

May 26, 2026

File: 29906

STORMWATER MANAGEMENT REPORT

PREPARED FOR

PROPOSED TWO LOT MINOR SUBDIVISION

Located at

**15 RIDGEWAY AVENUE
BLOCK 158 LOT 28.01**

Within The

**TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NJ**



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NJ License GE44863

STORMWATER DRAINAGE REPORT

05/26/26

Minor Subdivision 15 Ridgeway Ave West Orange, NJ

Introduction and Major Stormwater Discussion

This report has been prepared to demonstrate that the runoff from the proposed improvements to the site, which result in an increase of impervious coverage, is properly mitigated in accord with the requirements for a NJ DEP major stormwater project, and will pose no negative impact to any surrounding downstream properties.

To ensure that the design complies with the requirements and goals of the Township Stormwater Ordinance a detailed analysis of the site condition was performed. A soils evaluator tested various areas of the site to identify both seasonal high water levels and the ability of the soil to infiltrate runoff. Additionally areas allowing for use of low impact development were identified; including potential preservation of large deciduous trees, lessening the slope of surfaces and elongation of drainage paths. This study focused the design on the area of the site which would allow for use of infiltration.

Two stormwater management basins were designed for the project. The first, known as the "Front Yard Basin", a small scale sub-surface extended infiltration basin (a system allowing for infiltration and controlled release) was chosen as the green infrastructure BMP to provide infiltration and recharge as well as reduction of runoff quantity. The basin is located at the area of the site where the soils evaluation determined an acceptable infiltration rate for design (A factor of safety was applied to the analysis by utilizing $\frac{1}{2}$ of the measured infiltration rate in all calculations).

The "Front Yard Basin" works in conjunction with the proposed permeable pavement, another green infrastructure BMP, which is specified for all driveway surfaces. When rainfall from the Water Quality Storm is filtered by passing through the permeable pavement, conveyed to the basin and infiltrated, the system is rated for 80% total suspended solids reduction providing water quality treatment for the site. Runoff entering the permeable pavement shall be collected within a stone bed below the pavement. It is proposed to allow runoff to travel through the stone bed (supplemented by a series of perforated pipes) and enter the infiltration basin.

The second basin, known as the "Rear Yard Basin", collects runoff from roof surfaces, lawn areas, sidewalks and patios. As these surfaces are not subject to vehicle traffic provision of water quality treatment for this runoff is not required. The "Rear Yard Basin" is located at an area where the measured infiltration rate is less than 1"/hr, therefore although some infiltration will occur, it is not considered within the routing of the basin.

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Introduction and Major Stormwater Discussion (continued)

The basins shall be shared systems, accepting runoff from both lots, therefore easements allowing for common use and maintenance shall be established. Operations and maintenance requirements and responsibilities shall be filed with the record owner deeds.

The analysis shows that the runoff from the developed portion of the site directed towards the stormwater basins when combined with the runoff rate from the portions of the site which bypass the system, has been reduced to no more than 50% of the two year storm rate. 75% of the 10 year storm rate and 80% for the 100 year storm rate from what would have occurred if the design area were an undeveloped wooded lot.

Additionally, provisions for recharge and water quality have been provided and meet the requirements of the NJ DEP. The project also meets the requirements of the Township of West Orange Stormwater Ordinance with the exception of retaining the design "retention storm". The limitations of the sub-soil on the property will not allow for infiltration of this volume, which exceeds the NJ DEP requirements, and a waiver will be required. The proposed improvements provide a reduction in runoff rate from what occurs currently, provides water quality for motor vehicle surfaces where none is currently provided and maintains 100% of the existing infiltration on the site, justifying the requested waiver.

Property Description

The project site is an existing flag lot with a stem portion containing the driveway which fronts on Ridgeway Avenue. The 1.219 acre property was previously developed with a single family dwelling with attached garage, covered parking or storage area, retaining walls, bocci court and koi pond. The property is located within an existing residential neighborhood. The existing home is served by public utilities which are located within the bed of Ridgeway Avenue.

Drainage from a small portion of the property (approximately 3,000 sf) flows overland from a highpoint on the driveway stem towards Ridgeway Avenue. The remainder of the site drains overland from South to the North towards the rear of Lot 21.01 at which point runoff from the site is collected by an existing inlet and piped through Lot 21.01 to the Township storm sewer system. No existing stormwater management facilities were found on the site.

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Property Description (continued)

There are no protected steep slopes on the site; slopes on the property are predominantly between 1.5% and 8%.

The soils on the site are silt loam to loamy sand noted as BouB Boonton Urban Land within hydrologic soil type "C", with a seasonal water table depth exceeding 80" in depth and a moderately low to moderately high infiltration rate of the most restrictive soil layer of 0.06 to 0.20 in/hr (USDA NRCS Soil Survey).

On site soils testing revealed a depth to seasonal high water varying from 5' to 7.5' with an infiltration rate varying from 0.32"/hr to 1.00"/hr. Testing was done towards the four corners of the site. Only the southwest portion of the site yielded permeability rates great enough to support an infiltration system.

The vegetation on the site is predominantly well established lawn, with a number of large deciduous trees located predominantly along the exterior boundary of the site with a lesser concentration within the site interior.

A review of the NJ Geoweb site along with a site inspection by the engineer did not reveal any indications of wetlands, waterways or presence of protected species which might impact the development of the site.

Project Scope and Stormwater Management System Overview

It is proposed to subdivide the property into two lots. One lot will contain the existing home to the northeast of the site and a new home will be constructed on the second lot. Both lots will share a driveway access centered on the stem portions of the lots accessing Ridgeway Avenue.

Utility services for the homes shall be provided through the stem portions of the lot connecting to the mains on Ridgeway Ave.

Renovations and reconfiguration of the previously existing home was undertaken pursuant to an approved zoning permit. During the course of demolition the builder removed a significant portion of the existing dwelling leaving only the garage as a standing structure. Therefore from a

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Project Scope and Stormwater Management System Overview (continued)

stormwater modeling perspective the project shall be now considered the construction of two new homes.

A shared stormwater management system shall be constructed on the two lots. All proposed vehicle surfaces shall be constructed with permeable pavement. The driveway surfaces shall be underlain with a stone bed and an interconnecting perforated pipe system, both of which will collect runoff from the driveway and direct it towards a proposed "Front Yard " basin at the southwest corner of the site. Infiltration may be used in the basin as runoff is screened by the permeable pavement.

A second basin with the rear yard area will receive runoff from all roof surfaces and the front, side and rear yard lawn areas. As the measured infiltration rate at this basin is less than 1"/hr Infiltration is not used in the routing of the basin

The two basins shall, through the use of infiltration and orifice control, provide the required stormwater quantity reductions, recharge volumes and the required 80% reduction of total suspended solids for water quality from vehicle surfaces.

Design Discussion

Stormwater analysis of the project is accomplished utilizing HydroCAD version 10.20-8a Software furnished by HydroCAD Software Solutions LLC. The SCS-TR20 methodology is used to analyze NOAA 24 hr type C storms for both the current (2020) and projected (2050) 2, 10 and 100 year rainfalls along with the NJDEP 2 hour water quality design storm.

The model of this project focuses solely on the "developed" area of the site within the drainage area directed towards the residential properties to the north. As the Township stormwater ordinance defines the reconstruction of a home or milling or replacement of pavement as placement of new impervious surface, all impervious surfaces within this area whether driveway or existing roofs shall be considered "new" and altered from a good condition wood ground cover. The remaining portions of this drainage area which shall not be proposed with an impervious cover are considered existing lawn conditions altered from woods.

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Design Discussion (continued)

A small portion of the paved driveway stem from which runoff flows from the existing highpoint towards Ridgeway Ave is considered as replacement as it has existed prior to 1980 and continues to drain towards Ridgeway Ave. These areas are depicted on the drainage area map.

The area of the site to be studied in the existing condition is modeled as type "C" HSG with ground cover type of "good condition woods" with a curve number of 70. The time of concentration was calculated as 14.2 minutes consisting of sheet and shallow concentrated flow from the front of the proposed homes travelling to the study point which shall be the existing inlet to the rear of the site. The existing study area totals 48,267 sf.

The areas of the site to be studied in the proposed condition are modeled either as impervious surfaces with a curve number of 98 or lawn surfaces with a curve number of 74. The proposed condition study area has been divided into five contributing drainage areas. Two areas consist of the dwelling roofs, another is the area of permeable pavement and the area draining towards the pavement, another is the lawn areas directed to the Rear Yard Basin, and the last area is the portion of the site from which runoff bypasses stormwater control measures and enters the inlet at the study point. The area of the five proposed conditions drainage areas also total 48,267 sf

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Stormwater Analysis

Stormwater Quantity

Requirements

To comply with the Major Stormwater regulations quantity control restrictions, stormwater management measures shall be designed so that the post-construction peak runoff rates for the current and projected 2-, 10 and 100 year storm events, as defined and determined pursuant to N.J.A.C. 7:8-5.7(c) and (d), respectively, are 50, 75 and 80 percent, respectively, of the preconstruction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed.

Design Methodology/Discussion

The runoff rates from the existing condition were determined. The runoff rates from the proposed conditions were determined. A study point is modeled at the existing inlet to the rear of the site at which all runoff from the studied area is collected. A comparison to the pre construction and post construction rates along with the maximum allowed reduced rates follows.

Current Intensity Storm

	<u>Pre Construction Rate</u>	<u>Maximum</u>	<u>Post Construction Rate</u>
2 Year Storm	0.90 cfs	0.45 cfs	0.42 cfs
10 Year Storm	2.24 cfs	1.68 cfs	1.35 cfs
100 Year Storm	5.34 cfs	4.27 cfs	4.18 cfs

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Design Methodology/Discussion (continued)**Projected Intensity Storm**

	<u>Pre Construction Rate</u>	<u>Maximum</u>	<u>Post Construction Rate</u>
2 Year Storm	1.34 cfs	0.66 cfs	0.64 cfs
10 Year Storm	3.11 cfs	2.33 cfs	2.12 cfs
100 Year Storm	7.53 cfs	6.02 cfs	5.85 cfs

Stormwater Recharge**Requirements**

To comply with the Major Stormwater regulations recharge requirements, stormwater management measures shall be designed to demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the projected two-year storm, as defined and determined pursuant to N.J.A.C. 7:8- 5.7(d), is infiltrated.

Design Methodology/Discussion

Recharge has been provided by the use of a small scale infiltration basin and has been analyzed by utilizing the New Jersey Groundwater Recharge Spreadsheet (NJGRS)

As the NJGRS cannot model infiltration from a system which is simultaneously discharging outflow through an orifice the study area is limited to an 8" thick stone bed set below the system outlet. The BMP variable is the depth from the surface invert of the discharge orifice or 40". The depth to the lower surface is 48". The area, 1401 sf, is the footprint of the infiltration bed.

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Design Methodology/Discussion (continued)

Recharge Work Sheet One

Annual Groundwater Recharge Analysis (based on GSR-32)						Project Name: 15 Ridgeway Subdivision					
Select Township ↓			Average Annual P (in)	Climatic Factor	Description: File 29906						
ESSEX CO., WEST ORANGE TOWN			49.0	1.67	Analysis Date: 05/26/26						
Pre-Developed Conditions						Post-Developed Conditions					
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)	Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.883	Woods	Boonton	15.7	50,187	1	0.367	Impervious areas	Boonton	0.0	-
2	0.275	Impervious areas	Boonton	0.0	-	2	0.791	Open space	Boonton	14.9	42,921
3						3					
4						4					
5						5	0				
6						6	0				
7	0					7	0				
8	0					8	0				
9	0					9	0				
10	0					10	0				
11	0					11	0				
12	0					12	0				
13	0					13	0				
14	0					14	0				
15	0					15	0				
Total =	1.2			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)	Total =	1.2			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				11.9	50,187					10.2	42,921
						Annual Recharge Requirements Calculation ↓					
						% of Pre-Developed Annual Recharge to Preserve =		100%		Total Impervious Area (sq.ft)	
						Post-Development Annual Recharge Deficit=		7,267		(cubic feet)	
						Recharge Efficiency Parameters Calculations (area averages)					
						RWC= 3.57 (in)		DRWC= 0.00 (in)			
						ERWC = 0.59 (in)		EDRWC= 0.00 (in)			

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

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Design Methodology/Discussion (continued)

Recharge Work Sheet Two

Project Name		Description		Analysis Date		BMP or LID Type	
15 Ridgeway Subdivision		File 29906		05/26/26		Infiltration Basin	
Recharge BMP Input Parameters				Root Zone Water capacity Calculated Parameters			
Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit
BMP Area	ABMP	1401.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.61	in
BMP Effective Depth, this is the design variable	dBMP	0.8	in	ERWC Modified to consider dEXC	EDRWC	0.00	in
Upper level of the BMP surface (negative if above ground)	dBMPu	40.0	in	Empty Portion of RWC under Infiltr. BMP	RERWC	0.00	in
Depth of lower surface of BMP, must be >= dBMPu	dEXC	48.0	in				
Post-development Land Segment Location of BMP. Input Zero if Location is distributed or undetermined	SegBMP	2	unitless				
				Recharge Design Parameters			
				Parameter	Symbol	Value	Unit
				Inches of Runoff to capture	Qdesign	0.07	in
				Inches of Rainfall to capture	Pdesign	0.13	in
				Recharge Provided Avg. over Imp. Area		5.5	in
				Runoff Captured Avg. over imp. Area		5.5	in
				BMP Calculated Size Parameters			
				ABMP/Aimp	Aratio	0.09	unitless
				BMP Volume	VBMP	93	cu.ft
				Calculation Check Messages			
				Volume Balance--> OK			
				dBMP Check--> OK			
				dEXC Check--> OK			
				BMP Location--> OK			
Parameters from Annual Recharge Worksheet				System Performance Calculated Parameters			
Post-D Deficit Recharge (or desired recharge volume)	Vdef	7.267	cu.ft	Annual BMP Recharge Volume		7.267	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	15.987	sq.ft	Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
Root Zone Water Capacity	RWC	3.69	in	%Rainfall became Runoff		78.5%	%
RWC Modified to consider dEXC	DRWC	0.00	in	%Runoff Infiltrated		14.2%	%
Climatic Factor	C-factor	1.67	no units	%Runoff Recharged		14.2%	%
Average Annual P	Pavg	49.0	in	%Rainfall Recharged		11.1%	%
Recharge Requirement over Imp. Area	dr	5.5	in				
OTHER NOTES Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensitive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.							
How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP. To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration click the "Default Vdef & Aimp" button.							

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Stormwater Quality

To comply with the Major Stormwater regulations water quality requirements, stormwater management measures shall be designed to provide 80% reduction of the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm over the net increase of motor vehicle surface.

Design Methodology/Discussion

Clean roof runoff and runoff from lawns, walkways, patios or decks do not have to be treated for TSS removal.

Therefore discussion of water quality provision on site is limited to the remaining impervious surface comprising driveway cover. All proposed driveways on the site are specified to be constructed of a permeable pavement system.

Construction details provide a non-woven geotextile fabric underlain stone bed under all permeable pavement with a minimum depth of 8".

It is proposed that the rainfall and runoff from surrounding areas which is directed to the pavement shall travel through the stone bed (supplemented by a series of perforated piping) to the infiltration basin.

The lowest orifice outlet of the infiltration system is set at elevation 563.65 which allows for storage and infiltration of the Water Quality storm volume. Infiltration is not considered when routing the larger design storms through the infiltration basin.

Infiltration of the Water Quality Storm volume when pre-screened by filtration through a permeable pavement layer will provide the required 80% TSS removal for water quality.

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Infiltration Mounding Analysis

The mounding of the infiltrated water below the basin bottom is modeled utilizing the Hantush spreadsheet calculator downloaded from the NJDEP.

The mounding analysis shall be performed for two cases.

The first shall analyze the function of the pond during infiltration of the Water Quality Storm to determine if mounding will impact the rate of infiltration used in the design.

The second shall analyze the mounding which may occur during the projected 100 year storm. As infiltration is not utilized within the routing of the 2, 10 and 100 year storms, this study is performed only to determine any potential impact to surrounding foundations

Case One: Infiltration Impact Analysis:

The recharge rate, R, or the permeability rate utilized is $\frac{1}{2}$ of the measured rate of 1.0"/hr
R=0.5 "/hr

The basin dimensions for spread sheet entry were 42.5' x 6.5'. Because the basin shape is linear the spread sheet is run twice with the x and y values transposed.

The specific yield utilized was the default value of 0.15.

The horizontal hydraulic conductivity was set equal to the design permeability rate of 0.5"/hr.

The duration of the infiltration period was set at the time needed to infiltrate the Water Quality Storm or 8 hours.

The initial thickness of the saturated zone utilized was the default value of 10 feet.

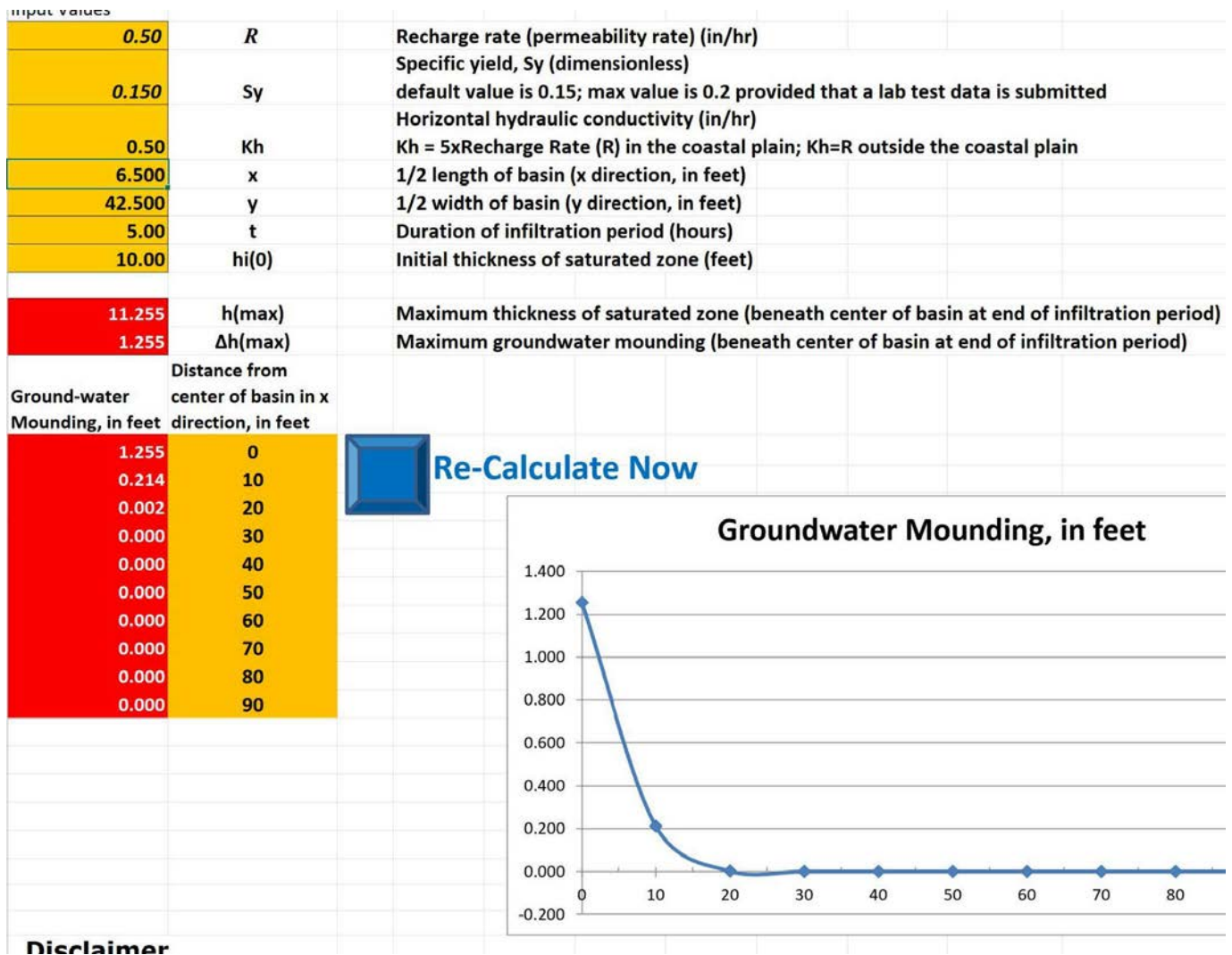
Results indicate a 1.2' rise in groundwater below the center of the basin. The basin is set 2.7' above the SHW level therefore there is no impact to the function of the system's infiltration rate when infiltrating the Water Quality Storm. Spread sheet detail follows.

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Infiltration Mounding Analysis Case One



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Case Two: Mounding Impact to Surrounding Foundations

The recharge rate, R, or the permeability rate utilized is $\frac{1}{2}$ of the measured rate of 1.0"/hr
R=0.5 "/hr

The basin dimensions for spread sheet entry were 42.5" x 6.5'. Because the basin shape is linear the spread sheet is run twice with the x and y values transposed.

The specific yield utilized was the default value of 0.15.

The horizontal hydraulic conductivity was set equal to the design permeability rate of 0.5"/hr.

The duration of the infiltration period was set at the time needed to pass the projected 100 year storm through the basin or 25 hours.

The initial thickness of the saturated zone utilized was the default value of 10 feet.

Results indicate a zero change in mounding at a distance 30' perpendicular from the center of the basin. There are no building structures with a basement within the area which would experience an increase of ground water elevation. Spread sheet detail follows.

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Infiltration Mounding Analysis Two

0.50	R	Recharge rate (permeability rate) (in/hr)
0.150	Sy	Specific yield, Sy (dimensionless) default value is 0.15; max value is 0.2 provided that a lab test data is submitted
0.50	Kh	Horizontal hydraulic conductivity (in/hr) Kh = 5xRecharge Rate (R) in the coastal plain; Kh=R outside the coastal plain
6.500	x	1/2 length of basin (x direction, in feet)
42.500	y	1/2 width of basin (y direction, in feet)
25.00	t	Duration of infiltration period (hours)
10.00	hi(0)	Initial thickness of saturated zone (feet)

14.049	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
4.049	Δh(max)	Maximum groundwater mounding (beneath center of basin at end of infiltration period)

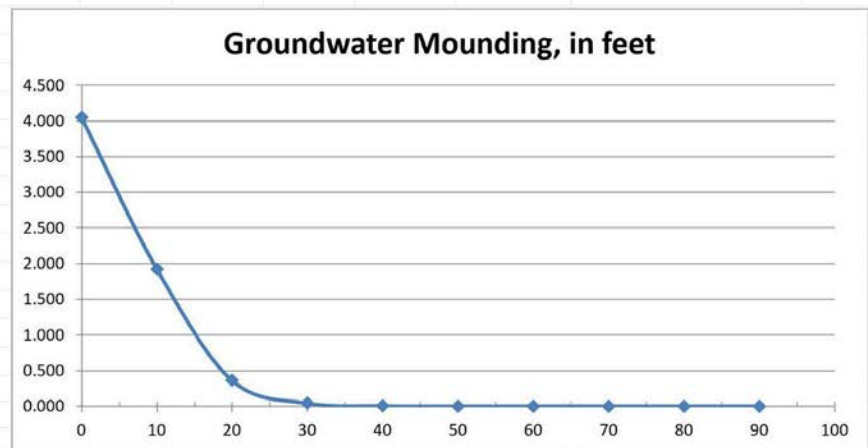
Ground-water
Mounding, in feet

Distance from
center of basin in x
direction, in feet

4.049	0
1.923	10
0.368	20
0.042	30
0.005	40
0.002	50
0.002	60
0.002	70
0.002	80
0.002	90



Re-Calculate Now



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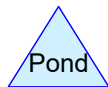
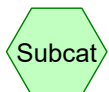
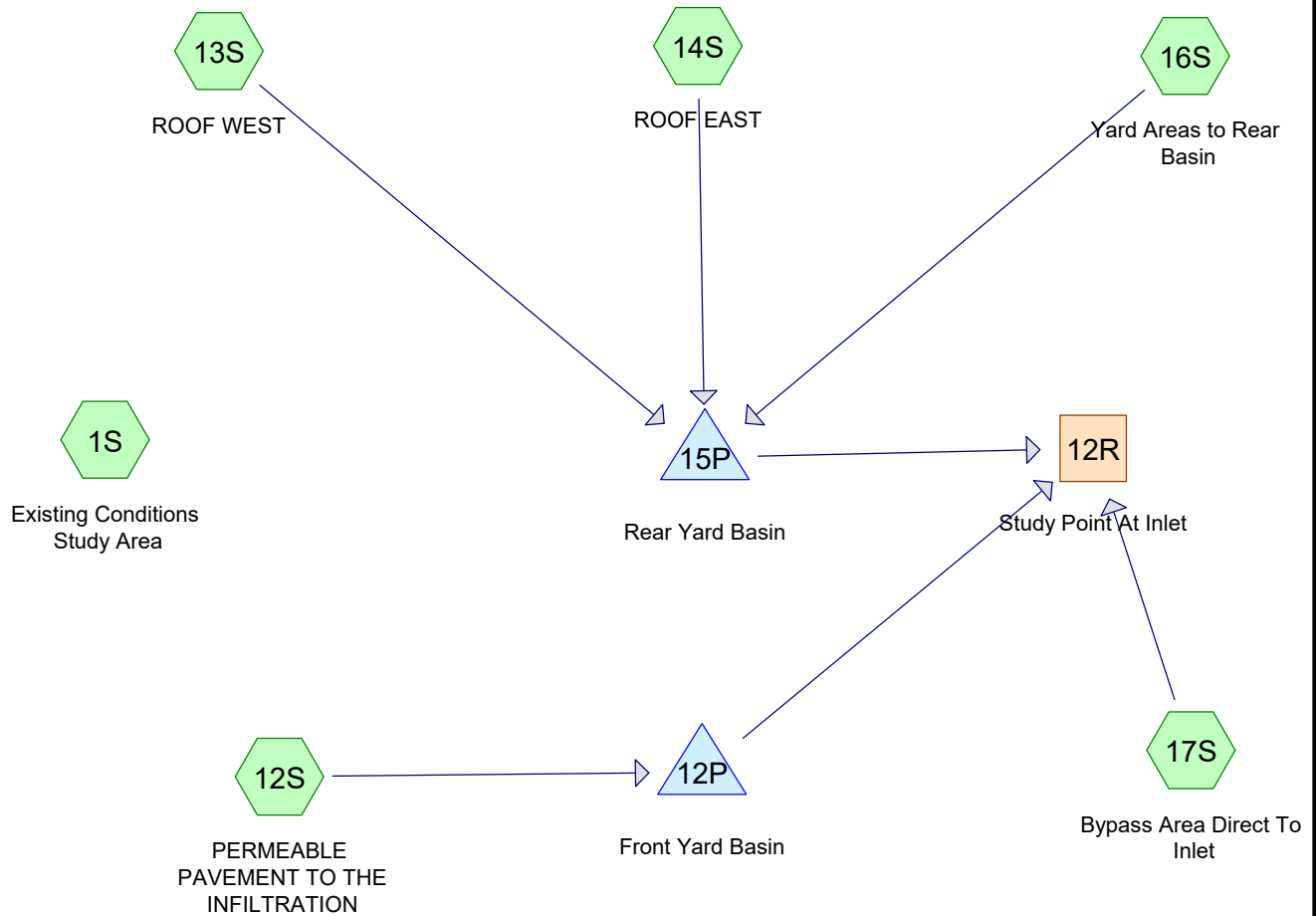
Civil Engineers & Land Surveyors
Certificate of Authorization 24GA27997700

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Diagram of System:	Page 0 of Attachment
Existing and Proposed Drainage Areas:	Page 1 of Attachment
Pond Summary and Routing:	Page 37 of Attachment
Combined Hydrographs at Inlet:	Page 63 of Attachment
Soils Testing:	Page 69 of Attachment



Routing Diagram for 29906 15 Ridgeway West Orange Second Submittal 5-26-26
 Prepared by Ensurlan Inc, Printed 5/26/2026
 HydroCAD® 10.20-8a s/n 11646 © 2025 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: Existing Conditions Study Area

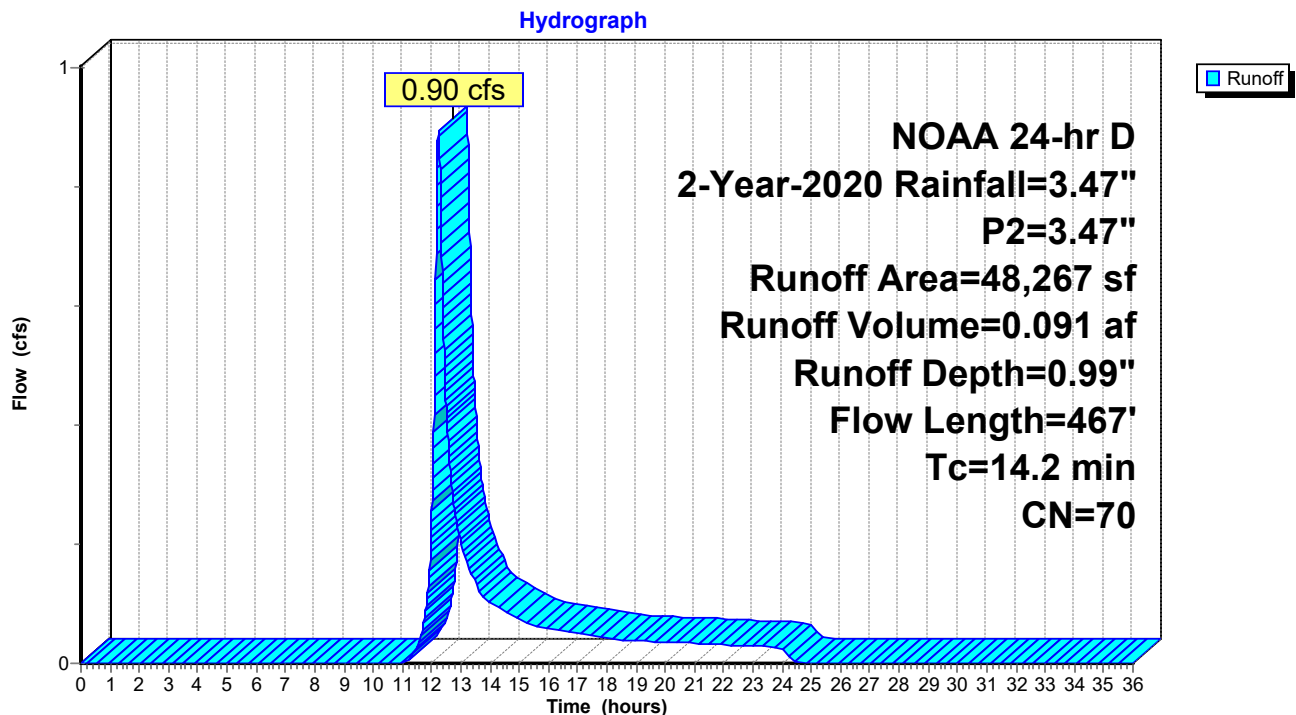
Runoff = 0.90 cfs @ 12.23 hrs, Volume= 0.091 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
48,267	70	Woods, Good, HSG C
48,267		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	170	0.0320	1.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.47"
10.3	130	0.0270	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.47"
2.4	167	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	467	Total			

