

HYDROLOGY REPORT

Ocean Breezes Condominium

294 Huttleston Avenue

Fairhaven, MA

May 6, 2019

Prepared By:

Carl H. Bevilacqua, PE

AVT ASSOCIATES

Civil Engineers & Surveyors

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508-992-0015

Ocean Breezes Condominium
294 Huttleston Avenue
Fairhaven, MA

DESCRIPTION:

The area to be developed is vacant land, which was previously the location of a restaurant. The foundation of the restaurant and its paved parking lot still remain. The remainder of the property is sparsely vegetated. The soil onsite is classified by NRCS as *242B, Hinckley Sandy Loam, 3% - 8% slopes*. The grading is relatively flat, draining mostly to the north (watershed W1), with a small portion (watershed W2) draining southeast to Huttleston Avenue. A portion of the land to the west drains onto this property, and is included in this analysis. A portion of the property to the east is also included, to be able to capture all of the runoff from the property. The existing impervious area (paving and building foundation) on the property is 14,965 SF. The proposed impervious area on the lot will be 9,192 SF, or a reduction of 5,773 SF. All other areas will be maintained lawn. The proposed grading plan captures most of the runoff from the site, eliminating the existing runoff from the property on to Huttleston Avenue. This is a precondition to obtaining a driveway permit from the State. There will be no use of fertilizers or pesticides allowed on site (Zone NRB).

HYDROLOGY:

The watershed areas were analyzed for the 2 year, 10 year, 25 year, and 100 year 24 hour storms, using HydroCad Release 10 software. All storms show a significant decrease in peak rates and runoff volumes from pre-development to post-development conditions. This is due to the decrease in the impervious area, and also the proposed upgrade in the condition of open areas from sparse vegetation to maintained lawn.

The building roof runoff will be connected to rechargers. No credit was taken for this runoff in the analysis. Although the project is not subject to Stormwater Management, it is anticipated that the water quality of the runoff will be improved, due the large decrease in impervious area, and the fact that most of the runoff, (Watershed W1), will be traveling over maintained lawn areas before exiting the site, and distributed over a 170' width.

SUMMARY:

2 yr, 24 hr storm

<u>Pre-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 1.20 cfs	V = 3,771 cf
<u>W1</u>	Q = 0.84 cfs	V = 2,798 cf	<u>W2</u> Q = 0.36 cfs V = 973 cf
<u>Post-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 0.19 cfs	V = 1,088 cf
<u>W1</u>	Q = 0.05 cfs	V = 734 cf	<u>W2</u> Q = 0.14 cfs V = 354 cf

10 yr, 24 hr storm

<u>Pre-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 2.51 cfs	V = 7,696 cf
<u>W1</u>	Q = 1.90 cfs	V = 6,018 cf	<u>W2</u> Q = 0.61 cfs V = 1,678 cf
<u>Post-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 0.80 cfs	V = 3,250 cf
<u>W1</u>	Q = 0.57 cfs	V = 2,639 cf	<u>W2</u> Q = 0.23 cfs V = 611 cf

25 yr, 24 hr storm

<u>Pre-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 3.61 cfs	V = 11,090 cf
<u>W1</u>	Q = 2.81 cfs	V = 8,850 cf	<u>W2</u> Q = 0.80 cfs V = 2,240 cf
<u>Post-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 1.48 cfs	V = 5,460 cf
<u>W1</u>	Q = 1.18 cfs	V = 4,645 cf	<u>W2</u> Q = 0.30 cfs V = 815 cf

100 yr, 24 hr storm

<u>Pre-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 5.95 cfs	V = 18,455 cf
<u>W1</u>	Q = 4.76 cfs	V = 15,057 cf	<u>W2</u> Q = 1.19 cfs V = 3,398 cf
<u>Post-development:</u>	(Total <u>W1</u> + <u>W2</u>)	Q = 3.14 cfs	V = 10,871 cf
<u>W1</u>	Q = 2.70 cfs	V = 9,634 cf	<u>W2</u> Q = 0.44 cfs V = 1,237 cf

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Page 1

Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: PRE W1

Runoff Area=35,643 sf 37.55% Impervious Runoff Depth=0.94"
Flow Length=260' Slope=0.0319 '/' Tc=7.9 min CN=71 Runoff=0.84 cfs 2,789 cf

Subcatchment 3S: PRE W2

Runoff Area=5,828 sf 80.10% Impervious Runoff Depth=2.00"
Flow Length=176' Slope=0.0389 '/' Tc=3.2 min CN=87 Runoff=0.36 cfs 973 cf

Total Runoff Area = 41,471 sf Runoff Volume = 3,762 cf Average Runoff Depth = 1.09"
56.47% Pervious = 23,419 sf 43.53% Impervious = 18,052 sf

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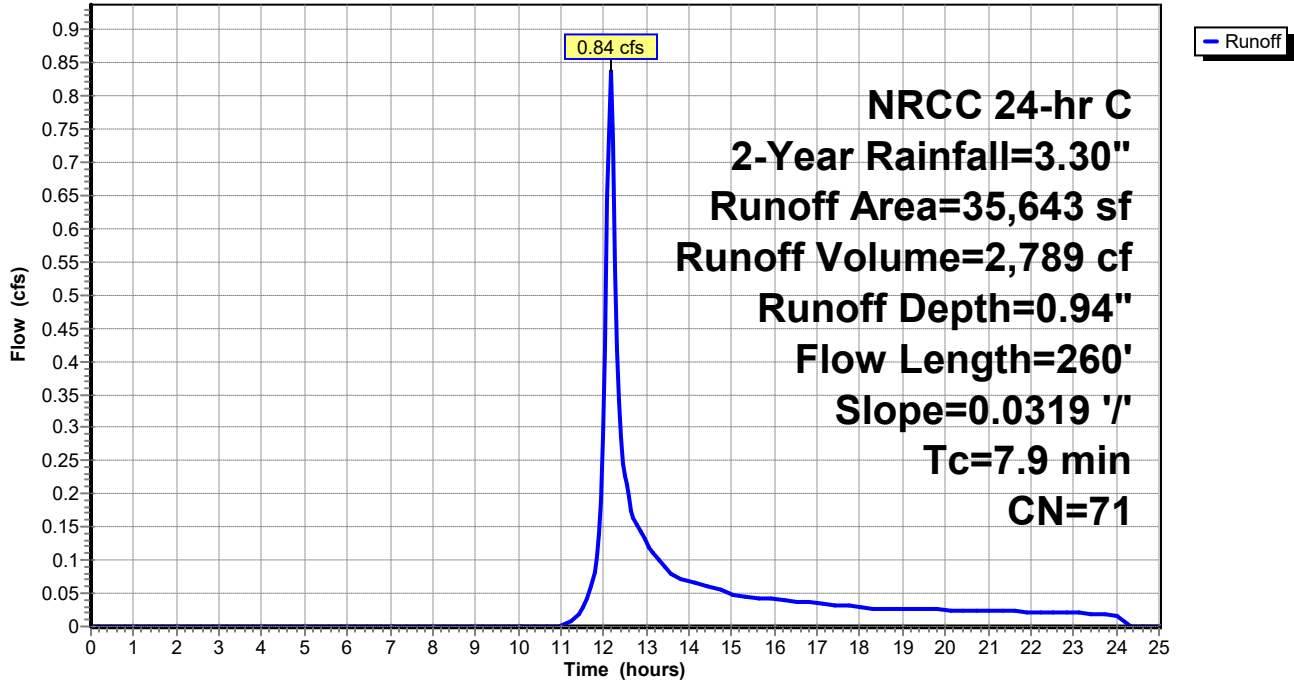
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Subcatchment 1S: PRE W1

