



**ENGINEER'S REPORT**

for

**Single Family Subdivision**

1789 Dodge Road

Town of Amherst, Erie County, New York State

Prepared for

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Prepared by

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February 2025





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## Section 1 - Location & Description

This project is a development of a 6.71 acre site located on the east side of Dodge Road in the Town of Amherst for a single family subdivision. Construction will consist of a proposed public roadway, public storm sewer, sanitary sewer and water mains, lighting and landscaping improvements. Seventeen (17) lots are proposed for the roadway extension, fourteen (14) of which will be building lots. One lot will be used for stormwater management areas and two lots will be permeant open space areas. Currently the site consists of a single-family house but the majority of the site is undeveloped woodlands, wetlands and open grass areas. Approximately 0.12 acres of the site are designated as Federal wetlands. The proposed site development area to be disturbed for this project is approximately 5.61 acres when construction is completed.

## Section 2 - Water Service

An existing 8" public PVC water main is located along the west side of Dodge Road that will be the source of water for this project. Approximately 637 LF of new 8" AWWA C-900 PVC water main will be installed along the public road. New ¾" Type 'k' copper services will tap the new 8" main and be installed for building each lot. Two (2) new public fire hydrants will be installed with maximum spacing not to exceed 400 feet.

Pipe material for the new main, hydrant installation and all fittings, valves, etc. will be in accordance with Erie County Water Authority (ECWA) standards. Per hydrant flow test provided by ECWA, the existing static pressure in the 8" PVC water main on Dodge Road Road was approximately 96 psi and the residual pressure was 84 psi. The proposed main, hydrant branches and hydrants will be installed and tested in accordance with ECWA Standard Specifications. Inspection and certification of the installation and testing of the water samples will be done by the ECWA. There are no conflicts with existing utilities in the area, the land is currently vacant. The proposed water main will maintain physical separation from other utilities as specified per Ten States Standards.

### Domestic Summary:

Peak Operating Demand:	51 gpm
Water Main:	8" PVC on Dodge Road
Static Pressure:	96 psi (per ECWA)

See attached water demand calculations in Appendix A for additional information.

## Section 3 - Sanitary Sewer Service

Proposed is 557 lf of 8" SDR-35 PVC public sanitary sewer, connected to the existing 8" sanitary sewer main along the east side of Dodge Road. The proposed sewer extension will run along the south side of the proposed roadway extension. Each proposed building lot will wye connect to the proposed 8" sanitary sewer via a 6" SDR-35 PVC sanitary lateral at 2.0% minimum slope.

### Design Parameters

4-bedroom house: 440 gal/day/house x 17 houses = 7,480 gpd

7,480 gpd \* 4.28 = 31,985 gpd \*use peaking factor of 4.28

The hydraulic loading rate is per "Design Standards for Intermediate Sized Wastewater Treatment Systems" 2014, NYSDEC.

Downstream sewer capacity analysis is included within the Appendix of this report.

#### Section 4 - Storm Sewer Service

The site drains from the west to the east and south. A portion of the site drains to Dodge Road on the west side of the property. The rest of the site drains to the south side of the property or to an existing federal wetland on the east side of the property.

The proposed onsite storm sewer system for this development project consists of smooth interior and perforated HDPE pipes connected by a series of catch basins. The storm water management system for this project consists of one bioretention areas and one pond that has an outlet control structure prior to discharge. The ponds drain to the existing wetland. The bioretention areas proposed on site are designed to provide 100% of the required Runoff Reduction volume (RRv) for the site. The soils in the vicinity of the bioretention area are mainly USDA hydrologic group 'D' and therefore the system will be installed with underdrains per NYSDEC requirements. The bioretention areas will consist of 8" perforated HDPE underdrains in 12" of drainage gravel, followed by filter fabric and then finally 30" minimum of planting soil. Overflow catch basins will be installed to allow 6" maximum temporary ponding for RRv treatment. The proposed detention pond outlet control pipe is designed to accommodate the 1-year through 100-year storm events controlling the offsite runoff rate to less than the existing runoff rates for pre-development drainage area which drains to the existing stream.

Runoff reduction volume (RRv), water quality volume (WQv) and stormwater volume attenuation for the site is designed in accordance with Chapter 4 of the NYSDEC Stormwater design manual. The bioretention areas will be provided as a "green infrastructure" practice to provide runoff reduction to meet the Chapter 4 requirements for the currently undeveloped areas. Runoff from the site was looked at as a whole for the calculation of volume attenuation requirements. The amount of impervious cover post-development is 1.57 acres. The proposed detention ponds are designed to accommodate the 1-year through 100-year storm events controlling the offsite runoff rate to less than the existing runoff rates.

#### Town of Amherst Requirement:

The Town of Amherst requires that the 25-year proposed storm event be attenuated with detention and that the outlet be restricted to the 10-year existing storm event. This volume of 16,041 cf is accommodated in the detention basin at elevation 583.35. At this elevation, the outlet discharge will be restricted to 6.29 cfs from the pond, which is less than the existing 10-year peak runoff outflow of 7.47 cfs of the overall site.

#### Detention Pond Summary:

Top of basin elevation = 585.00  
Bottom of basin elevation = 578.50  
Max. pond storage volume = 20,698 cf @ 583.86

#### Water Quality Summary:

WQv req'd = 7,594 cf (0.174 ac-ft)  
RRv min. req'd = 4,182 cf (0.096 ac-ft)  
RRv provided - bioretention area = 4,224 cf (0.097 ac-ft)  
WQv provided - bioretention area = 3,370 cf (0.077 ac-ft)  
Total RRv + WQv provided = 4,224 cf + 3,370 cf = 7,594 cf (0.174 ac-ft)

Bioretention: 100% of minimum post-development Runoff Reduction volume (RRv)  
Area: 4,400 sf  
Bottom Elevation: 582.50

Detention: Comparison of the existing 1-year vs. the proposed 1-year runoff  
Comparison of the existing 10-year vs. the proposed 10-year runoff  
Comparison of the existing 10-year vs. the proposed 25-year runoff

Dodge Road Single-Family Subdivision

2/11/2025

3 of 3

Comparison of the existing 100-year vs. the proposed 100-year runoff

**Runoff Summary**

Drainage Area

Event	Ex. Runoff (cfs)	Pro. Runoff (cfs)*	Result (cfs)
1-year	2.32	2.29	-0.03
10-year	7.47	3.99	-3.48
25-year	10.75	6.29	-4.46
100-year	17.66	13.15	-4.51

\*See attached storm drainage calculations and drainage report in Appendix B for additional information.

## Appendix A

### Sanitary Sewer and Water Demand Calculations





## Downstream Sewer Capacity Analysis





Single Family Subdivision  
1789 Dodge Road, Amherst New York

Downstream Sewer Capacity Analysis Report



Project Description

This project is a development of a 6.7 acre +/- site located at 1789 Dodge Road in the Town of Amherst. Construction will consist of extension and completion of a proposed local street. The property will be subdivided to accommodate for 17 single family home lots to be built at a later date. The site will also include the construction of on-site utility, lighting and landscaping improvements.

The proposed sewer for this project will tie into the existing 8" sewer main along Dodge Road. Sewage will then be conveyed northeast and then west through the 24" and 36" French Trunk Sewer. Flows are then ultimately conveyed north through the 48" Trunk Sewer to the Town of Amherst Wastewater Treatment Facility #16.

The sewer will be a minimum of 8" diameter in size, and will be publicly owned by the Town of Amherst.

Node 1 – 1875 Dodge Road (8"):

Existing Peak Flow measured (wet weather event)	=	0.013 cfs (.007 mgd)*
Proposed 1789 Dodge Rd Subdivision Peak Flow	=	0.049 cfs **
Proposed Peak Flow	=	0.062 cfs
Existing Peak Flow measured (dry weather event)	=	0.253 cfs (.136 mgd)*
Proposed 1789 Dodge Rd Peak Flow	=	0.049 cfs **
Proposed Peak Flow	=	0.302 cfs

Theoretical capacity of existing 8" VTP pipe @ 0.3% = 0.614 cfs

Conclusion: The proposed peak flow is less than the capacity of the 8" VTP pipe, therefore there is sufficient capacity. At no time during the monitoring did the flow depth exceed the pipe diameter at Node 1 of the downstream monitoring points during the rain events monitored

Notes:

Pipe slopes, sizes and materials provided by Town of Amherst Engineering Department Sewer Maintenance Division

\* Converted from measurements in TECSmith report dated 4/20/21

\*\* See Sanitary Sewage Demand Calculations

Node 2 – North French Rd (24")

Existing Peak Flow measured (wet weather event)	=	9.582 cfs (5.155 mgd)*
Proposed 1789 Dodge Rd Subdivision Peak Flow	=	0.049 cfs **
Proposed Peak Flow	=	9.631 cfs

Capacity of existing 24" RCP pipe = 7.714 cfs (4.15 mgd)

Conclusion: Current flows the day following the 1.11" rainfall event exceeded the capacity of the existing 24" sewer pipe, but at no time during the monitoring period did the flow at any point slow or stall which would have caused a backup or flooding at the manhole. In addition, Sanitary Sewer Overflow (SSO) did not occur. I/I mitigation shall be required for the contribution proposed for this project.

Node 3 – North French near Millersport (24")

Existing Peak Flow measured (wet weather event)	=	9.439 cfs (5.078 mgd)*
Proposed 1789 Dodge Rd Subdivision Peak Flow	=	0.049 cfs **
Proposed Peak Flow	=	9.488 cfs

Capacity of existing 24" RCP pipe = 7.714 cfs (4.15 mgd)

Conclusion: Current flows the day following the 0.7" rainfall event exceeded the capacity of the existing 24" sewer pipe, but at no time during the monitoring period did the flow at any point slow or stall which would have caused a backup or flooding at the manhole. In addition, Sanitary Sewer Overflow (SSO) did not occur. I/I mitigation shall be required for the contribution proposed for this project.

Notes:

Pipe slopes, sizes and materials provided by Town of Amherst Engineering Department  
Sewer Maintenance Division

\* Converted from measurements in TECSmith report dated 4/20/21

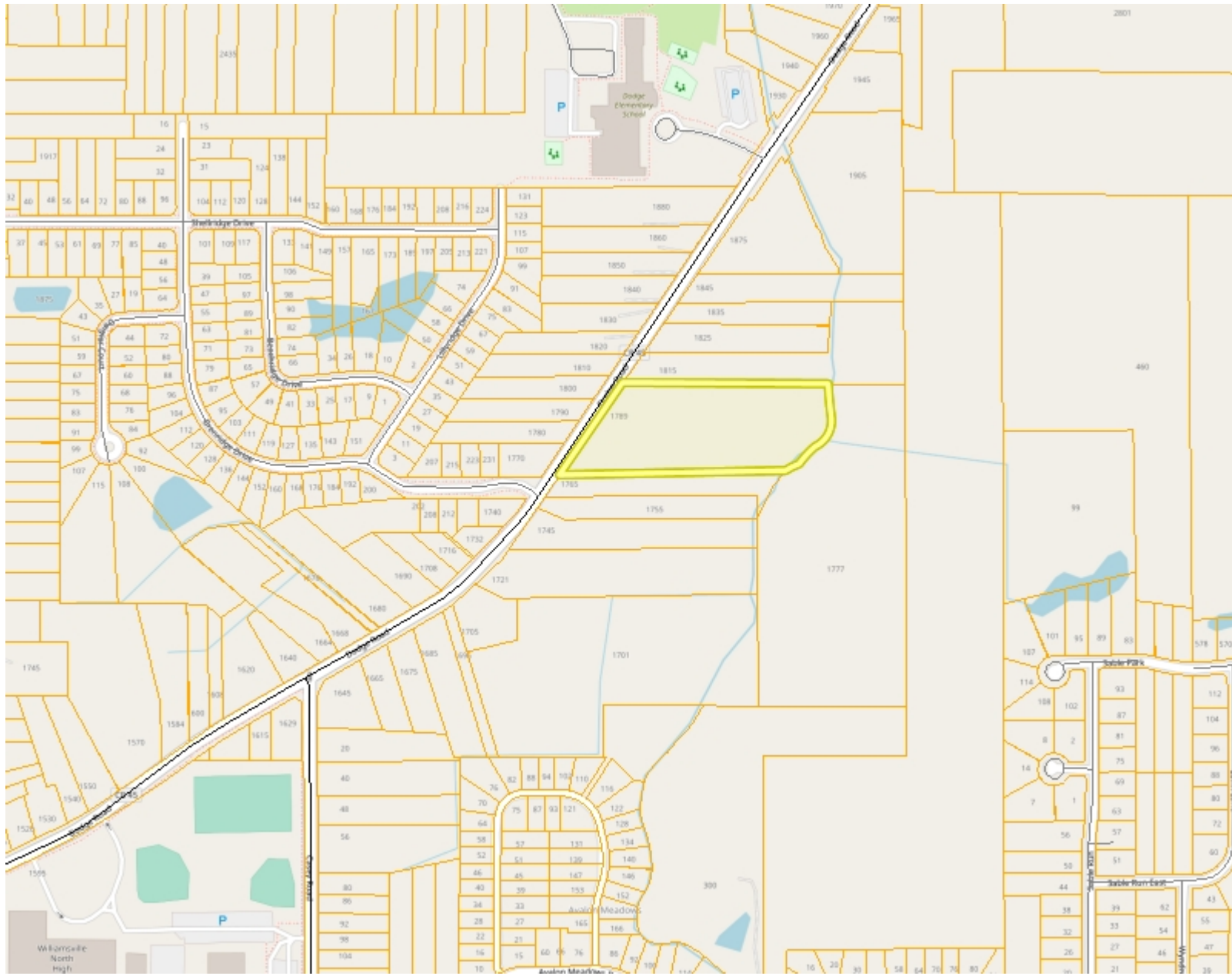
\*\* See Sanitary Sewage Demand Calculations

## Location Map





# Erie County On-Line Mapping Application



### Legend

- Parcels
- Streets and Highways**
  - Interstate
  - Primary State Road
  - Secondary State Road
  - County Road
  - Local Road

0 0.14 0.3 Miles

WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere  
THIS MAP IS NOT TO BE USED FOR NAVIGATION

**ERIE COUNTY**  
**DEPARTMENT OF ENVIRONMENT & PLANNING**  
**OFFICE OF GIS**

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

1: 9,028







## Sanitary Demand Calculations



**Sanitary Sewage Demand Calculations:**

1789 Dodge Road

$$440 \text{ gal/d/unit} \times 17 \text{ unit} = 7,480 \text{ gpd} \quad \text{*use 440 gallons per day per 4-bedroom house}$$

$$\text{Total Site Sanitary Demand:} = 7,480 \text{ gpd Average}$$

\* The hydraulic loading rate is per "Design Standards for Intermediate Sized Wastewater Treatment Systems" 2014, NYSDEC.

**Find Peak Sanitary Demand:**

Peaking Factor based on Population:

$$\text{Total demand: } 7,480 \text{ gpd} / 100 \text{ gpcd} = 75 \text{ per capita}$$

$$\text{Population (P)} = 75 \text{ people}$$

Peaking Factor:  $(18 + \sqrt{P}) / (4 + \sqrt{P})$  where P is in thousands

$$\text{Peaking Factor} = 4.28$$

$$\begin{aligned} \text{Peak Sanitary Demand} &= 7,480 \times 4.28 = 31,985 \text{ gpd} \\ &= 0.032 \text{ MGD} \\ &= 0.049 \text{ cfs} \end{aligned}$$

**Required Infiltration and Inflow Mitigation:**

$$\text{Peak Sanitary Flow} = 31,985 \text{ gpd} = 22.2 \text{ gpm}$$

$$4:1 \text{ offset flow per NYSDEC requirements} = 22.2 \times 4 = 88.8 \text{ gpm req'd}$$

$$\text{Mitigation Credit} = \$250 / \text{gpm}$$

$$\text{Mitigation Agreement Amount} = \$22,211.48$$



# TECSmith Monitoring Report



Date	Node 1			Node 2			Node 3			Rain. (inches)
	1875 Dodge Rd (8")			North French 24" (24")			N French EO Millersport (25")			
	FLOW (GAL x 1,000)	PEAK FLOW (MGD)	PEAK LEVEL (IN)	FLOW (GAL x 1,000)	PEAK FLOW (MDG)	PEAK LEVEL (IN)	FLOW (GAL x 1,000)	PEAK FLOW (MDG)	PEAK LEVEL (IN)	
3/15/2021	1.558	0.007	1.021	901.924	2.509	13.017	2451.565	3.138	16.050	0
3/16/2021	5.814	0.136	1.429	1851.456	2.431	12.927	2362.168	2.987	15.828	0
3/17/2021	3.897	0.117	1.276	1833.935	2.354	12.793	2359.427	3.078	15.946	0
3/18/2021	3.526	0.007	0.965	1810.464	2.378	12.837	2259.529	3.071	15.681	0
3/19/2021	2.127	0.006	0.722	1777.378	2.272	12.485	2186.568	2.873	15.229	0
3/20/2021	2.908	0.006	0.733	1835.479	2.712	13.695	2278.543	3.111	16.386	0
3/21/2021	1.471	0.005	0.891	1782.700	2.522	13.292	2306.858	3.161	16.261	0
3/22/2021	2.153	0.010	0.804	1756.434	2.338	12.610	2220.316	3.332	15.590	0
3/23/2021	1.794	0.012	0.909	1750.216	2.354	12.508	2165.263	2.942	15.598	0
3/24/2021	1.334	0.010	0.803	1800.258	2.322	12.720	2209.647	2.930	15.544	0.04
3/25/2021	2.060	0.006	0.854	1818.708	2.327	12.425	2191.851	2.903	15.835	0.1
3/26/2021	3.490	0.007	0.854	3394.673	5.155	32.200	3430.052	4.993	21.358	1.11
3/27/2021	2.520	0.008	0.748	2789.517	3.572	15.870	3247.935	4.098	19.565	0.01
3/28/2021	2.553	0.008	0.911	3084.039	4.855	24.342	3297.641	4.788	20.613	0.38
3/29/2021	1.726	0.006	0.907	1755.045	3.449	16.146	3240.507	4.662	19.849	0
3/30/2021	2.827	0.008	0.856	---	---	---	2916.616	3.723	17.876	0
3/31/2021	2.680	0.005	0.742	---	---	---	2702.193	3.508	17.153	0.15
4/1/2021	2.651	0.005	0.843	---	---	---	2714.987	3.372	16.766	0.01
4/2/2021	2.859	0.005	0.796	---	---	---	2505.293	3.203	16.568	0
4/3/2021	2.990	0.007	0.938	---	---	---	2525.733	3.514	16.884	0
4/4/2021	2.417	0.009	1.135	---	---	---	2373.848	3.533	16.405	0
4/5/2021	2.483	0.007	0.912	---	---	---	2266.588	3.080	15.777	0.03
4/6/2021	2.944	0.006	0.910	825.215	2.343	12.291	2252.135	2.939	15.594	0
4/7/2021	2.503	0.007	0.950	1846.587	2.402	12.565	2309.849	3.101	15.697	0.02
4/8/2021	2.082	0.008	1.024	1828.950	2.483	12.622	2261.713	3.460	15.656	0
4/9/2021	2.374	0.010	1.239	1831.352	2.368	12.721	2193.455	3.117	15.464	0.08
4/10/2021	2.260	0.008	1.127	1858.770	2.612	13.316	2316.192	3.504	16.334	0
4/11/2021	2.859	0.007	1.008	3042.992	5.147	30.730	3249.342	5.078	22.008	0.7
4/12/2021	2.895	0.015	0.889	2708.829	3.298	15.235	3106.551	4.305	19.509	0.05
4/13/2021	2.801	0.012	0.802	2463.126	3.020	14.069	2867.249	4.024	17.279	0
4/14/2021	2.756	0.008	0.821	2271.773	2.756	13.315	2145.403	3.626	16.706	0
4/15/2021	3.060	0.013	1.094	2356.976	2.957	14.016	2774.988	3.769	17.125	0.26
4/16/2021	3.263	0.008	1.131	2855.766	3.437	15.096	3174.564	3.761	17.887	0.11
4/17/2021	2.860	0.007	1.015	2575.069	3.305	14.893	3010.105	3.907	17.949	0
4/18/2021	3.009	0.009	0.913	2359.773	3.104	14.318	2819.097	3.644	17.325	0
4/19/2021	2.925	0.008	0.910	2144.199	2.646	12.962	2572.211	3.217	16.430	0.05
4/20/2021	1.089	0.007	0.914	928.283	2.885	13.472	1081.133	3.048	15.628	0.2
---	---	---	---	---	---	---	---	---	---	3.3

Yellow Highlights are Wet Weather Days

	MGD	CFS
Wet	0.007	0.013
Dry	0.136	0.253

	MGD	CFS
	5.155	9.582

	MGD	CFS
	5.078	9.439

Date: April 20, 2021

## **SANITARY SEWER FLOW CAPACITY STUDY – Summary Review**

**Prepared For:** 1789 Dodge Road Capacity Analysis

Christopher Wood  
487 Main Street, Suite 600  
Buffalo, New York 14203

**Project Name:** 1789 Dodge Road Capacity Analysis

**Flow Monitoring Period:** March 1, 2021 to April 13, 2021

**Rain Events (> 0.5-inches) Monitored:** March 26, (1.11”), and April 11 (0.70”)

**Number of Monitoring Nodes:** Three (3) downstream manholes

### **Node Locations and Descriptions:**

- Node 1            1875 Dodge Rd (8")
- Node 2            North French 24" (24")
- Node 3            N French EO Millersport (25")

### **Summary Conclusion:**

Based on the data presented in this report, specifically the flow depth measurements recorded (see graphs below)

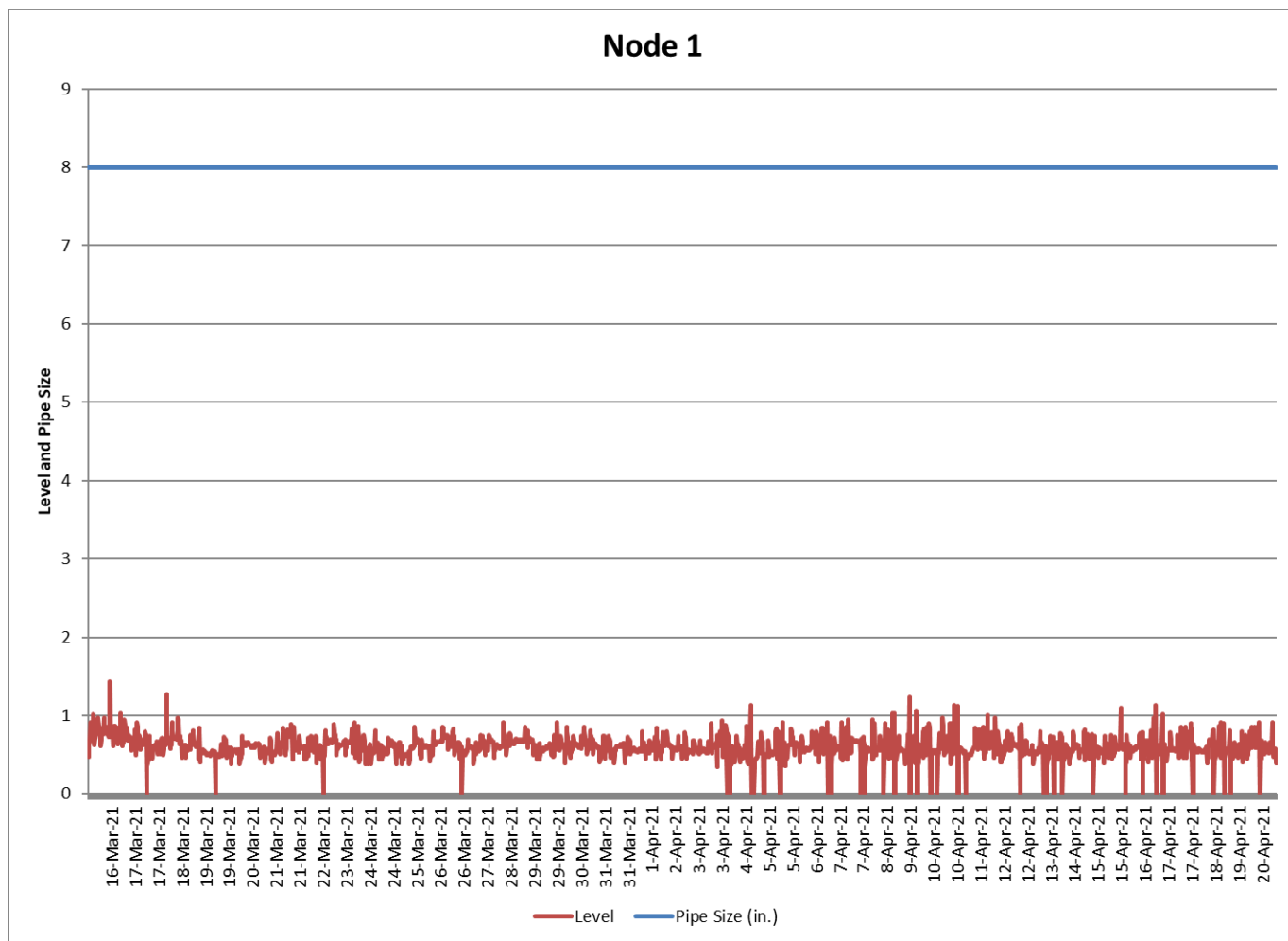
- At no time did the flow depth exceed pipe diameter at Nodes 1 and 3 of the downstream monitoring points during the wet weather vents monitored.
- Three times the flow depth exceed pipe diameter at Node 2 of the downstream monitoring points during the wet weather vents monitored.



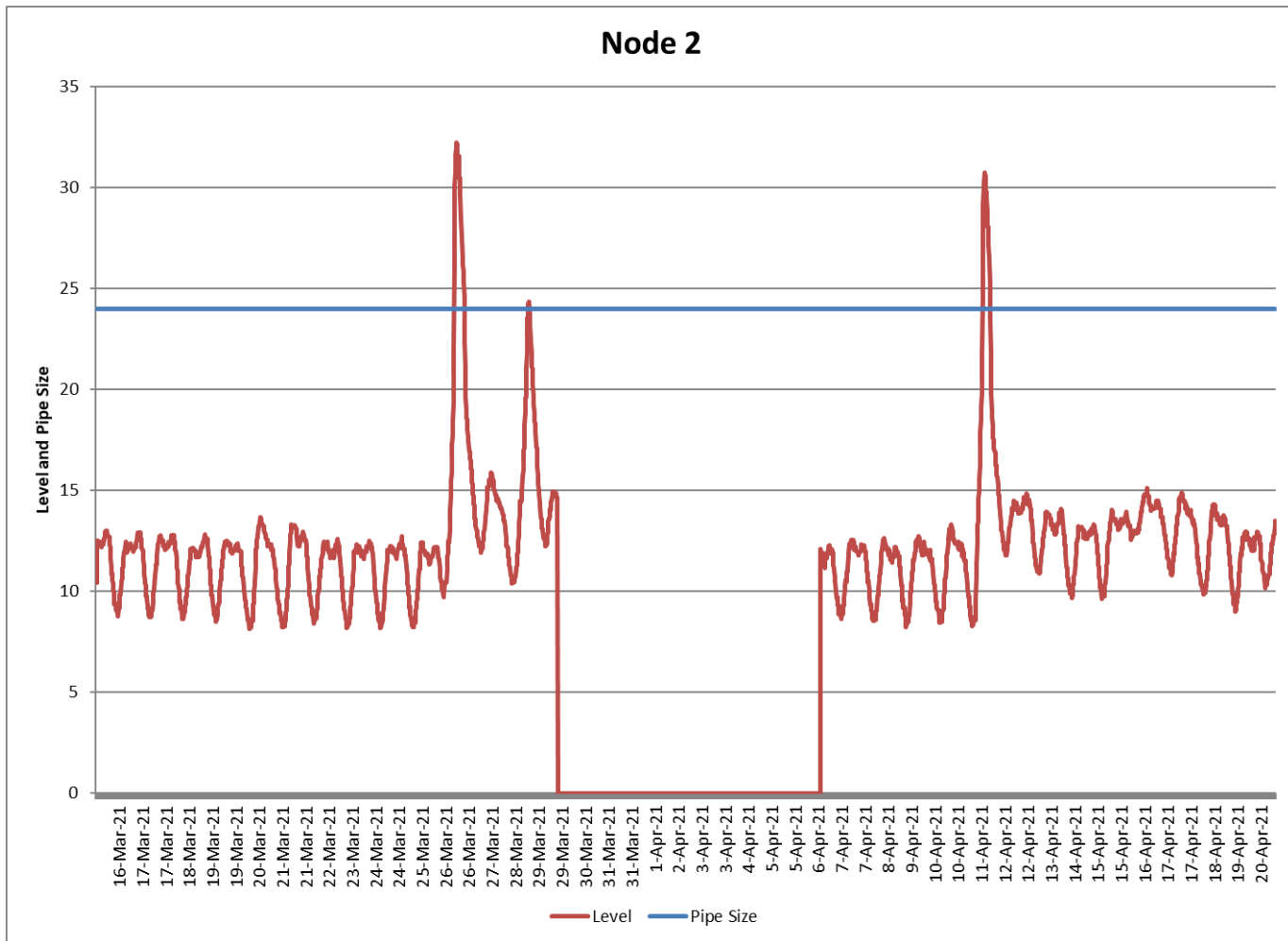
### Depth of Flow Capacity Summary:

Depth of flow capacity is based on diameter of pipe. See graphs below.

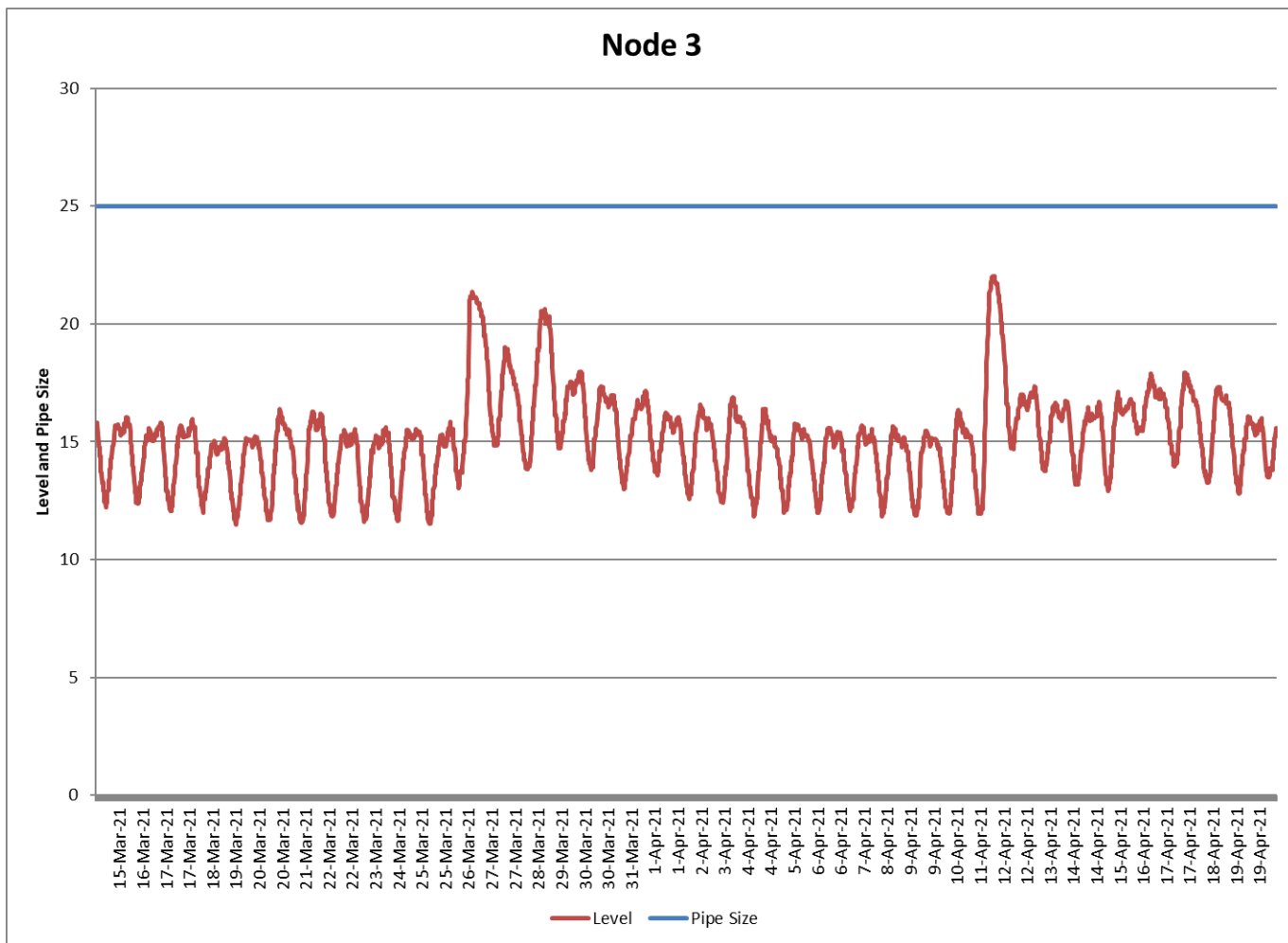
- At no time during the monitoring period did depth of flow exceed pipe diameter at Node 1.