Subcatchment 1S: Existing Conditions Study Area



Summary for Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION

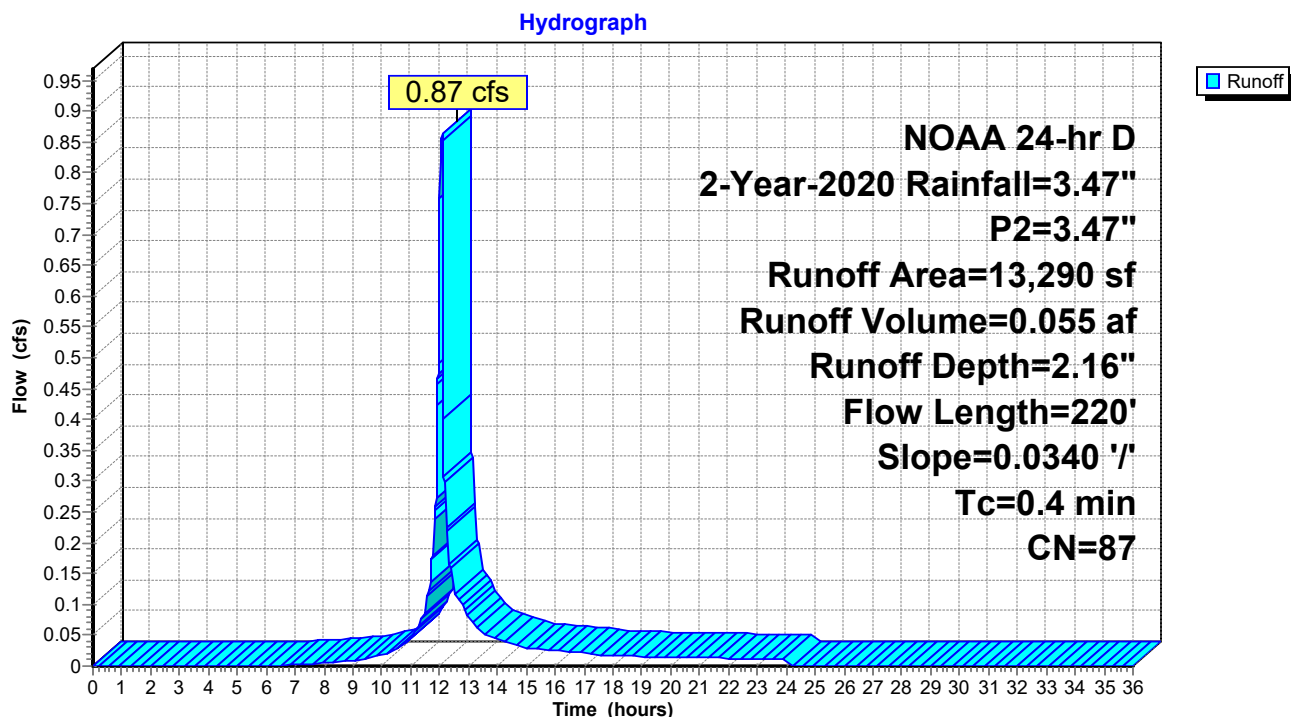
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.055 af, Depth= 2.16"
 Routed to Pond 12P : Front Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
* 6,776	99	Permeable Pavement
6,514	74	>75% Grass cover, Good, HSG C
13,290	87	Weighted Average
6,514		49.01% Pervious Area
6,776		50.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	220	0.0340	9.63	5.25	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.010 PVC, smooth interior

Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION



Summary for Subcatchment 13S: ROOF WEST

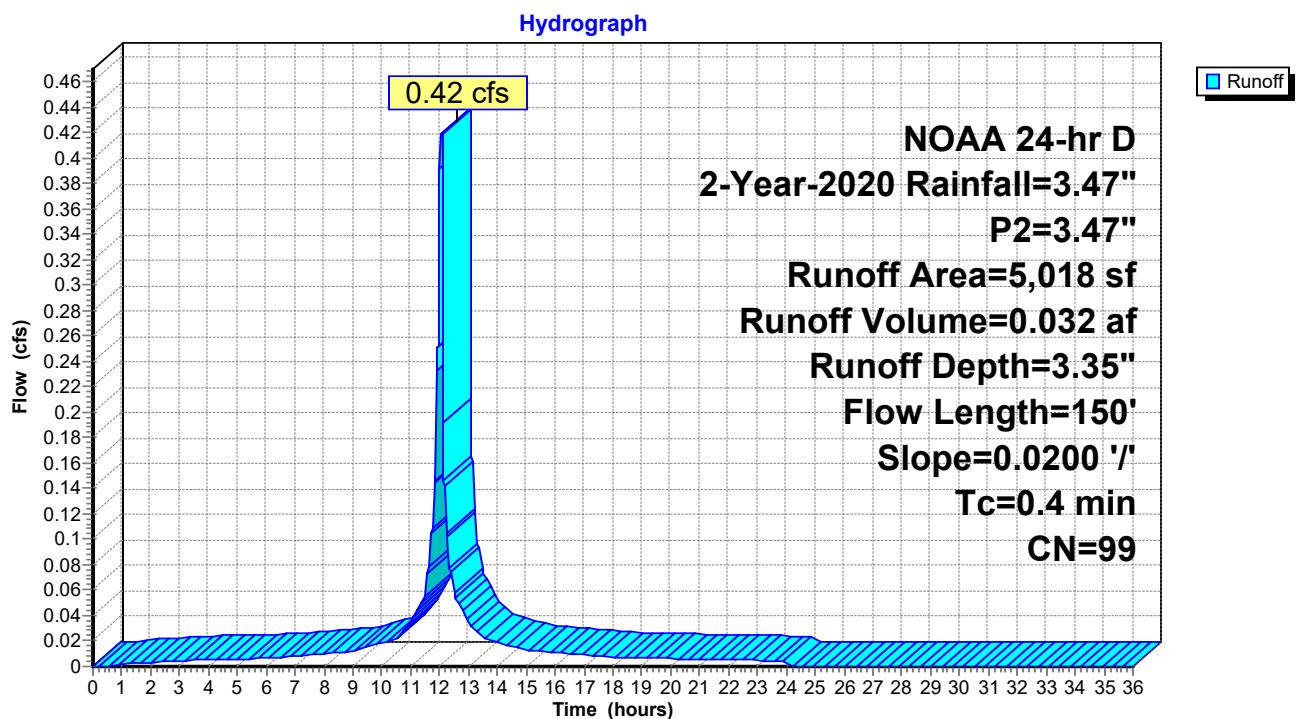
Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 3.35"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
* 5,018	99	
5,018		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, Roof Drains 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 13S: ROOF WEST



Summary for Subcatchment 14S: ROOF EAST

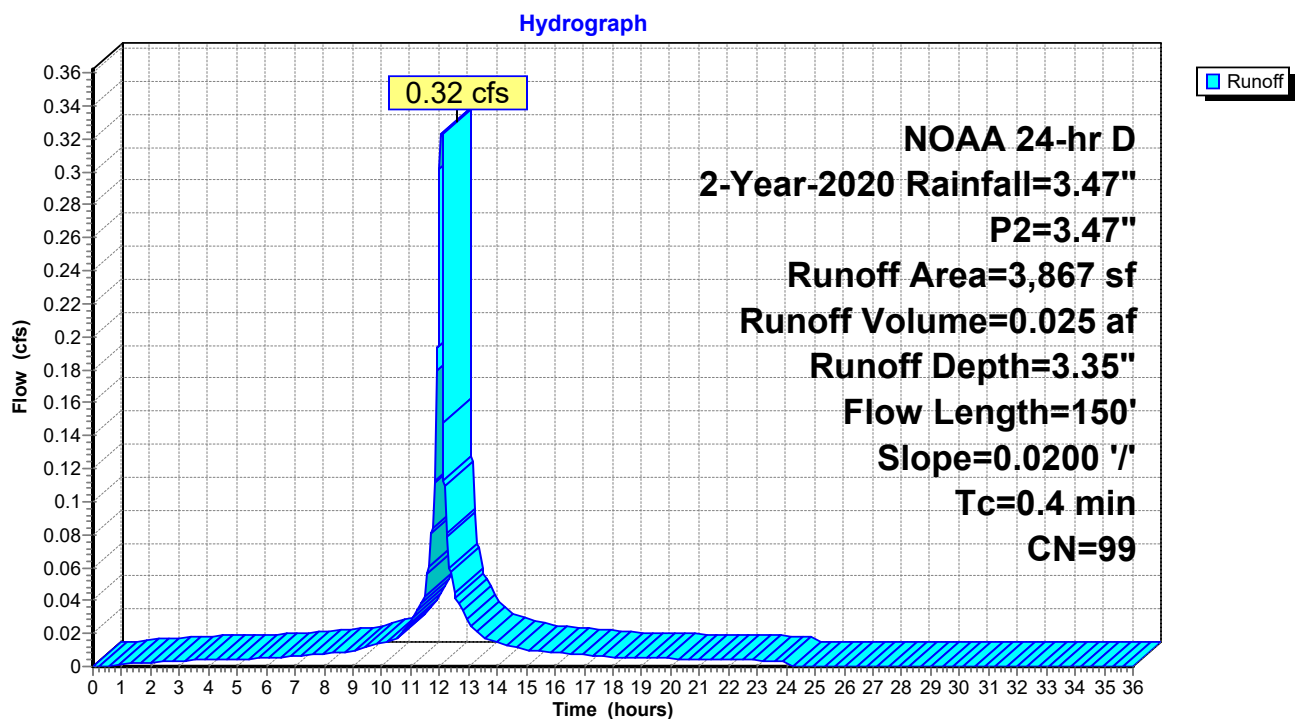
Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.025 af, Depth= 3.35"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
* 3,867	99	
3,867		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 14S: ROOF EAST



Summary for Subcatchment 16S: Yard Areas to Rear Basin

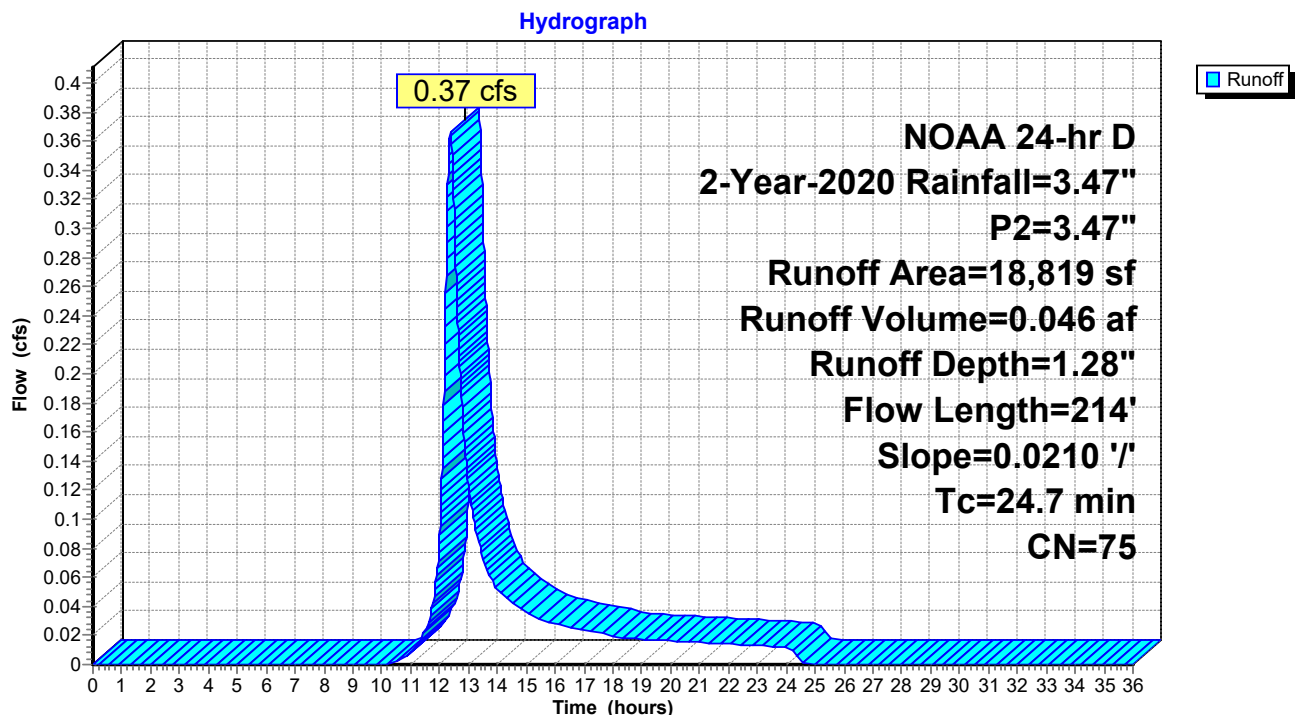
Runoff = 0.37 cfs @ 12.37 hrs, Volume= 0.046 af, Depth= 1.28"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
* 756	99	Sidewalks Patio Ac units
18,063	74	>75% Grass cover, Good, HSG C
18,819	75	Weighted Average
18,063		95.98% Pervious Area
756		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	214	0.0210	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.47"

Subcatchment 16S: Yard Areas to Rear Basin



Summary for Subcatchment 17S: Bypass Area Direct To Inlet

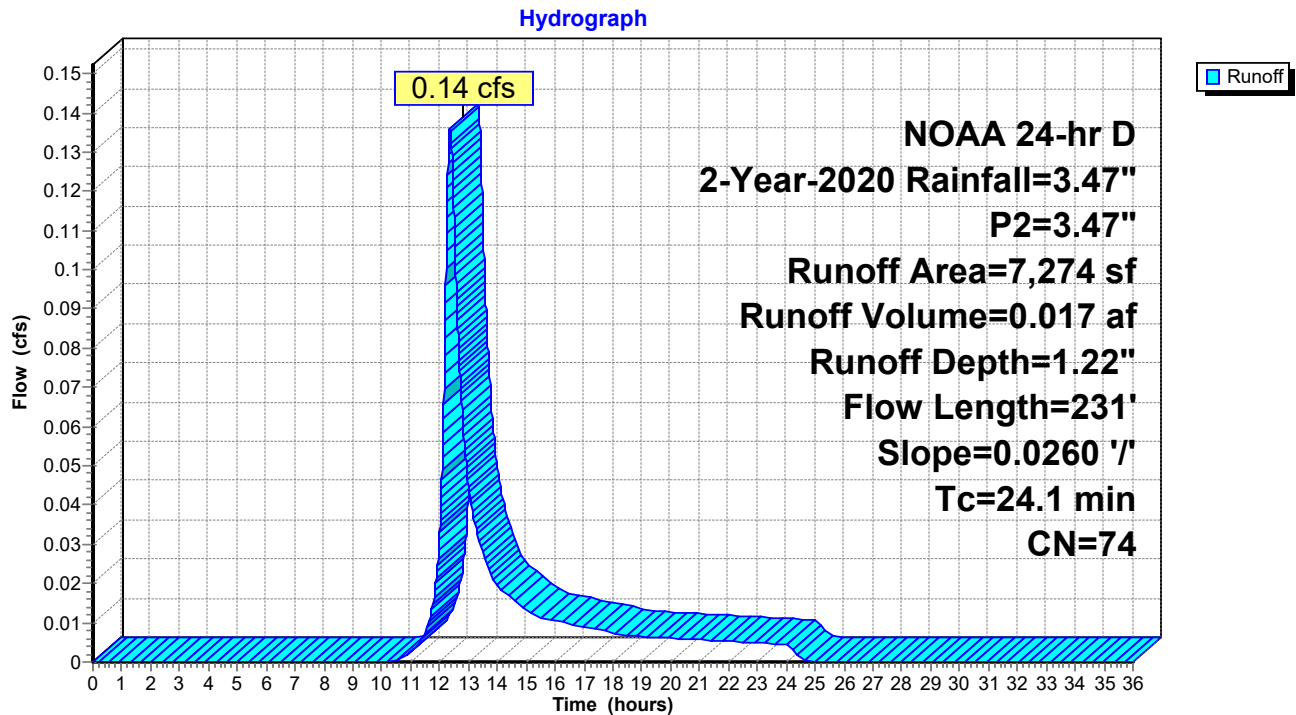
Runoff = 0.14 cfs @ 12.35 hrs, Volume= 0.017 af, Depth= 1.22"
 Routed to Reach 12R : Study Point At Inlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
7,274	74	>75% Grass cover, Good, HSG C
7,274		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	231	0.0260	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 3.47"

Subcatchment 17S: Bypass Area Direct To Inlet



Summary for Subcatchment 1S: Existing Conditions Study Area

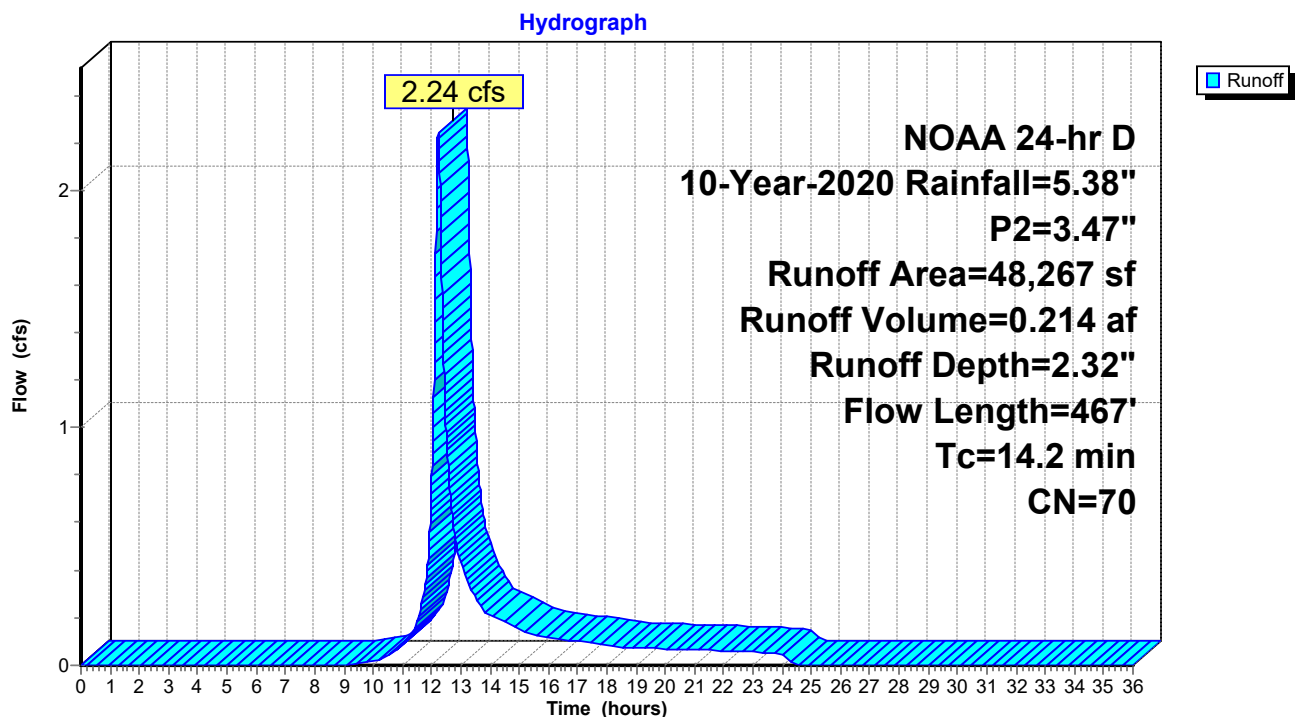
Runoff = 2.24 cfs @ 12.23 hrs, Volume= 0.214 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
48,267	70	Woods, Good, HSG C
48,267		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	170	0.0320	1.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.47"
10.3	130	0.0270	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.47"
2.4	167	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	467	Total			

Subcatchment 1S: Existing Conditions Study Area



Summary for Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION

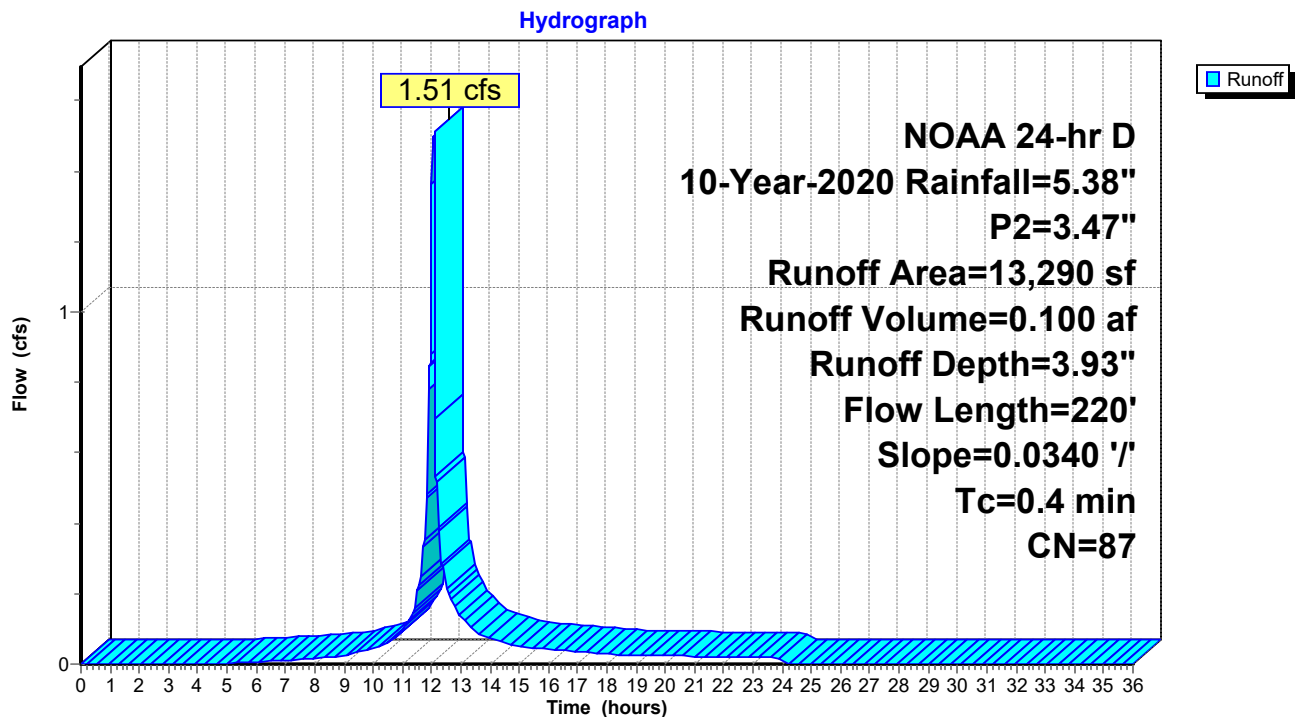
Runoff = 1.51 cfs @ 12.09 hrs, Volume= 0.100 af, Depth= 3.93"
 Routed to Pond 12P : Front Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

	Area (sf)	CN	Description
*	6,776	99	Permeable Pavement
	6,514	74	>75% Grass cover, Good, HSG C
	13,290	87	Weighted Average
	6,514		49.01% Pervious Area
	6,776		50.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	220	0.0340	9.63	5.25	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.010 PVC, smooth interior

Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION



Summary for Subcatchment 13S: ROOF WEST

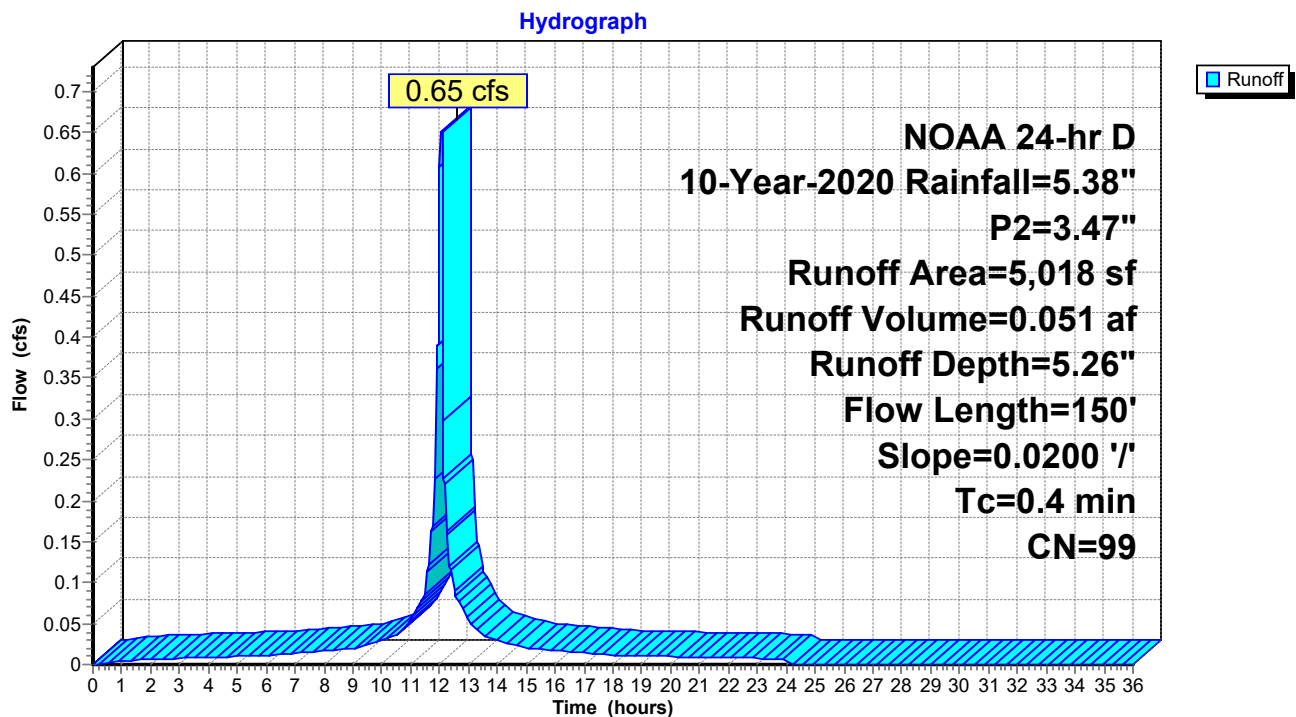
Runoff = 0.65 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 5.26"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
* 5,018	99	
5,018		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, Roof Drains 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 13S: ROOF WEST



Summary for Subcatchment 14S: ROOF EAST

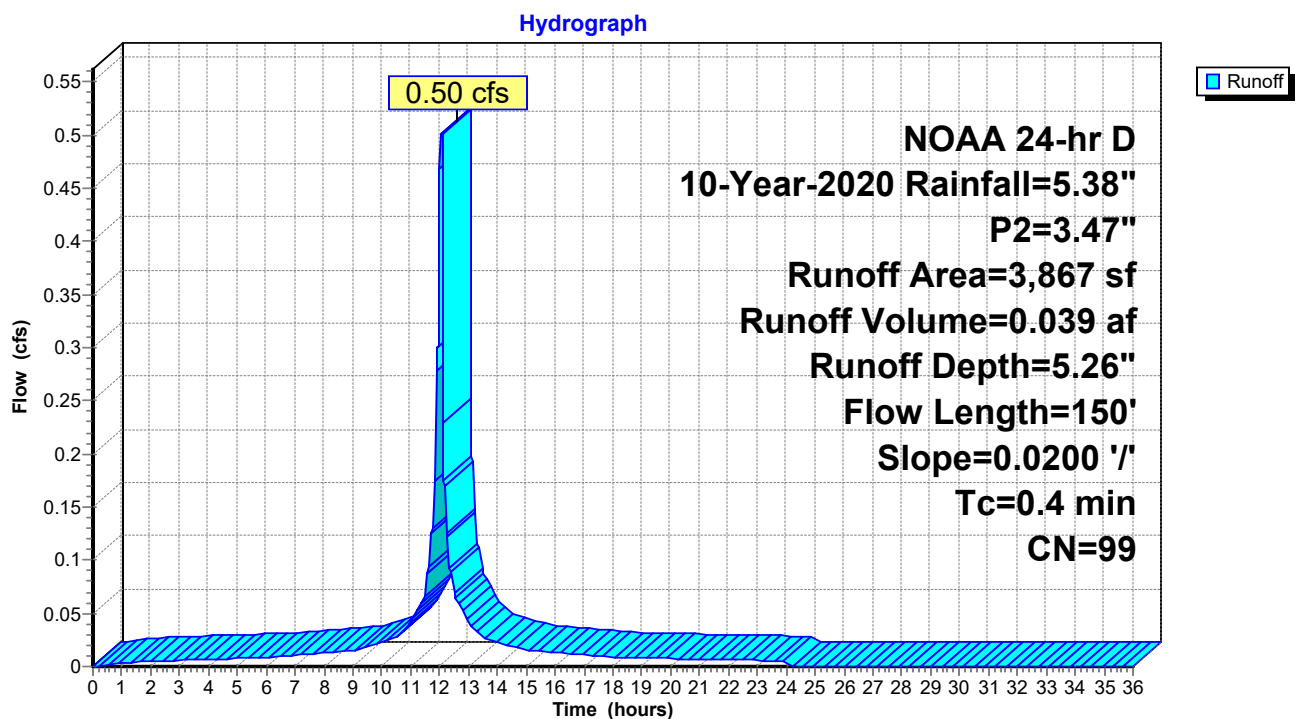
Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 5.26"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
* 3,867	99	
3,867		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 14S: ROOF EAST



