

# STORMWATER MANAGEMENT REPORT

## **“55+ MANUFACTURED HOUSING COMMUNITY” LOT 3 BERRY FARMS ROAD STURBRIDGE, MA 01566**

**Prepared for:**  
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*[Handwritten signature]* 4/5/22

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## **Section I - Introduction**

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### **A. Scope of Analysis**

The project Applicant, Justin Stelmok, retained McClure Engineering, Inc. (McClure) to prepare this engineering analysis of pre and post-development drainage runoff conditions for the proposed “55+ Manufactured Housing Community” Plan for the property located at Lot 3 Berry Farms Road, Sturbridge, MA (Site).

This Stormwater Management Report provides the required analysis of the proposed stormwater system for compliance with the Town of Sturbridge Bylaw requirements, and the Massachusetts 310 CMR 10.00 Wetland Protection Regulations as promulgated by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the authority granted under the Wetland Protection Act, M.G.L. c. 131 sec. 40 (WPA). The analysis includes pre- and post- conditions hydrologic modeling, and hydraulic sizing of the conveyance systems, sizing and analysis of Stormwater Best Management Practices (BMPs) of structural or non-structural techniques for managing stormwater to prevent or reduce non-point source pollutants from entering surface waters or ground waters. This report will demonstrate that the stormwater management system as designed and laid out at Lot 3 Berry Farms Road, Sturbridge, MA, complies with the referenced regulations.

A copy of the “MA-DEP Checklist for Stormwater Report” is included as Appendix A.

### **B. Site Description**

The subject site consists of approximately 41.5 acres. The property lies on the northern side of Main Street and along the Southbridge Town Line. The property is shown as Lot 3 of the Berry Farms Road Definitive Subdivision. The site is located within the Town of Sturbridge Rural Residential zoning district. The existing site consists of mostly wooded area, as well as wetlands. The site has previously been logged and some existing logging trails still exist throughout the property. The site topography slopes generally in a westerly direction towards a valley containing wetlands. The site is surrounded by wetlands on the western boundary, as well as (3) vernal pools as determined by LEC Environmental.

The site is located within an area of minimal flood hazard (Zone X) per Flood Insurance Rate Map (FIRM) Worcester County Massachusetts (All Jurisdictions), Map Number 25027C0933E, effective on 07/04/2011 (see Appendix C).

### **C. Proposed Construction**

The proposed site layout is for the construction of a 55+ Manufactured Housing Community. The community is proposed with (4) 20' wide private roads, (3) cul-de-sacs, (1) emergency access drive through the Town of Southbridge, a common clubhouse and active open space area, and (71) total units. The community will be serviced by municipal water and sewer through Berry Farms Road. The stormwater management system for the site consists of country style drainage, including swales and rain gardens with minimal structures for conveyance. Rain gardens will be placed between all units, and will act as a stormwater structure, but also on-site landscaping and yard separation/privacy barrier. Other than a single deep sump and hooded catch basin in the parking lot for the club house, all stormwater will be conveyed on the surface to rain gardens. These rain gardens will provide for peak flow attenuation, water quality treatment, and groundwater recharge. A total of (77) rain gardens are proposed, with the majority being smaller rain gardens positioned between units which will detain and treat runoff from the units, roads, and driveway. A few larger secondary rain gardens are also proposed. A single large infiltration basin is proposed within an existing natural depression. Interception trenches are proposed behind the units on Roads A and D to convey clean runoff from the undeveloped portions of the property towards the existing discharge points of the property.

The “**Special Permit and Site Plan, Blueberry Hill Estates, 55+ Manufactured Housing Community, Lot 3 Berry Farms Road, Sturbridge, MA**” Plan Set prepared by McClure Engineering, Inc., dated 4/1/22 provides details of the complete stormwater management system design.

## **Section II - Hydrologic Analysis**

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### **A. Purpose**

The purpose of this analysis is to determine the peak rate of stormwater runoff leaving the site and to design a stormwater management system that will prevent offsite flooding impacts. MassDEP Stormwater Management Policy, Standard No. 2, requires that post-development peak stormwater discharge rates shall not exceed pre-development levels.

### **B. Methodology**

The pre- and post-development stormwater runoff has been analyzed using HydroCAD, a stormwater modeling computer program. HydroCAD is a collection of techniques for the generation and routing of hydrographs, including Soil Conservation Service (SCS) Technical Release No. 20 (TR-20) and SCS Technical Release 55 (TR-55), Urban Hydrology for Small Watersheds. The analysis routes completely through one node at a time determining each outflow hydrograph before considering the next node.

The subcatchments have been modeled using SCS methods. Curve numbers, which are based upon the type of development and soil classifications, coupled with the time of concentration have been used to generate the peak storm flow for each area. The detailed information and results are provided in this report.

#### **Hydrology**

Computer Model: HydroCAD 10.0 © 2013 Applied Microcomputer Systems, drainage modeling software;

Hydrologic Methodology: TR-55 Methodology is used for analysis of peak flow and infiltration basin sizing.

Watershed Areas: Watershed areas are calculated using AutoCAD software based on the subcatchment areas delineated on topographic mapping included as “Pre-Development Drainage” and “Post-Development Drainage”. The areas shown, times of concentration and runoff coefficients are all consistent with the TR-55 drainage calculation method.

### **C. Selection of Storm Events**

The intensity for each storm event was determined from the National Oceanic and Atmospheric Administration National Weather Service Atlas 14 Point Precipitation Frequency Estimates (See Appendix C). Evaluations were based upon a Type III, 24-hour storm. Rainfall frequency and intensity used in this analysis are as follows:

<b><u>Design Storm Event</u></b>	<b><u>Rainfall Intensity</u></b>
2 year	3.24 inches
10 year	5.05 inches
25 year	6.18 inches
100 year	7.93 inches

### **D. Soils Classification**

Site soils classifications were obtained from the following sources:

- 1.) Advanced soil mapping performed by the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS), “Soil Survey of Worcester County, Massachusetts, Southern Part.” (See Appendix C for detailed soil information).

The soils descriptions are mapped as follows:

71B – Ridgebury Fine Sandy Loam – “HSG D”  
305C – Paxton Fine Sandy Loam – “HSG C”  
307C – Paxton Fine Sandy Loam – “HSG C”  
312B – Woodbridge Fine Sandy Loam – “HSG C”

2.) On site soil testing performed by Peter Engle, P.E. (SE#14009) on 9/3/20  
Testing pit locations and results are shown on the Existing Conditions Plans within the Plan Set.

Soil Permeability (k):

Design permeability (k) value:

k = 2.41 in / hr (Rawls Rate for Loamy Sand based upon on-site soil testing)

**E. Pre-Development Model Summary**

The pre-development hydrologic model analyzes the existing stormwater runoff from the site to (8) analysis points. The analysis points are: Southbridge Parcel 019-048 (0 Cournoyer Blvd), Wetland Series A (Flags A56-87), Wetland Series A (Flags A47-A56 and downstream Vernal Pool), Wetland Series A (Flags A32-A47), Wetland Series A (Flags A23-32 and upstream Vernal Pool), Wetland Series B (off-site), Wetland Series E (Vernal Pool), and Southbridge Parcel 032-092 Idlewood Street. The graphical presentation of the pre-development model is shown in Appendix D.

**F. Post-Development Model Summary**

The configuration of the post development analysis points, sub-catchments, ponds and reaches are generally configured as the pre-model. The post-development subcatchment has been broken into several smaller subcatchments for the analysis, in order to properly size the proposed rain gardens, infiltration basin, pipe network, etc. The analysis points are the same as the pre-development model. The graphical presentation of the post-development model is shown in Appendix E. For ease of the model, areas of the proposed units have been modeled as Residential Development – 1/8 acre lots with 65% impervious surface. The model should be considered conservative as the average lot is closer to 55% impervious surface as taken from the site plan. The unit sizes used in the analysis are also the largest units that will be made available to prospective buyers, and it is very unlikely all units will be this size.

**G. Summary of Peak Stormwater Discharge Rates**

The Pre- and Post-Analyses HydroCAD Reports of the 2, 10, 25 and 100 year frequency storms are provided in Appendix D and E respectively. The following summary table present results for the pre- and post-development analysis for the 2, 10, 25 and 100 year, 24-hr storm events at the analysis point as previously described. The table shows that post peak rate of runoff is less than or equal to that of pre-existing peak rate of runoff for all the storms as studied.

Table No. 1  
Analysis Point 1: Southbridge Parcel 019-048 (0 Cournoyer Blvd)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	2.58	2.56
10 Year Storm	6.90	6.86
25 Year Storm	9.96	9.90
100 Year Storm	15.00	14.91

Table No. 2  
Analysis Point 2: Wetland A (A56-A87)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	7.95	7.91
10 Year Storm	22.72	21.33
25 Year Storm	33.38	32.24
100 Year Storm	51.05	48.30

Table No. 3  
Analysis Point 3: Wetland (A47-A56 / downstream A series Vernal Pool)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	0.34	0.34
10 Year Storm	2.55	2.49
25 Year Storm	4.48	3.98
100 Year Storm	7.93	7.66

Table No. 4  
Analysis Point 4: Wetland Series A (A32-A47)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	3.07	2.70
10 Year Storm	9.20	8.14
25 Year Storm	13.66	12.87
100 Year Storm	21.07	18.78

Table No. 5  
Analysis Point 5: Wetland Series A (A23-A32/ Upstream Vernal Pool)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	2.87	2.71
10 Year Storm	8.60	8.32
25 Year Storm	12.80	12.22
100 Year Storm	19.79	18.53

Table No. 6  
Analysis Point 6: Wetland Series B

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	1.57	1.35
10 Year Storm	4.36	4.32
25 Year Storm	6.35	6.33
100 Year Storm	9.62	9.49

Table No. 7  
Analysis Point 7: Wetland Series E

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	1.61	1.42
10 Year Storm	6.18	6.05
25 Year Storm	9.74	9.27
100 Year Storm	15.87	15.62

Table No. 8  
Analysis Point 8: Southbridge Parcel 032-092 Idlewood Street

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	0.40	0.10
10 Year Storm	1.05	0.27
25 Year Storm	1.50	1.08
100 Year Storm	2.23	2.20

### **Section III – Stormwater Standards**

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#### **A. Standard 1 – Computations to Show That Discharge Does Not Cause Scour or Erosion**

*No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

##### **Proposed Full Compliance:**

The site drainage system has been designed from calculations based upon the 100-year design storm event using the peak flows predicted by the HydroCAD 10 Dynamic Modelling Program. The Manning's Equation has been used to size the drainage system pipe runs.

Manning's Equation:  $Q = A 1.486 R^{2/3} S^{1/2} / n$

Where: Q = Flow Discharge, cfs

A = Cross Sectional Area of Wetted Perimeter

n = Manning Coefficient of Channel Roughness

R = Hydraulic Radius (A/WP)

WP = Wetted Perimeter

S = Slope of Energy Gradient

No new untreated discharges are proposed for the development. All stormwater discharges for the site will have been conveyed through water quality treatment BMPs which meet Standard 4 prior to discharge. All stormwater discharges will also be conveyed to either rip rap outfalls or perforated pipe level spreaders to reduce runoff velocities and to prevent erosion or sedimentation of downstream discharge points. Rip rap outfalls and level spreaders as shown on the site plans have been designed for the applicable flows and velocities directed towards them.

#### **B. Standard 2 – Peak Rate Attenuation**

*Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.*

##### **Proposed Full Compliance:**

The peak rate attenuation analyses and summaries have been reported in hydrologic analysis provided in Section D of this report documenting there is no increase to off-site peak flow rates. A review of FEMA Flood Insurance Rate Map (FIRM) #25027C0933E (reduced scale provided in Appendix C) was reviewed for this site. The site is located in an area of minimal flood hazard (Zone X). The analysis as submitted indicates that there will be no increase in rate of runoff that would cause an increase of the flooding downstream.

#### **C. Standard 3 – Recharge**

*Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development conditions based on soil type. This Standard is met when the storm water management system is design to infiltrate the required recharge volume as determined in accordance with the Massachusetts Storm water Handbook.*

##### **Proposed Full Compliance:**

The majority of the stormwater runoff from the proposed impervious area will be directed to the proposed rain gardens. Rain gardens within areas of fill and which will meet the required separation to groundwater and bedrock will provide for groundwater recharge as well as peak flow attenuation and water quality treatment. Rain gardens in areas of cut which will not meet the required separation to groundwater or bedrock will be lined with a 10 mil. impervious poly barrier and will only provide for peak flow attenuation and water quality treatment. A single large infiltration basin is also proposed and will provide for significant ground water recharge. All together the rain

gardens and the infiltration basin will far exceed the required recharge volume. See Appendix F for computations of Standards 3 and 4. The following is a summary of the recharge for the three basins

1. Required Recharge Volume

- a. Impervious Area, as obtained from proposed Site Plan:

103,640 s.f. HSG B

219,110 s.f. HSG C

10,730 s.f. HSG D

- b. Required recharge volume  $R_v = F \times \text{Impervious Area}$  ( $F$  = target depth factor)

$$R_v = 103,640 \text{ sf} \times 0.35 \text{ in/sf} + 219,110 \text{ sf} \times 0.25 \text{ in/sf} + 10,730 \text{ sf} \times 0.1 \text{ in/sf} = 7,678 \text{ c.f.}$$

2. Provided Recharge Volume

- a. The proposed infiltration basin alone provides for 8,159 c.f. of storage volume below the lowest outlet (bottom of basin 704.00, orifice in outlet control structure at elevation 705.40), which is enough to meet the recharge volume requirement. According to the HydroCAD model, the basin infiltrates 18,906 c.f. during a two year storm event. The typical infiltrating rain garden between units provides for 265 c.f. of storage volume and provides for 840 c.f. of groundwater recharge during a two year storm event. Rain garden 2.1 provides for 3,865 c.f. of storage volume and provides for 10,643 c.f. of groundwater recharge during a two year storm event. Rain garden 3.1 provides for 675 c.f. of storage volume and provides for 3,592 c.f. of groundwater recharge during a two year storm event. Rain garden 4.1 provides for 3,456 c.f. of storage volume and provides for 18,212 c.f. of groundwater recharge during a two year storm event. Rain garden 4.2 provides for 1,920 c.f. of storage volume and provides for 10,242 c.f. of groundwater recharge during a two year storm event. Rain garden 5.1 provides for 984 c.f. of storage volume and provides for 3,616 c.f. of groundwater recharge during a two year storm event.

3. Drawdown within 72 hours:

$$T = 12 \times \text{Provided Recharge Volume} / (\text{Rawls Rate} \times \text{Basin Bottom Area})$$

Infiltration Basin  $T = 8.7$  hours

Rain Garden 5.1  $T = 4.1$  hours

Rain Garden 4.1  $T = 4.0$  hours

Rain Garden 4.2  $T = 4.0$  hours

Rain Garden 3.1  $T = 12.7$  hours

Rain Garden 2.1  $T = 4.6$  hours

Typical between unit Rain Garden  $T = 4.4$  hours

**D. Standard 4 – Water Quality**

*Stormwater management systems must be designed to remove 80% of the average annual post construction load of Total Suspended Solids (TSS). This standard is met when:*

- Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter implemented and maintained;*
- Stormwater BMPs are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*
- Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

**Proposed Full Compliance:**

TSS removal percentage computations are provided in Appendix F for the BMP treatment train as designed. There are several treatment trains created for the proposed drainage system:

- Runoff from pavement travels to an infiltrating rain garden with a sediment forebay and is discharged to a non-critical area. TSS removal equals 90%. The typical rain garden has an

- impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 210 c.f. (0.5" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
- b. Runoff from pavement travels to a lined rain garden with a sediment forebay and is discharged to a critical area (Vernal Pool). TSS removal equals 90%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
  - c. Runoff from pavement travels to an infiltrating rain garden with (2) sediment forebays (44% pretreatment) and is discharged to a critical area (vernal pool). TSS removal equals 93%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
  - d. Runoff from pavement travels to an infiltrating rain garden with a sediment forebay and is discharged to an additional infiltrating rain garden prior to discharge to a non-critical area. TSS removal equals 99%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 210 c.f. (0.5" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
  - e. Runoff from pavement travels to a lined rain garden with a sediment forebay and is discharged to an infiltrating rain garden prior to discharge to a non-critical area. TSS removal equals 99%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 210 c.f. (0.5" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
  - f. Runoff from pavement travels to a lined rain garden with a sediment forebay (90% pretreatment) and is discharged to an infiltrating rain garden prior to discharge to a critical area (vernal pool). TSS removal equals 99%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
  - g. Runoff from pavement travels to a rain garden with a Rain Guardian pretreatment device and is discharged to a non-critical area. TSS removal equals 90%. Rain garden 2.1 has an impervious area of 32,675 s.f. directed towards it, and therefore has a required water quality volume of 1,360 c.f. (0.5" water quality depth). During a two year storm event, rain garden 2.1 has an inflow of 12,150 c.f., therefore meeting the water quality volume requirement.
  - h. Runoff from pavement travels to a rain garden (lined or infiltrating) with a sediment forebay (90% pretreatment) and is discharged to an infiltration basin prior to discharge to a critical area (vernal pool). TSS removal equals 98%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement. The infiltration basin has an impervious area of 116,880 s.f. directed towards it, and therefore has a required water quality volume of 9,740 c.f. (1.0" water quality depth). During a two year storm event, the infiltration basin has an inflow of 31,784 c.f., therefore meeting the water quality volume requirement.
  - i. Runoff from pavement travels to an infiltration basin with a sediment forebay from a deep sump and hooded catch basin (44% pretreatment) prior to discharge to a critical area (vernal pool). TSS removal equals 85%. The deep sump catch basin has an impervious area of 6,100 s.f. directed towards it, and therefore has a required water quality volume of 510 c.f. (1.0" water quality depth). During a two year storm event, the deep sump catch basin has an inflow of 1,776 c.f., therefore meeting the water quality volume requirement. The infiltration basin has an impervious area of



116,880 s.f. directed towards it, and therefore has a required water quality volume of 9,740 c.f. (1.0" water quality depth). During a two year storm event, the infiltration basin has an inflow of 31,784 c.f., therefore meeting the water quality volume requirement.

All discharges from pavement are treated to a minimum of 85% TSS removal and all discharges to or near a critical area (Vernal Pools) are treated for 44% pretreatment prior to infiltration.

Per the EPA Region 1 BMP Performance Extrapolation Tool and the MA Stormwater Handbook, all treatment trains will also provide for a minimum 60% phosphorous removal as well.

The TSS removal computations are provided in Appendix F.

A "Long Term Operation and Maintenance Plan" is being provided as Appendix H.

**E. Standard 5 – Land Uses with Higher Potential Pollutant Loads**

*For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Storm water Handbook to eliminate or reduce the discharge of storm water runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, or storm water runoff, the proponent shall use the specific storm water BMP's determined by the Department to be suitable for such use as provided in the Massachusetts Storm water Handbook.*

**Proposed Full Compliance:**

- Not applicable - the Site is not a Land Use with High Potential Pollutant Loads.

**F. Standard 6 – Critical Areas**

*Storm water discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and storm water discharges near or any other critical area require the use of the specific storm water best management practices determined by the Department to be suitable for managing discharges to such area as provided in the Massachusetts Storm water Handbook.*

**Proposed Full Compliance:**

- The site does discharge to or near critical areas: three on- and off-site vernal pools. All discharges from pavement are treated to a minimum of 85% TSS removal and all discharges to or near a critical area (vernal pools) are treated for 44% pretreatment prior to infiltration. The 1" water quality depth was used to ensure the treatment BMPs treat the required water quality volumes.

**G. Standard 7 - Redevelopment**

*A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable; Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

**Proposed Full Compliance:**

- The Site is not considered a redevelopment, and all of the standards will be fully met.

#### **H. Standard 8 – Construction Period Controls**

*A plan to control construction related impacts including erosion sedimentation and other pollution prevention sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) must be implemented.*

##### **Proposed Full Compliance:**

- Draft - Weekly Construction Period Inspection Report is provided as Appendix G.
- Project will disturb > 1 Acre, therefore an EPA-NPDES Stormwater General Permit is required.
- The construction period erosion and sedimentation controls are outlined on the referenced site plans along with the sequence for implementation and construction phasing.

#### **I. Standard 9 – Operation and Maintenance Plan**

*A long term operation and maintenance plan must be developed and implemented to ensure that storm water management systems function as designed.*

##### **Proposed Full Compliance:**

- Long Term Operation and Maintenance Plan is included in the Stormwater Management Report, Appendix H.

#### **J. Standard 10 – Illicit Discharges to Drainage System**

*All illicit discharges to the stormwater management system are prohibited.*

##### **Proposed Full Compliance:**

- The Long Term Operation and Maintenance Plan provided in Appendix H addresses illicit discharges to drainage system and includes an Illicit Discharge Compliance Statement signed by the applicant.

**Tables No. 1-8** provide a summary of off-site Pre- and Post-Development peak runoff flow rates and volumes.

**Appendix A** includes a copy of the “MA-DEP Checklist for Stormwater Report”.

**Appendix B & C** includes maps and information regarding rainfall data and soils for the site.

**Appendix D & E** includes the complete Pre-Development and Post-Development *HydroCAD* drainage calculation reports figures for your review.

**Appendix F** provides additional stormwater calculations relating to compliance with the MA Stormwater Management Standards

**Appendix G** provides a DRAFT “Weekly Construction Period Inspection Report”

**Appendix H** provides a “Long Term Stormwater Operation & Maintenance Plan”

The “**Special Permit and Site Plan, Blueberry Hill Estates, 55+ Manufactured Housing Community, Lot 3 Berry Farms Road, Sturbridge, MA**” Plan Set prepared by McClure Engineering, Inc., dated 4/1/22 provides details of the complete stormwater management system design.

## **APPENDIX A**

### **MA-DEP STORMWATER CHECKLIST**





# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



*PCE* 4/5/22  
Signature and Date

## Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☒ New development  
☐ Redevelopment  
☐ Mix of New Development and Redevelopment



# Checklist for Stormwater Report

---

## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☒ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☒ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): \_\_\_\_\_

## Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - ☒ Static
  - ☐ Simple Dynamic
  - ☐ Dynamic Field<sup>1</sup>
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
  - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
  - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.





# Checklist for Stormwater Report

---

## Checklist (continued)

### Standard 3: Recharge (continued)

- ☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
  - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - ☐ is within the Zone II or Interim Wellhead Protection Area
    - ☒ is near or to other critical areas
    - ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - ☐ involves runoff from land uses with higher potential pollutant loads.
  - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
  - ☒ The ½" or 1" Water Quality Volume or
  - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- ☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☒ Critical areas and BMPs are identified in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - ☐ Limited Project
  - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - ☐ Bike Path and/or Foot Path
  - ☐ Redevelopment Project
  - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☐ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

### Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - ☒ Name of the stormwater management system owners;
  - ☒ Party responsible for operation and maintenance;
  - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
  - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
  - ☒ Description and delineation of public safety features;
  - ☒ Estimated operation and maintenance budget; and
  - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

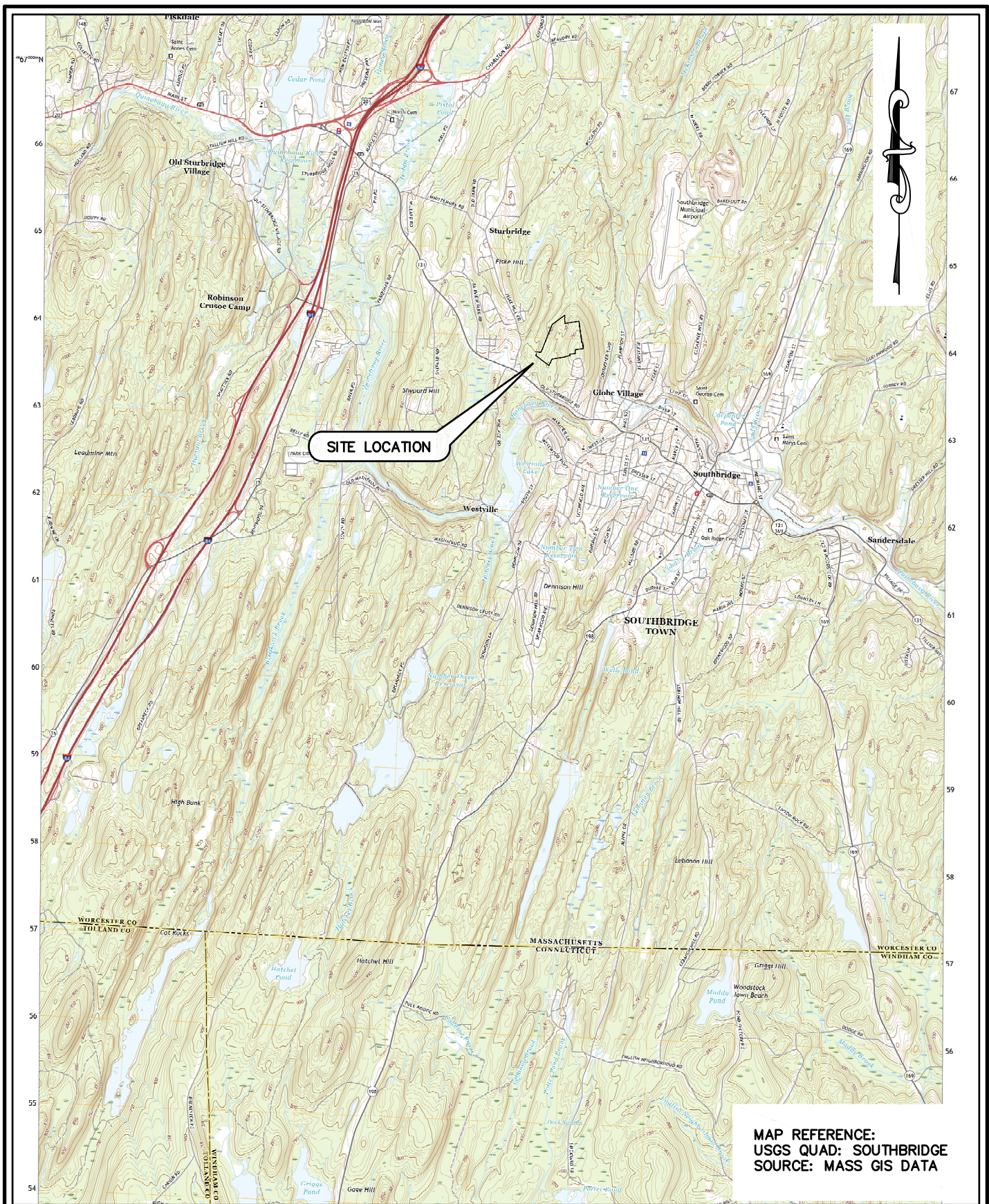
- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

## **APPENDIX B**

USGS – Figure 1







DATE:	3.31.22
DRAWN BY:	MM
APPROVED BY:	PE
SCALE:	
HORZ:	1"=5000'

**McCLURE**  
ENGINEERING, INC

119 Worcester Road  
Charlton, MA 01507

Tel: (508) 248-2005  
Fax (508) 248-4887  
Email: pengine@mcclureengineers.com

**USGS SITE LOCATION**  
**LOT 3**  
BERRY FARMS ROAD  
SOUTHBRIDGE, MASSACHUSETTS

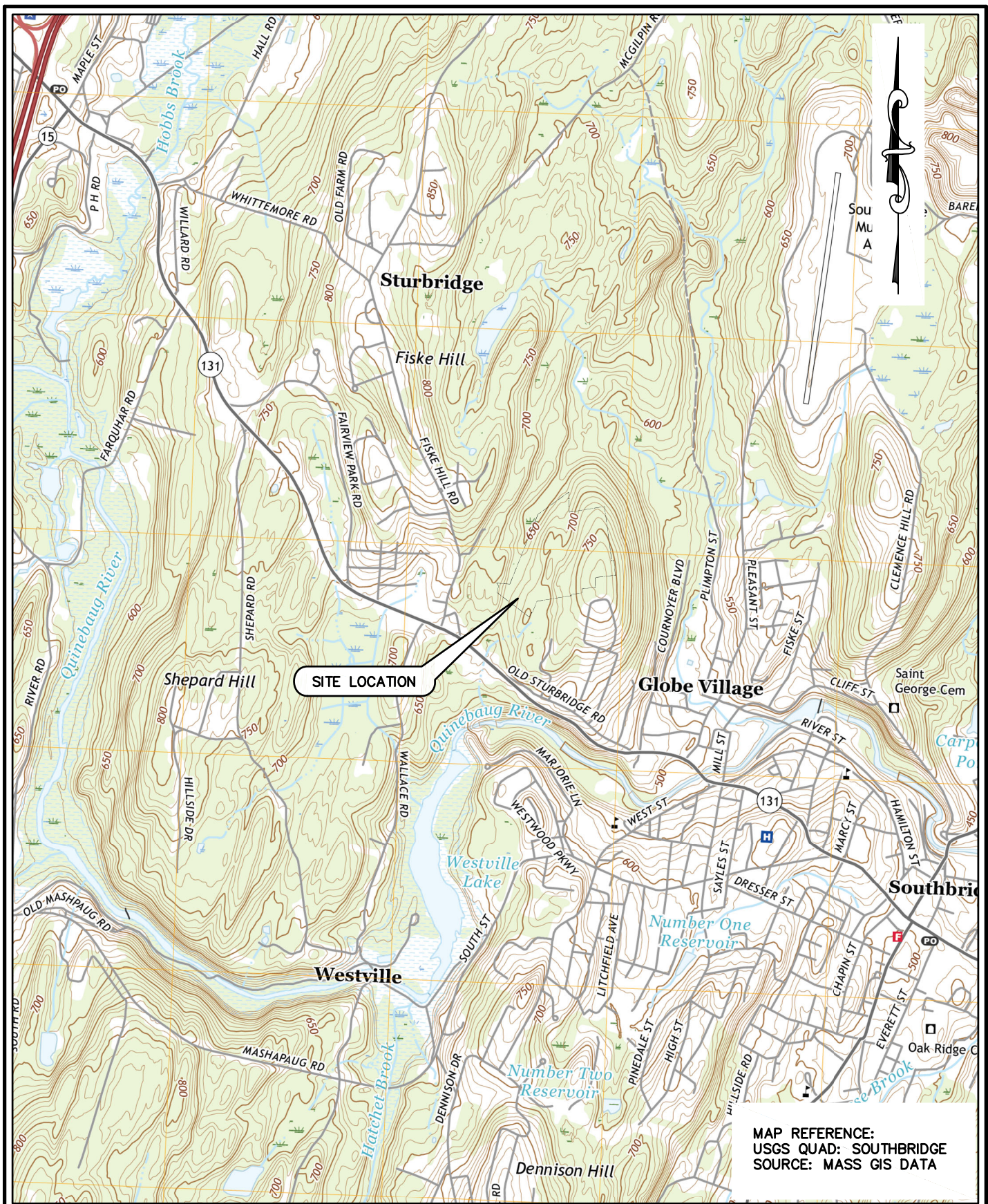
PROJ. NO. 287-2118-K  
DWG. USGS

**FIG**  
**1.1**









DATE:	3.31.22
DRAWN BY:	MM
APPROVED BY:	PE
SCALE:	
HORZ:	1"=2000'

**McCLURE**  
 ENGINEERING, INC

119 Worcester Road  
 Charlton, MA 01507

Email: pengine@mcclureengineers.com

Tel: (508) 248-2005  
 Fax (508) 248-4887

**USGS SITE LOCATION**  
**LOT 3**  
 BERRY FARMS ROAD  
 STURBRIDGE, MASSACHUSETTS

PROJ. NO. 287-2118-K  
 DWG. USGS

**FIG**  
**1.2**





## **APPENDIX C**

FEMA - FLOOD PLAIN MAPPING

NCRS SOIL MAPPING

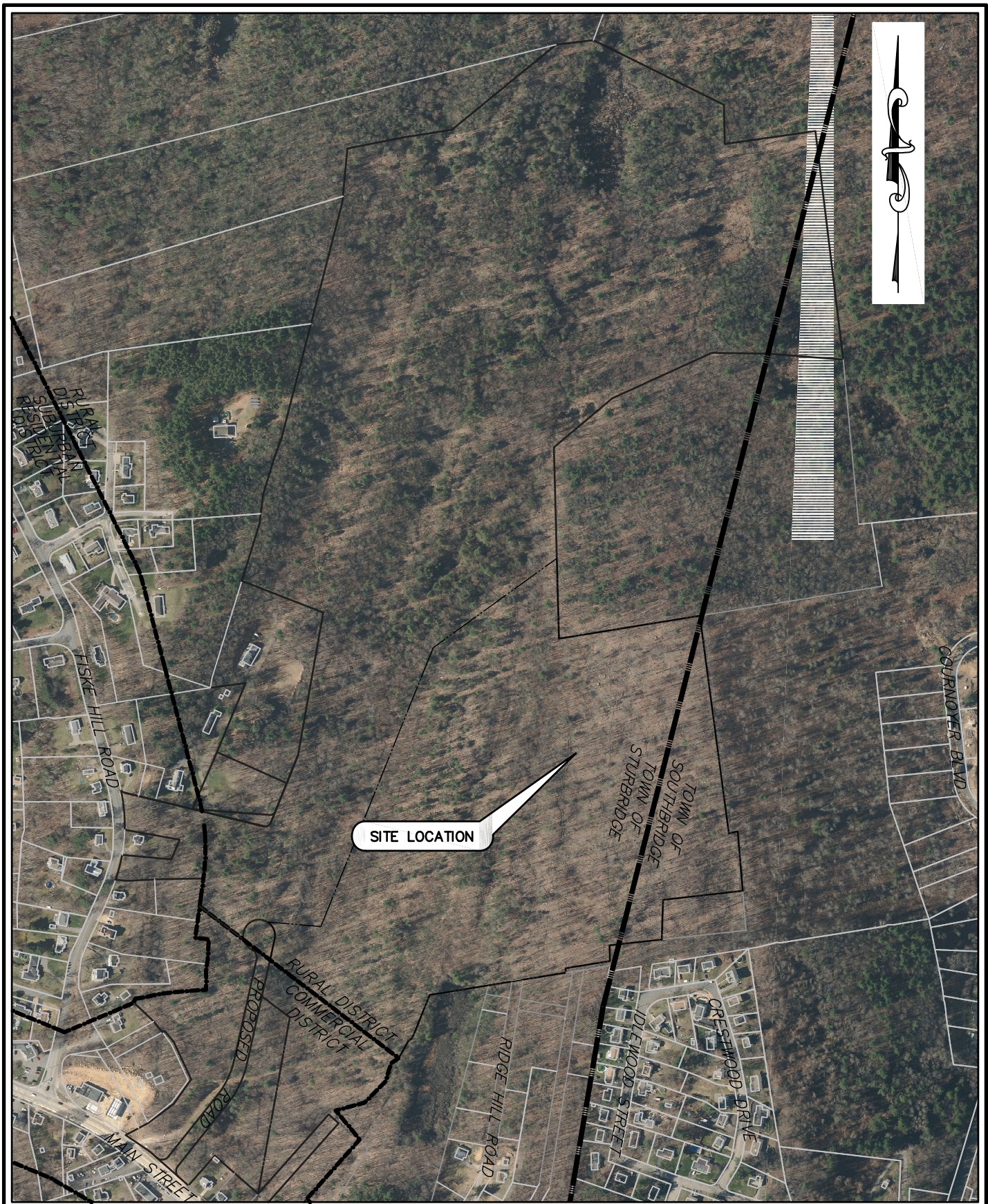
ON-SITE SOIL TESTING LOGS

RAWLS TABLE

NOAA PRECIPITATION FREQUENCY ESTIMATES







DATE:	3.31.22
DRAWN BY:	MM
APPROVED BY:	PE
SCALE:	
HORZ:	1"=500'

**McCLURE**  
ENGINEERING, INC

119 Worcester Road  
Charlton, MA 01507

Tel: (508) 248-2005  
Fax (508) 248-4887  
Email: pengine@mcclureengineers.com

**ORTHO IMAGERY**  
**LOT 3**  
**BERRY FARMS ROAD**  
STURBRIDGE, MASSACHUSETTS

PROJ. NO. 287-2118-K  
DWG. ORTHO

**FIG**  
**2**





# National Flood Hazard Layer FIRMMette



72°3'27"W 42°5'37"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
OTHER FEATURES		Levee, Dike, or Floodwall
		Cross Sections with 1% Annual Chance Water Surface Elevation
OTHER FEATURES		Coastal Transect
		Base Flood Elevation Line (BFE)
OTHER FEATURES		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
MAP PANELS		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

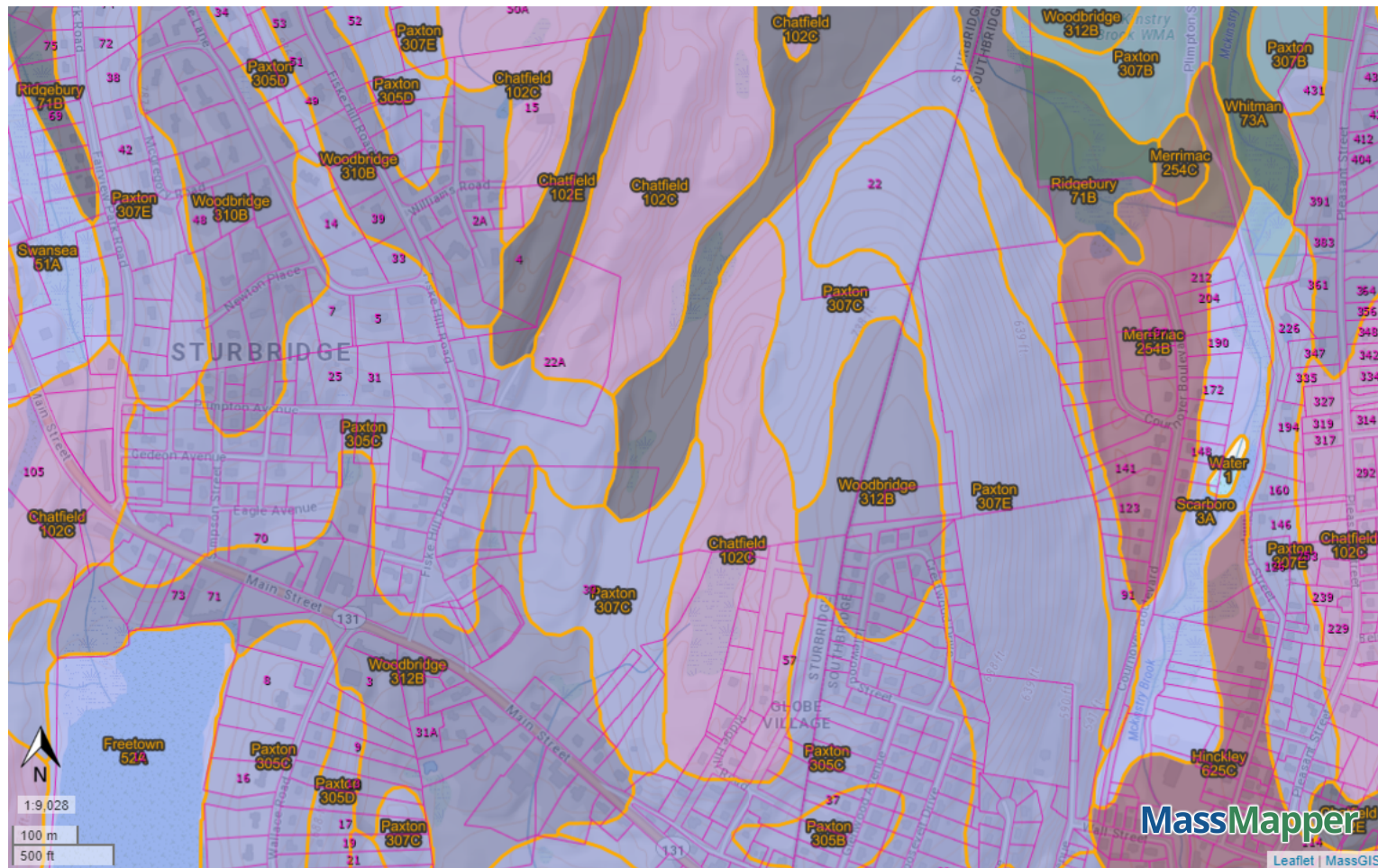
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **3/31/2022 at 10:34 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.





# MassGIS Soil Map



Property Tax Parcels

Soils Outlines



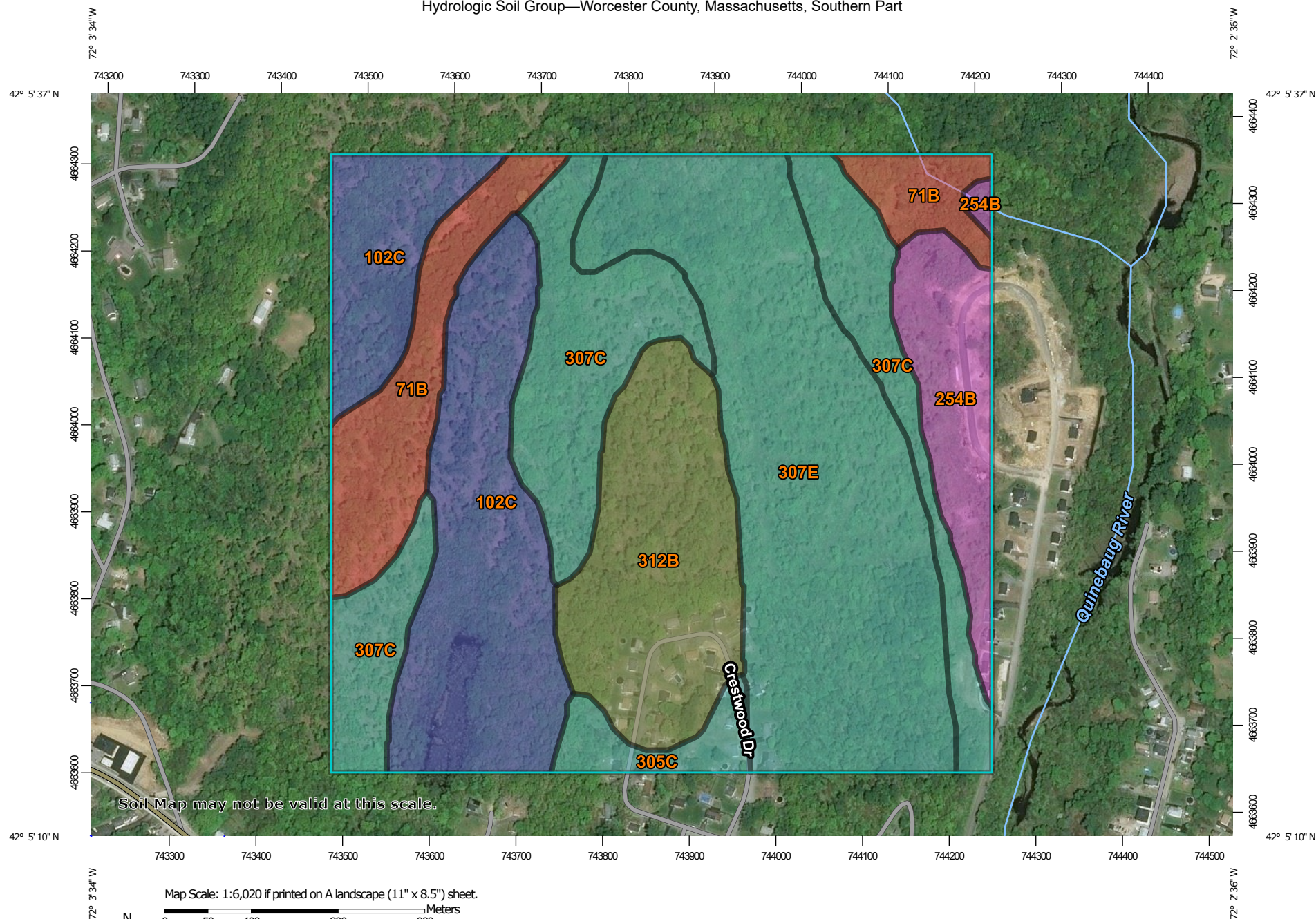
Top 20 Soils: Hydrologic Soil Group

- A
- A/D
- B
- B/D
- C
- C/D
- D





# Hydrologic Soil Group—Worcester County, Massachusetts, Southern Part



Soil Map may not be valid at this scale.

