

STORMWATER MANAGEMENT REPORT

Prepared for:

HELLER PROPERTY PARTNERS, LP

Block 2001, Existing Lots 19, 20, 21, 22 & 23
176, 178 & 180 Main Street

Borough of Madison
Morris County, New Jersey

Prepared by:

BOHLER //

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1. Introduction

The subject property is located at 176, 178 & 180 Main Street in the Borough of Madison, Morris County, New Jersey. The property is identified as Block 2001, Existing Lots 19, 20, 21, 22 and 23 on the Borough of Madison tax maps and is a total of 1.629 acres in size and will hereafter be referred to as “the site”. The site is bordered to the north by residential properties in the R-3 Zone and Highland Avenue beyond; to the east by a commercial property and Rosedale Avenue beyond; to the west by a residential property and a church beyond; and to the south by Main Street (a.k.a. New Jersey State Highway Route 124) and commercial and residential properties beyond. A tax map and aerial map is included at the beginning of Appendix C for reference.

The site on Lots 21-23 is currently a 2-story office building and associated parking within the CC zone. Two single-family homes once existed on the sites on Lots 19 and 20 but have recently been demolished. Lots 19 and 20 contains most of the site improvements including the proposed two-story office building and ancillary parking, sidewalks, driveways, stormwater and utility improvements. The only improvements proposed on lots 21-23 is pavement repair and proposed stormwater piping. A proposed stormwater management system will detain and infiltrate all new runoff from the proposed development and impervious areas.

This report summarizes the design objectives, methodology, and calculations for the conveyance, detention, and discharge of stormwater runoff leaving the site and is meant to accompany the Site Plan documents prepared by Bohler Engineering. Pre-development and post-development conditions are examined for stormwater quantity analysis, water quality analysis, groundwater recharge, soil erosion and sediment control, and low impact development based on the *NJDEP Stormwater Management Regulations* of June 2016.

2. Pre-Development Site Conditions

The site contains a total area of 1.629 acres and consists of four unique drainage areas: Existing Drainage areas #1-#4, which are described in more detail below. In the pre-development condition, the site consists of a two-story office building and two single-family residential buildings and garages. The residential buildings and garages have since been demolished within the last 2 years, however the design analyzed in this report factors the residential properties into the overall existing impervious area based upon NJDEP regulations allowing impervious surfaces removed in the last five years to be utilized in the analysis. Currently, the runoff generated on site outfalls partially to the northern property line via overland flow and partially to the southern property line to Main Street via overland flow. These ultimately flow south and east to existing inlets and ultimately to the Spring Garden Brook. There are also two existing infiltration basins capturing runoff and discharging via infiltration and overflowing into the right-of-way. The Existing Drainage Area Map in Appendix C illustrates the limits of each existing drainage area and how they relate to the existing site conditions.

2.1 Existing Drainage Area 1

Existing Drainage Area #1 contains 0.624 acres of land, of which 0.308 acres are impervious surface, and includes the majority of the parking area, portions of the landscaped area on Lots 21-23 as well as portions of the rear pervious area on Lots 19 and 20. The topography of the area slopes from north to south from a maximum elevation of approximately 234.40 to a minimum elevation of approximately 223.35 with slopes ranging from 3% to 5%. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 12.1 minutes. The runoff from Existing Drainage Area #1 flows from north to south into the existing northernmost Drywell Basin #1 in the parking area. DW #1 discharges via infiltration and overflows the inlet grate to EDA#2 for severe storms. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.2 Existing Drainage Area 2

Existing Drainage Area #2, which contains 0.317 acres of land, of which 0.242 acres are impervious surface, and includes the remaining portion of the parking area, the access driveway, the building roof and some of the adjacent grassed areas. The topography of the area slopes from north to south from a maximum elevation of approximately 227.79 to a minimum elevation of approximately 217.02 with slopes ranging from 5% to 10%. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a minimum time of concentration of 6 minutes. The runoff from Existing Drainage Area #2 flows from north to south into the second existing Drywell Basin #2 in the main driveway. DW #2 discharges via infiltration and overflows the inlet grate to Main Street for severe storms. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.3 Existing Drainage Area 3

Existing Drainage Area #3 has been analyzed as developed as the impervious coverage existed within the last five years and is accepted by the NJDEP. This area contains 0.484 acres of land, of which 0.204 acres are impervious surface, and includes the existing residences and the southern portion of the associated grass and impervious areas on Lots 19 and 20. The topography of the area slopes from north to south from a maximum elevation of approximately 234.00 to a minimum elevation of approximately 223.50 with slopes ranging from 1% to 10%. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 10.5 minutes. The runoff from Existing Drainage Area #3 flows from north to south into the right-of-way of Main Street (State Highway Route 134) and ultimately to an inlet approximately 150' south of the site. The Existing Drainage Area Map in

Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.4 Existing Drainage Area 4

The remainder of the area of study in the pre-development condition is contained within Existing Drainage Area #4, which contains 0.204 acres of land, all of which is pervious surface, and includes grassed areas along the northeastern and southeastern property lines. The topography of the area slopes from west to east and north to south from a maximum elevation of approximately 233.80 to a minimum elevation of approximately 217.07 with slopes ranging from 1% to 5%. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 16.9 minutes. The runoff from Existing Drainage Area #4 flows from west to east and north to south and ultimately discharges off-site to adjacent properties. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.5 Pre-Development Flow Summary

TABLE 2.1

DATA	EDA #1	EDA #2	P.O.I. #2	EDA #3	EDA #4
Area (acres)	0.624	0.252	0.876	0.484	0.204
Impervious (acres)	0.308	0.176	0.484	0.204	0.000
Tc (min)	12.1	10	12.1	10.5	16.9
2 Yr. Flow (CFS)	1.24	0.94	.03	0.95	0.21
10 Yr. Flow (CFS)	2.07	1.47	.25	1.62	0.44
100 Yr. Flow (CFS)	3.67	2.45	5.10	2.92	0.90

3. Post-Development Site Conditions

The post-development condition for the site includes the construction of a two-story office building with associated parking fields, driveways, sidewalks, utility infrastructure, underground stormwater detention facilities, and other site improvements. The proposed site is designed in a manner that generally maintains the existing drainage patterns and reduces discharge in each area. The studied watershed area in the post-development condition contains the same 1.629-acre area that was studied in the pre-development condition and consists of five unique drainage areas: Proposed Drainage Area #1a, Proposed Drainage Area #1b, Proposed Drainage Area #2, Proposed Drainage Area #3, and Proposed Drainage Area #4, which are described in more detail below.

A proposed stormwater conveyance system will collect the runoff from the proposed building and impervious areas via inlets, manholes, and stormwater piping and redirect it to the proposed underground infiltration basin and back to the existing dry well systems on the site. The development has been designed to reduce runoff to all drainage areas as well as all new impervious runoff to be contained and infiltrated for all events, including the 100-year event. The Proposed Drainage Area Map in Appendix C illustrates the limits of each proposed drainage area and how they relate to the proposed site conditions

3.1 Proposed Drainage Area 1a

Proposed Drainage Area 1a is comprised of a part of the same area in the post-development condition as it was in the pre-development condition, including portions of the existing and proposed parking areas, portions of landscaped area, and all of the proposed building's roof (0.117 acres). The overall area is reduced to 0.724 acres in size, of which 0.513 acres are impervious surface. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a minimum time of concentration of 6 minutes. Proposed Drainage Area #1a sheet flows across the parking and associated landscaped areas and is routed into three existing inlets and Proposed 'E' Inlet #3 through conveyance pipes and into the "Kracken" filter unit and then into the proposed infiltration basin. The routing of the runoff from Drainage Area #1a is reflected on the Inlet Area Map in Appendix C and is accounted for throughout the other Appendices of this report.

The runoff from Proposed Drainage Area #1a meets and exceeds the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.i. The proposed runoff reductions for Proposed Drainage Area #1 are exceeded. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.2 Proposed Drainage Area 1b

Proposed Drainage Area #1b is the remaining part of Area #1 and is similar to the pre-development condition as it was in the post-development condition. It is still directly tributary to the existing underground Drywell #1. Overall and impervious areas are reduced within Proposed Drainage Area #1b and it has been reduced to 0.260 acres in size, of which 0.217 acres are impervious surface. Proposed Drainage Area #1b will continue to overflow to the southern portion of the parking area and access drive to the existing south infiltration basin as before. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated minimum time of concentration of 6 minutes. The on-site runoff is routed to the existing drywell and ultimately discharges via infiltration. The routing of the runoff from Proposed Drainage Area #1b is reflected on the Inlet Area Map in Appendix C and is accounted for throughout the other Appendices of this report.

The proposed runoff from Proposed Drainage Area #1b meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.i. The proposed runoff hydrograph for Proposed Drainage

Area #2 does not exceed the existing runoff hydrograph for Existing Drainage Area #2 for the same storm events at any point along the hydrograph. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.3 Proposed Drainage Area 2

Proposed Drainage Area #2 consists of approximately 0.322 acres of land, of which 0.120 acres are impervious surface parking lot and 0.129 acres is the existing building roof. The area includes the landscaped and paved walkway areas in behind the existing buildings as well as stormwater and utility infrastructure. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a minimum time of concentration of 6 minutes. The runoff from Proposed Drainage Area #2 sheet flows from north to south and is still directly tributary to the existing underground Drywell #2 which overflows to the right-of-way of Main Street (NJSH 124) and ultimately to an inlet approximately 150 feet down the Main St. to the south. The routing of the runoff from Proposed Drainage Area #2 is depicted on the Inlet Area Map in Appendix C.

3.4 Proposed Drainage Area #3

Proposed Drainage Area #3 is similar to the post-development condition as it was in the pre-development condition only much smaller. No increase of impervious areas are proposed within Proposed Drainage Area #3 and it is reduced to 0.234 acres in size, none of which 0.027 acres are impervious surface. Proposed Drainage Area #3 sheet flows towards the southern limit (Main St.) of the property and off-site. A CN value of 74 was used for the pervious area with a calculated time of concentration of 10.5 minutes. The routing of the runoff from Off-Site Area #3 is reflected on the Inlet Area Map in Appendix C and is accounted for throughout the other Appendices of this report.

The proposed runoff from Proposed Drainage Area #3 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.i. The proposed runoff hydrograph for Proposed Drainage Area #4 does not exceed the existing runoff hydrograph for Existing Drainage Area #4 for the same storm events at any point along the hydrograph. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.5 Proposed Drainage Area 4

Proposed Drainage Area #4 is similar to the post-development condition as it was in the pre-development condition only smaller. No additional impervious areas are proposed within Proposed Drainage Area #4 and it is reduced to 0.086 acres in size, none of which is impervious surface. Proposed Drainage Area #4 sheet flows towards the eastern corner of the property and off-site. A CN value of 74 was used for the pervious area with a calculated time of concentration

of 16.9 minutes. The routing of the runoff from Off-Site Area #4 is reflected on the Inlet Area Map in Appendix C and is accounted for throughout the other Appendices of this report.

The proposed runoff from Proposed Drainage Area #4 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.i. The proposed runoff hydrograph for Proposed Drainage Area #4 does not exceed the existing runoff hydrograph for Existing Drainage Area #4 for the same storm events at any point along the hydrograph. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.6 Proposed Structural Stormwater Management Strategies

The four drainage areas in the post development condition flow to the same points of analysis identified in the existing condition. Three of the drainage areas, Proposed Drainage Area #1a, Proposed Drainage Area #1b, and Proposed Drainage Area #2, flow through the proposed on-site stormwater management systems, which are described in more detail below.

3.6.1 Dry Wells

As part of the proposed stormwater design, a “Storm Trap” dry well will be utilized to store and infiltrate runoff from the roof and new parking lot area of the proposed office building for all storm events, including the 100-year. The flow to the proposed dry well system is one acre maximum and drains within 72 hours based on the permeability rate of between 2 inches per hour and 6 inches per hour that was observed on site around the proposed dry wells. A rate of 1 inch per hour was used in the design for a factor of safety. Additionally, each dry well maintains a 2-foot separation minimum between the bottom of the dry well and the seasonal high groundwater table (not encountered during testing 10 ft. below grade). The proposed dry well system holds all of the runoff from the 100-year storm for new impervious areas. The basin has an emergency outlet proposed for more intense storms which discharges to Drywell #1 and then onto Drywell #2 and Main St.

TABLE 3.2.3

DESIGN PARAMETERS	
Maximum Drainage Area	1 acre
Maximum Design Volume	Water Quality Design Storm Volume
Maximum Design Storm Drain Time	72 Hours, Using Slowest Design Permeability Rate
Permeability Rate Factor of Safety	2
Minimum Subsoil Design Permeability Rate	0.5 inches/hour
Maximum Design Permeability Rate	10 inches/hour
Soil Testing Requirements	Must be consistent with Appendix E of the <i>NJ Stormwater Best Management Practices Manual</i>
Minimum Distance between Dry Well Bottom and Seasonal High Water Table	2 feet

3.6.2 Infiltration Basins

Two infiltration basins are currently existing on-site as the stormwater management facility for the existing site development, including the existing parking area, office building, driveways and landscape areas.

A proposed infiltration basin will be installed as the primary stormwater management facility for the proposed site development including emergency overflow from the dry well system. This infiltration basin meets the minimum requirements of being at least 2 feet between the bottom of the stone and the seasonal high ground water table. The maximum design volume to be infiltrated is the 100-year storm. The proposed failure relief mechanism for this basin is an existing grate located at the front property line near Main Street in the main driveway. This is connected to the basin via pipe, allowing for the discharge of excess stormwater in the case of a more intense storm.

TABLE 3.2.6

DESIGN PARAMETERS	
Storage Volume	Entire Water Quality Design Storm Volume
Maximum Design Storm Drain Time	72 Hours, Using Slowest Design Permeability Rate
Permeability Rate Factor of Safety	2
Minimum Subsoil Design Permeability Rate	0.5 inches/hour
Maximum Design Permeability Rate	10 inches/hour
Soil Testing Requirements	Must be consistent with Appendix E of the <i>NJ Stormwater Best Management Practices Manual</i>
Minimum Distance between Basin Bottom and Seasonal High Water Table	2 feet

3.7 Post-Development Flow Summary

TABLE 3.3

PROPOSED FLOW SUMMARY

	Proposed Drainage Area #1	Proposed Drainage Area #2	Proposed P.O.I. #2	Proposed Drainage Area #3	Proposed Drainage Area #4
Area (acres)	.984	.322	1.306	0.648	0.161
Impervious (acres)	.846	.249	1.095	0.276	0.000
Tc (min)	14.6	10.0	14.6	10.5	16.9
2 yr. Flow (cfs)	.00	.00	.00	0.33	0.09
10 yr. Flow (cfs)	.06	.09	.09	0.64	0.18
100 yr. Flow (cfs)	3.64	2.82	2.76	1.25	0.37

EXISTING FLOW SUMMARY

	Existing Drainage To POI #2 (cfs)	Total Flows Requiring Reductions (cfs) (EDA #3 & #4)	Required Reductions	Actual Reductions	Total Flows Exist/Prop (cfs) (EDA #3)	Total Flows Exist/Prop (cfs) (EDA #4)
2 yr. Flow (cfs)	.03	.03	50%	100%*	.93/.33	.20/.09
10 yr. Flow (cfs)	.21	.04	25%	81%	1.58/.64	.43/.18
100 yr. Flow (cfs)	4.97	1.73	20%	65%	2.83/1.25	.87/.37

*entire 2 year storm infiltrated in existing & proposed condition. Reductions NA. Offsite flows reduced = 60%/70%

4. Stormwater Management Design Methodology

In accordance with the NJDEP Stormwater Management Regulations, the proposed development must meet the requirements, if appropriate, for stormwater quantity reductions, water quality, groundwater recharge, soil erosion and sediment control, and low impact development. The following sections describe how each of the above items are addressed on site in the post-development condition.

4.1 Stormwater Quantity Controls

The Assessment of stormwater quantity has been based upon the Soil Conservation Service Method (SCS) Unit Hydrograph as described in Technical Release Number 55 (TR55), “Urban Hydrology for Small Watersheds”. Theoretical storms are modeled with the 24-Hour SCS Unit Dimensionless Hydrograph using the NOAA Atlas 14 Type D rainfall distribution and recurrence intervals of 2, 10, and 100 years. Hydrograph creation and routings are accomplished using the *HydroCAD* Version 10.00 program by HydroCAD Software Solutions, LLC. The following techniques from the *NJDEP Stormwater Management Regulations* is being applied to each drainage area as noted in section 3.3:

1. NJAC § 7:8-5.4(a)3.i states for stormwater runoff leaving the site, post-development runoff hydrographs for the 2-, 10-, and 100-year storms do not exceed, at any point in time, the pre-development runoff hydrographs for the same storm events. The above section of the NJAC will be applied to drainage areas that, under proposed conditions, will remain unchanged or have a net decrease in runoff.
2. NJDOT regulations prohibit any additional flow of volume discharge to NJDOT stormwater systems for any storm event.

The project’s proposed stormwater management facilities for stormwater peak flow attenuation will consist of one proposed infiltration basin and two existing infiltration basins addressing the drainage areas outlined in Section 3 of this report. The study requires the establishment of a point

of analysis, as indicated in Section 2. The information below describes the methodology in which the stormwater calculations were procured.

4.1.1 Site Soils

The major soil types present on site include fine sand with varying amounts of silt. Based on test pits performed in the field, soil permeability ranges from two to six inches per hour. These soils are classified as Hydrologic Soil Group Type C soils; therefore, values used in the CN and time of concentration calculations are associated with Type C soils. For areas where the calculated time of concentration is less than 6 minutes, a minimum of 6 minutes was used.

4.1.2 Rainfall Data

Rainfall data used in the stormwater calculations of this report are obtained from several different sources based on the latest NJDEP stormwater regulations. The Water Quality storm event is based on the NJDEP BMP Manual Chapter 5 definition of having a total rainfall depth of 1.25 inches and a total duration of two (2) hours. Twenty-four-hour rainfall frequency data in Morris County for all other storms is obtained from the NOAA Atlas 14, Volume 2, Precipitation-Frequency Atlas of the United States, updated in 2012 and listed in the table below:

TABLE 4.1

Event (year)	1	2	5	10	25	50	100
Rainfall (in)	2.94	3.54	4.47	5.24	6.37	7.32	8.35

4.1.3 Pipe Sizing

Calculations for sizing the stormwater pipe networks associated with the proposed stormwater management conveyance system can be found in Appendix B of this report. The Rational Method has been used to size the storm piping for the 25-year storm event. The calculations are conservatively based on a time of concentration of 6 minutes to any inlet. An Inlet Area Map is included in Appendix C.

4.2 Soil Erosion and Sediment Control

The Soil Erosion and Sediment Control plans and details are included within the Site Plan documents prepared by Bohler Engineering and must be followed throughout construction. Silt fences, stabilized construction entrances, a temporary stockpile and inlet filters are proposed

during construction. It is noted that stormwater from the site during construction will discharge to the existing basins; therefore, the offsite stability is considered stable. This report and the Site Plan documents prepared by Bohler Engineering are being submitted to the Morris County Soil Conservation District for approval.

4.3 Low-Impact Development and Non-Structural Stormwater Management Facilities

In accordance with the NJDEP regulations and the latest *New Jersey Stormwater Best Management Practices Manual*, several non-structural stormwater management strategies have been incorporated into the design of the site and are listed below:

4.3.1 Vegetation and Landscaping

A comprehensive Landscape Plan has been incorporated into the design of the proposed improvements on the site that provides low maintenance landscaping. The use of lawn areas has been minimized where applicable and fertilizers and pesticides are to be used sparingly.

4.3.1.1 Preservation of Natural Areas

The design of the improvements proposed on the site has preserved critical natural areas as part of the development. The previously landscaped areas will be protected during construction.

4.3.1.2 Native Ground Cover

Native plants including ground cover, shrubs and trees instead of turf grass have been proposed as part of the landscape design for the site. The native plantings will also require little or no irrigation once they are established.

4.3.1.3 Vegetative Filters and Buffers

Vegetative filters and buffers are used as part of the proposed design to intercept sheet flow from impervious areas to help increase the time of concentration and provide some water quality treatment prior to entering the proposed stormwater conveyance system. These vegetative filters and buffers differ from the vegetative filter strips described in Section 3.2 above in that they do not meet the requirements to achieve 60%-80% TSS removal but still provide some inherent benefit to the treatment of stormwater runoff. These buffer areas are not part of the calculated water treatment methodology used on site.

4.3.2 Minimize Land Disturbance

The proposed design of the site incorporates the preservation of existing vegetative areas that will remain undisturbed.

4.3.3 Impervious Area Management

Impervious areas are the primary source of additional runoff in the post-development site condition. The sections below describe the measures that have been taken in the proposed site design to minimize the amount of impervious proposed on site

4.3.3.1 Streets, Sidewalks, and Parking, Driveway Areas

As part of the proposed site design, the minimum allowable parking and drive aisle sizes, in accordance with local ordinances, are used in lieu of larger stalls and aisles to reduce the amount of impervious surface in the post-development condition.

4.3.4 Vegetative Conveyance

The stormwater and grading design for the site includes vegetative swales that provide a vegetative path to control and collect stormwater runoff between the existing and proposed buildings. The purpose of the swales is to attempt to minimize the decrease of the time of concentration in the post-development condition while also removing total suspended solids. The swales proposed in the stormwater management design are sloped at less than 2% slope with a 2-foot separation from the seasonal high ground water table.

Additionally, permeability testing in the area of the proposed swales has confirmed the subsoil permeability rate is at least 1 inch per hour. Even though infiltration is occurring in the swale, it is not being calculated in the groundwater recharge calculations. To achieve the 50% TSS removal rating, the proposed point-inflow vegetative swale is 51 feet in length, which exceeds the 50-foot minimum requirement for 50% TSS removal. Also, it has been confirmed through hydraulic analysis that the velocity within the swale is less than 0.9 feet per second for the Water Quality Design Storm

4.3.5 Preventative Source Controls

The proposed development complies with this strategy by providing a dumpster area in the north corner of the parking lot.

5. Conclusions

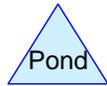
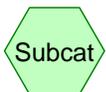
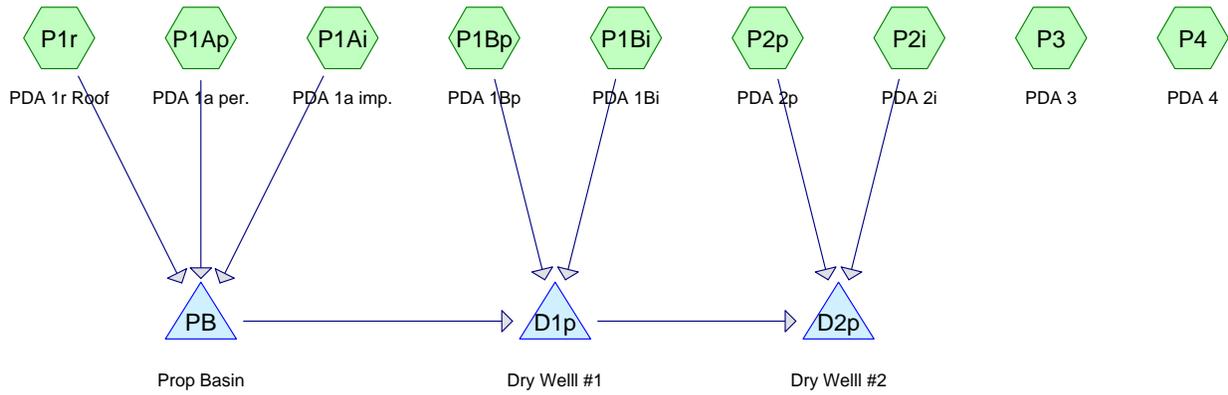
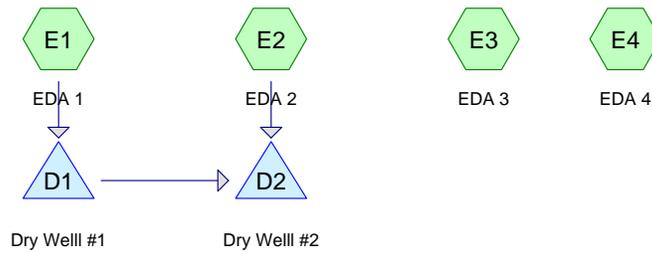
As demonstrated in the above sections, the stormwater management plan for the proposed development meets the *NJDEP Stormwater Management Regulations* of June 2016, and addresses the requirements for

stormwater quantity reductions, water quality, groundwater recharge, soil erosion and sediment control, and low impact development. As a result of the design calculations contained herein, Bohler Engineering anticipates that the stormwater design will not have a negative impact to surrounding areas.

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A. PRE- vs. POST-DEVELOPMENT HYDROGRAPHS

- ◆ **2-Year Storm Event**
- ◆ **10-Year Storm Event**
- ◆ **100-Year Storm Event**
- ◆ **Water Quality Storm Event**



Routing Diagram for J190530 Heller Madison_prop basin and dry well
 Prepared by {enter your company name here}, Printed 4/29/2020
 HydroCAD® 10.00-25 s/n 02612 © 2019 HydroCAD Software Solutions LLC

J190530 Heller Madison_prop basin and dry well

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.378	74	>75% Grass cover, Good, HSG C (E1, E2, E3, E4, P1Ap, P1Bp, P2p, P3, P4)
0.245	98	Bldg. Roof (E2, P1r)
0.129	98	Building Roof (P2i)
1.502	98	Paved parking, HSG B (E1, E2, E3, P1Ai, P1Bi, P2i, P3)
3.254	88	TOTAL AREA

J190530 Heller Madison_prop basin and dry well

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.502	HSG B	E1, E2, E3, P1Ai, P1Bi, P2i, P3
1.378	HSG C	E1, E2, E3, E4, P1Ap, P1Bp, P2p, P3, P4
0.000	HSG D	
0.375	Other	E2, P1r, P2i
3.254		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.378	0.000	0.000	1.378	>75% Grass cover, Good	E1, E2, E3, E4, P1Ap, P1Bp, P2p, P3, P4
0.000	0.000	0.000	0.000	0.245	0.245	Bldg. Roof	E2, P1r
0.000	0.000	0.000	0.000	0.129	0.129	Building Roof	P2i
0.000	1.502	0.000	0.000	0.000	1.502	Paved parking	E1, E2, E3, P1Ai, P1Bi, P2i, P3
0.000	1.502	1.378	0.000	0.375	3.254	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	PB	225.20	222.62	63.0	0.0410	0.013	12.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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

Subcatchment E1: EDA 1	Runoff Area=27,174 sf 49.37% Impervious Runoff Depth>2.27" Flow Length=209' Tc=12.1 min CN=74/98 Runoff=1.21 cfs 0.118 af
Subcatchment E2: EDA 2	Runoff Area=13,829 sf 76.19% Impervious Runoff Depth>2.82" Tc=6.0 min CN=74/98 Runoff=0.92 cfs 0.075 af
Subcatchment E3: EDA 3	Runoff Area=21,062 sf 42.13% Impervious Runoff Depth>2.12" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=0.93 cfs 0.085 af
Subcatchment E4: EDA 4	Runoff Area=8,879 sf 0.00% Impervious Runoff Depth>1.26" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.20 cfs 0.021 af
Subcatchment P1Ai: PDA 1a imp.	Runoff Area=22,353 sf 100.00% Impervious Runoff Depth>3.30" Tc=6.0 min CN=0/98 Runoff=1.73 cfs 0.141 af
Subcatchment P1Ap: PDA 1a per.	Runoff Area=4,108 sf 0.00% Impervious Runoff Depth>1.27" Tc=6.0 min CN=74/0 Runoff=0.14 cfs 0.010 af
Subcatchment P1Bi: PDA 1Bi	Runoff Area=9,460 sf 100.00% Impervious Runoff Depth>3.30" Tc=6.0 min CN=0/98 Runoff=0.73 cfs 0.060 af
Subcatchment P1Bp: PDA 1Bp	Runoff Area=1,883 sf 0.00% Impervious Runoff Depth>1.27" Tc=6.0 min CN=74/0 Runoff=0.06 cfs 0.005 af
Subcatchment P1r: PDA 1r Roof	Runoff Area=5,040 sf 100.00% Impervious Runoff Depth>3.30" Tc=6.0 min CN=0/98 Runoff=0.39 cfs 0.032 af
Subcatchment P2i: PDA 2i	Runoff Area=10,857 sf 100.00% Impervious Runoff Depth>3.30" Tc=6.0 min CN=0/98 Runoff=0.84 cfs 0.069 af
Subcatchment P2p: PDA 2p	Runoff Area=3,154 sf 0.00% Impervious Runoff Depth>1.27" Tc=6.0 min CN=74/0 Runoff=0.11 cfs 0.008 af
Subcatchment P3: PDA 3	Runoff Area=10,192 sf 11.77% Impervious Runoff Depth>1.50" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=0.33 cfs 0.029 af
Subcatchment P4: PDA 4	Runoff Area=3,762 sf 0.00% Impervious Runoff Depth>1.26" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.09 cfs 0.009 af
Pond D1: Dry Well #1	Peak Elev=222.37' Storage=3,270 cf Inflow=1.21 cfs 0.118 af Discarded=0.04 cfs 0.047 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.047 af
Pond D1p: Dry Well #1	Peak Elev=221.79' Storage=2,802 cf Inflow=0.79 cfs 0.064 af Outflow=0.00 cfs 0.000 af
Pond D2: Dry Well #2	Peak Elev=215.16' Storage=1,895 cf Inflow=0.92 cfs 0.075 af Discarded=0.03 cfs 0.038 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.038 af

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NOAA 24-hr D 2 year Rainfall=3.54"

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Pond D2p: Dry Well #2

Peak Elev=217.13' Storage=3,301 cf Inflow=0.94 cfs 0.076 af
Outflow=0.00 cfs 0.000 af

Pond PB: Prop Basin

Peak Elev=222.55' Storage=0.183 af Inflow=2.25 cfs 0.183 af
12.0" Round Culvert n=0.013 L=63.0' S=0.0410 '/ Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.254 ac Runoff Volume = 0.661 af Average Runoff Depth = 2.44"
42.34% Pervious = 1.378 ac 57.66% Impervious = 1.876 ac

Summary for Subcatchment E1: EDA 1

Runoff = 1.21 cfs @ 12.19 hrs, Volume= 0.118 af, Depth> 2.27"

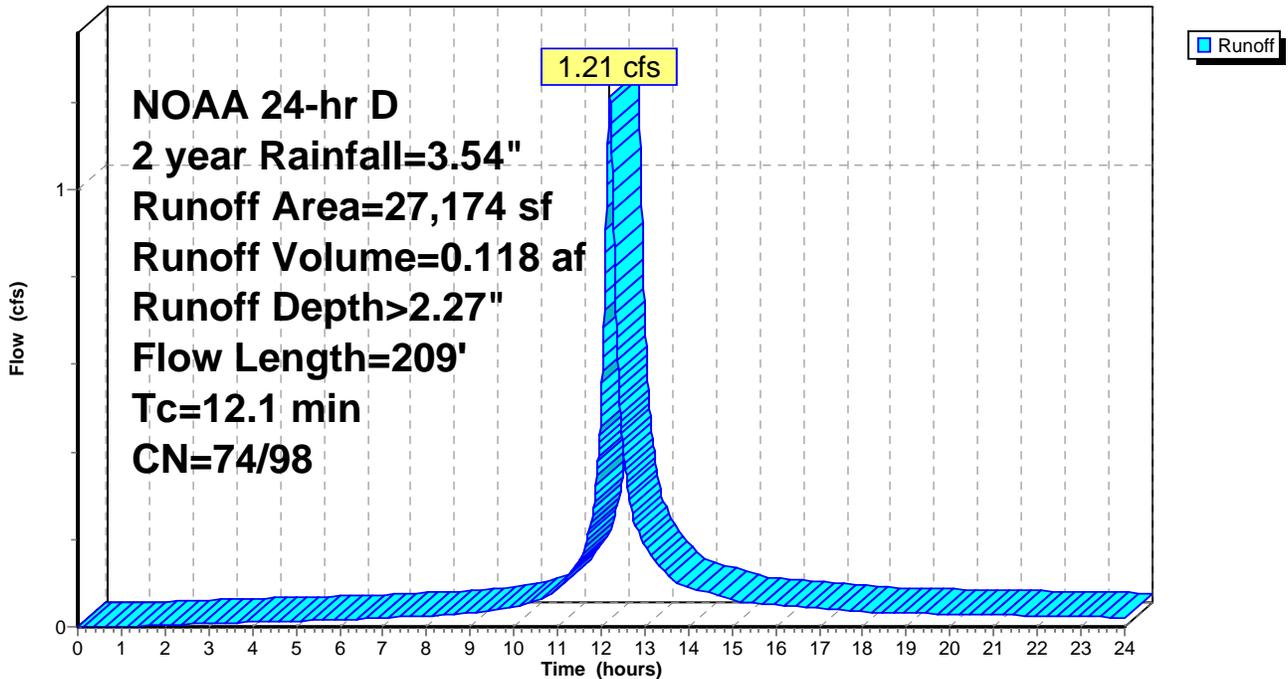
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
13,417	98	Paved parking, HSG B
13,757	74	>75% Grass cover, Good, HSG C
27,174	86	Weighted Average
13,757	74	50.63% Pervious Area
13,417	98	49.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	115	0.0406	0.17		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.4	35	0.0365	1.49		Sheet Flow, Sheet Impervious Smooth surfaces n= 0.011 P2= 3.54"
0.3	59	0.0349	3.79		Shallow Concentrated Flow, Shall Conc Imp Paved Kv= 20.3 fps
12.1	209	Total			

Subcatchment E1: EDA 1

Hydrograph



Summary for Subcatchment E2: EDA 2

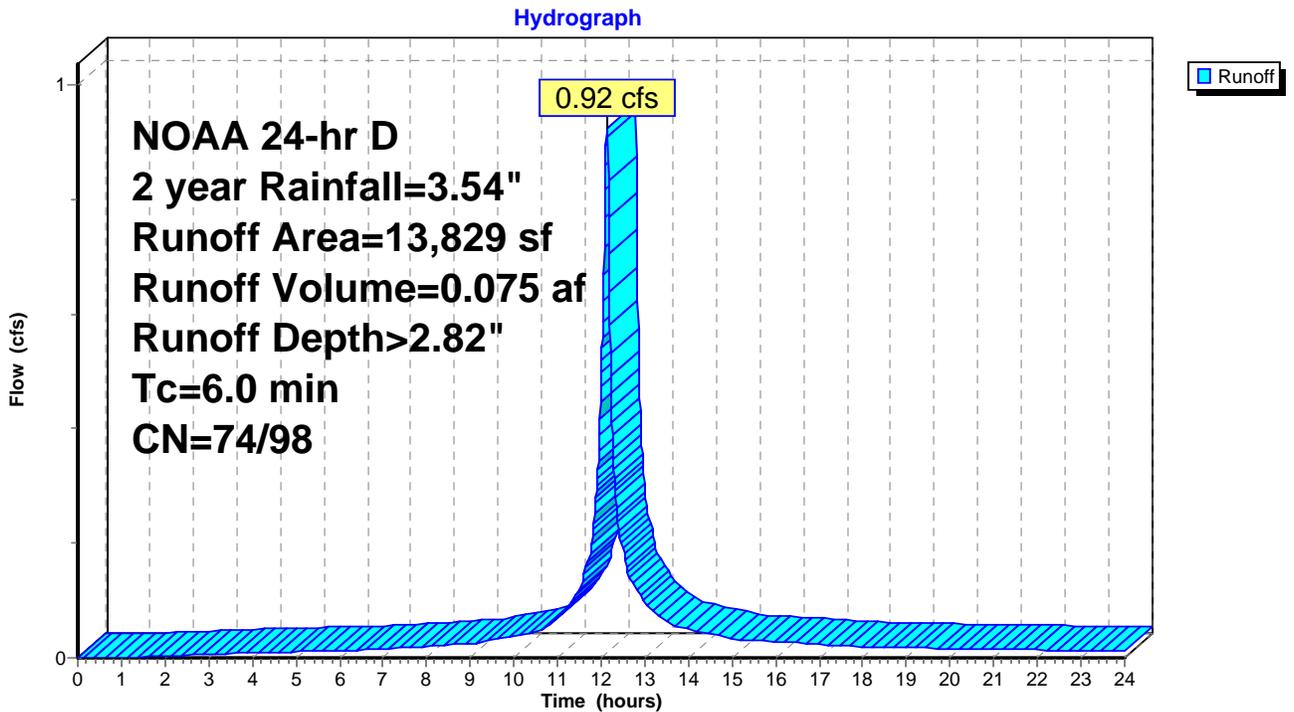
Runoff = 0.92 cfs @ 12.13 hrs, Volume= 0.075 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
* 5,640	98	Bldg. Roof
4,896	98	Paved parking, HSG B
3,293	74	>75% Grass cover, Good, HSG C
13,829	92	Weighted Average
3,293	74	23.81% Pervious Area
10,536	98	76.19% Impervious Area

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

Subcatchment E2: EDA 2



Summary for Subcatchment E3: EDA 3

Runoff = 0.93 cfs @ 12.18 hrs, Volume= 0.085 af, Depth> 2.12"

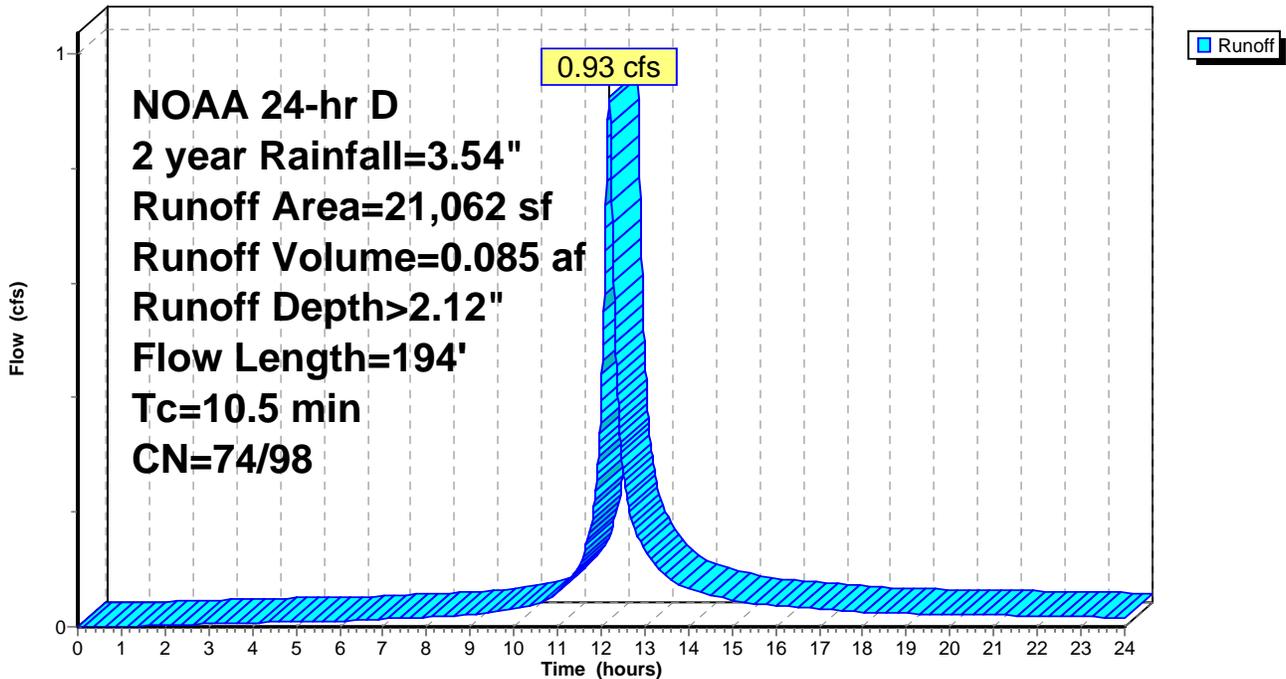
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
8,874	98	Paved parking, HSG B
12,188	74	>75% Grass cover, Good, HSG C
21,062	84	Weighted Average
12,188	74	57.87% Pervious Area
8,874	98	42.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment E3: EDA 3

Hydrograph



Summary for Subcatchment E4: EDA 4

Runoff = 0.20 cfs @ 12.26 hrs, Volume= 0.021 af, Depth> 1.26"

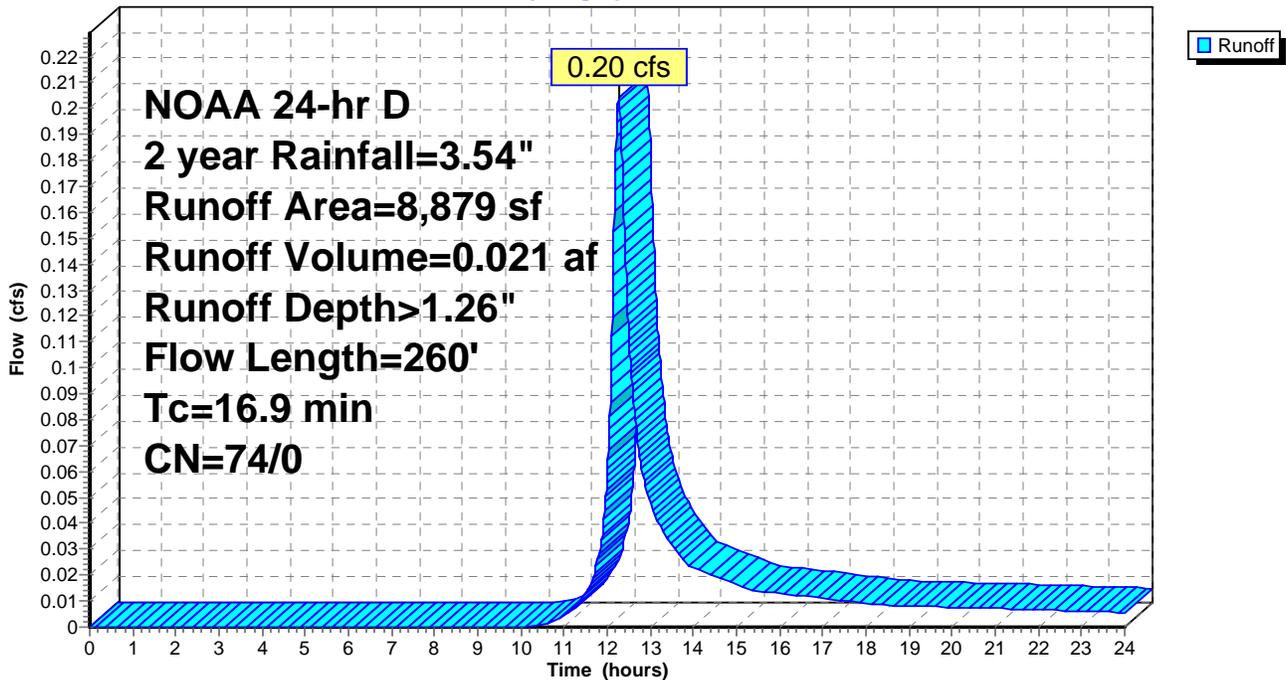
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
8,879	74	>75% Grass cover, Good, HSG C
8,879	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment E4: EDA 4

Hydrograph



Summary for Subcatchment P1Ai: PDA 1a imp.

