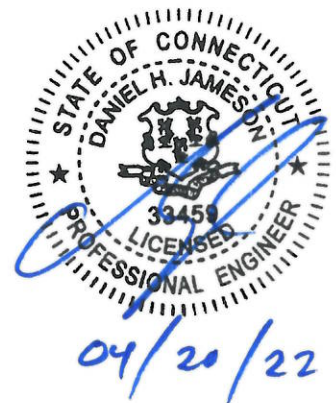


**Stormwater Management Report  
67 Kennedy Road Warehouse & Distribution Center  
352 Sullivan Ave, 67 & 68 Kennedy Road  
South Windsor, Connecticut**

Prepared by:

**Design Professionals, Inc.  
21 Jeffrey Drive  
South Windsor, CT 06074**

**March 30, 2022  
Revised to: April 20, 2022**



# Table of Contents

<b><u>Section</u></b>	<b><u>Page</u></b>
Introduction	2
Pre-Development Site Conditions	2
Post-Development Site Conditions	3
Analysis of Results	4
Storm Sewer Analysis	5
Water Quality	5
Conclusion	5

## **Appendices**

A	Pre-Development Drainage HydroCAD Report
B	Post-Development Drainage HydroCAD Report
C	NRCS Soil Map & Data
D	NOAA Atlas 14 Rainfall Data
E	Storm Sewer Analysis
F	Water quality Volume and Flow Data
G	Drainage Area Maps
	Existing Condition Drainage Area Map
	Proposed Condition Drainage Area Map

## **Introduction**

Scannell Properties #644, LLC is proposing an industrial development of a tract of land comprised of three properties located at 352 Sullivan Ave, & 67 & 68 Kennedy Road, South Windsor, Connecticut. The properties are referenced on the Town of South Windsor Tax Assessors map as GIS#: 87300352, 49800067, and 49800068 respectively. The proposed development will include the construction of one 241,800 SF industrial building. Associated site improvements will include but not be limited to new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's.

The total combined tract area is 19.245 acres. 17.5± acres of this area are proposed to be disturbed during construction. For more information, please refer to the plans entitled "67 Kennedy Road Warehouse & Distribution Center ~ Site Plan ~ 352 Sullivan Ave, & 67 & 68 Kennedy Road ~ South Windsor, Ct ~ GIS#: 87300352, 49800067, and 49800068" prepared by Design Professionals, Inc., and dated March 30, 2022, as amended.

## **Pre-Development Site Conditions**

The existing surficial characteristics of the area to be developed can be primarily classified as undisturbed woodland area surrounded by industrial development. The property shares its northern property boundary with Connecticut Southern Rail line. The center of this rail line was identified as the sites northern drainage limit. Further review of the site topography indicated a ridgeline exists spanning east to west across the center of the property. Stormwater that falls north of this boundary would flow to the rail line property. Stormwater that falls south of this boundary would flow to drainage system in Sullivan Ave and Kennedy Road. All stormwater runoff generated across the tract would flow to one of four design points. These four design points were identified as follows:

1. **Design Point 1 (DP#1):** Existing depression on Rail Line Property. Conveys water to a swale tributary to the Scantic River via an 18" CMP culvert.
2. **Design Point 2 (DP#2):** Sheet flow across the North-West Property corner to the Rail Line property.
3. **Design Point 3 (DP#3):** Sheet flow runoff to Sullivan Ave (via subsurface stormwater conveyance system on 330 Sullivan Ave in existing conditions).
4. **Design Point 4 (DP#4):** Sheet flow runoff to Kennedy Road.
5. **Design Point 5 (DP#5):** Existing roadway drainage to catchbasin in Kennedy Road.

All design points ultimately drain to The Scantic River, and is a part of local basin ID 4200-00-4-R18. Existing conditions watershed delineations are identified in the Existing Conditions Drainage Map located in **Appendix G**.

Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, soils types A, B, C, D, & B/D are located on site. See **Appendix C** for The NRCS Soil Map & Data.

An evaluation was performed to quantify the peak rate of stormwater discharge offsite to the design points identified. The Natural Resources Conservation Service's TR-55 Manual was followed in predicting the peak rates of runoff and volumes. HydroCAD computer modeling software was utilized.

Peak rates of stormwater runoff were evaluated for the 2-, 10-, 25-, 50- and 100-year storm events. Rainfall data from NOAA Atlas 14 Point Frequency Estimates was used to generate storm conditions. NOAA Atlas 14 rainfall data is included in **Appendix D** for reference. For more information, please refer to the enclosed Pre-Development Drainage HydroCAD Report located in **Appendix A**.

### **Post-Development Site Conditions**

The proposed development will include the construction of one 241,800 SF industrial building. Associated site improvements will include but not be limited to new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's. Site generated runoff from all proposed roofs, roadways, parking, and landscaped areas will be either collected in an underground storm water conveyance system or allowed to sheet flow to one of eight proposed detention systems. A general description of each detention system is included below:

1. Proposed Pond 1 (PP1) : 101,025± cft underground storage system collecting runoff from the proposed roof area and detained flow from pond water quality basin PP2. Detained discharge from this pond will be released to a proposed preformed scour hole near the 18" Pipe outlet (DP1) adjacent to the Rail Road Property.
2. Proposed Pond 2 (PP2) : 136,855± cft Water quality basin collecting runoff from the west truck parking and loading area. Detained discharge from this pond will be released pond underground chamber system PP1.
3. Proposed Pond 3 (PP3) : 5,027± cft underground storage system collecting runoff from the grass areas south of the proposed berm along Sullivan Ave. Detained discharge from this pond will be released to an Existing CB in Sullivan Ave.
4. Proposed Pond 4 (PP4) : 62,769± cft Water quality basin collecting runoff from the northern perimeter drive and detained flow from pond underground chamber system PP5. Detained discharge from this pond will be released to the proposed mitigation area within the existing railroad depression area.
5. Proposed Pond 5 (PP5) : 5,682± cft underground storage system collecting runoff from the eastern standard parking areas. Detained discharge from this pond will be released to

a splitter structure conveying detained flows to pond PP4 and a 6" outlet pipe proposed to send runoff directly to the mitigation area.

6. Proposed Pond 6 (PP6) : 42,367± cft Water quality basin collecting runoff from the proposed cul-de-sac and existing Kennedy Road runoff. Detained runoff from this basin will be released to the existing stormwater collection system in Kennedy Road.
7. Proposed Pond 7 (PP7) : 15,391± cft underground storage system collecting runoff from the grass area on the east side of the site adjacent to Kennedy Road. Detained runoff from this basin will be released to the existing stormwater collection system in Kennedy Road.
8. Proposed Pond 8 (PP8) : 3,839± cft underground storage system collecting runoff from the grass areas south the proposed building and north of the proposed berm along Sullivan Ave. Detained discharge from this pond will be released to an Existing CB in Sullivan Ave.

See **Appendix B** for the Post Development Condition and Pond summary HydroCAD reports. The Proposed Conditions Drainage Map for the site can be found in **Appendix G**.

### **Analysis of Results**

The pre-development and post-development conditions were analyzed using HydroCAD consistent with National Resource Conservation Service (NRCS) hydrology methods. Four discharge locations (**Design Point #1 - 4**) were identified as points of interest for assessing downstream effects. The following table contains the data generated from the HydroCAD software:

Reach		2 year	10 year	25 year	50 year	100 year
DP#1 – Rail Road Pond (North of site)	Pre	2.92	8.35	10.74	11.67	12.42
	Post	2.86	7.18	10.35	11.48	12.38
DP#2 – North West Corner of Site	Pre	0.02	0.29	0.68	1.05	1.52
	Post	0.02	0.15	0.28	0.38	0.51
DP#3 – Overland Flow to Sullivan Ave	Pre	0.00	0.74	1.77	2.73	3.90
	Post	0.02	0.33	1.27	2.14	3.07
DP#4 – Flow to Kennedy Road Drainage System	Pre	0.37	0.74	0.99	1.17	1.38
	Post	0.34	0.52	0.61	0.67	0.82

As seen in the table above, most of the storm events evaluated for the subject project will result in peak runoff rates in the proposed condition that are less than the peak runoff rates of the existing condition for 2-, 10-, 25-, 50- and 100-year design storms. There was a small 0.02 cfs increase in peak flow to DP#3 in the 2-yr storm. This increase to DP#3 is offset by reductions in

the peak flow to the other design points evaluated, all of which ultimately drain to the Scantic River. It is our opinion that this increase is negligible and will not cause any detrimental downstream impacts.

### **Storm Sewer Collection System**

The proposed subsurface stormwater collection and conveyance system was designed to adequately convey proposed runoff under 10- year storm event conditions. The design of the storm sewers followed the guidelines set forth in the Connecticut Department of Transportation's Drainage Manual. It is estimated that during a 10-year storm event, all proposed subsurface culverts will convey storm runoff without resulting in any unacceptable flooding conditions.

### **Water Quality**

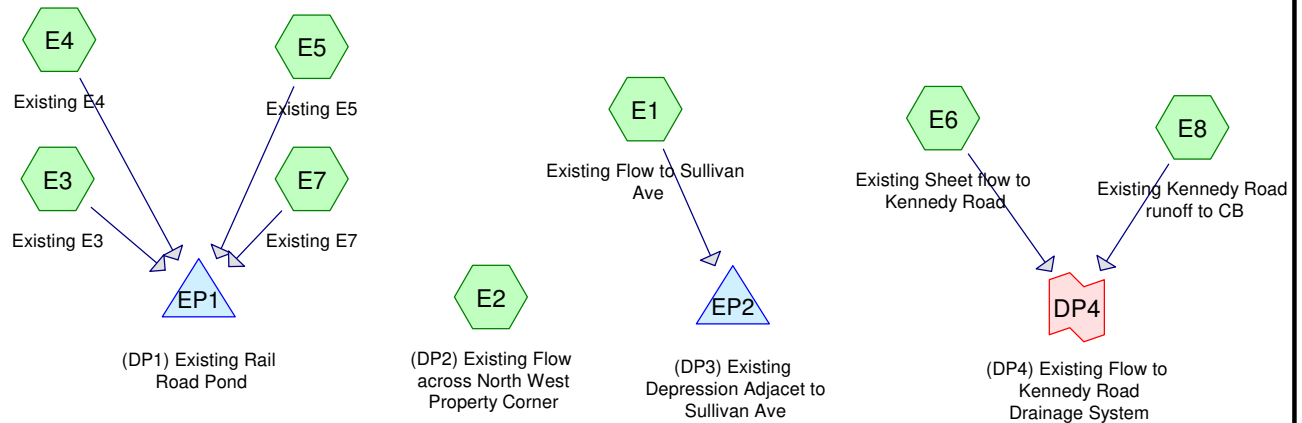
The proposed water quality basin's and forebay's were sized to treat a 1" rain event as recommended in the 2004 Connecticut Stormwater Quality Manual. The proposed forebay was sized to store over 10% of this water quality volume as recommended by the 2004 Connecticut Stormwater Quality Manual. Water Quality Volume calculations and basin stage storage tables are included as **Appendix F** of this report.

Stormtech Isolator rows will also be utilized to address water quality for all other areas draining to one of the proposed underground chamber systems. The number of isolator rows provided will be more than adequate to treat the required water quality flow rate based on the determined water quality flow and manufacture specs for treated flow rate per chamber. The required water quality flow was also calculated considering recommended equations provided in the 2004 Connecticut Stormwater Quality Manual. Water Quality Flow calculations and isolation chamber specs are included as **Appendix F** of this report.

### **Conclusion**

The proposed stormwater management system as discussed herein and shown on the referenced plans is appropriate for the proposed development on the subject site and should not pose any detrimental impacts to the environment.

**APPENDIX A**  
**Watershed Computations**  
**(Pre-Development Drainage HydroCAD Report)**





**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 2

Time span=0.00-72.00 hrs, dt=0.002 hrs, 36001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: Existing Flow to** Runoff Area=321,193 sf 0.59% Impervious Runoff Depth=0.46"  
Flow Length=887' Tc=65.5 min CN=62 Runoff=1.04 cfs 0.283 af

**Subcatchment E2: (DP2) Existing Flow** Runoff Area=76,582 sf 0.00% Impervious Runoff Depth=0.07"  
Flow Length=421' Tc=47.3 min CN=47 Runoff=0.02 cfs 0.010 af

**Subcatchment E3: Existing E3** Runoff Area=194,866 sf 0.00% Impervious Runoff Depth=0.58"  
Flow Length=716' Tc=62.2 min CN=65 Runoff=0.91 cfs 0.215 af

**Subcatchment E4: Existing E4** Runoff Area=56,986 sf 0.00% Impervious Runoff Depth=0.75"  
Flow Length=388' Tc=38.6 min CN=69 Runoff=0.50 cfs 0.082 af

**Subcatchment E5: Existing E5** Runoff Area=282,537 sf 14.41% Impervious Runoff Depth=0.90"  
Flow Length=1,310' Tc=91.0 min CN=72 Runoff=1.87 cfs 0.486 af

**Subcatchment E6: Existing Sheet flow to** Runoff Area=2,937 sf 0.00% Impervious Runoff Depth=0.24"  
Flow Length=26' Slope=0.0200 '/' Tc=7.3 min CN=55 Runoff=0.01 cfs 0.001 af

**Subcatchment E7: Existing E7** Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=0.62"  
Flow Length=197' Tc=25.0 min CN=66 Runoff=0.07 cfs 0.010 af

**Subcatchment E8: Existing Kennedy Road** Runoff Area=7,294 sf 69.19% Impervious Runoff Depth=1.87"  
Tc=6.0 min CN=87 Runoff=0.37 cfs 0.026 af

**Pond EP1: (DP1) Existing Rail Road Pond** Peak Elev=80.74' Storage=551 cf Inflow=2.94 cfs 0.793 af  
18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=2.92 cfs 0.793 af

**Pond EP2: (DP3) Existing Depression** Peak Elev=82.75' Storage=12,306 cf Inflow=1.04 cfs 0.283 af  
Outflow=0.00 cfs 0.000 af

**Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System** Inflow=0.37 cfs 0.027 af  
Primary=0.37 cfs 0.027 af

**Total Runoff Area = 21.828 ac Runoff Volume = 1.112 af Average Runoff Depth = 0.61"**  
**94.80% Pervious = 20.694 ac 5.20% Impervious = 1.135 ac**

**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 10-yr Rainfall=4.99"

Printed 3/30/2022

Page 3

Time span=0.00-72.00 hrs, dt=0.002 hrs, 36001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: Existing Flow to** Runoff Area=321,193 sf 0.59% Impervious Runoff Depth=1.43"  
Flow Length=887' Tc=65.5 min CN=62 Runoff=4.21 cfs 0.880 af

**Subcatchment E2: (DP2) Existing Flow** Runoff Area=76,582 sf 0.00% Impervious Runoff Depth=0.53"  
Flow Length=421' Tc=47.3 min CN=47 Runoff=0.29 cfs 0.078 af

**Subcatchment E3: Existing E3** Runoff Area=194,866 sf 0.00% Impervious Runoff Depth=1.65"  
Flow Length=716' Tc=62.2 min CN=65 Runoff=3.13 cfs 0.614 af

**Subcatchment E4: Existing E4** Runoff Area=56,986 sf 0.00% Impervious Runoff Depth=1.95"  
Flow Length=388' Tc=38.6 min CN=69 Runoff=1.46 cfs 0.213 af

**Subcatchment E5: Existing E5** Runoff Area=282,537 sf 14.41% Impervious Runoff Depth=2.19"  
Flow Length=1,310' Tc=91.0 min CN=72 Runoff=4.96 cfs 1.184 af

**Subcatchment E6: Existing Sheet flow to** Runoff Area=2,937 sf 0.00% Impervious Runoff Depth=0.97"  
Flow Length=26' Slope=0.0200 '/' Tc=7.3 min CN=55 Runoff=0.06 cfs 0.005 af

**Subcatchment E7: Existing E7** Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=1.72"  
Flow Length=197' Tc=25.0 min CN=66 Runoff=0.23 cfs 0.028 af

**Subcatchment E8: Existing Kennedy Road** Runoff Area=7,294 sf 69.19% Impervious Runoff Depth=3.56"  
Tc=6.0 min CN=87 Runoff=0.69 cfs 0.050 af

**Pond EP1: (DP1) Existing Rail Road Pond** Peak Elev=81.92' Storage=2,326 cf Inflow=8.49 cfs 2.038 af  
18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=8.35 cfs 2.038 af

**Pond EP2: (DP3) Existing Depression** Peak Elev=83.02' Storage=22,833 cf Inflow=4.21 cfs 0.880 af  
Outflow=0.74 cfs 0.487 af

**Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System** Inflow=0.74 cfs 0.055 af  
Primary=0.74 cfs 0.055 af

**Total Runoff Area = 21.828 ac Runoff Volume = 3.052 af Average Runoff Depth = 1.68"**  
**94.80% Pervious = 20.694 ac 5.20% Impervious = 1.135 ac**

**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 25-yr Rainfall=6.13"

Printed 3/30/2022

Page 4

Time span=0.00-72.00 hrs, dt=0.002 hrs, 36001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: Existing Flow to** Runoff Area=321,193 sf 0.59% Impervious Runoff Depth=2.18"  
Flow Length=887' Tc=65.5 min CN=62 Runoff=6.70 cfs 1.339 af

**Subcatchment E2: (DP2) Existing Flow** Runoff Area=76,582 sf 0.00% Impervious Runoff Depth=0.99"  
Flow Length=421' Tc=47.3 min CN=47 Runoff=0.68 cfs 0.145 af

**Subcatchment E3: Existing E3** Runoff Area=194,866 sf 0.00% Impervious Runoff Depth=2.45"  
Flow Length=716' Tc=62.2 min CN=65 Runoff=4.79 cfs 0.912 af

**Subcatchment E4: Existing E4** Runoff Area=56,986 sf 0.00% Impervious Runoff Depth=2.81"  
Flow Length=388' Tc=38.6 min CN=69 Runoff=2.15 cfs 0.307 af

**Subcatchment E5: Existing E5** Runoff Area=282,537 sf 14.41% Impervious Runoff Depth=3.10"  
Flow Length=1,310' Tc=91.0 min CN=72 Runoff=7.11 cfs 1.676 af

**Subcatchment E6: Existing Sheet flow to** Runoff Area=2,937 sf 0.00% Impervious Runoff Depth=1.59"  
Flow Length=26' Slope=0.0200 '/' Tc=7.3 min CN=55 Runoff=0.11 cfs 0.009 af

**Subcatchment E7: Existing E7** Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=2.54"  
Flow Length=197' Tc=25.0 min CN=66 Runoff=0.35 cfs 0.041 af

**Subcatchment E8: Existing Kennedy Road** Runoff Area=7,294 sf 69.19% Impervious Runoff Depth=4.64"  
Tc=6.0 min CN=87 Runoff=0.89 cfs 0.065 af

**Pond EP1: (DP1) Existing Rail Road Pond** Peak Elev=82.50' Storage=6,867 cf Inflow=12.49 cfs 2.935 af  
18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=10.74 cfs 2.935 af

**Pond EP2: (DP3) Existing Depression** Peak Elev=83.12' Storage=28,614 cf Inflow=6.70 cfs 1.339 af  
Outflow=1.77 cfs 0.946 af

**Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System** Inflow=0.99 cfs 0.074 af  
Primary=0.99 cfs 0.074 af

**Total Runoff Area = 21.828 ac Runoff Volume = 4.494 af Average Runoff Depth = 2.47"**  
**94.80% Pervious = 20.694 ac 5.20% Impervious = 1.135 ac**

**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 50-yr Rainfall=6.97"

Printed 3/30/2022

Page 5

Time span=0.00-72.00 hrs, dt=0.002 hrs, 36001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: Existing Flow to** Runoff Area=321,193 sf 0.59% Impervious Runoff Depth=2.78"  
Flow Length=887' Tc=65.5 min CN=62 Runoff=8.72 cfs 1.708 af

**Subcatchment E2: (DP2) Existing Flow** Runoff Area=76,582 sf 0.00% Impervious Runoff Depth=1.39"  
Flow Length=421' Tc=47.3 min CN=47 Runoff=1.05 cfs 0.204 af

**Subcatchment E3: Existing E3** Runoff Area=194,866 sf 0.00% Impervious Runoff Depth=3.08"  
Flow Length=716' Tc=62.2 min CN=65 Runoff=6.11 cfs 1.148 af

**Subcatchment E4: Existing E4** Runoff Area=56,986 sf 0.00% Impervious Runoff Depth=3.49"  
Flow Length=388' Tc=38.6 min CN=69 Runoff=2.67 cfs 0.380 af

**Subcatchment E5: Existing E5** Runoff Area=282,537 sf 14.41% Impervious Runoff Depth=3.80"  
Flow Length=1,310' Tc=91.0 min CN=72 Runoff=8.76 cfs 2.056 af

**Subcatchment E6: Existing Sheet flow to** Runoff Area=2,937 sf 0.00% Impervious Runoff Depth=2.10"  
Flow Length=26' Slope=0.0200 '/' Tc=7.3 min CN=55 Runoff=0.15 cfs 0.012 af

**Subcatchment E7: Existing E7** Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=3.18"  
Flow Length=197' Tc=25.0 min CN=66 Runoff=0.44 cfs 0.051 af

**Subcatchment E8: Existing Kennedy Road** Runoff Area=7,294 sf 69.19% Impervious Runoff Depth=5.45"  
Tc=6.0 min CN=87 Runoff=1.03 cfs 0.076 af

**Pond EP1: (DP1) Existing Rail Road Pond** Peak Elev=82.87' Storage=14,445 cf Inflow=15.61 cfs 3.636 af  
18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=11.67 cfs 3.636 af

**Pond EP2: (DP3) Existing Depression** Peak Elev=83.20' Storage=33,927 cf Inflow=8.72 cfs 1.708 af  
Outflow=2.73 cfs 1.314 af

**Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System** Inflow=1.17 cfs 0.088 af  
Primary=1.17 cfs 0.088 af

**Total Runoff Area = 21.828 ac Runoff Volume = 5.635 af Average Runoff Depth = 3.10"**  
**94.80% Pervious = 20.694 ac 5.20% Impervious = 1.135 ac**

**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 3/30/2022

Page 6

Time span=0.00-72.00 hrs, dt=0.002 hrs, 36001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: Existing Flow to** Runoff Area=321,193 sf 0.59% Impervious Runoff Depth=3.48"  
Flow Length=887' Tc=65.5 min CN=62 Runoff=11.07 cfs 2.138 af

**Subcatchment E2: (DP2) Existing Flow** Runoff Area=76,582 sf 0.00% Impervious Runoff Depth=1.88"  
Flow Length=421' Tc=47.3 min CN=47 Runoff=1.52 cfs 0.276 af

**Subcatchment E3: Existing E3** Runoff Area=194,866 sf 0.00% Impervious Runoff Depth=3.81"  
Flow Length=716' Tc=62.2 min CN=65 Runoff=7.63 cfs 1.422 af

**Subcatchment E4: Existing E4** Runoff Area=56,986 sf 0.00% Impervious Runoff Depth=4.26"  
Flow Length=388' Tc=38.6 min CN=69 Runoff=3.27 cfs 0.465 af

**Subcatchment E5: Existing E5** Runoff Area=282,537 sf 14.41% Impervious Runoff Depth=4.61"  
Flow Length=1,310' Tc=91.0 min CN=72 Runoff=10.63 cfs 2.490 af

**Subcatchment E6: Existing Sheet flow to** Runoff Area=2,937 sf 0.00% Impervious Runoff Depth=2.72"  
Flow Length=26' Slope=0.0200 '/' Tc=7.3 min CN=55 Runoff=0.20 cfs 0.015 af

**Subcatchment E7: Existing E7** Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=3.93"  
Flow Length=197' Tc=25.0 min CN=66 Runoff=0.55 cfs 0.063 af

**Subcatchment E8: Existing Kennedy Road** Runoff Area=7,294 sf 69.19% Impervious Runoff Depth=6.35"  
Tc=6.0 min CN=87 Runoff=1.19 cfs 0.089 af

**Pond EP1: (DP1) Existing Rail Road Pond** Peak Elev=83.19' Storage=25,625 cf Inflow=19.19 cfs 4.440 af  
18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=12.42 cfs 4.440 af

**Pond EP2: (DP3) Existing Depression** Peak Elev=83.28' Storage=40,432 cf Inflow=11.07 cfs 2.138 af  
Outflow=3.90 cfs 1.745 af

**Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System** Inflow=1.38 cfs 0.104 af  
Primary=1.38 cfs 0.104 af

**Total Runoff Area = 21.828 ac Runoff Volume = 6.958 af Average Runoff Depth = 3.82"**  
**94.80% Pervious = 20.694 ac 5.20% Impervious = 1.135 ac**

**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 7

**Summary for Subcatchment E1: Existing Flow to Sullivan Ave**

Runoff = 1.04 cfs @ 13.10 hrs, Volume= 0.283 af, Depth= 0.46"

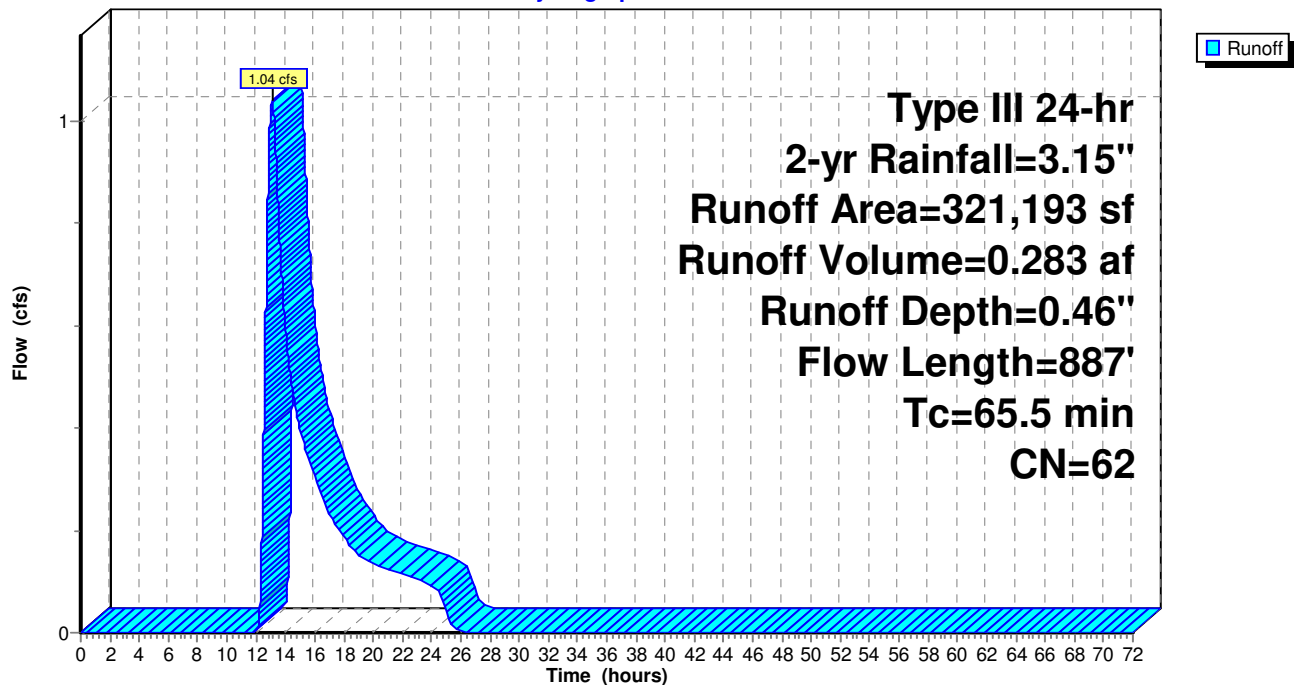
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

Area (sf)	CN	Description
23,040	61	>75% Grass cover, Good, HSG B
3,445	80	>75% Grass cover, Good, HSG D
* 3,223	71	>75% Grass cover, Good, HSG B/D
* 1,879	98	IMPERVIOUS
3,151	30	Woods, Good, HSG A
121,413	55	Woods, Good, HSG B
* 103,315	66	Woods, Good, HSG B/D
61,727	70	Woods, Good, HSG C
321,193	62	Weighted Average
319,314		99.41% Pervious Area
1,879		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	100	0.0150	0.07		<b>Sheet Flow, Woodland Sheet Flow</b>
					Woods: Light underbrush n= 0.400 P2= 3.22"
41.5	787	0.0040	0.32		<b>Shallow Concentrated Flow, Woodland SCF</b>
					Woodland Kv= 5.0 fps
65.5	887	Total			

# Subcatchment E1: Existing Flow to Sullivan Ave

Hydrograph



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 9

**Summary for Subcatchment E2: (DP2) Existing Flow across North West Property Corner**

Runoff = 0.02 cfs @ 15.50 hrs, Volume= 0.010 af, Depth= 0.07"

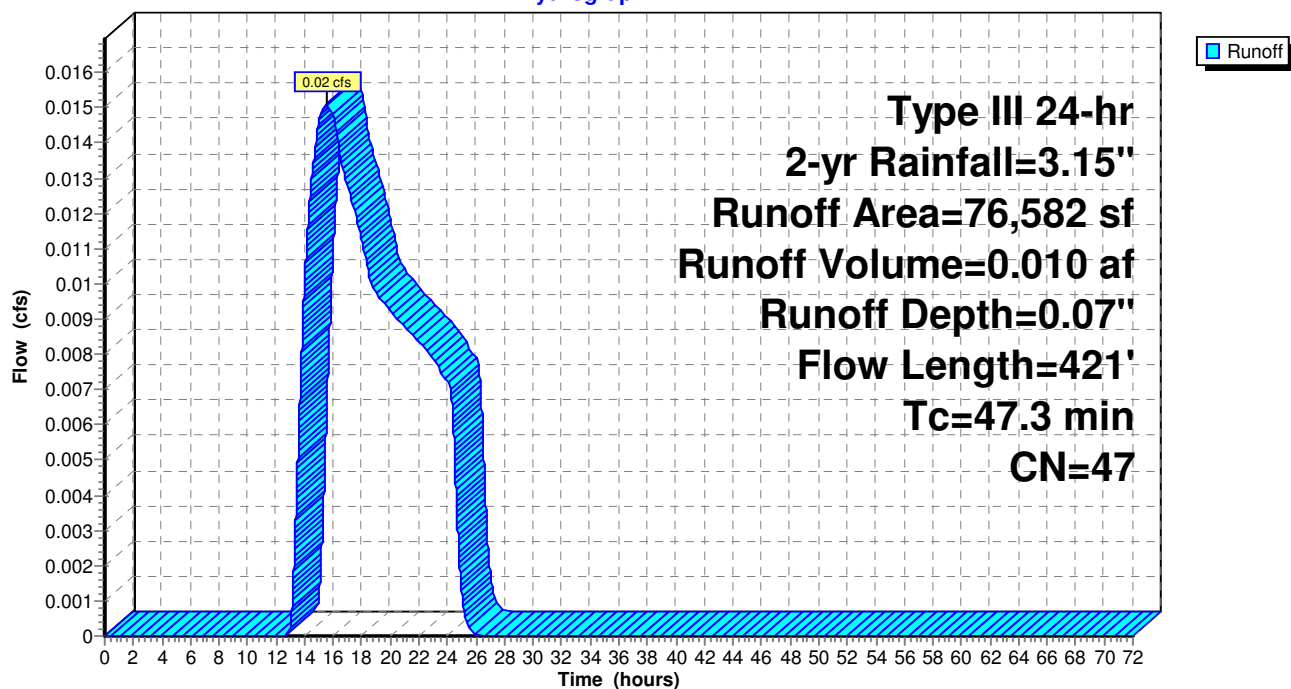
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

Area (sf)	CN	Description
1,541	39	>75% Grass cover, Good, HSG A
3,329	61	>75% Grass cover, Good, HSG B
* 285	71	>75% Grass cover, Good, HSG B/D
37,312	30	Woods, Good, HSG A
2,030	55	Woods, Good, HSG B
* 31,307	66	Woods, Good, HSG B/D
778	70	Woods, Good, HSG C
76,582	47	Weighted Average
76,582		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.4	100	0.0160	0.07		<b>Sheet Flow, Woodland SF</b>
					Woods: Light underbrush n= 0.400 P2= 3.22"
23.9	321	0.0020	0.22		<b>Shallow Concentrated Flow, Woodland SCF</b>
					Woodland Kv= 5.0 fps
47.3	421	Total			

**Subcatchment E2: (DP2) Existing Flow across North West Property Corner**

Hydrograph





**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 10

**Summary for Subcatchment E3: Existing E3**

Runoff = 0.91 cfs @ 12.99 hrs, Volume= 0.215 af, Depth= 0.58"

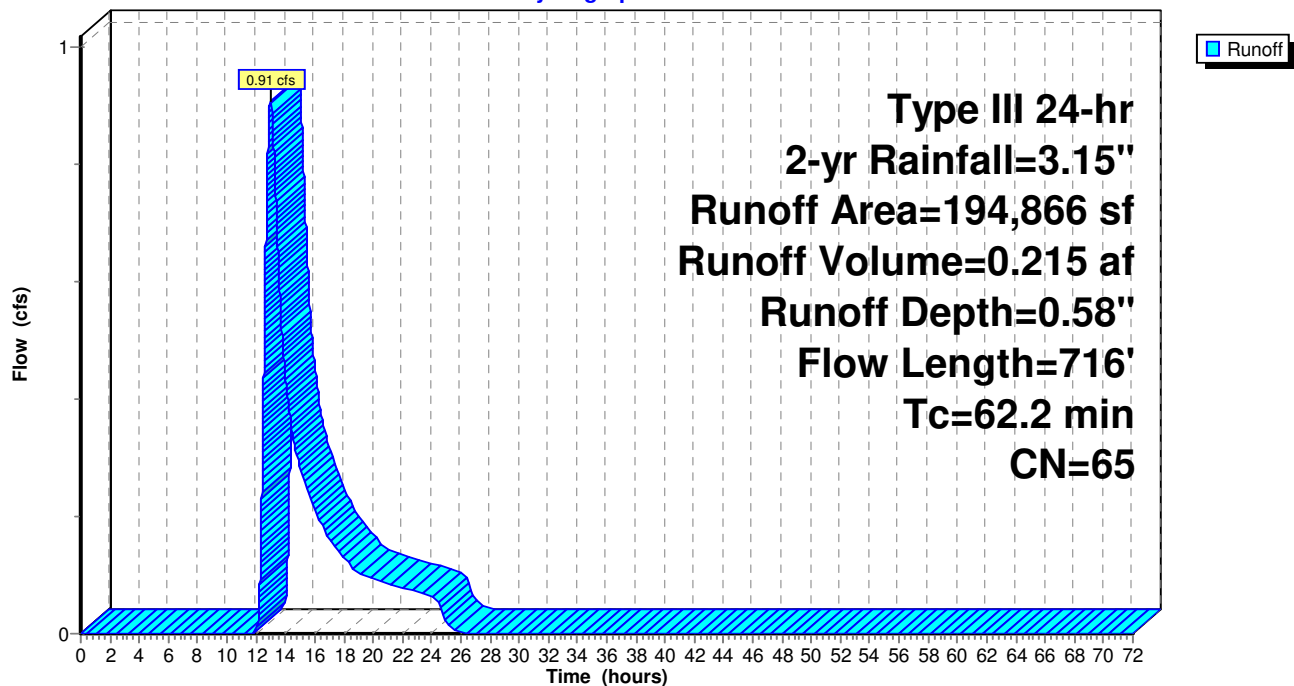
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

	Area (sf)	CN	Description
*	2,034	71	>75% Grass cover, Good, HSG B/D
	19,302	30	Woods, Good, HSG A
*	44,406	66	Woods, Good, HSG B/D
	129,124	70	Woods, Good, HSG C
	194,866	65	Weighted Average
	194,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	100	0.0140	0.07		<b>Sheet Flow, Woodland SF</b>
					Woods: Light underbrush n= 0.400 P2= 3.22"
37.5	616	0.0030	0.27		<b>Shallow Concentrated Flow, Woodland SCF</b>
					Woodland Kv= 5.0 fps
62.2	716	Total			

**Subcatchment E3: Existing E3**

Hydrograph



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 11

**Summary for Subcatchment E4: Existing E4**

Runoff = 0.50 cfs @ 12.61 hrs, Volume= 0.082 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

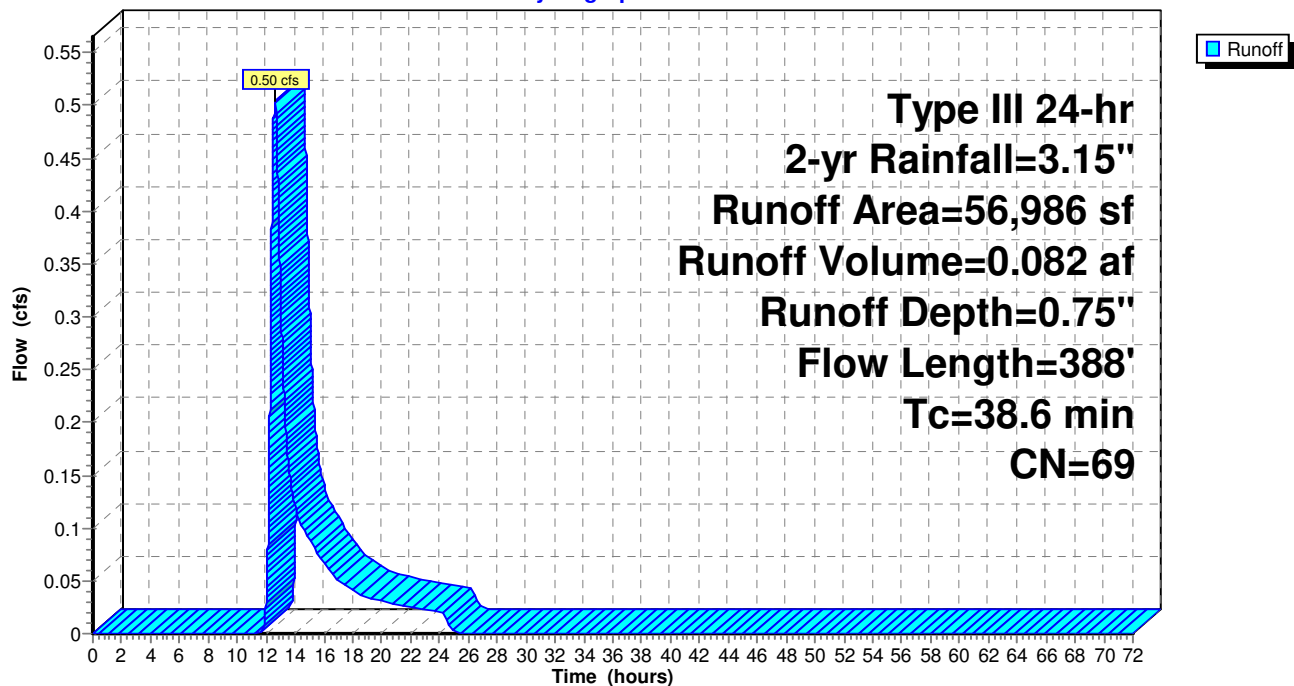
	Area (sf)	CN	Description
*	20,899	66	Woods, Good, HSG B/D
	36,087	70	Woods, Good, HSG C
	56,986	69	Weighted Average
	56,986		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.4	100	0.0160	0.07		<b>Sheet Flow, Woodland SF</b>
					Woods: Light underbrush n= 0.400 P2= 3.22"
15.2	288	0.0040	0.32		<b>Shallow Concentrated Flow, Woodland SCF</b>
					Woodland Kv= 5.0 fps
38.6	388	Total			

**Subcatchment E4: Existing E4**

Hydrograph



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 12

**Summary for Subcatchment E5: Existing E5**

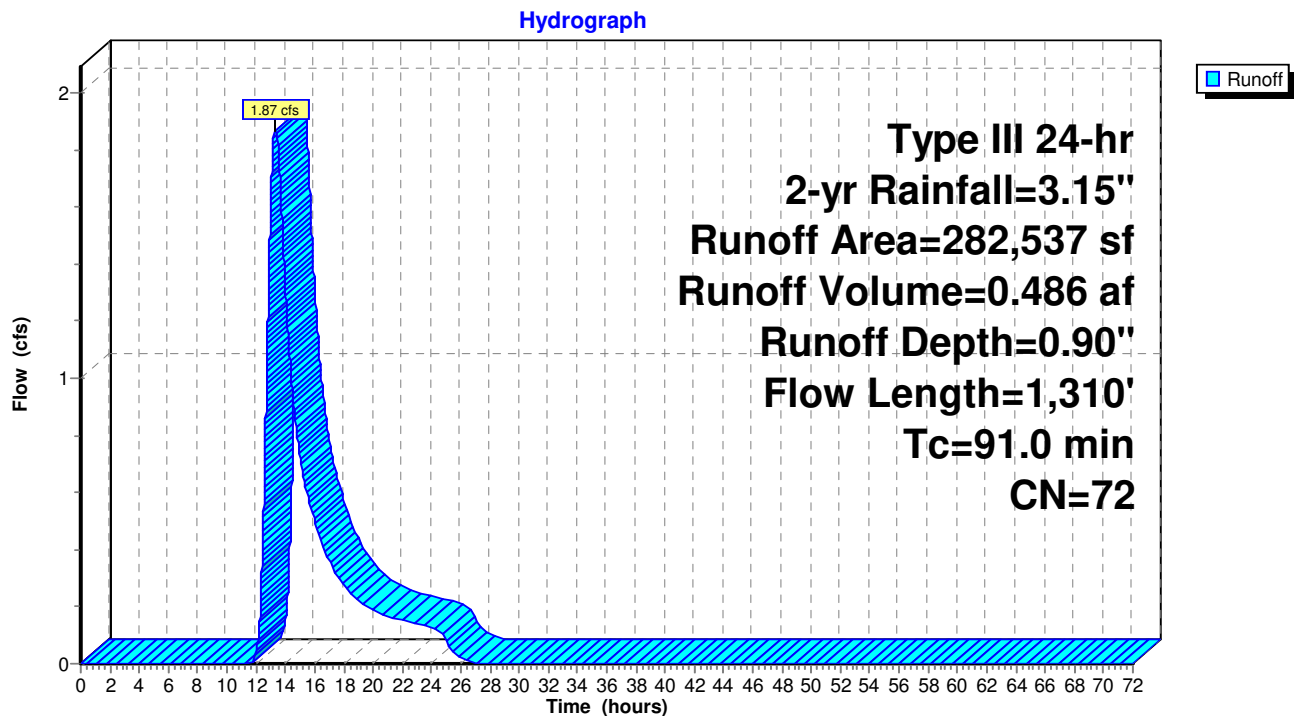
Runoff = 1.87 cfs @ 13.35 hrs, Volume= 0.486 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

	Area (sf)	CN	Description
*	7,449	71	>75% Grass cover, Good, HSG B/D
	5,261	74	>75% Grass cover, Good, HSG C
*	40,707	98	IMPERVIOUS
	456	55	Woods, Good, HSG B
*	158,845	66	Woods, Good, HSG B/D
	27,388	70	Woods, Good, HSG C
	28,470	71	Meadow, non-grazed, HSG C
*	13,961	68	Meadow, non-grazed, HSG B/D
	282,537	72	Weighted Average
	241,830		85.59% Pervious Area
	40,707		14.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	100	0.0110	0.06		<b>Sheet Flow, Woodland Sheet Flow</b>
					Woods: Light underbrush n= 0.400 P2= 3.22"
63.8	1,210	0.0040	0.32		<b>Shallow Concentrated Flow, Woodland SCF</b>
					Woodland Kv= 5.0 fps
91.0	1,310	Total			

## Subcatchment E5: Existing E5



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 14

**Summary for Subcatchment E6: Existing Sheet flow to Kennedy Road**

Runoff = 0.01 cfs @ 12.37 hrs, Volume= 0.001 af, Depth= 0.24"

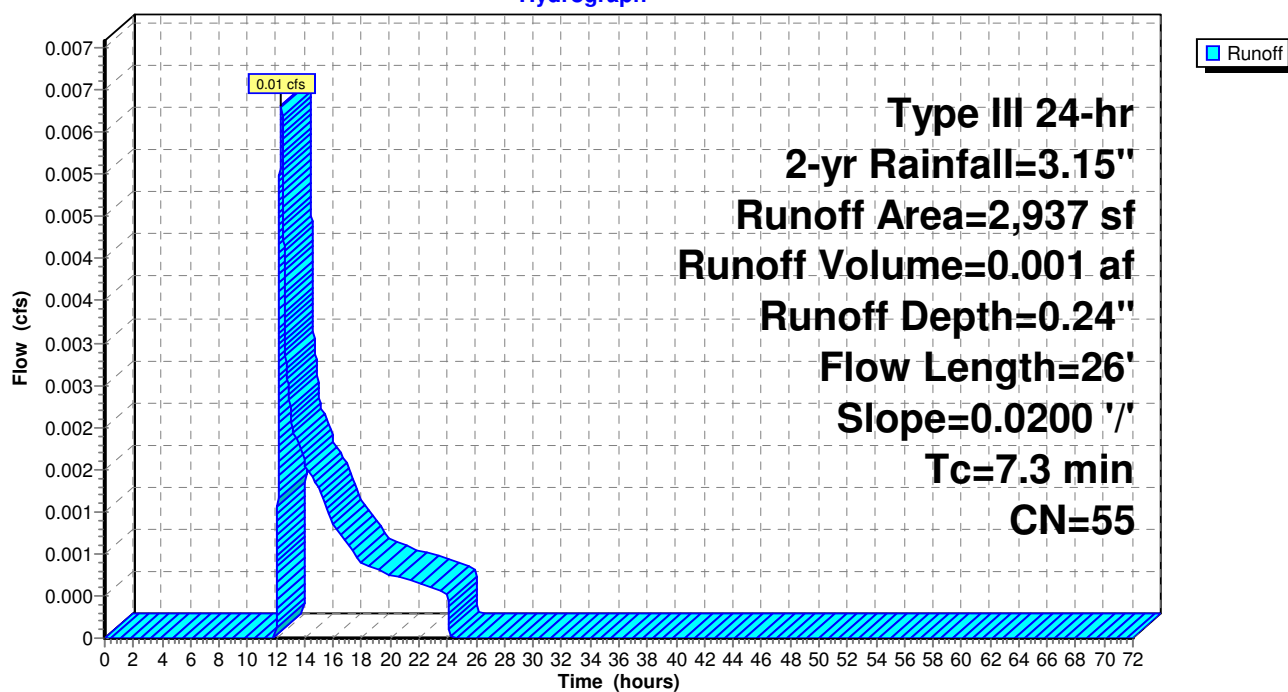
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

Area (sf)	CN	Description
2,937	55	Woods, Good, HSG B
2,937		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	26	0.0200	0.06		<b>Sheet Flow, Woodland SF</b> Woods: Light underbrush n= 0.400 P2= 3.22"

**Subcatchment E6: Existing Sheet flow to Kennedy Road**

Hydrograph



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 15

**Summary for Subcatchment E7: Existing E7**

Runoff = 0.07 cfs @ 12.42 hrs, Volume= 0.010 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

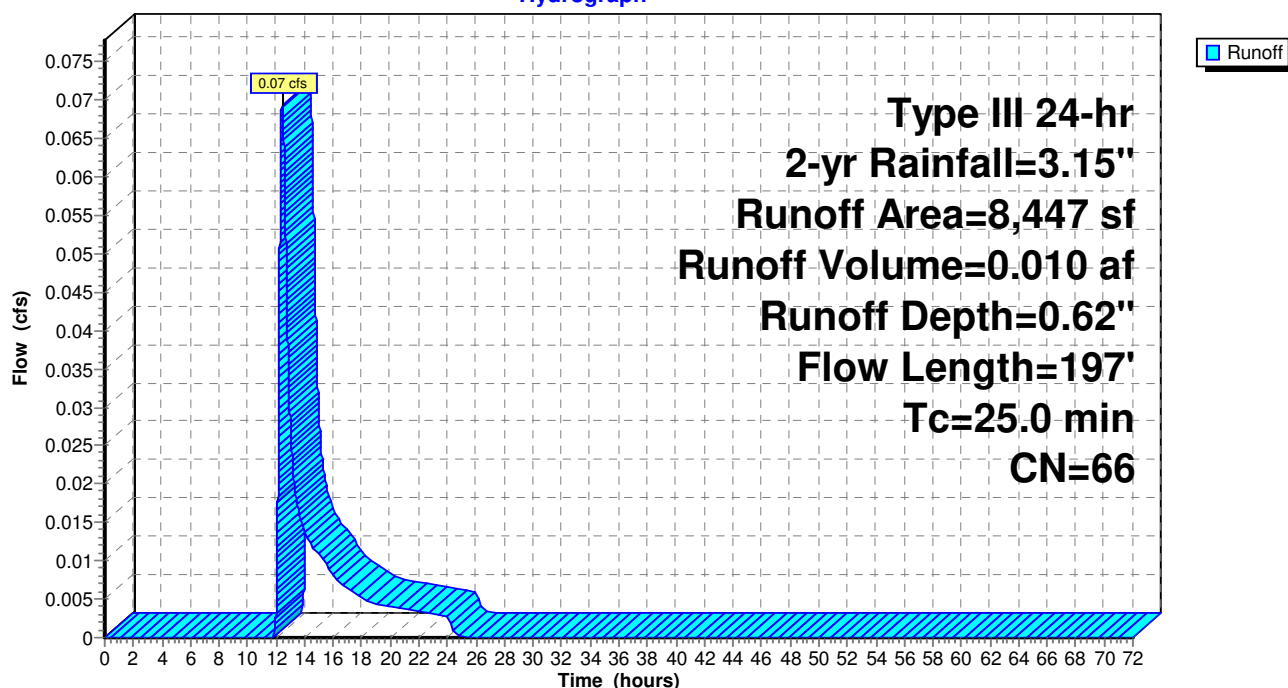
Area (sf)	CN	Description
2,335	39	>75% Grass cover, Good, HSG A
1,709	74	>75% Grass cover, Good, HSG C
* 1,796	98	IMPERVIOUS
450	30	Meadow, non-grazed, HSG A
2,157	71	Meadow, non-grazed, HSG C
8,447	66	Weighted Average
6,651		78.74% Pervious Area
1,796		21.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.4	100	0.0160	0.07		<b>Sheet Flow, Woodland SF</b>
					Woods: Light underbrush n= 0.400 P2= 3.22"
1.6	97	0.0420	1.02		<b>Shallow Concentrated Flow, Woodlan SCF</b>
					Woodland Kv= 5.0 fps
25.0	197	Total			

**Subcatchment E7: Existing E7**

Hydrograph



## 4670 Hydrocad

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 16

### Summary for Subcatchment E8: Existing Kennedy Road runoff to CB

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 1.87"

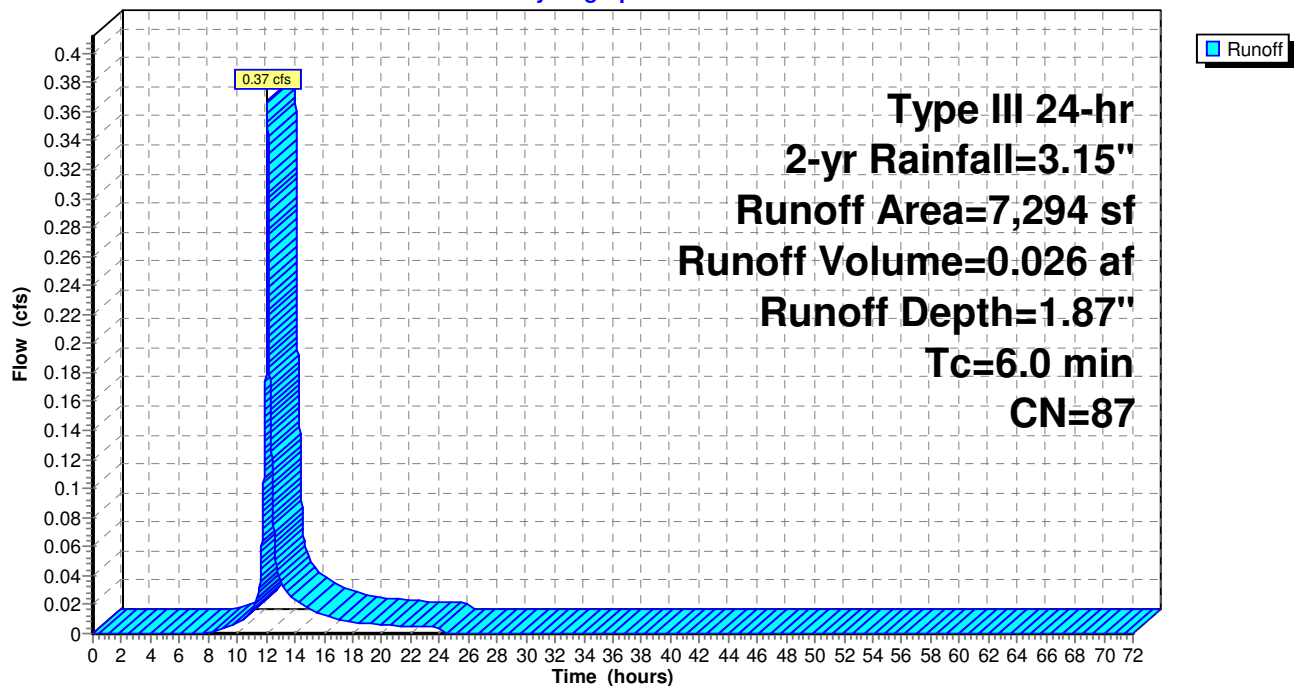
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

	Area (sf)	CN	Description
*	5,047	98	IMPERVIOUS
	2,047	61	>75% Grass cover, Good, HSG B
*	200	71	>75% Grass cover, Good, HSG B/D
	7,294	87	Weighted Average
	2,247		30.81% Pervious Area
	5,047		69.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

### Subcatchment E8: Existing Kennedy Road runoff to CB

Hydrograph



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 17

**Summary for Pond EP1: (DP1) Existing Rail Road Pond**

Inflow Area = 12.462 ac, 7.83% Impervious, Inflow Depth = 0.76" for 2-yr event  
 Inflow = 2.94 cfs @ 13.14 hrs, Volume= 0.793 af  
 Outflow = 2.92 cfs @ 13.20 hrs, Volume= 0.793 af, Atten= 0%, Lag= 3.4 min  
 Primary = 2.92 cfs @ 13.20 hrs, Volume= 0.793 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs

Peak Elev= 80.74' @ 13.20 hrs Surf.Area= 953 sf Storage= 551 cf

Plug-Flow detention time= 3.0 min calculated for 0.793 af (100% of inflow)

Center-of-Mass det. time= 3.0 min ( 947.4 - 944.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	79.70'	107,037 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.70	10	0	0
80.00	382	59	59
81.00	1,156	769	828
82.00	2,173	1,665	2,492
83.00	29,086	15,630	18,122
84.00	148,744	88,915	107,037

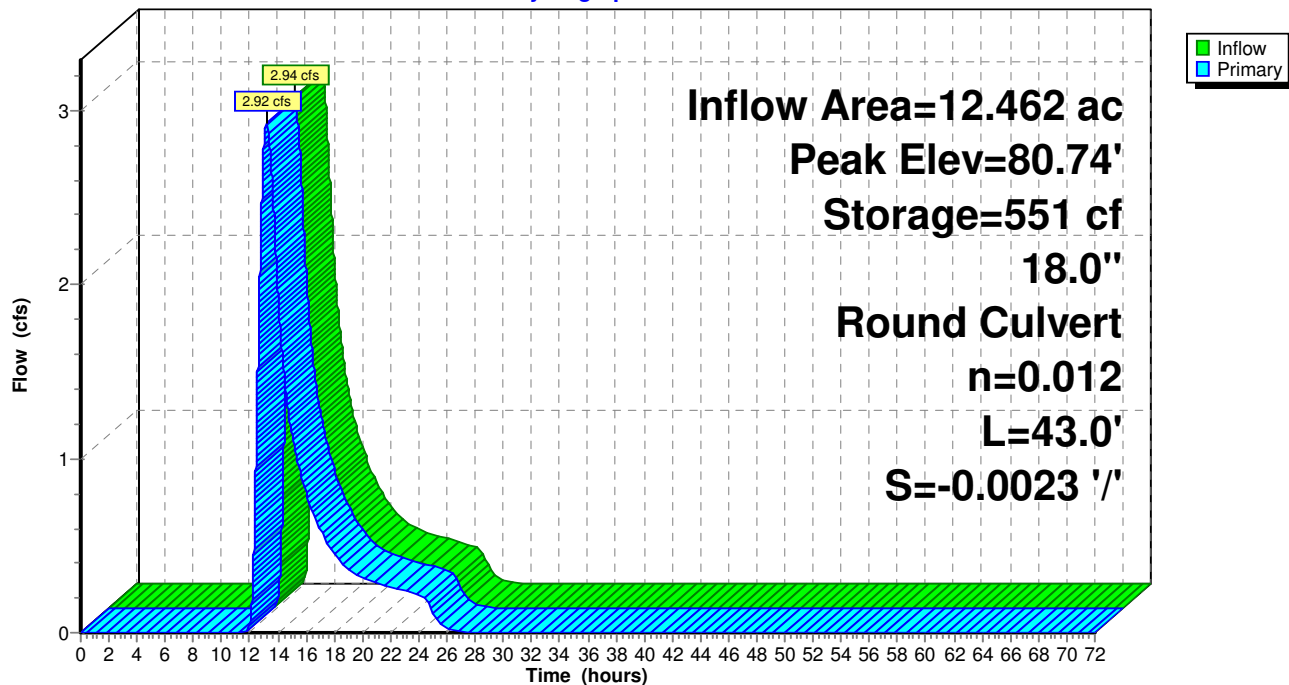
Device	Routing	Invert	Outlet Devices
#1	Primary	79.70'	<b>18.0" Round Culvert</b> L= 43.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 79.60' / 79.70' S= -0.0023 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

**Primary OutFlow** Max=2.92 cfs @ 13.20 hrs HW=80.74' (Free Discharge)↑**1=Culvert** (Barrel Controls 2.92 cfs @ 2.82 fps)



**Pond EP1: (DP1) Existing Rail Road Pond**

Hydrograph



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

Printed 3/30/2022

Page 19

**Summary for Pond EP2: (DP3) Existing Depression Adjacent to Sullivan Ave**

Inflow Area = 7.374 ac, 0.59% Impervious, Inflow Depth = 0.46" for 2-yr event  
 Inflow = 1.04 cfs @ 13.10 hrs, Volume= 0.283 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs

Peak Elev= 82.75' @ 27.66 hrs Surf.Area= 32,896 sf Storage= 12,306 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	144,179 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.00	81	0	0
83.00	44,050	22,066	22,066
84.00	200,176	122,113	144,179

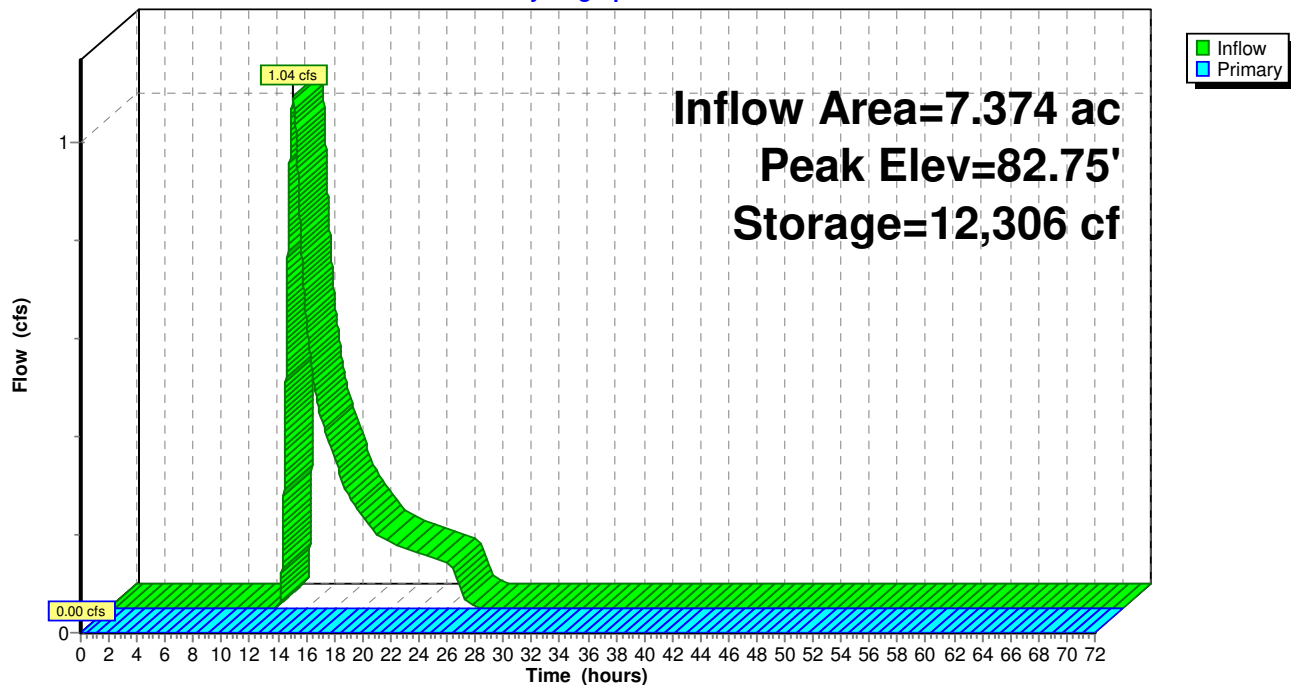
Device	Routing	Invert	Outlet Devices
#1	Primary	82.88'	<b>6.0' long x 3.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=82.00' (Free Discharge)

↑1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Pond EP2: (DP3) Existing Depression Adjacent to Sullivan Ave**

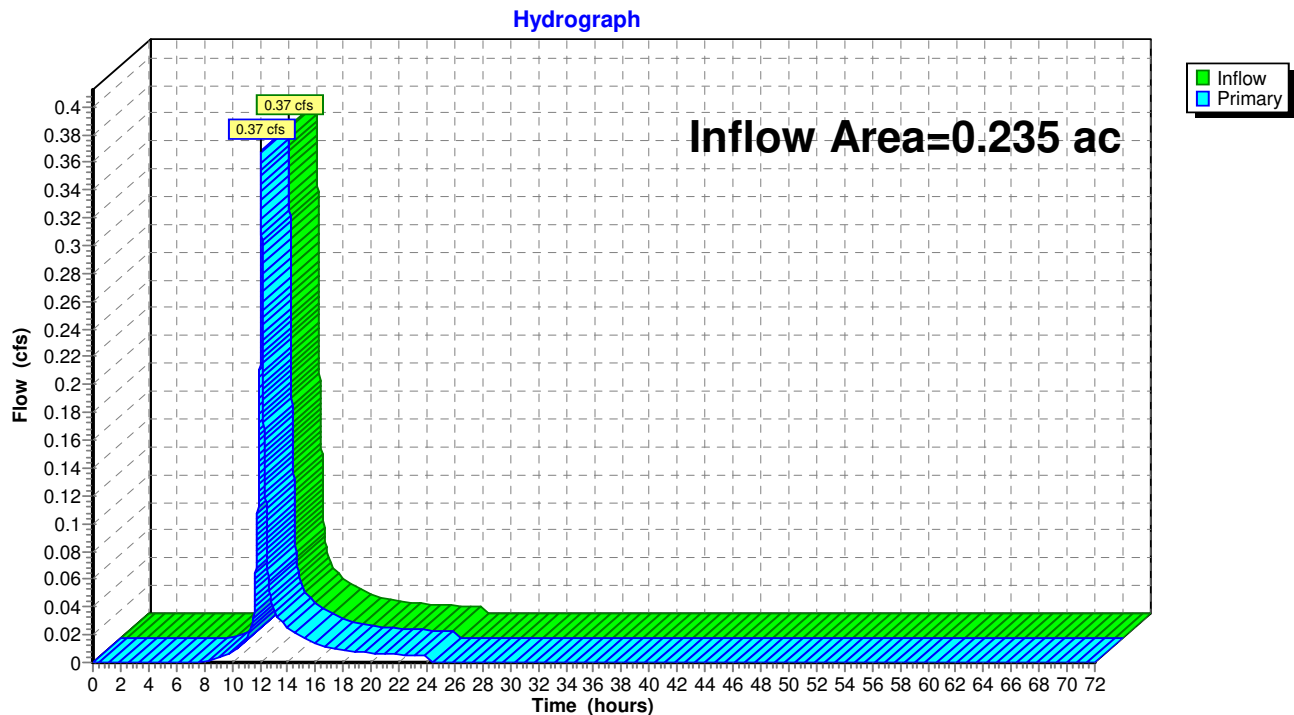
Hydrograph



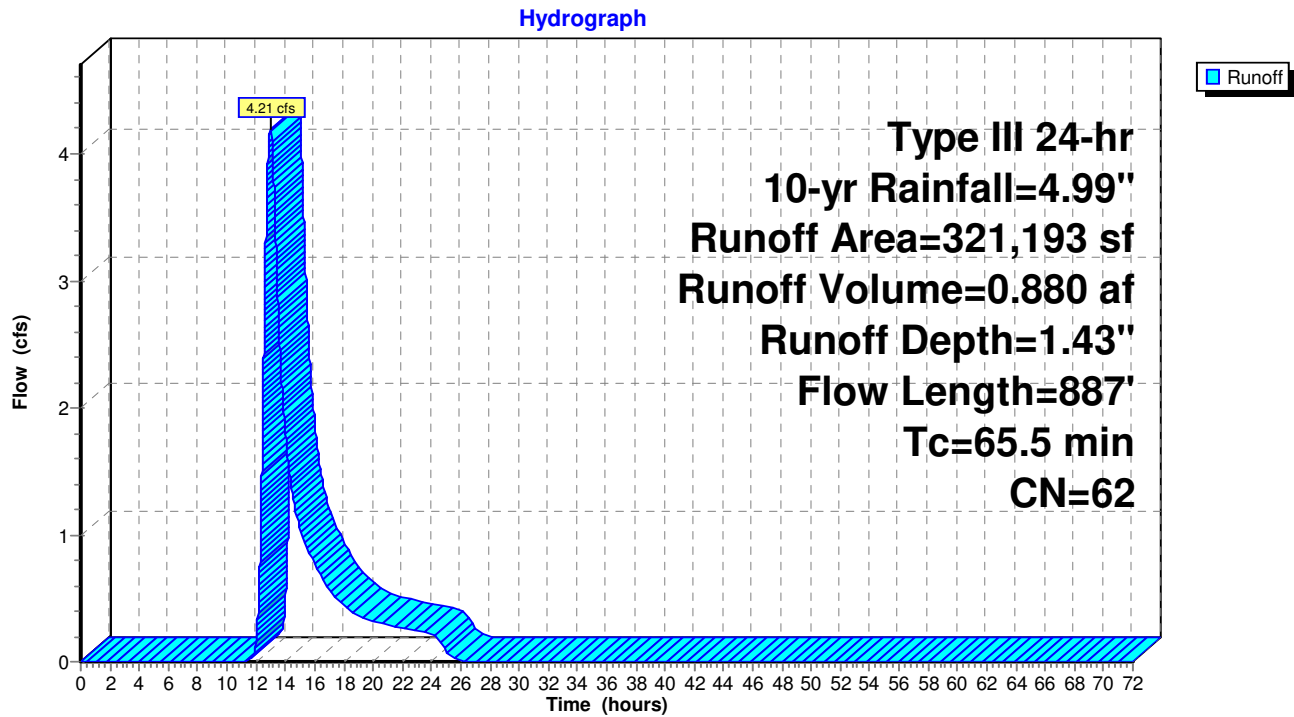
**Summary for Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System**

Inflow Area = 0.235 ac, 49.33% Impervious, Inflow Depth = 1.40" for 2-yr event  
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af  
Primary = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

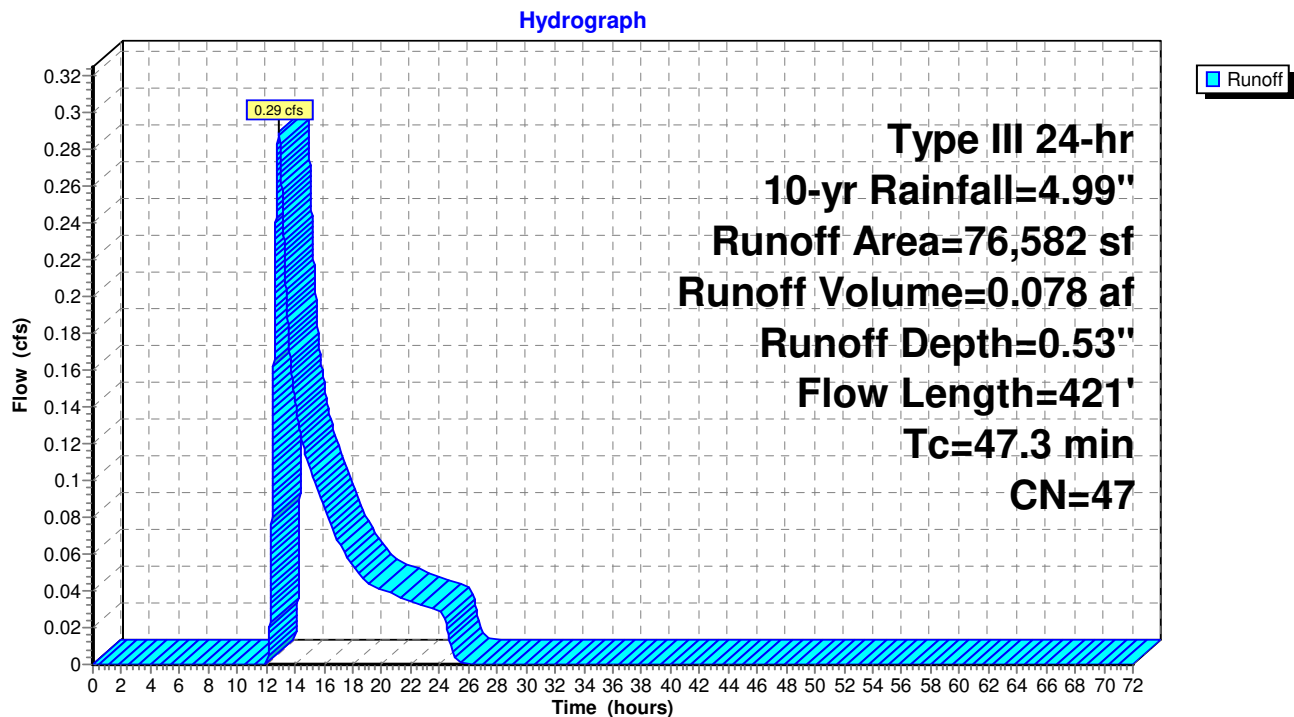
Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs

**Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System**

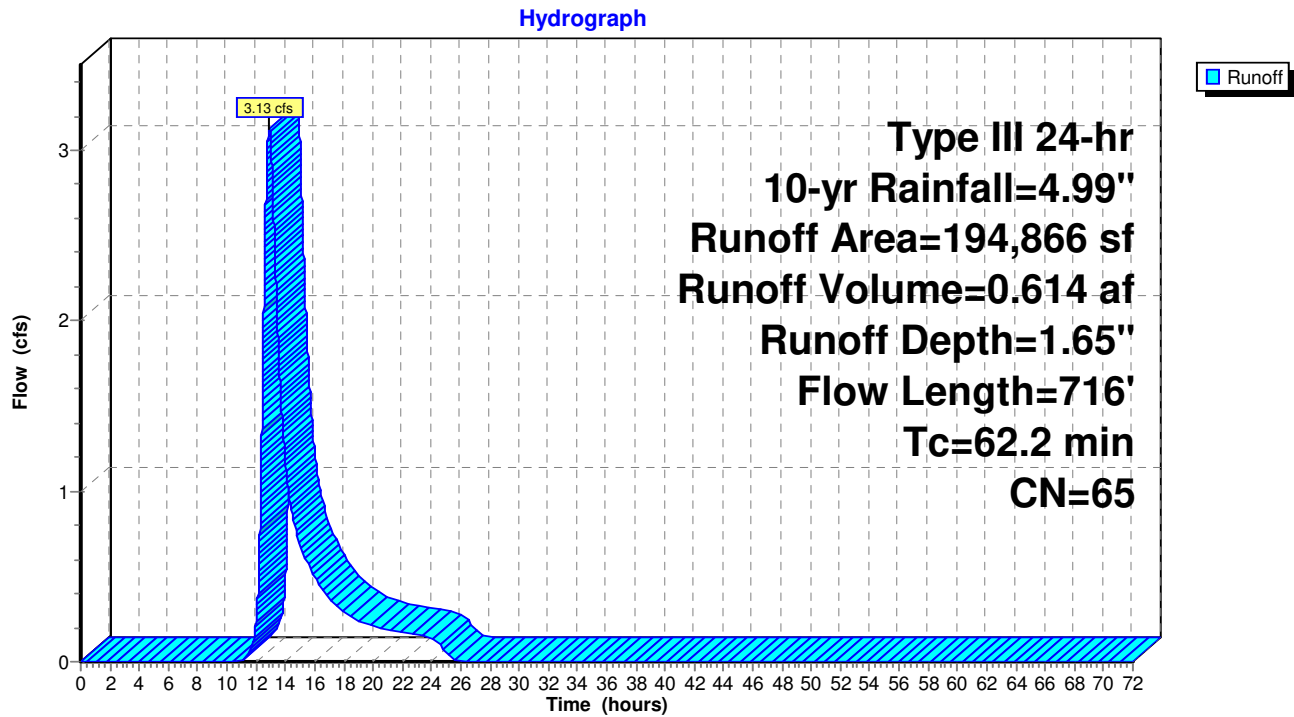
### Subcatchment E1: Existing Flow to Sullivan Ave



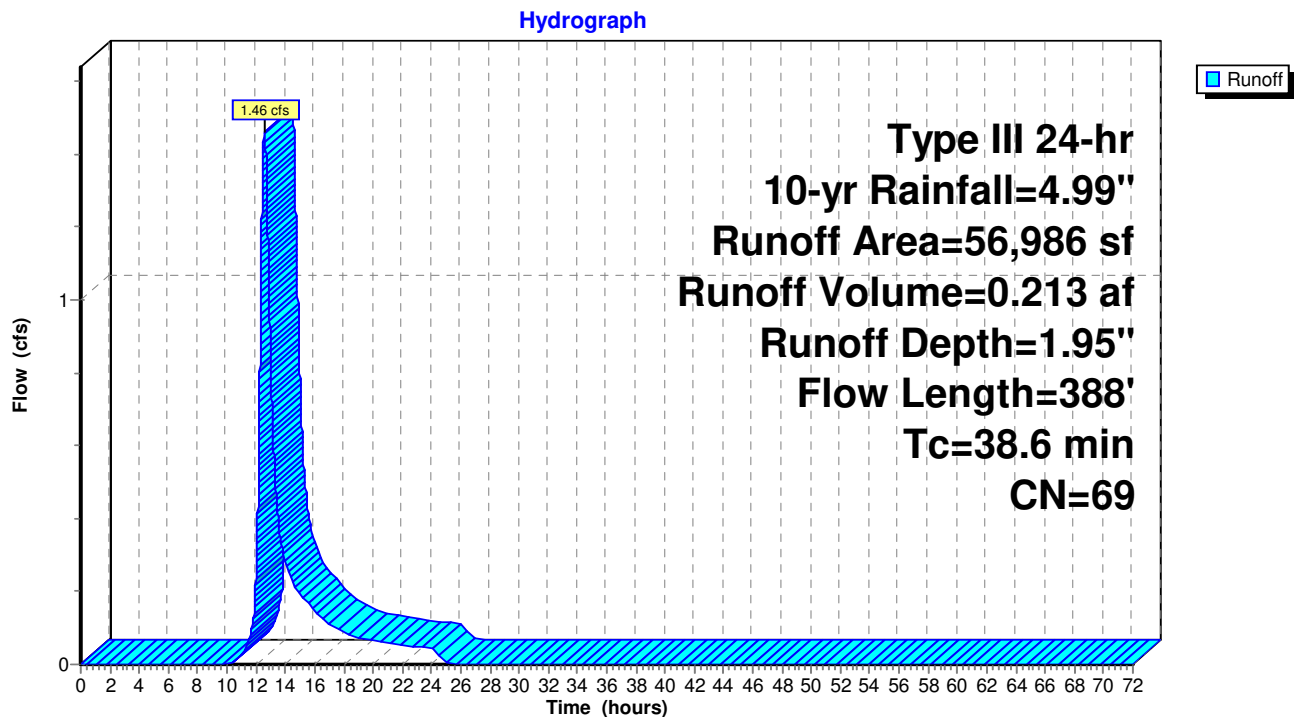
### Subcatchment E2: (DP2) Existing Flow across North West Property Corner



