

DRAINAGE REPORT



Revised
March 28, 2025

Received

APR 2 2025

Property Located at:

LAKE SIDE POINT
HERITAGE RD
EAST LYME, CT

Town of East Lyme
Land Use

Prepared For:

PORTSIDE HOLDINGS, INC &
ENGLISH HARBOR CAPITAL PARTNERS, LLC
TENANTS IN COMMON

38 Granite Street
New London, CT 06320

Prepared By:

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Oakdale, CT 03670



Timothy May,
PE

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May, PE", E=mayengineering@sbcglobal.net
Reason: I am the author of this document
Location: Office
Date: 2025-03-29 07:59:53
Foxit PhantomPDF Version: 9.7.5



Engineering, LLC

Civil Engineering, Site Planning, and Consulting

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The stormwater management report is developed in support of a proposed plan for a three-lot subdivision located at Heritage Road, East Lyme, CT. The proposed development is submitted for plan review and approval. The 2023 Connecticut Stormwater Quality Manual standards have been considered and evaluated for a plan review to demonstrate that stormwater design and devices can be effectively implemented to achieve Water Quality Volumes and Required Retention Volumes.

SITE DESCRIPTION:

The site is a 4.27-acre parcel located on the northern end of Heritage Rd and along the southwest shoreline of Pattagansett Lake in the Town of East Lyme, CT. The existing parcel is an undeveloped wooded parcel that has mature deciduous trees and several small grassed meadow areas. The parcel has average slopes ranging from 5% to 14%. There is an existing gravel driveway that provides access to the proposed three lots. The soil type is primarily a hydraulic soil group B consisting of *HINCKLEY - GRAVELLY LOAM*, *CHARLTON-CHATFIELD* and *HAVEN AND ENDFIELD* gravelly sandy loam. The soil types were evaluated for their permeability and have a moderate-to-high infiltration rate, referencing the USDA Natural Resource Conservation Service Soil Survey for this parcel.

The existing parcel contains no Directly Connected Impervious Areas (DCIA) that convey stormwater. All stormwater flows from the western side to the northeastern side of the parcel and then into Pattagansett Lake. The existing gravel driveway directs flows from the western side of the parcel, traveling northeast towards the property line. The existing gravel drive has a ditch on each side that facilitates stormwater channelization and infiltration. Existing conditions were verified after several large rainfalls in the spring and summer of 2024 and winter of 2025. After these large rainfall events, onsite inspection noted very little soil migration of fines, or acute channelization that resulted in little evidence of soil erosion. This further demonstrates that the onsite soil has a high infiltration capacity and the soil conditions at the site are stable.

The proposed three-lot subdivision design will have approximately 0.56 ac of disturbance for each lot total 1.5ac± of the 4.27-ac parcel. The drainage area for the 4.27-ac parcel is contained in a 15.8ac± sub-catchment drainage area. The existing gravel drive will be used to model the current condition and a proposed paved drive will be used in the developed for analysis. HydroCad Stormwater modeling software using Soil Conservation Service (SCS/NRCS) methods was used to develop existing/undeveloped stormwater conditions, which were then compared to proposed/developed conditions.

Water quality volumes (WQV), Required Retention volumes (RRV), Water Quality Flows (WQF) and pollutant reduction BMPs are evaluated and accomplished by the implementation of stormwater infiltration and retention devices to achieve the required 90% reduction in total suspended solids (TSS) and pollutant reduction. Stormwater from roof drains will be discharged to rain gardens designed to infiltrate storm water to reduce WQV and WQF. Permeable Interlocking Concrete Pavers (PICP) are incorporated in the driveway design to provide stormwater infiltration, storage and treatment to attenuate stormwater volumes and provide pollution reduction. Stormwater estimates have been modeled and estimated to ensure sufficient reduction of stormwater WQV.

DESIGN METHODOLOGY AND EVALUATION

The existing / current 4.77ac site contains:

- Gravel access road 15,500 sf (0.36 ac)
 - remaining side of access rd grass 23,410 sf (0.53)
 - Lightly wooded / high grass 38,200 sf (0.81 ac)
 - Wooded mature low density understory 133,729sf (3.07 ac)
- This part will be combined and integrated into the 15.8 ac drainage sub-catchment area*

The 4.77-ac site as proposed, consists of three parcels (Lot #1 - 1.19 ac; Lot #2 - 1.29 ac & Lot #3 - 1.79 ac) of proposed developed areas which contains:

- Access Road 13,466 sf (0.31) ac which will be paved with bituminous
 - remaining side of access rd grass 23,410 sf (0.53)
 - 9,300 sf (0.21 ac) permeable driveway pavers
 - 6,810 sf (0.15 ac) of roof impervious areas that will be diverted to Rain Gardens,
 - 60,263 sf (1.4 ac) of grassed lawn area.
 - The remaining 94,800 sf (2.17 ac) is undisturbed woodlands.
- This will be combined and integrated into the 15.8 ac drainage sub-catchment area*

Storm water discharges from roofs are diverted to rain gardens sized to accommodate 730 cf (0.0167 ac-ft) of WQV removal. PICP as designed provide 22,000 gal (2940 cf) storage/ infiltration, combined with the rain garden volume for a total of 27,460 gal (3673 cf) or 0.084 acre-ft of WQV treatment / infiltration of stormwater. This stormwater treatment design methodology is in excess of the Required Retention Volume (RRV) for the site, which is calculated to be 0.069 acre-ft or 3005 cf (22,478 gal).

The Permeable Interlocking Concrete Pavers (PICP) provide Stormwater BMPs, specifically stormwater infiltration that is designed to retain stormwater and provide treatment and peak runoff attenuation. PICP provide dual functions, including retention (volume reduction), groundwater recharge, treatment, and stormwater quantity control.