Map Scale: 1:6,020 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters

0 250 500 1000 1500 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



**Natural Resources  
Conservation Service**









Web Soil Survey  
National Cooperative Soil Survey

3/31/2022  
Page 1 of 4


**MAP LEGEND****Area of Interest (AOI)**
 Area of Interest (AOI)
**Soils****Soil Rating Polygons**





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

**Soil Rating Lines**






-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

**Soil Rating Points**

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

**Water Features**
 Streams and Canals
**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**
 Aerial Photography
**MAP INFORMATION**

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part  
Survey Area Data: Version 14, Sep 3, 2021

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

Date(s) aerial images were photographed: May 18, 2019—Jul 9, 2019

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

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	12.8	9.5%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	28.2	20.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	9.1	6.7%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.2	2.4%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	C	25.3	18.8%
307E	Paxton fine sandy loam, 15 to 35 percent slopes, extremely stony	C	38.0	28.3%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	17.9	13.3%
<b>Totals for Area of Interest</b>			<b>134.5</b>	<b>100.0%</b>

## Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher



**Table 2.3.3. 1982 Rawls Rates<sup>18</sup>**

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

---

<sup>18</sup> Rawls, Brakensiek and Saxton, 1982







## POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps & aeriels](#)

### PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.338 (0.263-0.428)	0.399 (0.310-0.506)	0.499 (0.386-0.635)	0.582 (0.448-0.745)	0.696 (0.518-0.930)	0.782 (0.570-1.07)	0.871 (0.616-1.24)	0.967 (0.652-1.41)	1.10 (0.714-1.67)	1.21 (0.763-1.87)
10-min	0.479 (0.373-0.607)	0.566 (0.440-0.717)	0.707 (0.547-0.899)	0.824 (0.635-1.06)	0.985 (0.734-1.32)	1.11 (0.808-1.51)	1.23 (0.872-1.75)	1.37 (0.923-2.00)	1.56 (1.01-2.37)	1.71 (1.08-2.65)
15-min	0.564 (0.439-0.714)	0.665 (0.517-0.843)	0.831 (0.643-1.06)	0.969 (0.747-1.24)	1.16 (0.864-1.55)	1.30 (0.951-1.78)	1.45 (1.03-2.06)	1.61 (1.09-2.36)	1.83 (1.19-2.78)	2.01 (1.27-3.12)
30-min	0.768 (0.597-0.972)	0.906 (0.704-1.15)	1.13 (0.877-1.44)	1.32 (1.02-1.69)	1.58 (1.18-2.11)	1.77 (1.29-2.43)	1.98 (1.40-2.80)	2.19 (1.48-3.21)	2.50 (1.62-3.79)	2.74 (1.73-4.25)
60-min	0.971 (0.756-1.23)	1.15 (0.891-1.45)	1.43 (1.11-1.82)	1.67 (1.29-2.14)	2.00 (1.49-2.67)	2.25 (1.64-3.07)	2.50 (1.77-3.55)	2.78 (1.87-4.06)	3.16 (2.05-4.80)	3.46 (2.19-5.37)
2-hr	1.25 (0.976-1.57)	1.46 (1.14-1.84)	1.82 (1.42-2.30)	2.11 (1.64-2.69)	2.52 (1.89-3.36)	2.82 (2.08-3.85)	3.14 (2.25-4.47)	3.51 (2.37-5.11)	4.06 (2.64-6.13)	4.52 (2.87-6.98)
3-hr	1.43 (1.13-1.79)	1.68 (1.32-2.11)	2.09 (1.64-2.64)	2.44 (1.90-3.09)	2.91 (2.19-3.87)	3.25 (2.41-4.44)	3.63 (2.62-5.18)	4.08 (2.76-5.92)	4.76 (3.10-7.17)	5.34 (3.40-8.22)
6-hr	1.79 (1.42-2.23)	2.13 (1.69-2.66)	2.69 (2.12-3.36)	3.15 (2.47-3.96)	3.79 (2.88-5.02)	4.25 (3.18-5.79)	4.76 (3.47-6.79)	5.40 (3.67-7.79)	6.38 (4.17-9.56)	7.23 (4.61-11.1)
12-hr	2.20 (1.76-2.72)	2.67 (2.13-3.31)	3.44 (2.73-4.27)	4.08 (3.21-5.09)	4.95 (3.79-6.54)	5.60 (4.21-7.59)	6.31 (4.62-8.96)	7.18 (4.90-10.3)	8.55 (5.60-12.7)	9.74 (6.23-14.8)
24-hr	2.63 (2.11-3.23)	3.24 (2.60-3.98)	4.23 (3.38-5.22)	5.05 (4.01-6.27)	6.18 (4.76-8.12)	7.02 (5.30-9.46)	7.93 (5.84-11.2)	9.07 (6.21-12.9)	10.8 (7.12-16.1)	12.4 (7.94-18.7)
2-day	3.05 (2.47-3.72)	3.78 (3.05-4.61)	4.96 (3.99-6.07)	5.94 (4.75-7.32)	7.28 (5.65-9.50)	8.28 (6.29-11.1)	9.36 (6.94-13.2)	10.7 (7.37-15.2)	12.8 (8.47-18.9)	14.7 (9.46-22.1)
3-day	3.33 (2.71-4.05)	4.12 (3.34-5.01)	5.41 (4.37-6.60)	6.48 (5.20-7.96)	7.95 (6.19-10.3)	9.03 (6.89-12.1)	10.2 (7.60-14.3)	11.7 (8.07-16.6)	14.1 (9.29-20.6)	16.1 (10.4-24.1)
4-day	3.57 (2.91-4.32)	4.41 (3.59-5.35)	5.78 (4.68-7.03)	6.92 (5.57-8.47)	8.48 (6.62-11.0)	9.63 (7.37-12.8)	10.9 (8.12-15.2)	12.5 (8.62-17.6)	15.0 (9.93-22.0)	17.2 (11.1-25.7)
7-day	4.24 (3.47-5.10)	5.18 (4.24-6.25)	6.72 (5.48-8.14)	8.00 (6.48-9.75)	9.76 (7.66-12.6)	11.1 (8.50-14.7)	12.5 (9.34-17.4)	14.3 (9.89-20.0)	17.1 (11.4-24.9)	19.6 (12.7-29.1)
10-day	4.92 (4.04-5.90)	5.92 (4.86-7.11)	7.55 (6.17-9.10)	8.90 (7.23-10.8)	10.8 (8.47-13.8)	12.1 (9.35-16.0)	13.6 (10.2-18.9)	15.5 (10.8-21.7)	18.4 (12.3-26.8)	21.0 (13.6-31.1)
20-day	7.09 (5.87-8.44)	8.14 (6.73-9.71)	9.86 (8.12-11.8)	11.3 (9.24-13.6)	13.3 (10.5-16.8)	14.7 (11.3-19.1)	16.3 (12.1-22.0)	18.1 (12.7-25.1)	20.8 (13.9-29.9)	23.0 (14.9-33.9)
30-day	8.90 (7.40-10.6)	9.98 (8.29-11.9)	11.7 (9.71-14.0)	13.2 (10.8-15.8)	15.2 (12.0-19.1)	16.7 (12.9-21.5)	18.3 (13.6-24.4)	20.0 (14.0-27.6)	22.3 (15.0-32.1)	24.2 (15.8-35.6)
45-day	11.1 (9.31-13.2)	12.3 (10.2-14.5)	14.1 (11.7-16.7)	15.6 (12.9-18.6)	17.7 (14.0-21.9)	19.3 (14.8-24.5)	20.9 (15.4-27.4)	22.4 (15.8-30.7)	24.4 (16.4-34.8)	25.8 (16.8-37.8)
60-day	13.0 (10.9-15.3)	14.1 (11.8-16.7)	16.0 (13.4-19.0)	17.6 (14.6-21.0)	19.8 (15.7-24.4)	21.5 (16.5-27.1)	23.1 (17.0-30.1)	24.5 (17.3-33.5)	26.2 (17.7-37.4)	27.4 (17.9-40.1)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

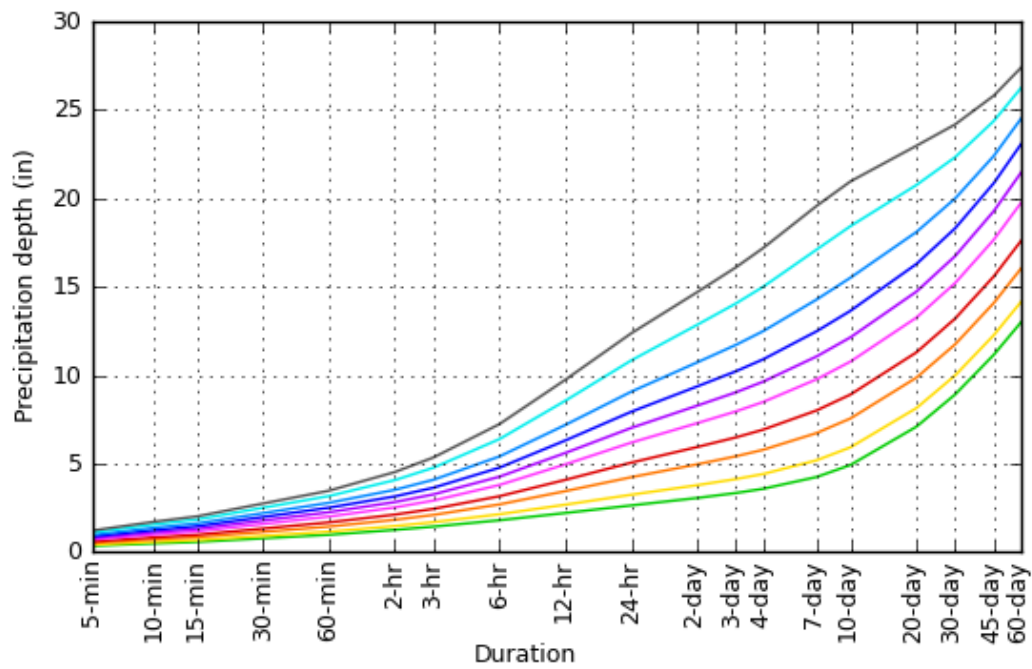
Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

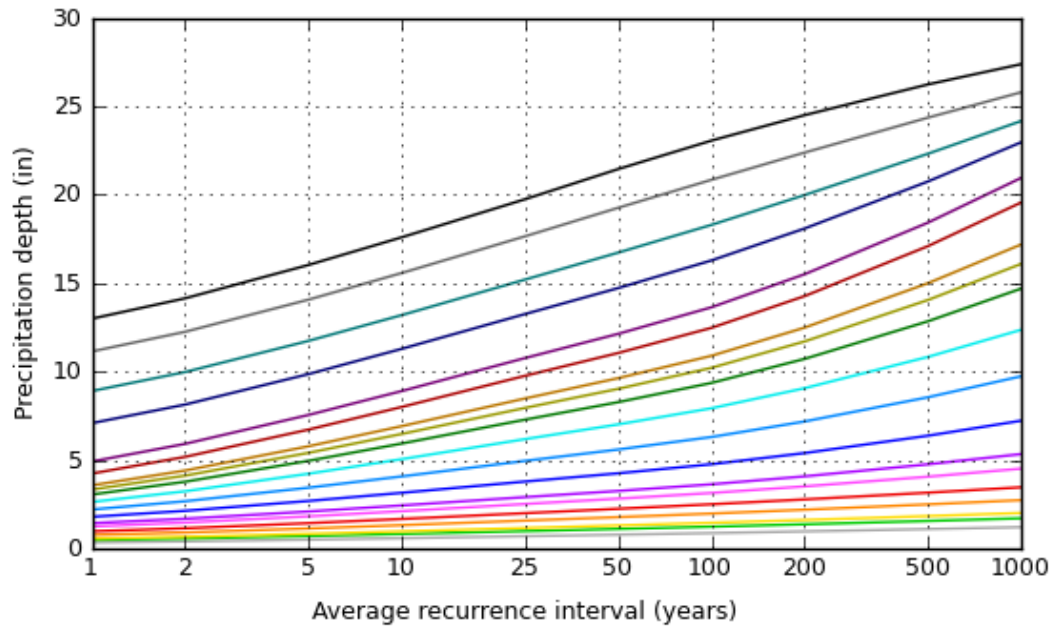
### PF graphical

# PDS-based depth-duration-frequency (DDF) curves

Latitude: 42.0910°, Longitude: -72.0529°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration
5-min
10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

## Maps & aerials

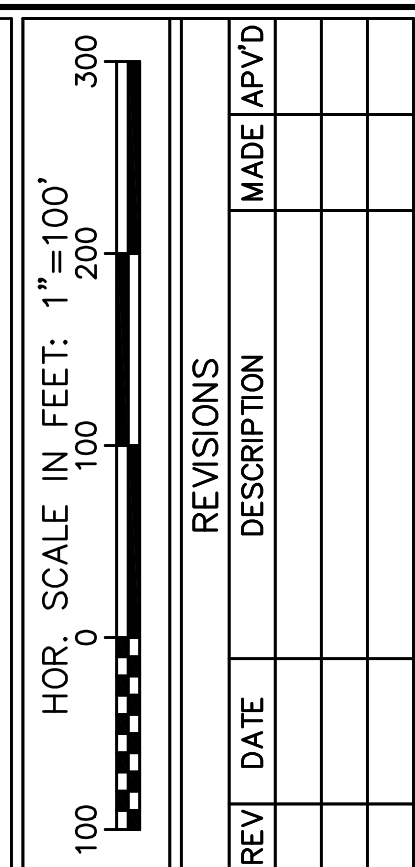
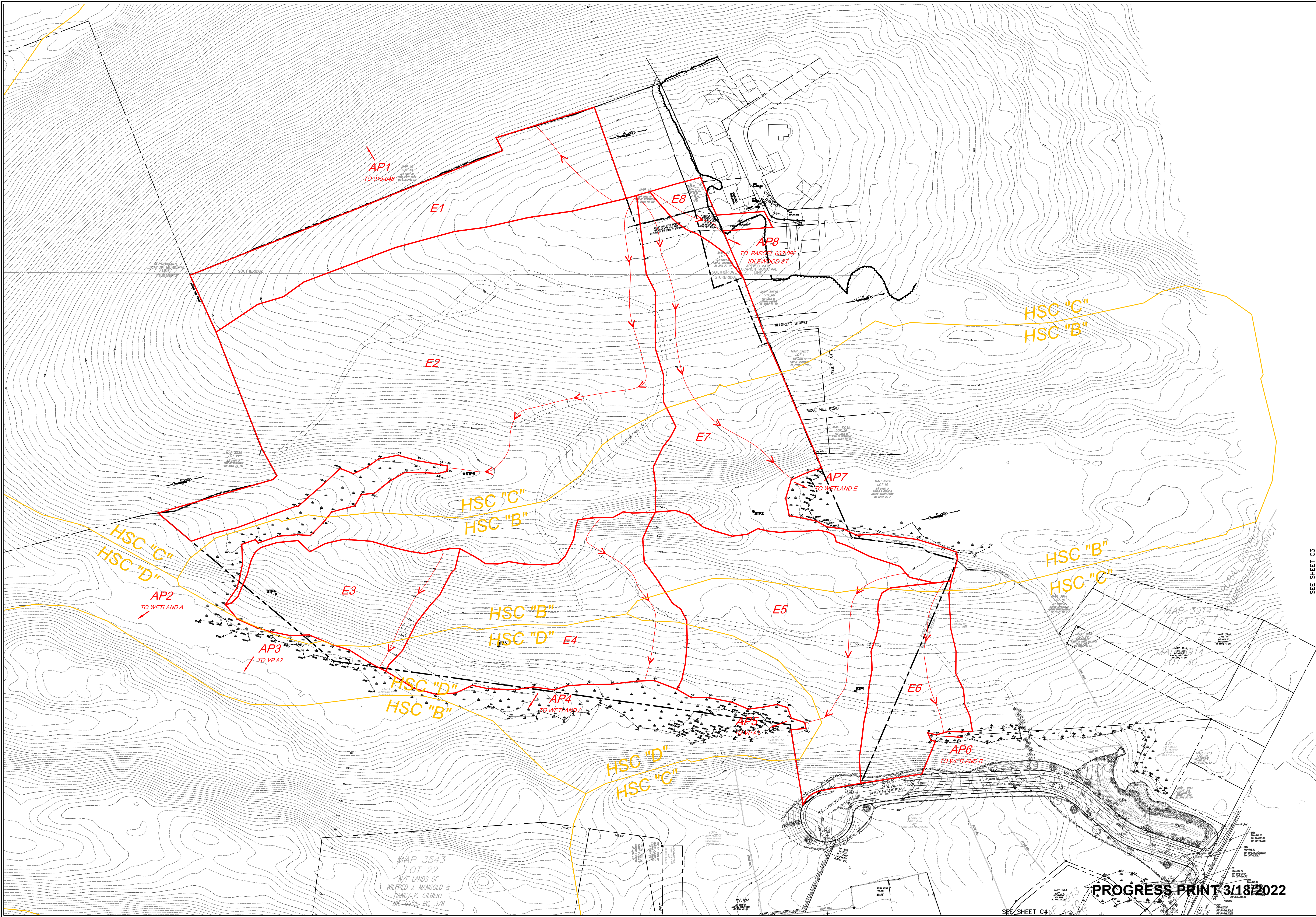
Small scale terrain

## **APPENDIX D**

### **PRE-DEVELOPMENT HYDROCAD DRAINAGE CALCULATIONS**







REVISIONS		MADE APVD	
REV	DATE	DESCRIPTION	

PETER C. ENGLE, P.E.  
PROFESSIONAL ENGINEER

**McCLURE**  
ENGINEERING, INC.  
119 Worcester Road  
Charlton, MA 01507  
Tel: (508) 248-2005  
Fax: (508) 248-4887  
Email: pengle@mcclureengineers.com

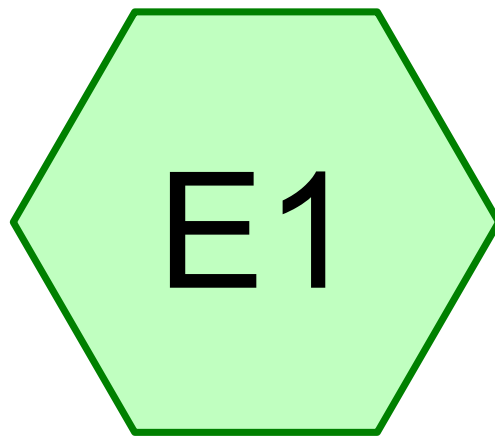
WATERSHED ANALYSIS  
LOT 3 BERRY FARMS ROAD  
STURBRIDGE, MA 01566  
PREPARED FOR  
JUSTIN STELMOK  
557 SOUTHWEST CUTOFF  
WORCESTER, MA 01607

DRAWN BY: WCN  
DATE: 3/31/2022  
CHK BY: P.E.  
SCALE: 1"=100'  
PROJ. NO. 287-2118-K

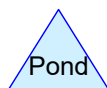
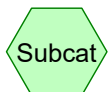
PRE-DEVELOPMENT

PROGRESS PRINT 3/18/2022





# AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)



**AP1**

Prepared by Microsoft

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Predevelopment AP1

Type III 24-hr 2YearMass Rainfall=3.24"

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Page 2

**Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 2.58 cfs @ 12.23 hrs, Volume= 11,834 cf, Depth&gt; 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			

**AP1**

Prepared by Microsoft

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Predevelopment AP1

Type III 24-hr 10YearMass Rainfall=5.05"

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Page 3

**Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 6.90 cfs @ 12.22 hrs, Volume= 28,841 cf, Depth&gt; 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			



**AP1**

Prepared by Microsoft

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Predevelopment AP1

Type III 24-hr 25YearMass Rainfall=6.18"

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Page 4

**Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 9.96 cfs @ 12.21 hrs, Volume= 41,026 cf, Depth&gt; 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			

**AP1**

Prepared by Microsoft

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Predevelopment AP1

Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 15.00 cfs @ 12.20 hrs, Volume= 61,293 cf, Depth&gt; 4.39"

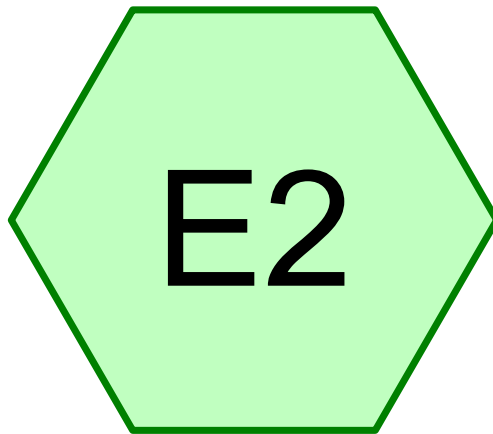
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

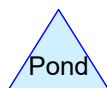
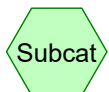
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			





# AP2 - To Wetland A (A56-A87)



**AP2**

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Predevelopment AP2

Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)**

Runoff = 7.95 cfs @ 12.38 hrs, Volume= 45,298 cf, Depth&gt; 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
23.6	950	Total			

**AP2**

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Predevelopment AP2

Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)**

Runoff = 22.72 cfs @ 12.35 hrs, Volume= 115,158 cf, Depth&gt; 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
23.6	950	Total			

**AP2**

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Predevelopment AP2

Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)**

Runoff = 33.38 cfs @ 12.34 hrs, Volume= 166,010 cf, Depth&gt; 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
23.6	950	Total			

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Predevelopment AP2

Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)**

Runoff = 51.05 cfs @ 12.33 hrs, Volume= 251,343 cf, Depth&gt; 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

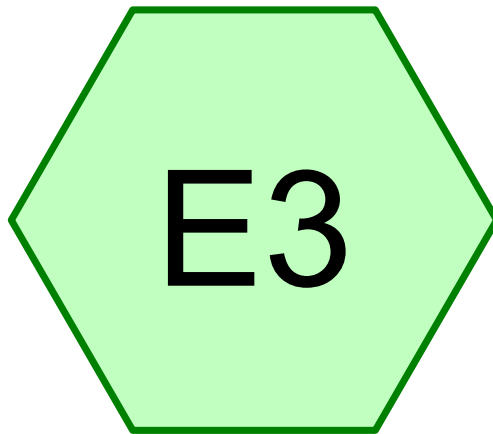
Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

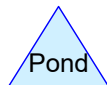
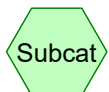
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
23.6	950	Total			







# AP3 - To Wetland A (A47-A56) / VP A2



## Routing Diagram for AP3

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**AP3**

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Predevelopment AP3

Type III 24-hr 2YearMass Rainfall=3.24"

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Page 2

**Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2**

Runoff = 0.34 cfs @ 12.33 hrs, Volume= 2,780 cf, Depth&gt; 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.8	330	Total			

**AP3**

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Predevelopment AP3

Type III 24-hr 10YearMass Rainfall=5.05"

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Page 3

**Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2**

Runoff = 2.55 cfs @ 12.13 hrs, Volume= 10,163 cf, Depth&gt; 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.8	330	Total			

**AP3**

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Predevelopment AP3

Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2**

Runoff = 4.48 cfs @ 12.12 hrs, Volume= 16,226 cf, Depth&gt; 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.8	330	Total			

**AP3**

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Predevelopment AP3

Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2**

Runoff = 7.93 cfs @ 12.12 hrs, Volume= 27,093 cf, Depth&gt; 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

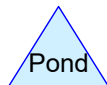
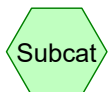
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.8	330	Total			





# AP4 - To Wetland A (A32-A47)





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Predevelopment AP4

Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)**

Runoff = 3.07 cfs @ 12.15 hrs, Volume= 12,702 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	485	Total			

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Predevelopment AP4

Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)**

Runoff = 9.20 cfs @ 12.14 hrs, Volume= 32,966 cf, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	485	Total			

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Predevelopment AP4

Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)**

Runoff = 13.66 cfs @ 12.13 hrs, Volume= 47,831 cf, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	485	Total			

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Predevelopment AP4

Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)**

Runoff = 21.07 cfs @ 12.13 hrs, Volume= 72,881 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	485	Total			

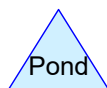
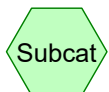




AP5 - To Wetland A  
(A23-A32) / VP A1



AP6 - To Wetland B  
(off-site)



**Routing Diagram for AP5&6**

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**AP5&6**

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Predevelopment AP5&amp;6

Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1**

Runoff = 2.87 cfs @ 12.27 hrs, Volume= 14,691 cf, Depth&gt; 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.8	505	Total			

**Summary for Subcatchment E6: AP6 - To Wetland B (off-site)**

Runoff = 1.57 cfs @ 12.15 hrs, Volume= 6,195 cf, Depth&gt; 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			



**AP5&6**

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Predevelopment AP5&amp;6

Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1**

Runoff = 8.60 cfs @ 12.24 hrs, Volume= 38,172 cf, Depth&gt; 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.8	505	Total			

**Summary for Subcatchment E6: AP6 - To Wetland B (off-site)**

Runoff = 4.36 cfs @ 12.13 hrs, Volume= 15,405 cf, Depth&gt; 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			

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Predevelopment AP5&amp;6

Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1**

Runoff = 12.80 cfs @ 12.23 hrs, Volume= 55,402 cf, Depth&gt; 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.8	505	Total			

**Summary for Subcatchment E6: AP6 - To Wetland B (off-site)**

Runoff = 6.35 cfs @ 12.13 hrs, Volume= 22,053 cf, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			

**AP5&6**

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Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1**

Runoff = 19.79 cfs @ 12.23 hrs, Volume= 84,447 cf, Depth&gt; 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.8	505	Total			

**Summary for Subcatchment E6: AP6 - To Wetland B (off-site)**

Runoff = 9.62 cfs @ 12.13 hrs, Volume= 33,159 cf, Depth&gt; 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

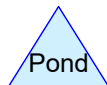
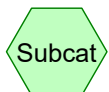
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			





# AP7 - To Wetland E



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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment E7: AP7 - To Wetland E**

Runoff = 1.61 cfs @ 12.40 hrs, Volume= 10,728 cf, Depth&gt; 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
21.5	840	Total			

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment E7: AP7 - To Wetland E**

Runoff = 6.18 cfs @ 12.33 hrs, Volume= 31,700 cf, Depth&gt; 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
21.5	840	Total			

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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment E7: AP7 - To Wetland E**

Runoff = 9.74 cfs @ 12.31 hrs, Volume= 47,805 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
21.5	840	Total			



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Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E7: AP7 - To Wetland E**

Runoff = 15.87 cfs @ 12.30 hrs, Volume= 75,646 cf, Depth&gt; 3.48"

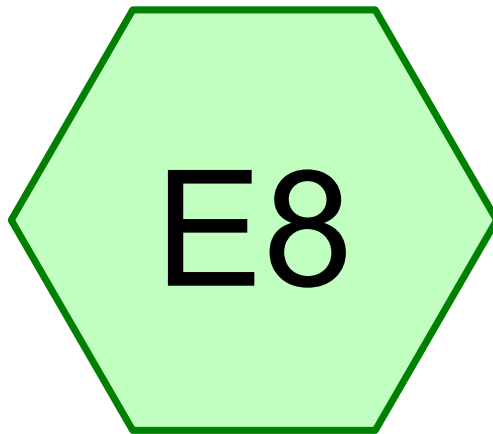
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

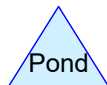
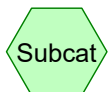
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
21.5	840	Total			





# AP8 - To Southbridge Parcel 032-092 Idlewood Street



**AP8**

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Predevelopment AP8

Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Runoff = 0.40 cfs @ 12.17 hrs, Volume= 1,626 cf, Depth&gt; 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
11.0	200	Total			

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Predevelopment AP8

Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Runoff = 1.05 cfs @ 12.16 hrs, Volume= 3,884 cf, Depth&gt; 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
11.0	200	Total			

**AP8**

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Predevelopment AP8

Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Runoff = 1.50 cfs @ 12.16 hrs, Volume= 5,490 cf, Depth&gt; 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
11.0	200	Total			

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Predevelopment AP8

Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Runoff = 2.23 cfs @ 12.15 hrs, Volume= 8,149 cf, Depth&gt; 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
11.0	200	Total			



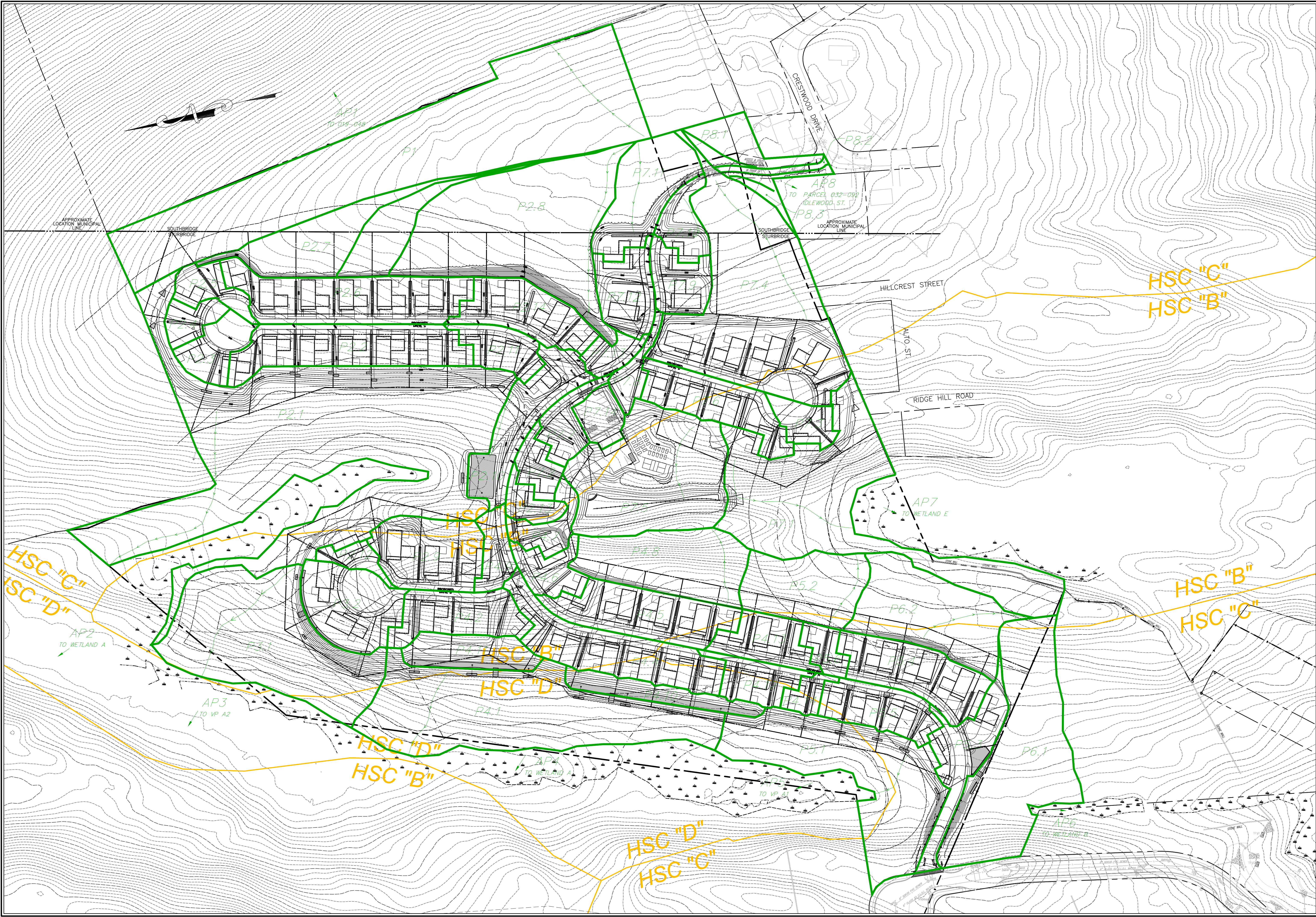


# **APPENDIX E**

## **POST-DEVELOPMENT HYDROCAD DRAINAGE CALCULATIONS**







HOR. SCALE IN FEET: 1"=80'

80 160 240

REVISIONS	
REV	DATE

PETER C. ENGLE, P.E.	
PROFESSIONAL ENGINEER	
MA LIC. NO.	53736

**McCLURE**  
ENGINEERING, INC.

119 Worcester Road  
Charlton, MA 01507

Tel: (508) 248-2005  
Fax: (508) 248-4887  
Email: peng@mcclureengineers.com

**WATERSHED ANALYSIS**  
"BLUREBERRY HILL ESTATES"  
LOT 3 BERRY FARMS ROAD  
STURBRIDGE, MA 01566

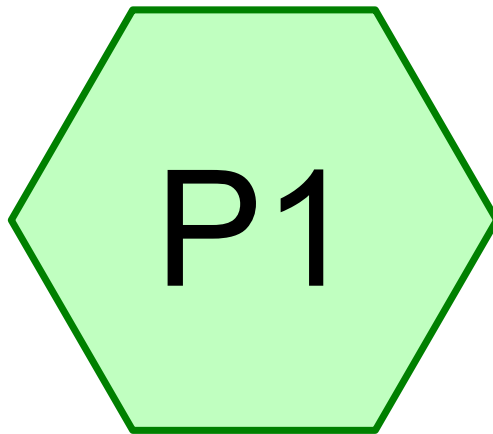
PREPARED FOR  
JUSTIN STELMOK  
557 SOUTHWEST CUTOFF  
WORCESTER, MA 01607

DRAWN BY:	WCN
DATE:	3/31/22
CHK BY:	PCE
SCALE:	1"=80'
PROJ. NO.	287-2118K

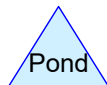
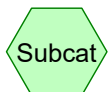
POSTDEVELOPMENT

**DA-PR**





# AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)



**AP1**

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Postdevelopment AP1

Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 2.56 cfs @ 12.23 hrs, Volume= 11,765 cf, Depth&gt; 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			

**AP1**

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Postdevelopment AP1

Type III 24-hr 10YearMass Rainfall=5.05"

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Page 3

**Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 6.86 cfs @ 12.22 hrs, Volume= 28,675 cf, Depth&gt; 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			

**AP1**

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Postdevelopment AP1

Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 9.90 cfs @ 12.21 hrs, Volume= 40,790 cf, Depth&gt; 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			

**AP1**

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Postdevelopment AP1

Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)**

Runoff = 14.91 cfs @ 12.20 hrs, Volume= 60,940 cf, Depth&gt; 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

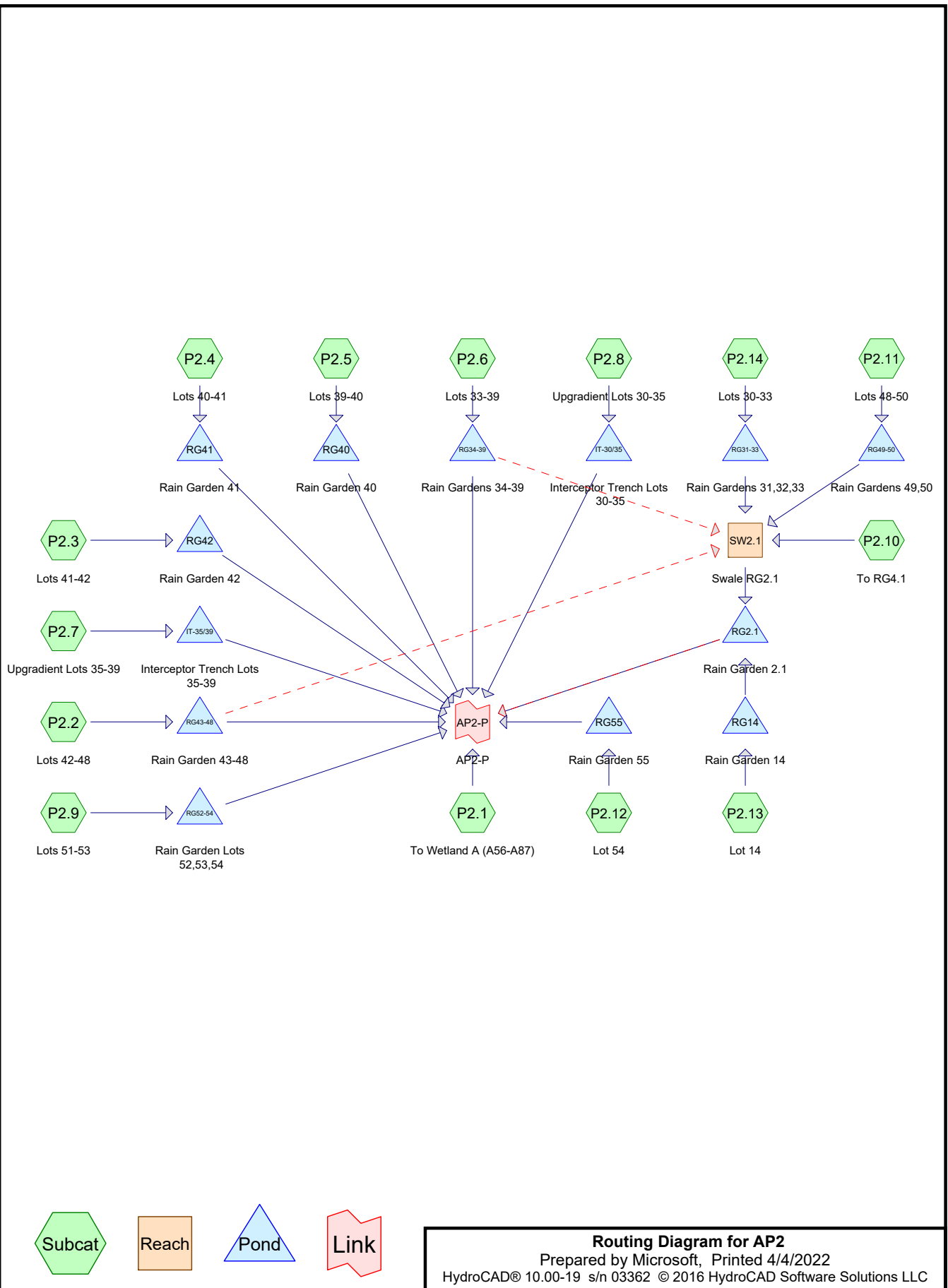
Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
15.1	270	Total			







**AP2**

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Postdevelopment AP2

Type III 24-hr 2YearMass Rainfall=3.24"

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Page 2

**Summary for Subcatchment P2.1: To Wetland A (A56-A87)**

Runoff = 3.65 cfs @ 12.15 hrs, Volume= 14,371 cf, Depth&gt; 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	430	Total			

**Summary for Subcatchment P2.10: To RG4.1**

Runoff = 1.01 cfs @ 12.11 hrs, Volume= 3,318 cf, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 12,070	90	Residential Lots, 65% imp, HSG C
2,925	70	Woods, Good, HSG C
11,575	74	>75% Grass cover, Good, HSG C
26,570	81	Weighted Average
18,725		70.47% Pervious Area
7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.2	150	Total			

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Postdevelopment AP2

Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P2.11: Lots 48-50**

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 1,912 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 10,410	90	Residential Lots, 65% imp, HSG C
3,644		35.00% Pervious Area
6,767		65.00% Impervious Area

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

**Summary for Subcatchment P2.12: Lot 54**

Runoff = 0.32 cfs @ 12.07 hrs, Volume= 1,001 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 5,450	90	Residential Lots, 65% imp, HSG C
1,908		35.00% Pervious Area
3,543		65.00% Impervious Area

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

**Summary for Subcatchment P2.13: Lot 14**

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 1,212 cf, Depth&gt; 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

**AP2**

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Postdevelopment AP2

Type III 24-hr 2YearMass Rainfall=3.24"

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

**Summary for Subcatchment P2.14: Lots 30-33**

Runoff = 1.27 cfs @ 12.07 hrs, Volume= 3,950 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 21,505	90	Residential Lots, 65% imp, HSG C
7,527		35.00% Pervious Area
13,978		65.00% Impervious Area

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

**Summary for Subcatchment P2.2: Lots 42-48**

Runoff = 2.35 cfs @ 12.07 hrs, Volume= 7,325 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 39,875	90	Residential Lots, 65% imp, HSG C
13,956		35.00% Pervious Area
25,919		65.00% Impervious Area

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

**Summary for Subcatchment P2.3: Lots 41-42**

Runoff = 0.75 cfs @ 12.07 hrs, Volume= 2,336 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area

**AP2**

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Postdevelopment AP2

Type III 24-hr 2YearMass Rainfall=3.24"

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Page 5

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

**Summary for Subcatchment P2.4: Lots 40-41**

Runoff = 0.44 cfs @ 12.07 hrs, Volume= 1,382 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

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

**Summary for Subcatchment P2.5: Lots 39-40**

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,750 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

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

**Summary for Subcatchment P2.6: Lots 33-39**

Runoff = 2.67 cfs @ 12.07 hrs, Volume= 8,319 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 45,285	90	Residential Lots, 65% imp, HSG C
15,850		35.00% Pervious Area
29,435		65.00% Impervious Area

**AP2**

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Postdevelopment AP2

Type III 24-hr 2YearMass Rainfall=3.24"

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

**Summary for Subcatchment P2.7: Upgradient Lots 35-39**

Runoff = 0.63 cfs @ 12.31 hrs, Volume= 3,211 cf, Depth&gt; 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

**Summary for Subcatchment P2.8: Upgradient Lots 30-35**

Runoff = 1.42 cfs @ 12.25 hrs, Volume= 6,623 cf, Depth&gt; 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

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**Summary for Subcatchment P2.9: Lots 51-53**

Runoff = 1.19 cfs @ 12.08 hrs, Volume= 3,680 cf, Depth&gt; 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
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Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

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

**Summary for Reach SW2.1: Swale RG2.1**

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 2.26" for 2YearMass event  
 Inflow = 2.04 cfs @ 12.16 hrs, Volume= 11,010 cf  
 Outflow = 2.04 cfs @ 12.16 hrs, Volume= 11,007 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 6.67 fps, Min. Travel Time= 0.3 min  
 Avg. Velocity= 2.43 fps, Avg. Travel Time= 0.8 min

Peak Storage= 37 cf @ 12.16 hrs  
 Average Depth at Peak Storage= 0.21'  
 Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding  
 Side Slope Z-value= 2.0 ' ' Top Width= 5.00'  
 Length= 120.0' Slope= 0.1500 ' '  
 Inlet Invert= 722.00', Outlet Invert= 704.00'





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**Summary for Pond IT-30/35: Interceptor Trench Lots 30-35**

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 0.90" for 2YearMass event  
 Inflow = 1.42 cfs @ 12.25 hrs, Volume= 6,623 cf  
 Outflow = 1.36 cfs @ 12.31 hrs, Volume= 6,565 cf, Atten= 4%, Lag= 3.6 min  
 Primary = 1.36 cfs @ 12.31 hrs, Volume= 6,565 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.56' @ 12.31 hrs Surf.Area= 1,470 sf Storage= 421 cf

Plug-Flow detention time= 12.1 min calculated for 6,565 cf (99% of inflow)  
 Center-of-Mass det. time= 7.3 min ( 885.7 - 878.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	<b>3.00'W x 490.00'L x 3.00'H Prismaoid</b> 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	<b>15.0" Round Culvert</b> L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 ' S= 0.0320 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.35 cfs @ 12.31 hrs HW=732.56' TW=0.00' (Dynamic Tailwater)  
 ↑1=Culvert (Inlet Controls 1.35 cfs @ 2.54 fps)

**Summary for Pond IT-35/39: Interceptor Trench Lots 35-39**

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 0.85" for 2YearMass event  
 Inflow = 0.63 cfs @ 12.31 hrs, Volume= 3,211 cf  
 Outflow = 0.58 cfs @ 12.40 hrs, Volume= 3,173 cf, Atten= 7%, Lag= 5.4 min  
 Primary = 0.58 cfs @ 12.40 hrs, Volume= 3,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 734.41' @ 12.40 hrs Surf.Area= 1,200 sf Storage= 251 cf

Plug-Flow detention time= 15.6 min calculated for 3,173 cf (99% of inflow)  
 Center-of-Mass det. time= 9.3 min ( 893.8 - 884.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	<b>3.00'W x 400.00'L x 3.00'H Prismaoid</b> 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	<b>10.0" Round Culvert</b> L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

**Primary OutFlow** Max=0.58 cfs @ 12.40 hrs HW=734.41' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.58 cfs @ 2.18 fps)

### Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 2.12" for 2YearMass event  
 Inflow = 0.39 cfs @ 12.07 hrs, Volume= 1,212 cf  
 Outflow = 0.25 cfs @ 12.18 hrs, Volume= 1,201 cf, Atten= 37%, Lag= 6.2 min  
 Primary = 0.25 cfs @ 12.18 hrs, Volume= 1,201 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 703.98' @ 12.18 hrs Surf.Area= 240 sf Storage= 218 cf

Plug-Flow detention time= 20.7 min calculated for 1,201 cf (99% of inflow)  
 Center-of-Mass det. time= 15.4 min ( 824.7 - 809.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	702.00'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	704.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	<b>6.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	703.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.24 cfs @ 12.18 hrs HW=703.97' TW=699.63' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.24 cfs of 0.70 cfs potential flow)  
 ↑ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↑ **3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.61 fps)  
 ↑ **4=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.60 fps)

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**Summary for Pond RG2.1: Rain Garden 2.1**

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 2.24" for 2YearMass event  
 Inflow = 2.29 cfs @ 12.16 hrs, Volume= 12,209 cf  
 Outflow = 0.51 cfs @ 13.38 hrs, Volume= 12,218 cf, Atten= 78%, Lag= 73.2 min  
 Discarded = 0.24 cfs @ 11.75 hrs, Volume= 10,668 cf  
 Primary = 0.27 cfs @ 13.38 hrs, Volume= 1,551 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 701.68' @ 13.38 hrs Surf.Area= 4,250 sf Storage= 5,023 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 149.0 min ( 971.1 - 822.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 85.0'
#2	698.75'	5,073 cf	<b>50.00'W x 85.00'L x 3.00'H Soil Media and Gravel</b> 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	<b>50.00'W x 85.00'L x 0.25'H Mulch</b> 1,063 cf Overall x 50.0% Voids
#4	702.00'	8,500 cf	<b>50.00'W x 85.00'L x 2.00'H Ponding</b>
		14,171 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	<b>12.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	<b>10.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	701.50'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Secondary	703.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#6	Discarded	698.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.24 cfs @ 11.75 hrs HW=698.80' (Free Discharge)  
 ↳ **6=Exfiltration** (Exfiltration Controls 0.24 cfs)

**Primary OutFlow** Max=0.27 cfs @ 13.38 hrs HW=701.68' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Passes 0.27 cfs of 1.60 cfs potential flow)  
 ↳ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↳ **3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 3.72 fps)  
 ↳ **4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 1.45 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)  
 ↳ **5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

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**Summary for Pond RG31-33: Rain Gardens 31,32,33**

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 1.27 cfs @ 12.07 hrs, Volume= 3,950 cf  
 Outflow = 0.50 cfs @ 12.31 hrs, Volume= 3,934 cf, Atten= 61%, Lag= 14.0 min  
 Primary = 0.50 cfs @ 12.31 hrs, Volume= 3,934 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 730.84' @ 12.31 hrs Surf.Area= 720 sf Storage= 829 cf

Plug-Flow detention time= 18.5 min calculated for 3,934 cf (100% of inflow)  
 Center-of-Mass det. time= 16.0 min ( 821.1 - 805.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	731.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=0.50 cfs @ 12.31 hrs HW=730.83' TW=722.20' (Dynamic Tailwater)

- 1=Culvert (Passes 0.50 cfs of 4.33 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.50 cfs @ 7.61 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Pond RG34-39: Rain Gardens 34-39**

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 2.67 cfs @ 12.07 hrs, Volume= 8,319 cf  
 Outflow = 1.04 cfs @ 12.31 hrs, Volume= 8,285 cf, Atten= 61%, Lag= 13.9 min  
 Primary = 0.70 cfs @ 12.31 hrs, Volume= 5,523 cf  
 Secondary = 0.35 cfs @ 12.31 hrs, Volume= 2,762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 731.03' @ 12.31 hrs Surf.Area= 1,440 sf Storage= 1,769 cf

Plug-Flow detention time= 18.8 min calculated for 8,268 cf (99% of inflow)

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Center-of-Mass det. time= 16.3 min ( 821.4 - 805.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	<b>12.0" Round Pipe Storage x 6</b> Inside #2 L= 60.0'
#2	728.25'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	731.50'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#6	Device 2	728.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#8	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.69 cfs @ 12.31 hrs HW=731.02' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.69 cfs of 6.01 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 0.69 cfs @ 7.90 fps)  
 7=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.53 fps)

**Secondary OutFlow** Max=0.35 cfs @ 12.31 hrs HW=731.02' TW=722.20' (Dynamic Tailwater)

2=Culvert (Passes 0.35 cfs of 3.00 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.34 cfs @ 7.90 fps)  
 8=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.53 fps)

**Summary for Pond RG40: Rain Garden 40**

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,750 cf  
 Outflow = 0.42 cfs @ 12.16 hrs, Volume= 1,743 cf, Atten= 25%, Lag= 5.0 min  
 Primary = 0.42 cfs @ 12.16 hrs, Volume= 1,743 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Peak Elev= 732.52' @ 12.16 hrs Surf.Area= 240 sf Storage= 294 cf

Plug-Flow detention time= 16.2 min calculated for 1,740 cf (99% of inflow)

Center-of-Mass det. time= 13.9 min ( 819.0 - 805.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	729.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	<b>8.0" Round Culvert</b> L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.41 cfs @ 12.16 hrs HW=732.50' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.41 cfs of 1.82 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.17 cfs @ 7.86 fps)  
 4=Orifice/Grate (Orifice Controls 0.24 cfs @ 2.78 fps)

**Summary for Pond RG41: Rain Garden 41**

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.44 cfs @ 12.07 hrs, Volume= 1,382 cf  
 Outflow = 0.30 cfs @ 12.16 hrs, Volume= 1,331 cf, Atten= 32%, Lag= 5.3 min  
 Discarded = 0.04 cfs @ 12.15 hrs, Volume= 750 cf  
 Primary = 0.26 cfs @ 12.17 hrs, Volume= 581 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 731.51' @ 12.17 hrs Surf.Area= 720 sf Storage= 349 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 79.0 min ( 884.1 - 805.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	728.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert</b> L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.04 cfs @ 12.15 hrs HW=731.50' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.26 cfs @ 12.17 hrs HW=731.49' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.26 cfs of 0.83 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.19 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.92 fps)**Summary for Pond RG42: Rain Garden 42**

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.75 cfs @ 12.07 hrs, Volume= 2,336 cf  
 Outflow = 0.35 cfs @ 12.26 hrs, Volume= 2,230 cf, Atten= 54%, Lag= 10.9 min  
 Discarded = 0.04 cfs @ 12.25 hrs, Volume= 1,451 cf  
 Primary = 0.31 cfs @ 12.26 hrs, Volume= 779 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 731.25' @ 12.26 hrs Surf.Area= 960 sf Storage= 703 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 105.3 min ( 910.4 - 805.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	<b>18.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	<b>8.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	<b>8.00'W x 60.00'L x 0.25'H Mulch</b> 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>8.00'W x 60.00'L x 1.00'H Ponding</b>
		1,243 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 12.25 hrs HW=731.25' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)**Primary OutFlow** Max=0.30 cfs @ 12.26 hrs HW=731.25' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.30 cfs of 1.29 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.22 cfs @ 4.49 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.69 fps)**Summary for Pond RG43-48: Rain Garden 43-48**

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 2.35 cfs @ 12.07 hrs, Volume= 7,325 cf  
 Outflow = 1.44 cfs @ 12.18 hrs, Volume= 7,171 cf, Atten= 39%, Lag= 6.5 min  
 Discarded = 0.16 cfs @ 12.15 hrs, Volume= 4,407 cf  
 Primary = 1.07 cfs @ 12.18 hrs, Volume= 2,303 cf  
 Secondary = 0.21 cfs @ 12.18 hrs, Volume= 461 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.83' @ 12.18 hrs Surf.Area= 2,880 sf Storage= 1,958 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 93.9 min ( 899.0 - 805.1 )



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Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	<b>12.0" Round Pipe Storage</b> x 6 Inside #2 L= 60.0'
#2	729.75'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	732.75'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	733.00'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	731.75'	<b>6.0" Round Culvert X 5.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	<b>6.0" Horiz. Orifice/Grate X 5.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	<b>2.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#7	Device 3	731.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	732.50'	<b>3.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#9	Device 3	732.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.16 cfs @ 12.15 hrs HW=732.82' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.16 cfs)**Primary OutFlow** Max=1.05 cfs @ 12.18 hrs HW=732.83' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.05 cfs of 4.28 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **6=Orifice/Grate** (Orifice Controls 0.52 cfs @ 4.80 fps)↑ **8=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.16 fps)**Secondary OutFlow** Max=0.21 cfs @ 12.18 hrs HW=732.83' TW=722.21' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.21 cfs of 0.86 cfs potential flow)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)↑ **7=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.80 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.11 cfs @ 2.16 fps)**Summary for Pond RG49-50: Rain Gardens 49,50**

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth &gt; 2.20" for 2YearMass event

Inflow = 0.61 cfs @ 12.07 hrs, Volume= 1,912 cf

Outflow = 0.22 cfs @ 12.34 hrs, Volume= 1,912 cf, Atten= 63%, Lag= 16.0 min

Discarded = 0.03 cfs @ 11.25 hrs, Volume= 1,377 cf

Primary = 0.20 cfs @ 12.34 hrs, Volume= 535 cf

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 731.07' @ 12.34 hrs Surf.Area= 480 sf Storage= 597 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 116.1 min ( 921.2 - 805.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	<b>12.0" Round Pipe Storage x 2</b> Inside #2 L= 60.0'
#2	728.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	731.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 11.25 hrs HW=728.30' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.20 cfs @ 12.34 hrs HW=731.06' TW=722.19' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.20 cfs of 1.34 cfs potential flow)

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

↑ **4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 4.11 fps)

↑ **5=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.86 fps)

### Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 1.57" for 2YearMass event  
 Inflow = 1.19 cfs @ 12.08 hrs, Volume= 3,680 cf  
 Outflow = 0.50 cfs @ 12.31 hrs, Volume= 3,662 cf, Atten= 58%, Lag= 14.1 min  
 Primary = 0.50 cfs @ 12.31 hrs, Volume= 3,662 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 689.07' @ 12.32 hrs Surf.Area= 720 sf Storage= 752 cf

Plug-Flow detention time= 18.0 min calculated for 3,654 cf (99% of inflow)  
 Center-of-Mass det. time= 15.1 min ( 849.4 - 834.3 )

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Type III 24-hr 2YearMass Rainfall=3.24"

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Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.00'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	689.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=0.50 cfs @ 12.31 hrs HW=689.06' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.50 cfs of 4.07 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.47 cfs @ 7.19 fps)  
 4=Orifice/Grate (Orifice Controls 0.03 cfs @ 0.84 fps)

**Summary for Pond RG55: Rain Garden 55**

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.32 cfs @ 12.07 hrs, Volume= 1,001 cf  
 Outflow = 0.13 cfs @ 12.31 hrs, Volume= 996 cf, Atten= 61%, Lag= 14.2 min  
 Primary = 0.13 cfs @ 12.31 hrs, Volume= 996 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 687.25' @ 12.31 hrs Surf.Area= 240 sf Storage= 208 cf

Plug-Flow detention time= 18.9 min calculated for 996 cf (100% of inflow)  
 Center-of-Mass det. time= 15.9 min ( 821.1 - 805.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	685.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

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Type III 24-hr 2YearMass Rainfall=3.24"

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Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.12 cfs @ 12.31 hrs HW=687.25' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.12 cfs of 1.06 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.12 cfs @ 5.73 fps)  
 4=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Link AP2-P: AP2-P**

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 0.90" for 2YearMass event  
 Inflow = 7.91 cfs @ 12.20 hrs, Volume= 41,248 cf  
 Primary = 7.91 cfs @ 12.20 hrs, Volume= 41,248 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P2.1: To Wetland A (A56-A87)**

Runoff = 9.73 cfs @ 12.14 hrs, Volume= 35,011 cf, Depth&gt; 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	430	Total			

**Summary for Subcatchment P2.10: To RG4.1**

Runoff = 2.05 cfs @ 12.11 hrs, Volume= 6,701 cf, Depth&gt; 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 12,070	90	Residential Lots, 65% imp, HSG C
2,925	70	Woods, Good, HSG C
11,575	74	>75% Grass cover, Good, HSG C
26,570	81	Weighted Average
18,725		70.47% Pervious Area
7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.2	150	Total			

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**Summary for Subcatchment P2.11: Lots 48-50**

Runoff = 1.07 cfs @ 12.07 hrs, Volume= 3,403 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 10,410	90	Residential Lots, 65% imp, HSG C
3,644		35.00% Pervious Area
6,767		65.00% Impervious Area

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

**Summary for Subcatchment P2.12: Lot 54**

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,781 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 5,450	90	Residential Lots, 65% imp, HSG C
1,908		35.00% Pervious Area
3,543		65.00% Impervious Area

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

**Summary for Subcatchment P2.13: Lot 14**

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 2,186 cf, Depth&gt; 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

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

**Summary for Subcatchment P2.14: Lots 30-33**

Runoff = 2.20 cfs @ 12.07 hrs, Volume= 7,029 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 21,505	90	Residential Lots, 65% imp, HSG C
7,527		35.00% Pervious Area
13,978		65.00% Impervious Area

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

**Summary for Subcatchment P2.2: Lots 42-48**

Runoff = 4.08 cfs @ 12.07 hrs, Volume= 13,034 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 39,875	90	Residential Lots, 65% imp, HSG C
13,956		35.00% Pervious Area
25,919		65.00% Impervious Area

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

**Summary for Subcatchment P2.3: Lots 41-42**

Runoff = 1.30 cfs @ 12.07 hrs, Volume= 4,156 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area



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

**Summary for Subcatchment P2.4: Lots 40-41**

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 2,460 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