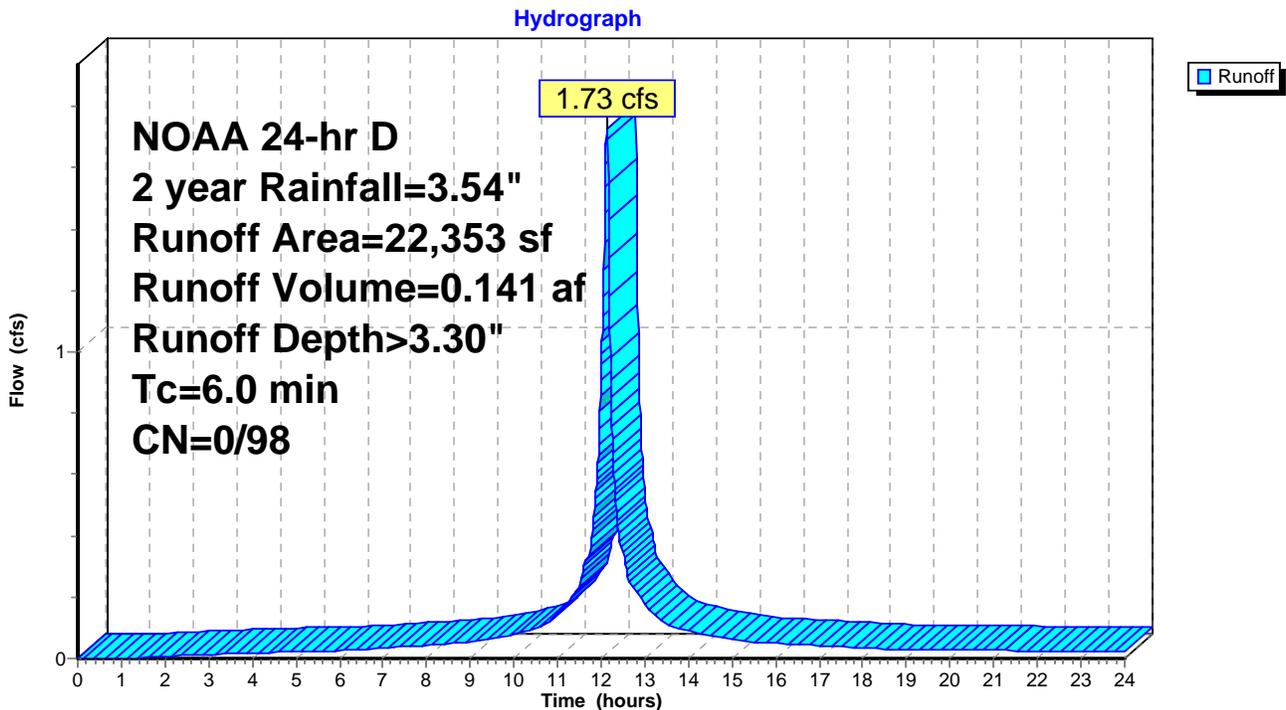
Runoff = 1.73 cfs @ 12.13 hrs, Volume= 0.141 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
22,353	98	Paved parking, HSG B
22,353	98	100.00% Impervious Area

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

Subcatchment P1Ai: PDA 1a imp.



Summary for Subcatchment P1Ap: PDA 1a per.

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 1.27"

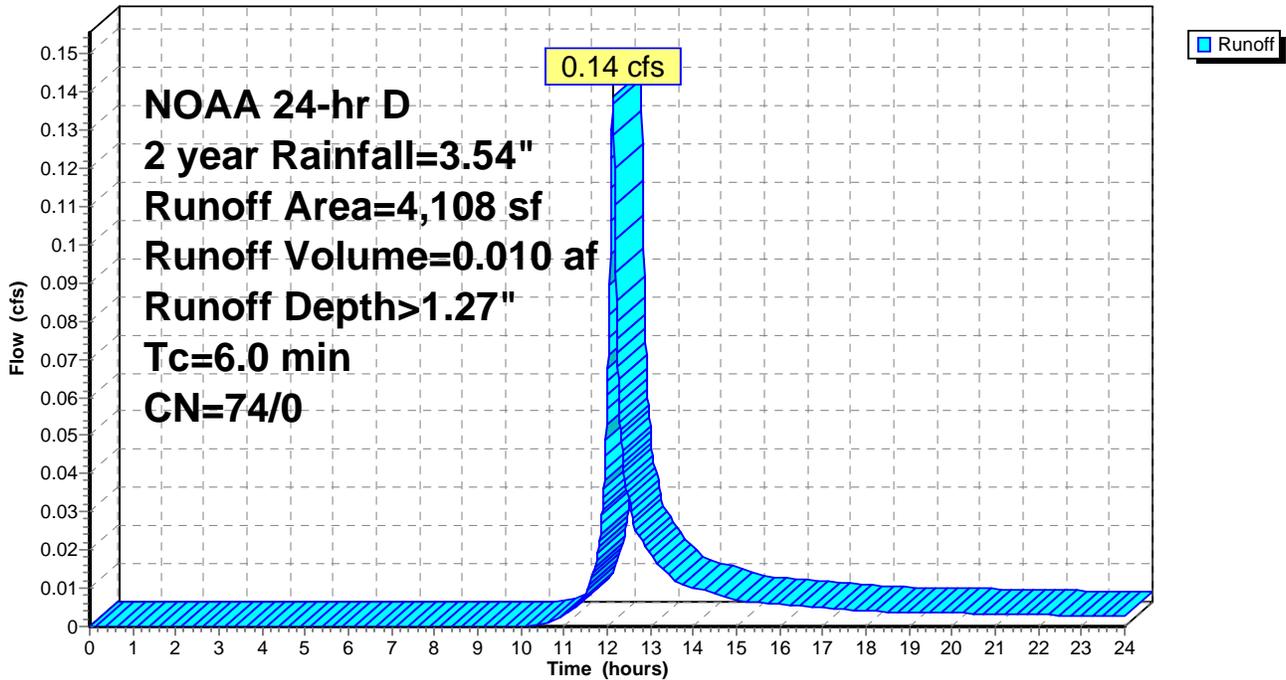
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
4,108	74	>75% Grass cover, Good, HSG C
4,108	74	100.00% Pervious Area

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

Subcatchment P1Ap: PDA 1a per.

Hydrograph



Summary for Subcatchment P1Bi: PDA 1Bi

Runoff = 0.73 cfs @ 12.13 hrs, Volume= 0.060 af, Depth> 3.30"

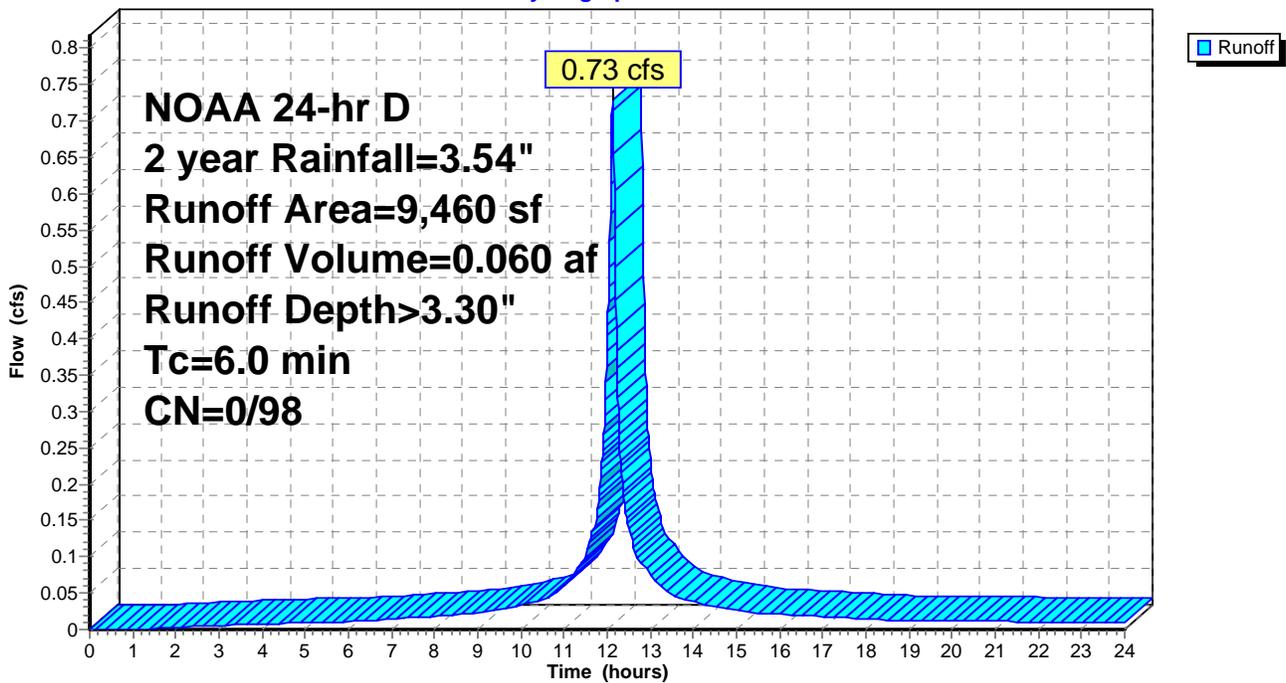
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
9,460	98	Paved parking, HSG B
9,460	98	100.00% Impervious Area

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

Subcatchment P1Bi: PDA 1Bi

Hydrograph



Summary for Subcatchment P1Bp: PDA 1Bp

Runoff = 0.06 cfs @ 12.14 hrs, Volume= 0.005 af, Depth> 1.27"

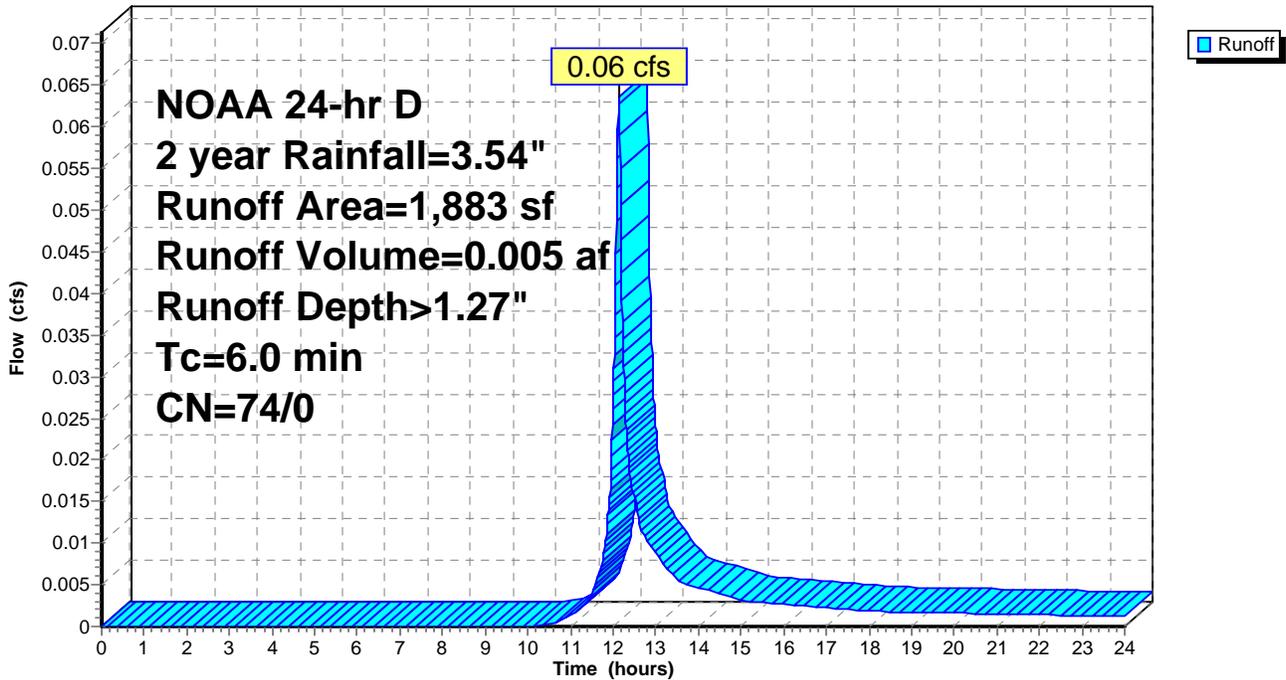
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
1,883	74	>75% Grass cover, Good, HSG C
1,883	74	100.00% Pervious Area

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

Subcatchment P1Bp: PDA 1Bp

Hydrograph



Summary for Subcatchment P1r: PDA 1r Roof

Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.032 af, Depth> 3.30"

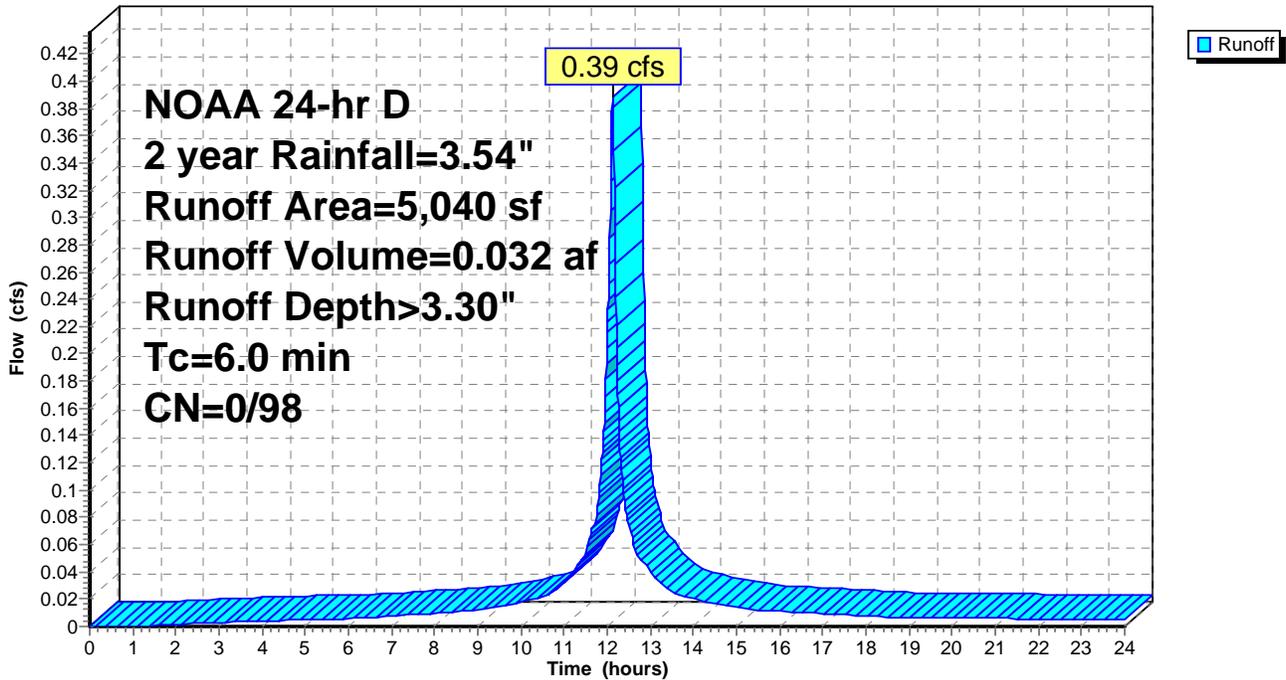
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
* 5,040	98	Bldg. Roof
5,040	98	100.00% Impervious Area

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

Subcatchment P1r: PDA 1r Roof

Hydrograph



Summary for Subcatchment P2i: PDA 2i

Runoff = 0.84 cfs @ 12.13 hrs, Volume= 0.069 af, Depth> 3.30"

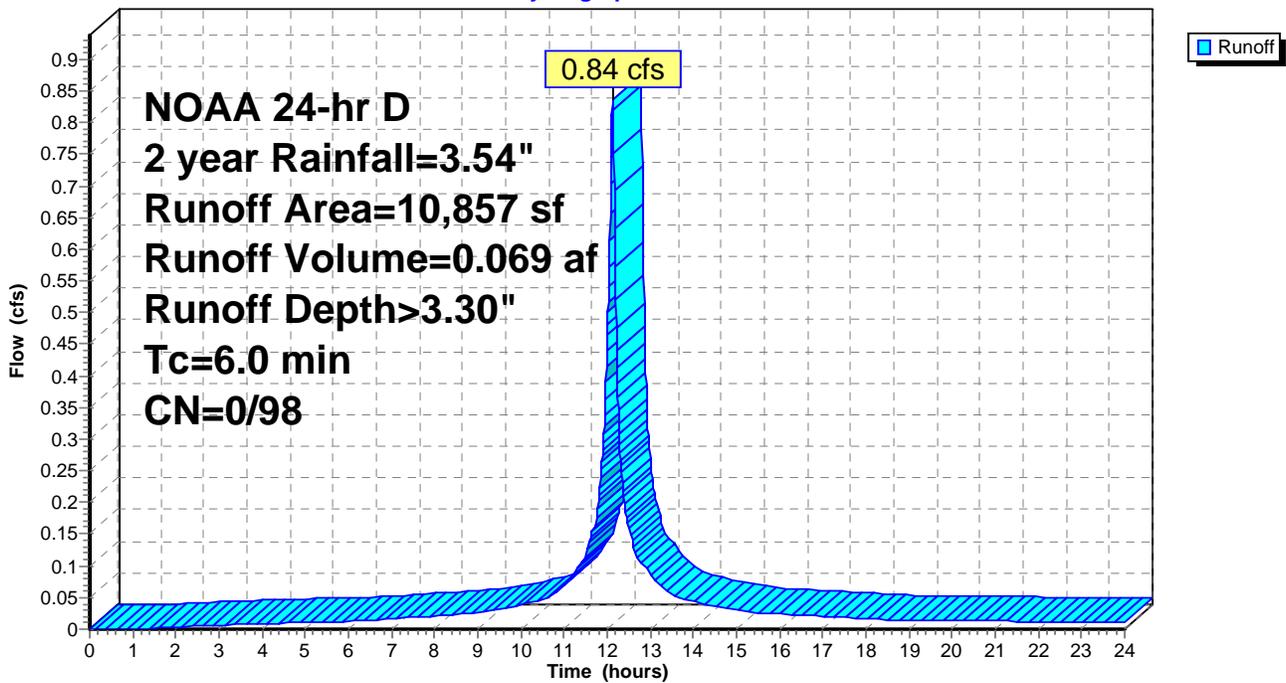
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

	Area (sf)	CN	Description
*	5,640	98	Building Roof
	5,217	98	Paved parking, HSG B
	10,857	98	Weighted Average
	10,857	98	100.00% Impervious Area

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

Subcatchment P2i: PDA 2i

Hydrograph



Summary for Subcatchment P2p: PDA 2p

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 1.27"

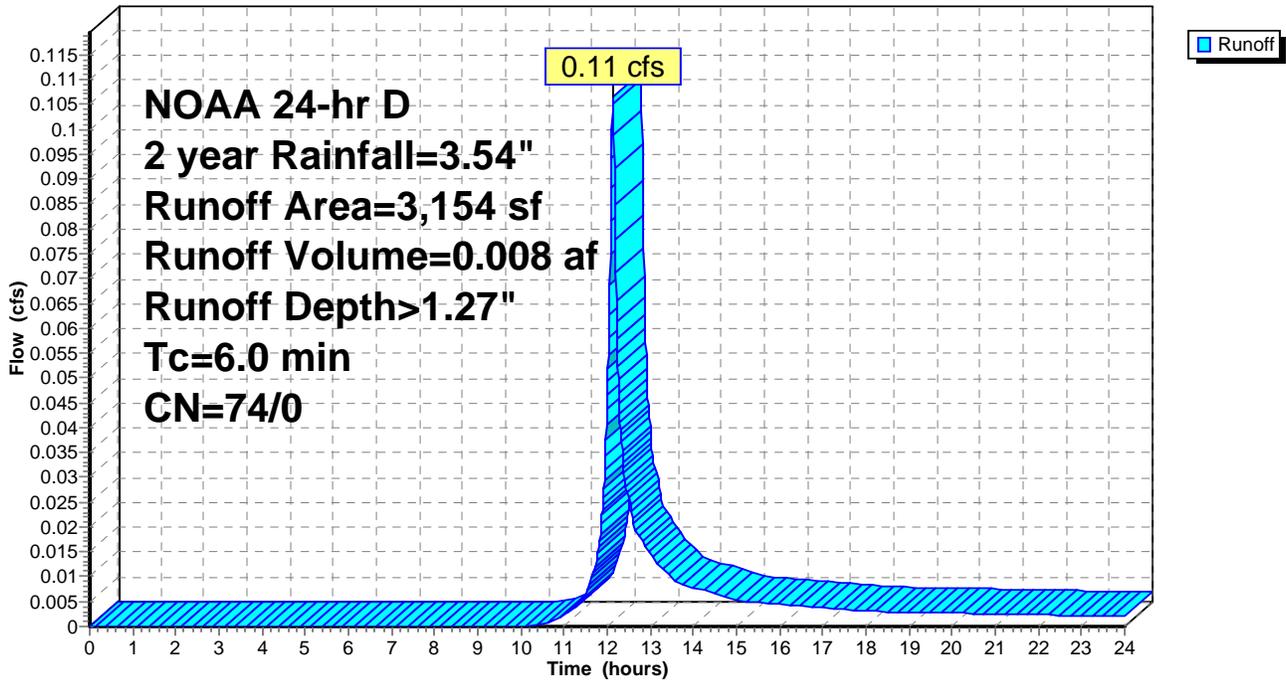
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
3,154	74	>75% Grass cover, Good, HSG C
3,154	74	100.00% Pervious Area

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

Subcatchment P2p: PDA 2p

Hydrograph



Summary for Subcatchment P3: PDA 3

Runoff = 0.33 cfs @ 12.18 hrs, Volume= 0.029 af, Depth> 1.50"

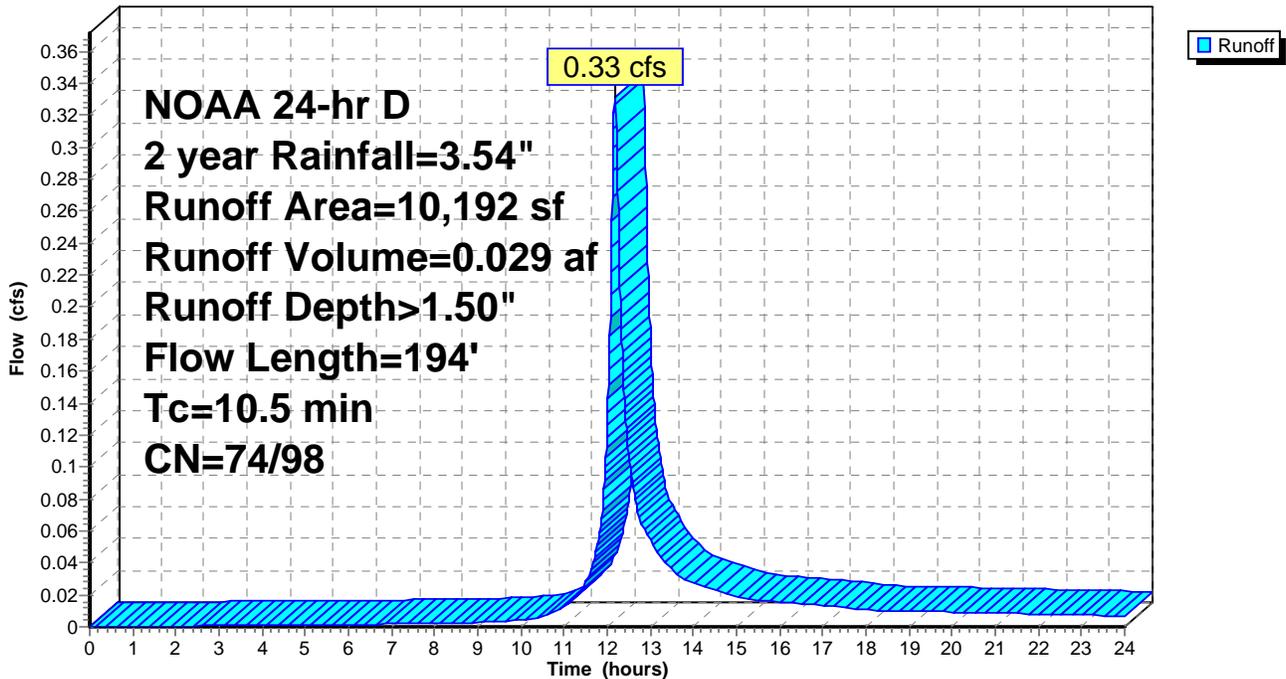
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
1,200	98	Paved parking, HSG B
8,992	74	>75% Grass cover, Good, HSG C
10,192	77	Weighted Average
8,992	74	88.23% Pervious Area
1,200	98	11.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment P3: PDA 3

Hydrograph



Summary for Subcatchment P4: PDA 4

Runoff = 0.09 cfs @ 12.26 hrs, Volume= 0.009 af, Depth> 1.26"

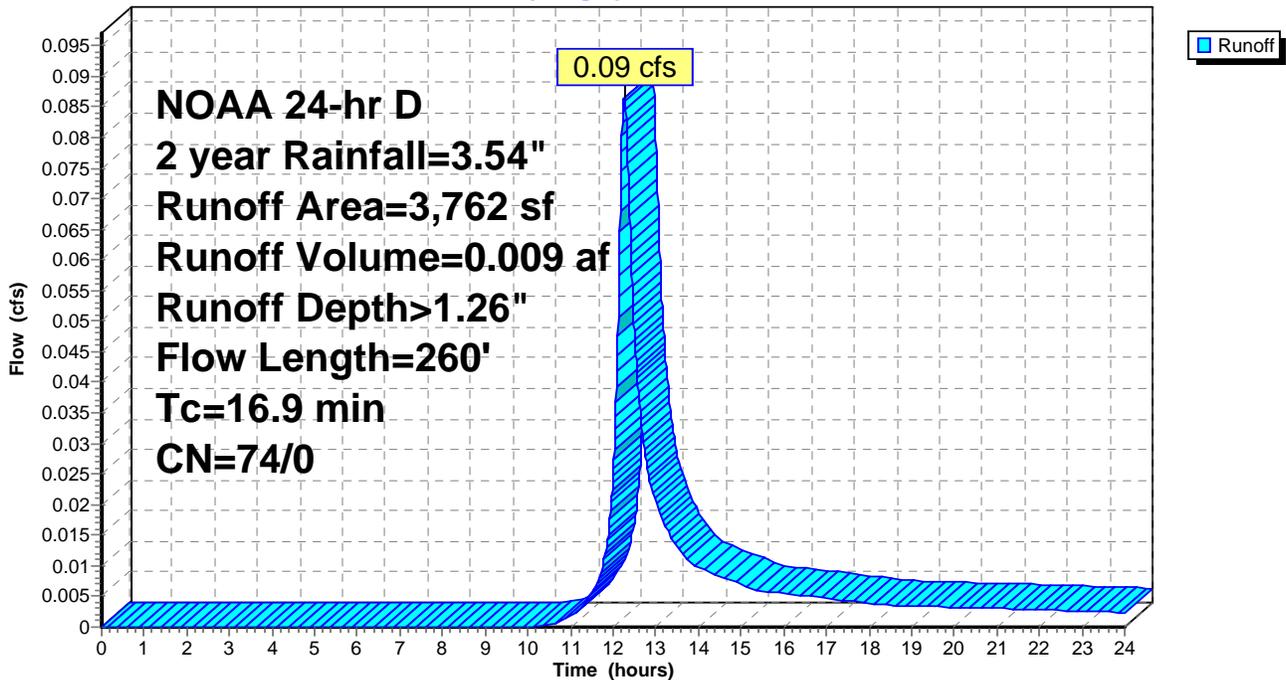
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2 year Rainfall=3.54"

Area (sf)	CN	Description
3,762	74	>75% Grass cover, Good, HSG C
3,762	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment P4: PDA 4

Hydrograph



Summary for Pond D1: Dry Well #1

Inflow Area = 0.624 ac, 49.37% Impervious, Inflow Depth > 2.27" for 2 year event
 Inflow = 1.21 cfs @ 12.19 hrs, Volume= 0.118 af
 Outflow = 0.04 cfs @ 17.76 hrs, Volume= 0.047 af, Atten= 97%, Lag= 334.0 min
 Discarded = 0.04 cfs @ 17.76 hrs, Volume= 0.047 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 222.37' @ 17.76 hrs Surf.Area= 1,559 sf Storage= 3,270 cf

Plug-Flow detention time= 295.7 min calculated for 0.047 af (40% of inflow)
 Center-of-Mass det. time= 134.7 min (926.5 - 791.7)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatic Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

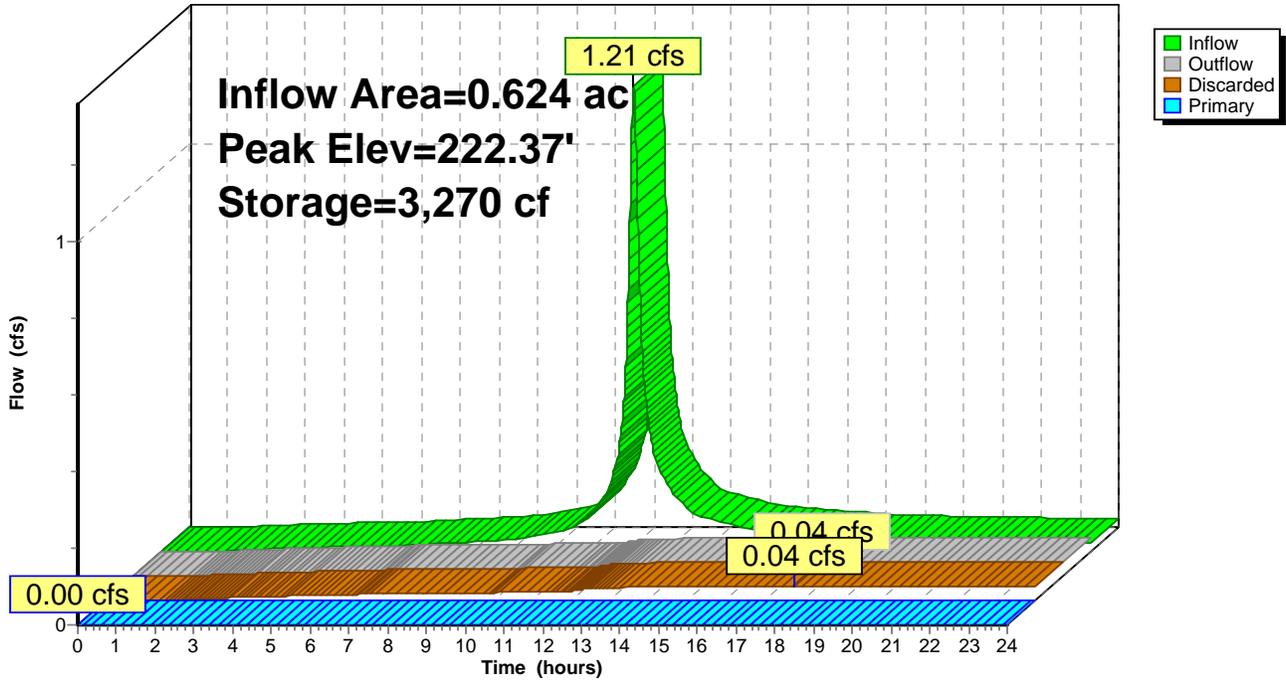
Device	Routing	Invert	Outlet Devices
#1	Discarded	217.89'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.04 cfs @ 17.76 hrs HW=222.37' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=217.89' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond D1: Dry Well#1

Hydrograph



Summary for Pond D1p: Dry Well #1

Inflow Area = 0.984 ac, 86.02% Impervious, Inflow Depth > 0.78" for 2 year event
 Inflow = 0.79 cfs @ 12.13 hrs, Volume= 0.064 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 221.79' @ 24.00 hrs Surf.Area= 1,453 sf Storage= 2,802 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatoid Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

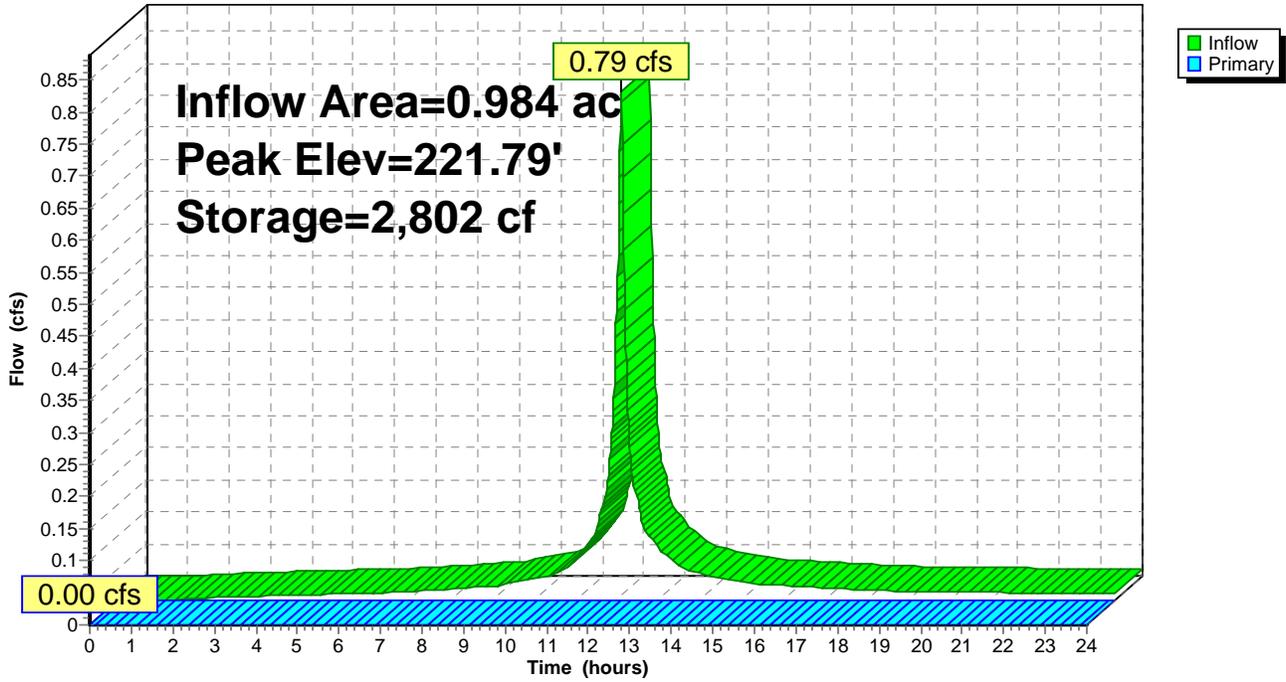
Device	Routing	Invert	Outlet Devices
#1	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=217.89' (Free Discharge)

↑1=Orifice/Grate (Controls 0.00 cfs)

Pond D1p: Dry Well #1

Hydrograph



Summary for Pond D2: Dry Well #2

Inflow Area = 0.941 ac, 58.42% Impervious, Inflow Depth > 0.95" for 2 year event
 Inflow = 0.92 cfs @ 12.13 hrs, Volume= 0.075 af
 Outflow = 0.03 cfs @ 15.97 hrs, Volume= 0.038 af, Atten= 97%, Lag= 230.4 min
 Discarded = 0.03 cfs @ 15.97 hrs, Volume= 0.038 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 215.16' @ 15.97 hrs Surf.Area= 1,214 sf Storage= 1,895 cf

Plug-Flow detention time= 282.6 min calculated for 0.038 af (51% of inflow)
 Center-of-Mass det. time= 144.9 min (912.3 - 767.4)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	396 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatic Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	171 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,073 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
218.00	72	396	396

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.56	600	171	171

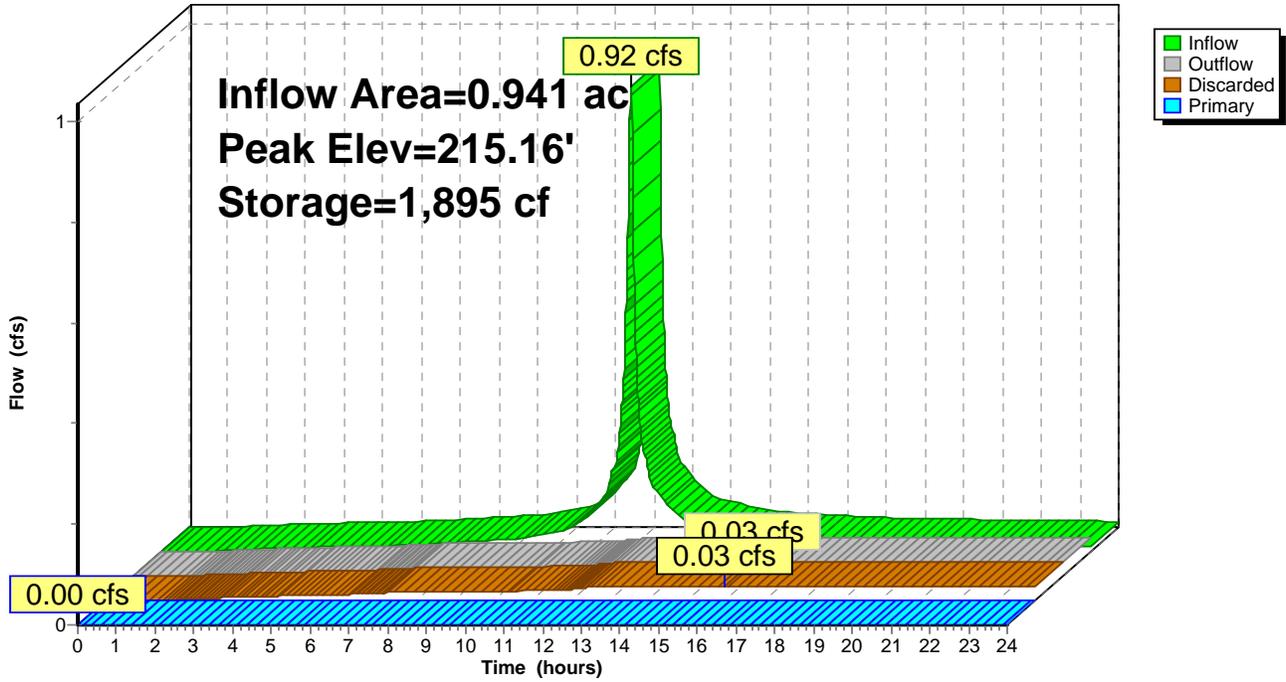
Device	Routing	Invert	Outlet Devices
#1	Discarded	212.00'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.03 cfs @ 15.97 hrs HW=215.16' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=212.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond D2: Dry Well #2