- Three times during the monitoring period did depth of flow exceed pipe diameter at Node 2.



- At no time during the monitoring period did depth of flow exceed pipe diameter at Node 3.



**(T) Amherst Engineering Department Sewer Maintenance Division  
Downstream Routing Map and Node Maps**



Town of Amherst Engineering Department  
Sewer Maintenance Division

Main Sanitary Sewer Interceptors  
DOWNSTREAM SEWER  
FRENCH/DODGE TRUNK SEWER  
TRANSIT ROAD TO PLANT #16  
JANUARY 2021

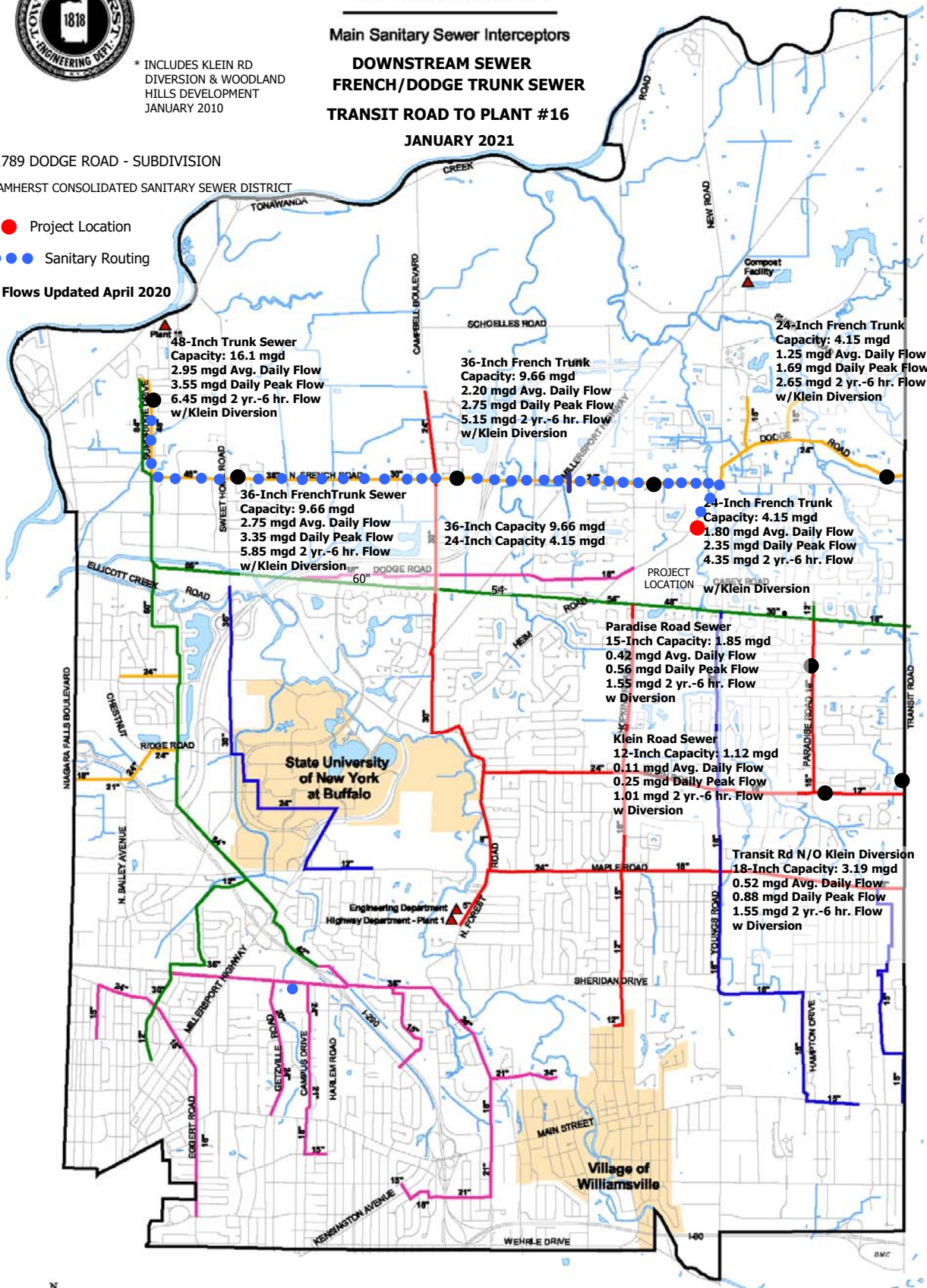
\* INCLUDES KLEIN RD  
DIVERSION & WOODLAND  
HILLS DEVELOPMENT  
JANUARY 2010

1789 DODGE ROAD - SUBDIVISION

AMHERST CONSOLIDATED SANITARY SEWER DISTRICT

- Project Location
- Sanitary Routing

Flows Updated April 2020



Plant #1  
48-Inch Trunk Sewer  
Capacity: 16.1 mgd  
2.95 mgd Avg. Daily Flow  
3.55 mgd Daily Peak Flow  
6.45 mgd 2 yr.-6 hr. Flow  
w/Klein Diversion

36-Inch French Trunk  
Capacity: 9.66 mgd  
2.20 mgd Avg. Daily Flow  
2.75 mgd Daily Peak Flow  
5.15 mgd 2 yr.-6 hr. Flow  
w/Klein Diversion

24-Inch French Trunk  
Capacity: 4.15 mgd  
1.25 mgd Avg. Daily Flow  
1.69 mgd Daily Peak Flow  
2.65 mgd 2 yr.-6 hr. Flow  
w/Klein Diversion

36-Inch French Trunk Sewer  
Capacity: 9.66 mgd  
2.75 mgd Avg. Daily Flow  
3.35 mgd Daily Peak Flow  
5.85 mgd 2 yr.-6 hr. Flow  
w/Klein Diversion

36-Inch Capacity 9.66 mgd  
24-Inch Capacity 4.15 mgd

24-Inch French Trunk  
Capacity: 4.15 mgd  
1.80 mgd Avg. Daily Flow  
2.35 mgd Daily Peak Flow  
4.35 mgd 2 yr.-6 hr. Flow  
w/Klein Diversion

Paradise Road Sewer  
15-Inch Capacity: 1.85 mgd  
0.42 mgd Avg. Daily Flow  
0.56 mgd Daily Peak Flow  
1.55 mgd 2 yr.-6 hr. Flow  
w Diversion

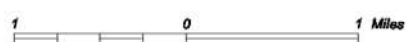
Klein Road Sewer  
12-Inch Capacity: 1.12 mgd  
0.11 mgd Avg. Daily Flow  
0.25 mgd Daily Peak Flow  
1.01 mgd 2 yr.-6 hr. Flow  
w Diversion

Transit Rd N/O Klein Diversion  
18-Inch Capacity: 3.19 mgd  
0.52 mgd Avg. Daily Flow  
0.88 mgd Daily Peak Flow  
1.55 mgd 2 yr.-6 hr. Flow  
w Diversion

State University of New York at Buffalo

Engineering Department  
Highway Department - Plant 1

Village of Williamsville







**FLOW METER # 3**  
3325 NORTH FRENCH RD  
RIM: 581.50 +/-  
INVERT: 563.61  
24-INCH RCP @ 0.08%  
TOA TEMP. FLOW METER





## Water Demand Calculations



Domestic Water Demand Calculations:

Dodge Road Subdivision Typical Demand:

Q = 6,160 gpd \* use 100% of Total Sanitary Average Daily Demand

Q = 4.28 gpm \* assume 24 hour day

Dodge Road Subdivision Peak Demand:

$Q_{peak} = 17 \text{ Units} @ 3 \text{ gpm} = 51 \text{ gpm}$  Peak Demand  
 \* use 3 gpm per unit (per ECDOH peak flow)

Headlosses:

$Q_{peak} = 51 \text{ gpm}$

Pipe = 8 inch C-900 PVC C = 140

Length = 637 LF (approx. distance from HDY M04-G45 on Goodrich Rd to last prop. hydrant)

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(637)(51)^{1.85}}{(140)^{1.85} (8)^{4.866}} = 0.04 \text{ ft} = 0.02 \text{ psi}$$

$\Delta \text{ elev} = -3 \text{ ft} = -1.30 \text{ psi}$  \*approximate 6' elev. drop to north unit @ building 11

Total Losses = -1.3 psi

Static Pressure = 96 psi \*per ECWA

Residual Pressure in main @ last prop. Hydrant =  $84 - 3.2 = 97.3 \text{ psi}$

**Peak Domestic Demand:**

Dodge Road Subdivision

$$14 \text{ Units} @ 3 \text{ gpm} = 42 \text{ gpm} \text{ Peak Domestic Demand}$$

\* use 3 gpm per unit (per ECDOH peak flow)

**Water Demand Calculations (fire):**

Fire Flow, Q = 1000 gpm \* per ISO Guidelines

Elev. @ ex. residual hyd. K04G12 = 590 ft

Static pressure @ ex. hyd. K04G12 = 96 psi \* per ECWA

Elev. @ connection: = 589.00 ft

$\Delta$  elev ex. hyd. K04G12 to connection = -1.00 = -0.43 psi (positive is decrease in pressure from static)  
 (negative is increase in pressure from static)

Static pressure @ connection = 96.4 psi

Elev. @ furthest pro. hydrant = 586 ft

$\Delta$  elev connection point to furthest hydrant = -3 = -1.3 psi (positive is decrease in pressure from static)  
 (negative is increase in pressure from static)

**Find residual at furthest hydrant using fire flow:**

Headlosses:

$Q_{\text{peak}} = 1000 \text{ gpm}$

Pipe = 8 inch C-900 PVC C = 140

Length = 637 LF (approx. distance from connection to furthest pro. hydrant)

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(637)(1000)^{1.85}}{(140)^{1.85} (8)^{4.866}} = 10.19 \text{ ft} = 4.4 \text{ psi}$$

Residual pressure at furthest pro. Hydrant = Static pressure at connection - headloss -  $\Delta$  elev  
 = 96.4 - 4.4 - -1.3  
 = 93.3 psi

**Find residual at furthest hydrant using total flow:**

Total flow = Fire Flow + Peak Domestic Flow = 1042 gpm

Headlosses:

$Q_{\text{peak}} = 1042 \text{ gpm}$

Pipe = 8 inch C-900 PVC C = 140

Length = 637 LF (approx. distance from connection to furthest pro. hydrant)

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(1465)(1084)^{1.85}}{(140)^{1.85} (8)^{4.866}} = 10.99 \text{ ft} = 4.8 \text{ psi}$$

Residual pressure at furthest pro. Hydrant = Static pressure at connection - headloss -  $\Delta$  elev  
 = 96.4 - 4.8 - -1.3  
 = 93.0 psi

**Sanitary Sewage Demand Calculations:**

**Proposed Subdivision:**

$$14 \text{ Lots} \quad 4 \text{ bdrm} \quad @ \quad 440 \text{ gpd} \quad = \quad 6,160 \text{ gpd}$$

$$\text{Total Average Daily Demand} = 6,160 \text{ gpd}$$

**Find Peak Sanitary Demand:**

$$\text{Total demand: } 6,160 \text{ gpd} / 100 \text{ gpcd} = 62 \text{ per capita}$$

$$\text{Population (P)} = 62 \text{ people}$$

$$\text{Peaking Factor: } (18 + \sqrt{P}) / (4 + \sqrt{P}) \quad \text{where P is in thousands}$$

$$\text{Peaking Factor} = 4.30$$

$$\begin{aligned} \text{Peak Sanitary Demand} &= 6,160 \times 4.30 = 26,460 \text{ gpd} \\ &= 0.026 \text{ MGD} \\ &= 0.041 \text{ cfs} \end{aligned}$$

**Required Infiltration and Inflow Mitigation:**

$$\text{Peak Sanitary Flow} = 26,460 \text{ gpd} = 18.4 \text{ gpm}$$

$$4:1 \text{ offset flow per NYSDEC requirements} = 18.4 \times 4 = 73.5 \text{ gpm req'd}$$

$$\text{Mitigation Credit} = 250 \text{ /gpm}$$

$$\text{Mitigation Agreement Amount} = \$18,375.27$$



## Appendix B

### Storm System Drainage Calculations

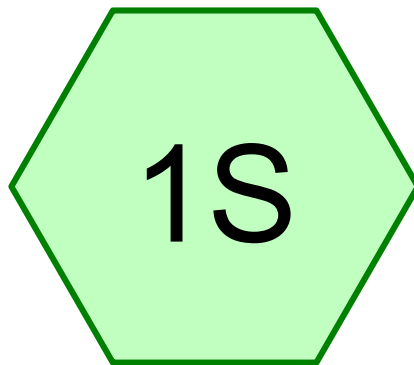




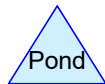
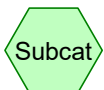
## Existing Runoff



# PRE-DEVELOPMENT



DA PRE DEV



## **20.247 - Dodge Road Hydrology**

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### **Project Notes**

Rainfall events imported from "NRCS-Rain.txt" for 7041 NY Erie

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### Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	NRCC 24-hr	A	Default	24.00	1	1.87	2
2	10-Year	NRCC 24-hr	A	Default	24.00	1	3.14	2
3	25-Year	NRCC 24-hr	A	Default	24.00	1	3.84	2
4	100-Year	NRCC 24-hr	A	Default	24.00	1	5.23	2

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### Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.060	96	Gravel surface, HSG D (1S)
0.050	98	Paved parking, HSG D (1S)
0.070	98	Roofs, HSG D (1S)
6.530	79	Woods/grass comb., Good, HSG D (1S)
<b>6.710</b>	<b>79</b>	<b>TOTAL AREA</b>

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### Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.060	0.000	0.060	Gravel surface	1S
0.000	0.000	0.000	0.050	0.000	0.050	Paved parking	1S
0.000	0.000	0.000	0.070	0.000	0.070	Roofs	1S
0.000	0.000	0.000	6.530	0.000	6.530	Woods/grass comb., Good	1S
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>6.710</b>	<b>0.000</b>	<b>6.710</b>	<b>TOTAL AREA</b>	

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 1-Year Rainfall=1.87"

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### Summary for Subcatchment 1S: DA PRE DEV

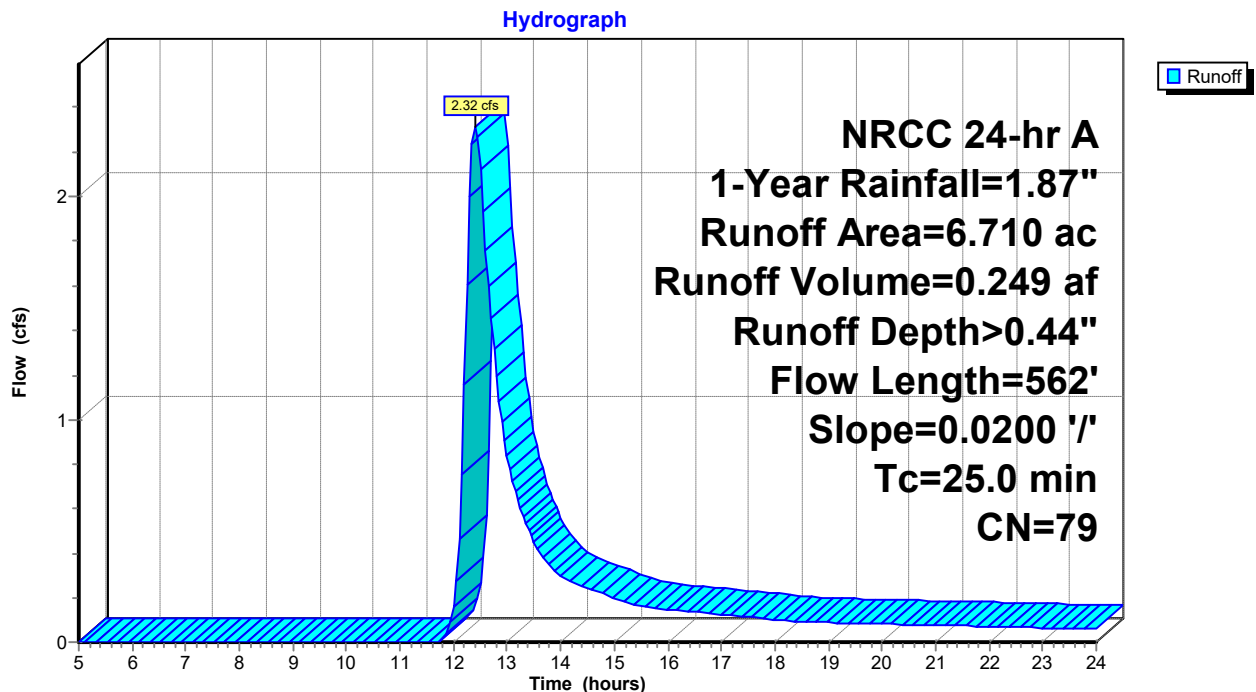
Runoff = 2.32 cfs @ 12.41 hrs, Volume= 0.249 af, Depth> 0.44"  
Routed to nonexistent node 11L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 1-Year Rainfall=1.87"

Area (ac)	CN	Description
6.530	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
0.060	96	Gravel surface, HSG D
0.070	98	Roofs, HSG D
6.710	79	Weighted Average
6.590		98.21% Pervious Area
0.120		1.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0200	0.10		<b>Sheet Flow, WOODS</b> Grass: Dense n= 0.240 P2= 2.20"
7.8	462	0.0200	0.99		<b>Shallow Concentrated Flow, WOODS</b> Short Grass Pasture Kv= 7.0 fps
25.0	562	Total			

### Subcatchment 1S: DA PRE DEV





**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Hydrograph for Subcatchment 1S: DA PRE DEV**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00	19.25	1.78	0.40	0.09
5.25	0.10	0.00	0.00	19.50	1.79	0.40	0.08
5.50	0.11	0.00	0.00	19.75	1.79	0.41	0.08
5.75	0.11	0.00	0.00	20.00	1.80	0.41	0.08
6.00	0.12	0.00	0.00	20.25	1.80	0.41	0.08
6.25	0.13	0.00	0.00	20.50	1.81	0.41	0.08
6.50	0.13	0.00	0.00	20.75	1.81	0.42	0.08
6.75	0.14	0.00	0.00	21.00	1.82	0.42	0.08
7.00	0.15	0.00	0.00	21.25	1.82	0.42	0.07
7.25	0.16	0.00	0.00	21.50	1.83	0.42	0.07
7.50	0.17	0.00	0.00	21.75	1.83	0.43	0.07
7.75	0.18	0.00	0.00	22.00	1.84	0.43	0.07
8.00	0.19	0.00	0.00	22.25	1.84	0.43	0.07
8.25	0.20	0.00	0.00	22.50	1.85	0.43	0.07
8.50	0.21	0.00	0.00	22.75	1.85	0.44	0.07
8.75	0.22	0.00	0.00	23.00	1.85	0.44	0.06
9.00	0.23	0.00	0.00	23.25	1.86	0.44	0.06
9.25	0.24	0.00	0.00	23.50	1.86	0.44	0.06
9.50	0.26	0.00	0.00	23.75	1.87	0.45	0.06
9.75	0.27	0.00	0.00	24.00	<b>1.87</b>	<b>0.45</b>	0.06
10.00	0.29	0.00	0.00				
10.25	0.31	0.00	0.00				
10.50	0.33	0.00	0.00				
10.75	0.36	0.00	0.00				
11.00	0.39	0.00	0.00				
11.25	0.44	0.00	0.00				
11.50	0.50	0.00	0.00				
11.75	0.62	0.00	0.00				
12.00	0.88	0.04	0.16				
12.25	1.25	0.15	<b>1.61</b>				
12.50	1.37	0.20	<b>2.12</b>				
12.75	1.43	0.23	1.32				
13.00	1.48	0.25	0.83				
13.25	1.51	0.26	0.60				
13.50	1.54	0.28	0.45				
13.75	1.56	0.29	0.36				
14.00	1.58	0.30	0.30				
14.25	1.60	0.30	0.27				
14.50	1.61	0.31	0.24				
14.75	1.63	0.32	0.22				
15.00	1.64	0.33	0.20				
15.25	1.65	0.33	0.18				
15.50	1.66	0.34	0.16				
15.75	1.67	0.34	0.15				
16.00	1.68	0.35	0.15				
16.25	1.69	0.35	0.14				
16.50	1.70	0.36	0.14				
16.75	1.71	0.36	0.13				
17.00	1.72	0.37	0.12				
17.25	1.73	0.37	0.12				
17.50	1.74	0.38	0.11				
17.75	1.74	0.38	0.11				
18.00	1.75	0.38	0.10				
18.25	1.76	0.39	0.09				
18.50	1.76	0.39	0.09				
18.75	1.77	0.39	0.09				
19.00	1.77	0.40	0.09				

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 10-Year Rainfall=3.14"

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### Summary for Subcatchment 1S: DA PRE DEV

Runoff = 7.47 cfs @ 12.37 hrs, Volume= 0.718 af, Depth> 1.28"  
Routed to nonexistent node 11L

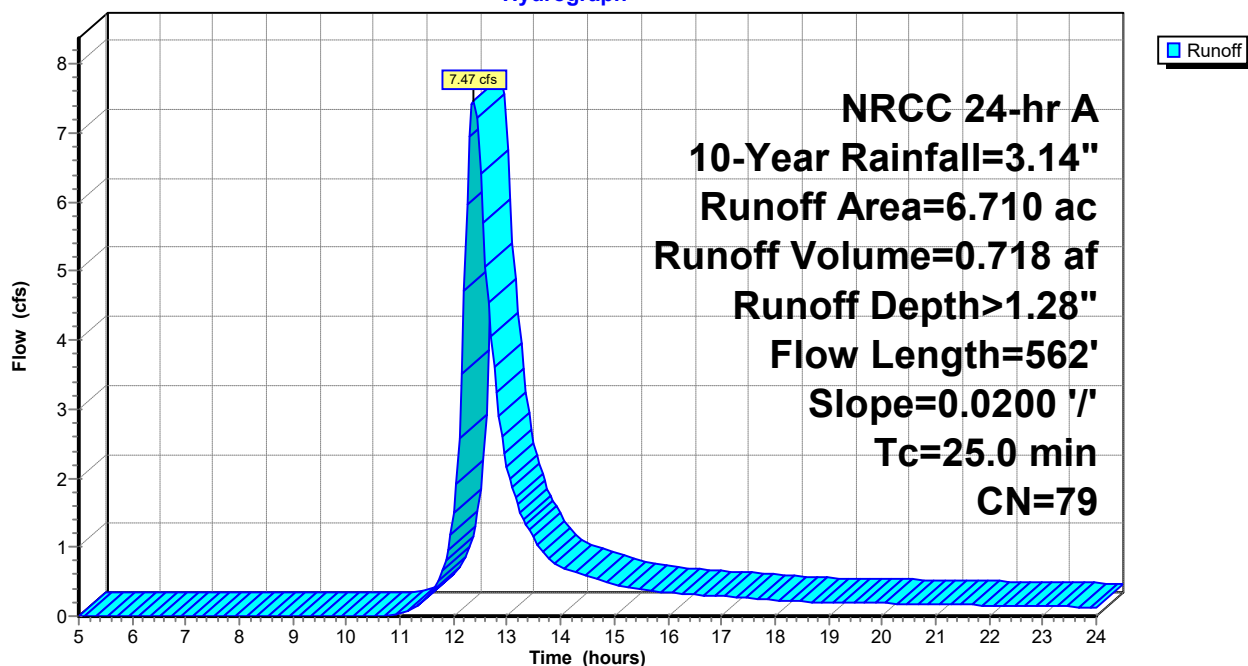
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
6.530	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
0.060	96	Gravel surface, HSG D
0.070	98	Roofs, HSG D
6.710	79	Weighted Average
6.590		98.21% Pervious Area
0.120		1.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0200	0.10		<b>Sheet Flow, WOODS</b> Grass: Dense n= 0.240 P2= 2.20"
7.8	462	0.0200	0.99		<b>Shallow Concentrated Flow, WOODS</b> Short Grass Pasture Kv= 7.0 fps
25.0	562	Total			

### Subcatchment 1S: DA PRE DEV

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 10-Year Rainfall=3.14"

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**Hydrograph for Subcatchment 1S: DA PRE DEV**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.16	0.00	0.00	19.25	2.99	1.18	0.20
5.25	0.17	0.00	0.00	19.50	3.00	1.19	0.19
5.50	0.18	0.00	0.00	19.75	3.01	1.19	0.19
5.75	0.19	0.00	0.00	20.00	3.02	1.20	0.19
6.00	0.20	0.00	0.00	20.25	3.03	1.21	0.18
6.25	0.21	0.00	0.00	20.50	3.04	1.21	0.18
6.50	0.22	0.00	0.00	20.75	3.04	1.22	0.18
6.75	0.24	0.00	0.00	21.00	3.05	1.23	0.17
7.00	0.25	0.00	0.00	21.25	3.06	1.23	0.17
7.25	0.26	0.00	0.00	21.50	3.07	1.24	0.16
7.50	0.28	0.00	0.00	21.75	3.08	1.24	0.16
7.75	0.29	0.00	0.00	22.00	3.08	1.25	0.16
8.00	0.31	0.00	0.00	22.25	3.09	1.26	0.15
8.25	0.33	0.00	0.00	22.50	3.10	1.26	0.15
8.50	0.35	0.00	0.00	22.75	3.11	1.27	0.15
8.75	0.36	0.00	0.00	23.00	3.11	1.27	0.14
9.00	0.38	0.00	0.00	23.25	3.12	1.28	0.14
9.25	0.41	0.00	0.00	23.50	3.13	1.28	0.14
9.50	0.43	0.00	0.00	23.75	3.13	1.29	0.13
9.75	0.46	0.00	0.00	24.00	<b>3.14</b>	<b>1.29</b>	0.13
10.00	0.49	0.00	0.00				
10.25	0.52	0.00	0.00				
10.50	0.56	0.00	0.00				
10.75	0.61	0.00	0.01				
11.00	0.66	0.01	0.05				
11.25	0.74	0.02	0.12				
11.50	0.84	0.03	0.26				
11.75	1.03	0.08	0.56				
12.00	1.48	0.25	1.49				
12.25	2.11	0.59	<b>5.96</b>				
12.50	2.30	0.70	<b>6.40</b>				
12.75	2.40	0.77	3.62				
13.00	2.48	0.82	2.16				
13.25	2.53	0.86	1.50				
13.50	2.58	0.89	1.11				
13.75	2.62	0.92	0.87				
14.00	2.65	0.94	0.71				
14.25	2.68	0.96	0.64				
14.50	2.71	0.98	0.58				
14.75	2.73	1.00	0.52				
15.00	2.76	1.01	0.47				
15.25	2.78	1.03	0.42				
15.50	2.79	1.04	0.38				
15.75	2.81	1.05	0.36				
16.00	2.83	1.07	0.34				
16.25	2.85	1.08	0.33				
16.50	2.86	1.09	0.32				
16.75	2.88	1.10	0.30				
17.00	2.89	1.11	0.29				
17.25	2.90	1.12	0.27				
17.50	2.92	1.13	0.26				
17.75	2.93	1.14	0.25				
18.00	2.94	1.14	0.23				
18.25	2.95	1.15	0.22				
18.50	2.96	1.16	0.21				
18.75	2.97	1.17	0.20				
19.00	2.98	1.17	0.20				

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 25-Year Rainfall=3.84"

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### Summary for Subcatchment 1S: DA PRE DEV

Runoff = 10.75 cfs @ 12.37 hrs, Volume= 1.020 af, Depth> 1.82"  
Routed to nonexistent node 11L

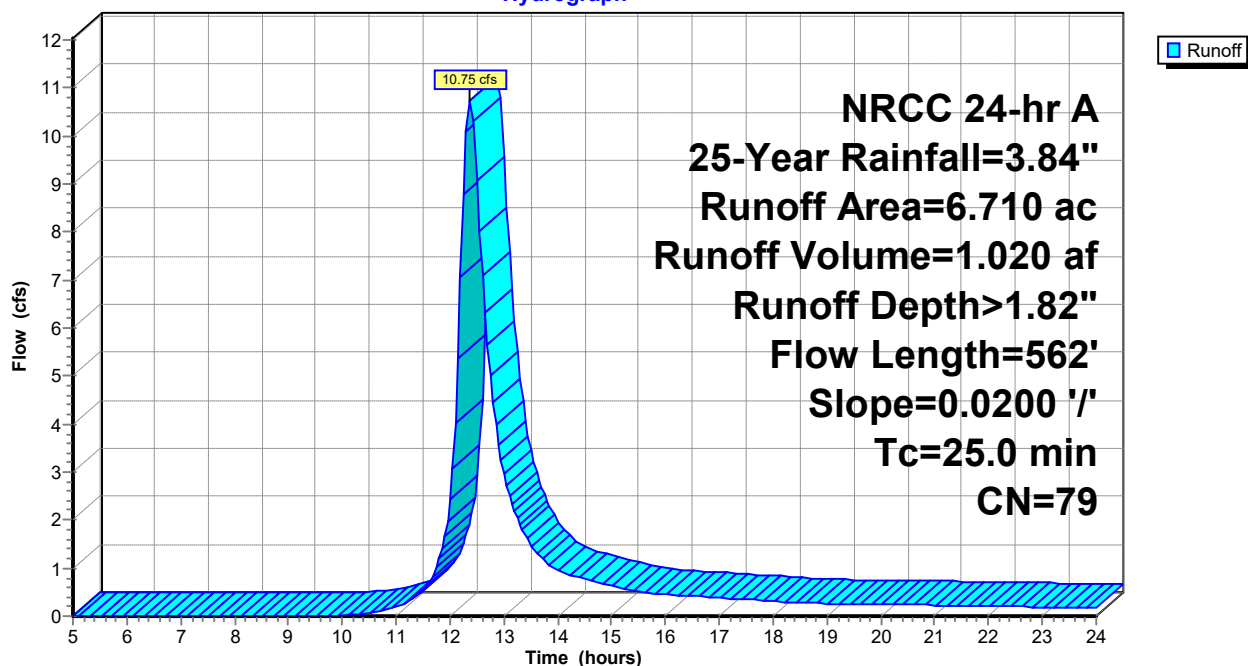
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 25-Year Rainfall=3.84"

Area (ac)	CN	Description
6.530	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
0.060	96	Gravel surface, HSG D
0.070	98	Roofs, HSG D
6.710	79	Weighted Average
6.590		98.21% Pervious Area
0.120		1.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0200	0.10		<b>Sheet Flow, WOODS</b> Grass: Dense n= 0.240 P2= 2.20"
7.8	462	0.0200	0.99		<b>Shallow Concentrated Flow, WOODS</b> Short Grass Pasture Kv= 7.0 fps
25.0	562	Total			

### Subcatchment 1S: DA PRE DEV

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 25-Year Rainfall=3.84"

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**Hydrograph for Subcatchment 1S: DA PRE DEV**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.20	0.00	0.00	19.25	3.66	1.69	0.26
5.25	0.21	0.00	0.00	19.50	3.67	1.70	0.25
5.50	0.22	0.00	0.00	19.75	3.68	1.71	0.25
5.75	0.23	0.00	0.00	20.00	3.69	1.72	0.25
6.00	0.25	0.00	0.00	20.25	3.70	1.72	0.24
6.25	0.26	0.00	0.00	20.50	3.71	1.73	0.24
6.50	0.27	0.00	0.00	20.75	3.72	1.74	0.23
6.75	0.29	0.00	0.00	21.00	3.73	1.75	0.23
7.00	0.31	0.00	0.00	21.25	3.74	1.76	0.22
7.25	0.32	0.00	0.00	21.50	3.75	1.77	0.22
7.50	0.34	0.00	0.00	21.75	3.76	1.77	0.21
7.75	0.36	0.00	0.00	22.00	3.77	1.78	0.21
8.00	0.38	0.00	0.00	22.25	3.78	1.79	0.20
8.25	0.40	0.00	0.00	22.50	3.79	1.79	0.20
8.50	0.42	0.00	0.00	22.75	3.80	1.80	0.19
8.75	0.45	0.00	0.00	23.00	3.81	1.81	0.19
9.00	0.47	0.00	0.00	23.25	3.82	1.82	0.18
9.25	0.50	0.00	0.00	23.50	3.82	1.82	0.18
9.50	0.53	0.00	0.00	23.75	3.83	1.83	0.17
9.75	0.56	0.00	0.00	24.00	<b>3.84</b>	<b>1.83</b>	0.17
10.00	0.60	0.00	0.01				
10.25	0.64	0.00	0.04				
10.50	0.68	0.01	0.07				
10.75	0.74	0.02	0.11				
11.00	0.81	0.03	0.19				
11.25	0.91	0.05	0.32				
11.50	1.03	0.08	0.55				
11.75	1.26	0.16	1.02				
12.00	1.81	0.41	2.45				
12.25	2.58	0.89	<b>8.77</b>				
12.50	2.81	1.05	<b>9.06</b>				
12.75	2.93	1.14	5.01				
13.00	3.03	1.21	2.96				
13.25	3.10	1.26	2.04				
13.50	3.16	1.30	1.50				
13.75	3.20	1.34	1.16				
14.00	3.24	1.37	0.96				
14.25	3.28	1.40	0.85				
14.50	3.31	1.42	0.77				
14.75	3.34	1.45	0.70				
15.00	3.37	1.47	0.63				
15.25	3.39	1.48	0.55				
15.50	3.42	1.50	0.50				
15.75	3.44	1.52	0.48				
16.00	3.46	1.53	0.46				
16.25	3.48	1.55	0.44				
16.50	3.50	1.57	0.42				
16.75	3.52	1.58	0.40				
17.00	3.53	1.59	0.38				
17.25	3.55	1.61	0.36				
17.50	3.57	1.62	0.35				
17.75	3.58	1.63	0.33				
18.00	3.59	1.64	0.31				
18.25	3.61	1.65	0.29				
18.50	3.62	1.66	0.28				
18.75	3.63	1.67	0.27				
19.00	3.64	1.68	0.26				