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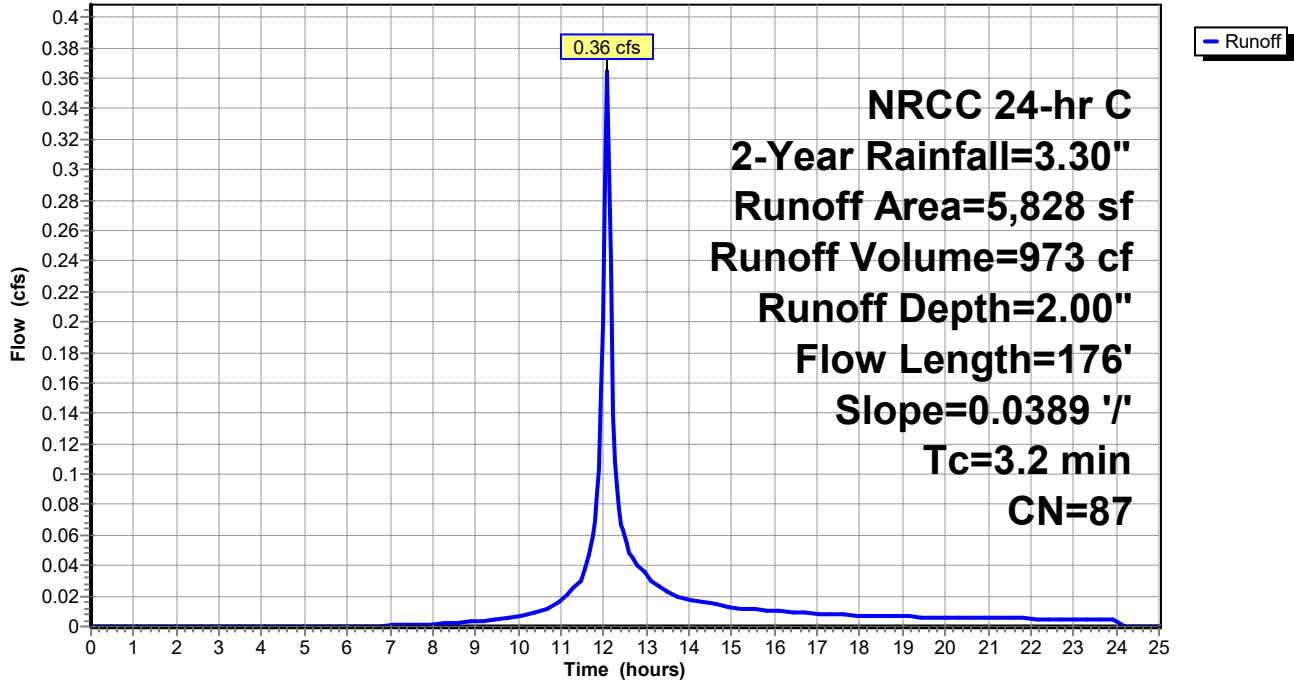
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Subcatchment 3S: PRE W2

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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: PRE W1

Runoff Area=35,643 sf 37.55% Impervious Runoff Depth=2.03"
Flow Length=260' Slope=0.0319 '/' Tc=7.9 min CN=71 Runoff=1.90 cfs 6,018 cf

Subcatchment 3S: PRE W2

Runoff Area=5,828 sf 80.10% Impervious Runoff Depth=3.45"
Flow Length=176' Slope=0.0389 '/' Tc=3.2 min CN=87 Runoff=0.61 cfs 1,678 cf

Total Runoff Area = 41,471 sf Runoff Volume = 7,696 cf Average Runoff Depth = 2.23"
56.47% Pervious = 23,419 sf 43.53% Impervious = 18,052 sf

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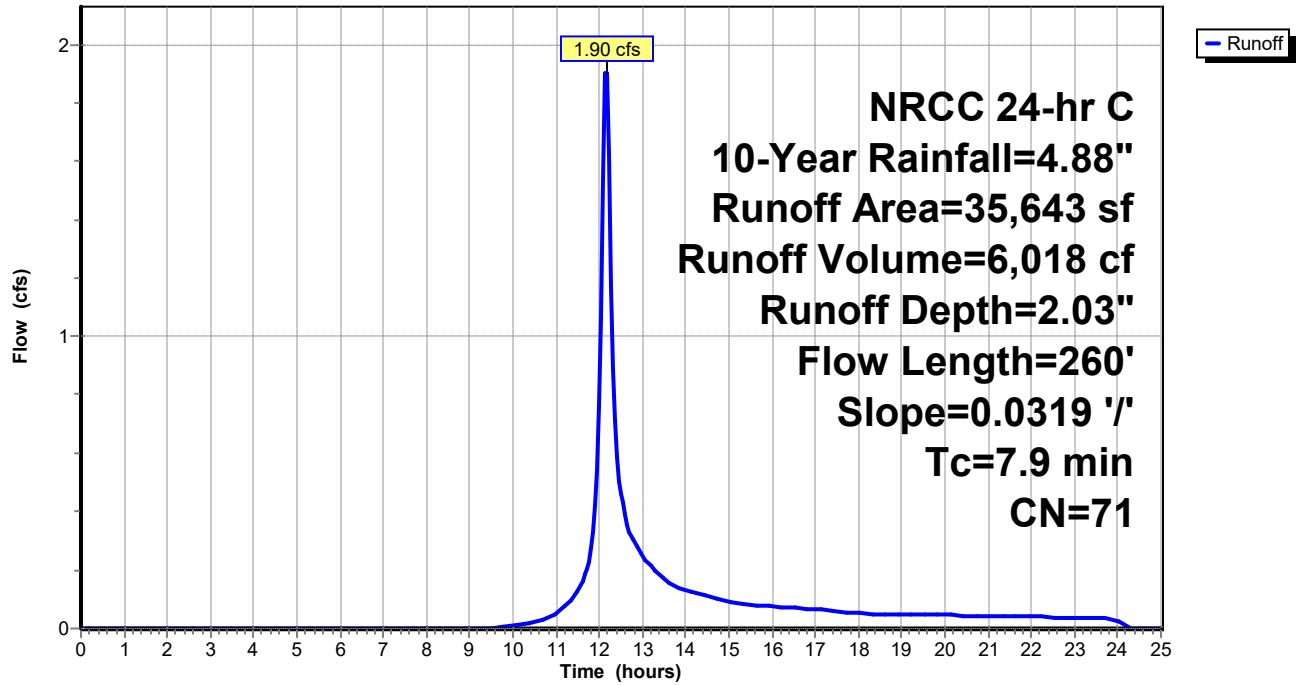
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Subcatchment 1S: PRE W1

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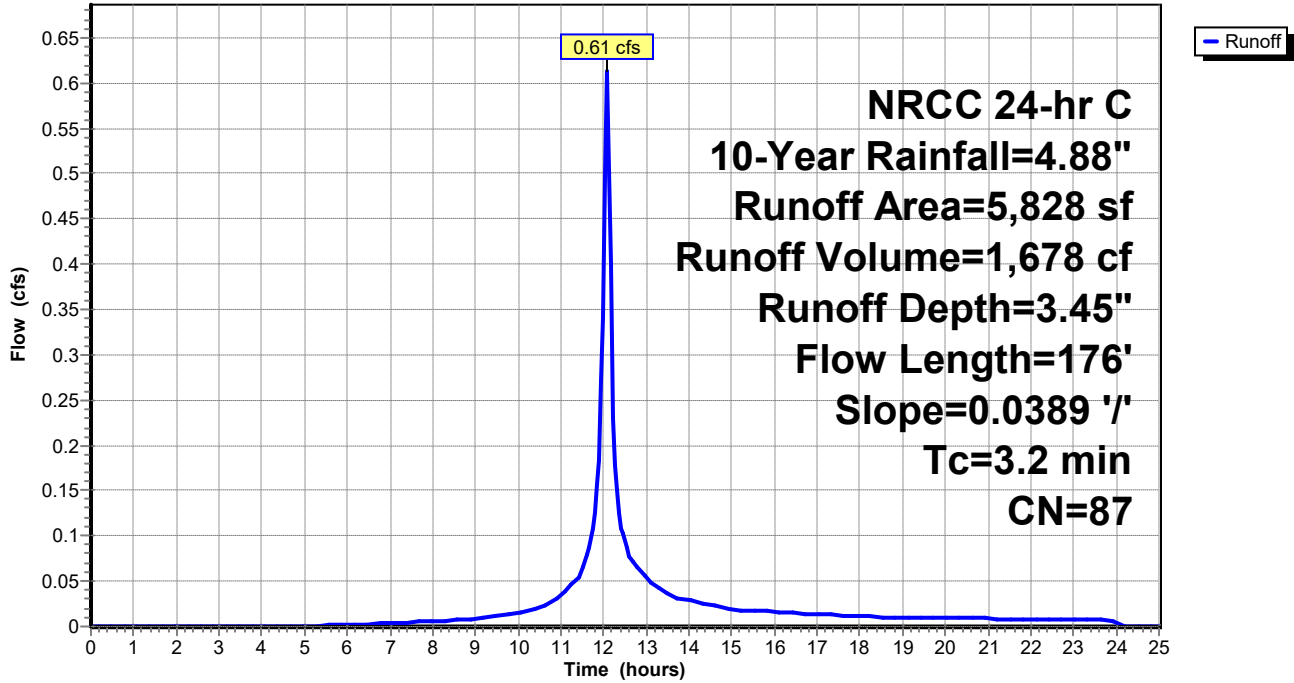
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Subcatchment 3S: PRE W2