Hydrograph



Summary for Pond D2p: Dry Well#2

Inflow Area = 1.305 ac, 83.92% Impervious, Inflow Depth > 0.70" for 2 year event
 Inflow = 0.94 cfs @ 12.13 hrs, Volume= 0.076 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 217.13' @ 24.00 hrs Surf.Area= 1,547 sf Storage= 3,301 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	1,554,300 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatic Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	152 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		1,557,959 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
21,800.00	72	1,554,300	1,554,300

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.50	600	152	152

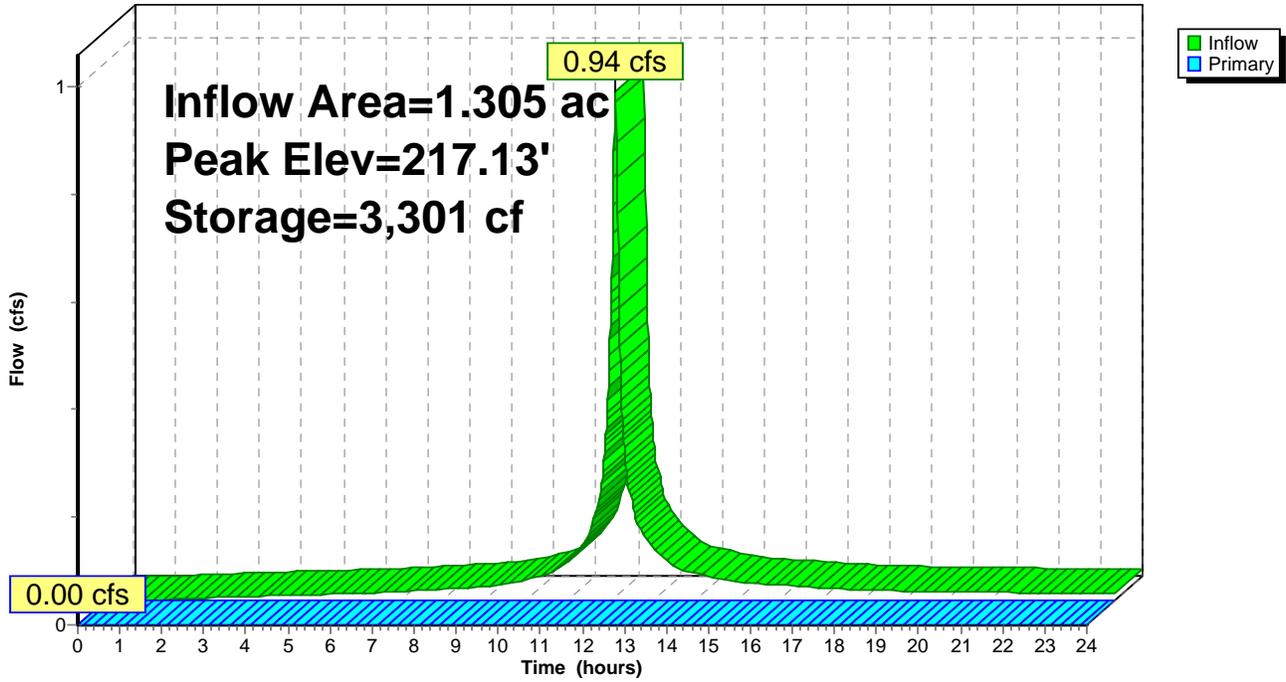
Device	Routing	Invert	Outlet Devices
#1	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=212.00' (Free Discharge)

↑1=Orifice/Grate (Controls 0.00 cfs)

Pond D2p: Dry Well #2

Hydrograph



Summary for Pond PB: Prop Basin

Inflow Area = 0.723 ac, 86.96% Impervious, Inflow Depth > 3.04" for 2 year event
 Inflow = 2.25 cfs @ 12.13 hrs, Volume= 0.183 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 222.55' @ 24.00 hrs Surf.Area= 0.109 ac Storage= 0.183 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

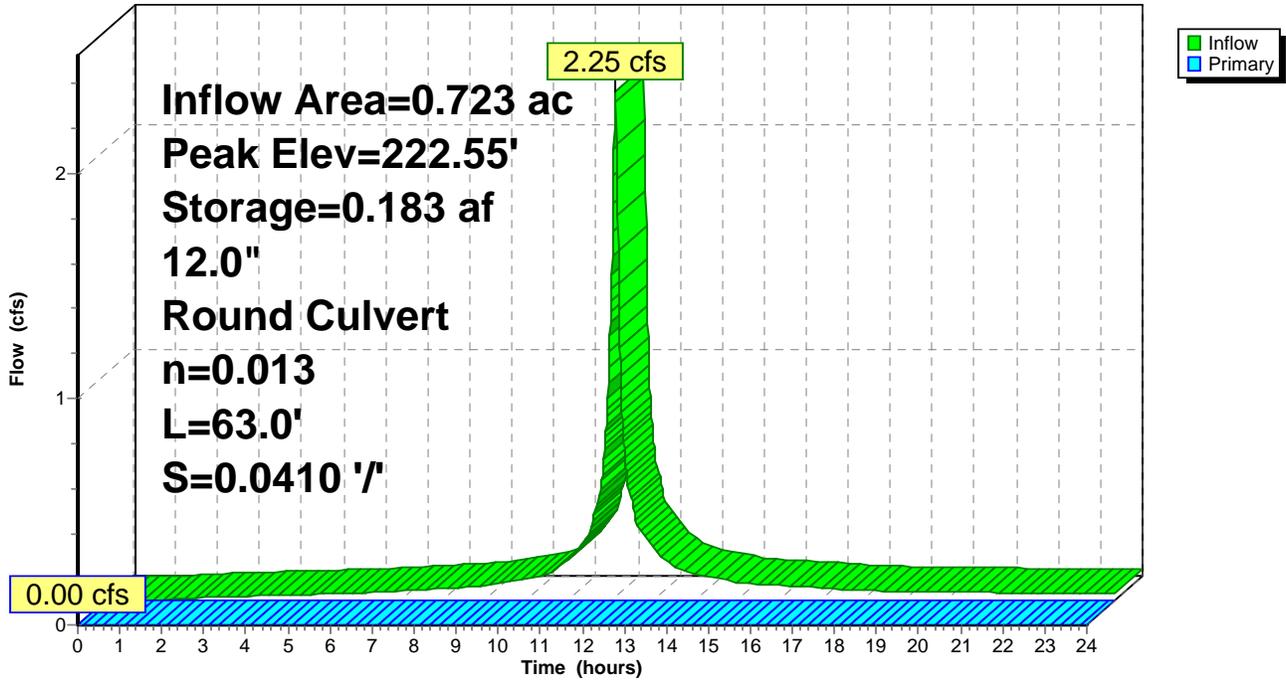
Volume	Invert	Avail.Storage	Storage Description
#1	219.33'	0.254 af	40.00'W x 57.00'L x 5.10'H Storm Trap 0.267 af Overall x 95.0% Voids
#2	218.33'	0.023 af	42.00'W x 59.00'L x 1.00'H Prismatic 0.057 af Overall x 40.0% Voids
#3	224.43'	0.000 af	2.50'D x 2.43'H Vertical Cone/Cylinder
		0.277 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	225.20'	12.0" Round Culvert L= 63.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.20' / 222.62' S= 0.0410 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=218.33' (Free Discharge)
 ↑1=Culvert (Controls 0.00 cfs)

Pond PB: Prop Basin

Hydrograph



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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

Subcatchment E1: EDA 1	Runoff Area=27,174 sf 49.37% Impervious Runoff Depth>3.76" Flow Length=209' Tc=12.1 min CN=74/98 Runoff=2.02 cfs 0.195 af
Subcatchment E2: EDA 2	Runoff Area=13,829 sf 76.19% Impervious Runoff Depth>4.42" Tc=6.0 min CN=74/98 Runoff=1.44 cfs 0.117 af
Subcatchment E3: EDA 3	Runoff Area=21,062 sf 42.13% Impervious Runoff Depth>3.58" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=1.58 cfs 0.144 af
Subcatchment E4: EDA 4	Runoff Area=8,879 sf 0.00% Impervious Runoff Depth>2.55" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.43 cfs 0.043 af
Subcatchment P1Ai: PDA 1a imp.	Runoff Area=22,353 sf 100.00% Impervious Runoff Depth>5.00" Tc=6.0 min CN=0/98 Runoff=2.57 cfs 0.214 af
Subcatchment P1Ap: PDA 1a per.	Runoff Area=4,108 sf 0.00% Impervious Runoff Depth>2.55" Tc=6.0 min CN=74/0 Runoff=0.28 cfs 0.020 af
Subcatchment P1Bi: PDA 1Bi	Runoff Area=9,460 sf 100.00% Impervious Runoff Depth>5.00" Tc=6.0 min CN=0/98 Runoff=1.09 cfs 0.090 af
Subcatchment P1Bp: PDA 1Bp	Runoff Area=1,883 sf 0.00% Impervious Runoff Depth>2.55" Tc=6.0 min CN=74/0 Runoff=0.13 cfs 0.009 af
Subcatchment P1r: PDA 1r Roof	Runoff Area=5,040 sf 100.00% Impervious Runoff Depth>5.00" Tc=6.0 min CN=0/98 Runoff=0.58 cfs 0.048 af
Subcatchment P2i: PDA 2i	Runoff Area=10,857 sf 100.00% Impervious Runoff Depth>5.00" Tc=6.0 min CN=0/98 Runoff=1.25 cfs 0.104 af
Subcatchment P2p: PDA 2p	Runoff Area=3,154 sf 0.00% Impervious Runoff Depth>2.55" Tc=6.0 min CN=74/0 Runoff=0.22 cfs 0.015 af
Subcatchment P3: PDA 3	Runoff Area=10,192 sf 11.77% Impervious Runoff Depth>2.84" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=0.64 cfs 0.055 af
Subcatchment P4: PDA 4	Runoff Area=3,762 sf 0.00% Impervious Runoff Depth>2.55" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.18 cfs 0.018 af
Pond D1: Dry Well #1	Peak Elev=224.59' Storage=4,424 cf Inflow=2.02 cfs 0.195 af Discarded=0.04 cfs 0.058 af Primary=0.38 cfs 0.037 af Outflow=0.43 cfs 0.095 af
Pond D1p: Dry Well #1	Peak Elev=224.52' Storage=4,419 cf Inflow=1.22 cfs 0.105 af Outflow=0.06 cfs 0.004 af
Pond D2: Dry Well #2	Peak Elev=218.05' Storage=3,904 cf Inflow=1.44 cfs 0.154 af Discarded=0.04 cfs 0.052 af Primary=0.17 cfs 0.019 af Outflow=0.21 cfs 0.071 af

Pond D2p: Dry Well #2

Peak Elev=218.01' Storage=3,903 cf Inflow=1.47 cfs 0.123 af
Outflow=0.09 cfs 0.033 af

Pond PB: Prop Basin

Peak Elev=225.31' Storage=0.276 af Inflow=3.43 cfs 0.282 af
12.0" Round Culvert n=0.013 L=63.0' S=0.0410 '/ Outflow=0.05 cfs 0.006 af

Total Runoff Area = 3.254 ac Runoff Volume = 1.074 af Average Runoff Depth = 3.96"
42.34% Pervious = 1.378 ac 57.66% Impervious = 1.876 ac

Summary for Subcatchment E1: EDA 1

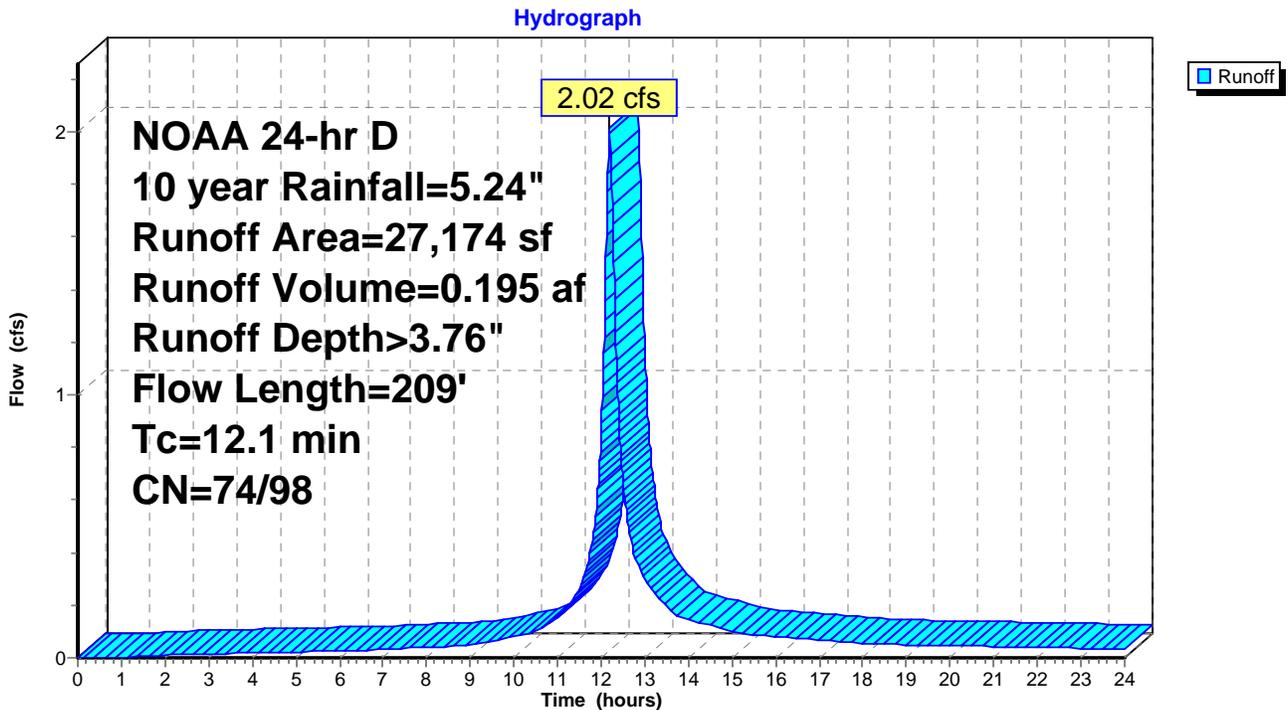
Runoff = 2.02 cfs @ 12.19 hrs, Volume= 0.195 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
13,417	98	Paved parking, HSG B
13,757	74	>75% Grass cover, Good, HSG C
27,174	86	Weighted Average
13,757	74	50.63% Pervious Area
13,417	98	49.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	115	0.0406	0.17		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.4	35	0.0365	1.49		Sheet Flow, Sheet Impervious Smooth surfaces n= 0.011 P2= 3.54"
0.3	59	0.0349	3.79		Shallow Concentrated Flow, Shall Conc Imp Paved Kv= 20.3 fps
12.1	209	Total			

Subcatchment E1: EDA 1



Summary for Subcatchment E2: EDA 2

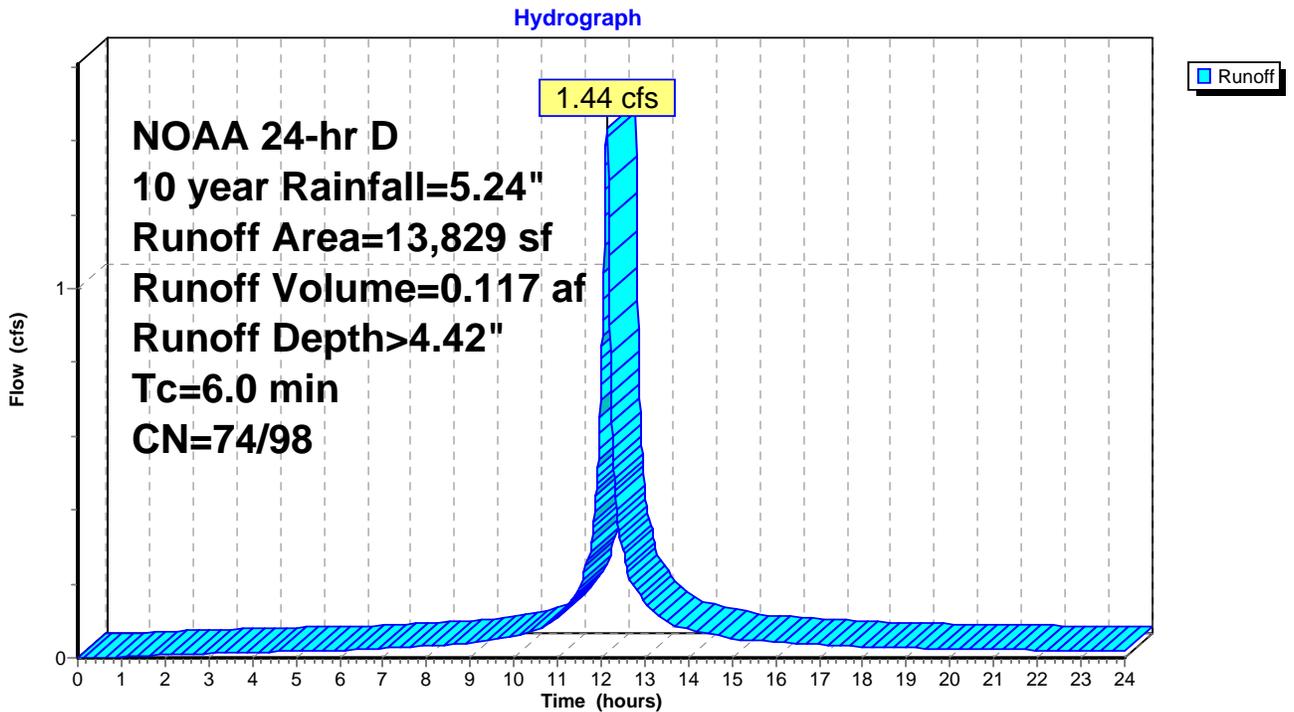
Runoff = 1.44 cfs @ 12.13 hrs, Volume= 0.117 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
* 5,640	98	Bldg. Roof
4,896	98	Paved parking, HSG B
3,293	74	>75% Grass cover, Good, HSG C
13,829	92	Weighted Average
3,293	74	23.81% Pervious Area
10,536	98	76.19% Impervious Area

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

Subcatchment E2: EDA 2



Summary for Subcatchment E3: EDA 3

Runoff = 1.58 cfs @ 12.18 hrs, Volume= 0.144 af, Depth> 3.58"

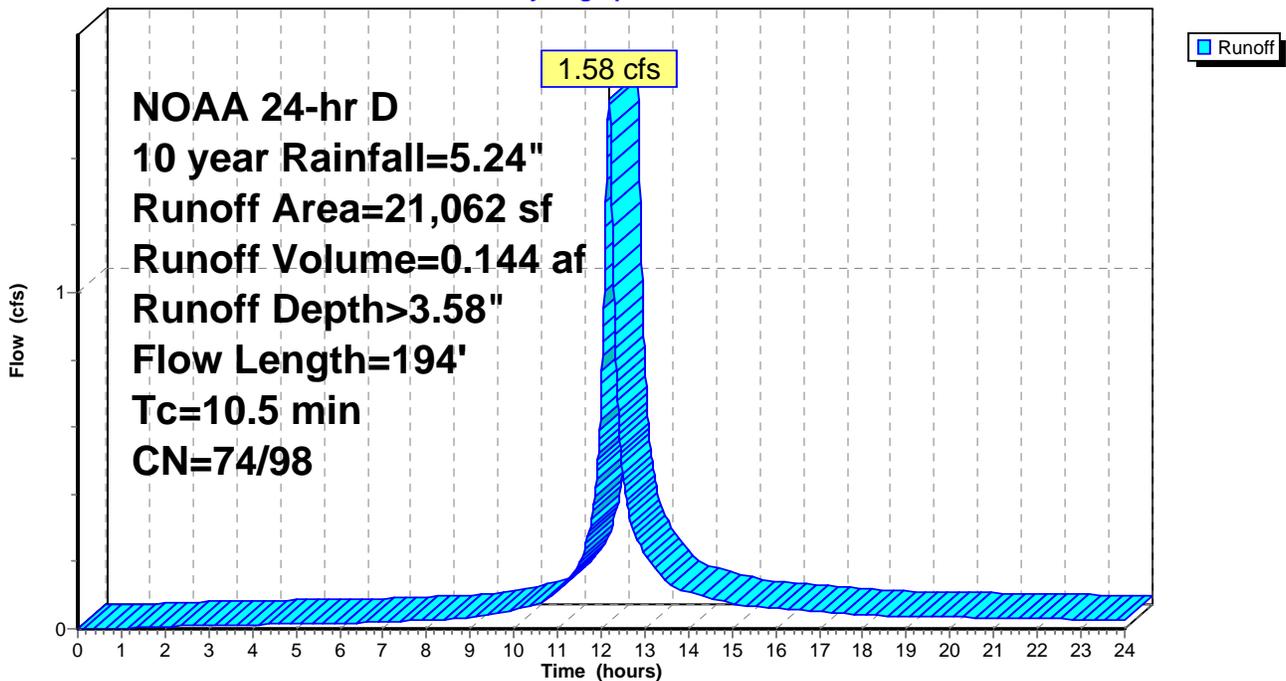
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
8,874	98	Paved parking, HSG B
12,188	74	>75% Grass cover, Good, HSG C
21,062	84	Weighted Average
12,188	74	57.87% Pervious Area
8,874	98	42.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment E3: EDA 3

Hydrograph



Summary for Subcatchment E4: EDA 4

Runoff = 0.43 cfs @ 12.26 hrs, Volume= 0.043 af, Depth> 2.55"

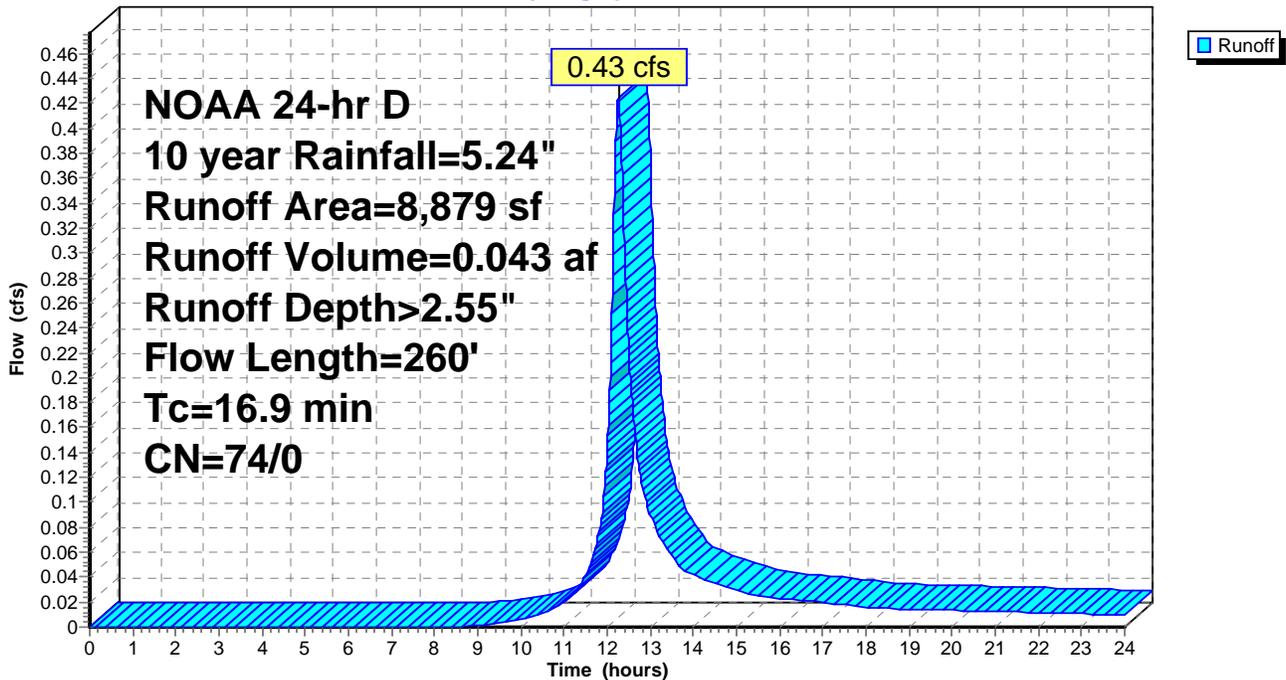
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
8,879	74	>75% Grass cover, Good, HSG C
8,879	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment E4: EDA 4

Hydrograph



Summary for Subcatchment P1Ai: PDA 1a imp.

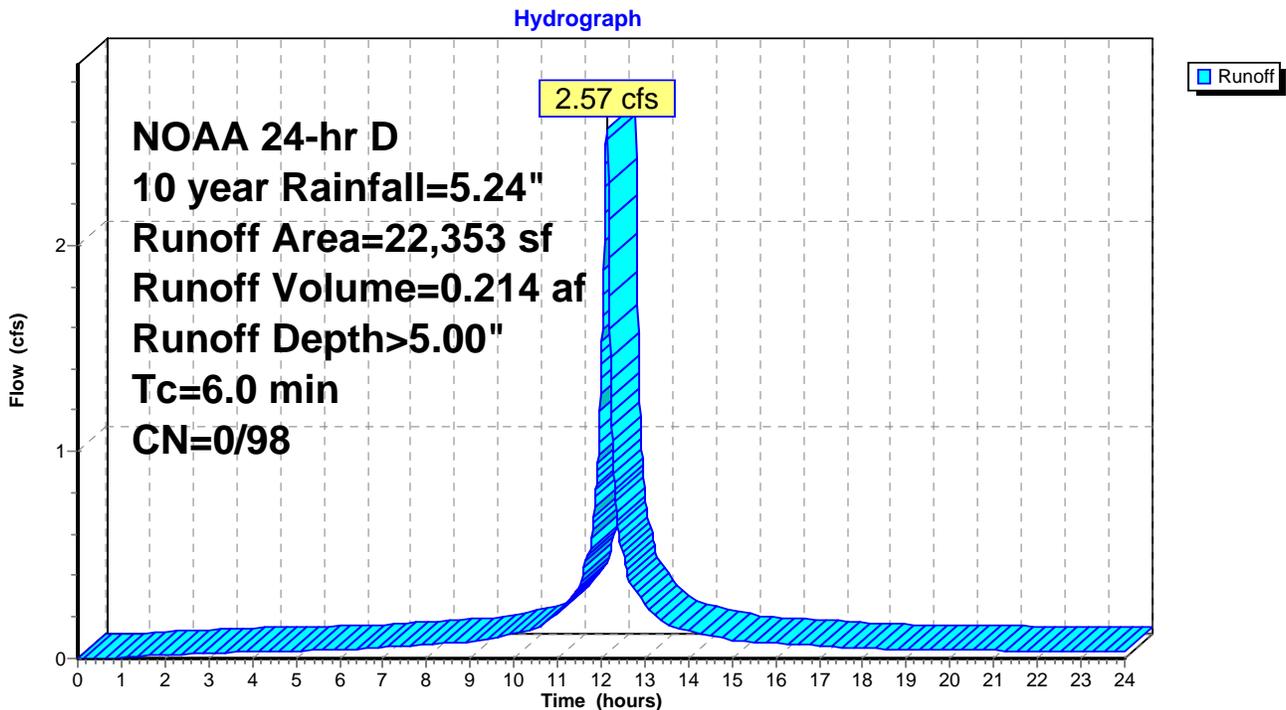
Runoff = 2.57 cfs @ 12.13 hrs, Volume= 0.214 af, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
22,353	98	Paved parking, HSG B
22,353	98	100.00% Impervious Area

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

Subcatchment P1Ai: PDA 1a imp.



Summary for Subcatchment P1Ap: PDA 1a per.

Runoff = 0.28 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 2.55"

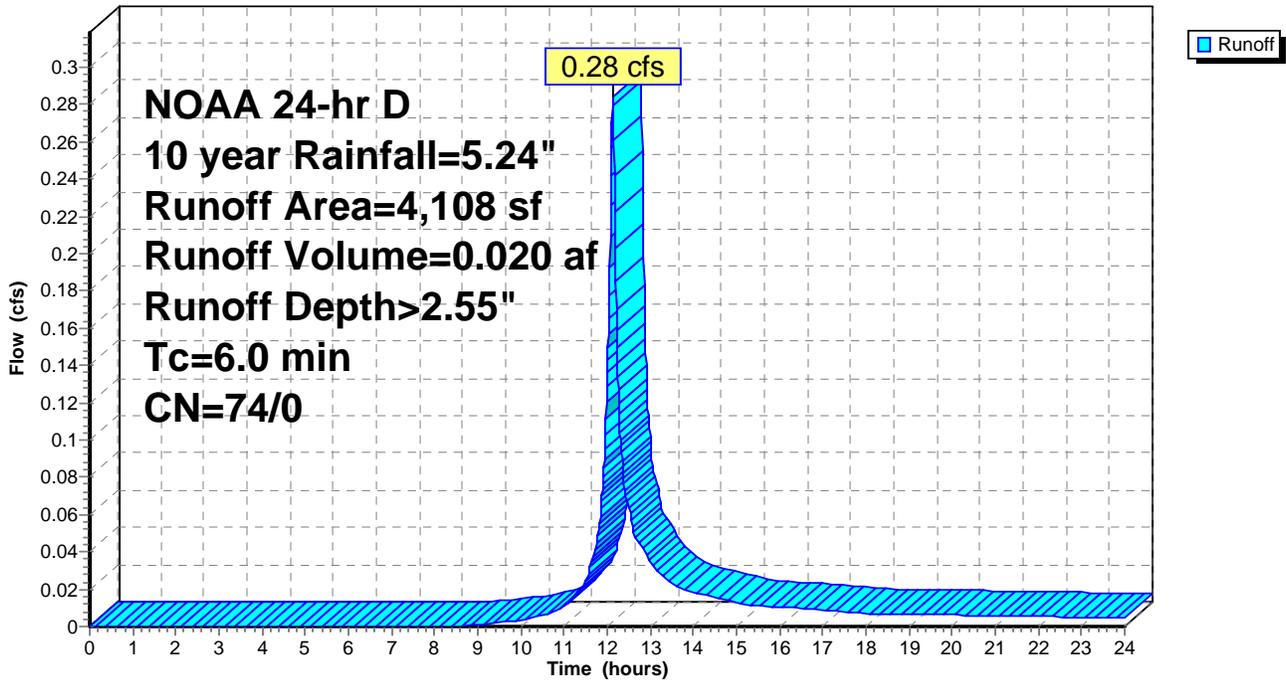
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
4,108	74	>75% Grass cover, Good, HSG C
4,108	74	100.00% Pervious Area

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

Subcatchment P1Ap: PDA 1a per.

Hydrograph



Summary for Subcatchment P1Bi: PDA 1Bi

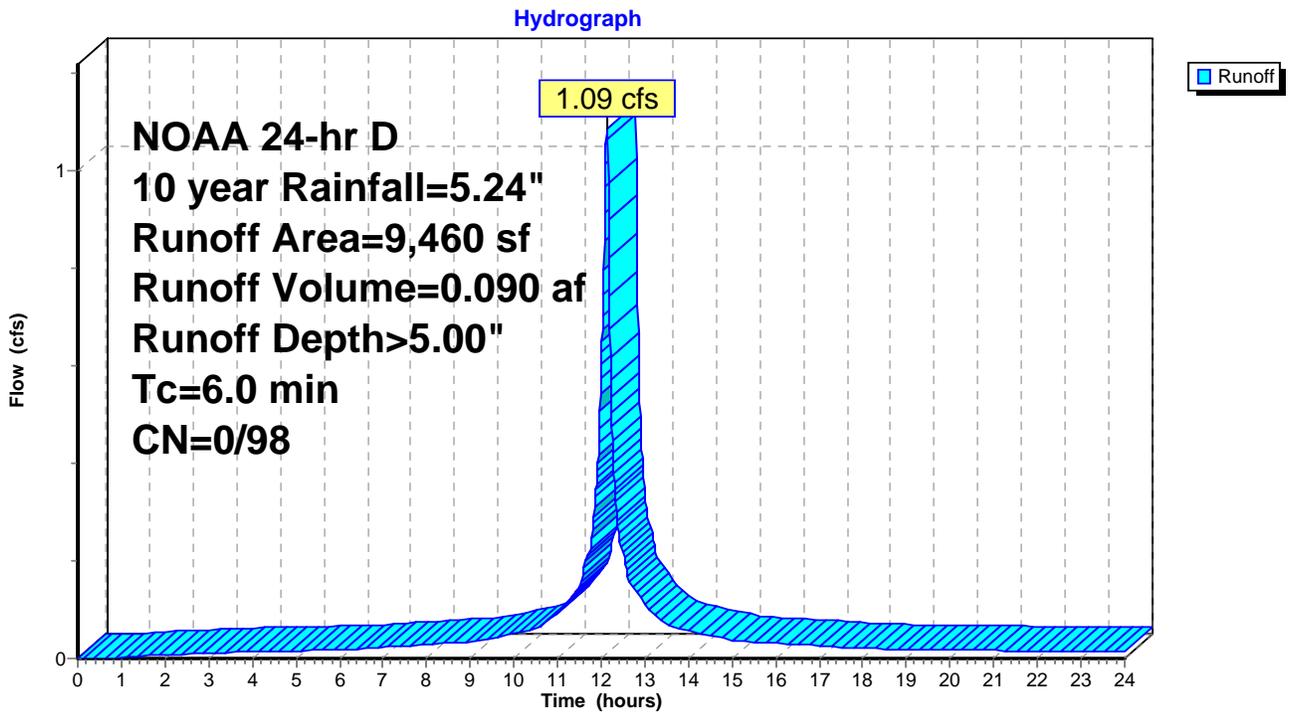
Runoff = 1.09 cfs @ 12.13 hrs, Volume= 0.090 af, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
9,460	98	Paved parking, HSG B
9,460	98	100.00% Impervious Area

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

Subcatchment P1Bi: PDA 1Bi



Summary for Subcatchment P1Bp: PDA 1Bp

Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.009 af, Depth> 2.55"

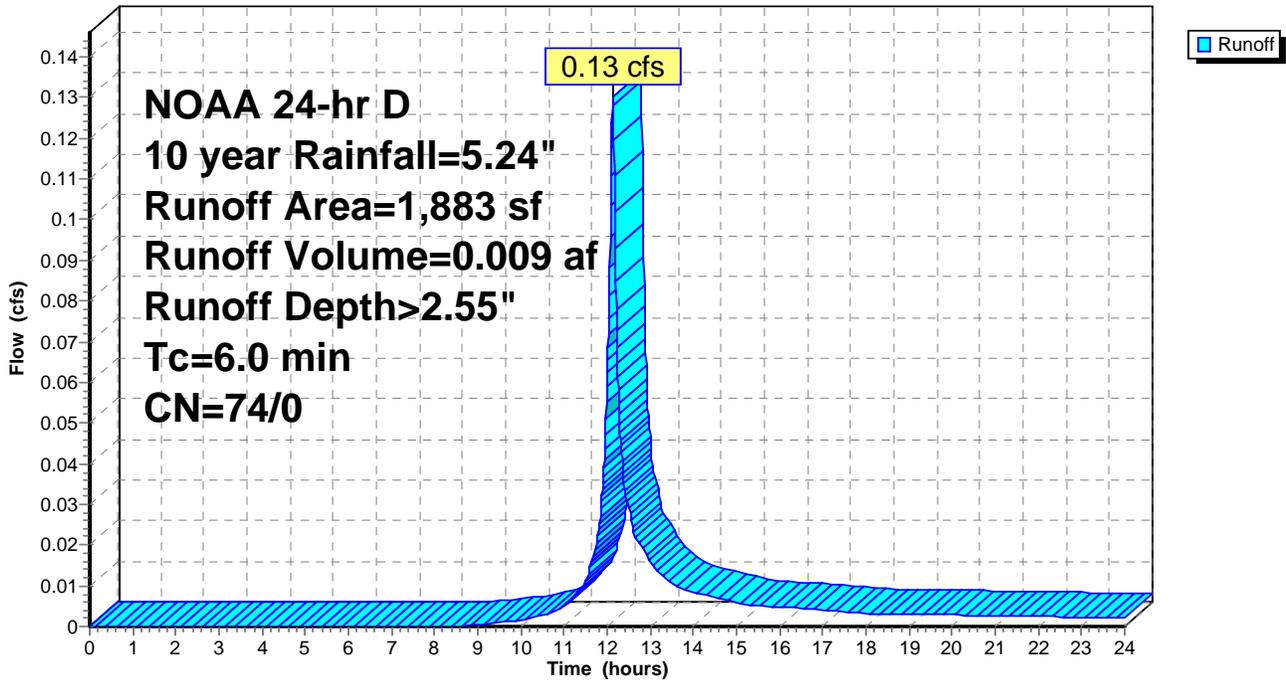
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
1,883	74	>75% Grass cover, Good, HSG C
1,883	74	100.00% Pervious Area

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

Subcatchment P1Bp: PDA 1Bp

Hydrograph



Summary for Subcatchment P1r: PDA 1r Roof

Runoff = 0.58 cfs @ 12.13 hrs, Volume= 0.048 af, Depth> 5.00"

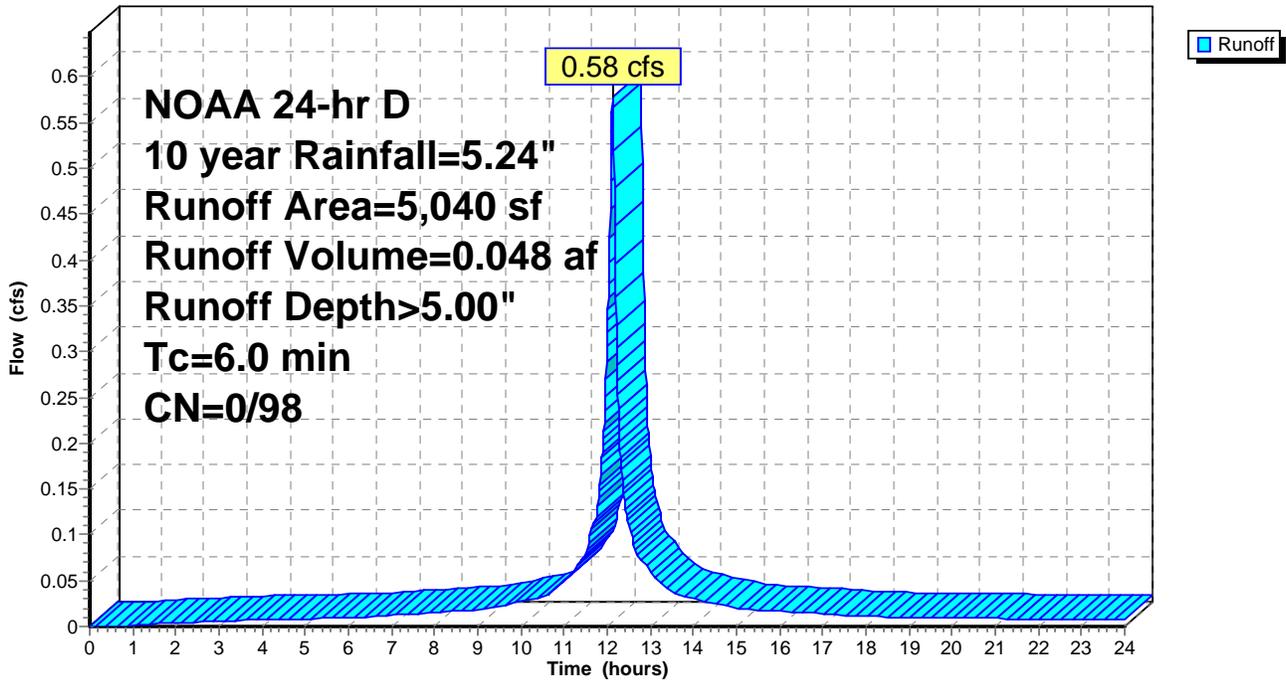
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
* 5,040	98	Bldg. Roof
5,040	98	100.00% Impervious Area