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

**Summary for Subcatchment P2.5: Lots 39-40**

Runoff = 0.98 cfs @ 12.07 hrs, Volume= 3,113 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

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

**Summary for Subcatchment P2.6: Lots 33-39**

Runoff = 4.64 cfs @ 12.07 hrs, Volume= 14,802 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 45,285	90	Residential Lots, 65% imp, HSG C
15,850		35.00% Pervious Area
29,435		65.00% Impervious Area

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Type III 24-hr 10YearMass Rainfall=5.05"

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

**Summary for Subcatchment P2.7: Upgradient Lots 35-39**

Runoff = 1.67 cfs @ 12.29 hrs, Volume= 7,827 cf, Depth&gt; 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

**Summary for Subcatchment P2.8: Upgradient Lots 30-35**

Runoff = 3.67 cfs @ 12.24 hrs, Volume= 15,826 cf, Depth&gt; 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P2.9: Lots 51-53**

Runoff = 2.36 cfs @ 12.08 hrs, Volume= 7,321 cf, Depth&gt; 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

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

**Summary for Reach SW2.1: Swale RG2.1**Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 4.39" for 10YearMass event  
Inflow = 4.88 cfs @ 12.13 hrs, Volume= 21,416 cf  
Outflow = 4.96 cfs @ 12.12 hrs, Volume= 21,412 cf, Atten= 0%, Lag= 0.0 minRouting by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Max. Velocity= 8.53 fps, Min. Travel Time= 0.2 min  
Avg. Velocity= 2.87 fps, Avg. Travel Time= 0.7 minPeak Storage= 69 cf @ 12.12 hrs  
Average Depth at Peak Storage= 0.34'  
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 2.0 ' ' Top Width= 5.00'  
Length= 120.0' Slope= 0.1500 ' '  
Inlet Invert= 722.00', Outlet Invert= 704.00'

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Pond IT-30/35: Interceptor Trench Lots 30-35**

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 2.15" for 10YearMass event  
 Inflow = 3.67 cfs @ 12.24 hrs, Volume= 15,826 cf  
 Outflow = 3.61 cfs @ 12.27 hrs, Volume= 15,743 cf, Atten= 2%, Lag= 2.0 min  
 Primary = 3.61 cfs @ 12.27 hrs, Volume= 15,743 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 733.01' @ 12.27 hrs Surf.Area= 1,470 sf Storage= 694 cf

Plug-Flow detention time= 8.3 min calculated for 15,743 cf (99% of inflow)  
 Center-of-Mass det. time= 5.2 min ( 857.3 - 852.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	<b>3.00'W x 490.00'L x 3.00'H Prismaoid</b> 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	<b>15.0" Round Culvert</b> L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=3.57 cfs @ 12.27 hrs HW=733.00' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 3.57 cfs @ 3.40 fps)

**Summary for Pond IT-35/39: Interceptor Trench Lots 35-39**

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 2.06" for 10YearMass event  
 Inflow = 1.67 cfs @ 12.29 hrs, Volume= 7,827 cf  
 Outflow = 1.61 cfs @ 12.35 hrs, Volume= 7,774 cf, Atten= 4%, Lag= 3.5 min  
 Primary = 1.61 cfs @ 12.35 hrs, Volume= 7,774 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 734.79' @ 12.35 hrs Surf.Area= 1,200 sf Storage= 461 cf

Plug-Flow detention time= 10.6 min calculated for 7,758 cf (99% of inflow)  
 Center-of-Mass det. time= 6.8 min ( 864.1 - 857.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	<b>3.00'W x 400.00'L x 3.00'H Prismaoid</b> 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	<b>10.0" Round Culvert</b> L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

**Primary OutFlow** Max=1.61 cfs @ 12.35 hrs HW=734.79' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 1.61 cfs @ 3.02 fps)

### Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 3.82" for 10YearMass event  
 Inflow = 0.69 cfs @ 12.07 hrs, Volume= 2,186 cf  
 Outflow = 0.50 cfs @ 12.15 hrs, Volume= 2,173 cf, Atten= 28%, Lag= 4.8 min  
 Primary = 0.50 cfs @ 12.15 hrs, Volume= 2,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 704.54' @ 12.15 hrs Surf.Area= 720 sf Storage= 312 cf

Plug-Flow detention time= 17.9 min calculated for 2,173 cf (99% of inflow)  
 Center-of-Mass det. time= 14.3 min ( 807.0 - 792.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	702.00'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	704.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	<b>6.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	703.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.50 cfs @ 12.15 hrs HW=704.54' TW=701.25' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.50 cfs of 0.83 cfs potential flow)  
 ↑ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↑ **3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.55 fps)  
 ↑ **4=Orifice/Grate** (Orifice Controls 0.33 cfs @ 3.80 fps)

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**Summary for Pond RG2.1: Rain Garden 2.1**

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 4.33" for 10YearMass event  
 Inflow = 5.37 cfs @ 12.13 hrs, Volume= 23,585 cf  
 Outflow = 1.44 cfs @ 12.72 hrs, Volume= 22,980 cf, Atten= 73%, Lag= 35.5 min  
 Discarded = 0.71 cfs @ 12.25 hrs, Volume= 16,567 cf  
 Primary = 0.72 cfs @ 12.72 hrs, Volume= 6,413 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 702.60' @ 12.72 hrs Surf.Area= 12,750 sf Storage= 8,209 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 104.4 min ( 908.7 - 804.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 85.0'
#2	698.75'	5,073 cf	<b>50.00'W x 85.00'L x 3.00'H Soil Media and Gravel</b> 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	<b>50.00'W x 85.00'L x 0.25'H Mulch</b> 1,063 cf Overall x 50.0% Voids
#4	702.00'	8,500 cf	<b>50.00'W x 85.00'L x 2.00'H Ponding</b>
		14,171 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	<b>12.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	<b>10.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	701.50'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Secondary	703.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#6	Discarded	698.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.71 cfs @ 12.25 hrs HW=702.03' (Free Discharge)  
 ↳ **6=Exfiltration** (Exfiltration Controls 0.71 cfs)

**Primary OutFlow** Max=0.72 cfs @ 12.72 hrs HW=702.60' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Passes 0.72 cfs of 3.96 cfs potential flow)  
 ↳ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↳ **3=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.92 fps)  
 ↳ **4=Orifice/Grate** (Orifice Controls 0.47 cfs @ 4.75 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)  
 ↳ **5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond RG31-33: Rain Gardens 31,32,33**

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 2.20 cfs @ 12.07 hrs, Volume= 7,029 cf  
 Outflow = 1.21 cfs @ 12.20 hrs, Volume= 7,008 cf, Atten= 45%, Lag= 7.7 min  
 Primary = 1.21 cfs @ 12.20 hrs, Volume= 7,008 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 731.88' @ 12.20 hrs Surf.Area= 2,160 sf Storage= 1,309 cf

Plug-Flow detention time= 17.0 min calculated for 6,993 cf (99% of inflow)  
 Center-of-Mass det. time= 15.1 min ( 804.2 - 789.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	731.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=1.21 cfs @ 12.20 hrs HW=731.88' TW=722.33' (Dynamic Tailwater)

- 1=Culvert (Passes 1.21 cfs of 5.21 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.59 cfs @ 9.06 fps)
- 4=Orifice/Grate (Orifice Controls 0.61 cfs @ 4.17 fps)

**Summary for Pond RG34-39: Rain Gardens 34-39**

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 4.64 cfs @ 12.07 hrs, Volume= 14,802 cf  
 Outflow = 2.51 cfs @ 12.20 hrs, Volume= 14,758 cf, Atten= 46%, Lag= 7.8 min  
 Primary = 1.67 cfs @ 12.20 hrs, Volume= 9,839 cf  
 Secondary = 0.84 cfs @ 12.20 hrs, Volume= 4,919 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 731.97' @ 12.20 hrs Surf.Area= 4,320 sf Storage= 2,759 cf

Plug-Flow detention time= 17.0 min calculated for 14,727 cf (99% of inflow)



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Center-of-Mass det. time= 15.1 min ( 804.2 - 789.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	<b>12.0" Round Pipe Storage x 6</b> Inside #2 L= 60.0'
#2	728.25'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	731.50'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#6	Device 2	728.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#8	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.67 cfs @ 12.20 hrs HW=731.97' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 1.67 cfs of 7.05 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 0.80 cfs @ 9.18 fps)  
 7=Orifice/Grate (Orifice Controls 0.87 cfs @ 4.43 fps)

**Secondary OutFlow** Max=0.84 cfs @ 12.20 hrs HW=731.97' TW=722.32' (Dynamic Tailwater)

2=Culvert (Passes 0.84 cfs of 3.52 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.40 cfs @ 9.18 fps)  
 8=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.43 fps)

**Summary for Pond RG40: Rain Garden 40**

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.98 cfs @ 12.07 hrs, Volume= 3,113 cf  
 Outflow = 0.67 cfs @ 12.16 hrs, Volume= 3,105 cf, Atten= 32%, Lag= 5.3 min  
 Primary = 0.67 cfs @ 12.16 hrs, Volume= 3,105 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Peak Elev= 733.40' @ 12.16 hrs Surf.Area= 720 sf Storage= 443 cf

Plug-Flow detention time= 14.5 min calculated for 3,105 cf (100% of inflow)

Center-of-Mass det. time= 12.8 min ( 801.9 - 789.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	729.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	<b>8.0" Round Culvert</b> L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.66 cfs @ 12.16 hrs HW=733.39' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.66 cfs of 2.02 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.08 fps)  
 4=Orifice/Grate (Orifice Controls 0.46 cfs @ 5.32 fps)

**Summary for Pond RG41: Rain Garden 41**

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.77 cfs @ 12.07 hrs, Volume= 2,460 cf  
 Outflow = 0.63 cfs @ 12.15 hrs, Volume= 2,307 cf, Atten= 19%, Lag= 4.7 min  
 Discarded = 0.04 cfs @ 12.00 hrs, Volume= 879 cf  
 Primary = 0.59 cfs @ 12.15 hrs, Volume= 1,428 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 732.12' @ 12.15 hrs Surf.Area= 720 sf Storage= 495 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 35.4 min ( 824.5 - 789.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	728.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert</b> L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.04 cfs @ 12.00 hrs HW=731.58' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.58 cfs @ 12.15 hrs HW=732.12' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.58 cfs of 1.06 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 0.21 cfs @ 1.12 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.43 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.80 fps)**Summary for Pond RG42: Rain Garden 42**

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 1.30 cfs @ 12.07 hrs, Volume= 4,156 cf  
 Outflow = 0.85 cfs @ 12.17 hrs, Volume= 3,849 cf, Atten= 34%, Lag= 5.8 min  
 Discarded = 0.08 cfs @ 12.05 hrs, Volume= 1,732 cf  
 Primary = 0.77 cfs @ 12.17 hrs, Volume= 2,117 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.11' @ 12.17 hrs Surf.Area= 1,440 sf Storage= 1,057 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 49.7 min ( 838.8 - 789.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	<b>18.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	<b>8.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	<b>8.00'W x 60.00'L x 0.25'H Mulch</b> 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>8.00'W x 60.00'L x 1.00'H Ponding</b>
		1,243 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.08 cfs @ 12.05 hrs HW=731.70' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)**Primary OutFlow** Max=0.74 cfs @ 12.17 hrs HW=732.09' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.74 cfs of 2.07 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 0.20 cfs @ 1.01 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.31 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.23 cfs @ 4.74 fps)**Summary for Pond RG43-48: Rain Garden 43-48**

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 4.08 cfs @ 12.07 hrs, Volume= 13,034 cf  
 Outflow = 2.57 cfs @ 12.17 hrs, Volume= 12,273 cf, Atten= 37%, Lag= 5.8 min  
 Discarded = 0.24 cfs @ 12.00 hrs, Volume= 5,189 cf  
 Primary = 1.94 cfs @ 12.17 hrs, Volume= 5,903 cf  
 Secondary = 0.39 cfs @ 12.17 hrs, Volume= 1,181 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 733.54' @ 12.17 hrs Surf.Area= 4,320 sf Storage= 2,856 cf

Plug-Flow detention time= 74.8 min calculated for 12,247 cf (94% of inflow)  
 Center-of-Mass det. time= 43.3 min ( 832.4 - 789.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	<b>12.0" Round Pipe Storage x 6</b> Inside #2 L= 60.0'
#2	729.75'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	732.75'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	733.00'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	731.75'	<b>6.0" Round Culvert X 5.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	<b>6.0" Horiz. Orifice/Grate X 5.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	<b>2.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#7	Device 3	731.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	732.50'	<b>3.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#9	Device 3	732.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.24 cfs @ 12.00 hrs HW=733.00' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.24 cfs)

**Primary OutFlow** Max=1.91 cfs @ 12.17 hrs HW=733.53' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 1.91 cfs of 5.84 cfs potential flow)

4=Orifice/Grate (Weir Controls 0.10 cfs @ 0.52 fps)

6=Orifice/Grate (Orifice Controls 0.68 cfs @ 6.26 fps)

8=Orifice/Grate (Orifice Controls 1.12 cfs @ 4.57 fps)

**Secondary OutFlow** Max=0.38 cfs @ 12.17 hrs HW=733.53' TW=722.33' (Dynamic Tailwater)

3=Culvert (Passes 0.38 cfs of 1.17 cfs potential flow)

5=Orifice/Grate (Weir Controls 0.02 cfs @ 0.52 fps)

7=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.26 fps)

9=Orifice/Grate (Orifice Controls 0.22 cfs @ 4.57 fps)

**Summary for Pond RG49-50: Rain Gardens 49,50**

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 1.07 cfs @ 12.07 hrs, Volume= 3,403 cf  
 Outflow = 0.70 cfs @ 12.17 hrs, Volume= 3,251 cf, Atten= 35%, Lag= 5.6 min  
 Discarded = 0.08 cfs @ 12.10 hrs, Volume= 1,644 cf  
 Primary = 0.62 cfs @ 12.17 hrs, Volume= 1,607 cf

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 731.73' @ 12.17 hrs Surf.Area= 1,440 sf Storage= 804 cf

Plug-Flow detention time= 87.6 min calculated for 3,251 cf (96% of inflow)  
 Center-of-Mass det. time= 62.3 min ( 851.4 - 789.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	<b>12.0" Round Pipe Storage x 2</b> Inside #2 L= 60.0'
#2	728.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	731.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Discarded OutFlow** Max=0.08 cfs @ 12.10 hrs HW=731.65' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

**Primary OutFlow** Max=0.61 cfs @ 12.17 hrs HW=731.72' TW=722.33' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.61 cfs of 2.09 cfs potential flow)

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

↑ **4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.68 fps)

↑ **5=Orifice/Grate** (Orifice Controls 0.37 cfs @ 3.72 fps)

### Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 3.12" for 10YearMass event  
 Inflow = 2.36 cfs @ 12.08 hrs, Volume= 7,321 cf  
 Outflow = 1.76 cfs @ 12.15 hrs, Volume= 7,297 cf, Atten= 25%, Lag= 4.5 min  
 Primary = 1.76 cfs @ 12.15 hrs, Volume= 7,297 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 690.07' @ 12.15 hrs Surf.Area= 2,160 sf Storage= 1,086 cf

Plug-Flow detention time= 14.9 min calculated for 7,297 cf (100% of inflow)  
 Center-of-Mass det. time= 12.9 min ( 827.4 - 814.5 )

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Type III 24-hr 10YearMass Rainfall=5.05"

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Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.00'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	689.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=1.76 cfs @ 12.15 hrs HW=690.06' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 1.76 cfs of 4.97 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.57 cfs @ 8.66 fps)  
 4=Orifice/Grate (Orifice Controls 1.19 cfs @ 4.56 fps)

**Summary for Pond RG55: Rain Garden 55**

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,781 cf  
 Outflow = 0.41 cfs @ 12.16 hrs, Volume= 1,775 cf, Atten= 27%, Lag= 5.5 min  
 Primary = 0.41 cfs @ 12.16 hrs, Volume= 1,775 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 688.48' @ 12.16 hrs Surf.Area= 240 sf Storage= 326 cf

Plug-Flow detention time= 18.2 min calculated for 1,771 cf (99% of inflow)  
 Center-of-Mass det. time= 15.9 min ( 805.0 - 789.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	685.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.39 cfs @ 12.16 hrs HW=688.45' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.39 cfs of 1.48 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.17 cfs @ 7.78 fps)  
 4=Orifice/Grate (Orifice Controls 0.22 cfs @ 2.54 fps)

**Summary for Link AP2-P: AP2-P**

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 2.10" for 10YearMass event  
 Inflow = 21.33 cfs @ 12.17 hrs, Volume= 96,405 cf  
 Primary = 21.33 cfs @ 12.17 hrs, Volume= 96,405 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P2.1: To Wetland A (A56-A87)**

Runoff = 14.02 cfs @ 12.14 hrs, Volume= 49,797 cf, Depth&gt; 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	430	Total			

**Summary for Subcatchment P2.10: To RG4.1**

Runoff = 2.72 cfs @ 12.10 hrs, Volume= 8,954 cf, Depth&gt; 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 12,070	90	Residential Lots, 65% imp, HSG C
2,925	70	Woods, Good, HSG C
11,575	74	>75% Grass cover, Good, HSG C
26,570	81	Weighted Average
18,725		70.47% Pervious Area
7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.2	150	Total			

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**Summary for Subcatchment P2.11: Lots 48-50**

Runoff = 1.35 cfs @ 12.07 hrs, Volume= 4,354 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 10,410	90	Residential Lots, 65% imp, HSG C
3,644		35.00% Pervious Area
6,767		65.00% Impervious Area

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

**Summary for Subcatchment P2.12: Lot 54**

Runoff = 0.70 cfs @ 12.07 hrs, Volume= 2,279 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 5,450	90	Residential Lots, 65% imp, HSG C
1,908		35.00% Pervious Area
3,543		65.00% Impervious Area

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

**Summary for Subcatchment P2.13: Lot 14**

Runoff = 0.87 cfs @ 12.07 hrs, Volume= 2,809 cf, Depth&gt; 4.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

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

**Summary for Subcatchment P2.14: Lots 30-33**

Runoff = 2.78 cfs @ 12.07 hrs, Volume= 8,994 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 21,505	90	Residential Lots, 65% imp, HSG C
7,527		35.00% Pervious Area
13,978		65.00% Impervious Area

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

**Summary for Subcatchment P2.2: Lots 42-48**

Runoff = 5.16 cfs @ 12.07 hrs, Volume= 16,676 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 39,875	90	Residential Lots, 65% imp, HSG C
13,956		35.00% Pervious Area
25,919		65.00% Impervious Area

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

**Summary for Subcatchment P2.3: Lots 41-42**

Runoff = 1.64 cfs @ 12.07 hrs, Volume= 5,318 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area

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

**Summary for Subcatchment P2.4: Lots 40-41**

Runoff = 0.97 cfs @ 12.07 hrs, Volume= 3,147 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

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

**Summary for Subcatchment P2.5: Lots 39-40**

Runoff = 1.23 cfs @ 12.07 hrs, Volume= 3,984 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

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

**Summary for Subcatchment P2.6: Lots 33-39**

Runoff = 5.86 cfs @ 12.07 hrs, Volume= 18,939 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 45,285	90	Residential Lots, 65% imp, HSG C
15,850		35.00% Pervious Area
29,435		65.00% Impervious Area

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

**Summary for Subcatchment P2.7: Upgradient Lots 35-39**

Runoff = 2.41 cfs @ 12.28 hrs, Volume= 11,134 cf, Depth&gt; 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

**Summary for Subcatchment P2.8: Upgradient Lots 30-35**

Runoff = 5.25 cfs @ 12.23 hrs, Volume= 22,370 cf, Depth&gt; 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

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**Summary for Subcatchment P2.9: Lots 51-53**

Runoff = 3.13 cfs @ 12.07 hrs, Volume= 9,733 cf, Depth&gt; 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

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

**Summary for Reach SW2.1: Swale RG2.1**

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 5.80" for 25YearMass event  
 Inflow = 7.81 cfs @ 12.14 hrs, Volume= 28,257 cf  
 Outflow = 7.83 cfs @ 12.14 hrs, Volume= 28,253 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 9.72 fps, Min. Travel Time= 0.2 min  
 Avg. Velocity= 3.10 fps, Avg. Travel Time= 0.6 min

Peak Storage= 97 cf @ 12.14 hrs  
 Average Depth at Peak Storage= 0.43'  
 Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding  
 Side Slope Z-value= 2.0 ' ' Top Width= 5.00'  
 Length= 120.0' Slope= 0.1500 ' '  
 Inlet Invert= 722.00', Outlet Invert= 704.00'



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**Summary for Pond IT-30/35: Interceptor Trench Lots 30-35**

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 3.03" for 25YearMass event  
 Inflow = 5.25 cfs @ 12.23 hrs, Volume= 22,370 cf  
 Outflow = 5.08 cfs @ 12.27 hrs, Volume= 22,274 cf, Atten= 3%, Lag= 2.7 min  
 Primary = 5.08 cfs @ 12.27 hrs, Volume= 22,274 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 733.36' @ 12.27 hrs Surf.Area= 1,470 sf Storage= 905 cf

Plug-Flow detention time= 7.2 min calculated for 22,228 cf (99% of inflow)  
 Center-of-Mass det. time= 4.7 min ( 846.7 - 842.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	<b>3.00'W x 490.00'L x 3.00'H Prismaoid</b> 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	<b>15.0" Round Culvert</b> L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 ' S= 0.0320 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=5.03 cfs @ 12.27 hrs HW=733.35' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 5.03 cfs @ 4.10 fps)

**Summary for Pond IT-35/39: Interceptor Trench Lots 35-39**

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 2.94" for 25YearMass event  
 Inflow = 2.41 cfs @ 12.28 hrs, Volume= 11,134 cf  
 Outflow = 2.26 cfs @ 12.36 hrs, Volume= 11,073 cf, Atten= 6%, Lag= 4.6 min  
 Primary = 2.26 cfs @ 12.36 hrs, Volume= 11,073 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 735.16' @ 12.36 hrs Surf.Area= 1,200 sf Storage= 640 cf

Plug-Flow detention time= 9.3 min calculated for 11,050 cf (99% of inflow)  
 Center-of-Mass det. time= 6.2 min ( 853.3 - 847.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	<b>3.00'W x 400.00'L x 3.00'H Prismaoid</b> 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	<b>10.0" Round Culvert</b> L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

**Primary OutFlow** Max=2.26 cfs @ 12.36 hrs HW=735.16' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 2.26 cfs @ 4.14 fps)

### Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 4.91" for 25YearMass event  
 Inflow = 0.87 cfs @ 12.07 hrs, Volume= 2,809 cf  
 Outflow = 0.56 cfs @ 12.16 hrs, Volume= 2,795 cf, Atten= 36%, Lag= 5.4 min  
 Primary = 0.56 cfs @ 12.16 hrs, Volume= 2,795 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 704.79' @ 12.17 hrs Surf.Area= 720 sf Storage= 395 cf

Plug-Flow detention time= 18.5 min calculated for 2,795 cf (100% of inflow)  
 Center-of-Mass det. time= 15.3 min ( 801.2 - 785.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	702.00'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	704.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	<b>6.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	703.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.56 cfs @ 12.16 hrs HW=704.78' TW=702.28' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.56 cfs of 0.87 cfs potential flow)  
 ↑ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↑ **3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.61 fps)  
 ↑ **4=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.47 fps)



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**Summary for Pond RG2.1: Rain Garden 2.1**

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 5.70" for 25YearMass event  
 Inflow = 8.39 cfs @ 12.14 hrs, Volume= 31,048 cf  
 Outflow = 3.19 cfs @ 12.54 hrs, Volume= 29,672 cf, Atten= 62%, Lag= 23.8 min  
 Discarded = 0.71 cfs @ 12.15 hrs, Volume= 18,673 cf  
 Primary = 2.47 cfs @ 12.54 hrs, Volume= 10,999 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 703.20' @ 12.54 hrs Surf.Area= 12,750 sf Storage= 10,787 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 85.7 min ( 883.4 - 797.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 85.0'
#2	698.75'	5,073 cf	<b>50.00'W x 85.00'L x 3.00'H Soil Media and Gravel</b> 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	<b>50.00'W x 85.00'L x 0.25'H Mulch</b> 1,063 cf Overall x 50.0% Voids
#4	702.00'	8,500 cf	<b>50.00'W x 85.00'L x 2.00'H Ponding</b>
		14,171 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	<b>12.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	<b>10.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	701.50'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Secondary	703.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#6	Discarded	698.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.71 cfs @ 12.15 hrs HW=702.22' (Free Discharge)  
 ↳ **6=Exfiltration** (Exfiltration Controls 0.71 cfs)

**Primary OutFlow** Max=2.45 cfs @ 12.54 hrs HW=703.20' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Passes 2.45 cfs of 4.93 cfs potential flow)  
 ↳ **2=Orifice/Grate** (Weir Controls 1.55 cfs @ 1.47 fps)  
 ↳ **3=Orifice/Grate** (Orifice Controls 0.31 cfs @ 7.01 fps)  
 ↳ **4=Orifice/Grate** (Orifice Controls 0.59 cfs @ 6.05 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)  
 ↳ **5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

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**Summary for Pond RG31-33: Rain Gardens 31,32,33**

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 2.78 cfs @ 12.07 hrs, Volume= 8,994 cf  
 Outflow = 2.30 cfs @ 12.15 hrs, Volume= 8,970 cf, Atten= 17%, Lag= 4.8 min  
 Primary = 2.30 cfs @ 12.15 hrs, Volume= 8,970 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.16' @ 12.15 hrs Surf.Area= 2,160 sf Storage= 1,512 cf

Plug-Flow detention time= 16.5 min calculated for 8,970 cf (100% of inflow)  
 Center-of-Mass det. time= 14.7 min ( 797.2 - 782.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	731.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=2.27 cfs @ 12.15 hrs HW=732.15' TW=722.43' (Dynamic Tailwater)

- 1=Culvert (Passes 2.27 cfs of 5.42 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.93 cfs @ 1.28 fps)
- 3=Orifice/Grate (Orifice Controls 0.62 cfs @ 9.41 fps)
- 4=Orifice/Grate (Orifice Controls 0.72 cfs @ 4.88 fps)

**Summary for Pond RG34-39: Rain Gardens 34-39**

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 5.86 cfs @ 12.07 hrs, Volume= 18,939 cf  
 Outflow = 4.91 cfs @ 12.14 hrs, Volume= 18,889 cf, Atten= 16%, Lag= 4.3 min  
 Primary = 3.27 cfs @ 12.14 hrs, Volume= 12,593 cf  
 Secondary = 1.64 cfs @ 12.14 hrs, Volume= 6,296 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.17' @ 12.14 hrs Surf.Area= 4,320 sf Storage= 3,047 cf

Plug-Flow detention time= 16.3 min calculated for 18,889 cf (100% of inflow)

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Center-of-Mass det. time= 14.6 min ( 797.1 - 782.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	<b>12.0" Round Pipe Storage x 6</b> Inside #2 L= 60.0'
#2	728.25'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	731.50'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#6	Device 2	728.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#8	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=3.19 cfs @ 12.14 hrs HW=732.17' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 3.19 cfs of 7.24 cfs potential flow)  
 3=Orifice/Grate (Weir Controls 1.40 cfs @ 1.34 fps)  
 5=Orifice/Grate (Orifice Controls 0.82 cfs @ 9.43 fps)  
 7=Orifice/Grate (Orifice Controls 0.96 cfs @ 4.91 fps)

**Secondary OutFlow** Max=1.59 cfs @ 12.14 hrs HW=732.17' TW=722.43' (Dynamic Tailwater)

2=Culvert (Passes 1.59 cfs of 3.62 cfs potential flow)  
 4=Orifice/Grate (Weir Controls 0.70 cfs @ 1.34 fps)  
 6=Orifice/Grate (Orifice Controls 0.41 cfs @ 9.43 fps)  
 8=Orifice/Grate (Orifice Controls 0.48 cfs @ 4.91 fps)

**Summary for Pond RG40: Rain Garden 40**

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 1.23 cfs @ 12.07 hrs, Volume= 3,984 cf  
 Outflow = 1.03 cfs @ 12.14 hrs, Volume= 3,974 cf, Atten= 16%, Lag= 4.2 min  
 Primary = 1.03 cfs @ 12.14 hrs, Volume= 3,974 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Peak Elev= 733.66' @ 12.14 hrs Surf.Area= 720 sf Storage= 504 cf

Plug-Flow detention time= 14.2 min calculated for 3,966 cf (100% of inflow)

Center-of-Mass det. time= 12.6 min ( 795.1 - 782.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	729.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	<b>8.0" Round Culvert</b> L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.00 cfs @ 12.14 hrs HW=733.64' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 1.00 cfs of 2.08 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.28 cfs @ 1.24 fps)
- 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.40 fps)
- 4=Orifice/Grate (Orifice Controls 0.51 cfs @ 5.85 fps)

**Summary for Pond RG41: Rain Garden 41**

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 0.97 cfs @ 12.07 hrs, Volume= 3,147 cf  
 Outflow = 0.94 cfs @ 12.12 hrs, Volume= 2,955 cf, Atten= 4%, Lag= 2.8 min  
 Discarded = 0.04 cfs @ 11.90 hrs, Volume= 937 cf  
 Primary = 0.89 cfs @ 12.12 hrs, Volume= 2,018 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 732.25' @ 12.11 hrs Surf.Area= 720 sf Storage= 527 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 25.2 min ( 807.7 - 782.5 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	728.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert</b> L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.04 cfs @ 11.90 hrs HW=731.52' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.84 cfs @ 12.12 hrs HW=732.22' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.84 cfs of 1.10 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 0.45 cfs @ 2.28 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.62 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.05 fps)**Summary for Pond RG42: Rain Garden 42**

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 1.64 cfs @ 12.07 hrs, Volume= 5,318 cf  
 Outflow = 1.50 cfs @ 12.12 hrs, Volume= 4,922 cf, Atten= 9%, Lag= 3.0 min  
 Discarded = 0.08 cfs @ 11.95 hrs, Volume= 1,850 cf  
 Primary = 1.42 cfs @ 12.12 hrs, Volume= 3,072 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.25' @ 12.12 hrs Surf.Area= 1,440 sf Storage= 1,125 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 35.2 min ( 817.7 - 782.5 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	<b>18.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	<b>8.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	<b>8.00'W x 60.00'L x 0.25'H Mulch</b> 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>8.00'W x 60.00'L x 1.00'H Ponding</b>
		1,243 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.08 cfs @ 11.95 hrs HW=731.57' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)**Primary OutFlow** Max=1.31 cfs @ 12.12 hrs HW=732.23' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.31 cfs of 2.15 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 0.74 cfs @ 1.56 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.55 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.06 fps)**Summary for Pond RG43-48: Rain Garden 43-48**

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 5.16 cfs @ 12.07 hrs, Volume= 16,676 cf  
 Outflow = 4.37 cfs @ 12.13 hrs, Volume= 15,653 cf, Atten= 15%, Lag= 3.4 min  
 Discarded = 0.24 cfs @ 11.95 hrs, Volume= 5,515 cf  
 Primary = 3.44 cfs @ 12.13 hrs, Volume= 8,448 cf  
 Secondary = 0.69 cfs @ 12.13 hrs, Volume= 1,690 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 733.65' @ 12.13 hrs Surf.Area= 4,320 sf Storage= 3,019 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 30.4 min ( 812.9 - 782.5 )

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Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	<b>12.0" Round Pipe Storage</b> x 6 Inside #2 L= 60.0'
#2	729.75'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	732.75'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	733.00'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	731.75'	<b>6.0" Round Culvert X 5.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	<b>6.0" Horiz. Orifice/Grate X 5.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	<b>2.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#7	Device 3	731.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	732.50'	<b>3.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#9	Device 3	732.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.24 cfs @ 11.95 hrs HW=733.03' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs)**Primary OutFlow** Max=3.32 cfs @ 12.13 hrs HW=733.64' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 3.32 cfs of 6.06 cfs potential flow)↑ **4=Orifice/Grate** (Weir Controls 1.42 cfs @ 1.24 fps)↑ **6=Orifice/Grate** (Orifice Controls 0.71 cfs @ 6.48 fps)↑ **8=Orifice/Grate** (Orifice Controls 1.19 cfs @ 4.86 fps)**Secondary OutFlow** Max=0.66 cfs @ 12.13 hrs HW=733.64' TW=722.42' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.66 cfs of 1.21 cfs potential flow)↑ **5=Orifice/Grate** (Weir Controls 0.28 cfs @ 1.24 fps)↑ **7=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.48 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.86 fps)**Summary for Pond RG49-50: Rain Gardens 49,50**

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 1.35 cfs @ 12.07 hrs, Volume= 4,354 cf  
 Outflow = 0.84 cfs @ 12.17 hrs, Volume= 4,113 cf, Atten= 38%, Lag= 5.8 min  
 Discarded = 0.08 cfs @ 12.00 hrs, Volume= 1,765 cf  
 Primary = 0.76 cfs @ 12.17 hrs, Volume= 2,348 cf

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.03' @ 12.17 hrs Surf.Area= 1,440 sf Storage= 949 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 44.8 min ( 827.3 - 782.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	<b>12.0" Round Pipe Storage x 2</b> Inside #2 L= 60.0'
#2	728.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	731.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Discarded OutFlow** Max=0.08 cfs @ 12.00 hrs HW=731.51' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

**Primary OutFlow** Max=0.75 cfs @ 12.17 hrs HW=732.02' TW=722.41' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.75 cfs of 2.33 cfs potential flow)

↑ **3=Orifice/Grate** (Weir Controls 0.03 cfs @ 0.46 fps)

↑ **4=Orifice/Grate** (Orifice Controls 0.27 cfs @ 6.25 fps)

↑ **5=Orifice/Grate** (Orifice Controls 0.45 cfs @ 4.55 fps)

### Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 4.15" for 25YearMass event  
 Inflow = 3.13 cfs @ 12.07 hrs, Volume= 9,733 cf  
 Outflow = 2.09 cfs @ 12.16 hrs, Volume= 9,705 cf, Atten= 33%, Lag= 5.3 min  
 Primary = 2.09 cfs @ 12.16 hrs, Volume= 9,705 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 690.52' @ 12.17 hrs Surf.Area= 2,160 sf Storage= 1,413 cf

Plug-Flow detention time= 14.5 min calculated for 9,685 cf (100% of inflow)  
 Center-of-Mass det. time= 12.8 min ( 819.2 - 806.5 )



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Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.00'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	689.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=2.06 cfs @ 12.16 hrs HW=690.50' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 2.06 cfs of 5.31 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.00 cfs @ 0.16 fps)
- 3=Orifice/Grate (Orifice Controls 0.60 cfs @ 9.22 fps)
- 4=Orifice/Grate (Orifice Controls 1.46 cfs @ 5.56 fps)

### Summary for Pond RG55: Rain Garden 55

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 0.70 cfs @ 12.07 hrs, Volume= 2,279 cf  
 Outflow = 0.54 cfs @ 12.14 hrs, Volume= 2,272 cf, Atten= 24%, Lag= 4.3 min  
 Primary = 0.54 cfs @ 12.14 hrs, Volume= 2,272 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 688.88' @ 12.14 hrs Surf.Area= 480 sf Storage= 367 cf

Plug-Flow detention time= 16.9 min calculated for 2,267 cf (99% of inflow)  
 Center-of-Mass det. time= 14.9 min ( 797.4 - 782.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	685.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.53 cfs @ 12.14 hrs HW=688.86' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.53 cfs of 1.60 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.38 fps)  
 4=Orifice/Grate (Orifice Controls 0.35 cfs @ 4.02 fps)

**Summary for Link AP2-P: AP2-P**

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 2.97" for 25YearMass event  
 Inflow = 32.24 cfs @ 12.15 hrs, Volume= 136,226 cf  
 Primary = 32.24 cfs @ 12.15 hrs, Volume= 136,226 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment P2.1: To Wetland A (A56-A87)**

Runoff = 21.04 cfs @ 12.14 hrs, Volume= 74,387 cf, Depth&gt; 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	430	Total			

**Summary for Subcatchment P2.10: To RG4.1**

Runoff = 3.77 cfs @ 12.10 hrs, Volume= 12,556 cf, Depth&gt; 5.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
* 12,070	90	Residential Lots, 65% imp, HSG C
2,925	70	Woods, Good, HSG C
11,575	74	>75% Grass cover, Good, HSG C
26,570	81	Weighted Average
18,725		70.47% Pervious Area
7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.2	150	Total			

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**Summary for Subcatchment P2.11: Lots 48-50**

Runoff = 1.78 cfs @ 12.07 hrs, Volume= 5,841 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
* 10,410	90	Residential Lots, 65% imp, HSG C
3,644		35.00% Pervious Area
6,767		65.00% Impervious Area

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

**Summary for Subcatchment P2.12: Lot 54**

Runoff = 0.93 cfs @ 12.07 hrs, Volume= 3,058 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
* 5,450	90	Residential Lots, 65% imp, HSG C
1,908		35.00% Pervious Area
3,543		65.00% Impervious Area

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

**Summary for Subcatchment P2.13: Lot 14**

Runoff = 1.16 cfs @ 12.07 hrs, Volume= 3,787 cf, Depth&gt; 6.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

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

**Summary for Subcatchment P2.14: Lots 30-33**

Runoff = 3.67 cfs @ 12.07 hrs, Volume= 12,066 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	21,505	90	Residential Lots, 65% imp, HSG C
	7,527		35.00% Pervious Area
	13,978		65.00% Impervious Area

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

**Summary for Subcatchment P2.2: Lots 42-48**

Runoff = 6.81 cfs @ 12.07 hrs, Volume= 22,374 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	39,875	90	Residential Lots, 65% imp, HSG C
	13,956		35.00% Pervious Area
	25,919		65.00% Impervious Area

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

**Summary for Subcatchment P2.3: Lots 41-42**

Runoff = 2.17 cfs @ 12.07 hrs, Volume= 7,134 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
	12,715	90	1/8 acre lots, 65% imp, HSG C
	4,450		35.00% Pervious Area
	8,265		65.00% Impervious Area

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

**Summary for Subcatchment P2.4: Lots 40-41**

Runoff = 1.28 cfs @ 12.07 hrs, Volume= 4,222 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

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

**Summary for Subcatchment P2.5: Lots 39-40**

Runoff = 1.63 cfs @ 12.07 hrs, Volume= 5,344 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

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

**Summary for Subcatchment P2.6: Lots 33-39**

Runoff = 7.73 cfs @ 12.07 hrs, Volume= 25,409 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
* 45,285	90	Residential Lots, 65% imp, HSG C
15,850		35.00% Pervious Area
29,435		65.00% Impervious Area

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

**Summary for Subcatchment P2.7: Upgradient Lots 35-39**

Runoff = 3.63 cfs @ 12.28 hrs, Volume= 16,636 cf, Depth&gt; 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

**Summary for Subcatchment P2.8: Upgradient Lots 30-35**

Runoff = 7.86 cfs @ 12.22 hrs, Volume= 33,209 cf, Depth&gt; 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

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**Summary for Subcatchment P2.9: Lots 51-53**

Runoff = 4.31 cfs @ 12.07 hrs, Volume= 13,577 cf, Depth&gt; 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

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

**Summary for Reach SW2.1: Swale RG2.1**

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 8.04" for 100YearMass event  
 Inflow = 11.68 cfs @ 12.12 hrs, Volume= 39,167 cf  
 Outflow = 11.70 cfs @ 12.12 hrs, Volume= 39,162 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 10.77 fps, Min. Travel Time= 0.2 min  
 Avg. Velocity= 3.41 fps, Avg. Travel Time= 0.6 min

Peak Storage= 130 cf @ 12.12 hrs  
 Average Depth at Peak Storage= 0.53'  
 Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding  
 Side Slope Z-value= 2.0 ' ' Top Width= 5.00'  
 Length= 120.0' Slope= 0.1500 ' '  
 Inlet Invert= 722.00', Outlet Invert= 704.00'





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**Summary for Pond IT-30/35: Interceptor Trench Lots 30-35**

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 4.50" for 100YearMass event  
 Inflow = 7.86 cfs @ 12.22 hrs, Volume= 33,209 cf  
 Outflow = 7.38 cfs @ 12.29 hrs, Volume= 33,096 cf, Atten= 6%, Lag= 3.7 min  
 Primary = 7.38 cfs @ 12.29 hrs, Volume= 33,096 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 734.18' @ 12.29 hrs Surf.Area= 1,470 sf Storage= 1,387 cf

Plug-Flow detention time= 6.2 min calculated for 33,027 cf (99% of inflow)  
 Center-of-Mass det. time= 4.2 min ( 835.0 - 830.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	<b>3.00'W x 490.00'L x 3.00'H Prismaoid</b> 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	<b>15.0" Round Culvert</b> L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 ' S= 0.0320 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=7.34 cfs @ 12.29 hrs HW=734.17' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 7.34 cfs @ 5.98 fps)

**Summary for Pond IT-35/39: Interceptor Trench Lots 35-39**

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 4.39" for 100YearMass event  
 Inflow = 3.63 cfs @ 12.28 hrs, Volume= 16,636 cf  
 Outflow = 3.10 cfs @ 12.40 hrs, Volume= 16,563 cf, Atten= 14%, Lag= 7.5 min  
 Primary = 3.10 cfs @ 12.40 hrs, Volume= 16,563 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 736.20' @ 12.40 hrs Surf.Area= 1,200 sf Storage= 1,139 cf

Plug-Flow detention time= 8.5 min calculated for 16,529 cf (99% of inflow)  
 Center-of-Mass det. time= 5.9 min ( 841.7 - 835.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	<b>3.00'W x 400.00'L x 3.00'H Prismaoid</b> 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	<b>10.0" Round Culvert</b> L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

**Primary OutFlow** Max=3.10 cfs @ 12.40 hrs HW=736.20' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 3.10 cfs @ 5.69 fps)

### Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 6.61" for 100YearMass event  
 Inflow = 1.16 cfs @ 12.07 hrs, Volume= 3,787 cf  
 Outflow = 0.90 cfs @ 12.16 hrs, Volume= 3,771 cf, Atten= 23%, Lag= 5.0 min  
 Primary = 0.90 cfs @ 12.16 hrs, Volume= 3,771 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 705.17' @ 12.16 hrs Surf.Area= 720 sf Storage= 507 cf

Plug-Flow detention time= 17.5 min calculated for 3,763 cf (99% of inflow)  
 Center-of-Mass det. time= 14.9 min ( 792.9 - 778.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	702.00'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	704.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	<b>6.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	703.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.81 cfs @ 12.16 hrs HW=705.16' TW=703.22' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 0.81 cfs @ 4.11 fps)  
 ↑**2=Orifice/Grate** (Passes < 0.33 cfs potential flow)  
 ↑**3=Orifice/Grate** (Passes < 0.15 cfs potential flow)  
 ↑**4=Orifice/Grate** (Passes < 0.47 cfs potential flow)

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**Summary for Pond RG2.1: Rain Garden 2.1**

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 7.88" for 100YearMass event  
 Inflow = 12.42 cfs @ 12.12 hrs, Volume= 42,934 cf  
 Outflow = 5.83 cfs @ 12.32 hrs, Volume= 40,599 cf, Atten= 53%, Lag= 12.0 min  
 Discarded = 0.71 cfs @ 12.00 hrs, Volume= 20,610 cf  
 Primary = 5.11 cfs @ 12.32 hrs, Volume= 19,988 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 703.61' @ 12.32 hrs Surf.Area= 12,750 sf Storage= 12,527 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 62.4 min ( 852.5 - 790.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 85.0'
#2	698.75'	5,073 cf	<b>50.00'W x 85.00'L x 3.00'H Soil Media and Gravel</b> 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	<b>50.00'W x 85.00'L x 0.25'H Mulch</b> 1,063 cf Overall x 50.0% Voids
#4	702.00'	8,500 cf	<b>50.00'W x 85.00'L x 2.00'H Ponding</b>
		14,171 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	<b>12.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	<b>10.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	701.50'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Secondary	703.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#6	Discarded	698.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.71 cfs @ 12.00 hrs HW=702.14' (Free Discharge)  
 ↳ **6=Exfiltration** (Exfiltration Controls 0.71 cfs)

**Primary OutFlow** Max=5.10 cfs @ 12.32 hrs HW=703.61' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Passes 5.10 cfs of 5.49 cfs potential flow)  
 ↳ **2=Orifice/Grate** (Orifice Controls 4.10 cfs @ 3.76 fps)  
 ↳ **3=Orifice/Grate** (Orifice Controls 0.33 cfs @ 7.65 fps)  
 ↳ **4=Orifice/Grate** (Orifice Controls 0.67 cfs @ 6.78 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)  
 ↳ **5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

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**Summary for Pond RG31-33: Rain Gardens 31,32,33**

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 3.67 cfs @ 12.07 hrs, Volume= 12,066 cf  
 Outflow = 3.22 cfs @ 12.12 hrs, Volume= 12,038 cf, Atten= 12%, Lag= 3.0 min  
 Primary = 3.22 cfs @ 12.12 hrs, Volume= 12,038 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.38' @ 12.12 hrs Surf.Area= 2,160 sf Storage= 1,674 cf

Plug-Flow detention time= 15.7 min calculated for 12,038 cf (100% of inflow)  
 Center-of-Mass det. time= 14.1 min ( 789.0 - 774.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	731.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=3.10 cfs @ 12.12 hrs HW=732.35' TW=722.52' (Dynamic Tailwater)

- 1=Culvert (Passes 3.10 cfs of 5.57 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.69 cfs @ 2.86 fps)
- 3=Orifice/Grate (Orifice Controls 0.63 cfs @ 9.65 fps)
- 4=Orifice/Grate (Orifice Controls 0.79 cfs @ 5.34 fps)

**Summary for Pond RG34-39: Rain Gardens 34-39**

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 7.73 cfs @ 12.07 hrs, Volume= 25,409 cf  
 Outflow = 6.60 cfs @ 12.12 hrs, Volume= 25,351 cf, Atten= 15%, Lag= 3.1 min  
 Primary = 4.40 cfs @ 12.12 hrs, Volume= 16,901 cf  
 Secondary = 2.20 cfs @ 12.12 hrs, Volume= 8,450 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.42' @ 12.12 hrs Surf.Area= 4,320 sf Storage= 3,409 cf

Plug-Flow detention time= 15.6 min calculated for 25,351 cf (100% of inflow)

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Center-of-Mass det. time= 14.1 min ( 789.0 - 774.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	<b>12.0" Round Pipe Storage x 6</b> Inside #2 L= 60.0'
#2	728.25'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	731.50'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#6	Device 2	728.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	731.00'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#8	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=4.31 cfs @ 12.12 hrs HW=732.40' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 4.31 cfs of 7.47 cfs potential flow)  
 3=Orifice/Grate (Orifice Controls 2.39 cfs @ 3.04 fps)  
 5=Orifice/Grate (Orifice Controls 0.85 cfs @ 9.71 fps)  
 7=Orifice/Grate (Orifice Controls 1.07 cfs @ 5.44 fps)

**Secondary OutFlow** Max=2.15 cfs @ 12.12 hrs HW=732.40' TW=722.52' (Dynamic Tailwater)

2=Culvert (Passes 2.15 cfs of 3.73 cfs potential flow)  
 4=Orifice/Grate (Orifice Controls 1.20 cfs @ 3.04 fps)  
 6=Orifice/Grate (Orifice Controls 0.42 cfs @ 9.71 fps)  
 8=Orifice/Grate (Orifice Controls 0.53 cfs @ 5.44 fps)

**Summary for Pond RG40: Rain Garden 40**

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.63 cfs @ 12.07 hrs, Volume= 5,344 cf  
 Outflow = 1.41 cfs @ 12.12 hrs, Volume= 5,333 cf, Atten= 13%, Lag= 3.0 min  
 Primary = 1.41 cfs @ 12.12 hrs, Volume= 5,333 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Peak Elev= 733.94' @ 12.12 hrs Surf.Area= 720 sf Storage= 573 cf

Plug-Flow detention time= 13.8 min calculated for 5,322 cf (100% of inflow)

Center-of-Mass det. time= 12.5 min ( 787.4 - 774.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	729.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	<b>8.0" Round Culvert</b> L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.37 cfs @ 12.12 hrs HW=733.91' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 1.37 cfs of 2.13 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.60 cfs @ 3.08 fps)  
 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.72 fps)  
 4=Orifice/Grate (Orifice Controls 0.55 cfs @ 6.36 fps)

**Summary for Pond RG41: Rain Garden 41**

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.28 cfs @ 12.07 hrs, Volume= 4,222 cf  
 Outflow = 1.12 cfs @ 12.12 hrs, Volume= 4,004 cf, Atten= 13%, Lag= 2.7 min  
 Discarded = 0.04 cfs @ 11.80 hrs, Volume= 1,006 cf  
 Primary = 1.08 cfs @ 12.12 hrs, Volume= 2,998 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 732.47' @ 12.12 hrs Surf.Area= 720 sf Storage= 579 cf

Plug-Flow detention time= 48.6 min calculated for 4,004 cf (95% of inflow)

Center-of-Mass det. time= 19.5 min ( 794.4 - 774.9 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	728.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert</b> L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.04 cfs @ 11.80 hrs HW=731.51' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.06 cfs @ 12.12 hrs HW=732.45' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.06 cfs of 1.17 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 0.63 cfs @ 3.23 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.15 cfs @ 7.01 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.54 fps)**Summary for Pond RG42: Rain Garden 42**

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 2.17 cfs @ 12.07 hrs, Volume= 7,134 cf  
 Outflow = 1.84 cfs @ 12.12 hrs, Volume= 6,655 cf, Atten= 15%, Lag= 3.0 min  
 Discarded = 0.08 cfs @ 11.85 hrs, Volume= 1,989 cf  
 Primary = 1.76 cfs @ 12.12 hrs, Volume= 4,666 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.46' @ 12.12 hrs Surf.Area= 1,440 sf Storage= 1,226 cf

Plug-Flow detention time= 61.0 min calculated for 6,655 cf (93% of inflow)  
 Center-of-Mass det. time= 24.9 min ( 799.7 - 774.9 )

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Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	<b>18.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	<b>8.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	<b>8.00'W x 60.00'L x 0.25'H Mulch</b> 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>8.00'W x 60.00'L x 1.00'H Ponding</b>
		1,243 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.08 cfs @ 11.85 hrs HW=731.59' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)**Primary OutFlow** Max=1.73 cfs @ 12.12 hrs HW=732.45' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.73 cfs of 2.29 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 1.12 cfs @ 3.21 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.93 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.53 fps)**Summary for Pond RG43-48: Rain Garden 43-48**

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
Inflow = 6.81 cfs @ 12.07 hrs, Volume= 22,374 cf  
Outflow = 5.98 cfs @ 12.12 hrs, Volume= 21,123 cf, Atten= 12%, Lag= 2.7 min  
Discarded = 0.24 cfs @ 11.85 hrs, Volume= 5,929 cf  
Primary = 4.78 cfs @ 12.12 hrs, Volume= 12,662 cf  
Secondary = 0.96 cfs @ 12.12 hrs, Volume= 2,532 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Peak Elev= 733.83' @ 12.12 hrs Surf.Area= 4,320 sf Storage= 3,279 cf