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: PRE W1

Runoff Area=35,643 sf 37.55% Impervious Runoff Depth=2.98"
Flow Length=260' Slope=0.0319 '/' Tc=7.9 min CN=71 Runoff=2.81 cfs 8,850 cf

Subcatchment 3S: PRE W2

Runoff Area=5,828 sf 80.10% Impervious Runoff Depth=4.61"
Flow Length=176' Slope=0.0389 '/' Tc=3.2 min CN=87 Runoff=0.80 cfs 2,240 cf

Total Runoff Area = 41,471 sf Runoff Volume = 11,090 cf Average Runoff Depth = 3.21"
56.47% Pervious = 23,419 sf 43.53% Impervious = 18,052 sf

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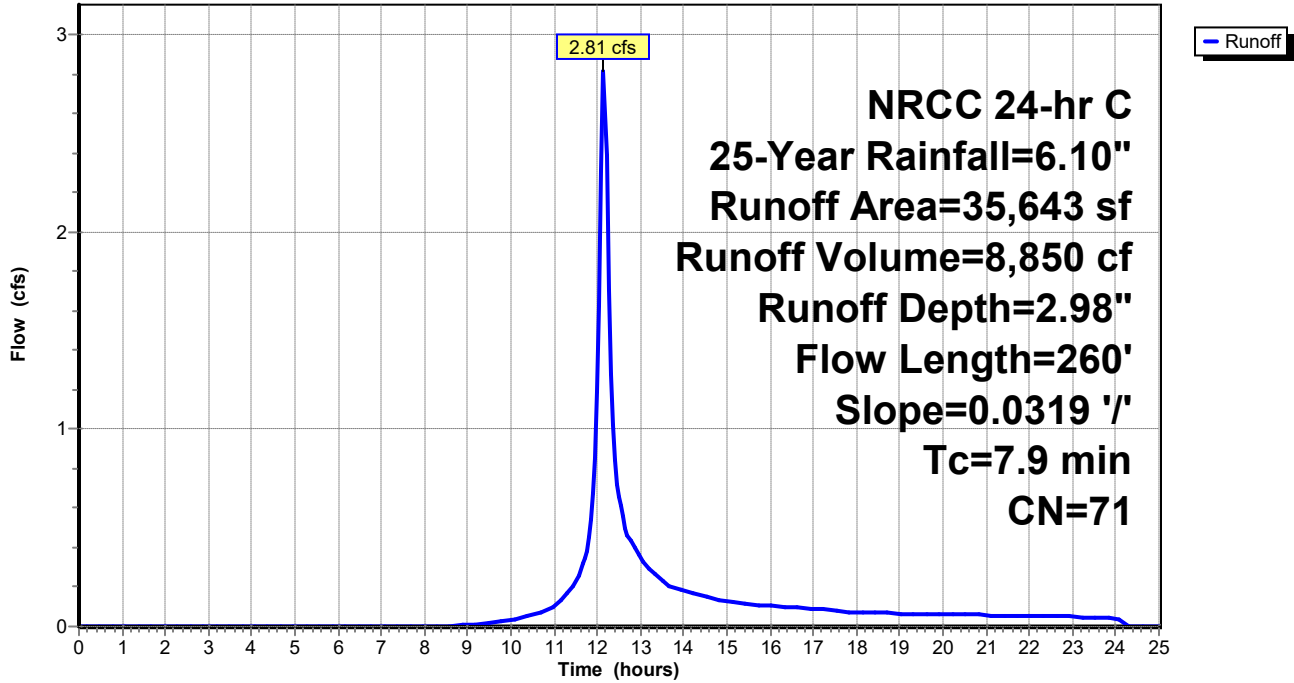
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Subcatchment 1S: PRE W1

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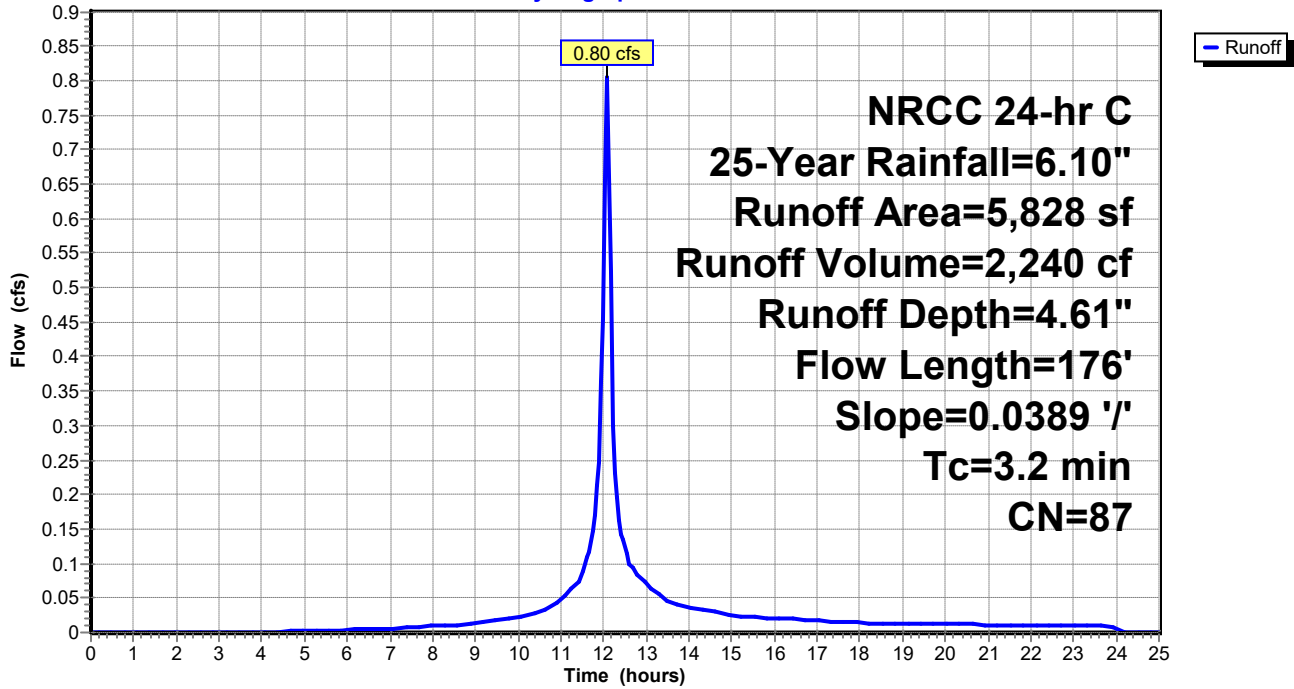
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Subcatchment 3S: PRE W2

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: PRE W1

Runoff Area=35,643 sf 37.55% Impervious Runoff Depth=5.07"
Flow Length=260' Slope=0.0319 '/' Tc=7.9 min CN=71 Runoff=4.76 cfs 15,057 cf

Subcatchment 3S: PRE W2

Runoff Area=5,828 sf 80.10% Impervious Runoff Depth=7.00"
Flow Length=176' Slope=0.0389 '/' Tc=3.2 min CN=87 Runoff=1.19 cfs 3,398 cf

Total Runoff Area = 41,471 sf Runoff Volume = 18,454 cf Average Runoff Depth = 5.34"
56.47% Pervious = 23,419 sf 43.53% Impervious = 18,052 sf

