



ENGINEER'S REPORT

for

Car Dealership
6766 Transit Road
Town of Amherst, Erie County, New York

Prepared for

West Herr Automotive Group

6766 Transit Road
Amherst, NY

Prepared by

Carmina Wood Design

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August 2026



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Section 1 - Location & Description

This redevelopment project consists of the construction of a 17,350 sf car dealership located at 6766 Transit Road in the Town of Amherst. Construction will also include on-site utility improvements, stormwater management, site landscaping, site lighting and associated parking. The existing site consists of foundation remains (from a previous restaurant & banquet facility) and an existing parking lot. Both will be removed as part of the redevelopment. The site is zoned GB - General Business District. The overall acreage and area of disturbance of the site is 2.16 acres.

See Attachment A for Site Location Map.

Section 2 - Water System

An existing 8" ECWA DIP water main is located along the west side of Transit Road. The water service for the proposed building will be tapped off the existing 8" main and consist of a 4" PVC fire service and 2" type "k" copper domestic service. A 4" RPZ and 2" RPZ and meter will be provided inside the building. Drainage due to testing or failure will be to the outside grade and nearest drainage inlet. Water inside the buildings will be used for typical bathroom and janitorial uses.

Domestic Summary:

Peak Operating Demand:	0.99 gpm
Water Main:	8"
Static Pressure:	60 psi (from ECWA flow test)
Friction Loss:	0.00 psi
Elevation Loss:	1.73 psi
Meter & RPZ Loss:	13 psi
Pressure at RPZ and meter:	45.3 psi

Fire Summary:

Peak Operating Demand:	1,000 gpm
Water Main:	8"
Static Pressure:	60 psi (from ECWA flow test)
Friction Loss:	14.74 psi
Elevation Loss:	1.73 psi
RPZ Loss:	12 psi
Pressure at RPZ:	31.5 psi

Repairs to all devices will be made during off hours; dual backflow preventers are not required. The site is not located in a 100-year flood plain.

Disinfection of the water service following installation will be continuous feed, according to AWWA C-651, latest revision.

See Attachment B for Sanitary Sewer & Water Calculations.

Section 3 - Sanitary Sewer Service

An existing 6" Town of Amherst sanitary sewer main is located along the south side of Harding Road and dead ends at a manhole located on the west property line of the project site. The proposed sanitary sewer service for the dealership will exit the west side of the building and connect to the existing manhole. The service will consist of approximately 100 LF of 6" SDR-35 PVC at a minimum slope of 1.0%. A separate grease line will discharge to a 1,500 gallon oil-water separator before connecting to the sanitary sewer lateral.

Design Parameters:

Car Dealership: 30 employees x 15 gpd/employee = 450 gpd

The hydraulic loading rates per "Design Standard for Wastewater Treatment Works" 2014, NYSDEC.

See Attachment B for Sanitary Sewer & Water Calculations

Section 4 - Storm Sewer Service

Stormwater runoff on the existing site sheet drains toward the center of the parking lot where it is collected by existing catch basins. Stormwater is conveyed westerly and connects to the storm sewer system along Transit Road via two (2) separate connections to catch basins.

Stormwater runoff from the proposed development area for this site will also discharge to the existing storm sewer system along Transit Road. Runoff on the east side of the site will utilize the two existing connections to the Transit Road storm sewer system, while the majority of the site will be conveyed north to an existing catch basin along Freeman Road. This storm sewer system along Freeman Road ties directly to the Transit Road system. The proposed hydrology for the development will consist of a combination of overland sheet flow and pipe channel flow. The storm sewer system for this site will consist of 8"-18" HDPE pipes connected by a series of catch basins. To meet NYSDEC water quality requirements, the northern connection to Freeman Road will connect to a treatment structure before connecting to the catch basin along Freeman Road. Since the proposed conditions result in a reduction of runoff from the site, no detention is required to meet NYSDEC water quantity requirements.

Design Criteria

Storm pipes: 10-year storm

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 25-year vs. the proposed 25-year runoff.
Comparison of the existing 100-year vs. the proposed 100-year runoff.

Total Site:

Event	Ex. Runoff (cfs)	Prop. Runoff (cfs)	Difference (cfs)
1-yr	4.09	4.04	-0.05
10-yr	7.88	7.32	-0.56
25-yr	9.96	9.13	-0.83
100-yr	14.05	12.75	-1.30

See Attachment C for Storm Water Calculations.

Section 5 - Erosion Control Summary

Stabilization Practices

Stabilization practices for this site include:

- A. Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed.
- B. Use of stabilization fabric for all slopes having a slope greater than 1V:3H.
- C. Permanent seeding and planting of all unpaved areas using the hydromulching grass seeding technique.
- D. Mulching exposed areas.
- E. Frequent watering to minimize wind erosion during construction.

Structural Practices

Structural practices for this site include:

- A. Inlet protection using a method detailed in the Construction Documents
- B. Perimeter protection using temporary silt fence
- C. Temporary stone wash off areas
- D. Stabilized Construction Entrance

Sequence of Major Activities

The Contractor will be responsible for implementing the following erosion control and storm water management control measures. The Contractor may designate these tasks to certain subcontractors as he sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the Contractor. The order of activities will be as follows:

- A. Install perimeter silt fences in the locations shown on the Demo & Erosion Control Plan sheet.
- B. Remove existing pavement and foundation remains as shown on the Demo & Erosion Control Plan sheet.
- C. Commence site grading.
- D. Disturbed areas of the site where construction activity has ceased for more than 14 days shall be temporarily seeded and watered.
- E. Construction of building.
- F. Installation of proposed utilities.
- G. Finalize pavement subgrade preparation.
- H. Construct all curb, drainage inlets, storm sewer pipes and storm sewer manholes, as shown on the plans. Install temporary inlet protection at the locations of all new inlets.
- I. Dust control.
- J. Remove inlet protection around inlets and manholes no more than 48 hours prior to placing stabilized base course.
- K. Install base material as required for pavement.
- L. Carry out final grading and seeding and planting.
- M. Clean storm system following construction.
- N. Remove silt fencing only after all paving is complete and exposed surfaces are stabilized.

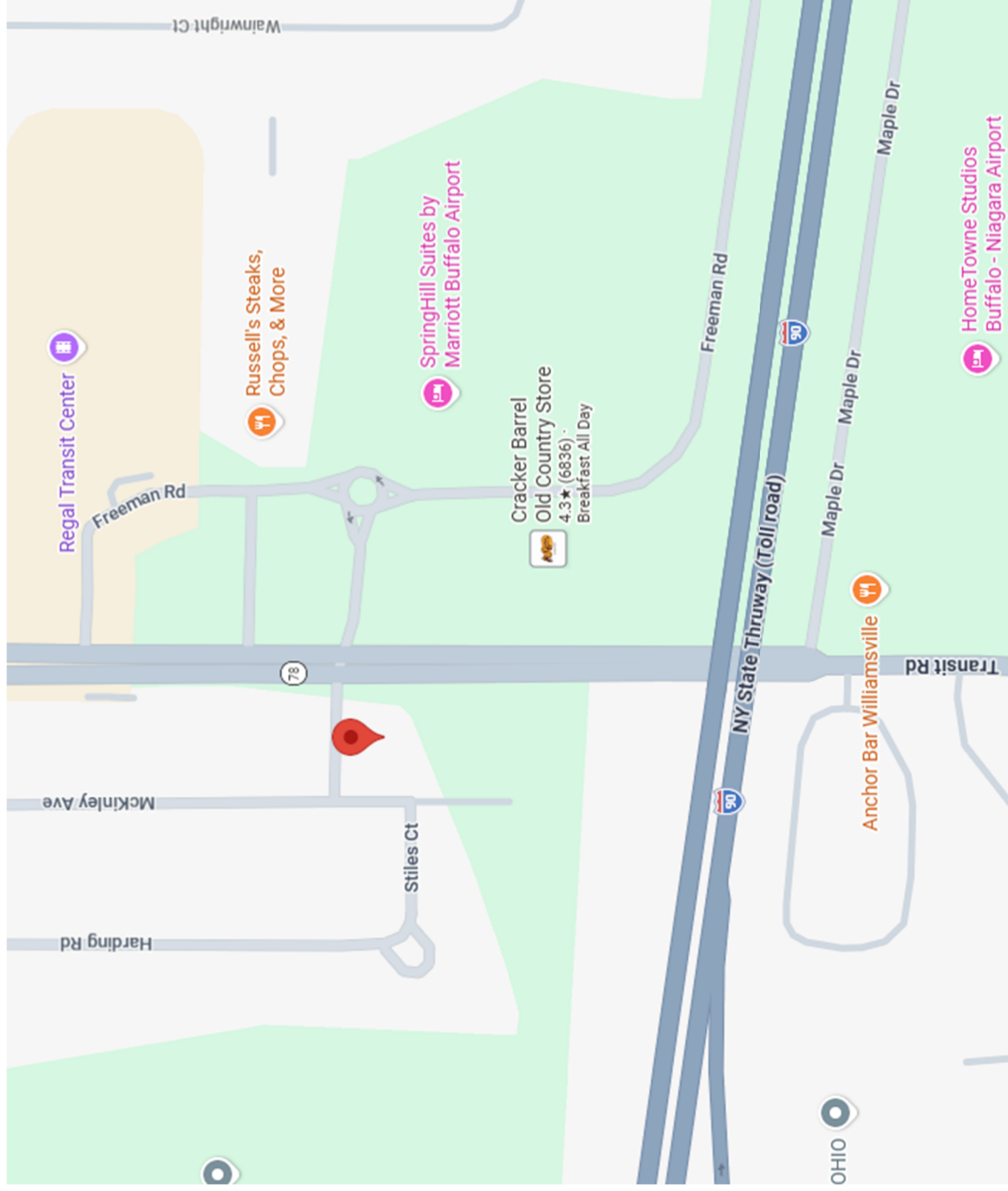
Section 6 - Geotechnical Items

According to the USDA Web Soil Survey, the onsite soil is made up of Cosad loamy fine sand and Wassaic silt loam. These soil groups are categorized under hydrologic soil groups C and C/D and will have a slow infiltration rate when thoroughly wet.

See Attachment D for Soil Information.

Attachment A
Site Location Map

Site Location Map



Attachment B

Sanitary Sewer & Water Demand Calculations

CARMINA WOOD DESIGN

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BUFFALO, NEW YORK, 14203

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FAX (716) 842-0263

Project No.: 26-4120

Date: 8/26/2026

Project Name: Car Dealership

Project Address: 6766 Transit Road - Town of Amherst

Subject: Sanitary Sewage & Domestic Water Demand Calcs

Sheet: 1 of 1

Sanitary Sewage Demand Calculations:**Car Dealership:**

30 employees @ 15.0 gpd/employee = 450 gpd

Total Demand = 450 gpd**Water Demand Calculations (Domestic):****Car Dealership:**

450 gpd x 1.1 = 495 gpd *use 110% of sewage demand

*use 1.8 peaking factor and assume an 15 hour day

495 gpd x 1day/15hr x 1hr/60min = 0.55 gpm

0.55 gpm x 1.8 = 0.99 gpm Q_{peak} **Headlosses:** Q_{peak} = 0.99 gpm

Pipe = 4 inch PVC C = 140

Length = 73 LF (approx. distance from main to RPZ and meter)

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(73)(0.99)^{1.85}}{(140)^{1.85} (4)^{4.866}} = 0.00 \text{ ft} = 0.00 \text{ psi}$$

 Δ elev = 4 ft = 1.73 psi *RPZ is located inside hotbox

Loss through meter = 1 psi

Loss through RPZ = 12 psi

Total Losses = 14.7 psi

Static Pressure = 60 psi

Residual pressure following RPZ = 60 - 14.7 = 45.3 psi (available at after RPZ and meter)**Water Demand Calculations (Fire):****Plaza Redevelopment:**

Q= 1,000 gpm

Headlosses: Q_{peak} = 1000.00 gpm

Pipe = 4 inch PVC C = 140

Length = 73 LF (approx. distance from main to RPZ and meter)

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(73)(1000)^{1.85}}{(140)^{1.85} (4)^{4.866}} = 34.05 \text{ ft} = 14.74 \text{ psi}$$

 Δ elev = 4 ft = 1.73 psi *RPZ is located inside building

Loss through RPZ = 12 psi

Total Losses = 28.5 psi

Static Pressure = 60 psi

Residual pressure following RPZ = 48 - 28.5 = 31.5 psi (available at after RPZ and meter)

