

## DRAINAGE REPORT Stormwater Mitigation Plan

October 11, 2021

**Property Located at:**

121 Upper Pattagansett Rd.  
East Lyme, CT 06333

**Prepared For:**

Project: Nottingham Hills Subdivision Phase V

English Harbor Asset Management, LLC  
38 Granite Street  
New London, CT 06320

**Prepared By:**

Timothy A. May, P.E.  
May Engineering, LLC  
1297 Rte 163  
Oakdale, CT 03670



## **SITE DESCRIPTION:**

The site is a 64-acre wooded parcel located along the northern shore of Pattagansett Lake. Specifically, the site is located at 121 Upper Pattagansett Rd in the town of East Lyme, CT. The parcel was previously used as a camp for the Girl Scouts of America. The existing site is partially developed with paved/gravel roads and camp buildings. The site is wooded with mature deciduous trees. There are slopes ranging from 3% to 12%. The soil type is primarily a hydraulic soil group B consisting of Canton-Charlton, Hinkley gravel and Charlton-Hollis series. The soil types were evaluated for their permeability and have a moderate to fast infiltration rate. The proposed site development is for 8 residential subdivision parcels, and one parcel to remain as-is.

The drainage areas for the proposed site development is split into two drainage areas labeled Drainage Area A (30.8 ac) and Drainage Area B (13.5 ac)(see drawing titled Drainage Areas). Drainage Area A is a 30.8 ac drainage area where water flows into a wetland settling basin on the north side of Upper Pattagansett Rd, then through a 12" re-enforced concrete culvert, then into Pattagansett Lake. Primarily, the stormwater flows are shallow concentrated flows that flow north to south across Drainage Area A, with limited channel flows for the last 250 ft before the wetland settling basin. There are some instances of intermittent channelized flows along the paved/gravel road, then the flows change back to shallow concentrated flows. Drainage Area B is a 13.5 ac drainage area that is primarily overland flow and water does not typically flow off the property due to topographic features along Upper Pattagansett Rd that contain stormwater on site.

## **RATIONALE FOR DESIGN:**

A drainage analysis is required to evaluate stormwater run-off associated with site development. A site evaluation along with a drainage analysis were conducted for estimating the storm water run-off. The site currently has 18 buildings in total with roofs, along with 45 wooden platform (tents/decks) which have a high run-off coefficient. There are packed gravel roads throughout Drainage Areas A & B, which have a high run-off coefficient. The proposed development for Drainage Area A removes 7 buildings, 10 tent platforms (8,830 sf impervious area) and gravel roads (46,472 sf). For proposed Drainage Area B, 2 buildings, 6 tent platforms (4,750 sf of impervious area) and 13,000 sf of gravel roads are to be removed.

The proposed development for Drainage Area A involves constructing 3 residential building lots and Drainage Area B involves constructing 5 residential lots, each with a 2,400 sf (roof area) home. Each home's roof drains are piped to a rain garden sized for 1" water quality volume. The paved driveways are sloped to drain down gradient through check dams to slow velocities, then into the woods.

The stormwater drainage analysis will compare the existing developed land to the proposed developed parcels which have the proposed buildings added and the old structures removed. Limits of clearing calculated for the proposed parcels will factor the change from wooded area to lawn area. Also, the extensive gravel drives and parking areas once removed will be seeded with grass to change the semi impervious area to a more pervious area. The rain gardens are very effective at retaining storm water from impervious areas and infiltrating large quantities of the roof stormwater run-off. This reduction in run-off leads to overall reduction in the amount of storm water and these BMPs increase water quality for water that flows into Pattagansett Lake.

**METHODOLOGY AND RESULTS**

**Drainage Analysis.** The SCS TR-20 drainage analysis method is used to determine the storm water runoff flow amounts. The storm frequency values used for the calculations herein include the 2-year, 5-year 10-year, 25-year, 50-year and 100-year storm rainfall event. The storm water model software used for this analysis is HydroCAD® 10.00-22 in which the SCS TR-20 method was used.

The following are the tabulated results for existing and proposed storm events:

**Drainage Area A**

<b>Events for Subcatchment A - existing: 30.8 AC</b>				
Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	4.34	0.972	0.38
5-year	4.20	9.34	1.791	0.70
10 year	4.80	13.94	2.516	0.98
25 year	5.70	21.78	3.745	1.46
50-year	6.35	28.00	4.719	1.84
100 year	<b>7.10</b>	<b>35.62</b>	<b>5.919</b>	<b>2.31</b>

<b>Events for Subcatchment A - Proposed: 30.8 AC</b>				
Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	2.82	0.728	0.28
5-year	4.20	6.92	1.439	0.56
10 year	4.80	10.93	2.084	0.81
25 year	5.70	18.03	3.200	1.25
50-year	6.35	23.76	4.098	1.60
100 year	<b>7.10</b>	<b>30.88</b>	<b>5.214</b>	<b>2.03</b>

**Stormwater Reduction for Drainage Area A**

- Q<sub>2</sub>** Peak Flows 35% - Volume 25%
- Q<sub>10</sub>** Peak Flows 21% - Volume 20%
- Q<sub>100</sub>** Peak Flows 13% - Volume 11%

**Drainage Area B**

<b>Events for Subcatchment B - existing: 13.5 AC</b>				
Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	3.55	0.596	0.53
5 year	4.30	7.15	1.080	0.96
10 year	4.80	9.45	1.387	1.23
25 year	5.70	13.97	1.992	1.77
50 year	6.30	17.19	2.427	2.16
100 year	<b>7.10</b>	<b>21.68</b>	<b>3.039</b>	<b>2.70</b>

<b>Events for Subcatchment B - Proposed: 13.5 AC</b>				
Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	2.54	0.470	0.42
5 year	4.30	5.67	0.900	0.80
10 year	4.80	7.75	1.178	1.05
25 year	5.70	11.94	1.736	1.54
50 year	6.30	14.97	2.142	1.90
100 year	<b>7.10</b>	<b>19.23</b>	<b>2.717</b>	<b>2.42</b>

**Stormwater Reduction for Drainage Area B**

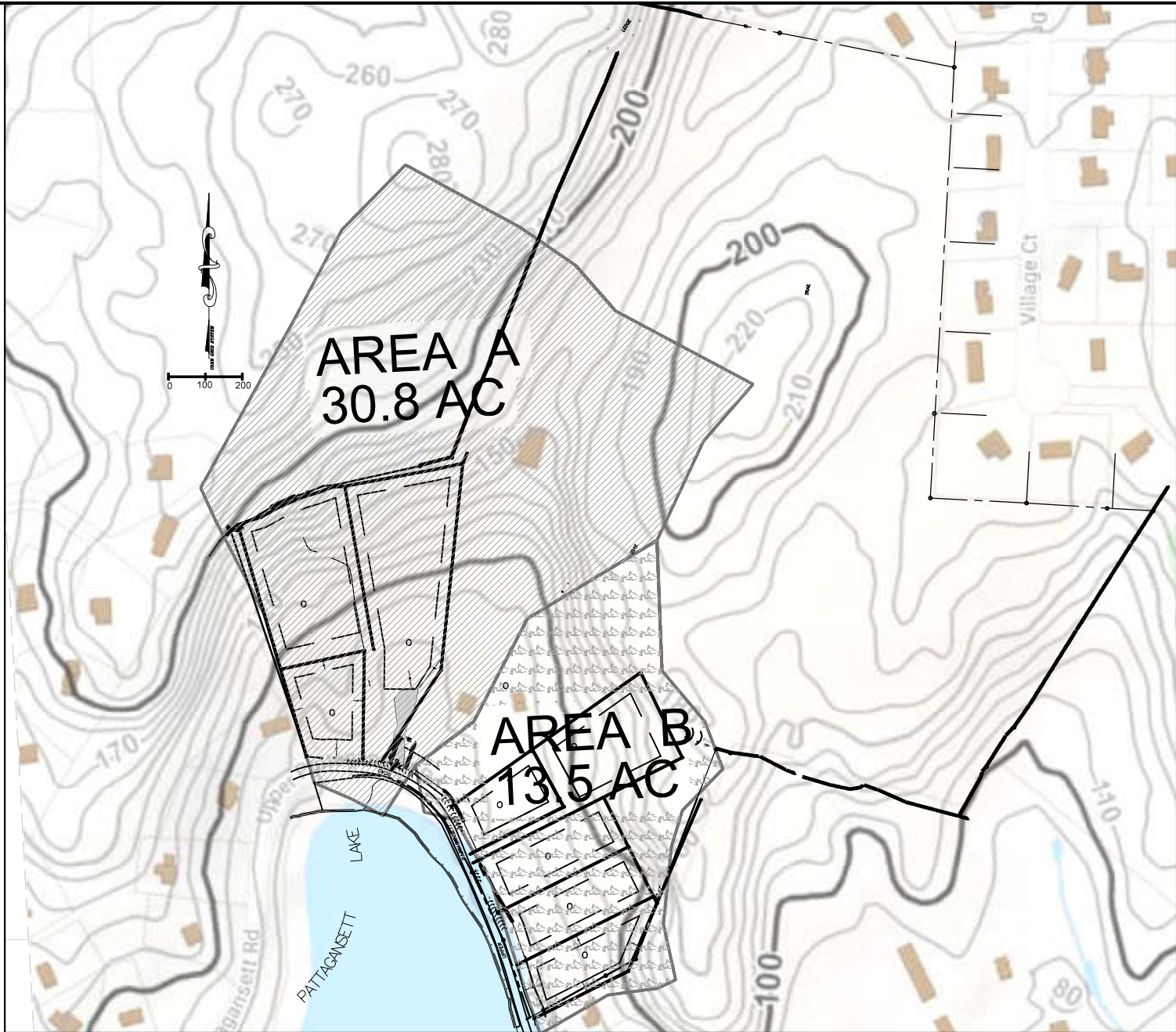
**Q<sub>2</sub>** Peak Flows 28% - Volume 21%

**Q<sub>10</sub>** Peak Flows 21% - Volume 16%

**Q<sub>100</sub>** Peak Flows 11% - Volume 11%

**SUMMARY**

The proposed Nottingham Hills Subdivision Phase V development plan results in a significant reduction of both storm water peak flows and volumes for Drainage Areas A and B. The plan of development for the 8 residential homes introduces storm water BMPs such as rain gardens and check dams along driveways. Removal of impervious areas such as buildings and tent platforms, along with gravel roads and parking areas, will increase the water quality significantly.



**May Engineering LLC**

Civil Engineering and Site Planning  
 1297 RT 163 Oakdale, CT 06370  
 860 884-9671

Project  
 Nottingham Hills Subdivision Phase V  
 121 Upper Pattagansett Rd.  
 East Lyme, CT. 06333

**DRAINAGE AREAS**

SCALE: 1"=400' & as noted

DATE: 16 AUG 2021

JOB NUMBER	SHEET
	1 of 1

DESCRIPTION:

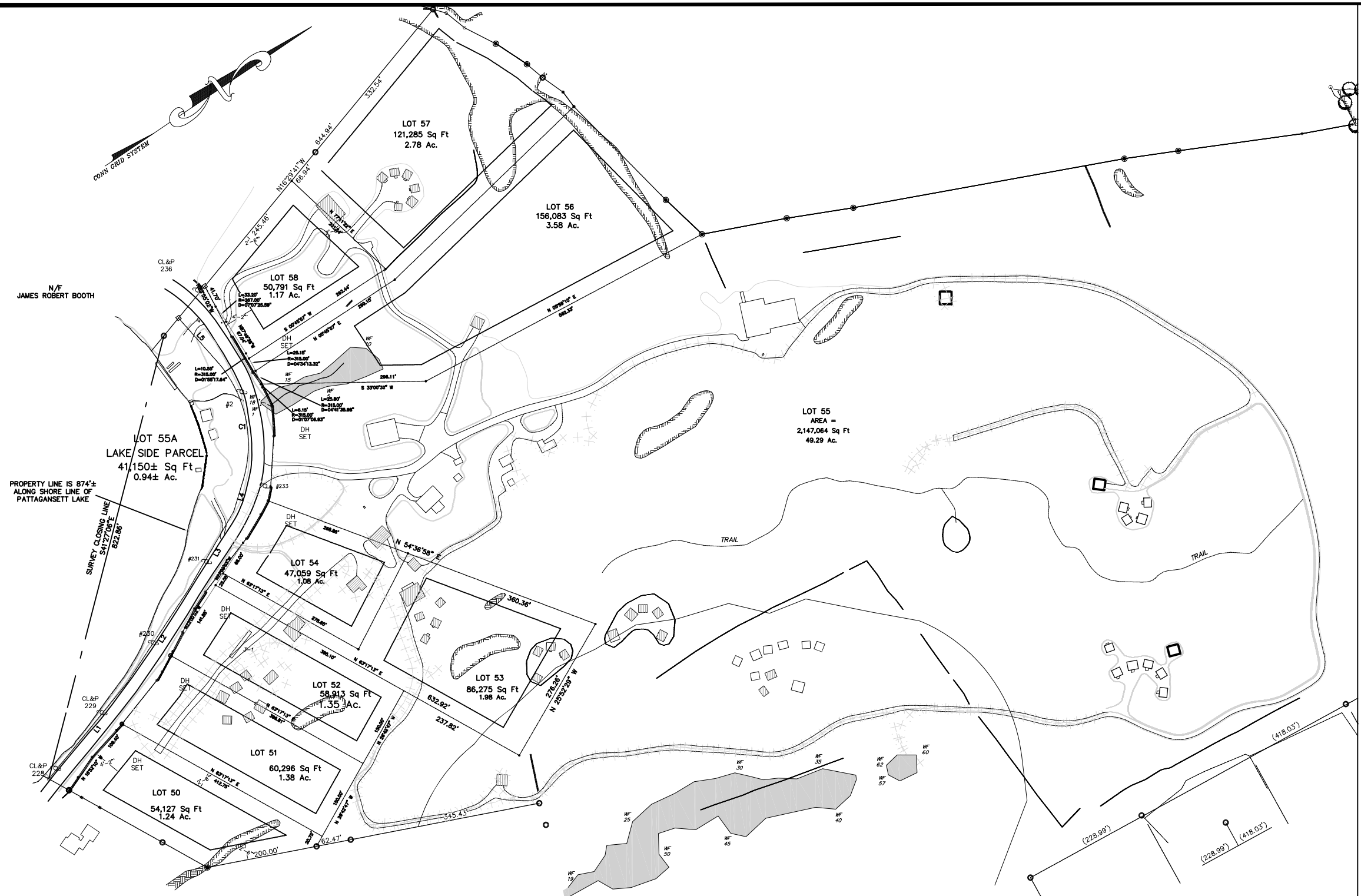
**Existing Buildings Impervious Areas & Gravel Roads**

