

**Stormwater Management Report  
25 Talbot Lane  
5 & 25 Talbot Lane and  
475 & 551 Governor's Highway  
South Windsor, Connecticut**

Prepared by:

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

**July 2, 2021  
Revised to: October 15, 2021**



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## **Introduction**

UW Vintage Lane II, LLC is proposing an industrial development of a tract of land comprised of four properties located at 5 & 25 Talbot Lane and 475 & 551 Governor's Highway, South Windsor, Connecticut. The properties are referenced on the Town of South Windsor Tax Assessors map as GIS#: 88900005, 88900025, 36900475 and 36900551, respectively. The proposed development will include the construction of one 359,640 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 30.37 acres. 27.1± acres of this area are proposed to be disturbed during construction. For more information, please refer to the plans entitled "25 Talbot Lane ~ Site Plan Application ~ 5 & 25 Talbot Lane and 475 & 551 Governor's Highway ~ South Windsor, Ct ~ GIS#: 88900005, 88900025, 36900475 and 36900551" prepared by Design Professionals, Inc., and dated July 02, 2021, as amended.

## **Pre-Development Site Conditions**

The existing surficial characteristics of the area to be developed can be primarily classified as undisturbed woodland area with industrial development to the west and residential properties to south and east. The northern property line along Governors Highway forms the drainage divide for storm water that falls within the ROW. No runoff from the site flows to the Governors Highway drainage system directly. Review of the site topography indicated 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 stilling basin @ SW corner of property. Conveying water through Carla's Pasta (50 Talbot Lane) via a 36" HDPE culvert.
2. **Design Point 2 (DP#2):** Existing outlet structure with 24" RCP culvert outlet to the Cody Circle subsurface drainage system.
3. **Design Point 3 (DP#3):** Sheet flow runoff across the SE Property corner.
4. **Design Point 4 (DP#4):** Existing outlet structure with 15" RCP culvert outlet to Temple Beth Hillel's drainage system (20 Baker Lane).

DP#1 ultimately drains to The Newbury Brook, and is a part of local basin ID 4000-21-1. DP#2 - 4 ultimately drain to The Podunk River, and is a part of local basin ID 4004-00-2-R1. Existing conditions watershed delineations are identified in the Existing Conditions Drainage Map located in **Appendix F**.

Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, soils types C, A/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. 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 359,640 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 collected in an underground storm water conveyance system. This conveyance system will be comprised of a series of catchbasins connected with culverts and an underground stormwater chamber system. All first flush stormwater will either be directed to proposed isolation rows within the underground chamber system, or the forebay within the proposed water quality basin for treatment.

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 F**.

### **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 – Existing Stilling Basin       | Pre  | 2.39   | 8.67    | 13.43   | 17.21   | 21.61    |
|                                      | Post | 2.31   | 8.64    | 13.20   | 17.1    | 21.33    |
| DP#2 – 24" RCP To Cody Circle        | Pre  | 2.85   | 8.66    | 12.87   | 16.15   | 19.89    |
|                                      | Post | 2.51   | 4.59    | 5.97    | 7.01    | 8.19     |
| DP#3 – SE Overflow                   | Pre  | 0.91   | 2.85    | 4.26    | 5.36    | 6.62     |
|                                      | Post | 0.94   | 2.82    | 4.18    | 5.24    | 6.45     |
| DP#4 – 15" RCP To Temple Beth Hillel | Pre  | 2.21   | 7.27    | 11.01   | 13.95   | 17.32    |
|                                      | Post | 0.66   | 1.99    | 2.94    | 3.69    | 4.54     |

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 0.03 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 DP#2 & 4, all of which ultimately drain to the Podunk 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. Autodesk Storm and Sanitary Analysis software was used for analysis. The computations are included as **Appendix D**.

### **Water Quality**

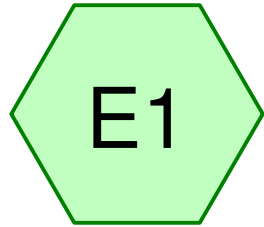
The proposed water quality basin and forebay were sized to treat a 3.10" rain event (per NOAA's Atlas 14 Point Precipitation Frequency Estimate for a 2-year, 24-hr storm) instead of 1" as recommended in the 2004 Connecticut Stormwater Quality Manual, per your recommendation. The proposed forebay was sized to store over 10% of this water quality volume as recommended by the 2004 Connecticut Stormwater Quality Manual. The water quality basin shall be evaluated at least every 5 years for the buildup of organic matter. If recommended by a qualified ecological consultant, the organic matter buildup shall be removed as directed.

Cultec Isolator rows will also be utilized to address water quality for pavement surfaces draining to them. 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 a 3.10" rain event. See **Attachment C** for water quality flow & volume calcs, pond and forebay stage storage reports, and Cultec Isolator rows manufactures specs.

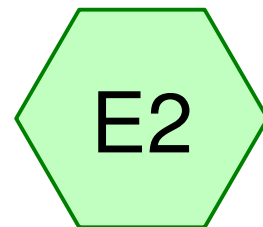
### **Conclusion**

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.

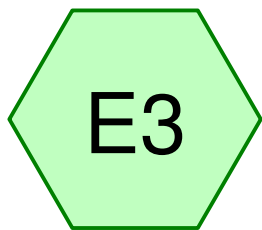
**APPENDIX A**  
**Watershed Computations**  
**(Pre-Development Drainage HydroCAD Report)**



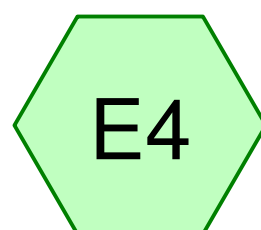
Existing E1 (DP1)



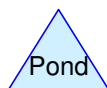
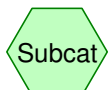
Existing E2 (DP2)



Existing E3 (DP3)



Existing E4 (DP4)



**Routing Diagram for 1976.U Hydrocad**

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## 1976.U Hydrocad

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

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2  
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 E1 (DP1)

Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=0.54"  
Flow Length=1,260' Tc=72.1 min CN=64 Runoff=2.39 cfs 0.642 af

### Subcatchment E2: Existing E2 (DP2)

Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=0.71"  
Flow Length=934' Tc=62.6 min CN=68 Runoff=2.85 cfs 0.626 af

### Subcatchment E3: Existing E3 (DP3)

Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=0.66"  
Flow Length=286' Tc=41.9 min CN=67 Runoff=0.91 cfs 0.161 af

### Subcatchment E4: Existing E4 (DP4)

Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=0.62"  
Flow Length=658' Tc=29.0 min CN=66 Runoff=2.21 cfs 0.338 af



## 1976.U Hydrocad

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

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2  
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 E1: Existing E1 (DP1)</b> | Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=1.57"<br>Flow Length=1,260' Tc=72.1 min CN=64 Runoff=8.67 cfs 1.885 af |
| <b>Subcatchment E2: Existing E2 (DP2)</b> | Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=1.87"<br>Flow Length=934' Tc=62.6 min CN=68 Runoff=8.66 cfs 1.660 af   |
| <b>Subcatchment E3: Existing E3 (DP3)</b> | Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=1.80"<br>Flow Length=286' Tc=41.9 min CN=67 Runoff=2.85 cfs 0.437 af    |
| <b>Subcatchment E4: Existing E4 (DP4)</b> | Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=1.72"<br>Flow Length=658' Tc=29.0 min CN=66 Runoff=7.27 cfs 0.942 af    |

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

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2  
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 E1 (DP1)**      Runoff Area=14.370 ac   0.56% Impervious   Runoff Depth=2.36"  
Flow Length=1,260'   Tc=72.1 min   CN=64   Runoff=13.43 cfs   2.822 af

**Subcatchment E2: Existing E2 (DP2)**      Runoff Area=10.640 ac   0.09% Impervious   Runoff Depth=2.72"  
Flow Length=934'   Tc=62.6 min   CN=68   Runoff=12.87 cfs   2.413 af

**Subcatchment E3: Existing E3 (DP3)**      Runoff Area=2.920 ac   0.00% Impervious   Runoff Depth=2.63"  
Flow Length=286'   Tc=41.9 min   CN=67   Runoff=4.26 cfs   0.640 af

**Subcatchment E4: Existing E4 (DP4)**      Runoff Area=6.569 ac   0.76% Impervious   Runoff Depth=2.54"  
Flow Length=658'   Tc=29.0 min   CN=66   Runoff=11.01 cfs   1.389 af

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

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2  
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 E1 (DP1)**      Runoff Area=14.370 ac   0.56% Impervious   Runoff Depth=2.98"  
Flow Length=1,260'   Tc=72.1 min   CN=64   Runoff=17.21 cfs   3.567 af

**Subcatchment E2: Existing E2 (DP2)**      Runoff Area=10.640 ac   0.09% Impervious   Runoff Depth=3.39"  
Flow Length=934'   Tc=62.6 min   CN=68   Runoff=16.15 cfs   3.002 af

**Subcatchment E3: Existing E3 (DP3)**      Runoff Area=2.920 ac   0.00% Impervious   Runoff Depth=3.28"  
Flow Length=286'   Tc=41.9 min   CN=67   Runoff=5.36 cfs   0.799 af

**Subcatchment E4: Existing E4 (DP4)**      Runoff Area=6.569 ac   0.76% Impervious   Runoff Depth=3.18"  
Flow Length=658'   Tc=29.0 min   CN=66   Runoff=13.95 cfs   1.741 af

## 1976.U Hydrocad

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

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2  
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 E1 (DP1)**      Runoff Area=14.370 ac   0.56% Impervious   Runoff Depth=3.70"  
Flow Length=1,260'   Tc=72.1 min   CN=64   Runoff=21.61 cfs   4.433 af

**Subcatchment E2: Existing E2 (DP2)**      Runoff Area=10.640 ac   0.09% Impervious   Runoff Depth=4.15"  
Flow Length=934'   Tc=62.6 min   CN=68   Runoff=19.89 cfs   3.681 af

**Subcatchment E3: Existing E3 (DP3)**      Runoff Area=2.920 ac   0.00% Impervious   Runoff Depth=4.04"  
Flow Length=286'   Tc=41.9 min   CN=67   Runoff=6.62 cfs   0.983 af

**Subcatchment E4: Existing E4 (DP4)**      Runoff Area=6.569 ac   0.76% Impervious   Runoff Depth=3.93"  
Flow Length=658'   Tc=29.0 min   CN=66   Runoff=17.32 cfs   2.149 af

**1976.U Hydrocad**

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

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**Summary for Subcatchment E1: Existing E1 (DP1)**

Runoff = 2.39 cfs @ 13.14 hrs, Volume= 0.642 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.170   | 60 | >75% Grass cover, Good, HSG A/D |
| * 0.010   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.030     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.080   | 98 | IMPERVIOUS                      |
| 1.200     | 30 | Woods, Good, HSG A              |
| * 1.860   | 54 | Woods, Good, HSG A/D            |
| * 3.710   | 66 | Woods, Good, HSG B/D            |
| 7.310     | 70 | Woods, Good, HSG C              |
| 14.370    | 64 | Weighted Average                |
| 14.290    |    | 99.44% Pervious Area            |
| 0.080     |    | 0.56% Impervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                    |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 19.6        | 100              | 0.0250           | 0.09                 |                   | <b>Sheet Flow, Woodland Sheet Flow</b>         |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 52.4        | 1,144            | 0.0053           | 0.36                 |                   | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                           |
| 0.1         | 16               | 0.2450           | 2.47                 |                   | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                           |
| 72.1        | 1,260            | Total            |                      |                   |  |

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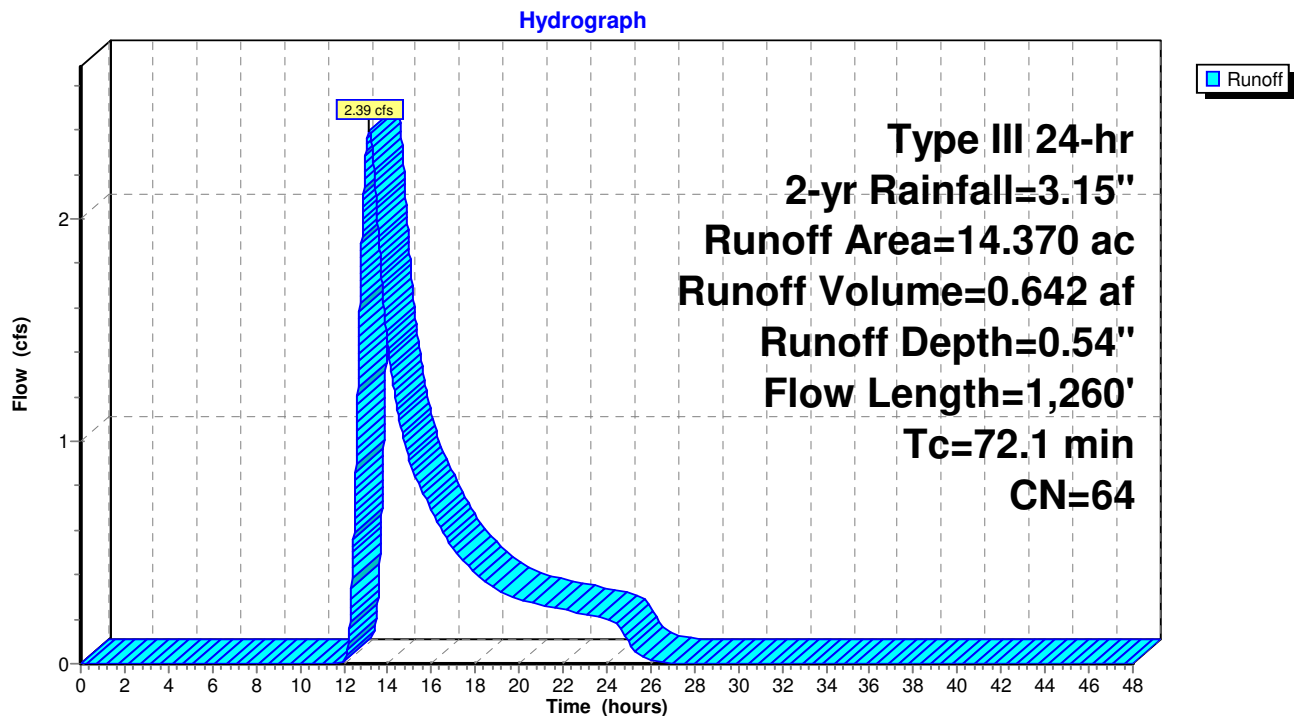
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Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

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## Subcatchment E1: Existing E1 (DP1)



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

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**Summary for Subcatchment E2: Existing E2 (DP2)**

Runoff = 2.85 cfs @ 12.94 hrs, Volume= 0.626 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.150   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.440     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.010   | 98 | IMPERVIOUS                      |
| * 4.610   | 66 | Woods, Good, HSG B/D            |
| 5.430     | 70 | Woods, Good, HSG C              |
| 10.640    | 68 | Weighted Average                |
| 10.630    |    | 99.91% Pervious Area            |
| 0.010     |    | 0.09% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 33.2     | 100           | 0.0067        | 0.05              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"                                      |
| 9.2      | 227           | 0.0067        | 0.41              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps  |
| 20.2     | 607           | 0.0005        | 0.50              | 18.04          | <b>Channel Flow, Channel Flow</b><br>Area= 36.0 sf Perim= 55.0' r= 0.65'<br>n= 0.050 Scattered brush, heavy weeds |
| 62.6     | 934           | Total         |                   |                |   |

# 1976.U Hydrocad

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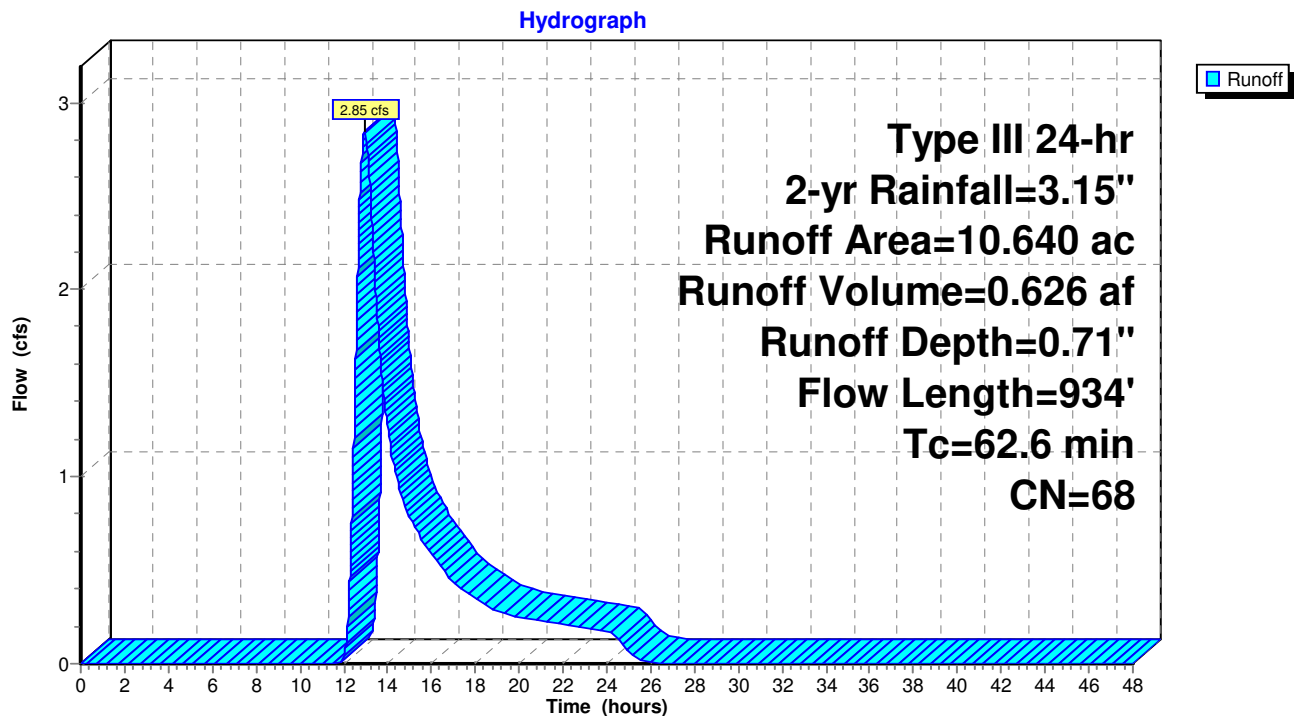
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Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

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## Subcatchment E2: Existing E2 (DP2)





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

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**Summary for Subcatchment E3: Existing E3 (DP3)**

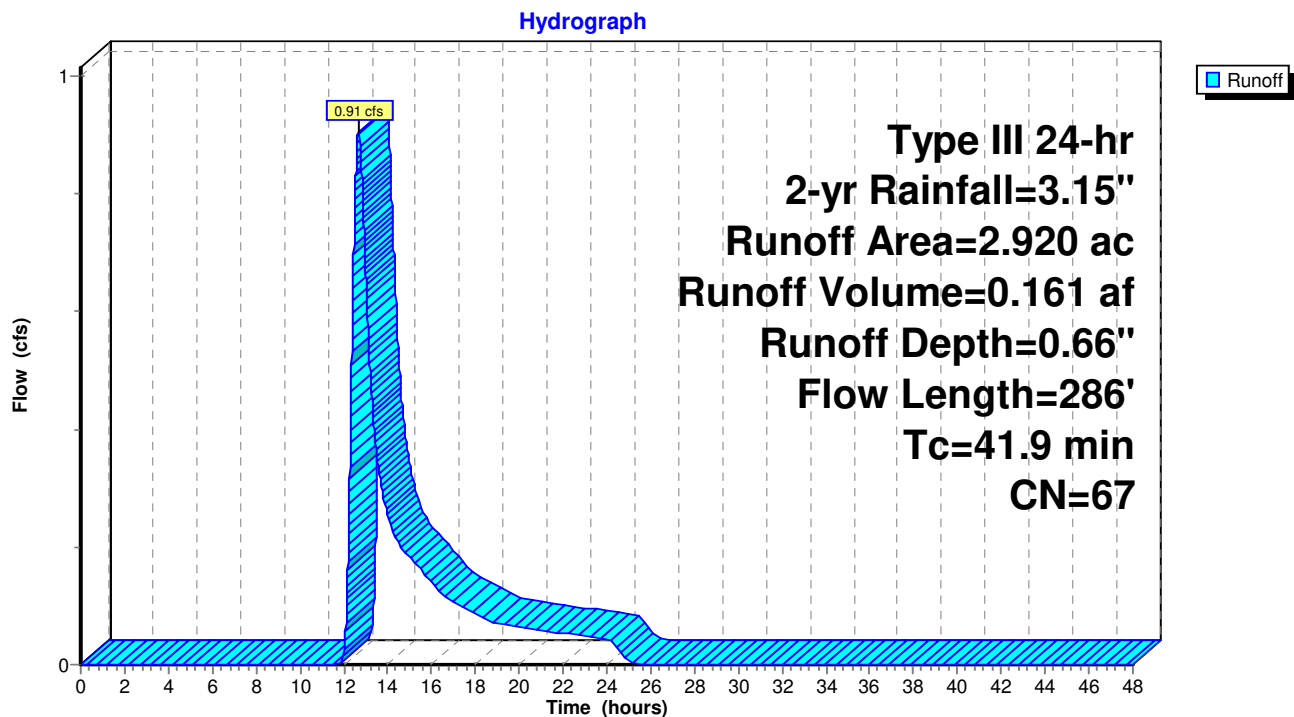
Runoff = 0.91 cfs @ 12.67 hrs, Volume= 0.161 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| * 2.220   | 66 | Woods, Good, HSG B/D  |
| 0.700     | 70 | Woods, Good, HSG C    |
| 2.920     | 67 | Weighted Average      |
| 2.920     |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 30.9     | 100           | 0.0080        | 0.05              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 11.0     | 186           | 0.0032        | 0.28              |                | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                           |
| 41.9     | 286           | Total         |                   |                |  |

**Subcatchment E3: Existing E3 (DP3)**

**1976.U Hydrocad**

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

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**Summary for Subcatchment E4: Existing E4 (DP4)**

Runoff = 2.21 cfs @ 12.50 hrs, Volume= 0.338 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.070   | 66 | >75% Grass cover, Good, HSG B/D |
| * 0.050   | 98 | IMPERVIOUS                      |
| 0.219     | 30 | Woods, Good, HSG A              |
| * 5.220   | 66 | Woods, Good, HSG B/D            |
| 1.010     | 70 | Woods, Good, HSG C              |
| 6.569     | 66 | Weighted Average                |
| 6.519     |    | 99.24% Pervious Area            |
| 0.050     |    | 0.76% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 14.9     | 100           | 0.0496        | 0.11              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"                                      |
| 9.9      | 294           | 0.0098        | 0.49              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps  |
| 4.2      | 264           | 0.0022        | 1.05              | 37.66          | <b>Channel Flow, Channel Flow</b><br>Area= 35.9 sf Perim= 55.0' r= 0.65'<br>n= 0.050 Scattered brush, heavy weeds |
| 29.0     | 658           | Total         |                   |                |   |

# 1976.U Hydrocad

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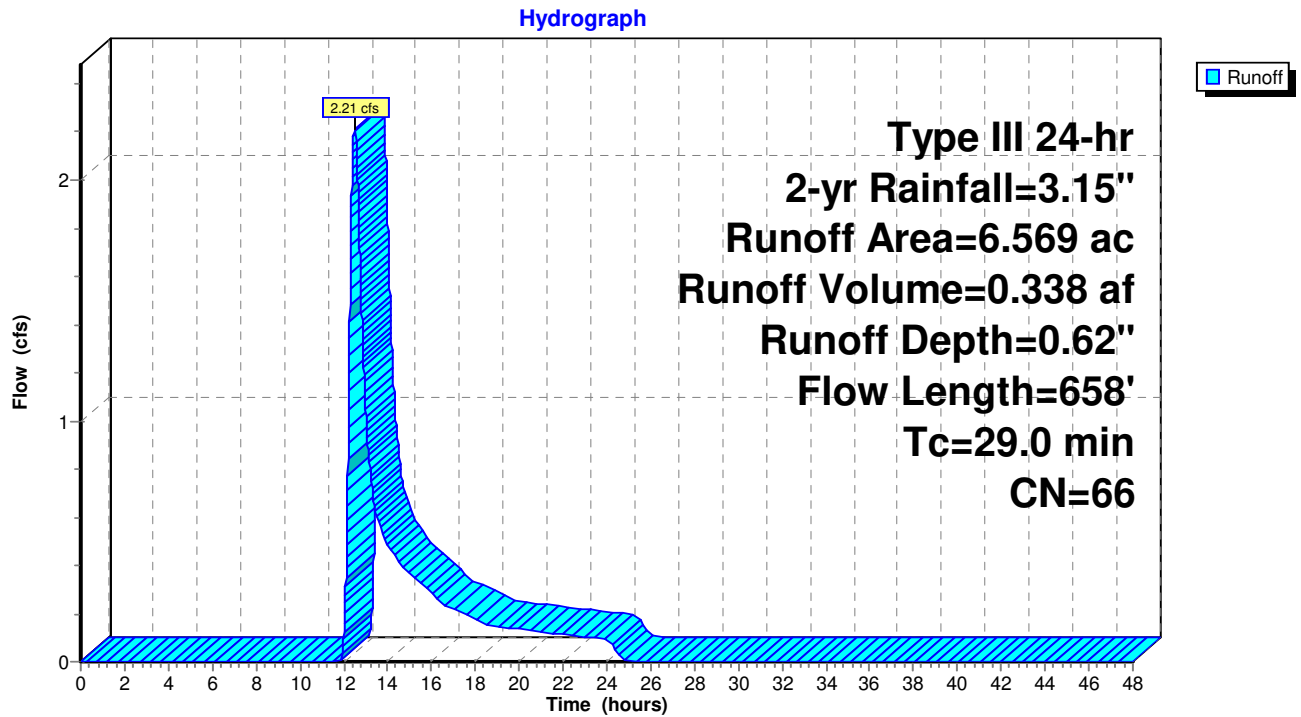
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Existing Condition  
Type III 24-hr 2-yr Rainfall=3.15"

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## Subcatchment E4: Existing E4 (DP4)



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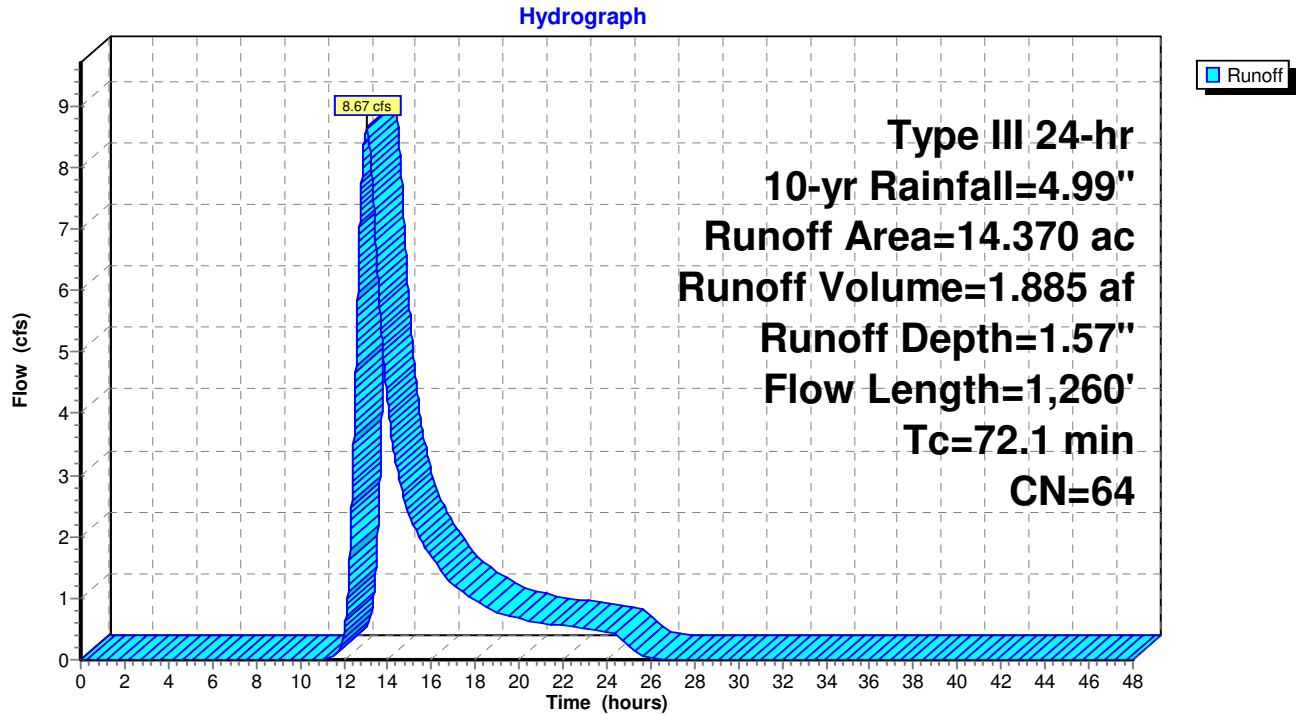
HydroCAD® 10.00-25 s/n 09320 © 2019 HydroCAD Software Solutions LLC

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

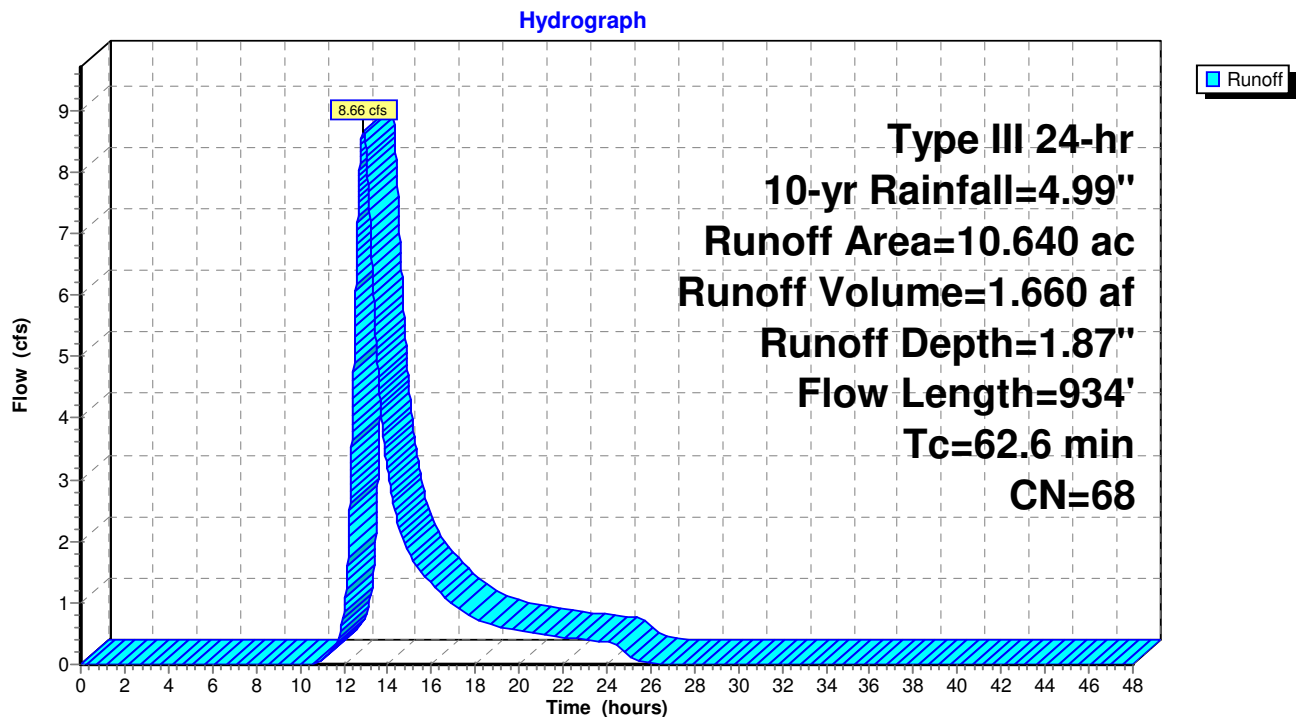
Printed 6/30/2021

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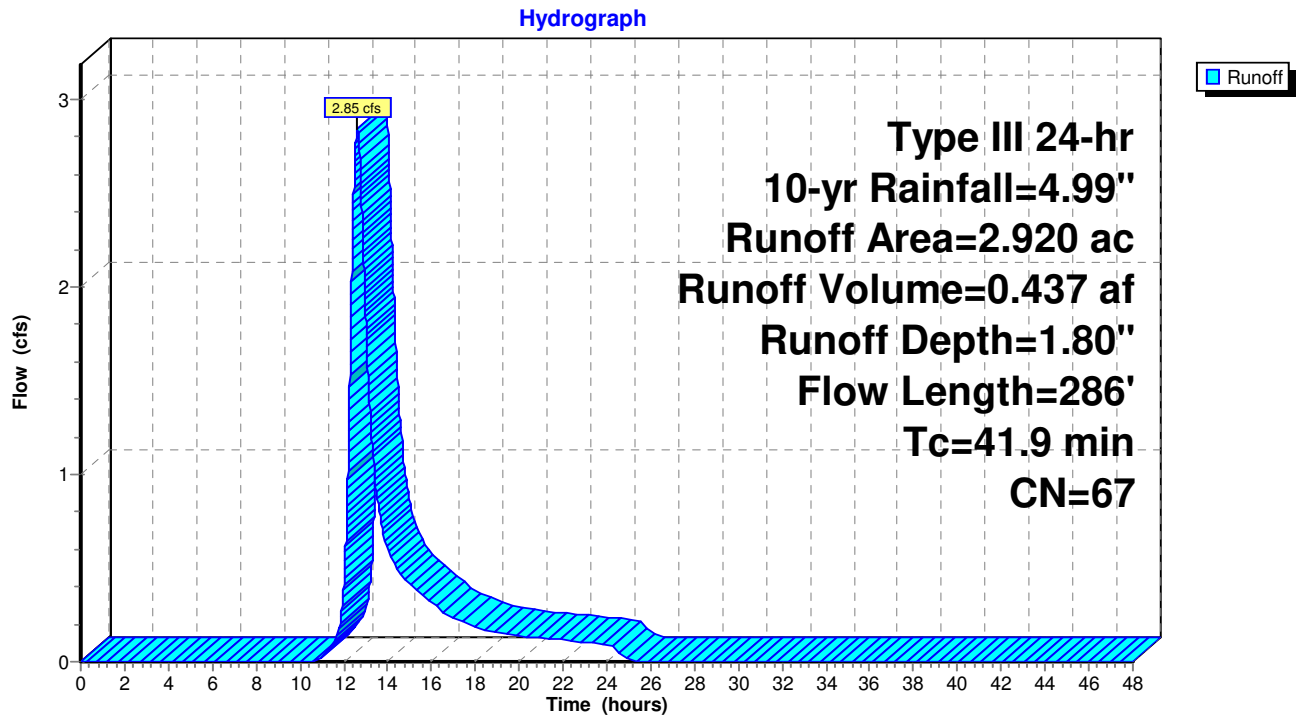
### Subcatchment E1: Existing E1 (DP1)