Summary for Subcatchment 16S: Yard Areas to Rear Basin

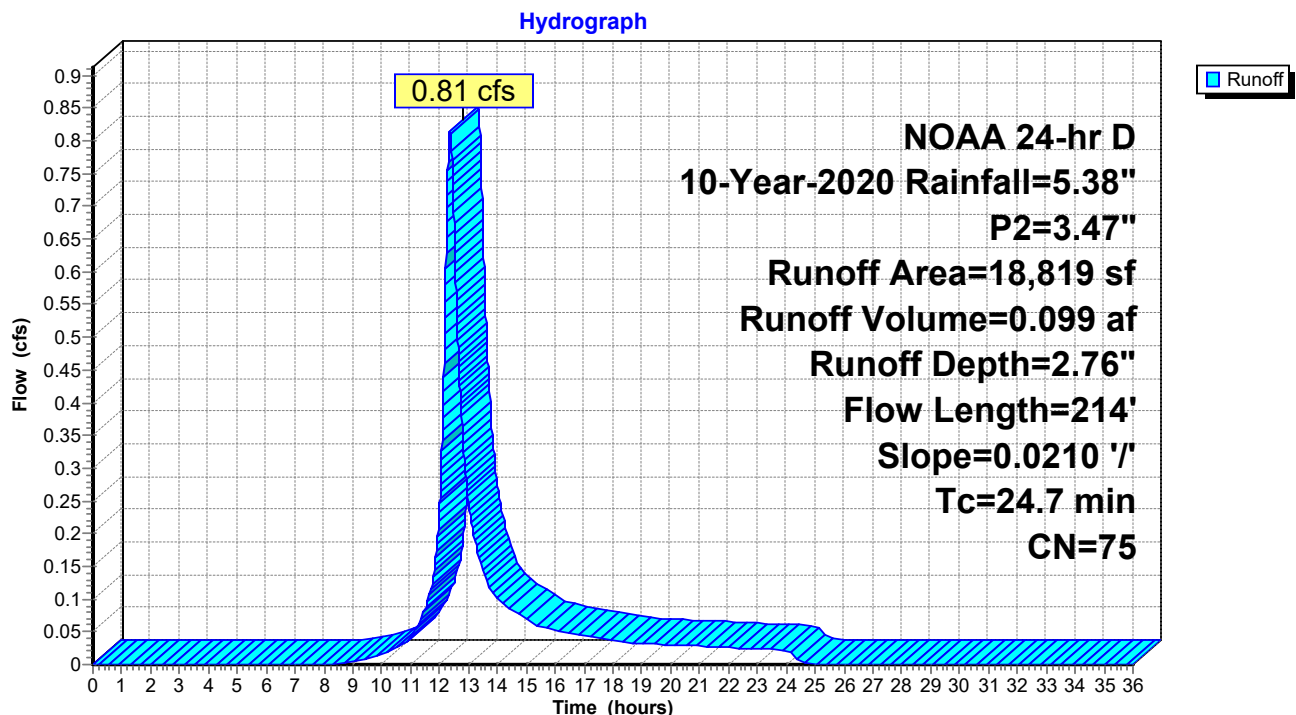
Runoff = 0.81 cfs @ 12.36 hrs, Volume= 0.099 af, Depth= 2.76"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
* 756	99	Sidewalks Patio Ac units
18,063	74	>75% Grass cover, Good, HSG C
18,819	75	Weighted Average
18,063		95.98% Pervious Area
756		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	214	0.0210	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.47"

Subcatchment 16S: Yard Areas to Rear Basin



Summary for Subcatchment 17S: Bypass Area Direct To Inlet

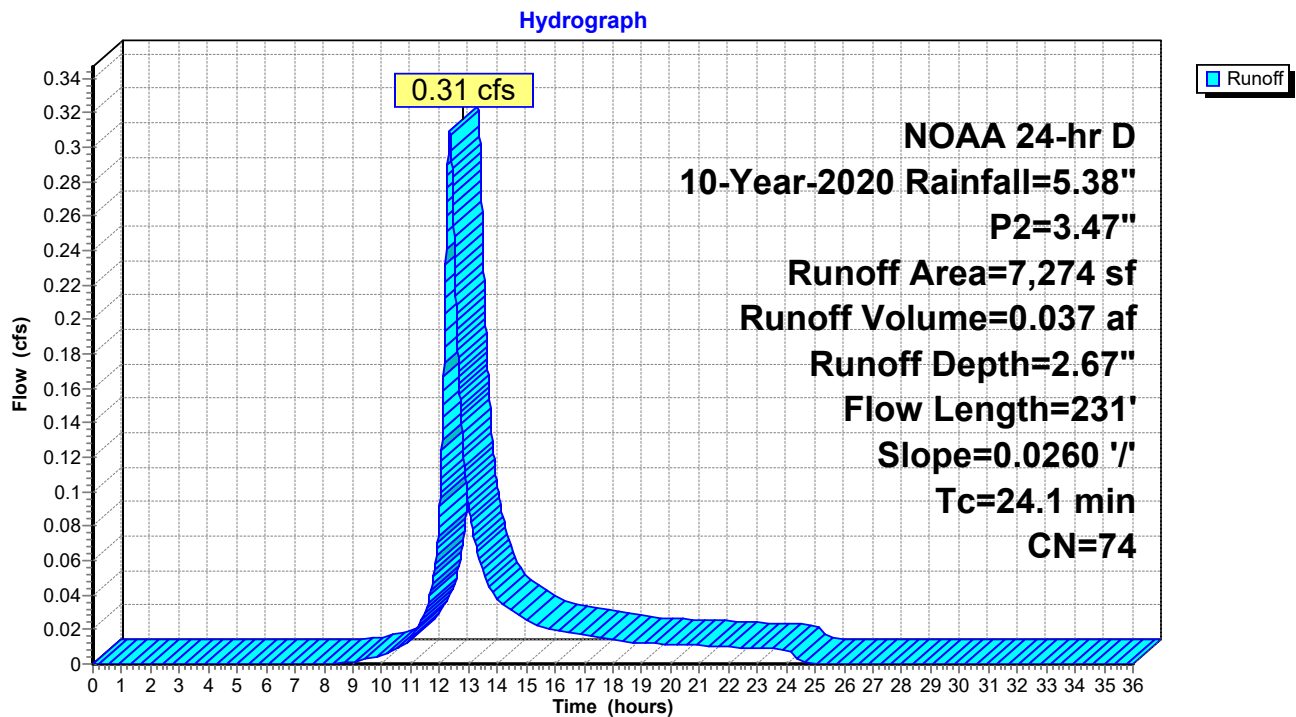
Runoff = 0.31 cfs @ 12.35 hrs, Volume= 0.037 af, Depth= 2.67"
 Routed to Reach 12R : Study Point At Inlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
7,274	74	>75% Grass cover, Good, HSG C
7,274		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	231	0.0260	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 3.47"

Subcatchment 17S: Bypass Area Direct To Inlet



Summary for Subcatchment 1S: Existing Conditions Study Area

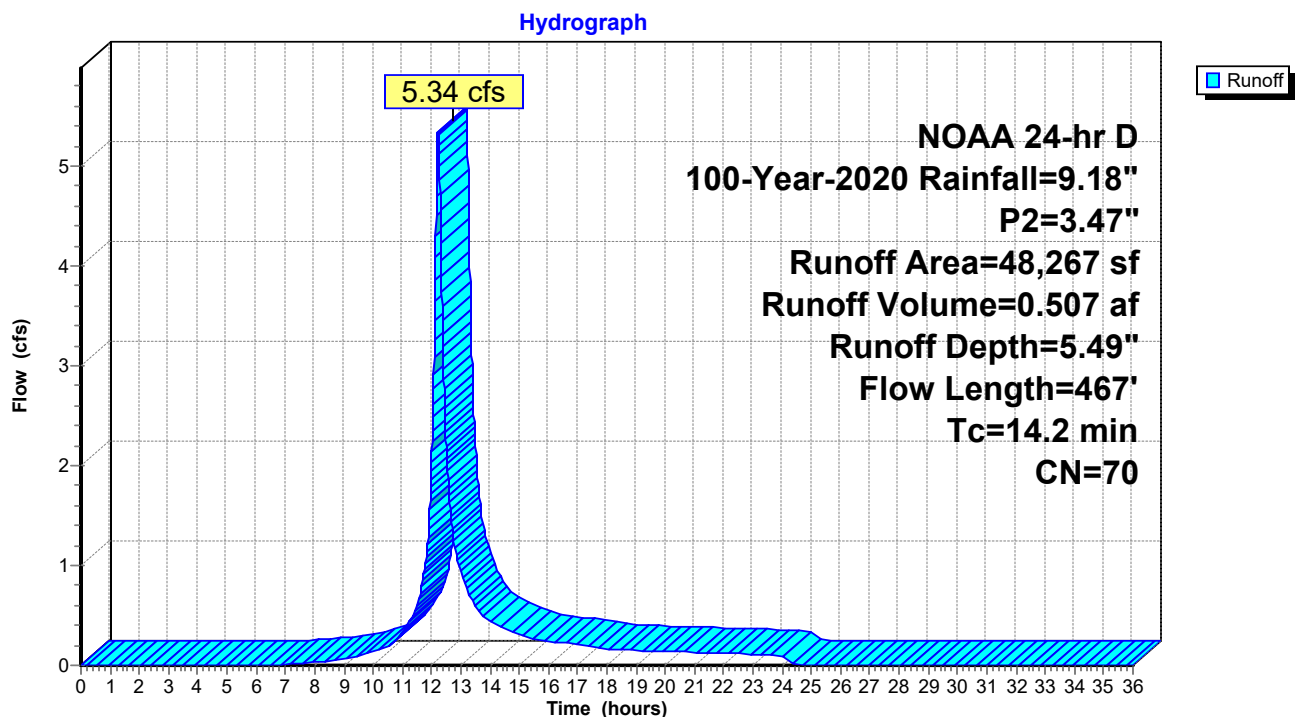
Runoff = 5.34 cfs @ 12.22 hrs, Volume= 0.507 af, Depth= 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
48,267	70	Woods, Good, HSG C
48,267		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	170	0.0320	1.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.47"
10.3	130	0.0270	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.47"
2.4	167	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	467	Total			

Subcatchment 1S: Existing Conditions Study Area



Summary for Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION

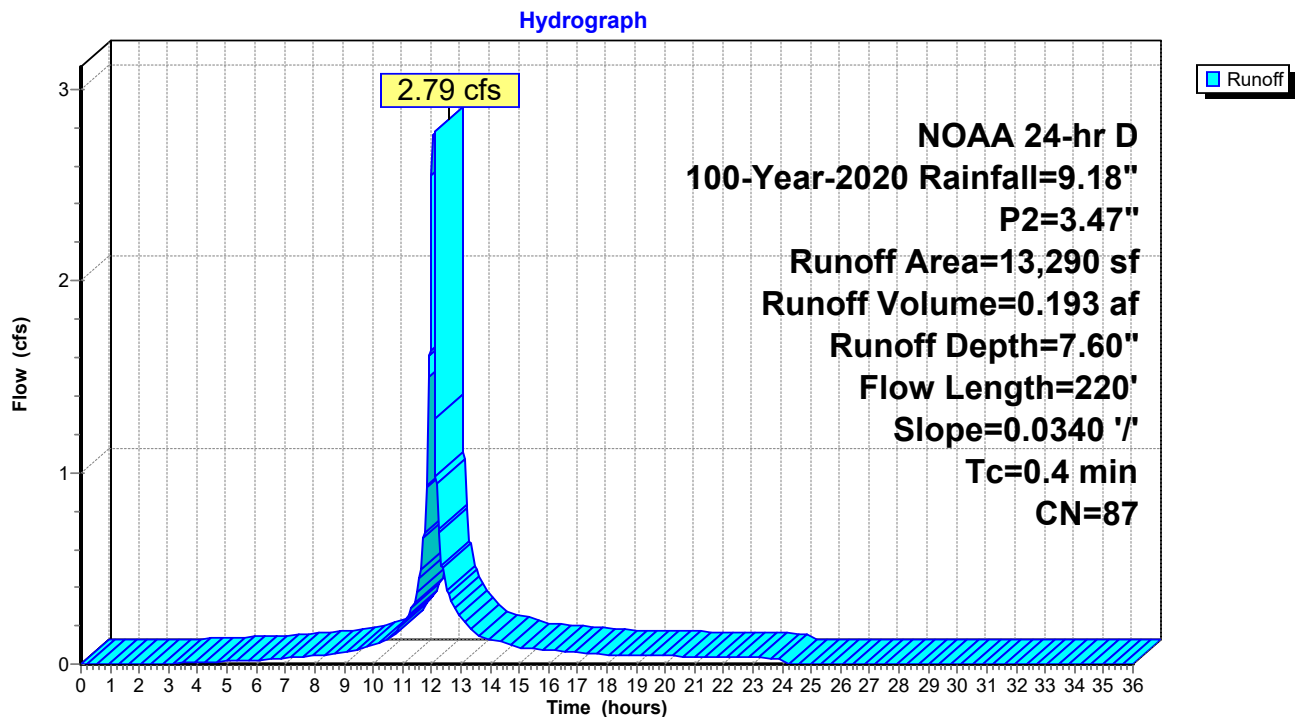
Runoff = 2.79 cfs @ 12.09 hrs, Volume= 0.193 af, Depth= 7.60"
 Routed to Pond 12P : Front Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

	Area (sf)	CN	Description
*	6,776	99	Permeable Pavement
	6,514	74	>75% Grass cover, Good, HSG C
	13,290	87	Weighted Average
	6,514		49.01% Pervious Area
	6,776		50.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	220	0.0340	9.63	5.25	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.010 PVC, smooth interior

Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION



Summary for Subcatchment 13S: ROOF WEST

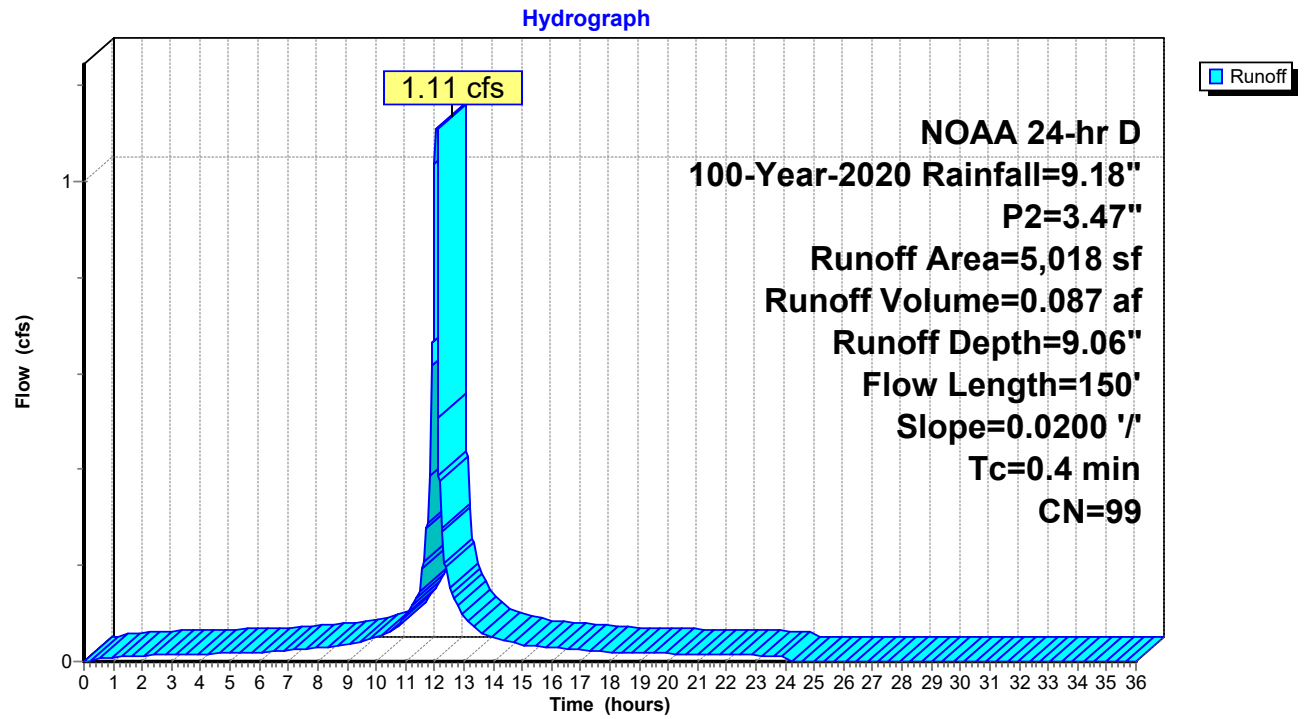
Runoff = 1.11 cfs @ 12.08 hrs, Volume= 0.087 af, Depth= 9.06"
Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

	Area (sf)	CN	Description
*	5,018	99	
	5,018		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, Roof Drains 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 13S: ROOF WEST



Summary for Subcatchment 14S: ROOF EAST

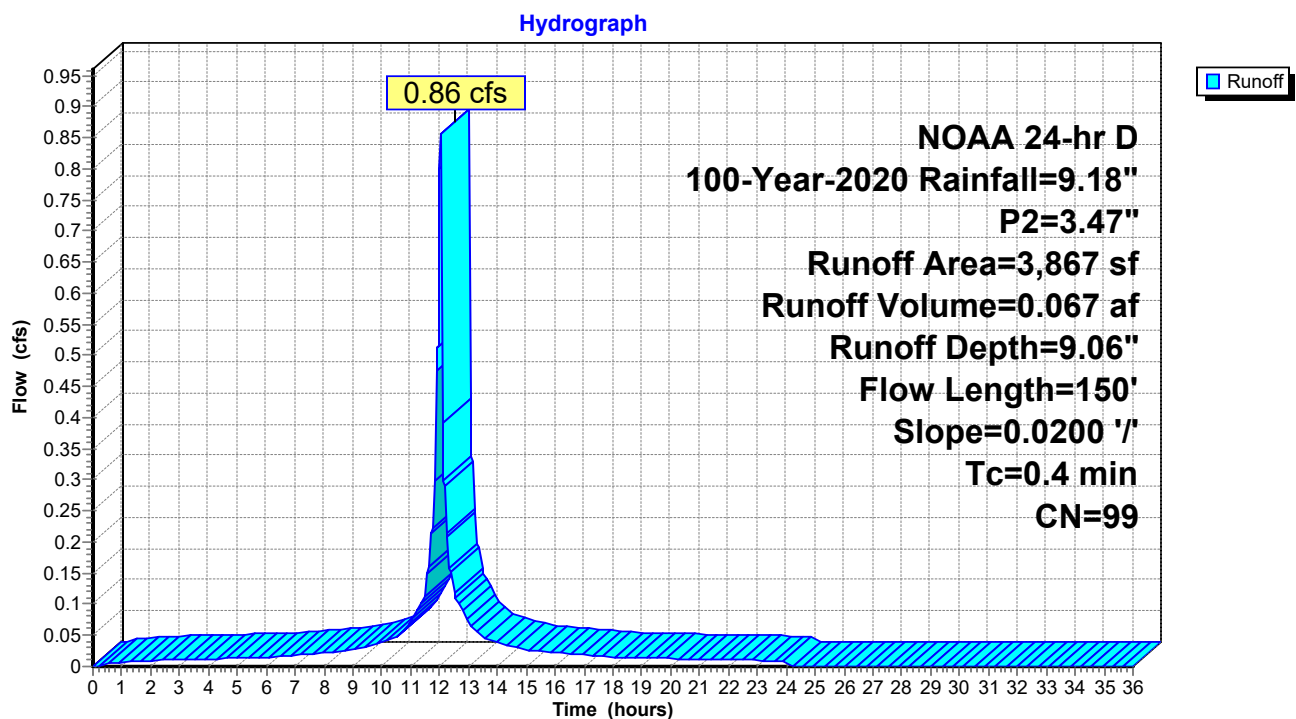
Runoff = 0.86 cfs @ 12.08 hrs, Volume= 0.067 af, Depth= 9.06"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
* 3,867	99	
3,867		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 14S: ROOF EAST



Summary for Subcatchment 16S: Yard Areas to Rear Basin

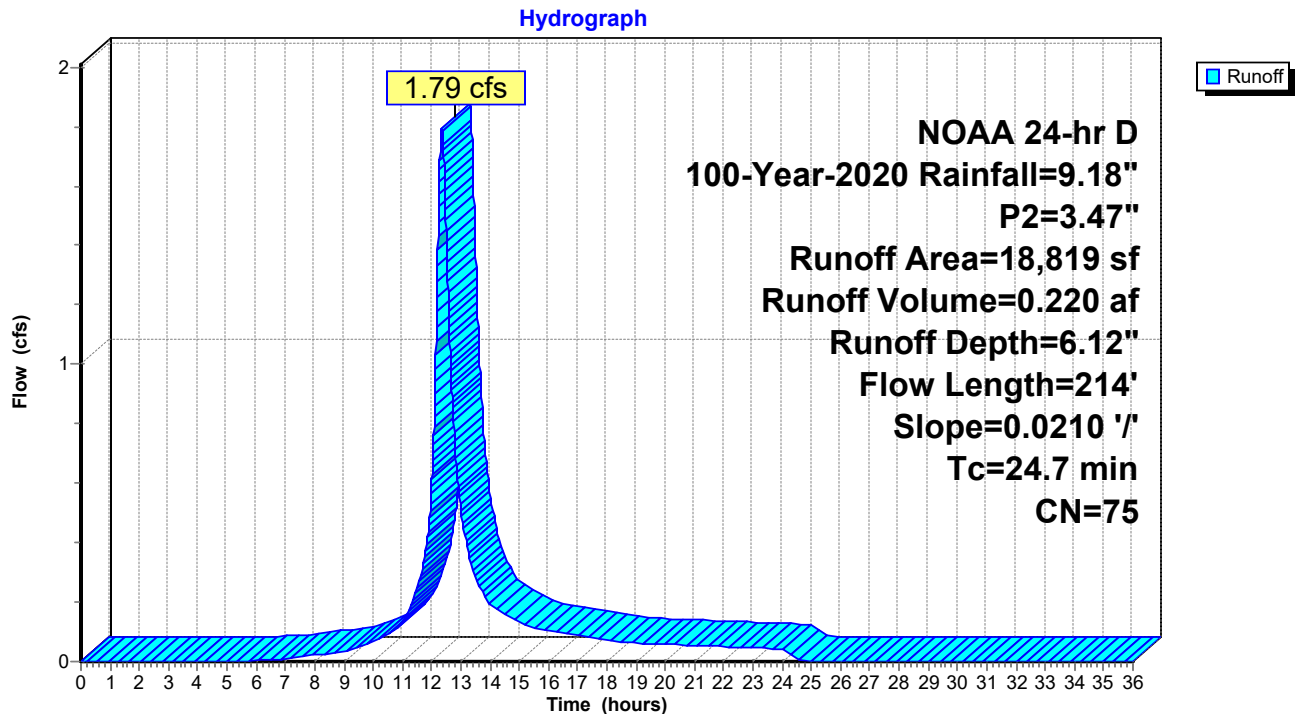
Runoff = 1.79 cfs @ 12.35 hrs, Volume= 0.220 af, Depth= 6.12"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
* 756	99	Sidewalks Patio Ac units
18,063	74	>75% Grass cover, Good, HSG C
18,819	75	Weighted Average
18,063		95.98% Pervious Area
756		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	214	0.0210	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.47"

Subcatchment 16S: Yard Areas to Rear Basin



Summary for Subcatchment 17S: Bypass Area Direct To Inlet

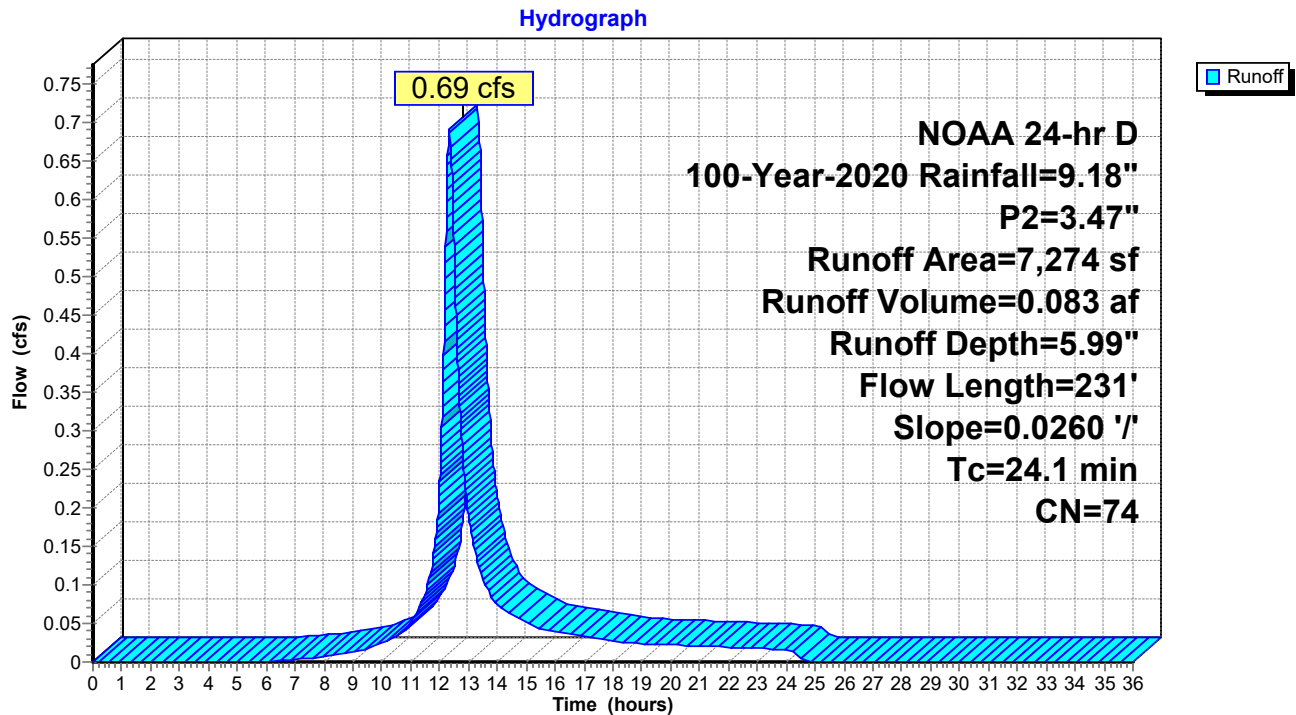
Runoff = 0.69 cfs @ 12.34 hrs, Volume= 0.083 af, Depth= 5.99"
 Routed to Reach 12R : Study Point At Inlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
7,274	74	>75% Grass cover, Good, HSG C
7,274		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	231	0.0260	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 3.47"

Subcatchment 17S: Bypass Area Direct To Inlet



Summary for Subcatchment 1S: Existing Conditions Study Area

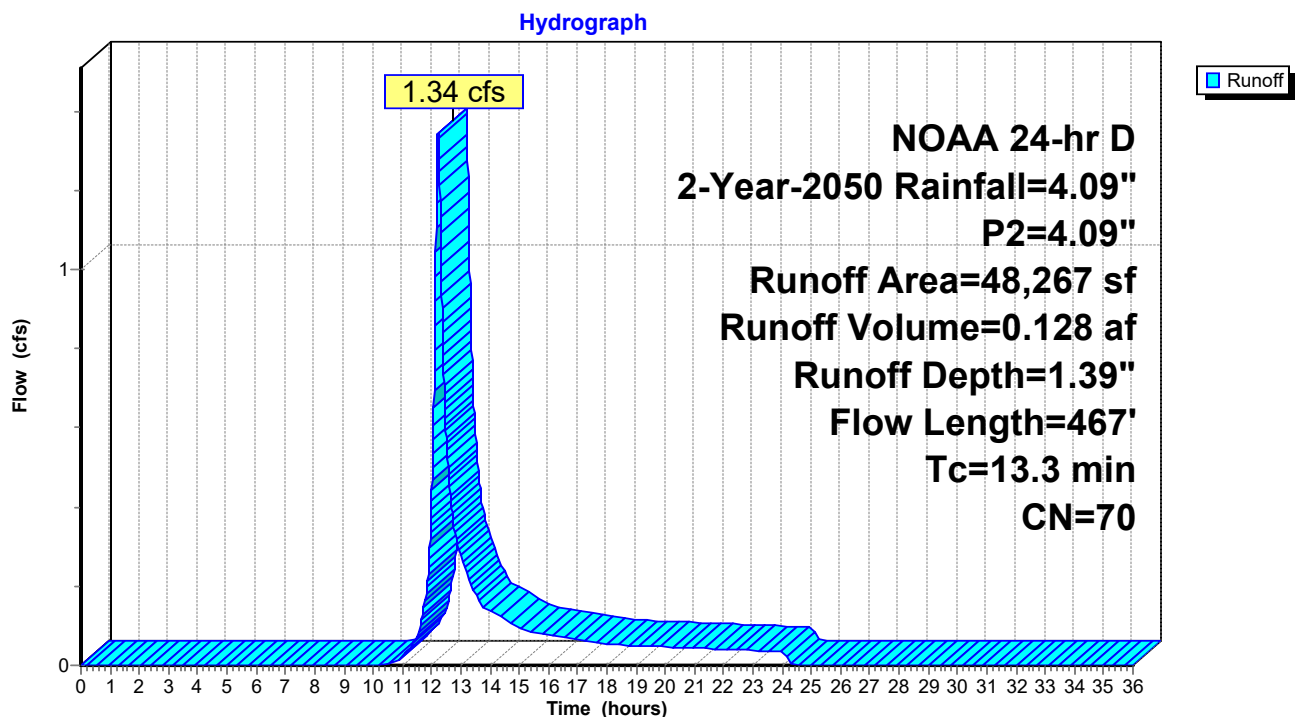
Runoff = 1.34 cfs @ 12.22 hrs, Volume= 0.128 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

Area (sf)	CN	Description
48,267	70	Woods, Good, HSG C
48,267		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	170	0.0320	2.09		Sheet Flow, Smooth surfaces n= 0.011 P2= 4.09"
9.5	130	0.0270	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 4.09"
2.4	167	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.3	467	Total			

Subcatchment 1S: Existing Conditions Study Area



Summary for Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION

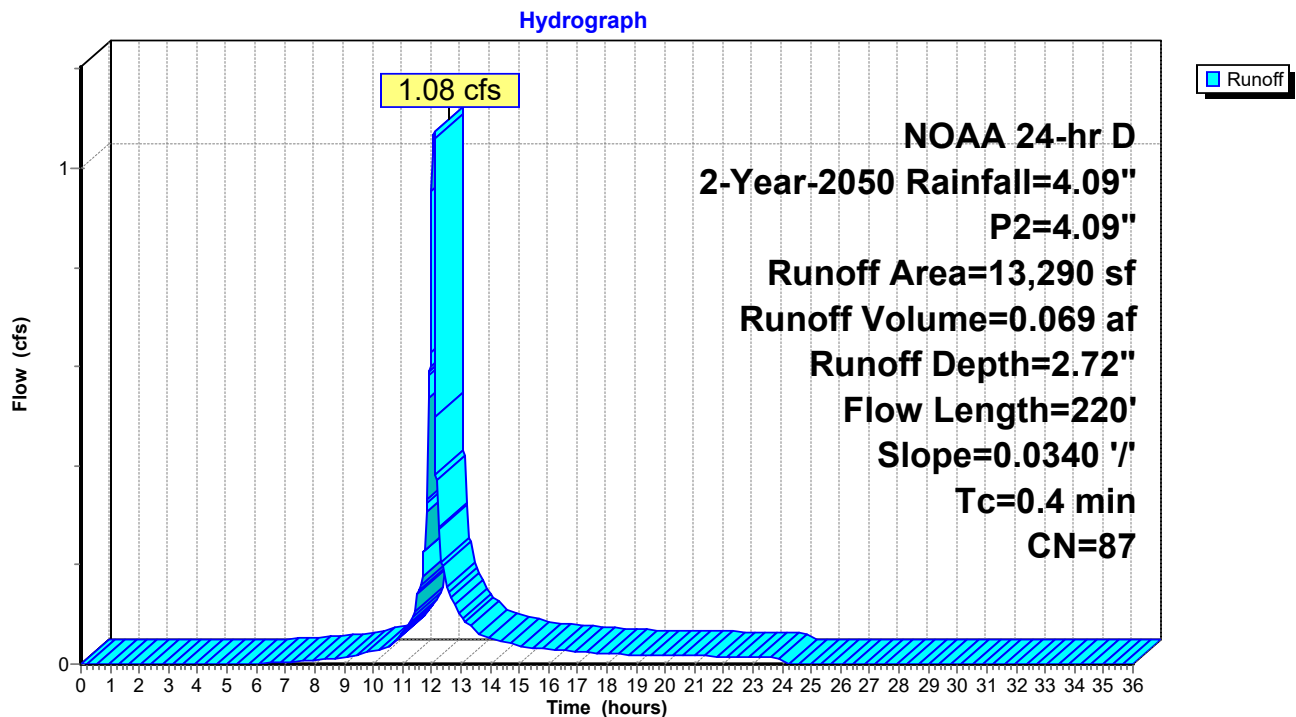
Runoff = 1.08 cfs @ 12.09 hrs, Volume= 0.069 af, Depth= 2.72"
 Routed to Pond 12P : Front Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

