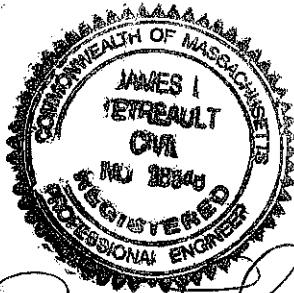


**DRAINAGE REPORT**  
for  
**RICE POND VILLAGE**  
**A PROPOSED RESIDENTIAL DEVELOPMENT**  
**AT 17 RICE ROAD, MILLBURY**

MARCH 26, 2021  
REVISED SEPTEMBER 3, 2021  
REVISED NOVEMBER 8, 2021



*James I. Ytreault*  
11/8/2021

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AZIMUTH LAND DESIGN, LLC  
325 Donald Lynch Boulevard, Suite 100, Marlborough, MA 01572 (508) 485-0137

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## INTRODUCTION

The proposed Rice Pond Village development is a condominium development of 23 duplexes, 46 total units, at 17 Rice Road in Millbury. The site has an area of 15.6 acres and contains one single family home, a garage and pool area with a large lawn around it but is otherwise undeveloped and wooded.

The topography of the site is defined by a ridge in the middle of the site which separates areas sloping downward to the northeast to the abutting Providence & Worcester Railroad property from areas sloping downward to the southwesterly side of the property to an existing unnamed pond.

The pond receives overland runoff from this and also abutters to the south of this property, having frontage on Rice Road, and also runoff from some 58 acres of the residential areas south of South Main Street.

A copy of the Web Soil Survey by NRCS is included at the back of this Report and it shows that soils on site are almost all Merrimac series soils categorized as hydrologic soil group A soils. We have excavated some official deep observation holes on site and, at several of these, observed soils had a sandy loam texture inconsistent with that mapping. Nevertheless, this report makes the conservative assumption that that mapping is correct.

There is a small area of Scarboro & Walpole series soils categorized as hydrologic soil group D soils immediately south of the unnamed pond.

There is also a small area of Canton series soils categorized as hydrologic soil group B soils at the southwesterly corner of the property and the entirety of the above referenced offsite drainage area lies over hydrologic soil group B soils, mostly Canton series soils.

Because wooded cover is being converted to lawn and landscaped areas, paved driveways and roofs, the rate of stormwater runoff from the site would increase if no measures were taken to prevent it.

Except for the first 62 feet of the new private road, Hillcrest Circle, all of the runoff from the new road will be collected by the site's drainage system and directed through a CDS model 2025 stormwater filtration unit and then into an infiltration structure off the side of station 10+70 of Hillcrest Circle.

This infiltration structure will be located in an area where the observed soil texture was a sand and where there was greater than 9 foot depth to possible seasonal high groundwater. The structure will cover an area measuring 118 feet by 52 feet, and will be a total of 8.5 feet deep. Within double washed, crushed stone, we will install 1,216 Storm Tank 25 series modules measuring 3 feet long, 1.5 feet wide and 6 feet deep.

This structure will accept all the runoff collected from even the 100 year storm event without piped outflow.

In addition to this structure, 15 of the 23 proposed duplexes will send all or part of their roof runoff to individual infiltration structures the dimensions of which are shown on detail sheet D3 of the Site Plans.

The body of this report contains the results of drainage calculations performed for the predevelopment and postdevelopment conditions during 2, 10, 25 and 100 year return frequency type III storm events. The 24 hour rainfalls associated with these storms are 3.15, 4.70, 5.90 and 8.35 inches respectively. Calculations were made using the HydroCAD stormwater modeling program. This program calculates hydrographs using a method very similar to that outlined in the Soil Conservation Service Technical Release Number 20 (TR-20). HydroCAD uses the TR-20 "curve number" evaluations of ground cover and the same times of concentration.

In calculating runoff, we have made certain assumptions. We assume that the maximum distance over which sheet flow will occur is 50 feet.

The following table compares the peak predevelopment and postdevelopment flows of stormwater at the design point:

DESIGN POINT

|   | PEAK FLOW RATE (in cfs) |             |             |              |
|---|-------------------------|-------------|-------------|--------------|
|   | 2 yr storm              | 10 yr storm | 25 yr storm | 100 yr storm |
| Abutter Gingras property line                 |                         |             |             |              |
| Subcat #1 pre                                 | 0.00 pre                | 0.00 pre    | 0.02 pre    | 0.21 pre     |
| Subcat #11 post                               | 0.00                    | 0.00        | 0.01        | 0.10         |
| Providence & Worcester railroad property line |                         |             |             |              |
| Subcat #2 pre                                 | 0.00 pre                | 0.01        | 0.10 pre    | 1.63 pre     |
| Subcat #12 post                               | 0.00                    | 0.01        | 0.05        | 0.69         |
| Abutter Cunha & Sora property line            |                         |             |             |              |
| Reach #3 pre                                  | 20.17 pre               | 57.61 pre   | 91.16 pre   | 166.14 pre   |
| Reach #13 post                                | 20.14                   | 56.95       | 89.80       | 163.01       |
| Abutter Mathieu & Swanson property line       |                         |             |             |              |
| Subcat #4 pre                                 | 0.00 pre                | 0.00 pre    | 0.00 pre    | 0.08 pre     |
| Subcat #14 post                               | 0.00                    | 0.00        | 0.00        | 0.05         |
| Rice Road right of way line                   |                         |             |             |              |
| Subcat #5 pre                                 | 0.00 pre                | 0.06 pre    | 0.31 pre    | 1.61 pre     |
| Subcat #15 post                               | 0.00                    | 0.04        | 0.18        | 0.87         |

## EXPLANATION OF HOW PRE AND POST DRAINAGE AREAS ARE THE SAME

I want to also take this opportunity to explain how these drainage calculations correctly compare the same drainage area in pre and postdevelopment conditions.

At first glance, this might not seem to be the case. The total area listing for the Predevelopment subcatchments is 77.128 acres and the total area of the Postdevelopment area listing is 76.227 acres.

But there are two additional factors that must be taken into account and when they're considered the pre and post areas are the same.

1) One is that subcatchment #4 in the predevelopment and #14 in the postdevelopment, the flow to the abutter at 11 Rice Road, Mathieu and Swanson is an area that is also part of subcatchment #33 in the predevelopment and #233 in the postdevelopment, the flow to the pond. The same drainage area is part of two different subcatchments because it contributes flow to the abutter and, through that property to the pond.

If we subtract the areas of subcatchments #'s 4 and 14 from the pre and post area totals, respectively, we get one step closer to a true comparison of the drainage areas.

Predev area listing, 77.128 acres – 0.491 acres (#4 area of 21,387 s.f.) = 76.637 acres

Postdev area listing, 76.216 acres -- 0.299 acres (#14 area of 13,028 s.f.)=75.917 acres

2) The second factor is that the calculations show subcatchments and ponds to confirm that individual infiltration structures receiving roof runoff from some of the units are adequately sized.

But the calculations only show one each of subcatchments #'s 101, 102, 104 and 105 while there are actually 8 different duplexes the roof runoff infiltration of which are described by subcat #101 and pond #101. These are the buildings with units numbers 1&2, 3&4, 5&6, 25&26, 27&28, 29&30, 31&32 and 33&34. So, a true accounting of areas in a comparison of pre and postdevelopment needs to show that there is not just one area described by subcat #101 but eight.

So, 7 more roofs need to be accounted for or  $7 \times 3,564 \text{ s.f.} = 24,948 \text{ s.f.}$

And there is not just one duplex roof for which subcatchment #102 and pond #102 describe the infiltration of roof runoff, but two, the buildings with units numbers 7&8 and 23&24.

So, 1 more roof needs to be accounted for or  $1 \times 2,310 \text{ s.f.} = 2,310 \text{ s.f.}$

And there is not just one duplex roof for which subcatchment #104 and pond #104 describe the infiltration of roof runoff, but three, the buildings with units numbers 9&10, 11&12 and 21&22.

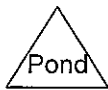
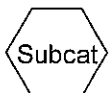
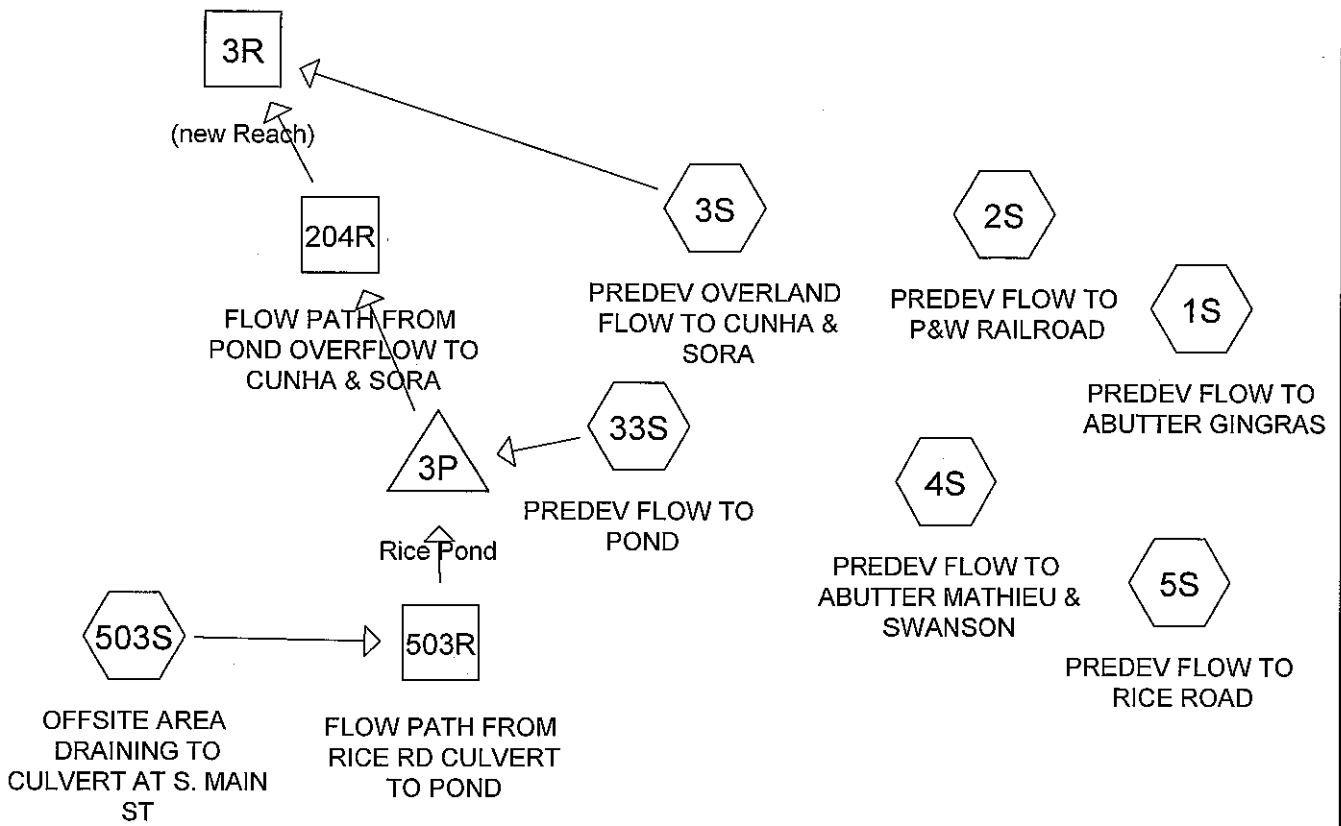
So, 2 more roofs need to be accounted for or  $2 \times 1,155 \text{ s.f.} = 2,310 \text{ s.f.}$

And there is not just one duplex roof for which subcatchment #105 and pond #105 describe the infiltration of roof runoff but two, the buildings with units numbers 17&18 and 19&20.

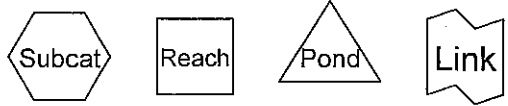
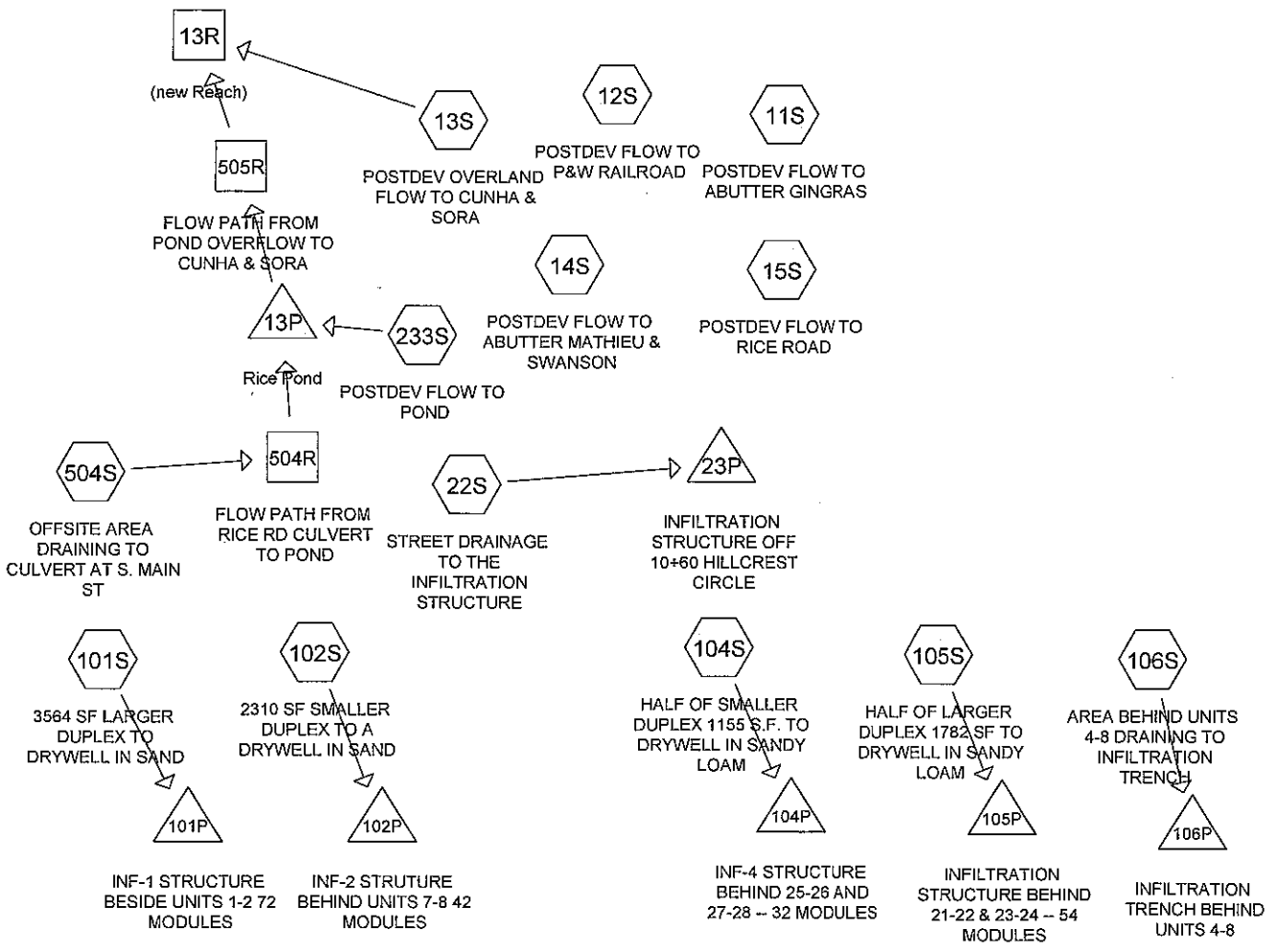
So, 1 more roof needs to be accounted for or  $1 \times 1,782 \text{ s.f.} = 1,782 \text{ s.f.}$

If we add these necessary adjustments together,  $24,948 + 2,310 + 2,310 + 1,782 = 31,350 \text{ s.f.}$   
Or 0.720 acres

If we add this adjustment of 0.720 acres to the adjusted postdevelopment total area from step one, of 75.917 acres, we get a total of 76.637 acres or the exact same total area as the predevelopment total after taking out the double counted subcatchment #4.