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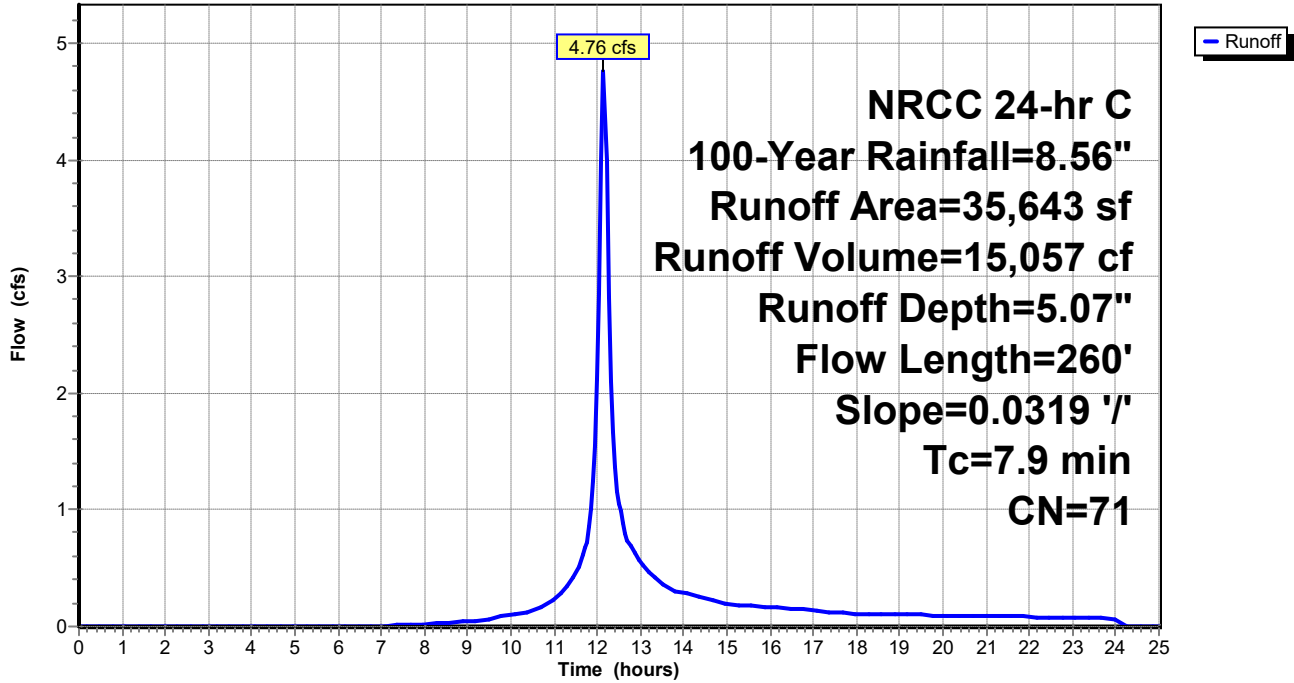
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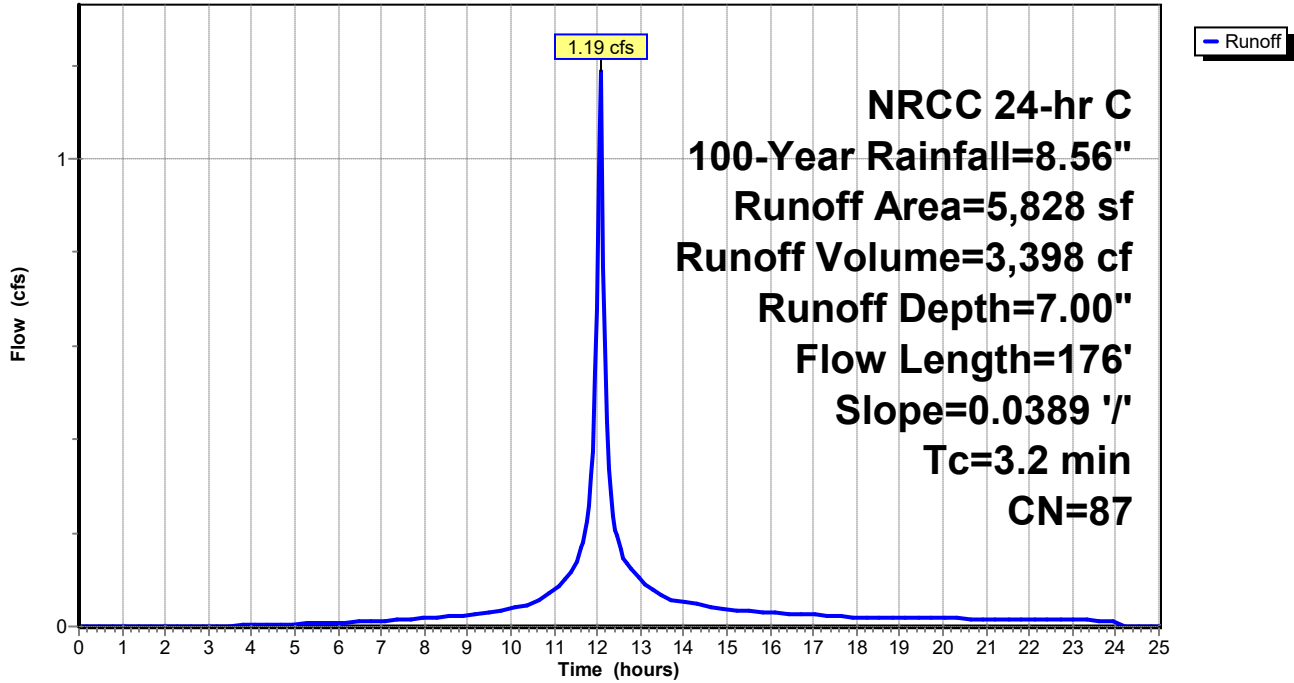
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Subcatchment 3S: PRE W2

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Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 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 1S: POST W1

Runoff Area=39,296 sf 24.43% Impervious Runoff Depth=0.22"
Flow Length=284' Slope=0.0492 '/' Tc=10.8 min CN=53 Runoff=0.05 cfs 734 cf

Subcatchment 3S: POST W2

Runoff Area=2,121 sf 81.09% Impervious Runoff Depth=2.00"
Flow Length=176' Slope=0.0754 '/' Tc=2.3 min CN=87 Runoff=0.14 cfs 354 cf

Total Runoff Area = 41,417 sf Runoff Volume = 1,088 cf Average Runoff Depth = 0.32"
72.67% Pervious = 30,098 sf 27.33% Impervious = 11,319 sf

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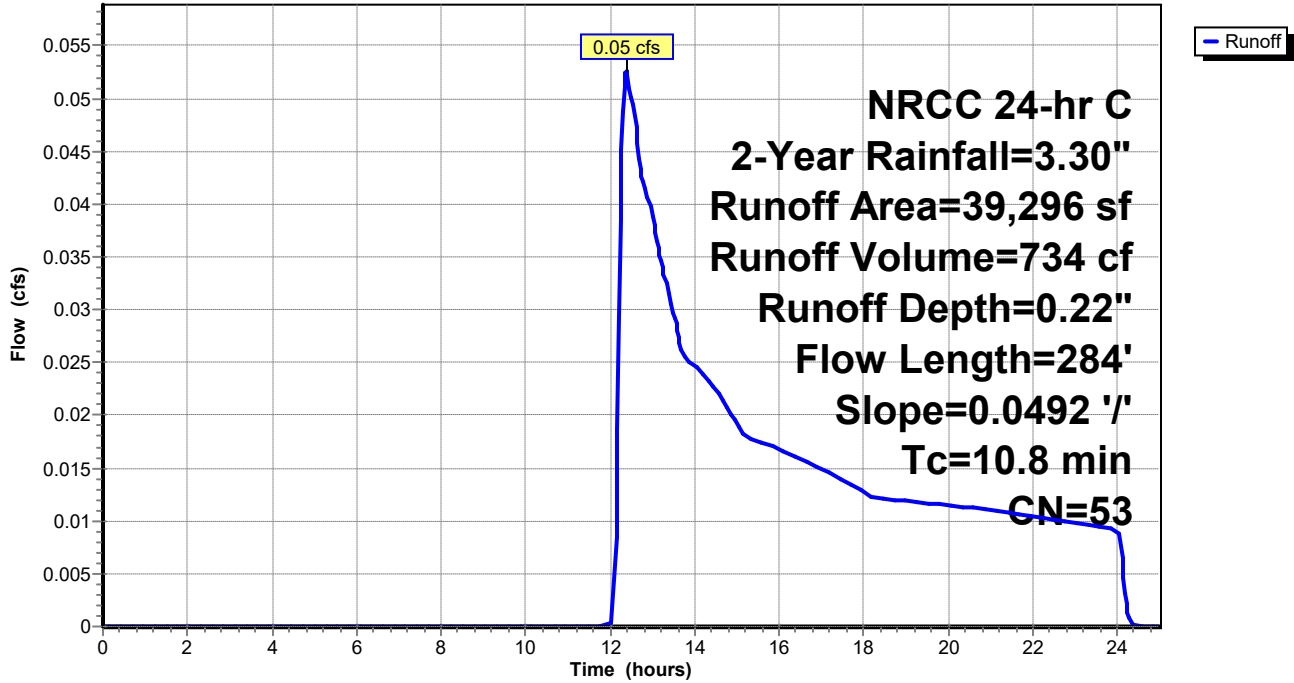
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Subcatchment 1S: POST W1