PICP provide pollutant removal of:

- Sediments - High (includes sediment-bound pollutants)
- Phosphorus - Moderate
- Nitrogen - Moderate
- Bacteria - High

SUMMARIZED RESULTS FROM HYDROCAD FOR STORM EVENTS

Stormwater Runoff Amounts (cfs)

	2 year	10 year	25 year	50 year	100 year
Existing	4.28	11.92	17.83	22.06	27.99
Proposed	3.30	10.12	15.55	19.48	25.01
<i>Change (cfs)</i>	0.98	1.8	2.28	2.58	2.98
% reduction	22.8%	15.1%	12.7%	11.6%	10.6%

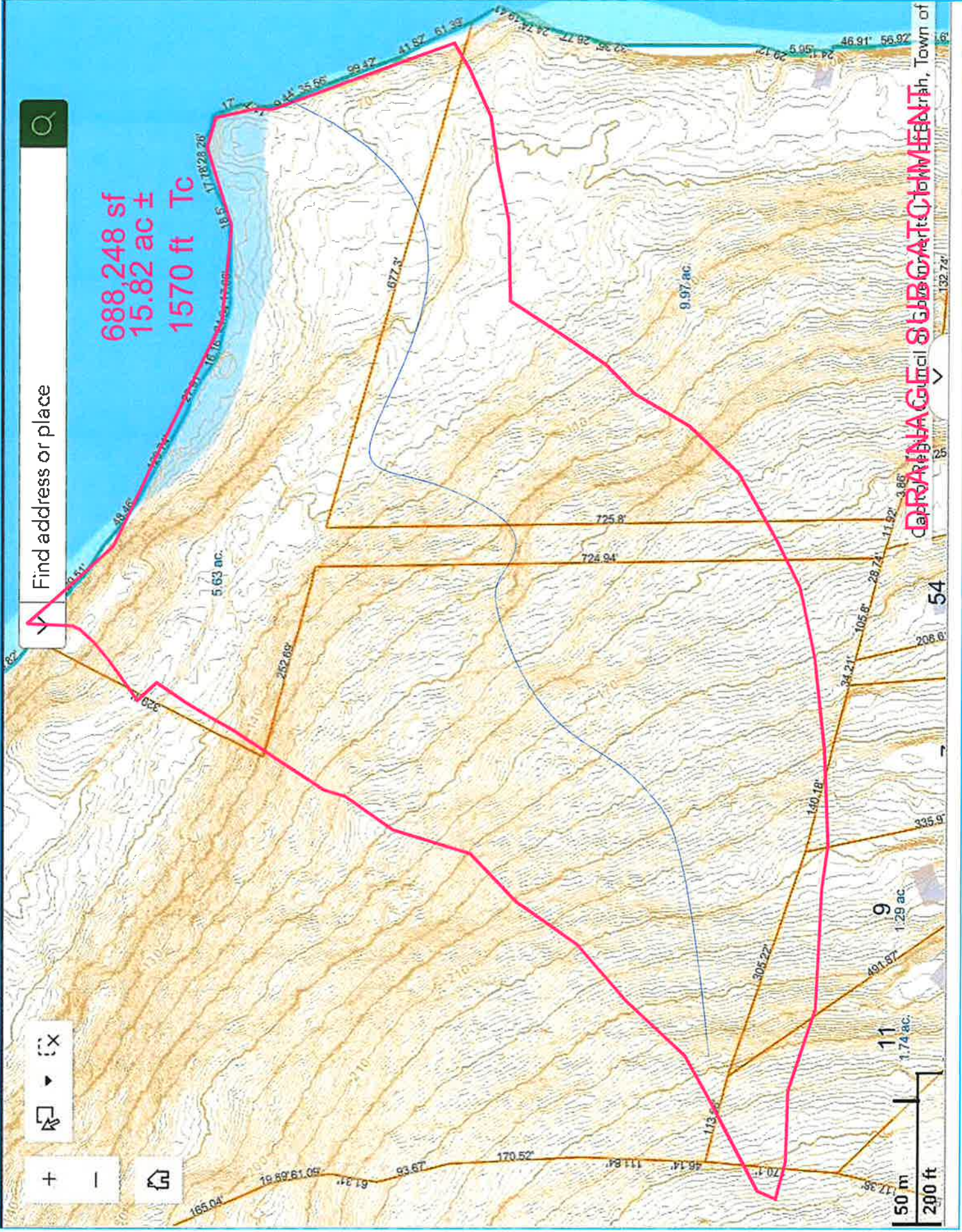
SUMMARY

The proposed subdivision plan as designed has incorporated stormwater BMPs and reduction practices to mitigate stormwater impacts. Water Quality Volumes and Required Retention Volumes are achieved and implemented with standard design practices that are within parameters of the existing site conditions using standard stormwater designs- Best Management Practices (2023 CT Stormwater Design Manual). The proposed Heritage Rd. Subdivision – Lake Side Point has an overall average stormwater reduction of 18% in peak runoff attenuation and exceeds WQV requirements for reduction.