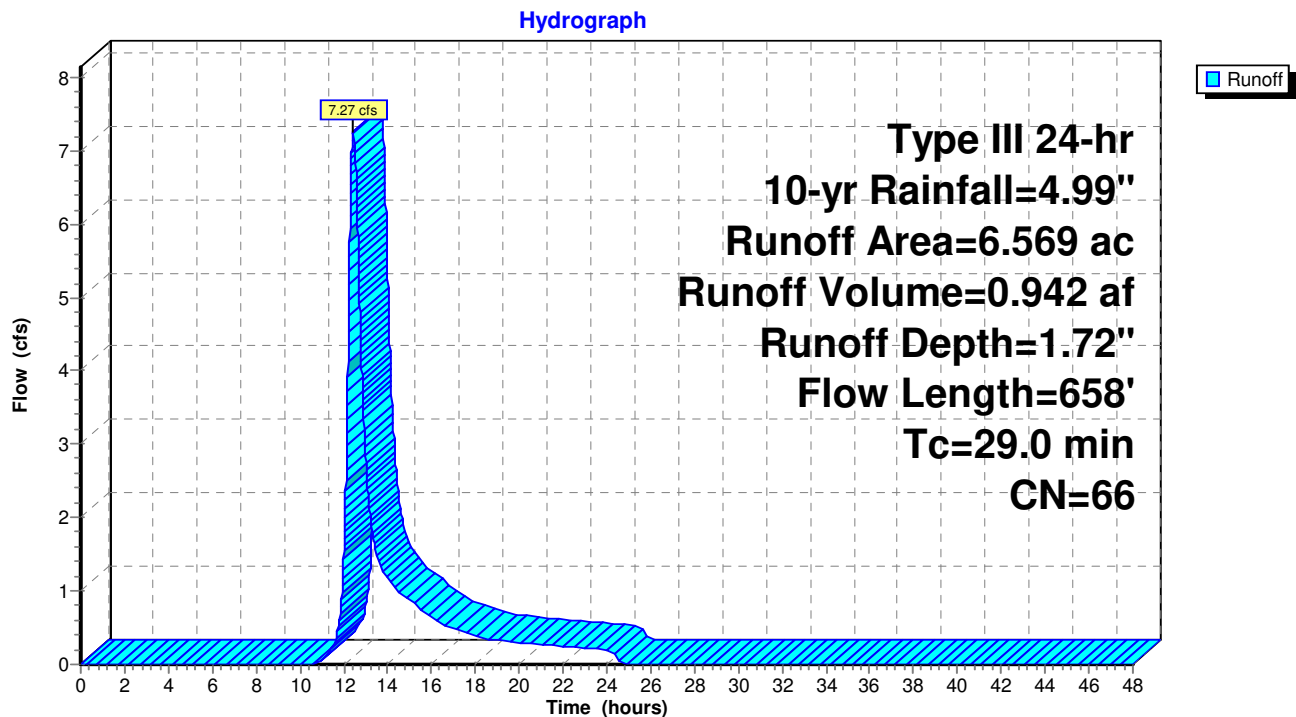
### Subcatchment E2: Existing E2 (DP2)



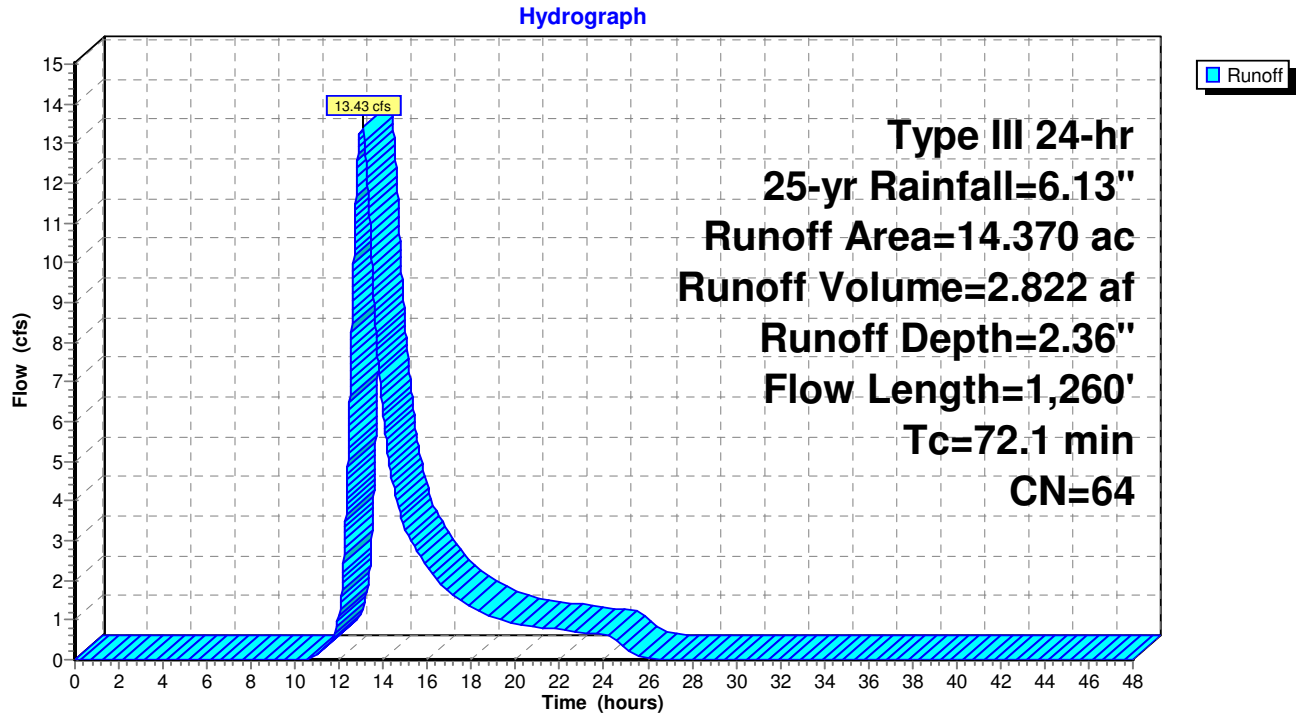
### Subcatchment E3: Existing E3 (DP3)



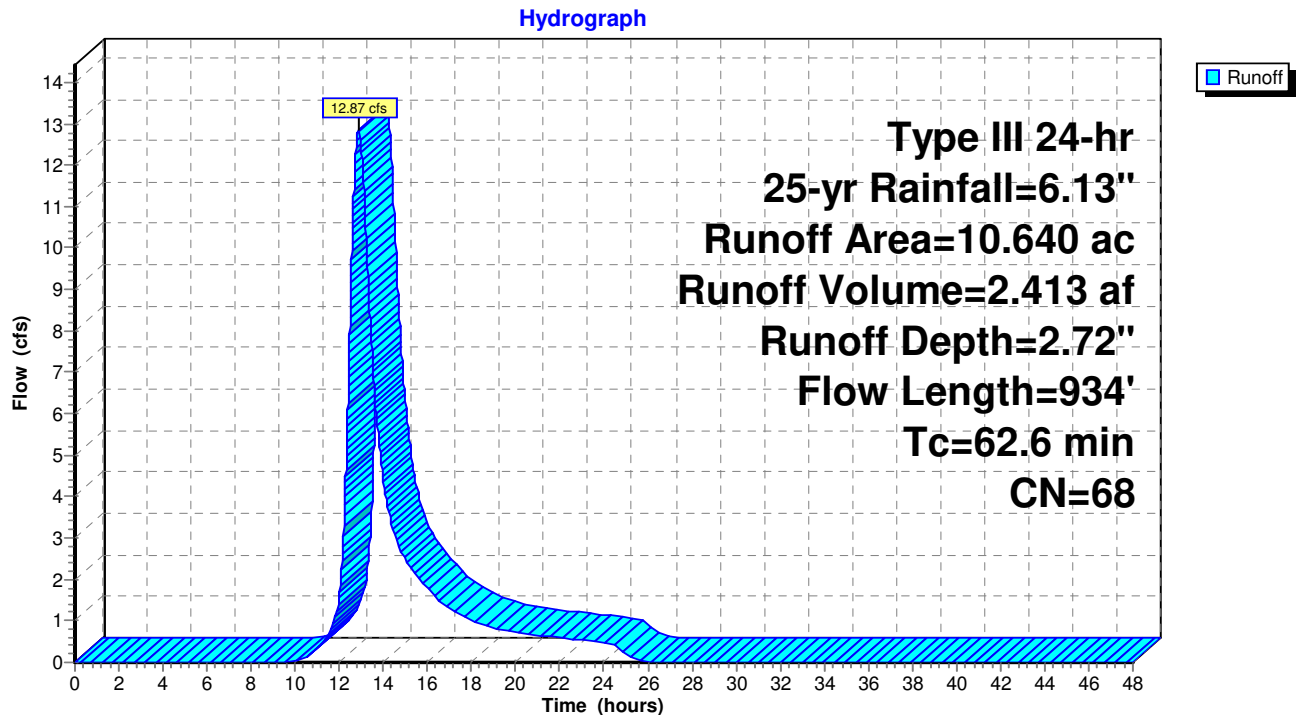
### Subcatchment E4: Existing E4 (DP4)



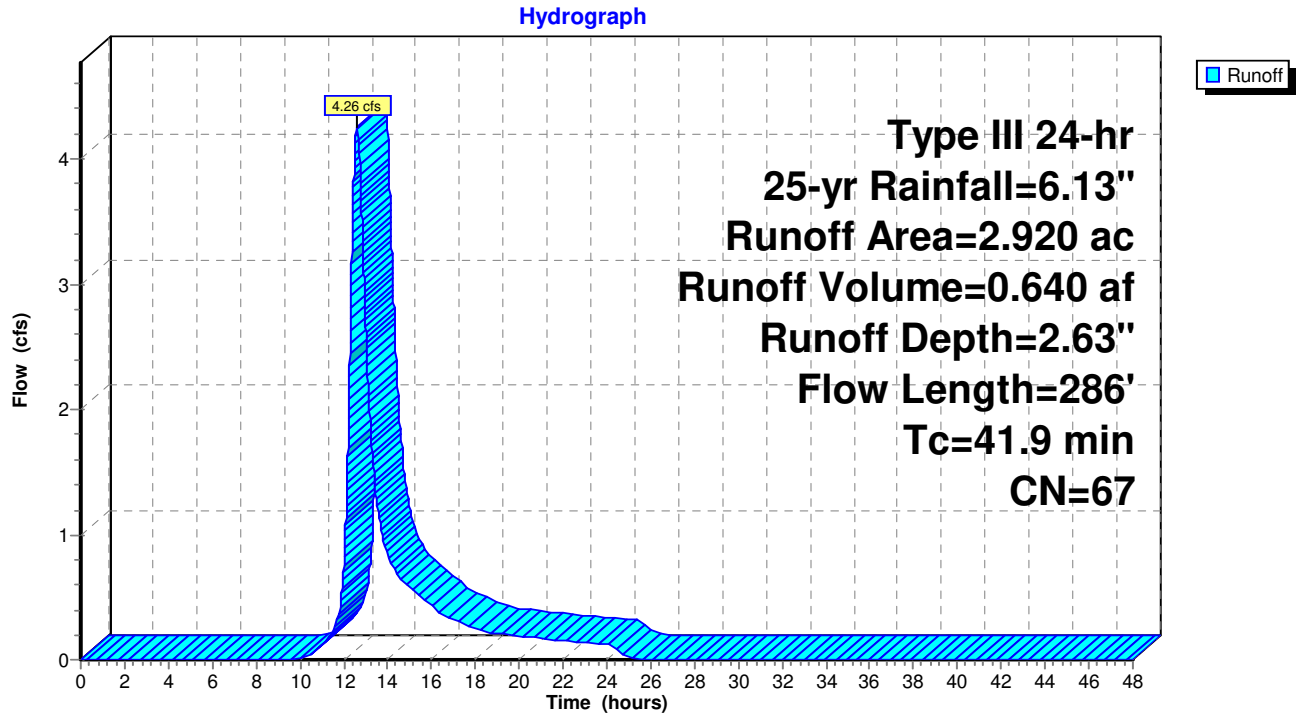
### Subcatchment E1: Existing E1 (DP1)



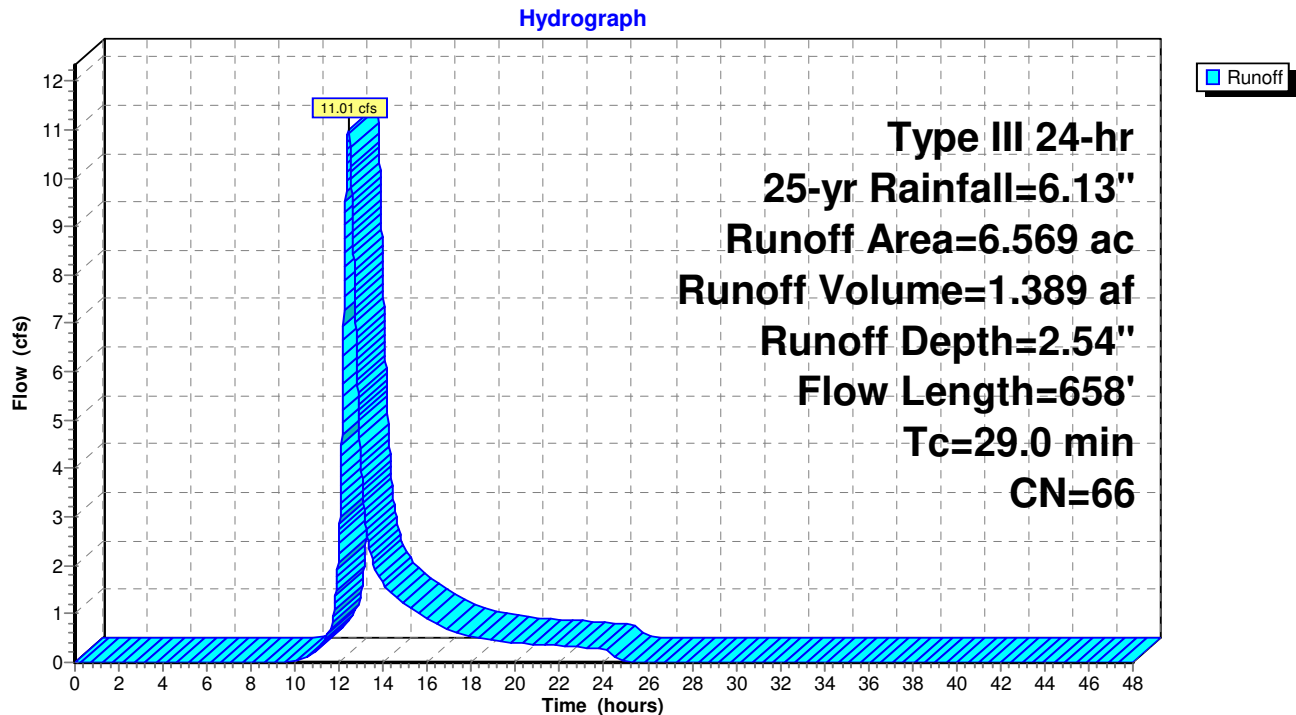
### Subcatchment E2: Existing E2 (DP2)



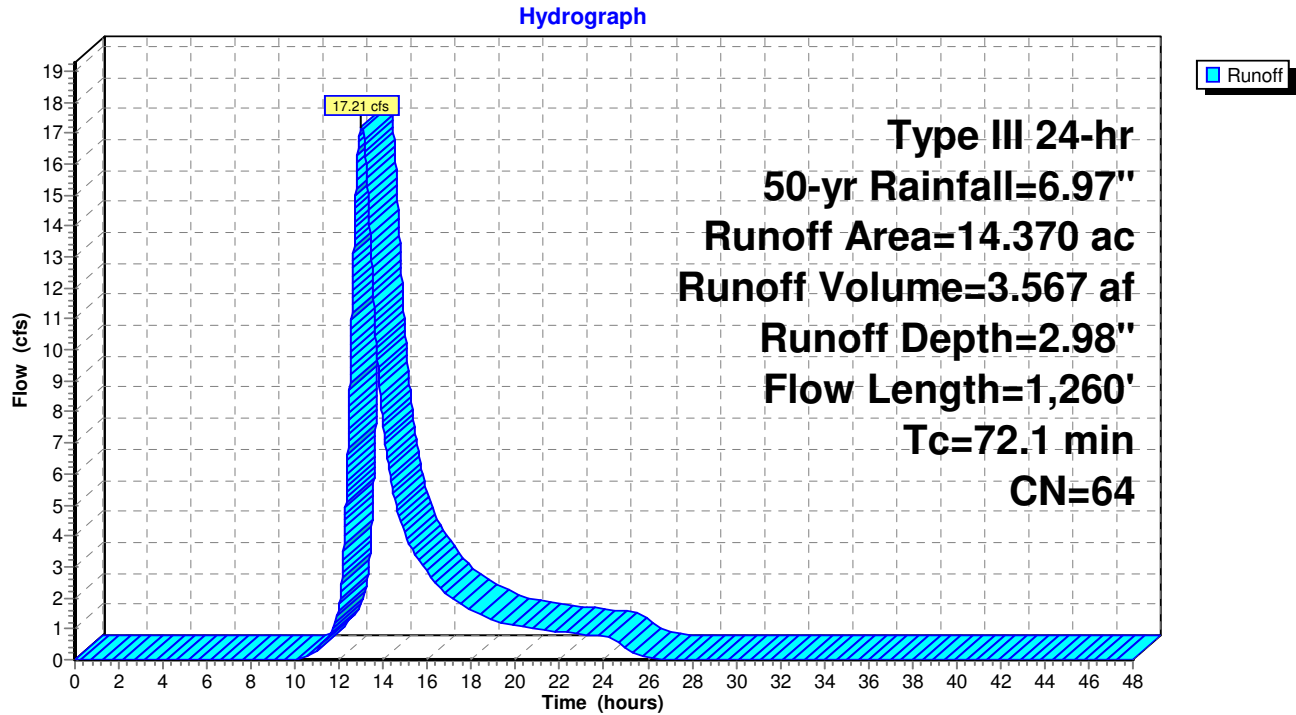
### Subcatchment E3: Existing E3 (DP3)



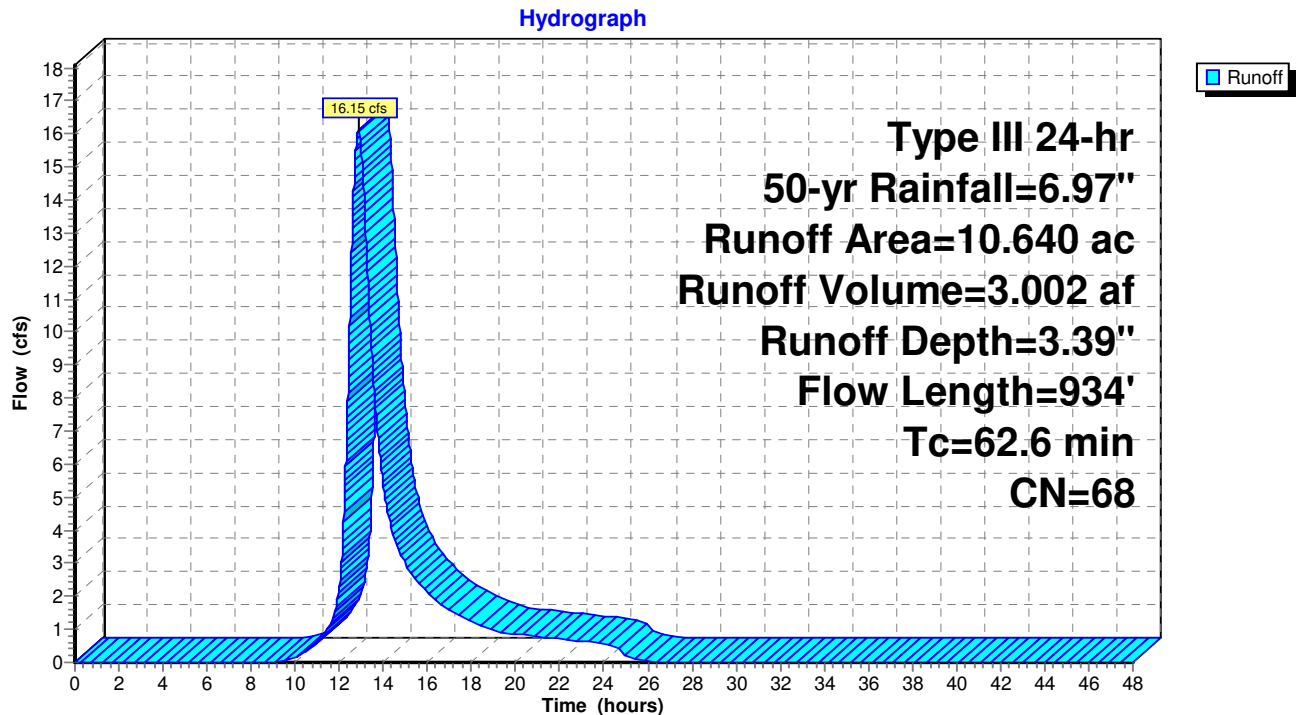
### Subcatchment E4: Existing E4 (DP4)



### Subcatchment E1: Existing E1 (DP1)



### Subcatchment E2: Existing E2 (DP2)





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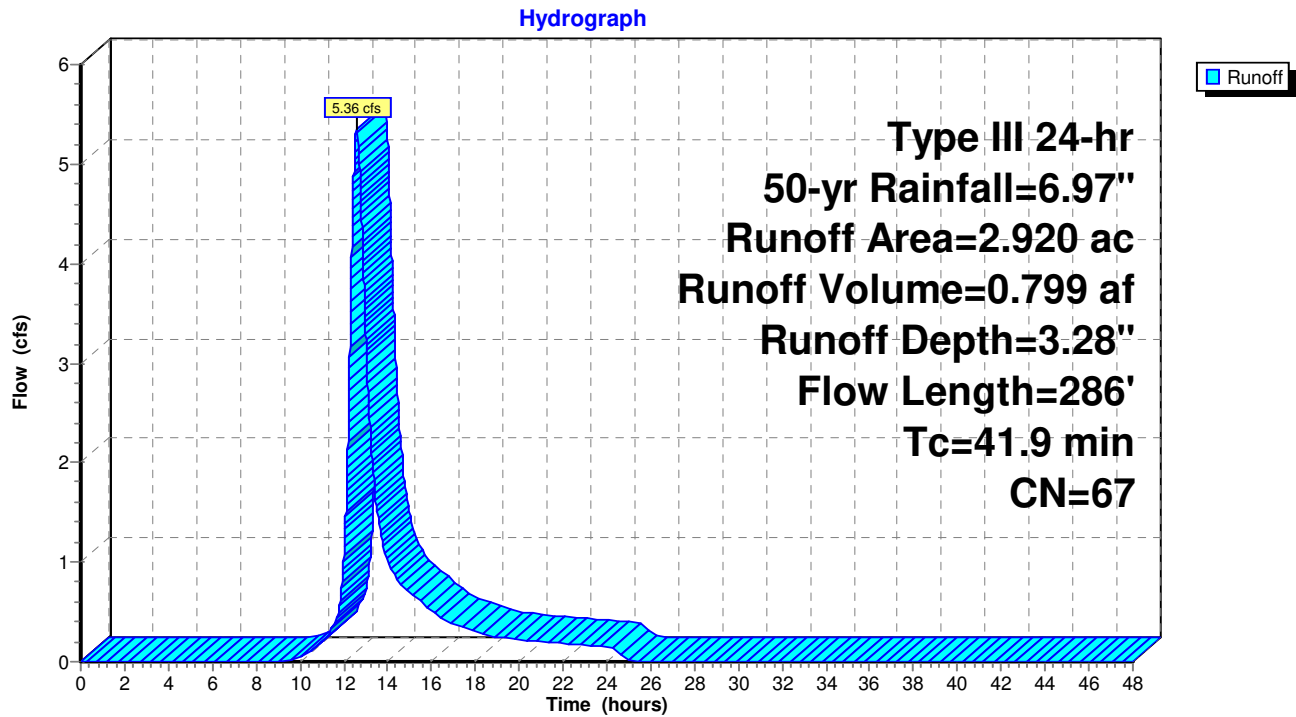
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Existing Condition  
Type III 24-hr 50-yr Rainfall=6.97"

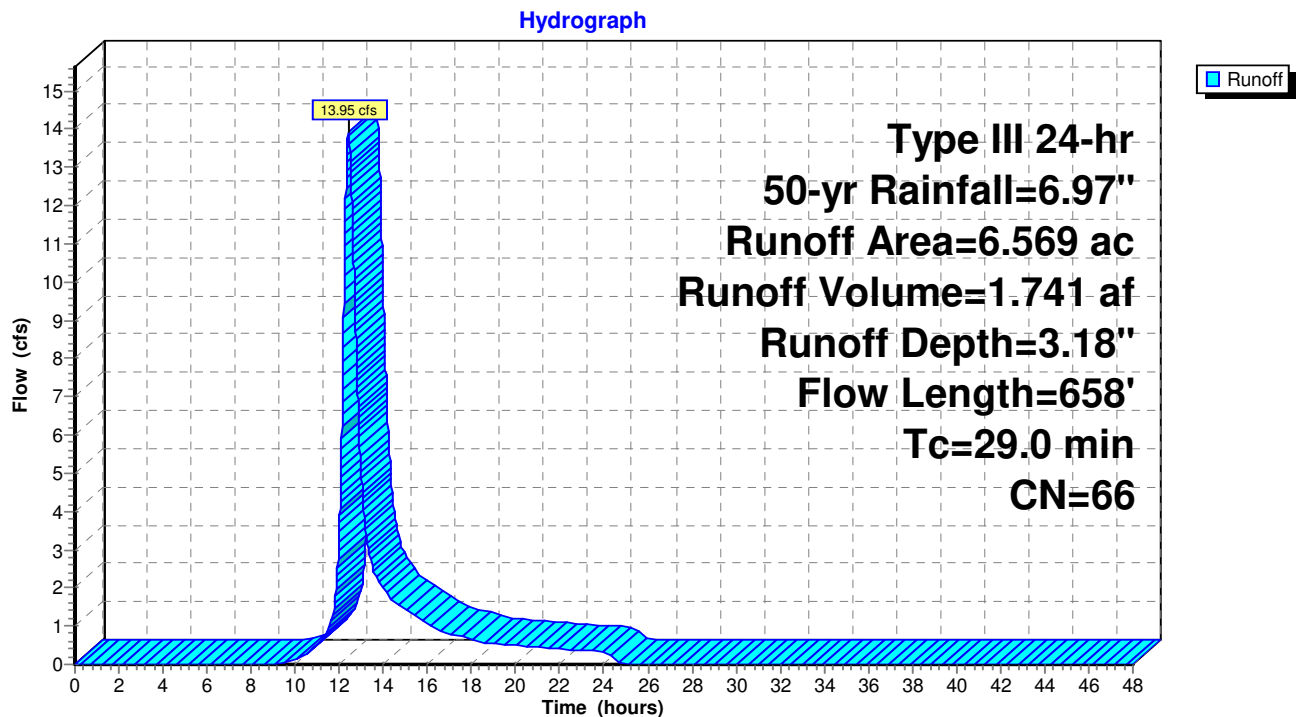
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## Subcatchment E3: Existing E3 (DP3)

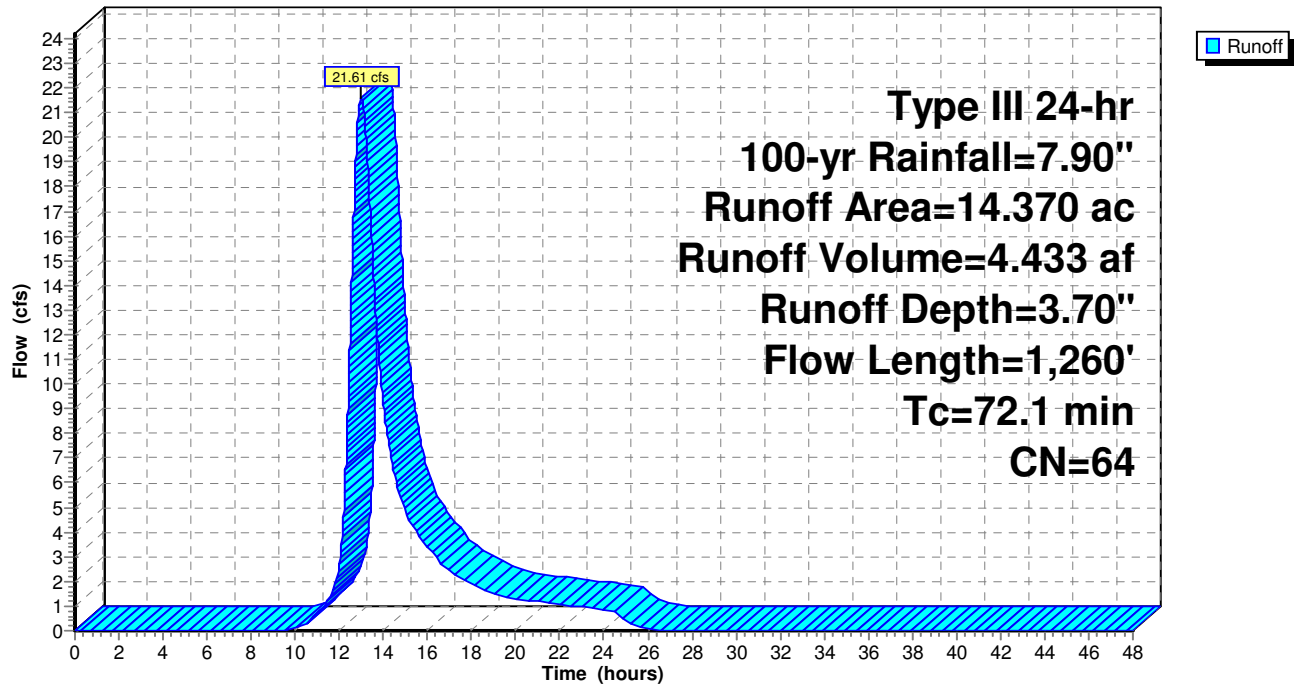


## Subcatchment E4: Existing E4 (DP4)



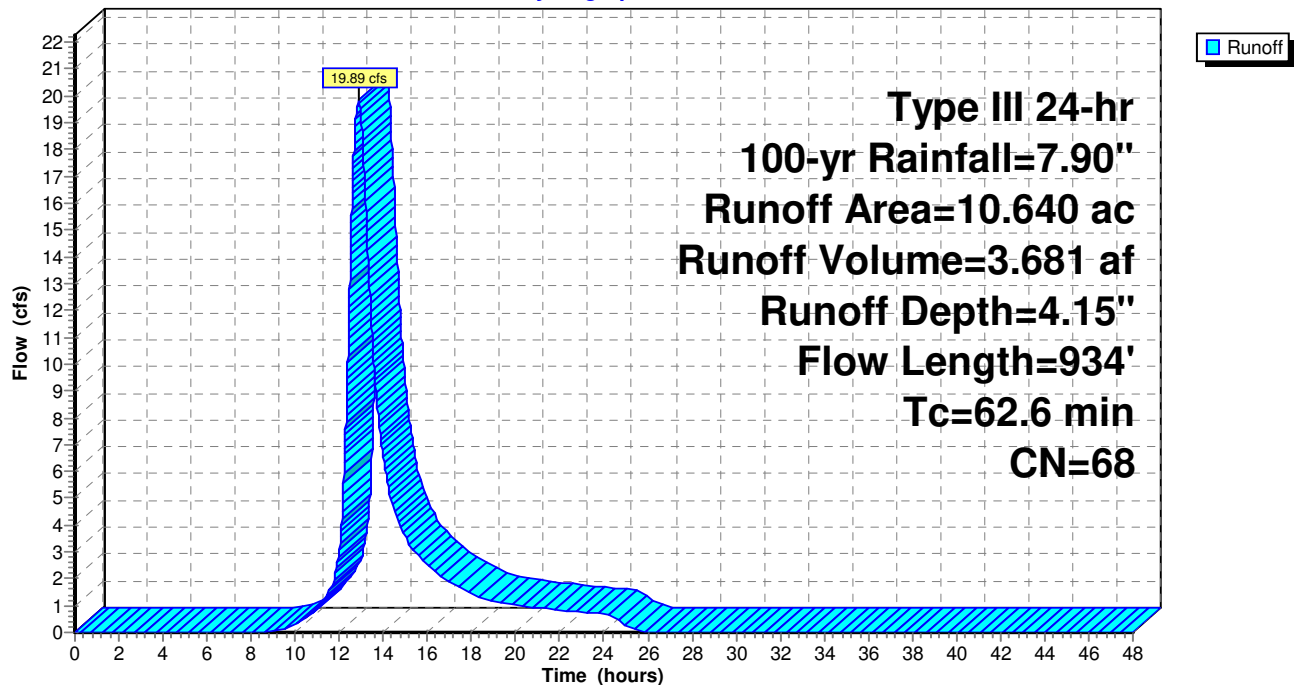
### Subcatchment E1: Existing E1 (DP1)