Plug-Flow detention time= 52.2 min calculated for 21,079 cf (94% of inflow)  
Center-of-Mass det. time= 21.6 min ( 796.4 - 774.9 )



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Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	<b>12.0" Round Pipe Storage x 6</b> Inside #2 L= 60.0'
#2	729.75'	1,615 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	732.75'	180 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 6 360 cf Overall x 50.0% Voids
#4	733.00'	1,440 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 6
		3,518 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	731.75'	<b>6.0" Round Culvert X 5.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	<b>6.0" Horiz. Orifice/Grate X 5.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	<b>2.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#7	Device 3	731.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	732.50'	<b>3.0" Vert. Orifice/Grate X 5.00</b> C= 0.600
#9	Device 3	732.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.24 cfs @ 11.85 hrs HW=733.03' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs)**Primary OutFlow** Max=4.69 cfs @ 12.12 hrs HW=733.82' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 4.69 cfs of 6.37 cfs potential flow)↑ **4=Orifice/Grate** (Orifice Controls 2.66 cfs @ 2.71 fps)↑ **6=Orifice/Grate** (Orifice Controls 0.74 cfs @ 6.78 fps)↑ **8=Orifice/Grate** (Orifice Controls 1.29 cfs @ 5.26 fps)**Secondary OutFlow** Max=0.94 cfs @ 12.12 hrs HW=733.82' TW=722.52' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.94 cfs of 1.27 cfs potential flow)↑ **5=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.71 fps)↑ **7=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.78 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.26 fps)**Summary for Pond RG49-50: Rain Gardens 49,50**

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.78 cfs @ 12.07 hrs, Volume= 5,841 cf  
 Outflow = 1.64 cfs @ 12.12 hrs, Volume= 5,494 cf, Atten= 7%, Lag= 2.8 min  
 Discarded = 0.08 cfs @ 11.95 hrs, Volume= 1,904 cf  
 Primary = 1.56 cfs @ 12.12 hrs, Volume= 3,590 cf

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 732.19' @ 12.12 hrs Surf.Area= 1,440 sf Storage= 1,024 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 29.6 min ( 804.5 - 774.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	<b>12.0" Round Pipe Storage x 2</b> Inside #2 L= 60.0'
#2	728.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	731.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	731.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	730.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	731.00'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Discarded OutFlow** Max=0.08 cfs @ 11.95 hrs HW=731.55' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

**Primary OutFlow** Max=1.46 cfs @ 12.12 hrs HW=732.17' TW=722.52' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 1.46 cfs of 2.44 cfs potential flow)

↑ **3=Orifice/Grate** (Weir Controls 0.69 cfs @ 1.33 fps)

↑ **4=Orifice/Grate** (Orifice Controls 0.28 cfs @ 6.52 fps)

↑ **5=Orifice/Grate** (Orifice Controls 0.48 cfs @ 4.91 fps)

### Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 5.79" for 100YearMass event  
 Inflow = 4.31 cfs @ 12.07 hrs, Volume= 13,577 cf  
 Outflow = 3.99 cfs @ 12.12 hrs, Volume= 13,545 cf, Atten= 8%, Lag= 2.9 min  
 Primary = 3.99 cfs @ 12.12 hrs, Volume= 13,545 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 690.83' @ 12.12 hrs Surf.Area= 2,160 sf Storage= 1,638 cf

Plug-Flow detention time= 14.0 min calculated for 13,545 cf (100% of inflow)  
 Center-of-Mass det. time= 12.5 min ( 809.6 - 797.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.00'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 1	689.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Primary OutFlow** Max=3.76 cfs @ 12.12 hrs HW=690.79' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 3.76 cfs of 5.52 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.53 cfs @ 2.59 fps)  
 3=Orifice/Grate (Orifice Controls 0.63 cfs @ 9.58 fps)  
 4=Orifice/Grate (Orifice Controls 1.61 cfs @ 6.13 fps)

### Summary for Pond RG55: Rain Garden 55

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 0.93 cfs @ 12.07 hrs, Volume= 3,058 cf  
 Outflow = 0.65 cfs @ 12.16 hrs, Volume= 3,050 cf, Atten= 30%, Lag= 5.1 min  
 Primary = 0.65 cfs @ 12.16 hrs, Volume= 3,050 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 689.32' @ 12.16 hrs Surf.Area= 720 sf Storage= 458 cf

Plug-Flow detention time= 16.1 min calculated for 3,050 cf (100% of inflow)  
 Center-of-Mass det. time= 14.4 min ( 789.3 - 774.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	685.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.64 cfs @ 12.16 hrs HW=689.31' TW=0.00' (Dynamic Tailwater)

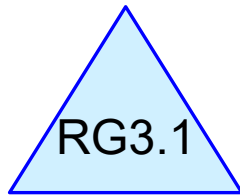
1=Culvert (Passes 0.64 cfs of 1.72 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 8.98 fps)  
 4=Orifice/Grate (Orifice Controls 0.45 cfs @ 5.14 fps)

**Summary for Link AP2-P: AP2-P**

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 4.43" for 100YearMass event  
 Inflow = 48.30 cfs @ 12.16 hrs, Volume= 203,190 cf  
 Primary = 48.30 cfs @ 12.16 hrs, Volume= 203,190 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

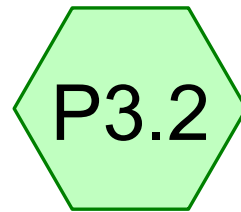




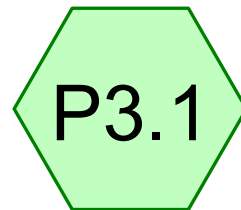
Rain Garden 3.1



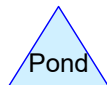
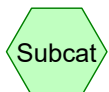
AP3 - To Wetland A  
(A47-A56) / VP A2



Lots 55-57



Undetained To Wetland  
A (A47-A56) / VP A2



**Routing Diagram for AP3**

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2**

Runoff = 0.32 cfs @ 12.30 hrs, Volume= 2,302 cf, Depth&gt; 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
61,120	55	Woods, Good, HSG B
10,695	61	>75% Grass cover, Good, HSG B
78,070	58	Weighted Average
78,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	300	Total			

**Summary for Subcatchment P3.2: Lots 55-57**

Runoff = 1.39 cfs @ 12.07 hrs, Volume= 4,140 cf, Depth&gt; 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
27,750	85	1/8 acre lots, 65% imp, HSG B
9,713		35.00% Pervious Area
18,038		65.00% Impervious Area

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

**Summary for Pond RG3.1: Rain Garden 3.1**

Inflow Area = 27,750 sf, 65.00% Impervious, Inflow Depth > 1.79" for 2YearMass event  
 Inflow = 1.39 cfs @ 12.07 hrs, Volume= 4,140 cf  
 Outflow = 0.11 cfs @ 13.47 hrs, Volume= 4,140 cf, Atten= 92%, Lag= 83.6 min  
 Discarded = 0.08 cfs @ 11.66 hrs, Volume= 3,592 cf  
 Primary = 0.03 cfs @ 13.47 hrs, Volume= 547 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 2YearMass Rainfall=3.24"

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Peak Elev= 685.65' @ 13.47 hrs Surf.Area= 1,410 sf Storage= 1,747 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 164.3 min ( 988.3 - 824.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	682.75'	185 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 235.0'
#2	682.75'	2,182 cf	<b>6.00'W x 235.00'L x 4.00'H Soil Media and Gravel</b> 5,640 cf Overall - 185 cf Embedded = 5,455 cf x 40.0% Voids
#3	686.75'	176 cf	<b>6.00'W x 235.00'L x 0.25'H Mulch</b> 353 cf Overall x 50.0% Voids
#4	687.00'	2,115 cf	<b>6.00'W x 235.00'L x 1.50'H Ponding</b>
		4,658 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	682.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	683.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.75' / 683.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	683.75'	<b>0.5" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	686.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	688.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	688.25'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.08 cfs @ 11.66 hrs HW=682.81' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)**Primary OutFlow** Max=0.03 cfs @ 13.47 hrs HW=685.65' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.03 cfs of 3.64 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 6.60 fps)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=682.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2**

Inflow Area = 105,820 sf, 17.05% Impervious, Inflow Depth &gt; 0.32" for 2YearMass event

Inflow = 0.34 cfs @ 12.31 hrs, Volume= 2,850 cf

Primary = 0.34 cfs @ 12.31 hrs, Volume= 2,850 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2**

Runoff = 1.86 cfs @ 12.16 hrs, Volume= 7,759 cf, Depth&gt; 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
61,120	55	Woods, Good, HSG B
10,695	61	>75% Grass cover, Good, HSG B
78,070	58	Weighted Average
78,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	300	Total			

**Summary for Subcatchment P3.2: Lots 55-57**

Runoff = 2.62 cfs @ 12.07 hrs, Volume= 7,889 cf, Depth&gt; 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
27,750	85	1/8 acre lots, 65% imp, HSG B
9,713		35.00% Pervious Area
18,038		65.00% Impervious Area

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

**Summary for Pond RG3.1: Rain Garden 3.1**

Inflow Area = 27,750 sf, 65.00% Impervious, Inflow Depth > 3.41" for 10YearMass event  
 Inflow = 2.62 cfs @ 12.07 hrs, Volume= 7,889 cf  
 Outflow = 0.94 cfs @ 12.33 hrs, Volume= 7,472 cf, Atten= 64%, Lag= 15.2 min  
 Discarded = 0.24 cfs @ 12.25 hrs, Volume= 4,465 cf  
 Primary = 0.71 cfs @ 12.33 hrs, Volume= 3,007 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10YearMass Rainfall=5.05"

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Peak Elev= 687.02' @ 12.33 hrs Surf.Area= 4,230 sf Storage= 2,577 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 110.1 min ( 915.8 - 805.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	682.75'	185 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 235.0'
#2	682.75'	2,182 cf	<b>6.00'W x 235.00'L x 4.00'H Soil Media and Gravel</b> 5,640 cf Overall - 185 cf Embedded = 5,455 cf x 40.0% Voids
#3	686.75'	176 cf	<b>6.00'W x 235.00'L x 0.25'H Mulch</b> 353 cf Overall x 50.0% Voids
#4	687.00'	2,115 cf	<b>6.00'W x 235.00'L x 1.50'H Ponding</b>
		4,658 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	682.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	683.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.75' / 683.65' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	683.75'	<b>0.5" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	686.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	688.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	688.25'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.24 cfs @ 12.25 hrs HW=687.00' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs)**Primary OutFlow** Max=0.71 cfs @ 12.33 hrs HW=687.02' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.71 cfs of 4.93 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 8.68 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.67 cfs @ 4.57 fps)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=682.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2**

Inflow Area = 105,820 sf, 17.05% Impervious, Inflow Depth > 1.22" for 10YearMass event  
 Inflow = 2.49 cfs @ 12.17 hrs, Volume= 10,766 cf  
 Primary = 2.49 cfs @ 12.17 hrs, Volume= 10,766 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2**

Runoff = 3.14 cfs @ 12.16 hrs, Volume= 12,131 cf, Depth&gt; 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
61,120	55	Woods, Good, HSG B
10,695	61	>75% Grass cover, Good, HSG B
78,070	58	Weighted Average
78,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	300	Total			

**Summary for Subcatchment P3.2: Lots 55-57**

Runoff = 3.39 cfs @ 12.07 hrs, Volume= 10,334 cf, Depth&gt; 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
27,750	85	1/8 acre lots, 65% imp, HSG B
9,713		35.00% Pervious Area
18,038		65.00% Impervious Area

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

**Summary for Pond RG3.1: Rain Garden 3.1**

Inflow Area = 27,750 sf, 65.00% Impervious, Inflow Depth > 4.47" for 25YearMass event  
 Inflow = 3.39 cfs @ 12.07 hrs, Volume= 10,334 cf  
 Outflow = 1.14 cfs @ 12.35 hrs, Volume= 9,680 cf, Atten= 67%, Lag= 16.6 min  
 Discarded = 0.24 cfs @ 12.08 hrs, Volume= 4,979 cf  
 Primary = 0.90 cfs @ 12.35 hrs, Volume= 4,702 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25YearMass Rainfall=6.18"

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Peak Elev= 687.60' @ 12.35 hrs Surf.Area= 4,230 sf Storage= 3,387 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 85.3 min ( 883.4 - 798.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	682.75'	185 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 235.0'
#2	682.75'	2,182 cf	<b>6.00'W x 235.00'L x 4.00'H Soil Media and Gravel</b> 5,640 cf Overall - 185 cf Embedded = 5,455 cf x 40.0% Voids
#3	686.75'	176 cf	<b>6.00'W x 235.00'L x 0.25'H Mulch</b> 353 cf Overall x 50.0% Voids
#4	687.00'	2,115 cf	<b>6.00'W x 235.00'L x 1.50'H Ponding</b>
		4,658 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	682.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	683.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.75' / 683.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	683.75'	<b>0.5" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	686.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	688.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	688.25'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.24 cfs @ 12.08 hrs HW=687.05' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs)**Primary OutFlow** Max=0.90 cfs @ 12.35 hrs HW=687.60' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.90 cfs of 5.38 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 9.42 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.86 cfs @ 5.84 fps)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=682.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2**

Inflow Area = 105,820 sf, 17.05% Impervious, Inflow Depth > 1.91" for 25YearMass event  
 Inflow = 3.98 cfs @ 12.16 hrs, Volume= 16,833 cf  
 Primary = 3.98 cfs @ 12.16 hrs, Volume= 16,833 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100YearMass Rainfall=7.93"

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**Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2**

Runoff = 5.39 cfs @ 12.15 hrs, Volume= 19,867 cf, Depth&gt; 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
61,120	55	Woods, Good, HSG B
10,695	61	>75% Grass cover, Good, HSG B
78,070	58	Weighted Average
78,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	300	Total			

**Summary for Subcatchment P3.2: Lots 55-57**

Runoff = 4.59 cfs @ 12.07 hrs, Volume= 14,201 cf, Depth&gt; 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
27,750	85	1/8 acre lots, 65% imp, HSG B
9,713		35.00% Pervious Area
18,038		65.00% Impervious Area

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

**Summary for Pond RG3.1: Rain Garden 3.1**

Inflow Area = 27,750 sf, 65.00% Impervious, Inflow Depth > 6.14" for 100YearMass event  
 Inflow = 4.59 cfs @ 12.07 hrs, Volume= 14,201 cf  
 Outflow = 2.54 cfs @ 12.18 hrs, Volume= 13,218 cf, Atten= 45%, Lag= 6.5 min  
 Discarded = 0.24 cfs @ 11.97 hrs, Volume= 5,492 cf  
 Primary = 2.31 cfs @ 12.18 hrs, Volume= 7,726 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100YearMass Rainfall=7.93"

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Peak Elev= 688.19' @ 12.18 hrs Surf.Area= 4,230 sf Storage= 4,226 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 62.6 min ( 851.9 - 789.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	682.75'	185 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 235.0'
#2	682.75'	2,182 cf	<b>6.00'W x 235.00'L x 4.00'H Soil Media and Gravel</b> 5,640 cf Overall - 185 cf Embedded = 5,455 cf x 40.0% Voids
#3	686.75'	176 cf	<b>6.00'W x 235.00'L x 0.25'H Mulch</b> 353 cf Overall x 50.0% Voids
#4	687.00'	2,115 cf	<b>6.00'W x 235.00'L x 1.50'H Ponding</b>
		4,658 cf	Total Available Storage

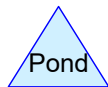
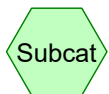
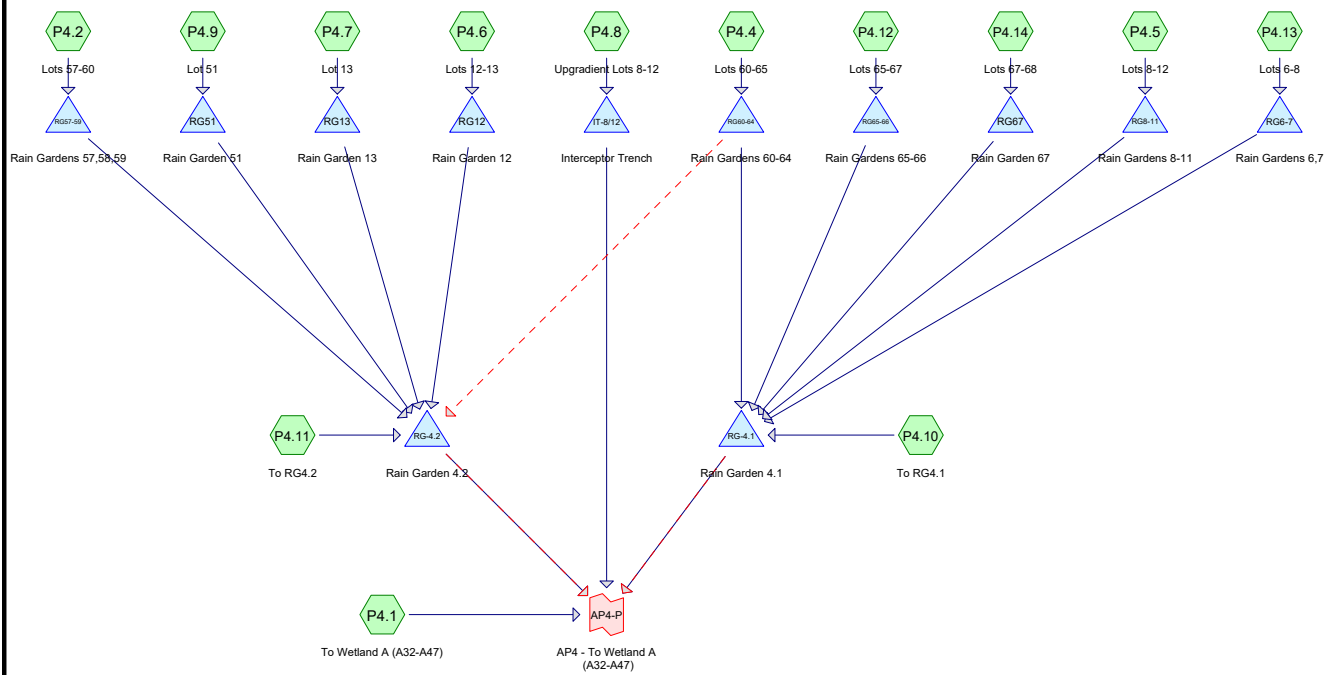
Device	Routing	Invert	Outlet Devices
#1	Discarded	682.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	683.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.75' / 683.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	683.75'	<b>0.5" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	686.00'	<b>3.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	688.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	688.25'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.24 cfs @ 11.97 hrs HW=687.01' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs)**Primary OutFlow** Max=2.31 cfs @ 12.18 hrs HW=688.19' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 2.31 cfs of 5.81 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 10.13 fps)↑ **4=Orifice/Grate** (Orifice Controls 1.02 cfs @ 6.92 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.25 cfs @ 2.12 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=682.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2**

Inflow Area = 105,820 sf, 17.05% Impervious, Inflow Depth > 3.13" for 100YearMass event  
 Inflow = 7.66 cfs @ 12.16 hrs, Volume= 27,593 cf  
 Primary = 7.66 cfs @ 12.16 hrs, Volume= 27,593 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs







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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P4.1: To Wetland A (A32-A47)**

Runoff = 2.70 cfs @ 12.11 hrs, Volume= 8,912 cf, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
73,955	77	Woods, Good, HSG D
5,565	61	>75% Grass cover, Good, HSG B
10,490	80	>75% Grass cover, Good, HSG D
90,640	76	Weighted Average
90,640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.9	185	Total			

**Summary for Subcatchment P4.10: To RG4.1**

Runoff = 0.46 cfs @ 12.11 hrs, Volume= 1,488 cf, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
12,335	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
12,460	80	Weighted Average
12,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

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**Summary for Subcatchment P4.11: To RG4.2**

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 625 cf, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
16,190	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
16,300	61	Weighted Average
16,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

**Summary for Subcatchment P4.12: Lots 65-67**

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 2,354 cf, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
5,410	90	1/8 acre lots, 65% imp, HSG C
6,895	92	1/8 acre lots, 65% imp, HSG D
12,305	91	Weighted Average
4,307		35.00% Pervious Area
7,998		65.00% Impervious Area

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

**Summary for Subcatchment P4.13: Lots 6-8**

Runoff = 1.06 cfs @ 12.07 hrs, Volume= 3,172 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

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Type III 24-hr 2YearMass Rainfall=3.24"

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Area (sf)	CN	Description
20,970	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
21,240	85	Weighted Average
7,434		35.00% Pervious Area
13,806		65.00% Impervious Area

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

**Summary for Subcatchment P4.14: Lots 67-68**

Runoff = 0.32 cfs @ 12.07 hrs, Volume= 974 cf, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
2,290	90	1/8 acre lots, 65% imp, HSG C
2,800	92	1/8 acre lots, 65% imp, HSG D
5,090	91	Weighted Average
1,782		35.00% Pervious Area
3,309		65.00% Impervious Area

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

**Summary for Subcatchment P4.2: Lots 57-60**

Runoff = 1.10 cfs @ 12.07 hrs, Volume= 3,269 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
21,890	85	1/8 acre lots, 65% imp, HSG B
7,662		35.00% Pervious Area
14,229		65.00% Impervious Area

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

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P4.4: Lots 60-65**

Runoff = 2.04 cfs @ 12.07 hrs, Volume= 6,114 cf, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
10,990	92	1/8 acre lots, 65% imp, HSG D
3,680	90	1/8 acre lots, 65% imp, HSG C
36,090	88	Weighted Average
12,632		35.00% Pervious Area
23,459		65.00% Impervious Area

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

**Summary for Subcatchment P4.5: Lots 8-12**

Runoff = 1.55 cfs @ 12.07 hrs, Volume= 4,629 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

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

**Summary for Subcatchment P4.6: Lots 12-13**

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,594 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

**Summary for Subcatchment P4.7: Lot 13**

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 1,487 cf, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

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

**Summary for Subcatchment P4.8: Upgradient Lots 8-12**

Runoff = 0.11 cfs @ 12.47 hrs, Volume= 935 cf, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.2	330	Total			

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P4.9: Lot 51**

Runoff = 0.48 cfs @ 12.07 hrs, Volume= 1,419 cf, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

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

**Summary for Pond IT-8/12: Interceptor Trench**

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 0.29" for 2YearMass event  
 Inflow = 0.11 cfs @ 12.47 hrs, Volume= 935 cf  
 Outflow = 0.08 cfs @ 12.64 hrs, Volume= 933 cf, Atten= 20%, Lag= 10.2 min  
 Primary = 0.08 cfs @ 12.64 hrs, Volume= 933 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 680.46' @ 12.64 hrs Surf.Area= 1,050 sf Storage= 79 cf

Plug-Flow detention time= 28.5 min calculated for 933 cf (100% of inflow)  
 Center-of-Mass det. time= 27.3 min ( 981.7 - 954.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	<b>3.00'W x 350.00'L x 3.00'H Prismaoid</b> 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	<b>8.0" Round Culvert</b> L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=0.08 cfs @ 12.64 hrs HW=680.46' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.08 cfs @ 1.35 fps)

### Summary for Pond RG-4.1: Rain Garden 4.1

Inflow Area = 118,185 sf, 58.15% Impervious, Inflow Depth = 1.17" for 2YearMass event  
 Inflow = 2.34 cfs @ 12.23 hrs, Volume= 11,553 cf  
 Outflow = 0.77 cfs @ 13.12 hrs, Volume= 11,554 cf, Atten= 67%, Lag= 53.4 min  
 Discarded = 0.24 cfs @ 11.87 hrs, Volume= 9,313 cf  
 Primary = 0.53 cfs @ 13.12 hrs, Volume= 2,241 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 671.19' @ 13.12 hrs Surf.Area= 4,320 sf Storage= 4,209 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 113.1 min ( 942.9 - 829.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	5,184 cf	<b>12.00'W x 360.00'L x 3.00'H Soil Media and Gravel</b> 12,960 cf Overall x 40.0% Voids
#2	671.75'	540 cf	<b>12.00'W x 360.00'L x 0.25'H Mulch</b> 1,080 cf Overall x 50.0% Voids
#3	672.00'	8,640 cf	<b>12.00'W x 360.00'L x 2.00'H Ponding</b>
		14,364 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	670.75'	<b>8.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	670.75'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 2	671.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#5	Device 2	673.25'	<b>8.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	673.25'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#7	Secondary	673.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.24 cfs @ 11.87 hrs HW=668.80' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs)

**Primary OutFlow** Max=0.53 cfs @ 13.12 hrs HW=671.19' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.53 cfs of 1.75 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.69 fps)

↑ **4=Orifice/Grate** ( Controls 0.00 cfs)

↑ **5=Orifice/Grate** ( Controls 0.00 cfs)

↑ **6=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)

↑ **7=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

### Summary for Pond RG-4.2: Rain Garden 4.2

Inflow Area = 67,515 sf, 49.31% Impervious, Inflow Depth = 1.18" for 2YearMass event  
 Inflow = 1.67 cfs @ 12.20 hrs, Volume= 6,637 cf  
 Outflow = 0.41 cfs @ 13.13 hrs, Volume= 6,637 cf, Atten= 76%, Lag= 56.2 min  
 Discarded = 0.13 cfs @ 11.96 hrs, Volume= 5,285 cf  
 Primary = 0.27 cfs @ 13.13 hrs, Volume= 1,351 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.33' @ 13.13 hrs Surf.Area= 2,400 sf Storage= 2,475 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 116.7 min ( 947.8 - 831.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	<b>10.00'W x 240.00'L x 3.00'H Soil Media and Gravel</b> 7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	<b>10.00'W x 240.00'L x 0.25'H Mulch</b> 600 cf Overall x 50.0% Voids
#3	679.00'	4,800 cf	<b>10.00'W x 240.00'L x 2.00'H Ponding</b>
		7,980 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	678.25'	<b>5.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	680.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	680.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.13 cfs @ 11.96 hrs HW=675.81' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.13 cfs)

**Primary OutFlow** Max=0.27 cfs @ 13.13 hrs HW=678.33' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.27 cfs of 1.48 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.22 cfs @ 3.39 fps)

↑ **4=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.95 fps)

↑ **5=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)

↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)



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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Pond RG12: Rain Garden 12**

Inflow Area = 10,675 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event  
 Inflow = 0.51 cfs @ 12.09 hrs, Volume= 1,594 cf  
 Outflow = 0.31 cfs @ 12.20 hrs, Volume= 1,594 cf, Atten= 38%, Lag= 6.5 min  
 Primary = 0.31 cfs @ 12.20 hrs, Volume= 1,594 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 688.79' @ 12.20 hrs Surf.Area= 240 sf Storage= 308 cf

Plug-Flow detention time= 19.0 min calculated for 1,594 cf (100% of inflow)  
 Center-of-Mass det. time= 18.9 min ( 844.8 - 825.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	686.25'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	689.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.31 cfs @ 12.20 hrs HW=688.79' TW=676.37' (Dynamic Tailwater)

- 1=Culvert (Passes 0.31 cfs of 1.43 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.55 fps)
- 4=Orifice/Grate (Orifice Controls 0.15 cfs @ 1.84 fps)

**Summary for Pond RG13: Rain Garden 13**

Inflow Area = 9,545 sf, 65.00% Impervious, Inflow Depth = 1.87" for 2YearMass event  
 Inflow = 0.50 cfs @ 12.07 hrs, Volume= 1,487 cf  
 Outflow = 0.27 cfs @ 12.20 hrs, Volume= 1,487 cf, Atten= 47%, Lag= 7.4 min  
 Primary = 0.27 cfs @ 12.20 hrs, Volume= 1,487 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 697.23' @ 12.20 hrs Surf.Area= 240 sf Storage= 301 cf

Plug-Flow detention time= 19.3 min calculated for 1,487 cf (100% of inflow)  
 Center-of-Mass det. time= 19.3 min ( 840.3 - 821.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	694.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	697.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	698.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	697.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.26 cfs @ 12.20 hrs HW=697.23' TW=676.34' (Dynamic Tailwater)

1=Culvert (Passes 0.26 cfs of 1.41 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.45 fps)  
 4=Orifice/Grate (Orifice Controls 0.10 cfs @ 1.62 fps)

### Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 1.87" for 2YearMass event  
 Inflow = 0.48 cfs @ 12.07 hrs, Volume= 1,419 cf  
 Outflow = 0.28 cfs @ 12.18 hrs, Volume= 1,419 cf, Atten= 42%, Lag= 6.2 min  
 Primary = 0.28 cfs @ 12.18 hrs, Volume= 1,419 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 694.24' @ 12.18 hrs Surf.Area= 240 sf Storage= 268 cf

Plug-Flow detention time= 17.4 min calculated for 1,418 cf (100% of inflow)  
 Center-of-Mass det. time= 17.3 min ( 838.4 - 821.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	691.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	695.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	694.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.28 cfs @ 12.18 hrs HW=694.24' TW=676.23' (Dynamic Tailwater)

- 1=Culvert (Passes 0.28 cfs of 1.42 cfs potential flow)  
 2=Orifice/Grate (Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.47 fps)  
 4=Orifice/Grate (Orifice Controls 0.11 cfs @ 1.68 fps)

**Summary for Pond RG57-59: Rain Gardens 57,58,59**

Inflow Area = 21,890 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event  
 Inflow = 1.10 cfs @ 12.07 hrs, Volume= 3,269 cf  
 Outflow = 0.60 cfs @ 12.19 hrs, Volume= 3,269 cf, Atten= 45%, Lag= 7.1 min  
 Discarded = 0.04 cfs @ 11.33 hrs, Volume= 2,126 cf  
 Primary = 0.56 cfs @ 12.19 hrs, Volume= 1,143 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 689.98' @ 12.19 hrs Surf.Area= 720 sf Storage= 870 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 115.8 min ( 940.5 - 824.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	689.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	689.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

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**Discarded OutFlow** Max=0.04 cfs @ 11.33 hrs HW=687.29' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.56 cfs @ 12.19 hrs HW=689.98' TW=676.32' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.56 cfs of 1.96 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 3.86 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.30 cfs @ 1.62 fps)**Summary for Pond RG6-7: Rain Gardens 6,7**

Inflow Area = 21,240 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event  
 Inflow = 1.06 cfs @ 12.07 hrs, Volume= 3,172 cf  
 Outflow = 0.56 cfs @ 12.20 hrs, Volume= 3,171 cf, Atten= 47%, Lag= 7.6 min  
 Primary = 0.56 cfs @ 12.20 hrs, Volume= 3,171 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 679.25' @ 12.20 hrs Surf.Area= 600 sf Storage= 656 cf

Plug-Flow detention time= 21.0 min calculated for 3,170 cf (100% of inflow)

Center-of-Mass det. time= 21.0 min ( 845.6 - 824.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	680.00'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	680.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	679.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.56 cfs @ 12.20 hrs HW=679.25' TW=669.39' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.56 cfs of 2.83 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.33 cfs @ 7.48 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.23 cfs @ 1.69 fps)

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**Summary for Pond RG60-64: Rain Gardens 60-64**

Inflow Area = 36,090 sf, 65.00% Impervious, Inflow Depth = 2.03" for 2YearMass event  
 Inflow = 2.04 cfs @ 12.07 hrs, Volume= 6,114 cf  
 Outflow = 0.94 cfs @ 12.23 hrs, Volume= 6,114 cf, Atten= 54%, Lag= 9.7 min  
 Discarded = 0.08 cfs @ 11.30 hrs, Volume= 4,271 cf  
 Primary = 0.69 cfs @ 12.23 hrs, Volume= 1,475 cf  
 Secondary = 0.17 cfs @ 12.23 hrs, Volume= 369 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 686.46' @ 12.23 hrs Surf.Area= 1,500 sf Storage= 1,766 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 113.6 min ( 927.3 - 813.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	<b>12.0" Round Pipe Storage</b> x 5 Inside #2 L= 60.0'
#2	683.75'	1,706 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 5 4,500 cf Overall - 236 cf Embedded = 4,264 cf x 40.0% Voids
#3	686.75'	188 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 5 375 cf Overall x 50.0% Voids
#4	687.00'	1,500 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 5
		3,629 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	685.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	687.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#7	Device 3	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	686.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#9	Device 3	686.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Discarded OutFlow** Max=0.08 cfs @ 11.30 hrs HW=683.79' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)**Primary OutFlow** Max=0.69 cfs @ 12.23 hrs HW=686.46' TW=669.53' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.69 cfs of 2.56 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **6=Orifice/Grate** (Orifice Controls 0.33 cfs @ 3.81 fps)↑ **8=Orifice/Grate** (Orifice Controls 0.36 cfs @ 1.55 fps)**Secondary OutFlow** Max=0.17 cfs @ 12.23 hrs HW=686.46' TW=676.55' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.17 cfs of 0.64 cfs potential flow)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)↑ **7=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.81 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.55 fps)**Summary for Pond RG65-66: Rain Gardens 65-66**

Inflow Area = 12,305 sf, 65.00% Impervious, Inflow Depth = 2.30" for 2YearMass event  
 Inflow = 0.77 cfs @ 12.07 hrs, Volume= 2,354 cf  
 Outflow = 0.34 cfs @ 12.24 hrs, Volume= 2,354 cf, Atten= 56%, Lag= 10.3 min  
 Discarded = 0.03 cfs @ 11.20 hrs, Volume= 1,708 cf  
 Primary = 0.31 cfs @ 12.24 hrs, Volume= 646 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 677.93' @ 12.24 hrs Surf.Area= 600 sf Storage= 701 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 111.5 min ( 912.6 - 801.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	675.25'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	678.25'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	678.50'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 675.15' S= 0.2100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

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**Discarded OutFlow** Max=0.03 cfs @ 11.20 hrs HW=675.29' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)**Primary OutFlow** Max=0.31 cfs @ 12.24 hrs HW=677.93' TW=669.57' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.31 cfs of 1.25 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.16 cfs @ 3.73 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.14 cfs @ 1.46 fps)**Summary for Pond RG67: Rain Garden 67**

Inflow Area = 5,090 sf, 65.00% Impervious, Inflow Depth = 2.30" for 2YearMass event  
 Inflow = 0.32 cfs @ 12.07 hrs, Volume= 974 cf  
 Outflow = 0.07 cfs @ 12.46 hrs, Volume= 974 cf, Atten= 77%, Lag= 23.4 min  
 Discarded = 0.02 cfs @ 11.41 hrs, Volume= 827 cf  
 Primary = 0.06 cfs @ 12.46 hrs, Volume= 147 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 677.64' @ 12.46 hrs Surf.Area= 300 sf Storage= 350 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 141.7 min ( 942.8 - 801.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	318 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 106 cf Embedded = 794 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Discarded OutFlow** Max=0.02 cfs @ 11.41 hrs HW=675.29' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Primary OutFlow** Max=0.06 cfs @ 12.46 hrs HW=677.64' TW=670.38' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.06 cfs of 0.29 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.66 fps)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)**Summary for Pond RG8-11: Rain Gardens 8-11**

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event  
 Inflow = 1.55 cfs @ 12.07 hrs, Volume= 4,629 cf  
 Outflow = 0.53 cfs @ 12.37 hrs, Volume= 4,627 cf, Atten= 66%, Lag= 17.4 min  
 Primary = 0.53 cfs @ 12.37 hrs, Volume= 4,627 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 677.45' @ 12.37 hrs Surf.Area= 1,200 sf Storage= 1,068 cf

Plug-Flow detention time= 23.0 min calculated for 4,627 cf (100% of inflow)

Center-of-Mass det. time= 22.8 min ( 847.4 - 824.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	424 cf	<b>18.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	675.75'	1,270 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 424 cf Embedded = 3,176 cf x 40.0% Voids
#3	678.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		3,044 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	678.00'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

**Primary OutFlow** Max=0.53 cfs @ 12.37 hrs HW=677.45' TW=670.06' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.53 cfs of 4.55 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 6.11 fps)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)



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*Type III 24-hr 2YearMass Rainfall=3.24"*

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**Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)**

Inflow Area = 314,740 sf, 32.41% Impervious, Inflow Depth = 0.51" for 2YearMass event  
Inflow = 2.70 cfs @ 12.11 hrs, Volume= 13,438 cf  
Primary = 2.70 cfs @ 12.11 hrs, Volume= 13,438 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P4.1: To Wetland A (A32-A47)**

Runoff = 6.08 cfs @ 12.10 hrs, Volume= 19,463 cf, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
73,955	77	Woods, Good, HSG D
5,565	61	>75% Grass cover, Good, HSG B
10,490	80	>75% Grass cover, Good, HSG D
90,640	76	Weighted Average
90,640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.9	185	Total			

**Summary for Subcatchment P4.10: To RG4.1**

Runoff = 0.95 cfs @ 12.10 hrs, Volume= 3,049 cf, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
12,335	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
12,460	80	Weighted Average
12,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P4.11: To RG4.2**

Runoff = 0.54 cfs @ 12.11 hrs, Volume= 1,901 cf, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
16,190	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
16,300	61	Weighted Average
16,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

**Summary for Subcatchment P4.12: Lots 65-67**

Runoff = 1.32 cfs @ 12.07 hrs, Volume= 4,133 cf, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
5,410	90	1/8 acre lots, 65% imp, HSG C
6,895	92	1/8 acre lots, 65% imp, HSG D
12,305	91	Weighted Average
4,307		35.00% Pervious Area
7,998		65.00% Impervious Area

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

**Summary for Subcatchment P4.13: Lots 6-8**

Runoff = 2.00 cfs @ 12.07 hrs, Volume= 6,043 cf, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

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Type III 24-hr 10YearMass Rainfall=5.05"

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Area (sf)	CN	Description
20,970	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
21,240	85	Weighted Average
7,434		35.00% Pervious Area
13,806		65.00% Impervious Area

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

**Summary for Subcatchment P4.14: Lots 67-68**

Runoff = 0.55 cfs @ 12.07 hrs, Volume= 1,710 cf, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
2,290	90	1/8 acre lots, 65% imp, HSG C
2,800	92	1/8 acre lots, 65% imp, HSG D
5,090	91	Weighted Average
1,782		35.00% Pervious Area
3,309		65.00% Impervious Area

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

**Summary for Subcatchment P4.2: Lots 57-60**

Runoff = 2.06 cfs @ 12.07 hrs, Volume= 6,228 cf, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
21,890	85	1/8 acre lots, 65% imp, HSG B
7,662		35.00% Pervious Area
14,229		65.00% Impervious Area

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

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P4.4: Lots 60-65**

Runoff = 3.65 cfs @ 12.07 hrs, Volume= 11,177 cf, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
10,990	92	1/8 acre lots, 65% imp, HSG D
3,680	90	1/8 acre lots, 65% imp, HSG C
36,090	88	Weighted Average
12,632		35.00% Pervious Area
23,459		65.00% Impervious Area

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

**Summary for Subcatchment P4.5: Lots 8-12**

Runoff = 2.92 cfs @ 12.07 hrs, Volume= 8,820 cf, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

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

**Summary for Subcatchment P4.6: Lots 12-13**

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 3,037 cf, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

**Summary for Subcatchment P4.7: Lot 13**

Runoff = 0.92 cfs @ 12.07 hrs, Volume= 2,795 cf, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

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

**Summary for Subcatchment P4.8: Upgradient Lots 8-12**

Runoff = 0.66 cfs @ 12.26 hrs, Volume= 3,416 cf, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.2	330	Total			

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P4.9: Lot 51**

Runoff = 0.88 cfs @ 12.07 hrs, Volume= 2,666 cf, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

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

**Summary for Pond IT-8/12: Interceptor Trench**

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 1.07" for 10YearMass event  
 Inflow = 0.66 cfs @ 12.26 hrs, Volume= 3,416 cf  
 Outflow = 0.60 cfs @ 12.36 hrs, Volume= 3,413 cf, Atten= 9%, Lag= 6.0 min  
 Primary = 0.60 cfs @ 12.36 hrs, Volume= 3,413 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 680.76' @ 12.36 hrs Surf.Area= 1,050 sf Storage= 250 cf

Plug-Flow detention time= 15.0 min calculated for 3,413 cf (100% of inflow)  
 Center-of-Mass det. time= 14.6 min ( 912.1 - 897.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	<b>3.00'W x 350.00'L x 3.00'H Prismaoid</b> 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	<b>8.0" Round Culvert</b> L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 ' S= 0.0549 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=0.60 cfs @ 12.36 hrs HW=680.76' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.60 cfs @ 2.32 fps)

**Summary for Pond RG-4.1: Rain Garden 4.1**

Inflow Area = 118,185 sf, 58.15% Impervious, Inflow Depth = 2.54" for 10YearMass event  
 Inflow = 7.26 cfs @ 12.14 hrs, Volume= 25,016 cf  
 Outflow = 3.38 cfs @ 12.43 hrs, Volume= 25,017 cf, Atten= 54%, Lag= 17.8 min  
 Discarded = 0.72 cfs @ 12.24 hrs, Volume= 13,211 cf  
 Primary = 2.65 cfs @ 12.43 hrs, Volume= 11,806 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 672.26' @ 12.43 hrs Surf.Area= 12,960 sf Storage= 6,840 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 78.8 min ( 886.3 - 807.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	5,184 cf	<b>12.00'W x 360.00'L x 3.00'H Soil Media and Gravel</b> 12,960 cf Overall x 40.0% Voids
#2	671.75'	540 cf	<b>12.00'W x 360.00'L x 0.25'H Mulch</b> 1,080 cf Overall x 50.0% Voids
#3	672.00'	8,640 cf	<b>12.00'W x 360.00'L x 2.00'H Ponding</b>
		14,364 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	670.75'	<b>8.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	670.75'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 2	671.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#5	Device 2	673.25'	<b>8.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	673.25'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#7	Secondary	673.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.72 cfs @ 12.24 hrs HW=672.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.72 cfs)

**Primary OutFlow** Max=2.65 cfs @ 12.43 hrs HW=672.26' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 2.65 cfs of 7.29 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 1.11 cfs @ 5.66 fps)

↑ **4=Orifice/Grate** (Orifice Controls 1.54 cfs @ 4.42 fps)

↑ **5=Orifice/Grate** ( Controls 0.00 cfs)

↑ **6=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)

↑ **7=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)



**Summary for Pond RG-4.2: Rain Garden 4.2**

Inflow Area = 67,515 sf, 49.31% Impervious, Inflow Depth = 2.66" for 10YearMass event  
 Inflow = 4.33 cfs @ 12.13 hrs, Volume= 14,991 cf  
 Outflow = 2.52 cfs @ 12.38 hrs, Volume= 14,992 cf, Atten= 42%, Lag= 14.8 min  
 Discarded = 0.40 cfs @ 12.21 hrs, Volume= 7,432 cf  
 Primary = 2.11 cfs @ 12.38 hrs, Volume= 7,560 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 679.24' @ 12.38 hrs Surf.Area= 7,200 sf Storage= 3,753 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 78.9 min ( 889.9 - 810.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	<b>10.00'W x 240.00'L x 3.00'H Soil Media and Gravel</b> 7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	<b>10.00'W x 240.00'L x 0.25'H Mulch</b> 600 cf Overall x 50.0% Voids
#3	679.00'	4,800 cf	<b>10.00'W x 240.00'L x 2.00'H Ponding</b>
		7,980 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	678.25'	<b>5.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	680.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	680.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.40 cfs @ 12.21 hrs HW=679.00' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.40 cfs)

**Primary OutFlow** Max=2.11 cfs @ 12.38 hrs HW=679.24' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 2.11 cfs of 3.16 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 5.71 fps)

↑ **4=Orifice/Grate** (Orifice Controls 1.74 cfs @ 4.25 fps)

↑ **5=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)

↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

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**Summary for Pond RG12: Rain Garden 12**

Inflow Area = 10,675 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event  
 Inflow = 0.96 cfs @ 12.09 hrs, Volume= 3,037 cf  
 Outflow = 0.66 cfs @ 12.18 hrs, Volume= 3,037 cf, Atten= 31%, Lag= 5.2 min  
 Primary = 0.66 cfs @ 12.18 hrs, Volume= 3,037 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 689.86' @ 12.18 hrs Surf.Area= 720 sf Storage= 468 cf

Plug-Flow detention time= 16.3 min calculated for 3,036 cf (100% of inflow)  
 Center-of-Mass det. time= 16.3 min ( 823.8 - 807.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	686.25'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	689.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.66 cfs @ 12.18 hrs HW=689.86' TW=678.80' (Dynamic Tailwater)

- 1=Culvert (Passes 0.66 cfs of 1.73 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.04 fps)
- 4=Orifice/Grate (Orifice Controls 0.46 cfs @ 5.26 fps)

**Summary for Pond RG13: Rain Garden 13**

Inflow Area = 9,545 sf, 65.00% Impervious, Inflow Depth = 3.51" for 10YearMass event  
 Inflow = 0.92 cfs @ 12.07 hrs, Volume= 2,795 cf  
 Outflow = 0.63 cfs @ 12.15 hrs, Volume= 2,795 cf, Atten= 31%, Lag= 4.6 min  
 Primary = 0.63 cfs @ 12.15 hrs, Volume= 2,795 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 698.25' @ 12.15 hrs Surf.Area= 720 sf Storage= 442 cf

Plug-Flow detention time= 16.4 min calculated for 2,794 cf (100% of inflow)  
 Center-of-Mass det. time= 16.4 min ( 819.5 - 803.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	694.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	697.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	698.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	697.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.63 cfs @ 12.15 hrs HW=698.25' TW=678.49' (Dynamic Tailwater)

- 1=Culvert (Passes 0.63 cfs of 1.70 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.19 cfs @ 8.90 fps)  
 4=Orifice/Grate (Orifice Controls 0.44 cfs @ 5.02 fps)

### Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 3.51" for 10YearMass event  
 Inflow = 0.88 cfs @ 12.07 hrs, Volume= 2,666 cf  
 Outflow = 0.62 cfs @ 12.15 hrs, Volume= 2,666 cf, Atten= 30%, Lag= 4.4 min  
 Primary = 0.62 cfs @ 12.15 hrs, Volume= 2,666 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 695.20' @ 12.15 hrs Surf.Area= 720 sf Storage= 394 cf

Plug-Flow detention time= 14.8 min calculated for 2,665 cf (100% of inflow)

Center-of-Mass det. time= 14.7 min ( 817.9 - 803.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	691.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	695.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	694.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.62 cfs @ 12.15 hrs HW=695.20' TW=678.44' (Dynamic Tailwater)

- 1=Culvert (Passes 0.62 cfs of 1.69 cfs potential flow)  
 2=Orifice/Grate (Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.19 cfs @ 8.83 fps)  
 4=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.89 fps)

**Summary for Pond RG57-59: Rain Gardens 57,58,59**

Inflow Area = 21,890 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event  
 Inflow = 2.06 cfs @ 12.07 hrs, Volume= 6,228 cf  
 Outflow = 1.56 cfs @ 12.14 hrs, Volume= 6,229 cf, Atten= 24%, Lag= 3.8 min  
 Discarded = 0.12 cfs @ 12.06 hrs, Volume= 2,760 cf  
 Primary = 1.44 cfs @ 12.14 hrs, Volume= 3,468 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 690.65' @ 12.14 hrs Surf.Area= 2,160 sf Storage= 1,146 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 85.3 min ( 891.5 - 806.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	689.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	689.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

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**Discarded OutFlow** Max=0.12 cfs @ 12.06 hrs HW=690.50' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.12 cfs)**Primary OutFlow** Max=1.44 cfs @ 12.14 hrs HW=690.65' TW=678.31' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.44 cfs of 3.04 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.36 cfs @ 5.52 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.08 cfs @ 4.12 fps)**Summary for Pond RG6-7: Rain Gardens 6,7**

Inflow Area = 21,240 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event  
 Inflow = 2.00 cfs @ 12.07 hrs, Volume= 6,043 cf  
 Outflow = 1.27 cfs @ 12.16 hrs, Volume= 6,043 cf, Atten= 36%, Lag= 5.3 min  
 Primary = 1.27 cfs @ 12.16 hrs, Volume= 6,043 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 680.27' @ 12.16 hrs Surf.Area= 1,800 sf Storage= 1,015 cf

Plug-Flow detention time= 18.0 min calculated for 6,040 cf (100% of inflow)

Center-of-Mass det. time= 18.0 min ( 824.2 - 806.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	680.00'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	680.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	679.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.27 cfs @ 12.16 hrs HW=680.27' TW=671.33' (Dynamic Tailwater)↑ **1=Culvert** (Passes 1.27 cfs of 3.42 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 8.93 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.88 cfs @ 5.06 fps)

**Summary for Pond RG60-64: Rain Gardens 60-64**

Inflow Area = 36,090 sf, 65.00% Impervious, Inflow Depth = 3.72" for 10YearMass event  
 Inflow = 3.65 cfs @ 12.07 hrs, Volume= 11,177 cf  
 Outflow = 2.63 cfs @ 12.14 hrs, Volume= 11,177 cf, Atten= 28%, Lag= 4.2 min  
 Discarded = 0.25 cfs @ 12.07 hrs, Volume= 5,554 cf  
 Primary = 1.91 cfs @ 12.14 hrs, Volume= 4,499 cf  
 Secondary = 0.48 cfs @ 12.14 hrs, Volume= 1,125 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 687.14' @ 12.14 hrs Surf.Area= 4,500 sf Storage= 2,335 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 87.1 min ( 883.7 - 796.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	<b>12.0" Round Pipe Storage</b> x 5 Inside #2 L= 60.0'
#2	683.75'	1,706 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 5 4,500 cf Overall - 236 cf Embedded = 4,264 cf x 40.0% Voids
#3	686.75'	188 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 5 375 cf Overall x 50.0% Voids
#4	687.00'	1,500 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 5
		3,629 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	685.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	687.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#7	Device 3	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	686.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#9	Device 3	686.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Discarded OutFlow** Max=0.25 cfs @ 12.07 hrs HW=687.02' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.25 cfs)**Primary OutFlow** Max=1.91 cfs @ 12.14 hrs HW=687.14' TW=671.08' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.91 cfs of 4.03 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **6=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.50 fps)↑ **8=Orifice/Grate** (Orifice Controls 1.43 cfs @ 4.09 fps)**Secondary OutFlow** Max=0.48 cfs @ 12.14 hrs HW=687.14' TW=678.39' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.48 cfs of 1.01 cfs potential flow)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)↑ **7=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.50 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.09 fps)**Summary for Pond RG65-66: Rain Gardens 65-66**

Inflow Area = 12,305 sf, 65.00% Impervious, Inflow Depth = 4.03" for 10YearMass event  
 Inflow = 1.32 cfs @ 12.07 hrs, Volume= 4,133 cf  
 Outflow = 1.01 cfs @ 12.13 hrs, Volume= 4,133 cf, Atten= 24%, Lag= 3.8 min  
 Discarded = 0.10 cfs @ 12.09 hrs, Volume= 2,190 cf  
 Primary = 0.91 cfs @ 12.13 hrs, Volume= 1,943 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.56' @ 12.13 hrs Surf.Area= 1,800 sf Storage= 887 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 87.9 min ( 873.5 - 785.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	675.25'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	678.25'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	678.50'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 675.15' S= 0.2100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

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**Discarded OutFlow** Max=0.10 cfs @ 12.09 hrs HW=678.52' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.10 cfs)**Primary OutFlow** Max=0.91 cfs @ 12.13 hrs HW=678.56' TW=670.97' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.91 cfs of 1.95 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.23 cfs @ 5.33 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.67 cfs @ 3.86 fps)**Summary for Pond RG67: Rain Garden 67**