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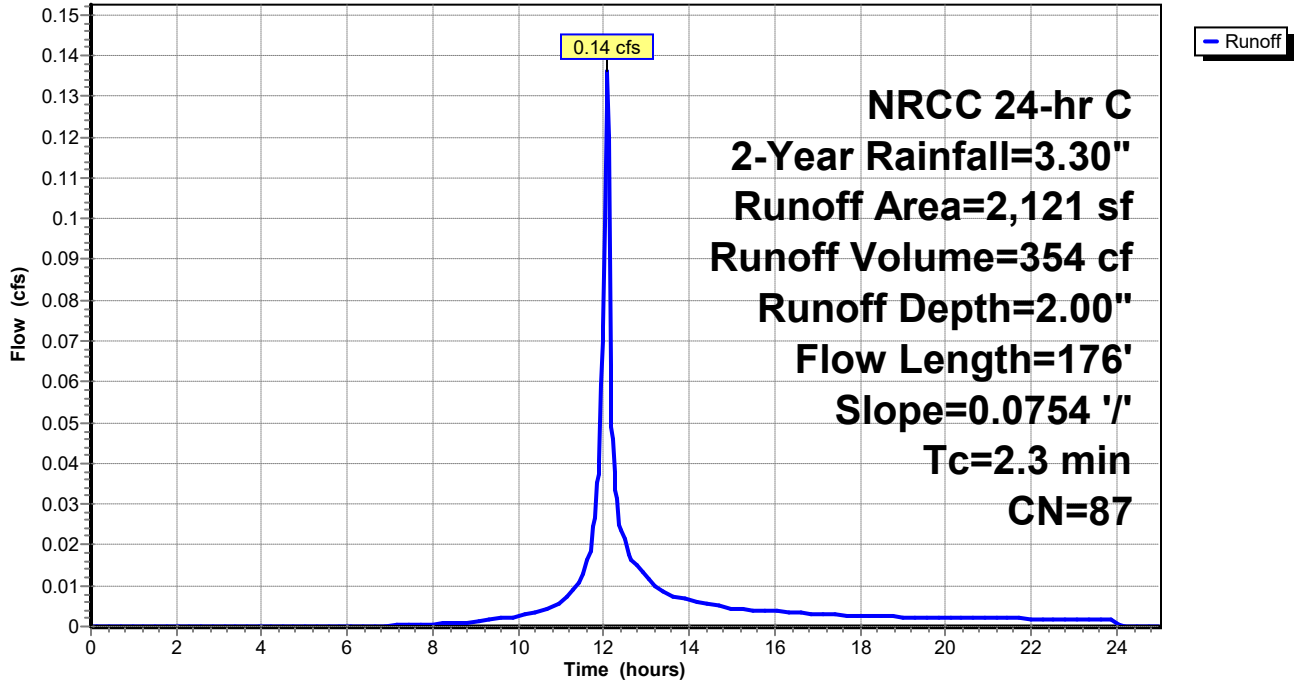
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Subcatchment 3S: POST W2

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Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 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 1S: POST W1

Runoff Area=39,296 sf 24.43% Impervious Runoff Depth=0.81"
Flow Length=284' Slope=0.0492 '/' Tc=10.8 min CN=53 Runoff=0.57 cfs 2,639 cf

Subcatchment 3S: POST W2

Runoff Area=2,121 sf 81.09% Impervious Runoff Depth=3.45"
Flow Length=176' Slope=0.0754 '/' Tc=2.3 min CN=87 Runoff=0.23 cfs 611 cf

Total Runoff Area = 41,417 sf Runoff Volume = 3,250 cf Average Runoff Depth = 0.94"
72.67% Pervious = 30,098 sf 27.33% Impervious = 11,319 sf

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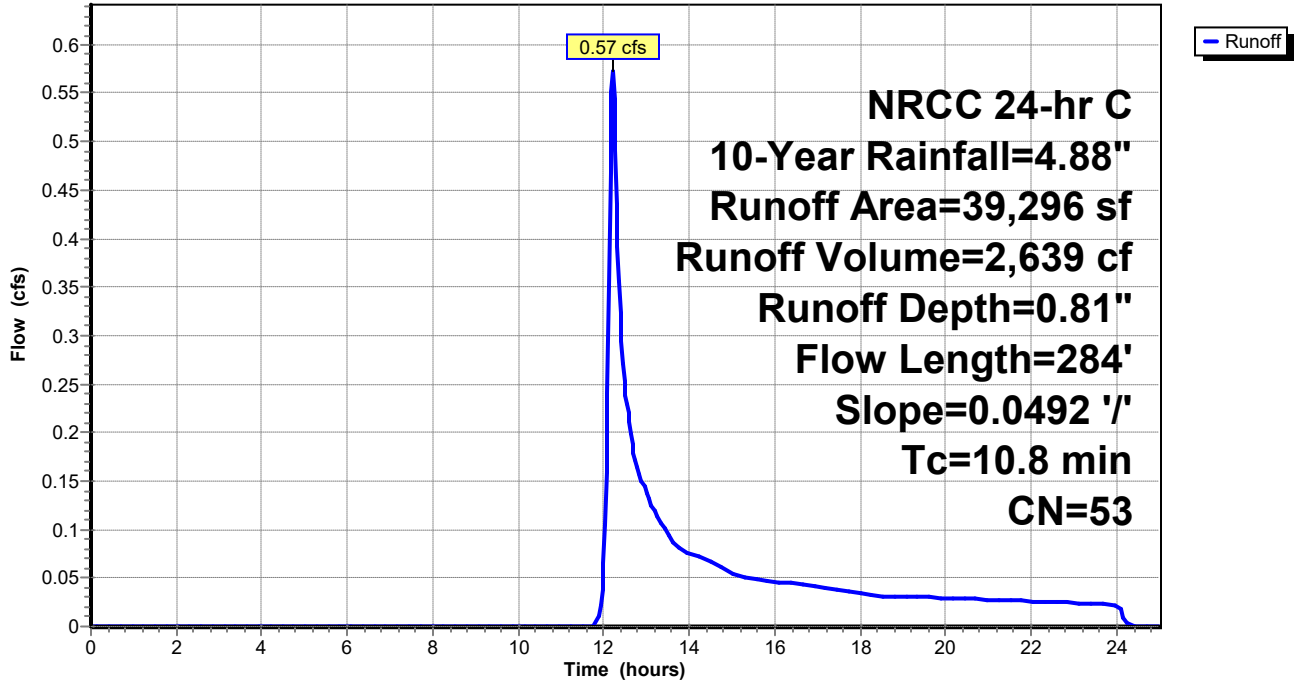
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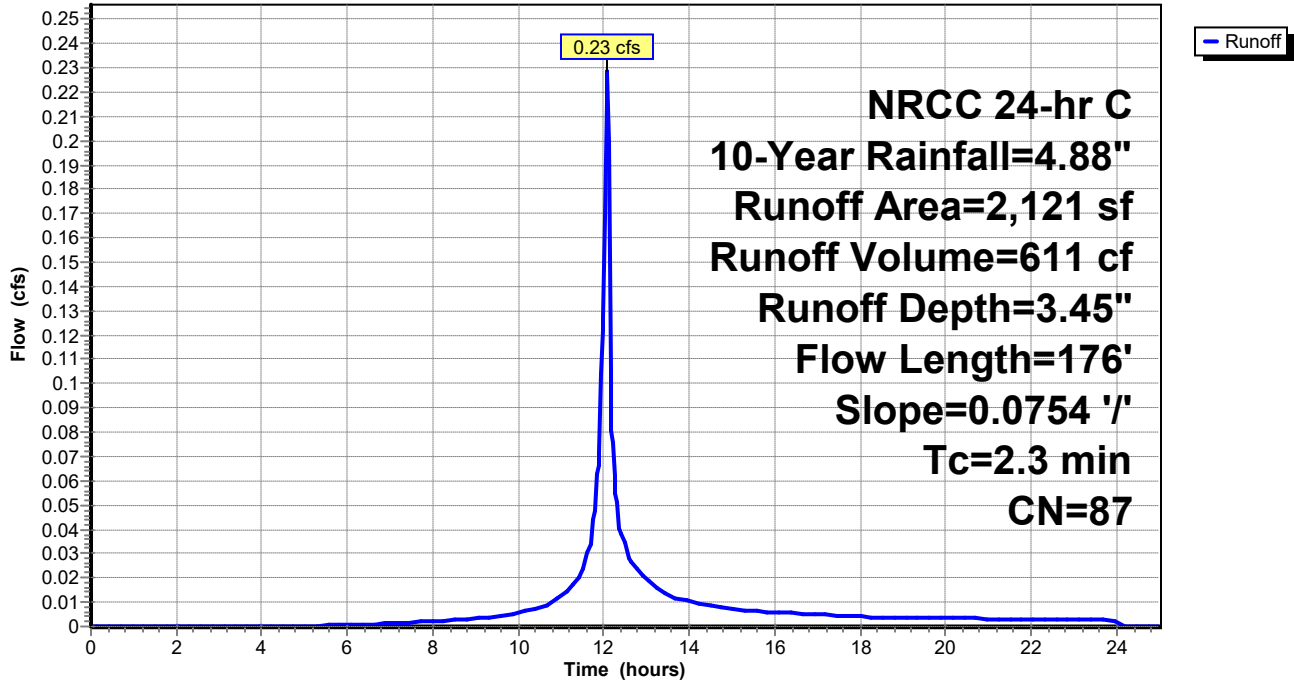
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Subcatchment 3S: POST W2