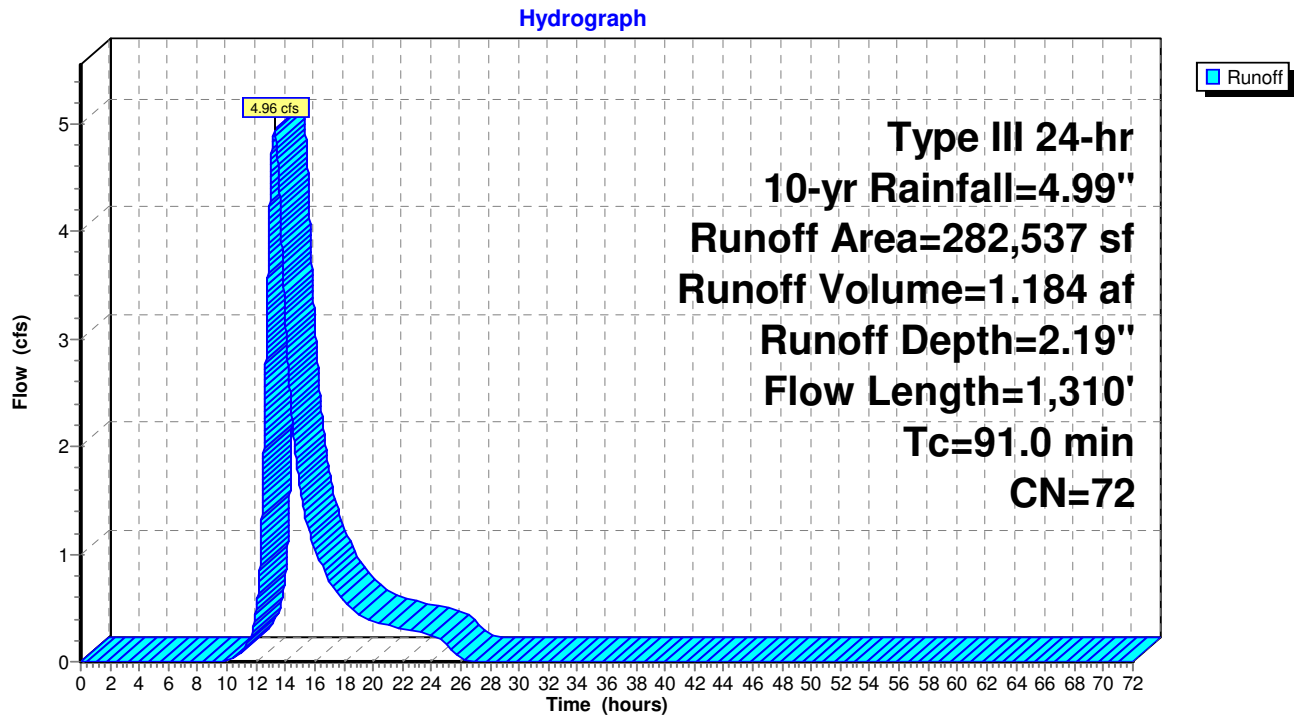
## Subcatchment E3: Existing E3



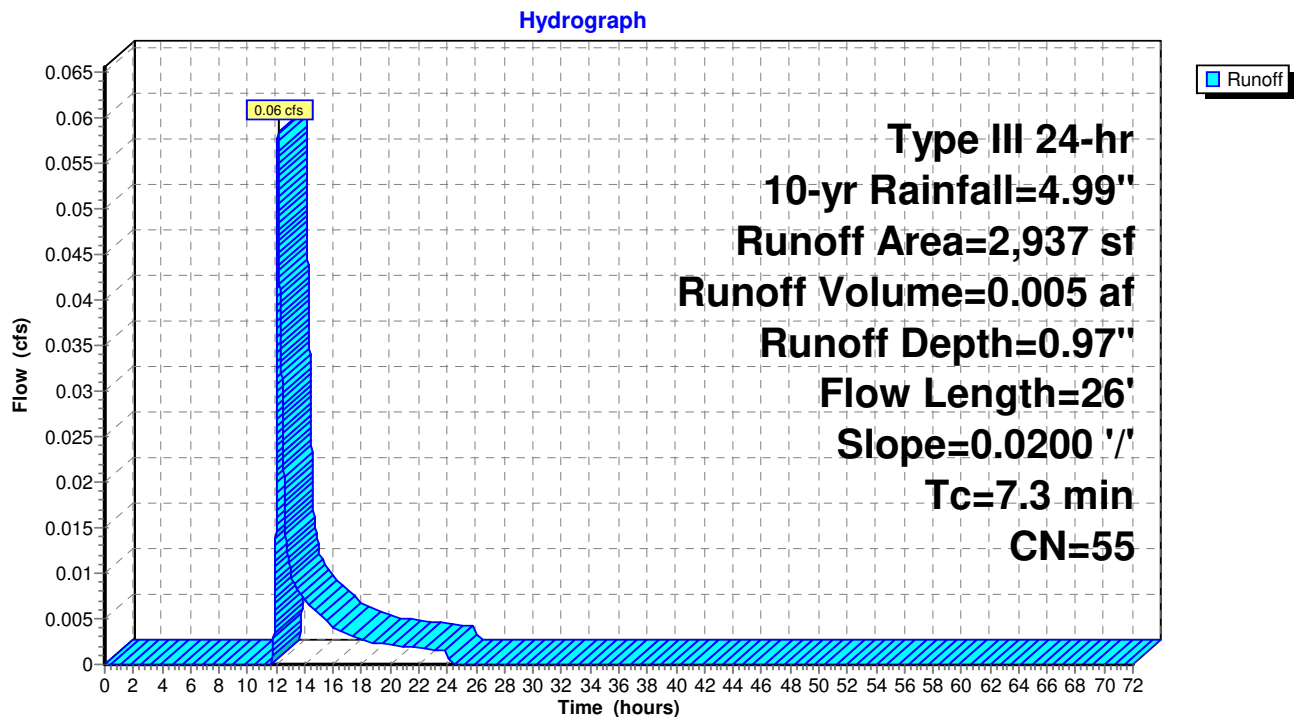
## Subcatchment E4: Existing E4

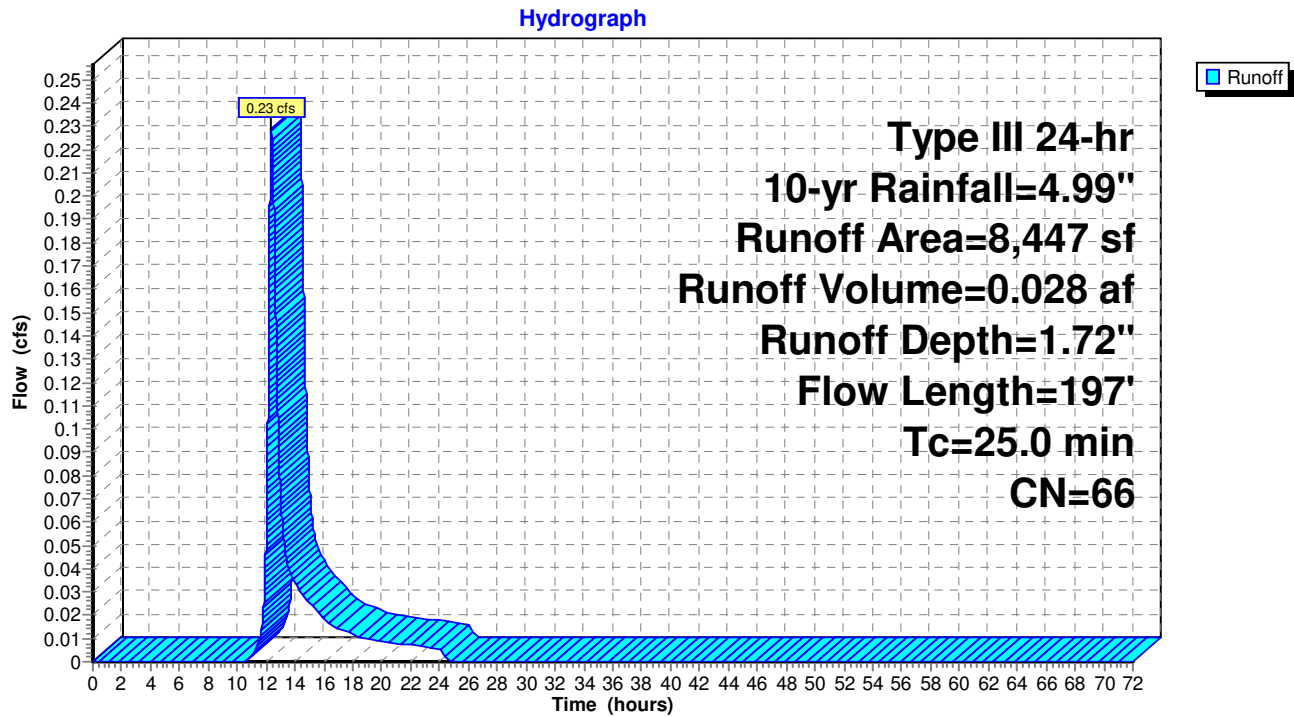
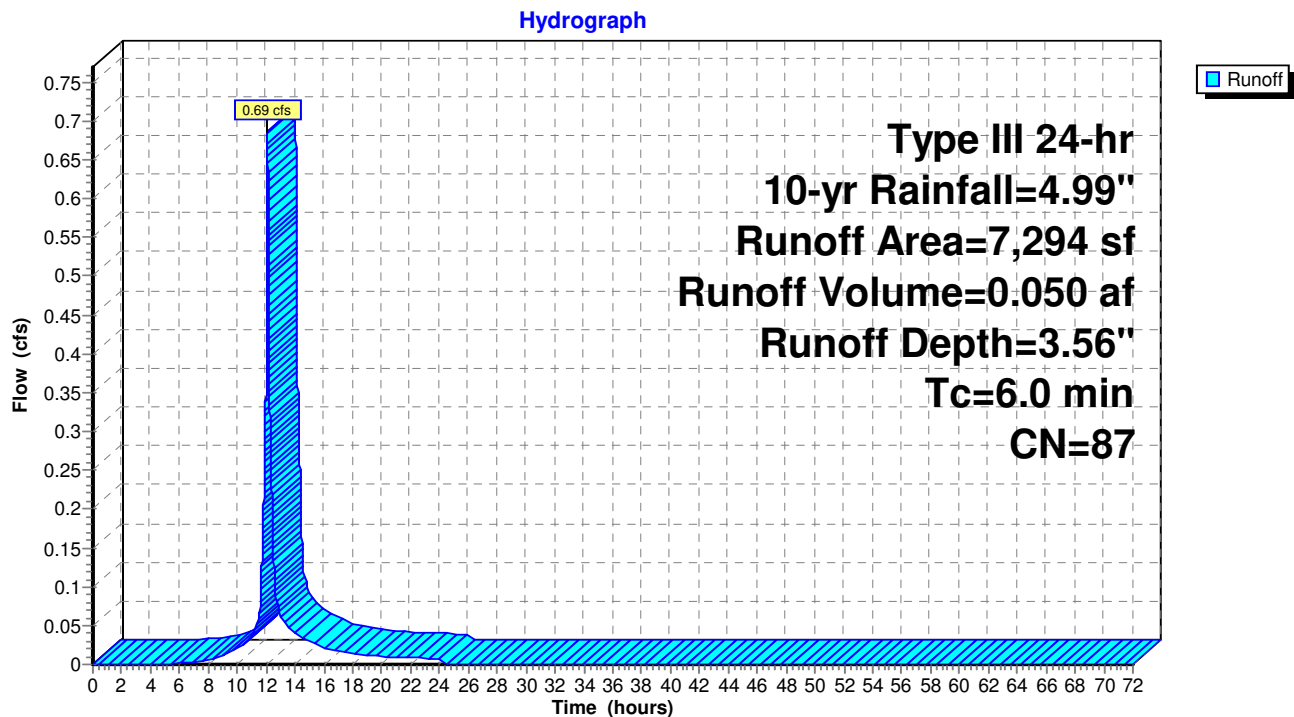


### Subcatchment E5: Existing E5



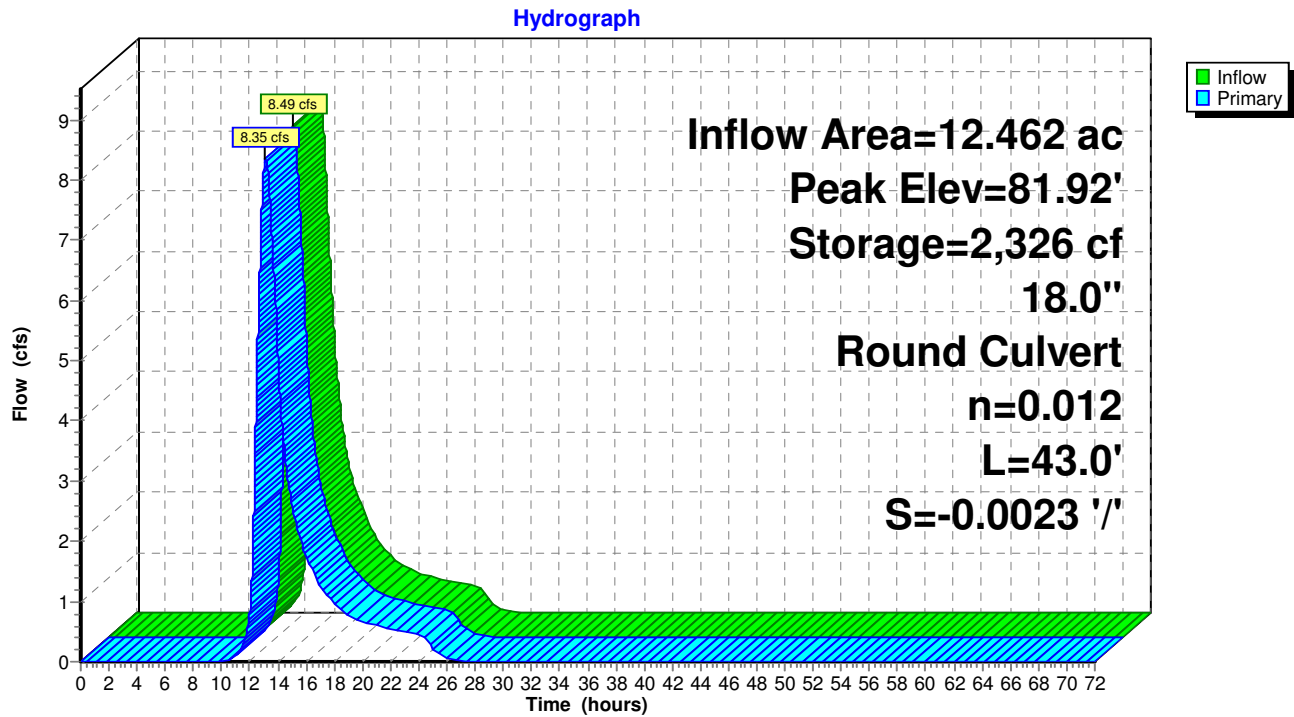
### Subcatchment E6: Existing Sheet flow to Kennedy Road



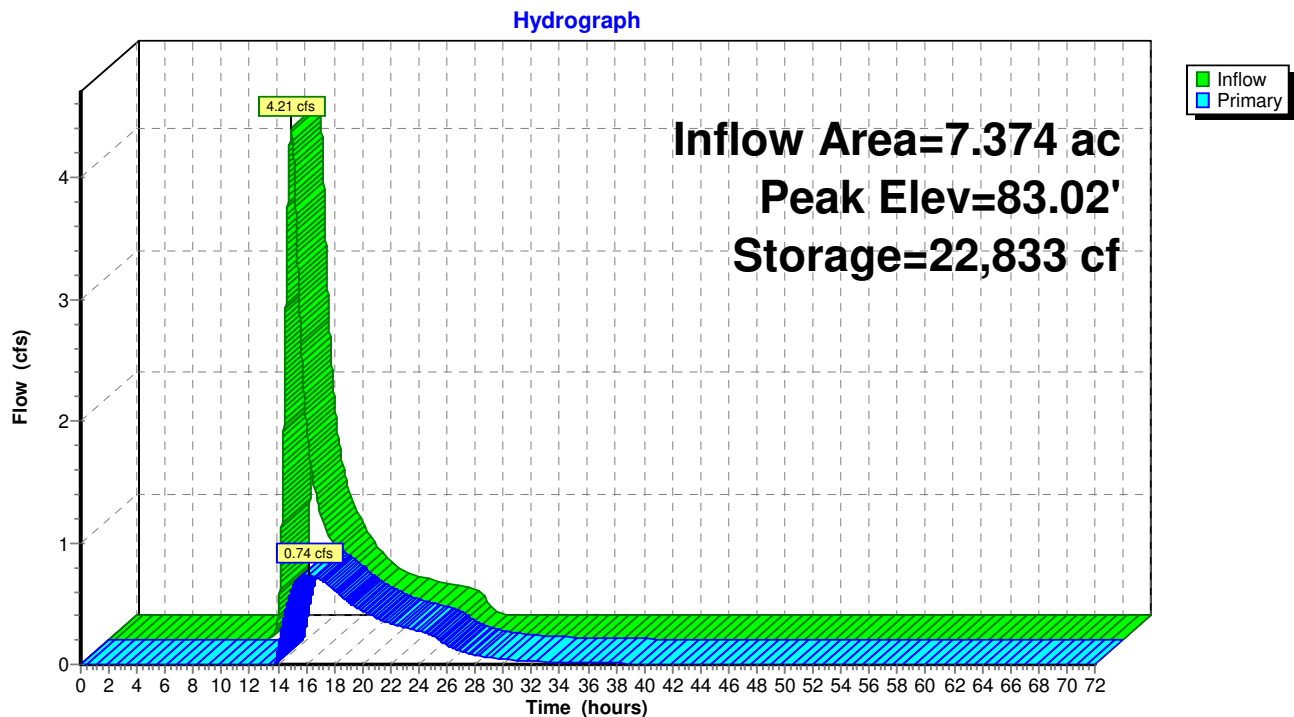
**Subcatchment E7: Existing E7****Subcatchment E8: Existing Kennedy Road runoff to CB**



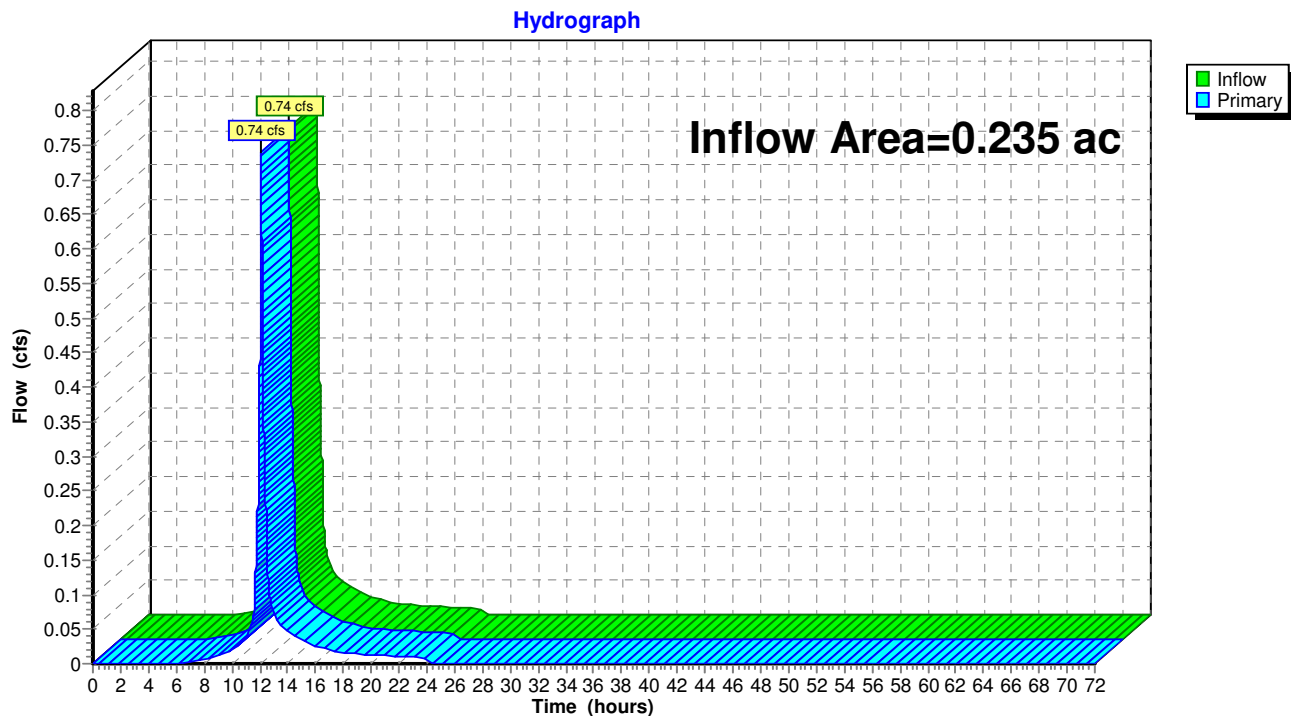
### Pond EP1: (DP1) Existing Rail Road Pond



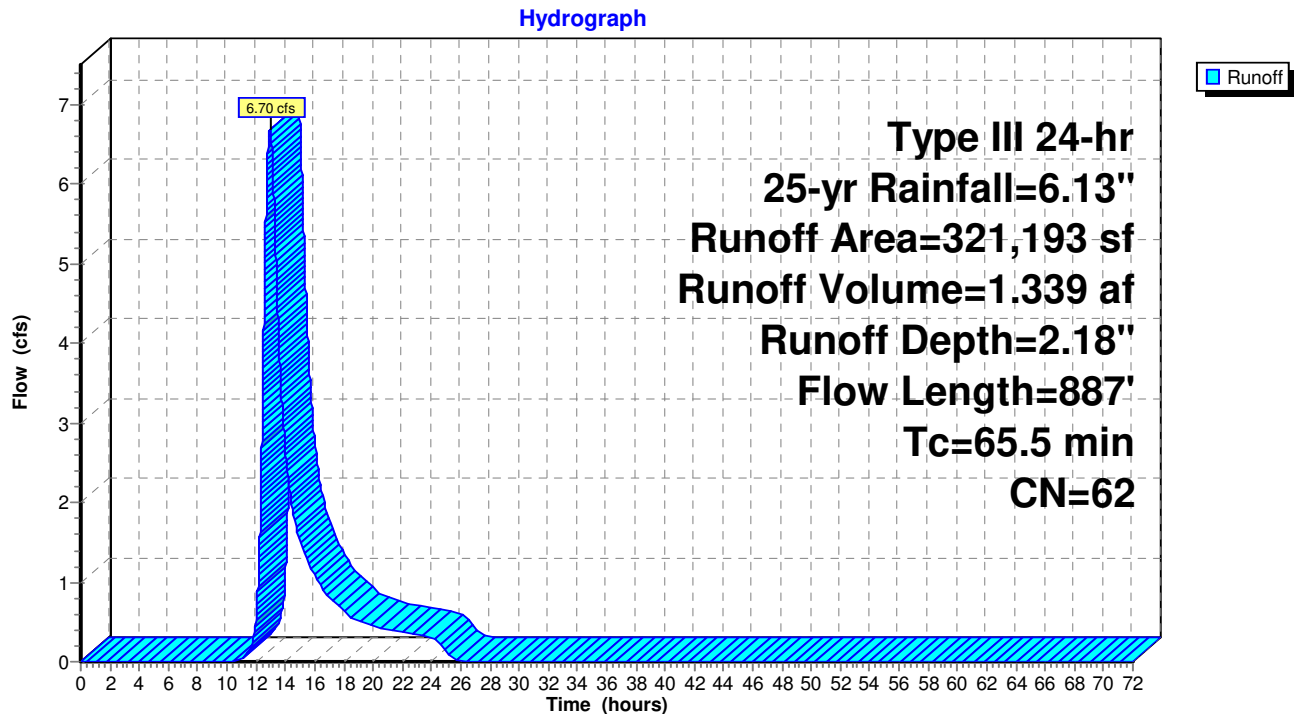
### Pond EP2: (DP3) Existing Depression Adjacent to Sullivan Ave



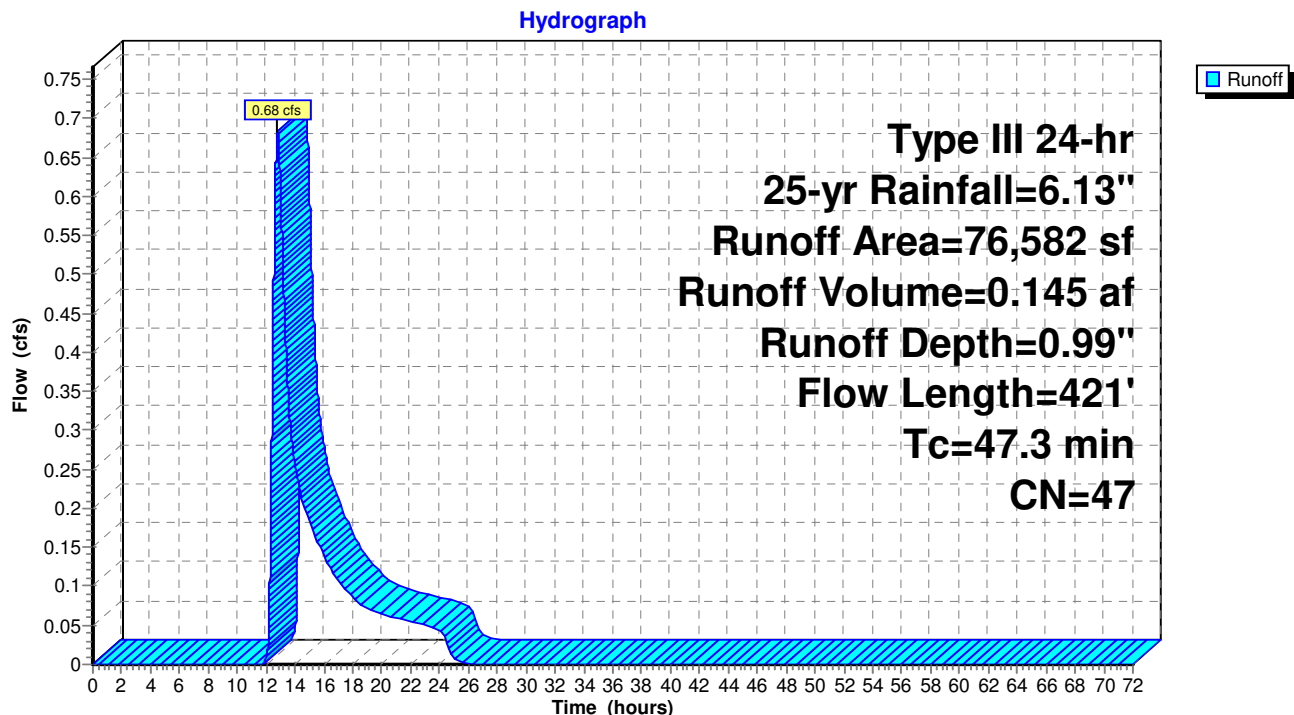
## Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System



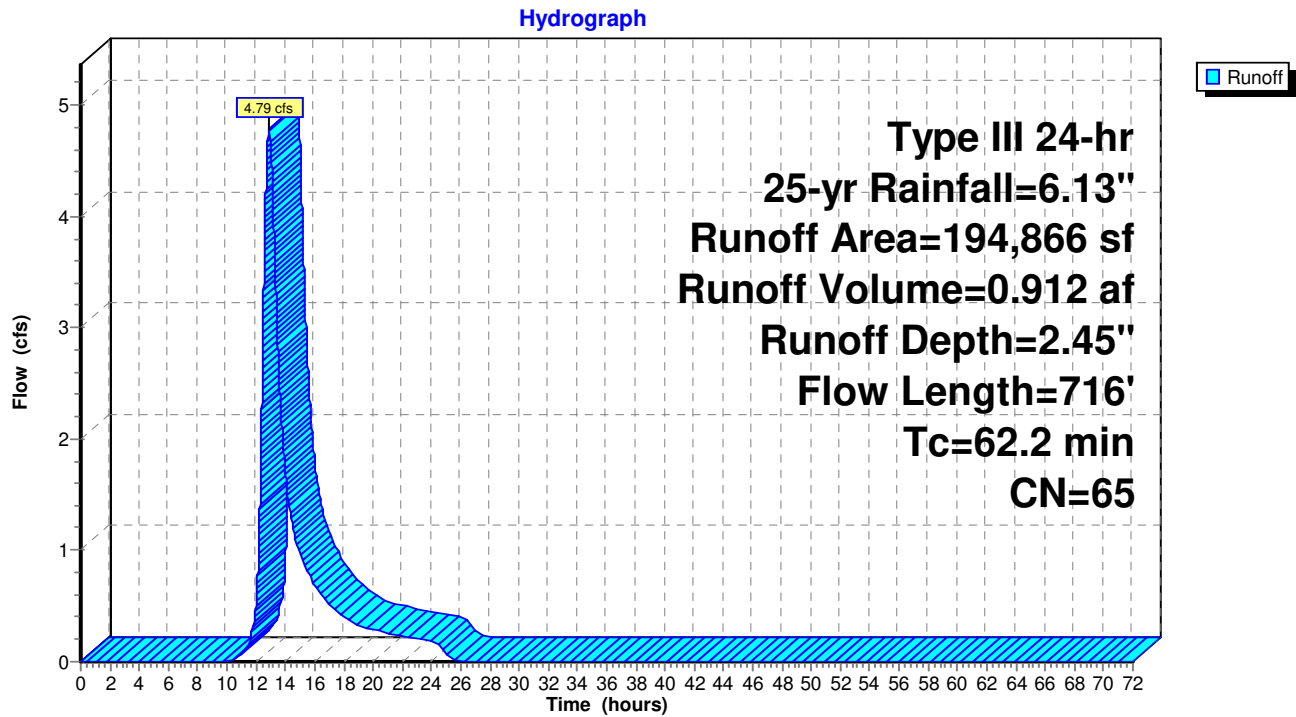
### Subcatchment E1: Existing Flow to Sullivan Ave



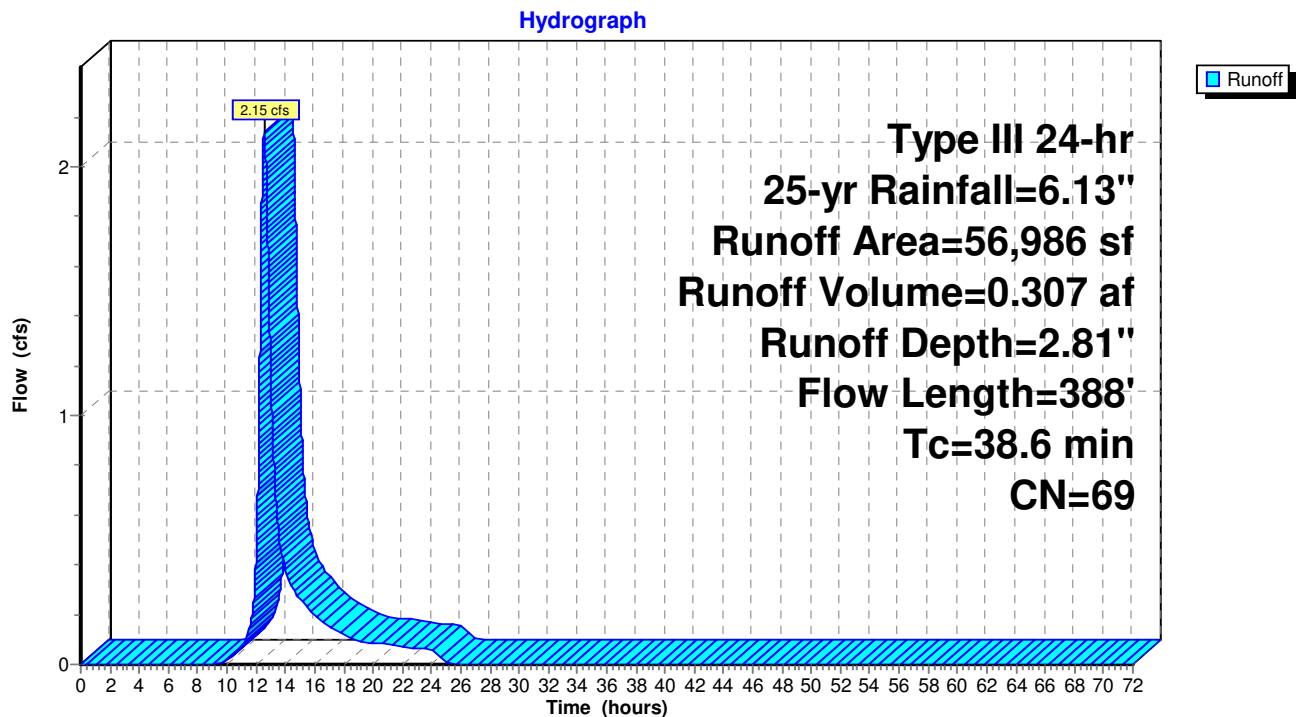
### Subcatchment E2: (DP2) Existing Flow across North West Property Corner



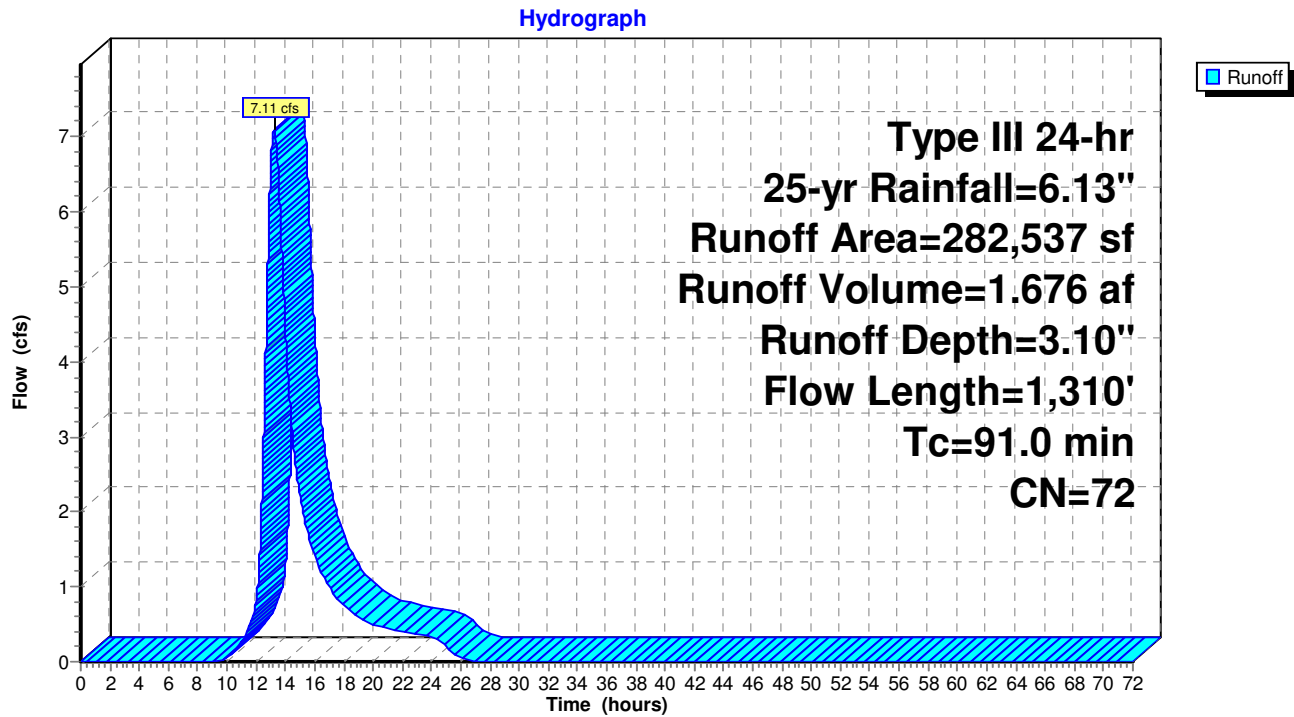
### Subcatchment E3: Existing E3



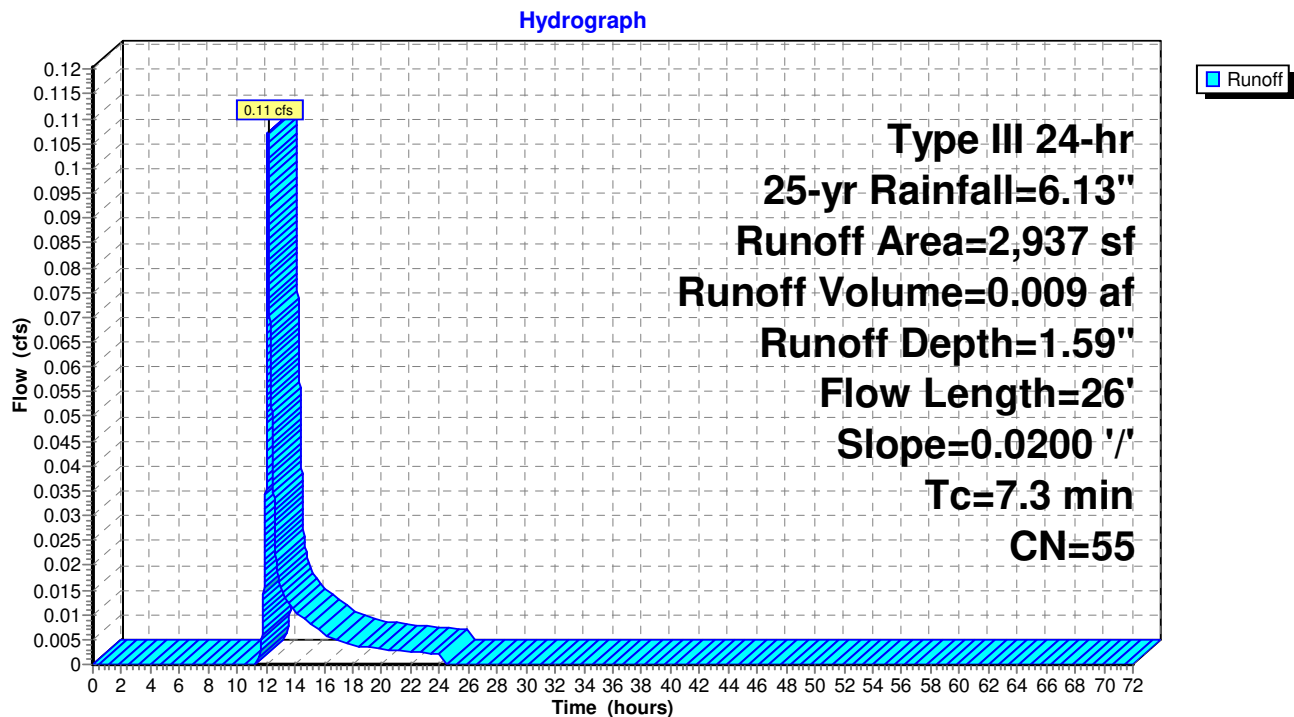
### Subcatchment E4: Existing E4



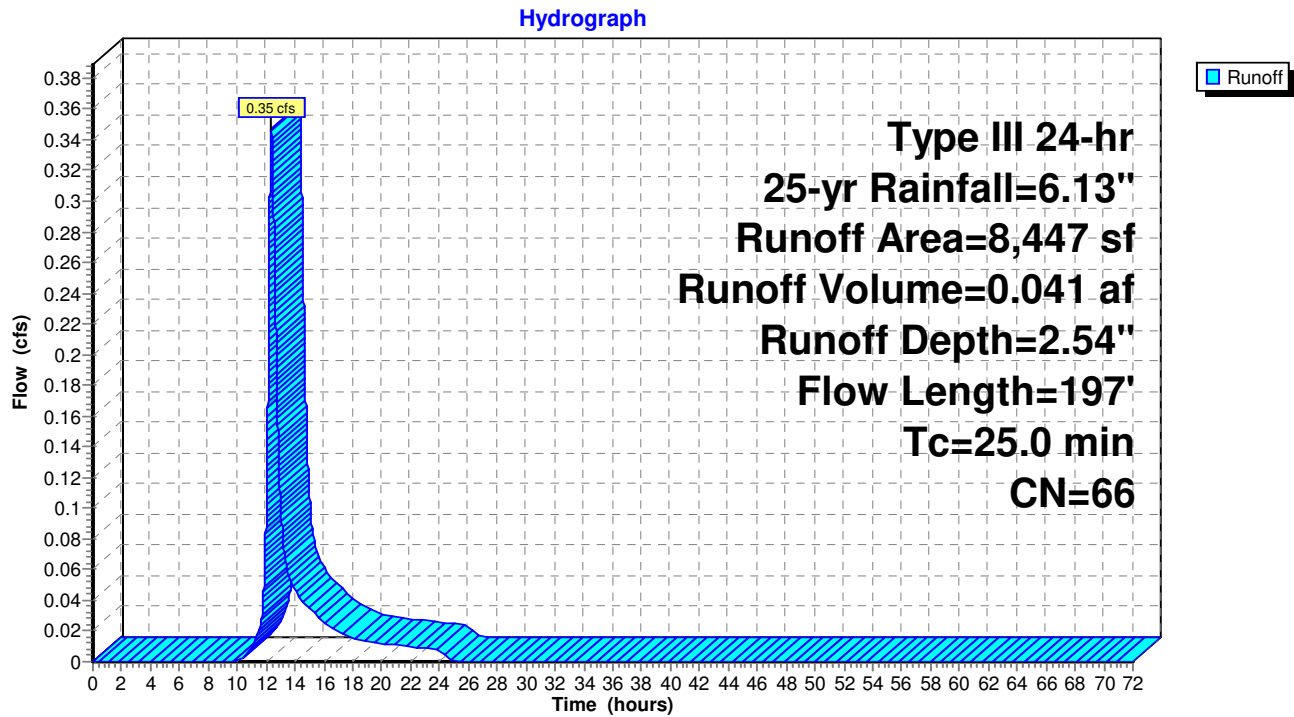
### Subcatchment E5: Existing E5



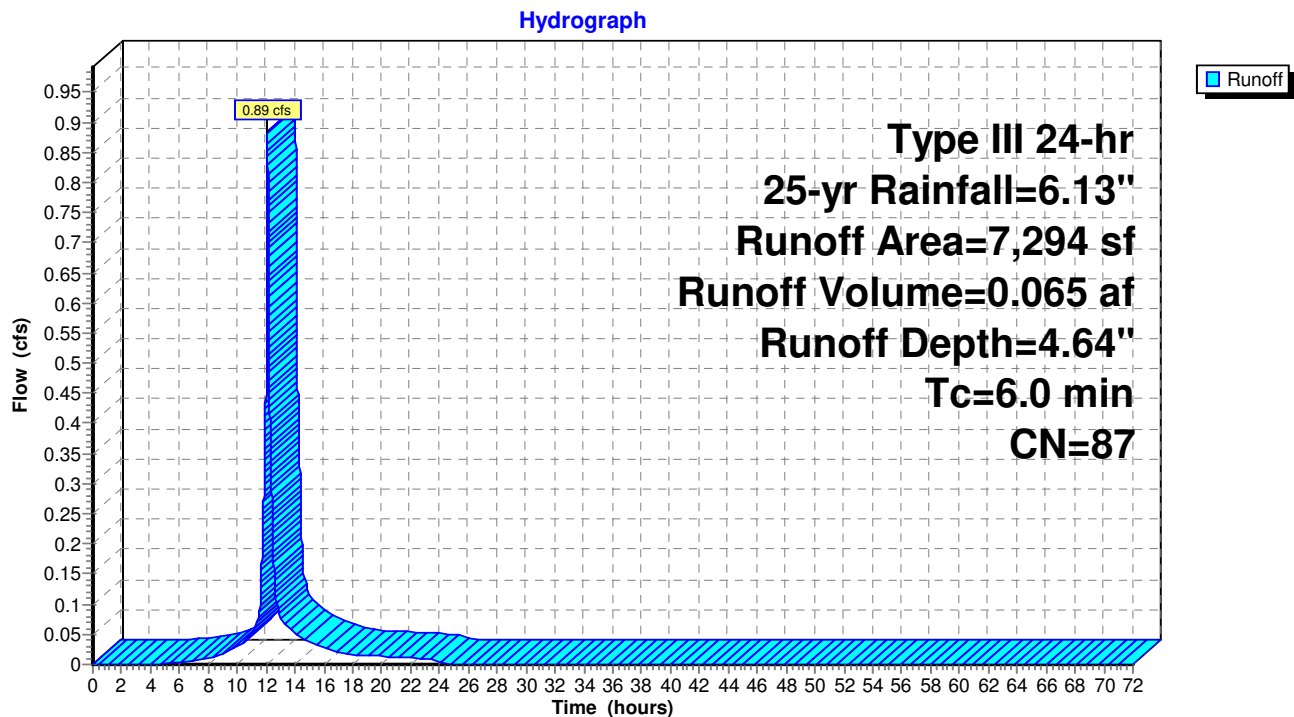
### Subcatchment E6: Existing Sheet flow to Kennedy Road



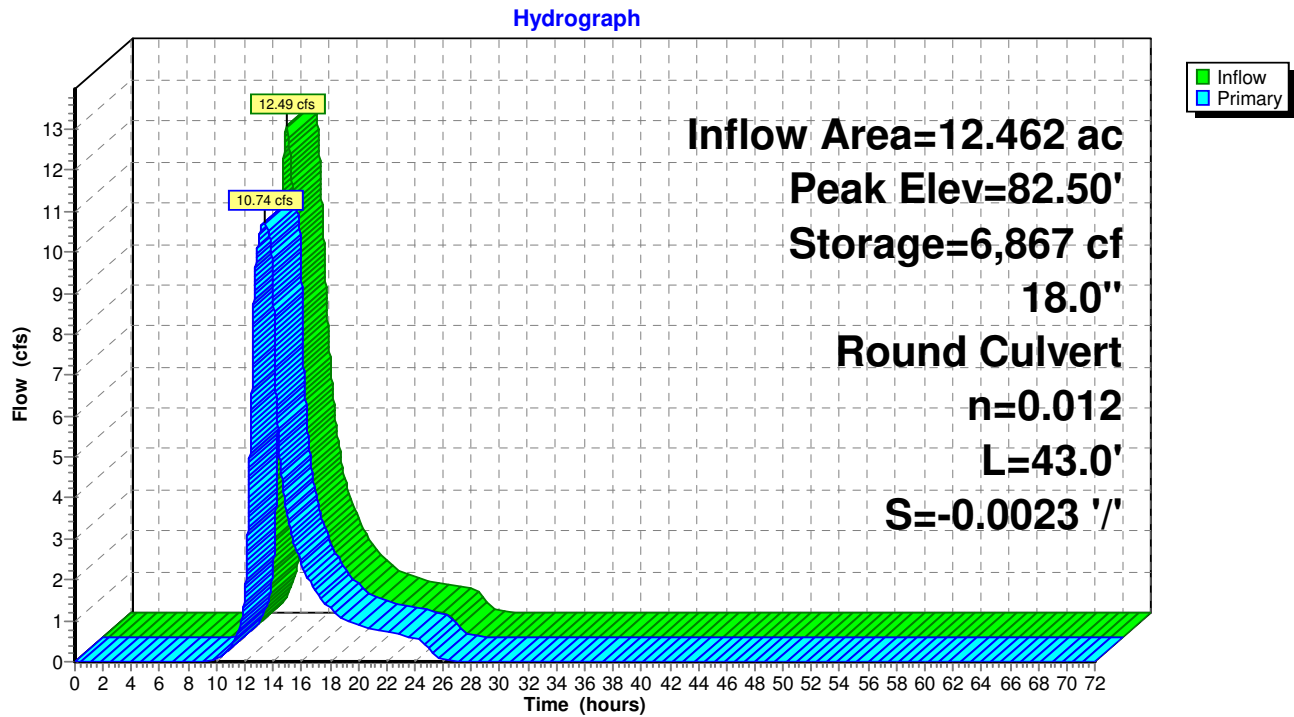
### Subcatchment E7: Existing E7



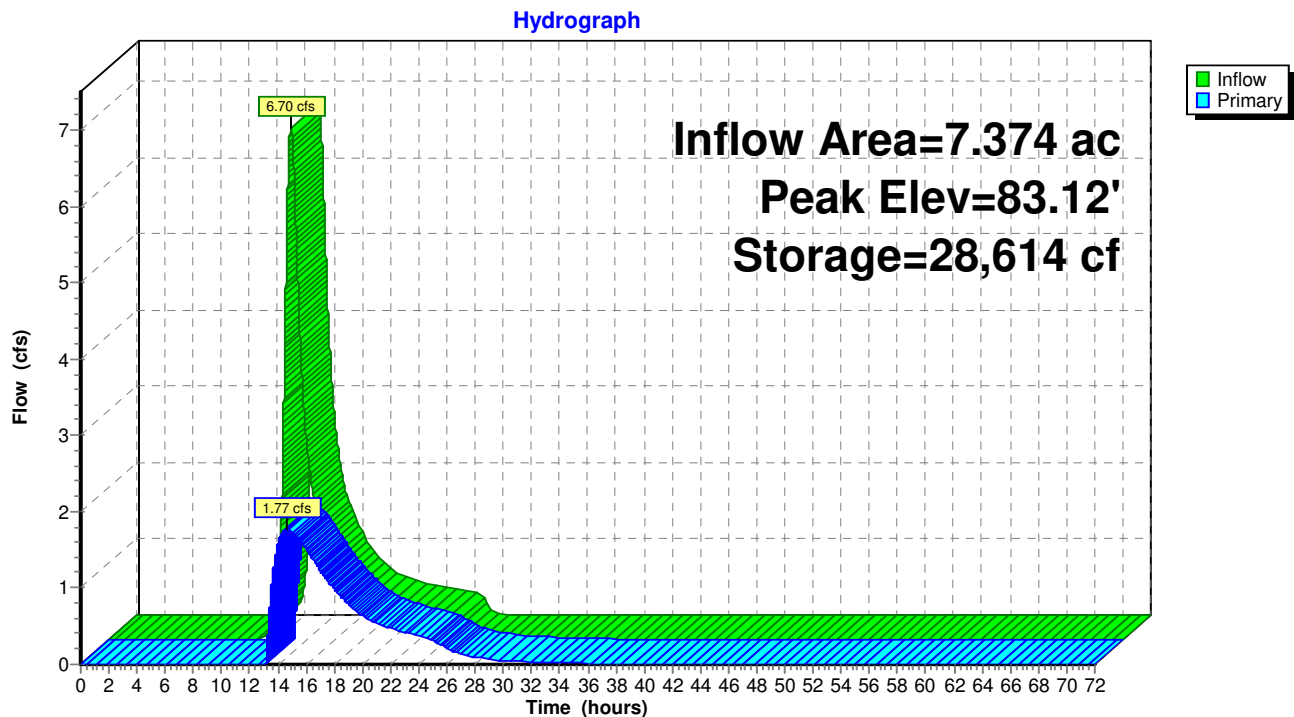
### Subcatchment E8: Existing Kennedy Road runoff to CB



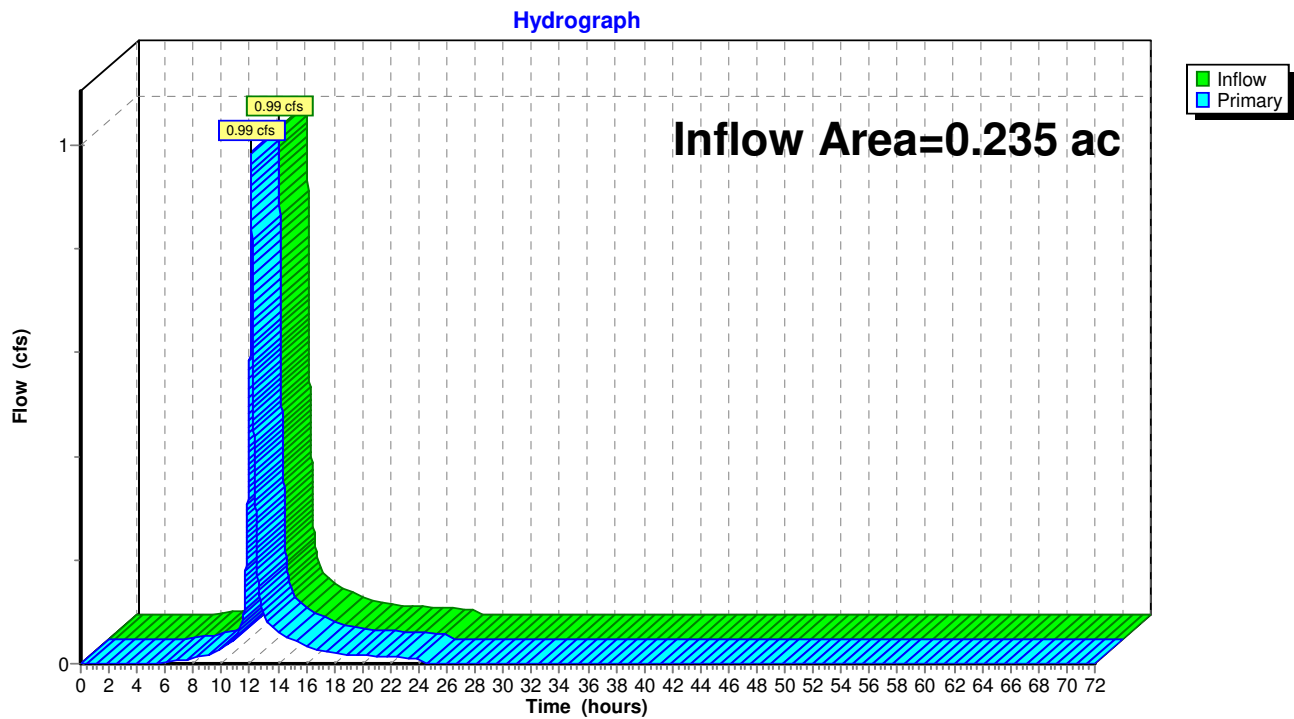
### Pond EP1: (DP1) Existing Rail Road Pond



### Pond EP2: (DP3) Existing Depression Adjacent to Sullivan Ave



### Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System





## 4670 Hydrocad

Prepared by Design Professionals, Inc.

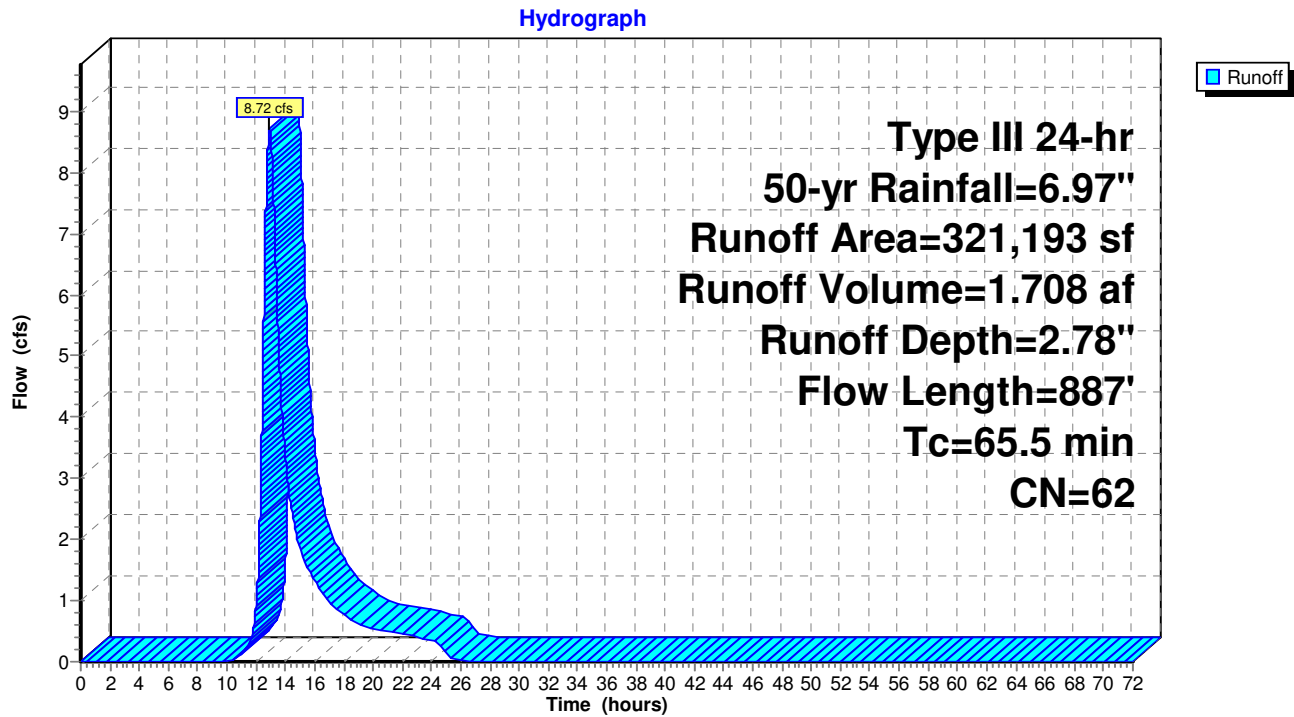
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 50-yr Rainfall=6.97"

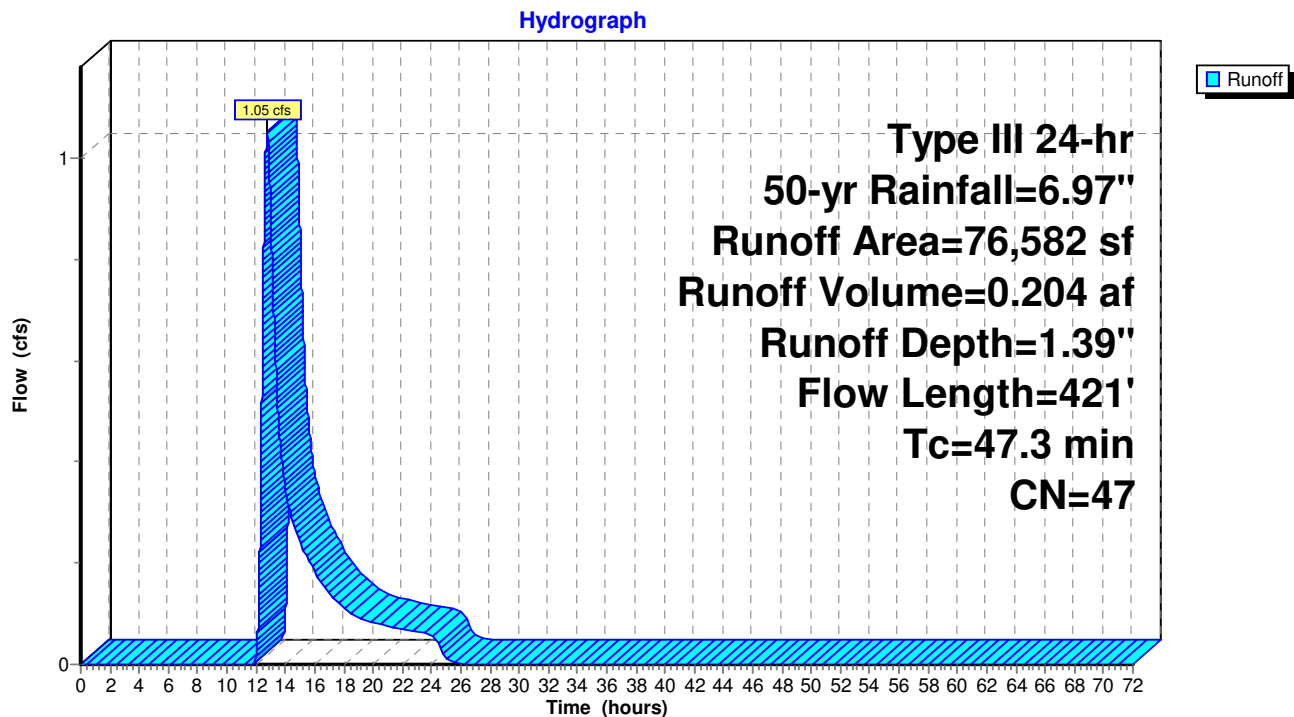
Printed 3/30/2022

Page 34

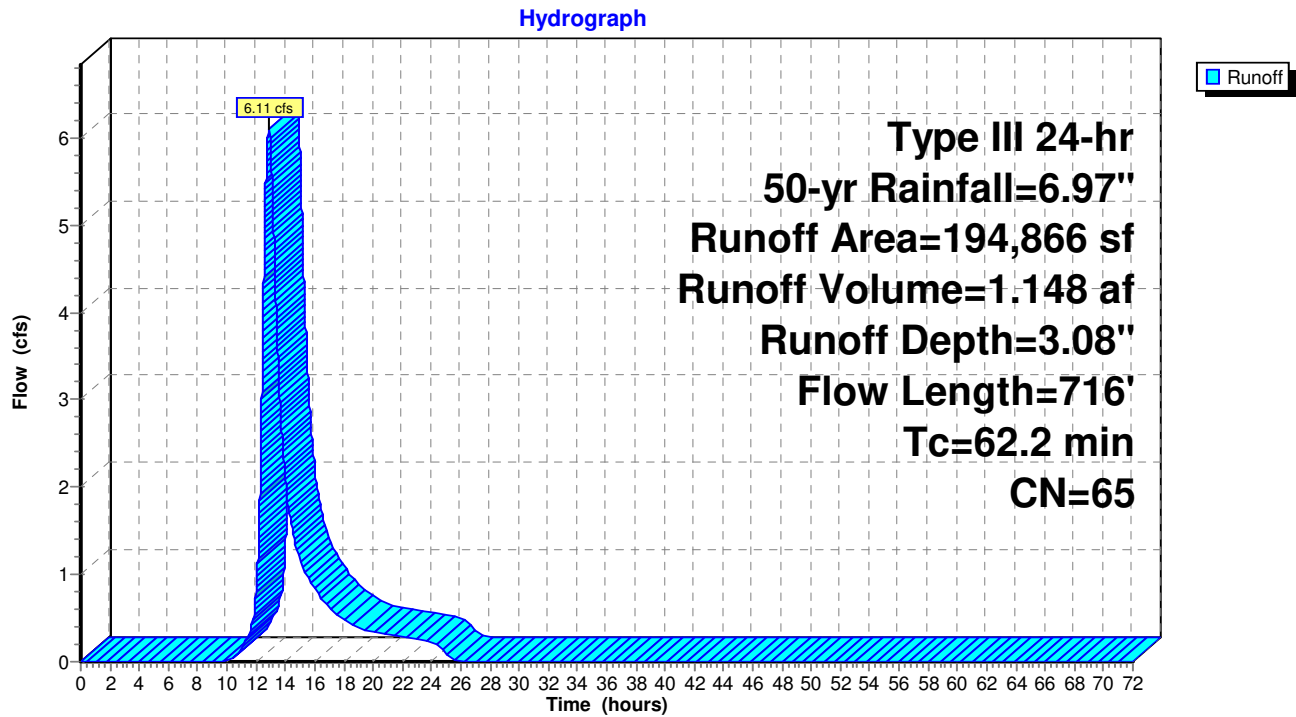
### Subcatchment E1: Existing Flow to Sullivan Ave



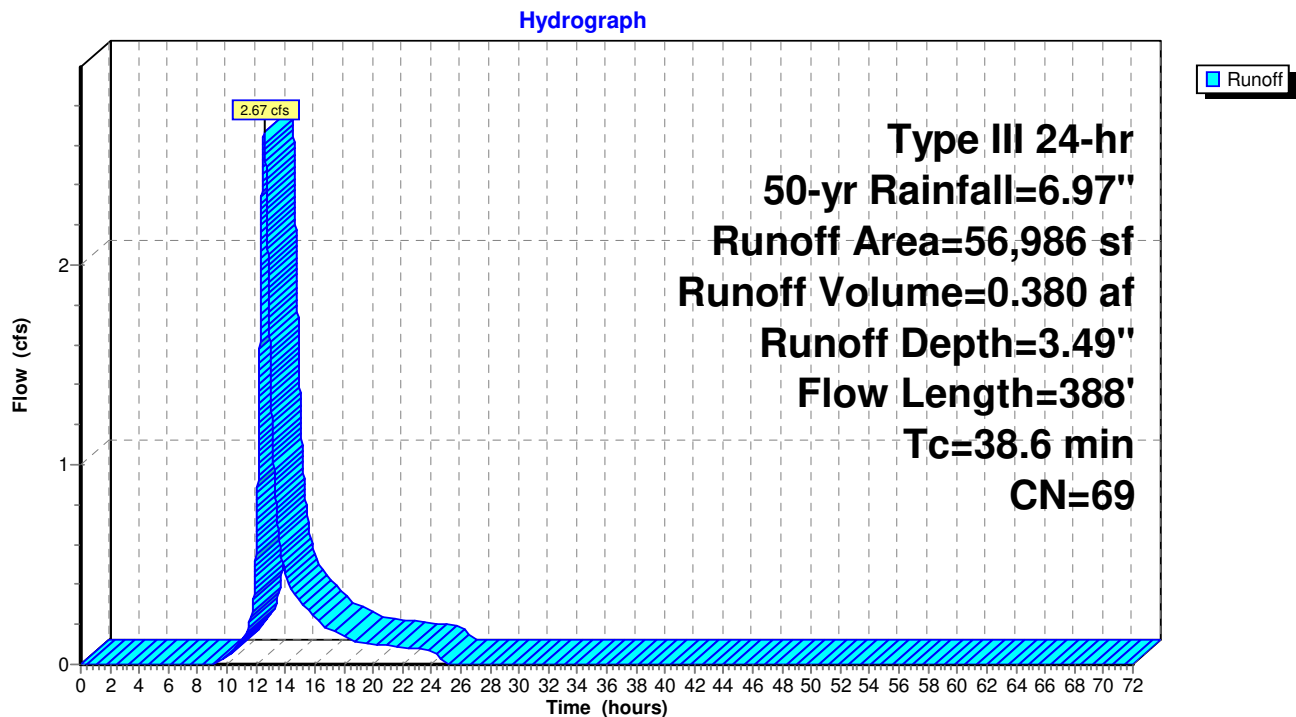
### Subcatchment E2: (DP2) Existing Flow across North West Property Corner



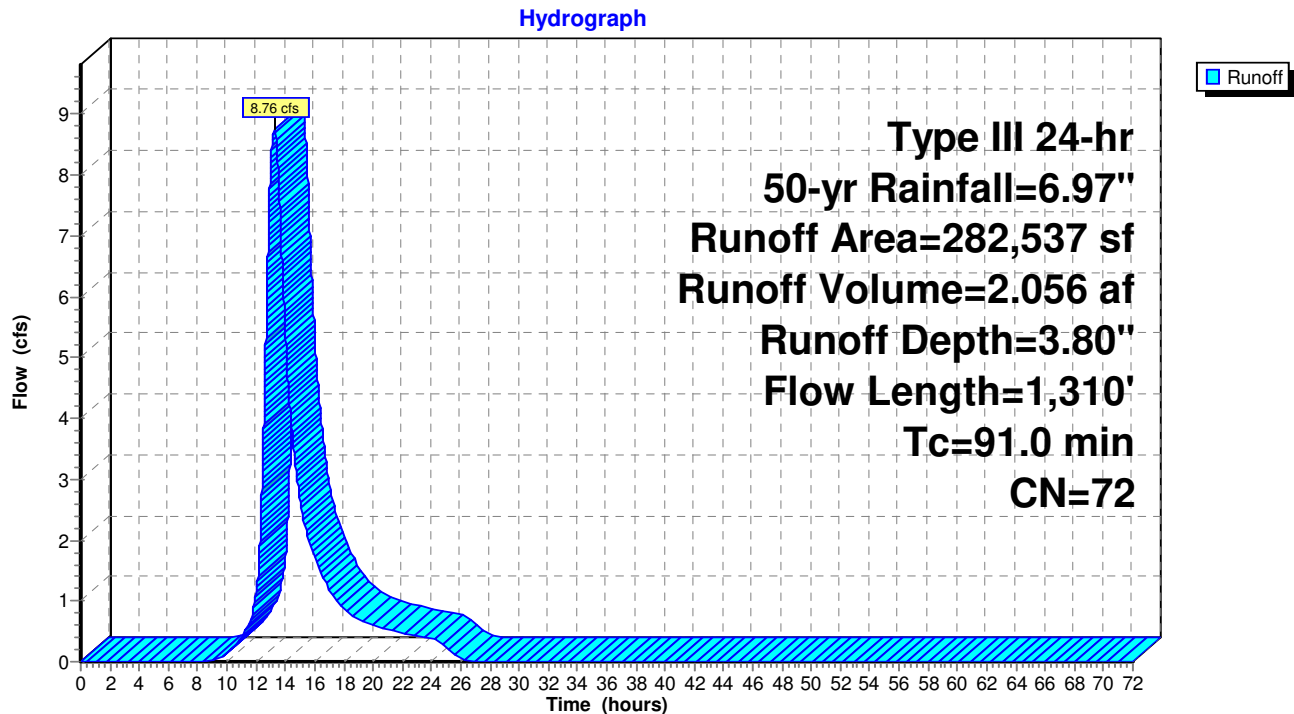
### Subcatchment E3: Existing E3



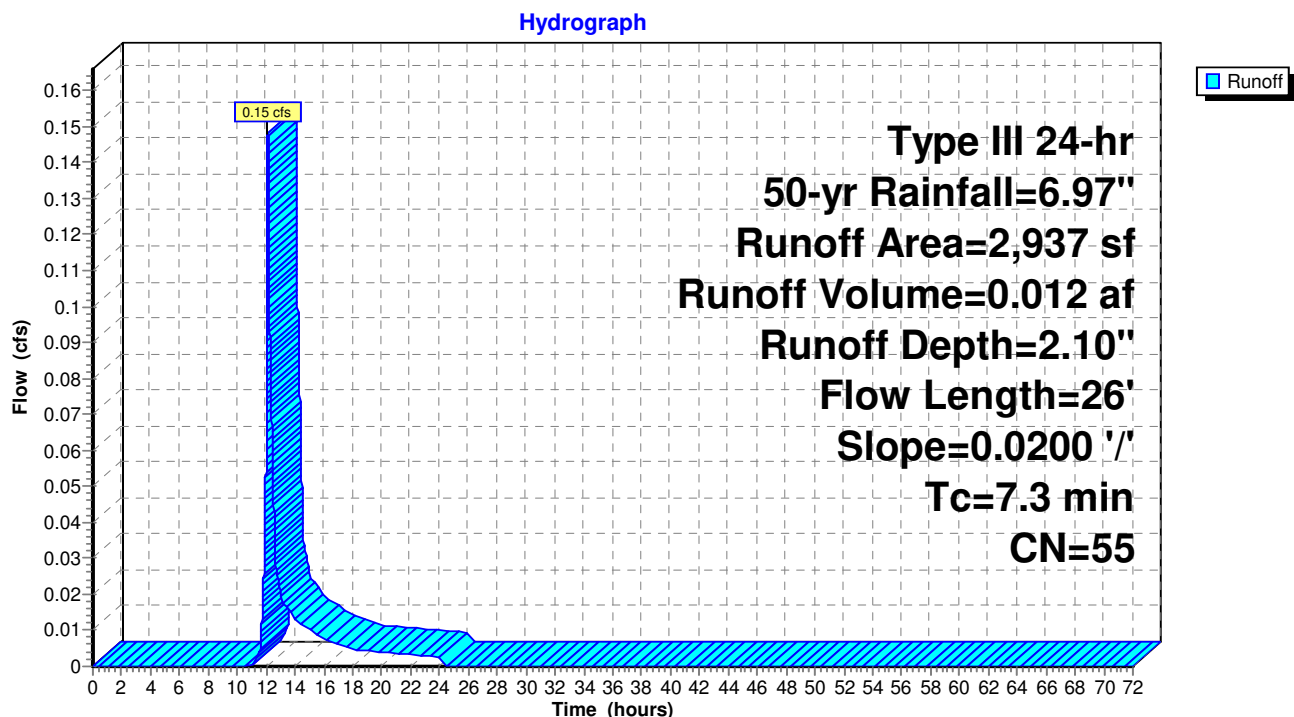
### Subcatchment E4: Existing E4



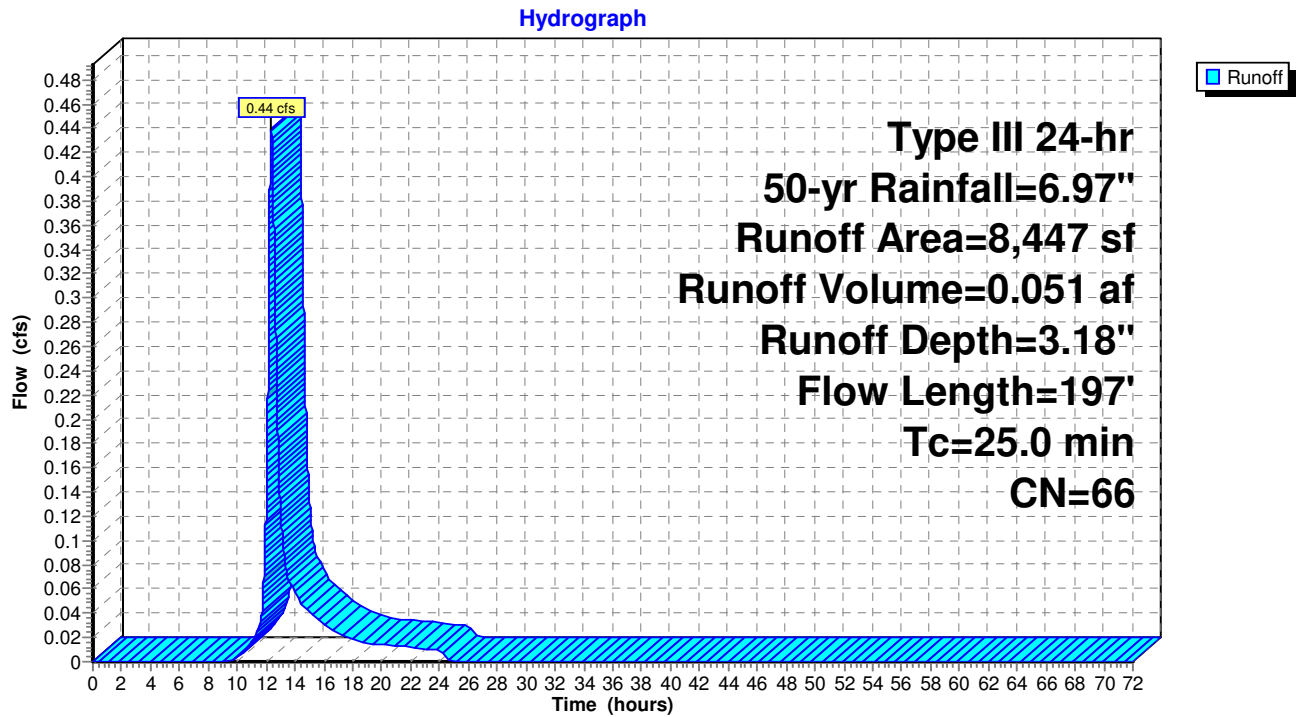
## Subcatchment E5: Existing E5



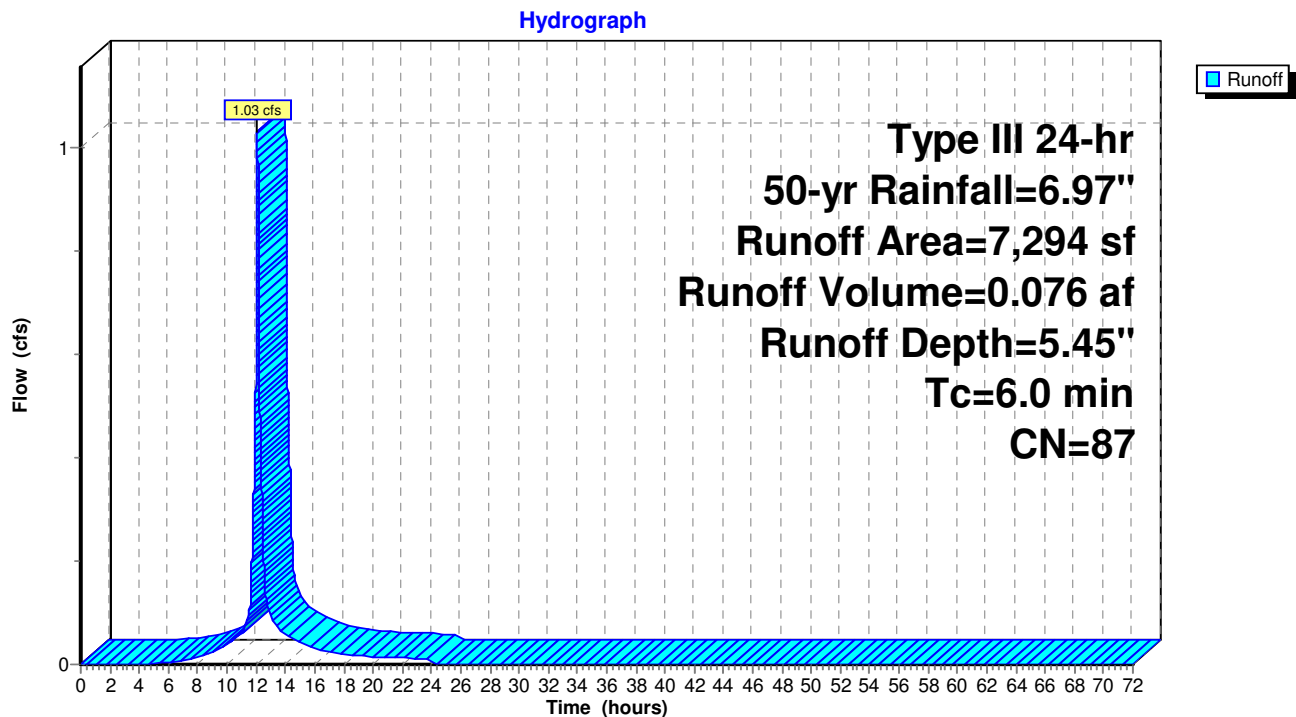
## Subcatchment E6: Existing Sheet flow to Kennedy Road