Drainage Area A - 30.8 ac -(Parcels 56, 57 & 58)	
2 Building to be removed roof area	1,750 sf
6 Deck/Tent Platforms to be removed	<u>3,000 sf</u>
Impervious Area	<u>4,750 sf</u>
Gravel Roads to be removed	13,000 sf
Buildings to remain Parcel 55	
7 building Roof Area	9,654 sf
19 Deck/Tent Platforms Area	4,550 sf

**Drainage Area B 13.5 ac -(Parcels 50, 51, 52, 53, & 54)**

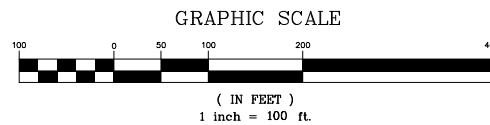
7 Building to be removed roof area	3,681 sf
10 Deck/Tent Platforms to be removed	<u>5,144 sf</u>
Impervious Area	<u>8,830 sf</u>
Gravel Road area to be removed	46,472 sf

**NOTE Shaded Building are planned to be removed**



**LEGEND**

STONE WALL	
PROPERTY LINE	
STREET LINE	
DRILL HOLE SET	• DH SET
DRILL HOLE FOUND	⊙ DH FND
MONUMENT FOUND	⊠ MON FND
IRON PIPE FOUND	○ IP FND
EDGE OF WETLANDS & FLAG	
UTILITY POLE	
EXPOSED LEDGE	



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**Plan of Subdivision Showing Existing Buildings and Roads**

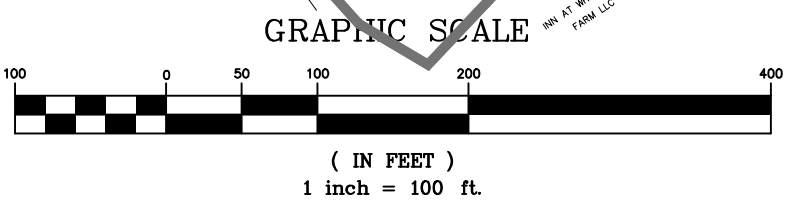
SCALE: as noted

DATE: 11 October 2021

JOB NUMBER	SHEET
	1 of 1

**Project**  
 Nottingham Hills Subdivision Phase V  
 121 Upper Pattagansett Rd.  
 East Lyme, CT. 06333

DESCRIPTION:



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**PROPOSED BUILDING**  
 SCALE: as noted  
 DATE: 10 OCT 2021

DESCRIPTION: Building Lot Development and Grading  
 Rain Garden Location and Drainage

JOB NUMBER	SHEET
	1 of 1

Soil Map—State of Connecticut  
(121 Upper Pattagansett Rd East Lyme CT )





## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut

Survey Area Data: Version 20, Jun 9, 2020

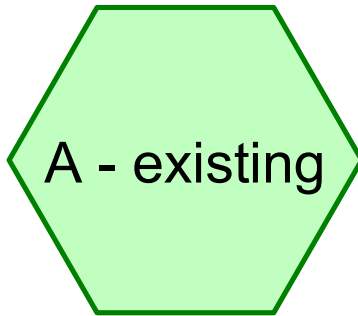
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 2019

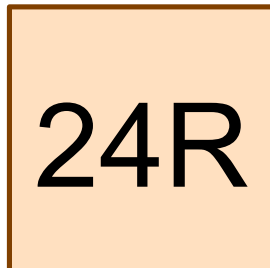
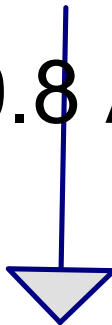
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

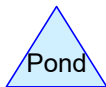
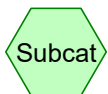
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Raypol silt loam	2.5	1.3%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	3.6	2.0%
38C	Hinckley loamy sand, 3 to 15 percent slopes	6.6	3.6%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	0.0	0.0%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	1.2	0.6%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	18.1	9.9%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	0.2	0.1%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	51.6	28.2%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	36.5	20.0%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	24.9	13.6%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	29.5	16.2%
76E	Rock outcrop-Hollis complex, 3 to 45 percent slopes	3.8	2.1%
86D	Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony	1.2	0.6%
701B	Ninigret fine sandy loam, 3 to 8 percent slopes	0.1	0.0%
W	Water	3.2	1.7%
<b>Totals for Area of Interest</b>		<b>182.8</b>	<b>100.0%</b>



30.8 AC



Outfall from Area A



**Summary for Subcatchment A - Proposed: 30.8 AC**

Runoff = 30.88 cfs @ 12.85 hrs, Volume= 5.214 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 year Rainfall=7.10"

Area (ac)	CN	Description
* 0.576	98	Paved parking Driveways, HSG B
* 0.173	30	Rain Garden, HSG B
* 5.624	58	Lawn, HSG B
24.430	55	Woods, Good, HSG B
30.803	56	Weighted Average
30.227		98.13% Pervious Area
0.576		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	40	0.0100	0.03		<b>Sheet Flow, sheet flow upper</b> Woods: Dense underbrush n= 0.800 P2= 3.35"
12.9	1,650	0.1810	2.13		<b>Shallow Concentrated Flow, sloped woodland</b> Woodland Kv= 5.0 fps
9.7	400	0.0750	0.68		<b>Shallow Concentrated Flow, woodland gental slope</b> Forest w/Heavy Litter Kv= 2.5 fps
12.5	348	0.0086	0.46		<b>Shallow Concentrated Flow, level ground</b> Woodland Kv= 5.0 fps
58.3	2,438	Total			

**Events for Subcatchment A - existing: 30.8 AC**

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	4.34	0.972	0.38
5-year	4.20	9.34	1.791	0.70
10 year	4.80	13.94	2.516	0.98
25 year	5.70	21.78	3.745	1.46
50-year	6.35	28.00	4.719	1.84
100 year	<b>7.10</b>	<b>35.62</b>	<b>5.919</b>	<b>2.31</b>

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A - existing: 30.8 AC** Runoff Area=30.800 ac 1.72% Impervious Runoff Depth>2.31"  
Flow Length=2,438' Tc=58.3 min CN=59 Runoff=35.62 cfs 5.919 af

**Reach 24R: Outfall from Area A** Inflow=35.62 cfs 5.919 af  
Outflow=35.62 cfs 5.919 af

**Total Runoff Area = 30.800 ac Runoff Volume = 5.919 af Average Runoff Depth = 2.31"**  
**98.28% Pervious = 30.271 ac 1.72% Impervious = 0.529 ac**

**Area A Existing Nottingham Hills Subdivision Phase V**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
4.591	67	Brush, Poor, HSG B (A - existing)
1.870	85	Gravel roads, HSG B (A - existing)
0.529	98	Roofs, HSG B (A - existing)
23.810	55	Woods, Good, HSG B (A - existing)
<b>30.800</b>	<b>59</b>	<b>TOTAL AREA</b>

**Area A Existing Nottingham Hills Subdivision Phase V**

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
30.800	HSG B	A - existing
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>30.800</b>		<b>TOTAL AREA</b>



**Area A Existing Nottingham Hills Subdivision Phase V**

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	4.591	0.000	0.000	0.000	4.591	Brush, Poor	A - existing
0.000	1.870	0.000	0.000	0.000	1.870	Gravel roads	A - existing
0.000	0.529	0.000	0.000	0.000	0.529	Roofs	A - existing
0.000	23.810	0.000	0.000	0.000	23.810	Woods, Good	A - existing
<b>0.000</b>	<b>30.800</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>30.800</b>	<b>TOTAL AREA</b>	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall from Area A**

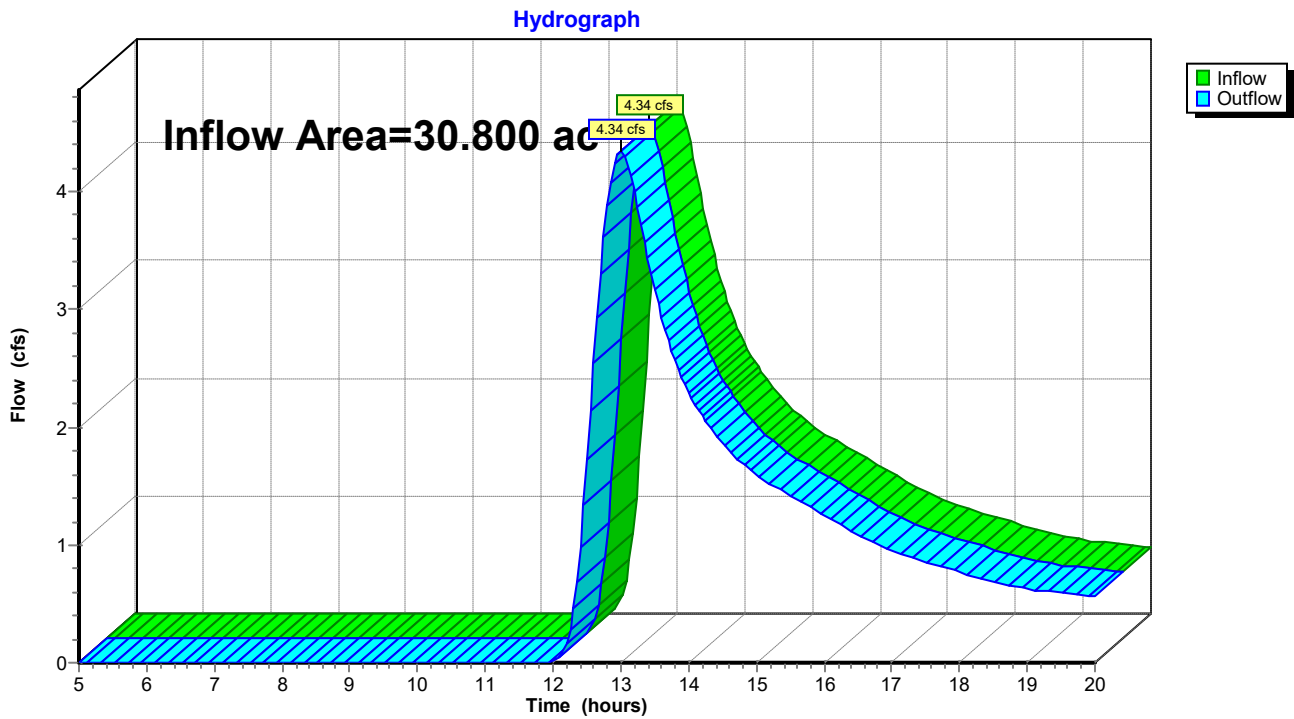
Inflow=4.34 cfs 0.972 af  
Outflow=4.34 cfs 0.972 af

### Summary for Reach 24R: Outfall from Area A

Inflow Area = 30.800 ac, 1.72% Impervious, Inflow Depth > 0.38" for 2-year event  
Inflow = 4.34 cfs @ 13.00 hrs, Volume= 0.972 af  
Outflow = 4.34 cfs @ 13.00 hrs, Volume= 0.972 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall from Area A



**Area A Existing Nottingham Hills Subdivision Phase V** *Type III 24-hr 5-year Rainfall=4.20"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall from Area A**

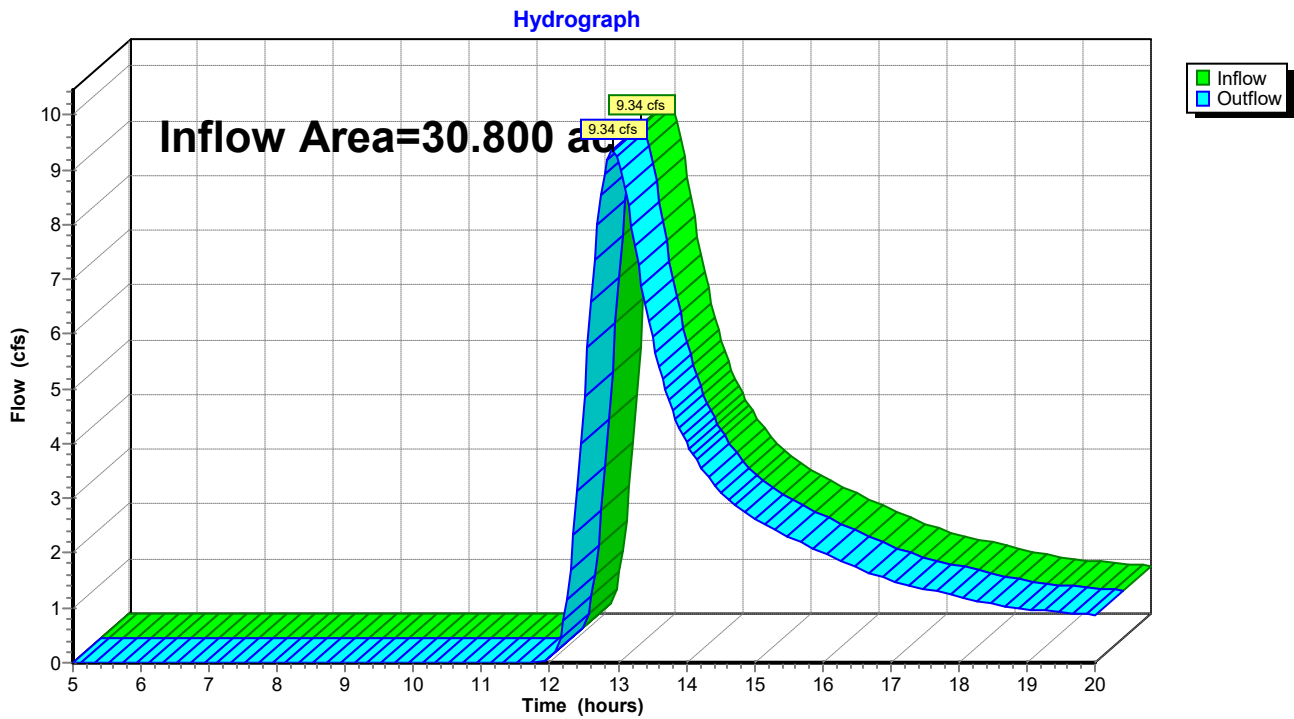
Inflow=9.34 cfs 1.791 af  
Outflow=9.34 cfs 1.791 af

### Summary for Reach 24R: Outfall from Area A

Inflow Area = 30.800 ac, 1.72% Impervious, Inflow Depth > 0.70" for 5-year event  
Inflow = 9.34 cfs @ 12.92 hrs, Volume= 1.791 af  
Outflow = 9.34 cfs @ 12.92 hrs, Volume= 1.791 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall from Area A



**Area A Existing Nottingham Hills Subdivision Phase** *Type III 24-hr 10 year Rainfall=4.80"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall from Area A**