Inflow Area = 5,090 sf, 65.00% Impervious, Inflow Depth = 4.03" for 10YearMass event  
 Inflow = 0.55 cfs @ 12.07 hrs, Volume= 1,710 cf  
 Outflow = 0.40 cfs @ 12.14 hrs, Volume= 1,710 cf, Atten= 26%, Lag= 4.0 min  
 Discarded = 0.03 cfs @ 12.10 hrs, Volume= 1,046 cf  
 Primary = 0.37 cfs @ 12.14 hrs, Volume= 664 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 678.32' @ 12.14 hrs Surf.Area= 600 sf Storage= 433 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 109.4 min ( 895.0 - 785.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	318 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 106 cf Embedded = 794 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600



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**Discarded OutFlow** Max=0.03 cfs @ 12.10 hrs HW=678.26' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)**Primary OutFlow** Max=0.37 cfs @ 12.14 hrs HW=678.32' TW=671.03' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.37 cfs of 0.85 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.77 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.27 cfs @ 3.04 fps)**Summary for Pond RG8-11: Rain Gardens 8-11**

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event  
 Inflow = 2.92 cfs @ 12.07 hrs, Volume= 8,820 cf  
 Outflow = 1.96 cfs @ 12.15 hrs, Volume= 8,819 cf, Atten= 33%, Lag= 4.8 min  
 Primary = 1.96 cfs @ 12.15 hrs, Volume= 8,819 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 678.71' @ 12.15 hrs Surf.Area= 1,200 sf Storage= 1,677 cf

Plug-Flow detention time= 21.1 min calculated for 8,819 cf (100% of inflow)

Center-of-Mass det. time= 21.0 min ( 827.2 - 806.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	424 cf	<b>18.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	675.75'	1,270 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 424 cf Embedded = 3,176 cf x 40.0% Voids
#3	678.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		3,044 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	678.00'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

**Primary OutFlow** Max=1.95 cfs @ 12.15 hrs HW=678.71' TW=671.23' (Dynamic Tailwater)↑ **1=Culvert** (Passes 1.95 cfs of 6.23 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.71 cfs @ 8.17 fps)↑ **4=Orifice/Grate** (Orifice Controls 1.24 cfs @ 3.56 fps)

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**Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)**

Inflow Area = 314,740 sf, 32.41% Impervious, Inflow Depth = 1.61" for 10YearMass event  
Inflow = 8.14 cfs @ 12.24 hrs, Volume= 42,243 cf  
Primary = 8.14 cfs @ 12.24 hrs, Volume= 42,243 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P4.1: To Wetland A (A32-A47)**

Runoff = 8.36 cfs @ 12.10 hrs, Volume= 26,708 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
73,955	77	Woods, Good, HSG D
5,565	61	>75% Grass cover, Good, HSG B
10,490	80	>75% Grass cover, Good, HSG D
90,640	76	Weighted Average
90,640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.9	185	Total			

**Summary for Subcatchment P4.10: To RG4.1**

Runoff = 1.27 cfs @ 12.10 hrs, Volume= 4,095 cf, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
12,335	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
12,460	80	Weighted Average
12,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

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**Summary for Subcatchment P4.11: To RG4.2**

Runoff = 0.86 cfs @ 12.11 hrs, Volume= 2,889 cf, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
16,190	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
16,300	61	Weighted Average
16,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

**Summary for Subcatchment P4.12: Lots 65-67**

Runoff = 1.66 cfs @ 12.07 hrs, Volume= 5,264 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
5,410	90	1/8 acre lots, 65% imp, HSG C
6,895	92	1/8 acre lots, 65% imp, HSG D
12,305	91	Weighted Average
4,307		35.00% Pervious Area
7,998		65.00% Impervious Area

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

**Summary for Subcatchment P4.13: Lots 6-8**

Runoff = 2.60 cfs @ 12.07 hrs, Volume= 7,916 cf, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

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Area (sf)	CN	Description
20,970	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
21,240	85	Weighted Average
7,434		35.00% Pervious Area
13,806		65.00% Impervious Area

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

**Summary for Subcatchment P4.14: Lots 67-68**

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 2,177 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
2,290	90	1/8 acre lots, 65% imp, HSG C
2,800	92	1/8 acre lots, 65% imp, HSG D
5,090	91	Weighted Average
1,782		35.00% Pervious Area
3,309		65.00% Impervious Area

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

**Summary for Subcatchment P4.2: Lots 57-60**

Runoff = 2.67 cfs @ 12.07 hrs, Volume= 8,159 cf, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
21,890	85	1/8 acre lots, 65% imp, HSG B
7,662		35.00% Pervious Area
14,229		65.00% Impervious Area

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

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**Summary for Subcatchment P4.4: Lots 60-65**

Runoff = 4.66 cfs @ 12.07 hrs, Volume= 14,434 cf, Depth= 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
10,990	92	1/8 acre lots, 65% imp, HSG D
3,680	90	1/8 acre lots, 65% imp, HSG C
36,090	88	Weighted Average
12,632		35.00% Pervious Area
23,459		65.00% Impervious Area

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

**Summary for Subcatchment P4.5: Lots 8-12**

Runoff = 3.79 cfs @ 12.07 hrs, Volume= 11,554 cf, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

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

**Summary for Subcatchment P4.6: Lots 12-13**

Runoff = 1.24 cfs @ 12.09 hrs, Volume= 3,979 cf, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

**Summary for Subcatchment P4.7: Lot 13**

Runoff = 1.19 cfs @ 12.07 hrs, Volume= 3,644 cf, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

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

**Summary for Subcatchment P4.8: Upgradient Lots 8-12**

Runoff = 1.17 cfs @ 12.25 hrs, Volume= 5,452 cf, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.2	330	Total			

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**Summary for Subcatchment P4.9: Lot 51**

Runoff = 1.13 cfs @ 12.07 hrs, Volume= 3,476 cf, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

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

**Summary for Pond IT-8/12: Interceptor Trench**

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 1.70" for 25YearMass event  
 Inflow = 1.17 cfs @ 12.25 hrs, Volume= 5,452 cf  
 Outflow = 1.06 cfs @ 12.33 hrs, Volume= 5,450 cf, Atten= 9%, Lag= 5.2 min  
 Primary = 1.06 cfs @ 12.33 hrs, Volume= 5,450 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 681.03' @ 12.33 hrs Surf.Area= 1,050 sf Storage= 380 cf

Plug-Flow detention time= 12.1 min calculated for 5,448 cf (100% of inflow)  
 Center-of-Mass det. time= 11.9 min ( 893.3 - 881.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	<b>3.00'W x 350.00'L x 3.00'H Prismaoid</b> 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	<b>8.0" Round Culvert</b> L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=1.06 cfs @ 12.33 hrs HW=681.03' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 1.06 cfs @ 3.03 fps)



**Summary for Pond RG-4.1: Rain Garden 4.1**

Inflow Area = 118,185 sf, 58.15% Impervious, Inflow Depth = 3.45" for 25YearMass event  
 Inflow = 9.27 cfs @ 12.13 hrs, Volume= 34,008 cf  
 Outflow = 4.20 cfs @ 12.48 hrs, Volume= 34,009 cf, Atten= 55%, Lag= 20.6 min  
 Discarded = 0.72 cfs @ 12.12 hrs, Volume= 15,577 cf  
 Primary = 3.48 cfs @ 12.48 hrs, Volume= 18,432 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 672.98' @ 12.48 hrs Surf.Area= 12,960 sf Storage= 9,977 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 72.1 min ( 872.7 - 800.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	5,184 cf	<b>12.00'W x 360.00'L x 3.00'H Soil Media and Gravel</b> 12,960 cf Overall x 40.0% Voids
#2	671.75'	540 cf	<b>12.00'W x 360.00'L x 0.25'H Mulch</b> 1,080 cf Overall x 50.0% Voids
#3	672.00'	8,640 cf	<b>12.00'W x 360.00'L x 2.00'H Ponding</b>
		14,364 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	670.75'	<b>8.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	670.75'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 2	671.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#5	Device 2	673.25'	<b>8.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	673.25'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#7	Secondary	673.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.72 cfs @ 12.12 hrs HW=672.02' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.72 cfs)

**Primary OutFlow** Max=3.48 cfs @ 12.48 hrs HW=672.98' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 3.48 cfs of 9.27 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 1.37 cfs @ 6.99 fps)

↑ **4=Orifice/Grate** (Orifice Controls 2.10 cfs @ 6.03 fps)

↑ **5=Orifice/Grate** ( Controls 0.00 cfs)

↑ **6=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)

↑ **7=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond RG-4.2: Rain Garden 4.2**

Inflow Area = 67,515 sf, 49.31% Impervious, Inflow Depth = 3.69" for 25YearMass event  
 Inflow = 5.91 cfs @ 12.13 hrs, Volume= 20,742 cf  
 Outflow = 3.19 cfs @ 12.43 hrs, Volume= 20,744 cf, Atten= 46%, Lag= 17.8 min  
 Discarded = 0.40 cfs @ 12.10 hrs, Volume= 8,665 cf  
 Primary = 2.79 cfs @ 12.43 hrs, Volume= 12,079 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 679.87' @ 12.43 hrs Surf.Area= 7,200 sf Storage= 5,267 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 70.2 min ( 875.4 - 805.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	<b>10.00'W x 240.00'L x 3.00'H Soil Media and Gravel</b> 7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	<b>10.00'W x 240.00'L x 0.25'H Mulch</b> 600 cf Overall x 50.0% Voids
#3	679.00'	4,800 cf	<b>10.00'W x 240.00'L x 2.00'H Ponding</b>
		7,980 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	678.25'	<b>5.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	680.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	680.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.40 cfs @ 12.10 hrs HW=679.02' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.40 cfs)

**Primary OutFlow** Max=2.79 cfs @ 12.43 hrs HW=679.87' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 2.79 cfs of 3.88 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.45 cfs @ 6.87 fps)

↑ **4=Orifice/Grate** (Orifice Controls 2.34 cfs @ 5.72 fps)

↑ **5=Orifice/Grate** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)

↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

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**Summary for Pond RG12: Rain Garden 12**

Inflow Area = 10,675 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event  
 Inflow = 1.24 cfs @ 12.09 hrs, Volume= 3,979 cf  
 Outflow = 1.07 cfs @ 12.14 hrs, Volume= 3,978 cf, Atten= 14%, Lag= 2.9 min  
 Primary = 1.07 cfs @ 12.14 hrs, Volume= 3,978 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 690.17' @ 12.14 hrs Surf.Area= 720 sf Storage= 542 cf

Plug-Flow detention time= 15.9 min calculated for 3,978 cf (100% of inflow)  
 Center-of-Mass det. time= 15.9 min ( 815.8 - 799.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	686.25'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	689.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.07 cfs @ 12.14 hrs HW=690.17' TW=679.22' (Dynamic Tailwater)

- 1=Culvert (Passes 1.07 cfs of 1.81 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.35 cfs @ 1.34 fps)
- 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.43 fps)
- 4=Orifice/Grate (Orifice Controls 0.51 cfs @ 5.90 fps)

**Summary for Pond RG13: Rain Garden 13**

Inflow Area = 9,545 sf, 65.00% Impervious, Inflow Depth = 4.58" for 25YearMass event  
 Inflow = 1.19 cfs @ 12.07 hrs, Volume= 3,644 cf  
 Outflow = 0.94 cfs @ 12.13 hrs, Volume= 3,643 cf, Atten= 21%, Lag= 3.5 min  
 Primary = 0.94 cfs @ 12.13 hrs, Volume= 3,643 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 698.63' @ 12.13 hrs Surf.Area= 720 sf Storage= 532 cf

Plug-Flow detention time= 16.1 min calculated for 3,643 cf (100% of inflow)  
 Center-of-Mass det. time= 16.0 min ( 811.7 - 795.7 )

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Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	694.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	697.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	698.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	697.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.94 cfs @ 12.13 hrs HW=698.62' TW=679.17' (Dynamic Tailwater)

- 1=Culvert (Passes 0.94 cfs of 1.80 cfs potential flow)  
 2=Orifice/Grate (Weir Controls 0.23 cfs @ 1.16 fps)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.38 fps)  
 4=Orifice/Grate (Orifice Controls 0.51 cfs @ 5.81 fps)

### Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 4.58" for 25YearMass event  
 Inflow = 1.13 cfs @ 12.07 hrs, Volume= 3,476 cf  
 Outflow = 0.85 cfs @ 12.14 hrs, Volume= 3,475 cf, Atten= 25%, Lag= 4.0 min  
 Primary = 0.85 cfs @ 12.14 hrs, Volume= 3,475 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 695.59' @ 12.14 hrs Surf.Area= 720 sf Storage= 488 cf

Plug-Flow detention time= 14.4 min calculated for 3,474 cf (100% of inflow)

Center-of-Mass det. time= 14.4 min ( 810.1 - 795.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	691.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	695.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	694.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.84 cfs @ 12.14 hrs HW=695.59' TW=679.21' (Dynamic Tailwater)

- 1=Culvert (Passes 0.84 cfs of 1.79 cfs potential flow)  
 2=Orifice/Grate (Weir Controls 0.14 cfs @ 0.98 fps)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.33 fps)  
 4=Orifice/Grate (Orifice Controls 0.50 cfs @ 5.74 fps)

**Summary for Pond RG57-59: Rain Gardens 57,58,59**

Inflow Area = 21,890 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event  
 Inflow = 2.67 cfs @ 12.07 hrs, Volume= 8,159 cf  
 Outflow = 1.81 cfs @ 12.15 hrs, Volume= 8,159 cf, Atten= 32%, Lag= 4.7 min  
 Discarded = 0.12 cfs @ 12.03 hrs, Volume= 3,054 cf  
 Primary = 1.69 cfs @ 12.15 hrs, Volume= 5,105 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 690.96' @ 12.15 hrs Surf.Area= 2,160 sf Storage= 1,372 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 75.3 min ( 873.9 - 798.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	689.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	689.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

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**Discarded OutFlow** Max=0.12 cfs @ 12.03 hrs HW=690.53' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.12 cfs)**Primary OutFlow** Max=1.69 cfs @ 12.15 hrs HW=690.96' TW=679.27' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.69 cfs of 3.43 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.40 cfs @ 6.15 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.29 cfs @ 4.93 fps)**Summary for Pond RG6-7: Rain Gardens 6,7**

Inflow Area = 21,240 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event  
 Inflow = 2.60 cfs @ 12.07 hrs, Volume= 7,916 cf  
 Outflow = 1.96 cfs @ 12.14 hrs, Volume= 7,916 cf, Atten= 25%, Lag= 3.9 min  
 Primary = 1.96 cfs @ 12.14 hrs, Volume= 7,916 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 680.64' @ 12.14 hrs Surf.Area= 1,800 sf Storage= 1,235 cf

Plug-Flow detention time= 17.7 min calculated for 7,916 cf (100% of inflow)

Center-of-Mass det. time= 17.6 min ( 816.2 - 798.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	680.00'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	680.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	679.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.95 cfs @ 12.14 hrs HW=680.64' TW=672.10' (Dynamic Tailwater)↑ **1=Culvert** (Passes 1.95 cfs of 3.61 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 0.52 cfs @ 1.21 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 9.39 fps)↑ **4=Orifice/Grate** (Orifice Controls 1.02 cfs @ 5.84 fps)

**Summary for Pond RG60-64: Rain Gardens 60-64**

Inflow Area = 36,090 sf, 65.00% Impervious, Inflow Depth = 4.80" for 25YearMass event  
 Inflow = 4.66 cfs @ 12.07 hrs, Volume= 14,434 cf  
 Outflow = 3.01 cfs @ 12.16 hrs, Volume= 14,435 cf, Atten= 35%, Lag= 5.1 min  
 Discarded = 0.25 cfs @ 12.03 hrs, Volume= 6,182 cf  
 Primary = 2.21 cfs @ 12.16 hrs, Volume= 6,603 cf  
 Secondary = 0.55 cfs @ 12.16 hrs, Volume= 1,651 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 687.42' @ 12.16 hrs Surf.Area= 4,500 sf Storage= 2,755 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 79.0 min ( 868.5 - 789.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	<b>12.0" Round Pipe Storage</b> x 5 Inside #2 L= 60.0'
#2	683.75'	1,706 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 5 4,500 cf Overall - 236 cf Embedded = 4,264 cf x 40.0% Voids
#3	686.75'	188 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 5 375 cf Overall x 50.0% Voids
#4	687.00'	1,500 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 5
		3,629 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	685.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	687.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#7	Device 3	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	686.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#9	Device 3	686.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Discarded OutFlow** Max=0.25 cfs @ 12.03 hrs HW=687.02' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.25 cfs)**Primary OutFlow** Max=2.21 cfs @ 12.16 hrs HW=687.42' TW=672.20' (Dynamic Tailwater)↑ **2=Culvert** (Passes 2.21 cfs of 4.50 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **6=Orifice/Grate** (Orifice Controls 0.53 cfs @ 6.06 fps)↑ **8=Orifice/Grate** (Orifice Controls 1.68 cfs @ 4.82 fps)**Secondary OutFlow** Max=0.55 cfs @ 12.16 hrs HW=687.42' TW=679.30' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.55 cfs of 1.13 cfs potential flow)↑ **5=Orifice/Grate** ( Controls 0.00 cfs)↑ **7=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.06 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.82 fps)**Summary for Pond RG65-66: Rain Gardens 65-66**

Inflow Area = 12,305 sf, 65.00% Impervious, Inflow Depth = 5.13" for 25YearMass event  
 Inflow = 1.66 cfs @ 12.07 hrs, Volume= 5,264 cf  
 Outflow = 1.13 cfs @ 12.15 hrs, Volume= 5,264 cf, Atten= 32%, Lag= 4.6 min  
 Discarded = 0.10 cfs @ 12.04 hrs, Volume= 2,435 cf  
 Primary = 1.03 cfs @ 12.15 hrs, Volume= 2,830 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.78' @ 12.15 hrs Surf.Area= 1,800 sf Storage= 1,018 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 80.7 min ( 859.9 - 779.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	675.25'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	678.25'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	678.50'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 675.15' S= 0.2100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600



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**Discarded OutFlow** Max=0.10 cfs @ 12.04 hrs HW=678.50' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.10 cfs)**Primary OutFlow** Max=1.03 cfs @ 12.15 hrs HW=678.78' TW=672.16' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.03 cfs of 2.14 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.79 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.78 cfs @ 4.47 fps)**Summary for Pond RG67: Rain Garden 67**

Inflow Area = 5,090 sf, 65.00% Impervious, Inflow Depth = 5.13" for 25YearMass event  
 Inflow = 0.69 cfs @ 12.07 hrs, Volume= 2,177 cf  
 Outflow = 0.51 cfs @ 12.14 hrs, Volume= 2,178 cf, Atten= 26%, Lag= 3.9 min  
 Discarded = 0.05 cfs @ 12.08 hrs, Volume= 1,165 cf  
 Primary = 0.46 cfs @ 12.14 hrs, Volume= 1,012 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.59' @ 12.14 hrs Surf.Area= 900 sf Storage= 487 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 99.1 min ( 878.3 - 779.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	318 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 106 cf Embedded = 794 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Discarded OutFlow** Max=0.05 cfs @ 12.08 hrs HW=678.52' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.05 cfs)**Primary OutFlow** Max=0.46 cfs @ 12.14 hrs HW=678.59' TW=672.10' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.46 cfs of 0.99 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.39 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.34 cfs @ 3.94 fps)**Summary for Pond RG8-11: Rain Gardens 8-11**

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event  
 Inflow = 3.79 cfs @ 12.07 hrs, Volume= 11,554 cf  
 Outflow = 2.45 cfs @ 12.16 hrs, Volume= 11,553 cf, Atten= 35%, Lag= 5.1 min  
 Primary = 2.45 cfs @ 12.16 hrs, Volume= 11,553 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 679.17' @ 12.16 hrs Surf.Area= 3,600 sf Storage= 2,051 cf

Plug-Flow detention time= 19.9 min calculated for 11,553 cf (100% of inflow)

Center-of-Mass det. time= 19.8 min ( 818.5 - 798.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	424 cf	<b>18.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	675.75'	1,270 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 424 cf Embedded = 3,176 cf x 40.0% Voids
#3	678.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		3,044 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	678.00'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

**Primary OutFlow** Max=2.45 cfs @ 12.16 hrs HW=679.17' TW=672.20' (Dynamic Tailwater)↑ **1=Culvert** (Passes 2.45 cfs of 6.73 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.77 cfs @ 8.80 fps)↑ **4=Orifice/Grate** (Orifice Controls 1.68 cfs @ 4.83 fps)

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**Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)**

Inflow Area = 314,740 sf, 32.41% Impervious, Inflow Depth = 2.39" for 25YearMass event  
Inflow = 12.87 cfs @ 12.12 hrs, Volume= 62,669 cf  
Primary = 12.87 cfs @ 12.12 hrs, Volume= 62,669 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P4.1: To Wetland A (A32-A47)**

Runoff = 11.98 cfs @ 12.10 hrs, Volume= 38,478 cf, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
73,955	77	Woods, Good, HSG D
5,565	61	>75% Grass cover, Good, HSG B
10,490	80	>75% Grass cover, Good, HSG D
90,640	76	Weighted Average
90,640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.9	185	Total			

**Summary for Subcatchment P4.10: To RG4.1**

Runoff = 1.77 cfs @ 12.10 hrs, Volume= 5,773 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
12,335	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
12,460	80	Weighted Average
12,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

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**Summary for Subcatchment P4.11: To RG4.2**

Runoff = 1.42 cfs @ 12.11 hrs, Volume= 4,607 cf, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
16,190	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
16,300	61	Weighted Average
16,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
7.0	200	Total			

**Summary for Subcatchment P4.12: Lots 65-67**

Runoff = 2.18 cfs @ 12.07 hrs, Volume= 7,030 cf, Depth= 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
5,410	90	1/8 acre lots, 65% imp, HSG C
6,895	92	1/8 acre lots, 65% imp, HSG D
12,305	91	Weighted Average
4,307		35.00% Pervious Area
7,998		65.00% Impervious Area

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

**Summary for Subcatchment P4.13: Lots 6-8**

Runoff = 3.51 cfs @ 12.07 hrs, Volume= 10,878 cf, Depth= 6.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

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Area (sf)	CN	Description
20,970	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
21,240	85	Weighted Average
7,434		35.00% Pervious Area
13,806		65.00% Impervious Area

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

**Summary for Subcatchment P4.14: Lots 67-68**

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 2,908 cf, Depth= 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
2,290	90	1/8 acre lots, 65% imp, HSG C
2,800	92	1/8 acre lots, 65% imp, HSG D
5,090	91	Weighted Average
1,782		35.00% Pervious Area
3,309		65.00% Impervious Area

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

**Summary for Subcatchment P4.2: Lots 57-60**

Runoff = 3.62 cfs @ 12.07 hrs, Volume= 11,211 cf, Depth= 6.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
21,890	85	1/8 acre lots, 65% imp, HSG B
7,662		35.00% Pervious Area
14,229		65.00% Impervious Area

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

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**Summary for Subcatchment P4.4: Lots 60-65**

Runoff = 6.20 cfs @ 12.07 hrs, Volume= 19,548 cf, Depth= 6.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
10,990	92	1/8 acre lots, 65% imp, HSG D
3,680	90	1/8 acre lots, 65% imp, HSG C
36,090	88	Weighted Average
12,632		35.00% Pervious Area
23,459		65.00% Impervious Area

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

**Summary for Subcatchment P4.5: Lots 8-12**

Runoff = 5.13 cfs @ 12.07 hrs, Volume= 15,876 cf, Depth= 6.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

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

**Summary for Subcatchment P4.6: Lots 12-13**

Runoff = 1.68 cfs @ 12.09 hrs, Volume= 5,467 cf, Depth= 6.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

**Summary for Subcatchment P4.7: Lot 13**

Runoff = 1.60 cfs @ 12.07 hrs, Volume= 4,982 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

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

**Summary for Subcatchment P4.8: Upgradient Lots 8-12**

Runoff = 2.07 cfs @ 12.23 hrs, Volume= 9,101 cf, Depth= 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
16.2	330	Total			



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**Summary for Subcatchment P4.9: Lot 51**

Runoff = 1.53 cfs @ 12.07 hrs, Volume= 4,752 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

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

**Summary for Pond IT-8/12: Interceptor Trench**

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 2.84" for 100YearMass event  
 Inflow = 2.07 cfs @ 12.23 hrs, Volume= 9,101 cf  
 Outflow = 1.77 cfs @ 12.34 hrs, Volume= 9,099 cf, Atten= 14%, Lag= 6.6 min  
 Primary = 1.77 cfs @ 12.34 hrs, Volume= 9,099 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 681.75' @ 12.34 hrs Surf.Area= 1,050 sf Storage= 682 cf

Plug-Flow detention time= 10.2 min calculated for 9,099 cf (100% of inflow)  
 Center-of-Mass det. time= 10.1 min ( 875.3 - 865.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	<b>3.00'W x 350.00'L x 3.00'H Prismaoid</b> 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	<b>8.0" Round Culvert</b> L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 ' S= 0.0549 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=1.77 cfs @ 12.34 hrs HW=681.75' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 1.77 cfs @ 5.08 fps)

### Summary for Pond RG-4.1: Rain Garden 4.1

Inflow Area = 118,185 sf, 58.15% Impervious, Inflow Depth = 4.92" for 100YearMass event  
 Inflow = 14.21 cfs @ 12.13 hrs, Volume= 48,503 cf  
 Outflow = 7.82 cfs @ 12.39 hrs, Volume= 48,507 cf, Atten= 45%, Lag= 15.3 min  
 Discarded = 0.72 cfs @ 11.98 hrs, Volume= 18,192 cf  
 Primary = 7.10 cfs @ 12.39 hrs, Volume= 30,315 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 673.59' @ 12.39 hrs Surf.Area= 12,960 sf Storage= 12,592 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 64.7 min ( 858.4 - 793.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	5,184 cf	<b>12.00'W x 360.00'L x 3.00'H Soil Media and Gravel</b> 12,960 cf Overall x 40.0% Voids
#2	671.75'	540 cf	<b>12.00'W x 360.00'L x 0.25'H Mulch</b> 1,080 cf Overall x 50.0% Voids
#3	672.00'	8,640 cf	<b>12.00'W x 360.00'L x 2.00'H Ponding</b>
		14,364 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	670.75'	<b>8.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	670.75'	<b>3.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 2	671.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#5	Device 2	673.25'	<b>8.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	673.25'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#7	Secondary	673.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.72 cfs @ 11.98 hrs HW=672.00' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.72 cfs)

**Primary OutFlow** Max=7.10 cfs @ 12.39 hrs HW=673.59' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 7.10 cfs of 10.64 cfs potential flow)  
 ↑ **3=Orifice/Grate** (Orifice Controls 1.56 cfs @ 7.93 fps)  
 ↑ **4=Orifice/Grate** (Orifice Controls 2.48 cfs @ 7.10 fps)  
 ↑ **5=Orifice/Grate** (Orifice Controls 1.96 cfs @ 2.81 fps)  
 ↑ **6=Orifice/Grate** (Orifice Controls 1.10 cfs @ 2.81 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)

↑ **7=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

### Summary for Pond RG-4.2: Rain Garden 4.2

Inflow Area = 67,515 sf, 49.31% Impervious, Inflow Depth = 5.37" for 100YearMass event  
 Inflow = 9.59 cfs @ 12.12 hrs, Volume= 30,188 cf  
 Outflow = 4.97 cfs @ 12.31 hrs, Volume= 30,188 cf, Atten= 48%, Lag= 11.9 min  
 Discarded = 0.40 cfs @ 11.95 hrs, Volume= 10,219 cf  
 Primary = 4.56 cfs @ 12.31 hrs, Volume= 19,969 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 680.67' @ 12.31 hrs Surf.Area= 7,200 sf Storage= 7,194 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 62.8 min ( 862.5 - 799.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	<b>10.00'W x 240.00'L x 3.00'H Soil Media and Gravel</b> 7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	<b>10.00'W x 240.00'L x 0.25'H Mulch</b> 600 cf Overall x 50.0% Voids
#3	679.00'	4,800 cf	<b>10.00'W x 240.00'L x 2.00'H Ponding</b>
		7,980 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#4	Device 2	678.25'	<b>5.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	680.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#6	Secondary	680.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.40 cfs @ 11.95 hrs HW=679.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.40 cfs)

**Primary OutFlow** Max=4.56 cfs @ 12.31 hrs HW=680.67' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 4.56 cfs of 4.64 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 8.11 fps)

↑ **4=Orifice/Grate** (Orifice Controls 2.93 cfs @ 7.16 fps)

↑ **5=Orifice/Grate** (Weir Controls 1.10 cfs @ 1.36 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)

↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

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**Summary for Pond RG12: Rain Garden 12**

Inflow Area = 10,675 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event  
 Inflow = 1.68 cfs @ 12.09 hrs, Volume= 5,467 cf  
 Outflow = 1.45 cfs @ 12.14 hrs, Volume= 5,467 cf, Atten= 14%, Lag= 2.9 min  
 Primary = 1.45 cfs @ 12.14 hrs, Volume= 5,467 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 690.50' @ 12.14 hrs Surf.Area= 720 sf Storage= 621 cf

Plug-Flow detention time= 15.5 min calculated for 5,467 cf (100% of inflow)  
 Center-of-Mass det. time= 15.4 min ( 806.5 - 791.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	686.25'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	689.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	689.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	688.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.45 cfs @ 12.14 hrs HW=690.50' TW=680.07' (Dynamic Tailwater)

- 1=Culvert (Passes 1.45 cfs of 1.89 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.67 cfs @ 3.40 fps)
- 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.83 fps)
- 4=Orifice/Grate (Orifice Controls 0.57 cfs @ 6.52 fps)

**Summary for Pond RG13: Rain Garden 13**

Inflow Area = 9,545 sf, 65.00% Impervious, Inflow Depth = 6.26" for 100YearMass event  
 Inflow = 1.60 cfs @ 12.07 hrs, Volume= 4,982 cf  
 Outflow = 1.37 cfs @ 12.12 hrs, Volume= 4,982 cf, Atten= 15%, Lag= 2.7 min  
 Primary = 1.37 cfs @ 12.12 hrs, Volume= 4,982 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 698.90' @ 12.12 hrs Surf.Area= 720 sf Storage= 599 cf

Plug-Flow detention time= 15.5 min calculated for 4,980 cf (100% of inflow)  
 Center-of-Mass det. time= 15.5 min ( 802.6 - 787.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	694.75'	246 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	697.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	698.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		622 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	697.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.37 cfs @ 12.12 hrs HW=698.90' TW=679.88' (Dynamic Tailwater)

- 1=Culvert (Passes 1.37 cfs of 1.87 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.60 cfs @ 3.06 fps)  
 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.71 fps)  
 4=Orifice/Grate (Orifice Controls 0.55 cfs @ 6.35 fps)

### Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 6.26" for 100YearMass event  
 Inflow = 1.53 cfs @ 12.07 hrs, Volume= 4,752 cf  
 Outflow = 1.31 cfs @ 12.12 hrs, Volume= 4,752 cf, Atten= 14%, Lag= 2.7 min  
 Primary = 1.31 cfs @ 12.12 hrs, Volume= 4,752 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 695.84' @ 12.12 hrs Surf.Area= 720 sf Storage= 549 cf

Plug-Flow detention time= 14.0 min calculated for 4,752 cf (100% of inflow)

Center-of-Mass det. time= 14.0 min ( 801.1 - 787.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	691.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	695.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	694.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.31 cfs @ 12.12 hrs HW=695.84' TW=679.87' (Dynamic Tailwater)

- 1=Culvert (Passes 1.31 cfs of 1.85 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.55 cfs @ 2.82 fps)  
 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.64 fps)  
 4=Orifice/Grate (Orifice Controls 0.54 cfs @ 6.23 fps)

**Summary for Pond RG57-59: Rain Gardens 57,58,59**

Inflow Area = 21,890 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event  
 Inflow = 3.62 cfs @ 12.07 hrs, Volume= 11,211 cf  
 Outflow = 3.22 cfs @ 12.11 hrs, Volume= 11,211 cf, Atten= 11%, Lag= 2.3 min  
 Discarded = 0.12 cfs @ 11.98 hrs, Volume= 3,357 cf  
 Primary = 3.10 cfs @ 12.11 hrs, Volume= 7,855 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 691.19' @ 12.11 hrs Surf.Area= 2,160 sf Storage= 1,538 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 62.6 min ( 852.5 - 789.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 3 180 cf Overall x 50.0% Voids
#4	690.50'	720 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		1,759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	689.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	689.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

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**Discarded OutFlow** Max=0.12 cfs @ 11.98 hrs HW=690.52' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.12 cfs)**Primary OutFlow** Max=3.10 cfs @ 12.11 hrs HW=691.19' TW=679.81' (Dynamic Tailwater)↑ **2=Culvert** (Passes 3.10 cfs of 3.69 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 1.25 cfs @ 2.11 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.43 cfs @ 6.57 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.42 cfs @ 5.44 fps)**Summary for Pond RG6-7: Rain Gardens 6,7**

Inflow Area = 21,240 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event  
 Inflow = 3.51 cfs @ 12.07 hrs, Volume= 10,878 cf  
 Outflow = 2.84 cfs @ 12.13 hrs, Volume= 10,877 cf, Atten= 19%, Lag= 3.3 min  
 Primary = 2.84 cfs @ 12.13 hrs, Volume= 10,877 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 680.96' @ 12.13 hrs Surf.Area= 1,800 sf Storage= 1,429 cf

Plug-Flow detention time= 17.0 min calculated for 10,873 cf (100% of inflow)

Center-of-Mass det. time= 17.0 min ( 806.8 - 789.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	680.00'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	680.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	679.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=2.84 cfs @ 12.13 hrs HW=680.96' TW=672.80' (Dynamic Tailwater)↑ **1=Culvert** (Passes 2.84 cfs of 3.76 cfs potential flow)↑ **2=Orifice/Grate** (Orifice Controls 1.28 cfs @ 3.27 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.43 cfs @ 9.78 fps)↑ **4=Orifice/Grate** (Orifice Controls 1.13 cfs @ 6.45 fps)

**Summary for Pond RG60-64: Rain Gardens 60-64**

Inflow Area = 36,090 sf, 65.00% Impervious, Inflow Depth = 6.50" for 100YearMass event  
 Inflow = 6.20 cfs @ 12.07 hrs, Volume= 19,548 cf  
 Outflow = 5.20 cfs @ 12.12 hrs, Volume= 19,549 cf, Atten= 16%, Lag= 3.0 min  
 Discarded = 0.25 cfs @ 11.98 hrs, Volume= 6,921 cf  
 Primary = 3.96 cfs @ 12.12 hrs, Volume= 10,103 cf  
 Secondary = 0.99 cfs @ 12.12 hrs, Volume= 2,526 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 687.67' @ 12.12 hrs Surf.Area= 4,500 sf Storage= 3,141 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 69.4 min ( 850.9 - 781.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	<b>12.0" Round Pipe Storage</b> x 5 Inside #2 L= 60.0'
#2	683.75'	1,706 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 5 4,500 cf Overall - 236 cf Embedded = 4,264 cf x 40.0% Voids
#3	686.75'	188 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 5 375 cf Overall x 50.0% Voids
#4	687.00'	1,500 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 5
		3,629 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	685.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	687.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#7	Device 3	685.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#8	Device 2	686.25'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#9	Device 3	686.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600



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**Discarded OutFlow** Max=0.25 cfs @ 11.98 hrs HW=687.02' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.25 cfs)**Primary OutFlow** Max=3.95 cfs @ 12.12 hrs HW=687.67' TW=672.76' (Dynamic Tailwater)↑ **2=Culvert** (Passes 3.95 cfs of 4.89 cfs potential flow)↑ **4=Orifice/Grate** (Weir Controls 1.50 cfs @ 1.37 fps)↑ **6=Orifice/Grate** (Orifice Controls 0.57 cfs @ 6.53 fps)↑ **8=Orifice/Grate** (Orifice Controls 1.88 cfs @ 5.40 fps)**Secondary OutFlow** Max=0.99 cfs @ 12.12 hrs HW=687.67' TW=679.91' (Dynamic Tailwater)↑ **3=Culvert** (Passes 0.99 cfs of 1.22 cfs potential flow)↑ **5=Orifice/Grate** (Weir Controls 0.37 cfs @ 1.37 fps)↑ **7=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.53 fps)↑ **9=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.40 fps)**Summary for Pond RG65-66: Rain Gardens 65-66**

Inflow Area = 12,305 sf, 65.00% Impervious, Inflow Depth = 6.86" for 100YearMass event

Inflow = 2.18 cfs @ 12.07 hrs, Volume= 7,030 cf

Outflow = 1.60 cfs @ 12.14 hrs, Volume= 7,030 cf, Atten= 27%, Lag= 4.1 min

Discarded = 0.10 cfs @ 12.00 hrs, Volume= 2,744 cf

Primary = 1.50 cfs @ 12.14 hrs, Volume= 4,286 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 679.10' @ 12.14 hrs Surf.Area= 1,800 sf Storage= 1,210 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 72.9 min ( 844.8 - 771.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	675.25'	682 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	678.25'	75 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 2 150 cf Overall x 50.0% Voids
#4	678.50'	600 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,452 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 675.15' S= 0.2100 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

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**Discarded OutFlow** Max=0.10 cfs @ 12.00 hrs HW=678.51' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.10 cfs)**Primary OutFlow** Max=1.50 cfs @ 12.14 hrs HW=679.10' TW=672.91' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.50 cfs of 2.39 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 0.31 cfs @ 1.02 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.28 cfs @ 6.39 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.91 cfs @ 5.23 fps)**Summary for Pond RG67: Rain Garden 67**

Inflow Area = 5,090 sf, 65.00% Impervious, Inflow Depth = 6.86" for 100YearMass event  
 Inflow = 0.90 cfs @ 12.07 hrs, Volume= 2,908 cf  
 Outflow = 0.59 cfs @ 12.15 hrs, Volume= 2,908 cf, Atten= 34%, Lag= 4.9 min  
 Discarded = 0.05 cfs @ 12.03 hrs, Volume= 1,317 cf  
 Primary = 0.54 cfs @ 12.15 hrs, Volume= 1,590 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.88' @ 12.15 hrs Surf.Area= 900 sf Storage= 575 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 88.7 min ( 860.6 - 771.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	106 cf	<b>18.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	318 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 106 cf Embedded = 794 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	677.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	677.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Discarded OutFlow** Max=0.05 cfs @ 12.03 hrs HW=678.51' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.05 cfs)**Primary OutFlow** Max=0.54 cfs @ 12.15 hrs HW=678.88' TW=673.02' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.54 cfs of 1.11 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.13 cfs @ 5.99 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.72 fps)**Summary for Pond RG8-11: Rain Gardens 8-11**

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event  
 Inflow = 5.13 cfs @ 12.07 hrs, Volume= 15,876 cf  
 Outflow = 3.80 cfs @ 12.14 hrs, Volume= 15,875 cf, Atten= 26%, Lag= 4.0 min  
 Primary = 3.80 cfs @ 12.14 hrs, Volume= 15,875 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 679.63' @ 12.14 hrs Surf.Area= 3,600 sf Storage= 2,599 cf

Plug-Flow detention time= 19.3 min calculated for 15,870 cf (100% of inflow)

Center-of-Mass det. time= 19.3 min ( 809.1 - 789.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	424 cf	<b>18.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	675.75'	1,270 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 424 cf Embedded = 3,176 cf x 40.0% Voids
#3	678.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		3,044 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	678.00'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

**Primary OutFlow** Max=3.79 cfs @ 12.14 hrs HW=679.63' TW=672.91' (Dynamic Tailwater)↑ **1=Culvert** (Passes 3.79 cfs of 7.20 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 0.94 cfs @ 1.17 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.82 cfs @ 9.38 fps)↑ **4=Orifice/Grate** (Orifice Controls 2.03 cfs @ 5.82 fps)

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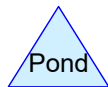
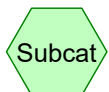
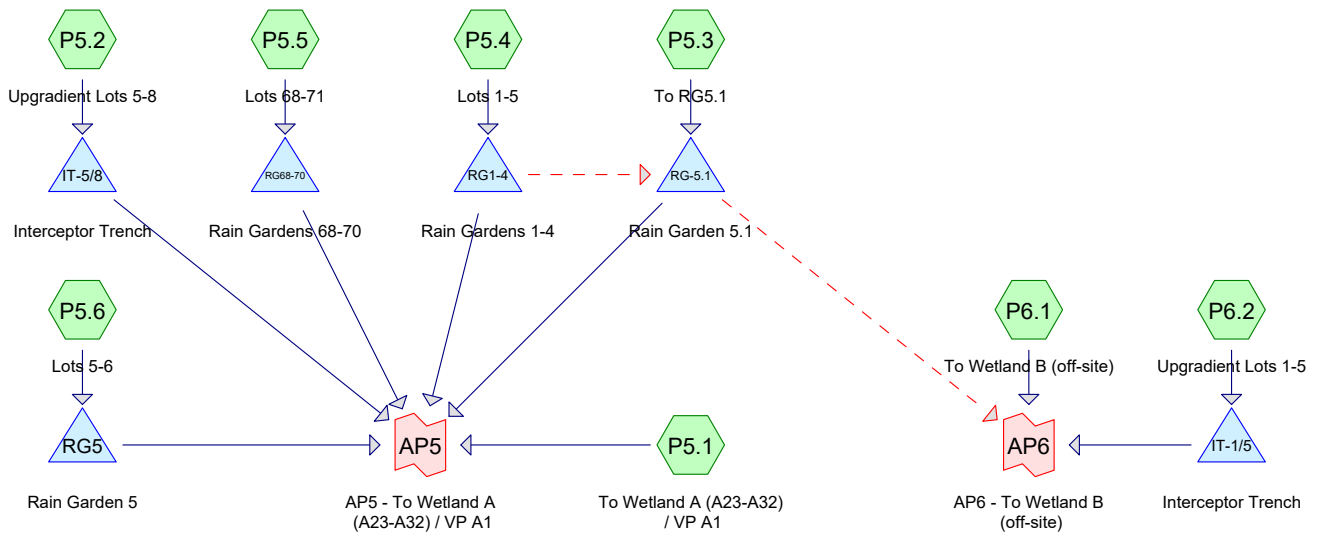
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**Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)**

Inflow Area = 314,740 sf, 32.41% Impervious, Inflow Depth = 3.73" for 100YearMass event  
Inflow = 18.78 cfs @ 12.27 hrs, Volume= 97,860 cf  
Primary = 18.78 cfs @ 12.27 hrs, Volume= 97,860 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs





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**Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1**

Runoff = 1.79 cfs @ 12.13 hrs, Volume= 6,307 cf, Depth&gt; 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
20,990	70	Woods, Good, HSG C
29,875	77	Woods, Good, HSG D
6,885	80	>75% Grass cover, Good, HSG D
9,200	74	>75% Grass cover, Good, HSG C
700	98	Unconnected roofs, HSG C
67,650	75	Weighted Average
66,950		98.97% Pervious Area
700		1.03% Impervious Area
700		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	60	0.0300	0.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.5	110	Total			

**Summary for Subcatchment P5.2: Upgradient Lots 5-8**

Runoff = 0.11 cfs @ 12.34 hrs, Volume= 813 cf, Depth&gt; 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
315	61	>75% Grass cover, Good, HSG B
1,160	74	>75% Grass cover, Good, HSG C
27,260	55	Woods, Good, HSG B
1,605	70	Woods, Good, HSG C
30,340	57	Weighted Average
30,340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	55	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.0	155	Total			

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P5.3: To RG5.1**

Runoff = 1.36 cfs @ 12.07 hrs, Volume= 4,116 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
22,410	90	1/8 acre lots, 65% imp, HSG C
7,844		35.00% Pervious Area
14,567		65.00% Impervious Area

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

**Summary for Subcatchment P5.4: Lots 1-5**

Runoff = 1.72 cfs @ 12.07 hrs, Volume= 5,193 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
28,275	90	1/8 acre lots, 65% imp, HSG C
9,896		35.00% Pervious Area
18,379		65.00% Impervious Area

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

**Summary for Subcatchment P5.5: Lots 68-71**

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 3,480 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
17,630	90	1/8 acre lots, 65% imp, HSG C
1,320	92	1/8 acre lots, 65% imp, HSG D
18,950	90	Weighted Average
6,633		35.00% Pervious Area
12,318		65.00% Impervious Area



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Type III 24-hr 2YearMass Rainfall=3.24"

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

**Summary for Subcatchment P5.6: Lots 5-6**

Runoff = 0.40 cfs @ 12.07 hrs, Volume= 1,205 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,560	90	1/8 acre lots, 65% imp, HSG C
2,296		35.00% Pervious Area
4,264		65.00% Impervious Area

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

**Summary for Subcatchment P6.1: To Wetland B (off-site)**

Runoff = 1.28 cfs @ 12.14 hrs, Volume= 4,951 cf, Depth&gt; 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P6.2: Upgradient Lots 1-5**

Runoff = 0.29 cfs @ 12.20 hrs, Volume= 1,678 cf, Depth&gt; 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
3,760	74	>75% Grass cover, Good, HSG C
28,400	55	Woods, Good, HSG B
11,745	70	Woods, Good, HSG C
43,905	61	Weighted Average
43,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.9	210	Total			

**Summary for Pond IT-1/5: Interceptor Trench**

Inflow Area = 43,905 sf, 0.00% Impervious, Inflow Depth > 0.46" for 2YearMass event  
 Inflow = 0.29 cfs @ 12.20 hrs, Volume= 1,678 cf  
 Outflow = 0.25 cfs @ 12.38 hrs, Volume= 1,653 cf, Atten= 16%, Lag= 10.7 min  
 Primary = 0.25 cfs @ 12.38 hrs, Volume= 1,653 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 677.28' @ 12.38 hrs Surf.Area= 945 sf Storage= 131 cf

Plug-Flow detention time= 18.1 min calculated for 1,652 cf (98% of inflow)  
 Center-of-Mass det. time= 10.5 min ( 926.1 - 915.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	1,090 cf	<b>3.00'W x 315.00'L x 3.00'H Prismatic</b> 2,835 cf Overall - 110 cf Embedded = 2,725 cf x 40.0% Voids
#2	677.00'	110 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 315.0'
		1,200 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	<b>8.0" Round Culvert</b> L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=0.25 cfs @ 12.38 hrs HW=677.28' TW=0.00' (Dynamic Tailwater)

1=Culvert (Inlet Controls 0.25 cfs @ 1.79 fps)

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Pond IT-5/8: Interceptor Trench**

Inflow Area = 30,340 sf, 0.00% Impervious, Inflow Depth > 0.32" for 2YearMass event  
 Inflow = 0.11 cfs @ 12.34 hrs, Volume= 813 cf  
 Outflow = 0.10 cfs @ 12.44 hrs, Volume= 802 cf, Atten= 8%, Lag= 6.4 min  
 Primary = 0.10 cfs @ 12.44 hrs, Volume= 802 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 680.17' @ 12.44 hrs Surf.Area= 600 sf Storage= 49 cf

Plug-Flow detention time= 16.4 min calculated for 802 cf (99% of inflow)  
 Center-of-Mass det. time= 9.3 min ( 948.4 - 939.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	692 cf	<b>3.00'W x 200.00'L x 3.00'H Prismaoid</b> 1,800 cf Overall - 70 cf Embedded = 1,730 cf x 40.0% Voids
#2	680.00'	70 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 200.0'
		762 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	<b>8.0" Round Culvert</b> L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 670.00' S= 0.0500 ' S= 0.0500 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=0.10 cfs @ 12.44 hrs HW=680.17' TW=0.00' (Dynamic Tailwater)  
 ↑1=Culvert (Inlet Controls 0.10 cfs @ 1.40 fps)

**Summary for Pond RG-5.1: Rain Garden 5.1**

Inflow Area = 22,410 sf, 65.00% Impervious, Inflow Depth > 2.90" for 2YearMass event  
 Inflow = 1.48 cfs @ 12.07 hrs, Volume= 5,407 cf  
 Outflow = 0.52 cfs @ 12.43 hrs, Volume= 5,408 cf, Atten= 65%, Lag= 21.3 min  
 Discarded = 0.13 cfs @ 12.40 hrs, Volume= 3,616 cf  
 Primary = 0.38 cfs @ 12.43 hrs, Volume= 1,791 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 672.96' @ 12.43 hrs Surf.Area= 2,400 sf Storage= 1,587 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 102.3 min ( 911.7 - 809.4 )

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Type III 24-hr 2YearMass Rainfall=3.24"

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Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	39 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 50.0'
#2	669.75'	1,424 cf	<b>20.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 3,600 cf Overall - 39 cf Embedded = 3,561 cf x 40.0% Voids
#3	672.75'	150 cf	<b>20.00'W x 60.00'L x 0.25'H Mulch</b> 300 cf Overall x 50.0% Voids
#4	673.00'	2,400 cf	<b>20.00'W x 60.00'L x 2.00'H Ponding</b>
		4,014 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	669.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	671.75'	<b>12.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 ' S= 0.0500 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	674.00'	<b>10.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	671.75'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	672.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#6	Secondary	674.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.13 cfs @ 12.40 hrs HW=672.95' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.13 cfs)**Primary OutFlow** Max=0.38 cfs @ 12.43 hrs HW=672.96' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.38 cfs of 3.18 cfs potential flow)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.01 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.77 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG1-4: Rain Gardens 1-4**

Inflow Area = 28,275 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 1.72 cfs @ 12.07 hrs, Volume= 5,193 cf  
 Outflow = 0.61 cfs @ 12.33 hrs, Volume= 5,166 cf, Atten= 64%, Lag= 15.5 min  
 Primary = 0.46 cfs @ 12.33 hrs, Volume= 3,875 cf  
 Secondary = 0.15 cfs @ 12.33 hrs, Volume= 1,292 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 675.96' @ 12.33 hrs Surf.Area= 1,200 sf Storage= 1,172 cf

Plug-Flow detention time= 21.9 min calculated for 5,164 cf (99% of inflow)  
 Center-of-Mass det. time= 18.7 min ( 823.6 - 805.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	673.75'	1,365 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	676.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	677.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,903 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	673.75'	<b>6.0" Round Culvert</b> L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.00' S= 0.0115 ' S= 0.0115 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	677.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	673.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#6	Device 2	673.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 1	676.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#8	Device 2	676.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.46 cfs @ 12.33 hrs HW=675.96' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.46 cfs of 3.97 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 0.46 cfs @ 7.01 fps)  
 7=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.15 cfs @ 12.33 hrs HW=675.96' TW=672.92' (Dynamic Tailwater)

2=Culvert (Passes 0.15 cfs of 0.96 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.15 cfs @ 7.01 fps)  
 8=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Pond RG5: Rain Garden 5**

Inflow Area = 6,560 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.40 cfs @ 12.07 hrs, Volume= 1,205 cf  
 Outflow = 0.15 cfs @ 12.32 hrs, Volume= 1,198 cf, Atten= 64%, Lag= 15.0 min  
 Primary = 0.15 cfs @ 12.32 hrs, Volume= 1,198 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 677.24' @ 12.32 hrs Surf.Area= 300 sf Storage= 267 cf