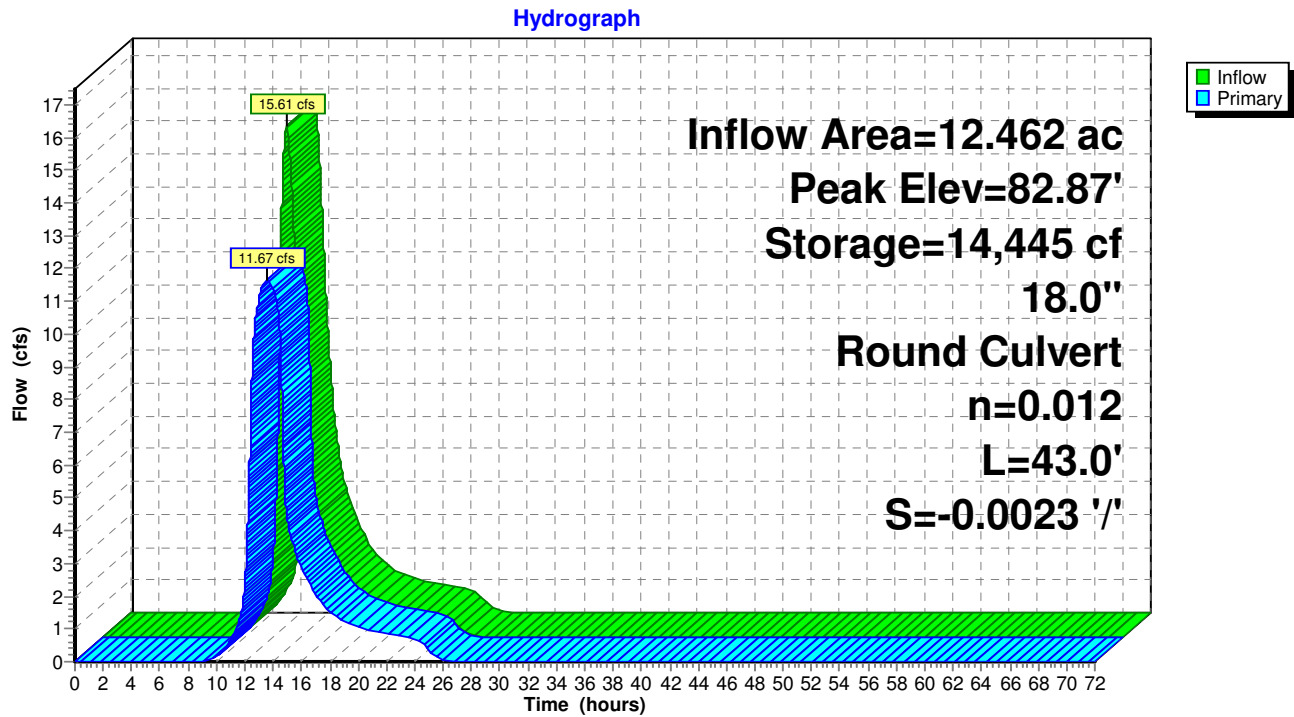
### Subcatchment E7: Existing E7



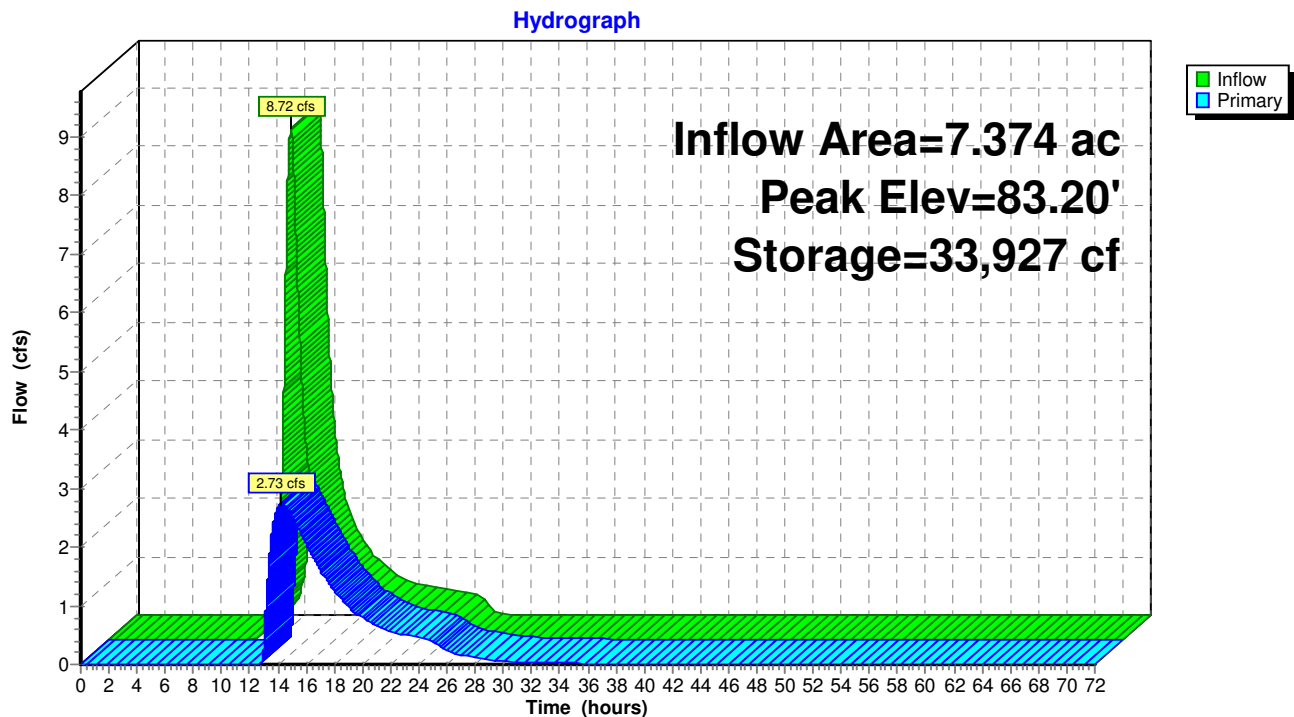
### Subcatchment E8: Existing Kennedy Road runoff to CB



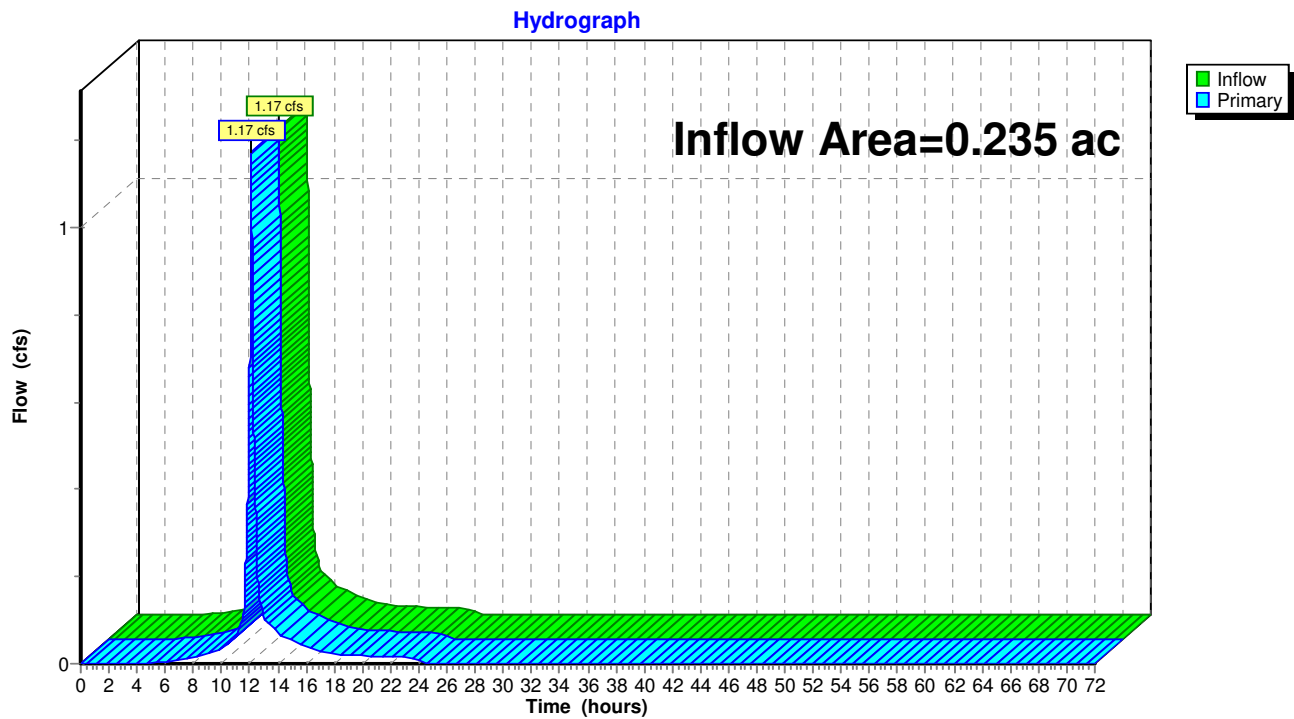
### Pond EP1: (DP1) Existing Rail Road Pond

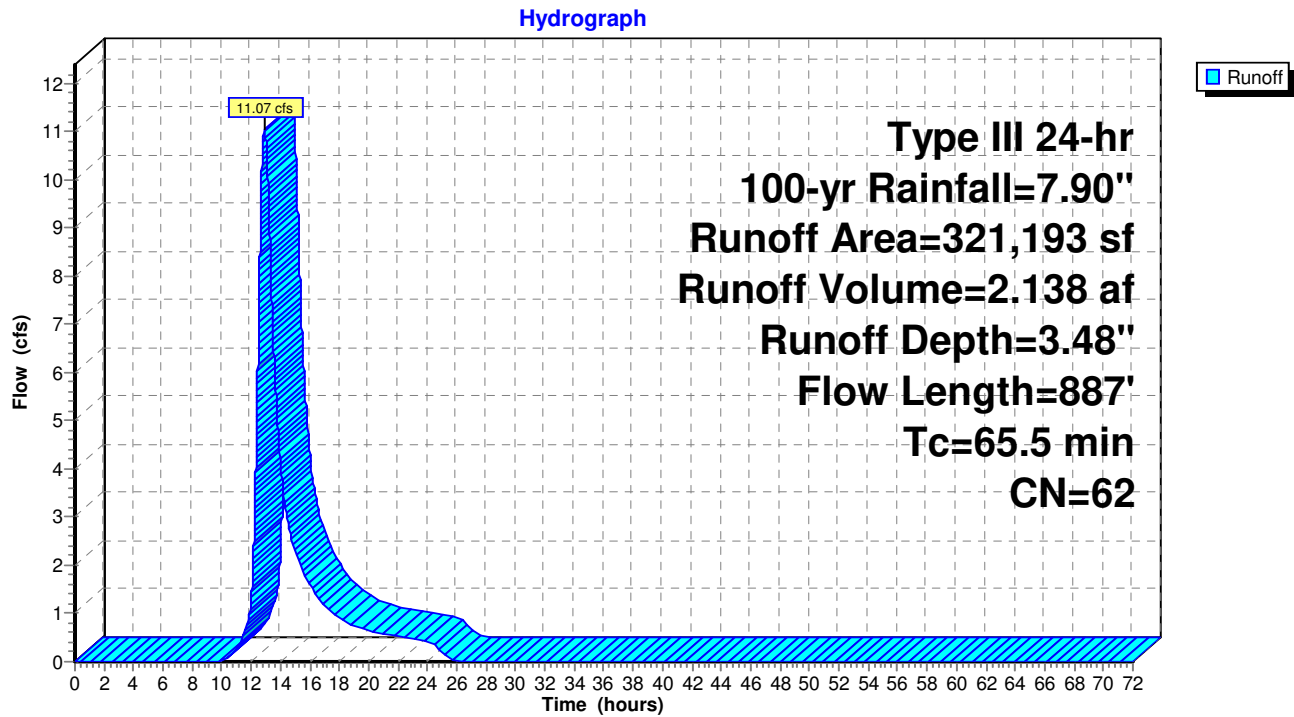
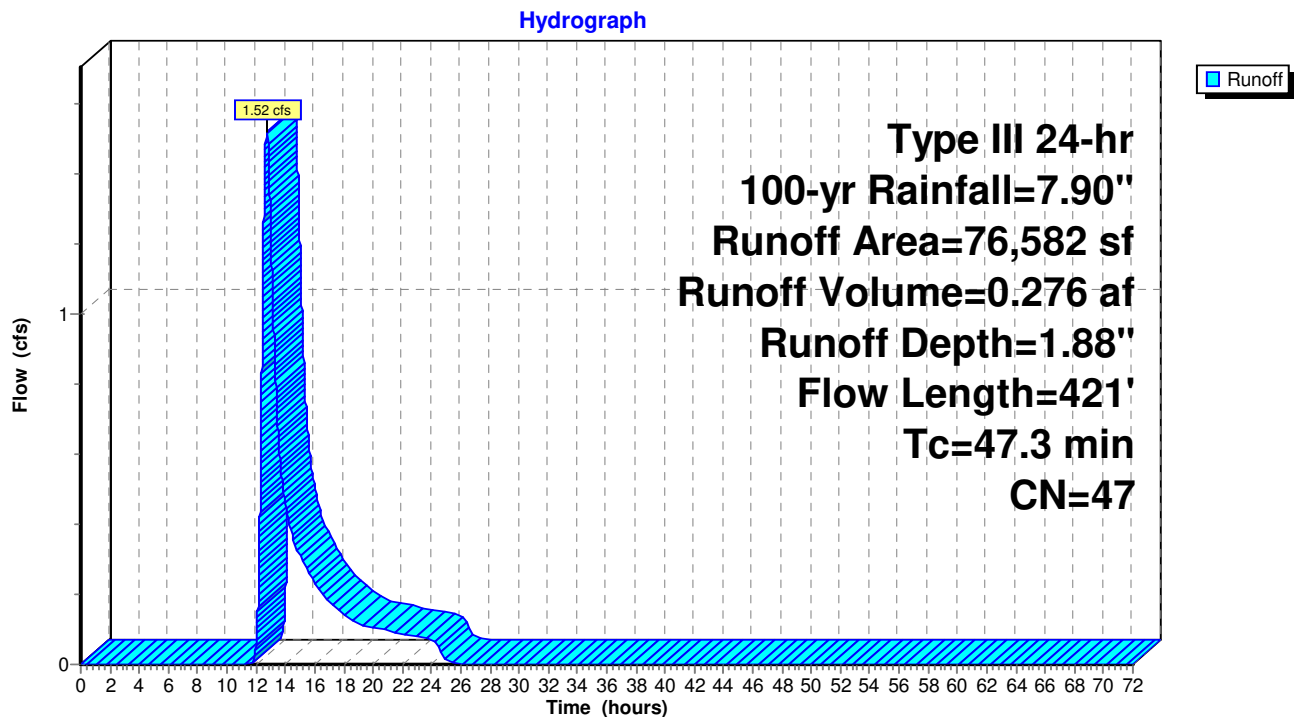


### Pond EP2: (DP3) Existing Depression Adjacent to Sullivan Ave

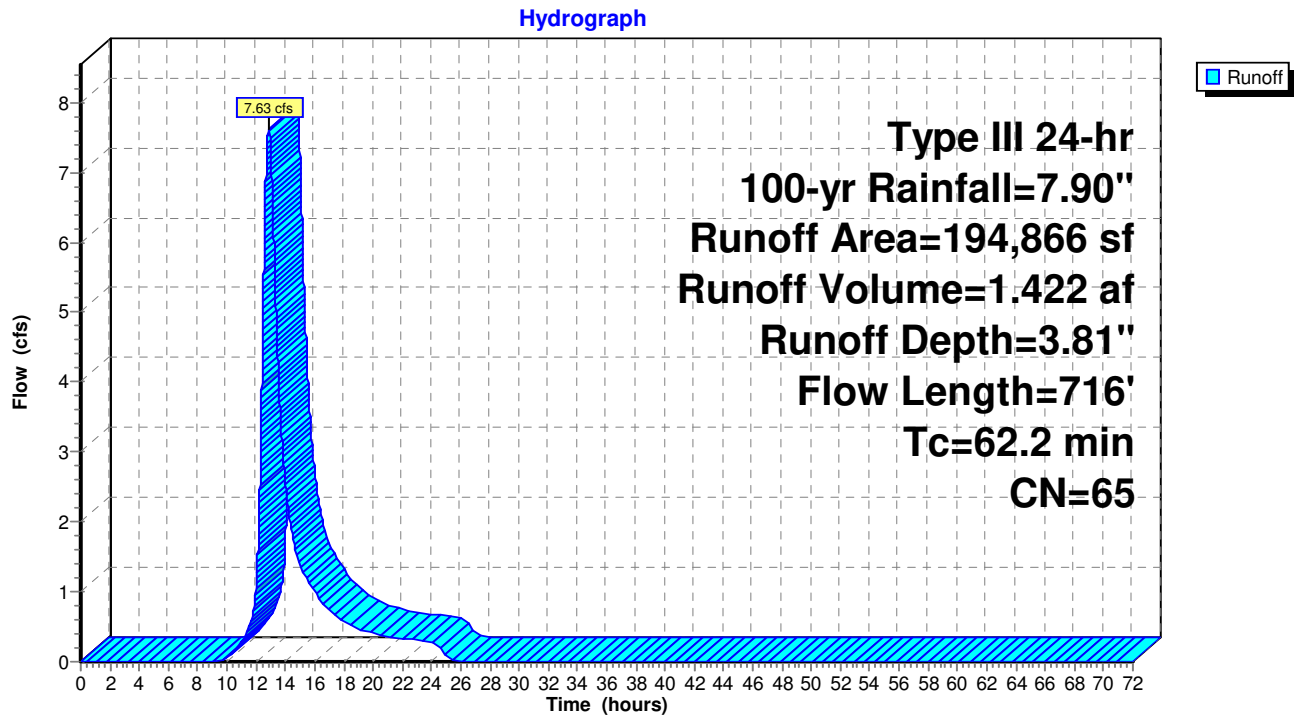


# Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System

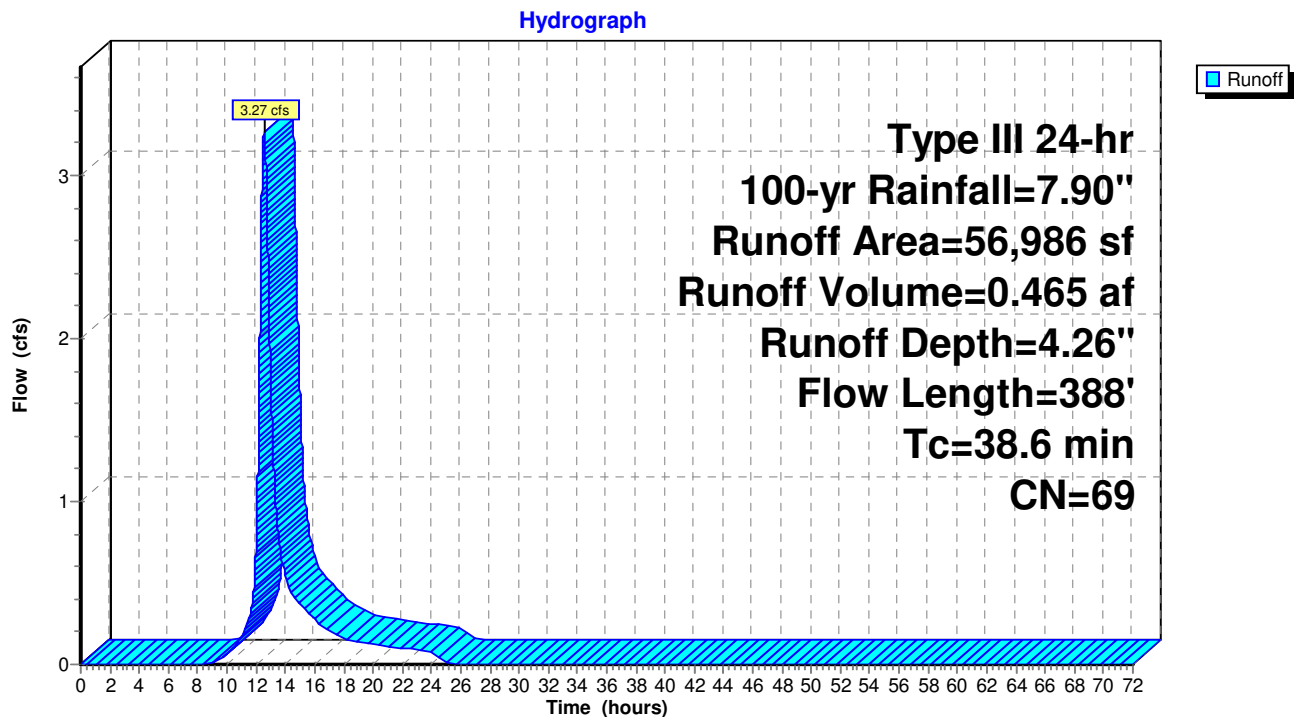


**Subcatchment E1: Existing Flow to Sullivan Ave****Subcatchment E2: (DP2) Existing Flow across North West Property Corner**

## Subcatchment E3: Existing E3



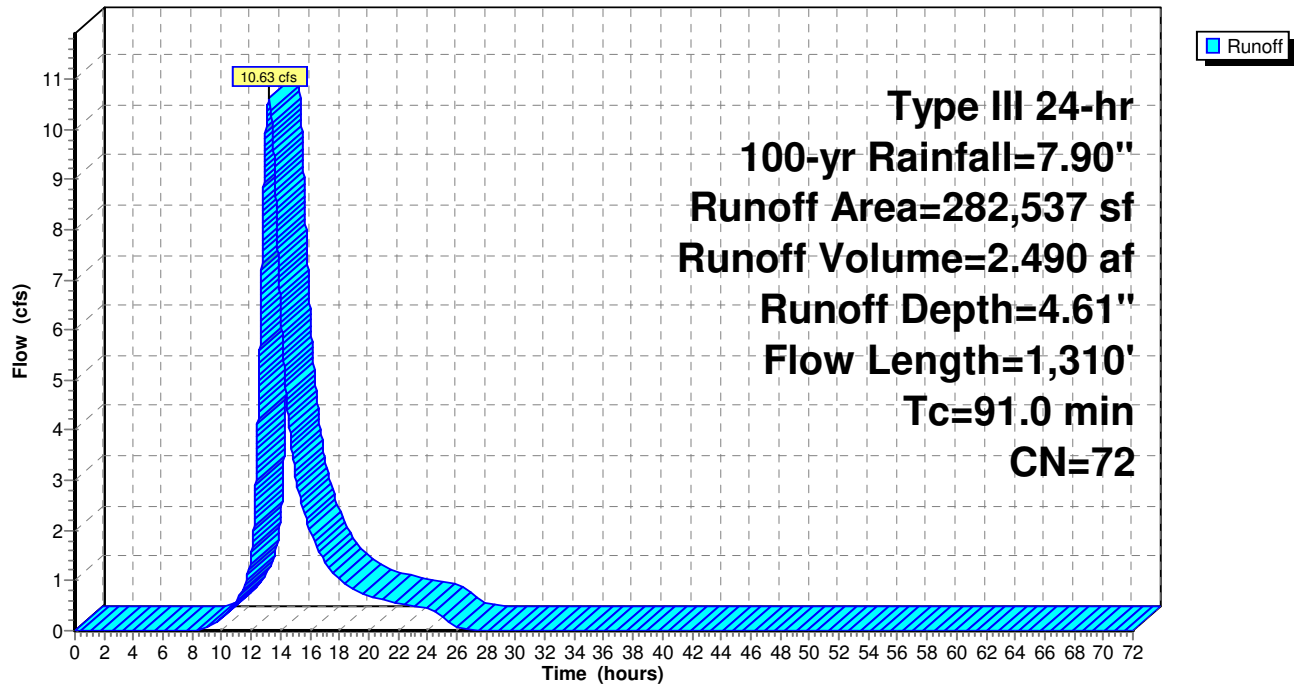
## Subcatchment E4: Existing E4





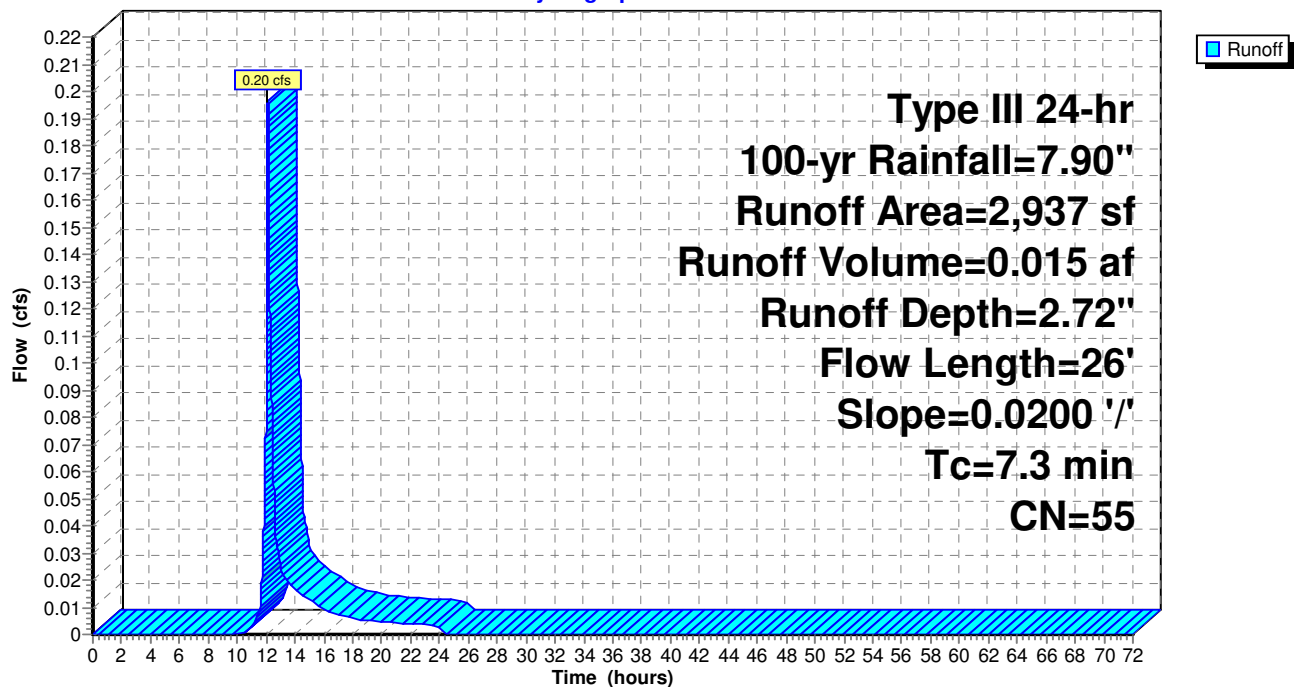
### Subcatchment E5: Existing E5

Hydrograph

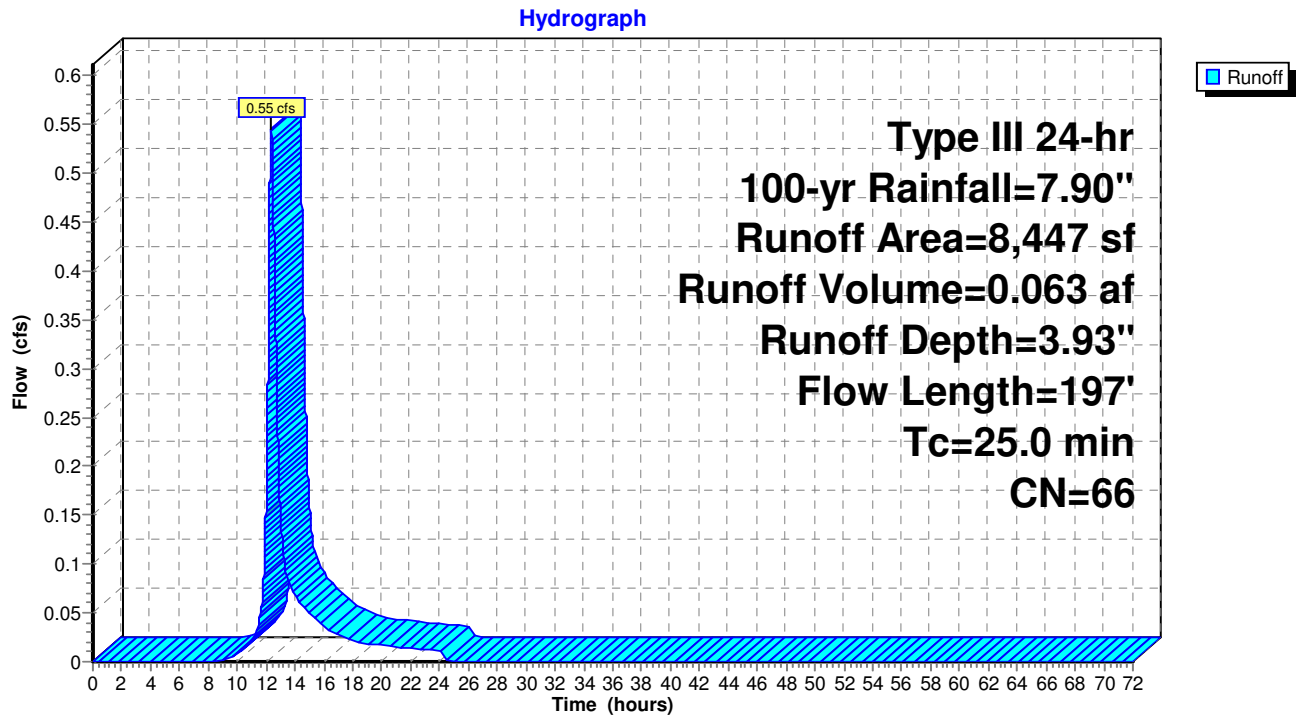


### Subcatchment E6: Existing Sheet flow to Kennedy Road

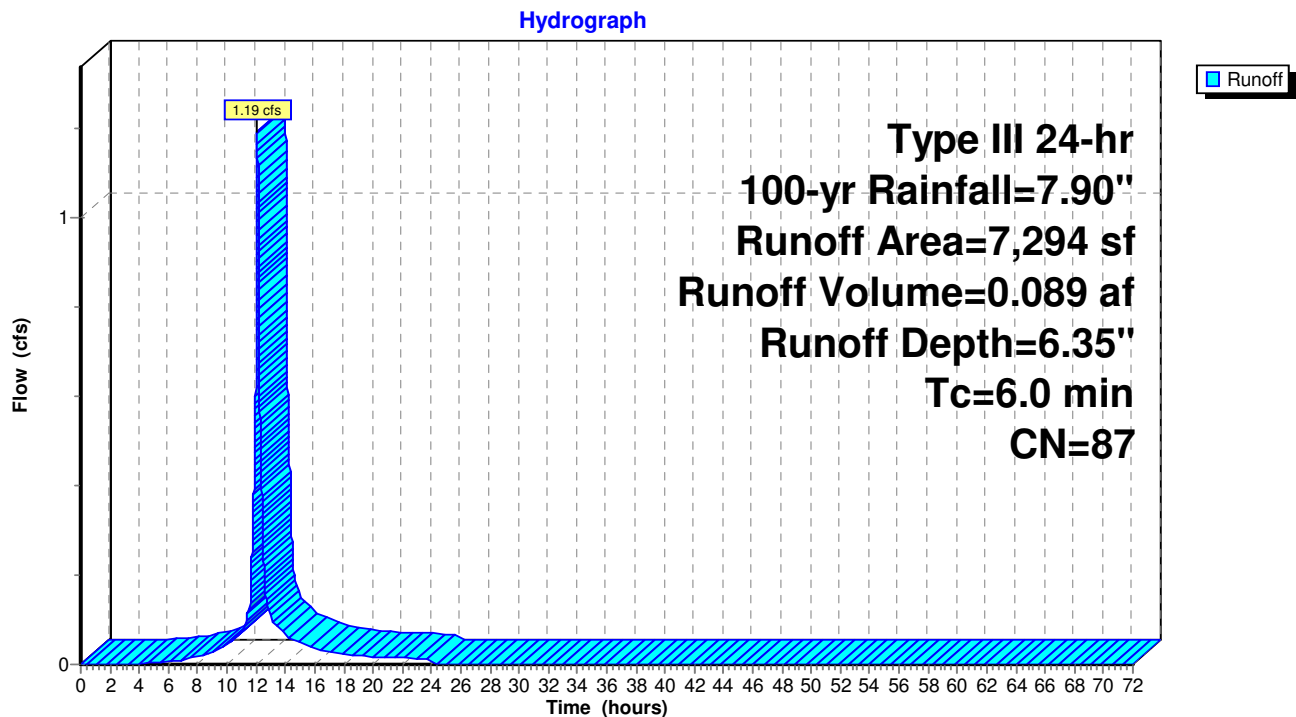
Hydrograph



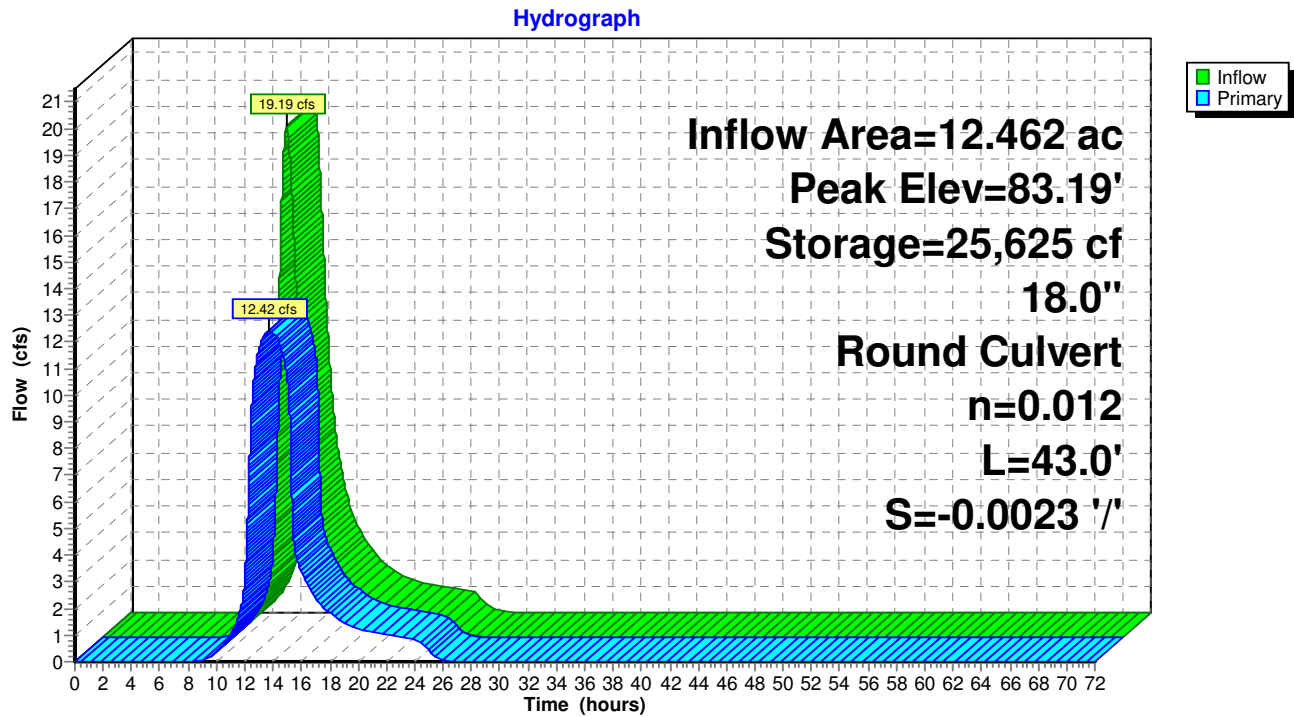
### Subcatchment E7: Existing E7



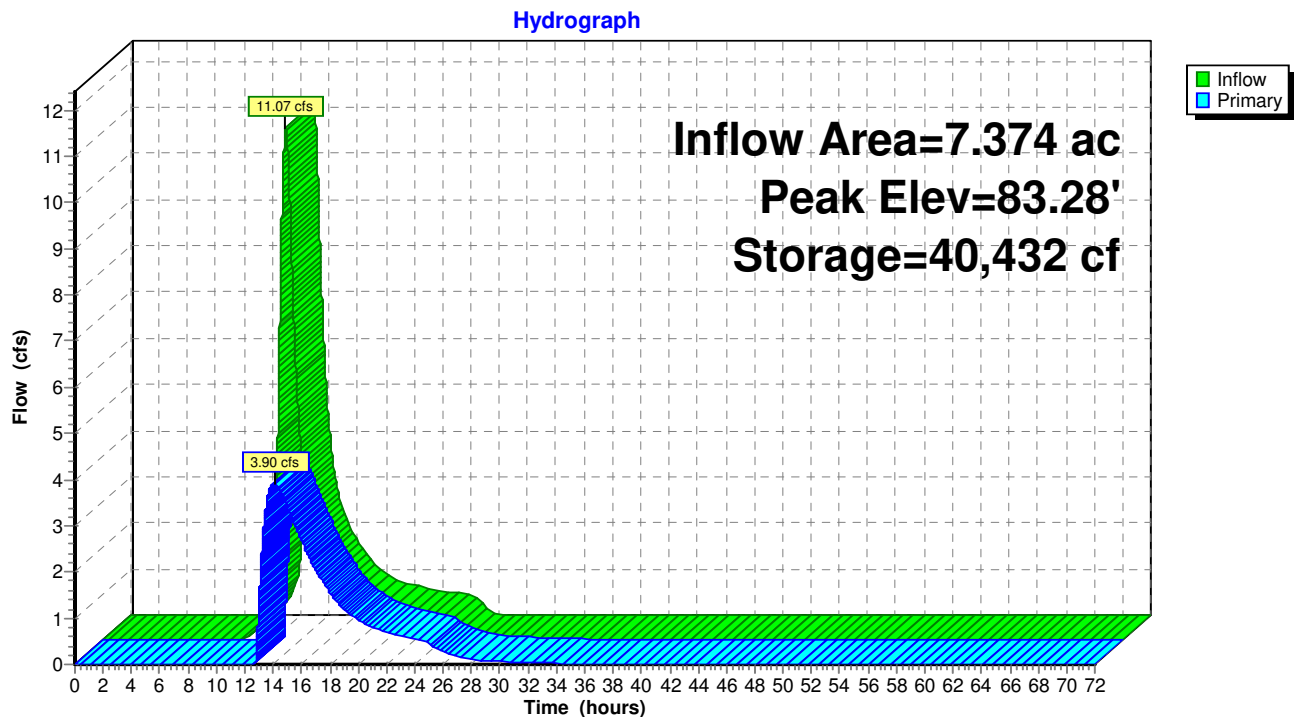
### Subcatchment E8: Existing Kennedy Road runoff to CB



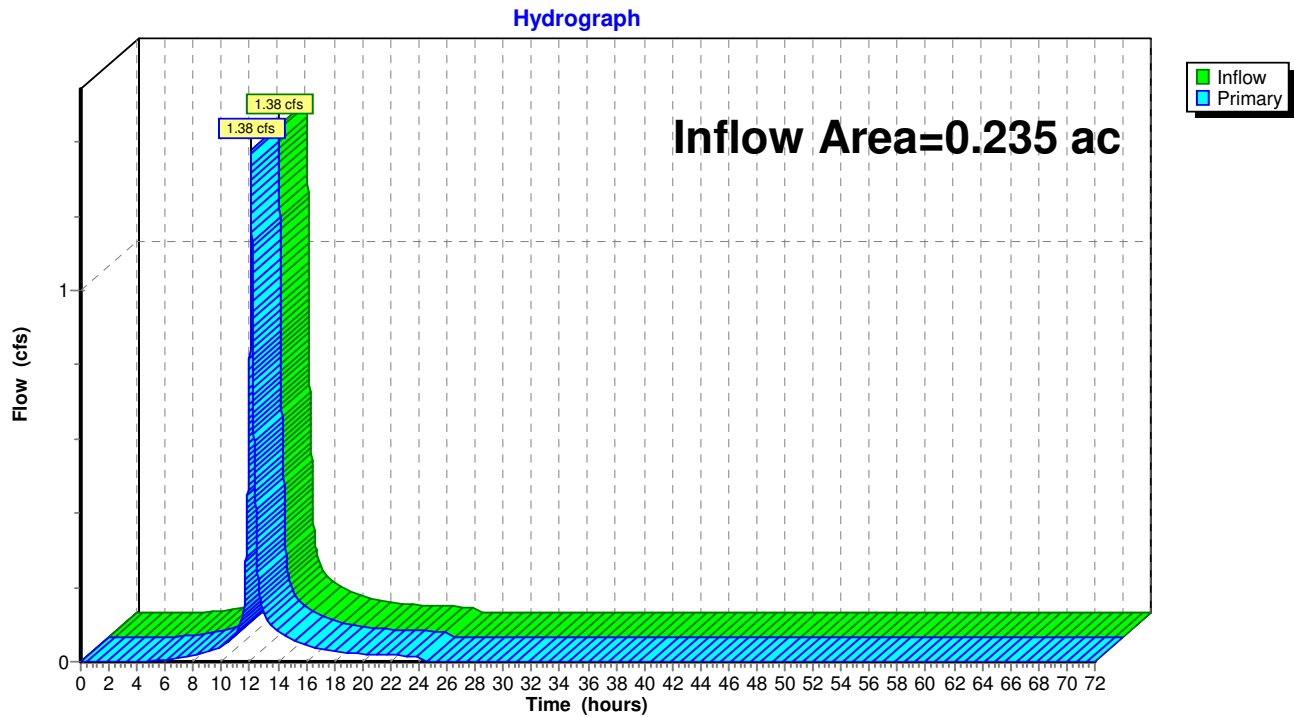
### Pond EP1: (DP1) Existing Rail Road Pond



### Pond EP2: (DP3) Existing Depression Adjacet to Sullivan Ave



# Link DP4: (DP4) Existing Flow to Kennedy Road Drainage System



**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 3/30/2022

Page 46

**Summary for Pond EP1: (DP1) Existing Rail Road Pond**

Inflow Area = 12.462 ac, 7.83% Impervious, Inflow Depth = 4.28" for 100-yr event  
 Inflow = 19.19 cfs @ 12.94 hrs, Volume= 4.440 af  
 Outflow = 12.42 cfs @ 13.71 hrs, Volume= 4.440 af, Atten= 35%, Lag= 46.0 min  
 Primary = 12.42 cfs @ 13.71 hrs, Volume= 4.440 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
 Peak Elev= 83.19' @ 13.71 hrs Surf.Area= 51,397 sf Storage= 25,625 cf

Plug-Flow detention time= 15.1 min calculated for 4.440 af (100% of inflow)  
 Center-of-Mass det. time= 15.1 min ( 906.2 - 891.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	79.70'	107,037 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.70	10	0	0
80.00	382	59	59
81.00	1,156	769	828
82.00	2,173	1,665	2,492
83.00	29,086	15,630	18,122
84.00	148,744	88,915	107,037

Device	Routing	Invert	Outlet Devices
#1	Primary	79.70'	<b>18.0" Round Culvert</b> L= 43.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 79.60' / 79.70' S= -0.0023 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

**Primary OutFlow** Max=12.42 cfs @ 13.71 hrs HW=83.19' (Free Discharge)

↑ **1=Culvert** (Inlet Controls 12.42 cfs @ 7.03 fps)

**Summary for Pond EP2: (DP3) Existing Depression Adjacent to Sullivan Ave**

Inflow Area = 7.374 ac, 0.59% Impervious, Inflow Depth = 3.48" for 100-yr event  
 Inflow = 11.07 cfs @ 12.88 hrs, Volume= 2.138 af  
 Outflow = 3.90 cfs @ 14.06 hrs, Volume= 1.745 af, Atten= 65%, Lag= 70.5 min  
 Primary = 3.90 cfs @ 14.06 hrs, Volume= 1.745 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.002 hrs  
 Peak Elev= 83.28' @ 14.06 hrs Surf.Area= 87,610 sf Storage= 40,432 cf

Plug-Flow detention time= 227.2 min calculated for 1.745 af (82% of inflow)  
 Center-of-Mass det. time= 151.4 min ( 1,049.0 - 897.6 )

**4670 Hydrocad**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Existing Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 3/30/2022

Page 47

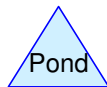
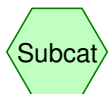
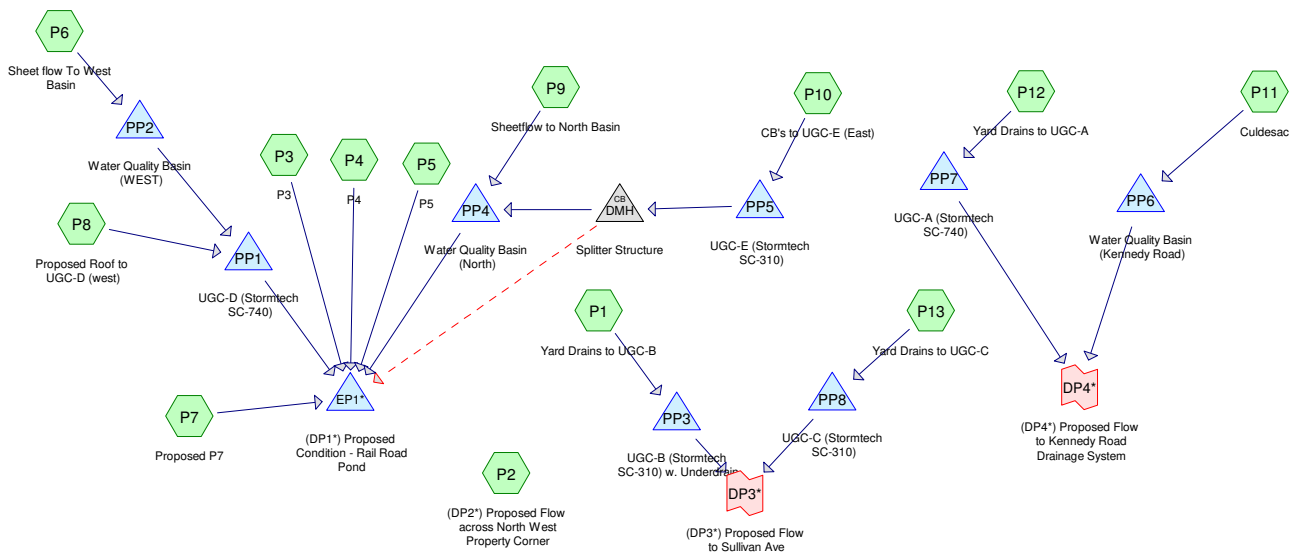
Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	144,179 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.00	81	0	0
83.00	44,050	22,066	22,066
84.00	200,176	122,113	144,179

Device	Routing	Invert	Outlet Devices
#1	Primary	82.88'	<b>6.0' long x 3.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

**Primary OutFlow** Max=3.90 cfs @ 14.06 hrs HW=83.28' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 3.90 cfs @ 1.63 fps)

**APPENDIX B**  
**Watershed Computations**  
**(Post-Development Drainage HydroCAD Report)**



### Routing Diagram for 4670 Hydrocad!

Prepared by Design Professionals, Inc. , Printed 4/20/2022  
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC



**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 2

Time span=0.00-84.00 hrs, dt=0.002 hrs, 42001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment P1: Yard Drains to UGC-B</b>	Runoff Area=53,290 sf 8.92% Impervious Runoff Depth=0.57" Tc=7.0 min CN=65 Runoff=0.61 cfs 0.058 af
<b>Subcatchment P10: CB's to UGC-E (East)</b>	Runoff Area=50,163 sf 84.49% Impervious Runoff Depth=2.39" Tc=6.0 min CN=93 Runoff=3.13 cfs 0.229 af
<b>Subcatchment P11: Culdesac</b>	Runoff Area=41,659 sf 70.56% Impervious Runoff Depth=2.03" Tc=6.0 min CN=89 Runoff=2.26 cfs 0.162 af
<b>Subcatchment P12: Yard Drains to UGC-A</b>	Runoff Area=50,556 sf 17.93% Impervious Runoff Depth=1.00" Tc=7.0 min CN=74 Runoff=1.24 cfs 0.097 af
<b>Subcatchment P13: Yard Drains to UGC-C</b>	Runoff Area=11,086 sf 6.38% Impervious Runoff Depth=0.49" Tc=7.0 min CN=63 Runoff=0.10 cfs 0.010 af
<b>Subcatchment P2: (DP2*) Proposed Flow</b>	Runoff Area=7,789 sf 0.00% Impervious Runoff Depth=0.23" Tc=8.0 min CN=55 Runoff=0.02 cfs 0.003 af
<b>Subcatchment P3: P3</b>	Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=0.57" Tc=8.0 min CN=65 Runoff=0.11 cfs 0.011 af
<b>Subcatchment P4: P4</b>	Runoff Area=24,823 sf 0.00% Impervious Runoff Depth=0.75" Flow Length=94' Slope=0.0014 '/' Tc=59.0 min CN=69 Runoff=0.17 cfs 0.035 af
<b>Subcatchment P5: P5</b>	Runoff Area=215,643 sf 4.13% Impervious Runoff Depth=0.75" Flow Length=400' Tc=44.4 min CN=69 Runoff=1.76 cfs 0.308 af
<b>Subcatchment P6: Sheet flow To West</b>	Runoff Area=203,856 sf 86.83% Impervious Runoff Depth=2.39" Tc=6.0 min CN=93 Runoff=12.72 cfs 0.931 af
<b>Subcatchment P7: Proposed P7</b>	Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=0.61" Flow Length=197' Tc=25.0 min CN=66 Runoff=0.07 cfs 0.010 af
<b>Subcatchment P8: Proposed Roof to</b>	Runoff Area=241,800 sf 100.00% Impervious Runoff Depth=2.91" Tc=6.0 min CN=98 Runoff=16.93 cfs 1.345 af
<b>Subcatchment P9: Sheetflow to North</b>	Runoff Area=44,272 sf 63.74% Impervious Runoff Depth=2.03" Tc=7.0 min CN=89 Runoff=2.32 cfs 0.172 af
<b>Pond DMH: Splitter Structure</b>	Peak Elev=85.27' Inflow=2.06 cfs 0.229 af Primary=1.50 cfs 0.151 af Secondary=0.56 cfs 0.078 af Outflow=2.06 cfs 0.229 af
<b>Pond EP1*: (DP1*) Proposed Condition - Rail</b>	Peak Elev=80.71' Storage=523 cf Inflow=2.81 cfs 2.627 af 18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=2.79 cfs 2.627 af
<b>Pond PP1: UGC-D (Stormtech SC-740)</b>	Peak Elev=84.01' Storage=55,185 cf Inflow=17.31 cfs 2.223 af Outflow=0.63 cfs 1.888 af

## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 3

<b>Pond PP2: Water Quality Basin (WEST)</b>	Peak Elev=84.10' Storage=43,719 cf Inflow=12.72 cfs 0.931 af 10.0" Round Culvert n=0.012 L=19.0' S=0.0063 ' /' Outflow=0.87 cfs 0.878 af
<b>Pond PP3: UGC-B (Stormtech SC-310) w.</b>	Peak Elev=80.86' Storage=3,737 cf Inflow=0.61 cfs 0.058 af Outflow=0.02 cfs 0.011 af
<b>Pond PP4: Water Quality Basin (North)</b>	Peak Elev=84.11' Storage=29,560 cf Inflow=3.66 cfs 0.322 af Outflow=0.08 cfs 0.296 af
<b>Pond PP5: UGC-E (Stormtech SC-310)</b>	Peak Elev=86.52' Storage=2,989 cf Inflow=3.13 cfs 0.229 af Outflow=2.06 cfs 0.229 af
<b>Pond PP6: Water Quality Basin (Kennedy</b>	Peak Elev=80.59' Storage=14,494 cf Inflow=2.26 cfs 0.162 af Outflow=0.27 cfs 0.160 af
<b>Pond PP7: UGC-A (Stormtech SC-740)</b>	Peak Elev=80.69' Storage=4,924 cf Inflow=1.24 cfs 0.097 af Outflow=0.02 cfs 0.087 af
<b>Pond PP8: UGC-C (Stormtech SC-310)</b>	Peak Elev=83.99' Storage=1,047 cf Inflow=0.10 cfs 0.010 af Outflow=0.01 cfs 0.010 af
<b>Link DP3*: (DP3*) Proposed Flow to Sullivan Ave</b>	Inflow=0.02 cfs 0.021 af Primary=0.02 cfs 0.021 af
<b>Link DP4*: (DP4*) Proposed Flow to Kennedy Road Drainage System</b>	Inflow=0.29 cfs 0.247 af Primary=0.29 cfs 0.247 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 10-yr Rainfall=4.98"

Printed 4/20/2022

Page 4

Time span=0.00-84.00 hrs, dt=0.002 hrs, 42001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment P1: Yard Drains to UGC-B</b>	Runoff Area=53,290 sf 8.92% Impervious Runoff Depth=1.64" Tc=7.0 min CN=65 Runoff=2.16 cfs 0.167 af
<b>Subcatchment P10: CB's to UGC-E (East)</b>	Runoff Area=50,163 sf 84.49% Impervious Runoff Depth=4.18" Tc=6.0 min CN=93 Runoff=5.31 cfs 0.401 af
<b>Subcatchment P11: Culdesac</b>	Runoff Area=41,659 sf 70.56% Impervious Runoff Depth=3.75" Tc=6.0 min CN=89 Runoff=4.09 cfs 0.299 af
<b>Subcatchment P12: Yard Drains to UGC-A</b>	Runoff Area=50,556 sf 17.93% Impervious Runoff Depth=2.35" Tc=7.0 min CN=74 Runoff=3.07 cfs 0.227 af
<b>Subcatchment P13: Yard Drains to UGC-C</b>	Runoff Area=11,086 sf 6.38% Impervious Runoff Depth=1.50" Tc=7.0 min CN=63 Runoff=0.40 cfs 0.032 af
<b>Subcatchment P2: (DP2*) Proposed Flow</b>	Runoff Area=7,789 sf 0.00% Impervious Runoff Depth=0.97" Tc=8.0 min CN=55 Runoff=0.15 cfs 0.014 af
<b>Subcatchment P3: P3</b>	Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=1.64" Tc=8.0 min CN=65 Runoff=0.40 cfs 0.032 af
<b>Subcatchment P4: P4</b>	Runoff Area=24,823 sf 0.00% Impervious Runoff Depth=1.94" Flow Length=94' Slope=0.0014 '/' Tc=59.0 min CN=69 Runoff=0.50 cfs 0.092 af
<b>Subcatchment P5: P5</b>	Runoff Area=215,643 sf 4.13% Impervious Runoff Depth=1.94" Flow Length=400' Tc=44.4 min CN=69 Runoff=5.11 cfs 0.801 af
<b>Subcatchment P6: Sheet flow To West</b>	Runoff Area=203,856 sf 86.83% Impervious Runoff Depth=4.18" Tc=6.0 min CN=93 Runoff=21.59 cfs 1.629 af
<b>Subcatchment P7: Proposed P7</b>	Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=1.71" Flow Length=197' Tc=25.0 min CN=66 Runoff=0.23 cfs 0.028 af
<b>Subcatchment P8: Proposed Roof to</b>	Runoff Area=241,800 sf 100.00% Impervious Runoff Depth=4.74" Tc=6.0 min CN=98 Runoff=27.08 cfs 2.194 af
<b>Subcatchment P9: Sheetflow to North</b>	Runoff Area=44,272 sf 63.74% Impervious Runoff Depth=3.75" Tc=7.0 min CN=89 Runoff=4.20 cfs 0.318 af
<b>Pond DMH: Splitter Structure</b>	Peak Elev=85.59' Inflow=3.61 cfs 0.401 af Primary=2.79 cfs 0.258 af Secondary=0.82 cfs 0.142 af Outflow=3.61 cfs 0.401 af
<b>Pond EP1*: (DP1*) Proposed Condition - Rail</b>	Peak Elev=81.75' Storage=1,982 cf Inflow=7.64 cfs 5.003 af 18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=7.43 cfs 5.003 af
<b>Pond PP1: UGC-D (Stormtech SC-740)</b>	Peak Elev=84.55' Storage=72,056 cf Inflow=28.10 cfs 3.760 af Outflow=1.96 cfs 3.405 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition

Type III 24-hr 10-yr Rainfall=4.98"

Printed 4/20/2022

Page 5

<b>Pond PP2: Water Quality Basin (WEST)</b>	Peak Elev=84.63' Storage=67,295 cf Inflow=21.59 cfs 1.629 af 10.0" Round Culvert n=0.012 L=19.0' S=0.0063 ' / Outflow=1.40 cfs 1.565 af
<b>Pond PP3: UGC-B (Stormtech SC-310) w.</b>	Peak Elev=81.09' Storage=4,558 cf Inflow=2.16 cfs 0.167 af Outflow=0.34 cfs 0.120 af
<b>Pond PP4: Water Quality Basin (North)</b>	Peak Elev=84.70' Storage=39,261 cf Inflow=6.69 cfs 0.576 af Outflow=0.12 cfs 0.502 af
<b>Pond PP5: UGC-E (Stormtech SC-310)</b>	Peak Elev=86.83' Storage=3,886 cf Inflow=5.31 cfs 0.401 af Outflow=3.61 cfs 0.401 af
<b>Pond PP6: Water Quality Basin (Kennedy</b>	Peak Elev=81.08' Storage=17,687 cf Inflow=4.09 cfs 0.299 af Outflow=0.40 cfs 0.298 af
<b>Pond PP7: UGC-A (Stormtech SC-740)</b>	Peak Elev=81.66' Storage=9,172 cf Inflow=3.07 cfs 0.227 af Outflow=0.06 cfs 0.196 af
<b>Pond PP8: UGC-C (Stormtech SC-310)</b>	Peak Elev=84.28' Storage=1,669 cf Inflow=0.40 cfs 0.032 af Outflow=0.02 cfs 0.031 af
<b>Link DP3*: (DP3*) Proposed Flow to Sullivan Ave</b>	Inflow=0.36 cfs 0.151 af Primary=0.36 cfs 0.151 af
<b>Link DP4*: (DP4*) Proposed Flow to Kennedy Road Drainage System</b>	Inflow=0.45 cfs 0.494 af Primary=0.45 cfs 0.494 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

Printed 4/20/2022

Page 6

Time span=0.00-84.00 hrs, dt=0.002 hrs, 42001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment P1: Yard Drains to UGC-B</b>	Runoff Area=53,290 sf 8.92% Impervious Runoff Depth=2.45" Tc=7.0 min CN=65 Runoff=3.32 cfs 0.249 af
<b>Subcatchment P10: CB's to UGC-E (East)</b>	Runoff Area=50,163 sf 84.49% Impervious Runoff Depth=5.31" Tc=6.0 min CN=93 Runoff=6.66 cfs 0.510 af
<b>Subcatchment P11: Culdesac</b>	Runoff Area=41,659 sf 70.56% Impervious Runoff Depth=4.86" Tc=6.0 min CN=89 Runoff=5.23 cfs 0.387 af
<b>Subcatchment P12: Yard Drains to UGC-A</b>	Runoff Area=50,556 sf 17.93% Impervious Runoff Depth=3.29" Tc=7.0 min CN=74 Runoff=4.33 cfs 0.319 af
<b>Subcatchment P13: Yard Drains to UGC-C</b>	Runoff Area=11,086 sf 6.38% Impervious Runoff Depth=2.27" Tc=7.0 min CN=63 Runoff=0.63 cfs 0.048 af
<b>Subcatchment P2: (DP2*) Proposed Flow</b>	Runoff Area=7,789 sf 0.00% Impervious Runoff Depth=1.59" Tc=8.0 min CN=55 Runoff=0.28 cfs 0.024 af
<b>Subcatchment P3: P3</b>	Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=2.45" Tc=8.0 min CN=65 Runoff=0.62 cfs 0.048 af
<b>Subcatchment P4: P4</b>	Runoff Area=24,823 sf 0.00% Impervious Runoff Depth=2.81" Flow Length=94' Slope=0.0014 '/' Tc=59.0 min CN=69 Runoff=0.74 cfs 0.134 af
<b>Subcatchment P5: P5</b>	Runoff Area=215,643 sf 4.13% Impervious Runoff Depth=2.81" Flow Length=400' Tc=44.4 min CN=69 Runoff=7.54 cfs 1.161 af
<b>Subcatchment P6: Sheet flow To West</b>	Runoff Area=203,856 sf 86.83% Impervious Runoff Depth=5.31" Tc=6.0 min CN=93 Runoff=27.06 cfs 2.071 af
<b>Subcatchment P7: Proposed P7</b>	Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=2.54" Flow Length=197' Tc=25.0 min CN=66 Runoff=0.35 cfs 0.041 af
<b>Subcatchment P8: Proposed Roof to</b>	Runoff Area=241,800 sf 100.00% Impervious Runoff Depth=5.89" Tc=6.0 min CN=98 Runoff=33.39 cfs 2.725 af
<b>Subcatchment P9: Sheetflow to North</b>	Runoff Area=44,272 sf 63.74% Impervious Runoff Depth=4.86" Tc=7.0 min CN=89 Runoff=5.37 cfs 0.412 af
<b>Pond DMH: Splitter Structure</b>	Peak Elev=85.79' Inflow=4.63 cfs 0.510 af Primary=3.68 cfs 0.273 af Secondary=0.94 cfs 0.237 af Outflow=4.63 cfs 0.510 af
<b>Pond EP1*: (DP1*) Proposed Condition -</b>	Peak Elev=82.42' Storage=5,748 cf Inflow=12.50 cfs 6.565 af 18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=10.53 cfs 6.564 af
<b>Pond PP1: UGC-D (Stormtech SC-740)</b>	Peak Elev=84.83' Storage=79,818 cf Inflow=34.72 cfs 4.730 af Outflow=3.39 cfs 4.369 af

## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

Printed 4/20/2022

Page 7

<b>Pond PP2: Water Quality Basin (WEST)</b>	Peak Elev=84.95' Storage=82,336 cf Inflow=27.06 cfs 2.071 af 10.0" Round Culvert n=0.012 L=19.0' S=0.0063 ' /' Outflow=1.33 cfs 2.004 af
<b>Pond PP3: UGC-B (Stormtech SC-310) w.</b>	Peak Elev=81.36' Storage=5,403 cf Inflow=3.32 cfs 0.249 af Outflow=1.14 cfs 0.202 af
<b>Pond PP4: Water Quality Basin (North)</b>	Peak Elev=84.97' Storage=43,921 cf Inflow=8.66 cfs 0.685 af Outflow=0.13 cfs 0.576 af
<b>Pond PP5: UGC-E (Stormtech SC-310)</b>	Peak Elev=87.05' Storage=4,406 cf Inflow=6.66 cfs 0.510 af Outflow=4.63 cfs 0.510 af
<b>Pond PP6: Water Quality Basin (Kennedy</b>	Peak Elev=81.38' Storage=19,784 cf Inflow=5.23 cfs 0.387 af Outflow=0.46 cfs 0.386 af
<b>Pond PP7: UGC-A (Stormtech SC-740)</b>	Peak Elev=82.30' Storage=11,407 cf Inflow=4.33 cfs 0.319 af Outflow=0.19 cfs 0.278 af
<b>Pond PP8: UGC-C (Stormtech SC-310)</b>	Peak Elev=84.53' Storage=2,189 cf Inflow=0.63 cfs 0.048 af Outflow=0.02 cfs 0.047 af
<b>Link DP3*: (DP3*) Proposed Flow to Sullivan Ave</b>	Inflow=1.16 cfs 0.250 af Primary=1.16 cfs 0.250 af
<b>Link DP4*: (DP4*) Proposed Flow to Kennedy Road Drainage System</b>	Inflow=0.62 cfs 0.664 af Primary=0.62 cfs 0.664 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

Printed 4/20/2022

Page 8

Time span=0.00-84.00 hrs, dt=0.002 hrs, 42001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment P1: Yard Drains to UGC-B</b>	Runoff Area=53,290 sf 8.92% Impervious Runoff Depth=3.08" Tc=7.0 min CN=65 Runoff=4.22 cfs 0.314 af
<b>Subcatchment P10: CB's to UGC-E (East)</b>	Runoff Area=50,163 sf 84.49% Impervious Runoff Depth=6.14" Tc=6.0 min CN=93 Runoff=7.64 cfs 0.589 af
<b>Subcatchment P11: Culdesac</b>	Runoff Area=41,659 sf 70.56% Impervious Runoff Depth=5.68" Tc=6.0 min CN=89 Runoff=6.06 cfs 0.453 af
<b>Subcatchment P12: Yard Drains to UGC-A</b>	Runoff Area=50,556 sf 17.93% Impervious Runoff Depth=4.02" Tc=7.0 min CN=74 Runoff=5.28 cfs 0.388 af
<b>Subcatchment P13: Yard Drains to UGC-C</b>	Runoff Area=11,086 sf 6.38% Impervious Runoff Depth=2.88" Tc=7.0 min CN=63 Runoff=0.82 cfs 0.061 af
<b>Subcatchment P2: (DP2*) Proposed Flow</b>	Runoff Area=7,789 sf 0.00% Impervious Runoff Depth=2.10" Tc=8.0 min CN=55 Runoff=0.38 cfs 0.031 af
<b>Subcatchment P3: P3</b>	Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=3.08" Tc=8.0 min CN=65 Runoff=0.78 cfs 0.060 af
<b>Subcatchment P4: P4</b>	Runoff Area=24,823 sf 0.00% Impervious Runoff Depth=3.49" Flow Length=94' Slope=0.0014 '/' Tc=59.0 min CN=69 Runoff=0.92 cfs 0.166 af
<b>Subcatchment P5: P5</b>	Runoff Area=215,643 sf 4.13% Impervious Runoff Depth=3.49" Flow Length=400' Tc=44.4 min CN=69 Runoff=9.40 cfs 1.440 af
<b>Subcatchment P6: Sheet flow To West</b>	Runoff Area=203,856 sf 86.83% Impervious Runoff Depth=6.14" Tc=6.0 min CN=93 Runoff=31.04 cfs 2.395 af
<b>Subcatchment P7: Proposed P7</b>	Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=3.18" Flow Length=197' Tc=25.0 min CN=66 Runoff=0.44 cfs 0.051 af
<b>Subcatchment P8: Proposed Roof to</b>	Runoff Area=241,800 sf 100.00% Impervious Runoff Depth=6.73" Tc=6.0 min CN=98 Runoff=38.00 cfs 3.114 af
<b>Subcatchment P9: Sheetflow to North</b>	Runoff Area=44,272 sf 63.74% Impervious Runoff Depth=5.68" Tc=7.0 min CN=89 Runoff=6.22 cfs 0.481 af
<b>Pond DMH: Splitter Structure</b>	Peak Elev=85.94' Inflow=5.33 cfs 0.589 af Primary=4.32 cfs 0.299 af Secondary=1.01 cfs 0.290 af Outflow=5.33 cfs 0.589 af
<b>Pond EP1*: (DP1*) Proposed Condition -</b>	Peak Elev=82.83' Storage=13,457 cf Inflow=16.58 cfs 7.717 af 18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=11.57 cfs 7.716 af
<b>Pond PP1: UGC-D (Stormtech SC-740)</b>	Peak Elev=85.20' Storage=87,761 cf Inflow=38.96 cfs 5.440 af Outflow=5.20 cfs 5.075 af

## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

Printed 4/20/2022

Page 9

<b>Pond PP2: Water Quality Basin (WEST)</b>	Peak Elev=85.17' Storage=93,070 cf Inflow=31.04 cfs 2.395 af 10.0" Round Culvert n=0.012 L=19.0' S=0.0063 ' / Outflow=1.57 cfs 2.326 af
<b>Pond PP3: UGC-B (Stormtech SC-310) w.</b>	Peak Elev=81.56' Storage=5,916 cf Inflow=4.22 cfs 0.314 af Outflow=1.91 cfs 0.267 af
<b>Pond PP4: Water Quality Basin (North)</b>	Peak Elev=85.18' Storage=47,524 cf Inflow=10.14 cfs 0.780 af Outflow=0.14 cfs 0.635 af
<b>Pond PP5: UGC-E (Stormtech SC-310)</b>	Peak Elev=87.24' Storage=4,777 cf Inflow=7.64 cfs 0.589 af Outflow=5.33 cfs 0.589 af
<b>Pond PP6: Water Quality Basin (Kennedy</b>	Peak Elev=81.60' Storage=21,357 cf Inflow=6.06 cfs 0.453 af Outflow=0.50 cfs 0.451 af
<b>Pond PP7: UGC-A (Stormtech SC-740)</b>	Peak Elev=82.44' Storage=11,785 cf Inflow=5.28 cfs 0.388 af Outflow=0.41 cfs 0.347 af
<b>Pond PP8: UGC-C (Stormtech SC-310)</b>	Peak Elev=84.70' Storage=2,506 cf Inflow=0.82 cfs 0.061 af Outflow=0.03 cfs 0.060 af
<b>Link DP3*: (DP3*) Proposed Flow to Sullivan Ave</b>	Inflow=1.92 cfs 0.327 af Primary=1.92 cfs 0.327 af
<b>Link DP4*: (DP4*) Proposed Flow to Kennedy Road Drainage System</b>	Inflow=0.92 cfs 0.799 af Primary=0.92 cfs 0.799 af



**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 10

Time span=0.00-84.00 hrs, dt=0.002 hrs, 42001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment P1: Yard Drains to UGC-B</b>	Runoff Area=53,290 sf 8.92% Impervious Runoff Depth=3.81" Tc=7.0 min CN=65 Runoff=5.26 cfs 0.389 af
<b>Subcatchment P10: CB's to UGC-E (East)</b>	Runoff Area=50,163 sf 84.49% Impervious Runoff Depth=7.06" Tc=6.0 min CN=93 Runoff=8.72 cfs 0.678 af
<b>Subcatchment P11: Culdesac</b>	Runoff Area=41,659 sf 70.56% Impervious Runoff Depth=6.59" Tc=6.0 min CN=89 Runoff=6.97 cfs 0.525 af
<b>Subcatchment P12: Yard Drains to UGC-A</b>	Runoff Area=50,556 sf 17.93% Impervious Runoff Depth=4.84" Tc=7.0 min CN=74 Runoff=6.34 cfs 0.468 af
<b>Subcatchment P13: Yard Drains to UGC-C</b>	Runoff Area=11,086 sf 6.38% Impervious Runoff Depth=3.59" Tc=7.0 min CN=63 Runoff=1.03 cfs 0.076 af
<b>Subcatchment P2: (DP2*) Proposed Flow</b>	Runoff Area=7,789 sf 0.00% Impervious Runoff Depth=2.72" Tc=8.0 min CN=55 Runoff=0.51 cfs 0.040 af
<b>Subcatchment P3: P3</b>	Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=3.81" Tc=8.0 min CN=65 Runoff=0.98 cfs 0.075 af
<b>Subcatchment P4: P4</b>	Runoff Area=24,823 sf 0.00% Impervious Runoff Depth=4.26" Flow Length=94' Slope=0.0014 '/' Tc=59.0 min CN=69 Runoff=1.13 cfs 0.203 af
<b>Subcatchment P5: P5</b>	Runoff Area=215,643 sf 4.13% Impervious Runoff Depth=4.26" Flow Length=400' Tc=44.4 min CN=69 Runoff=11.52 cfs 1.759 af
<b>Subcatchment P6: Sheet flow To West</b>	Runoff Area=203,856 sf 86.83% Impervious Runoff Depth=7.06" Tc=6.0 min CN=93 Runoff=35.42 cfs 2.755 af
<b>Subcatchment P7: Proposed P7</b>	Runoff Area=8,447 sf 21.26% Impervious Runoff Depth=3.93" Flow Length=197' Tc=25.0 min CN=66 Runoff=0.55 cfs 0.063 af
<b>Subcatchment P8: Proposed Roof to</b>	Runoff Area=241,800 sf 100.00% Impervious Runoff Depth=7.66" Tc=6.0 min CN=98 Runoff=43.10 cfs 3.543 af
<b>Subcatchment P9: Sheetflow to North</b>	Runoff Area=44,272 sf 63.74% Impervious Runoff Depth=6.59" Tc=7.0 min CN=89 Runoff=7.16 cfs 0.558 af
<b>Pond DMH: Splitter Structure</b>	Peak Elev=86.04' Inflow=5.75 cfs 0.678 af Primary=4.70 cfs 0.338 af Secondary=1.05 cfs 0.340 af Outflow=5.75 cfs 0.678 af
<b>Pond EP1*: (DP1*) Proposed Condition -</b>	Peak Elev=83.18' Storage=24,862 cf Inflow=21.02 cfs 8.998 af 18.0" Round Culvert n=0.012 L=43.0' S=-0.0023 '/' Outflow=12.40 cfs 8.997 af
<b>Pond PP1: UGC-D (Stormtech SC-740)</b>	Peak Elev=85.72' Storage=97,088 cf Inflow=43.10 cfs 6.227 af Outflow=7.15 cfs 5.857 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 11

<b>Pond PP2: Water Quality Basin (WEST)</b>	Peak Elev=85.41'	Storage=105,410 cf	Inflow=35.42 cfs	2.755 af
	10.0" Round Culvert n=0.012 L=19.0' S=0.0063 '/		Outflow=1.86 cfs	2.684 af
<b>Pond PP3: UGC-B (Stormtech SC-310) w.</b>	Peak Elev=81.83'	Storage=6,539 cf	Inflow=5.26 cfs	0.389 af
			Outflow=2.75 cfs	0.342 af
<b>Pond PP4: Water Quality Basin (North)</b>	Peak Elev=85.42'	Storage=51,980 cf	Inflow=11.65 cfs	0.896 af
			Outflow=0.15 cfs	0.701 af
<b>Pond PP5: UGC-E (Stormtech SC-310)</b>	Peak Elev=87.49'	Storage=5,245 cf	Inflow=8.72 cfs	0.678 af
			Outflow=5.75 cfs	0.678 af
<b>Pond PP6: Water Quality Basin (Kennedy</b>	Peak Elev=81.84'	Storage=23,135 cf	Inflow=6.97 cfs	0.525 af
			Outflow=0.54 cfs	0.524 af
<b>Pond PP7: UGC-A (Stormtech SC-740)</b>	Peak Elev=82.81'	Storage=12,755 cf	Inflow=6.34 cfs	0.468 af
			Outflow=0.73 cfs	0.427 af
<b>Pond PP8: UGC-C (Stormtech SC-310)</b>	Peak Elev=84.94'	Storage=2,910 cf	Inflow=1.03 cfs	0.076 af
			Outflow=0.04 cfs	0.075 af
<b>Link DP3*: (DP3*) Proposed Flow to Sullivan Ave</b>			Inflow=2.77 cfs	0.417 af
			Primary=2.77 cfs	0.417 af
<b>Link DP4*: (DP4*) Proposed Flow to Kennedy Road Drainage System</b>			Inflow=1.28 cfs	0.950 af
			Primary=1.28 cfs	0.950 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 12

**Summary for Subcatchment P1: Yard Drains to UGC-B**

Runoff = 0.61 cfs @ 12.13 hrs, Volume= 0.058 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
45,366	61	>75% Grass cover, Good, HSG B
3,169	80	>75% Grass cover, Good, HSG D
* 2	71	>75% Grass cover, Good, HSG B/D
* 4,753	98	IMPERVIOUS
53,290	65	Weighted Average
48,537		91.08% Pervious Area
4,753		8.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					<b>Direct Entry,</b>

**Summary for Subcatchment P10: CB's to UGC-E (East)**

Runoff = 3.13 cfs @ 12.09 hrs, Volume= 0.229 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
922	74	>75% Grass cover, Good, HSG C
2,430	61	>75% Grass cover, Good, HSG B
* 4,429	71	>75% Grass cover, Good, HSG B/D
* 42,382	98	IMPERVIOUS
50,163	93	Weighted Average
7,781		15.51% Pervious Area
42,382		84.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment P11: Culdesac**

Runoff = 2.26 cfs @ 12.09 hrs, Volume= 0.162 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 13

	Area (sf)	CN	Description
*	29,394	98	IMPERVIOUS
	2,607	61	>75% Grass cover, Good, HSG B
*	9,658	71	>75% Grass cover, Good, HSG B/D
	41,659	89	Weighted Average
	12,265		29.44% Pervious Area
	29,394		70.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment P12: Yard Drains to UGC-A**

Runoff = 1.24 cfs @ 12.11 hrs, Volume= 0.097 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	9,067	98	IMPERVIOUS
	12,690	61	>75% Grass cover, Good, HSG B
	4,707	74	>75% Grass cover, Good, HSG C
*	24,092	71	>75% Grass cover, Good, HSG B/D
	50,556	74	Weighted Average
	41,489		82.07% Pervious Area
	9,067		17.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					<b>Direct Entry,</b>

**Summary for Subcatchment P13: Yard Drains to UGC-C**

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	707	98	IMPERVIOUS
	10,379	61	>75% Grass cover, Good, HSG B
	11,086	63	Weighted Average
	10,379		93.62% Pervious Area
	707		6.38% Impervious Area

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 14

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					<b>Direct Entry,</b>

**Summary for Subcatchment P2: (DP2\*) Proposed Flow across North West Property Corner**

Runoff = 0.02 cfs @ 12.38 hrs, Volume= 0.003 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
2,334	39	>75% Grass cover, Good, HSG A
5,236	61	>75% Grass cover, Good, HSG B
* 219	71	>75% Grass cover, Good, HSG B/D
7,789	55	Weighted Average
7,789		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					<b>Direct Entry,</b>

**Summary for Subcatchment P3: P3**

Runoff = 0.11 cfs @ 12.13 hrs, Volume= 0.011 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
2,646	39	>75% Grass cover, Good, HSG A
7,594	74	>75% Grass cover, Good, HSG C
10,240	65	Weighted Average
10,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					<b>Direct Entry,</b>

**Summary for Subcatchment P4: P4**

Runoff = 0.17 cfs @ 12.91 hrs, Volume= 0.035 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 15

Area (sf)	CN	Description
4,911	74	>75% Grass cover, Good, HSG C
* 2,000	71	>75% Grass cover, Good, HSG B/D
* 14,330	66	Woods, Good, HSG B/D
3,582	70	Woods, Good, HSG C
24,823	69	Weighted Average
24,823		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
59.0	94	0.0014	0.03		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.22"

**Summary for Subcatchment P5: P5**

Runoff = 1.76 cfs @ 12.68 hrs, Volume= 0.308 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
1,504	74	>75% Grass cover, Good, HSG C
* 9,745	71	>75% Grass cover, Good, HSG B/D
25,599	70	Woods, Good, HSG C
* 127,460	66	Woods, Good, HSG B/D
* 8,904	98	IMPERVIOUS
* 13,961	68	Meadow, non-grazed, HSG B/D
28,470	71	Meadow, non-grazed, HSG C
215,643	69	Weighted Average
206,739		95.87% Pervious Area
8,904		4.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	23	0.2900	0.25		<b>Sheet Flow, GRASS SF</b> Grass: Dense n= 0.240 P2= 3.22"
22.4	82	0.0120	0.06		<b>Sheet Flow, WOODLAND SF</b> Woods: Light underbrush n= 0.400 P2= 3.22"
20.5	295	0.0023	0.24		<b>Shallow Concentrated Flow, WOOD SCF</b> Woodland Kv= 5.0 fps
44.4	400	Total			

**Summary for Subcatchment P6: Sheet flow To West Basin**

Runoff = 12.72 cfs @ 12.09 hrs, Volume= 0.931 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 16

Area (sf)	CN	Description
4,918	39	>75% Grass cover, Good, HSG A
6,710	61	>75% Grass cover, Good, HSG B
6,131	74	>75% Grass cover, Good, HSG C
* 9,090	71	>75% Grass cover, Good, HSG B/D
* 177,007	98	IMPERVIOUS
203,856	93	Weighted Average
26,849		13.17% Pervious Area
177,007		86.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment P7: Proposed P7**

Runoff = 0.07 cfs @ 12.42 hrs, Volume= 0.010 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
2,335	39	>75% Grass cover, Good, HSG A
1,709	74	>75% Grass cover, Good, HSG C
* 1,796	98	IMPERVIOUS
450	30	Meadow, non-grazed, HSG A
2,157	71	Meadow, non-grazed, HSG C
8,447	66	Weighted Average
6,651		78.74% Pervious Area
1,796		21.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.4	100	0.0160	0.07		<b>Sheet Flow, Woodland SF</b> Woods: Light underbrush n= 0.400 P2= 3.22"
1.6	97	0.0420	1.02		<b>Shallow Concentrated Flow, Woodlan SCF</b> Woodland Kv= 5.0 fps
25.0	197	Total			

**Summary for Subcatchment P8: Proposed Roof to UGC-D (west)**

Runoff = 16.93 cfs @ 12.09 hrs, Volume= 1.345 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 17

	Area (sf)	CN	Description
*	241,800	98	IMPERVIOUS
	241,800		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

**Summary for Subcatchment P9: Sheetflow to North Basin**

Runoff = 2.32 cfs @ 12.10 hrs, Volume= 0.172 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
	14,312	74	>75% Grass cover, Good, HSG C
*	1,743	71	>75% Grass cover, Good, HSG B/D
*	28,217	98	IMPERVIOUS
	44,272	89	Weighted Average
	16,055		36.26% Pervious Area
	28,217		63.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

**Summary for Pond DMH: Splitter Structure**

Inflow Area = 1.152 ac, 84.49% Impervious, Inflow Depth = 2.39" for 2-yr event  
 Inflow = 2.06 cfs @ 12.17 hrs, Volume= 0.229 af  
 Outflow = 2.06 cfs @ 12.17 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.50 cfs @ 12.17 hrs, Volume= 0.151 af  
 Secondary = 0.56 cfs @ 12.17 hrs, Volume= 0.078 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs  
 Peak Elev= 85.27' @ 12.17 hrs  
 Flood Elev= 85.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	84.55'	<b>15.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.55' / 84.50' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Secondary	84.55'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.55' / 84.50' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf



**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 18

**Primary OutFlow** Max=1.50 cfs @ 12.17 hrs HW=85.27' TW=83.73' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.50 cfs @ 2.94 fps)**Secondary OutFlow** Max=0.56 cfs @ 12.17 hrs HW=85.27' TW=80.34' (Dynamic Tailwater)↑**2=Culvert** (Barrel Controls 0.56 cfs @ 2.85 fps)**Summary for Pond EP1\*: (DP1\*) Proposed Condition - Rail Road Pond**

Inflow Area = 18.348 ac, 62.57% Impervious, Inflow Depth > 1.72" for 2-yr event  
 Inflow = 2.81 cfs @ 12.68 hrs, Volume= 2.627 af  
 Outflow = 2.79 cfs @ 12.72 hrs, Volume= 2.627 af, Atten= 1%, Lag= 2.6 min  
 Primary = 2.79 cfs @ 12.72 hrs, Volume= 2.627 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Peak Elev= 80.71' @ 12.72 hrs Surf.Area= 930 sf Storage= 523 cf

Plug-Flow detention time= 3.0 min calculated for 2.627 af (100% of inflow)

Center-of-Mass det. time= 2.8 min ( 1,866.4 - 1,863.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	79.70'	94,801 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.70	10	0	0
80.00	382	59	59
81.00	1,156	769	828
82.00	2,173	1,665	2,492
83.00	29,061	15,617	18,109
84.00	124,323	76,692	94,801

Device	Routing	Invert	Outlet Devices
#1	Primary	79.70'	<b>18.0" Round Culvert</b> L= 43.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 79.60' / 79.70' S= -0.0023 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

**Primary OutFlow** Max=2.79 cfs @ 12.72 hrs HW=80.71' (Free Discharge)↑**1=Culvert** (Barrel Controls 2.79 cfs @ 2.77 fps)**Summary for Pond PP1: UGC-D (Stormtech SC-740)**

Top of System Elev = 85.72

Inflow Area = 10.231 ac, 93.98% Impervious, Inflow Depth > 2.61" for 2-yr event  
 Inflow = 17.31 cfs @ 12.09 hrs, Volume= 2.223 af  
 Outflow = 0.63 cfs @ 18.00 hrs, Volume= 1.888 af, Atten= 96%, Lag= 354.6 min  
 Primary = 0.63 cfs @ 18.00 hrs, Volume= 1.888 af

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 19

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Peak Elev= 84.01' @ 18.00 hrs Surf.Area= 45,134 sf Storage= 55,185 cf

Plug-Flow detention time= 1,180.0 min calculated for 1.888 af (85% of inflow)

Center-of-Mass det. time= 943.0 min ( 2,025.4 - 1,082.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	82.22'	24,873 cf	<b>39.50'W x 715.62'L x 3.50'H Field A</b> 98,934 cf Overall - 36,752 cf Embedded = 62,182 cf x 40.0% Voids
#2A	82.72'	36,752 cf	<b>ADS_StormTech SC-740 +Cap</b> x 800 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 800 Chambers in 8 Rows
#3B	82.22'	11,489 cf	<b>15.75'W x 801.06'L x 3.50'H Field B</b> 44,158 cf Overall - 15,436 cf Embedded = 28,722 cf x 40.0% Voids
#4B	82.72'	15,436 cf	<b>ADS_StormTech SC-740 +Cap</b> x 336 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 336 Chambers in 3 Rows
#5C	82.22'	4,204 cf	<b>6.25'W x 680.02'L x 3.50'H Field C</b> 14,875 cf Overall - 4,364 cf Embedded = 10,511 cf x 40.0% Voids
#6C	82.72'	4,364 cf	<b>ADS_StormTech SC-740 +Cap</b> x 95 Inside #5 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		97,118 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	82.78'	<b>24.0" Round 24" RCP</b> L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.78' / 82.70' S= 0.0057 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	82.82'	<b>9.0" W x 2.0" H Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	84.12'	<b>16.0" W x 10.0" H Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	85.35'	<b>6.0" W x 10.0" H Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.63 cfs @ 18.00 hrs HW=84.01' TW=80.23' (Dynamic Tailwater)

1=24" RCP (Passes 0.63 cfs of 5.46 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.63 cfs @ 5.06 fps)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 4=Orifice/Grate ( Controls 0.00 cfs)

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 20

**Summary for Pond PP2: Water Quality Basin (WEST)**

Max Water Elev = 85.40 (1ft Freeboard)

Inflow Area = 4.680 ac, 86.83% Impervious, Inflow Depth = 2.39" for 2-yr event  
 Inflow = 12.72 cfs @ 12.09 hrs, Volume= 0.931 af  
 Outflow = 0.87 cfs @ 13.54 hrs, Volume= 0.878 af, Atten= 93%, Lag= 87.2 min  
 Primary = 0.87 cfs @ 13.54 hrs, Volume= 0.878 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 83.50' Surf.Area= 39,354 sf Storage= 18,954 cf

Peak Elev= 84.10' @ 13.54 hrs Surf.Area= 42,966 sf Storage= 43,719 cf (24,765 cf above start)

Plug-Flow detention time= 1,513.6 min calculated for 0.443 af (48% of inflow)

Center-of-Mass det. time= 787.9 min ( 1,581.2 - 793.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	83.00'	136,855 cf	<b>Custom Stage Data (Conic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
83.00	36,482	0	0	36,482
84.00	42,335	39,372	39,372	42,377
85.00	48,730	45,495	84,867	48,817
86.00	55,314	51,987	136,855	55,450

Device	Routing	Invert	Outlet Devices
#1	Primary	83.50'	<b>10.0" Round Culvert</b> L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 83.50' / 83.38' S= 0.0063 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf

**Primary OutFlow** Max=0.87 cfs @ 13.54 hrs HW=84.10' TW=83.75' (Dynamic Tailwater)

1=Culvert (Barrel Controls 0.87 cfs @ 2.88 fps)

**Summary for Pond PP3: UGC-B (Stormtech SC-310) w. Underdrain**

Top of System Elev = 82.06

Inflow Area = 1.223 ac, 8.92% Impervious, Inflow Depth = 0.57" for 2-yr event  
 Inflow = 0.61 cfs @ 12.13 hrs, Volume= 0.058 af  
 Outflow = 0.02 cfs @ 23.19 hrs, Volume= 0.011 af, Atten= 97%, Lag= 663.8 min  
 Primary = 0.02 cfs @ 23.19 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 80.30' Surf.Area= 5,806 sf Storage= 1,459 cf

Peak Elev= 80.86' @ 23.19 hrs Surf.Area= 5,806 sf Storage= 3,737 cf (2,278 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 686.6 min ( 1,584.8 - 898.2 )

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 21

Volume	Invert	Avail.Storage	Storage Description
#1A	79.73'	2,828 cf	<b>8.17'W x 473.12'L x 2.33'H Field A</b> 9,016 cf Overall - 1,946 cf Embedded = 7,070 cf x 40.0% Voids
#2A	80.23'	1,946 cf	<b>ADS_StormTech SC-310 +Cap</b> x 132 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 132 Chambers in 2 Rows
#3B	79.73'	1,483 cf	<b>4.83'W x 401.92'L x 2.33'H Field B</b> 4,533 cf Overall - 826 cf Embedded = 3,707 cf x 40.0% Voids
#4B	80.23'	826 cf	<b>ADS_StormTech SC-310 +Cap</b> x 56 Inside #3 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		7,082 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	79.69'	<b>12.0" Round 12" HDPE OUT</b> L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.69' / 79.27' S= 0.0210 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	80.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 23.19 hrs HW=80.86' TW=0.00' (Dynamic Tailwater)

1=12" HDPE OUT (Passes 0.02 cfs of 3.10 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.02 cfs @ 0.85 fps)

**Summary for Pond PP4: Water Quality Basin (North)**

Max Water Elev = 85.80 (1ft Freeboard)

Inflow Area =	2.168 ac, 74.76% Impervious, Inflow Depth = 1.78" for 2-yr event
Inflow =	3.66 cfs @ 12.11 hrs, Volume= 0.322 af
Outflow =	0.08 cfs @ 18.44 hrs, Volume= 0.296 af, Atten= 98%, Lag= 379.8 min
Primary =	0.08 cfs @ 18.44 hrs, Volume= 0.296 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 83.40' Surf.Area= 14,585 sf Storage= 18,791 cf

Peak Elev= 84.11' @ 18.44 hrs Surf.Area= 15,844 sf Storage= 29,560 cf (10,769 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 1,444.2 min ( 2,265.7 - 821.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	62,769 cf	<b>Custom Stage Data (Conic)</b> Listed below (Recalc)

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 22

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
82.00	12,313	0	0	12,313
83.00	13,894	13,096	13,096	13,945
84.00	15,654	14,765	27,861	15,757
85.00	17,454	16,546	44,407	17,614
86.00	19,286	18,362	62,769	19,508

Device	Routing	Invert	Outlet Devices
#1	Primary	83.35'	<b>12.0" Round Culvert</b> L= 19.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 83.35' / 83.30' S= 0.0026 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Device 1	83.40'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.08 cfs @ 18.44 hrs HW=84.11' TW=80.23' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.08 cfs of 1.29 cfs potential flow)↑ **2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.81 fps)**Summary for Pond PP5: UGC-E (Stormtech SC-310)**

Top of System Elev = 87.71

Inflow Area =	1.152 ac, 84.49% Impervious, Inflow Depth = 2.39" for 2-yr event
Inflow =	3.13 cfs @ 12.09 hrs, Volume= 0.229 af
Outflow =	2.06 cfs @ 12.17 hrs, Volume= 0.229 af, Atten= 34%, Lag= 5.2 min
Primary =	2.06 cfs @ 12.17 hrs, Volume= 0.229 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 85.95' Surf.Area= 4,780 sf Storage= 1,189 cf

Peak Elev= 86.52' @ 12.17 hrs Surf.Area= 4,780 sf Storage= 2,989 cf (1,800 cf above start)

Plug-Flow detention time= 126.7 min calculated for 0.202 af (88% of inflow)

Center-of-Mass det. time= 43.2 min ( 836.6 - 793.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	85.38'	1,850 cf	<b>4.83'W x 501.60'L x 2.33'H Field A</b> 5,657 cf Overall - 1,032 cf Embedded = 4,625 cf x 40.0% Voids
#2A	85.88'	1,032 cf	<b>ADS_StormTech SC-310 +Cap</b> x 70 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
#3B	85.38'	1,798 cf	<b>4.83'W x 487.36'L x 2.33'H Field B</b> 5,496 cf Overall - 1,002 cf Embedded = 4,494 cf x 40.0% Voids
#4B	85.88'	1,002 cf	<b>ADS_StormTech SC-310 +Cap</b> x 68 Inside #3 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		5,682 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 23

Device	Routing	Invert	Outlet Devices
#1	Primary	85.80'	<b>15.0" Round 15" HDPE OUT</b> L= 144.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.80' / 84.58' S= 0.0085 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#2	Device 1	85.95'	<b>12.0" Round 12" HDPE (x2) X 2.00</b> L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.95' / 85.80' S= 0.0300 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=2.06 cfs @ 12.17 hrs HW=86.52' TW=85.27' (Dynamic Tailwater)

1=15" HDPE OUT (Outlet Controls 2.06 cfs @ 4.09 fps)

2=12" HDPE (x2) (Passes 2.06 cfs of 2.14 cfs potential flow)

**Summary for Pond PP6: Water Quality Basin (Kennedy Road)**

Max Water Elev = 85.80 (1ft Freeboard)

Inflow Area =	0.956 ac, 70.56% Impervious, Inflow Depth = 2.03" for 2-yr event
Inflow =	2.26 cfs @ 12.09 hrs, Volume= 0.162 af
Outflow =	0.27 cfs @ 12.75 hrs, Volume= 0.160 af, Atten= 88%, Lag= 39.5 min
Primary =	0.27 cfs @ 12.75 hrs, Volume= 0.160 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 80.00' Surf.Area= 5,601 sf Storage= 11,033 cf

Peak Elev= 80.59' @ 12.75 hrs Surf.Area= 6,216 sf Storage= 14,494 cf (3,461 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 242.5 min ( 1,054.4 - 811.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	42,367 cf	<b>Custom Stage Data (Conic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.00	239	0	0	239
76.00	786	486	486	791
77.00	1,382	1,070	1,556	1,399
78.00	2,063	1,711	3,267	2,095
78.80	2,824	1,947	5,214	2,869
79.00	4,585	734	5,948	4,630
80.00	5,601	5,085	11,033	5,677
81.00	6,669	6,127	17,160	6,781
82.00	7,793	7,224	24,384	7,944
83.00	8,973	8,376	32,760	9,168
84.00	10,257	9,608	42,367	10,498

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 24

Device	Routing	Invert	Outlet Devices
#1	Primary	79.79'	<b>12.0" Round 12" RCP Culvert</b> L= 34.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.79' / 79.60' S= 0.0056 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	80.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.27 cfs @ 12.75 hrs HW=80.59' TW=0.00' (Dynamic Tailwater)↑ **1=12" RCP Culvert** (Passes 0.27 cfs of 1.57 cfs potential flow)↑ **2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 3.12 fps)**Summary for Pond PP7: UGC-A (Stormtech SC-740)**

Top of System Elev = 82.94

Inflow Area = 1.161 ac, 17.93% Impervious, Inflow Depth = 1.00" for 2-yr event  
 Inflow = 1.24 cfs @ 12.11 hrs, Volume= 0.097 af  
 Outflow = 0.02 cfs @ 23.30 hrs, Volume= 0.087 af, Atten= 98%, Lag= 671.3 min  
 Primary = 0.02 cfs @ 23.30 hrs, Volume= 0.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 80.00' Surf.Area= 6,498 sf Storage= 1,594 cf

Peak Elev= 80.69' @ 23.30 hrs Surf.Area= 6,498 sf Storage= 4,924 cf (3,330 cf above start)

Plug-Flow detention time= 2,543.8 min calculated for 0.050 af (52% of inflow)

Center-of-Mass det. time= 1,615.0 min ( 2,479.2 - 864.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	79.44'	4,292 cf	<b>6.25'W x 694.26'L x 3.50'H Field A</b> 15,187 cf Overall - 4,456 cf Embedded = 10,731 cf x 40.0% Voids
#2A	79.94'	4,456 cf	<b>ADS StormTech SC-740 +Cap</b> x 97 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
#3B	79.44'	2,140 cf	<b>6.25'W x 345.38'L x 3.50'H Field B</b> 7,555 cf Overall - 2,205 cf Embedded = 5,350 cf x 40.0% Voids
#4B	79.94'	2,205 cf	<b>ADS StormTech SC-740 +Cap</b> x 48 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
13,094 cf			Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	80.00'	<b>12.0" Round 12" HDPE</b> L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 80.00' / 79.90' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	80.66'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	80.00'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"

Printed 4/20/2022

Page 25

#4 Device 1 82.16' 9.0" W x 3.0" H Vert. Orifice/Grate C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 23.30 hrs HW=80.69' TW=0.00' (Dynamic Tailwater)

1=12" HDPE (Passes 0.02 cfs of 1.23 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.62 fps)  
 3=Orifice/Grate (Orifice Controls 0.02 cfs @ 3.89 fps)  
 4=Orifice/Grate (Controls 0.00 cfs)

**Summary for Pond PP8: UGC-C (Stormtech SC-310)**

Top of System Elev = 85.64

Inflow Area = 0.254 ac, 6.38% Impervious, Inflow Depth = 0.49" for 2-yr event  
 Inflow = 0.10 cfs @ 12.13 hrs, Volume= 0.010 af  
 Outflow = 0.01 cfs @ 17.02 hrs, Volume= 0.010 af, Atten= 93%, Lag= 293.5 min  
 Primary = 0.01 cfs @ 17.02 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 83.88' Surf.Area= 3,231 sf Storage= 804 cf

Peak Elev= 83.99' @ 17.02 hrs Surf.Area= 3,231 sf Storage= 1,047 cf (243 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 596.2 min ( 1,503.8 - 907.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	83.31'	1,299 cf	<b>4.83'W x 352.08'L x 2.33'H Field A</b> 3,971 cf Overall - 722 cf Embedded = 3,248 cf x 40.0% Voids
#2A	83.81'	722 cf	<b>ADS_StormTech SC-310 +Cap</b> x 49 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
#3B	83.31'	1,168 cf	<b>4.83'W x 316.48'L x 2.33'H Field B</b> 3,569 cf Overall - 649 cf Embedded = 2,921 cf x 40.0% Voids
#4B	83.81'	649 cf	<b>ADS_StormTech SC-310 +Cap</b> x 44 Inside #3 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		3,839 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	83.20'	<b>12.0" Round 12" HDPE</b> L= 96.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 83.20' / 81.60' S= 0.0167 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	83.88'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	84.50'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 2-yr Rainfall=3.14"  
Printed 4/20/2022  
Page 26

**Primary OutFlow** Max=0.01 cfs @ 17.02 hrs HW=83.99' TW=0.00' (Dynamic Tailwater)

↑ **1=12" HDPE** (Passes 0.01 cfs of 2.01 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 1.25 fps)

↑ **3=Orifice/Grate** ( Controls 0.00 cfs)

### Summary for Link DP3\*: (DP3\*) Proposed Flow to Sullivan Ave

Inflow Area = 1.478 ac, 8.48% Impervious, Inflow Depth > 0.17" for 2-yr event  
Inflow = 0.02 cfs @ 22.97 hrs, Volume= 0.021 af  
Primary = 0.02 cfs @ 22.97 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

### Summary for Link DP4\*: (DP4\*) Proposed Flow to Kennedy Road Drainage System

Inflow Area = 2.117 ac, 41.71% Impervious, Inflow Depth > 1.40" for 2-yr event  
Inflow = 0.29 cfs @ 12.81 hrs, Volume= 0.247 af  
Primary = 0.29 cfs @ 12.81 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

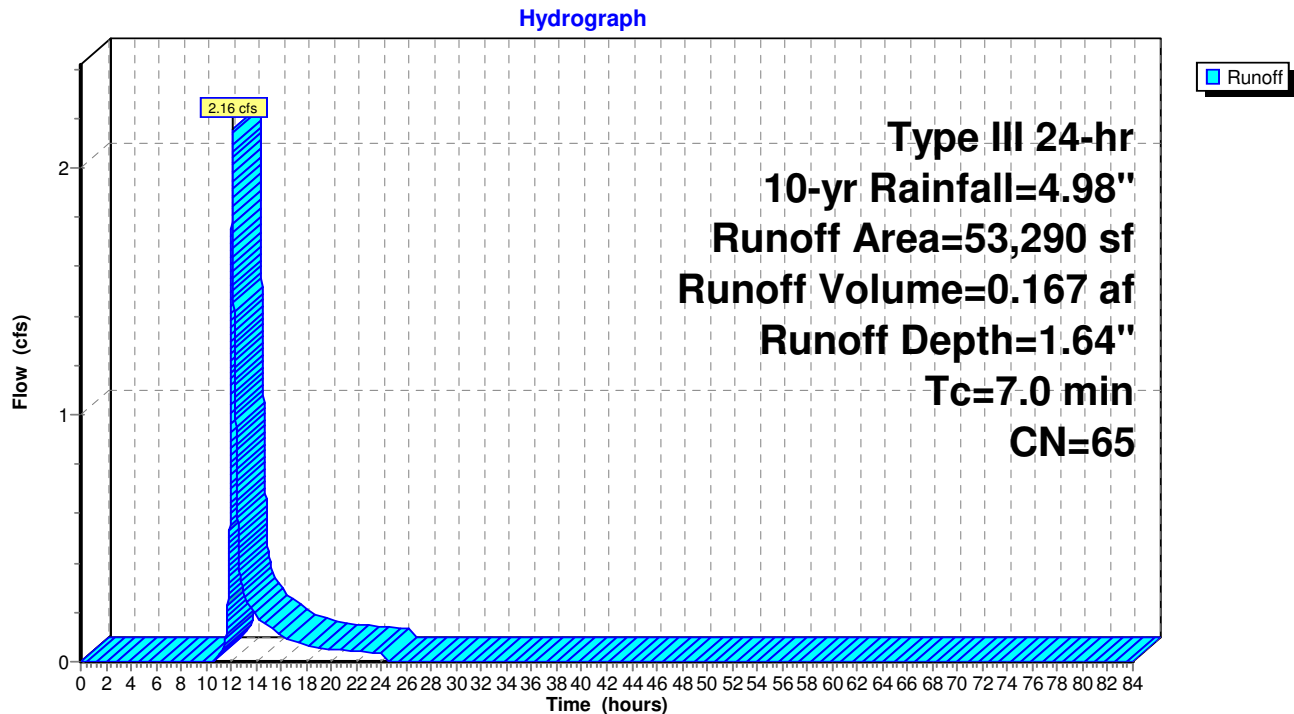
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 10-yr Rainfall=4.98"

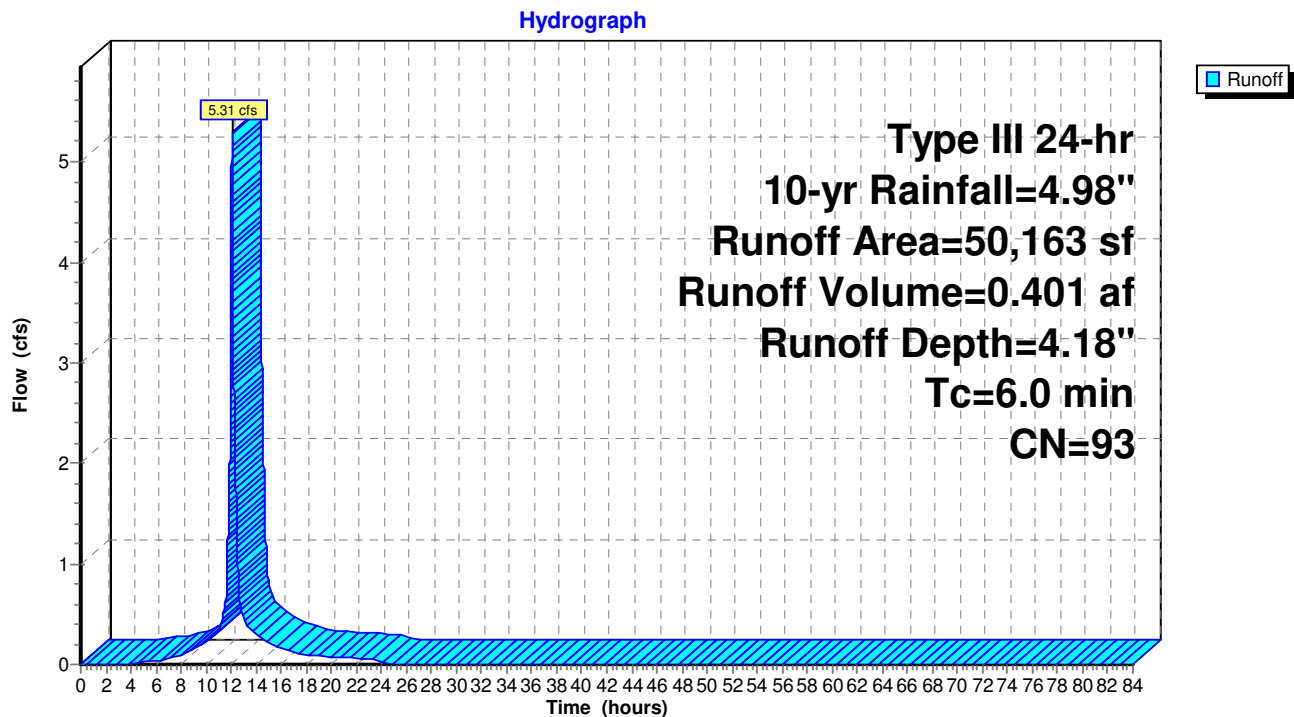
Printed 4/20/2022

Page 27

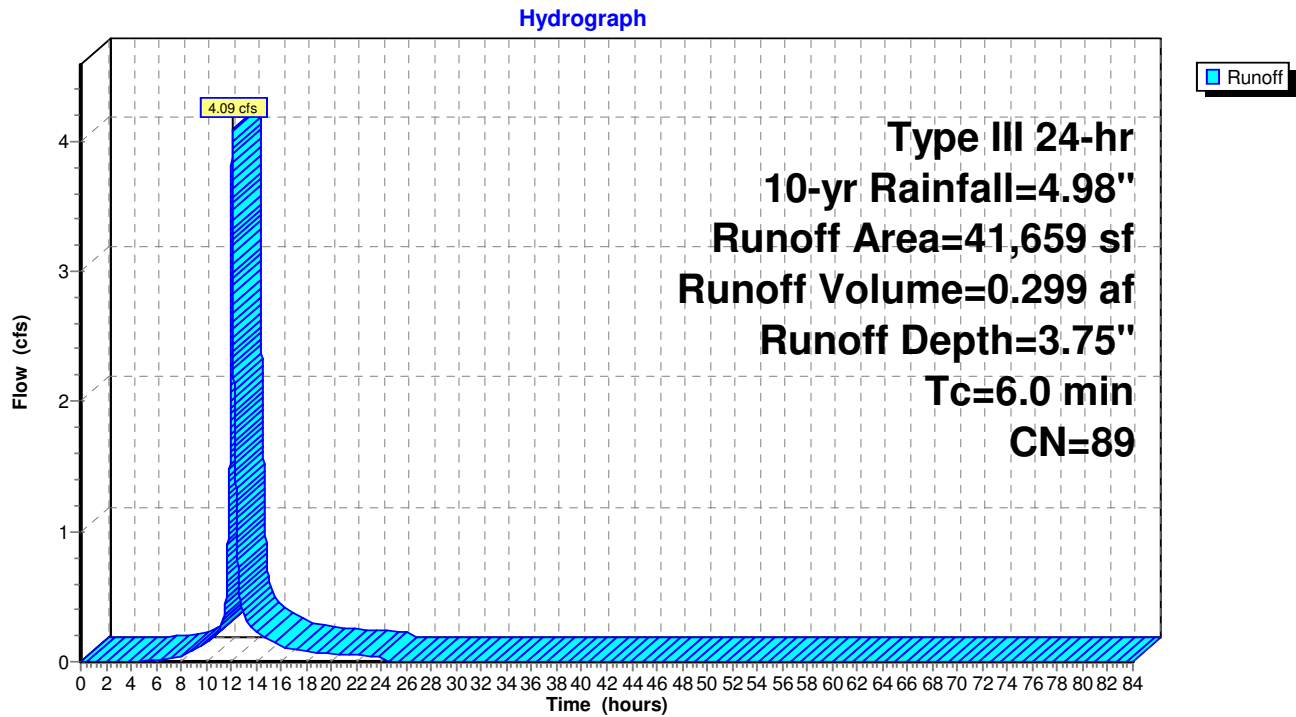
### Subcatchment P1: Yard Drains to UGC-B



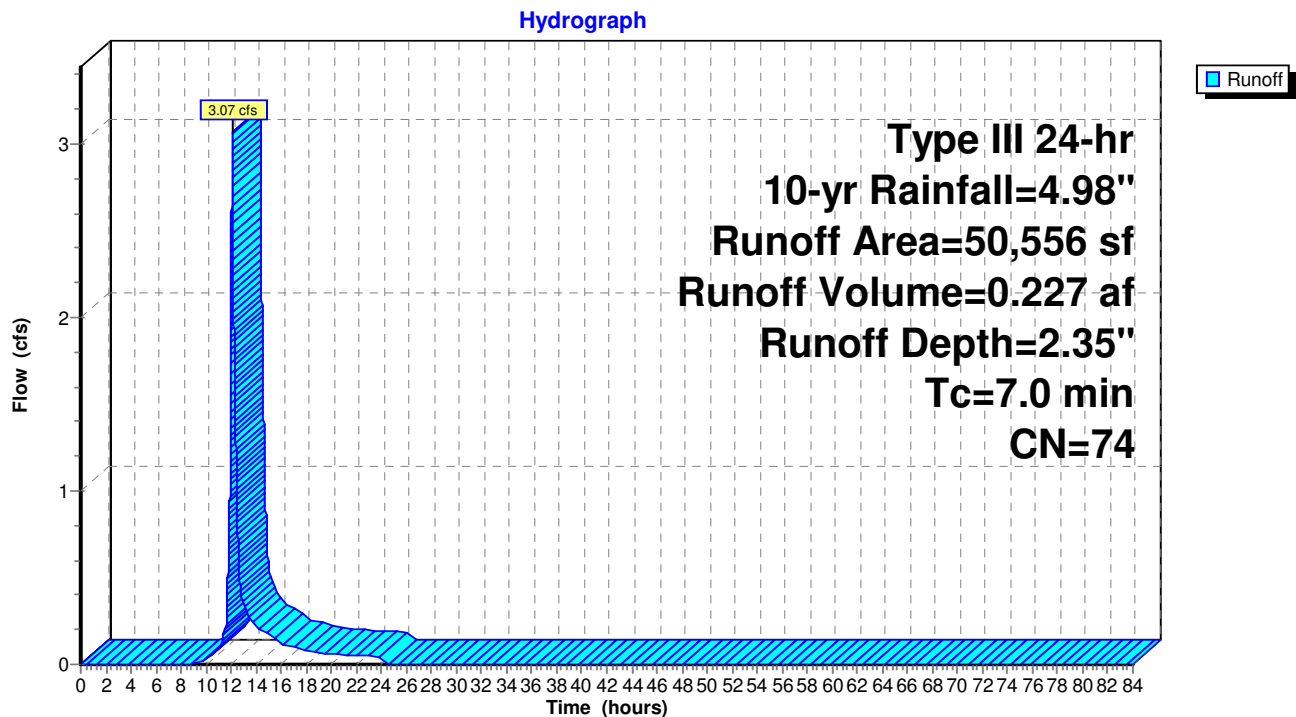
### Subcatchment P10: CB's to UGC-E (East)



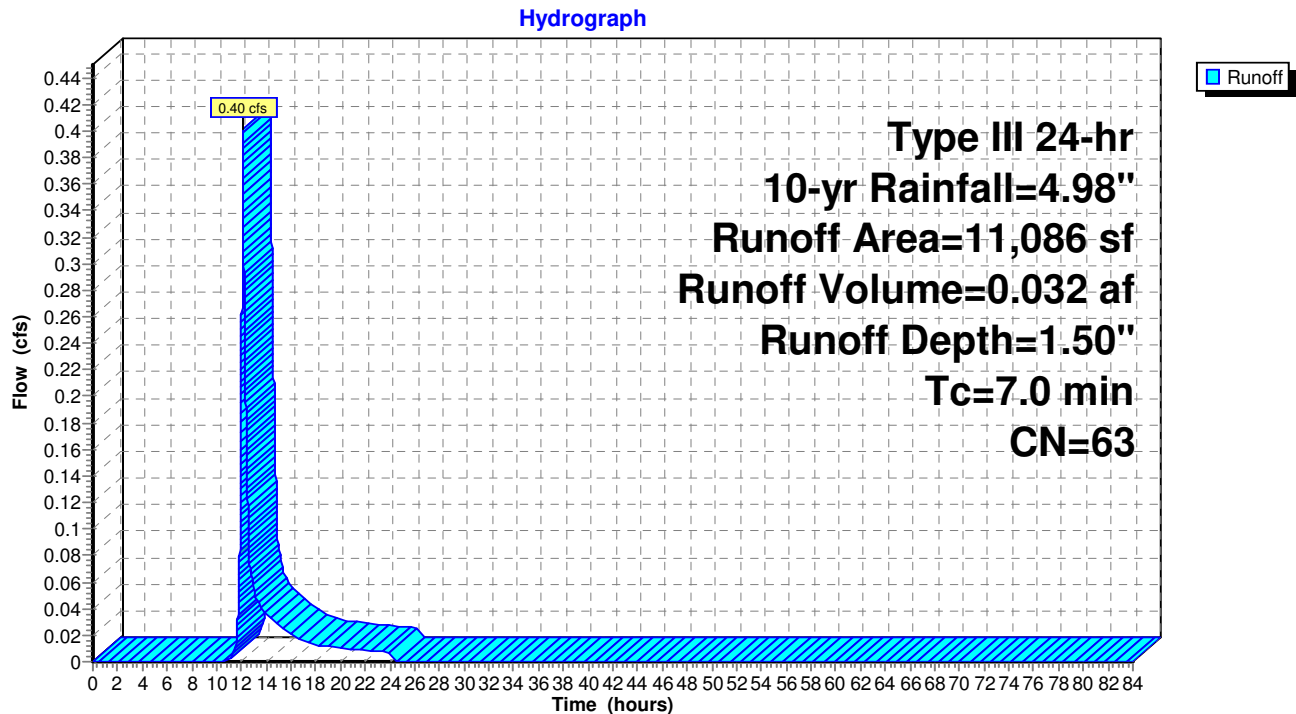
### Subcatchment P11: Culdesac



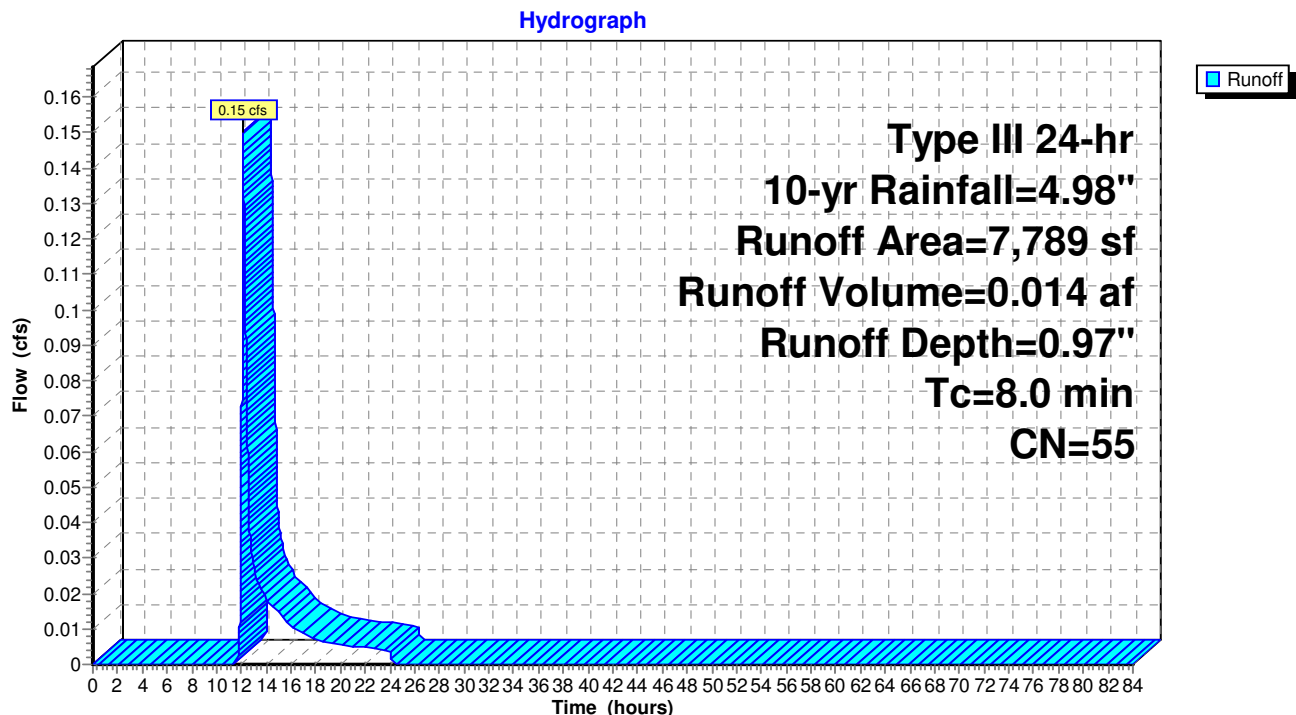
### Subcatchment P12: Yard Drains to UGC-A



### Subcatchment P13: Yard Drains to UGC-C

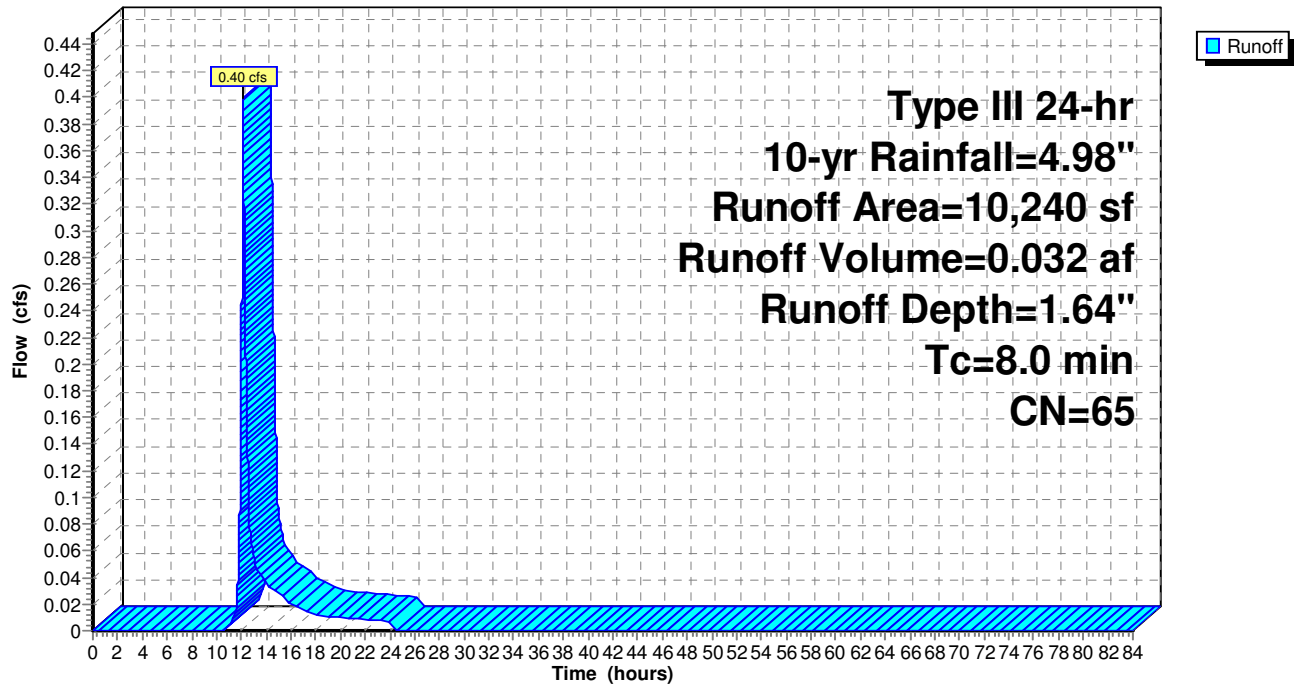


### Subcatchment P2: (DP2\*) Proposed Flow across North West Property Corner



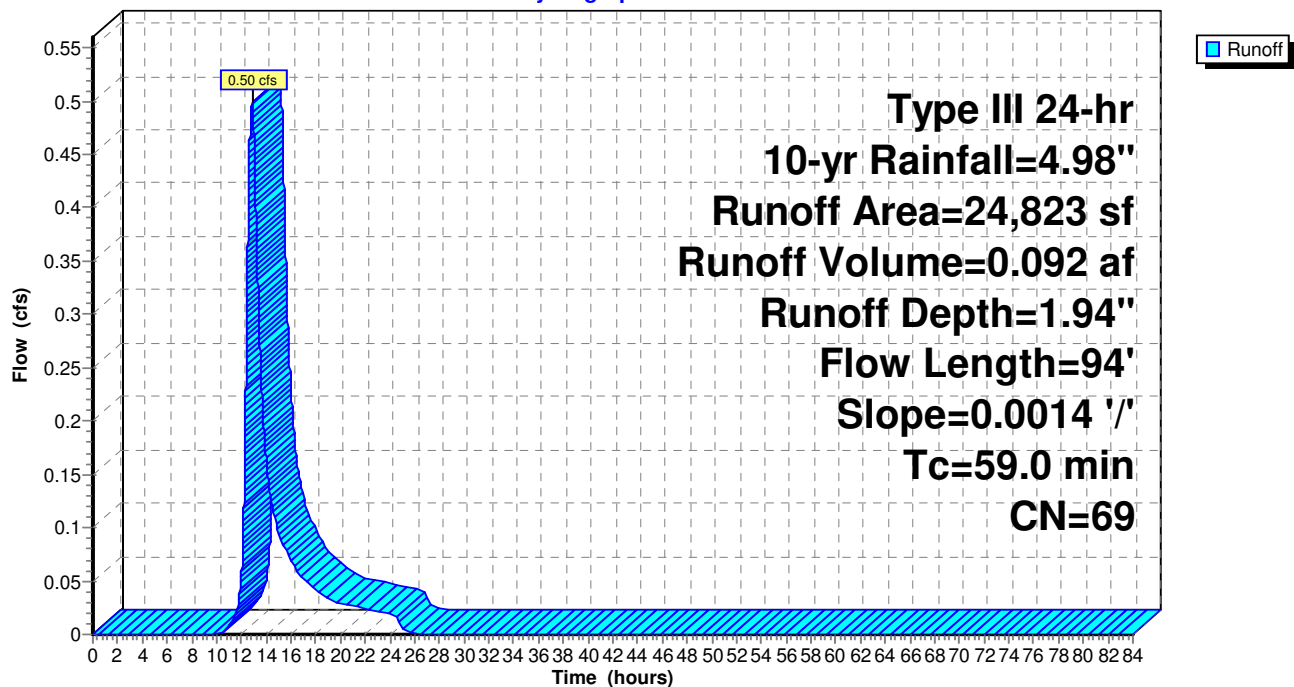
### Subcatchment P3: P3

#### Hydrograph



### Subcatchment P4: P4

#### Hydrograph



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

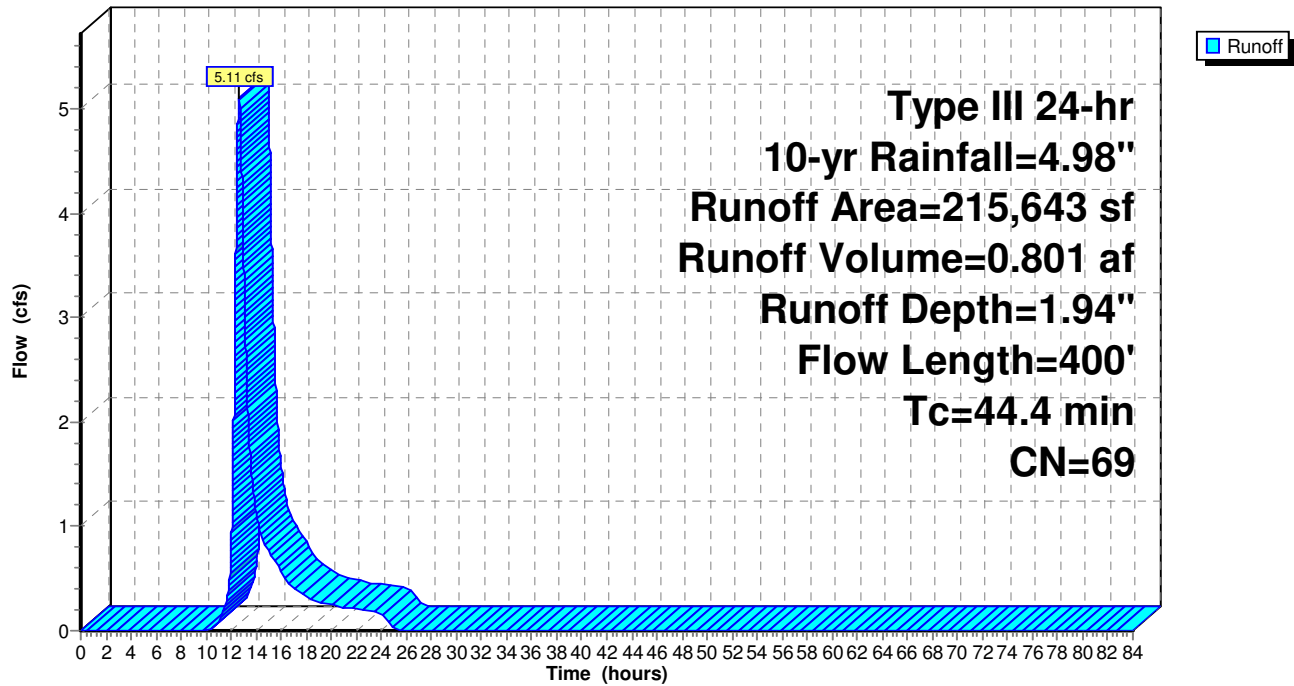
Proposed Condition  
Type III 24-hr 10-yr Rainfall=4.98"

Printed 4/20/2022

Page 31

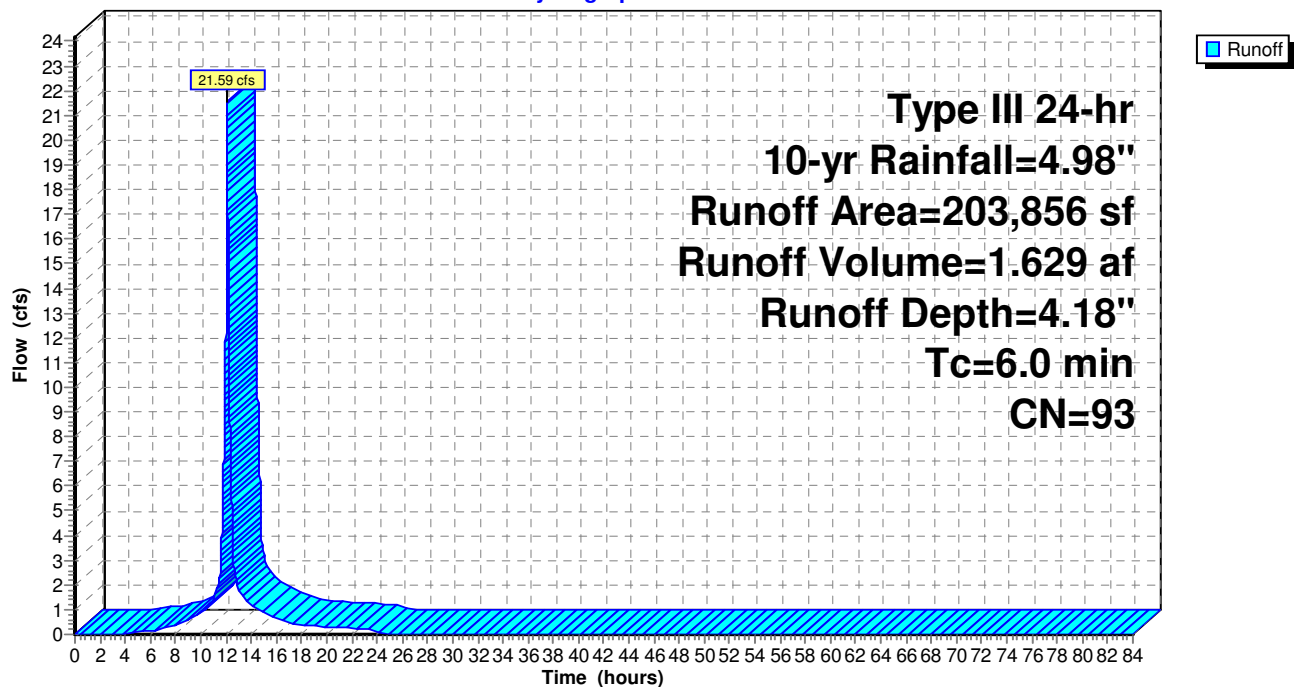
### Subcatchment P5: P5

Hydrograph

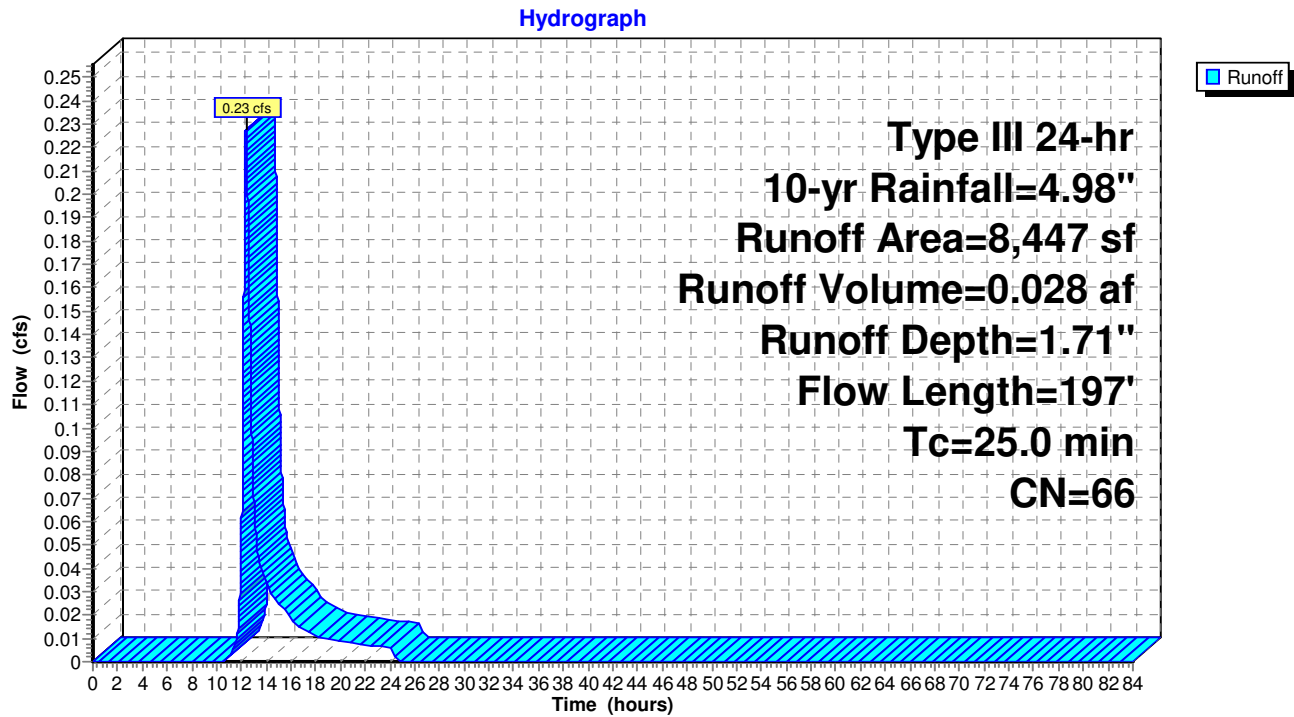


### Subcatchment P6: Sheet flow To West Basin

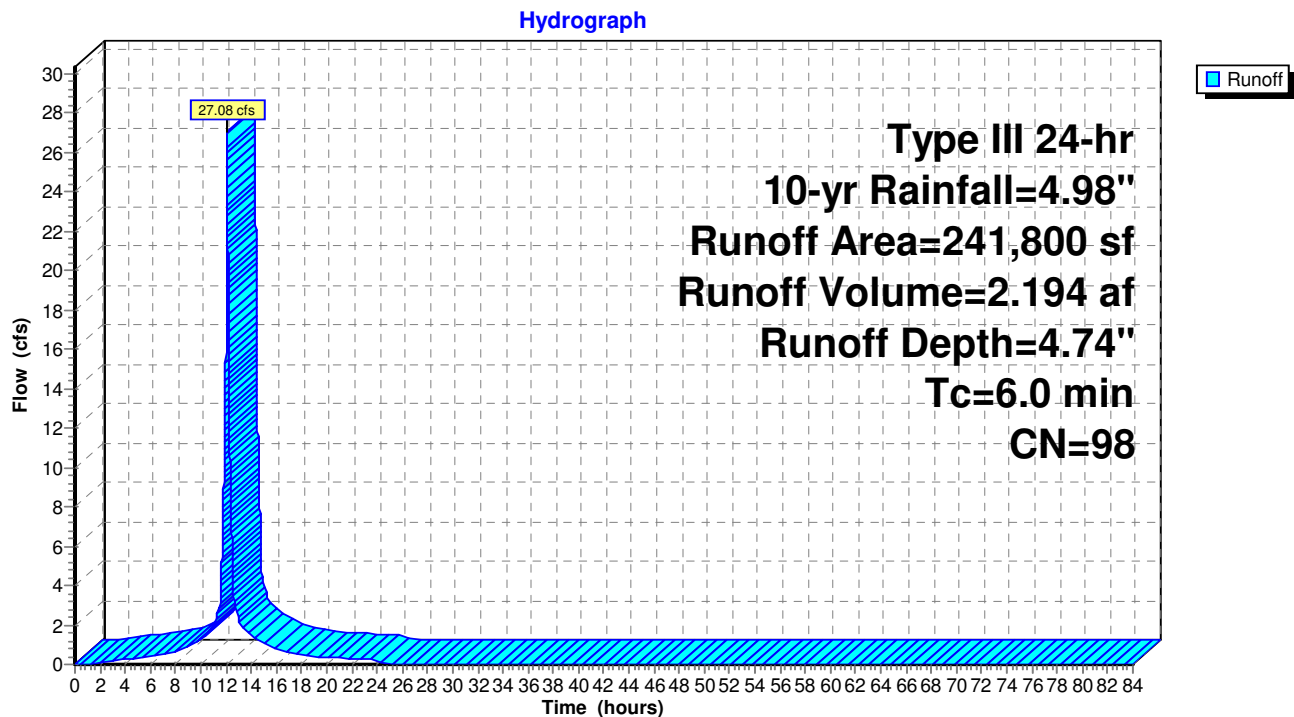
Hydrograph



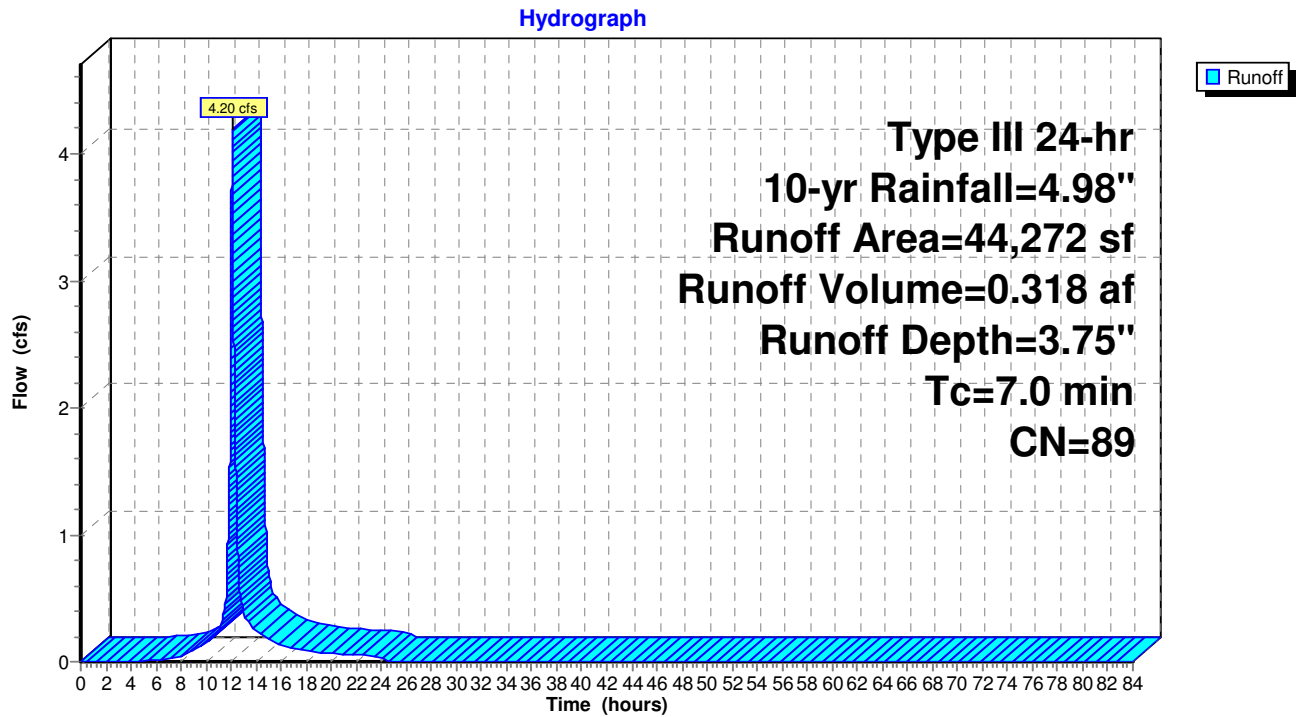
### Subcatchment P7: Proposed P7



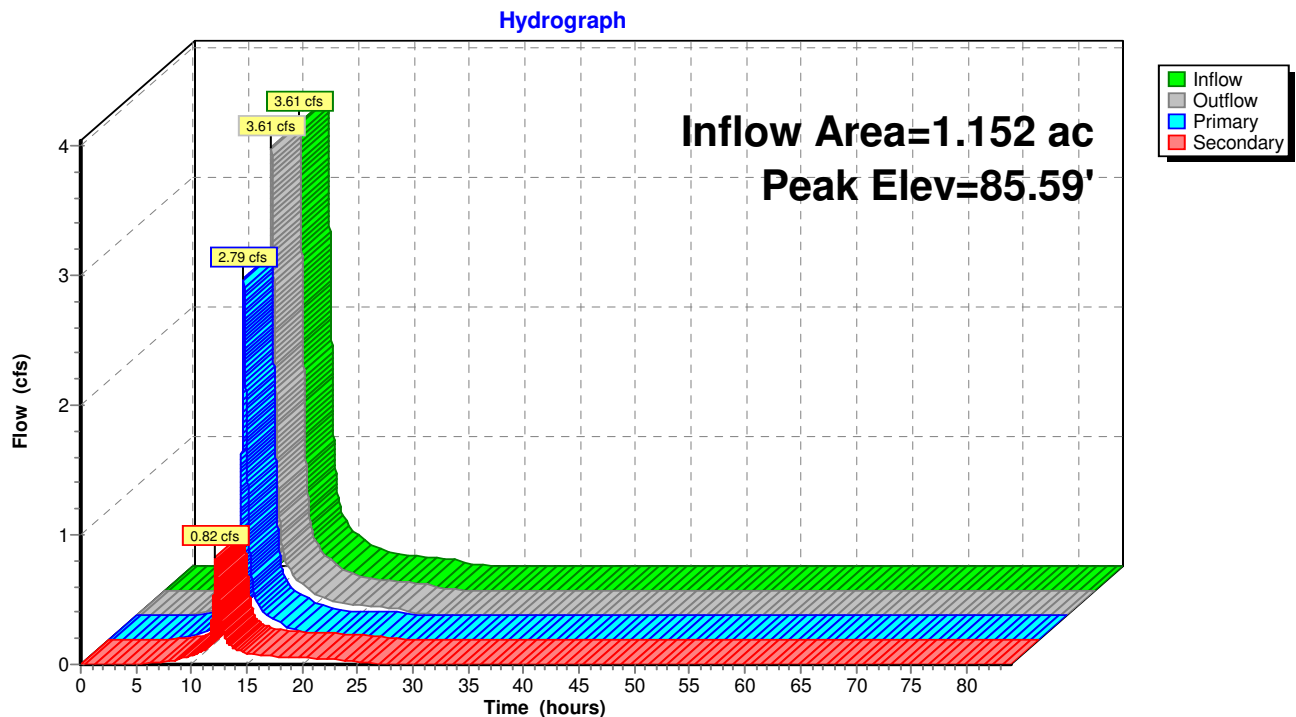
### Subcatchment P8: Proposed Roof to UGC-D (west)



### Subcatchment P9: Sheetflow to North Basin

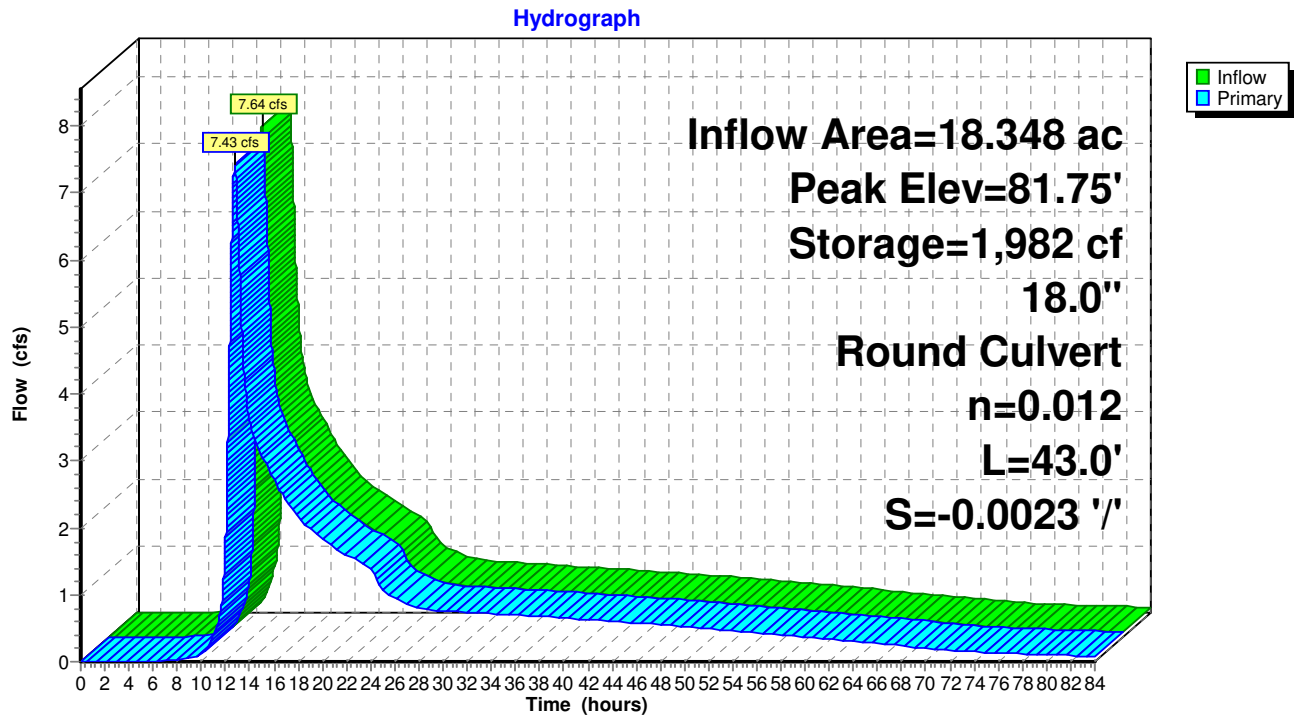


### Pond DMH: Splitter Structure

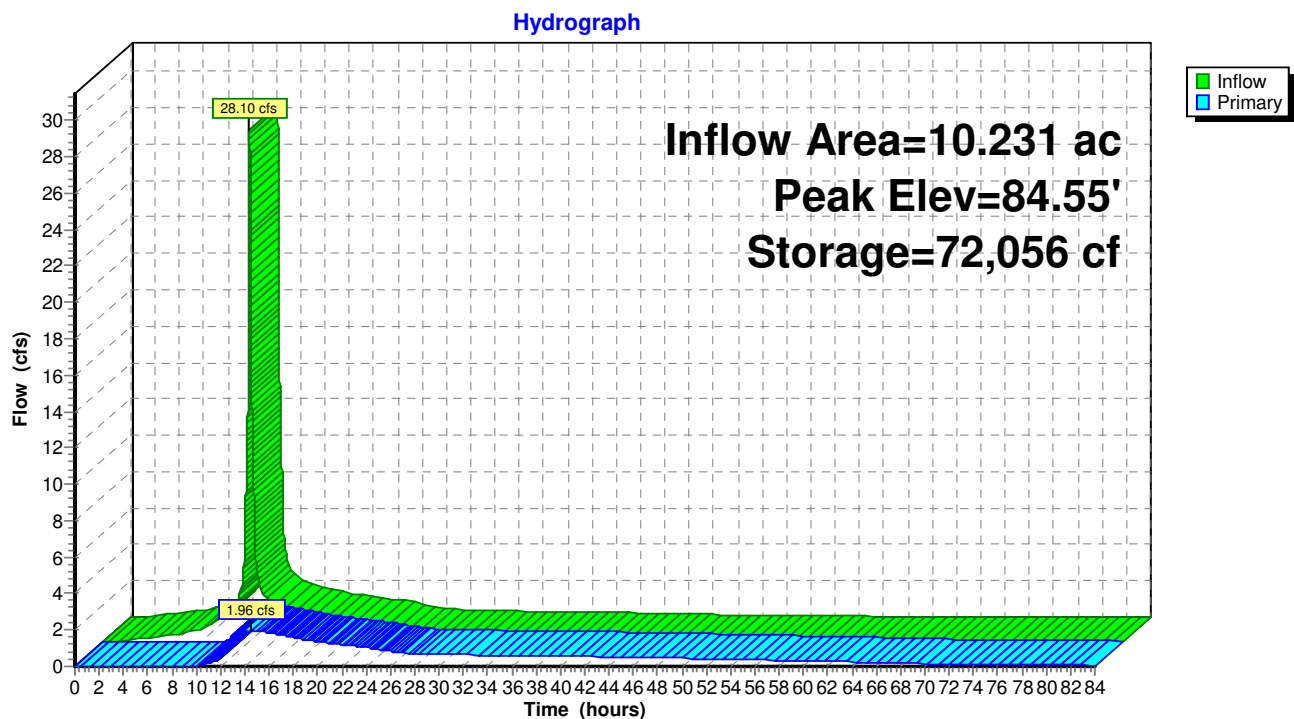




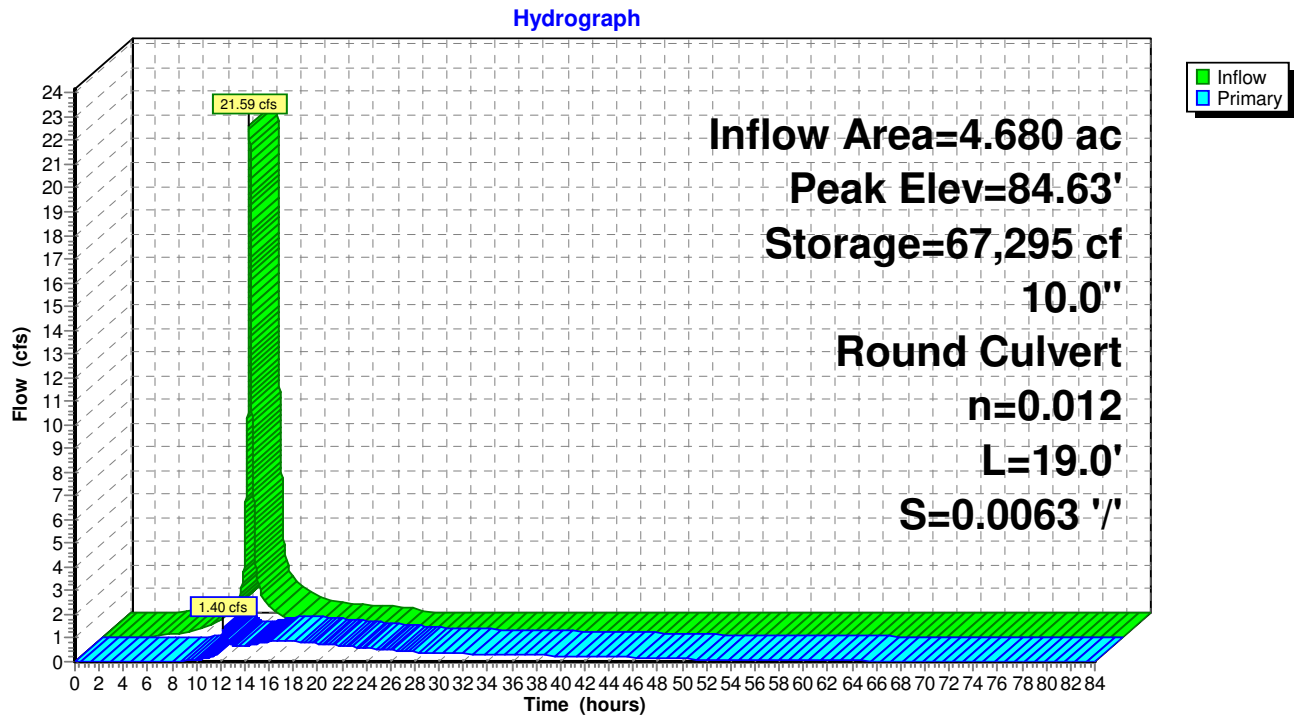
**Pond EP1\*: (DP1\*) Proposed Condition - Rail Road Pond**



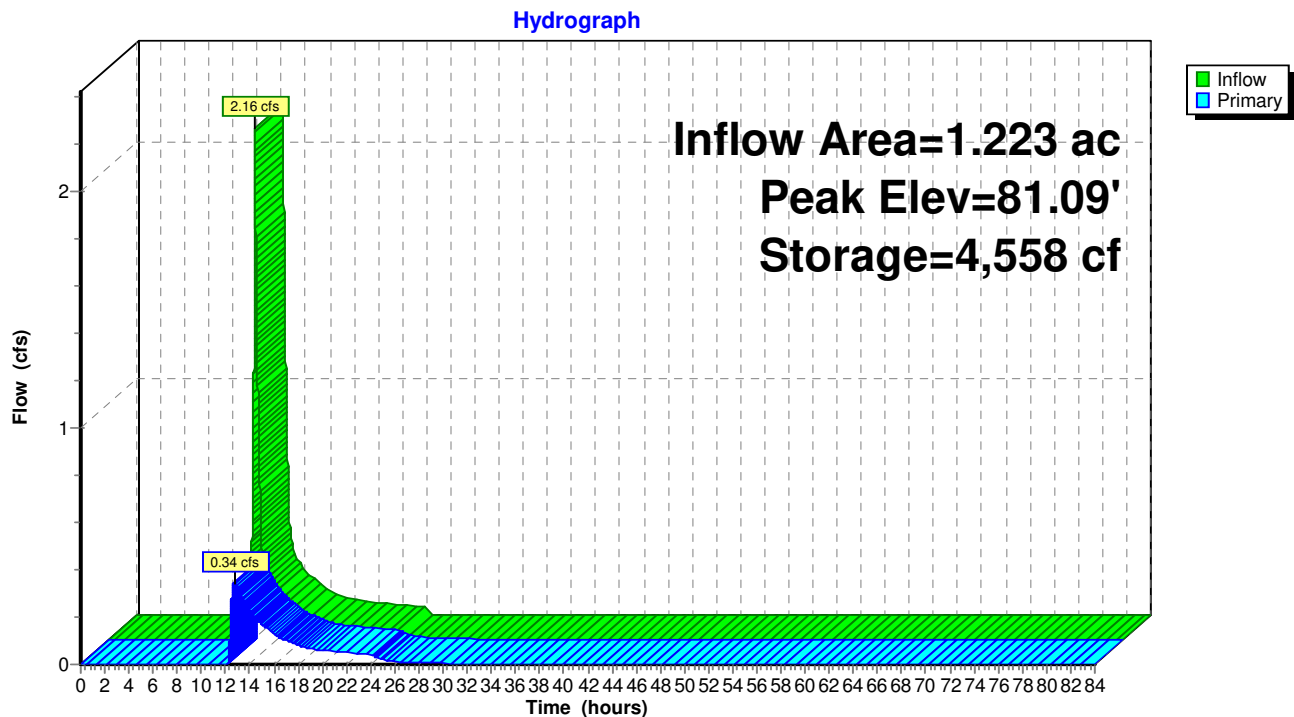
**Pond PP1: UGC-D (Stormtech SC-740)**



**Pond PP2: Water Quality Basin (WEST)**



**Pond PP3: UGC-B (Stormtech SC-310) w. Underdrain**



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

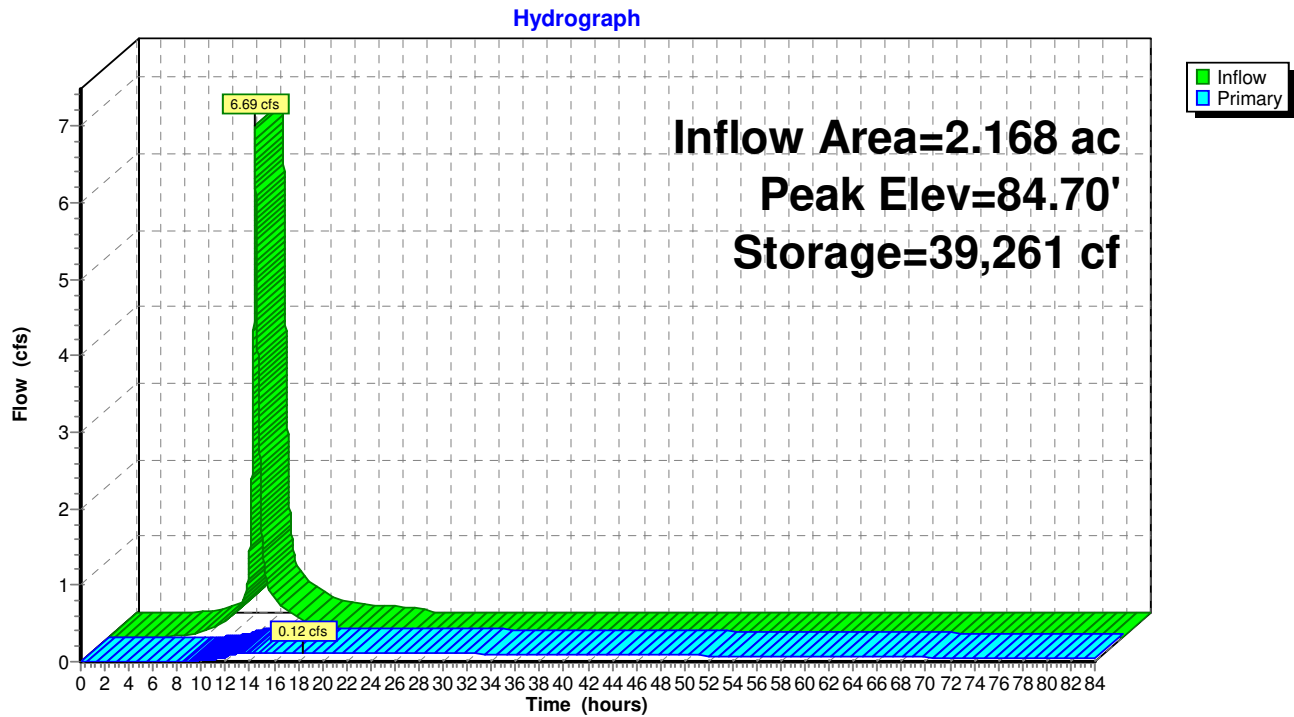
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 10-yr Rainfall=4.98"

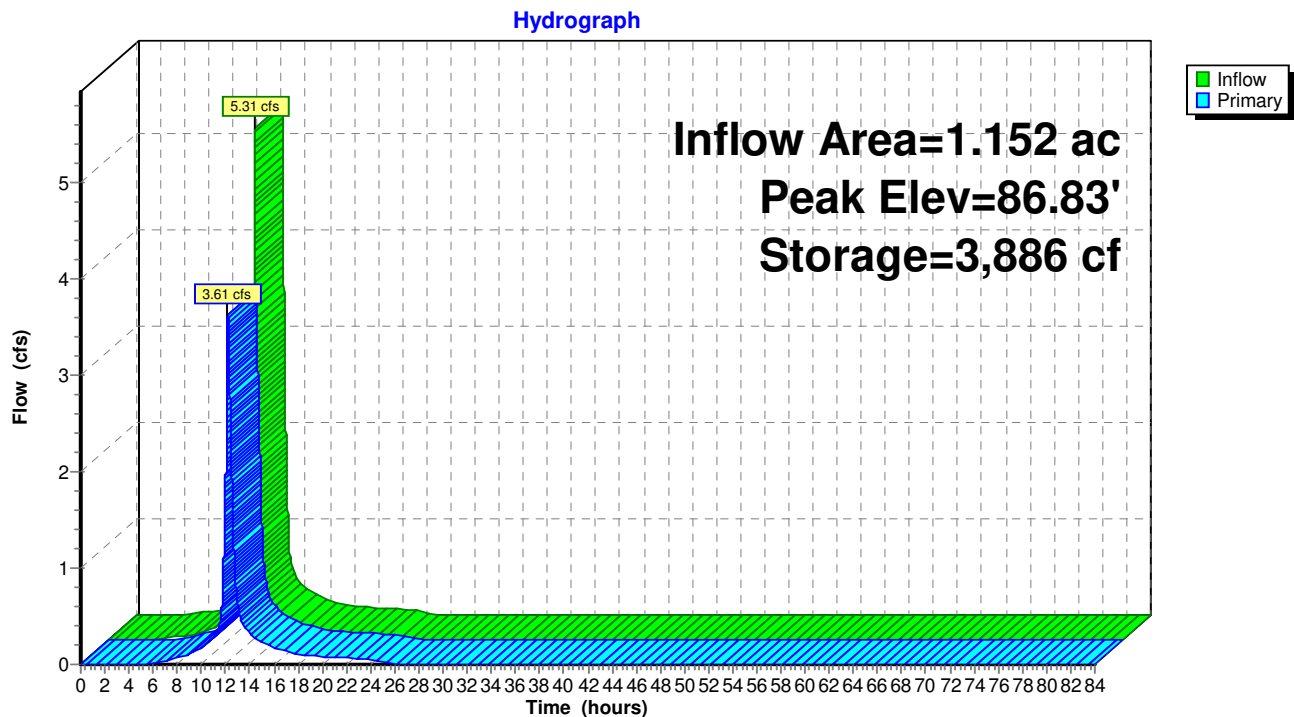
Printed 4/20/2022

Page 36

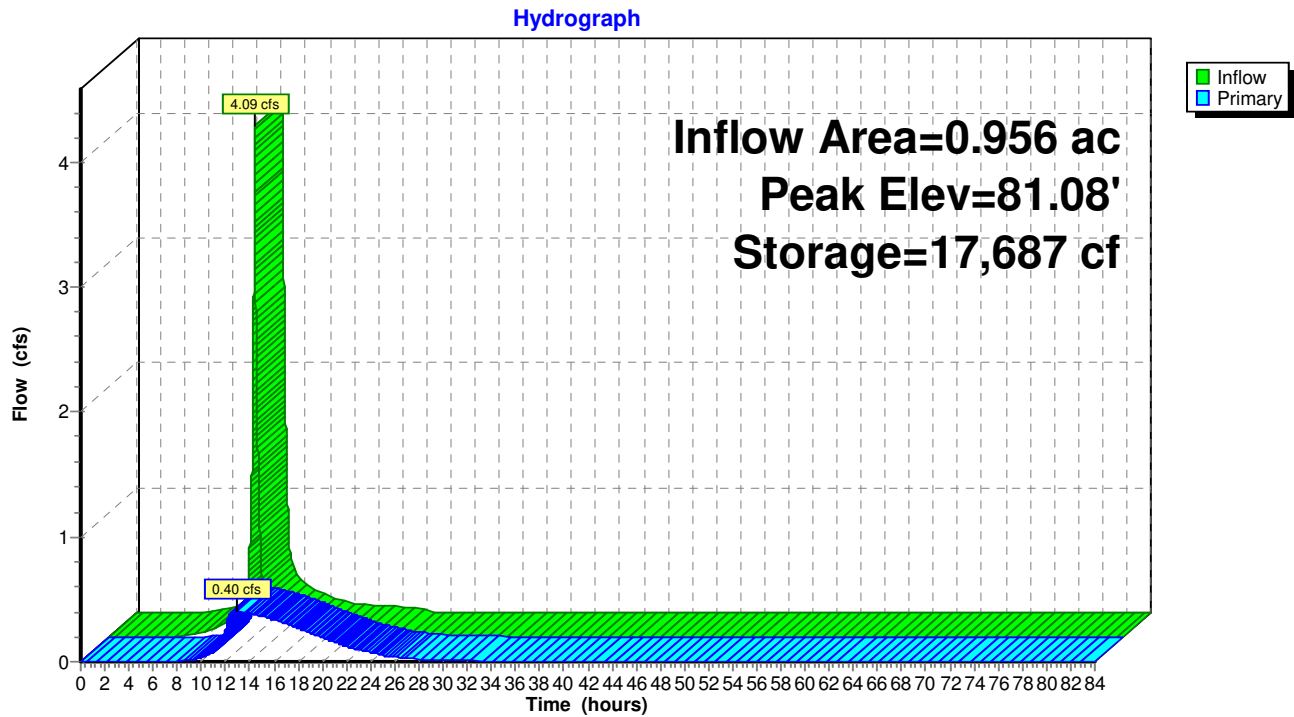
### Pond PP4: Water Quality Basin (North)



