.00	4.70	1.53	0.00	0.00
48.00	4.70	1.53	0.00	0.00
51.00	4.70	1.53	0.00	0.00
54.00	4.70	1.53	0.00	0.00
57.00	4.70	1.53	0.00	0.00
60.00	4.70	1.53	0.00	0.00
63.00	4.70	1.53	0.00	0.00
66.00	4.70	1.53	0.00	0.00
69.00	4.70	1.53	0.00	0.00
72.00	4.70	1.53	0.00	0.00
75.00	4.70	1.53	0.00	0.00
78.00	4.70	1.53	0.00	0.00
81.00	4.70	1.53	0.00	0.00
84.00	4.70	1.53	0.00	0.00
87.00	4.70	1.53	0.00	0.00
90.00	4.70	1.53	0.00	0.00
93.00	4.70	1.53	0.00	0.00
96.00	4.70	1.53	0.00	0.00
99.00	4.70	1.53	0.00	0.00

Summary for Subcatchment 27S: PDA-9 BYPASS

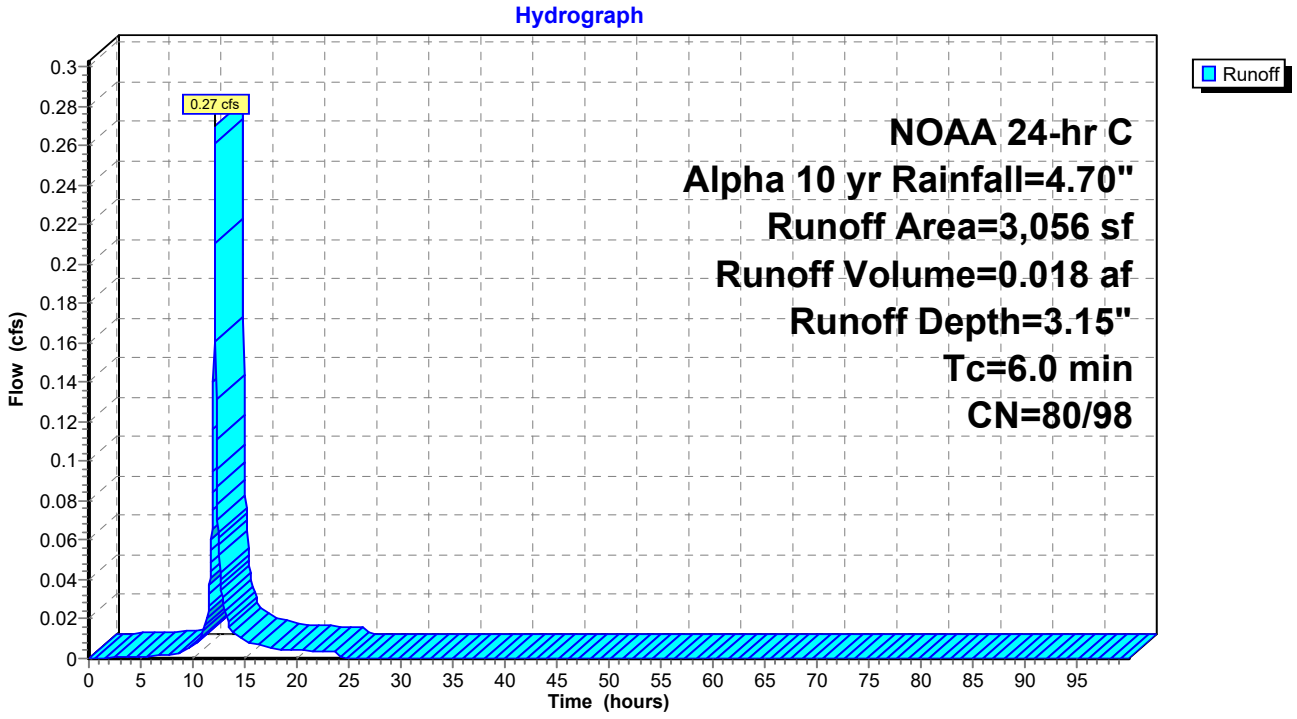
Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (sf)	CN	Description
*	860	98	Pavement
	2,196	80	>75% Grass cover, Good, HSG D
	3,056	85	Weighted Average
	2,196	80	71.86% Pervious Area
	860	98	28.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 27S: PDA-9 BYPASS



Hydrograph for Subcatchment 27S: PDA-9 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.00
6.00	0.37	0.00	0.21	0.00
9.00	0.69	0.01	0.49	0.00
12.00	2.24	0.71	2.01	**0.14**
15.00	4.01	2.05	3.78	**0.01**
18.00	4.33	2.32	4.09	0.00
21.00	4.53	2.49	4.30	0.00
24.00	**4.70**	**2.63**	**4.46**	0.00
27.00	4.70	2.63	4.46	0.00
30.00	4.70	2.63	4.46	0.00
33.00	4.70	2.63	4.46	0.00
36.00	4.70	2.63	4.46	0.00
39.00	4.70	2.63	4.46	0.00
42.00	4.70	2.63	4.46	0.00
45.00	4.70	2.63	4.46	0.00
48.00	4.70	2.63	4.46	0.00
51.00	4.70	2.63	4.46	0.00
54.00	4.70	2.63	4.46	0.00
57.00	4.70	2.63	4.46	0.00
60.00	4.70	2.63	4.46	0.00
63.00	4.70	2.63	4.46	0.00
66.00	4.70	2.63	4.46	0.00
69.00	4.70	2.63	4.46	0.00
72.00	4.70	2.63	4.46	0.00
75.00	4.70	2.63	4.46	0.00
78.00	4.70	2.63	4.46	0.00
81.00	4.70	2.63	4.46	0.00
84.00	4.70	2.63	4.46	0.00
87.00	4.70	2.63	4.46	0.00
90.00	4.70	2.63	4.46	0.00
93.00	4.70	2.63	4.46	0.00
96.00	4.70	2.63	4.46	0.00
99.00	4.70	2.63	4.46	0.00

Summary for Subcatchment 28S: PDA-4B

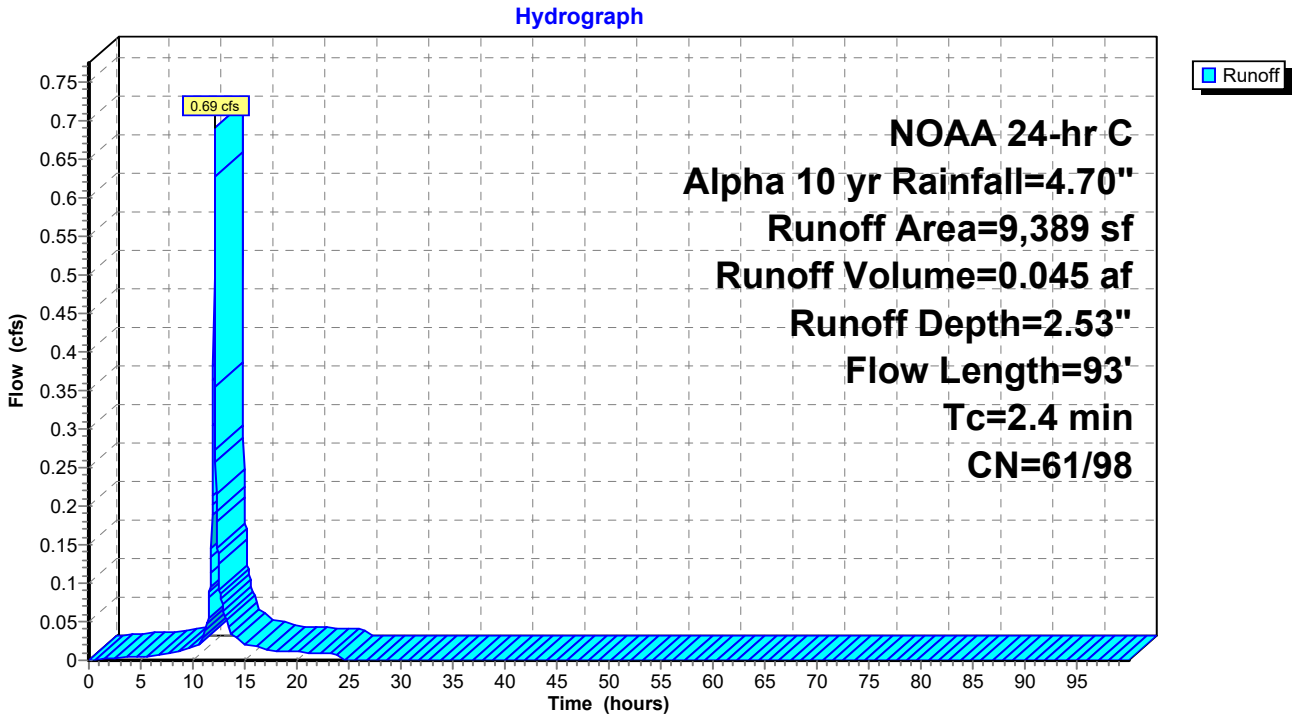
Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.045 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (sf)	CN	Description
	5,551	61	>75% Grass cover, Good, HSG B
*	3,331	98	Asphalt Pavement
*	507	98	Pervious Pavement
	9,389	76	Weighted Average
	5,551	61	59.12% Pervious Area
	3,838	98	40.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	32	0.1334	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	61	0.0360	1.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.4	93	Total			

Subcatchment 28S: PDA-4B



Hydrograph for Subcatchment 28S: PDA-4B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.00
6.00	0.37	0.00	0.21	0.01
9.00	0.69	0.00	0.49	0.01
12.00	2.24	0.13	2.01	**0.38**
15.00	4.01	0.82	3.78	**0.02**
18.00	4.33	0.98	4.09	0.01
21.00	4.53	1.10	4.30	0.01
24.00	**4.70**	**1.19**	**4.46**	0.01
27.00	4.70	1.19	4.46	0.00
30.00	4.70	1.19	4.46	0.00
33.00	4.70	1.19	4.46	0.00
36.00	4.70	1.19	4.46	0.00
39.00	4.70	1.19	4.46	0.00
42.00	4.70	1.19	4.46	0.00
45.00	4.70	1.19	4.46	0.00
48.00	4.70	1.19	4.46	0.00
51.00	4.70	1.19	4.46	0.00
54.00	4.70	1.19	4.46	0.00
57.00	4.70	1.19	4.46	0.00
60.00	4.70	1.19	4.46	0.00
63.00	4.70	1.19	4.46	0.00
66.00	4.70	1.19	4.46	0.00
69.00	4.70	1.19	4.46	0.00
72.00	4.70	1.19	4.46	0.00
75.00	4.70	1.19	4.46	0.00
78.00	4.70	1.19	4.46	0.00
81.00	4.70	1.19	4.46	0.00
84.00	4.70	1.19	4.46	0.00
87.00	4.70	1.19	4.46	0.00
90.00	4.70	1.19	4.46	0.00
93.00	4.70	1.19	4.46	0.00
96.00	4.70	1.19	4.46	0.00
99.00	4.70	1.19	4.46	0.00

Summary for Subcatchment 29S: PDA-3B

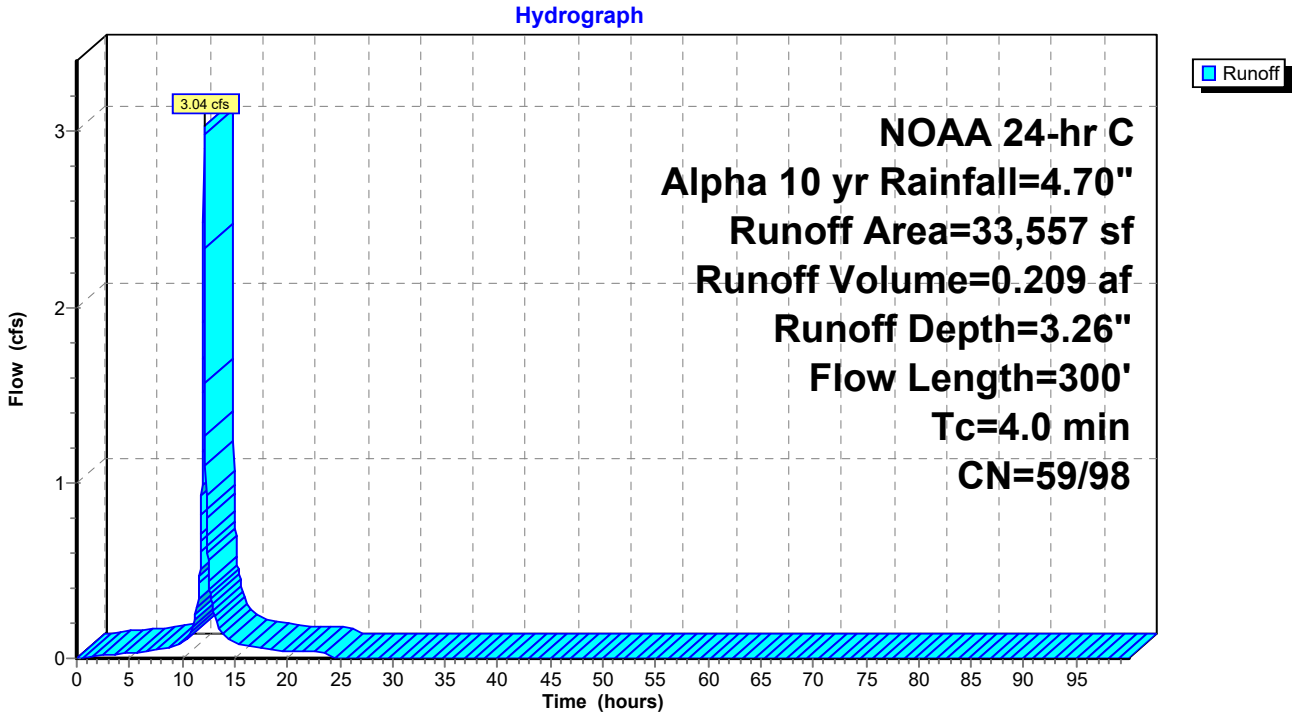
Runoff = 3.04 cfs @ 12.11 hrs, Volume= 0.209 af, Depth= 3.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 10 yr Rainfall=4.70"

	Area (sf)	CN	Description
*	75	98	Concrete Sidewalk
	10,980	61	>75% Grass cover, Good, HSG B
*	2,280	98	Future Sidewalk
*	19,281	98	Future Pervious Pavement
	941	39	>75% Grass cover, Good, HSG A
	33,557	84	Weighted Average
	11,921	59	35.52% Pervious Area
	21,636	98	64.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.2	50	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	200	0.0060	3.51	2.76	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.0	300	Total			

Subcatchment 29S: PDA-3B



Hydrograph for Subcatchment 29S: PDA-3B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.17	0.00	0.05	0.02
6.00	0.37	0.00	0.21	0.03
9.00	0.69	0.00	0.49	0.06
12.00	2.24	0.09	2.01	**1.70**
15.00	4.01	0.72	3.78	**0.09**
18.00	4.33	0.87	4.09	0.05
21.00	4.53	0.98	4.30	0.04
24.00	**4.70**	**1.07**	**4.46**	0.04
27.00	4.70	1.07	4.46	0.00
30.00	4.70	1.07	4.46	0.00
33.00	4.70	1.07	4.46	0.00
36.00	4.70	1.07	4.46	0.00
39.00	4.70	1.07	4.46	0.00
42.00	4.70	1.07	4.46	0.00
45.00	4.70	1.07	4.46	0.00
48.00	4.70	1.07	4.46	0.00
51.00	4.70	1.07	4.46	0.00
54.00	4.70	1.07	4.46	0.00
57.00	4.70	1.07	4.46	0.00
60.00	4.70	1.07	4.46	0.00
63.00	4.70	1.07	4.46	0.00
66.00	4.70	1.07	4.46	0.00
69.00	4.70	1.07	4.46	0.00
72.00	4.70	1.07	4.46	0.00
75.00	4.70	1.07	4.46	0.00
78.00	4.70	1.07	4.46	0.00
81.00	4.70	1.07	4.46	0.00
84.00	4.70	1.07	4.46	0.00
87.00	4.70	1.07	4.46	0.00
90.00	4.70	1.07	4.46	0.00
93.00	4.70	1.07	4.46	0.00
96.00	4.70	1.07	4.46	0.00
99.00	4.70	1.07	4.46	0.00

Summary for Pond 19P: PDA-4 Basin

Inflow Area = 1.719 ac, 85.61% Impervious, Inflow Depth = 3.99" for Alpha 10 yr event
Inflow = 8.26 cfs @ 12.10 hrs, Volume= 0.572 af
Outflow = 3.17 cfs @ 12.21 hrs, Volume= 0.543 af, Atten= 62%, Lag= 6.8 min
Primary = 3.17 cfs @ 12.21 hrs, Volume= 0.543 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 288.72' @ 12.21 hrs Surf.Area= 6,248 sf Storage= 8,612 cf

Plug-Flow detention time= 119.6 min calculated for 0.543 af (95% of inflow)
Center-of-Mass det. time= 89.2 min (842.3 - 753.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	286.25'	6,536 cf	**36.97'W x 169.00'L x 4.00'H Field A** 24,988 cf Overall - 8,648 cf Embedded = 16,340 cf x 40.0% Voids
#2A	286.75'	6,605 cf	**ADS N-12 30"** x 64 Inside #1 Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf 64 Chambers in 8 Rows 33.97' Header x 4.90 sf x 2 = 332.9 cf Inside
		13,141 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	286.75'	**24.0" Round Culvert** L= 62.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 286.75' / 285.60' S= 0.0184 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	286.75'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	287.75'	**9.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.17 cfs @ 12.21 hrs HW=288.72' (Free Discharge)
└**1=Culvert** (Passes 3.17 cfs of 18.71 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.87 cfs @ 6.39 fps)
  └**3=Orifice/Grate** (Orifice Controls 2.30 cfs @ 3.16 fps)

Pond 19P: PDA-4 Basin - Chamber Wizard Field A

Chamber Model = ADS N-12 30" (ADS N-12® Pipe)
Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf
Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf

36.0" Wide + 17.1" Spacing = 53.1" C-C Row Spacing

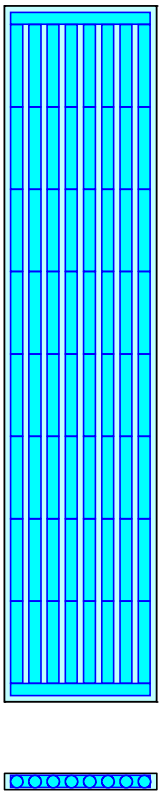
8 Chambers/Row x 20.00' Long +3.00' Header x 2 = 166.00' Row Length +18.0" End Stone x 2 = 169.00' Base Length
8 Rows x 36.0" Wide + 17.1" Spacing x 7 + 18.0" Side Stone x 2 = 36.97' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

64 Chambers x 98.0 cf + 33.97' Header x 4.90 sf x 2 = 6,604.9 cf Chamber Storage
64 Chambers x 128.3 cf + 33.97' Header x 6.41 sf x 2 = 8,644.6 cf Displacement

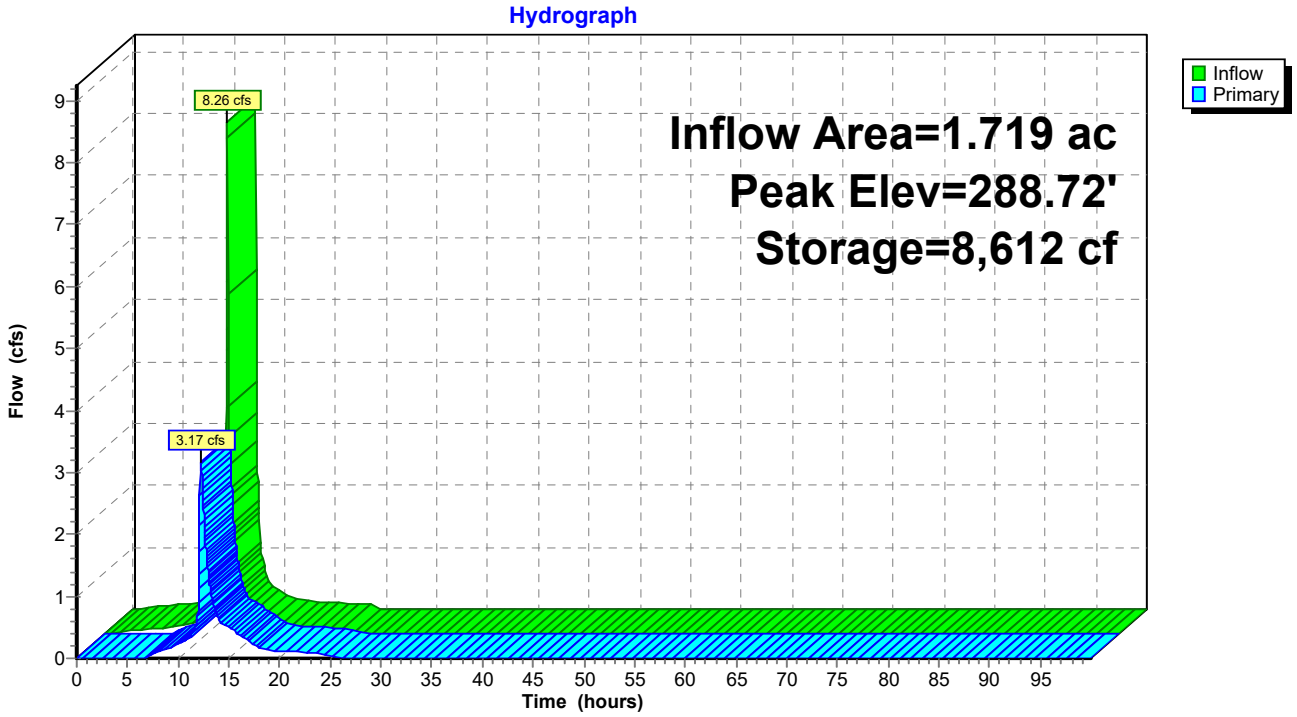
24,988.4 cf Field - 8,644.6 cf Chambers = 16,343.9 cf Stone x 40.0% Voids = 6,537.5 cf Stone Storage

Chamber Storage + Stone Storage = 13,142.5 cf = 0.302 af
Overall Storage Efficiency = 52.6%
Overall System Size = 169.00' x 36.97' x 4.00'

64 Chambers
925.5 cy Field
605.3 cy Stone



Pond 19P: PDA-4 Basin



Hydrograph for Pond 19P: PDA-4 Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	286.25	0.00
3.00	0.06	243	286.35	0.00
6.00	0.10	1,079	286.68	0.00
9.00	0.18	1,777	287.02	0.17
12.00	**4.91**	**5,767**	**288.07**	**1.12**
15.00	**0.22**	**3,581**	**287.55**	**0.50**
18.00	0.13	1,799	287.03	0.17
21.00	0.10	1,663	286.96	0.10
24.00	0.10	1,620	286.93	0.08
27.00	0.00	1,361	286.80	0.01
30.00	0.00	1,315	286.78	0.00
33.00	0.00	1,297	286.77	0.00
36.00	0.00	1,286	286.77	0.00
39.00	0.00	1,278	286.76	0.00
42.00	0.00	1,271	286.76	0.00
45.00	0.00	1,266	286.76	0.00
48.00	0.00	1,263	286.76	0.00
51.00	0.00	1,260	286.75	0.00
54.00	0.00	1,257	286.75	0.00
57.00	0.00	1,256	286.75	0.00
60.00	0.00	1,254	286.75	0.00
63.00	0.00	1,253	286.75	0.00
66.00	0.00	1,252	286.75	0.00
69.00	0.00	1,252	286.75	0.00
72.00	0.00	1,251	286.75	0.00
75.00	0.00	1,251	286.75	0.00
78.00	0.00	1,251	286.75	0.00
81.00	0.00	1,250	286.75	0.00
84.00	0.00	1,250	286.75	0.00
87.00	0.00	1,250	286.75	0.00
90.00	0.00	1,250	286.75	0.00
93.00	0.00	1,250	286.75	0.00
96.00	0.00	1,250	286.75	0.00
99.00	0.00	1,250	286.75	0.00

Summary for Pond 23P: Above-Ground Detension Basin 1

Inflow Area = 11.131 ac, 65.16% Impervious, Inflow Depth = 3.07" for Alpha 10 yr event
Inflow = 26.24 cfs @ 12.10 hrs, Volume= 2.846 af
Outflow = 4.07 cfs @ 13.35 hrs, Volume= 2.846 af, Atten= 84%, Lag= 74.7 min
Primary = 4.07 cfs @ 13.35 hrs, Volume= 2.846 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 272.44' @ 13.35 hrs Surf.Area= 18,441 sf Storage= 55,302 cf

Plug-Flow detention time= 284.5 min calculated for 2.845 af (100% of inflow)
Center-of-Mass det. time= 285.0 min (1,096.2 - 811.3)

Volume	Invert	Avail.Storage	Storage Description
#1	269.00'	107,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

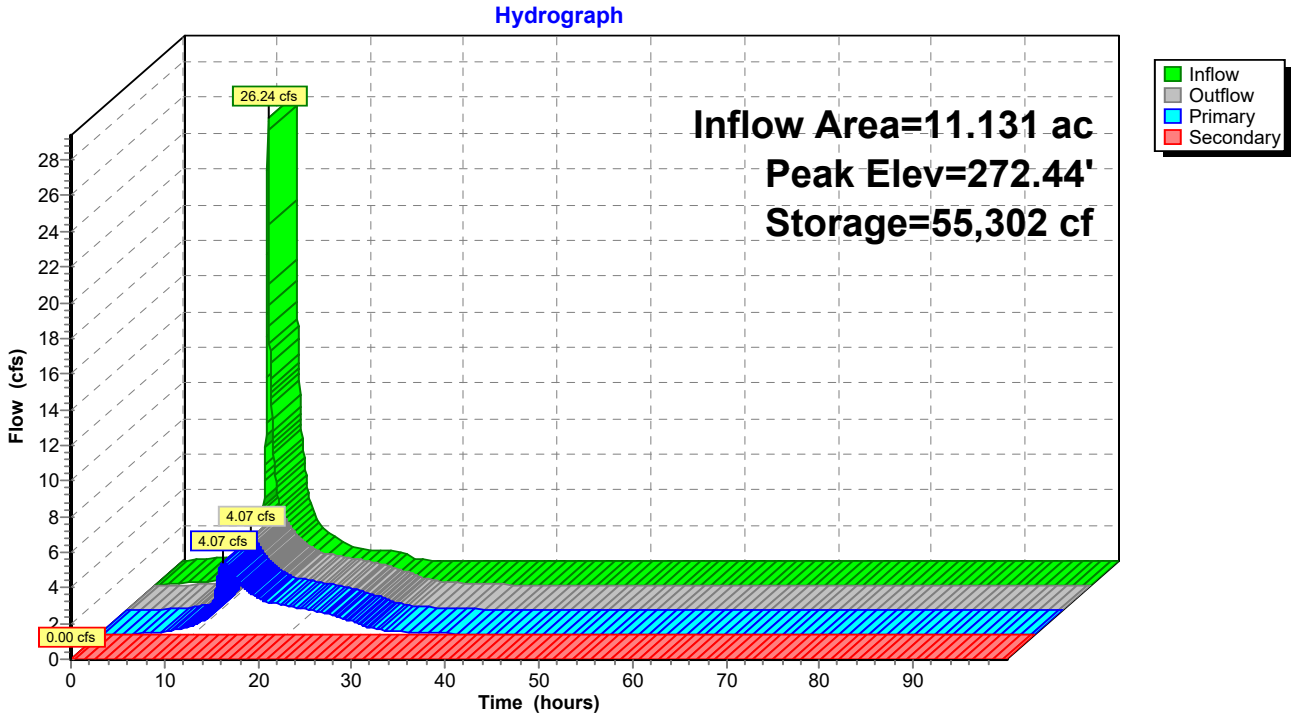
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
269.00	13,838	0	0
270.00	15,109	14,474	14,474
271.00	16,434	15,772	30,245
272.00	17,813	17,124	47,369
273.00	19,247	18,530	65,899
274.00	20,735	19,991	85,890
275.00	22,277	21,506	107,396

Device	Routing	Invert	Outlet Devices
#1	Primary	268.90'	**24.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 268.90' / 267.60' S= 0.0245 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	269.00'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	271.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	272.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	273.75'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	274.00'	**20.0' 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=4.07 cfs @ 13.35 hrs HW=272.44' (Free Discharge)
└─**1=Culvert** (Passes 4.07 cfs of 30.12 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.15 cfs @ 8.59 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.99 cfs @ 3.97 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.93 cfs @ 2.12 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=269.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 23P: Above-Ground Detension Basin 1



Hydrograph for Pond 23P: Above-Ground Detension Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	269.00	0.00	0.00	**0.00**
3.00	0.14	588	269.04	0.02	0.02	0.00
6.00	0.26	2,199	269.16	0.10	0.10	0.00
9.00	0.70	5,160	269.37	0.36	0.36	0.00
12.00	**15.21**	**22,343**	**270.51**	**1.35**	**1.35**	0.00
15.00	**1.85**	**49,807**	**272.14**	**2.94**	**2.94**	0.00
18.00	0.83	39,026	271.52	1.82	1.82	0.00
21.00	0.60	28,277	270.88	1.54	1.54	0.00
24.00	0.52	19,063	270.30	1.23	1.23	0.00
27.00	0.04	9,337	269.66	0.75	0.75	0.00
30.00	0.01	4,336	269.31	0.28	0.28	0.00
33.00	0.01	2,465	269.18	0.12	0.12	0.00
36.00	0.00	1,583	269.11	0.06	0.06	0.00
39.00	0.00	1,092	269.08	0.04	0.04	0.00
42.00	0.00	799	269.06	0.02	0.02	0.00
45.00	0.00	598	269.04	0.02	0.02	0.00
48.00	0.00	446	269.03	0.01	0.01	0.00
51.00	0.00	333	269.02	0.01	0.01	0.00
54.00	0.00	248	269.02	0.01	0.01	0.00
57.00	0.00	184	269.01	0.01	0.01	0.00
60.00	0.00	137	269.01	0.00	0.00	0.00
63.00	0.00	102	269.01	0.00	0.00	0.00
66.00	0.00	76	269.01	0.00	0.00	0.00
69.00	0.00	57	269.00	0.00	0.00	0.00
72.00	0.00	42	269.00	0.00	0.00	0.00
75.00	0.00	32	269.00	0.00	0.00	0.00
78.00	0.00	24	269.00	0.00	0.00	0.00
81.00	0.00	18	269.00	0.00	0.00	0.00
84.00	0.00	13	269.00	0.00	0.00	0.00
87.00	0.00	10	269.00	0.00	0.00	0.00
90.00	0.00	7	269.00	0.00	0.00	0.00
93.00	0.00	6	269.00	0.00	0.00	0.00
96.00	0.00	4	269.00	0.00	0.00	0.00
99.00	0.00	3	269.00	0.00	0.00	0.00

Summary for Pond 24P: Bioretention Basin

Inflow Area = 2.358 ac, 62.11% Impervious, Inflow Depth = 3.30" for Alpha 10 yr event
Inflow = 7.56 cfs @ 12.18 hrs, Volume= 0.648 af
Outflow = 2.66 cfs @ 12.43 hrs, Volume= 0.532 af, Atten= 65%, Lag= 15.2 min
Primary = 2.66 cfs @ 12.43 hrs, Volume= 0.532 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 277.30' @ 12.43 hrs Surf.Area= 7,166 sf Storage= 13,385 cf

Plug-Flow detention time= 225.0 min calculated for 0.532 af (82% of inflow)
Center-of-Mass det. time= 147.1 min (920.5 - 773.4)

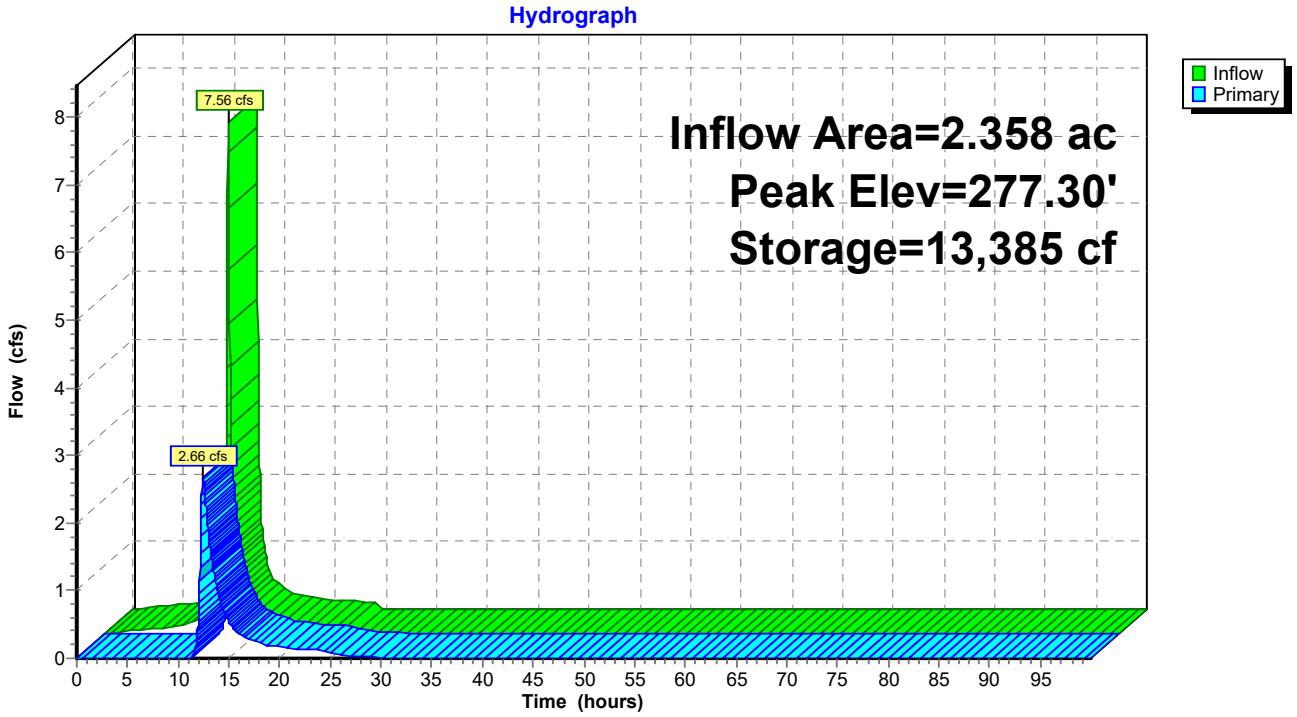
Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	37,747 cf	**Bioretention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	4,537	0	0
276.00	5,615	5,076	5,076
277.00	6,776	6,196	11,272
278.00	8,064	7,420	18,692
279.00	9,490	8,777	27,469
280.00	11,066	10,278	37,747

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 72.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 272.00' / 269.50' S= 0.0347 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	276.00'	**6.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.65 cfs @ 12.43 hrs HW=277.30' (Free Discharge)
└**1=Culvert** (Passes 2.65 cfs of 22.69 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.12 cfs @ 4.24 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 1.77 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 24P: Bioretention Basin



Hydrograph for Pond 24P: Bioretention Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	275.00	0.00
3.00	0.05	221	275.05	0.00
6.00	0.09	1,037	275.22	0.00
9.00	0.18	2,503	275.52	0.00
12.00	**3.37**	**8,219**	**276.53**	**0.62**
15.00	**0.29**	**7,960**	**276.49**	**0.55**
18.00	0.16	6,625	276.27	0.22
21.00	0.13	6,238	276.20	0.15
24.00	0.10	6,056	276.17	0.11
27.00	0.00	5,453	276.07	0.03
30.00	0.00	5,261	276.03	0.01
33.00	0.00	5,169	276.02	0.01
36.00	0.00	5,123	276.01	0.00
39.00	0.00	5,100	276.00	0.00
42.00	0.00	5,088	276.00	0.00
45.00	0.00	5,082	276.00	0.00
48.00	0.00	5,079	276.00	0.00
51.00	0.00	5,078	276.00	0.00
54.00	0.00	5,077	276.00	0.00
57.00	0.00	5,076	276.00	0.00
60.00	0.00	5,076	276.00	0.00
63.00	0.00	5,076	276.00	0.00
66.00	0.00	5,076	276.00	0.00
69.00	0.00	5,076	276.00	0.00
72.00	0.00	5,076	276.00	0.00
75.00	0.00	5,076	276.00	0.00
78.00	0.00	5,076	276.00	0.00
81.00	0.00	5,076	276.00	0.00
84.00	0.00	5,076	276.00	0.00
87.00	0.00	5,076	276.00	0.00
90.00	0.00	5,076	276.00	0.00
93.00	0.00	5,076	276.00	0.00
96.00	0.00	5,076	276.00	0.00
99.00	0.00	5,076	276.00	0.00