Attachment C

Storm Water Calculations

New York State Department of Environmental Conservation (NYSDEC)
Water Quality Volume (WQv) & Water Quality Peak Flow (Qp) Calculation Worksheet

Project: Proposed Car Dealership
 Location: 6766 Transit Road, Amherst, NY
 Date: 8/26/26
 Revised: -

TR-55 AND TR-20 RAINFALL DISTRIBUTION TYPE=

$$(R=I_a/P) \quad C_1=A \cdot R^2 + B \cdot R + C$$

Coefficients for unit peak discharge equation
 Coefficients for unit peak discharge equation
 Coefficients for unit peak discharge equation

II = (USER INPUT VALUE)

	A	B	C
C_0	-2.2349	0.4759	2.5273
C_1	1.5555	-0.7081	-0.5584
C_2	0.6041	0.0437	-0.1761

INPUT CRITERIA:

	ABBREVIATION	UNITS	TRIBUTARY (TREATED) AREA
TOTAL DEVELOPED (GREATER OF DISTURBED OR TRIBUTARY) AREA	A	acres	PDA = (USER INPUT VALUE)
IMPERVIOUS SURFACE AREA	I	acres	1.29 = (USER INPUT VALUE)
NYSDEC 90% RAINFALL EVENT NUMBER (1)	P	inches	1.00 = (USER INPUT VALUE)
TIME OF CONCENTRATION	T_c	hours	0.16 = (USER INPUT VALUE)

CALCULATIONS:

WATER QUALITY VOLUME (2)(3)

STORMWATER MANAGEMENT PRACTICES

REQUIRED WATER QUALITY VOLUME $WQ_v = 3630 \cdot P(0.05 \cdot A + 0.9 \cdot I)$

REQUIRED WATER QUALITY VOLUME (100% FOR NEW DEVELOPMENT)

REQUIRED REDEVELOPMENT WATER QUALITY VOLUME (75%)

REQUIRED PRETREATMENT WATER QUALITY VOLUME (25%)

PROVIDED WQ_v VOLUME

WQ_v	acres-ft	0.102
WQ_v	cu. ft.	4,458
WQ_v	cu. ft.	3,343
WQ_v	cu. ft.	1,114
WQ_v	cu. ft.	= (USER INPUT VALUE)

WATER QUALITY PEAK FLOW (4)

RUNOFF VOLUME $Q = WQ_v / (A \cdot 3600)$

$CN = 1000 / (10 + 5 \cdot P + 10 \cdot Q - 10(Q^2 + 1.25 \cdot Q \cdot P)^{0.5})$

CN ROUNDED

$CN < \text{or} = 98$

INITIAL ABSTRACTION ($I_a = 200 / CN - 2$)

RATIO $R = I_a / P$

$C_0 = A \cdot R^2 + B \cdot R + C$

$C_1 = A \cdot R^2 + B \cdot R + C$

$C_2 = A \cdot R^2 + B \cdot R + C$

UNIT PEAK DISCHARGE $q_u = 10 \cdot (C_0 + C_1 \cdot \log(T_c) + C_2 \cdot (\log(T_c))^2)$

REQUIRED NEW DEVELOPMENT WATER QUALITY PEAK FLOW $Q_p = q_u \cdot A \cdot Q / 640$ (100%)

REQUIRED REDEVELOPMENT WATER QUALITY PEAK FLOW (75%)

PROVIDED WATER QUALITY PEAK FLOW

MARKETED PEAK TREATMENT FLOW

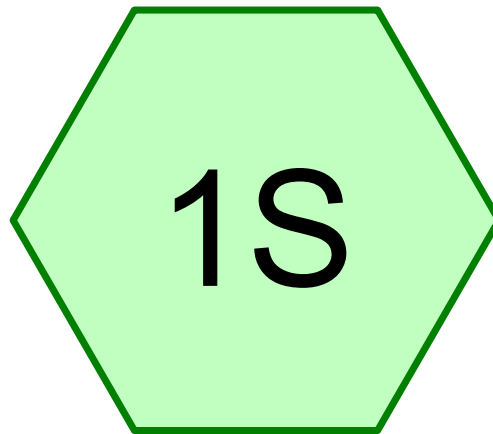
VERIFIED DESIGN (100% FLOW RATE) PER NYSDEC

WATER QUALITY UNIT PRODUCT AND MODEL

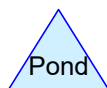
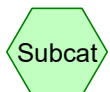
Q	inches	0.92
CN		99.27
CN		99
CN		98
I_a	inches	0.04
R		0.04
C_0		2.54
C_1		-0.58
C_2		-0.17
q_u	cfs/m ² /in	791.74
Q_p	cfs	1.52
Q_p	cfs	1.14
$Q_p \cdot P$	cfs	0.00 = (USER INPUT VALUE)
	cfs	0.00 = (USER INPUT VALUE)
	cfs	0.00 = (USER INPUT VALUE)
	each	0.00 = (USER INPUT VALUE)

References:

- (1) Refer to Section 4.2 Water Quality Volume (WQv) Figure 4.1 "90% Rainfall in New York State" in the [New York State Stormwater Design Manual](#), last revised August 2015.
- (2) Refer to Section 4.2 for Water Quality Volume (WQv) calculations in the [New York State Stormwater Design Manual](#), last revised August 2010.
- (3) Refer to Section 9.2.1 "Sizing Criteria" for Water Quality Volume (WQv) calculations for Redevelopment Projects in the [New York State Stormwater Design Manual](#), last revised August 2015.
- (4) Refer to Appendix B.2 "Water Quality Peak Flow Calculation" in the [New York State Stormwater Design Manual](#), last revised August 2015.



Existing



Routing Diagram for 26-4120 storm calcs - Existing
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26-4120 storm calcs - Existing

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Rainfall Events Listing

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

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
25,900	80	>75% Grass cover, Good, HSG D (1S)
12,317	96	Gravel surface, HSG D (1S)
55,916	98	Paved parking, HSG D (1S)
94,133	93	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
94,133	HSG D	1S
0	Other	
94,133		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	25,900	0	25,900	>75% Grass cover, Good
0	0	0	12,317	0	12,317	Gravel surface
0	0	0	55,916	0	55,916	Paved parking
0	0	0	94,133	0	94,133	TOTAL AREA

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1S	0.00	0.00	155.0	0.0050	0.025	0.0	10.0	0.0	

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Type II 24-hr 1-Year Rainfall=1.87"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Existing

Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=1.20"

Flow Length=313' Tc=8.4 min CN=93 Runoff=4.09 cfs 9,381 cf

Total Runoff Area = 94,133 sf Runoff Volume = 9,381 cf Average Runoff Depth = 1.20"

40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

26-4120 storm calcs - Existing

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Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Subcatchment 1S: Existing

Runoff = 4.09 cfs @ 12.00 hrs, Volume= 9,381 cf, Depth= 1.20"
 Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
 Type II 24-hr 1-Year Rainfall=1.87"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

26-4120 storm calcs - Existing

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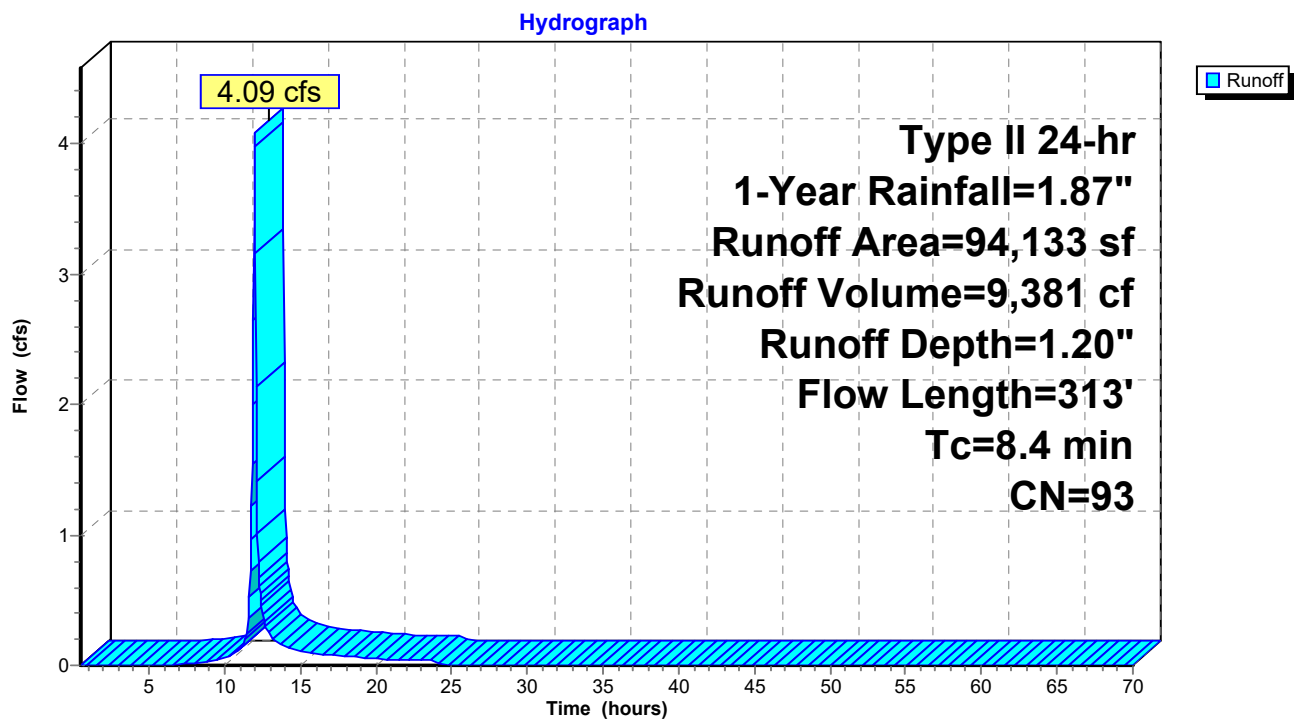
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Type II 24-hr 1-Year Rainfall=1.87"

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Subcatchment 1S: Existing



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Type II 24-hr 10-Year Rainfall=3.14"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Existing

Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=2.39"
Flow Length=313' Tc=8.4 min CN=93 Runoff=7.88 cfs 18,734 cf

Total Runoff Area = 94,133 sf Runoff Volume = 18,734 cf Average Runoff Depth = 2.39"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

26-4120 storm calcs - Existing

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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Subcatchment 1S: Existing

Runoff = 7.88 cfs @ 11.99 hrs, Volume= 18,734 cf, Depth= 2.39"
 Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
 Type II 24-hr 10-Year Rainfall=3.14"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

26-4120 storm calcs - Existing

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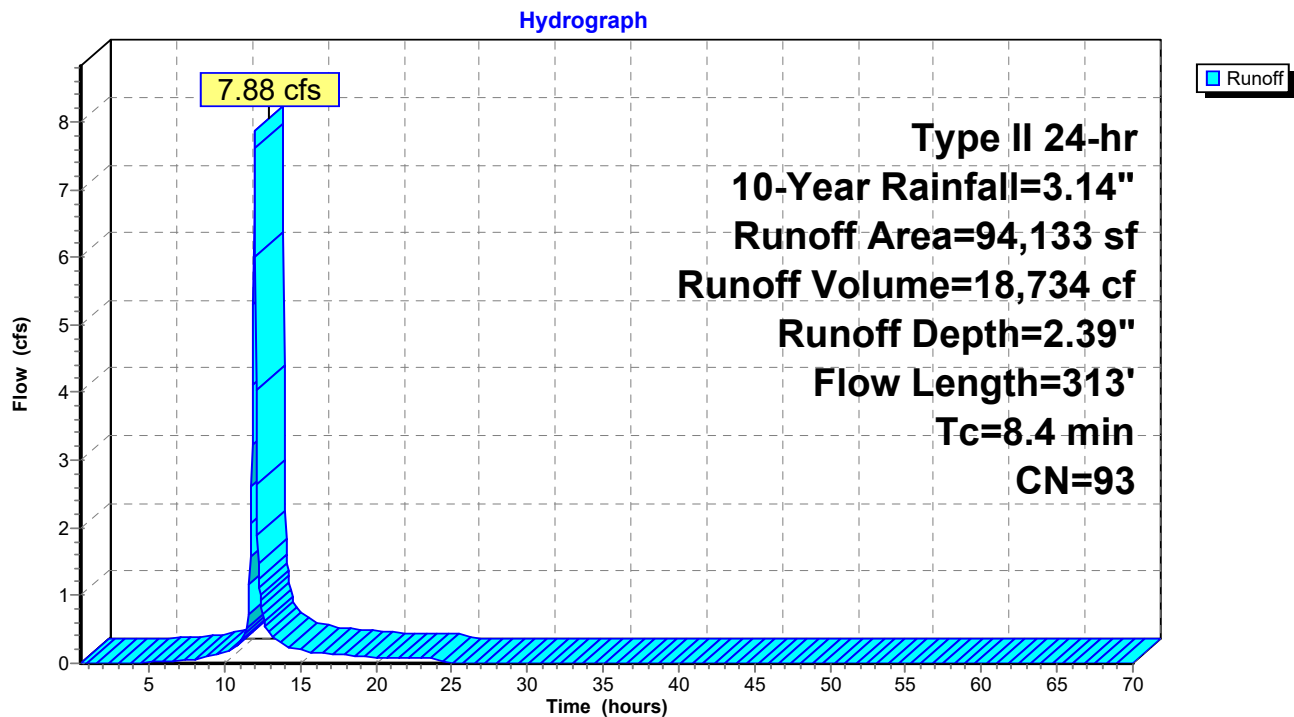
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Type II 24-hr 10-Year Rainfall=3.14"