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

Subcatchment P1r: PDA 1r Roof

Hydrograph



Summary for Subcatchment P2i: PDA 2i

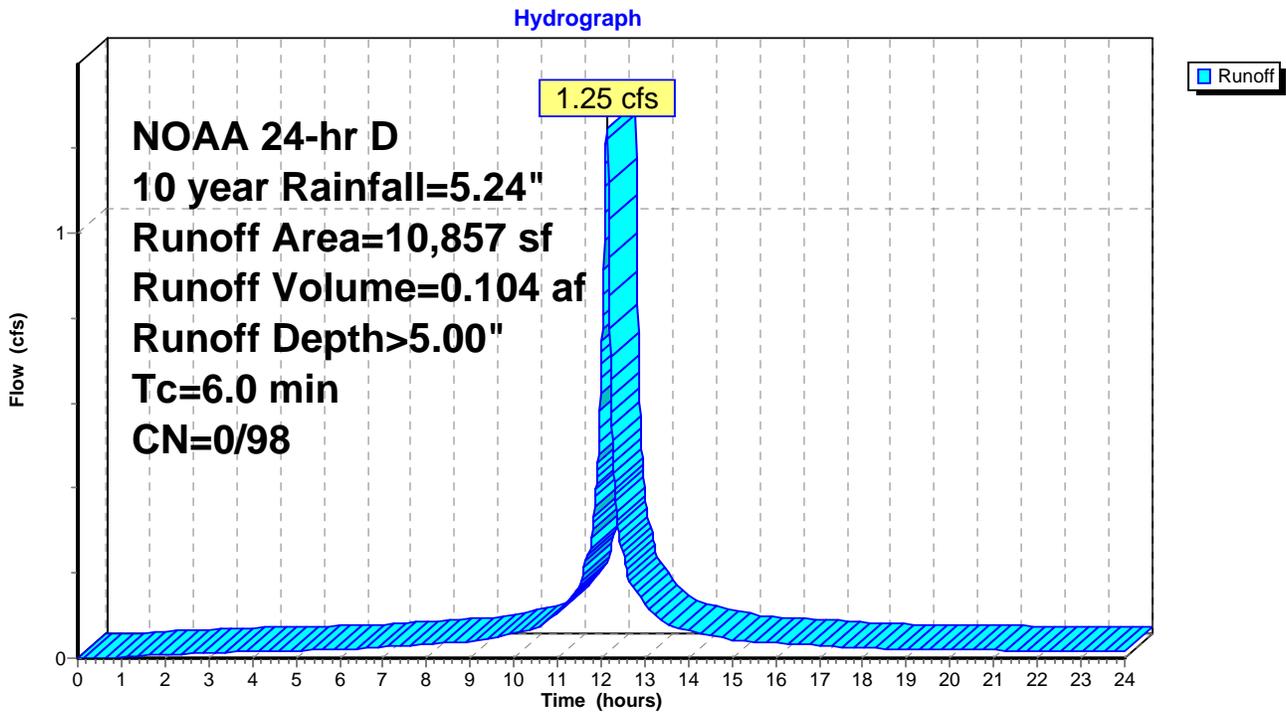
Runoff = 1.25 cfs @ 12.13 hrs, Volume= 0.104 af, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

	Area (sf)	CN	Description
*	5,640	98	Building Roof
	5,217	98	Paved parking, HSG B
	10,857	98	Weighted Average
	10,857	98	100.00% Impervious Area

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

Subcatchment P2i: PDA 2i



Summary for Subcatchment P2p: PDA 2p

Runoff = 0.22 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 2.55"

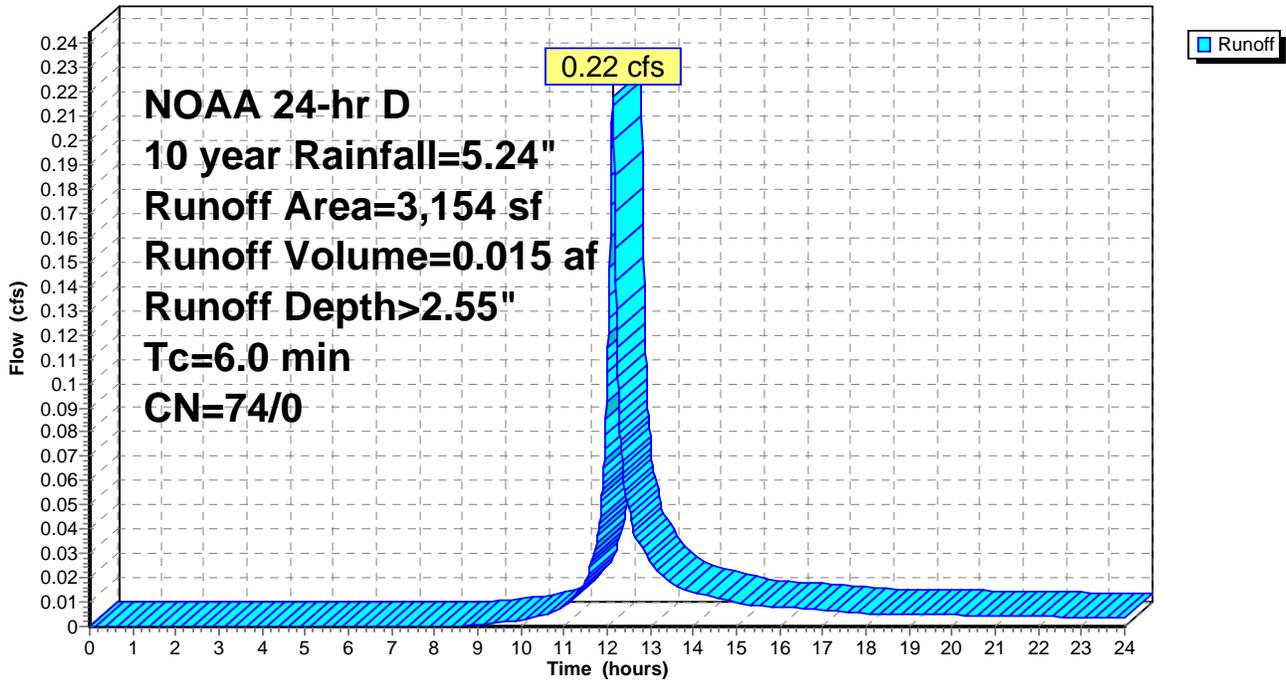
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
3,154	74	>75% Grass cover, Good, HSG C
3,154	74	100.00% Pervious Area

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

Subcatchment P2p: PDA 2p

Hydrograph



Summary for Subcatchment P3: PDA 3

Runoff = 0.64 cfs @ 12.18 hrs, Volume= 0.055 af, Depth> 2.84"

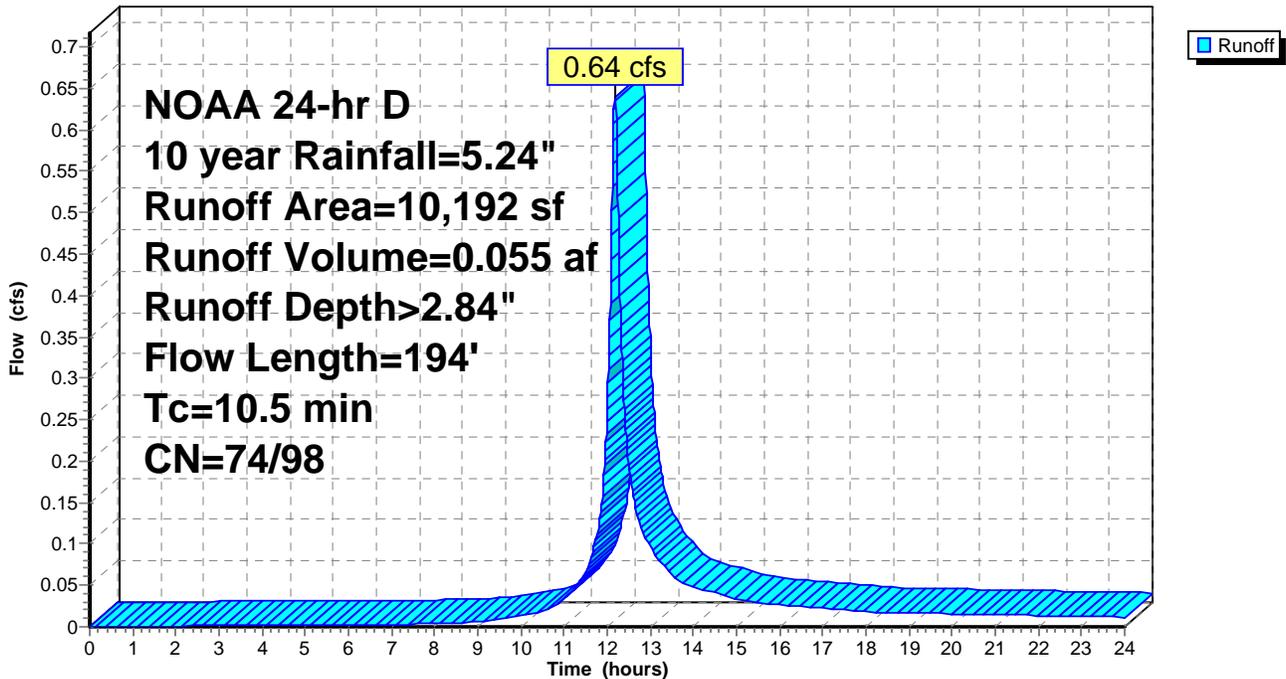
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
1,200	98	Paved parking, HSG B
8,992	74	>75% Grass cover, Good, HSG C
10,192	77	Weighted Average
8,992	74	88.23% Pervious Area
1,200	98	11.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment P3: PDA 3

Hydrograph



Summary for Subcatchment P4: PDA 4

Runoff = 0.18 cfs @ 12.26 hrs, Volume= 0.018 af, Depth> 2.55"

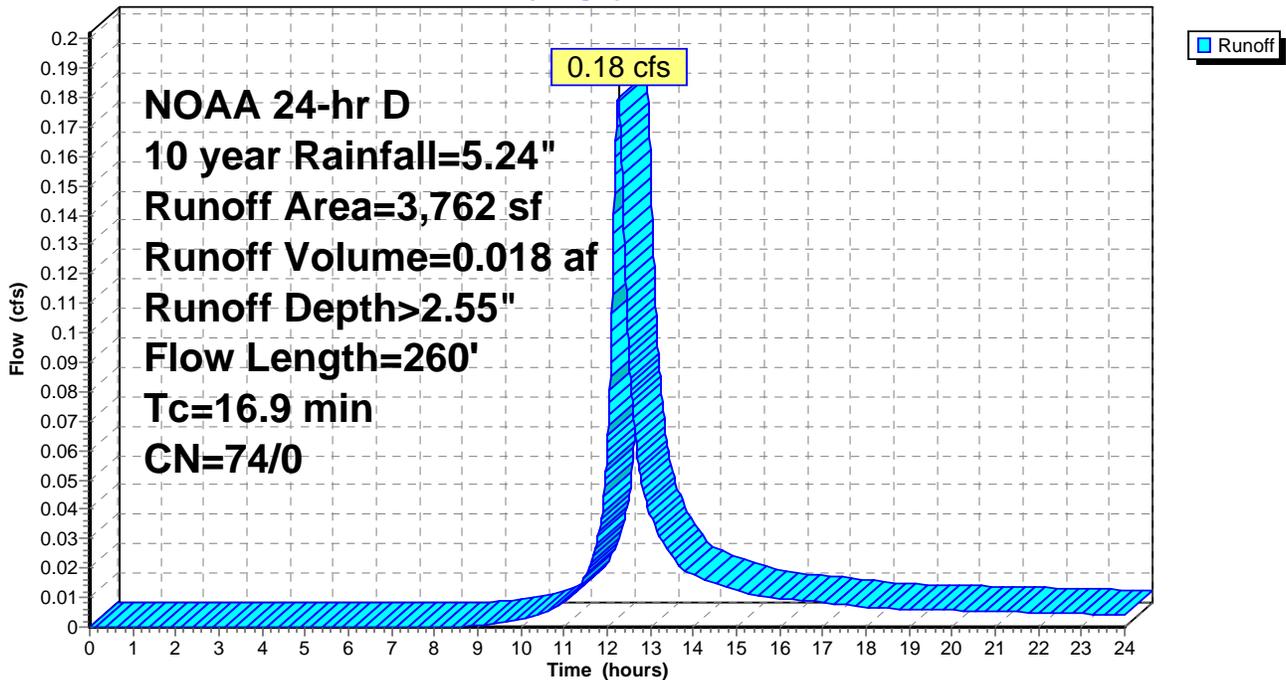
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10 year Rainfall=5.24"

Area (sf)	CN	Description
3,762	74	>75% Grass cover, Good, HSG C
3,762	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment P4: PDA 4

Hydrograph



Summary for Pond D1: Dry Well #1

Inflow Area = 0.624 ac, 49.37% Impervious, Inflow Depth > 3.76" for 10 year event
 Inflow = 2.02 cfs @ 12.19 hrs, Volume= 0.195 af
 Outflow = 0.43 cfs @ 12.71 hrs, Volume= 0.095 af, Atten= 79%, Lag= 30.8 min
 Discarded = 0.04 cfs @ 12.71 hrs, Volume= 0.058 af
 Primary = 0.38 cfs @ 12.71 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 224.59' @ 12.71 hrs Surf.Area= 1,904 sf Storage= 4,424 cf

Plug-Flow detention time= 243.7 min calculated for 0.095 af (49% of inflow)
 Center-of-Mass det. time= 102.4 min (888.3 - 785.8)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatoid Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

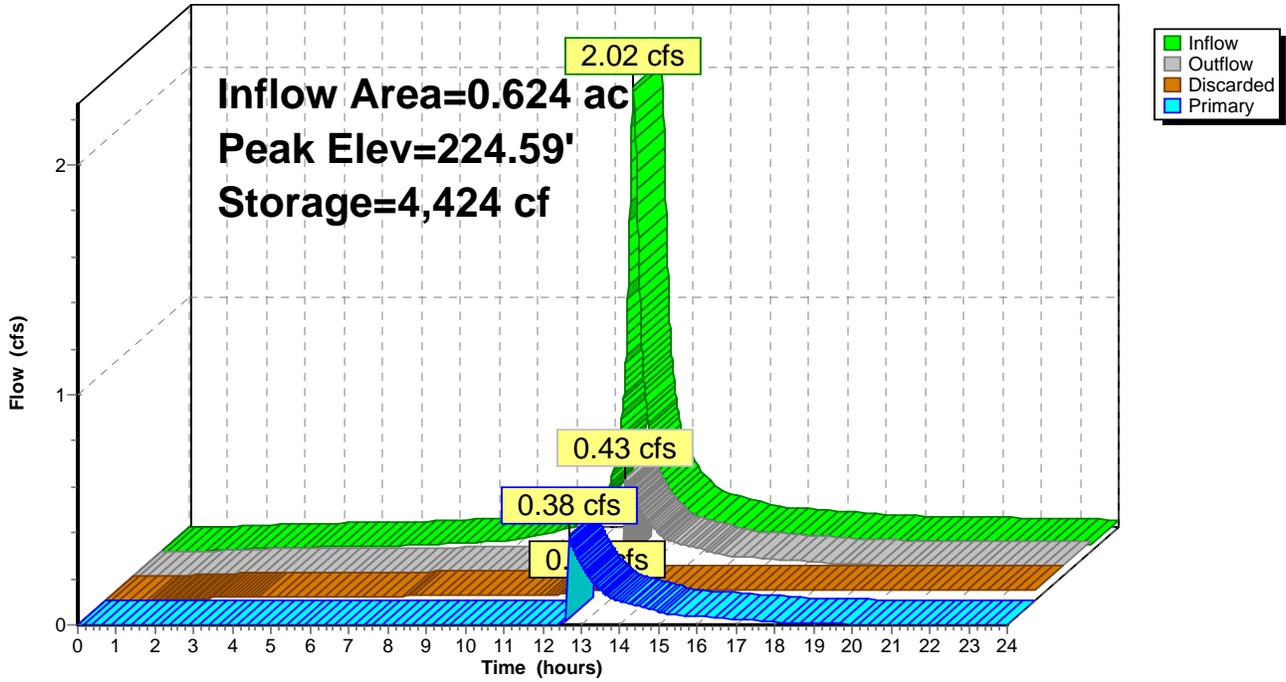
Device	Routing	Invert	Outlet Devices
#1	Discarded	217.89'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.04 cfs @ 12.71 hrs HW=224.59' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.37 cfs @ 12.71 hrs HW=224.59' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.37 cfs @ 0.98 fps)

Pond D1: Dry Well #1

Hydrograph



Summary for Pond D1p: Dry Well#1

[79] Warning: Submerged Pond PB Primary device # 1 OUTLET by 1.90'

Inflow Area = 0.984 ac, 86.02% Impervious, Inflow Depth > 1.28" for 10 year event
 Inflow = 1.22 cfs @ 12.13 hrs, Volume= 0.105 af
 Outflow = 0.06 cfs @ 23.25 hrs, Volume= 0.004 af, Atten= 95%, Lag= 667.2 min
 Primary = 0.06 cfs @ 23.25 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 224.52' @ 23.25 hrs Surf.Area= 1,848 sf Storage= 4,419 cf

Plug-Flow detention time= 1,200.7 min calculated for 0.004 af (4% of inflow)
 Center-of-Mass det. time= 626.4 min (1,416.5 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatoid Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

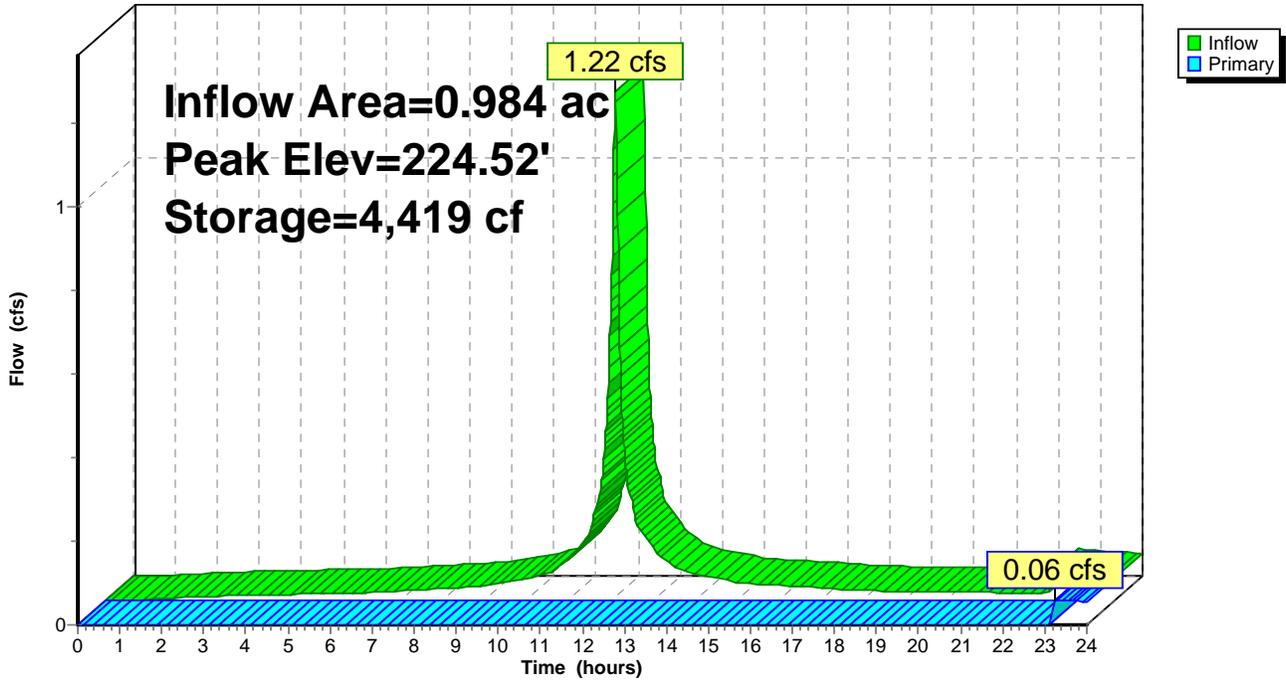
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

Device	Routing	Invert	Outlet Devices
#1	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.03 cfs @ 23.25 hrs HW=224.52' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.03 cfs @ 0.41 fps)

Pond D1p: Dry Well #1

Hydrograph



Summary for Pond D2: Dry Well #2

Inflow Area = 0.941 ac, 58.42% Impervious, Inflow Depth > 1.96" for 10 year event
 Inflow = 1.44 cfs @ 12.13 hrs, Volume= 0.154 af
 Outflow = 0.21 cfs @ 13.79 hrs, Volume= 0.071 af, Atten= 86%, Lag= 99.8 min
 Discarded = 0.04 cfs @ 13.79 hrs, Volume= 0.052 af
 Primary = 0.17 cfs @ 13.79 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 218.05' @ 13.79 hrs Surf.Area= 1,768 sf Storage= 3,904 cf

Plug-Flow detention time= 271.9 min calculated for 0.071 af (46% of inflow)
 Center-of-Mass det. time= 128.5 min (911.9 - 783.4)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	396 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatoid Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	171 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,073 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
218.00	72	396	396

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.56	600	171	171

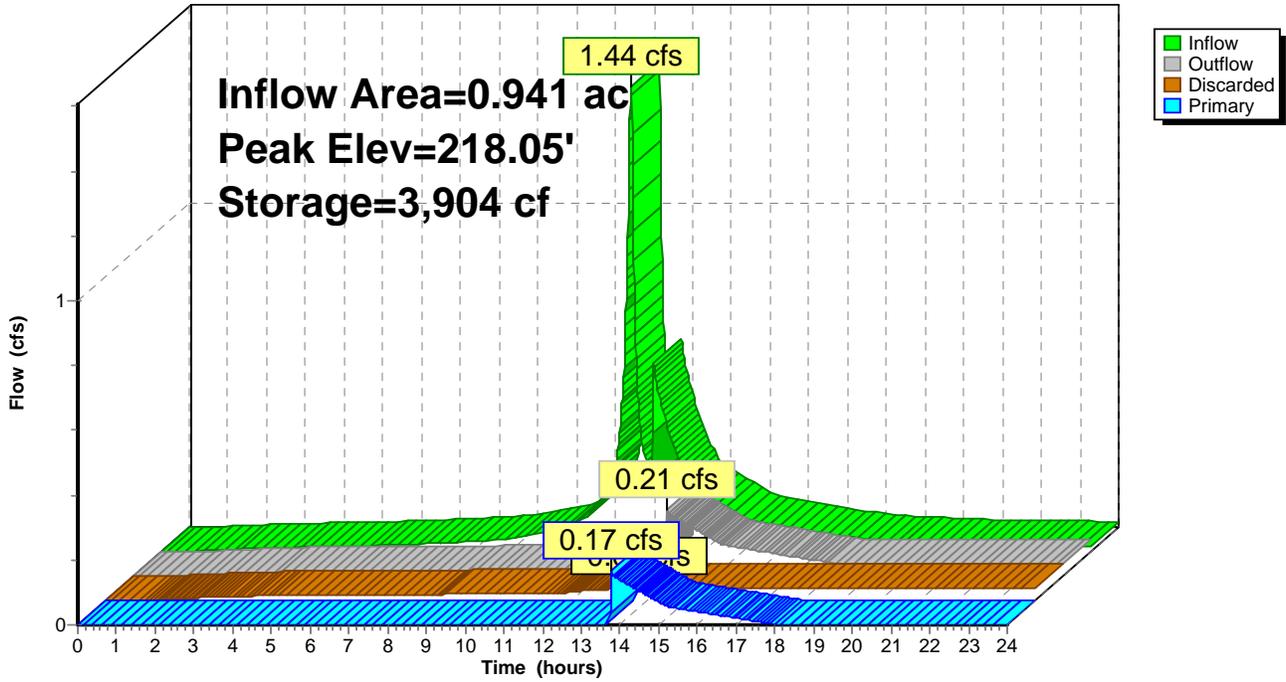
Device	Routing	Invert	Outlet Devices
#1	Discarded	212.00'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.04 cfs @ 13.79 hrs HW=218.05' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.14 cfs @ 13.79 hrs HW=218.05' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.14 cfs @ 0.71 fps)

Pond D2: Dry Well#2

Hydrograph



Summary for Pond D2p: Dry Well#2

Inflow Area = 1.305 ac, 83.92% Impervious, Inflow Depth > 1.13" for 10 year event
 Inflow = 1.47 cfs @ 12.13 hrs, Volume= 0.123 af
 Outflow = 0.09 cfs @ 13.66 hrs, Volume= 0.033 af, Atten= 94%, Lag= 92.1 min
 Primary = 0.09 cfs @ 13.66 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 218.01' @ 13.66 hrs Surf.Area= 1,724 sf Storage= 3,903 cf

Plug-Flow detention time= 552.4 min calculated for 0.033 af (27% of inflow)
 Center-of-Mass det. time= 310.5 min (1,090.7 - 780.2)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	1,554,300 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatoid Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	152 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		1,557,959 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
21,800.00	72	1,554,300	1,554,300

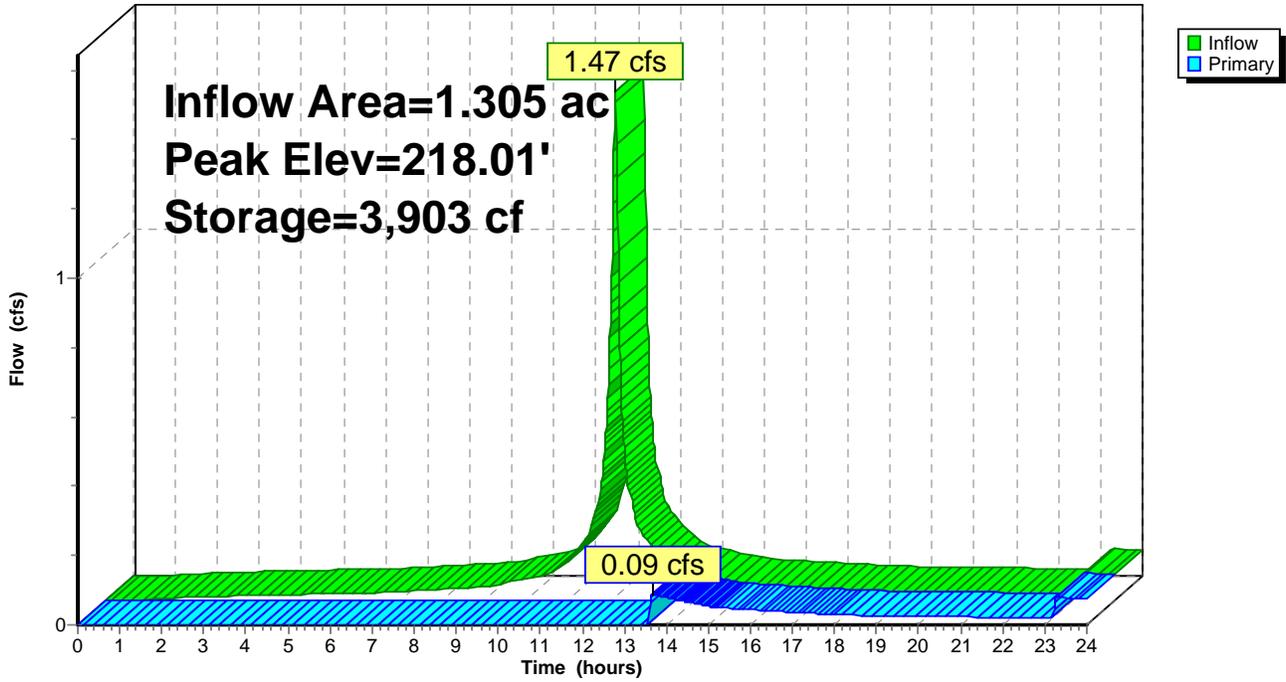
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.50	600	152	152

Device	Routing	Invert	Outlet Devices
#1	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.01 cfs @ 13.66 hrs HW=218.01' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.31 fps)

Pond D2p: Dry Well #2

Hydrograph



Summary for Pond PB: Prop Basin

Inflow Area = 0.723 ac, 86.96% Impervious, Inflow Depth > 4.68" for 10 year event
 Inflow = 3.43 cfs @ 12.13 hrs, Volume= 0.282 af
 Outflow = 0.05 cfs @ 22.50 hrs, Volume= 0.006 af, Atten= 98%, Lag= 622.4 min
 Primary = 0.05 cfs @ 22.50 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 225.31' @ 22.50 hrs Surf.Area= 0.109 ac Storage= 0.276 af

Plug-Flow detention time= 1,232.7 min calculated for 0.006 af (2% of inflow)
 Center-of-Mass det. time= 639.0 min (1,393.7 - 754.7)

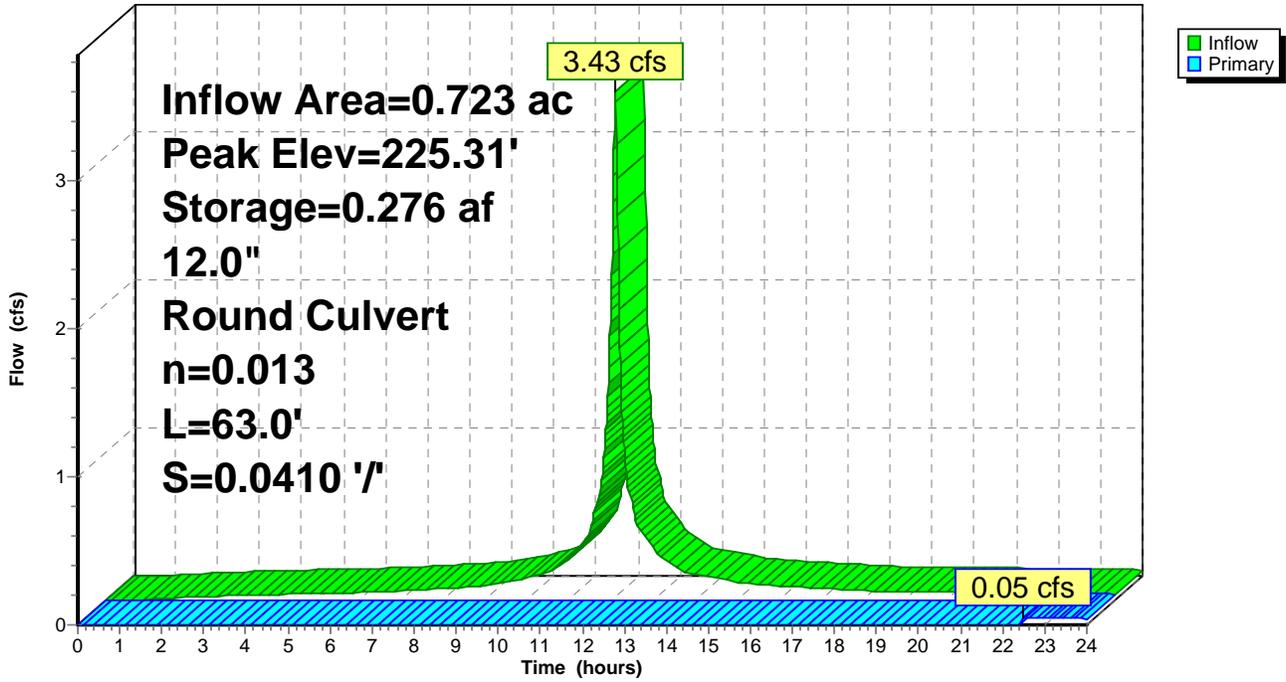
Volume	Invert	Avail.Storage	Storage Description
#1	219.33'	0.254 af	40.00'W x 57.00'L x 5.10'H Storm Trap 0.267 af Overall x 95.0% Voids
#2	218.33'	0.023 af	42.00'W x 59.00'L x 1.00'H Prismatic 0.057 af Overall x 40.0% Voids
#3	224.43'	0.000 af	2.50'D x 2.43'H Vertical Cone/Cylinder
		0.277 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	225.20'	12.0" Round Culvert L= 63.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.20' / 222.62' S= 0.0410 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.05 cfs @ 22.50 hrs HW=225.31' (Free Discharge)
 ↑1=Culvert (Inlet Controls 0.05 cfs @ 0.99 fps)

Pond PB: Prop Basin

Hydrograph



J190530 Heller Madison_prop basin and dry well NOAA 24-hr D 100 year Rainfall=8.35"

Prepared by {enter your company name here}

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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

Subcatchment E1: EDA 1	Runoff Area=27,174 sf 49.37% Impervious Runoff Depth>6.64" Flow Length=209' Tc=12.1 min CN=74/98 Runoff=3.56 cfs 0.345 af
Subcatchment E2: EDA 2	Runoff Area=13,829 sf 76.19% Impervious Runoff Depth>7.42" Tc=6.0 min CN=74/98 Runoff=2.39 cfs 0.196 af
Subcatchment E3: EDA 3	Runoff Area=21,062 sf 42.13% Impervious Runoff Depth>6.44" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=2.83 cfs 0.259 af
Subcatchment E4: EDA 4	Runoff Area=8,879 sf 0.00% Impervious Runoff Depth>5.22" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.87 cfs 0.089 af
Subcatchment P1Ai: PDA 1a imp.	Runoff Area=22,353 sf 100.00% Impervious Runoff Depth>8.10" Tc=6.0 min CN=0/98 Runoff=4.10 cfs 0.346 af
Subcatchment P1Ap: PDA 1a per.	Runoff Area=4,108 sf 0.00% Impervious Runoff Depth>5.23" Tc=6.0 min CN=74/0 Runoff=0.57 cfs 0.041 af
Subcatchment P1Bi: PDA 1Bi	Runoff Area=9,460 sf 100.00% Impervious Runoff Depth>8.10" Tc=6.0 min CN=0/98 Runoff=1.74 cfs 0.147 af
Subcatchment P1Bp: PDA 1Bp	Runoff Area=1,883 sf 0.00% Impervious Runoff Depth>5.23" Tc=6.0 min CN=74/0 Runoff=0.26 cfs 0.019 af
Subcatchment P1r: PDA 1r Roof	Runoff Area=5,040 sf 100.00% Impervious Runoff Depth>8.10" Tc=6.0 min CN=0/98 Runoff=0.93 cfs 0.078 af
Subcatchment P2i: PDA 2i	Runoff Area=10,857 sf 100.00% Impervious Runoff Depth>8.10" Tc=6.0 min CN=0/98 Runoff=1.99 cfs 0.168 af
Subcatchment P2p: PDA 2p	Runoff Area=3,154 sf 0.00% Impervious Runoff Depth>5.23" Tc=6.0 min CN=74/0 Runoff=0.44 cfs 0.032 af
Subcatchment P3: PDA 3	Runoff Area=10,192 sf 11.77% Impervious Runoff Depth>5.56" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=1.25 cfs 0.108 af
Subcatchment P4: PDA 4	Runoff Area=3,762 sf 0.00% Impervious Runoff Depth>5.22" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.37 cfs 0.038 af
Pond D1: Dry Well #1	Peak Elev=224.91' Storage=4,610 cf Inflow=3.56 cfs 0.345 af Discarded=0.07 cfs 0.063 af Primary=3.41 cfs 0.181 af Outflow=3.48 cfs 0.244 af
Pond D1p: Dry Well #1	Peak Elev=224.80' Storage=4,506 cf Inflow=3.64 cfs 0.355 af Outflow=2.13 cfs 0.253 af
Pond D2: Dry Well #2	Peak Elev=218.53' Storage=4,054 cf Inflow=5.13 cfs 0.377 af Discarded=0.05 cfs 0.058 af Primary=4.92 cfs 0.230 af Outflow=4.97 cfs 0.288 af

J190530 Heller Madison_prop basin and dry well NOAA 24-hr D 100 year Rainfall=8.35"

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Pond D2p: Dry Well #2

Peak Elev=218.30' Storage=3,982 cf Inflow=2.82 cfs 0.453 af
Outflow=2.76 cfs 0.363 af

Pond PB: Prop Basin

Peak Elev=226.49' Storage=0.277 af Inflow=5.60 cfs 0.466 af
12.0" Round Culvert n=0.013 L=63.0' S=0.0410 '/ Outflow=2.97 cfs 0.189 af

Total Runoff Area = 3.254 ac Runoff Volume = 1.867 af Average Runoff Depth = 6.88"
42.34% Pervious = 1.378 ac 57.66% Impervious = 1.876 ac

Summary for Subcatchment E1: EDA 1

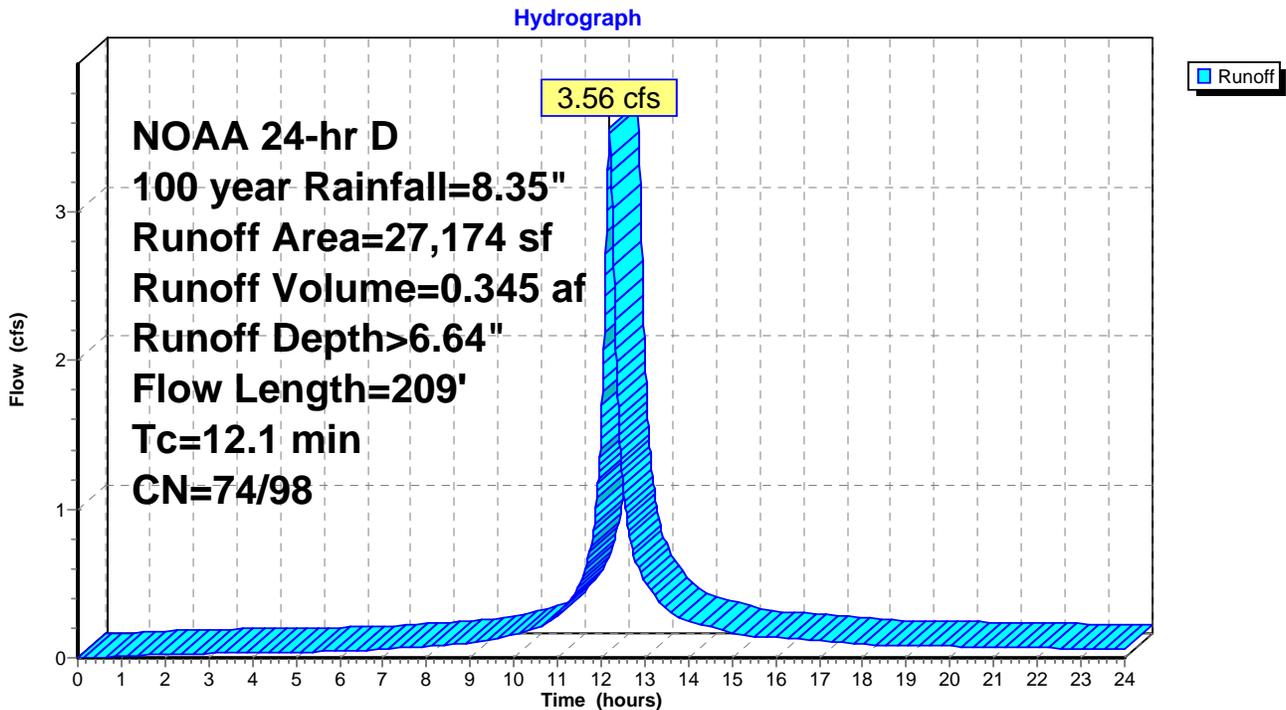
Runoff = 3.56 cfs @ 12.19 hrs, Volume= 0.345 af, Depth> 6.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
13,417	98	Paved parking, HSG B
13,757	74	>75% Grass cover, Good, HSG C
27,174	86	Weighted Average
13,757	74	50.63% Pervious Area
13,417	98	49.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	115	0.0406	0.17		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.4	35	0.0365	1.49		Sheet Flow, Sheet Impervious Smooth surfaces n= 0.011 P2= 3.54"
0.3	59	0.0349	3.79		Shallow Concentrated Flow, Shall Conc Imp Paved Kv= 20.3 fps
12.1	209	Total			