Routing Diagram for Rice Pond Village Millbury PREdevelopment 11-8-2021  
 Prepared by Azimuth Land Design, LLC, Printed 11/12/2021  
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Routing Diagram for Rice Pond Village Millbury POSTdevelopment 11-8-2021  
 Prepared by Azimuth Land Design, LLC, Printed 11/12/2021  
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2 YEAR STORM



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# **PREDEVELOPMENT**

**Summary for Subcatchment 1S: PREDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,858     | 30 | Woods, Good, HSG A            |
| 10,008    | 39 | >75% Grass cover, Good, HSG A |
| 16,866    | 35 | Weighted Average              |
| 16,866    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 4.3      | 50            | 0.1000        | 0.19              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"     |
| 0.9      | 100           | 0.1400        | 1.87              |                | Shallow Concentrated Flow,<br>Woodland Kv= 5.0 fps |
| 5.2      | 150           | Total         |                   |                |  |

**Summary for Subcatchment 2S: PREDEV FLOW TO P&W RAILROAD**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 179,428   | 30 | Woods, Good, HSG A            |
| 35,859    | 39 | >75% Grass cover, Good, HSG A |
| 3,896     | 98 | Paved parking, HSG A          |
| 219,183   | 33 | Weighted Average              |
| 215,287   |    | 98.22% Pervious Area          |
| 3,896     |    | 1.78% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.4      | 50            | 0.0400        | 0.09              |                | Sheet Flow,<br>Woods: Light underbrush n= 0.400 P2= 3.15"                              |
| 0.9      | 91            | 0.1200        | 1.73              |                | Shallow Concentrated Flow,<br>Woodland Kv= 5.0 fps                                     |
| 0.7      | 197           | 0.1060        | 4.99              | 14.98          | Channel Flow,<br>Area= 3.0 sf Perim= 4.0' r= 0.75'<br>n= 0.080 Earth, long dense weeds |
| 11.0     | 338           | Total         |                   |                |  |

**Summary for Subcatchment 3S: PREDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 0.01 cfs @ 20.00 hrs, Volume= 0.001 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description            |
|-----------|----|------------------------|
| 148,793   | 30 | Woods, Good, HSG A     |
| 30,807    | 98 | Water Surface, HSG A   |
| 179,600   | 42 | Weighted Average       |
| 148,793   |    | 82.85% Pervious Area   |
| 30,807    |    | 17.15% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 4S: PREDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 21,387    | 30 | Woods, Good, HSG A    |
| 21,387    |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.6     | 50            | 0.1200        | 0.08              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.4      | 57            | 0.1800        | 2.12              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 11.0     | 107           | Total         |                   |                |  |

**Summary for Subcatchment 5S: PREDEV FLOW TO RICE ROAD**

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 22,350    | 30 | Woods, Good, HSG A            |
| 30,632    | 39 | >75% Grass cover, Good, HSG A |
| * 5,307   | 98 | Existing roof and driveway    |
| 58,289    | 41 | Weighted Average              |
| 52,982    |    | 90.90% Pervious Area          |
| 5,307     |    | 9.10% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.3      | 50            | 0.0600        | 0.16              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"     |
| 3.7      | 212           | 0.0370        | 0.96              |                | Shallow Concentrated Flow,<br>Woodland Kv= 5.0 fps |
| 9.0      | 262           | Total         |                   |                |  |

**Summary for Subcatchment 33S: PREDEV FLOW TO POND**

Runoff = 1.65 cfs @ 12.33 hrs, Volume= 0.220 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 71,225    | 39 | >75% Grass cover, Good, HSG A |
| 49,927    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 313,497   | 61 | Weighted Average              |
| 250,155   |    | 79.80% Pervious Area          |
| 63,342    |    | 20.20% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 11.9     | 50            | 0.0900        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 3.9      | 242           | 0.0430        | 1.04              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 15.8     | 292           | Total         |                   |                |  |

**Summary for Subcatchment 503S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 23.92 cfs @ 12.63 hrs, Volume= 3.455 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description           |
|----------|---------------|---------------|-------------------|----------------|-----------------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | <b>Lag/CN Method,</b> |

**Summary for Reach 3R: (new Reach)**

Inflow Area = 69.880 ac, 24.04% Impervious, Inflow Depth > 0.59" for 2 YR STORM event  
 Inflow = 20.17 cfs @ 13.10 hrs, Volume= 3.420 af  
 Outflow = 20.17 cfs @ 13.10 hrs, Volume= 3.420 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

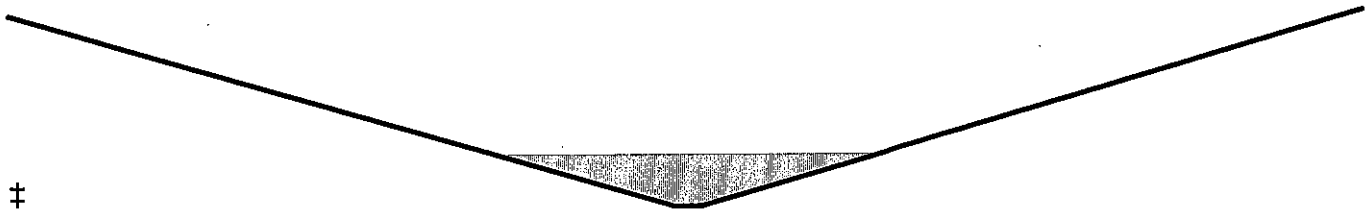
**Summary for Reach 204R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 0.63" for 2 YR STORM event  
 Inflow = 20.56 cfs @ 12.94 hrs, Volume= 3.454 af  
 Outflow = 20.17 cfs @ 13.10 hrs, Volume= 3.419 af, Atten= 2%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 1.76 fps, Min. Travel Time= 5.2 min  
 Avg. Velocity = 1.18 fps, Avg. Travel Time= 7.8 min

Peak Storage= 6,286 cf @ 13.01 hrs  
 Average Depth at Peak Storage= 0.81' , Surface Width= 26.33'  
 Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 15.0 ' / ' Top Width= 92.00'  
 Length= 547.0' Slope= 0.0068 ' / '  
 Inlet Invert= 389.50', Outlet Invert= 385.80'



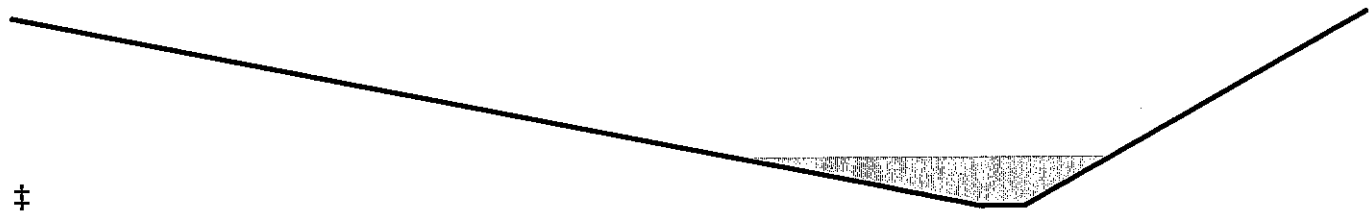
**Summary for Reach 503R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 0.71" for 2 YR STORM event  
 Inflow = 23.92 cfs @ 12.63 hrs, Volume= 3.455 af  
 Outflow = 23.72 cfs @ 12.72 hrs, Volume= 3.436 af, Atten= 1%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 3.36 fps, Min. Travel Time= 3.0 min  
 Avg. Velocity = 2.02 fps, Avg. Travel Time= 5.0 min

Peak Storage= 4,300 cf @ 12.67 hrs  
 Average Depth at Peak Storage= 0.76' , Surface Width= 16.51'  
 Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 14.0 5.0 ' / ' Top Width= 59.00'  
 Length= 608.0' Slope= 0.0255 ' / '  
 Inlet Invert= 405.50', Outlet Invert= 390.00'



**Summary for Pond 3P: Rice Pond**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 0.67" for 2 YR STORM event  
 Inflow = 24.58 cfs @ 12.71 hrs, Volume= 3.656 af  
 Outflow = 20.56 cfs @ 12.94 hrs, Volume= 3.454 af, Atten= 16%, Lag= 13.7 min  
 Primary = 20.56 cfs @ 12.94 hrs, Volume= 3.454 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 390.64' @ 12.94 hrs Surf.Area= 40,277 sf Storage= 26,377 cf

Plug-Flow detention time= 38.7 min calculated for 3.454 af (94% of inflow)  
 Center-of-Mass det. time= 21.3 min ( 881.6 - 860.2 )

| Volume | Invert  | Avail.Storage | Storage Description                                 |
|--------|---------|---------------|---|
| #1     | 389.80' | 285,060 cf    | Custom Stage Data (Prismatic) Listed below (Recalc) |

**Rice Pond Village Millbury PREdevelopment 11- Type III 24-hr 2 YR STORM Rainfall=3.15"**

Prepared by Azimuth Land Design, LLC

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 389.80              | 25,072               | 0                         | 0                         |
| 390.00              | 25,815               | 5,089                     | 5,089                     |
| 392.00              | 70,715               | 96,530                    | 101,619                   |
| 394.00              | 112,726              | 183,441                   | 285,060                   |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 389.90' | <b>171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir</b><br>Cv= 2.46 (C= 3.08) |

**Primary OutFlow** Max=20.53 cfs @ 12.94 hrs HW=390.64' (Free Discharge)

↳ **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 20.53 cfs @ 2.21 fps)

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# **POSTDEVELOPMENT**



**Summary for Subcatchment 11S: POSTDEV FLOW TO ABUTTER GINGRAS**

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 4,550     | 39 | >75% Grass cover, Good, HSG A |
| 6,450     | 30 | Woods, Good, HSG A            |
| 11,000    | 34 | Weighted Average              |
| 11,000    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.3      | 50            | 0.1100        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.4      | 52            | 0.1600        | 2.00              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 6.7      | 102           | Total         |                   |                |  |

**Summary for Subcatchment 12S: POSTDEV FLOW TO P&W RAILROAD**

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 26,479    | 30 | Woods, Good, HSG A            |
| 41,448    | 39 | >75% Grass cover, Good, HSG A |
| 67,927    | 35 | Weighted Average              |
| 67,927    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 13.9     | 50            | 0.0600        | 0.06              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.9      | 109           | 0.1500        | 1.94              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 14.8     | 159           | Total         |                   |                |  |

**Summary for Subcatchment 13S: POSTDEV OVERLAND FLOW TO CUNHA & SORA**

[73] Warning: Peak may fall outside time span

Runoff = 0.01 cfs @ 20.00 hrs, Volume= 0.003 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| * 1,870   | 98 | Back of units 17 & 18         |
| 30,807    | 98 | Water Surface, HSG A          |
| 7,459     | 39 | >75% Grass cover, Good, HSG A |
| 137,688   | 30 | Woods, Good, HSG A            |
| 177,824   | 43 | Weighted Average              |
| 145,147   |    | 81.62% Pervious Area          |
| 32,677    |    | 18.38% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 14S: POSTDEV FLOW TO ABUTTER MATHIEU & SWANSON**

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 12,463    | 30 | Woods, Good, HSG A            |
| 565       | 39 | >75% Grass cover, Good, HSG A |
| 13,028    | 30 | Weighted Average              |
| 13,028    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.5      | 50            | 0.1000        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.6      | 71            | 0.1700        | 2.06              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 7.1      | 121           | Total         |                   |                |  |

**Summary for Subcatchment 15S: POSTDEV FLOW TO RICE ROAD**

[73] Warning: Peak may fall outside time span

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,537     | 98 | Paved parking, HSG A          |
| 6,015     | 30 | Woods, Good, HSG A            |
| 21,042    | 39 | >75% Grass cover, Good, HSG A |
| 29,594    | 42 | Weighted Average              |
| 27,057    |    | 91.43% Pervious Area          |
| 2,537     |    | 8.57% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.3      | 50            | 0.0200        | 0.10              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 1.9      | 119           | 0.0050        | 1.06              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 10.2     | 169           | Total         |                   |                |  |

**Summary for Subcatchment 22S: STREET DRAINAGE TO THE INFILTRATION STRUCTURE**

Runoff = 4.20 cfs @ 12.16 hrs, Volume= 0.335 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| 52,472    | 39 | >75% Grass cover, Good, HSG A  |
| * 101,970 | 98 | Drive, driveways & roofs HSG A |
| 154,442   | 78 | Weighted Average               |
| 52,472    |    | 33.98% Pervious Area           |
| 101,970   |    | 66.02% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.9     | 50            | 0.0100        | 0.08              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.2      | 20            | 0.0100        | 1.50              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.1      | 21            | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps            |
| 11.2     | 91            | Total         |                   |                |  |

**Summary for Subcatchment 101S: 3564 SF LARGER DUPLEX TO DRYWELL IN SAND**

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.019 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 3,564     | 98 | Unconnected roofs, HSG A |
| 3,564     |    | 100.00% Impervious Area  |
| 3,564     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description          |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry,</b> |

**Summary for Subcatchment 102S: 2310 SF SMALLER DUPLEX TO A DRYWELL IN SAND**

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 2,310     | 98 | Roofs, HSG A            |
| 2,310     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description          |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry,</b> |

**Summary for Subcatchment 104S: HALF OF SMALLER DUPLEX 1155 S.F. TO DRYWELL IN SANDY LOA**

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 1,155     | 98 | Unconnected roofs, HSG A |
| 1,155     |    | 100.00% Impervious Area  |
| 1,155     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 105S: HALF OF LARGER DUPLEX 1782 SF TO DRYWELL IN SANDY LOAM**

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                 |
|-----------|----|-----------------------------|
| 1,782     | 98 | Unconnected pavement, HSG A |
| 1,782     |    | 100.00% Impervious Area     |
| 1,782     |    | 100.00% Unconnected         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 106S: AREA BEHIND UNITS 4-8 DRAINING TO INFILTRATION TRENCH**

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 14,300    | 39 | >75% Grass cover, Good, HSG A |
| 14,300    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 50            | 0.0700        | 0.17              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.4      | 72            | 0.0400        | 3.00              |                | Shallow Concentrated Flow,<br>Grassed Waterway Kv= 15.0 fps |
| 5.4      | 122           | Total         |                   |                |   |

**Summary for Subcatchment 233S: POSTDEV FLOW TO POND**

Runoff = 2.08 cfs @ 12.18 hrs, Volume= 0.225 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 4,379     | 39 | >75% Grass cover, Good, HSG A |
| 24,995    | 39 | >75% Grass cover, Good, HSG A |
| 31,725    | 39 | >75% Grass cover, Good, HSG A |
| 38,736    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 292,180   | 62 | Weighted Average              |
| 228,838   |    | 78.32% Pervious Area          |
| 63,342    |    | 21.68% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.0      | 50            | 0.0700        | 0.17              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.5      | 83            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 3.8      | 212           | 0.0340        | 0.92              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps          |
| 9.3      | 345           | Total         |                   |                |  |

**Summary for Subcatchment 504S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 23.92 cfs @ 12.63 hrs, Volume= 3.455 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 2 YR STORM Rainfall=3.15"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description    |
|-------------|------------------|------------------|----------------------|-------------------|----------------|
| 40.4        | 3,090            | 0.0670           | 1.27                 |                   | Lag/CN Method, |

**Summary for Reach 13R: (new Reach)**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 69.350 ac, 24.29% Impervious, Inflow Depth > 0.59" for 2 YR STORM event  
 Inflow = 20.14 cfs @ 13.10 hrs, Volume= 3.427 af  
 Outflow = 20.14 cfs @ 13.10 hrs, Volume= 3.427 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

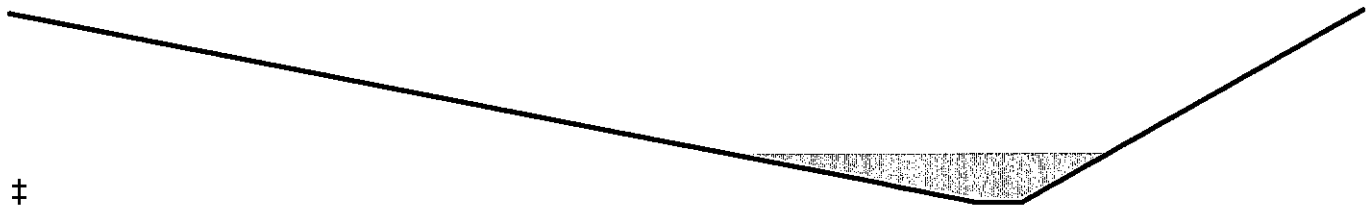
**Summary for Reach 504R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 0.71" for 2 YR STORM event  
 Inflow = 23.92 cfs @ 12.63 hrs, Volume= 3.455 af  
 Outflow = 23.72 cfs @ 12.72 hrs, Volume= 3.436 af, Atten= 1%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 3.36 fps, Min. Travel Time= 3.0 min  
 Avg. Velocity = 2.02 fps, Avg. Travel Time= 5.0 min