Find address or place

688,248 sf
15.82 ac ±
1570 ft Tc



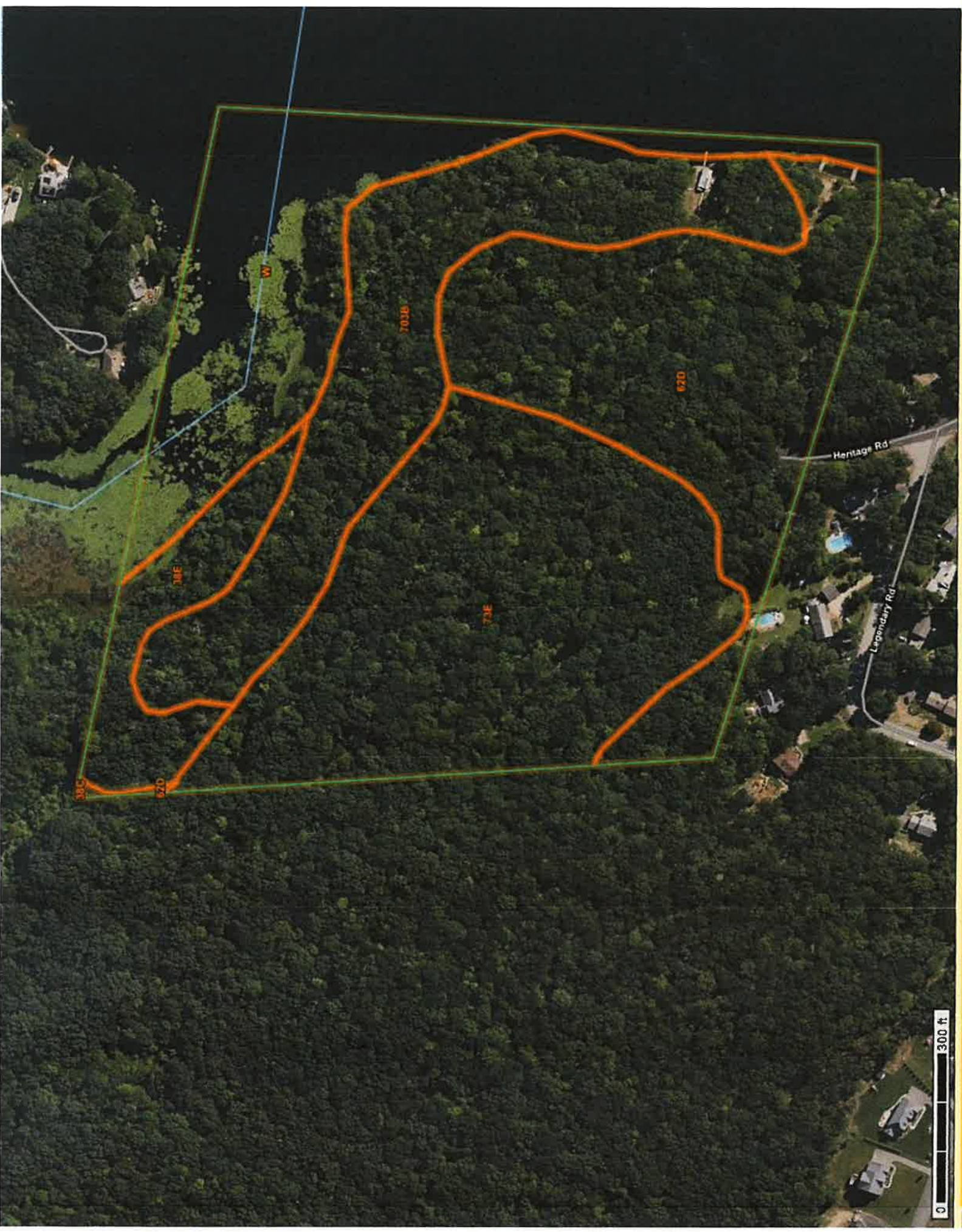
11 1.74 ac

9 1.29 ac

54

DRAINAGE SUB-CATCHMENT

Capitol Hill, Town of



Heritage Rd

Legendary Rd

30C

620

30E

701E

701B

620

W

0 300 ft



Undeveloped



Heritage Rd Subdivision Existing

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Printed 3/28/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.40	2
2	10 year	Type III 24-hr		Default	24.00	1	4.80	2
3	25 year	Type III 24-hr		Default	24.00	1	5.70	2
4	50 year	Type III 24-hr		Default	24.00	1	6.30	2
5	100 year	Type III 24-hr		Default	24.00	1	7.10	2

Heritage Rd Subdivision Existing

Prepared by May Engineering, LLC

Printed 3/28/2025

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.810	79	<50% Grass cover, Poor, HSG B (2S)
0.360	85	Gravel roads, HSG B (2S)
0.530	76	Sides of access rd shoulder grass (2S)
14.100	60	Woods, Fair, HSG B (2S)
15.800	62	TOTAL AREA

Heritage Rd Subdivision Existing

Prepared by May Engineering, LLC

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
15.270	HSG B	2S
0.000	HSG C	
0.000	HSG D	
0.530	Other	2S
15.800		TOTAL AREA

Summary for Subcatchment 2S: Undeveloped

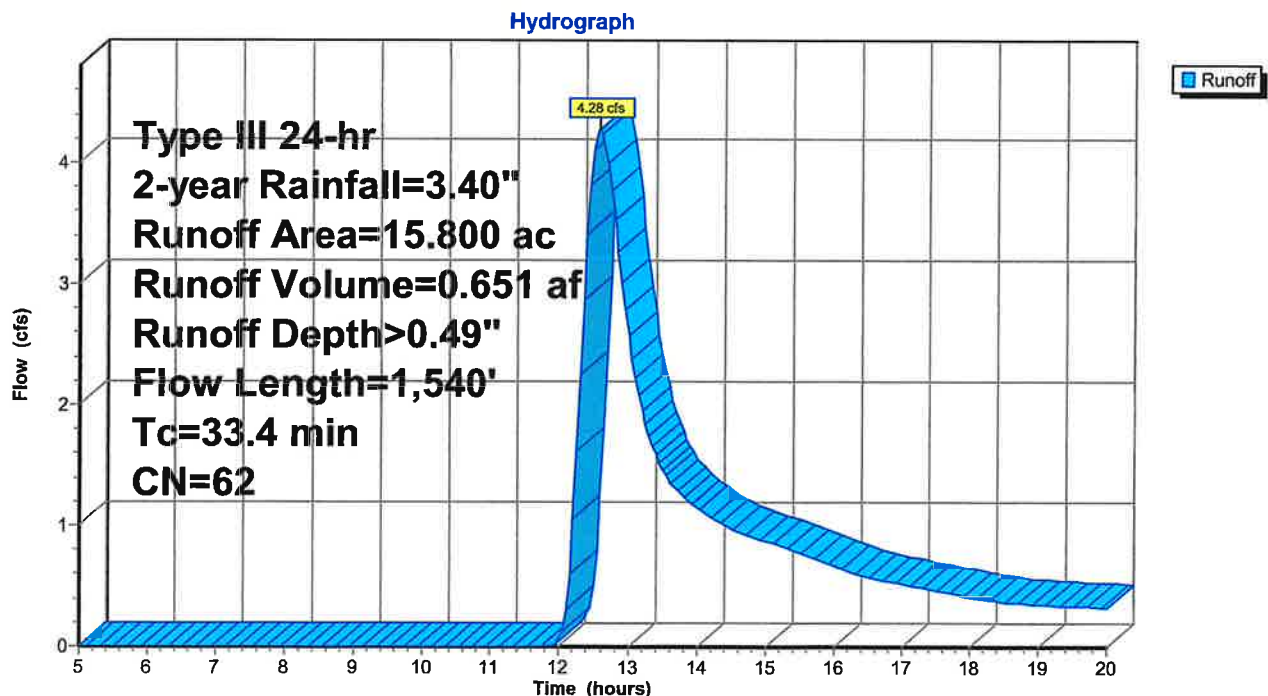
Runoff = 4.28 cfs @ 12.58 hrs, Volume= 0.651 af, Depth> 0.49"
 Routed to nonexistent node 3P

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 2-year Rainfall=3.40"