Plug-Flow detention time= 21.5 min calculated for 1,198 cf (99% of inflow)

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Type III 24-hr 2YearMass Rainfall=3.24"

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Center-of-Mass det. time= 18.2 min ( 823.1 - 805.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	341 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		726 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.25' / 675.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.14 cfs @ 12.32 hrs HW=677.24' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.14 cfs of 1.25 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.65 fps)

**Summary for Pond RG68-70: Rain Gardens 68-70**

Inflow Area = 18,950 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 1.15 cfs @ 12.07 hrs, Volume= 3,480 cf  
 Outflow = 0.49 cfs @ 12.26 hrs, Volume= 3,480 cf, Atten= 58%, Lag= 11.3 min  
 Discarded = 0.05 cfs @ 11.27 hrs, Volume= 2,533 cf  
 Primary = 0.44 cfs @ 12.26 hrs, Volume= 948 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 673.92' @ 12.26 hrs Surf.Area= 900 sf Storage= 1,048 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 113.5 min ( 918.5 - 805.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	671.25'	1,023 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,700 cf Overall - 141 cf Embedded = 2,559 cf x 40.0% Voids
#3	674.25'	113 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 3 225 cf Overall x 50.0% Voids
#4	674.50'	900 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		2,177 cf	Total Available Storage

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Type III 24-hr 2YearMass Rainfall=3.24"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	673.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	673.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Discarded OutFlow** Max=0.05 cfs @ 11.27 hrs HW=671.29' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.05 cfs)**Primary OutFlow** Max=0.44 cfs @ 12.26 hrs HW=673.92' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.44 cfs of 1.63 cfs potential flow)↑ **3=Orifice/Grate** (Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 3.70 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.20 cfs @ 1.42 fps)**Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1**

Inflow Area = 174,185 sf, 28.84% Impervious, Inflow Depth &gt; 1.03" for 2YearMass event

Inflow = 2.71 cfs @ 12.21 hrs, Volume= 14,921 cf

Primary = 2.71 cfs @ 12.21 hrs, Volume= 14,921 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**Summary for Link AP6: AP6 - To Wetland B (off-site)**

Inflow Area = 113,860 sf, 0.00% Impervious, Inflow Depth &gt; 0.70" for 2YearMass event

Inflow = 1.35 cfs @ 12.15 hrs, Volume= 6,603 cf

Primary = 1.35 cfs @ 12.15 hrs, Volume= 6,603 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1**

Runoff = 4.15 cfs @ 12.12 hrs, Volume= 14,012 cf, Depth&gt; 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
20,990	70	Woods, Good, HSG C
29,875	77	Woods, Good, HSG D
6,885	80	>75% Grass cover, Good, HSG D
9,200	74	>75% Grass cover, Good, HSG C
700	98	Unconnected roofs, HSG C
67,650	75	Weighted Average
66,950		98.97% Pervious Area
700		1.03% Impervious Area
700		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	60	0.0300	0.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.5	110	Total			

**Summary for Subcatchment P5.2: Upgradient Lots 5-8**

Runoff = 0.68 cfs @ 12.16 hrs, Volume= 2,851 cf, Depth&gt; 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
315	61	>75% Grass cover, Good, HSG B
1,160	74	>75% Grass cover, Good, HSG C
27,260	55	Woods, Good, HSG B
1,605	70	Woods, Good, HSG C
30,340	57	Weighted Average
30,340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	55	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.0	155	Total			



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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P5.3: To RG5.1**

Runoff = 2.36 cfs @ 12.07 hrs, Volume= 7,323 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
22,410	90	1/8 acre lots, 65% imp, HSG C
7,844		35.00% Pervious Area
14,567		65.00% Impervious Area

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

**Summary for Subcatchment P5.4: Lots 1-5**

Runoff = 2.98 cfs @ 12.07 hrs, Volume= 9,240 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
28,275	90	1/8 acre lots, 65% imp, HSG C
9,896		35.00% Pervious Area
18,379		65.00% Impervious Area

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

**Summary for Subcatchment P5.5: Lots 68-71**

Runoff = 2.00 cfs @ 12.07 hrs, Volume= 6,193 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
17,630	90	1/8 acre lots, 65% imp, HSG C
1,320	92	1/8 acre lots, 65% imp, HSG D
18,950	90	Weighted Average
6,633		35.00% Pervious Area
12,318		65.00% Impervious Area

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

**Summary for Subcatchment P5.6: Lots 5-6**

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 2,144 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,560	90	1/8 acre lots, 65% imp, HSG C
2,296		35.00% Pervious Area
4,264		65.00% Impervious Area

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

**Summary for Subcatchment P6.1: To Wetland B (off-site)**

Runoff = 3.43 cfs @ 12.13 hrs, Volume= 12,062 cf, Depth&gt; 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			

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**Summary for Subcatchment P6.2: Upgradient Lots 1-5**

Runoff = 1.27 cfs @ 12.17 hrs, Volume= 5,104 cf, Depth&gt; 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
3,760	74	>75% Grass cover, Good, HSG C
28,400	55	Woods, Good, HSG B
11,745	70	Woods, Good, HSG C
43,905	61	Weighted Average
43,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.9	210	Total			

**Summary for Pond IT-1/5: Interceptor Trench**

Inflow Area = 43,905 sf, 0.00% Impervious, Inflow Depth > 1.39" for 10YearMass event  
 Inflow = 1.27 cfs @ 12.17 hrs, Volume= 5,104 cf  
 Outflow = 1.11 cfs @ 12.24 hrs, Volume= 5,065 cf, Atten= 13%, Lag= 4.3 min  
 Primary = 1.11 cfs @ 12.24 hrs, Volume= 5,065 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 677.77' @ 12.24 hrs Surf.Area= 945 sf Storage= 357 cf

Plug-Flow detention time= 10.9 min calculated for 5,065 cf (99% of inflow)  
 Center-of-Mass det. time= 6.7 min ( 881.1 - 874.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	1,090 cf	<b>3.00'W x 315.00'L x 3.00'H Prismatic</b> 2,835 cf Overall - 110 cf Embedded = 2,725 cf x 40.0% Voids
#2	677.00'	110 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 315.0'
		1,200 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	<b>8.0" Round Culvert</b> L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=1.11 cfs @ 12.24 hrs HW=677.77' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.11 cfs @ 3.18 fps)

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**Summary for Pond IT-5/8: Interceptor Trench**

Inflow Area = 30,340 sf, 0.00% Impervious, Inflow Depth > 1.13" for 10YearMass event  
 Inflow = 0.68 cfs @ 12.16 hrs, Volume= 2,851 cf  
 Outflow = 0.63 cfs @ 12.21 hrs, Volume= 2,833 cf, Atten= 7%, Lag= 2.8 min  
 Primary = 0.63 cfs @ 12.21 hrs, Volume= 2,833 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 680.48' @ 12.21 hrs Surf.Area= 600 sf Storage= 147 cf

Plug-Flow detention time= 8.9 min calculated for 2,833 cf (99% of inflow)  
 Center-of-Mass det. time= 5.3 min ( 891.7 - 886.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	692 cf	<b>3.00'W x 200.00'L x 3.00'H Prismaoid</b> 1,800 cf Overall - 70 cf Embedded = 1,730 cf x 40.0% Voids
#2	680.00'	70 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 200.0'
		762 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	<b>8.0" Round Culvert</b> L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 670.00' S= 0.0500 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=0.63 cfs @ 12.21 hrs HW=680.48' TW=0.00' (Dynamic Tailwater)  
 ↑1=Culvert (Inlet Controls 0.63 cfs @ 2.36 fps)

**Summary for Pond RG-5.1: Rain Garden 5.1**

Inflow Area = 22,410 sf, 65.00% Impervious, Inflow Depth > 5.15" for 10YearMass event  
 Inflow = 2.80 cfs @ 12.08 hrs, Volume= 9,616 cf  
 Outflow = 1.11 cfs @ 12.34 hrs, Volume= 9,204 cf, Atten= 60%, Lag= 15.7 min  
 Discarded = 0.20 cfs @ 12.01 hrs, Volume= 4,718 cf  
 Primary = 0.91 cfs @ 12.34 hrs, Volume= 4,486 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 674.10' @ 12.34 hrs Surf.Area= 3,600 sf Storage= 2,932 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 61.6 min ( 854.5 - 792.9 )

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Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	39 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 50.0'
#2	669.75'	1,424 cf	<b>20.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 3,600 cf Overall - 39 cf Embedded = 3,561 cf x 40.0% Voids
#3	672.75'	150 cf	<b>20.00'W x 60.00'L x 0.25'H Mulch</b> 300 cf Overall x 50.0% Voids
#4	673.00'	2,400 cf	<b>20.00'W x 60.00'L x 2.00'H Ponding</b>
		4,014 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	669.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	671.75'	<b>12.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 ' S= 0.0500 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	674.00'	<b>10.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	671.75'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	672.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#6	Secondary	674.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.20 cfs @ 12.01 hrs HW=673.02' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.20 cfs)**Primary OutFlow** Max=0.91 cfs @ 12.34 hrs HW=674.10' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.91 cfs of 5.14 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 0.27 cfs @ 1.03 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.35 cfs @ 7.18 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.29 cfs @ 5.85 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG1-4: Rain Gardens 1-4**

Inflow Area = 28,275 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 2.98 cfs @ 12.07 hrs, Volume= 9,240 cf  
 Outflow = 2.11 cfs @ 12.14 hrs, Volume= 9,205 cf, Atten= 29%, Lag= 4.3 min  
 Primary = 1.58 cfs @ 12.14 hrs, Volume= 6,912 cf  
 Secondary = 0.53 cfs @ 12.14 hrs, Volume= 2,293 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 676.84' @ 12.14 hrs Surf.Area= 2,400 sf Storage= 1,609 cf

Plug-Flow detention time= 18.8 min calculated for 9,201 cf (100% of inflow)  
 Center-of-Mass det. time= 16.4 min ( 805.3 - 789.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	673.75'	1,365 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	676.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	677.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,903 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	673.75'	<b>6.0" Round Culvert</b> L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.00' S= 0.0115 ' S= 0.0115 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	677.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	673.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#6	Device 2	673.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 1	676.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#8	Device 2	676.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.58 cfs @ 12.14 hrs HW=676.84' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 1.58 cfs of 4.78 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 0.55 cfs @ 8.35 fps)  
 7=Orifice/Grate (Orifice Controls 1.04 cfs @ 3.96 fps)

**Secondary OutFlow** Max=0.53 cfs @ 12.14 hrs HW=676.84' TW=673.74' (Dynamic Tailwater)

2=Culvert (Passes 0.53 cfs of 1.08 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.35 fps)  
 8=Orifice/Grate (Orifice Controls 0.35 cfs @ 3.96 fps)

**Summary for Pond RG5: Rain Garden 5**

Inflow Area = 6,560 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.69 cfs @ 12.07 hrs, Volume= 2,144 cf  
 Outflow = 0.20 cfs @ 12.40 hrs, Volume= 2,135 cf, Atten= 71%, Lag= 19.5 min  
 Primary = 0.20 cfs @ 12.40 hrs, Volume= 2,135 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.91' @ 12.40 hrs Surf.Area= 900 sf Storage= 548 cf

Plug-Flow detention time= 26.4 min calculated for 2,135 cf (100% of inflow)

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Center-of-Mass det. time= 23.9 min ( 812.8 - 789.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	341 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		726 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.25' / 675.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.20 cfs @ 12.40 hrs HW=678.91' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.20 cfs of 1.75 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.10 fps)

**Summary for Pond RG68-70: Rain Gardens 68-70**

Inflow Area = 18,950 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 2.00 cfs @ 12.07 hrs, Volume= 6,193 cf  
 Outflow = 1.51 cfs @ 12.13 hrs, Volume= 5,949 cf, Atten= 24%, Lag= 3.8 min  
 Discarded = 0.15 cfs @ 12.09 hrs, Volume= 3,015 cf  
 Primary = 1.36 cfs @ 12.13 hrs, Volume= 2,934 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 674.56' @ 12.13 hrs Surf.Area= 2,700 sf Storage= 1,333 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 63.8 min ( 852.8 - 789.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	671.25'	1,023 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,700 cf Overall - 141 cf Embedded = 2,559 cf x 40.0% Voids
#3	674.25'	113 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 3 225 cf Overall x 50.0% Voids
#4	674.50'	900 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		2,177 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	673.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.15' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	673.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Discarded OutFlow** Max=0.15 cfs @ 12.09 hrs HW=674.52' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.15 cfs)**Primary OutFlow** Max=1.36 cfs @ 12.13 hrs HW=674.56' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.36 cfs of 2.92 cfs potential flow)↑ **3=Orifice/Grate** (Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.35 cfs @ 5.34 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.01 cfs @ 3.87 fps)**Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1**

Inflow Area = 174,185 sf, 28.84% Impervious, Inflow Depth &gt; 2.29" for 10YearMass event

Inflow = 8.32 cfs @ 12.14 hrs, Volume= 33,313 cf

Primary = 8.32 cfs @ 12.14 hrs, Volume= 33,313 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**Summary for Link AP6: AP6 - To Wetland B (off-site)**

Inflow Area = 113,860 sf, 0.00% Impervious, Inflow Depth &gt; 1.81" for 10YearMass event

Inflow = 4.32 cfs @ 12.15 hrs, Volume= 17,127 cf

Primary = 4.32 cfs @ 12.15 hrs, Volume= 17,127 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1**

Runoff = 5.74 cfs @ 12.12 hrs, Volume= 19,338 cf, Depth&gt; 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
20,990	70	Woods, Good, HSG C
29,875	77	Woods, Good, HSG D
6,885	80	>75% Grass cover, Good, HSG D
9,200	74	>75% Grass cover, Good, HSG C
700	98	Unconnected roofs, HSG C
67,650	75	Weighted Average
66,950		98.97% Pervious Area
700		1.03% Impervious Area
700		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	60	0.0300	0.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.5	110	Total			

**Summary for Subcatchment P5.2: Upgradient Lots 5-8**

Runoff = 1.17 cfs @ 12.15 hrs, Volume= 4,504 cf, Depth&gt; 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
315	61	>75% Grass cover, Good, HSG B
1,160	74	>75% Grass cover, Good, HSG C
27,260	55	Woods, Good, HSG B
1,605	70	Woods, Good, HSG C
30,340	57	Weighted Average
30,340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	55	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.0	155	Total			

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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P5.3: To RG5.1**

Runoff = 2.99 cfs @ 12.07 hrs, Volume= 9,370 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
22,410	90	1/8 acre lots, 65% imp, HSG C
7,844		35.00% Pervious Area
14,567		65.00% Impervious Area

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

**Summary for Subcatchment P5.4: Lots 1-5**

Runoff = 3.77 cfs @ 12.07 hrs, Volume= 11,823 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
28,275	90	1/8 acre lots, 65% imp, HSG C
9,896		35.00% Pervious Area
18,379		65.00% Impervious Area

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

**Summary for Subcatchment P5.5: Lots 68-71**

Runoff = 2.52 cfs @ 12.07 hrs, Volume= 7,924 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
17,630	90	1/8 acre lots, 65% imp, HSG C
1,320	92	1/8 acre lots, 65% imp, HSG D
18,950	90	Weighted Average
6,633		35.00% Pervious Area
12,318		65.00% Impervious Area

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

**Summary for Subcatchment P5.6: Lots 5-6**

Runoff = 0.87 cfs @ 12.07 hrs, Volume= 2,743 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,560	90	1/8 acre lots, 65% imp, HSG C
2,296		35.00% Pervious Area
4,264		65.00% Impervious Area

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

**Summary for Subcatchment P6.1: To Wetland B (off-site)**

Runoff = 4.95 cfs @ 12.13 hrs, Volume= 17,156 cf, Depth&gt; 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			

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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P6.2: Upgradient Lots 1-5**

Runoff = 2.03 cfs @ 12.16 hrs, Volume= 7,760 cf, Depth&gt; 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
3,760	74	>75% Grass cover, Good, HSG C
28,400	55	Woods, Good, HSG B
11,745	70	Woods, Good, HSG C
43,905	61	Weighted Average
43,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.9	210	Total			

**Summary for Pond IT-1/5: Interceptor Trench**

Inflow Area = 43,905 sf, 0.00% Impervious, Inflow Depth > 2.12" for 25YearMass event  
 Inflow = 2.03 cfs @ 12.16 hrs, Volume= 7,760 cf  
 Outflow = 1.69 cfs @ 12.25 hrs, Volume= 7,714 cf, Atten= 17%, Lag= 5.1 min  
 Primary = 1.69 cfs @ 12.25 hrs, Volume= 7,714 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 678.34' @ 12.25 hrs Surf.Area= 945 sf Storage= 574 cf

Plug-Flow detention time= 9.4 min calculated for 7,711 cf (99% of inflow)  
 Center-of-Mass det. time= 6.0 min ( 867.4 - 861.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	1,090 cf	<b>3.00'W x 315.00'L x 3.00'H Prismatic</b> 2,835 cf Overall - 110 cf Embedded = 2,725 cf x 40.0% Voids
#2	677.00'	110 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 315.0'
		1,200 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	<b>8.0" Round Culvert</b> L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=1.69 cfs @ 12.25 hrs HW=678.34' TW=0.00' (Dynamic Tailwater)

1=Culvert (Inlet Controls 1.69 cfs @ 4.84 fps)

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**Summary for Pond IT-5/8: Interceptor Trench**

Inflow Area = 30,340 sf, 0.00% Impervious, Inflow Depth > 1.78" for 25YearMass event  
 Inflow = 1.17 cfs @ 12.15 hrs, Volume= 4,504 cf  
 Outflow = 1.08 cfs @ 12.20 hrs, Volume= 4,482 cf, Atten= 7%, Lag= 2.8 min  
 Primary = 1.08 cfs @ 12.20 hrs, Volume= 4,482 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 680.75' @ 12.20 hrs Surf.Area= 600 sf Storage= 221 cf

Plug-Flow detention time= 7.3 min calculated for 4,480 cf (99% of inflow)  
 Center-of-Mass det. time= 4.5 min ( 875.7 - 871.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	692 cf	<b>3.00'W x 200.00'L x 3.00'H Prismaoid</b> 1,800 cf Overall - 70 cf Embedded = 1,730 cf x 40.0% Voids
#2	680.00'	70 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 200.0'
		762 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	<b>8.0" Round Culvert</b> L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 670.00' S= 0.0500 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=1.08 cfs @ 12.20 hrs HW=680.75' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 1.08 cfs @ 3.10 fps)

**Summary for Pond RG-5.1: Rain Garden 5.1**

Inflow Area = 22,410 sf, 65.00% Impervious, Inflow Depth > 6.59" for 25YearMass event  
 Inflow = 3.56 cfs @ 12.07 hrs, Volume= 12,299 cf  
 Outflow = 2.24 cfs @ 12.18 hrs, Volume= 11,666 cf, Atten= 37%, Lag= 6.5 min  
 Discarded = 0.20 cfs @ 11.88 hrs, Volume= 5,060 cf  
 Primary = 2.04 cfs @ 12.18 hrs, Volume= 6,606 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 674.29' @ 12.18 hrs Surf.Area= 3,600 sf Storage= 3,166 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 46.3 min ( 832.5 - 786.2 )

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Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	39 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 50.0'
#2	669.75'	1,424 cf	<b>20.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 3,600 cf Overall - 39 cf Embedded = 3,561 cf x 40.0% Voids
#3	672.75'	150 cf	<b>20.00'W x 60.00'L x 0.25'H Mulch</b> 300 cf Overall x 50.0% Voids
#4	673.00'	2,400 cf	<b>20.00'W x 60.00'L x 2.00'H Ponding</b>
		4,014 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	669.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	671.75'	<b>12.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 ' S= 0.0500 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	674.00'	<b>10.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	671.75'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	672.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#6	Secondary	674.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.20 cfs @ 11.88 hrs HW=673.02' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.20 cfs)**Primary OutFlow** Max=2.03 cfs @ 12.18 hrs HW=674.29' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 2.03 cfs of 5.41 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 1.36 cfs @ 1.77 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.37 cfs @ 7.49 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.22 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG1-4: Rain Gardens 1-4**

Inflow Area = 28,275 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
Inflow = 3.77 cfs @ 12.07 hrs, Volume= 11,823 cf  
Outflow = 2.47 cfs @ 12.15 hrs, Volume= 11,783 cf, Atten= 34%, Lag= 4.9 min  
Primary = 1.86 cfs @ 12.15 hrs, Volume= 8,854 cf  
Secondary = 0.61 cfs @ 12.15 hrs, Volume= 2,929 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Peak Elev= 677.20' @ 12.15 hrs Surf.Area= 3,600 sf Storage= 1,949 cf

Plug-Flow detention time= 18.0 min calculated for 11,778 cf (100% of inflow)  
Center-of-Mass det. time= 15.8 min ( 798.2 - 782.3 )

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Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	188 cf	<b>12.0" Round Pipe Storage x 4</b> Inside #2 L= 60.0'
#2	673.75'	1,365 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravelx 4</b> 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	676.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch x 4</b> 300 cf Overall x 50.0% Voids
#4	677.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding x 4</b>
		2,903 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	673.75'	<b>6.0" Round Culvert</b> L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.00' S= 0.0115 ' S= 0.0115 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	677.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	673.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#6	Device 2	673.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 1	676.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#8	Device 2	676.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.86 cfs @ 12.15 hrs HW=677.20' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 1.86 cfs of 5.08 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 0.58 cfs @ 8.84 fps)  
 7=Orifice/Grate (Orifice Controls 1.28 cfs @ 4.90 fps)

**Secondary OutFlow** Max=0.61 cfs @ 12.15 hrs HW=677.20' TW=674.27' (Dynamic Tailwater)

2=Culvert (Passes 0.61 cfs of 1.05 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.25 fps)  
 8=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.90 fps)

**Summary for Pond RG5: Rain Garden 5**

Inflow Area = 6,560 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 0.87 cfs @ 12.07 hrs, Volume= 2,743 cf  
 Outflow = 0.48 cfs @ 12.18 hrs, Volume= 2,734 cf, Atten= 45%, Lag= 6.6 min  
 Primary = 0.48 cfs @ 12.18 hrs, Volume= 2,734 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 679.14' @ 12.18 hrs Surf.Area= 900 sf Storage= 618 cf

Plug-Flow detention time= 25.4 min calculated for 2,732 cf (100% of inflow)

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Center-of-Mass det. time= 23.2 min ( 805.5 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	341 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		726 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.25' / 675.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.48 cfs @ 12.18 hrs HW=679.14' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.48 cfs of 1.80 cfs potential flow)  
 2=Orifice/Grate (Weir Controls 0.27 cfs @ 1.23 fps)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.40 fps)

**Summary for Pond RG68-70: Rain Gardens 68-70**

Inflow Area =	18,950 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow =	2.52 cfs @ 12.07 hrs, Volume= 7,924 cf
Outflow =	1.71 cfs @ 12.15 hrs, Volume= 7,514 cf, Atten= 32%, Lag= 4.7 min
Discarded =	0.15 cfs @ 12.04 hrs, Volume= 3,218 cf
Primary =	1.56 cfs @ 12.15 hrs, Volume= 4,296 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 674.79' @ 12.15 hrs Surf.Area= 2,700 sf Storage= 1,539 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 45.5 min ( 827.9 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	671.25'	1,023 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,700 cf Overall - 141 cf Embedded = 2,559 cf x 40.0% Voids
#3	674.25'	113 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 3 225 cf Overall x 50.0% Voids
#4	674.50'	900 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		2,177 cf	Total Available Storage



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Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	673.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	673.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Discarded OutFlow** Max=0.15 cfs @ 12.04 hrs HW=674.51' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.15 cfs)**Primary OutFlow** Max=1.56 cfs @ 12.15 hrs HW=674.79' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.56 cfs of 3.22 cfs potential flow)↑ **3=Orifice/Grate** (Controls 0.00 cfs)↑ **4=Orifice/Grate** (Orifice Controls 0.38 cfs @ 5.81 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.18 cfs @ 4.50 fps)**Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1**

Inflow Area = 174,185 sf, 28.84% Impervious, Inflow Depth &gt; 3.19" for 25YearMass event

Inflow = 12.22 cfs @ 12.15 hrs, Volume= 46,309 cf

Primary = 12.22 cfs @ 12.15 hrs, Volume= 46,309 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**Summary for Link AP6: AP6 - To Wetland B (off-site)**

Inflow Area = 113,860 sf, 0.00% Impervious, Inflow Depth &gt; 2.62" for 25YearMass event

Inflow = 6.33 cfs @ 12.14 hrs, Volume= 24,870 cf

Primary = 6.33 cfs @ 12.14 hrs, Volume= 24,870 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1**

Runoff = 8.29 cfs @ 12.12 hrs, Volume= 28,023 cf, Depth&gt; 4.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
20,990	70	Woods, Good, HSG C
29,875	77	Woods, Good, HSG D
6,885	80	>75% Grass cover, Good, HSG D
9,200	74	>75% Grass cover, Good, HSG C
700	98	Unconnected roofs, HSG C
67,650	75	Weighted Average
66,950		98.97% Pervious Area
700		1.03% Impervious Area
700		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	60	0.0300	0.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.5	110	Total			

**Summary for Subcatchment P5.2: Upgradient Lots 5-8**

Runoff = 2.04 cfs @ 12.15 hrs, Volume= 7,447 cf, Depth&gt; 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
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Area (sf)	CN	Description
315	61	>75% Grass cover, Good, HSG B
1,160	74	>75% Grass cover, Good, HSG C
27,260	55	Woods, Good, HSG B
1,605	70	Woods, Good, HSG C
30,340	57	Weighted Average
30,340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	55	0.1200	1.73		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.0	155	Total			

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**Summary for Subcatchment P5.3: To RG5.1**

Runoff = 3.94 cfs @ 12.07 hrs, Volume= 12,572 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
22,410	90	1/8 acre lots, 65% imp, HSG C
7,844		35.00% Pervious Area
14,567		65.00% Impervious Area

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

**Summary for Subcatchment P5.4: Lots 1-5**

Runoff = 4.97 cfs @ 12.07 hrs, Volume= 15,862 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
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Area (sf)	CN	Description
28,275	90	1/8 acre lots, 65% imp, HSG C
9,896		35.00% Pervious Area
18,379		65.00% Impervious Area

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

**Summary for Subcatchment P5.5: Lots 68-71**

Runoff = 3.33 cfs @ 12.07 hrs, Volume= 10,631 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
17,630	90	1/8 acre lots, 65% imp, HSG C
1,320	92	1/8 acre lots, 65% imp, HSG D
18,950	90	Weighted Average
6,633		35.00% Pervious Area
12,318		65.00% Impervious Area

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

**Summary for Subcatchment P5.6: Lots 5-6**

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 3,680 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,560	90	1/8 acre lots, 65% imp, HSG C
2,296		35.00% Pervious Area
4,264		65.00% Impervious Area

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

**Summary for Subcatchment P6.1: To Wetland B (off-site)**

Runoff = 7.44 cfs @ 12.13 hrs, Volume= 25,628 cf, Depth&gt; 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.2	385	Total			

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**Summary for Subcatchment P6.2: Upgradient Lots 1-5**

Runoff = 3.35 cfs @ 12.15 hrs, Volume= 12,377 cf, Depth&gt; 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
3,760	74	>75% Grass cover, Good, HSG C
28,400	55	Woods, Good, HSG B
11,745	70	Woods, Good, HSG C
43,905	61	Weighted Average
43,905		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.9	210	Total			

**Summary for Pond IT-1/5: Interceptor Trench**

Inflow Area = 43,905 sf, 0.00% Impervious, Inflow Depth > 3.38" for 100YearMass event  
 Inflow = 3.35 cfs @ 12.15 hrs, Volume= 12,377 cf  
 Outflow = 2.54 cfs @ 12.27 hrs, Volume= 12,322 cf, Atten= 24%, Lag= 6.7 min  
 Primary = 2.54 cfs @ 12.27 hrs, Volume= 12,322 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 679.65' @ 12.27 hrs Surf.Area= 945 sf Storage= 1,069 cf

Plug-Flow detention time= 8.5 min calculated for 12,322 cf (100% of inflow)  
 Center-of-Mass det. time= 5.9 min ( 853.3 - 847.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	1,090 cf	<b>3.00'W x 315.00'L x 3.00'H Prismatic</b> 2,835 cf Overall - 110 cf Embedded = 2,725 cf x 40.0% Voids
#2	677.00'	110 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 315.0'
		1,200 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	<b>8.0" Round Culvert</b> L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=2.54 cfs @ 12.27 hrs HW=679.65' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 2.54 cfs @ 7.28 fps)

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**Summary for Pond IT-5/8: Interceptor Trench**

Inflow Area = 30,340 sf, 0.00% Impervious, Inflow Depth > 2.95" for 100YearMass event  
 Inflow = 2.04 cfs @ 12.15 hrs, Volume= 7,447 cf  
 Outflow = 1.79 cfs @ 12.21 hrs, Volume= 7,419 cf, Atten= 12%, Lag= 3.6 min  
 Primary = 1.79 cfs @ 12.21 hrs, Volume= 7,419 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 681.47' @ 12.21 hrs Surf.Area= 600 sf Storage= 395 cf

Plug-Flow detention time= 6.1 min calculated for 7,416 cf (100% of inflow)  
 Center-of-Mass det. time= 4.0 min ( 859.7 - 855.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	692 cf	<b>3.00'W x 200.00'L x 3.00'H Prisma</b> 1,800 cf Overall - 70 cf Embedded = 1,730 cf x 40.0% Voids
#2	680.00'	70 cf	<b>8.0" Round Pipe Storage</b> Inside #1 L= 200.0'
		762 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	<b>8.0" Round Culvert</b> L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 670.00' S= 0.0500 ' S= 0.0500 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

**Primary OutFlow** Max=1.79 cfs @ 12.21 hrs HW=681.47' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 1.79 cfs @ 5.14 fps)

**Summary for Pond RG-5.1: Rain Garden 5.1**

Inflow Area = 22,410 sf, 65.00% Impervious, Inflow Depth > 8.83" for 100YearMass event  
 Inflow = 4.57 cfs @ 12.07 hrs, Volume= 16,496 cf  
 Outflow = 3.15 cfs @ 12.17 hrs, Volume= 15,631 cf, Atten= 31%, Lag= 5.7 min  
 Discarded = 0.20 cfs @ 11.72 hrs, Volume= 5,546 cf  
 Primary = 2.95 cfs @ 12.17 hrs, Volume= 10,085 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 674.71' @ 12.17 hrs Surf.Area= 3,600 sf Storage= 3,661 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 34.3 min ( 812.9 - 778.6 )

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Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	39 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 50.0'
#2	669.75'	1,424 cf	<b>20.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 3,600 cf Overall - 39 cf Embedded = 3,561 cf x 40.0% Voids
#3	672.75'	150 cf	<b>20.00'W x 60.00'L x 0.25'H Mulch</b> 300 cf Overall x 50.0% Voids
#4	673.00'	2,400 cf	<b>20.00'W x 60.00'L x 2.00'H Ponding</b>
		4,014 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	669.75'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	671.75'	<b>12.0" Round Culvert</b> L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 ' S= 0.0500 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	674.00'	<b>10.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	671.75'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Device 2	672.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#6	Secondary	674.75'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Discarded OutFlow** Max=0.20 cfs @ 11.72 hrs HW=673.00' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.20 cfs)**Primary OutFlow** Max=2.94 cfs @ 12.17 hrs HW=674.71' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 2.94 cfs of 5.93 cfs potential flow)↑ **3=Orifice/Grate** (Orifice Controls 2.21 cfs @ 4.05 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.40 cfs @ 8.10 fps)↑ **5=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.95 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)↑ **6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG1-4: Rain Gardens 1-4**

Inflow Area = 28,275 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 4.97 cfs @ 12.07 hrs, Volume= 15,862 cf  
 Outflow = 3.60 cfs @ 12.14 hrs, Volume= 15,816 cf, Atten= 27%, Lag= 4.2 min  
 Primary = 2.72 cfs @ 12.14 hrs, Volume= 11,892 cf  
 Secondary = 0.88 cfs @ 12.14 hrs, Volume= 3,924 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 677.61' @ 12.14 hrs Surf.Area= 3,600 sf Storage= 2,440 cf

Plug-Flow detention time= 17.6 min calculated for 15,810 cf (100% of inflow)  
 Center-of-Mass det. time= 15.7 min ( 790.4 - 774.8 )

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Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	673.75'	1,365 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	676.75'	150 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 4 300 cf Overall x 50.0% Voids
#4	677.00'	1,200 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,903 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	673.75'	<b>6.0" Round Culvert</b> L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.00' S= 0.0115 ' S= 0.0115 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	677.50'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	673.75'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#6	Device 2	673.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#7	Device 1	676.00'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#8	Device 2	676.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.72 cfs @ 12.14 hrs HW=677.61' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 2.72 cfs of 5.39 cfs potential flow)  
 3=Orifice/Grate (Weir Controls 0.59 cfs @ 1.10 fps)  
 5=Orifice/Grate (Orifice Controls 0.61 cfs @ 9.36 fps)  
 7=Orifice/Grate (Orifice Controls 1.52 cfs @ 5.79 fps)

**Secondary OutFlow** Max=0.88 cfs @ 12.14 hrs HW=677.61' TW=674.68' (Dynamic Tailwater)

2=Culvert (Passes 0.88 cfs of 1.05 cfs potential flow)  
 4=Orifice/Grate (Weir Controls 0.20 cfs @ 1.10 fps)  
 6=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.24 fps)  
 8=Orifice/Grate (Orifice Controls 0.51 cfs @ 5.79 fps)

**Summary for Pond RG5: Rain Garden 5**

Inflow Area = 6,560 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.15 cfs @ 12.07 hrs, Volume= 3,680 cf  
 Outflow = 0.82 cfs @ 12.14 hrs, Volume= 3,669 cf, Atten= 28%, Lag= 4.2 min  
 Primary = 0.82 cfs @ 12.14 hrs, Volume= 3,669 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 679.42' @ 12.14 hrs Surf.Area= 900 sf Storage= 702 cf

Plug-Flow detention time= 23.3 min calculated for 3,669 cf (100% of inflow)



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Center-of-Mass det. time= 21.3 min ( 796.1 - 774.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	675.25'	341 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	678.25'	38 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> 75 cf Overall x 50.0% Voids
#4	678.50'	300 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b>
		726 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.25'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.25' / 675.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.82 cfs @ 12.14 hrs HW=679.42' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.82 cfs of 1.87 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.61 cfs @ 3.12 fps)  
 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.73 fps)

**Summary for Pond RG68-70: Rain Gardens 68-70**

Inflow Area = 18,950 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 3.33 cfs @ 12.07 hrs, Volume= 10,631 cf  
 Outflow = 2.50 cfs @ 12.14 hrs, Volume= 10,021 cf, Atten= 25%, Lag= 3.9 min  
 Discarded = 0.15 cfs @ 12.00 hrs, Volume= 3,477 cf  
 Primary = 2.35 cfs @ 12.14 hrs, Volume= 6,544 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 675.11' @ 12.14 hrs Surf.Area= 2,700 sf Storage= 1,825 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 30.2 min ( 805.0 - 774.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	141 cf	<b>12.0" Round Pipe Storage</b> x 3 Inside #2 L= 60.0'
#2	671.25'	1,023 cf	<b>5.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 3 2,700 cf Overall - 141 cf Embedded = 2,559 cf x 40.0% Voids
#3	674.25'	113 cf	<b>5.00'W x 60.00'L x 0.25'H Mulch</b> x 3 225 cf Overall x 50.0% Voids
#4	674.50'	900 cf	<b>5.00'W x 60.00'L x 1.00'H Ponding</b> x 3
		2,177 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	673.25'	<b>6.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	<b>6.0" Horiz. Orifice/Grate X 3.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	<b>2.0" Vert. Orifice/Grate X 3.00</b> C= 0.600
#5	Device 2	673.75'	<b>4.0" Vert. Orifice/Grate X 3.00</b> C= 0.600

**Discarded OutFlow** Max=0.15 cfs @ 12.00 hrs HW=674.52' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.15 cfs)**Primary OutFlow** Max=2.34 cfs @ 12.14 hrs HW=675.11' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 2.34 cfs of 3.60 cfs potential flow)↑ **3=Orifice/Grate** (Weir Controls 0.54 cfs @ 1.07 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.42 cfs @ 6.41 fps)↑ **5=Orifice/Grate** (Orifice Controls 1.38 cfs @ 5.25 fps)**Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1**

Inflow Area = 174,185 sf, 28.84% Impervious, Inflow Depth &gt; 4.66" for 100YearMass event

Inflow = 18.53 cfs @ 12.14 hrs, Volume= 67,632 cf

Primary = 18.53 cfs @ 12.14 hrs, Volume= 67,632 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

**Summary for Link AP6: AP6 - To Wetland B (off-site)**

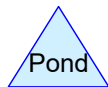
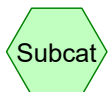
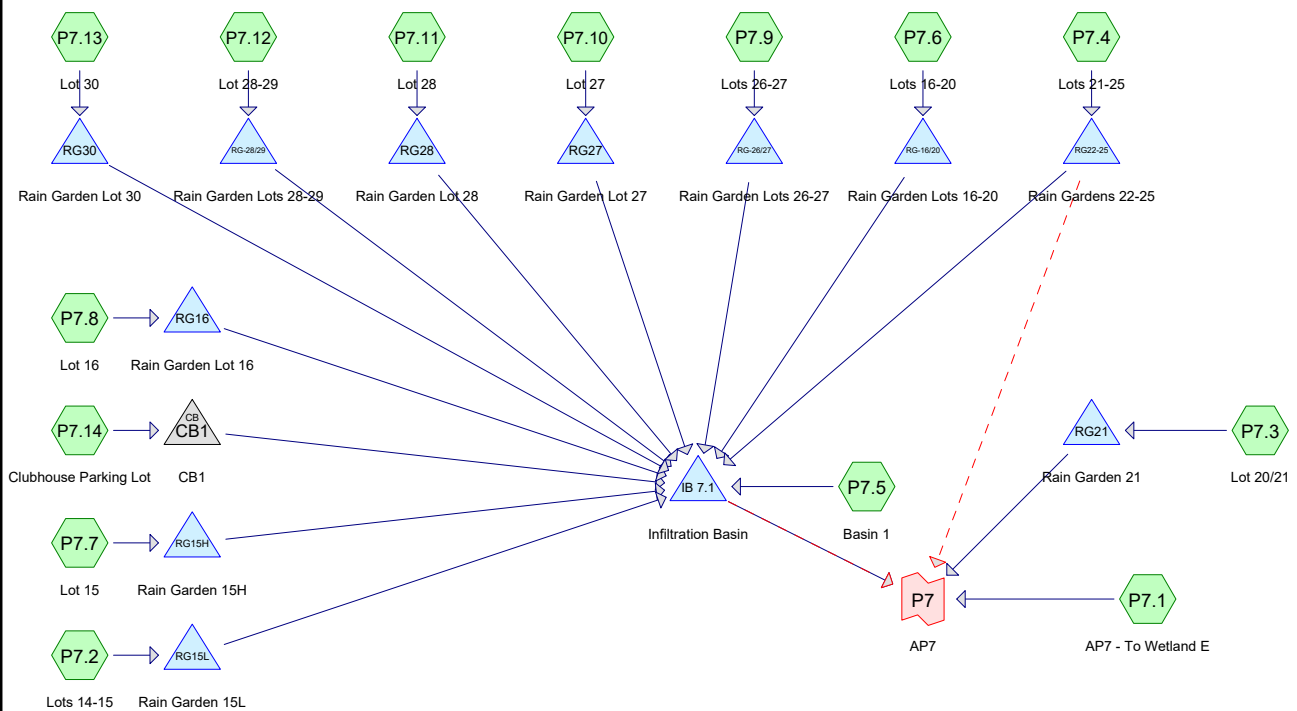
Inflow Area = 113,860 sf, 0.00% Impervious, Inflow Depth &gt; 4.00" for 100YearMass event

Inflow = 9.49 cfs @ 12.14 hrs, Volume= 37,949 cf

Primary = 9.49 cfs @ 12.14 hrs, Volume= 37,949 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs





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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P7.1: AP7 - To Wetland E**

Runoff = 0.27 cfs @ 12.34 hrs, Volume= 2,221 cf, Depth&gt; 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Adj	Description
77,250	55		Woods, Good, HSG B
12,715	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
91,525	57	56	Weighted Average, UI Adjusted
89,965			98.30% Pervious Area
1,560			1.70% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.6	320	Total			

**Summary for Subcatchment P7.10: Lot 27**

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 1,287 cf, Depth&gt; 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
* 3,845	90	Residential Lots, 65% imp, HSG C
2,045	70	Woods, Good, HSG C
940	89	Gravel roads, HSG C
3,970	74	>75% Grass cover, Good, HSG C
10,800	80	Weighted Average
8,301		76.86% Pervious Area
2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

**Summary for Subcatchment P7.11: Lot 28**

Runoff = 0.64 cfs @ 12.17 hrs, Volume= 2,534 cf, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

**Summary for Subcatchment P7.12: Lot 28-29**

Runoff = 1.04 cfs @ 12.07 hrs, Volume= 3,141 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

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

**Summary for Subcatchment P7.13: Lot 30**

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 1,238 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

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	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

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

**Summary for Subcatchment P7.14: Clubhouse Parking Lot**

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf, Depth&gt; 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
	1,410	74	>75% Grass cover, Good, HSG C
	750	98	Roofs, HSG C
	6,100	98	Paved parking, HSG C
	8,260	94	Weighted Average
	1,410		17.07% Pervious Area
	6,850		82.93% Impervious Area

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

**Summary for Subcatchment P7.2: Lots 14-15**

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 1,504 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

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

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**Summary for Subcatchment P7.3: Lot 20/21**

Runoff = 0.45 cfs @ 12.07 hrs, Volume= 1,332 cf, Depth&gt; 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
8,930	85	1/8 acre lots, 65% imp, HSG B
3,126		35.00% Pervious Area
5,805		65.00% Impervious Area

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

**Summary for Subcatchment P7.4: Lots 21-25**

Runoff = 2.88 cfs @ 12.18 hrs, Volume= 11,367 cf, Depth&gt; 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
38,735	90	1/8 acre lots, 65% imp, HSG C
11,540	85	1/8 acre lots, 65% imp, HSG B
49,505	70	Woods, Good, HSG C
* 320	74	Grass Paver, Good, HSG C
100,100	79	Weighted Average
67,421		67.35% Pervious Area
32,679		32.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	330	Total			

**Summary for Subcatchment P7.5: Basin 1**

Runoff = 1.30 cfs @ 12.11 hrs, Volume= 4,573 cf, Depth&gt; 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"



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Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.6	160	Total			

**Summary for Subcatchment P7.6: Lots 16-20**

Runoff = 1.35 cfs @ 12.07 hrs, Volume= 4,042 cf, Depth&gt; 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
11,200	90	1/8 acre lots, 65% imp, HSG C
13,695	85	1/8 acre lots, 65% imp, HSG B
24,895	87	Weighted Average
8,713		35.00% Pervious Area
16,182		65.00% Impervious Area

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

**Summary for Subcatchment P7.7: Lot 15**

Runoff = 0.64 cfs @ 12.07 hrs, Volume= 1,928 cf, Depth&gt; 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

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	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

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

**Summary for Subcatchment P7.8: Lot 16**

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 1,239 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

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

**Summary for Subcatchment P7.9: Lots 26-27**

Runoff = 0.83 cfs @ 12.07 hrs, Volume= 2,499 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

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

**Summary for Pond CB1: CB1**

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 2.58" for 2YearMass event  
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf  
Outflow = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf, Atten= 0%, Lag= 0.0 min  
Primary = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 2YearMass Rainfall=3.24"

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Peak Elev= 727.39' @ 12.07 hrs

Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	<b>12.0" Round Culvert</b> L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.57 cfs @ 12.07 hrs HW=727.39' TW=704.54' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.57 cfs @ 2.97 fps)**Summary for Pond IB 7.1: Infiltration Basin**

Inflow Area = 300,180 sf, 39.80% Impervious, Inflow Depth > 1.27" for 2YearMass event  
 Inflow = 6.22 cfs @ 12.15 hrs, Volume= 31,715 cf  
 Outflow = 1.60 cfs @ 13.05 hrs, Volume= 27,659 cf, Atten= 74%, Lag= 53.8 min  
 Discarded = 0.46 cfs @ 13.05 hrs, Volume= 18,965 cf  
 Primary = 1.14 cfs @ 13.05 hrs, Volume= 8,694 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 705.98' @ 13.05 hrs Surf.Area= 8,201 sf Storage= 12,605 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 122.7 min ( 960.8 - 838.1 )

Volume	Invert	Avail.Storage	Storage Description		
#1	704.00'	58,843 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Secondary	709.00'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	704.00'	<b>18.0" Round Culvert</b> L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	<b>24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.66 0.66

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Type III 24-hr 2YearMass Rainfall=3.24"

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#6 Device 3 705.40' **7.5" Vert. Orifice/Grate** C= 0.600**Discarded OutFlow** Max=0.46 cfs @ 13.05 hrs HW=705.98' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.46 cfs)**Primary OutFlow** Max=1.14 cfs @ 13.05 hrs HW=705.98' TW=0.00' (Dynamic Tailwater)↑ **3=Culvert** (Passes 1.14 cfs of 6.90 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **5=Custom Weir/Orifice** (Weir Controls 0.36 cfs @ 2.50 fps)↑ **6=Orifice/Grate** (Orifice Controls 0.77 cfs @ 2.60 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG-16/20: Rain Garden Lots 16-20**

Inflow Area = 24,895 sf, 65.00% Impervious, Inflow Depth &gt; 1.95" for 2YearMass event

Inflow = 1.35 cfs @ 12.07 hrs, Volume= 4,042 cf

Outflow = 0.55 cfs @ 12.29 hrs, Volume= 4,015 cf, Atten= 59%, Lag= 13.0 min

Primary = 0.55 cfs @ 12.29 hrs, Volume= 4,015 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 726.04' @ 12.29 hrs Surf.Area= 960 sf Storage= 801 cf

Plug-Flow detention time= 18.9 min calculated for 4,015 cf (99% of inflow)

Center-of-Mass det. time= 14.7 min ( 831.6 - 816.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 4 240 cf Overall x 50.0% Voids
#4	727.50'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	726.50'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Primary OutFlow** Max=0.55 cfs @ 12.29 hrs HW=726.04' TW=705.26' (Dynamic Tailwater)

- 1=Culvert (Passes 0.55 cfs of 4.70 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.55 cfs @ 6.29 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Pond RG-26/27: Rain Garden Lots 26-27**

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.83 cfs @ 12.07 hrs, Volume= 2,499 cf  
 Outflow = 0.36 cfs @ 12.25 hrs, Volume= 2,488 cf, Atten= 56%, Lag= 10.6 min  
 Primary = 0.36 cfs @ 12.25 hrs, Volume= 2,488 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 746.60' @ 12.25 hrs Surf.Area= 480 sf Storage= 508 cf

Plug-Flow detention time= 18.0 min calculated for 2,487 cf (100% of inflow)  
 Center-of-Mass det. time= 15.4 min ( 820.3 - 805.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	747.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	746.50'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.36 cfs @ 12.25 hrs HW=746.60' TW=705.14' (Dynamic Tailwater)

- 1=Culvert (Passes 0.36 cfs of 2.74 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.32 cfs @ 7.25 fps)
- 4=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.07 fps)

**Summary for Pond RG-28/29: Rain Garden Lots 28-29**

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 1.04 cfs @ 12.07 hrs, Volume= 3,141 cf  
 Outflow = 0.71 cfs @ 12.15 hrs, Volume= 3,129 cf, Atten= 32%, Lag= 4.7 min  
 Primary = 0.71 cfs @ 12.15 hrs, Volume= 3,129 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 742.37' @ 12.15 hrs Surf.Area= 480 sf Storage= 559 cf

Plug-Flow detention time= 16.8 min calculated for 3,129 cf (100% of inflow)  
 Center-of-Mass det. time= 14.4 min ( 819.3 - 805.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	743.00'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	742.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.71 cfs @ 12.15 hrs HW=742.37' TW=704.81' (Dynamic Tailwater)

- 1=Culvert (Passes 0.71 cfs of 2.91 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.33 cfs @ 7.67 fps)
- 4=Orifice/Grate (Orifice Controls 0.38 cfs @ 2.16 fps)

**Summary for Pond RG15H: Rain Garden 15H**

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.64 cfs @ 12.07 hrs, Volume= 1,928 cf  
 Outflow = 0.47 cfs @ 12.14 hrs, Volume= 1,807 cf, Atten= 26%, Lag= 4.0 min  
 Discarded = 0.04 cfs @ 12.07 hrs, Volume= 778 cf  
 Primary = 0.43 cfs @ 12.14 hrs, Volume= 1,029 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 718.63' @ 12.14 hrs Surf.Area= 720 sf Storage= 378 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

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Center-of-Mass det. time= 45.1 min ( 850.1 - 805.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	715.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	718.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	715.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.07 hrs HW=718.51' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.43 cfs @ 12.14 hrs HW=718.63' TW=704.77' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.43 cfs of 1.72 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.40 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.17 cfs @ 3.42 fps)**Summary for Pond RG15L: Rain Garden 15L**

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.50 cfs @ 12.07 hrs, Volume= 1,504 cf  
 Outflow = 0.41 cfs @ 12.13 hrs, Volume= 1,435 cf, Atten= 18%, Lag= 3.2 min  
 Discarded = 0.03 cfs @ 12.08 hrs, Volume= 746 cf  
 Primary = 0.38 cfs @ 12.13 hrs, Volume= 689 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 709.84' @ 12.13 hrs Surf.Area= 480 sf Storage= 327 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 68.5 min ( 873.5 - 805.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	706.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	709.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	706.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.03 cfs @ 12.08 hrs HW=709.76' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.03 cfs)**Primary OutFlow** Max=0.38 cfs @ 12.13 hrs HW=709.84' TW=704.73' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.38 cfs of 0.87 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 4.84 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.27 cfs @ 3.14 fps)**Summary for Pond RG16: Rain Garden Lot 16**

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.41 cfs @ 12.07 hrs, Volume= 1,239 cf  
 Outflow = 0.30 cfs @ 12.14 hrs, Volume= 1,209 cf, Atten= 26%, Lag= 4.1 min  
 Discarded = 0.01 cfs @ 10.84 hrs, Volume= 727 cf  
 Primary = 0.29 cfs @ 12.14 hrs, Volume= 482 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 733.13' @ 12.14 hrs Surf.Area= 240 sf Storage= 305 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 90.9 min ( 895.8 - 805.0 )



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Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	730.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	<b>6.0" Round Culvert</b> L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	730.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 10.84 hrs HW=730.29' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.29 cfs @ 12.14 hrs HW=733.13' TW=704.78' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.29 cfs of 0.75 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.30 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.20 cfs @ 2.24 fps)**Summary for Pond RG21: Rain Garden 21**