Peak Storage= 4,300 cf @ 12.67 hrs  
 Average Depth at Peak Storage= 0.76' , Surface Width= 16.51'  
 Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 14.0 5.0 ' / ' Top Width= 59.00'  
 Length= 608.0' Slope= 0.0255 ' / '  
 Inlet Invert= 405.50', Outlet Invert= 390.00'



**Summary for Reach 505R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

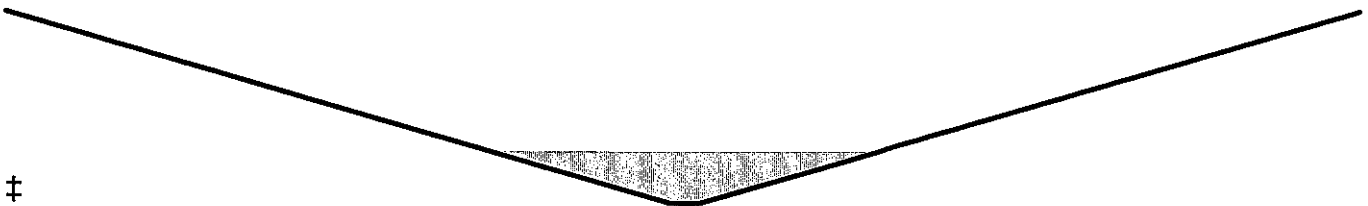
[79] Warning: Submerged Pond 13P Primary device # 1 by 0.41'

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 0.64" for 2 YR STORM event  
 Inflow = 20.52 cfs @ 12.94 hrs, Volume= 3.458 af  
 Outflow = 20.14 cfs @ 13.10 hrs, Volume= 3.424 af, Atten= 2%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 1.75 fps, Min. Travel Time= 5.2 min  
 Avg. Velocity = 1.17 fps, Avg. Travel Time= 7.8 min

Peak Storage= 6,279 cf @ 13.01 hrs  
 Average Depth at Peak Storage= 0.81' , Surface Width= 26.32'  
 Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 15.0 ' / ' Top Width= 92.00'  
 Length= 547.0' Slope= 0.0068 ' / '  
 Inlet Invert= 389.50', Outlet Invert= 385.80'



**Summary for Pond 13P: Rice Pond**

[62] Hint: Exceeded Reach 504R OUTLET depth by 0.01' @ 13.28 hrs

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 0.67" for 2 YR STORM event  
 Inflow = 24.38 cfs @ 12.72 hrs, Volume= 3.661 af  
 Outflow = 20.52 cfs @ 12.94 hrs, Volume= 3.458 af, Atten= 16%, Lag= 13.3 min  
 Primary = 20.52 cfs @ 12.94 hrs, Volume= 3.458 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 390.64' @ 12.94 hrs Surf.Area= 40,266 sf Storage= 26,356 cf

Plug-Flow detention time= 38.6 min calculated for 3.451 af (94% of inflow)  
 Center-of-Mass det. time= 21.4 min ( 881.1 - 859.7 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 389.80' | 285,060 cf    | <b>Custom Stage Data (Prismatic) Listed below (Recalc)</b> |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 389.80           | 25,072            | 0                      | 0                      |
| 390.00           | 25,815            | 5,089                  | 5,089                  |
| 392.00           | 70,715            | 96,530                 | 101,619                |
| 394.00           | 112,726           | 183,441                | 285,060                |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 389.90' | <b>171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir</b><br>Cv= 2.46 (C= 3.08) |

**Primary OutFlow** Max=20.50 cfs @ 12.94 hrs HW=390.64' (Free Discharge)  
 ↳ Sharp-Crested Vee/Trap Weir (Weir Controls 20.50 cfs @ 2.21 fps)



**Summary for Pond 23P: INFILTRATION STRUCTURE OFF 10+60 HILLCREST CIRCLE**

Inflow Area = 3.546 ac, 66.02% Impervious, Inflow Depth > 1.13" for 2 YR STORM event  
 Inflow = 4.20 cfs @ 12.16 hrs, Volume= 0.335 af  
 Outflow = 1.17 cfs @ 11.99 hrs, Volume= 0.335 af, Atten= 72%, Lag= 0.0 min  
 Discarded = 1.17 cfs @ 11.99 hrs, Volume= 0.335 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 375.43' @ 12.62 hrs Surf.Area= 6,136 sf Storage= 3,579 cf

Plug-Flow detention time= 20.1 min calculated for 0.335 af (100% of inflow)  
 Center-of-Mass det. time= 19.6 min ( 832.8 - 813.2 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 374.50' | 7,730 cf      | <b>118'X52' OUTSIDE OF STONE (Prismatic)</b> Listed below (Recalc)<br>52,156 cf Overall - 32,832 cf Embedded = 19,324 cf x 40.0% Voids  |
| #2     | 375.00' | 30,894 cf     | <b>StormTank 25 Series 72"</b> x 1216 Inside #1<br>Inside= 18.0"W x 72.0"H => 8.73 sf x 3.00'L = 26.2 cf<br>Outside= 18.0"W x 72.0"H => 9.00 sf x 3.00'L = 27.0 cf<br>1216 Chambers in 32 Rows<br>32,832 cf Overall x 97.0% Voids |
|        |         | 38,623 cf     | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 374.50           | 6,136             | 0                      | 0                      |
| 383.00           | 6,136             | 52,156                 | 52,156                 |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 374.50' | <b>8.270 in/hr Exfiltration over Surface area</b> |

Discarded OutFlow Max=1.17 cfs @ 11.99 hrs HW=374.60' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.17 cfs)

**Summary for Pond 101P: INF-1 STRUCTURE BESIDE UNITS 1-2 72 MODULES**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.082 ac, 100.00% Impervious, Inflow Depth > 2.73" for 2 YR STORM event  
 Inflow = 0.26 cfs @ 12.07 hrs, Volume= 0.019 af  
 Outflow = 0.08 cfs @ 11.84 hrs, Volume= 0.019 af, Atten= 70%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.84 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 395.66' @ 12.37 hrs Surf.Area= 406 sf Storage= 132 cf

Plug-Flow detention time= 8.3 min calculated for 0.019 af (100% of inflow)  
 Center-of-Mass det. time= 8.1 min ( 746.0 - 737.9 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 395.00' | 374 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,421 cf Overall - 486 cf Embedded = 935 cf x 40.0% Voids   |
| #2     | 395.50' | 445 cf        | <b>StormTank 25 Series 18"</b> x 72 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>72 Chambers in 8 Rows<br>486 cf Overall x 96.0% Voids |
|        |         | 819 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 395.00           | 406               | 0                      | 0                      |
| 398.50           | 406               | 1,421                  | 1,421                  |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 395.00' | <b>8.270 in/hr Exfiltration over Surface area</b> |

Discarded OutFlow Max=0.08 cfs @ 11.84 hrs HW=395.04' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

### Summary for Pond 102P: INF-2 STRUTURE BEHIND UNITS 7-8 42 MODULES

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.053 ac, 100.00% Impervious, Inflow Depth > 2.73" for 2 YR STORM event  
 Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af  
 Outflow = 0.05 cfs @ 11.81 hrs, Volume= 0.012 af, Atten= 71%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.81 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 396.70' @ 12.38 hrs Surf.Area= 253 sf Storage= 90 cf

Plug-Flow detention time= 9.1 min calculated for 0.012 af (100% of inflow)  
 Center-of-Mass det. time= 8.9 min ( 746.8 - 737.9 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 396.00' | 241 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>886 cf Overall - 284 cf Embedded = 602 cf x 40.0% Voids   |
| #2     | 396.50' | 260 cf        | <b>StormTank 25 Series 18"</b> x 42 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>42 Chambers in 6 Rows<br>284 cf Overall x 96.0% Voids |
|        |         | 500 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 396.00           | 253               | 0                      | 0                      |
| 399.50           | 253               | 886                    | 886                    |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 396.00' | <b>8.270 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.05 cfs @ 11.81 hrs HW=396.04' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.05 cfs)

**Summary for Pond 104P: INF-4 STRUCTURE BEHIND 25-26 AND 27-28 -- 32 MODULES**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.027 ac, 100.00% Impervious, Inflow Depth > 2.73" for 2 YR STORM event  
 Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af  
 Outflow = 0.01 cfs @ 11.24 hrs, Volume= 0.006 af, Atten= 93%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.24 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 379.03' @ 13.12 hrs Surf.Area= 256 sf Storage= 109 cf

Plug-Flow detention time= 145.7 min calculated for 0.006 af (92% of inflow)  
 Center-of-Mass det. time= 117.8 min ( 855.7 - 737.9 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 378.00' | 250 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>896 cf Overall - 270 cf Embedded = 626 cf x 40.0% Voids  |
| #2     | 379.00' | 247 cf        | <b>StormTank 25 Series 18"</b> x 40 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>40 Chambers in 4 Rows<br>270 cf Overall x 96.0% Voids |
|        |         | 498 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 378.00           | 256               | 0                      | 0                      |
| 381.50           | 256               | 896                    | 896                    |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 378.00' | <b>1.020 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.01 cfs @ 11.24 hrs HW=378.04' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Summary for Pond 105P: INFILTRATION STRUCTURE BEHIND 21-22 & 23-24 -- 54 MODULES**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth > 2.73" for 2 YR STORM event  
 Inflow = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af  
 Outflow = 0.01 cfs @ 11.18 hrs, Volume= 0.008 af, Atten= 93%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.18 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 379.80' @ 13.19 hrs Surf.Area= 385 sf Storage= 170 cf

Plug-Flow detention time= 149.1 min calculated for 0.008 af (90% of inflow)  
 Center-of-Mass det. time= 116.2 min ( 854.1 - 737.9 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 379.00' | 361 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>1,348 cf Overall - 446 cf Embedded = 902 cf x 40.0% Voids  |
| #2     | 379.50' | 408 cf        | <b>StormTank 25 Series 18"</b> x 66 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>66 Chambers in 6 Rows<br>446 cf Overall x 96.0% Voids |
|        |         | 769 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 379.00              | 385                  | 0                         | 0                         |
| 382.50              | 385                  | 1,348                     | 1,348                     |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 379.00' | <b>1.020 in/hr Exfiltration over Surface area</b> |

Discarded OutFlow Max=0.01 cfs @ 11.18 hrs HW=379.04' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

### Summary for Pond 106P: INFILTRATION TRENCH BEHIND UNITS 4-8

Inflow Area = 0.328 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2 YR STORM event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 394.00' @ 5.00 hrs Surf.Area= 634 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 394.00' | 597 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,902 cf Overall - 409 cf Embedded = 1,493 cf x 40.0% Voids  |
| #2     | 394.50' | 409 cf        | <b>Cultec R-150XLHD</b> x 15 Inside #1<br>Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf<br>Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap<br>Row Length Adjustment= +0.75' x 2.65 sf x 1 rows |
|        |         | 1,006 cf      | Total Available Storage  |

**Rice Pond Village Millbury POSTdevelopment 11- Type III 24-hr 2 YR STORM Rainfall=3.15"**

Prepared by Azimuth Land Design, LLC

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 394.00              | 634                  | 0                         | 0                         |
| 397.00              | 634                  | 1,902                     | 1,902                     |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 394.00' | <b>2.410 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.00 cfs @ 5.00 hrs HW=394.00' (Free Discharge)  
↑1=Exfiltration (Passes 0.00 cfs of 0.04 cfs potential flow)

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10 YEAR STORM

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# **PREDEVELOPMENT**

**Summary for Subcatchment 1S: PREDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.00 cfs @ 15.62 hrs, Volume= 0.001 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,858     | 30 | Woods, Good, HSG A            |
| 10,008    | 39 | >75% Grass cover, Good, HSG A |
| 16,866    | 35 | Weighted Average              |
| 16,866    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 4.3      | 50            | 0.1000        | 0.19              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"     |
| 0.9      | 100           | 0.1400        | 1.87              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps |
| 5.2      | 150           | Total         |                   |                |   |

**Summary for Subcatchment 2S: PREDEV FLOW TO P&W RAILROAD**

Runoff = 0.01 cfs @ 20.00 hrs, Volume= 0.004 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 179,428   | 30 | Woods, Good, HSG A            |
| 35,859    | 39 | >75% Grass cover, Good, HSG A |
| 3,896     | 98 | Paved parking, HSG A          |
| 219,183   | 33 | Weighted Average              |
| 215,287   |    | 98.22% Pervious Area          |
| 3,896     |    | 1.78% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.4      | 50            | 0.0400        | 0.09              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15"                              |
| 0.9      | 91            | 0.1200        | 1.73              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                                     |
| 0.7      | 197           | 0.1060        | 4.99              | 14.98          | <b>Channel Flow,</b><br>Area= 3.0 sf Perim= 4.0' r= 0.75'<br>n= 0.080 Earth, long dense weeds |
| 11.0     | 338           | Total         |                   |                |   |



**Summary for Subcatchment 3S: PREDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 0.19 cfs @ 12.82 hrs, Volume= 0.065 af, Depth> 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description            |
|-----------|----|------------------------|
| 148,793   | 30 | Woods, Good, HSG A     |
| 30,807    | 98 | Water Surface, HSG A   |
| 179,600   | 42 | Weighted Average       |
| 148,793   |    | 82.85% Pervious Area   |
| 30,807    |    | 17.15% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |

29.1 636 Total

**Summary for Subcatchment 4S: PREDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 21,387    | 30 | Woods, Good, HSG A    |
| 21,387    |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.6     | 50            | 0.1200        | 0.08              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.4      | 57            | 0.1800        | 2.12              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |

11.0 107 Total

**Summary for Subcatchment 5S: PREDEV FLOW TO RICE ROAD**

Runoff = 0.06 cfs @ 12.50 hrs, Volume= 0.018 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 22,350    | 30 | Woods, Good, HSG A            |
| 30,632    | 39 | >75% Grass cover, Good, HSG A |
| * 5,307   | 98 | Existing roof and driveway    |
| 58,289    | 41 | Weighted Average              |
| 52,982    |    | 90.90% Pervious Area          |
| 5,307     |    | 9.10% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.3      | 50            | 0.0600        | 0.16              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"     |
| 3.7      | 212           | 0.0370        | 0.96              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps |
| 9.0      | 262           | Total         |                   |                |   |

**Summary for Subcatchment 33S: PREDEV FLOW TO POND**

Runoff = 6.55 cfs @ 12.24 hrs, Volume= 0.642 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 71,225    | 39 | >75% Grass cover, Good, HSG A |
| 49,927    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 313,497   | 61 | Weighted Average              |
| 250,155   |    | 79.80% Pervious Area          |
| 63,342    |    | 20.20% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 11.9     | 50            | 0.0900        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 3.9      | 242           | 0.0430        | 1.04              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 15.8     | 292           | Total         |                   |                |  |

**Summary for Subcatchment 503S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 59.34 cfs @ 12.59 hrs, Volume= 8.027 af, Depth > 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description           |
|----------|---------------|---------------|-------------------|----------------|-----------------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | <b>Lag/CN Method,</b> |

**Summary for Reach 3R: (new Reach)**

Inflow Area = 69.880 ac, 24.04% Impervious, Inflow Depth > 1.44" for 10 YR STORM event  
 Inflow = 57.61 cfs @ 12.89 hrs, Volume= 8.391 af  
 Outflow = 57.61 cfs @ 12.89 hrs, Volume= 8.391 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

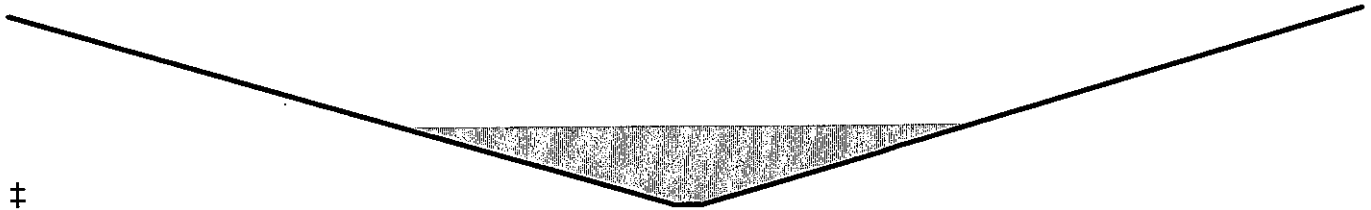
**Summary for Reach 204R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 1.53" for 10 YR STORM event  
 Inflow = 58.09 cfs @ 12.77 hrs, Volume= 8.380 af  
 Outflow = 57.42 cfs @ 12.89 hrs, Volume= 8.326 af, Atten= 1%, Lag= 7.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 2.28 fps, Min. Travel Time= 4.0 min  
 Avg. Velocity = 1.38 fps, Avg. Travel Time= 6.6 min