Hydrograph



### Subcatchment E2: Existing E2 (DP2)

Hydrograph



## 1976.U Hydrocad

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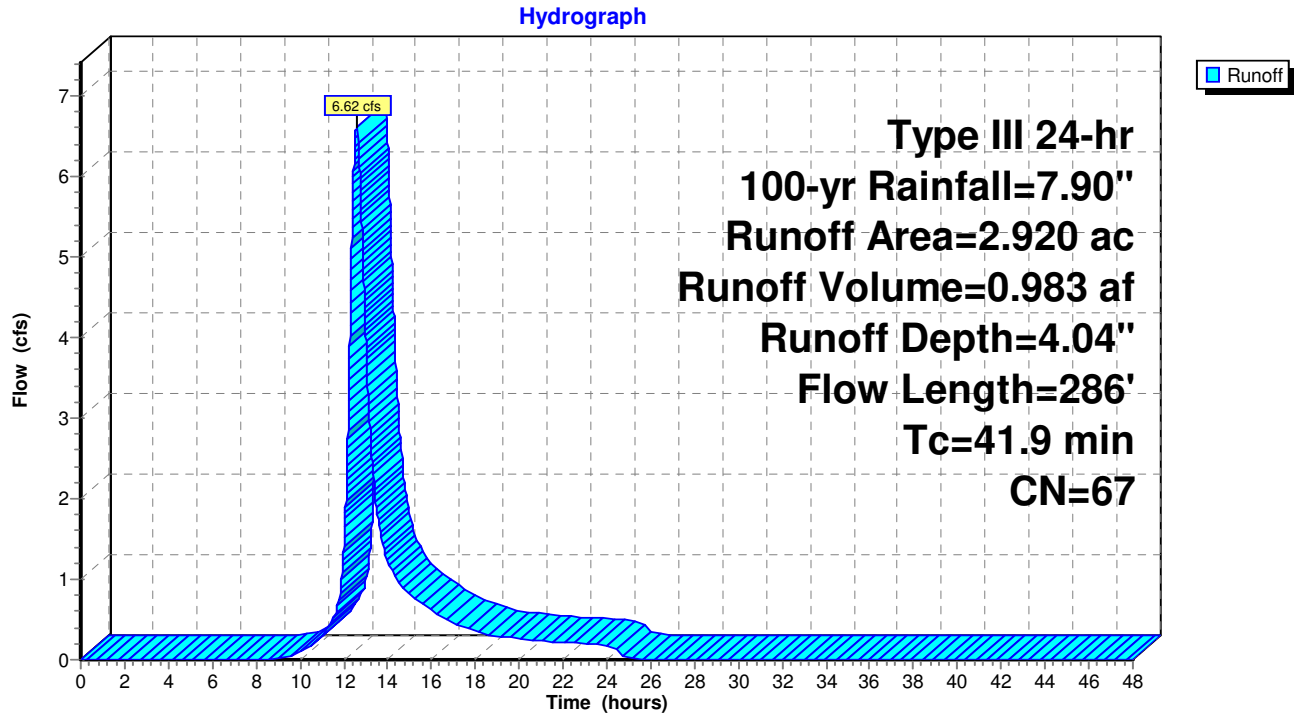
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Existing Condition  
Type III 24-hr 100-yr Rainfall=7.90"

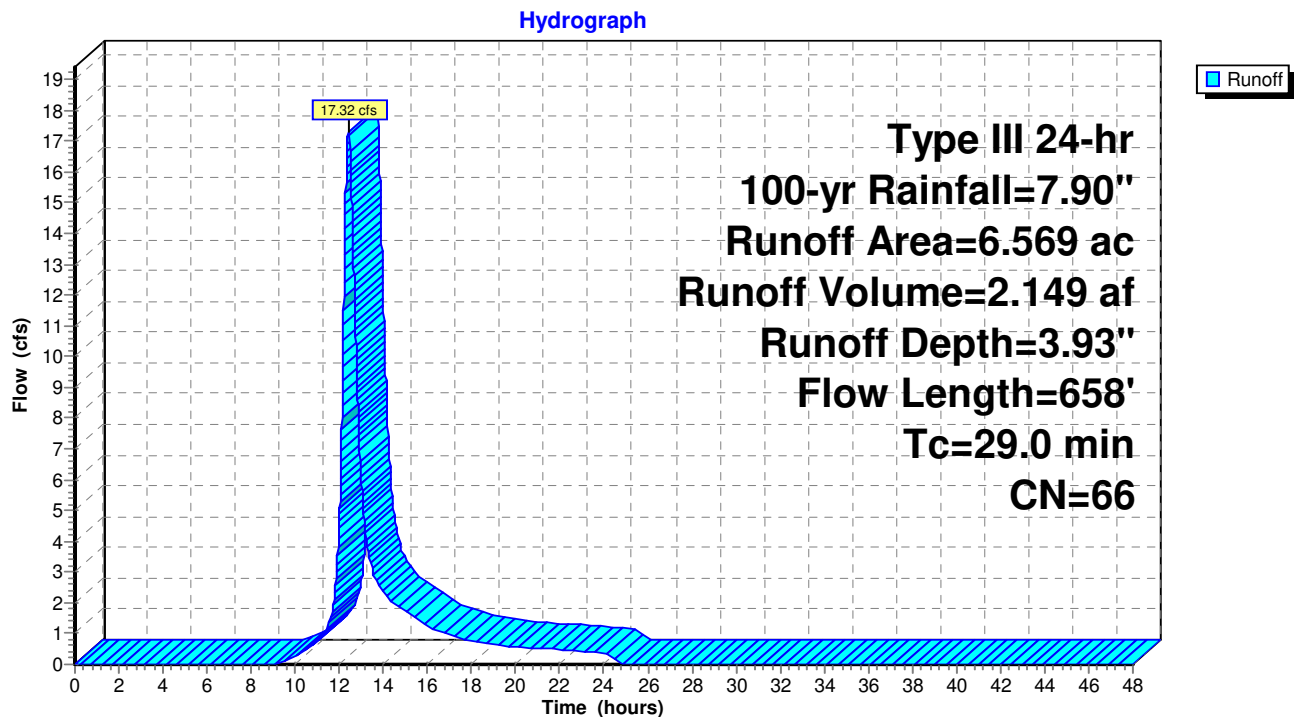
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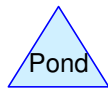
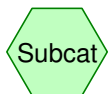
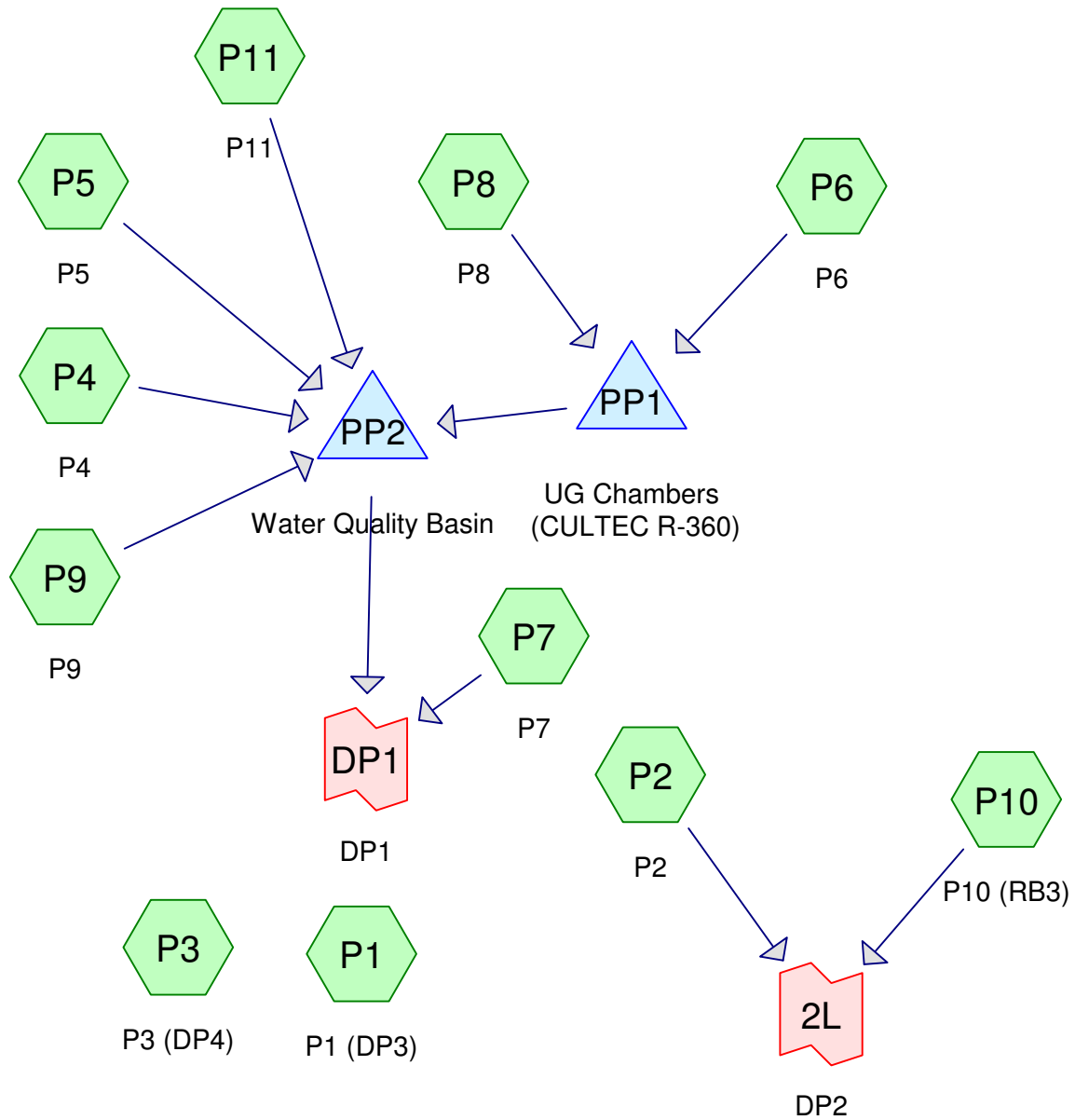
### Subcatchment E3: Existing E3 (DP3)



### Subcatchment E4: Existing E4 (DP4)



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



#### Routing Diagram for 1976.U Hydrocad

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**1976.U Hydrocad**

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Proposed Conditions

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

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Page 2

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3

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 P1: P1 (DP3)**Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=0.71"  
Flow Length=198' Tc=32.5 min CN=68 Runoff=0.94 cfs 0.143 af**Subcatchment P10: P10 (RB3)**Runoff Area=0.745 ac 100.00% Impervious Runoff Depth=2.92"  
Tc=6.0 min CN=98 Runoff=2.28 cfs 0.181 af**Subcatchment P11: P11**Runoff Area=2.302 ac 100.00% Impervious Runoff Depth=2.92"  
Tc=6.0 min CN=98 Runoff=7.04 cfs 0.560 af**Subcatchment P2: P2**Runoff Area=2.034 ac 0.69% Impervious Runoff Depth=0.85"  
Flow Length=514' Tc=30.9 min CN=71 Runoff=1.02 cfs 0.144 af**Subcatchment P3: P3 (DP4)**Runoff Area=1.922 ac 0.36% Impervious Runoff Depth=0.71"  
Flow Length=490' Tc=41.0 min CN=68 Runoff=0.66 cfs 0.113 af**Subcatchment P4: P4**Runoff Area=2.389 ac 54.42% Impervious Runoff Depth=1.50"  
Tc=10.0 min CN=82 Runoff=3.64 cfs 0.298 af**Subcatchment P5: P5**Runoff Area=6.487 ac 52.52% Impervious Runoff Depth=1.79"  
Tc=10.0 min CN=86 Runoff=11.91 cfs 0.969 af**Subcatchment P6: P6**Runoff Area=7.411 ac 72.49% Impervious Runoff Depth=2.04"  
Tc=10.0 min CN=89 Runoff=15.38 cfs 1.257 af**Subcatchment P7: P7**Runoff Area=3.585 ac 6.16% Impervious Runoff Depth=0.58"  
Flow Length=471' Tc=32.5 min CN=65 Runoff=1.04 cfs 0.172 af**Subcatchment P8: P8**Runoff Area=4.128 ac 100.00% Impervious Runoff Depth=2.92"  
Tc=6.0 min CN=98 Runoff=12.62 cfs 1.004 af**Subcatchment P9: P9**Runoff Area=1.081 ac 100.00% Impervious Runoff Depth=2.92"  
Tc=6.0 min CN=98 Runoff=3.30 cfs 0.263 af**Pond PP1: UG Chambers (CULTEC R-360)**Peak Elev=72.18' Storage=10,330 cf Inflow=26.78 cfs 2.261 af  
Outflow=24.21 cfs 2.261 af**Pond PP2: Water Quality Basin**Peak Elev=71.15' Storage=500,254 cf Inflow=47.93 cfs 4.350 af  
Outflow=1.44 cfs 4.040 af**Link 2L: DP2**Inflow=2.51 cfs 0.325 af  
Primary=2.51 cfs 0.325 af**Link DP1: DP1**Inflow=2.31 cfs 4.212 af  
Primary=2.31 cfs 4.212 af

**1976.U Hydrocad**

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Proposed Conditions

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

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Page 3

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3

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 P1: P1 (DP3)**Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=1.87"  
Flow Length=198' Tc=32.5 min CN=68 Runoff=2.82 cfs 0.379 af**Subcatchment P10: P10 (RB3)**Runoff Area=0.745 ac 100.00% Impervious Runoff Depth=4.75"  
Tc=6.0 min CN=98 Runoff=3.64 cfs 0.295 af**Subcatchment P11: P11**Runoff Area=2.302 ac 100.00% Impervious Runoff Depth=4.75"  
Tc=6.0 min CN=98 Runoff=11.24 cfs 0.912 af**Subcatchment P2: P2**Runoff Area=2.034 ac 0.69% Impervious Runoff Depth=2.11"  
Flow Length=514' Tc=30.9 min CN=71 Runoff=2.76 cfs 0.357 af**Subcatchment P3: P3 (DP4)**Runoff Area=1.922 ac 0.36% Impervious Runoff Depth=1.87"  
Flow Length=490' Tc=41.0 min CN=68 Runoff=1.99 cfs 0.300 af**Subcatchment P4: P4**Runoff Area=2.389 ac 54.42% Impervious Runoff Depth=3.07"  
Tc=10.0 min CN=82 Runoff=7.50 cfs 0.611 af**Subcatchment P5: P5**Runoff Area=6.487 ac 52.52% Impervious Runoff Depth=3.46"  
Tc=10.0 min CN=86 Runoff=22.70 cfs 1.869 af**Subcatchment P6: P6**Runoff Area=7.411 ac 72.49% Impervious Runoff Depth=3.76"  
Tc=10.0 min CN=89 Runoff=27.81 cfs 2.324 af**Subcatchment P7: P7**Runoff Area=3.585 ac 6.16% Impervious Runoff Depth=1.65"  
Flow Length=471' Tc=32.5 min CN=65 Runoff=3.58 cfs 0.492 af**Subcatchment P8: P8**Runoff Area=4.128 ac 100.00% Impervious Runoff Depth=4.75"  
Tc=6.0 min CN=98 Runoff=20.15 cfs 1.635 af**Subcatchment P9: P9**Runoff Area=1.081 ac 100.00% Impervious Runoff Depth=4.75"  
Tc=6.0 min CN=98 Runoff=5.28 cfs 0.428 af**Pond PP1: UG Chambers (CULTEC R-360)**Peak Elev=72.68' Storage=13,472 cf Inflow=46.05 cfs 3.959 af  
Outflow=42.83 cfs 3.958 af**Pond PP2: Water Quality Basin**Peak Elev=71.96' Storage=571,542 cf Inflow=86.48 cfs 7.778 af  
Outflow=5.97 cfs 7.350 af**Link 2L: DP2**Inflow=4.59 cfs 0.653 af  
Primary=4.59 cfs 0.653 af**Link DP1: DP1**Inflow=8.64 cfs 7.842 af  
Primary=8.64 cfs 7.842 af

**1976.U Hydrocad**

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Proposed Conditions

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

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Page 4

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3

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 P1: P1 (DP3)**Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=2.72"  
Flow Length=198' Tc=32.5 min CN=68 Runoff=4.18 cfs 0.551 af**Subcatchment P10: P10 (RB3)**Runoff Area=0.745 ac 100.00% Impervious Runoff Depth=5.89"  
Tc=6.0 min CN=98 Runoff=4.48 cfs 0.366 af**Subcatchment P11: P11**Runoff Area=2.302 ac 100.00% Impervious Runoff Depth=5.89"  
Tc=6.0 min CN=98 Runoff=13.83 cfs 1.130 af**Subcatchment P2: P2**Runoff Area=2.034 ac 0.69% Impervious Runoff Depth=3.00"  
Flow Length=514' Tc=30.9 min CN=71 Runoff=3.97 cfs 0.509 af**Subcatchment P3: P3 (DP4)**Runoff Area=1.922 ac 0.36% Impervious Runoff Depth=2.72"  
Flow Length=490' Tc=41.0 min CN=68 Runoff=2.94 cfs 0.436 af**Subcatchment P4: P4**Runoff Area=2.389 ac 54.42% Impervious Runoff Depth=4.11"  
Tc=10.0 min CN=82 Runoff=9.97 cfs 0.818 af**Subcatchment P5: P5**Runoff Area=6.487 ac 52.52% Impervious Runoff Depth=4.53"  
Tc=10.0 min CN=86 Runoff=29.45 cfs 2.451 af**Subcatchment P6: P6**Runoff Area=7.411 ac 72.49% Impervious Runoff Depth=4.86"  
Tc=10.0 min CN=89 Runoff=35.48 cfs 3.002 af**Subcatchment P7: P7**Runoff Area=3.585 ac 6.16% Impervious Runoff Depth=2.45"  
Flow Length=471' Tc=32.5 min CN=65 Runoff=5.48 cfs 0.731 af**Subcatchment P8: P8**Runoff Area=4.128 ac 100.00% Impervious Runoff Depth=5.89"  
Tc=6.0 min CN=98 Runoff=24.80 cfs 2.027 af**Subcatchment P9: P9**Runoff Area=1.081 ac 100.00% Impervious Runoff Depth=5.89"  
Tc=6.0 min CN=98 Runoff=6.50 cfs 0.531 af**Pond PP1: UG Chambers (CULTEC R-360)**Peak Elev=72.97' Storage=15,163 cf Inflow=57.95 cfs 5.029 af  
Outflow=54.43 cfs 5.028 af**Pond PP2: Water Quality Basin**Peak Elev=72.50' Storage=621,949 cf Inflow=110.61 cfs 9.958 af  
Outflow=8.81 cfs 9.484 af**Link 2L: DP2**Inflow=5.97 cfs 0.875 af  
Primary=5.97 cfs 0.875 af**Link DP1: DP1**Inflow=13.20 cfs 10.215 af  
Primary=13.20 cfs 10.215 af



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

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Page 5

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3  
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: P1 (DP3)</b>            | Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=3.39"<br>Flow Length=198' Tc=32.5 min CN=68 Runoff=5.24 cfs 0.686 af |
| <b>Subcatchment P10: P10 (RB3)</b>          | Runoff Area=0.745 ac 100.00% Impervious Runoff Depth=6.73"<br>Tc=6.0 min CN=98 Runoff=5.09 cfs 0.418 af                 |
| <b>Subcatchment P11: P11</b>                | Runoff Area=2.302 ac 100.00% Impervious Runoff Depth=6.73"<br>Tc=6.0 min CN=98 Runoff=15.74 cfs 1.291 af                |
| <b>Subcatchment P2: P2</b>                  | Runoff Area=2.034 ac 0.69% Impervious Runoff Depth=3.70"<br>Flow Length=514' Tc=30.9 min CN=71 Runoff=4.91 cfs 0.627 af |
| <b>Subcatchment P3: P3 (DP4)</b>            | Runoff Area=1.922 ac 0.36% Impervious Runoff Depth=3.39"<br>Flow Length=490' Tc=41.0 min CN=68 Runoff=3.69 cfs 0.542 af |
| <b>Subcatchment P4: P4</b>                  | Runoff Area=2.389 ac 54.42% Impervious Runoff Depth=4.89"<br>Tc=10.0 min CN=82 Runoff=11.80 cfs 0.973 af                |
| <b>Subcatchment P5: P5</b>                  | Runoff Area=6.487 ac 52.52% Impervious Runoff Depth=5.34"<br>Tc=10.0 min CN=86 Runoff=34.41 cfs 2.885 af                |
| <b>Subcatchment P6: P6</b>                  | Runoff Area=7.411 ac 72.49% Impervious Runoff Depth=5.68"<br>Tc=10.0 min CN=89 Runoff=41.10 cfs 3.507 af                |
| <b>Subcatchment P7: P7</b>                  | Runoff Area=3.585 ac 6.16% Impervious Runoff Depth=3.08"<br>Flow Length=471' Tc=32.5 min CN=65 Runoff=6.98 cfs 0.920 af |
| <b>Subcatchment P8: P8</b>                  | Runoff Area=4.128 ac 100.00% Impervious Runoff Depth=6.73"<br>Tc=6.0 min CN=98 Runoff=28.23 cfs 2.315 af                |
| <b>Subcatchment P9: P9</b>                  | Runoff Area=1.081 ac 100.00% Impervious Runoff Depth=6.73"<br>Tc=6.0 min CN=98 Runoff=7.39 cfs 0.606 af                 |
| <b>Pond PP1: UG Chambers (CULTEC R-360)</b> | Peak Elev=73.17' Storage=16,323 cf Inflow=66.68 cfs 5.823 af<br>Outflow=62.97 cfs 5.822 af                              |
| <b>Pond PP2: Water Quality Basin</b>        | Peak Elev=72.88' Storage=659,361 cf Inflow=128.40 cfs 11.578 af<br>Outflow=11.25 cfs 11.074 af                          |
| <b>Link 2L: DP2</b>                         | Inflow=7.01 cfs 1.045 af<br>Primary=7.01 cfs 1.045 af   |
| <b>Link DP1: DP1</b>                        | Inflow=17.10 cfs 11.994 af<br>Primary=17.10 cfs 11.994 af   |

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

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Page 6

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 3  
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: P1 (DP3)</b>            | Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=4.15"<br>Flow Length=198' Tc=32.5 min CN=68 Runoff=6.45 cfs 0.841 af |
| <b>Subcatchment P10: P10 (RB3)</b>          | Runoff Area=0.745 ac 100.00% Impervious Runoff Depth=7.66"<br>Tc=6.0 min CN=98 Runoff=5.78 cfs 0.476 af                 |
| <b>Subcatchment P11: P11</b>                | Runoff Area=2.302 ac 100.00% Impervious Runoff Depth=7.66"<br>Tc=6.0 min CN=98 Runoff=17.85 cfs 1.469 af                |
| <b>Subcatchment P2: P2</b>                  | Runoff Area=2.034 ac 0.69% Impervious Runoff Depth=4.49"<br>Flow Length=514' Tc=30.9 min CN=71 Runoff=5.97 cfs 0.761 af |
| <b>Subcatchment P3: P3 (DP4)</b>            | Runoff Area=1.922 ac 0.36% Impervious Runoff Depth=4.15"<br>Flow Length=490' Tc=41.0 min CN=68 Runoff=4.54 cfs 0.665 af |
| <b>Subcatchment P4: P4</b>                  | Runoff Area=2.389 ac 54.42% Impervious Runoff Depth=5.76"<br>Tc=10.0 min CN=82 Runoff=13.83 cfs 1.148 af                |
| <b>Subcatchment P5: P5</b>                  | Runoff Area=6.487 ac 52.52% Impervious Runoff Depth=6.23"<br>Tc=10.0 min CN=86 Runoff=39.88 cfs 3.370 af                |
| <b>Subcatchment P6: P6</b>                  | Runoff Area=7.411 ac 72.49% Impervious Runoff Depth=6.59"<br>Tc=10.0 min CN=89 Runoff=47.29 cfs 4.069 af                |
| <b>Subcatchment P7: P7</b>                  | Runoff Area=3.585 ac 6.16% Impervious Runoff Depth=3.81"<br>Flow Length=471' Tc=32.5 min CN=65 Runoff=8.70 cfs 1.139 af |
| <b>Subcatchment P8: P8</b>                  | Runoff Area=4.128 ac 100.00% Impervious Runoff Depth=7.66"<br>Tc=6.0 min CN=98 Runoff=32.02 cfs 2.635 af                |
| <b>Subcatchment P9: P9</b>                  | Runoff Area=1.081 ac 100.00% Impervious Runoff Depth=7.66"<br>Tc=6.0 min CN=98 Runoff=8.38 cfs 0.690 af                 |
| <b>Pond PP1: UG Chambers (CULTEC R-360)</b> | Peak Elev=73.40' Storage=17,539 cf Inflow=76.32 cfs 6.704 af<br>Outflow=72.44 cfs 6.704 af                              |
| <b>Pond PP2: Water Quality Basin</b>        | Peak Elev=73.31' Storage=702,630 cf Inflow=148.08 cfs 13.381 af<br>Outflow=13.53 cfs 12.843 af                          |
| <b>Link 2L: DP2</b>                         | Inflow=8.19 cfs 1.237 af<br>Primary=8.19 cfs 1.237 af   |
| <b>Link DP1: DP1</b>                        | Inflow=21.33 cfs 13.982 af<br>Primary=21.33 cfs 13.982 af   |

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

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**Summary for Subcatchment P1: P1 (DP3)**

Runoff = 0.94 cfs @ 12.53 hrs, Volume= 0.143 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

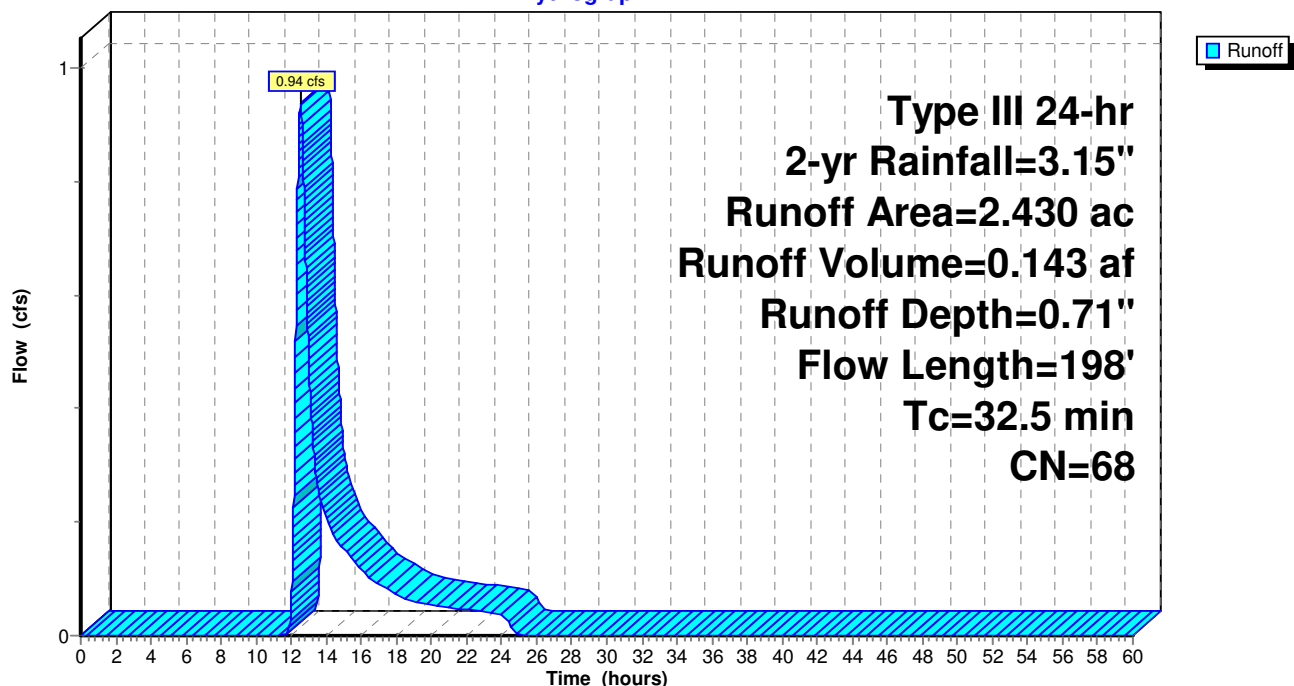
| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.420   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.160     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.220   | 66 | Woods, Good, HSG B/D            |
| 0.630     | 70 | Woods, Good, HSG C              |
| 2.430     | 68 | Weighted Average                |
| 2.430     |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 3.0      | 28            | 0.2100        | 0.15              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 25.5     | 72            | 0.0067        | 0.05              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 4.0      | 98            | 0.0067        | 0.41              |                | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                           |
| 32.5     | 198           | Total         |                   |                |  |

**Subcatchment P1: P1 (DP3)**

Hydrograph



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### Summary for Subcatchment P10: P10 (RB3)

Runoff = 2.28 cfs @ 12.08 hrs, Volume= 0.181 af, Depth= 2.92"

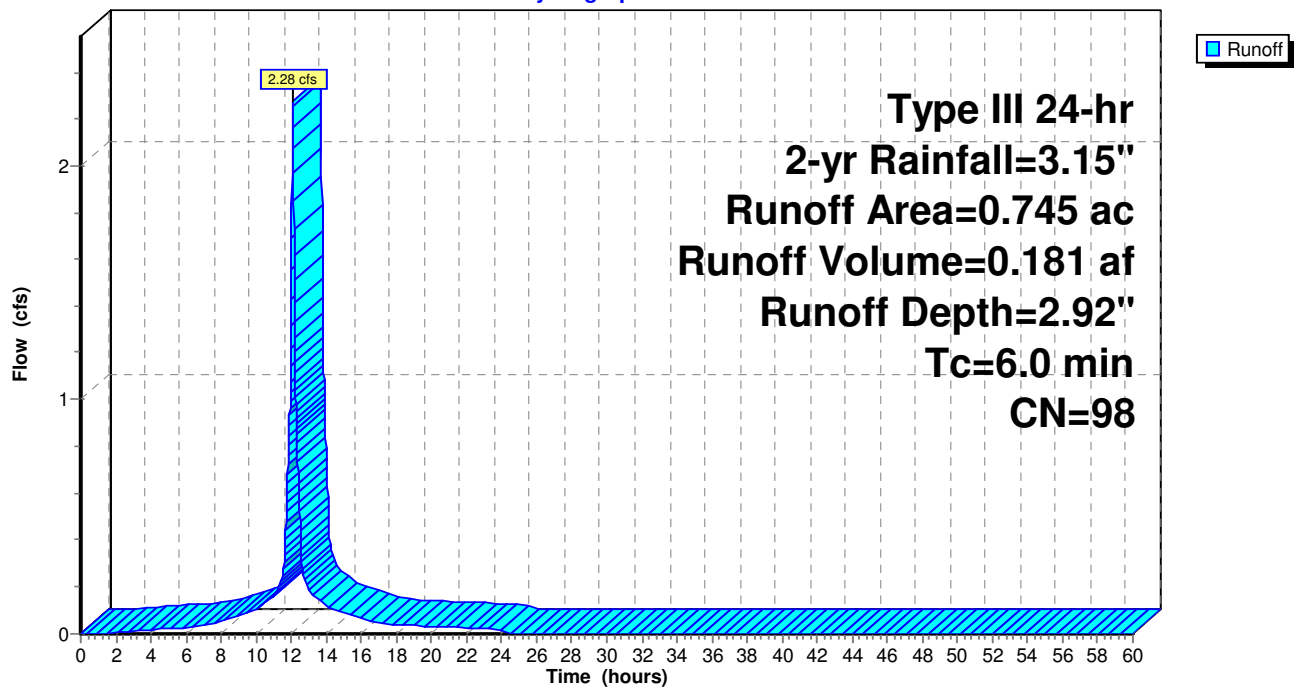
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.745   | 98 | IMPERVIOUS              |
| 0.745     |    | 100.00% Impervious Area |