Summary for Pond 25P: Subsurface Basin 3B

Inflow Area = 0.770 ac, 64.48% Impervious, Inflow Depth = 3.26" for Alpha 10 yr event
Inflow = 3.04 cfs @ 12.11 hrs, Volume= 0.209 af
Outflow = 2.00 cfs @ 12.16 hrs, Volume= 0.203 af, Atten= 34%, Lag= 3.4 min
Primary = 2.00 cfs @ 12.16 hrs, Volume= 0.203 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 285.39' @ 12.16 hrs Surf.Area= 2,166 sf Storage= 2,096 cf

Plug-Flow detention time= 72.8 min calculated for 0.202 af (97% of inflow)
Center-of-Mass det. time= 53.7 min (817.8 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.67'	1,658 cf	**17.80'W x 121.67'L x 3.00'H Field A** 6,497 cf Overall - 2,353 cf Embedded = 4,144 cf x 40.0% Voids
#2A	284.00'	1,860 cf	**ADS N-12 24"** x 30 Inside #1 Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf 30 Chambers in 5 Rows
		3,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	284.00'	**24.0" Round Culvert** L= 21.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 284.00' / 283.00' S= 0.0476 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	284.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	285.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.97 cfs @ 12.16 hrs HW=285.38' (Free Discharge)
└**1=Culvert** (Passes 1.97 cfs of 11.59 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.40 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.95 cfs @ 3.80 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.76 cfs @ 1.98 fps)

Pond 25P: Subsurface Basin 3B - Chamber Wizard Field A

Chamber Model = ADS N-12 24" (ADS N-12® Pipe)
Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf
Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf

28.0" Wide + 13.4" Spacing = 41.4" C-C Row Spacing

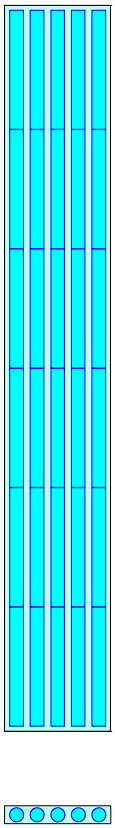
6 Chambers/Row x 20.00' Long = 120.00' Row Length +10.0" End Stone x 2 = 121.67' Base Length
5 Rows x 28.0" Wide + 13.4" Spacing x 4 + 10.0" Side Stone x 2 = 17.80' Base Width
4.0" Stone Base + 28.0" Chamber Height + 4.0" Stone Cover = 3.00' Field Height

30 Chambers x 62.0 cf = 1,860.0 cf Chamber Storage
30 Chambers x 78.4 cf = 2,352.8 cf Displacement

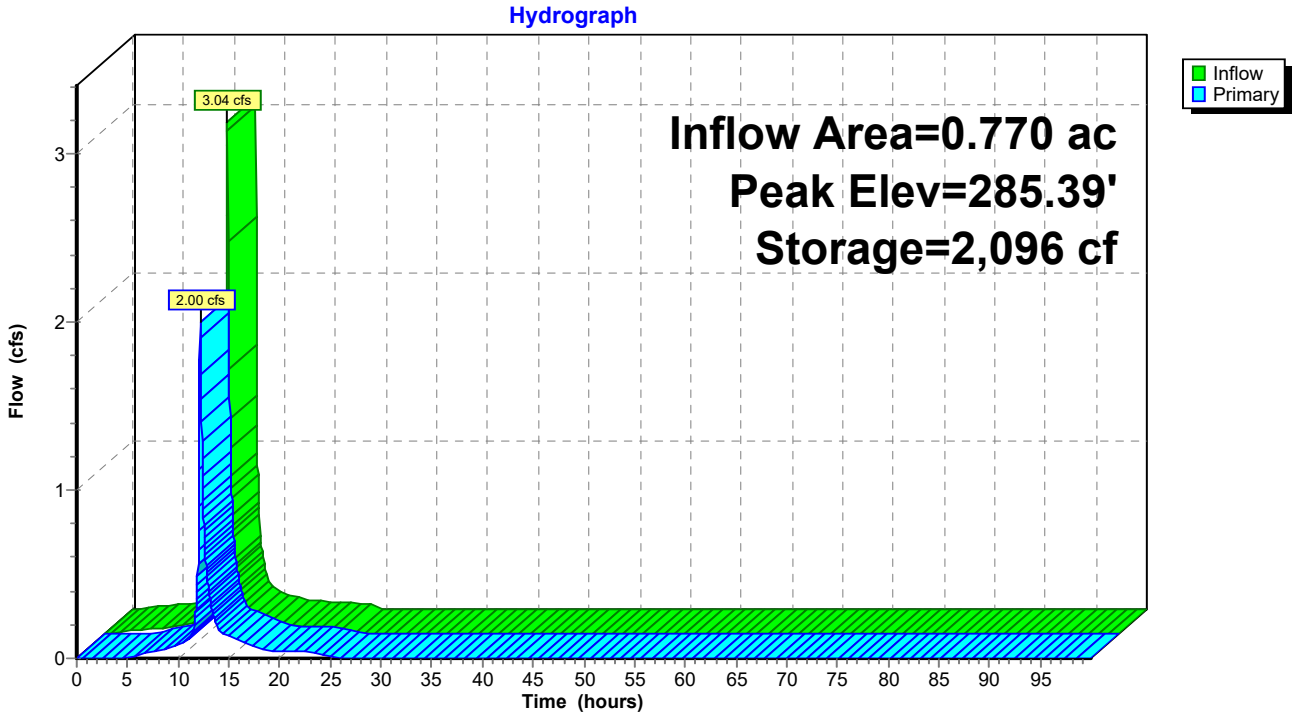
6,497.2 cf Field - 2,352.8 cf Chambers = 4,144.4 cf Stone x 40.0% Voids = 1,657.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,517.8 cf = 0.081 af
Overall Storage Efficiency = 54.1%
Overall System Size = 121.67' x 17.80' x 3.00'

30 Chambers
240.6 cy Field
153.5 cy Stone



Pond 25P: Subsurface Basin 3B



Hydrograph for Pond 25P: Subsurface Basin 3B

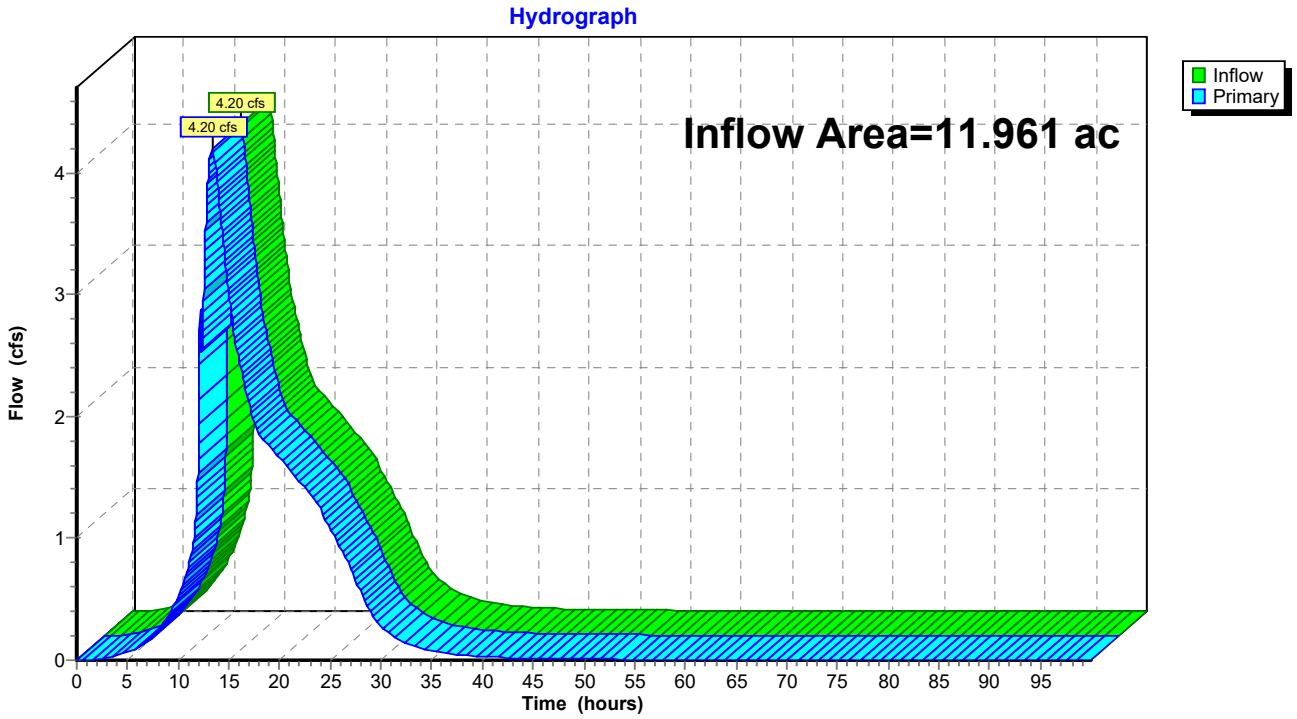
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	283.67	0.00
3.00	0.02	81	283.76	0.00
6.00	0.03	349	284.09	0.01
9.00	0.06	415	284.19	0.06
12.00	**1.70**	**1,470**	**284.98**	**0.76**
15.00	**0.09**	**699**	**284.45**	**0.13**
18.00	0.05	415	284.19	0.06
21.00	0.04	392	284.15	0.04
24.00	0.04	381	284.13	0.03
27.00	0.00	307	284.03	0.00
30.00	0.00	296	284.01	0.00
33.00	0.00	292	284.01	0.00
36.00	0.00	290	284.00	0.00
39.00	0.00	289	284.00	0.00
42.00	0.00	289	284.00	0.00
45.00	0.00	288	284.00	0.00
48.00	0.00	288	284.00	0.00
51.00	0.00	288	284.00	0.00
54.00	0.00	288	284.00	0.00
57.00	0.00	288	284.00	0.00
60.00	0.00	287	284.00	0.00
63.00	0.00	287	284.00	0.00
66.00	0.00	287	284.00	0.00
69.00	0.00	287	284.00	0.00
72.00	0.00	287	284.00	0.00
75.00	0.00	287	284.00	0.00
78.00	0.00	287	284.00	0.00
81.00	0.00	287	284.00	0.00
84.00	0.00	287	284.00	0.00
87.00	0.00	287	284.00	0.00
90.00	0.00	286	284.00	0.00
93.00	0.00	286	284.00	0.00
96.00	0.00	286	284.00	0.00
99.00	0.00	286	284.00	0.00

Summary for Link 20L: POA A

Inflow Area = 11.961 ac, 60.94% Impervious, Inflow Depth = 2.95" for Alpha 10 yr event
Inflow = 4.20 cfs @ 13.31 hrs, Volume= 2.937 af
Primary = 4.20 cfs @ 13.31 hrs, Volume= 2.937 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 20L: POA A



Hydrograph for Link 20L: POA A

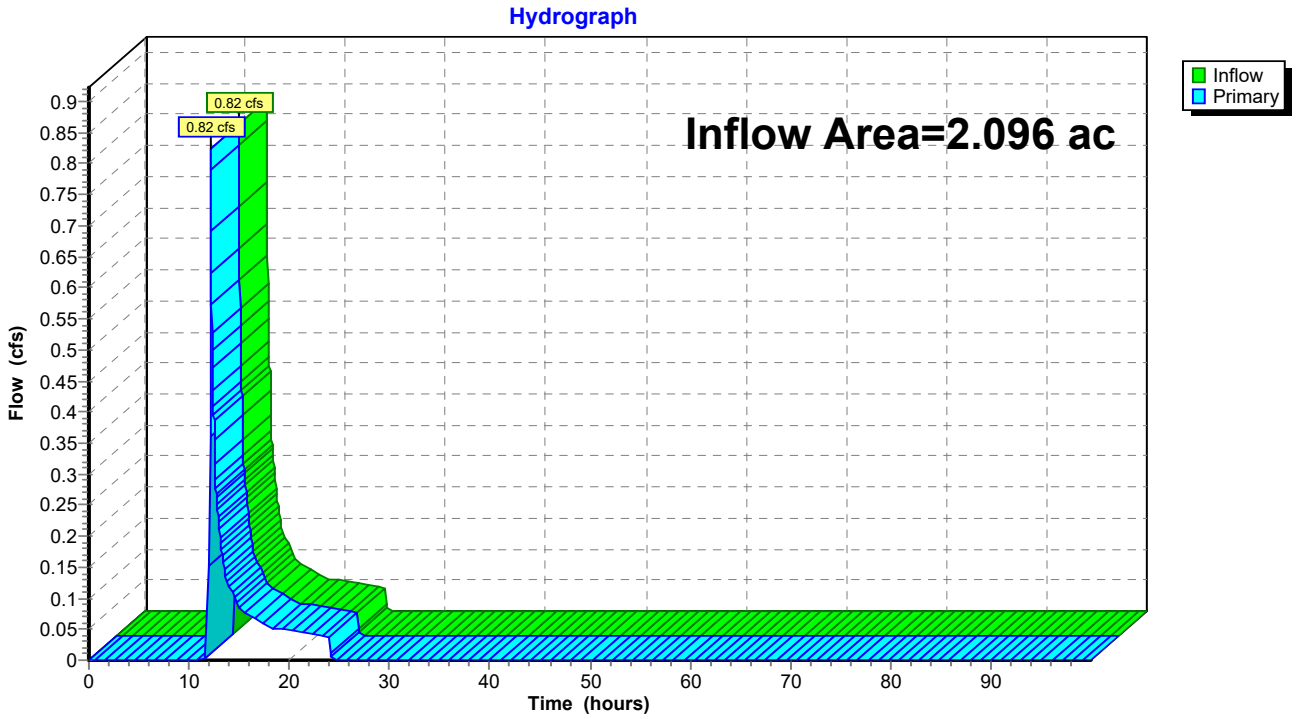
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.02	0.00	0.02	81.00	0.00	0.00	0.00
4.50	0.05	0.00	0.05	82.50	0.00	0.00	0.00
6.00	0.10	0.00	0.10	84.00	0.00	0.00	0.00
7.50	0.19	0.00	0.19	85.50	0.00	0.00	0.00
9.00	0.36	0.00	0.36	87.00	0.00	0.00	0.00
10.50	0.64	0.00	0.64	88.50	0.00	0.00	0.00
12.00	**1.79**	0.00	**1.79**	90.00	0.00	0.00	0.00
13.50	**4.15**	0.00	**4.15**	91.50	0.00	0.00	0.00
15.00	3.00	0.00	3.00	93.00	0.00	0.00	0.00
16.50	2.28	0.00	2.28	94.50	0.00	0.00	0.00
18.00	1.86	0.00	1.86	96.00	0.00	0.00	0.00
19.50	1.71	0.00	1.71	97.50	0.00	0.00	0.00
21.00	1.56	0.00	1.56	99.00	0.00	0.00	0.00
22.50	1.41	0.00	1.41				
24.00	1.26	0.00	1.26				
25.50	1.01	0.00	1.01				
27.00	0.75	0.00	0.75				
28.50	0.47	0.00	0.47				
30.00	0.28	0.00	0.28				
31.50	0.18	0.00	0.18				
33.00	0.12	0.00	0.12				
34.50	0.09	0.00	0.09				
36.00	0.06	0.00	0.06				
37.50	0.05	0.00	0.05				
39.00	0.04	0.00	0.04				
40.50	0.03	0.00	0.03				
42.00	0.02	0.00	0.02				
43.50	0.02	0.00	0.02				
45.00	0.02	0.00	0.02				
46.50	0.01	0.00	0.01				
48.00	0.01	0.00	0.01				
49.50	0.01	0.00	0.01				
51.00	0.01	0.00	0.01				
52.50	0.01	0.00	0.01				
54.00	0.01	0.00	0.01				
55.50	0.01	0.00	0.01				
57.00	0.01	0.00	0.01				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 22L: POA B

Inflow Area = 2.096 ac, 0.00% Impervious, Inflow Depth = 0.53" for Alpha 10 yr event
Inflow = 0.82 cfs @ 12.16 hrs, Volume= 0.092 af
Primary = 0.82 cfs @ 12.16 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 22L: POA B



Hydrograph for Link 22L: POA B

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**0.01**	0.00	**0.01**	90.00	0.00	0.00	0.00
13.50	**0.15**	0.00	**0.15**	91.50	0.00	0.00	0.00
15.00	0.09	0.00	0.09	93.00	0.00	0.00	0.00
16.50	0.07	0.00	0.07	94.50	0.00	0.00	0.00
18.00	0.05	0.00	0.05	96.00	0.00	0.00	0.00
19.50	0.05	0.00	0.05	97.50	0.00	0.00	0.00
21.00	0.05	0.00	0.05	99.00	0.00	0.00	0.00
22.50	0.04	0.00	0.04				
24.00	0.04	0.00	0.04				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment13S: PDA-1A Runoff Area=39,498 sf 0.00% Impervious Runoff Depth=2.23"
Flow Length=145' Tc=5.7 min CN=53/0 Runoff=2.58 cfs 0.168 af

Subcatchment14S: PDA-1B Runoff Area=134,400 sf 100.00% Impervious Runoff Depth=7.23"
Flow Length=888' Slope=0.0200 '/' Tc=3.3 min CN=0/98 Runoff=26.32 cfs 1.859 af

Subcatchment15S: PDA-2 Runoff Area=102,736 sf 62.11% Impervious Runoff Depth=5.77"
Flow Length=710' Tc=10.4 min CN=64/98 Runoff=13.32 cfs 1.133 af

Subcatchment16S: PDA-3A Runoff Area=34,643 sf 92.27% Impervious Runoff Depth=6.74"
Flow Length=174' Slope=0.0400 '/' Tc=1.2 min CN=39/98 Runoff=6.79 cfs 0.447 af

Subcatchment17S: PDA-4A Runoff Area=65,506 sf 92.02% Impervious Runoff Depth=6.90"
Flow Length=538' Tc=3.4 min CN=61/98 Runoff=12.29 cfs 0.864 af

Subcatchment21S: PDA-5 BYPASS Runoff Area=91,311 sf 0.00% Impervious Runoff Depth=1.84"
Flow Length=358' Tc=6.4 min CN=49/0 Runoff=4.61 cfs 0.321 af

Subcatchment23S: PDA-6 Runoff Area=9,055 sf 0.00% Impervious Runoff Depth=1.74"
Tc=6.0 min CN=48/0 Runoff=0.43 cfs 0.030 af

Subcatchment24S: PDA-7 Runoff Area=1.287 ac 0.00% Impervious Runoff Depth=2.33"
Flow Length=1,280' Tc=8.1 min CN=54/0 Runoff=3.49 cfs 0.250 af

Subcatchment25S: PDA-8 BYPASS Runoff Area=16,940 sf 4.17% Impervious Runoff Depth=2.25"
Flow Length=165' Slope=0.0400 '/' Tc=7.7 min CN=51/98 Runoff=1.00 cfs 0.073 af

Subcatchment26S: PDA-10 BYPASS Runoff Area=16,173 sf 0.00% Impervious Runoff Depth=3.58"
Flow Length=505' Tc=7.7 min CN=66/0 Runoff=1.63 cfs 0.111 af

Subcatchment27S: PDA-9 BYPASS Runoff Area=3,056 sf 28.14% Impervious Runoff Depth=5.72"
Tc=6.0 min CN=80/98 Runoff=0.48 cfs 0.033 af

Subcatchment28S: PDA-4B Runoff Area=9,389 sf 40.88% Impervious Runoff Depth=4.76"
Flow Length=93' Tc=2.4 min CN=61/98 Runoff=1.34 cfs 0.085 af

Subcatchment29S: PDA-3B Runoff Area=33,557 sf 64.48% Impervious Runoff Depth=5.67"
Flow Length=300' Tc=4.0 min CN=59/98 Runoff=5.34 cfs 0.364 af

Pond 19P: PDA-4 Basin Peak Elev=289.97' Storage=12,453 cf Inflow=13.61 cfs 0.950 af
Outflow=5.87 cfs 0.921 af

Pond 23P: Above-Ground Detension Peak Elev=273.94' Storage=84,726 cf Inflow=48.78 cfs 5.049 af
Primary=14.65 cfs 5.049 af Secondary=0.00 cfs 0.000 af Outflow=14.65 cfs 5.049 af

Pond 24P: Bioretention Basin Peak Elev=278.02' Storage=18,821 cf Inflow=13.32 cfs 1.133 af
Outflow=6.23 cfs 1.017 af

Pond 25P: Subsurface Basin 3B Peak Elev=285.85' Storage=2,767 cf Inflow=5.34 cfs 0.364 af
Outflow=4.11 cfs 0.357 af

Link 20L: POA A Inflow=15.22 cfs 5.266 af
Primary=15.22 cfs 5.266 af

Link 22L: POA B Inflow=4.61 cfs 0.321 af
Primary=4.61 cfs 0.321 af

Total Runoff Area = 14.057 ac Runoff Volume = 5.739 af Average Runoff Depth = 4.90"
48.15% Pervious = 6.769 ac 51.85% Impervious = 7.288 ac

Summary for Subcatchment 13S: PDA-1A

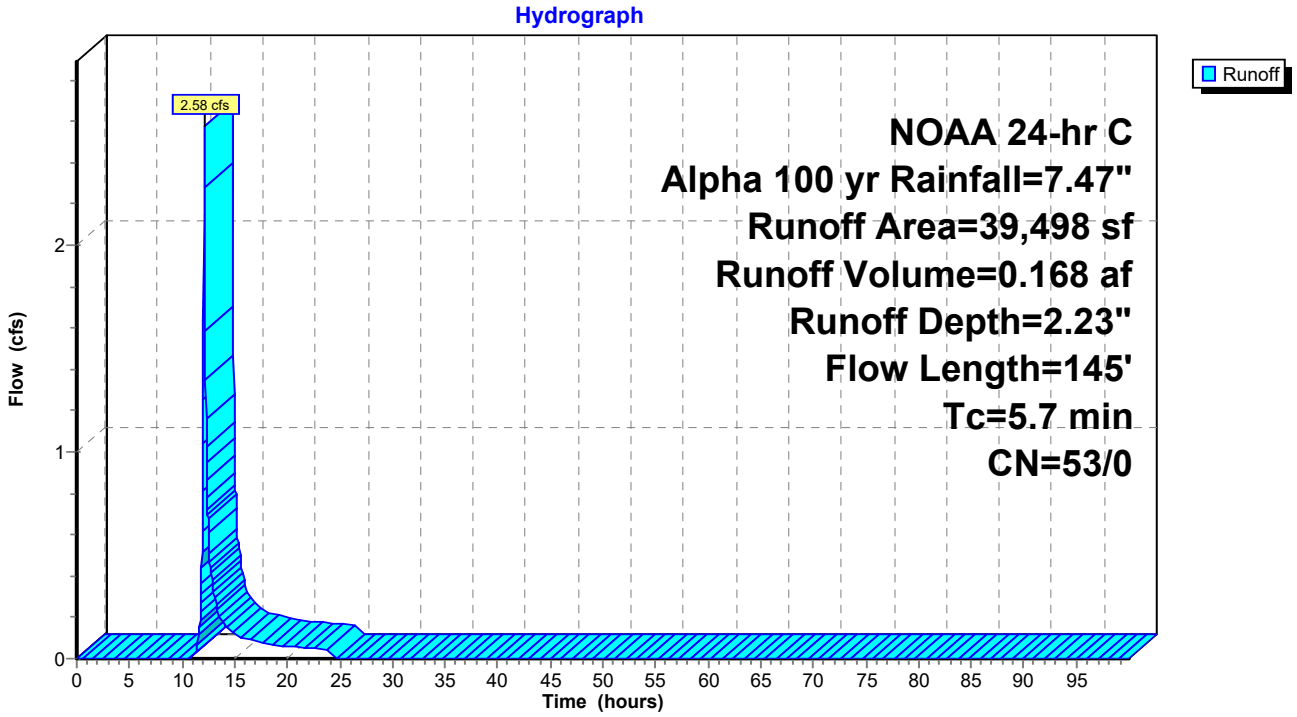
Runoff = 2.58 cfs @ 12.13 hrs, Volume= 0.168 af, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (sf)	CN	Description
1,134	80	>75% Grass cover, Good, HSG D
22,773	61	>75% Grass cover, Good, HSG B
15,591	39	>75% Grass cover, Good, HSG A
39,498	53	Weighted Average
39,498	53	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.1	45	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.7	145	Total			

Subcatchment 13S: PDA-1A



Hydrograph for Subcatchment 13S: PDA-1A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.30	0.00	**1.04**
15.00	6.38	1.57	0.00	**0.12**
18.00	6.88	1.86	0.00	0.07
21.00	7.21	2.06	0.00	0.06
24.00	**7.47**	**2.23**	0.00	0.05
27.00	7.47	2.23	0.00	0.00
30.00	7.47	2.23	0.00	0.00
33.00	7.47	2.23	0.00	0.00
36.00	7.47	2.23	0.00	0.00
39.00	7.47	2.23	0.00	0.00
42.00	7.47	2.23	0.00	0.00
45.00	7.47	2.23	0.00	0.00
48.00	7.47	2.23	0.00	0.00
51.00	7.47	2.23	0.00	0.00
54.00	7.47	2.23	0.00	0.00
57.00	7.47	2.23	0.00	0.00
60.00	7.47	2.23	0.00	0.00
63.00	7.47	2.23	0.00	0.00
66.00	7.47	2.23	0.00	0.00
69.00	7.47	2.23	0.00	0.00
72.00	7.47	2.23	0.00	0.00
75.00	7.47	2.23	0.00	0.00
78.00	7.47	2.23	0.00	0.00
81.00	7.47	2.23	0.00	0.00
84.00	7.47	2.23	0.00	0.00
87.00	7.47	2.23	0.00	0.00
90.00	7.47	2.23	0.00	0.00
93.00	7.47	2.23	0.00	0.00
96.00	7.47	2.23	0.00	0.00
99.00	7.47	2.23	0.00	0.00

Summary for Subcatchment 14S: PDA-1B

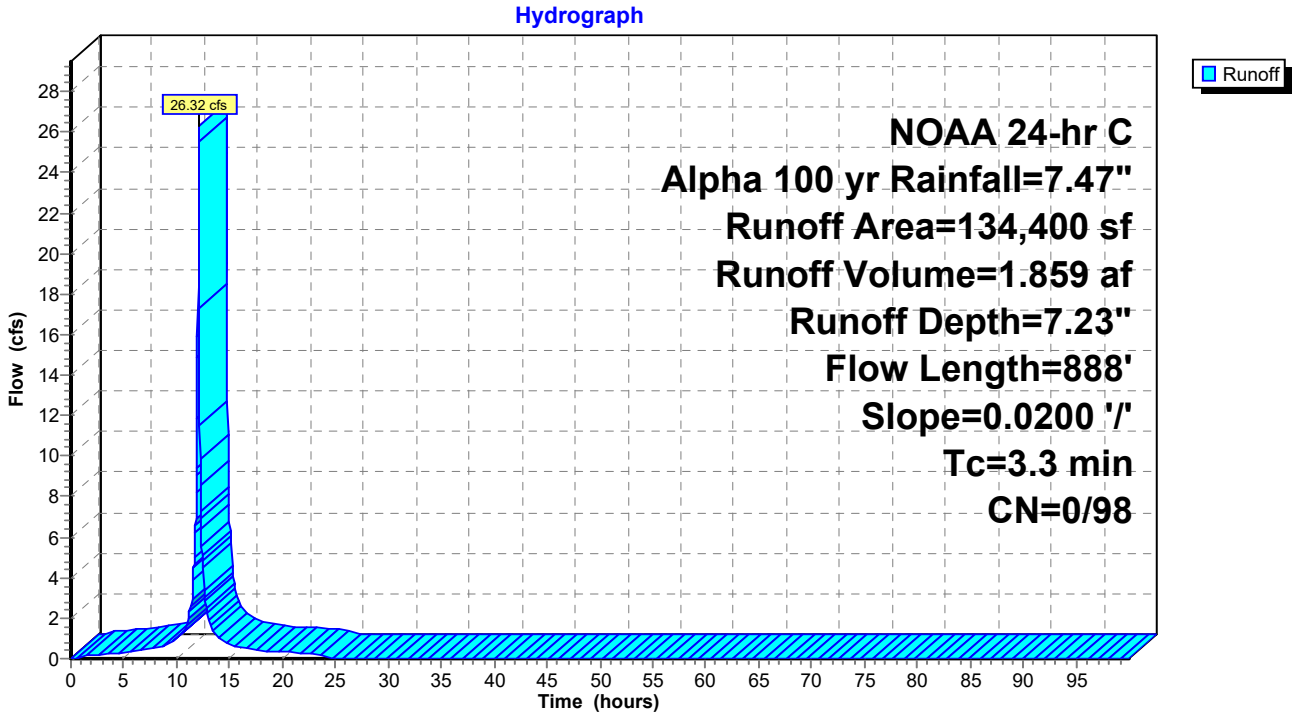
Runoff = 26.32 cfs @ 12.10 hrs, Volume= 1.859 af, Depth= 7.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (sf)	CN	Description
134,400	98	Unconnected pavement, HSG B
134,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.24"
1.2	210	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	578	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
3.3	888	Total			

Subcatchment 14S: PDA-1B



Hydrograph for Subcatchment 14S: PDA-1B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
3.00	0.26	0.00	0.12	0.23
6.00	0.59	0.00	0.40	0.35
9.00	1.09	0.00	0.88	0.63
12.00	3.56	0.00	3.33	**15.88**
15.00	6.38	0.00	6.14	**0.69**
18.00	6.88	0.00	6.64	0.38
21.00	7.21	0.00	6.97	0.31
24.00	**7.47**	0.00	**7.23**	0.29
27.00	7.47	0.00	7.23	0.00
30.00	7.47	0.00	7.23	0.00
33.00	7.47	0.00	7.23	0.00
36.00	7.47	0.00	7.23	0.00
39.00	7.47	0.00	7.23	0.00
42.00	7.47	0.00	7.23	0.00
45.00	7.47	0.00	7.23	0.00
48.00	7.47	0.00	7.23	0.00
51.00	7.47	0.00	7.23	0.00
54.00	7.47	0.00	7.23	0.00
57.00	7.47	0.00	7.23	0.00
60.00	7.47	0.00	7.23	0.00
63.00	7.47	0.00	7.23	0.00
66.00	7.47	0.00	7.23	0.00
69.00	7.47	0.00	7.23	0.00
72.00	7.47	0.00	7.23	0.00
75.00	7.47	0.00	7.23	0.00
78.00	7.47	0.00	7.23	0.00
81.00	7.47	0.00	7.23	0.00
84.00	7.47	0.00	7.23	0.00
87.00	7.47	0.00	7.23	0.00
90.00	7.47	0.00	7.23	0.00
93.00	7.47	0.00	7.23	0.00
96.00	7.47	0.00	7.23	0.00
99.00	7.47	0.00	7.23	0.00

Summary for Subcatchment 15S: PDA-2

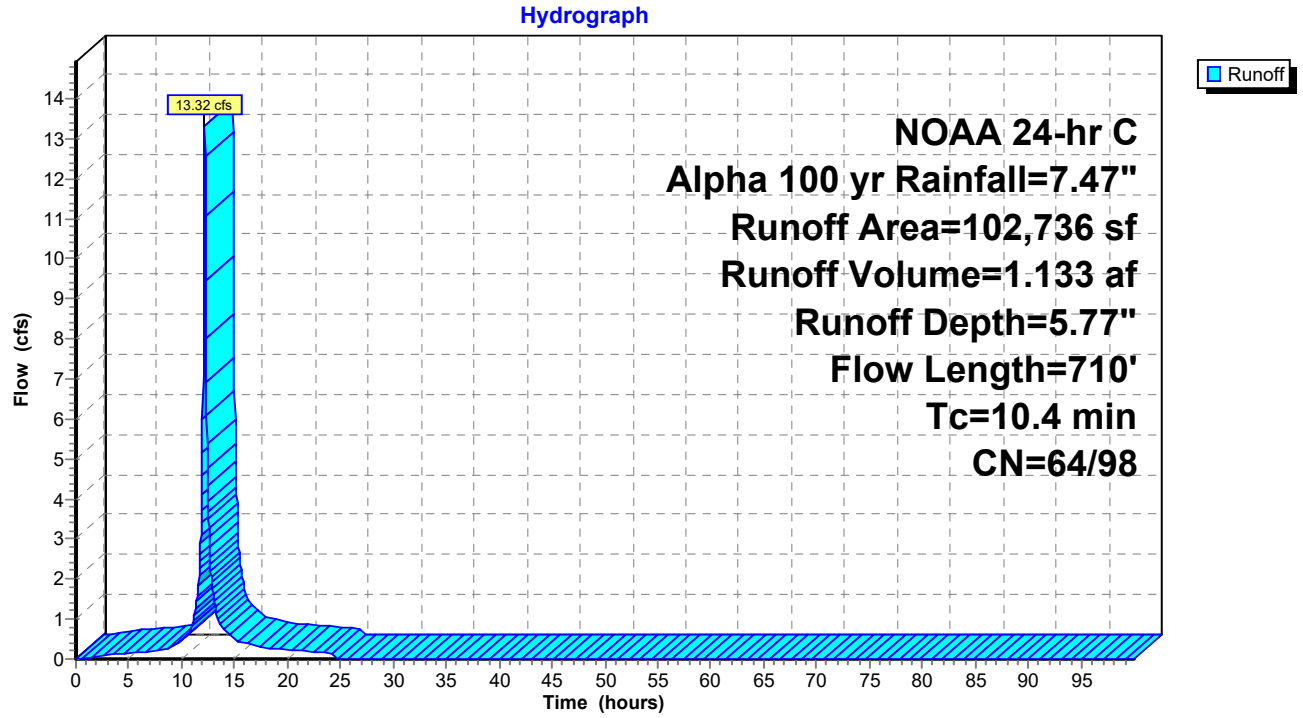
Runoff = 13.32 cfs @ 12.18 hrs, Volume= 1.133 af, Depth= 5.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (sf)	CN	Description
63,805	98	Unconnected pavement, HSG B
6,975	80	>75% Grass cover, Good, HSG D
788	39	>75% Grass cover, Good, HSG A
31,168	61	>75% Grass cover, Good, HSG B
102,736	85	Weighted Average
38,931	64	37.89% Pervious Area
63,805	98	62.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0550	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.1	210	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	400	0.0200	8.41	14.86	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
10.4	710	Total			

Subcatchment 15S: PDA-2



Hydrograph for Subcatchment 15S: PDA-2

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.11
6.00	0.59	0.00	0.40	0.16
9.00	1.09	0.00	0.88	0.30
12.00	3.56	0.74	3.33	**6.01**
15.00	6.38	2.54	6.14	**0.50**
18.00	6.88	2.91	6.64	0.27
21.00	7.21	3.16	6.97	0.22
24.00	**7.47**	**3.36**	**7.23**	0.18
27.00	7.47	3.36	7.23	0.00
30.00	7.47	3.36	7.23	0.00
33.00	7.47	3.36	7.23	0.00
36.00	7.47	3.36	7.23	0.00
39.00	7.47	3.36	7.23	0.00
42.00	7.47	3.36	7.23	0.00
45.00	7.47	3.36	7.23	0.00
48.00	7.47	3.36	7.23	0.00
51.00	7.47	3.36	7.23	0.00
54.00	7.47	3.36	7.23	0.00
57.00	7.47	3.36	7.23	0.00
60.00	7.47	3.36	7.23	0.00
63.00	7.47	3.36	7.23	0.00
66.00	7.47	3.36	7.23	0.00
69.00	7.47	3.36	7.23	0.00
72.00	7.47	3.36	7.23	0.00
75.00	7.47	3.36	7.23	0.00
78.00	7.47	3.36	7.23	0.00
81.00	7.47	3.36	7.23	0.00
84.00	7.47	3.36	7.23	0.00
87.00	7.47	3.36	7.23	0.00
90.00	7.47	3.36	7.23	0.00
93.00	7.47	3.36	7.23	0.00
96.00	7.47	3.36	7.23	0.00
99.00	7.47	3.36	7.23	0.00