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Subcatchment 1S: Existing



26-4120 storm calcs - Existing

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Type II 24-hr 25-Year Rainfall=3.84"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Existing

Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=3.06"
Flow Length=313' Tc=8.4 min CN=93 Runoff=9.96 cfs 24,038 cf

Total Runoff Area = 94,133 sf Runoff Volume = 24,038 cf Average Runoff Depth = 3.06"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

26-4120 storm calcs - Existing

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Type II 24-hr 25-Year Rainfall=3.84"

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Summary for Subcatchment 1S: Existing

Runoff = 9.96 cfs @ 11.99 hrs, Volume= 24,038 cf, Depth= 3.06"
 Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
 Type II 24-hr 25-Year Rainfall=3.84"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

26-4120 storm calcs - Existing

Prepared by Carmina Wood Design

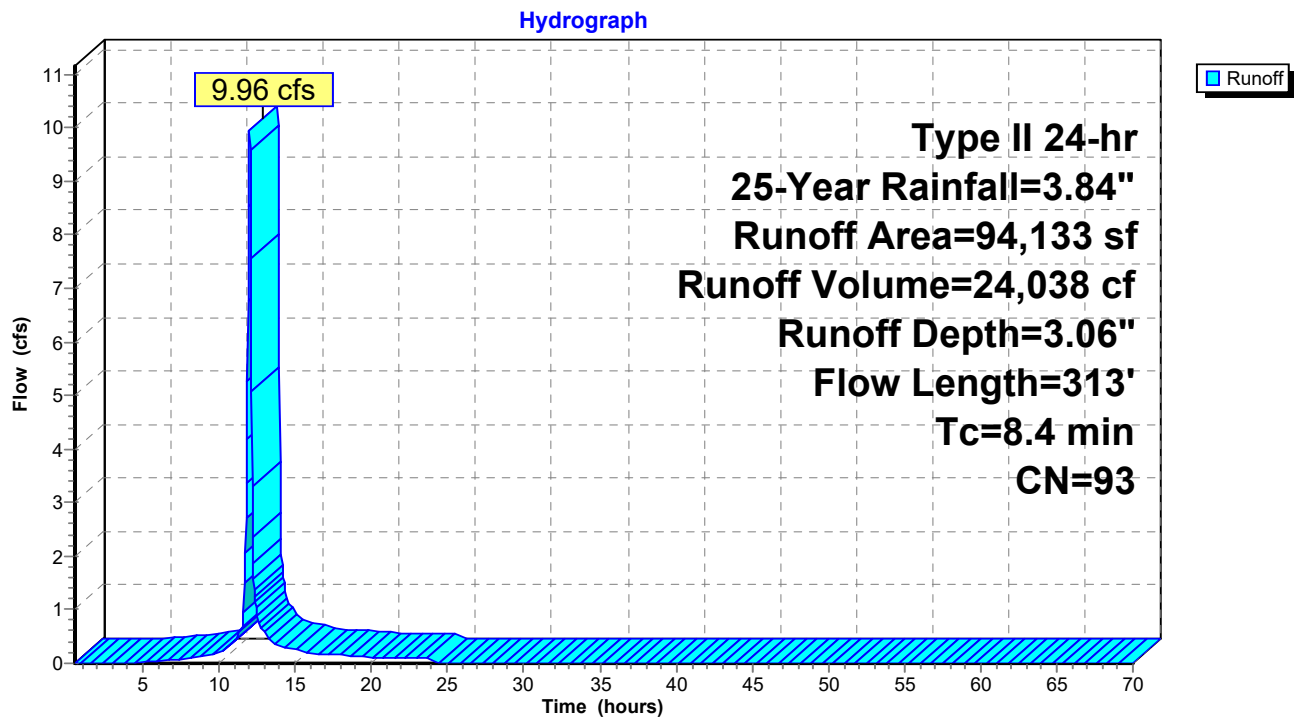
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Type II 24-hr 25-Year Rainfall=3.84"

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Subcatchment 1S: Existing



26-4120 storm calcs - Existing

Type II 24-hr 100-Year Rainfall=5.23"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Existing

Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=4.42"
Flow Length=313' Tc=8.4 min CN=93 Runoff=14.05 cfs 34,703 cf

Total Runoff Area = 94,133 sf Runoff Volume = 34,703 cf Average Runoff Depth = 4.42"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

26-4120 storm calcs - Existing

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Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Subcatchment 1S: Existing

Runoff = 14.05 cfs @ 11.99 hrs, Volume= 34,703 cf, Depth= 4.42"
 Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
 Type II 24-hr 100-Year Rainfall=5.23"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	Pipe Channel, 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

26-4120 storm calcs - Existing

Prepared by Carmina Wood Design

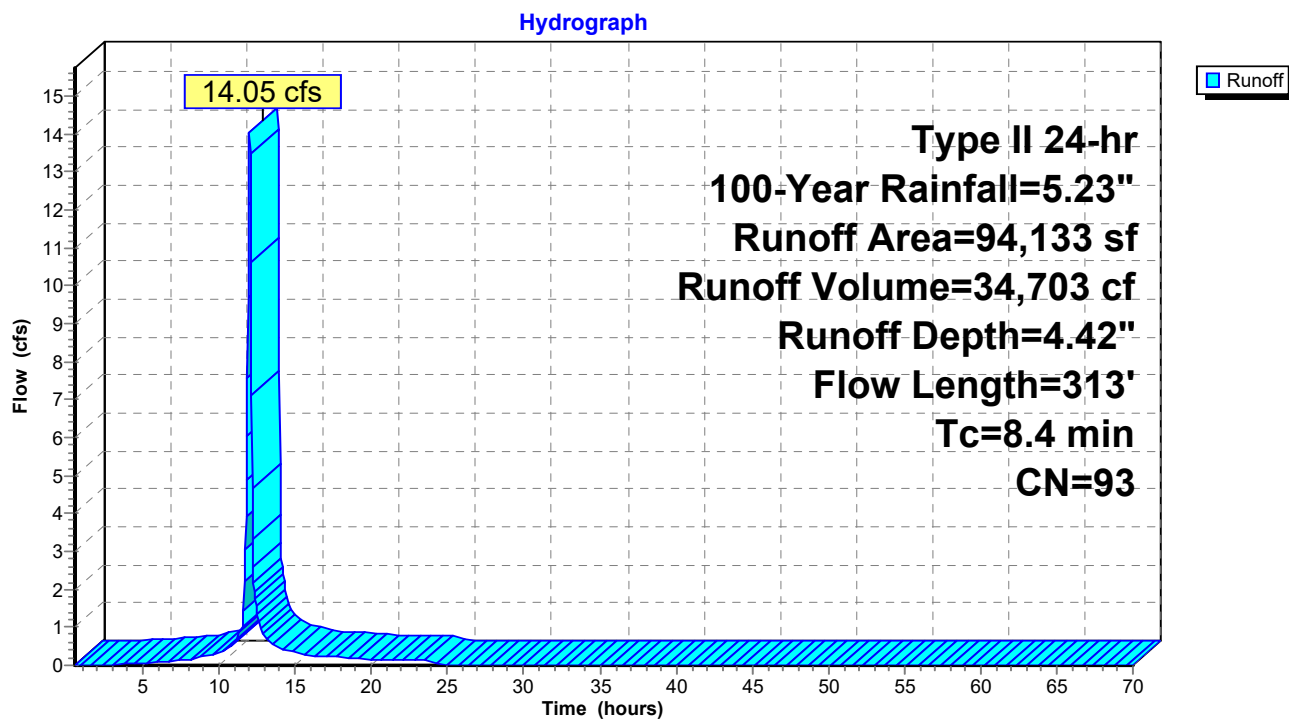
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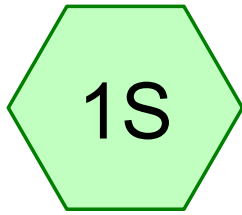
Type II 24-hr 100-Year Rainfall=5.23"

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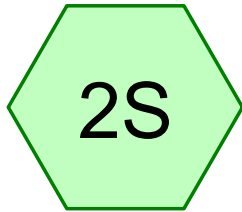
Page 18

Subcatchment 1S: Existing

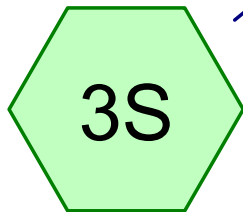




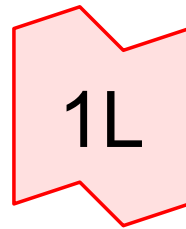
Proposed - to Freeman



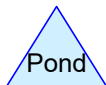
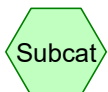
Proposed - to Transit
Road sewer



Proposed - Direct Offsite



Proposed - Total



26-4120 storm calcs - Proposed

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Rainfall Events Listing

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

26-4120 storm calcs - Proposed

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
20,061	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S)
896	98	Concrete sidewalk, HSG D (2S)
786	98	Concrete, HSG D (1S)
55,039	98	Paved parking, HSG D (1S, 2S, 3S)
17,350	98	Roofs, HSG D (1S)
94,132	94	TOTAL AREA

26-4120 storm calcs - Proposed

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
94,132	HSG D	1S, 2S, 3S
0	Other	
94,132		TOTAL AREA

26-4120 storm calcs - Proposed

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	20,061	0	20,061	>75% Grass cover, Good
0	0	0	786	0	786	Concrete
0	0	0	896	0	896	Concrete sidewalk
0	0	0	55,039	0	55,039	Paved parking
0	0	0	17,350	0	17,350	Roofs
0	0	0	94,132	0	94,132	TOTAL AREA

26-4120 storm calcs - Proposed

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1S	0.00	0.00	62.0	0.0050	0.013	0.0	12.0	0.0	
2	1S	0.00	0.00	83.0	0.0020	0.013	0.0	15.0	0.0	
3	1S	0.00	0.00	46.0	0.0030	0.013	0.0	18.0	0.0	
4	2S	0.00	0.00	73.0	0.0030	0.013	0.0	8.0	0.0	
5	2S	0.00	0.00	73.0	0.0050	0.013	0.0	8.0	0.0	

26-4120 storm calcs - Proposed

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Type II 24-hr 1-Year Rainfall=1.87"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Proposed - to Freeman Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=1.54"
Flow Length=279' Tc=9.6 min CN=97 Runoff=2.98 cfs 7,532 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=1.45"
Flow Length=186' Tc=6.8 min CN=96 Runoff=0.94 cfs 2,134 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=0.56"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=0.26 cfs 843 cf

Link 1L: Proposed - Total

Inflow=4.04 cfs 10,509 cf

Primary=4.04 cfs 10,509 cf

Total Runoff Area = 94,132 sf Runoff Volume = 10,509 cf Average Runoff Depth = 1.34"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

26-4120 storm calcs - Proposed

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Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Subcatchment 1S: Proposed - to Freeman

Runoff = 2.98 cfs @ 12.01 hrs, Volume= 7,532 cf, Depth= 1.54"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (sf)	CN	Description
17,350	98	Roofs, HSG D
38,063	98	Paved parking, HSG D
* 786	98	Concrete, HSG D
2,337	80	>75% Grass cover, Good, HSG D
58,536	97	Weighted Average
2,337		3.99% Pervious Area
56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	34	0.0150	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.9	54	0.0190	1.05		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	62	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.2	46	0.0030	3.26	5.75	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.6	279	Total			