Area (ac)	CN	Description
* 14.100	60	Woods, Fair, HSG B
0.360	85	Gravel roads, HSG B
* 0.530	76	Sides of acess rd shoulder grass
0.810	79	<50% Grass cover, Poor, HSG B
15.800	62	Weighted Average
15.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.4	1,100	0.0570	1.19		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
4.7	400	0.0800	1.41		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
33.4	1,540	Total			

Subcatchment 2S: Undeveloped



Summary for Subcatchment 2S: Undeveloped

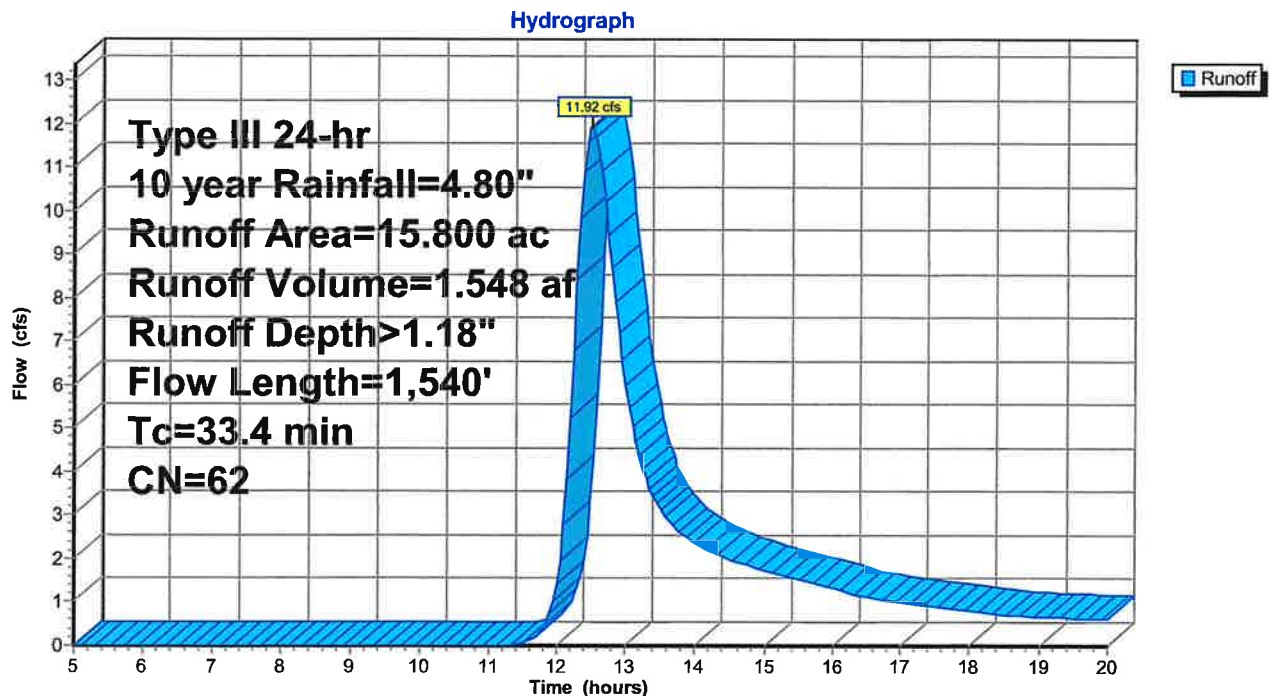
Runoff = 11.92 cfs @ 12.52 hrs, Volume= 1.548 af, Depth> 1.18"
 Routed to nonexistent node 3P

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 10 year Rainfall=4.80"

Area (ac)	CN	Description
* 14.100	60	Woods, Fair, HSG B
0.360	85	Gravel roads, HSG B
* 0.530	76	Sides of acess rd shoulder grass
0.810	79	<50% Grass cover, Poor, HSG B
15.800	62	Weighted Average
15.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.4	1,100	0.0570	1.19		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
4.7	400	0.0800	1.41		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
33.4	1,540	Total			

Subcatchment 2S: Undeveloped



Summary for Subcatchment 2S: Undeveloped

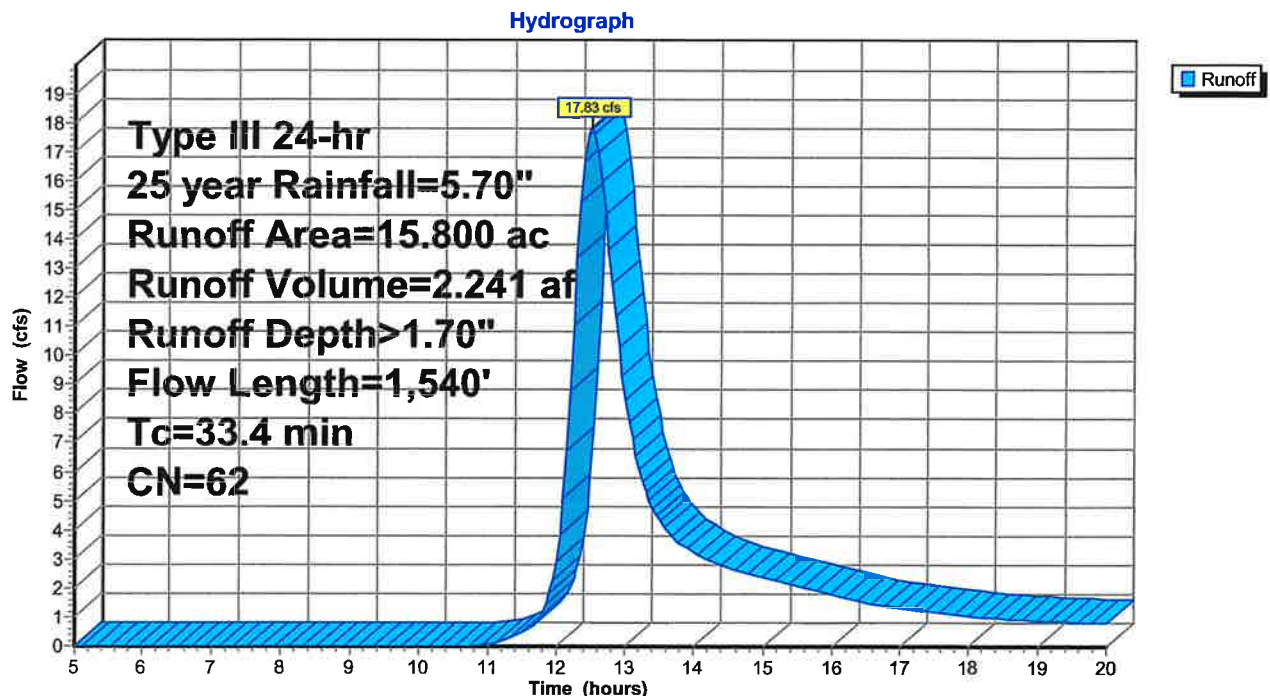
Runoff = 17.83 cfs @ 12.50 hrs, Volume= 2.241 af, Depth> 1.70"
 Routed to nonexistent node 3P