Summary for Subcatchment 16S: PDA-3A

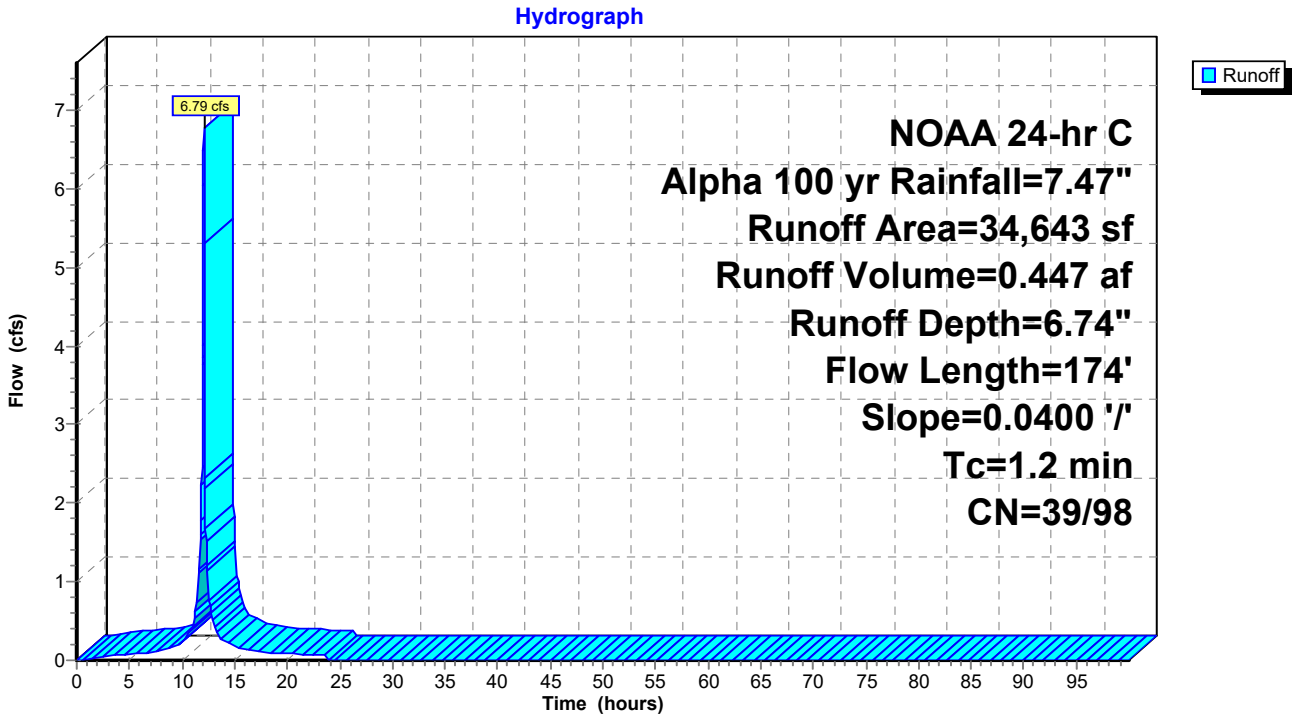
Runoff = 6.79 cfs @ 12.08 hrs, Volume= 0.447 af, Depth= 6.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (sf)	CN	Description
*	2,646	98	Concrete Sidewalk
*	29,318	98	Pavement
	2,679	39	>75% Grass cover, Good, HSG A
	34,643	93	Weighted Average
	2,679	39	7.73% Pervious Area
	31,964	98	92.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0400	1.83		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.3	74	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	174	Total			

Subcatchment 16S: PDA-3A



Hydrograph for Subcatchment 16S: PDA-3A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.06
6.00	0.59	0.00	0.40	0.08
9.00	1.09	0.00	0.88	0.15
12.00	3.56	0.01	3.33	**4.00**
15.00	6.38	0.56	6.14	**0.17**
18.00	6.88	0.73	6.64	0.09
21.00	7.21	0.84	6.97	0.08
24.00	**7.47**	**0.94**	**7.23**	0.07
27.00	7.47	0.94	7.23	0.00
30.00	7.47	0.94	7.23	0.00
33.00	7.47	0.94	7.23	0.00
36.00	7.47	0.94	7.23	0.00
39.00	7.47	0.94	7.23	0.00
42.00	7.47	0.94	7.23	0.00
45.00	7.47	0.94	7.23	0.00
48.00	7.47	0.94	7.23	0.00
51.00	7.47	0.94	7.23	0.00
54.00	7.47	0.94	7.23	0.00
57.00	7.47	0.94	7.23	0.00
60.00	7.47	0.94	7.23	0.00
63.00	7.47	0.94	7.23	0.00
66.00	7.47	0.94	7.23	0.00
69.00	7.47	0.94	7.23	0.00
72.00	7.47	0.94	7.23	0.00
75.00	7.47	0.94	7.23	0.00
78.00	7.47	0.94	7.23	0.00
81.00	7.47	0.94	7.23	0.00
84.00	7.47	0.94	7.23	0.00
87.00	7.47	0.94	7.23	0.00
90.00	7.47	0.94	7.23	0.00
93.00	7.47	0.94	7.23	0.00
96.00	7.47	0.94	7.23	0.00
99.00	7.47	0.94	7.23	0.00

Summary for Subcatchment 17S: PDA-4A

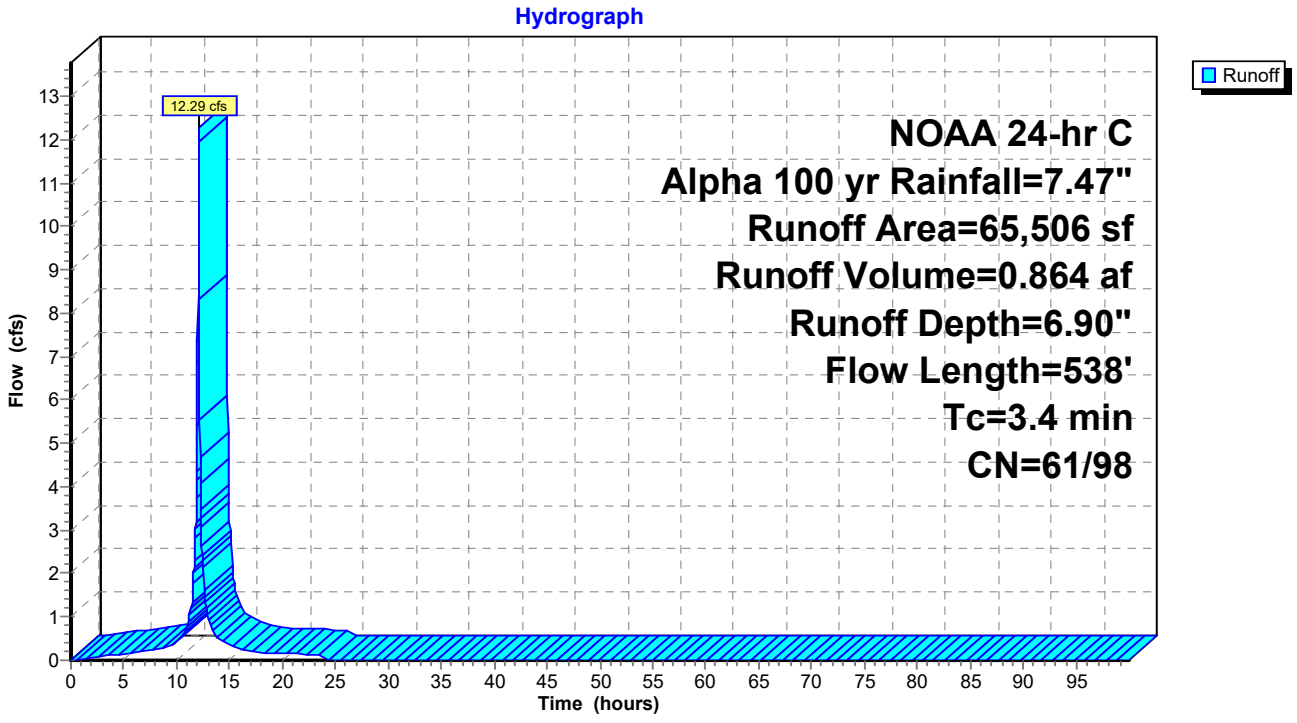
Runoff = 12.29 cfs @ 12.10 hrs, Volume= 0.864 af, Depth= 6.90"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (sf)	CN	Description
*	34,074	98	Heavy Duty Asphalt
*	26,203	98	Pervious Pavement
	5,229	61	>75% Grass cover, Good, HSG B
	65,506	95	Weighted Average
	5,229	61	7.98% Pervious Area
	60,277	98	92.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0422	1.87		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.5	438	0.0207	2.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	538	Total			

Subcatchment 17S: PDA-4A



Hydrograph for Subcatchment 17S: PDA-4A

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.10
6.00	0.59	0.00	0.40	0.16
9.00	1.09	0.00	0.88	0.28
12.00	3.56	0.60	3.33	**7.36**
15.00	6.38	2.26	6.14	**0.33**
18.00	6.88	2.61	6.64	0.18
21.00	7.21	2.85	6.97	0.15
24.00	**7.47**	**3.05**	**7.23**	0.14
27.00	7.47	3.05	7.23	0.00
30.00	7.47	3.05	7.23	0.00
33.00	7.47	3.05	7.23	0.00
36.00	7.47	3.05	7.23	0.00
39.00	7.47	3.05	7.23	0.00
42.00	7.47	3.05	7.23	0.00
45.00	7.47	3.05	7.23	0.00
48.00	7.47	3.05	7.23	0.00
51.00	7.47	3.05	7.23	0.00
54.00	7.47	3.05	7.23	0.00
57.00	7.47	3.05	7.23	0.00
60.00	7.47	3.05	7.23	0.00
63.00	7.47	3.05	7.23	0.00
66.00	7.47	3.05	7.23	0.00
69.00	7.47	3.05	7.23	0.00
72.00	7.47	3.05	7.23	0.00
75.00	7.47	3.05	7.23	0.00
78.00	7.47	3.05	7.23	0.00
81.00	7.47	3.05	7.23	0.00
84.00	7.47	3.05	7.23	0.00
87.00	7.47	3.05	7.23	0.00
90.00	7.47	3.05	7.23	0.00
93.00	7.47	3.05	7.23	0.00
96.00	7.47	3.05	7.23	0.00
99.00	7.47	3.05	7.23	0.00

Summary for Subcatchment 21S: PDA-5 BYPASS

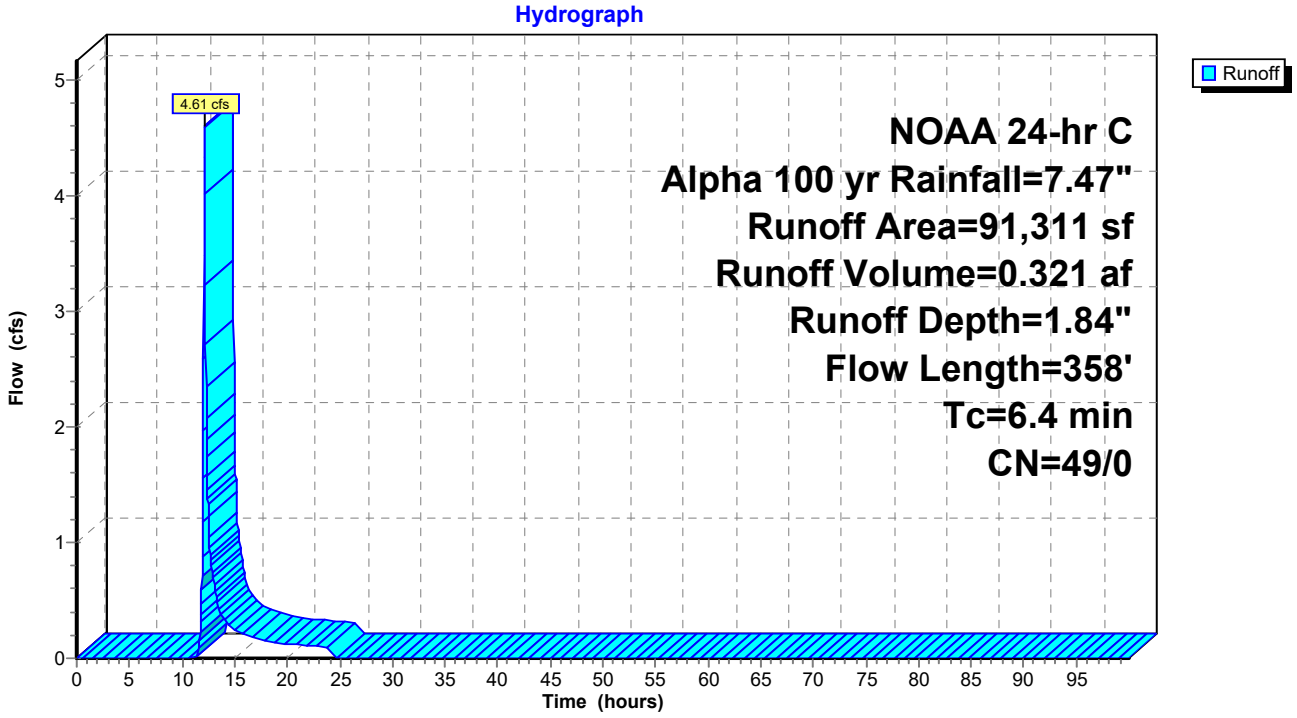
Runoff = 4.61 cfs @ 12.14 hrs, Volume= 0.321 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (sf)	CN	Description
2,125	73	Brush, Good, HSG D
89,186	48	Brush, Good, HSG B
91,311	49	Weighted Average
91,311	49	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.24"
0.9	258	0.0860	4.72		**Shallow Concentrated Flow, Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
6.4	358	Total			

Subcatchment 21S: PDA-5 BYPASS



Hydrograph for Subcatchment 21S: PDA-5 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.18	0.00	**1.57**
15.00	6.38	1.26	0.00	**0.24**
18.00	6.88	1.51	0.00	0.14
21.00	7.21	1.69	0.00	0.12
24.00	**7.47**	**1.84**	0.00	0.11
27.00	7.47	1.84	0.00	0.00
30.00	7.47	1.84	0.00	0.00
33.00	7.47	1.84	0.00	0.00
36.00	7.47	1.84	0.00	0.00
39.00	7.47	1.84	0.00	0.00
42.00	7.47	1.84	0.00	0.00
45.00	7.47	1.84	0.00	0.00
48.00	7.47	1.84	0.00	0.00
51.00	7.47	1.84	0.00	0.00
54.00	7.47	1.84	0.00	0.00
57.00	7.47	1.84	0.00	0.00
60.00	7.47	1.84	0.00	0.00
63.00	7.47	1.84	0.00	0.00
66.00	7.47	1.84	0.00	0.00
69.00	7.47	1.84	0.00	0.00
72.00	7.47	1.84	0.00	0.00
75.00	7.47	1.84	0.00	0.00
78.00	7.47	1.84	0.00	0.00
81.00	7.47	1.84	0.00	0.00
84.00	7.47	1.84	0.00	0.00
87.00	7.47	1.84	0.00	0.00
90.00	7.47	1.84	0.00	0.00
93.00	7.47	1.84	0.00	0.00
96.00	7.47	1.84	0.00	0.00
99.00	7.47	1.84	0.00	0.00

Summary for Subcatchment 23S: PDA-6

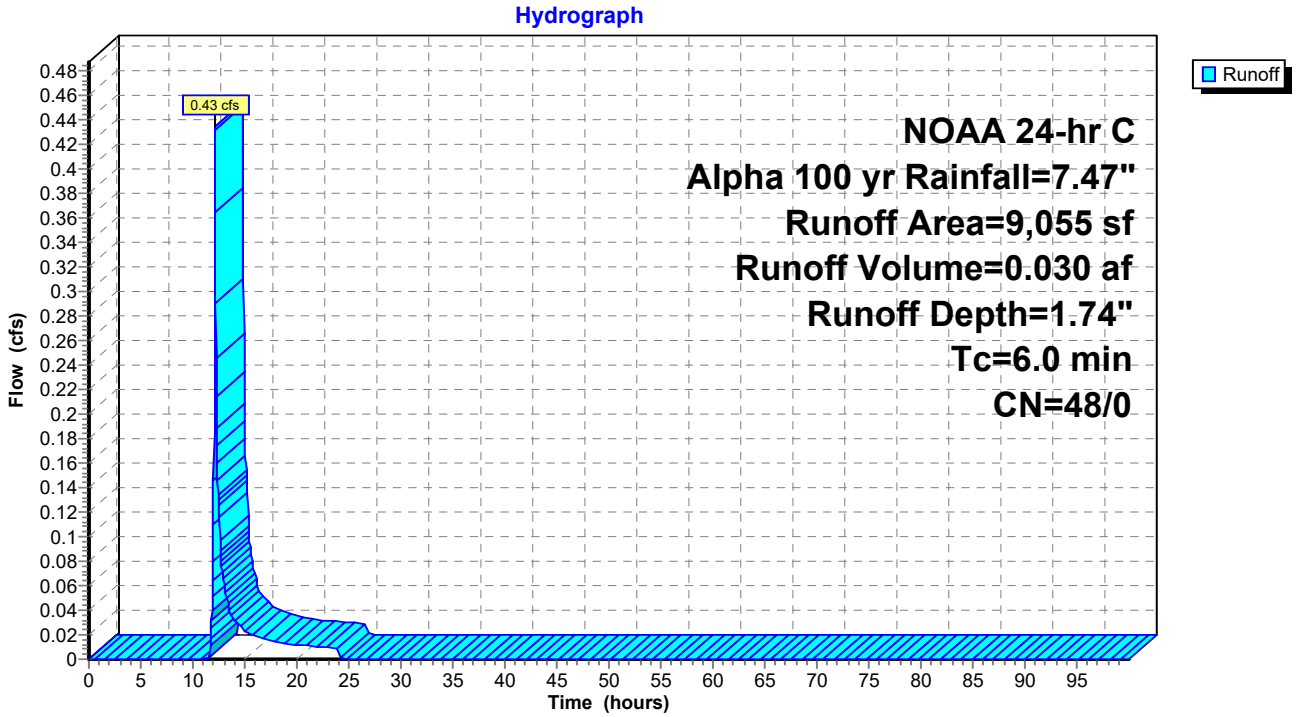
Runoff = 0.43 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (sf)	CN	Description
9,055	48	Brush, Good, HSG B
9,055	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 23S: PDA-6



Hydrograph for Subcatchment 23S: PDA-6

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.16	0.00	**0.15**
15.00	6.38	1.18	0.00	**0.02**
18.00	6.88	1.43	0.00	0.01
21.00	7.21	1.60	0.00	0.01
24.00	**7.47**	**1.74**	0.00	0.01
27.00	7.47	1.74	0.00	0.00
30.00	7.47	1.74	0.00	0.00
33.00	7.47	1.74	0.00	0.00
36.00	7.47	1.74	0.00	0.00
39.00	7.47	1.74	0.00	0.00
42.00	7.47	1.74	0.00	0.00
45.00	7.47	1.74	0.00	0.00
48.00	7.47	1.74	0.00	0.00
51.00	7.47	1.74	0.00	0.00
54.00	7.47	1.74	0.00	0.00
57.00	7.47	1.74	0.00	0.00
60.00	7.47	1.74	0.00	0.00
63.00	7.47	1.74	0.00	0.00
66.00	7.47	1.74	0.00	0.00
69.00	7.47	1.74	0.00	0.00
72.00	7.47	1.74	0.00	0.00
75.00	7.47	1.74	0.00	0.00
78.00	7.47	1.74	0.00	0.00
81.00	7.47	1.74	0.00	0.00
84.00	7.47	1.74	0.00	0.00
87.00	7.47	1.74	0.00	0.00
90.00	7.47	1.74	0.00	0.00
93.00	7.47	1.74	0.00	0.00
96.00	7.47	1.74	0.00	0.00
99.00	7.47	1.74	0.00	0.00

Summary for Subcatchment 24S: PDA-7

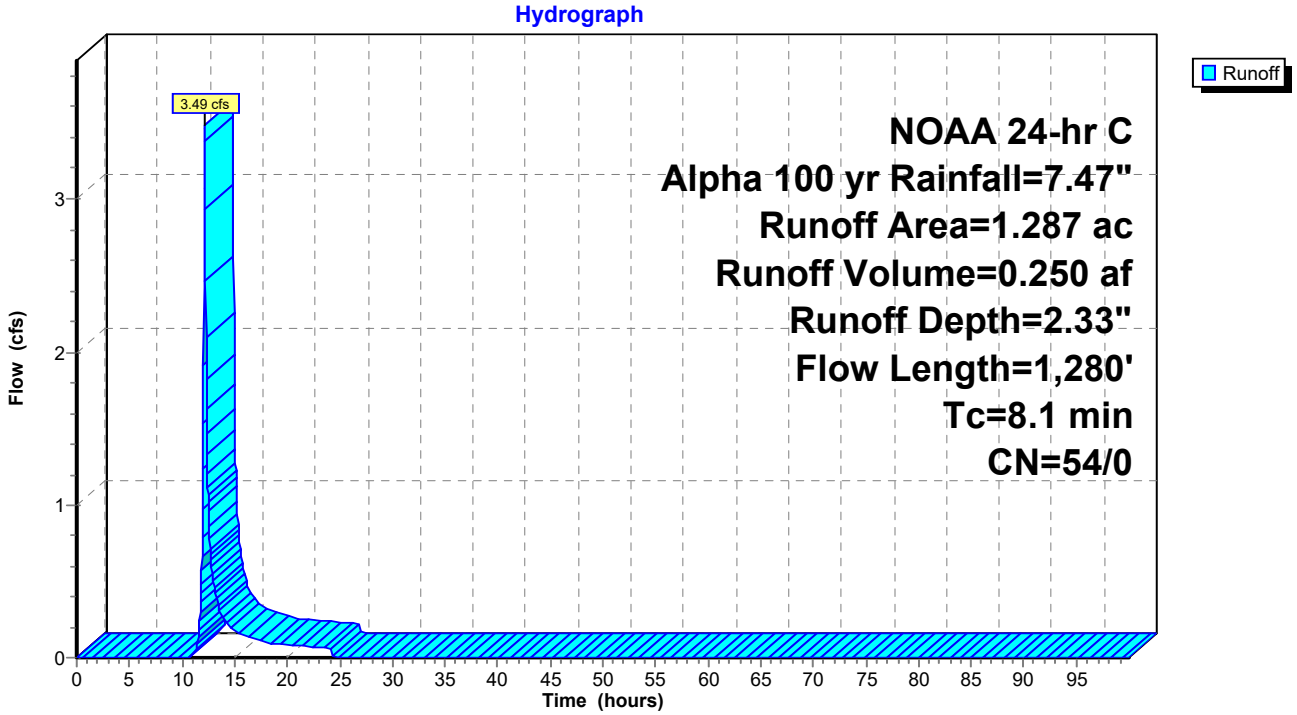
Runoff = 3.49 cfs @ 12.16 hrs, Volume= 0.250 af, Depth= 2.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (ac)	CN	Description
0.647	48	Brush, Good, HSG B
0.640	61	>75% Grass cover, Good, HSG B
1.287	54	Weighted Average
1.287	54	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	173	0.0783	4.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	1,007	0.0205	8.44	6.63	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
8.1	1,280	Total			

Subcatchment 24S: PDA-7



Hydrograph for Subcatchment 24S: PDA-7

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.33	0.00	**1.23**
15.00	6.38	1.66	0.00	**0.17**
18.00	6.88	1.96	0.00	0.10
21.00	7.21	2.16	0.00	0.08
24.00	**7.47**	**2.33**	0.00	0.07
27.00	7.47	2.33	0.00	0.00
30.00	7.47	2.33	0.00	0.00
33.00	7.47	2.33	0.00	0.00
36.00	7.47	2.33	0.00	0.00
39.00	7.47	2.33	0.00	0.00
42.00	7.47	2.33	0.00	0.00
45.00	7.47	2.33	0.00	0.00
48.00	7.47	2.33	0.00	0.00
51.00	7.47	2.33	0.00	0.00
54.00	7.47	2.33	0.00	0.00
57.00	7.47	2.33	0.00	0.00
60.00	7.47	2.33	0.00	0.00
63.00	7.47	2.33	0.00	0.00
66.00	7.47	2.33	0.00	0.00
69.00	7.47	2.33	0.00	0.00
72.00	7.47	2.33	0.00	0.00
75.00	7.47	2.33	0.00	0.00
78.00	7.47	2.33	0.00	0.00
81.00	7.47	2.33	0.00	0.00
84.00	7.47	2.33	0.00	0.00
87.00	7.47	2.33	0.00	0.00
90.00	7.47	2.33	0.00	0.00
93.00	7.47	2.33	0.00	0.00
96.00	7.47	2.33	0.00	0.00
99.00	7.47	2.33	0.00	0.00

Summary for Subcatchment 25S: PDA-8 BYPASS

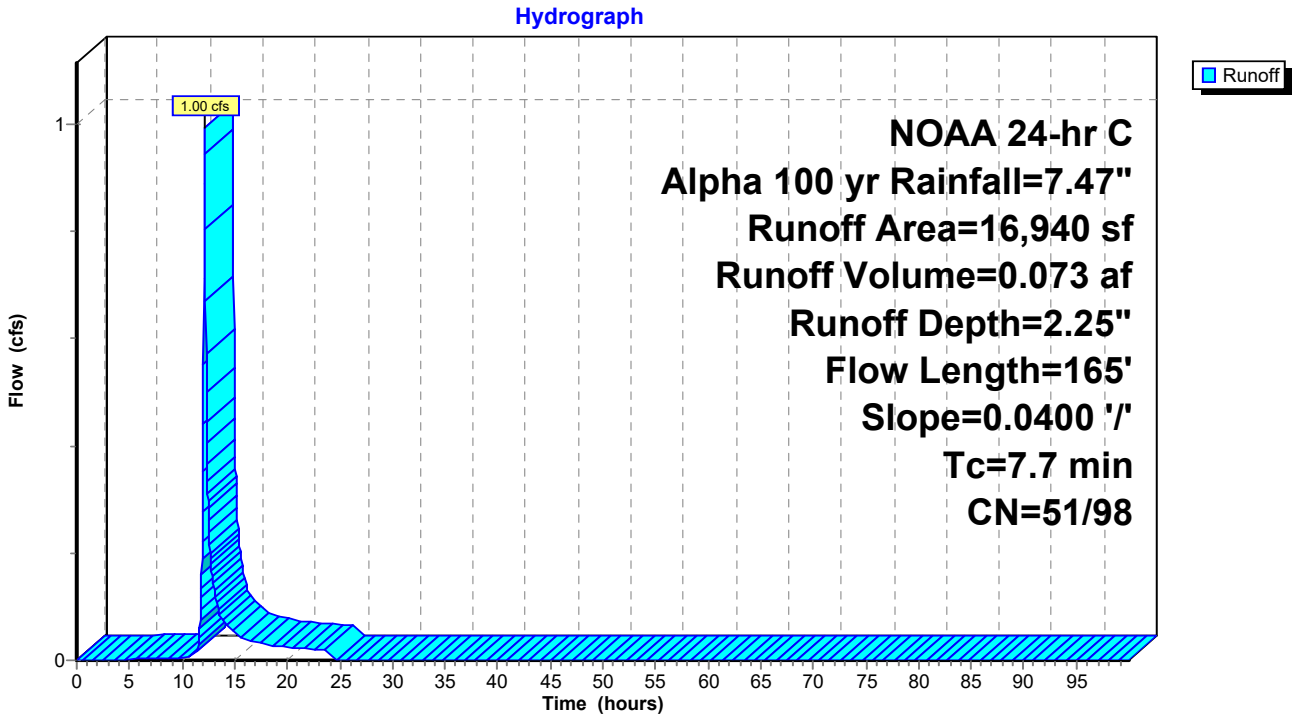
Runoff = 1.00 cfs @ 12.16 hrs, Volume= 0.073 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (sf)	CN	Description
*	706	98	Pavement
	7,396	39	>75% Grass cover, Good, HSG A
	8,838	61	>75% Grass cover, Good, HSG B
	16,940	53	Weighted Average
	16,234	51	95.83% Pervious Area
	706	98	4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0400	0.23		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.3	65	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	165	Total			

Subcatchment 25S: PDA-8 BYPASS



Hydrograph for Subcatchment 25S: PDA-8 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.00
6.00	0.59	0.00	0.40	0.00
9.00	1.09	0.00	0.88	0.00
12.00	3.56	0.24	3.33	**0.35**
15.00	6.38	1.41	6.14	**0.05**
18.00	6.88	1.69	6.64	0.03
21.00	7.21	1.88	6.97	0.02
24.00	**7.47**	**2.03**	**7.23**	0.02
27.00	7.47	2.03	7.23	0.00
30.00	7.47	2.03	7.23	0.00
33.00	7.47	2.03	7.23	0.00
36.00	7.47	2.03	7.23	0.00
39.00	7.47	2.03	7.23	0.00
42.00	7.47	2.03	7.23	0.00
45.00	7.47	2.03	7.23	0.00
48.00	7.47	2.03	7.23	0.00
51.00	7.47	2.03	7.23	0.00
54.00	7.47	2.03	7.23	0.00
57.00	7.47	2.03	7.23	0.00
60.00	7.47	2.03	7.23	0.00
63.00	7.47	2.03	7.23	0.00
66.00	7.47	2.03	7.23	0.00
69.00	7.47	2.03	7.23	0.00
72.00	7.47	2.03	7.23	0.00
75.00	7.47	2.03	7.23	0.00
78.00	7.47	2.03	7.23	0.00
81.00	7.47	2.03	7.23	0.00
84.00	7.47	2.03	7.23	0.00
87.00	7.47	2.03	7.23	0.00
90.00	7.47	2.03	7.23	0.00
93.00	7.47	2.03	7.23	0.00
96.00	7.47	2.03	7.23	0.00
99.00	7.47	2.03	7.23	0.00

Summary for Subcatchment 26S: PDA-10 BYPASS

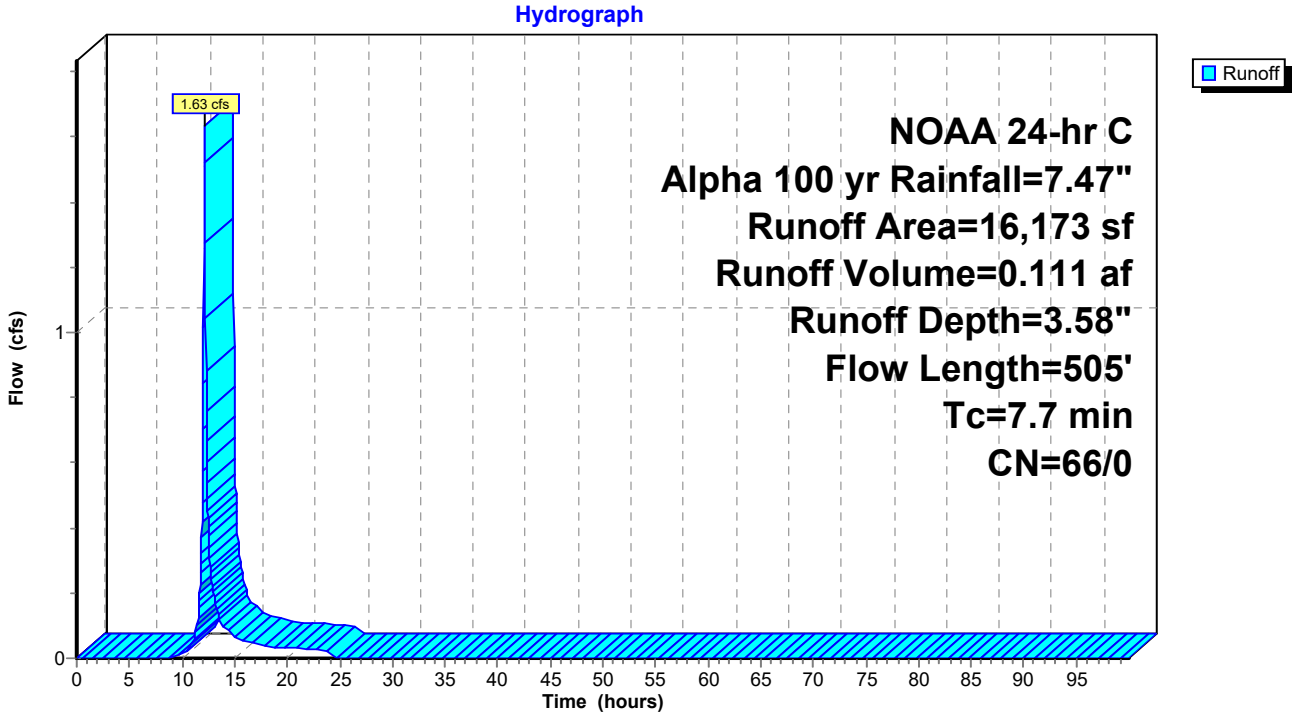
Runoff = 1.63 cfs @ 12.15 hrs, Volume= 0.111 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

Area (sf)	CN	Description
12,210	61	>75% Grass cover, Good, HSG B
3,963	80	>75% Grass cover, Good, HSG D
16,173	66	Weighted Average
16,173	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	81	0.0990	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.4	424	0.0170	2.10		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	505	Total			

Subcatchment 26S: PDA-10 BYPASS



Hydrograph for Subcatchment 26S: PDA-10 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
3.00	0.26	0.00	0.00	0.00
6.00	0.59	0.00	0.00	0.00
9.00	1.09	0.00	0.00	0.00
12.00	3.56	0.83	0.00	**0.70**
15.00	6.38	2.72	0.00	**0.06**
18.00	6.88	3.11	0.00	0.04
21.00	7.21	3.37	0.00	0.03
24.00	**7.47**	**3.58**	0.00	0.03
27.00	7.47	3.58	0.00	0.00
30.00	7.47	3.58	0.00	0.00
33.00	7.47	3.58	0.00	0.00
36.00	7.47	3.58	0.00	0.00
39.00	7.47	3.58	0.00	0.00
42.00	7.47	3.58	0.00	0.00
45.00	7.47	3.58	0.00	0.00
48.00	7.47	3.58	0.00	0.00
51.00	7.47	3.58	0.00	0.00
54.00	7.47	3.58	0.00	0.00
57.00	7.47	3.58	0.00	0.00
60.00	7.47	3.58	0.00	0.00
63.00	7.47	3.58	0.00	0.00
66.00	7.47	3.58	0.00	0.00
69.00	7.47	3.58	0.00	0.00
72.00	7.47	3.58	0.00	0.00
75.00	7.47	3.58	0.00	0.00
78.00	7.47	3.58	0.00	0.00
81.00	7.47	3.58	0.00	0.00
84.00	7.47	3.58	0.00	0.00
87.00	7.47	3.58	0.00	0.00
90.00	7.47	3.58	0.00	0.00
93.00	7.47	3.58	0.00	0.00
96.00	7.47	3.58	0.00	0.00
99.00	7.47	3.58	0.00	0.00

Summary for Subcatchment 27S: PDA-9 BYPASS

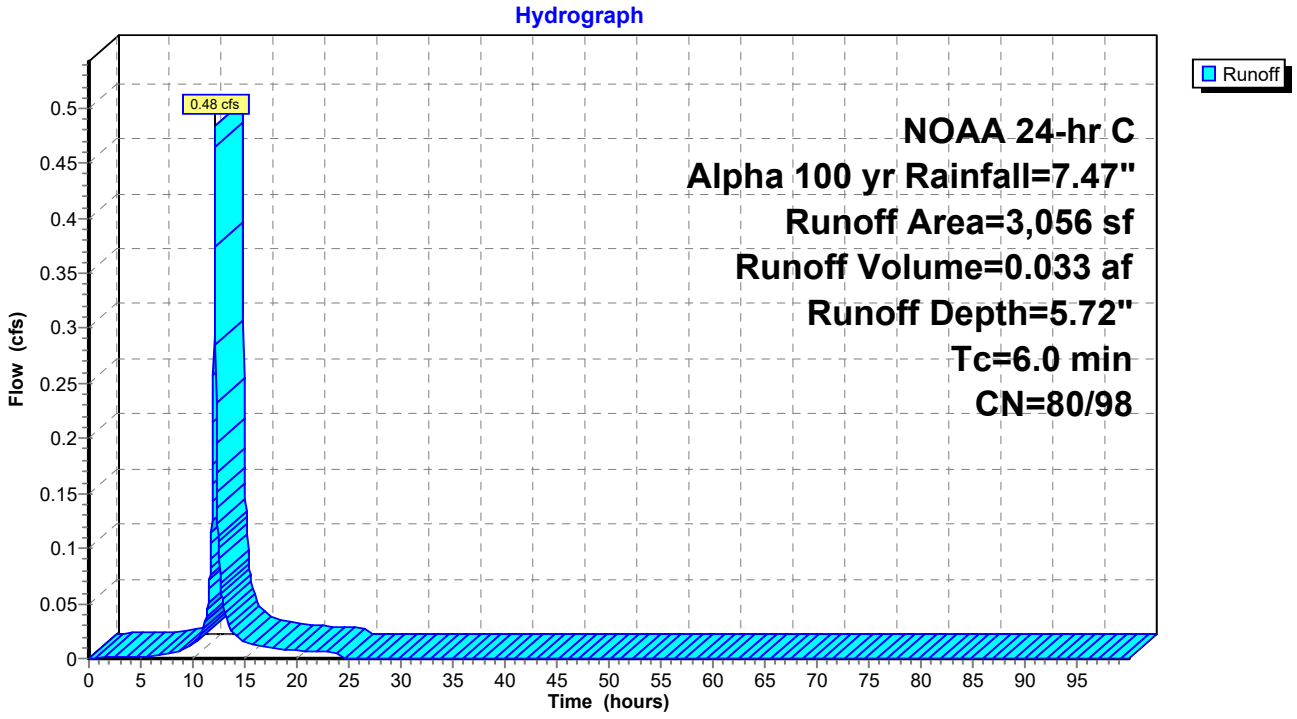
Runoff = 0.48 cfs @ 12.13 hrs, Volume= 0.033 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (sf)	CN	Description
*	860	98	Pavement
	2,196	80	>75% Grass cover, Good, HSG D
	3,056	85	Weighted Average
	2,196	80	71.86% Pervious Area
	860	98	28.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 27S: PDA-9 BYPASS