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Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 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 1S: POST W1

Runoff Area=39,296 sf 24.43% Impervious Runoff Depth=1.42"
Flow Length=284' Slope=0.0492 '/' Tc=10.8 min CN=53 Runoff=1.18 cfs 4,646 cf

Subcatchment 3S: POST W2

Runoff Area=2,121 sf 81.09% Impervious Runoff Depth=4.61"
Flow Length=176' Slope=0.0754 '/' Tc=2.3 min CN=87 Runoff=0.30 cfs 815 cf

Total Runoff Area = 41,417 sf Runoff Volume = 5,461 cf Average Runoff Depth = 1.58"
72.67% Pervious = 30,098 sf 27.33% Impervious = 11,319 sf

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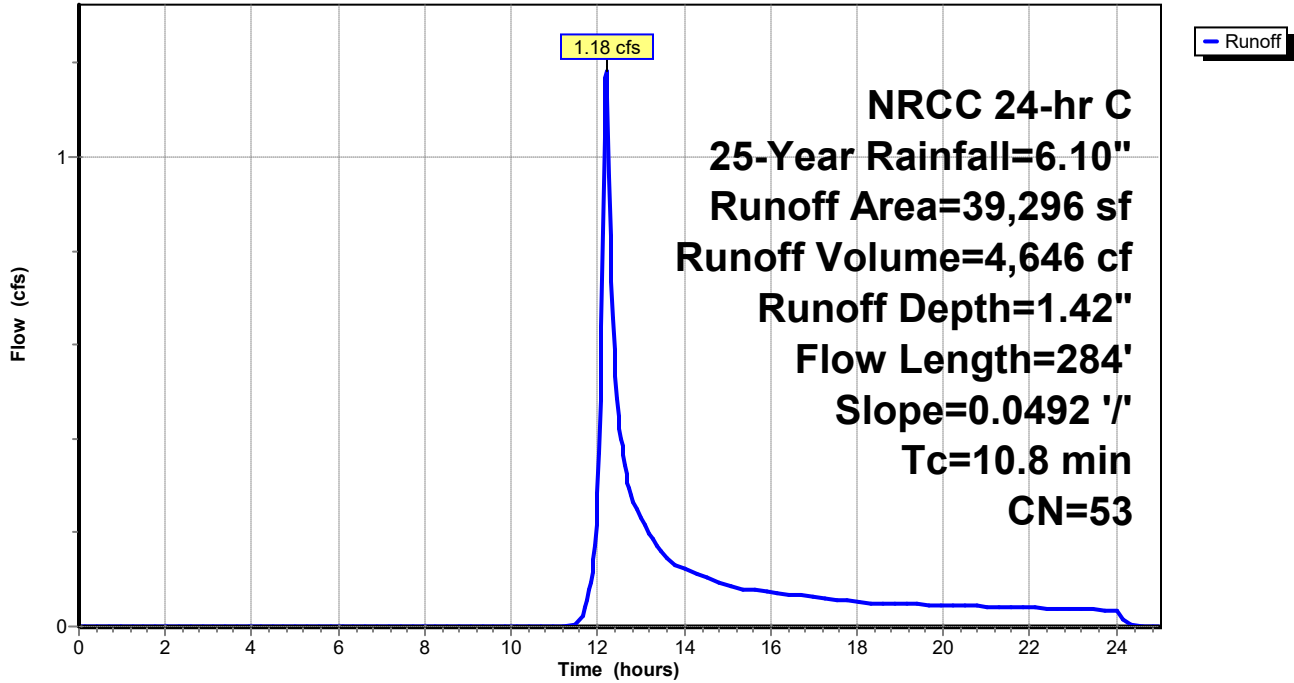
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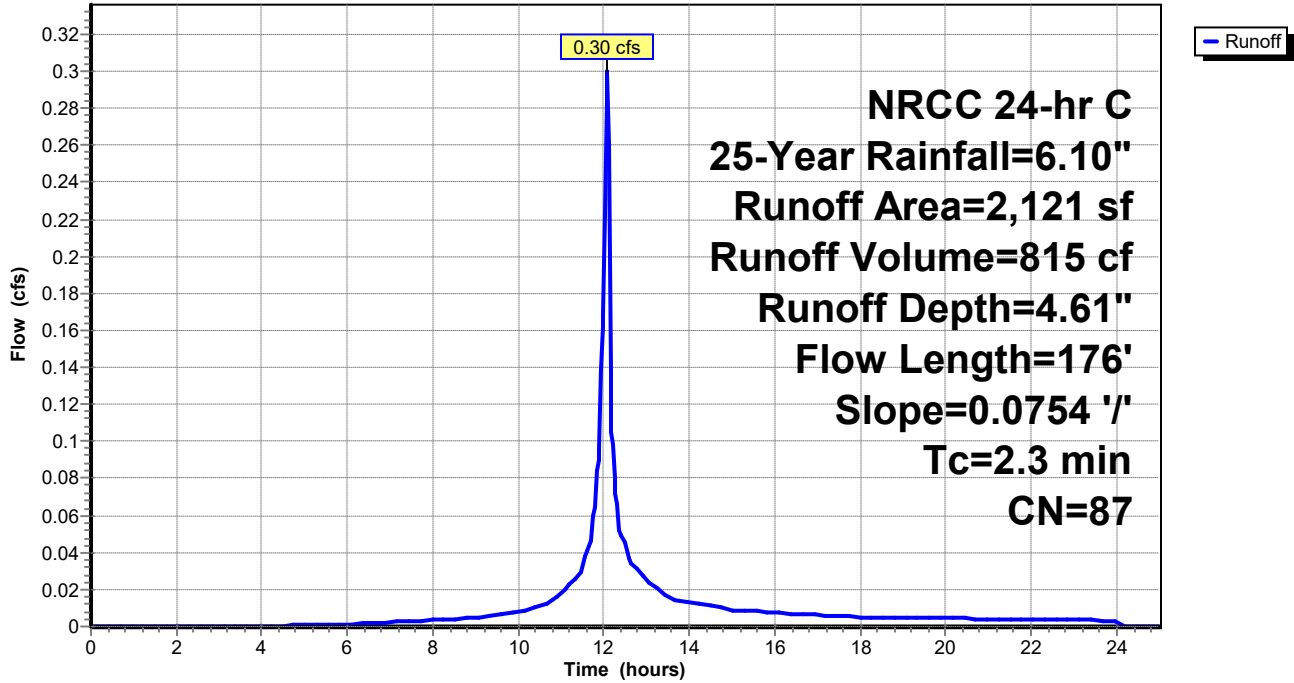
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Subcatchment 3S: POST W2