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 25 year Rainfall=5.70"

Area (ac)	CN	Description
* 14.100	60	Woods, Fair, HSG B
0.360	85	Gravel roads, HSG B
* 0.530	76	Sides of acess rd shoulder grass
0.810	79	<50% Grass cover, Poor, HSG B
15.800	62	Weighted Average
15.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.4	1,100	0.0570	1.19		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
4.7	400	0.0800	1.41		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
33.4	1,540	Total			

Subcatchment 2S: Undeveloped



Summary for Subcatchment 2S: Undeveloped

Runoff = 22.06 cfs @ 12.50 hrs, Volume= 2.741 af, Depth> 2.08"
 Routed to nonexistent node 3P

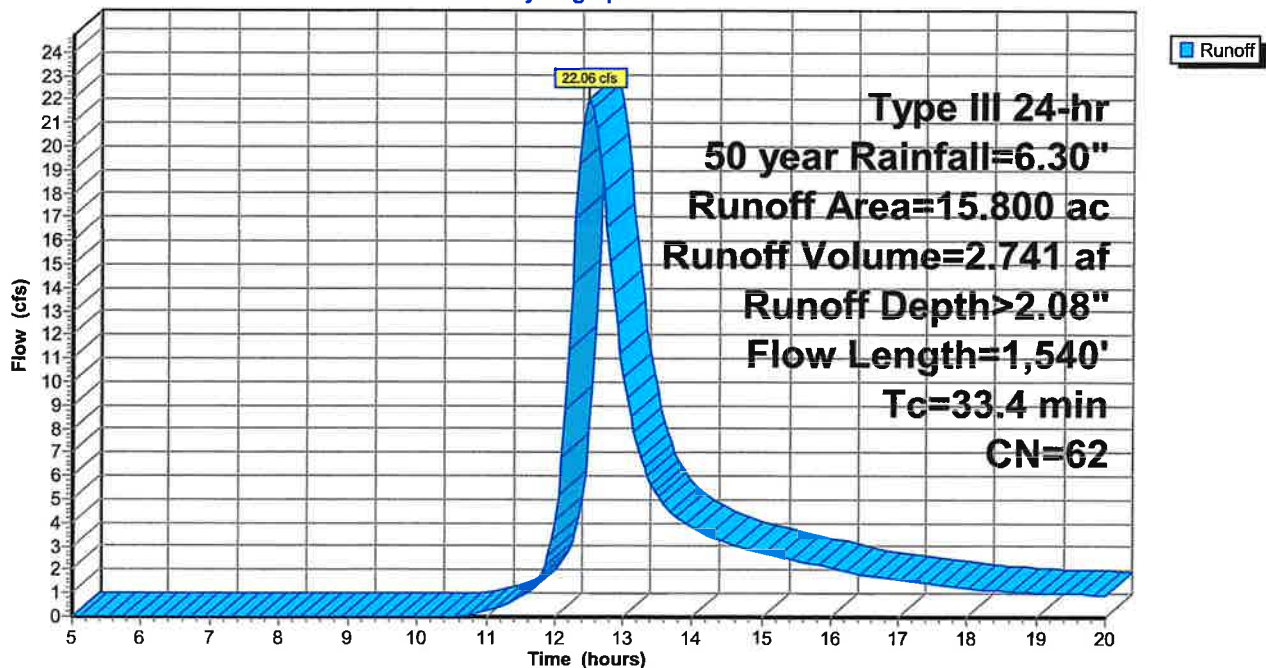
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 year Rainfall=6.30"

Area (ac)	CN	Description
* 14.100	60	Woods, Fair, HSG B
0.360	85	Gravel roads, HSG B
* 0.530	76	Sides of acess rd shoulder grass
0.810	79	<50% Grass cover, Poor, HSG B
15.800	62	Weighted Average
15.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.4	1,100	0.0570	1.19		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
4.7	400	0.0800	1.41		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
33.4	1,540	Total			

Subcatchment 2S: Undeveloped

Hydrograph



Summary for Subcatchment 2S: Undeveloped

Runoff = 27.99 cfs @ 12.49 hrs, Volume= 3.446 af, Depth> 2.62"
 Routed to nonexistent node 3P

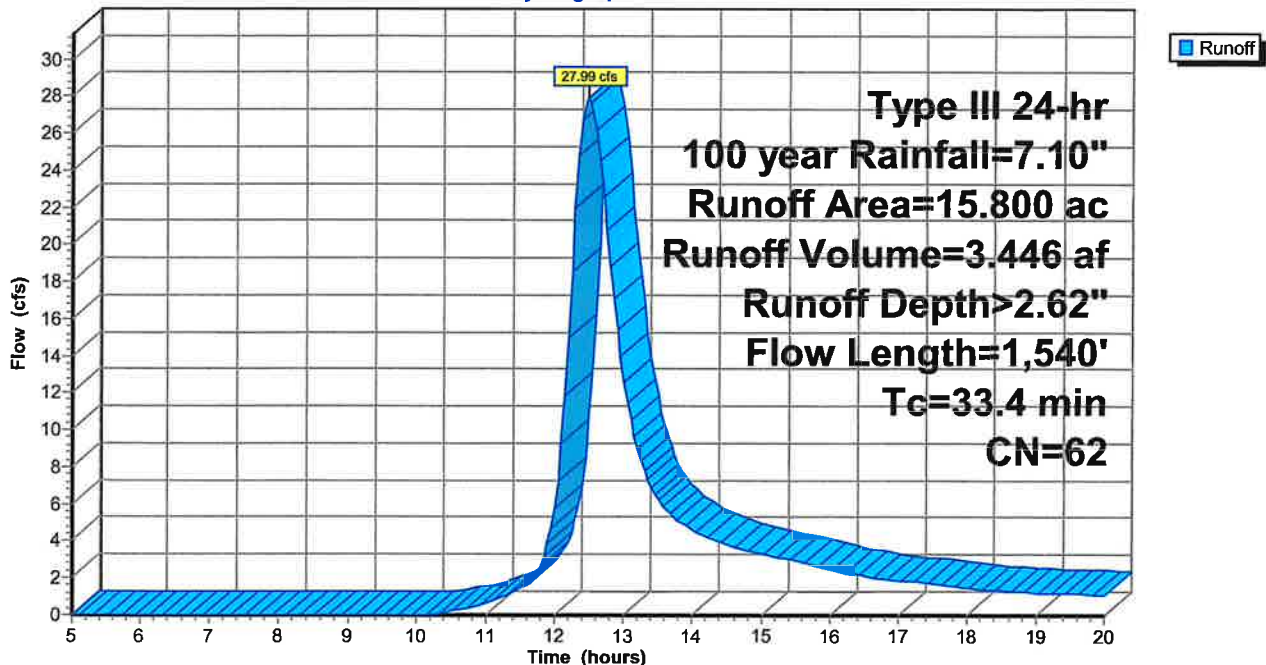
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 year Rainfall=7.10"