	Area (sf)	CN	Description
*	6,776	99	Permeable Pavement
	6,514	74	>75% Grass cover, Good, HSG C
	13,290	87	Weighted Average
	6,514		49.01% Pervious Area
	6,776		50.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	220	0.0340	9.63	5.25	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.010 PVC, smooth interior

Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION



Summary for Subcatchment 13S: ROOF WEST

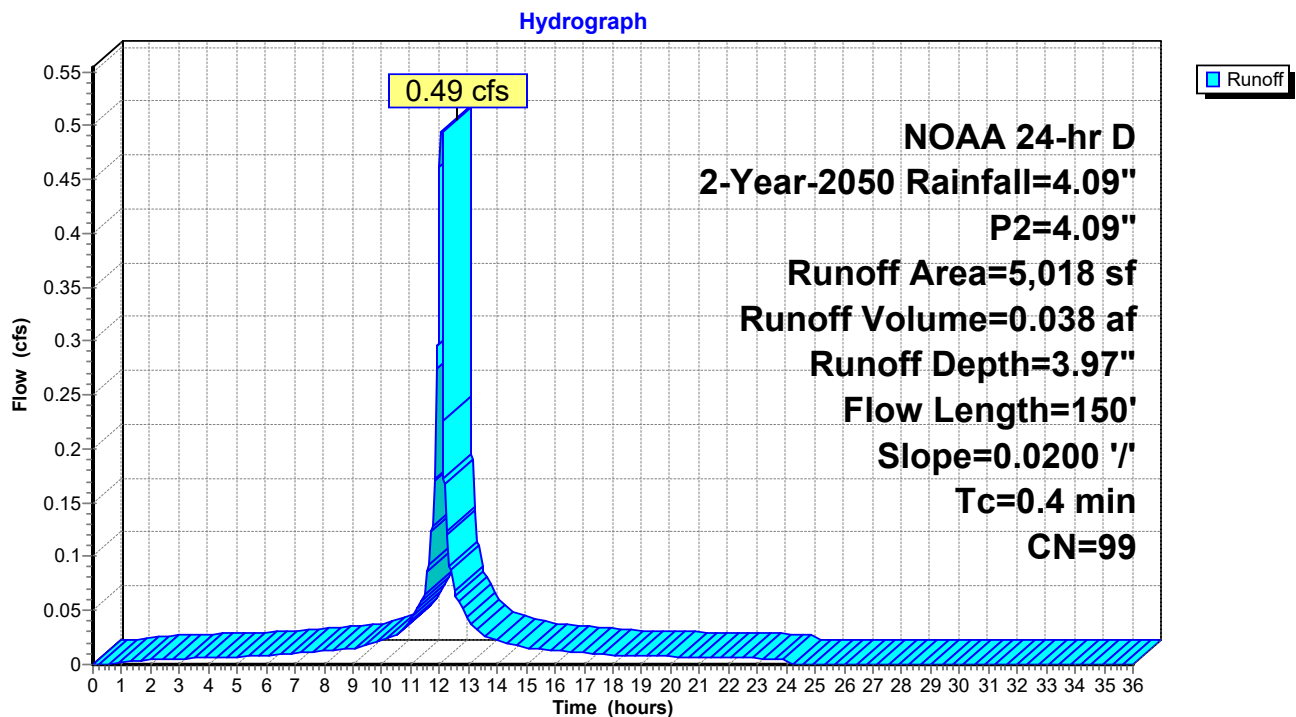
Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 3.97"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

Area (sf)	CN	Description
* 5,018	99	
5,018		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, Roof Drains 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 13S: ROOF WEST



Summary for Subcatchment 14S: ROOF EAST

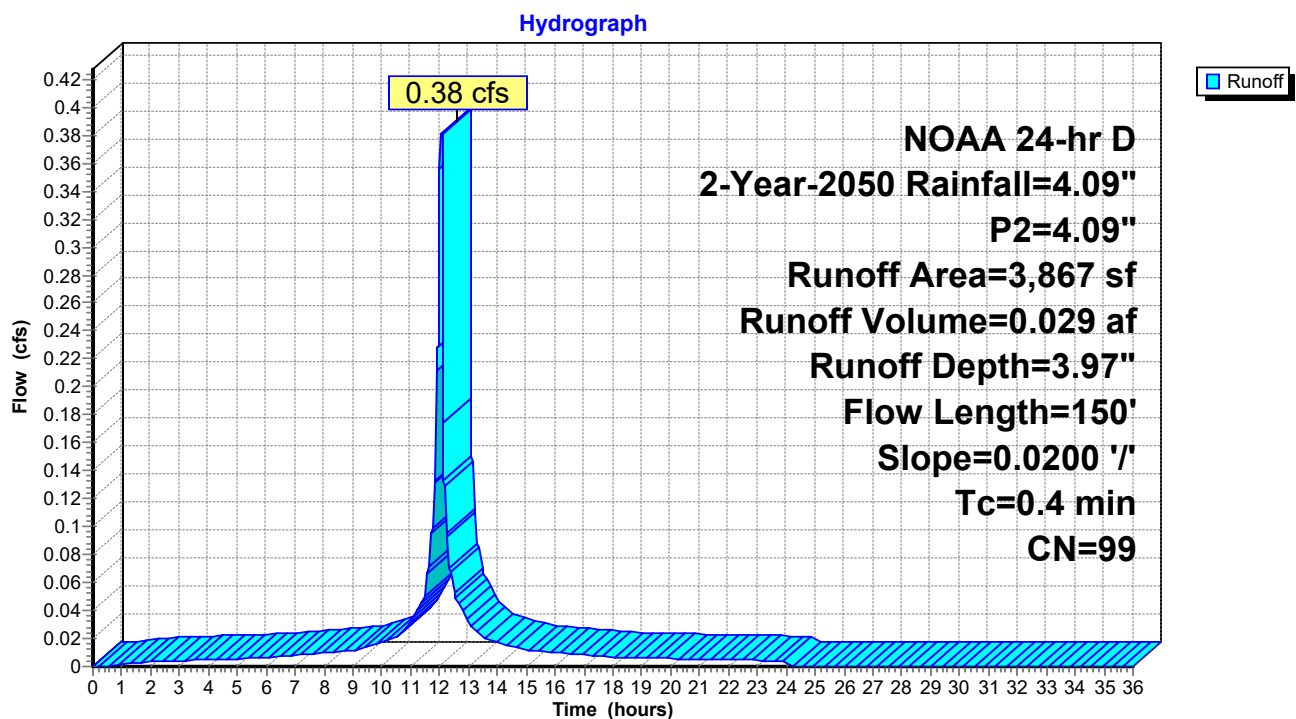
Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 3.97"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

Area (sf)	CN	Description
* 3,867	99	
3,867		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 14S: ROOF EAST



Summary for Subcatchment 16S: Yard Areas to Rear Basin

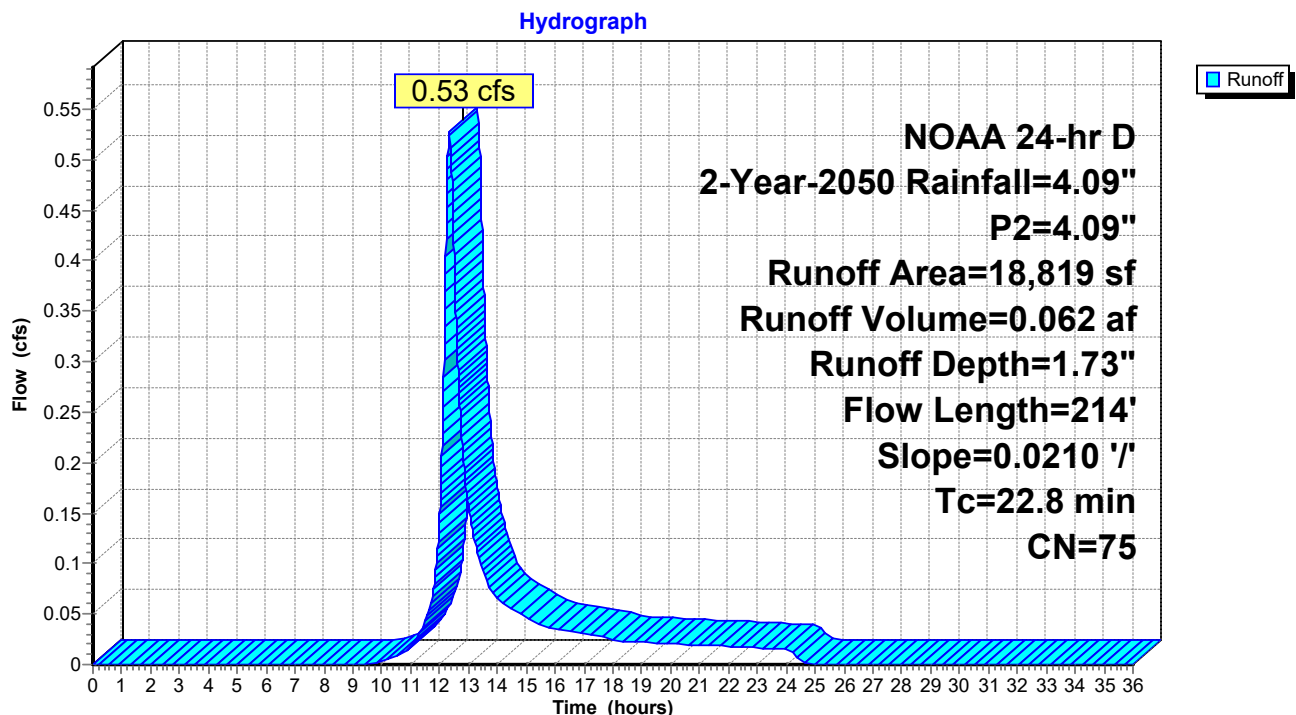
Runoff = 0.53 cfs @ 12.34 hrs, Volume= 0.062 af, Depth= 1.73"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

Area (sf)	CN	Description
* 756	99	Sidewalks Patio Ac units
18,063	74	>75% Grass cover, Good, HSG C
18,819	75	Weighted Average
18,063		95.98% Pervious Area
756		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	214	0.0210	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 4.09"

Subcatchment 16S: Yard Areas to Rear Basin



Summary for Subcatchment 17S: Bypass Area Direct To Inlet

Runoff = 0.20 cfs @ 12.33 hrs, Volume= 0.023 af, Depth= 1.66"
 Routed to Reach 12R : Study Point At Inlet

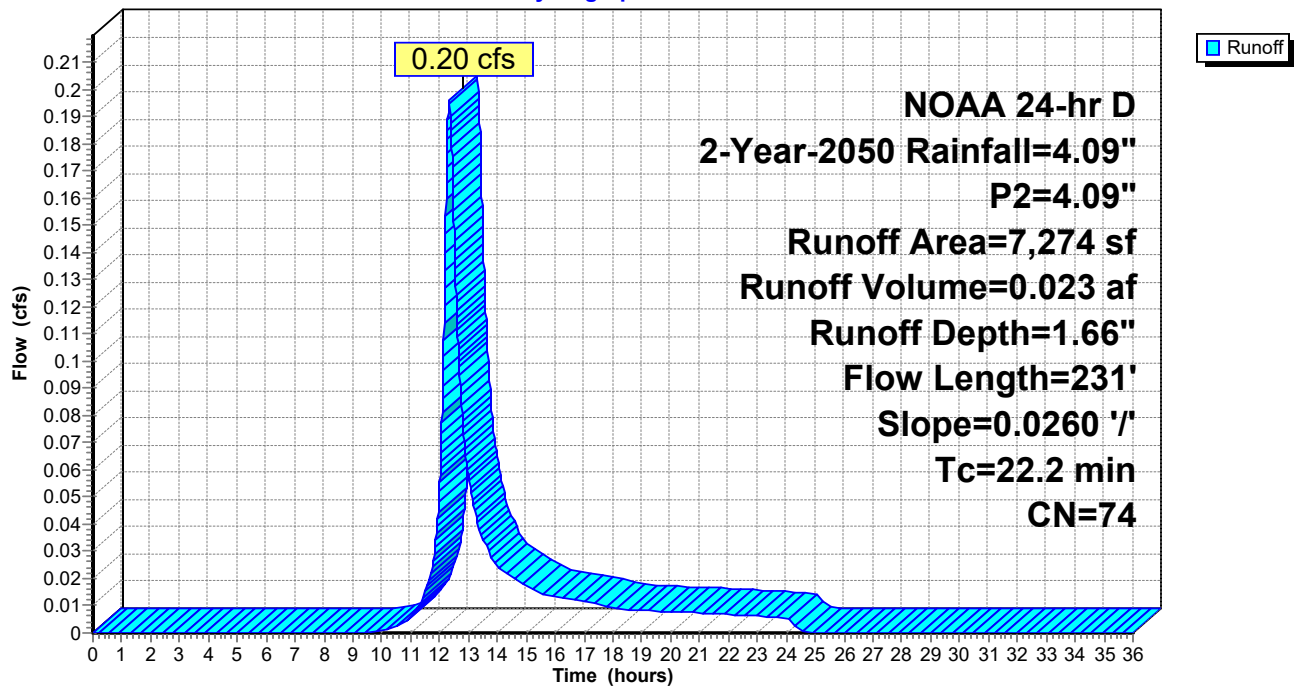
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

Area (sf)	CN	Description
7,274	74	>75% Grass cover, Good, HSG C
7,274		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	231	0.0260	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 4.09"

Subcatchment 17S: Bypass Area Direct To Inlet

Hydrograph



Summary for Subcatchment 1S: Existing Conditions Study Area

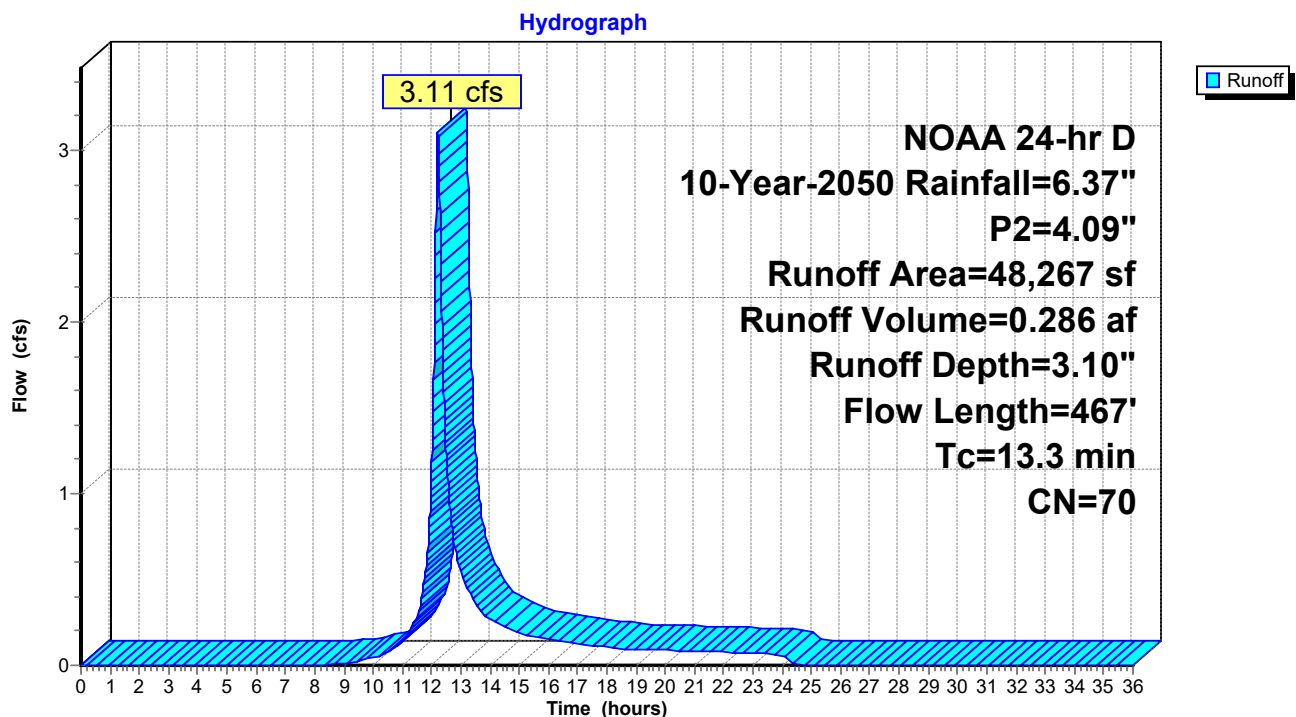
Runoff = 3.11 cfs @ 12.22 hrs, Volume= 0.286 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

Area (sf)	CN	Description
48,267	70	Woods, Good, HSG C
48,267		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	170	0.0320	2.09		Sheet Flow, Smooth surfaces n= 0.011 P2= 4.09"
9.5	130	0.0270	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 4.09"
2.4	167	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.3	467	Total			

Subcatchment 1S: Existing Conditions Study Area



Summary for Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION

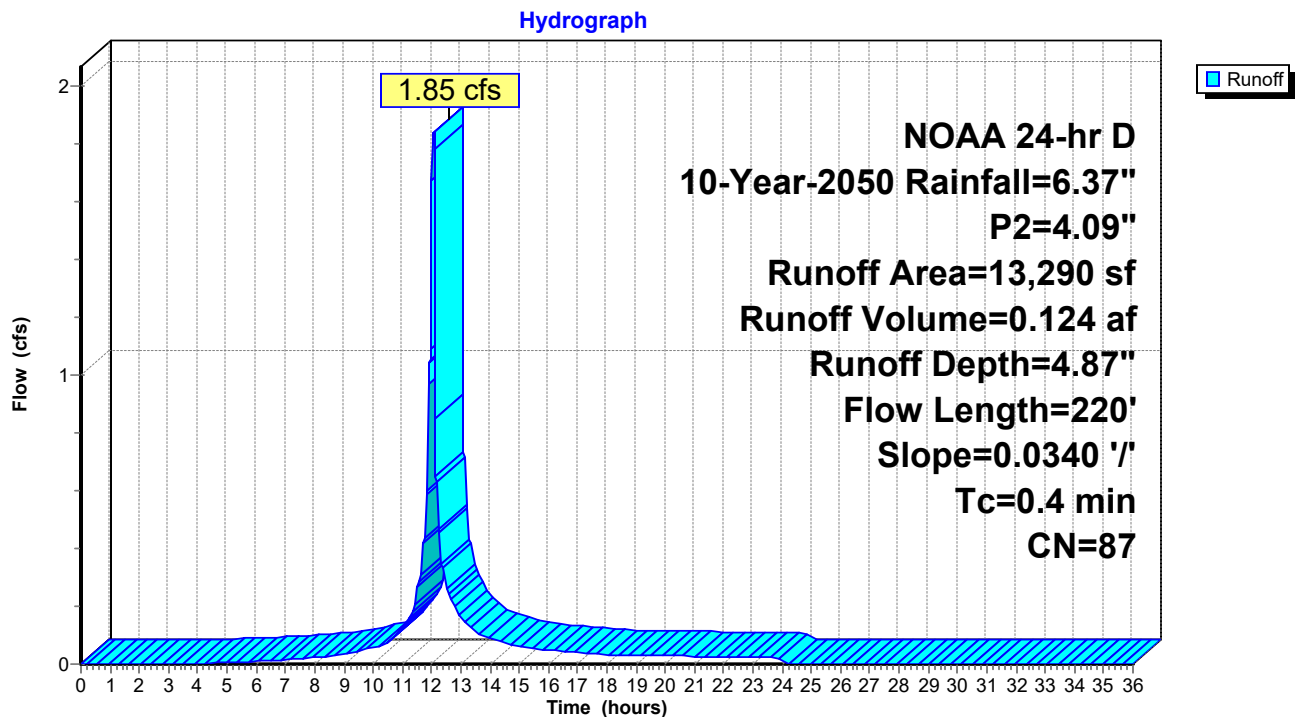
Runoff = 1.85 cfs @ 12.09 hrs, Volume= 0.124 af, Depth= 4.87"
 Routed to Pond 12P : Front Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

	Area (sf)	CN	Description
*	6,776	99	Permeable Pavement
	6,514	74	>75% Grass cover, Good, HSG C
	13,290	87	Weighted Average
	6,514		49.01% Pervious Area
	6,776		50.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	220	0.0340	9.63	5.25	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.010 PVC, smooth interior

Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION



Summary for Subcatchment 13S: ROOF WEST

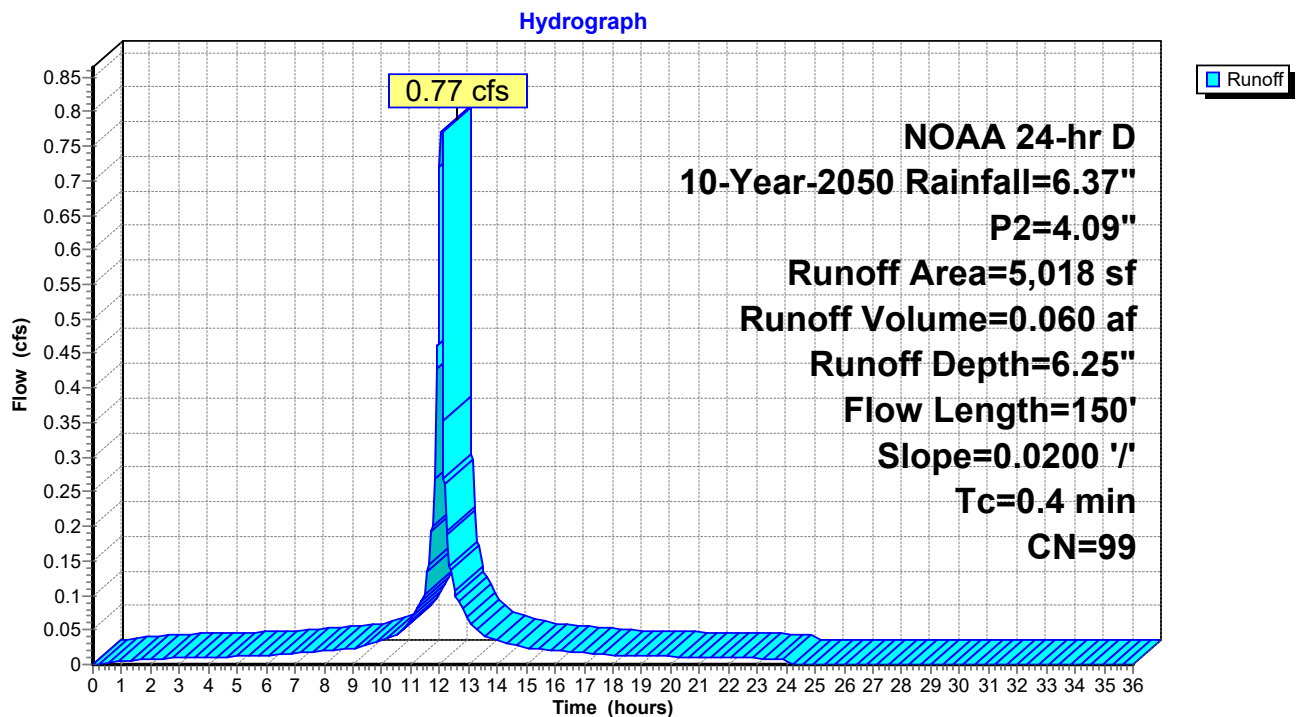
Runoff = 0.77 cfs @ 12.09 hrs, Volume= 0.060 af, Depth= 6.25"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

Area (sf)	CN	Description
* 5,018	99	
5,018		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, Roof Drains 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 13S: ROOF WEST



Summary for Subcatchment 14S: ROOF EAST

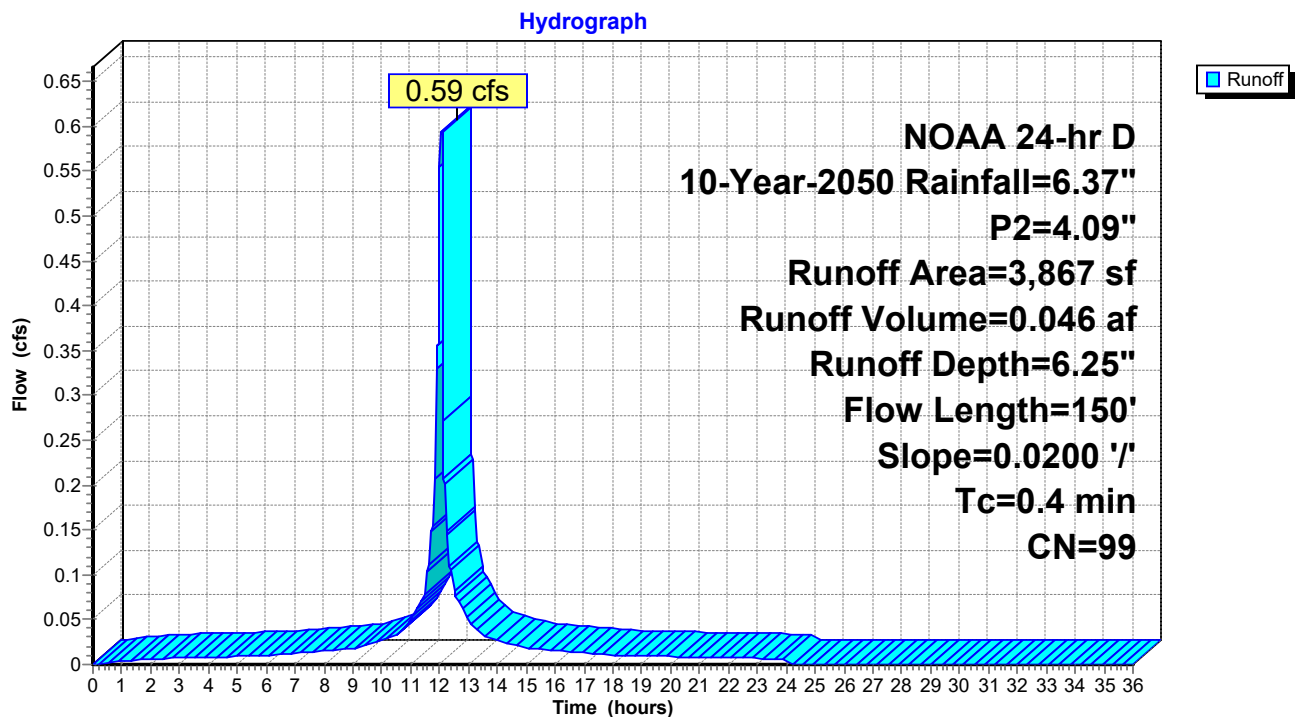
Runoff = 0.59 cfs @ 12.09 hrs, Volume= 0.046 af, Depth= 6.25"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

Area (sf)	CN	Description
* 3,867	99	
3,867		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 14S: ROOF EAST



Summary for Subcatchment 16S: Yard Areas to Rear Basin

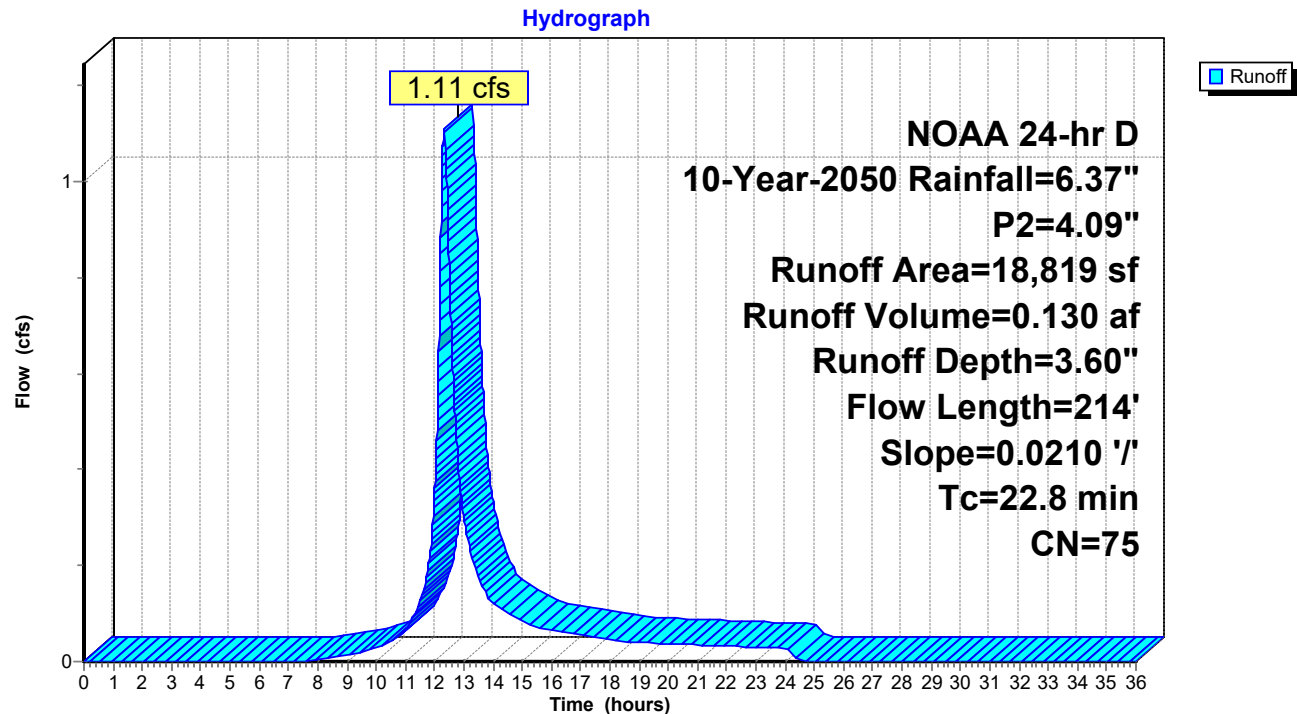
Runoff = 1.11 cfs @ 12.33 hrs, Volume= 0.130 af, Depth= 3.60"
Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

Area (sf)	CN	Description
* 756	99	Sidewalks Patio Ac units
18,063	74	>75% Grass cover, Good, HSG C
18,819	75	Weighted Average
18,063		95.98% Pervious Area
756		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	214	0.0210	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 4.09"