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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: POST W1

Runoff Area=39,296 sf 24.43% Impervious Runoff Depth=2.94"
Flow Length=284' Slope=0.0492 '/' Tc=10.8 min CN=53 Runoff=2.70 cfs 9,634 cf

Subcatchment 3S: POST W2

Runoff Area=2,121 sf 81.09% Impervious Runoff Depth=7.00"
Flow Length=176' Slope=0.0754 '/' Tc=2.3 min CN=87 Runoff=0.44 cfs 1,237 cf

Total Runoff Area = 41,417 sf Runoff Volume = 10,871 cf Average Runoff Depth = 3.15"
72.67% Pervious = 30,098 sf 27.33% Impervious = 11,319 sf

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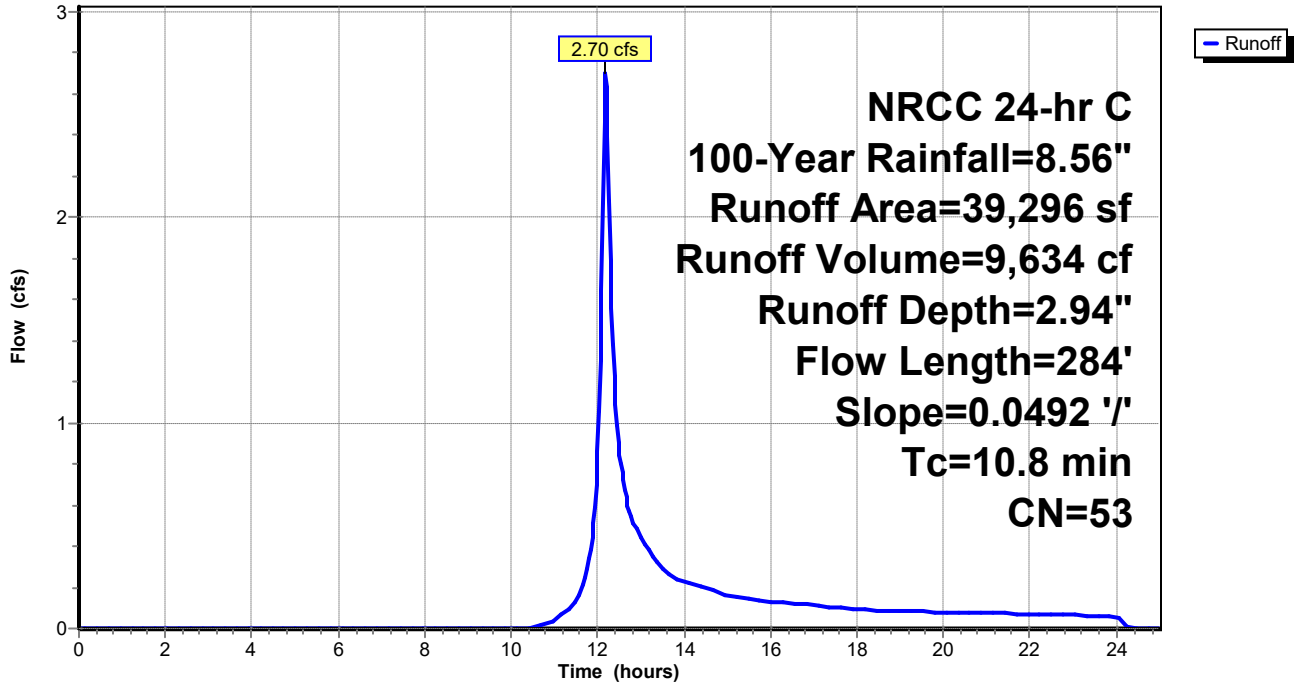
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Subcatchment 1S: POST W1

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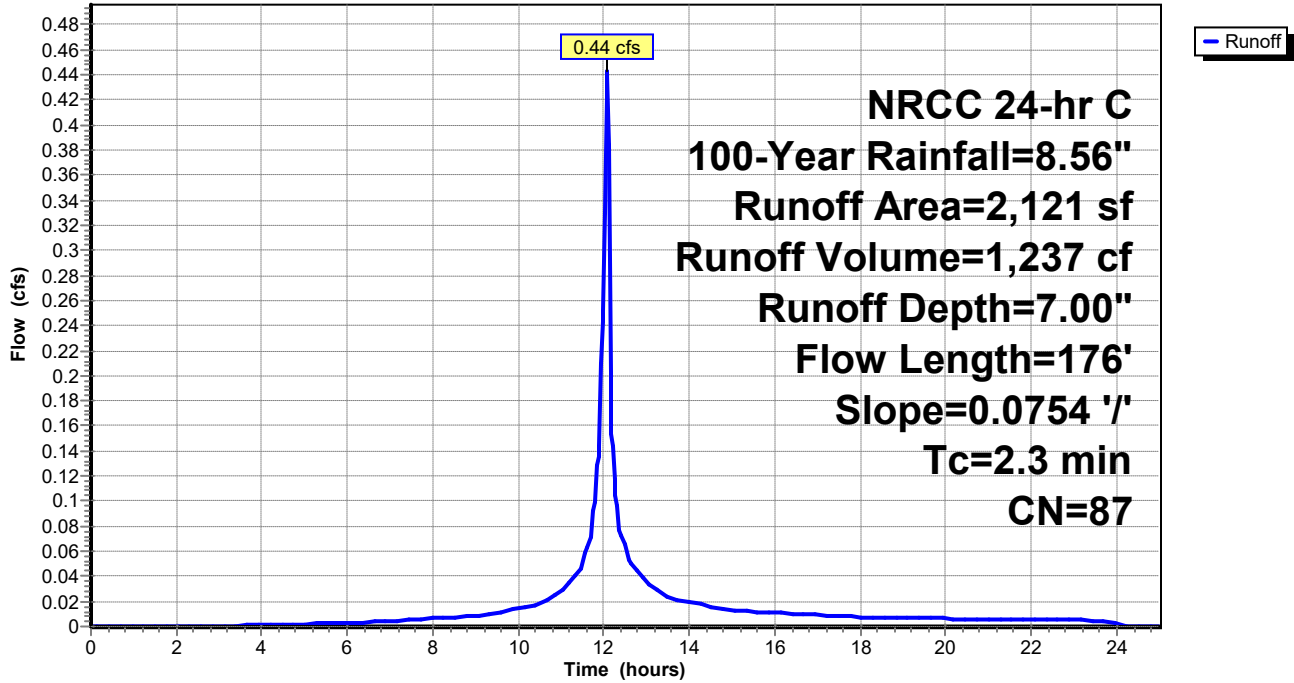
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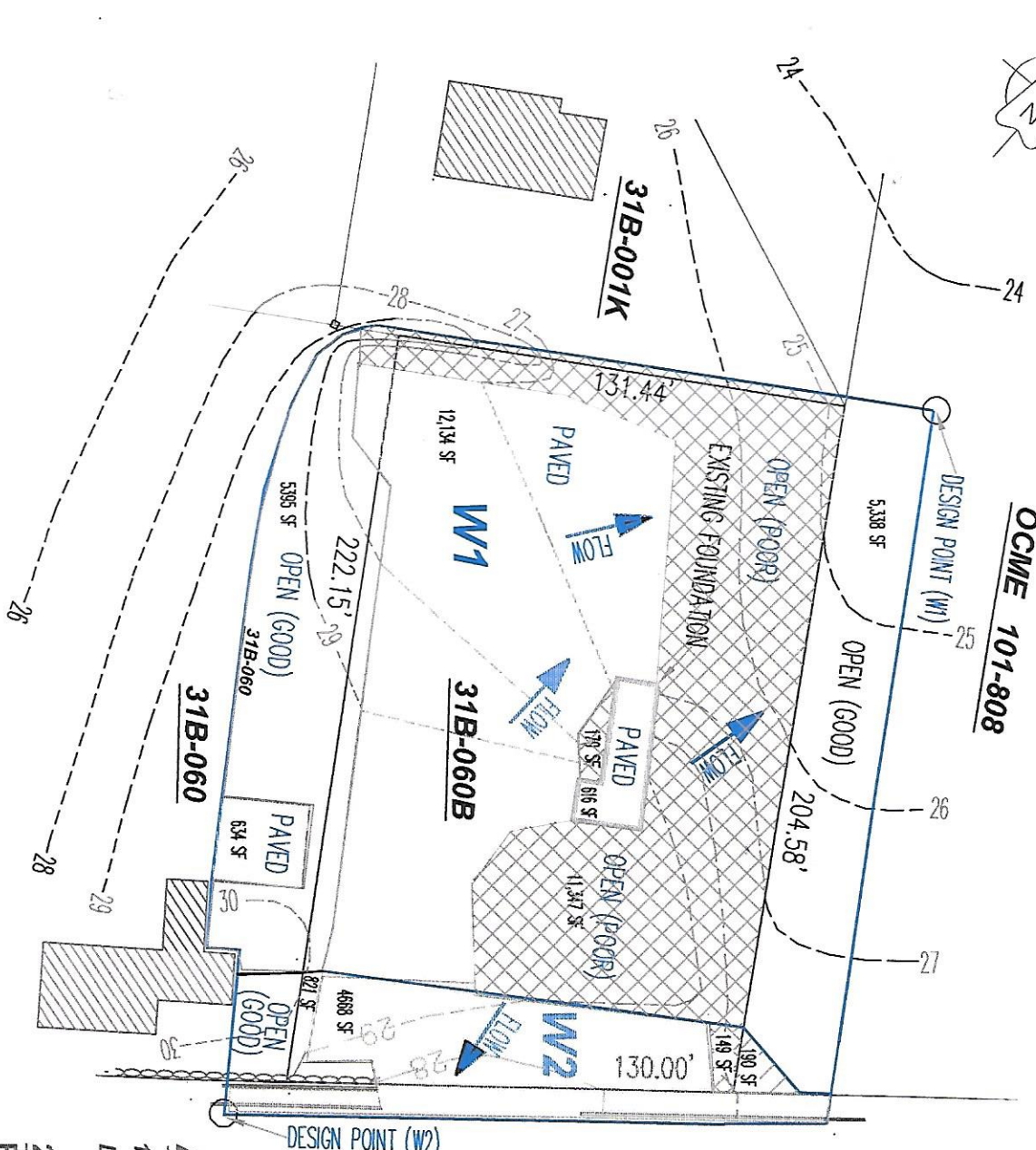
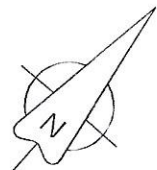
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Subcatchment 3S: POST W2