Hydrograph for Subcatchment 27S: PDA-9 BYPASS

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.00
6.00	0.59	0.00	0.40	0.00
9.00	1.09	0.11	0.88	0.01
12.00	3.56	1.68	3.33	**0.26**
15.00	6.38	4.12	6.14	**0.01**
18.00	6.88	4.58	6.64	0.01
21.00	7.21	4.89	6.97	0.01
24.00	**7.47**	**5.13**	**7.23**	0.01
27.00	7.47	5.13	7.23	0.00
30.00	7.47	5.13	7.23	0.00
33.00	7.47	5.13	7.23	0.00
36.00	7.47	5.13	7.23	0.00
39.00	7.47	5.13	7.23	0.00
42.00	7.47	5.13	7.23	0.00
45.00	7.47	5.13	7.23	0.00
48.00	7.47	5.13	7.23	0.00
51.00	7.47	5.13	7.23	0.00
54.00	7.47	5.13	7.23	0.00
57.00	7.47	5.13	7.23	0.00
60.00	7.47	5.13	7.23	0.00
63.00	7.47	5.13	7.23	0.00
66.00	7.47	5.13	7.23	0.00
69.00	7.47	5.13	7.23	0.00
72.00	7.47	5.13	7.23	0.00
75.00	7.47	5.13	7.23	0.00
78.00	7.47	5.13	7.23	0.00
81.00	7.47	5.13	7.23	0.00
84.00	7.47	5.13	7.23	0.00
87.00	7.47	5.13	7.23	0.00
90.00	7.47	5.13	7.23	0.00
93.00	7.47	5.13	7.23	0.00
96.00	7.47	5.13	7.23	0.00
99.00	7.47	5.13	7.23	0.00

Summary for Subcatchment 28S: PDA-4B

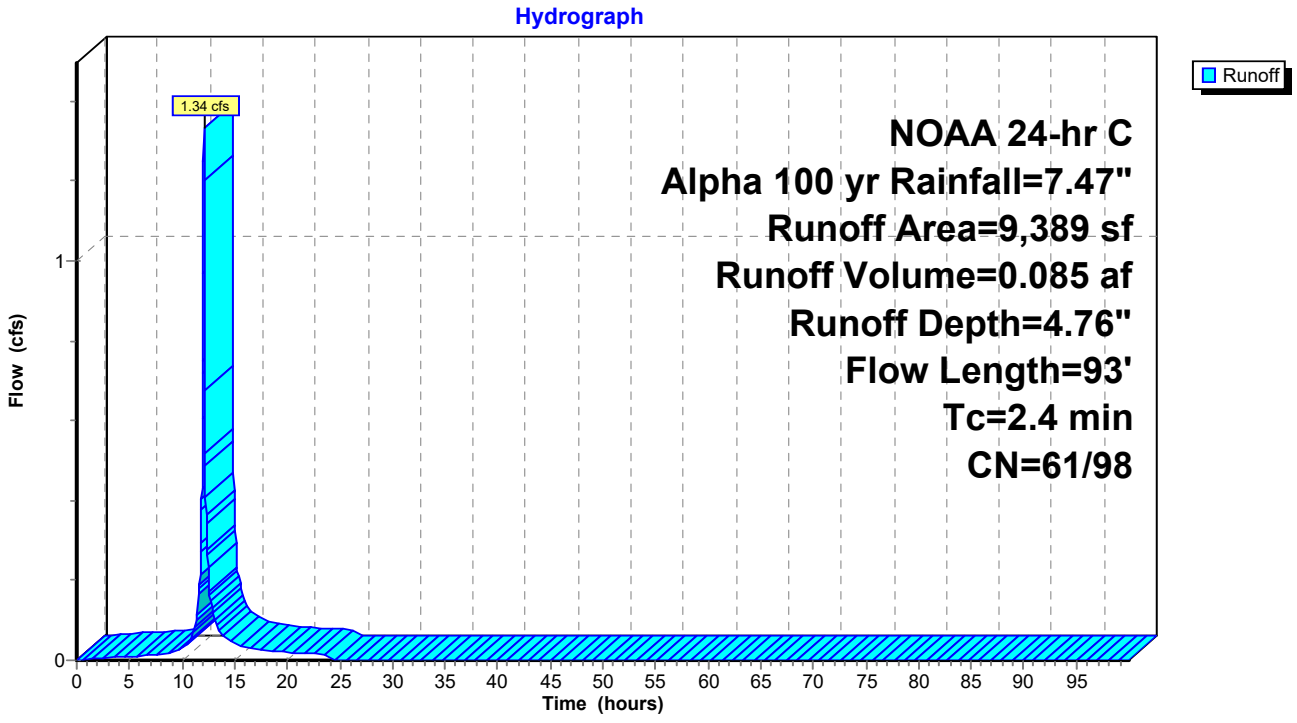
Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (sf)	CN	Description
	5,551	61	>75% Grass cover, Good, HSG B
*	3,331	98	Asphalt Pavement
*	507	98	Pervious Pavement
	9,389	76	Weighted Average
	5,551	61	59.12% Pervious Area
	3,838	98	40.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	32	0.1334	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	61	0.0360	1.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.4	93	Total			

Subcatchment 28S: PDA-4B



Hydrograph for Subcatchment 28S: PDA-4B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.01
6.00	0.59	0.00	0.40	0.01
9.00	1.09	0.00	0.88	0.02
12.00	3.56	0.60	3.33	**0.75**
15.00	6.38	2.26	6.14	**0.04**
18.00	6.88	2.61	6.64	0.02
21.00	7.21	2.85	6.97	0.02
24.00	**7.47**	**3.05**	**7.23**	0.02
27.00	7.47	3.05	7.23	0.00
30.00	7.47	3.05	7.23	0.00
33.00	7.47	3.05	7.23	0.00
36.00	7.47	3.05	7.23	0.00
39.00	7.47	3.05	7.23	0.00
42.00	7.47	3.05	7.23	0.00
45.00	7.47	3.05	7.23	0.00
48.00	7.47	3.05	7.23	0.00
51.00	7.47	3.05	7.23	0.00
54.00	7.47	3.05	7.23	0.00
57.00	7.47	3.05	7.23	0.00
60.00	7.47	3.05	7.23	0.00
63.00	7.47	3.05	7.23	0.00
66.00	7.47	3.05	7.23	0.00
69.00	7.47	3.05	7.23	0.00
72.00	7.47	3.05	7.23	0.00
75.00	7.47	3.05	7.23	0.00
78.00	7.47	3.05	7.23	0.00
81.00	7.47	3.05	7.23	0.00
84.00	7.47	3.05	7.23	0.00
87.00	7.47	3.05	7.23	0.00
90.00	7.47	3.05	7.23	0.00
93.00	7.47	3.05	7.23	0.00
96.00	7.47	3.05	7.23	0.00
99.00	7.47	3.05	7.23	0.00

Summary for Subcatchment 29S: PDA-3B

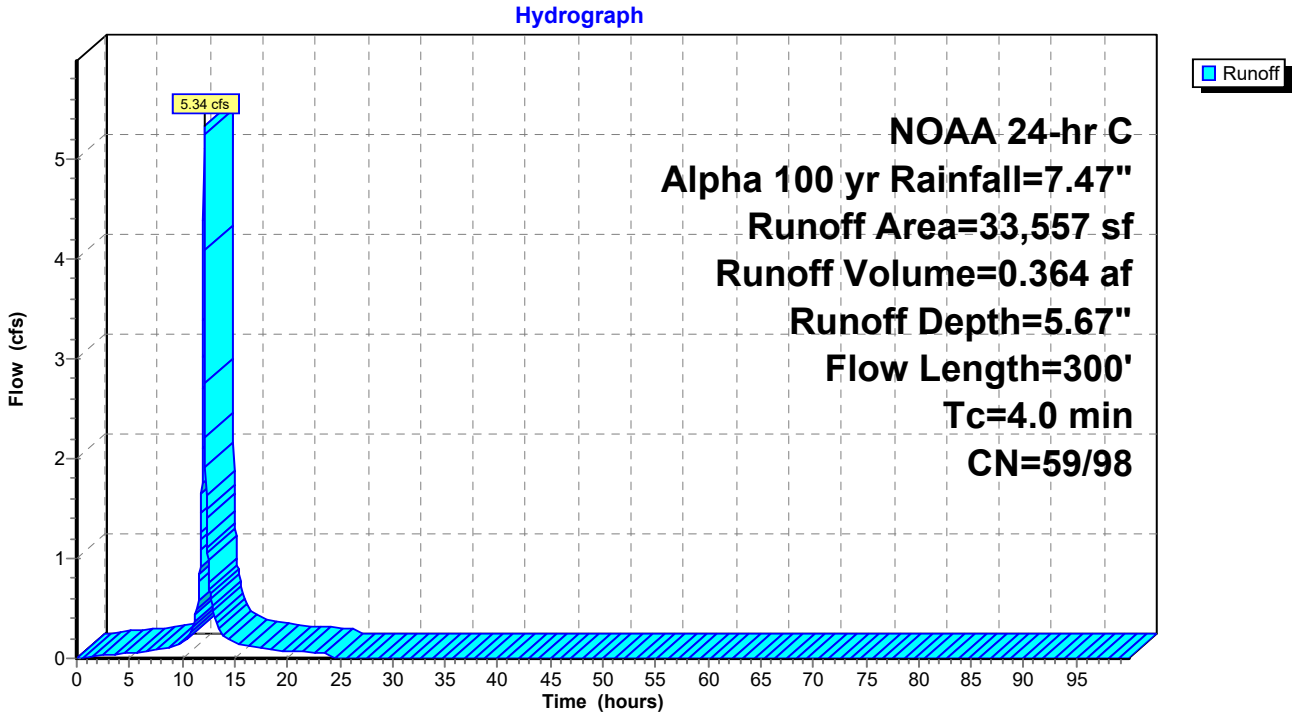
Runoff = 5.34 cfs @ 12.11 hrs, Volume= 0.364 af, Depth= 5.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100 yr Rainfall=7.47"

	Area (sf)	CN	Description
*	75	98	Concrete Sidewalk
	10,980	61	>75% Grass cover, Good, HSG B
*	2,280	98	Future Sidewalk
*	19,281	98	Future Pervious Pavement
	941	39	>75% Grass cover, Good, HSG A
	33,557	84	Weighted Average
	11,921	59	35.52% Pervious Area
	21,636	98	64.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.2	50	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	200	0.0060	3.51	2.76	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.0	300	Total			

Subcatchment 29S: PDA-3B



Hydrograph for Subcatchment 29S: PDA-3B

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
3.00	0.26	0.00	0.12	0.04
6.00	0.59	0.00	0.40	0.06
9.00	1.09	0.00	0.88	0.10
12.00	3.56	0.52	3.33	**3.01**
15.00	6.38	2.09	6.14	**0.15**
18.00	6.88	2.42	6.64	0.09
21.00	7.21	2.65	6.97	0.07
24.00	**7.47**	**2.84**	**7.23**	0.07
27.00	7.47	2.84	7.23	0.00
30.00	7.47	2.84	7.23	0.00
33.00	7.47	2.84	7.23	0.00
36.00	7.47	2.84	7.23	0.00
39.00	7.47	2.84	7.23	0.00
42.00	7.47	2.84	7.23	0.00
45.00	7.47	2.84	7.23	0.00
48.00	7.47	2.84	7.23	0.00
51.00	7.47	2.84	7.23	0.00
54.00	7.47	2.84	7.23	0.00
57.00	7.47	2.84	7.23	0.00
60.00	7.47	2.84	7.23	0.00
63.00	7.47	2.84	7.23	0.00
66.00	7.47	2.84	7.23	0.00
69.00	7.47	2.84	7.23	0.00
72.00	7.47	2.84	7.23	0.00
75.00	7.47	2.84	7.23	0.00
78.00	7.47	2.84	7.23	0.00
81.00	7.47	2.84	7.23	0.00
84.00	7.47	2.84	7.23	0.00
87.00	7.47	2.84	7.23	0.00
90.00	7.47	2.84	7.23	0.00
93.00	7.47	2.84	7.23	0.00
96.00	7.47	2.84	7.23	0.00
99.00	7.47	2.84	7.23	0.00

Summary for Pond 19P: PDA-4 Basin

Inflow Area = 1.719 ac, 85.61% Impervious, Inflow Depth = 6.63" for Alpha 100 yr event
Inflow = 13.61 cfs @ 12.10 hrs, Volume= 0.950 af
Outflow = 5.87 cfs @ 12.19 hrs, Volume= 0.921 af, Atten= 57%, Lag= 5.6 min
Primary = 5.87 cfs @ 12.19 hrs, Volume= 0.921 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 289.97' @ 12.19 hrs Surf.Area= 6,248 sf Storage= 12,453 cf

Plug-Flow detention time= 92.6 min calculated for 0.921 af (97% of inflow)
Center-of-Mass det. time= 73.0 min (820.3 - 747.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	286.25'	6,536 cf	**36.97'W x 169.00'L x 4.00'H Field A** 24,988 cf Overall - 8,648 cf Embedded = 16,340 cf x 40.0% Voids
#2A	286.75'	6,605 cf	**ADS N-12 30"** x 64 Inside #1 Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf 64 Chambers in 8 Rows 33.97' Header x 4.90 sf x 2 = 332.9 cf Inside
		13,141 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	286.75'	**24.0" Round Culvert** L= 62.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 286.75' / 285.60' S= 0.0184 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	286.75'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	287.75'	**9.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.85 cfs @ 12.19 hrs HW=289.96' (Free Discharge)
└**1=Culvert** (Passes 5.85 cfs of 28.14 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.14 cfs @ 8.35 fps)
  └**3=Orifice/Grate** (Orifice Controls 4.71 cfs @ 6.28 fps)

Pond 19P: PDA-4 Basin - Chamber Wizard Field A

Chamber Model = ADS N-12 30" (ADS N-12® Pipe)
Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf
Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf

36.0" Wide + 17.1" Spacing = 53.1" C-C Row Spacing

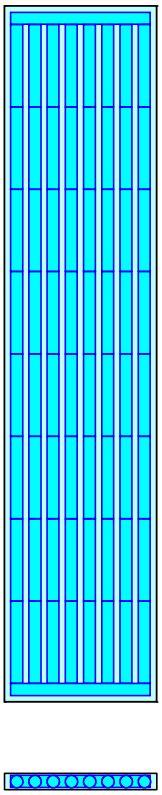
8 Chambers/Row x 20.00' Long +3.00' Header x 2 = 166.00' Row Length +18.0" End Stone x 2 = 169.00' Base Length
8 Rows x 36.0" Wide + 17.1" Spacing x 7 + 18.0" Side Stone x 2 = 36.97' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

64 Chambers x 98.0 cf + 33.97' Header x 4.90 sf x 2 = 6,604.9 cf Chamber Storage
64 Chambers x 128.3 cf + 33.97' Header x 6.41 sf x 2 = 8,644.6 cf Displacement

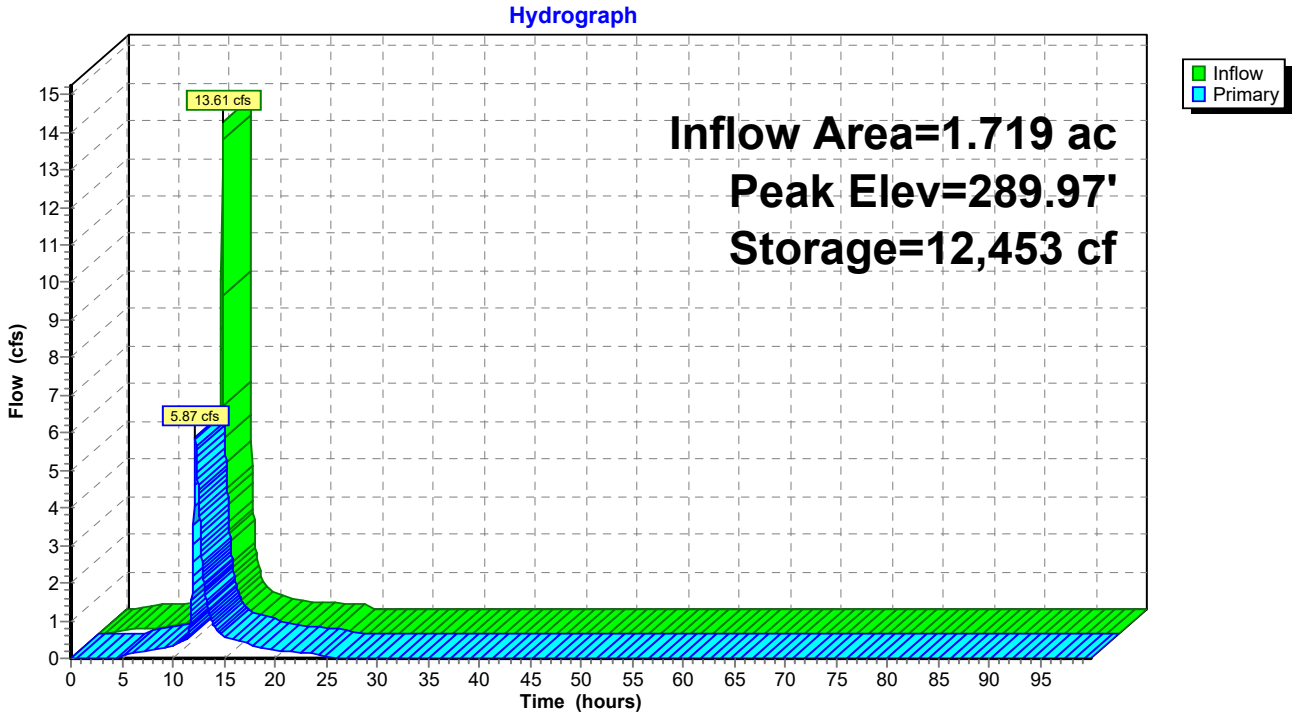
24,988.4 cf Field - 8,644.6 cf Chambers = 16,343.9 cf Stone x 40.0% Voids = 6,537.5 cf Stone Storage

Chamber Storage + Stone Storage = 13,142.5 cf = 0.302 af
Overall Storage Efficiency = 52.6%
Overall System Size = 169.00' x 36.97' x 4.00'

64 Chambers
925.5 cy Field
605.3 cy Stone



Pond 19P: PDA-4 Basin



Hydrograph for Pond 19P: PDA-4 Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	286.25	0.00
3.00	0.11	600	286.49	0.00
6.00	0.17	1,728	286.99	0.14
9.00	0.30	2,048	287.12	0.27
12.00	**8.11**	**8,464**	**288.69**	**3.04**
15.00	**0.37**	**4,393**	**287.75**	**0.58**
18.00	0.21	2,375	287.22	0.34
21.00	0.16	1,803	287.03	0.18
24.00	0.16	1,722	286.99	0.14
27.00	0.00	1,369	286.80	0.01
30.00	0.00	1,317	286.78	0.00
33.00	0.00	1,298	286.77	0.00
36.00	0.00	1,287	286.77	0.00
39.00	0.00	1,279	286.76	0.00
42.00	0.00	1,272	286.76	0.00
45.00	0.00	1,267	286.76	0.00
48.00	0.00	1,263	286.76	0.00
51.00	0.00	1,260	286.75	0.00
54.00	0.00	1,258	286.75	0.00
57.00	0.00	1,256	286.75	0.00
60.00	0.00	1,254	286.75	0.00
63.00	0.00	1,253	286.75	0.00
66.00	0.00	1,252	286.75	0.00
69.00	0.00	1,252	286.75	0.00
72.00	0.00	1,251	286.75	0.00
75.00	0.00	1,251	286.75	0.00
78.00	0.00	1,251	286.75	0.00
81.00	0.00	1,250	286.75	0.00
84.00	0.00	1,250	286.75	0.00
87.00	0.00	1,250	286.75	0.00
90.00	0.00	1,250	286.75	0.00
93.00	0.00	1,250	286.75	0.00
96.00	0.00	1,250	286.75	0.00
99.00	0.00	1,250	286.75	0.00

Summary for Pond 23P: Above-Ground Detension Basin 1

Inflow Area = 11.131 ac, 65.16% Impervious, Inflow Depth = 5.44" for Alpha 100 yr event
Inflow = 48.78 cfs @ 12.10 hrs, Volume= 5.049 af
Outflow = 14.65 cfs @ 12.64 hrs, Volume= 5.049 af, Atten= 70%, Lag= 32.4 min
Primary = 14.65 cfs @ 12.64 hrs, Volume= 5.049 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 273.94' @ 12.64 hrs Surf.Area= 20,651 sf Storage= 84,726 cf

Plug-Flow detention time= 222.0 min calculated for 5.049 af (100% of inflow)
Center-of-Mass det. time= 222.0 min (1,021.7 - 799.8)

Volume	Invert	Avail.Storage	Storage Description
#1	269.00'	107,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

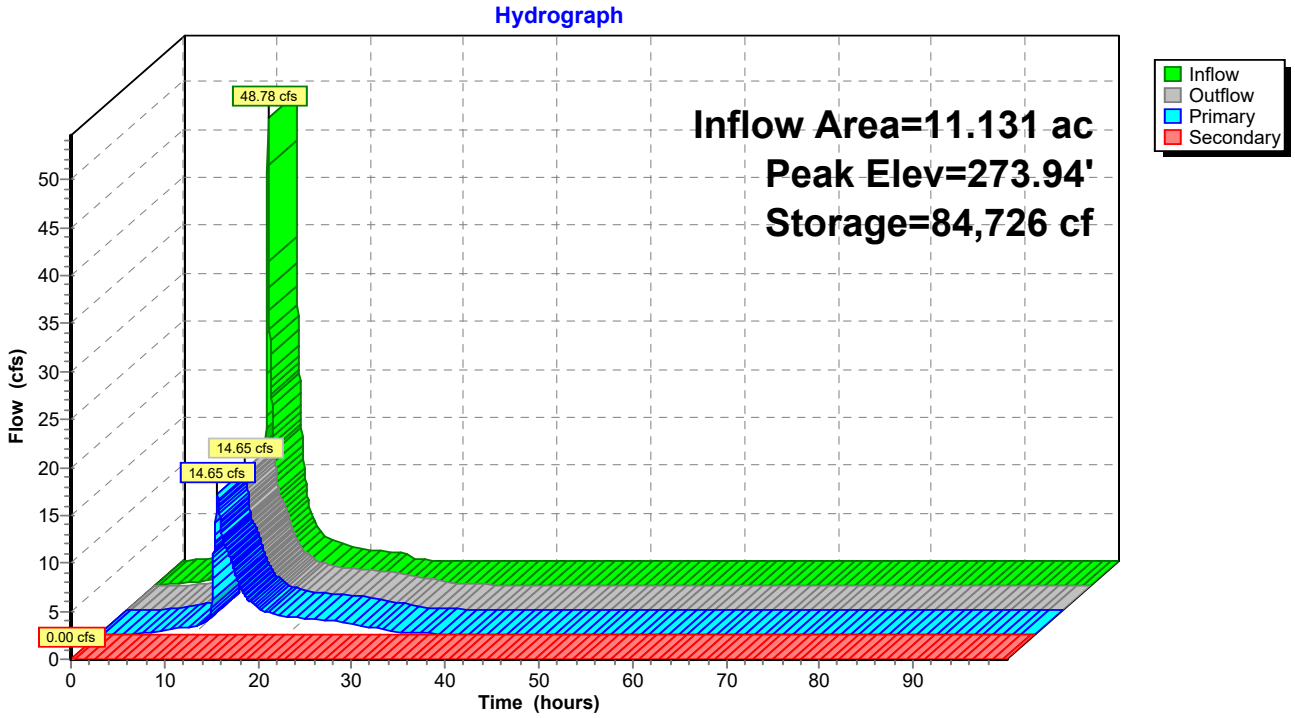
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
269.00	13,838	0	0
270.00	15,109	14,474	14,474
271.00	16,434	15,772	30,245
272.00	17,813	17,124	47,369
273.00	19,247	18,530	65,899
274.00	20,735	19,991	85,890
275.00	22,277	21,506	107,396

Device	Routing	Invert	Outlet Devices
#1	Primary	268.90'	**24.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 268.90' / 267.60' S= 0.0245 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	269.00'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	271.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	272.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	273.75'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	274.00'	**20.0' 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=14.59 cfs @ 12.64 hrs HW=273.94' (Free Discharge)
└─**1=Culvert** (Passes 14.59 cfs of 38.02 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.61 cfs @ 10.43 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.78 cfs @ 7.13 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 5.76 cfs @ 5.76 fps)
  └─**5=Orifice/Grate** (Weir Controls 4.45 cfs @ 1.44 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=269.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 23P: Above-Ground Detension Basin 1



Hydrograph for Pond 23P: Above-Ground Detension Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	269.00	0.00	0.00	**0.00**
3.00	0.29	1,412	269.10	0.05	0.05	0.00
6.00	0.62	4,428	269.32	0.29	0.29	0.00
9.00	1.14	8,628	269.61	0.70	0.70	0.00
12.00	**28.97**	**41,899**	**271.69**	**2.01**	**2.01**	0.00
15.00	**2.77**	**59,913**	**272.69**	**5.21**	**5.21**	0.00
18.00	1.47	45,660	271.90	2.37	2.37	0.00
21.00	1.02	37,111	271.41	1.77	1.77	0.00
24.00	0.88	28,927	270.92	1.55	1.55	0.00
27.00	0.05	16,067	270.10	1.11	1.11	0.00
30.00	0.02	7,187	269.51	0.58	0.58	0.00
33.00	0.01	3,538	269.25	0.20	0.20	0.00
36.00	0.00	2,093	269.15	0.09	0.09	0.00
39.00	0.00	1,377	269.10	0.05	0.05	0.00
42.00	0.00	965	269.07	0.03	0.03	0.00
45.00	0.00	715	269.05	0.02	0.02	0.00
48.00	0.00	533	269.04	0.02	0.02	0.00
51.00	0.00	397	269.03	0.01	0.01	0.00
54.00	0.00	295	269.02	0.01	0.01	0.00
57.00	0.00	219	269.02	0.01	0.01	0.00
60.00	0.00	163	269.01	0.00	0.00	0.00
63.00	0.00	121	269.01	0.00	0.00	0.00
66.00	0.00	90	269.01	0.00	0.00	0.00
69.00	0.00	67	269.00	0.00	0.00	0.00
72.00	0.00	50	269.00	0.00	0.00	0.00
75.00	0.00	37	269.00	0.00	0.00	0.00
78.00	0.00	28	269.00	0.00	0.00	0.00
81.00	0.00	21	269.00	0.00	0.00	0.00
84.00	0.00	15	269.00	0.00	0.00	0.00
87.00	0.00	12	269.00	0.00	0.00	0.00
90.00	0.00	9	269.00	0.00	0.00	0.00
93.00	0.00	6	269.00	0.00	0.00	0.00
96.00	0.00	5	269.00	0.00	0.00	0.00
99.00	0.00	4	269.00	0.00	0.00	0.00

Summary for Pond 24P: Bioretention Basin

Inflow Area = 2.358 ac, 62.11% Impervious, Inflow Depth = 5.77" for Alpha 100 yr event
Inflow = 13.32 cfs @ 12.18 hrs, Volume= 1.133 af
Outflow = 6.23 cfs @ 12.36 hrs, Volume= 1.017 af, Atten= 53%, Lag= 10.8 min
Primary = 6.23 cfs @ 12.36 hrs, Volume= 1.017 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 278.02' @ 12.36 hrs Surf.Area= 8,087 sf Storage= 18,821 cf

Plug-Flow detention time= 167.6 min calculated for 1.016 af (90% of inflow)
Center-of-Mass det. time= 114.1 min (883.4 - 769.2)

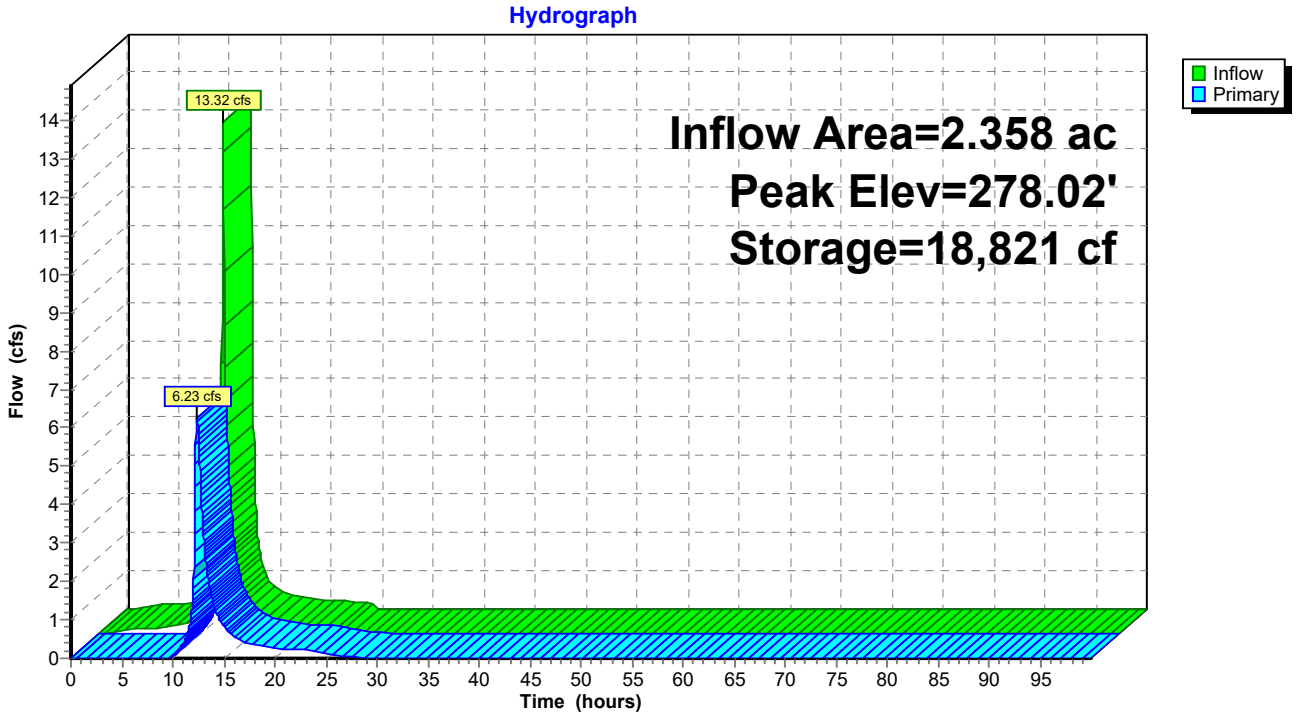
Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	37,747 cf	**Bioretention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	4,537	0	0
276.00	5,615	5,076	5,076
277.00	6,776	6,196	11,272
278.00	8,064	7,420	18,692
279.00	9,490	8,777	27,469
280.00	11,066	10,278	37,747

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 72.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 272.00' / 269.50' S= 0.0347 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	276.00'	**6.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.23 cfs @ 12.36 hrs HW=278.02' (Free Discharge)
└**1=Culvert** (Passes 6.23 cfs of 24.41 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.95 cfs @ 5.90 fps)
  ├**3=Orifice/Grate** (Orifice Controls 3.28 cfs @ 3.28 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 24P: Bioretention Basin



Hydrograph for Pond 24P: Bioretention Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	275.00	0.00
3.00	0.11	555	275.12	0.00
6.00	0.16	2,044	275.43	0.00
9.00	0.30	4,502	275.90	0.00
12.00	**6.01**	**11,815**	**277.08**	**1.84**
15.00	**0.50**	**8,968**	**276.65**	**0.84**
18.00	0.27	7,221	276.37	0.36
21.00	0.22	6,713	276.28	0.24
24.00	0.18	6,464	276.24	0.19
27.00	0.00	5,547	276.08	0.04
30.00	0.00	5,296	276.04	0.01
33.00	0.00	5,187	276.02	0.01
36.00	0.00	5,132	276.01	0.00
39.00	0.00	5,104	276.00	0.00
42.00	0.00	5,090	276.00	0.00
45.00	0.00	5,083	276.00	0.00
48.00	0.00	5,080	276.00	0.00
51.00	0.00	5,078	276.00	0.00
54.00	0.00	5,077	276.00	0.00
57.00	0.00	5,076	276.00	0.00
60.00	0.00	5,076	276.00	0.00
63.00	0.00	5,076	276.00	0.00
66.00	0.00	5,076	276.00	0.00
69.00	0.00	5,076	276.00	0.00
72.00	0.00	5,076	276.00	0.00
75.00	0.00	5,076	276.00	0.00
78.00	0.00	5,076	276.00	0.00
81.00	0.00	5,076	276.00	0.00
84.00	0.00	5,076	276.00	0.00
87.00	0.00	5,076	276.00	0.00
90.00	0.00	5,076	276.00	0.00
93.00	0.00	5,076	276.00	0.00
96.00	0.00	5,076	276.00	0.00
99.00	0.00	5,076	276.00	0.00

Summary for Pond 25P: Subsurface Basin 3B

Inflow Area = 0.770 ac, 64.48% Impervious, Inflow Depth = 5.67" for Alpha 100 yr event
Inflow = 5.34 cfs @ 12.11 hrs, Volume= 0.364 af
Outflow = 4.11 cfs @ 12.15 hrs, Volume= 0.357 af, Atten= 23%, Lag= 2.6 min
Primary = 4.11 cfs @ 12.15 hrs, Volume= 0.357 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 285.85' @ 12.15 hrs Surf.Area= 2,166 sf Storage= 2,767 cf

Plug-Flow detention time= 53.5 min calculated for 0.357 af (98% of inflow)
Center-of-Mass det. time= 42.2 min (803.1 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.67'	1,658 cf	**17.80'W x 121.67'L x 3.00'H Field A** 6,497 cf Overall - 2,353 cf Embedded = 4,144 cf x 40.0% Voids
#2A	284.00'	1,860 cf	**ADS N-12 24"** x 30 Inside #1 Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf 30 Chambers in 5 Rows
		3,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	284.00'	**24.0" Round Culvert** L= 21.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 284.00' / 283.00' S= 0.0476 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	284.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	285.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.09 cfs @ 12.15 hrs HW=285.85' (Free Discharge)
└**1=Culvert** (Passes 4.09 cfs of 17.58 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.33 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.26 cfs @ 5.04 fps)
  └**4=Orifice/Grate** (Orifice Controls 2.52 cfs @ 2.96 fps)

Pond 25P: Subsurface Basin 3B - Chamber Wizard Field A

Chamber Model = ADS N-12 24" (ADS N-12® Pipe)
Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf
Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf

28.0" Wide + 13.4" Spacing = 41.4" C-C Row Spacing

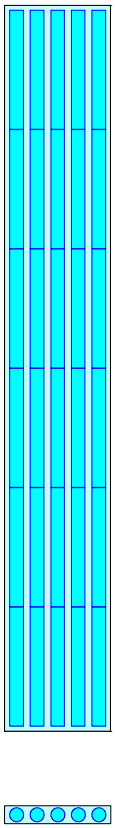
6 Chambers/Row x 20.00' Long = 120.00' Row Length +10.0" End Stone x 2 = 121.67' Base Length
5 Rows x 28.0" Wide + 13.4" Spacing x 4 + 10.0" Side Stone x 2 = 17.80' Base Width
4.0" Stone Base + 28.0" Chamber Height + 4.0" Stone Cover = 3.00' Field Height