Peak Storage= 13,771 cf @ 12.83 hrs  
 Average Depth at Peak Storage= 1.23', Surface Width= 38.92'  
 Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 15.0 ' ' Top Width= 92.00'  
 Length= 547.0' Slope= 0.0068 ' '  
 Inlet Invert= 389.50', Outlet Invert= 385.80'



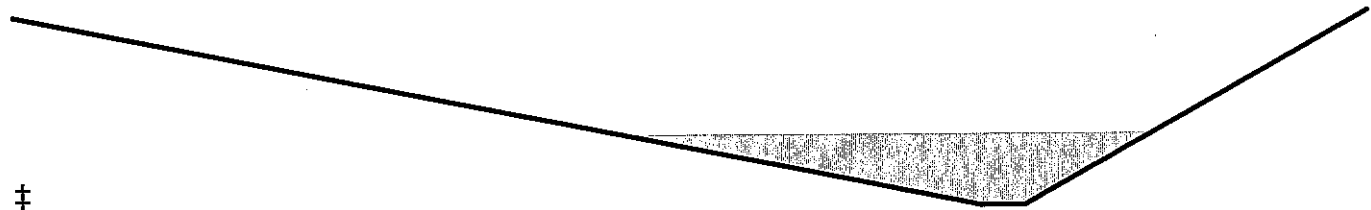
**Summary for Reach 503R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 1.64" for 10 YR STORM event  
 Inflow = 59.34 cfs @ 12.59 hrs, Volume= 8.027 af  
 Outflow = 59.08 cfs @ 12.66 hrs, Volume= 7.998 af, Atten= 0%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 4.22 fps, Min. Travel Time= 2.4 min  
 Avg. Velocity = 2.33 fps, Avg. Travel Time= 4.4 min

Peak Storage= 8,513 cf @ 12.62 hrs  
 Average Depth at Peak Storage= 1.11' , Surface Width= 23.15'  
 Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 14.0 5.0 ' / ' Top Width= 59.00'  
 Length= 608.0' Slope= 0.0255 ' / '  
 Inlet Invert= 405.50', Outlet Invert= 390.00'



**Summary for Pond 3P: Rice Pond**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 1.58" for 10 YR STORM event  
 Inflow = 61.93 cfs @ 12.64 hrs, Volume= 8.640 af  
 Outflow = 58.09 cfs @ 12.77 hrs, Volume= 8.380 af, Atten= 6%, Lag= 7.9 min  
 Primary = 58.09 cfs @ 12.77 hrs, Volume= 8.380 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 391.06' @ 12.77 hrs Surf.Area= 49,622 sf Storage= 45,086 cf

Plug-Flow detention time= 24.8 min calculated for 8.380 af (97% of inflow)  
 Center-of-Mass det. time= 14.6 min ( 855.1 - 840.4 )

| Volume | Invert  | Avail.Storage | Storage Description                                 |
|--------|---------|---------------|---|
| #1     | 389.80' | 285,060 cf    | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 389.80              | 25,072               | 0                         | 0                         |
| 390.00              | 25,815               | 5,089                     | 5,089                     |
| 392.00              | 70,715               | 96,530                    | 101,619                   |
| 394.00              | 112,726              | 183,441                   | 285,060                   |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 389.90' | <b>171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir</b><br>Cv= 2.46 (C= 3.08) |

**Primary OutFlow** Max=58.06 cfs @ 12.77 hrs HW=391.06' (Free Discharge)  
 ↳ **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 58.06 cfs @ 2.72 fps)

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# **POSTDEVELOPMENT**

**Summary for Subcatchment 11S: POSTDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.00 cfs @ 17.14 hrs, Volume= 0.000 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 4,550     | 39 | >75% Grass cover, Good, HSG A |
| 6,450     | 30 | Woods, Good, HSG A            |
| 11,000    | 34 | Weighted Average              |
| 11,000    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.3      | 50            | 0.1100        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.4      | 52            | 0.1600        | 2.00              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 6.7      | 102           | Total         |                   |                |  |

**Summary for Subcatchment 12S: POSTDEV FLOW TO P&W RAILROAD**

Runoff = 0.01 cfs @ 15.77 hrs, Volume= 0.004 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 26,479    | 30 | Woods, Good, HSG A            |
| 41,448    | 39 | >75% Grass cover, Good, HSG A |
| 67,927    | 35 | Weighted Average              |
| 67,927    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 13.9     | 50            | 0.0600        | 0.06              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.9      | 109           | 0.1500        | 1.94              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 14.8     | 159           | Total         |                   |                |  |

**Summary for Subcatchment 13S: POSTDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 0.25 cfs @ 12.76 hrs, Volume= 0.075 af, Depth> 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| * 1,870   | 98 | Back of units 17 & 18         |
| 30,807    | 98 | Water Surface, HSG A          |
| 7,459     | 39 | >75% Grass cover, Good, HSG A |
| 137,688   | 30 | Woods, Good, HSG A            |
| 177,824   | 43 | Weighted Average              |
| 145,147   |    | 81.62% Pervious Area          |
| 32,677    |    | 18.38% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 14S: POSTDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 12,463    | 30 | Woods, Good, HSG A            |
| 565       | 39 | >75% Grass cover, Good, HSG A |
| 13,028    | 30 | Weighted Average              |
| 13,028    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.5      | 50            | 0.1000        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.6      | 71            | 0.1700        | 2.06              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 7.1      | 121           | Total         |                   |                |  |

**Summary for Subcatchment 15S: POSTDEV FLOW TO RICE ROAD**

Runoff = 0.04 cfs @ 12.49 hrs, Volume= 0.011 af, Depth> 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"



| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,537     | 98 | Paved parking, HSG A          |
| 6,015     | 30 | Woods, Good, HSG A            |
| 21,042    | 39 | >75% Grass cover, Good, HSG A |
| 29,594    | 42 | Weighted Average              |
| 27,057    |    | 91.43% Pervious Area          |
| 2,537     |    | 8.57% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.3      | 50            | 0.0200        | 0.10              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 1.9      | 119           | 0.0050        | 1.06              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 10.2     | 169           | Total         |                   |                |  |

**Summary for Subcatchment 22S: STREET DRAINAGE TO THE INFILTRATION STRUCTURE**

Runoff = 8.56 cfs @ 12.16 hrs, Volume= 0.675 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| 52,472    | 39 | >75% Grass cover, Good, HSG A  |
| * 101,970 | 98 | Drive, driveways & roofs HSG A |
| 154,442   | 78 | Weighted Average               |
| 52,472    |    | 33.98% Pervious Area           |
| 101,970   |    | 66.02% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.9     | 50            | 0.0100        | 0.08              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.2      | 20            | 0.0100        | 1.50              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.1      | 21            | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps            |
| 11.2     | 91            | Total         |                   |                |  |

**Summary for Subcatchment 101S: 3564 SF LARGER DUPLEX TO DRYWELL IN SAND**

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 0.028 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 3,564     | 98 | Unconnected roofs, HSG A |
| 3,564     |    | 100.00% Impervious Area  |
| 3,564     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 102S: 2310 SF SMALLER DUPLEX TO A DRYWELL IN SAND**

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 0.018 af, Depth> 4.14"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 2,310     | 98 | Roofs, HSG A            |
| 2,310     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 104S: HALF OF SMALLER DUPLEX 1155 S.F. TO DRYWELL IN SANDY LOAM**

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af, Depth> 4.14"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 1,155     | 98 | Unconnected roofs, HSG A |
| 1,155     |    | 100.00% Impervious Area  |
| 1,155     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 105S: HALF OF LARGER DUPLEX 1782 SF TO DRYWELL IN SANDY LOAM**

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 0.014 af, Depth> 4.14"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                 |
|-----------|----|-----------------------------|
| 1,782     | 98 | Unconnected pavement, HSG A |
| 1,782     |    | 100.00% Impervious Area     |
| 1,782     |    | 100.00% Unconnected         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 106S: AREA BEHIND UNITS 4-8 DRAINING TO INFILTRATION TRENCH**

Runoff = 0.01 cfs @ 13.75 hrs, Volume= 0.003 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 14,300    | 39 | >75% Grass cover, Good, HSG A |
| 14,300    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 50            | 0.0700        | 0.17              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.4      | 72            | 0.0400        | 3.00              |                | Shallow Concentrated Flow,<br>Grassed Waterway Kv= 15.0 fps |
| 5.4      | 122           | Total         |                   |                |   |

**Summary for Subcatchment 233S: POSTDEV FLOW TO POND**

Runoff = 7.91 cfs @ 12.15 hrs, Volume= 0.634 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 4,379     | 39 | >75% Grass cover, Good, HSG A |
| 24,995    | 39 | >75% Grass cover, Good, HSG A |
| 31,725    | 39 | >75% Grass cover, Good, HSG A |
| 38,736    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 292,180   | 62 | Weighted Average              |
| 228,838   |    | 78.32% Pervious Area          |
| 63,342    |    | 21.68% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.0      | 50            | 0.0700        | 0.17              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.5      | 83            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 3.8      | 212           | 0.0340        | 0.92              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps          |
| 9.3      | 345           | Total         |                   |                |  |

**Summary for Subcatchment 504S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 59.34 cfs @ 12.59 hrs, Volume= 8.027 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 10 YR STORM Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description    |
|----------|---------------|---------------|-------------------|----------------|----------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | Lag/CN Method, |

**Summary for Reach 13R: (new Reach)**

Inflow Area = 69.350 ac, 24.29% Impervious, Inflow Depth > 1.45" for 10 YR STORM event  
 Inflow = 56.95 cfs @ 12.90 hrs, Volume= 8.394 af  
 Outflow = 56.95 cfs @ 12.90 hrs, Volume= 8.394 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

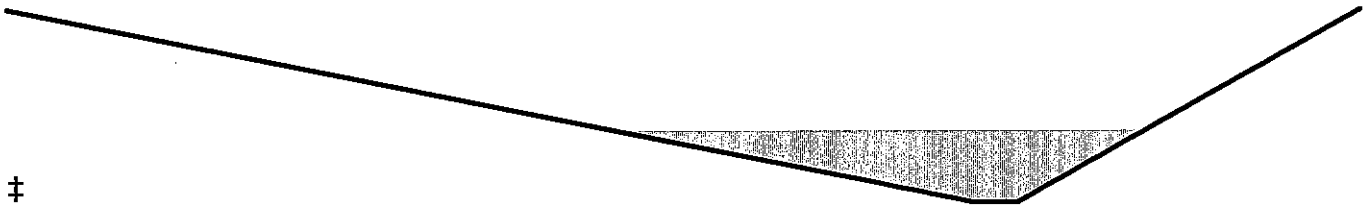
**Summary for Reach 504R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 1.64" for 10 YR STORM event  
Inflow = 59.34 cfs @ 12.59 hrs, Volume= 8.027 af  
Outflow = 59.08 cfs @ 12.66 hrs, Volume= 7.998 af, Atten= 0%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
Max. Velocity= 4.22 fps, Min. Travel Time= 2.4 min  
Avg. Velocity = 2.33 fps, Avg. Travel Time= 4.4 min

Peak Storage= 8,513 cf @ 12.62 hrs  
Average Depth at Peak Storage= 1.11' , Surface Width= 23.15'  
Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 14.0 5.0 ' / ' Top Width= 59.00'  
Length= 608.0' Slope= 0.0255 ' / '  
Inlet Invert= 405.50', Outlet Invert= 390.00'



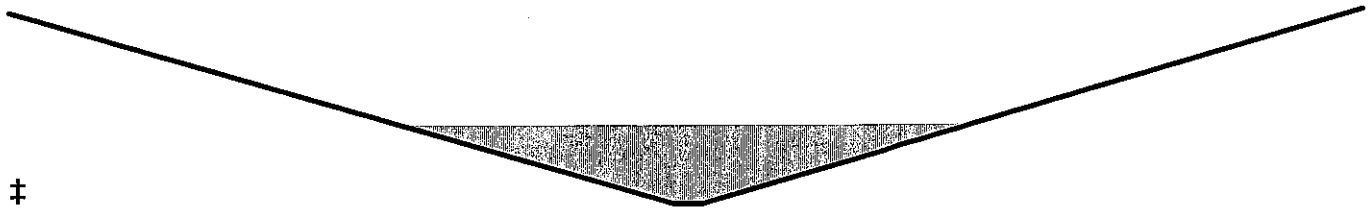
**Summary for Reach 505R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 1.54" for 10 YR STORM event  
Inflow = 57.36 cfs @ 12.78 hrs, Volume= 8.373 af  
Outflow = 56.71 cfs @ 12.90 hrs, Volume= 8.319 af, Atten= 1%, Lag= 7.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
Max. Velocity= 2.28 fps, Min. Travel Time= 4.0 min  
Avg. Velocity = 1.38 fps, Avg. Travel Time= 6.6 min

Peak Storage= 13,643 cf @ 12.83 hrs  
Average Depth at Peak Storage= 1.22' , Surface Width= 38.73'  
Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 15.0 ' / ' Top Width= 92.00'  
Length= 547.0' Slope= 0.0068 ' / '  
Inlet Invert= 389.50', Outlet Invert= 385.80'



**Summary for Pond 13P: Rice Pond**

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 1.59" for 10 YR STORM event  
 Inflow = 60.97 cfs @ 12.65 hrs, Volume= 8.632 af  
 Outflow = 57.36 cfs @ 12.78 hrs, Volume= 8.373 af, Atten= 6%, Lag= 7.6 min  
 Primary = 57.36 cfs @ 12.78 hrs, Volume= 8.373 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 391.05' @ 12.78 hrs Surf.Area= 49,480 sf Storage= 44,775 cf

Plug-Flow detention time= 24.8 min calculated for 8.356 af (97% of inflow)  
 Center-of-Mass det. time= 14.7 min ( 854.6 - 839.9 )

| Volume | Invert  | Avail.Storage | Storage Description                                 |
|--------|---------|---------------|---|
| #1     | 389.80' | 285,060 cf    | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 389.80           | 25,072            | 0                      | 0                      |
| 390.00           | 25,815            | 5,089                  | 5,089                  |
| 392.00           | 70,715            | 96,530                 | 101,619                |
| 394.00           | 112,726           | 183,441                | 285,060                |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 389.90' | 171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir<br>Cv= 2.46 (C= 3.08) |

Primary OutFlow Max=57.30 cfs @ 12.78 hrs HW=391.05' (Free Discharge)  
 ↑-1=Sharp-Crested Vee/Trap Weir (Weir Controls 57.30 cfs @ 2.71 fps)

**Summary for Pond 23P: INFILTRATION STRUCTURE OFF 10+60 HILLCREST CIRCLE**

Inflow Area = 3.546 ac, 66.02% Impervious, Inflow Depth > 2.28" for 10 YR STORM event  
 Inflow = 8.56 cfs @ 12.16 hrs, Volume= 0.675 af  
 Outflow = 1.17 cfs @ 11.78 hrs, Volume= 0.674 af, Atten= 86%, Lag= 0.0 min  
 Discarded = 1.17 cfs @ 11.78 hrs, Volume= 0.674 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 376.80' @ 12.96 hrs Surf.Area= 6,136 sf Storage= 10,952 cf

Plug-Flow detention time= 79.6 min calculated for 0.674 af (100% of inflow)  
 Center-of-Mass det. time= 79.2 min ( 876.8 - 797.6 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 374.50' | 7,730 cf      | <b>118'X52' OUTSIDE OF STONE (Prismatic)</b> Listed below (Recalc)<br>52,156 cf Overall - 32,832 cf Embedded = 19,324 cf x 40.0% Voids  |
| #2     | 375.00' | 30,894 cf     | <b>StormTank 25 Series 72"</b> x 1216 Inside #1<br>Inside= 18.0"W x 72.0"H => 8.73 sf x 3.00'L = 26.2 cf<br>Outside= 18.0"W x 72.0"H => 9.00 sf x 3.00'L = 27.0 cf<br>1216 Chambers in 32 Rows<br>32,832 cf Overall x 97.0% Voids |
|        |         | 38,623 cf     | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 374.50           | 6,136             | 0                      | 0                      |
| 383.00           | 6,136             | 52,156                 | 52,156                 |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 374.50' | <b>8.270 in/hr Exfiltration over Surface area</b> |

Discarded OutFlow Max=1.17 cfs @ 11.78 hrs HW=374.60' (Free Discharge)  
 ↑ 1=Exfiltration (Exfiltration Controls 1.17 cfs)

**Summary for Pond 101P: INF-1 STRUCTURE BESIDE UNITS 1-2 72 MODULES**

Inflow Area = 0.082 ac, 100.00% Impervious, Inflow Depth > 4.14" for 10 YR STORM event  
 Inflow = 0.39 cfs @ 12.07 hrs, Volume= 0.028 af  
 Outflow = 0.08 cfs @ 11.72 hrs, Volume= 0.028 af, Atten= 80%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.72 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 396.15' @ 12.48 hrs Surf.Area= 406 sf Storage= 294 cf