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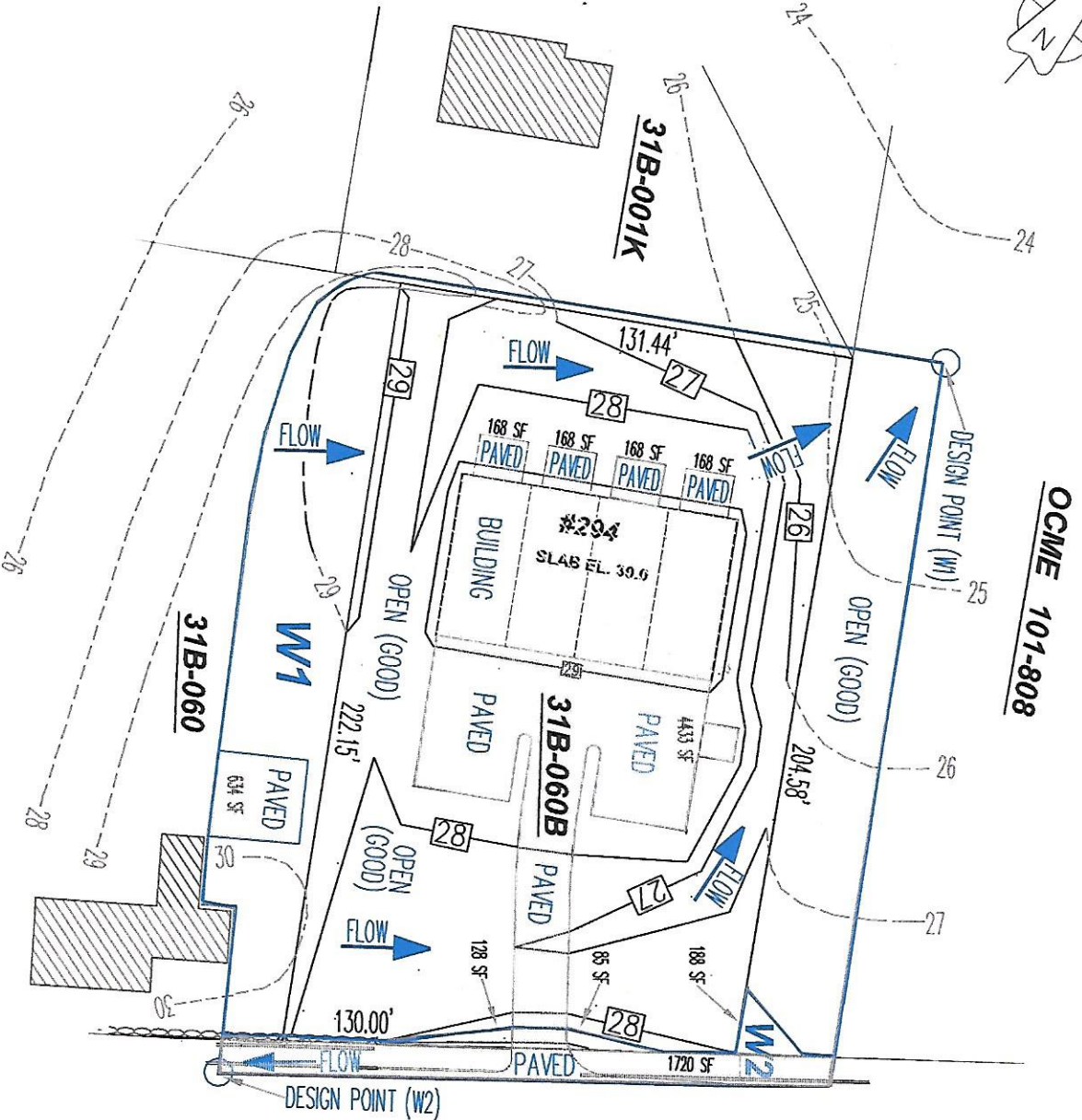
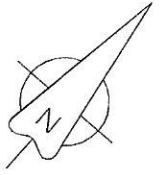


THE SOIL ON SITE IS CLASSIFIED BY NRCS AS 242B
 HINCKLEY SANDY LOAM 3% - 8% SLOPES, HSG "A".

AVT ASSOCIATES
 18 Algonquin Drive
 Dartmouth, MA 02748-1203

294 HUTTLESTON AVENUE
FAIRHAVEN, MA

PRE-DEVELOPMENT
 WATERSHEDS



THE SOIL ON SITE IS CLASSIFIED BY NRCS AS 242B
 HINCKLEY SANDY LOAM 3% - 8% SLOPES, HSG "A".

**HUTTLESTON AVENUE
 (ROUTE 6)**

AVT ASSOCIATES

18 Algonquin Drive
 Dartmouth, MA 02748-1203

294 HUTTLESTON AVENUE
 FAIRHAVEN, MA

POST-DEVELOPMENT
 WATERSHEDS