Subcatchment E1: EDA 1



Summary for Subcatchment E2: EDA 2

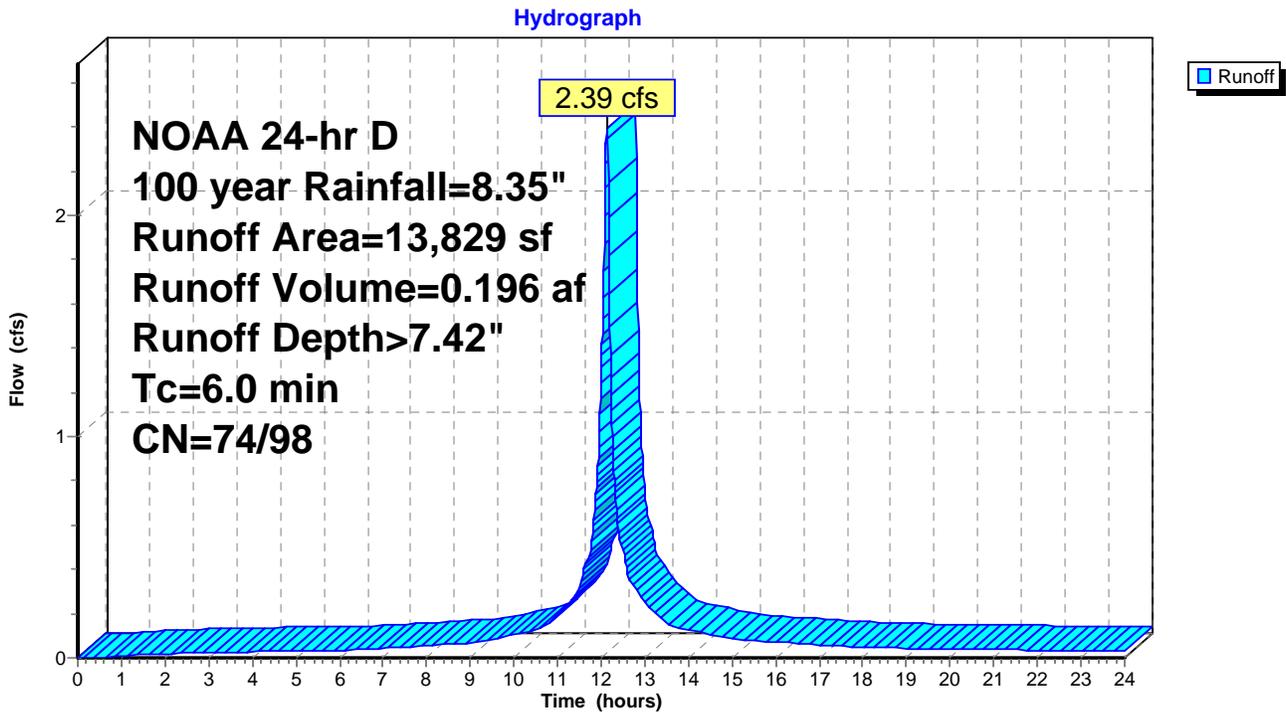
Runoff = 2.39 cfs @ 12.13 hrs, Volume= 0.196 af, Depth> 7.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
* 5,640	98	Bldg. Roof
4,896	98	Paved parking, HSG B
3,293	74	>75% Grass cover, Good, HSG C
13,829	92	Weighted Average
3,293	74	23.81% Pervious Area
10,536	98	76.19% Impervious Area

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

Subcatchment E2: EDA 2



Summary for Subcatchment E3: EDA 3

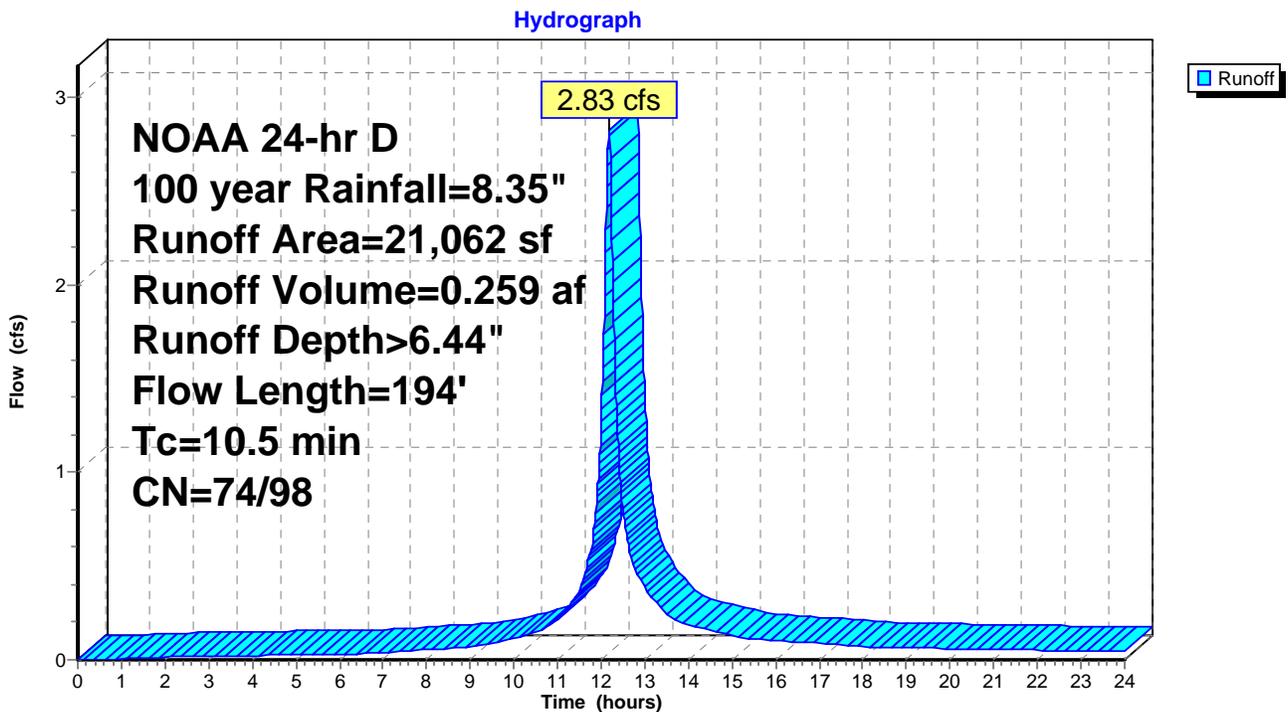
Runoff = 2.83 cfs @ 12.18 hrs, Volume= 0.259 af, Depth> 6.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
8,874	98	Paved parking, HSG B
12,188	74	>75% Grass cover, Good, HSG C
21,062	84	Weighted Average
12,188	74	57.87% Pervious Area
8,874	98	42.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment E3: EDA 3



Summary for Subcatchment E4: EDA 4

Runoff = 0.87 cfs @ 12.26 hrs, Volume= 0.089 af, Depth> 5.22"

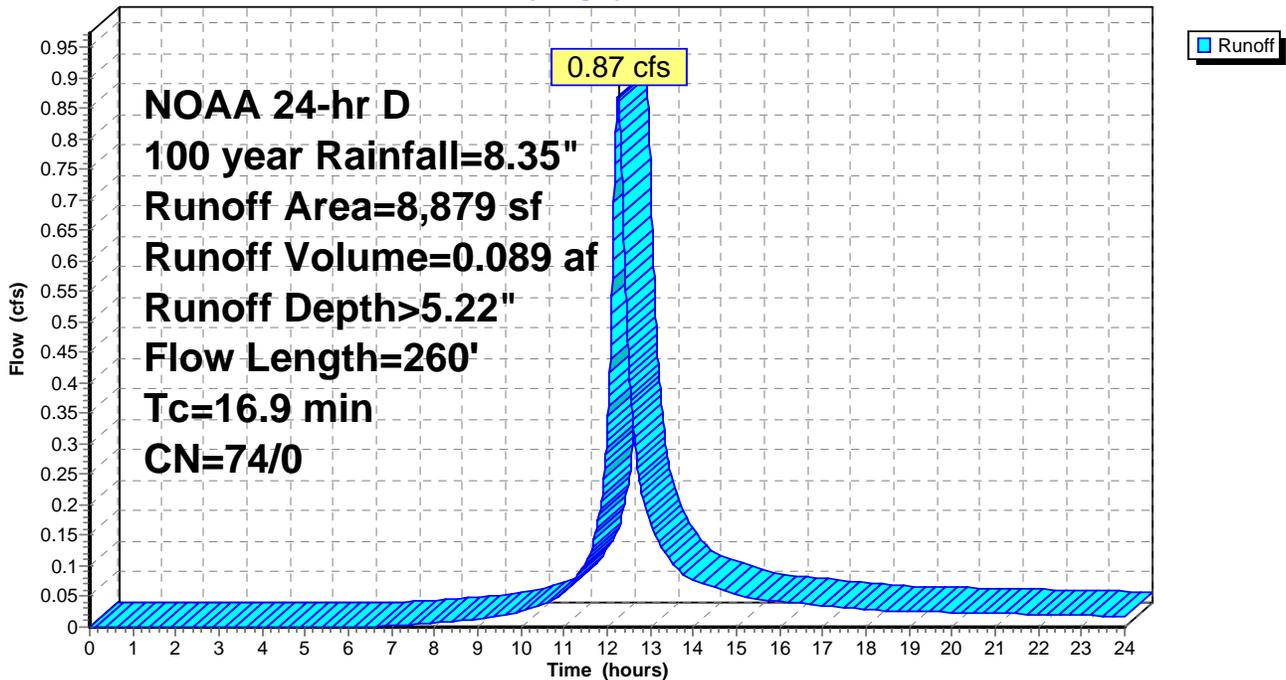
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
8,879	74	>75% Grass cover, Good, HSG C
8,879	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment E4: EDA 4

Hydrograph



Summary for Subcatchment P1Ai: PDA 1a imp.

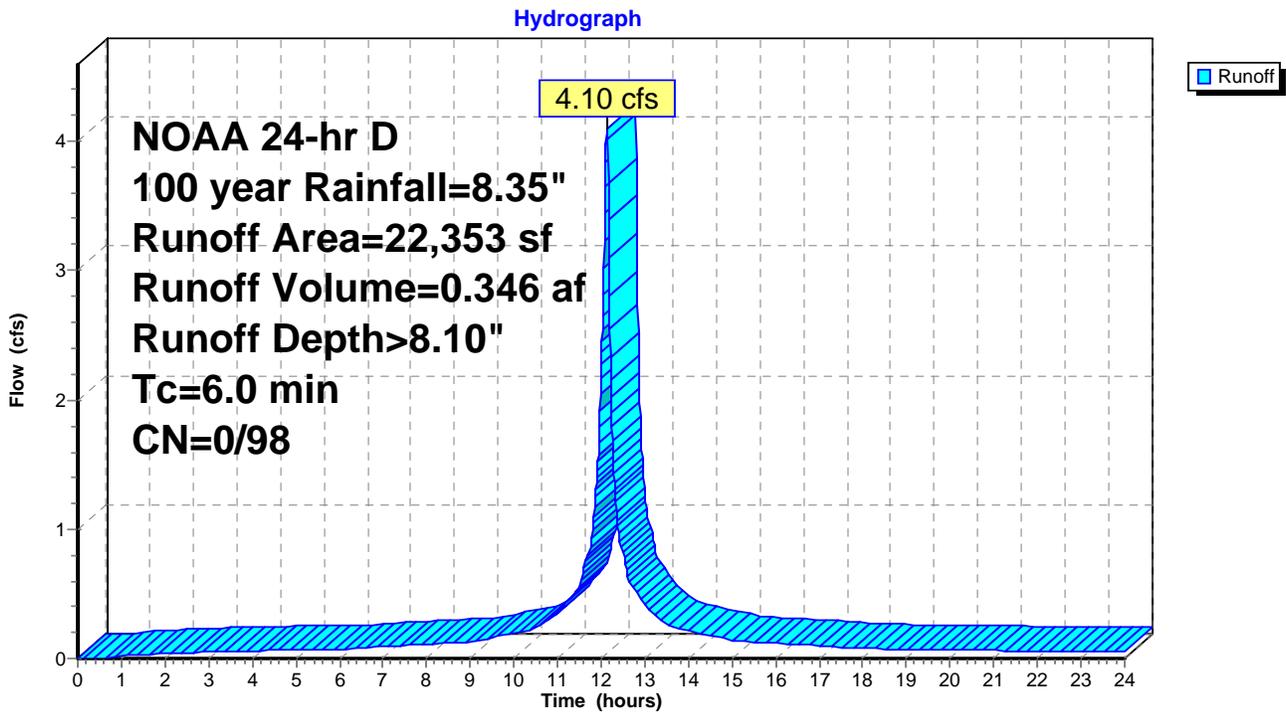
Runoff = 4.10 cfs @ 12.13 hrs, Volume= 0.346 af, Depth> 8.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
22,353	98	Paved parking, HSG B
22,353	98	100.00% Impervious Area

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

Subcatchment P1Ai: PDA 1a imp.



Summary for Subcatchment P1Ap: PDA 1a per.

Runoff = 0.57 cfs @ 12.13 hrs, Volume= 0.041 af, Depth> 5.23"

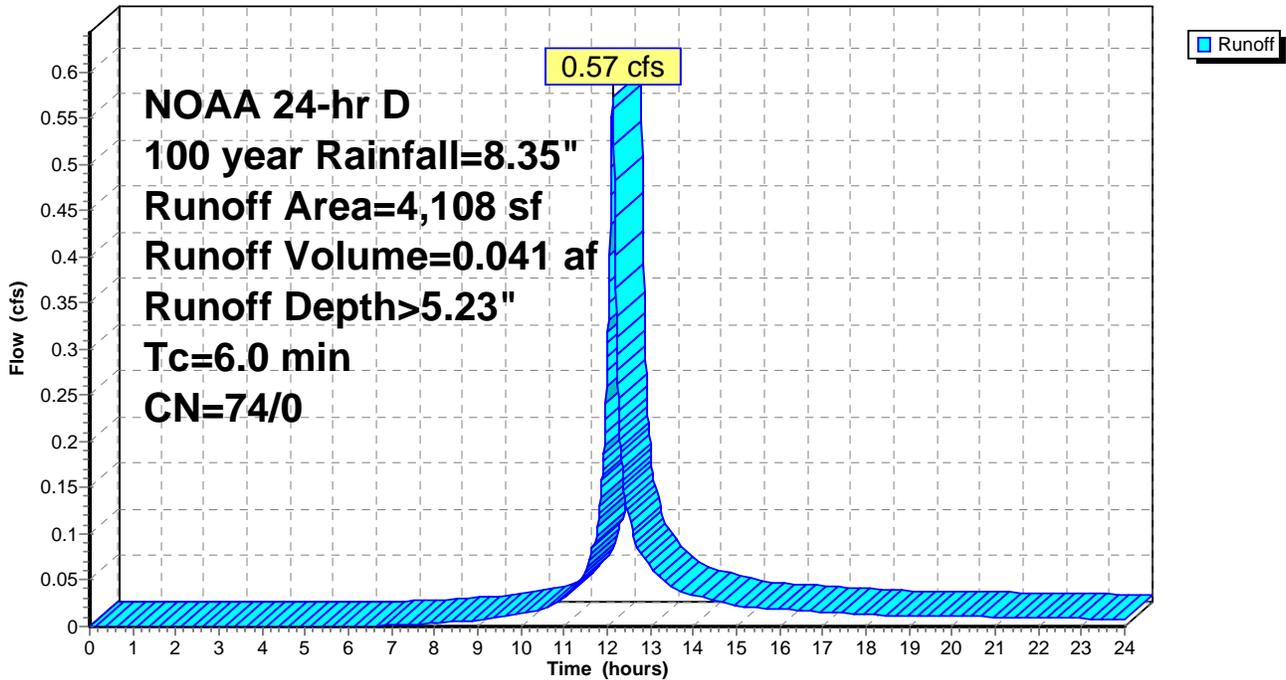
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
4,108	74	>75% Grass cover, Good, HSG C
4,108	74	100.00% Pervious Area

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

Subcatchment P1Ap: PDA 1a per.

Hydrograph



Summary for Subcatchment P1Bi: PDA 1Bi

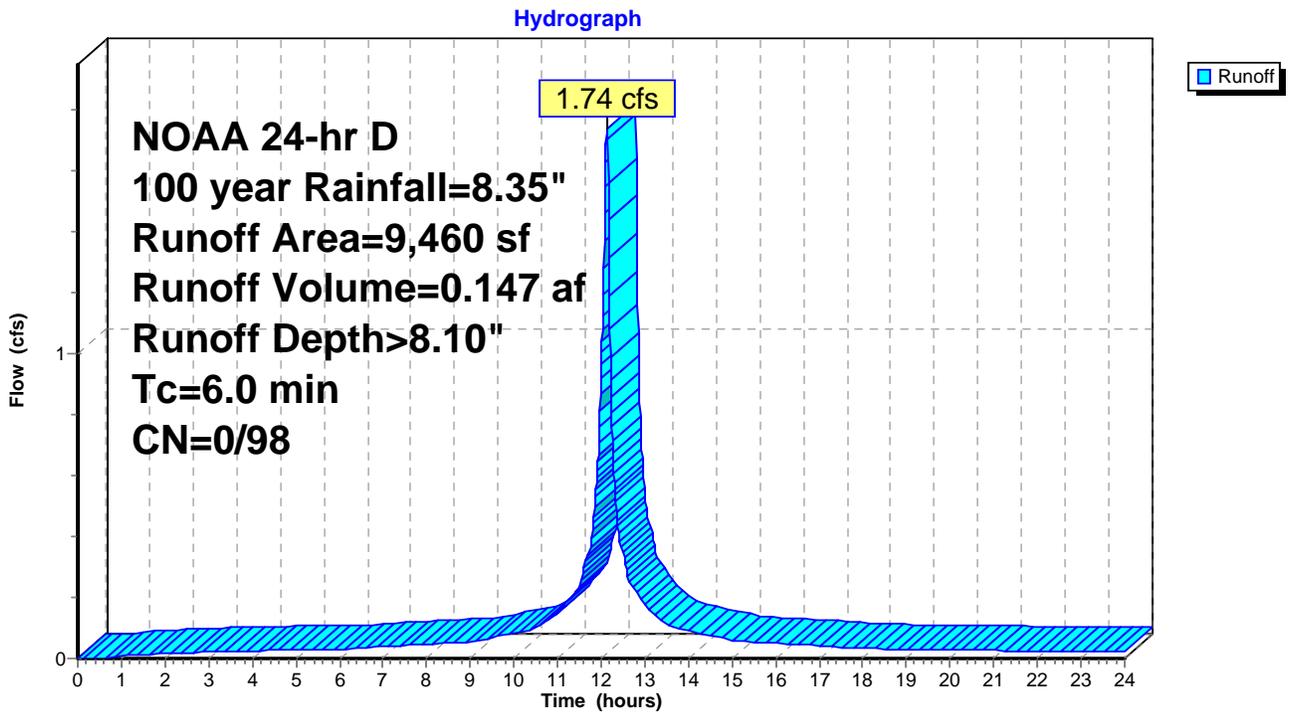
Runoff = 1.74 cfs @ 12.13 hrs, Volume= 0.147 af, Depth> 8.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
9,460	98	Paved parking, HSG B
9,460	98	100.00% Impervious Area

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

Subcatchment P1Bi: PDA 1Bi



Summary for Subcatchment P1Bp: PDA 1Bp

Runoff = 0.26 cfs @ 12.13 hrs, Volume= 0.019 af, Depth> 5.23"

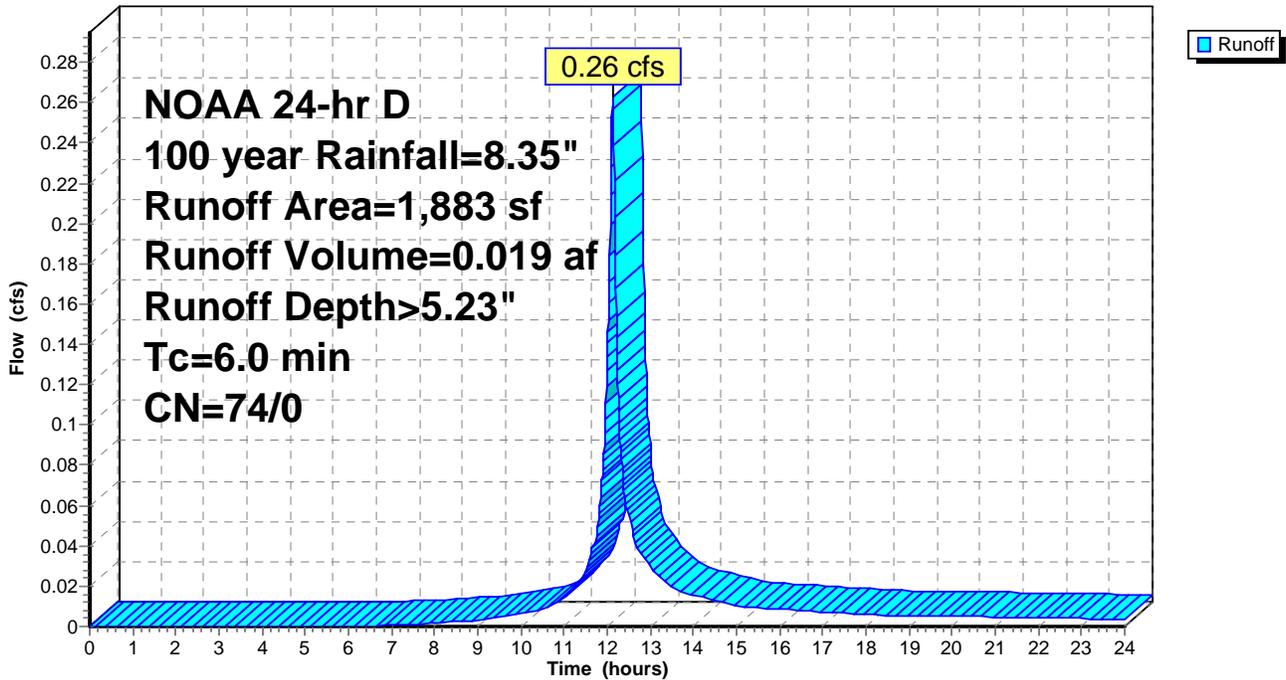
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
1,883	74	>75% Grass cover, Good, HSG C
1,883	74	100.00% Pervious Area

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

Subcatchment P1Bp: PDA 1Bp

Hydrograph



Summary for Subcatchment P1r: PDA 1r Roof

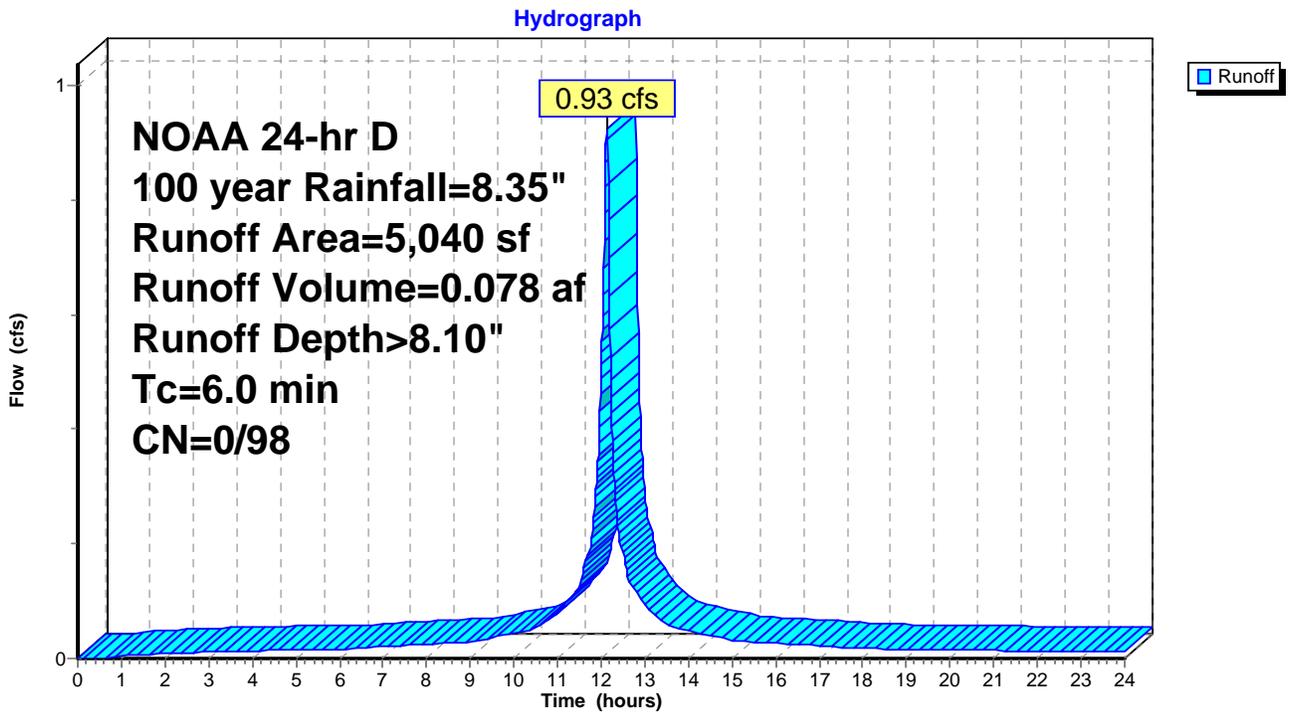
Runoff = 0.93 cfs @ 12.13 hrs, Volume= 0.078 af, Depth> 8.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
* 5,040	98	Bldg. Roof
5,040	98	100.00% Impervious Area

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

Subcatchment P1r: PDA 1r Roof



Summary for Subcatchment P2i: PDA 2i

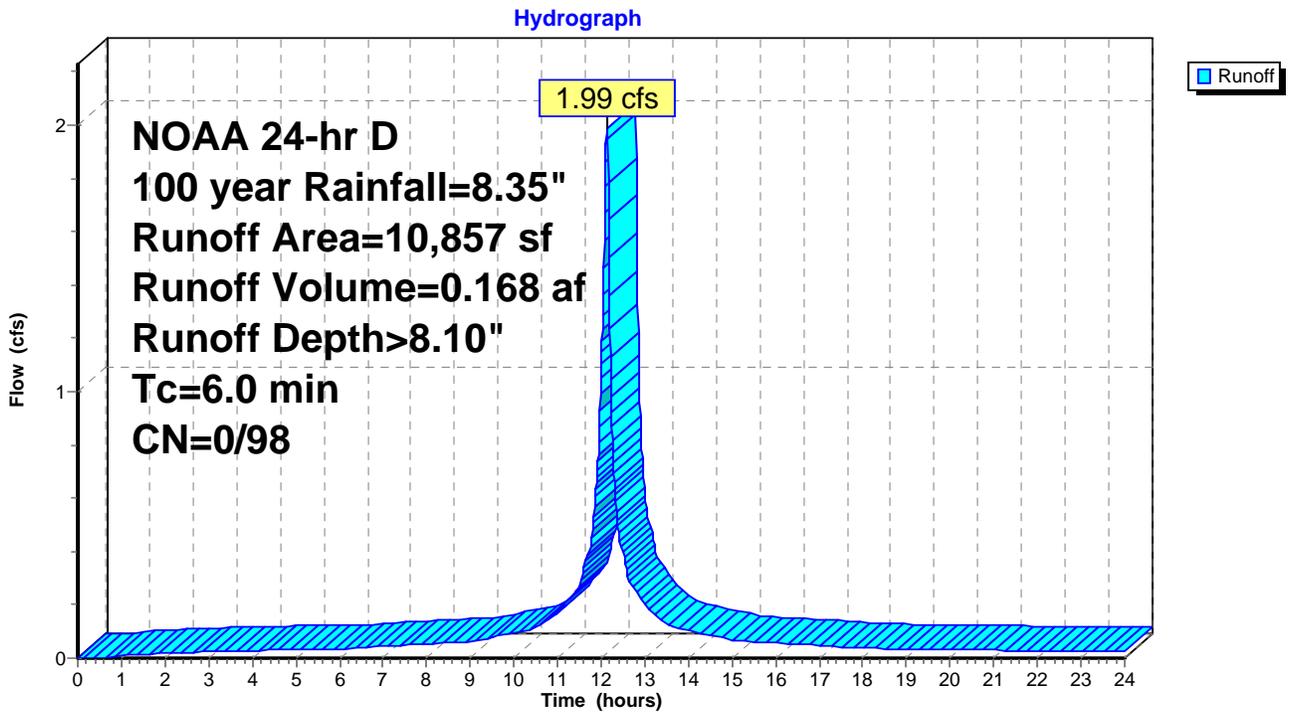
Runoff = 1.99 cfs @ 12.13 hrs, Volume= 0.168 af, Depth> 8.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
* 5,640	98	Building Roof
5,217	98	Paved parking, HSG B
10,857	98	Weighted Average
10,857	98	100.00% Impervious Area

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

Subcatchment P2i: PDA 2i



Summary for Subcatchment P2p: PDA 2p

Runoff = 0.44 cfs @ 12.13 hrs, Volume= 0.032 af, Depth> 5.23"

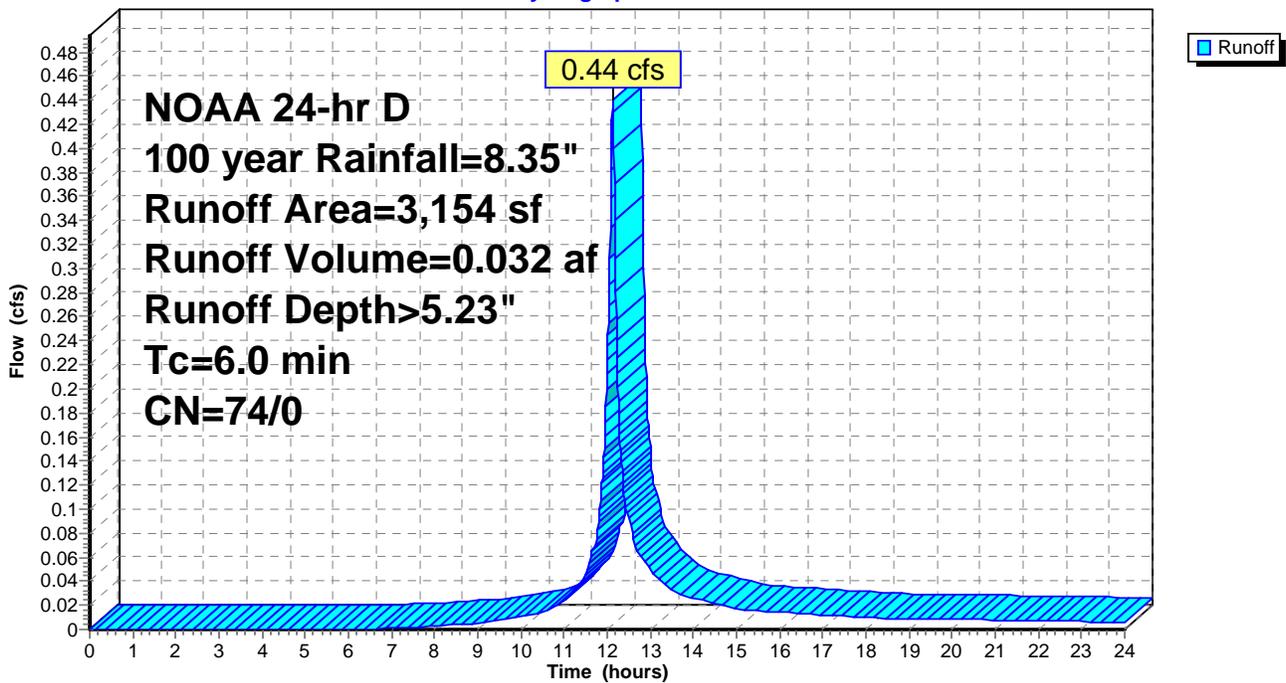
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
3,154	74	>75% Grass cover, Good, HSG C
3,154	74	100.00% Pervious Area

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

Subcatchment P2p: PDA 2p

Hydrograph



Summary for Subcatchment P3: PDA 3

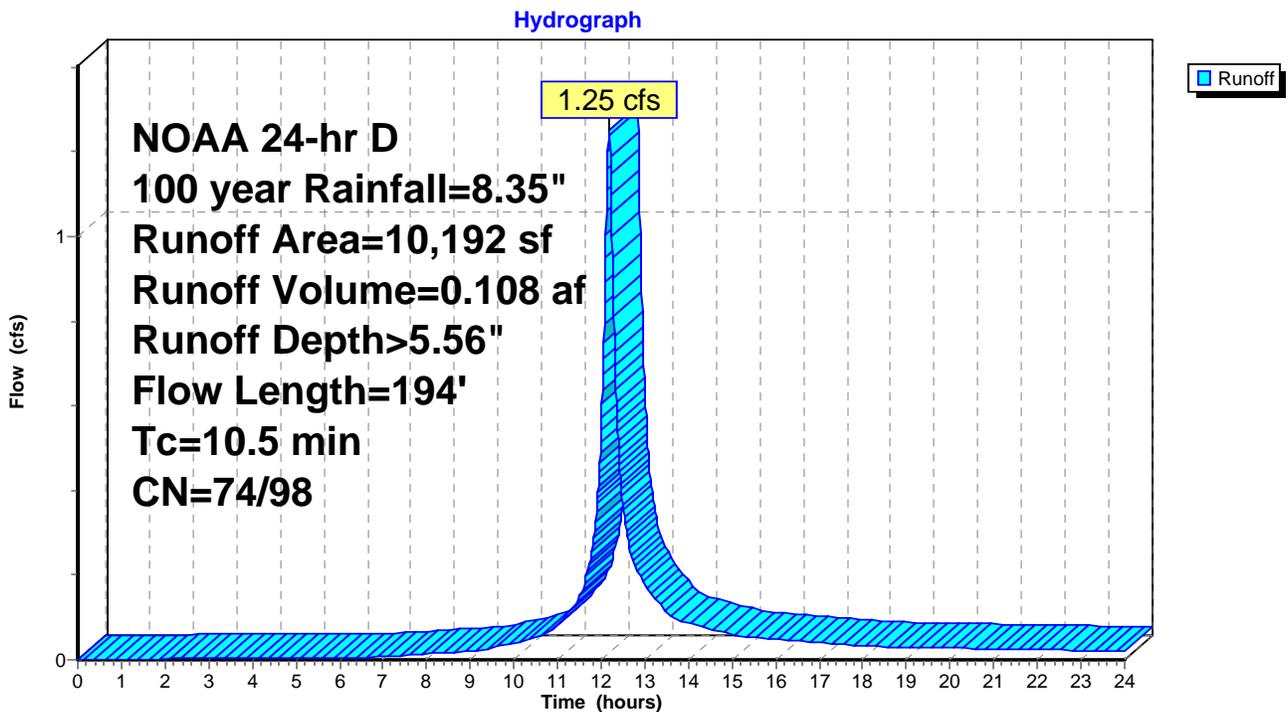
Runoff = 1.25 cfs @ 12.18 hrs, Volume= 0.108 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
1,200	98	Paved parking, HSG B
8,992	74	>75% Grass cover, Good, HSG C
10,192	77	Weighted Average
8,992	74	88.23% Pervious Area
1,200	98	11.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment P3: PDA 3



Summary for Subcatchment P4: PDA 4

Runoff = 0.37 cfs @ 12.26 hrs, Volume= 0.038 af, Depth> 5.22"

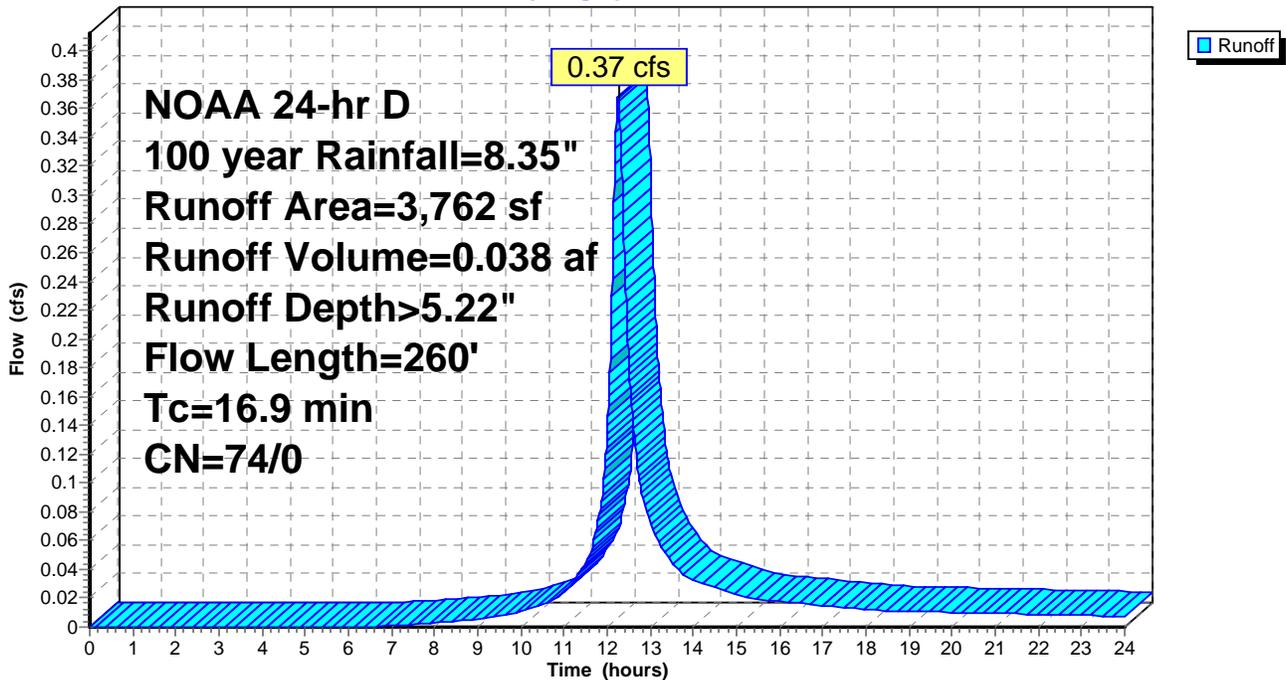
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100 year Rainfall=8.35"

Area (sf)	CN	Description
3,762	74	>75% Grass cover, Good, HSG C
3,762	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment P4: PDA 4

Hydrograph



Summary for Pond D1: Dry Well #1

Inflow Area = 0.624 ac, 49.37% Impervious, Inflow Depth > 6.64" for 100 year event
 Inflow = 3.56 cfs @ 12.19 hrs, Volume= 0.345 af
 Outflow = 3.48 cfs @ 12.22 hrs, Volume= 0.244 af, Atten= 2%, Lag= 1.4 min
 Discarded = 0.07 cfs @ 12.22 hrs, Volume= 0.063 af
 Primary = 3.41 cfs @ 12.22 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 224.91' @ 12.22 hrs Surf.Area= 2,966 sf Storage= 4,610 cf

Plug-Flow detention time= 164.4 min calculated for 0.244 af (71% of inflow)
 Center-of-Mass det. time= 60.9 min (838.8 - 777.9)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatic Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

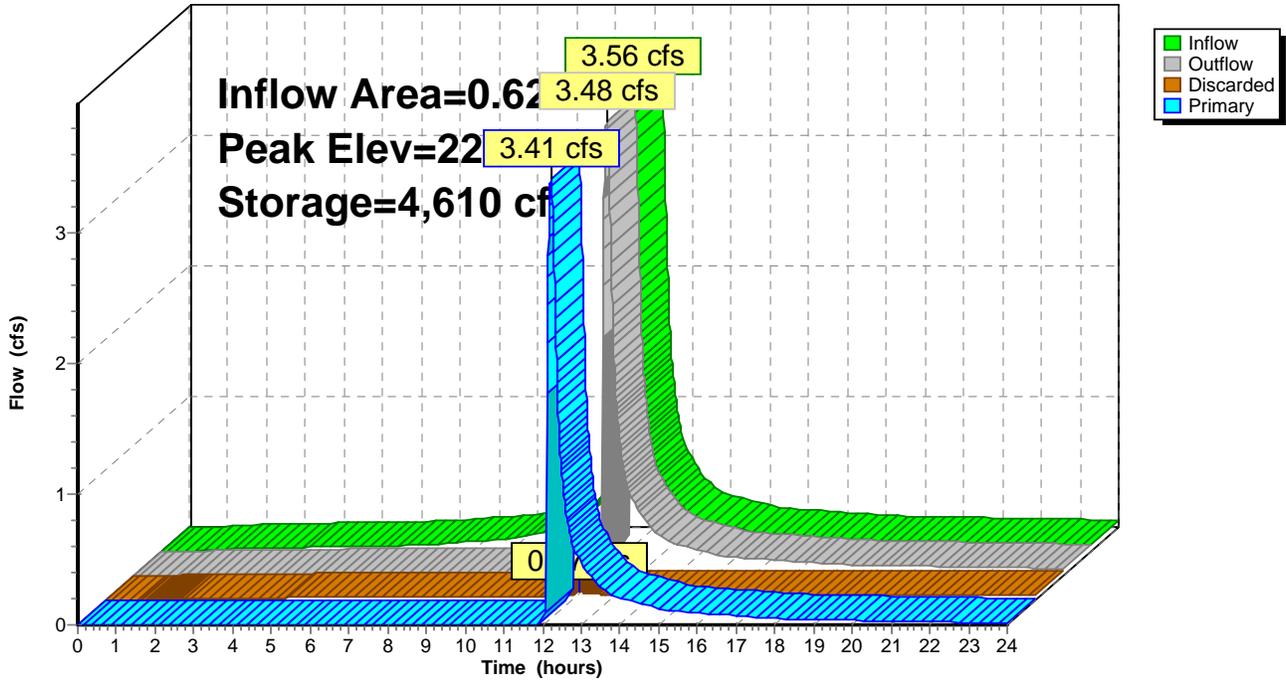
Device	Routing	Invert	Outlet Devices
#1	Discarded	217.89'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.07 cfs @ 12.22 hrs HW=224.91' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=3.40 cfs @ 12.22 hrs HW=224.91' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 3.40 cfs @ 2.06 fps)