Plug-Flow detention time= 20.1 min calculated for 0.028 af (100% of inflow)  
 Center-of-Mass det. time= 19.9 min ( 754.6 - 734.7 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 395.00' | 374 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,421 cf Overall - 486 cf Embedded = 935 cf x 40.0% Voids   |
| #2     | 395.50' | 445 cf        | <b>StormTank 25 Series 18"</b> x 72 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>72 Chambers in 8 Rows<br>486 cf Overall x 96.0% Voids |
|        |         | 819 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 395.00           | 406               | 0                      | 0                      |
| 398.50           | 406               | 1,421                  | 1,421                  |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 395.00' | <b>8.270 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.08 cfs @ 11.72 hrs HW=395.04' (Free Discharge)  
 ↖1=Exfiltration (Exfiltration Controls 0.08 cfs)

**Summary for Pond 102P: INF-2 STRUTURE BEHIND UNITS 7-8 42 MODULES**

Inflow Area = 0.053 ac, 100.00% Impervious, Inflow Depth > 4.14" for 10 YR STORM event  
 Inflow = 0.25 cfs @ 12.07 hrs, Volume= 0.018 af  
 Outflow = 0.05 cfs @ 11.69 hrs, Volume= 0.018 af, Atten= 81%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.69 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 397.23' @ 12.49 hrs Surf.Area= 253 sf Storage= 196 cf

Plug-Flow detention time= 21.9 min calculated for 0.018 af (100% of inflow)  
 Center-of-Mass det. time= 21.6 min ( 756.4 - 734.7 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 396.00' | 241 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>886 cf Overall - 284 cf Embedded = 602 cf x 40.0% Voids   |
| #2     | 396.50' | 260 cf        | <b>StormTank 25 Series 18" x 42</b> Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>42 Chambers in 6 Rows<br>284 cf Overall x 96.0% Voids |
|        |         | 500 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 396.00           | 253               | 0                      | 0                      |
| 399.50           | 253               | 886                    | 886                    |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 396.00' | <b>8.270 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.05 cfs @ 11.69 hrs HW=396.04' (Free Discharge)  
 ↖1=Exfiltration (Exfiltration Controls 0.05 cfs)

**Summary for Pond 104P: INF-4 STRUCTURE BEHIND 25-26 AND 27-28 -- 32 MODULES**

Inflow Area = 0.027 ac, 100.00% Impervious, Inflow Depth > 4.14" for 10 YR STORM event  
 Inflow = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af  
 Outflow = 0.01 cfs @ 10.28 hrs, Volume= 0.006 af, Atten= 95%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 10.28 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 379.47' @ 14.15 hrs Surf.Area= 256 sf Storage= 195 cf

Plug-Flow detention time= 160.8 min calculated for 0.006 af (67% of inflow)  
 Center-of-Mass det. time= 89.3 min ( 824.1 - 734.7 )



**Rice Pond Village Millbury POSTdevelopment 1** Type III 24-hr 10 YR STORM Rainfall=4.70"

Prepared by Azimuth Land Design, LLC

Printed 11/12/2021

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| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 378.00' | 250 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>896 cf Overall - 270 cf Embedded = 626 cf x 40.0% Voids  |
| #2     | 379.00' | 247 cf        | <b>StormTank 25 Series 18"</b> x 40 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>40 Chambers in 4 Rows<br>270 cf Overall x 96.0% Voids |
|        |         | 498 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 378.00              | 256                  | 0                         | 0                         |
| 381.50              | 256                  | 896                       | 896                       |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 378.00' | <b>1.020 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.01 cfs @ 10.28 hrs HW=378.04' (Free Discharge)  
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Summary for Pond 105P: INFILTRATION STRUCTURE BEHIND 21-22 & 23-24 -- 54 MODULES**

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth > 4.14" for 10 YR STORM event  
 Inflow = 0.19 cfs @ 12.07 hrs, Volume= 0.014 af  
 Outflow = 0.01 cfs @ 10.19 hrs, Volume= 0.009 af, Atten= 95%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 10.19 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 380.24' @ 14.25 hrs Surf.Area= 385 sf Storage= 304 cf

Plug-Flow detention time= 161.3 min calculated for 0.009 af (66% of inflow)  
 Center-of-Mass det. time= 87.6 min ( 822.4 - 734.7 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 379.00' | 361 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>1,348 cf Overall - 446 cf Embedded = 902 cf x 40.0% Voids  |
| #2     | 379.50' | 408 cf        | <b>StormTank 25 Series 18"</b> x 66 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>66 Chambers in 6 Rows<br>446 cf Overall x 96.0% Voids |
|        |         | 769 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 379.00              | 385                  | 0                         | 0                         |
| 382.50              | 385                  | 1,348                     | 1,348                     |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 379.00' | <b>1.020 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.01 cfs @ 10.19 hrs HW=379.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Summary for Pond 106P: INFILTRATION TRENCH BEHIND UNITS 4-8**

Inflow Area = 0.328 ac, 0.00% Impervious, Inflow Depth > 0.11" for 10 YR STORM event  
 Inflow = 0.01 cfs @ 13.75 hrs, Volume= 0.003 af  
 Outflow = 0.01 cfs @ 13.81 hrs, Volume= 0.003 af, Atten= 0%, Lag= 3.5 min  
 Discarded = 0.01 cfs @ 13.81 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 394.01' @ 13.81 hrs Surf.Area= 634 sf Storage= 1 cf

Plug-Flow detention time= 3.6 min calculated for 0.003 af (99% of inflow)  
 Center-of-Mass det. time= 2.3 min ( 948.3 - 946.1 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 394.00' | 597 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,902 cf Overall - 409 cf Embedded = 1,493 cf x 40.0% Voids  |
| #2     | 394.50' | 409 cf        | <b>Cultec R-150XLHD</b> x 15 Inside #1<br>Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf<br>Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap<br>Row Length Adjustment= +0.75' x 2.65 sf x 1 rows |
|        |         | 1,006 cf      | Total Available Storage  |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 394.00           | 634               | 0                      | 0                      |
| 397.00           | 634               | 1,902                  | 1,902                  |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 394.00' | <b>2.410 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=0.04 cfs @ 13.81 hrs HW=394.01' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

25 YEAR STORM

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# **PREDEVELOPMENT**

**Summary for Subcatchment 1S: PREDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.02 cfs @ 12.47 hrs, Volume= 0.006 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,858     | 30 | Woods, Good, HSG A            |
| 10,008    | 39 | >75% Grass cover, Good, HSG A |
| 16,866    | 35 | Weighted Average              |
| 16,866    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 4.3      | 50            | 0.1000        | 0.19              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"     |
| 0.9      | 100           | 0.1400        | 1.87              |                | Shallow Concentrated Flow,<br>Woodland Kv= 5.0 fps |
| 5.2      | 150           | Total         |                   |                |  |

**Summary for Subcatchment 2S: PREDEV FLOW TO P&W RAILROAD**

Runoff = 0.10 cfs @ 14.71 hrs, Volume= 0.047 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 179,428   | 30 | Woods, Good, HSG A            |
| 35,859    | 39 | >75% Grass cover, Good, HSG A |
| 3,896     | 98 | Paved parking, HSG A          |
| 219,183   | 33 | Weighted Average              |
| 215,287   |    | 98.22% Pervious Area          |
| 3,896     |    | 1.78% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.4      | 50            | 0.0400        | 0.09              |                | Sheet Flow,<br>Woods: Light underbrush n= 0.400 P2= 3.15"                              |
| 0.9      | 91            | 0.1200        | 1.73              |                | Shallow Concentrated Flow,<br>Woodland Kv= 5.0 fps                                     |
| 0.7      | 197           | 0.1060        | 4.99              | 14.98          | Channel Flow,<br>Area= 3.0 sf Perim= 4.0' r= 0.75'<br>n= 0.080 Earth, long dense weeds |
| 11.0     | 338           | Total         |                   |                |  |

**Summary for Subcatchment 3S: PREDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 0.87 cfs @ 12.62 hrs, Volume= 0.168 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description            |
|-----------|----|------------------------|
| 148,793   | 30 | Woods, Good, HSG A     |
| 30,807    | 98 | Water Surface, HSG A   |
| 179,600   | 42 | Weighted Average       |
| 148,793   |    | 82.85% Pervious Area   |
| 30,807    |    | 17.15% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 4S: PREDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.00 cfs @ 15.73 hrs, Volume= 0.002 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 21,387    | 30 | Woods, Good, HSG A    |
| 21,387    |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.6     | 50            | 0.1200        | 0.08              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.4      | 57            | 0.1800        | 2.12              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 11.0     | 107           | Total         |                   |                |  |

**Summary for Subcatchment 5S: PREDEV FLOW TO RICE ROAD**

Runoff = 0.31 cfs @ 12.35 hrs, Volume= 0.049 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 22,350    | 30 | Woods, Good, HSG A            |
| 30,632    | 39 | >75% Grass cover, Good, HSG A |
| * 5,307   | 98 | Existing roof and driveway    |
| 58,289    | 41 | Weighted Average              |
| 52,982    |    | 90.90% Pervious Area          |
| 5,307     |    | 9.10% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.3      | 50            | 0.0600        | 0.16              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"     |
| 3.7      | 212           | 0.0370        | 0.96              |                | Shallow Concentrated Flow,<br>Woodland Kv= 5.0 fps |
| 9.0      | 262           | Total         |                   |                |  |

**Summary for Subcatchment 33S: PREDEV FLOW TO POND**

Runoff = 11.42 cfs @ 12.23 hrs, Volume= 1.056 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 71,225    | 39 | >75% Grass cover, Good, HSG A |
| 49,927    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 313,497   | 61 | Weighted Average              |
| 250,155   |    | 79.80% Pervious Area          |
| 63,342    |    | 20.20% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 11.9     | 50            | 0.0900        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 3.9      | 242           | 0.0430        | 1.04              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 15.8     | 292           | Total         |                   |                |  |

**Summary for Subcatchment 503S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 90.74 cfs @ 12.57 hrs, Volume= 12.149 af, Depth> 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description    |
|----------|---------------|---------------|-------------------|----------------|----------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | Lag/CN Method, |

**Summary for Reach 3R: (new Reach)**

Inflow Area = 69.880 ac, 24.04% Impervious, Inflow Depth > 2.23" for 25 YR STORM event  
 Inflow = 91.16 cfs @ 12.83 hrs, Volume= 12.973 af  
 Outflow = 91.16 cfs @ 12.83 hrs, Volume= 12.973 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

**Summary for Reach 204R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

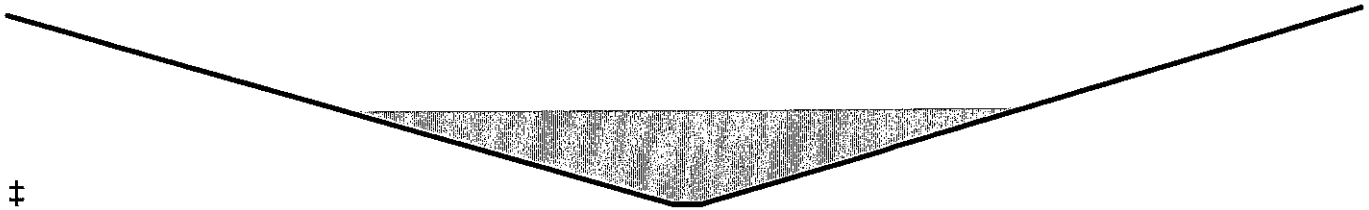
Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 2.35" for 25 YR STORM event  
 Inflow = 91.21 cfs @ 12.73 hrs, Volume= 12.873 af  
 Outflow = 90.44 cfs @ 12.83 hrs, Volume= 12.805 af, Atten= 1%, Lag= 6.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 2.56 fps, Min. Travel Time= 3.6 min  
 Avg. Velocity = 1.47 fps, Avg. Travel Time= 6.2 min

Peak Storage= 19,350 cf @ 12.77 hrs  
 Average Depth at Peak Storage= 1.47', Surface Width= 46.11'  
 Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 15.0 ' / ' Top Width= 92.00'  
 Length= 547.0' Slope= 0.0068 ' / '  
 Inlet Invert= 389.50', Outlet Invert= 385.80'





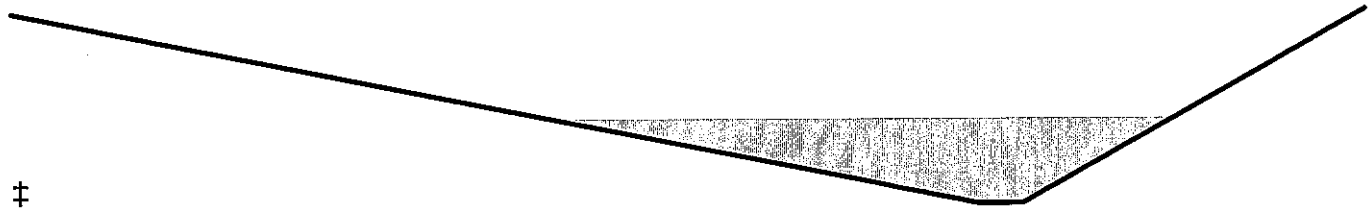
**Summary for Reach 503R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 2.49" for 25 YR STORM event  
 Inflow = 90.74 cfs @ 12.57 hrs, Volume= 12.149 af  
 Outflow = 90.45 cfs @ 12.64 hrs, Volume= 12.113 af, Atten= 0%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 4.70 fps, Min. Travel Time= 2.2 min  
 Avg. Velocity = 2.50 fps, Avg. Travel Time= 4.0 min

Peak Storage= 11,707 cf @ 12.60 hrs  
 Average Depth at Peak Storage= 1.32', Surface Width= 27.12'  
 Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 14.0 5.0 ' Top Width= 59.00'  
 Length= 608.0' Slope= 0.0255 '  
 Inlet Invert= 405.50', Outlet Invert= 390.00'



**Summary for Pond 3P: Rice Pond**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 2.40" for 25 YR STORM event  
 Inflow = 95.30 cfs @ 12.62 hrs, Volume= 13.169 af  
 Outflow = 91.21 cfs @ 12.73 hrs, Volume= 12.873 af, Atten= 4%, Lag= 6.5 min  
 Primary = 91.21 cfs @ 12.73 hrs, Volume= 12.873 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 391.30' @ 12.73 hrs Surf.Area= 55,061 sf Storage= 57,768 cf

Plug-Flow detention time= 20.6 min calculated for 12.873 af (98% of inflow)  
 Center-of-Mass det. time= 12.7 min ( 843.7 - 831.0 )

| Volume | Invert  | Avail.Storage | Storage Description                                 |
|--------|---------|---------------|---|
| #1     | 389.80' | 285,060 cf    | Custom Stage Data (Prismatic) Listed below (Recalc) |

**Rice Pond Village Millbury PREdevelopment 11** Type III 24-hr 25 YR STORM Rainfall=5.90"

Prepared by Azimuth Land Design, LLC

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| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 389.80              | 25,072               | 0                         | 0                         |
| 390.00              | 25,815               | 5,089                     | 5,089                     |
| 392.00              | 70,715               | 96,530                    | 101,619                   |
| 394.00              | 112,726              | 183,441                   | 285,060                   |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 389.90' | <b>171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir</b><br>Cv= 2.46 (C= 3.08) |

Primary OutFlow Max=91.11 cfs @ 12.73 hrs HW=391.30' (Free Discharge)  
↑1=Sharp-Crested Vee/Trap Weir (Weir Controls 91.11 cfs @ 2.98 fps)

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# POSTDEVELOPMENT

**Summary for Subcatchment 11S: POSTDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.01 cfs @ 13.72 hrs, Volume= 0.003 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 4,550     | 39 | >75% Grass cover, Good, HSG A |
| 6,450     | 30 | Woods, Good, HSG A            |
| 11,000    | 34 | Weighted Average              |
| 11,000    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.3      | 50            | 0.1100        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.4      | 52            | 0.1600        | 2.00              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 6.7      | 102           | Total         |                   |                |  |

**Summary for Subcatchment 12S: POSTDEV FLOW TO P&W RAILROAD**

Runoff = 0.05 cfs @ 12.64 hrs, Volume= 0.023 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 26,479    | 30 | Woods, Good, HSG A            |
| 41,448    | 39 | >75% Grass cover, Good, HSG A |
| 67,927    | 35 | Weighted Average              |
| 67,927    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 13.9     | 50            | 0.0600        | 0.06              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.9      | 109           | 0.1500        | 1.94              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 14.8     | 159           | Total         |                   |                |  |