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

### Subcatchment P10: P10 (RB3)

Hydrograph



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### Summary for Subcatchment P11: P11

Runoff = 7.04 cfs @ 12.08 hrs, Volume= 0.560 af, Depth= 2.92"

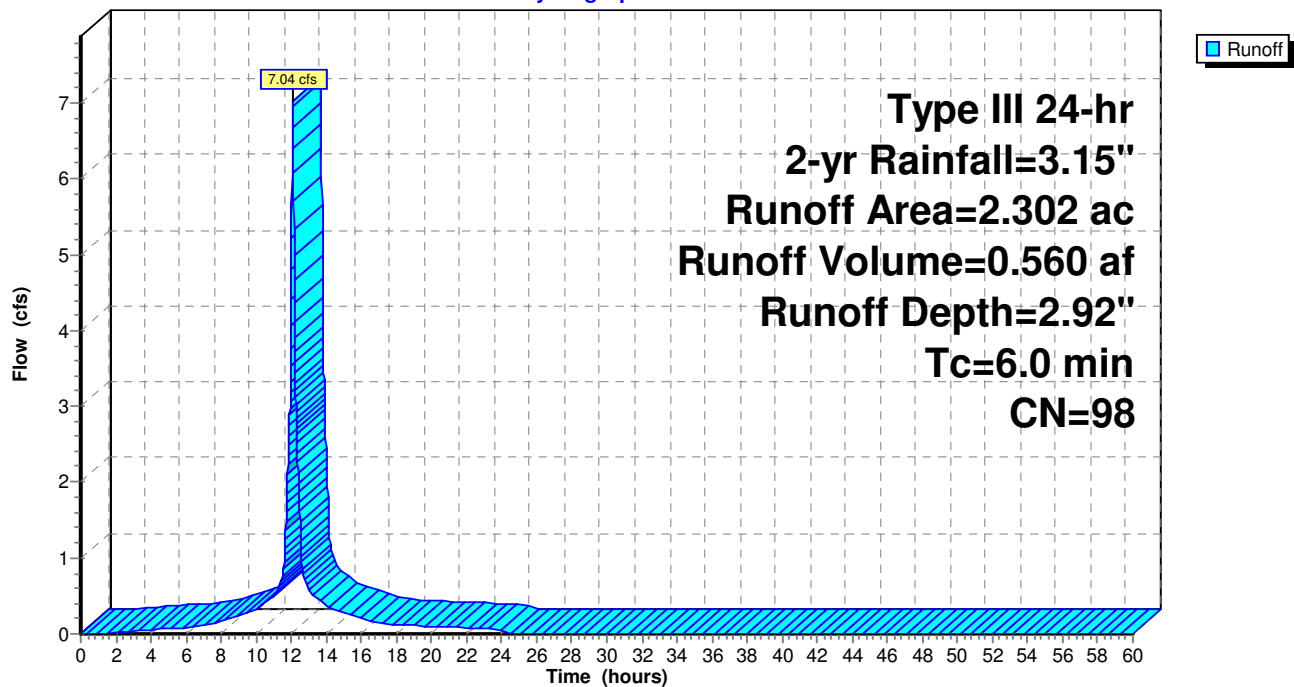
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 2.302   | 98 | IMPERVIOUS              |
| 2.302     |    | 100.00% Impervious Area |

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

### Subcatchment P11: P11

Hydrograph



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**Summary for Subcatchment P2: P2**

Runoff = 1.02 cfs @ 12.47 hrs, Volume= 0.144 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.300   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.527     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.014   | 98 | IMPERVIOUS                      |
| * 0.380   | 66 | Woods, Good, HSG B/D            |
| 0.813     | 70 | Woods, Good, HSG C              |
| 2.034     | 71 | Weighted Average                |
| 2.020     |    | 99.31% Pervious Area            |
| 0.014     |    | 0.69% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 20.1     | 100           | 0.0084        | 0.08              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"                    |
| 2.6      | 100           | 0.0084        | 0.64              |                | <b>Shallow Concentrated Flow, Grass SCF</b><br>Short Grass Pasture Kv= 7.0 fps    |
| 6.9      | 190           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps            |
| 1.3      | 124           | 0.0050        | 1.58              | 57.03          | <b>Channel Flow, Channel Flow</b><br>Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050 |
| 30.9     | 514           | Total         |                   |                |   |

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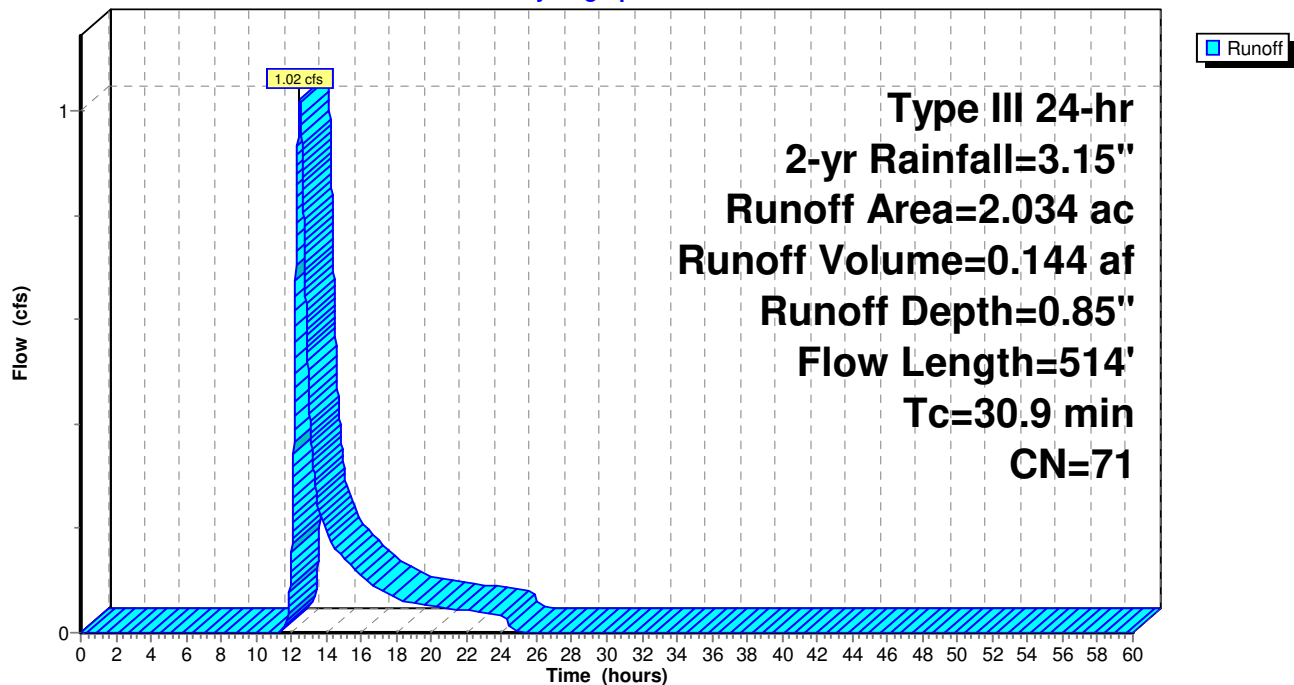
Type III 24-hr 2-yr Rainfall=3.15"

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### Subcatchment P2: P2

Hydrograph



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**Summary for Subcatchment P3: P3 (DP4)**

Runoff = 0.66 cfs @ 12.66 hrs, Volume= 0.113 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.441   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.064     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.292   | 66 | Woods, Good, HSG B/D            |
| 0.118     | 70 | Woods, Good, HSG C              |
| * 0.007   | 98 | IMPERVIOUS                      |
| 1.922     | 68 | Weighted Average                |
| 1.915     |    | 99.64% Pervious Area            |
| 0.007     |    | 0.36% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.1      | 16            | 0.2800        | 0.23              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"               |
| 25.7     | 84            | 0.0089        | 0.05              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22" |
| 14.2     | 390           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps       |
| 41.0     | 490           | Total         |                   |                |  |



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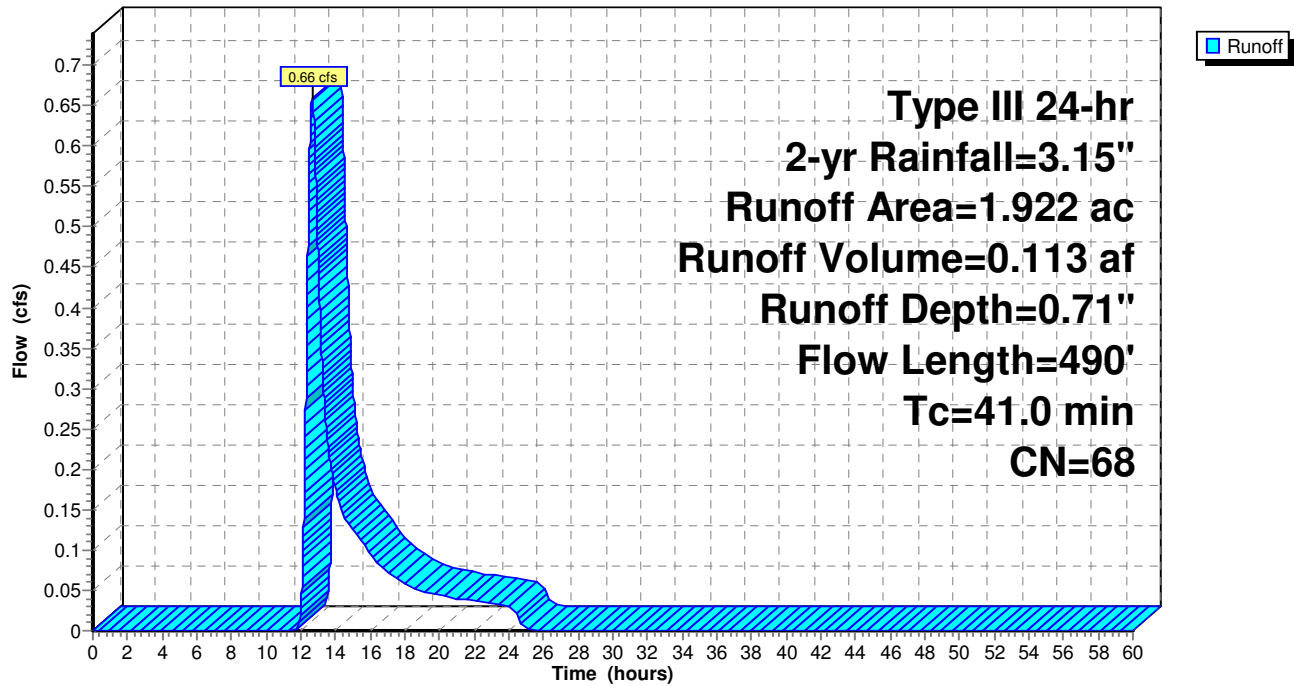
Type III 24-hr 2-yr Rainfall=3.15"

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## Subcatchment P3: P3 (DP4)

Hydrograph



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

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**Summary for Subcatchment P4: P4**

Runoff = 3.64 cfs @ 12.14 hrs, Volume= 0.298 af, Depth= 1.50"

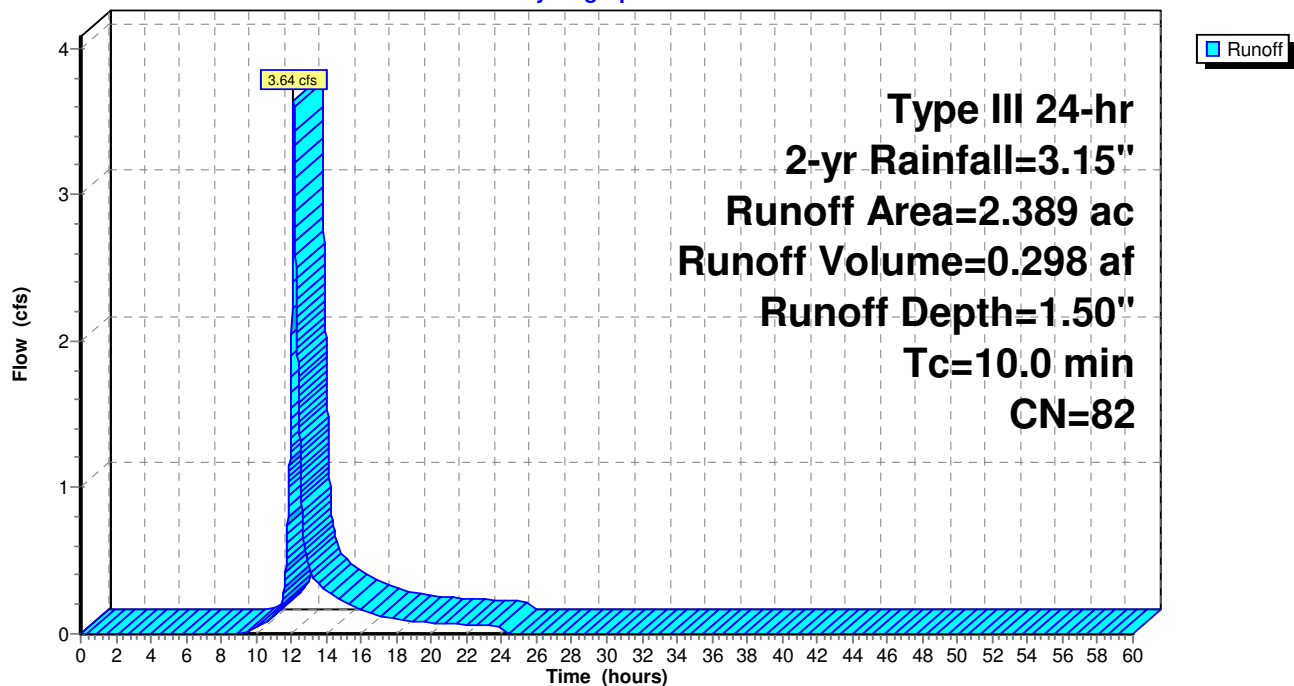
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.263     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.792   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.034     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.300   | 98 | IMPERVIOUS                      |
| 2.389     | 82 | Weighted Average                |
| 1.089     |    | 45.58% Pervious Area            |
| 1.300     |    | 54.42% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description             |
|----------|---------------|---------------|-------------------|----------------|-------------------------|
| 10.0     |               |               |                   |                | Direct Entry, estimated |

**Subcatchment P4: P4**

Hydrograph



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

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### Summary for Subcatchment P5: P5

Runoff = 11.91 cfs @ 12.14 hrs, Volume= 0.969 af, Depth= 1.79"

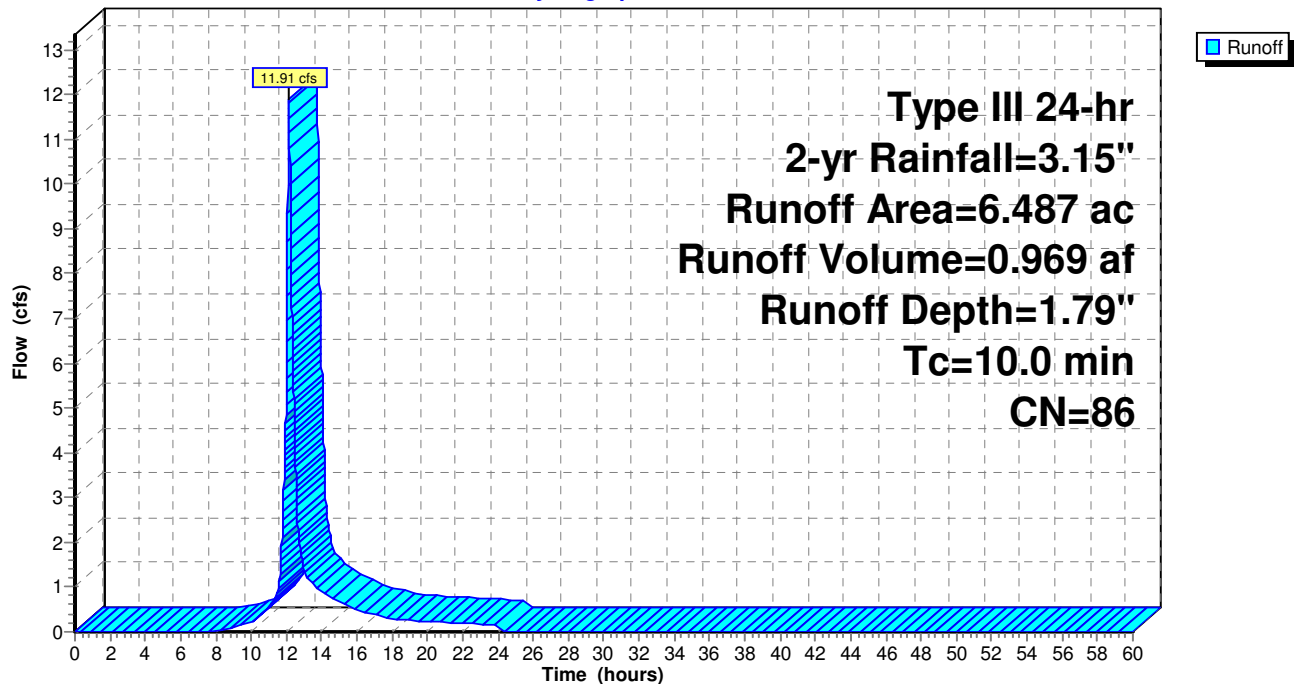
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.052   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.761   | 71 | >75% Grass cover, Good, HSG B/D |
| 1.267     | 74 | >75% Grass cover, Good, HSG C   |
| * 3.407   | 98 | IMPERVIOUS                      |
| 6.487     | 86 | Weighted Average                |
| 3.080     |    | 47.48% Pervious Area            |
| 3.407     |    | 52.52% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description             |
|----------|---------------|---------------|-------------------|----------------|-------------------------|
| 10.0     |               |               |                   |                | Direct Entry, estimated |

### Subcatchment P5: P5

Hydrograph



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### Summary for Subcatchment P6: P6

Runoff = 15.38 cfs @ 12.14 hrs, Volume= 1.257 af, Depth= 2.04"

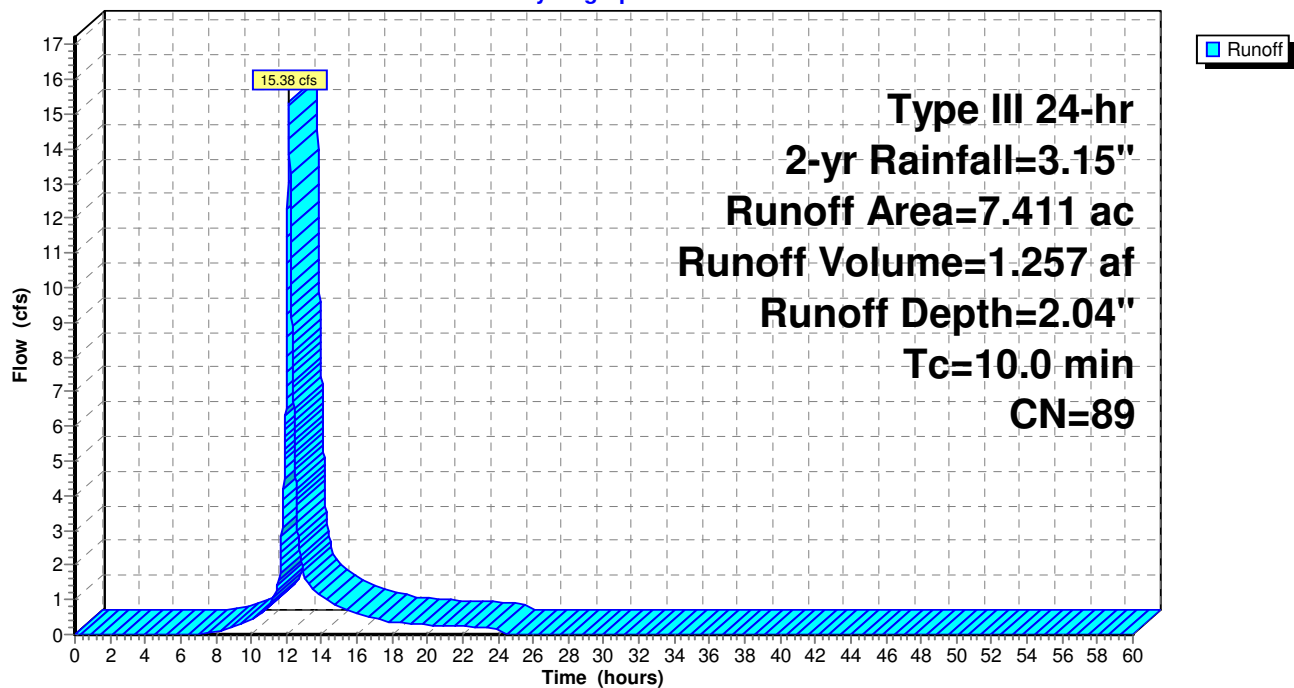
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.427     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.012   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.243   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.357     | 74 | >75% Grass cover, Good, HSG C   |
| * 5.372   | 98 | IMPERVIOUS                      |
| 7.411     | 89 | Weighted Average                |
| 2.039     |    | 27.51% Pervious Area            |
| 5.372     |    | 72.49% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description             |
|----------|---------------|---------------|-------------------|----------------|-------------------------|
| 10.0     |               |               |                   |                | Direct Entry, estimated |

### Subcatchment P6: P6

Hydrograph



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**Summary for Subcatchment P7: P7**

Runoff = 1.04 cfs @ 12.56 hrs, Volume= 0.172 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.550   | 60 | >75% Grass cover, Good, HSG A/D |
| * 0.410   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.335     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.230   | 54 | Woods, Good, HSG A/D            |
| * 0.251   | 66 | Woods, Good, HSG B/D            |
| 0.588     | 70 | Woods, Good, HSG C              |
| * 0.221   | 98 | IMPERVIOUS                      |
| 3.585     | 65 | Weighted Average                |
| 3.364     |    | 93.84% Pervious Area            |
| 0.221     |    | 6.16% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.9      | 12            | 0.2600        | 0.21              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"         |
| 21.6     | 88            | 0.0152        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"       |
| 10.0     | 371           | 0.0152        | 0.62              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps |
| 32.5     | 471           | Total         |                   |                |  |

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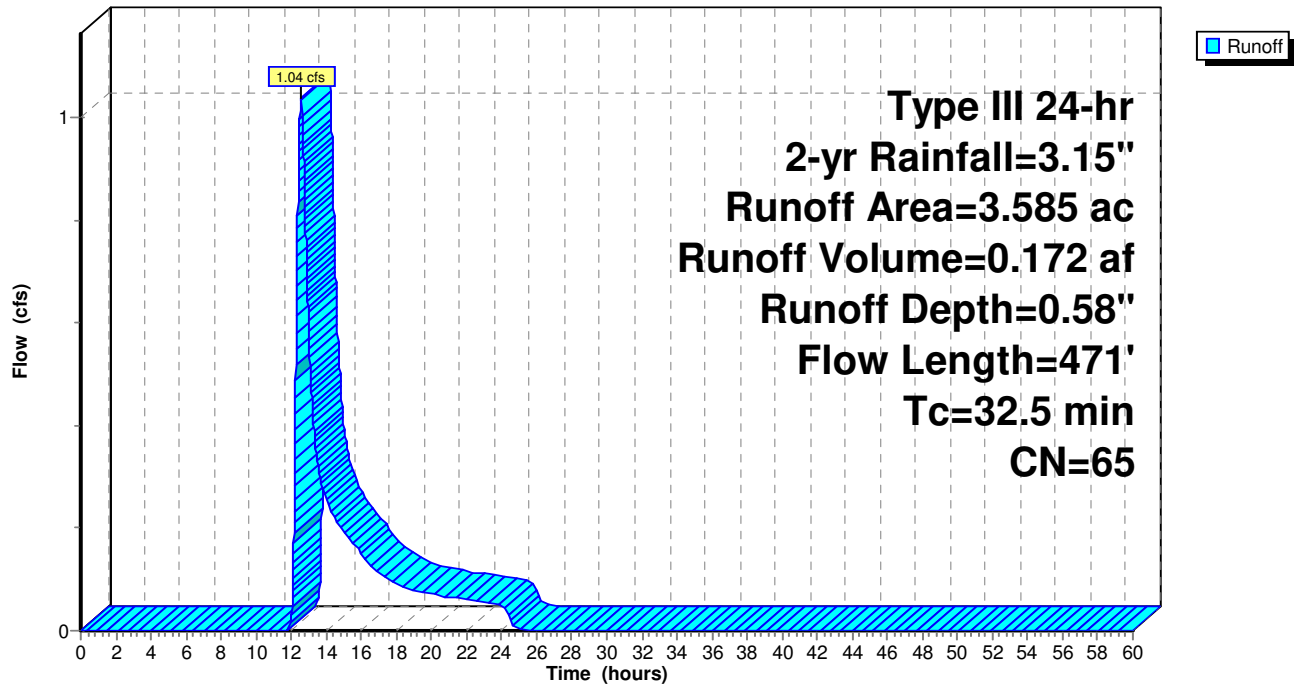
Type III 24-hr 2-yr Rainfall=3.15"

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### Subcatchment P7: P7

Hydrograph



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### Summary for Subcatchment P8: P8

Runoff = 12.62 cfs @ 12.08 hrs, Volume= 1.004 af, Depth= 2.92"

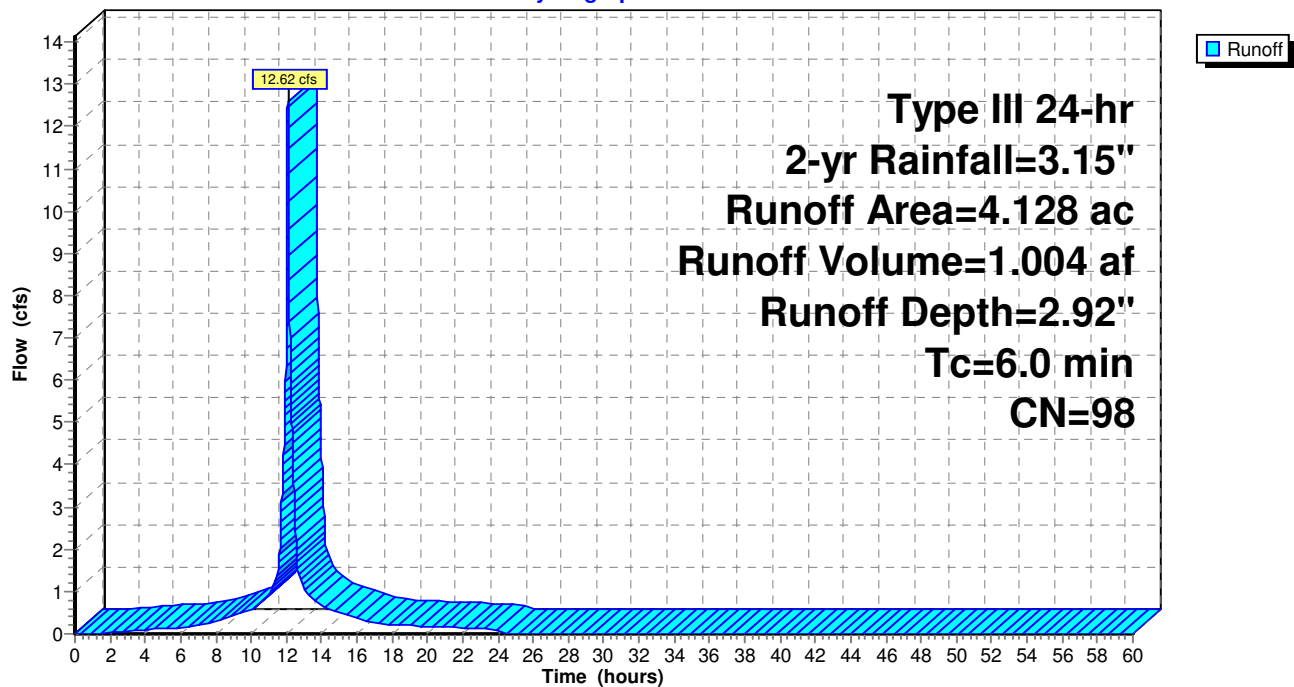
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 4.128   | 98 | IMPERVIOUS              |
| 4.128     |    | 100.00% Impervious Area |

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

### Subcatchment P8: P8

Hydrograph



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### Summary for Subcatchment P9: P9

Runoff = 3.30 cfs @ 12.08 hrs, Volume= 0.263 af, Depth= 2.92"

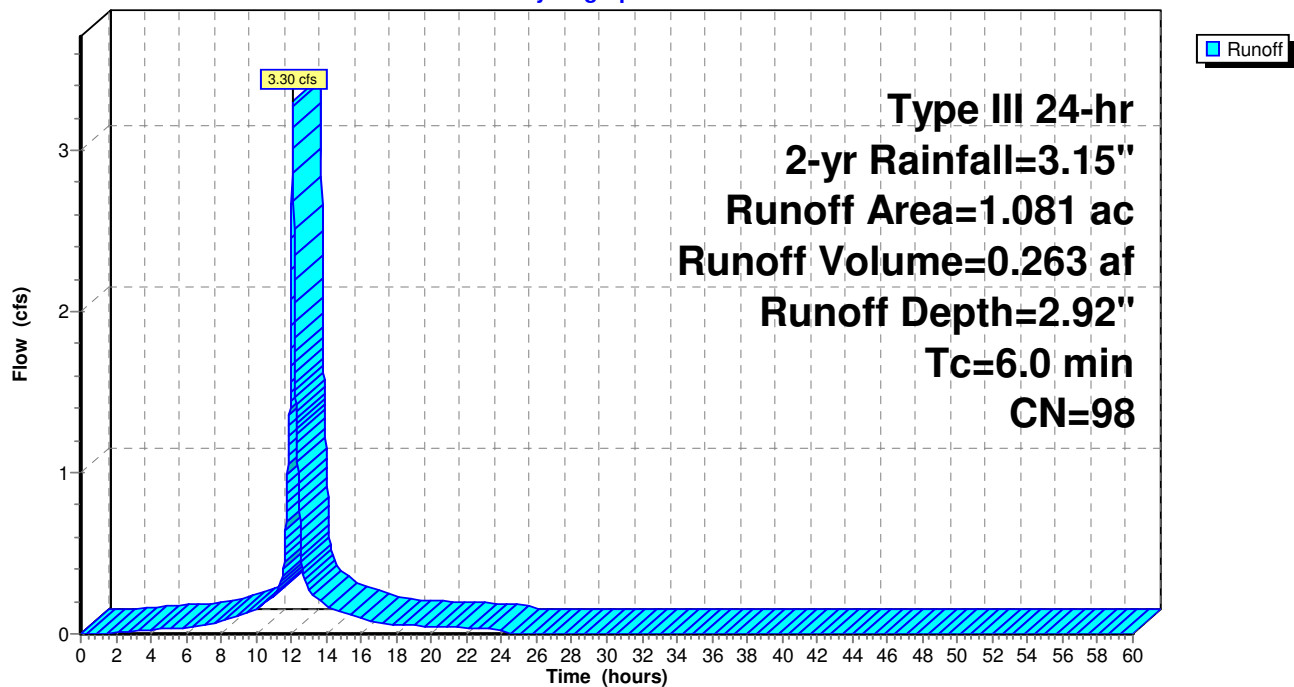
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 1.081   | 98 | IMPERVIOUS              |
| 1.081     |    | 100.00% Impervious Area |

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

### Subcatchment P9: P9

Hydrograph





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**Summary for Pond PP1: UG Chambers (CULTEC R-360)**

Inflow Area = 11.539 ac, 82.33% Impervious, Inflow Depth = 2.35" for 2-yr event  
 Inflow = 26.78 cfs @ 12.11 hrs, Volume= 2.261 af  
 Outflow = 24.21 cfs @ 12.16 hrs, Volume= 2.261 af, Atten= 10%, Lag= 3.0 min  
 Primary = 24.21 cfs @ 12.16 hrs, Volume= 2.261 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 71.00' Surf.Area= 8,790 sf Storage= 2,382 cf

Peak Elev= 72.18' @ 12.16 hrs Surf.Area= 8,790 sf Storage= 10,330 cf (7,948 cf above start)

Plug-Flow detention time= 47.0 min calculated for 2.206 af (98% of inflow)