Pond D1: Dry Well #1

Hydrograph



Summary for Pond D1p: Dry Well#1

[79] Warning: Submerged Pond PB Primary device # 1 OUTLET by 2.18'

Inflow Area = 0.984 ac, 86.02% Impervious, Inflow Depth > 4.33" for 100 year event
 Inflow = 3.64 cfs @ 12.30 hrs, Volume= 0.355 af
 Outflow = 2.13 cfs @ 12.35 hrs, Volume= 0.253 af, Atten= 41%, Lag= 3.1 min
 Primary = 2.13 cfs @ 12.35 hrs, Volume= 0.253 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 224.80' @ 12.35 hrs Surf.Area= 2,593 sf Storage= 4,506 cf

Plug-Flow detention time= 204.1 min calculated for 0.253 af (71% of inflow)
 Center-of-Mass det. time= 87.6 min (934.1 - 846.5)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatoid Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

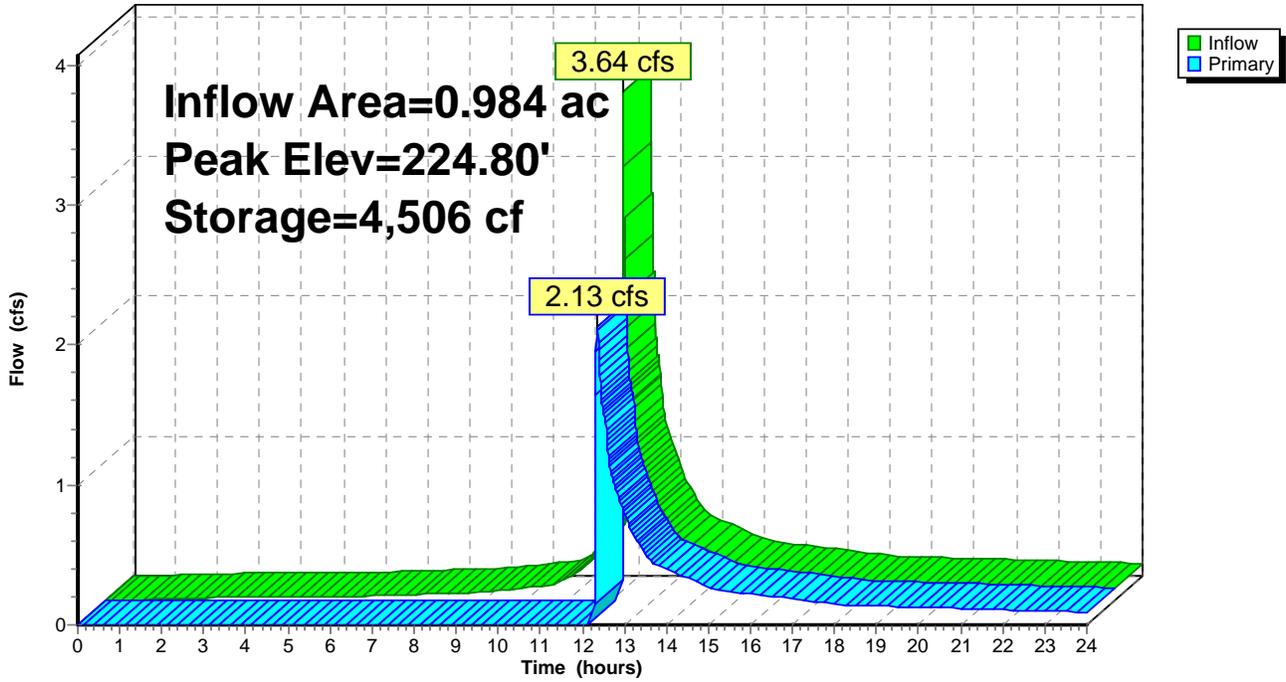
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

Device	Routing	Invert	Outlet Devices
#1	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.11 cfs @ 12.35 hrs HW=224.80' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 2.11 cfs @ 1.76 fps)

Pond D1p: Dry Well #1

Hydrograph



Summary for Pond D2: Dry Well #2

Inflow Area = 0.941 ac, 58.42% Impervious, Inflow Depth > 4.81" for 100 year event
 Inflow = 5.13 cfs @ 12.16 hrs, Volume= 0.377 af
 Outflow = 4.97 cfs @ 12.19 hrs, Volume= 0.288 af, Atten= 3%, Lag= 1.9 min
 Discarded = 0.05 cfs @ 12.19 hrs, Volume= 0.058 af
 Primary = 4.92 cfs @ 12.19 hrs, Volume= 0.230 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 218.53' @ 12.19 hrs Surf.Area= 2,269 sf Storage= 4,054 cf

Plug-Flow detention time= 122.7 min calculated for 0.287 af (76% of inflow)
 Center-of-Mass det. time= 41.7 min (830.6 - 788.9)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	396 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatic Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	171 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,073 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
218.00	72	396	396

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.56	600	171	171

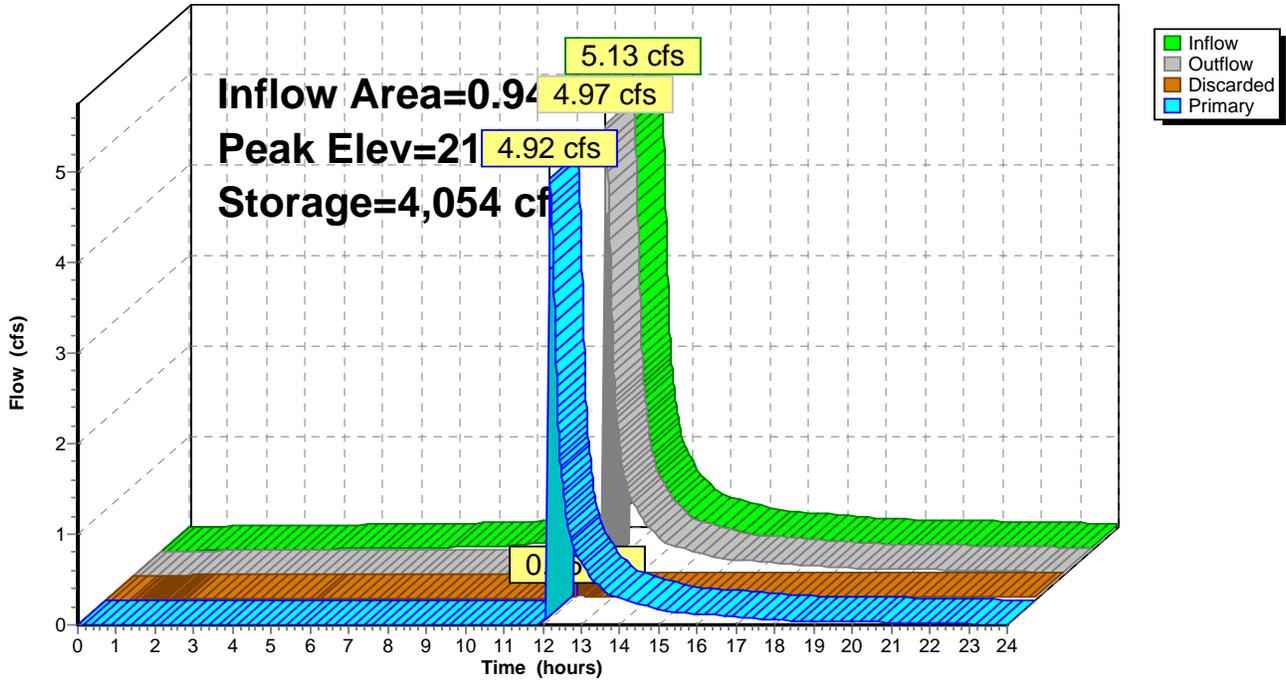
Device	Routing	Invert	Outlet Devices
#1	Discarded	212.00'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.05 cfs @ 12.19 hrs HW=218.53' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=4.91 cfs @ 12.19 hrs HW=218.53' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 4.91 cfs @ 2.33 fps)

Pond D2: Dry Well #2

Hydrograph



Summary for Pond D2p: Dry Well#2

Inflow Area = 1.305 ac, 83.92% Impervious, Inflow Depth > 4.17" for 100 year event
 Inflow = 2.82 cfs @ 12.35 hrs, Volume= 0.453 af
 Outflow = 2.76 cfs @ 12.36 hrs, Volume= 0.363 af, Atten= 2%, Lag= 0.9 min
 Primary = 2.76 cfs @ 12.36 hrs, Volume= 0.363 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 218.30' @ 12.36 hrs Surf.Area= 2,073 sf Storage= 3,982 cf

Plug-Flow detention time= 154.1 min calculated for 0.363 af (80% of inflow)
 Center-of-Mass det. time= 64.3 min (918.8 - 854.5)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	1,554,300 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismaoid Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	152 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		1,557,959 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
21,800.00	72	1,554,300	1,554,300

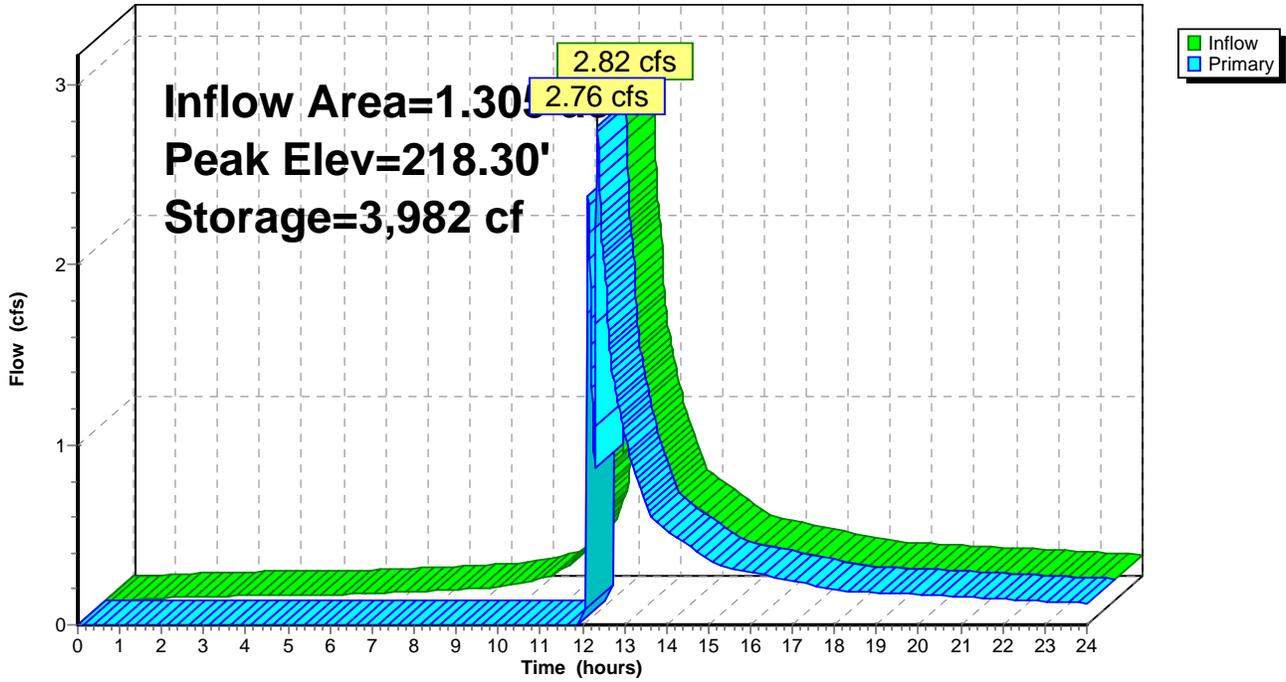
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.50	600	152	152

Device	Routing	Invert	Outlet Devices
#1	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.15 cfs @ 12.36 hrs HW=218.30' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 2.15 cfs @ 1.77 fps)

Pond D2p: Dry Well #2

Hydrograph



Summary for Pond PB: Prop Basin

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=10)

Inflow Area = 0.723 ac, 86.96% Impervious, Inflow Depth > 7.73" for 100 year event
 Inflow = 5.60 cfs @ 12.13 hrs, Volume= 0.466 af
 Outflow = 2.97 cfs @ 12.30 hrs, Volume= 0.189 af, Atten= 47%, Lag= 10.3 min
 Primary = 2.97 cfs @ 12.30 hrs, Volume= 0.189 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 226.49' @ 12.30 hrs Surf.Area= 0.109 ac Storage= 0.277 af

Plug-Flow detention time= 356.7 min calculated for 0.189 af (41% of inflow)
 Center-of-Mass det. time= 183.0 min (930.9 - 747.9)

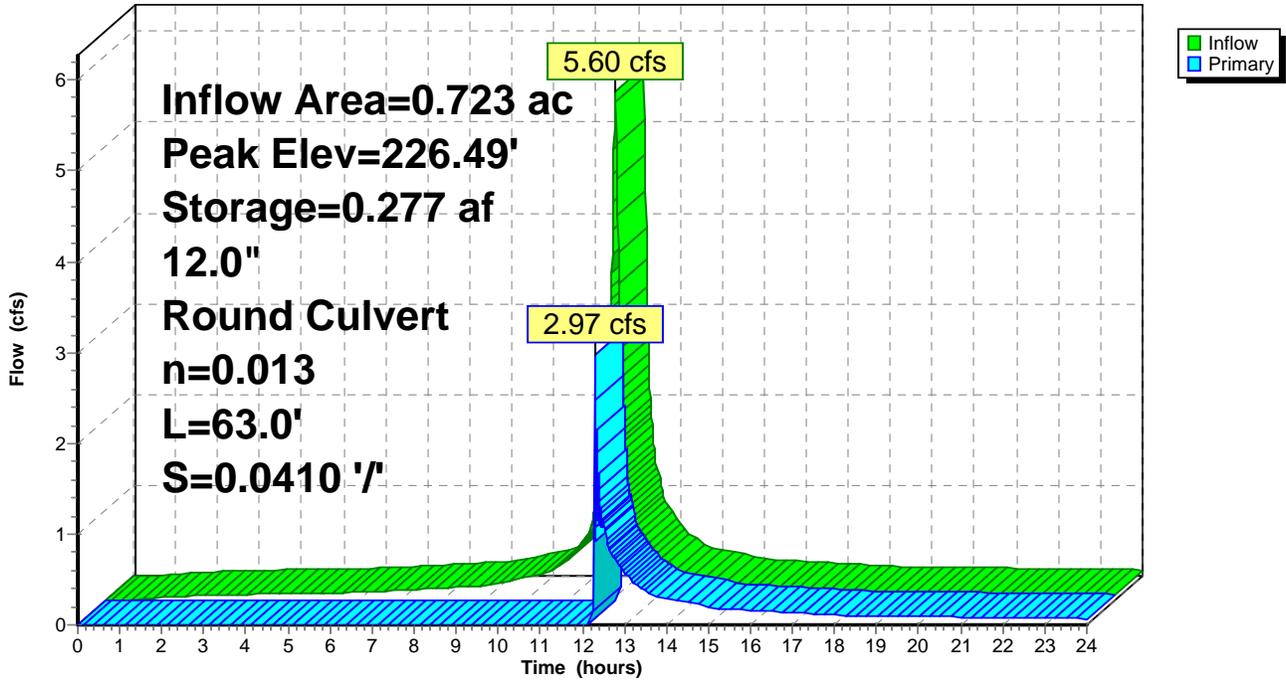
Volume	Invert	Avail.Storage	Storage Description
#1	219.33'	0.254 af	40.00'W x 57.00'L x 5.10'H Storm Trap 0.267 af Overall x 95.0% Voids
#2	218.33'	0.023 af	42.00'W x 59.00'L x 1.00'H Prismatic 0.057 af Overall x 40.0% Voids
#3	224.43'	0.000 af	2.50'D x 2.43'H Vertical Cone/Cylinder
		0.277 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	225.20'	12.0" Round Culvert L= 63.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.20' / 222.62' S= 0.0410 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.92 cfs @ 12.30 hrs HW=226.47' (Free Discharge)
 ↑1=Culvert (Inlet Controls 2.92 cfs @ 3.72 fps)

Pond PB: Prop Basin

Hydrograph



J190530 Heller Madison_prop basin and dry well

NJ DEP 2-hr WQ Rainfall=1.25"

Prepared by {enter your company name here}

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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

Subcatchment E1: EDA 1	Runoff Area=27,174 sf 49.37% Impervious Runoff Depth=0.55" Flow Length=209' Tc=12.1 min CN=74/98 Runoff=0.77 cfs 0.028 af
Subcatchment E2: EDA 2	Runoff Area=13,829 sf 76.19% Impervious Runoff Depth=0.81" Tc=6.0 min CN=74/98 Runoff=0.71 cfs 0.021 af
Subcatchment E3: EDA 3	Runoff Area=21,062 sf 42.13% Impervious Runoff Depth=0.48" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=0.54 cfs 0.019 af
Subcatchment E4: EDA 4	Runoff Area=8,879 sf 0.00% Impervious Runoff Depth=0.07" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.02 cfs 0.001 af
Subcatchment P1Ai: PDA 1a imp.	Runoff Area=22,353 sf 100.00% Impervious Runoff Depth=1.03" Tc=6.0 min CN=0/98 Runoff=1.50 cfs 0.044 af
Subcatchment P1Ap: PDA 1a per.	Runoff Area=4,108 sf 0.00% Impervious Runoff Depth=0.07" Tc=6.0 min CN=74/0 Runoff=0.01 cfs 0.001 af
Subcatchment P1Bi: PDA 1Bi	Runoff Area=9,460 sf 100.00% Impervious Runoff Depth=1.03" Tc=6.0 min CN=0/98 Runoff=0.64 cfs 0.019 af
Subcatchment P1Bp: PDA 1Bp	Runoff Area=1,883 sf 0.00% Impervious Runoff Depth=0.07" Tc=6.0 min CN=74/0 Runoff=0.01 cfs 0.000 af
Subcatchment P1r: PDA 1r Roof	Runoff Area=5,040 sf 100.00% Impervious Runoff Depth=1.03" Tc=6.0 min CN=0/98 Runoff=0.34 cfs 0.010 af
Subcatchment P2i: PDA 2i	Runoff Area=10,857 sf 100.00% Impervious Runoff Depth=1.03" Tc=6.0 min CN=0/98 Runoff=0.73 cfs 0.021 af
Subcatchment P2p: PDA 2p	Runoff Area=3,154 sf 0.00% Impervious Runoff Depth=0.07" Tc=6.0 min CN=74/0 Runoff=0.01 cfs 0.000 af
Subcatchment P3: PDA 3	Runoff Area=10,192 sf 11.77% Impervious Runoff Depth=0.19" Flow Length=194' Tc=10.5 min CN=74/98 Runoff=0.09 cfs 0.004 af
Subcatchment P4: PDA 4	Runoff Area=3,762 sf 0.00% Impervious Runoff Depth=0.07" Flow Length=260' Tc=16.9 min CN=74/0 Runoff=0.01 cfs 0.001 af
Pond D1: Dry Well #1	Peak Elev=219.81' Storage=1,110 cf Inflow=0.77 cfs 0.028 af Discarded=0.03 cfs 0.028 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.028 af
Pond D1p: Dry Well #1	Peak Elev=219.44' Storage=827 cf Inflow=0.64 cfs 0.019 af Outflow=0.00 cfs 0.000 af
Pond D2: Dry Well #2	Peak Elev=213.69' Storage=817 cf Inflow=0.71 cfs 0.021 af Discarded=0.02 cfs 0.021 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.021 af

J190530 Heller Madison_prop basin and dry well

NJ DEP 2-hr WQ Rainfall=1.25"

Prepared by {enter your company name here}

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Pond D2p: Dry Well #2

Peak Elev=213.68' Storage=814 cf Inflow=0.73 cfs 0.022 af
Outflow=0.00 cfs 0.000 af

Pond PB: Prop Basin

Peak Elev=219.97' Storage=0.055 af Inflow=1.85 cfs 0.055 af
12.0" Round Culvert n=0.013 L=63.0' S=0.0410 '/ Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.254 ac Runoff Volume = 0.170 af Average Runoff Depth = 0.63"
42.34% Pervious = 1.378 ac 57.66% Impervious = 1.876 ac

Summary for Subcatchment E1: EDA 1

Runoff = 0.77 cfs @ 1.17 hrs, Volume= 0.028 af, Depth= 0.55"

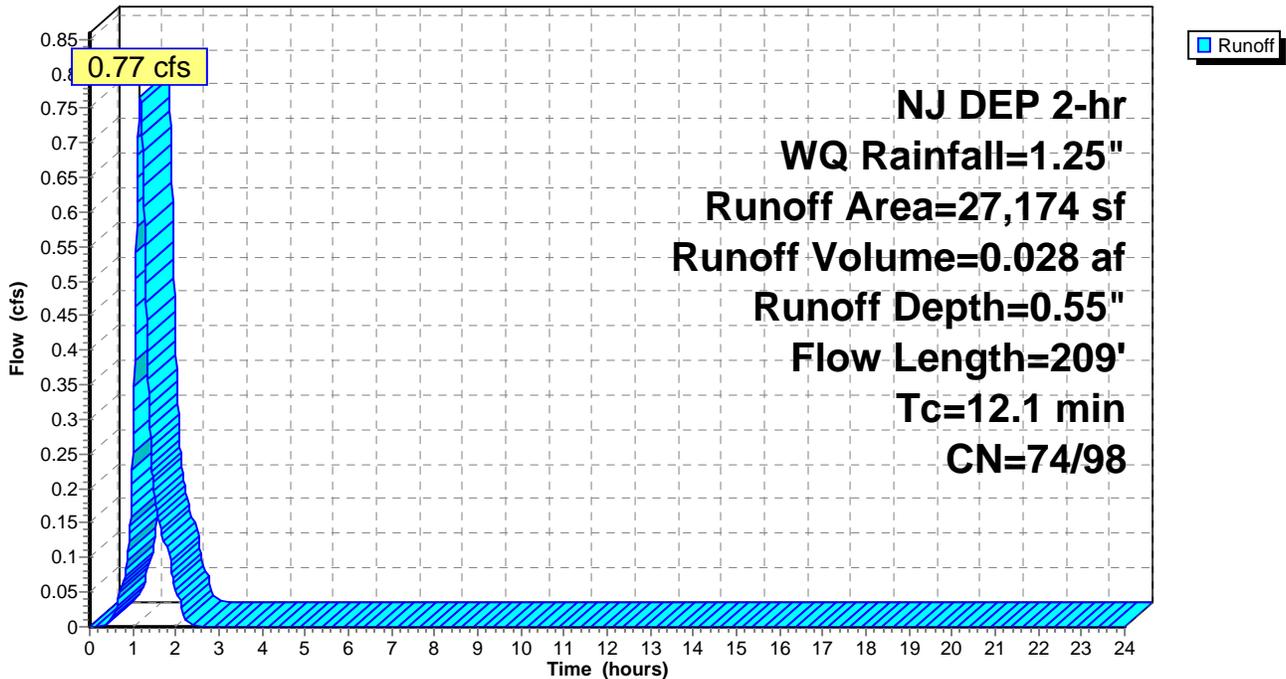
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
13,417	98	Paved parking, HSG B
13,757	74	>75% Grass cover, Good, HSG C
27,174	86	Weighted Average
13,757	74	50.63% Pervious Area
13,417	98	49.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	115	0.0406	0.17		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.4	35	0.0365	1.49		Sheet Flow, Sheet Impervious Smooth surfaces n= 0.011 P2= 3.54"
0.3	59	0.0349	3.79		Shallow Concentrated Flow, Shall Conc Imp Paved Kv= 20.3 fps
12.1	209	Total			

Subcatchment E1: EDA 1

Hydrograph



Summary for Subcatchment E2: EDA 2

Runoff = 0.71 cfs @ 1.11 hrs, Volume= 0.021 af, Depth= 0.81"

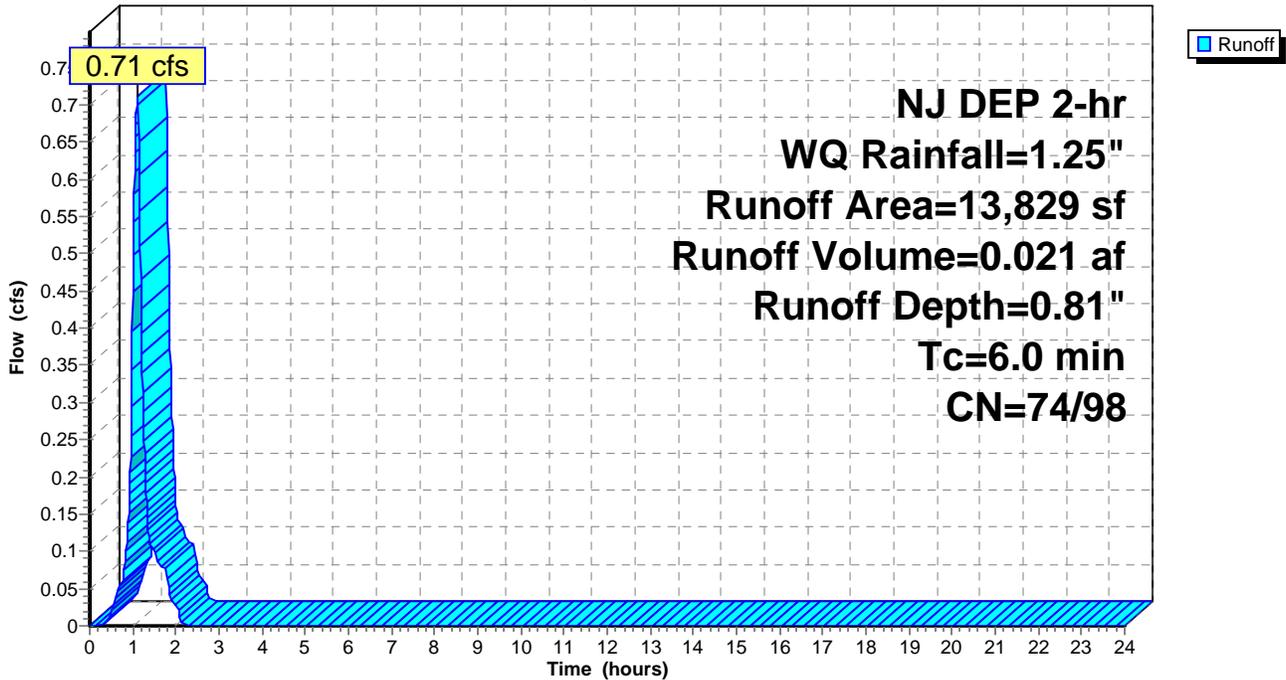
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

	Area (sf)	CN	Description
*	5,640	98	Bldg. Roof
	4,896	98	Paved parking, HSG B
	3,293	74	>75% Grass cover, Good, HSG C
	13,829	92	Weighted Average
	3,293	74	23.81% Pervious Area
	10,536	98	76.19% Impervious Area

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

Subcatchment E2: EDA 2

Hydrograph



Summary for Subcatchment E3: EDA 3

Runoff = 0.54 cfs @ 1.16 hrs, Volume= 0.019 af, Depth= 0.48"

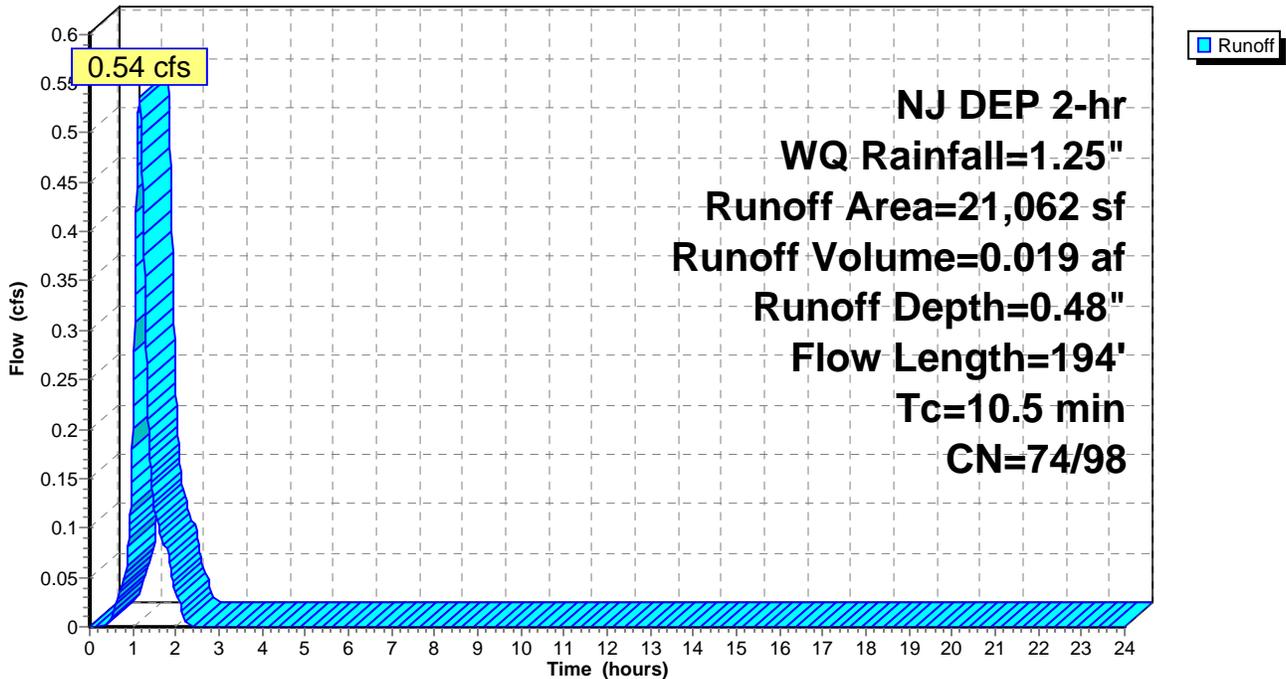
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
8,874	98	Paved parking, HSG B
12,188	74	>75% Grass cover, Good, HSG C
21,062	84	Weighted Average
12,188	74	57.87% Pervious Area
8,874	98	42.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment E3: EDA 3

Hydrograph



Summary for Subcatchment E4: EDA 4

Runoff = 0.02 cfs @ 1.37 hrs, Volume= 0.001 af, Depth= 0.07"

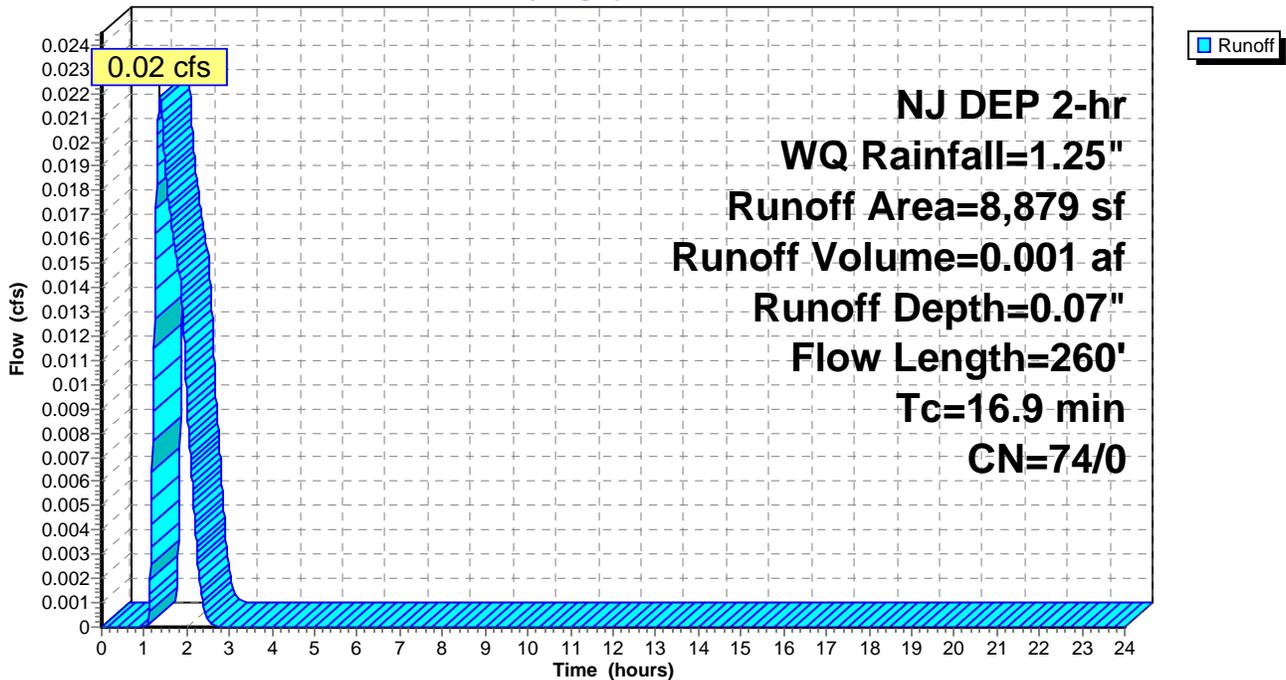
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
8,879	74	>75% Grass cover, Good, HSG C
8,879	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment E4: EDA 4

Hydrograph



Summary for Subcatchment P1Ai: PDA 1a imp.

Runoff = 1.50 cfs @ 1.11 hrs, Volume= 0.044 af, Depth= 1.03"

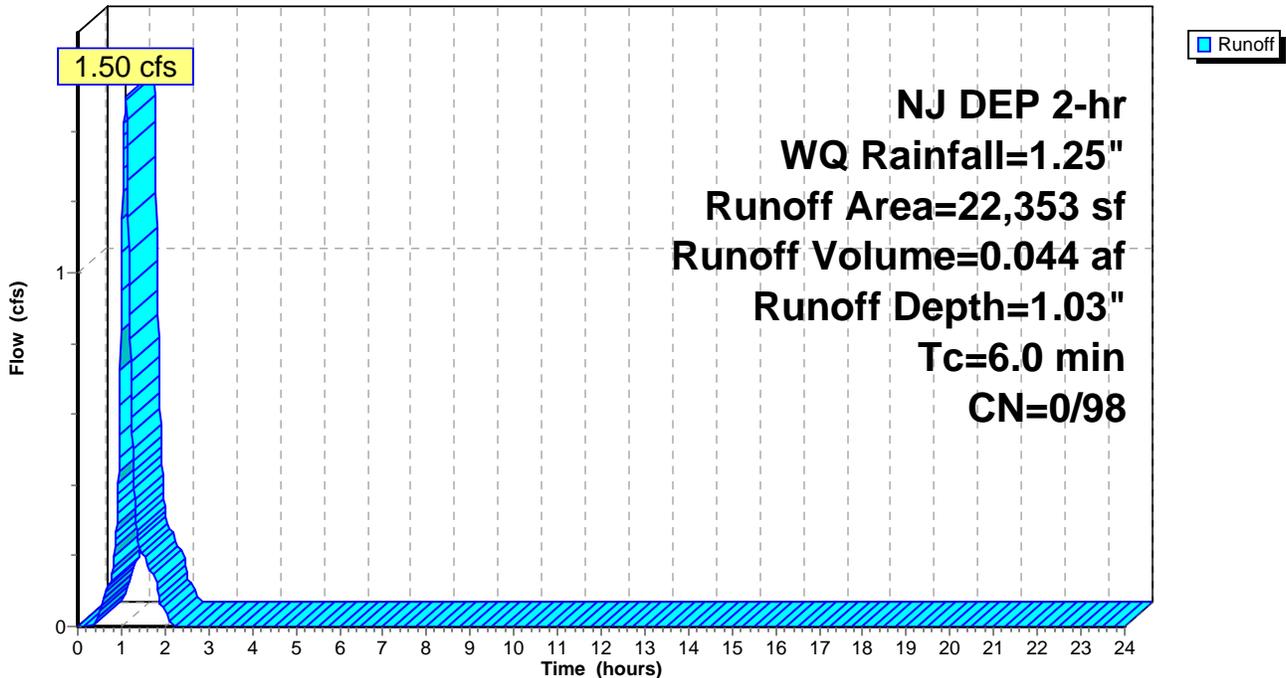
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
22,353	98	Paved parking, HSG B
22,353	98	100.00% Impervious Area

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

Subcatchment P1Ai: PDA 1a imp.

Hydrograph



Summary for Subcatchment P1Ap: PDA 1a per.

Runoff = 0.01 cfs @ 1.20 hrs, Volume= 0.001 af, Depth= 0.07"

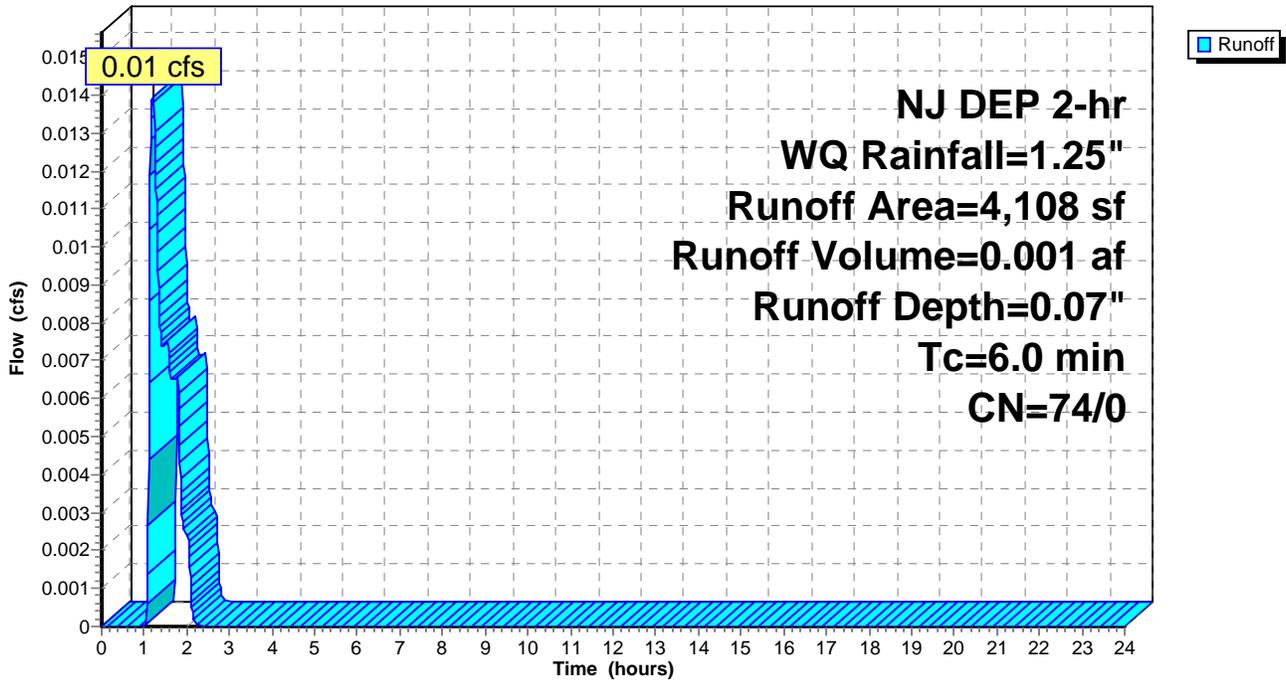
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
4,108	74	>75% Grass cover, Good, HSG C
4,108	74	100.00% Pervious Area

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

Subcatchment P1Ap: PDA 1a per.