Inflow=13.94 cfs 2.516 af

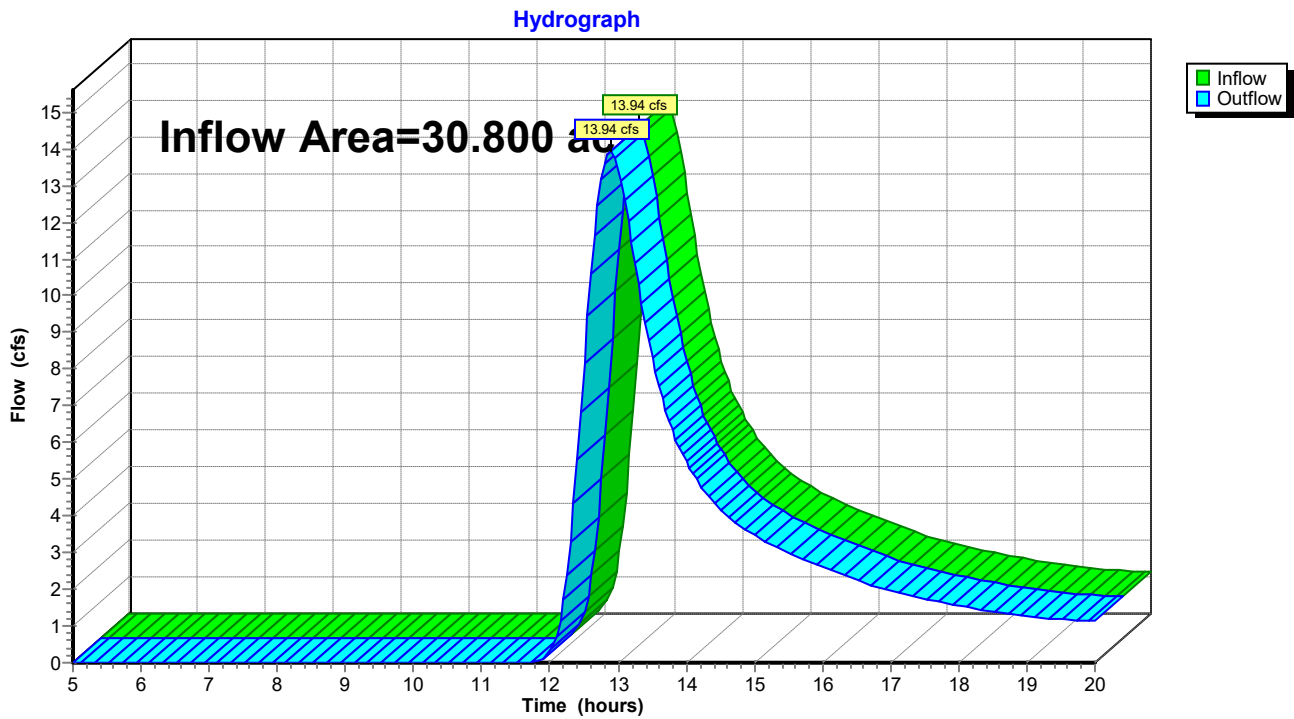
Outflow=13.94 cfs 2.516 af

### Summary for Reach 24R: Outfall from Area A

Inflow Area = 30.800 ac, 1.72% Impervious, Inflow Depth > 0.98" for 10 year event  
 Inflow = 13.94 cfs @ 12.90 hrs, Volume= 2.516 af  
 Outflow = 13.94 cfs @ 12.90 hrs, Volume= 2.516 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall from Area A



**Area A Existing Nottingham Hills Subdivision Phase** *Type III 24-hr 25 year Rainfall=5.70"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall from Area A**

Inflow=21.78 cfs 3.745 af

Outflow=21.78 cfs 3.745 af

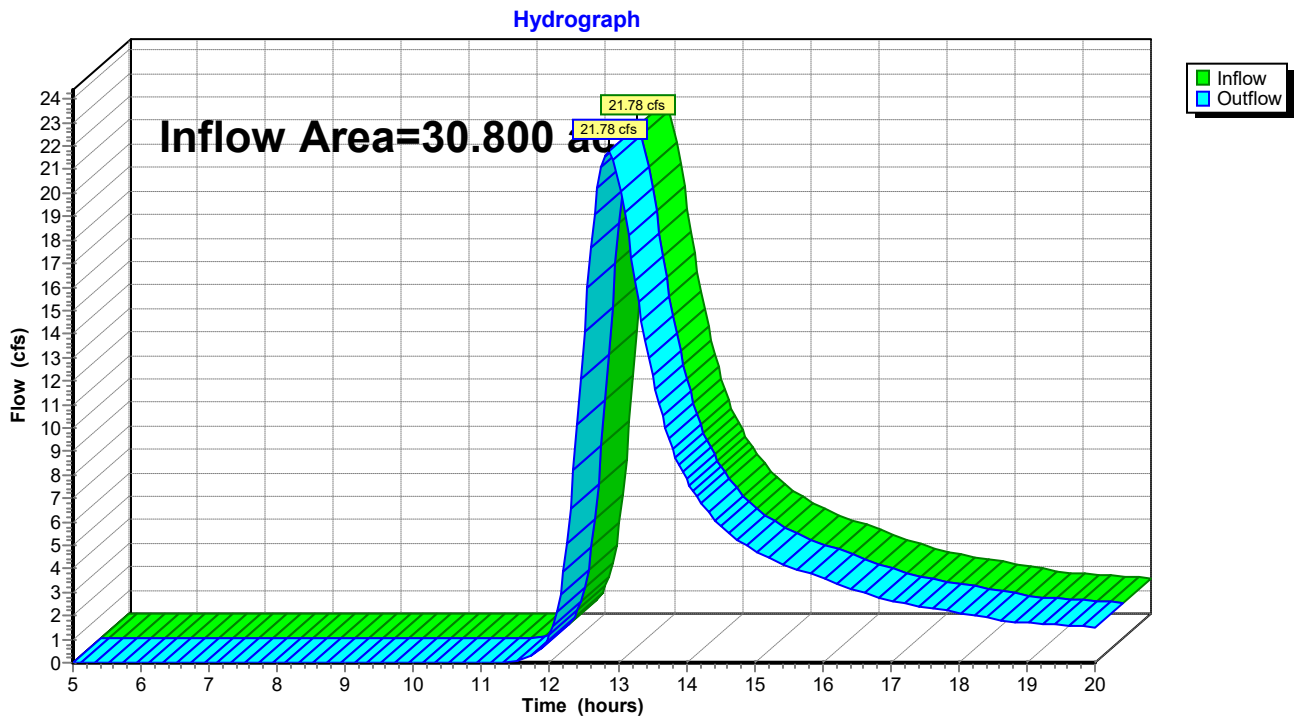


### Summary for Reach 24R: Outfall from Area A

Inflow Area = 30.800 ac, 1.72% Impervious, Inflow Depth > 1.46" for 25 year event  
 Inflow = 21.78 cfs @ 12.87 hrs, Volume= 3.745 af  
 Outflow = 21.78 cfs @ 12.87 hrs, Volume= 3.745 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall from Area A



**Area A Existing Nottingham Hills Subdivision Phase** *Type III 24-hr 50-year Rainfall=6.35"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall from Area A**

Inflow=28.00 cfs 4.719 af

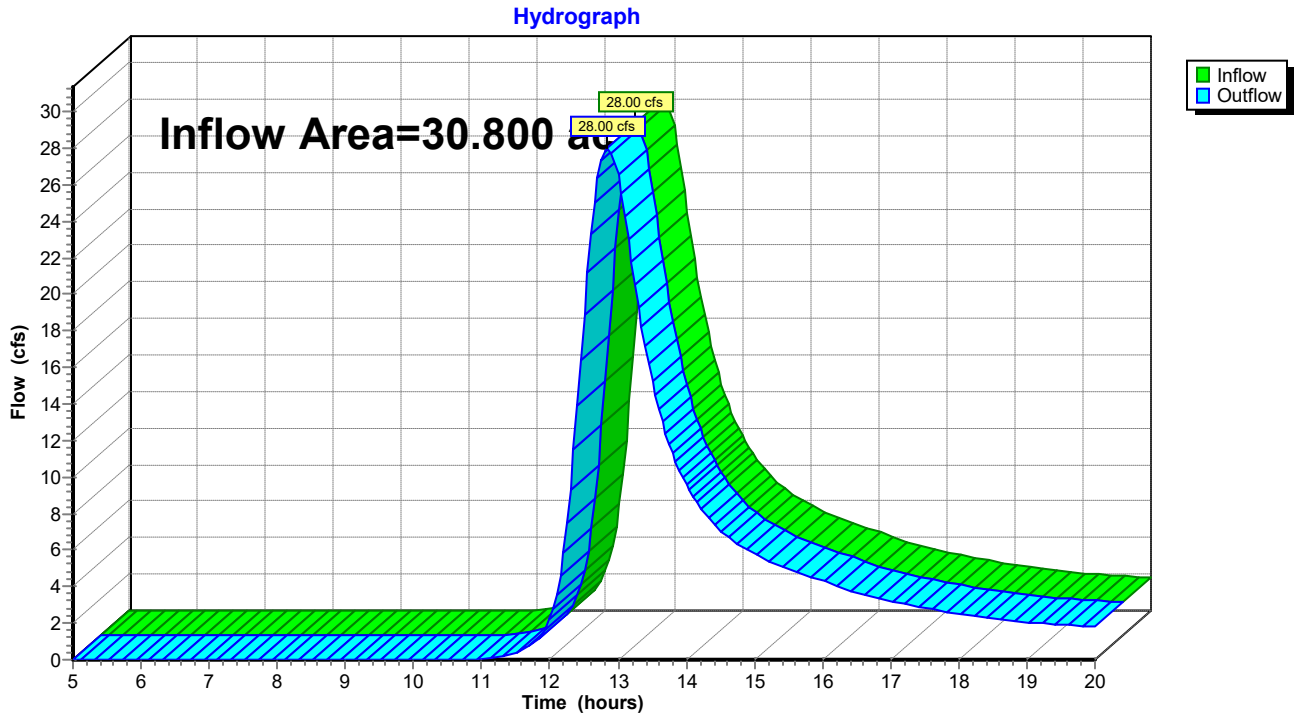
Outflow=28.00 cfs 4.719 af

### Summary for Reach 24R: Outfall from Area A

Inflow Area = 30.800 ac, 1.72% Impervious, Inflow Depth > 1.84" for 50-year event  
Inflow = 28.00 cfs @ 12.85 hrs, Volume= 4.719 af  
Outflow = 28.00 cfs @ 12.85 hrs, Volume= 4.719 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall from Area A



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall from Area A**

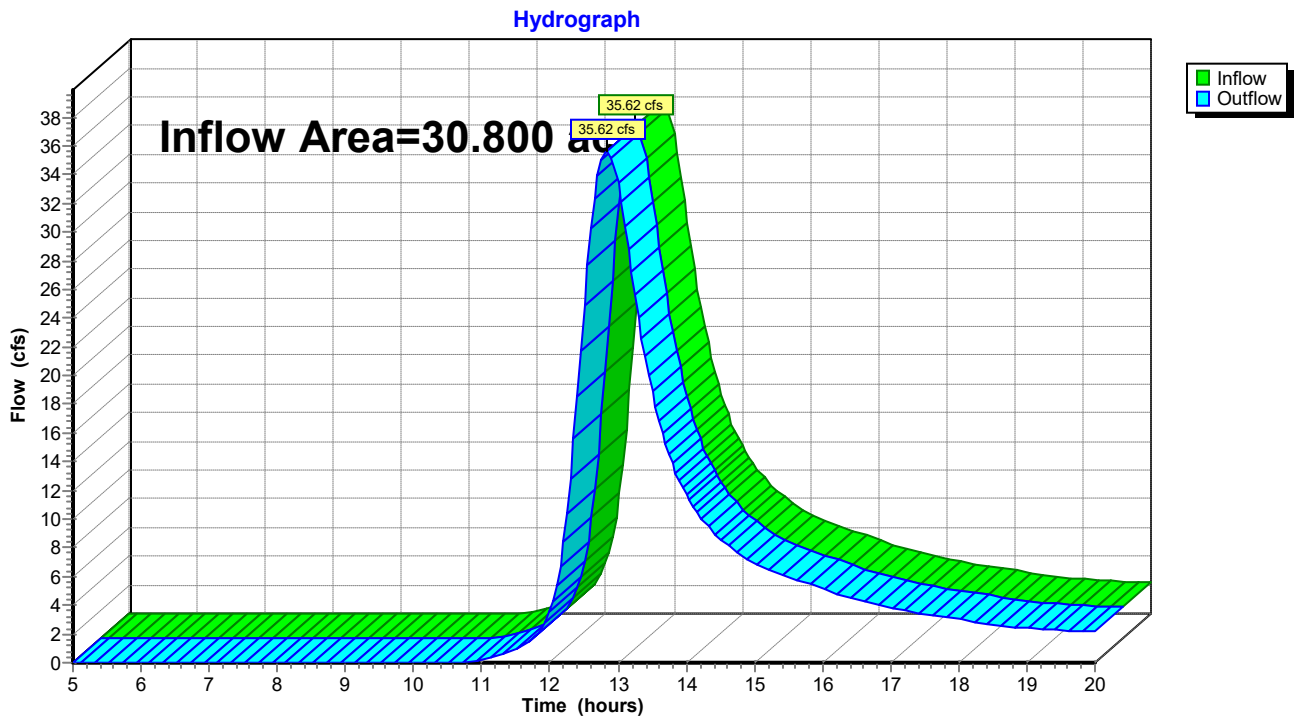
Inflow=35.62 cfs 5.919 af  
Outflow=35.62 cfs 5.919 af

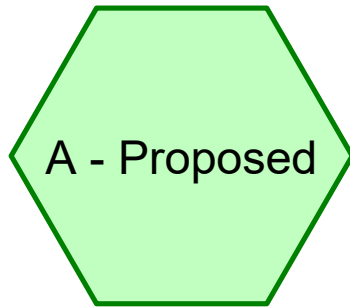
### Summary for Reach 24R: Outfall from Area A

Inflow Area = 30.800 ac, 1.72% Impervious, Inflow Depth > 2.31" for 100 year event  
Inflow = 35.62 cfs @ 12.84 hrs, Volume= 5.919 af  
Outflow = 35.62 cfs @ 12.84 hrs, Volume= 5.919 af, Atten= 0%, Lag= 0.0 min

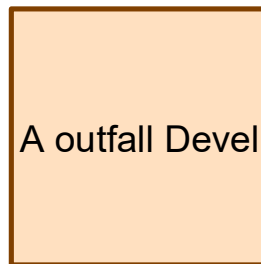
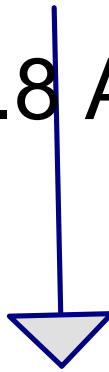
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall from Area A

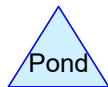
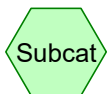




30.8 AC



## Outfall from Area A



**Summary for Subcatchment A - Proposed: 30.8 AC**

Runoff = 30.88 cfs @ 12.85 hrs, Volume= 5.214 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 year Rainfall=7.10"