Area (ac)	CN	Description
* 14.100	60	Woods, Fair, HSG B
0.360	85	Gravel roads, HSG B
* 0.530	76	Sides of access rd shoulder grass
0.810	79	<50% Grass cover, Poor, HSG B
15.800	62	Weighted Average
15.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.4	1,100	0.0570	1.19		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
4.7	400	0.0800	1.41		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
33.4	1,540	Total			

Subcatchment 2S: Undeveloped

Hydrograph





Developed



Heritage Rd Subdivision Proposed

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.40	2
2	10 year	Type III 24-hr		Default	24.00	1	4.80	2
3	25 year	Type III 24-hr		Default	24.00	1	5.70	2
4	50 year	Type III 24-hr		Default	24.00	1	6.30	2
5	100 year	Type III 24-hr		Default	24.00	1	7.10	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.530	69	50-75% Grass cover, Fair, HSG B side of access rd (3S)
0.100	85	Gravel roads, HSG B (3S)
1.400	52	Lawns >75% Grass cover, Good, HSG B (3S)
0.310	89	Paved roads w/open ditches, 50% imp, HSG B (3S)
0.210	32	Permeable Paver Driveway parking, HSG B (3S)
13.250	60	Woods, Good, HSG B (3S)
15.800	60	TOTAL AREA

Heritage Rd Subdivision Proposed

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
15.800	HSG B	3S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
15.800		TOTAL AREA

Summary for Subcatchment 3S: Developed

Runoff = 3.30 cfs @ 12.64 hrs, Volume= 0.553 af, Depth> 0.42"
 Routed to nonexistent node 8P

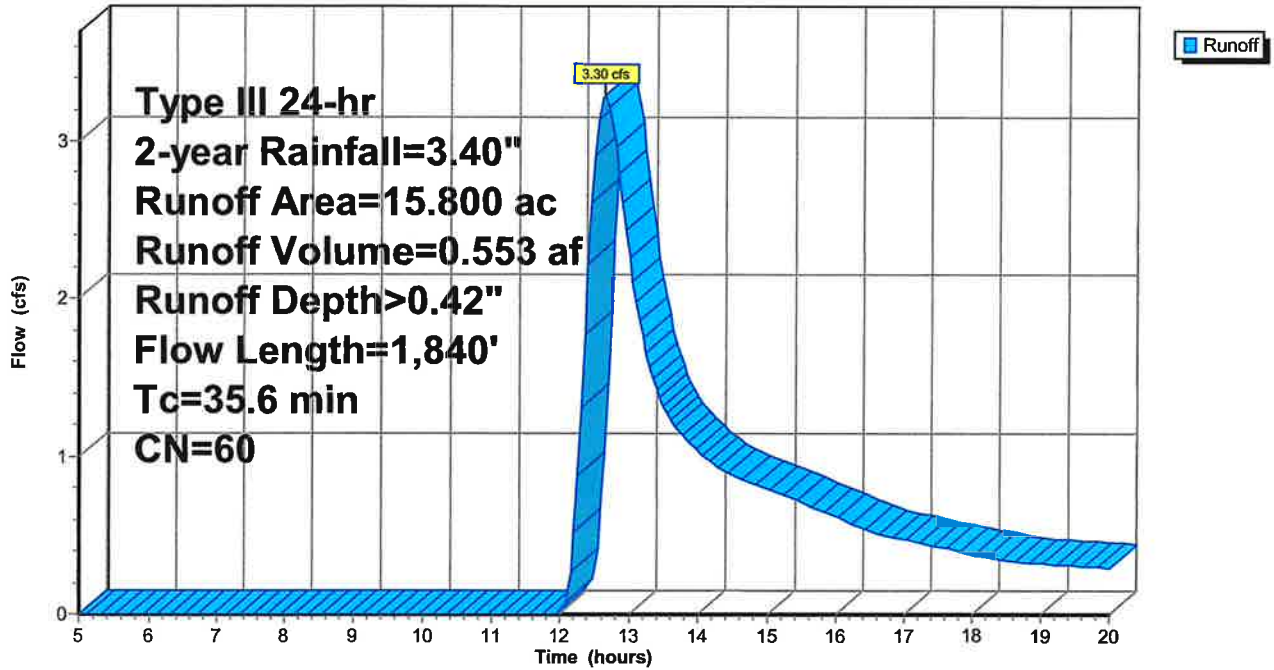
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year Rainfall=3.40"

Area (ac)	CN	Description
* 13.250	60	Woods, Good, HSG B
* 0.210	32	Permeable Paver Driveway parking, HSG B
* 1.400	52	Lawns >75% Grass cover, Good, HSG B
0.310	89	Paved roads w/open ditches, 50% imp, HSG B
* 0.530	69	50-75% Grass cover, Fair, HSG B side of access rd
0.100	85	Gravel roads, HSG B
15.800	60	Weighted Average
15.645		99.02% Pervious Area
0.155		0.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.2	1,100	0.0580	1.20		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
5.0	350	0.0550	1.17		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
2.1	350		2.84		Lake or Reservoir, Permeable Paver 40% void Mean Depth= 0.25'
35.6	1,840	Total			