Center-of-Mass det. time= 21.6 min ( 811.0 - 789.4 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1A    | 70.41' | 4,508 cf      | <b>7.00'W x 624.17'L x 4.00'H Field A</b><br>17,477 cf Overall - 6,206 cf Embedded = 11,271 cf x 40.0% Voids   |
| #2A    | 70.91' | 6,206 cf      | <b>Cultec R-360HD</b> x 169 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #3B    | 70.41' | 4,561 cf      | <b>7.00'W x 631.50'L x 4.00'H Field B</b><br>17,682 cf Overall - 6,279 cf Embedded = 11,403 cf x 40.0% Voids   |
| #4B    | 70.91' | 6,279 cf      | <b>Cultec R-360HD</b> x 171 Inside #3<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #5     | 74.41' | 72 cf         | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
| #6     | 75.90' | 1,752 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
|        |        | 23,378 cf     | Total Available Storage  |

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 74.41               | 48                   | 0                         | 0                         |
| 75.90               | 48                   | 72                        | 72                        |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 75.90               | 5                    | 0                         | 0                         |
| 77.00               | 3,180                | 1,752                     | 1,752                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET A</b><br>L= 34.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0147 ' / ' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET B</b>   |

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#3 Primary 71.00' L= 37.0' CPP, square edge headwall, Ke= 0.500  
Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0135 '/' Cc= 0.900  
n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf  
**30.0" Round UG1-OUTLET C**  
L= 41.0' CPP, square edge headwall, Ke= 0.500  
Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0122 '/' Cc= 0.900  
n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

**Primary OutFlow** Max=24.19 cfs @ 12.16 hrs HW=72.18' TW=70.28' (Dynamic Tailwater)

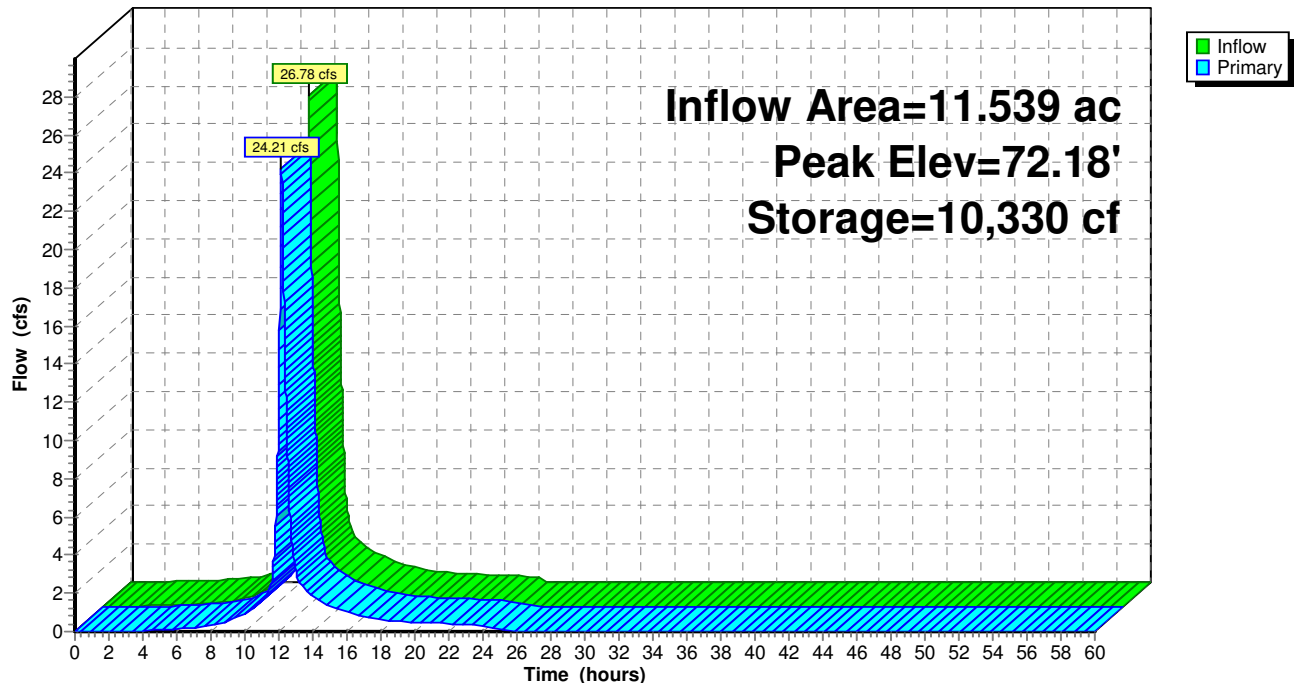
1=UG1-OUTLET A (Barrel Controls 8.14 cfs @ 5.23 fps)

2=UG1-OUTLET B (Barrel Controls 8.07 cfs @ 5.18 fps)

3=UG1-OUTLET C (Barrel Controls 7.98 cfs @ 5.13 fps)

### Pond PP1: UG Chambers (CULTEC R-360)

Hydrograph



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**Summary for Pond PP2: Water Quality Basin**

Inflow Area = 23.798 ac, 73.91% Impervious, Inflow Depth = 2.19" for 2-yr event  
 Inflow = 47.93 cfs @ 12.13 hrs, Volume= 4.350 af  
 Outflow = 1.44 cfs @ 17.21 hrs, Volume= 4.040 af, Atten= 97%, Lag= 304.6 min  
 Primary = 1.44 cfs @ 17.21 hrs, Volume= 4.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 69.40' Surf.Area= 70,371 sf Storage= 364,407 cf

Peak Elev= 71.15' @ 17.21 hrs Surf.Area= 84,827 sf Storage= 500,254 cf (135,847 cf above start)

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

Center-of-Mass det. time= 1,024.8 min ( 1,831.2 - 806.3 )

| Volume              | Invert               | Avail.Storage             | Storage Description                                    |                     |
|---------------------|----------------------|---------------------------|--|---------------------|
| #1                  | 61.00'               | 1,010,167 cf              | <b>Custom Stage Data (Conic)</b> Listed below (Recalc) |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                              | Wet.Area<br>(sq-ft) |
| 61.00               | 23,792               | 0                         | 0  | 23,792              |
| 62.00               | 27,841               | 25,790                    | 25,790   | 27,881              |
| 63.00               | 31,986               | 29,890                    | 55,680   | 32,071              |
| 64.00               | 36,230               | 34,086                    | 89,766   | 36,365              |
| 65.00               | 40,581               | 38,385                    | 128,150  | 40,771              |
| 66.00               | 45,053               | 42,798                    | 170,948  | 45,303              |
| 67.00               | 50,959               | 47,976                    | 218,924  | 51,260              |
| 68.00               | 59,020               | 54,940                    | 273,864  | 59,363              |
| 69.00               | 67,150               | 63,041                    | 336,905  | 67,542              |
| 70.00               | 75,343               | 71,207                    | 408,112  | 75,789              |
| 71.00               | 83,598               | 79,435                    | 487,547  | 84,104              |
| 72.00               | 91,912               | 87,722                    | 575,269  | 92,485              |
| 73.00               | 100,282              | 96,067                    | 671,336  | 100,926             |
| 74.00               | 108,710              | 104,468                   | 775,804  | 109,432             |
| 75.00               | 117,193              | 112,925                   | 888,729  | 117,998             |
| 76.00               | 125,734              | 121,438                   | 1,010,167  | 126,628             |

| Device | Routing  | Invert | Outlet Devices   |          |
|--------|----------|--------|--|----------|
| #1     | Primary  | 69.32' | <b>30.0" Round Culvert</b><br>L= 66.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 69.32' / 69.25' S= 0.0011 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |          |
| #2     | Device 1 | 69.32' | <b>11.0" W x 3.0" H Vert. Orifice/Grate</b>  | C= 0.600 |
| #3     | Device 1 | 71.16' | <b>33.0" W x 5.0" H Vert. Orifice/Grate</b>  | C= 0.600 |
| #4     | Device 1 | 72.00' | <b>11.0" W x 11.0" H Vert. Orifice/Grate</b>   | C= 0.600 |

**Primary OutFlow** Max=1.44 cfs @ 17.21 hrs HW=71.15' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 1.44 cfs of 11.44 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.44 cfs @ 6.29 fps)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 4=Orifice/Grate ( Controls 0.00 cfs)

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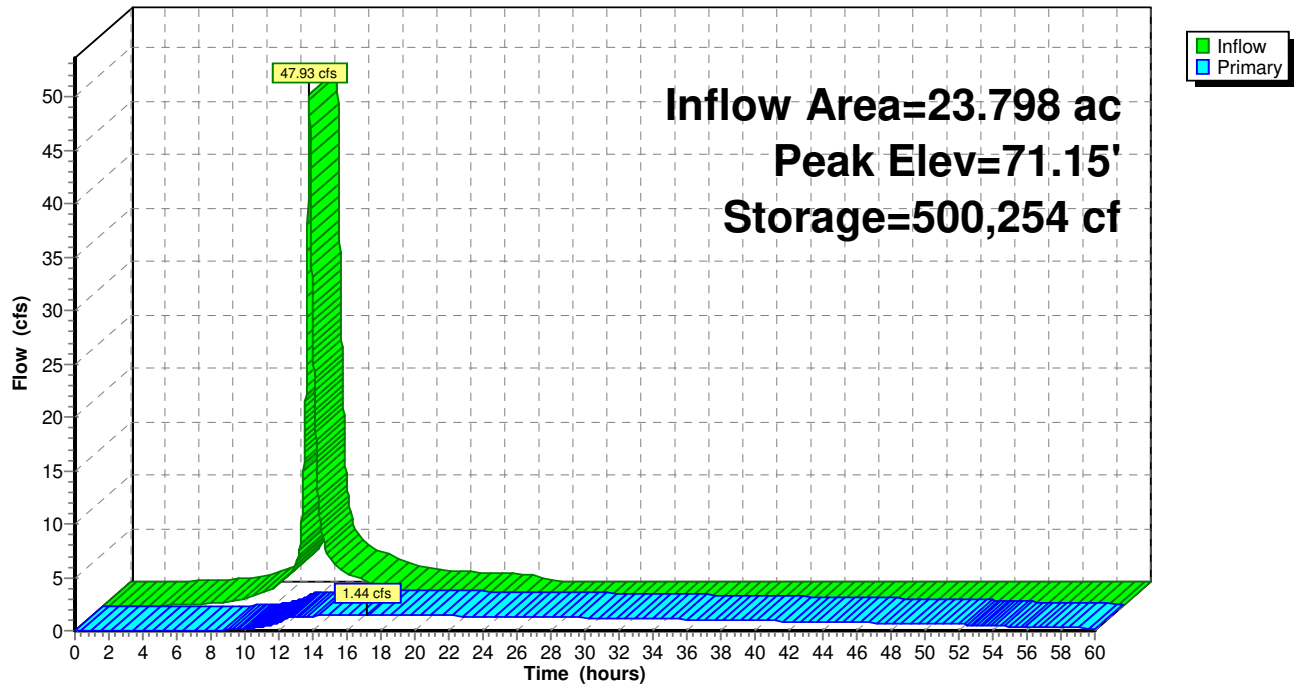
Proposed Conditions  
Type III 24-hr 2-yr Rainfall=3.15"

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## Pond PP2: Water Quality Basin

Hydrograph



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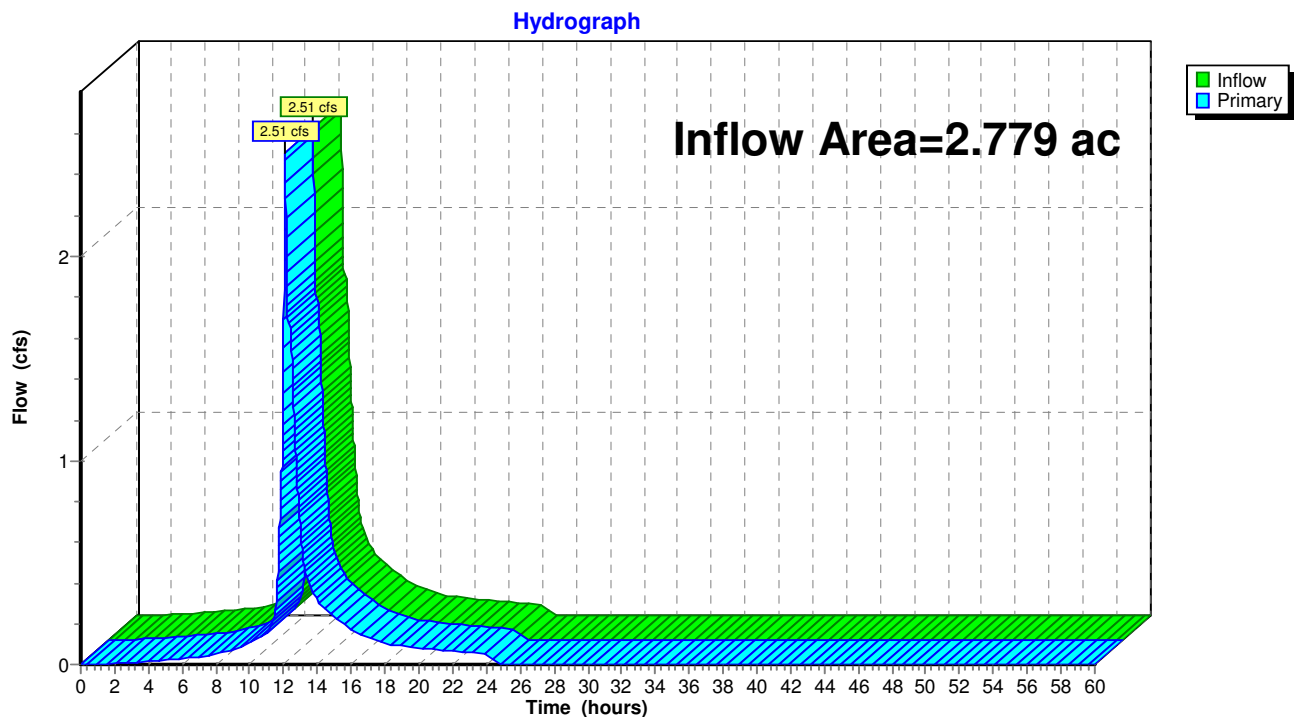
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### Summary for Link 2L: DP2

Inflow Area = 2.779 ac, 27.31% Impervious, Inflow Depth = 1.40" for 2-yr event  
Inflow = 2.51 cfs @ 12.09 hrs, Volume= 0.325 af  
Primary = 2.51 cfs @ 12.09 hrs, Volume= 0.325 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link 2L: DP2



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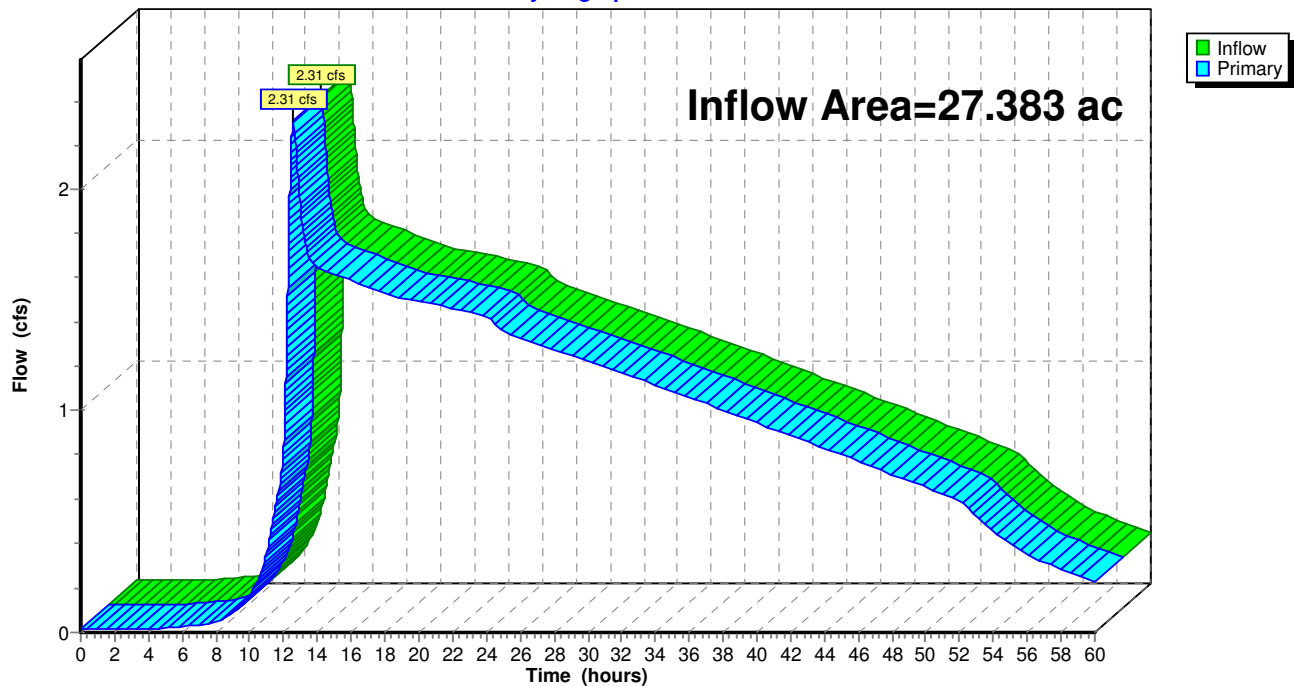
### Summary for Link DP1: DP1

Inflow Area = 27.383 ac, 65.04% Impervious, Inflow Depth > 1.85" for 2-yr event  
Inflow = 2.31 cfs @ 12.57 hrs, Volume= 4.212 af  
Primary = 2.31 cfs @ 12.57 hrs, Volume= 4.212 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP1: DP1

Hydrograph



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**Summary for Subcatchment P1: P1 (DP3)**

Runoff = 2.82 cfs @ 12.47 hrs, Volume= 0.379 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.420   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.160     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.220   | 66 | Woods, Good, HSG B/D            |
| 0.630     | 70 | Woods, Good, HSG C              |
| 2.430     | 68 | Weighted Average                |
| 2.430     |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 3.0      | 28            | 0.2100        | 0.15              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 25.5     | 72            | 0.0067        | 0.05              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 4.0      | 98            | 0.0067        | 0.41              |                | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                           |
| 32.5     | 198           | Total         |                   |                |  |

**Summary for Subcatchment P10: P10 (RB3)**

Runoff = 3.64 cfs @ 12.08 hrs, Volume= 0.295 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.745   | 98 | IMPERVIOUS              |
| 0.745     |    | 100.00% 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: P11**

Runoff = 11.24 cfs @ 12.08 hrs, Volume= 0.912 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

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| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 2.302   | 98 | IMPERVIOUS              |
| 2.302     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P2: P2**

Runoff = 2.76 cfs @ 12.46 hrs, Volume= 0.357 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.300   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.527     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.014   | 98 | IMPERVIOUS                      |
| * 0.380   | 66 | Woods, Good, HSG B/D            |
| 0.813     | 70 | Woods, Good, HSG C              |
| 2.034     | 71 | Weighted Average                |
| 2.020     |    | 99.31% Pervious Area            |
| 0.014     |    | 0.69% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 20.1     | 100           | 0.0084        | 0.08              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"                    |
| 2.6      | 100           | 0.0084        | 0.64              |                | <b>Shallow Concentrated Flow, Grass SCF</b><br>Short Grass Pasture Kv= 7.0 fps    |
| 6.9      | 190           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps            |
| 1.3      | 124           | 0.0050        | 1.58              | 57.03          | <b>Channel Flow, Channel Flow</b><br>Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050 |
| 30.9     | 514           | Total         |                   |                |   |

**Summary for Subcatchment P3: P3 (DP4)**

Runoff = 1.99 cfs @ 12.61 hrs, Volume= 0.300 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"



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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.441   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.064     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.292   | 66 | Woods, Good, HSG B/D            |
| 0.118     | 70 | Woods, Good, HSG C              |
| * 0.007   | 98 | IMPERVIOUS                      |
| 1.922     | 68 | Weighted Average                |
| 1.915     |    | 99.64% Pervious Area            |
| 0.007     |    | 0.36% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.1      | 16            | 0.2800        | 0.23              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"               |
| 25.7     | 84            | 0.0089        | 0.05              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22" |
| 14.2     | 390           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps       |
| 41.0     | 490           | Total         |                   |                |  |

**Summary for Subcatchment P4: P4**

Runoff = 7.50 cfs @ 12.14 hrs, Volume= 0.611 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.263     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.792   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.034     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.300   | 98 | IMPERVIOUS                      |
| 2.389     | 82 | Weighted Average                |
| 1.089     |    | 45.58% Pervious Area            |
| 1.300     |    | 54.42% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                    |
|----------|---------------|---------------|-------------------|----------------|--------------------------------|
| 10.0     |               |               |                   |                | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P5: P5**

Runoff = 22.70 cfs @ 12.14 hrs, Volume= 1.869 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.052   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.761   | 71 | >75% Grass cover, Good, HSG B/D |
| 1.267     | 74 | >75% Grass cover, Good, HSG C   |
| * 3.407   | 98 | IMPERVIOUS                      |
| 6.487     | 86 | Weighted Average                |
| 3.080     |    | 47.48% Pervious Area            |
| 3.407     |    | 52.52% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description             |
|-------------|------------------|------------------|----------------------|-------------------|-------------------------|
| 10.0        |                  |                  |                      |                   | Direct Entry, estimated |

**Summary for Subcatchment P6: P6**

Runoff = 27.81 cfs @ 12.14 hrs, Volume= 2.324 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.427     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.012   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.243   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.357     | 74 | >75% Grass cover, Good, HSG C   |
| * 5.372   | 98 | IMPERVIOUS                      |
| 7.411     | 89 | Weighted Average                |
| 2.039     |    | 27.51% Pervious Area            |
| 5.372     |    | 72.49% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description             |
|-------------|------------------|------------------|----------------------|-------------------|-------------------------|
| 10.0        |                  |                  |                      |                   | Direct Entry, estimated |

**Summary for Subcatchment P7: P7**

Runoff = 3.58 cfs @ 12.49 hrs, Volume= 0.492 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.550   | 60 | >75% Grass cover, Good, HSG A/D |
| * 0.410   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.335     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.230   | 54 | Woods, Good, HSG A/D            |
| * 0.251   | 66 | Woods, Good, HSG B/D            |
| 0.588     | 70 | Woods, Good, HSG C              |
| * 0.221   | 98 | IMPERVIOUS                      |
| 3.585     | 65 | Weighted Average                |
| 3.364     |    | 93.84% Pervious Area            |
| 0.221     |    | 6.16% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.9      | 12            | 0.2600        | 0.21              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"         |
| 21.6     | 88            | 0.0152        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"       |
| 10.0     | 371           | 0.0152        | 0.62              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps |
| 32.5     | 471           | Total         |                   |                |  |

**Summary for Subcatchment P8: P8**

Runoff = 20.15 cfs @ 12.08 hrs, Volume= 1.635 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 4.128   | 98 | IMPERVIOUS              |
| 4.128     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P9: P9**

Runoff = 5.28 cfs @ 12.08 hrs, Volume= 0.428 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=4.99"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 1.081   | 98 | IMPERVIOUS              |
| 1.081     |    | 100.00% Impervious Area |

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

**Summary for Pond PP1: UG Chambers (CULTEC R-360)**

Inflow Area = 11.539 ac, 82.33% Impervious, Inflow Depth = 4.12" for 10-yr event  
 Inflow = 46.05 cfs @ 12.11 hrs, Volume= 3.959 af  
 Outflow = 42.83 cfs @ 12.15 hrs, Volume= 3.958 af, Atten= 7%, Lag= 2.5 min  
 Primary = 42.83 cfs @ 12.15 hrs, Volume= 3.958 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 71.00' Surf.Area= 8,790 sf Storage= 2,382 cf

Peak Elev= 72.68' @ 12.15 hrs Surf.Area= 8,790 sf Storage= 13,472 cf (11,090 cf above start)

Plug-Flow detention time= 43.1 min calculated for 3.903 af (99% of inflow)

Center-of-Mass det. time= 27.2 min ( 804.7 - 777.5 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1A    | 70.41' | 4,508 cf      | <b>7.00'W x 624.17'L x 4.00'H Field A</b><br>17,477 cf Overall - 6,206 cf Embedded = 11,271 cf x 40.0% Voids   |
| #2A    | 70.91' | 6,206 cf      | <b>Cultec R-360HD</b> x 169 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #3B    | 70.41' | 4,561 cf      | <b>7.00'W x 631.50'L x 4.00'H Field B</b><br>17,682 cf Overall - 6,279 cf Embedded = 11,403 cf x 40.0% Voids   |
| #4B    | 70.91' | 6,279 cf      | <b>Cultec R-360HD</b> x 171 Inside #3<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #5     | 74.41' | 72 cf         | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
| #6     | 75.90' | 1,752 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
|        |        | 23,378 cf     | Total Available Storage  |

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 74.41               | 48                   | 0                         | 0                         |
| 75.90               | 48                   | 72                        | 72                        |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 75.90               | 5                    | 0                         | 0                         |
| 77.00               | 3,180                | 1,752                     | 1,752                     |

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| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET A</b><br>L= 34.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0147 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET B</b><br>L= 37.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0135 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #3     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET C</b><br>L= 41.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0122 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |

**Primary OutFlow** Max=42.83 cfs @ 12.15 hrs HW=72.68' TW=71.02' (Dynamic Tailwater)

1=UG1-OUTLET A (Barrel Controls 14.38 cfs @ 5.79 fps)  
 2=UG1-OUTLET B (Barrel Controls 14.28 cfs @ 5.75 fps)  
 3=UG1-OUTLET C (Barrel Controls 14.16 cfs @ 5.71 fps)

### Summary for Pond PP2: Water Quality Basin

Inflow Area = 23.798 ac, 73.91% Impervious, Inflow Depth = 3.92" for 10-yr event  
 Inflow = 86.48 cfs @ 12.13 hrs, Volume= 7.778 af  
 Outflow = 5.97 cfs @ 13.98 hrs, Volume= 7.350 af, Atten= 93%, Lag= 110.7 min  
 Primary = 5.97 cfs @ 13.98 hrs, Volume= 7.350 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 69.40' Surf.Area= 70,371 sf Storage= 364,407 cf

Peak Elev= 71.96' @ 13.98 hrs Surf.Area= 91,567 sf Storage= 571,542 cf (207,135 cf above start)

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

Center-of-Mass det. time= 752.2 min ( 1,549.1 - 797.0 )

| Volume | Invert | Avail.Storage | Storage Description                                    |
|--------|--------|---------------|--|
| #1     | 61.00' | 1,010,167 cf  | <b>Custom Stage Data (Conic)</b> Listed below (Recalc) |

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 61.00               | 23,792               | 0                         | 0                         | 23,792              |
| 62.00               | 27,841               | 25,790                    | 25,790                    | 27,881              |
| 63.00               | 31,986               | 29,890                    | 55,680                    | 32,071              |
| 64.00               | 36,230               | 34,086                    | 89,766                    | 36,365              |
| 65.00               | 40,581               | 38,385                    | 128,150                   | 40,771              |
| 66.00               | 45,053               | 42,798                    | 170,948                   | 45,303              |
| 67.00               | 50,959               | 47,976                    | 218,924                   | 51,260              |
| 68.00               | 59,020               | 54,940                    | 273,864                   | 59,363              |
| 69.00               | 67,150               | 63,041                    | 336,905                   | 67,542              |
| 70.00               | 75,343               | 71,207                    | 408,112                   | 75,789              |
| 71.00               | 83,598               | 79,435                    | 487,547                   | 84,104              |
| 72.00               | 91,912               | 87,722                    | 575,269                   | 92,485              |
| 73.00               | 100,282              | 96,067                    | 671,336                   | 100,926             |
| 74.00               | 108,710              | 104,468                   | 775,804                   | 109,432             |
| 75.00               | 117,193              | 112,925                   | 888,729                   | 117,998             |
| 76.00               | 125,734              | 121,438                   | 1,010,167                 | 126,628             |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 69.32' | <b>30.0" Round Culvert</b><br>L= 66.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 69.32' / 69.25' S= 0.0011 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Device 1 | 69.32' | <b>11.0" W x 3.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 71.16' | <b>33.0" W x 5.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 72.00' | <b>11.0" W x 11.0" H Vert. Orifice/Grate</b> C= 0.600  |

**Primary OutFlow** Max=5.97 cfs @ 13.98 hrs HW=71.96' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 5.97 cfs of 20.73 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.75 cfs @ 7.63 fps)  
 3=Orifice/Grate (Orifice Controls 4.22 cfs @ 3.68 fps)  
 4=Orifice/Grate (Controls 0.00 cfs)

**Summary for Link 2L: DP2**

Inflow Area = 2.779 ac, 27.31% Impervious, Inflow Depth = 2.82" for 10-yr event  
 Inflow = 4.59 cfs @ 12.09 hrs, Volume= 0.653 af  
 Primary = 4.59 cfs @ 12.09 hrs, Volume= 0.653 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP1: DP1**

Inflow Area = 27.383 ac, 65.04% Impervious, Inflow Depth > 3.44" for 10-yr event  
 Inflow = 8.64 cfs @ 12.57 hrs, Volume= 7.842 af  
 Primary = 8.64 cfs @ 12.57 hrs, Volume= 7.842 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P1: P1 (DP3)**

Runoff = 4.18 cfs @ 12.46 hrs, Volume= 0.551 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.420   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.160     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.220   | 66 | Woods, Good, HSG B/D            |
| 0.630     | 70 | Woods, Good, HSG C              |
| 2.430     | 68 | Weighted Average                |
| 2.430     |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 3.0      | 28            | 0.2100        | 0.15              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 25.5     | 72            | 0.0067        | 0.05              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 4.0      | 98            | 0.0067        | 0.41              |                | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                           |
| 32.5     | 198           | Total         |                   |                |  |

**Summary for Subcatchment P10: P10 (RB3)**

Runoff = 4.48 cfs @ 12.08 hrs, Volume= 0.366 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.745   | 98 | IMPERVIOUS              |
| 0.745     |    | 100.00% 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: P11**

Runoff = 13.83 cfs @ 12.08 hrs, Volume= 1.130 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

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| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 2.302   | 98 | IMPERVIOUS              |
| 2.302     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P2: P2**

Runoff = 3.97 cfs @ 12.43 hrs, Volume= 0.509 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.300   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.527     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.014   | 98 | IMPERVIOUS                      |
| * 0.380   | 66 | Woods, Good, HSG B/D            |
| 0.813     | 70 | Woods, Good, HSG C              |
| 2.034     | 71 | Weighted Average                |
| 2.020     |    | 99.31% Pervious Area            |
| 0.014     |    | 0.69% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 20.1     | 100           | 0.0084        | 0.08              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"                    |
| 2.6      | 100           | 0.0084        | 0.64              |                | <b>Shallow Concentrated Flow, Grass SCF</b><br>Short Grass Pasture Kv= 7.0 fps    |
| 6.9      | 190           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps            |
| 1.3      | 124           | 0.0050        | 1.58              | 57.03          | <b>Channel Flow, Channel Flow</b><br>Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050 |
| 30.9     | 514           | Total         |                   |                |   |

**Summary for Subcatchment P3: P3 (DP4)**

Runoff = 2.94 cfs @ 12.58 hrs, Volume= 0.436 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"



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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.441   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.064     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.292   | 66 | Woods, Good, HSG B/D            |
| 0.118     | 70 | Woods, Good, HSG C              |
| * 0.007   | 98 | IMPERVIOUS                      |
| 1.922     | 68 | Weighted Average                |
| 1.915     |    | 99.64% Pervious Area            |
| 0.007     |    | 0.36% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.1      | 16            | 0.2800        | 0.23              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"               |
| 25.7     | 84            | 0.0089        | 0.05              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22" |
| 14.2     | 390           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps       |
| 41.0     | 490           | Total         |                   |                |  |

**Summary for Subcatchment P4: P4**

Runoff = 9.97 cfs @ 12.14 hrs, Volume= 0.818 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.263     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.792   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.034     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.300   | 98 | IMPERVIOUS                      |
| 2.389     | 82 | Weighted Average                |
| 1.089     |    | 45.58% Pervious Area            |
| 1.300     |    | 54.42% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                    |
|----------|---------------|---------------|-------------------|----------------|--------------------------------|
| 10.0     |               |               |                   |                | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P5: P5**

Runoff = 29.45 cfs @ 12.14 hrs, Volume= 2.451 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.052   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.761   | 71 | >75% Grass cover, Good, HSG B/D |
| 1.267     | 74 | >75% Grass cover, Good, HSG C   |
| * 3.407   | 98 | IMPERVIOUS                      |
| 6.487     | 86 | Weighted Average                |
| 3.080     |    | 47.48% Pervious Area            |
| 3.407     |    | 52.52% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                    |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------|
| 10.0        |                  |                  |                      |                   | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P6: P6**

Runoff = 35.48 cfs @ 12.14 hrs, Volume= 3.002 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.427     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.012   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.243   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.357     | 74 | >75% Grass cover, Good, HSG C   |
| * 5.372   | 98 | IMPERVIOUS                      |
| 7.411     | 89 | Weighted Average                |
| 2.039     |    | 27.51% Pervious Area            |
| 5.372     |    | 72.49% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                    |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------|
| 10.0        |                  |                  |                      |                   | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P7: P7**