Area (ac)	CN	Description
* 0.576	98	Paved parking Driveways, HSG B
* 0.173	30	Rain Garden, HSG B
* 5.624	58	Lawn, HSG B
24.430	55	Woods, Good, HSG B
30.803	56	Weighted Average
30.227		98.13% Pervious Area
0.576		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	40	0.0100	0.03		<b>Sheet Flow, sheet flow upper</b> Woods: Dense underbrush n= 0.800 P2= 3.35"
12.9	1,650	0.1810	2.13		<b>Shallow Concentrated Flow, sloped woodland</b> Woodland Kv= 5.0 fps
9.7	400	0.0750	0.68		<b>Shallow Concentrated Flow, woodland gental slope</b> Forest w/Heavy Litter Kv= 2.5 fps
12.5	348	0.0086	0.46		<b>Shallow Concentrated Flow, level ground</b> Woodland Kv= 5.0 fps
58.3	2,438	Total			

**Events for Subcatchment A - Proposed: 30.8 AC**

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	2.82	0.728	0.28
5-year	4.20	6.92	1.439	0.56
10 year	4.80	10.93	2.084	0.81
25 year	5.70	18.03	3.200	1.25
50-year	6.35	23.76	4.098	1.60
100 year	<b>7.10</b>	<b>30.88</b>	<b>5.214</b>	<b>2.03</b>



**Area A Proposed Nottingham Hills Subdivision Pha** Type III 24-hr 100 year Rainfall=7.10"  
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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A - Proposed: 30.8 AC** Runoff Area=30.803 ac 1.87% Impervious Runoff Depth>2.03"  
Flow Length=2,438' Tc=58.3 min CN=56 Runoff=30.88 cfs 5.214 af

**Reach A outfall Devel: Outfall from Area A** Inflow=30.88 cfs 5.214 af  
Outflow=30.88 cfs 5.214 af

**Total Runoff Area = 30.803 ac Runoff Volume = 5.214 af Average Runoff Depth = 2.03"**  
**98.13% Pervious = 30.227 ac 1.87% Impervious = 0.576 ac**

**Area A Proposed Nottingham Hills Subdivision Phase V**Prepared by May Engineering, LLC Timothy May, PE  
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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
5.624	58	Lawn, HSG B (A - Proposed)
0.576	98	Paved parking Driveways, HSG B (A - Proposed)
0.173	30	Rain Garden, HSG B (A - Proposed)
24.430	55	Woods, Good, HSG B (A - Proposed)
<b>30.803</b>	<b>56</b>	<b>TOTAL AREA</b>

**Area A Proposed Nottingham Hills Subdivision Phase V**

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
30.803	HSG B	A - Proposed
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>30.803</b>		<b>TOTAL AREA</b>

**Area A Proposed Nottingham Hills Subdivision Phase V**

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	5.624	0.000	0.000	0.000	5.624	Lawn	A - Propose d
0.000	0.576	0.000	0.000	0.000	0.576	Paved parking Driveways	A - Propose d
0.000	0.173	0.000	0.000	0.000	0.173	Rain Garden	A - Propose d
0.000	24.430	0.000	0.000	0.000	24.430	Woods, Good	A - Propose d
<b>0.000</b>	<b>30.803</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>30.803</b>	<b>TOTAL AREA</b>	

**Area A Proposed Nottingham Hills Subdivision Phase** *Type III 24-hr 2-year Rainfall=3.40"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach A outfall Devel: Outfall from Area A**

Inflow=2.82 cfs 0.728 af

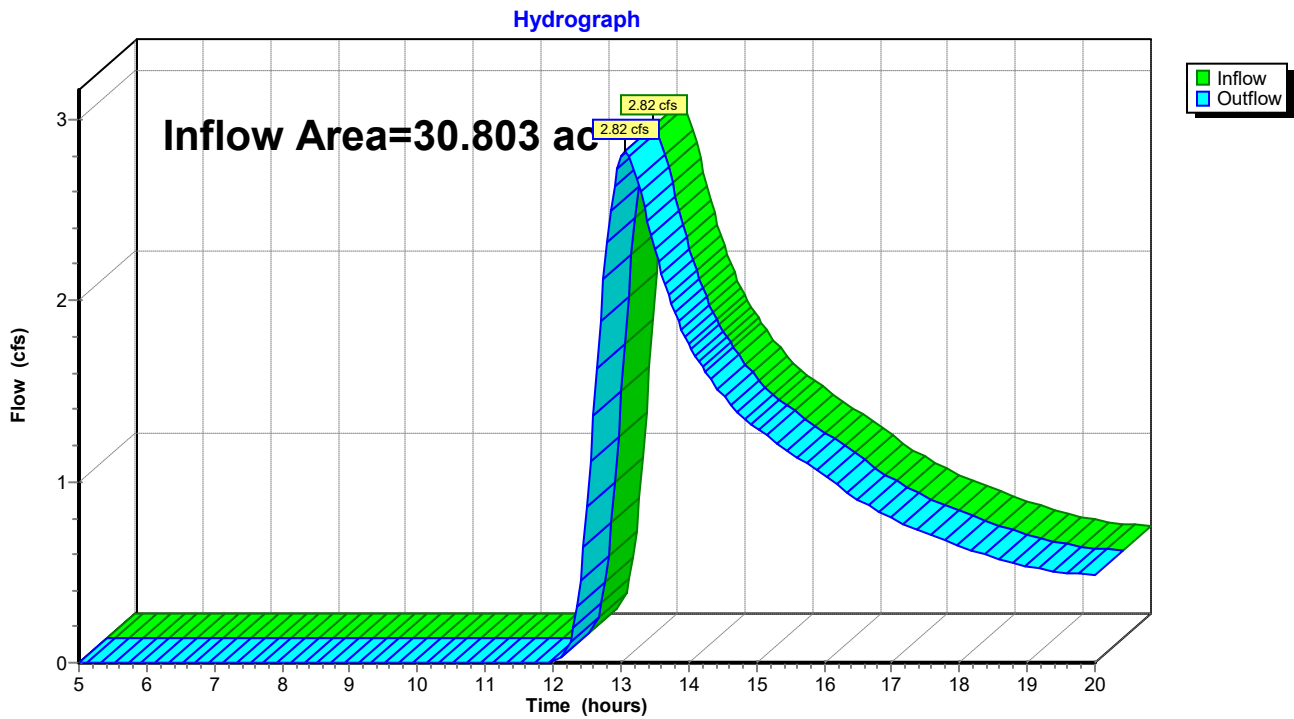
Outflow=2.82 cfs 0.728 af

**Summary for Reach A outfall Level: Outfall from Area A**

Inflow Area = 30.803 ac, 1.87% Impervious, Inflow Depth > 0.28" for 2-year event  
 Inflow = 2.82 cfs @ 13.07 hrs, Volume= 0.728 af  
 Outflow = 2.82 cfs @ 13.07 hrs, Volume= 0.728 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach A outfall Level: Outfall from Area A**



**Area A Proposed Nottingham Hills Subdivision Phase** *Type III 24-hr 5-year Rainfall=4.20"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach A outfall Devel: Outfall from Area A**

Inflow=6.92 cfs 1.439 af

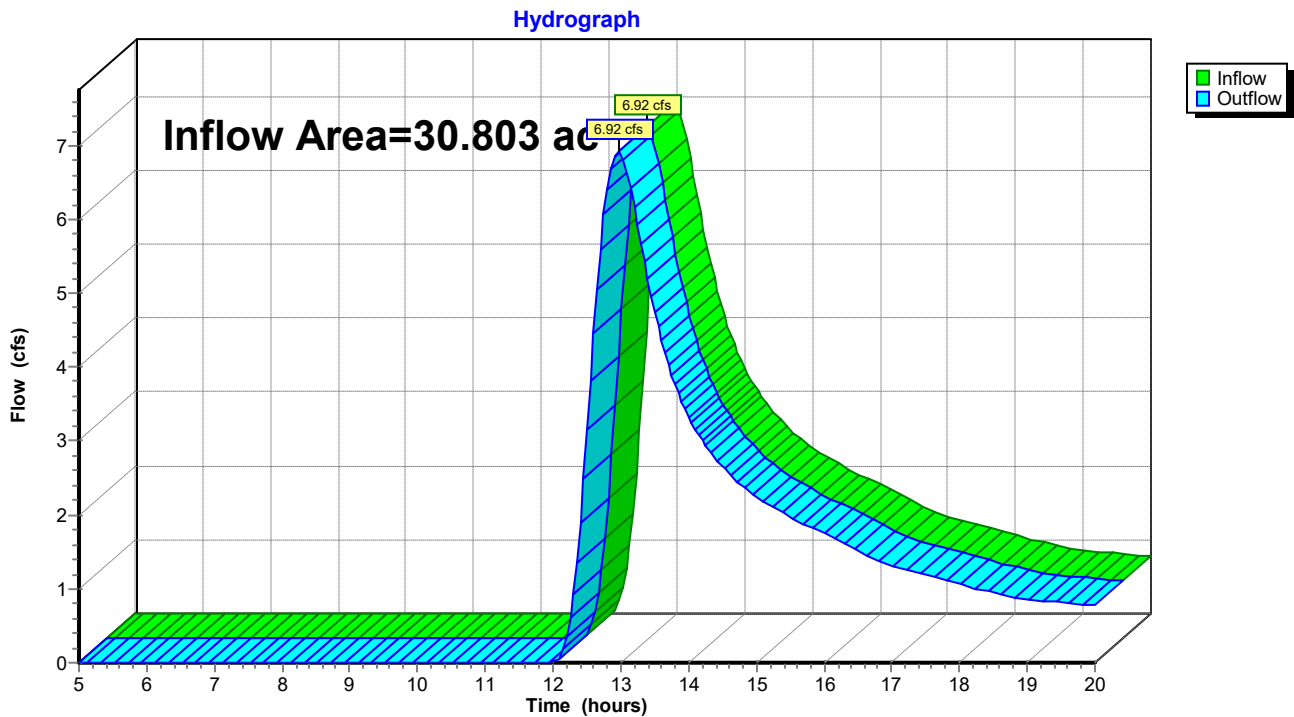
Outflow=6.92 cfs 1.439 af

### Summary for Reach A outfall Level: Outfall from Area A

Inflow Area = 30.803 ac, 1.87% Impervious, Inflow Depth > 0.56" for 5-year event  
Inflow = 6.92 cfs @ 12.97 hrs, Volume= 1.439 af  
Outflow = 6.92 cfs @ 12.97 hrs, Volume= 1.439 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach A outfall Level: Outfall from Area A





Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach A outfall Devel: Outfall from Area A**

Inflow=10.93 cfs 2.084 af

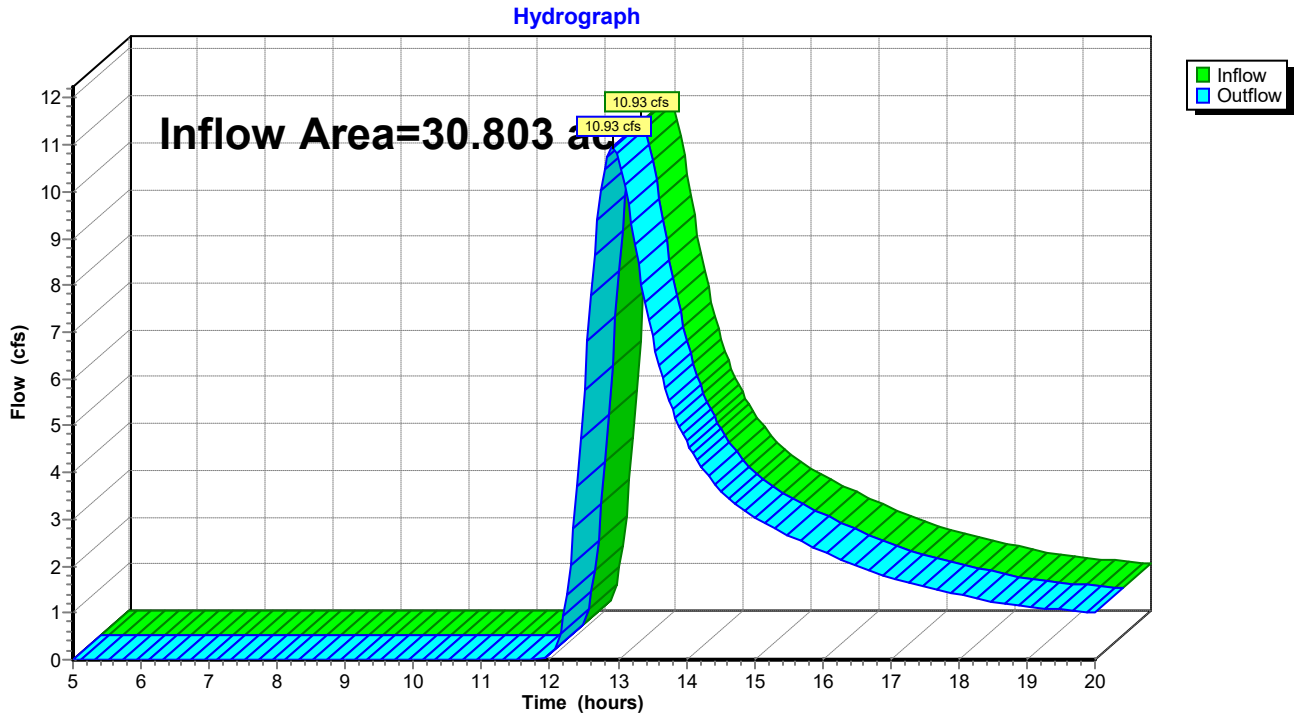
Outflow=10.93 cfs 2.084 af

**Summary for Reach A outfall Level: Outfall from Area A**

Inflow Area = 30.803 ac, 1.87% Impervious, Inflow Depth > 0.81" for 10 year event  
 Inflow = 10.93 cfs @ 12.92 hrs, Volume= 2.084 af  
 Outflow = 10.93 cfs @ 12.92 hrs, Volume= 2.084 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach A outfall Level: Outfall from Area A**



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach A outfall Devel: Outfall from Area A**