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 100-Year Rainfall=5.23"

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### Summary for Subcatchment 1S: DA PRE DEV

Runoff = 17.66 cfs @ 12.36 hrs, Volume= 1.670 af, Depth> 2.99"  
Routed to nonexistent node 11L

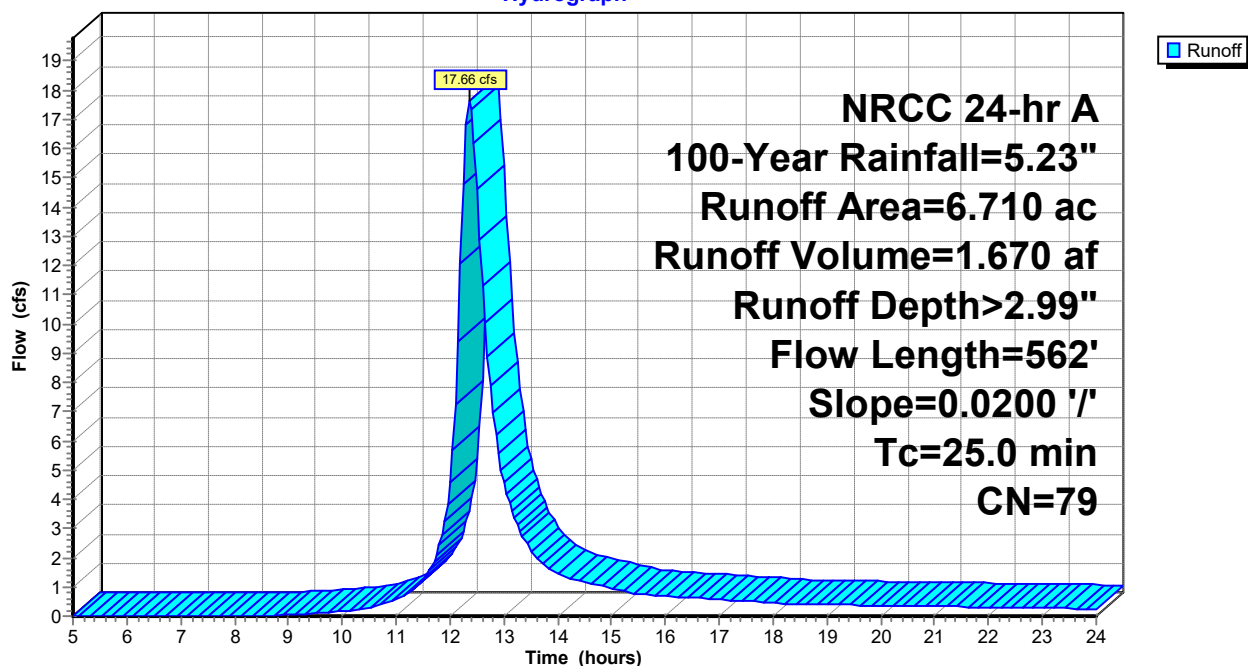
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 100-Year Rainfall=5.23"

Area (ac)	CN	Description
6.530	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
0.060	96	Gravel surface, HSG D
0.070	98	Roofs, HSG D
6.710	79	Weighted Average
6.590		98.21% Pervious Area
0.120		1.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	100	0.0200	0.10		<b>Sheet Flow, WOODS</b> Grass: Dense n= 0.240 P2= 2.20"
7.8	462	0.0200	0.99		<b>Shallow Concentrated Flow, WOODS</b> Short Grass Pasture Kv= 7.0 fps
25.0	562	Total			

### Subcatchment 1S: DA PRE DEV

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 100-Year Rainfall=5.23"

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**Hydrograph for Subcatchment 1S: DA PRE DEV**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.27	0.00	0.00	19.25	4.98	2.78	0.39
5.25	0.28	0.00	0.00	19.50	5.00	2.80	0.38
5.50	0.30	0.00	0.00	19.75	5.01	2.81	0.37
5.75	0.32	0.00	0.00	20.00	5.03	2.82	0.36
6.00	0.33	0.00	0.00	20.25	5.04	2.84	0.36
6.25	0.35	0.00	0.00	20.50	5.06	2.85	0.35
6.50	0.37	0.00	0.00	20.75	5.07	2.86	0.34
6.75	0.39	0.00	0.00	21.00	5.08	2.87	0.34
7.00	0.42	0.00	0.00	21.25	5.10	2.89	0.33
7.25	0.44	0.00	0.00	21.50	5.11	2.90	0.32
7.50	0.46	0.00	0.00	21.75	5.12	2.91	0.32
7.75	0.49	0.00	0.00	22.00	5.14	2.92	0.31
8.00	0.52	0.00	0.00	22.25	5.15	2.93	0.30
8.25	0.55	0.00	0.00	22.50	5.16	2.94	0.29
8.50	0.58	0.00	0.00	22.75	5.17	2.95	0.29
8.75	0.61	0.00	0.02	23.00	5.19	2.96	0.28
9.00	0.64	0.00	0.04	23.25	5.20	2.97	0.27
9.25	0.68	0.01	0.06	23.50	5.21	2.98	0.26
9.50	0.72	0.01	0.09	23.75	5.22	2.99	0.26
9.75	0.76	0.02	0.13	24.00	<b>5.23</b>	<b>3.00</b>	0.25
10.00	0.81	0.03	0.17				
10.25	0.87	0.04	0.23				
10.50	0.93	0.05	0.30				
10.75	1.01	0.07	0.39				
11.00	1.10	0.10	0.56				
11.25	1.24	0.15	0.81				
11.50	1.40	0.22	1.26				
11.75	1.72	0.37	2.12				
12.00	2.46	0.81	4.59				
12.25	3.51	1.57	<b>14.79</b>				
12.50	3.83	1.82	<b>14.60</b>				
12.75	3.99	1.96	7.87				
13.00	4.13	2.07	4.57				
13.25	4.22	2.15	3.11				
13.50	4.30	2.21	2.27				
13.75	4.36	2.26	1.76				
14.00	4.42	2.31	1.44				
14.25	4.47	2.35	1.28				
14.50	4.51	2.39	1.16				
14.75	4.55	2.42	1.05				
15.00	4.59	2.45	0.94				
15.25	4.62	2.48	0.83				
15.50	4.65	2.51	0.75				
15.75	4.68	2.53	0.71				
16.00	4.71	2.56	0.68				
16.25	4.74	2.58	0.66				
16.50	4.77	2.60	0.63				
16.75	4.79	2.62	0.60				
17.00	4.81	2.64	0.57				
17.25	4.84	2.66	0.54				
17.50	4.86	2.68	0.51				
17.75	4.88	2.70	0.49				
18.00	4.90	2.71	0.46				
18.25	4.91	2.73	0.43				
18.50	4.93	2.74	0.41				
18.75	4.95	2.76	0.40				
19.00	4.96	2.77	0.39				

## **20.247 - Dodge Road Hydrology**

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#### **10-Year Event**

- 8 Subcat 1S: DA PRE DEV

#### **25-Year Event**

- 10 Subcat 1S: DA PRE DEV

#### **100-Year Event**

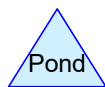
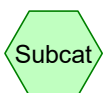
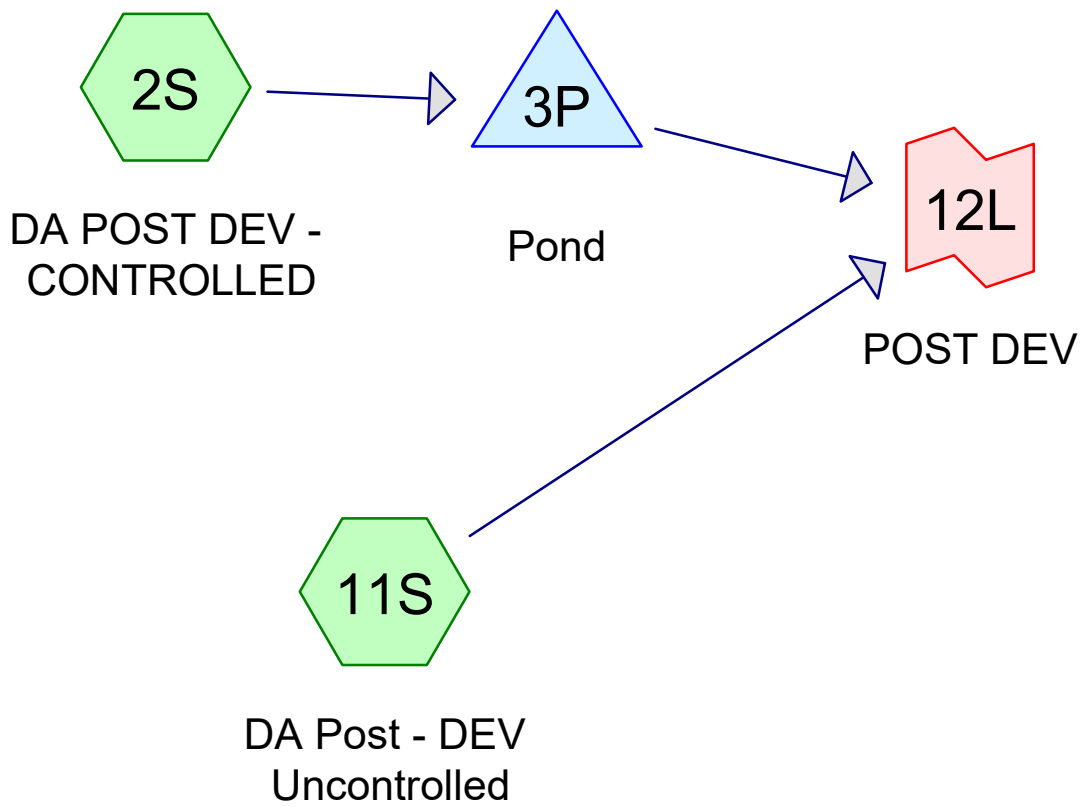
- 12 Subcat 1S: DA PRE DEV



## Proposed Runoff



**POST-DEVELOPMENT**



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### **Project Notes**

Rainfall events imported from "NRCS-Rain.txt" for 7041 NY Erie

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### Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	NRCC 24-hr	A	Default	24.00	1	1.87	2
2	10-Year	NRCC 24-hr	A	Default	24.00	1	3.14	2
3	25-Year	NRCC 24-hr	A	Default	24.00	1	3.84	2
4	100-Year	NRCC 24-hr	A	Default	24.00	1	5.23	2

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### Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.270	87	1/4 acre lots, 38% imp, HSG D (2S)
2.470	80	>75% Grass cover, Good, HSG D (2S, 11S)
0.970	98	Paved parking, HSG D (2S)
<b>6.710</b>	<b>86</b>	<b>TOTAL AREA</b>

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### Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
6.710	HSG D	2S, 11S
0.000	Other	
<b>6.710</b>		<b>TOTAL AREA</b>

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### Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	3.270	0.000	3.270	1/4 acre lots, 38% imp	2S
0.000	0.000	0.000	2.470	0.000	2.470	>75% Grass cover, Good	2S, 11S
0.000	0.000	0.000	0.970	0.000	0.970	Paved parking	2S
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>6.710</b>	<b>0.000</b>	<b>6.710</b>	<b>TOTAL AREA</b>	



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### Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	2S	0.00	0.00	740.0	0.0040	0.013	0.0	12.0	0.0
2	3P	578.51	578.45	16.0	0.0037	0.012	0.0	8.0	0.0
3	3P	578.34	578.21	34.0	0.0038	0.012	0.0	18.0	0.0

**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 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 2S: DA POST DEV -** Runoff Area=5.610 ac 39.44% Impervious Runoff Depth>0.80"  
Flow Length=860' Tc=27.1 min CN=87 Runoff=3.74 cfs 0.374 af

**Subcatchment 11S: DA Post - DEV** Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>0.48"  
Flow Length=370' Slope=0.0100 '/ Tc=22.0 min CN=80 Runoff=0.45 cfs 0.044 af

**Pond 3P: Pond** Peak Elev=580.32' Storage=3,985 cf Inflow=3.74 cfs 0.374 af  
Outflow=2.05 cfs 0.367 af

**Link 12L: POST DEV** Inflow=2.29 cfs 0.411 af  
Primary=2.29 cfs 0.411 af

**Total Runoff Area = 6.710 ac Runoff Volume = 0.418 af Average Runoff Depth = 0.75"**  
**67.03% Pervious = 4.497 ac 32.97% Impervious = 2.213 ac**

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 1-Year Rainfall=1.87"

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### Summary for Subcatchment 2S: DA POST DEV - CONTROLLED

[47] Hint: Peak is 166% of capacity of segment #3

Runoff = 3.74 cfs @ 12.40 hrs, Volume= 0.374 af, Depth> 0.80"  
Routed to Pond 3P : Pond

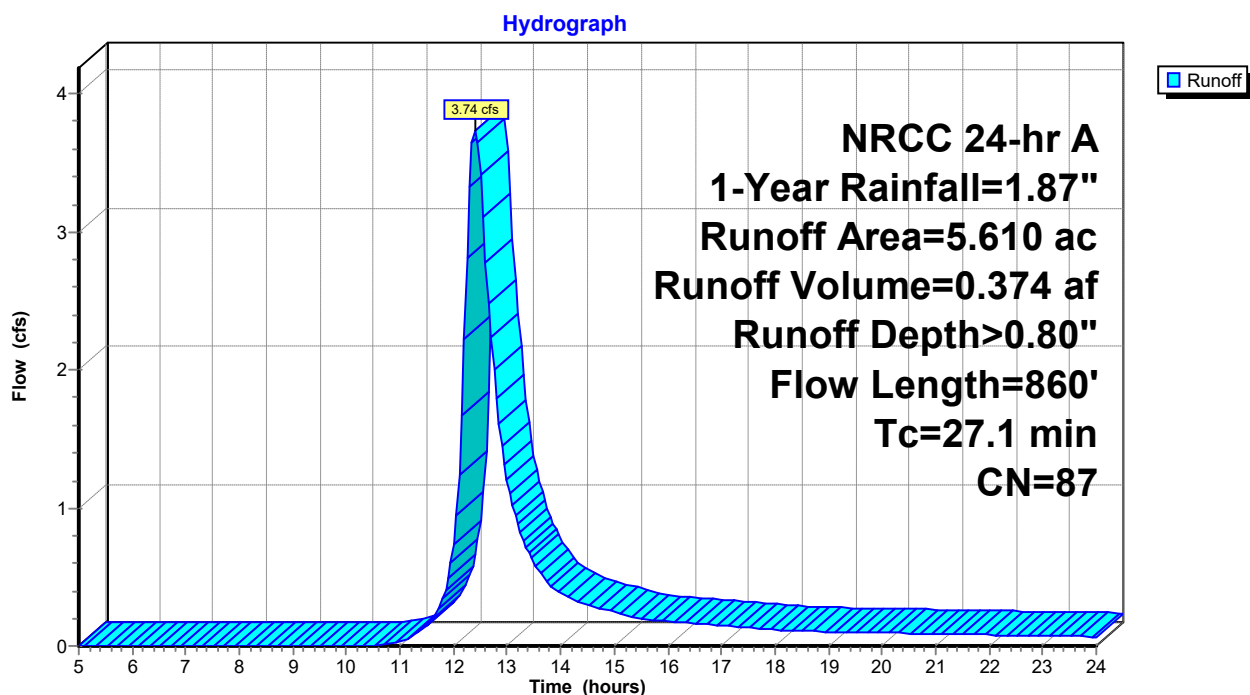
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 1-Year Rainfall=1.87"

Area (ac)	CN	Description
0.970	98	Paved parking, HSG D
3.270	87	1/4 acre lots, 38% imp, HSG D
1.370	80	>75% Grass cover, Good, HSG D
5.610	87	Weighted Average
3.397		60.56% Pervious Area
2.213		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0100	0.07		<b>Sheet Flow, SF</b> Grass: Dense n= 0.240 P2= 2.20"
0.1	20	0.0200	2.28		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.3	740	0.0040	2.87	2.25	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
27.1	860	Total			

### Subcatchment 2S: DA POST DEV - CONTROLLED



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Hydrograph for Subcatchment 2S: DA POST DEV - CONTROLLED**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00	19.25	1.78	0.74	0.10
5.25	0.10	0.00	0.00	19.50	1.79	0.74	0.10
5.50	0.11	0.00	0.00	19.75	1.79	0.75	0.10
5.75	0.11	0.00	0.00	20.00	1.80	0.75	0.10
6.00	0.12	0.00	0.00	20.25	1.80	0.75	0.09
6.25	0.13	0.00	0.00	20.50	1.81	0.76	0.09
6.50	0.13	0.00	0.00	20.75	1.81	0.76	0.09
6.75	0.14	0.00	0.00	21.00	1.82	0.77	0.09
7.00	0.15	0.00	0.00	21.25	1.82	0.77	0.09
7.25	0.16	0.00	0.00	21.50	1.83	0.77	0.08
7.50	0.17	0.00	0.00	21.75	1.83	0.78	0.08
7.75	0.18	0.00	0.00	22.00	1.84	0.78	0.08
8.00	0.19	0.00	0.00	22.25	1.84	0.78	0.08
8.25	0.20	0.00	0.00	22.50	1.85	0.79	0.08
8.50	0.21	0.00	0.00	22.75	1.85	0.79	0.08
8.75	0.22	0.00	0.00	23.00	1.85	0.79	0.07
9.00	0.23	0.00	0.00	23.25	1.86	0.80	0.07
9.25	0.24	0.00	0.00	23.50	1.86	0.80	0.07
9.50	0.26	0.00	0.00	23.75	1.87	0.80	0.07
9.75	0.27	0.00	0.00	24.00	<b>1.87</b>	<b>0.81</b>	0.07
10.00	0.29	0.00	0.00				
10.25	0.31	0.00	0.00				
10.50	0.33	0.00	0.00				
10.75	0.36	0.00	0.01				
11.00	0.39	0.01	0.04				
11.25	0.44	0.01	0.07				
11.50	0.50	0.02	0.15				
11.75	0.62	0.06	0.29				
12.00	0.88	0.16	0.74				
12.25	1.25	0.37	<b>2.81</b>				
12.50	1.37	0.45	<b>3.41</b>				
12.75	1.43	0.49	2.00				
13.00	1.48	0.52	1.20				
13.25	1.51	0.54	0.82				
13.50	1.54	0.56	0.60				
13.75	1.56	0.58	0.46				
14.00	1.58	0.59	0.38				
14.25	1.60	0.60	0.33				
14.50	1.61	0.62	0.30				
14.75	1.63	0.63	0.27				
15.00	1.64	0.64	0.24				
15.25	1.65	0.64	0.22				
15.50	1.66	0.65	0.20				
15.75	1.67	0.66	0.18				
16.00	1.68	0.67	0.18				
16.25	1.69	0.67	0.17				
16.50	1.70	0.68	0.16				
16.75	1.71	0.69	0.16				
17.00	1.72	0.69	0.15				
17.25	1.73	0.70	0.14				
17.50	1.74	0.71	0.13				
17.75	1.74	0.71	0.13				
18.00	1.75	0.72	0.12				
18.25	1.76	0.72	0.11				
18.50	1.76	0.72	0.11				
18.75	1.77	0.73	0.10				
19.00	1.77	0.73	0.10				

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 1-Year Rainfall=1.87"

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### Summary for Subcatchment 11S: DA Post - DEV Uncontrolled

Runoff = 0.45 cfs @ 12.36 hrs, Volume= 0.044 af, Depth> 0.48"  
Routed to Link 12L : POST DEV

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 1-Year Rainfall=1.87"

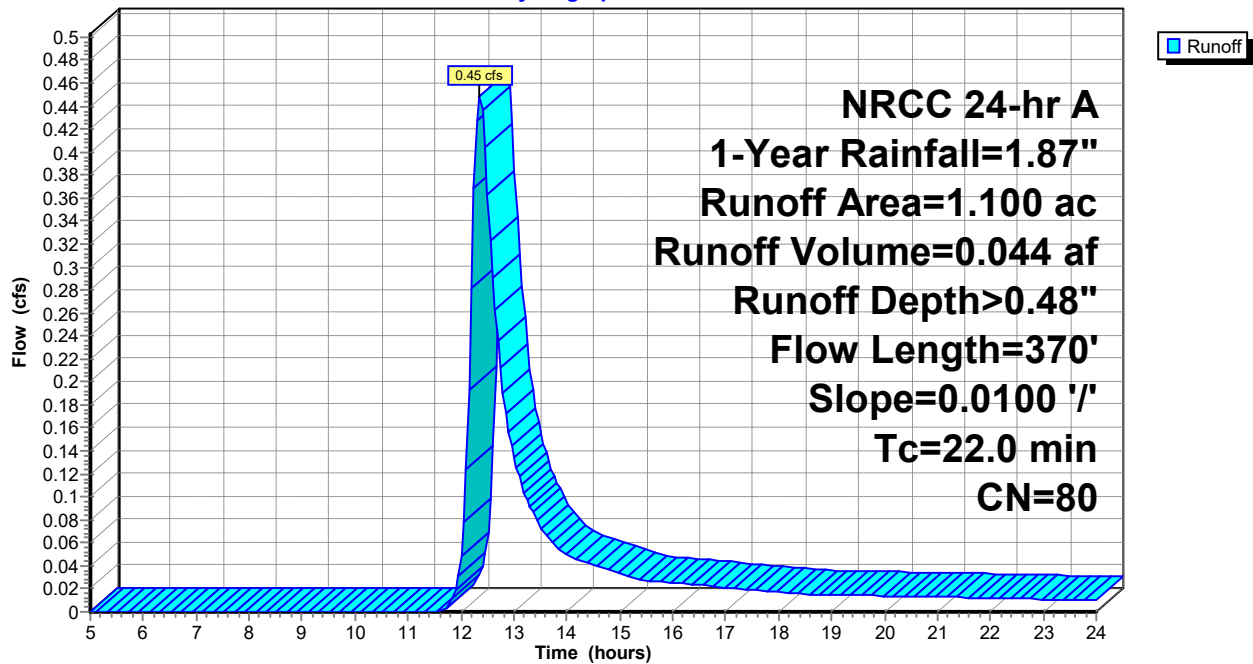
Area (ac)	CN	Description
1.100	80	>75% Grass cover, Good, HSG D
1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		<b>Sheet Flow, SF</b> Grass: Short n= 0.150 P2= 2.20"
6.4	270	0.0100	0.70		<b>Shallow Concentrated Flow, SCF</b> Short Grass Pasture Kv= 7.0 fps
22.0	370	Total			

### Subcatchment 11S: DA Post - DEV Uncontrolled

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Hydrograph for Subcatchment 11S: DA Post - DEV Uncontrolled**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00	19.25	1.78	0.43	0.01
5.25	0.10	0.00	0.00	19.50	1.79	0.44	0.01
5.50	0.11	0.00	0.00	19.75	1.79	0.44	0.01
5.75	0.11	0.00	0.00	20.00	1.80	0.44	0.01
6.00	0.12	0.00	0.00	20.25	1.80	0.45	0.01
6.25	0.13	0.00	0.00	20.50	1.81	0.45	0.01
6.50	0.13	0.00	0.00	20.75	1.81	0.45	0.01
6.75	0.14	0.00	0.00	21.00	1.82	0.45	0.01
7.00	0.15	0.00	0.00	21.25	1.82	0.46	0.01
7.25	0.16	0.00	0.00	21.50	1.83	0.46	0.01
7.50	0.17	0.00	0.00	21.75	1.83	0.46	0.01
7.75	0.18	0.00	0.00	22.00	1.84	0.47	0.01
8.00	0.19	0.00	0.00	22.25	1.84	0.47	0.01
8.25	0.20	0.00	0.00	22.50	1.85	0.47	0.01
8.50	0.21	0.00	0.00	22.75	1.85	0.47	0.01
8.75	0.22	0.00	0.00	23.00	1.85	0.48	0.01
9.00	0.23	0.00	0.00	23.25	1.86	0.48	0.01
9.25	0.24	0.00	0.00	23.50	1.86	0.48	0.01
9.50	0.26	0.00	0.00	23.75	1.87	0.48	0.01
9.75	0.27	0.00	0.00	24.00	<b>1.87</b>	<b>0.48</b>	0.01
10.00	0.29	0.00	0.00				
10.25	0.31	0.00	0.00				
10.50	0.33	0.00	0.00				
10.75	0.36	0.00	0.00				
11.00	0.39	0.00	0.00				
11.25	0.44	0.00	0.00				
11.50	0.50	0.00	0.00				
11.75	0.62	0.01	0.00				
12.00	0.88	0.05	0.05				
12.25	1.25	0.17	<b>0.37</b>				
12.50	1.37	0.22	<b>0.36</b>				
12.75	1.43	0.25	0.21				
13.00	1.48	0.27	0.13				
13.25	1.51	0.29	0.10				
13.50	1.54	0.30	0.07				
13.75	1.56	0.32	0.06				
14.00	1.58	0.33	0.05				
14.25	1.60	0.33	0.05				
14.50	1.61	0.34	0.04				
14.75	1.63	0.35	0.04				
15.00	1.64	0.36	0.03				
15.25	1.65	0.36	0.03				
15.50	1.66	0.37	0.03				
15.75	1.67	0.38	0.03				
16.00	1.68	0.38	0.03				
16.25	1.69	0.39	0.02				
16.50	1.70	0.39	0.02				
16.75	1.71	0.40	0.02				
17.00	1.72	0.40	0.02				
17.25	1.73	0.41	0.02				
17.50	1.74	0.41	0.02				
17.75	1.74	0.41	0.02				
18.00	1.75	0.42	0.02				
18.25	1.76	0.42	0.02				
18.50	1.76	0.42	0.02				
18.75	1.77	0.43	0.02				
19.00	1.77	0.43	0.01				

## 20.247 - Dodge Road Hydrology

NRCC 24-hr A 1-Year Rainfall=1.87"

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### Summary for Pond 3P: Pond

Inflow Area = 5.610 ac, 39.44% Impervious, Inflow Depth > 0.80" for 1-Year event  
 Inflow = 3.74 cfs @ 12.40 hrs, Volume= 0.374 af  
 Outflow = 2.05 cfs @ 12.74 hrs, Volume= 0.367 af, Atten= 45%, Lag= 20.5 min  
 Primary = 2.05 cfs @ 12.74 hrs, Volume= 0.367 af  
 Routed to Link 12L : POST DEV

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 580.32' @ 12.74 hrs Surf.Area= 2,767 sf Storage= 3,985 cf

Plug-Flow detention time= 36.2 min calculated for 0.367 af (98% of inflow)  
 Center-of-Mass det. time= 25.4 min ( 871.8 - 846.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	578.50'	34,837 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
578.50	1,628	0	0
579.00	1,920	887	887
580.00	2,550	2,235	3,122
581.00	3,220	2,885	6,007
582.00	3,960	3,590	9,597
583.00	4,760	4,360	13,957
584.00	11,860	8,310	22,267
585.00	13,280	12,570	34,837

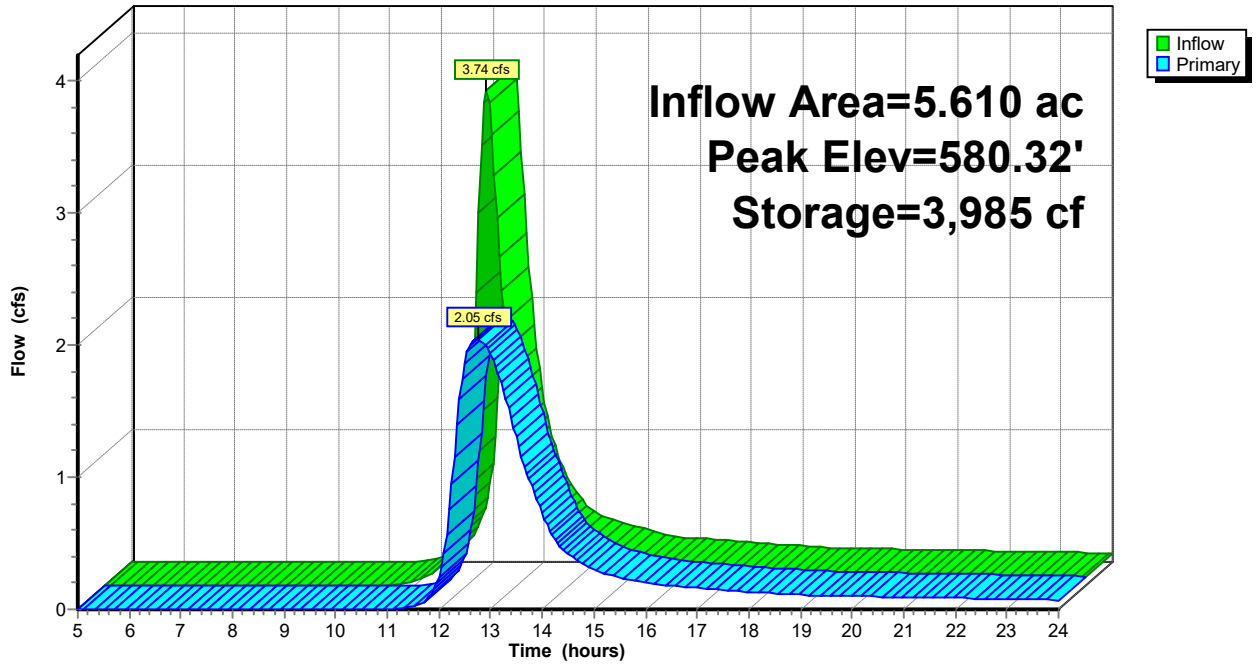
Device	Routing	Invert	Outlet Devices
#1	Device 4	578.51'	<b>8.0" Round Culvert</b> L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.51' / 578.45' S= 0.0037 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Device 4	583.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 4	584.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	578.34'	<b>18.0" Round Culvert</b> L= 34.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.34' / 578.21' S= 0.0038 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=2.04 cfs @ 12.74 hrs HW=580.32' (Free Discharge)

- 4=Culvert (Passes 2.04 cfs of 7.94 cfs potential flow)
- 1=Culvert (Inlet Controls 2.04 cfs @ 5.86 fps)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate ( Controls 0.00 cfs)