Subcatchment 16S: Yard Areas to Rear Basin



Summary for Subcatchment 17S: Bypass Area Direct To Inlet

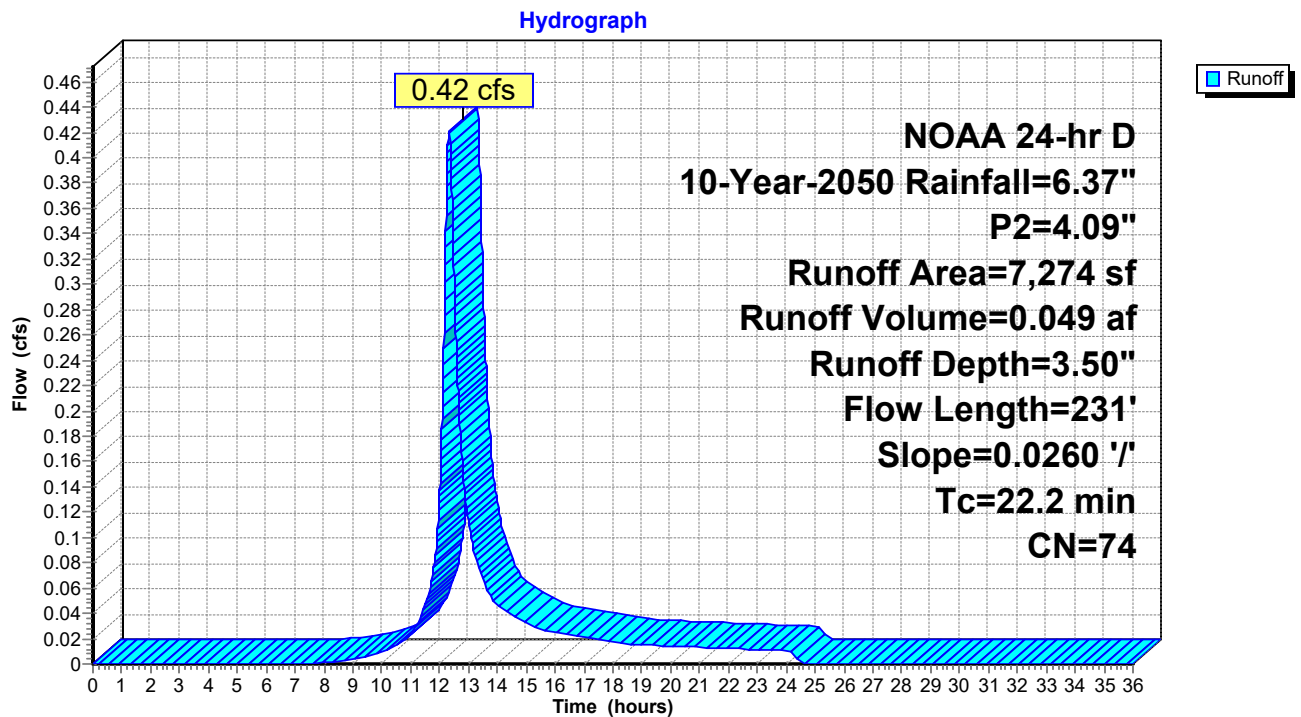
Runoff = 0.42 cfs @ 12.31 hrs, Volume= 0.049 af, Depth= 3.50"
 Routed to Reach 12R : Study Point At Inlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

Area (sf)	CN	Description
7,274	74	>75% Grass cover, Good, HSG C
7,274		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	231	0.0260	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 4.09"

Subcatchment 17S: Bypass Area Direct To Inlet



Summary for Subcatchment 1S: Existing Conditions Study Area

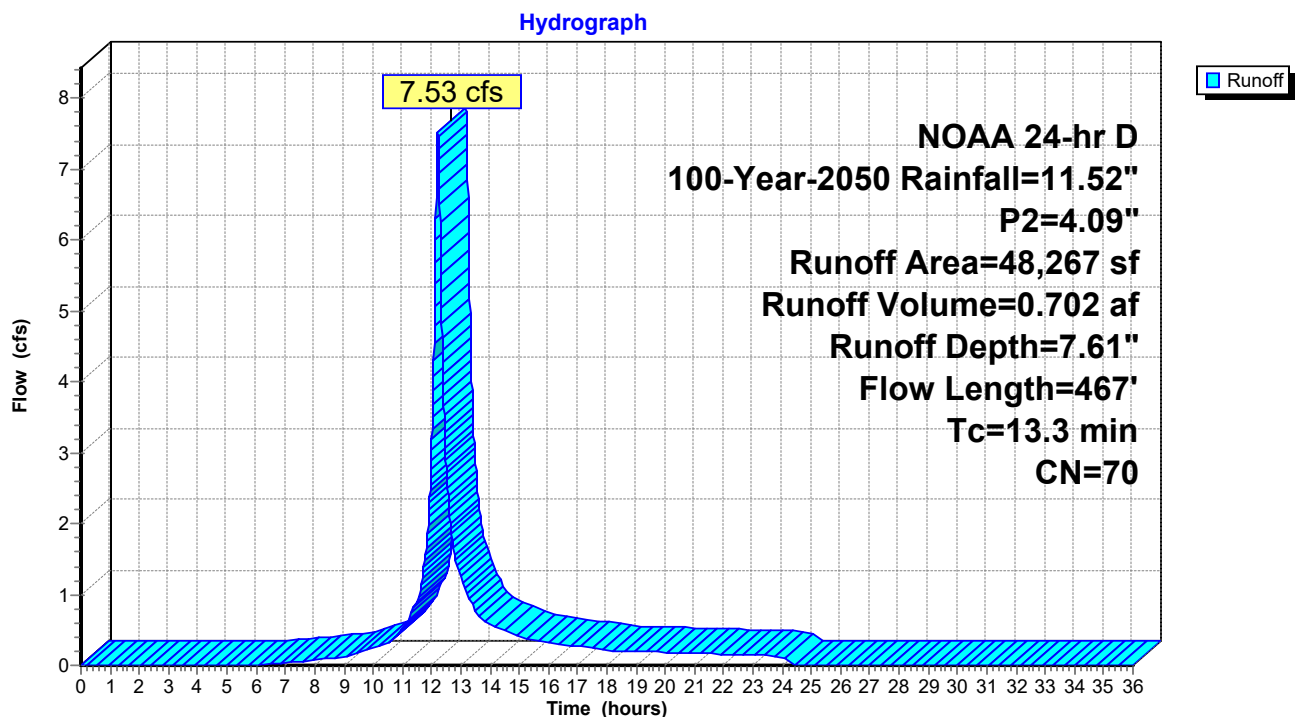
Runoff = 7.53 cfs @ 12.21 hrs, Volume= 0.702 af, Depth= 7.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

Area (sf)	CN	Description
48,267	70	Woods, Good, HSG C
48,267		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	170	0.0320	2.09		Sheet Flow, Smooth surfaces n= 0.011 P2= 4.09"
9.5	130	0.0270	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 4.09"
2.4	167	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.3	467	Total			

Subcatchment 1S: Existing Conditions Study Area



Summary for Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION

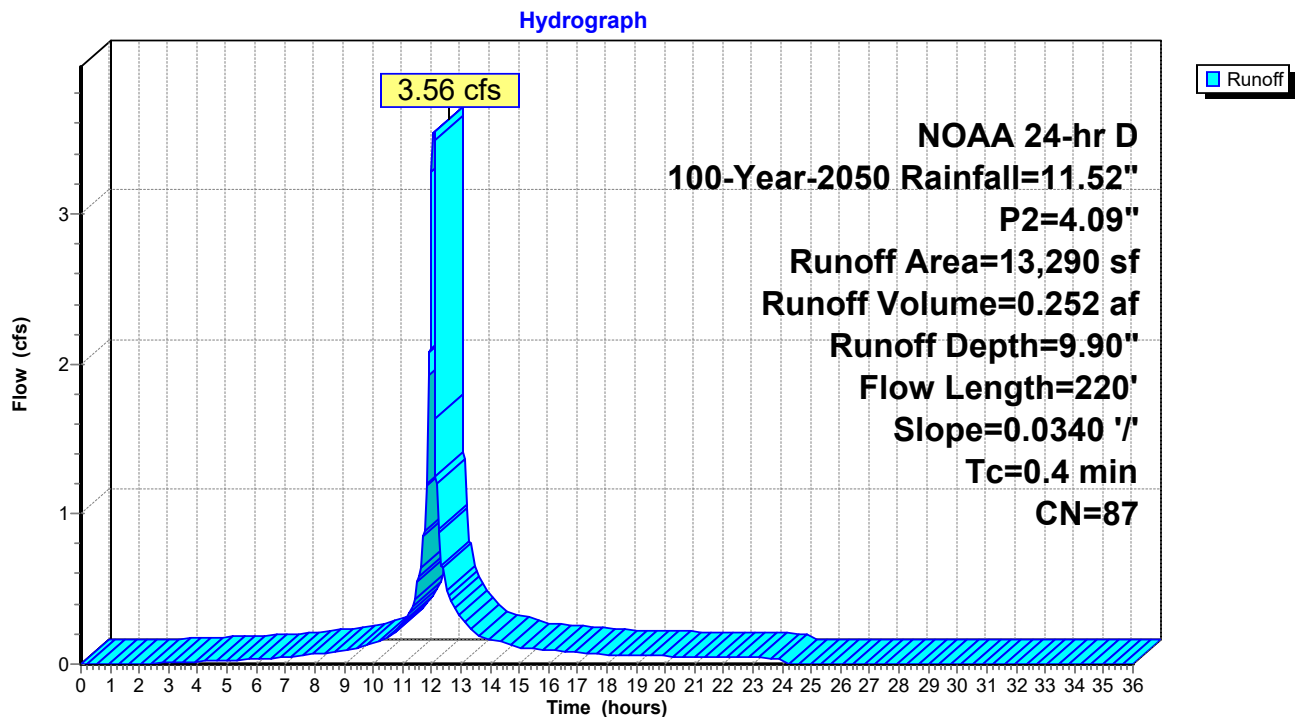
Runoff = 3.56 cfs @ 12.09 hrs, Volume= 0.252 af, Depth= 9.90"
 Routed to Pond 12P : Front Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

	Area (sf)	CN	Description
*	6,776	99	Permeable Pavement
	6,514	74	>75% Grass cover, Good, HSG C
	13,290	87	Weighted Average
	6,514		49.01% Pervious Area
	6,776		50.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	220	0.0340	9.63	5.25	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.010 PVC, smooth interior

Subcatchment 12S: PERMEABLE PAVEMENT TO THE INFILTRATION



Summary for Subcatchment 13S: ROOF WEST

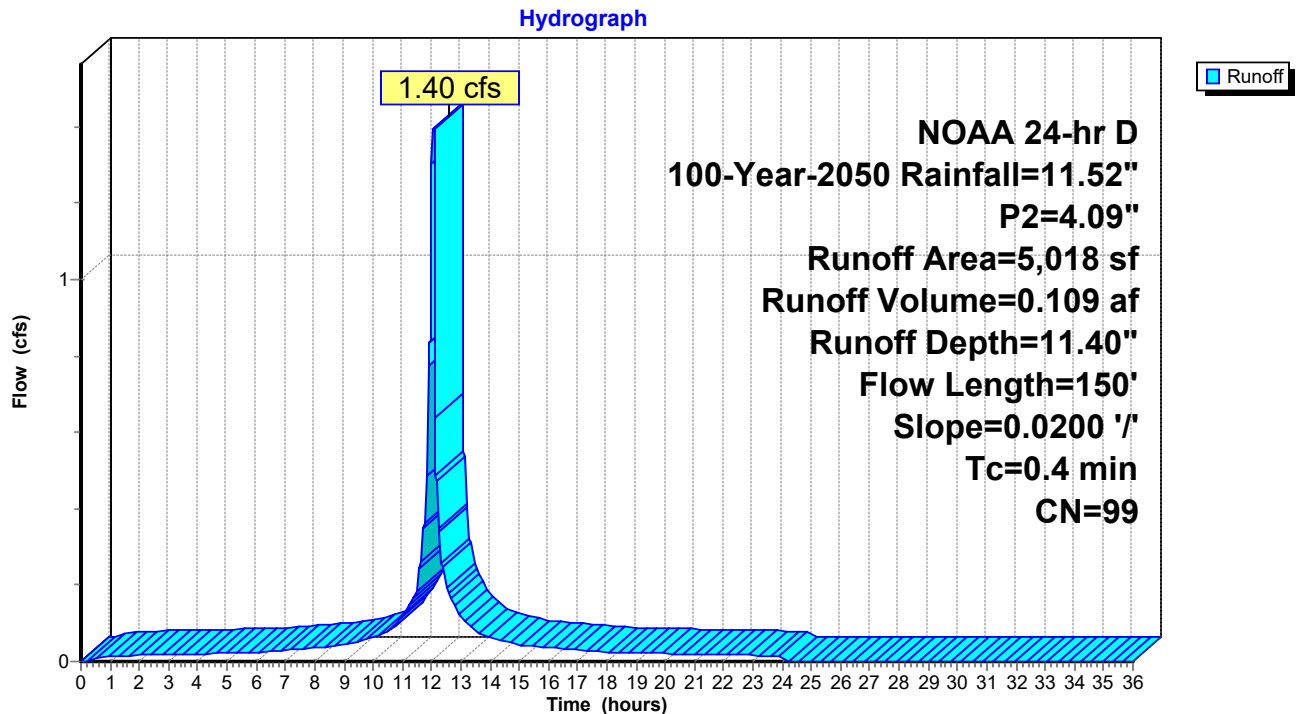
Runoff = 1.40 cfs @ 12.08 hrs, Volume= 0.109 af, Depth=11.40"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

Area (sf)	CN	Description
* 5,018	99	
5,018		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, Roof Drains 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 13S: ROOF WEST



Summary for Subcatchment 14S: ROOF EAST

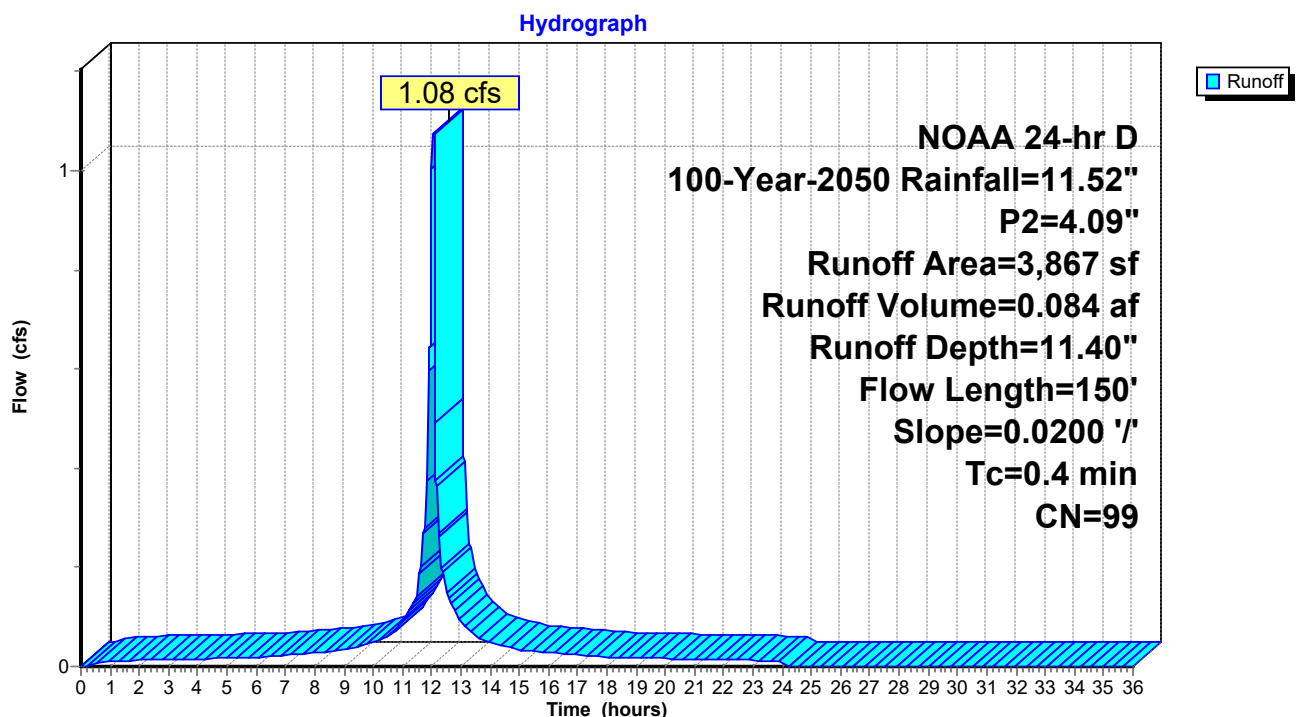
Runoff = 1.08 cfs @ 12.08 hrs, Volume= 0.084 af, Depth=11.40"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

Area (sf)	CN	Description
* 3,867	99	
3,867		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	150	0.0200	6.36	2.22	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior

Subcatchment 14S: ROOF EAST



Summary for Subcatchment 16S: Yard Areas to Rear Basin

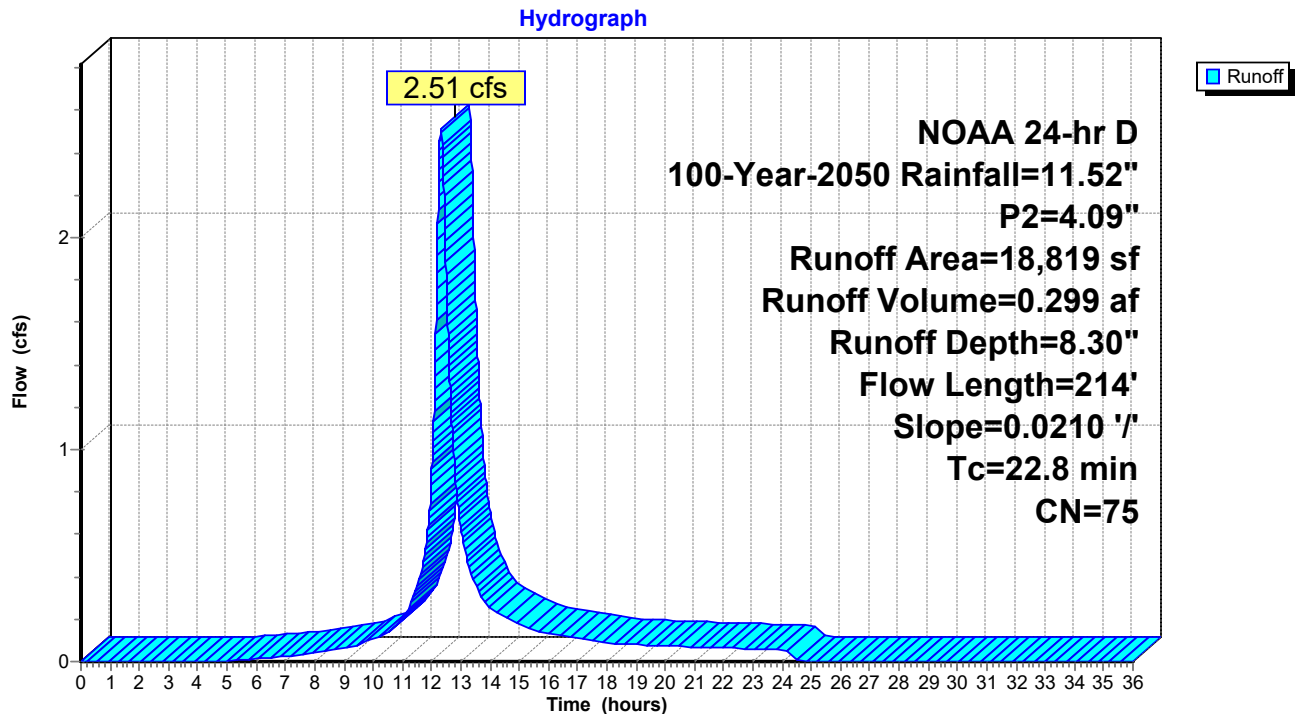
Runoff = 2.51 cfs @ 12.33 hrs, Volume= 0.299 af, Depth= 8.30"
 Routed to Pond 15P : Rear Yard Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

Area (sf)	CN	Description
* 756	99	Sidewalks Patio Ac units
18,063	74	>75% Grass cover, Good, HSG C
18,819	75	Weighted Average
18,063		95.98% Pervious Area
756		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	214	0.0210	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 4.09"

Subcatchment 16S: Yard Areas to Rear Basin



Summary for Subcatchment 17S: Bypass Area Direct To Inlet

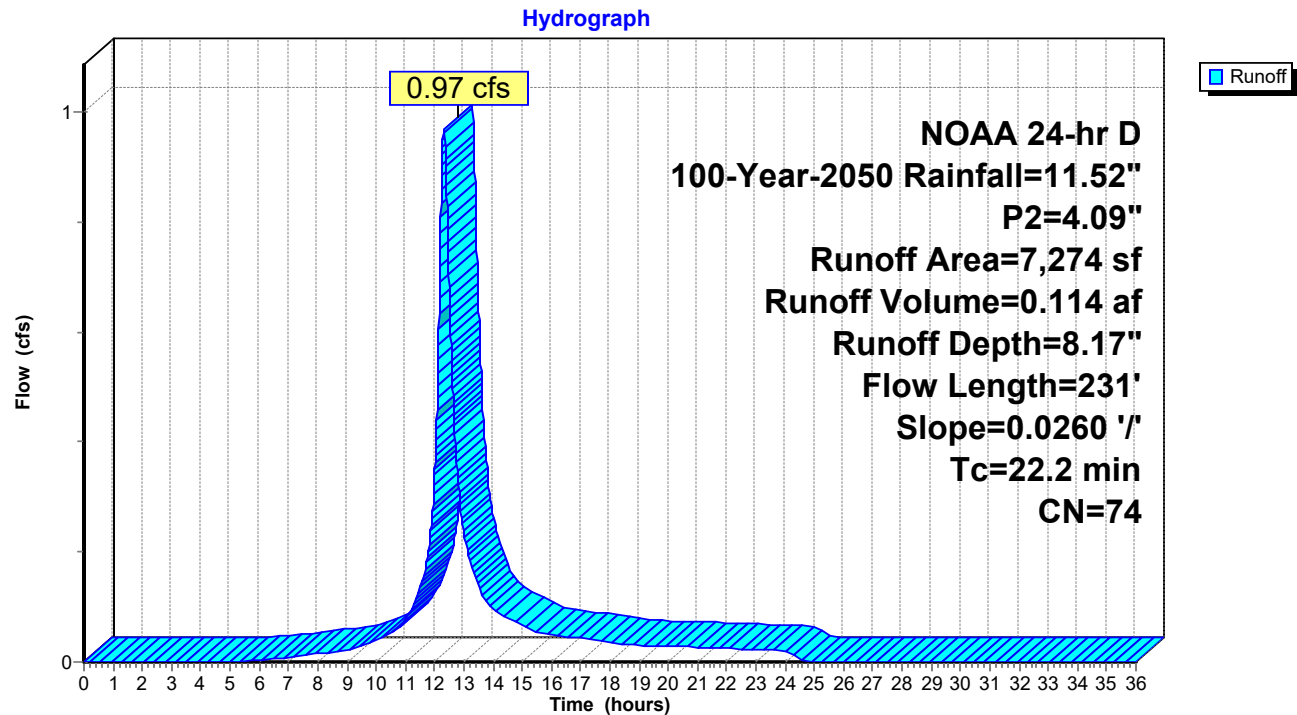
Runoff = 0.97 cfs @ 12.31 hrs, Volume= 0.114 af, Depth= 8.17"
Routed to Reach 12R : Study Point At Inlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

Area (sf)	CN	Description
7,274	74	>75% Grass cover, Good, HSG C
7,274		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	231	0.0260	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 4.09"

Subcatchment 17S: Bypass Area Direct To Inlet



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 2.16" for 2-Year-2020 event
 Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.055 af
 Outflow = 0.14 cfs @ 12.50 hrs, Volume= 0.055 af, Atten= 84%, Lag= 24.9 min
 Discarded = 0.02 cfs @ 12.50 hrs, Volume= 0.027 af
 Primary = 0.12 cfs @ 12.50 hrs, Volume= 0.027 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 564.31' @ 12.50 hrs Surf.Area= 1,086 sf Storage= 921 cf

Plug-Flow detention time= 173.8 min calculated for 0.055 af (100% of inflow)
 Center-of-Mass det. time= 173.8 min (992.4 - 818.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
			2,720 cf Total Available Storage

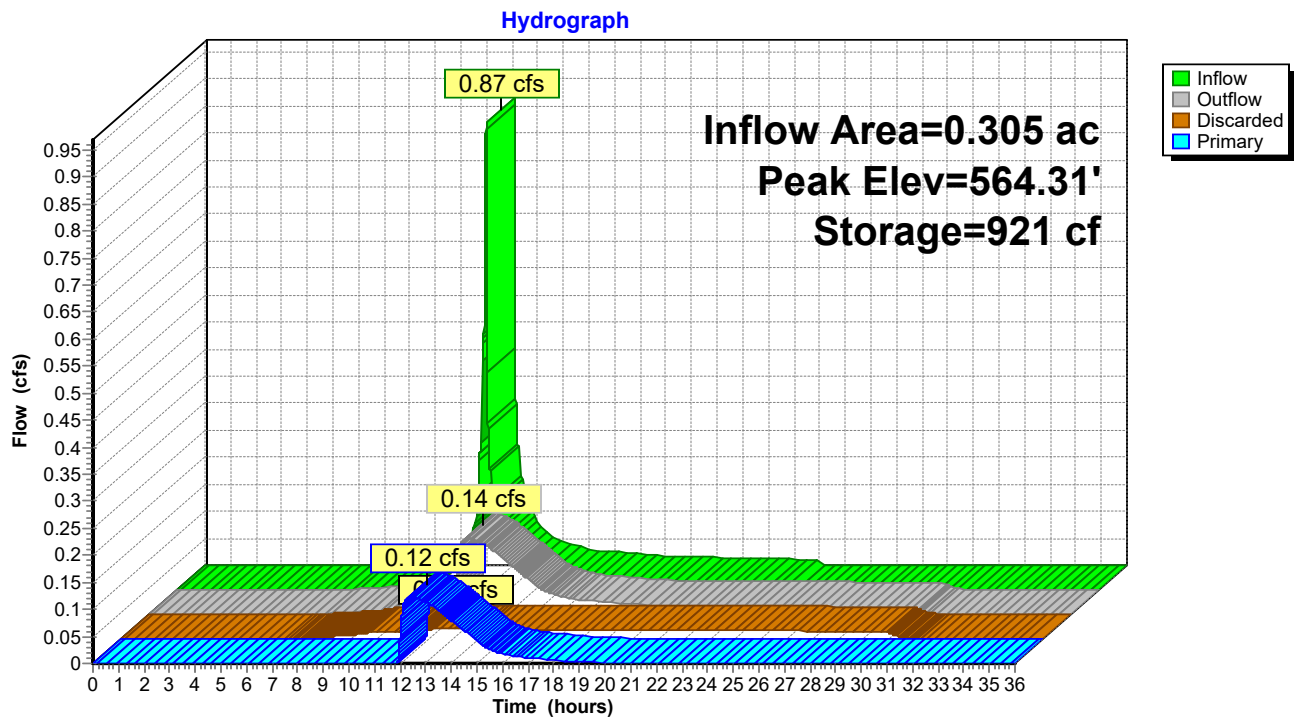
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.50 hrs HW=564.31' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.12 cfs @ 12.50 hrs HW=564.31' (Free Discharge)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 3.59 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.32 fps)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 3.93" for 10-Year-2020 event
 Inflow = 1.51 cfs @ 12.09 hrs, Volume= 0.100 af
 Outflow = 0.83 cfs @ 12.11 hrs, Volume= 0.100 af, Atten= 45%, Lag= 1.2 min
 Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.032 af
 Primary = 0.80 cfs @ 12.11 hrs, Volume= 0.068 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 564.88' @ 12.11 hrs Surf.Area= 1,086 sf Storage= 1,399 cf

Plug-Flow detention time= 123.8 min calculated for 0.100 af (100% of inflow)
 Center-of-Mass det. time= 123.8 min (923.6 - 799.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
			2,720 cf Total Available Storage

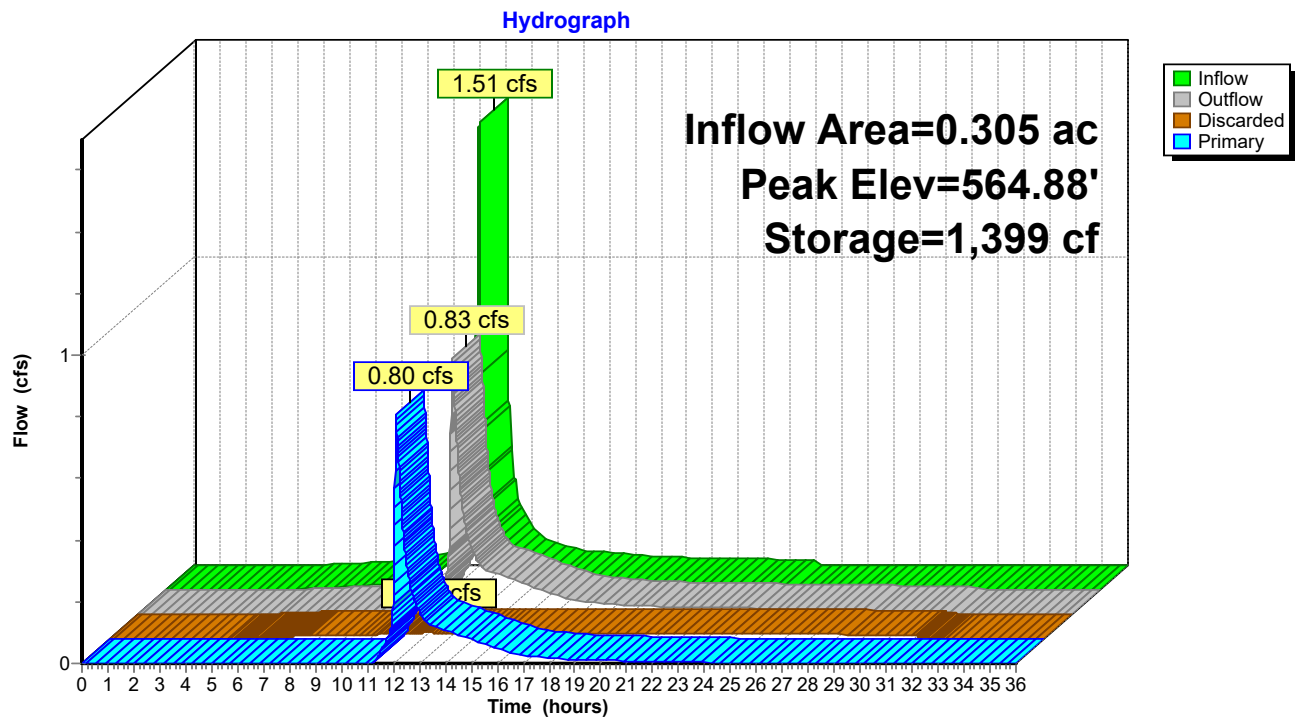
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=564.88' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.80 cfs @ 12.11 hrs HW=564.88' (Free Discharge)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 5.11 fps)
 | **3=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.78 fps)
 | **4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.45 fps)
 | **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 7.60" for 100-Year-2020 event
 Inflow = 2.79 cfs @ 12.09 hrs, Volume= 0.193 af
 Outflow = 1.81 cfs @ 12.11 hrs, Volume= 0.193 af, Atten= 35%, Lag= 1.0 min
 Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.037 af
 Primary = 1.78 cfs @ 12.11 hrs, Volume= 0.157 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 565.65' @ 12.11 hrs Surf.Area= 1,086 sf Storage= 1,988 cf