**Summary for Subcatchment 13S: POSTDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 1.02 cfs @ 12.60 hrs, Volume= 0.184 af, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| * 1,870   | 98 | Back of units 17 & 18         |
| 30,807    | 98 | Water Surface, HSG A          |
| 7,459     | 39 | >75% Grass cover, Good, HSG A |
| 137,688   | 30 | Woods, Good, HSG A            |
| 177,824   | 43 | Weighted Average              |
| 145,147   |    | 81.62% Pervious Area          |
| 32,677    |    | 18.38% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 14S: POSTDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.00 cfs @ 15.66 hrs, Volume= 0.001 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 12,463    | 30 | Woods, Good, HSG A            |
| 565       | 39 | >75% Grass cover, Good, HSG A |
| 13,028    | 30 | Weighted Average              |
| 13,028    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.5      | 50            | 0.1000        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.6      | 71            | 0.1700        | 2.06              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 7.1      | 121           | Total         |                   |                |  |

**Summary for Subcatchment 15S: POSTDEV FLOW TO RICE ROAD**

Runoff = 0.18 cfs @ 12.34 hrs, Volume= 0.028 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,537     | 98 | Paved parking, HSG A          |
| 6,015     | 30 | Woods, Good, HSG A            |
| 21,042    | 39 | >75% Grass cover, Good, HSG A |
| 29,594    | 42 | Weighted Average              |
| 27,057    |    | 91.43% Pervious Area          |
| 2,537     |    | 8.57% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.3      | 50            | 0.0200        | 0.10              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 1.9      | 119           | 0.0050        | 1.06              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 10.2     | 169           | Total         |                   |                |  |

**Summary for Subcatchment 22S: STREET DRAINAGE TO THE INFILTRATION STRUCTURE**

Runoff = 12.16 cfs @ 12.16 hrs, Volume= 0.962 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| 52,472    | 39 | >75% Grass cover, Good, HSG A  |
| * 101,970 | 98 | Drive, driveways & roofs HSG A |
| 154,442   | 78 | Weighted Average               |
| 52,472    |    | 33.98% Pervious Area           |
| 101,970   |    | 66.02% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.9     | 50            | 0.0100        | 0.08              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.2      | 20            | 0.0100        | 1.50              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.1      | 21            | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps            |
| 11.2     | 91            | Total         |                   |                |  |

**Summary for Subcatchment 101S: 3564 SF LARGER DUPLEX TO DRYWELL IN SAND**

Runoff = 0.49 cfs @ 12.07 hrs, Volume= 0.036 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 3,564     | 98 | Unconnected roofs, HSG A |
| 3,564     |    | 100.00% Impervious Area  |
| 3,564     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 102S: 2310 SF SMALLER DUPLEX TO A DRYWELL IN SAND**

Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 2,310     | 98 | Roofs, HSG A            |
| 2,310     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 104S: HALF OF SMALLER DUPLEX 1155 S.F. TO DRYWELL IN SANDY LOAM**

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.012 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 1,155     | 98 | Unconnected roofs, HSG A |
| 1,155     |    | 100.00% Impervious Area  |
| 1,155     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 105S: HALF OF LARGER DUPLEX 1782 SF TO DRYWELL IN SANDY LOAM**

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.018 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                 |
|-----------|----|-----------------------------|
| 1,782     | 98 | Unconnected pavement, HSG A |
| 1,782     |    | 100.00% Impervious Area     |
| 1,782     |    | 100.00% Unconnected         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 106S: AREA BEHIND UNITS 4-8 DRAINING TO INFILTRATION TRENCH**

Runoff = 0.05 cfs @ 12.34 hrs, Volume= 0.010 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 14,300    | 39 | >75% Grass cover, Good, HSG A |
| 14,300    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 50            | 0.0700        | 0.17              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.4      | 72            | 0.0400        | 3.00              |                | Shallow Concentrated Flow,<br>Grassed Waterway Kv= 15.0 fps |
| 5.4      | 122           | Total         |                   |                |   |

**Summary for Subcatchment 233S: POSTDEV FLOW TO POND**

Runoff = 13.51 cfs @ 12.14 hrs, Volume= 1.032 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 25 YR STORM Rainfall=5.90"



**Rice Pond Village Millbury POSTdevelopment 1 Type III 24-hr 25 YR STORM Rainfall=5.90"**

Prepared by Azimuth Land Design, LLC

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| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 4,379     | 39 | >75% Grass cover, Good, HSG A |
| 24,995    | 39 | >75% Grass cover, Good, HSG A |
| 31,725    | 39 | >75% Grass cover, Good, HSG A |
| 38,736    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 292,180   | 62 | Weighted Average              |
| 228,838   |    | 78.32% Pervious Area          |
| 63,342    |    | 21.68% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.0      | 50            | 0.0700        | 0.17              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.5      | 83            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 3.8      | 212           | 0.0340        | 0.92              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps          |
| 9.3      | 345           | Total         |                   |                |  |

**Summary for Subcatchment 504S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 90.74 cfs @ 12.57 hrs, Volume= 12.149 af, Depth> 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
Type III 24-hr 25 YR STORM Rainfall=5.90"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description    |
|----------|---------------|---------------|-------------------|----------------|----------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | Lag/CN Method, |

**Summary for Reach 13R: (new Reach)**

Inflow Area = 69.350 ac, 24.29% Impervious, Inflow Depth > 2.24" for 25 YR STORM event  
Inflow = 89.80 cfs @ 12.84 hrs, Volume= 12.965 af  
Outflow = 89.80 cfs @ 12.84 hrs, Volume= 12.965 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

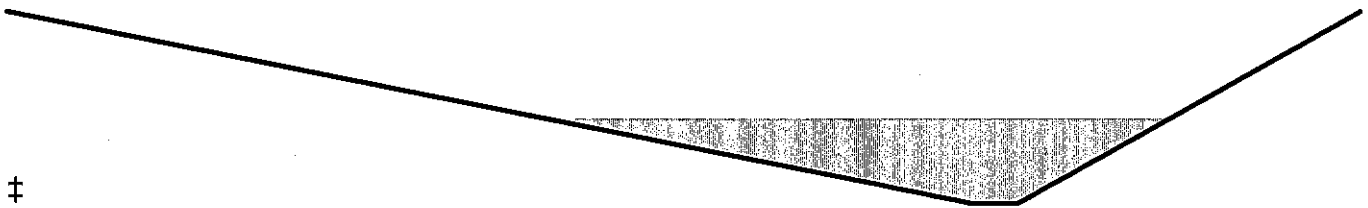
### Summary for Reach 504R: FLOW PATH FROM RICE RD CULVERT TO POND

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 2.49" for 25 YR STORM event  
Inflow = 90.74 cfs @ 12.57 hrs, Volume= 12.149 af  
Outflow = 90.45 cfs @ 12.64 hrs, Volume= 12.113 af, Atten= 0%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
Max. Velocity= 4.70 fps, Min. Travel Time= 2.2 min  
Avg. Velocity = 2.50 fps, Avg. Travel Time= 4.0 min

Peak Storage= 11,707 cf @ 12.60 hrs  
Average Depth at Peak Storage= 1.32' , Surface Width= 27.12'  
Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 14.0 5.0 ' / ' Top Width= 59.00'  
Length= 608.0' Slope= 0.0255 ' / '  
Inlet Invert= 405.50', Outlet Invert= 390.00'



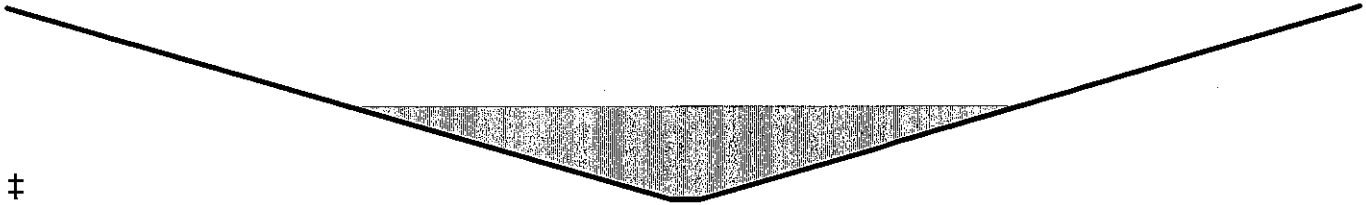
### Summary for Reach 505R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 2.36" for 25 YR STORM event  
Inflow = 89.73 cfs @ 12.73 hrs, Volume= 12.849 af  
Outflow = 88.99 cfs @ 12.84 hrs, Volume= 12.782 af, Atten= 1%, Lag= 6.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
Max. Velocity= 2.55 fps, Min. Travel Time= 3.6 min  
Avg. Velocity = 1.47 fps, Avg. Travel Time= 6.2 min

Peak Storage= 19,115 cf @ 12.78 hrs  
Average Depth at Peak Storage= 1.46' , Surface Width= 45.83'  
Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 15.0 ' / ' Top Width= 92.00'  
Length= 547.0' Slope= 0.0068 ' / '  
Inlet Invert= 389.50', Outlet Invert= 385.80'



**Summary for Pond 13P: Rice Pond**

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 2.42" for 25 YR STORM event  
 Inflow = 93.55 cfs @ 12.62 hrs, Volume= 13.145 af  
 Outflow = 89.73 cfs @ 12.73 hrs, Volume= 12.849 af, Atten= 4%, Lag= 6.5 min  
 Primary = 89.73 cfs @ 12.73 hrs, Volume= 12.849 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 391.29' @ 12.73 hrs Surf.Area= 54,844 sf Storage= 57,237 cf

Plug-Flow detention time= 20.6 min calculated for 12.849 af (98% of inflow)  
 Center-of-Mass det. time= 12.8 min ( 843.2 - 830.5 )

| Volume | Invert  | Avail.Storage | Storage Description                                 |
|--------|---------|---------------|---|
| #1     | 389.80' | 285,060 cf    | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 389.80           | 25,072            | 0                      | 0                      |
| 390.00           | 25,815            | 5,089                  | 5,089                  |
| 392.00           | 70,715            | 96,530                 | 101,619                |
| 394.00           | 112,726           | 183,441                | 285,060                |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 389.90' | 171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir<br>Cv= 2.46 (C= 3.08) |

Primary OutFlow Max=89.64 cfs @ 12.73 hrs HW=391.29' (Free Discharge)  
 ↳1=Sharp-Crested Vee/Trap Weir (Weir Controls 89.64 cfs @ 2.97 fps)

**Summary for Pond 23P: INFILTRATION STRUCTURE OFF 10+60 HILLCREST CIRCLE**

Inflow Area = 3.546 ac, 66.02% Impervious, Inflow Depth > 3.26" for 25 YR STORM event  
 Inflow = 12.16 cfs @ 12.16 hrs, Volume= 0.962 af  
 Outflow = 1.17 cfs @ 11.63 hrs, Volume= 0.910 af, Atten= 90%, Lag= 0.0 min  
 Discarded = 1.17 cfs @ 11.63 hrs, Volume= 0.910 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 378.10' @ 13.41 hrs Surf.Area= 6,136 sf Storage= 18,027 cf

Plug-Flow detention time= 146.4 min calculated for 0.910 af (95% of inflow)  
 Center-of-Mass det. time= 126.9 min ( 916.3 - 789.5 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 374.50' | 7,730 cf      | <b>118'X52' OUTSIDE OF STONE (Prismatic)</b> Listed below (Recalc)<br>52,156 cf Overall - 32,832 cf Embedded = 19,324 cf x 40.0% Voids  |
| #2     | 375.00' | 30,894 cf     | <b>StormTank 25 Series 72"</b> x 1216 Inside #1<br>Inside= 18.0"W x 72.0"H => 8.73 sf x 3.00'L = 26.2 cf<br>Outside= 18.0"W x 72.0"H => 9.00 sf x 3.00'L = 27.0 cf<br>1216 Chambers in 32 Rows<br>32,832 cf Overall x 97.0% Voids |
|        |         | 38,623 cf     | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 374.50           | 6,136             | 0                      | 0                      |
| 383.00           | 6,136             | 52,156                 | 52,156                 |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 374.50' | <b>8.270 in/hr Exfiltration over Surface area</b> |

**Discarded OutFlow** Max=1.17 cfs @ 11.63 hrs HW=374.59' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 1.17 cfs)

**Summary for Pond 101P: INF-1 STRUCTURE BESIDE UNITS 1-2 72 MODULES**

Inflow Area = 0.082 ac, 100.00% Impervious, Inflow Depth > 5.24" for 25 YR STORM event  
 Inflow = 0.49 cfs @ 12.07 hrs, Volume= 0.036 af  
 Outflow = 0.08 cfs @ 11.66 hrs, Volume= 0.036 af, Atten= 84%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.66 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 396.56' @ 12.53 hrs Surf.Area= 406 sf Storage= 431 cf

Plug-Flow detention time= 32.0 min calculated for 0.036 af (100% of inflow)  
 Center-of-Mass det. time= 31.7 min ( 765.2 - 733.5 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 395.00' | 374 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,421 cf Overall - 486 cf Embedded = 935 cf x 40.0% Voids   |
| #2     | 395.50' | 445 cf        | <b>StormTank 25 Series 18"</b> x 72 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>72 Chambers in 8 Rows<br>486 cf Overall x 96.0% Voids |
|        |         | 819 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 395.00           | 406               | 0                      | 0                      |
| 398.50           | 406               | 1,421                  | 1,421                  |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 395.00' | <b>8.270 in/hr Exfiltration over Surface area</b> |

Discarded OutFlow Max=0.08 cfs @ 11.66 hrs HW=395.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

**Summary for Pond 102P: INF-2 STRUTURE BEHIND UNITS 7-8 42 MODULES**

Inflow Area = 0.053 ac, 100.00% Impervious, Inflow Depth > 5.24" for 25 YR STORM event  
 Inflow = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af  
 Outflow = 0.05 cfs @ 11.66 hrs, Volume= 0.023 af, Atten= 85%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.66 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 397.68' @ 12.54 hrs Surf.Area= 253 sf Storage= 286 cf

Plug-Flow detention time= 34.5 min calculated for 0.023 af (100% of inflow)  
 Center-of-Mass det. time= 34.3 min ( 767.8 - 733.5 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 396.00' | 241 cf        | <b>Custom Stage Data (Prismatic) Listed below (Recalc)</b><br>886 cf Overall - 284 cf Embedded = 602 cf x 40.0% Voids   |
| #2     | 396.50' | 260 cf        | <b>StormTank 25 Series 18" x 42 Inside #1</b><br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>42 Chambers in 6 Rows<br>284 cf Overall x 96.0% Voids |
|        |         | 500 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 396.00           | 253               | 0                      | 0                      |
| 399.50           | 253               | 886                    | 886                    |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 396.00' | 8.270 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.05 cfs @ 11.66 hrs HW=396.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.05 cfs)

**Summary for Pond 104P: INF-4 STRUCTURE BEHIND 25-26 AND 27-28 -- 32 MODULES**

Inflow Area = 0.027 ac, 100.00% Impervious, Inflow Depth > 5.24" for 25 YR STORM event  
 Inflow = 0.16 cfs @ 12.07 hrs, Volume= 0.012 af  
 Outflow = 0.01 cfs @ 9.44 hrs, Volume= 0.006 af, Atten= 96%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 9.44 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 379.87' @ 15.00 hrs Surf.Area= 256 sf Storage= 272 cf

Plug-Flow detention time= 160.0 min calculated for 0.006 af (56% of inflow)  
 Center-of-Mass det. time= 73.5 min ( 807.0 - 733.5 )

**Rice Pond Village Millbury POSTdevelopment 1** Type III 24-hr 25 YR STORM Rainfall=5.90"

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| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 378.00' | 250 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>896 cf Overall - 270 cf Embedded = 626 cf x 40.0% Voids  |
| #2     | 379.00' | 247 cf        | <b>StormTank 25 Series 18"</b> x 40 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>40 Chambers in 4 Rows<br>270 cf Overall x 96.0% Voids |
|        |         | 498 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 378.00              | 256                  | 0                         | 0                         |
| 381.50              | 256                  | 896                       | 896                       |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 378.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.01 cfs @ 9.44 hrs HW=378.04' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Summary for Pond 105P: INFILTRATION STRUCTURE BEHIND 21-22 & 23-24 -- 54 MODULES**

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth > 5.24" for 25 YR STORM event  
 Inflow = 0.24 cfs @ 12.07 hrs, Volume= 0.018 af  
 Outflow = 0.01 cfs @ 9.38 hrs, Volume= 0.010 af, Atten= 96%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 9.38 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 380.63' @ 15.09 hrs Surf.Area= 385 sf Storage= 425 cf