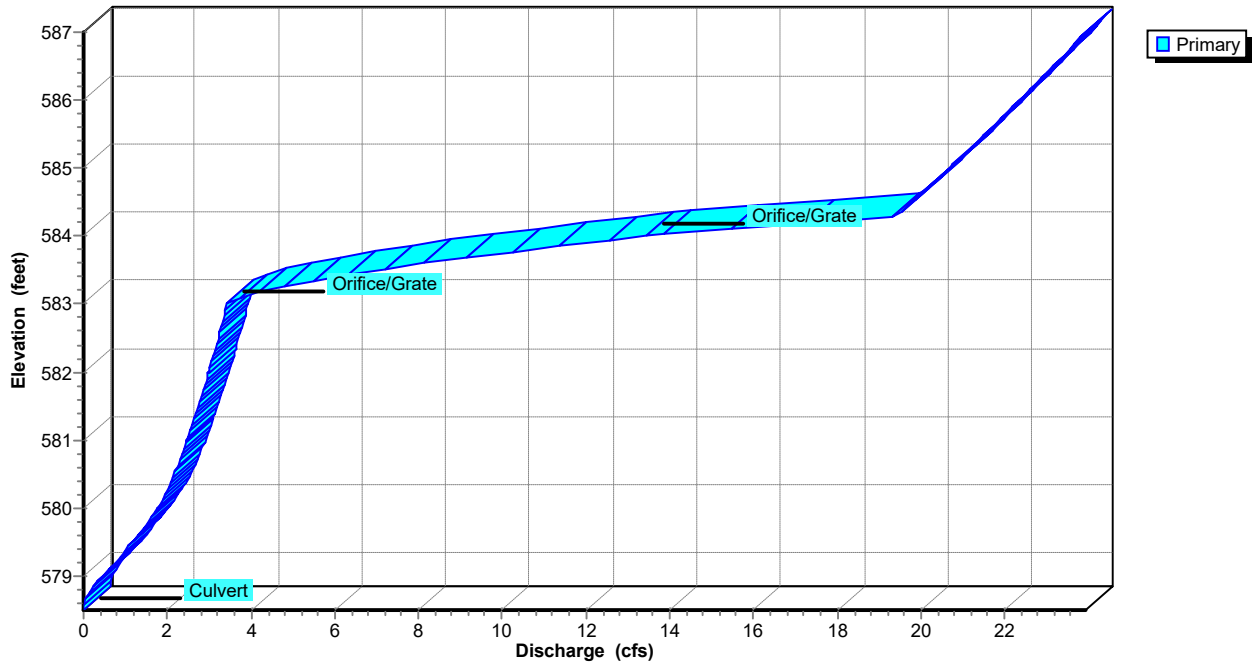
### Pond 3P: Pond

Hydrograph



### Pond 3P: Pond

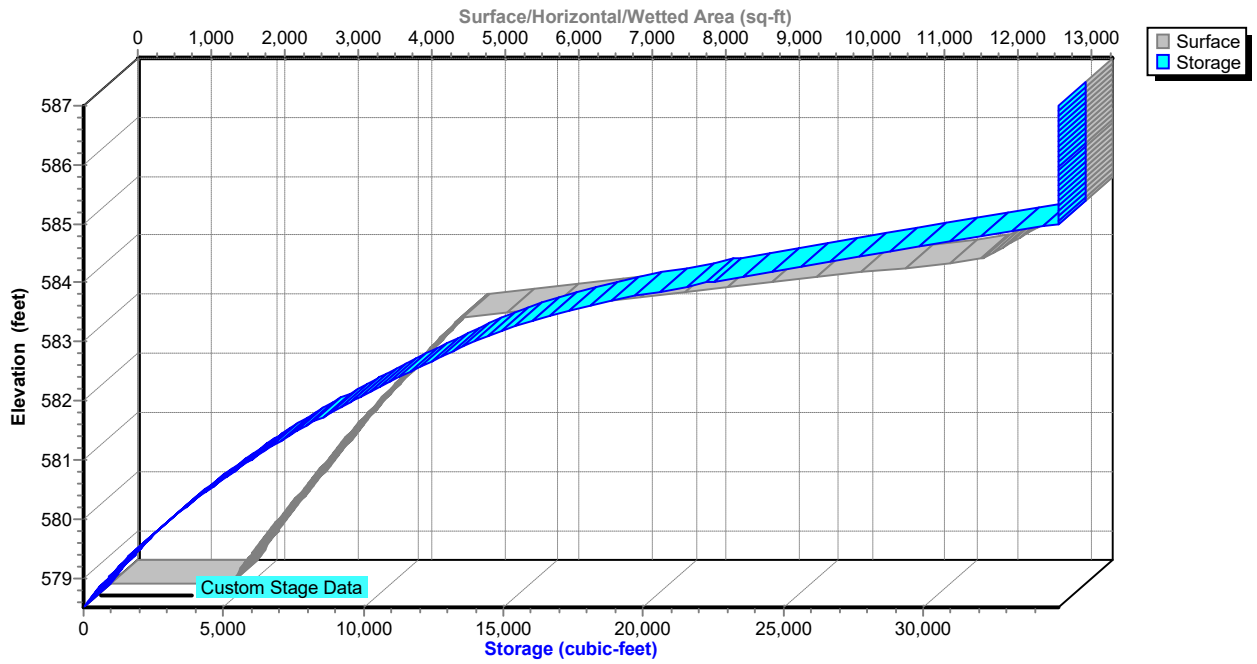
Stage-Discharge





### Pond 3P: Pond

Stage-Area-Storage



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Hydrograph for Pond 3P: Pond**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	578.50	0.00
5.50	0.00	0	578.50	0.00
6.00	0.00	0	578.50	0.00
6.50	0.00	0	578.50	0.00
7.00	0.00	0	578.50	0.00
7.50	0.00	0	578.50	0.00
8.00	0.00	0	578.50	0.00
8.50	0.00	0	578.50	0.00
9.00	0.00	0	578.50	0.00
9.50	0.00	0	578.50	0.00
10.00	0.00	0	578.50	0.00
10.50	0.00	1	578.50	0.00
11.00	0.04	30	578.52	0.00
11.50	0.15	163	578.60	0.02
12.00	<b>0.74</b>	611	578.85	0.24
12.50	<b>3.41</b>	<b>3,384</b>	<b>580.10</b>	<b>1.86</b>
13.00	1.20	<b>3,583</b>	<b>580.18</b>	<b>1.93</b>
13.50	0.60	2,154	579.60	1.30
14.00	0.38	1,213	579.17	0.73
14.50	0.30	835	578.97	0.42
15.00	0.24	690	578.90	0.30
15.50	0.20	599	578.85	0.24
16.00	0.18	544	578.82	0.20
16.50	0.16	510	578.80	0.18
17.00	0.15	484	578.78	0.16
17.50	0.13	461	578.77	0.15
18.00	0.12	438	578.76	0.13
18.50	0.11	414	578.74	0.12
19.00	0.10	395	578.73	0.11
19.50	0.10	383	578.73	0.10
20.00	0.10	373	578.72	0.10
20.50	0.09	365	578.72	0.10
21.00	0.09	358	578.71	0.09
21.50	0.08	350	578.71	0.09
22.00	0.08	343	578.70	0.08
22.50	0.08	335	578.70	0.08
23.00	0.07	328	578.69	0.08
23.50	0.07	320	578.69	0.07
24.00	0.07	313	578.69	0.07

**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Stage-Discharge for Pond 3P: Pond**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
578.50	0.00	581.35	2.66	584.20	17.41
578.55	0.00	581.40	2.69	584.25	18.57
578.60	0.02	581.45	2.71	584.30	19.42
578.65	0.04	581.50	2.74	584.35	19.51
578.70	0.08	581.55	2.77	584.40	19.61
578.75	0.12	581.60	2.79	584.45	19.70
578.80	0.18	581.65	2.82	584.50	19.79
578.85	0.24	581.70	2.84	584.55	19.88
578.90	0.31	581.75	2.87	584.60	19.97
578.95	0.38	581.80	2.89	584.65	20.06
579.00	0.46	581.85	2.91	584.70	20.15
579.05	0.54	581.90	2.94	584.75	20.24
579.10	0.62	581.95	2.96	584.80	20.33
579.15	0.70	582.00	2.99	584.85	20.42
579.20	0.78	582.05	3.01	584.90	20.51
579.25	0.86	582.10	3.03	584.95	20.60
579.30	0.93	582.15	3.06	585.00	20.69
579.35	0.98	582.20	3.08	585.05	20.77
579.40	1.00	582.25	3.10	585.10	20.86
579.45	1.08	582.30	3.12	585.15	20.95
579.50	1.16	582.35	3.15	585.20	21.03
579.55	1.23	582.40	3.17	585.25	21.12
579.60	1.30	582.45	3.19	585.30	21.20
579.65	1.37	582.50	3.21	585.35	21.29
579.70	1.43	582.55	3.24	585.40	21.37
579.75	1.49	582.60	3.26	585.45	21.46
579.80	1.55	582.65	3.28	585.50	21.54
579.85	1.60	582.70	3.30	585.55	21.63
579.90	1.66	582.75	3.32	585.60	21.71
579.95	1.71	582.80	3.34	585.65	21.79
580.00	1.76	582.85	3.36	585.70	21.88
580.05	1.81	582.90	3.39	585.75	21.96
580.10	1.86	582.95	3.41	585.80	22.04
580.15	1.90	583.00	3.43	585.85	22.12
580.20	1.95	583.05	3.55	585.90	22.20
580.25	1.99	583.10	3.77	585.95	22.29
580.30	2.03	583.15	4.05	586.00	22.37
580.35	2.06	583.20	4.37	586.05	22.45
580.40	2.10	583.25	4.73	586.10	22.53
580.45	2.13	583.30	5.13	586.15	22.61
580.50	2.16	583.35	5.56	586.20	22.69
580.55	2.20	583.40	6.02	586.25	22.77
580.60	2.23	583.45	6.51	586.30	22.85
580.65	2.26	583.50	7.03	586.35	22.93
580.70	2.29	583.55	7.57	586.40	23.01
580.75	2.32	583.60	8.14	586.45	23.08
580.80	2.35	583.65	8.73	586.50	23.16
580.85	2.38	583.70	9.34	586.55	23.24
580.90	2.41	583.75	9.98	586.60	23.32
580.95	2.44	583.80	10.63	586.65	23.40
581.00	2.47	583.85	11.31	586.70	23.47
581.05	2.50	583.90	12.00	586.75	23.55
581.10	2.52	583.95	12.71	586.80	23.63
581.15	2.55	584.00	13.45	586.85	23.70
581.20	2.58	584.05	14.30	586.90	23.78
581.25	2.61	584.10	15.27	586.95	23.85
581.30	2.63	584.15	16.31	587.00	<b>23.93</b>

**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Stage-Area-Storage for Pond 3P: Pond**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
578.50	1,628	0	584.20	12,144	24,667
578.60	1,686	166	584.30	12,286	25,889
578.70	1,745	337	584.40	12,428	27,125
578.80	1,803	515	584.50	12,570	28,375
578.90	1,862	698	584.60	12,712	29,639
579.00	1,920	887	584.70	12,854	30,917
579.10	1,983	1,082	584.80	12,996	32,209
579.20	2,046	1,284	584.90	13,138	33,516
579.30	2,109	1,491	585.00	<b>13,280</b>	<b>34,837</b>
579.40	2,172	1,705	585.10	13,280	34,837
579.50	2,235	1,926	585.20	13,280	34,837
579.60	2,298	2,152	585.30	13,280	34,837
579.70	2,361	2,385	585.40	13,280	34,837
579.80	2,424	2,625	585.50	13,280	34,837
579.90	2,487	2,870	585.60	13,280	34,837
580.00	2,550	3,122	585.70	13,280	34,837
580.10	2,617	3,380	585.80	13,280	34,837
580.20	2,684	3,645	585.90	13,280	34,837
580.30	2,751	3,917	586.00	13,280	34,837
580.40	2,818	4,196	586.10	13,280	34,837
580.50	2,885	4,481	586.20	13,280	34,837
580.60	2,952	4,773	586.30	13,280	34,837
580.70	3,019	5,071	586.40	13,280	34,837
580.80	3,086	5,376	586.50	13,280	34,837
580.90	3,153	5,688	586.60	13,280	34,837
581.00	3,220	6,007	586.70	13,280	34,837
581.10	3,294	6,333	586.80	13,280	34,837
581.20	3,368	6,666	586.90	13,280	34,837
581.30	3,442	7,006	587.00	13,280	34,837
581.40	3,516	7,354			
581.50	3,590	7,710			
581.60	3,664	8,072			
581.70	3,738	8,442			
581.80	3,812	8,820			
581.90	3,886	9,205			
582.00	3,960	9,597			
582.10	4,040	9,997			
582.20	4,120	10,405			
582.30	4,200	10,821			
582.40	4,280	11,245			
582.50	4,360	11,677			
582.60	4,440	12,117			
582.70	4,520	12,565			
582.80	4,600	13,021			
582.90	4,680	13,485			
583.00	4,760	13,957			
583.10	5,470	14,469			
583.20	6,180	15,051			
583.30	6,890	15,704			
583.40	7,600	16,429			
583.50	8,310	17,225			
583.60	9,020	18,091			
583.70	9,730	19,029			
583.80	10,440	20,037			
583.90	11,150	21,116			
584.00	11,860	22,267			
584.10	12,002	23,460			

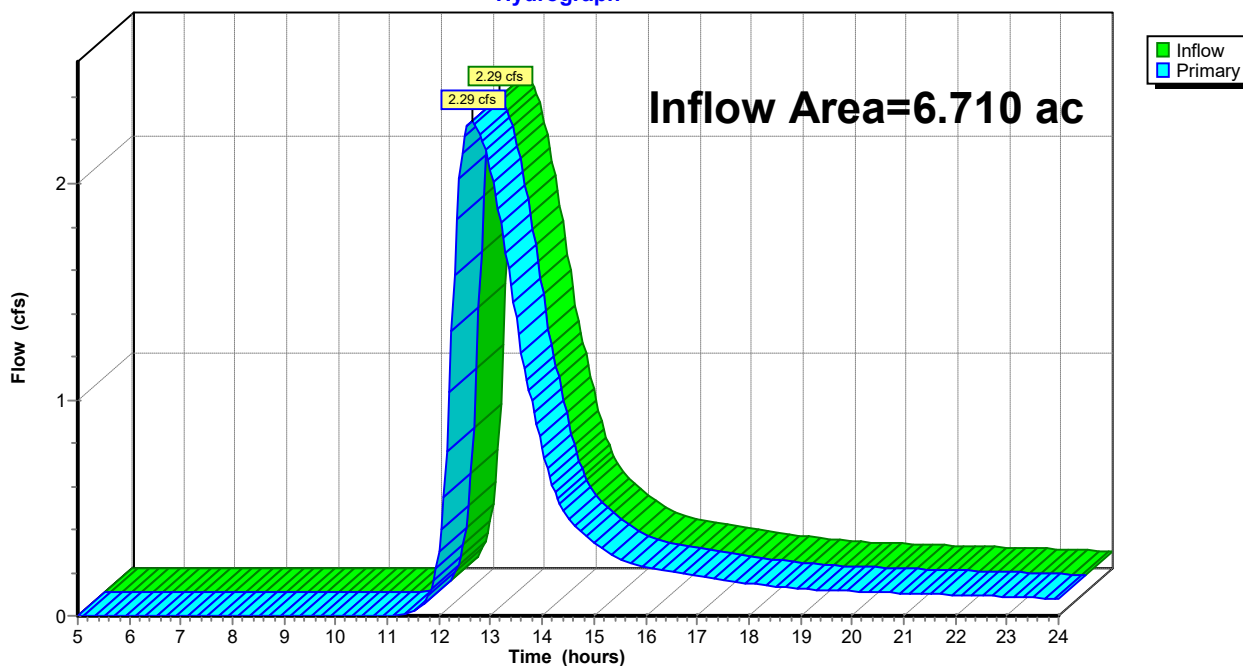
### Summary for Link 12L: POST DEV

Inflow Area = 6.710 ac, 32.97% Impervious, Inflow Depth > 0.74" for 1-Year event  
Inflow = 2.29 cfs @ 12.63 hrs, Volume= 0.411 af  
Primary = 2.29 cfs @ 12.63 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

### Link 12L: POST DEV

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 1-Year Rainfall=1.87"

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**Hydrograph for Link 12L: POST DEV**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	0.00	0.00	19.25	0.12	0.00	0.12
5.25	0.00	0.00	0.00	19.50	0.12	0.00	0.12
5.50	0.00	0.00	0.00	19.75	0.12	0.00	0.12
5.75	0.00	0.00	0.00	20.00	0.11	0.00	0.11
6.00	0.00	0.00	0.00	20.25	0.11	0.00	0.11
6.25	0.00	0.00	0.00	20.50	0.11	0.00	0.11
6.50	0.00	0.00	0.00	20.75	0.11	0.00	0.11
6.75	0.00	0.00	0.00	21.00	0.11	0.00	0.11
7.00	0.00	0.00	0.00	21.25	0.10	0.00	0.10
7.25	0.00	0.00	0.00	21.50	0.10	0.00	0.10
7.50	0.00	0.00	0.00	21.75	0.10	0.00	0.10
7.75	0.00	0.00	0.00	22.00	0.10	0.00	0.10
8.00	0.00	0.00	0.00	22.25	0.09	0.00	0.09
8.25	0.00	0.00	0.00	22.50	0.09	0.00	0.09
8.50	0.00	0.00	0.00	22.75	0.09	0.00	0.09
8.75	0.00	0.00	0.00	23.00	0.09	0.00	0.09
9.00	0.00	0.00	0.00	23.25	0.09	0.00	0.09
9.25	0.00	0.00	0.00	23.50	0.08	0.00	0.08
9.50	0.00	0.00	0.00	23.75	0.08	0.00	0.08
9.75	0.00	0.00	0.00	24.00	0.08	0.00	0.08
10.00	0.00	0.00	0.00				
10.25	0.00	0.00	0.00				
10.50	0.00	0.00	0.00				
10.75	0.00	0.00	0.00				
11.00	0.00	0.00	0.00				
11.25	0.01	0.00	0.01				
11.50	0.02	0.00	0.02				
11.75	0.07	0.00	0.07				
12.00	0.29	0.00	0.29				
12.25	1.32	0.00	1.32				
12.50	<b>2.22</b>	0.00	<b>2.22</b>				
12.75	<b>2.26</b>	0.00	<b>2.26</b>				
13.00	2.06	0.00	2.06				
13.25	1.75	0.00	1.75				
13.50	1.38	0.00	1.38				
13.75	1.05	0.00	1.05				
14.00	0.78	0.00	0.78				
14.25	0.57	0.00	0.57				
14.50	0.46	0.00	0.46				
14.75	0.39	0.00	0.39				
15.00	0.34	0.00	0.34				
15.25	0.30	0.00	0.30				
15.50	0.26	0.00	0.26				
15.75	0.24	0.00	0.24				
16.00	0.22	0.00	0.22				
16.25	0.21	0.00	0.21				
16.50	0.20	0.00	0.20				
16.75	0.19	0.00	0.19				
17.00	0.18	0.00	0.18				
17.25	0.17	0.00	0.17				
17.50	0.17	0.00	0.17				
17.75	0.16	0.00	0.16				
18.00	0.15	0.00	0.15				
18.25	0.14	0.00	0.14				
18.50	0.14	0.00	0.14				
18.75	0.13	0.00	0.13				
19.00	0.13	0.00	0.13				

**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 10-Year Rainfall=3.14"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 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 2S: DA POST DEV -** Runoff Area=5.610 ac 39.44% Impervious Runoff Depth>1.85"  
Flow Length=860' Tc=27.1 min CN=87 Runoff=8.76 cfs 0.866 af

**Subcatchment 11S: DA Post - DEV** Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>1.35"  
Flow Length=370' Slope=0.0100 '/ Tc=22.0 min CN=80 Runoff=1.37 cfs 0.124 af

**Pond 3P: Pond** Peak Elev=582.58' Storage=12,044 cf Inflow=8.76 cfs 0.866 af  
Outflow=3.25 cfs 0.856 af

**Link 12L: POST DEV** Inflow=3.99 cfs 0.980 af  
Primary=3.99 cfs 0.980 af

**Total Runoff Area = 6.710 ac Runoff Volume = 0.990 af Average Runoff Depth = 1.77"**  
**67.03% Pervious = 4.497 ac 32.97% Impervious = 2.213 ac**

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 10-Year Rainfall=3.14"

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### Summary for Subcatchment 2S: DA POST DEV - CONTROLLED

[47] Hint: Peak is 389% of capacity of segment #3

Runoff = 8.76 cfs @ 12.38 hrs, Volume= 0.866 af, Depth> 1.85"  
Routed to Pond 3P : Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 10-Year Rainfall=3.14"

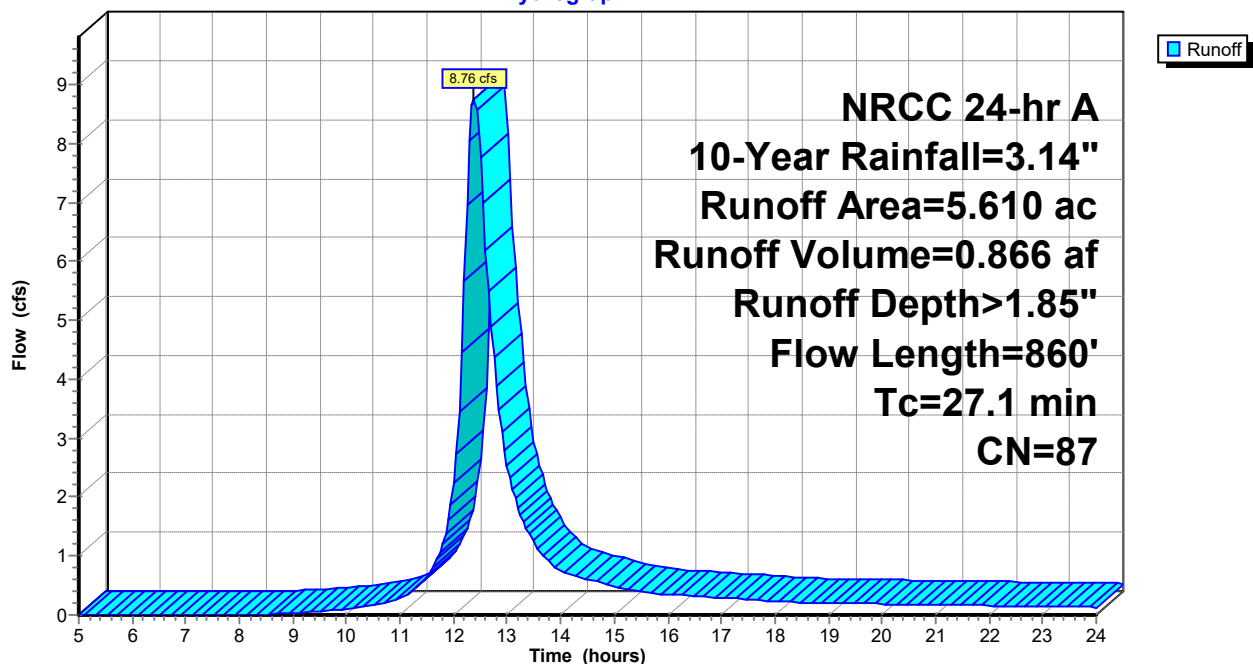
Area (ac)	CN	Description
0.970	98	Paved parking, HSG D
3.270	87	1/4 acre lots, 38% imp, HSG D
1.370	80	>75% Grass cover, Good, HSG D
5.610	87	Weighted Average
3.397		60.56% Pervious Area
2.213		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0100	0.07		<b>Sheet Flow, SF</b> Grass: Dense n= 0.240 P2= 2.20"
0.1	20	0.0200	2.28		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.3	740	0.0040	2.87	2.25	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
27.1	860	Total			

### Subcatchment 2S: DA POST DEV - CONTROLLED

Hydrograph





**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 10-Year Rainfall=3.14"

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**Hydrograph for Subcatchment 2S: DA POST DEV - CONTROLLED**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.16	0.00	0.00	19.25	2.99	1.73	0.20
5.25	0.17	0.00	0.00	19.50	3.00	1.74	0.19
5.50	0.18	0.00	0.00	19.75	3.01	1.75	0.19
5.75	0.19	0.00	0.00	20.00	3.02	1.75	0.19
6.00	0.20	0.00	0.00	20.25	3.03	1.76	0.18
6.25	0.21	0.00	0.00	20.50	3.04	1.77	0.18
6.50	0.22	0.00	0.00	20.75	3.04	1.78	0.18
6.75	0.24	0.00	0.00	21.00	3.05	1.79	0.17
7.00	0.25	0.00	0.00	21.25	3.06	1.79	0.17
7.25	0.26	0.00	0.00	21.50	3.07	1.80	0.16
7.50	0.28	0.00	0.00	21.75	3.08	1.81	0.16
7.75	0.29	0.00	0.00	22.00	3.08	1.81	0.16
8.00	0.31	0.00	0.00	22.25	3.09	1.82	0.15
8.25	0.33	0.00	0.00	22.50	3.10	1.83	0.15
8.50	0.35	0.00	0.01	22.75	3.11	1.83	0.15
8.75	0.36	0.00	0.02	23.00	3.11	1.84	0.14
9.00	0.38	0.00	0.03	23.25	3.12	1.84	0.14
9.25	0.41	0.01	0.04	23.50	3.13	1.85	0.14
9.50	0.43	0.01	0.06	23.75	3.13	1.86	0.13
9.75	0.46	0.02	0.08	24.00	<b>3.14</b>	<b>1.86</b>	0.13
10.00	0.49	0.02	0.10				
10.25	0.52	0.03	0.13				
10.50	0.56	0.04	0.17				
10.75	0.61	0.05	0.21				
11.00	0.66	0.07	0.30				
11.25	0.74	0.10	0.43				
11.50	0.84	0.15	0.65				
11.75	1.03	0.24	1.07				
12.00	1.48	0.52	2.24				
12.25	2.11	0.99	<b>6.97</b>				
12.50	2.30	1.14	<b>7.78</b>				
12.75	2.40	1.23	4.36				
13.00	2.48	1.29	2.54				
13.25	2.53	1.34	1.70				
13.50	2.58	1.38	1.22				
13.75	2.62	1.41	0.93				
14.00	2.65	1.44	0.76				
14.25	2.68	1.46	0.67				
14.50	2.71	1.49	0.60				
14.75	2.73	1.51	0.54				
15.00	2.76	1.53	0.49				
15.25	2.78	1.54	0.43				
15.50	2.79	1.56	0.39				
15.75	2.81	1.58	0.37				
16.00	2.83	1.59	0.35				
16.25	2.85	1.60	0.34				
16.50	2.86	1.62	0.32				
16.75	2.88	1.63	0.31				
17.00	2.89	1.64	0.29				
17.25	2.90	1.66	0.28				
17.50	2.92	1.67	0.26				
17.75	2.93	1.68	0.25				
18.00	2.94	1.69	0.24				
18.25	2.95	1.70	0.22				
18.50	2.96	1.70	0.21				
18.75	2.97	1.71	0.20				
19.00	2.98	1.72	0.20				

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 10-Year Rainfall=3.14"

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### Summary for Subcatchment 11S: DA Post - DEV Uncontrolled

Runoff = 1.37 cfs @ 12.33 hrs, Volume= 0.124 af, Depth> 1.35"  
Routed to Link 12L : POST DEV

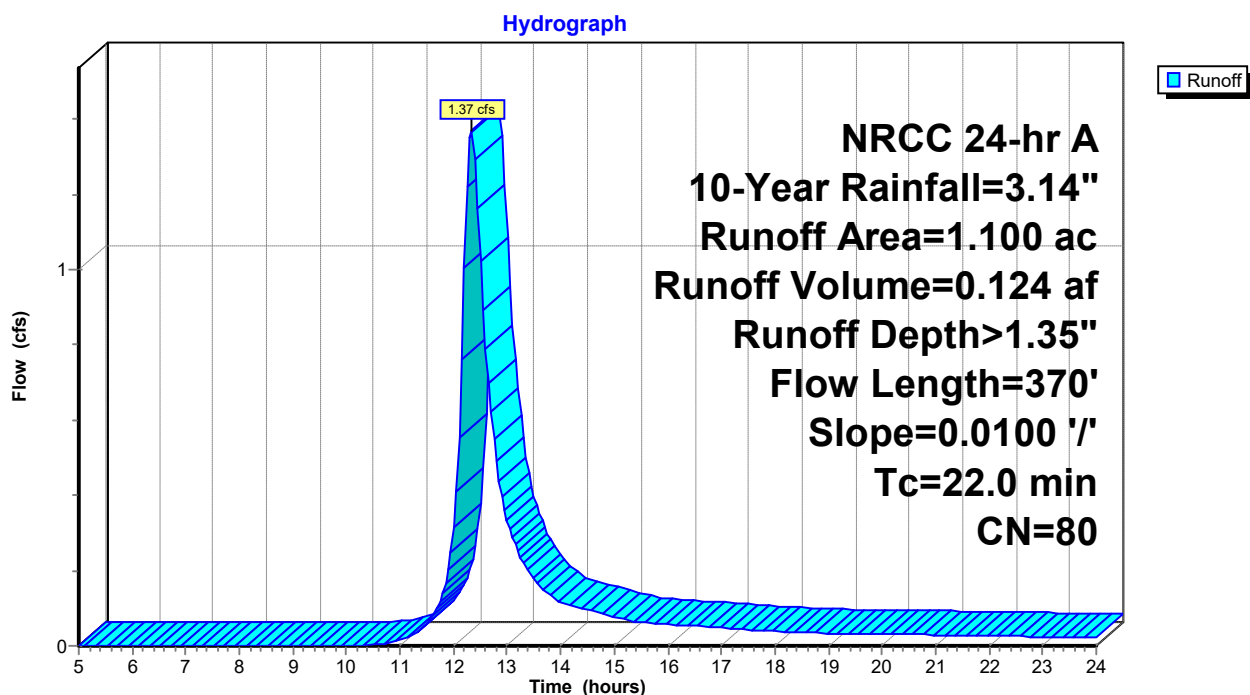
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
1.100	80	>75% Grass cover, Good, HSG D
1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		<b>Sheet Flow, SF</b> Grass: Short n= 0.150 P2= 2.20"
6.4	270	0.0100	0.70		<b>Shallow Concentrated Flow, SCF</b> Short Grass Pasture Kv= 7.0 fps
22.0	370	Total			

### Subcatchment 11S: DA Post - DEV Uncontrolled



**20.247 - Dodge Road Hydrology**

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**Hydrograph for Subcatchment 11S: DA Post - DEV Uncontrolled**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.16	0.00	0.00	19.25	2.99	1.24	0.03
5.25	0.17	0.00	0.00	19.50	3.00	1.25	0.03
5.50	0.18	0.00	0.00	19.75	3.01	1.26	0.03
5.75	0.19	0.00	0.00	20.00	3.02	1.26	0.03
6.00	0.20	0.00	0.00	20.25	3.03	1.27	0.03
6.25	0.21	0.00	0.00	20.50	3.04	1.28	0.03
6.50	0.22	0.00	0.00	20.75	3.04	1.28	0.03
6.75	0.24	0.00	0.00	21.00	3.05	1.29	0.03
7.00	0.25	0.00	0.00	21.25	3.06	1.30	0.03
7.25	0.26	0.00	0.00	21.50	3.07	1.30	0.03
7.50	0.28	0.00	0.00	21.75	3.08	1.31	0.03
7.75	0.29	0.00	0.00	22.00	3.08	1.31	0.03
8.00	0.31	0.00	0.00	22.25	3.09	1.32	0.03
8.25	0.33	0.00	0.00	22.50	3.10	1.33	0.03
8.50	0.35	0.00	0.00	22.75	3.11	1.33	0.02
8.75	0.36	0.00	0.00	23.00	3.11	1.34	0.02
9.00	0.38	0.00	0.00	23.25	3.12	1.34	0.02
9.25	0.41	0.00	0.00	23.50	3.13	1.35	0.02
9.50	0.43	0.00	0.00	23.75	3.13	1.35	0.02
9.75	0.46	0.00	0.00	24.00	<b>3.14</b>	<b>1.36</b>	0.02
10.00	0.49	0.00	0.00				
10.25	0.52	0.00	0.00				
10.50	0.56	0.00	0.00				
10.75	0.61	0.00	0.01				
11.00	0.66	0.01	0.02				
11.25	0.74	0.02	0.03				
11.50	0.84	0.04	0.06				
11.75	1.03	0.09	0.12				
12.00	1.48	0.28	0.31				
12.25	2.11	0.63	<b>1.22</b>				
12.50	2.30	0.75	<b>1.02</b>				
12.75	2.40	0.82	0.55				
13.00	2.48	0.87	0.33				
13.25	2.53	0.91	0.23				
13.50	2.58	0.95	0.18				
13.75	2.62	0.97	0.14				
14.00	2.65	1.00	0.12				
14.25	2.68	1.02	0.11				
14.50	2.71	1.04	0.10				
14.75	2.73	1.05	0.09				
15.00	2.76	1.07	0.08				
15.25	2.78	1.08	0.07				
15.50	2.79	1.10	0.06				
15.75	2.81	1.11	0.06				
16.00	2.83	1.12	0.06				
16.25	2.85	1.14	0.06				
16.50	2.86	1.15	0.05				
16.75	2.88	1.16	0.05				
17.00	2.89	1.17	0.05				
17.25	2.90	1.18	0.05				
17.50	2.92	1.19	0.04				
17.75	2.93	1.20	0.04				
18.00	2.94	1.20	0.04				
18.25	2.95	1.21	0.04				
18.50	2.96	1.22	0.03				
18.75	2.97	1.23	0.03				
19.00	2.98	1.23	0.03				

## 20.247 - Dodge Road Hydrology

NRCC 24-hr A 10-Year Rainfall=3.14"

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### Summary for Pond 3P: Pond