Inflow Area = 8,930 sf, 65.00% Impervious, Inflow Depth > 1.79" for 2YearMass event  
Inflow = 0.45 cfs @ 12.07 hrs, Volume= 1,332 cf  
Outflow = 0.32 cfs @ 12.15 hrs, Volume= 1,263 cf, Atten= 28%, Lag= 4.3 min  
Discarded = 0.01 cfs @ 11.14 hrs, Volume= 690 cf  
Primary = 0.31 cfs @ 12.15 hrs, Volume= 573 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 727.67' @ 12.15 hrs Surf.Area= 240 sf Storage= 309 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 76.4 min ( 900.5 - 824.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	724.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	727.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	728.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	726.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 726.75' / 726.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	726.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	727.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	724.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.01 cfs @ 11.14 hrs HW=724.79' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.31 cfs @ 12.15 hrs HW=727.67' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.31 cfs of 0.75 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.41 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.21 cfs @ 2.44 fps)**Summary for Pond RG22-25: Rain Gardens 22-25**

Inflow Area = 100,100 sf, 32.65% Impervious, Inflow Depth > 1.36" for 2YearMass event  
 Inflow = 2.88 cfs @ 12.18 hrs, Volume= 11,367 cf  
 Outflow = 2.38 cfs @ 12.29 hrs, Volume= 11,323 cf, Atten= 17%, Lag= 6.1 min  
 Primary = 1.78 cfs @ 12.29 hrs, Volume= 8,493 cf  
 Secondary = 0.59 cfs @ 12.29 hrs, Volume= 2,831 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 726.46' @ 12.29 hrs Surf.Area= 960 sf Storage= 769 cf

Plug-Flow detention time= 6.5 min calculated for 11,323 cf (100% of inflow)

Center-of-Mass det. time= 4.2 min ( 854.3 - 850.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	<b>12.0" Round Pipe Storage x 4</b> Inside #2 L= 60.0'
#2	724.75'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel x 4</b> 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch x 4</b> 240 cf Overall x 50.0% Voids
#4	728.00'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding x 4</b>
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	<b>8.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#6	Device 2	724.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	727.25'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#8	Device 2	727.25'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.78 cfs @ 12.29 hrs HW=726.46' TW=705.25' (Dynamic Tailwater)

1=Culvert (Passes 1.78 cfs of 5.91 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 1.78 cfs @ 6.06 fps)  
 7=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.59 cfs @ 12.29 hrs HW=726.46' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 0.59 cfs of 1.97 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.59 cfs @ 6.06 fps)  
 8=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Pond RG27: Rain Garden Lot 27**

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 1.43" for 2YearMass event  
 Inflow = 0.36 cfs @ 12.14 hrs, Volume= 1,287 cf  
 Outflow = 0.19 cfs @ 12.38 hrs, Volume= 1,280 cf, Atten= 48%, Lag= 14.3 min  
 Primary = 0.19 cfs @ 12.38 hrs, Volume= 1,280 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 757.11' @ 12.38 hrs Surf.Area= 240 sf Storage= 255 cf

Plug-Flow detention time= 17.9 min calculated for 1,280 cf (99% of inflow)

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Center-of-Mass det. time= 15.0 min ( 859.4 - 844.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	754.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	758.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	<b>6.0" Round Culvert</b> L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 ' S= 0.0347 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	757.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.19 cfs @ 12.38 hrs HW=757.11' TW=705.49' (Dynamic Tailwater)

- 1=Culvert (Passes 0.19 cfs of 1.33 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.26 fps)  
 4=Orifice/Grate (Orifice Controls 0.03 cfs @ 1.12 fps)

**Summary for Pond RG28: Rain Garden Lot 28**

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 1.06" for 2YearMass event  
 Inflow = 0.64 cfs @ 12.17 hrs, Volume= 2,534 cf  
 Outflow = 0.53 cfs @ 12.27 hrs, Volume= 2,527 cf, Atten= 18%, Lag= 5.7 min  
 Primary = 0.53 cfs @ 12.27 hrs, Volume= 2,527 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 755.13' @ 12.27 hrs Surf.Area= 240 sf Storage= 161 cf

Plug-Flow detention time= 5.1 min calculated for 2,527 cf (100% of inflow)  
 Center-of-Mass det. time= 3.5 min ( 868.2 - 864.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	753.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	757.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	<b>8.0" Round Culvert</b> L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	756.25'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.53 cfs @ 12.27 hrs HW=755.13' TW=705.19' (Dynamic Tailwater)

- 1=Culvert (Passes 0.53 cfs of 1.56 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.53 cfs @ 5.39 fps)  
 4=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Pond RG30: Rain Garden Lot 30**

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event  
 Inflow = 0.41 cfs @ 12.07 hrs, Volume= 1,238 cf  
 Outflow = 0.18 cfs @ 12.26 hrs, Volume= 1,233 cf, Atten= 57%, Lag= 11.2 min  
 Primary = 0.18 cfs @ 12.26 hrs, Volume= 1,233 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 730.09' @ 12.26 hrs Surf.Area= 240 sf Storage= 252 cf

Plug-Flow detention time= 18.1 min calculated for 1,232 cf (100% of inflow)  
 Center-of-Mass det. time= 15.4 min ( 820.4 - 805.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	727.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	730.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Primary OutFlow** Max=0.18 cfs @ 12.26 hrs HW=730.09' TW=705.17' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.18 cfs of 1.37 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.23 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.99 fps)**Summary for Link P7: AP7**

Inflow Area = 400,635 sf, 31.66% Impervious, Inflow Depth &gt; 0.43" for 2YearMass event

Inflow = 1.42 cfs @ 12.72 hrs, Volume= 14,318 cf

Primary = 1.42 cfs @ 12.72 hrs, Volume= 14,318 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P7.1: AP7 - To Wetland E**

Runoff = 1.98 cfs @ 12.14 hrs, Volume= 8,120 cf, Depth&gt; 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Adj	Description
77,250	55		Woods, Good, HSG B
12,715	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
91,525	57	56	Weighted Average, UI Adjusted
89,965			98.30% Pervious Area
1,560			1.70% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.6	320	Total			

**Summary for Subcatchment P7.10: Lot 27**

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 2,638 cf, Depth&gt; 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
* 3,845	90	Residential Lots, 65% imp, HSG C
2,045	70	Woods, Good, HSG C
940	89	Gravel roads, HSG C
3,970	74	>75% Grass cover, Good, HSG C
10,800	80	Weighted Average
8,301		76.86% Pervious Area
2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

**Summary for Subcatchment P7.11: Lot 28**

Runoff = 1.53 cfs @ 12.16 hrs, Volume= 5,729 cf, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

**Summary for Subcatchment P7.12: Lot 28-29**

Runoff = 1.80 cfs @ 12.07 hrs, Volume= 5,590 cf, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

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

**Summary for Subcatchment P7.13: Lot 30**

Runoff = 0.71 cfs @ 12.07 hrs, Volume= 2,203 cf, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"



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Type III 24-hr 10YearMass Rainfall=5.05"

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	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

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

**Summary for Subcatchment P7.14: Clubhouse Parking Lot**

Runoff = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf, Depth&gt; 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
	1,410	74	>75% Grass cover, Good, HSG C
	750	98	Roofs, HSG C
	6,100	98	Paved parking, HSG C
	8,260	94	Weighted Average
	1,410		17.07% Pervious Area
	6,850		82.93% Impervious Area

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

**Summary for Subcatchment P7.2: Lots 14-15**

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 2,676 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

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

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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P7.3: Lot 20/21**

Runoff = 0.84 cfs @ 12.07 hrs, Volume= 2,539 cf, Depth&gt; 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
8,930	85	1/8 acre lots, 65% imp, HSG B
3,126		35.00% Pervious Area
5,805		65.00% Impervious Area

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

**Summary for Subcatchment P7.4: Lots 21-25**

Runoff = 6.11 cfs @ 12.18 hrs, Volume= 23,668 cf, Depth&gt; 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
38,735	90	1/8 acre lots, 65% imp, HSG C
11,540	85	1/8 acre lots, 65% imp, HSG B
49,505	70	Woods, Good, HSG C
* 320	74	Grass Paver, Good, HSG C
100,100	79	Weighted Average
67,421		67.35% Pervious Area
32,679		32.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	330	Total			

**Summary for Subcatchment P7.5: Basin 1**

Runoff = 3.47 cfs @ 12.10 hrs, Volume= 11,141 cf, Depth&gt; 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

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Type III 24-hr 10YearMass Rainfall=5.05"

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Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.6	160	Total			

**Summary for Subcatchment P7.6: Lots 16-20**

Runoff = 2.46 cfs @ 12.07 hrs, Volume= 7,492 cf, Depth&gt; 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
11,200	90	1/8 acre lots, 65% imp, HSG C
13,695	85	1/8 acre lots, 65% imp, HSG B
24,895	87	Weighted Average
8,713		35.00% Pervious Area
16,182		65.00% Impervious Area

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

**Summary for Subcatchment P7.7: Lot 15**

Runoff = 1.11 cfs @ 12.07 hrs, Volume= 3,431 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

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Type III 24-hr 10YearMass Rainfall=5.05"

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	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

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

**Summary for Subcatchment P7.8: Lot 16**

Runoff = 0.71 cfs @ 12.07 hrs, Volume= 2,204 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

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

**Summary for Subcatchment P7.9: Lots 26-27**

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 4,446 cf, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

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

**Summary for Pond CB1: CB1**

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 4.35" for 10YearMass event  
 Inflow = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf  
 Outflow = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10YearMass Rainfall=5.05"

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Peak Elev= 727.52' @ 12.07 hrs

Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	<b>12.0" Round Culvert</b> L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.93 cfs @ 12.07 hrs HW=727.52' TW=705.61' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.93 cfs @ 3.32 fps)**Summary for Pond IB 7.1: Infiltration Basin**

Inflow Area = 300,180 sf, 39.80% Impervious, Inflow Depth > 2.60" for 10YearMass event  
 Inflow = 15.60 cfs @ 12.14 hrs, Volume= 65,069 cf  
 Outflow = 4.45 cfs @ 12.70 hrs, Volume= 58,179 cf, Atten= 71%, Lag= 33.5 min  
 Discarded = 0.57 cfs @ 12.70 hrs, Volume= 22,594 cf  
 Primary = 3.88 cfs @ 12.70 hrs, Volume= 35,585 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 707.24' @ 12.70 hrs Surf.Area= 10,272 sf Storage= 24,228 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 72.9 min ( 893.3 - 820.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	704.00'	58,843 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Secondary	709.00'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	704.00'	<b>18.0" Round Culvert</b> L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	<b>24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.66 0.66

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Type III 24-hr 10YearMass Rainfall=5.05"

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#6 Device 3 705.40' **7.5" Vert. Orifice/Grate** C= 0.600**Discarded OutFlow** Max=0.57 cfs @ 12.70 hrs HW=707.24' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.57 cfs)**Primary OutFlow** Max=3.88 cfs @ 12.70 hrs HW=707.24' TW=0.00' (Dynamic Tailwater)↑ **3=Culvert** (Passes 3.88 cfs of 12.80 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **5=Custom Weir/Orifice** (Weir Controls 2.05 cfs @ 4.45 fps)↑ **6=Orifice/Grate** (Orifice Controls 1.83 cfs @ 5.96 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG-16/20: Rain Garden Lots 16-20**

Inflow Area = 24,895 sf, 65.00% Impervious, Inflow Depth > 3.61" for 10YearMass event  
 Inflow = 2.46 cfs @ 12.07 hrs, Volume= 7,492 cf  
 Outflow = 1.86 cfs @ 12.14 hrs, Volume= 7,459 cf, Atten= 25%, Lag= 3.9 min  
 Primary = 1.86 cfs @ 12.14 hrs, Volume= 7,459 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 727.14' @ 12.14 hrs Surf.Area= 960 sf Storage= 1,222 cf

Plug-Flow detention time= 16.6 min calculated for 7,459 cf (100% of inflow)

Center-of-Mass det. time= 13.7 min ( 813.1 - 799.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 4 240 cf Overall x 50.0% Voids
#4	727.50'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	726.50'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

**Primary OutFlow** Max=1.85 cfs @ 12.14 hrs HW=727.14' TW=706.01' (Dynamic Tailwater)

- 1=Culvert (Passes 1.85 cfs of 6.14 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.70 cfs @ 8.06 fps)
- 4=Orifice/Grate (Orifice Controls 1.15 cfs @ 3.30 fps)

### Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 1.44 cfs @ 12.07 hrs, Volume= 4,446 cf  
 Outflow = 1.10 cfs @ 12.13 hrs, Volume= 4,432 cf, Atten= 23%, Lag= 3.7 min  
 Primary = 1.10 cfs @ 12.13 hrs, Volume= 4,432 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 747.42' @ 12.13 hrs Surf.Area= 960 sf Storage= 674 cf

Plug-Flow detention time= 15.2 min calculated for 4,430 cf (100% of inflow)  
 Center-of-Mass det. time= 13.2 min ( 802.2 - 789.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	747.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	746.50'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.10 cfs @ 12.13 hrs HW=747.42' TW=705.99' (Dynamic Tailwater)

- 1=Culvert (Passes 1.10 cfs of 3.23 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.37 cfs @ 8.46 fps)
- 4=Orifice/Grate (Orifice Controls 0.73 cfs @ 4.19 fps)

**Summary for Pond RG-28/29: Rain Garden Lots 28-29**

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 1.80 cfs @ 12.07 hrs, Volume= 5,590 cf  
 Outflow = 1.26 cfs @ 12.15 hrs, Volume= 5,574 cf, Atten= 30%, Lag= 4.4 min  
 Primary = 1.26 cfs @ 12.15 hrs, Volume= 5,574 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 743.25' @ 12.15 hrs Surf.Area= 1,440 sf Storage= 811 cf

Plug-Flow detention time= 14.6 min calculated for 5,574 cf (100% of inflow)  
 Center-of-Mass det. time= 12.8 min ( 801.8 - 789.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	743.00'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	742.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.26 cfs @ 12.15 hrs HW=743.25' TW=706.06' (Dynamic Tailwater)

- 1=Culvert (Passes 1.26 cfs of 3.41 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.39 cfs @ 8.90 fps)
- 4=Orifice/Grate (Orifice Controls 0.87 cfs @ 5.00 fps)

**Summary for Pond RG15H: Rain Garden 15H**

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 1.11 cfs @ 12.07 hrs, Volume= 3,431 cf  
 Outflow = 1.00 cfs @ 12.11 hrs, Volume= 3,224 cf, Atten= 10%, Lag= 2.2 min  
 Discarded = 0.04 cfs @ 11.98 hrs, Volume= 897 cf  
 Primary = 0.96 cfs @ 12.11 hrs, Volume= 2,327 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 719.15' @ 12.11 hrs Surf.Area= 720 sf Storage= 503 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)



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Center-of-Mass det. time= 19.2 min ( 808.2 - 789.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	715.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	718.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	715.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.98 hrs HW=718.52' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.96 cfs @ 12.11 hrs HW=719.15' TW=705.84' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.96 cfs of 2.10 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 0.40 cfs @ 1.27 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.42 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.88 fps)**Summary for Pond RG15L: Rain Garden 15L**

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.86 cfs @ 12.07 hrs, Volume= 2,676 cf  
 Outflow = 0.59 cfs @ 12.15 hrs, Volume= 2,506 cf, Atten= 31%, Lag= 4.6 min  
 Discarded = 0.04 cfs @ 12.03 hrs, Volume= 859 cf  
 Primary = 0.55 cfs @ 12.15 hrs, Volume= 1,647 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 710.42' @ 12.15 hrs Surf.Area= 720 sf Storage= 447 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 29.1 min ( 818.1 - 789.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	706.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	709.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	706.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.03 hrs HW=710.02' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.55 cfs @ 12.15 hrs HW=710.42' TW=706.08' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.55 cfs of 1.13 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.06 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.82 fps)**Summary for Pond RG16: Rain Garden Lot 16**

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.71 cfs @ 12.07 hrs, Volume= 2,204 cf  
 Outflow = 0.53 cfs @ 12.14 hrs, Volume= 2,074 cf, Atten= 25%, Lag= 3.9 min  
 Discarded = 0.04 cfs @ 12.06 hrs, Volume= 833 cf  
 Primary = 0.49 cfs @ 12.14 hrs, Volume= 1,241 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 733.69' @ 12.14 hrs Surf.Area= 720 sf Storage= 391 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 40.4 min ( 829.3 - 789.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	730.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	<b>6.0" Round Culvert</b> L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 ' S= 0.0417 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	730.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.06 hrs HW=733.53' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.49 cfs @ 12.14 hrs HW=733.69' TW=706.01' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.49 cfs of 1.03 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.60 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.23 fps)**Summary for Pond RG21: Rain Garden 21**

Inflow Area = 8,930 sf, 65.00% Impervious, Inflow Depth > 3.41" for 10YearMass event  
Inflow = 0.84 cfs @ 12.07 hrs, Volume= 2,539 cf  
Outflow = 0.58 cfs @ 12.15 hrs, Volume= 2,361 cf, Atten= 31%, Lag= 4.5 min  
Discarded = 0.04 cfs @ 12.04 hrs, Volume= 804 cf  
Primary = 0.54 cfs @ 12.15 hrs, Volume= 1,557 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 728.38' @ 12.15 hrs Surf.Area= 720 sf Storage= 438 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 27.7 min ( 833.4 - 805.7 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	724.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	727.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	728.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	726.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 726.75' / 726.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	726.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	727.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	724.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.04 hrs HW=728.03' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.54 cfs @ 12.15 hrs HW=728.38' TW=0.00' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.54 cfs of 1.11 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 5.99 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.73 fps)**Summary for Pond RG22-25: Rain Gardens 22-25**

Inflow Area = 100,100 sf, 32.65% Impervious, Inflow Depth > 2.84" for 10YearMass event  
 Inflow = 6.11 cfs @ 12.18 hrs, Volume= 23,668 cf  
 Outflow = 5.26 cfs @ 12.26 hrs, Volume= 23,612 cf, Atten= 14%, Lag= 4.8 min  
 Primary = 3.95 cfs @ 12.26 hrs, Volume= 17,709 cf  
 Secondary = 1.32 cfs @ 12.26 hrs, Volume= 5,903 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 728.26' @ 12.26 hrs Surf.Area= 2,880 sf Storage= 1,637 cf

Plug-Flow detention time= 5.5 min calculated for 23,612 cf (100% of inflow)

Center-of-Mass det. time= 4.1 min ( 833.1 - 829.0 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	<b>12.0" Round Pipe Storage x 4</b> Inside #2 L= 60.0'
#2	724.75'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel x 4</b> 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch x 4</b> 240 cf Overall x 50.0% Voids
#4	728.00'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding x 4</b>
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	<b>8.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#6	Device 2	724.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	727.25'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#8	Device 2	727.25'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=3.95 cfs @ 12.26 hrs HW=728.26' TW=706.63' (Dynamic Tailwater)

1=Culvert (Passes 3.95 cfs of 8.99 cfs potential flow)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Orifice Controls 2.61 cfs @ 8.86 fps)  
 7=Orifice/Grate (Orifice Controls 1.34 cfs @ 4.53 fps)

**Secondary OutFlow** Max=1.32 cfs @ 12.26 hrs HW=728.26' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 1.32 cfs of 3.00 cfs potential flow)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 6=Orifice/Grate (Orifice Controls 0.87 cfs @ 8.86 fps)  
 8=Orifice/Grate (Orifice Controls 0.45 cfs @ 4.53 fps)

**Summary for Pond RG27: Rain Garden Lot 27**

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 2.93" for 10YearMass event  
 Inflow = 0.75 cfs @ 12.14 hrs, Volume= 2,638 cf  
 Outflow = 0.59 cfs @ 12.22 hrs, Volume= 2,629 cf, Atten= 21%, Lag= 5.2 min  
 Primary = 0.59 cfs @ 12.22 hrs, Volume= 2,629 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 758.07' @ 12.22 hrs Surf.Area= 720 sf Storage= 363 cf

Plug-Flow detention time= 14.8 min calculated for 2,628 cf (100% of inflow)

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Center-of-Mass det. time= 12.8 min ( 836.6 - 823.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	754.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	758.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	<b>6.0" Round Culvert</b> L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 ' S= 0.0347 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	757.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.59 cfs @ 12.22 hrs HW=758.07' TW=706.48' (Dynamic Tailwater)

- 1=Culvert (Passes 0.59 cfs of 1.52 cfs potential flow)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.19 cfs @ 8.66 fps)  
 4=Orifice/Grate (Orifice Controls 0.40 cfs @ 4.58 fps)

**Summary for Pond RG28: Rain Garden Lot 28**

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 2.40" for 10YearMass event  
 Inflow = 1.53 cfs @ 12.16 hrs, Volume= 5,729 cf  
 Outflow = 1.45 cfs @ 12.20 hrs, Volume= 5,719 cf, Atten= 5%, Lag= 2.5 min  
 Primary = 1.45 cfs @ 12.20 hrs, Volume= 5,719 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 756.97' @ 12.20 hrs Surf.Area= 480 sf Storage= 342 cf

Plug-Flow detention time= 4.5 min calculated for 5,719 cf (100% of inflow)  
 Center-of-Mass det. time= 3.5 min ( 844.1 - 840.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	753.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	757.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Type III 24-hr 10YearMass Rainfall=5.05"

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Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	<b>8.0" Round Culvert</b> L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	756.25'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.45 cfs @ 12.20 hrs HW=756.96' TW=706.38' (Dynamic Tailwater)

- 1=Culvert (Passes 1.45 cfs of 2.65 cfs potential flow)  
 2=Orifice/Grate (Controls 0.00 cfs)  
 3=Orifice/Grate (Orifice Controls 0.83 cfs @ 8.46 fps)  
 4=Orifice/Grate (Orifice Controls 0.62 cfs @ 3.56 fps)

**Summary for Pond RG30: Rain Garden Lot 30**

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event  
 Inflow = 0.71 cfs @ 12.07 hrs, Volume= 2,203 cf  
 Outflow = 0.55 cfs @ 12.13 hrs, Volume= 2,196 cf, Atten= 23%, Lag= 3.7 min  
 Primary = 0.55 cfs @ 12.13 hrs, Volume= 2,196 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 730.91' @ 12.13 hrs Surf.Area= 480 sf Storage= 335 cf

Plug-Flow detention time= 15.3 min calculated for 2,196 cf (100% of inflow)  
 Center-of-Mass det. time= 13.3 min ( 802.2 - 789.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	727.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	730.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Primary OutFlow** Max=0.55 cfs @ 12.13 hrs HW=730.91' TW=705.99' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.55 cfs of 1.61 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.44 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.14 fps)**Summary for Link P7: AP7**

Inflow Area = 400,635 sf, 31.66% Impervious, Inflow Depth &gt; 1.53" for 10YearMass event

Inflow = 6.05 cfs @ 12.36 hrs, Volume= 51,165 cf

Primary = 6.05 cfs @ 12.36 hrs, Volume= 51,165 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P7.1: AP7 - To Wetland E**

Runoff = 3.48 cfs @ 12.13 hrs, Volume= 12,964 cf, Depth&gt; 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Adj	Description
77,250	55		Woods, Good, HSG B
12,715	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
91,525	57	56	Weighted Average, UI Adjusted
89,965			98.30% Pervious Area
1,560			1.70% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.6	320	Total			

**Summary for Subcatchment P7.10: Lot 27**

Runoff = 1.00 cfs @ 12.14 hrs, Volume= 3,543 cf, Depth&gt; 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
* 3,845	90	Residential Lots, 65% imp, HSG C
2,045	70	Woods, Good, HSG C
940	89	Gravel roads, HSG C
3,970	74	>75% Grass cover, Good, HSG C
10,800	80	Weighted Average
8,301		76.86% Pervious Area
2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

**Summary for Subcatchment P7.11: Lot 28**

Runoff = 2.14 cfs @ 12.16 hrs, Volume= 7,952 cf, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

**Summary for Subcatchment P7.12: Lot 28-29**

Runoff = 2.28 cfs @ 12.07 hrs, Volume= 7,152 cf, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

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

**Summary for Subcatchment P7.13: Lot 30**

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 2,818 cf, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

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	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

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

**Summary for Subcatchment P7.14: Clubhouse Parking Lot**

Runoff = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf, Depth&gt; 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
	1,410	74	>75% Grass cover, Good, HSG C
	750	98	Roofs, HSG C
	6,100	98	Paved parking, HSG C
	8,260	94	Weighted Average
	1,410		17.07% Pervious Area
	6,850		82.93% Impervious Area

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

**Summary for Subcatchment P7.2: Lots 14-15**

Runoff = 1.09 cfs @ 12.07 hrs, Volume= 3,425 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

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

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**Summary for Subcatchment P7.3: Lot 20/21**

Runoff = 1.09 cfs @ 12.07 hrs, Volume= 3,326 cf, Depth&gt; 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
8,930	85	1/8 acre lots, 65% imp, HSG B
3,126		35.00% Pervious Area
5,805		65.00% Impervious Area

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

**Summary for Subcatchment P7.4: Lots 21-25**

Runoff = 8.23 cfs @ 12.18 hrs, Volume= 31,960 cf, Depth&gt; 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
38,735	90	1/8 acre lots, 65% imp, HSG C
11,540	85	1/8 acre lots, 65% imp, HSG B
49,505	70	Woods, Good, HSG C
* 320	74	Grass Paver, Good, HSG C
100,100	79	Weighted Average
67,421		67.35% Pervious Area
32,679		32.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	330	Total			

**Summary for Subcatchment P7.5: Basin 1**

Runoff = 5.00 cfs @ 12.10 hrs, Volume= 15,846 cf, Depth&gt; 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

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Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.6	160	Total			

**Summary for Subcatchment P7.6: Lots 16-20**

Runoff = 3.16 cfs @ 12.07 hrs, Volume= 9,721 cf, Depth&gt; 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
11,200	90	1/8 acre lots, 65% imp, HSG C
13,695	85	1/8 acre lots, 65% imp, HSG B
24,895	87	Weighted Average
8,713		35.00% Pervious Area
16,182		65.00% Impervious Area

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

**Summary for Subcatchment P7.7: Lot 15**

Runoff = 1.40 cfs @ 12.07 hrs, Volume= 4,390 cf, Depth&gt; 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

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	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

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

**Summary for Subcatchment P7.8: Lot 16**

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 2,820 cf, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

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

**Summary for Subcatchment P7.9: Lots 26-27**

Runoff = 1.81 cfs @ 12.07 hrs, Volume= 5,689 cf, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

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

**Summary for Pond CB1: CB1**

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 5.47" for 25YearMass event  
Inflow = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf  
Outflow = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf, Atten= 0%, Lag= 0.0 min  
Primary = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Peak Elev= 727.59' @ 12.07 hrs

Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	<b>12.0" Round Culvert</b> L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.16 cfs @ 12.07 hrs HW=727.59' TW=706.29' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.16 cfs @ 3.48 fps)**Summary for Pond IB 7.1: Infiltration Basin**

Inflow Area = 300,180 sf, 39.80% Impervious, Inflow Depth > 3.50" for 25YearMass event  
 Inflow = 20.33 cfs @ 12.12 hrs, Volume= 87,591 cf  
 Outflow = 6.90 cfs @ 12.57 hrs, Volume= 79,645 cf, Atten= 66%, Lag= 27.1 min  
 Discarded = 0.65 cfs @ 12.57 hrs, Volume= 24,502 cf  
 Primary = 6.25 cfs @ 12.57 hrs, Volume= 55,143 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 708.02' @ 12.57 hrs Surf.Area= 11,643 sf Storage= 32,681 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 65.1 min ( 878.5 - 813.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	704.00'	58,843 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Secondary	709.00'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	704.00'	<b>18.0" Round Culvert</b> L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	<b>24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.66 0.66

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Type III 24-hr 25YearMass Rainfall=6.18"

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#6 Device 3 705.40' **7.5" Vert. Orifice/Grate** C= 0.600**Discarded OutFlow** Max=0.65 cfs @ 12.57 hrs HW=708.02' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.65 cfs)**Primary OutFlow** Max=6.25 cfs @ 12.57 hrs HW=708.02' TW=0.00' (Dynamic Tailwater)↑ **3=Culvert** (Passes 6.25 cfs of 15.37 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **5=Custom Weir/Orifice** (Weir Controls 4.01 cfs @ 4.73 fps)↑ **6=Orifice/Grate** (Orifice Controls 2.24 cfs @ 7.31 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG-16/20: Rain Garden Lots 16-20**

Inflow Area = 24,895 sf, 65.00% Impervious, Inflow Depth > 4.69" for 25YearMass event  
 Inflow = 3.16 cfs @ 12.07 hrs, Volume= 9,721 cf  
 Outflow = 2.34 cfs @ 12.14 hrs, Volume= 9,684 cf, Atten= 26%, Lag= 4.0 min  
 Primary = 2.34 cfs @ 12.14 hrs, Volume= 9,684 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 727.56' @ 12.14 hrs Surf.Area= 2,880 sf Storage= 1,444 cf

Plug-Flow detention time= 15.4 min calculated for 9,680 cf (100% of inflow)

Center-of-Mass det. time= 13.0 min ( 805.2 - 792.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 4 240 cf Overall x 50.0% Voids
#4	727.50'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	726.50'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600



**Primary OutFlow** Max=2.34 cfs @ 12.14 hrs HW=727.56' TW=706.74' (Dynamic Tailwater)

- 1=Culvert (Passes 2.34 cfs of 6.62 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.75 cfs @ 8.65 fps)
- 4=Orifice/Grate (Orifice Controls 1.59 cfs @ 4.55 fps)

### Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 1.81 cfs @ 12.07 hrs, Volume= 5,689 cf  
 Outflow = 1.27 cfs @ 12.14 hrs, Volume= 5,673 cf, Atten= 30%, Lag= 4.4 min  
 Primary = 1.27 cfs @ 12.14 hrs, Volume= 5,673 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 747.76' @ 12.14 hrs Surf.Area= 1,440 sf Storage= 816 cf

Plug-Flow detention time= 14.6 min calculated for 5,671 cf (100% of inflow)  
 Center-of-Mass det. time= 12.8 min ( 795.2 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	747.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	746.50'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.27 cfs @ 12.14 hrs HW=747.76' TW=706.79' (Dynamic Tailwater)

- 1=Culvert (Passes 1.27 cfs of 3.41 cfs potential flow)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 0.39 cfs @ 8.91 fps)
- 4=Orifice/Grate (Orifice Controls 0.88 cfs @ 5.03 fps)

**Summary for Pond RG-28/29: Rain Garden Lots 28-29**

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 2.28 cfs @ 12.07 hrs, Volume= 7,152 cf  
 Outflow = 1.73 cfs @ 12.13 hrs, Volume= 7,134 cf, Atten= 24%, Lag= 3.8 min  
 Primary = 1.73 cfs @ 12.13 hrs, Volume= 7,134 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 743.60' @ 12.13 hrs Surf.Area= 1,440 sf Storage= 979 cf

Plug-Flow detention time= 14.3 min calculated for 7,131 cf (100% of inflow)  
 Center-of-Mass det. time= 12.7 min ( 795.1 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	743.00'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	742.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.72 cfs @ 12.13 hrs HW=743.60' TW=706.72' (Dynamic Tailwater)

- 1=Culvert (Passes 1.72 cfs of 3.59 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.31 cfs @ 1.01 fps)
- 3=Orifice/Grate (Orifice Controls 0.41 cfs @ 9.34 fps)
- 4=Orifice/Grate (Orifice Controls 1.00 cfs @ 5.76 fps)

**Summary for Pond RG15H: Rain Garden 15H**

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 1.40 cfs @ 12.07 hrs, Volume= 4,390 cf  
 Outflow = 1.37 cfs @ 12.09 hrs, Volume= 4,170 cf, Atten= 2%, Lag= 1.0 min  
 Discarded = 0.04 cfs @ 11.90 hrs, Volume= 954 cf  
 Primary = 1.33 cfs @ 12.09 hrs, Volume= 3,216 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 719.23' @ 12.09 hrs Surf.Area= 720 sf Storage= 521 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

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Center-of-Mass det. time= 15.9 min ( 798.2 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	715.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	718.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	715.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.90 hrs HW=718.51' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.32 cfs @ 12.09 hrs HW=719.23' TW=706.41' (Dynamic Tailwater)↑ **1=Culvert** (Passes 1.32 cfs of 2.16 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 0.75 cfs @ 1.57 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.56 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.06 fps)**Summary for Pond RG15L: Rain Garden 15L**

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 1.09 cfs @ 12.07 hrs, Volume= 3,425 cf  
 Outflow = 0.92 cfs @ 12.12 hrs, Volume= 3,221 cf, Atten= 16%, Lag= 2.9 min  
 Discarded = 0.04 cfs @ 11.99 hrs, Volume= 915 cf  
 Primary = 0.88 cfs @ 12.12 hrs, Volume= 2,306 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 710.64' @ 12.12 hrs Surf.Area= 720 sf Storage= 500 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 21.2 min ( 803.5 - 782.3 )

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Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	706.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	709.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	706.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.99 hrs HW=710.00' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.88 cfs @ 12.12 hrs HW=710.64' TW=706.62' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.88 cfs of 1.21 cfs potential flow)↳ **2=Orifice/Grate** (Weir Controls 0.27 cfs @ 1.23 fps)↳ **3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.47 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.33 fps)**Summary for Pond RG16: Rain Garden Lot 16**

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 0.90 cfs @ 12.07 hrs, Volume= 2,820 cf  
 Outflow = 0.61 cfs @ 12.15 hrs, Volume= 2,647 cf, Atten= 32%, Lag= 4.7 min  
 Discarded = 0.04 cfs @ 12.02 hrs, Volume= 887 cf  
 Primary = 0.57 cfs @ 12.15 hrs, Volume= 1,759 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 733.98' @ 12.15 hrs Surf.Area= 720 sf Storage= 461 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 28.1 min ( 810.5 - 782.3 )

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Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	730.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	<b>6.0" Round Culvert</b> L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	730.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.02 hrs HW=733.50' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.57 cfs @ 12.15 hrs HW=733.98' TW=706.81' (Dynamic Tailwater)↳ **1=Culvert** (Passes 0.57 cfs of 1.15 cfs potential flow)↳ **2=Orifice/Grate** ( Controls 0.00 cfs)↳ **3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.17 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.96 fps)**Summary for Pond RG21: Rain Garden 21**

Inflow Area = 8,930 sf, 65.00% Impervious, Inflow Depth > 4.47" for 25YearMass event  
Inflow = 1.09 cfs @ 12.07 hrs, Volume= 3,326 cf  
Outflow = 0.91 cfs @ 12.12 hrs, Volume= 3,116 cf, Atten= 16%, Lag= 3.0 min  
Discarded = 0.04 cfs @ 12.00 hrs, Volume= 858 cf  
Primary = 0.87 cfs @ 12.12 hrs, Volume= 2,259 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 728.64' @ 12.12 hrs Surf.Area= 720 sf Storage= 500 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 19.6 min ( 817.7 - 798.1 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	724.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	727.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	728.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	726.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 726.75' / 726.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	726.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	727.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	724.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 12.00 hrs HW=728.02' (Free Discharge)

**5=Exfiltration** (Exfiltration Controls 0.04 cfs)
**Primary OutFlow** Max=0.87 cfs @ 12.12 hrs HW=728.64' TW=0.00' (Dynamic Tailwater)

**1=Culvert** (Passes 0.87 cfs of 1.21 cfs potential flow)
 
**2=Orifice/Grate** (Weir Controls 0.27 cfs @ 1.22 fps)
 
**3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.47 fps)
 
**4=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.32 fps)
**Summary for Pond RG22-25: Rain Gardens 22-25**

Inflow Area = 100,100 sf, 32.65% Impervious, Inflow Depth > 3.83" for 25YearMass event  
 Inflow = 8.23 cfs @ 12.18 hrs, Volume= 31,960 cf  
 Outflow = 8.10 cfs @ 12.20 hrs, Volume= 31,897 cf, Atten= 2%, Lag= 1.4 min  
 Primary = 6.07 cfs @ 12.20 hrs, Volume= 23,923 cf  
 Secondary = 2.02 cfs @ 12.20 hrs, Volume= 7,974 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 728.65' @ 12.20 hrs Surf.Area= 2,880 sf Storage= 2,005 cf

Plug-Flow detention time= 5.2 min calculated for 31,884 cf (100% of inflow)  
 Center-of-Mass det. time= 4.0 min ( 824.5 - 820.5 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	<b>12.0" Round Pipe Storage x 4</b> Inside #2 L= 60.0'
#2	724.75'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravelx 4</b> 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch x 4</b> 240 cf Overall x 50.0% Voids
#4	728.00'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding x 4</b>
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	<b>8.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#6	Device 2	724.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	727.25'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#8	Device 2	727.25'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=6.06 cfs @ 12.20 hrs HW=728.65' TW=707.13' (Dynamic Tailwater)

1=Culvert (Passes 6.06 cfs of 9.52 cfs potential flow)  
 3=Orifice/Grate (Weir Controls 1.71 cfs @ 1.25 fps)  
 5=Orifice/Grate (Orifice Controls 2.75 cfs @ 9.35 fps)  
 7=Orifice/Grate (Orifice Controls 1.60 cfs @ 5.43 fps)

**Secondary OutFlow** Max=2.02 cfs @ 12.20 hrs HW=728.65' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 2.02 cfs of 3.17 cfs potential flow)  
 4=Orifice/Grate (Weir Controls 0.57 cfs @ 1.25 fps)  
 6=Orifice/Grate (Orifice Controls 0.92 cfs @ 9.35 fps)  
 8=Orifice/Grate (Orifice Controls 0.53 cfs @ 5.43 fps)

**Summary for Pond RG27: Rain Garden Lot 27**

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 3.94" for 25YearMass event  
 Inflow = 1.00 cfs @ 12.14 hrs, Volume= 3,543 cf  
 Outflow = 0.76 cfs @ 12.23 hrs, Volume= 3,533 cf, Atten= 24%, Lag= 5.7 min  
 Primary = 0.76 cfs @ 12.23 hrs, Volume= 3,533 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 758.55' @ 12.23 hrs Surf.Area= 720 sf Storage= 479 cf

Plug-Flow detention time= 14.5 min calculated for 3,533 cf (100% of inflow)

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Center-of-Mass det. time= 12.8 min ( 828.2 - 815.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	754.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	758.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	<b>6.0" Round Culvert</b> L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 ' S= 0.0347 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	757.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.76 cfs @ 12.23 hrs HW=758.55' TW=707.28' (Dynamic Tailwater)

- 1=Culvert (Passes 0.76 cfs of 1.61 cfs potential flow)  
 2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.75 fps)  
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.29 fps)  
 4=Orifice/Grate (Orifice Controls 0.49 cfs @ 5.67 fps)

**Summary for Pond RG28: Rain Garden Lot 28**

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 3.33" for 25YearMass event  
 Inflow = 2.14 cfs @ 12.16 hrs, Volume= 7,952 cf  
 Outflow = 1.99 cfs @ 12.21 hrs, Volume= 7,941 cf, Atten= 7%, Lag= 3.0 min  
 Primary = 1.99 cfs @ 12.21 hrs, Volume= 7,941 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 757.57' @ 12.21 hrs Surf.Area= 720 sf Storage= 482 cf

Plug-Flow detention time= 4.3 min calculated for 7,937 cf (100% of inflow)  
 Center-of-Mass det. time= 3.4 min ( 834.6 - 831.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	753.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	757.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage



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Type III 24-hr 25YearMass Rainfall=6.18"

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Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	<b>8.0" Round Culvert</b> L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	756.25'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.99 cfs @ 12.21 hrs HW=757.57' TW=707.17' (Dynamic Tailwater)

- 1=Culvert (Passes 1.99 cfs of 2.93 cfs potential flow)  
 2=Orifice/Grate (Weir Controls 0.18 cfs @ 0.85 fps)  
 3=Orifice/Grate (Orifice Controls 0.91 cfs @ 9.25 fps)  
 4=Orifice/Grate (Orifice Controls 0.90 cfs @ 5.16 fps)

**Summary for Pond RG30: Rain Garden Lot 30**

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event  
 Inflow = 0.90 cfs @ 12.07 hrs, Volume= 2,818 cf  
 Outflow = 0.63 cfs @ 12.14 hrs, Volume= 2,810 cf, Atten= 30%, Lag= 4.4 min  
 Primary = 0.63 cfs @ 12.14 hrs, Volume= 2,810 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 731.24' @ 12.14 hrs Surf.Area= 720 sf Storage= 405 cf

Plug-Flow detention time= 14.6 min calculated for 2,809 cf (100% of inflow)  
 Center-of-Mass det. time= 12.8 min ( 795.2 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	727.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	730.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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**Primary OutFlow** Max=0.63 cfs @ 12.14 hrs HW=731.24' TW=706.78' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.63 cfs of 1.70 cfs potential flow)↑ **2=Orifice/Grate** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.89 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.44 cfs @ 4.99 fps)**Summary for Link P7: AP7**

Inflow Area = 400,635 sf, 31.66% Impervious, Inflow Depth &gt; 2.35" for 25YearMass event

Inflow = 9.27 cfs @ 12.41 hrs, Volume= 78,340 cf

Primary = 9.27 cfs @ 12.41 hrs, Volume= 78,340 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P7.1: AP7 - To Wetland E**

Runoff = 6.17 cfs @ 12.13 hrs, Volume= 21,646 cf, Depth&gt; 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Adj	Description
77,250	55		Woods, Good, HSG B
12,715	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
91,525	57	56	Weighted Average, UI Adjusted
89,965			98.30% Pervious Area
1,560			1.70% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
8.6	320	Total			

**Summary for Subcatchment P7.10: Lot 27**

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 4,995 cf, Depth&gt; 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
* 3,845	90	Residential Lots, 65% imp, HSG C
2,045	70	Woods, Good, HSG C
940	89	Gravel roads, HSG C
3,970	74	>75% Grass cover, Good, HSG C
10,800	80	Weighted Average
8,301		76.86% Pervious Area
2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

**Summary for Subcatchment P7.11: Lot 28**

Runoff = 3.12 cfs @ 12.16 hrs, Volume= 11,591 cf, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

**Summary for Subcatchment P7.12: Lot 28-29**

Runoff = 3.01 cfs @ 12.07 hrs, Volume= 9,596 cf, Depth> 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

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

**Summary for Subcatchment P7.13: Lot 30**

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 3,781 cf, Depth> 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

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	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

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

**Summary for Subcatchment P7.14: Clubhouse Parking Lot**

Runoff = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf, Depth&gt; 7.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
	1,410	74	>75% Grass cover, Good, HSG C
	750	98	Roofs, HSG C
	6,100	98	Paved parking, HSG C
	8,260	94	Weighted Average
	1,410		17.07% Pervious Area
	6,850		82.93% Impervious Area

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

**Summary for Subcatchment P7.2: Lots 14-15**

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 4,594 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

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

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**Summary for Subcatchment P7.3: Lot 20/21**

Runoff = 1.48 cfs @ 12.07 hrs, Volume= 4,570 cf, Depth&gt; 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
8,930	85	1/8 acre lots, 65% imp, HSG B
3,126		35.00% Pervious Area
5,805		65.00% Impervious Area

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

**Summary for Subcatchment P7.4: Lots 21-25**

Runoff = 11.57 cfs @ 12.18 hrs, Volume= 45,297 cf, Depth&gt; 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
38,735	90	1/8 acre lots, 65% imp, HSG C
11,540	85	1/8 acre lots, 65% imp, HSG B
49,505	70	Woods, Good, HSG C
* 320	74	Grass Paver, Good, HSG C
100,100	79	Weighted Average
67,421		67.35% Pervious Area
32,679		32.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	330	Total			

**Summary for Subcatchment P7.5: Basin 1**

Runoff = 7.50 cfs @ 12.10 hrs, Volume= 23,670 cf, Depth&gt; 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

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Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
6.6	160	Total			

**Summary for Subcatchment P7.6: Lots 16-20**

Runoff = 4.23 cfs @ 12.07 hrs, Volume= 13,229 cf, Depth&gt; 6.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
11,200	90	1/8 acre lots, 65% imp, HSG C
13,695	85	1/8 acre lots, 65% imp, HSG B
24,895	87	Weighted Average
8,713		35.00% Pervious Area
16,182		65.00% Impervious Area

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

**Summary for Subcatchment P7.7: Lot 15**

Runoff = 1.85 cfs @ 12.07 hrs, Volume= 5,890 cf, Depth&gt; 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

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	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

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

**Summary for Subcatchment P7.8: Lot 16**

Runoff = 1.19 cfs @ 12.07 hrs, Volume= 3,784 cf, Depth> 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

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

**Summary for Subcatchment P7.9: Lots 26-27**

Runoff = 2.39 cfs @ 12.07 hrs, Volume= 7,632 cf, Depth> 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

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

**Summary for Pond CB1: CB1**

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 7.21" for 100YearMass event  
Inflow = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf  
Outflow = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf, Atten= 0%, Lag= 0.0 min  
Primary = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



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Peak Elev= 727.69' @ 12.07 hrs

Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	<b>12.0" Round Culvert</b> L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.50 cfs @ 12.07 hrs HW=727.69' TW=707.17' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.50 cfs @ 3.68 fps)**Summary for Pond IB 7.1: Infiltration Basin**

Inflow Area = 300,180 sf, 39.80% Impervious, Inflow Depth > 4.95" for 100YearMass event  
 Inflow = 31.35 cfs @ 12.13 hrs, Volume= 123,911 cf  
 Outflow = 11.37 cfs @ 12.54 hrs, Volume= 115,141 cf, Atten= 64%, Lag= 24.6 min  
 Discarded = 0.73 cfs @ 12.54 hrs, Volume= 27,067 cf  
 Primary = 10.64 cfs @ 12.54 hrs, Volume= 88,074 cf  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 708.99' @ 12.54 hrs Surf.Area= 13,139 sf Storage= 44,748 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 60.5 min ( 865.8 - 805.3 )

Volume	Invert	Avail.Storage	Storage Description		
#1	704.00'	58,843 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Secondary	709.00'	<b>10.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	704.00'	<b>18.0" Round Culvert</b> L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	<b>24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.66 0.66

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#6 Device 3 705.40' **7.5" Vert. Orifice/Grate** C= 0.600**Discarded OutFlow** Max=0.73 cfs @ 12.54 hrs HW=708.99' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.73 cfs)**Primary OutFlow** Max=10.64 cfs @ 12.54 hrs HW=708.99' TW=0.00' (Dynamic Tailwater)↑ **3=Culvert** (Passes 10.64 cfs of 17.52 cfs potential flow)↑ **4=Orifice/Grate** ( Controls 0.00 cfs)↑ **5=Custom Weir/Orifice** (Weir Controls 7.96 cfs @ 5.34 fps)↑ **6=Orifice/Grate** (Orifice Controls 2.67 cfs @ 8.72 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond RG-16/20: Rain Garden Lots 16-20**

Inflow Area = 24,895 sf, 65.00% Impervious, Inflow Depth &gt; 6.38" for 100YearMass event

Inflow = 4.23 cfs @ 12.07 hrs, Volume= 13,229 cf

Outflow = 2.81 cfs @ 12.15 hrs, Volume= 13,188 cf, Atten= 34%, Lag= 4.8 min

Primary = 2.81 cfs @ 12.15 hrs, Volume= 13,188 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 728.02' @ 12.15 hrs Surf.Area= 2,880 sf Storage= 1,882 cf

Plug-Flow detention time= 14.8 min calculated for 13,182 cf (100% of inflow)

Center-of-Mass det. time= 12.7 min ( 796.6 - 783.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	<b>12.0" Round Pipe Storage</b> x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 4 240 cf Overall x 50.0% Voids
#4	727.50'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	<b>6.0" Round Culvert X 4.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	<b>6.0" Horiz. Orifice/Grate X 4.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	<b>2.0" Vert. Orifice/Grate X 4.00</b> C= 0.600
#4	Device 1	726.50'	<b>4.0" Vert. Orifice/Grate X 4.00</b> C= 0.600

**Primary OutFlow** Max=2.81 cfs @ 12.15 hrs HW=728.02' TW=707.83' (Dynamic Tailwater)

- 1=Culvert (Passes 2.81 cfs of 7.09 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.05 cfs @ 0.43 fps)
- 3=Orifice/Grate (Orifice Controls 0.81 cfs @ 9.24 fps)
- 4=Orifice/Grate (Orifice Controls 1.95 cfs @ 5.60 fps)

### Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 2.39 cfs @ 12.07 hrs, Volume= 7,632 cf  
 Outflow = 1.93 cfs @ 12.13 hrs, Volume= 7,614 cf, Atten= 19%, Lag= 3.3 min  
 Primary = 1.93 cfs @ 12.13 hrs, Volume= 7,614 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 748.13' @ 12.13 hrs Surf.Area= 1,440 sf Storage= 997 cf

Plug-Flow detention time= 14.2 min calculated for 7,611 cf (100% of inflow)  
 Center-of-Mass det. time= 12.7 min ( 787.4 - 774.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	747.50'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	746.50'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=1.92 cfs @ 12.13 hrs HW=748.13' TW=707.62' (Dynamic Tailwater)

- 1=Culvert (Passes 1.92 cfs of 3.60 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.50 cfs @ 1.19 fps)
- 3=Orifice/Grate (Orifice Controls 0.41 cfs @ 9.39 fps)
- 4=Orifice/Grate (Orifice Controls 1.02 cfs @ 5.83 fps)

**Summary for Pond RG-28/29: Rain Garden Lots 28-29**

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 3.01 cfs @ 12.07 hrs, Volume= 9,596 cf  
 Outflow = 2.59 cfs @ 12.12 hrs, Volume= 9,575 cf, Atten= 14%, Lag= 2.7 min  
 Primary = 2.59 cfs @ 12.12 hrs, Volume= 9,575 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 743.83' @ 12.12 hrs Surf.Area= 1,440 sf Storage= 1,090 cf

Plug-Flow detention time= 14.0 min calculated for 9,571 cf (100% of inflow)  
 Center-of-Mass det. time= 12.5 min ( 787.3 - 774.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	<b>12.0" Round Pipe Storage</b> x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 2 120 cf Overall x 50.0% Voids
#4	743.00'	480 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 2
		1,173 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	<b>6.0" Round Culvert X 2.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	<b>2.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	742.00'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=2.58 cfs @ 12.12 hrs HW=743.83' TW=707.53' (Dynamic Tailwater)

- 1=Culvert (Passes 2.58 cfs of 3.70 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.08 cfs @ 2.75 fps)
- 3=Orifice/Grate (Orifice Controls 0.42 cfs @ 9.62 fps)
- 4=Orifice/Grate (Orifice Controls 1.08 cfs @ 6.20 fps)

**Summary for Pond RG15H: Rain Garden 15H**

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.85 cfs @ 12.07 hrs, Volume= 5,890 cf  
 Outflow = 1.72 cfs @ 12.10 hrs, Volume= 5,666 cf, Atten= 7%, Lag= 1.7 min  
 Discarded = 0.04 cfs @ 11.80 hrs, Volume= 1,022 cf  
 Primary = 1.68 cfs @ 12.10 hrs, Volume= 4,645 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 719.41' @ 12.10 hrs Surf.Area= 720 sf Storage= 565 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