Runoff = 5.48 cfs @ 12.46 hrs, Volume= 0.731 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.550   | 60 | >75% Grass cover, Good, HSG A/D |
| * 0.410   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.335     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.230   | 54 | Woods, Good, HSG A/D            |
| * 0.251   | 66 | Woods, Good, HSG B/D            |
| 0.588     | 70 | Woods, Good, HSG C              |
| * 0.221   | 98 | IMPERVIOUS                      |
| 3.585     | 65 | Weighted Average                |
| 3.364     |    | 93.84% Pervious Area            |
| 0.221     |    | 6.16% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.9      | 12            | 0.2600        | 0.21              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"         |
| 21.6     | 88            | 0.0152        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"       |
| 10.0     | 371           | 0.0152        | 0.62              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps |
| 32.5     | 471           | Total         |                   |                |  |

**Summary for Subcatchment P8: P8**

Runoff = 24.80 cfs @ 12.08 hrs, Volume= 2.027 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 4.128   | 98 | IMPERVIOUS              |
| 4.128     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P9: P9**

Runoff = 6.50 cfs @ 12.08 hrs, Volume= 0.531 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.13"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 1.081   | 98 | IMPERVIOUS              |
| 1.081     |    | 100.00% Impervious Area |

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

**Summary for Pond PP1: UG Chambers (CULTEC R-360)**

Inflow Area = 11.539 ac, 82.33% Impervious, Inflow Depth = 5.23" for 25-yr event  
 Inflow = 57.95 cfs @ 12.11 hrs, Volume= 5.029 af  
 Outflow = 54.43 cfs @ 12.15 hrs, Volume= 5.028 af, Atten= 6%, Lag= 2.3 min  
 Primary = 54.43 cfs @ 12.15 hrs, Volume= 5.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 71.00' Surf.Area= 8,790 sf Storage= 2,382 cf

Peak Elev= 72.97' @ 12.15 hrs Surf.Area= 8,790 sf Storage= 15,163 cf (12,781 cf above start)

Plug-Flow detention time= 43.3 min calculated for 4.974 af (99% of inflow)

Center-of-Mass det. time= 30.0 min ( 802.5 - 772.5 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1A    | 70.41' | 4,508 cf      | <b>7.00'W x 624.17'L x 4.00'H Field A</b><br>17,477 cf Overall - 6,206 cf Embedded = 11,271 cf x 40.0% Voids   |
| #2A    | 70.91' | 6,206 cf      | <b>Cultec R-360HD</b> x 169 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #3B    | 70.41' | 4,561 cf      | <b>7.00'W x 631.50'L x 4.00'H Field B</b><br>17,682 cf Overall - 6,279 cf Embedded = 11,403 cf x 40.0% Voids   |
| #4B    | 70.91' | 6,279 cf      | <b>Cultec R-360HD</b> x 171 Inside #3<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #5     | 74.41' | 72 cf         | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
| #6     | 75.90' | 1,752 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
|        |        | 23,378 cf     | Total Available Storage  |

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 74.41               | 48                   | 0                         | 0                         |
| 75.90               | 48                   | 72                        | 72                        |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 75.90               | 5                    | 0                         | 0                         |
| 77.00               | 3,180                | 1,752                     | 1,752                     |

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| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET A</b><br>L= 34.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0147 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET B</b><br>L= 37.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0135 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #3     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET C</b><br>L= 41.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0122 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |

**Primary OutFlow** Max=54.39 cfs @ 12.15 hrs HW=72.96' TW=71.49' (Dynamic Tailwater)

1=UG1-OUTLET A (Barrel Controls 18.25 cfs @ 6.06 fps)  
 2=UG1-OUTLET B (Barrel Controls 18.14 cfs @ 6.03 fps)  
 3=UG1-OUTLET C (Barrel Controls 18.00 cfs @ 5.98 fps)

### Summary for Pond PP2: Water Quality Basin

Inflow Area = 23.798 ac, 73.91% Impervious, Inflow Depth = 5.02" for 25-yr event  
 Inflow = 110.61 cfs @ 12.13 hrs, Volume= 9.958 af  
 Outflow = 8.81 cfs @ 13.56 hrs, Volume= 9.484 af, Atten= 92%, Lag= 86.1 min  
 Primary = 8.81 cfs @ 13.56 hrs, Volume= 9.484 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3  
 Starting Elev= 69.40' Surf.Area= 70,371 sf Storage= 364,407 cf  
 Peak Elev= 72.50' @ 13.56 hrs Surf.Area= 96,025 sf Storage= 621,949 cf (257,543 cf above start)

Plug-Flow detention time= 2,527.9 min calculated for 1.118 af (11% of inflow)  
 Center-of-Mass det. time= 657.9 min ( 1,451.1 - 793.2 )

| Volume | Invert | Avail.Storage | Storage Description                                    |
|--------|--------|---------------|--|
| #1     | 61.00' | 1,010,167 cf  | <b>Custom Stage Data (Conic)</b> Listed below (Recalc) |

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 61.00               | 23,792               | 0                         | 0                         | 23,792              |
| 62.00               | 27,841               | 25,790                    | 25,790                    | 27,881              |
| 63.00               | 31,986               | 29,890                    | 55,680                    | 32,071              |
| 64.00               | 36,230               | 34,086                    | 89,766                    | 36,365              |
| 65.00               | 40,581               | 38,385                    | 128,150                   | 40,771              |
| 66.00               | 45,053               | 42,798                    | 170,948                   | 45,303              |
| 67.00               | 50,959               | 47,976                    | 218,924                   | 51,260              |
| 68.00               | 59,020               | 54,940                    | 273,864                   | 59,363              |
| 69.00               | 67,150               | 63,041                    | 336,905                   | 67,542              |
| 70.00               | 75,343               | 71,207                    | 408,112                   | 75,789              |
| 71.00               | 83,598               | 79,435                    | 487,547                   | 84,104              |
| 72.00               | 91,912               | 87,722                    | 575,269                   | 92,485              |
| 73.00               | 100,282              | 96,067                    | 671,336                   | 100,926             |
| 74.00               | 108,710              | 104,468                   | 775,804                   | 109,432             |
| 75.00               | 117,193              | 112,925                   | 888,729                   | 117,998             |
| 76.00               | 125,734              | 121,438                   | 1,010,167                 | 126,628             |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 69.32' | <b>30.0" Round Culvert</b><br>L= 66.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 69.32' / 69.25' S= 0.0011 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Device 1 | 69.32' | <b>11.0" W x 3.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 71.16' | <b>33.0" W x 5.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 72.00' | <b>11.0" W x 11.0" H Vert. Orifice/Grate</b> C= 0.600  |

**Primary OutFlow** Max=8.81 cfs @ 13.56 hrs HW=72.50' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 8.81 cfs of 25.87 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.93 cfs @ 8.41 fps)  
 3=Orifice/Grate (Orifice Controls 5.85 cfs @ 5.11 fps)  
 4=Orifice/Grate (Orifice Controls 1.03 cfs @ 2.26 fps)

**Summary for Link 2L: DP2**

Inflow Area = 2.779 ac, 27.31% Impervious, Inflow Depth = 3.78" for 25-yr event  
 Inflow = 5.97 cfs @ 12.09 hrs, Volume= 0.875 af  
 Primary = 5.97 cfs @ 12.09 hrs, Volume= 0.875 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP1: DP1**

Inflow Area = 27.383 ac, 65.04% Impervious, Inflow Depth > 4.48" for 25-yr event  
 Inflow = 13.20 cfs @ 12.54 hrs, Volume= 10.215 af  
 Primary = 13.20 cfs @ 12.54 hrs, Volume= 10.215 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P1: P1 (DP3)**

Runoff = 5.24 cfs @ 12.46 hrs, Volume= 0.686 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.420   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.160     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.220   | 66 | Woods, Good, HSG B/D            |
| 0.630     | 70 | Woods, Good, HSG C              |
| 2.430     | 68 | Weighted Average                |
| 2.430     |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 3.0      | 28            | 0.2100        | 0.15              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 25.5     | 72            | 0.0067        | 0.05              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 4.0      | 98            | 0.0067        | 0.41              |                | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                           |
| 32.5     | 198           | Total         |                   |                |  |

**Summary for Subcatchment P10: P10 (RB3)**

Runoff = 5.09 cfs @ 12.08 hrs, Volume= 0.418 af, Depth= 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.745   | 98 | IMPERVIOUS              |
| 0.745     |    | 100.00% 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: P11**

Runoff = 15.74 cfs @ 12.08 hrs, Volume= 1.291 af, Depth= 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

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| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 2.302   | 98 | IMPERVIOUS              |
| 2.302     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P2: P2**

Runoff = 4.91 cfs @ 12.43 hrs, Volume= 0.627 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.300   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.527     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.014   | 98 | IMPERVIOUS                      |
| * 0.380   | 66 | Woods, Good, HSG B/D            |
| 0.813     | 70 | Woods, Good, HSG C              |
| 2.034     | 71 | Weighted Average                |
| 2.020     |    | 99.31% Pervious Area            |
| 0.014     |    | 0.69% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 20.1     | 100           | 0.0084        | 0.08              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"                    |
| 2.6      | 100           | 0.0084        | 0.64              |                | <b>Shallow Concentrated Flow, Grass SCF</b><br>Short Grass Pasture Kv= 7.0 fps    |
| 6.9      | 190           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps            |
| 1.3      | 124           | 0.0050        | 1.58              | 57.03          | <b>Channel Flow, Channel Flow</b><br>Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050 |
| 30.9     | 514           | Total         |                   |                |   |

**Summary for Subcatchment P3: P3 (DP4)**

Runoff = 3.69 cfs @ 12.57 hrs, Volume= 0.542 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"



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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.441   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.064     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.292   | 66 | Woods, Good, HSG B/D            |
| 0.118     | 70 | Woods, Good, HSG C              |
| * 0.007   | 98 | IMPERVIOUS                      |
| 1.922     | 68 | Weighted Average                |
| 1.915     |    | 99.64% Pervious Area            |
| 0.007     |    | 0.36% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.1      | 16            | 0.2800        | 0.23              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"               |
| 25.7     | 84            | 0.0089        | 0.05              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22" |
| 14.2     | 390           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps       |
| 41.0     | 490           | Total         |                   |                |  |

**Summary for Subcatchment P4: P4**

Runoff = 11.80 cfs @ 12.14 hrs, Volume= 0.973 af, Depth= 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.263     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.792   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.034     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.300   | 98 | IMPERVIOUS                      |
| 2.389     | 82 | Weighted Average                |
| 1.089     |    | 45.58% Pervious Area            |
| 1.300     |    | 54.42% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                    |
|----------|---------------|---------------|-------------------|----------------|--------------------------------|
| 10.0     |               |               |                   |                | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P5: P5**

Runoff = 34.41 cfs @ 12.14 hrs, Volume= 2.885 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.052   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.761   | 71 | >75% Grass cover, Good, HSG B/D |
| 1.267     | 74 | >75% Grass cover, Good, HSG C   |
| * 3.407   | 98 | IMPERVIOUS                      |
| 6.487     | 86 | Weighted Average                |
| 3.080     |    | 47.48% Pervious Area            |
| 3.407     |    | 52.52% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                    |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------|
| 10.0        |                  |                  |                      |                   | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P6: P6**

Runoff = 41.10 cfs @ 12.14 hrs, Volume= 3.507 af, Depth= 5.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.427     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.012   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.243   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.357     | 74 | >75% Grass cover, Good, HSG C   |
| * 5.372   | 98 | IMPERVIOUS                      |
| 7.411     | 89 | Weighted Average                |
| 2.039     |    | 27.51% Pervious Area            |
| 5.372     |    | 72.49% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                    |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------|
| 10.0        |                  |                  |                      |                   | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P7: P7**

Runoff = 6.98 cfs @ 12.46 hrs, Volume= 0.920 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.550   | 60 | >75% Grass cover, Good, HSG A/D |
| * 0.410   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.335     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.230   | 54 | Woods, Good, HSG A/D            |
| * 0.251   | 66 | Woods, Good, HSG B/D            |
| 0.588     | 70 | Woods, Good, HSG C              |
| * 0.221   | 98 | IMPERVIOUS                      |
| 3.585     | 65 | Weighted Average                |
| 3.364     |    | 93.84% Pervious Area            |
| 0.221     |    | 6.16% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.9      | 12            | 0.2600        | 0.21              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"         |
| 21.6     | 88            | 0.0152        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"       |
| 10.0     | 371           | 0.0152        | 0.62              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps |
| 32.5     | 471           | Total         |                   |                |  |

**Summary for Subcatchment P8: P8**

Runoff = 28.23 cfs @ 12.08 hrs, Volume= 2.315 af, Depth= 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 4.128   | 98 | IMPERVIOUS              |
| 4.128     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P9: P9**

Runoff = 7.39 cfs @ 12.08 hrs, Volume= 0.606 af, Depth= 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-yr Rainfall=6.97"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 1.081   | 98 | IMPERVIOUS              |
| 1.081     |    | 100.00% Impervious Area |

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

**Summary for Pond PP1: UG Chambers (CULTEC R-360)**

Inflow Area = 11.539 ac, 82.33% Impervious, Inflow Depth = 6.06" for 50-yr event  
 Inflow = 66.68 cfs @ 12.11 hrs, Volume= 5.823 af  
 Outflow = 62.97 cfs @ 12.15 hrs, Volume= 5.822 af, Atten= 6%, Lag= 2.2 min  
 Primary = 62.97 cfs @ 12.15 hrs, Volume= 5.822 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 71.00' Surf.Area= 8,790 sf Storage= 2,382 cf

Peak Elev= 73.17' @ 12.15 hrs Surf.Area= 8,790 sf Storage= 16,323 cf (13,941 cf above start)

Plug-Flow detention time= 42.8 min calculated for 5.767 af (99% of inflow)

Center-of-Mass det. time= 31.1 min ( 800.6 - 769.5 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1A    | 70.41' | 4,508 cf      | <b>7.00'W x 624.17'L x 4.00'H Field A</b><br>17,477 cf Overall - 6,206 cf Embedded = 11,271 cf x 40.0% Voids   |
| #2A    | 70.91' | 6,206 cf      | <b>Cultec R-360HD</b> x 169 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #3B    | 70.41' | 4,561 cf      | <b>7.00'W x 631.50'L x 4.00'H Field B</b><br>17,682 cf Overall - 6,279 cf Embedded = 11,403 cf x 40.0% Voids   |
| #4B    | 70.91' | 6,279 cf      | <b>Cultec R-360HD</b> x 171 Inside #3<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #5     | 74.41' | 72 cf         | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
| #6     | 75.90' | 1,752 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
|        |        | 23,378 cf     | Total Available Storage  |

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 74.41               | 48                   | 0                         | 0                         |
| 75.90               | 48                   | 72                        | 72                        |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 75.90               | 5                    | 0                         | 0                         |
| 77.00               | 3,180                | 1,752                     | 1,752                     |

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| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET A</b><br>L= 34.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0147 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET B</b><br>L= 37.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0135 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #3     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET C</b><br>L= 41.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0122 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |

**Primary OutFlow** Max=62.91 cfs @ 12.15 hrs HW=73.17' TW=71.82' (Dynamic Tailwater)

1=UG1-OUTLET A (Barrel Controls 21.10 cfs @ 6.24 fps)  
 2=UG1-OUTLET B (Barrel Controls 20.98 cfs @ 6.21 fps)  
 3=UG1-OUTLET C (Barrel Controls 20.83 cfs @ 6.16 fps)

### Summary for Pond PP2: Water Quality Basin

Inflow Area = 23.798 ac, 73.91% Impervious, Inflow Depth = 5.84" for 50-yr event  
 Inflow = 128.40 cfs @ 12.13 hrs, Volume= 11.578 af  
 Outflow = 11.25 cfs @ 13.27 hrs, Volume= 11.074 af, Atten= 91%, Lag= 68.5 min  
 Primary = 11.25 cfs @ 13.27 hrs, Volume= 11.074 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 69.40' Surf.Area= 70,371 sf Storage= 364,407 cf

Peak Elev= 72.88' @ 13.27 hrs Surf.Area= 99,258 sf Storage= 659,361 cf (294,954 cf above start)

Plug-Flow detention time= 1,909.9 min calculated for 2.708 af (23% of inflow)

Center-of-Mass det. time= 608.1 min ( 1,398.6 - 790.6 )

| Volume | Invert | Avail.Storage | Storage Description                                    |
|--------|--------|---------------|--|
| #1     | 61.00' | 1,010,167 cf  | <b>Custom Stage Data (Conic)</b> Listed below (Recalc) |

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 61.00               | 23,792               | 0                         | 0                         | 23,792              |
| 62.00               | 27,841               | 25,790                    | 25,790                    | 27,881              |
| 63.00               | 31,986               | 29,890                    | 55,680                    | 32,071              |
| 64.00               | 36,230               | 34,086                    | 89,766                    | 36,365              |
| 65.00               | 40,581               | 38,385                    | 128,150                   | 40,771              |
| 66.00               | 45,053               | 42,798                    | 170,948                   | 45,303              |
| 67.00               | 50,959               | 47,976                    | 218,924                   | 51,260              |
| 68.00               | 59,020               | 54,940                    | 273,864                   | 59,363              |
| 69.00               | 67,150               | 63,041                    | 336,905                   | 67,542              |
| 70.00               | 75,343               | 71,207                    | 408,112                   | 75,789              |
| 71.00               | 83,598               | 79,435                    | 487,547                   | 84,104              |
| 72.00               | 91,912               | 87,722                    | 575,269                   | 92,485              |
| 73.00               | 100,282              | 96,067                    | 671,336                   | 100,926             |
| 74.00               | 108,710              | 104,468                   | 775,804                   | 109,432             |
| 75.00               | 117,193              | 112,925                   | 888,729                   | 117,998             |
| 76.00               | 125,734              | 121,438                   | 1,010,167                 | 126,628             |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 69.32' | <b>30.0" Round Culvert</b><br>L= 66.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 69.32' / 69.25' S= 0.0011 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Device 1 | 69.32' | <b>11.0" W x 3.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 71.16' | <b>33.0" W x 5.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 72.00' | <b>11.0" W x 11.0" H Vert. Orifice/Grate</b> C= 0.600  |

**Primary OutFlow** Max=11.25 cfs @ 13.27 hrs HW=72.88' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 11.25 cfs of 29.46 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 2.04 cfs @ 8.92 fps)  
 3=Orifice/Grate (Orifice Controls 6.78 cfs @ 5.92 fps)  
 4=Orifice/Grate (Orifice Controls 2.43 cfs @ 3.01 fps)

**Summary for Link 2L: DP2**

Inflow Area = 2.779 ac, 27.31% Impervious, Inflow Depth = 4.51" for 50-yr event  
 Inflow = 7.01 cfs @ 12.10 hrs, Volume= 1.045 af  
 Primary = 7.01 cfs @ 12.10 hrs, Volume= 1.045 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP1: DP1**

Inflow Area = 27.383 ac, 65.04% Impervious, Inflow Depth > 5.26" for 50-yr event  
 Inflow = 17.10 cfs @ 12.53 hrs, Volume= 11.994 af  
 Primary = 17.10 cfs @ 12.53 hrs, Volume= 11.994 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P1: P1 (DP3)**

Runoff = 6.45 cfs @ 12.46 hrs, Volume= 0.841 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.420   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.160     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.220   | 66 | Woods, Good, HSG B/D            |
| 0.630     | 70 | Woods, Good, HSG C              |
| 2.430     | 68 | Weighted Average                |
| 2.430     |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 3.0      | 28            | 0.2100        | 0.15              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 25.5     | 72            | 0.0067        | 0.05              |                | <b>Sheet Flow, Woodland SF</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.22"     |
| 4.0      | 98            | 0.0067        | 0.41              |                | <b>Shallow Concentrated Flow, Woodland SCF</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                           |
| 32.5     | 198           | Total         |                   |                |  |

**Summary for Subcatchment P10: P10 (RB3)**

Runoff = 5.78 cfs @ 12.08 hrs, Volume= 0.476 af, Depth= 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.745   | 98 | IMPERVIOUS              |
| 0.745     |    | 100.00% 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: P11**

Runoff = 17.85 cfs @ 12.08 hrs, Volume= 1.469 af, Depth= 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

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| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 2.302   | 98 | IMPERVIOUS              |
| 2.302     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P2: P2**

Runoff = 5.97 cfs @ 12.43 hrs, Volume= 0.761 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.300   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.527     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.014   | 98 | IMPERVIOUS                      |
| * 0.380   | 66 | Woods, Good, HSG B/D            |
| 0.813     | 70 | Woods, Good, HSG C              |
| 2.034     | 71 | Weighted Average                |
| 2.020     |    | 99.31% Pervious Area            |
| 0.014     |    | 0.69% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 20.1     | 100           | 0.0084        | 0.08              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"                    |
| 2.6      | 100           | 0.0084        | 0.64              |                | <b>Shallow Concentrated Flow, Grass SCF</b><br>Short Grass Pasture Kv= 7.0 fps    |
| 6.9      | 190           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps            |
| 1.3      | 124           | 0.0050        | 1.58              | 57.03          | <b>Channel Flow, Channel Flow</b><br>Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050 |
| 30.9     | 514           | Total         |                   |                |   |

**Summary for Subcatchment P3: P3 (DP4)**

Runoff = 4.54 cfs @ 12.57 hrs, Volume= 0.665 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.441   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.064     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.292   | 66 | Woods, Good, HSG B/D            |
| 0.118     | 70 | Woods, Good, HSG C              |
| * 0.007   | 98 | IMPERVIOUS                      |
| 1.922     | 68 | Weighted Average                |
| 1.915     |    | 99.64% Pervious Area            |
| 0.007     |    | 0.36% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.1      | 16            | 0.2800        | 0.23              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"               |
| 25.7     | 84            | 0.0089        | 0.05              |                | <b>Sheet Flow, Woodland SF</b><br>Woods: Light underbrush n= 0.400 P2= 3.22" |
| 14.2     | 390           | 0.0084        | 0.46              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps       |
| 41.0     | 490           | Total         |                   |                |  |

**Summary for Subcatchment P4: P4**

Runoff = 13.83 cfs @ 12.14 hrs, Volume= 1.148 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.263     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.792   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.034     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.300   | 98 | IMPERVIOUS                      |
| 2.389     | 82 | Weighted Average                |
| 1.089     |    | 45.58% Pervious Area            |
| 1.300     |    | 54.42% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                    |
|----------|---------------|---------------|-------------------|----------------|--------------------------------|
| 10.0     |               |               |                   |                | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P5: P5**

Runoff = 39.88 cfs @ 12.14 hrs, Volume= 3.370 af, Depth= 6.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.052   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.761   | 71 | >75% Grass cover, Good, HSG B/D |
| 1.267     | 74 | >75% Grass cover, Good, HSG C   |
| * 3.407   | 98 | IMPERVIOUS                      |
| 6.487     | 86 | Weighted Average                |
| 3.080     |    | 47.48% Pervious Area            |
| 3.407     |    | 52.52% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                    |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------|
| 10.0        |                  |                  |                      |                   | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P6: P6**

Runoff = 47.29 cfs @ 12.13 hrs, Volume= 4.069 af, Depth= 6.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.427     | 39 | >75% Grass cover, Good, HSG A   |
| * 0.012   | 60 | >75% Grass cover, Good, HSG A/D |
| * 1.243   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.357     | 74 | >75% Grass cover, Good, HSG C   |
| * 5.372   | 98 | IMPERVIOUS                      |
| 7.411     | 89 | Weighted Average                |
| 2.039     |    | 27.51% Pervious Area            |
| 5.372     |    | 72.49% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                    |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------|
| 10.0        |                  |                  |                      |                   | <b>Direct Entry, estimated</b> |

**Summary for Subcatchment P7: P7**

Runoff = 8.70 cfs @ 12.46 hrs, Volume= 1.139 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

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| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.550   | 60 | >75% Grass cover, Good, HSG A/D |
| * 0.410   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.335     | 74 | >75% Grass cover, Good, HSG C   |
| * 1.230   | 54 | Woods, Good, HSG A/D            |
| * 0.251   | 66 | Woods, Good, HSG B/D            |
| 0.588     | 70 | Woods, Good, HSG C              |
| * 0.221   | 98 | IMPERVIOUS                      |
| 3.585     | 65 | Weighted Average                |
| 3.364     |    | 93.84% Pervious Area            |
| 0.221     |    | 6.16% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.9      | 12            | 0.2600        | 0.21              |                | <b>Sheet Flow, Grass SF</b><br>Grass: Dense n= 0.240 P2= 3.22"         |
| 21.6     | 88            | 0.0152        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.22"       |
| 10.0     | 371           | 0.0152        | 0.62              |                | <b>Shallow Concentrated Flow, Woodland SCF</b><br>Woodland Kv= 5.0 fps |
| 32.5     | 471           | Total         |                   |                |  |

**Summary for Subcatchment P8: P8**

Runoff = 32.02 cfs @ 12.08 hrs, Volume= 2.635 af, Depth= 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 4.128   | 98 | IMPERVIOUS              |
| 4.128     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment P9: P9**

Runoff = 8.38 cfs @ 12.08 hrs, Volume= 0.690 af, Depth= 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.90"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 1.081   | 98 | IMPERVIOUS              |
| 1.081     |    | 100.00% Impervious Area |

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

**Summary for Pond PP1: UG Chambers (CULTEC R-360)**

Inflow Area = 11.539 ac, 82.33% Impervious, Inflow Depth = 6.97" for 100-yr event  
 Inflow = 76.32 cfs @ 12.11 hrs, Volume= 6.704 af  
 Outflow = 72.44 cfs @ 12.14 hrs, Volume= 6.704 af, Atten= 5%, Lag= 2.1 min  
 Primary = 72.44 cfs @ 12.14 hrs, Volume= 6.704 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 71.00' Surf.Area= 8,790 sf Storage= 2,382 cf

Peak Elev= 73.40' @ 12.14 hrs Surf.Area= 8,790 sf Storage= 17,539 cf (15,157 cf above start)

Plug-Flow detention time= 42.0 min calculated for 6.648 af (99% of inflow)

Center-of-Mass det. time= 31.9 min ( 798.6 - 766.7 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1A    | 70.41' | 4,508 cf      | <b>7.00'W x 624.17'L x 4.00'H Field A</b><br>17,477 cf Overall - 6,206 cf Embedded = 11,271 cf x 40.0% Voids   |
| #2A    | 70.91' | 6,206 cf      | <b>Cultec R-360HD</b> x 169 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #3B    | 70.41' | 4,561 cf      | <b>7.00'W x 631.50'L x 4.00'H Field B</b><br>17,682 cf Overall - 6,279 cf Embedded = 11,403 cf x 40.0% Voids   |
| #4B    | 70.91' | 6,279 cf      | <b>Cultec R-360HD</b> x 171 Inside #3<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #5     | 74.41' | 72 cf         | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
| #6     | 75.90' | 1,752 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
|        |        | 23,378 cf     | Total Available Storage  |

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 74.41               | 48                   | 0                         | 0                         |
| 75.90               | 48                   | 72                        | 72                        |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 75.90               | 5                    | 0                         | 0                         |
| 77.00               | 3,180                | 1,752                     | 1,752                     |

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| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET A</b><br>L= 34.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0147 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET B</b><br>L= 37.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0135 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #3     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET C</b><br>L= 41.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0122 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |

**Primary OutFlow** Max=72.36 cfs @ 12.14 hrs HW=73.39' TW=72.18' (Dynamic Tailwater)

1=UG1-OUTLET A (Barrel Controls 24.27 cfs @ 6.43 fps)  
 2=UG1-OUTLET B (Barrel Controls 24.13 cfs @ 6.39 fps)  
 3=UG1-OUTLET C (Barrel Controls 23.96 cfs @ 6.35 fps)

**Summary for Pond PP2: Water Quality Basin**

Inflow Area = 23.798 ac, 73.91% Impervious, Inflow Depth = 6.75" for 100-yr event  
 Inflow = 148.08 cfs @ 12.13 hrs, Volume= 13.381 af  
 Outflow = 13.53 cfs @ 13.16 hrs, Volume= 12.843 af, Atten= 91%, Lag= 61.8 min  
 Primary = 13.53 cfs @ 13.16 hrs, Volume= 12.843 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3  
 Starting Elev= 69.40' Surf.Area= 70,371 sf Storage= 364,407 cf  
 Peak Elev= 73.31' @ 13.16 hrs Surf.Area= 102,843 sf Storage= 702,630 cf (338,223 cf above start)

Plug-Flow detention time= 1,482.2 min calculated for 4.476 af (33% of inflow)  
 Center-of-Mass det. time= 567.6 min ( 1,355.6 - 788.0 )

| Volume | Invert | Avail.Storage | Storage Description                                    |
|--------|--------|---------------|--|
| #1     | 61.00' | 1,010,167 cf  | <b>Custom Stage Data (Conic)</b> Listed below (Recalc) |

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 61.00               | 23,792               | 0                         | 0                         | 23,792              |
| 62.00               | 27,841               | 25,790                    | 25,790                    | 27,881              |
| 63.00               | 31,986               | 29,890                    | 55,680                    | 32,071              |
| 64.00               | 36,230               | 34,086                    | 89,766                    | 36,365              |
| 65.00               | 40,581               | 38,385                    | 128,150                   | 40,771              |
| 66.00               | 45,053               | 42,798                    | 170,948                   | 45,303              |
| 67.00               | 50,959               | 47,976                    | 218,924                   | 51,260              |
| 68.00               | 59,020               | 54,940                    | 273,864                   | 59,363              |
| 69.00               | 67,150               | 63,041                    | 336,905                   | 67,542              |
| 70.00               | 75,343               | 71,207                    | 408,112                   | 75,789              |
| 71.00               | 83,598               | 79,435                    | 487,547                   | 84,104              |
| 72.00               | 91,912               | 87,722                    | 575,269                   | 92,485              |
| 73.00               | 100,282              | 96,067                    | 671,336                   | 100,926             |
| 74.00               | 108,710              | 104,468                   | 775,804                   | 109,432             |
| 75.00               | 117,193              | 112,925                   | 888,729                   | 117,998             |
| 76.00               | 125,734              | 121,438                   | 1,010,167                 | 126,628             |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 69.32' | <b>30.0" Round Culvert</b><br>L= 66.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 69.32' / 69.25' S= 0.0011 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Device 1 | 69.32' | <b>11.0" W x 3.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 71.16' | <b>33.0" W x 5.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 72.00' | <b>11.0" W x 11.0" H Vert. Orifice/Grate</b> C= 0.600  |

**Primary OutFlow** Max=13.53 cfs @ 13.16 hrs HW=73.31' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 13.53 cfs of 34.59 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 2.17 cfs @ 9.46 fps)  
 3=Orifice/Grate (Orifice Controls 7.68 cfs @ 6.70 fps)  
 4=Orifice/Grate (Orifice Controls 3.68 cfs @ 4.38 fps)

**Summary for Link 2L: DP2**

Inflow Area = 2.779 ac, 27.31% Impervious, Inflow Depth = 5.34" for 100-yr event  
 Inflow = 8.19 cfs @ 12.10 hrs, Volume= 1.237 af  
 Primary = 8.19 cfs @ 12.10 hrs, Volume= 1.237 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP1: DP1**

Inflow Area = 27.383 ac, 65.04% Impervious, Inflow Depth > 6.13" for 100-yr event  
 Inflow = 21.33 cfs @ 12.52 hrs, Volume= 13.982 af  
 Primary = 21.33 cfs @ 12.52 hrs, Volume= 13.982 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Pond PP1: UG Chambers (CULTEC R-360)**

Inflow Area = 11.539 ac, 82.33% Impervious, Inflow Depth = 6.97" for 100-yr event  
 Inflow = 76.32 cfs @ 12.11 hrs, Volume= 6.704 af  
 Outflow = 72.44 cfs @ 12.14 hrs, Volume= 6.704 af, Atten= 5%, Lag= 2.1 min  
 Primary = 72.44 cfs @ 12.14 hrs, Volume= 6.704 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 71.00' Surf.Area= 8,790 sf Storage= 2,382 cf

Peak Elev= 73.40' @ 12.14 hrs Surf.Area= 8,790 sf Storage= 17,539 cf (15,157 cf above start)

Plug-Flow detention time= 42.0 min calculated for 6.648 af (99% of inflow)

Center-of-Mass det. time= 31.9 min ( 798.6 - 766.7 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1A    | 70.41' | 4,508 cf      | <b>7.00'W x 624.17'L x 4.00'H Field A</b><br>17,477 cf Overall - 6,206 cf Embedded = 11,271 cf x 40.0% Voids   |
| #2A    | 70.91' | 6,206 cf      | <b>Cultec R-360HD</b> x 169 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #3B    | 70.41' | 4,561 cf      | <b>7.00'W x 631.50'L x 4.00'H Field B</b><br>17,682 cf Overall - 6,279 cf Embedded = 11,403 cf x 40.0% Voids   |
| #4B    | 70.91' | 6,279 cf      | <b>Cultec R-360HD</b> x 171 Inside #3<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf |
| #5     | 74.41' | 72 cf         | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
| #6     | 75.90' | 1,752 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)   |
|        |        | 23,378 cf     | Total Available Storage  |

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 74.41               | 48                   | 0                         | 0                         |
| 75.90               | 48                   | 72                        | 72                        |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 75.90               | 5                    | 0                         | 0                         |
| 77.00               | 3,180                | 1,752                     | 1,752                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET A</b><br>L= 34.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0147 ' / ' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Primary | 71.00' | <b>30.0" Round UG1-OUTLET B</b>   |

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#3 Primary 71.00' L= 37.0' CPP, square edge headwall, Ke= 0.500  
 Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0135 '/' Cc= 0.900  
 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf  
**30.0" Round UG1-OUTLET C**  
 L= 41.0' CPP, square edge headwall, Ke= 0.500  
 Inlet / Outlet Invert= 71.00' / 70.50' S= 0.0122 '/' Cc= 0.900  
 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

**Primary OutFlow** Max=72.36 cfs @ 12.14 hrs HW=73.39' TW=72.18' (Dynamic Tailwater)

1=UG1-OUTLET A (Barrel Controls 24.27 cfs @ 6.43 fps)

2=UG1-OUTLET B (Barrel Controls 24.13 cfs @ 6.39 fps)

3=UG1-OUTLET C (Barrel Controls 23.96 cfs @ 6.35 fps)

**Summary for Pond PP2: Water Quality Basin**

Inflow Area = 23.798 ac, 73.91% Impervious, Inflow Depth = 6.75" for 100-yr event  
 Inflow = 148.08 cfs @ 12.13 hrs, Volume= 13.381 af  
 Outflow = 13.53 cfs @ 13.16 hrs, Volume= 12.843 af, Atten= 91%, Lag= 61.8 min  
 Primary = 13.53 cfs @ 13.16 hrs, Volume= 12.843 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 69.40' Surf.Area= 70,371 sf Storage= 364,407 cf

Peak Elev= 73.31' @ 13.16 hrs Surf.Area= 102,843 sf Storage= 702,630 cf (338,223 cf above start)

Plug-Flow detention time= 1,482.2 min calculated for 4.476 af (33% of inflow)

Center-of-Mass det. time= 567.6 min ( 1,355.6 - 788.0 )

| Volume              | Invert               | Avail.Storage             | Storage Description                                    |                     |
|---------------------|----------------------|---------------------------|--|---------------------|
| #1                  | 61.00'               | 1,010,167 cf              | <b>Custom Stage Data (Conic)</b> Listed below (Recalc) |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                              | Wet.Area<br>(sq-ft) |
| 61.00               | 23,792               | 0                         | 0  | 23,792              |
| 62.00               | 27,841               | 25,790                    | 25,790   | 27,881              |
| 63.00               | 31,986               | 29,890                    | 55,680   | 32,071              |
| 64.00               | 36,230               | 34,086                    | 89,766   | 36,365              |
| 65.00               | 40,581               | 38,385                    | 128,150  | 40,771              |
| 66.00               | 45,053               | 42,798                    | 170,948  | 45,303              |
| 67.00               | 50,959               | 47,976                    | 218,924  | 51,260              |
| 68.00               | 59,020               | 54,940                    | 273,864  | 59,363              |
| 69.00               | 67,150               | 63,041                    | 336,905  | 67,542              |
| 70.00               | 75,343               | 71,207                    | 408,112  | 75,789              |
| 71.00               | 83,598               | 79,435                    | 487,547  | 84,104              |
| 72.00               | 91,912               | 87,722                    | 575,269  | 92,485              |
| 73.00               | 100,282              | 96,067                    | 671,336  | 100,926             |
| 74.00               | 108,710              | 104,468                   | 775,804  | 109,432             |
| 75.00               | 117,193              | 112,925                   | 888,729  | 117,998             |
| 76.00               | 125,734              | 121,438                   | 1,010,167  | 126,628             |



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| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 69.32' | <b>30.0" Round Culvert</b><br>L= 66.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 69.32' / 69.25' S= 0.0011 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf |
| #2     | Device 1 | 69.32' | <b>11.0" W x 3.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 71.16' | <b>33.0" W x 5.0" H Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 72.00' | <b>11.0" W x 11.0" H Vert. Orifice/Grate</b> C= 0.600  |

**Primary OutFlow** Max=13.53 cfs @ 13.16 hrs HW=73.31' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 13.53 cfs of 34.59 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 2.17 cfs @ 9.46 fps)
- 3=Orifice/Grate (Orifice Controls 7.68 cfs @ 6.70 fps)
- 4=Orifice/Grate (Orifice Controls 3.68 cfs @ 4.38 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



June 29, 2021

# Preface

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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.