Hydrograph



Summary for Subcatchment P1Bi: PDA 1Bi

Runoff = 0.64 cfs @ 1.11 hrs, Volume= 0.019 af, Depth= 1.03"

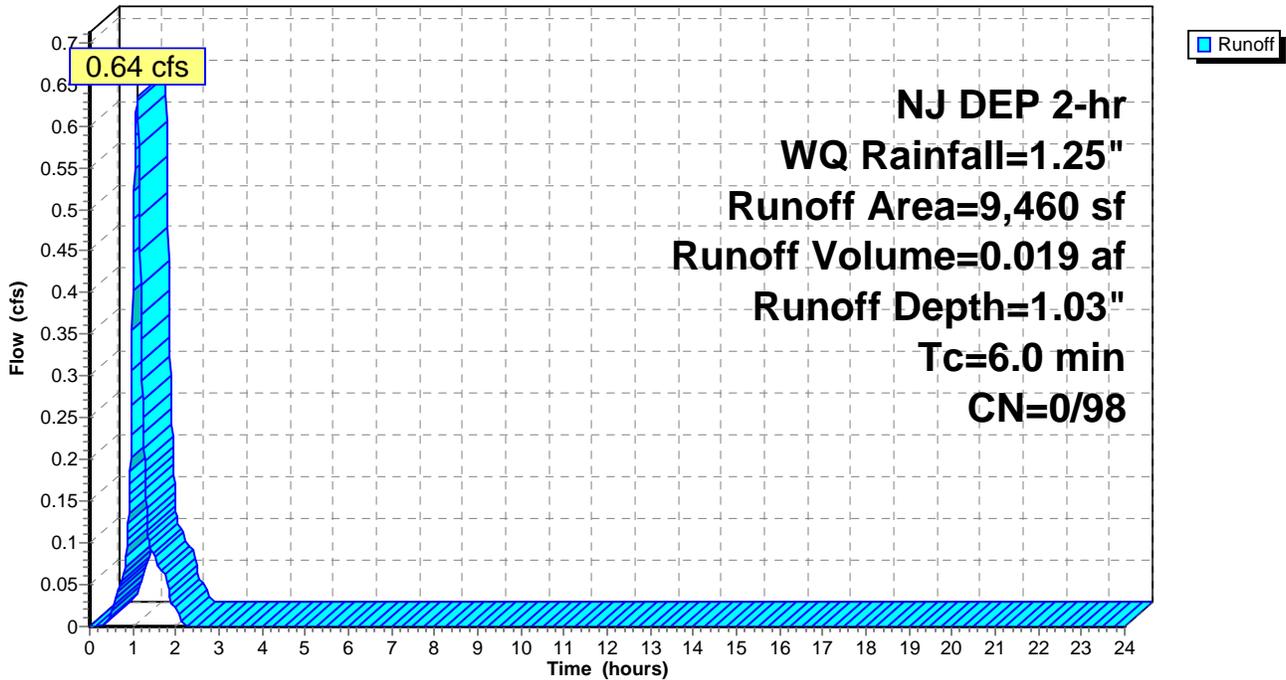
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
9,460	98	Paved parking, HSG B
9,460	98	100.00% Impervious Area

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

Subcatchment P1Bi: PDA 1Bi

Hydrograph



Summary for Subcatchment P1Bp: PDA 1Bp

Runoff = 0.01 cfs @ 1.20 hrs, Volume= 0.000 af, Depth= 0.07"

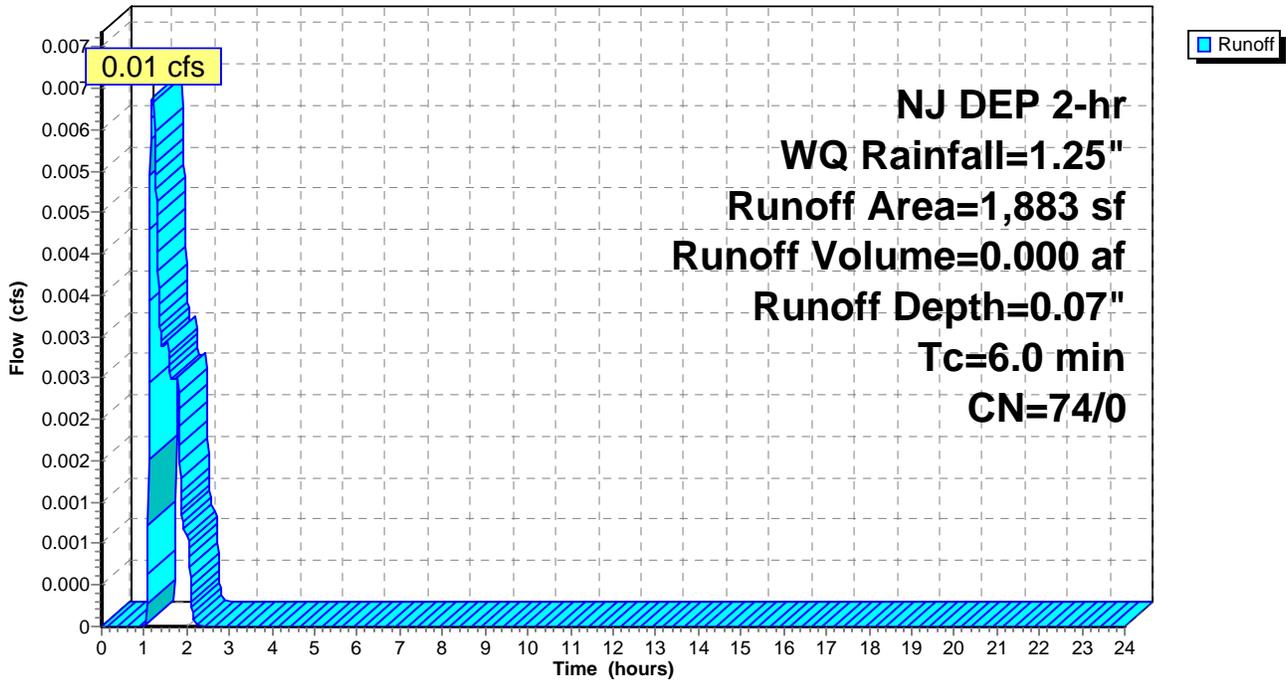
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
1,883	74	>75% Grass cover, Good, HSG C
1,883	74	100.00% Pervious Area

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

Subcatchment P1Bp: PDA 1Bp

Hydrograph



Summary for Subcatchment P1r: PDA 1r Roof

Runoff = 0.34 cfs @ 1.11 hrs, Volume= 0.010 af, Depth= 1.03"

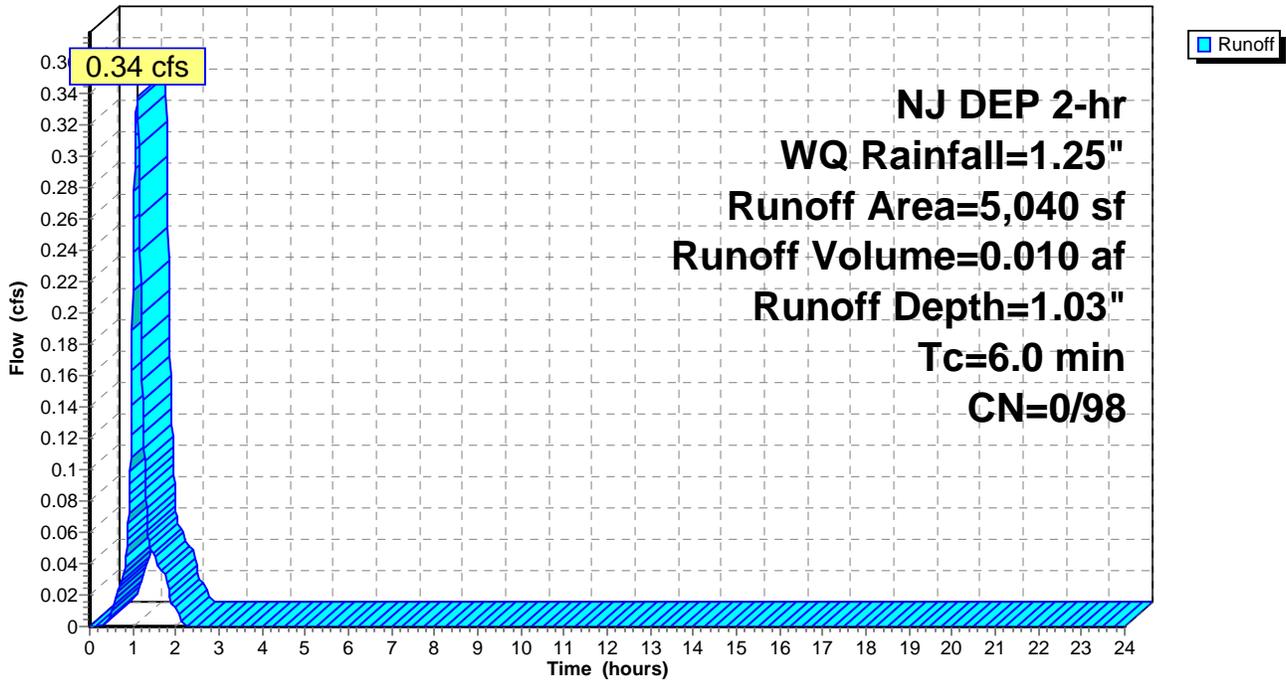
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
* 5,040	98	Bldg. Roof
5,040	98	100.00% Impervious Area

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

Subcatchment P1r: PDA 1r Roof

Hydrograph



Summary for Subcatchment P2i: PDA 2i

Runoff = 0.73 cfs @ 1.11 hrs, Volume= 0.021 af, Depth= 1.03"

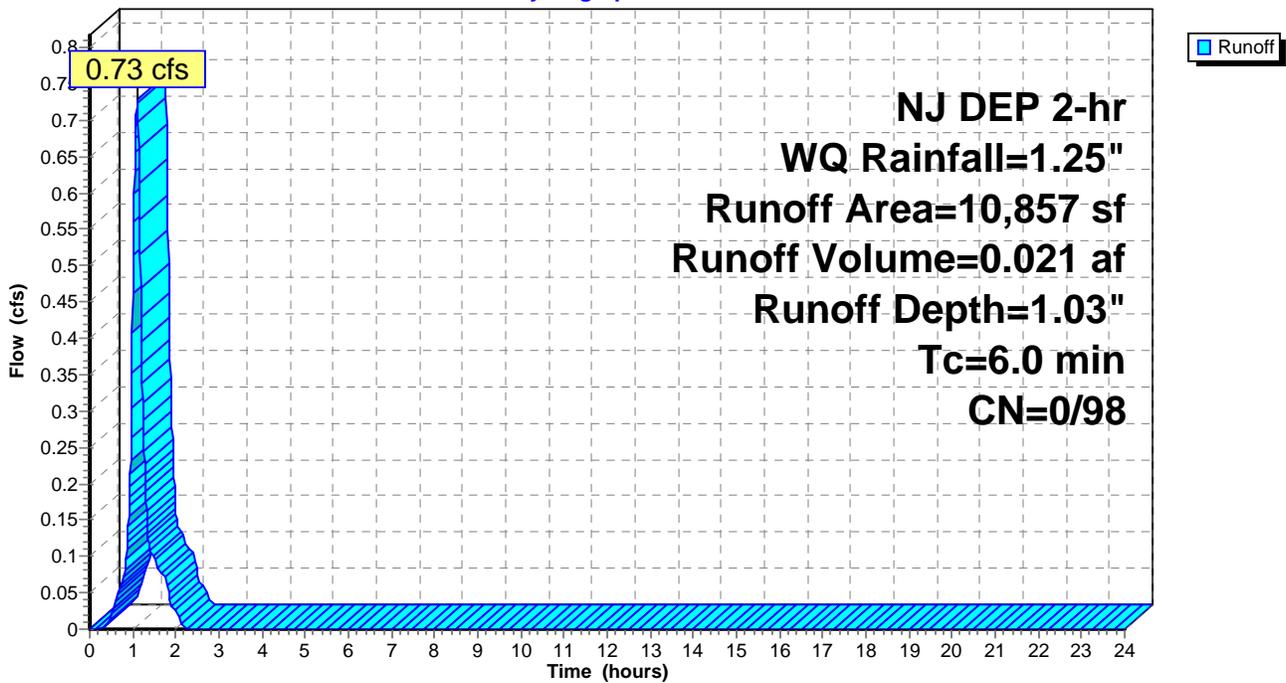
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

	Area (sf)	CN	Description
*	5,640	98	Building Roof
	5,217	98	Paved parking, HSG B
	10,857	98	Weighted Average
	10,857	98	100.00% Impervious Area

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

Subcatchment P2i: PDA 2i

Hydrograph



Summary for Subcatchment P2p: PDA 2p

Runoff = 0.01 cfs @ 1.20 hrs, Volume= 0.000 af, Depth= 0.07"

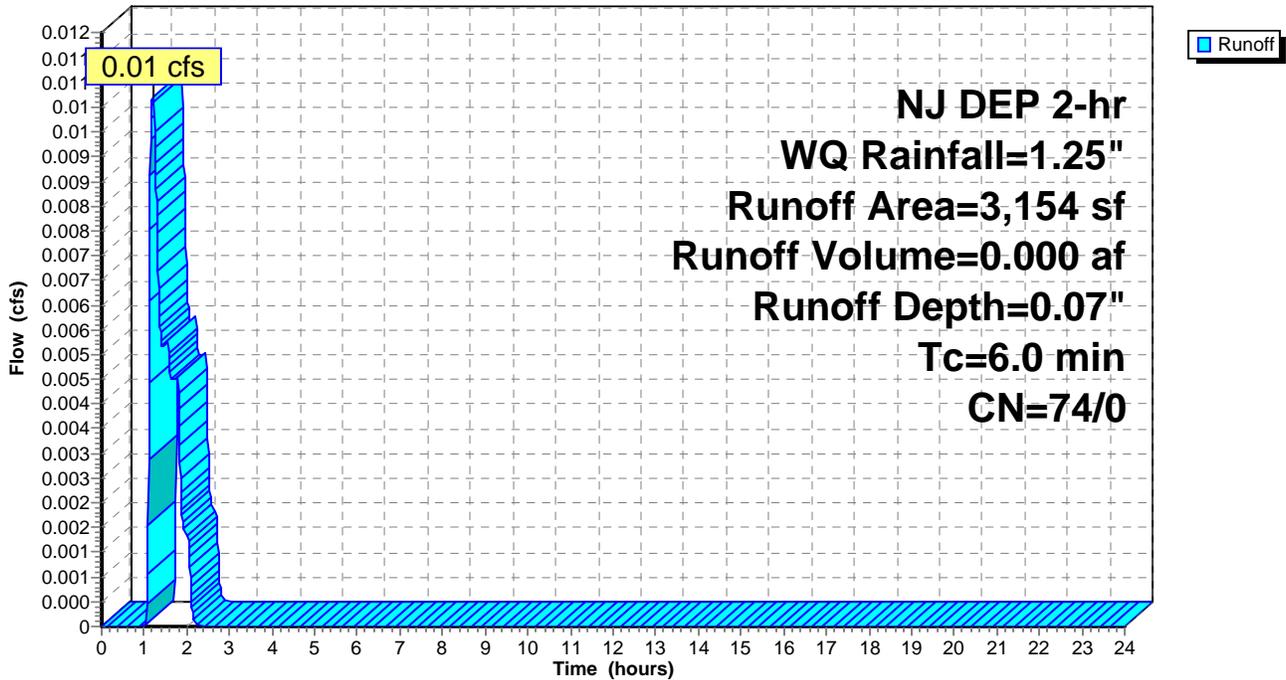
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
3,154	74	>75% Grass cover, Good, HSG C
3,154	74	100.00% Pervious Area

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

Subcatchment P2p: PDA 2p

Hydrograph



Summary for Subcatchment P3: PDA 3

Runoff = 0.09 cfs @ 1.18 hrs, Volume= 0.004 af, Depth= 0.19"

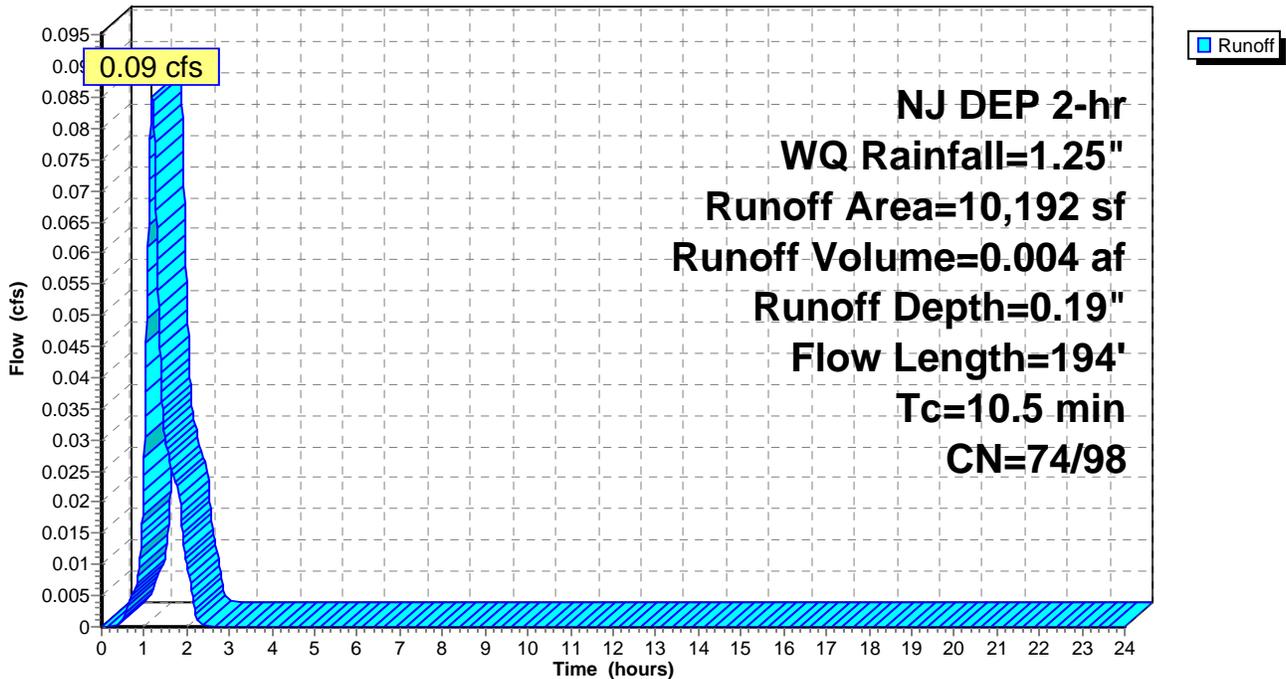
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
1,200	98	Paved parking, HSG B
8,992	74	>75% Grass cover, Good, HSG C
10,192	77	Weighted Average
8,992	74	88.23% Pervious Area
1,200	98	11.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	80	0.0300	0.14		Sheet Flow, Sheet Grass Grass: Dense n= 0.240 P2= 3.54"
0.7	70	0.0300	1.58		Sheet Flow, Sheet Paved Smooth surfaces n= 0.011 P2= 3.54"
0.1	44	0.1150	5.09		Shallow Concentrated Flow, Shall Conc Grass Grassed Waterway Kv= 15.0 fps
10.5	194	Total			

Subcatchment P3: PDA 3

Hydrograph



Summary for Subcatchment P4: PDA 4

Runoff = 0.01 cfs @ 1.37 hrs, Volume= 0.001 af, Depth= 0.07"

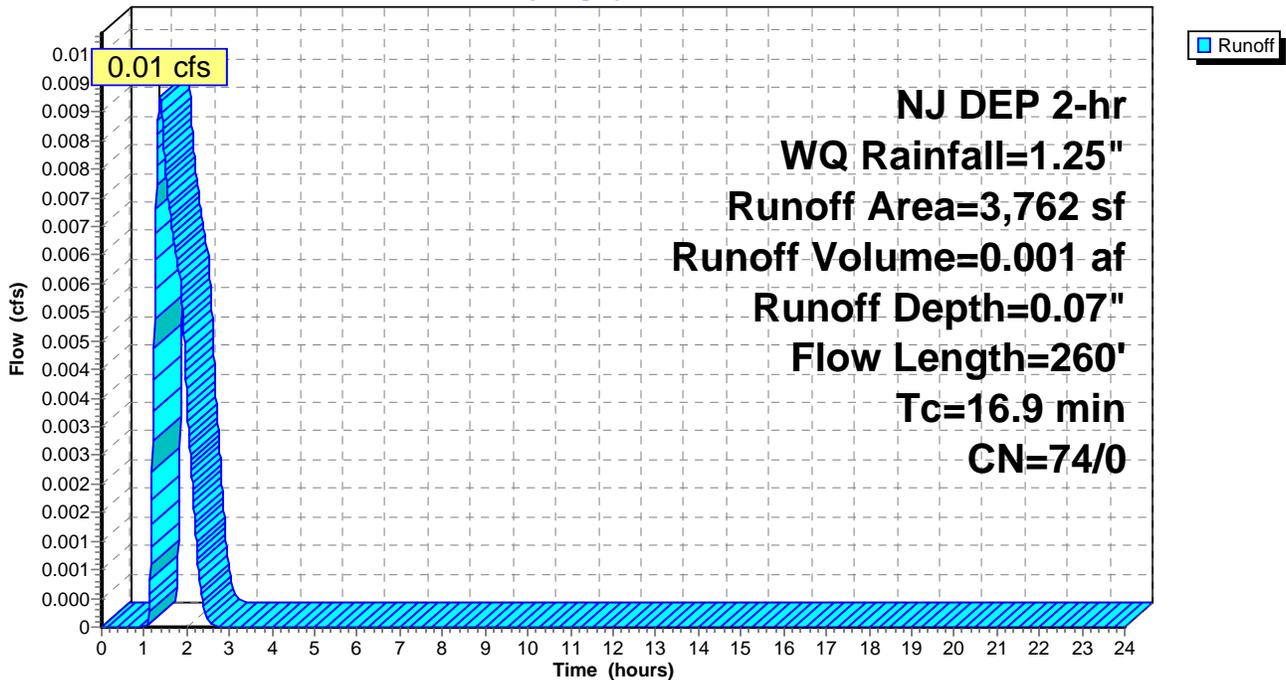
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
3,762	74	>75% Grass cover, Good, HSG C
3,762	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	150	0.0300	0.16		Sheet Flow, Sheet Per Grass: Dense n= 0.240 P2= 3.54"
0.9	110	0.0180	2.01		Shallow Concentrated Flow, Shall Conc Per Grassed Waterway Kv= 15.0 fps
16.9	260	Total			

Subcatchment P4: PDA 4

Hydrograph



Summary for Pond D1: Dry Well #1

Inflow Area = 0.624 ac, 49.37% Impervious, Inflow Depth = 0.55" for WQ event
 Inflow = 0.77 cfs @ 1.17 hrs, Volume= 0.028 af
 Outflow = 0.03 cfs @ 2.15 hrs, Volume= 0.028 af, Atten= 97%, Lag= 58.6 min
 Discarded = 0.03 cfs @ 2.15 hrs, Volume= 0.028 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 219.81' @ 2.15 hrs Surf.Area= 1,115 sf Storage= 1,110 cf

Plug-Flow detention time= 399.8 min calculated for 0.028 af (100% of inflow)
 Center-of-Mass det. time= 400.0 min (477.2 - 77.1)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatoid Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

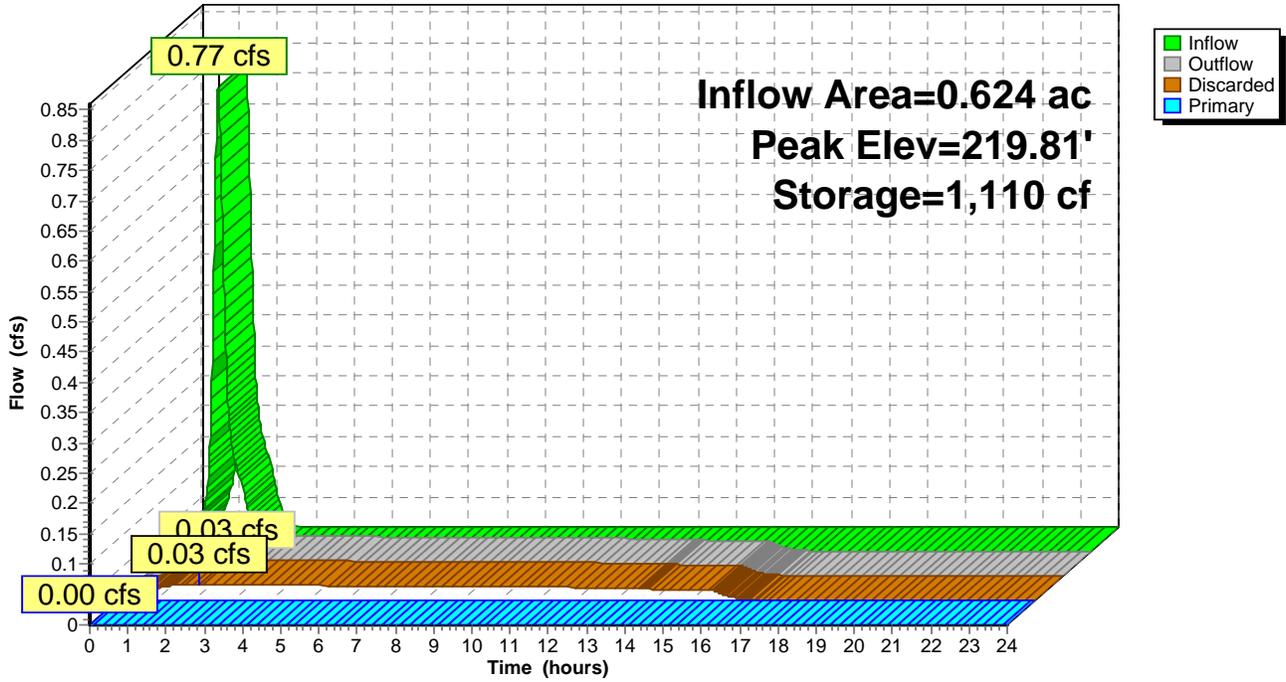
Device	Routing	Invert	Outlet Devices
#1	Discarded	217.89'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.03 cfs @ 2.15 hrs HW=219.81' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=217.89' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond D1: Dry Well #1

Hydrograph



Summary for Pond D1p: Dry Well#1

Inflow Area = 0.984 ac, 86.02% Impervious, Inflow Depth = 0.23" for WQ event
 Inflow = 0.64 cfs @ 1.11 hrs, Volume= 0.019 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 219.44' @ 2.34 hrs Surf.Area= 1,055 sf Storage= 827 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	218.38'	1,684 cf	48.0" Round Pipe Storage Inside #3 L= 134.0'
#2	218.38'	446 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	217.89'	2,293 cf	12.00'W x 62.00'L x 6.00'H Prismatoid Z=1.0 7,416 cf Overall - 1,684 cf Embedded = 5,732 cf x 40.0% Voids
#4	224.58'	298 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,721 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.38	72	0	0
224.58	72	446	446

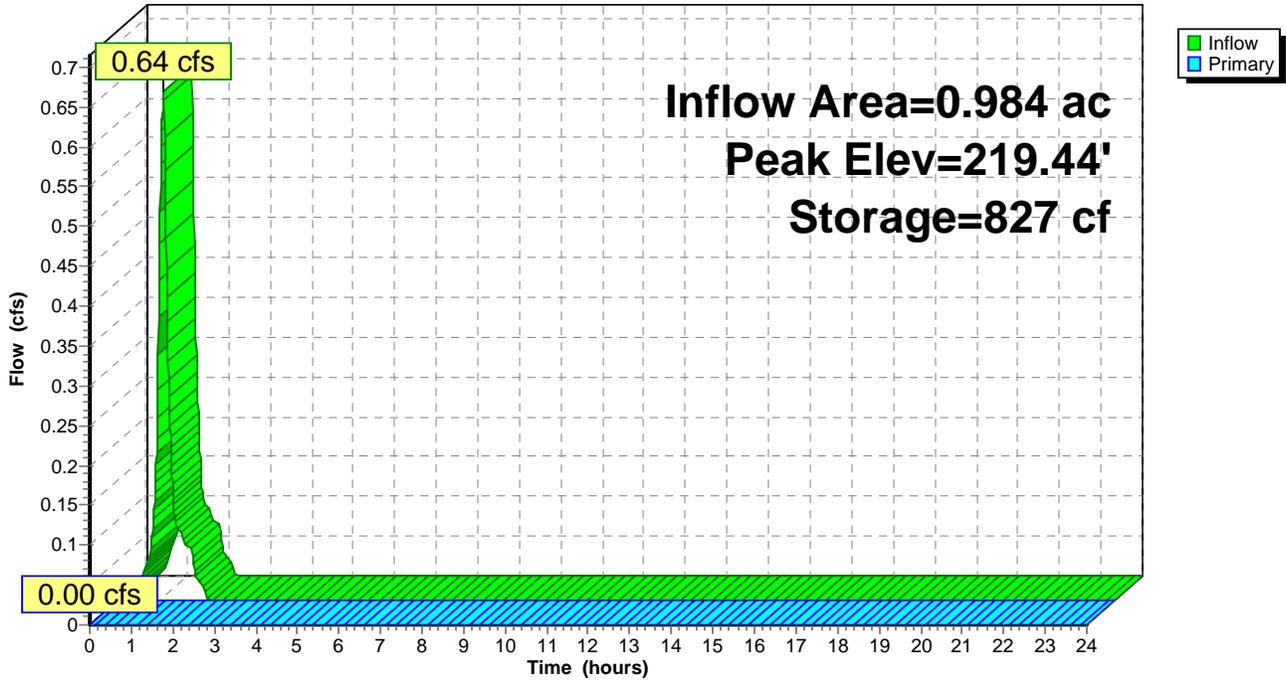
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
224.58	9	0	0
225.00	1,410	298	298

Device	Routing	Invert	Outlet Devices
#1	Primary	224.50'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=217.89' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)

Pond D1p: Dry Well #1

Hydrograph



J190530 Heller Madison_prop basin and dry well

NJ DEP 2-hr WQ Rainfall=1.25"

Prepared by {enter your company name here}

Printed 4/29/2020

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Summary for Pond D2: Dry Well #2

Inflow Area = 0.941 ac, 58.42% Impervious, Inflow Depth = 0.27" for WQ event
 Inflow = 0.71 cfs @ 1.11 hrs, Volume= 0.021 af
 Outflow = 0.02 cfs @ 2.05 hrs, Volume= 0.021 af, Atten= 97%, Lag= 56.4 min
 Discarded = 0.02 cfs @ 2.05 hrs, Volume= 0.021 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 213.69' @ 2.05 hrs Surf.Area= 985 sf Storage= 817 cf

Plug-Flow detention time= 333.2 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 333.4 min (404.1 - 70.7)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	396 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatic Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	171 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		4,073 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
218.00	72	396	396

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.56	600	171	171

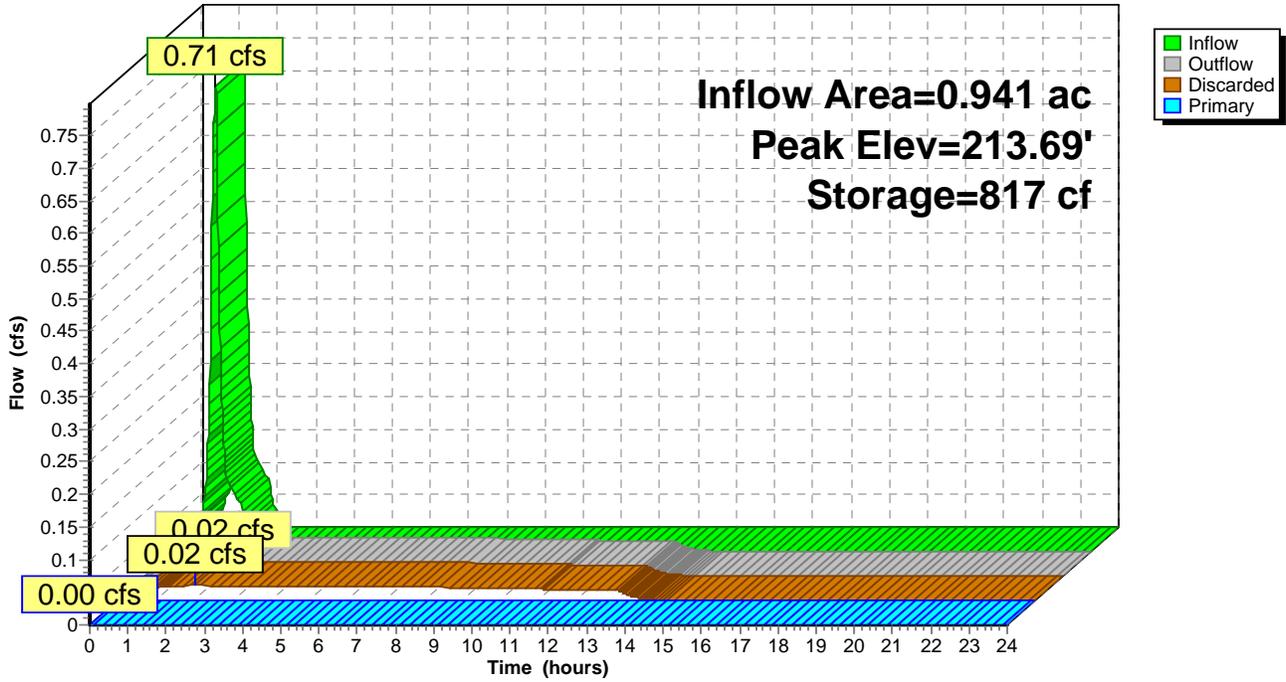
Device	Routing	Invert	Outlet Devices
#1	Discarded	212.00'	1.000 in/hr Exfiltration over Horizontal area
#2	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.02 cfs @ 2.05 hrs HW=213.69' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=212.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond D2: Dry Well #2

Hydrograph



Summary for Pond D2p: Dry Well#2

Inflow Area = 1.305 ac, 83.92% Impervious, Inflow Depth = 0.20" for WQ event
 Inflow = 0.73 cfs @ 1.11 hrs, Volume= 0.022 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 213.68' @ 2.34 hrs Surf.Area= 984 sf Storage= 814 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	1,332 cf	48.0" Round Pipe Storage Inside #3 L= 106.0'
#2	212.50'	1,554,300 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	212.00'	2,174 cf	12.00'W x 56.00'L x 6.00'H Prismatoid Z=1.0 6,768 cf Overall - 1,332 cf Embedded = 5,436 cf x 40.0% Voids
#4	218.00'	152 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		1,557,959 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	72	0	0
21,800.00	72	1,554,300	1,554,300

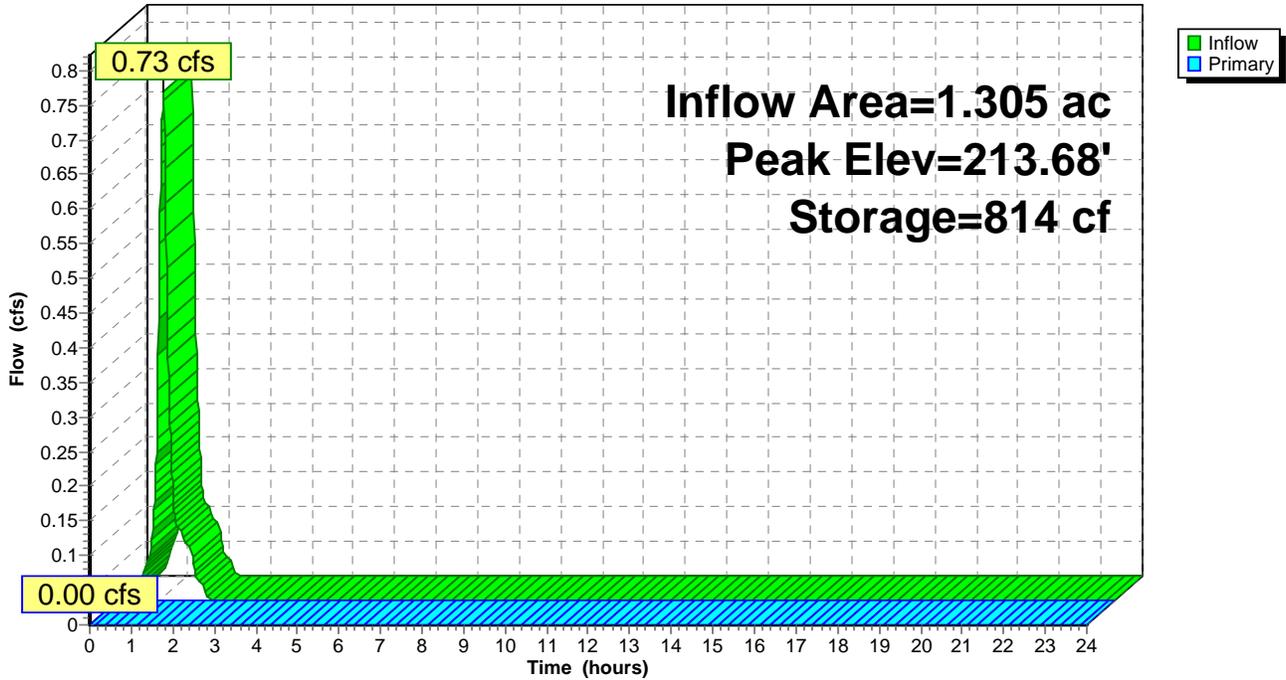
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	9	0	0
218.50	600	152	152

Device	Routing	Invert	Outlet Devices
#1	Primary	218.00'	48.0" W x 25.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=212.00' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)

Pond D2p: Dry Well #2

Hydrograph



Summary for Pond PB: Prop Basin

Inflow Area = 0.723 ac, 86.96% Impervious, Inflow Depth = 0.91" for WQ event
 Inflow = 1.85 cfs @ 1.11 hrs, Volume= 0.055 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 219.97' @ 2.34 hrs Surf.Area= 0.109 ac Storage= 0.055 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

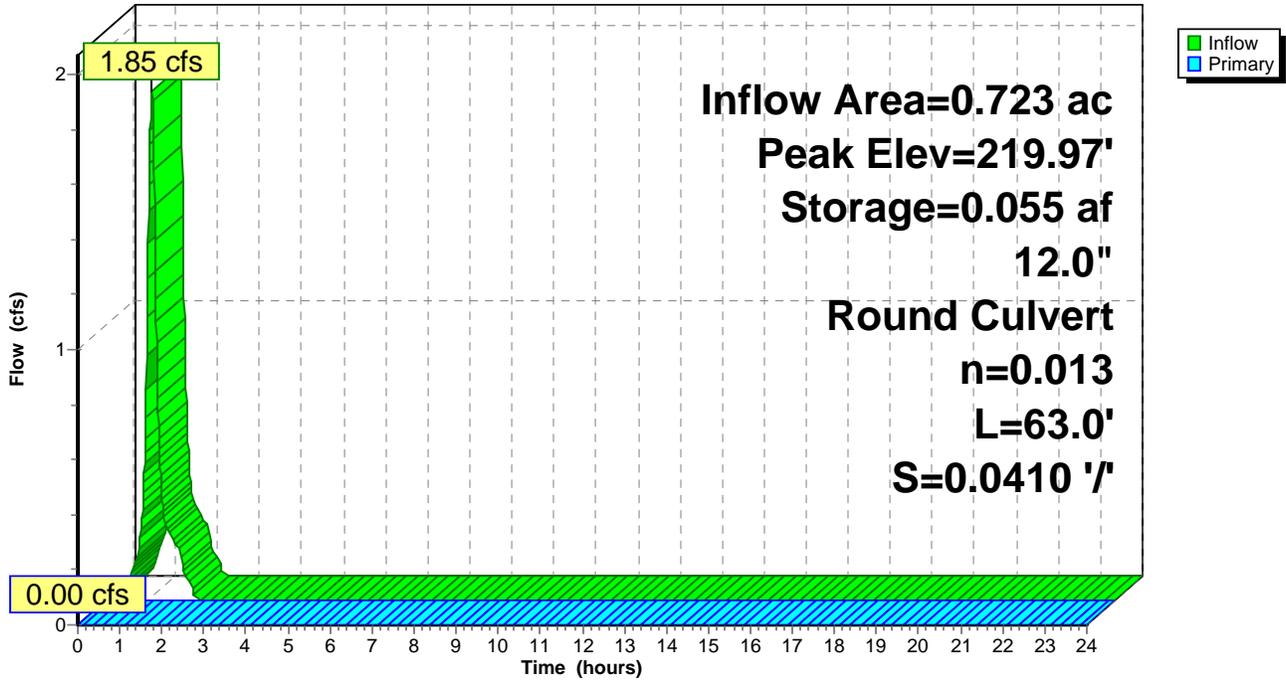
Volume	Invert	Avail.Storage	Storage Description
#1	219.33'	0.254 af	40.00'W x 57.00'L x 5.10'H Storm Trap 0.267 af Overall x 95.0% Voids
#2	218.33'	0.023 af	42.00'W x 59.00'L x 1.00'H Prismatic 0.057 af Overall x 40.0% Voids
#3	224.43'	0.000 af	2.50'D x 2.43'H Vertical Cone/Cylinder
		0.277 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	225.20'	12.0" Round Culvert L= 63.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.20' / 222.62' S= 0.0410 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=218.33' (Free Discharge)
 ↑1=Culvert (Controls 0.00 cfs)

Pond PB: Prop Basin

Hydrograph



B. DESIGN CALCULATIONS

- ◆ **Pipe Sizing**
- ◆ **Sample SingleTrap Design Criteria**

Project Number: J190530
 BOROUGH OF MADISON, MORRIS COUNTY, NEW JERSEY

DATE: 3/10/2020
 BY: RW
 CHK BY: BE

Heller Property Partners, LP

Proposed Office Building & Site Improvements

Storm Frequency (in years):

Sheet Name:

Structure Information Pipe Information

Upstream Structure	DownStream Structure	Size:	Qty:	Type:	Length:	Slope(ft/ft):	n:	Class:	Area in Acres:	C Value	C x A	Cx A cum	I	Q to Inlet	Q cum for Pipe	Pipe Capacity	Pipe Velocity	Tt In Pipe	Tc to Inlet	Final TC
ROOF	C/O1	8 in.	1		20.0	0.0100	0.010		0.12 Ac.	0.98	0.12	0.12	7.49	0.90	0.90	1.57	4.50 fps.	0.07 min	6.0 min	6.0 min
IN1	IN2	15 in.	1		72.0	0.0100	0.010		0.16 Ac.	0.98	0.16	0.16	7.49	1.20	1.20	8.39	6.84 fps.	0.18 min	6.0 min	6.0 min
IN2	Kraken	15 in.	1		16.0	0.0100	0.010		0.11 Ac.	0.98	0.10	0.52	7.49	0.75	3.89	8.39	6.84 fps.	0.04 min	6.0 min	6.18 min
IN3	IN2	15 in.	1		47.0	0.0100	0.010		0.31 Ac.	0.84	0.26	0.26	7.49	1.95	1.95	8.39	6.84 fps.	0.11 min	6.0 min	6.0 min
Kraken	ST	15 in.	1		5.0	0.0100	0.010		0.00 Ac.	0.98	0.00	0.52	7.49	0.00	3.89	8.39	6.84 fps.	0.01 min	6.0 min	6.22 min

STORMTRAP SYSTEM INFORMATION		
WATER STORAGE REQ'D:	10000	CUBIC FEET
WATER STORAGE PROV:	12559.8	CUBIC FEET
UNIT HEADROOM:	5' 0"	SINGLETRAP
UNIT QUANTITY:	27	TOTAL PIECES

STORMTRAP STRUCTURAL DESIGN CRITERIA

1. STORMTRAP MODULES SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/ OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.
2. COVER RANGE: MIN. 1.08' MAX. 4.00' CONSULT STORMTRAP FOR ADDITIONAL COVER OPTIONS.
3. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.