Plug-Flow detention time= 86.4 min calculated for 0.193 af (100% of inflow)
 Center-of-Mass det. time= 86.5 min (866.4 - 779.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
			2,720 cf Total Available Storage

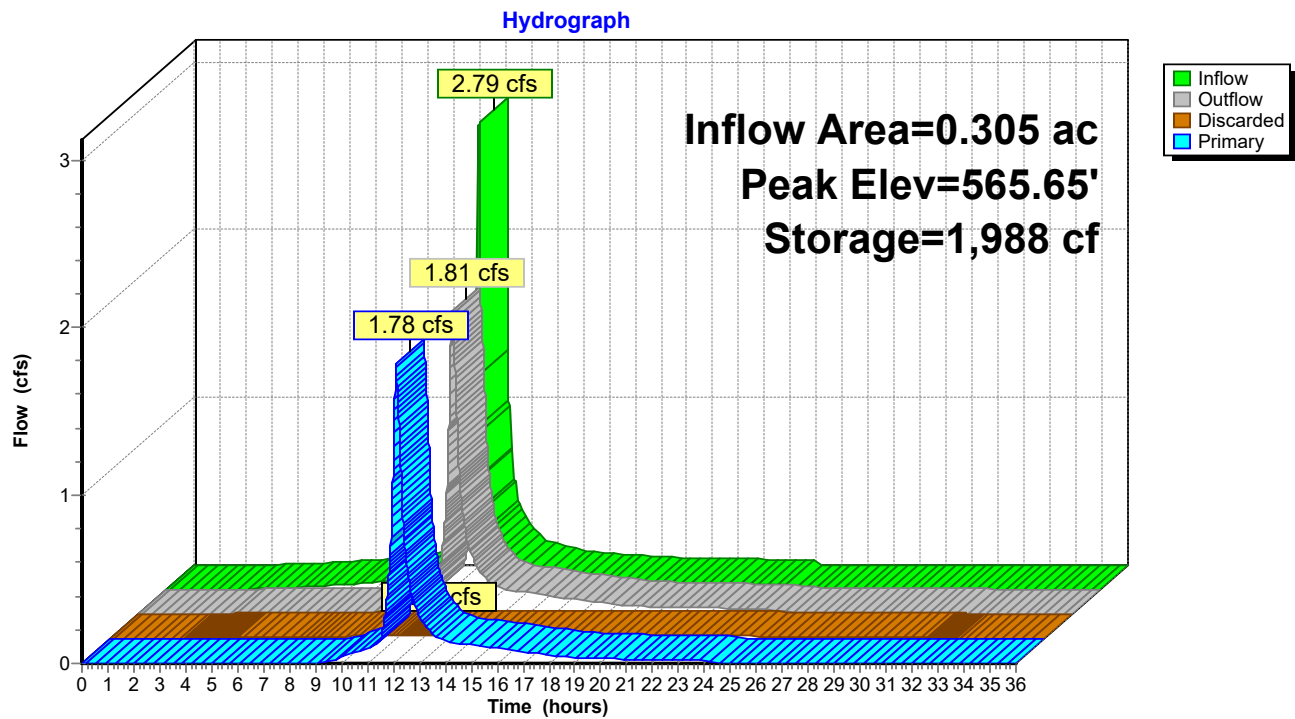
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=565.64' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=1.78 cfs @ 12.11 hrs HW=565.64' (Free Discharge)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.23 cfs @ 6.62 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.04 fps)
 ↳ **4=Orifice/Grate** (Orifice Controls 0.56 cfs @ 4.13 fps)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 2.72" for 2-Year-2050 event
 Inflow = 1.08 cfs @ 12.09 hrs, Volume= 0.069 af
 Outflow = 0.28 cfs @ 12.22 hrs, Volume= 0.069 af, Atten= 74%, Lag= 7.7 min
 Discarded = 0.02 cfs @ 12.22 hrs, Volume= 0.029 af
 Primary = 0.26 cfs @ 12.22 hrs, Volume= 0.040 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 564.51' @ 12.22 hrs Surf.Area= 1,086 sf Storage= 1,089 cf

Plug-Flow detention time= 154.4 min calculated for 0.069 af (100% of inflow)
 Center-of-Mass det. time= 154.5 min (965.8 - 811.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
		2,720 cf	Total Available Storage

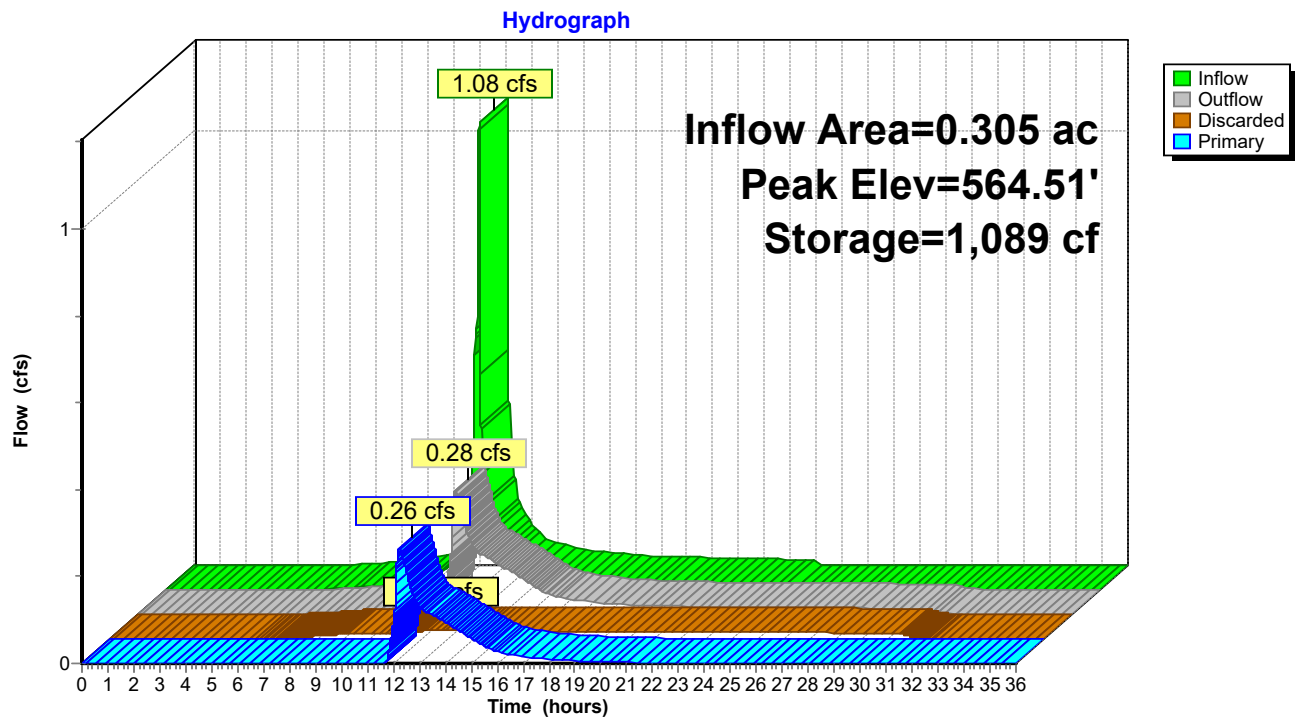
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.22 hrs HW=564.51' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.26 cfs @ 12.22 hrs HW=564.51' (Free Discharge)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 4.18 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 1.55 fps)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 4.87" for 10-Year-2050 event
 Inflow = 1.85 cfs @ 12.09 hrs, Volume= 0.124 af
 Outflow = 1.21 cfs @ 12.11 hrs, Volume= 0.124 af, Atten= 35%, Lag= 1.0 min
 Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.033 af
 Primary = 1.19 cfs @ 12.11 hrs, Volume= 0.091 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 565.11' @ 12.11 hrs Surf.Area= 1,086 sf Storage= 1,577 cf

Plug-Flow detention time= 109.3 min calculated for 0.124 af (100% of inflow)
 Center-of-Mass det. time= 109.4 min (902.6 - 793.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
			2,720 cf Total Available Storage

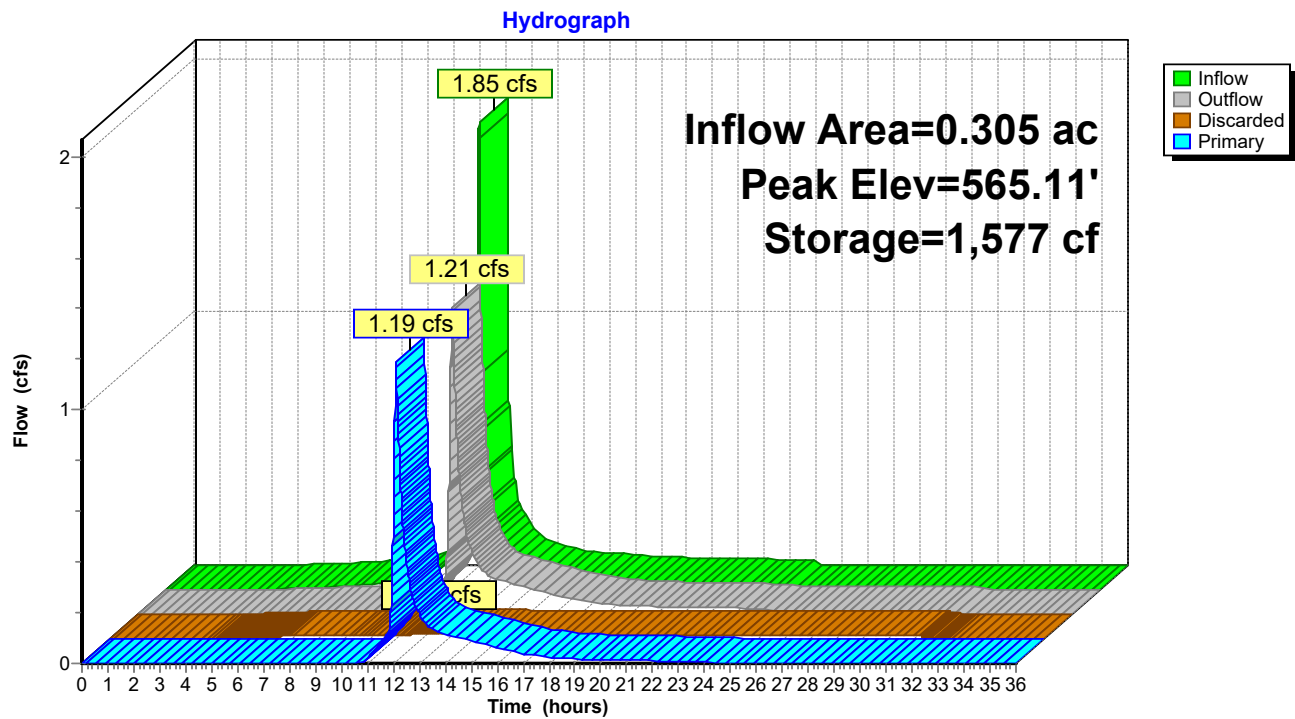
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=565.10' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=1.19 cfs @ 12.11 hrs HW=565.10' (Free Discharge)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.59 fps)
 | **3=Orifice/Grate** (Orifice Controls 0.70 cfs @ 3.58 fps)
 | **4=Orifice/Grate** (Orifice Controls 0.29 cfs @ 2.16 fps)
 | **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 9.90" for 100-Year-2050 event
 Inflow = 3.56 cfs @ 12.09 hrs, Volume= 0.252 af
 Outflow = 2.21 cfs @ 12.11 hrs, Volume= 0.252 af, Atten= 38%, Lag= 1.1 min
 Discarded = 0.03 cfs @ 12.11 hrs, Volume= 0.039 af
 Primary = 2.18 cfs @ 12.11 hrs, Volume= 0.213 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 566.15' @ 12.11 hrs Surf.Area= 1,086 sf Storage= 2,325 cf

Plug-Flow detention time= 76.0 min calculated for 0.252 af (100% of inflow)
 Center-of-Mass det. time= 76.2 min (848.6 - 772.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
		2,720 cf	Total Available Storage

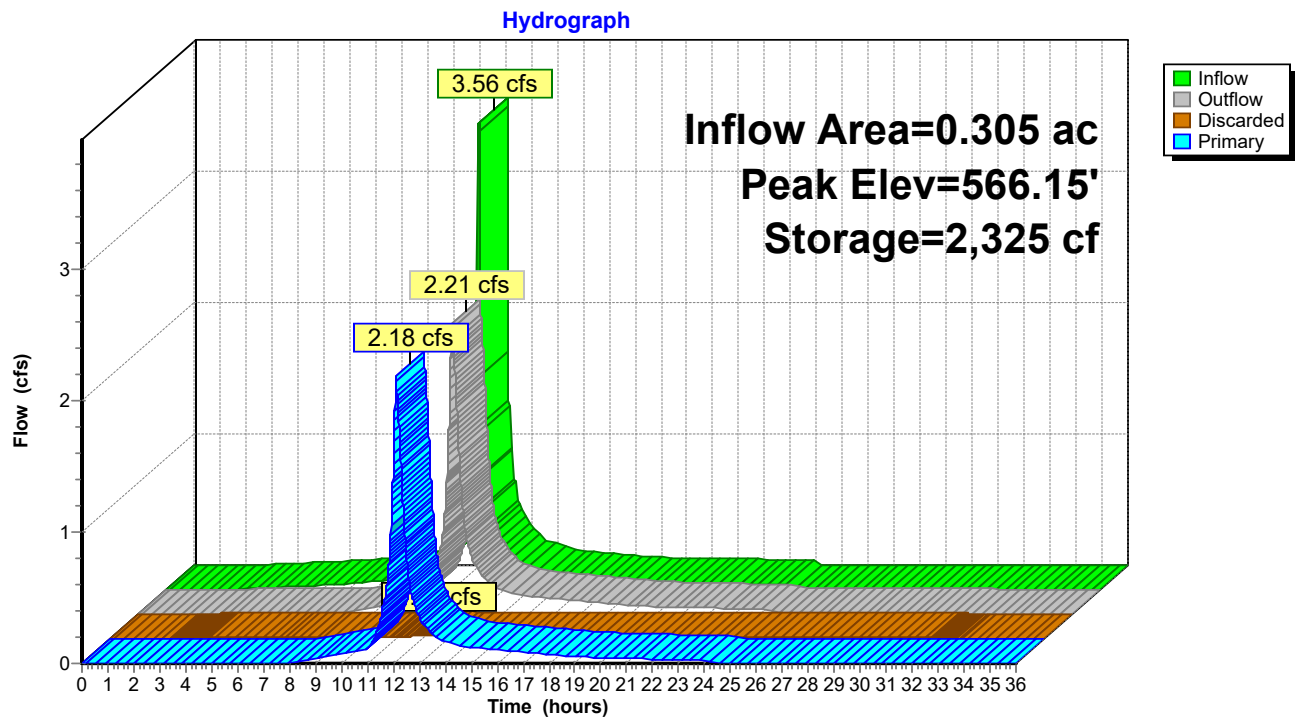
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 12.11 hrs HW=566.15' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=2.18 cfs @ 12.11 hrs HW=566.15' (Free Discharge)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 7.45 fps)
 | **3=Orifice/Grate** (Orifice Controls 1.20 cfs @ 6.09 fps)
 | **4=Orifice/Grate** (Orifice Controls 0.73 cfs @ 5.36 fps)
 | **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 12P: Front Yard Basin

Inflow Area = 0.305 ac, 50.99% Impervious, Inflow Depth = 0.37" for WQDS event
 Inflow = 0.48 cfs @ 1.08 hrs, Volume= 0.009 af
 Outflow = 0.02 cfs @ 2.00 hrs, Volume= 0.009 af, Atten= 97%, Lag= 55.4 min
 Discarded = 0.02 cfs @ 2.00 hrs, Volume= 0.009 af
 Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 563.65' @ 2.00 hrs Surf.Area= 1,086 sf Storage= 352 cf

Plug-Flow detention time= 213.1 min calculated for 0.009 af (100% of inflow)
 Center-of-Mass det. time= 213.0 min (286.3 - 73.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	563.00'	1,082 cf	12.75'W x 85.17'L x 4.00'H Field A 4,343 cf Overall - 1,638 cf Embedded = 2,705 cf x 40.0% Voids
#2A	563.50'	1,638 cf	Cultec R-360HD x 44 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 44 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
			2,720 cf Total Available Storage

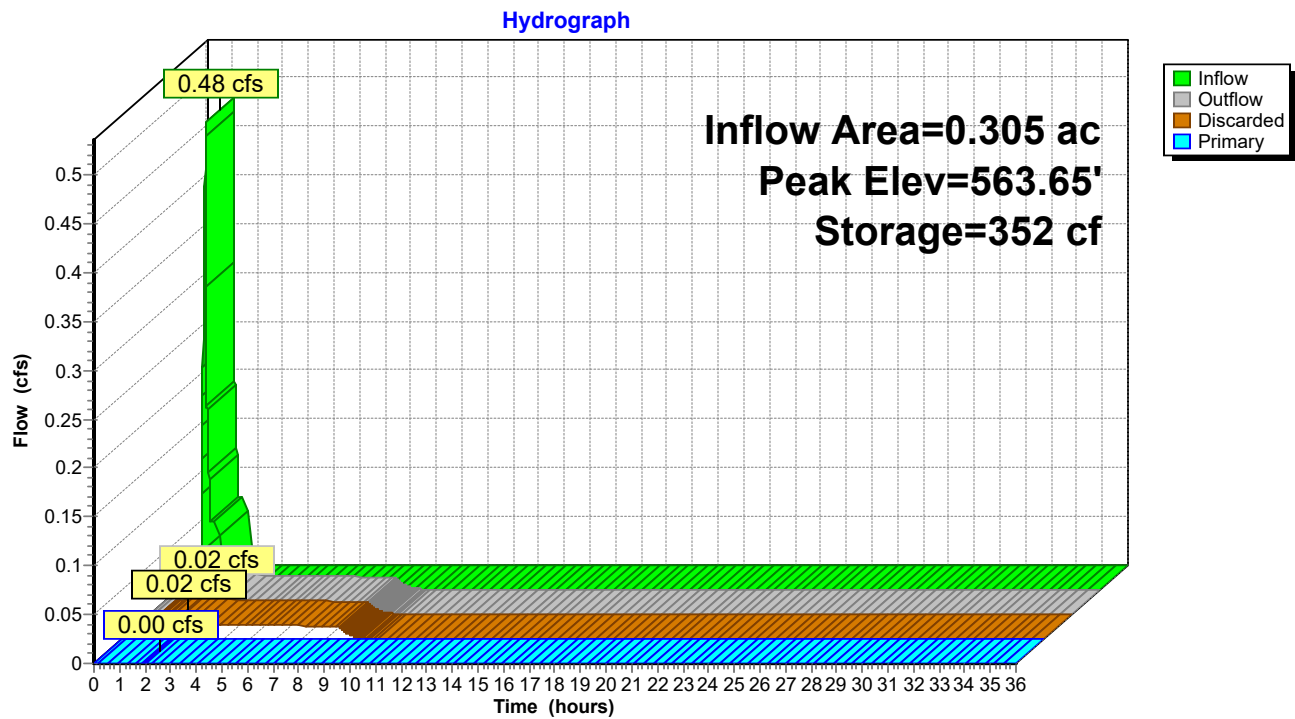
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	563.00'	0.500 in/hr Exfiltration over Horizontal area below 563.50' Conductivity to Groundwater Elevation = 560.30'
#2	Primary	563.65'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.30'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	564.70'	5.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	566.95'	4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 2.00 hrs HW=563.65' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=563.65' (Free Discharge)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.16 fps)
 ↳ **3=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12P: Front Yard Basin



Summary for Pond 15P: Rear Yard Basin

Inflow Area = 0.636 ac, 34.80% Impervious, Inflow Depth = 1.94" for 2-Year-2020 event
 Inflow = 0.88 cfs @ 12.09 hrs, Volume= 0.103 af
 Outflow = 0.19 cfs @ 13.01 hrs, Volume= 0.103 af, Atten= 79%, Lag= 55.0 min
 Primary = 0.19 cfs @ 13.01 hrs, Volume= 0.103 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 563.39' @ 13.01 hrs Surf.Area= 1,526 sf Storage= 1,392 cf

Plug-Flow detention time= 81.3 min calculated for 0.103 af (100% of inflow)
 Center-of-Mass det. time= 81.4 min (884.9 - 803.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	562.00'	1,388 cf	20.50'W x 74.43'L x 3.50'H Field A 5,341 cf Overall - 1,871 cf Embedded = 3,470 cf x 40.0% Voids
#2A	562.50'	1,871 cf	Cultec R-300HD x 40 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 40 Chambers in 4 Rows Cap Storage= 2.7 cf x 2 x 4 rows = 21.2 cf
		3,259 cf	Total Available Storage

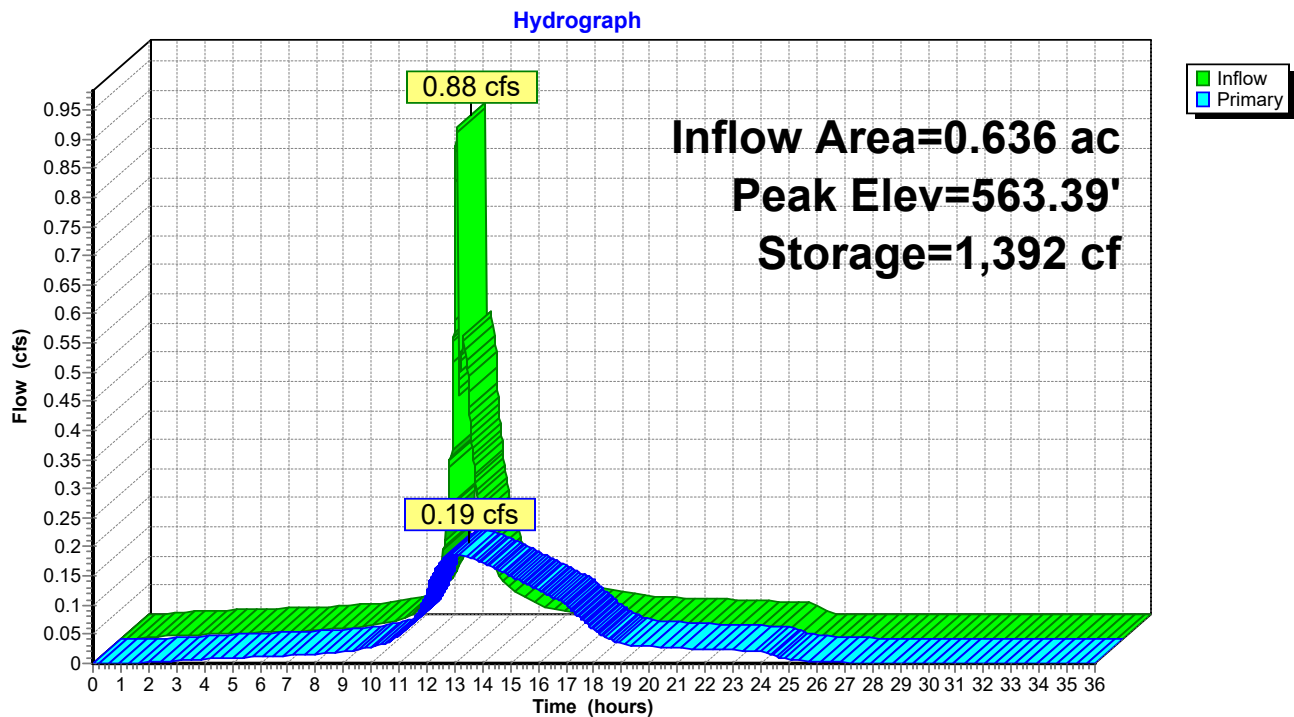
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	562.00'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	563.80'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.40'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.19 cfs @ 13.01 hrs HW=563.39' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.19 cfs @ 5.45 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 15P: Rear Yard Basin



Summary for Pond 15P: Rear Yard Basin

Inflow Area = 0.636 ac, 34.80% Impervious, Inflow Depth = 3.56" for 10-Year-2020 event
 Inflow = 1.50 cfs @ 12.09 hrs, Volume= 0.189 af
 Outflow = 0.77 cfs @ 12.53 hrs, Volume= 0.189 af, Atten= 49%, Lag= 26.8 min
 Primary = 0.77 cfs @ 12.53 hrs, Volume= 0.189 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 564.23' @ 12.53 hrs Surf.Area= 1,526 sf Storage= 2,319 cf

Plug-Flow detention time= 85.1 min calculated for 0.189 af (100% of inflow)
 Center-of-Mass det. time= 85.1 min (884.4 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	562.00'	1,388 cf	20.50'W x 74.43'L x 3.50'H Field A 5,341 cf Overall - 1,871 cf Embedded = 3,470 cf x 40.0% Voids
#2A	562.50'	1,871 cf	Cultec R-300HD x 40 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 40 Chambers in 4 Rows Cap Storage= 2.7 cf x 2 x 4 rows = 21.2 cf
		3,259 cf	Total Available Storage

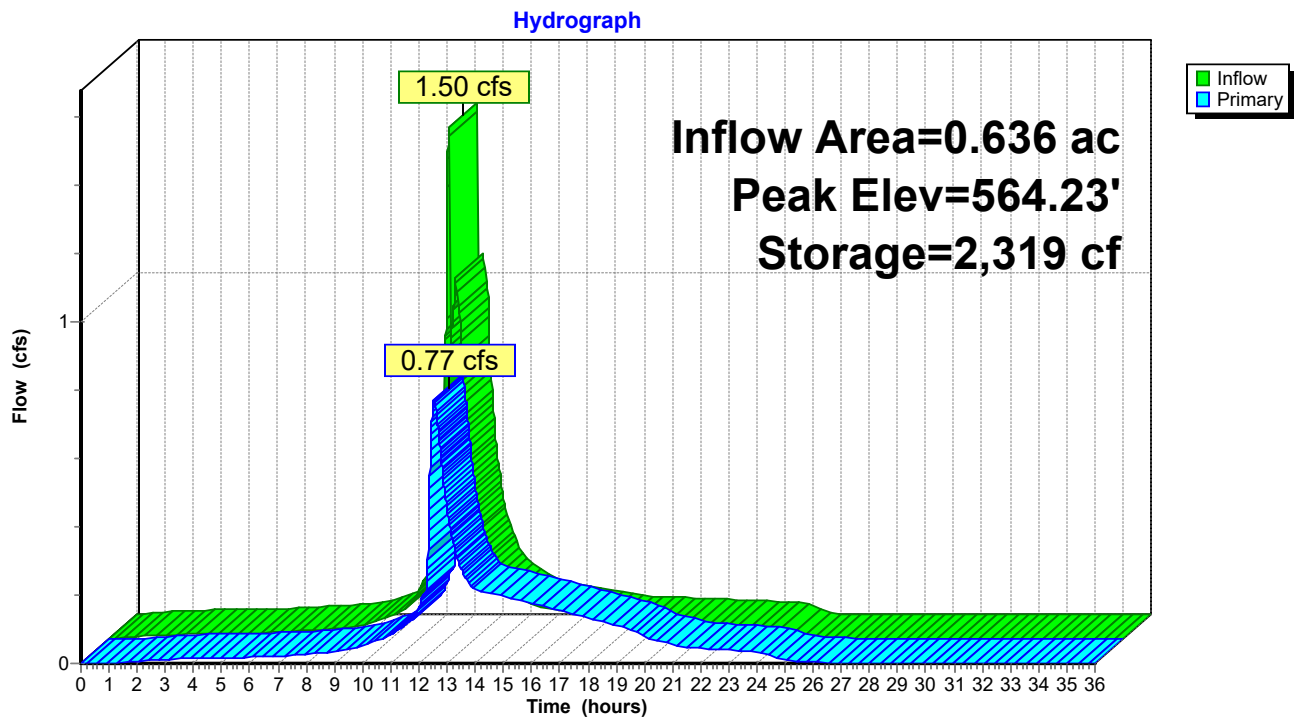
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	562.00'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	563.80'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.40'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.77 cfs @ 12.53 hrs HW=564.23' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.24 cfs @ 7.02 fps)
- 2=Orifice/Grate (Orifice Controls 0.53 cfs @ 2.23 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 15P: Rear Yard Basin



Summary for Pond 15P: Rear Yard Basin

Inflow Area = 0.636 ac, 34.80% Impervious, Inflow Depth = 7.06" for 100-Year-2020 event
 Inflow = 2.79 cfs @ 12.09 hrs, Volume= 0.374 af
 Outflow = 2.12 cfs @ 12.39 hrs, Volume= 0.374 af, Atten= 24%, Lag= 17.8 min
 Primary = 2.12 cfs @ 12.39 hrs, Volume= 0.374 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 564.80' @ 12.39 hrs Surf.Area= 1,526 sf Storage= 2,826 cf

Plug-Flow detention time= 68.3 min calculated for 0.374 af (100% of inflow)
 Center-of-Mass det. time= 68.3 min (858.6 - 790.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	562.00'	1,388 cf	20.50'W x 74.43'L x 3.50'H Field A 5,341 cf Overall - 1,871 cf Embedded = 3,470 cf x 40.0% Voids
#2A	562.50'	1,871 cf	Cultec R-300HD x 40 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 40 Chambers in 4 Rows Cap Storage= 2.7 cf x 2 x 4 rows = 21.2 cf
		3,259 cf	Total Available Storage