26-4120 storm calcs - Proposed

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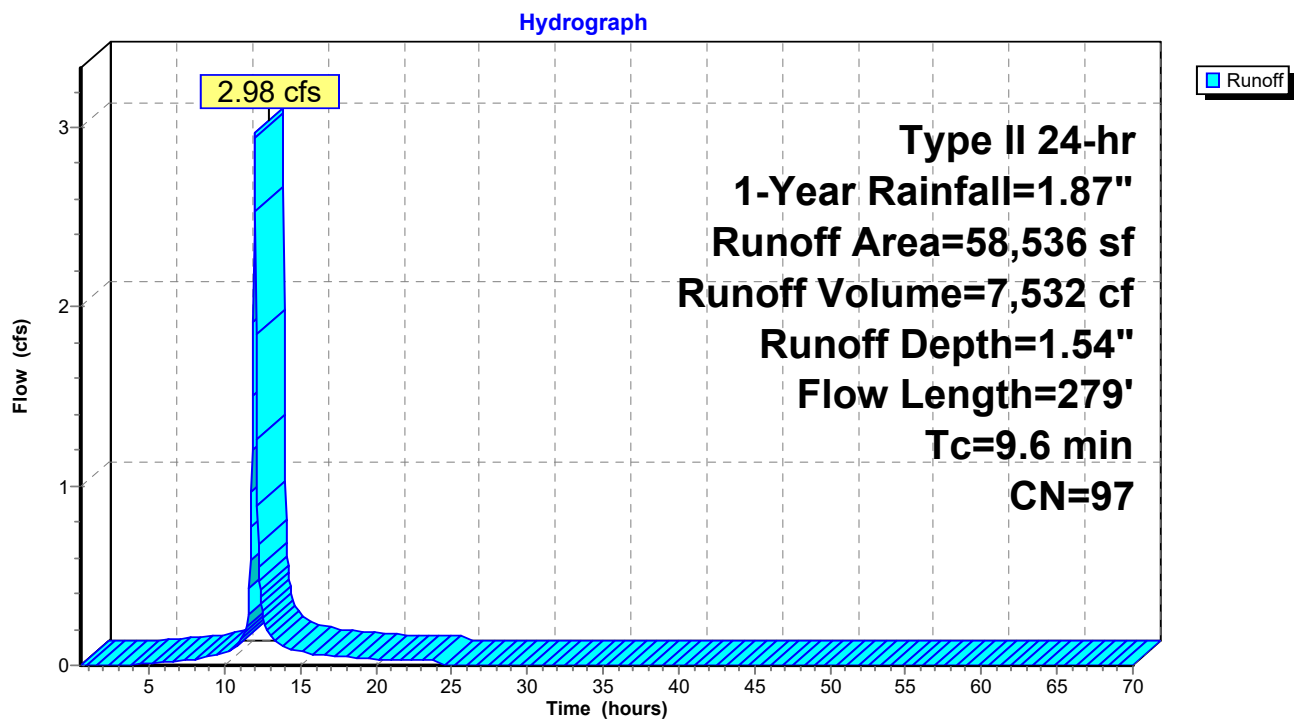
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Type II 24-hr 1-Year Rainfall=1.87"

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Subcatchment 1S: Proposed - to Freeman



26-4120 storm calcs - Proposed

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Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Subcatchment 2S: Proposed - to Transit Road sewer

Runoff = 0.94 cfs @ 11.98 hrs, Volume= 2,134 cf, Depth= 1.45"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (sf)	CN	Description
15,144	98	Paved parking, HSG D
* 896	98	Concrete sidewalk, HSG D
1,633	80	>75% Grass cover, Good, HSG D
17,673	96	Weighted Average
1,633		9.24% Pervious Area
16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

26-4120 storm calcs - Proposed

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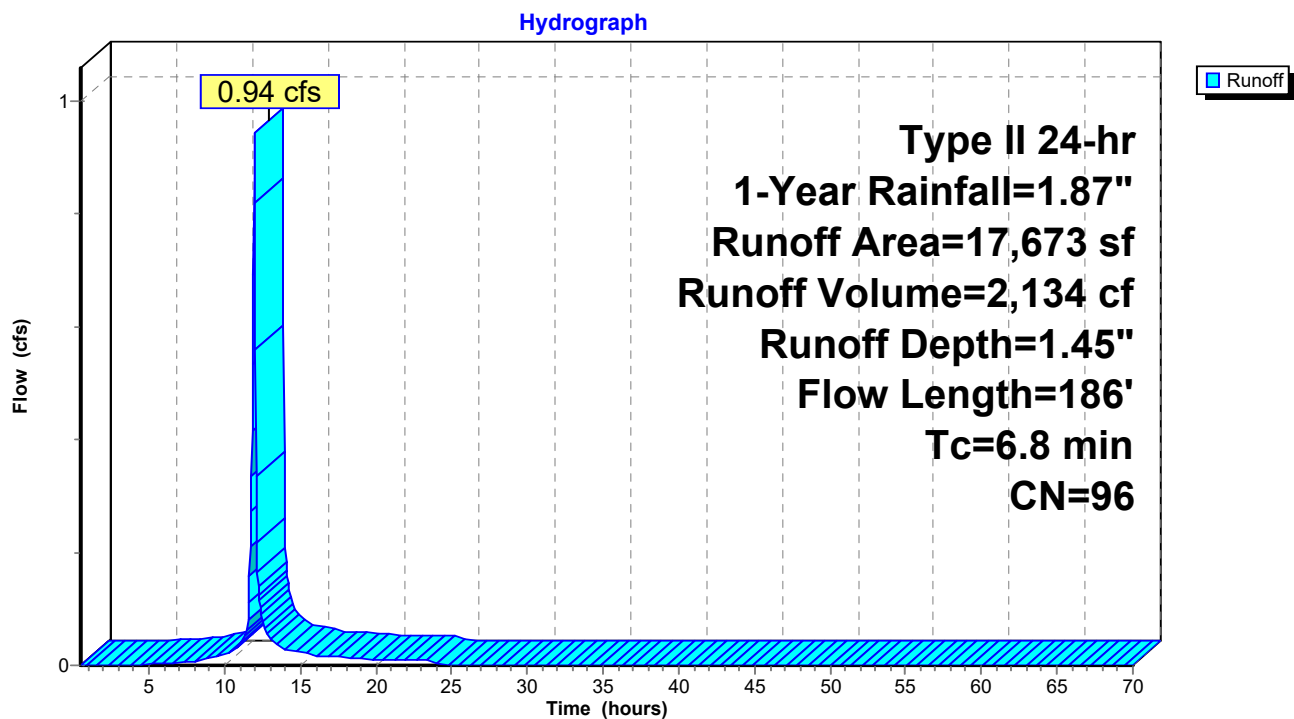
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Type II 24-hr 1-Year Rainfall=1.87"

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Subcatchment 2S: Proposed - to Transit Road sewer



26-4120 storm calcs - Proposed

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Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Subcatchment 3S: Proposed - Direct Offsite

Runoff = 0.26 cfs @ 12.12 hrs, Volume= 843 cf, Depth= 0.56"
Routed to Link 1L : Proposed - Total

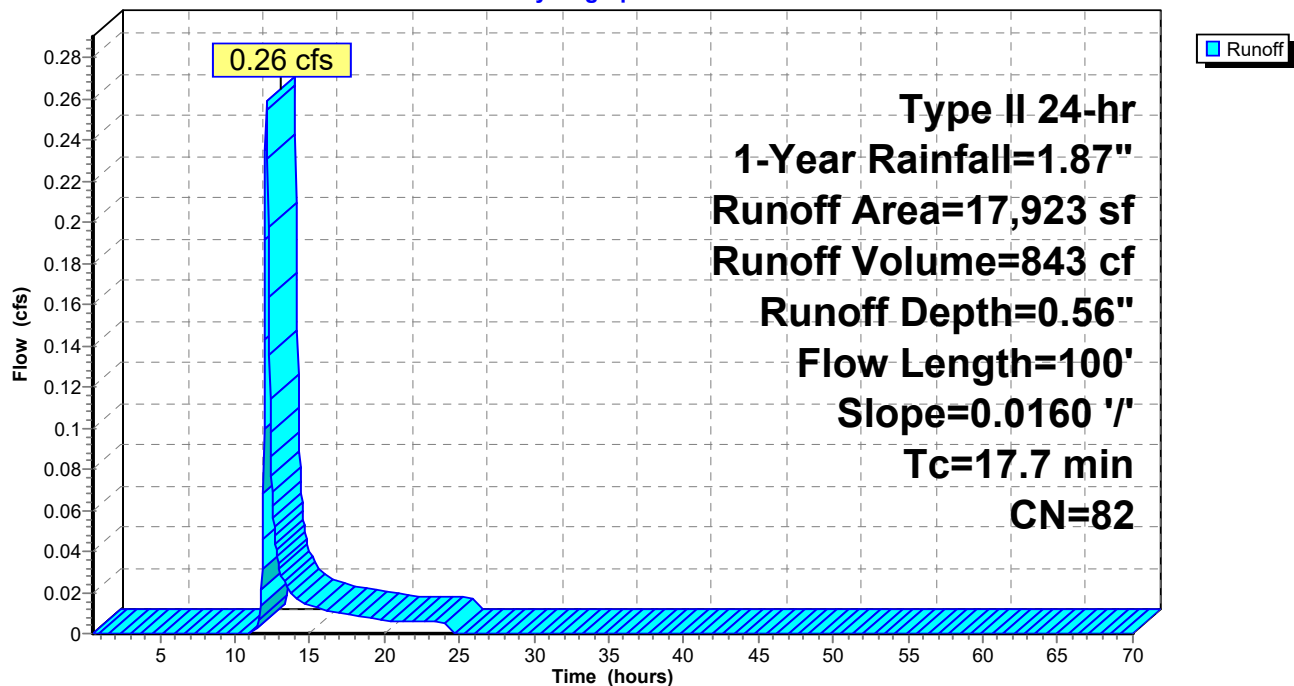
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite

Hydrograph



26-4120 storm calcs - Proposed

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Type II 24-hr 1-Year Rainfall=1.87"

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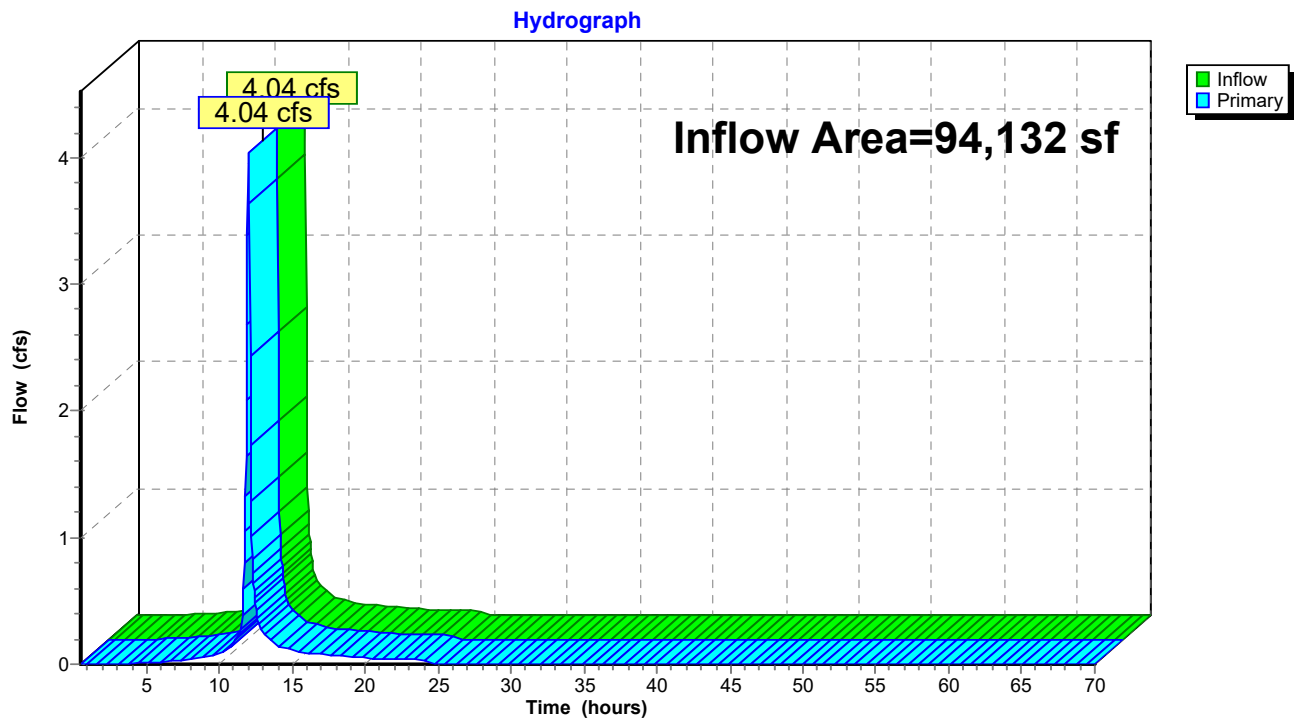
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Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 1.34" for 1-Year event
Inflow = 4.04 cfs @ 12.00 hrs, Volume= 10,509 cf
Primary = 4.04 cfs @ 12.00 hrs, Volume= 10,509 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