Subcatchment 3S: Developed

Hydrograph



Summary for Subcatchment 3S: Developed

Runoff = 10.12 cfs @ 12.56 hrs, Volume= 1.385 af, Depth> 1.05"
 Routed to nonexistent node 8P

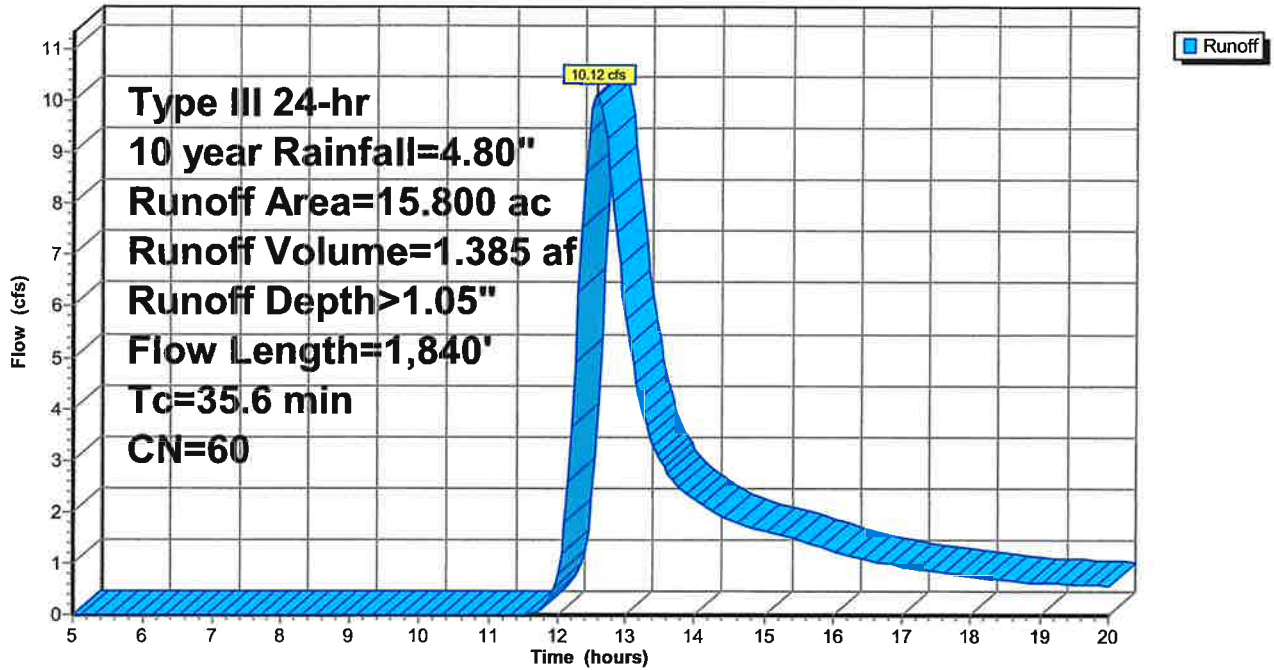
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10 year Rainfall=4.80"

Area (ac)	CN	Description
* 13.250	60	Woods, Good, HSG B
* 0.210	32	Permeable Paver Driveway parking, HSG B
* 1.400	52	Lawns >75% Grass cover, Good, HSG B
0.310	89	Paved roads w/open ditches, 50% imp, HSG B
* 0.530	69	50-75% Grass cover, Fair, HSG B side of access rd
0.100	85	Gravel roads, HSG B
15.800	60	Weighted Average
15.645		99.02% Pervious Area
0.155		0.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.2	1,100	0.0580	1.20		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
5.0	350	0.0550	1.17		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
2.1	350		2.84		Lake or Reservoir, Permeable Paver 40% void Mean Depth= 0.25'
35.6	1,840	Total			

Subcatchment 3S: Developed

Hydrograph



Heritage Rd Subdivision Proposed

Type III 24-hr 25 year Rainfall=5.70"

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Summary for Subcatchment 3S: Developed

Runoff = 15.55 cfs @ 12.54 hrs, Volume= 2.040 af, Depth> 1.55"
 Routed to nonexistent node 8P

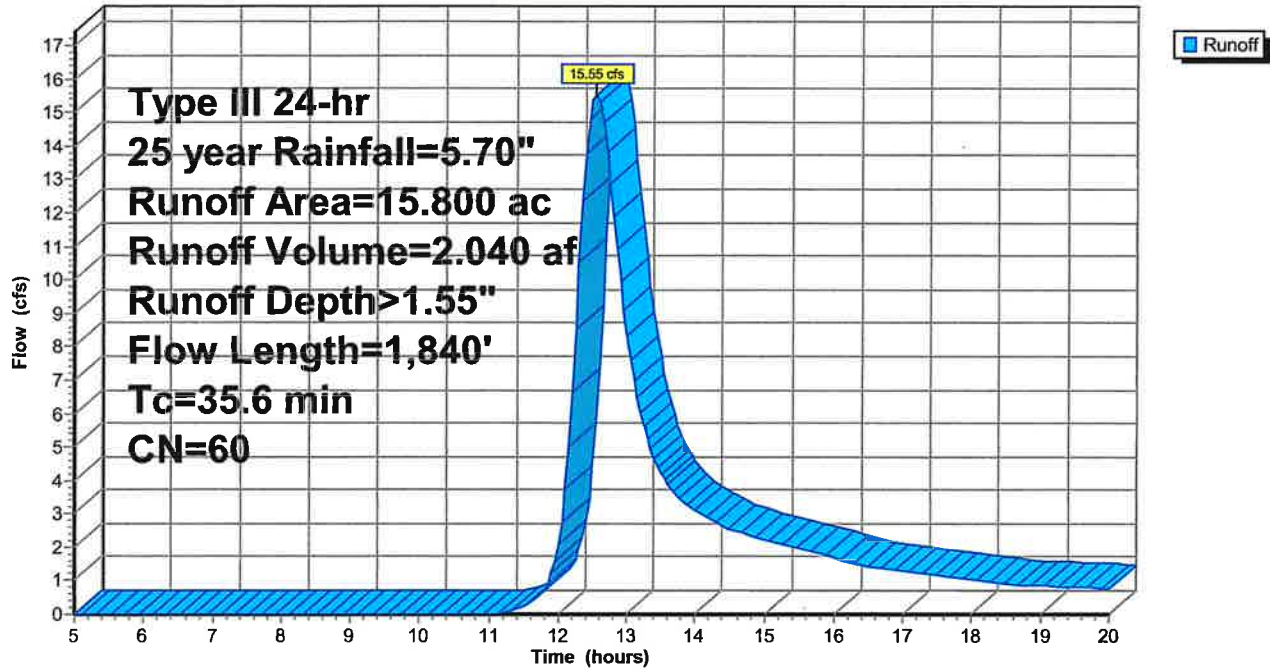
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 year Rainfall=5.70"