30 Chambers x 62.0 cf = 1,860.0 cf Chamber Storage
30 Chambers x 78.4 cf = 2,352.8 cf Displacement

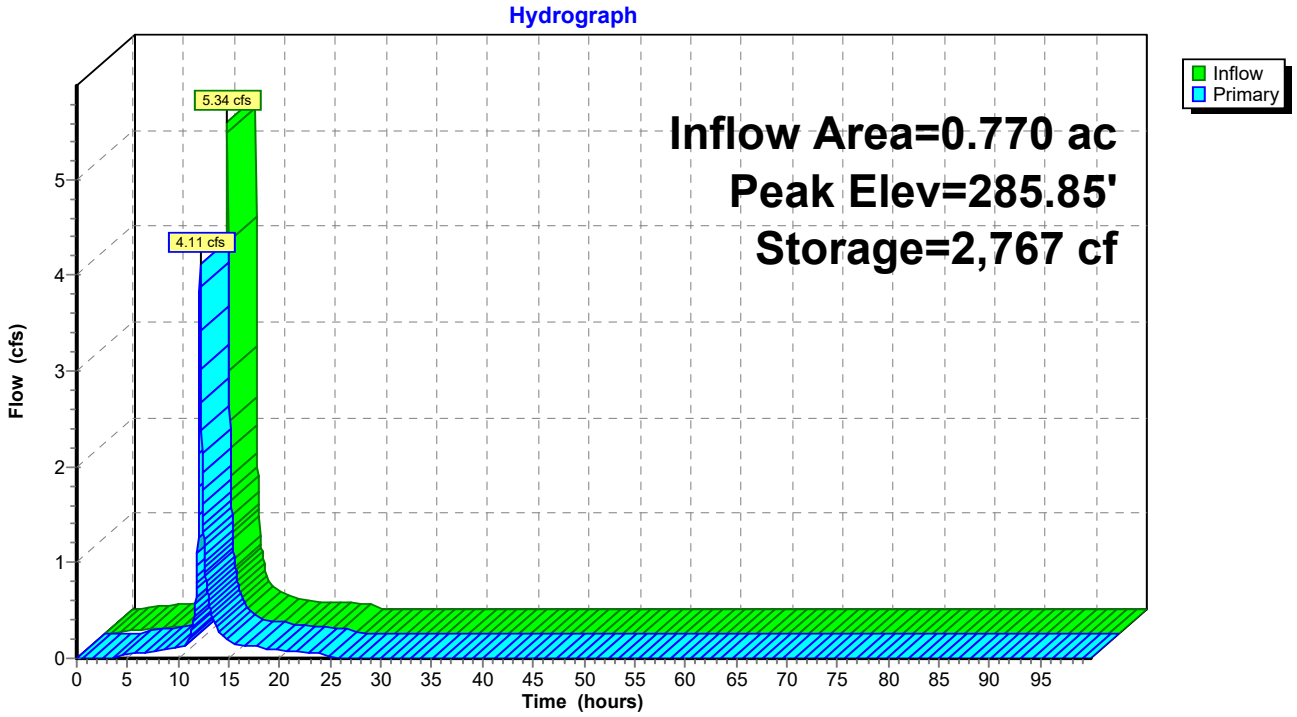
6,497.2 cf Field - 2,352.8 cf Chambers = 4,144.4 cf Stone x 40.0% Voids = 1,657.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,517.8 cf = 0.081 af
Overall Storage Efficiency = 54.1%
Overall System Size = 121.67' x 17.80' x 3.00'

30 Chambers
240.6 cy Field
153.5 cy Stone



Pond 25P: Subsurface Basin 3B



Hydrograph for Pond 25P: Subsurface Basin 3B

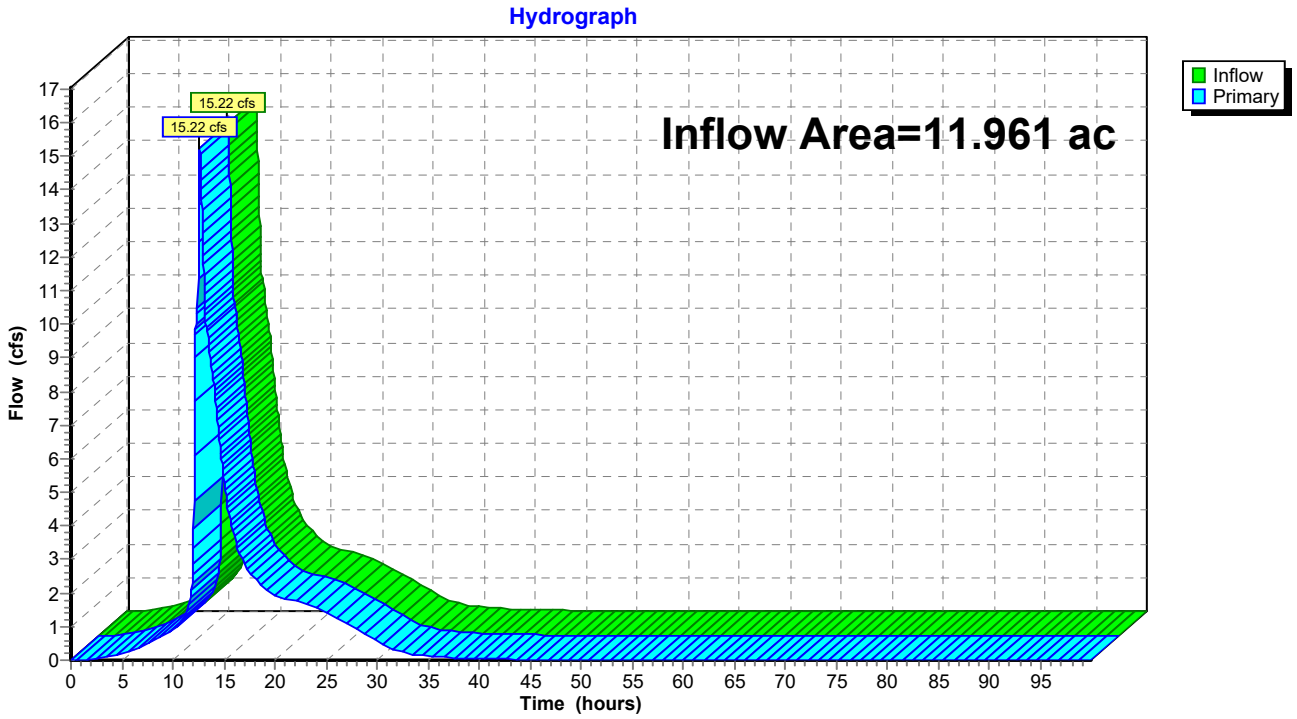
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	283.67	0.00
3.00	0.04	201	283.90	0.00
6.00	0.06	409	284.18	0.05
9.00	0.10	491	284.27	0.09
12.00	**3.01**	**2,012**	**285.33**	**1.79**
15.00	**0.15**	**860**	**284.57**	**0.18**
18.00	0.09	587	284.36	0.11
21.00	0.07	443	284.22	0.07
24.00	0.07	413	284.18	0.06
27.00	0.00	308	284.03	0.00
30.00	0.00	297	284.01	0.00
33.00	0.00	292	284.01	0.00
36.00	0.00	290	284.00	0.00
39.00	0.00	289	284.00	0.00
42.00	0.00	289	284.00	0.00
45.00	0.00	288	284.00	0.00
48.00	0.00	288	284.00	0.00
51.00	0.00	288	284.00	0.00
54.00	0.00	288	284.00	0.00
57.00	0.00	288	284.00	0.00
60.00	0.00	287	284.00	0.00
63.00	0.00	287	284.00	0.00
66.00	0.00	287	284.00	0.00
69.00	0.00	287	284.00	0.00
72.00	0.00	287	284.00	0.00
75.00	0.00	287	284.00	0.00
78.00	0.00	287	284.00	0.00
81.00	0.00	287	284.00	0.00
84.00	0.00	287	284.00	0.00
87.00	0.00	287	284.00	0.00
90.00	0.00	287	284.00	0.00
93.00	0.00	286	284.00	0.00
96.00	0.00	286	284.00	0.00
99.00	0.00	286	284.00	0.00

Summary for Link 20L: POA A

Inflow Area = 11.961 ac, 60.94% Impervious, Inflow Depth = 5.28" for Alpha 100 yr event
Inflow = 15.22 cfs @ 12.63 hrs, Volume= 5.266 af
Primary = 15.22 cfs @ 12.63 hrs, Volume= 5.266 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 20L: POA A



Hydrograph for Link 20L: POA A

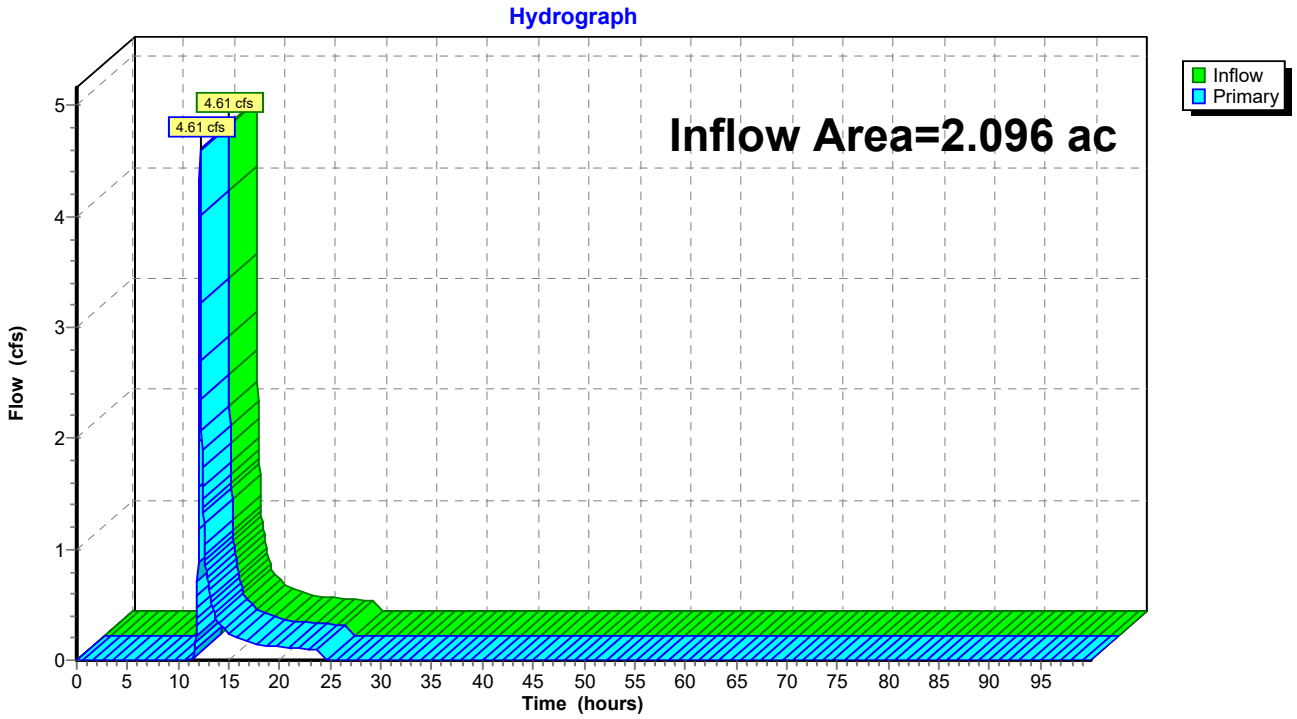
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.01	0.00	0.01	79.50	0.00	0.00	0.00
3.00	0.06	0.00	0.06	81.00	0.00	0.00	0.00
4.50	0.14	0.00	0.14	82.50	0.00	0.00	0.00
6.00	0.29	0.00	0.29	84.00	0.00	0.00	0.00
7.50	0.50	0.00	0.50	85.50	0.00	0.00	0.00
9.00	0.71	0.00	0.71	87.00	0.00	0.00	0.00
10.50	1.00	0.00	1.00	88.50	0.00	0.00	0.00
12.00	**3.33**	0.00	**3.33**	90.00	0.00	0.00	0.00
13.50	**9.47**	0.00	**9.47**	91.50	0.00	0.00	0.00
15.00	5.34	0.00	5.34	93.00	0.00	0.00	0.00
16.50	3.24	0.00	3.24	94.50	0.00	0.00	0.00
18.00	2.45	0.00	2.45	96.00	0.00	0.00	0.00
19.50	2.02	0.00	2.02	97.50	0.00	0.00	0.00
21.00	1.83	0.00	1.83	99.00	0.00	0.00	0.00
22.50	1.72	0.00	1.72				
24.00	1.61	0.00	1.61				
25.50	1.35	0.00	1.35				
27.00	1.11	0.00	1.11				
28.50	0.85	0.00	0.85				
30.00	0.58	0.00	0.58				
31.50	0.33	0.00	0.33				
33.00	0.20	0.00	0.20				
34.50	0.14	0.00	0.14				
36.00	0.09	0.00	0.09				
37.50	0.07	0.00	0.07				
39.00	0.05	0.00	0.05				
40.50	0.04	0.00	0.04				
42.00	0.03	0.00	0.03				
43.50	0.02	0.00	0.02				
45.00	0.02	0.00	0.02				
46.50	0.02	0.00	0.02				
48.00	0.02	0.00	0.02				
49.50	0.01	0.00	0.01				
51.00	0.01	0.00	0.01				
52.50	0.01	0.00	0.01				
54.00	0.01	0.00	0.01				
55.50	0.01	0.00	0.01				
57.00	0.01	0.00	0.01				
58.50	0.01	0.00	0.01				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Summary for Link 22L: POA B

Inflow Area = 2.096 ac, 0.00% Impervious, Inflow Depth = 1.84" for Alpha 100 yr event
Inflow = 4.61 cfs @ 12.14 hrs, Volume= 0.321 af
Primary = 4.61 cfs @ 12.14 hrs, Volume= 0.321 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs

Link 22L: POA B



Hydrograph for Link 22L: POA B

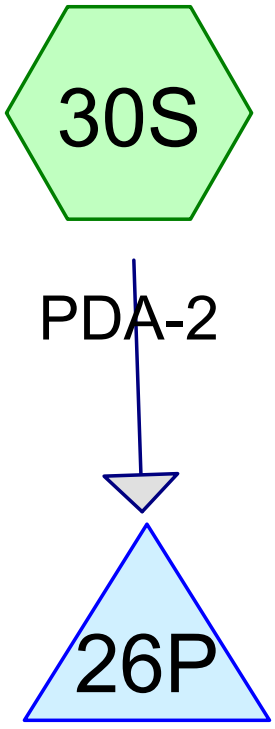
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	78.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	79.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	82.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	85.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	88.50	0.00	0.00	0.00
12.00	**1.57**	0.00	**1.57**	90.00	0.00	0.00	0.00
13.50	**0.43**	0.00	**0.43**	91.50	0.00	0.00	0.00
15.00	0.24	0.00	0.24	93.00	0.00	0.00	0.00
16.50	0.18	0.00	0.18	94.50	0.00	0.00	0.00
18.00	0.14	0.00	0.14	96.00	0.00	0.00	0.00
19.50	0.13	0.00	0.13	97.50	0.00	0.00	0.00
21.00	0.12	0.00	0.12	99.00	0.00	0.00	0.00
22.50	0.10	0.00	0.10				
24.00	0.11	0.00	0.11				
25.50	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.50	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.50	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.50	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.50	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.50	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.50	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.50	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.50	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.50	0.00	0.00	0.00				
54.00	0.00	0.00	0.00				
55.50	0.00	0.00	0.00				
57.00	0.00	0.00	0.00				
58.50	0.00	0.00	0.00				
60.00	0.00	0.00	0.00				
61.50	0.00	0.00	0.00				
63.00	0.00	0.00	0.00				
64.50	0.00	0.00	0.00				
66.00	0.00	0.00	0.00				
67.50	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
72.00	0.00	0.00	0.00				
73.50	0.00	0.00	0.00				
75.00	0.00	0.00	0.00				
76.50	0.00	0.00	0.00				

Colliers
Engineering
& Design

Appendix C |

Water Quality Storm Analysis

Water Quality



Bioretention Basin

Subcat Reach Pond Link

Routing Diagram for 220302_Alpha Warehouse Stormwater
Prepared by Colliers Engineering & Design, Printed 3/29/2022
HydroCAD® 10.10-3a s/n 08506 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	NJWQ	NJ DEP 2-hr		Default	2.00	1	1.25	2
2	Alpha 2 yr	NOAA 24-hr	C	Default	24.00	1	2.98	2
3	Alpha 10 yr	NOAA 24-hr	C	Default	24.00	1	4.70	2
4	Alpha 100 yr	NOAA 24-hr	C	Default	24.00	1	7.47	2
5	Alpha 100yr + 50%	NOAA 24-hr	C	Default	24.00	1	11.20	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.018	39	>75% Grass cover, Good, HSG A (30S)
0.716	61	>75% Grass cover, Good, HSG B (30S)
0.160	80	>75% Grass cover, Good, HSG D (30S)
1.465	98	Unconnected pavement, HSG B (30S)
2.358	**85**	**TOTAL AREA**

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment30S: PDA-2 Runoff Area=102,736 sf 62.11% Impervious Runoff Depth=0.64"
Flow Length=710' Tc=10.4 min CN=64/98 Runoff=3.75 cfs 0.126 af

Pond 26P: Bioretention Basin Peak Elev=276.07' Storage=5,468 cf Inflow=3.75 cfs 0.126 af
Outflow=0.03 cfs 0.010 af

Total Runoff Area = 2.358 ac Runoff Volume = 0.126 af Average Runoff Depth = 0.64"
37.89% Pervious = 0.894 ac 62.11% Impervious = 1.465 ac

Summary for Subcatchment 30S: PDA-2

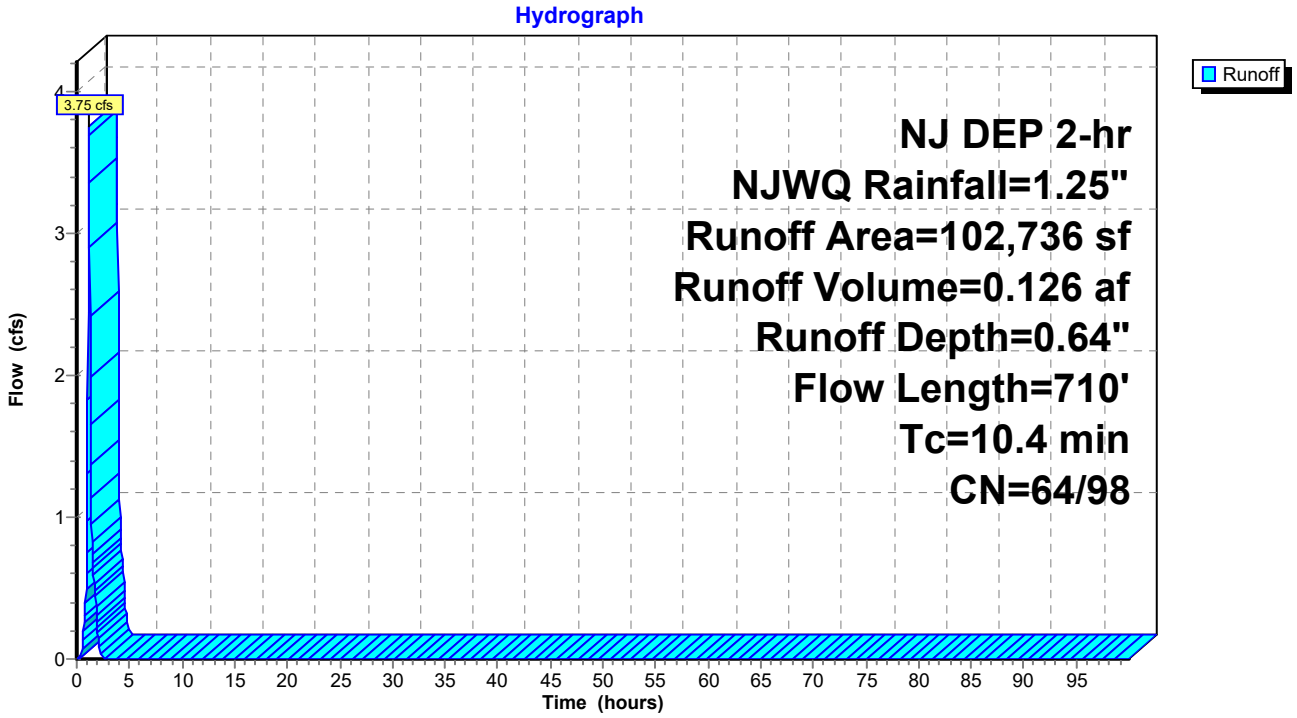
Runoff = 3.75 cfs @ 1.15 hrs, Volume= 0.126 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NJ DEP 2-hr NJWQ Rainfall=1.25"

Area (sf)	CN	Description
63,805	98	Unconnected pavement, HSG B
6,975	80	>75% Grass cover, Good, HSG D
788	39	>75% Grass cover, Good, HSG A
31,168	61	>75% Grass cover, Good, HSG B
102,736	85	Weighted Average
38,931	64	37.89% Pervious Area
63,805	98	62.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0550	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.1	210	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	400	0.0200	8.41	14.86	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
10.4	710	Total			

Subcatchment 30S: PDA-2



Hydrograph for Subcatchment 30S: PDA-2

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	**0.00**	**0.00**	**0.00**	**0.00**
3.00	**1.25**	**0.00**	**1.03**	**0.00**
6.00	1.25	0.00	1.03	0.00
9.00	1.25	0.00	1.03	0.00
12.00	1.25	0.00	1.03	0.00
15.00	1.25	0.00	1.03	0.00
18.00	1.25	0.00	1.03	0.00
21.00	1.25	0.00	1.03	0.00
24.00	1.25	0.00	1.03	0.00
27.00	1.25	0.00	1.03	0.00
30.00	1.25	0.00	1.03	0.00
33.00	1.25	0.00	1.03	0.00
36.00	1.25	0.00	1.03	0.00
39.00	1.25	0.00	1.03	0.00
42.00	1.25	0.00	1.03	0.00
45.00	1.25	0.00	1.03	0.00
48.00	1.25	0.00	1.03	0.00
51.00	1.25	0.00	1.03	0.00
54.00	1.25	0.00	1.03	0.00
57.00	1.25	0.00	1.03	0.00
60.00	1.25	0.00	1.03	0.00
63.00	1.25	0.00	1.03	0.00
66.00	1.25	0.00	1.03	0.00
69.00	1.25	0.00	1.03	0.00
72.00	1.25	0.00	1.03	0.00
75.00	1.25	0.00	1.03	0.00
78.00	1.25	0.00	1.03	0.00
81.00	1.25	0.00	1.03	0.00
84.00	1.25	0.00	1.03	0.00
87.00	1.25	0.00	1.03	0.00
90.00	1.25	0.00	1.03	0.00
93.00	1.25	0.00	1.03	0.00
96.00	1.25	0.00	1.03	0.00
99.00	1.25	0.00	1.03	0.00

Summary for Pond 26P: Bioretention Basin

Inflow Area = 2.358 ac, 62.11% Impervious, Inflow Depth = 0.64" for NJWQ event
Inflow = 3.75 cfs @ 1.15 hrs, Volume= 0.126 af
Outflow = 0.03 cfs @ 2.22 hrs, Volume= 0.010 af, Atten= 99%, Lag= 64.1 min
Primary = 0.03 cfs @ 2.22 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 276.07' @ 2.22 hrs Surf.Area= 5,695 sf Storage= 5,468 cf

Plug-Flow detention time= 318.8 min calculated for 0.010 af (8% of inflow)
Center-of-Mass det. time= 291.1 min (365.5 - 74.4)

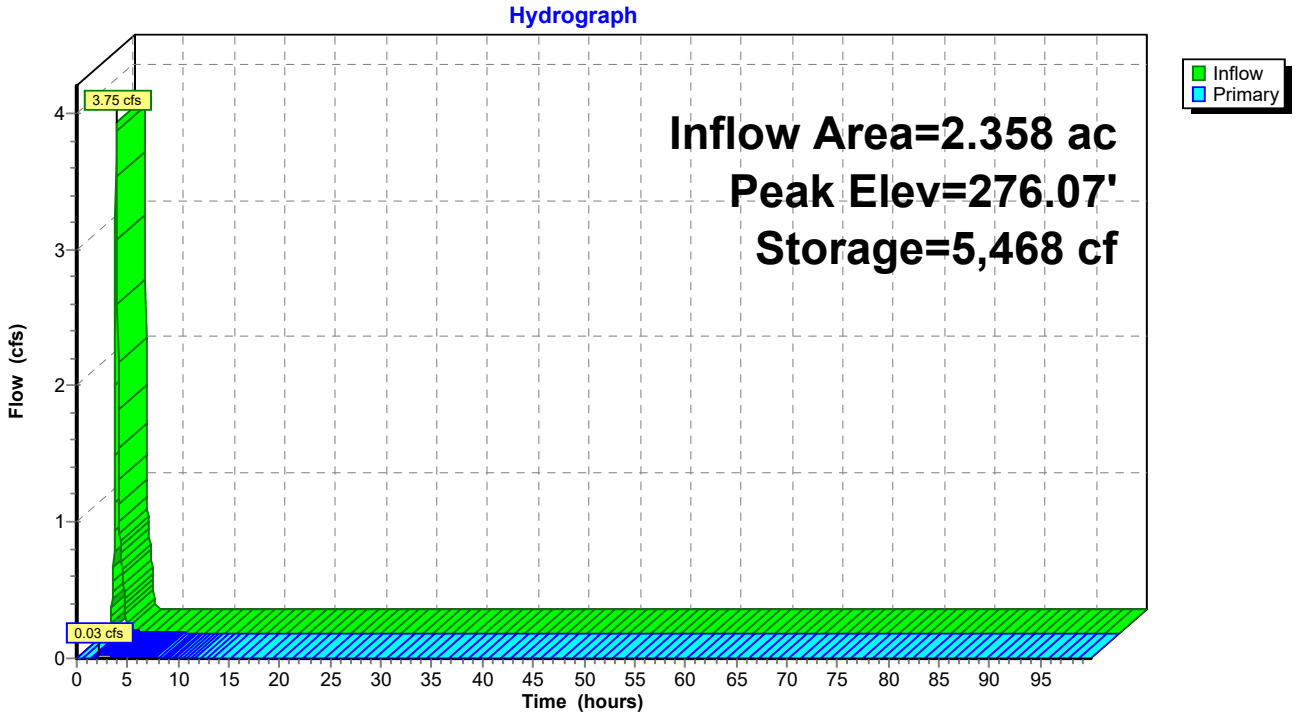
Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	37,747 cf	**Bioretention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	4,537	0	0
276.00	5,615	5,076	5,076
277.00	6,776	6,196	11,272
278.00	8,064	7,420	18,692
279.00	9,490	8,777	27,469
280.00	11,066	10,278	37,747

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 72.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 272.00' / 269.50' S= 0.0347 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	276.00'	**6.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

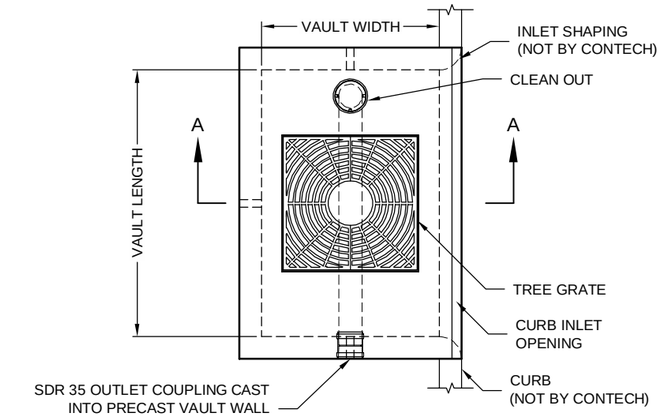
Primary OutFlow Max=0.03 cfs @ 2.22 hrs HW=276.07' (Free Discharge)
↑**1=Culvert** (Passes 0.03 cfs of 19.38 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.84 fps)
3=Orifice/Grate (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Pond 26P: Bioretention Basin

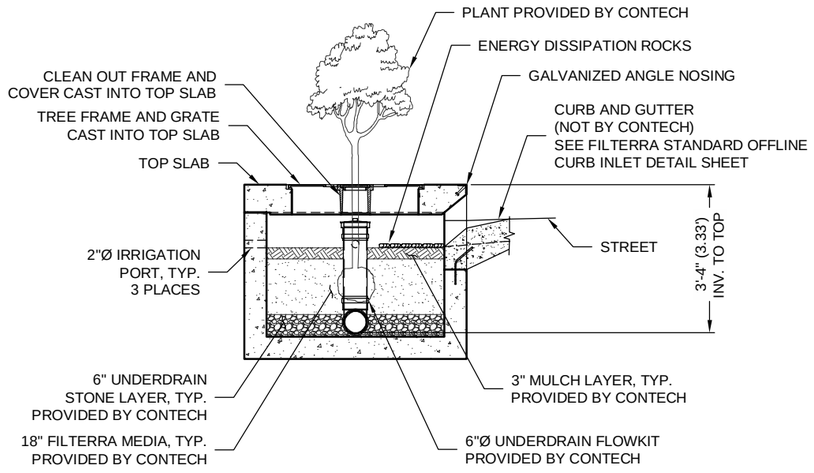


Hydrograph for Pond 26P: Bioretention Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0**	**275.00**	**0.00**
3.00	**0.00**	**5,400**	**276.06**	**0.02**
6.00	0.00	5,238	276.03	0.01
9.00	0.00	5,157	276.01	0.01
12.00	0.00	5,117	276.01	0.00
15.00	0.00	5,097	276.00	0.00
18.00	0.00	5,086	276.00	0.00
21.00	0.00	5,081	276.00	0.00
24.00	0.00	5,079	276.00	0.00
27.00	0.00	5,077	276.00	0.00
30.00	0.00	5,077	276.00	0.00
33.00	0.00	5,076	276.00	0.00
36.00	0.00	5,076	276.00	0.00
39.00	0.00	5,076	276.00	0.00
42.00	0.00	5,076	276.00	0.00
45.00	0.00	5,076	276.00	0.00
48.00	0.00	5,076	276.00	0.00
51.00	0.00	5,076	276.00	0.00
54.00	0.00	5,076	276.00	0.00
57.00	0.00	5,076	276.00	0.00
60.00	0.00	5,076	276.00	0.00
63.00	0.00	5,076	276.00	0.00
66.00	0.00	5,076	276.00	0.00
69.00	0.00	5,076	276.00	0.00
72.00	0.00	5,076	276.00	0.00
75.00	0.00	5,076	276.00	0.00
78.00	0.00	5,076	276.00	0.00
81.00	0.00	5,076	276.00	0.00
84.00	0.00	5,076	276.00	0.00
87.00	0.00	5,076	276.00	0.00
90.00	0.00	5,076	276.00	0.00
93.00	0.00	5,076	276.00	0.00
96.00	0.00	5,076	276.00	0.00
99.00	0.00	5,076	276.00	0.00



PLAN VIEW



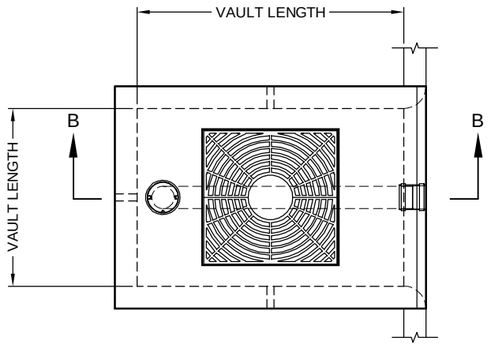
SECTION A-A

FT-HC LONG SIDE INLET CONFIGURATION

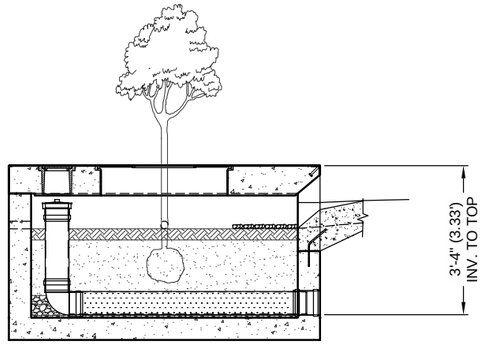
DESIGNATION	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (L x W)	OUTLET PIPE DIA	TREE GRATE QTY & SIZE
FT0604-HC	N/A CA	6 x 4	6 x 4	6" SDR 35	(1) 3' x 3'
FT06504-HC	CA ONLY	6.5 x 4	6.5 x 4	6" SDR 35	(1) 3' x 3'
FT078045-HC	DE, MD, NJ, PA, VA, WV ONLY	7.83 x 4.5	7.83 x 4.5	6" SDR 35	(1) 3' x 3'
FT0804-HC	N/A DE, MD, NJ, PA, VA, WV	8 x 4	8 x 4	6" SDR 35	(1) 3' x 3'
FT0806-HC	ALL	8 x 6	8 x 6	6" SDR 35	(1) 4' x 4'
FT1006-HC	ALL	10 x 6	10 x 6	6" SDR 35	(1) 4' x 4'
FT1206-HC	ALL	12 x 6	12 x 6	6" SDR 35	(2) 4' x 4'
FT1307-HC	ALL	13 x 7	13 x 7	6" SDR 35	(2) 4' x 4'
FT1408-HC	CALL CONTECH	14 x 8	14 x 8	6" SDR 35	(2) 4' x 4'
FT1509-HC	CALL CONTECH	15 x 9	15 x 9	6" SDR 35	(2) 4' x 4'
FT1608-HC	CALL CONTECH	16 x 8	16 x 8	6" SDR 35	(2) 4' x 4'
FT1808-HC	CALL CONTECH	18 x 8	18 x 8	6" SDR 35	(2) 4' x 4'
FT2008-HC	CALL CONTECH	20 x 8	20 x 8	6" SDR 35	(3) 4' x 4'
FT2208-HC	CALL CONTECH	22 x 8	22 x 8	6" SDR 35	(3) 4' x 4'

N/A = NOT AVAILABLE

INTERNAL PIPE CONFIGURATION MAY VARY DEPENDING UPON OUTLET LOCATION.



PLAN VIEW

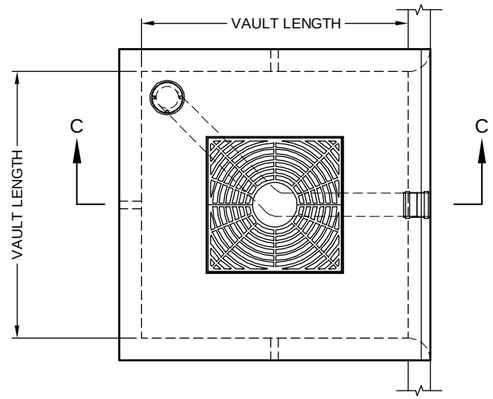


SECTION B-B

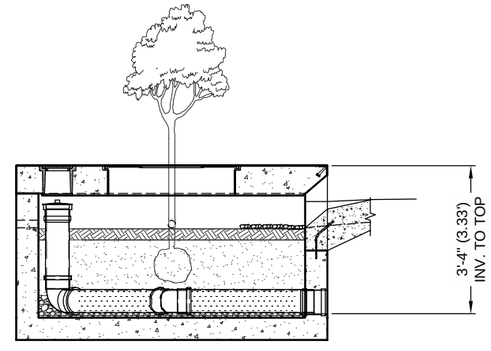
FT-HC SHORT SIDE INLET CONFIGURATION

DESIGNATION	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (W x L)	OUTLET PIPE DIA	TREE GRATE QTY & SIZE
FT0406-HC	N/A CA	4 x 6	4 x 6	6" SDR 35	(1) 3' x 3'
FT04065-HC	CA ONLY	4 x 6.5	4 x 6.5	6" SDR 35	(1) 3' x 3'
FT0408-HC	N/A DE, MD, NJ, PA, VA, WV	4 x 8	4 x 8	6" SDR 35	(1) 3' x 3'
FT045078-HC	DE, MD, NJ, PA, VA, WV ONLY	4.5 x 7.83	4.5 x 7.83	6" SDR 35	(1) 3' x 3'
FT0608-HC	ALL	6 x 8	6 x 8	6" SDR 35	(1) 4' x 4'
FT0610-HC	ALL	6 x 10	6 x 10	6" SDR 35	(1) 4' x 4'
FT0612-HC	ALL	6 x 12	6 x 12	6" SDR 35	(2) 4' x 4'
FT0713-HC	ALL	7 x 13	7 x 13	6" SDR 35	(2) 4' x 4'

N/A = NOT AVAILABLE



PLAN VIEW



SECTION C-C

FT-HC SQUARE INLET CONFIGURATION

DESIGNATION	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (W x L)	OUTLET PIPE DIA	TREE GRATE QTY & SIZE
FT0404-HC	ALL	4 x 4	4 x 4	6" SDR 35	(1) 3' x 3'
FT0606-HC	ALL	6 x 6	6 x 6	6" SDR 35	(1) 3' x 3'

N/A = NOT AVAILABLE

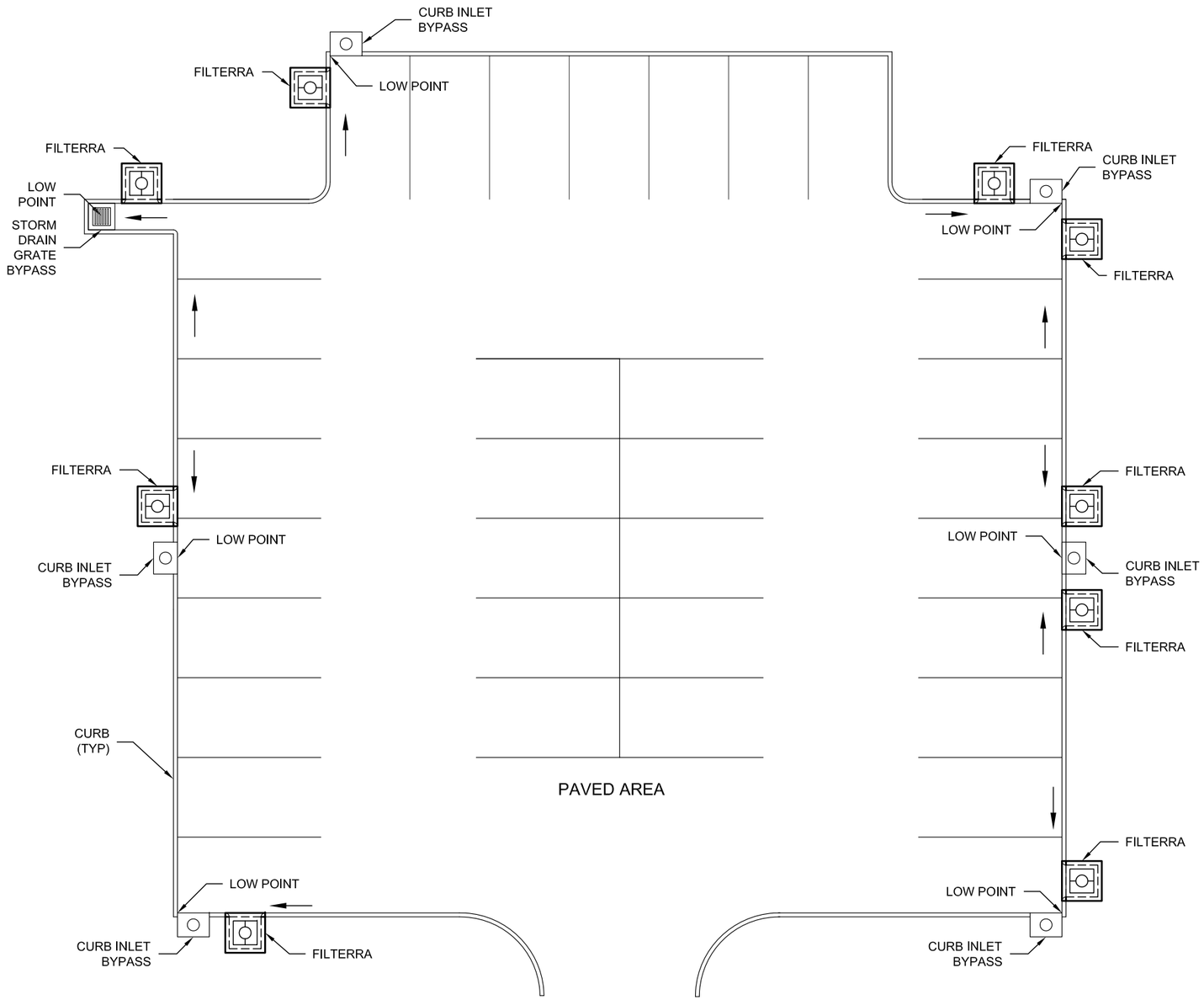
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 6,277,274; 6,585,321; 7,625,485; 7,425,261; 7,833,412; RELATED FOREIGN PATENTS.