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# Soil Map

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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 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 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       | 20.6         | 42.8%          |
| 15                                 | Scarboro muck, 0 to 3 percent slopes            | 2.1          | 4.4%           |
| 36B                                | Windsor loamy sand, 3 to 8 percent slopes       | 1.9          | 4.0%           |
| 306                                | Udorthents-Urban land complex                   | 3.2          | 6.6%           |
| 308                                | Udorthents, smoothed                            | 1.5          | 3.1%           |
| 701A                               | Ninigret fine sandy loam, 0 to 3 percent slopes | 18.8         | 39.1%          |
| <b>Totals for Area of Interest</b> |   | <b>48.2</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:* Outwash terraces, outwash plains, depressions, deltas, depressions

*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 capacity:* 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:* Deltas, outwash plains, 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 terraces, deltas, outwash plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 15—Scarboro muck, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 2svkt  
*Elevation:* 0 to 1,350 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:* Not prime farmland

### Map Unit Composition

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

### Description of Scarboro

#### Setting

*Landform:* Outwash deltas, depressions, drainageways, outwash terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope, tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave, linear  
*Parent material:* Sandy glaciofluvial deposits derived from schist and/or gneiss and/or granite

#### Typical profile

*Oa - 0 to 8 inches:* muck  
*A - 8 to 14 inches:* mucky fine sandy loam  
*Cg1 - 14 to 22 inches:* sand

## Custom Soil Resource Report

*Cg2 - 22 to 65 inches: gravelly sand*

### Properties and qualities

*Slope: 0 to 3 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Very poorly drained*

*Runoff class: Negligible*

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

*Depth to water table: About 0 to 2 inches*

*Frequency of flooding: None*

*Frequency of ponding: Frequent*

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

*Available water capacity: Moderate (about 6.1 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 5w*

*Hydrologic Soil Group: A/D*

*Ecological site: F144AY031MA - Very Wet Outwash*

*Hydric soil rating: Yes*

### Minor Components

#### Timakwa

*Percent of map unit: 10 percent*

*Landform: Swamps*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Base slope, tread, dip*

*Down-slope shape: Linear, concave*

*Across-slope shape: Linear, concave*

*Hydric soil rating: Yes*

#### Walpole

*Percent of map unit: 8 percent*

*Landform: Deltas, outwash terraces, depressions, outwash plains, depressions*

*Landform position (two-dimensional): Toeslope*

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

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Hydric soil rating: Yes*

#### Deerfield

*Percent of map unit: 2 percent*

*Landform: Outwash plains, terraces*

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

*Down-slope shape: Linear*

*Across-slope shape: Concave*

*Hydric soil rating: No*

### **36B—Windsor loamy sand, 3 to 8 percent slopes**

#### **Map Unit Setting**

*National map unit symbol:* 2svkf

*Elevation:* 0 to 1,210 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 terraces, deltas, outwash plains, 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:* 3 to 8 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 capacity:* Low (about 4.5 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**

**Hinckley, loamy sand**

*Percent of map unit:* 10 percent

*Landform:* Eskers, kames, deltas, outwash plains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Nose slope, side slope, crest, head slope, rise

*Down-slope shape:* Convex

*Across-slope shape:* Convex, linear

*Hydric soil rating:* No

**Deerfield, loamy sand**

*Percent of map unit:* 5 percent

*Landform:* Outwash plains, terraces, deltas

*Landform position (two-dimensional):* Footslope

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

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* No

**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 capacity:* 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

**308—Udorthents, smoothed**

**Map Unit Setting**

*National map unit symbol:* 9lmj

*Elevation:* 0 to 2,000 feet

## Custom Soil Resource Report

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

### Description of Udorthents

#### Setting

*Down-slope shape:* Convex  
*Across-slope shape:* Linear

#### 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 35 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately 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 24 to 54 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Moderate (about 6.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

### Minor Components

#### Unnamed, undisturbed soils

*Percent of map unit:* 7 percent  
*Hydric soil rating:* No

#### Udorthents, wet substratum

*Percent of map unit:* 7 percent  
*Hydric soil rating:* No

#### Urban land

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### Rock outcrop

*Percent of map unit:* 1 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:* Outwash terraces, kames, moraines, outwash plains, kame terraces

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Base slope, tread

*Down-slope shape:* Linear, convex

*Across-slope shape:* Concave, convex

*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

*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 capacity:* Low (about 3.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* C

## Custom Soil Resource Report

*Ecological site:* F144AY026CT - Moist Silty Outwash

*Hydric soil rating:* No

### Minor Components

#### **Merrimac**

*Percent of map unit:* 5 percent

*Landform:* Moraines, kames, eskers, outwash terraces, outwash plains

*Landform position (two-dimensional):* Shoulder, summit

*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:* Moraines, outwash terraces, outwash plains, kame terraces, kames

*Landform position (two-dimensional):* Shoulder, summit

*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, outwash plains, deltas, valley trains

*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:* Depressions, drainageways

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

# **Soil Information for All Uses**

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## **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






## 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 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 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    | 20.6         | 42.8%          |
| 15                                 | Scarboro muck, 0 to 3 percent slopes            | A/D    | 2.1          | 4.4%           |
| 36B                                | Windsor loamy sand, 3 to 8 percent slopes       | A      | 1.9          | 4.0%           |
| 306                                | Udorthents-Urban land complex                   | B      | 3.2          | 6.6%           |
| 308                                | Udorthents, smoothed                            | C      | 1.5          | 3.1%           |
| 701A                               | Ninigret fine sandy loam, 0 to 3 percent slopes | C      | 18.8         | 39.1%          |
| <b>Totals for Area of Interest</b> |   |        | <b>48.2</b>  | <b>100.0%</b>  |

**Rating Options—Hydrologic Soil Group***Aggregation Method:* Dominant Condition*Component Percent Cutoff:* None Specified*Tie-break Rule:* Higher

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**APPENDIX D**  
**Storm Sewer Analysis Results**

**Subbasin Summary**

| Subbasin<br>ID             | Area | Weighted<br>Runoff<br>Coefficient | Total<br>Rainfall | Total<br>Runoff | Total<br>Runoff<br>Volume | Peak<br>Runoff | Time of<br>Concentration |
|----------------------------|------|-----------------------------------|-------------------|-----------------|---------------------------|----------------|--------------------------|
|                            | (ac) |                                   | (in)              | (in)            | (ac-in)                   | (cfs)          | (days hh:mm:ss)          |
| Sub-CB-1                   | 0.40 | 0.7800                            | 0.68              | 0.53            | 0.21                      | 2.11           | 0 00:06:00               |
| Sub-CB-10                  | 0.46 | 0.9000                            | 0.68              | 0.61            | 0.28                      | 2.81           | 0 00:06:00               |
| Sub-CB-11                  | 0.20 | 0.9000                            | 0.68              | 0.61            | 0.12                      | 1.23           | 0 00:06:00               |
| Sub-CB-12                  | 0.51 | 0.8900                            | 0.68              | 0.60            | 0.30                      | 3.05           | 0 00:06:00               |
| Sub-CB-13                  | 0.54 | 0.7900                            | 0.68              | 0.53            | 0.29                      | 2.87           | 0 00:06:00               |
| Sub-CB-14                  | 0.26 | 0.8100                            | 0.68              | 0.55            | 0.14                      | 1.40           | 0 00:06:00               |
| Sub-CB-2                   | 0.50 | 0.8000                            | 0.68              | 0.54            | 0.27                      | 2.70           | 0 00:06:00               |
| Sub-CB-20                  | 0.25 | 0.5000                            | 0.68              | 0.34            | 0.09                      | 0.86           | 0 00:06:00               |
| Sub-CB-21 (double type ii) | 0.30 | 0.5200                            | 0.73              | 0.38            | 0.11                      | 0.97           | 0 00:07:00               |
| Sub-CB-22 (double type ii) | 0.34 | 0.5400                            | 0.73              | 0.39            | 0.13                      | 1.13           | 0 00:07:00               |
| Sub-CB-23                  | 0.57 | 0.6200                            | 0.77              | 0.48            | 0.27                      | 2.05           | 0 00:08:00               |
| Sub-CB-3                   | 0.26 | 0.5800                            | 0.77              | 0.45            | 0.12                      | 0.87           | 0 00:08:00               |
| Sub-CB-4                   | 0.16 | 0.4700                            | 0.73              | 0.34            | 0.06                      | 0.48           | 0 00:07:00               |
| Sub-CB-5 (double type ii)  | 0.46 | 0.4300                            | 0.77              | 0.33            | 0.15                      | 1.14           | 0 00:08:00               |
| Sub-CB-6 (double type ii)  | 0.44 | 0.4300                            | 0.77              | 0.33            | 0.15                      | 1.09           | 0 00:08:00               |
| Sub-CB-7                   | 0.37 | 0.6400                            | 0.77              | 0.49            | 0.18                      | 1.37           | 0 00:08:00               |
| Sub-CB-8                   | 0.29 | 0.7200                            | 0.73              | 0.52            | 0.15                      | 1.28           | 0 00:07:00               |
| Sub-CB-9                   | 0.57 | 0.9000                            | 0.68              | 0.61            | 0.34                      | 3.44           | 0 00:06:00               |
| Sub-RA1                    | 0.36 | 0.9000                            | 0.68              | 0.61            | 0.22                      | 2.16           | 0 00:06:00               |
| Sub-RA2                    | 0.73 | 0.9000                            | 0.68              | 0.61            | 0.44                      | 4.41           | 0 00:06:00               |
| Sub-RA3                    | 0.74 | 0.9000                            | 0.68              | 0.61            | 0.45                      | 4.53           | 0 00:06:00               |
| Sub-RA4                    | 0.72 | 0.9000                            | 0.68              | 0.61            | 0.43                      | 4.35           | 0 00:06:00               |
| Sub-RA5                    | 0.69 | 0.9000                            | 0.68              | 0.61            | 0.42                      | 4.18           | 0 00:06:00               |
| Sub-RA6                    | 0.48 | 0.9000                            | 0.68              | 0.61            | 0.29                      | 2.89           | 0 00:06:00               |
| Sub-RA7                    | 0.42 | 0.9000                            | 0.68              | 0.61            | 0.26                      | 2.56           | 0 00:06:00               |
| Sub-RB1                    | 0.36 | 0.9000                            | 0.68              | 0.61            | 0.22                      | 2.16           | 0 00:06:00               |
| Sub-RB2                    | 0.73 | 0.9000                            | 0.68              | 0.61            | 0.44                      | 4.41           | 0 00:06:00               |
| Sub-RB3                    | 0.75 | 0.9000                            | 0.68              | 0.61            | 0.45                      | 4.53           | 0 00:06:00               |
| Sub-RB4                    | 0.72 | 0.9000                            | 0.68              | 0.61            | 0.43                      | 4.35           | 0 00:06:00               |
| Sub-RB5                    | 0.69 | 0.9000                            | 0.68              | 0.61            | 0.42                      | 4.18           | 0 00:06:00               |
| Sub-RB6                    | 0.47 | 0.9000                            | 0.68              | 0.61            | 0.29                      | 2.89           | 0 00:06:00               |
| Sub-RB7                    | 0.42 | 0.9000                            | 0.68              | 0.61            | 0.26                      | 2.57           | 0 00:06:00               |
| Sub-YD-1 (12 NYLOPLAST)    | 0.11 | 0.2500                            | 0.77              | 0.19            | 0.02                      | 0.16           | 0 00:08:00               |
| Sub-YD-2 (24 NYLOPLAST)    | 0.19 | 0.2500                            | 0.77              | 0.19            | 0.04                      | 0.27           | 0 00:08:00               |
| Sub-YD-3 (12 NYLOPLAST)    | 0.06 | 0.2500                            | 0.77              | 0.19            | 0.01                      | 0.09           | 0 00:08:00               |
| Sub-YD-4 (12 NYLOPLAST)    | 0.06 | 0.2500                            | 0.77              | 0.19            | 0.01                      | 0.08           | 0 00:08:00               |
| Sub-YD-6 (24 NYLOPLAST)    | 0.41 | 0.2500                            | 0.86              | 0.21            | 0.09                      | 0.53           | 0 00:10:00               |
| Sub-YD-7 (24 NYLOPLAST)    | 0.45 | 0.2500                            | 0.86              | 0.21            | 0.10                      | 0.58           | 0 00:10:00               |

## Link Summary

| From<br>(Inlet)<br>Node | To (Outlet)<br>Node    | Length | Inlet<br>Invert<br>Elevation | Outlet<br>Invert<br>Elevation | Average<br>Slope | Diameter or<br>Height | Manning's<br>Roughness | Peak<br>Flow | Design Flow<br>Capacity | Peak Flow<br>Velocity | Peak Flow<br>Depth |
|-------------------------|------------------------|--------|------------------------------|-------------------------------|------------------|-----------------------|------------------------|--------------|-------------------------|-----------------------|--------------------|
|                         |                        | (ft)   | (ft)                         | (ft)                          | (%)              | (in)                  |                        | (cfs)        | (cfs)                   | (ft/sec)              | (ft)               |
| CB-11                   | CB-10                  | 124.00 | 73.30                        | 72.68                         | 0.5000           | 10.000                | 0.0120                 | 1.08         | 1.68                    | 2.50                  | 0.74               |
| CB-8                    | CB-10                  | 146.00 | 72.90                        | 72.28                         | 0.4200           | 15.000                | 0.0120                 | 1.71         | 4.94                    | 2.15                  | 1.05               |
| UG1-OUTLET C            | FE-6                   | 41.00  | 71.00                        | 70.50                         | 1.2200           | 30.000                | 0.0120                 | 22.03        | 49.07                   | 6.93                  | 1.92               |
| RA6                     | TEE-3                  | 16.00  | 75.60                        | 71.42                         | 26.1200          | 12.000                | 0.0120                 | 2.88         | 19.73                   | 5.22                  | 0.66               |
| RB4                     | FE-12                  | 159.00 | 78.40                        | 74.00                         | 2.7700           | 12.000                | 0.0120                 | 4.30         | 6.71                    | 8.56                  | 0.61               |
| RB6                     | FE-3                   | 160.00 | 78.40                        | 74.00                         | 2.7500           | 12.000                | 0.0120                 | 2.85         | 6.69                    | 7.82                  | 0.47               |
| RB3                     | CLEANOUT               | 141.00 | 78.40                        | 76.71                         | 1.2000           | 12.000                | 0.0120                 | 4.07         | 4.13                    | 5.21                  | 0.99               |
| RB5                     | FE-2                   | 159.00 | 78.40                        | 74.00                         | 2.7700           | 12.000                | 0.0120                 | 4.14         | 6.71                    | 8.50                  | 0.60               |
| RB2                     | CB-3                   | 118.00 | 78.60                        | 77.20                         | 1.1900           | 12.000                | 0.0120                 | 3.91         | 4.20                    | 5.63                  | 0.88               |
| RB1                     | CB-3                   | 95.00  | 78.60                        | 77.20                         | 1.4700           | 12.000                | 0.0120                 | 2.11         | 4.69                    | 5.41                  | 0.50               |
| YD-7 (24 NYLOPLAST)     | CB-14                  | 36.00  | 72.70                        | 72.51                         | 0.5300           | 10.000                | 0.0120                 | 0.62         | 1.72                    | 2.61                  | 0.82               |
| RA1                     | DMH-1                  | 22.00  | 75.60                        | 75.35                         | 1.1400           | 12.000                | 0.0120                 | 2.14         | 4.11                    | 4.46                  | 0.59               |
| RA7                     | DMH-4                  | 14.00  | 75.60                        | 75.35                         | 1.7900           | 12.000                | 0.0120                 | 2.55         | 5.16                    | 5.16                  | 0.60               |
| RB7                     | FE-4                   | 160.00 | 78.40                        | 74.00                         | 2.7500           | 12.000                | 0.0120                 | 2.54         | 6.69                    | 7.61                  | 0.44               |
| CLEANOUT                | DMH-6 (15 NYLOPLAST)   | 141.00 | 76.71                        | 76.01                         | 0.5000           | 15.000                | 0.0120                 | 4.01         | 5.01                    | 4.29                  | 0.93               |
| DMH-6 (15 NYLOPLAST)    | DMH-8 (15 NYLOPLAST)   | 362.00 | 76.01                        | 74.22                         | 0.4900           | 15.000                | 0.0120                 | 4.00         | 4.98                    | 4.13                  | 0.94               |
| DMH-8 (15 NYLOPLAST)    | FE-11                  | 43.00  | 74.22                        | 74.00                         | 0.5100           | 15.000                | 0.0120                 | 3.88         | 5.08                    | 4.04                  | 0.91               |
| CB-4                    | CB-3                   | 103.00 | 74.56                        | 74.04                         | 0.5000           | 15.000                | 0.0120                 | 2.01         | 4.99                    | 2.34                  | 1.13               |
| CB-1                    | FE-1                   | 63.00  | 72.41                        | 72.10                         | 0.4900           | 30.000                | 0.0120                 | 13.13        | 31.33                   | 5.24                  | 1.27               |
| YD-6 (24 NYLOPLAST)     | CB-8                   | 136.00 | 73.70                        | 73.01                         | 0.5100           | 8.000                 | 0.0120                 | 0.52         | 0.93                    | 2.53                  | 0.50               |
| TEE-2                   | DMH-3                  | 130.00 | 72.75                        | 72.09                         | 0.5100           | 24.000                | 0.0120                 | 13.13        | 17.46                   | 4.28                  | 1.92               |
| RA4                     | TEE-2                  | 17.00  | 75.60                        | 72.75                         | 16.7600          | 12.000                | 0.0120                 | 4.32         | 15.80                   | 9.33                  | 0.77               |
| UG1-OUTLET A            | FE-10                  | 34.00  | 71.00                        | 70.50                         | 1.4700           | 30.000                | 0.0120                 | 22.19        | 53.89                   | 6.97                  | 1.92               |
| CB-13                   | CB-12                  | 122.00 | 71.89                        | 71.28                         | 0.5000           | 18.000                | 0.0120                 | 4.11         | 5.09                    | 2.34                  | 1.46               |
| CB-5 (double type ii)   | CB-4                   | 131.00 | 75.24                        | 74.56                         | 0.5200           | 10.000                | 0.0120                 | 1.32         | 1.71                    | 3.00                  | 0.77               |
| CB-23                   | CB-2                   | 56.00  | 73.00                        | 72.70                         | 0.5400           | 30.000                | 0.0120                 | 9.64         | 32.52                   | 3.36                  | 1.43               |
| CB-2                    | CB-1                   | 56.00  | 72.70                        | 72.41                         | 0.5200           | 30.000                | 0.0120                 | 11.55        | 31.80                   | 3.96                  | 1.44               |
| CB-3                    | CB-23                  | 204.00 | 74.04                        | 73.00                         | 0.5100           | 18.000                | 0.0120                 | 7.65         | 8.13                    | 4.41                  | 1.43               |
| CB-10                   | CB-9                   | 121.00 | 72.28                        | 71.68                         | 0.5000           | 18.000                | 0.0120                 | 4.69         | 8.03                    | 2.66                  | 1.48               |
| CB-6 (double type ii)   | CB-7                   | 124.00 | 74.00                        | 73.36                         | 0.5200           | 10.000                | 0.0120                 | 1.45         | 1.71                    | 3.04                  | 0.68               |
| CB-7                    | CB-9                   | 110.00 | 73.30                        | 72.75                         | 0.5000           | 15.000                | 0.0120                 | 2.77         | 4.95                    | 3.84                  | 0.72               |
| CB-9                    | CB-12                  | 117.00 | 71.68                        | 71.10                         | 0.5000           | 30.000                | 0.0120                 | 9.74         | 19.87                   | 3.29                  | 1.60               |
| CB-12                   | Out-1Pipe - (36)       | 6.00   | 71.10                        | 71.06                         | 0.6700           | 30.000                | 0.0120                 | 16.11        | 138.15                  | 5.05                  | 1.55               |
| CB-14                   | CB-13                  | 124.00 | 72.51                        | 71.89                         | 0.5000           | 15.000                | 0.0120                 | 1.68         | 4.95                    | 1.84                  | 1.11               |
| UG1-OUTLET B            | FE-7                   | 37.00  | 71.00                        | 70.50                         | 1.3500           | 30.000                | 0.0120                 | 22.02        | 51.65                   | 6.95                  | 1.94               |
| YD-1 (12 NYLOPLAST)     | CB-5 (double type ii)  | 123.00 | 77.06                        | 76.44                         | 0.5000           | 8.000                 | 0.0120                 | 0.15         | 0.93                    | 1.93                  | 0.18               |
| YD-3 (12 NYLOPLAST)     | YD-2 (24 NYLOPLAST)    | 98.00  | 75.12                        | 74.62                         | 0.5100           | 8.000                 | 0.0120                 | 0.16         | 0.94                    | 1.62                  | 0.22               |
| YD-4 (12 NYLOPLAST)     | YD-3 (12 NYLOPLAST)    | 83.00  | 75.55                        | 75.12                         | 0.5200           | 8.000                 | 0.0120                 | 0.08         | 0.94                    | 1.23                  | 0.16               |
| YD-5 (12 NYLOPLAST)     | CB-8                   | 48.00  | 75.55                        | 73.80                         | 3.6500           | 8.000                 | 0.0120                 | 0.00         | 2.50                    | 0.00                  | 0.03               |
| YD-2 (24 NYLOPLAST)     | CB-6 (double type ii)  | 57.00  | 74.62                        | 74.00                         | 1.0900           | 8.000                 | 0.0120                 | 0.41         | 1.37                    | 1.64                  | 0.46               |
| FE-8                    | OCS-1 (60 INSIDE %%C)  | 65.00  | 69.38                        | 69.32                         | 0.0900           | 30.000                | 0.0120                 | 8.93         | 19.87                   | 5.40                  | 1.18               |
| OCS-1 (60 INSIDE %%C)   | FE-9                   | 75.00  | 69.32                        | 69.25                         | 0.0900           | 30.000                | 0.0120                 | 5.97         | 19.87                   | 3.45                  | 0.96               |
| CB-21 (double type ii)  | CB-22 (double type ii) | 242.64 | 72.70                        | 71.50                         | 0.4900           | 12.000                | 0.0120                 | 0.92         | 2.71                    | 2.07                  | 0.55               |
| CB-22 (double type ii)  | FE-5                   | 20.00  | 71.50                        | 71.40                         | 0.5000           | 15.000                | 0.0120                 | 1.99         | 4.95                    | 3.22                  | 0.63               |
| CB-20                   | DMH-5                  | 56.00  | 73.50                        | 73.21                         | 0.5200           | 12.000                | 0.0120                 | 0.83         | 2.78                    | 2.86                  | 0.40               |
| DMH-1                   | TEE-1                  | 117.00 | 74.83                        | 74.23                         | 0.5100           | 18.000                | 0.0120                 | 1.95         | 8.15                    | 2.03                  | 0.90               |
| TEE-1                   | DMH-2                  | 146.00 | 74.23                        | 73.49                         | 0.5100           | 18.000                | 0.0120                 | 5.88         | 8.10                    | 3.71                  | 1.31               |
| DMH-2                   | TEE-2                  | 147.00 | 73.49                        | 72.75                         | 0.5000           | 24.000                | 0.0120                 | 9.66         | 17.39                   | 3.72                  | 1.67               |
| DMH-3                   | TEE-3                  | 131.00 | 72.09                        | 71.42                         | 0.5100           | 30.000                | 0.0120                 | 16.81        | 31.78                   | 3.82                  | 2.11               |
| TEE-3                   | DMH-4                  | 51.00  | 71.42                        | 71.16                         | 0.5100           | 30.000                | 0.0120                 | 19.29        | 31.73                   | 4.22                  | 2.20               |
| DMH-4                   | DMH-7                  | 79.00  | 71.16                        | 71.00                         | 0.2000           | 36.000                | 0.0120                 | 21.51        | 32.52                   | 4.42                  | 1.95               |
| RA2                     | TEE-1                  | 16.00  | 75.60                        | 74.23                         | 8.5600           | 12.000                | 0.0120                 | 4.38         | 11.29                   | 7.34                  | 0.86               |
| RA3                     | DMH-2                  | 14.00  | 75.60                        | 75.35                         | 1.7900           | 12.000                | 0.0120                 | 4.53         | 5.16                    | 6.28                  | 0.86               |
| RA5                     | DMH-3                  | 15.00  | 75.60                        | 75.35                         | 1.6700           | 12.000                | 0.0120                 | 4.18         | 4.98                    | 5.87                  | 0.85               |

[illegible]

**Junction Input**

| Element<br>ID          | Invert<br>Elevation<br>(ft) | Ground/Rim<br>(Max)<br>Elevation<br>(ft) |
|------------------------|-----------------------------|--|
| CB-1                   | 72.41                       | 77.00                                    |
| CB-10                  | 72.28                       | 75.40                                    |
| CB-11                  | 73.30                       | 75.50                                    |
| CB-12                  | 71.70                       | 75.90                                    |
| CB-13                  | 71.89                       | 75.60                                    |
| CB-14                  | 72.51                       | 75.50                                    |
| CB-2                   | 72.70                       | 77.00                                    |
| CB-20                  | 73.50                       | 75.80                                    |
| CB-21 (double type ii) | 72.70                       | 75.10                                    |
| CB-22 (double type ii) | 71.50                       | 75.10                                    |
| CB-23                  | 73.00                       | 77.00                                    |
| CB-3                   | 74.04                       | 79.90                                    |
| CB-4                   | 74.56                       | 79.71                                    |
| CB-5 (double type ii)  | 75.24                       | 78.38                                    |
| CB-6 (double type ii)  | 74.00                       | 77.70                                    |
| CB-7                   | 73.30                       | 76.00                                    |
| CB-8                   | 73.01                       | 75.60                                    |
| CB-9                   | 71.68                       | 75.90                                    |
| CLEANOUT               | 76.78                       | 79.16                                    |
| DMH-1                  | 74.83                       | 77.75                                    |
| DMH-2                  | 73.49                       | 77.75                                    |
| DMH-3                  | 72.09                       | 77.75                                    |
| DMH-4                  | 71.16                       | 77.75                                    |
| DMH-6 (15 NYLOPLAST)   | 76.06                       | 78.43                                    |
| DMH-8 (15 NYLOPLAST)   | 74.23                       | 77.00                                    |
| FE-8                   | 69.38                       | 71.88                                    |
| OCS-1 (60 INSIDE %%C)  | 69.32                       | 75.90                                    |
| RA1                    | 75.60                       | 77.70                                    |
| RA2                    | 75.60                       | 77.70                                    |
| RA3                    | 75.60                       | 77.70                                    |
| RA4                    | 75.60                       | 76.76                                    |
| RA5                    | 75.60                       | 81.10                                    |
| RA6                    | 75.60                       | 78.10                                    |
| RA7                    | 75.60                       | 78.10                                    |
| RB1                    | 75.60                       | 77.75                                    |
| RB2                    | 75.60                       | 77.70                                    |
| RB3                    | 77.50                       | 79.60                                    |
| RB4                    | 78.80                       | 80.90                                    |
| RB5                    | 78.80                       | 79.90                                    |
| RB6                    | 78.80                       | 77.96                                    |
| RB7                    | 78.80                       | 77.96                                    |
| TEE-1                  | 74.23                       | 76.00                                    |
| TEE-2                  | 72.75                       | 75.06                                    |
| TEE-3                  | 71.42                       | 74.34                                    |
| UG1-OUTLET A           | 71.00                       | 77.30                                    |
| UG1-OUTLET B           | 71.00                       | 77.30                                    |
| UG1-OUTLET C           | 71.00                       | 77.30                                    |
| YD-1 (12 NYLOPLAST)    | 77.06                       | 79.06                                    |
| YD-2 (24 NYLOPLAST)    | 74.62                       | 77.26                                    |
| YD-3 (12 NYLOPLAST)    | 75.12                       | 77.26                                    |
| YD-4 (12 NYLOPLAST)    | 75.55                       | 77.35                                    |
| YD-5 (12 NYLOPLAST)    | 75.55                       | 77.35                                    |
| YD-6 (24 NYLOPLAST)    | 73.70                       | 75.50                                    |
| YD-7 (24 NYLOPLAST)    | 72.70                       | 74.70                                    |