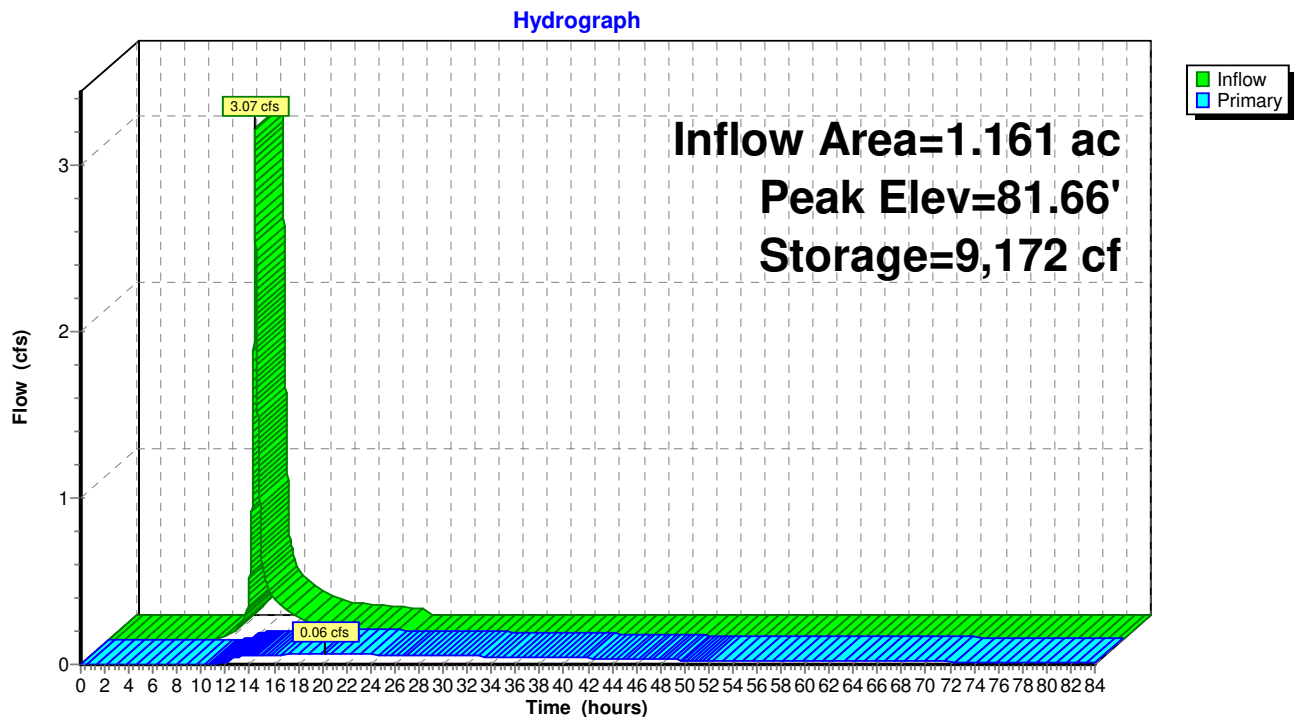
### Pond PP5: UGC-E (Stormtech SC-310)



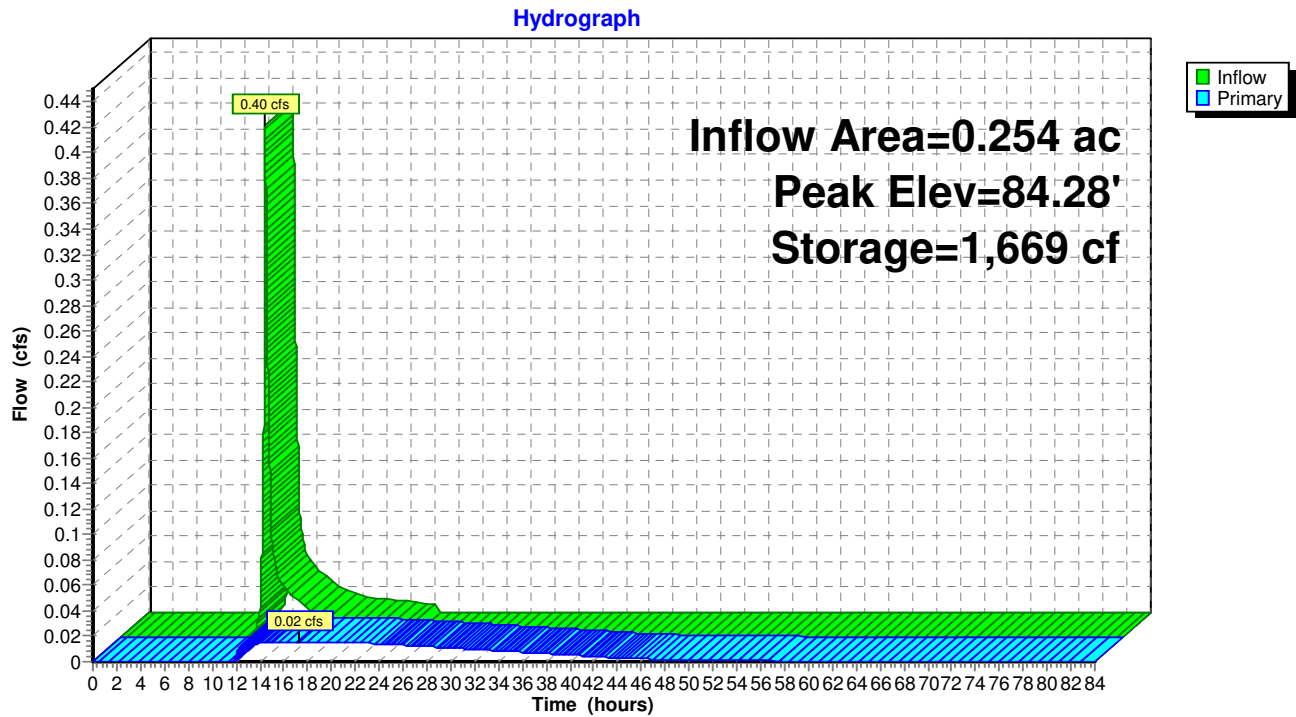
### Pond PP6: Water Quality Basin (Kennedy Road)



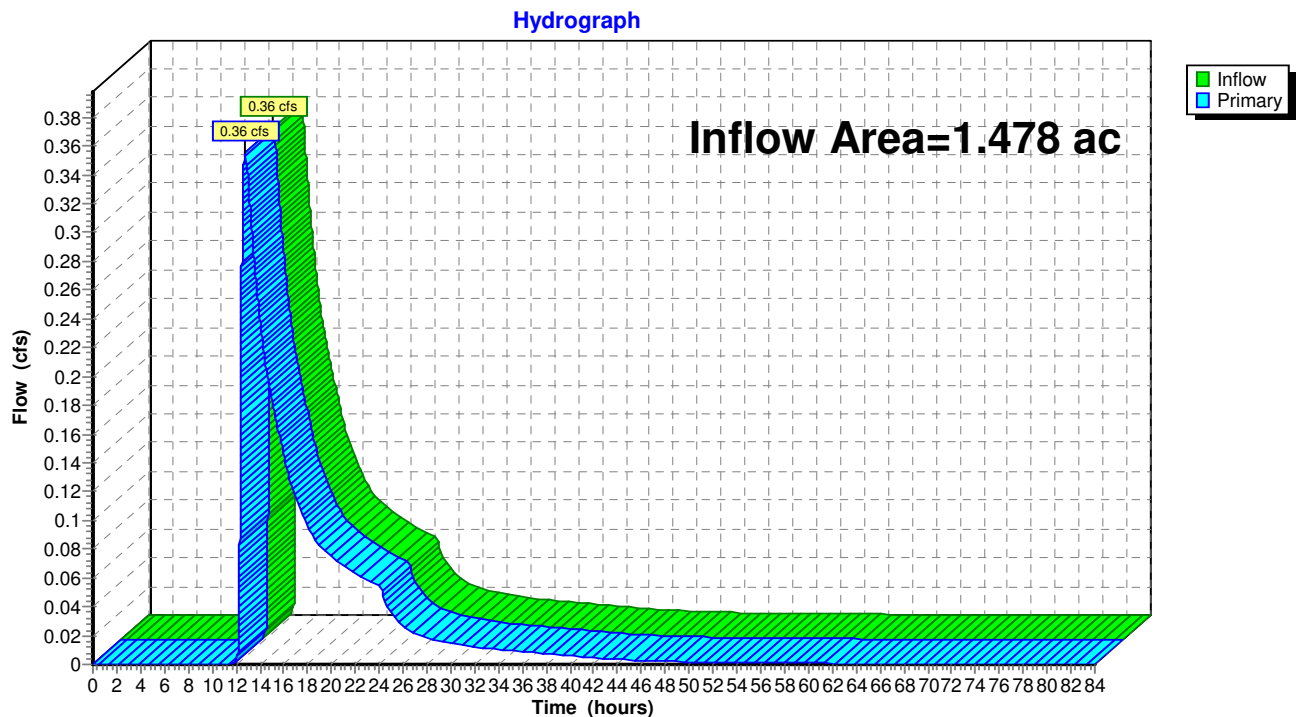
### Pond PP7: UGC-A (Stormtech SC-740)



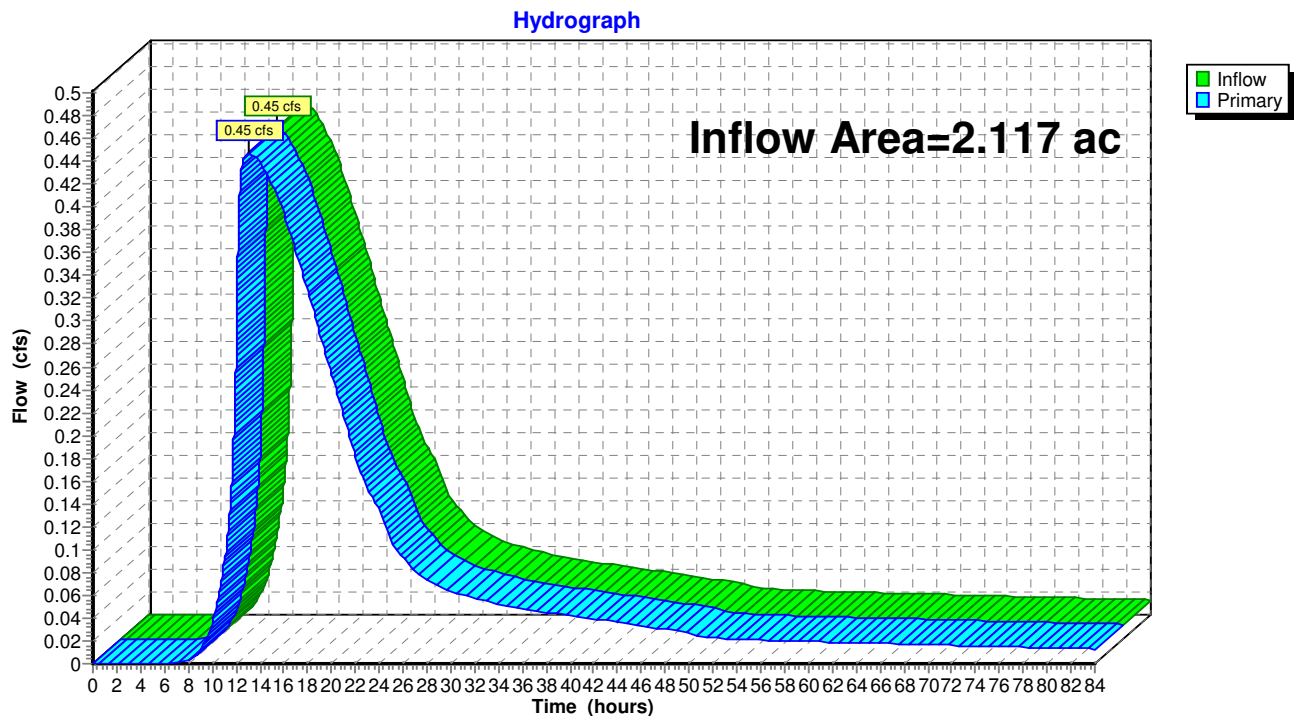
**Pond PP8: UGC-C (Stormtech SC-310)**



**Link DP3\*: (DP3\*) Proposed Flow to Sullivan Ave**



# Link DP4\*: (DP4\*) Proposed Flow to Kennedy Road Drainage System



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

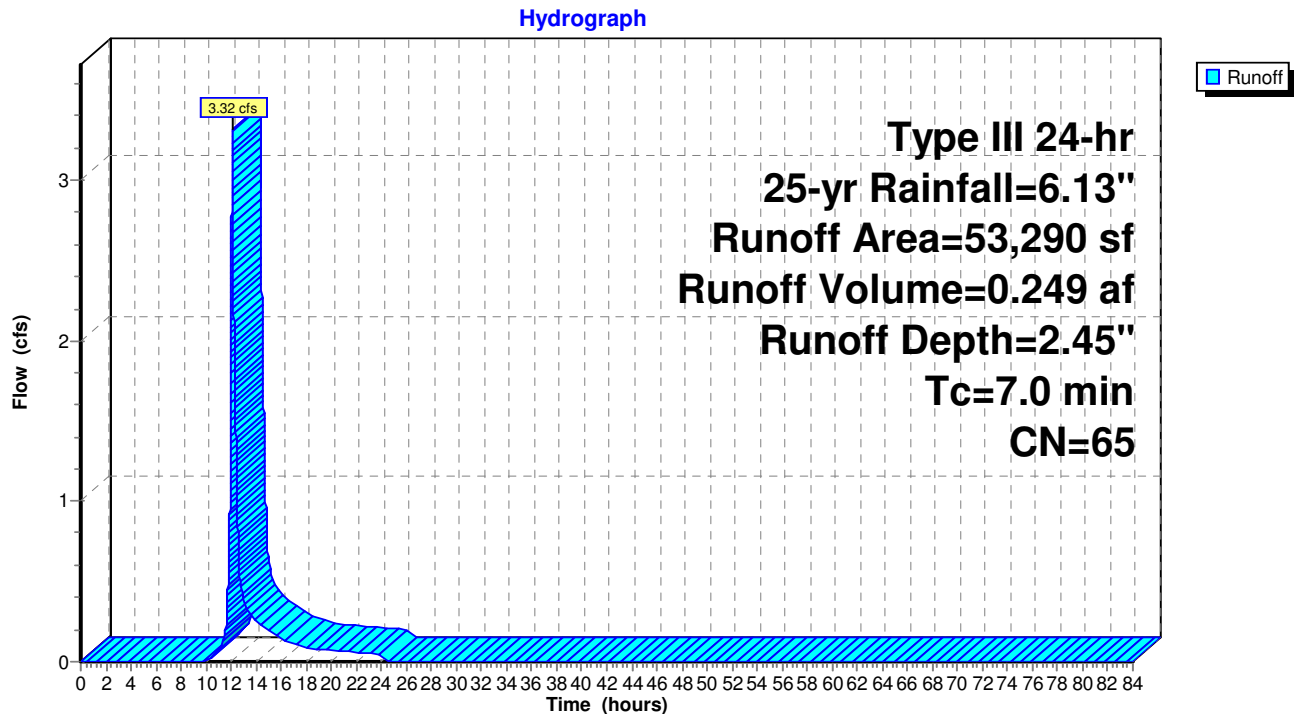
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

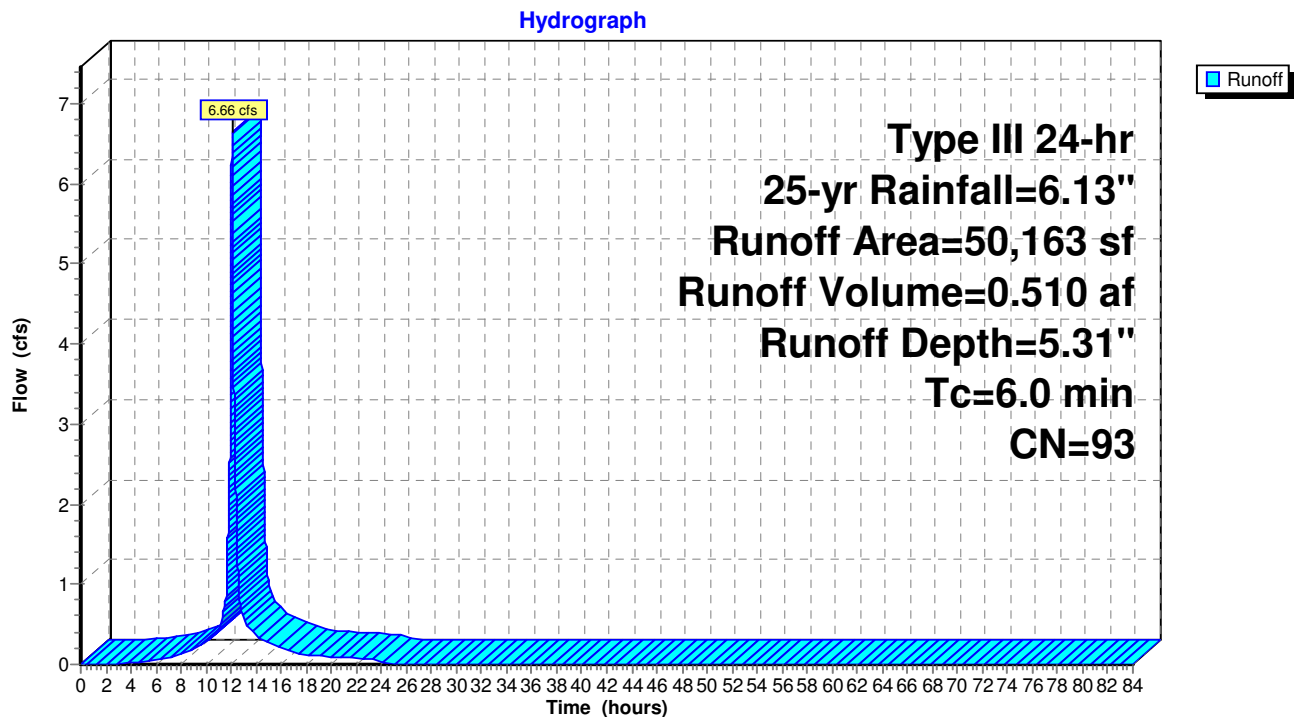
Printed 4/20/2022

Page 40

### Subcatchment P1: Yard Drains to UGC-B



### Subcatchment P10: CB's to UGC-E (East)



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

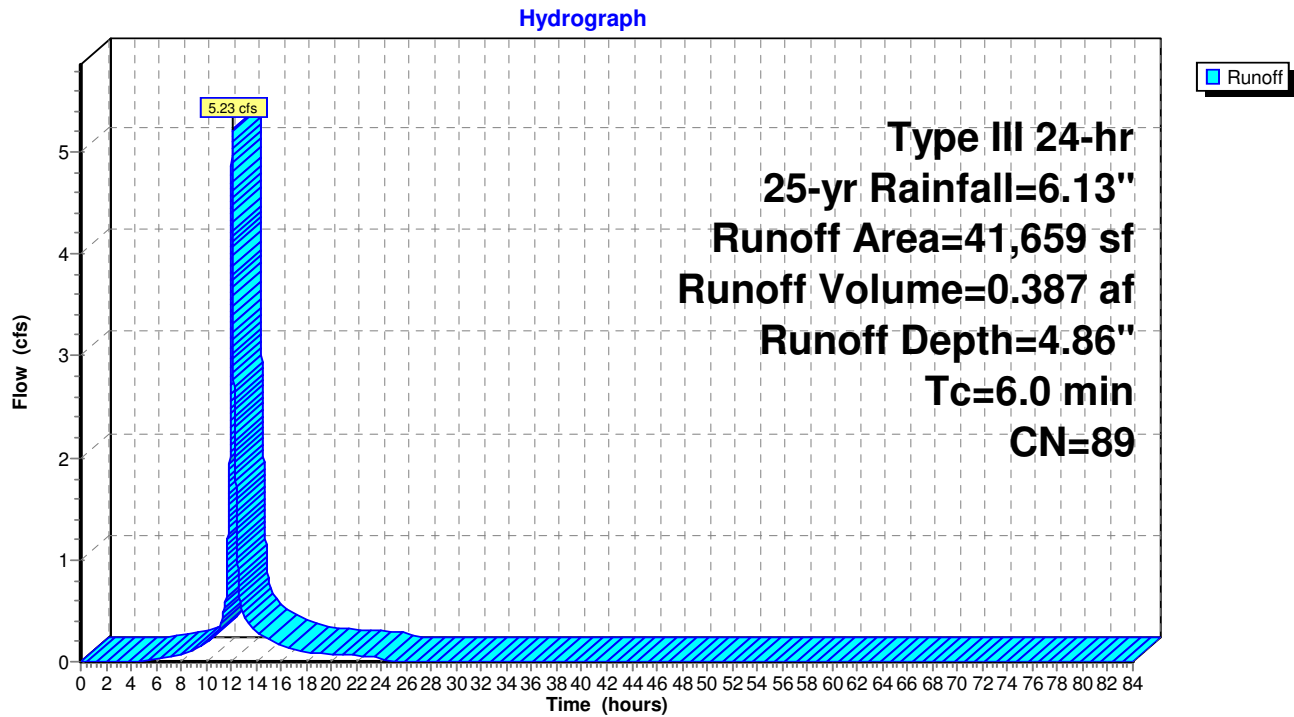
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

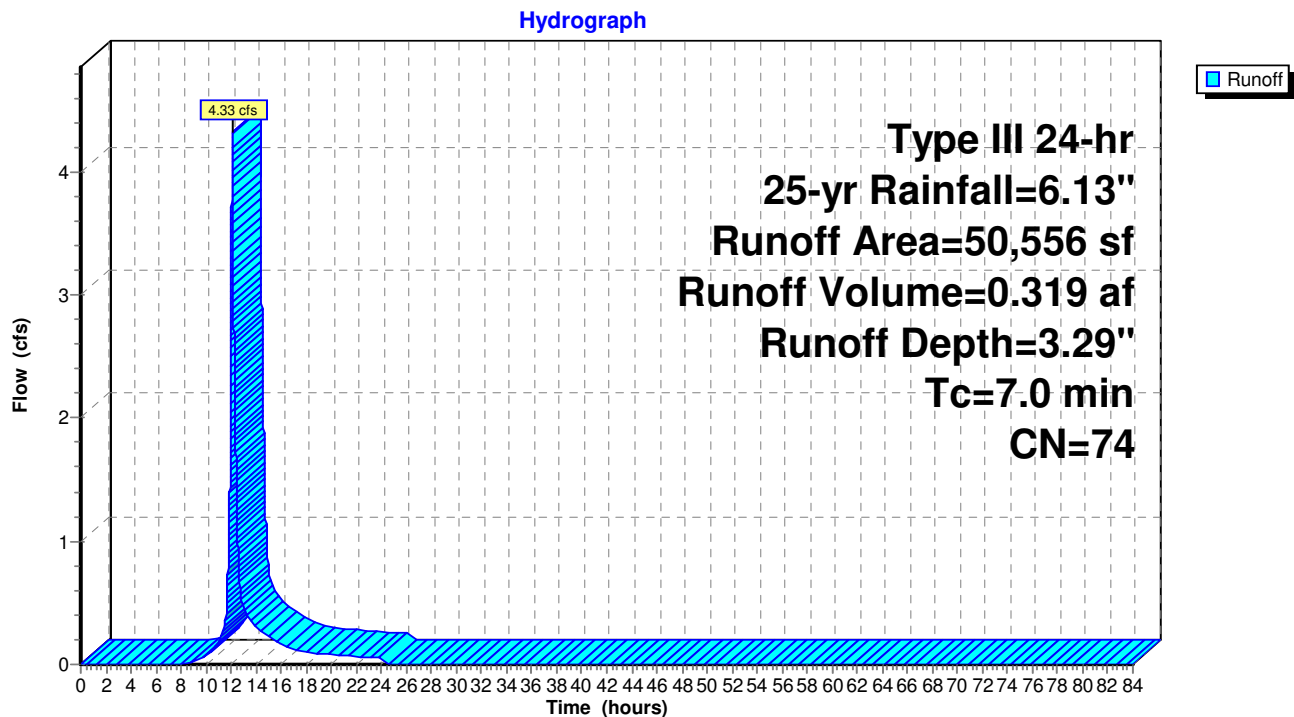
Printed 4/20/2022

Page 41

### Subcatchment P11: Culdesac



### Subcatchment P12: Yard Drains to UGC-A





## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

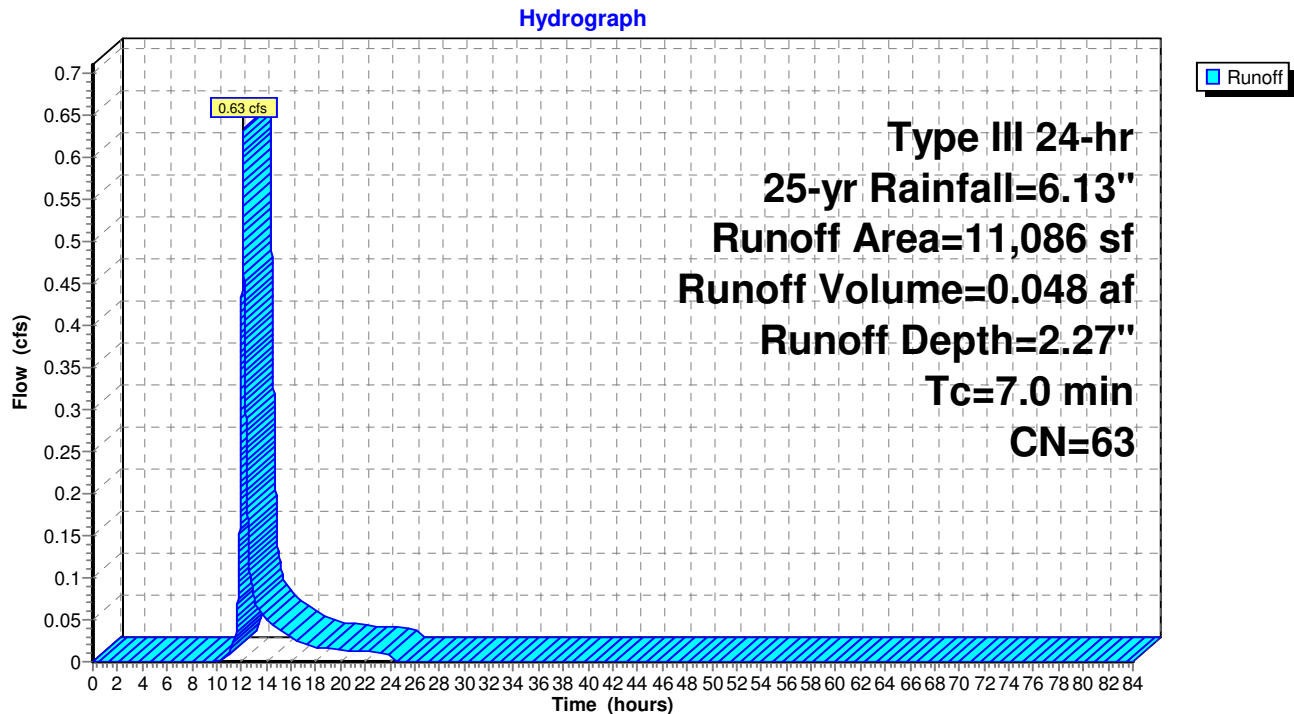
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

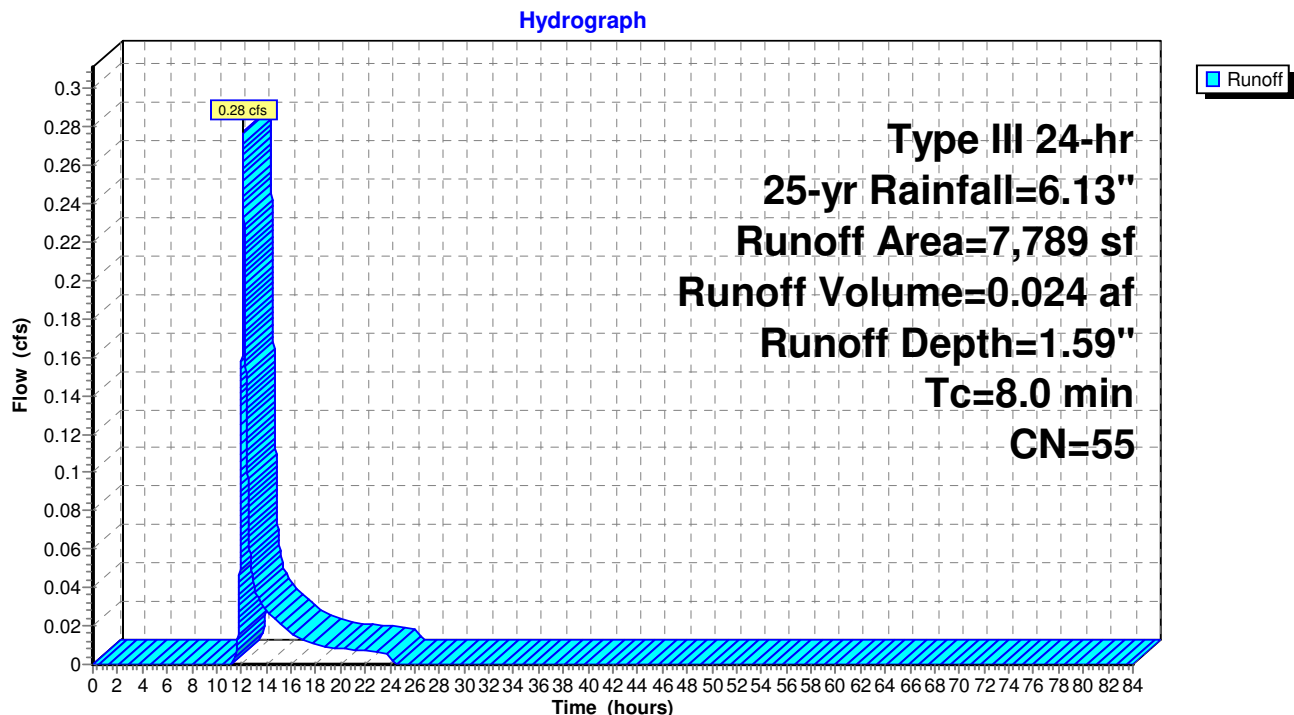
Printed 4/20/2022

Page 42

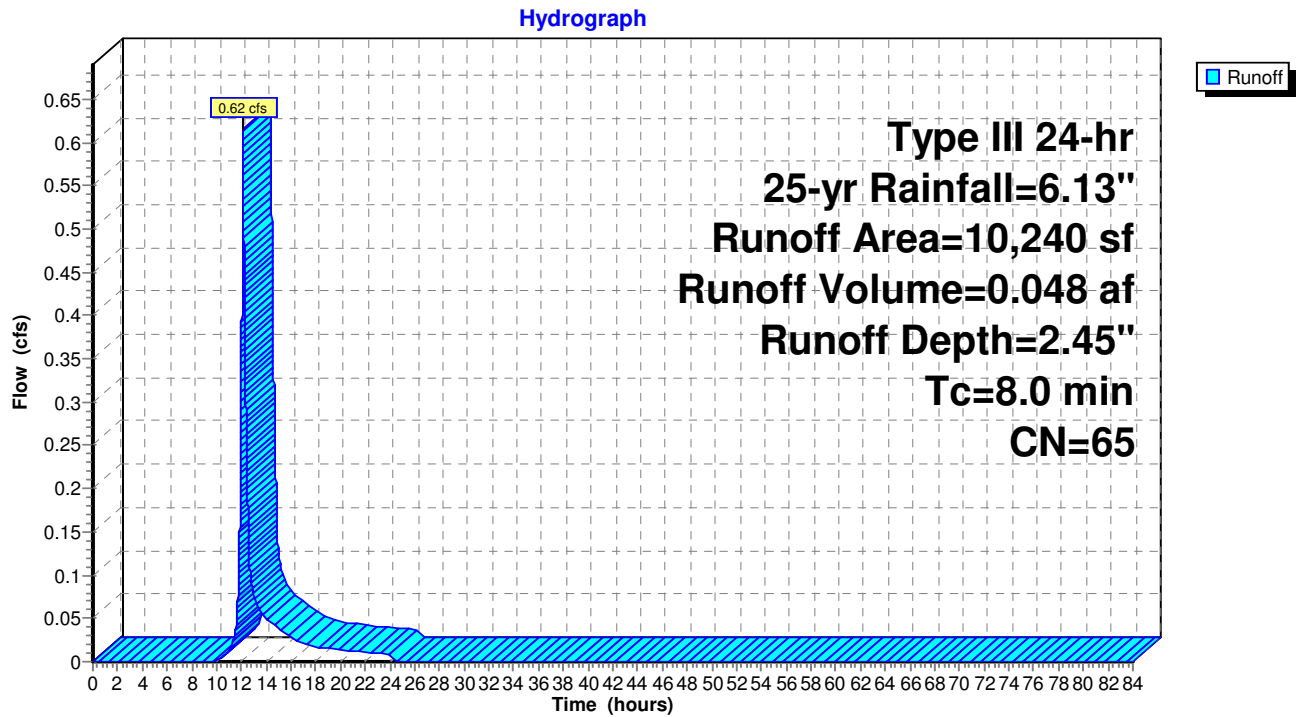
### Subcatchment P13: Yard Drains to UGC-C



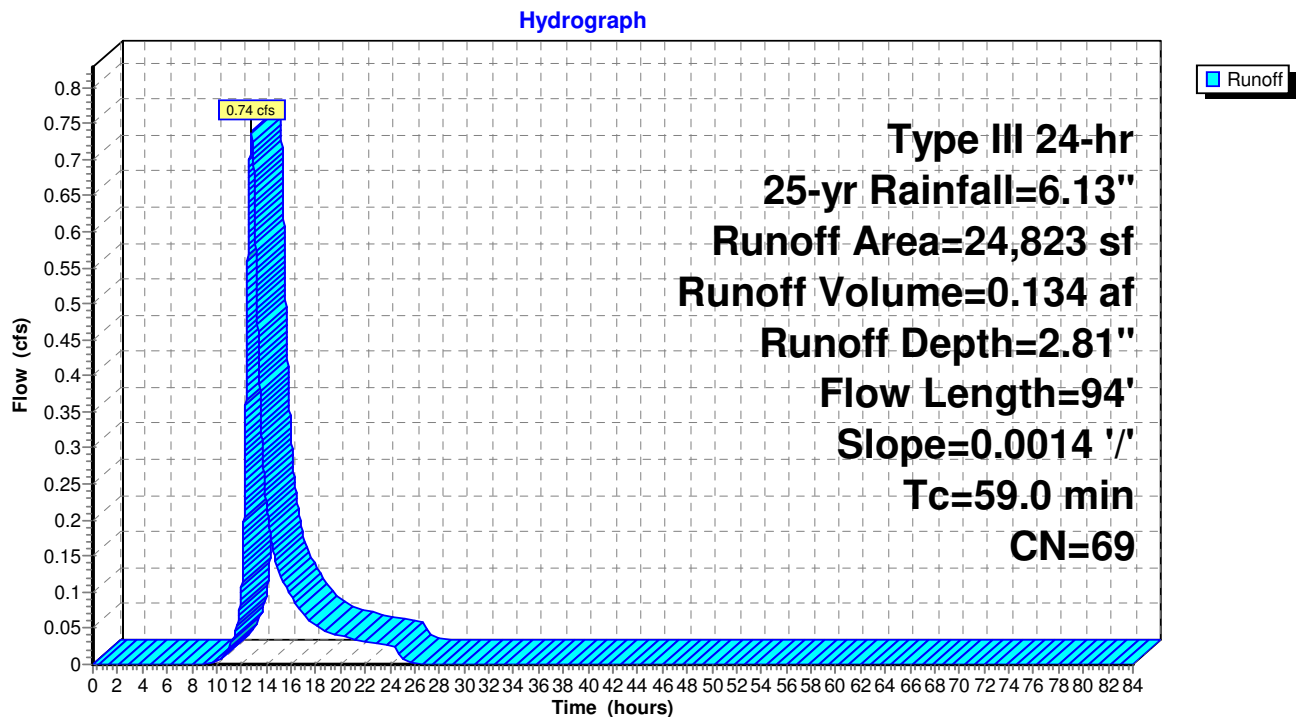
### Subcatchment P2: (DP2\*) Proposed Flow across North West Property Corner



Subcatchment P3: P3



Subcatchment P4: P4



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

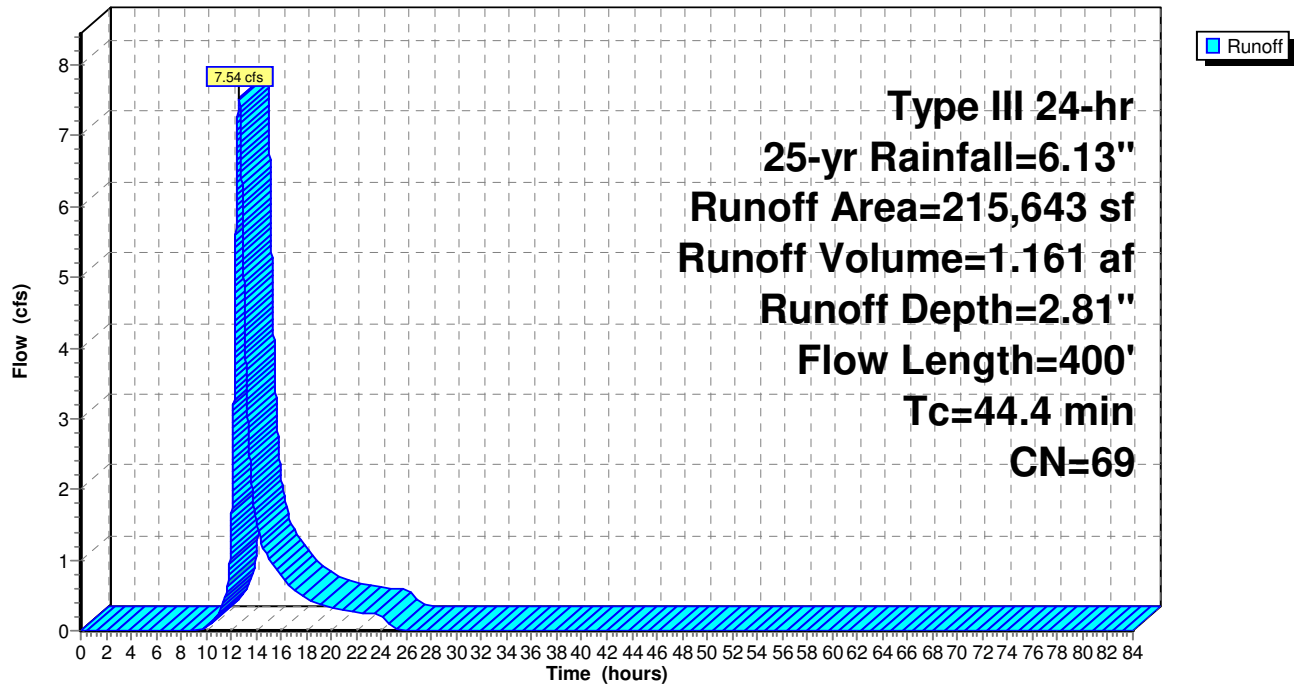
Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

Printed 4/20/2022

Page 44

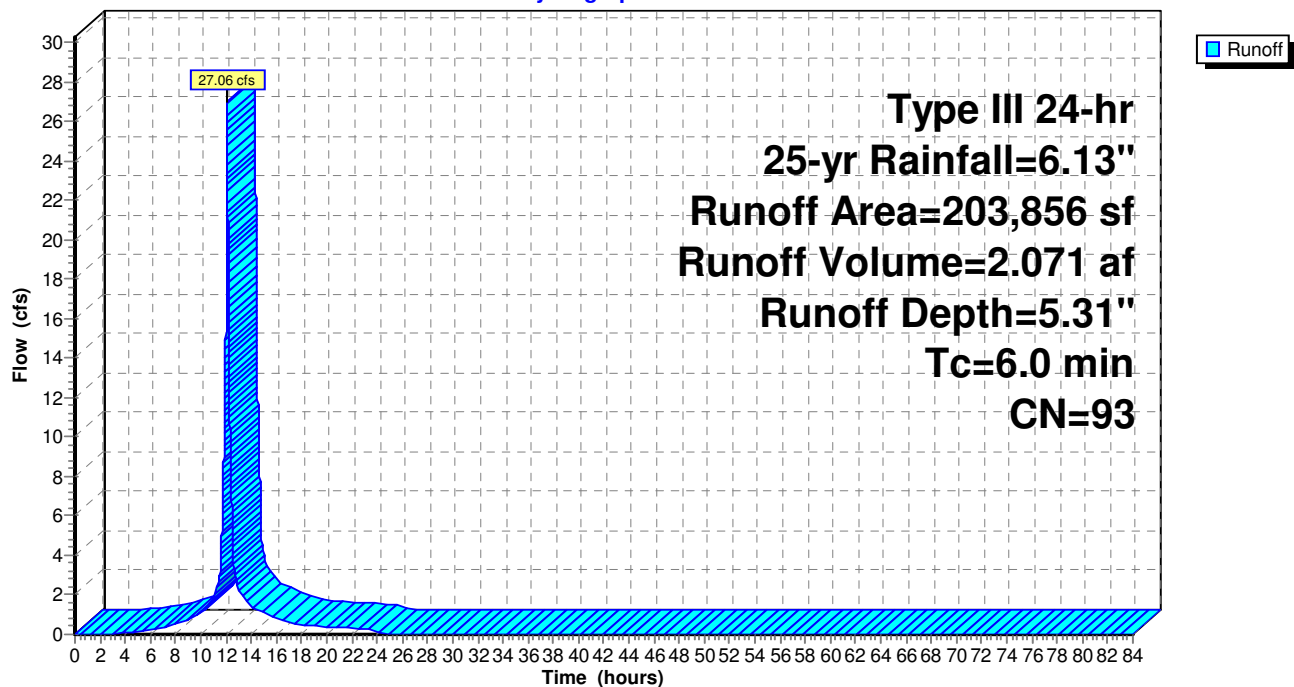
### Subcatchment P5: P5

Hydrograph

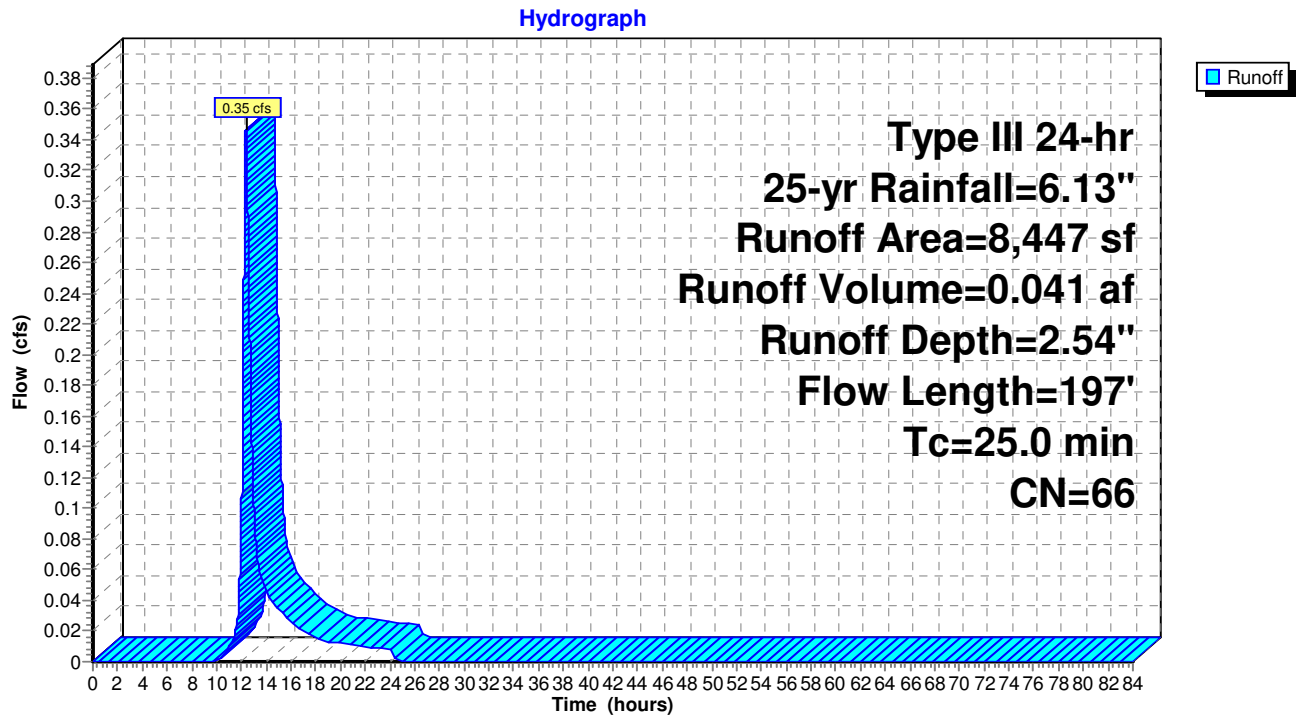


### Subcatchment P6: Sheet flow To West Basin

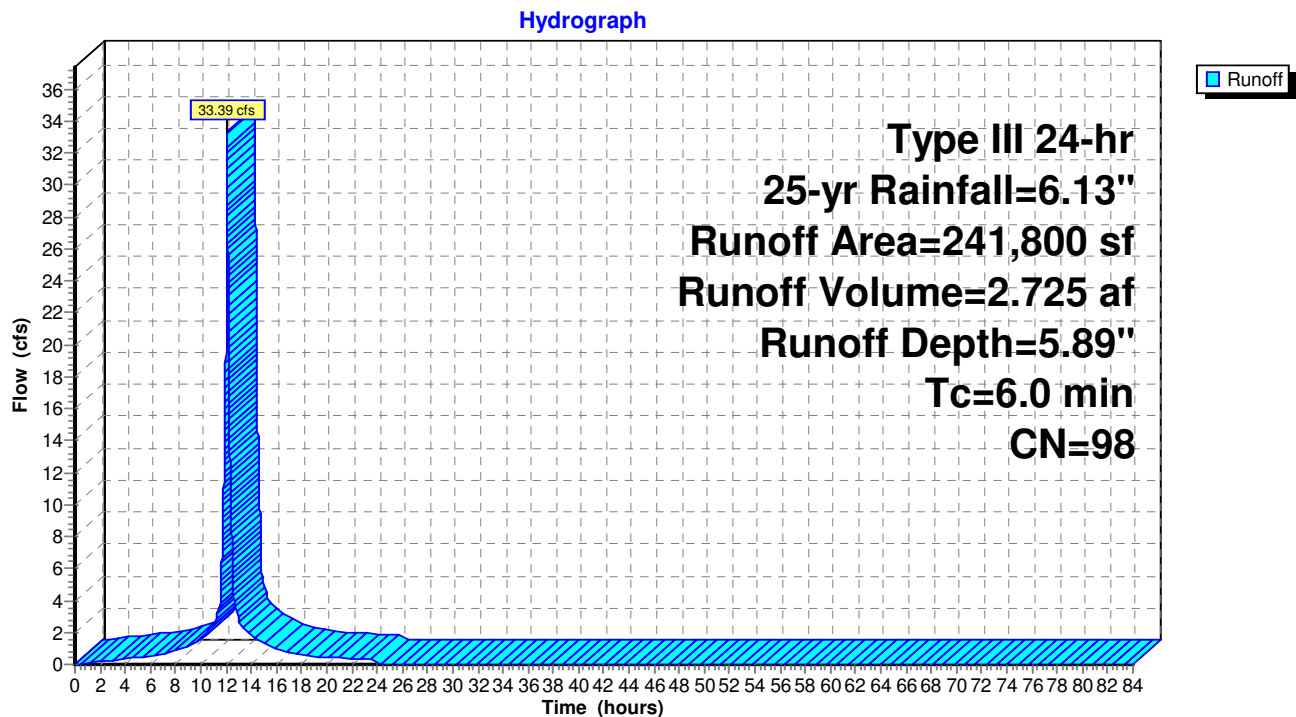
Hydrograph



### Subcatchment P7: Proposed P7



### Subcatchment P8: Proposed Roof to UGC-D (west)



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

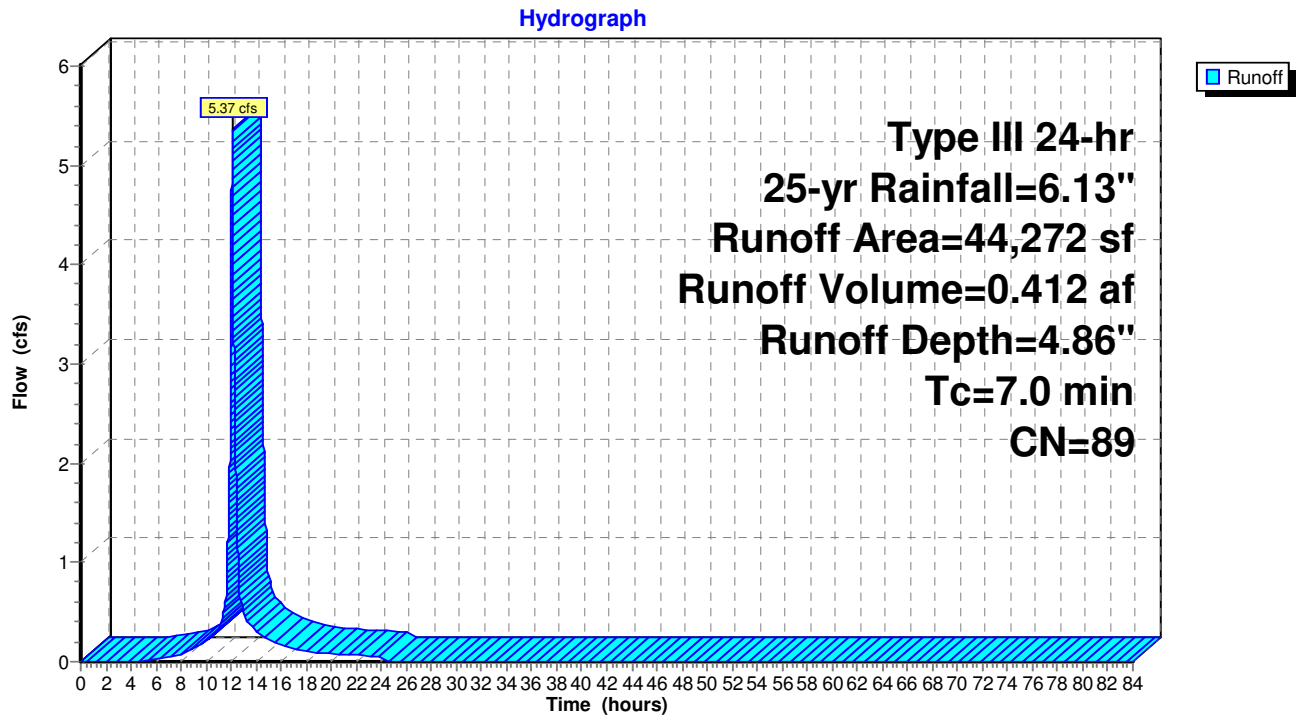
Proposed Condition

Type III 24-hr 25-yr Rainfall=6.13"

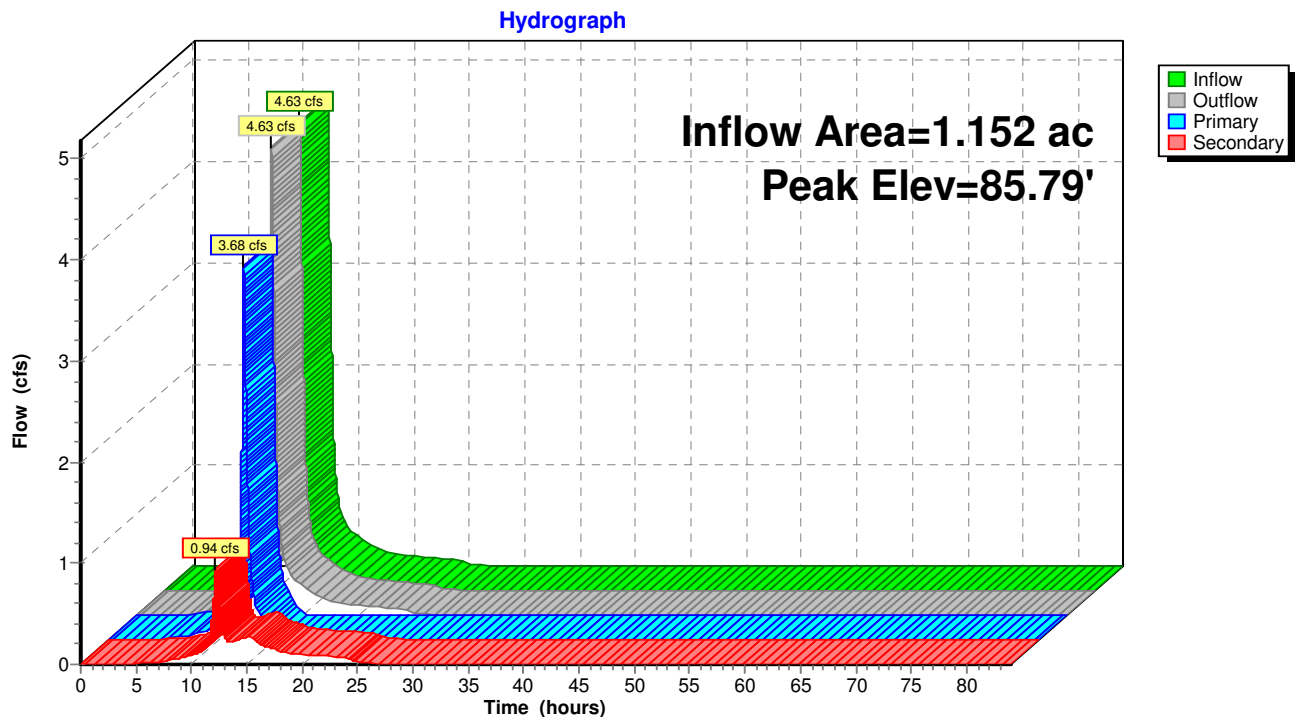
Printed 4/20/2022

Page 46

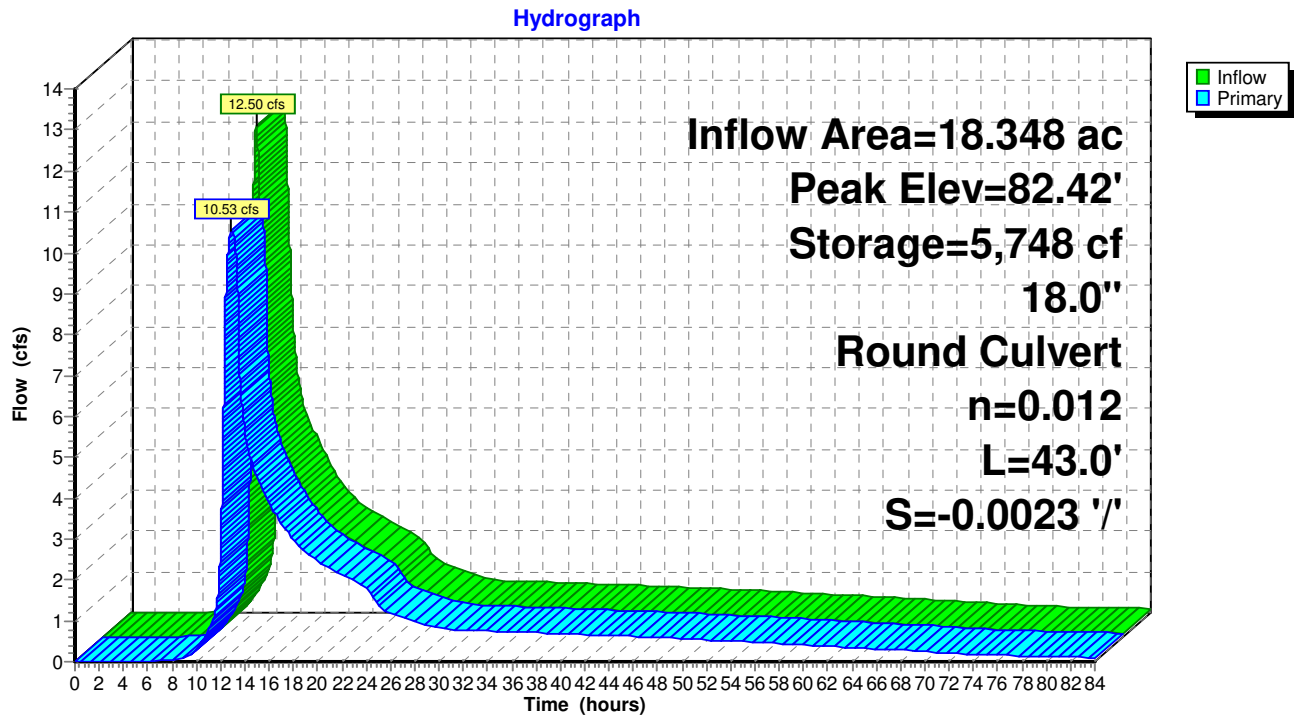
### Subcatchment P9: Sheetflow to North Basin



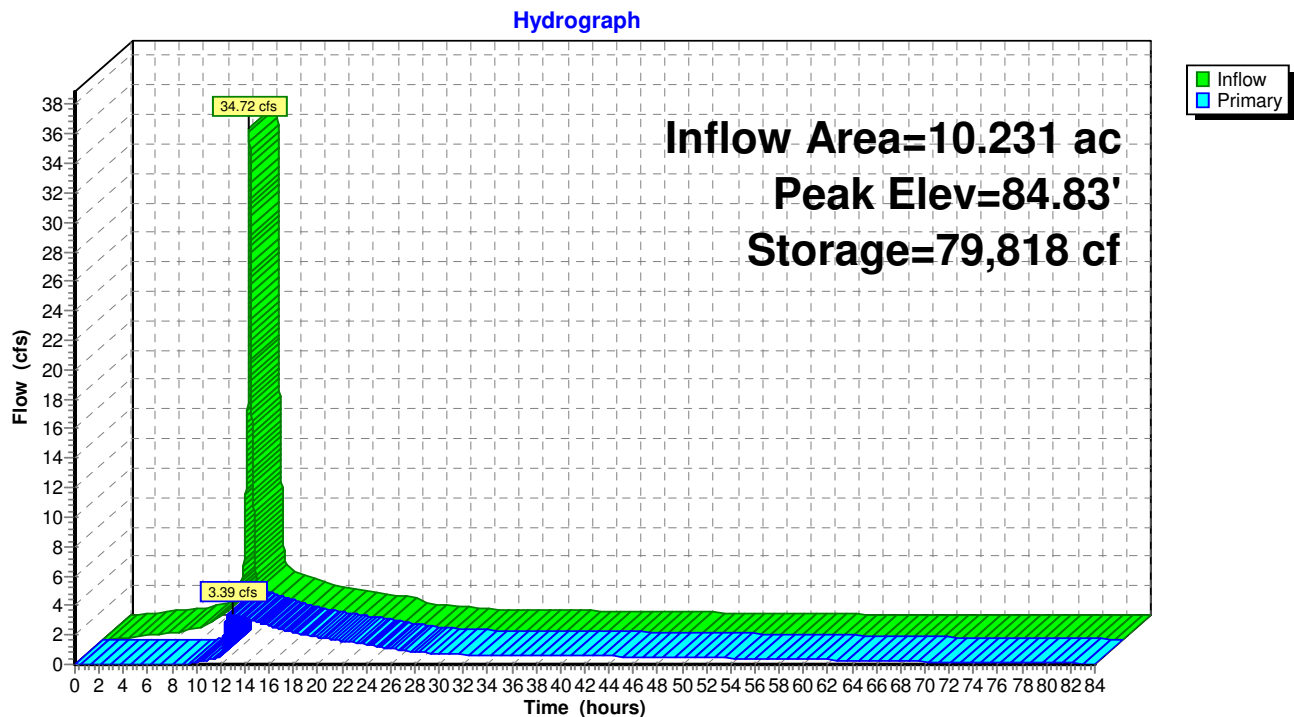
### Pond DMH: Splitter Structure



**Pond EP1\*: (DP1\*) Proposed Condition - Rail Road Pond**



**Pond PP1: UGC-D (Stormtech SC-740)**



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

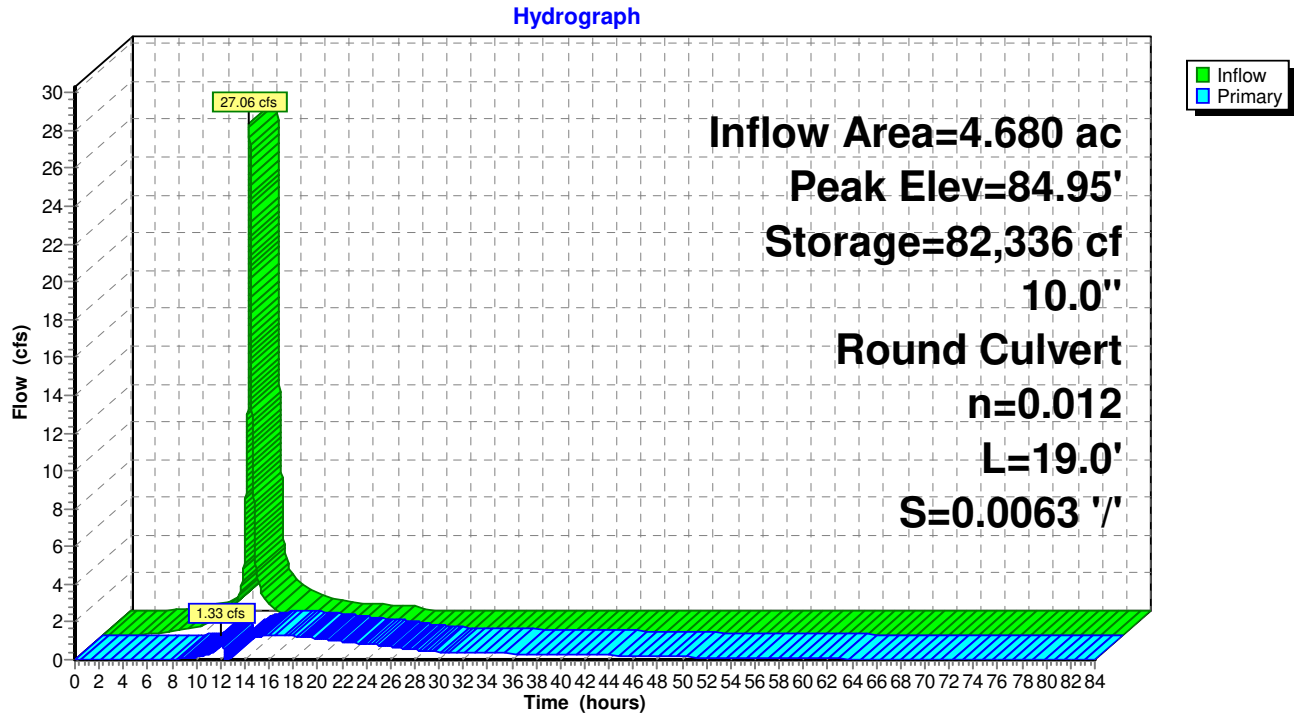
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

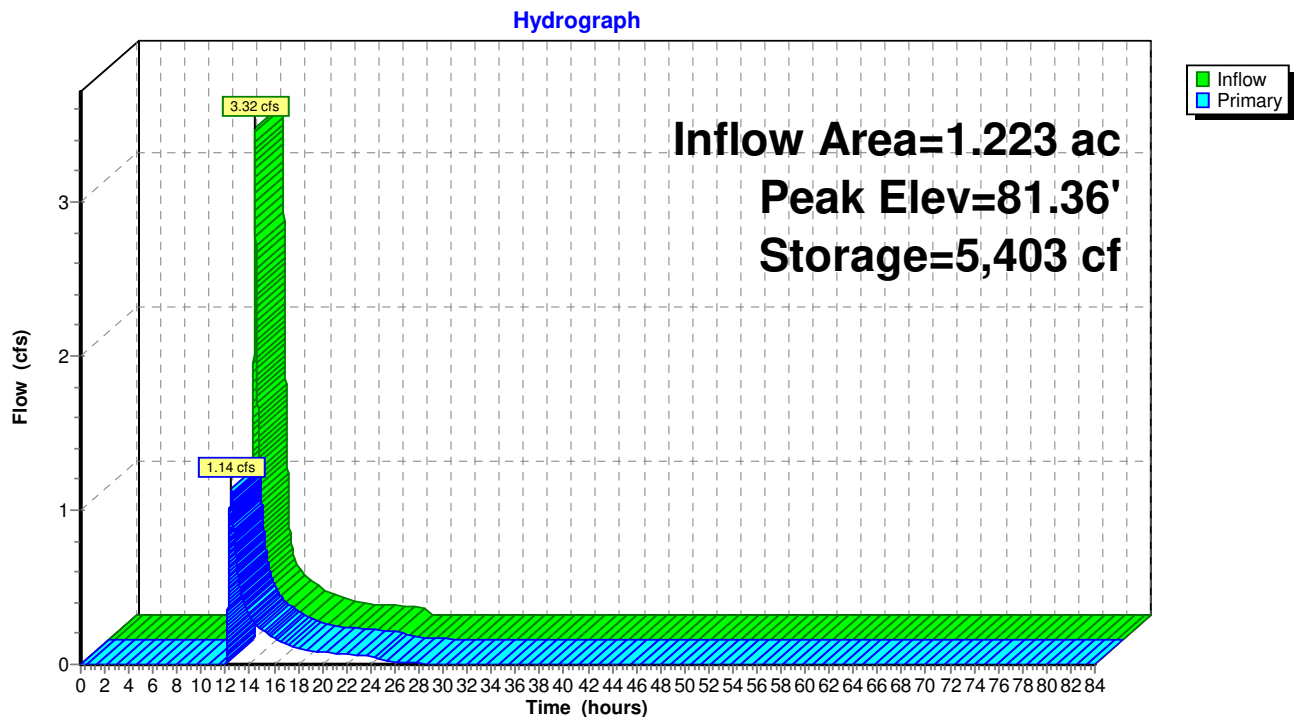
Printed 4/20/2022

Page 48

### Pond PP2: Water Quality Basin (WEST)



### Pond PP3: UGC-B (Stormtech SC-310) w. Underdrain



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

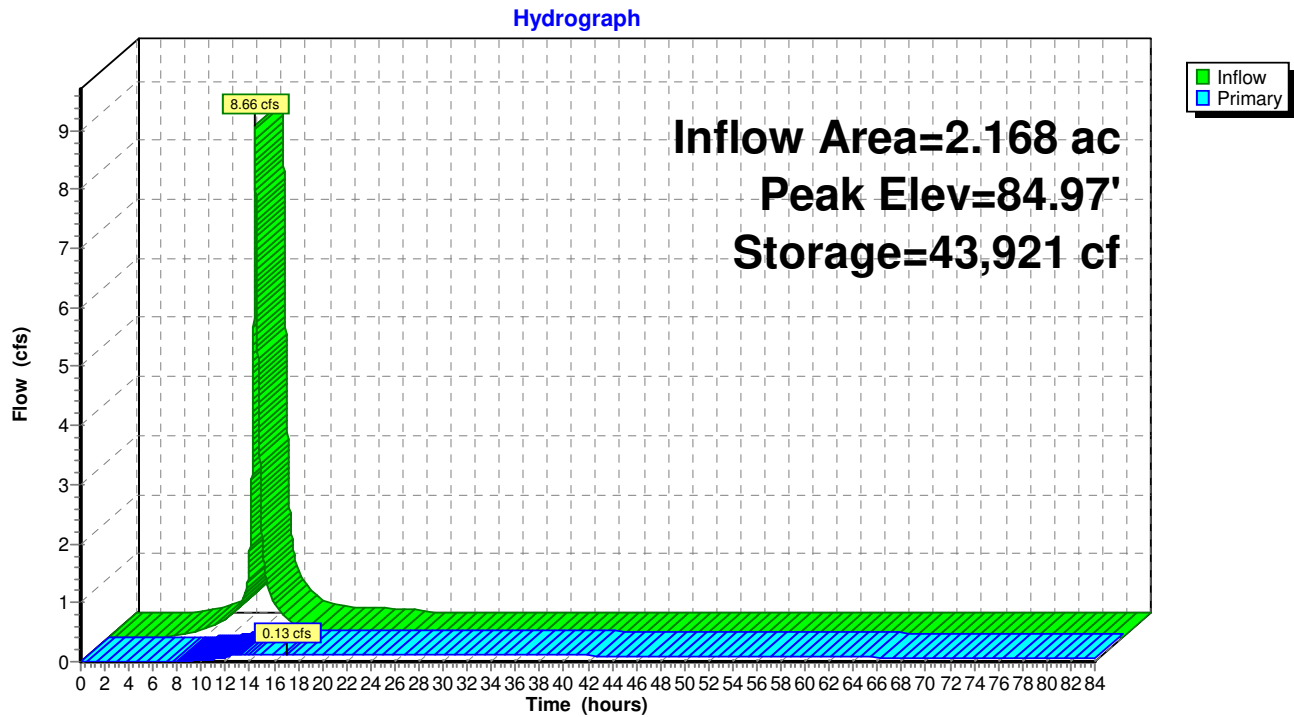
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

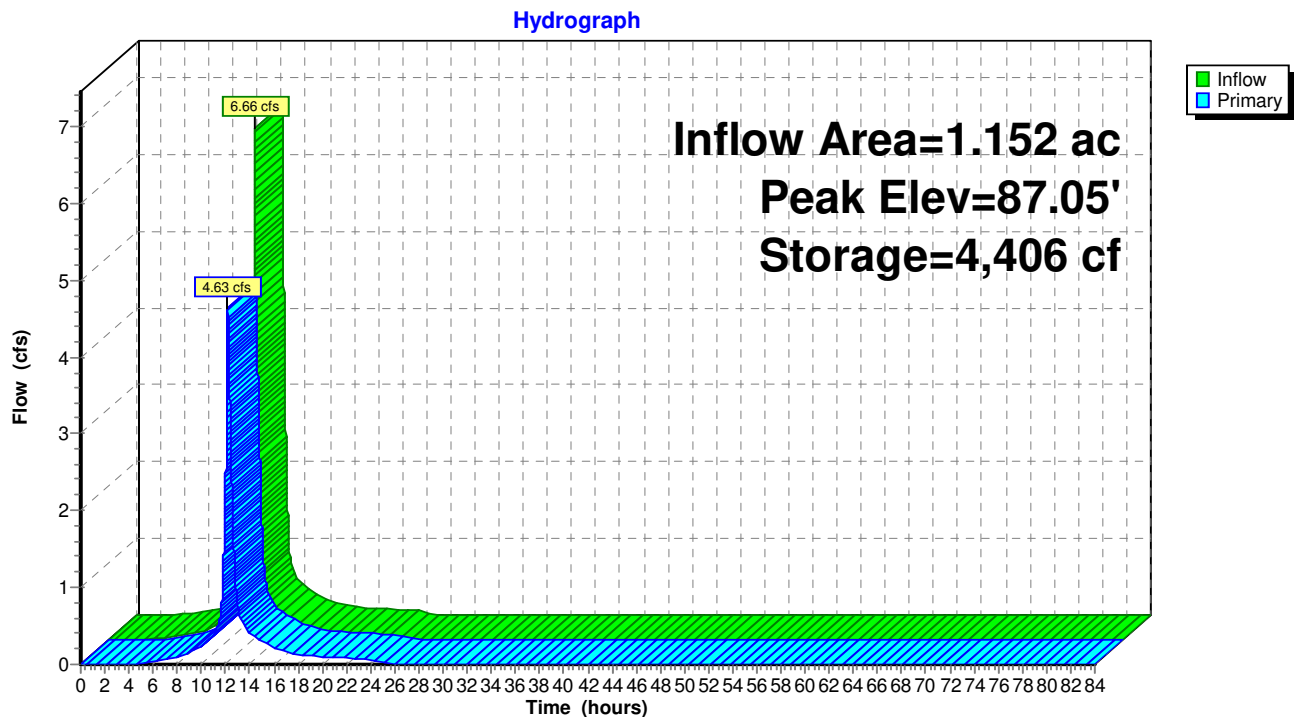
Printed 4/20/2022

Page 49

### Pond PP4: Water Quality Basin (North)



### Pond PP5: UGC-E (Stormtech SC-310)





## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

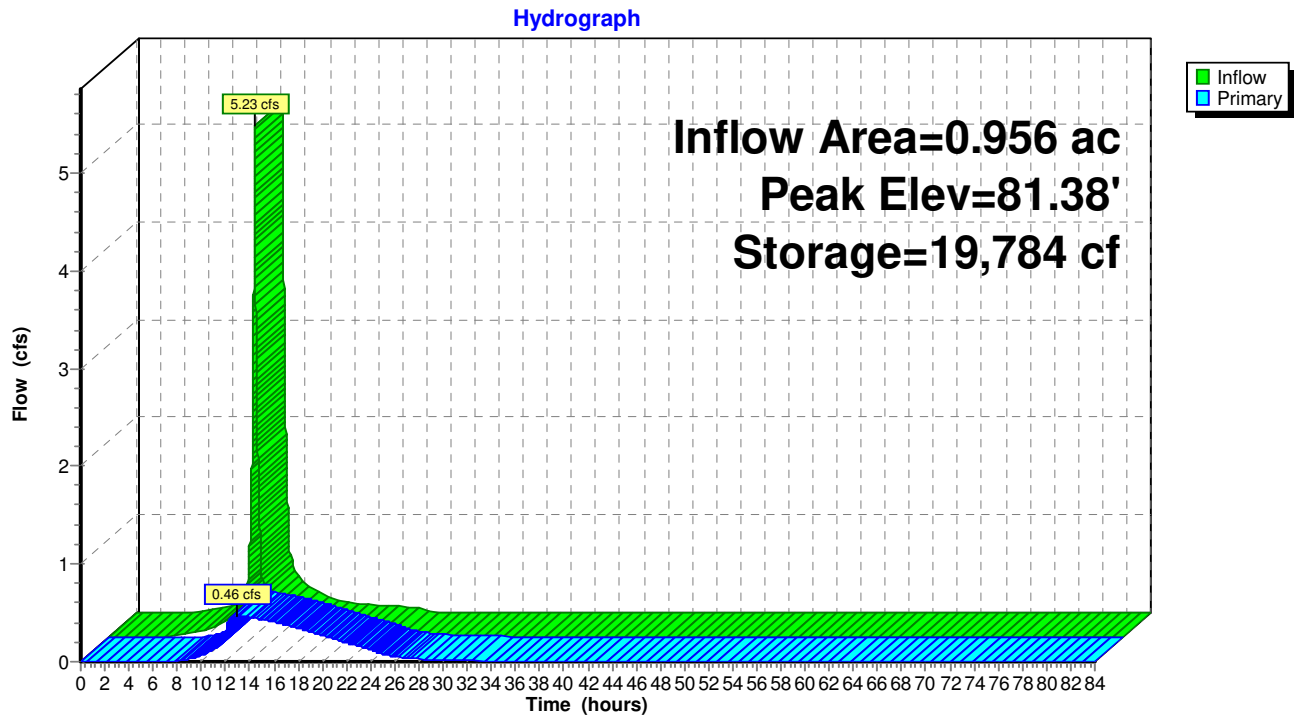
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 25-yr Rainfall=6.13"