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Contech Engineered Solutions LLC or one of its affiliated companies ("Contech"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Contech. Failure to comply is done at the user's own risk and Contech expressly disclaims any liability or responsibility for such use. If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Contech immediately for re-evaluation of the design. Contech accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

FILTERRA HC OFFLINE (FT-HC) CONFIGURATION DETAIL

\\QUIKRETE.NET\CONTECH\COMMON\CADCAD STANDARDS\CADPROGRAMS\DEVELOPMENT\STORMWATER\FILTERRA\FILTERRAINU HC STANDARD CONFIG DETAILSIFT-HC - FILTERRA OFFLINE CONFIG DTL.DWG 4/8/2021 7:00 AM



CORRECT FLOW SOLUTIONS

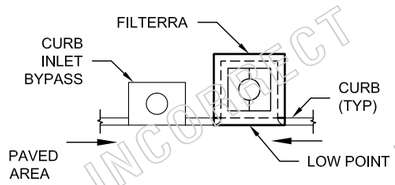
NOTES:
- ARROWS INDICATE DIRECTION OF FLOW.
- PARKING LOT SHOWN IS TO ILLUSTRATE FILTERRA LAYOUT OPTIONS ONLY.

filterra®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 6,277,274; 6,569,321; 7,625,480; 7,425,261; 7,833,412; RELATED FOREIGN PATENTS.

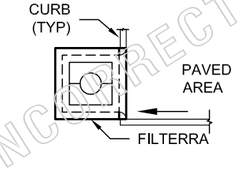
DESIGN NOTES

1. GRADING OF CURB AND GUTTER SHOULD BE SET SO THAT GUTTER FLOW APPROACHES THE FILTERRA FROM ONE SIDE OF THE THROAT AND FLOWS AWAY FROM THE FILTERRA ON THE OPPOSITE SIDE DURING EXTREME STORM EVENTS.
2. DESIGN OR INSTALLATION THAT CAUSES THE GUTTER FLOW TO APPROACH FROM BOTH SIDES OF THE FILTERRA WILL RESULT IN SITE MAINTENANCE ISSUES AND VOID THE MANUFACTURER'S MAINTENANCE PROGRAM. EXAMPLE A.
3. WHEN FLOW FROM AN ADJACENT CURB HITS THE FILTERRA "HEAD ON" IT CAN CAUSE SYSTEM DAMAGE (MEDIA EROSION OR SUSPENSION). EVEN IF BYPASS IS PROVIDED THIS IS A SERIOUS SITUATION. EXAMPLE B.
4. GUTTER FLOW SHOULD APPROACH THE FILTERRA THROAT SO THAT WATER FLOWS IN A LINEAR PATTERN IN FRONT OF THE THROAT DURING EXTREME STORM EVENTS. EXCESS WATER SHOULD CONTINUE TO FLOW IN FRONT OF THE FILTERRA TO A BYPASS INLET OR OTHER RELIEF.



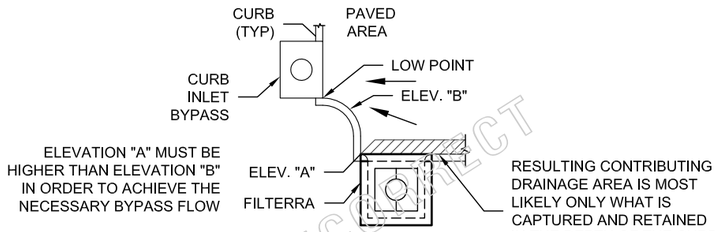
INCORRECT: FLOW PATTERN TO FILTERRA SKIPPING BYPASS

EXAMPLE A

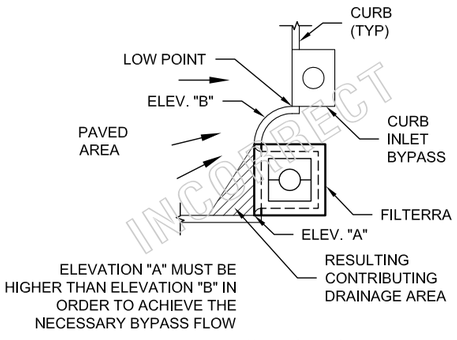


PROBLEM: FLOW FROM ADJACENT GUTTER HITS FILTERRA HEAD ON.

EXAMPLE B



EXAMPLE C



EXAMPLE D

INCORRECT FLOW PATTERNS

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Contech Engineered Solutions LLC or one of its affiliated companies ("Contech"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Contech. Failure to comply is done at the user's own risk and Contech expressly disclaims any liability or responsibility for such use. If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Contech immediately for re-evaluation of the design. Contech accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

CONTECH®
ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

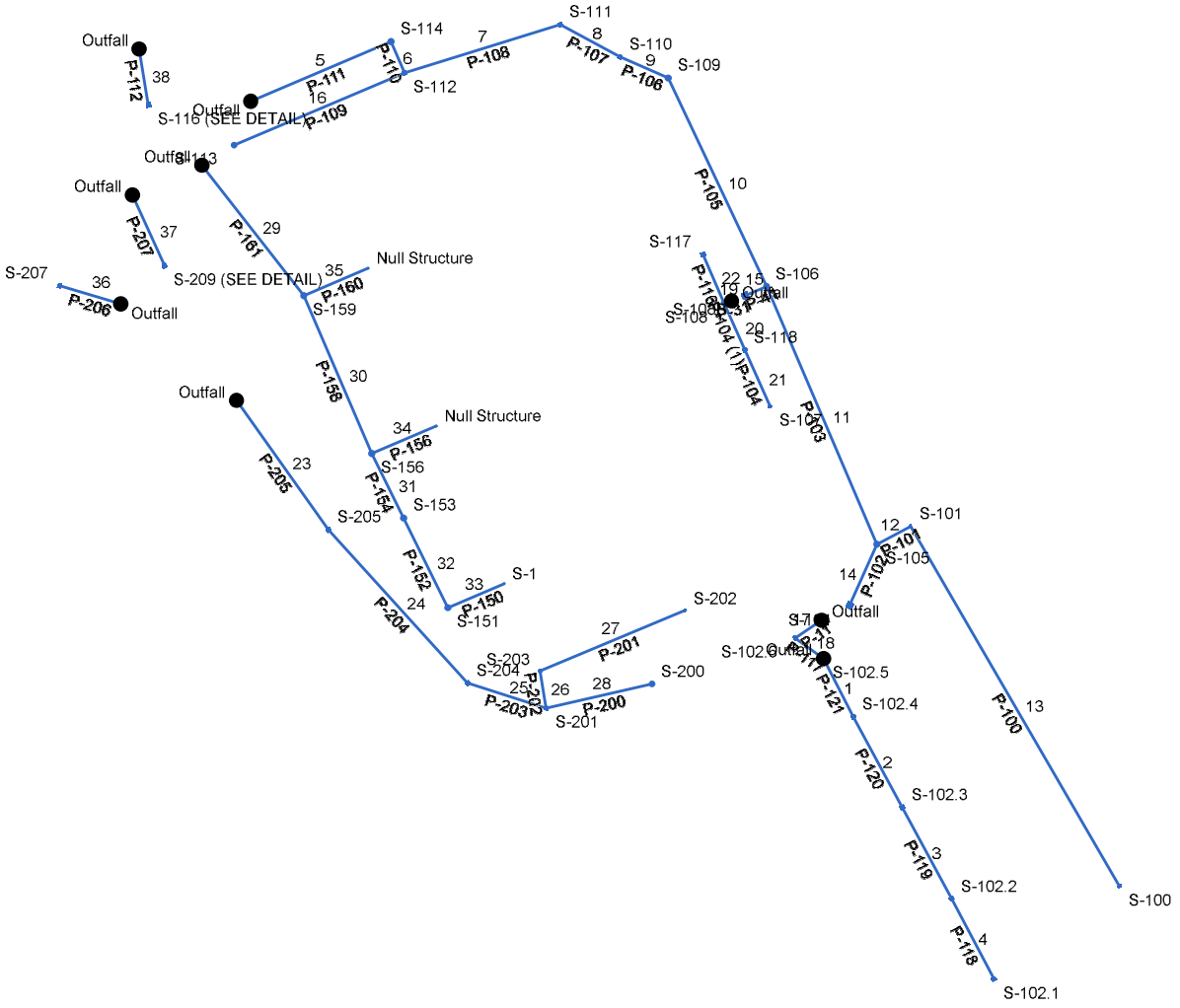
GRADING AND GUTTER FLOW SOLUTIONS STANDARD DETAIL

Colliers Engineering & Design

Appendix D |

Storm Sewer Design

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 220317_PIPE SIZING.stm	Number of lines: 38	Date: 3/25/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	60.854	62.953	Comb	0.00	0.31	0.95	6.0	287.64	1.45	288.52	18	Cir	0.012	0.50	291.76	P-121
2	1	95.853	-1.271	Comb	0.00	0.31	0.95	6.0	288.62	1.91	290.45	18	Cir	0.012	0.50	293.69	P-120
3	2	96.956	0.172	Comb	0.00	0.30	0.95	6.0	290.55	1.90	292.39	18	Cir	0.012	0.50	295.62	P-119
4	3	84.529	0.416	Comb	0.00	0.31	0.95	6.0	292.49	2.02	294.20	18	Cir	0.012	1.00	297.30	P-118
5	End	141.522	-23.144	MH	0.00	0.00	0.00	6.0	269.00	3.53	274.00	24	Cir	0.012	1.00	281.93	P-111
6	5	31.796	89.517	Comb	0.00	0.25	0.95	6.0	274.50	3.15	275.50	24	Cir	0.012	1.50	284.42	P-110
7	6	151.307	-83.704	Comb	0.00	0.00	0.00	6.0	275.60	1.26	277.50	24	Cir	0.012	1.14	287.53	P-108
8	7	62.963	45.936	Comb	0.00	0.16	0.95	6.0	277.60	1.11	278.30	24	Cir	0.012	0.50	288.37	P-107
9	8	49.099	-4.866	MH	0.00	0.00	0.00	6.0	278.40	1.22	279.00	24	Cir	0.012	0.70	289.33	P-106
10	9	214.704	41.115	MH	0.00	0.00	0.00	6.0	279.10	1.58	282.50	24	Cir	0.012	1.00	288.93	P-105
11	10	261.190	2.076	MH	0.00	0.00	0.00	6.0	282.60	1.11	285.50	24	Cir	0.012	1.00	295.10	P-103
12	11	35.402	-94.916	DrGrt	0.00	0.82	0.50	6.0	290.00	6.78	292.40	12	Cir	0.012	1.50	294.84	P-101
13	12	387.295	87.957	DrGrt	0.00	0.46	0.50	6.0	292.50	2.45	302.00	12	Cir	0.012	1.00	310.01	P-100
14	11	62.465	46.971	MH	5.87	0.00	0.00	6.0	285.60	1.84	286.75	24	Cir	0.012	1.00	292.62	P-102
15	10	21.276	92.319	MH	4.11	0.00	0.00	6.0	283.00	4.70	284.00	18	Cir	0.012	1.00	288.48	P-41
16	6	172.001	90.563	Comb	0.00	0.28	0.95	6.0	276.00	1.74	279.00	18	Cir	0.012	1.00	281.35	P-109
17	End	29.837	145.787	Comb	0.00	0.28	0.95	6.0	287.00	0.84	287.25	18	Cir	0.012	1.50	290.35	P-11
18	17	32.514	-110.228	Comb	0.00	0.25	0.95	6.0	287.35	0.58	287.54	18	Cir	0.012	1.00	0.00	P-117
19	End	7.173	162.810	Comb	0.00	0.28	0.50	6.0	284.50	3.49	284.75	18	Cir	0.012	2.24	288.02	P-31
20	19	47.660	-96.680	Comb	0.00	0.12	0.50	6.0	285.00	1.95	285.93	18	Cir	0.012	0.50	288.30	P-104 (1)
21	20	57.536	0.000	DrGrt	0.00	0.17	0.50	6.0	286.43	0.97	286.99	12	Cir	0.012	1.00	289.80	P-104
22	19	49.558	83.894	Comb	0.00	0.12	0.95	6.0	284.89	0.71	285.24	18	Cir	0.012	1.00	288.32	P-116
23	End	147.712	54.726	Comb	0.00	0.17	0.95	6.0	275.00	1.96	277.90	18	Cir	0.012	0.50	282.60	P-205

Project File: 220317_PIPE SIZING.stm | Number of lines: 38 | Date: 3/25/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	192.630	-6.821	Comb	0.00	0.04	0.95	6.0	278.00	1.82	281.50	18	Cir	0.012	0.84	285.81	P-204
25	24	76.599	-30.118	Comb	0.00	0.08	0.95	6.0	281.60	1.04	282.40	18	Cir	0.012	1.91	287.76	P-203
26	25	35.104	-116.835	DrGrt	0.00	0.04	0.95	6.0	283.00	1.14	283.40	12	Cir	0.012	1.46	287.50	P-202
27	26	145.925	76.218	DrGrt	0.00	0.15	0.50	6.0	283.50	1.02	284.99	12	Cir	0.012	1.00	287.50	P-201
28	25	100.818	-30.742	Comb	0.00	0.08	0.95	6.0	282.50	1.49	284.00	18	Cir	0.012	1.00	289.09	P-200
29	End	153.982	52.160	MH	0.00	0.00	0.00	6.0	269.50	3.57	275.00	24	Cir	0.012	0.97	283.72	P-161
30	29	160.000	14.615	MH	0.00	0.00	0.00	6.0	275.40	1.00	277.00	24	Cir	0.012	1.00	283.72	P-158
31	30	67.087	-2.969	MH	0.00	0.00	0.00	6.0	278.13	1.00	278.80	24	Cir	0.012	0.15	283.92	P-154
32	31	93.128	0.000	MH	0.00	0.00	0.00	6.0	279.00	1.07	280.00	24	Cir	0.012	1.00	284.84	P-152
33	32	56.701	-87.031	None	0.00	1.03	0.95	6.0	280.43	1.01	281.00	24	Cir	0.012	1.00	286.56	P-150
34	30	65.000	-90.000	None	0.00	1.03	0.95	6.0	280.35	1.00	281.00	24	Cir	0.012	1.00	0.00	P-156
35	29	65.000	-75.386	None	0.00	1.03	0.95	6.0	280.35	1.00	281.00	24	Cir	0.012	1.00	0.00	P-160
36	End	59.469	-163.320	Comb	0.00	0.28	0.95	6.0	275.00	1.83	276.09	12	Cir	0.012	1.00	278.76	P-206
37	End	72.317	65.666	Comb	6.23	0.00	0.00	6.0	269.50	4.70	272.90	18	Cir	0.012	1.00	278.50	P-207
38	End	53.026	80.588	Comb	14.65	0.00	0.00	6.0	267.60	2.45	268.90	18	Cir	0.012	1.00	273.75	P-112

Project File: 220317_PIPE SIZING.stm | Number of lines: 38 | Date: 3/25/2022

MC-RPRT_B

Line No.	Line ID	Inlet ID	Total Runoff (cfs)	Capac Full (cfs)	Vel Up (ft/s)	Vel Dn (ft/s)	Line Size (in)	Line Slope (%)	Line Length (ft)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)	Runoff Coeff (C)	
1	P-121	S-102.4	6.99	13.68	5.45	5.46	18	1.45	60.854	288.52	287.64	291.76	0.00	289.54	288.66	1.74	n/a	0.95	
2	P-120	S-102.3	5.33	15.72	4.89	4.68	18	1.91	95.853	290.45	288.62	293.69	291.76	291.34 j	289.54	1.74	1.64	0.95	
3	P-119	S-102.2	3.64	15.67	4.28	3.87	18	1.90	96.956	292.39	290.55	295.62	293.69	293.12 j	291.34	1.73	1.64	0.95	
4	P-118	S-102.1	1.95	16.18	3.53	2.78	18	2.02	84.529	294.20	292.49	297.30	295.62	294.73 j	293.12	1.60	1.63	0.95	
5	P-111	S-114	6.70	46.06	6.73	6.69	24	3.53	141.522	274.00	269.00	281.93	271.13	275.47 j	270.48	5.93	0.13	0.00	
6	P-110	S-112	6.72	43.45	6.74	11.04	24	3.15	31.796	275.50	274.50	284.42	281.93	276.97	275.47	6.92	5.43	0.95	
7	P-108	S-111	4.18	27.46	6.25	6.16	24	1.26	151.307	277.50	275.60	287.53	284.42	278.85 j	276.97	8.03	6.82	0.00	
8	P-107	S-110	4.21	25.84	6.26	6.84	24	1.11	62.963	278.30	277.60	288.37	287.53	279.66	278.85	8.07	7.93	0.95	
9	P-106	S-109	3.43	27.09	6.11	6.45	24	1.22	49.099	279.00	278.40	289.33	288.37	280.32	279.66	8.33	7.97	0.00	
10	P-105	S-106	3.52	30.83	6.13	6.75	24	1.58	214.704	282.50	279.10	288.93	289.33	283.82	280.32	4.43	8.23	0.00	
11	P-103	S-105	3.70	25.82	5.38	4.76	24	1.11	261.190	285.50	282.60	295.10	288.93	286.61 j	283.82	7.60	4.33	0.00	
12	P-101	S-101	3.72	10.05	5.39	11.83	12	6.78	35.402	292.40	290.00	294.84	295.10	293.22	290.42	1.44	4.10	0.50	
13	P-100	S-100	1.53	6.04	3.67	2.52	12	2.45	387.295	302.00	292.50	310.01	294.84	302.52 j	293.22	7.01	1.34	0.50	
14	P-102	S-104	0.00	33.25	4.57	3.71	24	1.84	62.465	286.75	285.60	292.62	295.10	287.61 j	286.61	3.87	7.50	0.00	
15	P-41	S-108B	0.00	24.66	4.46	4.15	18	4.70	21.276	284.00	283.00	288.48	288.93	284.78 j	283.82	2.98	4.43	0.00	
16	P-109	S-113	1.77	15.02	3.43	1.46	18	1.74	172.001	279.00	276.00	281.35	284.42	279.50 j	276.97	0.85	6.92	0.95	
17	P-11	S-102.6	3.25	10.41	4.13	4.10	18	0.84	29.837	287.25	287.00	290.35	291.54	287.94 j	287.69	1.60	3.04	0.95	
18	P-117	S-102.5	1.58	8.70	3.32	2.46	18	0.58	32.514	287.54	287.35	0.00	290.35	288.01 j	287.94	n/a	1.50	0.95	
19	P-31	S-108	2.36	21.24	3.74	3.74	18	3.49	7.173	284.75	284.50	288.02	288.18	285.33	285.08	1.77	2.18	0.50	
20	P-104 (1)	S-118	0.91	15.89	2.84	3.14	18	1.95	47.660	285.93	285.00	288.30	288.02	286.28	285.33	0.87	1.52	0.50	
21	P-104	S-107	0.56	3.81	2.70	3.47	12	0.97	57.536	286.99	286.43	289.80	288.30	287.30	286.69	1.81	0.87	0.50	
22	P-116	S-117	0.76	9.56	2.71	1.74	18	0.71	49.558	285.24	284.89	288.32	288.02	285.56 j	285.33	1.58	1.63	0.95	
23	P-205	S-205	2.17	15.94	3.64	3.61	18	1.96	147.712	277.90	275.00	282.60	276.60	278.46 j	275.56	3.20	0.10	0.95	

Project File: 220317_PIPE SIZING.stm | Number of lines: 38 | Date: 3/25/2022

NOTES: ** Critical depth

MC-RPRT_B

Line No.	Line ID	Inlet ID	Total Runoff (cfs)	Capac Full (cfs)	Vel Up (ft/s)	Vel Dn (ft/s)	Line Size (in)	Line Slope (%)	Line Length (ft)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)	Runoff Coeff (C)	
24	P-204	S-204	1.54	15.33	3.30	3.40	18	1.82	192.630	281.50	278.00	285.81	282.60	281.97	278.46	2.81	3.10	0.95	
25	P-203	S-201	1.41	11.63	3.21	4.22	18	1.04	76.599	282.40	281.60	287.76	285.81	282.84	281.97	3.86	2.71	0.95	
26	P-202	S-203	0.64	4.12	2.81	3.82	12	1.14	35.104	283.40	283.00	287.50	287.76	283.73	283.27	3.10	3.76	0.95	
27	P-201	S-202	0.50	3.90	2.60	3.41	12	1.02	145.925	284.99	283.50	287.50	287.50	285.28	283.74	1.51	3.00	0.50	
28	P-200	S-200	0.50	13.88	2.43	1.64	18	1.49	100.818	284.00	282.50	289.09	287.76	284.26 j	282.84	3.59	3.76	0.95	
29	P-161	S-159	17.61	46.31	6.92	6.92	24	3.57	153.982	275.00	269.50	283.72	0.00	276.51	271.01	6.72	n/a	0.00	
30	P-158	S-156	12.06	24.50	5.86	6.73	24	1.00	160.000	277.00	275.40	283.72	283.72	278.25	276.51	4.72	6.32	0.00	
31	P-154	S-153	6.17	24.49	4.65	6.49	24	1.00	67.087	278.80	278.13	283.92	283.72	279.68	278.81	3.12	3.59	0.00	
32	P-152	S-151	6.37	25.39	4.69	6.72	24	1.07	93.128	280.00	279.00	284.84	283.92	280.89	279.68	2.84	2.92	0.00	
33	P-150	S-1	6.49	24.57	4.72	6.60	24	1.01	56.701	281.00	280.43	286.56	284.84	281.90	281.13	3.56	2.41	0.95	
34	P-156	Null Structure	6.49	24.50	4.72	6.58	24	1.00	65.000	281.00	280.35	0.00	283.72	281.90	281.05	n/a	1.37	0.95	
35	P-160	Null Structure	6.49	24.50	4.72	6.58	24	1.00	65.000	281.00	280.35	0.00	283.72	281.90	281.05	n/a	1.37	0.95	
36	P-206	S-207	1.77	5.22	3.86	3.90	12	1.83	59.469	276.09	275.00	278.76	276.60	276.65	275.56	1.67	0.60	0.95	
37	P-207	S-209 (SEE DETAIL)	0.00	24.67	5.19	5.22	18	4.70	72.317	272.90	269.50	278.50	0.00	273.86	270.46	4.10	n/a	0.00	
38	P-112	S-116 (SEE DETAIL)	0.00	17.81	8.55	8.53	18	2.45	53.026	268.90	267.60	273.75	0.00	270.30 j	269.00	3.35	n/a	0.00	

Project File: 220317_PIPE SIZING.stm | Number of lines: 38 | Date: 3/25/2022

NOTES: ** Critical depth

Colliers
Engineering
& Design

Appendix E |

Conduit Outlet Protection Calculations

Swale Calculations

Colliers Engineering & Design

Date: 3/4/2022
Project: Alpha Borough, NJ
Project No: 19004898B

Calculated By: TDB
Checked By:

Conduit Outlet Protection Calculations

Rip Rap Pad # RIP RAP S-206

Design Parameters:

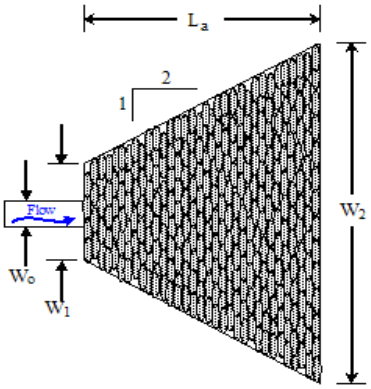
Design Storm Flow for 25 Year, Q	2.17	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW [1]	1.67	ft
	21	

Apron Dimension Calculations:

Unit Dicharge, $q = Q/D_o$ = 1.45 cfs per foot

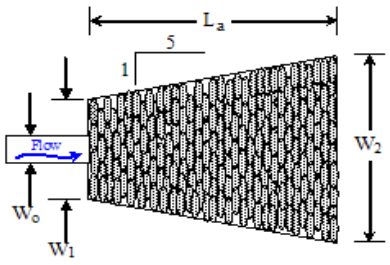
- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =
Width, $W_1 = 3W_o$ = W_1 =
Width, $W_2 = 3W_o + L_a$ = W_2 =



- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 3.54 ft or L_a = **6 ft**
Width, $W_1 = 3W_o$ = 4.5 ft or W_1 = **5 ft**
Width, $W_2 = 3W_o + 0.4L_a$ = 5.92 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.016q^{1.33}}{TW}$ = 0.19 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Colliers Engineering & Design

Date: 3/4/2022
Project: Alpha Borough, NJ
Project No: 19004898B

Calculated By: TDB
Checked By:

Conduit Outlet Protection Calculations

Rip Rap Pad # RIP RAP S-208

Design Parameters:

Design Storm Flow for 25 Year, Q	1.77	cfs
Vertical Dimension of Outlet Pipe, D_o	12	in
Horizontal Dimension of Outlet Pipe, W_o	12	in
Tailwater Depth, TW [1]	1.67	ft
	21	

Apron Dimension Calculations:

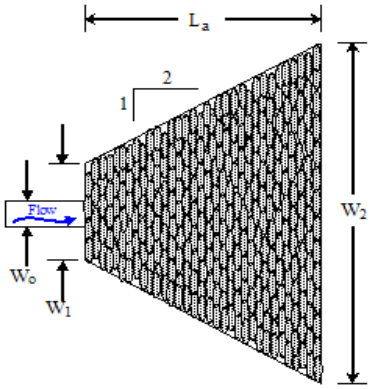
Unit Dicharge, $q = Q/D_o$ = 1.77 cfs per foot

- **Case I:** $TW < 1/2\ D_o$

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

Width, $W_1 = 3W_o$ = W_1 =

Width, $W_2 = 3W_o + L_a$ = W_2 =

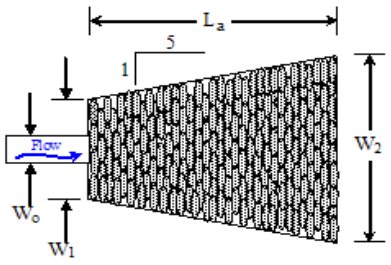


- **Case II:** $TW \geq 1/2\ D_o$

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 5.31 ft or L_a = **6 ft**

Width, $W_1 = 3W_o$ = 3. ft or W_1 = **3 ft**

Width, $W_2 = 3W_o + 0.4L_a$ = 5.12 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.016q^{1.33}}{TW}$ = 0.25 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Colliers Engineering & Design

Date: 3/4/2022
Project: Alpha Borough, N
Project No: 19004898B

Calculated By: TDB
Checked By:

Conduit Outlet Protection Calculations

Rip Rap Pad # RIP RAP P-207

Design Parameters:

Design Storm Flow for 25 Year, Q	6.23	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW[1]	1.54	ft
	21	

Apron Dimension Calculations:

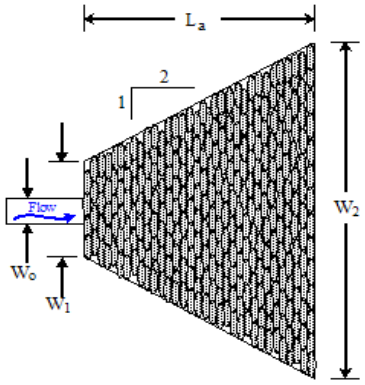
Unit Dicharge, $q = Q/D_o$ = 4.15 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

Width, $W_1 = 3W_o$ = W_1 =

Width, $W_2 = 3W_o + L_a$ = W_2 =

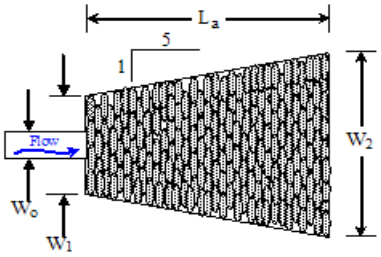


- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 10.17 ft or L_a = **11 ft**

Width, $W_1 = 3W_o$ = 4.5 ft or W_1 = **5 ft**

Width, $W_2 = 3W_o + 0.4L_a$ = 8.57 ft or W_2 = **9 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.016q^{1.33}}{TW}$ = 0.83 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Colliers Engineering & Design

Date: 3/4/2022
Project: Alpha Borough, N
Project No: 19004898B

Calculated By: TDB
Checked By:

Conduit Outlet Protection Calculations

Rip Rap Pad # RIP RAP P-161

Design Parameters:

Design Storm Flow for 25 Year, Q	17.42	cfs
Vertical Dimension of Outlet Pipe, D_o	24	in
Horizontal Dimension of Outlet Pipe, W_o	24	in
Tailwater Depth, TW [1]	1.54	ft
	21	

Apron Dimension Calculations:

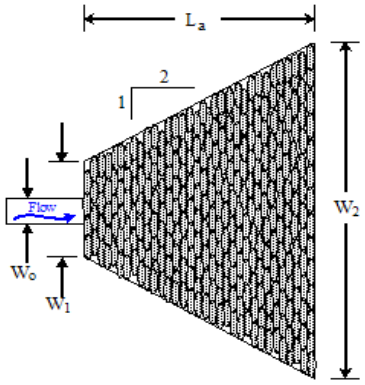
Unit Dicharge, $q = Q/D_o$ = 8.71 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

Width, $W_1 = 3W_o$ = W_1 =

Width, $W_2 = 3W_o + L_a$ = W_2 =

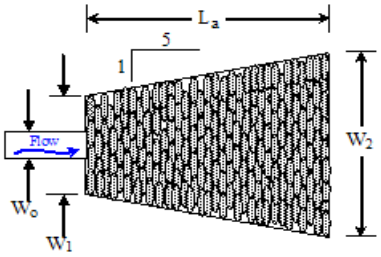


- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 18.48 ft or L_a = **19 ft**

Width, $W_1 = 3W_o$ = 6. ft or W_1 = **6 ft**

Width, $W_2 = 3W_o + 0.4L_a$ = 13.39 ft or W_2 = **14 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.016q^{1.33}}{TW}$ = 2.22 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Colliers Engineering & Design

Date: 3/4/2022
Project: Alpha Borough, NJ
Project No: 19004898B

Calculated By: TDB
Checked By:

Conduit Outlet Protection Calculations

Rip Rap Pad # RIP RAP S-115

Design Parameters:

Design Storm Flow for 25 Year, Q	6.70	cfs
Vertical Dimension of Outlet Pipe, D_o	24	in
Horizontal Dimension of Outlet Pipe, W_o	24	in
Tailwater Depth, TW [1]	2.04	ft
	21	

Apron Dimension Calculations:

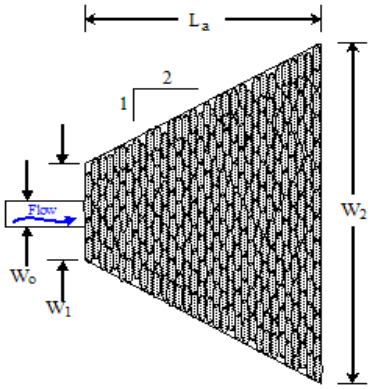
Unit Dicharge, $q = Q/D_o$ = 3.35 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

Width, $W_1 = 3W_o$ = W_1 =

Width, $W_2 = 3W_o + L_a$ = W_2 =

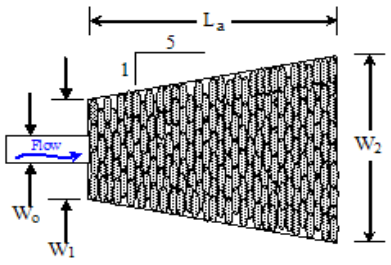


- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 7.11 ft or L_a = **8 ft**

Width, $W_1 = 3W_o$ = 6. ft or W_1 = **6 ft**

Width, $W_2 = 3W_o + 0.4L_a$ = 8.84 ft or W_2 = **9 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.016q^{1.33}}{TW}$ = 0.47 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

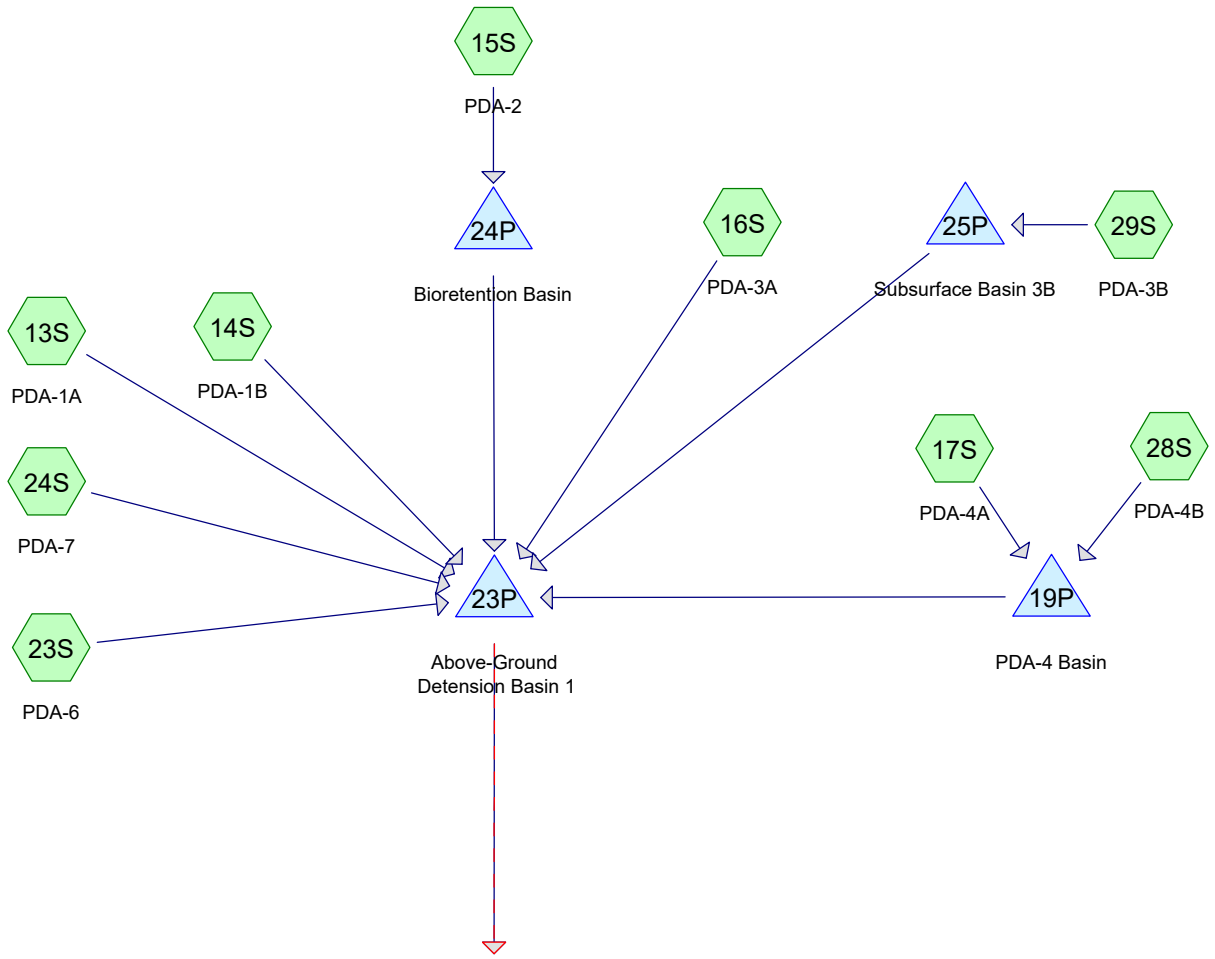
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Colliers
Engineering
& Design