26-4120 storm calcs - Proposed

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Type II 24-hr 10-Year Rainfall=3.14"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Proposed - to Freeman Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=2.80"
Flow Length=279' Tc=9.6 min CN=97 Runoff=5.20 cfs 13,644 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=2.69"
Flow Length=186' Tc=6.8 min CN=96 Runoff=1.68 cfs 3,962 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=1.49"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=0.73 cfs 2,225 cf

Link 1L: Proposed - Total

Inflow=7.32 cfs 19,831 cf

Primary=7.32 cfs 19,831 cf

Total Runoff Area = 94,132 sf Runoff Volume = 19,831 cf Average Runoff Depth = 2.53"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

26-4120 storm calcs - Proposed

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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Subcatchment 1S: Proposed - to Freeman

Runoff = 5.20 cfs @ 12.01 hrs, Volume= 13,644 cf, Depth= 2.80"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (sf)	CN	Description
17,350	98	Roofs, HSG D
38,063	98	Paved parking, HSG D
* 786	98	Concrete, HSG D
2,337	80	>75% Grass cover, Good, HSG D
58,536	97	Weighted Average
2,337		3.99% Pervious Area
56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	34	0.0150	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.9	54	0.0190	1.05		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	62	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.2	46	0.0030	3.26	5.75	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.6	279	Total			

26-4120 storm calcs - Proposed

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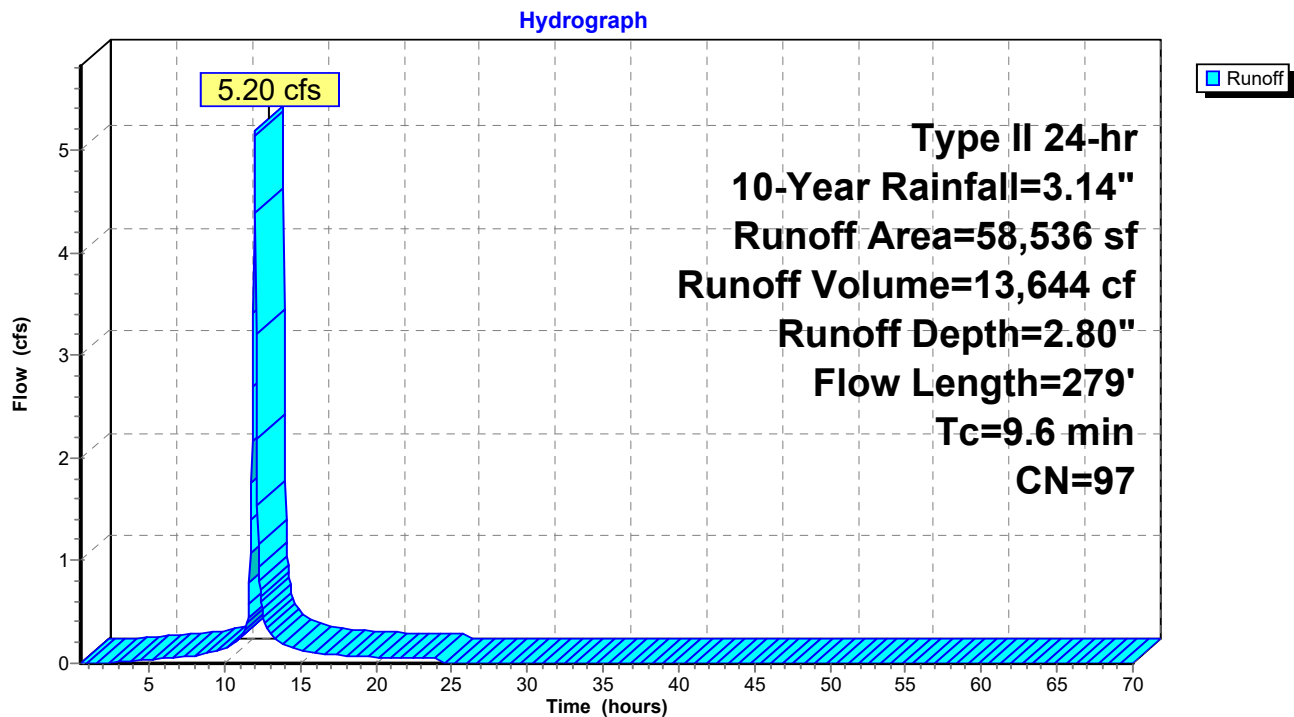
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Type II 24-hr 10-Year Rainfall=3.14"

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Subcatchment 1S: Proposed - to Freeman



26-4120 storm calcs - Proposed

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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Subcatchment 2S: Proposed - to Transit Road sewer

Runoff = 1.68 cfs @ 11.97 hrs, Volume= 3,962 cf, Depth= 2.69"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (sf)	CN	Description
15,144	98	Paved parking, HSG D
* 896	98	Concrete sidewalk, HSG D
1,633	80	>75% Grass cover, Good, HSG D
17,673	96	Weighted Average
1,633		9.24% Pervious Area
16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

26-4120 storm calcs - Proposed

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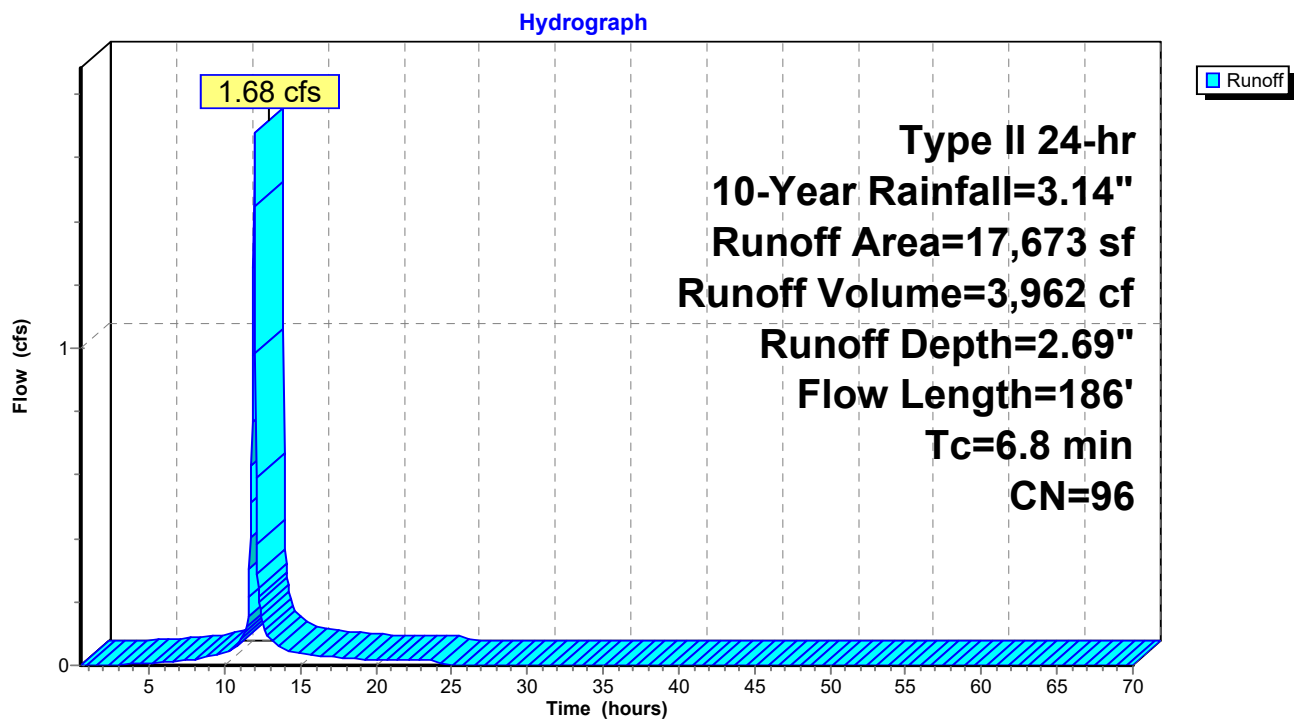
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Type II 24-hr 10-Year Rainfall=3.14"

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Subcatchment 2S: Proposed - to Transit Road sewer



26-4120 storm calcs - Proposed

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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Subcatchment 3S: Proposed - Direct Offsite

Runoff = 0.73 cfs @ 12.10 hrs, Volume= 2,225 cf, Depth= 1.49"
Routed to Link 1L : Proposed - Total

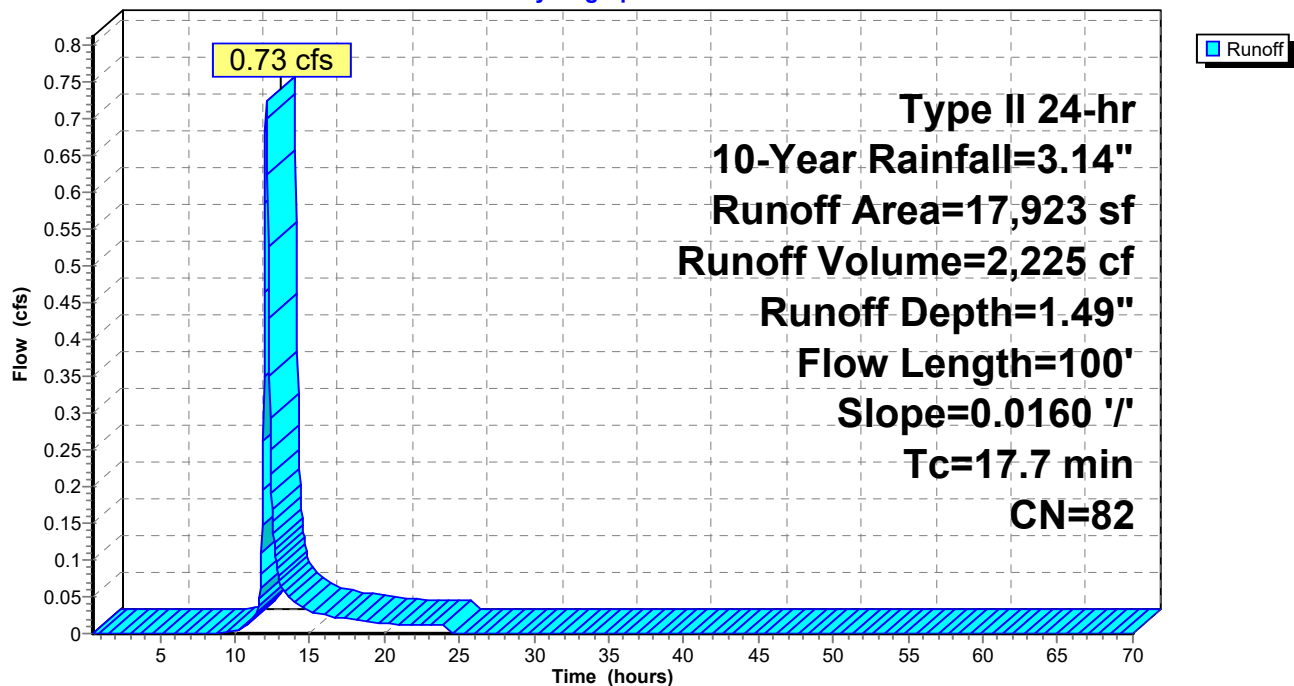
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite

Hydrograph



26-4120 storm calcs - Proposed

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Type II 24-hr 10-Year Rainfall=3.14"