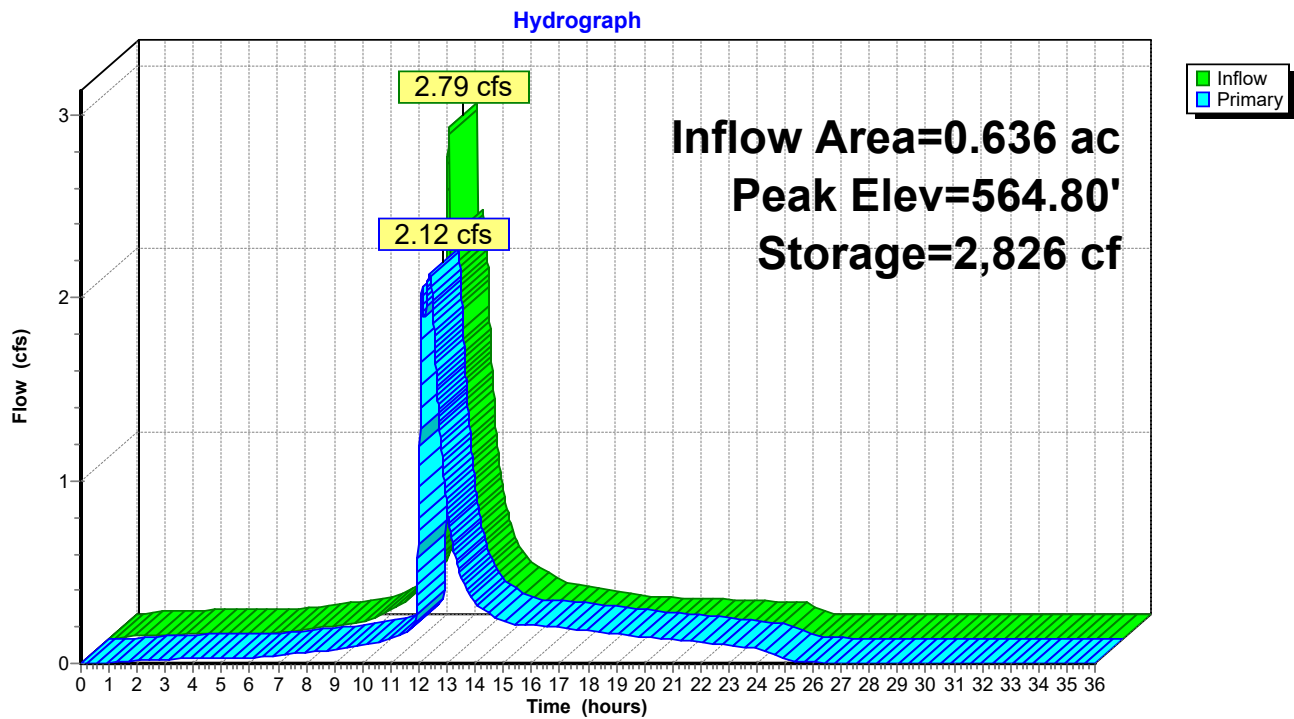
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	562.00'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	563.80'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.40'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.12 cfs @ 12.39 hrs HW=564.80' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.27 cfs @ 7.91 fps)
- 2=Orifice/Grate (Orifice Controls 1.38 cfs @ 3.94 fps)
- 3=Orifice/Grate (Orifice Controls 0.48 cfs @ 2.16 fps)

Pond 15P: Rear Yard Basin



Summary for Pond 15P: Rear Yard Basin

Inflow Area = 0.636 ac, 34.80% Impervious, Inflow Depth = 2.45" for 2-Year-2050 event
 Inflow = 1.09 cfs @ 12.09 hrs, Volume= 0.130 af
 Outflow = 0.22 cfs @ 13.03 hrs, Volume= 0.130 af, Atten= 80%, Lag= 56.5 min
 Primary = 0.22 cfs @ 13.03 hrs, Volume= 0.130 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 563.83' @ 13.03 hrs Surf.Area= 1,526 sf Storage= 1,901 cf

Plug-Flow detention time= 94.1 min calculated for 0.130 af (100% of inflow)
 Center-of-Mass det. time= 94.0 min (895.6 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	562.00'	1,388 cf	20.50'W x 74.43'L x 3.50'H Field A 5,341 cf Overall - 1,871 cf Embedded = 3,470 cf x 40.0% Voids
#2A	562.50'	1,871 cf	Cultec R-300HD x 40 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 40 Chambers in 4 Rows Cap Storage= 2.7 cf x 2 x 4 rows = 21.2 cf
		3,259 cf	Total Available Storage

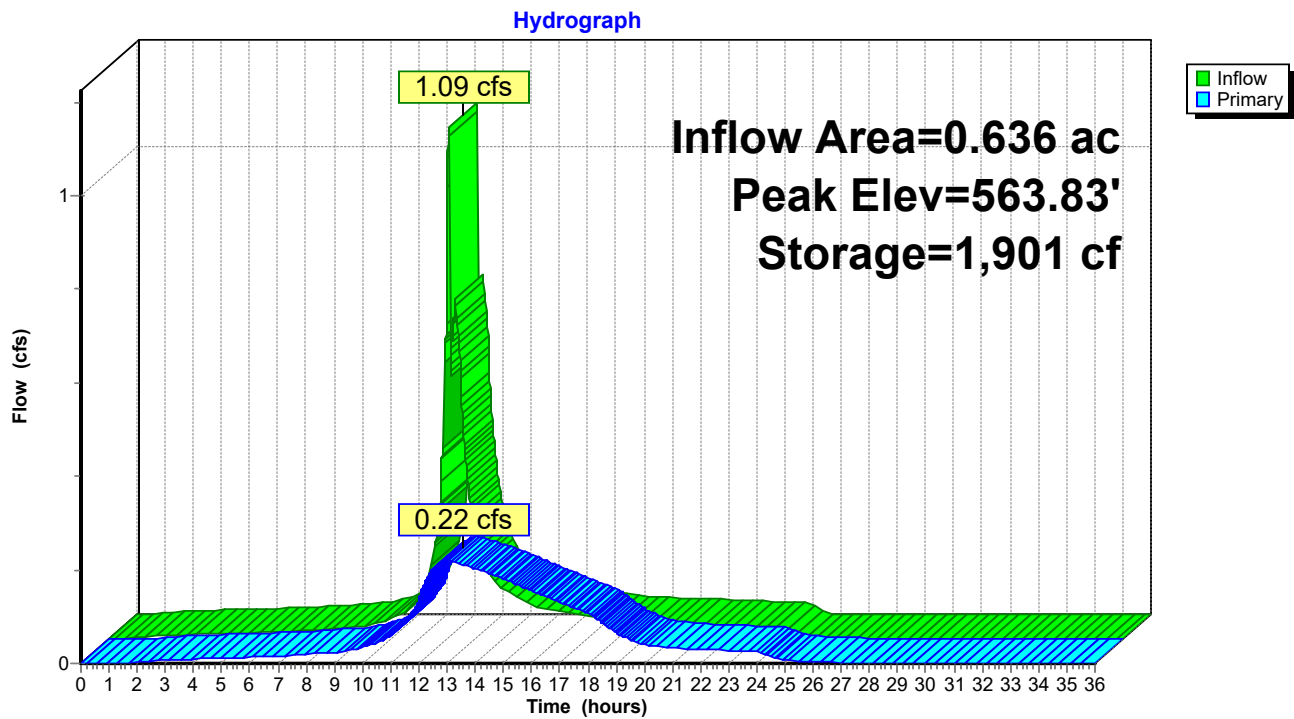
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	562.00'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	563.80'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.40'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 13.03 hrs HW=563.83' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.22 cfs @ 6.33 fps)
- 2=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.62 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 15P: Rear Yard Basin



Summary for Pond 15P: Rear Yard Basin

Inflow Area = 0.636 ac, 34.80% Impervious, Inflow Depth = 4.45" for 10-Year-2050 event
 Inflow = 1.87 cfs @ 12.09 hrs, Volume= 0.236 af
 Outflow = 1.19 cfs @ 12.44 hrs, Volume= 0.236 af, Atten= 36%, Lag= 21.2 min
 Primary = 1.19 cfs @ 12.44 hrs, Volume= 0.236 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 564.44' @ 12.44 hrs Surf.Area= 1,526 sf Storage= 2,523 cf

Plug-Flow detention time= 78.5 min calculated for 0.236 af (100% of inflow)
 Center-of-Mass det. time= 78.5 min (874.3 - 795.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	562.00'	1,388 cf	20.50'W x 74.43'L x 3.50'H Field A 5,341 cf Overall - 1,871 cf Embedded = 3,470 cf x 40.0% Voids
#2A	562.50'	1,871 cf	Cultec R-300HD x 40 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 40 Chambers in 4 Rows Cap Storage= 2.7 cf x 2 x 4 rows = 21.2 cf
		3,259 cf	Total Available Storage

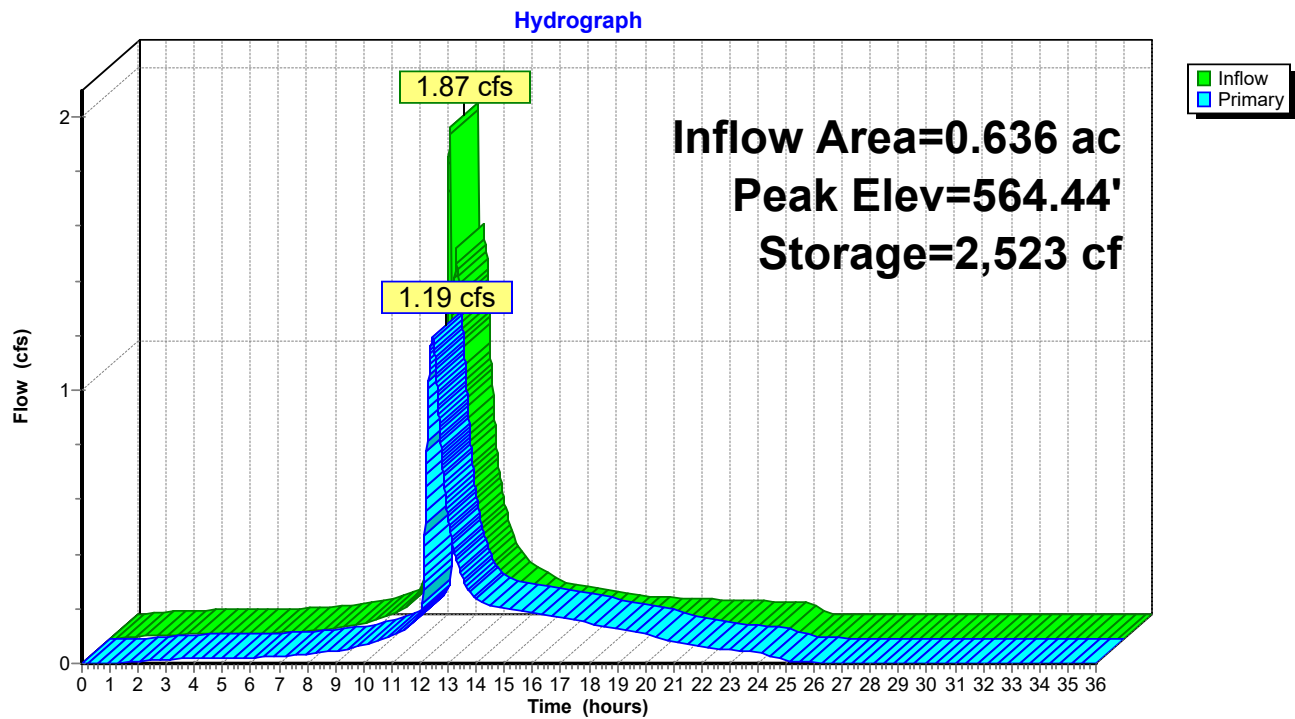
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	562.00'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	563.80'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.40'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 12.44 hrs HW=564.44' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.25 cfs @ 7.36 fps)
- 2=Orifice/Grate (Orifice Controls 0.94 cfs @ 2.72 fps)
- 3=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.68 fps)

Pond 15P: Rear Yard Basin



Summary for Pond 15P: Rear Yard Basin

Inflow Area = 0.636 ac, 34.80% Impervious, Inflow Depth = 9.30" for 100-Year-2050 event
 Inflow = 3.70 cfs @ 12.09 hrs, Volume= 0.493 af
 Outflow = 3.15 cfs @ 12.10 hrs, Volume= 0.493 af, Atten= 15%, Lag= 0.8 min
 Primary = 3.15 cfs @ 12.10 hrs, Volume= 0.493 af
 Routed to Reach 12R : Study Point At Inlet

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 565.19' @ 12.10 hrs Surf.Area= 1,526 sf Storage= 3,070 cf

Plug-Flow detention time= 63.6 min calculated for 0.493 af (100% of inflow)
 Center-of-Mass det. time= 63.6 min (848.4 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	562.00'	1,388 cf	20.50'W x 74.43'L x 3.50'H Field A 5,341 cf Overall - 1,871 cf Embedded = 3,470 cf x 40.0% Voids
#2A	562.50'	1,871 cf	Cultec R-300HD x 40 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 40 Chambers in 4 Rows Cap Storage= 2.7 cf x 2 x 4 rows = 21.2 cf
		3,259 cf	Total Available Storage

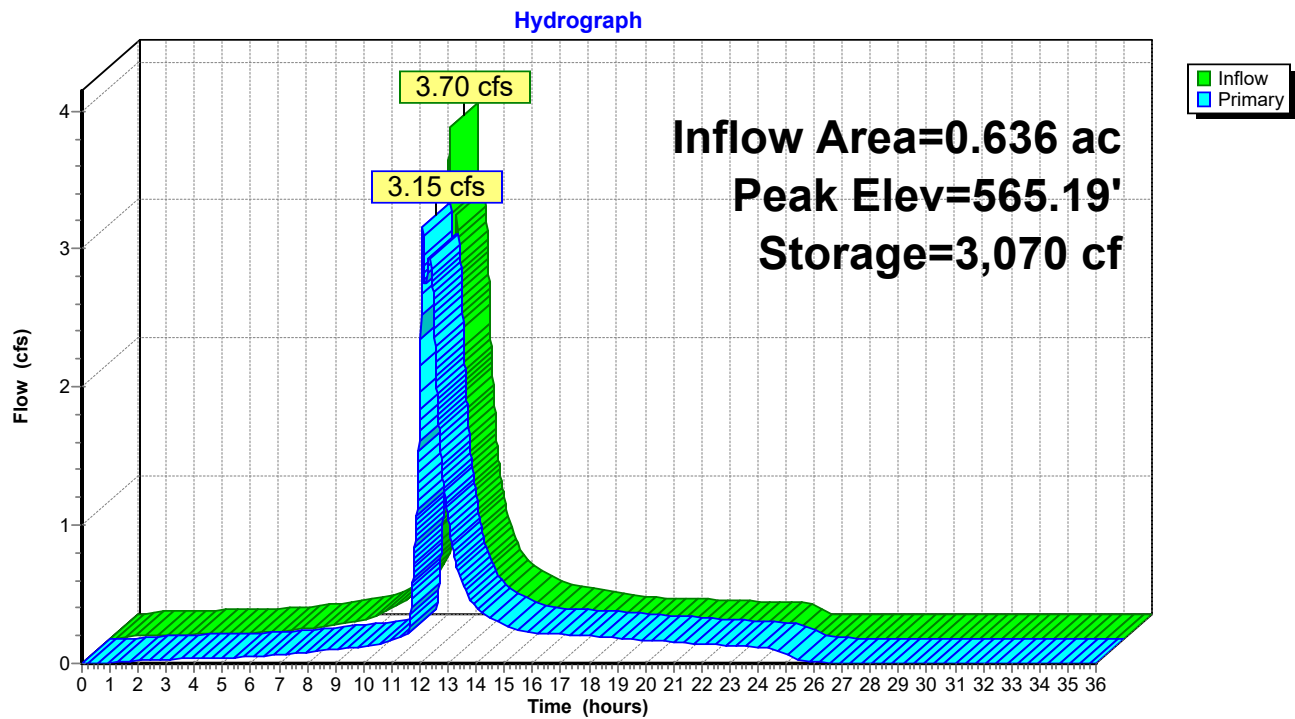
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	562.00'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	563.80'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	564.40'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.14 cfs @ 12.10 hrs HW=565.19' (Free Discharge)

↑
 1=Orifice/Grate (Orifice Controls 0.29 cfs @ 8.45 fps)
 2=Orifice/Grate (Orifice Controls 1.72 cfs @ 4.94 fps)
 3=Orifice/Grate (Orifice Controls 1.13 cfs @ 3.24 fps)

Pond 15P: Rear Yard Basin

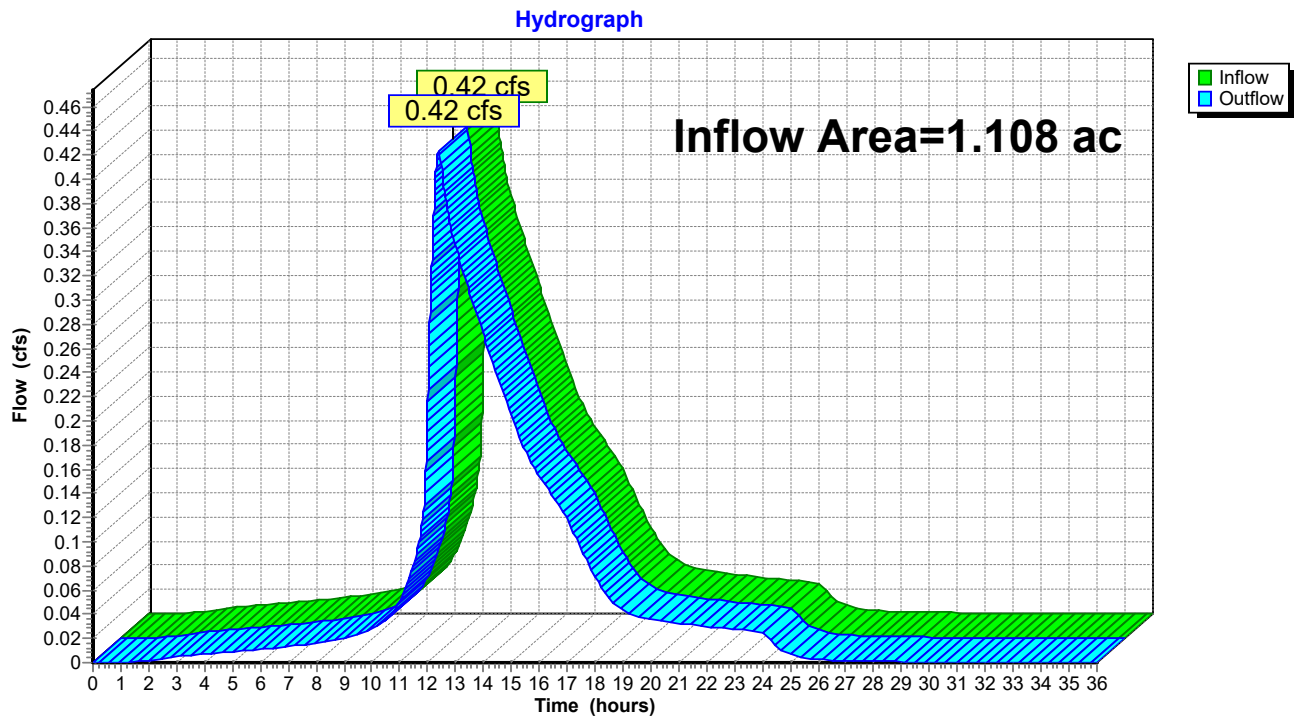


Summary for Reach 12R: Study Point At Inlet

Inflow Area = 1.108 ac, 34.01% Impervious, Inflow Depth = 1.60" for 2-Year-2020 event
Inflow = 0.42 cfs @ 12.40 hrs, Volume= 0.147 af
Outflow = 0.42 cfs @ 12.40 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 12R: Study Point At Inlet

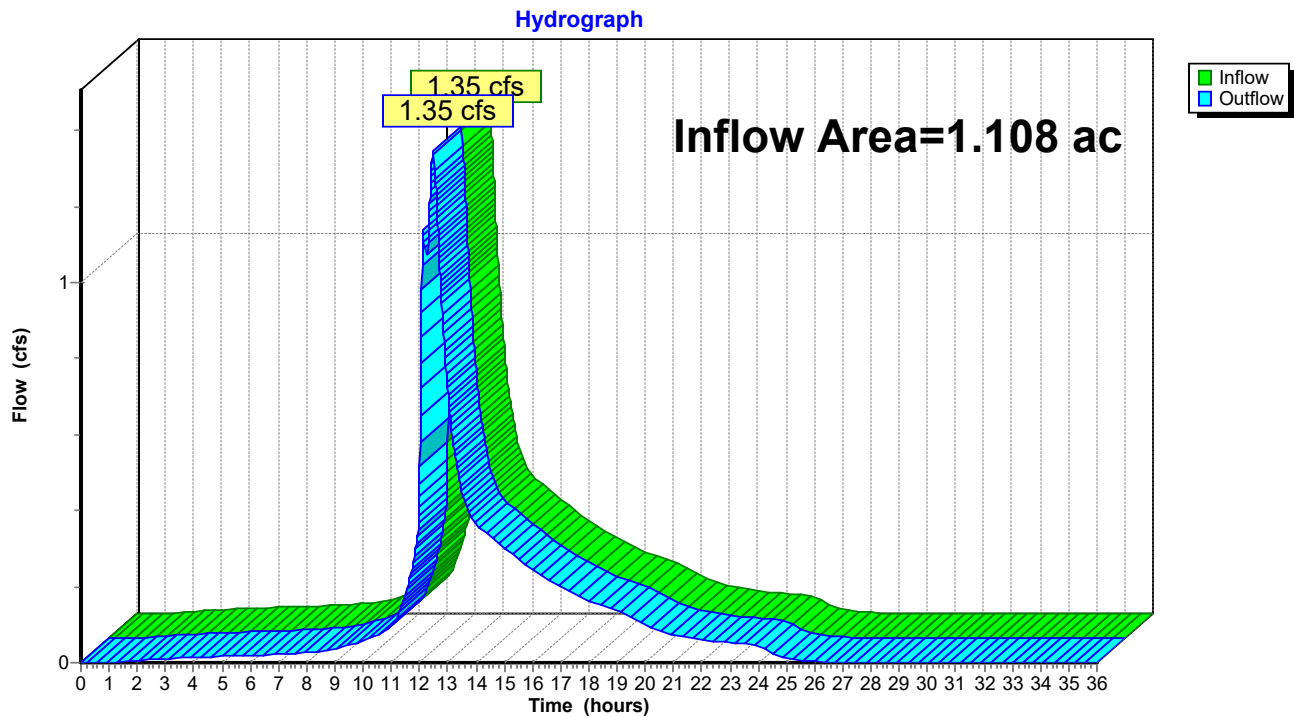


Summary for Reach 12R: Study Point At Inlet

Inflow Area = 1.108 ac, 34.01% Impervious, Inflow Depth = 3.18" for 10-Year-2020 event
Inflow = 1.35 cfs @ 12.49 hrs, Volume= 0.294 af
Outflow = 1.35 cfs @ 12.49 hrs, Volume= 0.294 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 12R: Study Point At Inlet

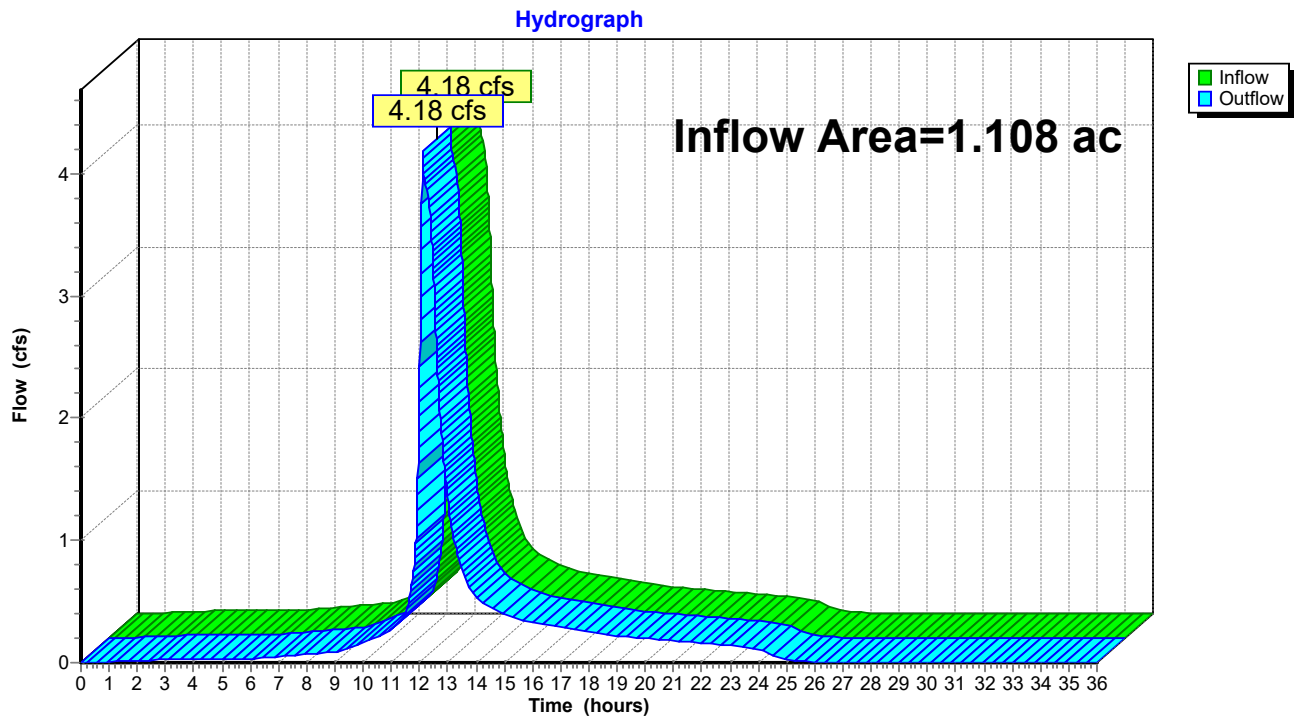


Summary for Reach 12R: Study Point At Inlet

Inflow Area = 1.108 ac, 34.01% Impervious, Inflow Depth = 6.65" for 100-Year-2020 event
Inflow = 4.18 cfs @ 12.11 hrs, Volume= 0.614 af
Outflow = 4.18 cfs @ 12.11 hrs, Volume= 0.614 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 12R: Study Point At Inlet

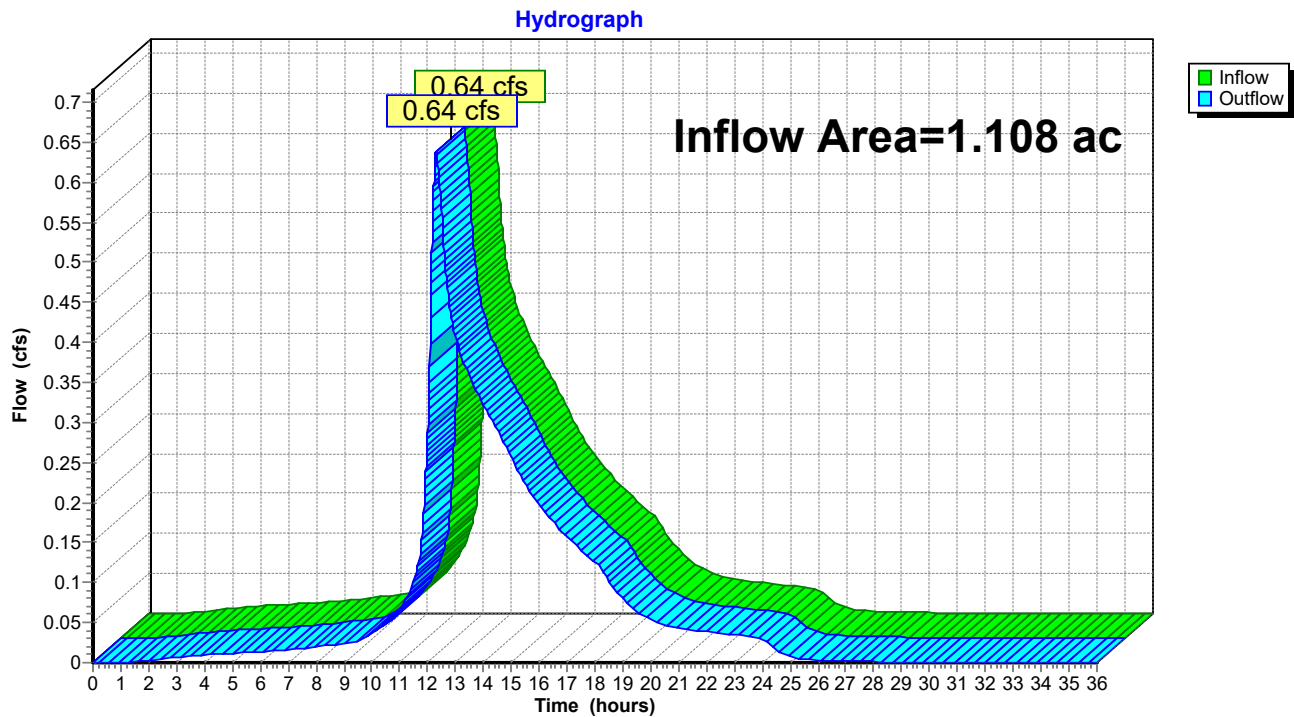


Summary for Reach 12R: Study Point At Inlet

Inflow Area = 1.108 ac, 34.01% Impervious, Inflow Depth = 2.09" for 2-Year-2050 event
Inflow = 0.64 cfs @ 12.31 hrs, Volume= 0.193 af
Outflow = 0.64 cfs @ 12.31 hrs, Volume= 0.193 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 12R: Study Point At Inlet

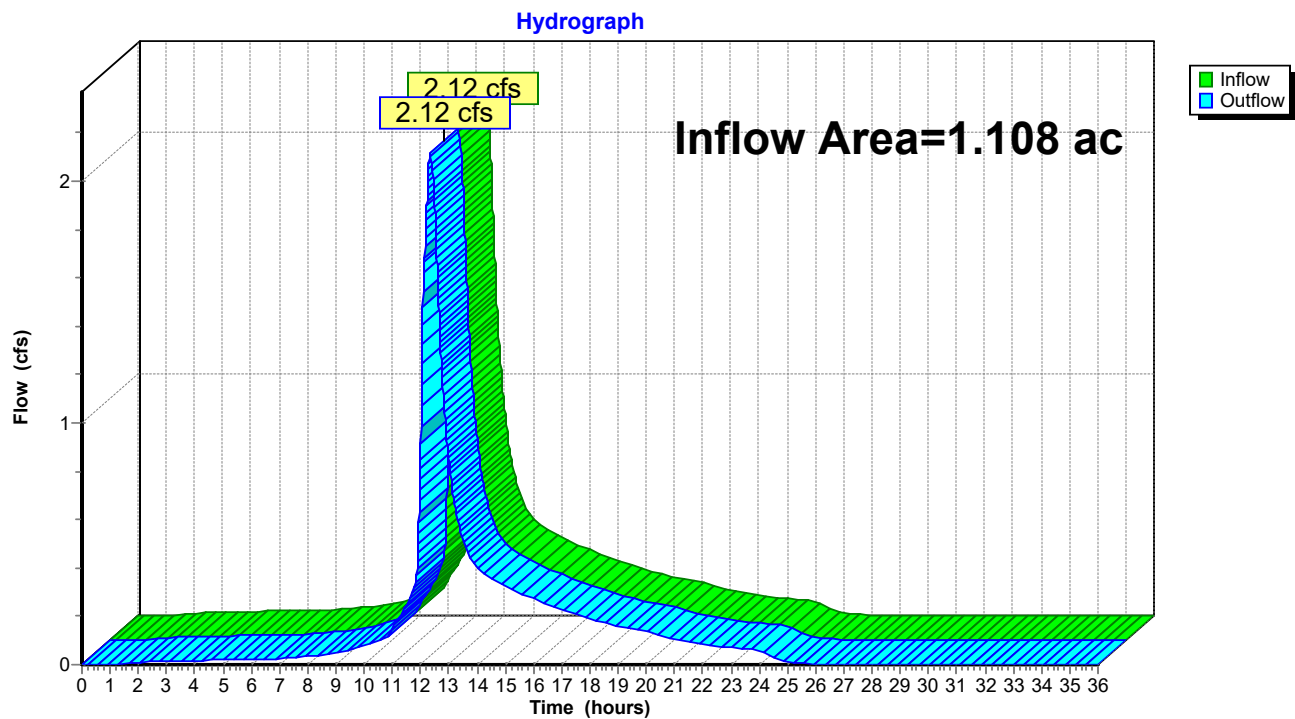


Summary for Reach 12R: Study Point At Inlet

Inflow Area = 1.108 ac, 34.01% Impervious, Inflow Depth = 4.06" for 10-Year-2050 event
Inflow = 2.12 cfs @ 12.33 hrs, Volume= 0.375 af
Outflow = 2.12 cfs @ 12.33 hrs, Volume= 0.375 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 12R: Study Point At Inlet