Appendix F |

Emergency Spillway Calculations

Proposed Conditions



Subcat Reach Pond Link

Routing Diagram for 220302_Alpha Warehouse Stormwater
Prepared by Colliers Engineering & Design, Printed 3/29/2022
HydroCAD® 10.10-3a s/n 08506 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	NJWQ	NJ DEP 2-hr		Default	2.00	1	1.25	2
2	Alpha 2 yr	NOAA 24-hr	C	Default	24.00	1	2.98	2
3	Alpha 10 yr	NOAA 24-hr	C	Default	24.00	1	4.70	2
4	Alpha 100 yr	NOAA 24-hr	C	Default	24.00	1	7.47	2
5	Alpha 100yr + 50%	NOAA 24-hr	C	Default	24.00	1	11.20	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.459	39	>75% Grass cover, Good, HSG A (13S, 15S, 16S, 29S)
2.378	61	>75% Grass cover, Good, HSG B (13S, 15S, 17S, 24S, 28S, 29S)
0.186	80	>75% Grass cover, Good, HSG D (13S, 15S)
0.076	98	Asphalt Pavement (28S)
0.855	48	Brush, Good, HSG B (23S, 24S)
0.062	98	Concrete Sidewalk (16S, 29S)
0.443	98	Future Pervious Pavement (29S)
0.052	98	Future Sidewalk (29S)
0.782	98	Heavy Duty Asphalt (17S)
0.673	98	Pavement (16S)
0.613	98	Pervious Pavement (17S, 28S)
4.550	98	Unconnected pavement, HSG B (14S, 15S)
11.131	**84**	**TOTAL AREA**

Time span=0.00-100.00 hrs, dt=0.03 hrs, 3334 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment13S: PDA-1A Runoff Area=39,498 sf 0.00% Impervious Runoff Depth=4.86"
Flow Length=145' Tc=5.7 min CN=53/0 Runoff=5.81 cfs 0.367 af

Subcatchment14S: PDA-1B Runoff Area=134,400 sf 100.00% Impervious Runoff Depth=10.96"
Flow Length=888' Slope=0.0200 '/' Tc=3.3 min CN=0/98 Runoff=39.52 cfs 2.818 af

Subcatchment15S: PDA-2 Runoff Area=102,736 sf 62.11% Impervious Runoff Depth=9.26"
Flow Length=710' Tc=10.4 min CN=64/98 Runoff=21.40 cfs 1.819 af

Subcatchment16S: PDA-3A Runoff Area=34,643 sf 92.27% Impervious Runoff Depth=10.32"
Flow Length=174' Slope=0.0400 '/' Tc=1.2 min CN=39/98 Runoff=10.35 cfs 0.684 af

Subcatchment17S: PDA-4A Runoff Area=65,506 sf 92.02% Impervious Runoff Depth=10.57"
Flow Length=538' Tc=3.4 min CN=61/98 Runoff=18.70 cfs 1.324 af

Subcatchment23S: PDA-6 Runoff Area=9,055 sf 0.00% Impervious Runoff Depth=4.11"
Tc=6.0 min CN=48/0 Runoff=1.11 cfs 0.071 af

Subcatchment24S: PDA-7 Runoff Area=1.287 ac 0.00% Impervious Runoff Depth=5.01"
Flow Length=1,280' Tc=8.1 min CN=54/0 Runoff=7.78 cfs 0.537 af

Subcatchment28S: PDA-4B Runoff Area=9,389 sf 40.88% Impervious Runoff Depth=8.05"
Flow Length=93' Tc=2.4 min CN=61/98 Runoff=2.27 cfs 0.145 af

Subcatchment29S: PDA-3B Runoff Area=33,557 sf 64.48% Impervious Runoff Depth=9.11"
Flow Length=300' Tc=4.0 min CN=59/98 Runoff=8.60 cfs 0.585 af

Pond 19P: PDA-4 Basin Peak Elev=333.95' Storage=13,141 cf Inflow=20.94 cfs 1.469 af
Outflow=28.92 cfs 1.440 af

Pond 23P: Above-Ground Detension Peak Elev=274.59' Storage=98,328 cf Inflow=101.66 cfs 8.197 af
Primary=40.94 cfs 7.692 af Secondary=24.19 cfs 0.506 af Outflow=65.12 cfs 8.197 af

Pond 24P: Bioretention Basin Peak Elev=278.70' Storage=24,712 cf Inflow=21.40 cfs 1.819 af
Outflow=13.59 cfs 1.703 af

Pond 25P: Subsurface Basin 3B Peak Elev=286.60' Storage=3,457 cf Inflow=8.60 cfs 0.585 af
Outflow=7.01 cfs 0.578 af

Total Runoff Area = 11.131 ac Runoff Volume = 8.349 af Average Runoff Depth = 9.00"
34.84% Pervious = 3.878 ac 65.16% Impervious = 7.253 ac

Summary for Subcatchment 13S: PDA-1A

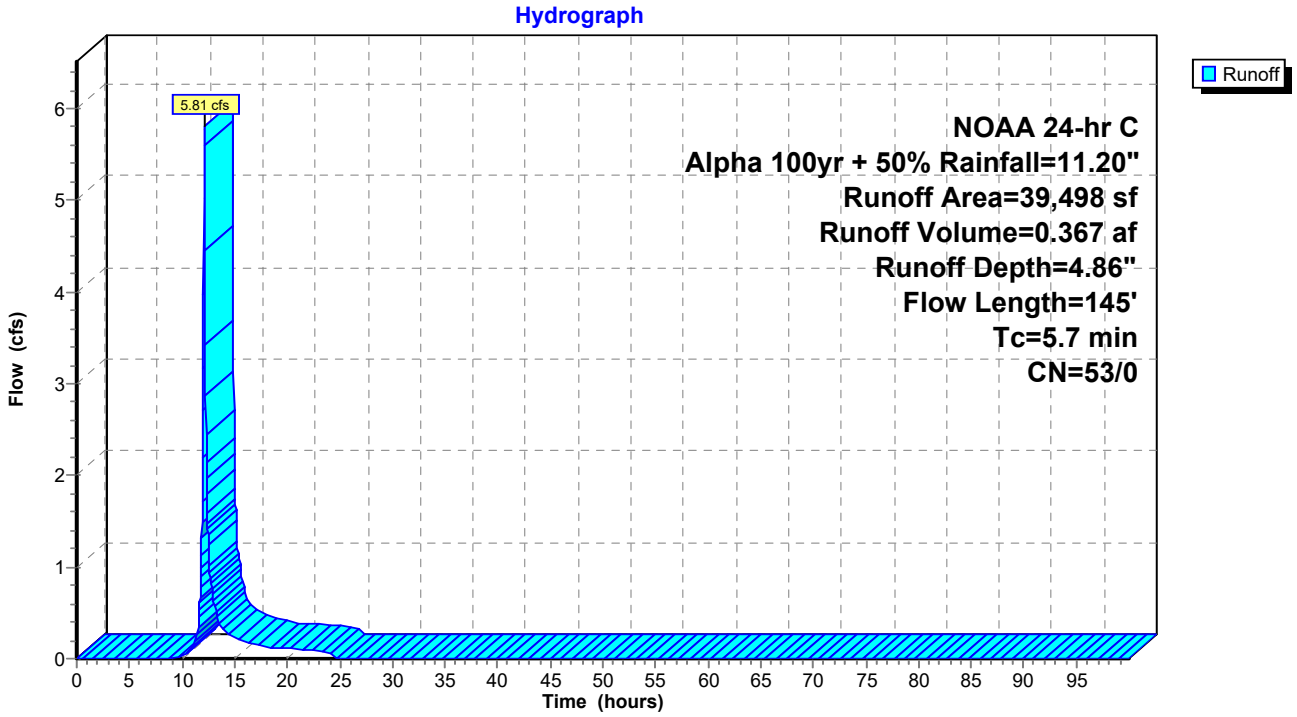
Runoff = 5.81 cfs @ 12.13 hrs, Volume= 0.367 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

Area (sf)	CN	Description
1,134	80	>75% Grass cover, Good, HSG D
22,773	61	>75% Grass cover, Good, HSG B
15,591	39	>75% Grass cover, Good, HSG A
39,498	53	Weighted Average
39,498	53	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, lawn** Grass: Short n= 0.150 P2= 3.24"
0.1	45	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.7	145	Total			

Subcatchment 13S: PDA-1A



Summary for Subcatchment 14S: PDA-1B

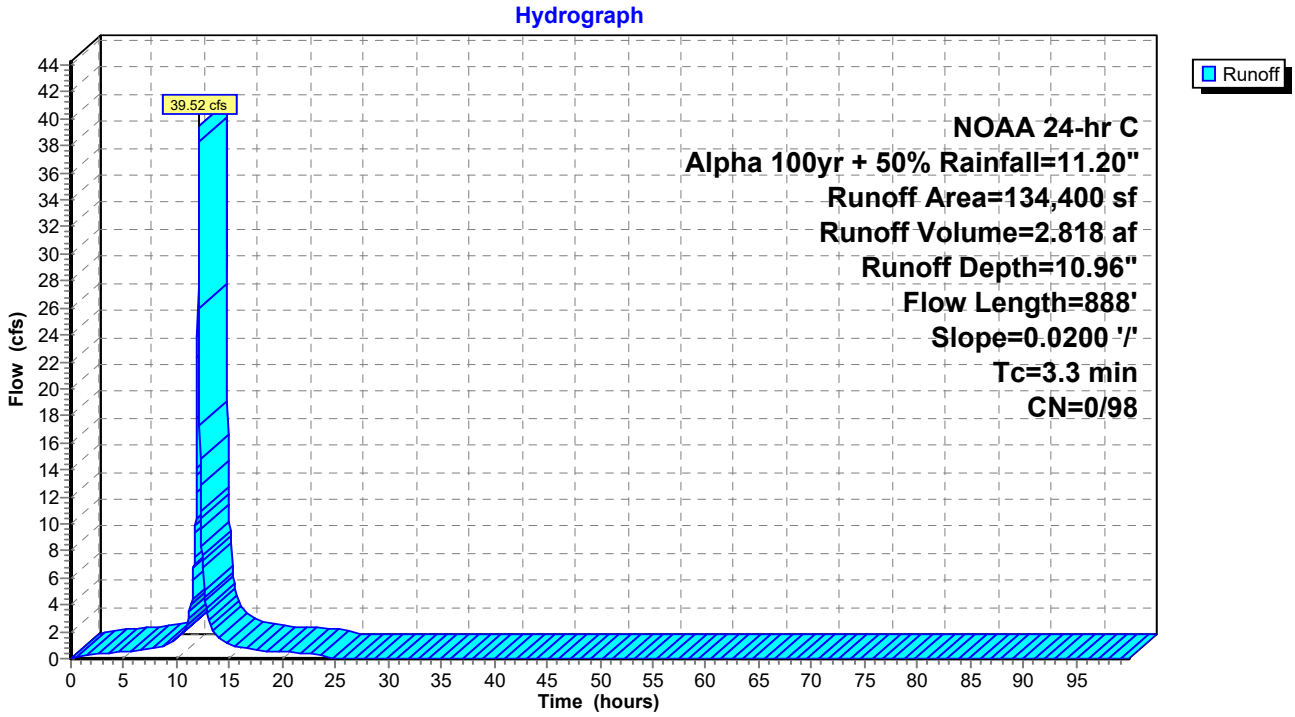
Runoff = 39.52 cfs @ 12.10 hrs, Volume= 2.818 af, Depth=10.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

Area (sf)	CN	Description
134,400	98	Unconnected pavement, HSG B
134,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.24"
1.2	210	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	578	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
3.3	888	Total			

Subcatchment 14S: PDA-1B



Summary for Subcatchment 15S: PDA-2

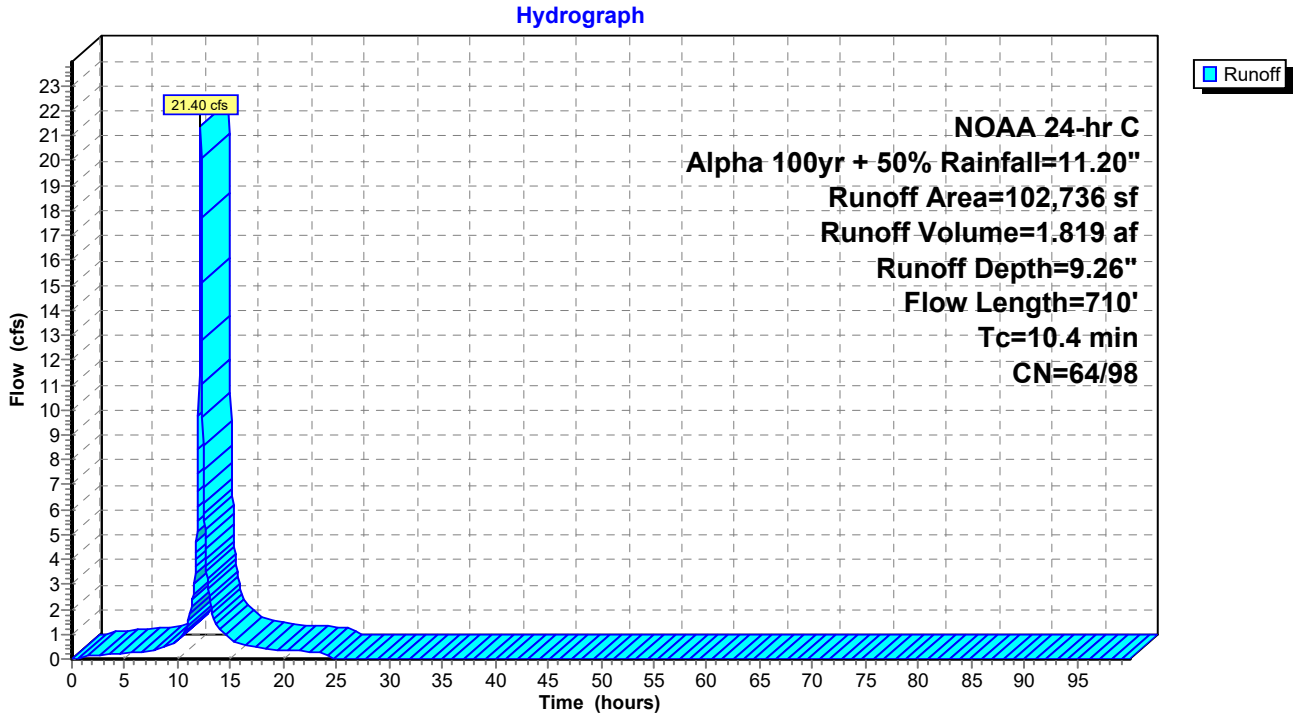
Runoff = 21.40 cfs @ 12.18 hrs, Volume= 1.819 af, Depth= 9.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

Area (sf)	CN	Description
63,805	98	Unconnected pavement, HSG B
6,975	80	>75% Grass cover, Good, HSG D
788	39	>75% Grass cover, Good, HSG A
31,168	61	>75% Grass cover, Good, HSG B
102,736	85	Weighted Average
38,931	64	37.89% Pervious Area
63,805	98	62.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0550	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
3.1	210	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	400	0.0200	8.41	14.86	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
10.4	710	Total			

Subcatchment 15S: PDA-2



Summary for Subcatchment 16S: PDA-3A

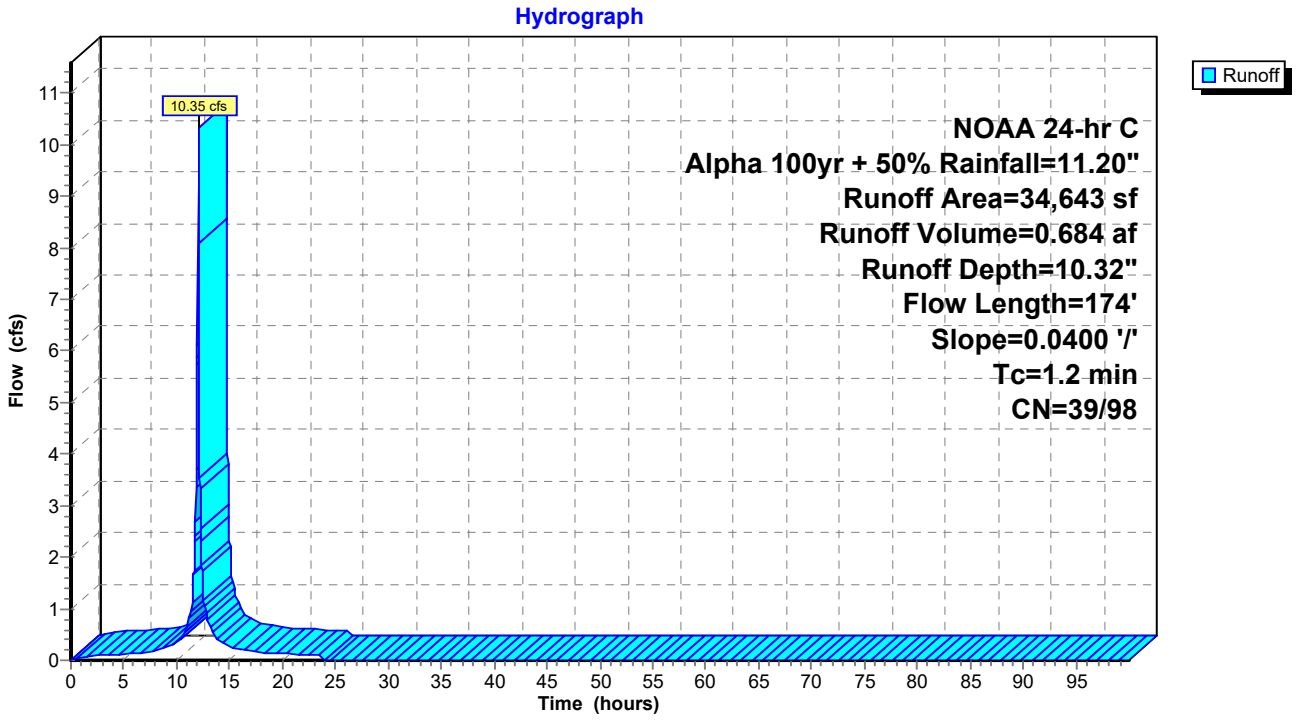
Runoff = 10.35 cfs @ 12.08 hrs, Volume= 0.684 af, Depth=10.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

	Area (sf)	CN	Description
*	2,646	98	Concrete Sidewalk
*	29,318	98	Pavement
	2,679	39	>75% Grass cover, Good, HSG A
	34,643	93	Weighted Average
	2,679	39	7.73% Pervious Area
	31,964	98	92.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0400	1.83		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
0.3	74	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	174	Total			

Subcatchment 16S: PDA-3A



Summary for Subcatchment 17S: PDA-4A

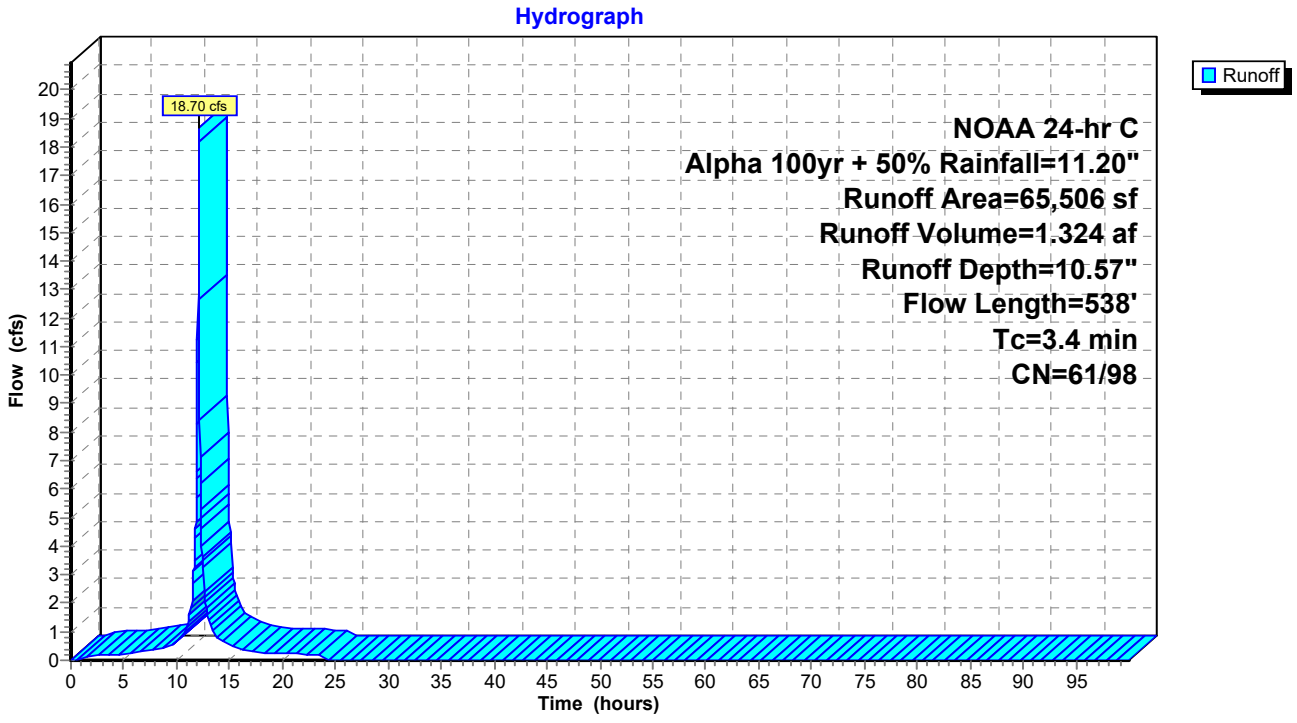
Runoff = 18.70 cfs @ 12.10 hrs, Volume= 1.324 af, Depth=10.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

	Area (sf)	CN	Description
*	34,074	98	Heavy Duty Asphalt
*	26,203	98	Pervious Pavement
	5,229	61	>75% Grass cover, Good, HSG B
	65,506	95	Weighted Average
	5,229	61	7.98% Pervious Area
	60,277	98	92.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0422	1.87		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.5	438	0.0207	2.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	538	Total			

Subcatchment 17S: PDA-4A



Summary for Subcatchment 23S: PDA-6

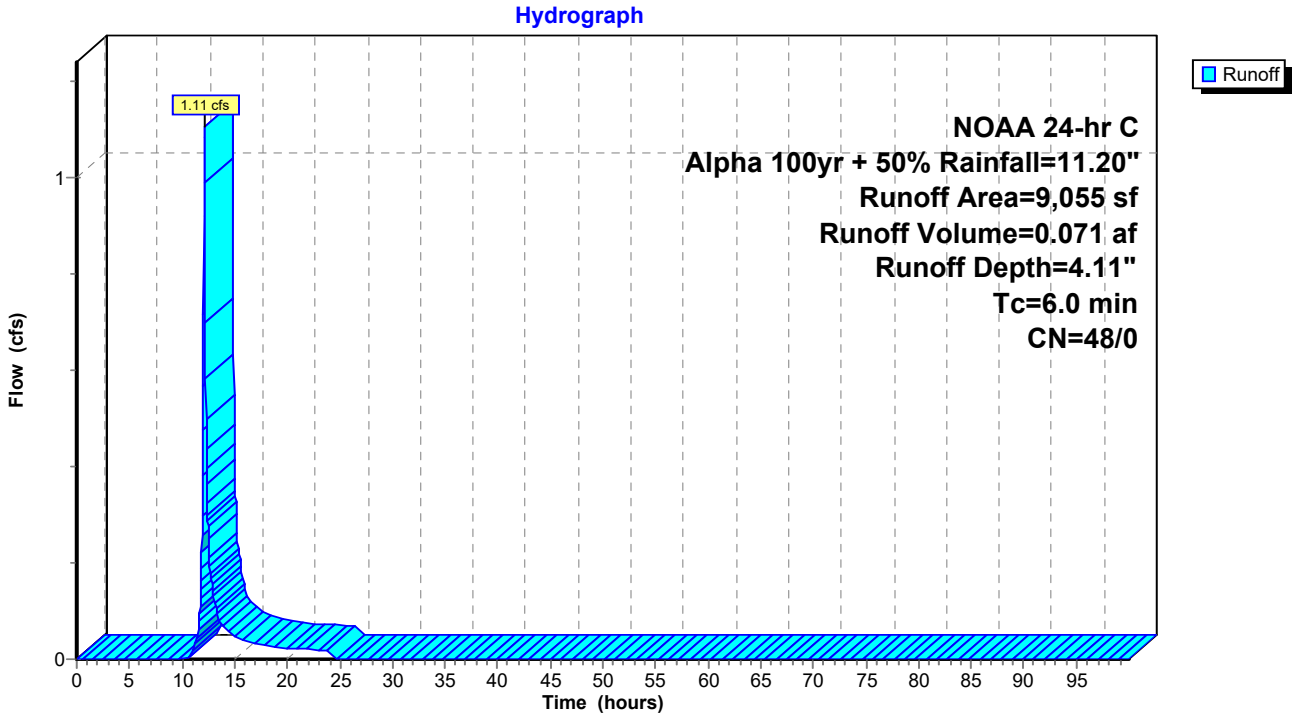
Runoff = 1.11 cfs @ 12.14 hrs, Volume= 0.071 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

Area (sf)	CN	Description
9,055	48	Brush, Good, HSG B
9,055	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 23S: PDA-6



Summary for Subcatchment 24S: PDA-7

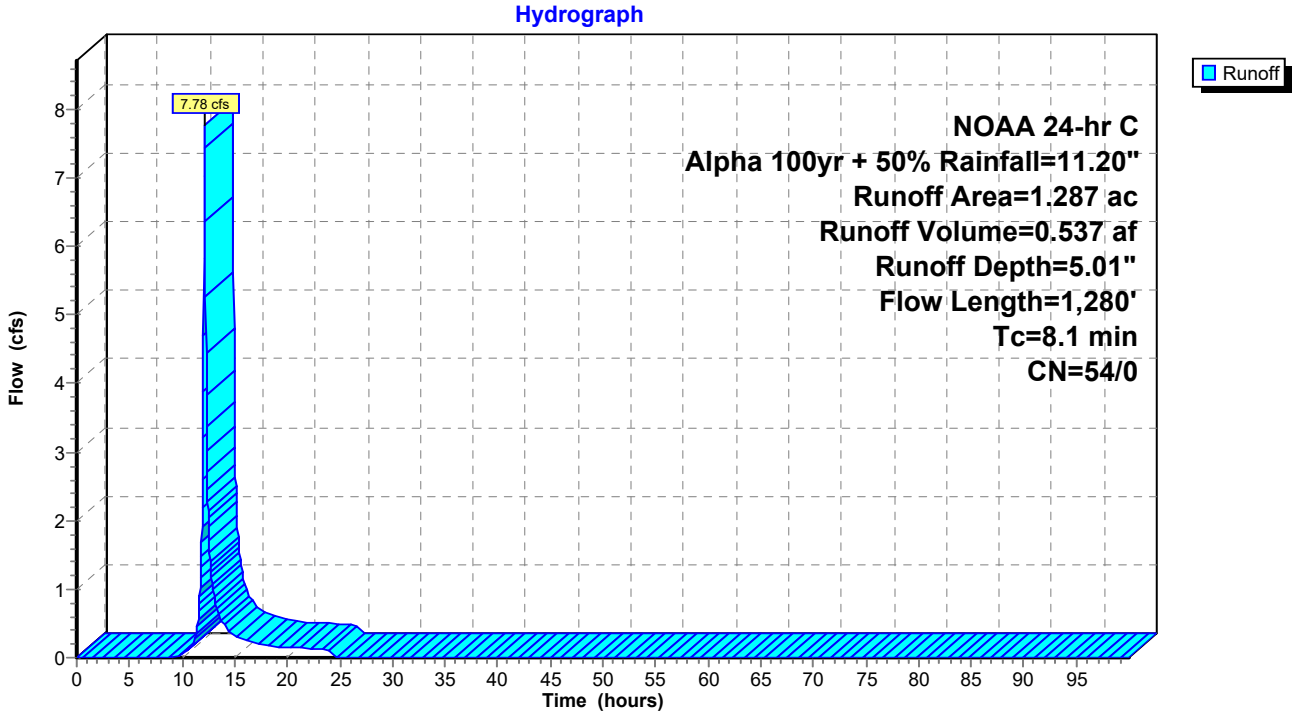
Runoff = 7.78 cfs @ 12.16 hrs, Volume= 0.537 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

Area (ac)	CN	Description
0.647	48	Brush, Good, HSG B
0.640	61	>75% Grass cover, Good, HSG B
1.287	54	Weighted Average
1.287	54	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0853	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	173	0.0783	4.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	1,007	0.0205	8.44	6.63	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
8.1	1,280	Total			

Subcatchment 24S: PDA-7



Summary for Subcatchment 28S: PDA-4B

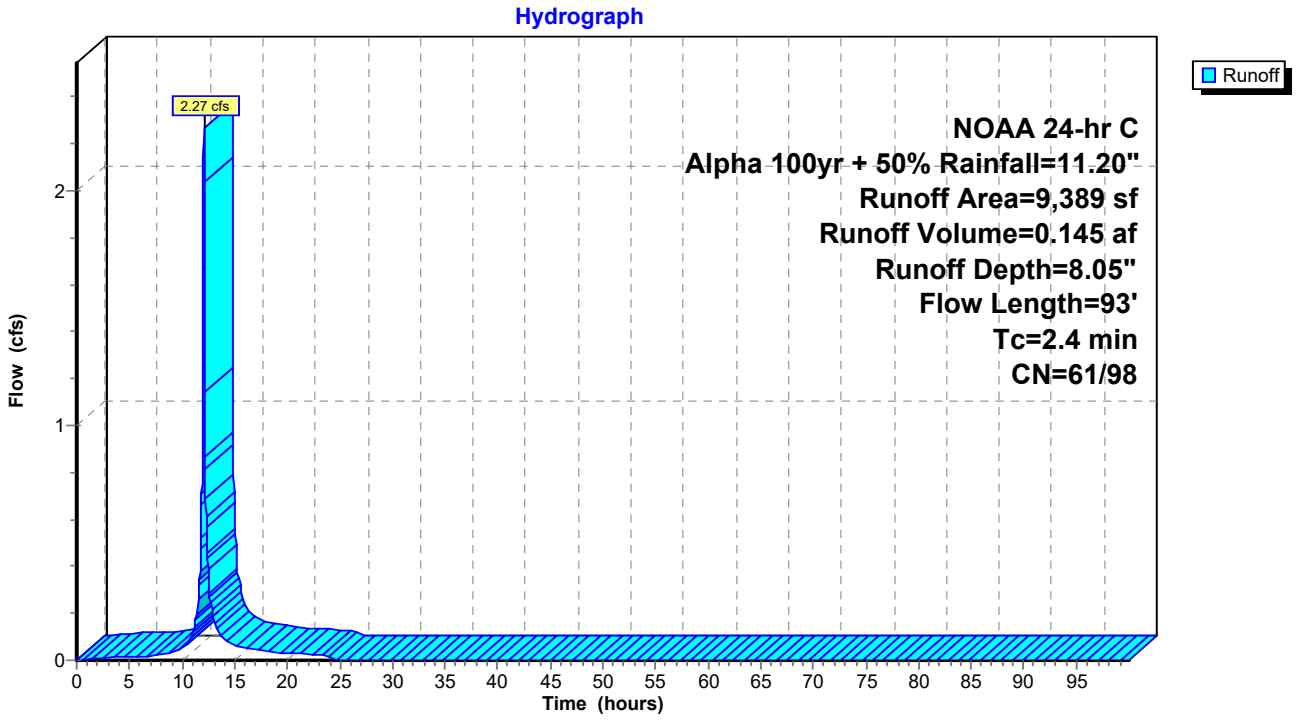
Runoff = 2.27 cfs @ 12.09 hrs, Volume= 0.145 af, Depth= 8.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

	Area (sf)	CN	Description
	5,551	61	>75% Grass cover, Good, HSG B
*	3,331	98	Asphalt Pavement
*	507	98	Pervious Pavement
	9,389	76	Weighted Average
	5,551	61	59.12% Pervious Area
	3,838	98	40.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	32	0.1334	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.6	61	0.0360	1.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.24"
2.4	93	Total			

Subcatchment 28S: PDA-4B



Summary for Subcatchment 29S: PDA-3B

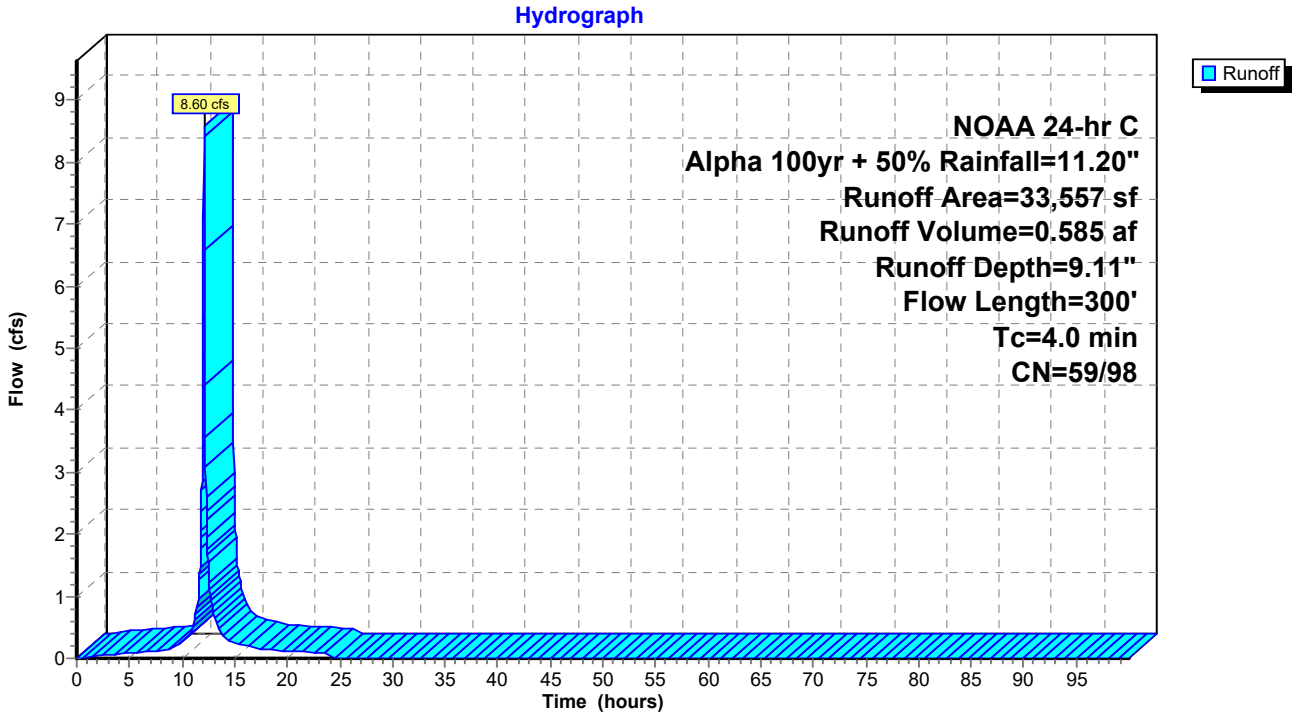
Runoff = 8.60 cfs @ 12.11 hrs, Volume= 0.585 af, Depth= 9.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
NOAA 24-hr C Alpha 100yr + 50% Rainfall=11.20"