Inflow=18.03 cfs 3.200 af

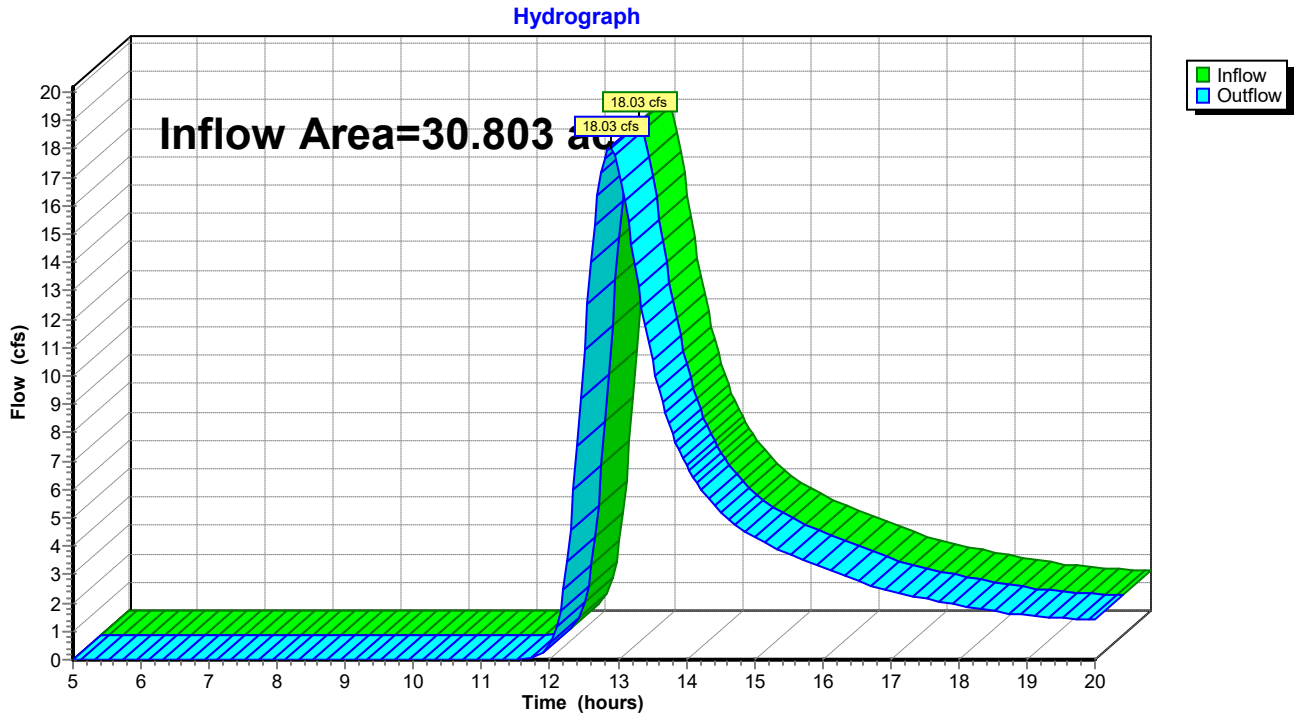
Outflow=18.03 cfs 3.200 af

### Summary for Reach A outfall Level: Outfall from Area A

Inflow Area = 30.803 ac, 1.87% Impervious, Inflow Depth > 1.25" for 25 year event  
 Inflow = 18.03 cfs @ 12.89 hrs, Volume= 3.200 af  
 Outflow = 18.03 cfs @ 12.89 hrs, Volume= 3.200 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach A outfall Level: Outfall from Area A



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach A outfall Devel: Outfall from Area A**

Inflow=23.76 cfs 4.098 af

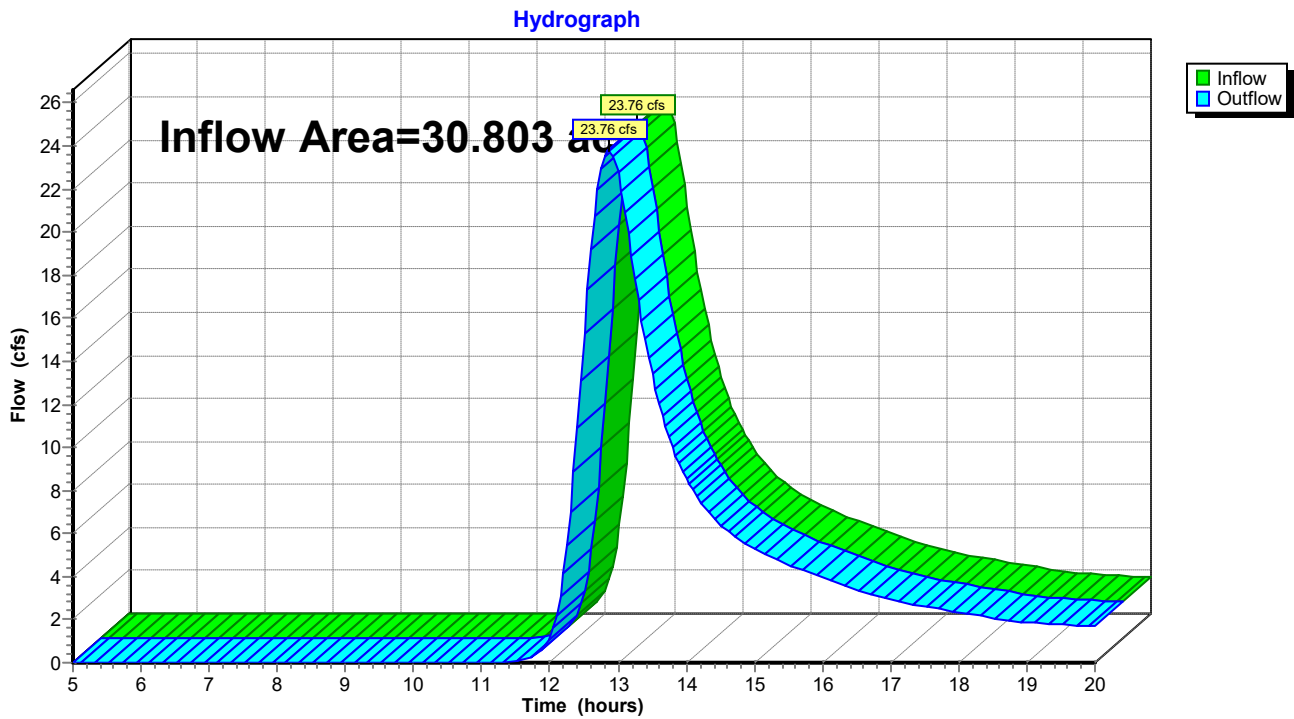
Outflow=23.76 cfs 4.098 af

**Summary for Reach A outfall Level: Outfall from Area A**

Inflow Area = 30.803 ac, 1.87% Impervious, Inflow Depth > 1.60" for 50-year event  
 Inflow = 23.76 cfs @ 12.87 hrs, Volume= 4.098 af  
 Outflow = 23.76 cfs @ 12.87 hrs, Volume= 4.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach A outfall Level: Outfall from Area A**



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach A outfall Devel: Outfall from Area A**

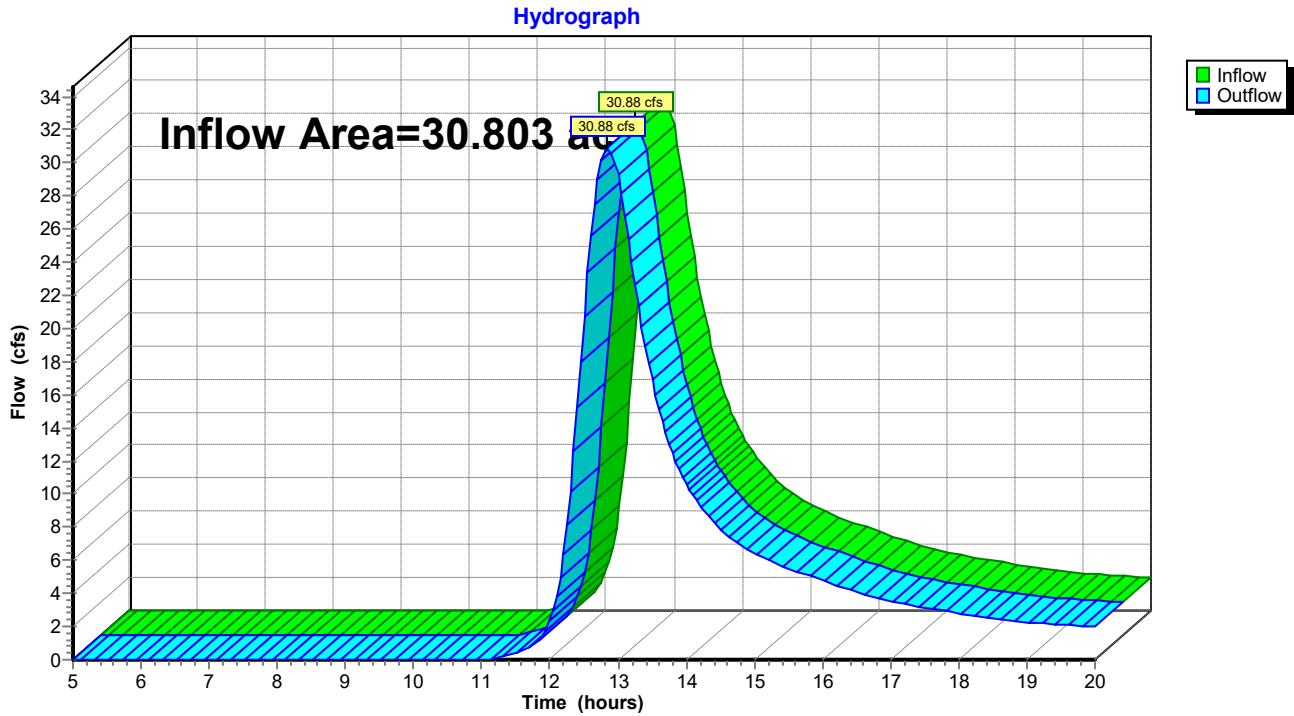
Inflow=30.88 cfs 5.214 af  
Outflow=30.88 cfs 5.214 af

**Summary for Reach A outfall Level: Outfall from Area A**

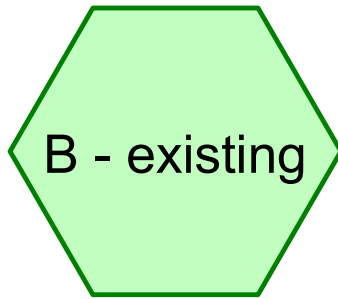
Inflow Area = 30.803 ac, 1.87% Impervious, Inflow Depth > 2.03" for 100 year event  
 Inflow = 30.88 cfs @ 12.85 hrs, Volume= 5.214 af  
 Outflow = 30.88 cfs @ 12.85 hrs, Volume= 5.214 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

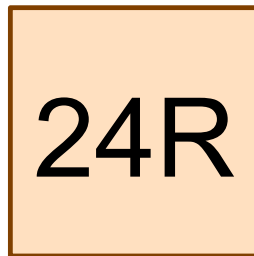
**Reach A outfall Level: Outfall from Area A**



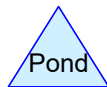
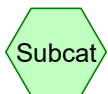




13.5 AC



Outfall



**Summary for Subcatchment B - existing: 13.5 AC**

Runoff = 21.68 cfs @ 12.63 hrs, Volume= 3.039 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 year Rainfall=7.10"

Area (ac)	CN	Description
* 0.203	98	Roofs tent decks , HSG B
1.067	85	Gravel roads, HSG B
12.230	60	Woods, Fair, HSG B
13.500	63	Weighted Average
13.297		98.50% Pervious Area
0.203		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	30	0.0100	0.03		<b>Sheet Flow,</b> Woods: Dense underbrush n= 0.800 P2= 3.35"
3.1	326	0.1200	1.73		<b>Shallow Concentrated Flow, sloped woodland</b> Woodland Kv= 5.0 fps
22.4	600	0.0080	0.45		<b>Shallow Concentrated Flow, level ground</b> Woodland Kv= 5.0 fps
43.9	956	Total			

**Events for Subcatchment B - existing: 13.5 AC**

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	3.55	0.596	0.53
5 year	4.30	7.15	1.080	0.96
10 year	4.80	9.45	1.387	1.23
25 year	5.70	13.97	1.992	1.77
50 year	6.30	17.19	2.427	2.16
100 year	<b>7.10</b>	<b>21.68</b>	<b>3.039</b>	<b>2.70</b>

**Area B Existing Nottingham Hills Subdivision Phase V**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
1.067	85	Gravel roads, HSG B (B - existing)
0.203	98	Roofs tent decks , HSG B (B - existing)
12.230	60	Woods, Fair, HSG B (B - existing)
<b>13.500</b>	<b>63</b>	<b>TOTAL AREA</b>

**Area B Existing Nottingham Hills Subdivision Phase V**

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
13.500	HSG B	B - existing
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>13.500</b>		<b>TOTAL AREA</b>

**Area B Existing Nottingham Hills Subdivision Phase V**

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.067	0.000	0.000	0.000	1.067	Gravel roads	B - existing
0.000	0.203	0.000	0.000	0.000	0.203	Roofs tent decks	B - existing
0.000	12.230	0.000	0.000	0.000	12.230	Woods, Fair	B - existing
<b>0.000</b>	<b>13.500</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>13.500</b>	<b>TOTAL AREA</b>	

**Area B Existing Nottingham Hills Subdivision Phase V** *Type III 24-hr 2-year Rainfall=3.40"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall**

Inflow=3.55 cfs 0.596 af

Outflow=3.55 cfs 0.596 af

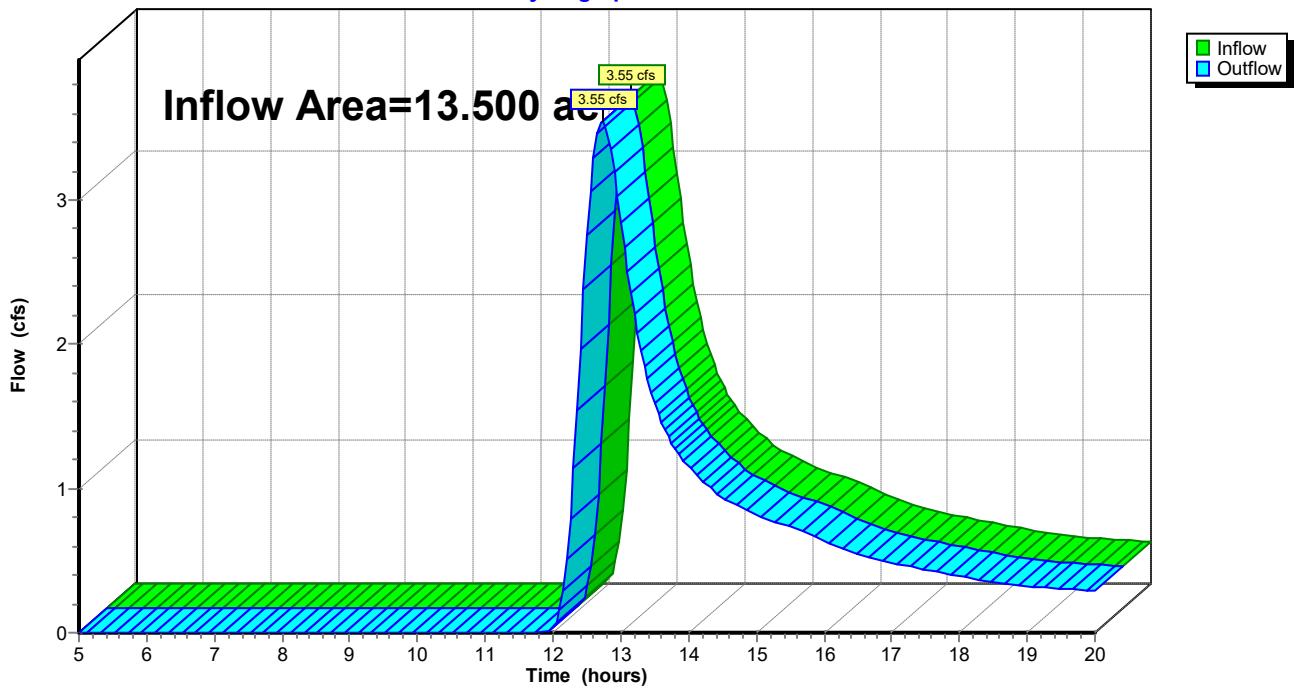
### Summary for Reach 24R: Outfall

Inflow Area = 13.500 ac, 1.50% Impervious, Inflow Depth > 0.53" for 2-year event  
 Inflow = 3.55 cfs @ 12.73 hrs, Volume= 0.596 af  
 Outflow = 3.55 cfs @ 12.73 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall