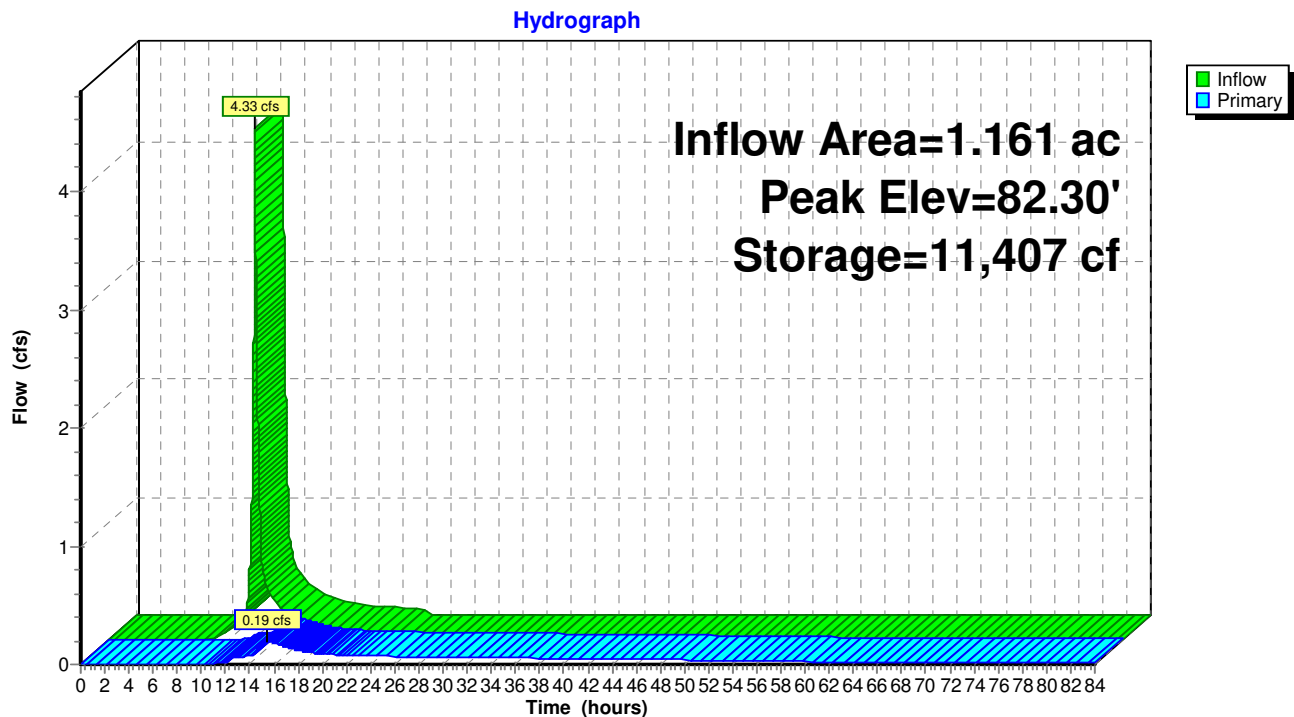
Printed 4/20/2022

Page 50

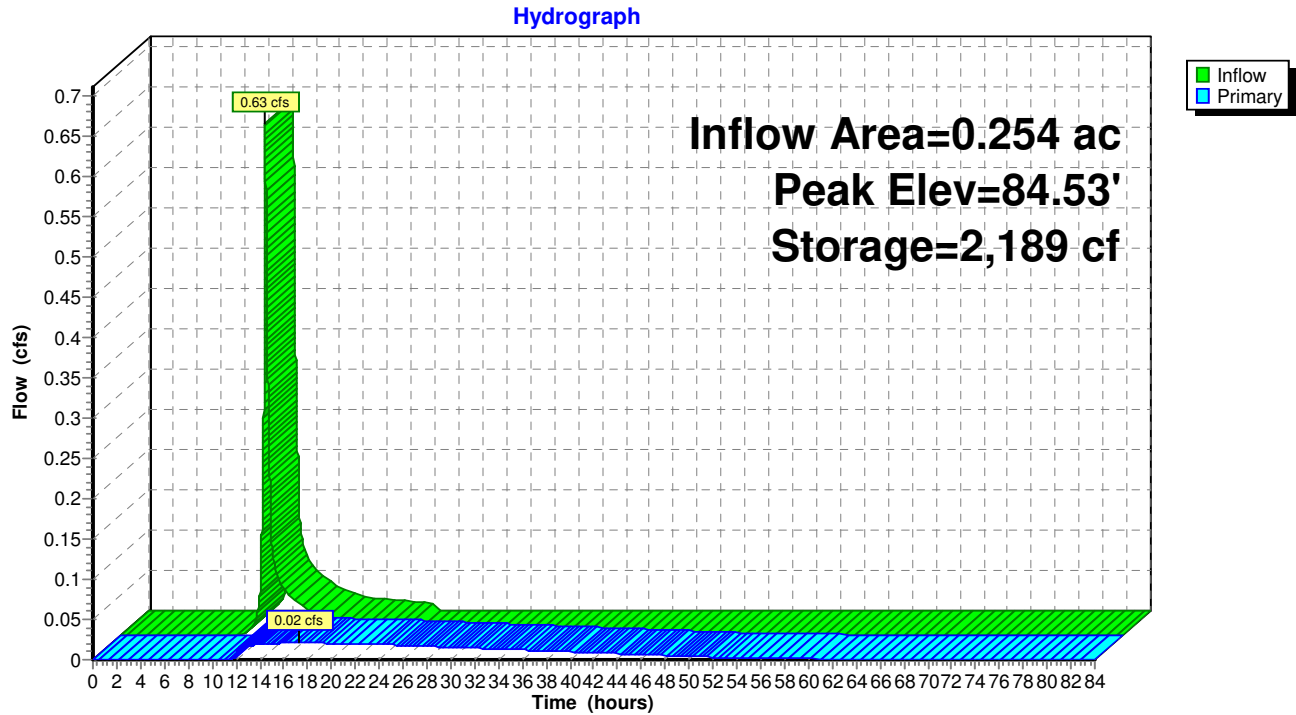
### Pond PP6: Water Quality Basin (Kennedy Road)



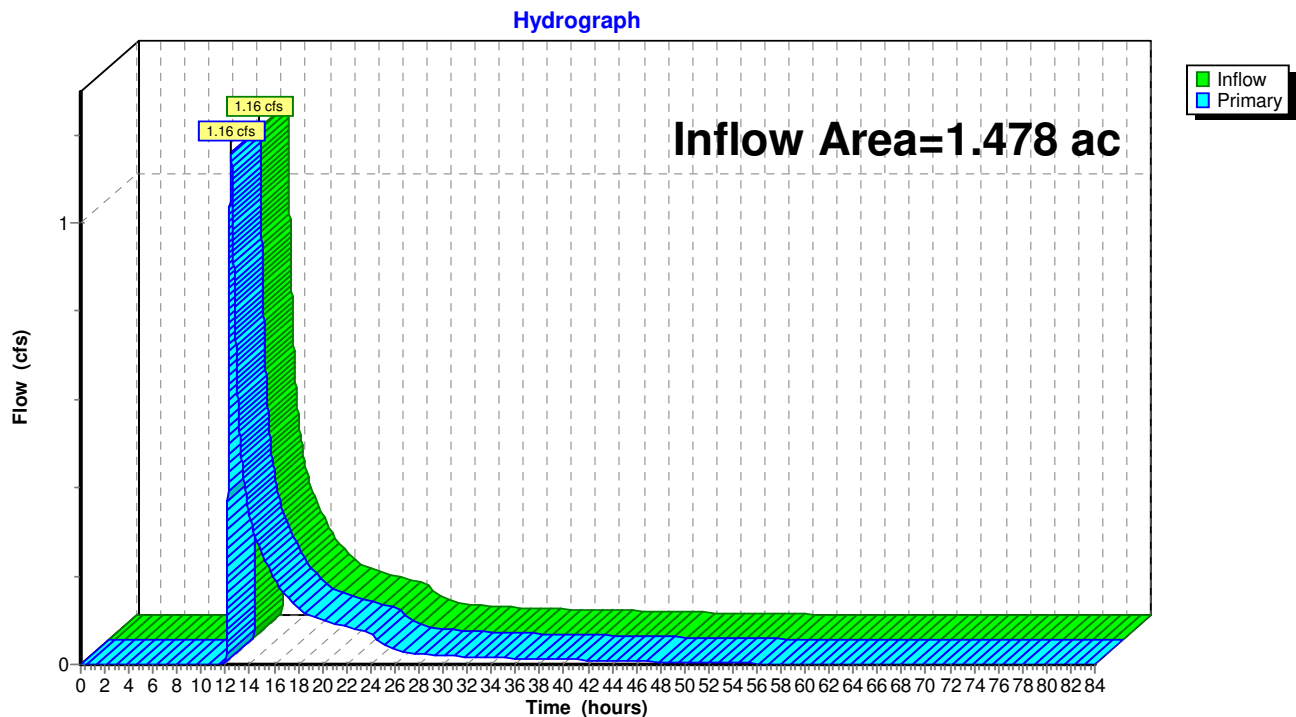
### Pond PP7: UGC-A (Stormtech SC-740)



**Pond PP8: UGC-C (Stormtech SC-310)**



**Link DP3\*: (DP3\*) Proposed Flow to Sullivan Ave**



# 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

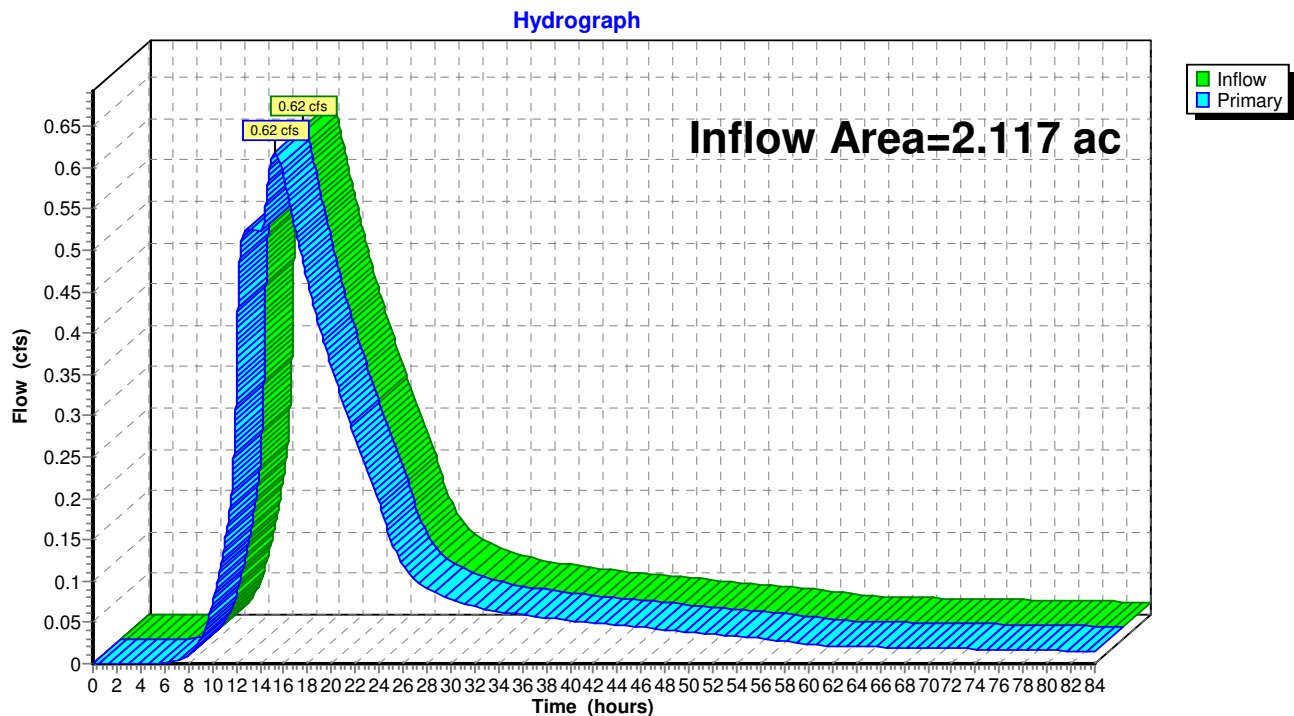
Proposed Condition

Type III 24-hr 25-yr Rainfall=6.13"

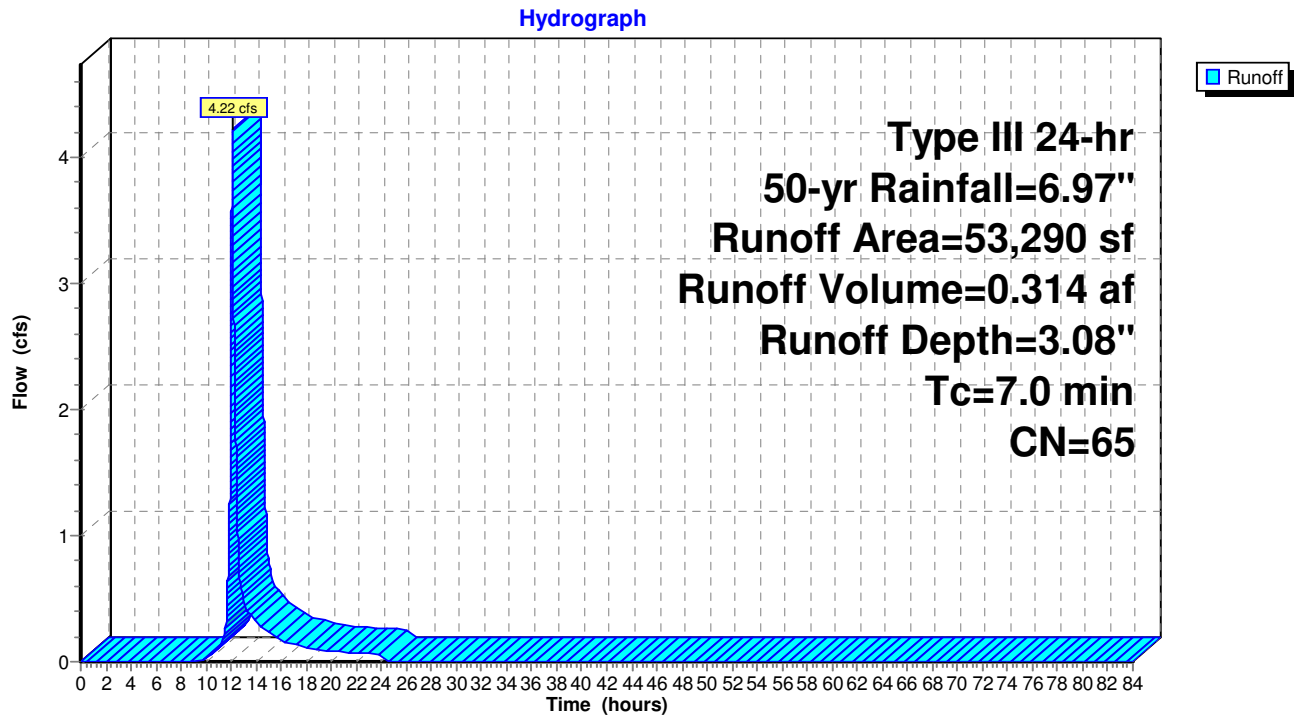
Printed 4/20/2022

Page 52

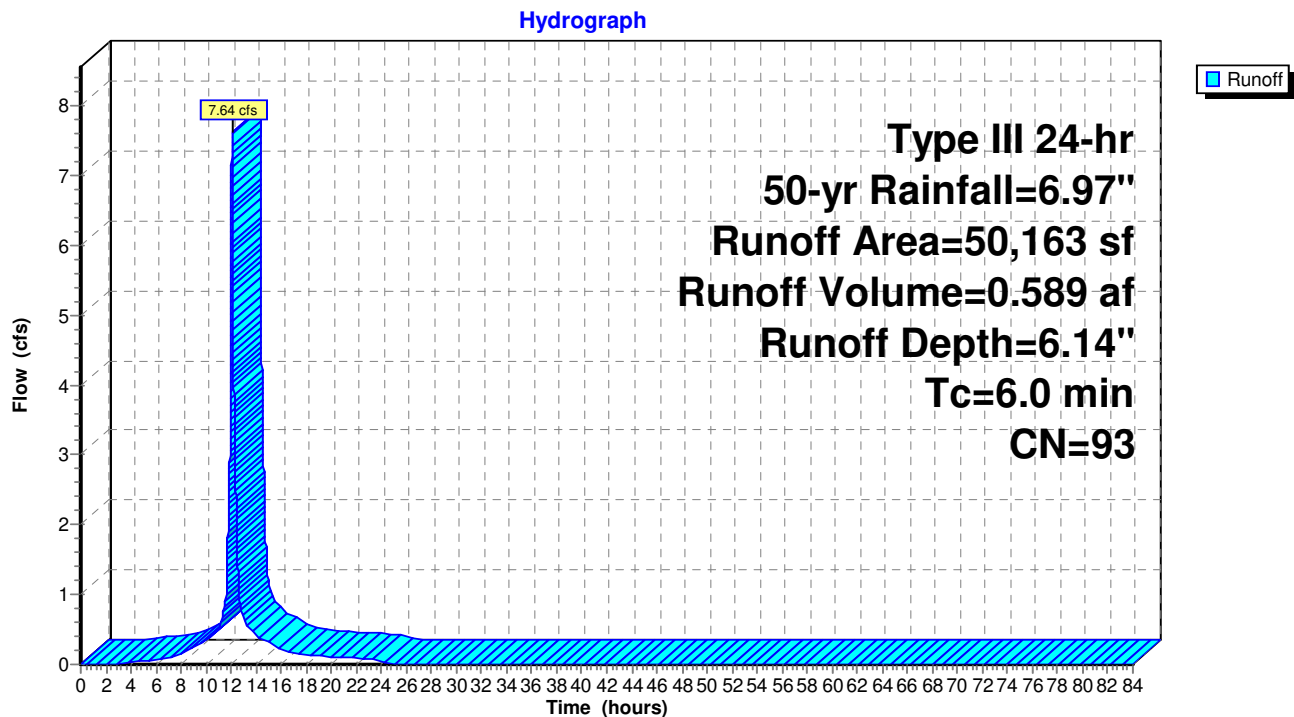
## Link DP4\*: (DP4\*) Proposed Flow to Kennedy Road Drainage System



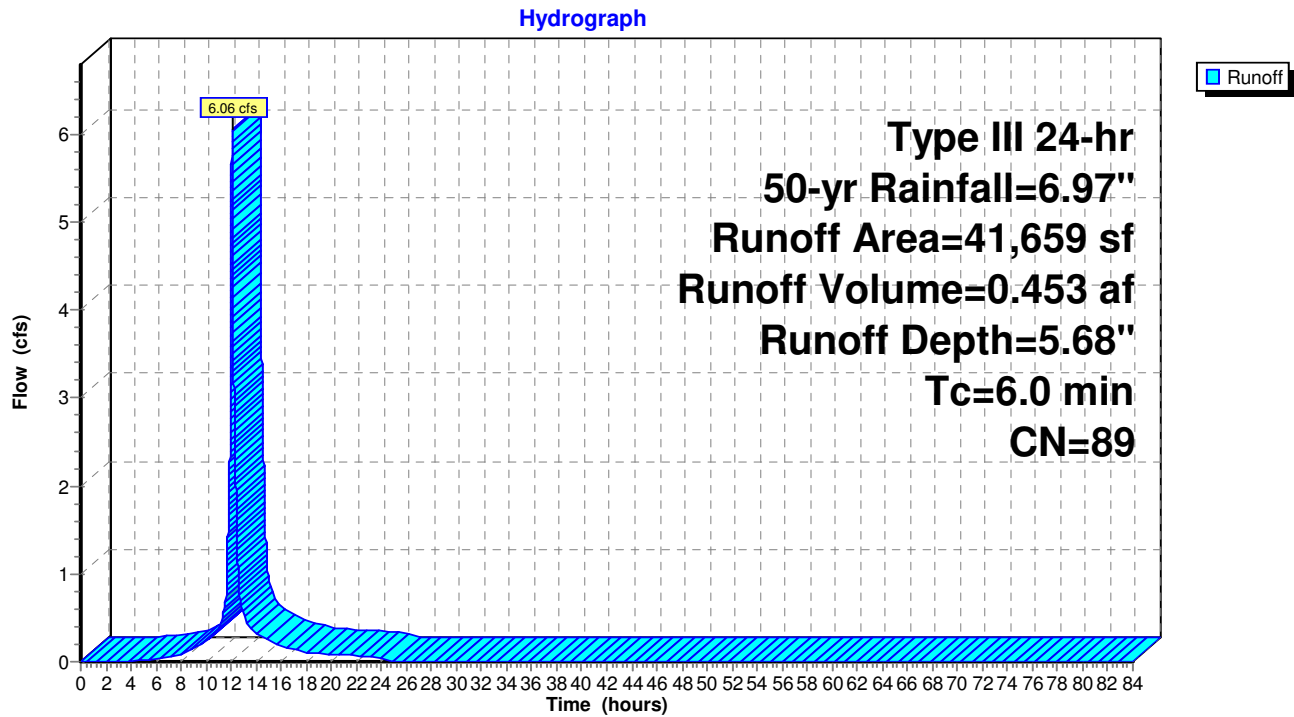
### Subcatchment P1: Yard Drains to UGC-B



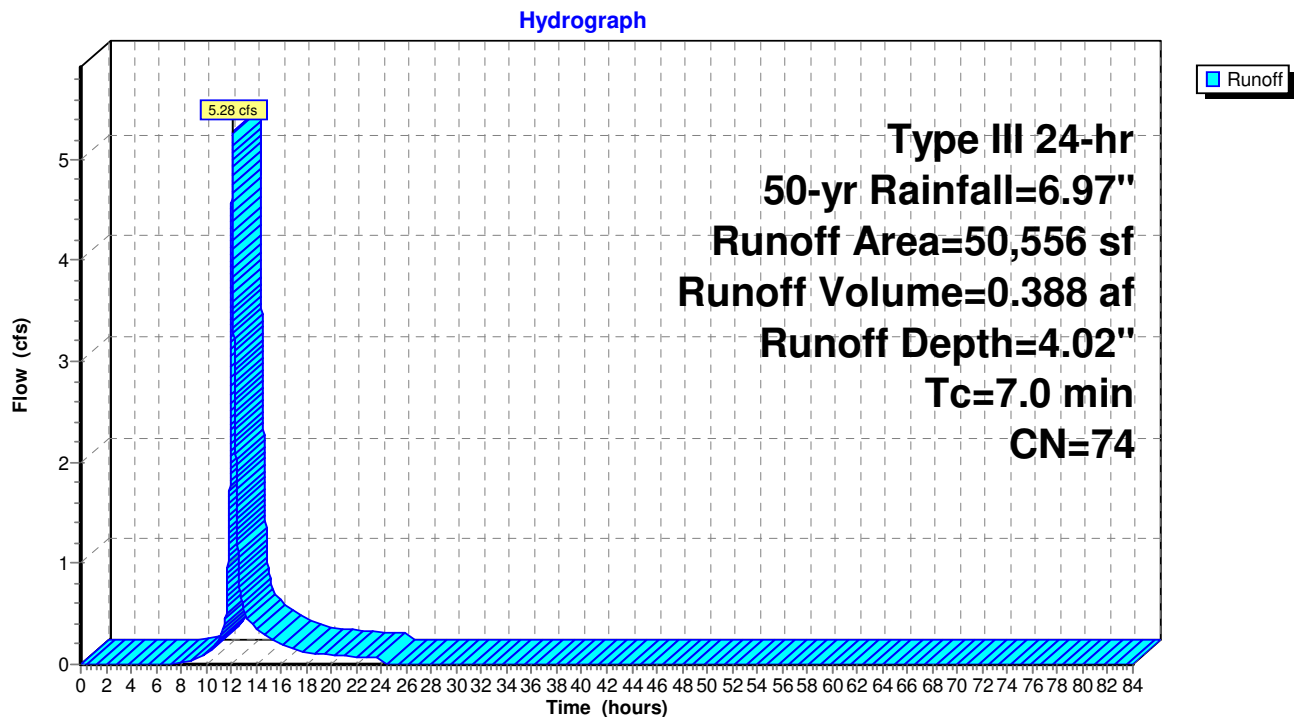
### Subcatchment P10: CB's to UGC-E (East)



Subcatchment P11: Culdesac



Subcatchment P12: Yard Drains to UGC-A



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

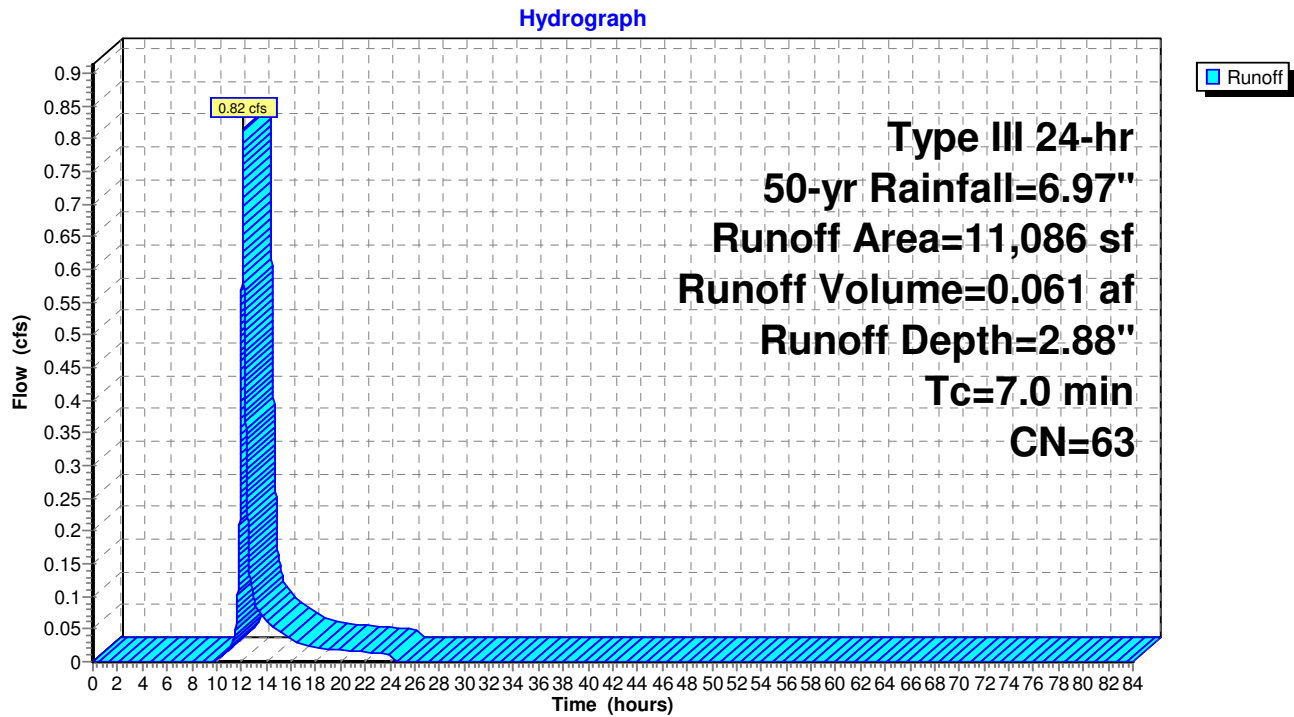
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

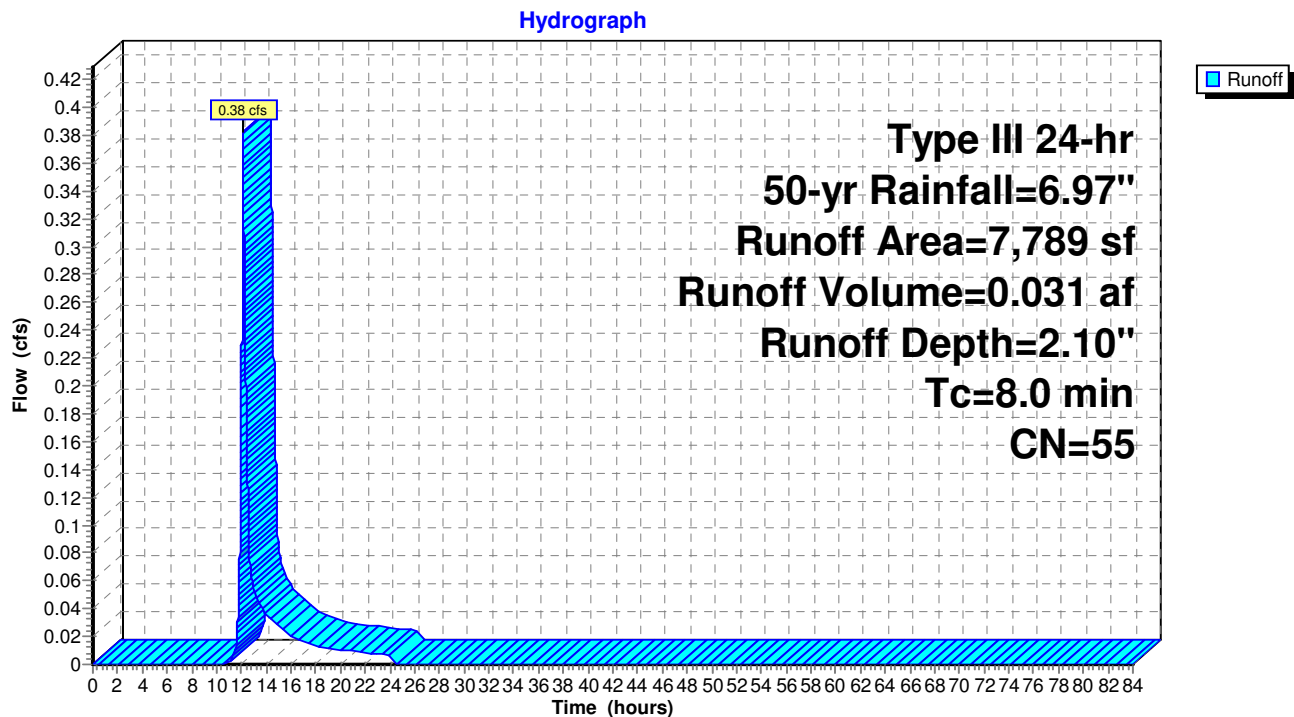
Printed 4/20/2022

Page 55

### Subcatchment P13: Yard Drains to UGC-C



### Subcatchment P2: (DP2\*) Proposed Flow across North West Property Corner



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

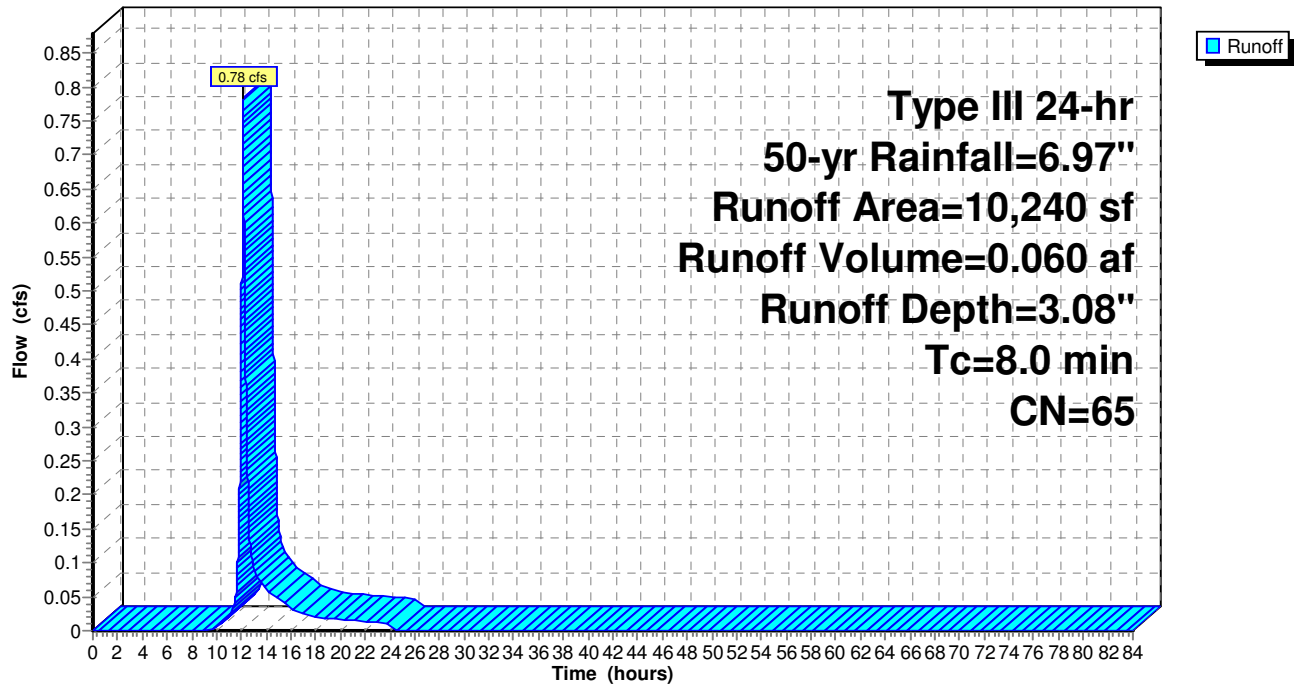
Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

Printed 4/20/2022

Page 56

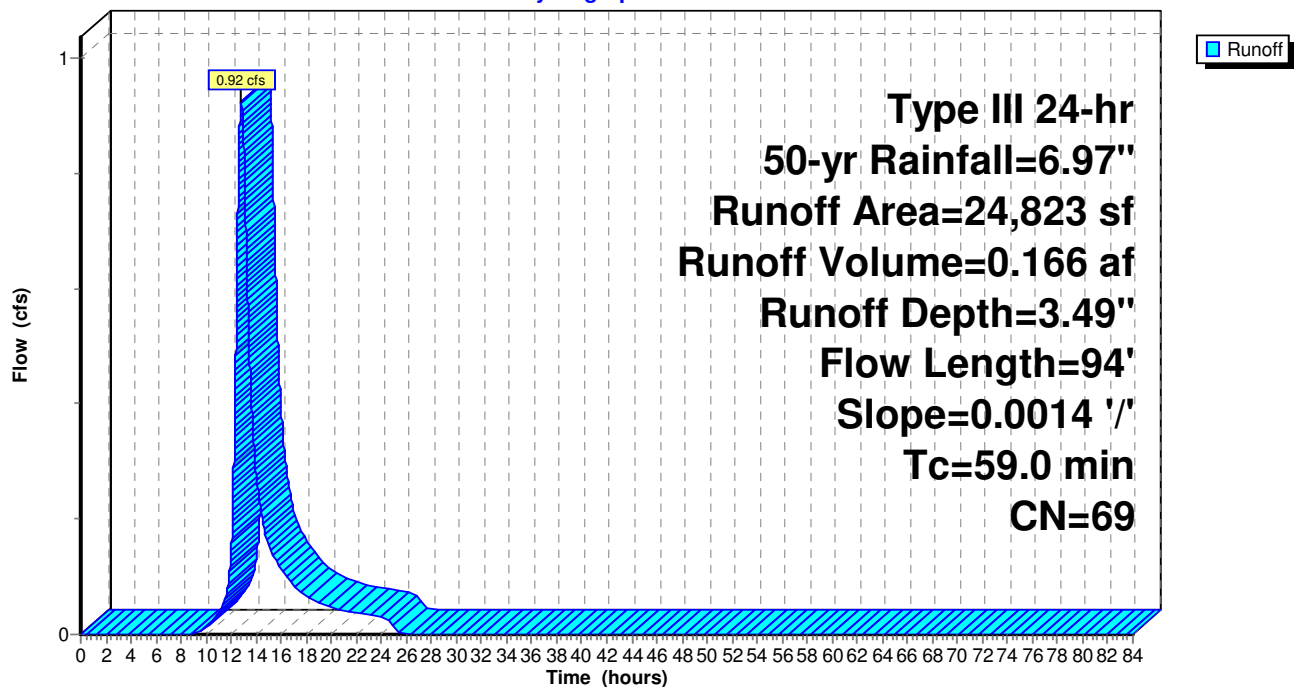
### Subcatchment P3: P3

Hydrograph



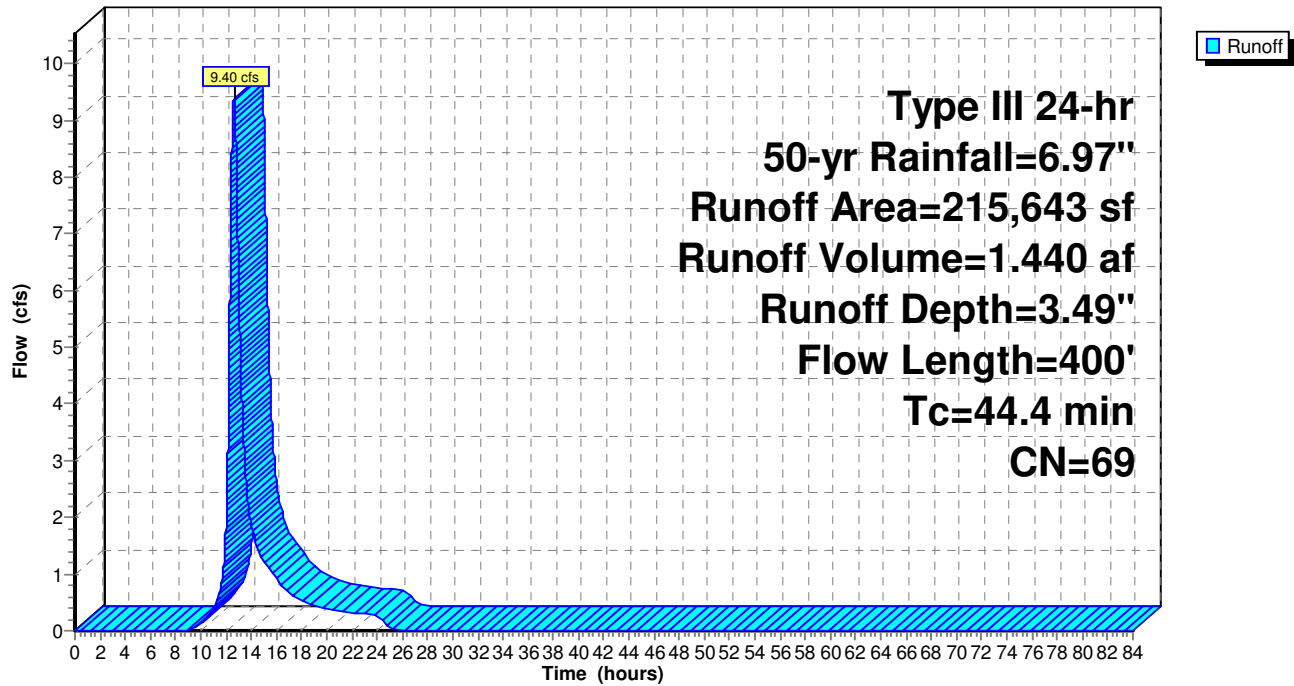
### Subcatchment P4: P4

Hydrograph



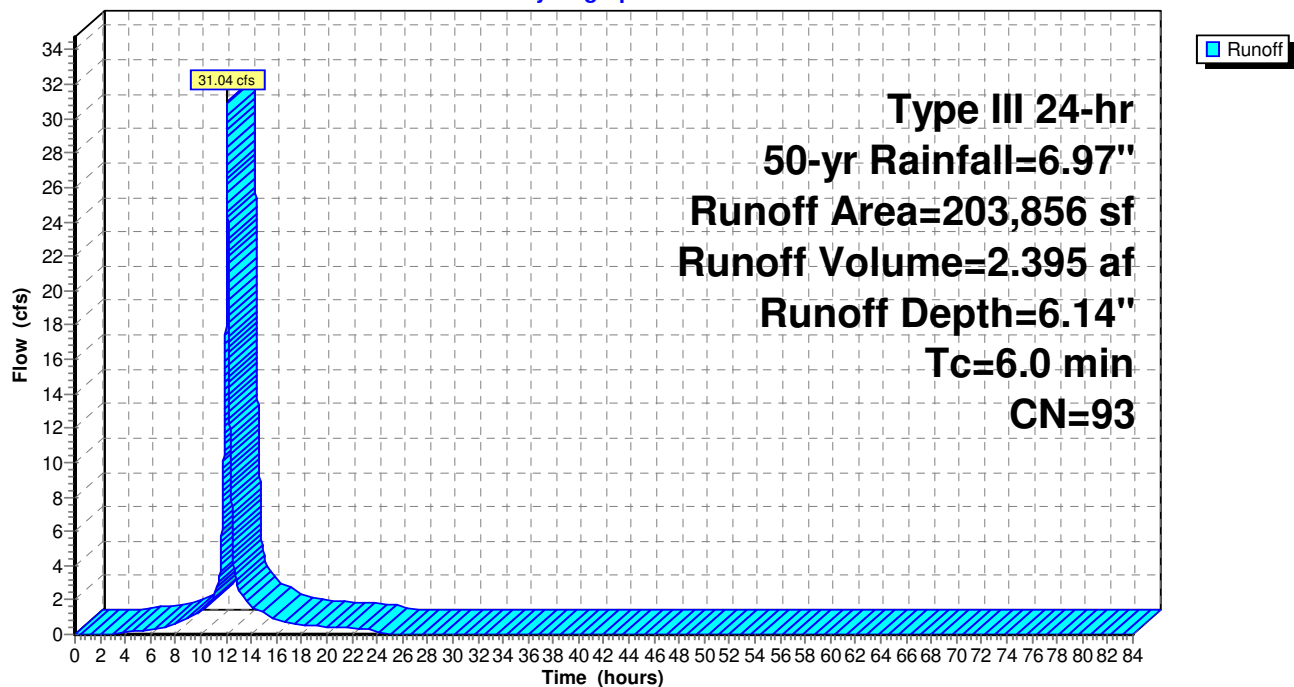
### Subcatchment P5: P5

#### Hydrograph



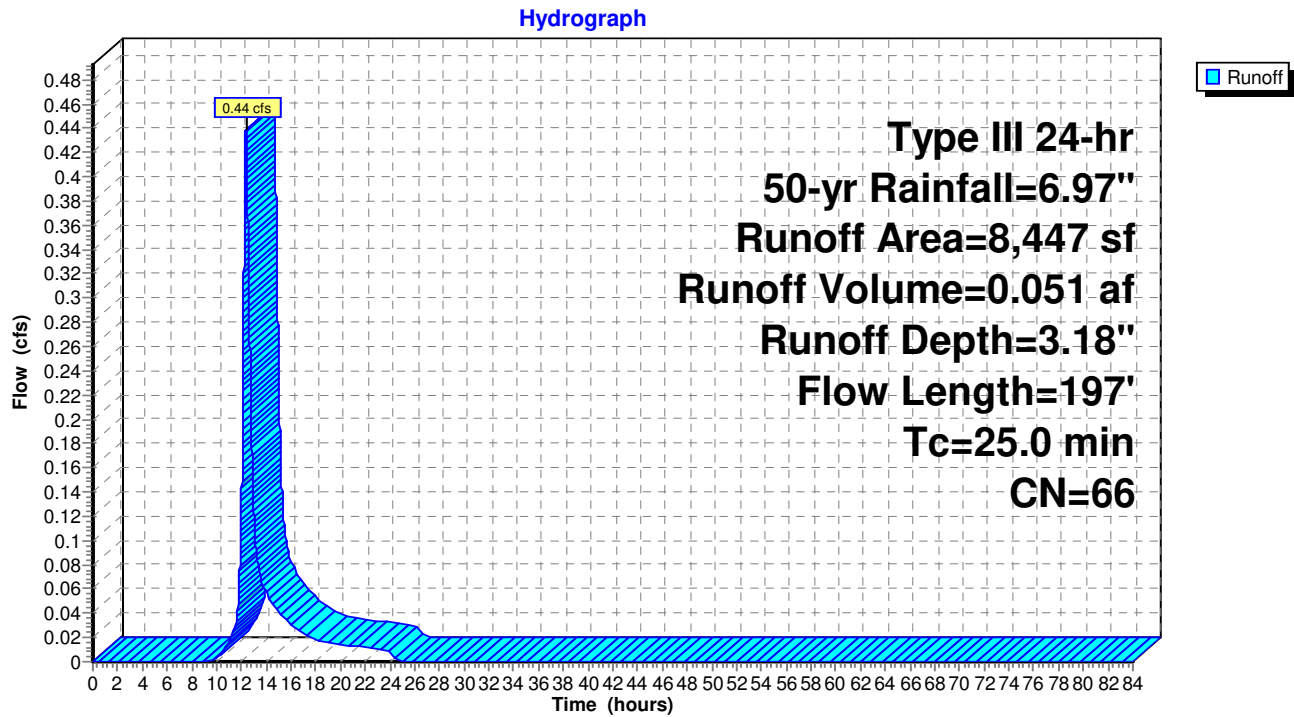
### Subcatchment P6: Sheet flow To West Basin

#### Hydrograph

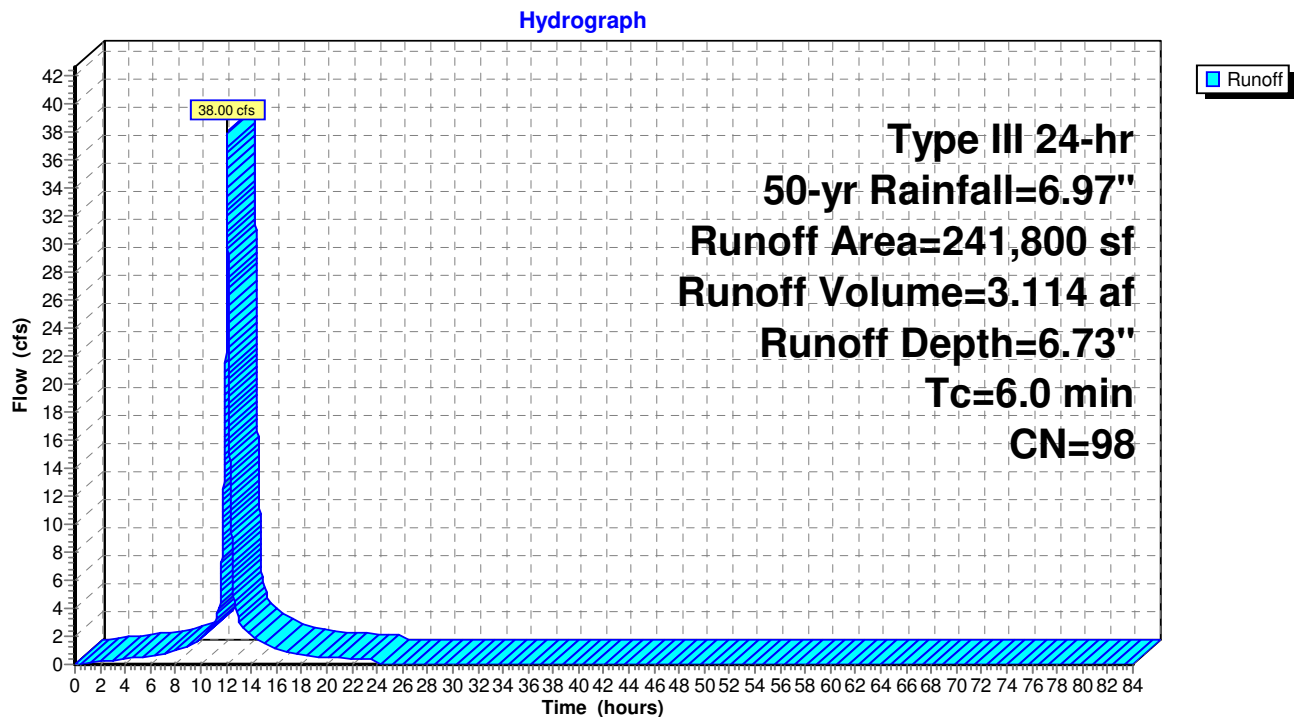




### Subcatchment P7: Proposed P7



### Subcatchment P8: Proposed Roof to UGC-D (west)



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

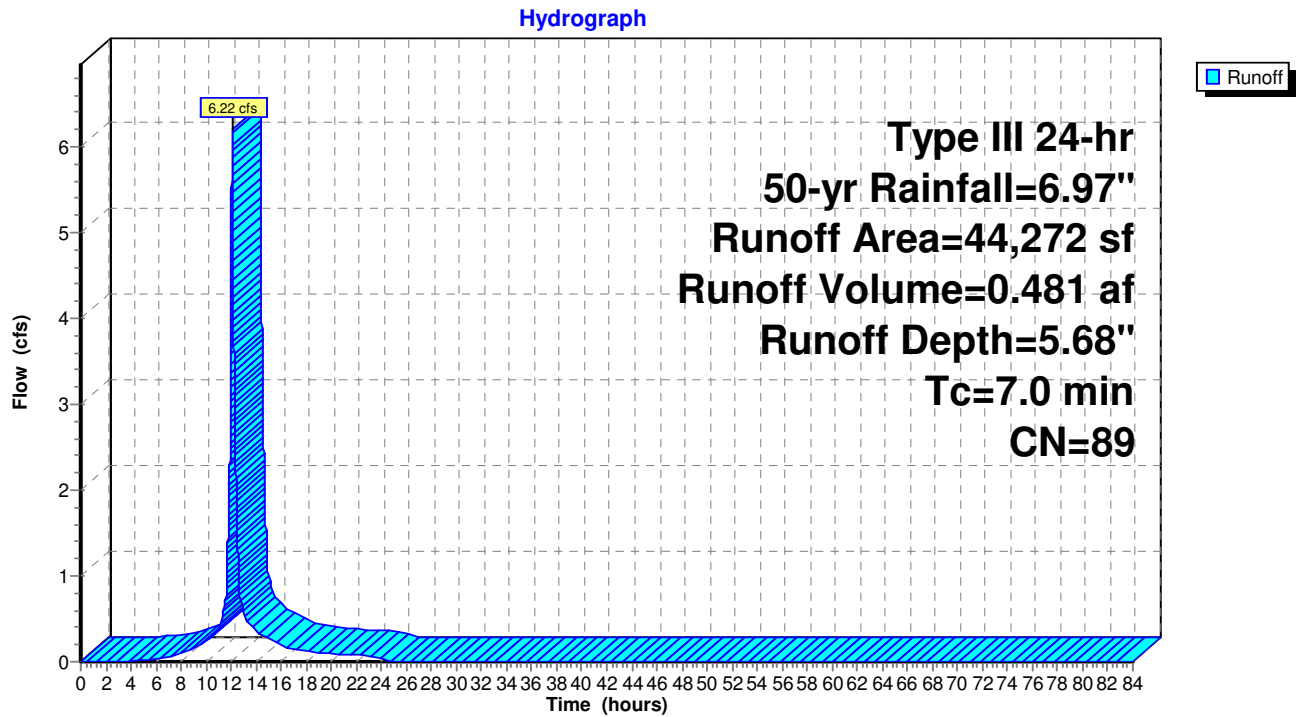
Proposed Condition

Type III 24-hr 50-yr Rainfall=6.97"

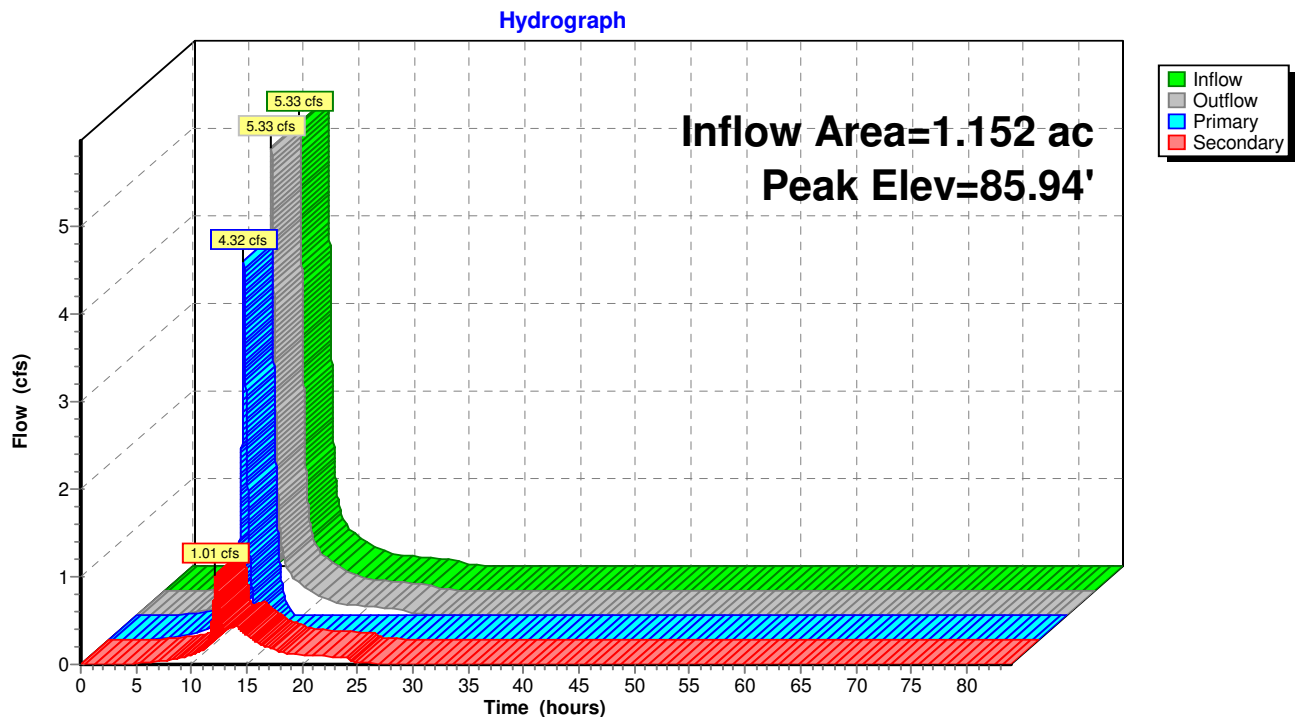
Printed 4/20/2022

Page 59

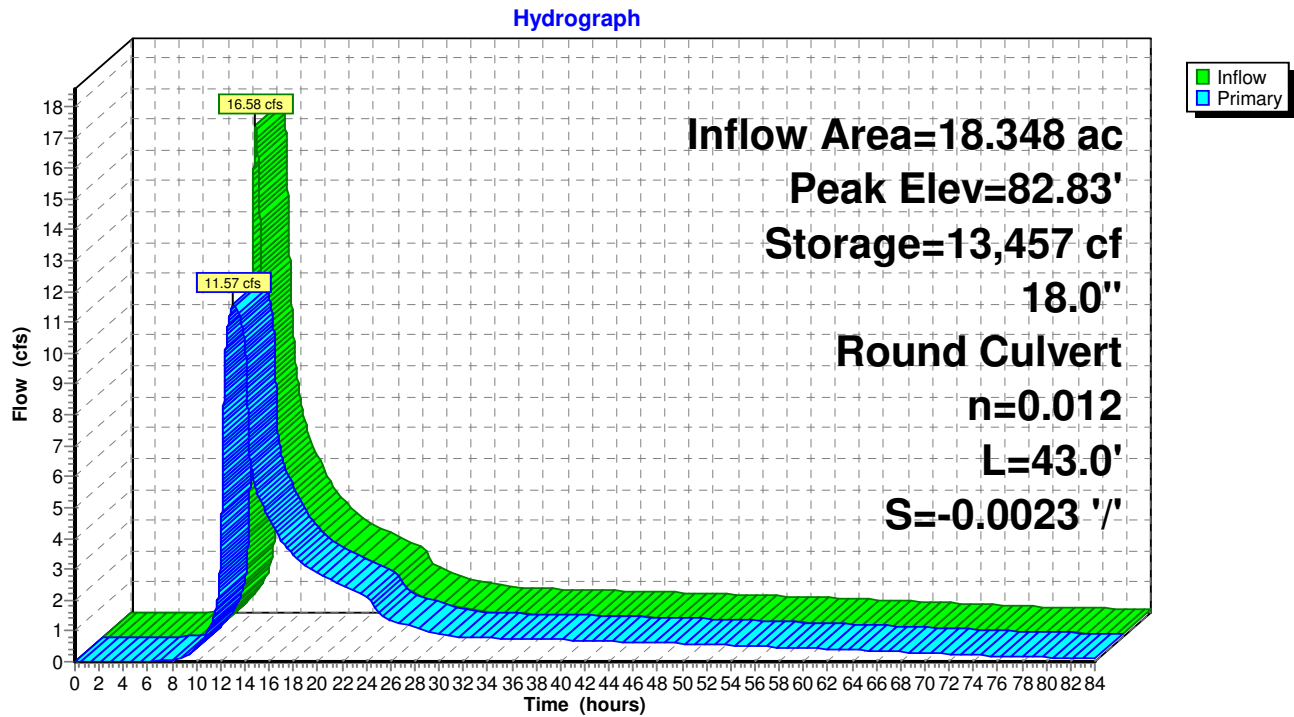
### Subcatchment P9: Sheetflow to North Basin



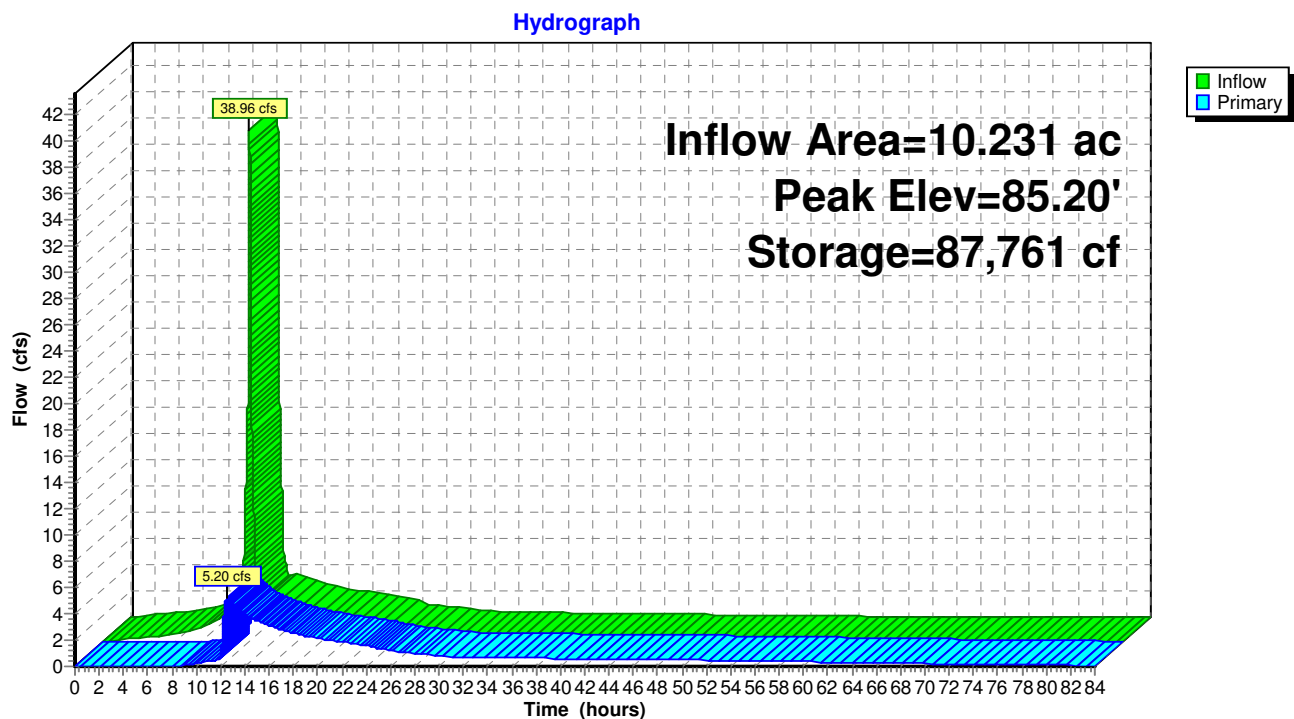
### Pond DMH: Splitter Structure



**Pond EP1\*: (DP1\*) Proposed Condition - Rail Road Pond**

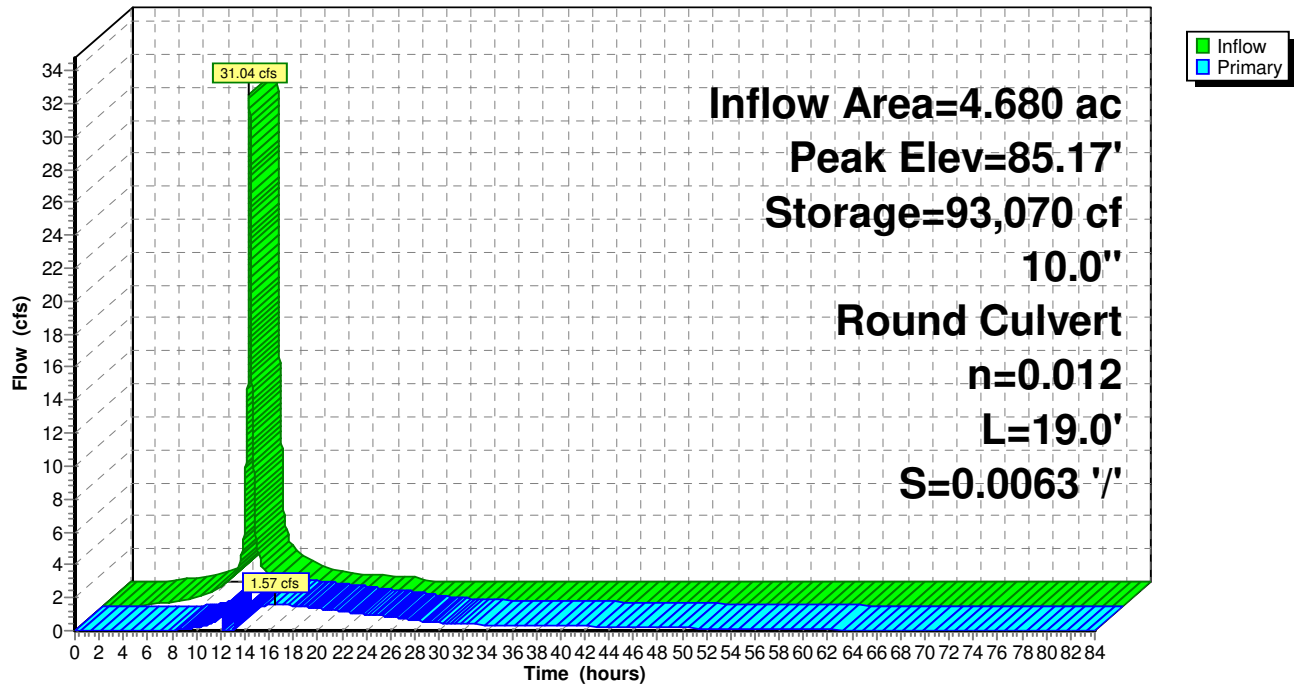


**Pond PP1: UGC-D (Stormtech SC-740)**



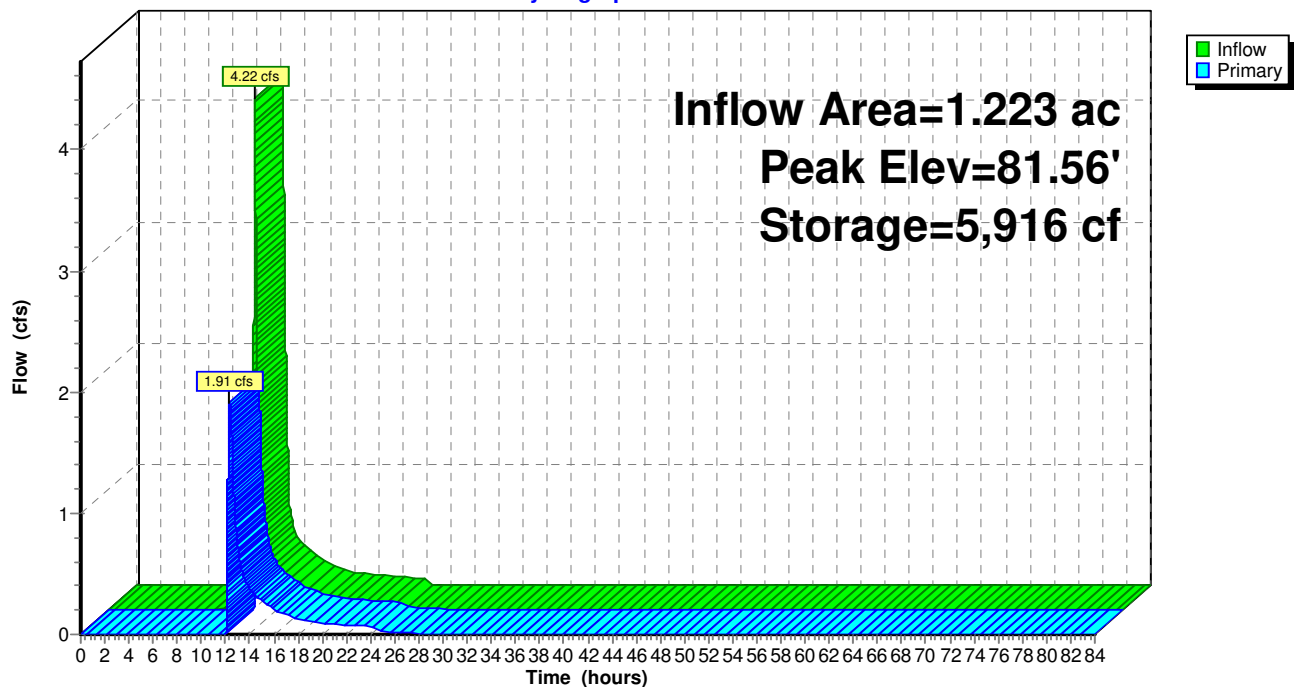
**Pond PP2: Water Quality Basin (WEST)**

Hydrograph



**Pond PP3: UGC-B (Stormtech SC-310) w. Underdrain**

Hydrograph



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

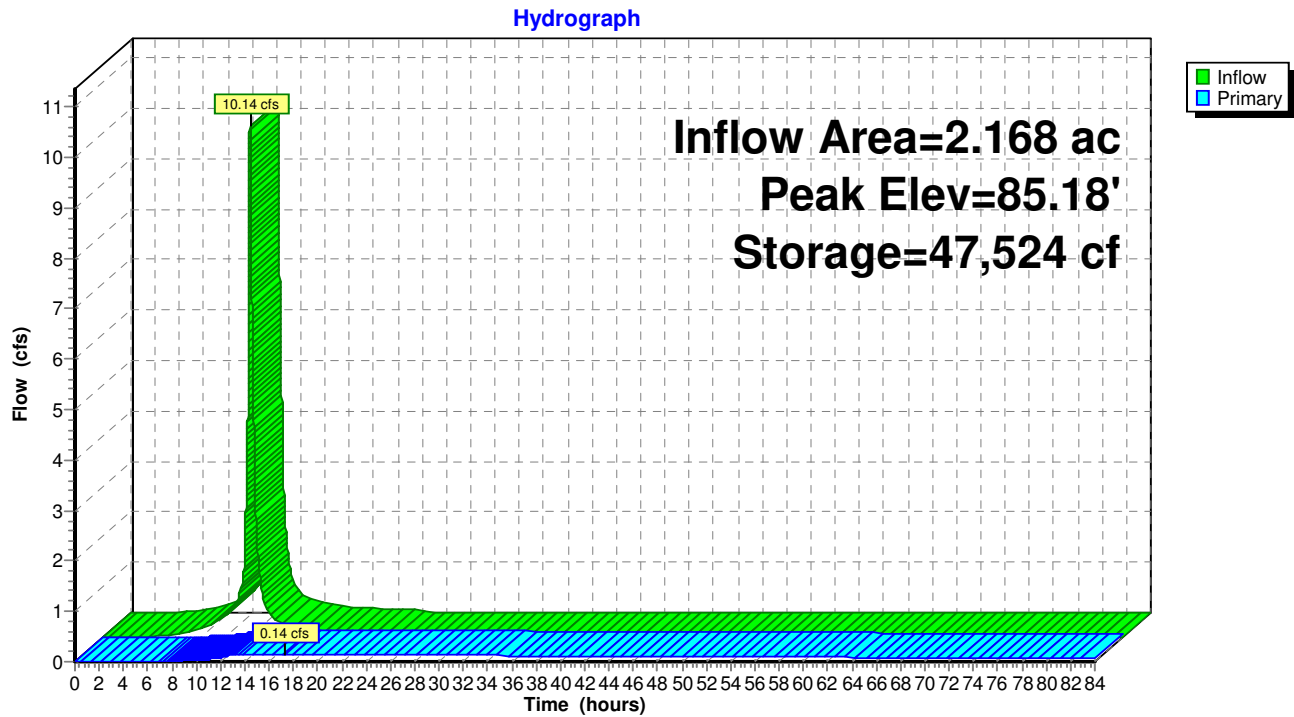
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

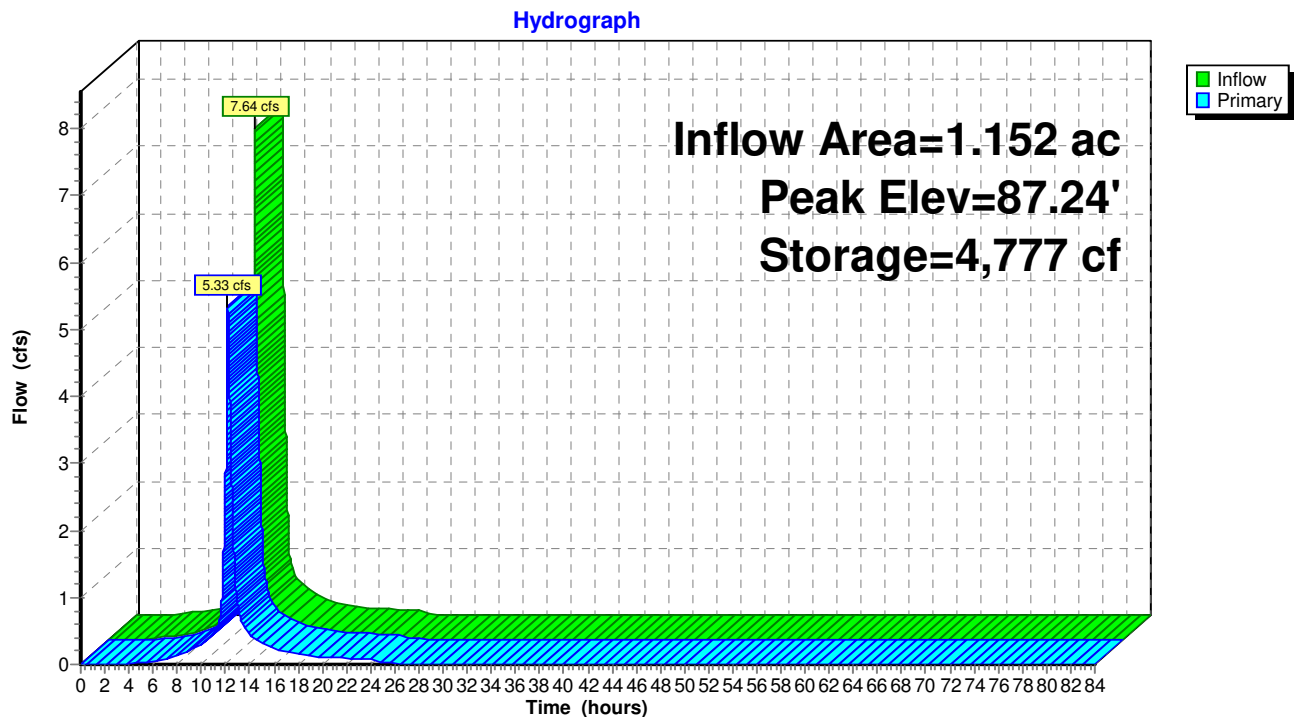
Printed 4/20/2022

Page 62

### Pond PP4: Water Quality Basin (North)



### Pond PP5: UGC-E (Stormtech SC-310)



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

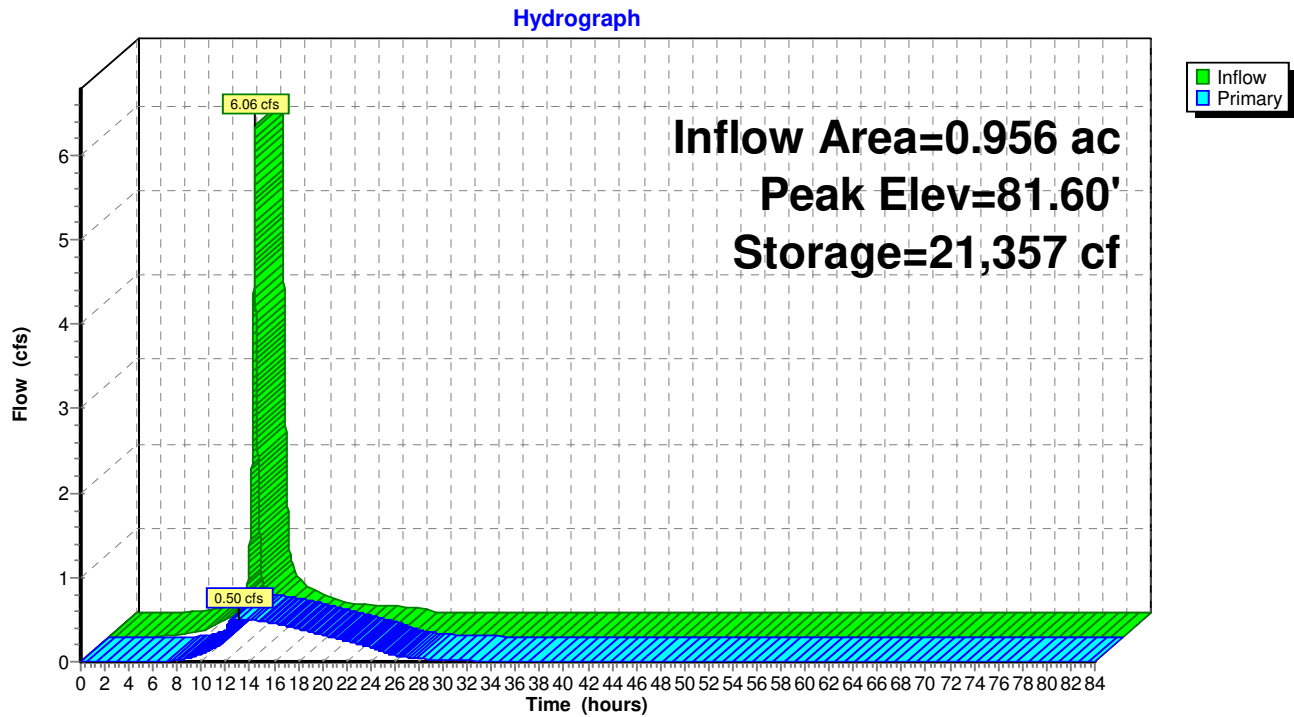
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

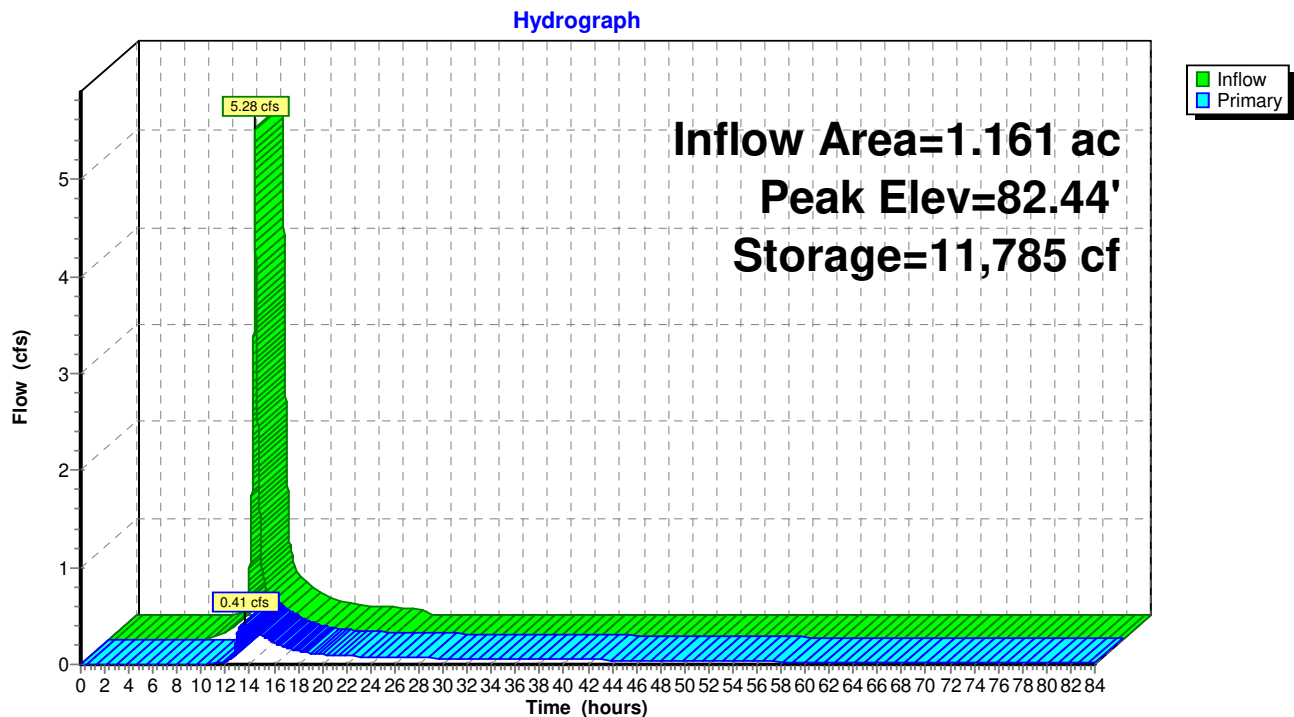
Printed 4/20/2022

Page 63

### Pond PP6: Water Quality Basin (Kennedy Road)



### Pond PP7: UGC-A (Stormtech SC-740)



# 4670 Hydrocad!

Prepared by Design Professionals, Inc.