StormTrap®

PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]

1-877-867-6872

ENGINEER INFORMATION:

PROJECT INFORMATION:

SINGLETRAP

INFILTRATION

CURRENT ISSUE DATE:

ISSUED FOR:

SAMPLE PROJECT

REV.	DATE:	ISSUED FOR:	DWN BY:

SCALE:

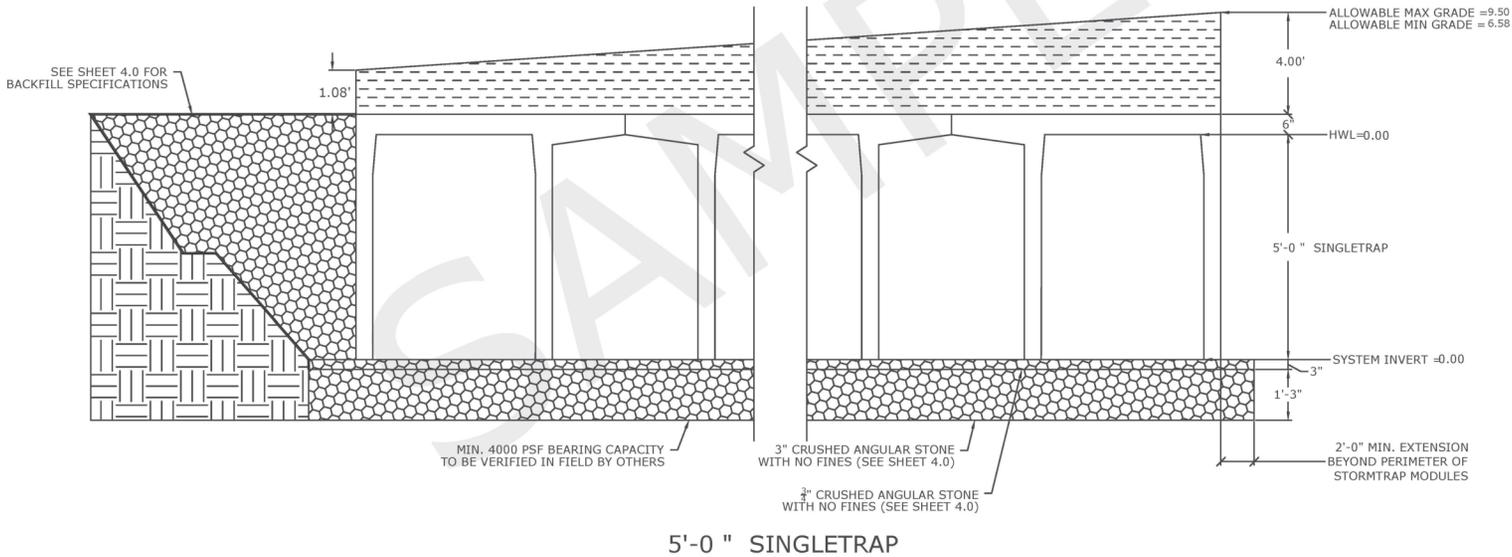
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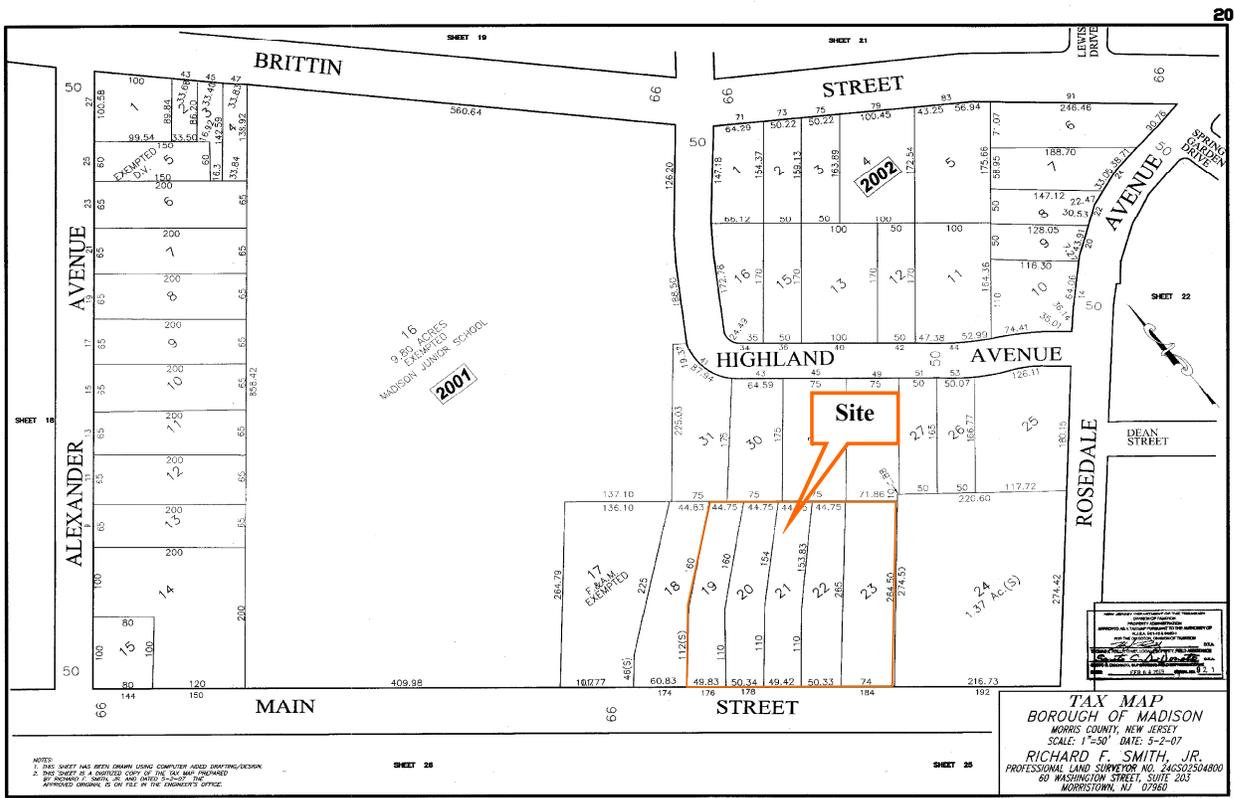
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C. MAPS

- ◆ **Tax Map**
- ◆ **Aerial Map**
- ◆ **Roads Map**
- ◆ **USGS Map**
- ◆ **Soils Map**
- ◆ **Community Wells & Wellhead Protection Area Map**
- ◆ **Drainage Area Maps**
 - **Existing Drainage Area Map**
 - **Proposed Drainage Area Map**
 - **Inlet Drainage Area Map**



Tax Map

Source: Borough of Madison Tax Map Sheet #20

Heller Property Partners, LP

176, 178 & 180 Main Street
Block 2001, Lots 19, 20, 21, 22 & 23

Borough of Madison, Morris County, New Jersey

BENJ #J190530

Prepared by: BM

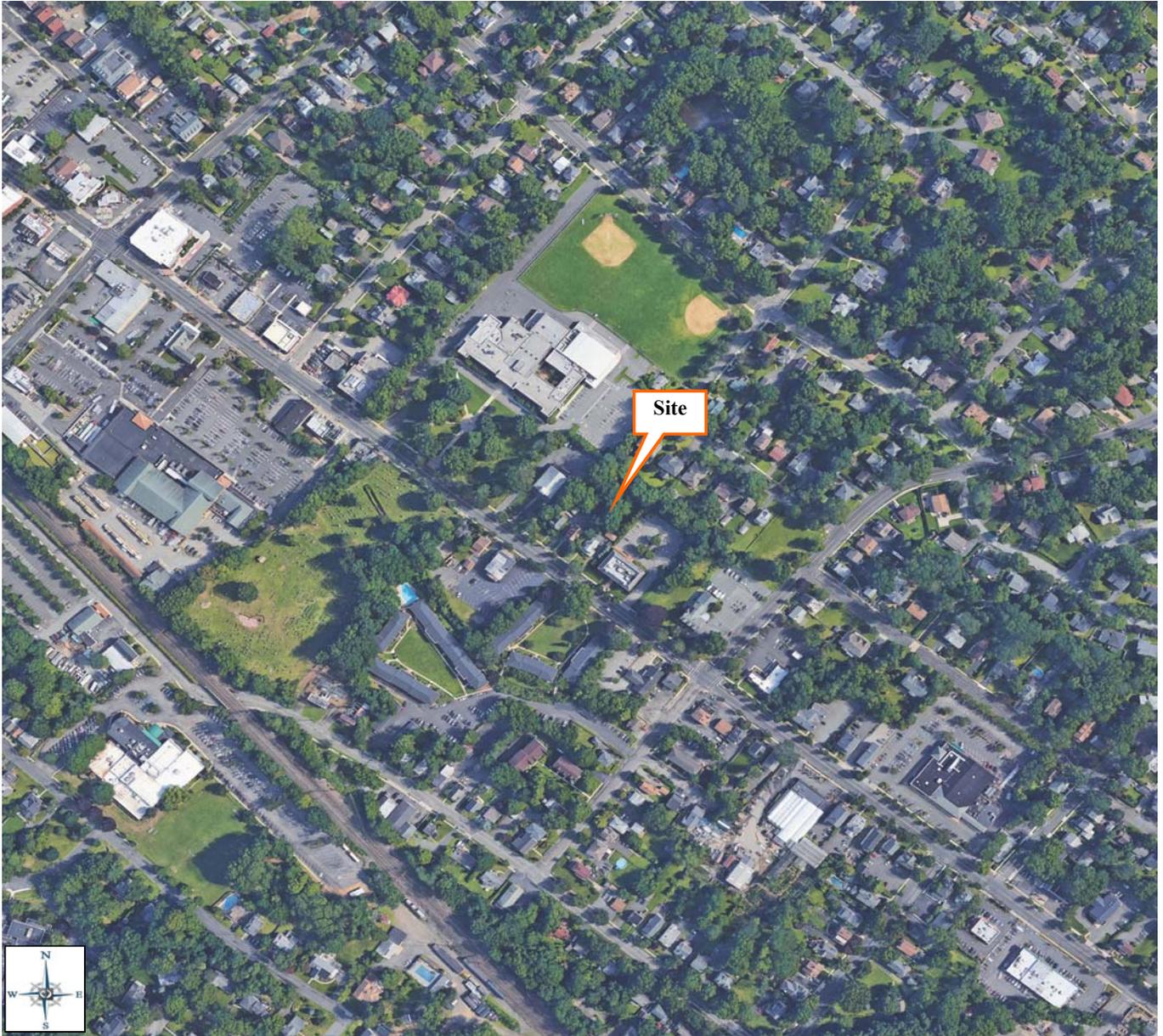
Date: 8/1/2019

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Scale: NTS



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Aerial Map

Source: Google Earth 2019

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Block 2001, Lots 19, 20, 21, 22 & 23

Borough of Madison, Morris County, New Jersey

BENJ #J190530

Prepared by: BM

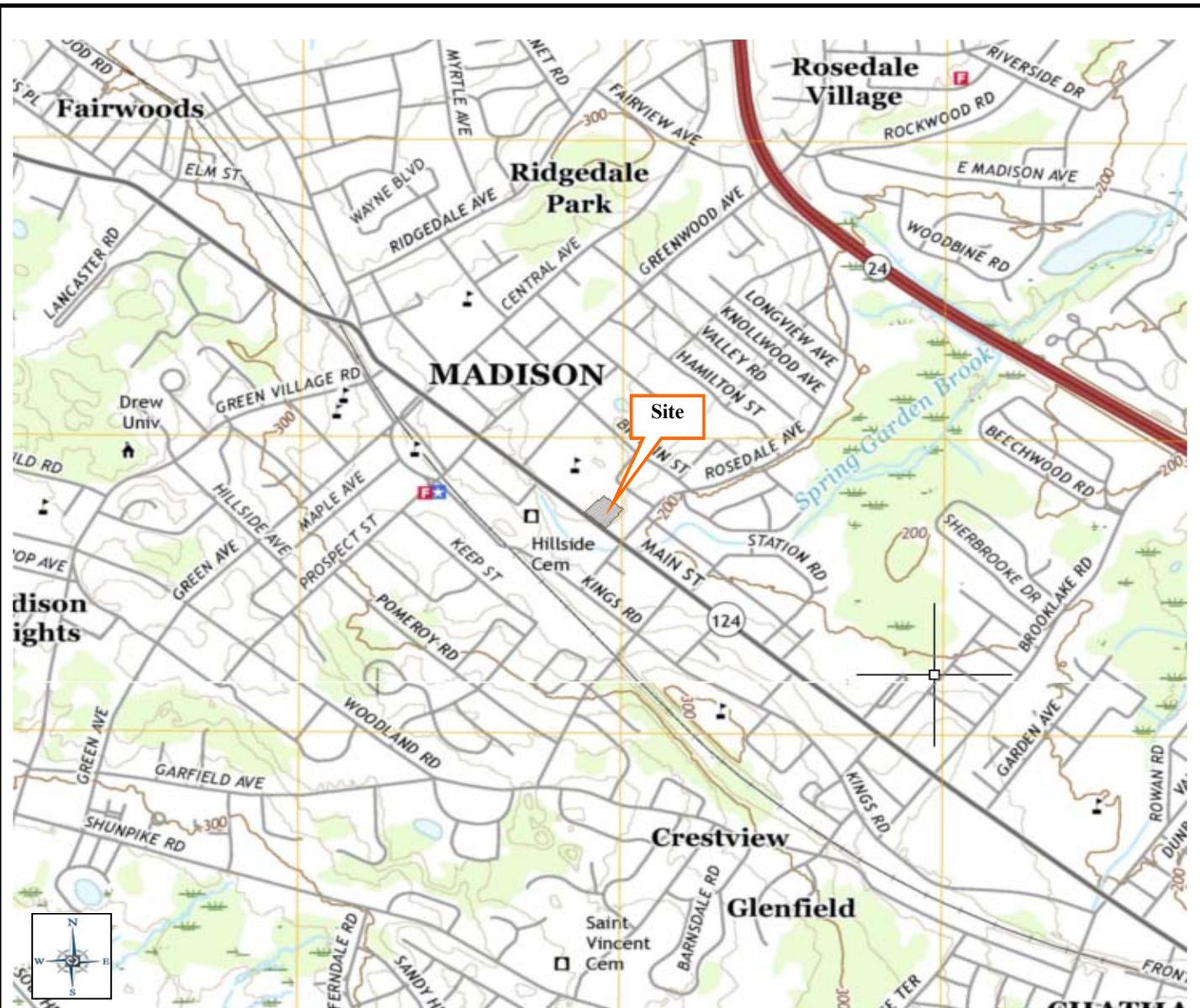
Date: 8/1/2019

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USGS Map
517,000-ft. E; 70,000-ft. N
Morristown Quadrangle

Source: USGS, 2016

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Prepared by: BM

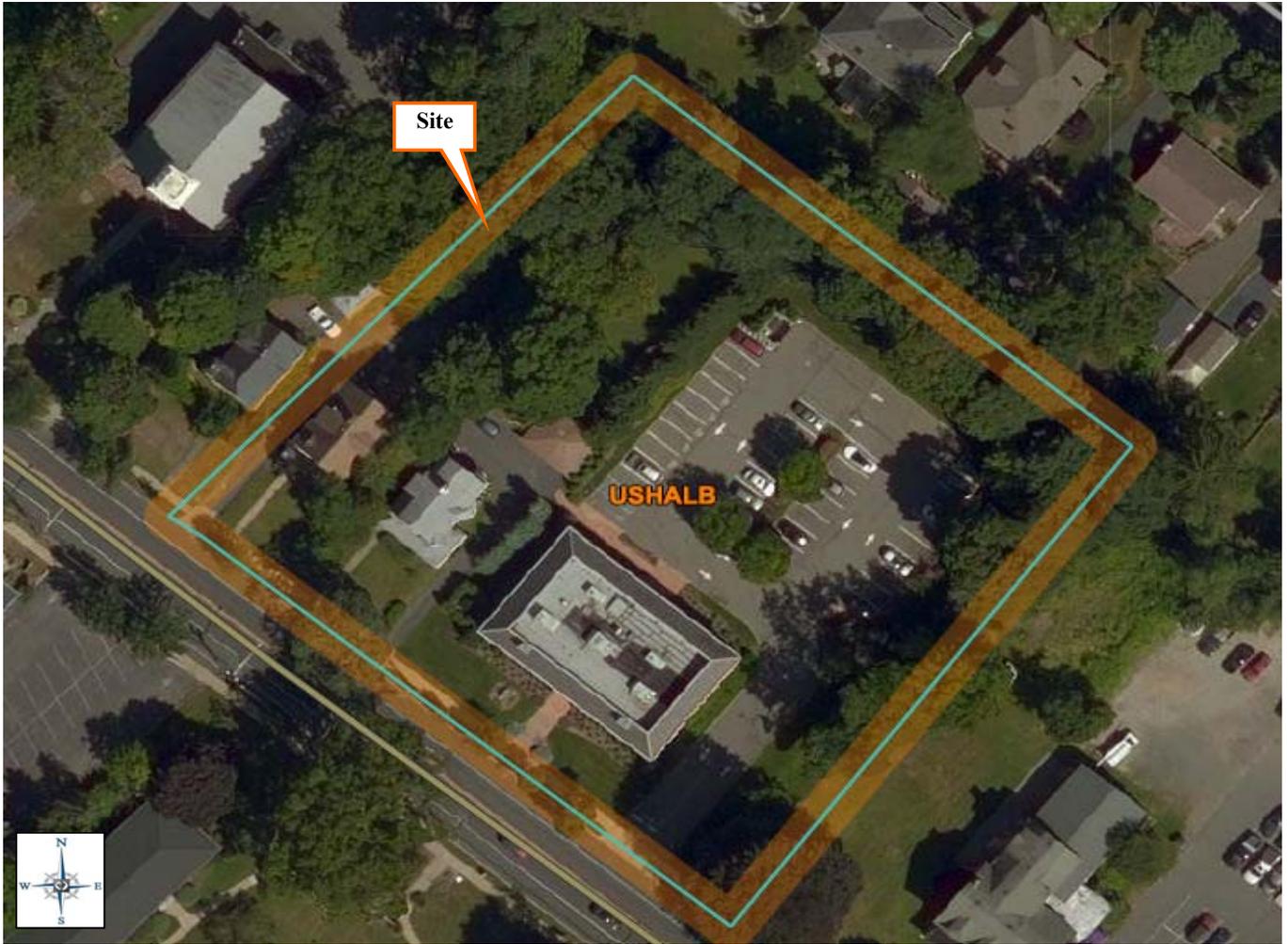
Date: 8/1/2019

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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
USHALB	Urban land-Haledon complex, 3 to 8 percent slopes	1.9	100.0%
Totals for Area of Interest		1.9	100.0%

Soils Map

Source: NRCS Web Soil Survey, 2012

0

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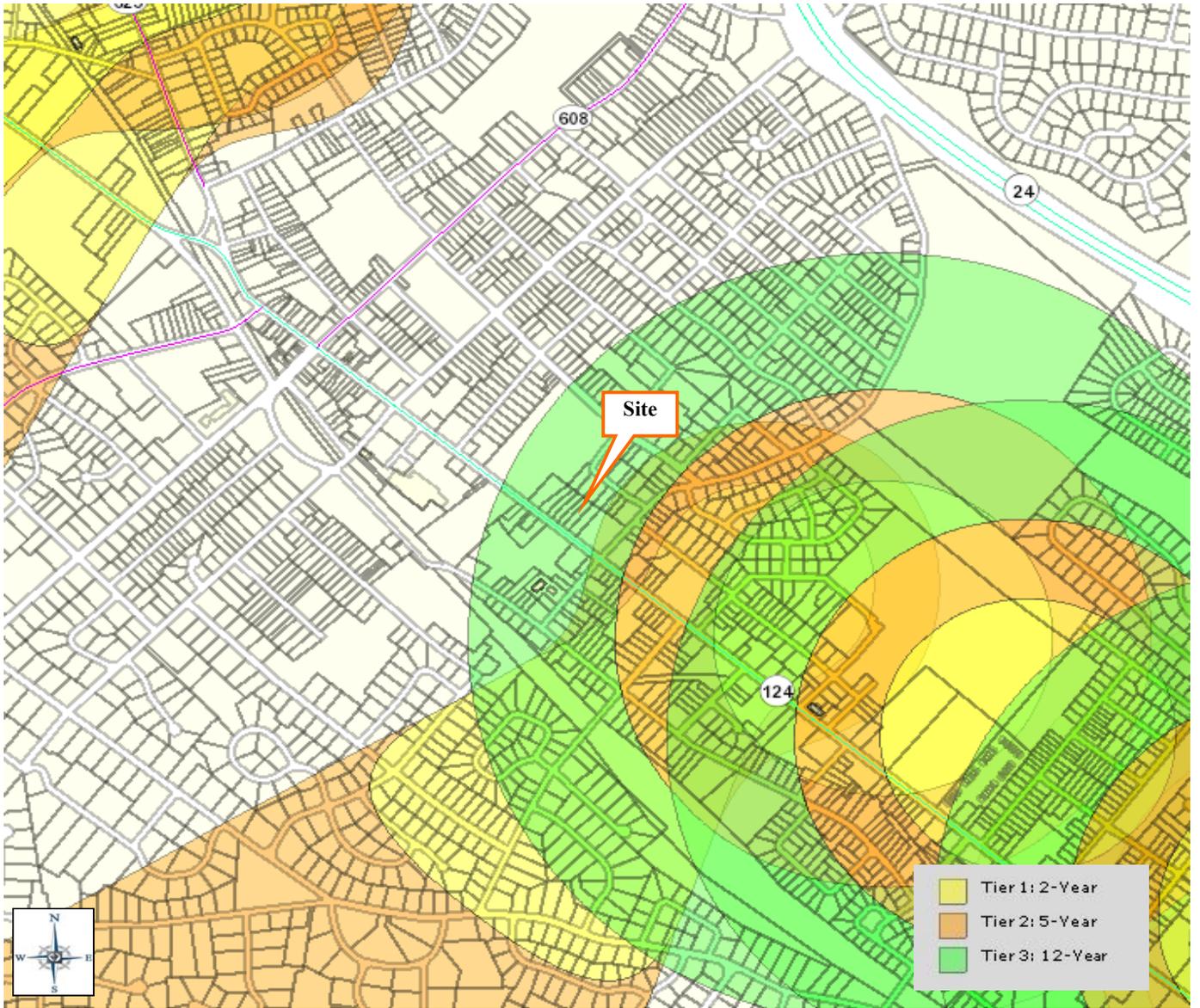
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Community Wells & Wellhead Protection Area Map

Source: NJ GeoWeb

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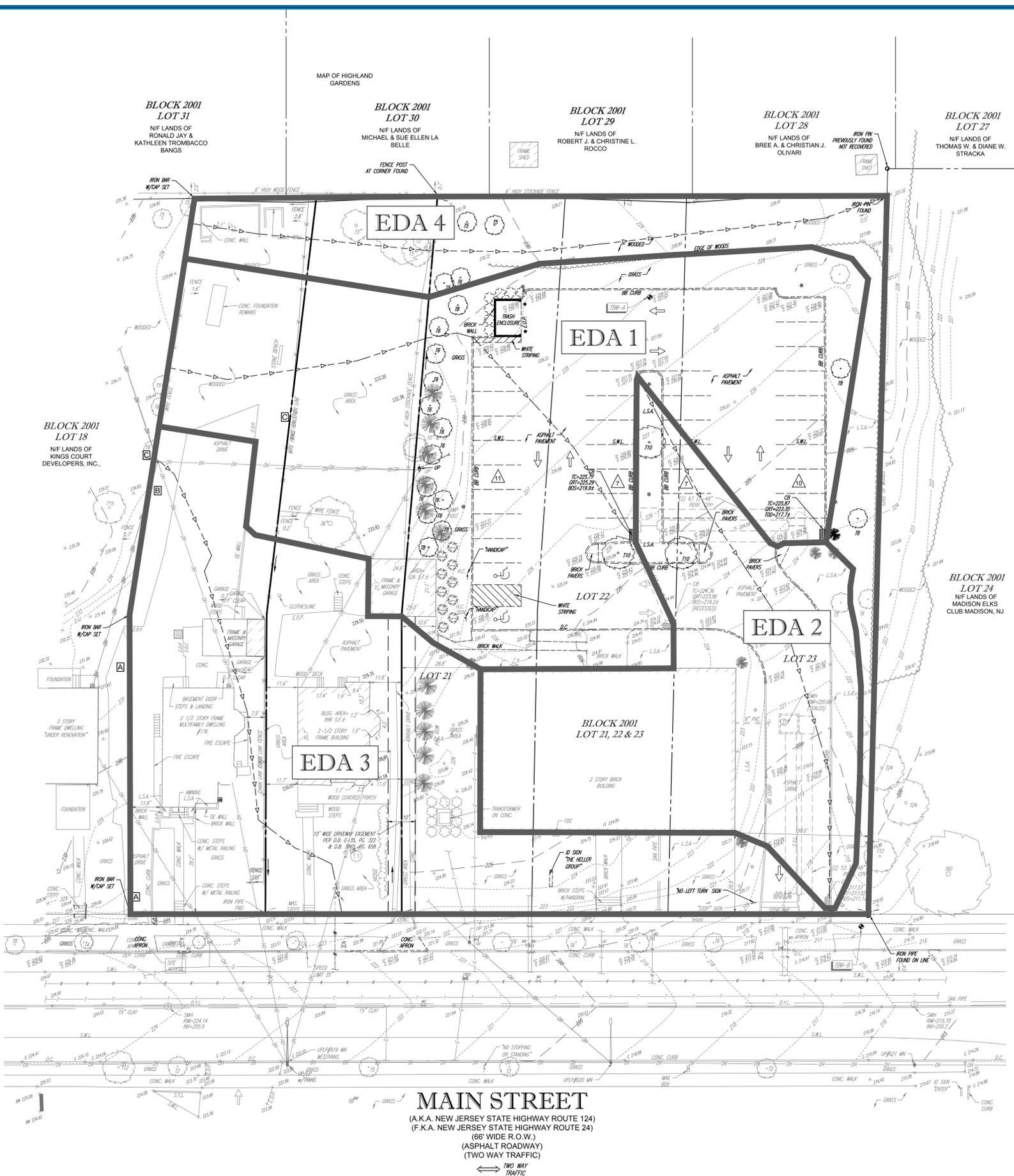
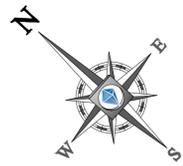
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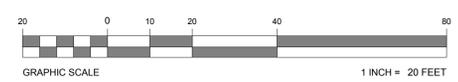
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 CAD I.D.: J190530-SEB2019

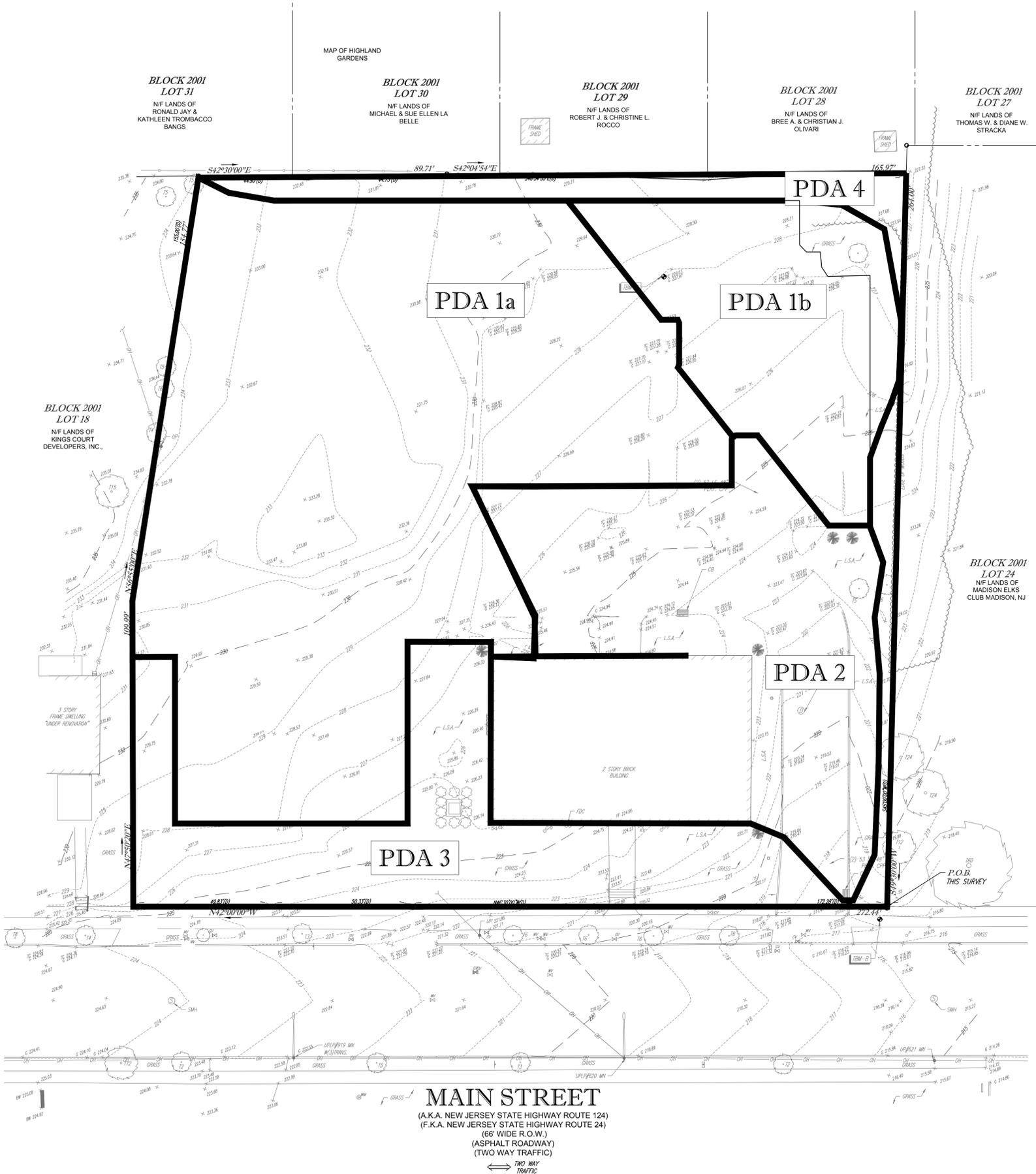
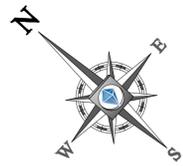
PROJECT:
PRELIMINARY & FINAL SITE & SUBDIVISION PLAN
 FOR
HELLER PROPERTY PARTNERS, LP
 PROPOSED OFFICE BUILDING & SITE IMPROVEMENTS
 BLOCK 2001; EXIST. LOTS 19, 20, 21, 22 & 23
 176, 178 & 180 MAIN STREET
 BOROUGH OF MADISON
 MORRIS COUNTY, NEW JERSEY

BOHLER ENGINEERING
 BOHLER ENGINEERING NJ, LLC
 35 TECHNOLOGY DRIVE
 WARREN, NJ 07059
 Phone: (908) 688-6300
 Fax: (908) 754-4401
 www.BohlerEngineering.com
 NJ CERT. OF AUTHORIZATION NO. 245A28161700

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 NEW YORK LICENSE No. 079512

SHEET TITLE:
EXISTING DRAINAGE AREAS MAP
 SHEET NUMBER:
1
 OF 3
 REVISION 0 - 07/19/2019





**BLOCK 2001
LOT 31**
N/F LANDS OF
RONALD JAY &
KATHLEEN TROMBACCO
BANGS

**BLOCK 2001
LOT 30**
N/F LANDS OF
MICHAEL & SUE ELLEN LA
BELLE

**BLOCK 2001
LOT 29**
N/F LANDS OF
ROBERT J. & CHRISTIAN L.
ROCCO

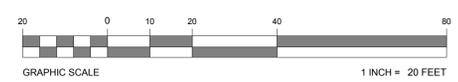
**BLOCK 2001
LOT 28**
N/F LANDS OF
BREE A. & CHRISTIAN J.
OLIVARI

**BLOCK 2001
LOT 27**
N/F LANDS OF
THOMAS W. & DIANE W.
STRACKA

**BLOCK 2001
LOT 18**
N/F LANDS OF
KINGS COURT
DEVELOPERS, INC.

**BLOCK 2001
LOT 24**
N/F LANDS OF
MADISON ELKS
CLUB MADISON, NJ

MAIN STREET
(A.K.A. NEW JERSEY STATE HIGHWAY ROUTE 124)
(F.K.A. NEW JERSEY STATE HIGHWAY ROUTE 24)
(66' WIDE R.O.W.)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)



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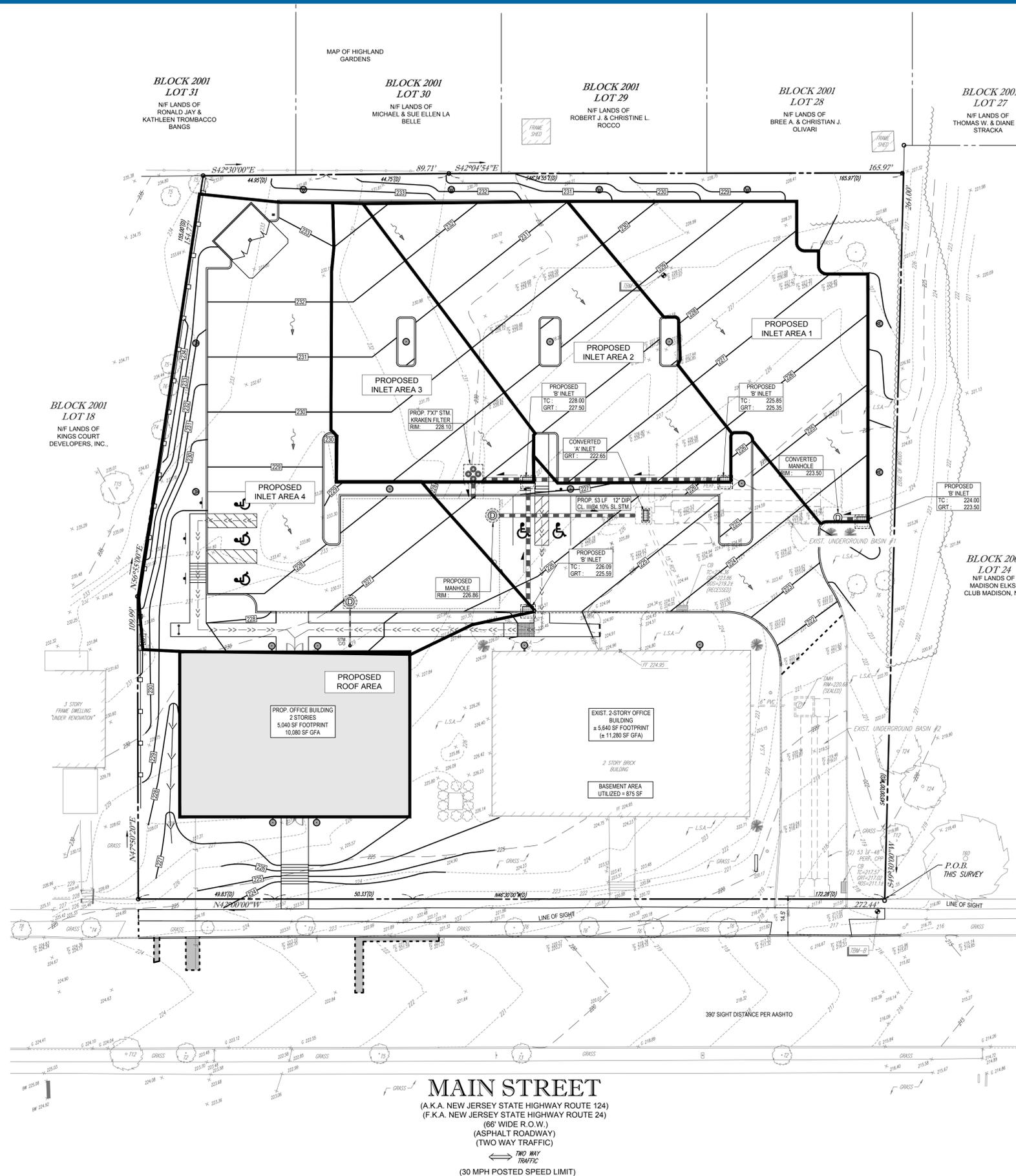
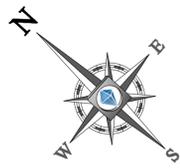
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CAD I.D.: J190530-IDA-2A

PRELIMINARY FINAL SITE & SUBDIVISION PLAN

FOR
HELLER PROPERTY PARTNERS, LLC

PROPOSED OFFICE BUILDING & SITE IMPROVEMENTS

BLOCK 001; EXIST. LOTS 19, 20, 21, 22 & 23
176, 178 & 180 MAIN STREET
BOROUGH OF MADISON
MORRIS COUNTY, NEW JERSEY

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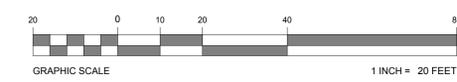
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NEW YORK LICENSE No. 079512

SHEET TITLE:
INLET DRAINAGE AREA MAP

SHEET NUMBER:
3
OF 3

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390' SIGHT DISTANCE PER AASHTO



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