Hydrograph





**Area B Existing Nottingham Hills Subdivision Phase V** *Type III 24-hr 5 year Rainfall=4.30"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall**

Inflow=7.15 cfs 1.080 af

Outflow=7.15 cfs 1.080 af

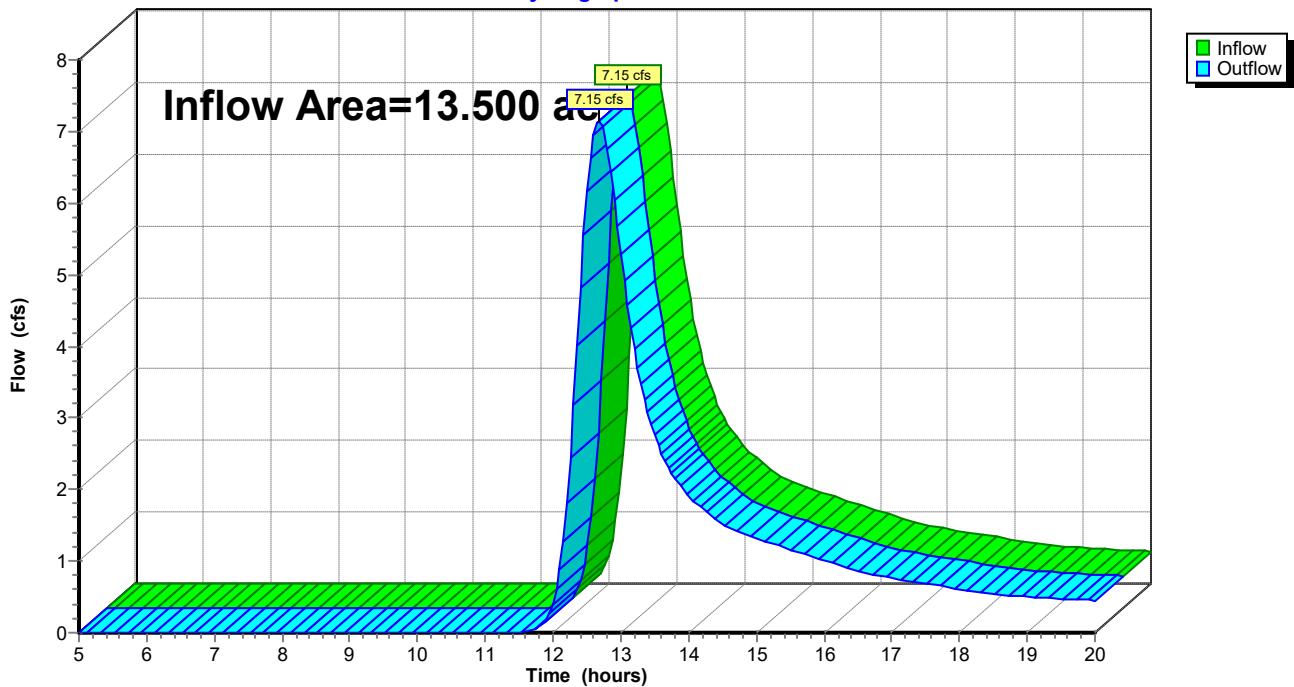
### Summary for Reach 24R: Outfall

Inflow Area = 13.500 ac, 1.50% Impervious, Inflow Depth > 0.96" for 5 year event  
Inflow = 7.15 cfs @ 12.68 hrs, Volume= 1.080 af  
Outflow = 7.15 cfs @ 12.68 hrs, Volume= 1.080 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall

Hydrograph



**Area B Existing Nottingham Hills Subdivision Phase V** *Type III 24-hr 10 year Rainfall=4.80"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall**

Inflow=9.45 cfs 1.387 af  
Outflow=9.45 cfs 1.387 af

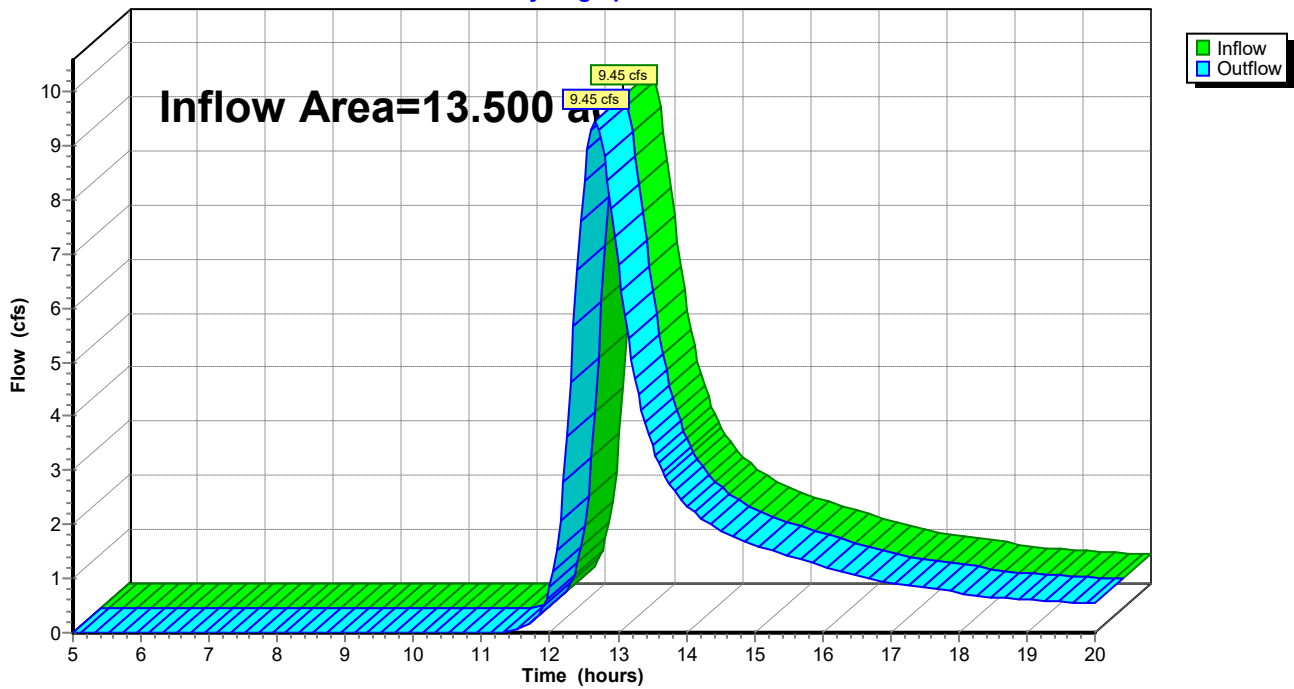
### Summary for Reach 24R: Outfall

Inflow Area = 13.500 ac, 1.50% Impervious, Inflow Depth > 1.23" for 10 year event  
Inflow = 9.45 cfs @ 12.66 hrs, Volume= 1.387 af  
Outflow = 9.45 cfs @ 12.66 hrs, Volume= 1.387 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall

Hydrograph



**Area B Existing Nottingham Hills Subdivision Phase V** *Type III 24-hr 25 year Rainfall=5.70"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall**

Inflow=13.97 cfs 1.992 af

Outflow=13.97 cfs 1.992 af

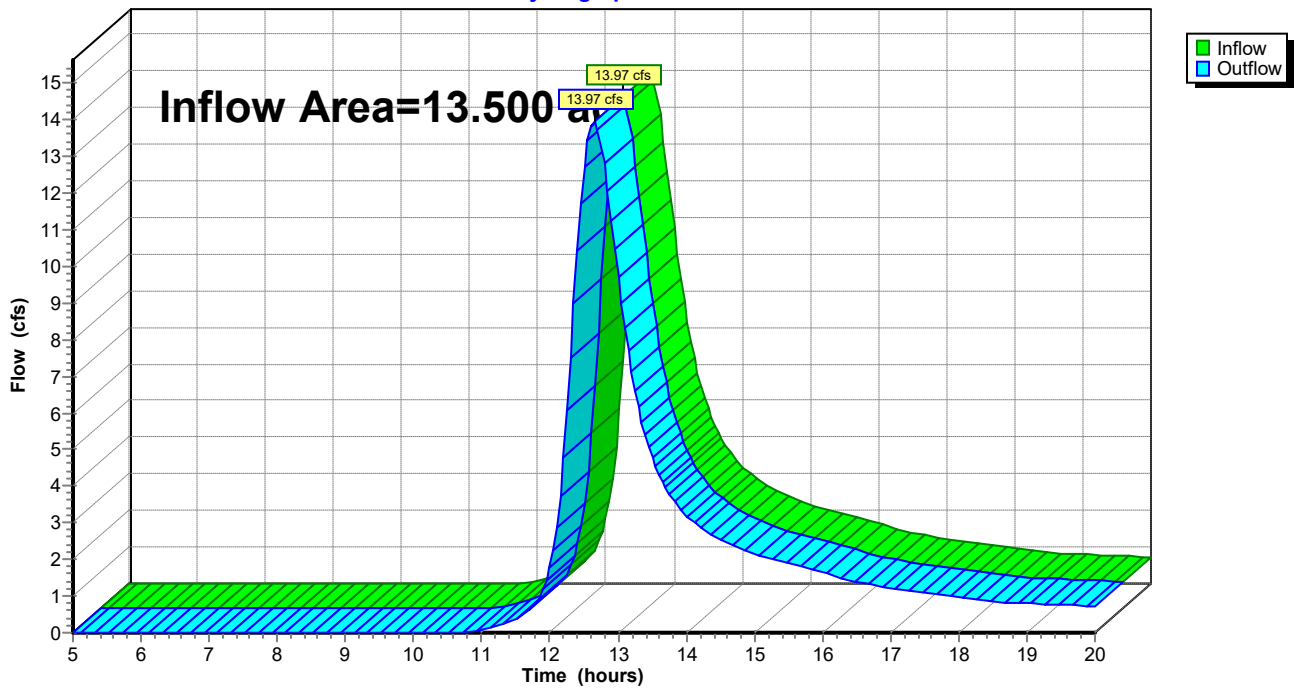
### Summary for Reach 24R: Outfall

Inflow Area = 13.500 ac, 1.50% Impervious, Inflow Depth > 1.77" for 25 year event  
Inflow = 13.97 cfs @ 12.65 hrs, Volume= 1.992 af  
Outflow = 13.97 cfs @ 12.65 hrs, Volume= 1.992 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall

Hydrograph



**Area B Existing Nottingham Hills Subdivision Phase V** *Type III 24-hr 50 year Rainfall=6.30"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall**

Inflow=17.19 cfs 2.427 af

Outflow=17.19 cfs 2.427 af

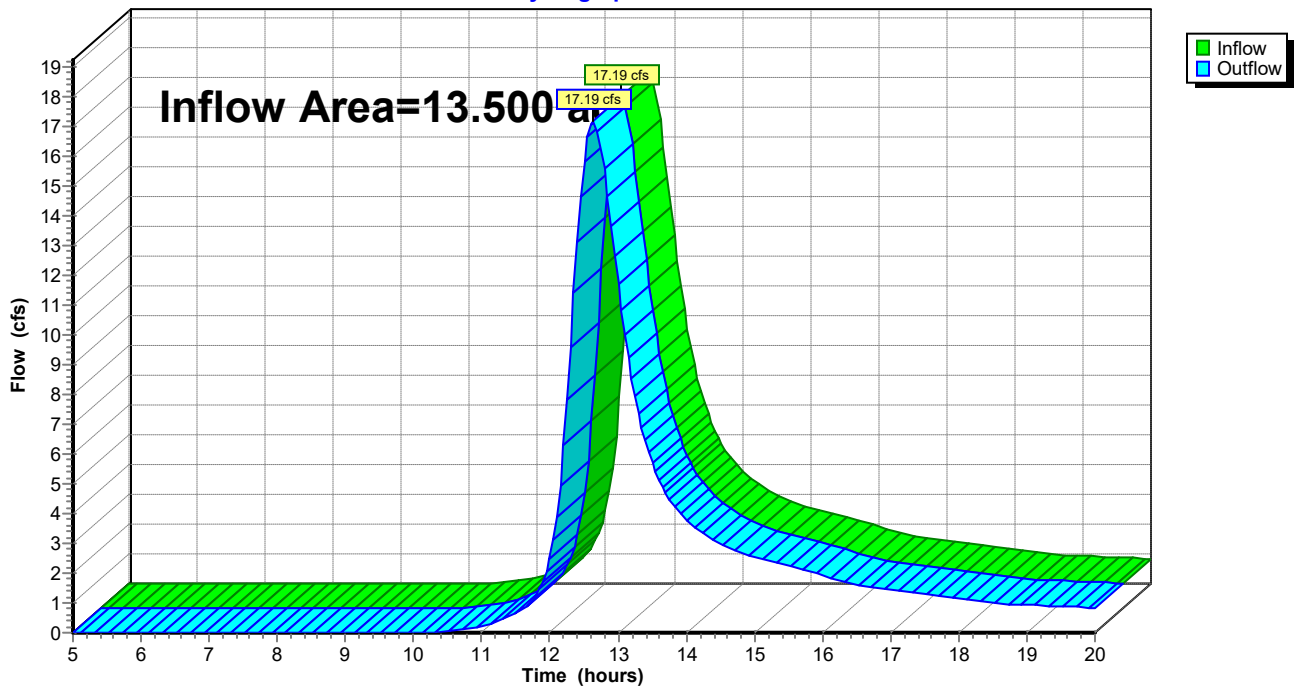
### Summary for Reach 24R: Outfall

Inflow Area = 13.500 ac, 1.50% Impervious, Inflow Depth > 2.16" for 50 year event  
Inflow = 17.19 cfs @ 12.64 hrs, Volume= 2.427 af  
Outflow = 17.19 cfs @ 12.64 hrs, Volume= 2.427 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 24R: Outfall