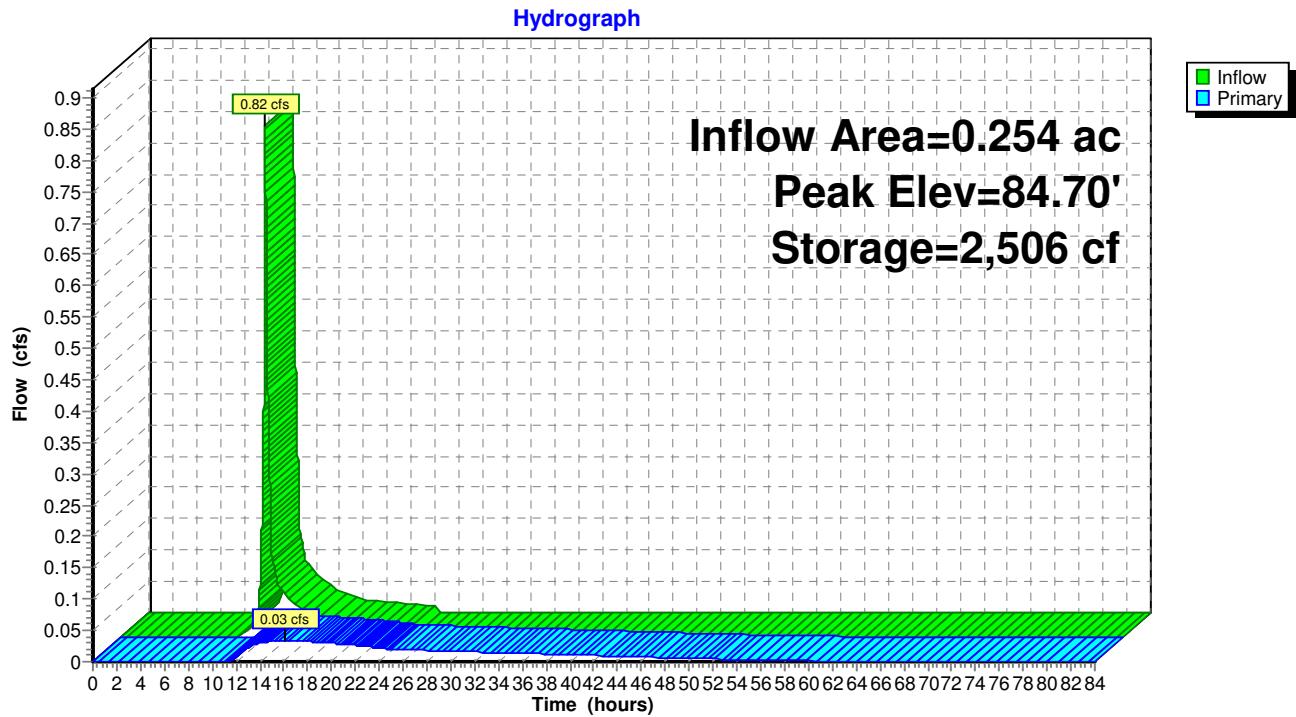
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 50-yr Rainfall=6.97"

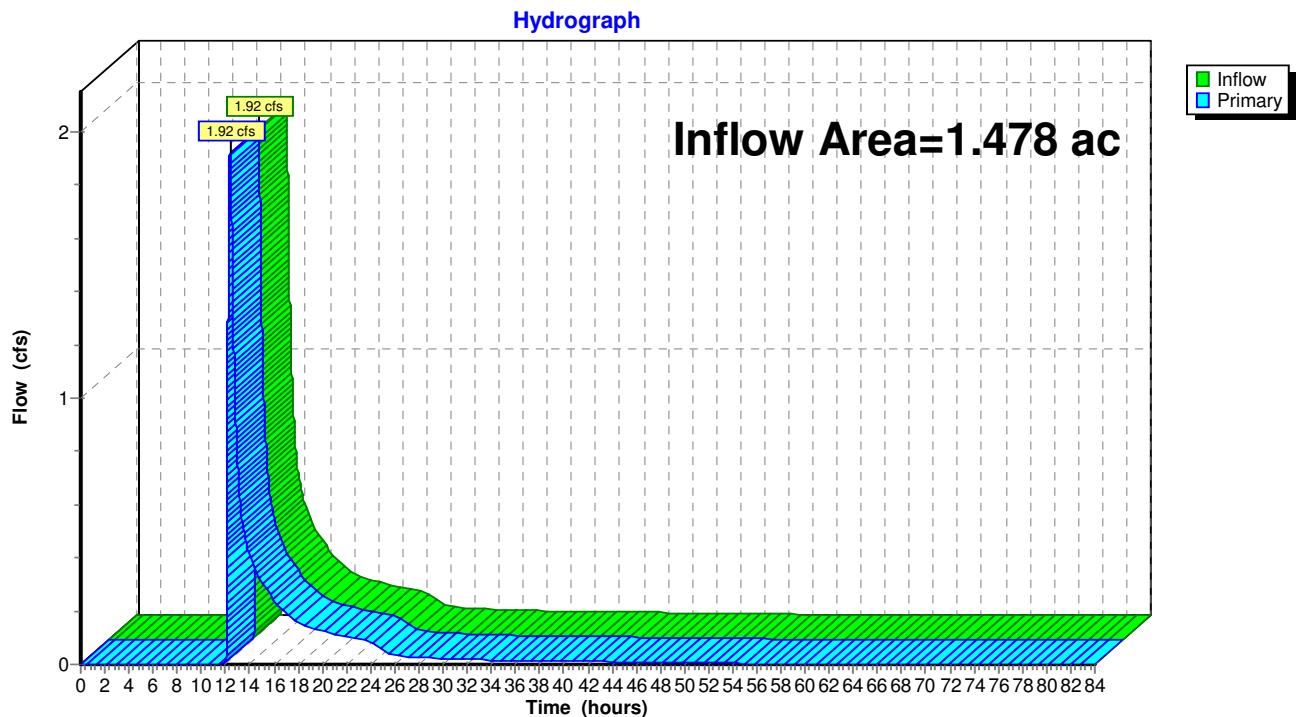
Printed 4/20/2022

Page 64

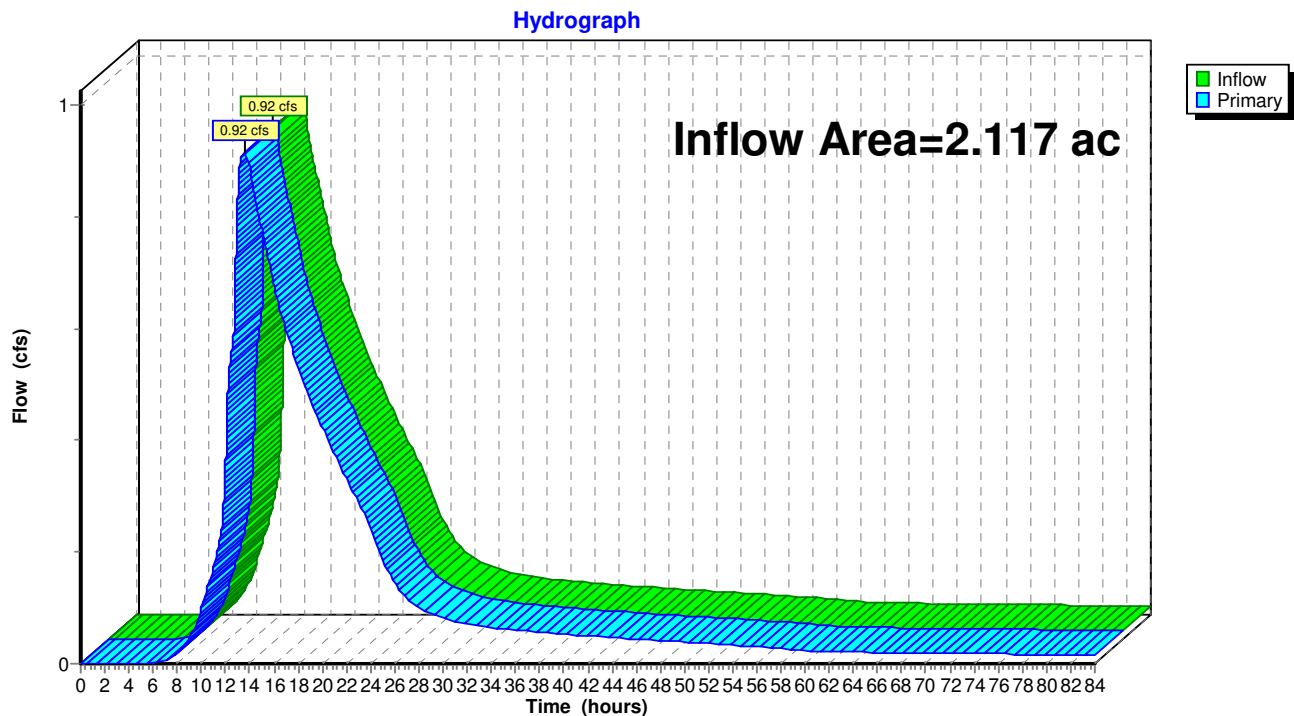
## Pond PP8: UGC-C (Stormtech SC-310)



## Link DP3\*: (DP3\*) Proposed Flow to Sullivan Ave

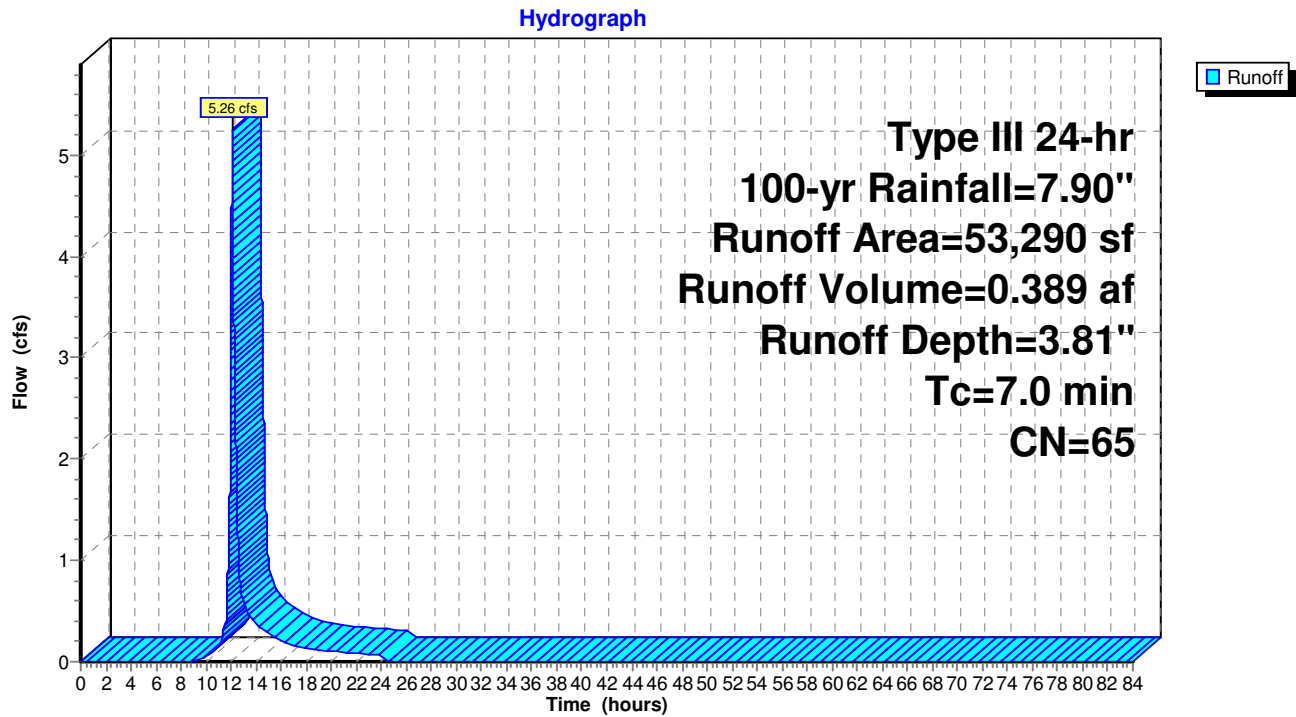


# Link DP4\*: (DP4\*) Proposed Flow to Kennedy Road Drainage System

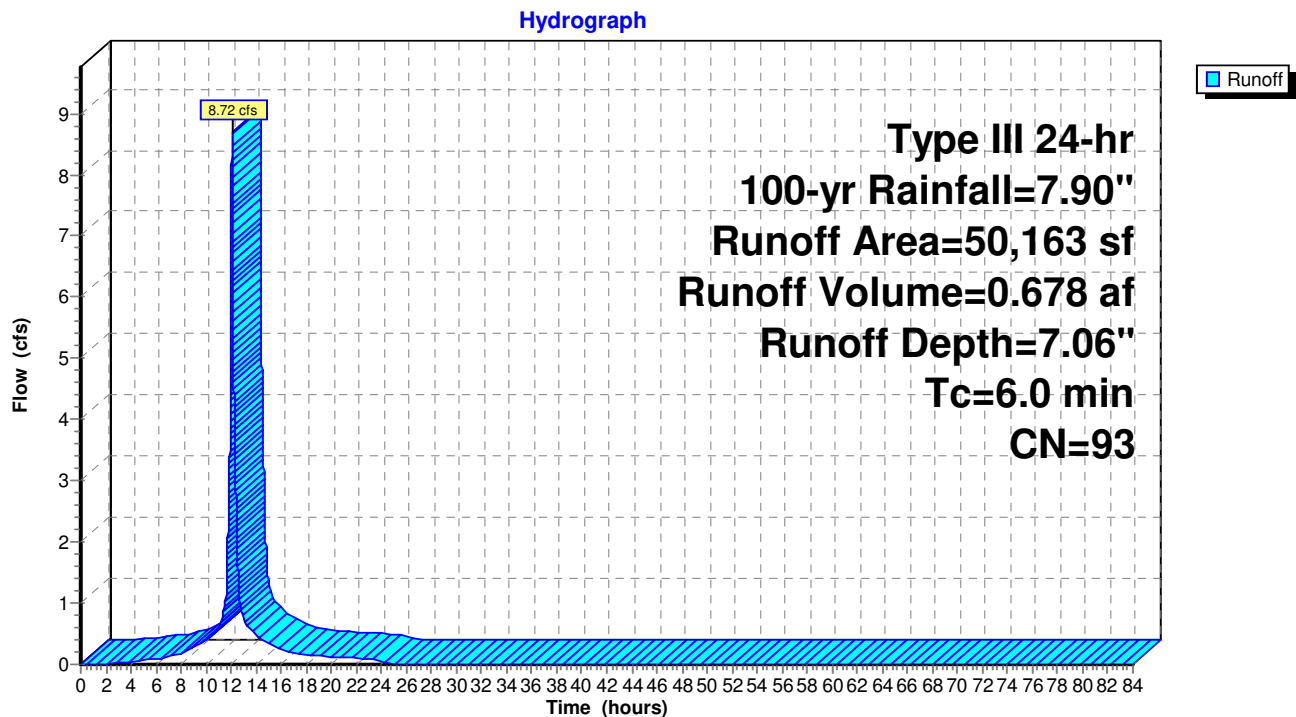




**Subcatchment P1: Yard Drains to UGC-B**



**Subcatchment P10: CB's to UGC-E (East)**



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

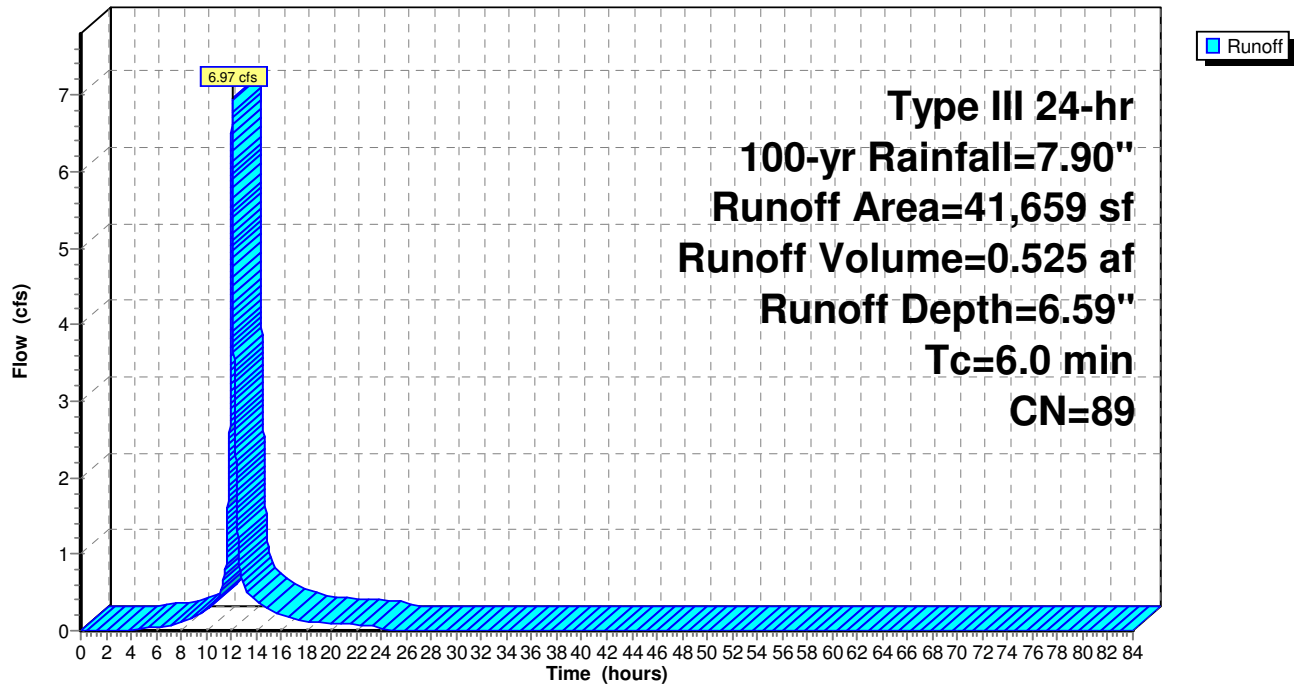
Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 67

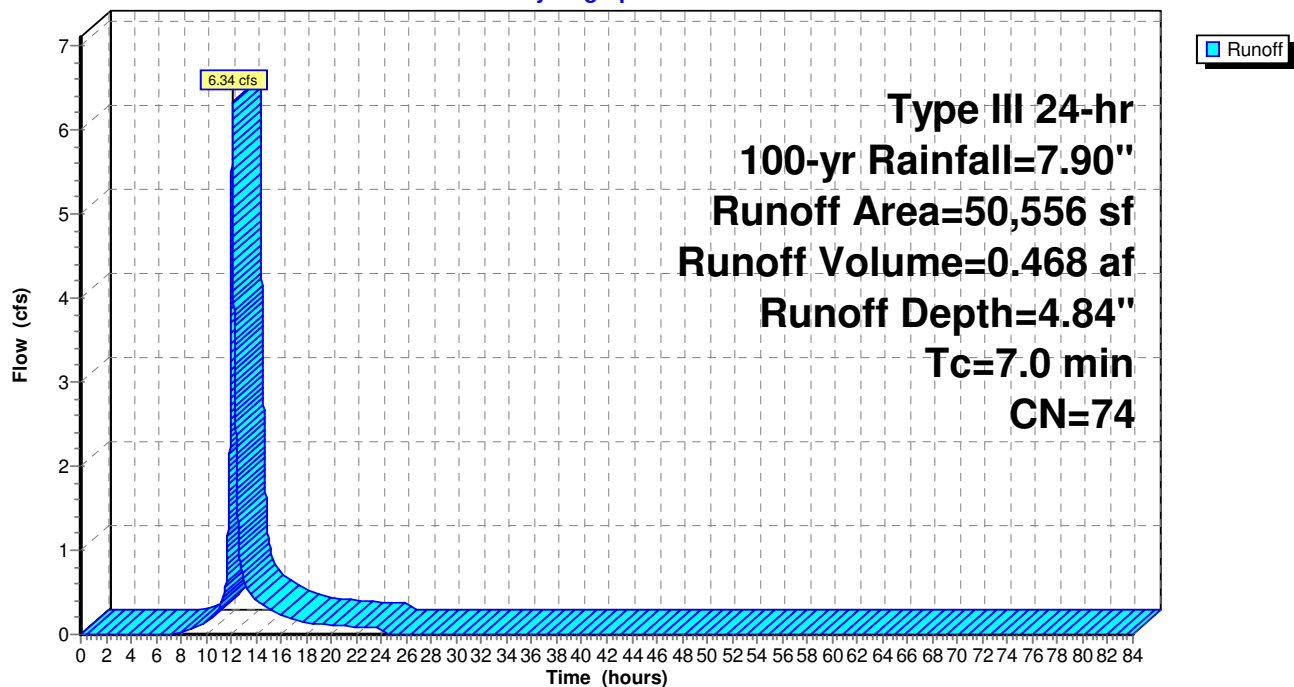
### Subcatchment P11: Culdesac

Hydrograph

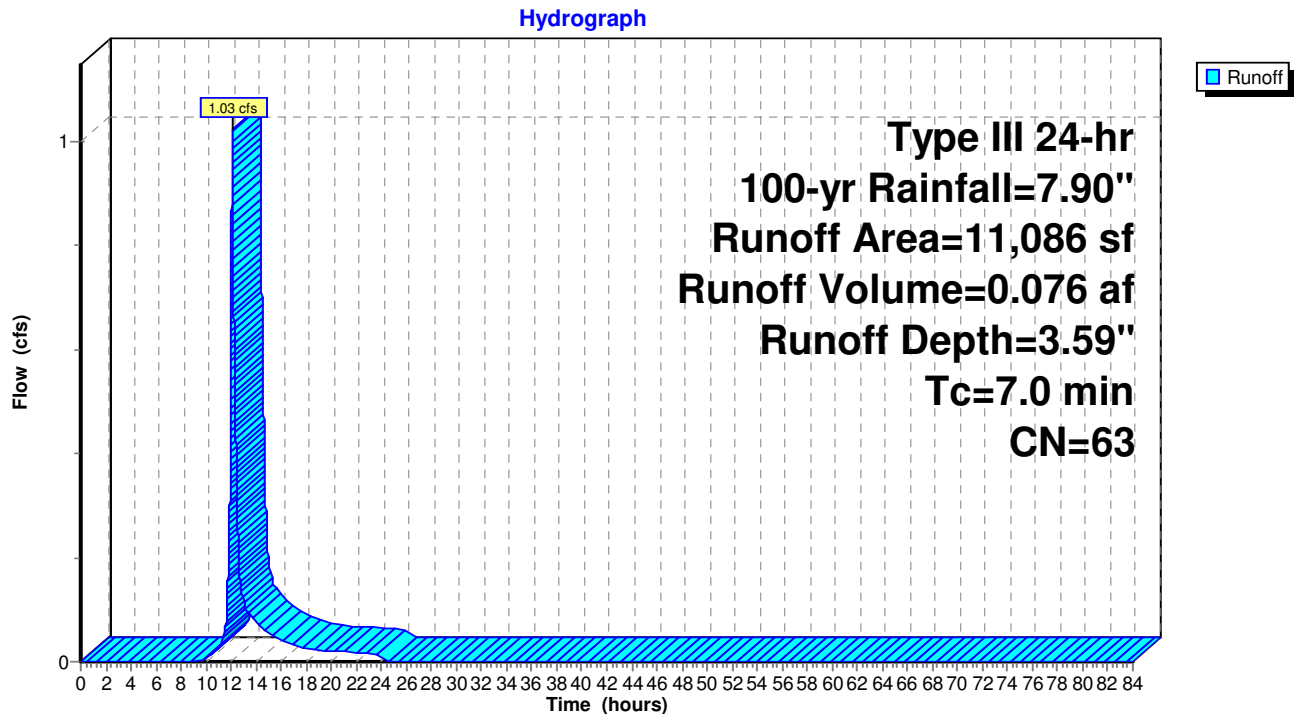


### Subcatchment P12: Yard Drains to UGC-A

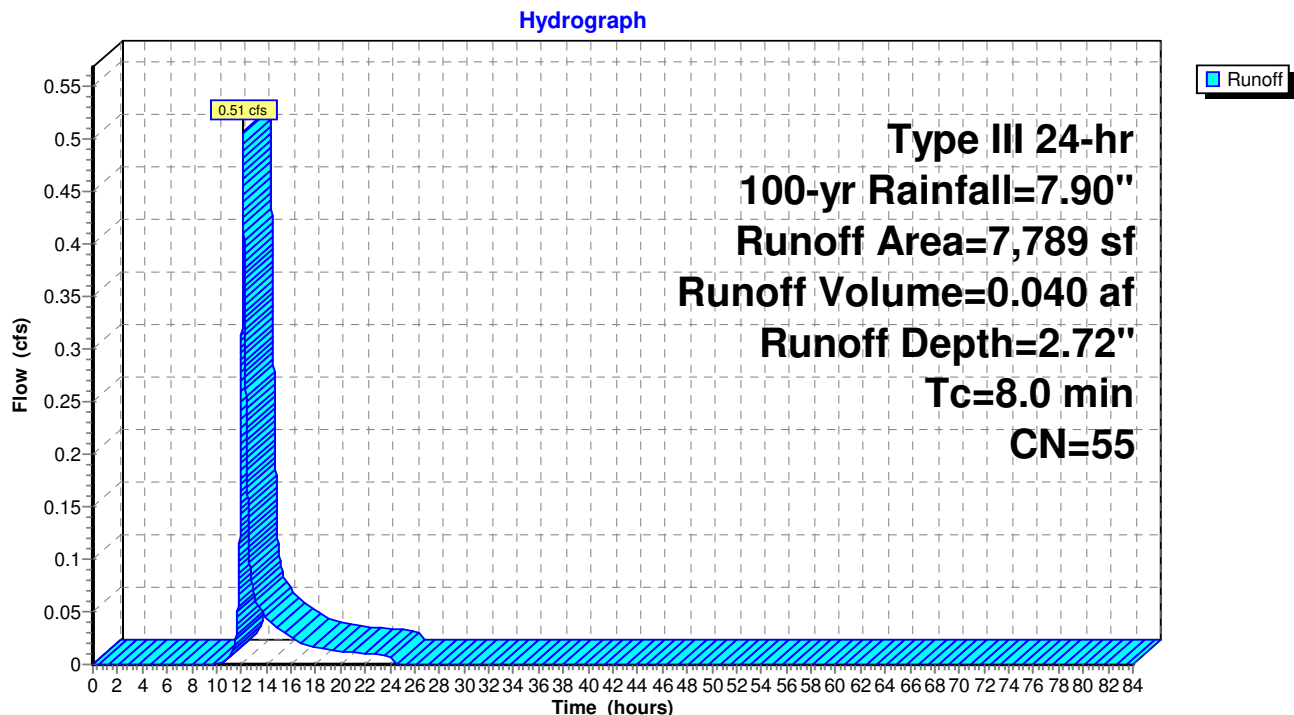
Hydrograph



### Subcatchment P13: Yard Drains to UGC-C

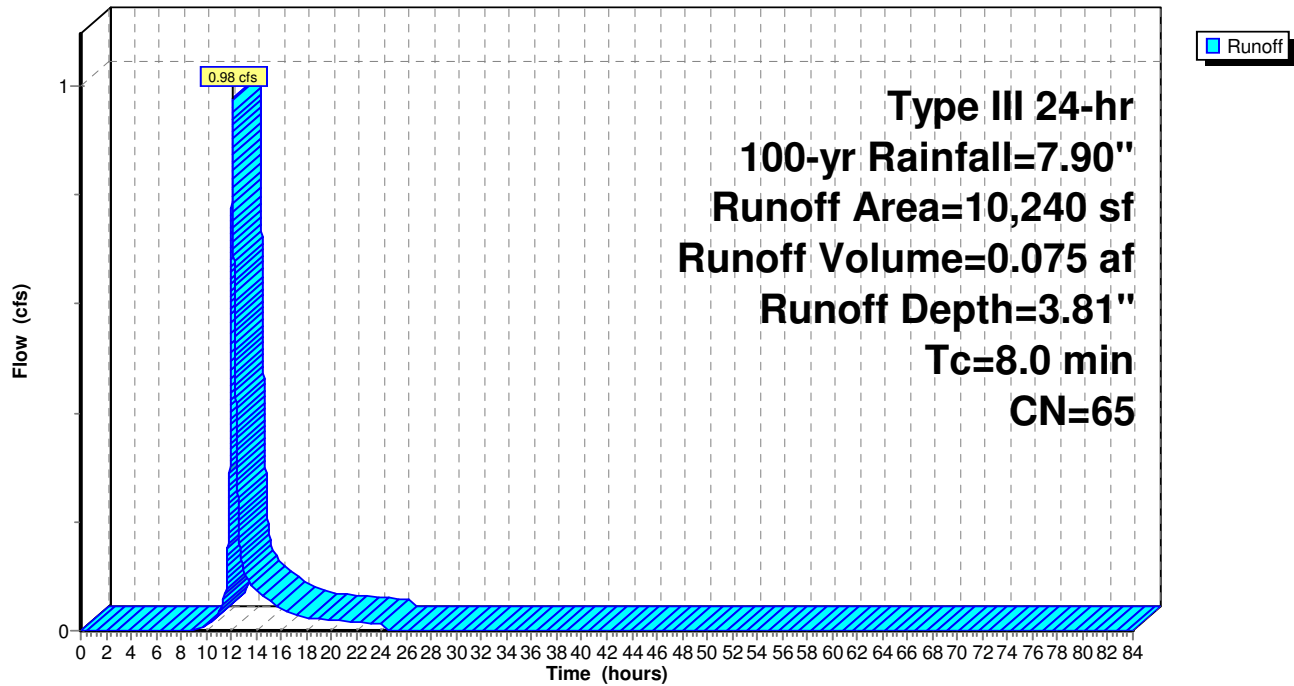


### Subcatchment P2: (DP2\*) Proposed Flow across North West Property Corner



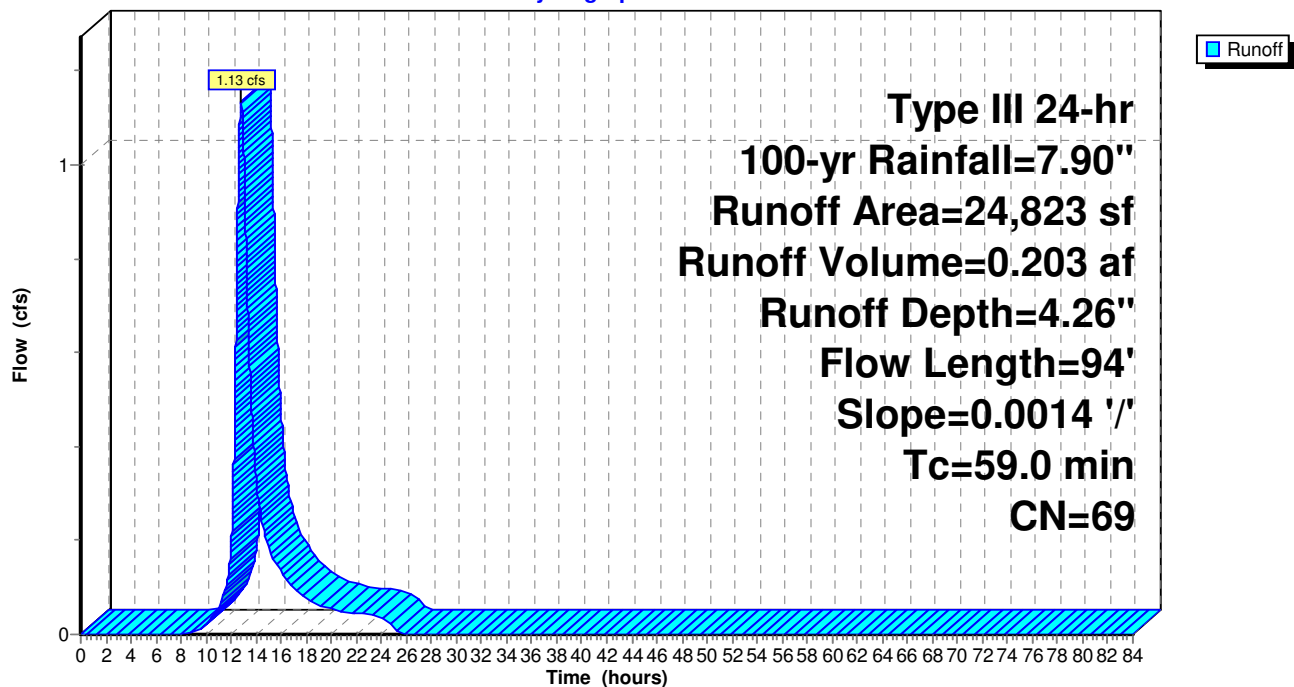
### Subcatchment P3: P3

#### Hydrograph



### Subcatchment P4: P4

#### Hydrograph



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

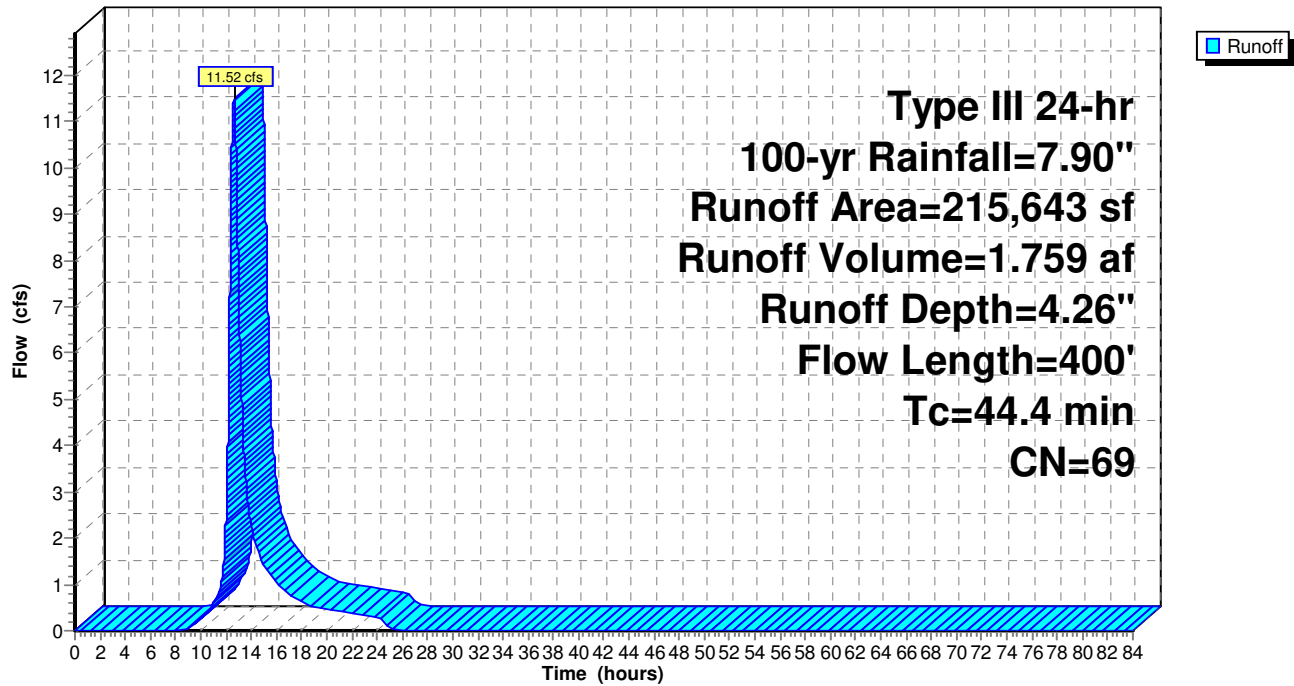
Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 70

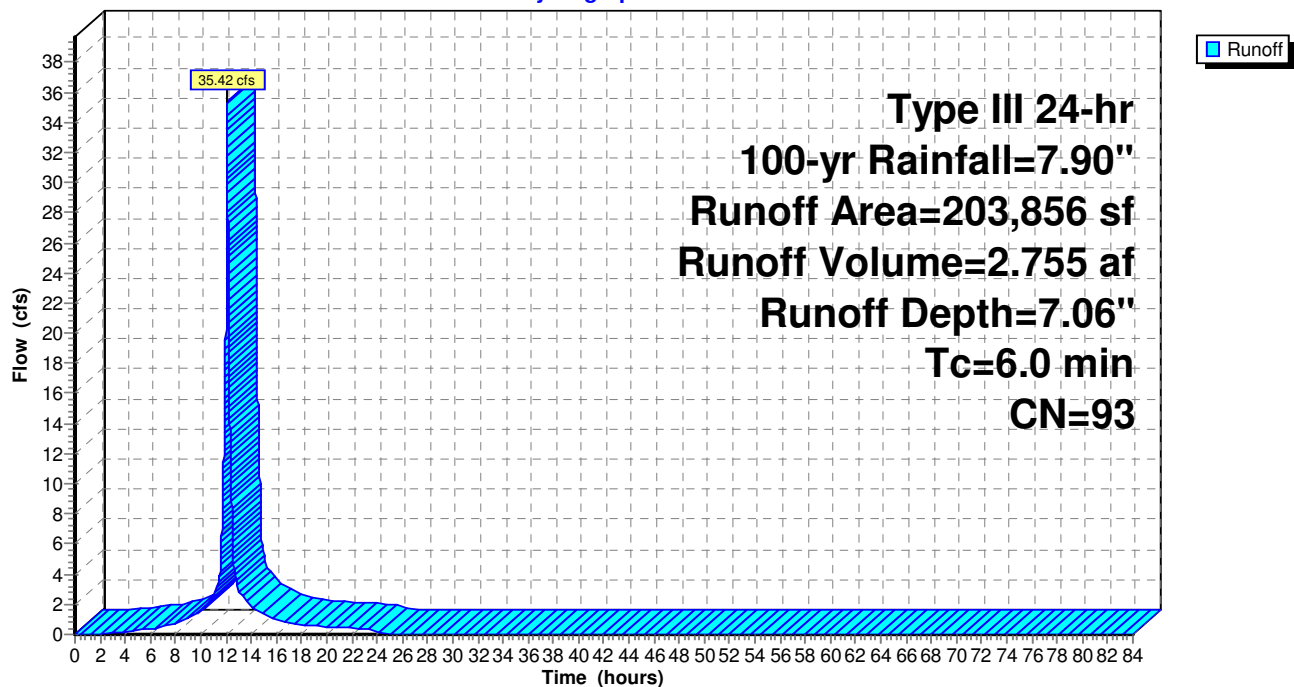
### Subcatchment P5: P5

Hydrograph

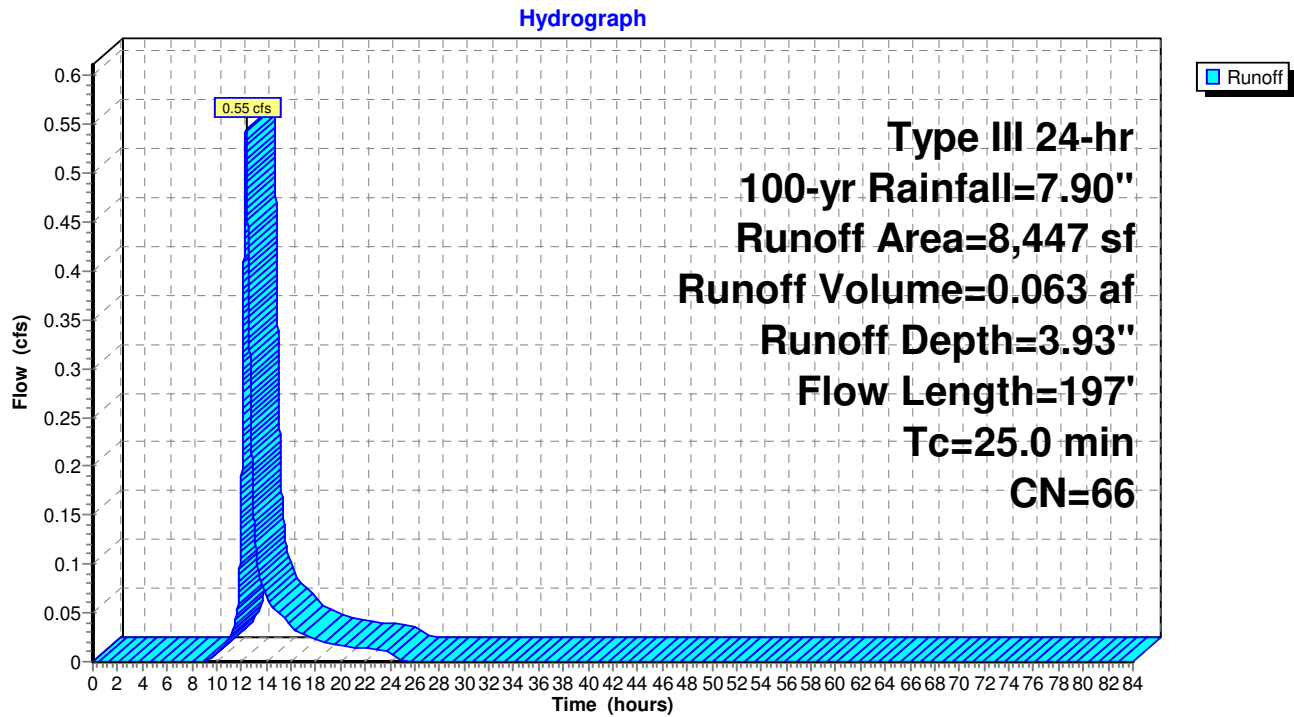


### Subcatchment P6: Sheet flow To West Basin

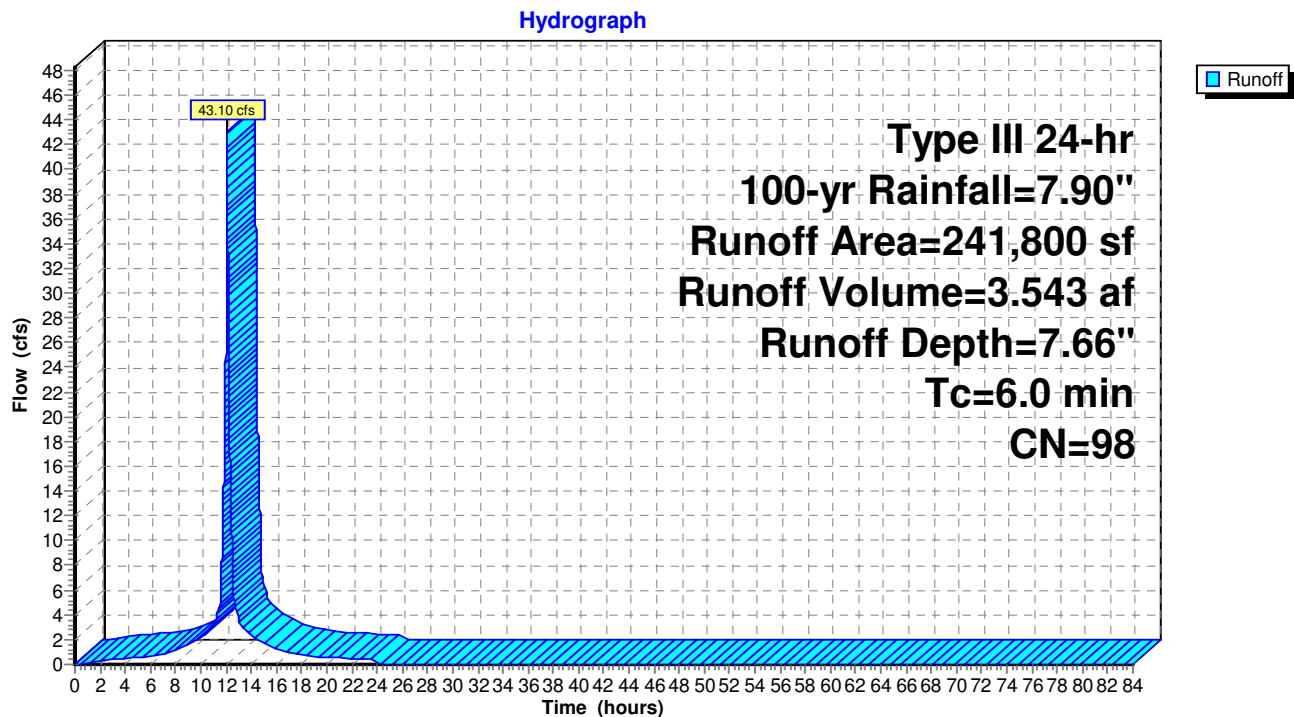
Hydrograph



### Subcatchment P7: Proposed P7



### Subcatchment P8: Proposed Roof to UGC-D (west)



## 4670 Hydrocad!

Prepared by Design Professionals, Inc.

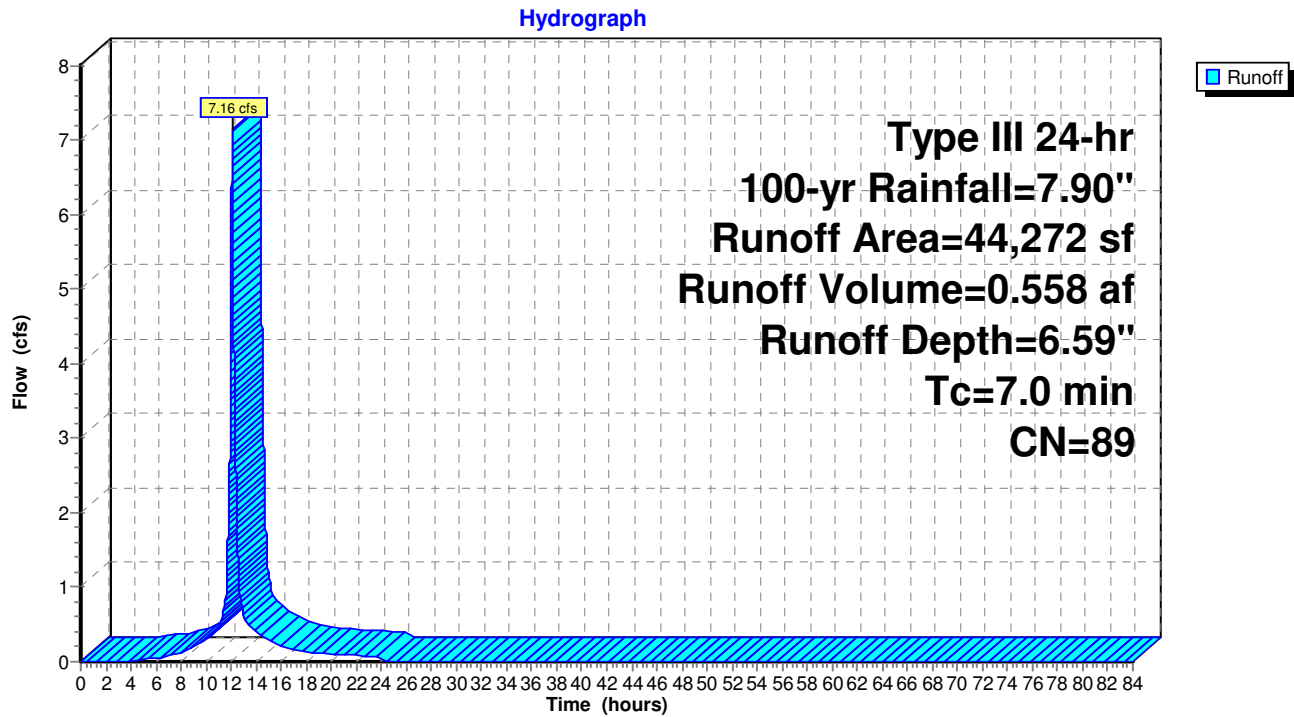
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

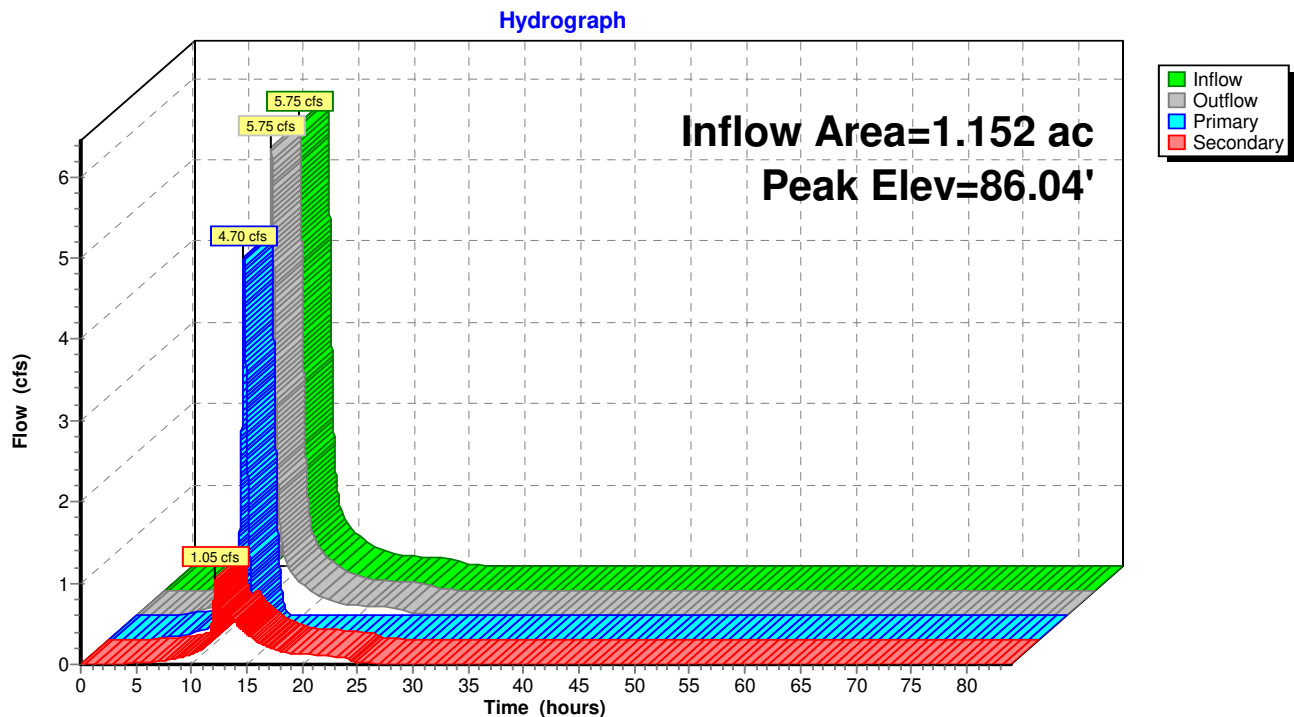
Printed 4/20/2022

Page 72

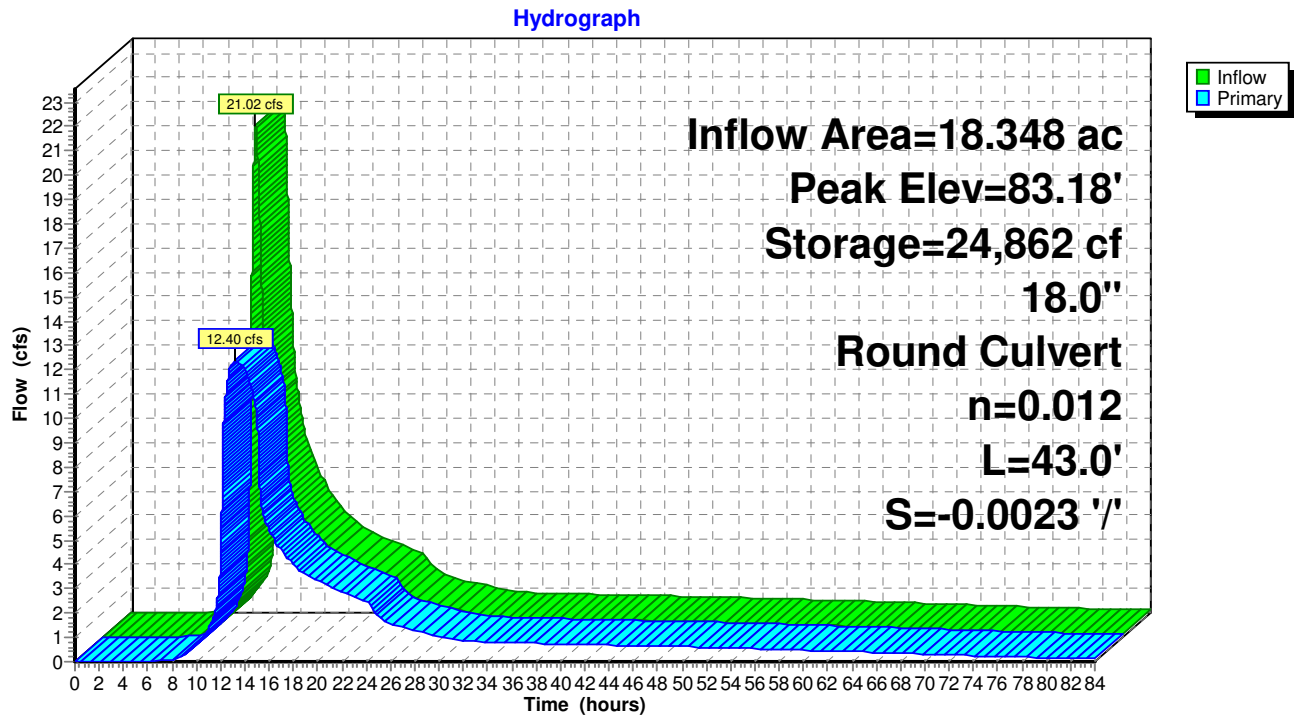
### Subcatchment P9: Sheetflow to North Basin



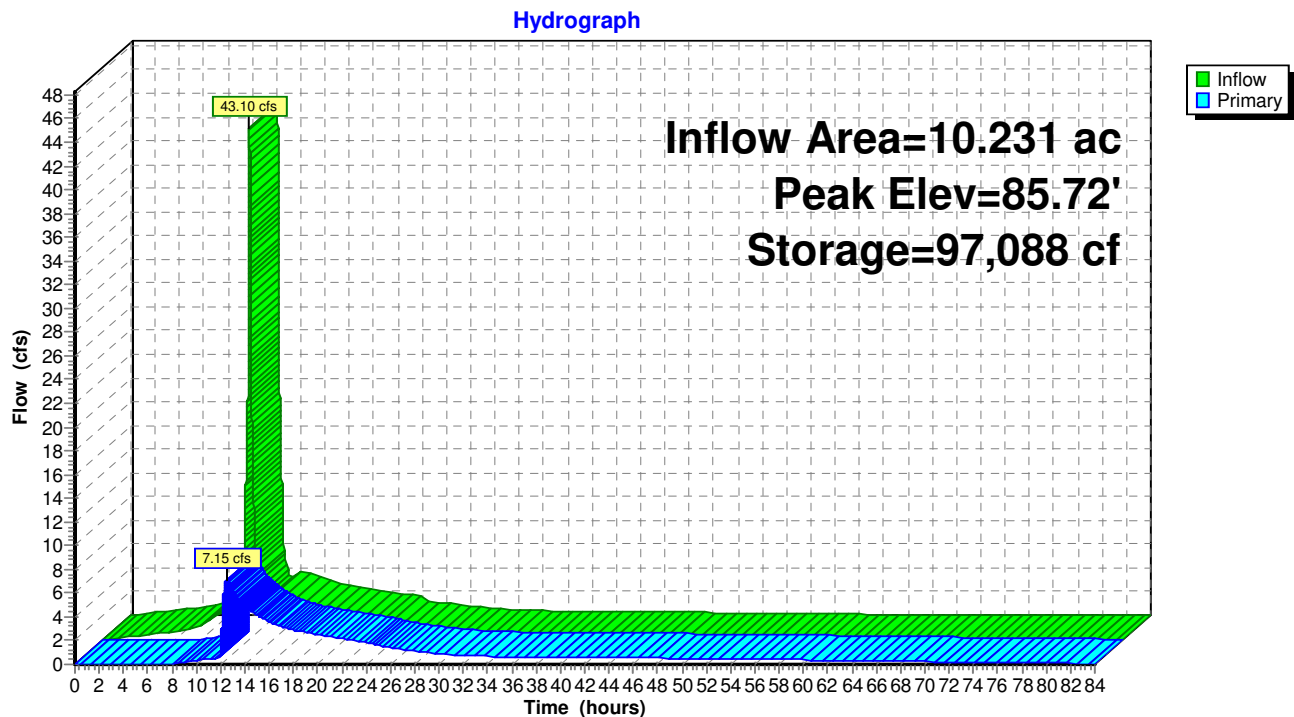
### Pond DMH: Splitter Structure



**Pond EP1\*: (DP1\*) Proposed Condition - Rail Road Pond**

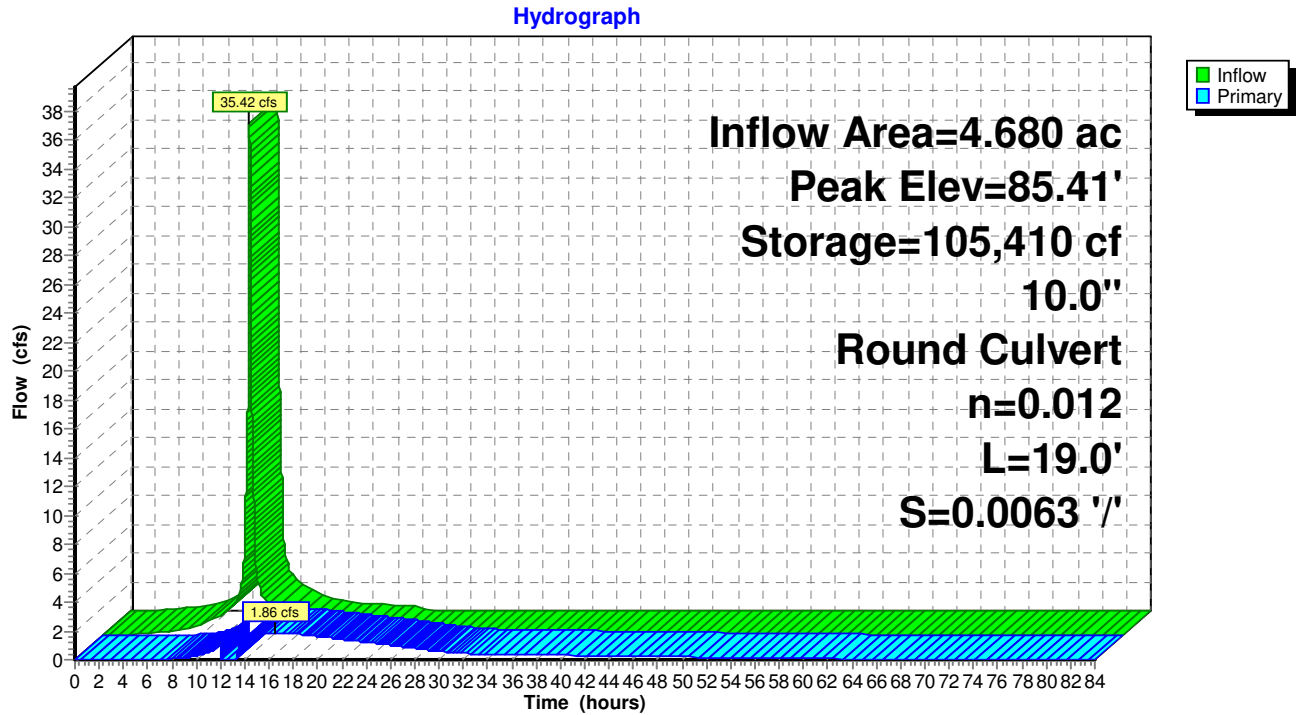


**Pond PP1: UGC-D (Stormtech SC-740)**

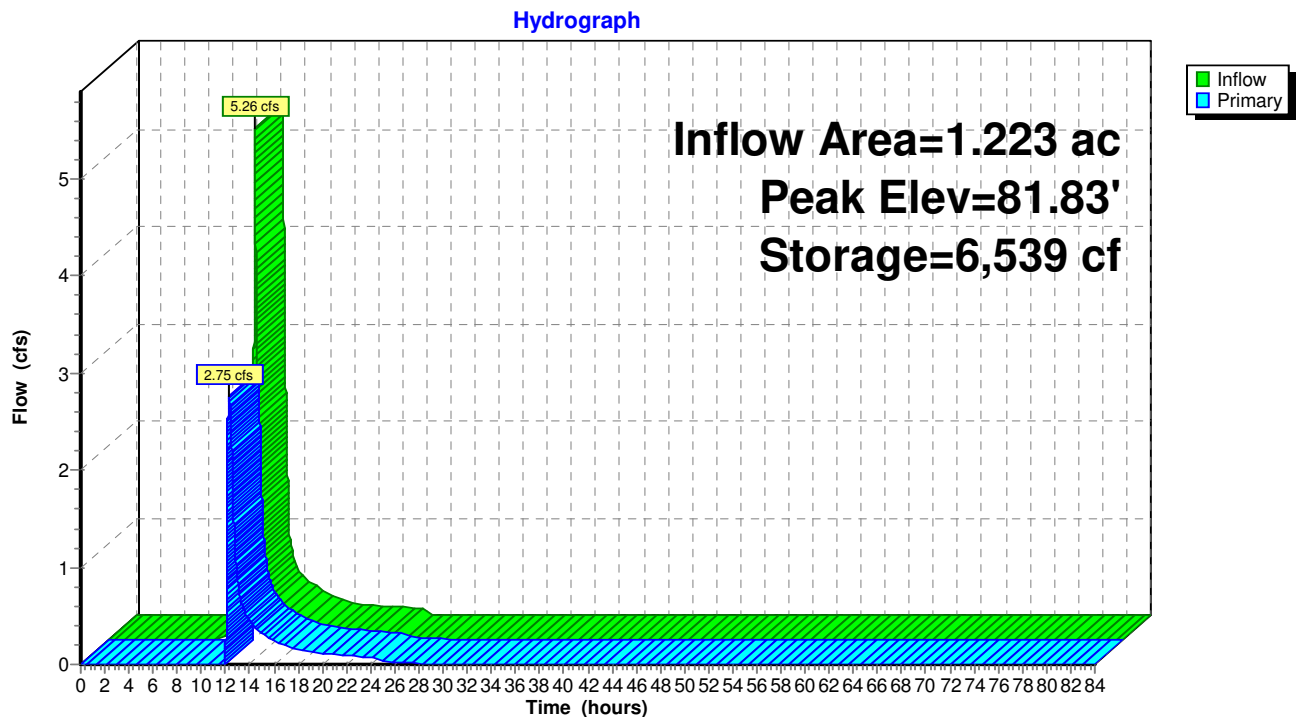




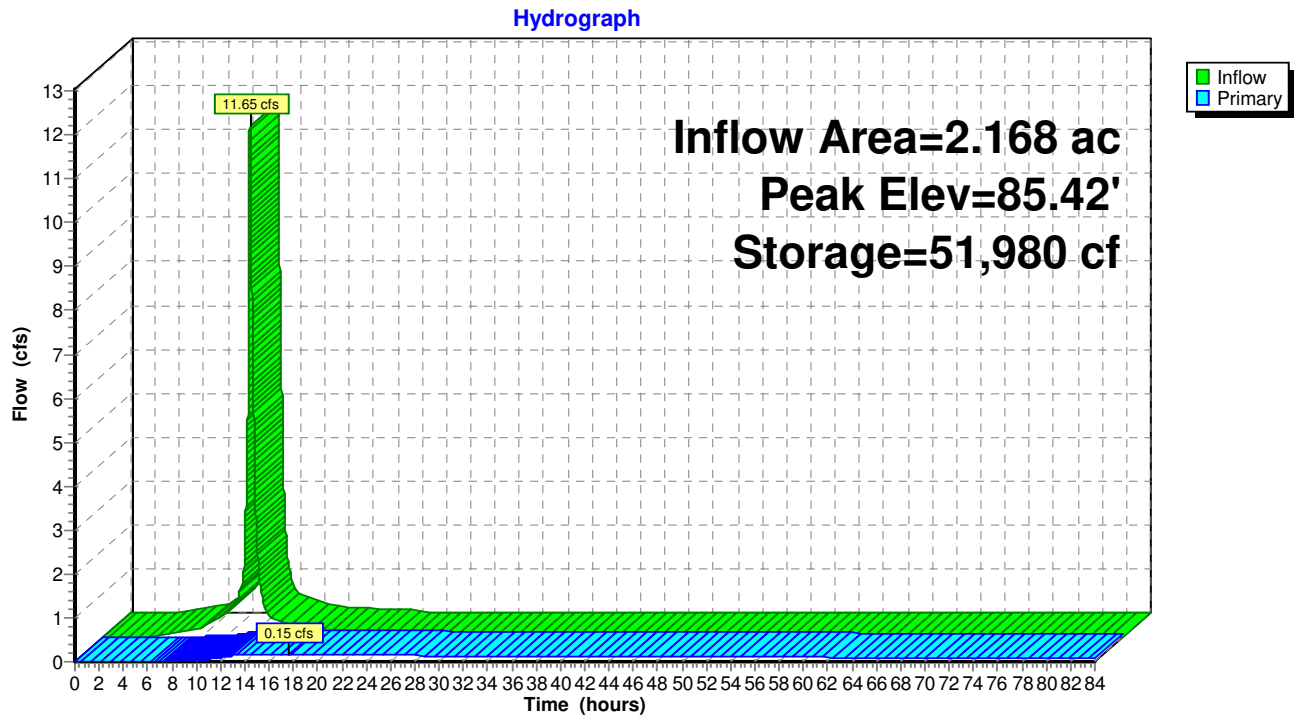
**Pond PP2: Water Quality Basin (WEST)**



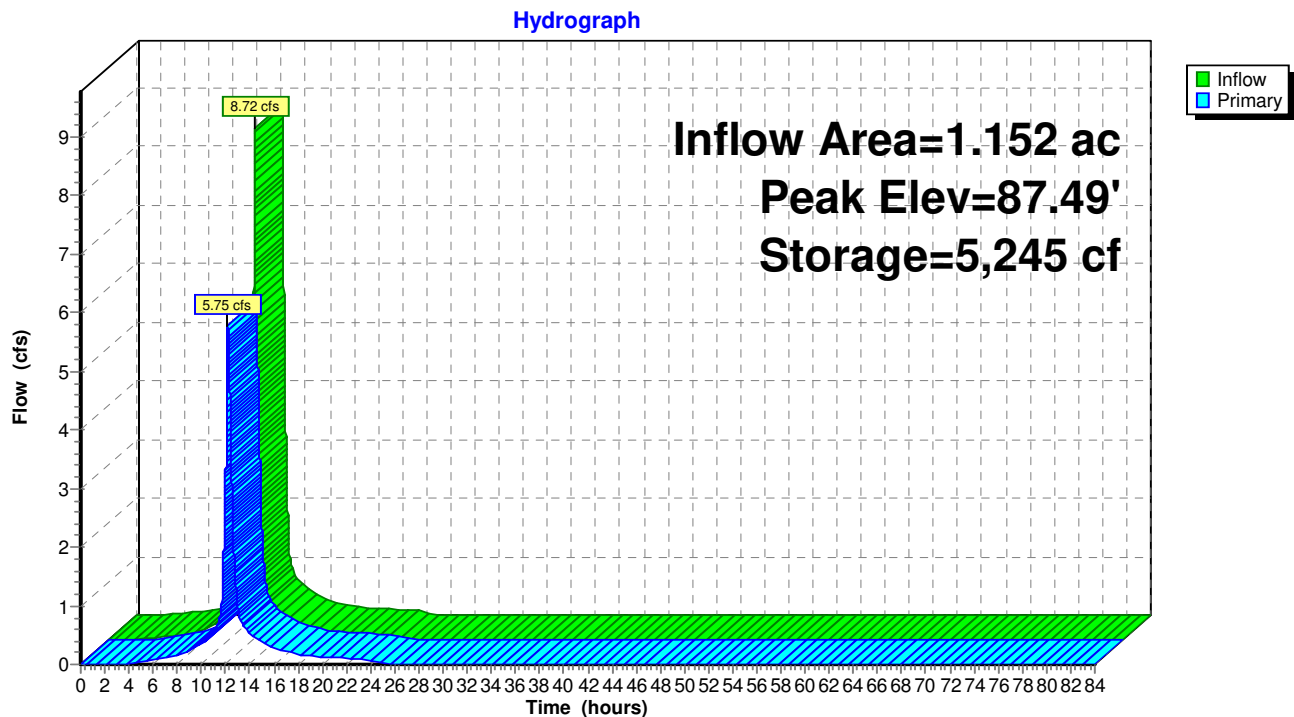
**Pond PP3: UGC-B (Stormtech SC-310) w. Underdrain**



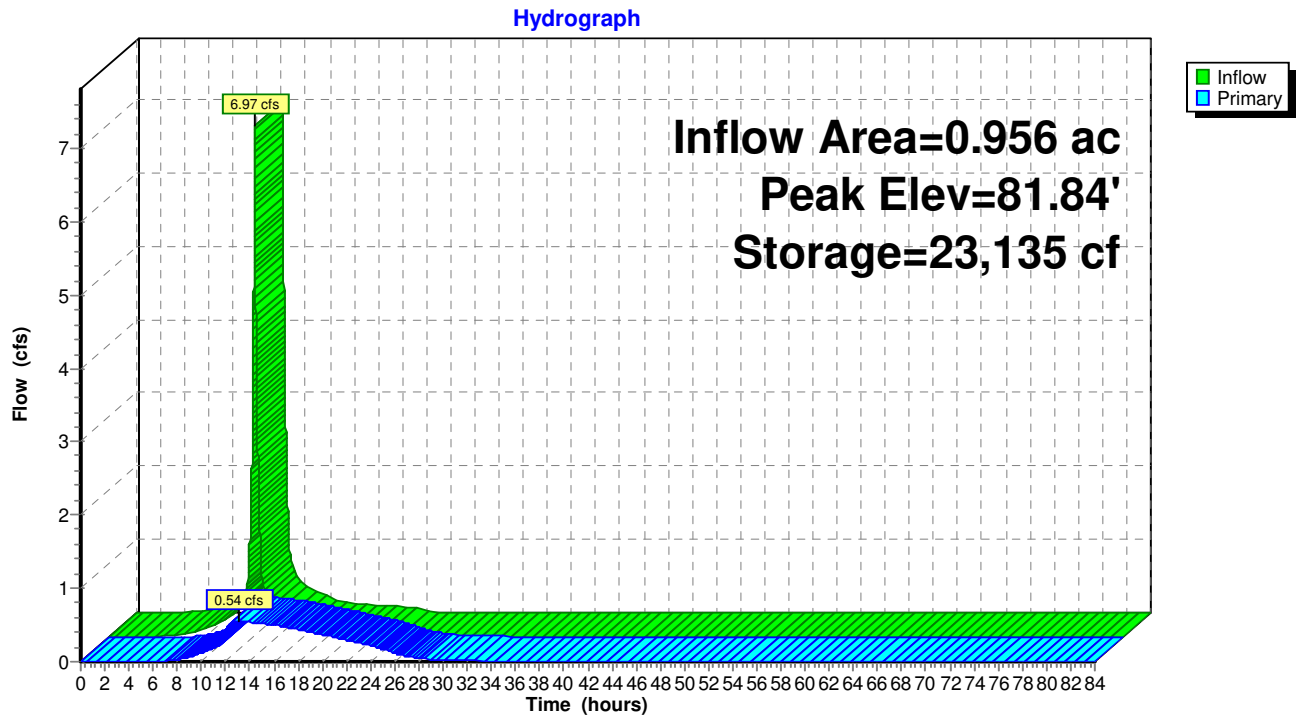
### Pond PP4: Water Quality Basin (North)



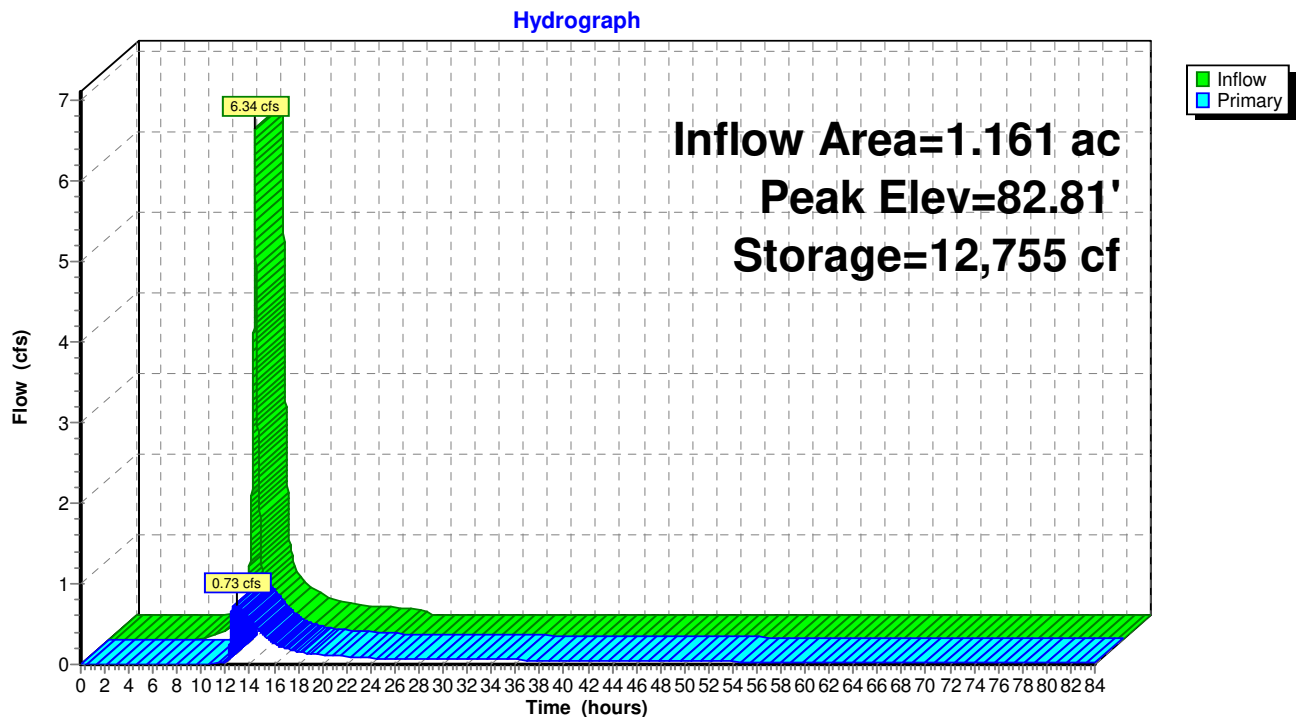
### Pond PP5: UGC-E (Stormtech SC-310)



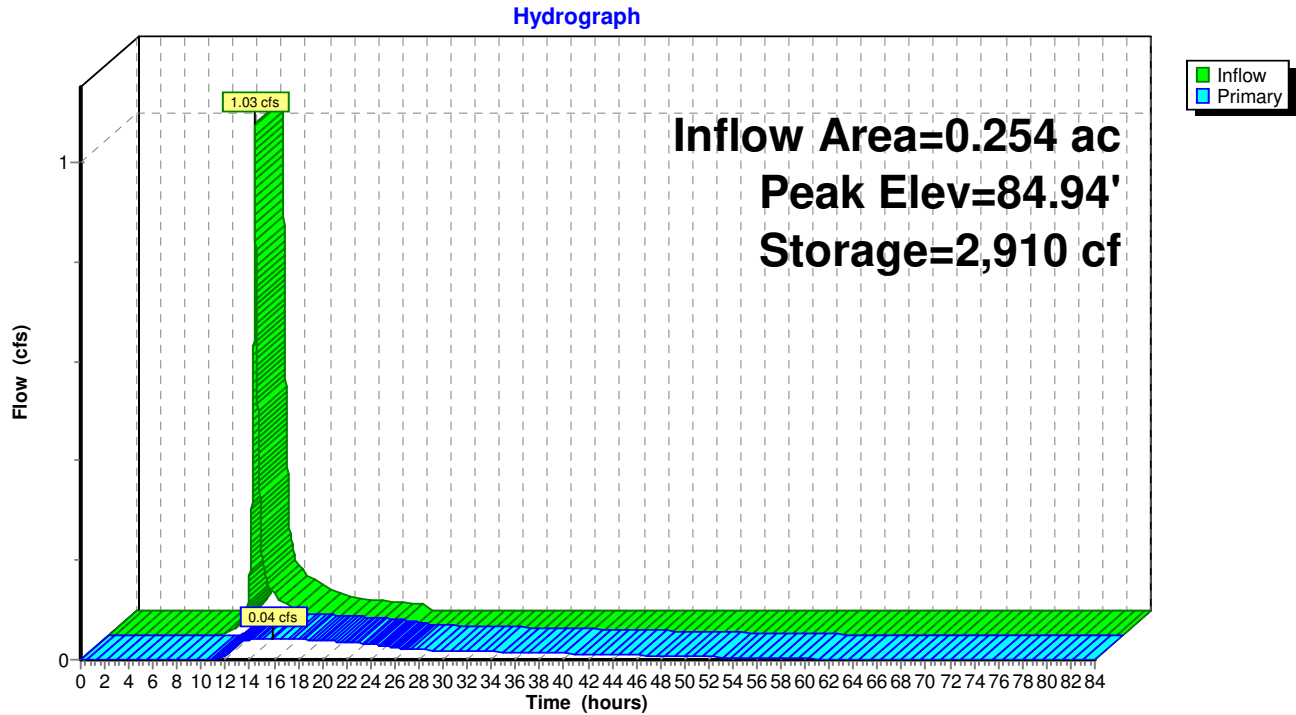
**Pond PP6: Water Quality Basin (Kennedy Road)**



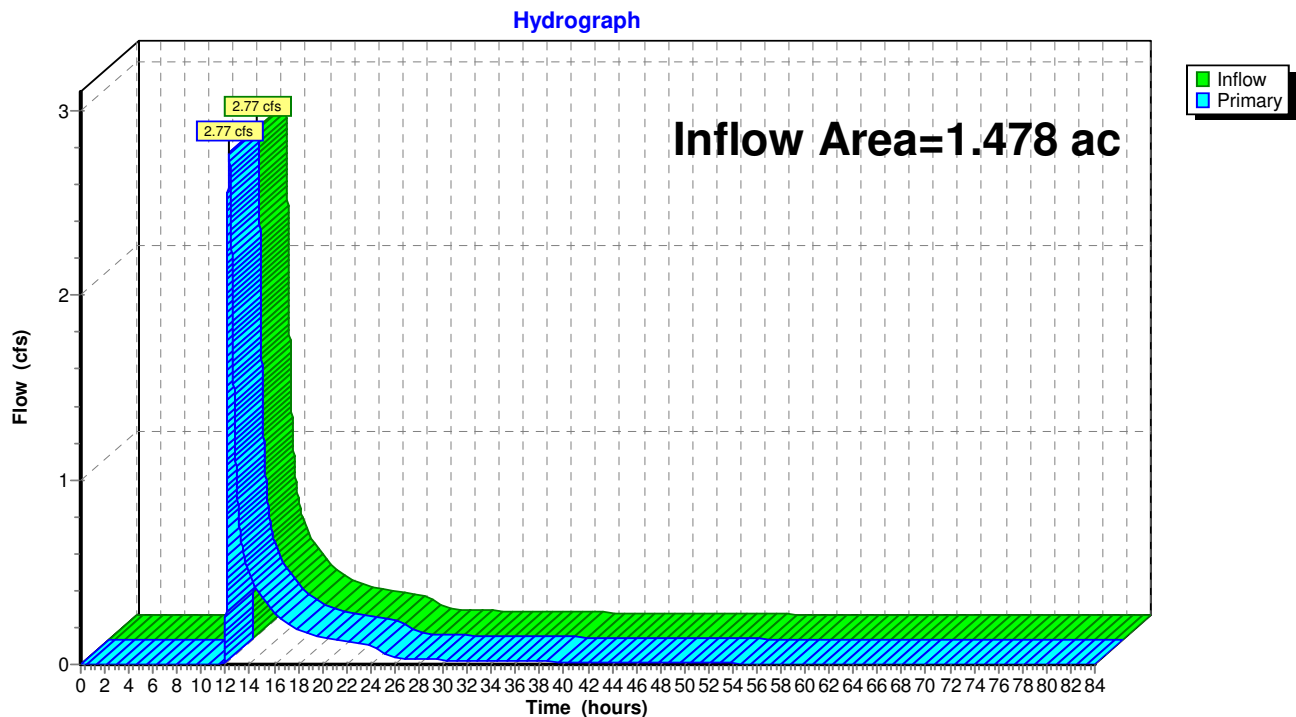
**Pond PP7: UGC-A (Stormtech SC-740)**



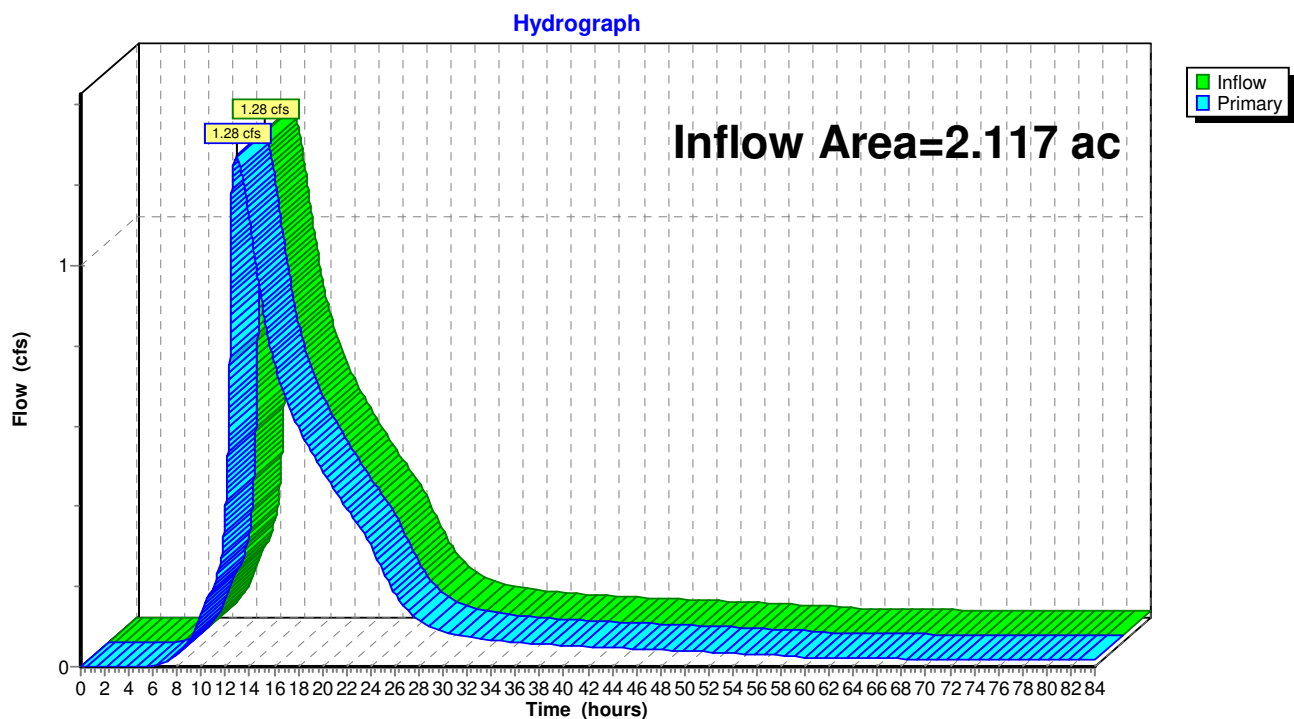
**Pond PP8: UGC-C (Stormtech SC-310)**



**Link DP3\*: (DP3\*) Proposed Flow to Sullivan Ave**



# Link DP4\*: (DP4\*) Proposed Flow to Kennedy Road Drainage System



**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 79

**Summary for Pond DMH: Splitter Structure**

Inflow Area = 1.152 ac, 84.49% Impervious, Inflow Depth = 7.06" for 100-yr event  
 Inflow = 5.75 cfs @ 12.14 hrs, Volume= 0.678 af  
 Outflow = 5.75 cfs @ 12.14 hrs, Volume= 0.678 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.70 cfs @ 12.14 hrs, Volume= 0.338 af  
 Secondary = 1.05 cfs @ 12.14 hrs, Volume= 0.340 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Peak Elev= 86.04' @ 12.14 hrs