**Junction Results**

| Element<br>ID          | Peak<br>Inflow | Peak<br>Lateral<br>Inflow | Max HGL<br>Elevation<br>Attained | Min<br>Freeboard<br>Attained | Time of<br>Max HGL<br>Occurrence |
|------------------------|----------------|---------------------------|----------------------------------|------------------------------|----------------------------------|
|                        | (cfs)          | (cfs)                     | (ft)                             | (ft)                         | (days hh:mm)                     |
| CB-1                   | 13.12          | 2.11                      | 73.83                            | 3.17                         | 0 00:07                          |
| CB-10                  | 4.75           | 2.80                      | 73.75                            | 1.65                         | 0 00:07                          |
| CB-11                  | 1.23           | 1.23                      | 73.94                            | 1.56                         | 0 00:07                          |
| CB-12                  | 16.11          | 3.04                      | 73.15                            | 2.75                         | 0 00:07                          |
| CB-13                  | 4.18           | 2.87                      | 73.37                            | 2.23                         | 0 00:06                          |
| CB-14                  | 1.65           | 1.40                      | 73.47                            | 2.03                         | 0 00:06                          |
| CB-2                   | 11.54          | 2.70                      | 74.18                            | 2.82                         | 0 00:07                          |
| CB-20                  | 0.86           | 0.86                      | 73.92                            | 1.88                         | 0 00:06                          |
| CB-21 (double type ii) | 0.97           | 0.97                      | 73.10                            | 2.00                         | 0 00:07                          |
| CB-22 (double type ii) | 2.02           | 1.12                      | 72.20                            | 2.90                         | 0 00:07                          |
| CB-23                  | 9.60           | 2.05                      | 74.39                            | 2.61                         | 0 00:07                          |
| CB-3                   | 7.82           | 0.87                      | 75.50                            | 4.40                         | 0 00:07                          |
| CB-4                   | 1.67           | 0.48                      | 75.58                            | 4.13                         | 0 00:07                          |
| CB-5 (double type ii)  | 1.28           | 1.14                      | 75.95                            | 2.43                         | 0 00:08                          |
| CB-6 (double type ii)  | 1.50           | 1.09                      | 74.66                            | 3.04                         | 0 00:08                          |
| CB-7                   | 2.77           | 1.37                      | 74.06                            | 1.94                         | 0 00:08                          |
| CB-8                   | 1.63           | 1.28                      | 73.86                            | 1.74                         | 0 00:07                          |
| CB-9                   | 9.70           | 3.44                      | 73.45                            | 2.45                         | 0 00:07                          |
| CLEANOUT               | 4.07           | 0.00                      | 77.76                            | 1.39                         | 0 00:06                          |
| DMH-1                  | 2.14           | 0.00                      | 75.47                            | 2.28                         | 0 00:06                          |
| DMH-2                  | 10.21          | 0.00                      | 74.95                            | 2.80                         | 0 00:07                          |
| DMH-3                  | 16.87          | 0.00                      | 74.04                            | 3.71                         | 0 00:07                          |
| DMH-4                  | 21.46          | 0.00                      | 73.30                            | 4.45                         | 0 00:06                          |
| DMH-6 (15 NYLOPLAST)   | 4.01           | 0.00                      | 76.94                            | 1.49                         | 0 00:07                          |
| DMH-8 (15 NYLOPLAST)   | 4.00           | 0.00                      | 75.26                            | 1.74                         | 0 00:08                          |
| FE-8                   | 5.97           | 5.97                      | 70.72                            | 1.17                         | 0 00:00                          |
| OCS-1 (60 INSIDE %%C)  | 8.93           | 0.00                      | 70.44                            | 5.46                         | 0 00:01                          |
| RA1                    | 2.16           | 2.16                      | 76.27                            | 1.44                         | 0 00:06                          |
| RA2                    | 4.41           | 4.41                      | 76.32                            | 1.39                         | 0 00:06                          |
| RA3                    | 4.52           | 4.52                      | 76.88                            | 0.82                         | 0 00:06                          |
| RA4                    | 4.34           | 4.34                      | 76.13                            | 0.63                         | 0 00:06                          |
| RA5                    | 4.18           | 4.18                      | 76.76                            | 4.34                         | 0 00:06                          |
| RA6                    | 2.89           | 2.89                      | 75.93                            | 2.18                         | 0 00:06                          |
| RA7                    | 2.56           | 2.56                      | 76.31                            | 1.80                         | 0 00:06                          |
| RB1                    | 2.16           | 2.16                      | 79.13                            | 0.47                         | 0 00:06                          |
| RB2                    | 4.41           | 4.41                      | 79.60                            | 0.00                         | 0 00:06                          |
| RB3                    | 4.52           | 4.52                      | 79.60                            | 0.00                         | 0 00:05                          |
| RB4                    | 4.34           | 4.34                      | 79.44                            | 1.46                         | 0 00:06                          |
| RB5                    | 4.18           | 4.18                      | 79.43                            | 0.48                         | 0 00:06                          |
| RB6                    | 2.88           | 2.88                      | 79.29                            | 0.51                         | 0 00:06                          |
| RB7                    | 2.57           | 2.57                      | 79.26                            | 0.54                         | 0 00:06                          |
| TEE-1                  | 6.22           | 0.00                      | 75.40                            | 0.60                         | 0 00:06                          |
| TEE-2                  | 13.79          | 0.00                      | 74.63                            | 0.43                         | 0 00:07                          |
| TEE-3                  | 19.26          | 0.00                      | 73.69                            | 0.66                         | 0 00:07                          |
| UG1-OUTLET A           | 18.32          | 14.38                     | 73.42                            | 3.88                         | 0 00:00                          |
| UG1-OUTLET B           | 18.09          | 14.28                     | 73.42                            | 3.88                         | 0 00:00                          |
| UG1-OUTLET C           | 17.86          | 14.16                     | 73.42                            | 3.88                         | 0 00:00                          |
| YD-1 (12 NYLOPLAST)    | 0.16           | 0.16                      | 77.24                            | 1.82                         | 0 00:08                          |
| YD-2 (24 NYLOPLAST)    | 0.42           | 0.27                      | 74.87                            | 2.39                         | 0 00:08                          |
| YD-3 (12 NYLOPLAST)    | 0.17           | 0.09                      | 75.31                            | 1.95                         | 0 00:08                          |
| YD-4 (12 NYLOPLAST)    | 0.08           | 0.08                      | 75.68                            | 1.67                         | 0 00:08                          |
| YD-5 (12 NYLOPLAST)    | 0.00           | 0.00                      | 75.55                            | 1.80                         | 0 00:00                          |
| YD-6 (24 NYLOPLAST)    | 0.53           | 0.53                      | 74.05                            | 1.45                         | 0 00:10                          |
| YD-7 (24 NYLOPLAST)    | 0.58           | 0.58                      | 73.50                            | 1.20                         | 0 00:06                          |

**APPENDIX E**  
**Water Quality Calculations**

## **25 Talbot Lane – DPI Project No.:1976.U**

October 15, 2021

### **Water Quality Volume Calculations**

Per 2004 Connecticut Stormwater Quality Manual, Section 7.4.1:

Areas for Calculation: On Site to Forebay (P3)

|              | P4 & P5 |
|--------------|---------|
| Impervious   | 4.707   |
| Pervious     | 4.169   |
| Total Area   | 8.876   |
| % Impervious | 53.03%  |

Water Quality Volume (WQV) =  $(3.10'')^1(R)(A)/12$ , where:

R = unitless volumetric runoff coefficient =  $0.05 + 0.009(I)$ , where:

I = percent impervious cover of drainage area = 53.03%

R =  $0.05 + 0.009(I)$

R =  $0.05 + 0.009(53.03)$

R = 0.527

A = drainage area in acres = 8.876 acres

WQV =  $(3.10'')(R)(A \text{ acres})/12$  inches per foot

WQV =  $(3.10'')(0.527)(8.876 \text{ acres})/12$  inches per foot

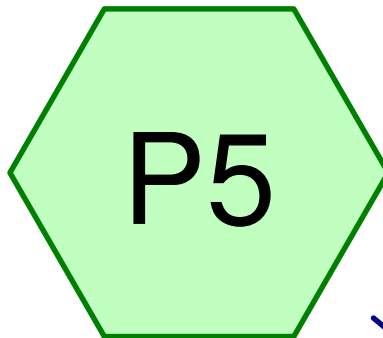
**WQV = 1.21 acre-feet required = 52,707.6 cft**

### **Proposed BMP**

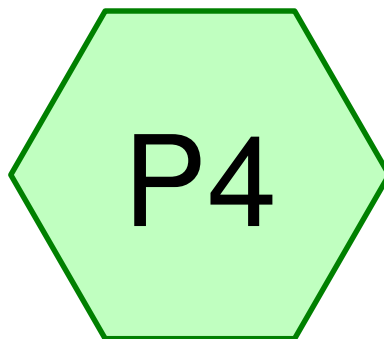
The proposed water quality basin and forebay are proposed to provide **7,047 cft** (below basin outlet FE-8 @ Elev. 69.4) and **357,360 cft+** (below spillway at Elev. 69.40) of water quality storage, respectively. The forebay will provide storage for more than 10% of the determined water quality volume draining to the basin. The forebay in combination with the proposed wet pool of the water quality basin will provide a total water quality storage volume of **364,407 cft**; more than 100% of the water quality volume. Water quality basin and forebay stage storage reports are included as a part of this appendix.

---

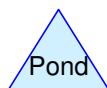
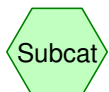
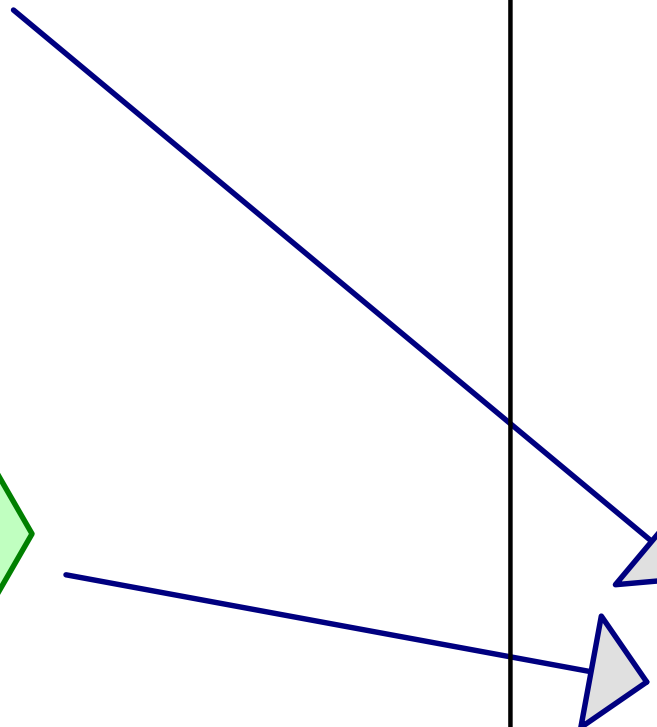
<sup>1</sup> NOAA's Atlas 14 Point Precipitation Frequency Estimates, predicts a 2-year, 24-hr storm onsite will generate 3.10" of rain. WQV was calculated based on the 2-year, 24 Hour storm condition instead of 1" as recommended by the 2004 Water Quality Manual per comments from the Town Engineer.



P5



P4



**Routing Diagram for 1976.U Hydrocad**

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**1976.U Hydrocad**

Prepared by Design Professionals, Inc.

Printed 10/15/2021

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Page 2

**Ground Covers (selected nodes)**

| HSG-A<br>(acres) | HSG-B<br>(acres) | HSG-C<br>(acres) | HSG-D<br>(acres) | Other<br>(acres) | Total<br>(acres) | Ground<br>Cover        | Subcatchment<br>Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------------|-------------------------|
| 0.315            | 2.553            | 1.301            | 0.000            | 0.000            | 4.169            | >75% Grass cover, Good | P4, P5                  |
| 0.000            | 0.000            | 0.000            | 0.000            | 4.707            | 4.707            | IMPERVIOUS             | P4, P5                  |
| <b>0.315</b>     | <b>2.553</b>     | <b>1.301</b>     | <b>0.000</b>     | <b>4.707</b>     | <b>8.876</b>     | <b>TOTAL AREA</b>      |                         |

**1976.U Hydrocad**

Prepared by Design Professionals, Inc.

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

Printed 10/15/2021

**Stage-Area-Storage for Pond PP2: Water Quality Basin**

| Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 61.00               | 23,792             | 0                       | 68.80               | 65,482             | 323,642                 |
| 61.15               | 24,379             | 3,613                   | 68.95               | 66,731             | 333,558                 |
| 61.30               | 24,973             | 7,314                   | 69.10               | 67,948             | 343,660                 |
| 61.45               | 25,575             | 11,105                  | 69.25               | 69,154             | 353,943                 |
| 61.60               | 26,183             | 14,987                  | 69.40               | 70,371             | 364,407                 |
| 61.75               | 26,799             | 18,960                  | 69.55               | 71,598             | 375,054                 |
| 61.90               | 27,422             | 23,027                  | 69.70               | 72,836             | 385,887                 |
| 62.05               | 28,041             | 27,187                  | 69.85               | 74,084             | 396,905                 |
| 62.20               | 28,647             | 31,439                  | 70.00               | 75,343             | 408,112                 |
| 62.35               | 29,259             | 35,781                  | 70.15               | 76,554             | 419,505                 |
| 62.50               | 29,878             | 40,217                  | 70.30               | 77,774             | 431,079                 |
| 62.65               | 30,503             | 44,745                  | 70.45               | 79,005             | 442,837                 |
| 62.80               | 31,134             | 49,368                  | 70.60               | 80,245             | 454,781                 |
| 62.95               | 31,772             | 54,086                  | 70.75               | 81,494             | 466,911                 |
| 63.10               | 32,399             | 58,899                  | 70.90               | 82,753             | 479,230                 |
| 63.25               | 33,022             | 63,805                  | 71.05               | 84,004             | 491,737                 |
| 63.40               | 33,652             | 68,806                  | 71.20               | 85,229             | 504,430                 |
| 63.55               | 34,287             | 73,901                  | 71.35               | 86,463             | 517,306                 |
| 63.70               | 34,929             | 79,092                  | 71.50               | 87,706             | 530,369                 |
| 63.85               | 35,577             | 84,380                  | 71.65               | 88,957             | 543,619                 |
| 64.00               | 36,230             | 89,766                  | 71.80               | 90,218             | 557,057                 |
| 64.15               | 36,867             | 95,248                  | 71.95               | 91,487             | 570,684                 |
| 64.30               | 37,509             | 100,826                 | 72.10               | 92,733             | 584,501                 |
| 64.45               | 38,157             | 106,501                 | 72.25               | 93,970             | 598,504                 |
| 64.60               | 38,811             | 112,273                 | 72.40               | 95,216             | 612,693                 |
| 64.75               | 39,470             | 118,144                 | 72.55               | 96,470             | 627,069                 |
| 64.90               | 40,135             | 124,115                 | 72.70               | 97,733             | 641,635                 |
| 65.05               | 40,799             | 130,185                 | 72.85               | 99,003             | 656,390                 |
| 65.20               | 41,457             | 136,354                 | 73.00               | 100,282            | 671,336                 |
| 65.35               | 42,120             | 142,622                 | 73.15               | 101,525            | 686,471                 |
| 65.50               | 42,788             | 148,990                 | 73.30               | 102,775            | 701,794                 |
| 65.65               | 43,461             | 155,459                 | 73.45               | 104,033            | 717,304                 |
| 65.80               | 44,140             | 162,029                 | 73.60               | 105,298            | 733,004                 |
| 65.95               | 44,824             | 168,701                 | 73.75               | 106,571            | 748,894                 |
| 66.10               | 45,627             | 175,482                 | 73.90               | 107,852            | 764,976                 |
| 66.25               | 46,495             | 182,391                 | 74.05               | 109,127            | 781,249                 |
| 66.40               | 47,372             | 189,431                 | 74.20               | 110,381            | 797,712                 |
| 66.55               | 48,256             | 196,603                 | 74.35               | 111,643            | 814,364                 |
| 66.70               | 49,149             | 203,908                 | 74.50               | 112,912            | 831,206                 |
| 66.85               | 50,050             | 211,348                 | 74.65               | 114,188            | 848,238                 |
| 67.00               | 50,959             | 218,924                 | 74.80               | 115,471            | 865,462                 |
| 67.15               | 52,130             | 226,655                 | 74.95               | 116,761            | 882,880                 |
| 67.30               | 53,315             | 234,563                 | 75.10               | 118,034            | 900,490                 |
| 67.45               | 54,513             | 242,650                 | 75.25               | 119,300            | 918,290                 |
| 67.60               | 55,725             | 250,918                 | 75.40               | 120,573            | 936,280                 |
| 67.75               | 56,949             | 259,368                 | 75.55               | 121,853            | 954,462                 |
| 67.90               | 58,187             | 268,004                 | 75.70               | 123,140            | 972,837                 |
| 68.05               | 59,414             | 276,825                 | 75.85               | 124,434            | 991,404                 |
| 68.20               | 60,604             | 285,826                 | 76.00               | <b>125,734</b>     | <b>1,010,167</b>        |
| 68.35               | 61,806             | 295,007                 |                     |                    |                         |
| 68.50               | 63,019             | 304,368                 |                     |                    |                         |
| 68.65               | 64,245             | 313,913                 |                     |                    |                         |

## **25 Talbot Lane – DPI Project No.:1976.U**

August 25, 2021

### **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 (CB9 – CB18)**

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 = 88

Ia = 0.273 inches

Design Precipitation (P) = **3.10" (2-yr, 24-Hr) for water quality storms per NOAA Atlas 14<sup>1</sup>**

Ia/P = 0.273

Unit Peak Discharge qu = 625 cfs/mi<sup>2</sup>/inch

Drainage Area A = 242,629.2 sf = 5.57 acres = 0.0087 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 = 68.04%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(68.04)

R = 0.662

A = drainage area in acres = 5.57 acres

WQV = (3.15")(R)(A)/12

WQV = (1")(0.662)(5.57 acres) / 12 in/ft

WQV = 0.968 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.968 acre-feet x 12 in/ft) / 5.57 acres

Q = 2.085 in

WQF = qu x A x Q

WQF = 625 cfs/mi<sup>2</sup>/inch x 0.0087 mi<sup>2</sup> x 2.085 in

WQF = **11.337 cfs required**

### **Proposed**

The proposed **112** chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **11.337 cfs** water quality flow. The current design plan will provide **11.424 cfs** of WQF. See isolator row sizing chart included in the appendix.

---

<sup>1</sup> NOAA's Atlas 14 Point Precipitation Frequency Estimates, predicts a 2-year, 24-hr storm onsite will generate 3.10" of rain. WQV was calculated based on the 2-year, 24 Hour storm condition instead of 1" as recommended by the 2004 Water Quality Manual per comments from the Town Engineer.

## **25 Talbot Lane – DPI Project No.:1976.U**

August 25, 2021

### **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 (CB20)**

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 = 88

Ia = 0.273 inches

Design Precipitation (P) = **3.10" (2-yr, 24-Hr) for water quality storms per NOAA Atlas 14<sup>2</sup>**

Ia/P = 0.273

Unit Peak Discharge qu = 625 cfs/mi<sup>2</sup>/inch

Drainage Area A = 25,264.8 sf = 0.58 acres = 0.00084 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 = 60.34%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(60.34)

R = 0.593

A = drainage area in acres = 0.58 acres

WQV = (3.10")(R)(A)/12

WQV = (3.10")(0.593)(0.58 acres) / 12 in/ft

WQV = 0.089 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.089 acre-feet x 12 in/ft) / 0.58 acres

Q = 1.841 in

WQF = qu x A x Q

WQF = 625 cfs/mi<sup>2</sup>/inch x 0.00084 mi<sup>2</sup> x 1.841 in

WQF = **0.966 cfs required**

### **Proposed**

The proposed **10** chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.97 cfs** water quality flow. The current design plan will provide **1.02 cfs** of WQF. See isolator row sizing chart included in the appendix.

---

<sup>2</sup> NOAA's Atlas 14 Point Precipitation Frequency Estimates, predicts a 2-year, 24-hr storm onsite will generate 3.10" of rain. WQV was calculated based on the 2-year, 24 Hour storm condition instead of 1" as recommended by the 2004 Water Quality Manual per comments from the Town Engineer.



## **25 Talbot Lane – DPI Project No.:1976.U**

August 25, 2021

### **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 (CB21)**

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 = 92

Ia = 0.174 inches

Design Precipitation (P) = **3.10" (2-yr, 24-Hr) for water quality storms per NOAA Atlas 14<sup>3</sup>**

Ia/P = 0.174

Unit Peak Discharge qu = 630 cfs/mi<sup>2</sup>/inch

Drainage Area A = 18,295.2 sf = 0.42 acres = 0.00066 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 = 76.19%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(76.19)

R = 0.736

A = drainage area in acres = 0.42 acres

WQV = (3.10")(R)(A)/12

WQV = (3.10")(0.736)(0.42 acres) / 12 in/ft

WQV = 0.080 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.080 acre-feet x 12 in/ft) / 0.42 acres

Q = 2.286 in

WQF = qu x A x Q

WQF = 630 cfs/mi<sup>2</sup>/inch x 0.00066 mi<sup>2</sup> x 2.286 in

WQF = **0.951 cfs required**

### **Proposed**

The proposed **10** chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.951 cfs** water quality flow. The current design plan will provide **1.02 cfs** of WQF. See isolator row sizing chart included in the appendix.

---

<sup>3</sup> NOAA's Atlas 14 Point Precipitation Frequency Estimates, predicts a 2-year, 24-hr storm onsite will generate 3.10" of rain. WQV was calculated based on the 2-year, 24 Hour storm condition instead of 1" as recommended by the 2004 Water Quality Manual per comments from the Town Engineer.

## **25 Talbot Lane – DPI Project No.:1976.U**

August 25, 2021

### **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 (CB22)**

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 = 91

Ia = 0.198 inches

Design Precipitation (P) = **3.10" (2-yr, 24-Hr) for water quality storms per NOAA Atlas 14<sup>4</sup>**

Ia/P = 0.198

Unit Peak Discharge qu = 630 cfs/mi<sup>2</sup>/inch

Drainage Area A = 19,602 sf = 0.45 acres = 0.0007 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 = 77.78%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(77.78)

R = 0.750

A = drainage area in acres = 0.45 acres

WQV = (3.10")(R)(A)/12

WQV = (3.10")(0.750)(0.45 acres) / 12 in/ft

WQV = 0.087 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.087 acre-feet x 12 in/ft) / 0.45 acres

Q = 2.32 in

WQF = qu x A x Q

WQF = 630 cfs/mi<sup>2</sup>/inch x 0.0007 mi<sup>2</sup> x 2.32 in

WQF = **1.023 cfs required**

### **Proposed**

The proposed **11** chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **1.023 cfs** water quality flow. The current design plan will provide

**1.12 cfs** of WQF. See isolator row sizing chart included in the appendix.

---

<sup>4</sup> NOAA's Atlas 14 Point Precipitation Frequency Estimates, predicts a 2-year, 24-hr storm onsite will generate 3.10" of rain. WQV was calculated based on the 2-year, 24 Hour storm condition instead of 1" as recommended by the 2004 Water Quality Manual per comments from the Town Engineer.

**1976.U Hydrocad**

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Proposed Conditions

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

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Page 1

**Summary for Subcatchment 7S: ISO-7 (CB 6-14 & YD 2-7)**

Runoff = 9.21 cfs @ 12.12 hrs, Volume= 0.701 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.431     | 39 | >75% Grass cover, Good, HSG A   |
| * 1.243   | 71 | >75% Grass cover, Good, HSG B/D |
| 0.288     | 74 | >75% Grass cover, Good, HSG C   |
| * 2.945   | 98 | IMPERVIOUS                      |
| 4.907     | 85 | Weighted Average                |
| 1.962     |    | 39.98% Pervious Area            |
| 2.945     |    | 60.02% Impervious Area          |

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

**Summary for Subcatchment 8S: ISO-6 (CB-15)**

Runoff = 1.08 cfs @ 12.08 hrs, Volume= 0.081 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.048     | 74 | >75% Grass cover, Good, HSG C |
| * 0.326   | 98 | IMPERVIOUS                    |
| 0.374     | 95 | Weighted Average              |
| 0.048     |    | 12.83% Pervious Area          |
| 0.326     |    | 87.17% Impervious Area        |

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

**Summary for Subcatchment 9S: ISO-5 (CB-16)**

Runoff = 1.15 cfs @ 12.08 hrs, Volume= 0.088 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

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Proposed Conditions  
Type III 24-hr 2-yr Rainfall=3.15"

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| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.025     | 74 | >75% Grass cover, Good, HSG C |
| * 0.364   | 98 | IMPERVIOUS                    |
| 0.389     | 96 | Weighted Average              |
| 0.025     |    | 6.43% Pervious Area           |
| 0.364     |    | 93.57% Impervious Area        |

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

**Summary for Subcatchment 10S: ISO-4 (CB-17)**

Runoff = 1.56 cfs @ 12.08 hrs, Volume= 0.124 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.510   | 98 | IMPERVIOUS              |
| 0.510     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment 11S: ISO-3 (CB-18)**

Runoff = 1.53 cfs @ 12.08 hrs, Volume= 0.121 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.499   | 98 | IMPERVIOUS              |
| 0.499     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment 13S: ISO-2 (CB-19)**

Runoff = 1.57 cfs @ 12.08 hrs, Volume= 0.125 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

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

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| Area (ac) | CN | Description             |
|-----------|----|-------------------------|
| * 0.514   | 98 | IMPERVIOUS              |
| 0.514     |    | 100.00% Impervious Area |

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

**Summary for Subcatchment 15S: ISO-1 (CB-20)**

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.15"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| * 0.014   | 60 | >75% Grass cover, Good, HSG A/D |
| 0.026     | 74 | >75% Grass cover, Good, HSG C   |
| * 0.214   | 98 | IMPERVIOUS                      |
| 0.254     | 93 | Weighted Average                |
| 0.040     |    | 15.75% Pervious Area            |
| 0.214     |    | 84.25% Impervious Area          |

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

## CULTEC Separator Row Sizing Tables (Imperial)

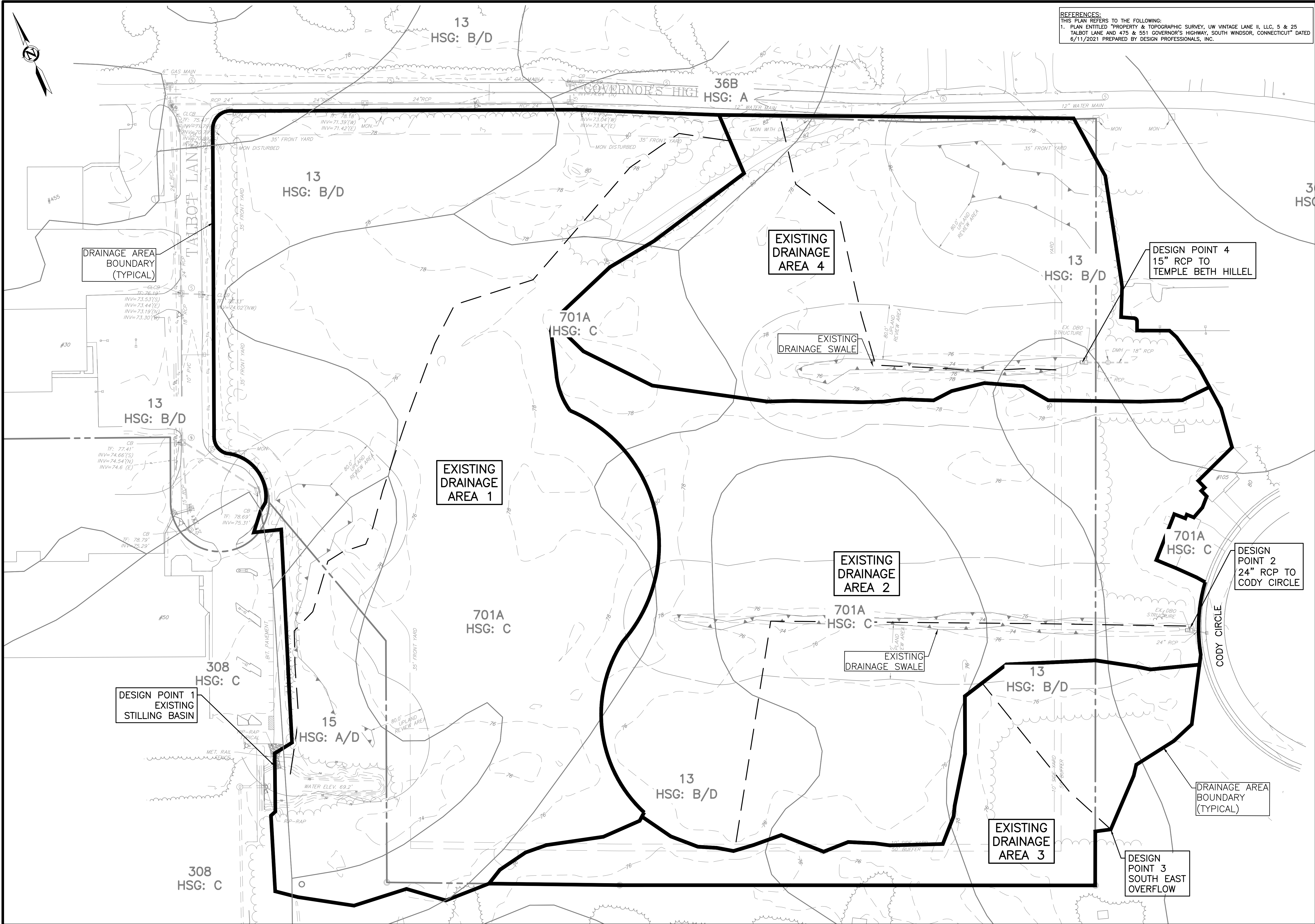
Maine DEP / ADS Equivalent Sizing (OK 110 Particle Distribution)

|                   | 80% TSS Flow Rate<br>(Maine DEP) | Chamber<br>Width | Installed Chamber<br>Length | Bottom Area | Treatment Rate<br>/ Chamber |
|-------------------|----------------------------------|------------------|-----------------------------|-------------|-----------------------------|
| CONTACTOR 100HD   | 2.5 gpm/sf                       | 3.00'            | 7.5'                        | 22.50 s.f.  | 0.125 cfs                   |
| RECHARGER 150XLHD | 2.5 gpm/sf                       | 2.75'            | 10.25'                      | 28.18 s.f.  | 0.157 cfs                   |
| RECHARGER 180HD   | 2.5 gpm/sf                       | 3.00'            | 6.33'                       | 18.99 s.f.  | 0.106 cfs                   |
| RECHARGER 280HD   | 2.5 gpm/sf                       | 3.91'            | 7.00'                       | 27.37 s.f.  | 0.152 cfs                   |
| RECHARGER 330XLHD | 2.5 gpm/sf                       | 4.33'            | 7.00'                       | 31.31 s.f.  | 0.174 cfs                   |
| RECHARGER 360HD   | 2.5 gpm/sf                       | 5.00'            | 3.67'                       | 18.35 s.f.  | 0.102 cfs                   |
| RECHARGER 902HD   | 2.5 gpm/sf                       | 6.50'            | 3.67'                       | 23.86 s.f.  | 0.133 cfs                   |

ETV (ETV / NJDEP Particle Distribution)

|                   | 80% TSS Flow Rate<br>(ETV) | Chamber<br>Width | Installed Chamber<br>Length | Bottom Area | Treatment Rate<br>/ Chamber |
|-------------------|----------------------------|------------------|-----------------------------|-------------|-----------------------------|
| CONTACTOR 100HD   | 1.0 gpm/sf                 | 3.00'            | 7.5'                        | 22.50 s.f.  | 0.050 cfs                   |
| RECHARGER 150XLHD | 1.0 gpm/sf                 | 2.75'            | 10.25'                      | 28.18 s.f.  | 0.063 cfs                   |
| RECHARGER 180HD   | 1.0 gpm/sf                 | 3.00'            | 6.33'                       | 18.99 s.f.  | 0.042 cfs                   |
| RECHARGER 280HD   | 1.0 gpm/sf                 | 3.91'            | 7.00'                       | 27.37 s.f.  | 0.061 cfs                   |
| RECHARGER 330XLHD | 1.0 gpm/sf                 | 4.33'            | 7.00'                       | 31.31 s.f.  | 0.070 cfs                   |
| RECHARGER 360HD   | 1.0 gpm/sf                 | 5.00'            | 3.67'                       | 18.35 s.f.  | 0.041 cfs                   |
| RECHARGER 902HD   | 1.0 gpm/sf                 | 6.50'            | 3.67'                       | 23.86 s.f.  | 0.053 cfs                   |

**APPENDIX F**  
**Drainage Area Maps**



REFERENCES:  
THIS PLAN REFERS TO THE FOLLOWING:  
1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, UW VINTAGE LANE II, LLC, 5 & 25 TALBOT LANE AND 475 & 551 GOVERNOR'S HIGHWAY, SOUTH WINDSOR, CONNECTICUT" DATED 6/11/2021 PREPARED BY DESIGN PROFESSIONALS, INC.

21 JUNE 2021  
P.O. BOX 167  
SOUTH WINDSOR, CT 06074  
860-268-2452  
www.designprofessionals.com

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PLANNERS / LANDSCAPE ARCHITECTS

PREPARED FOR:  
UW Vintage Lane II, LLC  
PO Box 504  
South Glastonbury, CT 06073  
860-268-2452 T

PROJECT NO:  
1976U  
DATE:  
07/02/21  
DRAWN BY:  
BPW  
CHECKED BY:  
DHI

**25 TALBOT LANE  
SITE PLAN APPLICATION**  
5 & 25 TALBOT ROAD  
475 & 551 GOVERNOR'S HIGHWAY  
SOUTH WINDSOR, CONNECTICUT  
GIS Nos. 88900005, 88900025, 36900475, 36900551

| NO. | DATE | REVISIONS | BY |
|-----|------|-----------|----|
|     |      |           |    |
|     |      |           |    |
|     |      |           |    |
|     |      |           |    |

EXISTING  
DRAINAGE MAP

SCALE: 0 30' 60' 120'  
1" = 60'

SHEET  
**C-DA1**  
SHEET 1 OF 2