Hydrograph





Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach 24R: Outfall**

Inflow=21.68 cfs 3.039 af  
Outflow=21.68 cfs 3.039 af

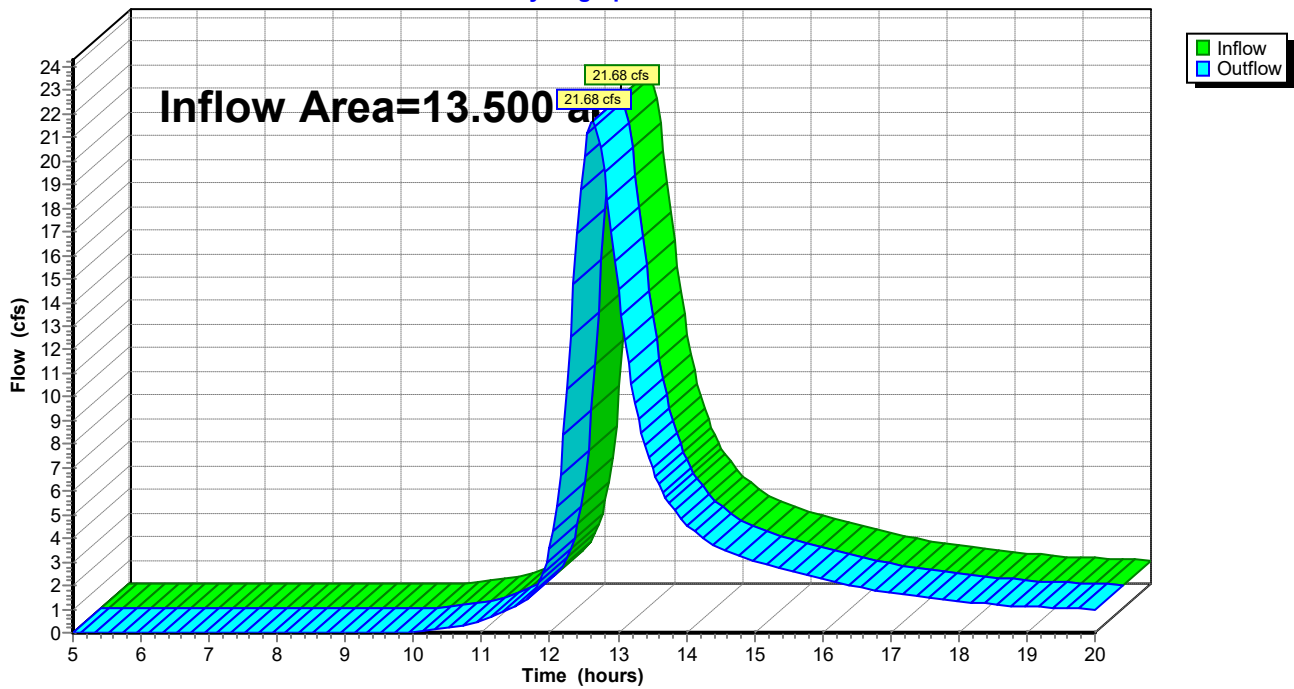
### Summary for Reach 24R: Outfall

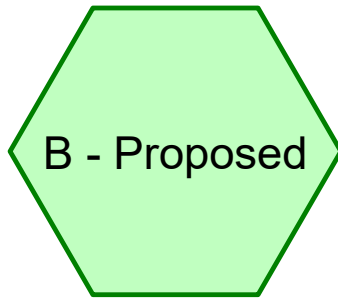
Inflow Area = 13.500 ac, 1.50% Impervious, Inflow Depth > 2.70" for 100 year event  
Inflow = 21.68 cfs @ 12.63 hrs, Volume= 3.039 af  
Outflow = 21.68 cfs @ 12.63 hrs, Volume= 3.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

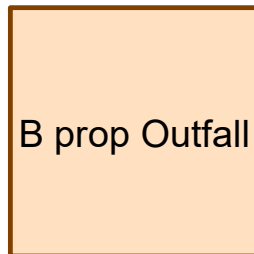
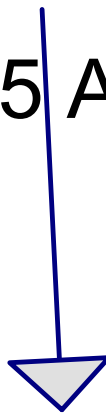
### Reach 24R: Outfall

Hydrograph

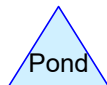
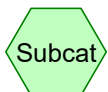




13.5 AC



Outfall



**Summary for Subcatchment B - Proposed: 13.5 AC**

Runoff = 19.23 cfs @ 12.64 hrs, Volume= 2.717 af, Depth> 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 year Rainfall=7.10"

Area (ac)	CN	Description
* 0.275	30	roof to Rain gardens
* 0.264	98	Driveways Paved, HSG B
* 1.200	60	Lawns grass, HSG B
11.761	60	Woods, Fair, HSG B
13.500	60	Weighted Average
13.236		98.04% Pervious Area
0.264		1.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	30	0.0100	0.03		<b>Sheet Flow,</b> Woods: Dense underbrush n= 0.800 P2= 3.35"
3.1	326	0.1200	1.73		<b>Shallow Concentrated Flow, sloped woodland</b> Woodland Kv= 5.0 fps
22.4	600	0.0080	0.45		<b>Shallow Concentrated Flow, level ground</b> Woodland Kv= 5.0 fps
43.9	956	Total			

**Events for Subcatchment B - Proposed: 13.5 AC**

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.40	2.54	0.470	0.42
5 year	4.30	5.67	0.900	0.80
10 year	4.80	7.75	1.178	1.05
25 year	5.70	11.94	1.736	1.54
50 year	6.30	14.97	2.142	1.90
100 year	<b>7.10</b>	<b>19.23</b>	<b>2.717</b>	<b>2.42</b>

**Area B Proposed Nottingham Hills Subdivision Phase V**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.264	98	Driveways Paved, HSG B (B - Proposed)
1.200	60	Lawns grass, HSG B (B - Proposed)
11.761	60	Woods, Fair, HSG B (B - Proposed)
0.275	30	roof to Rain gardens (B - Proposed)
<b>13.500</b>	<b>60</b>	<b>TOTAL AREA</b>

**Area B Proposedg Nottingham Hills Subdivision Phase V**

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
13.225	HSG B	B - Proposed
0.000	HSG C	
0.000	HSG D	
0.275	Other	B - Proposed
<b>13.500</b>		<b>TOTAL AREA</b>

**Area B Proposedg Nottingham Hills Subdivision Phase V**

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.264	0.000	0.000	0.000	0.264	Driveways Paved	B - Proposed
0.000	1.200	0.000	0.000	0.000	1.200	Lawns grass	B - Proposed
0.000	11.761	0.000	0.000	0.000	11.761	Woods, Fair	B - Proposed
0.000	0.000	0.000	0.000	0.275	0.275	roof to Rain gardens	B - Proposed
<b>0.000</b>	<b>13.225</b>	<b>0.000</b>	<b>0.000</b>	<b>0.275</b>	<b>13.500</b>	<b>TOTAL AREA</b>	



**Area B Proposedg Nottingham Hills Subdivision Phase** *Type III 24-hr 2-year Rainfall=3.40"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach B prop Outfall: Outfall**

Inflow=2.54 cfs 0.470 af

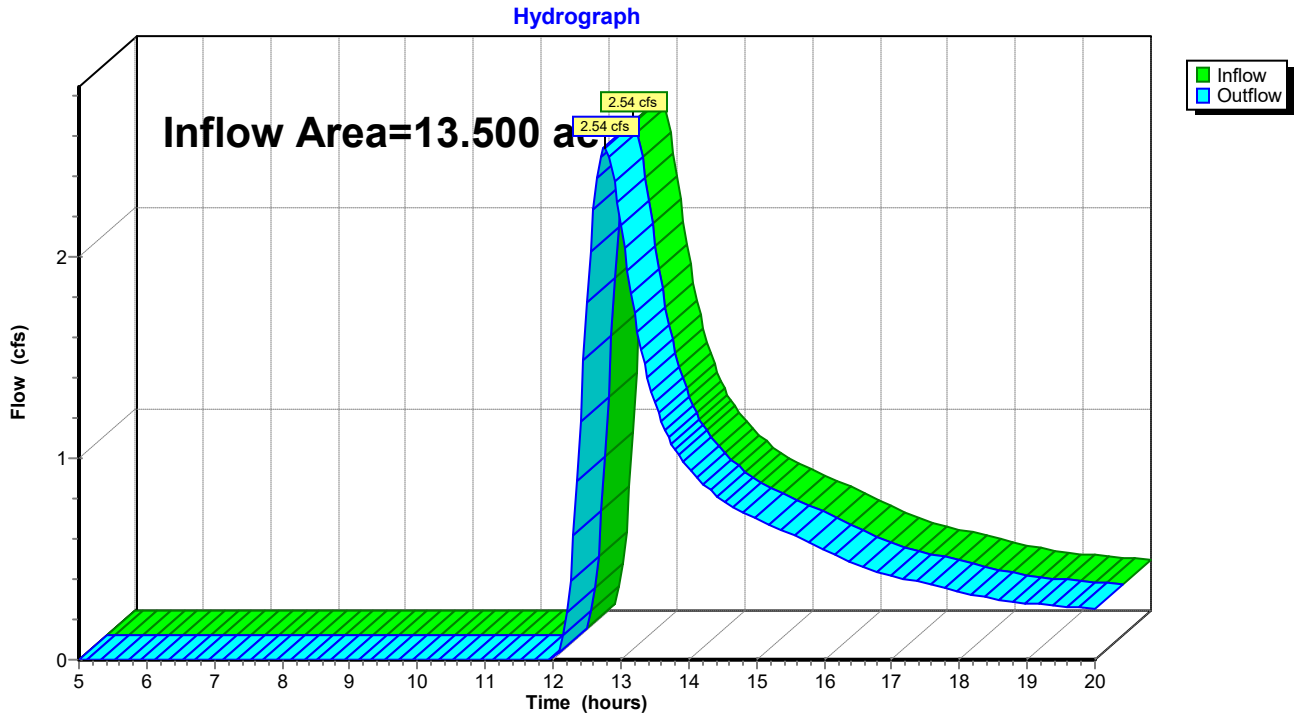
Outflow=2.54 cfs 0.470 af

### Summary for Reach B prop Outfall: Outfall

Inflow Area = 13.500 ac, 1.96% Impervious, Inflow Depth > 0.42" for 2-year event  
 Inflow = 2.54 cfs @ 12.76 hrs, Volume= 0.470 af  
 Outflow = 2.54 cfs @ 12.76 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach B prop Outfall: Outfall



**Area B Proposedg Nottingham Hills Subdivision Phase** *Type III 24-hr 5 year Rainfall=4.30"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach B prop Outfall: Outfall**

Inflow=5.67 cfs 0.900 af

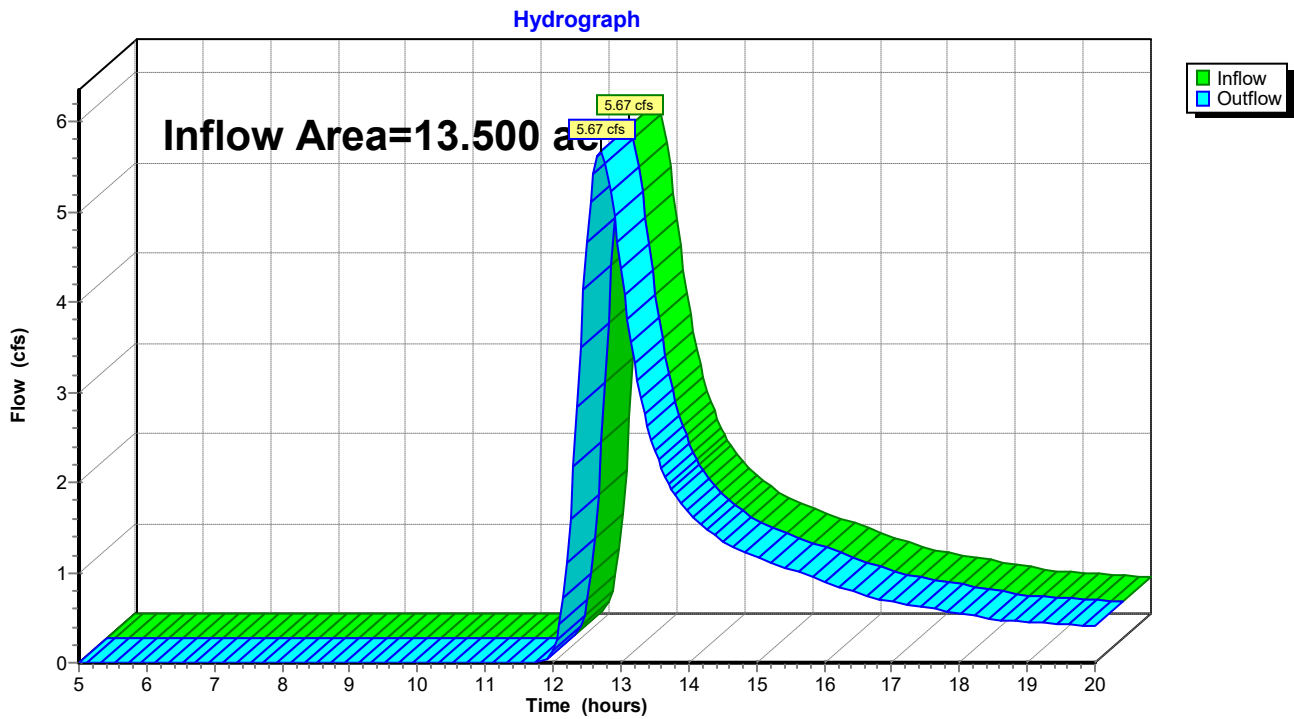
Outflow=5.67 cfs 0.900 af

**Summary for Reach B prop Outfall: Outfall**

Inflow Area = 13.500 ac, 1.96% Impervious, Inflow Depth > 0.80" for 5 year event  
 Inflow = 5.67 cfs @ 12.70 hrs, Volume= 0.900 af  
 Outflow = 5.67 cfs @ 12.70 hrs, Volume= 0.900 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach B prop Outfall: Outfall**



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach B prop Outfall: Outfall**