	Area (sf)	CN	Description
*	75	98	Concrete Sidewalk
	10,980	61	>75% Grass cover, Good, HSG B
*	2,280	98	Future Sidewalk
*	19,281	98	Future Pervious Pavement
	941	39	>75% Grass cover, Good, HSG A
	33,557	84	Weighted Average
	11,921	59	35.52% Pervious Area
	21,636	98	64.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	50	0.1000	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
0.2	50	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	200	0.0060	3.51	2.76	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.0	300	Total			

Subcatchment 29S: PDA-3B



Summary for Pond 19P: PDA-4 Basin

Inflow Area = 1.719 ac, 85.61% Impervious, Inflow Depth = 10.25" for Alpha 100yr + 50% event
Inflow = 20.94 cfs @ 12.10 hrs, Volume= 1.469 af
Outflow = 28.92 cfs @ 12.09 hrs, Volume= 1.440 af, Atten= 0%, Lag= 0.0 min
Primary = 28.92 cfs @ 12.09 hrs, Volume= 1.440 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 333.95' @ 12.09 hrs Surf.Area= 6,248 sf Storage= 13,141 cf

Plug-Flow detention time= 74.5 min calculated for 1.440 af (98% of inflow)
Center-of-Mass det. time= 61.2 min (804.5 - 743.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	286.25'	6,536 cf	**36.97'W x 169.00'L x 4.00'H Field A** 24,988 cf Overall - 8,648 cf Embedded = 16,340 cf x 40.0% Voids
#2A	286.75'	6,605 cf	**ADS N-12 30"** x 64 Inside #1 Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf 64 Chambers in 8 Rows 33.97' Header x 4.90 sf x 2 = 332.9 cf Inside
		13,141 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	286.75'	**24.0" Round Culvert** L= 62.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 286.75' / 285.60' S= 0.0184 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	286.75'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	287.75'	**9.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=28.68 cfs @ 12.09 hrs HW=333.21' (Free Discharge)
└**1=Culvert** (Passes 28.68 cfs of 127.49 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 4.47 cfs @ 32.75 fps)
└**3=Orifice/Grate** (Orifice Controls 24.22 cfs @ 32.29 fps)

Pond 19P: PDA-4 Basin - Chamber Wizard Field A

Chamber Model = ADS N-12 30" (ADS N-12® Pipe)
Inside= 30.0"W x 30.0"H => 4.90 sf x 20.00'L = 98.0 cf
Outside= 36.0"W x 36.0"H => 6.41 sf x 20.00'L = 128.3 cf

36.0" Wide + 17.1" Spacing = 53.1" C-C Row Spacing

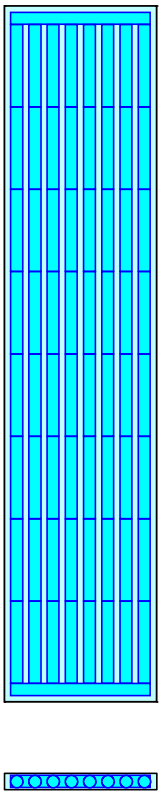
8 Chambers/Row x 20.00' Long +3.00' Header x 2 = 166.00' Row Length +18.0" End Stone x 2 = 169.00' Base Length
8 Rows x 36.0" Wide + 17.1" Spacing x 7 + 18.0" Side Stone x 2 = 36.97' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

64 Chambers x 98.0 cf + 33.97' Header x 4.90 sf x 2 = 6,604.9 cf Chamber Storage
64 Chambers x 128.3 cf + 33.97' Header x 6.41 sf x 2 = 8,644.6 cf Displacement

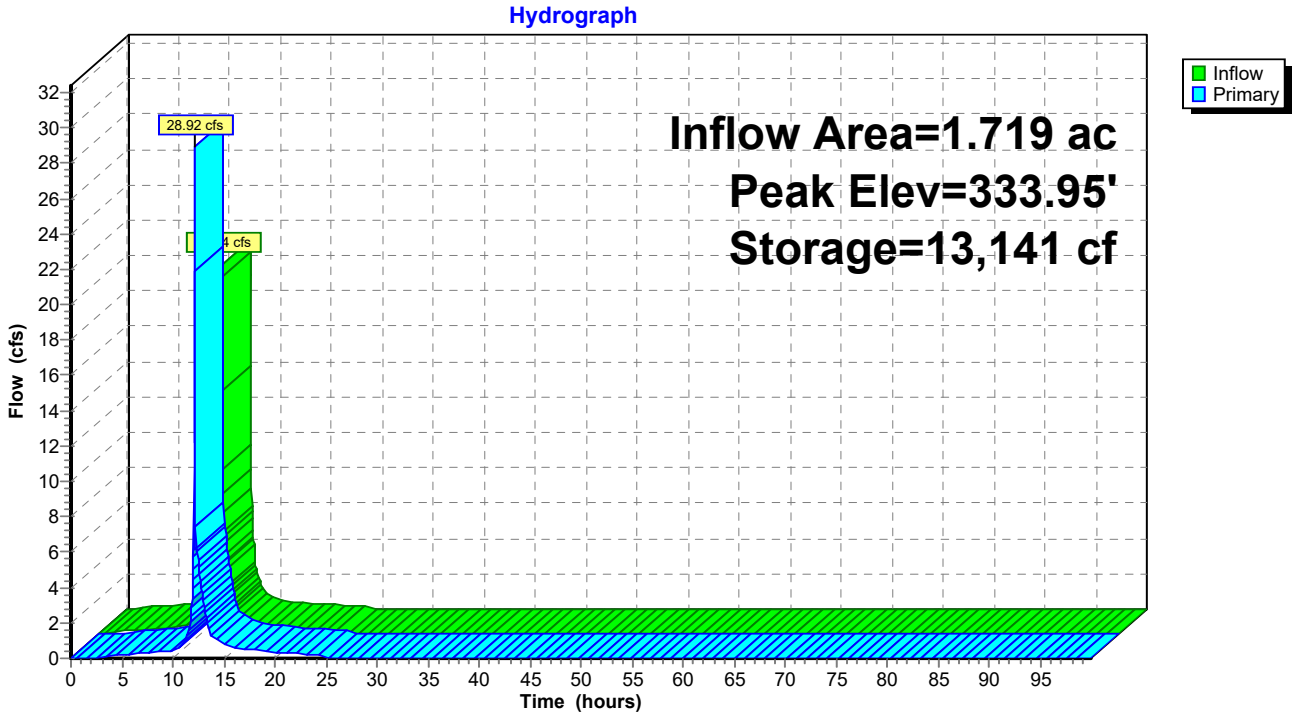
24,988.4 cf Field - 8,644.6 cf Chambers = 16,343.9 cf Stone x 40.0% Voids = 6,537.5 cf Stone Storage

Chamber Storage + Stone Storage = 13,142.5 cf = 0.302 af
Overall Storage Efficiency = 52.6%
Overall System Size = 169.00' x 36.97' x 4.00'

64 Chambers
925.5 cy Field
605.3 cy Stone



Pond 19P: PDA-4 Basin



Summary for Pond 23P: Above-Ground Detension Basin 1

Inflow Area = 11.131 ac, 65.16% Impervious, Inflow Depth = 8.84" for Alpha 100yr + 50% event
Inflow = 101.66 cfs @ 12.09 hrs, Volume= 8.197 af
Outflow = 65.12 cfs @ 12.17 hrs, Volume= 8.197 af, Atten= 36%, Lag= 4.7 min
Primary = 40.94 cfs @ 12.17 hrs, Volume= 7.692 af
Secondary = 24.19 cfs @ 12.17 hrs, Volume= 0.506 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 274.59' @ 12.17 hrs Surf.Area= 21,640 sf Storage= 98,328 cf

Plug-Flow detention time= 168.7 min calculated for 8.195 af (100% of inflow)
Center-of-Mass det. time= 169.2 min (959.6 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1	269.00'	107,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

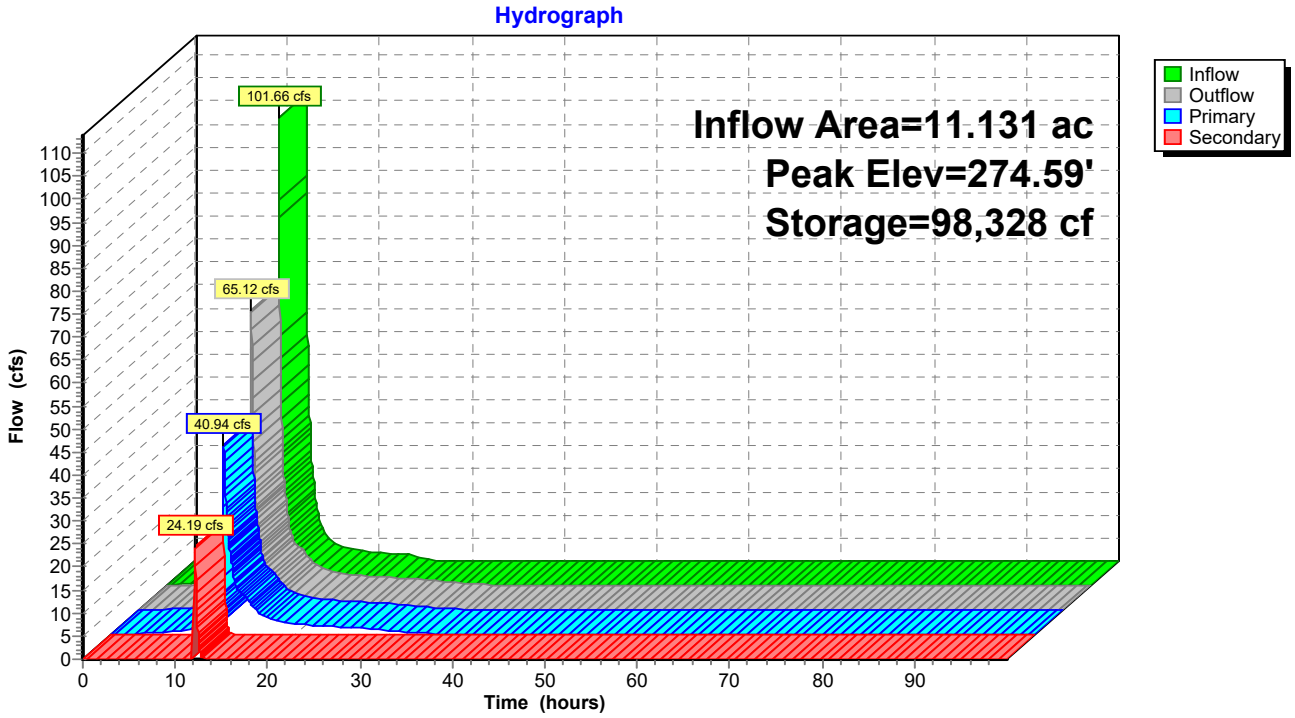
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
269.00	13,838	0	0
270.00	15,109	14,474	14,474
271.00	16,434	15,772	30,245
272.00	17,813	17,124	47,369
273.00	19,247	18,530	65,899
274.00	20,735	19,991	85,890
275.00	22,277	21,506	107,396

Device	Routing	Invert	Outlet Devices
#1	Primary	268.90'	**24.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 268.90' / 267.60' S= 0.0245 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	269.00'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	271.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	272.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	273.75'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	274.00'	**20.0' 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=40.90 cfs @ 12.17 hrs HW=274.58' (Free Discharge)
└─**1=Culvert** (Inlet Controls 40.90 cfs @ 13.02 fps)
  ├─**2=Orifice/Grate** (Passes < 2.78 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 2.02 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 6.93 cfs potential flow)
  └─**5=Orifice/Grate** (Passes < 39.53 cfs potential flow)

Secondary OutFlow Max=23.70 cfs @ 12.17 hrs HW=274.58' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 23.70 cfs @ 2.04 fps)

Pond 23P: Above-Ground Detension Basin 1



Summary for Pond 24P: Bioretention Basin

Inflow Area = 2.358 ac, 62.11% Impervious, Inflow Depth = 9.26" for Alpha 100yr + 50% event
Inflow = 21.40 cfs @ 12.18 hrs, Volume= 1.819 af
Outflow = 13.59 cfs @ 12.29 hrs, Volume= 1.703 af, Atten= 36%, Lag= 7.0 min
Primary = 13.59 cfs @ 12.29 hrs, Volume= 1.703 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 278.70' @ 12.29 hrs Surf.Area= 9,066 sf Storage= 24,712 cf

Plug-Flow detention time= 129.0 min calculated for 1.702 af (94% of inflow)
Center-of-Mass det. time= 92.3 min (857.5 - 765.1)

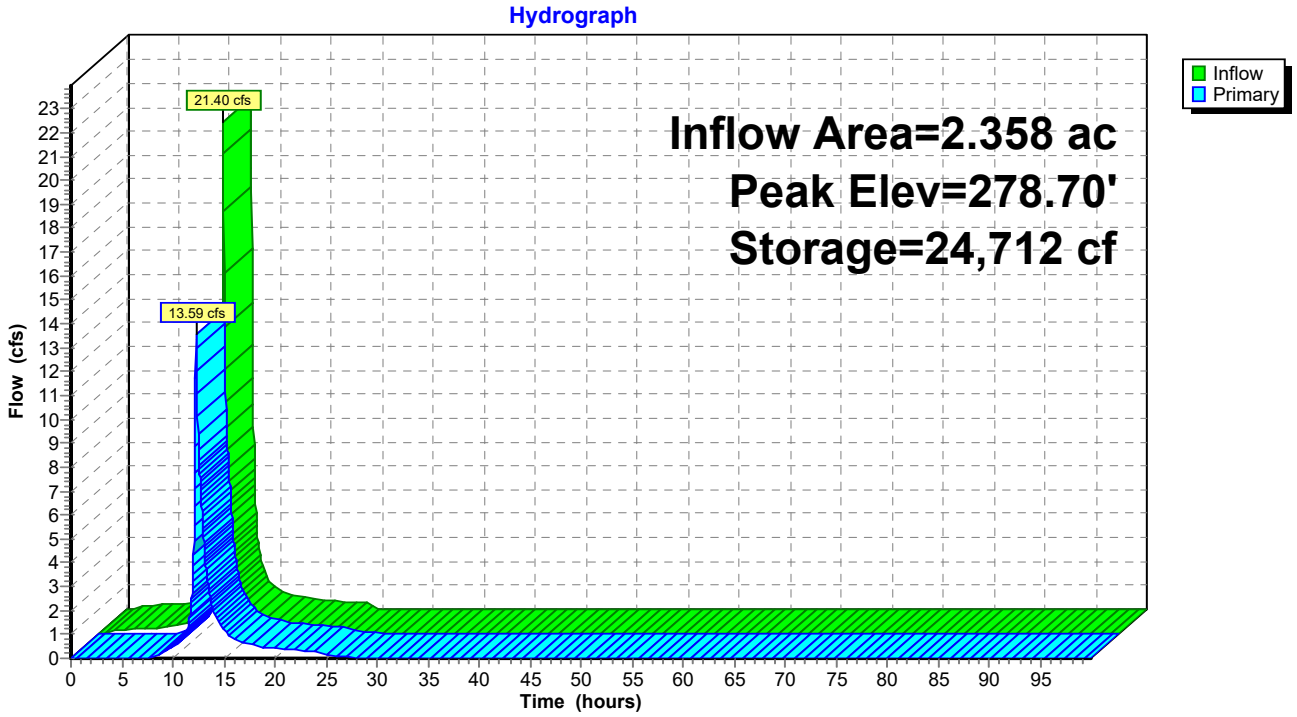
Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	37,747 cf	**Bioretention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	4,537	0	0
276.00	5,615	5,076	5,076
277.00	6,776	6,196	11,272
278.00	8,064	7,420	18,692
279.00	9,490	8,777	27,469
280.00	11,066	10,278	37,747

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 72.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 272.00' / 269.50' S= 0.0347 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	276.00'	**6.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=13.52 cfs @ 12.29 hrs HW=278.70' (Free Discharge)
└**1=Culvert** (Passes 13.52 cfs of 25.95 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.56 cfs @ 7.13 fps)
  ├**3=Orifice/Grate** (Orifice Controls 5.24 cfs @ 5.24 fps)
  └**4=Orifice/Grate** (Weir Controls 4.71 cfs @ 1.47 fps)

Pond 24P: Bioretention Basin



Summary for Pond 25P: Subsurface Basin 3B

Inflow Area = 0.770 ac, 64.48% Impervious, Inflow Depth = 9.11" for Alpha 100yr + 50% event
Inflow = 8.60 cfs @ 12.11 hrs, Volume= 0.585 af
Outflow = 7.01 cfs @ 12.14 hrs, Volume= 0.578 af, Atten= 18%, Lag= 2.2 min
Primary = 7.01 cfs @ 12.14 hrs, Volume= 0.578 af

Routing by Stor-Ind method, Time Span= 0.00-99.99 hrs, dt= 0.03 hrs
Peak Elev= 286.60' @ 12.14 hrs Surf.Area= 2,166 sf Storage= 3,457 cf

Plug-Flow detention time= 42.4 min calculated for 0.578 af (99% of inflow)
Center-of-Mass det. time= 35.3 min (793.1 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.67'	1,658 cf	**17.80'W x 121.67'L x 3.00'H Field A** 6,497 cf Overall - 2,353 cf Embedded = 4,144 cf x 40.0% Voids
#2A	284.00'	1,860 cf	**ADS N-12 24"** x 30 Inside #1 Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf 30 Chambers in 5 Rows
		3,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	284.00'	**24.0" Round Culvert** L= 21.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 284.00' / 283.00' S= 0.0476 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	284.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	285.00'	**12.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.96 cfs @ 12.14 hrs HW=286.58' (Free Discharge)
└**1=Culvert** (Passes 6.96 cfs of 23.79 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 7.55 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.63 cfs @ 6.51 fps)
  └**4=Orifice/Grate** (Orifice Controls 4.96 cfs @ 4.96 fps)

Pond 25P: Subsurface Basin 3B - Chamber Wizard Field A

Chamber Model = ADS N-12 24" (ADS N-12® Pipe)
Inside= 23.8"W x 23.8"H => 3.10 sf x 20.00'L = 62.0 cf
Outside= 28.0"W x 28.0"H => 3.92 sf x 20.00'L = 78.4 cf

28.0" Wide + 13.4" Spacing = 41.4" C-C Row Spacing

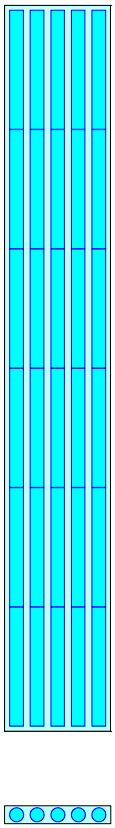
6 Chambers/Row x 20.00' Long = 120.00' Row Length +10.0" End Stone x 2 = 121.67' Base Length
5 Rows x 28.0" Wide + 13.4" Spacing x 4 + 10.0" Side Stone x 2 = 17.80' Base Width
4.0" Stone Base + 28.0" Chamber Height + 4.0" Stone Cover = 3.00' Field Height

30 Chambers x 62.0 cf = 1,860.0 cf Chamber Storage
30 Chambers x 78.4 cf = 2,352.8 cf Displacement

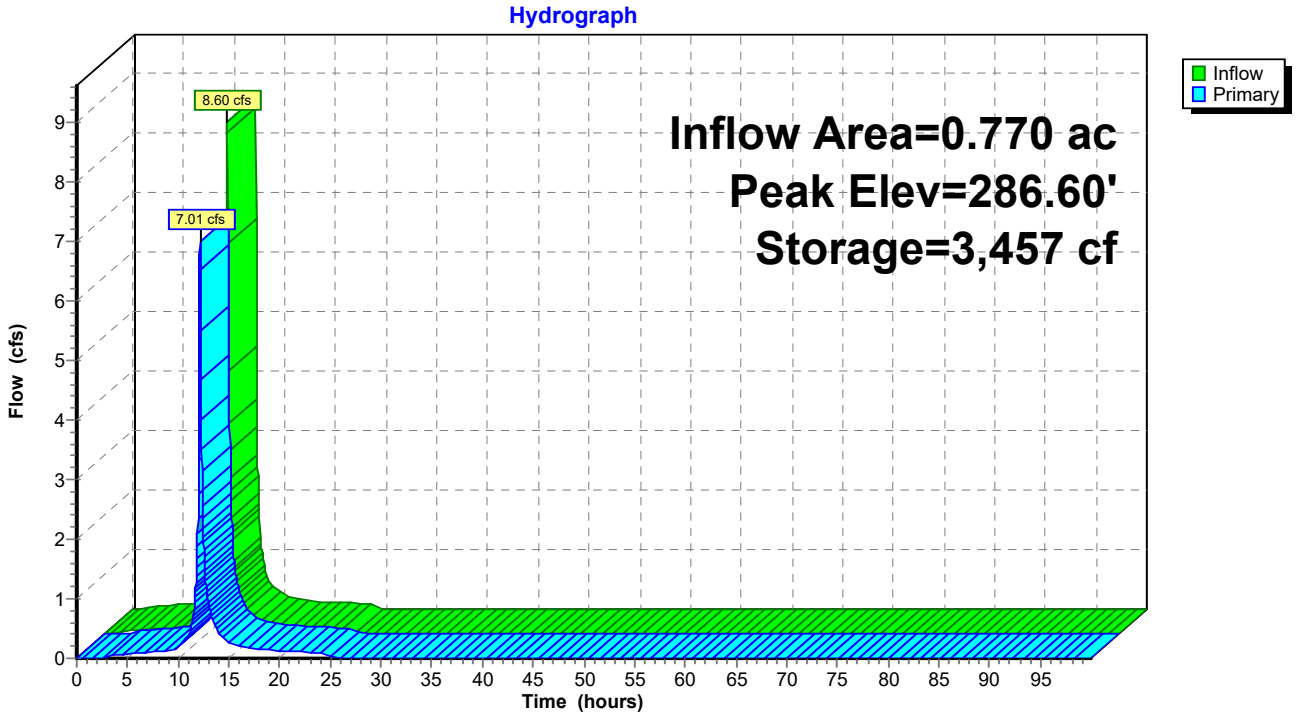
6,497.2 cf Field - 2,352.8 cf Chambers = 4,144.4 cf Stone x 40.0% Voids = 1,657.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,517.8 cf = 0.081 af
Overall Storage Efficiency = 54.1%
Overall System Size = 121.67' x 17.80' x 3.00'

30 Chambers
240.6 cy Field
153.5 cy Stone



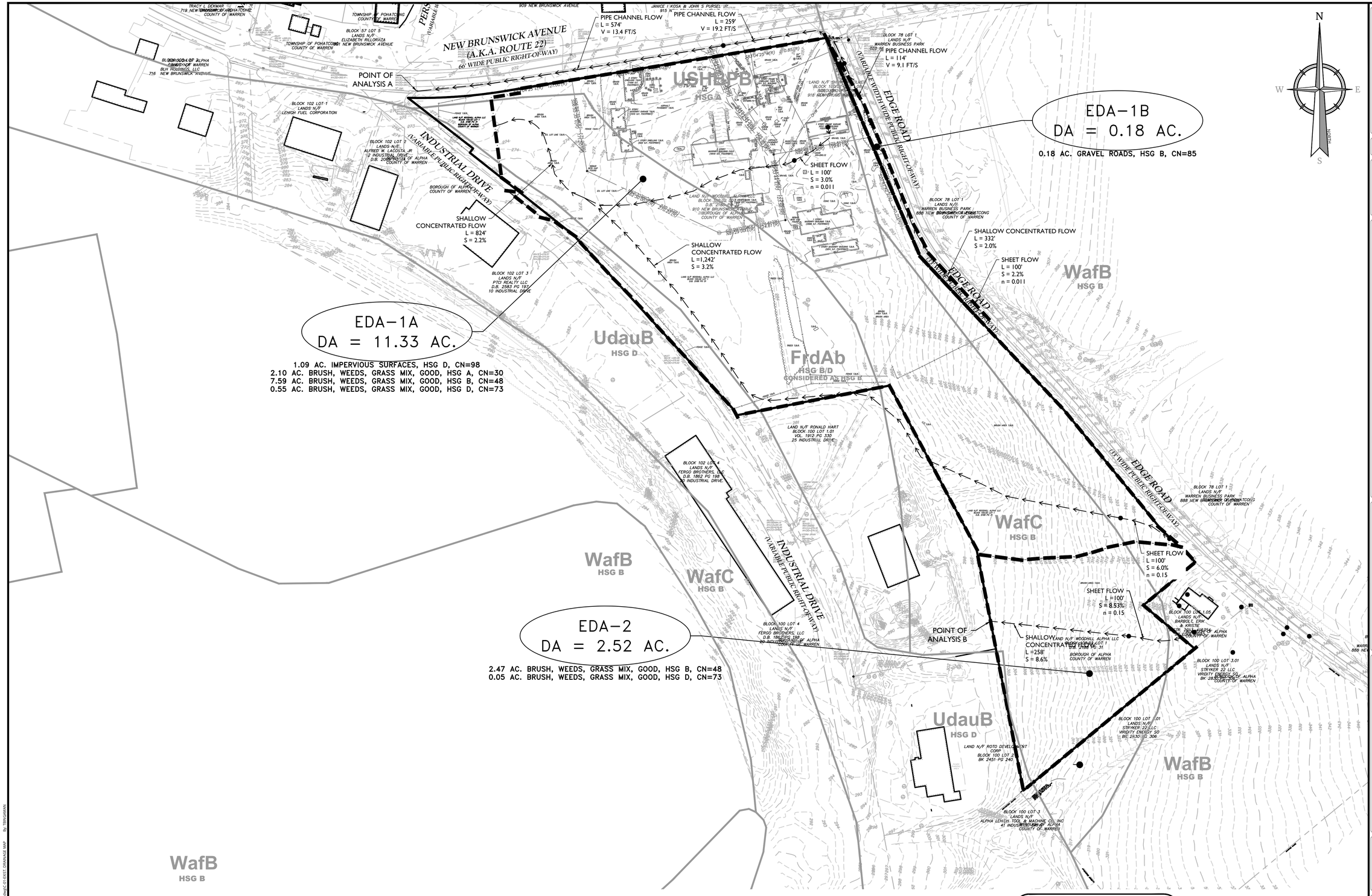
Pond 25P: Subsurface Basin 3B



Colliers
Engineering
& Design

Appendix G |

Drainage Area Maps



Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2022. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

C. Richard Roseberry
NEW JERSEY LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: GE37546
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

PRELIMINARY AND FINAL MAJOR SITE PLAN

FOR

WOODHILL ALPHA, LLC

BLOCK 100
LOTS 1, 1.08 AND 1.09

BOROUGH OF ALPHA,
WARREN COUNTY,
NEW JERSEY

Colliers Engineering & Design
CLINTON
Shelbourne at Hunterdon
53 Frontage Road, Suite 110
Hampton, NJ 08827
Phone: 908.238.0900
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	3/1/22	OKC	JPA

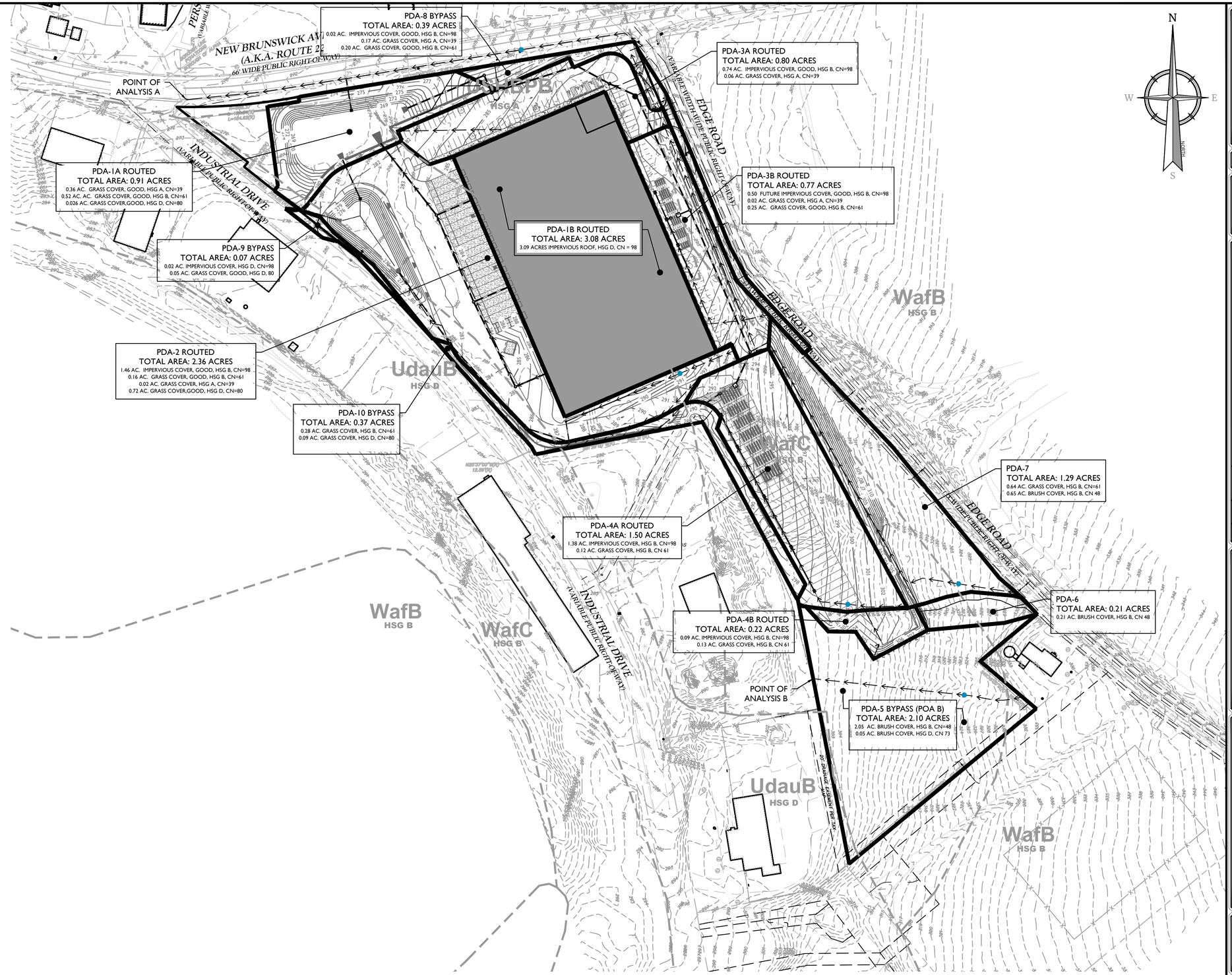
PROJECT NUMBER:	DRAWING NAME:
19004898B	C-DRAN-EXST

SHEET TITLE:
EXISTING DRAINAGE MAP

SHEET NUMBER:
1 of 3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2019\19004898B\Engineering\Drainage Maps\C-DRAN-EXST.dwg|C-01 EXST. DRAINAGE MAP By: TBINGAMAN



Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2022. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

C. Richard Roseberry
NEW JERSEY LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: GE37546
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

PRELIMINARY AND FINAL MAJOR SITE PLAN

FOR

WOODHILL ALPHA, LLC

BLOCK 100
LOTS 1, 1.08 AND 1.09

BOROUGH OF ALPHA,
WARREN COUNTY,
NEW JERSEY

Colliers Engineering & Design
CLINTON
Shelbourne at Hunterdon
53 Frontage Road, Suite 110
Hampton, NJ 08827
Phone: 908.238.0900
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	3/1/22	OKC	JPA

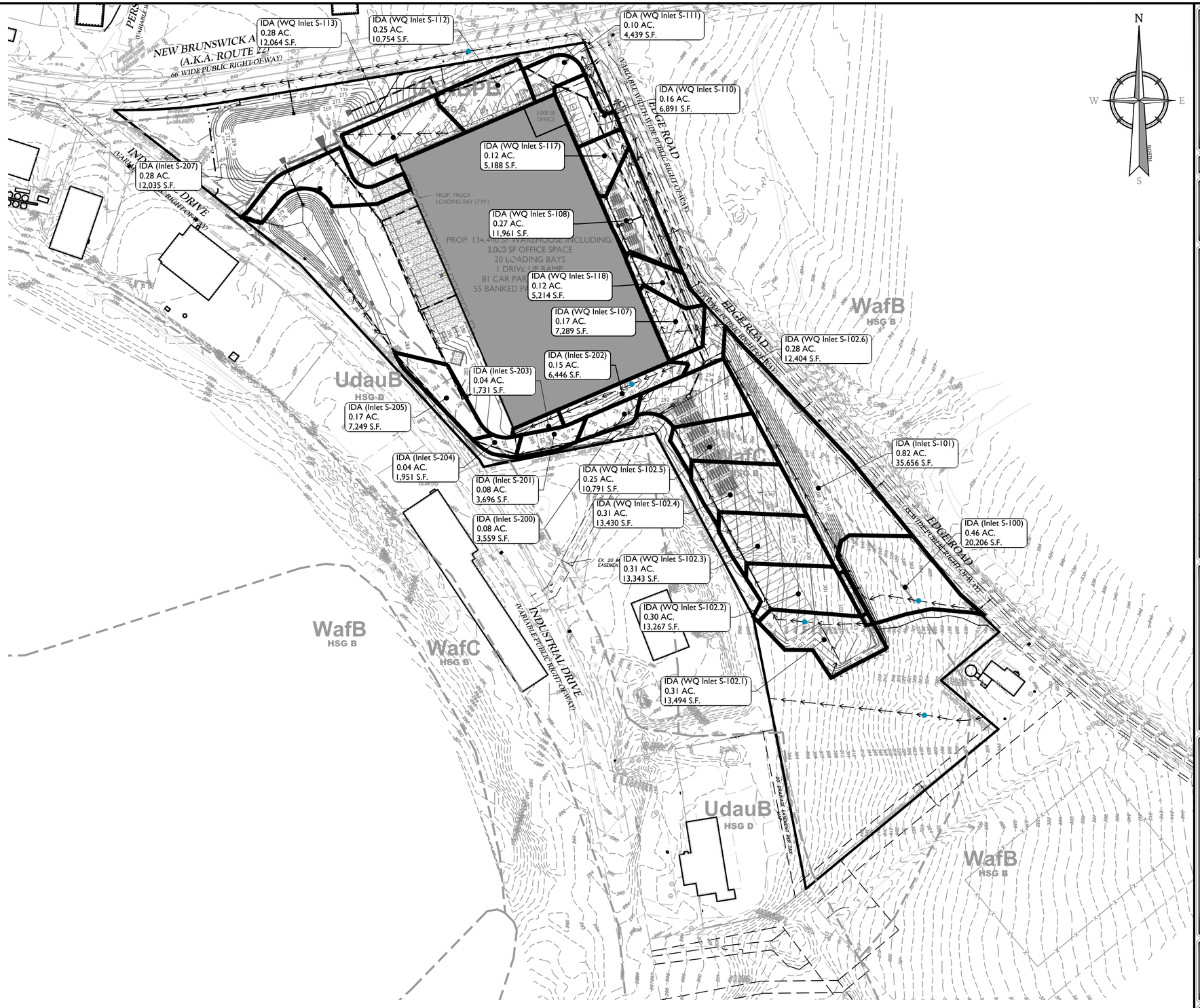
PROJECT NUMBER:	DRAWING NAME:
19004898B	C-DRNG-PRSD

SHEET TITLE:
PROPOSED DRAINAGE MAP

SHEET NUMBER:
2 of 3

2019\19004898B\Engineering\Drainage Maps\C-DRNG-PRSD.dwg|C-02-PROP. DRAINAGE MAP By: TBINGAMAN

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.



Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2022. Colliers Engineering & Design. All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

C. Richard Roseberry
NEW JERSEY LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: GE37546
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

PRELIMINARY AND FINAL
MAJOR SITE PLAN

FOR

WOODHILL ALPHA, LLC

BLOCK 100
LOTS 1, 1.08 AND 1.09

BOROUGH OF ALPHA,
WARREN COUNTY,
NEW JERSEY

Colliers Engineering & Design
CLINTON
Shelbourne at Hunterdon
53 Frontage Road, Suite 110
Hampton, NJ 08827
Phone: 908.238.0900
COLLIERS ENGINEERING & DESIGN, INC.
DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	3/1/22	OKC	JPA

PROJECT NUMBER:	DRAWING NAME:
19004898B	C-DRNG-PRSD

SHEET TITLE:
INLET
DRAINAGE AREA MAP

SHEET NUMBER:
3 of 3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2019\19004898B\Engineering\Drainage Maps\C-DRNG-PRSD.dwg|C-03 INLET DRAINAGE MAP By: TBINGAMAN

Colliers Engineering & Design

Colliers Engineering & Design is a trusted provider of multi-discipline engineering, design and consulting services providing customized solutions for public and private clients through a network of offices nationwide.

For a full listing of our office locations, please visit colliersengineering.com

1 877 627 3772

Civil/Site • Traffic/Transportation • Governmental • Survey/Geospatial
Infrastructure • Geotechnical/Environmental • Telecommunications • Utilities/Energy