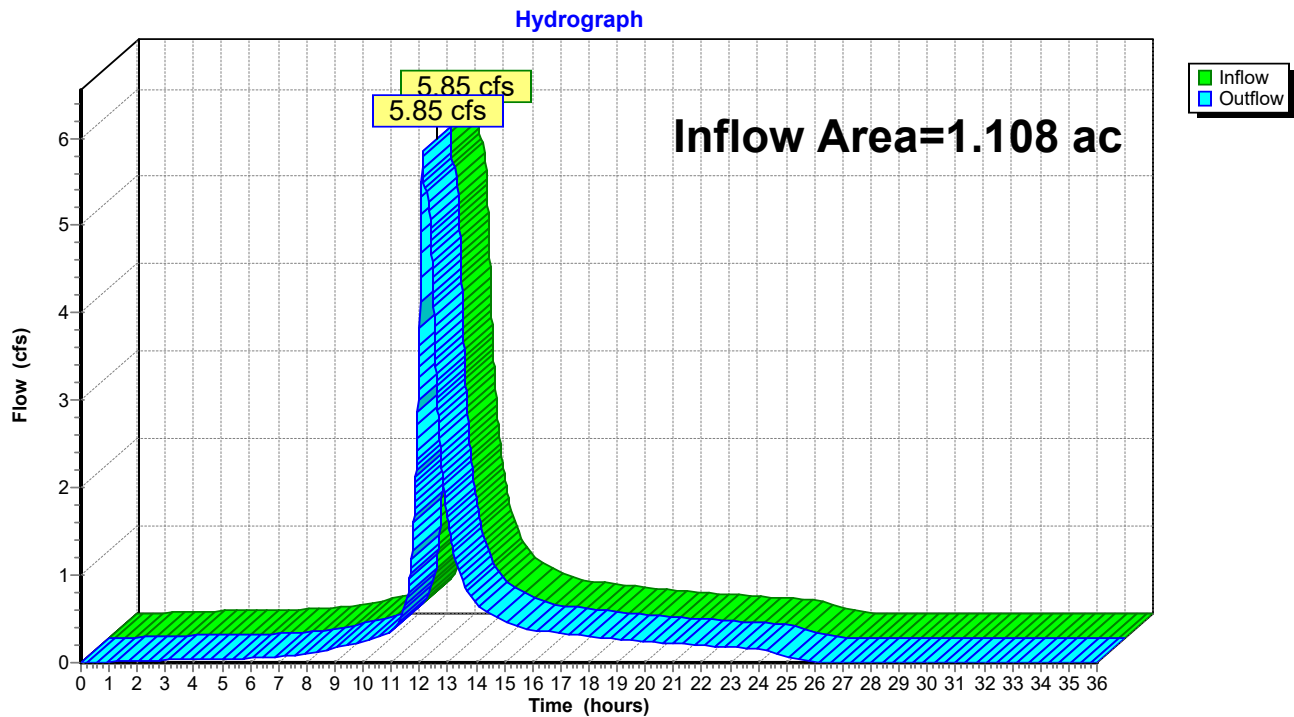


Summary for Reach 12R: Study Point At Inlet

Inflow Area = 1.108 ac, 34.01% Impervious, Inflow Depth = 8.87" for 100-Year-2050 event
Inflow = 5.85 cfs @ 12.11 hrs, Volume= 0.820 af
Outflow = 5.85 cfs @ 12.11 hrs, Volume= 0.820 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 12R: Study Point At Inlet



DEPTH

LOGGED BY: VINCENT CREEVY, Block 158, Proposed Lot 28.04 West Orange
SOIL LOG -3-Dry Well-03/20/2026

SOIL DESCRIPTION

- 0-31" 7.5YR 4/4 Brown, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*****NO MOTTLES OR WATER OBSERVED
- 31"-68" 7.5YR 6/6 Redish yellow, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*****NO MOTTLES OR WATER OBSERVED
- 68"-144" 7.5YR 5/4 Brown siltloam (SAMPLE @ 73") 15% Gravel-25% Cobble-3" to 8" 110" -144"
slightly moist, subangular blocky, friable, plastic
*****MOTTLES OBSERVED 10YR 5/6 @ 95"(few, medium, distinct) SEASONAL HIGH WATER
*****WATER SEEPAGE OBSERVED @ 105"

DEPTH

LOGGED BY: VINCENT CREEVY, Block 158, Proposed Lot 28.03 West Orange
SOIL LOG -1-Dry Well-03/20/2026

SOIL DESCRIPTION

- 0-13" 7.5YR 3/3 Dark brown, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*****NO MOTTLES OR WATER OBSERVED
- 31"-68" 7.5YR 6/4 light brown, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*****NO MOTTLES OR WATER OBSERVED
- 68"-130" 7.5YR 5/4 Brown siltloam (SAMPLE @ 73") 15% Gravel-25% Cobble-3" to 10" 108" -130"
moist, subangular blocky, friable, plastic
*****MOTTLES OBSERVED 10YR 5/6 @ 68"(few, medium, distinct) SEASONAL HIGH WATER
*****WATER SEEPAGE OBSERVED @ 70"

LOGGED BY:VINCENT CREEVY,Block 158, Proposed Lot 28.04 West Orange

DEPTH

SOIL LOG -2-Dry Well-03/20/2026

SOIL DESCRIPTION

- 0-44" 7.5YR 4/4 Brown, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*****NO MOTTLES OR WATER OBSERVED
- 44"-69" 7.5YR 6/6 Redish yellow, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*******MOTTLES OBSERVED 10YR 5/6 @ 60"(few, medium, distinct) SEASONAL HIGH WATER**
*******WATER SEEPAGE OBSERVED @ 65"**
- 69"-144" 7.5YR 5/4 Brown siltloam (SAMPLE @ 75") 15% Gravel-10% Cobble-3" to 8" 101" -144"
moist, subangular blocky, friable, plastic
*******WET THROUGH OUT**

LOGGED BY:VINCENT CREEVY,Block 158, Proposed Lot 28.03 West Orange

DEPTH

SOIL LOG -4-Dry Well-03/20/2026

SOIL DESCRIPTION

- 0-65" 7.5YR 4/4 Brown, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*****NO MOTTLES OR WATER OBSERVED
- 65"-75" 7.5YR 6/6 Redish yellow, siltloam
slightly moist, subangular blocky, friable, slightly plastic to plastic
*******MOTTLES OBSERVED 10YR 5/6 @ 74"(few, medium, distinct) SEASONAL HIGH WATER**
- 75"-144" 7.5YR 5/4 Brown siltloam (SAMPLE @ 80") 15% Gravel-25% Cobble-3" to 8" 105" -144"
moist, subangular blocky, friable, plastic
*******WATER SEEPAGE OBSERVED @ 76"**

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.03 W. Orange (Dry Well)

1. Test Number Log -4 Replicate (letter) B Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 80"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.7"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

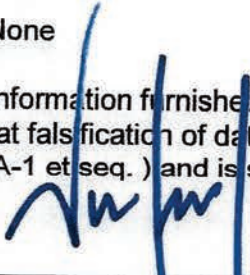
5.62min./inch
5.64min./inch
5.64min./inch
5.65min./inch
5.65min./inch
5.65min./inch

9. Calculation of Permeability:

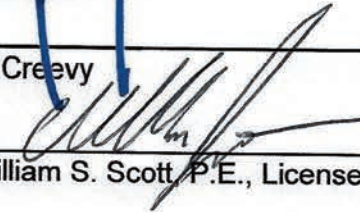
$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2) \\ = (60 \text{ min/hr} \times 0.194/3.534) \times 3.7" / 5.63 \\ \times \ln(7.0/6.0) = 0.33 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026

Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026

William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.03 W. Orange (Dry Well)

1. Test Number Log -4 Replicate (letter) A Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 80"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.5"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

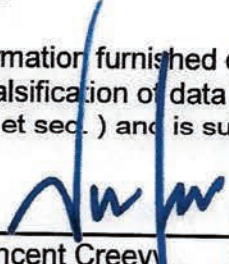
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5.62min./inch
5.62min./inch
5.63min./inch
5.63min./inch
5.63min./inch

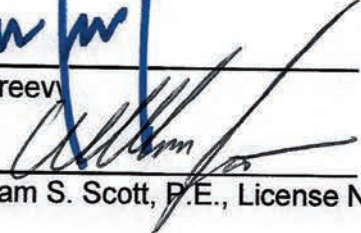
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2)$$
$$= (60 \text{ min/hr} \times 0.194/3.534) \times 3.5" / 5.63$$
$$\times \ln (7.0/6.0) = 0.32 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.03 W. Orange (Dry Well)

1. Test Number Log -4 Replicate (letter) A Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 80"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.5"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

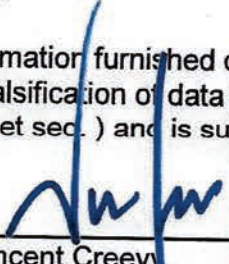
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5.62min./inch
5.62min./inch
5.63min./inch
5.63min./inch
5.63min./inch

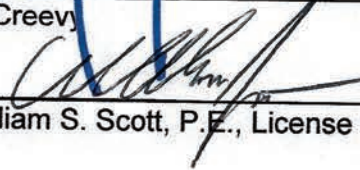
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2) \\ = (60 \text{ min/hr} \times 0.194/3.534) \times 3.5" / 5.63 \\ \times \ln(7.0/6.0) = 0.32 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.03 W. Orange (Dry Well)

1. Test Number Log -3 Replicate (letter) B Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 73"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.4"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

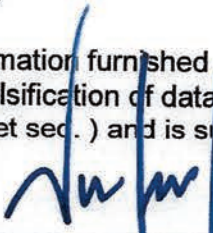
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2.48min./inch
2.49min./inch
2.49min./inch
2.49min./inch
2.49min./inch

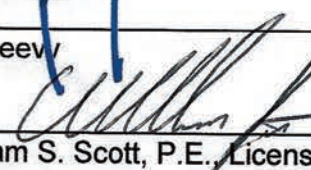
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2) \\ = (60 \text{ min/hr} \times 0.194/3.534) \times 3.4" / 2.49 \\ \times \ln(7.0/6.0) = 0.69 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.03 W. Orange (Dry Well)

1. Test Number Log -3 Replicate (letter) A Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 73"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.5"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

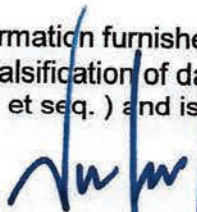
2.62min./inch
2.63min./inch
2.63min./inch
2.65min./inch
2.65min./inch
2.65min./inch

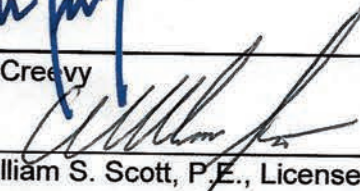
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2) \\ = (60 \text{ min/hr} \times 0.194/3.534) \times 3.5" / 2.65 \\ \times \ln(7.0/6.0) = 0.67 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.04 W. Orange (Dry Well)

1. Test Number Log -2 Replicate (letter) B Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 75"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.6"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

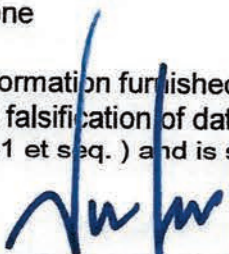
4.14min./inch
4.13min./inch
4.14min./inch
4.15min./inch
4.15min./inch
4.15min./inch

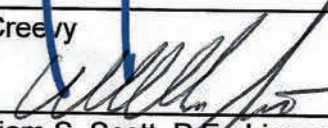
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2) \\ = (60 \text{ min/hr} \times 0.194/3.534) \times 3.6" / 4.15 \\ \times \ln(7.0/6.0) = 0.44 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.04 W. Orange (Dry Well)

1. Test Number Log -2 Replicate (letter) A Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 75"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.4"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

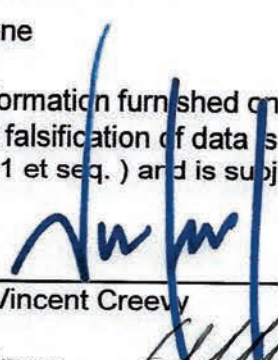
3.84min./inch
3.84min./inch
3.85min./inch
4.0min./inch
4.0min./inch
4.0min./inch

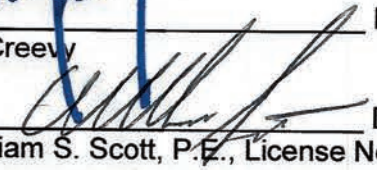
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2) \\ = (60 \text{ min/hr} \times 0.194/3.534) \times 3.4" / 4.0 \\ \times \ln(7.0/6.0) = 0.43 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.04 W. Orange (Dry Well)

1. Test Number Log -1 Replicate (letter) B Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 72"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.5"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

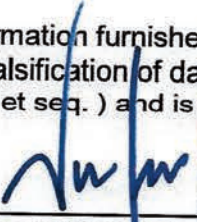
1.73min./inch
1.74min./inch
1.74min./inch
1.75min./inch
1.75min./inch
1.75min./inch

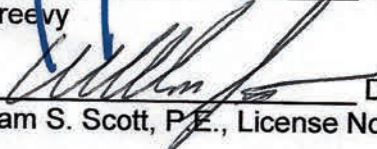
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2)$$
$$= (60 \text{ min/hr} \times 0.194/3.534) \times 3.5" / 1.75$$
$$\times \ln(7.0/6.0) = 1.02 \text{ in/hr} = K-1$$

10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

Form 3b. Tube Permeameter Test Data: Blk. 158, Prop. Lot 28.04 W. Orange (Dry Well)

1. Test Number Log -1 Replicate (letter) A Date Collected 03/20/2025

2. Material Tested: Test in Native Soil – Indicate Depth 72"

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in inches 1.88"
Length of Sample, L, in inches 3.25"

5. Bulk Density Determination:

6. Standpipe used: No X Yes
Indicate Internal Radius, 0.44"

7. Height of Water Level Above Rim of Test Basin, in inches:
At the Beginning of Each Test Interval, H₁ 7.0"
At the End of Each Test Interval, H₂ 6.0"

8. Rate of Water Level Drop:
*****STOPWATCH USED

Length of Test Interval, T in Minutes (decimal)

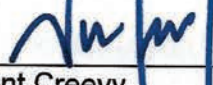
1.64min./inch
1.64min./inch
1.65min./inch
1.65min./inch
1.65min./inch
1.65min./inch

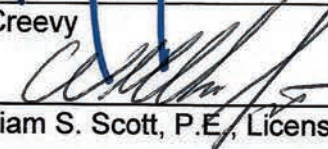
9. Calculation of Permeability:

$$K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H_1/H_2)$$
$$= (60 \text{ min/hr} \times 0.194/3.534) \times 3.25" / 1.65$$
$$\times \ln(7.0/6.0) = 1.0 \text{ in/hr} = K-1$$

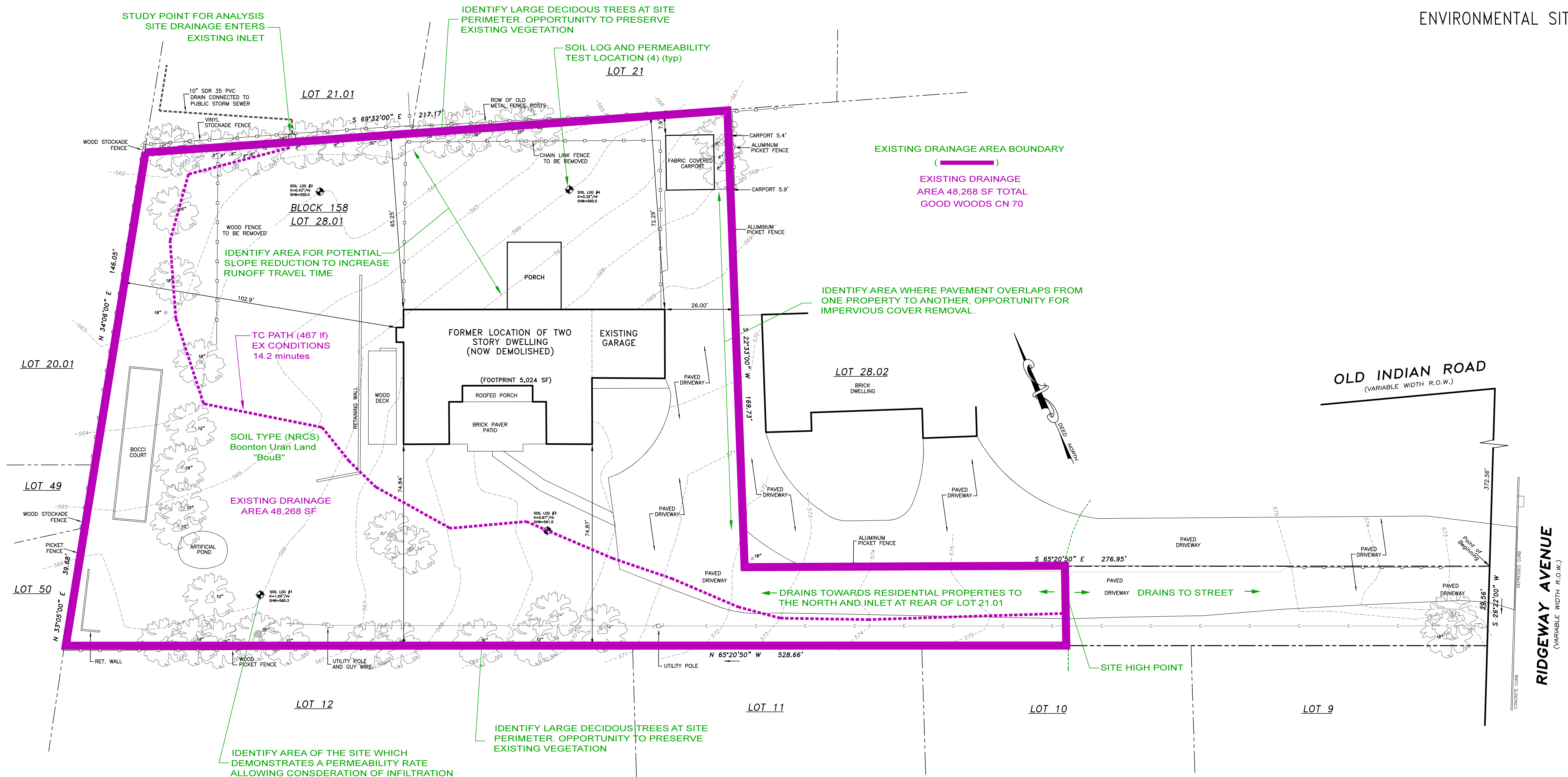
10. Defects in the Sample: None

11. I hereby certify that the information furnished on Form 3B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. : 7:14-8.

Signature of Soil Evaluator  Date 03/21/2026
Vincent Creevy

Signature of Professional Engineer  Date 03/21/2026
William S. Scott, P.E., License No. 44863

ENVIRONMENTAL SITE ANALYSIS AND MAP



SITE DESCRIPTION AND ENVIRONMENTAL ANALYSIS

The project site is an existing flag lot with a stem portion containing the driveway which fronts on Ridgeway Avenue. The 1.219 acre property was developed with a single family dwelling with attached garage, covered parking or storage area, retaining walls, bocci court and koi pond. The property is located within an existing residential neighborhood. The existing home is served by public utilities which are located within the bed of Ridgeway Avenue.

A small portion of the property (approximately 3,000 sf) drains overland from a highpoint on the driveway stem towards Ridgeway Avenue. The remainder of the site drains overland from South to the North towards the rear of Lot 21.01 at which point runoff from the site is collected by an existing inlet and piped through Lot 21.01 to the Township storm sewer system. No existing stormwater management facilities were found on the site.

There are no protected steep slopes on the site; slopes on the property are predominantly between 1.5% and 8%.

The soils on the site are silt loam to loamy sand noted as BouB Boonton Urban Land within hydrologic soil type "C", with a seasonal water table depth exceeding 80" in depth and a moderately low to moderately high infiltration rate of the most restrictive soil layer of 0.06 to 0.20 in/hr (USDA NRCS Soil Survey).

On site soils testing revealed a depth to seasonal high water varying from 5' to 7.5' with an infiltration rate varying from 0.32"/hr to 1.00"/hr.

The vegetation on the site is predominantly well established lawn, with a number of large deciduous trees located predominantly along the exterior boundary of the site with a lesser concentration within the site interior.

A review of the NJ Geoweb site along with a site inspection by the engineer did not reveal any indications of wetlands, springs, seeps, intermittent or perennial streams or waterways or presence of protected species which might impact the development of the site.

FACTORS CONSTRAINING DEVELOPMENT

The on site soils testing consisting of four soil logs determined that the soils to the south of the property have an infiltration rate above 0.5"/hr which is the minimum allowable for stormwater management facilities which are infiltration based systems. The area to the north demonstrated infiltration rates below the minimum allowed for infiltration based systems.

Revision Table:
3) 5-28-26 STORMWATER
2) TOWNSHIP ZONING/ENGINEERING REVIEW 04-13-26
1) UPDATE FOR NEW HOUSE PLAN 01-06-2026
0) INITIAL ISSUE 11-25-2025

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Professional Land Surveyor
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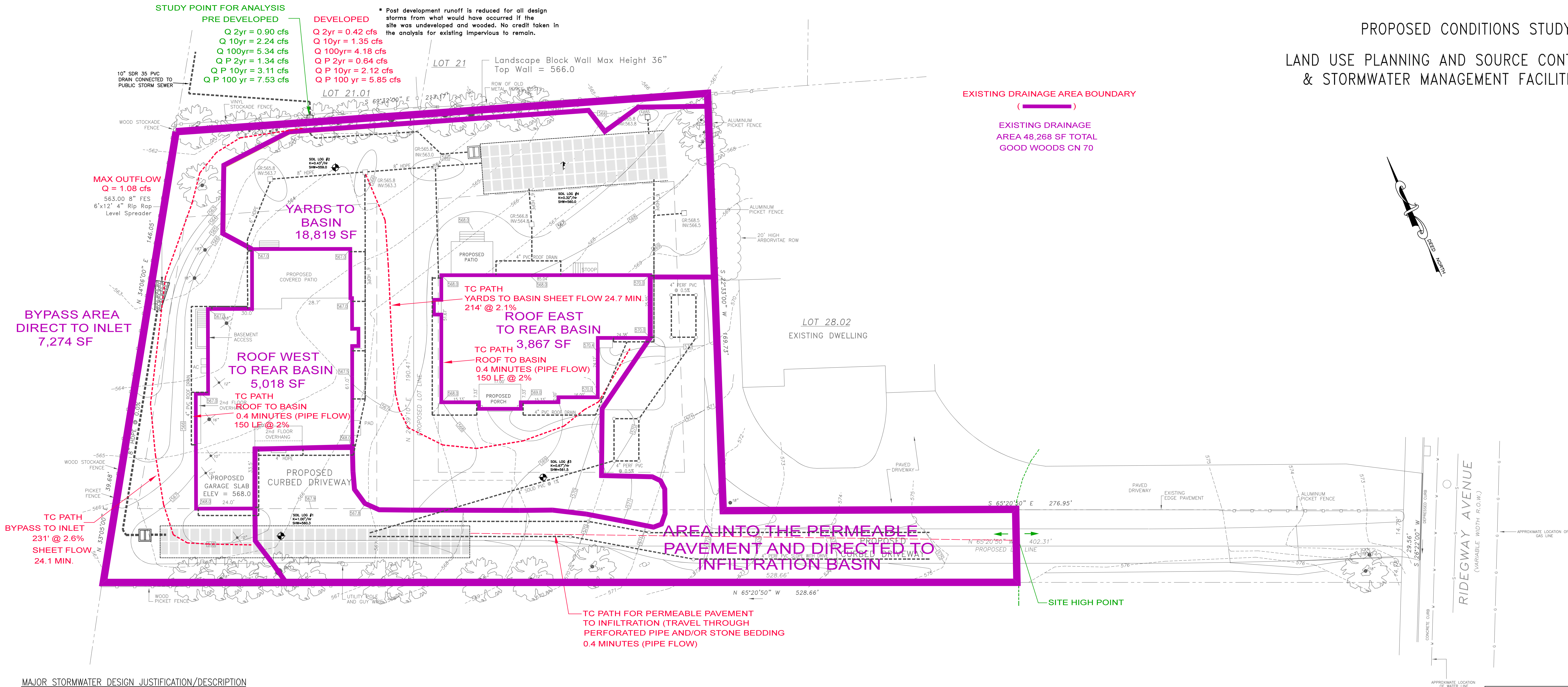
ENGINEERING SURVEYING PLAN
ENSURPLAN INC.
(Certificate of Authorization No. 240427997700)
P.O. BOX 4304, WARREN, N.J. 07059
Tel: 732-469-0400
ensurplan@gmail.com

ENVIRONMENTAL SITE ANALYSIS AND MAP
15 RIDGEWAY AVENUE
LOT 28.01 IN BLOCK 158
(TAX MAP SHEET NO. 91)
SITUATED IN THE
TWP. OF WEST ORANGE, ESSEX COUNTY, NJ

SCALE: 1"=20'	ORDER: E-11156	5
DATE: 11-25-2025	FILE: 29906	7

PROPOSED CONDITIONS STUDY

LAND USE PLANNING AND SOURCE CONTROL PLAN
& STORMWATER MANAGEMENT FACILITIES MAP



MAJOR STORMWATER DESIGN JUSTIFICATION/DESCRIPTION

This report has been prepared to demonstrate that the runoff from the proposed improvements to the site, which result in an increase of impervious coverage, is properly mitigated in accord with the requirements for a NJ DEP major stormwater project, and will pose no negative impact to any surrounding downstream properties.

To ensure that the design complies with the requirements and goals of the Township Stormwater Ordinance a detailed analysis of the site condition was performed. A soils evaluator tested various areas of the site to identify both seasonal high water levels and the ability of the soil to infiltrate runoff. Additionally areas allowing for use of low impact development were identified; including potential preservation of large deciduous trees, lessening the slope of surfaces and elongation of drainage paths. This study focused the design on the area of the site which would allow for use of infiltration.

Two stormwater management basins were designed for the project. The first, known as the "Front Yard Basin", a small scale sub-surface extended infiltration basin (a system allowing for infiltration and controlled release) was chosen as the green infrastructure BMP to provide infiltration and recharge as well as reduction of runoff quantity. The basin is located at the area of the site where the soils evaluation determined an acceptable infiltration rate for design (A factor of safety was applied to the analysis by utilizing 1/2 of the measured infiltration rate in all calculations).

The "Front Yard Basin" works in conjunction with the proposed permeable pavement, another green infrastructure BMP, which is specified for all driveway surfaces. When rainfall from the Water Quality Storm is filtered by passing through the permeable pavement, conveyed to the basin and infiltrated, the system is rated for 80% total suspended solids reduction providing water quality treatment for the site. Runoff from the permeable pavement shall be collected within a stone bed below the pavement. It is proposed to allow runoff to travel through the stone bed (supplemented by a series of perforated pipes) and enter the infiltration basin.

The second basin, known as the "Rear Yard Basin", collects runoff from roof surfaces, lawn areas, sidewalks and patios. As these surfaces are not subject to vehicle traffic provision of water quality treatment for this runoff is not required. The "Rear Yard Basin" is located at an area where the measured infiltration rate is less than 1"/hr, therefore although some infiltration will occur, it is not considered within the routing of the basin.

The basins shall be shared systems, accepting runoff from both lots, therefore easements allowing for common use and maintenance shall be established. Operations and maintenance requirements and responsibilities shall be filed with the record owner deeds.

The analysis shows that the runoff from the developed portion of the site directed towards the stormwater basins when combined with the runoff rate from the portions of the site which bypass the system, has been reduced to no more than 50% of the two year storm rate. 75% of the 10 year storm rate and 80% for the 100 year storm rate from what would have occurred if the design area were an undeveloped wooded lot.

Additionally, provisions for recharge and water quality have been provided and meet the requirements of the NJ DEP. The project also meets the requirements of the Township of West Orange Stormwater Ordinance with the exception of retaining the design "retention storm". The limitations of the sub-soil on the property will not allow for infiltration of this volume, which exceeds the NJ DEP requirements, and a waiver will be required. The proposed improvements provide a reduction in runoff rate from what occurs currently, provides water quality for motor vehicle surfaces where none is currently provided, and maintains 100% of the existing infiltration on the site, justifying the requested waiver.

LAND USE PLANNING DISCUSSION

The total area of land disturbance is 1.10 Acres

In accordance with the goals and standards of Chapter 25-29.3 through 25-29.5 of the West Orange Code this plan has been developed in the following manner.

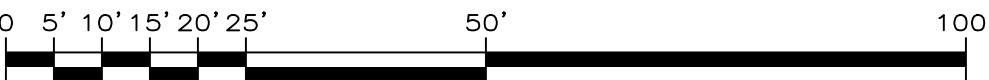
The project construction shall conform to a Soil Erosion and Sediment Control Plan, to be reviewed and approved by the Conservation District.

Green Infrastructure has been implemented into the design through use of permeable pavement systems which collect, store and direct runoff towards an infiltration basin, providing water quality, recharge and volume reduction.

Additionally low impact development measures are implemented throughout the unstudied portion of the project which will lessen the overall stormwater runoff from the site to a greater extent. The measures include; preservation of large deciduous trees along the site perimeter, lessening of slopes in the rear yard of proposed homes and increasing drainage path routes in order to increase time of concentration.

TABLE OF BMP INFORMATION

BMP DESCRIPTION	BOTTOM ELEVATION	S.H.W. ELEVATION	INFILTRATION RATE 1/HR
INFILTRATION BASIN	563.0	560.3	1.00
PERMEABLE PAVEMENT	566.5	560.3/561.0	N/A



GRAPHIC SCALE
1"=20'

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SURVEYING
PLANNING**
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ensurplan@gmail.com

**LAND USE PLANNING AND SOURCE CONTROL
STORMWATER MANAGEMENT FACILITIES MAP
15 RIDGEWAY AVENUE**

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