Inflow=7.75 cfs 1.178 af

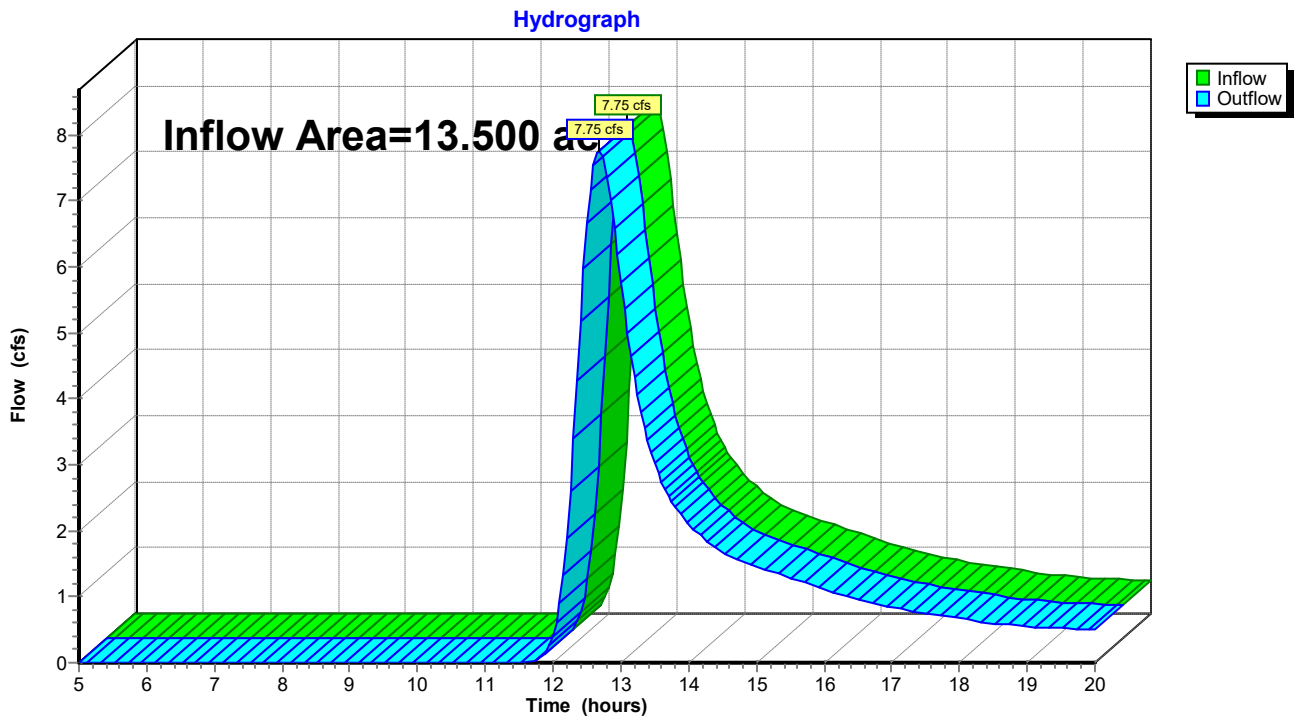
Outflow=7.75 cfs 1.178 af

### Summary for Reach B prop Outfall: Outfall

Inflow Area = 13.500 ac, 1.96% Impervious, Inflow Depth > 1.05" for 10 year event  
 Inflow = 7.75 cfs @ 12.68 hrs, Volume= 1.178 af  
 Outflow = 7.75 cfs @ 12.68 hrs, Volume= 1.178 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach B prop Outfall: Outfall



**Area B Proposedg Nottingham Hills Subdivision Phas** *Type III 24-hr 25 year Rainfall=5.70"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach B prop Outfall: Outfall**

Inflow=11.94 cfs 1.736 af

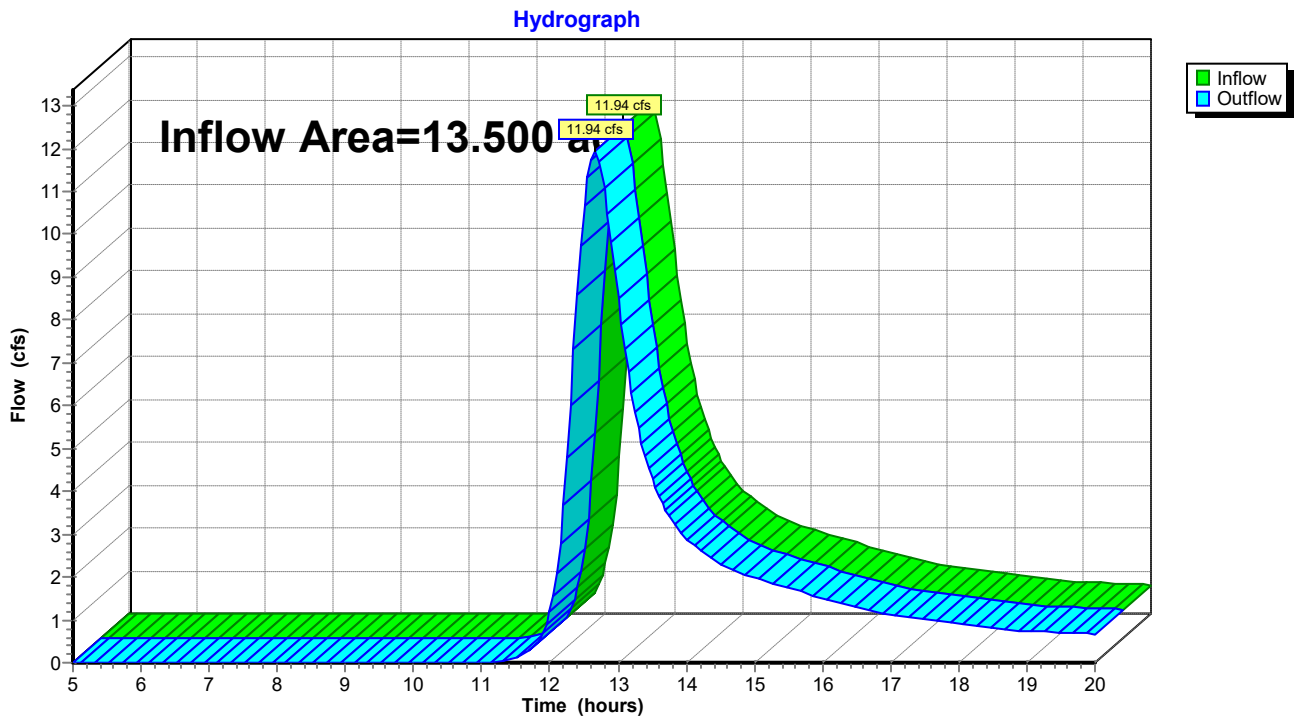
Outflow=11.94 cfs 1.736 af

### Summary for Reach B prop Outfall: Outfall

Inflow Area = 13.500 ac, 1.96% Impervious, Inflow Depth > 1.54" for 25 year event  
Inflow = 11.94 cfs @ 12.66 hrs, Volume= 1.736 af  
Outflow = 11.94 cfs @ 12.66 hrs, Volume= 1.736 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach B prop Outfall: Outfall





**Area B Proposedg Nottingham Hills Subdivision Phas** *Type III 24-hr 50 year Rainfall=6.30"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach B prop Outfall: Outfall**

Inflow=14.97 cfs 2.142 af

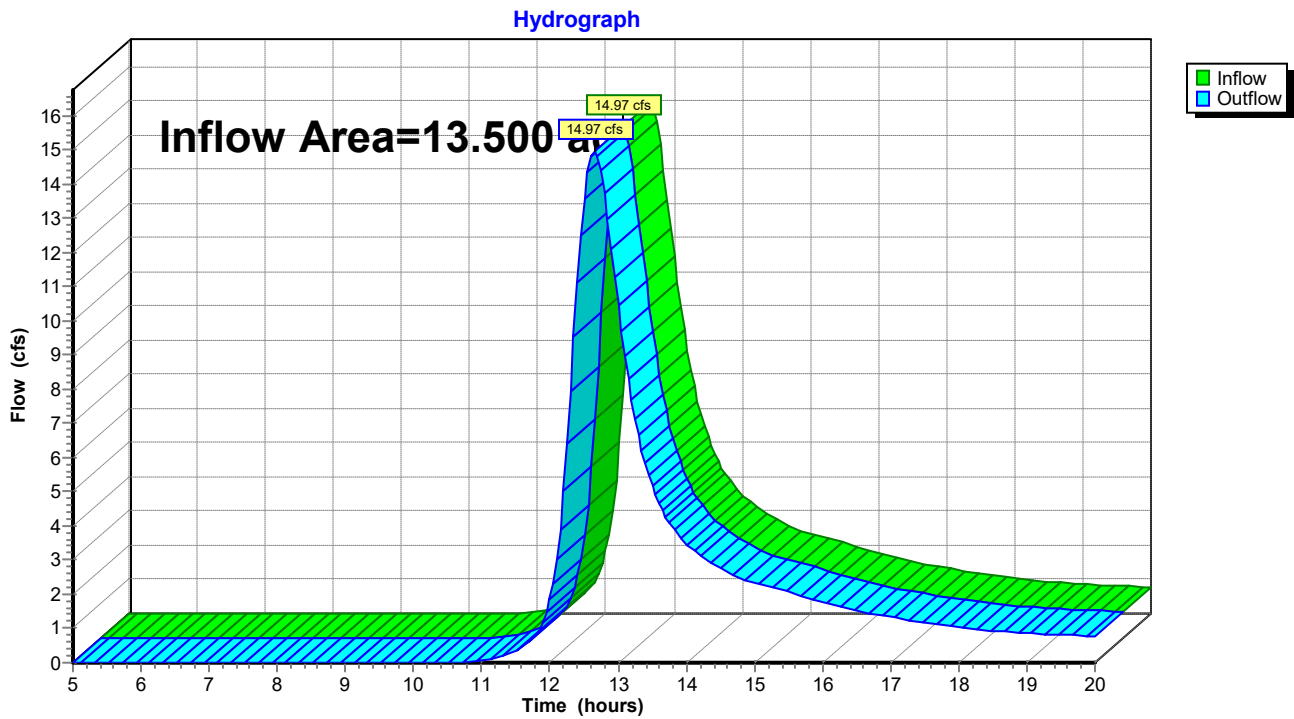
Outflow=14.97 cfs 2.142 af

### Summary for Reach B prop Outfall: Outfall

Inflow Area = 13.500 ac, 1.96% Impervious, Inflow Depth > 1.90" for 50 year event  
 Inflow = 14.97 cfs @ 12.65 hrs, Volume= 2.142 af  
 Outflow = 14.97 cfs @ 12.65 hrs, Volume= 2.142 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach B prop Outfall: Outfall



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Reach B prop Outfall: Outfall**

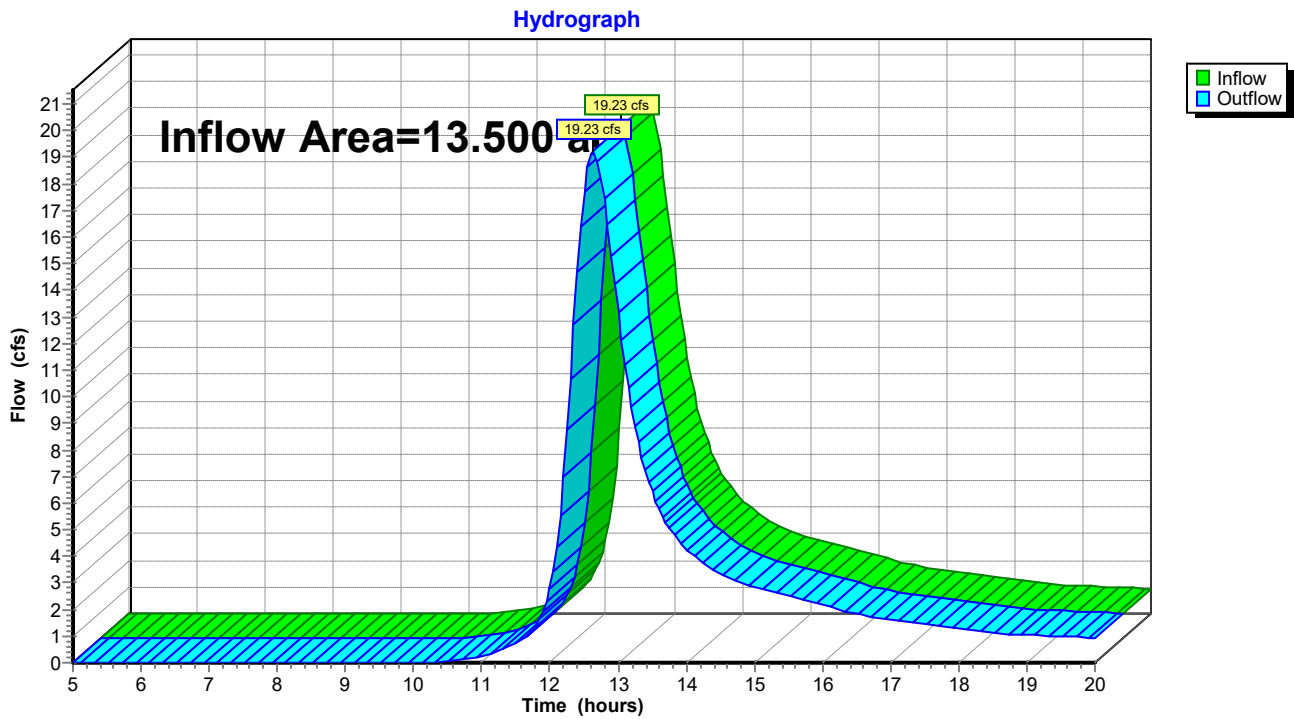
Inflow=19.23 cfs 2.717 af  
Outflow=19.23 cfs 2.717 af

### Summary for Reach B prop Outfall: Outfall

Inflow Area = 13.500 ac, 1.96% Impervious, Inflow Depth > 2.42" for 100 year event  
Inflow = 19.23 cfs @ 12.64 hrs, Volume= 2.717 af  
Outflow = 19.23 cfs @ 12.64 hrs, Volume= 2.717 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach B prop Outfall: Outfall



# Rain Gardens

## Water Quality Volume rainfall event 1" WQV rainfall

where:

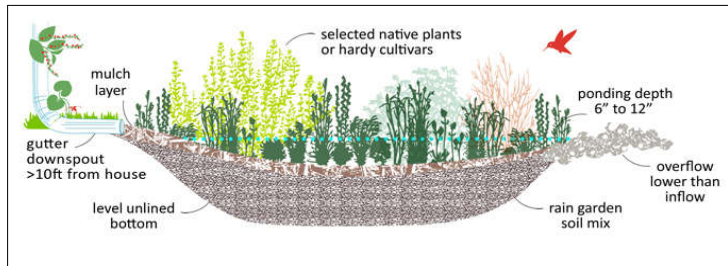
$P$  = design precipitation, inches (1" for water quality storm)

$A$  = drainage area (acres) roof area 2,400 sf >> 0.055 ac

$V$  = runoff volume CF

$V = (1"/12)\text{ft} \times 2400 \text{ sf} = 200 \text{ CF}$

**Rain Garden size 10-foot wide X 20 -feet long x 1-foot deep= 200CF**



**Figure 4-6 Residential Rain Gardens**

**Typical Residential Rain Garden (With and Without Masonry Wall)**