Plug-Flow detention time= 160.8 min calculated for 0.010 af (55% of inflow)  
 Center-of-Mass det. time= 71.9 min ( 805.4 - 733.5 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 379.00' | 361 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>1,348 cf Overall - 446 cf Embedded = 902 cf x 40.0% Voids  |
| #2     | 379.50' | 408 cf        | <b>StormTank 25 Series 18"</b> x 66 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>66 Chambers in 6 Rows<br>446 cf Overall x 96.0% Voids |
|        |         | 769 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 379.00              | 385                  | 0                         | 0                         |
| 382.50              | 385                  | 1,348                     | 1,348                     |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 379.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.01 cfs @ 9.38 hrs HW=379.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Summary for Pond 106P: INFILTRATION TRENCH BEHIND UNITS 4-8**

Inflow Area = 0.328 ac, 0.00% Impervious, Inflow Depth > 0.35" for 25 YR STORM event  
 Inflow = 0.05 cfs @ 12.34 hrs, Volume= 0.010 af  
 Outflow = 0.04 cfs @ 12.26 hrs, Volume= 0.009 af, Atten= 33%, Lag= 0.0 min  
 Discarded = 0.04 cfs @ 12.26 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 394.08' @ 12.54 hrs Surf.Area= 634 sf Storage= 21 cf

Plug-Flow detention time= 4.4 min calculated for 0.009 af (100% of inflow)  
 Center-of-Mass det. time= 3.3 min ( 895.6 - 892.3 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 394.00' | 597 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,902 cf Overall - 409 cf Embedded = 1,493 cf x 40.0% Voids  |
| #2     | 394.50' | 409 cf        | <b>Cultec R-150XLHD</b> x 15 Inside #1<br>Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf<br>Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap<br>Row Length Adjustment= +0.75' x 2.65 sf x 1 rows |
|        |         | 1,006 cf      | Total Available Storage  |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 394.00           | 634               | 0                      | 0                      |
| 397.00           | 634               | 1,902                  | 1,902                  |

| Device | Routing   | Invert  | Outlet Devices                                    |
|--------|-----------|---------|---|
| #1     | Discarded | 394.00' | <b>2.410 in/hr Exfiltration over Surface area</b> |

Discarded OutFlow Max=0.04 cfs @ 12.26 hrs HW=394.03' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

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100 YEAR STORM



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# **PREDEVELOPMENT**

**Summary for Subcatchment 1S: PREDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.026 af, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,858     | 30 | Woods, Good, HSG A            |
| 10,008    | 39 | >75% Grass cover, Good, HSG A |
| 16,866    | 35 | Weighted Average              |
| 16,866    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 4.3      | 50            | 0.1000        | 0.19              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"     |
| 0.9      | 100           | 0.1400        | 1.87              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps |
| 5.2      | 150           | Total         |                   |                |   |

**Summary for Subcatchment 2S: PREDEV FLOW TO P&W RAILROAD**

Runoff = 1.63 cfs @ 12.38 hrs, Volume= 0.265 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 179,428   | 30 | Woods, Good, HSG A            |
| 35,859    | 39 | >75% Grass cover, Good, HSG A |
| 3,896     | 98 | Paved parking, HSG A          |
| 219,183   | 33 | Weighted Average              |
| 215,287   |    | 98.22% Pervious Area          |
| 3,896     |    | 1.78% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.4      | 50            | 0.0400        | 0.09              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15"                              |
| 0.9      | 91            | 0.1200        | 1.73              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                                     |
| 0.7      | 197           | 0.1060        | 4.99              | 14.98          | <b>Channel Flow,</b><br>Area= 3.0 sf Perim= 4.0' r= 0.75'<br>n= 0.080 Earth, long dense weeds |
| 11.0     | 338           | Total         |                   |                |   |

**Summary for Subcatchment 3S: PREDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 3.59 cfs @ 12.50 hrs, Volume= 0.486 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description            |
|-----------|----|------------------------|
| 148,793   | 30 | Woods, Good, HSG A     |
| 30,807    | 98 | Water Surface, HSG A   |
| 179,600   | 42 | Weighted Average       |
| 148,793   |    | 82.85% Pervious Area   |
| 30,807    |    | 17.15% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 4S: PREDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.08 cfs @ 12.47 hrs, Volume= 0.017 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 21,387    | 30 | Woods, Good, HSG A    |
| 21,387    |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.6     | 50            | 0.1200        | 0.08              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.4      | 57            | 0.1800        | 2.12              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 11.0     | 107           | Total         |                   |                |  |

**Summary for Subcatchment 5S: PREDEV FLOW TO RICE ROAD**

Runoff = 1.61 cfs @ 12.15 hrs, Volume= 0.149 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 22,350    | 30 | Woods, Good, HSG A            |
| 30,632    | 39 | >75% Grass cover, Good, HSG A |
| * 5,307   | 98 | Existing roof and driveway    |
| 58,289    | 41 | Weighted Average              |
| 52,982    |    | 90.90% Pervious Area          |
| 5,307     |    | 9.10% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.3      | 50            | 0.0600        | 0.16              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"     |
| 3.7      | 212           | 0.0370        | 0.96              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps |
| 9.0      | 262           | Total         |                   |                |   |

**Summary for Subcatchment 33S: PREDEV FLOW TO POND**

Runoff = 22.89 cfs @ 12.22 hrs, Volume= 2.050 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 71,225    | 39 | >75% Grass cover, Good, HSG A |
| 49,927    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 313,497   | 61 | Weighted Average              |
| 250,155   |    | 79.80% Pervious Area          |
| 63,342    |    | 20.20% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 11.9     | 50            | 0.0900        | 0.07              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 3.9      | 242           | 0.0430        | 1.04              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 15.8     | 292           | Total         |                   |                |  |

**Summary for Subcatchment 503S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 160.17 cfs @ 12.55 hrs, Volume= 21.459 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description           |
|----------|---------------|---------------|-------------------|----------------|-----------------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | <b>Lag/CN Method,</b> |

**Summary for Reach 3R: (new Reach)**

Inflow Area = 69.880 ac, 24.04% Impervious, Inflow Depth > 4.03" for 100YR STORM event  
 Inflow = 166.14 cfs @ 12.77 hrs, Volume= 23.492 af  
 Outflow = 166.14 cfs @ 12.77 hrs, Volume= 23.492 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

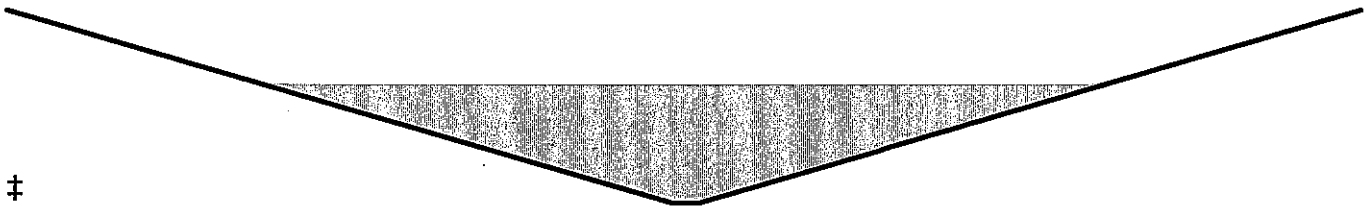
**Summary for Reach 204R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 4.22" for 100YR STORM event  
 Inflow = 164.67 cfs @ 12.68 hrs, Volume= 23.099 af  
 Outflow = 163.52 cfs @ 12.77 hrs, Volume= 23.006 af, Atten= 1%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 2.97 fps, Min. Travel Time= 3.1 min  
 Avg. Velocity = 1.62 fps, Avg. Travel Time= 5.6 min

Peak Storage= 30,181 cf @ 12.72 hrs  
 Average Depth at Peak Storage= 1.85', Surface Width= 57.57'  
 Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 15.0 ' Top Width= 92.00'  
 Length= 547.0' Slope= 0.0068 '  
 Inlet Invert= 389.50', Outlet Invert= 385.80'



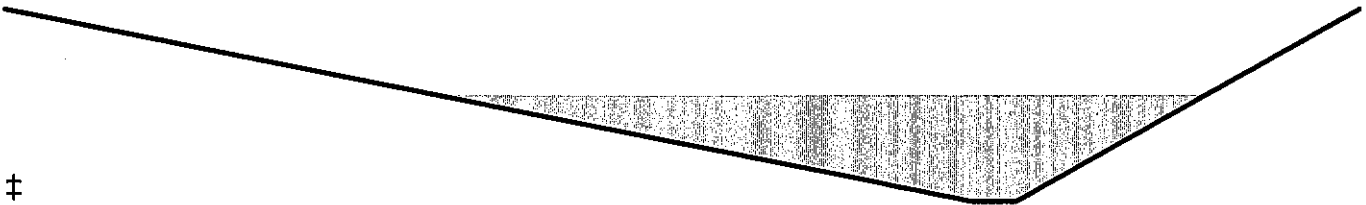
**Summary for Reach 503R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 4.40" for 100YR STORM event  
 Inflow = 160.17 cfs @ 12.55 hrs, Volume= 21.459 af  
 Outflow = 159.78 cfs @ 12.61 hrs, Volume= 21.408 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 5.42 fps, Min. Travel Time= 1.9 min  
 Avg. Velocity = 2.76 fps, Avg. Travel Time= 3.7 min

Peak Storage= 17,925 cf @ 12.58 hrs  
 Average Depth at Peak Storage= 1.66', Surface Width= 33.53'  
 Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 14.0 5.0 ' / ' Top Width= 59.00'  
 Length= 608.0' Slope= 0.0255 ' / '  
 Inlet Invert= 405.50', Outlet Invert= 390.00'



**Summary for Pond 3P: Rice Pond**

Inflow Area = 65.757 ac, 24.48% Impervious, Inflow Depth > 4.28" for 100YR STORM event  
 Inflow = 169.53 cfs @ 12.59 hrs, Volume= 23.459 af  
 Outflow = 164.67 cfs @ 12.68 hrs, Volume= 23.099 af, Atten= 3%, Lag= 5.3 min  
 Primary = 164.67 cfs @ 12.68 hrs, Volume= 23.099 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 391.69' @ 12.68 hrs Surf.Area= 63,855 sf Storage= 81,060 cf

Plug-Flow detention time= 16.2 min calculated for 23.053 af (98% of inflow)  
 Center-of-Mass det. time= 10.6 min ( 828.6 - 817.9 )

| Volume | Invert  | Avail.Storage | Storage Description                                 |
|--------|---------|---------------|---|
| #1     | 389.80' | 285,060 cf    | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 389.80              | 25,072               | 0                         | 0                         |
| 390.00              | 25,815               | 5,089                     | 5,089                     |
| 392.00              | 70,715               | 96,530                    | 101,619                   |
| 394.00              | 112,726              | 183,441                   | 285,060                   |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 389.90' | <b>171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir</b><br>Cv= 2.46 (C= 3.08) |

**Primary OutFlow** Max=164.61 cfs @ 12.68 hrs HW=391.69' (Free Discharge)

↳ **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 164.61 cfs @ 3.36 fps)

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# **POSTDEVELOPMENT**



**Summary for Subcatchment 11S: POSTDEV FLOW TO ABUTTER GINGRAS**

Runoff = 0.10 cfs @ 12.28 hrs, Volume= 0.015 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 4,550     | 39 | >75% Grass cover, Good, HSG A |
| 6,450     | 30 | Woods, Good, HSG A            |
| 11,000    | 34 | Weighted Average              |
| 11,000    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.3      | 50            | 0.1100        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.4      | 52            | 0.1600        | 2.00              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 6.7      | 102           | Total         |                   |                |  |

**Summary for Subcatchment 12S: POSTDEV FLOW TO P&W RAILROAD**

Runoff = 0.69 cfs @ 12.38 hrs, Volume= 0.103 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 26,479    | 30 | Woods, Good, HSG A            |
| 41,448    | 39 | >75% Grass cover, Good, HSG A |
| 67,927    | 35 | Weighted Average              |
| 67,927    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 13.9     | 50            | 0.0600        | 0.06              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15" |
| 0.9      | 109           | 0.1500        | 1.94              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 14.8     | 159           | Total         |                   |                |  |

**Summary for Subcatchment 13S: POSTDEV OVERLAND FLOW TO CUNHA & SORA**

Runoff = 3.88 cfs @ 12.49 hrs, Volume= 0.514 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| * 1,870   | 98 | Back of units 17 & 18         |
| 30,807    | 98 | Water Surface, HSG A          |
| 7,459     | 39 | >75% Grass cover, Good, HSG A |
| 137,688   | 30 | Woods, Good, HSG A            |
| 177,824   | 43 | Weighted Average              |
| 145,147   |    | 81.62% Pervious Area          |
| 32,677    |    | 18.38% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.0     | 50            | 0.0140        | 0.03              |                | <b>Sheet Flow,</b><br>Woods: Dense underbrush n= 0.800 P2= 3.15"  |
| 2.3      | 186           | 0.0710        | 1.33              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps   |
| 1.8      | 400           | 0.0090        | 3.75              | 59.94          | <b>Channel Flow,</b><br>Area= 16.0 sf Perim= 14.6' r= 1.10'<br>n= 0.040 Earth, cobble bottom, clean sides |
| 29.1     | 636           | Total         |                   |                |   |

**Summary for Subcatchment 14S: POSTDEV FLOW TO ABUTTER MATHIEU & SWANSON**

Runoff = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 12,463    | 30 | Woods, Good, HSG A            |
| 565       | 39 | >75% Grass cover, Good, HSG A |
| 13,028    | 30 | Weighted Average              |
| 13,028    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 6.5      | 50            | 0.1000        | 0.13              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.15" |
| 0.6      | 71            | 0.1700        | 2.06              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps        |
| 7.1      | 121           | Total         |                   |                |  |

**Summary for Subcatchment 15S: POSTDEV FLOW TO RICE ROAD**

Runoff = 0.87 cfs @ 12.17 hrs, Volume= 0.081 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,537     | 98 | Paved parking, HSG A          |
| 6,015     | 30 | Woods, Good, HSG A            |
| 21,042    | 39 | >75% Grass cover, Good, HSG A |
| 29,594    | 42 | Weighted Average              |
| 27,057    |    | 91.43% Pervious Area          |
| 2,537     |    | 8.57% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.3      | 50            | 0.0200        | 0.10              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 1.9      | 119           | 0.0050        | 1.06              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 10.2     | 169           | Total         |                   |                |  |

**Summary for Subcatchment 22S: STREET DRAINAGE TO THE INFILTRATION STRUCTURE**

Runoff = 19.75 cfs @ 12.15 hrs, Volume= 1.586 af, Depth> 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| 52,472    | 39 | >75% Grass cover, Good, HSG A  |
| * 101,970 | 98 | Drive, driveways & roofs HSG A |
| 154,442   | 78 | Weighted Average               |
| 52,472    |    | 33.98% Pervious Area           |
| 101,970   |    | 66.02% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.9     | 50            | 0.0100        | 0.08              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.2      | 20            | 0.0100        | 1.50              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.1      | 21            | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps            |
| 11.2     | 91            | Total         |                   |                |  |

**Summary for Subcatchment 101S: 3564 SF LARGER DUPLEX TO DRYWELL IN SAND**

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 0.051 af, Depth> 7.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 3,564     | 98 | Unconnected roofs, HSG A |
| 3,564     |    | 100.00% Impervious Area  |
| 3,564     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 102S: 2310 SF SMALLER DUPLEX TO A DRYWELL IN SAND**

Runoff = 0.45 cfs @ 12.07 hrs, Volume= 0.033 af, Depth> 7.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 2,310     | 98 | Roofs, HSG A            |
| 2,310     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 104S: HALF OF SMALLER DUPLEX 1155 S.F. TO DRYWELL IN SANDY LOAM**

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af, Depth> 7.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description              |
|-----------|----|--------------------------|
| 1,155     | 98 | Unconnected roofs, HSG A |
| 1,155     |    | 100.00% Impervious Area  |
| 1,155     |    | 100.00% Unconnected      |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment 105S: HALF OF LARGER DUPLEX 1782 SF TO DRYWELL IN SANDY LOAM**

Runoff = 0.34 cfs @ 12.07 hrs, Volume= 0.025 af, Depth> 7.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                 |
|-----------|----|-----------------------------|
| 1,782     | 98 | Unconnected pavement, HSG A |
| 1,782     |    | 100.00% Impervious Area     |
| 1,782     |    | 100.00% Unconnected         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description          |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry,</b> |

**Summary for Subcatchment 106S: AREA BEHIND UNITS 4-8 DRAINING TO INFILTRATION TRENCH**

Runoff = 0.36 cfs @ 12.11 hrs, Volume= 0.031 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 14,300    | 39 | >75% Grass cover, Good, HSG A |
| 14,300    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.0      | 50            | 0.0700        | 0.17              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.4      | 72            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 5.4      | 122           | Total         |                   |                |  |