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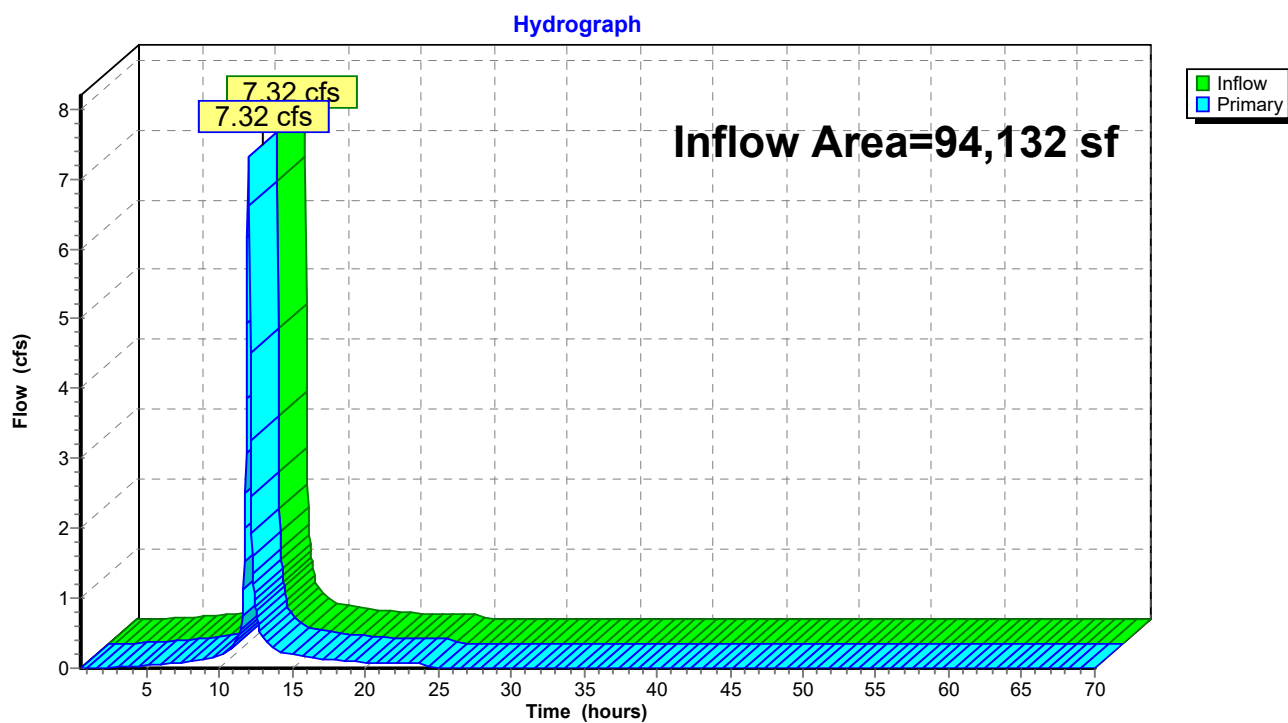
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Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 2.53" for 10-Year event
Inflow = 7.32 cfs @ 12.00 hrs, Volume= 19,831 cf
Primary = 7.32 cfs @ 12.00 hrs, Volume= 19,831 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



26-4120 storm calcs - Proposed

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Type II 24-hr 25-Year Rainfall=3.84"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Proposed - to Freeman Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=3.49"
Flow Length=279' Tc=9.6 min CN=97 Runoff=6.41 cfs 17,035 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=3.38"
Flow Length=186' Tc=6.8 min CN=96 Runoff=2.09 cfs 4,980 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=2.07"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=1.01 cfs 3,087 cf

Link 1L: Proposed - Total

Inflow=9.13 cfs 25,103 cf

Primary=9.13 cfs 25,103 cf

Total Runoff Area = 94,132 sf Runoff Volume = 25,103 cf Average Runoff Depth = 3.20"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

26-4120 storm calcs - Proposed

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Type II 24-hr 25-Year Rainfall=3.84"

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Summary for Subcatchment 1S: Proposed - to Freeman

Runoff = 6.41 cfs @ 12.01 hrs, Volume= 17,035 cf, Depth= 3.49"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (sf)	CN	Description
17,350	98	Roofs, HSG D
38,063	98	Paved parking, HSG D
* 786	98	Concrete, HSG D
2,337	80	>75% Grass cover, Good, HSG D
58,536	97	Weighted Average
2,337		3.99% Pervious Area
56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	34	0.0150	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.9	54	0.0190	1.05		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	62	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.2	46	0.0030	3.26	5.75	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.6	279	Total			

26-4120 storm calcs - Proposed

Prepared by Carmina Wood Design

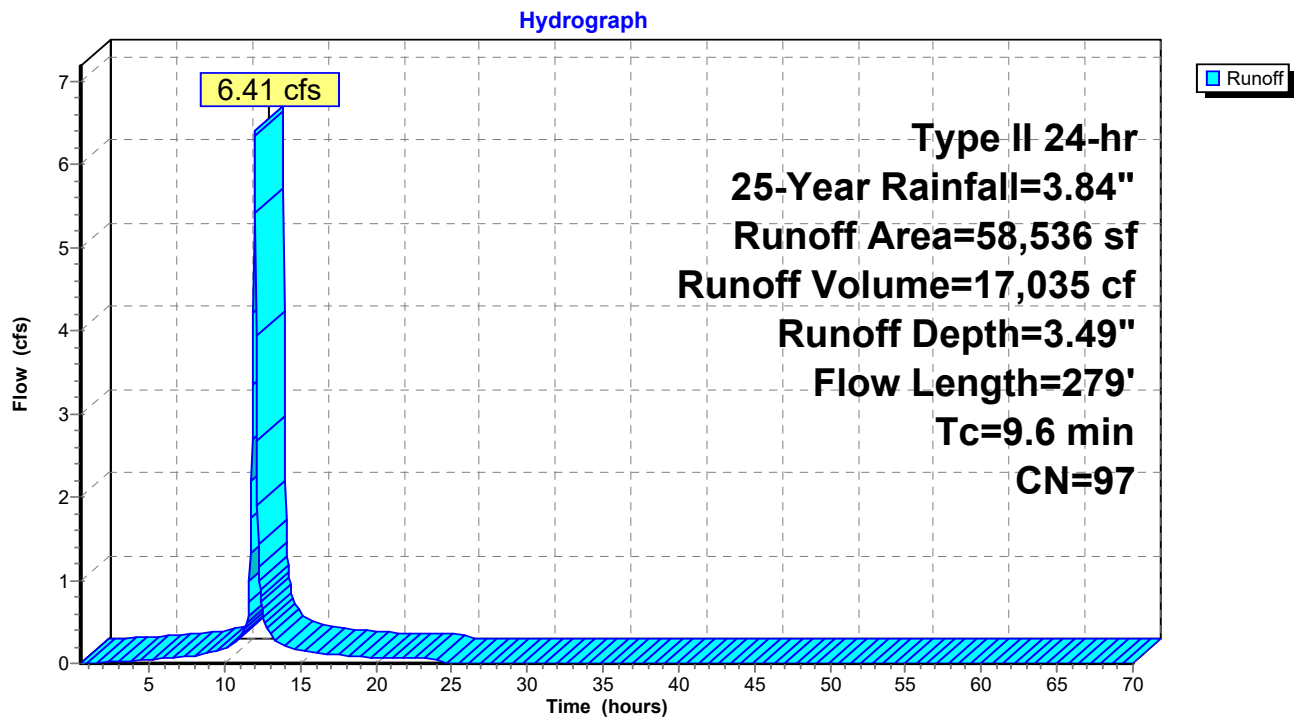
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Type II 24-hr 25-Year Rainfall=3.84"

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Subcatchment 1S: Proposed - to Freeman



26-4120 storm calcs - Proposed

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Type II 24-hr 25-Year Rainfall=3.84"

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Summary for Subcatchment 2S: Proposed - to Transit Road sewer

Runoff = 2.09 cfs @ 11.97 hrs, Volume= 4,980 cf, Depth= 3.38"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (sf)	CN	Description
15,144	98	Paved parking, HSG D
* 896	98	Concrete sidewalk, HSG D
1,633	80	>75% Grass cover, Good, HSG D
17,673	96	Weighted Average
1,633		9.24% Pervious Area
16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

26-4120 storm calcs - Proposed

Prepared by Carmina Wood Design

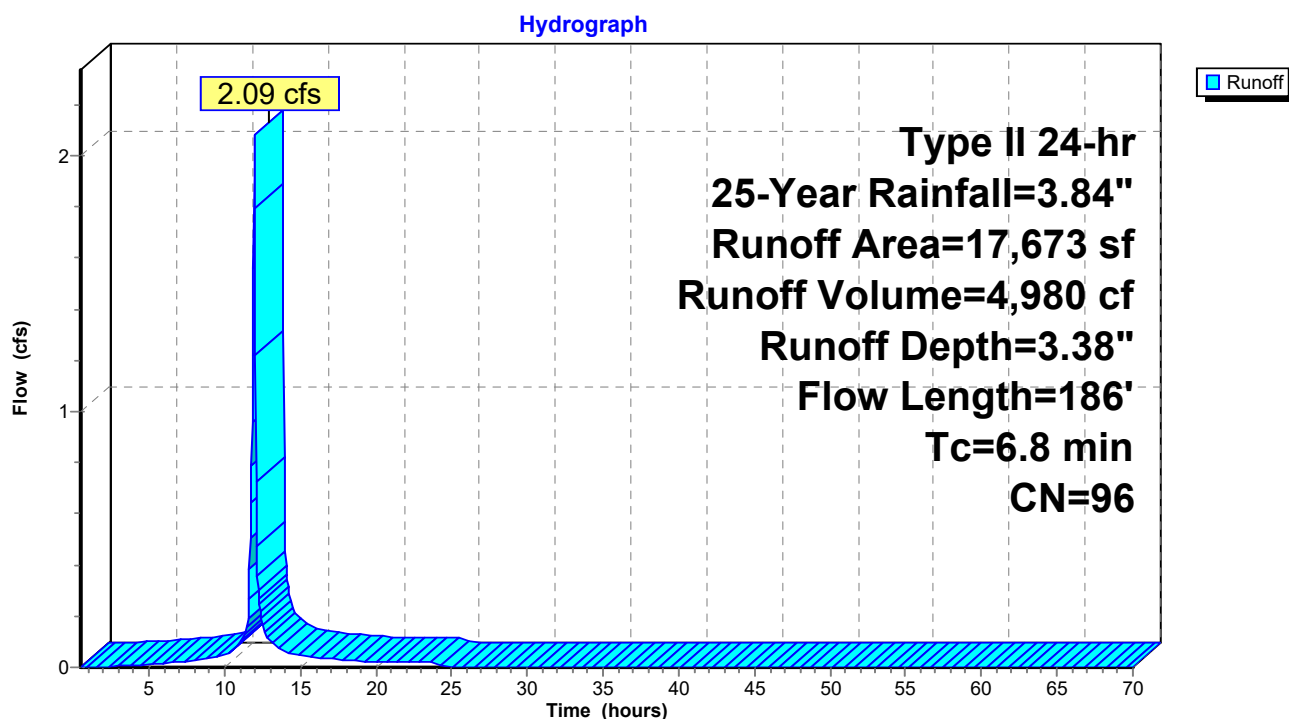
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Type II 24-hr 25-Year Rainfall=3.84"

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Subcatchment 2S: Proposed - to Transit Road sewer



26-4120 storm calcs - Proposed

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Type II 24-hr 25-Year Rainfall=3.84"

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Summary for Subcatchment 3S: Proposed - Direct Offsite

Runoff = 1.01 cfs @ 12.10 hrs, Volume= 3,087 cf, Depth= 2.07"