Area (ac)	CN	Description
* 13.250	60	Woods, Good, HSG B
* 0.210	32	Permeable Paver Driveway parking, HSG B
* 1.400	52	Lawns >75% Grass cover, Good, HSG B
0.310	89	Paved roads w/open ditches, 50% imp, HSG B
* 0.530	69	50-75% Grass cover, Fair, HSG B side of access rd
0.100	85	Gravel roads, HSG B
15.800	60	Weighted Average
15.645		99.02% Pervious Area
0.155		0.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.2	1,100	0.0580	1.20		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
5.0	350	0.0550	1.17		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
2.1	350		2.84		Lake or Reservoir, Permeable Paver 40% void Mean Depth= 0.25'
35.6	1,840	Total			

Subcatchment 3S: Developed

Hydrograph



Summary for Subcatchment 3S: Developed

Runoff = 19.48 cfs @ 12.54 hrs, Volume= 2.517 af, Depth> 1.91"
 Routed to nonexistent node 8P

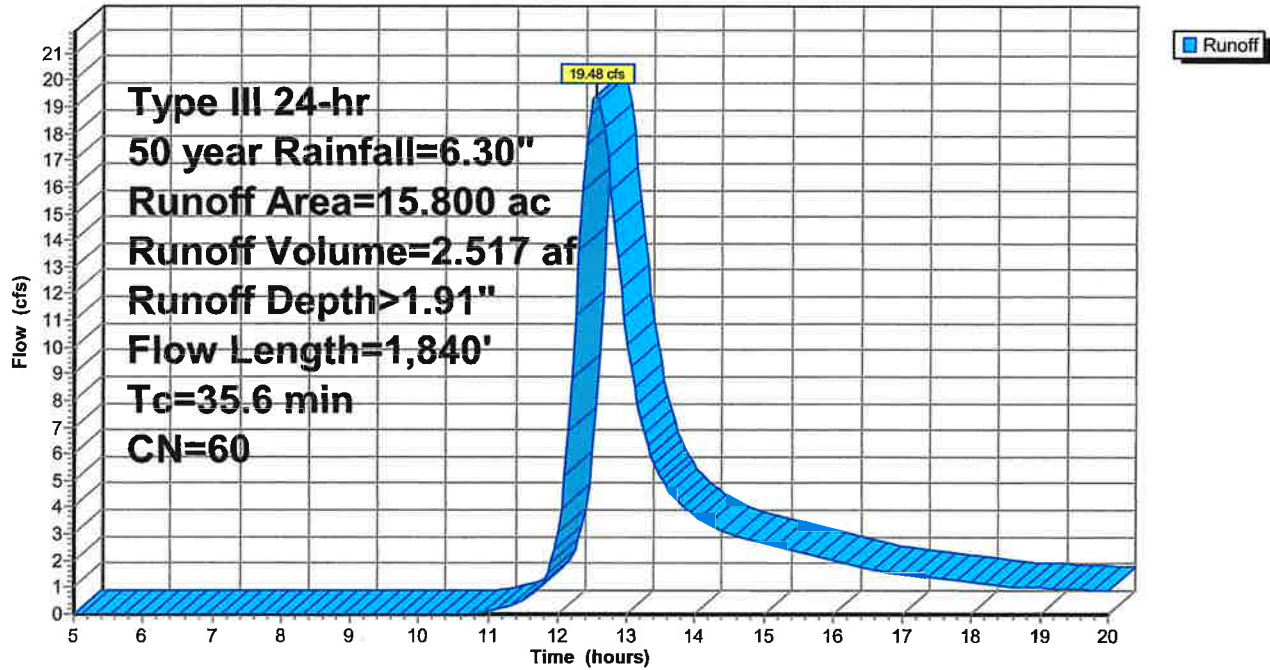
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 year Rainfall=6.30"

Area (ac)	CN	Description
* 13.250	60	Woods, Good, HSG B
* 0.210	32	Permeable Paver Driveway parking, HSG B
* 1.400	52	Lawns >75% Grass cover, Good, HSG B
0.310	89	Paved roads w/open ditches, 50% imp, HSG B
* 0.530	69	50-75% Grass cover, Fair, HSG B side of access rd
0.100	85	Gravel roads, HSG B
15.800	60	Weighted Average
15.645		99.02% Pervious Area
0.155		0.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.2	1,100	0.0580	1.20		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
5.0	350	0.0550	1.17		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
2.1	350		2.84		Lake or Reservoir, Permeable Paver 40% void Mean Depth= 0.25'
35.6	1,840	Total			

Subcatchment 3S: Developed

Hydrograph



Summary for Subcatchment 3S: Developed

Runoff = 25.01 cfs @ 12.53 hrs, Volume= 3.192 af, Depth> 2.42"
 Routed to nonexistent node 8P

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
* 13.250	60	Woods, Good, HSG B
* 0.210	32	Permeable Paver Driveway parking, HSG B
* 1.400	52	Lawns >75% Grass cover, Good, HSG B
0.310	89	Paved roads w/open ditches, 50% imp, HSG B
* 0.530	69	50-75% Grass cover, Fair, HSG B side of access rd
0.100	85	Gravel roads, HSG B
15.800	60	Weighted Average
15.645		99.02% Pervious Area
0.155		0.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	40	0.0400	0.05		Sheet Flow, sheet flow Woods: Dense underbrush n= 0.800 P2= 3.35"
15.2	1,100	0.0580	1.20		Shallow Concentrated Flow, shallow 1st leg 7% Woodland Kv= 5.0 fps
5.0	350	0.0550	1.17		Shallow Concentrated Flow, 2nd leg Woodland Kv= 5.0 fps
2.1	350		2.84		Lake or Reservoir, Permeable Paver 40% void Mean Depth= 0.25'
35.6	1,840	Total			

Subcatchment 3S: Developed