**Summary for Subcatchment 233S: POSTDEV FLOW TO POND**

Runoff = 26.58 cfs @ 12.14 hrs, Volume= 1.978 af, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 30,502    | 98 | Water Surface, HSG A          |
| * 13,200  | 98 | Roofs & Driveways, HSG A      |
| 4,379     | 39 | >75% Grass cover, Good, HSG A |
| 24,995    | 39 | >75% Grass cover, Good, HSG A |
| 31,725    | 39 | >75% Grass cover, Good, HSG A |
| 38,736    | 30 | Woods, Good, HSG A            |
| 14,588    | 30 | Woods, Good, HSG A            |
| * 10,940  | 98 | Roofs & Driveways, HSG B      |
| 26,999    | 61 | >75% Grass cover, Good, HSG B |
| 20,859    | 55 | Woods, Good, HSG B            |
| * 8,700   | 98 | Roofs & Driveways, HSG D      |
| 42,423    | 80 | >75% Grass cover, Good, HSG D |
| 24,134    | 77 | Woods, Good, HSG D            |
| 292,180   | 62 | Weighted Average              |
| 228,838   |    | 78.32% Pervious Area          |
| 63,342    |    | 21.68% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.0      | 50            | 0.0700        | 0.17              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.15"              |
| 0.5      | 83            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 3.8      | 212           | 0.0340        | 0.92              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps          |
| 9.3      | 345           | Total         |                   |                |  |

**Summary for Subcatchment 504S: OFFSITE AREA DRAINING TO CULVERT AT S. MAIN ST**

Runoff = 160.17 cfs @ 12.55 hrs, Volume= 21.459 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Type III 24-hr 100YR STORM Rainfall=8.35"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 58.560    | 70 | 1/2 acre lots, 25% imp, HSG B |
| 43.920    |    | 75.00% Pervious Area          |
| 14.640    |    | 25.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description    |
|----------|---------------|---------------|-------------------|----------------|----------------|
| 40.4     | 3,090         | 0.0670        | 1.27              |                | Lag/CN Method, |

**Summary for Reach 13R: (new Reach)**

Inflow Area = 69.350 ac, 24.29% Impervious, Inflow Depth > 4.06" for 100YR STORM event  
 Inflow = 163.01 cfs @ 12.77 hrs, Volume= 23.449 af  
 Outflow = 163.01 cfs @ 12.77 hrs, Volume= 23.449 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

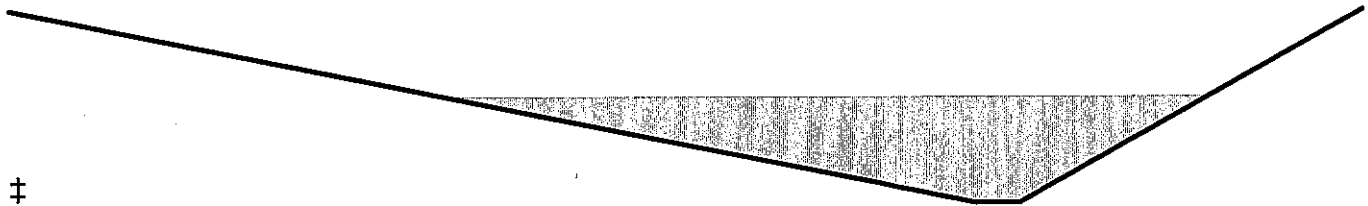
**Summary for Reach 504R: FLOW PATH FROM RICE RD CULVERT TO POND**

Inflow Area = 58.560 ac, 25.00% Impervious, Inflow Depth > 4.40" for 100YR STORM event  
 Inflow = 160.17 cfs @ 12.55 hrs, Volume= 21.459 af  
 Outflow = 159.78 cfs @ 12.61 hrs, Volume= 21.408 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 5.42 fps, Min. Travel Time= 1.9 min  
 Avg. Velocity = 2.76 fps, Avg. Travel Time= 3.7 min

Peak Storage= 17,925 cf @ 12.58 hrs  
 Average Depth at Peak Storage= 1.66', Surface Width= 33.53'  
 Bank-Full Depth= 3.00' Flow Area= 91.5 sf, Capacity= 723.88 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 14.0 5.0 '/' Top Width= 59.00'  
 Length= 608.0' Slope= 0.0255 '/'  
 Inlet Invert= 405.50', Outlet Invert= 390.00'



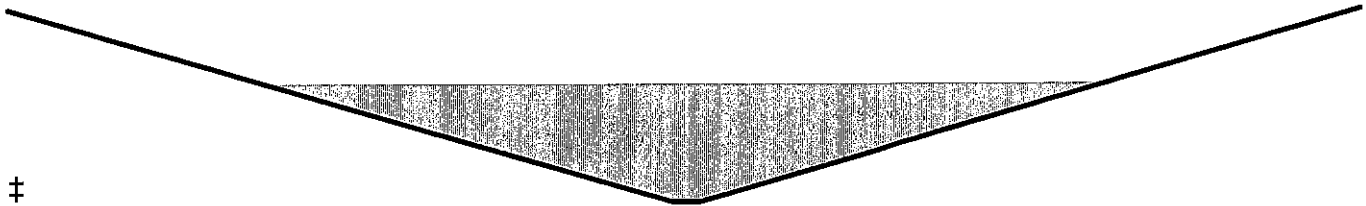
**Summary for Reach 505R: FLOW PATH FROM POND OVERFLOW TO CUNHA & SORA**

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 4.23" for 100YR STORM event  
 Inflow = 161.34 cfs @ 12.69 hrs, Volume= 23.028 af  
 Outflow = 160.27 cfs @ 12.78 hrs, Volume= 22.935 af, Atten= 1%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Max. Velocity= 2.95 fps, Min. Travel Time= 3.1 min  
 Avg. Velocity = 1.62 fps, Avg. Travel Time= 5.6 min

Peak Storage= 29,727 cf @ 12.73 hrs  
 Average Depth at Peak Storage= 1.84', Surface Width= 57.14'  
 Bank-Full Depth= 3.00' Flow Area= 141.0 sf, Capacity= 571.84 cfs

2.00' x 3.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
 Side Slope Z-value= 15.0 '/' Top Width= 92.00'  
 Length= 547.0' Slope= 0.0068 '/'  
 Inlet Invert= 389.50', Outlet Invert= 385.80'



**Summary for Pond 13P: Rice Pond**

Inflow Area = 65.268 ac, 24.66% Impervious, Inflow Depth > 4.30" for 100YR STORM event  
 Inflow = 165.94 cfs @ 12.59 hrs, Volume= 23.386 af  
 Outflow = 161.34 cfs @ 12.69 hrs, Volume= 23.028 af, Atten= 3%, Lag= 5.4 min  
 Primary = 161.34 cfs @ 12.69 hrs, Volume= 23.028 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 391.68' @ 12.69 hrs Surf.Area= 63,514 sf Storage= 80,092 cf

Plug-Flow detention time= 16.2 min calculated for 22.982 af (98% of inflow)  
 Center-of-Mass det. time= 10.7 min ( 828.1 - 817.4 )

| Volume           | Invert            | Avail.Storage          | Storage Description                                 |
|------------------|-------------------|------------------------|---|
| #1               | 389.80'           | 285,060 cf             | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet)                              |
| 389.80           | 25,072            | 0                      | 0   |
| 390.00           | 25,815            | 5,089                  | 5,089   |
| 392.00           | 70,715            | 96,530                 | 101,619   |
| 394.00           | 112,726           | 183,441                | 285,060   |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 389.90' | 171.9 deg x 2.0' long Sharp-Crested Vee/Trap Weir<br>Cv= 2.46 (C= 3.08) |

Primary OutFlow Max=161.23 cfs @ 12.69 hrs HW=391.68' (Free Discharge)  
 ↑1=Sharp-Crested Vee/Trap Weir (Weir Controls 161.23 cfs @ 3.34 fps)

**Summary for Pond 23P: INFILTRATION STRUCTURE OFF 10+60 HILLCREST CIRCLE**

Inflow Area = 3.546 ac, 66.02% Impervious, Inflow Depth > 5.37" for 100YR STORM event  
 Inflow = 19.75 cfs @ 12.15 hrs, Volume= 1.586 af  
 Outflow = 1.17 cfs @ 11.12 hrs, Volume= 1.011 af, Atten= 94%, Lag= 0.0 min  
 Discarded = 1.17 cfs @ 11.12 hrs, Volume= 1.011 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 381.81' @ 14.66 hrs Surf.Area= 6,136 sf Storage= 35,714 cf

Plug-Flow detention time= 177.6 min calculated for 1.011 af (64% of inflow)  
 Center-of-Mass det. time= 106.1 min ( 883.9 - 777.8 )



| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 374.50' | 7,730 cf      | <b>118'X52' OUTSIDE OF STONE (Prismatic)</b> Listed below (Recalc)<br>52,156 cf Overall - 32,832 cf Embedded = 19,324 cf x 40.0% Voids  |
| #2     | 375.00' | 30,894 cf     | <b>StormTank 25 Series 72" x 1216</b> Inside #1<br>Inside= 18.0"W x 72.0"H => 8.73 sf x 3.00'L = 26.2 cf<br>Outside= 18.0"W x 72.0"H => 9.00 sf x 3.00'L = 27.0 cf<br>1216 Chambers in 32 Rows<br>32,832 cf Overall x 97.0% Voids |
|        |         | 38,623 cf     | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 374.50           | 6,136             | 0                      | 0                      |
| 383.00           | 6,136             | 52,156                 | 52,156                 |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 374.50' | 8.270 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=1.17 cfs @ 11.12 hrs HW=374.59' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.17 cfs)

### Summary for Pond 101P: INF-1 STRUCTURE BESIDE UNITS 1-2 72 MODULES

Inflow Area = 0.082 ac, 100.00% Impervious, Inflow Depth > 7.46" for 100YR STORM event  
 Inflow = 0.69 cfs @ 12.07 hrs, Volume= 0.051 af  
 Outflow = 0.08 cfs @ 11.54 hrs, Volume= 0.051 af, Atten= 89%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.54 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 397.93' @ 12.66 hrs Surf.Area= 406 sf Storage= 726 cf

Plug-Flow detention time= 61.8 min calculated for 0.051 af (100% of inflow)  
 Center-of-Mass det. time= 61.5 min ( 793.7 - 732.2 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 395.00' | 374 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,421 cf Overall - 486 cf Embedded = 935 cf x 40.0% Voids   |
| #2     | 395.50' | 445 cf        | <b>StormTank 25 Series 18" x 72</b> Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>72 Chambers in 8 Rows<br>486 cf Overall x 96.0% Voids |
|        |         | 819 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 395.00           | 406               | 0                      | 0                      |
| 398.50           | 406               | 1,421                  | 1,421                  |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 395.00' | 8.270 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.08 cfs @ 11.54 hrs HW=395.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

**Summary for Pond 102P: INF-2 STRUTURE BEHIND UNITS 7-8 42 MODULES**

Inflow Area = 0.053 ac, 100.00% Impervious, Inflow Depth > 7.46" for 100YR STORM event  
 Inflow = 0.45 cfs @ 12.07 hrs, Volume= 0.033 af  
 Outflow = 0.05 cfs @ 11.51 hrs, Volume= 0.033 af, Atten= 89%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.51 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 399.28' @ 12.69 hrs Surf.Area= 253 sf Storage= 478 cf

Plug-Flow detention time= 66.4 min calculated for 0.033 af (100% of inflow)  
 Center-of-Mass det. time= 66.1 min ( 798.3 - 732.2 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 396.00' | 241 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>886 cf Overall - 284 cf Embedded = 602 cf x 40.0% Voids   |
| #2     | 396.50' | 260 cf        | <b>StormTank 25 Series 18" x 42</b> Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>42 Chambers in 6 Rows<br>284 cf Overall x 96.0% Voids |
|        |         | 500 cf        | Total Available Storage   |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 396.00           | 253               | 0                      | 0                      |
| 399.50           | 253               | 886                    | 886                    |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 396.00' | 8.270 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.05 cfs @ 11.51 hrs HW=396.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.05 cfs)

**Summary for Pond 104P: INF-4 STRUCTURE BEHIND 25-26 AND 27-28 -- 32 MODULES**

Inflow Area = 0.027 ac, 100.00% Impervious, Inflow Depth > 7.46" for 100YR STORM event  
 Inflow = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af  
 Outflow = 0.01 cfs @ 8.42 hrs, Volume= 0.007 af, Atten= 97%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 8.42 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 381.01' @ 15.98 hrs Surf.Area= 256 sf Storage= 447 cf

Plug-Flow detention time= 165.1 min calculated for 0.007 af (42% of inflow)  
 Center-of-Mass det. time= 51.4 min ( 783.6 - 732.2 )

**Rice Pond Village Millbury POSTdevelopment 1 Type III 24-hr 100YR STORM Rainfall=8.35"**

Prepared by Azimuth Land Design, LLC

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| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 378.00' | 250 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>896 cf Overall - 270 cf Embedded = 626 cf x 40.0% Voids  |
| #2     | 379.00' | 247 cf        | <b>StormTank 25 Series 18"</b> x 40 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>40 Chambers in 4 Rows<br>270 cf Overall x 96.0% Voids |
|        |         | 498 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 378.00              | 256                  | 0                         | 0                         |
| 381.50              | 256                  | 896                       | 896                       |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 378.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.01 cfs @ 8.42 hrs HW=378.04' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Summary for Pond 105P: INFILTRATION STRUCTURE BEHIND 21-22 & 23-24 -- 54 MODULES**

Inflow Area = 0.041 ac, 100.00% Impervious, Inflow Depth > 7.46" for 100YR STORM event  
 Inflow = 0.34 cfs @ 12.07 hrs, Volume= 0.025 af  
 Outflow = 0.01 cfs @ 8.36 hrs, Volume= 0.010 af, Atten= 97%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 8.36 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 382.03' @ 16.04 hrs Surf.Area= 385 sf Storage= 696 cf

Plug-Flow detention time= 166.5 min calculated for 0.010 af (41% of inflow)  
 Center-of-Mass det. time= 49.9 min ( 782.1 - 732.2 )

| Volume | Invert  | Avail.Storage | Storage Description   |
|--------|---------|---------------|---|
| #1     | 379.00' | 361 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below<br>1,348 cf Overall - 446 cf Embedded = 902 cf x 40.0% Voids  |
| #2     | 379.50' | 408 cf        | <b>StormTank 25 Series 18"</b> x 66 Inside #1<br>Inside= 18.0"W x 18.0"H => 2.15 sf x 3.00'L = 6.4 cf<br>Outside= 18.0"W x 18.0"H => 2.25 sf x 3.00'L = 6.8 cf<br>66 Chambers in 6 Rows<br>446 cf Overall x 96.0% Voids |
|        |         | 769 cf        | Total Available Storage   |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 379.00              | 385                  | 0                         | 0                         |
| 382.50              | 385                  | 1,348                     | 1,348                     |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 379.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.01 cfs @ 8.36 hrs HW=379.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Summary for Pond 106P: INFILTRATION TRENCH BEHIND UNITS 4-8**

Inflow Area = 0.328 ac, 0.00% Impervious, Inflow Depth > 1.15" for 100YR STORM event  
 Inflow = 0.36 cfs @ 12.11 hrs, Volume= 0.031 af  
 Outflow = 0.04 cfs @ 11.99 hrs, Volume= 0.024 af, Atten= 90%, Lag= 0.0 min  
 Discarded = 0.04 cfs @ 11.99 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs  
 Peak Elev= 395.48' @ 15.35 hrs Surf.Area= 634 sf Storage= 574 cf

Plug-Flow detention time= 174.0 min calculated for 0.024 af (75% of inflow)  
 Center-of-Mass det. time= 108.3 min ( 958.8 - 850.5 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 394.00' | 597 cf        | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)<br>1,902 cf Overall - 409 cf Embedded = 1,493 cf x 40.0% Voids  |
| #2     | 394.50' | 409 cf        | <b>Cultec R-150XLHD</b> x 15 Inside #1<br>Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf<br>Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap<br>Row Length Adjustment= +0.75' x 2.65 sf x 1 rows |
|        |         | 1,006 cf      | Total Available Storage  |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 394.00           | 634               | 0                      | 0                      |
| 397.00           | 634               | 1,902                  | 1,902                  |

| Device | Routing   | Invert  | Outlet Devices                             |
|--------|-----------|---------|--|
| #1     | Discarded | 394.00' | 2.410 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.04 cfs @ 11.99 hrs HW=394.04' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)