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Center-of-Mass det. time= 14.4 min ( 789.2 - 774.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	715.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	<b>8.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	718.00'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	715.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.80 hrs HW=718.51' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.68 cfs @ 12.10 hrs HW=719.41' TW=707.40' (Dynamic Tailwater)↑ **1=Culvert** (Passes 1.68 cfs of 2.27 cfs potential flow)↑ **2=Orifice/Grate** (Orifice Controls 1.08 cfs @ 3.09 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.87 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.46 fps)**Summary for Pond RG15L: Rain Garden 15L**

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.44 cfs @ 12.07 hrs, Volume= 4,594 cf  
 Outflow = 1.26 cfs @ 12.11 hrs, Volume= 4,373 cf, Atten= 13%, Lag= 2.5 min  
 Discarded = 0.04 cfs @ 11.91 hrs, Volume= 983 cf  
 Primary = 1.22 cfs @ 12.11 hrs, Volume= 3,390 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 710.86' @ 12.11 hrs Surf.Area= 720 sf Storage= 552 cf

Plug-Flow detention time= 44.6 min calculated for 4,372 cf (95% of inflow)

Center-of-Mass det. time= 17.3 min ( 792.0 - 774.8 )

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Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	706.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	709.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	706.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.91 hrs HW=710.01' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.22 cfs @ 12.11 hrs HW=710.86' TW=707.51' (Dynamic Tailwater)↳ **1=Culvert** (Passes 1.22 cfs of 1.29 cfs potential flow)↳ **2=Orifice/Grate** (Orifice Controls 0.56 cfs @ 2.87 fps)↳ **3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.85 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.50 cfs @ 5.78 fps)**Summary for Pond RG16: Rain Garden Lot 16**

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
Inflow = 1.19 cfs @ 12.07 hrs, Volume= 3,784 cf  
Outflow = 1.06 cfs @ 12.11 hrs, Volume= 3,574 cf, Atten= 11%, Lag= 2.3 min  
Discarded = 0.04 cfs @ 11.97 hrs, Volume= 956 cf  
Primary = 1.02 cfs @ 12.11 hrs, Volume= 2,618 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Peak Elev= 734.18' @ 12.11 hrs Surf.Area= 720 sf Storage= 510 cf

Plug-Flow detention time= 50.7 min calculated for 3,572 cf (94% of inflow)  
Center-of-Mass det. time= 19.9 min ( 794.6 - 774.8 )

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Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	730.25'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	<b>6.0" Round Culvert</b> L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 ' S= 0.0417 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	732.75'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	730.25'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.97 hrs HW=733.50' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.02 cfs @ 12.11 hrs HW=734.18' TW=707.48' (Dynamic Tailwater)↳ **1=Culvert** (Passes 1.02 cfs of 1.23 cfs potential flow)↳ **2=Orifice/Grate** (Weir Controls 0.40 cfs @ 1.40 fps)↳ **3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.55 fps)↳ **4=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.42 fps)**Summary for Pond RG21: Rain Garden 21**

Inflow Area = 8,930 sf, 65.00% Impervious, Inflow Depth > 6.14" for 100YearMass event  
Inflow = 1.48 cfs @ 12.07 hrs, Volume= 4,570 cf  
Outflow = 1.28 cfs @ 12.11 hrs, Volume= 4,348 cf, Atten= 13%, Lag= 2.6 min  
Discarded = 0.04 cfs @ 11.91 hrs, Volume= 928 cf  
Primary = 1.24 cfs @ 12.11 hrs, Volume= 3,420 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 728.88' @ 12.11 hrs Surf.Area= 720 sf Storage= 558 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 16.2 min ( 805.6 - 789.3 )

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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	724.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	727.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	728.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	726.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 726.75' / 726.65' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	726.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	727.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#5	Discarded	724.75'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.04 cfs @ 11.91 hrs HW=728.01' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.24 cfs @ 12.11 hrs HW=728.88' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Passes 1.24 cfs of 1.30 cfs potential flow)↑ **2=Orifice/Grate** (Orifice Controls 0.58 cfs @ 2.98 fps)↑ **3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.89 fps)↑ **4=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.83 fps)**Summary for Pond RG22-25: Rain Gardens 22-25**

Inflow Area = 100,100 sf, 32.65% Impervious, Inflow Depth > 5.43" for 100YearMass event  
 Inflow = 11.57 cfs @ 12.18 hrs, Volume= 45,297 cf  
 Outflow = 11.22 cfs @ 12.21 hrs, Volume= 45,225 cf, Atten= 3%, Lag= 1.9 min  
 Primary = 8.41 cfs @ 12.21 hrs, Volume= 33,919 cf  
 Secondary = 2.80 cfs @ 12.21 hrs, Volume= 11,306 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 728.94' @ 12.21 hrs Surf.Area= 2,880 sf Storage= 2,291 cf

Plug-Flow detention time= 4.7 min calculated for 45,206 cf (100% of inflow)  
 Center-of-Mass det. time= 3.7 min ( 814.3 - 810.7 )



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Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	<b>12.0" Round Pipe Storage x 4</b> Inside #2 L= 60.0'
#2	724.75'	1,077 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> x 4 240 cf Overall x 50.0% Voids
#4	728.00'	960 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b> x 4
		2,345 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	<b>8.0" Round Culvert X 3.00</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	<b>8.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	<b>6.0" Horiz. Orifice/Grate X 6.00</b> C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#6	Device 2	724.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#7	Device 1	727.25'	<b>3.0" Vert. Orifice/Grate X 6.00</b> C= 0.600
#8	Device 2	727.25'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=8.41 cfs @ 12.21 hrs HW=728.94' TW=708.22' (Dynamic Tailwater)

1=Culvert (Passes 8.41 cfs of 9.91 cfs potential flow)  
 3=Orifice/Grate (Orifice Controls 3.78 cfs @ 3.21 fps)  
 5=Orifice/Grate (Orifice Controls 2.86 cfs @ 9.71 fps)  
 7=Orifice/Grate (Orifice Controls 1.78 cfs @ 6.03 fps)

**Secondary OutFlow** Max=2.80 cfs @ 12.21 hrs HW=728.94' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 2.80 cfs of 3.30 cfs potential flow)  
 4=Orifice/Grate (Orifice Controls 1.26 cfs @ 3.21 fps)  
 6=Orifice/Grate (Orifice Controls 0.95 cfs @ 9.71 fps)  
 8=Orifice/Grate (Orifice Controls 0.59 cfs @ 6.03 fps)

**Summary for Pond RG27: Rain Garden Lot 27**

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 5.55" for 100YearMass event  
 Inflow = 1.40 cfs @ 12.13 hrs, Volume= 4,995 cf  
 Outflow = 1.27 cfs @ 12.18 hrs, Volume= 4,983 cf, Atten= 9%, Lag= 3.0 min  
 Primary = 1.27 cfs @ 12.18 hrs, Volume= 4,983 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 758.80' @ 12.18 hrs Surf.Area= 720 sf Storage= 539 cf

Plug-Flow detention time= 14.0 min calculated for 4,983 cf (100% of inflow)

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Center-of-Mass det. time= 12.5 min ( 818.2 - 805.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	754.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	758.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	<b>6.0" Round Culvert</b> L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 ' S= 0.0347 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	757.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.27 cfs @ 12.18 hrs HW=758.80' TW=708.06' (Dynamic Tailwater)

- 1=Culvert (Passes 1.27 cfs of 1.66 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.52 cfs @ 2.65 fps)  
 3=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.59 fps)  
 4=Orifice/Grate (Orifice Controls 0.54 cfs @ 6.16 fps)

**Summary for Pond RG28: Rain Garden Lot 28**

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 4.85" for 100YearMass event  
 Inflow = 3.12 cfs @ 12.16 hrs, Volume= 11,591 cf  
 Outflow = 3.04 cfs @ 12.19 hrs, Volume= 11,578 cf, Atten= 2%, Lag= 1.6 min  
 Primary = 3.04 cfs @ 12.19 hrs, Volume= 11,578 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 757.84' @ 12.19 hrs Surf.Area= 720 sf Storage= 547 cf

Plug-Flow detention time= 4.0 min calculated for 11,573 cf (100% of inflow)  
 Center-of-Mass det. time= 3.3 min ( 823.8 - 820.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	753.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	757.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

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Type III 24-hr 100YearMass Rainfall=7.93"

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Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	<b>8.0" Round Culvert</b> L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	<b>6.0" Horiz. Orifice/Grate X 2.00</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	<b>3.0" Vert. Orifice/Grate X 2.00</b> C= 0.600
#4	Device 1	756.25'	<b>4.0" Vert. Orifice/Grate X 2.00</b> C= 0.600

**Primary OutFlow** Max=3.04 cfs @ 12.19 hrs HW=757.84' TW=708.07' (Dynamic Tailwater)

- 1=Culvert (Passes 3.04 cfs of 3.04 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.10 cfs @ 2.79 fps)  
 3=Orifice/Grate (Orifice Controls 0.94 cfs @ 9.58 fps)  
 4=Orifice/Grate (Orifice Controls 1.00 cfs @ 5.74 fps)

**Summary for Pond RG30: Rain Garden Lot 30**

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event  
 Inflow = 1.18 cfs @ 12.07 hrs, Volume= 3,781 cf  
 Outflow = 0.95 cfs @ 12.13 hrs, Volume= 3,772 cf, Atten= 20%, Lag= 3.4 min  
 Primary = 0.95 cfs @ 12.13 hrs, Volume= 3,772 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 731.63' @ 12.13 hrs Surf.Area= 720 sf Storage= 497 cf

Plug-Flow detention time= 14.3 min calculated for 3,770 cf (100% of inflow)  
 Center-of-Mass det. time= 12.7 min ( 787.4 - 774.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	<b>12.0" Round Pipe Storage</b> Inside #2 L= 60.0'
#2	727.75'	269 cf	<b>4.00'W x 60.00'L x 3.00'H Soil Media and Gravel</b> 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	<b>4.00'W x 60.00'L x 0.25'H Mulch</b> 60 cf Overall x 50.0% Voids
#4	731.00'	240 cf	<b>4.00'W x 60.00'L x 1.00'H Ponding</b>
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	<b>6.0" Round Culvert</b> L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	<b>2.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	730.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

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Type III 24-hr 100YearMass Rainfall=7.93"

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**Primary OutFlow** Max=0.94 cfs @ 12.13 hrs HW=731.63' TW=707.63' (Dynamic Tailwater)

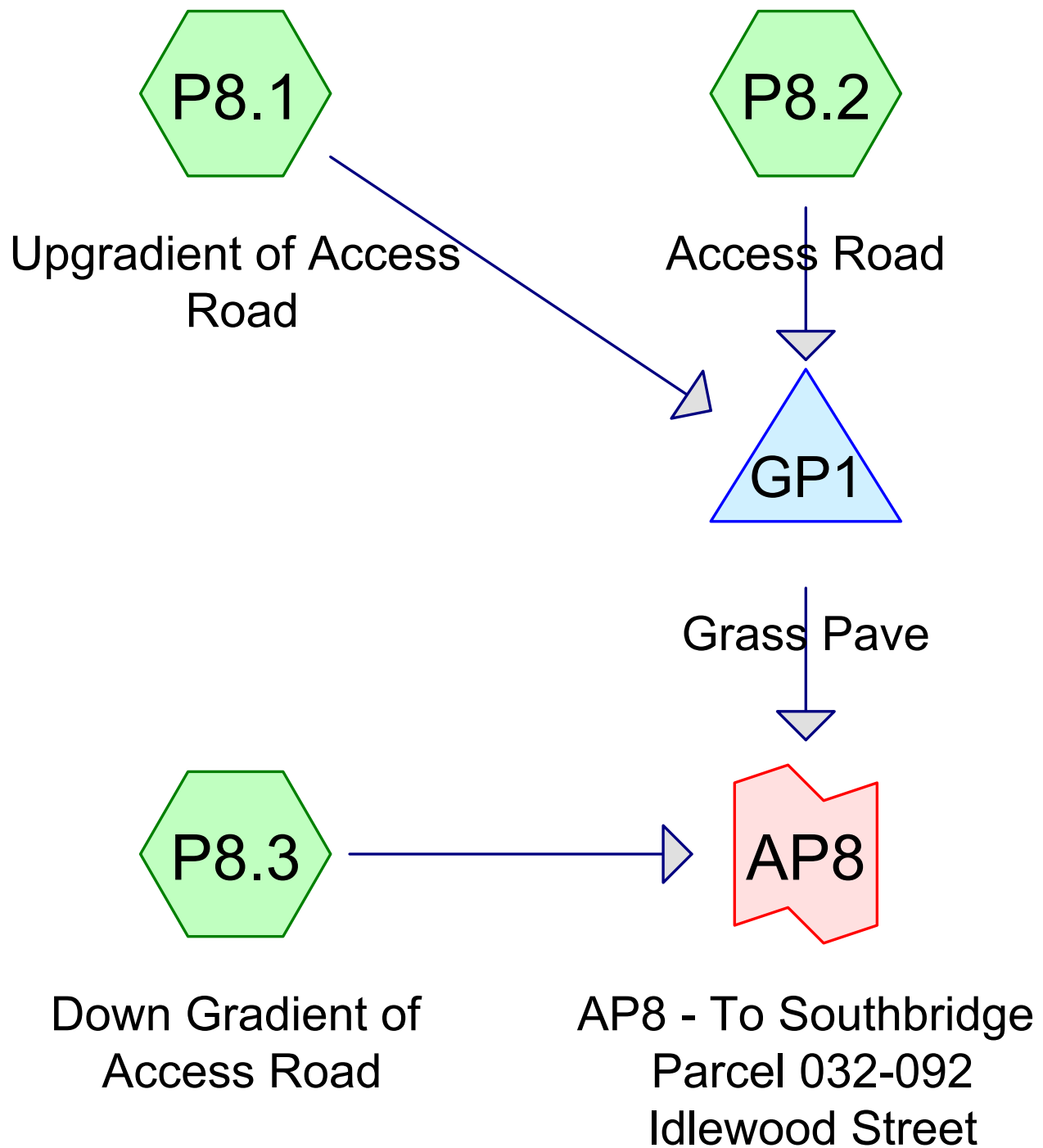
- 1=Culvert (Passes 0.94 cfs of 1.80 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.23 cfs @ 1.16 fps)
- 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.38 fps)
- 4=Orifice/Grate (Orifice Controls 0.51 cfs @ 5.82 fps)

**Summary for Link P7: AP7**

Inflow Area = 400,635 sf, 31.66% Impervious, Inflow Depth > 3.73" for 100YearMass event  
Inflow = 15.62 cfs @ 12.18 hrs, Volume= 124,446 cf  
Primary = 15.62 cfs @ 12.18 hrs, Volume= 124,446 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs





**Routing Diagram for AP8**

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Type III 24-hr 2YearMass Rainfall=3.24"

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**Summary for Subcatchment P8.1: Upgradient of Access Road**

Runoff = 0.26 cfs @ 12.16 hrs, Volume= 1,024 cf, Depth&gt; 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
3,340	74	>75% Grass cover, Good, HSG C
13,655	71	Weighted Average
13,655		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**Summary for Subcatchment P8.2: Access Road**

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 239 cf, Depth&gt; 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
2,700	74	>75% Grass cover, Good, HSG C
2,700		100.00% Pervious Area

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

**Summary for Subcatchment P8.3: Down Gradient of Access Road**

Runoff = 0.10 cfs @ 12.15 hrs, Volume= 395 cf, Depth&gt; 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
1,170	74	>75% Grass cover, Good, HSG C
5,265	71	Weighted Average
5,265		100.00% Pervious Area

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Type III 24-hr 2YearMass Rainfall=3.24"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	100	Total			

**Summary for Pond GP1: Grass Pave**

Inflow Area = 16,355 sf, 0.00% Impervious, Inflow Depth > 0.93" for 2YearMass event  
 Inflow = 0.32 cfs @ 12.14 hrs, Volume= 1,263 cf  
 Outflow = 0.15 cfs @ 12.08 hrs, Volume= 1,264 cf, Atten= 52%, Lag= 0.0 min  
 Discarded = 0.15 cfs @ 12.08 hrs, Volume= 1,264 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 764.13' @ 12.47 hrs Surf.Area= 2,700 sf Storage= 137 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 3.9 min ( 875.0 - 871.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	1,080 cf	<b>12.00'W x 225.00'L x 1.00'H Prismatic</b> 2,700 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	764.83'	<b>225.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Discarded OutFlow** Max=0.15 cfs @ 12.08 hrs HW=764.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=764.00' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 0.22" for 2YearMass event  
 Inflow = 0.10 cfs @ 12.15 hrs, Volume= 395 cf  
 Primary = 0.10 cfs @ 12.15 hrs, Volume= 395 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



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Type III 24-hr 10YearMass Rainfall=5.05"

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**Summary for Subcatchment P8.1: Upgradient of Access Road**

Runoff = 0.67 cfs @ 12.15 hrs, Volume= 2,446 cf, Depth&gt; 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
3,340	74	>75% Grass cover, Good, HSG C
13,655	71	Weighted Average
13,655		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**Summary for Subcatchment P8.2: Access Road**

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 540 cf, Depth&gt; 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
2,700	74	>75% Grass cover, Good, HSG C
2,700		100.00% Pervious Area

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

**Summary for Subcatchment P8.3: Down Gradient of Access Road**

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 943 cf, Depth&gt; 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
1,170	74	>75% Grass cover, Good, HSG C
5,265	71	Weighted Average
5,265		100.00% Pervious Area

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Type III 24-hr 10YearMass Rainfall=5.05"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	100	Total			

**Summary for Pond GP1: Grass Pave**

Inflow Area = 16,355 sf, 0.00% Impervious, Inflow Depth > 2.19" for 10YearMass event  
 Inflow = 0.81 cfs @ 12.13 hrs, Volume= 2,986 cf  
 Outflow = 0.15 cfs @ 11.88 hrs, Volume= 2,986 cf, Atten= 81%, Lag= 0.0 min  
 Discarded = 0.15 cfs @ 11.88 hrs, Volume= 2,986 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 764.79' @ 12.72 hrs Surf.Area= 2,700 sf Storage= 852 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 38.8 min ( 883.9 - 845.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	1,080 cf	<b>12.00'W x 225.00'L x 1.00'H Prismatic</b> 2,700 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	764.83'	<b>225.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Discarded OutFlow** Max=0.15 cfs @ 11.88 hrs HW=764.01' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=764.00' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 0.52" for 10YearMass event  
 Inflow = 0.27 cfs @ 12.14 hrs, Volume= 943 cf  
 Primary = 0.27 cfs @ 12.14 hrs, Volume= 943 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25YearMass Rainfall=6.18"

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**Summary for Subcatchment P8.1: Upgradient of Access Road**

Runoff = 0.96 cfs @ 12.15 hrs, Volume= 3,457 cf, Depth&gt; 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
3,340	74	>75% Grass cover, Good, HSG C
13,655	71	Weighted Average
13,655		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**Summary for Subcatchment P8.2: Access Road**

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 750 cf, Depth&gt; 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
2,700	74	>75% Grass cover, Good, HSG C
2,700		100.00% Pervious Area

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

**Summary for Subcatchment P8.3: Down Gradient of Access Road**

Runoff = 0.38 cfs @ 12.13 hrs, Volume= 1,333 cf, Depth&gt; 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
1,170	74	>75% Grass cover, Good, HSG C
5,265	71	Weighted Average
5,265		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	100	Total			

**Summary for Pond GP1: Grass Pave**

Inflow Area = 16,355 sf, 0.00% Impervious, Inflow Depth > 3.09" for 25YearMass event  
 Inflow = 1.15 cfs @ 12.13 hrs, Volume= 4,207 cf  
 Outflow = 0.97 cfs @ 12.25 hrs, Volume= 4,208 cf, Atten= 16%, Lag= 7.3 min  
 Discarded = 0.15 cfs @ 11.77 hrs, Volume= 3,646 cf  
 Primary = 0.82 cfs @ 12.25 hrs, Volume= 562 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 764.84' @ 12.25 hrs Surf.Area= 2,700 sf Storage= 910 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 39.1 min ( 874.3 - 835.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	1,080 cf	<b>12.00'W x 225.00'L x 1.00'H Prismatic</b> 2,700 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	764.83'	<b>225.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Discarded OutFlow** Max=0.15 cfs @ 11.77 hrs HW=764.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

**Primary OutFlow** Max=0.72 cfs @ 12.25 hrs HW=764.84' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.72 cfs @ 0.27 fps)

**Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 1.05" for 25YearMass event  
 Inflow = 1.08 cfs @ 12.25 hrs, Volume= 1,895 cf  
 Primary = 1.08 cfs @ 12.25 hrs, Volume= 1,895 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment P8.1: Upgradient of Access Road**

Runoff = 1.43 cfs @ 12.14 hrs, Volume= 5,131 cf, Depth&gt; 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
3,340	74	>75% Grass cover, Good, HSG C
13,655	71	Weighted Average
13,655		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**Summary for Subcatchment P8.2: Access Road**

Runoff = 0.37 cfs @ 12.07 hrs, Volume= 1,093 cf, Depth&gt; 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
2,700	74	>75% Grass cover, Good, HSG C
2,700		100.00% Pervious Area

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

**Summary for Subcatchment P8.3: Down Gradient of Access Road**

Runoff = 0.57 cfs @ 12.13 hrs, Volume= 1,979 cf, Depth&gt; 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
1,170	74	>75% Grass cover, Good, HSG C
5,265	71	Weighted Average
5,265		100.00% Pervious Area

**AP8**

Prepared by Microsoft

HydroCAD® 10.00-19 s/n 03362 © 2016 HydroCAD Software Solutions LLC

Postdevelopment AP8

Type III 24-hr 100YearMass Rainfall=7.93"

Printed 4/4/2022

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
9.5	100	Total			

**Summary for Pond GP1: Grass Pave**

Inflow Area = 16,355 sf, 0.00% Impervious, Inflow Depth > 4.57" for 100YearMass event  
 Inflow = 1.71 cfs @ 12.13 hrs, Volume= 6,224 cf  
 Outflow = 1.77 cfs @ 12.13 hrs, Volume= 6,225 cf, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.15 cfs @ 11.66 hrs, Volume= 4,555 cf  
 Primary = 1.62 cfs @ 12.13 hrs, Volume= 1,670 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Peak Elev= 764.85' @ 12.13 hrs Surf.Area= 2,700 sf Storage= 918 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 35.6 min ( 859.6 - 824.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	1,080 cf	<b>12.00'W x 225.00'L x 1.00'H Prismatic</b> 2,700 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	764.83'	<b>225.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Discarded OutFlow** Max=0.15 cfs @ 11.66 hrs HW=764.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

**Primary OutFlow** Max=1.62 cfs @ 12.13 hrs HW=764.85' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.62 cfs @ 0.36 fps)

**Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street**

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 2.03" for 100YearMass event  
 Inflow = 2.20 cfs @ 12.13 hrs, Volume= 3,649 cf  
 Primary = 2.20 cfs @ 12.13 hrs, Volume= 3,649 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



## **APPENDIX F**

### **ADDITIONAL DRAINAGE CALCULATION WORKSHEETS**





## INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment A, B, G

TSS Removal Calculation Worksheet	B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Rain Garden	0.90	1.00	0.90	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10

Total TSS Removal =

90%

Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train

Project: Lot 3 Berry Farms Rd  
Prepared By: PCE  
Date: 4.1.22

\*Equals remaining load from previous BMP (E)  
which enters the BMP



## INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment C

TSS Removal Calculation Worksheet	B	C	D	E	F
	BMP <sup>1</sup>	TSS Removal Rate <sup>1</sup>	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
	Sediment Forebay	0.25	1.00	0.25	0.75
	Rain Garden	0.90	0.75	0.68	0.08
		0.00	0.08	0.00	0.08
		0.00	0.08	0.00	0.08
		0.00	0.08	0.00	0.08

Total TSS Removal =

93%

Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train

Project: Lot 3 Berry Farms Rd  
Prepared By: PCE  
Date: 4.1.22

\*Equals remaining load from previous BMP (E)  
which enters the BMP



## INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment D, E, F

TSS Removal Calculation Worksheet	B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Rain Garden	0.90	1.00	0.90	0.10
	Rain Garden	0.90	0.10	0.09	0.01
		0.00	0.01	0.00	0.01
		0.00	0.01	0.00	0.01
		0.00	0.01	0.00	0.01

Total TSS Removal =

99%

Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train

Project: Lot 3 Berry Farms Rd  
Prepared By: PCE  
Date: 4.1.22

\*Equals remaining load from previous BMP (E)  
which enters the BMP



## INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment H

TSS Removal Calculation Worksheet	B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Rain Garden	0.90	1.00	0.90	0.10
	Infiltration Basin	0.80	0.10	0.08	0.02
		0.00	0.02	0.00	0.02
		0.00	0.02	0.00	0.02
		0.00	0.02	0.00	0.02

Total TSS Removal =

98%

Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train

Project: Lot 3 Berry Farms Rd  
Prepared By: PCE  
Date: 4.1.22

\*Equals remaining load from previous BMP (E)  
which enters the BMP





## INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment I

TSS Removal Calculation Worksheet	B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
	Infiltration Basin	0.80	0.75	0.60	0.15
		0.00	0.15	0.00	0.15
		0.00	0.15	0.00	0.15
		0.00	0.15	0.00	0.15

Total TSS Removal =

85%

Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train

Project: Lot 3 Berry Farms Rd  
Prepared By: PCE  
Date: 4.1.22

\*Equals remaining load from previous BMP (E)  
which enters the BMP



## **APPENDIX G**

### **CONSTRUCTION PERIOD STORMWATER POLLUTION PREVENTION PLAN AND DRAFT WEEKLY CONSTRUCTION PERIOD INSPECTION REPORT**



# Weekly Stormwater Construction Site Inspection Report

## Lot 3 Berry Farms Road, Sturbridge, MA 01566

General Information				
<b>Project Name</b>	<b>55+ MANUFACTURED HOUSING COMMUNITY</b>			
<b>MassDEP File Number:</b>				
<b>Date of Inspection</b>		<b>Start/End Time</b>		
<b>Inspector's Name(s) &amp; Contact Information</b>				
<b>Type of Inspection:</b> <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event				
Weather Information				
<b>Has there been a storm event since the last inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, provide:</b> Storm Start Date & Time:                      Storm Duration (hrs):                      Approximate Amount of Precipitation (in):				
<b>Weather at time of this inspection?</b> <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other:    Temperature:				
<b>Have any discharges occurred since the last inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, describe:</b>				
<b>Are there any discharges at the time of inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, describe:</b>				
	Site – Specific BMPs	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Erosion Control Barrier	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Catch Basin Inlet Protection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Temporary Soil Stabilization	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Stormwater System	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

### CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

**Print name and title:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	<b>Slopes</b> and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	<b>Natural Resource</b> areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	<b>Perimeter Controls</b> and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	<b>Discharge Points</b> and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	<b>Storm Drain Inlets</b> properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	<b>Construction exit</b> preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	<b>Trash / Litter</b> from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	<b>Washout Facilities</b> (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	<b>Vehicle and Equipment Fueling</b> , cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	<b>Materials</b> that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	<b>Non-stormwater discharges</b> (wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

# **APPENDIX H**

## **STORMWATER MANAGEMENT SYSTEM LONG-TERM OPERATION & MAINTENANCE (O & M) PLAN**





# **STORMWATER MANAGEMENT SYSTEM**

## **Long Term Operations and Maintenance Plan**

**“Blueberry Hill Estates”  
Lot 3 Berry Farms Road  
Sturbridge, MA 01566**

**Prepared For:**  
Justin Stelmok  
557 Southwest Cutoff  
Worcester, MA 01607

March 31, 2022

**McCLURE**  

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ENGINEERING, INC

119 Worcester Road – Charlton, Massachusetts 01507 – T: 508.248.2005

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## **ATTACHMENTS**

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<b>Attachment #2</b>	<b>Inspection Log &amp; Maintenance Plan</b>

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**Long-Term Operation & Maintenance Plan  
Site Stormwater Management System  
Lot 3 Berry Farms Road, Sturbridge, MA**

---

**Property Owner/Responsible Party:** Justin Stelmok  
557 Southwest Cutoff  
Worcester, MA 01607  
Phone: (508) 832-5324 Office  
Phone: (508) 868-3996 Cell

**Storm Water Management System Owner:** (same as above)

**Site subject to Wetlands Protection Act:** Yes

**The Responsible Party Shall:**

- Prepare an “**Operation and Maintenance (O & M) Compliance Statement**” (Attachment #1)
- Implement the routine and non-routine operation, maintenance, and inspection tasks in accordance with the procedures specified in this document to ensure that all storm water management systems function as designed.
- Maintain a log of all operation and maintenance (O & M) activities. Keep records for the last three (3) years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and disposal location).
- Make this log available to **Town of Sturbridge** official representatives upon request;
- Allow **Town of Sturbridge** official representatives to inspect each storm water system “best management practice” (BMP) to determine whether the responsible party is implementing the operation and maintenance plan;
- Agree to notify in writing all future property owners of the presence of the storm water management system and the requirement for proper operation and maintenance.

Responsible Party shall maintain a contract with the following companies:

**Landscaping and Pavement Maintenance:** \_\_\_\_\_

**Snow Removal and Plowing:** \_\_\_\_\_

**Storm Water System Maintenance:** \_\_\_\_\_

---

**Long-Term Operation & Maintenance Plan**  
**Blueberry Hill Estates**  
**Lot 3 Berry Farms Road, Sturbridge, MA**

---

**Site Description:**

The Subject Site consists of approximately 41.5 acres. The property lies on the northern side of Main Street and along the Southbridge Town Line. The property is shown as Lot 3 of the Berry Farms Road Definitive Subdivision. The site is located within the Town of Sturbridge Rural Residential zoning district. The existing site consists of mostly wooded area, as well as wetlands. The site has previously been logged and some existing logging trails still exist throughout the property. The site topography slopes generally in a westerly direction towards a valley containing wetlands. The site is surrounded by wetlands on the western boundary, as well as (3) vernal pools as determined by LEC Environmental.

The site is located within an area of minimal flood hazard (Zone X) per Flood Insurance Rate Map (FIRM) Worcester County Massachusetts (All Jurisdictions), Map Number 25027C0933E, effective on 07/04/2011 (see Appendix C).

The proposed site layout is for the construction of a 55+ Manufactured Housing Community. The community is proposed with (4) 20' wide private roads, (3) cul-de-sacs, (1) emergency access drive through the Town of Southbridge, a common clubhouse and active open space area, and (71) total units. The community will be serviced by municipal water and sewer through Berry Farms Road. The stormwater management system for the site consists of country style drainage, including swales and rain gardens with minimal structures for conveyance. Rain gardens will be placed between all units, and will act as a stormwater structure, but also on-site landscaping and yard separation/ privacy barrier. Other than a single deep sump and hooded catch basin in the parking lot for the club house, all stormwater will be conveyed on the surface to rain gardens. These rain gardens will provide for peak flow attenuation, water quality treatment, and groundwater recharge. A total of (77) rain gardens are proposed, with the majority being smaller rain gardens positioned between units which will detain and treat runoff from the units, roads, and driveway. A few larger secondary rain gardens are also proposed. A single large infiltration basin is proposed within an existing natural depression. Interception trenches are proposed behind the units on Roads A and D to convey clean runoff from the undeveloped portions of the property towards the existing discharge points of the property.

The "Special Permit and Site Plan, Blueberry Hill Estates, 55+ Manufactured Housing Community, Lot 3 Berry Farms Road, Sturbridge, MA" Plan Set prepared by McClure Engineering, Inc., dated 4/1/22 provides details of the complete stormwater management system design.

## **Operation and Maintenance (O&M) Plan**

The purpose of this Storm Water Management System Operation and Maintenance Plan is to prevent erosion, sedimentation, pollution or other deterioration of the storm water management system and resource areas located on and adjacent to the property located at Lot 3 Berry Farms Road, Sturbridge, MA. The storm water management system shall be maintained properly to assure its continued performance. Inspection and maintenance for the system should be in compliance with Table 1.

**TABLE 1**

<b>STORMWATER SYSTEM INSPECTION AND MAINTENANCE SCHEDULE</b>		
<b>“Blueberry Hill Estates” Lot 3 Berry Farms Road, Sturbridge, MA</b>		
<b>Best Management Practice (BMP)</b>	<b>Inspection Frequency</b>	<b>Maintenance Frequency</b>
<b>STRUCTURAL BMPs</b>		
<b>Infiltration Basin</b>	After every major storm during first 3 months of operation and twice a year thereafter and when there are discharges through the high outlet orifice.	Bi-Annual Min (Early Spring & Late Fall) and/or As Needed
<b>Deep Sump Hooded Catch Basin</b>	Quarterly	Quarterly and/or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the basin to the lowest pipe invert in the basin.
<b>Sediment Forebay</b>	Monthly	Quarterly and/or As Needed
<b>Interceptor Trench</b>	Quarterly	As Needed
<b>Rain Garden</b>	Monthly	As Needed
<b>Rain Guardian</b>	Quarterly	As Needed
<b>Pipe Outfall/ Rip Rap Apron/ Level Spreader</b>	After heavy rains and Bi-Annually Min (Early Spring & Late Fall)	Bi-Annual Min (Early Spring & Late Fall) and/or As Needed

<b>NON-STRUCTURAL STORMWATER CONTROLS</b>		
<b>Landscaping</b>	Bi-Annual (Early Spring & Late Fall)	Seasonally As Needed
<b>Parking Area Sweeping</b>	Bi-Annual (Early Spring & Late Fall)	Bi-Annual ( 2-Times / Year) (Apr/May and Oct/Nov.)
<b>Snow Removal</b>	Seasonally As Needed	In Accordance with M.G.L. Title XIV. Public Ways and Works; Chapter 85
<b>Site Inspections</b>	Bi-Annual (Early Spring & Late Fall)	Keep Records on File at Site for Three (3) Years

Responsible Party shall be responsible for the system and all Operation and Maintenance procedures, including those outlined in the following sections.

### **STRUCTURAL STORM WATER BMP MAINTENANCE:**

#### **Infiltration Basin:**

Infiltration basins are prone to clogging and failure so it is imperative to develop and implement aggressive maintenance plans and schedules. Installing the required pretreatment BMPs will significantly reduce maintenance requirements for the basin. Perform inspections and preventive maintenance at least twice a year, and after every time drainage discharges through the high outlet orifice. Inspect the pretreatment BMPs in accordance with the minimal requirements specified for those practices and after every major storm event. A major storm event is defined as a storm that is equal to or greater than the 2-year, 24-hour storm (generally 2.9 to 3.6 inches in a 24-hour period, depending in geographic location in Massachusetts). Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots). Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include: signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, condition of riprap, sediment accumulation, and the health of the turf. At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately. Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

#### **Deep Sump Hooded Catch Basin:**

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect or clean deep sump basins at least four times per year and at the end of the foliage and snow removal seasons. Sediments must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Clamshell buckets are

typically used to remove sediment in Massachusetts. However, vacuum trucks are preferable, because they remove more trapped sediment and supernatant than clamshells. Vacuuming is also a speedier process and is less likely to snap the cast iron hood within the deep sump catch basin. Although catch basin debris often contains concentrations of oil and hazardous materials such as petroleum hydrocarbons and metals, MassDEP classifies them as solid waste. Unless there is evidence that they have been contaminated by a spill or other means, MassDEP does not routinely require catch basin cleanings to be tested before disposal. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste. In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste, without any prior approval by MassDEP. However, some landfills require catch basin cleanings to be tested before they are accepted.

### **Sediment Forebay:**

Sediment forebays should be readily accessible for maintenance and sediment removal. Inspect sediment forebays after each significant rainfall. Remove and properly dispose of sediment at least 2 times per year or when sediment deposits total approximately 12". The effectiveness of a sediment forebay is based less on its size than on regular sediment removal. Place waste material in designated disposal areas. Smooth site to blend with surrounding area and stabilize. Clean or replace gravel when sediment pool does not drain properly. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. After removing the sediment, replace any vegetation damaged during the clean-out by reseeding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots. Check embankment, emergency spillway, and outlet for erosion damage. Check embankment for: settlement, seepage, or slumping along the toe or around pipe. Look for signs of seepage or erosion. Repair immediately. Remove trash and other debris from principal spillway, emergency spillway, and pool area.

### **Rain Garden/ Bioretention:**

Bioretention areas require careful attention while plants are being established and seasonal landscaping maintenance thereafter. Inspect pretreatment devices and bioretention cells regularly for sediment build-up, structural damage, and standing water. Inspect soil and repair eroded areas monthly. Re-mulch void areas as needed. Remove litter and debris monthly. Treat diseased vegetation as needed. Remove and replace dead vegetation twice per year (spring and fall). Proper selection of plant species and support during establishment of vegetation should minimize—if not eliminate—the need for fertilizers and pesticides. Remove invasive species as needed to prevent these species from spreading into the bioretention area. Replace mulch every two years, in the early spring. Upon failure, excavate bioretention area, scarify bottom and sides, replace filter fabric and soil, replant, and mulch. Because the soil medium filters contaminants from runoff, the cation exchange capacity of the soil media will eventually be exhausted. When the cation exchange capacity of the soil media decreases, change the soil media to prevent contaminants from migrating to the groundwater, or from being discharged via an underdrain outlet. Using small shrubs and plants instead of larger trees will make it easier to replace the media with clean material when needed. Plant maintenance is critical. Concentrated salts in roadway runoff may kill plants, necessitating removal of dead vegetation each spring and replanting. Never store snow in bioretention areas.



**Pipe Outfall/Rip Rap Apron/Level Spreader:**

Inspect riprap outlet structures after heavy rains for erosion at sides and ends of apron and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet pad. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade. If erosion is occurring down gradient of the outfall, the down gradient vegetation is not stable and the area should be stabilized, the rip rap apron is not long or wide enough and needs to be increased, or the riprap stones are too small or not graded well. If movement of stone is occurring: riprap stones may be too small or not graded well, or the appropriate filter fabric may not be installed under riprap. If erosion occurs around apron and scour holes appear at outlet, foundation may not be excavated wide or deep enough. If erosion of the foundation is occurring, the appropriate filter fabric may not be installed under riprap.

Level spreaders should be inspected periodically and after every major storm. Any detrimental sediment accumulation should be removed. If rilling has taken place on the lip, the damage should be repaired and re-vegetated. Vegetation should be mowed occasionally to control weeds and encroachment of woody vegetation. Clippings should be removed and disposed of outside the spreader and away from the outlet area. Fertilization should be done as necessary to keep the vegetation healthy and dense. The spreader should be inspected after every runoff event to ensure that it is functioning correctly.

**Interceptor Trench**

Interceptor trenches are prone to failure due to clogging, it is imperative that they be aggressively maintained on a regular schedule. Using pretreatment BMPs will significantly reduce the maintenance requirements for the trench itself. Removing accumulated sediment from a deep sump catch basin or a vegetated filter strip is considerably less difficult and less costly than rehabilitating a trench. Perform preventive maintenance at least twice a year. Inspect and clean pretreatment BMPs every six months and after every major storm event (2 year return frequency). Check inlet and outlet pipes to determine if they are clogged. Remove accumulated sediment, trash, debris, leaves and grass clippings from mowing. Remove tree seedlings, before they become firmly established. Inspect the trench after the first several rainfall events, after all major storms, and on regularly scheduled dates every six months. If the top of the trench is grassed, it must be mowed on a seasonal basis. Grass height must be maintained to be no more than four inches. Routinely remove grass clippings leaves and accumulated sediment from the surface of the trench. Inspect the trench 24 hours or several days after a rain event, to look for ponded water. If there is ponded water at the surface of the trench, it is likely that the trench surface is clogged. To address surface clogging, remove and replace the topsoil or first layer of stone aggregate and the filter fabric. If water is ponded inside the trench, it may indicate that the bottom of the trench has failed. To rehabilitate a failed trench, all accumulated sediment must be stripped from the bottom, the bottom of the trench must be scarified and tilled to induce infiltration, and all of the stone aggregate and filter fabric or media must be removed and replaced.

### **Rain Guardian**

Rain Guardian pretreatment chambers simplify bioretention maintenance by collecting sand, leaves, grass clippings, and other debris in an easy to clean, confined location. Regularly maintaining the Rain Guardian sustains its functionality by maximizing storage and filtration capacities. Maintenance frequency is variable and depends on many factors such as rainfall frequency, drainage area size and land use type, and season of the year. Following rain events, inspect the pretreatment chamber for debris on the top grate, within the chamber, and on the vertical, drop-in filter wall. The maintenance steps described below should be completed if areas of the top grate are clogged, the chamber is >75% full, or the vertical filter wall is clogged. Maintenance should be completed when stormwater has completely drained from the bioretention practice. The filter wall allows the chamber to dry between rain events, which further simplifies maintenance by ensuring removed debris is largely dry. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of according to local environmental rules. Once cleaning is complete, reinstall the filter wall with filter fabric facing the inside of the chamber and replace the top grate.

### **NON - STRUCTURAL STORM WATER MANAGEMENT CONTROLS / GOOD HOUSEKEEPING PRACTICES:**

#### **Hay bales:**

Inspect straw/hay bales before a forecasted storm event, immediately after each runoff producing rainfall and at least daily during prolonged rainfall. Ensure there are not gaps between bales or evidence of undermining. Close attention should be paid to the repair of damaged bales, undercutting beneath bales, and flow around the ends of the bales. Necessary repairs to barriers or replacement of bales should be accomplished promptly. Replace rotted or sediment covered bales as necessary. Sediment deposits should be checked after each runoff-producing rainfall. They must be removed when the level of deposition reaches approximately one-half the height of the barrier. Any sediment deposits remaining in place after the straw bale barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

#### **Silt Fence:**

A sediment fence requires a great deal of maintenance. Silt fences should be inspected immediately after each rainfall and at least daily during prolonged rainfall. Remove accumulated sediment when it reaches one half the height of the sediment fence. Remove sediment deposits promptly to provide adequate storage volume for the next rain and to reduce pressure on fence. Take care to avoid undermining fence during cleanout. Sagging, frayed, torn, or otherwise damaged fabric should be repaired or replaced. Repair end runs and undercutting. Inspect reinforcement and staking materials for structural integrity, and replace when necessary. Sediment deposits remaining after the fabric has been removed should be graded to conform to the existing topography and vegetated.

#### **Mulching:**

Mulching shall be used in areas which cannot be seeded because of the season, or are otherwise unfavorable for plant growth (traffic and parking areas). When properly applied, mulch offers a fast, effective means of controlling erosion and dust. Soil surfaces should be roughened prior to mulching. Run track-mounted machinery up and down the slope in order to leave horizontal

depressions in the soil running parallel to the slope. Roughened soil surfaces should be mulched and/or seeded as soon as possible. Ensure there is a continuous, uniform, even coverage. Ensure mulch layer is not so thick that it suppresses desired seed germination and plant growth. Ensure rilling or gullyng does not occur beneath “binded” mulch. Replace or repair mulch if washed or blown away. On steep slopes and critical areas such as waterways, use netting or anchoring with mulch to hold it in place. Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting. Straw or grass mulches that blow or wash away should be repaired promptly. Blanket mulch that is displaced by flowing water should be repaired as soon as possible. Continue inspections until vegetation is well established.

### **Temporary & Permanent Seeding**

Well-established vegetation is widely considered the most effective form of erosion control. The presence of temporary or permanent cover will provide stabilization and erosion protection to disturbed areas. Temporary seed mixes contain annual vegetation that grows quickly and helps stabilize an area until permanent vegetation can be established. Proper soil bed preparation, seeding method and soil moisture are critical for successful seed application. Before planting, scarify/roughen the soil surface and install appropriate surface drainage measures to prevent erosion and scouring. Seed with an approved conservation cover mix during the specified growing season, using native plant species. Seeding operations should be performed within one of the following periods: April 1 - May 31, August 1 - September 10, November 1 - December 15 as a dormant seeding (seeding rates shall be increased by 50% for dormant seeding). As needed, provide water, fertilizer, lime, and mulch to the seedbed. If it is unlikely that growth will occur due to cold weather, apply mulch for temporary stabilization. Inspect within 6 weeks of planting to see if stands are adequate. Check for damage after heavy rains. Stands should be uniform and dense. Fertilize, reseed, and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary. Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather or on adverse sites. Water application rates should be controlled to prevent runoff. Inspect seeded areas for failure and make appropriate repairs and re-seed and re-plant as necessary. Inspect for bare spots, rilling, or gullyng and correct as necessary. If stand has less than 40% cover, re-evaluate selection of seeding materials and quantities of fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations. If the season prevents resowing, mulch or jute netting is an effective temporary cover. Lack of water may also be an issue. Conduct a follow up survey after one year and re-seed failed areas. Temporarily stabilized areas will require permanent stabilization when the area has been completed as designed or when the growing season begins.

### **Landscape & Parking Area Maintenance**

Landscape areas shall be maintained in a neat and orderly fashion. Landscape maintenance debris shall not be deposited on adjacent properties and properly disposed of off-site as necessary to maintain a clean and orderly appearance. Parking Areas shall be inspected often and after significant rainfall events. Inspect for signs of erosion, rilling, gullyng. Regrade and repair parking areas as necessary. If areas are needing constant maintenance apply mulch/wood chips to help prevent further erosion. Areas not used for parking or traffic should be seeded for stabilization. All parking areas should be stabilized prior to off season shutdown, preferably with a mulch application.

### **Fertilizer, Herbicide, and Pesticide Storage**

Storage of all fertilizers, herbicides, and pesticides will be indoors. Use of all fertilizers, herbicides, and pesticides shall be in a manner consistent with the products intended use.

### **Waste Storage & Trash Removal**

All waste products are to be stored indoors, under cover, or within a covered dumpster. Inspect on-site area for litter and trash on a weekly basis. Any accumulated trash, litter, and discarded materials in this area will be removed and will be disposed of at a suitable location on a weekly basis. The loading and dumpster areas throughout the site will be inspected on a daily basis for cardboard and/or paper products and will be inspected on a weekly basis for any accumulated trash, litter, and discarded material. Dumpster to be kept closed when not in use. Gates to the dumpster enclosure areas are proposed to be locked when not in use.

### **Hazardous Waste or Oil Spill Response Procedure**

Initial Notification: In the event of a spill of hazardous waste or oil the facility manager or supervisor will be notified immediately by telephone.

Assessment – Initial Containment: The supervisor or manager will assess the incident and initiate control measures. The supervisor will first contact the Town of Sturbridge Fire Department and then notify the Town of Sturbridge. The Fire Department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department Telephone: 911 (Emergency)  
508-347-2525 (Non-Emergency/Dispatch)

Police Department Telephone: 911 (Emergency)  
508-347-2525 (Non-Emergency/Dispatch)

Further Notification: Based on the assessment by the Fire Chief, additional notification to a clean up contractor may be made. The Massachusetts Department of Environmental Protection and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of clean up and notification required.

### **SNOW MANAGEMENT PLAN:**

Snow plowing will be done to allow access to the site and provide safe passage from vehicle to front door. No salt shall be used to treat unpaved areas during snow and ice conditions. Snow from lighter storms will be plowed to the perimeter of the parking lots and allowed to melt onto the pavement surfaces. Snow will be temporarily stock piled on the pavement surface during larger storm events to keep the parking area open for customers. This stockpiling will be temporary and will be located within designated areas throughout the Site, furthest away from the building entrances. If Site snow storage interferes with parking lot operations (i.e. blocking of travel aisles, sight distance, or parking) the snow pile will be either removed or reduced legally in a legal manner by the snow plow vendor within 24 hours.

### **Winter Road Salt & Sand Use Restrictions**

Salt and sand for winter de-icing will only be stored indoors or under cover. Use of road salt and sand will only be used on a limited basis during the winter months to insure safe passage of pedestrian walkways and parking areas.

### **INSPECTIONS / RECORDKEEPING / TRAINING:**

#### **Routine Inspections**

Routine inspections and maintenance to be conducted with the frequency described in this Operation and Maintenance Plan. An example inspection form is provided in **Attachment #2**.

#### **Recordkeeping**

Records of all drainage system inspections and maintenance shall be kept on file for a period of at least three (3) years and provided to the Town of Sturbridge upon request.

### **PUBLIC SAFETY FEATURES:**

All cast iron storm water structure grates and covers shall be kept in good condition and kept closed at all times. Any damaged or broken structures will be replaced immediately upon discovery;

### **OPERATION AND MAINTENANCE BUDGET ESTIMATE:**

The responsible party agrees to maintain an adequate annual budget to provide for the routine maintenance activities detailed in this document including but not limited to:

- Infiltration Basin Maintenance
- Rain Garden Maintenance
- Interceptor Trench Maintenance
- Rain Guardian Maintenance
- Deep Sump Hooded Catch Basin Maintenance
- Sediment Forebay Maintenance
- Pipe Outfall/ Rip Rap Apron/ Level Spreader Maintenance
- Landscape Maintenance
- Trash Removal
- Snow Plowing & Removal

## **Attachment #1**

### **Operation & Maintenance (O & M) Compliance Statement**



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**Illicit Discharge Compliance Statement**  
**Site Storm water Management System**  
**Blueberry Hill Estates**  
**Lot 3 Berry Farms Road, Sturbridge, MA**

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**Property Owner/Responsible Party:** Justin Stelmok  
557 Southwest Cutoff  
Worcester, MA 01607  
Phone: (508) 832-5324 Office  
Phone: (508) 868-3996 Cell

**Storm water Management System Owner:** (same as above)

**Site subject to Wetlands Protection Act:** Yes

**The above listed Responsible Party is responsible for implementation of this “Long-Term Operation and Maintenance Plan” and certifies that:**

- The site has been inspected for erosion and appropriate steps have been taken to permanently stabilize any eroded areas.
- All aspects of storm water BMPs have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the storm water at the site may be managed in accordance with the Stormwater Management Standards, revise date January 2, 2008.
- There is no record or knowledge of existing illicit discharges to the on-site stormwater management system.
- All “future property owners” must be notified of their continuing legal responsibility to operate and maintain the existing stormwater management system structures.
- The “Long-Term Operation and Maintenance Plan” for the storm water BMPs is being implemented.

Signature of Responsible Party:

\_\_\_\_\_  
Justin Stelmok

\_\_\_\_\_  
Date





## **Attachment #2**

### **Inspection & Maintenance Reports**



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**Long-Term Operation and Maintenance Plan  
Storm Water Management System**

**Lot 3 Berry Farms Road, Sturbridge, MA**

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***INSPECTION AND MAINTENANCE REPORT FORM***

Note: This Log should be copied prior to use. Note Additional Comments on back of Form.

Inspector's Name: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ am/pm

Inspector's Qualifications: \_\_\_\_\_

Days Since Last Rainfall: \_\_\_\_\_ Amount of Last Rainfall: \_\_\_\_\_ inches

Item/Condition to be Checked	Maintenance Required		Corrective Action & Date
	No	Yes	
Infiltration Basin			*Inspect Twice Per Year Minimum, Report encountered issues to engineer as soon as possible.
Deep Sump Hooded Catch Basin			
Sediment Forebay			
Rain Guardian			
Rain Garden			
Interceptor Trench			
Pipe Outfall/ Rip Rap Apron/ Level Spreader			
Landscaping / Trash Removal			
Snow Removal (seasonal)			

**Corrective Actions Taken (if necessary):**