Flood Elev= 85.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	84.55'	<b>15.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.55' / 84.50' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Secondary	84.55'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.55' / 84.50' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf

**Primary OutFlow** Max=4.70 cfs @ 12.14 hrs HW=86.04' TW=84.53' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 4.70 cfs @ 4.06 fps)**Secondary OutFlow** Max=1.05 cfs @ 12.14 hrs HW=86.04' TW=81.66' (Dynamic Tailwater)↑**2=Culvert** (Inlet Controls 1.05 cfs @ 5.37 fps)**Summary for Pond EP1\*: (DP1\*) Proposed Condition - Rail Road Pond**

Inflow Area = 18.348 ac, 62.57% Impervious, Inflow Depth > 5.88" for 100-yr event  
 Inflow = 21.02 cfs @ 12.58 hrs, Volume= 8.998 af  
 Outflow = 12.40 cfs @ 13.26 hrs, Volume= 8.997 af, Atten= 41%, Lag= 40.5 min  
 Primary = 12.40 cfs @ 13.26 hrs, Volume= 8.997 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Peak Elev= 83.18' @ 13.26 hrs Surf.Area= 46,163 sf Storage= 24,862 cf

Plug-Flow detention time= 9.1 min calculated for 8.997 af (100% of inflow)

Center-of-Mass det. time= 8.9 min ( 1,521.4 - 1,512.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	79.70'	94,801 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 80

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.70	10	0	0
80.00	382	59	59
81.00	1,156	769	828
82.00	2,173	1,665	2,492
83.00	29,061	15,617	18,109
84.00	124,323	76,692	94,801

Device	Routing	Invert	Outlet Devices
#1	Primary	79.70'	<b>18.0" Round Culvert</b> L= 43.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 79.60' / 79.70' S= -0.0023 ' ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

**Primary OutFlow** Max=12.40 cfs @ 13.26 hrs HW=83.18' (Free Discharge)↑**1=Culvert** (Inlet Controls 12.40 cfs @ 7.02 fps)**Summary for Pond PP1: UGC-D (Stormtech SC-740)**

Top of System Elev = 85.72

Inflow Area =	10.231 ac, 93.98% Impervious, Inflow Depth > 7.30" for 100-yr event
Inflow =	43.10 cfs @ 12.09 hrs, Volume= 6.227 af
Outflow =	7.15 cfs @ 12.54 hrs, Volume= 5.857 af, Atten= 83%, Lag= 27.6 min
Primary =	7.15 cfs @ 12.54 hrs, Volume= 5.857 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Peak Elev= 85.72' @ 12.54 hrs Surf.Area= 45,134 sf Storage= 97,088 cf

Plug-Flow detention time= 682.3 min calculated for 5.857 af (94% of inflow)

Center-of-Mass det. time= 553.4 min ( 1,652.5 - 1,099.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	82.22'	24,873 cf	<b>39.50'W x 715.62'L x 3.50'H Field A</b> 98,934 cf Overall - 36,752 cf Embedded = 62,182 cf x 40.0% Voids
#2A	82.72'	36,752 cf	<b>ADS_StormTech SC-740 +Cap</b> x 800 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 800 Chambers in 8 Rows
#3B	82.22'	11,489 cf	<b>15.75'W x 801.06'L x 3.50'H Field B</b> 44,158 cf Overall - 15,436 cf Embedded = 28,722 cf x 40.0% Voids
#4B	82.72'	15,436 cf	<b>ADS_StormTech SC-740 +Cap</b> x 336 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 336 Chambers in 3 Rows
#5C	82.22'	4,204 cf	<b>6.25'W x 680.02'L x 3.50'H Field C</b> 14,875 cf Overall - 4,364 cf Embedded = 10,511 cf x 40.0% Voids
#6C	82.72'	4,364 cf	<b>ADS_StormTech SC-740 +Cap</b> x 95 Inside #5 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition

Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 81

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

97,118 cf Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	82.78'	<b>24.0" Round 24" RCP</b> L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.78' / 82.70' S= 0.0057 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	82.82'	<b>9.0" W x 2.0" H Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	84.12'	<b>16.0" W x 10.0" H Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	85.35'	<b>6.0" W x 10.0" H Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=7.15 cfs @ 12.54 hrs HW=85.72' TW=82.74' (Dynamic Tailwater)

1=24" RCP (Passes 7.15 cfs of 19.81 cfs potential flow)

2=Orifice/Grate (Orifice Controls 1.01 cfs @ 8.08 fps)

3=Orifice/Grate (Orifice Controls 5.78 cfs @ 5.21 fps)

4=Orifice/Grate (Orifice Controls 0.36 cfs @ 1.95 fps)

**Summary for Pond PP2: Water Quality Basin (WEST)**

Max Water Elev = 85.40 (1ft Freeboard)

Inflow Area =	4.680 ac, 86.83% Impervious, Inflow Depth = 7.06" for 100-yr event
Inflow =	35.42 cfs @ 12.09 hrs, Volume= 2.755 af
Outflow =	1.86 cfs @ 16.48 hrs, Volume= 2.684 af, Atten= 95%, Lag= 263.7 min
Primary =	1.86 cfs @ 16.48 hrs, Volume= 2.684 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 83.50' Surf.Area= 39,354 sf Storage= 18,954 cf

Peak Elev= 85.41' @ 14.52 hrs Surf.Area= 51,382 sf Storage= 105,410 cf (86,456 cf above start)

Plug-Flow detention time= 1,025.6 min calculated for 2.249 af (82% of inflow)

Center-of-Mass det. time= 805.7 min ( 1,571.4 - 765.7 )

Volume	Invert	Avail.Storage	Storage Description	
#1	83.00'	136,855 cf	<b>Custom Stage Data (Conic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
83.00	36,482	0	0	36,482
84.00	42,335	39,372	39,372	42,377
85.00	48,730	45,495	84,867	48,817
86.00	55,314	51,987	136,855	55,450

Device	Routing	Invert	Outlet Devices
#1	Primary	83.50'	<b>10.0" Round Culvert</b>



**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 82

L= 19.0' CPP, square edge headwall, Ke= 0.500  
 Inlet / Outlet Invert= 83.50' / 83.38' S= 0.0063 '/' Cc= 0.900  
 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf

**Primary OutFlow** Max=1.86 cfs @ 16.48 hrs HW=85.33' TW=84.83' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.86 cfs @ 3.41 fps)**Summary for Pond PP3: UGC-B (Stormtech SC-310) w. Underdrain**

Top of System Elev = 82.06

Inflow Area = 1.223 ac, 8.92% Impervious, Inflow Depth = 3.81" for 100-yr event  
 Inflow = 5.26 cfs @ 12.10 hrs, Volume= 0.389 af  
 Outflow = 2.75 cfs @ 12.27 hrs, Volume= 0.342 af, Atten= 48%, Lag= 10.3 min  
 Primary = 2.75 cfs @ 12.27 hrs, Volume= 0.342 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 80.30' Surf.Area= 5,806 sf Storage= 1,459 cf

Peak Elev= 81.83' @ 12.27 hrs Surf.Area= 5,806 sf Storage= 6,539 cf (5,080 cf above start)

Plug-Flow detention time= 174.8 min calculated for 0.308 af (79% of inflow)

Center-of-Mass det. time= 74.4 min ( 911.3 - 836.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	79.73'	2,828 cf	<b>8.17'W x 473.12'L x 2.33'H Field A</b> 9,016 cf Overall - 1,946 cf Embedded = 7,070 cf x 40.0% Voids
#2A	80.23'	1,946 cf	<b>ADS_StormTech SC-310 +Cap</b> x 132 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 132 Chambers in 2 Rows
#3B	79.73'	1,483 cf	<b>4.83'W x 401.92'L x 2.33'H Field B</b> 4,533 cf Overall - 826 cf Embedded = 3,707 cf x 40.0% Voids
#4B	80.23'	826 cf	<b>ADS_StormTech SC-310 +Cap</b> x 56 Inside #3 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		7,082 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	79.69'	<b>12.0" Round 12" HDPE OUT</b> L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.69' / 79.27' S= 0.0210 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	80.80'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.75 cfs @ 12.27 hrs HW=81.83' TW=0.00' (Dynamic Tailwater)↑**1=12" HDPE OUT** (Passes 2.75 cfs of 4.84 cfs potential flow)↑**2=Orifice/Grate** (Orifice Controls 2.75 cfs @ 3.50 fps)

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 83

**Summary for Pond PP4: Water Quality Basin (North)**

Max Water Elev = 85.80 (1ft Freeboard)

Inflow Area = 2.168 ac, 74.76% Impervious, Inflow Depth = 4.96" for 100-yr event  
 Inflow = 11.65 cfs @ 12.11 hrs, Volume= 0.896 af  
 Outflow = 0.15 cfs @ 17.61 hrs, Volume= 0.701 af, Atten= 99%, Lag= 329.9 min  
 Primary = 0.15 cfs @ 17.61 hrs, Volume= 0.701 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 83.40' Surf.Area= 14,585 sf Storage= 18,791 cf

Peak Elev= 85.42' @ 17.61 hrs Surf.Area= 18,221 sf Storage= 51,980 cf (33,189 cf above start)

Plug-Flow detention time= 3,312.0 min calculated for 0.269 af (30% of inflow)

Center-of-Mass det. time= 1,842.4 min ( 2,591.4 - 749.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	62,769 cf	<b>Custom Stage Data (Conic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
82.00	12,313	0	0	12,313
83.00	13,894	13,096	13,096	13,945
84.00	15,654	14,765	27,861	15,757
85.00	17,454	16,546	44,407	17,614
86.00	19,286	18,362	62,769	19,508

Device	Routing	Invert	Outlet Devices
#1	Primary	83.35'	<b>12.0" Round Culvert</b> L= 19.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 83.35' / 83.30' S= 0.0026 ' S= 0.0026 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Device 1	83.40'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.15 cfs @ 17.61 hrs HW=85.42' TW=81.01' (Dynamic Tailwater)

1=Culvert (Passes 0.15 cfs of 4.72 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.15 cfs @ 6.71 fps)

**Summary for Pond PP5: UGC-E (Stormtech SC-310)**

Top of System Elev = 87.71

Inflow Area = 1.152 ac, 84.49% Impervious, Inflow Depth = 7.06" for 100-yr event  
 Inflow = 8.72 cfs @ 12.09 hrs, Volume= 0.678 af  
 Outflow = 5.75 cfs @ 12.14 hrs, Volume= 0.678 af, Atten= 34%, Lag= 3.0 min  
 Primary = 5.75 cfs @ 12.14 hrs, Volume= 0.678 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 84

Starting Elev= 85.95' Surf.Area= 4,780 sf Storage= 1,189 cf

Peak Elev= 87.49' @ 12.17 hrs Surf.Area= 4,780 sf Storage= 5,245 cf (4,056 cf above start)

Plug-Flow detention time= 67.5 min calculated for 0.650 af (96% of inflow)

Center-of-Mass det. time= 27.2 min ( 792.8 - 765.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	85.38'	1,850 cf	<b>4.83'W x 501.60'L x 2.33'H Field A</b> 5,657 cf Overall - 1,032 cf Embedded = 4,625 cf x 40.0% Voids
#2A	85.88'	1,032 cf	<b>ADS_StormTech SC-310 +Cap</b> x 70 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
#3B	85.38'	1,798 cf	<b>4.83'W x 487.36'L x 2.33'H Field B</b> 5,496 cf Overall - 1,002 cf Embedded = 4,494 cf x 40.0% Voids
#4B	85.88'	1,002 cf	<b>ADS_StormTech SC-310 +Cap</b> x 68 Inside #3 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		5,682 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	85.80'	<b>15.0" Round 15" HDPE OUT</b> L= 144.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.80' / 84.58' S= 0.0085 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#2	Device 1	85.95'	<b>12.0" Round 12" HDPE (x2) X 2.00</b> L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.95' / 85.80' S= 0.0300 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=5.75 cfs @ 12.14 hrs HW=87.43' TW=86.04' (Dynamic Tailwater)↑ **1=15" HDPE OUT** (Outlet Controls 5.75 cfs @ 4.71 fps)↑ **2=12" HDPE (x2)** (Passes 5.75 cfs of 7.50 cfs potential flow)**Summary for Pond PP6: Water Quality Basin (Kennedy Road)**

Max Water Elev = 85.80 (1ft Freeboard)

Inflow Area =	0.956 ac, 70.56% Impervious, Inflow Depth = 6.59" for 100-yr event
Inflow =	6.97 cfs @ 12.09 hrs, Volume= 0.525 af
Outflow =	0.54 cfs @ 13.10 hrs, Volume= 0.524 af, Atten= 92%, Lag= 61.0 min
Primary =	0.54 cfs @ 13.10 hrs, Volume= 0.524 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 80.00' Surf.Area= 5,601 sf Storage= 11,033 cf

Peak Elev= 81.84' @ 13.10 hrs Surf.Area= 7,605 sf Storage= 23,135 cf (12,102 cf above start)

Plug-Flow detention time= 649.0 min calculated for 0.271 af (52% of inflow)

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition  
Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 85

Center-of-Mass det. time= 295.7 min ( 1,075.2 - 779.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	75.00'	42,367 cf	<b>Custom Stage Data (Conic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
75.00	239	0	0	239
76.00	786	486	486	791
77.00	1,382	1,070	1,556	1,399
78.00	2,063	1,711	3,267	2,095
78.80	2,824	1,947	5,214	2,869
79.00	4,585	734	5,948	4,630
80.00	5,601	5,085	11,033	5,677
81.00	6,669	6,127	17,160	6,781
82.00	7,793	7,224	24,384	7,944
83.00	8,973	8,376	32,760	9,168
84.00	10,257	9,608	42,367	10,498

Device	Routing	Invert	Outlet Devices
#1	Primary	79.79'	<b>12.0" Round 12" RCP Culvert</b> L= 34.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.79' / 79.60' S= 0.0056 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	80.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.54 cfs @ 13.10 hrs HW=81.84' TW=0.00' (Dynamic Tailwater)

1=12" RCP Culvert (Passes 0.54 cfs of 4.38 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.54 cfs @ 6.22 fps)

**Summary for Pond PP7: UGC-A (Stormtech SC-740)**

Top of System Elev = 82.94

Inflow Area =	1.161 ac, 17.93% Impervious, Inflow Depth = 4.84" for 100-yr event
Inflow =	6.34 cfs @ 12.10 hrs, Volume= 0.468 af
Outflow =	0.73 cfs @ 12.86 hrs, Volume= 0.427 af, Atten= 88%, Lag= 45.8 min
Primary =	0.73 cfs @ 12.86 hrs, Volume= 0.427 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 80.00' Surf.Area= 6,498 sf Storage= 1,594 cf

Peak Elev= 82.81' @ 12.86 hrs Surf.Area= 6,498 sf Storage= 12,755 cf (11,161 cf above start)

Plug-Flow detention time= 1,031.6 min calculated for 0.390 af (83% of inflow)

Center-of-Mass det. time= 874.4 min ( 1,692.2 - 817.8 )

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition

Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 86

Volume	Invert	Avail.Storage	Storage Description
#1A	79.44'	4,292 cf	<b>6.25'W x 694.26'L x 3.50'H Field A</b> 15,187 cf Overall - 4,456 cf Embedded = 10,731 cf x 40.0% Voids
#2A	79.94'	4,456 cf	<b>ADS_StormTech SC-740 +Cap</b> x 97 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
#3B	79.44'	2,140 cf	<b>6.25'W x 345.38'L x 3.50'H Field B</b> 7,555 cf Overall - 2,205 cf Embedded = 5,350 cf x 40.0% Voids
#4B	79.94'	2,205 cf	<b>ADS_StormTech SC-740 +Cap</b> x 48 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		13,094 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	80.00'	<b>12.0" Round 12" HDPE</b> L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 80.00' / 79.90' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	80.66'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	80.00'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	82.16'	<b>9.0" W x 3.0" H Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.73 cfs @ 12.86 hrs HW=82.81' TW=0.00' (Dynamic Tailwater)

- 1=12" HDPE (Passes 0.73 cfs of 5.75 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.99 fps)
- 3=Orifice/Grate (Orifice Controls 0.04 cfs @ 8.01 fps)
- 4=Orifice/Grate (Orifice Controls 0.65 cfs @ 3.48 fps)

**Summary for Pond PP8: UGC-C (Stormtech SC-310)**

Top of System Elev = 85.64

Inflow Area =	0.254 ac, 6.38% Impervious, Inflow Depth = 3.59" for 100-yr event
Inflow =	1.03 cfs @ 12.10 hrs, Volume= 0.076 af
Outflow =	0.04 cfs @ 15.89 hrs, Volume= 0.075 af, Atten= 96%, Lag= 227.4 min
Primary =	0.04 cfs @ 15.89 hrs, Volume= 0.075 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.002 hrs

Starting Elev= 83.88' Surf.Area= 3,231 sf Storage= 804 cf

Peak Elev= 84.94' @ 15.89 hrs Surf.Area= 3,231 sf Storage= 2,910 cf (2,106 cf above start)

Plug-Flow detention time= 1,147.7 min calculated for 0.057 af (75% of inflow)

Center-of-Mass det. time= 811.7 min ( 1,652.8 - 841.2 )

**4670 Hydrocad!**

Prepared by Design Professionals, Inc.

HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

Proposed Condition

Type III 24-hr 100-yr Rainfall=7.90"

Printed 4/20/2022

Page 87

Volume	Invert	Avail.Storage	Storage Description
#1A	83.31'	1,299 cf	<b>4.83'W x 352.08'L x 2.33'H Field A</b> 3,971 cf Overall - 722 cf Embedded = 3,248 cf x 40.0% Voids
#2A	83.81'	722 cf	<b>ADS_StormTech SC-310 +Cap</b> x 49 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
#3B	83.31'	1,168 cf	<b>4.83'W x 316.48'L x 2.33'H Field B</b> 3,569 cf Overall - 649 cf Embedded = 2,921 cf x 40.0% Voids
#4B	83.81'	649 cf	<b>ADS_StormTech SC-310 +Cap</b> x 44 Inside #3 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		3,839 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	83.20'	<b>12.0" Round 12" HDPE</b> L= 96.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 83.20' / 81.60' S= 0.0167 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	83.88'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	84.50'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.04 cfs @ 15.89 hrs HW=84.94' TW=0.00' (Dynamic Tailwater)

- 1=12" HDPE (Passes 0.04 cfs of 4.21 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.03 cfs @ 4.86 fps)
- 3=Orifice/Grate (Orifice Controls 0.02 cfs @ 3.03 fps)

**APPENDIX C**  
**NRCS Soil Map & Data**



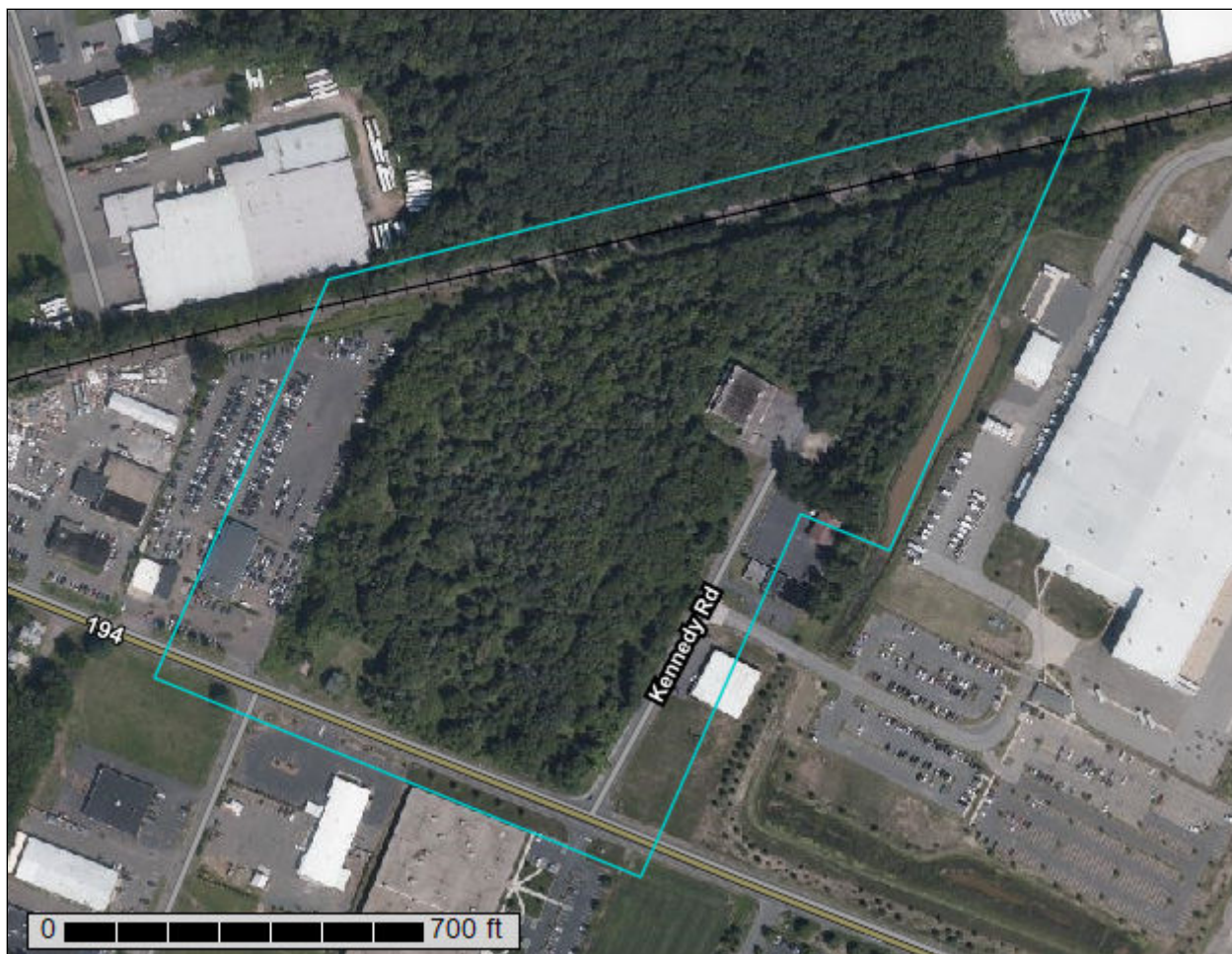
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for State of Connecticut



March 18, 2022



# Preface

---

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

---

<b>Preface</b> .....	2
<b>How Soil Surveys Are Made</b> .....	5
<b>Soil Map</b> .....	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
State of Connecticut.....	13
13—Walpole sandy loam, 0 to 3 percent slopes.....	13
23A—Sudbury sandy loam, 0 to 5 percent slopes.....	14
36A—Windsor loamy sand, 0 to 3 percent slopes.....	16
304—Udorthents, loamy, very steep.....	17
306—Udorthents-Urban land complex.....	19
307—Urban land.....	20
701A—Ninigret fine sandy loam, 0 to 3 percent slopes.....	21
<b>Soil Information for All Uses</b> .....	23
Soil Properties and Qualities.....	23
Soil Qualities and Features.....	23
Hydrologic Soil Group.....	23
<b>References</b> .....	28

# How Soil Surveys Are Made

---

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map





# Custom Soil Resource Report

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole


 Slide or Slip


 Sodic Spot


 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

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:  
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: State of Connecticut  
Survey Area Data: Version 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13	Walpole sandy loam, 0 to 3 percent slopes	10.6	32.3%
23A	Sudbury sandy loam, 0 to 5 percent slopes	3.7	11.4%
36A	Windsor loamy sand, 0 to 3 percent slopes	1.9	5.8%
304	Udorthents, loamy, very steep	0.1	0.2%
306	Udorthents-Urban land complex	5.7	17.2%
307	Urban land	1.4	4.2%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	9.5	28.8%
<b>Totals for Area of Interest</b>		<b>32.9</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## State of Connecticut

### 13—Walpole sandy loam, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2svkl

*Elevation:* 0 to 1,020 feet

*Mean annual precipitation:* 36 to 71 inches

*Mean annual air temperature:* 39 to 55 degrees F

*Frost-free period:* 140 to 250 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Walpole and similar soils:* 80 percent

*Minor components:* 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Walpole

##### Setting

*Landform:* Depressions, outwash plains, outwash terraces, depressions, deltas

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread, dip, talf

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Sandy glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

##### Typical profile

*Oe - 0 to 1 inches:* mucky peat

*A - 1 to 7 inches:* sandy loam

*Bg - 7 to 21 inches:* sandy loam

*BC - 21 to 25 inches:* gravelly sandy loam

*C - 25 to 65 inches:* very gravelly sand

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Poorly drained

*Runoff class:* Very high

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high  
(0.14 to 14.17 in/hr)

*Depth to water table:* About 0 to 4 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Moderate (about 6.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* B/D

*Ecological site:* F144AY028MA - Wet Outwash

*Hydric soil rating:* Yes

**Minor Components**

**Sudbury**

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, deltas, terraces  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Scarboro**

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, deltas, outwash terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**23A—Sudbury sandy loam, 0 to 5 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 9lkv  
*Elevation:* 0 to 1,200 feet  
*Mean annual precipitation:* 43 to 54 inches  
*Mean annual air temperature:* 45 to 55 degrees F  
*Frost-free period:* 140 to 185 days  
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Sudbury and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sudbury**

**Setting**

*Landform:* Terraces, outwash plains  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

**Typical profile**

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 5 inches:* sandy loam  
*Bw1 - 5 to 17 inches:* gravelly sandy loam  
*Bw2 - 17 to 25 inches:* sandy loam  
*2C - 25 to 60 inches:* stratified gravel to sand

**Properties and qualities**

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* About 18 to 36 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 4.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* B  
*Ecological site:* F144AY027MA - Moist Sandy Outwash  
*Hydric soil rating:* No

**Minor Components**

**Agawam**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Merrimac**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains, kames  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Ninigret**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

**Tisbury**

*Percent of map unit:* 3 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Walpole**

*Percent of map unit:* 2 percent  
*Landform:* Drainageways on terraces, depressions on terraces  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

### 36A—Windsor loamy sand, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2svkg

*Elevation:* 0 to 990 feet

*Mean annual precipitation:* 36 to 71 inches

*Mean annual air temperature:* 39 to 55 degrees F

*Frost-free period:* 140 to 240 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Windsor, loamy sand, and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Windsor, Loamy Sand

##### Setting

*Landform:* Outwash plains, outwash terraces, deltas, dunes

*Landform position (three-dimensional):* Tread, riser

*Down-slope shape:* Linear, convex

*Across-slope shape:* Linear, convex

*Parent material:* Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

##### Typical profile

*O - 0 to 1 inches:* moderately decomposed plant material

*A - 1 to 3 inches:* loamy sand

*Bw - 3 to 25 inches:* loamy sand

*C - 25 to 65 inches:* sand

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to very high (1.42 to 99.90 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 3.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2s

*Hydrologic Soil Group:* A

*Ecological site:* F144AY022MA - Dry Outwash

*Hydric soil rating:* No

**Minor Components**

**Deerfield, loamy sand**

*Percent of map unit:* 10 percent  
*Landform:* Deltas, terraces, outwash plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread, talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Hinckley, loamy sand**

*Percent of map unit:* 5 percent  
*Landform:* Deltas, kames, eskers, outwash plains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Head slope, nose slope, side slope, crest, rise  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex, linear  
*Hydric soil rating:* No

**304—Udorthents, loamy, very steep**

**Map Unit Setting**

*National map unit symbol:* 9lmd  
*Elevation:* 0 to 1,200 feet  
*Mean annual precipitation:* 37 to 52 inches  
*Mean annual air temperature:* 45 to 55 degrees F  
*Frost-free period:* 140 to 185 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Udorthents and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Udorthents**

**Setting**

*Landform:* Escarpments  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Parent material:* Glaciolacustrine deposits

**Typical profile**

*A - 0 to 5 inches:* loam  
*C1 - 5 to 21 inches:* gravelly loam  
*C2 - 21 to 80 inches:* very gravelly sandy loam



**Properties and qualities**

*Slope:* 25 to 70 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Very high  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)  
*Depth to water table:* About 54 to 72 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 6.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

**Minor Components**

**Shaker**

*Percent of map unit:* 3 percent  
*Landform:* Terraces, drainageways, depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Scitico**

*Percent of map unit:* 3 percent  
*Landform:* Terraces, drainageways, depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Maybid**

*Percent of map unit:* 2 percent  
*Landform:* Terraces, drainageways, depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Raynham**

*Percent of map unit:* 1 percent  
*Landform:* Drainageways, depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Unnamed, frequently flooded**

*Percent of map unit:* 1 percent  
*Landform:* Drainageways  
*Hydric soil rating:* Yes

### **306—Udorthents-Urban land complex**

#### **Map Unit Setting**

*National map unit symbol:* 9lmg  
*Elevation:* 0 to 2,000 feet  
*Mean annual precipitation:* 43 to 56 inches  
*Mean annual air temperature:* 45 to 55 degrees F  
*Frost-free period:* 120 to 185 days  
*Farmland classification:* Not prime farmland

#### **Map Unit Composition**

*Udorthents and similar soils:* 50 percent  
*Urban land:* 35 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Udorthents**

##### **Setting**

*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Parent material:* Drift

##### **Typical profile**

*A - 0 to 5 inches:* loam  
*C1 - 5 to 21 inches:* gravelly loam  
*C2 - 21 to 80 inches:* very gravelly sandy loam

##### **Properties and qualities**

*Slope:* 0 to 25 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)  
*Depth to water table:* About 54 to 72 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 6.8 inches)

##### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

#### **Description of Urban Land**

##### **Typical profile**

*H - 0 to 6 inches:* material

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

*Hydrologic Soil Group:* D

*Hydric soil rating:* Unranked

**Minor Components**

**Unnamed, undisturbed soils**

*Percent of map unit:* 8 percent

*Hydric soil rating:* No

**Udorthents, wet substratum**

*Percent of map unit:* 5 percent

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Hydric soil rating:* No

**Rock outcrop**

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

**307—Urban land**

**Map Unit Setting**

*National map unit symbol:* 9lmh

*Elevation:* 0 to 2,000 feet

*Mean annual precipitation:* 43 to 56 inches

*Mean annual air temperature:* 45 to 55 degrees F

*Frost-free period:* 120 to 185 days

*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Urban land:* 80 percent

*Minor components:* 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Urban Land**

**Typical profile**

*H - 0 to 6 inches:* material

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

*Hydrologic Soil Group:* D

*Hydric soil rating:* Unranked

**Minor Components**

**Udorthents, wet substratum**

*Percent of map unit:* 10 percent

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Hydric soil rating:* No

**Unnamed, undisturbed soils**

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

**701A—Ninigret fine sandy loam, 0 to 3 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2y07d

*Elevation:* 0 to 1,260 feet

*Mean annual precipitation:* 43 to 54 inches

*Mean annual air temperature:* 45 to 55 degrees F

*Frost-free period:* 140 to 185 days

*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Ninigret and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Ninigret**

**Setting**

*Landform:* Kame terraces, outwash plains, moraines, kames, outwash terraces

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Base slope, tread

*Down-slope shape:* Convex, linear

*Across-slope shape:* Convex, concave

*Parent material:* Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

**Typical profile**

*Ap - 0 to 8 inches:* fine sandy loam

*Bw1 - 8 to 16 inches:* fine sandy loam

*Bw2 - 16 to 26 inches:* fine sandy loam

*2C - 26 to 65 inches:* stratified loamy sand to loamy fine sand

**Properties and qualities**

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 18 to 38 inches to strongly contrasting textural stratification

*Drainage class:* Moderately well drained

*Runoff class:* Very low

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high  
(0.14 to 14.17 in/hr)

*Depth to water table:* About 17 to 39 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* C

*Ecological site:* F144AY026CT - Moist Silty Outwash

*Hydric soil rating:* No

### Minor Components

#### Merrimac

*Percent of map unit:* 5 percent

*Landform:* Outwash plains, outwash terraces, eskers, kames, moraines

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Side slope, crest, tread

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Agawam

*Percent of map unit:* 5 percent

*Landform:* Kame terraces, outwash plains, outwash terraces, moraines, kames

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Side slope, crest, tread

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Tisbury

*Percent of map unit:* 3 percent

*Landform:* Outwash terraces, valley trains, deltas, outwash plains

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* No

#### Raypol

*Percent of map unit:* 2 percent

*Landform:* Drainageways, depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

# **Soil Information for All Uses**

---

## **Soil Properties and Qualities**

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## **Soil Qualities and Features**

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

## **Hydrologic Soil Group**

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.

## Custom Soil Resource Report

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.

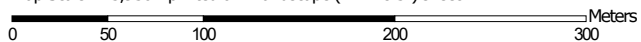
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

# Custom Soil Resource Report Map—Hydrologic Soil Group



Soil Map may not be valid at this scale.

Map Scale: 1:3,950 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



## Custom Soil Resource Report

### 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

 C  
 C/D  
 D  
 Not rated or not available


#### Water Features

 Streams and Canals

#### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

#### Background

 Aerial Photography

### MAP INFORMATION

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

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:  
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: State of Connecticut  
Survey Area Data: Version 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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

**Table—Hydrologic Soil Group**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
13	Walpole sandy loam, 0 to 3 percent slopes	B/D	10.6	32.3%
23A	Sudbury sandy loam, 0 to 5 percent slopes	B	3.7	11.4%
36A	Windsor loamy sand, 0 to 3 percent slopes	A	1.9	5.8%
304	Udorthents, loamy, very steep	B	0.1	0.2%
306	Udorthents-Urban land complex	B	5.7	17.2%
307	Urban land	D	1.4	4.2%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	9.5	28.8%
<b>Totals for Area of Interest</b>			<b>32.9</b>	<b>100.0%</b>

**Rating Options—Hydrologic Soil Group***Aggregation Method: Dominant Condition**Component Percent Cutoff: None Specified**Tie-break Rule: Higher*

# References

---

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_054262](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262)
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053577](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577)
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053580](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580)
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2\\_053374](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374)
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

## Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\\_054242](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242)

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)

**APPENDIX D**  
**NOAA Atlas 14 Rainfall Data**



**NOAA Atlas 14, Volume 10, Version 3**  
**Location name: South Windsor, Connecticut, USA\***  
**Latitude: 41.8547°, Longitude: -72.5879°**  
**Elevation: 82.29 ft\*\***  
 \* source: ESRI Maps  
 \*\* source: USGS



### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

### PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.338 (0.261-0.438)	0.409 (0.315-0.530)	0.525 (0.403-0.683)	0.621 (0.474-0.812)	0.753 (0.558-1.03)	0.853 (0.620-1.19)	0.957 (0.677-1.39)	1.07 (0.722-1.60)	1.24 (0.804-1.91)	1.38 (0.874-2.17)
10-min	0.479 (0.370-0.621)	0.580 (0.447-0.751)	0.744 (0.572-0.969)	0.880 (0.673-1.15)	1.07 (0.790-1.46)	1.21 (0.877-1.69)	1.36 (0.959-1.97)	1.52 (1.02-2.26)	1.76 (1.14-2.71)	1.96 (1.24-3.07)
15-min	0.564 (0.435-0.730)	0.682 (0.525-0.884)	0.875 (0.672-1.14)	1.03 (0.790-1.35)	1.25 (0.930-1.72)	1.42 (1.03-1.99)	1.59 (1.13-2.32)	1.79 (1.20-2.66)	2.07 (1.34-3.19)	2.30 (1.46-3.61)
30-min	0.757 (0.584-0.980)	0.918 (0.708-1.19)	1.18 (0.907-1.54)	1.40 (1.07-1.84)	1.70 (1.26-2.33)	1.93 (1.40-2.70)	2.17 (1.53-3.15)	2.44 (1.64-3.62)	2.82 (1.83-4.34)	3.13 (1.98-4.92)
60-min	0.950 (0.733-1.23)	1.16 (0.890-1.50)	1.49 (1.15-1.94)	1.77 (1.35-2.32)	2.15 (1.60-2.95)	2.44 (1.77-3.41)	2.74 (1.94-3.98)	3.08 (2.07-4.58)	3.57 (2.31-5.49)	3.97 (2.51-6.22)
2-hr	1.23 (0.952-1.58)	1.48 (1.15-1.91)	1.90 (1.47-2.46)	2.25 (1.73-2.93)	2.73 (2.04-3.72)	3.09 (2.26-4.31)	3.47 (2.48-5.04)	3.92 (2.64-5.78)	4.59 (2.98-7.01)	5.15 (3.27-8.03)
3-hr	1.41 (1.10-1.82)	1.71 (1.33-2.19)	2.19 (1.70-2.82)	2.59 (1.99-3.35)	3.14 (2.35-4.27)	3.54 (2.61-4.94)	3.98 (2.86-5.78)	4.51 (3.04-6.64)	5.32 (3.46-8.10)	6.00 (3.82-9.32)
6-hr	1.77 (1.39-2.26)	2.15 (1.68-2.75)	2.77 (2.16-3.55)	3.28 (2.54-4.23)	3.99 (3.00-5.40)	4.50 (3.34-6.26)	5.07 (3.67-7.35)	5.77 (3.91-8.44)	6.86 (4.47-10.4)	7.79 (4.97-12.0)
12-hr	2.17 (1.71-2.75)	2.66 (2.09-3.37)	3.46 (2.71-4.40)	4.12 (3.21-5.28)	5.03 (3.82-6.79)	5.71 (4.25-7.89)	6.44 (4.70-9.31)	7.36 (5.00-10.7)	8.80 (5.76-13.2)	10.0 (6.43-15.4)
24-hr	2.52 (2.00-3.18)	3.14 (2.48-3.96)	4.15 (3.27-5.25)	4.98 (3.90-6.35)	6.13 (4.68-8.24)	6.97 (5.23-9.61)	7.90 (5.81-11.4)	9.09 (6.20-13.1)	11.0 (7.21-16.4)	12.7 (8.12-19.3)
2-day	2.83 (2.25-3.55)	3.57 (2.84-4.48)	4.78 (3.79-6.02)	5.79 (4.56-7.33)	7.17 (5.51-9.62)	8.18 (6.19-11.3)	9.31 (6.91-13.5)	10.8 (7.39-15.5)	13.3 (8.72-19.7)	15.4 (9.94-23.4)
3-day	3.08 (2.46-3.85)	3.90 (3.11-4.87)	5.23 (4.16-6.56)	6.33 (5.01-7.99)	7.85 (6.06-10.5)	8.96 (6.80-12.3)	10.2 (7.61-14.7)	11.9 (8.12-17.0)	14.6 (9.62-21.6)	17.1 (11.0-25.7)
4-day	3.32 (2.66-4.13)	4.18 (3.35-5.22)	5.61 (4.47-7.02)	6.79 (5.38-8.54)	8.41 (6.50-11.2)	9.58 (7.29-13.1)	10.9 (8.15-15.7)	12.7 (8.70-18.1)	15.6 (10.3-23.0)	18.2 (11.8-27.4)
7-day	3.95 (3.18-4.90)	4.93 (3.97-6.13)	6.54 (5.24-8.15)	7.87 (6.27-9.86)	9.71 (7.53-12.9)	11.0 (8.42-15.0)	12.5 (9.37-17.9)	14.5 (9.99-20.6)	17.7 (11.7-26.0)	20.6 (13.3-30.8)
10-day	4.59 (3.71-5.68)	5.63 (4.54-6.97)	7.34 (5.89-9.11)	8.75 (6.99-10.9)	10.7 (8.31-14.1)	12.1 (9.24-16.4)	13.7 (10.2-19.4)	15.7 (10.9-22.3)	19.0 (12.6-27.8)	22.0 (14.2-32.7)
20-day	6.62 (5.37-8.13)	7.72 (6.26-9.49)	9.52 (7.70-11.8)	11.0 (8.85-13.7)	13.1 (10.2-17.0)	14.6 (11.1-19.4)	16.3 (12.1-22.5)	18.3 (12.7-25.6)	21.3 (14.2-30.9)	23.9 (15.6-35.4)
30-day	8.35 (6.80-10.2)	9.48 (7.71-11.6)	11.3 (9.18-13.9)	12.8 (10.4-15.9)	15.0 (11.6-19.3)	16.5 (12.6-21.7)	18.2 (13.4-24.8)	20.1 (14.0-28.0)	22.8 (15.3-32.9)	25.1 (16.3-36.9)
45-day	10.5 (8.61-12.8)	11.7 (9.55-14.3)	13.6 (11.1-16.7)	15.2 (12.3-18.7)	17.3 (13.5-22.1)	19.0 (14.5-24.7)	20.7 (15.2-27.8)	22.4 (15.7-31.1)	24.7 (16.6-35.5)	26.5 (17.3-38.9)
60-day	12.4 (10.1-15.1)	13.6 (11.1-16.5)	15.5 (12.7-19.0)	17.2 (13.9-21.1)	19.4 (15.2-24.6)	21.2 (16.1-27.4)	22.9 (16.7-30.4)	24.5 (17.2-33.8)	26.5 (17.8-37.9)	27.9 (18.3-40.9)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).  
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.  
 Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

### PF graphical



**NOAA Atlas 14, Volume 10, Version 3**  
**Location name: South Windsor, Connecticut, USA\***  
**Latitude: 41.8547°, Longitude: -72.5879°**  
**Elevation: 82.29 ft\*\***  
 \* source: ESRI Maps  
 \*\* source: USGS



### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

### PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.06 (3.13-5.26)	4.91 (3.78-6.36)	6.30 (4.84-8.20)	7.45 (5.69-9.74)	9.04 (6.70-12.4)	10.2 (7.44-14.3)	11.5 (8.12-16.7)	12.9 (8.66-19.2)	14.9 (9.65-23.0)	16.6 (10.5-26.0)
10-min	2.87 (2.22-3.73)	3.48 (2.68-4.51)	4.46 (3.43-5.81)	5.28 (4.04-6.91)	6.40 (4.74-8.76)	7.25 (5.26-10.1)	8.13 (5.75-11.8)	9.13 (6.13-13.6)	10.6 (6.83-16.2)	11.7 (7.43-18.4)
15-min	2.26 (1.74-2.92)	2.73 (2.10-3.54)	3.50 (2.69-4.55)	4.14 (3.16-5.42)	5.02 (3.72-6.87)	5.68 (4.13-7.94)	6.38 (4.51-9.26)	7.16 (4.81-10.6)	8.28 (5.36-12.7)	9.21 (5.83-14.5)
30-min	1.51 (1.17-1.96)	1.84 (1.42-2.38)	2.36 (1.81-3.08)	2.80 (2.14-3.67)	3.41 (2.52-4.66)	3.86 (2.81-5.40)	4.34 (3.07-6.30)	4.87 (3.27-7.23)	5.64 (3.65-8.68)	6.27 (3.97-9.84)
60-min	0.950 (0.733-1.23)	1.16 (0.890-1.50)	1.49 (1.15-1.94)	1.77 (1.35-2.32)	2.15 (1.60-2.95)	2.44 (1.77-3.41)	2.74 (1.94-3.98)	3.08 (2.07-4.58)	3.57 (2.31-5.49)	3.97 (2.51-6.22)
2-hr	0.614 (0.476-0.790)	0.742 (0.575-0.956)	0.952 (0.735-1.23)	1.13 (0.864-1.46)	1.36 (1.02-1.86)	1.54 (1.13-2.15)	1.73 (1.24-2.52)	1.96 (1.32-2.89)	2.29 (1.49-3.51)	2.58 (1.63-4.02)
3-hr	0.471 (0.367-0.604)	0.569 (0.442-0.731)	0.729 (0.564-0.939)	0.861 (0.664-1.12)	1.04 (0.782-1.42)	1.18 (0.868-1.64)	1.33 (0.953-1.93)	1.50 (1.01-2.21)	1.77 (1.15-2.70)	2.00 (1.27-3.11)
6-hr	0.296 (0.232-0.378)	0.359 (0.281-0.459)	0.462 (0.360-0.593)	0.548 (0.424-0.706)	0.665 (0.502-0.902)	0.752 (0.557-1.05)	0.847 (0.613-1.23)	0.964 (0.652-1.41)	1.15 (0.747-1.73)	1.30 (0.830-2.01)
12-hr	0.180 (0.142-0.228)	0.220 (0.173-0.280)	0.287 (0.225-0.365)	0.342 (0.267-0.438)	0.418 (0.317-0.564)	0.474 (0.353-0.655)	0.535 (0.390-0.773)	0.611 (0.415-0.888)	0.730 (0.478-1.10)	0.834 (0.534-1.28)
24-hr	0.105 (0.083-0.133)	0.131 (0.103-0.165)	0.173 (0.136-0.219)	0.208 (0.163-0.264)	0.256 (0.195-0.343)	0.291 (0.218-0.401)	0.329 (0.242-0.475)	0.379 (0.258-0.548)	0.458 (0.300-0.685)	0.527 (0.338-0.803)
2-day	0.059 (0.047-0.074)	0.074 (0.059-0.093)	0.100 (0.079-0.125)	0.121 (0.095-0.153)	0.149 (0.115-0.200)	0.170 (0.129-0.235)	0.194 (0.144-0.280)	0.225 (0.154-0.323)	0.276 (0.182-0.410)	0.322 (0.207-0.487)
3-day	0.043 (0.034-0.054)	0.054 (0.043-0.068)	0.073 (0.058-0.091)	0.088 (0.070-0.111)	0.109 (0.084-0.146)	0.124 (0.094-0.171)	0.142 (0.106-0.204)	0.165 (0.113-0.236)	0.203 (0.134-0.300)	0.237 (0.153-0.357)
4-day	0.035 (0.028-0.043)	0.044 (0.035-0.054)	0.058 (0.047-0.073)	0.071 (0.056-0.089)	0.088 (0.068-0.117)	0.100 (0.076-0.137)	0.114 (0.085-0.164)	0.132 (0.091-0.189)	0.163 (0.107-0.240)	0.190 (0.123-0.285)
7-day	0.024 (0.019-0.029)	0.029 (0.024-0.036)	0.039 (0.031-0.048)	0.047 (0.037-0.059)	0.058 (0.045-0.077)	0.066 (0.050-0.089)	0.075 (0.056-0.106)	0.086 (0.059-0.123)	0.106 (0.070-0.155)	0.123 (0.079-0.183)
10-day	0.019 (0.015-0.024)	0.023 (0.019-0.029)	0.031 (0.025-0.038)	0.036 (0.029-0.046)	0.045 (0.035-0.059)	0.050 (0.039-0.068)	0.057 (0.043-0.081)	0.066 (0.045-0.093)	0.079 (0.053-0.116)	0.091 (0.059-0.136)
20-day	0.014 (0.011-0.017)	0.016 (0.013-0.020)	0.020 (0.016-0.024)	0.023 (0.018-0.028)	0.027 (0.021-0.035)	0.030 (0.023-0.040)	0.034 (0.025-0.047)	0.038 (0.026-0.053)	0.044 (0.030-0.064)	0.050 (0.032-0.074)
30-day	0.012 (0.009-0.014)	0.013 (0.011-0.016)	0.016 (0.013-0.019)	0.018 (0.014-0.022)	0.021 (0.016-0.027)	0.023 (0.017-0.030)	0.025 (0.019-0.034)	0.028 (0.019-0.039)	0.032 (0.021-0.046)	0.035 (0.023-0.051)
45-day	0.010 (0.008-0.012)	0.011 (0.009-0.013)	0.013 (0.010-0.015)	0.014 (0.011-0.017)	0.016 (0.013-0.020)	0.018 (0.013-0.023)	0.019 (0.014-0.026)	0.021 (0.015-0.029)	0.023 (0.015-0.033)	0.025 (0.016-0.036)
60-day	0.009 (0.007-0.010)	0.009 (0.008-0.011)	0.011 (0.009-0.013)	0.012 (0.010-0.015)	0.013 (0.011-0.017)	0.015 (0.011-0.019)	0.016 (0.012-0.021)	0.017 (0.012-0.024)	0.018 (0.012-0.026)	0.019 (0.013-0.028)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

### PF graphical

**APPENDIX E**  
**Storm Sewer Analysis**



**Subbasin Summary**

Subbasin ID	Area	Weighted Runoff Coefficient	Total Rainfall	Total Runoff	Total Runoff	Peak Runoff	Time of Concentration
	(ac)		(in)	(in)	Volume (ac-in)	(cfs)	(days hh:mm:ss)
Sub-CB-01	0.20	0.6100	0.73	0.44	0.09	0.76	0 00:07:00
Sub-CB-02	0.17	0.7700	0.68	0.52	0.09	0.86	0 00:06:00
Sub-CB-03	0.11	0.7900	0.68	0.53	0.06	0.58	0 00:06:00
Sub-CB-04	0.27	0.8100	0.68	0.55	0.15	1.46	0 00:06:00
Sub-CB-05	0.30	0.8100	0.68	0.55	0.16	1.63	0 00:06:00
Sub-CB-06	0.31	0.8100	0.68	0.55	0.17	1.72	0 00:06:00
Sub-CB-09 (DEEP SUMP)	0.21	0.9000	0.68	0.61	0.13	1.29	0 00:06:00
Sub-CB-10 (DEEP SUMP)	0.06	0.9000	0.68	0.61	0.04	0.37	0 00:06:00
Sub-CB-11 (DEEP SUMP)	0.32	0.9000	0.68	0.61	0.20	1.97	0 00:06:00
Sub-DMH-07(ROOF)	1.33	0.9000	0.68	0.61	0.81	8.09	0 00:06:00
Sub-DMH-09(ROOF)	1.28	0.9000	0.68	0.61	0.78	7.79	0 00:06:00
Sub-DMH-11(ROOF)	1.71	0.9000	0.68	0.61	1.04	10.40	0 00:06:00
Sub-DMH-13(ROOF)	1.24	0.9000	0.68	0.61	0.75	7.54	0 00:06:00
Sub-S.DRAIN-01	0.13	0.7600	0.68	0.51	0.07	0.67	0 00:06:00
Sub-S.DRAIN-02	0.12	0.8200	0.68	0.55	0.07	0.67	0 00:06:00
Sub-YD-01	0.17	0.2500	0.77	0.19	0.03	0.25	0 00:08:00
Sub-YD-02	0.12	0.2500	0.77	0.19	0.02	0.17	0 00:08:00
Sub-YD-03	0.16	0.2500	0.77	0.19	0.03	0.23	0 00:08:00
Sub-YD-04	0.16	0.2500	0.77	0.19	0.03	0.24	0 00:08:00
Sub-YD-05	0.13	0.2500	0.77	0.19	0.03	0.19	0 00:08:00
Sub-YD-06	0.17	0.2500	0.77	0.19	0.03	0.24	0 00:08:00
Sub-YD-07	0.06	0.2500	0.77	0.19	0.01	0.09	0 00:08:00
Sub-YD-08	0.16	0.2500	0.77	0.19	0.03	0.24	0 00:08:00
Sub-YD-09	0.14	0.2500	0.77	0.19	0.03	0.21	0 00:08:00
Sub-YD-10	0.16	0.2500	0.77	0.19	0.03	0.23	0 00:08:00
Sub-YD-11	0.13	0.2500	0.77	0.19	0.03	0.20	0 00:08:00
Sub-YD-12	0.08	0.3200	0.68	0.22	0.02	0.17	0 00:06:00
Sub-YD-13	0.10	0.3000	0.68	0.20	0.02	0.20	0 00:06:00
Sub-YD-14	0.08	0.2500	0.77	0.19	0.02	0.11	0 00:08:00
Sub-YD-15	0.36	0.2500	0.68	0.17	0.06	0.62	0 00:06:00

## Link Summary

From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity
		(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)
SLOTTED DRAIN TRANSITION TO CB-08	CB-08	6.04	83.68	82.83	14.0800	12.000	0.0120	0.65	14.48
SLOTTED DRAIN TRANSITION TO CB-07	CB-07	3.89	85.25	84.27	25.2000	12.000	0.0120	0.65	19.37
CB-09 (DEEP SUMP)	CB-10 (DEEP SUMP)	92.15	81.46	81.00	0.5000	15.000	0.0120	1.26	4.95
CB-11 (DEEP SUMP)	CB-10 (DEEP SUMP)	83.83	81.20	80.78	0.5000	15.000	0.0120	1.92	4.95
CB-04	DMH-02	21.51	86.61	85.97	2.9800	12.000	0.0120	1.45	6.66
CB-05	DMH-03	21.33	86.61	85.97	3.0000	12.000	0.0120	1.62	6.69
CB-06	DMH-04	21.35	86.61	85.97	3.0000	12.000	0.0120	1.71	6.68
CB-02	CB-03	135.00	87.00	86.33	0.5000	12.000	0.0120	0.83	2.72
YD-15	CB-01	56.00	80.80	80.51	0.5200	12.000	0.0120	0.61	2.78
YD-06	UGC-A14	19.56	80.80	80.04	3.8900	12.000	0.0120	0.24	7.61
SD-02	SLOTTED DRAIN TRANSITION TO CB-08	28.28	84.00	83.68	1.1300	12.000	0.0120	0.65	4.11
CB-03	UGC-E01	76.50	86.33	85.95	0.5000	12.000	0.0120	1.35	2.72
SD-01	SLOTTED DRAIN TRANSITION TO CB-07	22.82	85.50	85.25	1.1000	12.000	0.0120	0.66	4.04
YD-01	UGC-A01	11.96	80.64	80.04	5.0000	12.000	0.0120	0.24	8.63
YD-02	UGC-A03	3.56	81.28	80.04	34.8300	12.000	0.0120	0.17	22.78
YD-03	UGC-A05	3.56	81.28	80.04	34.8300	12.000	0.0120	0.23	22.78
CB-07	DMH-01 (24 PLASTIC)	12.11	83.97	83.91	0.5000	12.000	0.0120	0.65	2.73
DMH-01 (24 PLASTIC)	UGC-A07	3.56	81.28	80.04	34.8300	12.000	0.0120	0.65	22.78
YD-04	UGC-A09	3.57	81.28	80.04	34.7800	12.000	0.0120	0.24	22.76
YD-05	UGC-A11	3.57	81.28	80.04	34.7800	12.000	0.0120	0.19	22.76
CB-08	DMH-02 (24 PLASTIC)	12.67	82.83	82.77	0.5000	12.000	0.0120	0.64	2.73
DMH-02 (24 PLASTIC)	UGC-A12	3.35	81.28	80.04	37.0100	12.000	0.0120	0.64	23.48
YD-07	UGC-B01	3.00	80.32	80.30	0.6200	12.000	0.0120	0.09	3.04
CB-01	UGC-B10	19.00	80.41	80.30	0.5800	12.000	0.0120	1.30	2.94
YD-08	UGC-B03	3.00	81.60	80.30	43.3300	12.000	0.0120	0.24	25.41
YD-09	UGC-B05	3.00	81.60	80.30	43.3300	12.000	0.0120	0.21	25.41
YD-10	UGC-B07	3.00	81.60	80.30	43.3300	12.000	0.0120	0.23	25.41
YD-11	UGC-B09	3.00	81.60	80.30	43.3300	12.000	0.0120	0.19	25.41
YD-14	DMH-11 (24 PLASTIC)	4.00	88.80	88.77	0.7100	12.000	0.0120	0.11	3.25
YD-12	UGC-C01	3.00	83.90	83.88	0.5900	12.000	0.0120	0.17	2.97
YD-13	UGC-C03	3.00	85.22	83.88	44.6700	12.000	0.0120	0.20	25.80
DMH-11 (24 PLASTIC)	UGC-C05	3.00	85.22	83.88	44.6700	12.000	0.0120	0.11	25.80
DMH-02	UGC-E03	3.56	85.97	85.95	0.5600	12.000	0.0120	1.44	2.89
CB-10 (DEEP SUMP)	FE-06	17.00	80.59	80.50	0.5300	15.000	0.0130	3.49	4.70
DMH-13	DMH-12	55.00	85.80	84.63	2.1300	15.000	0.0120	7.50	10.21
DMH-11	DMH-10	55.00	85.80	84.63	2.1300	15.000	0.0120	10.39	10.21
DMH-09	DMH-08	55.00	85.80	84.63	2.1300	15.000	0.0120	7.73	10.21
DMH-07	DMH-06	55.00	85.80	84.63	2.1300	15.000	0.0120	8.01	10.21

Peak Flow    Peak Flow    Total Time  
 Velocity      Depth    Surcharged

(ft/sec)	(ft)	(min)
2.40	0.38	0.00
4.74	0.23	0.00
2.24	0.58	0.00
2.30	0.80	0.00
3.57	0.53	0.00
5.81	0.39	0.00
5.87	0.40	0.00
2.31	0.47	0.00
2.05	0.40	0.00
4.09	0.13	0.00
2.46	0.37	0.00
3.22	0.53	0.00
2.56	0.36	0.00
4.32	0.12	0.00
7.12	0.07	0.00
7.62	0.08	0.00
2.45	0.37	0.00
9.00	0.15	0.00
7.65	0.08	0.00
7.28	0.07	0.00
2.45	0.37	0.00
9.06	0.15	0.00
1.47	0.13	0.00
3.12	0.52	0.00
8.09	0.08	0.00
7.85	0.07	0.00
8.01	0.08	0.00
7.74	0.07	0.00
1.67	0.14	0.00
1.72	0.18	0.00
7.87	0.07	0.00
6.97	0.05	0.00
3.03	0.58	0.00
3.12	1.07	0.00
7.60	0.94	0.00
8.71	1.25	0.00
7.62	0.97	0.00
7.64	1.01	0.00

**Junction Input**

Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)
CB-01	80.41	84.04
CB-02	87.00	89.45
CB-03	86.33	89.63
CB-04	86.61	89.05
CB-05	86.61	89.05
CB-06	86.61	89.05
CB-07	83.97	86.77
CB-08	82.83	85.33
CB-09 (DEEP SUMP)	81.46	84.16
CB-10 (DEEP SUMP)	80.59	84.09
CB-11 (DEEP SUMP)	81.20	83.90
DMH-01 (24 PLASTIC)	80.06	86.01
DMH-02	85.97	90.14
DMH-02 (24 PLASTIC)	81.28	86.07
DMH-07	85.80	89.13
DMH-09	85.80	89.13
DMH-11	85.80	89.13
DMH-11 (24 PLASTIC)	85.22	92.50
DMH-13	85.80	89.13
SD-01	85.50	85.36
SD-02	84.00	84.29
SLOTTED DRAIN TRANSITION TO CB-08	83.68	84.22
SLOTTED DRAIN TRANSITION TO CB-07	85.25	89.55
YD-01	80.64	84.60
YD-02	81.28	85.00
YD-03	80.06	85.00
YD-04	80.06	85.00
YD-05	80.06	85.00
YD-06	80.80	83.00
YD-07	80.32	83.80
YD-08	80.32	83.80
YD-09	81.60	83.80
YD-10	80.32	83.80
YD-11	80.32	83.80
YD-12	83.90	91.00
YD-13	83.90	91.00
YD-14	88.80	91.00
YD-15	80.80	83.00

**Junction Results**

Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Min Freeboard Attained	Time of Max HGL Occurrence
	(cfs)	(cfs)	(ft)	(ft)	(days hh:mm)
CB-01	1.30	0.76	80.99	3.05	0 00:07
CB-02	0.86	0.86	87.38	2.07	0 00:06
CB-03	1.39	0.58	86.89	2.74	0 00:06
CB-04	1.46	1.46	87.01	2.04	0 00:06
CB-05	1.63	1.63	87.05	2.00	0 00:06
CB-06	1.72	1.72	87.06	1.99	0 00:06
CB-07	0.65	0.00	84.38	2.39	0 00:06
CB-08	0.65	0.00	83.24	2.09	0 00:06
CB-09 (DEEP SUMP)	1.29	1.29	81.90	2.26	0 00:06
CB-10 (DEEP SUMP)	3.53	0.37	81.73	2.36	0 00:06
CB-11 (DEEP SUMP)	1.97	1.97	81.86	2.04	0 00:06
DMH-01 (24 PLASTIC)	0.65	0.00	81.46	4.55	0 00:06
DMH-02	1.45	0.00	86.64	3.50	0 00:06
DMH-02 (24 PLASTIC)	0.64	0.00	81.46	4.61	0 00:06
DMH-07	8.09	8.09	87.00	2.13	0 00:06
DMH-09	7.78	7.78	86.93	2.20	0 00:06
DMH-11	10.40	10.40	88.37	0.76	0 00:05
DMH-11 (24 PLASTIC)	0.11	0.00	85.28	7.22	0 00:08
DMH-13	7.54	7.54	86.89	2.24	0 00:06
SD-01	0.67	0.67	85.89	0.61	0 00:06
SD-02	0.66	0.66	84.39	0.61	0 00:06
SLOTTED DRAIN TRANSITION TO CB-08	0.65	0.00	84.04	0.64	0 00:06
SLOTTED DRAIN TRANSITION TO CB-07	0.66	0.00	85.59	3.96	0 00:06
YD-01	0.25	0.25	80.77	3.83	0 00:08
YD-02	0.17	0.17	81.36	3.64	0 00:08
YD-03	0.23	0.23	81.37	3.63	0 00:08
YD-04	0.24	0.24	81.37	3.63	0 00:08
YD-05	0.19	0.19	81.36	3.64	0 00:08
YD-06	0.24	0.24	80.94	2.06	0 00:08
YD-07	0.09	0.09	80.46	3.34	0 00:08
YD-08	0.24	0.24	81.69	2.11	0 00:08
YD-09	0.21	0.21	81.68	2.12	0 00:08
YD-10	0.23	0.23	81.69	2.11	0 00:08
YD-11	0.19	0.19	81.68	2.12	0 00:08
YD-12	0.17	0.17	84.10	6.90	0 00:06
YD-13	0.20	0.20	85.30	5.70	0 00:06
YD-14	0.11	0.11	88.95	2.05	0 00:08
YD-15	0.62	0.62	81.14	1.86	0 00:06

**APPENDIX F**  
**Water Quality Volume**

**67 Kennedy Road – DPI Project No.:4670**

April 20, 2022

**Water Quality Volume Calculations**

Per 2004 Connecticut Stormwater Quality Manual, Section 7.4.1:

Areas for Calculation: Drainage Area P9 to North Basin

	P9
Impervious	0.65
Pervious	0.37
Total Area	1.02
% Impervious	63.74%

Water Quality Volume (WQV) = (1") (R)(A)/12, where:

R = unitless volumetric runoff coefficient =  $0.05 + 0.009(I)$ , where:

I = percent impervious cover of drainage area = 63.74%

$R = 0.05 + 0.009(I)$

$R = 0.05 + 0.009(63.74)$

$R = \underline{0.624}$

A = drainage area in acres = 1.02 acres

$WQV = (1'')(R)(A \text{ acres})/12 \text{ inches per foot}$

$WQV = (1'')(0.624)(1.02 \text{ acres})/12 \text{ inches per foot}$

**$WQV = \underline{0.053} \text{ acre-feet required} = 2,310.42 \text{ cft}$**

**Proposed BMP**

The proposed North Water Quality Basin will provide **30,046 cft** (below basin outlet FE-04 @ Elev. 83.40). The proposed wet pool of the water quality basin will provide more than 100% of the water quality volume for the area drainage to it. Water quality basin stage storage reports are included as a part of this appendix.

**67 Kennedy Road – DPI Project No.:4670**

April 20, 2022

**Water Quality Volume Calculations**

Per 2004 Connecticut Stormwater Quality Manual, Section 7.4.1:

Areas for Calculation: Drainage Area P6 to West Basin

	P6
Impervious	4.06
Pervious	0.62
Total Area	4.68
% Impervious	86.82%

Water Quality Volume (WQV) = (1") (R)(A)/12, where:

R = unitless volumetric runoff coefficient =  $0.05 + 0.009(I)$ , where:

I = percent impervious cover of drainage area = 86.82%

$R = 0.05 + 0.009(I)$

$R = 0.05 + 0.009(86.82)$

$R = \underline{0.831}$

A = drainage area in acres = 4.68 acres

$WQV = (1'')(R)(A \text{ acres})/12 \text{ inches per foot}$

$WQV = (1'')(0.831)(4.68 \text{ acres})/12 \text{ inches per foot}$

**$WQV = \underline{0.324} \text{ acre-feet required} = 14,113.44 \text{ cft}$**

**Proposed BMP**

The proposed West Water Quality Basin will provide **59,237 cft** (below basin outlet FE-01 @ Elev. 83.50). The proposed wet pool of the water quality basin will provide more than 100% of the water quality volume for the area drainage to it. Water quality basin stage storage reports are included as a part of this appendix.



NORTH BASIN WQV STAGE STORAGE TABLE						
ELEV	AREA (sq. ft.)	DEPT H (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
80.00	6,470.57	N/A	N/A	0.00	N/A	0.00
81.00	7,691.22	1.00	7080.90	7080.90	7072.11	7072.11
82.00	9,006.34	1.00	8348.78	15429.68	8340.14	15412.25
83.00	10,432.26	1.00	9719.30	25148.97	9710.57	25122.82
83.40	14,284.79	0.40	4943.41	30092.38	4923.27	30046.09

WEST BASIN WQV STAGE STORAGE TABLE						
ELEV	AREA (sq. ft.)	DEPT H (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
81.00	17,089.46	N/A	N/A	0.00	N/A	0.00
82.00	21,605.71	1.00	19347.59	19347.59	19303.51	19303.51
83.00	26,250.26	1.00	23927.99	43275.57	23890.34	43193.84
83.50	38,302.72	0.50	16138.25	59413.82	16043.65	59237.50

## **67 Kennedy Road – DPI Project No.:4670**

April 20, 2022

### **Water Quality Flow Calculations**

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi<sup>2</sup>/inch) per Exhibit 4-III

A = drainage area (mi<sup>2</sup>)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

### **ISOLATION ROW-1 (P12 to UGC-A)**

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

7 mins = 0.12 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 74

Ia = 0.703 inches

Design Precipitation (P) = **1"**

Ia/P = 0.703

Unit Peak Discharge qu = 200 cfs/mi<sup>2</sup>/inch

Drainage Area A = 50,556 sf = 1.16 acres = 0.0018 mi<sup>2</sup>

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (3.10") (R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 17.93%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(17.93)

R = 0.211

A = drainage area in acres = 1.16 acres

WQV = (1.0 in)(R)(A)/12

WQV = (1.0 in)(0.211)(1.16 acres) / 12 in/ft

WQV = 0.020 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.020 acre-feet x 12 in/ft) / 1.16 acres

Q = 0.206 in

WQF = qu x A x Q

WQF = 200 cfs/mi<sup>2</sup>/inch x 0.0018 mi<sup>2</sup> x 0.206 in

WQF = **0.074 cfs required**

### **Proposed**

The proposed **8** chamber **SC-740** Stormtech Isolator row (@ **0.15 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.074 cfs** water quality flow. The current design plan will provide **1.20 cfs** of WQF. See isolator row sizing chart included in the appendix.

## **67 Kennedy Road – DPI Project No.:4670**

April 20, 2022

### **Water Quality Flow Calculations**

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi<sup>2</sup>/inch) per Exhibit 4-III

A = drainage area (mi<sup>2</sup>)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

### **ISOLATION ROW-2 (P1 to UGC-B)**

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

7 mins = 0.12 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 65

Ia = 1.077 inches

Design Precipitation (P) = **1"**

Ia/P = 1.077

Unit Peak Discharge qu = 140 cfs/mi<sup>2</sup>/inch

Drainage Area A = 53,290 sf = 1.22 acres = 0.0019 mi<sup>2</sup>

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (3.10") (R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 8.92%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(8.92)

R = 0.130

A = drainage area in acres = 1.22 acres

WQV = (1.0 in)(R)(A)/12

WQV = (1.0 in)(0.130)(1.22 acres) / 12 in/ft

WQV = 0.013 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.013 acre-feet x 12 in/ft) / 1.22 acres

Q = 0.128 in

WQF = qu x A x Q

WQF = 140 cfs/mi<sup>2</sup>/inch x 0.0019 mi<sup>2</sup> x 0.128 in

WQF = **0.034 cfs required**

### **Proposed**

The proposed **7** chamber **SC-310** Stormtech Isolator row (@ **0.11 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.074 cfs** water quality flow. The current design plan will provide **0.77 cfs** of WQF. See isolator row sizing chart included in the appendix.

## **67 Kennedy Road – DPI Project No.:4670**

April 20, 2022

### **Water Quality Flow Calculations**

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi<sup>2</sup>/inch) per Exhibit 4-III

A = drainage area (mi<sup>2</sup>)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

### **ISOLATION ROW-3 (P13 to UGC-C)**

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

7 mins = 0.12 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 63

Ia = 1.175 inches

Design Precipitation (P) = **1"**

Ia/P = 1.175

Unit Peak Discharge qu = 130 cfs/mi<sup>2</sup>/inch

Drainage Area A = 11,086 sf = 0.25 acres = 0.0004 mi<sup>2</sup>

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (3.10") (R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 6.38%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(6.38)

R = 0.107

A = drainage area in acres = 0.25 acres

WQV = (1.0 in)(R)(A)/12

WQV = (1.0 in)(0.107)(0.25 acres) / 12 in/ft

WQV = 0.002 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.002 acre-feet x 12 in/ft) / 0.25 acres

Q = 0.096 in

WQF = qu x A x Q

WQF = 130 cfs/mi<sup>2</sup>/inch x 0.0004 mi<sup>2</sup> x 0.096 in

WQF = **0.049 cfs required**

### **Proposed**

The proposed 7 chamber SC-310 Stormtech Isolator row (@ **0.11 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.049 cfs** water quality flow. The current design plan will provide **0.77 cfs** of WQF. See isolator row sizing chart included in the appendix.

## **67 Kennedy Road – DPI Project No.:4670**

April 20, 2022

### **Water Quality Flow Calculations**

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi<sup>2</sup>/inch) per Exhibit 4-III

A = drainage area (mi<sup>2</sup>)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

### **ISOLATION ROW-4 (P10 to UGC-E)**

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.10 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 93

Ia = 0.151 inches

Design Precipitation (P) = **1"**

Ia/P = 0.151

Unit Peak Discharge qu = 645 cfs/mi<sup>2</sup>/inch

Drainage Area A = 50,163 sf = 1.15 acres = 0.0018 mi<sup>2</sup>

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (3.10") (R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 84.49%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(84.49)

R = 0.810

A = drainage area in acres = 1.15 acres

WQV = (1.0 in)(R)(A)/12

WQV = (1.0 in)(0.810)(1.15 acres) / 12 in/ft

WQV = 0.078 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.078 acre-feet x 12 in/ft) / 1.15 acres

Q = 0.814 in

WQF = qu x A x Q

WQF = 645 cfs/mi<sup>2</sup>/inch x 0.0018 mi<sup>2</sup> x 0.814 in

WQF = **0.945 cfs required**

### **Proposed**

The proposed **10** chamber **SC-310** Stormtech Isolator row (@ **0.11 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.945 cfs** water quality flow. The current design plan will provide **1.10 cfs** of WQF. See isolator row sizing chart included in the appendix.

**APPENDIX G**  
**Drainage Area Maps**

REFERENCES:  
THIS PLAN REFERS TO THE FOLLOWING:  
1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, 67 KENNEDY ROAD & 352 SULLIVAN AVENUE, SOUTH WINDSOR, CONNECTICUT" DATED 9/20/2021, PREPARED BY DESIGN PROFESSIONALS, INC.

DESIGN POINT 1  
18" CORRUGATED METAL PIPE  
FROM EXISTING POND IN RAIL ROAD R.O.W.

EP2 OUTLET  
18" ACCMP  
ELEV.=79.60±

DESIGN POINT 2  
FLOW ACROSS NORTH  
WEST PROPERTY CORNER

DESIGN POINT 3  
TO SULLIVAN AVE VIA 330  
SULLIVAN AVE SUBSURFACE  
STORMWATER CONVEYANCE  
SYSTEM

EP1 SPILLWAY  
ELEV.=82.88±

DESIGN POINT 4  
FLOW TO KENNEDY ROAD  
DRAINAGE SYSTEM

67 KENNEDY ROAD  
WAREHOUSE &  
DISTRIBUTION CENTER  
352 SULLIVAN AVENUE, 67 & 68 KENNEDY ROAD  
SOUTH WINDSOR, CONNECTICUT 06074  
GIS NOS: 87300352, 49800067, & 49800068

NO.	DATE	REVISIONS	BY

EXISTING  
DRAINAGE MAP

SCALE: 0 30' 60' 120'  
1" = 60'

SHEET 1 OF 24

PREPARED FOR:  
Scannell Properties #644, LLC  
294 Grove Lane East  
Suite 140  
Wayzata, MN 55391  
763-331-8851 T

PROJECT NO:  
4670  
DATE:  
3/30/2022  
DESIGNED BY:  
DHL/BPW  
CHECKED BY:  
CJ/DEN  
CADD BY:  
CJ/DEN

DESIGN PROFESSIONALS, INC.  
21 JEFFREY DRIVE  
P.O. BOX 167  
SOUTH WINDSOR, CT 06074  
860-291-8727 - F  
www.designprofessionalsinc.com  
CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS  
PLANNERS / LANDSCAPE ARCHITECTS



REFERENCES:  
THIS PLAN REFERS TO THE FOLLOWING:  
1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, 67 KENNEDY ROAD & 352 SULLIVAN AVENUE, SOUTH WINDSOR, CONNECTICUT" DATED 9/20/2021, PREPARED BY DESIGN PROFESSIONALS, INC.

DESIGN POINT 1  
18" CORRUGATED METAL PIPE  
FROM EXISTING POND IN RAIL ROAD R.O.W.

DESIGN POINT 2  
FLOW ACROSS NORTH  
WEST PROPERTY CORNER

DESIGN POINT 3  
TO SULLIVAN AVE VIA 330  
SULLIVAN AVE SUBSURFACE  
STORMWATER CONVEYANCE  
SYSTEM

DESIGN POINT 4  
FLOW TO KENNEDY ROAD  
DRAINAGE SYSTEM

WETLANDS CREATION AREA  
TEST PIT DATA  
TP #1 MOTTLE @ 16"  
OW @ 24"  
TP #2 MOTTLE @ 16"  
OW @ 24"  
TP #3 MOTTLE @ 14"  
OW @ 22"  
EXISTING TREE NOTES  
MATURE TREES TO BE  
PROTECTED DURING GRADING.  
CONTRACTOR SHALL  
COORDINATE WITH ALL POINTS  
FOR TREE PROTECTION.  
TREES TO BE PROTECTED:  
1. 14" RED MAPLE  
2. 14" RED MAPLE  
3. 11" RED MAPLE  
4. 11" RED MAPLE  
5. 20" RED OAK  
6. 8" BLACK GUM  
7. 10" BLACK GUM

PROPOSED  
DRAINAGE MAP

REVISIONS

NO.	DATE	BY	REVISIONS
1	4/7/22	DHJ	EAS PLAN UPDATES
2	4/20/22	DHJ	P2C SUBMISSION

SCALE: 0 30' 60' 120'  
1" = 60'

SHEET 1 OF 24

C-DA2

67 KENNEDY ROAD  
WAREHOUSE &  
DISTRIBUTION CENTER

352 SULLIVAN AVENUE, 67 & 68 KENNEDY ROAD  
SOUTH WINDSOR, CONNECTICUT 06074  
GIS NOs: 87300352, 49800067, & 49800068

PREPARED FOR  
Scannell Properties #644, LLC  
294 Grove Lane East  
Suite 140  
Wayzata, MN 55391  
763-331-8851 T

PROJECT NO.  
4670

DATE  
3/30/2022

DESIGNED BY  
DHJ/BPW

DRAWN BY  
CJDA/DPW

CHECKED BY  
CJDA/DPW

design  
professionals

CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS  
PLANNERS / LANDSCAPE ARCHITECTS

21 JEFFREY DRIVE  
P.O. BOX 167  
SOUTH WINDSOR, CT 06074  
860-291-8737 - F  
860-291-8737 - M  
www.designprofessionalsinc.com