Inflow Area = 5.610 ac, 39.44% Impervious, Inflow Depth > 1.85" for 10-Year event  
 Inflow = 8.76 cfs @ 12.38 hrs, Volume= 0.866 af  
 Outflow = 3.25 cfs @ 12.88 hrs, Volume= 0.856 af, Atten= 63%, Lag= 29.8 min  
 Primary = 3.25 cfs @ 12.88 hrs, Volume= 0.856 af  
 Routed to Link 12L : POST DEV

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 582.58' @ 12.88 hrs Surf.Area= 4,427 sf Storage= 12,044 cf

Plug-Flow detention time= 44.7 min calculated for 0.854 af (99% of inflow)  
 Center-of-Mass det. time= 37.8 min ( 864.4 - 826.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	578.50'	34,837 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
578.50	1,628	0	0
579.00	1,920	887	887
580.00	2,550	2,235	3,122
581.00	3,220	2,885	6,007
582.00	3,960	3,590	9,597
583.00	4,760	4,360	13,957
584.00	11,860	8,310	22,267
585.00	13,280	12,570	34,837

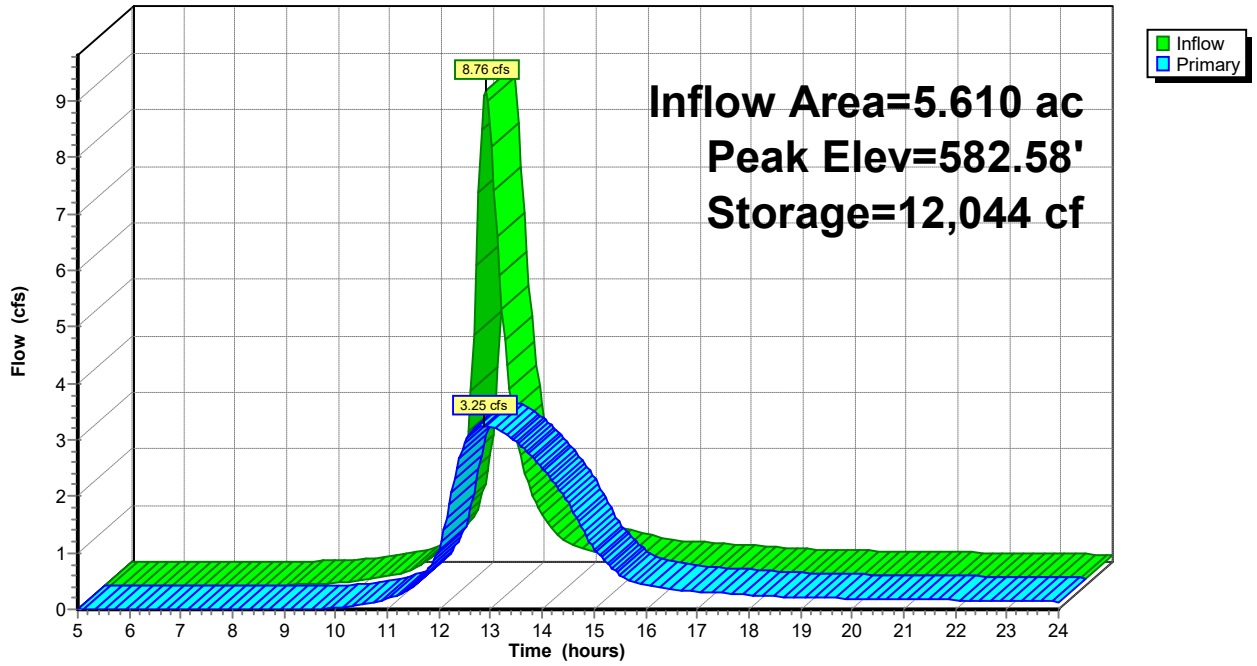
Device	Routing	Invert	Outlet Devices
#1	Device 4	578.51'	<b>8.0" Round Culvert</b> L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.51' / 578.45' S= 0.0037 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Device 4	583.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 4	584.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	578.34'	<b>18.0" Round Culvert</b> L= 34.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.34' / 578.21' S= 0.0038 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=3.25 cfs @ 12.88 hrs HW=582.58' (Free Discharge)

- 4=Culvert (Passes 3.25 cfs of 15.90 cfs potential flow)
- 1=Culvert (Inlet Controls 3.25 cfs @ 9.31 fps)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate ( Controls 0.00 cfs)

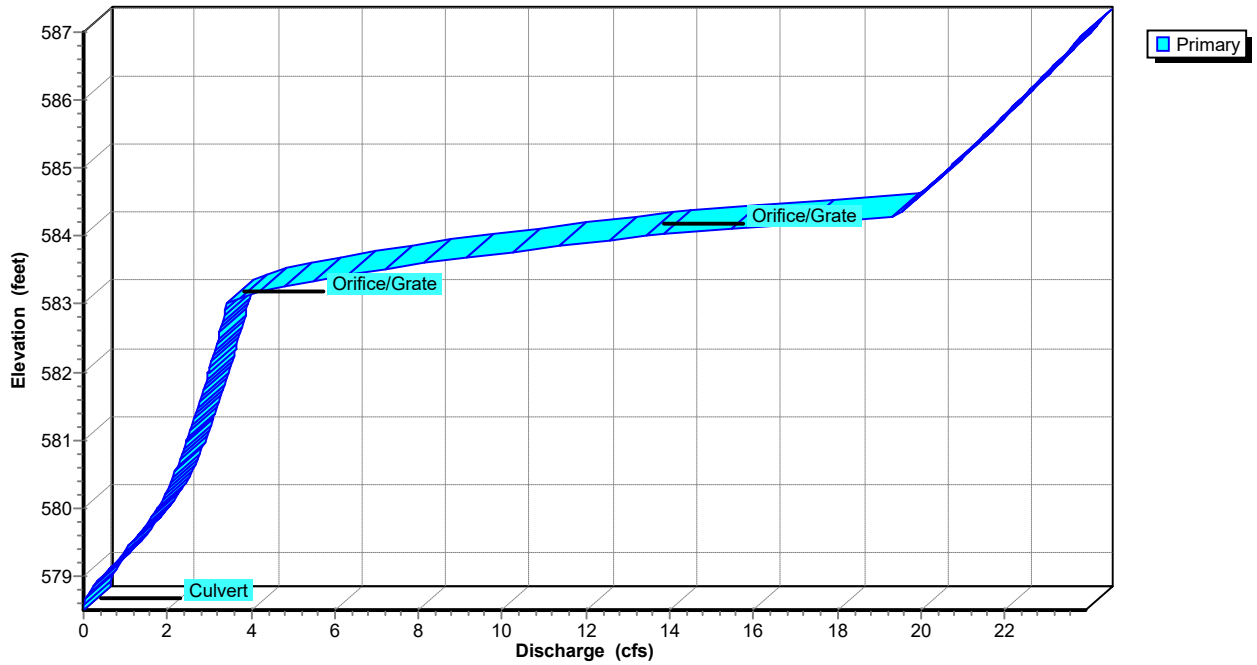
### Pond 3P: Pond

Hydrograph

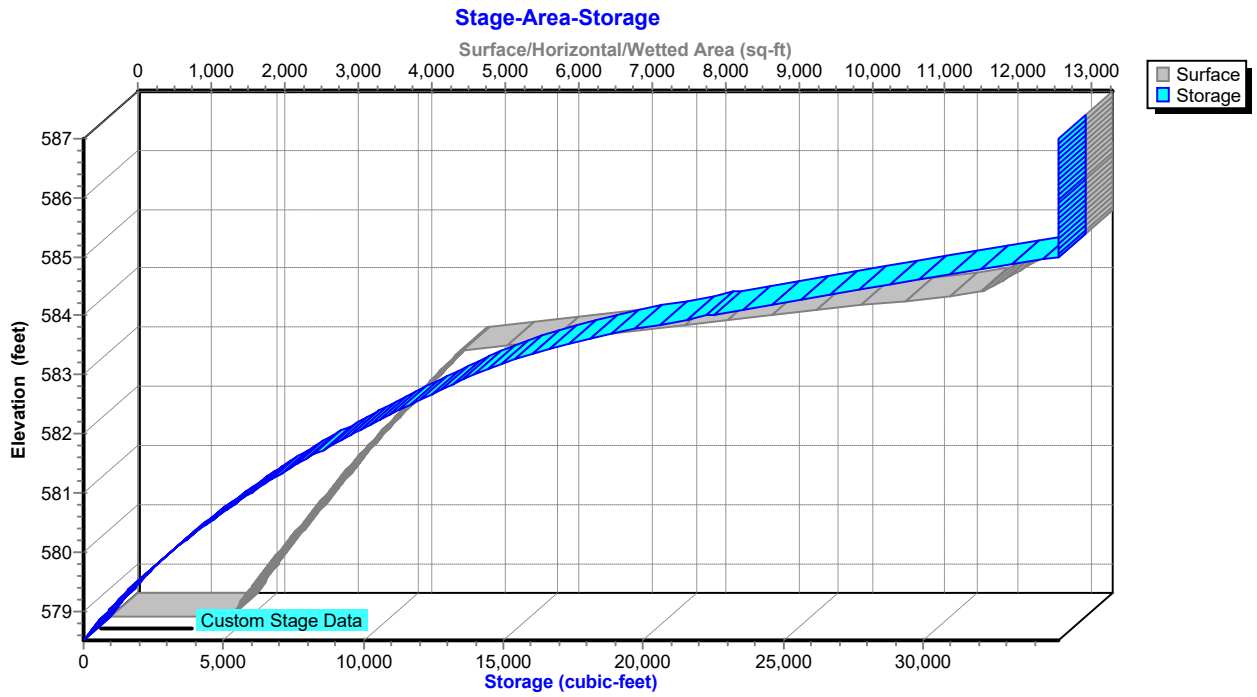


### Pond 3P: Pond

Stage-Discharge



### Pond 3P: Pond



**20.247 - Dodge Road Hydrology**

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**Hydrograph for Pond 3P: Pond**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	578.50	0.00
5.50	0.00	0	578.50	0.00
6.00	0.00	0	578.50	0.00
6.50	0.00	0	578.50	0.00
7.00	0.00	0	578.50	0.00
7.50	0.00	0	578.50	0.00
8.00	0.00	0	578.50	0.00
8.50	0.01	6	578.50	0.00
9.00	0.03	39	578.52	0.00
9.50	0.06	103	578.56	0.01
10.00	0.10	210	578.63	0.03
10.50	0.17	349	578.71	0.09
11.00	0.30	515	578.80	0.18
11.50	0.65	823	578.97	0.41
12.00	<b>2.24</b>	1,751	579.42	1.04
12.50	<b>7.78</b>	<b>9,263</b>	<b>581.91</b>	<b>2.95</b>
13.00	2.54	<b>11,884</b>	<b>582.55</b>	<b>3.23</b>
13.50	1.22	9,430	581.96	2.97
14.00	0.76	6,200	581.06	2.50
14.50	0.60	3,434	580.12	1.88
15.00	0.49	1,781	579.43	1.06
15.50	0.39	1,070	579.09	0.61
16.00	0.35	839	578.97	0.42
16.50	0.32	756	578.93	0.35
17.00	0.29	709	578.91	0.32
17.50	0.26	667	578.88	0.29
18.00	0.24	628	578.86	0.26
18.50	0.21	590	578.84	0.23
19.00	0.20	563	578.83	0.21
19.50	0.19	546	578.82	0.20
20.00	0.19	533	578.81	0.19
20.50	0.18	521	578.80	0.19
21.00	0.17	510	578.80	0.18
21.50	0.16	499	578.79	0.17
22.00	0.16	487	578.78	0.16
22.50	0.15	476	578.78	0.16
23.00	0.14	464	578.77	0.15
23.50	0.14	453	578.77	0.14
24.00	0.13	441	578.76	0.13

**20.247 - Dodge Road Hydrology**

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**Stage-Discharge for Pond 3P: Pond**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
578.50	0.00	581.35	2.66	584.20	17.41
578.55	0.00	581.40	2.69	584.25	18.57
578.60	0.02	581.45	2.71	584.30	19.42
578.65	0.04	581.50	2.74	584.35	19.51
578.70	0.08	581.55	2.77	584.40	19.61
578.75	0.12	581.60	2.79	584.45	19.70
578.80	0.18	581.65	2.82	584.50	19.79
578.85	0.24	581.70	2.84	584.55	19.88
578.90	0.31	581.75	2.87	584.60	19.97
578.95	0.38	581.80	2.89	584.65	20.06
579.00	0.46	581.85	2.91	584.70	20.15
579.05	0.54	581.90	2.94	584.75	20.24
579.10	0.62	581.95	2.96	584.80	20.33
579.15	0.70	582.00	2.99	584.85	20.42
579.20	0.78	582.05	3.01	584.90	20.51
579.25	0.86	582.10	3.03	584.95	20.60
579.30	0.93	582.15	3.06	585.00	20.69
579.35	0.98	582.20	3.08	585.05	20.77
579.40	1.00	582.25	3.10	585.10	20.86
579.45	1.08	582.30	3.12	585.15	20.95
579.50	1.16	582.35	3.15	585.20	21.03
579.55	1.23	582.40	3.17	585.25	21.12
579.60	1.30	582.45	3.19	585.30	21.20
579.65	1.37	582.50	3.21	585.35	21.29
579.70	1.43	582.55	3.24	585.40	21.37
579.75	1.49	582.60	3.26	585.45	21.46
579.80	1.55	582.65	3.28	585.50	21.54
579.85	1.60	582.70	3.30	585.55	21.63
579.90	1.66	582.75	3.32	585.60	21.71
579.95	1.71	582.80	3.34	585.65	21.79
580.00	1.76	582.85	3.36	585.70	21.88
580.05	1.81	582.90	3.39	585.75	21.96
580.10	1.86	582.95	3.41	585.80	22.04
580.15	1.90	583.00	3.43	585.85	22.12
580.20	1.95	583.05	3.55	585.90	22.20
580.25	1.99	583.10	3.77	585.95	22.29
580.30	2.03	583.15	4.05	586.00	22.37
580.35	2.06	583.20	4.37	586.05	22.45
580.40	2.10	583.25	4.73	586.10	22.53
580.45	2.13	583.30	5.13	586.15	22.61
580.50	2.16	583.35	5.56	586.20	22.69
580.55	2.20	583.40	6.02	586.25	22.77
580.60	2.23	583.45	6.51	586.30	22.85
580.65	2.26	583.50	7.03	586.35	22.93
580.70	2.29	583.55	7.57	586.40	23.01
580.75	2.32	583.60	8.14	586.45	23.08
580.80	2.35	583.65	8.73	586.50	23.16
580.85	2.38	583.70	9.34	586.55	23.24
580.90	2.41	583.75	9.98	586.60	23.32
580.95	2.44	583.80	10.63	586.65	23.40
581.00	2.47	583.85	11.31	586.70	23.47
581.05	2.50	583.90	12.00	586.75	23.55
581.10	2.52	583.95	12.71	586.80	23.63
581.15	2.55	584.00	13.45	586.85	23.70
581.20	2.58	584.05	14.30	586.90	23.78
581.25	2.61	584.10	15.27	586.95	23.85
581.30	2.63	584.15	16.31	587.00	<b>23.93</b>



**20.247 - Dodge Road Hydrology**

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**Stage-Area-Storage for Pond 3P: Pond**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
578.50	1,628	0	584.20	12,144	24,667
578.60	1,686	166	584.30	12,286	25,889
578.70	1,745	337	584.40	12,428	27,125
578.80	1,803	515	584.50	12,570	28,375
578.90	1,862	698	584.60	12,712	29,639
579.00	1,920	887	584.70	12,854	30,917
579.10	1,983	1,082	584.80	12,996	32,209
579.20	2,046	1,284	584.90	13,138	33,516
579.30	2,109	1,491	585.00	<b>13,280</b>	<b>34,837</b>
579.40	2,172	1,705	585.10	13,280	34,837
579.50	2,235	1,926	585.20	13,280	34,837
579.60	2,298	2,152	585.30	13,280	34,837
579.70	2,361	2,385	585.40	13,280	34,837
579.80	2,424	2,625	585.50	13,280	34,837
579.90	2,487	2,870	585.60	13,280	34,837
580.00	2,550	3,122	585.70	13,280	34,837
580.10	2,617	3,380	585.80	13,280	34,837
580.20	2,684	3,645	585.90	13,280	34,837
580.30	2,751	3,917	586.00	13,280	34,837
580.40	2,818	4,196	586.10	13,280	34,837
580.50	2,885	4,481	586.20	13,280	34,837
580.60	2,952	4,773	586.30	13,280	34,837
580.70	3,019	5,071	586.40	13,280	34,837
580.80	3,086	5,376	586.50	13,280	34,837
580.90	3,153	5,688	586.60	13,280	34,837
581.00	3,220	6,007	586.70	13,280	34,837
581.10	3,294	6,333	586.80	13,280	34,837
581.20	3,368	6,666	586.90	13,280	34,837
581.30	3,442	7,006	587.00	13,280	34,837
581.40	3,516	7,354			
581.50	3,590	7,710			
581.60	3,664	8,072			
581.70	3,738	8,442			
581.80	3,812	8,820			
581.90	3,886	9,205			
582.00	3,960	9,597			
582.10	4,040	9,997			
582.20	4,120	10,405			
582.30	4,200	10,821			
582.40	4,280	11,245			
582.50	4,360	11,677			
582.60	4,440	12,117			
582.70	4,520	12,565			
582.80	4,600	13,021			
582.90	4,680	13,485			
583.00	4,760	13,957			
583.10	5,470	14,469			
583.20	6,180	15,051			
583.30	6,890	15,704			
583.40	7,600	16,429			
583.50	8,310	17,225			
583.60	9,020	18,091			
583.70	9,730	19,029			
583.80	10,440	20,037			
583.90	11,150	21,116			
584.00	11,860	22,267			
584.10	12,002	23,460			

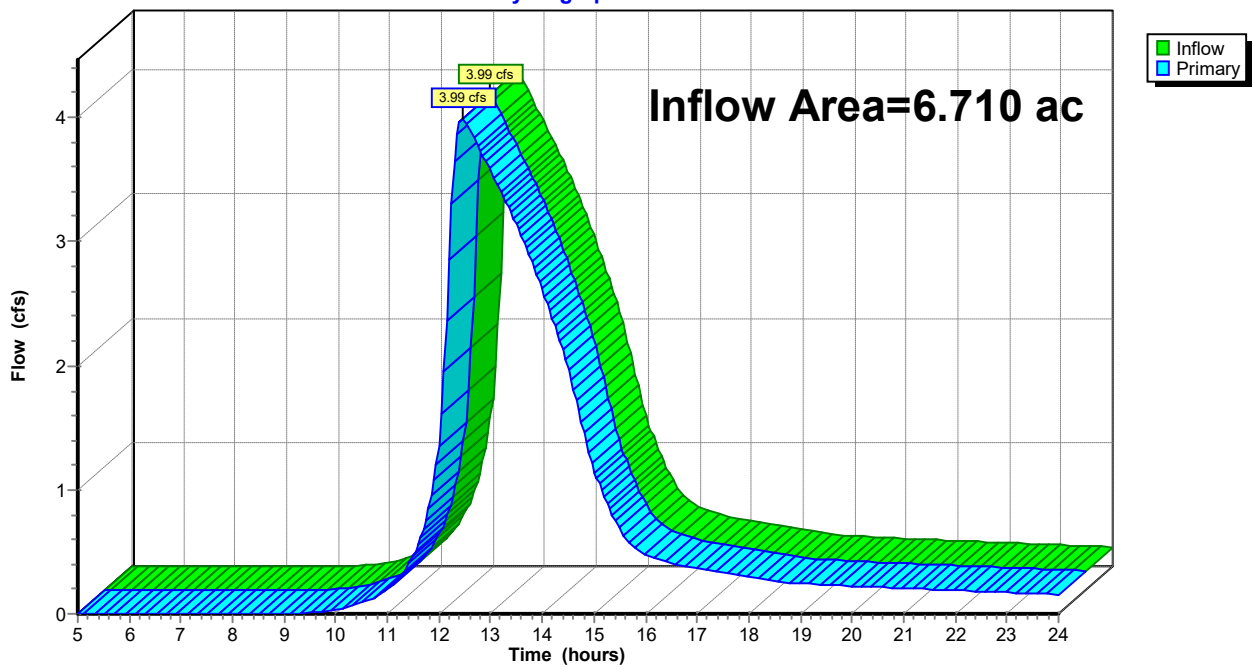
Summary for Link 12L: POST DEV

Inflow Area = 6.710 ac, 32.97% Impervious, Inflow Depth > 1.75" for 10-Year event  
Inflow = 3.99 cfs @ 12.45 hrs, Volume= 0.980 af  
Primary = 3.99 cfs @ 12.45 hrs, Volume= 0.980 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Link 12L: POST DEV

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 10-Year Rainfall=3.14"

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**Hydrograph for Link 12L: POST DEV**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	0.00	0.00	19.25	0.24	0.00	0.24
5.25	0.00	0.00	0.00	19.50	0.23	0.00	0.23
5.50	0.00	0.00	0.00	19.75	0.23	0.00	0.23
5.75	0.00	0.00	0.00	20.00	0.22	0.00	0.22
6.00	0.00	0.00	0.00	20.25	0.22	0.00	0.22
6.25	0.00	0.00	0.00	20.50	0.22	0.00	0.22
6.50	0.00	0.00	0.00	20.75	0.21	0.00	0.21
6.75	0.00	0.00	0.00	21.00	0.21	0.00	0.21
7.00	0.00	0.00	0.00	21.25	0.20	0.00	0.20
7.25	0.00	0.00	0.00	21.50	0.20	0.00	0.20
7.50	0.00	0.00	0.00	21.75	0.19	0.00	0.19
7.75	0.00	0.00	0.00	22.00	0.19	0.00	0.19
8.00	0.00	0.00	0.00	22.25	0.19	0.00	0.19
8.25	0.00	0.00	0.00	22.50	0.18	0.00	0.18
8.50	0.00	0.00	0.00	22.75	0.18	0.00	0.18
8.75	0.00	0.00	0.00	23.00	0.17	0.00	0.17
9.00	0.00	0.00	0.00	23.25	0.17	0.00	0.17
9.25	0.00	0.00	0.00	23.50	0.16	0.00	0.16
9.50	0.01	0.00	0.01	23.75	0.16	0.00	0.16
9.75	0.02	0.00	0.02	24.00	0.16	0.00	0.16
10.00	0.03	0.00	0.03				
10.25	0.05	0.00	0.05				
10.50	0.09	0.00	0.09				
10.75	0.13	0.00	0.13				
11.00	0.20	0.00	0.20				
11.25	0.30	0.00	0.30				
11.50	0.46	0.00	0.46				
11.75	0.76	0.00	0.76				
12.00	1.36	0.00	1.36				
12.25	<b>3.31</b>	0.00	<b>3.31</b>				
12.50	<b>3.97</b>	0.00	<b>3.97</b>				
12.75	3.78	0.00	3.78				
13.00	3.57	0.00	3.57				
13.25	3.37	0.00	3.37				
13.50	3.14	0.00	3.14				
13.75	2.89	0.00	2.89				
14.00	2.62	0.00	2.62				
14.25	2.32	0.00	2.32				
14.50	1.97	0.00	1.97				
14.75	1.55	0.00	1.55				
15.00	1.13	0.00	1.13				
15.25	0.89	0.00	0.89				
15.50	0.67	0.00	0.67				
15.75	0.55	0.00	0.55				
16.00	0.48	0.00	0.48				
16.25	0.43	0.00	0.43				
16.50	0.41	0.00	0.41				
16.75	0.38	0.00	0.38				
17.00	0.37	0.00	0.37				
17.25	0.35	0.00	0.35				
17.50	0.33	0.00	0.33				
17.75	0.31	0.00	0.31				
18.00	0.30	0.00	0.30				
18.25	0.28	0.00	0.28				
18.50	0.26	0.00	0.26				
18.75	0.25	0.00	0.25				
19.00	0.25	0.00	0.25				

## 20.247 - Dodge Road Hydrology

NRCC 24-hr A 25-Year Rainfall=3.84"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 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 2S: DA POST DEV -** Runoff Area=5.610 ac 39.44% Impervious Runoff Depth>2.48"  
Flow Length=860' Tc=27.1 min CN=87 Runoff=11.67 cfs 1.159 af

**Subcatchment 11S: DA Post - DEV** Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>1.90"  
Flow Length=370' Slope=0.0100 '/ Tc=22.0 min CN=80 Runoff=1.95 cfs 0.174 af

**Pond 3P: Pond** Peak Elev=583.35' Storage=16,041 cf Inflow=11.67 cfs 1.159 af  
Outflow=5.54 cfs 1.147 af

**Link 12L: POST DEV** Inflow=6.29 cfs 1.322 af  
Primary=6.29 cfs 1.322 af

**Total Runoff Area = 6.710 ac Runoff Volume = 1.333 af Average Runoff Depth = 2.38"**  
**67.03% Pervious = 4.497 ac 32.97% Impervious = 2.213 ac**

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 25-Year Rainfall=3.84"

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### Summary for Subcatchment 2S: DA POST DEV - CONTROLLED

[47] Hint: Peak is 518% of capacity of segment #3

Runoff = 11.67 cfs @ 12.38 hrs, Volume= 1.159 af, Depth> 2.48"  
Routed to Pond 3P : Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 25-Year Rainfall=3.84"

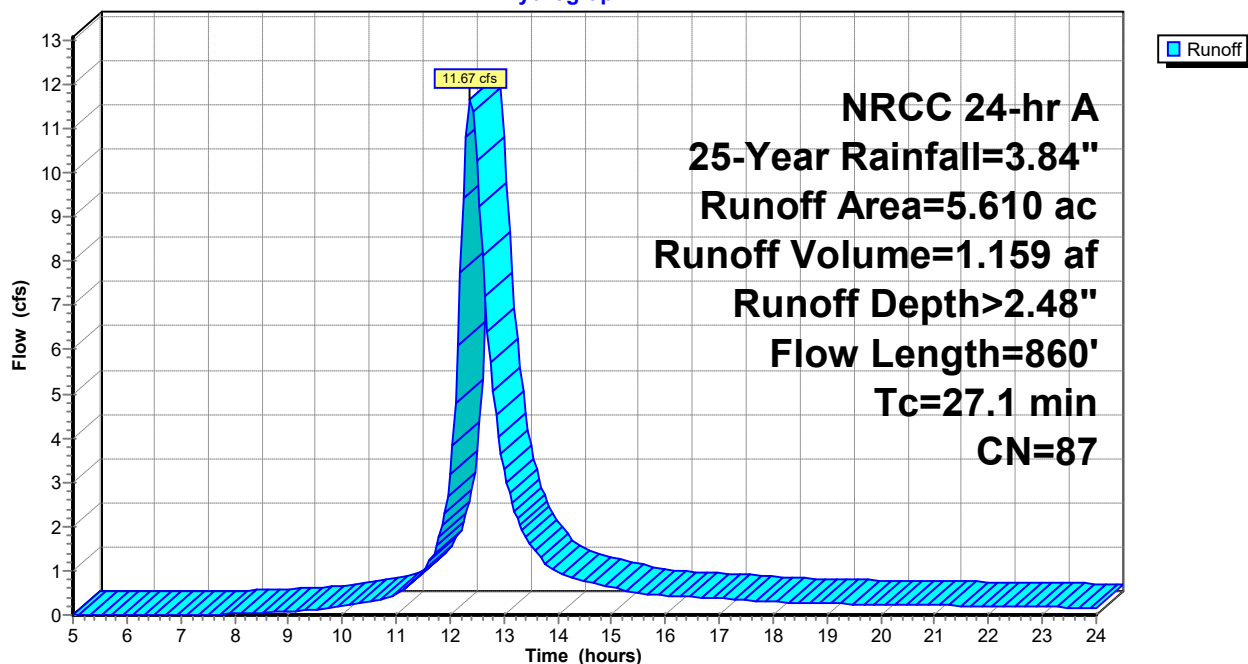
Area (ac)	CN	Description
0.970	98	Paved parking, HSG D
3.270	87	1/4 acre lots, 38% imp, HSG D
1.370	80	>75% Grass cover, Good, HSG D
5.610	87	Weighted Average
3.397		60.56% Pervious Area
2.213		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0100	0.07		<b>Sheet Flow, SF</b> Grass: Dense n= 0.240 P2= 2.20"
0.1	20	0.0200	2.28		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.3	740	0.0040	2.87	2.25	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
27.1	860	Total			

### Subcatchment 2S: DA POST DEV - CONTROLLED

Hydrograph



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 25-Year Rainfall=3.84"

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**Hydrograph for Subcatchment 2S: DA POST DEV - CONTROLLED**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.20	0.00	0.00	19.25	3.66	2.32	0.25
5.25	0.21	0.00	0.00	19.50	3.67	2.33	0.25
5.50	0.22	0.00	0.00	19.75	3.68	2.34	0.24
5.75	0.23	0.00	0.00	20.00	3.69	2.35	0.24
6.00	0.25	0.00	0.00	20.25	3.70	2.36	0.23
6.25	0.26	0.00	0.00	20.50	3.71	2.37	0.23
6.50	0.27	0.00	0.00	20.75	3.72	2.38	0.22
6.75	0.29	0.00	0.00	21.00	3.73	2.39	0.22
7.00	0.31	0.00	0.00	21.25	3.74	2.40	0.21
7.25	0.32	0.00	0.00	21.50	3.75	2.41	0.21
7.50	0.34	0.00	0.01	21.75	3.76	2.42	0.20
7.75	0.36	0.00	0.02	22.00	3.77	2.43	0.20
8.00	0.38	0.00	0.03	22.25	3.78	2.44	0.19
8.25	0.40	0.01	0.04	22.50	3.79	2.45	0.19
8.50	0.42	0.01	0.05	22.75	3.80	2.45	0.19
8.75	0.45	0.01	0.06	23.00	3.81	2.46	0.18
9.00	0.47	0.02	0.08	23.25	3.82	2.47	0.18
9.25	0.50	0.02	0.10	23.50	3.82	2.48	0.17
9.50	0.53	0.03	0.12	23.75	3.83	2.48	0.17
9.75	0.56	0.04	0.15	24.00	<b>3.84</b>	<b>2.49</b>	0.16
10.00	0.60	0.05	0.19				
10.25	0.64	0.06	0.24				
10.50	0.68	0.08	0.29				
10.75	0.74	0.10	0.36				
11.00	0.81	0.13	0.48				
11.25	0.91	0.18	0.67				
11.50	1.03	0.24	0.99				
11.75	1.26	0.38	1.57				
12.00	1.81	0.76	3.17				
12.25	2.58	1.38	<b>9.42</b>				
12.50	2.81	1.57	<b>10.28</b>				
12.75	2.93	1.68	5.70				
13.00	3.03	1.76	3.29				
13.25	3.10	1.83	2.18				
13.50	3.16	1.88	1.57				
13.75	3.20	1.92	1.20				
14.00	3.24	1.95	0.97				
14.25	3.28	1.99	0.85				
14.50	3.31	2.02	0.77				
14.75	3.34	2.04	0.69				
15.00	3.37	2.07	0.62				
15.25	3.39	2.09	0.55				
15.50	3.42	2.11	0.50				
15.75	3.44	2.13	0.47				
16.00	3.46	2.15	0.45				
16.25	3.48	2.16	0.43				
16.50	3.50	2.18	0.41				
16.75	3.52	2.20	0.39				
17.00	3.53	2.21	0.37				
17.25	3.55	2.23	0.35				
17.50	3.57	2.24	0.34				
17.75	3.58	2.25	0.32				
18.00	3.59	2.27	0.30				
18.25	3.61	2.28	0.28				
18.50	3.62	2.29	0.27				
18.75	3.63	2.30	0.26				
19.00	3.64	2.31	0.25				

## 20.247 - Dodge Road Hydrology

Prepared by Carmina Wood Morris, PC

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NRCC 24-hr A 25-Year Rainfall=3.84"

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### Summary for Subcatchment 11S: DA Post - DEV Uncontrolled

Runoff = 1.95 cfs @ 12.33 hrs, Volume= 0.174 af, Depth> 1.90"  
 Routed to Link 12L : POST DEV

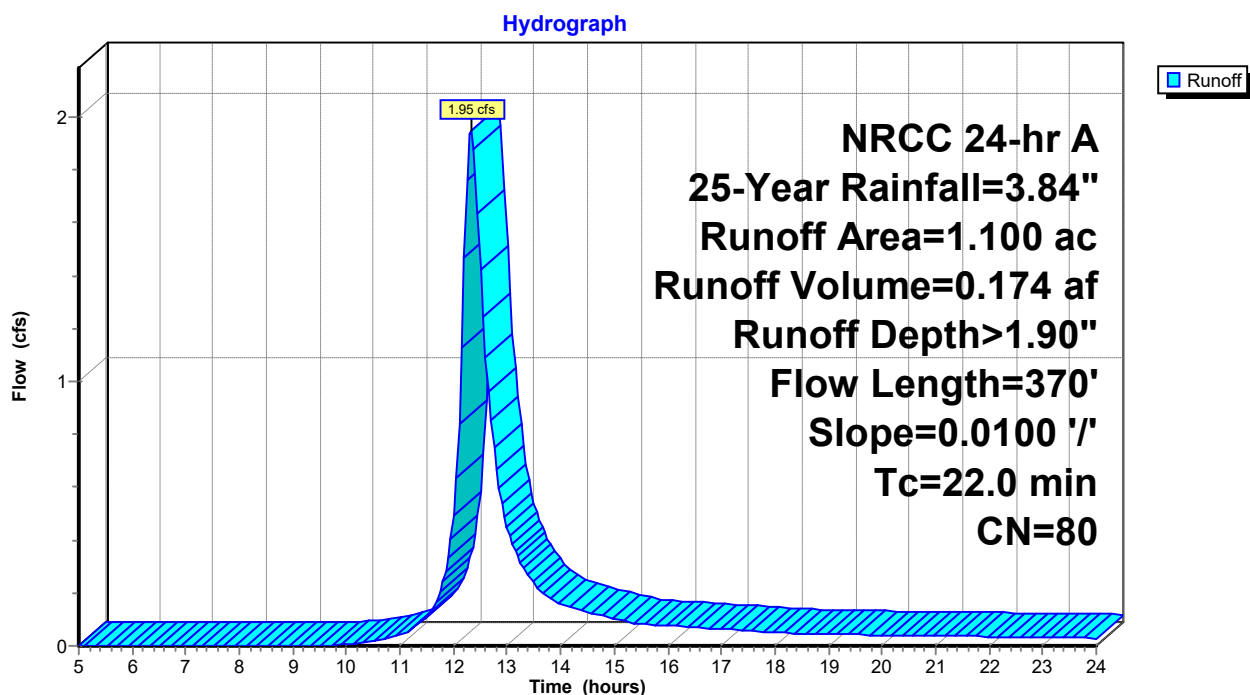
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
 NRCC 24-hr A 25-Year Rainfall=3.84"

Area (ac)	CN	Description
1.100	80	>75% Grass cover, Good, HSG D
1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		<b>Sheet Flow, SF</b> Grass: Short n= 0.150 P2= 2.20"
6.4	270	0.0100	0.70		<b>Shallow Concentrated Flow, SCF</b> Short Grass Pasture Kv= 7.0 fps
22.0	370	Total			

### Subcatchment 11S: DA Post - DEV Uncontrolled



**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 25-Year Rainfall=3.84"

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**Hydrograph for Subcatchment 11S: DA Post - DEV Uncontrolled**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.20	0.00	0.00	19.25	3.66	1.76	0.04
5.25	0.21	0.00	0.00	19.50	3.67	1.77	0.04
5.50	0.22	0.00	0.00	19.75	3.68	1.78	0.04
5.75	0.23	0.00	0.00	20.00	3.69	1.79	0.04
6.00	0.25	0.00	0.00	20.25	3.70	1.80	0.04
6.25	0.26	0.00	0.00	20.50	3.71	1.81	0.04
6.50	0.27	0.00	0.00	20.75	3.72	1.82	0.04
6.75	0.29	0.00	0.00	21.00	3.73	1.82	0.04
7.00	0.31	0.00	0.00	21.25	3.74	1.83	0.04
7.25	0.32	0.00	0.00	21.50	3.75	1.84	0.04
7.50	0.34	0.00	0.00	21.75	3.76	1.85	0.04
7.75	0.36	0.00	0.00	22.00	3.77	1.86	0.03
8.00	0.38	0.00	0.00	22.25	3.78	1.86	0.03
8.25	0.40	0.00	0.00	22.50	3.79	1.87	0.03
8.50	0.42	0.00	0.00	22.75	3.80	1.88	0.03
8.75	0.45	0.00	0.00	23.00	3.81	1.88	0.03
9.00	0.47	0.00	0.00	23.25	3.82	1.89	0.03
9.25	0.50	0.00	0.00	23.50	3.82	1.90	0.03
9.50	0.53	0.00	0.00	23.75	3.83	1.90	0.03
9.75	0.56	0.00	0.00	24.00	<b>3.84</b>	<b>1.91</b>	0.03
10.00	0.60	0.00	0.01				
10.25	0.64	0.01	0.01				
10.50	0.68	0.01	0.02				
10.75	0.74	0.02	0.03				
11.00	0.81	0.03	0.04				
11.25	0.91	0.06	0.07				
11.50	1.03	0.09	0.11				
11.75	1.26	0.18	0.21				
12.00	1.81	0.45	0.50				
12.25	2.58	0.94	<b>1.76</b>				
12.50	2.81	1.11	<b>1.42</b>				
12.75	2.93	1.20	0.75				
13.00	3.03	1.27	0.45				
13.25	3.10	1.33	0.31				
13.50	3.16	1.37	0.24				
13.75	3.20	1.40	0.19				
14.00	3.24	1.43	0.16				
14.25	3.28	1.46	0.14				
14.50	3.31	1.49	0.13				
14.75	3.34	1.51	0.12				
15.00	3.37	1.53	0.10				
15.25	3.39	1.55	0.09				
15.50	3.42	1.57	0.08				
15.75	3.44	1.59	0.08				
16.00	3.46	1.60	0.08				
16.25	3.48	1.62	0.07				
16.50	3.50	1.64	0.07				
16.75	3.52	1.65	0.07				
17.00	3.53	1.66	0.06				
17.25	3.55	1.68	0.06				
17.50	3.57	1.69	0.06				
17.75	3.58	1.70	0.05				
18.00	3.59	1.71	0.05				
18.25	3.61	1.72	0.05				
18.50	3.62	1.73	0.05				
18.75	3.63	1.74	0.04				
19.00	3.64	1.75	0.04				



## 20.247 - Dodge Road Hydrology

NRCC 24-hr A 25-Year Rainfall=3.84"

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### Summary for Pond 3P: Pond

Inflow Area = 5.610 ac, 39.44% Impervious, Inflow Depth > 2.48" for 25-Year event  
Inflow = 11.67 cfs @ 12.38 hrs, Volume= 1.159 af  
Outflow = 5.54 cfs @ 12.77 hrs, Volume= 1.147 af, Atten= 53%, Lag= 23.1 min  
Primary = 5.54 cfs @ 12.77 hrs, Volume= 1.147 af  
Routed to Link 12L : POST DEV

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
Peak Elev= 583.35' @ 12.77 hrs Surf.Area= 7,228 sf Storage= 16,041 cf

Plug-Flow detention time= 46.4 min calculated for 1.147 af (99% of inflow)  
Center-of-Mass det. time= 40.6 min ( 860.3 - 819.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	578.50'	34,837 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
578.50	1,628	0	0
579.00	1,920	887	887
580.00	2,550	2,235	3,122
581.00	3,220	2,885	6,007
582.00	3,960	3,590	9,597
583.00	4,760	4,360	13,957
584.00	11,860	8,310	22,267
585.00	13,280	12,570	34,837

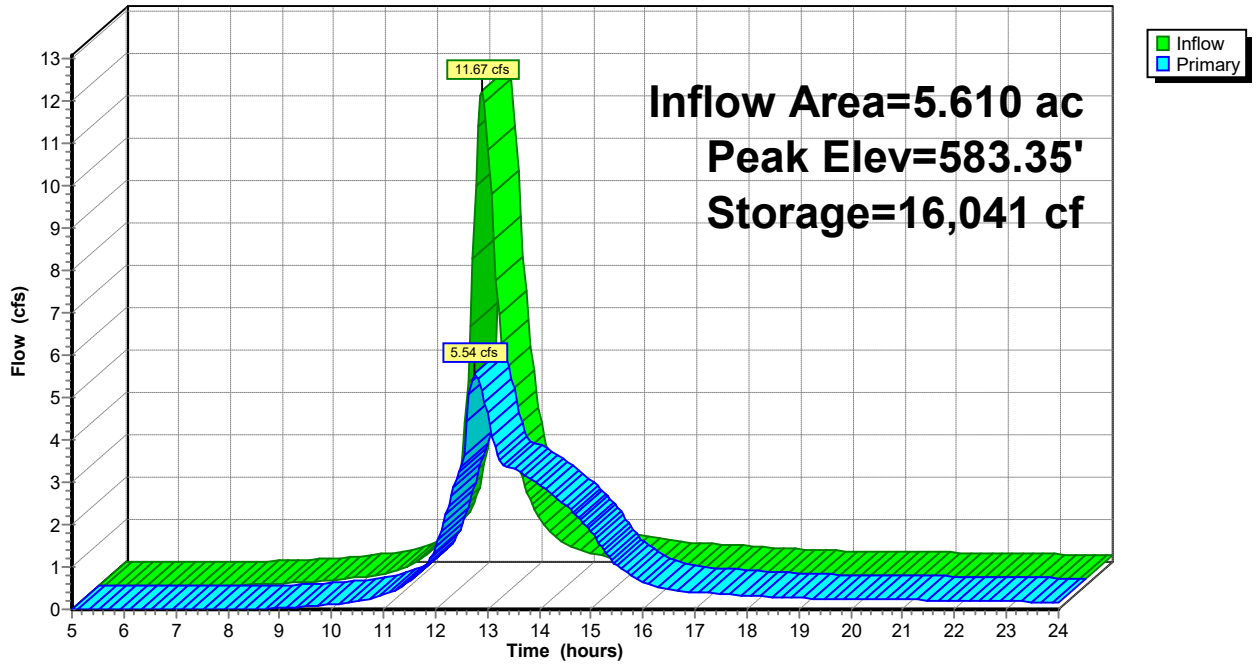
Device	Routing	Invert	Outlet Devices
#1	Device 4	578.51'	<b>8.0" Round Culvert</b> L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.51' / 578.45' S= 0.0037 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Device 4	583.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 4	584.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	578.34'	<b>18.0" Round Culvert</b> L= 34.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.34' / 578.21' S= 0.0038 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=5.52 cfs @ 12.77 hrs HW=583.35' (Free Discharge)

- 4=Culvert (Passes 5.52 cfs of 17.55 cfs potential flow)
- 1=Culvert (Inlet Controls 3.57 cfs @ 10.22 fps)
- 2=Orifice/Grate (Orifice Controls 1.96 cfs @ 1.89 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

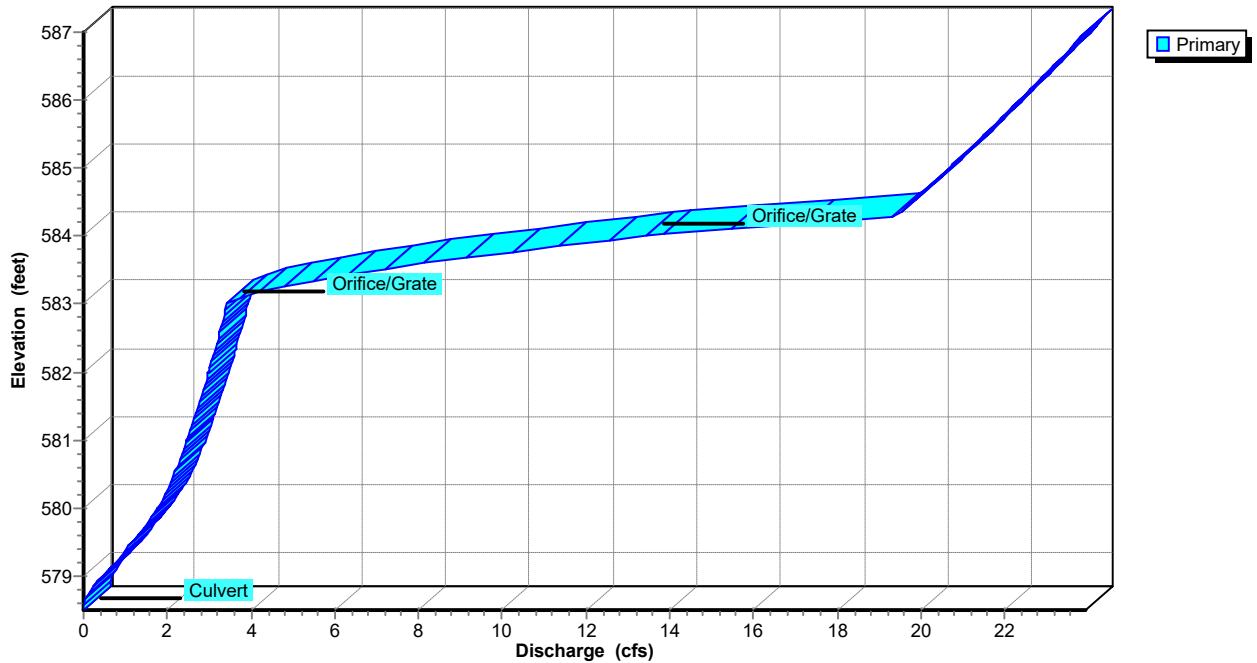
### Pond 3P: Pond

Hydrograph

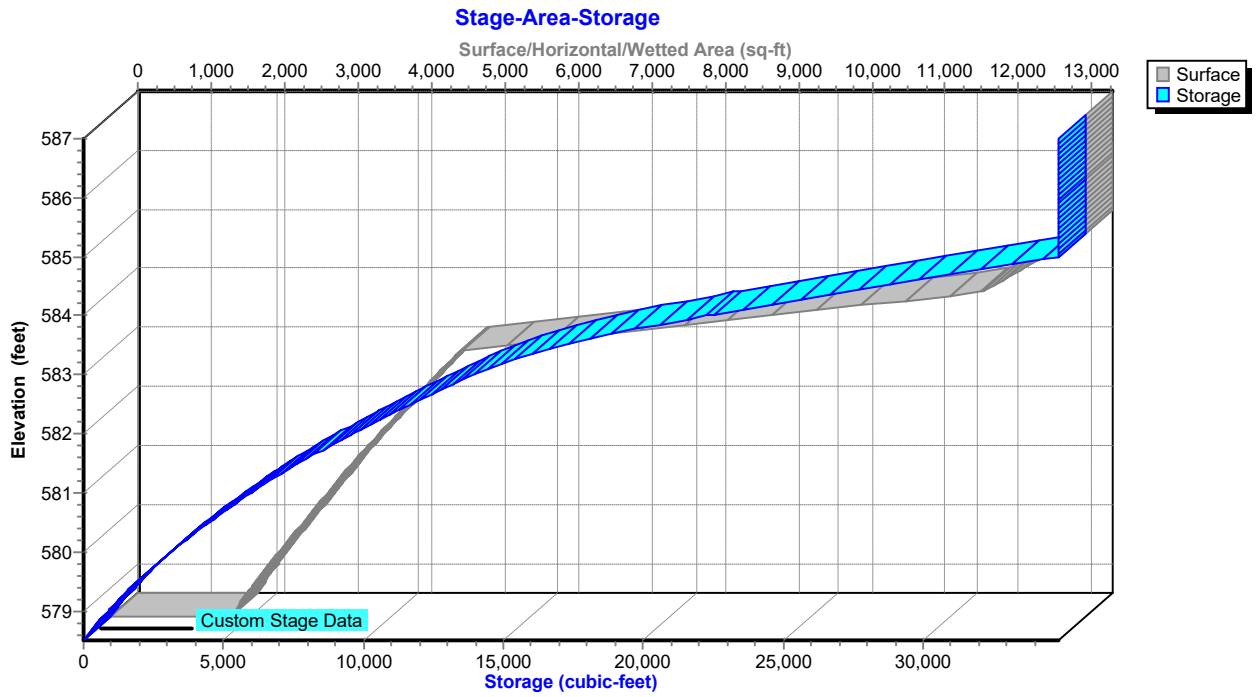


### Pond 3P: Pond

Stage-Discharge



### Pond 3P: Pond



**20.247 - Dodge Road Hydrology**

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**Hydrograph for Pond 3P: Pond**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	578.50	0.00
5.50	0.00	0	578.50	0.00
6.00	0.00	0	578.50	0.00
6.50	0.00	0	578.50	0.00
7.00	0.00	0	578.50	0.00
7.50	0.01	4	578.50	0.00
8.00	0.03	33	578.52	0.00
8.50	0.05	95	578.56	0.01
9.00	0.08	187	578.61	0.03
9.50	0.12	288	578.67	0.06
10.00	0.19	411	578.74	0.12
10.50	0.29	556	578.82	0.21
11.00	0.48	739	578.92	0.34
11.50	0.99	1,132	579.12	0.66
12.00	<b>3.17</b>	2,485	579.74	1.48
12.50	<b>10.28</b>	<b>13,162</b>	<b>582.83</b>	<b>3.36</b>
13.00	3.29	<b>15,270</b>	<b>583.23</b>	<b>4.62</b>
13.50	1.57	12,698	582.73	3.31
14.00	0.97	9,243	581.91	2.94
14.50	0.77	5,916	580.97	2.45
15.00	0.62	3,283	580.06	1.82
15.50	0.50	1,729	579.41	1.04
16.00	0.45	1,094	579.11	0.63
16.50	0.41	901	579.01	0.47
17.00	0.37	822	578.97	0.41
17.50	0.34	769	578.94	0.36
18.00	0.30	721	578.91	0.33
18.50	0.27	673	578.89	0.29
19.00	0.25	641	578.87	0.27
19.50	0.25	623	578.86	0.25
20.00	0.24	609	578.85	0.24
20.50	0.23	596	578.84	0.23
21.00	0.22	584	578.84	0.22
21.50	0.21	570	578.83	0.22
22.00	0.20	556	578.82	0.21
22.50	0.19	541	578.81	0.20
23.00	0.18	527	578.81	0.19
23.50	0.17	512	578.80	0.18
24.00	0.16	497	578.79	0.17

**20.247 - Dodge Road Hydrology**

NRCC 24-hr A 25-Year Rainfall=3.84"

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**Stage-Discharge for Pond 3P: Pond**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
578.50	0.00	581.35	2.66	584.20	17.41
578.55	0.00	581.40	2.69	584.25	18.57
578.60	0.02	581.45	2.71	584.30	19.42
578.65	0.04	581.50	2.74	584.35	19.51
578.70	0.08	581.55	2.77	584.40	19.61
578.75	0.12	581.60	2.79	584.45	19.70
578.80	0.18	581.65	2.82	584.50	19.79
578.85	0.24	581.70	2.84	584.55	19.88
578.90	0.31	581.75	2.87	584.60	19.97
578.95	0.38	581.80	2.89	584.65	20.06
579.00	0.46	581.85	2.91	584.70	20.15
579.05	0.54	581.90	2.94	584.75	20.24
579.10	0.62	581.95	2.96	584.80	20.33
579.15	0.70	582.00	2.99	584.85	20.42
579.20	0.78	582.05	3.01	584.90	20.51
579.25	0.86	582.10	3.03	584.95	20.60
579.30	0.93	582.15	3.06	585.00	20.69
579.35	0.98	582.20	3.08	585.05	20.77
579.40	1.00	582.25	3.10	585.10	20.86
579.45	1.08	582.30	3.12	585.15	20.95
579.50	1.16	582.35	3.15	585.20	21.03
579.55	1.23	582.40	3.17	585.25	21.12
579.60	1.30	582.45	3.19	585.30	21.20
579.65	1.37	582.50	3.21	585.35	21.29
579.70	1.43	582.55	3.24	585.40	21.37
579.75	1.49	582.60	3.26	585.45	21.46
579.80	1.55	582.65	3.28	585.50	21.54
579.85	1.60	582.70	3.30	585.55	21.63
579.90	1.66	582.75	3.32	585.60	21.71
579.95	1.71	582.80	3.34	585.65	21.79
580.00	1.76	582.85	3.36	585.70	21.88
580.05	1.81	582.90	3.39	585.75	21.96
580.10	1.86	582.95	3.41	585.80	22.04
580.15	1.90	583.00	3.43	585.85	22.12
580.20	1.95	583.05	3.55	585.90	22.20
580.25	1.99	583.10	3.77	585.95	22.29
580.30	2.03	583.15	4.05	586.00	22.37
580.35	2.06	583.20	4.37	586.05	22.45
580.40	2.10	583.25	4.73	586.10	22.53
580.45	2.13	583.30	5.13	586.15	22.61
580.50	2.16	583.35	5.56	586.20	22.69
580.55	2.20	583.40	6.02	586.25	22.77
580.60	2.23	583.45	6.51	586.30	22.85
580.65	2.26	583.50	7.03	586.35	22.93
580.70	2.29	583.55	7.57	586.40	23.01
580.75	2.32	583.60	8.14	586.45	23.08
580.80	2.35	583.65	8.73	586.50	23.16
580.85	2.38	583.70	9.34	586.55	23.24
580.90	2.41	583.75	9.98	586.60	23.32
580.95	2.44	583.80	10.63	586.65	23.40
581.00	2.47	583.85	11.31	586.70	23.47
581.05	2.50	583.90	12.00	586.75	23.55
581.10	2.52	583.95	12.71	586.80	23.63
581.15	2.55	584.00	13.45	586.85	23.70
581.20	2.58	584.05	14.30	586.90	23.78
581.25	2.61	584.10	15.27	586.95	23.85
581.30	2.63	584.15	16.31	587.00	<b>23.93</b>

**20.247 - Dodge Road Hydrology**

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**Stage-Area-Storage for Pond 3P: Pond**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
578.50	1,628	0	584.20	12,144	24,667
578.60	1,686	166	584.30	12,286	25,889
578.70	1,745	337	584.40	12,428	27,125
578.80	1,803	515	584.50	12,570	28,375
578.90	1,862	698	584.60	12,712	29,639
579.00	1,920	887	584.70	12,854	30,917
579.10	1,983	1,082	584.80	12,996	32,209
579.20	2,046	1,284	584.90	13,138	33,516
579.30	2,109	1,491	585.00	<b>13,280</b>	<b>34,837</b>
579.40	2,172	1,705	585.10	13,280	34,837
579.50	2,235	1,926	585.20	13,280	34,837
579.60	2,298	2,152	585.30	13,280	34,837
579.70	2,361	2,385	585.40	13,280	34,837
579.80	2,424	2,625	585.50	13,280	34,837
579.90	2,487	2,870	585.60	13,280	34,837
580.00	2,550	3,122	585.70	13,280	34,837
580.10	2,617	3,380	585.80	13,280	34,837
580.20	2,684	3,645	585.90	13,280	34,837
580.30	2,751	3,917	586.00	13,280	34,837
580.40	2,818	4,196	586.10	13,280	34,837
580.50	2,885	4,481	586.20	13,280	34,837
580.60	2,952	4,773	586.30	13,280	34,837
580.70	3,019	5,071	586.40	13,280	34,837
580.80	3,086	5,376	586.50	13,280	34,837
580.90	3,153	5,688	586.60	13,280	34,837
581.00	3,220	6,007	586.70	13,280	34,837
581.10	3,294	6,333	586.80	13,280	34,837
581.20	3,368	6,666	586.90	13,280	34,837
581.30	3,442	7,006	587.00	13,280	34,837
581.40	3,516	7,354			
581.50	3,590	7,710			
581.60	3,664	8,072			
581.70	3,738	8,442			
581.80	3,812	8,820			
581.90	3,886	9,205			
582.00	3,960	9,597			
582.10	4,040	9,997			
582.20	4,120	10,405			
582.30	4,200	10,821			
582.40	4,280	11,245			
582.50	4,360	11,677			
582.60	4,440	12,117			
582.70	4,520	12,565			
582.80	4,600	13,021			
582.90	4,680	13,485			
583.00	4,760	13,957			
583.10	5,470	14,469			
583.20	6,180	15,051			
583.30	6,890	15,704			
583.40	7,600	16,429			
583.50	8,310	17,225			
583.60	9,020	18,091			
583.70	9,730	19,029			
583.80	10,440	20,037			
583.90	11,150	21,116			
584.00	11,860	22,267			
584.10	12,002	23,460			

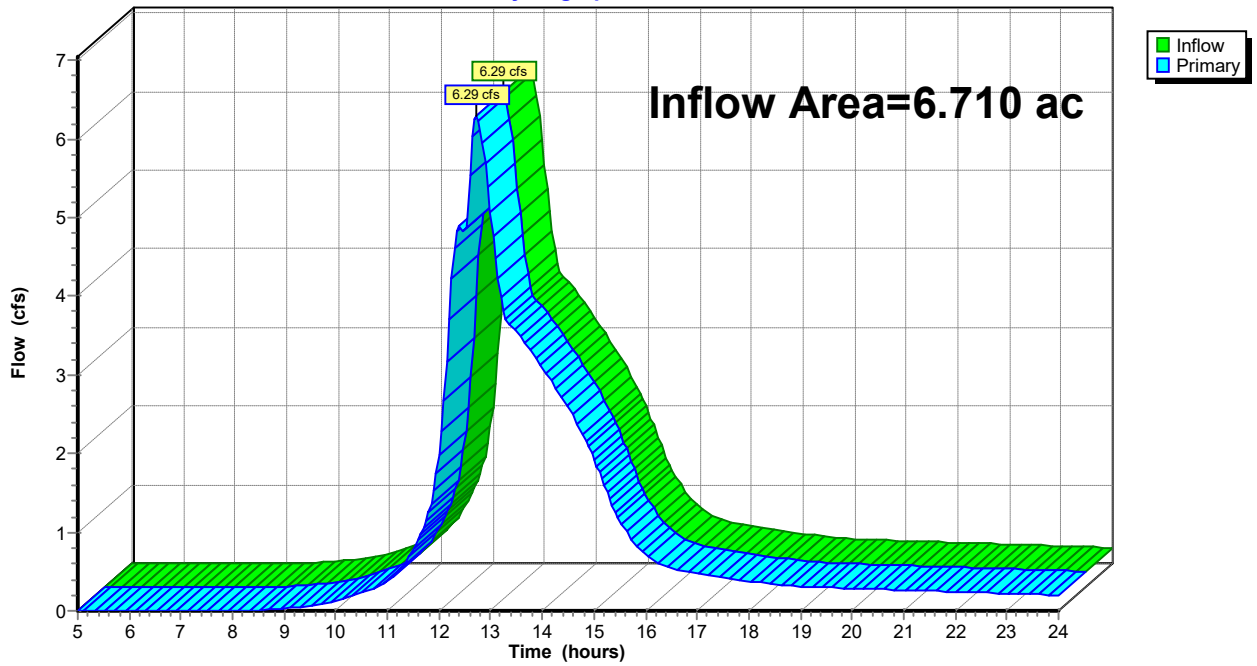
Summary for Link 12L: POST DEV

Inflow Area = 6.710 ac, 32.97% Impervious, Inflow Depth > 2.36" for 25-Year event  
Inflow = 6.29 cfs @ 12.73 hrs, Volume= 1.322 af  
Primary = 6.29 cfs @ 12.73 hrs, Volume= 1.322 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Link 12L: POST DEV

Hydrograph



**20.247 - Dodge Road Hydrology**

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**Hydrograph for Link 12L: POST DEV**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	0.00	0.00	19.25	0.30	0.00	0.30
5.25	0.00	0.00	0.00	19.50	0.30	0.00	0.30
5.50	0.00	0.00	0.00	19.75	0.29	0.00	0.29
5.75	0.00	0.00	0.00	20.00	0.28	0.00	0.28
6.00	0.00	0.00	0.00	20.25	0.28	0.00	0.28
6.25	0.00	0.00	0.00	20.50	0.27	0.00	0.27
6.50	0.00	0.00	0.00	20.75	0.27	0.00	0.27
6.75	0.00	0.00	0.00	21.00	0.26	0.00	0.26
7.00	0.00	0.00	0.00	21.25	0.26	0.00	0.26
7.25	0.00	0.00	0.00	21.50	0.25	0.00	0.25
7.50	0.00	0.00	0.00	21.75	0.25	0.00	0.25
7.75	0.00	0.00	0.00	22.00	0.24	0.00	0.24
8.00	0.00	0.00	0.00	22.25	0.24	0.00	0.24
8.25	0.00	0.00	0.00	22.50	0.23	0.00	0.23
8.50	0.01	0.00	0.01	22.75	0.23	0.00	0.23
8.75	0.01	0.00	0.01	23.00	0.22	0.00	0.22
9.00	0.03	0.00	0.03	23.25	0.21	0.00	0.21
9.25	0.04	0.00	0.04	23.50	0.21	0.00	0.21
9.50	0.06	0.00	0.06	23.75	0.20	0.00	0.20
9.75	0.09	0.00	0.09	24.00	0.20	0.00	0.20
10.00	0.12	0.00	0.12				
10.25	0.17	0.00	0.17				
10.50	0.22	0.00	0.22				
10.75	0.29	0.00	0.29				
11.00	0.38	0.00	0.38				
11.25	0.53	0.00	0.53				
11.50	0.77	0.00	0.77				
11.75	1.15	0.00	1.15				
12.00	1.98	0.00	1.98				
12.25	4.22	0.00	4.22				
12.50	4.78	0.00	4.78				
12.75	<b>6.29</b>	0.00	<b>6.29</b>				
13.00	5.07	0.00	5.07				
13.25	3.81	0.00	3.81				
13.50	3.55	0.00	3.55				
13.75	3.33	0.00	3.33				
14.00	3.10	0.00	3.10				
14.25	2.85	0.00	2.85				
14.50	2.58	0.00	2.58				
14.75	2.28	0.00	2.28				
15.00	1.92	0.00	1.92				
15.25	1.50	0.00	1.50				
15.50	1.12	0.00	1.12				
15.75	0.89	0.00	0.89				
16.00	0.71	0.00	0.71				
16.25	0.60	0.00	0.60				
16.50	0.54	0.00	0.54				
16.75	0.50	0.00	0.50				
17.00	0.47	0.00	0.47				
17.25	0.44	0.00	0.44				
17.50	0.42	0.00	0.42				
17.75	0.40	0.00	0.40				
18.00	0.38	0.00	0.38				
18.25	0.36	0.00	0.36				
18.50	0.34	0.00	0.34				
18.75	0.32	0.00	0.32				
19.00	0.31	0.00	0.31				



**20.247 - Dodge Road Hydrology**

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 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 2S: DA POST DEV -** Runoff Area=5.610 ac 39.44% Impervious Runoff Depth>3.77"  
Flow Length=860' Tc=27.1 min CN=87 Runoff=17.52 cfs 1.761 af

**Subcatchment 11S: DA Post - DEV** Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>3.08"  
Flow Length=370' Slope=0.0100 '/ Tc=22.0 min CN=80 Runoff=3.17 cfs 0.283 af

**Pond 3P: Pond** Peak Elev=583.86' Storage=20,698 cf Inflow=17.52 cfs 1.761 af  
Outflow=11.47 cfs 1.748 af

**Link 12L: POST DEV** Inflow=13.15 cfs 2.030 af  
Primary=13.15 cfs 2.030 af

**Total Runoff Area = 6.710 ac Runoff Volume = 2.044 af Average Runoff Depth = 3.66"**  
**67.03% Pervious = 4.497 ac 32.97% Impervious = 2.213 ac**

## 20.247 - Dodge Road Hydrology

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NRCC 24-hr A 100-Year Rainfall=5.23"

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### Summary for Subcatchment 2S: DA POST DEV - CONTROLLED

[47] Hint: Peak is 777% of capacity of segment #3

Runoff = 17.52 cfs @ 12.38 hrs, Volume= 1.761 af, Depth> 3.77"  
Routed to Pond 3P : Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 100-Year Rainfall=5.23"

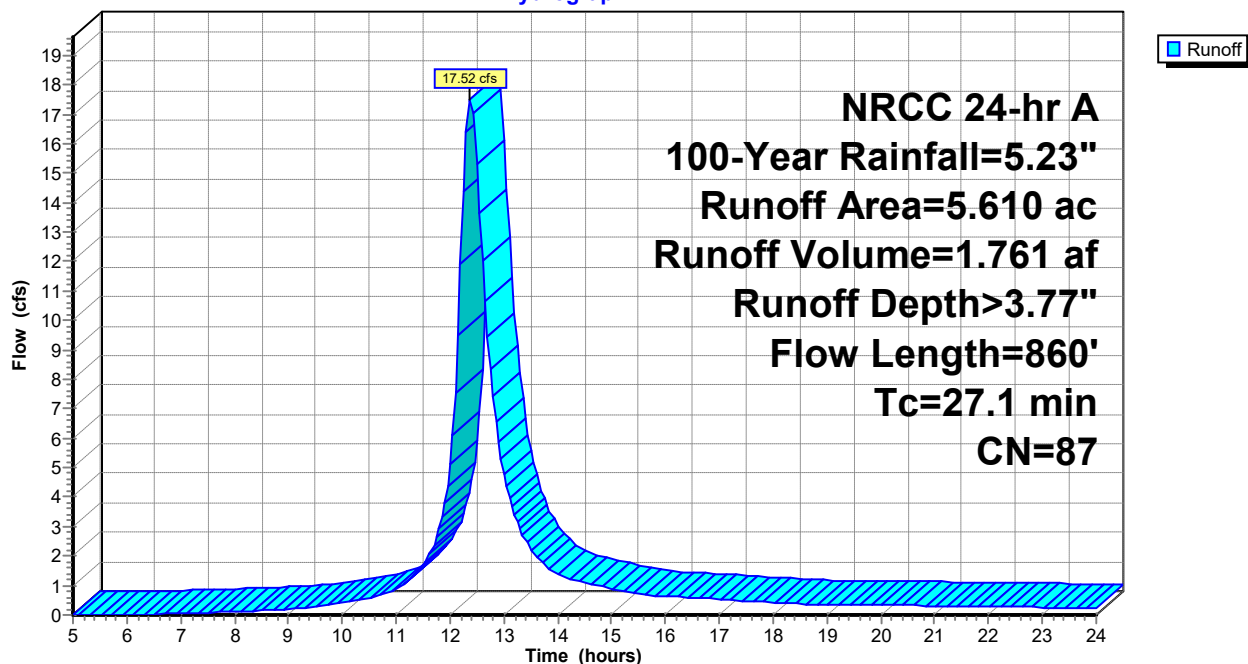
Area (ac)	CN	Description
0.970	98	Paved parking, HSG D
3.270	87	1/4 acre lots, 38% imp, HSG D
1.370	80	>75% Grass cover, Good, HSG D
5.610	87	Weighted Average
3.397		60.56% Pervious Area
2.213		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0100	0.07		<b>Sheet Flow, SF</b> Grass: Dense n= 0.240 P2= 2.20"
0.1	20	0.0200	2.28		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.3	740	0.0040	2.87	2.25	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
27.1	860	Total			

### Subcatchment 2S: DA POST DEV - CONTROLLED

Hydrograph



**20.247 - Dodge Road Hydrology**

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**Hydrograph for Subcatchment 2S: DA POST DEV - CONTROLLED**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.27	0.00	0.00	19.25	4.98	3.55	0.35
5.25	0.28	0.00	0.00	19.50	5.00	3.56	0.35
5.50	0.30	0.00	0.00	19.75	5.01	3.58	0.34
5.75	0.32	0.00	0.00	20.00	5.03	3.59	0.33
6.00	0.33	0.00	0.01	20.25	5.04	3.61	0.33
6.25	0.35	0.00	0.01	20.50	5.06	3.62	0.32
6.50	0.37	0.00	0.02	20.75	5.07	3.63	0.31
6.75	0.39	0.01	0.03	21.00	5.08	3.65	0.31
7.00	0.42	0.01	0.05	21.25	5.10	3.66	0.30
7.25	0.44	0.01	0.06	21.50	5.11	3.67	0.29
7.50	0.46	0.02	0.08	21.75	5.12	3.69	0.29
7.75	0.49	0.02	0.10	22.00	5.14	3.70	0.28
8.00	0.52	0.03	0.12	22.25	5.15	3.71	0.28
8.25	0.55	0.04	0.14	22.50	5.16	3.72	0.27
8.50	0.58	0.04	0.16	22.75	5.17	3.73	0.26
8.75	0.61	0.05	0.18	23.00	5.19	3.74	0.26
9.00	0.64	0.06	0.21	23.25	5.20	3.75	0.25
9.25	0.68	0.08	0.24	23.50	5.21	3.76	0.24
9.50	0.72	0.09	0.28	23.75	5.22	3.77	0.24
9.75	0.76	0.11	0.34	24.00	<b>5.23</b>	<b>3.78</b>	0.23
10.00	0.81	0.13	0.41				
10.25	0.87	0.16	0.49				
10.50	0.93	0.19	0.57				
10.75	1.01	0.23	0.68				
11.00	1.10	0.28	0.89				
11.25	1.24	0.36	1.21				
11.50	1.40	0.47	1.72				
11.75	1.72	0.69	2.63				
12.00	2.46	1.28	5.11				
12.25	3.51	2.19	<b>14.37</b>				
12.50	3.83	2.48	<b>15.28</b>				
12.75	3.99	2.63	8.35				
13.00	4.13	2.75	4.77				
13.25	4.22	2.84	3.15				
13.50	4.30	2.91	2.25				
13.75	4.36	2.97	1.71				
14.00	4.42	3.02	1.39				
14.25	4.47	3.07	1.22				
14.50	4.51	3.11	1.10				
14.75	4.55	3.15	0.99				
15.00	4.59	3.18	0.89				
15.25	4.62	3.21	0.78				
15.50	4.65	3.24	0.71				
15.75	4.68	3.27	0.66				
16.00	4.71	3.30	0.63				
16.25	4.74	3.32	0.61				
16.50	4.77	3.35	0.58				
16.75	4.79	3.37	0.56				
17.00	4.81	3.39	0.53				
17.25	4.84	3.41	0.50				
17.50	4.86	3.43	0.48				
17.75	4.88	3.45	0.45				
18.00	4.90	3.47	0.42				
18.25	4.91	3.49	0.40				
18.50	4.93	3.50	0.38				
18.75	4.95	3.52	0.37				
19.00	4.96	3.53	0.36				

## 20.247 - Dodge Road Hydrology

Prepared by Carmina Wood Morris, PC

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NRCC 24-hr A 100-Year Rainfall=5.23"

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### Summary for Subcatchment 11S: DA Post - DEV Uncontrolled

Runoff = 3.17 cfs @ 12.32 hrs, Volume= 0.283 af, Depth> 3.08"  
Routed to Link 12L : POST DEV

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr A 100-Year Rainfall=5.23"

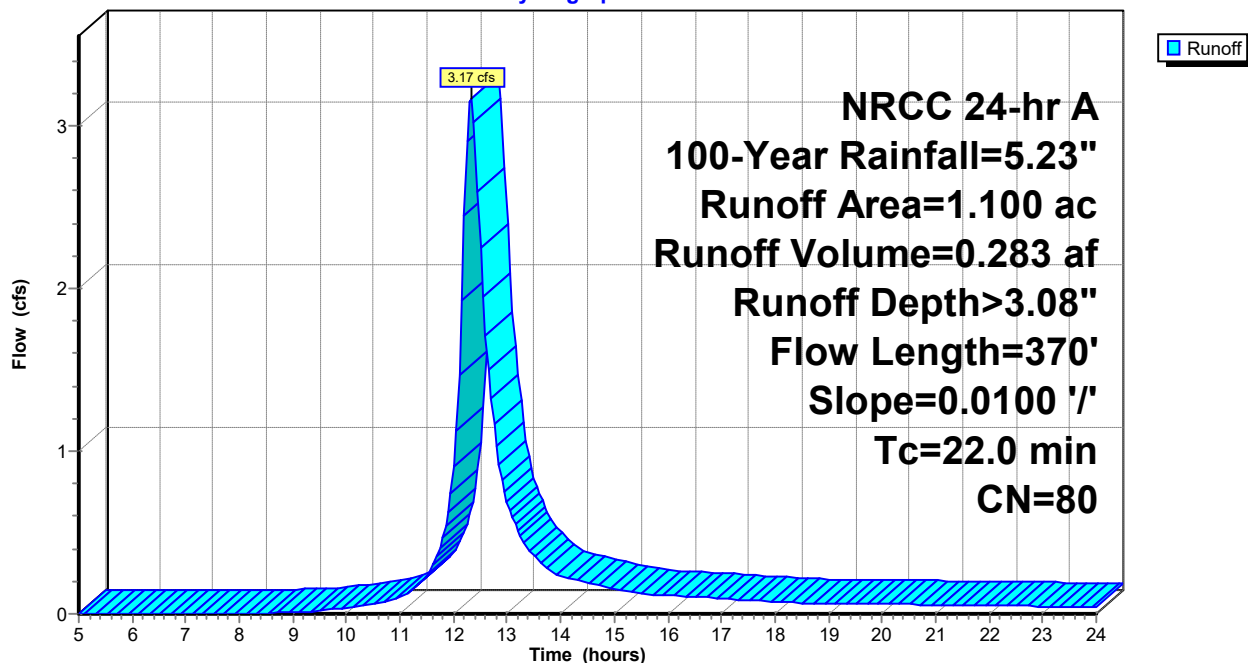
Area (ac)	CN	Description
1.100	80	>75% Grass cover, Good, HSG D
1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		<b>Sheet Flow, SF</b> Grass: Short n= 0.150 P2= 2.20"
6.4	270	0.0100	0.70		<b>Shallow Concentrated Flow, SCF</b> Short Grass Pasture Kv= 7.0 fps
22.0	370	Total			

### Subcatchment 11S: DA Post - DEV Uncontrolled

Hydrograph



**20.247 - Dodge Road Hydrology**

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**Hydrograph for Subcatchment 11S: DA Post - DEV Uncontrolled**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.27	0.00	0.00	19.25	4.98	2.88	0.06
5.25	0.28	0.00	0.00	19.50	5.00	2.89	0.06
5.50	0.30	0.00	0.00	19.75	5.01	2.90	0.06
5.75	0.32	0.00	0.00	20.00	5.03	2.92	0.06
6.00	0.33	0.00	0.00	20.25	5.04	2.93	0.06
6.25	0.35	0.00	0.00	20.50	5.06	2.94	0.06
6.50	0.37	0.00	0.00	20.75	5.07	2.95	0.06
6.75	0.39	0.00	0.00	21.00	5.08	2.97	0.06
7.00	0.42	0.00	0.00	21.25	5.10	2.98	0.05
7.25	0.44	0.00	0.00	21.50	5.11	2.99	0.05
7.50	0.46	0.00	0.00	21.75	5.12	3.00	0.05
7.75	0.49	0.00	0.00	22.00	5.14	3.01	0.05
8.00	0.52	0.00	0.00	22.25	5.15	3.02	0.05
8.25	0.55	0.00	0.00	22.50	5.16	3.04	0.05
8.50	0.58	0.00	0.00	22.75	5.17	3.05	0.05
8.75	0.61	0.00	0.01	23.00	5.19	3.06	0.05
9.00	0.64	0.01	0.01	23.25	5.20	3.07	0.04
9.25	0.68	0.01	0.01	23.50	5.21	3.08	0.04
9.50	0.72	0.02	0.02	23.75	5.22	3.08	0.04
9.75	0.76	0.02	0.03	24.00	<b>5.23</b>	<b>3.09</b>	0.04
10.00	0.81	0.03	0.04				
10.25	0.87	0.05	0.05				
10.50	0.93	0.06	0.06				
10.75	1.01	0.09	0.08				
11.00	1.10	0.12	0.11				
11.25	1.24	0.17	0.16				
11.50	1.40	0.24	0.24				
11.75	1.72	0.40	0.41				
12.00	2.46	0.86	0.90				
12.25	3.51	1.64	<b>2.91</b>				
12.50	3.83	1.90	<b>2.25</b>				
12.75	3.99	2.04	1.16				
13.00	4.13	2.15	0.69				
13.25	4.22	2.23	0.48				
13.50	4.30	2.29	0.36				
13.75	4.36	2.34	0.28				
14.00	4.42	2.39	0.23				
14.25	4.47	2.43	0.21				
14.50	4.51	2.47	0.19				
14.75	4.55	2.51	0.17				
15.00	4.59	2.54	0.15				
15.25	4.62	2.57	0.13				
15.50	4.65	2.59	0.12				
15.75	4.68	2.62	0.12				
16.00	4.71	2.64	0.11				
16.25	4.74	2.67	0.11				
16.50	4.77	2.69	0.10				
16.75	4.79	2.71	0.10				
17.00	4.81	2.73	0.09				
17.25	4.84	2.75	0.09				
17.50	4.86	2.77	0.08				
17.75	4.88	2.79	0.08				
18.00	4.90	2.80	0.08				
18.25	4.91	2.82	0.07				
18.50	4.93	2.83	0.07				
18.75	4.95	2.85	0.07				
19.00	4.96	2.86	0.07				

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### Summary for Pond 3P: Pond

Inflow Area = 5.610 ac, 39.44% Impervious, Inflow Depth > 3.77" for 100-Year event  
 Inflow = 17.52 cfs @ 12.38 hrs, Volume= 1.761 af  
 Outflow = 11.47 cfs @ 12.62 hrs, Volume= 1.748 af, Atten= 35%, Lag= 14.8 min  
 Primary = 11.47 cfs @ 12.62 hrs, Volume= 1.748 af  
 Routed to Link 12L : POST DEV

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 583.86' @ 12.62 hrs Surf.Area= 10,880 sf Storage= 20,698 cf

Plug-Flow detention time= 40.5 min calculated for 1.748 af (99% of inflow)  
 Center-of-Mass det. time= 35.7 min ( 845.6 - 809.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	578.50'	34,837 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
578.50	1,628	0	0
579.00	1,920	887	887
580.00	2,550	2,235	3,122
581.00	3,220	2,885	6,007
582.00	3,960	3,590	9,597
583.00	4,760	4,360	13,957
584.00	11,860	8,310	22,267
585.00	13,280	12,570	34,837

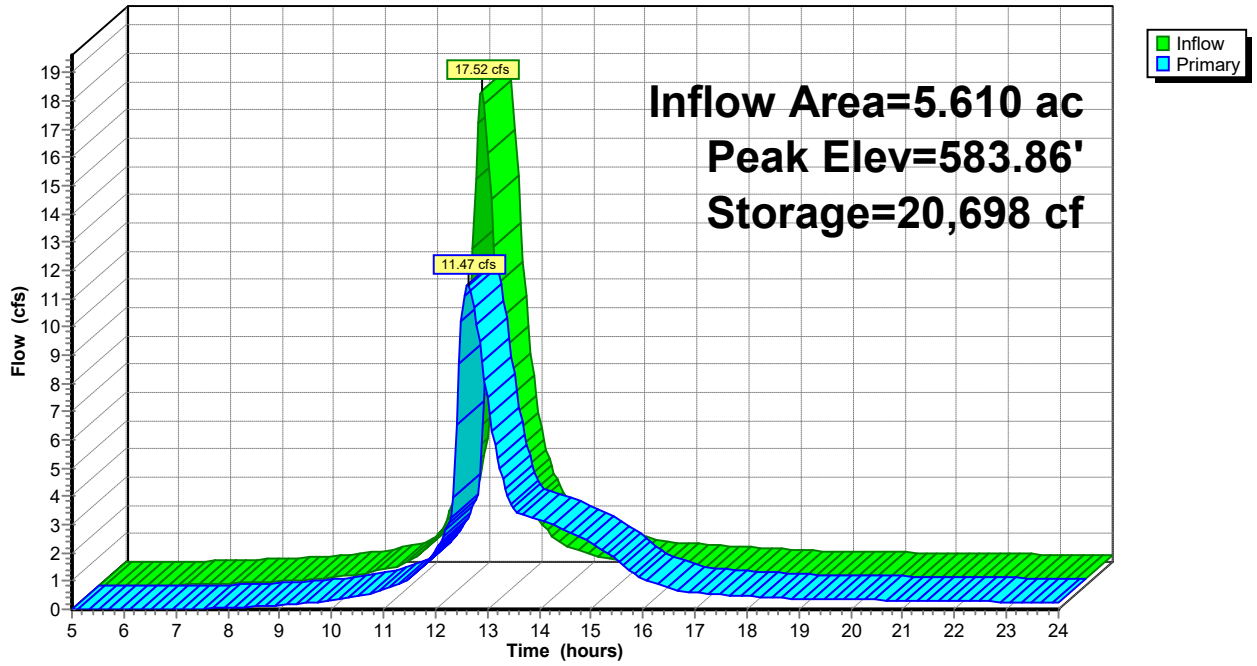
Device	Routing	Invert	Outlet Devices
#1	Device 4	578.51'	<b>8.0" Round Culvert</b> L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.51' / 578.45' S= 0.0037 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Device 4	583.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 4	584.00'	<b>36.0" W x 36.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	578.34'	<b>18.0" Round Culvert</b> L= 34.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 578.34' / 578.21' S= 0.0038 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=11.42 cfs @ 12.62 hrs HW=583.86' (Free Discharge)

- ↑ **4=Culvert** (Passes 11.42 cfs of 18.58 cfs potential flow)
- ↑ **1=Culvert** (Inlet Controls 3.76 cfs @ 10.78 fps)
- ↑ **2=Orifice/Grate** (Orifice Controls 7.66 cfs @ 2.97 fps)
- ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

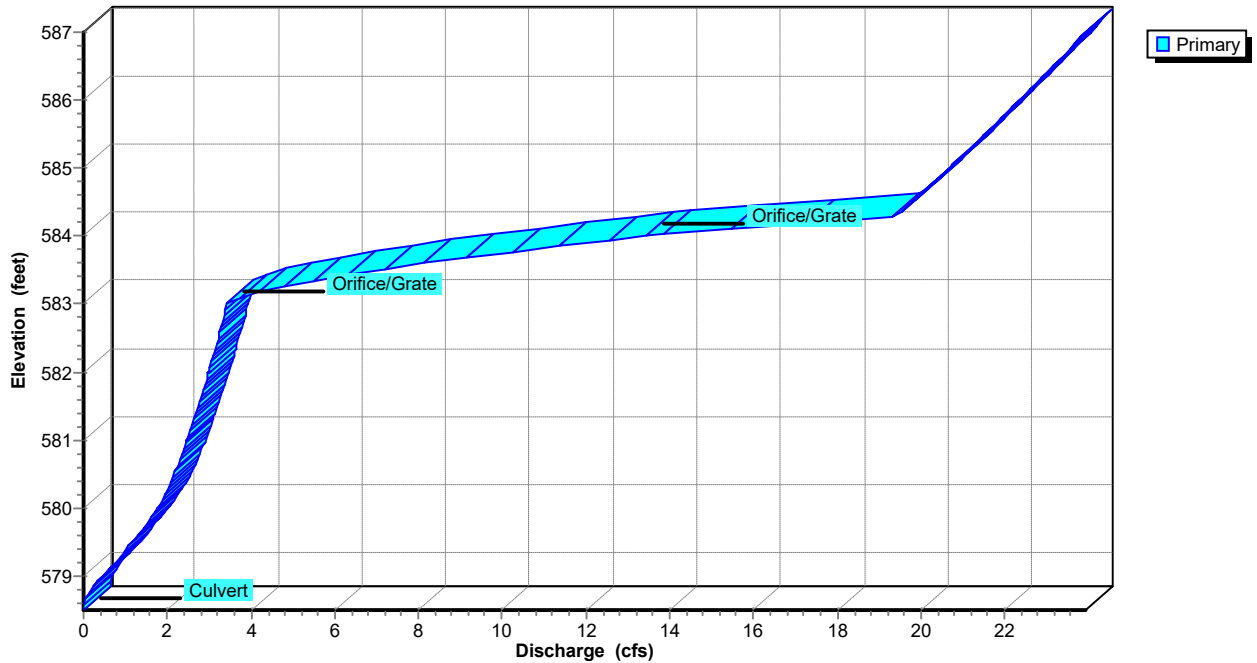
### Pond 3P: Pond

Hydrograph

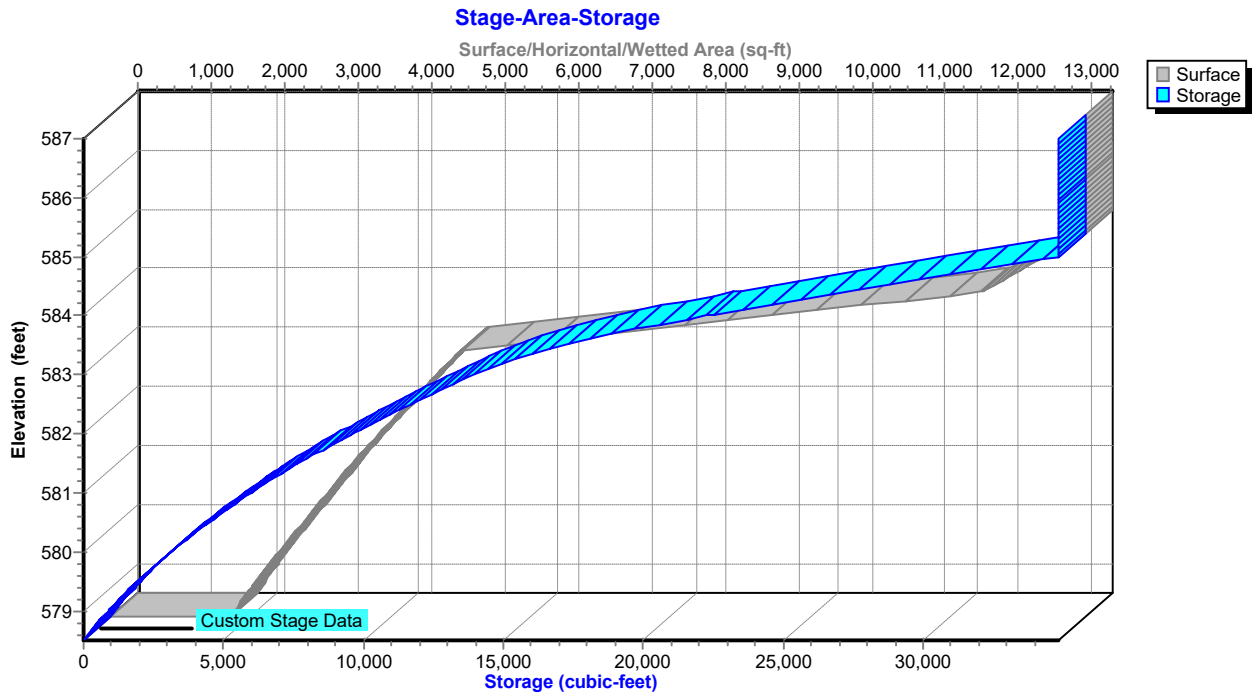


### Pond 3P: Pond

Stage-Discharge



### Pond 3P: Pond





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**Hydrograph for Pond 3P: Pond**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	578.50	0.00
5.50	0.00	0	578.50	0.00
6.00	0.01	2	578.50	0.00
6.50	0.02	26	578.52	0.00
7.00	0.05	82	578.55	0.01
7.50	0.08	174	578.60	0.02
8.00	0.12	279	578.67	0.05
8.50	0.16	382	578.73	0.10
9.00	0.21	477	578.78	0.16
9.50	0.28	572	578.83	0.22
10.00	0.41	712	578.91	0.32
10.50	0.57	893	579.00	0.46
11.00	0.89	1,150	579.13	0.67
11.50	1.72	1,824	579.45	1.09
12.00	<b>5.11</b>	4,233	580.41	2.11
12.50	<b>15.28</b>	<b>19,692</b>	<b>583.77</b>	<b>10.19</b>
13.00	4.77	<b>17,576</b>	<b>583.54</b>	<b>7.48</b>
13.50	2.25	14,196	583.05	3.58
14.00	1.39	11,345	582.42	3.18
14.50	1.10	8,154	581.62	2.80
15.00	0.89	5,300	580.78	2.34
15.50	0.71	3,022	579.96	1.72
16.00	0.63	1,762	579.43	1.05
16.50	0.58	1,244	579.18	0.75
17.00	0.53	1,052	579.08	0.60
17.50	0.48	960	579.04	0.52
18.00	0.42	890	579.00	0.46
18.50	0.38	826	578.97	0.41
19.00	0.36	786	578.95	0.38
19.50	0.35	763	578.93	0.36
20.00	0.33	745	578.92	0.34
20.50	0.32	727	578.92	0.33
21.00	0.31	710	578.91	0.32
21.50	0.29	692	578.90	0.30
22.00	0.28	674	578.89	0.29
22.50	0.27	656	578.88	0.28
23.00	0.26	638	578.87	0.27
23.50	0.24	620	578.86	0.25
24.00	0.23	602	578.85	0.24

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**Stage-Discharge for Pond 3P: Pond**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
578.50	0.00	581.35	2.66	584.20	17.41
578.55	0.00	581.40	2.69	584.25	18.57
578.60	0.02	581.45	2.71	584.30	19.42
578.65	0.04	581.50	2.74	584.35	19.51
578.70	0.08	581.55	2.77	584.40	19.61
578.75	0.12	581.60	2.79	584.45	19.70
578.80	0.18	581.65	2.82	584.50	19.79
578.85	0.24	581.70	2.84	584.55	19.88
578.90	0.31	581.75	2.87	584.60	19.97
578.95	0.38	581.80	2.89	584.65	20.06
579.00	0.46	581.85	2.91	584.70	20.15
579.05	0.54	581.90	2.94	584.75	20.24
579.10	0.62	581.95	2.96	584.80	20.33
579.15	0.70	582.00	2.99	584.85	20.42
579.20	0.78	582.05	3.01	584.90	20.51
579.25	0.86	582.10	3.03	584.95	20.60
579.30	0.93	582.15	3.06	585.00	20.69
579.35	0.98	582.20	3.08	585.05	20.77
579.40	1.00	582.25	3.10	585.10	20.86
579.45	1.08	582.30	3.12	585.15	20.95
579.50	1.16	582.35	3.15	585.20	21.03
579.55	1.23	582.40	3.17	585.25	21.12
579.60	1.30	582.45	3.19	585.30	21.20
579.65	1.37	582.50	3.21	585.35	21.29
579.70	1.43	582.55	3.24	585.40	21.37
579.75	1.49	582.60	3.26	585.45	21.46
579.80	1.55	582.65	3.28	585.50	21.54
579.85	1.60	582.70	3.30	585.55	21.63
579.90	1.66	582.75	3.32	585.60	21.71
579.95	1.71	582.80	3.34	585.65	21.79
580.00	1.76	582.85	3.36	585.70	21.88
580.05	1.81	582.90	3.39	585.75	21.96
580.10	1.86	582.95	3.41	585.80	22.04
580.15	1.90	583.00	3.43	585.85	22.12
580.20	1.95	583.05	3.55	585.90	22.20
580.25	1.99	583.10	3.77	585.95	22.29
580.30	2.03	583.15	4.05	586.00	22.37
580.35	2.06	583.20	4.37	586.05	22.45
580.40	2.10	583.25	4.73	586.10	22.53
580.45	2.13	583.30	5.13	586.15	22.61
580.50	2.16	583.35	5.56	586.20	22.69
580.55	2.20	583.40	6.02	586.25	22.77
580.60	2.23	583.45	6.51	586.30	22.85
580.65	2.26	583.50	7.03	586.35	22.93
580.70	2.29	583.55	7.57	586.40	23.01
580.75	2.32	583.60	8.14	586.45	23.08
580.80	2.35	583.65	8.73	586.50	23.16
580.85	2.38	583.70	9.34	586.55	23.24
580.90	2.41	583.75	9.98	586.60	23.32
580.95	2.44	583.80	10.63	586.65	23.40
581.00	2.47	583.85	11.31	586.70	23.47
581.05	2.50	583.90	12.00	586.75	23.55
581.10	2.52	583.95	12.71	586.80	23.63
581.15	2.55	584.00	13.45	586.85	23.70
581.20	2.58	584.05	14.30	586.90	23.78
581.25	2.61	584.10	15.27	586.95	23.85
581.30	2.63	584.15	16.31	587.00	<b>23.93</b>

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**Stage-Area-Storage for Pond 3P: Pond**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
578.50	1,628	0	584.20	12,144	24,667
578.60	1,686	166	584.30	12,286	25,889
578.70	1,745	337	584.40	12,428	27,125
578.80	1,803	515	584.50	12,570	28,375
578.90	1,862	698	584.60	12,712	29,639
579.00	1,920	887	584.70	12,854	30,917
579.10	1,983	1,082	584.80	12,996	32,209
579.20	2,046	1,284	584.90	13,138	33,516
579.30	2,109	1,491	585.00	<b>13,280</b>	<b>34,837</b>
579.40	2,172	1,705	585.10	13,280	34,837
579.50	2,235	1,926	585.20	13,280	34,837
579.60	2,298	2,152	585.30	13,280	34,837
579.70	2,361	2,385	585.40	13,280	34,837
579.80	2,424	2,625	585.50	13,280	34,837
579.90	2,487	2,870	585.60	13,280	34,837
580.00	2,550	3,122	585.70	13,280	34,837
580.10	2,617	3,380	585.80	13,280	34,837
580.20	2,684	3,645	585.90	13,280	34,837
580.30	2,751	3,917	586.00	13,280	34,837
580.40	2,818	4,196	586.10	13,280	34,837
580.50	2,885	4,481	586.20	13,280	34,837
580.60	2,952	4,773	586.30	13,280	34,837
580.70	3,019	5,071	586.40	13,280	34,837
580.80	3,086	5,376	586.50	13,280	34,837
580.90	3,153	5,688	586.60	13,280	34,837
581.00	3,220	6,007	586.70	13,280	34,837
581.10	3,294	6,333	586.80	13,280	34,837
581.20	3,368	6,666	586.90	13,280	34,837
581.30	3,442	7,006	587.00	13,280	34,837
581.40	3,516	7,354			
581.50	3,590	7,710			
581.60	3,664	8,072			
581.70	3,738	8,442			
581.80	3,812	8,820			
581.90	3,886	9,205			
582.00	3,960	9,597			
582.10	4,040	9,997			
582.20	4,120	10,405			
582.30	4,200	10,821			
582.40	4,280	11,245			
582.50	4,360	11,677			
582.60	4,440	12,117			
582.70	4,520	12,565			
582.80	4,600	13,021			
582.90	4,680	13,485			
583.00	4,760	13,957			
583.10	5,470	14,469			
583.20	6,180	15,051			
583.30	6,890	15,704			
583.40	7,600	16,429			
583.50	8,310	17,225			
583.60	9,020	18,091			
583.70	9,730	19,029			
583.80	10,440	20,037			
583.90	11,150	21,116			
584.00	11,860	22,267			
584.10	12,002	23,460			

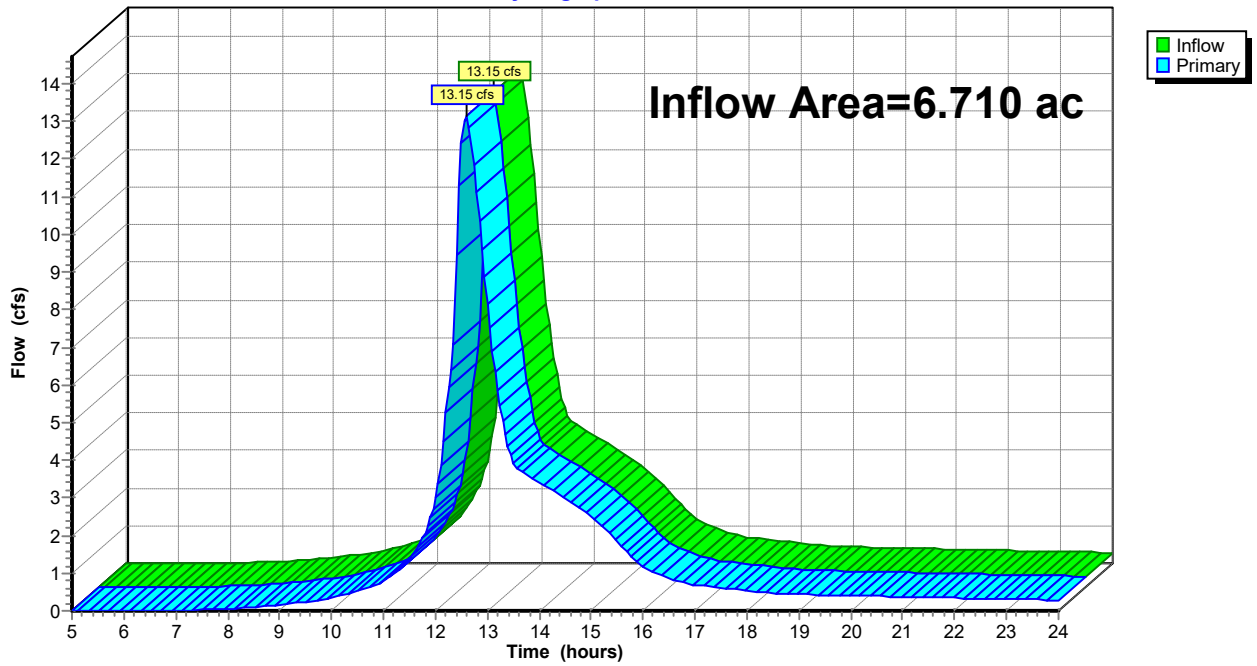
Summary for Link 12L: POST DEV

Inflow Area = 6.710 ac, 32.97% Impervious, Inflow Depth > 3.63" for 100-Year event  
Inflow = 13.15 cfs @ 12.59 hrs, Volume= 2.030 af  
Primary = 13.15 cfs @ 12.59 hrs, Volume= 2.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Link 12L: POST DEV

Hydrograph



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**Hydrograph for Link 12L: POST DEV**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	0.00	0.00	19.25	0.43	0.00	0.43
5.25	0.00	0.00	0.00	19.50	0.42	0.00	0.42
5.50	0.00	0.00	0.00	19.75	0.41	0.00	0.41
5.75	0.00	0.00	0.00	20.00	0.40	0.00	0.40
6.00	0.00	0.00	0.00	20.25	0.40	0.00	0.40
6.25	0.00	0.00	0.00	20.50	0.39	0.00	0.39
6.50	0.00	0.00	0.00	20.75	0.38	0.00	0.38
6.75	0.00	0.00	0.00	21.00	0.37	0.00	0.37
7.00	0.01	0.00	0.01	21.25	0.37	0.00	0.37
7.25	0.01	0.00	0.01	21.50	0.36	0.00	0.36
7.50	0.02	0.00	0.02	21.75	0.35	0.00	0.35
7.75	0.04	0.00	0.04	22.00	0.34	0.00	0.34
8.00	0.05	0.00	0.05	22.25	0.33	0.00	0.33
8.25	0.08	0.00	0.08	22.50	0.33	0.00	0.33
8.50	0.11	0.00	0.11	22.75	0.32	0.00	0.32
8.75	0.13	0.00	0.13	23.00	0.31	0.00	0.31
9.00	0.17	0.00	0.17	23.25	0.30	0.00	0.30
9.25	0.20	0.00	0.20	23.50	0.30	0.00	0.30
9.50	0.24	0.00	0.24	23.75	0.29	0.00	0.29
9.75	0.29	0.00	0.29	24.00	0.28	0.00	0.28
10.00	0.36	0.00	0.36				
10.25	0.43	0.00	0.43				
10.50	0.52	0.00	0.52				
10.75	0.63	0.00	0.63				
11.00	0.78	0.00	0.78				
11.25	1.02	0.00	1.02				
11.50	1.32	0.00	1.32				
11.75	1.92	0.00	1.92				
12.00	3.01	0.00	3.01				
12.25	5.94	0.00	5.94				
12.50	<b>12.44</b>	0.00	<b>12.44</b>				
12.75	<b>11.83</b>	0.00	<b>11.83</b>				
13.00	8.17	0.00	8.17				
13.25	5.43	0.00	5.43				
13.50	3.93	0.00	3.93				
13.75	3.61	0.00	3.61				
14.00	3.41	0.00	3.41				
14.25	3.21	0.00	3.21				
14.50	2.99	0.00	2.99				
14.75	2.75	0.00	2.75				
15.00	2.49	0.00	2.49				
15.25	2.20	0.00	2.20				
15.50	1.84	0.00	1.84				
15.75	1.48	0.00	1.48				
16.00	1.16	0.00	1.16				
16.25	1.00	0.00	1.00				
16.50	0.85	0.00	0.85				
16.75	0.75	0.00	0.75				
17.00	0.69	0.00	0.69				
17.25	0.64	0.00	0.64				
17.50	0.60	0.00	0.60				
17.75	0.57	0.00	0.57				
18.00	0.54	0.00	0.54				
18.25	0.50	0.00	0.50				
18.50	0.48	0.00	0.48				
18.75	0.46	0.00	0.46				
19.00	0.44	0.00	0.44				

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- 5 Soil Listing (selected nodes)
- 6 Ground Covers (selected nodes)
- 7 Pipe Listing (selected nodes)

**1-Year Event**

- 8 Node Listing
- 9 Subcat 2S: DA POST DEV - CONTROLLED
- 11 Subcat 11S: DA Post - DEV Uncontrolled
- 13 Pond 3P: Pond
- 19 Link 12L: POST DEV

**10-Year Event**

- 21 Node Listing
- 22 Subcat 2S: DA POST DEV - CONTROLLED
- 24 Subcat 11S: DA Post - DEV Uncontrolled
- 26 Pond 3P: Pond
- 32 Link 12L: POST DEV

**25-Year Event**

- 34 Node Listing
- 35 Subcat 2S: DA POST DEV - CONTROLLED
- 37 Subcat 11S: DA Post - DEV Uncontrolled
- 39 Pond 3P: Pond
- 45 Link 12L: POST DEV

**100-Year Event**

- 47 Node Listing
- 48 Subcat 2S: DA POST DEV - CONTROLLED
- 50 Subcat 11S: DA Post - DEV Uncontrolled
- 52 Pond 3P: Pond
- 58 Link 12L: POST DEV

## Green Infrastructure & Water Quality Calculations





## Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal? No

What is the nature of this construction project? New Construction

Design Point: 1  
 P= 0.90 inches *Enter 90% Rainfall Event as P*

### Calculate Required WQv

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	SMP Description
1	5.00	1.65	33	0.35	5,668	
2	1.71	0.56	33	0.34	1,926	
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
<b>Total</b>	6.71	2.21	33	0.35	<b>7594</b>	<b>Required WQv</b>
					<b>0.17</b>	<b>af</b>

## Steps 3 and 5 - Apply RR Techniques and Standard SMPs

Runoff Reduction Volume and Treated Volumes						
	Runoff Reduction Techniques/Standard SMPs		Total Contributing Area	Total Contributing Impervious Area	WQv Reduced (RRv)	WQv Treated
			(acres)	(acres)	(cf)	(cf)
<b>RR Techniques</b>	Conservation of Natural Areas	RR-1	0.00		0	
	Sheet Flow to Riparian Buffer/Filter Strip	RR-2	0.00	0.00	0	
	Tree Planting/Tree Pit/Tree Trench	RR-3	0.00	0.00	0	
	Disconnection of Rooftop Runoff	RR-4		0.00	0	
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rainwater Harvesting Systems	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Extensive & Intensive)	RR-10	0.00	0.00	0	
	Stream Daylighting	RR-11				
<b>Standard SMPs w/ RRv Capacity</b>	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00	0.00	0	0
	Infiltration Bioretention	F-4	0.00	0.00	0	0
	Filtration Bioretention	F-5	6.71	2.21	4,224	3,370
	Bioslope	F-6	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
<b>Standard SMPs</b>	Micropool Extended Detention	P-1	0.00	0.00		0
	Wet Pond	P-2	0.00	0.00		0
	Wet Extended Detention	P-3	0.00	0.00		0
	Multiple Pond System	P-4	0.00	0.00		0
	Shallow Wetland	W-1	0.00	0.00		0
	Extended Detention Shallow Wetland	W-2	0.00	0.00		0
	Pond/Wetland System	W-3	0.00	0.00		0
	Pocket Wetland	W-4	0.00	0.00		0
	Gravel Wetland	W-5	0.00	0.00		0
	Surface Sand Filter	F-1	0.00	0.00		0
	Underground Sand Filter	F-2	0.00	0.00		0
	Perimeter Sand Filter	F-3	0.00	0.00		0
Wet Swale	O-2	0.00	0.00		0	
<b>Alt. SMPs</b>	Flow Based Alternative Practice	-	0.00	0.00		0
	Volume Based Alternative Practice	-				
Totals by RR Technique →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			6.71	2.21	4,224	3,370
Totals by Standard SMP →			0.00	0.00		0
Totals by Alternative SMP →			0.00	0.00		0
Totals ( RR Techniques + all SMPs) →			6.71	2.21	4,224	3,370

## Step 4 - Calculate Minimum RRv Required

### Enter the Soils Data for the site

Hydrologic Soil Group	Acres	S
A		55%
B		40%
C		30%
D	6.71	20%
Total Area	6.71	

### Calculate the Minimum RRv

S =	<b>0.20</b>	
Impervious =	6.71	<i>acres</i>
Precipitation	0.90	<i>inches</i>
Rv	0.95	
<b>Minimum RRv</b>	<b>0.096</b>	<b><i>af</i></b>
	4182	<i>cf</i>

# Filtration Bioretention (F-5)

<b>Design Point:</b>	1						
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	Precipitation (in)	Description
1	5.00	1.65	33	0.35	5,668	0.90	0
Design Criteria							
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)			0	Underdrains required			
Is the contributing area to the practice a stormwater hotspot?			No				
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?			No				
Is contributing area greater than max. contributing area?			No				
Enter depth to seasonal high water table (ft)			2				
Enter depth to bedrock (ft)			NA				
Is pretreatment provided, in conformance with Section 6.4.3.1			Yes				
Enter average height of ponding (ft)			0.5				
Enter depth of surface layer (inches)			3				
Enter depth of filter media (ft)			2.5				
Enter depth of drainage layer (inches)			12				
Enter slope of maintenance access (%)			5				
Enter width of maintenance access (ft)			12				
Sizing Criteria							
				Value	Units	Notes	
Permeability Flow Rate			k	1	ft/day		
Filter Time			tf	2	days		
Required Filter Area			Af	2362	sf		
Enter Provided Filter Area			Af	2900	sf		
Recalculated Water Quality Volume (based on provided filter area)			WQv calc	6960	cf		
Calculate Runoff Reduction							
<b>RRv Provided</b>		<b>2,784</b>	<b>cf</b>				
WQv Treated		2884	cf	This is the portion of the WQv that is not reduced in the practice.			

# Filtration Bioretention (F-5)

<b>Design Point:</b>	<b>1</b>						
<b>Enter Site Data For Drainage Area to be Treated by Practice</b>							
Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	Precipitation (in)	Description
2	1.71	0.56	33	0.34	1,926	0.90	0
<b>Design Criteria</b>							
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)			0	Underdrains required			
Is the contributing area to the practice a stormwater hotspot?			No				
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?			No				
Is contributing area greater than max. contributing area?			No				
Enter depth to seasonal high water table (ft)			2				
Enter depth to bedrock (ft)			NA				
Is pretreatment provided, in conformance with Section 6.4.3.1							
Enter average height of ponding (ft)			0.5				
Enter depth of surface layer (inches)			3				
Enter depth of filter media (ft)			2.5				
Enter depth of drainage layer (inches)			12				
Enter slope of maintenance access (%)			5				
Enter width of maintenance access (ft)			12				
<b>Sizing Criteria</b>							
				Value	Units	Notes	
Permeability Flow Rate			k	1	ft/day		
Filter Time			tf	2	days		
Required Filter Area			Af	803	sf		
Enter Provided Filter Area			Af	1500	sf		
Recalculated Water Quality Volume (based on provided filter area)			WQv calc	3600	cf		
<b>Calculate Runoff Reduction</b>							
<b>RRv Provided</b>		<b>1,440</b>	<b>cf</b>				
WQv Treated		486	cf	This is the portion of the WQv that is not reduced in the practice.			

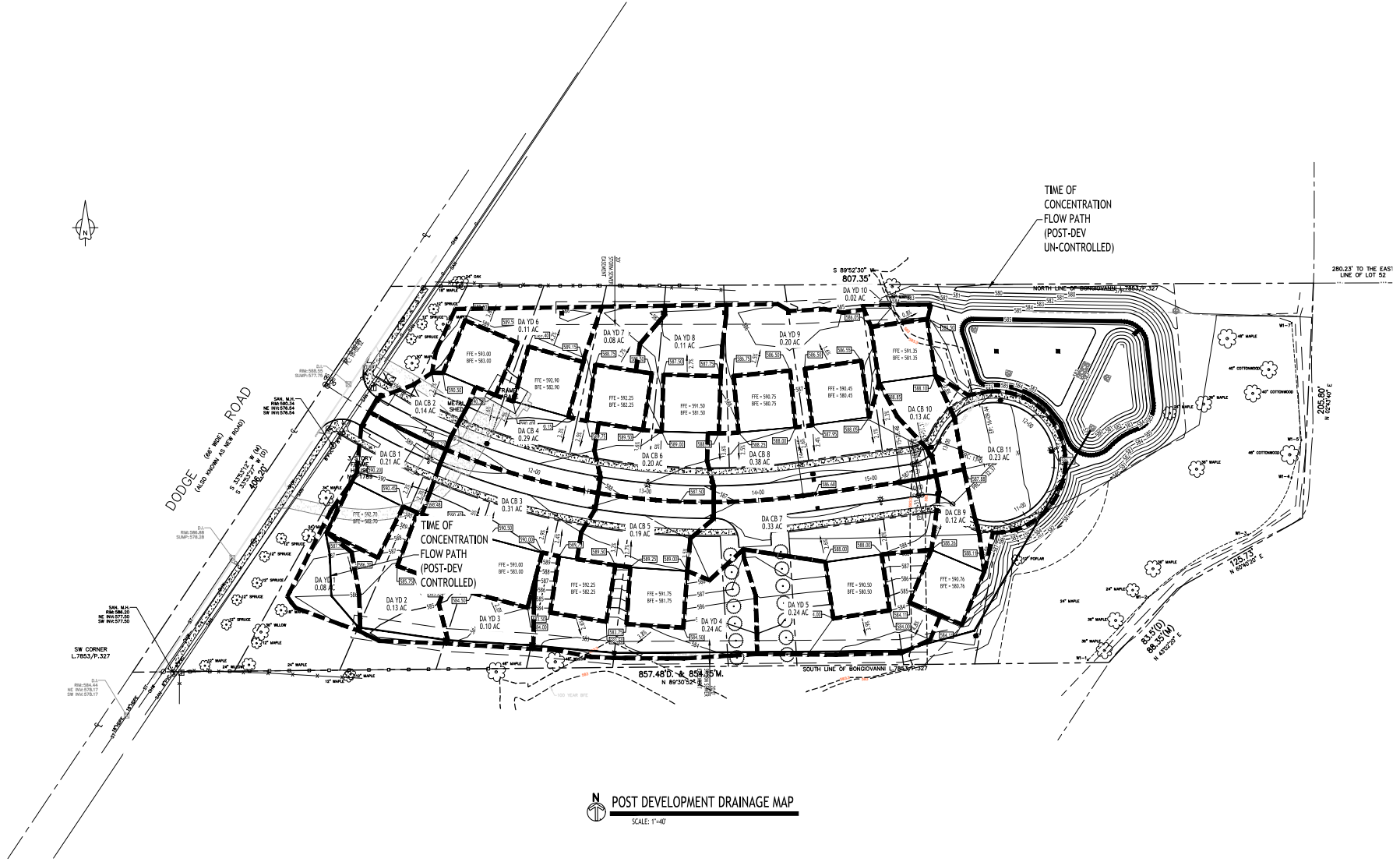


## Storm Sewer Calculations





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**N** POST DEVELOPMENT DRAINAGE MAP  
SCALE: 1"=40'

TOWN OF AMHERST APPROVAL BOX:

NOTE: BOUNDARY AND TOPOGRAPHIC INFORMATION PROVIDED BY OTHERS. CARMINA WOOD DESIGN ASSUMES NO RESPONSIBILITY FOR ITS ACCURACY.

40' 0 40 80ft.

Single Family Subdivision  
1789 Dodge Road  
Amherst, New York

REV.	DATE	DESCRIPTION
01	09/19/2024	Rev. Per Town Comments
02	10/24/2024	Rev. Per Town Comments
03	11/11/2024	Rev. Per Town Comments

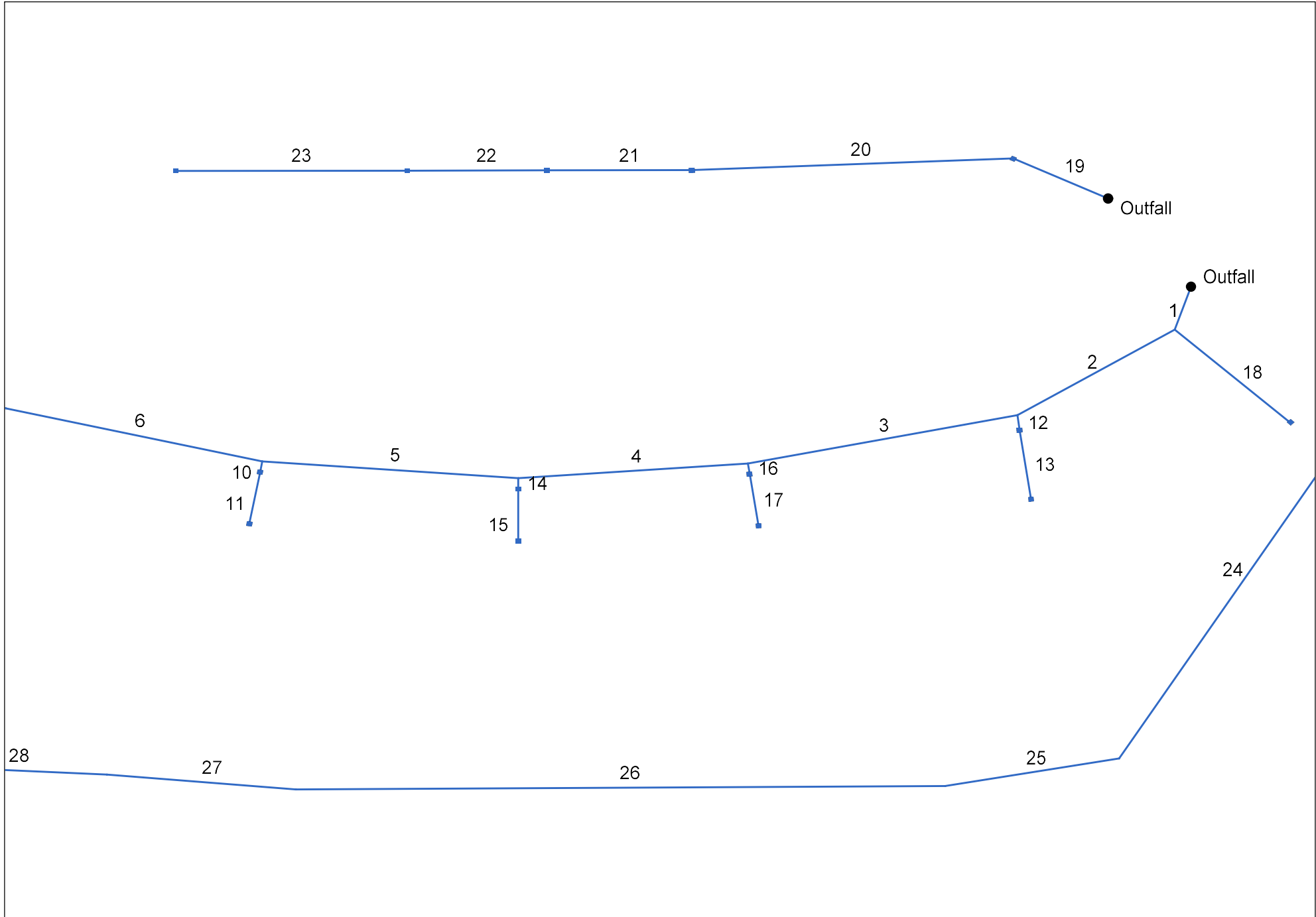
**PRELIMINARY**  
NOT FOR CONSTRUCTION

DRAWING NAME:  
Storm Drainage Area Map

Date: 09/29/24  
Drawn By: C. Wood  
Scale: As Noted

DRAWING NO.:

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



Project File: HydraFlow.stm

Number of lines: 29

Date: 2/11/2025

# Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
29	28	77.093	5.132	Genr	0.00	0.08	0.35	5.0	581.18	0.40	581.49	12	Cir	0.012	1.00	585.26	YD 1 - YD 2
28	27	75.349	-2.440	Genr	0.00	0.13	0.35	5.0	580.88	0.40	581.18	12	Cir	0.012	0.50	584.06	YD 2 - YD 3
27	26	72.927	5.999	Genr	0.00	0.10	0.35	5.0	580.59	0.40	580.88	12	Cir	0.012	0.50	583.32	YD 3 - YD 4
26	25	249.680	10.862	Genr	0.00	0.24	0.35	8.0	579.59	0.40	580.59	12	Cir	0.012	0.50	582.62	YD 4 - YD 5
25	24	68.135	49.571	Genr	0.00	0.24	0.35	8.0	579.32	0.40	579.59	12	Cir	0.012	0.50	582.14	YD 5 - STM MH 8
24	End	205.342	119.188	Genr	0.00	0.00	0.00	0.0	578.60	0.35	579.32	12	Cir	0.012	1.20	583.01	MH 8 - ES
23	22	88.884	0.002	Genr	0.00	0.11	0.35	5.0	583.46	1.27	584.59	12	Cir	0.012	1.00	587.92	YD 10 - YD 9
22	21	53.658	0.000	Genr	0.00	0.08	0.35	5.0	583.25	0.39	583.46	12	Cir	0.012	0.50	586.71	YD 9 - YD 8
21	20	55.745	2.507	Genr	0.00	0.11	0.35	5.0	583.03	0.39	583.25	12	Cir	0.012	0.50	586.17	YD 8 - YD 7
20	19	123.646	-30.328	Genr	0.00	0.20	0.35	5.0	582.64	0.32	583.03	12	Cir	0.012	0.50	585.06	YD 7 - YD 6
19	End	41.197	-152.273	Genr	0.00	0.02	0.35	5.0	582.50	0.34	582.64	12	Cir	0.012	0.84	585.50	YD 6 - ES
18	1	63.113	-61.600	Genr	0.00	0.23	0.35	10.0	582.89	0.40	583.14	12	Cir	0.012	1.00	586.14	CB 11 - MH 7
17	16	25.000	0.693	Genr	0.00	0.30	0.30	14.0	583.35	0.32	583.43	12	Cir	0.012	1.00	586.43	CB 7 - CB 8
16	3	5.225	-85.817	Genr	0.00	0.30	0.30	14.0	583.33	0.38	583.35	12	Cir	0.012	0.50	586.43	CB 8 - MH 5
15	14	24.988	0.800	Genr	0.00	0.19	0.35	8.0	583.86	0.52	583.99	12	Cir	0.012	1.00	586.96	CB 5 - CB 6
14	4	5.265	-86.259	Genr	0.00	0.20	0.35	8.0	583.84	0.38	583.86	12	Cir	0.012	0.50	586.96	CB 6 - MH 4
13	12	33.529	0.000	Genr	0.00	0.12	0.45	5.0	584.25	0.39	584.38	12	Cir	0.012	1.00	587.38	CB 9 - CB 10
12	2	7.220	-63.196	Genr	0.00	0.13	0.35	5.0	584.22	0.42	584.25	12	Cir	0.012	0.50	587.41	CB 10 - MH 6
11	10	24.968	0.039	Genr	0.00	0.31	0.45	5.0	584.88	0.40	584.98	12	Cir	0.012	1.00	587.98	CB 3 - CB 4
10	5	5.280	-85.144	Genr	0.00	0.29	0.45	0.0	584.86	0.38	584.88	12	Cir	0.012	0.50	587.98	CB 4 - MH 3
9	8	24.937	0.235	Genr	0.00	0.21	0.45	5.0	585.45	0.40	585.55	12	Cir	0.012	1.00	588.55	CB 1 - CB 2
8	7	5.265	-85.303	Genr	0.00	0.14	0.35	5.0	585.43	0.38	585.45	12	Cir	0.012	0.50	588.51	CB 2 - MH 1
7	6	101.916	10.042	Genr	0.00	0.00	0.00	0.0	584.51	0.40	584.92	12	Cir	0.012	1.50	589.08	MH 1 - MH 2

Project File: HydraFlow.stm

Number of lines: 29

Date: 2/11/2025

# Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
6	5	101.918	9.883	Genr	0.00	0.00	0.00	0.0	584.10	0.40	584.51	12	Cir	0.012	0.50	589.45	MH 2 - MH 3
5	4	98.692	9.151	Genr	0.00	0.00	0.00	0.0	583.71	0.40	584.10	18	Cir	0.012	1.50	588.52	MH 3 - MH 4
4	3	88.483	8.095	Genr	0.00	0.00	0.00	0.0	583.33	0.43	583.71	18	Cir	0.012	1.50	587.50	MH 4 - MH 5
3	2	106.221	21.577	Genr	0.00	0.00	0.00	0.0	582.91	0.40	583.33	18	Cir	0.012	1.50	586.96	MH 5 - MH 6
2	1	73.200	39.076	Genr	0.00	0.00	0.00	0.0	582.62	0.40	582.91	18	Cir	0.012	1.37	587.99	MH 6 - MH 7
1	End	21.560	106.728	Genr	0.00	0.00	0.00	0.0	582.50	0.56	582.62	18	Cir	0.012	1.35	587.75	MH 7 - ES
Project File: HydraFlow.stm												Number of lines: 29				Date: 2/11/2025	

# Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow						Total Travel Time (min)	
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)		Travel Time (min)
29	YD 1 - YD 2	User																		5.00
28	YD 2 - YD 3	User																		5.00
27	YD 3 - YD 4	User																		5.00
26	YD 4 - YD 5	User																		8.00
25	YD 5 - STM MH 8	User																		8.00
24	MH 8 - ES	User																		0.00
23	YD 10 - YD 9	User																		5.00
22	YD 9 - YD 8	User																		5.00
21	YD 8 - YD 7	User																		5.00
20	YD 7 - YD 6	User																		5.00
19	YD 6 - ES	User																		5.00
18	CB 11 - MH 7	User																		10.00
17	CB 7 - CB 8	User																		14.00
16	CB 8 - MH 5	User																		14.00
15	CB 5 - CB 6	User																		8.00
14	CB 6 - MH 4	User																		8.00
13	CB 9 - CB 10	User																		5.00
12	CB 10 - MH 6	User																		5.00
11	CB 3 - CB 4	User																		5.00
10	CB 4 - MH 3	User																		0.00
9	CB 1 - CB 2	User																		5.00
8	CB 2 - MH 1	User																		5.00
7	MH 1 - MH 2	User																		0.00
6	MH 2 - MH 3	User																		0.00
Project File: HydraFlow.stm					Min. Tc used for intensity calculations = 5 min					Number of lines: 29					Date: 2/11/2025					

# Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow						Total Travel Time (min)	
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)		Travel Time (min)
5	MH 3 - MH 4	User																		0.00
4	MH 4 - MH 5	User																		0.00
3	MH 5 - MH 6	User																		0.00
2	MH 6 - MH 7	User																		0.00
1	MH 7 - ES	User																		0.00
Project File: HydraFlow.stm					Min. Tc used for intensity calculations = 5 min					Number of lines: 29					Date: 2/11/2025					

# Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
29	12	0.20	581.18	581.51	0.33	0.10	0.91	0.01	581.52	0.052	77.093	581.49	581.68 j	0.19**	0.10	2.00	0.06	581.74	0.479	0.265	0.205	1.00	0.06
28	12	0.44	580.88	581.27	0.39	0.18	1.58	0.04	581.31	0.131	75.349	581.18	581.46	0.28**	0.18	2.49	0.10	581.55	0.466	0.299	0.225	0.50	0.05
27	12	0.62	580.59	581.02	0.43	0.22	1.90	0.06	581.08	0.171	72.927	580.88	581.21	0.33**	0.23	2.74	0.12	581.33	0.468	0.320	0.233	0.50	0.06
26	12	1.06	579.59	580.25	0.66	0.32	1.91	0.06	580.31	0.124	249.680	580.59	581.02	0.43**	0.32	3.25	0.16	581.19	0.500	0.312	n/a	0.50	0.08
25	12	1.41	579.32	580.09	0.77	0.65	2.17	0.07	580.16	0.151	68.135	579.59	580.19	0.60	0.49	2.87	0.13	580.32	0.298	0.224	0.153	0.50	0.06
24	12	1.39	578.60	579.10	0.50	0.39	3.55	0.20	579.30	0.521	205.342	579.32	579.96	0.64	0.53	2.60	0.11	580.07	0.234	0.377	0.775	1.20	0.13
23	12	0.28	583.46	583.87	0.41	0.13	0.93	0.08	583.94	0.000	88.884	584.59	584.81 j	0.22**	0.13	2.22	0.08	584.88	0.000	0.000	n/a	1.00	n/a
22	12	0.41	583.25	583.83	0.58	0.48	0.87	0.01	583.84	0.028	53.658	583.46	583.85	0.39	0.28	1.46	0.03	583.88	0.111	0.070	0.037	0.50	0.02
21	12	0.62	583.03	583.81	0.78	0.65	0.95	0.01	583.82	0.029	55.745	583.25	583.82	0.57	0.46	1.35	0.03	583.85	0.068	0.048	0.027	0.50	0.01
20	12	1.00	582.64	583.71	1.00	0.79	1.28	0.03	583.73	0.068	123.646	583.03	583.79	0.76	0.64	1.57	0.04	583.83	0.080	0.074	0.091	0.50	0.02
19	12	1.00	582.50	583.66	1.00	0.79	1.28	0.03	583.69	0.068	41.197	582.64	583.69	1.00	0.79	1.28	0.03	583.71	0.068	0.068	0.028	0.84	0.02
18	12	0.49	582.89	583.44	0.55	0.45	1.09	0.02	583.46	0.045	63.113	583.14	583.49	0.35	0.24	1.99	0.06	583.55	0.231	0.138	0.087	1.00	0.06
17	12	0.48	583.35	584.52	1.00	0.79	0.61	0.01	584.53	0.016	25.000	583.43	584.53	1.00	0.79	0.61	0.01	584.53	0.016	0.016	0.004	1.00	0.01
16	12	0.95	583.33	584.51	1.00	0.79	1.20	0.02	584.53	0.060	5.225	583.35	584.51	1.00	0.79	1.20	0.02	584.53	0.060	0.060	0.003	0.50	0.01
15	12	0.43	583.86	584.83	0.97	0.17	0.55	0.10	584.93	0.000	24.988	583.99	584.26	0.27**	0.17	2.50	0.10	584.36	0.000	0.000	n/a	1.00	0.10
14	12	0.86	583.84	584.82	0.98	0.78	1.10	0.02	584.84	0.044	5.265	583.86	584.82	0.96	0.77	1.11	0.02	584.84	0.043	0.044	0.002	0.50	0.01
13	12	0.39	584.25	584.67	0.42	0.31	1.26	0.02	584.69	0.078	33.529	584.38	584.69	0.31	0.21	1.88	0.06	584.75	0.236	0.157	0.053	1.00	0.06
12	12	0.69	584.22	584.58	0.36*	0.25	2.71	0.11	584.69	0.415	7.220	584.25	584.61	0.36	0.25	2.70	0.11	584.72	0.414	0.415	0.030	0.50	0.06
11	12	1.01	584.88	585.65	0.77	0.65	1.55	0.04	585.69	0.077	24.968	584.98	585.66	0.68	0.57	1.76	0.05	585.71	0.104	0.090	0.023	1.00	0.05
10	12	1.93	584.86	585.54	0.68*	0.57	3.37	0.18	585.72	0.379	5.280	584.88	585.57	0.69	0.57	3.36	0.18	585.74	0.378	0.378	0.020	0.50	0.09
9	12	0.68	585.45	585.97	0.52	0.42	1.65	0.04	586.01	0.108	24.937	585.55	585.99	0.44	0.33	2.07	0.07	586.05	0.201	0.155	0.039	1.00	0.07
8	12	1.02	585.43	585.89	0.46*	0.35	2.91	0.13	586.02	0.380	5.265	585.45	585.91	0.46	0.35	2.92	0.13	586.04	0.383	0.382	0.020	0.50	0.07

Project File: HydraFlow.stm

Number of lines: 29

Run Date: 2/11/2025

Notes: \* depth assumed; \*\* Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

# Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
7	12	1.02	584.51	585.16	0.65	0.54	1.89	0.06	585.21	0.122	101.916	584.92	585.36	0.44	0.33	3.09	0.15	585.50	0.449	0.286	0.291	1.50	0.22
6	12	0.97	584.10	585.07	0.97	0.78	1.24	0.02	585.09	0.055	101.918	584.51	585.13	0.62	0.51	1.89	0.06	585.19	0.126	0.090	0.092	0.50	0.03
5	18	2.66	583.71	584.82	1.11	1.40	1.90	0.06	584.87	0.068	98.692	584.10	584.87	0.77	0.92	2.89	0.13	585.00	0.196	0.132	0.130	1.50	0.19
4	18	3.41	583.33	584.51	1.18	1.49	2.29	0.08	584.59	0.098	88.483	583.71	584.57	0.86	1.05	3.25	0.16	584.74	0.229	0.163	0.144	1.50	0.25
3	18	3.83	582.91	584.12	1.21	1.53	2.50	0.10	584.22	0.116	106.221	583.33	584.23	0.90	1.11	3.46	0.19	584.42	0.251	0.183	0.195	1.50	0.28
2	18	4.26	582.62	583.45	0.83*	1.01	4.23	0.28	583.73	0.396	73.200	582.91	583.74	0.83	1.01	4.23	0.28	584.02	0.398	0.397	0.291	1.37	0.38
1	18	4.61	582.50	583.39	0.89	0.99	4.22	0.33	583.72	0.000	21.560	582.62	583.44	0.82**	0.99	4.64	0.33	583.78	0.000	0.000	n/a	1.35	0.45

Project File: HydraFlow.stm

Number of lines: 29

Run Date: 2/11/2025

Notes: \* depth assumed; \*\* Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box



**Appendix C**  
**Earthwork Calculations**



# Cut/Fill Report

**Generated:** 2025-02-11 14:39:10

**By user:** dlapietra

**Drawing:** K:\Civil\2020\20.247 1789 Dodge Road, Amherst\03 -  
CIVIL\DWG\K:\Civil\2020\20.247 1789 Dodge Road, Amherst\03 -  
CIVIL\DWG\20.247 C-200.dwg

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Cut & Fill Report	full	1.000	1.000	203694.40	7308.39	11743.90	4435.51<Fill>

Totals				
	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	203694.40	7308.39	11743.90	4435.51<Fill>

\* Value adjusted by cut or fill factor other than 1.0