Routed to Link 1L : Proposed - Total

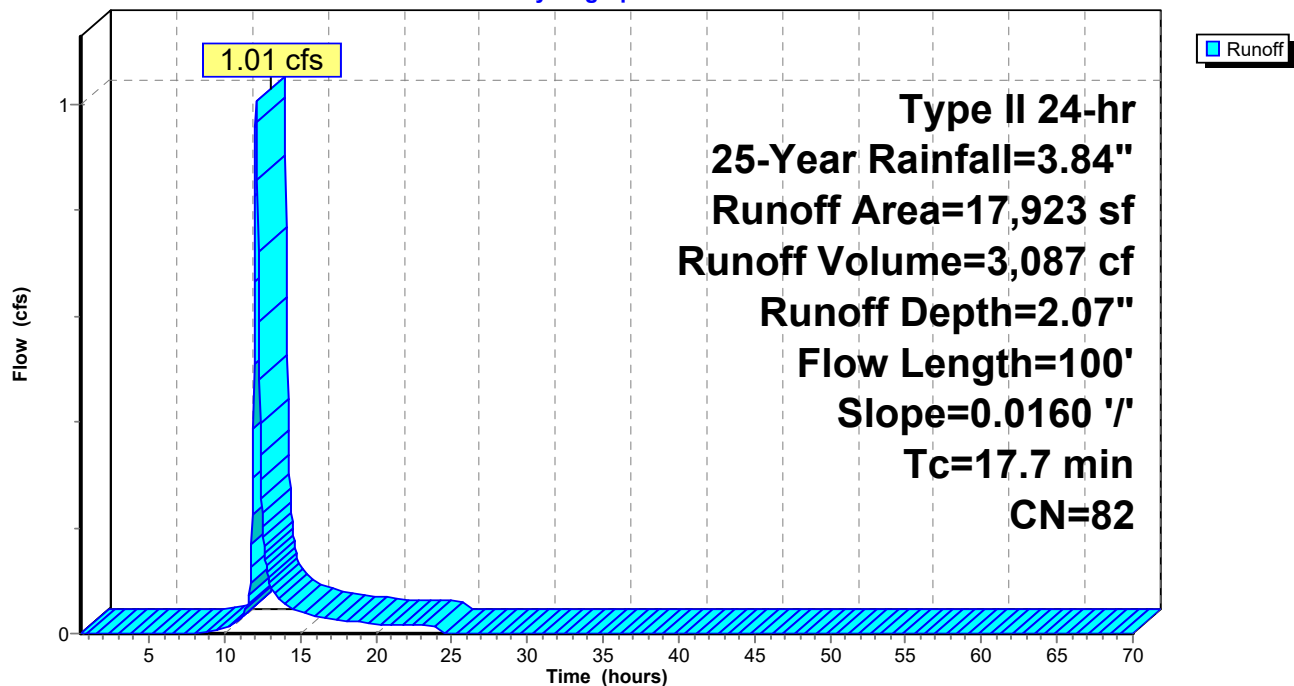
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite

Hydrograph



26-4120 storm calcs - Proposed

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Type II 24-hr 25-Year Rainfall=3.84"

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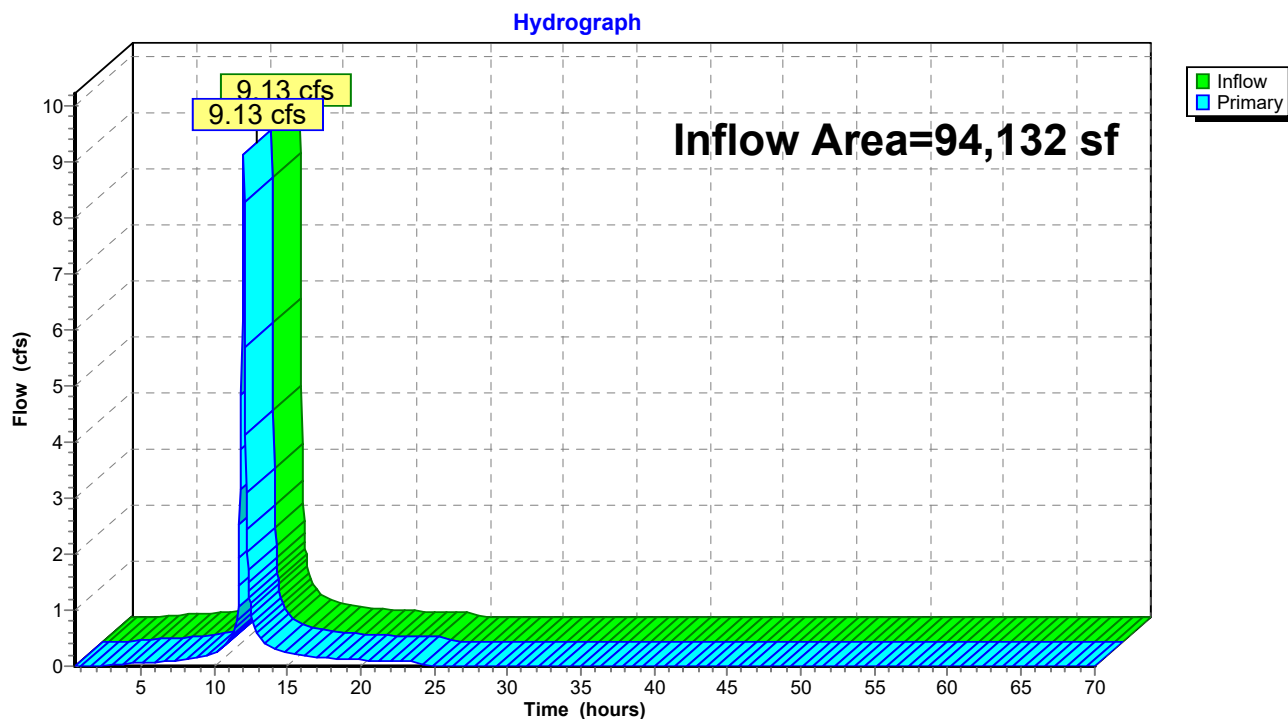
Page 27

Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 3.20" for 25-Year event
Inflow = 9.13 cfs @ 12.00 hrs, Volume= 25,103 cf
Primary = 9.13 cfs @ 12.00 hrs, Volume= 25,103 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



26-4120 storm calcs - Proposed

Type II 24-hr 100-Year Rainfall=5.23"

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Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points

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

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

Subcatchment1S: Proposed - to Freeman Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=4.88"
Flow Length=279' Tc=9.6 min CN=97 Runoff=8.81 cfs 23,787 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=4.76"
Flow Length=186' Tc=6.8 min CN=96 Runoff=2.88 cfs 7,012 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=3.29"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=1.60 cfs 4,907 cf

Link 1L: Proposed - Total

Inflow=12.75 cfs 35,706 cf

Primary=12.75 cfs 35,706 cf

Total Runoff Area = 94,132 sf Runoff Volume = 35,706 cf Average Runoff Depth = 4.55"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

26-4120 storm calcs - Proposed

Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Subcatchment 1S: Proposed - to Freeman

Runoff = 8.81 cfs @ 12.00 hrs, Volume= 23,787 cf, Depth= 4.88"
 Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
 Type II 24-hr 100-Year Rainfall=5.23"

Area (sf)	CN	Description
17,350	98	Roofs, HSG D
38,063	98	Paved parking, HSG D
* 786	98	Concrete, HSG D
2,337	80	>75% Grass cover, Good, HSG D
58,536	97	Weighted Average
2,337		3.99% Pervious Area
56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	34	0.0150	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.9	54	0.0190	1.05		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.3	62	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.2	46	0.0030	3.26	5.75	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.6	279	Total			

26-4120 storm calcs - Proposed

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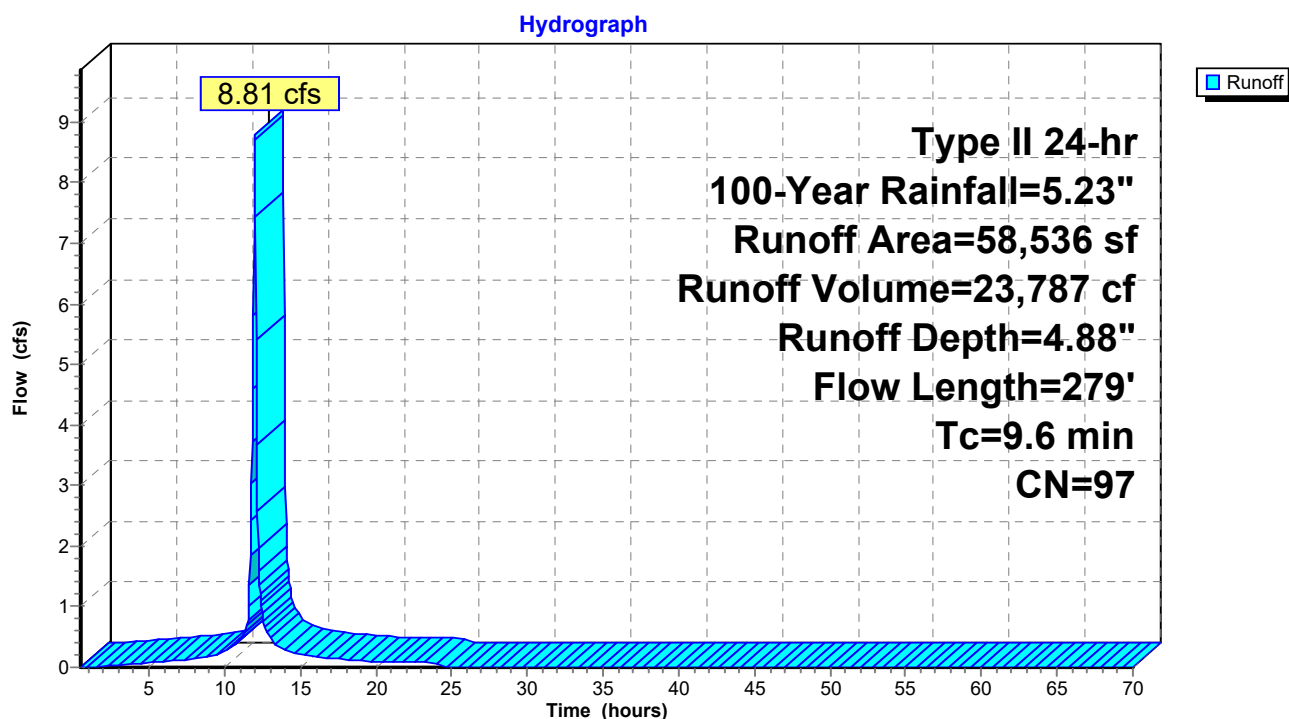
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Type II 24-hr 100-Year Rainfall=5.23"

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Subcatchment 1S: Proposed - to Freeman



26-4120 storm calcs - Proposed

Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Subcatchment 2S: Proposed - to Transit Road sewer

Runoff = 2.88 cfs @ 11.97 hrs, Volume= 7,012 cf, Depth= 4.76"

Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (sf)	CN	Description
15,144	98	Paved parking, HSG D
* 896	98	Concrete sidewalk, HSG D
1,633	80	>75% Grass cover, Good, HSG D
17,673	96	Weighted Average
1,633		9.24% Pervious Area
16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

26-4120 storm calcs - Proposed

Prepared by Carmina Wood Design

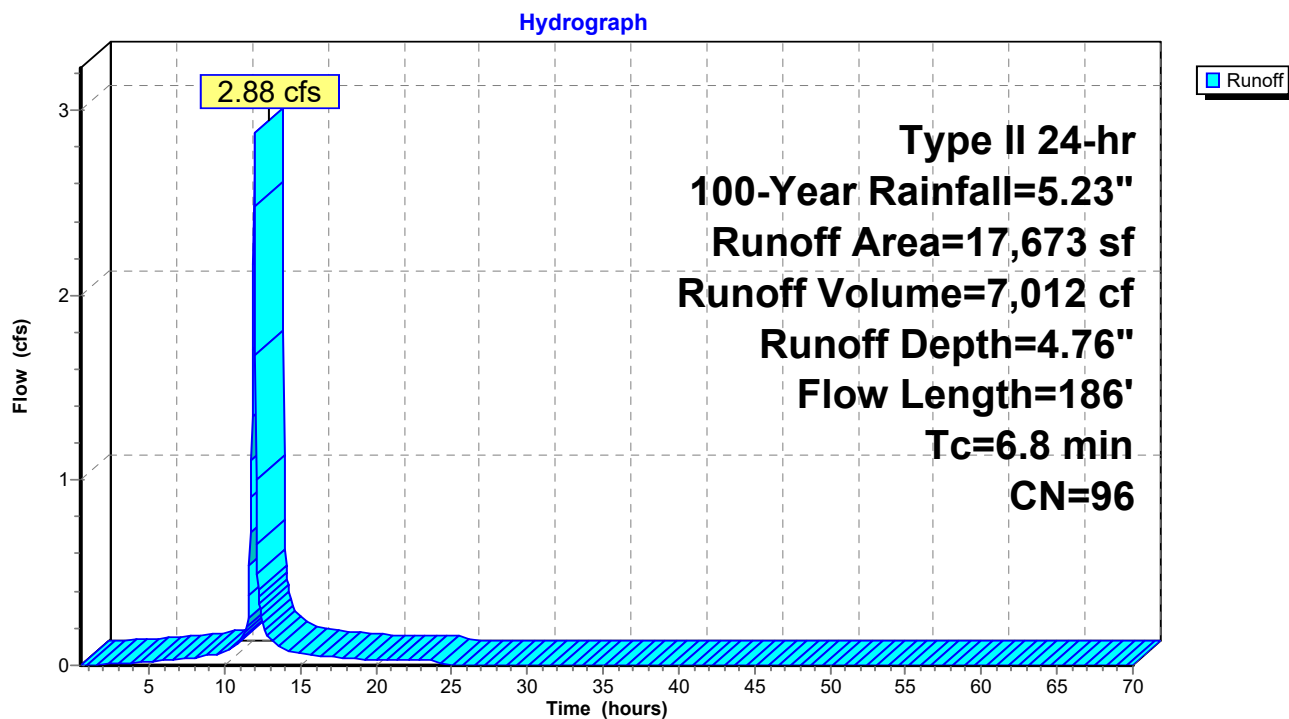
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Type II 24-hr 100-Year Rainfall=5.23"

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Subcatchment 2S: Proposed - to Transit Road sewer



26-4120 storm calcs - Proposed

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Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Subcatchment 3S: Proposed - Direct Offsite

Runoff = 1.60 cfs @ 12.10 hrs, Volume= 4,907 cf, Depth= 3.29"

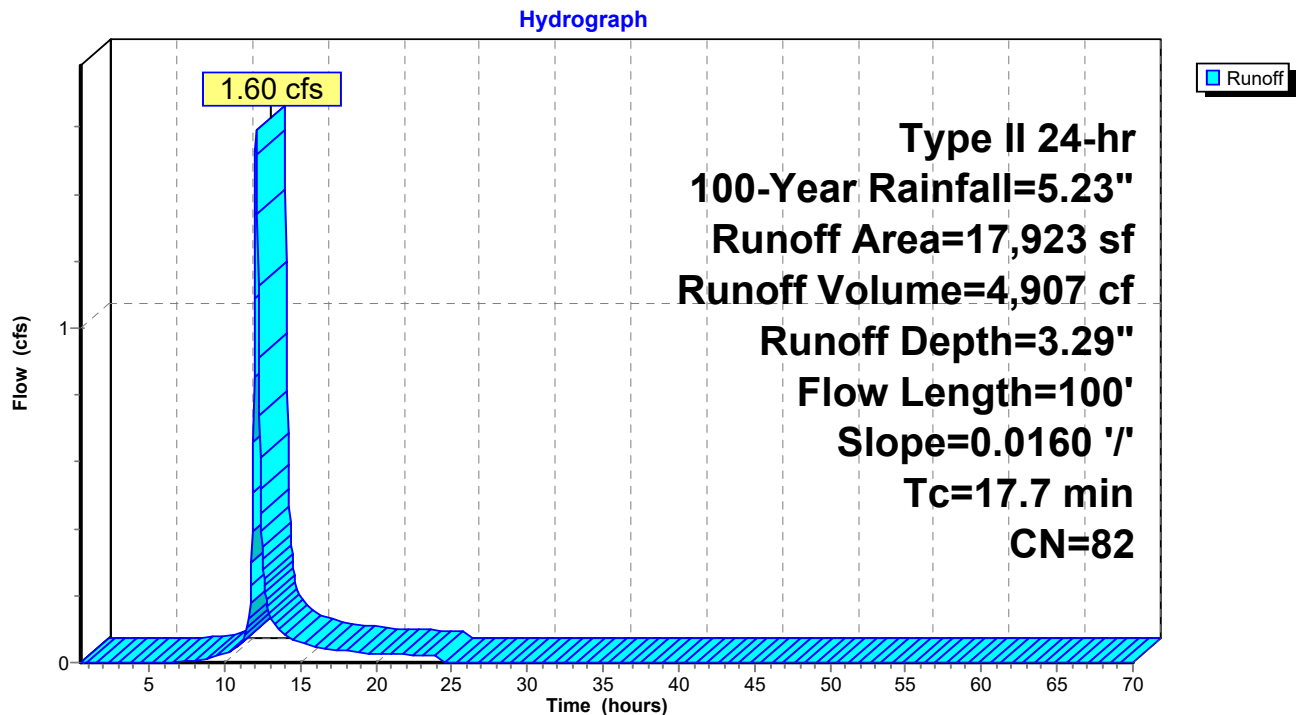
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite



26-4120 storm calcs - Proposed

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Type II 24-hr 100-Year Rainfall=5.23"

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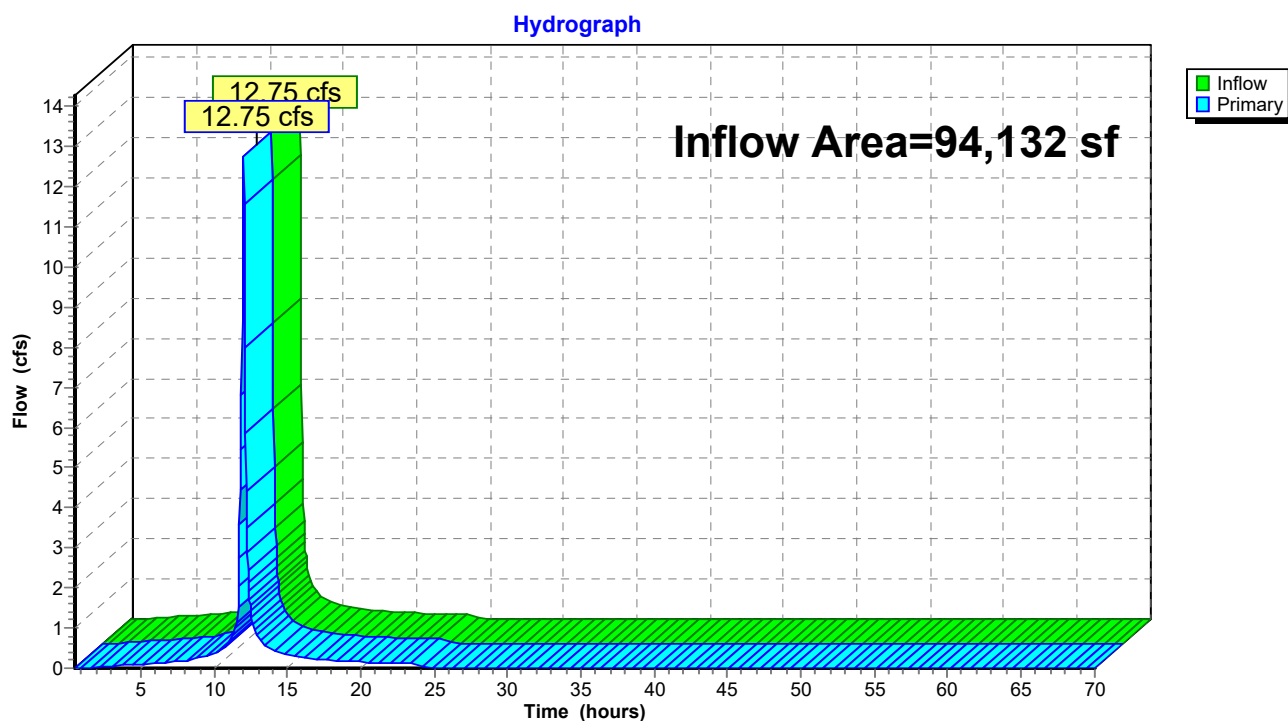
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Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 4.55" for 100-Year event
Inflow = 12.75 cfs @ 12.00 hrs, Volume= 35,706 cf
Primary = 12.75 cfs @ 12.00 hrs, Volume= 35,706 cf, Atten= 0%, Lag= 0.0 min

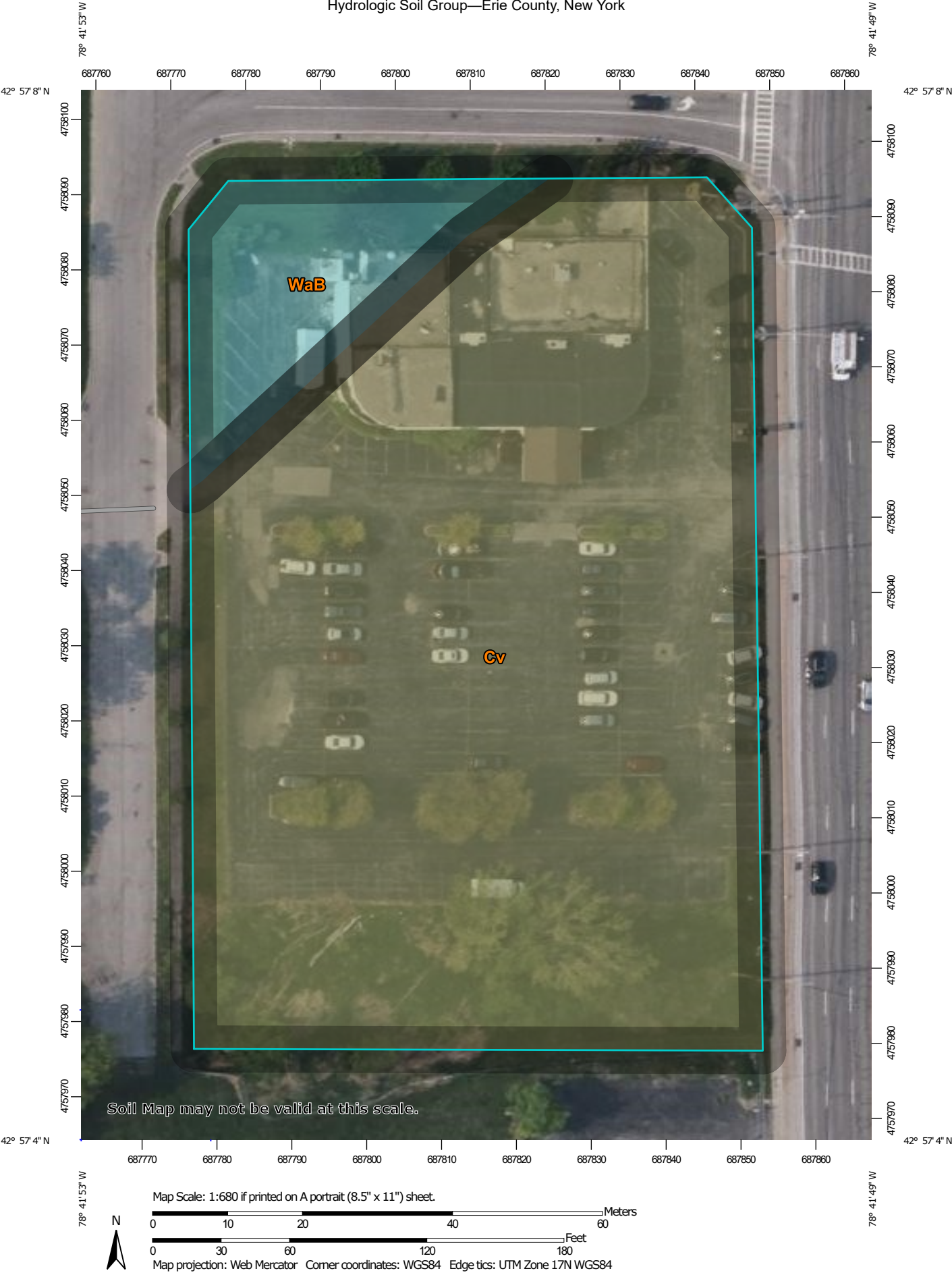
Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



Attachment D
Soil Information

Hydrologic Soil Group—Erie County, New York



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A

 A/D

 B

 B/D

 C

 C/D

 D

 Not rated or not available

Soil Rating Lines

 A

 A/D

 B

 B/D

 C

 C/D

 D

 Not rated or not available

Soil Rating Points

 A

 A/D

 B

 B/D

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

 C

 C/D

 D

 Not rated or not available

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: [Web Soil Survey](#)

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Erie County, New York

Survey Area Data: Version 25, Sep 4, 2025

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

Date(s) aerial images were photographed: May 13, 2023—May 27, 2023

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Cv	Cosad loamy fine sand	C/D	1.9	89.3%
WaB	Wassaic silt loam, 3 to 8 percent slopes	C	0.2	10.7%
Totals for Area of Interest			2.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher