FINAL
DRAINAGE REPORT

"Timber Crest Estates"
&
"Kingsbury Village"
Medway, MA

August 6, 2019

Prepared for:
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FINAL DRAINAGE REPORT
"TIMBER CREST ESTATES" & "KINGSBURY VILLAGE"
MEDWAY, MASSACHUSETTS

Sections

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Appendices

FINAL DRAINAGE REPORT
"TIMBER CREST ESTATES" & "KINGSBURY VILLAGE"
MEDWAY, MASSACHUSETTS
August 6, 2019

EXPLANATORY NOTE: This report was compiled as a Final Drainage Report for the project now known as Timber Crest Estates & Kingsbury Village, where the east side of the development representing lots 71-143 was given its own name (Kingsbury Village) to differentiate it from the west side development consisting of lots 1-70 (Timber Crest Estates). This report is a compilation of the original Final Drainage Report for Timber Crest Estates dated August 14, 2018 and supplemental reports that were subsequently approved by the Medway Conservation per an Order of Conditions (DEP File No. 216-914), issued 3/5/19. Accordingly, the following narrative and calculations were not edited to correspond to the Final Plans submitted to the Zoning Board, dated August 6, 2019, but rather the text and calculations reference the Conservation Permitting Plans dated August 14, 2018.

The primary changes incorporated into this Final Drainage Report include:

- post-development calculations to Design Point 4 were updated per the October 5, 2018 Supplemental Drainage Report.
- the Roof Drain spreadsheet in Appendix D-4 was updated to reflect the latest lot layout whereby several lots were eliminated and some houses only need rear roof drains as noted on the grading plans and the Oct. 5, 2018 Supplemental Report.

Lastly, reference herein is made to a separate document: Final, Long-Term Stormwater Operation & Maintenance Plan & Pollution Prevention Plan dated August 6, 2019. This long-term plan covers the entirety of the project site and was updated to reflect the latest road, project names for the east and west sides, and the emergency access road located at #13 Fairway Lane.

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MEDWAY, MASSACHUSETTS
August 6, 2019

See Explanatory Note on previous page.

Section 1.0: Introduction

This report was originally prepared to accompany the Notice of Intent filing for the Timber Crest Estates project, and calculations have been updated as noted in the Explanatory Note. The project is a proposed subdivision with 136 house lots on 169 acres in the north section of Medway. The project lays out into two sections referred to as the West Side (accessed off Winthrop Street) and East Side (accessed off Holliston Street, Fairway Lane and Fern Path). Conservation Permitting Plans dated August 14, 2018 show the proposed project in detail, based upon a Comprehensive Permit per MGL Ch. 40B, issued by the Medway Zoning Board of Appeals. The drainage calculations herein document that stormwater runoff rates can be controlled using structural and low-impact development techniques, in compliance with the Massachusetts Department of Environmental Protection's (DEP's) Stormwater Management Regulations.

Section 2.0: Existing Conditions

Timber Crest Estates is located in the northerly area of Medway (refer to USGS Locus Map, Figure 1), containing 10 parcels of mostly woodlands, totaling approximately 170 acres. The site is bordered by residential areas along Winthrop Street and Ohlson Circle to the west, Fairway Lane to the north, Holliston Street to the east, and Fern Path and Howe Street to the south. The site is in the AR-I zoning district. Homes in the area are generally ranch or colonial-style homes situated on lots ranging in size from approximately ¼ to 1+ acres.

The property is currently mostly wooded, except for homesites at 102 Winthrop Street and 165 Holliston Street, with two utility easements running parallel to each other across the site. These easements are for underground natural gas mains (Algonquin Gas Transmission Company) and overhead, electric power transmission lines (Boston Edison). The site topography is relatively gently sloping, characterized by small hills and lower valleys where wetlands are located. Elevations are approximately 266 ft. at Winthrop Street, 280 ft. at Fairway Lane, 270 ft. at Holliston Street, and 274 ft. at Fern Path, with interior elevations ranging from approximately 265 ft. to 284 ft.

Soils in the upland areas of the site have been identified by the NRCS as varying types of sandy loam, with both Hydrologic Soil Group A and C. Refer to Appendix A for NRCS soils map information. Test pits were dug in locations where stormwater basins are proposed to document soil types and groundwater conditions (refer to the subdivision plans for test pit locations and soil logs). Soils in these test pits varied across the site, and included areas of sand, loamy sand and sandy loam. Groundwater was identified in some test pits either via mottling or standing water in the holes, and varied from approximately 3 ft. below ground surface or deeper in most locations.

The site location is not within any mapped environmentally sensitive areas based on review of MassGIS data, except there are four certified vernal pools (CVPs) in the northeast portion of the site and four other potential vernal pools that have all been mapped and previously reviewed by the Medway Conservation Commission. The site is not within any regulatory floodways (i.e., no 100-yr. floodplains, see attached Flood Insurance Rate Map, Figure 2), state-designated

Outstanding Resource Waters (except for the four CVPs), Areas of Critical Environmental Concern (see Figure 3), Zone II of public wells or Zone A of public water supplies, or priority habitat of endangered or rare species as mapped by the MA Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (see Figure 4).

The wetlands on the site have been delineated with most of the bordering vegetated wetlands approved via three Orders of Resource Area Delineation issued by the Medway Conservation Commission; a fourth ORAD indicates that there is an intermittent stream present on the east portion of the site flowing northerly from the site to a culvert under Fairway Lane (note: the intermittent determination extends up to the south property line of the 165 Holliston Street property, and this streambed has also been documented to be dry to at least the north property line at 167 Holliston Street (land of Richards)).

The wetlands cover much of the interior portions of the site, and drain off-site to the northwest, northeast and southwest through three (3) different intermittent streams. Other discharge points are located (1) along the west boundary of the site towards the Winthrop Street drainage system, and (2) two isolated wetlands in the southwest corner of the site. These areas were delineated as a result of field investigations and review of the topography.

As such, the site was delineated into a number of sub-catchment areas, and runoff conditions were calculated at these 5 design discharge points, representing the flow to each of the wetland areas. Please refer to Appendix D-1 for Existing Hydrology Calculations (i.e., pre-development conditions) and Appendix J for the Pre-Development Drainage Map).

Section 3.0: Proposed Development

Timber Crest Estates is a subdivision with two separate neighborhoods planned to preserve wetlands and upland areas between them as open space. The project consists of 136 homes, including 70 single family homes on the west portion of the site and 66 single-family homes on the east portion of the site. The subdivision roadway entrance for the west side is off of Winthrop Street directly opposite from Stephanie Road, ending in a cul de sac with an emergency access connecting to 13 Ohlson Circle. The east side subdivision includes a roadway off Holliston Street with 1 cul de sac road and an emergency access road across 13 Fairway Lane; 4 lots are planned along a common driveway off Fairway Lane, and 2 lots are proposed at the end of Fern Path. The subdivision will be serviced by town sewer and water mains. Underground cable utilities and natural gas are also to be provided.

Wetland alteration will be required to install a precast concrete arch roadway to cross an intermittent stream with bordering vegetated wetland on the east side, and a box culvert to cross over an intermittent stream for an emergency access road behind the home on 13 Ohlson Circle. Bordering vegetated wetland replication will be provided at a ratio of 1:1.

The site design and stormwater management system features sustainable development techniques to minimize the impact on the environment. It utilizes several low impact development techniques and best management practices (BMPs) as outlined in DEP's Stormwater Management Handbook, including the following:

- Narrower roadways, small lots and short driveways to reduce impervious area,

- Grassed parking areas at two proposed bus shelters at Winthrop and Holliston Streets.
- Roof drains are planned for most homes to recharge groundwater and reduce runoff volumes (see Appendix D-4).
- Bioretention areas (or rain gardens) are planned in 4 locations to infiltrate and control runoff.
- Thirteen stormwater infiltration basins and two underground leaching chamber beds are proposed to recharge groundwater and reduce runoff rates and volumes.
- Three detention basins and two water quality swales are proposed to reduce runoff rates.
- As was recommended by the Medway Department of Public Services in a comment letter during the Comprehensive Permit hearings with the Zoning Board, the site design and stormwater system for the 2 proposed homes at the end of Fern Path incorporate a T-turnaround for emergency vehicles (instead of a large paved cul de sac) and a shallow grassed infiltration basin, as low impact development features.
- Similar to above, and as requested by the Medway Conservation Commission during the Notice of Intent hearing process, the applicant has sought ways to minimize wetland impacts and further reduced proposed impervious area on the site by eliminating a roadway that required crossing a wetland, and replaced this longer road with a shorter, narrower, common driveway that eliminated several house lots. A low impact drainage system consisting of a grass channel and infiltration basin was used along the driveway. One cul de sac road and 5 lots were also eliminated on the east side.
- A precast concrete arch bridge with a longer span was used to reduce wetland alteration.
- All stormwater runoff from the other east and west side roads are directed to deep sump catch basins and piped to detention and infiltration basins which will store and infiltrate the runoff and slowly release it at a reduced flow rate from existing conditions. Some of the runoff will be discharged into the underlying soil (via roof drains and infiltration basins) thus providing recharge to the local aquifer.

These BMPS are sited at appropriate locations based on the soils and setbacks to wetlands, and were sized to accommodate the 100-year design storm without increasing any potential for downstream flooding. Refer to Appendix D-2 for the post-development hydrology calculations and Appendix J for the watershed map.

Section 4.0: Drainage Design Methodology

To determine changes in storm runoff for the proposed project, the HydroCAD Stormwater Modeling System software was used. This software closely approximates the USDA Soil Conservation Service (SCS) TR-20 methodology for calculating runoff. The SI routing method was used, except where tailwater conditions were found. We utilized the Dynamic SI method to accurately model tailwater conditions (See Appendix D-3). The calculations determined the change in the existing and post-development runoff rates to each drainage design point for each of the 2 year, 10 year, and 100 year storm events (and as requested by the Conservation Commission during the Comprehensive Permit hearings, the 25-year storm was also analyzed). All storm events analyzed comply with Technical Paper-40 (*Rainfall Frequency Atlas of the United States*) Rainfall Data. Infiltration rates used to size the recharge BMPs are based on the soil types found in the test pits and Rawl's rates as designated by DEP.

The stormwater design complies with the DEP Stormwater Management Regulations, incorporating a number of BMPs for water quality, recharge and runoff control (refer to Appendix

B for the DEP Stormwater Checklist). The calculations herein document compliance with rate and volume control, sizing of the detention and infiltration systems, as well as pretreatment, water quality and recharge volumes, and discharge velocities. Separate documents are provided for construction period erosion and sediment control (see Draft Final, Stormwater Pollution Prevention Plan – site contractor and contact information is not available until contract is awarded by developer) and to ensure long-term viability of these drainage systems and to prevent pollution and degradation of the environment (see Long-Term Stormwater Operation & Maintenance Plan and Pollution Prevention Plan). Please note that this project is subject to a NPDES General Construction Permit and a Final Storm Water Pollution Prevention Plan with the appropriate contractor information shall be submitted prior to construction to comply with Standard 8 of the DEP Stormwater Management Regulations.

Section 5.0: Summary of Results

In accordance with DEP requirements, the storm water design controls runoff for the 2 year, 10 year, and 100 year storm events (and also the 25-year storm) below existing conditions. There are five off-site design points analyzed with a summary of runoff rates and volumes as follows.

Comparison of Pre- & Post-Development Runoff Rates

Design Point 1 - To Wetland and Low Area @ Winthrop Street

	Pre development	**Post development**
	Rate/Volume	Rate/Volume
2 Year Storm (3.20")		
• To Design Point 1	0.32 cfs 0.077 af	0.26 cfs 0.041 af
10 Year Storm (4.70")		
• To Design Point 1	3.48 cfs 0.480 af	2.80 cfs 0.398 af
25 Year Storm (5.50")		
• To Design Point 1	7.27 cfs 0.756 af	5.90 cfs 0.649 af
100 Year Storm (6.70")		
• To Design Point 1	12.68 cfs 1.228 af	11.30 cfs 1.092 af

Design Point 2 – To Intermittent Stream Flowing Offsite Northwest

	Pre development	**Post development**
	Rate	Rate
2 Year Storm (3.20")		
• To Design Point 2	0.70 cfs 0.140 af	0.48 cfs 0.105 af
10 Year Storm (4.70")		
• To Design Point 2	3.84 cfs 0.447 af	2.86 cfs 0.352 af
25 Year Storm (5.50")		
• To Design Point 2	6.26 cfs 0.794 af	4.84 cfs 0.553 af
100 Year Storm (6.70")		
• To Design Point 2	10.41 cfs 1.621 af	8.41 cfs 1.331 af

Design Point 3 - To Central Wetlands Flowing to Lovering Street

	Pre development	Post development
	Rate	Rate
2 Year Storm (3.20")		
• To Design Point 3	1.65 cfs 0.394 af	1.23 cfs 0.448 af
10 Year Storm (4.70")		
• To Design Point 3	9.47 cfs 1.43 af	6.23 cfs 1.497 af
25 Year Storm (5.50")		
• To Design Point 3	15.77 cfs 2.245 af	10.04 cfs 2.255 af
100 Year Storm (6.70")		
• To Design Point 3	29.08 cfs 3.735 af	18.11 cfs 3.733 af

Design Point 4 - To East Wetlands Flowing to Fairway Lane Culvert

	Pre development	Post development
	Rate	Rate
2 Year Storm (3.20")		
• To Design Point 4	3.15 cfs 0.418 af	2.61 cfs 0.382 af
10 Year Storm (4.70")		
• To Design Point 4	8.67 cfs 1.177 af	7.37 cfs 1.073 af
25 Year Storm (5.50")		
• To Design Point 4	13.75 cfs 1.727 af	11.50 cfs 1.603 af
100 Year Storm (6.70")		
• To Design Point 4	23.17 cfs 2.711 af	20.25 cfs 2.518 af

Design Point 5 - To Onsite Isolated Wetlands North of Ohlson Circle

	Pre development	Post development
	Rate	Rate
2 Year Storm (3.20")		
• To Design Point 5	0.00 cfs 0.000 af	0.00 cfs 0.000 af
10 Year Storm (4.70")		
• To Design Point 5	0.00 cfs 0.000 af	0.00 cfs 0.001 af
25 Year Storm (5.50")		
• To Design Point 5	0.02 cfs 0.016 af	0.02 cfs 0.017 af
100 Year Storm (6.70")		
• To Design Point 5	0.14 cfs 0.089 af	0.12 cfs 0.074 af

Section 6.0: The Stormwater Management Standards
This section documents compliance with DEP's 10 Stormwater Management Standards.

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

   The proposed stormwater conveyances do not discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. See Appendix C.

2. *Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

   Infiltration basins, detention basins, leaching chamber beds, bioretention areas, and water quality swales have been incorporated into the storm water design to control runoff rates for the 2, 10, 25, and 100-year storm events. Five design points have been analyzed: (1) flow to wetland & low area at Winthrop St., (2) flow to intermittent stream flowing offsite northwest, (3) flow to central wetlands flowing to Lovering St., (4) flow to east wetlands flowing to Fairway Lane culvert, and (5) flow to onsite isolated wetlands north of Ohlson Cir. Peak flow rates have been reduced in all cases from pre- to post-development. Offsite flooding for the 100-year storm has also been reduced at all design points, by recharging runoff so that post-development runoff volumes are below existing conditions. See summary of results in Section 5, as well as the HydroCAD calculations in Appendices D-1 and D-2.

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

   Infiltration basins and leaching chamber beds have been designed to recharge more than three times the required recharge volume of storm water for the site. The required recharge volume has been calculated using the simple dynamic method. These calculations as well as drawdown calculations for all infiltration BMPs have been provided in Appendix E.

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

   a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

   b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

   c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

The storm water management system for this project has been designed to remove a minimum of 80% of the average annual post construction load of total suspended solids in accordance with this standard. This standard has been met as noted below.

(a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan (see Appendix I).
(b) The structural BMP treatment trains utilized will capture the required water quality volume determined per the Massachusetts Stormwater Handbook (see Appendix F-1).
(c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook using deep sump catch basins, sediment forebays, and water quality tanks (see Appendices F-2 to F-4).

5. *For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater 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, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

   The site is not a source of higher pollutant loads. This standard is not applicable.

6. *Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

   Portions of the site runoff discharge near the Vernal Pools, however, all stormwater basin outlets are more than 100' from the vernal pools per DEP Stormwater Handbook requirements. Source control and pollution prevention measures, along with specific structural storm water BMPs determined by the Department to be suitable for managing discharges to critical areas, as provided in the Massachusetts Stormwater Handbook, have been incorporated in the drainage design of the site. For discharges to ORWs such as vernal pools deep sump catch basins, sediment forebays, and water quality tanks are recommended structural pretreatment BMPs, and infiltration basins are highly recommended infiltration BMPs.

7. *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.*

   The site is not a redevelopment project. This standard is not applicable.

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

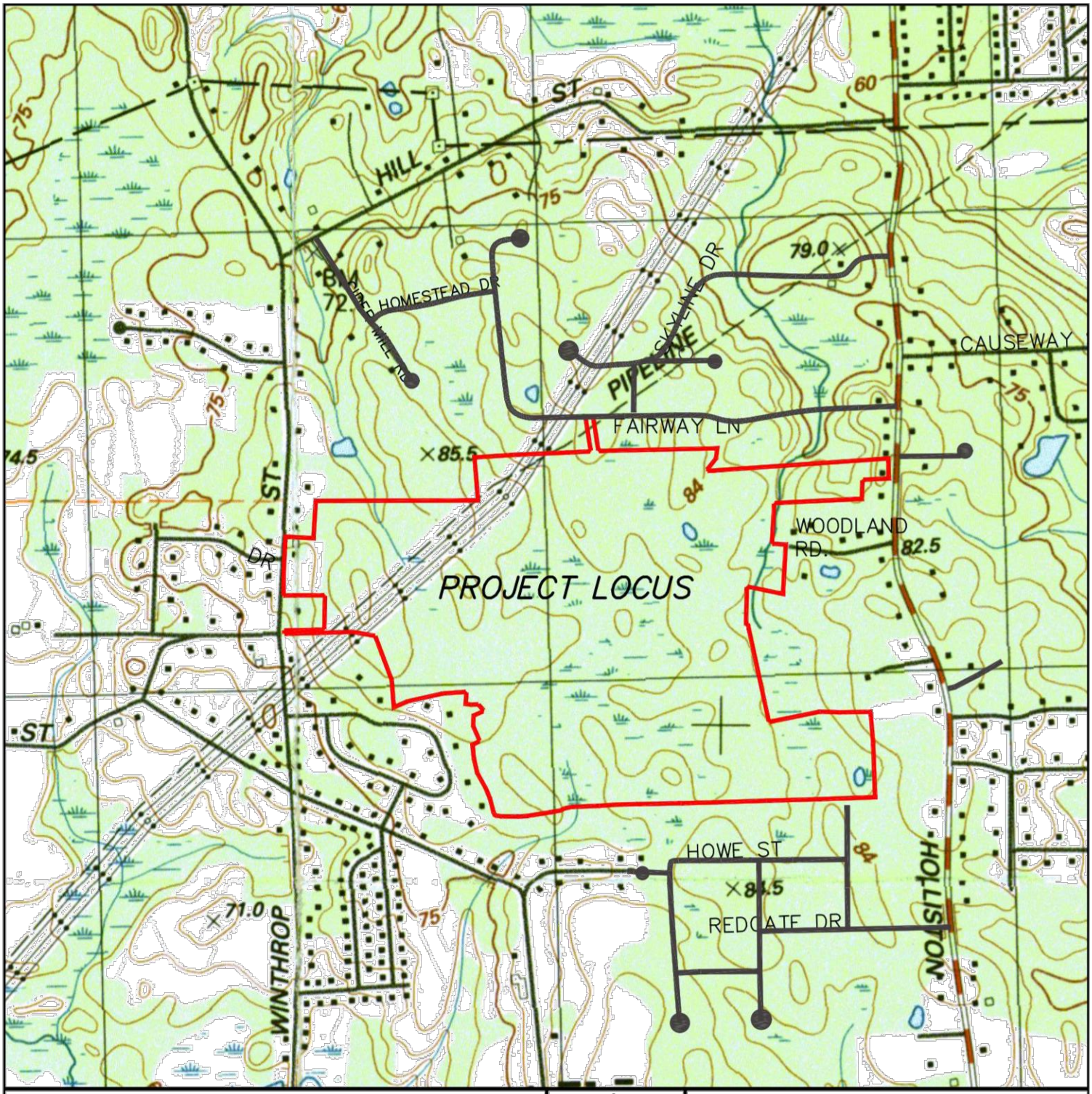
   General construction sequencing and erosion control requirements are shown on the plans, and additional erosion and sediment controls and other pollutant source controls for the construction period are provided in the Draft Final SWPPP that was prepared under separate cover; the SWPPP includes a detailed Erosion and Sediment Control Plan and identifies responsible parties to maintain the controls. Temporary sediment basins have been sized according to DEP Guidance on Erosion Controls. Prior to construction, this SWPPP shall be updated with contractor information along with the EPA NPDES General Permit filing. This standard has been met.

9. *A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

   A detailed Long-Term Stormwater O&M Plan and Pollution Prevention Plan describing inspection and maintenance schedules for each drainage BMP with an O&M Log Sheet is provided under separate cover. This standard has been met.

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

    Appendix I contains a signed Illicit Discharge Statement. This standard has been met.



USGS LOCUS MAP
"TIMBER CREST ESTATES"
MEDWAY, MASS.
SOURCE: USGS MAP

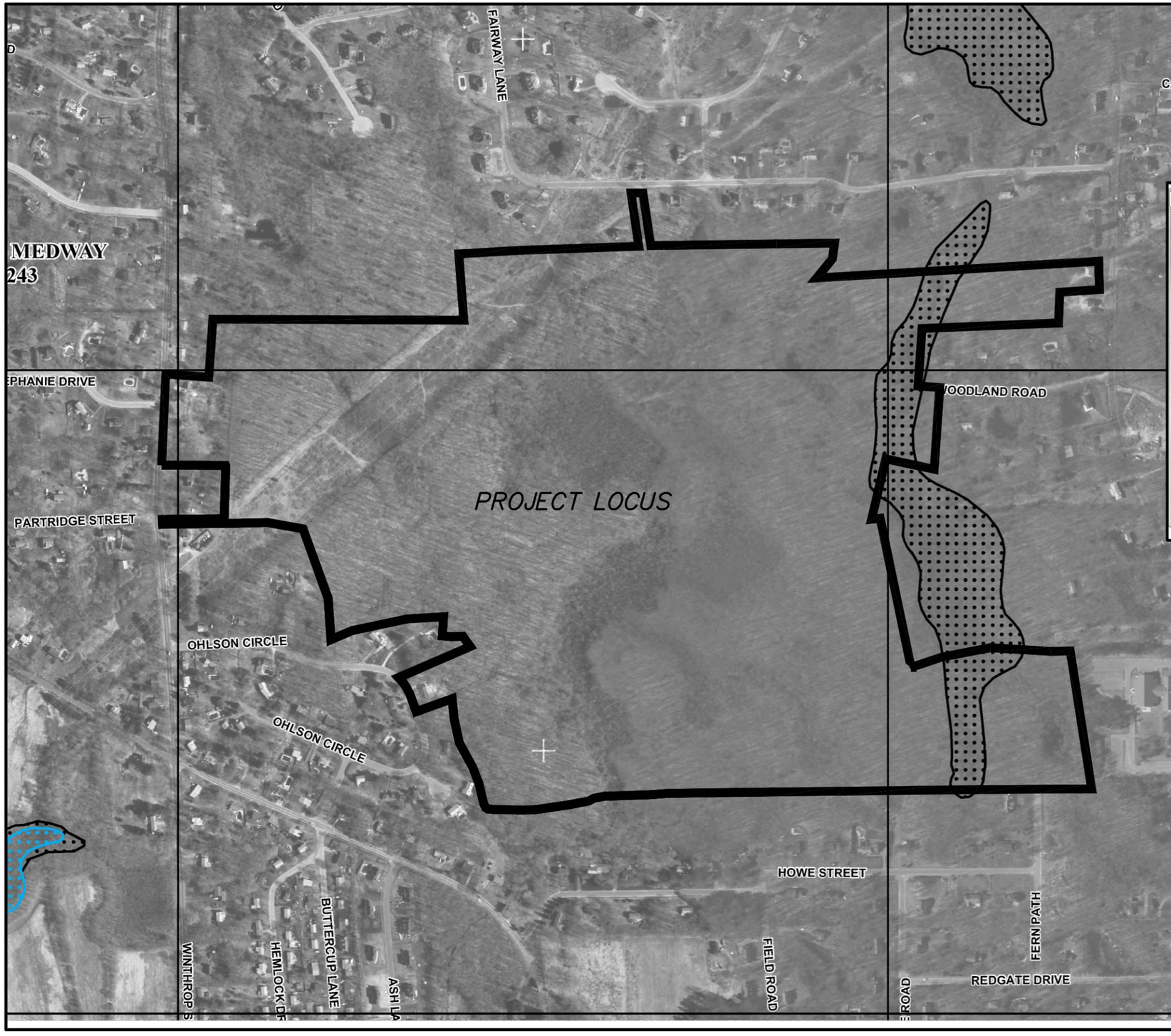
FEET 0 1000 2000 3000

SCALE: 1"=1000'

Outback Engineering Incorporated

165 EAST GROVE STREET
MIDDLEBOROUGH, MASS. 02346
TEL 508-946-9231

FIGURE 1



NFIP

PANEL 0141E

FIRM

FLOOD INSURANCE RATE MAP

NORFOLK COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

PANEL 141 OF 430

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MEDWAY, TOWN OF	250243	0141	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25021C0141E
EFFECTIVE DATE
JULY 17, 2012

Federal Emergency Management Agency

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

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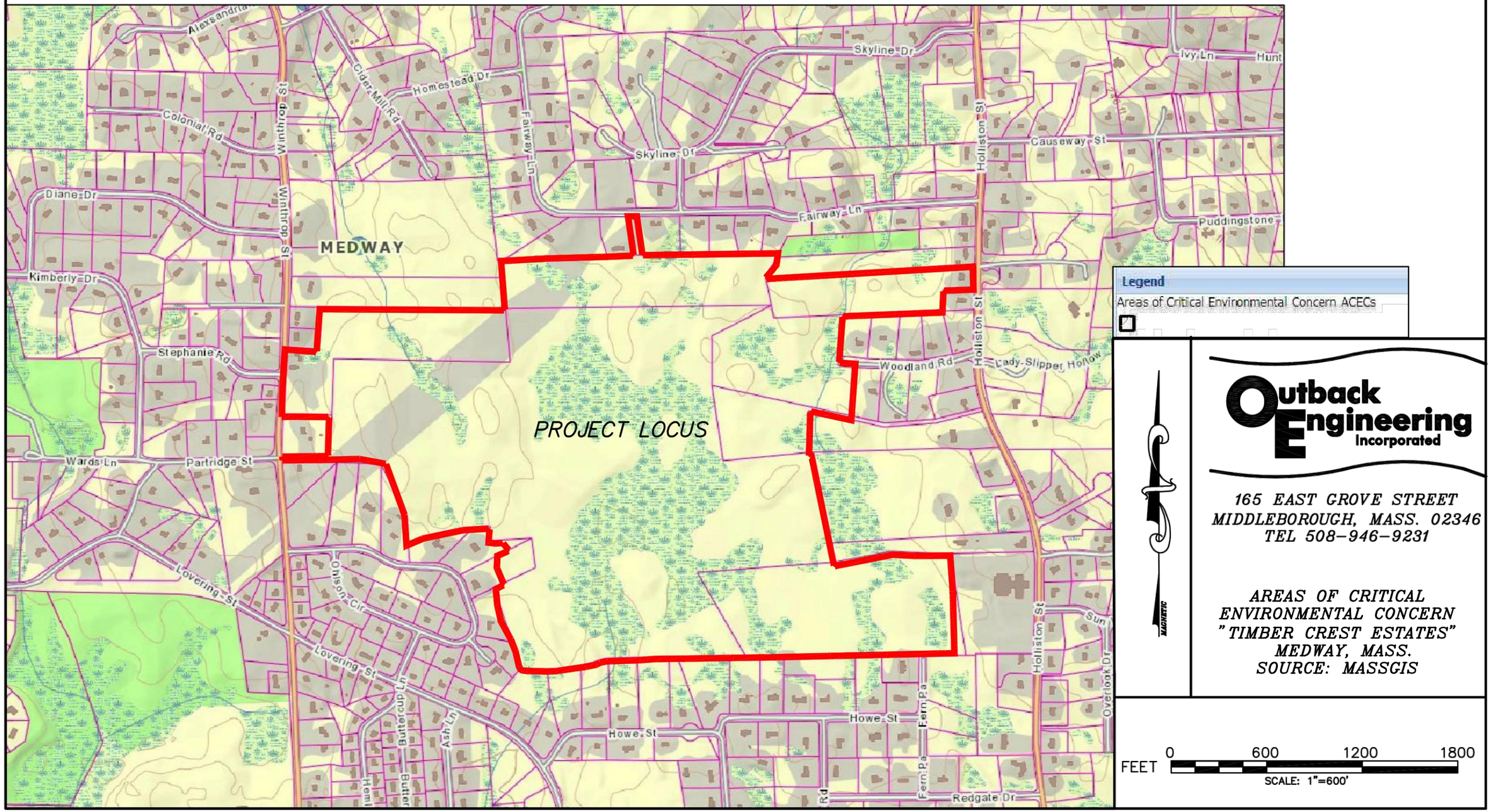
TEL 508-946-9231

FLOOD MAP
"TIMBER CREST ESTATES"
MEDWAY, MASS.
SOURCE: BING MAPS

FEET 0 500 1000 1500

SCALE: 1"=500'

FIGURE 2


Alexsandria
Cider Mill Rd
Homestead Dr
Skyline Dr
Ivy Ln
Hunt
Winthrop St
Colonial Rd
Fairway Ln
Skyline Dr
Holliston St
Causeway St
Diane Dr
MEDWAY
Fairway Ln
Puddingstone
Kimberly Dr
Stephanie Rd
Woodland Rd
Lady Slipper Hollow
PROJECT LOCUS
Wards Ln
Partridge St
Lovering St
Onison Cir
Lovering St
Howe St
Howe St
Redgate Dr
Overlook Dr
Legend
Areas of Critical Environmental Concern ACECs
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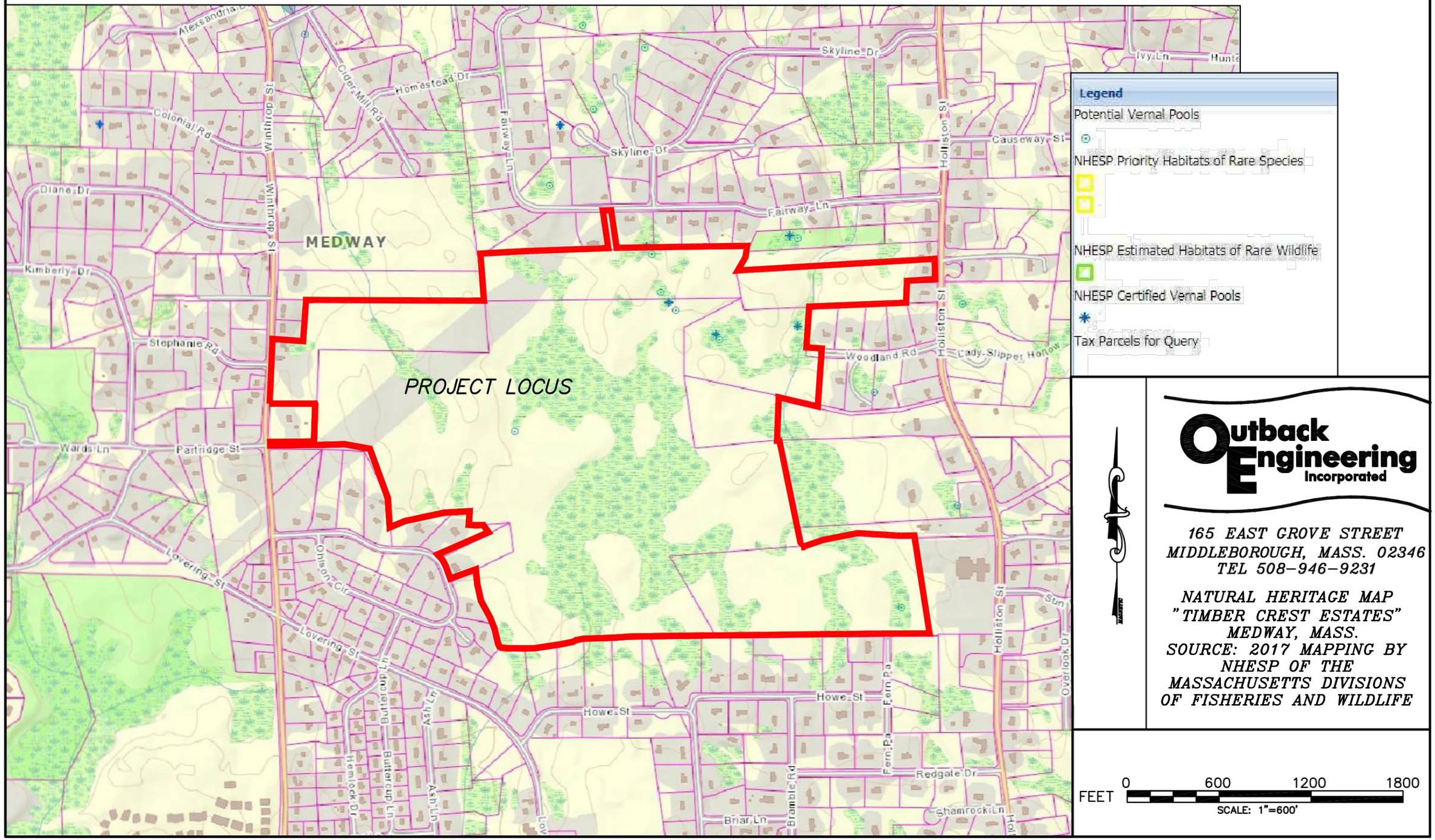
AREAS OF CRITICAL ENVIRONMENTAL CONCERN
"TIMBER CREST ESTATES"
MEDWAY, MASS.
SOURCE: MASSGIS
FEET
0
600
1200
1800
SCALE: 1"=600'

FIGURE 3



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TEL 508-946-9231

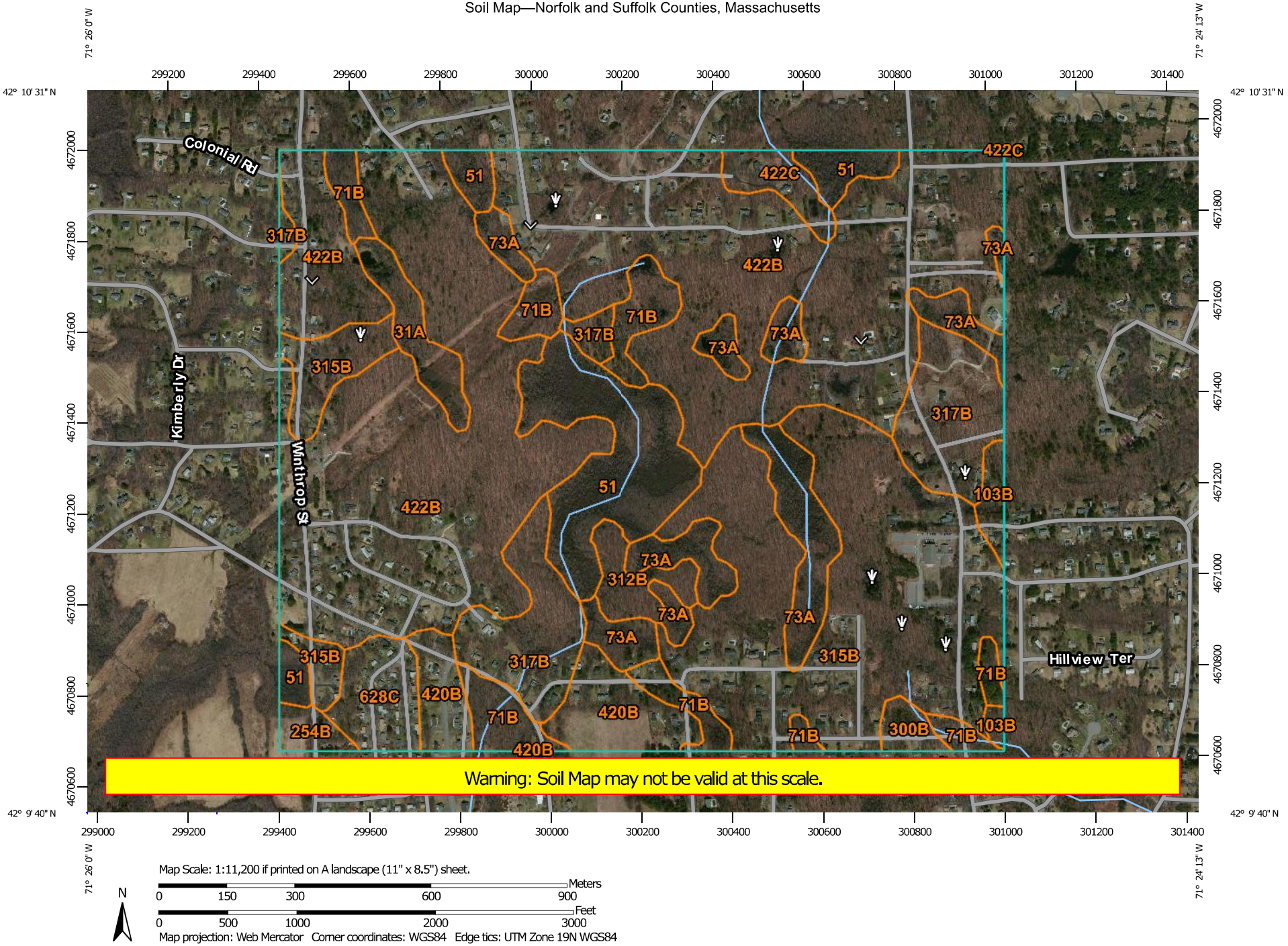
NATURAL HERITAGE MAP
"TIMBER CREST ESTATES"
MEDWAY, MASS.
SOURCE: 2017 MAPPING BY
NHESP OF THE
MASSACHUSETTS DIVISIONS
OF FISHERIES AND WILDLIFE

FIGURE 4

Appendix A

NRCS Soil characteristics for on-site soils

Soil Map—Norfolk and Suffolk Counties, Massachusetts



Map Scale: 1:11,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: http://websoilsurvey.nrcs.usda.gov
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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 11, Sep 28, 2015

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

Date(s) aerial images were photographed: Apr 8, 2011—Apr 9, 2011

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

Map Unit Legend

Norfolk and Suffolk Counties, Massachusetts (MA616)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
31A	Walpole sandy loam, 0 to 3 percent slopes	7.9	1.5%
51	Swansea muck, 0 to 1 percent slopes	37.6	7.2%
71B	Ridgebury fine sandy loam, 2 to 8 percent slopes, extremely stony	25.8	4.9%
73A	Whitman fine sandy loam, 0 to 5 percent slopes, extremely stony	33.8	6.5%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	3.9	0.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	3.2	0.6%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	3.1	0.6%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	6.6	1.3%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	101.3	19.4%
317B	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	36.8	7.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	18.5	3.5%
422B	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony	227.9	43.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	5.9	1.1%
628C	Canton-Urban land complex, 3 to 15 percent slopes	10.2	1.9%
Totals for Area of Interest		**522.4**	**100.0%**

Appendix B

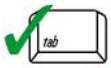
DEP Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.[1] 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[2]
- 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.

[1] 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.

[2] 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

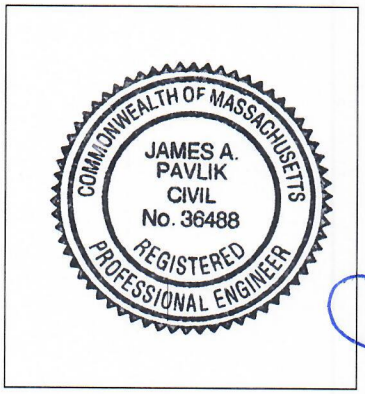
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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



James Pavlik 8-14-18

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[1]

☐ 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.

[1] 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 C

Maximum Discharge Velocities (Standard #1)

165 East Grove Street
Middleborough, MA 02346
Tel: 508-946-9231 Fax: 508-947-8873
www.outback-eng.com

JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 8/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P **DATE:** 8/14/18
TOWN: Medway

STANDARD 1: NO UNTREATED DISCHARGE OR EROSION TO WETLANDS

No new untreated discharge:
Computations required to demonstrate compliance with Standards 4 through 6 may be used to demonstrate that all new discharges are adequately treated.

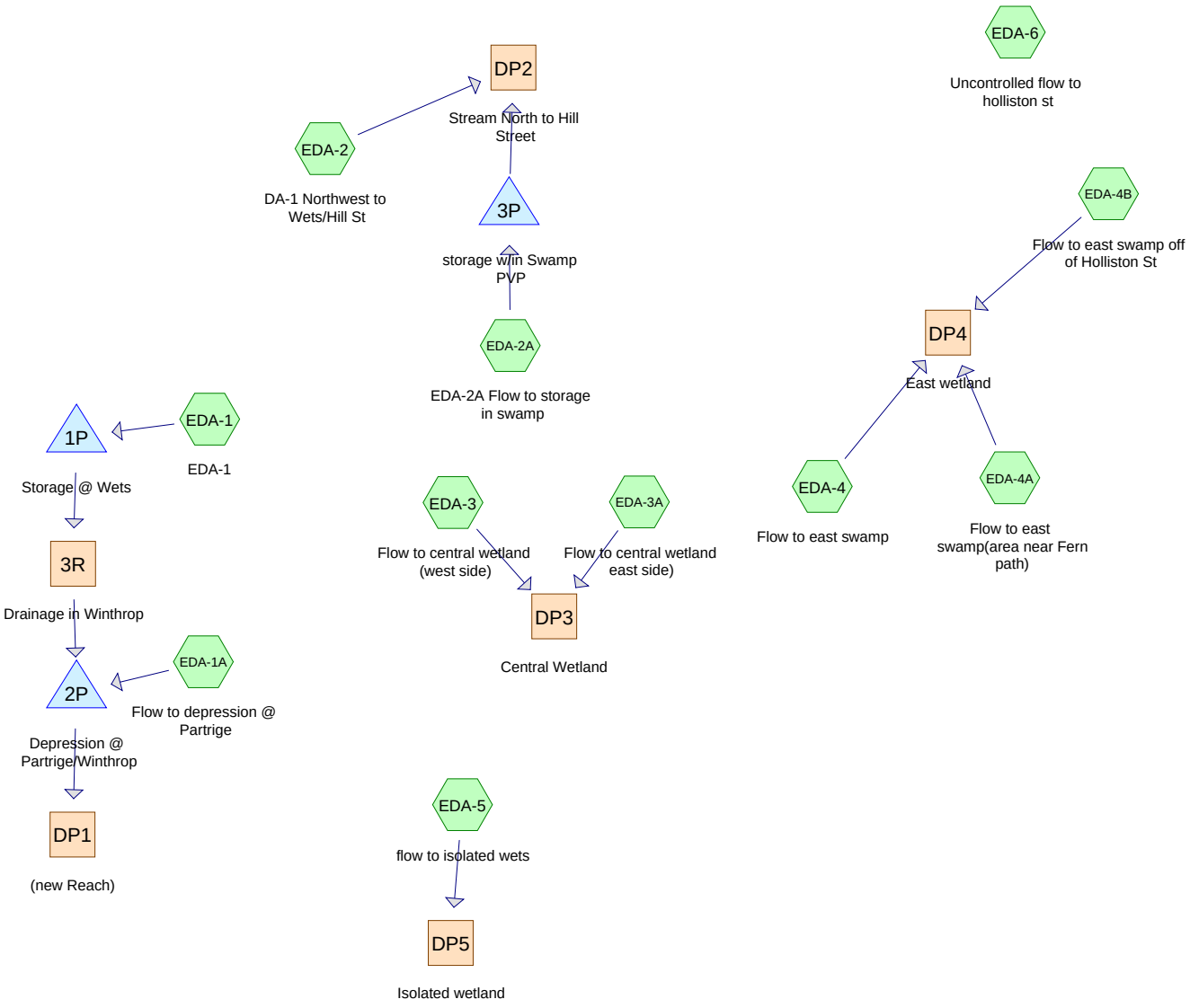
Maximum Discharge Velocity & Ability of Ground Surface to Resist Erosion:

Discharge Outlet	Max. Discharge Velocity (ft/s)*	Receiving Groundcover	Receiving Slope	Permissible Velocity (ft/s)**	Suitability
6" Orifice @ Infil. Basin 1	3.84	Lawn	1%	5	O.K.
4" Orifice @ Infil. Basin #2	2.89	Lawn	2%	5	O.K.
1' L x 1.90' H sharp crested vee weir @ Infil. Basin #6	4.07	Lawn	2%	5	O.K.
6" Orifice @ Infil. Basin #8	3.85	Lawn	4%	5	O.K.
4" Orifice @ Det. Basin #8A	2.93	Lawn	1%	5	O.K.
2" Orifice @ Det. Basin #10	1.79	Lawn	2%	5	O.K.
1.5' rise Sharp crested vee weir @ WQS #1	6.05	Lawn	1%	5	Requires Ground Armouring
1.5' rise Sharp crested vee weir @ WQS #2	5.66	Lawn	1%	5	Requires Ground Armouring
12" Culvert @ Infil. Basin #14	3.78	Lawn	2%	5	O.K.
Broad-crested weir @ infil. Basin #16	4.70	Lawn	2%	5	O.K.

* Maximum discharge velocity obtained from post-development hydrology calculation (see Appendix D-2)

Appendix D-1

Existing Hydrology Calculations (Standard #2)



Routing Diagram for Appendix D1 - PRE - 8.14.18

Prepared by {enter your company name here}, Printed 8/14/2018

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEDA-1: EDA-1 Runoff Area=253,893 sf 5.78% Impervious Runoff Depth=0.41"
Flow Length=410' Tc=18.5 min CN=60 Runoff=1.19 cfs 0.198 af

SubcatchmentEDA-1A: Flow to Runoff Area=90,949 sf 12.28% Impervious Runoff Depth=0.13"
Flow Length=700' Tc=20.9 min CN=50 Runoff=0.04 cfs 0.022 af

SubcatchmentEDA-2: DA-1 Northwest to Runoff Area=262,052 sf 1.98% Impervious Runoff Depth=0.28"
Flow Length=450' Tc=13.3 min CN=56 Runoff=0.70 cfs 0.140 af

SubcatchmentEDA-2A: EDA-2A Flow to Runoff Area=525,669 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=470' Tc=21.7 min CN=44 Runoff=0.05 cfs 0.032 af

SubcatchmentEDA-3: Flow to central Runoff Area=680,802 sf 1.42% Impervious Runoff Depth=0.00"
Flow Length=237' Tc=14.2 min CN=37 Runoff=0.00 cfs 0.000 af

SubcatchmentEDA-3A: Flow to central Runoff Area=820,784 sf 2.23% Impervious Runoff Depth=0.25"
Flow Length=208' Tc=19.6 min CN=55 Runoff=1.65 cfs 0.394 af

SubcatchmentEDA-4: Flow to east swamp Runoff Area=531,965 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=320' Tc=15.3 min CN=46 Runoff=0.09 cfs 0.059 af

SubcatchmentEDA-4A: Flow to east Runoff Area=213,749 sf 0.00% Impervious Runoff Depth=0.88"
Flow Length=230' Slope=0.0150 '/' Tc=18.7 min CN=71 Runoff=3.15 cfs 0.359 af

SubcatchmentEDA-4B: Flow to east Runoff Area=191,650 sf 0.39% Impervious Runoff Depth=0.00"
Flow Length=283' Tc=17.4 min CN=32 Runoff=0.00 cfs 0.000 af

SubcatchmentEDA-5: flow to isolated wets Runoff Area=284,124 sf 0.07% Impervious Runoff Depth=0.00"
Flow Length=260' Tc=17.2 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentEDA-6: Uncontrolled flow to Runoff Area=8,799 sf 20.67% Impervious Runoff Depth=0.31"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min UI Adjusted CN=57 Runoff=0.03 cfs 0.005 af

Reach 3R: Drainage in Winthrop Inflow=0.30 cfs 0.059 af
Outflow=0.30 cfs 0.059 af

Reach DP1: (new Reach) Inflow=0.33 cfs 0.077 af
Outflow=0.33 cfs 0.077 af

Reach DP2: Stream North to Hill Street Inflow=0.70 cfs 0.140 af
Outflow=0.70 cfs 0.140 af

Reach DP3: Central Wetland Inflow=1.65 cfs 0.394 af
Outflow=1.65 cfs 0.394 af

Reach DP4: East wetland Inflow=3.15 cfs 0.418 af
Outflow=3.15 cfs 0.418 af

Reach DP5: Isolated wetland Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Storage @ Wets Peak Elev=260.05' Storage=2,429 cf Inflow=1.19 cfs 0.198 af
Discarded=0.10 cfs 0.125 af Primary=0.30 cfs 0.059 af Outflow=0.40 cfs 0.184 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=254.50' Storage=32 cf Inflow=0.34 cfs 0.082 af
Discarded=0.01 cfs 0.005 af Primary=0.33 cfs 0.077 af Outflow=0.34 cfs 0.082 af

Pond 3P: storage w/in Swamp PVP Peak Elev=274.05' Storage=1,402 cf Inflow=0.05 cfs 0.032 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 88.715 ac Runoff Volume = 1.210 af Average Runoff Depth = 0.16"
98.40% Pervious = 87.297 ac 1.60% Impervious = 1.419 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 1.19 cfs @ 12.40 hrs, Volume= 0.198 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
116,100	70	Woods, Good, HSG C
47,785	79	1 acre lots, 20% imp, HSG C
25,570	51	1 acre lots, 20% imp, HSG A
64,438	30	Woods, Good, HSG A
253,893	60	Weighted Average
239,222		94.22% Pervious Area
14,671		5.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	0.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	410	Total			

Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff = 0.04 cfs @ 12.99 hrs, Volume= 0.022 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
35,109	30	Woods, Good, HSG A
34,104	51	1 acre lots, 20% imp, HSG A
21,736	79	1 acre lots, 20% imp, HSG C
90,949	50	Weighted Average
79,781		87.72% Pervious Area
11,168		12.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
10.4	650	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.9	700	Total			

Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff = 0.70 cfs @ 12.42 hrs, Volume= 0.140 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
70,267	70	Woods, Good, HSG C
97,291	30	Woods, Good, HSG A
23,173	77	Woods, Good, HSG D
15,000	51	1 acre lots, 20% imp, HSG A
11,000	79	1 acre lots, 20% imp, HSG C
1,983	30	Woods, Good, HSG A
37,177	79	Woods, Fair, HSG D
6,161	73	Woods, Fair, HSG C
262,052	56	Weighted Average
256,852		98.02% Pervious Area
5,200		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff = 0.05 cfs @ 15.94 hrs, Volume= 0.032 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
354,543	30	Woods, Good, HSG A
55,228	77	Woods, Good, HSG D
21,275	36	Woods, Fair, HSG A
94,623	79	Woods, Fair, HSG D
525,669	44	Weighted Average
525,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
9.4	420	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.7	470	Total			

Summary for Subcatchment EDA-3: Flow to central wetland (west side)

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
547,340	30	Woods, Good, HSG A
24,107	70	Woods, Good, HSG C
60,955	77	Woods, Good, HSG D
48,400	51	1 acre lots, 20% imp, HSG A
680,802	37	Weighted Average
671,122		98.58% Pervious Area
9,680		1.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff = 1.65 cfs @ 12.54 hrs, Volume= 0.394 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
	276,175	30	Woods, Good, HSG A
	210,377	70	Woods, Good, HSG C
	99,197	77	Woods, Good, HSG D
	82,670	51	1 acre lots, 20% imp, HSG A
	8,962	84	1 acre lots, 20% imp, HSG D
*	31,051	30	wetland HSG A
*	112,352	77	wetland , HSG D
	820,784	55	Weighted Average
	802,458		97.77% Pervious Area
	18,326		2.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	158	0.0260	0.81		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
19.6	208	Total			

Summary for Subcatchment EDA-4: Flow to east swamp

Runoff = 0.09 cfs @ 15.20 hrs, Volume= 0.059 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
326,247	30	Woods, Good, HSG A
173,077	70	Woods, Good, HSG C
32,641	77	Woods, Good, HSG D
531,965	46	Weighted Average
531,965		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0330	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	270	0.0300	0.87		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
15.3	320	Total			

Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff = 3.15 cfs @ 12.29 hrs, Volume= 0.359 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
184,092	70	Woods, Good, HSG C
29,657	77	Woods, Good, HSG D
213,749	71	Weighted Average
213,749		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	180	0.0150	0.61		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
18.7	230	Total			

Summary for Subcatchment EDA-4B: Flow to east swamp off of Holliston St

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
	179,571	30	Woods, Good, HSG A
	5,339	77	Woods, Good, HSG D
*	740	98	ex. roof Monego
*	3,100	49	ex. 163 holliston st lawn
	2,900	49	50-75% Grass cover, Fair, HSG A
	191,650	32	Weighted Average
	190,910		99.61% Pervious Area
	740		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.1	233	0.0500	3.60		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
17.4	283	Total			

Summary for Subcatchment EDA-5: flow to isolated wets

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
	278,932	30	Woods, Good, HSG A
*	192	98	ex roof
	5,000	39	>75% Grass cover, Good, HSG A
	284,124	30	Weighted Average
	283,932		99.93% Pervious Area
	192		0.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	210	0.0540	3.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	260	Total			

Summary for Subcatchment EDA-6: Uncontrolled flow to holliston st

Runoff = 0.03 cfs @ 12.27 hrs, Volume= 0.005 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Adj	Description
6,980	49		50-75% Grass cover, Fair, HSG A
809	98		Unconnected roofs, HSG A
1,010	98		Paved parking, HSG A
8,799	59	57	Weighted Average, UI Adjusted
6,980			79.33% Pervious Area
1,819			20.67% Impervious Area
809			44.47% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"

Summary for Reach 3R: Drainage in Winthrop

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 0.12" for 2-Yr Storm event
Inflow = 0.30 cfs @ 13.18 hrs, Volume= 0.059 af
Outflow = 0.30 cfs @ 13.18 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP1: (new Reach)

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 0.12" for 2-Yr Storm event
Inflow = 0.33 cfs @ 13.21 hrs, Volume= 0.077 af
Outflow = 0.33 cfs @ 13.21 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream North to Hill Street

Inflow Area = 18.084 ac, 0.66% Impervious, Inflow Depth = 0.09" for 2-Yr Storm event
Inflow = 0.70 cfs @ 12.42 hrs, Volume= 0.140 af
Outflow = 0.70 cfs @ 12.42 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP3: Central Wetland

Inflow Area = 34.472 ac, 1.87% Impervious, Inflow Depth = 0.14" for 2-Yr Storm event
Inflow = 1.65 cfs @ 12.54 hrs, Volume= 0.394 af
Outflow = 1.65 cfs @ 12.54 hrs, Volume= 0.394 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP4: East wetland

Inflow Area = 21.519 ac, 0.08% Impervious, Inflow Depth = 0.23" for 2-Yr Storm event
Inflow = 3.15 cfs @ 12.29 hrs, Volume= 0.418 af
Outflow = 3.15 cfs @ 12.29 hrs, Volume= 0.418 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated wetland

Inflow Area = 6.523 ac, 0.07% Impervious, Inflow Depth = 0.00" for 2-Yr Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 0.41" for 2-Yr Storm event
Inflow = 1.19 cfs @ 12.40 hrs, Volume= 0.198 af
Outflow = 0.40 cfs @ 13.18 hrs, Volume= 0.184 af, Atten= 67%, Lag= 46.9 min
Discarded = 0.10 cfs @ 13.18 hrs, Volume= 0.125 af
Primary = 0.30 cfs @ 13.18 hrs, Volume= 0.059 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.05' @ 13.18 hrs Surf.Area= 4,196 sf Storage= 2,429 cf

Plug-Flow detention time= 219.3 min calculated for 0.184 af (93% of inflow)
Center-of-Mass det. time= 184.0 min (1,116.0 - 932.0)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.10 cfs @ 13.18 hrs HW=260.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.29 cfs @ 13.18 hrs HW=260.05' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.29 cfs @ 0.58 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 0.12" for 2-Yr Storm event
Inflow = 0.34 cfs @ 13.18 hrs, Volume= 0.082 af
Outflow = 0.34 cfs @ 13.21 hrs, Volume= 0.082 af, Atten= 0%, Lag= 1.9 min
Discarded = 0.01 cfs @ 13.21 hrs, Volume= 0.005 af
Primary = 0.33 cfs @ 13.21 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 254.50' @ 13.21 hrs Surf.Area= 191 sf Storage= 32 cf

Plug-Flow detention time= 2.0 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 2.0 min (926.0 - 923.9)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.01 cfs @ 13.21 hrs HW=254.50' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.33 cfs @ 13.21 hrs HW=254.50' (Free Discharge)
├**2=Culvert** (Inlet Controls 0.33 cfs @ 1.65 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 12.068 ac, 0.00% Impervious, Inflow Depth = 0.03" for 2-Yr Storm event
Inflow = 0.05 cfs @ 15.94 hrs, Volume= 0.032 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.05' @ 25.25 hrs Surf.Area= 28,809 sf Storage= 1,402 cf

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

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

Volume	Invert	Avail.Storage	Storage Description
#1	274.00’	48,566 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	74,000	1,890.0	48,566	48,566	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.50’	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00’ (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEDA-1: EDA-1 Runoff Area=253,893 sf 5.78% Impervious Runoff Depth=1.13"
Flow Length=410' Tc=18.5 min CN=60 Runoff=4.63 cfs 0.549 af

SubcatchmentEDA-1A: Flow to Runoff Area=90,949 sf 12.28% Impervious Runoff Depth=0.57"
Flow Length=700' Tc=20.9 min CN=50 Runoff=0.56 cfs 0.100 af

SubcatchmentEDA-2: DA-1 Northwest to Runoff Area=262,052 sf 1.98% Impervious Runoff Depth=0.89"
Flow Length=450' Tc=13.3 min CN=56 Runoff=3.84 cfs 0.447 af

SubcatchmentEDA-2A: EDA-2A Flow to Runoff Area=525,669 sf 0.00% Impervious Runoff Depth=0.31"
Flow Length=470' Tc=21.7 min CN=44 Runoff=1.09 cfs 0.314 af

SubcatchmentEDA-3: Flow to central Runoff Area=680,802 sf 1.42% Impervious Runoff Depth=0.09"
Flow Length=237' Tc=14.2 min CN=37 Runoff=0.19 cfs 0.119 af

SubcatchmentEDA-3A: Flow to central Runoff Area=820,784 sf 2.23% Impervious Runoff Depth=0.83"
Flow Length=208' Tc=19.6 min CN=55 Runoff=9.47 cfs 1.311 af

SubcatchmentEDA-4: Flow to east swamp Runoff Area=531,965 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=320' Tc=15.3 min CN=46 Runoff=1.88 cfs 0.400 af

SubcatchmentEDA-4A: Flow to east Runoff Area=213,749 sf 0.00% Impervious Runoff Depth=1.89"
Flow Length=230' Slope=0.0150 '/' Tc=18.7 min CN=71 Runoff=7.35 cfs 0.774 af

SubcatchmentEDA-4B: Flow to east Runoff Area=191,650 sf 0.39% Impervious Runoff Depth=0.01"
Flow Length=283' Tc=17.4 min CN=32 Runoff=0.01 cfs 0.003 af

SubcatchmentEDA-5: flow to isolated wets Runoff Area=284,124 sf 0.07% Impervious Runoff Depth=0.00"
Flow Length=260' Tc=17.2 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentEDA-6: Uncontrolled flow to Runoff Area=8,799 sf 20.67% Impervious Runoff Depth=0.95"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min UI Adjusted CN=57 Runoff=0.18 cfs 0.016 af

Reach 3R: Drainage in Winthrop Inflow=3.89 cfs 0.396 af
Outflow=3.89 cfs 0.396 af

Reach DP1: (new Reach) Inflow=3.42 cfs 0.480 af
Outflow=3.42 cfs 0.480 af

Reach DP2: Stream North to Hill Street Inflow=3.84 cfs 0.447 af
Outflow=3.84 cfs 0.447 af

Reach DP3: Central Wetland Inflow=9.47 cfs 1.430 af
Outflow=9.47 cfs 1.430 af

Reach DP4: East wetland Inflow=8.67 cfs 1.177 af
Outflow=8.67 cfs 1.177 af

Reach DP5: Isolated wetland Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Storage @ Wets Peak Elev=260.28' Storage=3,524 cf Inflow=4.63 cfs 0.549 af
Discarded=0.12 cfs 0.135 af Primary=3.89 cfs 0.396 af Outflow=4.01 cfs 0.531 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=255.75' Storage=1,365 cf Inflow=4.45 cfs 0.496 af
Discarded=0.13 cfs 0.016 af Primary=3.42 cfs 0.480 af Outflow=3.55 cfs 0.496 af

Pond 3P: storage w/in Swamp PVP Peak Elev=274.39' Storage=13,664 cf Inflow=1.09 cfs 0.314 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 88.715 ac Runoff Volume = 4.031 af Average Runoff Depth = 0.55"
98.40% Pervious = 87.297 ac 1.60% Impervious = 1.419 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 4.63 cfs @ 12.30 hrs, Volume= 0.549 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
116,100	70	Woods, Good, HSG C
47,785	79	1 acre lots, 20% imp, HSG C
25,570	51	1 acre lots, 20% imp, HSG A
64,438	30	Woods, Good, HSG A
253,893	60	Weighted Average
239,222		94.22% Pervious Area
14,671		5.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	0.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	410	Total			

Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff = 0.56 cfs @ 12.45 hrs, Volume= 0.100 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
35,109	30	Woods, Good, HSG A
34,104	51	1 acre lots, 20% imp, HSG A
21,736	79	1 acre lots, 20% imp, HSG C
90,949	50	Weighted Average
79,781		87.72% Pervious Area
11,168		12.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
10.4	650	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.9	700	Total			

Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff = 3.84 cfs @ 12.22 hrs, Volume= 0.447 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
70,267	70	Woods, Good, HSG C
97,291	30	Woods, Good, HSG A
23,173	77	Woods, Good, HSG D
15,000	51	1 acre lots, 20% imp, HSG A
11,000	79	1 acre lots, 20% imp, HSG C
1,983	30	Woods, Good, HSG A
37,177	79	Woods, Fair, HSG D
6,161	73	Woods, Fair, HSG C
262,052	56	Weighted Average
256,852		98.02% Pervious Area
5,200		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff = 1.09 cfs @ 12.60 hrs, Volume= 0.314 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
354,543	30	Woods, Good, HSG A
55,228	77	Woods, Good, HSG D
21,275	36	Woods, Fair, HSG A
94,623	79	Woods, Fair, HSG D
525,669	44	Weighted Average
525,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
9.4	420	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.7	470	Total			

Summary for Subcatchment EDA-3: Flow to central wetland (west side)

Runoff = 0.19 cfs @ 15.10 hrs, Volume= 0.119 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
547,340	30	Woods, Good, HSG A
24,107	70	Woods, Good, HSG C
60,955	77	Woods, Good, HSG D
48,400	51	1 acre lots, 20% imp, HSG A
680,802	37	Weighted Average
671,122		98.58% Pervious Area
9,680		1.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff = 9.47 cfs @ 12.35 hrs, Volume= 1.311 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
	276,175	30	Woods, Good, HSG A
	210,377	70	Woods, Good, HSG C
	99,197	77	Woods, Good, HSG D
	82,670	51	1 acre lots, 20% imp, HSG A
	8,962	84	1 acre lots, 20% imp, HSG D
*	31,051	30	wetland HSG A
*	112,352	77	wetland , HSG D
	820,784	55	Weighted Average
	802,458		97.77% Pervious Area
	18,326		2.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	158	0.0260	0.81		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
19.6	208	Total			

Summary for Subcatchment EDA-4: Flow to east swamp

Runoff = 1.88 cfs @ 12.46 hrs, Volume= 0.400 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
326,247	30	Woods, Good, HSG A
173,077	70	Woods, Good, HSG C
32,641	77	Woods, Good, HSG D
531,965	46	Weighted Average
531,965		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0330	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	270	0.0300	0.87		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
15.3	320	Total			

Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff = 7.35 cfs @ 12.27 hrs, Volume= 0.774 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
184,092	70	Woods, Good, HSG C
29,657	77	Woods, Good, HSG D
213,749	71	Weighted Average
213,749		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	180	0.0150	0.61		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
18.7	230	Total			

Summary for Subcatchment EDA-4B: Flow to east swamp off of Holliston St

Runoff = 0.01 cfs @ 23.03 hrs, Volume= 0.003 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
	179,571	30	Woods, Good, HSG A
	5,339	77	Woods, Good, HSG D
*	740	98	ex. roof Monego
*	3,100	49	ex. 163 holliston st lawn
	2,900	49	50-75% Grass cover, Fair, HSG A
	191,650	32	Weighted Average
	190,910		99.61% Pervious Area
	740		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.1	233	0.0500	3.60		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
17.4	283	Total			

Summary for Subcatchment EDA-5: flow to isolated wets

Runoff = 0.00 cfs @ 24.09 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
	278,932	30	Woods, Good, HSG A
*	192	98	ex roof
	5,000	39	>75% Grass cover, Good, HSG A
	284,124	30	Weighted Average
	283,932		99.93% Pervious Area
	192		0.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	210	0.0540	3.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	260	Total			

Summary for Subcatchment EDA-6: Uncontrolled flow to holliston st

Runoff = 0.18 cfs @ 12.11 hrs, Volume= 0.016 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Adj	Description
6,980	49		50-75% Grass cover, Fair, HSG A
809	98		Unconnected roofs, HSG A
1,010	98		Paved parking, HSG A
8,799	59	57	Weighted Average, UI Adjusted
6,980			79.33% Pervious Area
1,819			20.67% Impervious Area
809			44.47% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"

Summary for Reach 3R: Drainage in Winthrop

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 0.82" for 10-Yr Storm event
Inflow = 3.89 cfs @ 12.44 hrs, Volume= 0.396 af
Outflow = 3.89 cfs @ 12.44 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP1: (new Reach)

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 0.73" for 10-Yr Storm event
Inflow = 3.42 cfs @ 12.62 hrs, Volume= 0.480 af
Outflow = 3.42 cfs @ 12.62 hrs, Volume= 0.480 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream North to Hill Street

Inflow Area = 18.084 ac, 0.66% Impervious, Inflow Depth = 0.30" for 10-Yr Storm event
Inflow = 3.84 cfs @ 12.22 hrs, Volume= 0.447 af
Outflow = 3.84 cfs @ 12.22 hrs, Volume= 0.447 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP3: Central Wetland

Inflow Area = 34.472 ac, 1.87% Impervious, Inflow Depth = 0.50" for 10-Yr Storm event
Inflow = 9.47 cfs @ 12.35 hrs, Volume= 1.430 af
Outflow = 9.47 cfs @ 12.35 hrs, Volume= 1.430 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP4: East wetland

Inflow Area = 21.519 ac, 0.08% Impervious, Inflow Depth = 0.66" for 10-Yr Storm event
Inflow = 8.67 cfs @ 12.30 hrs, Volume= 1.177 af
Outflow = 8.67 cfs @ 12.30 hrs, Volume= 1.177 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated wetland

Inflow Area = 6.523 ac, 0.07% Impervious, Inflow Depth = 0.00" for 10-Yr Storm event
Inflow = 0.00 cfs @ 24.09 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.09 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 1.13" for 10-Yr Storm event
Inflow = 4.63 cfs @ 12.30 hrs, Volume= 0.549 af
Outflow = 4.01 cfs @ 12.44 hrs, Volume= 0.531 af, Atten= 13%, Lag= 8.3 min
Discarded = 0.12 cfs @ 12.44 hrs, Volume= 0.135 af
Primary = 3.89 cfs @ 12.44 hrs, Volume= 0.396 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.28' @ 12.43 hrs Surf.Area= 5,275 sf Storage= 3,524 cf

Plug-Flow detention time= 85.6 min calculated for 0.531 af (97% of inflow)
Center-of-Mass det. time= 68.2 min (960.0 - 891.8)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.12 cfs @ 12.44 hrs HW=260.28' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=3.87 cfs @ 12.44 hrs HW=260.28' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 3.87 cfs @ 1.37 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 0.75" for 10-Yr Storm event
Inflow = 4.45 cfs @ 12.44 hrs, Volume= 0.496 af
Outflow = 3.55 cfs @ 12.62 hrs, Volume= 0.496 af, Atten= 20%, Lag= 11.1 min
Discarded = 0.13 cfs @ 12.62 hrs, Volume= 0.016 af
Primary = 3.42 cfs @ 12.62 hrs, Volume= 0.480 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 255.75' @ 12.62 hrs Surf.Area= 2,283 sf Storage= 1,365 cf

Plug-Flow detention time= 2.9 min calculated for 0.495 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (888.8 - 885.8)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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 @ 12.62 hrs HW=255.75' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=3.42 cfs @ 12.62 hrs HW=255.75' (Free Discharge)
├**2=Culvert** (Inlet Controls 3.42 cfs @ 4.35 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 12.068 ac, 0.00% Impervious, Inflow Depth = 0.31" for 10-Yr Storm event
Inflow = 1.09 cfs @ 12.60 hrs, Volume= 0.314 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.39' @ 25.25 hrs Surf.Area= 42,791 sf Storage= 13,664 cf

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

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

Volume	Invert	Avail.Storage	Storage Description
#1	274.00’	48,566 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	74,000	1,890.0	48,566	48,566	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.50’	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00’ (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEDA-1: EDA-1 Runoff Area=253,893 sf 5.78% Impervious Runoff Depth=1.60"
Flow Length=410' Tc=18.5 min CN=60 Runoff=6.96 cfs 0.778 af

SubcatchmentEDA-1A: Flow to Runoff Area=90,949 sf 12.28% Impervious Runoff Depth=0.91"
Flow Length=700' Tc=20.9 min CN=50 Runoff=1.07 cfs 0.158 af

SubcatchmentEDA-2: DA-1 Northwest to Runoff Area=262,052 sf 1.98% Impervious Runoff Depth=1.31"
Flow Length=450' Tc=13.3 min CN=56 Runoff=6.26 cfs 0.656 af

SubcatchmentEDA-2A: EDA-2A Flow to Runoff Area=525,669 sf 0.00% Impervious Runoff Depth=0.56"
Flow Length=470' Tc=21.7 min CN=44 Runoff=2.76 cfs 0.560 af

SubcatchmentEDA-3: Flow to central Runoff Area=680,802 sf 1.42% Impervious Runoff Depth=0.23"
Flow Length=237' Tc=14.2 min CN=37 Runoff=0.62 cfs 0.299 af

SubcatchmentEDA-3A: Flow to central Runoff Area=820,784 sf 2.23% Impervious Runoff Depth=1.24"
Flow Length=208' Tc=19.6 min CN=55 Runoff=15.71 cfs 1.946 af

SubcatchmentEDA-4: Flow to east swamp Runoff Area=531,965 sf 0.00% Impervious Runoff Depth=0.67"
Flow Length=320' Tc=15.3 min CN=46 Runoff=4.12 cfs 0.679 af

SubcatchmentEDA-4A: Flow to east Runoff Area=213,749 sf 0.00% Impervious Runoff Depth=2.50"
Flow Length=230' Slope=0.0150 '/' Tc=18.7 min CN=71 Runoff=9.85 cfs 1.023 af

SubcatchmentEDA-4B: Flow to east Runoff Area=191,650 sf 0.39% Impervious Runoff Depth=0.07"
Flow Length=283' Tc=17.4 min CN=32 Runoff=0.04 cfs 0.025 af

SubcatchmentEDA-5: flow to isolated wets Runoff Area=284,124 sf 0.07% Impervious Runoff Depth=0.03"
Flow Length=260' Tc=17.2 min CN=30 Runoff=0.02 cfs 0.016 af

SubcatchmentEDA-6: Uncontrolled flow to Runoff Area=8,799 sf 20.67% Impervious Runoff Depth=1.38"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min UI Adjusted CN=57 Runoff=0.29 cfs 0.023 af

Reach 3R: Drainage in Winthrop Inflow=6.34 cfs 0.621 af
Outflow=6.34 cfs 0.621 af

Reach DP1: (new Reach) Inflow=7.03 cfs 0.756 af
Outflow=7.03 cfs 0.756 af

Reach DP2: Stream North to Hill Street Inflow=6.26 cfs 0.794 af
Outflow=6.26 cfs 0.794 af

Reach DP3: Central Wetland Inflow=15.77 cfs 2.245 af
Outflow=15.77 cfs 2.245 af

Reach DP4: East wetland Inflow=13.74 cfs 1.727 af
Outflow=13.74 cfs 1.727 af

Reach DP5: Isolated wetland Inflow=0.02 cfs 0.016 af
Outflow=0.02 cfs 0.016 af

Pond 1P: Storage @ Wets Peak Elev=260.39' Storage=4,111 cf Inflow=6.96 cfs 0.778 af
Discarded=0.14 cfs 0.139 af Primary=6.34 cfs 0.621 af Outflow=6.47 cfs 0.760 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=256.12' Storage=2,367 cf Inflow=7.41 cfs 0.779 af
Discarded=0.18 cfs 0.024 af Primary=7.03 cfs 0.756 af Outflow=7.21 cfs 0.779 af

Pond 3P: storage w/in Swamp PVP Peak Elev=274.52' Storage=19,188 cf Inflow=2.76 cfs 0.560 af
Outflow=0.29 cfs 0.137 af

Total Runoff Area = 88.715 ac Runoff Volume = 6.164 af Average Runoff Depth = 0.83"
98.40% Pervious = 87.297 ac 1.60% Impervious = 1.419 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 6.96 cfs @ 12.28 hrs, Volume= 0.778 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
116,100	70	Woods, Good, HSG C
47,785	79	1 acre lots, 20% imp, HSG C
25,570	51	1 acre lots, 20% imp, HSG A
64,438	30	Woods, Good, HSG A
253,893	60	Weighted Average
239,222		94.22% Pervious Area
14,671		5.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	0.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	410	Total			

Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff = 1.07 cfs @ 12.38 hrs, Volume= 0.158 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
35,109	30	Woods, Good, HSG A
34,104	51	1 acre lots, 20% imp, HSG A
21,736	79	1 acre lots, 20% imp, HSG C
90,949	50	Weighted Average
79,781		87.72% Pervious Area
11,168		12.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
10.4	650	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.9	700	Total			

Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff = 6.26 cfs @ 12.21 hrs, Volume= 0.656 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
70,267	70	Woods, Good, HSG C
97,291	30	Woods, Good, HSG A
23,173	77	Woods, Good, HSG D
15,000	51	1 acre lots, 20% imp, HSG A
11,000	79	1 acre lots, 20% imp, HSG C
1,983	30	Woods, Good, HSG A
37,177	79	Woods, Fair, HSG D
6,161	73	Woods, Fair, HSG C
262,052	56	Weighted Average
256,852		98.02% Pervious Area
5,200		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff = 2.76 cfs @ 12.51 hrs, Volume= 0.560 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
354,543	30	Woods, Good, HSG A
55,228	77	Woods, Good, HSG D
21,275	36	Woods, Fair, HSG A
94,623	79	Woods, Fair, HSG D
525,669	44	Weighted Average
525,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
9.4	420	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.7	470	Total			

Summary for Subcatchment EDA-3: Flow to central wetland (west side)

Runoff = 0.62 cfs @ 12.61 hrs, Volume= 0.299 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
547,340	30	Woods, Good, HSG A
24,107	70	Woods, Good, HSG C
60,955	77	Woods, Good, HSG D
48,400	51	1 acre lots, 20% imp, HSG A
680,802	37	Weighted Average
671,122		98.58% Pervious Area
9,680		1.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff = 15.71 cfs @ 12.32 hrs, Volume= 1.946 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

	Area (sf)	CN	Description
	276,175	30	Woods, Good, HSG A
	210,377	70	Woods, Good, HSG C
	99,197	77	Woods, Good, HSG D
	82,670	51	1 acre lots, 20% imp, HSG A
	8,962	84	1 acre lots, 20% imp, HSG D
*	31,051	30	wetland HSG A
*	112,352	77	wetland , HSG D
	820,784	55	Weighted Average
	802,458		97.77% Pervious Area
	18,326		2.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	158	0.0260	0.81		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
19.6	208	Total			

Summary for Subcatchment EDA-4: Flow to east swamp

Runoff = 4.12 cfs @ 12.36 hrs, Volume= 0.679 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
326,247	30	Woods, Good, HSG A
173,077	70	Woods, Good, HSG C
32,641	77	Woods, Good, HSG D
531,965	46	Weighted Average
531,965		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0330	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	270	0.0300	0.87		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
15.3	320	Total			

Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff = 9.85 cfs @ 12.27 hrs, Volume= 1.023 af, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Description
184,092	70	Woods, Good, HSG C
29,657	77	Woods, Good, HSG D
213,749	71	Weighted Average
213,749		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	180	0.0150	0.61		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
18.7	230	Total			

Summary for Subcatchment EDA-4B: Flow to east swamp off of Holliston St

Runoff = 0.04 cfs @ 15.63 hrs, Volume= 0.025 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

	Area (sf)	CN	Description
	179,571	30	Woods, Good, HSG A
	5,339	77	Woods, Good, HSG D
*	740	98	ex. roof Monego
*	3,100	49	ex. 163 holliston st lawn
	2,900	49	50-75% Grass cover, Fair, HSG A
	191,650	32	Weighted Average
	190,910		99.61% Pervious Area
	740		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.1	233	0.0500	3.60		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
17.4	283	Total			

Summary for Subcatchment EDA-5: flow to isolated wets

Runoff = 0.02 cfs @ 21.25 hrs, Volume= 0.016 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

	Area (sf)	CN	Description
	278,932	30	Woods, Good, HSG A
*	192	98	ex roof
	5,000	39	>75% Grass cover, Good, HSG A
	284,124	30	Weighted Average
	283,932		99.93% Pervious Area
	192		0.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	210	0.0540	3.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	260	Total			

Summary for Subcatchment EDA-6: Uncontrolled flow to holliston st

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.023 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-Yr Storm Rainfall=5.50"

Area (sf)	CN	Adj	Description
6,980	49		50-75% Grass cover, Fair, HSG A
809	98		Unconnected roofs, HSG A
1,010	98		Paved parking, HSG A
8,799	59	57	Weighted Average, UI Adjusted
6,980			79.33% Pervious Area
1,819			20.67% Impervious Area
809			44.47% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"

Summary for Reach 3R: Drainage in Winthrop

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 1.28" for 25-Yr Storm event
Inflow = 6.34 cfs @ 12.37 hrs, Volume= 0.621 af
Outflow = 6.34 cfs @ 12.37 hrs, Volume= 0.621 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP1: (new Reach)

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 1.15" for 25-Yr Storm event
Inflow = 7.03 cfs @ 12.46 hrs, Volume= 0.756 af
Outflow = 7.03 cfs @ 12.46 hrs, Volume= 0.756 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream North to Hill Street

Inflow Area = 18.084 ac, 0.66% Impervious, Inflow Depth > 0.53" for 25-Yr Storm event
Inflow = 6.26 cfs @ 12.21 hrs, Volume= 0.794 af
Outflow = 6.26 cfs @ 12.21 hrs, Volume= 0.794 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP3: Central Wetland

Inflow Area = 34.472 ac, 1.87% Impervious, Inflow Depth = 0.78" for 25-Yr Storm event
Inflow = 15.77 cfs @ 12.32 hrs, Volume= 2.245 af
Outflow = 15.77 cfs @ 12.32 hrs, Volume= 2.245 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP4: East wetland

Inflow Area = 21.519 ac, 0.08% Impervious, Inflow Depth = 0.96" for 25-Yr Storm event
Inflow = 13.74 cfs @ 12.29 hrs, Volume= 1.727 af
Outflow = 13.74 cfs @ 12.29 hrs, Volume= 1.727 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated wetland

Inflow Area = 6.523 ac, 0.07% Impervious, Inflow Depth = 0.03" for 25-Yr Storm event
Inflow = 0.02 cfs @ 21.25 hrs, Volume= 0.016 af
Outflow = 0.02 cfs @ 21.25 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 1.60" for 25-Yr Storm event
Inflow = 6.96 cfs @ 12.28 hrs, Volume= 0.778 af
Outflow = 6.47 cfs @ 12.37 hrs, Volume= 0.760 af, Atten= 7%, Lag= 5.2 min
Discarded = 0.14 cfs @ 12.37 hrs, Volume= 0.139 af
Primary = 6.34 cfs @ 12.37 hrs, Volume= 0.621 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.39' @ 12.37 hrs Surf.Area= 5,810 sf Storage= 4,111 cf

Plug-Flow detention time= 62.4 min calculated for 0.760 af (98% of inflow)
Center-of-Mass det. time= 49.6 min (929.7 - 880.2)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.14 cfs @ 12.37 hrs HW=260.39' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=6.28 cfs @ 12.37 hrs HW=260.39' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 6.28 cfs @ 1.63 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 1.18" for 25-Yr Storm event
Inflow = 7.41 cfs @ 12.37 hrs, Volume= 0.779 af
Outflow = 7.21 cfs @ 12.46 hrs, Volume= 0.779 af, Atten= 3%, Lag= 5.3 min
Discarded = 0.18 cfs @ 12.46 hrs, Volume= 0.024 af
Primary = 7.03 cfs @ 12.46 hrs, Volume= 0.756 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 256.12' @ 12.46 hrs Surf.Area= 3,234 sf Storage= 2,367 cf

Plug-Flow detention time= 3.9 min calculated for 0.779 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (881.8 - 877.9)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.18 cfs @ 12.46 hrs HW=256.12' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=6.91 cfs @ 12.46 hrs HW=256.12' (Free Discharge)
├**2=Culvert** (Inlet Controls 3.97 cfs @ 5.05 fps)
└**3=Broad-Crested Rectangular Weir**(Weir Controls 2.94 cfs @ 0.85 fps)

Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 12.068 ac, 0.00% Impervious, Inflow Depth = 0.56" for 25-Yr Storm event
Inflow = 2.76 cfs @ 12.51 hrs, Volume= 0.560 af
Outflow = 0.29 cfs @ 20.03 hrs, Volume= 0.137 af, Atten= 90%, Lag= 451.1 min
Primary = 0.29 cfs @ 20.03 hrs, Volume= 0.137 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.52' @ 20.03 hrs Surf.Area= 48,367 sf Storage= 19,188 cf

Plug-Flow detention time= 548.1 min calculated for 0.137 af (24% of inflow)

Center-of-Mass det. time= 352.2 min (1,303.3 - 951.1)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00’	48,566 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	74,000	1,890.0	48,566	48,566	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.50’	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.28 cfs @ 20.03 hrs HW=274.52’ (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.28 cfs @ 0.34 fps)

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEDA-1: EDA-1 Runoff Area=253,893 sf 5.78% Impervious Runoff Depth=2.39"
Flow Length=410' Tc=18.5 min CN=60 Runoff=10.89 cfs 1.163 af

SubcatchmentEDA-1A: Flow to Runoff Area=90,949 sf 12.28% Impervious Runoff Depth=1.50"
Flow Length=700' Tc=20.9 min CN=50 Runoff=2.05 cfs 0.261 af

SubcatchmentEDA-2: DA-1 Northwest to Runoff Area=262,052 sf 1.98% Impervious Runoff Depth=2.03"
Flow Length=450' Tc=13.3 min CN=56 Runoff=10.41 cfs 1.015 af

SubcatchmentEDA-2A: EDA-2A Flow to Runoff Area=525,669 sf 0.00% Impervious Runoff Depth=1.02"
Flow Length=470' Tc=21.7 min CN=44 Runoff=6.61 cfs 1.028 af

SubcatchmentEDA-3: Flow to central Runoff Area=680,802 sf 1.42% Impervious Runoff Depth=0.53"
Flow Length=237' Tc=14.2 min CN=37 Runoff=3.20 cfs 0.696 af

SubcatchmentEDA-3A: Flow to central Runoff Area=820,784 sf 2.23% Impervious Runoff Depth=1.94"
Flow Length=208' Tc=19.6 min CN=55 Runoff=26.54 cfs 3.040 af

SubcatchmentEDA-4: Flow to east swamp Runoff Area=531,965 sf 0.00% Impervious Runoff Depth=1.18"
Flow Length=320' Tc=15.3 min CN=46 Runoff=9.39 cfs 1.198 af

SubcatchmentEDA-4A: Flow to east Runoff Area=213,749 sf 0.00% Impervious Runoff Depth=3.47"
Flow Length=230' Slope=0.0150 '/' Tc=18.7 min CN=71 Runoff=13.79 cfs 1.420 af

SubcatchmentEDA-4B: Flow to east Runoff Area=191,650 sf 0.39% Impervious Runoff Depth=0.25"
Flow Length=283' Tc=17.4 min CN=32 Runoff=0.16 cfs 0.093 af

SubcatchmentEDA-5: flow to isolated wets Runoff Area=284,124 sf 0.07% Impervious Runoff Depth=0.16"
Flow Length=260' Tc=17.2 min CN=30 Runoff=0.14 cfs 0.089 af

SubcatchmentEDA-6: Uncontrolled flow to Runoff Area=8,799 sf 20.67% Impervious Runoff Depth=2.12"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min UI Adjusted CN=57 Runoff=0.47 cfs 0.036 af

Reach 3R: Drainage in Winthrop Inflow=10.16 cfs 0.999 af
Outflow=10.16 cfs 0.999 af

Reach DP1: (new Reach) Inflow=11.94 cfs 1.228 af
Outflow=11.94 cfs 1.228 af

Reach DP2: Stream North to Hill Street Inflow=10.41 cfs 1.621 af
Outflow=10.41 cfs 1.621 af

Reach DP3: Central Wetland Inflow=29.08 cfs 3.735 af
Outflow=29.08 cfs 3.735 af

Reach DP4: East wetland Inflow=23.17 cfs 2.711 af
Outflow=23.17 cfs 2.711 af

Reach DP5: Isolated wetland Inflow=0.14 cfs 0.089 af
Outflow=0.14 cfs 0.089 af

Pond 1P: Storage @ Wets Peak Elev=260.53' Storage=4,953 cf Inflow=10.89 cfs 1.163 af
Discarded=0.15 cfs 0.145 af Primary=10.16 cfs 0.999 af Outflow=10.31 cfs 1.144 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=256.22' Storage=2,716 cf Inflow=12.21 cfs 1.260 af
Discarded=0.20 cfs 0.033 af Primary=11.94 cfs 1.228 af Outflow=12.14 cfs 1.260 af

Pond 3P: storage w/in Swamp PVP Peak Elev=274.55' Storage=20,647 cf Inflow=6.61 cfs 1.028 af
Outflow=1.33 cfs 0.606 af

Total Runoff Area = 88.715 ac Runoff Volume = 10.038 af Average Runoff Depth = 1.36"
98.40% Pervious = 87.297 ac 1.60% Impervious = 1.419 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 10.89 cfs @ 12.27 hrs, Volume= 1.163 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
116,100	70	Woods, Good, HSG C
47,785	79	1 acre lots, 20% imp, HSG C
25,570	51	1 acre lots, 20% imp, HSG A
64,438	30	Woods, Good, HSG A
253,893	60	Weighted Average
239,222		94.22% Pervious Area
14,671		5.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	0.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	410	Total			

Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff = 2.05 cfs @ 12.34 hrs, Volume= 0.261 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
35,109	30	Woods, Good, HSG A
34,104	51	1 acre lots, 20% imp, HSG A
21,736	79	1 acre lots, 20% imp, HSG C
90,949	50	Weighted Average
79,781		87.72% Pervious Area
11,168		12.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
10.4	650	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.9	700	Total			

Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff = 10.41 cfs @ 12.20 hrs, Volume= 1.015 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
70,267	70	Woods, Good, HSG C
97,291	30	Woods, Good, HSG A
23,173	77	Woods, Good, HSG D
15,000	51	1 acre lots, 20% imp, HSG A
11,000	79	1 acre lots, 20% imp, HSG C
1,983	30	Woods, Good, HSG A
37,177	79	Woods, Fair, HSG D
6,161	73	Woods, Fair, HSG C
262,052	56	Weighted Average
256,852		98.02% Pervious Area
5,200		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff = 6.61 cfs @ 12.41 hrs, Volume= 1.028 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
354,543	30	Woods, Good, HSG A
55,228	77	Woods, Good, HSG D
21,275	36	Woods, Fair, HSG A
94,623	79	Woods, Fair, HSG D
525,669	44	Weighted Average
525,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
9.4	420	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.7	470	Total			

Summary for Subcatchment EDA-3: Flow to central wetland (west side)

Runoff = 3.20 cfs @ 12.46 hrs, Volume= 0.696 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
547,340	30	Woods, Good, HSG A
24,107	70	Woods, Good, HSG C
60,955	77	Woods, Good, HSG D
48,400	51	1 acre lots, 20% imp, HSG A
680,802	37	Weighted Average
671,122		98.58% Pervious Area
9,680		1.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff = 26.54 cfs @ 12.30 hrs, Volume= 3.040 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
	276,175	30	Woods, Good, HSG A
	210,377	70	Woods, Good, HSG C
	99,197	77	Woods, Good, HSG D
	82,670	51	1 acre lots, 20% imp, HSG A
	8,962	84	1 acre lots, 20% imp, HSG D
*	31,051	30	wetland HSG A
*	112,352	77	wetland , HSG D
	820,784	55	Weighted Average
	802,458		97.77% Pervious Area
	18,326		2.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	158	0.0260	0.81		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
19.6	208	Total			

Summary for Subcatchment EDA-4: Flow to east swamp

Runoff = 9.39 cfs @ 12.27 hrs, Volume= 1.198 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
326,247	30	Woods, Good, HSG A
173,077	70	Woods, Good, HSG C
32,641	77	Woods, Good, HSG D
531,965	46	Weighted Average
531,965		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0330	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	270	0.0300	0.87		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
15.3	320	Total			

Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff = 13.79 cfs @ 12.26 hrs, Volume= 1.420 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
184,092	70	Woods, Good, HSG C
29,657	77	Woods, Good, HSG D
213,749	71	Weighted Average
213,749		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	180	0.0150	0.61		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
18.7	230	Total			

Summary for Subcatchment EDA-4B: Flow to east swamp off of Holliston St

Runoff = 0.16 cfs @ 13.00 hrs, Volume= 0.093 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
	179,571	30	Woods, Good, HSG A
	5,339	77	Woods, Good, HSG D
*	740	98	ex. roof Monego
*	3,100	49	ex. 163 holliston st lawn
	2,900	49	50-75% Grass cover, Fair, HSG A
	191,650	32	Weighted Average
	190,910		99.61% Pervious Area
	740		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.1	233	0.0500	3.60		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
17.4	283	Total			

Summary for Subcatchment EDA-5: flow to isolated wets

Runoff = 0.14 cfs @ 14.90 hrs, Volume= 0.089 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
	278,932	30	Woods, Good, HSG A
*	192	98	ex roof
	5,000	39	>75% Grass cover, Good, HSG A
	284,124	30	Weighted Average
	283,932		99.93% Pervious Area
	192		0.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	210	0.0540	3.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.2	260	Total			

Summary for Subcatchment EDA-6: Uncontrolled flow to holliston st

Runoff = 0.47 cfs @ 12.10 hrs, Volume= 0.036 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Adj	Description
6,980	49		50-75% Grass cover, Fair, HSG A
809	98		Unconnected roofs, HSG A
1,010	98		Paved parking, HSG A
8,799	59	57	Weighted Average, UI Adjusted
6,980			79.33% Pervious Area
1,819			20.67% Impervious Area
809			44.47% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"

Summary for Reach 3R: Drainage in Winthrop

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 2.06" for 100-Yr Storm event
Inflow = 10.16 cfs @ 12.34 hrs, Volume= 0.999 af
Outflow = 10.16 cfs @ 12.34 hrs, Volume= 0.999 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP1: (new Reach)

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 1.86" for 100-Yr Storm event
Inflow = 11.94 cfs @ 12.36 hrs, Volume= 1.228 af
Outflow = 11.94 cfs @ 12.36 hrs, Volume= 1.228 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream North to Hill Street

Inflow Area = 18.084 ac, 0.66% Impervious, Inflow Depth = 1.08" for 100-Yr Storm event
Inflow = 10.41 cfs @ 12.20 hrs, Volume= 1.621 af
Outflow = 10.41 cfs @ 12.20 hrs, Volume= 1.621 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP3: Central Wetland

Inflow Area = 34.472 ac, 1.87% Impervious, Inflow Depth = 1.30" for 100-Yr Storm event
Inflow = 29.08 cfs @ 12.32 hrs, Volume= 3.735 af
Outflow = 29.08 cfs @ 12.32 hrs, Volume= 3.735 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP4: East wetland

Inflow Area = 21.519 ac, 0.08% Impervious, Inflow Depth = 1.51" for 100-Yr Storm event
Inflow = 23.17 cfs @ 12.27 hrs, Volume= 2.711 af
Outflow = 23.17 cfs @ 12.27 hrs, Volume= 2.711 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated wetland

Inflow Area = 6.523 ac, 0.07% Impervious, Inflow Depth = 0.16" for 100-Yr Storm event
Inflow = 0.14 cfs @ 14.90 hrs, Volume= 0.089 af
Outflow = 0.14 cfs @ 14.90 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.829 ac, 5.78% Impervious, Inflow Depth = 2.39" for 100-Yr Storm event
Inflow = 10.89 cfs @ 12.27 hrs, Volume= 1.163 af
Outflow = 10.31 cfs @ 12.34 hrs, Volume= 1.144 af, Atten= 5%, Lag= 4.1 min
Discarded = 0.15 cfs @ 12.34 hrs, Volume= 0.145 af
Primary = 10.16 cfs @ 12.34 hrs, Volume= 0.999 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.53' @ 12.34 hrs Surf.Area= 6,537 sf Storage= 4,953 cf

Plug-Flow detention time= 43.7 min calculated for 1.142 af (98% of inflow)
Center-of-Mass det. time= 35.3 min (902.9 - 867.7)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.15 cfs @ 12.34 hrs HW=260.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=10.12 cfs @ 12.34 hrs HW=260.52' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 10.12 cfs @ 1.93 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.916 ac, 7.49% Impervious, Inflow Depth = 1.91" for 100-Yr Storm event
Inflow = 12.21 cfs @ 12.34 hrs, Volume= 1.260 af
Outflow = 12.14 cfs @ 12.36 hrs, Volume= 1.260 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.20 cfs @ 12.36 hrs, Volume= 0.033 af
Primary = 11.94 cfs @ 12.36 hrs, Volume= 1.228 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 256.22' @ 12.36 hrs Surf.Area= 3,532 sf Storage= 2,716 cf

Plug-Flow detention time= 3.6 min calculated for 1.258 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (872.5 - 868.9)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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 @ 12.36 hrs HW=256.22' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=11.91 cfs @ 12.36 hrs HW=256.22' (Free Discharge)
├**2=Culvert** (Inlet Controls 4.12 cfs @ 5.24 fps)
└**3=Broad-Crested Rectangular Weir**(Weir Controls 7.80 cfs @ 1.17 fps)

Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 12.068 ac, 0.00% Impervious, Inflow Depth = 1.02" for 100-Yr Storm event
Inflow = 6.61 cfs @ 12.41 hrs, Volume= 1.028 af
Outflow = 1.33 cfs @ 14.45 hrs, Volume= 0.606 af, Atten= 80%, Lag= 122.0 min
Primary = 1.33 cfs @ 14.45 hrs, Volume= 0.606 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.55' @ 14.45 hrs Surf.Area= 49,785 sf Storage= 20,647 cf

Plug-Flow detention time= 285.1 min calculated for 0.605 af (59% of inflow)

Center-of-Mass det. time= 149.5 min (1,072.5 - 923.1)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00’	48,566 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

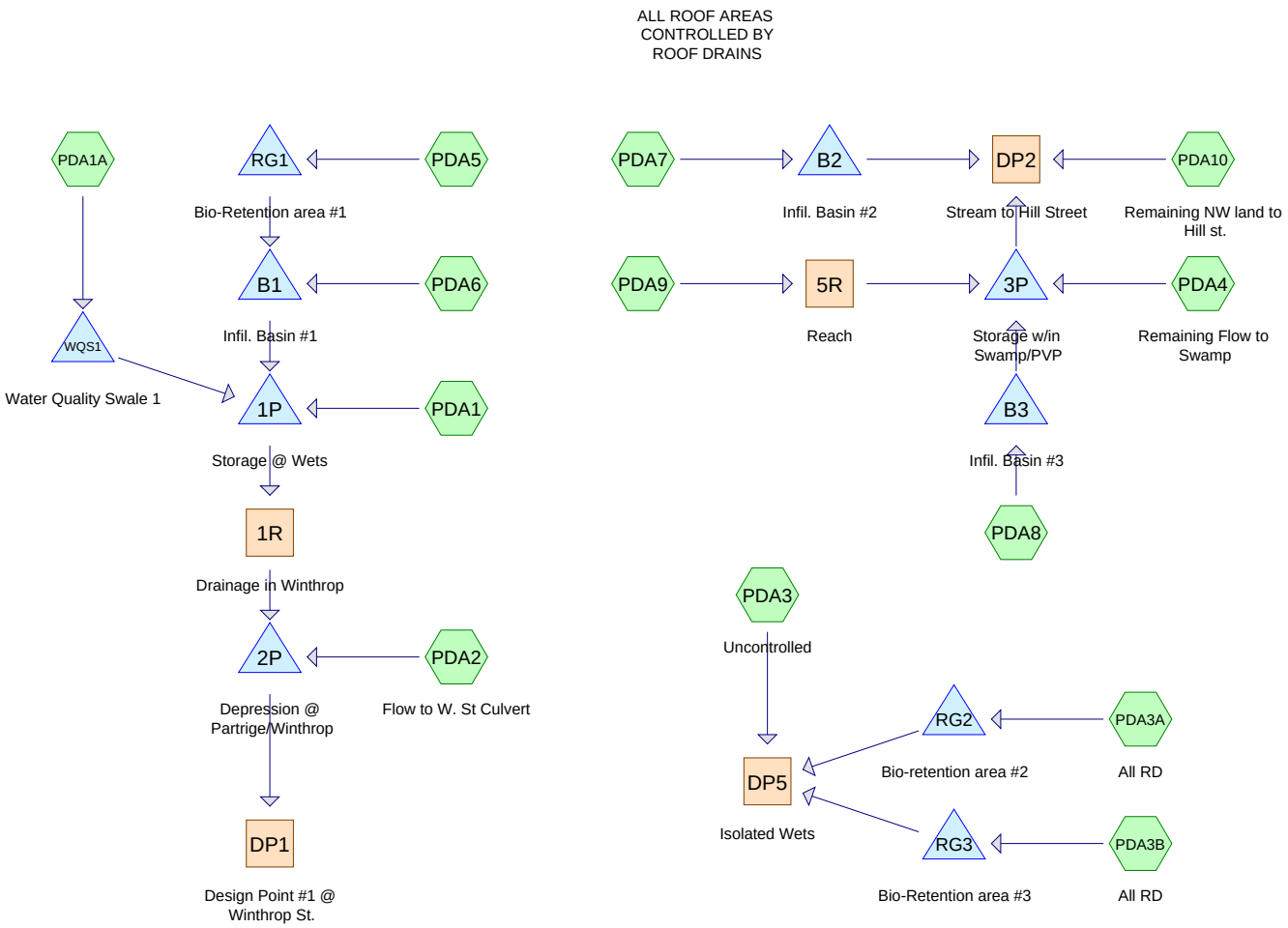
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	74,000	1,890.0	48,566	48,566	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.50’	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.32 cfs @ 14.45 hrs HW=274.55’ (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.32 cfs @ 0.57 fps)

Appendix D-2

Post-Development Hydrology Calculations (Standard #2)



Subcat Reach Pond Link

Routing Diagram for Appendix D2 - POST-WEST-NORTH - 8.14.18

Prepared by {enter your company name here}, Printed 8/14/2018

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPDA1: Runoff Area=36,360 sf 1.71% Impervious Runoff Depth=0.34"
Flow Length=300' Tc=7.8 min CN=58 Runoff=0.14 cfs 0.024 af

SubcatchmentPDA10: Remaining NW Runoff Area=218,382 sf 0.41% Impervious Runoff Depth=0.25"
Flow Length=450' Tc=13.3 min CN=55 Runoff=0.48 cfs 0.105 af

SubcatchmentPDA1A: Runoff Area=35,356 sf 18.10% Impervious Runoff Depth=1.27"
Tc=6.0 min CN=78 Runoff=1.17 cfs 0.086 af

SubcatchmentPDA2: Flow to W. St Culvert Runoff Area=70,655 sf 10.61% Impervious Runoff Depth=0.13"
Flow Length=535' Tc=6.5 min CN=50 Runoff=0.04 cfs 0.017 af

SubcatchmentPDA3: Uncontrolled Runoff Area=188,422 sf 0.10% Impervious Runoff Depth=0.00"
Flow Length=210' Tc=18.7 min CN=31 Runoff=0.00 cfs 0.000 af

SubcatchmentPDA3A: All RD Runoff Area=13,000 sf 8.46% Impervious Runoff Depth=0.03"
Tc=6.0 min CN=44 Runoff=0.00 cfs 0.001 af

SubcatchmentPDA3B: All RD Runoff Area=6,600 sf 16.67% Impervious Runoff Depth=0.11"
Tc=6.0 min CN=49 Runoff=0.00 cfs 0.001 af

SubcatchmentPDA4: Remaining Flow to Runoff Area=308,043 sf 0.00% Impervious Runoff Depth=0.25"
Flow Length=470' Tc=9.3 min CN=55 Runoff=0.71 cfs 0.148 af

SubcatchmentPDA5: Runoff Area=41,015 sf 0.34% Impervious Runoff Depth=1.04"
Flow Length=160' Tc=8.7 min CN=74 Runoff=0.97 cfs 0.081 af

SubcatchmentPDA6: Runoff Area=137,715 sf 23.24% Impervious Runoff Depth=0.60"
Flow Length=752' Tc=8.5 min CN=65 Runoff=1.56 cfs 0.158 af

SubcatchmentPDA7: Runoff Area=89,674 sf 36.94% Impervious Runoff Depth=0.93"
Flow Length=721' Tc=11.8 min CN=72 Runoff=1.68 cfs 0.159 af

SubcatchmentPDA8: Runoff Area=135,290 sf 33.43% Impervious Runoff Depth=0.37"
Flow Length=416' Tc=17.9 min CN=59 Runoff=0.55 cfs 0.097 af

SubcatchmentPDA9: Runoff Area=69,814 sf 1.48% Impervious Runoff Depth=0.00"
Flow Length=480' Tc=12.0 min CN=38 Runoff=0.00 cfs 0.000 af

Reach 1R: Drainage in Winthrop Inflow=0.24 cfs 0.027 af
Outflow=0.24 cfs 0.027 af

Reach 5R: Reach Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
12.0" Round Pipe n=0.011 L=115.0' S=0.0217 '/' Capacity=6.21 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Design Point #1 @ Winthrop St. Inflow=0.26 cfs 0.041 af
Outflow=0.26 cfs 0.041 af

Reach DP2: Stream to Hill Street Inflow=0.48 cfs 0.105 af
Outflow=0.48 cfs 0.105 af

Reach DP5: Isolated Wets Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Storage @ Wets Peak Elev=260.04' Storage=2,399 cf Inflow=1.06 cfs 0.138 af
Discarded=0.10 cfs 0.107 af Primary=0.24 cfs 0.027 af Outflow=0.33 cfs 0.134 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=254.46' Storage=25 cf Inflow=0.27 cfs 0.044 af
Discarded=0.01 cfs 0.004 af Primary=0.26 cfs 0.041 af Outflow=0.27 cfs 0.044 af

Pond 3P: Storage w/in Swamp/PVP Peak Elev=274.20' Storage=6,440 cf Inflow=0.71 cfs 0.148 af
Outflow=0.00 cfs 0.000 af

Pond B1: Infil. Basin #1 Peak Elev=266.79' Storage=2,010 cf Inflow=1.56 cfs 0.165 af
Discarded=0.21 cfs 0.137 af Primary=0.22 cfs 0.028 af Outflow=0.43 cfs 0.165 af

Pond B2: Infil. Basin #2 Peak Elev=275.06' Storage=1,838 cf Inflow=1.68 cfs 0.159 af
Discarded=0.43 cfs 0.159 af Primary=0.00 cfs 0.000 af Outflow=0.43 cfs 0.159 af

Pond B3: Infil. Basin #3 Peak Elev=277.55' Storage=313 cf Inflow=0.55 cfs 0.097 af
Discarded=0.38 cfs 0.097 af Primary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.097 af

Pond RG1: Bio-Retention area #1 Peak Elev=270.42' Storage=941 cf Inflow=0.97 cfs 0.081 af
Discarded=0.14 cfs 0.075 af Primary=0.30 cfs 0.007 af Outflow=0.44 cfs 0.081 af

Pond RG2: Bio-retention area #2 Peak Elev=275.00' Storage=0 cf Inflow=0.00 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond RG3: Bio-Retention area #3 Peak Elev=275.00' Storage=1 cf Inflow=0.00 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond WQS1: Water Quality Swale 1 Peak Elev=262.84' Storage=491 cf Inflow=1.17 cfs 0.086 af
Outflow=0.92 cfs 0.086 af

Total Runoff Area = 30.999 ac Runoff Volume = 0.878 af Average Runoff Depth = 0.34"
90.42% Pervious = 28.030 ac 9.58% Impervious = 2.969 ac

Summary for Subcatchment PDA1:

Runoff = 0.14 cfs @ 12.20 hrs, Volume= 0.024 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	10,712	70	Woods, Good, HSG C
	9,898	49	50-75% Grass cover, Fair, HSG A
	7,602	30	Woods, Good, HSG A
*	621	98	ex. roof
	7,527	79	50-75% Grass cover, Fair, HSG C
	36,360	58	Weighted Average
	35,739		98.29% Pervious Area
	621		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	250	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.8	300	Total			

Summary for Subcatchment PDA10: Remaining NW land to Hill st.

Runoff = 0.48 cfs @ 12.45 hrs, Volume= 0.105 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	26,256	43	Woods/grass comb., Fair, HSG A
	3,882	76	Woods/grass comb., Fair, HSG C
*	885	98	ex roof
	10,105	39	>75% Grass cover, Good, HSG A
	22,520	74	>75% Grass cover, Good, HSG C
	69,434	30	Woods, Good, HSG A
	24,449	70	Woods, Good, HSG C
	60,851	77	Woods, Good, HSG D
	218,382	55	Weighted Average
	217,497		99.59% Pervious Area
	885		0.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment PDA1A:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.086 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	6,400	98	Pavement, HSG C
	26,556	74	>75% Grass cover, Good, HSG C
	2,400	70	Woods, Good, HSG C
	35,356	78	Weighted Average
	28,956		81.90% Pervious Area
	6,400		18.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min. Tc per TR-55**

Summary for Subcatchment PDA2: Flow to W. St Culvert

Runoff = 0.04 cfs @ 12.49 hrs, Volume= 0.017 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	7,500	98	ex roof and drive
	25,790	39	>75% Grass cover, Good, HSG A
	11,331	74	>75% Grass cover, Good, HSG C
	21,304	30	Woods, Good, HSG A
	4,730	70	Woods, Good, HSG C
	70,655	50	Weighted Average
	63,155		89.39% Pervious Area
	7,500		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0360	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
2.1	485	0.0560	3.81		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
6.5	535	Total			

Summary for Subcatchment PDA3: Uncontrolled

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	192	98	ex roof
	28,800	39	>75% Grass cover, Good, HSG A
	159,430	30	Woods, Good, HSG A
	188,422	31	Weighted Average
	188,230		99.90% Pervious Area
	192		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.4	160	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.7	210	Total			

Summary for Subcatchment PDA3A: All RD

Runoff = 0.00 cfs @ 15.69 hrs, Volume= 0.001 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	11,900	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	13,000	44	Weighted Average
	11,900		91.54% Pervious Area
	1,100		8.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA3B: All RD

Runoff = 0.00 cfs @ 13.67 hrs, Volume= 0.001 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	5,500	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	6,600	49	Weighted Average
	5,500		83.33% Pervious Area
	1,100		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA4: Remaining Flow to Swamp

Runoff = 0.71 cfs @ 12.39 hrs, Volume= 0.148 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
52,426	39	>75% Grass cover, Good, HSG A
1,238	80	>75% Grass cover, Good, HSG D
105,623	30	Woods, Good, HSG A
148,756	79	Woods, Fair, HSG D
308,043	55	Weighted Average
308,043		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		**Sheet Flow,** Range n= 0.130 P2= 3.20"
4.3	420	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	470	Total			

Summary for Subcatchment PDA5:

Runoff = 0.97 cfs @ 12.14 hrs, Volume= 0.081 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	4,700	70	Woods, Good, HSG C
	36,175	74	>75% Grass cover, Good, HSG C
*	140	98	Ex. Roofs, HSG A
	41,015	74	Weighted Average
	40,875		99.66% Pervious Area
	140		0.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	110	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
8.7	160	Total			

Summary for Subcatchment PDA6:

Runoff = 1.56 cfs @ 12.15 hrs, Volume= 0.158 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
49,158	74	>75% Grass cover, Good, HSG C
32,000	98	Paved parking, HSG C
47,262	39	>75% Grass cover, Good, HSG A
7,348	30	Woods, Good, HSG A
1,947	70	Woods, Good, HSG C
137,715	65	Weighted Average
105,715		76.76% Pervious Area
32,000		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.9	127	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
1.2	475	0.0220	6.73	5.28	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.5	752	Total			

Summary for Subcatchment PDA7:

Runoff = 1.68 cfs @ 12.18 hrs, Volume= 0.159 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
33,130	98	Paved parking, HSG C
28,405	39	>75% Grass cover, Good, HSG A
28,139	74	>75% Grass cover, Good, HSG C
89,674	72	Weighted Average
56,544		63.06% Pervious Area
33,130		36.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.0	191	0.0400	3.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.5	480	0.0100	5.36	4.21	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
11.8	721	Total			

Summary for Subcatchment PDA8:

Runoff = 0.55 cfs @ 12.42 hrs, Volume= 0.097 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
45,227	98	Paved parking, HSG A
69,758	39	>75% Grass cover, Good, HSG A
20,305	43	Woods/grass comb., Fair, HSG A
135,290	59	Weighted Average
90,063		66.57% Pervious Area
45,227		33.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	239	0.0190	2.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	80	0.0070	1.70		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	47	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
17.9	416	Total			

Summary for Subcatchment PDA9:

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	2,689	96	Gravel surface, HSG A
*	1,035	98	ex roof
	66,090	35	Brush, Fair, HSG A
	69,814	38	Weighted Average
	68,779		98.52% Pervious Area
	1,035		1.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	430	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
12.0	480	Total			

Summary for Reach 1R: Drainage in Winthrop

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 0.06" for 2-year event
Inflow = 0.24 cfs @ 13.31 hrs, Volume= 0.027 af
Outflow = 0.24 cfs @ 13.31 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

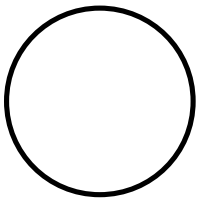
Summary for Reach 5R: Reach

Inflow Area = 1.603 ac, 1.48% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 115.0' Slope= 0.0217 '/'
Inlet Invert= 279.50', Outlet Invert= 277.00'



Summary for Reach DP1: Design Point #1 @ Winthrop St.

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 0.07" for 2-year event
Inflow = 0.26 cfs @ 13.34 hrs, Volume= 0.041 af
Outflow = 0.26 cfs @ 13.34 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream to Hill Street

Inflow Area = 18.852 ac, 9.78% Impervious, Inflow Depth = 0.07" for 2-year event
Inflow = 0.48 cfs @ 12.45 hrs, Volume= 0.105 af
Outflow = 0.48 cfs @ 12.45 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated Wets

Inflow Area = 4.776 ac, 1.15% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth > 0.29" for 2-year event
Inflow = 1.06 cfs @ 12.17 hrs, Volume= 0.138 af
Outflow = 0.33 cfs @ 13.31 hrs, Volume= 0.134 af, Atten= 68%, Lag= 68.5 min
Discarded = 0.10 cfs @ 13.31 hrs, Volume= 0.107 af
Primary = 0.24 cfs @ 13.31 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.04' @ 13.31 hrs Surf.Area= 4,164 sf Storage= 2,399 cf

Plug-Flow detention time= 252.8 min calculated for 0.134 af (97% of inflow)
Center-of-Mass det. time= 233.8 min (1,105.3 - 871.5)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.10 cfs @ 13.31 hrs HW=260.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.23 cfs @ 13.31 hrs HW=260.04' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.23 cfs @ 0.54 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 0.07" for 2-year event
Inflow = 0.27 cfs @ 13.31 hrs, Volume= 0.044 af
Outflow = 0.27 cfs @ 13.34 hrs, Volume= 0.044 af, Atten= 0%, Lag= 1.6 min
Discarded = 0.01 cfs @ 13.34 hrs, Volume= 0.004 af
Primary = 0.26 cfs @ 13.34 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 254.46' @ 13.34 hrs Surf.Area= 164 sf Storage= 25 cf

Plug-Flow detention time= 2.5 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 2.5 min (907.2 - 904.6)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.01 cfs @ 13.34 hrs HW=254.46' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.26 cfs @ 13.34 hrs HW=254.46' (Free Discharge)
├**2=Culvert** (Inlet Controls 0.26 cfs @ 1.54 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 11.780 ac, 9.02% Impervious, Inflow Depth = 0.15" for 2-year event
Inflow = 0.71 cfs @ 12.39 hrs, Volume= 0.148 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.20' @ 24.60 hrs Surf.Area= 36,340 sf Storage= 6,440 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	53,729 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	86,000	1,890.0	53,729	53,729	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.75'	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B1: Infil. Basin #1

Inflow Area = 4.103 ac, 17.98% Impervious, Inflow Depth = 0.48" for 2-year event
Inflow = 1.56 cfs @ 12.15 hrs, Volume= 0.165 af
Outflow = 0.43 cfs @ 12.77 hrs, Volume= 0.165 af, Atten= 72%, Lag= 36.8 min
Discarded = 0.21 cfs @ 12.77 hrs, Volume= 0.137 af
Primary = 0.22 cfs @ 12.77 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 266.79' @ 12.77 hrs Surf.Area= 3,738 sf Storage= 2,010 cf

Plug-Flow detention time= 66.2 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 66.0 min (957.9 - 891.9)

Volume	Invert	Avail.Storage	Storage Description
#1	266.20'	16,732 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
266.20	3,039	303.7	0	0	3,039
268.00	5,379	341.2	7,477	7,477	5,049
269.50	6,997	372.2	9,255	16,732	6,889

Device	Routing	Invert	Outlet Devices
#1	Discarded	266.20'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	267.50'	**2.5' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.3' Crest Height
#4	Primary	268.50'	**12.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.3' Crest Height

Discarded OutFlow Max=0.21 cfs @ 12.77 hrs HW=266.79' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.22 cfs @ 12.77 hrs HW=266.79' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 1.85 fps)
├**3=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)
└**4=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B2: Infil. Basin #2

Inflow Area = 2.059 ac, 36.94% Impervious, Inflow Depth = 0.93" for 2-year event
Inflow = 1.68 cfs @ 12.18 hrs, Volume= 0.159 af
Outflow = 0.43 cfs @ 12.71 hrs, Volume= 0.159 af, Atten= 74%, Lag= 31.5 min
Discarded = 0.43 cfs @ 12.71 hrs, Volume= 0.159 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 275.06' @ 12.71 hrs Surf.Area= 2,250 sf Storage= 1,838 cf

Plug-Flow detention time= 35.2 min calculated for 0.159 af (100% of inflow)
Center-of-Mass det. time= 35.2 min (909.3 - 874.1)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	15,793 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	1,260	214.7	0	0	1,260
276.00	3,362	301.0	4,453	4,453	4,839
278.00	5,281	338.7	8,571	13,025	6,862
278.50	5,797	348.1	2,768	15,793	7,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	277.50'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.43 cfs @ 12.71 hrs HW=275.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B3: Infil. Basin #3

Inflow Area = 3.106 ac, 33.43% Impervious, Inflow Depth = 0.37" for 2-year event
Inflow = 0.55 cfs @ 12.42 hrs, Volume= 0.097 af
Outflow = 0.38 cfs @ 12.68 hrs, Volume= 0.097 af, Atten= 31%, Lag= 16.0 min
Discarded = 0.38 cfs @ 12.68 hrs, Volume= 0.097 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 277.55' @ 12.68 hrs Surf.Area= 6,805 sf Storage= 313 cf

Plug-Flow detention time= 8.6 min calculated for 0.097 af (100% of inflow)
Center-of-Mass det. time= 8.6 min (946.0 - 937.4)

Volume	Invert	Avail.Storage	Storage Description
#1	277.50'	22,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
277.50	6,760	328.3	0	0	6,760
278.00	7,259	337.8	3,504	3,504	7,290
280.10	10,853	451.7	18,892	22,396	14,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	277.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	279.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.38 cfs @ 12.68 hrs HW=277.55' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=277.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG1: Bio-Retention area #1

Inflow Area = 0.942 ac, 0.34% Impervious, Inflow Depth = 1.04" for 2-year event
Inflow = 0.97 cfs @ 12.14 hrs, Volume= 0.081 af
Outflow = 0.44 cfs @ 12.46 hrs, Volume= 0.081 af, Atten= 55%, Lag= 19.2 min
Discarded = 0.14 cfs @ 12.46 hrs, Volume= 0.075 af
Primary = 0.30 cfs @ 12.46 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.42' @ 12.46 hrs Surf.Area= 2,445 sf Storage= 941 cf

Plug-Flow detention time= 53.6 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 53.5 min (918.1 - 864.6)

Volume	Invert	Avail.Storage	Storage Description
#1	270.00'	2,541 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.00	1,998	169.0	0	0	1,998
271.00	3,125	206.0	2,541	2,541	3,118

Device	Routing	Invert	Outlet Devices
#1	Device 2	270.40'	**2.0" x 2.0" Horiz. Orifice/Grate X 36.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	268.67'	**12.0" Round Culvert** L= 70.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 268.67' / 267.97' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Discarded	270.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.14 cfs @ 12.46 hrs HW=270.42' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.29 cfs @ 12.46 hrs HW=270.42' (Free Discharge)
└**2=Culvert** (Passes 0.29 cfs of 4.23 cfs potential flow)
└**1=Orifice/Grate** (Weir Controls 0.29 cfs @ 0.51 fps)

Summary for Pond RG2: Bio-retention area #2

Inflow Area = 0.298 ac, 8.46% Impervious, Inflow Depth = 0.03" for 2-year event
Inflow = 0.00 cfs @ 15.69 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.78 hrs, Volume= 0.001 af, Atten= 0%, Lag= 5.2 min
Discarded = 0.00 cfs @ 15.78 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 275.00' @ 15.78 hrs Surf.Area= 247 sf Storage= 0 cf

Plug-Flow detention time= 5.0 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (1,141.0 - 1,135.9)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,124 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	247	169.5	0	0	247
276.70	1,194	201.6	1,124	1,124	1,246

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.01 cfs @ 15.78 hrs HW=275.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG3: Bio-Retention area #3

Inflow Area = 0.152 ac, 16.67% Impervious, Inflow Depth = 0.11" for 2-year event
Inflow = 0.00 cfs @ 13.67 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 13.75 hrs, Volume= 0.001 af, Atten= 0%, Lag= 5.2 min
Discarded = 0.00 cfs @ 13.75 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 275.00' @ 13.75 hrs Surf.Area= 267 sf Storage= 1 cf

Plug-Flow detention time= 5.0 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (1,029.9 - 1,024.8)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	266	181.9	0	0	266
276.70	1,275	214.0	1,203	1,203	1,332

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.01 cfs @ 13.75 hrs HW=275.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS1: Water Quality Swale 1

Inflow Area = 0.812 ac, 18.10% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 1.17 cfs @ 12.10 hrs, Volume= 0.086 af
Outflow = 0.92 cfs @ 12.17 hrs, Volume= 0.086 af, Atten= 21%, Lag= 4.2 min
Primary = 0.92 cfs @ 12.17 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 262.84' @ 12.17 hrs Surf.Area= 657 sf Storage= 491 cf

Plug-Flow detention time= 26.2 min calculated for 0.086 af (100% of inflow)
Center-of-Mass det. time= 26.1 min (875.3 - 849.2)

Volume	Invert	Avail.Storage	Storage Description
#1	261.90'	1,420 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.90	1	4.0	0	0	1
262.00	472	164.9	16	16	2,164
264.00	960	180.3	1,403	1,420	2,710

Device	Routing	Invert	Outlet Devices
#1	Primary	261.90'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir**
			Cv= 2.56 (C= 3.20)
#2	Primary	263.40'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

0.5’ Crest Height

Primary OutFlow Max=0.90 cfs @ 12.17 hrs HW=262.84’ (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir**(Weir Controls 0.90 cfs @ 2.48 fps)
└─**2=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPDA1: Runoff Area=36,360 sf 1.71% Impervious Runoff Depth=1.01"
Flow Length=300' Tc=7.8 min CN=58 Runoff=0.75 cfs 0.070 af

SubcatchmentPDA10: Remaining NW Runoff Area=218,382 sf 0.41% Impervious Runoff Depth=0.83"
Flow Length=450' Tc=13.3 min CN=55 Runoff=2.86 cfs 0.349 af

SubcatchmentPDA1A: Runoff Area=35,356 sf 18.10% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=78 Runoff=2.29 cfs 0.166 af

SubcatchmentPDA2: Flow to W. St Culvert Runoff Area=70,655 sf 10.61% Impervious Runoff Depth=0.57"
Flow Length=535' Tc=6.5 min CN=50 Runoff=0.58 cfs 0.078 af

SubcatchmentPDA3: Uncontrolled Runoff Area=188,422 sf 0.10% Impervious Runoff Depth=0.00"
Flow Length=210' Tc=18.7 min CN=31 Runoff=0.00 cfs 0.001 af

SubcatchmentPDA3A: All RD Runoff Area=13,000 sf 8.46% Impervious Runoff Depth=0.31"
Tc=6.0 min CN=44 Runoff=0.03 cfs 0.008 af

SubcatchmentPDA3B: All RD Runoff Area=6,600 sf 16.67% Impervious Runoff Depth=0.53"
Tc=6.0 min CN=49 Runoff=0.05 cfs 0.007 af

SubcatchmentPDA4: Remaining Flow to Runoff Area=308,043 sf 0.00% Impervious Runoff Depth=0.83"
Flow Length=470' Tc=9.3 min CN=55 Runoff=4.60 cfs 0.492 af

SubcatchmentPDA5: Runoff Area=41,015 sf 0.34% Impervious Runoff Depth=2.13"
Flow Length=160' Tc=8.7 min CN=74 Runoff=2.08 cfs 0.167 af

SubcatchmentPDA6: Runoff Area=137,715 sf 23.24% Impervious Runoff Depth=1.46"
Flow Length=752' Tc=8.5 min CN=65 Runoff=4.54 cfs 0.384 af

SubcatchmentPDA7: Runoff Area=89,674 sf 36.94% Impervious Runoff Depth=1.97"
Flow Length=721' Tc=11.8 min CN=72 Runoff=3.83 cfs 0.338 af

SubcatchmentPDA8: Runoff Area=135,290 sf 33.43% Impervious Runoff Depth=1.07"
Flow Length=416' Tc=17.9 min CN=59 Runoff=2.31 cfs 0.276 af

SubcatchmentPDA9: Runoff Area=69,814 sf 1.48% Impervious Runoff Depth=0.12"
Flow Length=480' Tc=12.0 min CN=38 Runoff=0.02 cfs 0.016 af

Reach 1R: Drainage in Winthrop Inflow=2.84 cfs 0.333 af
Outflow=2.84 cfs 0.333 af

Reach 5R: Reach Avg. Flow Depth=0.05' Max Vel=1.93 fps Inflow=0.02 cfs 0.016 af
12.0" Round Pipe n=0.011 L=115.0' S=0.0217 '/' Capacity=6.21 cfs Outflow=0.02 cfs 0.016 af

Reach DP1: Design Point #1 @ Winthrop St. Inflow=2.80 cfs 0.398 af
Outflow=2.80 cfs 0.398 af

Reach DP2: Stream to Hill Street Inflow=2.86 cfs 0.352 af
Outflow=2.86 cfs 0.352 af

Reach DP5: Isolated Wets Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Pond 1P: Storage @ Wets Peak Elev=260.23' Storage=3,252 cf Inflow=3.22 cfs 0.474 af
Discarded=0.12 cfs 0.130 af Primary=2.84 cfs 0.333 af Outflow=2.96 cfs 0.463 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=255.41' Storage=708 cf Inflow=3.16 cfs 0.411 af
Discarded=0.08 cfs 0.012 af Primary=2.80 cfs 0.398 af Outflow=2.89 cfs 0.411 af

Pond 3P: Storage w/in Swamp/PVP Peak Elev=274.55' Storage=22,102 cf Inflow=4.60 cfs 0.507 af
Outflow=0.00 cfs 0.000 af

Pond B1: Infil. Basin #1 Peak Elev=267.74' Storage=6,150 cf Inflow=6.04 cfs 0.443 af
Discarded=0.28 cfs 0.205 af Primary=1.93 cfs 0.238 af Outflow=2.21 cfs 0.443 af

Pond B2: Infil. Basin #2 Peak Elev=276.18' Storage=5,082 cf Inflow=3.83 cfs 0.338 af
Discarded=0.67 cfs 0.334 af Primary=0.07 cfs 0.004 af Outflow=0.75 cfs 0.338 af

Pond B3: Infil. Basin #3 Peak Elev=278.04' Storage=3,811 cf Inflow=2.31 cfs 0.276 af
Discarded=0.41 cfs 0.276 af Primary=0.00 cfs 0.000 af Outflow=0.41 cfs 0.276 af

Pond RG1: Bio-Retention area #1 Peak Elev=270.51' Storage=1,159 cf Inflow=2.08 cfs 0.167 af
Discarded=0.14 cfs 0.108 af Primary=1.61 cfs 0.059 af Outflow=1.75 cfs 0.167 af

Pond RG2: Bio-retention area #2 Peak Elev=275.10' Storage=26 cf Inflow=0.03 cfs 0.008 af
Discarded=0.02 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.008 af

Pond RG3: Bio-Retention area #3 Peak Elev=275.13' Storage=38 cf Inflow=0.05 cfs 0.007 af
Discarded=0.02 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.007 af

Pond WQS1: Water Quality Swale 1 Peak Elev=263.18' Storage=725 cf Inflow=2.29 cfs 0.166 af
Outflow=1.97 cfs 0.166 af

Total Runoff Area = 30.999 ac Runoff Volume = 2.351 af Average Runoff Depth = 0.91"
90.42% Pervious = 28.030 ac 9.58% Impervious = 2.969 ac

Summary for Subcatchment PDA1:

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 0.070 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	10,712	70	Woods, Good, HSG C
	9,898	49	50-75% Grass cover, Fair, HSG A
	7,602	30	Woods, Good, HSG A
*	621	98	ex. roof
	7,527	79	50-75% Grass cover, Fair, HSG C
	36,360	58	Weighted Average
	35,739		98.29% Pervious Area
	621		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	250	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.8	300	Total			

Summary for Subcatchment PDA10: Remaining NW land to Hill st.

Runoff = 2.86 cfs @ 12.23 hrs, Volume= 0.349 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	26,256	43	Woods/grass comb., Fair, HSG A
	3,882	76	Woods/grass comb., Fair, HSG C
*	885	98	ex roof
	10,105	39	>75% Grass cover, Good, HSG A
	22,520	74	>75% Grass cover, Good, HSG C
	69,434	30	Woods, Good, HSG A
	24,449	70	Woods, Good, HSG C
	60,851	77	Woods, Good, HSG D
	218,382	55	Weighted Average
	217,497		99.59% Pervious Area
	885		0.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment PDA1A:

Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.166 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	6,400	98	Pavement, HSG C
	26,556	74	>75% Grass cover, Good, HSG C
	2,400	70	Woods, Good, HSG C
	35,356	78	Weighted Average
	28,956		81.90% Pervious Area
	6,400		18.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min. Tc per TR-55**

Summary for Subcatchment PDA2: Flow to W. St Culvert

Runoff = 0.58 cfs @ 12.16 hrs, Volume= 0.078 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	7,500	98	ex roof and drive
	25,790	39	>75% Grass cover, Good, HSG A
	11,331	74	>75% Grass cover, Good, HSG C
	21,304	30	Woods, Good, HSG A
	4,730	70	Woods, Good, HSG C
	70,655	50	Weighted Average
	63,155		89.39% Pervious Area
	7,500		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0360	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
2.1	485	0.0560	3.81		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
6.5	535	Total			

Summary for Subcatchment PDA3: Uncontrolled

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
*	192	98	ex roof
	28,800	39	>75% Grass cover, Good, HSG A
	159,430	30	Woods, Good, HSG A
	188,422	31	Weighted Average
	188,230		99.90% Pervious Area
	192		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.4	160	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.7	210	Total			

Summary for Subcatchment PDA3A: All RD

Runoff = 0.03 cfs @ 12.37 hrs, Volume= 0.008 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	11,900	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	13,000	44	Weighted Average
	11,900		91.54% Pervious Area
	1,100		8.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA3B: All RD

Runoff = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	5,500	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	6,600	49	Weighted Average
	5,500		83.33% Pervious Area
	1,100		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA4: Remaining Flow to Swamp

Runoff = 4.60 cfs @ 12.17 hrs, Volume= 0.492 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
52,426	39	>75% Grass cover, Good, HSG A
1,238	80	>75% Grass cover, Good, HSG D
105,623	30	Woods, Good, HSG A
148,756	79	Woods, Fair, HSG D
308,043	55	Weighted Average
308,043		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		**Sheet Flow,** Range n= 0.130 P2= 3.20"
4.3	420	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	470	Total			

Summary for Subcatchment PDA5:

Runoff = 2.08 cfs @ 12.13 hrs, Volume= 0.167 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	4,700	70	Woods, Good, HSG C
	36,175	74	>75% Grass cover, Good, HSG C
*	140	98	Ex. Roofs, HSG A
	41,015	74	Weighted Average
	40,875		99.66% Pervious Area
	140		0.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	110	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
8.7	160	Total			

Summary for Subcatchment PDA6:

Runoff = 4.54 cfs @ 12.14 hrs, Volume= 0.384 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
49,158	74	>75% Grass cover, Good, HSG C
32,000	98	Paved parking, HSG C
47,262	39	>75% Grass cover, Good, HSG A
7,348	30	Woods, Good, HSG A
1,947	70	Woods, Good, HSG C
137,715	65	Weighted Average
105,715		76.76% Pervious Area
32,000		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.9	127	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
1.2	475	0.0220	6.73	5.28	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.5	752	Total			

Summary for Subcatchment PDA7:

Runoff = 3.83 cfs @ 12.17 hrs, Volume= 0.338 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
33,130	98	Paved parking, HSG C
28,405	39	>75% Grass cover, Good, HSG A
28,139	74	>75% Grass cover, Good, HSG C
89,674	72	Weighted Average
56,544		63.06% Pervious Area
33,130		36.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.0	191	0.0400	3.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.5	480	0.0100	5.36	4.21	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
11.8	721	Total			

Summary for Subcatchment PDA8:

Runoff = 2.31 cfs @ 12.29 hrs, Volume= 0.276 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (sf)	CN	Description
45,227	98	Paved parking, HSG A
69,758	39	>75% Grass cover, Good, HSG A
20,305	43	Woods/grass comb., Fair, HSG A
135,290	59	Weighted Average
90,063		66.57% Pervious Area
45,227		33.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	239	0.0190	2.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	80	0.0070	1.70		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	47	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
17.9	416	Total			

Summary for Subcatchment PDA9:

Runoff = 0.02 cfs @ 14.79 hrs, Volume= 0.016 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (sf)	CN	Description
	2,689	96	Gravel surface, HSG A
*	1,035	98	ex roof
	66,090	35	Brush, Fair, HSG A
	69,814	38	Weighted Average
	68,779		98.52% Pervious Area
	1,035		1.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	430	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
12.0	480	Total			

Summary for Reach 1R: Drainage in Winthrop

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 0.69" for 10-year event
Inflow = 2.84 cfs @ 12.51 hrs, Volume= 0.333 af
Outflow = 2.84 cfs @ 12.51 hrs, Volume= 0.333 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

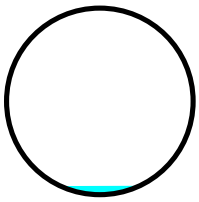
Summary for Reach 5R: Reach

Inflow Area = 1.603 ac, 1.48% Impervious, Inflow Depth = 0.12" for 10-year event
Inflow = 0.02 cfs @ 14.79 hrs, Volume= 0.016 af
Outflow = 0.02 cfs @ 14.82 hrs, Volume= 0.016 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.93 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.64 fps, Avg. Travel Time= 1.2 min

Peak Storage= 1 cf @ 14.81 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 115.0' Slope= 0.0217 '/'
Inlet Invert= 279.50', Outlet Invert= 277.00'



Summary for Reach DP1: Design Point #1 @ Winthrop St.

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 0.65" for 10-year event
Inflow = 2.80 cfs @ 12.61 hrs, Volume= 0.398 af
Outflow = 2.80 cfs @ 12.61 hrs, Volume= 0.398 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream to Hill Street

Inflow Area = 18.852 ac, 9.78% Impervious, Inflow Depth = 0.22" for 10-year event
Inflow = 2.86 cfs @ 12.23 hrs, Volume= 0.352 af
Outflow = 2.86 cfs @ 12.23 hrs, Volume= 0.352 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated Wets

Inflow Area = 4.776 ac, 1.15% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 0.99" for 10-year event
Inflow = 3.22 cfs @ 12.16 hrs, Volume= 0.474 af
Outflow = 2.96 cfs @ 12.51 hrs, Volume= 0.463 af, Atten= 8%, Lag= 21.0 min
Discarded = 0.12 cfs @ 12.51 hrs, Volume= 0.130 af
Primary = 2.84 cfs @ 12.51 hrs, Volume= 0.333 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.23' @ 12.51 hrs Surf.Area= 5,018 sf Storage= 3,252 cf

Plug-Flow detention time= 91.1 min calculated for 0.462 af (97% of inflow)
Center-of-Mass det. time= 77.9 min (918.1 - 840.2)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.12 cfs @ 12.51 hrs HW=260.23' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=2.83 cfs @ 12.51 hrs HW=260.23' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.83 cfs @ 1.23 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 0.67" for 10-year event
Inflow = 3.16 cfs @ 12.49 hrs, Volume= 0.411 af
Outflow = 2.89 cfs @ 12.61 hrs, Volume= 0.411 af, Atten= 9%, Lag= 7.2 min
Discarded = 0.08 cfs @ 12.61 hrs, Volume= 0.012 af
Primary = 2.80 cfs @ 12.61 hrs, Volume= 0.398 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 255.41' @ 12.61 hrs Surf.Area= 1,511 sf Storage= 708 cf

Plug-Flow detention time= 2.4 min calculated for 0.410 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (840.1 - 837.7)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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 @ 12.61 hrs HW=255.40' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=2.80 cfs @ 12.61 hrs HW=255.40' (Free Discharge)
├**2=Culvert** (Inlet Controls 2.80 cfs @ 3.57 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 11.780 ac, 9.02% Impervious, Inflow Depth = 0.52" for 10-year event
Inflow = 4.60 cfs @ 12.17 hrs, Volume= 0.507 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.55' @ 25.30 hrs Surf.Area= 55,248 sf Storage= 22,102 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	53,729 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	86,000	1,890.0	53,729	53,729	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.75'	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B1: Infil. Basin #1

Inflow Area = 4.103 ac, 17.98% Impervious, Inflow Depth = 1.30" for 10-year event
Inflow = 6.04 cfs @ 12.16 hrs, Volume= 0.443 af
Outflow = 2.21 cfs @ 12.51 hrs, Volume= 0.443 af, Atten= 63%, Lag= 21.4 min
Discarded = 0.28 cfs @ 12.51 hrs, Volume= 0.205 af
Primary = 1.93 cfs @ 12.51 hrs, Volume= 0.238 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 267.74' @ 12.51 hrs Surf.Area= 5,006 sf Storage= 6,150 cf

Plug-Flow detention time= 66.3 min calculated for 0.442 af (100% of inflow)
Center-of-Mass det. time= 66.3 min (917.8 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	266.20'	16,732 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
266.20	3,039	303.7	0	0	3,039
268.00	5,379	341.2	7,477	7,477	5,049
269.50	6,997	372.2	9,255	16,732	6,889

Device	Routing	Invert	Outlet Devices
#1	Discarded	266.20'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	267.50'	**2.5' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.3' Crest Height
#4	Primary	268.50'	**12.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.3' Crest Height

Discarded OutFlow Max=0.28 cfs @ 12.51 hrs HW=267.74' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=1.92 cfs @ 12.51 hrs HW=267.74' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.80 fps)
├**3=Sharp-Crested Rectangular Weir**(Weir Controls 0.98 cfs @ 1.65 fps)
└**4=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B2: Infil. Basin #2

Inflow Area = 2.059 ac, 36.94% Impervious, Inflow Depth = 1.97" for 10-year event
Inflow = 3.83 cfs @ 12.17 hrs, Volume= 0.338 af
Outflow = 0.75 cfs @ 12.77 hrs, Volume= 0.338 af, Atten= 81%, Lag= 35.9 min
Discarded = 0.67 cfs @ 12.77 hrs, Volume= 0.334 af
Primary = 0.07 cfs @ 12.77 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 276.18' @ 12.77 hrs Surf.Area= 3,519 sf Storage= 5,082 cf

Plug-Flow detention time= 73.8 min calculated for 0.337 af (100% of inflow)
Center-of-Mass det. time= 73.7 min (924.8 - 851.1)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	15,793 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	1,260	214.7	0	0	1,260
276.00	3,362	301.0	4,453	4,453	4,839
278.00	5,281	338.7	8,571	13,025	6,862
278.50	5,797	348.1	2,768	15,793	7,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	277.50'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.67 cfs @ 12.77 hrs HW=276.18' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.67 cfs)

Primary OutFlow Max=0.07 cfs @ 12.77 hrs HW=276.18' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.45 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B3: Infil. Basin #3

Inflow Area = 3.106 ac, 33.43% Impervious, Inflow Depth = 1.07" for 10-year event
Inflow = 2.31 cfs @ 12.29 hrs, Volume= 0.276 af
Outflow = 0.41 cfs @ 13.63 hrs, Volume= 0.276 af, Atten= 82%, Lag= 80.1 min
Discarded = 0.41 cfs @ 13.63 hrs, Volume= 0.276 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 278.04' @ 13.63 hrs Surf.Area= 7,324 sf Storage= 3,811 cf

Plug-Flow detention time= 89.8 min calculated for 0.276 af (100% of inflow)
Center-of-Mass det. time= 89.7 min (984.3 - 894.6)

Volume	Invert	Avail.Storage	Storage Description
#1	277.50'	22,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
277.50	6,760	328.3	0	0	6,760
278.00	7,259	337.8	3,504	3,504	7,290
280.10	10,853	451.7	18,892	22,396	14,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	277.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	279.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.41 cfs @ 13.63 hrs HW=278.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=277.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG1: Bio-Retention area #1

Inflow Area = 0.942 ac, 0.34% Impervious, Inflow Depth = 2.13" for 10-year event
Inflow = 2.08 cfs @ 12.13 hrs, Volume= 0.167 af
Outflow = 1.75 cfs @ 12.20 hrs, Volume= 0.167 af, Atten= 16%, Lag= 4.4 min
Discarded = 0.14 cfs @ 12.20 hrs, Volume= 0.108 af
Primary = 1.61 cfs @ 12.20 hrs, Volume= 0.059 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.51' @ 12.20 hrs Surf.Area= 2,543 sf Storage= 1,159 cf

Plug-Flow detention time= 43.6 min calculated for 0.167 af (100% of inflow)
Center-of-Mass det. time= 43.6 min (886.6 - 843.0)

Volume	Invert	Avail.Storage	Storage Description
#1	270.00'	2,541 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.00	1,998	169.0	0	0	1,998
271.00	3,125	206.0	2,541	2,541	3,118

Device	Routing	Invert	Outlet Devices
#1	Device 2	270.40'	**2.0" x 2.0" Horiz. Orifice/Grate X 36.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	268.67'	**12.0" Round Culvert** L= 70.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 268.67' / 267.97' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Discarded	270.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.14 cfs @ 12.20 hrs HW=270.51' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.61 cfs @ 12.20 hrs HW=270.51' (Free Discharge)
└**2=Culvert** (Passes 1.61 cfs of 4.38 cfs potential flow)
└**1=Orifice/Grate** (Orifice Controls 1.61 cfs @ 1.61 fps)

Summary for Pond RG2: Bio-retention area #2

Inflow Area = 0.298 ac, 8.46% Impervious, Inflow Depth = 0.31" for 10-year event
Inflow = 0.03 cfs @ 12.37 hrs, Volume= 0.008 af
Outflow = 0.02 cfs @ 12.97 hrs, Volume= 0.008 af, Atten= 53%, Lag= 36.1 min
Discarded = 0.02 cfs @ 12.97 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 275.10' @ 12.97 hrs Surf.Area= 282 sf Storage= 26 cf

Plug-Flow detention time= 11.9 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 11.9 min (980.2 - 968.3)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,124 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	247	169.5	0	0	247
276.70	1,194	201.6	1,124	1,124	1,246

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.02 cfs @ 12.97 hrs HW=275.10' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG3: Bio-Retention area #3

Inflow Area = 0.152 ac, 16.67% Impervious, Inflow Depth = 0.53" for 10-year event
Inflow = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af
Outflow = 0.02 cfs @ 12.63 hrs, Volume= 0.007 af, Atten= 61%, Lag= 28.1 min
Discarded = 0.02 cfs @ 12.63 hrs, Volume= 0.007 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 275.13' @ 12.63 hrs Surf.Area= 317 sf Storage= 38 cf

Plug-Flow detention time= 14.4 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 14.3 min (943.7 - 929.4)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	266	181.9	0	0	266
276.70	1,275	214.0	1,203	1,203	1,332

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.02 cfs @ 12.63 hrs HW=275.13' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS1: Water Quality Swale 1

Inflow Area = 0.812 ac, 18.10% Impervious, Inflow Depth = 2.46" for 10-year event
Inflow = 2.29 cfs @ 12.09 hrs, Volume= 0.166 af
Outflow = 1.97 cfs @ 12.15 hrs, Volume= 0.166 af, Atten= 14%, Lag= 3.1 min
Primary = 1.97 cfs @ 12.15 hrs, Volume= 0.166 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 263.18' @ 12.14 hrs Surf.Area= 739 sf Storage= 725 cf

Plug-Flow detention time= 19.6 min calculated for 0.166 af (100% of inflow)
Center-of-Mass det. time= 19.5 min (849.5 - 829.9)

Volume	Invert	Avail.Storage	Storage Description
#1	261.90'	1,420 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.90	1	4.0	0	0	1
262.00	472	164.9	16	16	2,164
264.00	960	180.3	1,403	1,420	2,710

Device	Routing	Invert	Outlet Devices
#1	Primary	261.90'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir**
			Cv= 2.56 (C= 3.20)
#2	Primary	263.40'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

0.5’ Crest Height

Primary OutFlow Max=1.95 cfs @ 12.15 hrs HW=263.18’ (Free Discharge)
1=Sharp-Crested Vee/Trap Weir(Weir Controls 1.95 cfs @ 2.89 fps)
2=Sharp-Crested Rectangular Weir(Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPDA1: Runoff Area=36,360 sf 1.71% Impervious Runoff Depth=1.45"
Flow Length=300' Tc=7.8 min CN=58 Runoff=1.17 cfs 0.101 af

SubcatchmentPDA10: Remaining NW Runoff Area=218,382 sf 0.41% Impervious Runoff Depth=1.24"
Flow Length=450' Tc=13.3 min CN=55 Runoff=4.84 cfs 0.518 af

SubcatchmentPDA1A: Runoff Area=35,356 sf 18.10% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=78 Runoff=2.93 cfs 0.212 af

SubcatchmentPDA2: Flow to W. St Culvert Runoff Area=70,655 sf 10.61% Impervious Runoff Depth=0.91"
Flow Length=535' Tc=6.5 min CN=50 Runoff=1.20 cfs 0.123 af

SubcatchmentPDA3: Uncontrolled Runoff Area=188,422 sf 0.10% Impervious Runoff Depth=0.05"
Flow Length=210' Tc=18.7 min CN=31 Runoff=0.02 cfs 0.017 af

SubcatchmentPDA3A: All RD Runoff Area=13,000 sf 8.46% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=44 Runoff=0.08 cfs 0.014 af

SubcatchmentPDA3B: All RD Runoff Area=6,600 sf 16.67% Impervious Runoff Depth=0.85"
Tc=6.0 min CN=49 Runoff=0.10 cfs 0.011 af

SubcatchmentPDA4: Remaining Flow to Runoff Area=308,043 sf 0.00% Impervious Runoff Depth=1.24"
Flow Length=470' Tc=9.3 min CN=55 Runoff=7.69 cfs 0.730 af

SubcatchmentPDA5: Runoff Area=41,015 sf 0.34% Impervious Runoff Depth=2.77"
Flow Length=160' Tc=8.7 min CN=74 Runoff=2.72 cfs 0.217 af

SubcatchmentPDA6: Runoff Area=137,715 sf 23.24% Impervious Runoff Depth=1.99"
Flow Length=752' Tc=8.5 min CN=65 Runoff=6.40 cfs 0.526 af

SubcatchmentPDA7: Runoff Area=89,674 sf 36.94% Impervious Runoff Depth=2.59"
Flow Length=721' Tc=11.8 min CN=72 Runoff=5.10 cfs 0.444 af

SubcatchmentPDA8: Runoff Area=135,290 sf 33.43% Impervious Runoff Depth=1.53"
Flow Length=416' Tc=17.9 min CN=59 Runoff=3.55 cfs 0.395 af

SubcatchmentPDA9: Runoff Area=69,814 sf 1.48% Impervious Runoff Depth=0.27"
Flow Length=480' Tc=12.0 min CN=38 Runoff=0.10 cfs 0.036 af

Reach 1R: Drainage in Winthrop Inflow=5.62 cfs 0.548 af
Outflow=5.62 cfs 0.548 af

Reach 5R: Reach Avg. Flow Depth=0.09' Max Vel=2.95 fps Inflow=0.10 cfs 0.036 af
12.0" Round Pipe n=0.011 L=115.0' S=0.0217 '/' Capacity=6.21 cfs Outflow=0.10 cfs 0.036 af

Reach DP1: Design Point #1 @ Winthrop St. Inflow=5.90 cfs 0.649 af
Outflow=5.90 cfs 0.649 af

Reach DP2: Stream to Hill Street Inflow=4.84 cfs 0.553 af
Outflow=4.84 cfs 0.553 af

Reach DP5: Isolated Wets Inflow=0.02 cfs 0.017 af
Outflow=0.02 cfs 0.017 af

Pond 1P: Storage @ Wets Peak Elev=260.36' Storage=3,943 cf Inflow=5.96 cfs 0.701 af
Discarded=0.13 cfs 0.138 af Primary=5.62 cfs 0.548 af Outflow=5.75 cfs 0.686 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=256.09' Storage=2,270 cf Inflow=6.28 cfs 0.671 af
Discarded=0.18 cfs 0.021 af Primary=5.90 cfs 0.649 af Outflow=6.08 cfs 0.671 af

Pond 3P: Storage w/in Swamp/PVP Peak Elev=274.73' Storage=33,381 cf Inflow=7.69 cfs 0.766 af
Outflow=0.00 cfs 0.000 af

Pond B1: Infil. Basin #1 Peak Elev=268.01' Storage=7,546 cf Inflow=8.31 cfs 0.621 af
Discarded=0.30 cfs 0.234 af Primary=4.08 cfs 0.387 af Outflow=4.38 cfs 0.621 af

Pond B2: Infil. Basin #2 Peak Elev=276.66' Storage=6,875 cf Inflow=5.10 cfs 0.444 af
Discarded=0.76 cfs 0.409 af Primary=0.30 cfs 0.036 af Outflow=1.05 cfs 0.444 af

Pond B3: Infil. Basin #3 Peak Elev=278.44' Storage=6,818 cf Inflow=3.55 cfs 0.395 af
Discarded=0.44 cfs 0.395 af Primary=0.00 cfs 0.000 af Outflow=0.44 cfs 0.395 af

Pond RG1: Bio-Retention area #1 Peak Elev=270.59' Storage=1,354 cf Inflow=2.72 cfs 0.217 af
Discarded=0.15 cfs 0.122 af Primary=2.08 cfs 0.095 af Outflow=2.23 cfs 0.217 af

Pond RG2: Bio-retention area #2 Peak Elev=275.38' Storage=120 cf Inflow=0.08 cfs 0.014 af
Discarded=0.02 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.014 af

Pond RG3: Bio-Retention area #3 Peak Elev=275.32' Storage=104 cf Inflow=0.10 cfs 0.011 af
Discarded=0.02 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.011 af

Pond WQS1: Water Quality Swale 1 Peak Elev=263.32' Storage=833 cf Inflow=2.93 cfs 0.212 af
Outflow=2.56 cfs 0.212 af

Total Runoff Area = 30.999 ac Runoff Volume = 3.344 af Average Runoff Depth = 1.29"
90.42% Pervious = 28.030 ac 9.58% Impervious = 2.969 ac

Summary for Subcatchment PDA1:

Runoff = 1.17 cfs @ 12.13 hrs, Volume= 0.101 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	10,712	70	Woods, Good, HSG C
	9,898	49	50-75% Grass cover, Fair, HSG A
	7,602	30	Woods, Good, HSG A
*	621	98	ex. roof
	7,527	79	50-75% Grass cover, Fair, HSG C
	36,360	58	Weighted Average
	35,739		98.29% Pervious Area
	621		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	250	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.8	300	Total			

Summary for Subcatchment PDA10: Remaining NW land to Hill st.

Runoff = 4.84 cfs @ 12.22 hrs, Volume= 0.518 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	26,256	43	Woods/grass comb., Fair, HSG A
	3,882	76	Woods/grass comb., Fair, HSG C
*	885	98	ex roof
	10,105	39	>75% Grass cover, Good, HSG A
	22,520	74	>75% Grass cover, Good, HSG C
	69,434	30	Woods, Good, HSG A
	24,449	70	Woods, Good, HSG C
	60,851	77	Woods, Good, HSG D
	218,382	55	Weighted Average
	217,497		99.59% Pervious Area
	885		0.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment PDA1A:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.212 af, Depth= 3.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
*	6,400	98	Pavement, HSG C
	26,556	74	>75% Grass cover, Good, HSG C
	2,400	70	Woods, Good, HSG C
	35,356	78	Weighted Average
	28,956		81.90% Pervious Area
	6,400		18.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min. Tc per TR-55**

Summary for Subcatchment PDA2: Flow to W. St Culvert

Runoff = 1.20 cfs @ 12.12 hrs, Volume= 0.123 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
*	7,500	98	ex roof and drive
	25,790	39	>75% Grass cover, Good, HSG A
	11,331	74	>75% Grass cover, Good, HSG C
	21,304	30	Woods, Good, HSG A
	4,730	70	Woods, Good, HSG C
	70,655	50	Weighted Average
	63,155		89.39% Pervious Area
	7,500		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0360	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
2.1	485	0.0560	3.81		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
6.5	535	Total			

Summary for Subcatchment PDA3: Uncontrolled

Runoff = 0.02 cfs @ 17.04 hrs, Volume= 0.017 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
*	192	98	ex roof
	28,800	39	>75% Grass cover, Good, HSG A
	159,430	30	Woods, Good, HSG A
	188,422	31	Weighted Average
	188,230		99.90% Pervious Area
	192		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.4	160	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.7	210	Total			

Summary for Subcatchment PDA3A: All RD

Runoff = 0.08 cfs @ 12.15 hrs, Volume= 0.014 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	11,900	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	13,000	44	Weighted Average
	11,900		91.54% Pervious Area
	1,100		8.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA3B: All RD

Runoff = 0.10 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	5,500	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	6,600	49	Weighted Average
	5,500		83.33% Pervious Area
	1,100		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA4: Remaining Flow to Swamp

Runoff = 7.69 cfs @ 12.16 hrs, Volume= 0.730 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (sf)	CN	Description
52,426	39	>75% Grass cover, Good, HSG A
1,238	80	>75% Grass cover, Good, HSG D
105,623	30	Woods, Good, HSG A
148,756	79	Woods, Fair, HSG D
308,043	55	Weighted Average
308,043		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		**Sheet Flow,** Range n= 0.130 P2= 3.20"
4.3	420	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	470	Total			

Summary for Subcatchment PDA5:

Runoff = 2.72 cfs @ 12.13 hrs, Volume= 0.217 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	4,700	70	Woods, Good, HSG C
	36,175	74	>75% Grass cover, Good, HSG C
*	140	98	Ex. Roofs, HSG A
	41,015	74	Weighted Average
	40,875		99.66% Pervious Area
	140		0.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	110	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
8.7	160	Total			

Summary for Subcatchment PDA6:

Runoff = 6.40 cfs @ 12.13 hrs, Volume= 0.526 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (sf)	CN	Description
49,158	74	>75% Grass cover, Good, HSG C
32,000	98	Paved parking, HSG C
47,262	39	>75% Grass cover, Good, HSG A
7,348	30	Woods, Good, HSG A
1,947	70	Woods, Good, HSG C
137,715	65	Weighted Average
105,715		76.76% Pervious Area
32,000		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.9	127	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
1.2	475	0.0220	6.73	5.28	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.5	752	Total			

Summary for Subcatchment PDA7:

Runoff = 5.10 cfs @ 12.17 hrs, Volume= 0.444 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (sf)	CN	Description
33,130	98	Paved parking, HSG C
28,405	39	>75% Grass cover, Good, HSG A
28,139	74	>75% Grass cover, Good, HSG C
89,674	72	Weighted Average
56,544		63.06% Pervious Area
33,130		36.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.0	191	0.0400	3.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.5	480	0.0100	5.36	4.21	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
11.8	721	Total			

Summary for Subcatchment PDA8:

Runoff = 3.55 cfs @ 12.27 hrs, Volume= 0.395 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (sf)	CN	Description
45,227	98	Paved parking, HSG A
69,758	39	>75% Grass cover, Good, HSG A
20,305	43	Woods/grass comb., Fair, HSG A
135,290	59	Weighted Average
90,063		66.57% Pervious Area
45,227		33.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	239	0.0190	2.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	80	0.0070	1.70		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	47	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
17.9	416	Total			

Summary for Subcatchment PDA9:

Runoff = 0.10 cfs @ 12.52 hrs, Volume= 0.036 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	2,689	96	Gravel surface, HSG A
*	1,035	98	ex roof
	66,090	35	Brush, Fair, HSG A
	69,814	38	Weighted Average
	68,779		98.52% Pervious Area
	1,035		1.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	430	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
12.0	480	Total			

Summary for Reach 1R: Drainage in Winthrop

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 1.14" for 25-year event
Inflow = 5.62 cfs @ 12.43 hrs, Volume= 0.548 af
Outflow = 5.62 cfs @ 12.43 hrs, Volume= 0.548 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

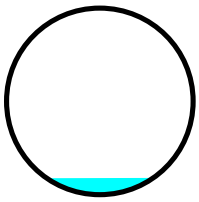
Summary for Reach 5R: Reach

Inflow Area = 1.603 ac, 1.48% Impervious, Inflow Depth = 0.27" for 25-year event
Inflow = 0.10 cfs @ 12.52 hrs, Volume= 0.036 af
Outflow = 0.10 cfs @ 12.54 hrs, Volume= 0.036 af, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.95 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.06 fps, Avg. Travel Time= 0.9 min

Peak Storage= 4 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 115.0' Slope= 0.0217 '/'
Inlet Invert= 279.50', Outlet Invert= 277.00'



Summary for Reach DP1: Design Point #1 @ Winthrop St.

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 1.06" for 25-year event
Inflow = 5.90 cfs @ 12.48 hrs, Volume= 0.649 af
Outflow = 5.90 cfs @ 12.48 hrs, Volume= 0.649 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream to Hill Street

Inflow Area = 18.852 ac, 9.78% Impervious, Inflow Depth = 0.35" for 25-year event
Inflow = 4.84 cfs @ 12.22 hrs, Volume= 0.553 af
Outflow = 4.84 cfs @ 12.22 hrs, Volume= 0.553 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated Wets

Inflow Area = 4.776 ac, 1.15% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.02 cfs @ 17.04 hrs, Volume= 0.017 af
Outflow = 0.02 cfs @ 17.04 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 1.46" for 25-year event
Inflow = 5.96 cfs @ 12.36 hrs, Volume= 0.701 af
Outflow = 5.75 cfs @ 12.43 hrs, Volume= 0.686 af, Atten= 3%, Lag= 4.2 min
Discarded = 0.13 cfs @ 12.43 hrs, Volume= 0.138 af
Primary = 5.62 cfs @ 12.43 hrs, Volume= 0.548 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.36' @ 12.43 hrs Surf.Area= 5,659 sf Storage= 3,943 cf

Plug-Flow detention time= 65.7 min calculated for 0.685 af (98% of inflow)
Center-of-Mass det. time= 54.6 min (886.4 - 831.8)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.13 cfs @ 12.43 hrs HW=260.36' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=5.59 cfs @ 12.43 hrs HW=260.36' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 5.59 cfs @ 1.56 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 1.09" for 25-year event
Inflow = 6.28 cfs @ 12.41 hrs, Volume= 0.671 af
Outflow = 6.08 cfs @ 12.48 hrs, Volume= 0.671 af, Atten= 3%, Lag= 4.5 min
Discarded = 0.18 cfs @ 12.48 hrs, Volume= 0.021 af
Primary = 5.90 cfs @ 12.48 hrs, Volume= 0.649 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 256.09' @ 12.48 hrs Surf.Area= 3,148 sf Storage= 2,270 cf

Plug-Flow detention time= 4.2 min calculated for 0.670 af (100% of inflow)
Center-of-Mass det. time= 4.2 min (834.6 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.18 cfs @ 12.48 hrs HW=256.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=5.83 cfs @ 12.48 hrs HW=256.09' (Free Discharge)
├**2=Culvert** (Inlet Controls 3.93 cfs @ 5.00 fps)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 1.90 cfs @ 0.73 fps)

Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 11.780 ac, 9.02% Impervious, Inflow Depth = 0.78" for 25-year event
Inflow = 7.69 cfs @ 12.16 hrs, Volume= 0.766 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.73' @ 25.30 hrs Surf.Area= 67,017 sf Storage= 33,381 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	53,729 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	86,000	1,890.0	53,729	53,729	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.75'	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B1: Infil. Basin #1

Inflow Area = 4.103 ac, 17.98% Impervious, Inflow Depth = 1.81" for 25-year event
Inflow = 8.31 cfs @ 12.14 hrs, Volume= 0.621 af
Outflow = 4.38 cfs @ 12.41 hrs, Volume= 0.621 af, Atten= 47%, Lag= 16.2 min
Discarded = 0.30 cfs @ 12.41 hrs, Volume= 0.234 af
Primary = 4.08 cfs @ 12.41 hrs, Volume= 0.387 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 268.01' @ 12.41 hrs Surf.Area= 5,392 sf Storage= 7,546 cf

Plug-Flow detention time= 60.4 min calculated for 0.620 af (100% of inflow)
Center-of-Mass det. time= 60.4 min (902.0 - 841.6)

Volume	Invert	Avail.Storage	Storage Description
#1	266.20'	16,732 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
266.20	3,039	303.7	0	0	3,039
268.00	5,379	341.2	7,477	7,477	5,049
269.50	6,997	372.2	9,255	16,732	6,889

Device	Routing	Invert	Outlet Devices
#1	Discarded	266.20'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	267.50'	**2.5' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.3' Crest Height
#4	Primary	268.50'	**12.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.3' Crest Height

Discarded OutFlow Max=0.30 cfs @ 12.41 hrs HW=268.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=4.06 cfs @ 12.41 hrs HW=268.01' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 1.06 cfs @ 5.41 fps)
├**3=Sharp-Crested Rectangular Weir**(Weir Controls 3.00 cfs @ 2.45 fps)
└**4=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B2: Infil. Basin #2

Inflow Area = 2.059 ac, 36.94% Impervious, Inflow Depth = 2.59" for 25-year event
Inflow = 5.10 cfs @ 12.17 hrs, Volume= 0.444 af
Outflow = 1.05 cfs @ 12.72 hrs, Volume= 0.444 af, Atten= 79%, Lag= 32.9 min
Discarded = 0.76 cfs @ 12.72 hrs, Volume= 0.409 af
Primary = 0.30 cfs @ 12.72 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 276.66' @ 12.72 hrs Surf.Area= 3,950 sf Storage= 6,875 cf

Plug-Flow detention time= 79.9 min calculated for 0.444 af (100% of inflow)
Center-of-Mass det. time= 79.8 min (922.9 - 843.1)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	15,793 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	1,260	214.7	0	0	1,260
276.00	3,362	301.0	4,453	4,453	4,839
278.00	5,281	338.7	8,571	13,025	6,862
278.50	5,797	348.1	2,768	15,793	7,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	277.50'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.76 cfs @ 12.72 hrs HW=276.66' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.76 cfs)

Primary OutFlow Max=0.30 cfs @ 12.72 hrs HW=276.66' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 3.39 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B3: Infil. Basin #3

Inflow Area = 3.106 ac, 33.43% Impervious, Inflow Depth = 1.53" for 25-year event
Inflow = 3.55 cfs @ 12.27 hrs, Volume= 0.395 af
Outflow = 0.44 cfs @ 14.28 hrs, Volume= 0.395 af, Atten= 87%, Lag= 120.2 min
Discarded = 0.44 cfs @ 14.28 hrs, Volume= 0.395 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 278.44' @ 14.28 hrs Surf.Area= 7,946 sf Storage= 6,818 cf

Plug-Flow detention time= 164.7 min calculated for 0.395 af (100% of inflow)
Center-of-Mass det. time= 164.6 min (1,047.1 - 882.5)

Volume	Invert	Avail.Storage	Storage Description
#1	277.50'	22,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
277.50	6,760	328.3	0	0	6,760
278.00	7,259	337.8	3,504	3,504	7,290
280.10	10,853	451.7	18,892	22,396	14,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	277.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	279.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.44 cfs @ 14.28 hrs HW=278.44' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.44 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=277.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG1: Bio-Retention area #1

Inflow Area = 0.942 ac, 0.34% Impervious, Inflow Depth = 2.77" for 25-year event
Inflow = 2.72 cfs @ 12.13 hrs, Volume= 0.217 af
Outflow = 2.23 cfs @ 12.21 hrs, Volume= 0.217 af, Atten= 18%, Lag= 4.8 min
Discarded = 0.15 cfs @ 12.21 hrs, Volume= 0.122 af
Primary = 2.08 cfs @ 12.21 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.59' @ 12.21 hrs Surf.Area= 2,629 sf Storage= 1,354 cf

Plug-Flow detention time= 39.4 min calculated for 0.217 af (100% of inflow)
Center-of-Mass det. time= 39.4 min (874.7 - 835.3)

Volume	Invert	Avail.Storage	Storage Description
#1	270.00'	2,541 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.00	1,998	169.0	0	0	1,998
271.00	3,125	206.0	2,541	2,541	3,118

Device	Routing	Invert	Outlet Devices
#1	Device 2	270.40'	**2.0" x 2.0" Horiz. Orifice/Grate X 36.00** C= 0.600
			Limited to weir flow at low heads
#2	Primary	268.67'	**12.0" Round Culvert**
			L= 70.3' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 268.67' / 267.97' S= 0.0100 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Discarded	270.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.15 cfs @ 12.21 hrs HW=270.59' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=2.07 cfs @ 12.21 hrs HW=270.59' (Free Discharge)
└**2=Culvert** (Passes 2.07 cfs of 4.50 cfs potential flow)
└**1=Orifice/Grate** (Orifice Controls 2.07 cfs @ 2.07 fps)

Summary for Pond RG2: Bio-retention area #2

Inflow Area = 0.298 ac, 8.46% Impervious, Inflow Depth = 0.56" for 25-year event
Inflow = 0.08 cfs @ 12.15 hrs, Volume= 0.014 af
Outflow = 0.02 cfs @ 13.76 hrs, Volume= 0.014 af, Atten= 73%, Lag= 96.6 min
Discarded = 0.02 cfs @ 13.76 hrs, Volume= 0.014 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 275.38' @ 13.76 hrs Surf.Area= 396 sf Storage= 120 cf

Plug-Flow detention time= 55.4 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 55.3 min (991.8 - 936.5)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,124 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	247	169.5	0	0	247
276.70	1,194	201.6	1,124	1,124	1,246

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.02 cfs @ 13.76 hrs HW=275.38' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG3: Bio-Retention area #3

Inflow Area = 0.152 ac, 16.67% Impervious, Inflow Depth = 0.85" for 25-year event
Inflow = 0.10 cfs @ 12.12 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 12.91 hrs, Volume= 0.011 af, Atten= 78%, Lag= 47.1 min
Discarded = 0.02 cfs @ 12.91 hrs, Volume= 0.011 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 275.32' @ 12.91 hrs Surf.Area= 396 sf Storage= 104 cf

Plug-Flow detention time= 41.4 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 41.3 min (949.4 - 908.1)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	266	181.9	0	0	266
276.70	1,275	214.0	1,203	1,203	1,332

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.02 cfs @ 12.91 hrs HW=275.32' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond WQS1: Water Quality Swale 1

Inflow Area = 0.812 ac, 18.10% Impervious, Inflow Depth = 3.14" for 25-year event
Inflow = 2.93 cfs @ 12.09 hrs, Volume= 0.212 af
Outflow = 2.56 cfs @ 12.14 hrs, Volume= 0.212 af, Atten= 13%, Lag= 2.8 min
Primary = 2.56 cfs @ 12.14 hrs, Volume= 0.212 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 263.32' @ 12.14 hrs Surf.Area= 775 sf Storage= 833 cf

Plug-Flow detention time= 17.3 min calculated for 0.212 af (100% of inflow)
Center-of-Mass det. time= 17.6 min (840.4 - 822.9)

Volume	Invert	Avail.Storage	Storage Description
#1	261.90'	1,420 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.90	1	4.0	0	0	1
262.00	472	164.9	16	16	2,164
264.00	960	180.3	1,403	1,420	2,710

Device	Routing	Invert	Outlet Devices
#1	Primary	261.90'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir**
			Cv= 2.56 (C= 3.20)
#2	Primary	263.40'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

0.5’ Crest Height

Primary OutFlow Max=2.52 cfs @ 12.14 hrs HW=263.31’ (Free Discharge)
1=Sharp-Crested Vee/Trap Weir(Weir Controls 2.52 cfs @ 3.04 fps)
2=Sharp-Crested Rectangular Weir(Controls 0.00 cfs)

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPDA1: Runoff Area=36,360 sf 1.71% Impervious Runoff Depth=2.21"
Flow Length=300' Tc=7.8 min CN=58 Runoff=1.90 cfs 0.154 af

SubcatchmentPDA10: Remaining NW Runoff Area=218,382 sf 0.41% Impervious Runoff Depth=1.94"
Flow Length=450' Tc=13.3 min CN=55 Runoff=8.20 cfs 0.809 af

SubcatchmentPDA1A: Runoff Area=35,356 sf 18.10% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=78 Runoff=3.90 cfs 0.284 af

SubcatchmentPDA2: Flow to W. St Culvert Runoff Area=70,655 sf 10.61% Impervious Runoff Depth=1.50"
Flow Length=535' Tc=6.5 min CN=50 Runoff=2.36 cfs 0.203 af

SubcatchmentPDA3: Uncontrolled Runoff Area=188,422 sf 0.10% Impervious Runoff Depth=0.21"
Flow Length=210' Tc=18.7 min CN=31 Runoff=0.12 cfs 0.074 af

SubcatchmentPDA3A: All RD Runoff Area=13,000 sf 8.46% Impervious Runoff Depth=1.02"
Tc=6.0 min CN=44 Runoff=0.24 cfs 0.025 af

SubcatchmentPDA3B: All RD Runoff Area=6,600 sf 16.67% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=49 Runoff=0.21 cfs 0.018 af

SubcatchmentPDA4: Remaining Flow to Runoff Area=308,043 sf 0.00% Impervious Runoff Depth=1.94"
Flow Length=470' Tc=9.3 min CN=55 Runoff=13.01 cfs 1.141 af

SubcatchmentPDA5: Runoff Area=41,015 sf 0.34% Impervious Runoff Depth=3.78"
Flow Length=160' Tc=8.7 min CN=74 Runoff=3.75 cfs 0.297 af

SubcatchmentPDA6: Runoff Area=137,715 sf 23.24% Impervious Runoff Depth=2.87"
Flow Length=752' Tc=8.5 min CN=65 Runoff=9.41 cfs 0.757 af

SubcatchmentPDA7: Runoff Area=89,674 sf 36.94% Impervious Runoff Depth=3.57"
Flow Length=721' Tc=11.8 min CN=72 Runoff=7.08 cfs 0.613 af

SubcatchmentPDA8: Runoff Area=135,290 sf 33.43% Impervious Runoff Depth=2.30"
Flow Length=416' Tc=17.9 min CN=59 Runoff=5.61 cfs 0.595 af

SubcatchmentPDA9: Runoff Area=69,814 sf 1.48% Impervious Runoff Depth=0.60"
Flow Length=480' Tc=12.0 min CN=38 Runoff=0.41 cfs 0.080 af

Reach 1R: Drainage in Winthrop Inflow=10.18 cfs 0.918 af
Outflow=10.18 cfs 0.918 af

Reach 5R: Reach Avg. Flow Depth=0.17' Max Vel=4.47 fps Inflow=0.41 cfs 0.080 af
12.0" Round Pipe n=0.011 L=115.0' S=0.0217 '/' Capacity=6.21 cfs Outflow=0.41 cfs 0.080 af

Reach DP1: Design Point #1 @ Winthrop St. Inflow=11.30 cfs 1.092 af
Outflow=11.30 cfs 1.092 af

Reach DP2: Stream to Hill Street Inflow=8.41 cfs 1.331 af
Outflow=8.41 cfs 1.331 af

Reach DP5: Isolated Wets Inflow=0.12 cfs 0.074 af
Outflow=0.12 cfs 0.074 af

Pond 1P: Storage @ Wets Peak Elev=260.53' Storage=4,959 cf Inflow=10.73 cfs 1.083 af
Discarded=0.15 cfs 0.148 af Primary=10.18 cfs 0.918 af Outflow=10.34 cfs 1.066 af

Pond 2P: Depression @ Partrige/Winthrop Peak Elev=256.21' Storage=2,674 cf Inflow=11.53 cfs 1.122 af
Discarded=0.20 cfs 0.030 af Primary=11.30 cfs 1.092 af Outflow=11.49 cfs 1.122 af

Pond 3P: Storage w/in Swamp/PVP Peak Elev=274.78' Storage=36,876 cf Inflow=13.13 cfs 1.221 af
Outflow=0.85 cfs 0.428 af

Pond B1: Infil. Basin #1 Peak Elev=268.34' Storage=9,343 cf Inflow=11.86 cfs 0.912 af
Discarded=0.32 cfs 0.267 af Primary=7.48 cfs 0.645 af Outflow=7.80 cfs 0.912 af

Pond B2: Infil. Basin #2 Peak Elev=277.39' Storage=10,020 cf Inflow=7.08 cfs 0.613 af
Discarded=0.89 cfs 0.519 af Primary=0.47 cfs 0.094 af Outflow=1.36 cfs 0.613 af

Pond B3: Infil. Basin #3 Peak Elev=279.09' Storage=12,338 cf Inflow=5.61 cfs 0.595 af
Discarded=0.50 cfs 0.595 af Primary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.595 af

Pond RG1: Bio-Retention area #1 Peak Elev=270.72' Storage=1,712 cf Inflow=3.75 cfs 0.297 af
Discarded=0.16 cfs 0.141 af Primary=2.72 cfs 0.155 af Outflow=2.88 cfs 0.297 af

Pond RG2: Bio-retention area #2 Peak Elev=275.82' Storage=342 cf Inflow=0.24 cfs 0.025 af
Discarded=0.03 cfs 0.025 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.025 af

Pond RG3: Bio-Retention area #3 Peak Elev=275.61' Storage=240 cf Inflow=0.21 cfs 0.018 af
Discarded=0.03 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.018 af

Pond WQS1: Water Quality Swale 1 Peak Elev=263.47' Storage=949 cf Inflow=3.90 cfs 0.284 af
Outflow=3.78 cfs 0.285 af

Total Runoff Area = 30.999 ac Runoff Volume = 5.050 af Average Runoff Depth = 1.95"
90.42% Pervious = 28.030 ac 9.58% Impervious = 2.969 ac

Summary for Subcatchment PDA1:

Runoff = 1.90 cfs @ 12.12 hrs, Volume= 0.154 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
	10,712	70	Woods, Good, HSG C
	9,898	49	50-75% Grass cover, Fair, HSG A
	7,602	30	Woods, Good, HSG A
*	621	98	ex. roof
	7,527	79	50-75% Grass cover, Fair, HSG C
	36,360	58	Weighted Average
	35,739		98.29% Pervious Area
	621		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	250	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.8	300	Total			

Summary for Subcatchment PDA10: Remaining NW land to Hill st.

Runoff = 8.20 cfs @ 12.21 hrs, Volume= 0.809 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
	26,256	43	Woods/grass comb., Fair, HSG A
	3,882	76	Woods/grass comb., Fair, HSG C
*	885	98	ex roof
	10,105	39	>75% Grass cover, Good, HSG A
	22,520	74	>75% Grass cover, Good, HSG C
	69,434	30	Woods, Good, HSG A
	24,449	70	Woods, Good, HSG C
	60,851	77	Woods, Good, HSG D
	218,382	55	Weighted Average
	217,497		99.59% Pervious Area
	885		0.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.8	400	0.0220	2.39		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
13.3	450	Total			

Summary for Subcatchment PDA1A:

Runoff = 3.90 cfs @ 12.09 hrs, Volume= 0.284 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
*	6,400	98	Pavement, HSG C
	26,556	74	>75% Grass cover, Good, HSG C
	2,400	70	Woods, Good, HSG C
	35,356	78	Weighted Average
	28,956		81.90% Pervious Area
	6,400		18.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min. Tc per TR-55**

Summary for Subcatchment PDA2: Flow to W. St Culvert

Runoff = 2.36 cfs @ 12.11 hrs, Volume= 0.203 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
*	7,500	98	ex roof and drive
	25,790	39	>75% Grass cover, Good, HSG A
	11,331	74	>75% Grass cover, Good, HSG C
	21,304	30	Woods, Good, HSG A
	4,730	70	Woods, Good, HSG C
	70,655	50	Weighted Average
	63,155		89.39% Pervious Area
	7,500		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0360	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
2.1	485	0.0560	3.81		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
6.5	535	Total			

Summary for Subcatchment PDA3: Uncontrolled

Runoff = 0.12 cfs @ 13.96 hrs, Volume= 0.074 af, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
*	192	98	ex roof
	28,800	39	>75% Grass cover, Good, HSG A
	159,430	30	Woods, Good, HSG A
	188,422	31	Weighted Average
	188,230		99.90% Pervious Area
	192		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.4	160	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.7	210	Total			

Summary for Subcatchment PDA3A: All RD

Runoff = 0.24 cfs @ 12.12 hrs, Volume= 0.025 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
	11,900	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	13,000	44	Weighted Average
	11,900		91.54% Pervious Area
	1,100		8.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA3B: All RD

Runoff = 0.21 cfs @ 12.11 hrs, Volume= 0.018 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
	5,500	39	>75% Grass cover, Good, HSG A
*	1,100	98	Roof Area
	6,600	49	Weighted Average
	5,500		83.33% Pervious Area
	1,100		16.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment PDA4: Remaining Flow to Swamp

Runoff = 13.01 cfs @ 12.15 hrs, Volume= 1.141 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

Area (sf)	CN	Description
52,426	39	>75% Grass cover, Good, HSG A
1,238	80	>75% Grass cover, Good, HSG D
105,623	30	Woods, Good, HSG A
148,756	79	Woods, Fair, HSG D
308,043	55	Weighted Average
308,043		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		**Sheet Flow,** Range n= 0.130 P2= 3.20"
4.3	420	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.3	470	Total			

Summary for Subcatchment PDA5:

Runoff = 3.75 cfs @ 12.12 hrs, Volume= 0.297 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
	4,700	70	Woods, Good, HSG C
	36,175	74	>75% Grass cover, Good, HSG C
*	140	98	Ex. Roofs, HSG A
	41,015	74	Weighted Average
	40,875		99.66% Pervious Area
	140		0.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	110	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
8.7	160	Total			

Summary for Subcatchment PDA6:

Runoff = 9.41 cfs @ 12.13 hrs, Volume= 0.757 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

Area (sf)	CN	Description
49,158	74	>75% Grass cover, Good, HSG C
32,000	98	Paved parking, HSG C
47,262	39	>75% Grass cover, Good, HSG A
7,348	30	Woods, Good, HSG A
1,947	70	Woods, Good, HSG C
137,715	65	Weighted Average
105,715		76.76% Pervious Area
32,000		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.9	127	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
1.2	475	0.0220	6.73	5.28	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.5	752	Total			

Summary for Subcatchment PDA7:

Runoff = 7.08 cfs @ 12.17 hrs, Volume= 0.613 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

Area (sf)	CN	Description
33,130	98	Paved parking, HSG C
28,405	39	>75% Grass cover, Good, HSG A
28,139	74	>75% Grass cover, Good, HSG C
89,674	72	Weighted Average
56,544		63.06% Pervious Area
33,130		36.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.0	191	0.0400	3.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.5	480	0.0100	5.36	4.21	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
11.8	721	Total			

Summary for Subcatchment PDA8:

Runoff = 5.61 cfs @ 12.27 hrs, Volume= 0.595 af, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

Area (sf)	CN	Description
45,227	98	Paved parking, HSG A
69,758	39	>75% Grass cover, Good, HSG A
20,305	43	Woods/grass comb., Fair, HSG A
135,290	59	Weighted Average
90,063		66.57% Pervious Area
45,227		33.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	239	0.0190	2.22		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.8	80	0.0070	1.70		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	47	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
17.9	416	Total			

Summary for Subcatchment PDA9:

Runoff = 0.41 cfs @ 12.40 hrs, Volume= 0.080 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN	Description
	2,689	96	Gravel surface, HSG A
*	1,035	98	ex roof
	66,090	35	Brush, Fair, HSG A
	69,814	38	Weighted Average
	68,779		98.52% Pervious Area
	1,035		1.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	430	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
12.0	480	Total			

Summary for Reach 1R: Drainage in Winthrop

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 1.92" for 100-year event
Inflow = 10.18 cfs @ 12.33 hrs, Volume= 0.918 af
Outflow = 10.18 cfs @ 12.33 hrs, Volume= 0.918 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

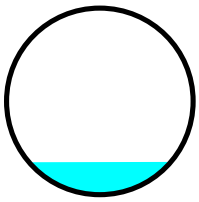
Summary for Reach 5R: Reach

Inflow Area = 1.603 ac, 1.48% Impervious, Inflow Depth = 0.60" for 100-year event
Inflow = 0.41 cfs @ 12.40 hrs, Volume= 0.080 af
Outflow = 0.41 cfs @ 12.41 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.47 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.54 fps, Avg. Travel Time= 0.8 min

Peak Storage= 11 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 115.0' Slope= 0.0217 '/'
Inlet Invert= 279.50', Outlet Invert= 277.00'



Summary for Reach DP1: Design Point #1 @ Winthrop St.

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 1.78" for 100-year event
Inflow = 11.30 cfs @ 12.34 hrs, Volume= 1.092 af
Outflow = 11.30 cfs @ 12.34 hrs, Volume= 1.092 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP2: Stream to Hill Street

Inflow Area = 18.852 ac, 9.78% Impervious, Inflow Depth > 0.85" for 100-year event
Inflow = 8.41 cfs @ 12.21 hrs, Volume= 1.331 af
Outflow = 8.41 cfs @ 12.21 hrs, Volume= 1.331 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach DP5: Isolated Wets

Inflow Area = 4.776 ac, 1.15% Impervious, Inflow Depth = 0.19" for 100-year event
Inflow = 0.12 cfs @ 13.96 hrs, Volume= 0.074 af
Outflow = 0.12 cfs @ 13.96 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Storage @ Wets

Inflow Area = 5.749 ac, 15.64% Impervious, Inflow Depth = 2.26" for 100-year event
Inflow = 10.73 cfs @ 12.26 hrs, Volume= 1.083 af
Outflow = 10.34 cfs @ 12.33 hrs, Volume= 1.066 af, Atten= 4%, Lag= 4.4 min
Discarded = 0.15 cfs @ 12.33 hrs, Volume= 0.148 af
Primary = 10.18 cfs @ 12.33 hrs, Volume= 0.918 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 260.53' @ 12.33 hrs Surf.Area= 6,542 sf Storage= 4,959 cf

Plug-Flow detention time= 45.7 min calculated for 1.064 af (98% of inflow)
Center-of-Mass det. time= 37.1 min (863.0 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	259.00'	8,718 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
259.00	850	120.0	0	0	850
261.00	9,400	360.0	8,718	8,718	10,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	260.00'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.15 cfs @ 12.33 hrs HW=260.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=10.14 cfs @ 12.33 hrs HW=260.52' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 10.14 cfs @ 1.93 fps)

Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.371 ac, 14.53% Impervious, Inflow Depth = 1.83" for 100-year event
Inflow = 11.53 cfs @ 12.32 hrs, Volume= 1.122 af
Outflow = 11.49 cfs @ 12.34 hrs, Volume= 1.122 af, Atten= 0%, Lag= 1.4 min
Discarded = 0.20 cfs @ 12.34 hrs, Volume= 0.030 af
Primary = 11.30 cfs @ 12.34 hrs, Volume= 1.092 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 256.21' @ 12.34 hrs Surf.Area= 3,497 sf Storage= 2,674 cf

Plug-Flow detention time= 3.9 min calculated for 1.120 af (100% of inflow)
Center-of-Mass det. time= 3.9 min (831.3 - 827.4)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	6,459 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
254.00	0	0.0	0	0	0
255.50	1,720	170.0	860	860	2,303
257.00	6,210	300.0	5,599	6,459	7,178

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	254.20'	**12.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Primary	256.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.19 cfs @ 12.34 hrs HW=256.21' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=11.25 cfs @ 12.34 hrs HW=256.21' (Free Discharge)
├**2=Culvert** (Inlet Controls 4.10 cfs @ 5.22 fps)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 7.15 cfs @ 1.14 fps)

Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 11.780 ac, 9.02% Impervious, Inflow Depth = 1.24" for 100-year event
Inflow = 13.13 cfs @ 12.15 hrs, Volume= 1.221 af
Outflow = 0.85 cfs @ 15.93 hrs, Volume= 0.428 af, Atten= 93%, Lag= 226.6 min
Primary = 0.85 cfs @ 15.93 hrs, Volume= 0.428 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.78' @ 15.93 hrs Surf.Area= 70,454 sf Storage= 36,876 cf

Plug-Flow detention time= 419.4 min calculated for 0.428 af (35% of inflow)
Center-of-Mass det. time= 271.2 min (1,148.6 - 877.4)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	53,729 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	27,000	1,100.0	0	0	27,000
275.00	86,000	1,890.0	53,729	53,729	214,976

Device	Routing	Invert	Outlet Devices
#1	Primary	274.75'	**50.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.85 cfs @ 15.93 hrs HW=274.78' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Weir Controls 0.85 cfs @ 0.50 fps)

Summary for Pond B1: Infil. Basin #1

Inflow Area = 4.103 ac, 17.98% Impervious, Inflow Depth = 2.67" for 100-year event
Inflow = 11.86 cfs @ 12.14 hrs, Volume= 0.912 af
Outflow = 7.80 cfs @ 12.32 hrs, Volume= 0.912 af, Atten= 34%, Lag= 10.9 min
Discarded = 0.32 cfs @ 12.32 hrs, Volume= 0.267 af
Primary = 7.48 cfs @ 12.32 hrs, Volume= 0.645 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 268.34' @ 12.32 hrs Surf.Area= 5,723 sf Storage= 9,343 cf

Plug-Flow detention time= 53.2 min calculated for 0.912 af (100% of inflow)
Center-of-Mass det. time= 53.1 min (884.5 - 831.5)

Volume	Invert	Avail.Storage	Storage Description
#1	266.20'	16,732 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
266.20	3,039	303.7	0	0	3,039
268.00	5,379	341.2	7,477	7,477	5,049
269.50	6,997	372.2	9,255	16,732	6,889

Device	Routing	Invert	Outlet Devices
#1	Discarded	266.20'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	267.50'	**2.5' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.3' Crest Height
#4	Primary	268.50'	**12.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.3' Crest Height

Discarded OutFlow Max=0.32 cfs @ 12.32 hrs HW=268.33' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=7.44 cfs @ 12.32 hrs HW=268.33' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 1.19 cfs @ 6.06 fps)
├**3=Sharp-Crested Rectangular Weir**(Weir Controls 6.25 cfs @ 3.22 fps)
└**4=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B2: Infil. Basin #2

Inflow Area = 2.059 ac, 36.94% Impervious, Inflow Depth = 3.57" for 100-year event
Inflow = 7.08 cfs @ 12.17 hrs, Volume= 0.613 af
Outflow = 1.36 cfs @ 12.73 hrs, Volume= 0.613 af, Atten= 81%, Lag= 33.9 min
Discarded = 0.89 cfs @ 12.73 hrs, Volume= 0.519 af
Primary = 0.47 cfs @ 12.73 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 277.39' @ 12.73 hrs Surf.Area= 4,655 sf Storage= 10,020 cf

Plug-Flow detention time= 89.6 min calculated for 0.612 af (100% of inflow)
Center-of-Mass det. time= 89.4 min (923.2 - 833.8)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	15,793 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	1,260	214.7	0	0	1,260
276.00	3,362	301.0	4,453	4,453	4,839
278.00	5,281	338.7	8,571	13,025	6,862
278.50	5,797	348.1	2,768	15,793	7,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	277.50'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.89 cfs @ 12.73 hrs HW=277.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.89 cfs)

Primary OutFlow Max=0.47 cfs @ 12.73 hrs HW=277.39' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.33 fps)
└**3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond B3: Infil. Basin #3

Inflow Area = 3.106 ac, 33.43% Impervious, Inflow Depth = 2.30" for 100-year event
Inflow = 5.61 cfs @ 12.27 hrs, Volume= 0.595 af
Outflow = 0.50 cfs @ 15.16 hrs, Volume= 0.595 af, Atten= 91%, Lag= 173.8 min
Discarded = 0.50 cfs @ 15.16 hrs, Volume= 0.595 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 279.09' @ 15.16 hrs Surf.Area= 9,029 sf Storage= 12,338 cf

Plug-Flow detention time= 279.3 min calculated for 0.595 af (100% of inflow)
Center-of-Mass det. time= 279.2 min (1,148.8 - 869.6)

Volume	Invert	Avail.Storage	Storage Description
#1	277.50'	22,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
277.50	6,760	328.3	0	0	6,760
278.00	7,259	337.8	3,504	3,504	7,290
280.10	10,853	451.7	18,892	22,396	14,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	277.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	279.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.50 cfs @ 15.16 hrs HW=279.09' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.50 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=277.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG1: Bio-Retention area #1

Inflow Area = 0.942 ac, 0.34% Impervious, Inflow Depth = 3.78" for 100-year event
Inflow = 3.75 cfs @ 12.12 hrs, Volume= 0.297 af
Outflow = 2.88 cfs @ 12.22 hrs, Volume= 0.297 af, Atten= 23%, Lag= 5.5 min
Discarded = 0.16 cfs @ 12.22 hrs, Volume= 0.141 af
Primary = 2.72 cfs @ 12.22 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.72' @ 12.22 hrs Surf.Area= 2,783 sf Storage= 1,712 cf

Plug-Flow detention time= 35.7 min calculated for 0.297 af (100% of inflow)
Center-of-Mass det. time= 35.6 min (862.0 - 826.4)

Volume	Invert	Avail.Storage	Storage Description
#1	270.00'	2,541 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.00	1,998	169.0	0	0	1,998
271.00	3,125	206.0	2,541	2,541	3,118

Device	Routing	Invert	Outlet Devices
#1	Device 2	270.40'	**2.0" x 2.0" Horiz. Orifice/Grate X 36.00** C= 0.600
			Limited to weir flow at low heads
#2	Primary	268.67'	**12.0" Round Culvert**
			L= 70.3' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 268.67' / 267.97' S= 0.0100 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Discarded	270.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.15 cfs @ 12.22 hrs HW=270.71' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=2.70 cfs @ 12.22 hrs HW=270.71' (Free Discharge)
└**2=Culvert** (Passes 2.70 cfs of 4.70 cfs potential flow)
└**1=Orifice/Grate** (Orifice Controls 2.70 cfs @ 2.70 fps)

Summary for Pond RG2: Bio-retention area #2

Inflow Area = 0.298 ac, 8.46% Impervious, Inflow Depth = 1.02" for 100-year event
Inflow = 0.24 cfs @ 12.12 hrs, Volume= 0.025 af
Outflow = 0.03 cfs @ 14.01 hrs, Volume= 0.025 af, Atten= 86%, Lag= 113.1 min
Discarded = 0.03 cfs @ 14.01 hrs, Volume= 0.025 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 275.82' @ 14.01 hrs Surf.Area= 615 sf Storage= 342 cf

Plug-Flow detention time= 121.7 min calculated for 0.025 af (100% of inflow)
Center-of-Mass det. time= 121.5 min (1,030.0 - 908.5)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,124 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	247	169.5	0	0	247
276.70	1,194	201.6	1,124	1,124	1,246

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.03 cfs @ 14.01 hrs HW=275.82' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond RG3: Bio-Retention area #3

Inflow Area = 0.152 ac, 16.67% Impervious, Inflow Depth = 1.42" for 100-year event
Inflow = 0.21 cfs @ 12.11 hrs, Volume= 0.018 af
Outflow = 0.03 cfs @ 13.08 hrs, Volume= 0.018 af, Atten= 85%, Lag= 58.4 min
Discarded = 0.03 cfs @ 13.08 hrs, Volume= 0.018 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 275.61' @ 13.08 hrs Surf.Area= 540 sf Storage= 240 cf

Plug-Flow detention time= 84.8 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 84.7 min (972.5 - 887.9)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	1,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	266	181.9	0	0	266
276.70	1,275	214.0	1,203	1,203	1,332

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	276.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.03 cfs @ 13.08 hrs HW=275.61' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS1: Water Quality Swale 1

Inflow Area = 0.812 ac, 18.10% Impervious, Inflow Depth = 4.20" for 100-year event
Inflow = 3.90 cfs @ 12.09 hrs, Volume= 0.284 af
Outflow = 3.78 cfs @ 12.11 hrs, Volume= 0.285 af, Atten= 3%, Lag= 1.3 min
Primary = 3.78 cfs @ 12.11 hrs, Volume= 0.285 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 263.47' @ 12.12 hrs Surf.Area= 814 sf Storage= 949 cf

Plug-Flow detention time= 14.3 min calculated for 0.284 af (100% of inflow)
Center-of-Mass det. time= 15.3 min (829.9 - 814.6)

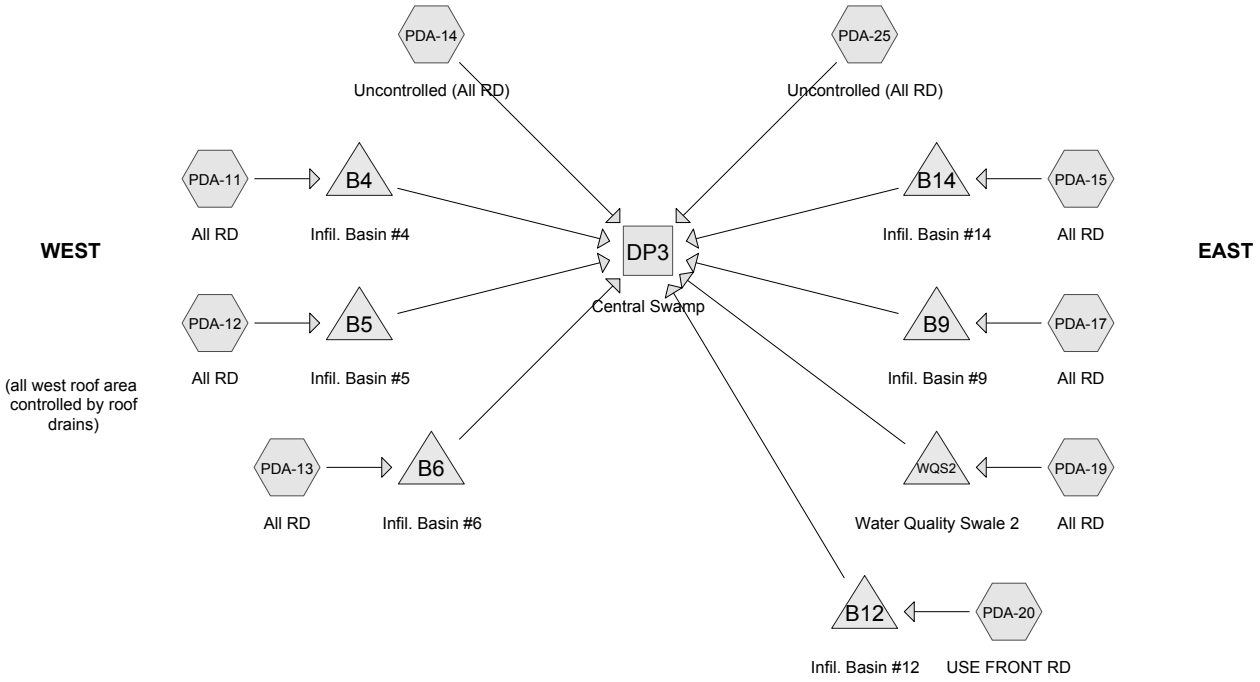
Volume	Invert	Avail.Storage	Storage Description
#1	261.90'	1,420 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.90	1	4.0	0	0	1
262.00	472	164.9	16	16	2,164
264.00	960	180.3	1,403	1,420	2,710

Device	Routing	Invert	Outlet Devices
#1	Primary	261.90'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir**
			Cv= 2.56 (C= 3.20)
#2	Primary	263.40'	**12.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

0.5’ Crest Height

Primary OutFlow Max=3.62 cfs @ 12.11 hrs HW=263.45’ (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir**(Orifice Controls 3.14 cfs @ 3.37 fps)
└─**2=Sharp-Crested Rectangular Weir**(Weir Controls 0.49 cfs @ 0.76 fps)



Subcat Reach Pond Link

Routing Diagram for Appendix D2 - POST-CENTRAL - 10.5.18
Prepared by Outback Engineering Inc., Printed 4/16/2019

Summary for Subcatchment PDA-11: All RD

Runoff = 0.09 cfs @ 12.57 hrs, Volume= 0.034 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
29,960	98	Paved parking, HSG A
52,743	39	>75% Grass cover, Good, HSG A
37,306	30	Woods, Good, HSG A
120,009	51	Weighted Average
90,049		75.04% Pervious Area
29,960		24.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	198	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
14.3	248	Total			

Summary for Subcatchment PDA-12: All RD

Runoff = 0.57 cfs @ 12.16 hrs, Volume= 0.061 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
23,725	98	Paved parking, HSG A
33,222	39	>75% Grass cover, Good, HSG A
116	30	Woods, Good, HSG A
57,063	64	Weighted Average
33,338		58.42% Pervious Area
23,725		41.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	128	0.0200	2.87		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
0.8	334	0.0250	7.17	5.63	**Pipe Channel, CD** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
8.9	512	Total			

Summary for Subcatchment PDA-13: All RD

Runoff = 0.63 cfs @ 12.24 hrs, Volume= 0.093 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
38,223	98	Paved parking, HSG A
55,327	39	>75% Grass cover, Good, HSG A
8,562	80	>75% Grass cover, Good, HSG D
16,475	30	Woods, Good, HSG A
118,587	60	Weighted Average
80,364		67.77% Pervious Area
38,223		32.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0080	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	99	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
2.0	262	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	49	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
11.0	460	Total			

Summary for Subcatchment PDA-14: Uncontrolled (All RD)

Runoff = 0.05 cfs @ 15.49 hrs, Volume= 0.030 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	2,604	98	ex roof
	3,144	98	Paved parking, HSG A
*	1,928	98	ex. drive
	92,623	39	>75% Grass cover, Good, HSG A
	5,470	74	>75% Grass cover, Good, HSG C
	175,955	30	Woods, Good, HSG A
	4,247	70	Woods, Good, HSG C
	74,983	77	Woods, Good, HSG D
	360,954	45	Weighted Average
	353,278		97.87% Pervious Area
	7,676		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment PDA-15: All RD

Runoff = 0.16 cfs @ 12.42 hrs, Volume= 0.029 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	11,534	98	Pavement
	30,119	39	>75% Grass cover, Good, HSG A
*	2,500	98	ex. Driveway
	44,153	58	Weighted Average
	30,119		68.22% Pervious Area
	14,034		31.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	50	0.0020	0.06		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.0	175	0.0080	1.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.1	225	Total			

Summary for Subcatchment PDA-17: All RD

Runoff = 0.97 cfs @ 12.10 hrs, Volume= 0.073 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	21,271	98	roads,sidewalks, drives
	13,589	39	>75% Grass cover, Good, HSG A
	34,860	75	Weighted Average
	13,589		38.98% Pervious Area
	21,271		61.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.2	24	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
0.2	50	0.0100	4.54	3.56	**Pipe Channel, cd** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
6.0	124	Total			

Summary for Subcatchment PDA-19: All RD

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	16,893	98	roads,sidewalks, drives
	12,029	39	>75% Grass cover, Good, HSG A
	5,192	80	>75% Grass cover, Good, HSG D
	34,114	74	Weighted Average
	17,221		50.48% Pervious Area
	16,893		49.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	32	0.0200	0.14		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
1.6	200	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
5.5	232	Total			

Summary for Subcatchment PDA-20: USE FRONT RD

Runoff = 2.09 cfs @ 12.10 hrs, Volume= 0.156 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	15,182	98	roads,sidewalks, drives
	22,890	74	>75% Grass cover, Good, HSG C
	6,475	98	Unconnected roofs, HSG A
	44,547	86	Weighted Average
	22,890		51.38% Pervious Area
	21,657		48.62% Impervious Area
	6,475		29.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.1	14	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.0	147	0.0150	2.49		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
0.4	100	0.0100	4.54	3.56	**Pipe Channel, de** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
7.1	311	Total			

Summary for Subcatchment PDA-25: Uncontrolled (All RD)

Runoff = 1.06 cfs @ 13.03 hrs, Volume= 0.350 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
	76,354	39	>75% Grass cover, Good, HSG A
	50,958	74	>75% Grass cover, Good, HSG C
	3,094	80	>75% Grass cover, Good, HSG D
	218,731	30	Woods, Good, HSG A
	75,889	70	Woods, Good, HSG C
	225,507	77	Woods, Good, HSG D
*	1,950	98	ex Roofs, HSG A
*	1,921	98	Pavement
	654,404	56	Weighted Average
	650,533		99.41% Pervious Area
	3,871		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
33.1	770	0.0060	0.39		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
53.1	820	Total			

Summary for Reach DP3: Central Swamp

Inflow Area = 33.717 ac, 12.07% Impervious, Inflow Depth = 0.16" for 2-Yr Storm event
Inflow = 1.23 cfs @ 13.00 hrs, Volume= 0.448 af
Outflow = 1.23 cfs @ 13.00 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond B12: Infil. Basin #12

Inflow Area = 1.023 ac, 48.62% Impervious, Inflow Depth = 1.84" for 2-Yr Storm event
Inflow = 2.09 cfs @ 12.10 hrs, Volume= 0.156 af
Outflow = 0.49 cfs @ 12.53 hrs, Volume= 0.156 af, Atten= 76%, Lag= 25.4 min
Discarded = 0.49 cfs @ 12.53 hrs, Volume= 0.156 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 269.22' @ 12.53 hrs Surf.Area= 2,578 sf Storage= 1,710 cf

Plug-Flow detention time= 22.2 min calculated for 0.156 af (100% of inflow)
Center-of-Mass det. time= 22.2 min (845.8 - 823.6)

Volume	Invert	Avail.Storage	Storage Description
#1	268.50'	11,423 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.50	2,158	188.0	0	0	2,158
269.00	2,446	197.0	1,150	1,150	2,450
271.00	3,754	238.0	6,153	7,304	3,934
272.00	4,496	257.0	4,119	11,423	4,723

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	271.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.49 cfs @ 12.53 hrs HW=269.22' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=268.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B14: Infil. Basin #14

Inflow Area = 1.014 ac, 31.78% Impervious, Inflow Depth = 0.34" for 2-Yr Storm event
Inflow = 0.16 cfs @ 12.42 hrs, Volume= 0.029 af
Outflow = 0.05 cfs @ 13.35 hrs, Volume= 0.029 af, Atten= 67%, Lag= 55.8 min
Discarded = 0.05 cfs @ 13.35 hrs, Volume= 0.029 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 272.24' @ 13.35 hrs Surf.Area= 938 sf Storage= 211 cf

Plug-Flow detention time= 35.4 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 35.4 min (977.5 - 942.2)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	6,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	830	156.5	0	0	830
274.00	1,941	203.3	2,694	2,694	2,217
275.10	5,452	876.5	3,904	6,597	60,067

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	271.36'	**12.0" Round Culvert** L= 36.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 271.36' / 271.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	273.70'	**12.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.05 cfs @ 13.35 hrs HW=272.24' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.00' (Free Discharge)
↑**2=Culvert** (Passes 0.00 cfs of 1.28 cfs potential flow)
↑**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond B4: Infil. Basin #4

Inflow Area = 2.755 ac, 24.96% Impervious, Inflow Depth = 0.15" for 2-Yr Storm event
Inflow = 0.09 cfs @ 12.57 hrs, Volume= 0.034 af
Outflow = 0.08 cfs @ 12.72 hrs, Volume= 0.034 af, Atten= 13%, Lag= 9.3 min
Discarded = 0.08 cfs @ 12.72 hrs, Volume= 0.034 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 272.51' @ 12.72 hrs Surf.Area= 4,290 sf Storage= 34 cf

Plug-Flow detention time= 7.4 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 7.4 min (1,011.8 - 1,004.4)

Volume	Invert	Avail.Storage	Storage Description
#1	272.50'	14,869 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.50	4,280	318.0	0	0	4,280
274.00	6,339	407.0	7,914	7,914	9,443
275.00	7,590	426.0	6,955	14,869	10,770

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.24 cfs @ 12.72 hrs HW=272.51' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B5: Infil. Basin #5

Inflow Area = 1.310 ac, 41.58% Impervious, Inflow Depth = 0.56" for 2-Yr Storm event
Inflow = 0.57 cfs @ 12.16 hrs, Volume= 0.061 af
Outflow = 0.28 cfs @ 12.51 hrs, Volume= 0.061 af, Atten= 51%, Lag= 20.8 min
Discarded = 0.28 cfs @ 12.51 hrs, Volume= 0.061 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 271.57' @ 12.51 hrs Surf.Area= 5,030 sf Storage= 332 cf

Plug-Flow detention time= 11.0 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 11.0 min (913.5 - 902.5)

Volume	Invert	Avail.Storage	Storage Description
#1	271.50'	19,582 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.50	4,974	279.7	0	0	4,974
272.00	5,401	289.2	2,593	2,593	5,427
274.00	7,683	346.1	13,017	15,610	8,373
274.50	8,209	355.5	3,972	19,582	8,926

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.28 cfs @ 12.51 hrs HW=271.57' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=271.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Infil. Basin #6

Inflow Area = 2.722 ac, 32.23% Impervious, Inflow Depth = 0.41" for 2-Yr Storm event
Inflow = 0.63 cfs @ 12.24 hrs, Volume= 0.093 af
Outflow = 0.18 cfs @ 13.09 hrs, Volume= 0.093 af, Atten= 72%, Lag= 51.4 min
Discarded = 0.18 cfs @ 13.09 hrs, Volume= 0.093 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 268.95' @ 13.09 hrs Surf.Area= 3,197 sf Storage= 787 cf

Plug-Flow detention time= 39.3 min calculated for 0.093 af (100% of inflow)
Center-of-Mass det. time= 39.1 min (964.1 - 925.0)

Volume	Invert	Avail.Storage	Storage Description
#1	268.70'	15,856 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.70	3,000	274.0	0	0	3,000
270.00	4,075	294.0	4,581	4,581	3,976
272.00	6,635	360.0	10,607	15,187	7,473
272.10	6,740	361.5	669	15,856	7,566

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	270.70'	**1.0' long x 1.90' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)
#3	Primary	271.10'	**20.0' long x 2.30' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.18 cfs @ 13.09 hrs HW=268.95' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=268.70' (Free Discharge)
├**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└**3=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B9: Infil. Basin #9

Inflow Area = 0.800 ac, 61.02% Impervious, Inflow Depth = 1.09" for 2-Yr Storm event
Inflow = 0.97 cfs @ 12.10 hrs, Volume= 0.073 af
Outflow = 0.07 cfs @ 14.33 hrs, Volume= 0.073 af, Atten= 93%, Lag= 133.7 min
Discarded = 0.07 cfs @ 14.33 hrs, Volume= 0.073 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 273.19' @ 14.33 hrs Surf.Area= 3,059 sf Storage= 1,412 cf

Plug-Flow detention time= 211.2 min calculated for 0.073 af (100% of inflow)
Center-of-Mass det. time= 211.0 min (1,069.8 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	272.70'	13,493 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.70	2,714	235.7	0	0	2,714
274.00	3,675	259.6	4,137	4,137	3,710
276.00	5,759	307.9	9,356	13,493	5,963

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	275.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.07 cfs @ 14.33 hrs HW=273.19' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.70' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS2: Water Quality Swale 2

Inflow Area = 0.783 ac, 49.52% Impervious, Inflow Depth = 1.04" for 2-Yr Storm event
Inflow = 0.90 cfs @ 12.09 hrs, Volume= 0.068 af
Outflow = 0.49 cfs @ 12.26 hrs, Volume= 0.068 af, Atten= 46%, Lag= 10.2 min
Primary = 0.49 cfs @ 12.26 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 270.53' @ 12.26 hrs Surf.Area= 1,084 sf Storage= 564 cf

Plug-Flow detention time= 35.8 min calculated for 0.068 af (100% of inflow)
Center-of-Mass det. time= 35.4 min (897.0 - 861.6)

Volume	Invert	Avail.Storage	Storage Description
#1	269.80'	3,979 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.80	1	4.0	0	0	1
270.00	828	163.0	57	57	2,114
272.00	1,970	199.5	2,717	2,774	3,228
272.50	2,879	275.1	1,205	3,979	6,085

Device	Routing	Invert	Outlet Devices
#1	Primary	269.80'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)
#2	Primary	271.30'	**15.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=0.48 cfs @ 12.26 hrs HW=270.53' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.48 cfs @ 2.19 fps)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment PDA-11: All RD

Runoff = 0.94 cfs @ 12.31 hrs, Volume= 0.143 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
29,960	98	Paved parking, HSG A
52,743	39	>75% Grass cover, Good, HSG A
37,306	30	Woods, Good, HSG A
120,009	51	Weighted Average
90,049		75.04% Pervious Area
29,960		24.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	198	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
14.3	248	Total			

Summary for Subcatchment PDA-12: All RD

Runoff = 1.76 cfs @ 12.14 hrs, Volume= 0.152 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
23,725	98	Paved parking, HSG A
33,222	39	>75% Grass cover, Good, HSG A
116	30	Woods, Good, HSG A
57,063	64	Weighted Average
33,338		58.42% Pervious Area
23,725		41.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	128	0.0200	2.87		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
0.8	334	0.0250	7.17	5.63	**Pipe Channel, CD** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
8.9	512	Total			

Summary for Subcatchment PDA-13: All RD

Runoff = 2.62 cfs @ 12.17 hrs, Volume= 0.256 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
38,223	98	Paved parking, HSG A
55,327	39	>75% Grass cover, Good, HSG A
8,562	80	>75% Grass cover, Good, HSG D
16,475	30	Woods, Good, HSG A
118,587	60	Weighted Average
80,364		67.77% Pervious Area
38,223		32.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0080	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	99	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
2.0	262	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	49	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
11.0	460	Total			

Summary for Subcatchment PDA-14: Uncontrolled (All RD)

Runoff = 1.06 cfs @ 12.47 hrs, Volume= 0.243 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	2,604	98	ex roof
	3,144	98	Paved parking, HSG A
*	1,928	98	ex. drive
	92,623	39	>75% Grass cover, Good, HSG A
	5,470	74	>75% Grass cover, Good, HSG C
	175,955	30	Woods, Good, HSG A
	4,247	70	Woods, Good, HSG C
	74,983	77	Woods, Good, HSG D
	360,954	45	Weighted Average
	353,278		97.87% Pervious Area
	7,676		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment PDA-15: All RD

Runoff = 0.72 cfs @ 12.26 hrs, Volume= 0.085 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	11,534	98	Pavement
	30,119	39	>75% Grass cover, Good, HSG A
*	2,500	98	ex. Driveway
	44,153	58	Weighted Average
	30,119		68.22% Pervious Area
	14,034		31.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	50	0.0020	0.06		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.0	175	0.0080	1.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.1	225	Total			

Summary for Subcatchment PDA-17: All RD

Runoff = 2.02 cfs @ 12.09 hrs, Volume= 0.147 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	21,271	98	roads,sidewalks, drives
	13,589	39	>75% Grass cover, Good, HSG A
	34,860	75	Weighted Average
	13,589		38.98% Pervious Area
	21,271		61.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.2	24	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
0.2	50	0.0100	4.54	3.56	**Pipe Channel, cd** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
6.0	124	Total			

Summary for Subcatchment PDA-19: All RD

Runoff = 1.92 cfs @ 12.09 hrs, Volume= 0.139 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	16,893	98	roads,sidewalks, drives
	12,029	39	>75% Grass cover, Good, HSG A
	5,192	80	>75% Grass cover, Good, HSG D
	34,114	74	Weighted Average
	17,221		50.48% Pervious Area
	16,893		49.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	32	0.0200	0.14		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
1.6	200	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
5.5	232	Total			

Summary for Subcatchment PDA-20: USE FRONT RD

Runoff = 3.59 cfs @ 12.10 hrs, Volume= 0.272 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	15,182	98	roads,sidewalks, drives
	22,890	74	>75% Grass cover, Good, HSG C
	6,475	98	Unconnected roofs, HSG A
	44,547	86	Weighted Average
	22,890		51.38% Pervious Area
	21,657		48.62% Impervious Area
	6,475		29.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.1	14	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.0	147	0.0150	2.49		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
0.4	100	0.0100	4.54	3.56	**Pipe Channel, de** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
7.1	311	Total			

Summary for Subcatchment PDA-25: Uncontrolled (All RD)

Runoff = 5.27 cfs @ 12.85 hrs, Volume= 1.115 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
	76,354	39	>75% Grass cover, Good, HSG A
	50,958	74	>75% Grass cover, Good, HSG C
	3,094	80	>75% Grass cover, Good, HSG D
	218,731	30	Woods, Good, HSG A
	75,889	70	Woods, Good, HSG C
	225,507	77	Woods, Good, HSG D
*	1,950	98	ex Roofs, HSG A
*	1,921	98	Pavement
	654,404	56	Weighted Average
	650,533		99.41% Pervious Area
	3,871		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
33.1	770	0.0060	0.39		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
53.1	820	Total			

Summary for Reach DP3: Central Swamp

Inflow Area = 33.717 ac, 12.07% Impervious, Inflow Depth = 0.53" for 10-Yr Storm event
Inflow = 6.23 cfs @ 12.81 hrs, Volume= 1.497 af
Outflow = 6.23 cfs @ 12.81 hrs, Volume= 1.497 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond B12: Infil. Basin #12

Inflow Area = 1.023 ac, 48.62% Impervious, Inflow Depth = 3.19" for 10-Yr Storm event
Inflow = 3.59 cfs @ 12.10 hrs, Volume= 0.272 af
Outflow = 0.58 cfs @ 12.61 hrs, Volume= 0.272 af, Atten= 84%, Lag= 30.6 min
Discarded = 0.58 cfs @ 12.61 hrs, Volume= 0.272 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 269.97' @ 12.61 hrs Surf.Area= 3,043 sf Storage= 3,796 cf

Plug-Flow detention time= 49.0 min calculated for 0.271 af (100% of inflow)
Center-of-Mass det. time= 48.9 min (856.7 - 807.8)

Volume	Invert	Avail.Storage	Storage Description
#1	268.50'	11,423 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.50	2,158	188.0	0	0	2,158
269.00	2,446	197.0	1,150	1,150	2,450
271.00	3,754	238.0	6,153	7,304	3,934
272.00	4,496	257.0	4,119	11,423	4,723

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	271.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.58 cfs @ 12.61 hrs HW=269.97' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.58 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=268.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B14: Infil. Basin #14

Inflow Area = 1.014 ac, 31.78% Impervious, Inflow Depth = 1.01" for 10-Yr Storm event
Inflow = 0.72 cfs @ 12.26 hrs, Volume= 0.085 af
Outflow = 0.08 cfs @ 15.12 hrs, Volume= 0.085 af, Atten= 88%, Lag= 171.2 min
Discarded = 0.08 cfs @ 15.12 hrs, Volume= 0.085 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 273.33' @ 15.12 hrs Surf.Area= 1,519 sf Storage= 1,542 cf

Plug-Flow detention time= 223.7 min calculated for 0.085 af (100% of inflow)
Center-of-Mass det. time= 223.6 min (1,120.1 - 896.5)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	6,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	830	156.5	0	0	830
274.00	1,941	203.3	2,694	2,694	2,217
275.10	5,452	876.5	3,904	6,597	60,067

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	271.36'	**12.0" Round Culvert** L= 36.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 271.36' / 271.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	273.70'	**12.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.08 cfs @ 15.12 hrs HW=273.33' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.00' (Free Discharge)
↑—**2=Culvert** (Passes 0.00 cfs of 1.28 cfs potential flow)
↑—**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond B4: Infil. Basin #4

Inflow Area = 2.755 ac, 24.96% Impervious, Inflow Depth = 0.62" for 10-Yr Storm event
Inflow = 0.94 cfs @ 12.31 hrs, Volume= 0.143 af
Outflow = 0.26 cfs @ 13.25 hrs, Volume= 0.143 af, Atten= 72%, Lag= 56.6 min
Discarded = 0.26 cfs @ 13.25 hrs, Volume= 0.143 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 272.79' @ 13.25 hrs Surf.Area= 4,642 sf Storage= 1,277 cf

Plug-Flow detention time= 42.7 min calculated for 0.143 af (100% of inflow)
Center-of-Mass det. time= 42.7 min (968.2 - 925.5)

Volume	Invert	Avail.Storage	Storage Description
#1	272.50'	14,869 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.50	4,280	318.0	0	0	4,280
274.00	6,339	407.0	7,914	7,914	9,443
275.00	7,590	426.0	6,955	14,869	10,770

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.26 cfs @ 13.25 hrs HW=272.79' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B5: Infil. Basin #5

Inflow Area = 1.310 ac, 41.58% Impervious, Inflow Depth = 1.39" for 10-Yr Storm event
Inflow = 1.76 cfs @ 12.14 hrs, Volume= 0.152 af
Outflow = 0.30 cfs @ 12.89 hrs, Volume= 0.152 af, Atten= 83%, Lag= 44.7 min
Discarded = 0.30 cfs @ 12.89 hrs, Volume= 0.152 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 271.89' @ 12.89 hrs Surf.Area= 5,305 sf Storage= 2,003 cf

Plug-Flow detention time= 57.1 min calculated for 0.151 af (100% of inflow)
Center-of-Mass det. time= 57.1 min (927.5 - 870.4)

Volume	Invert	Avail.Storage	Storage Description
#1	271.50'	19,582 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.50	4,974	279.7	0	0	4,974
272.00	5,401	289.2	2,593	2,593	5,427
274.00	7,683	346.1	13,017	15,610	8,373
274.50	8,209	355.5	3,972	19,582	8,926

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.30 cfs @ 12.89 hrs HW=271.89' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=271.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Infil. Basin #6

Inflow Area = 2.722 ac, 32.23% Impervious, Inflow Depth = 1.13" for 10-Yr Storm event
Inflow = 2.62 cfs @ 12.17 hrs, Volume= 0.256 af
Outflow = 0.23 cfs @ 15.24 hrs, Volume= 0.256 af, Atten= 91%, Lag= 184.0 min
Discarded = 0.23 cfs @ 15.24 hrs, Volume= 0.256 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 270.09' @ 15.24 hrs Surf.Area= 4,179 sf Storage= 4,959 cf

Plug-Flow detention time= 251.4 min calculated for 0.256 af (100% of inflow)
Center-of-Mass det. time= 251.3 min (1,136.1 - 884.8)

Volume	Invert	Avail.Storage	Storage Description
#1	268.70'	15,856 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.70	3,000	274.0	0	0	3,000
270.00	4,075	294.0	4,581	4,581	3,976
272.00	6,635	360.0	10,607	15,187	7,473
272.10	6,740	361.5	669	15,856	7,566

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	270.70'	**1.0' long x 1.90' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)
#3	Primary	271.10'	**20.0' long x 2.30' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.23 cfs @ 15.24 hrs HW=270.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=268.70' (Free Discharge)
├**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└**3=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B9: Infil. Basin #9

Inflow Area = 0.800 ac, 61.02% Impervious, Inflow Depth = 2.21" for 10-Yr Storm event
Inflow = 2.02 cfs @ 12.09 hrs, Volume= 0.147 af
Outflow = 0.08 cfs @ 15.81 hrs, Volume= 0.147 af, Atten= 96%, Lag= 222.7 min
Discarded = 0.08 cfs @ 15.81 hrs, Volume= 0.147 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 273.87' @ 15.81 hrs Surf.Area= 3,571 sf Storage= 3,661 cf

Plug-Flow detention time= 476.9 min calculated for 0.147 af (100% of inflow)
Center-of-Mass det. time= 476.6 min (1,314.5 - 837.9)

Volume	Invert	Avail.Storage	Storage Description
#1	272.70'	13,493 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.70	2,714	235.7	0	0	2,714
274.00	3,675	259.6	4,137	4,137	3,710
276.00	5,759	307.9	9,356	13,493	5,963

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	275.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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 @ 15.81 hrs HW=273.87' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.70' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS2: Water Quality Swale 2

Inflow Area = 0.783 ac, 49.52% Impervious, Inflow Depth = 2.13" for 10-Yr Storm event
Inflow = 1.92 cfs @ 12.09 hrs, Volume= 0.139 af
Outflow = 1.31 cfs @ 12.18 hrs, Volume= 0.139 af, Atten= 32%, Lag= 5.5 min
Primary = 1.31 cfs @ 12.18 hrs, Volume= 0.139 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 270.89' @ 12.18 hrs Surf.Area= 1,276 sf Storage= 986 cf

Plug-Flow detention time= 28.0 min calculated for 0.139 af (100% of inflow)
Center-of-Mass det. time= 28.1 min (868.2 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	269.80'	3,979 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.80	1	4.0	0	0	1
270.00	828	163.0	57	57	2,114
272.00	1,970	199.5	2,717	2,774	3,228
272.50	2,879	275.1	1,205	3,979	6,085

Device	Routing	Invert	Outlet Devices
#1	Primary	269.80'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)
#2	Primary	271.30'	**15.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=1.30 cfs @ 12.18 hrs HW=270.89' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.30 cfs @ 2.67 fps)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment PDA-11: All RD

Runoff = 1.79 cfs @ 12.25 hrs, Volume= 0.223 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
29,960	98	Paved parking, HSG A
52,743	39	>75% Grass cover, Good, HSG A
37,306	30	Woods, Good, HSG A
120,009	51	Weighted Average
90,049		75.04% Pervious Area
29,960		24.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	198	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
14.3	248	Total			

Summary for Subcatchment PDA-12: All RD

Runoff = 2.50 cfs @ 12.14 hrs, Volume= 0.209 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
23,725	98	Paved parking, HSG A
33,222	39	>75% Grass cover, Good, HSG A
116	30	Woods, Good, HSG A
57,063	64	Weighted Average
33,338		58.42% Pervious Area
23,725		41.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	128	0.0200	2.87		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
0.8	334	0.0250	7.17	5.63	**Pipe Channel, CD** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
8.9	512	Total			

Summary for Subcatchment PDA-13: All RD

Runoff = 3.95 cfs @ 12.17 hrs, Volume= 0.364 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
38,223	98	Paved parking, HSG A
55,327	39	>75% Grass cover, Good, HSG A
8,562	80	>75% Grass cover, Good, HSG D
16,475	30	Woods, Good, HSG A
118,587	60	Weighted Average
80,364		67.77% Pervious Area
38,223		32.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0080	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	99	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
2.0	262	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	49	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
11.0	460	Total			

Summary for Subcatchment PDA-14: Uncontrolled (All RD)

Runoff = 2.44 cfs @ 12.37 hrs, Volume= 0.422 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	2,604	98	ex roof
	3,144	98	Paved parking, HSG A
*	1,928	98	ex. drive
	92,623	39	>75% Grass cover, Good, HSG A
	5,470	74	>75% Grass cover, Good, HSG C
	175,955	30	Woods, Good, HSG A
	4,247	70	Woods, Good, HSG C
	74,983	77	Woods, Good, HSG D
	360,954	45	Weighted Average
	353,278		97.87% Pervious Area
	7,676		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment PDA-15: All RD

Runoff = 1.13 cfs @ 12.25 hrs, Volume= 0.123 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	11,534	98	Pavement
	30,119	39	>75% Grass cover, Good, HSG A
*	2,500	98	ex. Driveway
	44,153	58	Weighted Average
	30,119		68.22% Pervious Area
	14,034		31.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	50	0.0020	0.06		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.0	175	0.0080	1.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.1	225	Total			

Summary for Subcatchment PDA-17: All RD

Runoff = 2.63 cfs @ 12.09 hrs, Volume= 0.191 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	21,271	98	roads,sidewalks, drives
	13,589	39	>75% Grass cover, Good, HSG A
	34,860	75	Weighted Average
	13,589		38.98% Pervious Area
	21,271		61.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.2	24	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
0.2	50	0.0100	4.54	3.56	**Pipe Channel, cd** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
6.0	124	Total			

Summary for Subcatchment PDA-19: All RD

Runoff = 2.52 cfs @ 12.09 hrs, Volume= 0.181 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	16,893	98	roads,sidewalks, drives
	12,029	39	>75% Grass cover, Good, HSG A
	5,192	80	>75% Grass cover, Good, HSG D
	34,114	74	Weighted Average
	17,221		50.48% Pervious Area
	16,893		49.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	32	0.0200	0.14		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
1.6	200	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
5.5	232	Total			

Summary for Subcatchment PDA-20: USE FRONT RD

Runoff = 4.40 cfs @ 12.10 hrs, Volume= 0.335 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	15,182	98	roads,sidewalks, drives
	22,890	74	>75% Grass cover, Good, HSG C
	6,475	98	Unconnected roofs, HSG A
	44,547	86	Weighted Average
	22,890		51.38% Pervious Area
	21,657		48.62% Impervious Area
	6,475		29.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.1	14	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.0	147	0.0150	2.49		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
0.4	100	0.0100	4.54	3.56	**Pipe Channel, de** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
7.1	311	Total			

Summary for Subcatchment PDA-25: Uncontrolled (All RD)

Runoff = 8.44 cfs @ 12.82 hrs, Volume= 1.639 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-Hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
	76,354	39	>75% Grass cover, Good, HSG A
	50,958	74	>75% Grass cover, Good, HSG C
	3,094	80	>75% Grass cover, Good, HSG D
	218,731	30	Woods, Good, HSG A
	75,889	70	Woods, Good, HSG C
	225,507	77	Woods, Good, HSG D
*	1,950	98	ex Roofs, HSG A
*	1,921	98	Pavement
	654,404	56	Weighted Average
	650,533		99.41% Pervious Area
	3,871		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
33.1	770	0.0060	0.39		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
53.1	820	Total			

Summary for Reach DP3: Central Swamp

Inflow Area = 33.717 ac, 12.07% Impervious, Inflow Depth = 0.80" for 25-yr event
Inflow = 10.04 cfs @ 12.77 hrs, Volume= 2.255 af
Outflow = 10.04 cfs @ 12.77 hrs, Volume= 2.255 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond B12: Infil. Basin #12

Inflow Area = 1.023 ac, 48.62% Impervious, Inflow Depth = 3.94" for 25-yr event
Inflow = 4.40 cfs @ 12.10 hrs, Volume= 0.335 af
Outflow = 0.63 cfs @ 12.65 hrs, Volume= 0.335 af, Atten= 86%, Lag= 33.1 min
Discarded = 0.63 cfs @ 12.65 hrs, Volume= 0.335 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 270.34' @ 12.65 hrs Surf.Area= 3,292 sf Storage= 4,985 cf

Plug-Flow detention time= 62.8 min calculated for 0.335 af (100% of inflow)
Center-of-Mass det. time= 62.7 min (864.6 - 801.9)

Volume	Invert	Avail.Storage	Storage Description
#1	268.50'	11,423 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.50	2,158	188.0	0	0	2,158
269.00	2,446	197.0	1,150	1,150	2,450
271.00	3,754	238.0	6,153	7,304	3,934
272.00	4,496	257.0	4,119	11,423	4,723

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	271.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.63 cfs @ 12.65 hrs HW=270.34' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.63 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=268.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B14: Infil. Basin #14

Inflow Area = 1.014 ac, 31.78% Impervious, Inflow Depth = 1.45" for 25-yr event
Inflow = 1.13 cfs @ 12.25 hrs, Volume= 0.123 af
Outflow = 0.16 cfs @ 13.79 hrs, Volume= 0.123 af, Atten= 85%, Lag= 92.5 min
Discarded = 0.10 cfs @ 13.79 hrs, Volume= 0.114 af
Primary = 0.06 cfs @ 13.79 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 273.77' @ 13.79 hrs Surf.Area= 1,792 sf Storage= 2,270 cf

Plug-Flow detention time= 263.6 min calculated for 0.123 af (100% of inflow)
Center-of-Mass det. time= 263.5 min (1,147.3 - 883.8)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	6,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	830	156.5	0	0	830
274.00	1,941	203.3	2,694	2,694	2,217
275.10	5,452	876.5	3,904	6,597	60,067

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	271.36'	**12.0" Round Culvert** L= 36.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 271.36' / 271.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	273.70'	**12.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.10 cfs @ 13.79 hrs HW=273.77' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.06 cfs @ 13.79 hrs HW=273.77' (Free Discharge)
↑—**2=Culvert** (Passes 0.06 cfs of 4.62 cfs potential flow)
↑—**3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 0.87 fps)

Summary for Pond B4: Infil. Basin #4

Inflow Area = 2.755 ac, 24.96% Impervious, Inflow Depth = 0.97" for 25-yr event
Inflow = 1.79 cfs @ 12.25 hrs, Volume= 0.223 af
Outflow = 0.29 cfs @ 14.18 hrs, Volume= 0.223 af, Atten= 84%, Lag= 115.4 min
Discarded = 0.29 cfs @ 14.18 hrs, Volume= 0.223 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 273.16' @ 14.18 hrs Surf.Area= 5,138 sf Storage= 3,111 cf

Plug-Flow detention time= 114.0 min calculated for 0.223 af (100% of inflow)
Center-of-Mass det. time= 113.9 min (1,020.8 - 906.9)

Volume	Invert	Avail.Storage	Storage Description
#1	272.50'	14,869 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.50	4,280	318.0	0	0	4,280
274.00	6,339	407.0	7,914	7,914	9,443
275.00	7,590	426.0	6,955	14,869	10,770

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.29 cfs @ 14.18 hrs HW=273.16' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B5: Infil. Basin #5

Inflow Area = 1.310 ac, 41.58% Impervious, Inflow Depth = 1.91" for 25-yr event
Inflow = 2.50 cfs @ 12.14 hrs, Volume= 0.209 af
Outflow = 0.31 cfs @ 13.16 hrs, Volume= 0.209 af, Atten= 88%, Lag= 61.3 min
Discarded = 0.31 cfs @ 13.16 hrs, Volume= 0.209 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 272.13' @ 13.16 hrs Surf.Area= 5,533 sf Storage= 3,282 cf

Plug-Flow detention time= 100.1 min calculated for 0.209 af (100% of inflow)
Center-of-Mass det. time= 100.0 min (960.4 - 860.4)

Volume	Invert	Avail.Storage	Storage Description
#1	271.50'	19,582 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.50	4,974	279.7	0	0	4,974
272.00	5,401	289.2	2,593	2,593	5,427
274.00	7,683	346.1	13,017	15,610	8,373
274.50	8,209	355.5	3,972	19,582	8,926

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.31 cfs @ 13.16 hrs HW=272.13' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=271.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Infil. Basin #6

Inflow Area = 2.722 ac, 32.23% Impervious, Inflow Depth = 1.60" for 25-yr event
Inflow = 3.95 cfs @ 12.17 hrs, Volume= 0.364 af
Outflow = 0.31 cfs @ 15.30 hrs, Volume= 0.364 af, Atten= 92%, Lag= 187.7 min
Discarded = 0.28 cfs @ 15.30 hrs, Volume= 0.360 af
Primary = 0.03 cfs @ 15.30 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 270.74' @ 15.30 hrs Surf.Area= 4,949 sf Storage= 7,913 cf

Plug-Flow detention time= 344.8 min calculated for 0.364 af (100% of inflow)
Center-of-Mass det. time= 344.6 min (1,217.8 - 873.2)

Volume	Invert	Avail.Storage	Storage Description
#1	268.70'	15,856 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.70	3,000	274.0	0	0	3,000
270.00	4,075	294.0	4,581	4,581	3,976
272.00	6,635	360.0	10,607	15,187	7,473
272.10	6,740	361.5	669	15,856	7,566

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	270.70'	**1.0' long x 1.90' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)
#3	Primary	271.10'	**20.0' long x 2.30' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.28 cfs @ 15.30 hrs HW=270.74' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.03 cfs @ 15.30 hrs HW=270.74' (Free Discharge)
├**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.03 cfs @ 0.65 fps)
└**3=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B9: Infil. Basin #9

Inflow Area = 0.800 ac, 61.02% Impervious, Inflow Depth = 2.86" for 25-yr event
Inflow = 2.63 cfs @ 12.09 hrs, Volume= 0.191 af
Outflow = 0.09 cfs @ 16.15 hrs, Volume= 0.191 af, Atten= 96%, Lag= 243.1 min
Discarded = 0.09 cfs @ 16.15 hrs, Volume= 0.191 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 274.24' @ 16.15 hrs Surf.Area= 3,900 sf Storage= 5,046 cf

Plug-Flow detention time= 601.3 min calculated for 0.191 af (100% of inflow)
Center-of-Mass det. time= 601.6 min (1,432.0 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	272.70'	13,493 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.70	2,714	235.7	0	0	2,714
274.00	3,675	259.6	4,137	4,137	3,710
276.00	5,759	307.9	9,356	13,493	5,963

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	275.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.09 cfs @ 16.15 hrs HW=274.24' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.70' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS2: Water Quality Swale 2

Inflow Area = 0.783 ac, 49.52% Impervious, Inflow Depth = 2.77" for 25-yr event
Inflow = 2.52 cfs @ 12.09 hrs, Volume= 0.181 af
Outflow = 1.84 cfs @ 12.17 hrs, Volume= 0.181 af, Atten= 27%, Lag= 4.8 min
Primary = 1.84 cfs @ 12.17 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 271.05' @ 12.17 hrs Surf.Area= 1,365 sf Storage= 1,193 cf

Plug-Flow detention time= 25.6 min calculated for 0.181 af (100% of inflow)
Center-of-Mass det. time= 25.8 min (858.1 - 832.4)

Volume	Invert	Avail.Storage	Storage Description
#1	269.80'	3,979 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.80	1	4.0	0	0	1
270.00	828	163.0	57	57	2,114
272.00	1,970	199.5	2,717	2,774	3,228
272.50	2,879	275.1	1,205	3,979	6,085

Device	Routing	Invert	Outlet Devices
#1	Primary	269.80'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)
#2	Primary	271.30'	**15.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=1.81 cfs @ 12.17 hrs HW=271.04' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.81 cfs @ 2.85 fps)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment PDA-11: All RD

Runoff = 3.35 cfs @ 12.23 hrs, Volume= 0.364 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
29,960	98	Paved parking, HSG A
52,743	39	>75% Grass cover, Good, HSG A
37,306	30	Woods, Good, HSG A
120,009	51	Weighted Average
90,049		75.04% Pervious Area
29,960		24.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	198	0.0100	1.61		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
14.3	248	Total			

Summary for Subcatchment PDA-12: All RD

Runoff = 3.72 cfs @ 12.13 hrs, Volume= 0.303 af, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
23,725	98	Paved parking, HSG A
33,222	39	>75% Grass cover, Good, HSG A
116	30	Woods, Good, HSG A
57,063	64	Weighted Average
33,338		58.42% Pervious Area
23,725		41.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	128	0.0200	2.87		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
0.8	334	0.0250	7.17	5.63	**Pipe Channel, CD** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
8.9	512	Total			

Summary for Subcatchment PDA-13: All RD

Runoff = 6.17 cfs @ 12.16 hrs, Volume= 0.543 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
38,223	98	Paved parking, HSG A
55,327	39	>75% Grass cover, Good, HSG A
8,562	80	>75% Grass cover, Good, HSG D
16,475	30	Woods, Good, HSG A
118,587	60	Weighted Average
80,364		67.77% Pervious Area
38,223		32.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0080	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.7	99	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
2.0	262	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.2	49	0.0100	4.54	3.56	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
11.0	460	Total			

Summary for Subcatchment PDA-14: Uncontrolled (All RD)

Runoff = 5.84 cfs @ 12.26 hrs, Volume= 0.759 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	2,604	98	ex roof
	3,144	98	Paved parking, HSG A
*	1,928	98	ex. drive
	92,623	39	>75% Grass cover, Good, HSG A
	5,470	74	>75% Grass cover, Good, HSG C
	175,955	30	Woods, Good, HSG A
	4,247	70	Woods, Good, HSG C
	74,983	77	Woods, Good, HSG D
	360,954	45	Weighted Average
	353,278		97.87% Pervious Area
	7,676		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0260	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	187	0.0400	1.00		**Shallow Concentrated Flow, bc** Woodland Kv= 5.0 fps
14.2	237	Total			

Summary for Subcatchment PDA-15: All RD

Runoff = 1.81 cfs @ 12.24 hrs, Volume= 0.186 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	11,534	98	Pavement
	30,119	39	>75% Grass cover, Good, HSG A
*	2,500	98	ex. Driveway
	44,153	58	Weighted Average
	30,119		68.22% Pervious Area
	14,034		31.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	50	0.0020	0.06		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.0	175	0.0080	1.44		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.1	225	Total			

Summary for Subcatchment PDA-17: All RD

Runoff = 3.57 cfs @ 12.09 hrs, Volume= 0.259 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	21,271	98	roads,sidewalks, drives
	13,589	39	>75% Grass cover, Good, HSG A
	34,860	75	Weighted Average
	13,589		38.98% Pervious Area
	21,271		61.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.2	24	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
0.2	50	0.0100	4.54	3.56	**Pipe Channel, cd** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
6.0	124	Total			

Summary for Subcatchment PDA-19: All RD

Runoff = 3.44 cfs @ 12.09 hrs, Volume= 0.247 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	16,893	98	roads,sidewalks, drives
	12,029	39	>75% Grass cover, Good, HSG A
	5,192	80	>75% Grass cover, Good, HSG D
	34,114	74	Weighted Average
	17,221		50.48% Pervious Area
	16,893		49.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	32	0.0200	0.14		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
1.6	200	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
5.5	232	Total			

Summary for Subcatchment PDA-20: USE FRONT RD

Runoff = 5.61 cfs @ 12.10 hrs, Volume= 0.433 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	15,182	98	roads,sidewalks, drives
	22,890	74	>75% Grass cover, Good, HSG C
	6,475	98	Unconnected roofs, HSG A
	44,547	86	Weighted Average
	22,890		51.38% Pervious Area
	21,657		48.62% Impervious Area
	6,475		29.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.1	14	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.0	147	0.0150	2.49		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
0.4	100	0.0100	4.54	3.56	**Pipe Channel, de** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
7.1	311	Total			

Summary for Subcatchment PDA-25: Uncontrolled (All RD)

Runoff = 13.96 cfs @ 12.79 hrs, Volume= 2.536 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
	76,354	39	>75% Grass cover, Good, HSG A
	50,958	74	>75% Grass cover, Good, HSG C
	3,094	80	>75% Grass cover, Good, HSG D
	218,731	30	Woods, Good, HSG A
	75,889	70	Woods, Good, HSG C
	225,507	77	Woods, Good, HSG D
*	1,950	98	ex Roofs, HSG A
*	1,921	98	Pavement
	654,404	56	Weighted Average
	650,533		99.41% Pervious Area
	3,871		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
33.1	770	0.0060	0.39		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
53.1	820	Total			

Summary for Reach DP3: Central Swamp

Inflow Area = 33.717 ac, 12.07% Impervious, Inflow Depth = 1.33" for 100-Yr Storm event
Inflow = 18.11 cfs @ 12.70 hrs, Volume= 3.733 af
Outflow = 18.11 cfs @ 12.70 hrs, Volume= 3.733 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond B12: Infil. Basin #12

Inflow Area = 1.023 ac, 48.62% Impervious, Inflow Depth = 5.08" for 100-Yr Storm event
Inflow = 5.61 cfs @ 12.10 hrs, Volume= 0.433 af
Outflow = 0.70 cfs @ 12.73 hrs, Volume= 0.433 af, Atten= 87%, Lag= 37.6 min
Discarded = 0.70 cfs @ 12.73 hrs, Volume= 0.433 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 270.88' @ 12.73 hrs Surf.Area= 3,670 sf Storage= 6,872 cf

Plug-Flow detention time= 82.6 min calculated for 0.432 af (100% of inflow)
Center-of-Mass det. time= 82.5 min (877.3 - 794.8)

Volume	Invert	Avail.Storage	Storage Description
#1	268.50'	11,423 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.50	2,158	188.0	0	0	2,158
269.00	2,446	197.0	1,150	1,150	2,450
271.00	3,754	238.0	6,153	7,304	3,934
272.00	4,496	257.0	4,119	11,423	4,723

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	271.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.70 cfs @ 12.73 hrs HW=270.88' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.70 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=268.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B14: Infil. Basin #14

Inflow Area = 1.014 ac, 31.78% Impervious, Inflow Depth = 2.21" for 100-Yr Storm event
Inflow = 1.81 cfs @ 12.24 hrs, Volume= 0.186 af
Outflow = 0.71 cfs @ 12.67 hrs, Volume= 0.186 af, Atten= 61%, Lag= 25.6 min
Discarded = 0.11 cfs @ 12.67 hrs, Volume= 0.129 af
Primary = 0.59 cfs @ 12.67 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 274.02' @ 12.67 hrs Surf.Area= 2,001 sf Storage= 2,743 cf

Plug-Flow detention time= 207.1 min calculated for 0.186 af (100% of inflow)
Center-of-Mass det. time= 207.2 min (1,077.7 - 870.5)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	6,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	830	156.5	0	0	830
274.00	1,941	203.3	2,694	2,694	2,217
275.10	5,452	876.5	3,904	6,597	60,067

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	271.36'	**12.0" Round Culvert** L= 36.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 271.36' / 271.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	273.70'	**12.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 12.67 hrs HW=274.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.59 cfs @ 12.67 hrs HW=274.02' (Free Discharge)
↑—**2=Culvert** (Passes 0.59 cfs of 4.91 cfs potential flow)
↑—**3=Orifice/Grate** (Orifice Controls 0.59 cfs @ 1.83 fps)

Summary for Pond B4: Infil. Basin #4

Inflow Area = 2.755 ac, 24.96% Impervious, Inflow Depth = 1.59" for 100-Yr Storm event
Inflow = 3.35 cfs @ 12.23 hrs, Volume= 0.364 af
Outflow = 0.34 cfs @ 15.22 hrs, Volume= 0.364 af, Atten= 90%, Lag= 179.5 min
Discarded = 0.34 cfs @ 15.22 hrs, Volume= 0.364 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 273.83' @ 15.22 hrs Surf.Area= 6,093 sf Storage= 6,888 cf

Plug-Flow detention time= 238.5 min calculated for 0.364 af (100% of inflow)
Center-of-Mass det. time= 238.3 min (1,127.1 - 888.8)

Volume	Invert	Avail.Storage	Storage Description
#1	272.50'	14,869 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.50	4,280	318.0	0	0	4,280
274.00	6,339	407.0	7,914	7,914	9,443
275.00	7,590	426.0	6,955	14,869	10,770

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.34 cfs @ 15.22 hrs HW=273.83' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B5: Infil. Basin #5

Inflow Area = 1.310 ac, 41.58% Impervious, Inflow Depth = 2.78" for 100-Yr Storm event
Inflow = 3.72 cfs @ 12.13 hrs, Volume= 0.303 af
Outflow = 0.33 cfs @ 13.85 hrs, Volume= 0.303 af, Atten= 91%, Lag= 102.9 min
Discarded = 0.33 cfs @ 13.85 hrs, Volume= 0.303 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 272.53' @ 13.85 hrs Surf.Area= 5,965 sf Storage= 5,596 cf

Plug-Flow detention time= 172.7 min calculated for 0.303 af (100% of inflow)
Center-of-Mass det. time= 172.6 min (1,021.8 - 849.2)

Volume	Invert	Avail.Storage	Storage Description
#1	271.50'	19,582 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.50	4,974	279.7	0	0	4,974
272.00	5,401	289.2	2,593	2,593	5,427
274.00	7,683	346.1	13,017	15,610	8,373
274.50	8,209	355.5	3,972	19,582	8,926

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			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=0.33 cfs @ 13.85 hrs HW=272.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=271.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Infil. Basin #6

Inflow Area = 2.722 ac, 32.23% Impervious, Inflow Depth = 2.39" for 100-Yr Storm event
Inflow = 6.17 cfs @ 12.16 hrs, Volume= 0.543 af
Outflow = 1.06 cfs @ 12.88 hrs, Volume= 0.543 af, Atten= 83%, Lag= 42.7 min
Discarded = 0.30 cfs @ 12.88 hrs, Volume= 0.409 af
Primary = 0.76 cfs @ 12.88 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 271.08' @ 12.88 hrs Surf.Area= 5,379 sf Storage= 9,665 cf

Plug-Flow detention time= 281.4 min calculated for 0.543 af (100% of inflow)
Center-of-Mass det. time= 281.2 min (1,141.9 - 860.7)

Volume	Invert	Avail.Storage	Storage Description
#1	268.70'	15,856 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
268.70	3,000	274.0	0	0	3,000
270.00	4,075	294.0	4,581	4,581	3,976
272.00	6,635	360.0	10,607	15,187	7,473
272.10	6,740	361.5	669	15,856	7,566

Device	Routing	Invert	Outlet Devices
#1	Discarded	268.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	270.70'	**1.0' long x 1.90' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)
#3	Primary	271.10'	**20.0' long x 2.30' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.30 cfs @ 12.88 hrs HW=271.08' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.76 cfs @ 12.88 hrs HW=271.08' (Free Discharge)
├**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.76 cfs @ 2.02 fps)
└**3=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B9: Infil. Basin #9

Inflow Area = 0.800 ac, 61.02% Impervious, Inflow Depth = 3.89" for 100-Yr Storm event
Inflow = 3.57 cfs @ 12.09 hrs, Volume= 0.259 af
Outflow = 0.10 cfs @ 16.76 hrs, Volume= 0.259 af, Atten= 97%, Lag= 280.0 min
Discarded = 0.10 cfs @ 16.76 hrs, Volume= 0.259 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 274.78' @ 16.76 hrs Surf.Area= 4,430 sf Storage= 7,286 cf

Plug-Flow detention time= 768.5 min calculated for 0.259 af (100% of inflow)
Center-of-Mass det. time= 768.5 min (1,590.1 - 821.6)

Volume	Invert	Avail.Storage	Storage Description
#1	272.70'	13,493 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.70	2,714	235.7	0	0	2,714
274.00	3,675	259.6	4,137	4,137	3,710
276.00	5,759	307.9	9,356	13,493	5,963

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	275.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** 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=0.10 cfs @ 16.76 hrs HW=274.78' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.70' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQS2: Water Quality Swale 2

Inflow Area = 0.783 ac, 49.52% Impervious, Inflow Depth = 3.78" for 100-Yr Storm event
Inflow = 3.44 cfs @ 12.09 hrs, Volume= 0.247 af
Outflow = 2.64 cfs @ 12.16 hrs, Volume= 0.247 af, Atten= 23%, Lag= 4.3 min
Primary = 2.64 cfs @ 12.16 hrs, Volume= 0.247 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 271.24' @ 12.16 hrs Surf.Area= 1,479 sf Storage= 1,469 cf

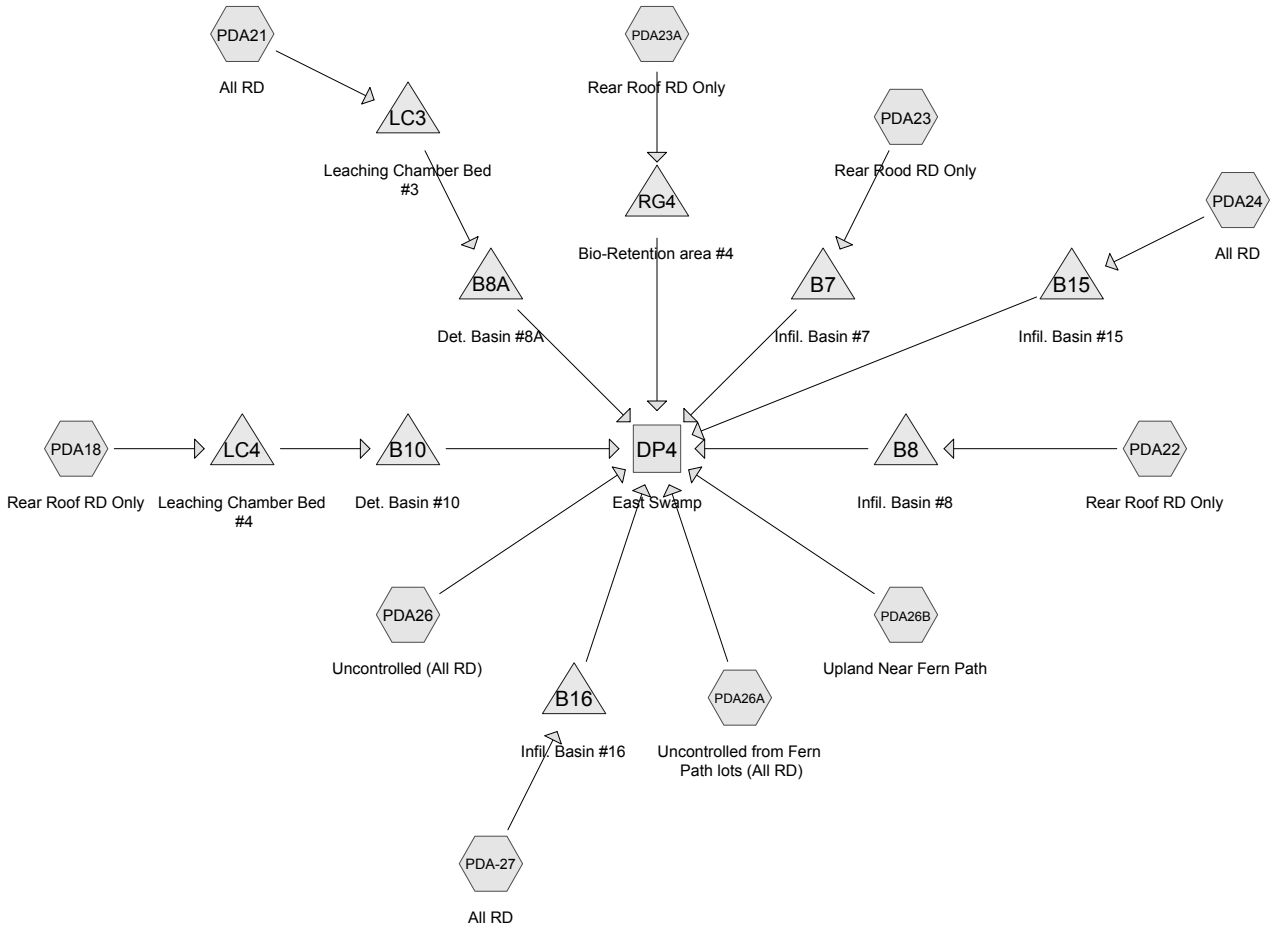
Plug-Flow detention time= 23.0 min calculated for 0.247 af (100% of inflow)
Center-of-Mass det. time= 23.2 min (846.6 - 823.4)

Volume	Invert	Avail.Storage	Storage Description
#1	269.80'	3,979 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.80	1	4.0	0	0	1
270.00	828	163.0	57	57	2,114
272.00	1,970	199.5	2,717	2,774	3,228
272.50	2,879	275.1	1,205	3,979	6,085

Device	Routing	Invert	Outlet Devices
#1	Primary	269.80'	**45.0 deg x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)
#2	Primary	271.30'	**15.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=2.61 cfs @ 12.16 hrs HW=271.23' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.61 cfs @ 3.07 fps)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)



Subcat Reach Pond Link

Routing Diagram for Appendix D2 - POST-EAST - 10.5.18
Prepared by Outback Engineering Inc., Printed 4/16/2019

Summary for Subcatchment PDA-27: All RD

Runoff = 0.68 cfs @ 12.10 hrs, Volume= 0.050 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	4,896	98	roads, sidewalks, drives, HSG C
	12,884	74	>75% Grass cover, Good, HSG C
	17,780	81	Weighted Average
	12,884		72.46% Pervious Area
	4,896		27.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
6.1	115	Total			

Summary for Subcatchment PDA18: Rear Roof RD Only

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.061 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Subcatchment PDA21: All RD

Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.061 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	23,137	98	roads, sidewalks, drives, HSG A
	29,938	39	>75% Grass cover, Good, HSG A
	53,075	65	Weighted Average
	29,938		56.41% Pervious Area
	23,137		43.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.4	53	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
7.3	260	Total			

Summary for Subcatchment PDA22: Rear Roof RD Only

Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.080 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	16,514	98	roads, sidewalks, drives, HSG A
*	2,107	98	roads, sidewalks, drives, HSG D
	35,157	39	>75% Grass cover, Good, HSG A
	1,327	80	>75% Grass cover, Good, HSG D
*	9,900	98	front roof areas
	65,005	66	Weighted Average
	36,484		56.12% Pervious Area
	28,521		43.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.2	26	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.6	235	0.0150	2.49		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.9	225	0.0080	4.06	3.19	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.3	536	Total			

Summary for Subcatchment PDA23: Rear Rood RD Only

Runoff = 1.39 cfs @ 12.10 hrs, Volume= 0.110 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	27,655	98	roads, sidewalks, drives, HSG A
	29,781	39	>75% Grass cover, Good, HSG A
	8,116	98	Unconnected roofs, HSG A
	65,552	71	Weighted Average
	29,781		45.43% Pervious Area
	35,771		54.57% Impervious Area
	8,116		22.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA23A: Rear Roof RD Only

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
16,250	30	Woods, Good, HSG A
28,700	34	Weighted Average
28,700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
0.2	70	0.0900	4.83		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
7.7	120	Total			

Summary for Subcatchment PDA24: All RD

Runoff = 0.00 cfs @ 15.69 hrs, Volume= 0.002 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	2,724	98	Pavement, HSG A
	19,674	39	>75% Grass cover, Good, HSG A
	3,110	30	Woods, Good, HSG A
	25,508	44	Weighted Average
	22,784		89.32% Pervious Area
	2,724		10.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA26: Uncontrolled (All RD)

Runoff = 0.02 cfs @ 17.26 hrs, Volume= 0.016 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
	33,333	74	>75% Grass cover, Good, HSG C
	110,370	39	>75% Grass cover, Good, HSG A
	181,305	30	Woods, Good, HSG A
	5,366	80	>75% Grass cover, Good, HSG D
	19,695	77	Woods, Good, HSG D
	25,769	70	Woods, Good, HSG C
*	2,500	98	lot 124 long drive
	378,338	43	Weighted Average
	375,838		99.34% Pervious Area
	2,500		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
0.7	100	0.0200	2.28		**Shallow Concentrated Flow, b** Unpaved Kv= 16.1 fps
12.0	150	Total			

Summary for Subcatchment PDA26A: Uncontrolled from Fern Path lots (All RD)

Runoff = 1.35 cfs @ 12.43 hrs, Volume= 0.177 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
13,183	74	>75% Grass cover, Good, HSG C
66,432	70	Woods, Good, HSG C
12,190	77	Woods, Good, HSG D
7,800	74	>75% Grass cover, Good, HSG C
99,605	72	Weighted Average
99,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
7.5	225	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
27.5	275	Total			

Summary for Subcatchment PDA26B: Upland Near Fern Path

Runoff = 1.45 cfs @ 12.25 hrs, Volume= 0.157 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

Area (sf)	CN	Description
76,546	70	Woods, Good, HSG C
16,894	77	Woods, Good, HSG D
93,440	71	Weighted Average
93,440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
4.0	120	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
16.3	170	Total			

Summary for Reach DP4: East Swamp

Inflow Area = 19.978 ac, 13.67% Impervious, Inflow Depth = 0.23" for 2-Yr Storm event
Inflow = 2.61 cfs @ 12.35 hrs, Volume= 0.382 af
Outflow = 2.61 cfs @ 12.35 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 0.38" for 2-Yr Storm event
Inflow = 0.32 cfs @ 12.42 hrs, Volume= 0.031 af
Outflow = 0.07 cfs @ 13.79 hrs, Volume= 0.031 af, Atten= 79%, Lag= 81.8 min
Primary = 0.07 cfs @ 13.79 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.00' @ 13.79 hrs Surf.Area= 1,375 sf Storage= 423 cf

Plug-Flow detention time= 83.5 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 83.6 min (944.2 - 860.6)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	9,318 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,263	223.2	3,607	4,032	3,805
274.00	3,042	234.3	5,286	9,318	4,415

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.07 cfs @ 13.79 hrs HW=270.00' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.10 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B15: Infil. Basin #15

Inflow Area = 0.586 ac, 10.68% Impervious, Inflow Depth = 0.03" for 2-Yr Storm event
Inflow = 0.00 cfs @ 15.69 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 15.90 hrs, Volume= 0.002 af, Atten= 1%, Lag= 12.3 min
Discarded = 0.00 cfs @ 15.90 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 264.00' @ 15.90 hrs Surf.Area= 531 sf Storage= 2 cf

Plug-Flow detention time= 11.7 min calculated for 0.002 af (100% of inflow)
Center-of-Mass det. time= 11.8 min (1,147.7 - 1,135.9)

Volume	Invert	Avail.Storage	Storage Description
#1	264.00'	7,324 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.00	530	103.9	0	0	530
266.00	1,761	191.4	2,171	2,171	2,607
268.00	3,489	301.2	5,152	7,324	6,940

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.00'	**12.0" Round Emergency Overflow Culvert** L= 58.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 266.00' / 264.84' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 15.90 hrs HW=264.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=264.00' (Free Discharge)
↑—**2=Emergency Overflow Culvert** (Controls 0.00 cfs)

Summary for Pond B16: Infil. Basin #16

Inflow Area = 0.408 ac, 27.54% Impervious, Inflow Depth = 1.47" for 2-Yr Storm event
Inflow = 0.68 cfs @ 12.10 hrs, Volume= 0.050 af
Outflow = 0.24 cfs @ 12.41 hrs, Volume= 0.050 af, Atten= 64%, Lag= 19.0 min
Discarded = 0.22 cfs @ 12.41 hrs, Volume= 0.050 af
Primary = 0.03 cfs @ 12.41 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 272.22' @ 12.41 hrs Surf.Area= 1,131 sf Storage= 410 cf

Plug-Flow detention time= 11.1 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 11.1 min (850.7 - 839.6)

Volume	Invert	Avail.Storage	Storage Description
#1	271.80'	2,643 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.80	877	136.2	0	0	877
272.00	960	140.0	184	184	965
273.50	2,431	218.3	2,459	2,643	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.80'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	272.20'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 12.41 hrs HW=272.22' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=0.02 cfs @ 12.41 hrs HW=272.22' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.30 fps)

Summary for Pond B7: Infil. Basin #7

Inflow Area = 1.505 ac, 54.57% Impervious, Inflow Depth = 0.88" for 2-Yr Storm event
Inflow = 1.39 cfs @ 12.10 hrs, Volume= 0.110 af
Outflow = 0.20 cfs @ 12.95 hrs, Volume= 0.110 af, Atten= 86%, Lag= 51.0 min
Discarded = 0.20 cfs @ 12.95 hrs, Volume= 0.110 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 261.45' @ 12.95 hrs Surf.Area= 3,543 sf Storage= 1,503 cf

Plug-Flow detention time= 68.3 min calculated for 0.110 af (100% of inflow)
Center-of-Mass det. time= 68.1 min (940.3 - 872.2)

Volume	Invert	Avail.Storage	Storage Description
#1	261.00'	15,989 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.00	3,170	255.0	0	0	3,170
262.00	4,030	275.0	3,591	3,591	4,054
264.00	6,476	335.0	10,410	14,001	7,030
264.30	6,777	338.0	1,988	15,989	7,220

Device	Routing	Invert	Outlet Devices
#1	Discarded	261.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	263.30'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.20 cfs @ 12.95 hrs HW=261.45' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=261.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B8: Infil. Basin #8

Inflow Area = 1.492 ac, 43.88% Impervious, Inflow Depth = 0.64" for 2-Yr Storm event
Inflow = 0.82 cfs @ 12.15 hrs, Volume= 0.080 af
Outflow = 0.22 cfs @ 12.65 hrs, Volume= 0.080 af, Atten= 73%, Lag= 30.4 min
Discarded = 0.22 cfs @ 12.65 hrs, Volume= 0.080 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 265.43' @ 12.65 hrs Surf.Area= 1,139 sf Storage= 791 cf

Plug-Flow detention time= 29.6 min calculated for 0.080 af (100% of inflow)
Center-of-Mass det. time= 29.6 min (922.9 - 893.2)

Volume	Invert	Avail.Storage	Storage Description
#1	264.50'	6,295 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.50	586	116.0	0	0	586
266.00	1,563	189.0	1,553	1,553	2,372
268.00	3,284	242.1	4,742	6,295	4,244

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	265.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	266.50'	**2.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height

Discarded OutFlow Max=0.22 cfs @ 12.65 hrs HW=265.43' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=264.50' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B8A: Det. Basin #8A

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 0.00" for 2-Yr Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.20' @ 0.00 hrs Surf.Area= 36 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	270.20'	4,378 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.20	36	36.0	0	0	36
271.00	275	265.0	109	109	5,523
272.00	1,068	285.0	628	738	6,440
274.00	2,696	313.0	3,641	4,378	7,901

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#2	Primary	270.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=270.20' (Free Discharge)
└**1=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond LC3: Leaching Chamber Bed #3

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 0.60" for 2-Yr Storm event
Inflow = 0.62 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.11 cfs @ 12.00 hrs, Volume= 0.061 af, Atten= 82%, Lag= 0.0 min
Discarded = 0.11 cfs @ 12.00 hrs, Volume= 0.061 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 272.09' @ 13.06 hrs Surf.Area= 0.045 ac Storage= 0.016 af

Plug-Flow detention time= 53.7 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 53.6 min (950.2 - 896.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	271.40'	0.039 af	**11.33'W x 172.00'L x 3.21'H Field A** 0.144 af Overall - 0.047 af Embedded = 0.096 af x 40.0% Voids
#2A	271.90'	0.047 af	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
		0.086 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.80'	**6.0" Round Culvert X 4.00**
			L= 7.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 273.80' / 273.70' S= 0.0143 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 12.00 hrs HW=271.43' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=271.40' (Free Discharge)
2=Culvert (Controls 0.00 cfs)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 0.73" for 2-Yr Storm event
Inflow = 0.67 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.34 cfs @ 12.42 hrs, Volume= 0.056 af, Atten= 49%, Lag= 17.5 min
Discarded = 0.02 cfs @ 11.80 hrs, Volume= 0.025 af
Primary = 0.32 cfs @ 12.42 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 272.01' @ 12.42 hrs Surf.Area= 0.016 ac Storage= 0.015 af

Plug-Flow detention time= 184.4 min calculated for 0.056 af (93% of inflow)
Center-of-Mass det. time= 150.0 min (1,034.9 - 884.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A**
			0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1
			Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
			Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
			Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert**
			L= 54.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 11.80 hrs HW=270.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.32 cfs @ 12.42 hrs HW=272.01' (Free Discharge)
2=Culvert (Inlet Controls 0.32 cfs @ 1.79 fps)

Summary for Pond RG4: Bio-Retention area #4

Inflow Area = 0.659 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 265.50' @ 0.00 hrs Surf.Area= 164 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	265.50'	334 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.50	164	114.0	0	0	164
266.50	541	134.9	334	334	596

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.25'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=265.50' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=265.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment PDA-27: All RD

Runoff = 1.27 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	4,896	98	roads, sidewalks, drives, HSG C
	12,884	74	>75% Grass cover, Good, HSG C
	17,780	81	Weighted Average
	12,884		72.46% Pervious Area
	4,896		27.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
6.1	115	Total			

Summary for Subcatchment PDA18: Rear Roof RD Only

Runoff = 1.73 cfs @ 12.12 hrs, Volume= 0.138 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Subcatchment PDA21: All RD

Runoff = 1.84 cfs @ 12.12 hrs, Volume= 0.148 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	23,137	98	roads, sidewalks, drives, HSG A
	29,938	39	>75% Grass cover, Good, HSG A
	53,075	65	Weighted Average
	29,938		56.41% Pervious Area
	23,137		43.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.4	53	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
7.3	260	Total			

Summary for Subcatchment PDA22: Rear Roof RD Only

Runoff = 2.28 cfs @ 12.13 hrs, Volume= 0.190 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	16,514	98	roads, sidewalks, drives, HSG A
*	2,107	98	roads, sidewalks, drives, HSG D
	35,157	39	>75% Grass cover, Good, HSG A
	1,327	80	>75% Grass cover, Good, HSG D
*	9,900	98	front roof areas
	65,005	66	Weighted Average
	36,484		56.12% Pervious Area
	28,521		43.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.2	26	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.6	235	0.0150	2.49		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.9	225	0.0080	4.06	3.19	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.3	536	Total			

Summary for Subcatchment PDA23: Rear Rood RD Only

Runoff = 3.22 cfs @ 12.10 hrs, Volume= 0.237 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	27,655	98	roads, sidewalks, drives, HSG A
	29,781	39	>75% Grass cover, Good, HSG A
	8,116	98	Unconnected roofs, HSG A
	65,552	71	Weighted Average
	29,781		45.43% Pervious Area
	35,771		54.57% Impervious Area
	8,116		22.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA23A: Rear Roof RD Only

Runoff = 0.00 cfs @ 17.15 hrs, Volume= 0.002 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
16,250	30	Woods, Good, HSG A
28,700	34	Weighted Average
28,700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
0.2	70	0.0900	4.83		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
7.7	120	Total			

Summary for Subcatchment PDA24: All RD

Runoff = 0.07 cfs @ 12.37 hrs, Volume= 0.015 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	2,724	98	Pavement, HSG A
	19,674	39	>75% Grass cover, Good, HSG A
	3,110	30	Woods, Good, HSG A
	25,508	44	Weighted Average
	22,784		89.32% Pervious Area
	2,724		10.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA26: Uncontrolled (All RD)

Runoff = 0.71 cfs @ 12.49 hrs, Volume= 0.199 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
	33,333	74	>75% Grass cover, Good, HSG C
	110,370	39	>75% Grass cover, Good, HSG A
	181,305	30	Woods, Good, HSG A
	5,366	80	>75% Grass cover, Good, HSG D
	19,695	77	Woods, Good, HSG D
	25,769	70	Woods, Good, HSG C
*	2,500	98	lot 124 long drive
	378,338	43	Weighted Average
	375,838		99.34% Pervious Area
	2,500		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
0.7	100	0.0200	2.28		**Shallow Concentrated Flow, b** Unpaved Kv= 16.1 fps
12.0	150	Total			

Summary for Subcatchment PDA26A: Uncontrolled from Fern Path lots (All RD)

Runoff = 3.04 cfs @ 12.40 hrs, Volume= 0.375 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
13,183	74	>75% Grass cover, Good, HSG C
66,432	70	Woods, Good, HSG C
12,190	77	Woods, Good, HSG D
7,800	74	>75% Grass cover, Good, HSG C
99,605	72	Weighted Average
99,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
7.5	225	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
27.5	275	Total			

Summary for Subcatchment PDA26B: Upland Near Fern Path

Runoff = 3.38 cfs @ 12.24 hrs, Volume= 0.338 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)	CN	Description
76,546	70	Woods, Good, HSG C
16,894	77	Woods, Good, HSG D
93,440	71	Weighted Average
93,440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
4.0	120	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
16.3	170	Total			

Summary for Reach DP4: East Swamp

Inflow Area = 19.978 ac, 13.67% Impervious, Inflow Depth = 0.64" for 10-Yr Storm event
Inflow = 7.37 cfs @ 12.32 hrs, Volume= 1.073 af
Outflow = 7.37 cfs @ 12.32 hrs, Volume= 1.073 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 1.29" for 10-Yr Storm event
Inflow = 1.62 cfs @ 12.16 hrs, Volume= 0.107 af
Outflow = 0.13 cfs @ 14.14 hrs, Volume= 0.107 af, Atten= 92%, Lag= 119.1 min
Primary = 0.13 cfs @ 14.14 hrs, Volume= 0.107 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 271.11' @ 14.14 hrs Surf.Area= 1,844 sf Storage= 2,213 cf

Plug-Flow detention time= 212.7 min calculated for 0.107 af (100% of inflow)
Center-of-Mass det. time= 212.4 min (1,062.8 - 850.4)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	9,318 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,263	223.2	3,607	4,032	3,805
274.00	3,042	234.3	5,286	9,318	4,415

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.13 cfs @ 14.14 hrs HW=271.11' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.13 cfs @ 5.95 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B15: Infil. Basin #15

Inflow Area = 0.586 ac, 10.68% Impervious, Inflow Depth = 0.31" for 10-Yr Storm event
Inflow = 0.07 cfs @ 12.37 hrs, Volume= 0.015 af
Outflow = 0.03 cfs @ 12.92 hrs, Volume= 0.015 af, Atten= 52%, Lag= 33.1 min
Discarded = 0.03 cfs @ 12.92 hrs, Volume= 0.015 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 264.09' @ 12.92 hrs Surf.Area= 571 sf Storage= 51 cf

Plug-Flow detention time= 15.3 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 15.4 min (983.7 - 968.3)

Volume	Invert	Avail.Storage	Storage Description
#1	264.00'	7,324 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.00	530	103.9	0	0	530
266.00	1,761	191.4	2,171	2,171	2,607
268.00	3,489	301.2	5,152	7,324	6,940

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.00'	**12.0" Round Emergency Overflow Culvert** L= 58.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 266.00' / 264.84' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.92 hrs HW=264.09' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=264.00' (Free Discharge)
↑—**2=Emergency Overflow Culvert** (Controls 0.00 cfs)

Summary for Pond B16: Infil. Basin #16

Inflow Area = 0.408 ac, 27.54% Impervious, Inflow Depth = 2.72" for 10-Yr Storm event
Inflow = 1.27 cfs @ 12.09 hrs, Volume= 0.093 af
Outflow = 1.02 cfs @ 12.17 hrs, Volume= 0.093 af, Atten= 20%, Lag= 4.4 min
Discarded = 0.24 cfs @ 12.17 hrs, Volume= 0.075 af
Primary = 0.78 cfs @ 12.17 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 272.36' @ 12.17 hrs Surf.Area= 1,256 sf Storage= 586 cf

Plug-Flow detention time= 10.4 min calculated for 0.092 af (100% of inflow)
Center-of-Mass det. time= 10.4 min (832.2 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	271.80'	2,643 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.80	877	136.2	0	0	877
272.00	960	140.0	184	184	965
273.50	2,431	218.3	2,459	2,643	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.80'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	272.20'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.24 cfs @ 12.17 hrs HW=272.36' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.74 cfs @ 12.17 hrs HW=272.36' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.74 cfs @ 0.93 fps)

Summary for Pond B7: Infil. Basin #7

Inflow Area = 1.505 ac, 54.57% Impervious, Inflow Depth = 1.89" for 10-Yr Storm event
Inflow = 3.22 cfs @ 12.10 hrs, Volume= 0.237 af
Outflow = 0.24 cfs @ 14.03 hrs, Volume= 0.237 af, Atten= 93%, Lag= 116.1 min
Discarded = 0.24 cfs @ 14.03 hrs, Volume= 0.237 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 262.24' @ 14.03 hrs Surf.Area= 4,296 sf Storage= 4,603 cf

Plug-Flow detention time= 209.6 min calculated for 0.237 af (100% of inflow)
Center-of-Mass det. time= 209.4 min (1,057.8 - 848.4)

Volume	Invert	Avail.Storage	Storage Description
#1	261.00'	15,989 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.00	3,170	255.0	0	0	3,170
262.00	4,030	275.0	3,591	3,591	4,054
264.00	6,476	335.0	10,410	14,001	7,030
264.30	6,777	338.0	1,988	15,989	7,220

Device	Routing	Invert	Outlet Devices
#1	Discarded	261.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	263.30'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.24 cfs @ 14.03 hrs HW=262.24' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=261.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B8: Infil. Basin #8

Inflow Area = 1.492 ac, 43.88% Impervious, Inflow Depth = 1.53" for 10-Yr Storm event
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.190 af
Outflow = 0.89 cfs @ 12.48 hrs, Volume= 0.190 af, Atten= 61%, Lag= 20.8 min
Discarded = 0.35 cfs @ 12.48 hrs, Volume= 0.155 af
Primary = 0.54 cfs @ 12.48 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 266.33' @ 12.48 hrs Surf.Area= 1,803 sf Storage= 2,107 cf

Plug-Flow detention time= 44.2 min calculated for 0.190 af (100% of inflow)
Center-of-Mass det. time= 44.2 min (908.3 - 864.1)

Volume	Invert	Avail.Storage	Storage Description
#1	264.50'	6,295 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.50	586	116.0	0	0	586
266.00	1,563	189.0	1,553	1,553	2,372
268.00	3,284	242.1	4,742	6,295	4,244

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	265.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	266.50'	**2.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height

Discarded OutFlow Max=0.34 cfs @ 12.48 hrs HW=266.33' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.54 cfs @ 12.48 hrs HW=266.33' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.54 cfs @ 2.76 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B8A: Det. Basin #8A

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 0.02" for 10-Yr Storm event
Inflow = 0.02 cfs @ 14.90 hrs, Volume= 0.002 af
Outflow = 0.02 cfs @ 14.95 hrs, Volume= 0.002 af, Atten= 1%, Lag= 2.9 min
Primary = 0.02 cfs @ 14.95 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 270.35' @ 14.95 hrs Surf.Area= 64 sf Storage= 7 cf

Plug-Flow detention time= 6.8 min calculated for 0.002 af (98% of inflow)
Center-of-Mass det. time= 5.4 min (910.1 - 904.7)

Volume	Invert	Avail.Storage	Storage Description
#1	270.20'	4,378 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.20	36	36.0	0	0	36
271.00	275	265.0	109	109	5,523
272.00	1,068	285.0	628	738	6,440
274.00	2,696	313.0	3,641	4,378	7,901

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#2	Primary	270.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 14.95 hrs HW=270.35' (Free Discharge)
└**1=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.08 fps)

Summary for Pond LC3: Leaching Chamber Bed #3

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 1.46" for 10-Yr Storm event
Inflow = 1.84 cfs @ 12.12 hrs, Volume= 0.148 af
Outflow = 0.13 cfs @ 14.90 hrs, Volume= 0.148 af, Atten= 93%, Lag= 167.1 min
Discarded = 0.11 cfs @ 11.70 hrs, Volume= 0.146 af
Primary = 0.02 cfs @ 14.90 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 273.84' @ 14.90 hrs Surf.Area= 0.045 ac Storage= 0.071 af

Plug-Flow detention time= 305.2 min calculated for 0.148 af (100% of inflow)
Center-of-Mass det. time= 305.1 min (1,171.1 - 866.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	271.40'	0.039 af	**11.33'W x 172.00'L x 3.21'H Field A** 0.144 af Overall - 0.047 af Embedded = 0.096 af x 40.0% Voids
#2A	271.90'	0.047 af	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
		0.086 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.80'	**6.0" Round Culvert X 4.00**
			L= 7.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 273.80' / 273.70' S= 0.0143 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 11.70 hrs HW=271.43' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.02 cfs @ 14.90 hrs HW=273.84' (Free Discharge)
2=Culvert (Inlet Controls 0.02 cfs @ 0.71 fps)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 1.67" for 10-Yr Storm event
Inflow = 1.73 cfs @ 12.12 hrs, Volume= 0.138 af
Outflow = 1.64 cfs @ 12.16 hrs, Volume= 0.133 af, Atten= 6%, Lag= 2.4 min
Discarded = 0.02 cfs @ 10.95 hrs, Volume= 0.027 af
Primary = 1.62 cfs @ 12.16 hrs, Volume= 0.107 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 272.42' @ 12.16 hrs Surf.Area= 0.016 ac Storage= 0.019 af

Plug-Flow detention time= 83.8 min calculated for 0.133 af (97% of inflow)
Center-of-Mass det. time= 66.1 min (924.2 - 858.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A**
			0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1
			Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
			Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
			Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert**
			L= 54.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 10.95 hrs HW=270.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.58 cfs @ 12.16 hrs HW=272.41' (Free Discharge)
2=Culvert (Inlet Controls 1.58 cfs @ 2.80 fps)

Summary for Pond RG4: Bio-Retention area #4

Inflow Area = 0.659 ac, 0.00% Impervious, Inflow Depth = 0.03" for 10-Yr Storm event
Inflow = 0.00 cfs @ 17.15 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 17.20 hrs, Volume= 0.002 af, Atten= 0%, Lag= 3.0 min
Discarded = 0.00 cfs @ 17.20 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 265.50' @ 17.20 hrs Surf.Area= 165 sf Storage= 0 cf

Plug-Flow detention time= 3.0 min calculated for 0.002 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (1,171.9 - 1,168.9)

Volume	Invert	Avail.Storage	Storage Description
#1	265.50'	334 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.50	164	114.0	0	0	164
266.50	541	134.9	334	334	596

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.25'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 17.20 hrs HW=265.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=265.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment PDA-27: All RD

Runoff = 1.60 cfs @ 12.09 hrs, Volume= 0.117 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	4,896	98	roads, sidewalks, drives, HSG C
	12,884	74	>75% Grass cover, Good, HSG C
	17,780	81	Weighted Average
	12,884		72.46% Pervious Area
	4,896		27.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
6.1	115	Total			

Summary for Subcatchment PDA18: Rear Roof RD Only

Runoff = 2.38 cfs @ 12.12 hrs, Volume= 0.186 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Subcatchment PDA21: All RD

Runoff = 2.60 cfs @ 12.11 hrs, Volume= 0.203 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	23,137	98	roads, sidewalks, drives, HSG A
	29,938	39	>75% Grass cover, Good, HSG A
	53,075	65	Weighted Average
	29,938		56.41% Pervious Area
	23,137		43.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.4	53	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
7.3	260	Total			

Summary for Subcatchment PDA22: Rear Roof RD Only

Runoff = 3.18 cfs @ 12.13 hrs, Volume= 0.258 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	16,514	98	roads, sidewalks, drives, HSG A
*	2,107	98	roads, sidewalks, drives, HSG D
	35,157	39	>75% Grass cover, Good, HSG A
	1,327	80	>75% Grass cover, Good, HSG D
*	9,900	98	front roof areas
	65,005	66	Weighted Average
	36,484		56.12% Pervious Area
	28,521		43.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.2	26	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.6	235	0.0150	2.49		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.9	225	0.0080	4.06	3.19	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.3	536	Total			

Summary for Subcatchment PDA23: Rear Rood RD Only

Runoff = 4.30 cfs @ 12.10 hrs, Volume= 0.314 af, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	27,655	98	roads, sidewalks, drives, HSG A
	29,781	39	>75% Grass cover, Good, HSG A
	8,116	98	Unconnected roofs, HSG A
	65,552	71	Weighted Average
	29,781		45.43% Pervious Area
	35,771		54.57% Impervious Area
	8,116		22.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA23A: Rear Roof RD Only

Runoff = 0.01 cfs @ 14.83 hrs, Volume= 0.007 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
16,250	30	Woods, Good, HSG A
28,700	34	Weighted Average
28,700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
0.2	70	0.0900	4.83		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
7.7	120	Total			

Summary for Subcatchment PDA24: All RD

Runoff = 0.16 cfs @ 12.15 hrs, Volume= 0.027 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	2,724	98	Pavement, HSG A
	19,674	39	>75% Grass cover, Good, HSG A
	3,110	30	Woods, Good, HSG A
	25,508	44	Weighted Average
	22,784		89.32% Pervious Area
	2,724		10.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA26: Uncontrolled (All RD)

Runoff = 1.90 cfs @ 12.39 hrs, Volume= 0.365 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
	33,333	74	>75% Grass cover, Good, HSG C
	110,370	39	>75% Grass cover, Good, HSG A
	181,305	30	Woods, Good, HSG A
	5,366	80	>75% Grass cover, Good, HSG D
	19,695	77	Woods, Good, HSG D
	25,769	70	Woods, Good, HSG C
*	2,500	98	lot 124 long drive
	378,338	43	Weighted Average
	375,838		99.34% Pervious Area
	2,500		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
0.7	100	0.0200	2.28		**Shallow Concentrated Flow, b** Unpaved Kv= 16.1 fps
12.0	150	Total			

Summary for Subcatchment PDA26A: Uncontrolled from Fern Path lots (All RD)

Runoff = 4.05 cfs @ 12.39 hrs, Volume= 0.493 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
13,183	74	>75% Grass cover, Good, HSG C
66,432	70	Woods, Good, HSG C
12,190	77	Woods, Good, HSG D
7,800	74	>75% Grass cover, Good, HSG C
99,605	72	Weighted Average
99,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
7.5	225	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
27.5	275	Total			

Summary for Subcatchment PDA26B: Upland Near Fern Path

Runoff = 4.53 cfs @ 12.23 hrs, Volume= 0.447 af, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
76,546	70	Woods, Good, HSG C
16,894	77	Woods, Good, HSG D
93,440	71	Weighted Average
93,440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
4.0	120	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
16.3	170	Total			

Summary for Reach DP4: East Swamp

Inflow Area = 19.978 ac, 13.67% Impervious, Inflow Depth > 0.96" for 25-yr event
Inflow = 11.50 cfs @ 12.31 hrs, Volume= 1.603 af
Outflow = 11.50 cfs @ 12.31 hrs, Volume= 1.603 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 1.86" for 25-yr event
Inflow = 2.25 cfs @ 12.14 hrs, Volume= 0.154 af
Outflow = 0.15 cfs @ 14.48 hrs, Volume= 0.153 af, Atten= 93%, Lag= 140.2 min
Primary = 0.15 cfs @ 14.48 hrs, Volume= 0.153 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 271.75' @ 14.48 hrs Surf.Area= 2,141 sf Storage= 3,483 cf

Plug-Flow detention time= 280.2 min calculated for 0.153 af (100% of inflow)
Center-of-Mass det. time= 279.1 min (1,124.6 - 845.5)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	9,318 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,263	223.2	3,607	4,032	3,805
274.00	3,042	234.3	5,286	9,318	4,415

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.15 cfs @ 14.48 hrs HW=271.75' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.15 cfs @ 7.09 fps)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond B15: Infil. Basin #15

Inflow Area = 0.586 ac, 10.68% Impervious, Inflow Depth = 0.56" for 25-yr event
Inflow = 0.16 cfs @ 12.15 hrs, Volume= 0.027 af
Outflow = 0.04 cfs @ 13.99 hrs, Volume= 0.027 af, Atten= 75%, Lag= 110.6 min
Discarded = 0.04 cfs @ 13.99 hrs, Volume= 0.027 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 264.41' @ 13.99 hrs Surf.Area= 722 sf Storage= 254 cf

Plug-Flow detention time= 65.5 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 65.3 min (1,001.8 - 936.5)

Volume	Invert	Avail.Storage	Storage Description
#1	264.00'	7,324 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.00	530	103.9	0	0	530
266.00	1,761	191.4	2,171	2,171	2,607
268.00	3,489	301.2	5,152	7,324	6,940

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.00'	**12.0" Round Emergency Overflow Culvert** L= 58.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 266.00' / 264.84' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 13.99 hrs HW=264.41' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=264.00' (Free Discharge)
↑—**2=Emergency Overflow Culvert** (Controls 0.00 cfs)

Summary for Pond B16: Infil. Basin #16

Inflow Area = 0.408 ac, 27.54% Impervious, Inflow Depth = 3.43" for 25-yr event
Inflow = 1.60 cfs @ 12.09 hrs, Volume= 0.117 af
Outflow = 1.39 cfs @ 12.15 hrs, Volume= 0.117 af, Atten= 13%, Lag= 3.2 min
Discarded = 0.25 cfs @ 12.15 hrs, Volume= 0.088 af
Primary = 1.15 cfs @ 12.15 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 272.41' @ 12.15 hrs Surf.Area= 1,297 sf Storage= 647 cf

Plug-Flow detention time= 10.1 min calculated for 0.117 af (100% of inflow)
Center-of-Mass det. time= 10.1 min (825.3 - 815.2)

Volume	Invert	Avail.Storage	Storage Description
#1	271.80'	2,643 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.80	877	136.2	0	0	877
272.00	960	140.0	184	184	965
273.50	2,431	218.3	2,459	2,643	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.80'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	272.20'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.25 cfs @ 12.15 hrs HW=272.41' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=1.14 cfs @ 12.15 hrs HW=272.41' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 1.14 cfs @ 1.08 fps)

Summary for Pond B7: Infil. Basin #7

Inflow Area = 1.505 ac, 54.57% Impervious, Inflow Depth = 2.50" for 25-yr event
Inflow = 4.30 cfs @ 12.10 hrs, Volume= 0.314 af
Outflow = 0.27 cfs @ 14.52 hrs, Volume= 0.314 af, Atten= 94%, Lag= 145.4 min
Discarded = 0.27 cfs @ 14.52 hrs, Volume= 0.314 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 262.69' @ 14.52 hrs Surf.Area= 4,805 sf Storage= 6,624 cf

Plug-Flow detention time= 278.3 min calculated for 0.314 af (100% of inflow)
Center-of-Mass det. time= 278.2 min (1,118.4 - 840.2)

Volume	Invert	Avail.Storage	Storage Description
#1	261.00'	15,989 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.00	3,170	255.0	0	0	3,170
262.00	4,030	275.0	3,591	3,591	4,054
264.00	6,476	335.0	10,410	14,001	7,030
264.30	6,777	338.0	1,988	15,989	7,220

Device	Routing	Invert	Outlet Devices
#1	Discarded	261.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	263.30'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.27 cfs @ 14.52 hrs HW=262.69' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=261.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B8: Infil. Basin #8

Inflow Area = 1.492 ac, 43.88% Impervious, Inflow Depth = 2.08" for 25-yr event
Inflow = 3.18 cfs @ 12.13 hrs, Volume= 0.258 af
Outflow = 1.54 cfs @ 12.39 hrs, Volume= 0.258 af, Atten= 52%, Lag= 15.6 min
Discarded = 0.39 cfs @ 12.39 hrs, Volume= 0.186 af
Primary = 1.15 cfs @ 12.39 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 266.65' @ 12.39 hrs Surf.Area= 2,054 sf Storage= 2,727 cf

Plug-Flow detention time= 42.7 min calculated for 0.258 af (100% of inflow)
Center-of-Mass det. time= 42.6 min (897.3 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1	264.50'	6,295 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.50	586	116.0	0	0	586
266.00	1,563	189.0	1,553	1,553	2,372
268.00	3,284	242.1	4,742	6,295	4,244

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	265.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	266.50'	**2.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height

Discarded OutFlow Max=0.39 cfs @ 12.39 hrs HW=266.65' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=1.14 cfs @ 12.39 hrs HW=266.65' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.76 cfs @ 3.88 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.38 cfs @ 1.28 fps)

Summary for Pond B8A: Det. Basin #8A

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 0.43" for 25-yr event
Inflow = 0.58 cfs @ 12.55 hrs, Volume= 0.044 af
Outflow = 0.37 cfs @ 12.73 hrs, Volume= 0.044 af, Atten= 36%, Lag= 10.6 min
Primary = 0.37 cfs @ 12.73 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 271.20' @ 12.73 hrs Surf.Area= 393 sf Storage= 176 cf

Plug-Flow detention time= 4.7 min calculated for 0.043 af (100% of inflow)
Center-of-Mass det. time= 4.5 min (815.4 - 810.9)

Volume	Invert	Avail.Storage	Storage Description
#1	270.20'	4,378 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.20	36	36.0	0	0	36
271.00	275	265.0	109	109	5,523
272.00	1,068	285.0	628	738	6,440
274.00	2,696	313.0	3,641	4,378	7,901

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#2	Primary	270.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.37 cfs @ 12.73 hrs HW=271.20' (Free Discharge)
└**1=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.26 fps)

Summary for Pond LC3: Leaching Chamber Bed #3

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 1.99" for 25-yr event
Inflow = 2.60 cfs @ 12.11 hrs, Volume= 0.203 af
Outflow = 0.69 cfs @ 12.55 hrs, Volume= 0.203 af, Atten= 73%, Lag= 26.2 min
Discarded = 0.11 cfs @ 11.55 hrs, Volume= 0.159 af
Primary = 0.58 cfs @ 12.55 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 274.04' @ 12.55 hrs Surf.Area= 0.045 ac Storage= 0.076 af

Plug-Flow detention time= 256.9 min calculated for 0.203 af (100% of inflow)
Center-of-Mass det. time= 256.8 min (1,113.2 - 856.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	271.40'	0.039 af	**11.33'W x 172.00'L x 3.21'H Field A** 0.144 af Overall - 0.047 af Embedded = 0.096 af x 40.0% Voids
#2A	271.90'	0.047 af	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
		0.086 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.80'	**6.0" Round Culvert X 4.00**
			L= 7.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 273.80' / 273.70' S= 0.0143 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 11.55 hrs HW=271.43' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.58 cfs @ 12.55 hrs HW=274.04' (Free Discharge)
↑**2=Culvert** (Barrel Controls 0.58 cfs @ 2.25 fps)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 2.24" for 25-yr event
Inflow = 2.38 cfs @ 12.12 hrs, Volume= 0.186 af
Outflow = 2.27 cfs @ 12.14 hrs, Volume= 0.181 af, Atten= 5%, Lag= 1.6 min
Discarded = 0.02 cfs @ 10.40 hrs, Volume= 0.027 af
Primary = 2.25 cfs @ 12.14 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 272.58' @ 12.14 hrs Surf.Area= 0.016 ac Storage= 0.020 af

Plug-Flow detention time= 64.6 min calculated for 0.181 af (98% of inflow)
Center-of-Mass det. time= 50.5 min (899.7 - 849.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A**
			0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1
			Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
			Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
			Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert**
			L= 54.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 10.40 hrs HW=270.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.23 cfs @ 12.14 hrs HW=272.58' (Free Discharge)
↑**2=Culvert** (Inlet Controls 2.23 cfs @ 3.14 fps)

Summary for Pond RG4: Bio-Retention area #4

Inflow Area = 0.659 ac, 0.00% Impervious, Inflow Depth = 0.12" for 25-yr event
Inflow = 0.01 cfs @ 14.83 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 15.75 hrs, Volume= 0.007 af, Atten= 10%, Lag= 55.5 min
Discarded = 0.01 cfs @ 15.75 hrs, Volume= 0.007 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 265.55' @ 15.75 hrs Surf.Area= 177 sf Storage= 8 cf

Plug-Flow detention time= 5.9 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 5.9 min (1,068.8 - 1,062.9)

Volume	Invert	Avail.Storage	Storage Description
#1	265.50'	334 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.50	164	114.0	0	0	164
266.50	541	134.9	334	334	596

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.25'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 15.75 hrs HW=265.55' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=265.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment PDA-27: All RD

Runoff = 2.09 cfs @ 12.09 hrs, Volume= 0.154 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	4,896	98	roads, sidewalks, drives, HSG C
	12,884	74	>75% Grass cover, Good, HSG C
	17,780	81	Weighted Average
	12,884		72.46% Pervious Area
	4,896		27.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
6.1	115	Total			

Summary for Subcatchment PDA18: Rear Roof RD Only

Runoff = 3.40 cfs @ 12.12 hrs, Volume= 0.262 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Subcatchment PDA21: All RD

Runoff = 3.82 cfs @ 12.11 hrs, Volume= 0.292 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	23,137	98	roads, sidewalks, drives, HSG A
	29,938	39	>75% Grass cover, Good, HSG A
	53,075	65	Weighted Average
	29,938		56.41% Pervious Area
	23,137		43.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
0.4	53	0.0200	2.28		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
7.3	260	Total			

Summary for Subcatchment PDA22: Rear Roof RD Only

Runoff = 4.68 cfs @ 12.12 hrs, Volume= 0.369 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	16,514	98	roads, sidewalks, drives, HSG A
*	2,107	98	roads, sidewalks, drives, HSG D
	35,157	39	>75% Grass cover, Good, HSG A
	1,327	80	>75% Grass cover, Good, HSG D
*	9,900	98	front roof areas
	65,005	66	Weighted Average
	36,484		56.12% Pervious Area
	28,521		43.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.2	26	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.6	235	0.0150	2.49		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
0.9	225	0.0080	4.06	3.19	**Pipe Channel, DE** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
8.3	536	Total			

Summary for Subcatchment PDA23: Rear Rood RD Only

Runoff = 6.00 cfs @ 12.09 hrs, Volume= 0.435 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	27,655	98	roads, sidewalks, drives, HSG A
	29,781	39	>75% Grass cover, Good, HSG A
	8,116	98	Unconnected roofs, HSG A
	65,552	71	Weighted Average
	29,781		45.43% Pervious Area
	35,771		54.57% Impervious Area
	8,116		22.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA23A: Rear Roof RD Only

Runoff = 0.07 cfs @ 12.44 hrs, Volume= 0.020 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
16,250	30	Woods, Good, HSG A
28,700	34	Weighted Average
28,700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
0.2	70	0.0900	4.83		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
7.7	120	Total			

Summary for Subcatchment PDA24: All RD

Runoff = 0.47 cfs @ 12.12 hrs, Volume= 0.050 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	2,724	98	Pavement, HSG A
	19,674	39	>75% Grass cover, Good, HSG A
	3,110	30	Woods, Good, HSG A
	25,508	44	Weighted Average
	22,784		89.32% Pervious Area
	2,724		10.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR55-MIN**

Summary for Subcatchment PDA26: Uncontrolled (All RD)

Runoff = 4.95 cfs @ 12.24 hrs, Volume= 0.686 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
	33,333	74	>75% Grass cover, Good, HSG C
	110,370	39	>75% Grass cover, Good, HSG A
	181,305	30	Woods, Good, HSG A
	5,366	80	>75% Grass cover, Good, HSG D
	19,695	77	Woods, Good, HSG D
	25,769	70	Woods, Good, HSG C
*	2,500	98	lot 124 long drive
	378,338	43	Weighted Average
	375,838		99.34% Pervious Area
	2,500		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
0.7	100	0.0200	2.28		**Shallow Concentrated Flow, b** Unpaved Kv= 16.1 fps
12.0	150	Total			

Summary for Subcatchment PDA26A: Uncontrolled from Fern Path lots (All RD)

Runoff = 5.62 cfs @ 12.39 hrs, Volume= 0.681 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
13,183	74	>75% Grass cover, Good, HSG C
66,432	70	Woods, Good, HSG C
12,190	77	Woods, Good, HSG D
7,800	74	>75% Grass cover, Good, HSG C
99,605	72	Weighted Average
99,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	50	0.0060	0.04		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
7.5	225	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
27.5	275	Total			

Summary for Subcatchment PDA26B: Upland Near Fern Path

Runoff = 6.34 cfs @ 12.23 hrs, Volume= 0.621 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
76,546	70	Woods, Good, HSG C
16,894	77	Woods, Good, HSG D
93,440	71	Weighted Average
93,440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow, a** Woods: Light underbrush n= 0.400 P2= 3.20"
4.0	120	0.0100	0.50		**Shallow Concentrated Flow, b** Woodland Kv= 5.0 fps
16.3	170	Total			

Summary for Reach DP4: East Swamp

Inflow Area = 19.978 ac, 13.67% Impervious, Inflow Depth > 1.51" for 100-Yr Storm event
Inflow = 20.25 cfs @ 12.26 hrs, Volume= 2.518 af
Outflow = 20.25 cfs @ 12.26 hrs, Volume= 2.518 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 2.77" for 100-Yr Storm event
Inflow = 3.18 cfs @ 12.15 hrs, Volume= 0.229 af
Outflow = 0.19 cfs @ 14.97 hrs, Volume= 0.220 af, Atten= 94%, Lag= 169.5 min
Primary = 0.19 cfs @ 14.97 hrs, Volume= 0.220 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 272.69' @ 14.97 hrs Surf.Area= 2,520 sf Storage= 5,687 cf

Plug-Flow detention time= 372.4 min calculated for 0.220 af (96% of inflow)
Center-of-Mass det. time= 351.9 min (1,190.9 - 839.0)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	9,318 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,263	223.2	3,607	4,032	3,805
274.00	3,042	234.3	5,286	9,318	4,415

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.19 cfs @ 14.97 hrs HW=272.69' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.49 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B15: Infil. Basin #15

Inflow Area = 0.586 ac, 10.68% Impervious, Inflow Depth = 1.02" for 100-Yr Storm event
Inflow = 0.47 cfs @ 12.12 hrs, Volume= 0.050 af
Outflow = 0.06 cfs @ 14.74 hrs, Volume= 0.050 af, Atten= 88%, Lag= 156.9 min
Discarded = 0.06 cfs @ 14.74 hrs, Volume= 0.050 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 264.97' @ 14.74 hrs Surf.Area= 1,038 sf Storage= 748 cf

Plug-Flow detention time= 159.2 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 159.0 min (1,067.5 - 908.5)

Volume	Invert	Avail.Storage	Storage Description
#1	264.00'	7,324 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.00	530	103.9	0	0	530
266.00	1,761	191.4	2,171	2,171	2,607
268.00	3,489	301.2	5,152	7,324	6,940

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.00'	**12.0" Round Emergency Overflow Culvert** L= 58.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 266.00' / 264.84' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.06 cfs @ 14.74 hrs HW=264.97' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=264.00' (Free Discharge)
↑—**2=Emergency Overflow Culvert** (Controls 0.00 cfs)

Summary for Pond B16: Infil. Basin #16

Inflow Area = 0.408 ac, 27.54% Impervious, Inflow Depth = 4.53" for 100-Yr Storm event
Inflow = 2.09 cfs @ 12.09 hrs, Volume= 0.154 af
Outflow = 1.90 cfs @ 12.13 hrs, Volume= 0.154 af, Atten= 9%, Lag= 2.3 min
Discarded = 0.26 cfs @ 12.13 hrs, Volume= 0.108 af
Primary = 1.65 cfs @ 12.13 hrs, Volume= 0.046 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 272.47' @ 12.13 hrs Surf.Area= 1,346 sf Storage= 719 cf

Plug-Flow detention time= 9.9 min calculated for 0.154 af (100% of inflow)
Center-of-Mass det. time= 9.9 min (817.2 - 807.3)

Volume	Invert	Avail.Storage	Storage Description
#1	271.80'	2,643 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.80	877	136.2	0	0	877
272.00	960	140.0	184	184	965
273.50	2,431	218.3	2,459	2,643	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.80'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	272.20'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.26 cfs @ 12.13 hrs HW=272.46' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=1.60 cfs @ 12.13 hrs HW=272.46' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 1.60 cfs @ 1.22 fps)

Summary for Pond B7: Infil. Basin #7

Inflow Area = 1.505 ac, 54.57% Impervious, Inflow Depth = 3.47" for 100-Yr Storm event
Inflow = 6.00 cfs @ 12.09 hrs, Volume= 0.435 af
Outflow = 0.36 cfs @ 14.48 hrs, Volume= 0.424 af, Atten= 94%, Lag= 143.4 min
Discarded = 0.31 cfs @ 14.48 hrs, Volume= 0.421 af
Primary = 0.04 cfs @ 14.48 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 263.32' @ 14.48 hrs Surf.Area= 5,579 sf Storage= 9,904 cf

Plug-Flow detention time= 358.4 min calculated for 0.424 af (97% of inflow)
Center-of-Mass det. time= 343.9 min (1,174.5 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1	261.00'	15,989 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
261.00	3,170	255.0	0	0	3,170
262.00	4,030	275.0	3,591	3,591	4,054
264.00	6,476	335.0	10,410	14,001	7,030
264.30	6,777	338.0	1,988	15,989	7,220

Device	Routing	Invert	Outlet Devices
#1	Discarded	261.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	263.30'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.31 cfs @ 14.48 hrs HW=263.32' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.04 cfs @ 14.48 hrs HW=263.32' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.38 fps)

Summary for Pond B8: Infil. Basin #8

Inflow Area = 1.492 ac, 43.88% Impervious, Inflow Depth = 2.97" for 100-Yr Storm event
Inflow = 4.68 cfs @ 12.12 hrs, Volume= 0.369 af
Outflow = 3.12 cfs @ 12.26 hrs, Volume= 0.369 af, Atten= 33%, Lag= 8.1 min
Discarded = 0.44 cfs @ 12.26 hrs, Volume= 0.226 af
Primary = 2.68 cfs @ 12.26 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 266.92' @ 12.26 hrs Surf.Area= 2,279 sf Storage= 3,317 cf

Plug-Flow detention time= 39.0 min calculated for 0.369 af (100% of inflow)
Center-of-Mass det. time= 39.0 min (883.1 - 844.1)

Volume	Invert	Avail.Storage	Storage Description
#1	264.50'	6,295 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.50	586	116.0	0	0	586
266.00	1,563	189.0	1,553	1,553	2,372
268.00	3,284	242.1	4,742	6,295	4,244

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	265.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	266.50'	**2.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height

Discarded OutFlow Max=0.44 cfs @ 12.26 hrs HW=266.92' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.44 cfs)

Primary OutFlow Max=2.66 cfs @ 12.26 hrs HW=266.92' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.91 cfs @ 4.62 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.75 cfs @ 2.17 fps)

Summary for Pond B8A: Det. Basin #8A

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 1.14" for 100-Yr Storm event
Inflow = 2.01 cfs @ 12.28 hrs, Volume= 0.116 af
Outflow = 0.62 cfs @ 12.68 hrs, Volume= 0.116 af, Atten= 69%, Lag= 23.5 min
Primary = 0.62 cfs @ 12.68 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 272.59' @ 12.68 hrs Surf.Area= 1,473 sf Storage= 1,488 cf

Plug-Flow detention time= 22.5 min calculated for 0.116 af (100% of inflow)
Center-of-Mass det. time= 22.4 min (817.4 - 795.0)

Volume	Invert	Avail.Storage	Storage Description
#1	270.20'	4,378 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.20	36	36.0	0	0	36
271.00	275	265.0	109	109	5,523
272.00	1,068	285.0	628	738	6,440
274.00	2,696	313.0	3,641	4,378	7,901

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#2	Primary	270.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.62 cfs @ 12.68 hrs HW=272.59' (Free Discharge)
└**1=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Orifice Controls 0.62 cfs @ 7.10 fps)

Summary for Pond LC3: Leaching Chamber Bed #3

Inflow Area = 1.218 ac, 43.59% Impervious, Inflow Depth = 2.87" for 100-Yr Storm event
Inflow = 3.82 cfs @ 12.11 hrs, Volume= 0.292 af
Outflow = 2.12 cfs @ 12.28 hrs, Volume= 0.292 af, Atten= 45%, Lag= 10.4 min
Discarded = 0.11 cfs @ 11.15 hrs, Volume= 0.175 af
Primary = 2.01 cfs @ 12.28 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 274.35' @ 12.28 hrs Surf.Area= 0.045 ac Storage= 0.081 af

Plug-Flow detention time= 202.1 min calculated for 0.291 af (100% of inflow)
Center-of-Mass det. time= 202.4 min (1,047.8 - 845.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	271.40'	0.039 af	**11.33'W x 172.00'L x 3.21'H Field A** 0.144 af Overall - 0.047 af Embedded = 0.096 af x 40.0% Voids
#2A	271.90'	0.047 af	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
		0.086 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	271.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	273.80'	**6.0" Round Culvert X 4.00**
			L= 7.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 273.80' / 273.70' S= 0.0143 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 11.15 hrs HW=271.43' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=1.99 cfs @ 12.28 hrs HW=274.34' (Free Discharge)
↑**2=Culvert** (Barrel Controls 1.99 cfs @ 2.90 fps)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 3.17" for 100-Yr Storm event
Inflow = 3.40 cfs @ 12.12 hrs, Volume= 0.262 af
Outflow = 3.19 cfs @ 12.15 hrs, Volume= 0.257 af, Atten= 6%, Lag= 1.9 min
Discarded = 0.02 cfs @ 9.65 hrs, Volume= 0.028 af
Primary = 3.18 cfs @ 12.15 hrs, Volume= 0.229 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 272.94' @ 12.15 hrs Surf.Area= 0.016 ac Storage= 0.023 af

Plug-Flow detention time= 47.6 min calculated for 0.257 af (98% of inflow)
Center-of-Mass det. time= 37.7 min (876.8 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A**
			0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1
			Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
			Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
			Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert**
			L= 54.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 9.65 hrs HW=270.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.17 cfs @ 12.15 hrs HW=272.93' (Free Discharge)
↑**2=Culvert** (Inlet Controls 3.17 cfs @ 4.03 fps)

Summary for Pond RG4: Bio-Retention area #4

Inflow Area = 0.659 ac, 0.00% Impervious, Inflow Depth = 0.36" for 100-Yr Storm event
Inflow = 0.07 cfs @ 12.44 hrs, Volume= 0.020 af
Outflow = 0.02 cfs @ 15.89 hrs, Volume= 0.020 af, Atten= 66%, Lag= 207.0 min
Discarded = 0.02 cfs @ 15.89 hrs, Volume= 0.020 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 266.21' @ 15.89 hrs Surf.Area= 409 sf Storage= 197 cf

Plug-Flow detention time= 111.9 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 111.8 min (1,099.4 - 987.6)

Volume	Invert	Avail.Storage	Storage Description
#1	265.50'	334 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.50	164	114.0	0	0	164
266.50	541	134.9	334	334	596

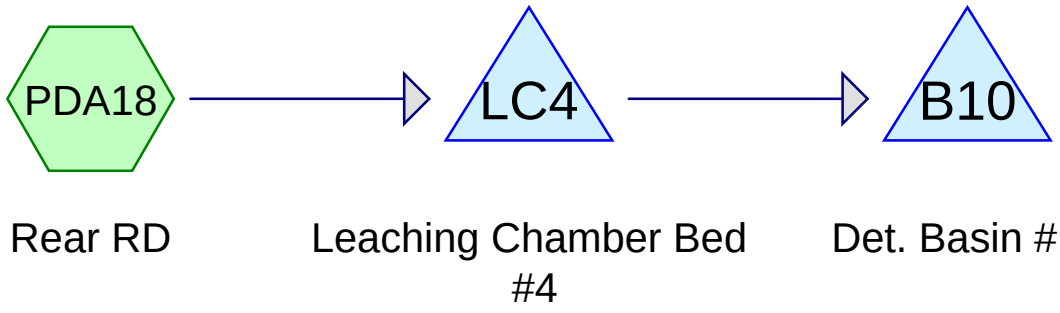
Device	Routing	Invert	Outlet Devices
#1	Discarded	265.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	266.25'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.02 cfs @ 15.89 hrs HW=266.21' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=265.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Appendix D-3

Post-Development Hydrology Calculations for Tailwater Condition
at LC-4 & Detention Basin 10 (Standard #2)



Subcat Reach Pond Link

Routing Diagram for Appendix D3 - LC4 DynamicSI 8.14.18
Prepared by {enter your company name here}, Printed 8/14/2018

Time span=0.00-35.00 hrs, dt=0.05 hrs, 701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA18: Rear RD Runoff Area=43,236 sf 49.57% Impervious Runoff Depth=0.73"
Flow Length=322' Tc=7.8 min CN=68 Runoff=0.67 cfs 0.061 af

Pond B10: Det. Basin #10 Peak Elev=270.00' Storage=420 cf Inflow=0.32 cfs 0.031 af
Outflow=0.07 cfs 0.031 af

Pond LC4: Leaching Chamber Bed #4 Peak Elev=272.01' Storage=0.015 af Inflow=0.67 cfs 0.061 af
Discarded=0.02 cfs 0.029 af Primary=0.32 cfs 0.031 af Outflow=0.34 cfs 0.061 af

Total Runoff Area = 0.993 ac Runoff Volume = 0.061 af Average Runoff Depth = 0.73"
50.43% Pervious = 0.501 ac 49.57% Impervious = 0.492 ac

Summary for Subcatchment PDA18: Rear RD

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.061 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 0.38" for 2-Yr Storm event
Inflow = 0.32 cfs @ 12.43 hrs, Volume= 0.031 af
Outflow = 0.07 cfs @ 13.79 hrs, Volume= 0.031 af, Atten= 79%, Lag= 82.0 min
Primary = 0.07 cfs @ 13.79 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 270.00' @ 13.79 hrs Surf.Area= 1,371 sf Storage= 420 cf

Plug-Flow detention time= 83.6 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 83.3 min (943.6 - 860.3)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	11,150 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,683	235.0	3,991	4,417	4,168
274.00	4,100	269.0	6,733	11,150	5,621

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir**

2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.07 cfs @ 13.79 hrs HW=270.00' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.07 cfs @ 3.09 fps)
2=Sharp-Crested Rectangular Weir(Controls 0.00 cfs)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 0.73" for 2-Yr Storm event
Inflow = 0.67 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.34 cfs @ 12.43 hrs, Volume= 0.061 af, Atten= 50%, Lag= 17.6 min
Discarded = 0.02 cfs @ 11.85 hrs, Volume= 0.029 af
Primary = 0.32 cfs @ 12.43 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 272.01' @ 12.43 hrs Surf.Area= 0.016 ac Storage= 0.015 af

Plug-Flow detention time= 208.0 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 208.7 min (1,093.5 - 884.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A** 0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert** L= 54.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 11.85 hrs HW=270.56' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.32 cfs @ 12.43 hrs HW=272.01' TW=269.71' (Dynamic Tailwater)
2=Culvert (Inlet Controls 0.32 cfs @ 1.79 fps)

Time span=0.00-35.00 hrs, dt=0.05 hrs, 701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA18: Rear RD Runoff Area=43,236 sf 49.57% Impervious Runoff Depth=1.67"
Flow Length=322' Tc=7.8 min CN=68 Runoff=1.73 cfs 0.138 af

Pond B10: Det. Basin #10 Peak Elev=271.06' Storage=2,221 cf Inflow=1.66 cfs 0.107 af
Outflow=0.13 cfs 0.107 af

Pond LC4: Leaching Chamber Bed #4 Peak Elev=272.43' Storage=0.019 af Inflow=1.73 cfs 0.138 af
Discarded=0.02 cfs 0.031 af Primary=1.66 cfs 0.107 af Outflow=1.68 cfs 0.138 af

Total Runoff Area = 0.993 ac Runoff Volume = 0.138 af Average Runoff Depth = 1.67"
50.43% Pervious = 0.501 ac 49.57% Impervious = 0.492 ac

Summary for Subcatchment PDA18: Rear RD

Runoff = 1.73 cfs @ 12.12 hrs, Volume= 0.138 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 1.29" for 10-Yr Storm event
Inflow = 1.66 cfs @ 12.16 hrs, Volume= 0.107 af
Outflow = 0.13 cfs @ 14.18 hrs, Volume= 0.107 af, Atten= 92%, Lag= 121.5 min
Primary = 0.13 cfs @ 14.18 hrs, Volume= 0.107 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 271.06' @ 14.18 hrs Surf.Area= 2,019 sf Storage= 2,221 cf

Plug-Flow detention time= 215.9 min calculated for 0.107 af (100% of inflow)
Center-of-Mass det. time= 215.8 min (1,066.3 - 850.5)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	11,150 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,683	235.0	3,991	4,417	4,168
274.00	4,100	269.0	6,733	11,150	5,621

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir**

2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.13 cfs @ 14.18 hrs HW=271.06' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.13 cfs @ 5.86 fps)
2=Sharp-Crested Rectangular Weir(Controls 0.00 cfs)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 1.67" for 10-Yr Storm event
Inflow = 1.73 cfs @ 12.12 hrs, Volume= 0.138 af
Outflow = 1.68 cfs @ 12.16 hrs, Volume= 0.138 af, Atten= 3%, Lag= 2.4 min
Discarded = 0.02 cfs @ 11.10 hrs, Volume= 0.031 af
Primary = 1.66 cfs @ 12.16 hrs, Volume= 0.107 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 272.43' @ 12.16 hrs Surf.Area= 0.016 ac Storage= 0.019 af

Plug-Flow detention time= 97.8 min calculated for 0.138 af (100% of inflow)
Center-of-Mass det. time= 98.5 min (956.6 - 858.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A** 0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert** L= 54.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 11.10 hrs HW=270.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.62 cfs @ 12.16 hrs HW=272.42' TW=270.05' (Dynamic Tailwater)
2=Culvert (Inlet Controls 1.62 cfs @ 2.82 fps)

Time span=0.00-35.00 hrs, dt=0.05 hrs, 701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA18: Rear RD Runoff Area=43,236 sf 49.57% Impervious Runoff Depth=2.24"
Flow Length=322' Tc=7.8 min CN=68 Runoff=2.38 cfs 0.186 af

Pond B10: Det. Basin #10 Peak Elev=271.64' Storage=3,496 cf Inflow=2.29 cfs 0.153 af
Outflow=0.15 cfs 0.153 af

Pond LC4: Leaching Chamber Bed #4 Peak Elev=272.60' Storage=0.020 af Inflow=2.38 cfs 0.186 af
Discarded=0.02 cfs 0.032 af Primary=2.29 cfs 0.153 af Outflow=2.31 cfs 0.186 af

Total Runoff Area = 0.993 ac Runoff Volume = 0.186 af Average Runoff Depth = 2.24"
50.43% Pervious = 0.501 ac 49.57% Impervious = 0.492 ac

Summary for Subcatchment PDA18: Rear RD

Runoff = 2.38 cfs @ 12.12 hrs, Volume= 0.186 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 1.85" for 25-yr event
Inflow = 2.29 cfs @ 12.15 hrs, Volume= 0.153 af
Outflow = 0.15 cfs @ 14.58 hrs, Volume= 0.153 af, Atten= 93%, Lag= 145.9 min
Primary = 0.15 cfs @ 14.58 hrs, Volume= 0.153 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 271.64' @ 14.58 hrs Surf.Area= 2,416 sf Storage= 3,496 cf

Plug-Flow detention time= 287.5 min calculated for 0.153 af (100% of inflow)
Center-of-Mass det. time= 287.1 min (1,133.0 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	11,150 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,683	235.0	3,991	4,417	4,168
274.00	4,100	269.0	6,733	11,150	5,621

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir**

2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.15 cfs @ 14.58 hrs HW=271.64' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.90 fps)
└**2=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 2.24" for 25-yr event
Inflow = 2.38 cfs @ 12.12 hrs, Volume= 0.186 af
Outflow = 2.31 cfs @ 12.15 hrs, Volume= 0.186 af, Atten= 3%, Lag= 1.7 min
Discarded = 0.02 cfs @ 10.60 hrs, Volume= 0.032 af
Primary = 2.29 cfs @ 12.15 hrs, Volume= 0.153 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 272.60' @ 12.15 hrs Surf.Area= 0.016 ac Storage= 0.020 af

Plug-Flow detention time= 75.2 min calculated for 0.185 af (100% of inflow)
Center-of-Mass det. time= 75.9 min (925.1 - 849.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A** 0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert** L= 54.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 10.60 hrs HW=270.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.27 cfs @ 12.15 hrs HW=272.59' TW=270.39' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 2.27 cfs @ 3.16 fps)

Time span=0.00-35.00 hrs, dt=0.05 hrs, 701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA18: Rear RD Runoff Area=43,236 sf 49.57% Impervious Runoff Depth=3.17"
Flow Length=322' Tc=7.8 min CN=68 Runoff=3.40 cfs 0.262 af

Pond B10: Det. Basin #10 Peak Elev=272.41' Storage=5,562 cf Inflow=3.21 cfs 0.229 af
Outflow=0.18 cfs 0.229 af

Pond LC4: Leaching Chamber Bed #4 Peak Elev=272.95' Storage=0.023 af Inflow=3.40 cfs 0.262 af
Discarded=0.02 cfs 0.033 af Primary=3.21 cfs 0.229 af Outflow=3.23 cfs 0.262 af

Total Runoff Area = 0.993 ac Runoff Volume = 0.262 af Average Runoff Depth = 3.17"
50.43% Pervious = 0.501 ac 49.57% Impervious = 0.492 ac

Summary for Subcatchment PDA18: Rear RD

Runoff = 3.40 cfs @ 12.12 hrs, Volume= 0.262 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	17,400	98	roads, sidewalks, drives, HSG A
	4,031	98	Unconnected roofs, HSG A
	21,805	39	>75% Grass cover, Good, HSG A
	43,236	68	Weighted Average
	21,805		50.43% Pervious Area
	21,431		49.57% Impervious Area
	4,031		18.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
2.2	272	0.0100	2.03		**Shallow Concentrated Flow, bc** Paved Kv= 20.3 fps
7.8	322	Total			

Summary for Pond B10: Det. Basin #10

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 2.77" for 100-Yr Storm event
Inflow = 3.21 cfs @ 12.15 hrs, Volume= 0.229 af
Outflow = 0.18 cfs @ 15.06 hrs, Volume= 0.229 af, Atten= 95%, Lag= 174.6 min
Primary = 0.18 cfs @ 15.06 hrs, Volume= 0.229 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 272.41' @ 15.06 hrs Surf.Area= 2,947 sf Storage= 5,562 cf

Plug-Flow detention time= 387.2 min calculated for 0.229 af (100% of inflow)
Center-of-Mass det. time= 386.5 min (1,233.4 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	269.50'	11,150 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
269.50	415	97.0	0	0	415
270.00	1,380	210.0	425	425	3,177
272.00	2,683	235.0	3,991	4,417	4,168
274.00	4,100	269.0	6,733	11,150	5,621

Device	Routing	Invert	Outlet Devices
#1	Primary	269.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	273.00'	**10.0' long x 1.00' rise Sharp-Crested Rectangular Weir**

2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=0.18 cfs @ 15.06 hrs HW=272.41' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.09 fps)
2=Sharp-Crested Rectangular Weir(Controls 0.00 cfs)

Summary for Pond LC4: Leaching Chamber Bed #4

Inflow Area = 0.993 ac, 49.57% Impervious, Inflow Depth = 3.17" for 100-Yr Storm event
Inflow = 3.40 cfs @ 12.12 hrs, Volume= 0.262 af
Outflow = 3.23 cfs @ 12.15 hrs, Volume= 0.262 af, Atten= 5%, Lag= 2.0 min
Discarded = 0.02 cfs @ 9.90 hrs, Volume= 0.033 af
Primary = 3.21 cfs @ 12.15 hrs, Volume= 0.229 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.05 hrs
Peak Elev= 272.95' @ 12.15 hrs Surf.Area= 0.016 ac Storage= 0.023 af

Plug-Flow detention time= 62.5 min calculated for 0.262 af (100% of inflow)
Center-of-Mass det. time= 63.2 min (902.3 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	270.51'	0.012 af	**21.00'W x 33.50'L x 2.54'H Field A** 0.041 af Overall - 0.011 af Embedded = 0.030 af x 40.0% Voids
#2A	271.01'	0.011 af	**Cultec R-150XLHD** x 18 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		0.023 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.51'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	271.73'	**12.0" Round Culvert** L= 54.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 271.73' / 271.19' S= 0.0100 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 9.90 hrs HW=270.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.21 cfs @ 12.15 hrs HW=272.95' TW=270.98' (Dynamic Tailwater)
2=Culvert (Inlet Controls 3.21 cfs @ 4.08 fps)

Appendix D-4

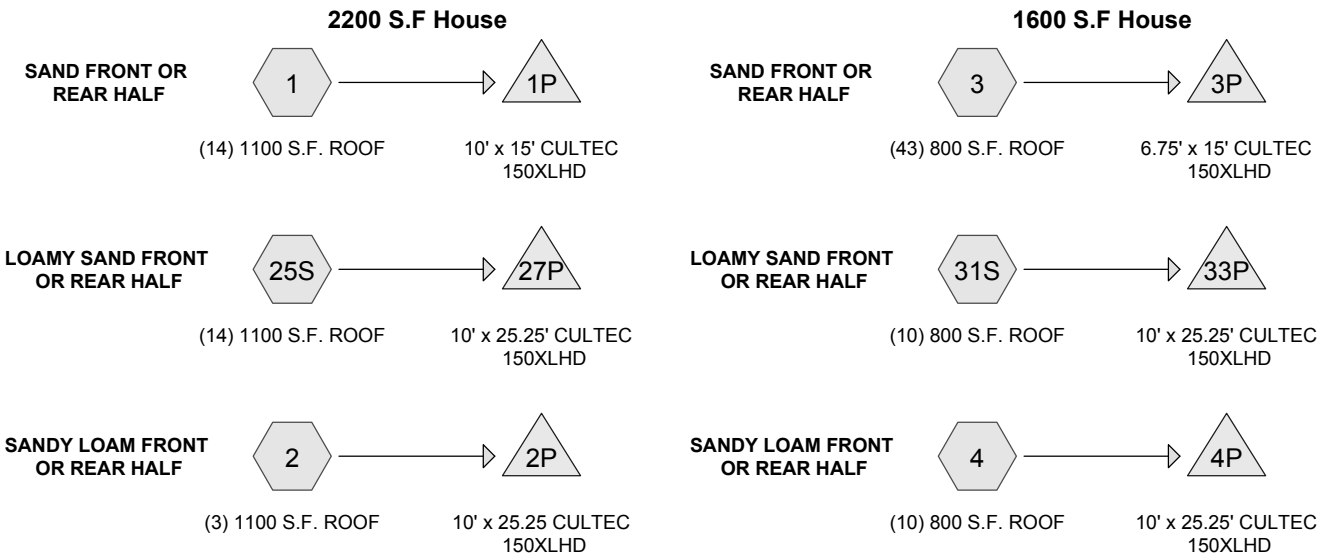
Roof Drain Calculations

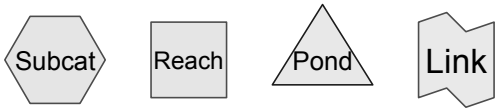
The following calculations were prepared to provide preliminary roof drain sizes based on assumed home styles planned for Timber Crest Estates. Calculations are based on providing storage for the 100-year storm and account for roof drains located in either sand, loamy sand, or sandy loam based on test pits conducted to date (corresponding exfiltration Rawl's rates per DEP stormwater standards were used). Refer to Grading and Drainage Plans, dated 8/14/18, for potential future layouts of homes and roof drains. Typical roof drain details are shown on sheet 44. The Spreadsheet herein provides preliminary design information for roof areas, groundwater elevations based on available test pits, and preliminary bottom roof drain elevations, finish grades, and bed sizes. These preliminary calculations and the corresponding layouts on the grading sheets demonstrate that appropriate roof drains can be sited on each lot, subject to final site design for each home.

The spreadsheet may be used as a review and approval tool to confirm proper design of the final systems shown on individual site plans for each lot during the building permitting process. Please note the spreadsheet calcs are based on assumptions for roof areas, while the grading plans and HydroCad Post-Development Calcs may utilize different roof areas. Actual homes built may be different than what is shown on the Grading & Drainage Plans. So long as a minimum of 4.35 acres of roof area for the project is recharged for the 100-year storm per the HydroCad calcs in Appendix D-2, then there will be no increase in offsite runoff or volume.

Note: Bioretention Areas 2 and 3 on lots 19 and 20 were sized to accommodate the rear roof and lawn areas for each respective lot.

WEST SIDE ROOF AREAS





Routing Diagram for Appendix D4 - Roof Drain Calcs West side 8.14.18
Prepared by Microsoft, Printed 8/31/2018

Appendix D-4

Roof Drain Calculations

The following calculations were prepared to provide preliminary roof drain sizes based on assumed home styles planned for Timber Crest Estates. Calculations are based on providing storage for the 100-year storm and account for roof drains located in either sand, loamy sand, or sandy loam based on test pits conducted to date (corresponding exfiltration Rawl's rates per DEP stormwater standards were used). Refer to Grading and Drainage Plans, dated 8/14/18, for potential future layouts of homes and roof drains. Typical roof drain details are shown on sheet 44. The Spreadsheet herein provides preliminary design information for roof areas, groundwater elevations based on available test pits, and preliminary bottom roof drain elevations, finish grades, and bed sizes. These preliminary calculations and the corresponding layouts on the grading sheets demonstrate that appropriate roof drains can be sited on each lot, subject to final site design for each home.

The spreadsheet may be used as a review and approval tool to confirm proper design of the final systems shown on individual site plans for each lot during the building permitting process. Please note the spreadsheet calcs are based on assumptions for roof areas, while the grading plans and HydroCad Post-Development Calcs may utilize different roof areas. Actual homes built may be different than what is shown on the Grading & Drainage Plans. So long as a minimum of 4.35 acres of roof area for the project is recharged for the 100-year storm per the HydroCad calcs in Appendix D-2, then there will be no increase in offsite runoff or volume.

Note: Bioretention Areas 2 and 3 on lots 19 and 20 were sized to accommodate the rear roof and lawn areas for each respective lot.

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: (14) 1100 S.F. ROOF Runoff Area=1,100 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

Subcatchment2: (3) 1100 S.F. ROOF Runoff Area=1,100 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

Subcatchment3: (43) 800 S.F. ROOF Runoff Area=800 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment4: (10) 800 S.F. ROOF Runoff Area=800 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment25S: (14) 1100 S.F. ROOF Runoff Area=1,100 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

Subcatchment31S: (10) 800 S.F. ROOF Runoff Area=800 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Pond 1P: 10' x 15' CULTEC 150XLHD Peak Elev=1.86' Storage=0.003 af Inflow=0.16 cfs 0.014 af
Outflow=0.03 cfs 0.014 af

Pond 2P: 10' x 25.25 CULTEC 150XLHD Peak Elev=2.36' Storage=0.007 af Inflow=0.16 cfs 0.014 af
Outflow=0.01 cfs 0.014 af

Pond 3P: 6.75' x 15' CULTEC 150XLHD Peak Elev=2.30' Storage=0.003 af Inflow=0.12 cfs 0.010 af
Outflow=0.02 cfs 0.010 af

Pond 4P: 10' x 25.25' CULTEC 150XLHD Peak Elev=1.41' Storage=0.004 af Inflow=0.12 cfs 0.010 af
Outflow=0.01 cfs 0.010 af

Pond 27P: 10' x 25.25' CULTEC 150XLHD Peak Elev=1.50' Storage=0.005 af Inflow=0.16 cfs 0.014 af
Outflow=0.01 cfs 0.014 af

Pond 33P: 10' x 25.25' CULTEC 150XLHD Peak Elev=1.00' Storage=0.003 af Inflow=0.12 cfs 0.010 af
Outflow=0.01 cfs 0.010 af

Total Runoff Area = 0.131 ac Runoff Volume = 0.070 af Average Runoff Depth = 6.46"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.131 ac

Summary for Subcatchment 1: (14) 1100 S.F. ROOF

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	1,100	98	roofs
	1,100		100.00% Impervious Area

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

Summary for Subcatchment 2: (3) 1100 S.F. ROOF

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	1,100	98	roofs
	1,100		100.00% Impervious Area

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

Summary for Subcatchment 3: (43) 800 S.F. ROOF

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	800	98	roofs
	800		100.00% Impervious Area

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

Summary for Subcatchment 4: (10) 800 S.F. ROOF

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	800	98	roofs
	800		100.00% Impervious Area

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

Summary for Subcatchment 25S: (14) 1100 S.F. ROOF

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	1,100	98	roofs
	1,100		100.00% Impervious Area

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

Summary for Subcatchment 31S: (10) 800 S.F. ROOF

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	800	98	roofs
	800		100.00% Impervious Area

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

Summary for Pond 1P: 10' x 15' CULTEC 150XLHD

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.03 cfs @ 11.70 hrs, Volume= 0.014 af, Atten= 82%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.70 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.86' @ 12.54 hrs Surf.Area= 0.003 ac Storage= 0.003 af

Plug-Flow detention time= 26.2 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 26.2 min (769.8 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.003 af	**10.00'W x 15.00'L x 2.54'H Field A** 0.009 af Overall - 0.001 af Embedded = 0.007 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-150XLHD** x 2 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		0.004 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.70 hrs HW=0.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond 2P: 10' x 25.25 CULTEC 150XLHD

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.01 cfs @ 9.10 hrs, Volume= 0.014 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.10 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.36' @ 15.31 hrs Surf.Area= 0.006 ac Storage= 0.007 af

Plug-Flow detention time= 432.3 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 432.4 min (1,175.9 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**10.00'W x 25.25'L x 2.54'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	0.50'	0.003 af	**Cultec R-150XLHD** x 4 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		0.007 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 9.10 hrs HW=0.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond 3P: 6.75' x 15' CULTEC 150XLHD

Inflow Area = 0.018 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.02 cfs @ 11.65 hrs, Volume= 0.010 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.65 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.30' @ 12.56 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 30.4 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 30.4 min (774.0 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.75'W x 15.00'L x 2.54'H Field A** 0.006 af Overall - 0.001 af Embedded = 0.005 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-150XLHD** Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 1 rows
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.65 hrs HW=0.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Summary for Pond 4P: 10' x 25.25' CULTEC 150XLHD

Inflow Area = 0.018 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 10.20 hrs, Volume= 0.010 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.20 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.41' @ 14.17 hrs Surf.Area= 0.006 ac Storage= 0.004 af

Plug-Flow detention time= 263.4 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 263.4 min (1,007.0 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**10.00'W x 25.25'L x 2.54'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	0.50'	0.003 af	**Cultec R-150XLHD** x 4 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		0.007 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.20 hrs HW=0.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond 27P: 10' x 25.25' CULTEC 150XLHD

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.01 cfs @ 11.30 hrs, Volume= 0.014 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.30 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 0.006 ac Storage= 0.005 af

Plug-Flow detention time= 102.1 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 102.0 min (845.6 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**10.00'W x 25.25'L x 2.54'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	0.50'	0.003 af	**Cultec R-150XLHD** x 4 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		0.007 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.30 hrs HW=0.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond 33P: 10' x 25.25' CULTEC 150XLHD

Inflow Area = 0.018 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 11.60 hrs, Volume= 0.010 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.60 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.00' @ 12.67 hrs Surf.Area= 0.006 ac Storage= 0.003 af

Plug-Flow detention time= 58.1 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 58.1 min (801.6 - 743.6)

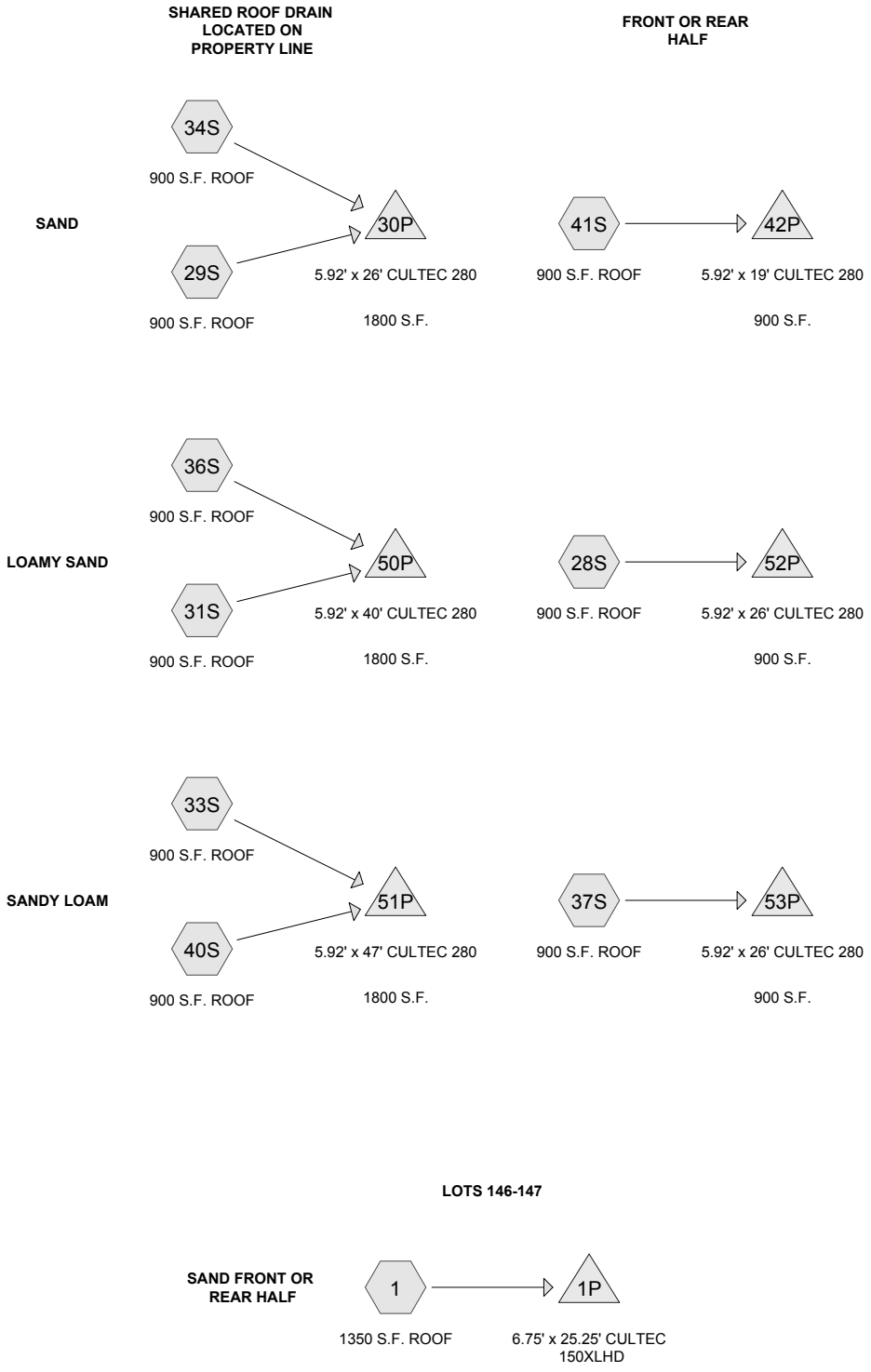
Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**10.00'W x 25.25'L x 2.54'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	0.50'	0.003 af	**Cultec R-150XLHD** x 4 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		0.007 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.60 hrs HW=0.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

EAST SIDE ROOF AREAS



Routing Diagram for Appendix D4 - Roof Drain Calcs East side 8.14.18
Prepared by Microsoft, Printed 8/31/2018

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: 1350 S.F. ROOF Runoff Area=1,350 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af

Subcatchment28S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment29S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment31S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment33S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment34S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment36S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment37S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment40S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment41S: 900 S.F. ROOF Runoff Area=900 sf 100.00% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Pond 1P: 6.75' x 25.25' CULTEC 150XLHD Peak Elev=2.25' Storage=0.004 af Inflow=0.20 cfs 0.017 af
Outflow=0.03 cfs 0.017 af

Pond 30P: 5.92' x 26' CULTEC 280 Peak Elev=3.61' Storage=0.007 af Inflow=0.27 cfs 0.022 af
Outflow=0.03 cfs 0.022 af

Pond 42P: 5.92' x 19' CULTEC 280 Peak Elev=2.06' Storage=0.003 af Inflow=0.13 cfs 0.011 af
Outflow=0.02 cfs 0.011 af

Pond 50P: 5.92' x 40' CULTEC 280 Peak Elev=3.22' Storage=0.010 af Inflow=0.27 cfs 0.022 af
Outflow=0.01 cfs 0.022 af

Pond 51P: 5.92' x 47' CULTEC 280 Peak Elev=3.86' Storage=0.013 af Inflow=0.27 cfs 0.022 af
Outflow=0.01 cfs 0.022 af

Pond 52P: 5.92' x 26' CULTEC 280 Peak Elev=2.23' Storage=0.004 af Inflow=0.13 cfs 0.011 af
Outflow=0.01 cfs 0.011 af

Pond 53P: 5.92' x 26' CULTEC 280 Peak Elev=3.30' Storage=0.006 af Inflow=0.13 cfs 0.011 af
Outflow=0.00 cfs 0.011 af

Total Runoff Area = 0.217 ac Runoff Volume = 0.117 af Average Runoff Depth = 6.46"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.217 ac

Summary for Subcatchment 1: 1350 S.F. ROOF

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	1,350	98	roofs
	1,350		100.00% Impervious Area

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

Summary for Subcatchment 28S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 29S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 31S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 33S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 34S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 36S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 37S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 40S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Subcatchment 41S: 900 S.F. ROOF

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description
*	900	98	roofs
	900		100.00% Impervious Area

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

Summary for Pond 1P: 6.75' x 25.25' CULTEC 150XLHD

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.03 cfs @ 11.65 hrs, Volume= 0.017 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.65 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.25' @ 12.56 hrs Surf.Area= 0.004 ac Storage= 0.004 af

Plug-Flow detention time= 30.6 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 30.6 min (774.1 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.003 af	**6.75'W x 25.25'L x 2.54'H Field A** 0.010 af Overall - 0.001 af Embedded = 0.009 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-150XLHD** x 2 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 1 rows
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.65 hrs HW=0.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond 30P: 5.92' x 26' CULTEC 280

Inflow Area = 0.041 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.03 cfs @ 11.50 hrs, Volume= 0.022 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.50 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.61' @ 12.74 hrs Surf.Area= 0.004 ac Storage= 0.007 af

Plug-Flow detention time= 64.7 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 64.6 min (808.2 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**5.92'W x 26.00'L x 4.21'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	1.00'	0.003 af	**Cultec R-280HD** x 3 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		0.008 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.50 hrs HW=0.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond 42P: 5.92' x 19' CULTEC 280

Inflow Area = 0.021 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 11.70 hrs, Volume= 0.011 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.70 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.06' @ 12.56 hrs Surf.Area= 0.003 ac Storage= 0.003 af

Plug-Flow detention time= 31.8 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 31.8 min (775.3 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.004 af	**5.92'W x 19.00'L x 4.21'H Field A** 0.011 af Overall - 0.002 af Embedded = 0.009 af x 40.0% Voids
#2A	1.00'	0.002 af	**Cultec R-280HD** x 2 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		0.006 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.70 hrs HW=0.06' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Summary for Pond 50P: 5.92' x 40' CULTEC 280

Inflow Area = 0.041 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.01 cfs @ 10.15 hrs, Volume= 0.022 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.15 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.22' @ 14.24 hrs Surf.Area= 0.005 ac Storage= 0.010 af

Plug-Flow detention time= 268.1 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 268.1 min (1,011.6 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.007 af	**5.92'W x 40.00'L x 4.21'H Field A** 0.023 af Overall - 0.005 af Embedded = 0.018 af x 40.0% Voids
#2A	1.00'	0.005 af	**Cultec R-280HD** x 5 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		0.012 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.15 hrs HW=0.04' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Summary for Pond 51P: 5.92' x 47' CULTEC 280

Inflow Area = 0.041 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.01 cfs @ 8.10 hrs, Volume= 0.022 af, Atten= 98%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.10 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.86' @ 16.58 hrs Surf.Area= 0.006 ac Storage= 0.013 af

Plug-Flow detention time= 765.0 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 765.4 min (1,508.9 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.008 af	**5.92'W x 47.00'L x 4.21'H Field A** 0.027 af Overall - 0.006 af Embedded = 0.021 af x 40.0% Voids
#2A	1.00'	0.006 af	**Cultec R-280HD** x 6 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		0.014 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.10 hrs HW=0.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond 52P: 5.92' x 26' CULTEC 280

Inflow Area = 0.021 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 10.75 hrs, Volume= 0.011 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.75 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.23' @ 13.57 hrs Surf.Area= 0.004 ac Storage= 0.004 af

Plug-Flow detention time= 172.3 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 172.3 min (915.9 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**5.92'W x 26.00'L x 4.21'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	1.00'	0.003 af	**Cultec R-280HD** x 3 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		0.008 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.75 hrs HW=0.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond 53P: 5.92' x 26' CULTEC 280

Inflow Area = 0.021 ac,100.00% Impervious, Inflow Depth = 6.46" for 100-Yr Storm event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.00 cfs @ 8.40 hrs, Volume= 0.011 af, Atten= 97%, Lag= 0.0 min
Discarded = 0.00 cfs @ 8.40 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.30' @ 16.11 hrs Surf.Area= 0.004 ac Storage= 0.006 af

Plug-Flow detention time= 666.2 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 666.5 min (1,410.1 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.005 af	**5.92'W x 26.00'L x 4.21'H Field A** 0.015 af Overall - 0.003 af Embedded = 0.012 af x 40.0% Voids
#2A	1.00'	0.003 af	**Cultec R-280HD** x 3 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		0.008 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 8.40 hrs HW=0.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Timber Crest Estates
Roof Infiltration Requirements

6/28/2018

Notes:
1.) Lots 76-79 were eliminated.
2.) All proposed homes on West side shall have front and rear roof drains, except rear roofs on lots 19&20 shall be recharged via bioretention areas 2 & 3, respectivley.
3.) All proposed homes on East side shall have roof drains, front & rear, except lots 80-84, 85-91, 104-107, 112-119, 126-128, 132, 133, 138, 139, and 141-145, which shall have rear roof drains only. (See typical roof drain
4.) Table to be used as design guide, when designing individual lots, specific test pits shall be completed.
5.) East Side - Preliminary roof areas shown below are based on 1800 s.f. roof areas for each home. Actual home areas may vary and shall be reflected in final design.
* In TP-1B, remove and replace A, B, and C1 layer (C2 layer - loamy sand)
** Lot 80 - ESHGW interpolated using TP-30 (ESHGW=270.20) and existing topography
*** Lots 87-89 - ESHGW interpolated using TP-13B (ESHGW=269.4), existing topography, and known wetland elevation (266.0).

Lot Identification		**Design Assumptions (Documented per Conservation Commission Review)**								**Concept Design - Check**						**Final Design (To be completed prior to issuing Building Permit)**											**Final Design - Check**					
Lot No.	System Location	Test Pit (See Notes)	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Infiltration Area Shown (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check	Test Pit	Licensed Soil Evaluator	Endorsing Engineer	PE No.	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area (sf)	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Final Infiltration Area (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check
A	F	TP-36	2.41	0.18	261.50	1100	198	263.50	266.54	253	54.50	264.70	1.20	268.24	0.50	TP-LotA-F	John Smith	Jane Smith	14529	2.41	0.18	262.50	1000	180	264.50	267.54	160	(20.00)	268.60	4.10	272.00	4.46
A	R	TP-36	2.41	0.18	261.50	1100	198	263.50	266.54	253	54.50	263.20	(0.30)	266.74	0.50	TP-LotA-R	John Smith	Jane Smith	14529	2.41	0.18	262.50	800	144	264.50	267.54	200	56.00	264.60	0.10	264.00	(3.54)
B	F	TP-36	1.02	0.20	261.50	850	170	263.50	266.54	253	82.50	264.70	1.20	268.24	0.50	TP-LotB-F	John Smith	Jane Smith	14529	1.02	0.20	262.50	800	160	264.50	267.54	200	40.00	268.50	4.00	272.00	4.46
B	R	TP-36	1.02	0.20	261.50	850	170	263.50	266.54	253	82.50	264.00	0.50	266.74	(0.30)	TP-LotB-R	John Smith	Jane Smith	14529	1.02	0.20	262.50	1000	200	264.50	267.54	400	200.00	263.50	(1.00)	272.00	4.46
C	F	TP-36	8.27	0.12	261.50	2200	264	263.50	266.54	253	(11.50)	264.00	0.50	266.74	(0.30)	TP-LotC-F	John Smith	Jane Smith	14529	8.27	0.12	262.50	2000	240	264.50	267.54	400	160.00	268.70	4.20	272.00	4.46
C	R	N/A																													
WEST SIDE																															
1	Front	TP-36	2.41	0.18	261.50	1100	198	263.50	267.00	253	54.50	265.50	2.00	269.00	0.46																	
1	Rear	TP-36	2.41	0.18	261.50	1100	198	263.50	267.00	253	54.50	264.50	1.00	268.00	0.46																	
2	Front	TP-1A	1.02	0.20	261.40	1100	220	263.40	266.90	253	32.50	269.50	6.10	273.00	0.46																	
2	Rear	TP-1A	1.02	0.20	261.40	1100	220	263.40	266.90	253	32.50	269.50	6.10	273.00	0.46																	
3	Front	TP-1A	1.02	0.20	261.40	800	160	263.40	266.90	253	92.50	272.00	8.60	275.50	0.46																	
3	Rear	TP-1A	1.02	0.20	261.40	800	160	263.40	266.90	253	92.50	272.00	8.60	275.50	0.46																	
4	Front	TP-1A	1.02	0.20	261.40	800	160	263.40	266.90	253	92.50	271.50	8.10	275.00	0.46																	
4	Rear	TP-1A	1.02	0.20	261.40	800	160	263.40	266.90	253	92.50	267.00	3.60	270.50	0.46																	
5	Front	TP-1B *	1.02	0.20	262.20	800	160	264.20	267.70	253	92.50	269.00	4.80	272.50	0.46																	
5	Rear	TP-1B *	1.02	0.20	262.20	800	160	264.20	267.70	253	92.50	265.50	1.30	269.00	0.46																	
6	Front	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	275.00	10.80	278.50	0.46																	
6	Rear	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	271.50	7.30	275.00	0.46																	
7	Front	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	277.50	13.30	281.00	0.46																	
7	Rear	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	272.00	7.80	275.50	0.46																	
8	Front	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	278.00	13.80	281.50	0.46																	
8	Rear	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	272.50	8.30	276.00	0.46																	
9	Front	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	275.00	10.80	278.50	0.46																	
9	Rear	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	271.50	7.30	275.00	0.46																	
10	Front	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	276.00	11.80	279.50	0.46																	
10	Rear	TP-1B *	2.41	0.18	262.20	1100	198	264.20	267.70	253	54.50	273.00	8.80	276.50	0.46																	
11	Front	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	277.50	13.30	281.00	0.46																	
11	Rear	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	274.00	9.80	277.50	0.46																	
12	Front	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	280.00	15.80	283.50	0.46																	
12	Rear	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	274.00	9.80	277.50	0.46																	
13	Front	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	279.50	15.30	283.00	0.46																	
13	Rear	TP-1B *	2.41	0.18	262.20	800	144	264.20	267.70	253	108.50	274.00	9.80	277.50	0.46																	
14	Front	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	277.10	2.00	280.60	0.46																	
14	Rear	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																	
15	Front	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	278.00	2.90	281.50	0.46																	
15	Rear	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																	
16	Front	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	278.30	3.20	281.80	0.46																	
16	Rear	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																	
17	Front	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	280.20	5.10	283.70	0.46																	
17	Rear	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																	
18	Front	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	280.00	4.90	283.50	0.46																	
18	Rear	TP-4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																	
19	Front	38	2.41	0.18	272.40	800	144	274.40	277.90	253	108.50	279.00	4.60	282.50	0.46																	
19	See Bioretention Area #2 Calculations in Drainage Report																															
20	Front	39	2.41	0.18	272.20	800	144	274.20	277.70	253	108.50	276.00	1.80	279.50	0.46																	
20	See Bioretention Area #3 Calculations in Drainage Report																															
21	Front	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	275.70	0.80	279.20	0.46																	
21	Rear	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	274.90	0.00	278.40	0.46																	
22	Front	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	275.50	0.60	279.00	0.46																	
22	Rear	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	274.90	0.00	278.40	0.46																	

Timber Crest Estates
Roof Infiltration Requirements

Notes:
1.) Lots 76-79 were eliminated.
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3.) All proposed homes on East side shall have roof drains, front & rear, except lots 80-84, 85-91, 104-107, 112-119, 126-128, 132, 133, 138, 139, and 141-145, which shall have rear roof drains only. (See typical roof drain
4.) Table to be used as design guide, when designing individual lots, specific test pits shall be completed.
5.) East Side - Preliminary roof areas shown below are based on 1800 s.f. roof areas for each home. Actual home areas may vary and shall be reflected in final design.
* In TP-1B, remove and replace A, B, and C1 layer (C2 layer - loamy sand)
** Lot 80 - ESHGW interpolated using TP-30 (ESHGW=270.20) and existing topography
*** Lots 87-89 - ESHGW interpolated using TP-13B (ESHGW=269.4), existing topography, and known wetland elevation (266.0).

Lot Identification		**Design Assumptions (Documented per Conservation Commission Review)**								**Concept Design - Check**						**Final Design (To be completed prior to issuing Building Permit)**										**Final Design - Check**					
Lot No.	System Location	Test Pit (See Notes)	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Infiltration Area Shown (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check	Test Pit	Licensed Soil Evaluator	Endorsing Engineer	PE No.	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area (sf)	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Final Infiltration Area (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check
23	Front	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	276.00	1.10	279.50	0.46																
23	Rear	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	274.90	0.00	278.40	0.46																
24	Front	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	276.50	1.60	280.00	0.46																
24	Rear	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	274.90	0.00	278.40	0.46																
25	Left	37	2.41	0.18	272.90	1100	198	274.90	278.40	253	54.50	276.00	1.10	279.50	0.46																
25	Rear	37	2.41	0.18	272.90	1100	198	274.90	278.40	253	54.50	274.90	0.00	278.40	0.46																
26	Front	37	2.41	0.18	272.90	1100	198	274.90	278.40	253	54.50	274.90	0.00	278.40	0.46																
26	Rear	37	2.41	0.18	272.90	1100	198	274.90	278.40	253	54.50	274.90	0.00	278.40	0.46																
27	Right	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	275.00	0.10	278.50	0.46																
27	Front	37	2.41	0.18	272.90	800	144	274.90	278.40	253	108.50	274.90	0.00	278.40	0.46																
28	Front	7A	2.41	0.18	264.20	1100	198	266.20	269.70	253	54.50	277.50	11.30	281.00	0.46																
28	Rear	7A	2.41	0.18	264.20	1100	198	266.20	269.70	253	54.50	271.00	4.80	274.50	0.46																
29	Front	7A	2.41	0.18	264.20	800	144	266.20	269.70	253	108.50	276.50	10.30	280.00	0.46																
29	Rear	7A	2.41	0.18	264.20	800	144	266.20	269.70	253	108.50	270.00	3.80	273.50	0.46																
30	Front	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	274.00	7.10	277.50	0.46																
30	Rear	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	267.50	0.60	271.00	0.46																
31	Front	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	273.00	6.10	276.50	0.46																
31	Rear	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	266.90	0.00	270.40	0.46																
32	Front	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	272.50	5.60	276.00	0.46																
32	Rear	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	266.90	0.00	270.40	0.46																
33	Front	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	272.50	5.60	276.00	0.46																
33	Rear	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	266.90	0.00	270.40	0.46																
34	Front	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	273.50	6.60	277.00	0.46																
34	Rear	7B	2.41	0.18	264.90	800	144	266.90	270.40	253	108.50	266.90	0.00	270.40	0.46																
35	Right	6A	2.41	0.18	267.90	800	144	269.90	273.40	253	108.50	272.50	2.60	276.00	0.46																
35	Left	6A	2.41	0.18	267.90	800	144	269.90	273.40	253	108.50	272.50	2.60	276.00	0.46																
36	Front	6A	2.41	0.18	267.90	800	144	269.90	273.40	253	108.50	272.50	2.60	276.00	0.46																
36	Right	6A	2.41	0.18	267.90	800	144	269.90	273.40	253	108.50	269.90	0.00	273.40	0.46																
37	Front	6A	2.41	0.18	267.90	1100	198	269.90	273.40	253	54.50	271.50	1.60	275.00	0.46																
37	Right	6A	2.41	0.18	267.90	1100	198	269.90	273.40	253	54.50	269.90	0.00	273.40	0.46																
38	Front	6A	2.41	0.18	267.90	800	144	269.90	273.40	253	108.50	271.50	1.60	275.00	0.46																
38	Rear	6A	2.41	0.18	267.90	800	144	269.90	273.40	253	108.50	269.90	0.00	273.40	0.46																
39	Front	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	270.10	0.00	273.60	0.46																
39	Rear	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	270.10	0.00	273.60	0.46																
40	Front	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	270.10	0.00	273.60	0.46																
40	Rear	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	270.10	0.00	273.60	0.46																
41	Front	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	276.00	5.90	279.50	0.46																
41	Rear	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	271.80	1.70	275.30	0.46																
42	Front	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	273.50	3.40	277.00	0.46																
42	Rear	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	272.50	2.40	276.00	0.46																
43	Front	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	273.50	3.40	277.00	0.46																
43	Rear	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	273.50	3.40	277.00	0.46																
44	Front	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	279.50	9.40	283.00	0.46																
44	Rear	6B	2.41	0.18	268.10	800	144	270.10	273.60	253	108.50	272.50	2.40	276.00	0.46																
45	Front	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	277.50	7.40	281.00	0.46																
45	Rear	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	272.50	2.40	276.00	0.46																
46	Front	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	274.50	4.40	278.00	0.46																
46	Rear	6B	2.41	0.18	268.10	1100	198	270.10	273.60	253	54.50	271.50	1.40	275.00	0.46																
47	Front	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	272.50	1.20	276.00	0.46																
47	Rear	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	271.30	0.00	274.80	0.46																
48	Front	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	272.50	1.20	276.00	0.46																
48	Right	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	271.30	0.00	274.80	0.46																

Timber Crest Estates
Roof Infiltration Requirements

Notes:
1.) Lots 76-79 were eliminated.
2.) All proposed homes on West side shall have front and rear roof drains, except rear roofs on lots 19&20 shall be recharged via bioretention areas 2 & 3, respectivley.
3.) All proposed homes on East side shall have roof drains, front & rear, except lots 80-84, 85-91, 104-107, 112-119, 126-128, 132, 133, 138, 139, and 141-145, which shall have rear roof drains only. (See typical roof drain
4.) Table to be used as design guide, when designing individual lots, specific test pits shall be completed.
5.) East Side - Preliminary roof areas shown below are based on 1800 s.f. roof areas for each home. Actual home areas may vary and shall be reflected in final design.
* In TP-1B, remove and replace A, B, and C1 layer (C2 layer - loamy sand)
** Lot 80 - ESHGW interpolated using TP-30 (ESHGW=270.20) and existing topography
*** Lots 87-89 - ESHGW interpolated using TP-13B (ESHGW=269.4), existing topography, and known wetland elevation (266.0).

Lot Identification		**Design Assumptions (Documented per Conservation Commission Review)**								**Concept Design - Check**						**Final Design (To be completed prior to issuing Building Permit)**										**Final Design - Check**					
Lot No.	System Location	Test Pit (See Notes)	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Infiltration Area Shown (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check	Test Pit	Licensed Soil Evaluator	Endorsing Engineer	PE No.	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area (sf)	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Final Infiltration Area (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check
49	Front	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	277.50	6.20	281.00	0.46																
49	Rear	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	271.30	0.00	274.80	0.46																
50	Front	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	279.50	8.20	283.00	0.46																
50	Rear	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	273.00	1.70	276.50	0.46																
51	Front	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	280.50	9.20	284.00	0.46																
51	Rear	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	274.00	2.70	277.50	0.46																
52	Front	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	280.50	9.20	284.00	0.46																
52	Rear	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	274.00	2.70	277.50	0.46																
53	Front	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	281.00	9.70	284.50	0.46																
53	Rear	5A	2.41	0.18	269.30	800	144	271.30	274.80	253	108.50	274.50	3.20	278.00	0.46																
54	Front	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	281.00	9.70	284.50	0.46																
54	Rear	5A	2.41	0.18	269.30	1100	198	271.30	274.80	253	54.50	274.50	3.20	278.00	0.46																
55	Front	4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	280.00	4.90	283.50	0.46																
55	Rear	4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																
56	Front	4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	280.00	4.90	283.50	0.46																
56	Rear	4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																
57	Front	4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	280.00	4.90	283.50	0.46																
57	Rear	4B	2.41	0.18	273.10	800	144	275.10	278.60	253	108.50	275.10	0.00	278.60	0.46																
58	Front	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	279.00	5.10	282.50	0.46																
58	Rear	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	273.90	0.00	277.40	0.46																
59	Front	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	279.00	5.10	282.50	0.46																
59	Rear	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	273.90	0.00	277.40	0.46																
60	Front	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	280.00	6.10	283.50	0.46																
60	Rear	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	273.90	0.00	277.40	0.46																
61	Front	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	279.00	5.10	282.50	0.46																
61	Rear	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	273.90	0.00	277.40	0.46																
62	Front	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	279.00	5.10	282.50	0.46																
62	Rear	3B	2.41	0.18	271.90	800	144	273.90	277.40	253	108.50	273.90	0.00	277.40	0.46																
63	Front	3B	8.27	0.12	271.90	800	96	273.90	277.40	101	5.25	279.50	5.60	283.00	0.46																
63	Rear	3B	8.27	0.12	271.90	800	96	273.90	277.40	101	5.25	273.90	0.00	277.40	0.46																
64	Front	3B	8.27	0.12	271.90	800	96	273.90	277.40	101	5.25	279.50	5.60	283.00	0.46																
64	Rear	3B	8.27	0.12	271.90	800	96	273.90	277.40	101	5.25	273.90	0.00	277.40	0.46																
65	Front	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	279.50	5.90	283.00	0.46																
65	Rear	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	274.00	0.40	277.50	0.46																
66	Front	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	274.60	1.00	278.10	0.46																
66	Rear	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	273.60	0.00	277.10	0.46																
67	Right	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	277.50	3.90	281.00	0.46																
67	Rear	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	273.60	0.00	277.10	0.46																
68	Right	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	275.00	1.40	278.50	0.46																
68	Rear	2B	2.41	0.18	271.60	800	144	273.60	277.10	253	108.50	273.60	0.00	277.10	0.46																
69	Left	2A	1.02	0.20	270.30	800	160	272.30	275.80	186	26.00	273.90	1.60	277.40	0.46																
69	Rear	2A	1.02	0.20	270.30	800	160	272.30	275.80	186	26.00	272.30	0.00	275.80	0.46																
70	Left	41	1.02	0.20	266.70	800	160	268.70	272.20	186	26.00	270.00	1.30	273.50	0.46																
70	Rear	41	1.02	0.20	266.70	800	160	268.70	272.20	186	26.00	269.50	0.80	273.00	0.46																
EAST SIDE																															
71	Right	21A	2.41	0.13	269.80	900	117	271.80	275.30	118	1.40	273.00	1.20	277.80	1.76																
71	Left	21A	2.41	0.13	269.80	900	117	271.80	275.30	118	1.40	273.00	1.20	277.80	1.76																
72	Right	10B	2.41	0.13	270.00	900	117	272.00	275.50	118	1.40	273.00	1.00	277.80	1.76																
72	Left	10B	2.41	0.13	270.00	900	117	272.00	275.50	118	1.40	273.00	1.00	277.80	1.76																
73	Right	10B	2.41	0.13	270.00	900	117	272.00	275.50	118	1.40	272.00	0.00	276.80	1.76																
73	Left	10B	2.41	0.13	270.00	900	117	272.00	275.50	118	1.40	272.00	0.00	276.80	1.76																
74	Right	10B	2.41	0.13	270.00	900	117	272.00	275.50	118	1.40	272.00	0.00	276.80	1.76																

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* In TP-1B, remove and replace A, B, and C1 layer (C2 layer - loamy sand)
** Lot 80 - ESHGW interpolated using TP-30 (ESHGW=270.20) and existing topography
*** Lots 87-89 - ESHGW interpolated using TP-13B (ESHGW=269.4), existing topography, and known wetland elevation (266.0).

Lot Identification		**Design Assumptions (Documented per Conservation Commission Review)**								**Concept Design - Check**						**Final Design (To be completed prior to issuing Building Permit)**										**Final Design - Check**					
Lot No.	System Location	Test Pit (See Notes)	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Infiltration Area Shown (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check	Test Pit	Licensed Soil Evaluator	Endorsing Engineer	PE No.	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area (sf)	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Final Infiltration Area (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check
74	Left	10B	2.41	0.13	270.00	900	117	272.00	275.50	118	1.40	272.00	0.00	276.80	1.76																
75	Right	12A	8.27	0.09	268.70	900	76.5	270.70	275.50	77	0.46	270.70	0.00	275.50	1.76																
75	Left	12A	8.27	0.09	268.70	900	76.5	270.70	275.50	112	35.50	270.70	0.00	275.50	1.76																
80**	Rear	30	2.41	0.13	264.20	900	117	266.20	271.00	153	36.00	266.50	0.30	271.30	1.76																
81	Rear	26	2.41	0.13	258.80	900	117	260.80	265.60	153	36.00	264.50	3.70	269.30	1.76																
82	Rear	28B	2.41	0.13	256.90	900	117	258.90	263.70	153	36.00	264.30	5.40	269.10	1.76																
83	Rear	28B	2.41	0.13	256.90	900	117	258.90	263.70	153	36.00	264.30	5.40	269.10	1.76																
84	Rear	28B	2.41	0.13	256.90	900	117	258.90	263.70	153	36.00	264.00	5.10	268.80	1.76																
85	Rear	32	2.41	0.13	258.50	900	117	260.50	265.30	153	36.00	267.00	6.50	271.80	1.76																
86	Left	32	2.41	0.13	258.50	900	117	260.50	265.30	118	1.40	267.00	6.50	271.80	1.76																
87***	Right	13A	2.41	0.13	267.50	900	117	269.50	274.30	118	1.40	269.50	0.00	274.30	1.76																
88***	Left	13A	2.41	0.13	267.50	900	117	269.50	274.30	118	1.40	269.50	0.00	274.30	1.76																
89***	Right	13A	2.41	0.13	267.50	900	117	269.50	274.30	118	1.40	269.50	0.00	274.30	1.76																
90	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.40	271.10	0.00	275.90	1.76																
91	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.40	271.10	0.00	275.90	1.76																
92	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.00	271.10	0.00	275.90	1.76																
92	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	153	36.00	271.10	0.00	275.90	1.76																
93	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	153	36.00	271.10	0.00	275.90	1.76																
93	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.00	271.10	0.00	275.90	1.76																
94	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.00	271.10	0.00	275.90	1.76																
94	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	153	36.00	271.10	0.00	275.90	1.76																
95	Right	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	112	35.50	274.00	0.00	278.80	1.76																
95	Left	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
96	Right	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
96	Left	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
97	Right	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
97	Left	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
98	Right	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
98	Rear	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.50	274.00	0.00	278.80	1.76																
99	Right	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
99	Left	25A	8.27	0.09	272.00	900	76.5	274.00	278.80	77	0.46	274.00	0.00	278.80	1.76																
100	Right	12B	1.02	0.15	267.90	900	135	269.90	274.70	153	18.00	271.50	1.60	276.30	1.76																
100	Left	12B	1.02	0.15	267.90	900	135	269.90	274.70	139	4.00	271.50	1.60	276.30	1.76																
101	Right	12B	1.02	0.15	267.90	900	135	269.90	274.70	139	4.00	271.50	1.60	276.30	1.76																
101	Left	12B	1.02	0.15	267.90	900	135	269.90	274.70	139	4.00	271.50	1.60	276.30	1.76																
102	Right	12B	1.02	0.15	267.90	900	135	269.90	274.70	139	4.00	271.50	1.60	276.30	1.76																
102	Left	12B	1.02	0.15	267.90	900	135	269.90	274.70	139	4.00	271.50	1.60	276.30	1.76																
103	Right	12B	1.02	0.15	267.90	900	135	269.90	274.70	139	4.00	271.50	1.60	276.30	1.76																
103	Left	12B	1.02	0.15	267.90	900	135	269.90	274.70	153	18.00	271.50	1.60	276.30	1.76																
104	Left	14A	2.41	0.13	267.70	900	117	269.70	274.50	118	1.00	271.50	1.80	276.30	1.76																
105	Right	14A	2.41	0.13	267.70	900	117	269.70	274.50	118	1.00	271.50	1.80	276.30	1.76																
106	Rear	23A	1.02	0.15	266.70	900	135	268.70	273.50	153	18.00	269.00	0.30	273.80	1.76																
107	Left	15B	2.41	0.13	266.70	900	117	268.70	273.50	118	1.00	269.50	0.80	274.30	1.76																
108	Right	15B	2.41	0.13	268.20	900	117	270.20	275.00	118	1.40	270.20	0.00	275.00	1.76																
108	Front	15B	2.41	0.13	268.20	900	117	270.20	275.00	153	36.00	270.20	0.00	275.00	1.76																
109	Rear	17B	8.27	0.09	268.40	900	76.5	270.40	275.20	112	35.50	270.40	0.00	275.20	1.76																
109	Left	17B	8.27	0.09	268.40	900	76.5	270.40	275.20	77	0.46	270.40	0.00	275.20	1.76																
110	Right	17B	8.27	0.09	268.40	900	76.5	270.40	275.20	77	0.46	270.40	0.00	275.20	1.76																
110	Left	17B	8.27	0.09	268.40	900	76.5	270.40	275.20	77	0.46	270.40	0.00	275.20	1.76																
111	Right	17A	8.27	0.09	267.10	900	76.5	269.10	273.90	77	0.46	270.00	0.90	274.80	1.76																
111	Rear	17A	8.27	0.09	267.10	900	76.5	269.10	273.90	112	35.50	270.00	0.90	274.80	1.76																

Timber Crest Estates
Roof Infiltration Requirements

Notes:
1.) Lots 76-79 were eliminated.
2.) All proposed homes on West side shall have front and rear roof drains, except rear roofs on lots 19&20 shall be recharged via bioretention areas 2 & 3, respectivley.
3.) All proposed homes on East side shall have roof drains, front & rear, except lots 80-84, 85-91, 104-107, 112-119, 126-128, 132, 133, 138, 139, and 141-145, which shall have rear roof drains only. (See typical roof drain
4.) Table to be used as design guide, when designing individual lots, specific test pits shall be completed.
5.) East Side - Preliminary roof areas shown below are based on 1800 s.f. roof areas for each home. Actual home areas may vary and shall be reflected in final design.
* In TP-1B, remove and replace A, B, and C1 layer (C2 layer - loamy sand)
** Lot 80 - ESHGW interpolated using TP-30 (ESHGW=270.20) and existing topography
*** Lots 87-89 - ESHGW interpolated using TP-13B (ESHGW=269.4), existing topography, and known wetland elevation (266.0).

Lot Identification		**Design Assumptions (Documented per Conservation Commission Review)**								**Concept Design - Check**						**Final Design (To be completed prior to issuing Building Permit)**										**Final Design - Check**					
Lot No.	System Location	Test Pit (See Notes)	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Infiltration Area Shown (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check	Test Pit	Licensed Soil Evaluator	Endorsing Engineer	PE No.	Rawls Rate (in/hr)	Req'd Infilt. per Contributing Roof Area (sf/sf)	ESHGW (elevation in feet NGVD)	Contributing Roof Area (sf)	Required Infiltration Area (sf)	Minimum Bottom Elevation	Minimum Finish Grade	Final Infiltration Area (sf)	Check	Proposed Bottom Elevation	Check	Proposed Finish Grade	Check
112	Rear	17A	8.27	0.09	267.10	900	76.5	269.10	273.90	112	35.50	269.10	0.00	273.90	1.76																
114	Rear	18A	8.27	0.09	265.20	900	76.5	267.20	272.00	112	35.50	267.20	0.00	272.00	1.76																
115	Rear	18A	8.27	0.09	265.20	900	76.5	267.20	272.00	112	35.50	267.20	0.00	272.00	1.76																
116	Left	18A	8.27	0.09	265.20	900	76.5	267.20	272.00	77	0.46	268.40	1.20	273.20	1.76																
117	Right	16B	8.27	0.09	266.40	900	76.5	268.40	273.20	77	0.46	268.40	0.00	273.20	1.76																
118	Rear	16B	8.27	0.09	266.40	900	76.5	268.40	273.20	112	35.50	268.40	0.00	273.20	1.76																
119	Rear	16B	8.27	0.09	266.40	900	76.5	268.40	273.20	112	35.50	268.40	0.00	273.20	1.76																
120	Rear	16B	2.41	0.13	266.40	900	117	268.40	273.20	153	36.00	268.40	0.00	273.20	1.76																
120	Left	16B	2.41	0.13	266.40	900	117	268.40	273.20	118	1.40	268.40	0.00	273.20	1.76																
121	Right	16B	2.41	0.13	266.40	900	117	268.40	273.20	118	1.40	268.40	0.00	273.20	1.76																
121	Front	16B	2.41	0.13	266.40	900	117	268.40	273.20	153	36.00	268.40	0.00	273.20	1.76																
122	Right	22B	2.41	0.13	266.80	900	117	268.80	273.60	153	36.00	268.80	0.00	273.60	1.76																
122	Left	22B	2.41	0.13	266.80	900	117	268.80	273.60	118	1.40	268.80	0.00	273.60	1.76																
123	Right	22B	2.41	0.13	266.80	900	117	268.80	273.60	118	1.40	268.80	0.00	273.60	1.76																
123	Rear	22B	2.41	0.13	266.80	900	117	268.80	273.60	153	36.00	268.80	0.00	273.60	1.76																
126	Rear	23B	1.02	0.15	266.80	900	135	268.80	273.60	153	18.00	268.80	0.00	273.60	1.76																
127	Rear	14B	2.41	0.13	267.00	900	117	269.00	273.80	153	36.00	269.00	0.00	273.80	1.76																
128	Rear	14B	2.41	0.13	267.00	900	117	269.00	273.80	153	36.00	269.00	0.00	273.80	1.76																
129	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	153	36.00	271.10	0.00	276.00	1.86																
129	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.40	271.10	0.00	276.00	1.86																
130	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.40	271.10	0.00	276.00	1.86																
130	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.40	271.10	0.00	276.00	1.86																
131	Right	13A	2.41	0.13	269.10	900	117	271.10	275.90	118	1.40	271.10	0.00	276.00	1.86																
131	Left	13A	2.41	0.13	269.10	900	117	271.10	275.90	153	36.00	271.10	0.00	276.00	1.86																
132	Rear	13B	8.27	0.09	269.40	900	76.5	271.40	276.20	112	35.50	271.40	0.00	276.20	1.76																
133	Rear	13B	8.27	0.09	269.40	900	76.5	271.40	276.20	112	35.50	271.40	0.00	276.20	1.76																
138	Rear	31	8.27	0.09	258.70	900	76.5	260.70	265.50	112	35.50	262.20	1.50	267.00	1.76																
139	Rear	31	8.27	0.09	258.70	900	76.5	260.70	265.50	77	0.50	267.20	6.50	272.00	1.76																
140	Front	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	264.00	4.80	268.80	1.76																
140	Rear	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	264.00	4.80	268.80	1.76																
141	Rear	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	264.00	4.80	268.80	1.76																
142	Rear	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	263.50	4.30	268.30	1.76																
143	Rear	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	264.00	4.80	268.80	1.76																
144	Rear	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	264.00	4.80	268.80	1.76																
145	Rear	27	8.27	0.09	257.20	900	76.5	259.20	264.00	112	35.50	262.00	2.80	266.80	1.76																
146	Front	19A	8.27	0.09	269.80	1350	114.75	271.80	275.30	170	55.25	271.80	0.00	275.30	0.46																
146	Rear	19A	8.27	0.09	269.80	1350	114.75	271.80	275.30	170	55.25	271.80	0.00	275.30	0.46																
147	Front	19A	8.27	0.09	269.80	1350	114.75	271.80	275.30	170	55.25	271.80	0.00	275.30	0.46																
147	Rear	19A	8.27	0.09	269.80	1350	114.75	271.80	275.30	170	55.25	271.80	0.00	275.30	0.46																

Appendix E

Groundwater Recharge and Basin Drawdown Calculations (Standard #3)

Outback Engineering Incorporated

165 East Grove Street
Middleborough, MA 02346
Tel: 508-946-9231 Fax: 508-947-8873
www.outback-eng.com

JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 10/4/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 10/4/18
TOWN: Medway

STANDARD 3: GROUNDWATER RECHARGE CALCULATIONS

Required Recharge Volume
Rv = F x impervious area (including green roofs & porous pavement)
where F = Target Depth Factor

Total Impervious Area*= 413,941 S.F. = 9.50 ACRES

***Total Impervious area does not include roof areas going to roof drains (front roof areas of Lots 80-84, 104-107, 112-119, 126-128, and 141-145 do not have roof drains and are included in the total impervious area shown).**

	HSG A	HSG B	HSG C	HSG D
Impervious Area (sf)	322,419	0	91,522	0
Target Depth Factor (in.)	0.6	0.35	0.25	0.1
Annual Recharge Volume (cf)	16,121	0	1,907	0

Total required volume to recharge = 18,028 c.f.

CAPTURE AREA ADJUSTMENT:

Total Site Impervious Area	=	9.50	ACRES				
Total Impervious Area Directed to Infiltration BMPs	=	8.89	ACRES				
Adjustment Ratio	=	9.50	/	8.89	=	1.07	
Adjusted Required Recharge Volume	=	**18,028**	x	1.07	=	**19,278**	**c.f.**
	=	**19,278**	/	43,560	=	**0.443**	**a.f.**

SIMPLE DYNAMIC METHOD:
Recharge Provided through exfiltration in Infiltration Basins 1-9, 12, 14-16, and Leaching Chambers 3 and 4.
1.20" rainfall event required to produce *adjusted* required recharge volume
*Storm start time of 11 hours and end time of 13 hours (see attached hydrograph and drain summary)
Required Storage Volume, assuming exfiltration rate of 1.02 in/hr = **16,450 cf**

Volume provided in Infiltration Basin 1 (below lowest outlet at 265.5):
Cumulative Vol. at 265.50 = 3,022 c.f.

Volume provided in Infiltration Basin 2 (below lowest outlet at 276.0):
Cumulative Vol. at 276.00 = 4,453 c.f.

Volume provided in Infiltration Basin 3 (below lowest outlet at 279.0):
Cumulative Vol. at 279.00 = 12,500 c.f.

Volume provided in Infiltration Basin 4 (below lowest outlet at 274.00):
Cumulative Vol. at 274.00 = 7,914 c.f.

Volume provided in Infiltration Basin 5 (below lowest outlet at 273.00):
Cumulative Vol. at 273.00 = 9,101 c.f.

Volume provided in Infiltration Basin 6 (below lowest outlet at 270.70):
Cumulative Vol. at 270.70 = 8,293 c.f.

Volume provided in Infiltration Basin 7 (below lowest outlet at 263.3):
Cumulative Vol. at 263.30 = 6,839 c.f.

Volume provided in Infiltration Basin 8 (below lowest outlet at 265.75):
Cumulative Vol. at 265.75 = 1,294 c.f.

Volume provided in Infiltration Basin 9 (below lowest outlet at 275.00):
Cumulative Vol. at 275.00 = 8,815 c.f.

Volume provided in Infiltration Basin 12 (below lowest outlet at 271.00):
Cumulative Vol. at 271.00 = 7,304 c.f.

Volume provided in Infiltration Basin 14 (below lowest outlet at 273.70):
Cumulative Vol. at 273.70 = 2,290 c.f.

Volume provided in Infiltration Basin 15 (below lowest outlet at 266.00):
Cumulative Vol. at 266.00 = 2,171 c.f.

Volume provided in Infiltration Basin 16 (below lowest outlet at 272.25):
Cumulative Vol. at 272.25 = 1,122 c.f.

Volume provided in Leaching Chamber Bed 3 (below lowest outlet at 273.80):
Cumulative Vol. at 273.80 = 2,344 c.f.

Volume provided in Leaching Chamber Bed 4 (below lowest outlet at 271.22):
Cumulative Vol. at 271.22 = 488 c.f.

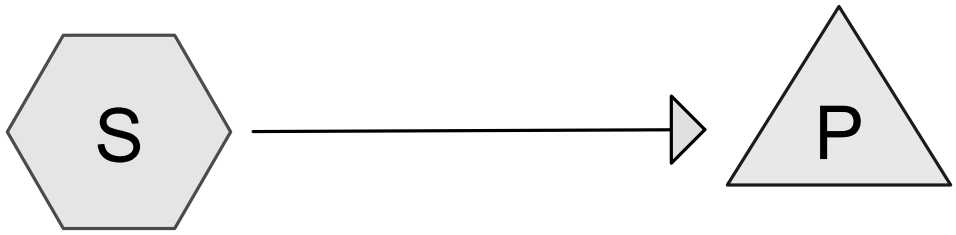
STORAGE VOLUME PROVIDED

Infiltration BMP	TOTAL VOLUME (C.F.)	BOTTOM AREA (S.F.)
Basin 1	3,022	3,448
Basin 2	4,453	1,260
Basin 3	12,500	6,760
Basin 4	7,914	4,280
Basin 5	9,101	4,974
Basin 6	8,293	3,000
Basin 7	6,839	3,170
Basin 8	1,294	586
Basin 9	8,815	2,714
Basin 12	7,304	2,158
Basin 14	2,290	830
Basin 15	2,171	530
Basin 16	1,122	877
LC 3	2,344	1,949
LC 4	488	704
TOTAL	**77,950**	37,240

DRAWDOWN WITHIN 72 HOURS

DRAWDOWN TIME = (Rv)(1/IR)(12 inches/ 1 foot)(1/BA)
WHERE,
Rv = RECHARGE VOLUME IN CUBIC FEET
IR = DESIGN INFILTRATION RATE IN INCHES PER HOUR
BA = BOTTOM AREA IN SQUARE FEET

INFILTRATION BASIN 1											
DRAWDOWN TIME	=	3,022	X	1 / 2.41	X	12 / 1	X	1 / 3,448	=	**4.36**	Hours
INFILTRATION BASIN 2											
DRAWDOWN TIME	=	4,453	X	1 / 8.27	X	12 / 1	X	1 / 1,260	=	**5.13**	Hours
INFILTRATION BASIN 3											
DRAWDOWN TIME	=	12,500	X	1 / 2.41	X	12 / 1	X	1 / 6,760	=	**9.21**	Hours
INFILTRATION BASIN 4											
DRAWDOWN TIME	=	7,914	X	1 / 2.41	X	12 / 1	X	1 / 4,280	=	**9.21**	Hours
INFILTRATION BASIN 5											
DRAWDOWN TIME	=	9,101	X	1 / 2.41	X	12 / 1	X	1 / 4,974	=	**9.11**	Hours
INFILTRATION BASIN 6											
DRAWDOWN TIME	=	8,293	X	1 / 2.41	X	12 / 1	X	1 / 3,000	=	**13.76**	Hours
INFILTRATION BASIN 7											
DRAWDOWN TIME	=	6,839	X	1 / 2.41	X	12 / 1	X	1 / 3,170	=	**10.74**	Hours
INFILTRATION BASIN 8											
DRAWDOWN TIME	=	1,294	X	1 / 8.27	X	12 / 1	X	1 / 586	=	**3.20**	Hours
INFILTRATION BASIN 9											
DRAWDOWN TIME	=	8,815	X	1 / 1.02	X	12 / 1	X	1 / 2,714	=	**38.21**	Hours
INFILTRATION BASIN 12											
DRAWDOWN TIME	=	7,304	X	1 / 8.27	X	12 / 1	X	1 / 2,158	=	**4.91**	Hours
INFILTRATION BASIN 14											
DRAWDOWN TIME	=	2,290	X	1 / 2.41	X	12 / 1	X	1 / 830	=	**13.74**	Hours
INFILTRATION BASIN 15											
DRAWDOWN TIME	=	2,171	X	1 / 2.41	X	12 / 1	X	1 / 530	=	**20.40**	Hours
INFILTRATION BASIN 16											
DRAWDOWN TIME	=	1,122	X	1 / 8.27	X	12 / 1	X	1 / 877	=	**1.86**	Hours
LEACHING CHAMBER BED 3											
DRAWDOWN TIME	=	2,344	X	1 / 2.41	X	12 / 1	X	1 / 1,949	=	**5.99**	Hours
LEACHING CHAMBER BED 4											
DRAWDOWN TIME	=	488	X	1 / 1.02	X	12 / 1	X	1 / 704	=	**8.16**	Hours
RAIN GARDEN 1											
DRAWDOWN TIME	=	1,016	X	1 / 2.41	X	12 / 1	X	1 / 1,998	=	**2.53**	Hours
RAIN GARDEN 2											
DRAWDOWN TIME	=	661	X	1 / 2.41	X	12 / 1	X	1 / 247	=	**13.33**	Hours
RAIN GARDEN 3											
DRAWDOWN TIME	=	708	X	1 / 2.41	X	12 / 1	X	1 / 266	=	**13.25**	Hours
RAIN GARDEN 4											
DRAWDOWN TIME	=	251	X	1 / 2.41	X	12 / 1	X	1 / 164	=	**7.62**	Hours



Impervious Area

Recharge Volume

Subcat Reach Pond Link

Routing Diagram for Appendix E - Groundwater Recharge
Prepared by Outback Engineering Inc., Printed 4/16/2019

Summary for Subcatchment S: Impervious Area

Runoff = 10.34 cfs @ 12.09 hrs, Volume= 0.444 af, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.05 hrs
Type III 24-hr Recharge Rainfall=1.20"

	Area (sf)	CN	Description
*	420,861	98	Impervious
	420,861		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 Minimum**

Summary for Pond P: Recharge Volume

Inflow Area = 9.662 ac,100.00% Impervious, Inflow Depth > 0.55" for Recharge event
Inflow = 10.34 cfs @ 12.09 hrs, Volume= 0.444 af
Outflow = 0.39 cfs @ 11.15 hrs, Volume= 0.066 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.39 cfs @ 11.15 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 11.00-13.00 hrs, dt= 0.05 hrs
Peak Elev= 101.00' @ 13.00 hrs Surf.Area= 16,450 sf Storage= 16,420 cf

Plug-Flow detention time= 35.1 min calculated for 0.065 af (15% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	16,450 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	16,450	0	0
101.00	16,450	16,450	16,450

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.39 cfs @ 11.15 hrs HW=100.01' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Appendix F-1

Water Quality Volume Calculations (Standard #4)

Outback Engineering Incorporated

165 East Grove Street
Middleborough, MA 02346
Tel: 508-946-9231 Fax: 508-947-8873
www.outback-eng.com

JOB #: OE-2765 **CALC BY:** TEM **DATE:** 10/4/18
JOB NAME: Timber Crest Estates **CHECK BY:** JAP **DATE:** 10/4/18
TOWN: Medway

STANDARD 4: WATER QUALITY

WATER QUALITY VOLUME:
V(WQ) = D(WQ) X (12 IN. / FT) X A(IMP)
WHERE,
V(WQ) = REQUIRED WATER QUALITY TREATMENT VOLUME IN CUBIC FEET
D(WQ) = WATER QUALITY DEPTH (0.5 INCH OR 1 INCH)
A(IMP) = IMPERVIOUS AREA IN S.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 1
CONTRIBUITING IMPERVIOUS AREA = 37,462 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	37,462	S.F.	=	1,561	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	5	CATCH BASINS						=	251	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	365	C.F.

VOLUME PROVIDED AT BASIN 1 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	3,022	C.F.
								TOTAL	=	3,638	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 2
CONTRIBUITING IMPERVIOUS AREA = 33,130 S.F.

V(WQ)	=	1	IN.	X	1 FT/ 12 IN.	X	33,130	S.F.	=	2,761	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	3	CATCH BASINS						=	151	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	614	C.F.

VOLUME PROVIDED AT BASIN 2 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	4,453	C.F.
								TOTAL	=	5,218	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 3
CONTRIBUITING IMPERVIOUS AREA = 45,227 S.F.

V(WQ)	=	1	IN.	X	1 FT/ 12 IN.	X	45,227	S.F.	=	3,769	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	4	CATCH BASINS						=	201	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	1,123	C.F.

VOLUME PROVIDED AT BASIN 3 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	12,500	C.F.
								TOTAL	=	13,824	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 4
CONTRIBUITING IMPERVIOUS AREA = 29,960 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	29,960	S.F.	=	1,248	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	2	CATCH BASINS						=	101	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	307	C.F.

VOLUME PROVIDED AT BASIN 4 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	7,914	C.F.
								TOTAL	=	8,322	C.F.

Outback Engineering Incorporated

165 East Grove Street
Middleborough, MA 02346
Tel: 508-946-9231 Fax: 508-947-8873
www.outback-eng.com

JOB #: OE-2765 **CALC BY:** TEM **DATE:** 10/4/18
JOB NAME: Timber Crest Estates **CHECK BY:** JAP **DATE:** 10/4/18
TOWN: Medway

WATER QUALITY VOLUME AT INFILTRATION BASIN 5

CONTRIBUITING IMPERVIOUS AREA = 23,725 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	23,725	S.F.	=	989	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	3	CATCH BASINS						=	151	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	266	C.F.

VOLUME PROVIDED AT BASIN 5 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	9,101	C.F.
								TOTAL	=	9,518	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 6

CONTRIBUITING IMPERVIOUS AREA = 38,223 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	38,223	S.F.	=	1,593	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	2	CATCH BASINS						=	101	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	428	C.F.

VOLUME PROVIDED AT BASIN 6 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	8,293	C.F.
								TOTAL	=	8,822	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 7

CONTRIBUITING IMPERVIOUS AREA = 35,771 S.F.

V(WQ)	=	0.5	IN.	X	IN.	X	35,771	S.F.	=	1,490	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	2	CATCH BASINS						=	101	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	297	C.F.

VOLUME PROVIDED AT BASIN 7 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	6,839	C.F.
								TOTAL	=	7,237	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 8

CONTRIBUITING IMPERVIOUS AREA = 18,621 S.F.

V(WQ)	=	1	IN.	X	IN.	X	18,621	S.F.	=	1,552	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	4	CATCH BASINS						=	201	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	260	C.F.

VOLUME PROVIDED AT BASIN 8 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	1,294	C.F.
								TOTAL	=	1,755	C.F.

WATER QUALITY VOLUME AT DRY DETENTION BASIN 8A (LC-3)

CONTRIBUITING IMPERVIOUS AREA = 23,137 S.F.

V(WQ)	=	1	IN.	X	IN.	X	23,137	S.F.	=	1,928	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	4	CATCH BASINS						=	201	C.F.

VOLUME PROVIDED FROM WATER QUALITY TANK (3000 GALLON) =401 ft^3

									=	401	C.F.

VOLUME PROVIDED FROM LEACHING CHAMBERS

(below lowest oulet)									=	2,052	C.F.
								TOTAL	=	2,654	C.F.

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WATER QUALITY VOLUME AT INFILTRATION BASIN 9

CONTRIBUITING IMPERVIOUS AREA = 21,271 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	21,271	S.F.	=	886	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	3	CATCH BASINS						=	151	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	235	C.F.

VOLUME PROVIDED AT BASIN 9 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	3,409	C.F.
								TOTAL	=	3,795	C.F.

WATER QUALITY VOLUME AT DRY DETENTION BASIN 10 (LC-4)

CONTRIBUITING IMPERVIOUS AREA = 21,431 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	21,431	S.F.	=	893	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	2	CATCH BASINS						=	101	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	223	C.F.

VOLUME PROVIDED FROM WATER QUALITY TANK (3500 GALLON) =468 ft^3

									=	468	C.F.

VOLUME PROVIDED FROM LEACHING CHAMBERS

(below lowest outlet)									=	488	C.F.
								TOTAL	=	1,280	C.F.

WATER QUALITY VOLUME AT WATER QUALITY SWALE #2

CONTRIBUITING IMPERVIOUS AREA = 16,893 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	16,893	S.F.	=	704	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	2	CATCH BASINS						=	101	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	302	C.F.

VOLUME PROVIDED FROM WATER QUALITY SWALE *(See Post-Development HydroCAD Calc)*

									=	1,823	C.F.
								TOTAL	=	2,226	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 12

CONTRIBUITING IMPERVIOUS AREA = 21,657 S.F.

V(WQ)	=	1	IN.	X	1 FT/ 12 IN.	X	21,657	S.F.	=	1,805	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	1	CATCH BASINS						=	50	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	341	C.F.

VOLUME PROVIDED AT BASIN 12 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	7,304	C.F.
								TOTAL	=	7,695	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 14

CONTRIBUITING IMPERVIOUS AREA = 14,034 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	14,034	S.F.	=	585	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	386	C.F.

VOLUME PROVIDED AT BASIN 14 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	2,290	C.F.
								TOTAL	=	2,676	C.F.

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WATER QUALITY VOLUME AT INFILTRATION BASIN 15

CONTRIBUITING IMPERVIOUS AREA = 2,724 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	2,724	S.F.	=	114	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	1	CATCH BASINS						=	50	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	267	C.F.

VOLUME PROVIDED AT BASIN 15 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	266	C.F.
								TOTAL	=	583	C.F.

WATER QUALITY VOLUME AT INFILTRATION BASIN 16

CONTRIBUITING IMPERVIOUS AREA = 4,896 S.F.

V(WQ)	=	1	IN.	X	1 FT/ 12 IN.	X	4,896	S.F.	=	408	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	548	C.F.

VOLUME PROVIDED AT BASIN 16 (BELOW LOWEST OUTLET)

(See Groundwater Recharge Calcualtions)									=	1,122	C.F.
								TOTAL	=	1,670	C.F.

WATER QUALITY VOLUME AT WATER QUALITY SWALE #1

CONTRIBUITING IMPERVIOUS AREA = 6,400 S.F.

V(WQ)	=	0.5	IN.	X	1 FT/ 12 IN.	X	6,400	S.F.	=	267	C.F.

VOLUME PROVIDED FROM DEEP SUMP HOODED CATCH BASINS

(3.14 x (2ft)^2 x 4ft)	X	2	CATCH BASINS						=	101	C.F.

VOLUME PROVIDED FROM SEDIMENT FOREBAY

(See Sediment Forebay Calculations)									=	238	C.F.

VOLUME PROVIDED FROM WATER QUALITY SWALE *(See Post-Development HydroCAD Calc)*

									=	994	C.F.
								TOTAL	=	1,333	C.F.

Appendix F-2

TSS Removal Calculations (Standard #4)

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TSS REMOVAL CALCULATIONS FOR INFILTRATION BASINS WITH RAPID INFILTRATION

PRETREATMENT OF INFILTRATION BASIN 2

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1.00	0.25	0.75
Sediment Forebay	25%	0.75	0.19	0.56
		Total TSS Removal=	0.44	

PRETREATMENT OF INFILTRATION BASIN 3

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1.00	0.25	0.75
Sediment Forebay	25%	0.75	0.19	0.56
		Total TSS Removal=	0.44	

PRETREATMENT OF INFILTRATION BASIN 8

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1.00	0.25	0.75
Sediment Forebay	25%	0.75	0.19	0.56
		Total TSS Removal=	0.44	

PRETREATMENT OF LEACHING CHAMBER BED 3 / DRY DETENTION BASIN 8A

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1.00	0.25	0.75
Water Quality Tank	25%	0.75	0.19	0.56
		Total TSS Removal=	0.44	

PRETREATMENT OF INFILTRATION BASIN 12

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1.00	0.25	0.75
Sediment Forebay	25%	0.75	0.19	0.56
		Total TSS Removal=	0.44	

PRETREATMENT OF INFILTRATION BASIN 16

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Sediment Forebay	25%	1.00	0.25	0.75
Sediment Forebay	25%	0.75	0.19	0.56
		Total TSS Removal=	0.44	

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TSS REMOVALS FOR EACH DISCHARGE

TREATMENT OF INFILTRATION BASIN 1

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 2

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 3

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 4

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 5

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 6

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

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TREATMENT OF INFILTRATION BASIN 7

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 8

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF LEACHING CHAMBER BED 3 / DRY DETENTION BASIN 8A

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Leaching Chambers (with Pre-Treatment WQ tank)	80%	0.75	0.6	0.15
Dry Detention Basin	0%	0.15	0	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 9

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF LEACHING CHAMBER BED 4 / DRY DETENTION BASIN 10

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Leaching Chambers (with Pre-Treament WQ tank)	80%	0.75	0.60	0.15
Dry Detention Basin	0%	0.15	0.00	0.15
		Total TSS Removal=	0.85	

TREATMENT OF WATER QUALITY SWALE #1

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Sed Forebay	25%	0.75	0.19	0.56
Water Quality Swale w/ forebay	70%	0.56	0.39	0.17
		Total TSS Removal=	0.83	

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TREATMENT OF WATER QUALITY SWALE #2

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Sed Forebay	25%	0.75	0.19	0.56
Water Quality Swale w/ forebay	70%	0.56	0.39	0.17
		Total TSS Removal=	0.83	

TREATMENT OF INFILTRATION BASIN 12

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 14

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Infiltration Basin (with Sediment Forebay)	80%	1	0.8	0.2
		Total TSS Removal=	0.80	

TREATMENT OF INFILTRATION BASIN 15

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

TREATMENT OF INFILTRATION BASIN 16

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BXC)	E Remaining Load (C-D)
Sediment Forebay	25%	1	0.25	0.75
Infiltration Basin (with Sediment Forebay)	80%	0.75	0.6	0.15
		Total TSS Removal=	0.85	

Appendix F-3

Sediment Forebay Calculations (Standard #4)

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SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #1

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 32,000 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 32,000 S.F.

= 267 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 266.20 AREA = 93 S.F.
FOREBAY BERM EL. = 267.70 AREA = 393 S.F.

VOLUME PROVIDED = 365 C.F.

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SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #2

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 33,130 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

$$\text{REQ'D SED. FOREBAY VOLUME} = .1\text{"} \text{ INCHES} \times \frac{1 \text{ FT}}{12 \text{ IN}} \times 33{,}130 \text{ S.F.}$$

= 276 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 274.00 AREA = 234 S.F.
FOREBAY BERM EL. = 275.50 AREA = 585 S.F.

VOLUME PROVIDED = 614 C.F.

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SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #3

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 45,227 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1 \text{ FT}}{12 \text{ IN}}$ X 45,227 S.F.

= 377 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

	BOTTOM FOREBAY EL. =	277.50	AREA =	70	S.F.
Forebay @ West side of basin	FOREBAY BERM EL. =	279.00	AREA =	332	S.F.
			VOLUME PROVIDED =	302	C.F.
	BOTTOM FOREBAY EL. =	277.50	AREA =	305	S.F.
Forebay @ East side of basin	FOREBAY BERM EL. =	279.00	AREA =	790	S.F.
			VOLUME PROVIDED =	821	C.F.

1,123 C.F.

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SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #4

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 29,960 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

$$\text{REQ'D SED. FOREBAY VOLUME} = .1\text{"} \text{ INCHES} \times \frac{1 \text{ FT}}{12 \text{ IN}} \times 29{,}960 \text{ S.F.}$$

= 250 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 272.50 AREA = 229 S.F.
FOREBAY BERM EL. = 273.50 AREA = 385 S.F.

VOLUME PROVIDED = 307 C.F.

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SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #5

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 23,725 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

$$\text{REQ'D SED. FOREBAY VOLUME} = .1\text{"} \text{ INCHES} \times \frac{1 \text{ FT}}{12 \text{ IN}} \times 23{,}725 \text{ S.F.}$$

= 198 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 271.30 AREA = 134 S.F.
FOREBAY BERM EL. = 272.50 AREA = 310 S.F.

VOLUME PROVIDED = 266 C.F.

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JOB #: OE-2765 **CALC BY:** T.EM. **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #6

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 38,223 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 38,223 S.F.

= 319 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 268.70 AREA = 174 S.F.
FOREBAY BERM EL. = 270.00 AREA = 485 S.F.

VOLUME PROVIDED = 428 C.F.

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JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #7

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 35,771 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 35,771 S.F.

= 298 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 261.00 AREA = 201 S.F.
FOREBAY BERM EL. = 262.00 AREA = 394 S.F.

VOLUME PROVIDED = 298 C.F.

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JOB #: OE-2765 CALC BY: T.E.M. DATE: 10/04/18
JOB NAME: Timber Crest Estates CHECK BY: J.A.P. DATE: 10/04/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #8

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 18,621 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = 0.1" INCHES X $\frac{1 \text{ FT}}{12 \text{ IN}}$ X 18,621 S.F.

= 155 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 264.50 AREA = 19 S.F.
FOREBAY BERM EL. = 266.00 AREA = 327 S.F.

VOLUME PROVIDED = 260 C.F.

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JOB #: OE-2765 **CALC BY:** K.A.D. **DATE:** 08/14/18
JOB NAME: Timber Crest estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: medway MA

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #9

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 21,271 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 21,271 S.F.

= 177 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 272.70 AREA = 60 S.F.
FOREBAY BERM EL. = 274.00 AREA = 302 S.F.

VOLUME PROVIDED = 235 C.F.

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JOB #: OE-2765 **CALC BY:** C.J.V. **DATE:** 08/14/18
JOB NAME: timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #12

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 21,657 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 21,657 S.F.

= 180 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 269.00 AREA = 105 S.F.
FOREBAY BERM EL. = 270.50 AREA = 350 S.F.

VOLUME PROVIDED = 341 C.F.

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JOB #: OE-2765 **CALC BY:** CJV **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #14

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 14,034 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 14,034 S.F.

= 117 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 273.00 AREA = 225 S.F.
FOREBAY BERM EL. = 274.00 AREA = 546 S.F.

VOLUME PROVIDED = 386 C.F.

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JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #15

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 2,724 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 2,724 S.F.

= 23 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAY

BOTTOM FOREBAY EL. = 264.00 AREA = 69 S.F.
FOREBAY BERM EL. = 265.50 AREA = 287 S.F.

VOLUME PROVIDED = 267 C.F.

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JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR INFIL. BASIN #16

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 4,896 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X 1 FT / 12 IN X 4,896 S.F.

= 41 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAYS

FIRST FOREBAY	BOTTOM FOREBAY EL. =	271.00	AREA =	48	S.F.
	FOREBAY BERM EL. =	272.50	AREA =	285	S.F.
	VOLUME PROVIDED =			250	C.F.
SECOND FOREBAY	BOTTOM FOREBAY EL. =	271.00	AREA =	68	S.F.
	FOREBAY BERM EL. =	272.50	AREA =	329	S.F.
	VOLUME PROVIDED =			298	C.F.
	TOTAL VOLUME PROVIDED =			548	C.F.

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JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR WATER QUALITY SWALE #1

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 6,400 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = 0.1" INCHES X $\frac{1\ FT}{12\ IN}$ X 6,400 S.F.

= 53 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAYS

FIRST FOREBAY	BOTTOM FOREBAY EL. =	263.00	AREA =	61	S.F.
	FOREBAY BERM EL. =	264.00	AREA =	177	S.F.
			VOLUME PROVIDED =	119	C.F.
SECOND FOREBAY	BOTTOM FOREBAY EL. =	263.00	AREA =	61	S.F.
	FOREBAY BERM EL. =	264.00	AREA =	177	S.F.
			VOLUME PROVIDED =	119	C.F.
			TOTAL VOLUME PROVIDED =	238	C.F.

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JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 08/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 08/14/18
TOWN: Medway

SEDIMENT FOREBAY SIZING CALCULATION FOR WATER QUALITY SWALE #2

TOTAL CONTRIBUTING IMPERVIOUS AREA TO FOREBAY

= 16,893 s.f.

REQUIRED VOLUME OF SEDIMENT FOREBAY = VOLUME PRODUCED BY 0.1" RUNOFF/IMPERVIOUS ACRE

REQ'D SED. FOREBAY VOLUME = .1" INCHES X $\frac{1\ FT}{12\ IN}$ X 16,893 S.F.

= 141 C.F.

PROVIDED VOLUME OF SEDIMENT FOREBAYS

FIRST FOREBAY	BOTTOM FOREBAY EL. =	270.80	AREA =	36	S.F.
	FOREBAY BERM EL. =	272.00	AREA =	218	S.F.
	VOLUME PROVIDED =			152	C.F.
SECOND FOREBAY	BOTTOM FOREBAY EL. =	270.80	AREA =	45	S.F.
	FOREBAY BERM EL. =	272.00	AREA =	204	S.F.
	VOLUME PROVIDED =			149	C.F.
	TOTAL VOLUME PROVIDED =			302	C.F.

Appendix F-4
Water Quality Inlet Calculations

Outback Engineering Incorporated

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Tel: 508-946-9231 Fax: 508-947-8873

JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 8/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 8/14/18

WATER QUALITY INLET #1 CALCULATIONS (Flow to LC-3 Drain Bed & Det. Basin 8A)

Contributing Impervious Area = 23,137 s.f.

First Chamber (400 c.f. / contributing impervious acre)

= 23,137 s.f. x $\frac{1 \text{ Acre}}{43{,}560 \text{ s.f.}}$ = 0.53 Acres

= $\frac{400 \text{ c.f.}}{\text{acre}}$ x 0.53 Acres = 212 c.f.

= $\frac{7.48 \text{ gal}}{\text{c.f.}}$ x 212 c.f. = 1,589 Gallons (Min.)

Second Chamber

= 500 Gallons (Min.)

ThirdChamber

= 500 Gallons (Min)

Use a 3000 Gallon Tank

WATER QUALITY INLET #2 CALCULATIONS (Flow to LC-4 Drain Bed & Det. Basin 10)

Contributing Impervious Area = 17,400 s.f.

First Chamber (400 c.f. / contributing impervious acre)

= 17,400 s.f. x $\frac{1 \text{ Acre}}{43{,}560 \text{ s.f.}}$ = 0.40 Acres

= $\frac{400 \text{ c.f.}}{\text{acre}}$ x 0.40 Acres = 160 c.f.

= $\frac{7.48 \text{ gal}}{\text{c.f.}}$ x 160 c.f. = 1,195 Gallons (Min.)

Second Chamber

= 500 Gallons (Min.)

ThirdChamber

= 500 Gallons (Min)

Use a 2500 Gallon Tank

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Tel: 508-946-9231 Fax: 508-947-8873

JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 8/14/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 8/14/18
TOWN: Medway
Des. Storm: 2 year

WATER QUALITY TANK BYPASS CALCULATION

Per the Stormwater Management Regulations, water quality tanks must be designed offline, pass the 2-year 24-hour storm without interference, and must have a bypass for larger storms to prevent resuspension of solids. This calculation provides the required elevation difference between the two outlets in the required flow splitter drain manhole (highlighted in yellow). The bypass pipe must be set at this relative height above the outlet to the water quality tank. Also see detail for flow limiter on sheet 43 of the site plans.

WATER QUALITY TANK 1

(DMH-LC3 acts as the flow splitter manhole for WQ Tank 1)

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-LC3A	DMH-LC3A	0.53	0.26	0.26	0.60	0.32	10	0.17	10.17	3.2	1.01
2	4	CB-LC3B	DMH-LC3A	0.37	0.16	0.21	0.56	0.21	10	0.11	10.11	3.2	0.67
3	4	DMH-LC3A	DMH-LC3	0.90	0.42	0.48	0.58	0.52	10	0.35	10.35	3.2	1.68
4	4	CB-LC3C	DMH-LC3	0.20	0.10	0.10	0.61	0.12	10	0.05	10.05	3.2	0.39
5	4	CB-LC3D	DMH-LC3	0.10	0.05	0.05	0.59	0.06	10	0.11	10.11	3.2	0.20
6	4	DMH-LC3	WQI-1	1.20	0.58	0.63	0.59	0.71	10	0.03	10.03	3.2	2.27

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW				
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)
1	12	0.012	0.01	44	4.91	3.86	4.25	1.01	0.26	0.3	4.1
2	12	0.012	0.01	25	4.91	3.86	3.80	0.67	0.17	0.3	3.4
3	12	0.012	0.005	79	3.47	2.73	3.75	1.68	0.62	0.6	6.7
4	12	0.012	0.01	9	4.91	3.86	3.23	0.39	0.10	0.2	2.6
5	12	0.012	0.01	17	4.91	3.86	2.54	0.20	0.05	0.1	1.7
6	10	0.012	0.01	9	4.35	2.37	5.09	2.27	0.95	0.8	7.5

WATER QUALITY TANK 2

(DMH-LC4 acts as the flow splitter manhole for WQ Tank 2)

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-LC4C	DMH-LC4A	0.20	0.14	0.06	0.72	0.15	10	0.06	10.06	3.2	0.46
2	4	CB-LC4D	DMH-LC4A	0.28	0.19	0.09	0.71	0.20	10	0.09	10.09	3.2	0.63
3	4	DMH-LC4A	DMH-LC4	0.48	0.33	0.15	0.72	0.34	10	0.23	10.23	3.2	1.09
4	4	CB-LC4A	DMH-LC4	0.07	0.04	0.03	0.66	0.05	10	0.14	10.14	3.2	0.15
5	4	CB-LC4B	DMH-LC4	0.21	0.15	0.06	0.73	0.15	10	0.06	10.06	3.2	0.49
6	4	DMH-LC4	WQI-2	0.76	0.52	0.23	0.71	0.54	10	0.02	10.02	3.2	1.73

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW				
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)
1	12	0.012	0.01	13	4.91	3.86	3.42	0.46	0.12	0.2	2.8
2	12	0.012	0.01	20	4.91	3.86	3.74	0.63	0.16	0.3	3.3
3	12	0.012	0.008	55	4.40	3.45	3.98	1.09	0.32	0.4	4.5
4	12	0.012	0.01	20	4.91	3.86	2.34	0.15	0.04	0.1	1.5
5	12	0.012	0.01	12	4.91	3.86	3.47	0.49	0.13	0.2	2.9
6	10	0.012	0.01	6	4.35	2.37	4.86	1.73	0.73	0.6	6.3

Appendix G
Pipe Calculations

Outback Engineering Incorporated

165 East Grove Street
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JOB #: OE-2765 **CALC BY:** T.E.M. **DATE:** 10/4/18
JOB NAME: Timber Crest Estates **CHECK BY:** J.A.P. **DATE:** 10/4/18
TOWN: Medway
Des. Storm: 25 year

PIPE CAPACITY CALCULATIONS

MIN VELOCITY: 2 ft./sec. **MAX VELOCITY:** 10 ft./sec.

PIPE NETWORK TO WATER QUALITY SWALE #1

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-WQSA	DMH-WQS	0.19	0.10	0.09	0.63	0.12	10	0.09	10.09	5	0.60
2	4	CB-WQSB	DMH-WQS	0.37	0.07	0.30	0.41	0.15	10	0.08	10.08	5	0.77
3	4	DMH-WQS	FE-WQS	0.56	0.17	0.39	0.49	0.27	10	0.13	10.13	5	1.37

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	20	4.91	3.86	3.69	0.60	0.16	0.3	3.2	OK!
2	12	0.012	0.01	20	4.91	3.86	3.96	0.77	0.20	0.3	3.6	OK!
3	12	0.012	0.02	46	6.95	5.46	5.94	1.37	0.25	0.3	4.1	OK!

PIPE NETWORK TO INFILTRATION BASIN #1

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-1D	DMH-1C	0.44	0.18	0.25	0.55	0.24	10	0.07	10.07	5	1.21
2	4	CB-1E	DMH-1C	0.23	0.10	0.12	0.57	0.13	10	0.09	10.09	5	0.66
3	4	CB-1F	DMH-1C	1.15	0.28	0.86	0.45	0.51	10	0.13	10.13	5	2.56
4	4	DMH-1C	DMH-1B	1.81	0.57	1.24	0.49	0.89	10	0.29	10.29	5	4.43
5	4	CB-1A	DMH-1B	0.12	0.07	0.06	0.63	0.08	10	0.08	10.08	5	0.39
6	4	CB-1B	DMH-1B	0.15	0.07	0.08	0.58	0.09	10	0.11	10.11	5	0.44
7	4	DMH-1B	DMH-1A	2.09	0.71	1.38	0.50	1.05	10	0.07	10.07	5	5.26
8	4	CB-1C	DMH-1A	0.83	0.00	0.83	0.30	0.25	10	0.34	10.34	5	1.24
9	4	DMH-1A	FE-1	2.91	0.71	2.21	0.45	1.30	10	0.38	10.38	5	6.50

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	18	4.91	3.86	4.44	1.21	0.31	0.4	4.5	OK!
2	12	0.012	0.01	20	4.91	3.86	3.79	0.66	0.17	0.3	3.4	OK!
3	12	0.012	0.025	58	7.77	6.10	7.58	2.56	0.42	0.4	5.3	OK!
4	12	0.012	0.021	142	7.12	5.59	8.07	4.43	0.79	0.7	7.9	OK!
5	12	0.012	0.01	15	4.91	3.86	3.23	0.39	0.10	0.2	2.6	OK!
6	12	0.012	0.01	22	4.91	3.86	3.36	0.44	0.11	0.2	2.7	OK!
7	12	0.012	0.021	35	7.12	5.59	8.30	5.26	0.94	0.7	8.9	OK!
8	12	0.012	0.01	90	4.91	3.86	4.47	1.24	0.32	0.4	4.6	OK!
9	18	0.012	0.004	107	4.07	7.20	4.71	6.50	0.90	0.7	12.9	OK!

PIPE NETWORK TO INFILTRATION BASIN #2

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-2C	DMH-2C	0.26	0.14	0.12	0.62	0.16	10	0.06	10.06	5	0.81
2	4	CB-2D	DMH-2C	0.53	0.17	0.36	0.49	0.26	10	0.08	10.08	5	1.30
3	4	DMH-2C	DMH-2B	0.79	0.31	0.48	0.53	0.42	10	1.08	11.08	5	2.11
4	4	CB-2A	DMH-2B	0.52	0.26	0.26	0.60	0.31	10	0.03	10.03	5	1.54
5	4	CB-2B	DMH-2B	0.48	0.20	0.28	0.55	0.27	10	0.20	10.20	5	1.33
6	4	DMH-2B	DMH-2A	1.79	0.77	1.02	0.56	1.00	10	0.10	10.10	5	4.99
7	4	DMH-2A	FE-2	1.79	0.77	1.02	0.56	1.00	10	0.29	10.29	5	4.99

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	14	4.91	3.86	4.01	0.81	0.21	0.3	3.7	**OK!**
2	12	0.012	0.01	21	4.91	3.86	4.53	1.30	0.34	0.4	4.7	**OK!**
3	12	0.012	0.0075	300	4.26	3.34	4.62	2.11	0.63	0.6	6.8	**OK!**
4	12	0.012	0.01	9	4.91	3.86	4.73	1.54	0.40	0.4	5.1	**OK!**
5	12	0.012	0.01	56	4.91	3.86	4.55	1.33	0.35	0.4	4.7	**OK!**
6	18	0.012	0.01	39	6.44	11.38	6.36	4.99	0.44	0.5	8.1	**OK!**
7	18	0.012	0.01	111	6.44	11.38	6.36	4.99	0.44	0.5	8.1	**OK!**

PIPE NETWORK TO INFILTRATION BASIN #3

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-3A	DMH-3A	1.77	0.48	1.29	0.46	0.82	10	0.06	10.06	5	4.08
2	4	CB-3B	DMH-3A	0.34	0.20	0.14	0.65	0.22	10	0.04	10.04	5	1.09
3	4	DMH-3A	FE-3A	2.10	0.67	1.43	0.49	1.04	10	0.06	10.06	5	5.18
4	4	CB-3C	DMH-3B	0.43	0.23	0.20	0.62	0.27	10	0.05	10.05	5	1.33
5	4	CB-3D	DMH-3B	0.20	0.12	0.08	0.67	0.14	10	0.08	10.08	5	0.68
6	4	DMH-3B	FE-3B	0.63	0.35	0.28	0.64	0.40	10	0.12	10.12	5	2.01

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	21	4.91	3.86	5.78	4.08	1.06	0.9	10.5	**OK!**
2	12	0.012	0.01	11	4.91	3.86	4.33	1.09	0.28	0.4	4.3	**OK!**
3	12	0.012	0.017	25	6.41	5.03	7.57	5.18	1.03	0.8	10.0	**OK!**
4	12	0.012	0.01	14	4.91	3.86	4.55	1.33	0.35	0.4	4.7	**OK!**
5	12	0.012	0.01	19	4.91	3.86	3.82	0.68	0.18	0.3	3.4	**OK!**
6	12	0.012	0.013	41	5.60	4.40	5.60	2.01	0.46	0.5	5.5	**OK!**

PIPE NETWORK TO INFILTRATION BASIN #4

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-4	DMH-4A	0.34	0.16	0.18	0.58	0.20	10	0.08	10.08	5	0.98
2	4	CB-4B	DMH-4A	0.34	0.16	0.18	0.58	0.20	10	0.06	10.06	5	0.98
3	4	DMH-4A	DMH-4	0.68	0.31	0.37	0.58	0.39	10	0.44	10.44	5	1.95
4	4	CB-4	DMH-4	0.68	0.35	0.33	0.61	0.42	10	0.05	10.05	5	2.08
5	4	DMH-4	FE-4	1.36	0.66	0.69	0.59	0.81	10	0.46	10.46	5	4.03

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	20	4.91	3.86	4.21	0.98	0.25	0.3	4.1	**OK!**
2	12	0.012	0.01	14	4.91	3.86	4.21	0.98	0.25	0.3	4.1	**OK!**
3	12	0.012	0.01	132	4.91	3.86	5.05	1.95	0.51	0.5	5.9	**OK!**
4	12	0.012	0.01	14	4.91	3.86	5.13	2.08	0.54	0.5	6.2	**OK!**
5	12	0.012	0.01	160	4.91	3.86	5.80	4.03	1.04	0.9	10.2	**OK!**

PIPE NETWORK TO INFILTRATION BASIN #5

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-5A	DMH-5B	0.10	0.07	0.03	0.72	0.07	10	0.25	10.25	5	0.37
2	4	CB-5B	DMH-5B	0.01	0.01	0.00	0.85	0.01	10	0.23	10.23	5	0.05
3	4	CB-5C	DMH-5B	0.15	0.08	0.07	0.60	0.09	10	0.04	10.04	5	0.45
4	4	DMH-5B	DMH-5A	0.26	0.16	0.11	0.66	0.17	10	0.26	10.26	5	0.87
5	4	DMH-5A	DMH-5	0.26	0.16	0.11	0.66	0.17	10	0.48	10.48	5	0.87
6	4	CB-5	DMH-5	0.68	0.38	0.30	0.64	0.43	10	0.04	10.04	5	2.17
7	4	DMH-5	FE-5	0.95	0.54	0.41	0.64	0.61	10	0.36	10.36	5	3.04

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	47	4.91	3.86	3.18	0.37	0.10	0.2	2.5	OK!
2	12	0.012	0.02	29	6.95	5.46	2.15	0.05	0.01	0.1	0.8	OK!
3	12	0.012	0.01	9	4.91	3.86	3.39	0.45	0.12	0.2	2.8	OK!
4	12	0.012	0.01	65	4.91	3.86	4.09	0.87	0.23	0.3	3.9	OK!
5	12	0.012	0.01	117	4.91	3.86	4.09	0.87	0.23	0.3	3.9	OK!
6	12	0.012	0.01	12	4.91	3.86	5.19	2.17	0.56	0.5	6.3	OK!
7	12	0.012	0.009	115	4.66	3.66	5.32	3.04	0.83	0.7	8.1	OK!

PIPE NETWORK TO INFILTRATION BASIN #6

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-6A	DMH-6A	0.20	0.11	0.09	0.63	0.12	10	0.06	10.06	5	0.62
2	4	CB-6B	DMH-6A	0.11	0.08	0.03	0.72	0.08	10	0.09	10.09	5	0.39
3	4	DMH-6A	DMH-6B	0.31	0.18	0.12	0.66	0.20	10	0.57	10.57	5	1.01
4	4	DMH-6B	DMH-6C	0.31	0.18	0.12	0.66	0.20	10	0.31	10.31	5	1.01
5	4	DMH-6C	DMH-6D	0.31	0.18	0.12	0.66	0.20	10	0.35	10.35	5	1.01
6	4	CB-6D	DMH-6D	0.32	0.15	0.17	0.59	0.19	10	0.07	10.07	5	0.94
7	4	CB-6E	DMH-6D	0.18	0.11	0.07	0.68	0.12	10	0.08	10.08	5	0.60
8	4	CULVERT	DMH-6D	0.69	0.00	0.69	0.30	0.21	15	0.08	15.08	4.5	0.93
9	4	DMH-6D	DMH-6E	1.49	0.45	1.04	0.48	0.72	15	0.48	15.48	4.5	3.23
10	4	CB-6C	DMH-6E	0.36	0.24	0.12	0.70	0.25	10	0.05	10.05	5	1.27
11	4	DMH-6E	FE-6	1.86	0.69	1.16	0.52	0.97	15	0.10	15.10	4.5	4.37

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	13	4.91	3.86	3.73	0.62	0.16	0.3	3.3	OK!
2	12	0.012	0.01	18	4.91	3.86	3.24	0.39	0.10	0.2	2.6	OK!
3	12	0.012	0.01	145	4.91	3.86	4.25	1.01	0.26	0.3	4.1	OK!
4	12	0.012	0.01	79	4.91	3.86	4.25	1.01	0.26	0.3	4.1	OK!
5	12	0.012	0.01	90	4.91	3.86	4.25	1.01	0.26	0.3	4.1	OK!
6	12	0.012	0.01	17	4.91	3.86	4.17	0.94	0.24	0.3	4.0	OK!
7	12	0.012	0.01	17	4.91	3.86	3.70	0.60	0.16	0.3	3.2	OK!
8	12	0.012	0.01	21	4.91	3.86	4.16	0.93	0.24	0.3	4.0	OK!
9	12	0.012	0.0058	119	3.74	2.94	4.15	3.23	1.10	1.0	11.4	OK!
10	12	0.012	0.011	14	5.15	4.05	4.66	1.27	0.31	0.4	4.5	OK!
11	18	0.012	0.0067	33	5.27	9.31	5.30	4.37	0.47	0.5	8.5	OK!

PIPE NETWORK TO INFILTRATION BASIN #7

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-7A	DMH-7A	0.32	0.18	0.14	0.64	0.21	10	0.12	10.12	5	1.03
2	4	CB-7B	DMH-7A	0.28	0.26	0.02	0.85	0.24	10	0.08	10.08	5	1.21
3	4	DMH-7A	DMH-7B	0.61	0.44	0.16	0.74	0.45	10	0.34	10.34	5	2.24
4	4	CB-7C	DMH-7B	0.31	0.22	0.09	0.72	0.22	10	0.08	10.08	5	1.12
5	4	CB-7D	DMH-7B	0.24	0.20	0.05	0.78	0.19	10	0.04	10.04	5	0.96
6	4	DMH-7B	FE-7	1.16	0.86	0.30	0.74	0.86	10	0.15	10.15	5	4.31

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	30	4.91	3.86	4.26	1.03	0.27	0.3	4.2	OK!
2	12	0.012	0.01	22	4.91	3.86	4.44	1.21	0.31	0.4	4.5	OK!
3	12	0.012	0.004	74	3.11	2.44	3.61	2.24	0.92	0.7	8.7	OK!
4	12	0.012	0.01	21	4.91	3.86	4.35	1.12	0.29	0.4	4.3	OK!
5	12	0.012	0.013	12	5.60	4.40	4.62	0.96	0.22	0.3	3.8	OK!
6	18	0.012	0.003	36	3.53	6.23	3.90	4.31	0.69	0.6	10.9	OK!

PIPE NETWORK TO INFILTRATION BASIN #8

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-8B	DMH-8A	0.23	0.14	0.10	0.65	0.15	10	0.04	10.04	5	0.76
2	4	CB-8C	DMH-8A	0.30	0.18	0.12	0.66	0.20	10	0.07	10.07	5	0.99
3	4	DMH-8A	DMH-8B	0.53	0.32	0.22	0.66	0.35	10	0.46	10.46	5	1.75
4	4	CB-8D	DMH-8B	0.27	0.14	0.13	0.61	0.16	10	0.08	10.08	5	0.82
5	4	CB-8E	DMH-8B	0.21	0.17	0.04	0.79	0.17	10	0.10	10.10	5	0.85
6	4	DMH-8B	FE-8	1.02	0.63	0.39	0.67	0.68	10	0.07	10.07	5	3.42

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	9	4.91	3.86	3.95	0.76	0.20	0.3	3.6	**OK!**
2	12	0.012	0.01	17	4.91	3.86	4.22	0.99	0.26	0.3	4.1	**OK!**
3	12	0.012	0.0125	147	5.49	4.32	5.31	1.75	0.41	0.4	5.2	**OK!**
4	12	0.012	0.01	19	4.91	3.86	4.03	0.82	0.21	0.3	3.8	**OK!**
5	12	0.012	0.01	24	4.91	3.86	4.06	0.85	0.22	0.3	3.8	**OK!**
6	12	0.012	0.016	30	6.22	4.88	6.89	3.42	0.70	0.6	7.3	**OK!**

PIPE NETWORK TO LEACHING CHAMBER BED #3 (DETENTION BASIN #8A)

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-LC3A	DMH-LC3A	0.53	0.26	0.26	0.60	0.32	10	0.15	10.15	5	1.58
2	4	CB-LC3B	DMH-LC3A	0.37	0.16	0.21	0.56	0.21	10	0.10	10.10	5	1.04
3	4	DMH-LC3A	DMH-LC3	0.90	0.42	0.48	0.58	0.52	10	0.32	10.32	5	2.62
4	4	CB-LC3C	DMH-LC3	0.20	0.10	0.10	0.61	0.12	10	0.00	10.00	5	0.61
5	4	CB-LC3D	DMH-LC3	0.10	0.05	0.05	0.59	0.06	10	0.01	10.01	5	0.31
6	4	DMH-LC3	LC3	1.20	0.58	0.63	0.59	0.71	10	0.00	10.00	5	3.54

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	44	4.91	3.86	4.77	1.58	0.41	0.4	5.2	**OK!**
2	12	0.012	0.01	25	4.91	3.86	4.28	1.04	0.27	0.4	4.2	**OK!**
3	12	0.012	0.005	79	3.47	2.73	4.07	2.62	0.96	0.8	9.1	**OK!**
4	12	0.012	0.01	1	4.91	3.86	3.71	0.61	0.16	0.3	3.3	**OK!**
5	12	0.012	0.01	1	4.91	3.86	2.98	0.31	0.08	0.2	2.2	**OK!**
6	12	0.012	0.01	1	4.91	3.86	5.70	3.54	0.92	0.7	8.7	**OK!**

PIPE NETWORK TO INFILTRATION BASIN #9

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-9A	DMH-9	0.21	0.14	0.07	0.70	0.15	10	0.07	10.07	5	0.73
2	4	CB-9B	DMH-9	0.38	0.26	0.12	0.71	0.27	10	0.04	10.04	5	1.34
3	4	DMH-9	FE-9	0.58	0.40	0.19	0.71	0.41	10	0.14	10.14	5	2.07

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	17	4.91	3.86	3.90	0.73	0.19	0.3	3.6	**OK!**
2	12	0.012	0.01	12	4.91	3.86	4.56	1.34	0.35	0.4	4.7	**OK!**
3	12	0.012	0.01	42	4.91	3.86	5.12	2.07	0.54	0.5	6.1	**OK!**

PIPE NETWORK TO LEACHING CHAMBER BED #4 (DETENTION BASIN #10)

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-LC4C	DMH-LC4A	0.20	0.14	0.06	0.72	0.15	10	0.06	10.06	5	0.73
2	4	CB-LC4D	DMH-LC4A	0.28	0.19	0.09	0.71	0.20	10	0.08	10.08	5	0.98
3	4	DMH-LC4A	DMH-LC4	0.48	0.33	0.15	0.72	0.34	10	0.20	10.20	5	1.71
4	4	CB-LC4A	DMH-LC4	0.07	0.04	0.03	0.66	0.05	10	0.12	10.12	5	0.24
5	4	CB-LC4B	DMH-LC4	0.21	0.15	0.06	0.73	0.15	10	0.05	10.05	5	0.76
6	4	DMH-LC4	LC4	0.76	0.52	0.23	0.71	0.54	10	0.03	10.03	5	2.71

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	13	4.91	3.86	3.89	0.73	0.19	0.3	3.5	**OK!**
2	12	0.012	0.01	20	4.91	3.86	4.21	0.98	0.25	0.3	4.1	**OK!**
3	12	0.012	0.008	55	4.40	3.45	4.49	1.71	0.49	0.5	5.8	**OK!**
4	12	0.012	0.01	20	4.91	3.86	2.74	0.24	0.06	0.2	1.9	**OK!**
5	12	0.012	0.01	12	4.91	3.86	3.95	0.76	0.20	0.3	3.6	**OK!**
6	12	0.012	0.05	18	10.99	8.63	9.94	2.71	0.31	0.4	4.5	**OK!**

PIPE NETWORK TO WATER QUALITY SWALE #2

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-11A	DMH-11	0.29	0.18	0.11	0.68	0.19	10	0.08	10.08	5	0.97
2	4	CB-11B	DMH-11	0.26	0.20	0.06	0.77	0.20	10	0.04	10.04	5	1.00
3	4	DMH-11	FE-11	0.55	0.38	0.16	0.72	0.39	10	0.08	10.08	5	1.97

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	21	4.91	3.86	4.20	0.97	0.25	0.3	4.1	**OK!**
2	12	0.012	0.01	9	4.91	3.86	4.23	1.00	0.26	0.3	4.1	**OK!**
3	12	0.012	0.01	24	4.91	3.86	5.06	1.97	0.51	0.5	5.9	**OK!**

PIPE NETWORK TO INFILTRATION BASIN #12

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-12	FE-12	0.77	0.52	0.25	0.71	0.54	10	0.33	10.33	5	2.72

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.01	109	4.91	3.86	5.45	2.72	0.71	0.6	7.3	**OK!**

PIPE NETWORK TO INFILTRATION BASIN #15

PIPE DESCRIPTION				DRAINAGE AREA (acres)	IMPERV. AREA (acres)	PERV. AREA (acres)	C perv.= 0.30 imp.=0.90	CA	TIME OF CONC. (min.)			I (in./hr)	Qc=CIA (cfs)
LENGTH #	DA #	FROM	TO						Inlet (min.)	Drain (min.)	Total (min.)		
1	4	CB-15	DMH-15	0.29	0.07	0.22	0.44	0.13	10	0.95	10.95	5	0.65
2	4	DMH-15	FE-15	0.29	0.07	0.22	0.44	0.13	10	0.22	10.22	5	0.65

LENGTH #	PIPE DIAMETER (in.)	PIPE MATERIAL (n-value)	SLOPE (ft./ft.)	LENGTH (ft)	FULL FLOW		CURRENT FLOW					
					Vf (ft/sec)	Qf (cfs)	Vc (ft/sec)	Qc (cfs)	Qc/Qf	d/D (in.)	Depth of flow in pipe (in)	
1	12	0.012	0.006	178	3.81	2.99	3.14	0.65	0.22	0.3	3.8	**OK!**
2	12	0.012	0.006	42	3.81	2.99	3.14	0.65	0.22	0.3	3.8	**OK!**

Appendix H
Mounding Calculations

Timber Crest Estates
Groundwater Mounding Assessment

Per the DEP Stormwater Management Regulations, groundwater mounding analysis beneath infiltration systems within jurisdiction of the Wetlands Protection Act are required when the bottom of an infiltration drainage system is within 4 ft. of the seasonal high water table. The attached table summarizes the mound heights calculated at each such BMP for the 100-yr. storm, and notes the available separation to groundwater before the mound occurs.

The groundwater mounding calculations were performed using software developed by GeoHydroCycle, Inc. of Natick MA. This software program is based on the Hantush Method using Glover's Solution. Using the Hantush Method, a number of input parameters are required in order to compute the groundwater mound height. All input parameters used have been derived using standard practices and readily available information from the site plans, soil test pits and drainage calculations prepared for the project. The following are the input parameters used in the mounding calculations:

Application Rate: Is the volume of water that is infiltrated by each BMP in the 100-yr. storm (denoted as "Discarded Volume" in the provided HydroCAD calculations) divided by the wetted area of the infiltration practice.

Duration of Application: The duration is 1 day to match the 100-year, 24-hour storm events.

Fillable Porosity: This is a value based on the soil classification found at the location of the infiltration practice. The attached graph by Walton demonstrates the porosity for all soil types in this case can be fairly characterized as 0.35.

Hydraulic Conductivity: The values used in the Hantush method were estimated based on the attached graph by Anderson & Woessner and our assessment of the soil test pits performed within the infiltration BMP on site; 9 ft/day for Sandy Loams, 60 ft/day for Loamy Sands, and 200 ft/day for Coarse Sands & Gravels.

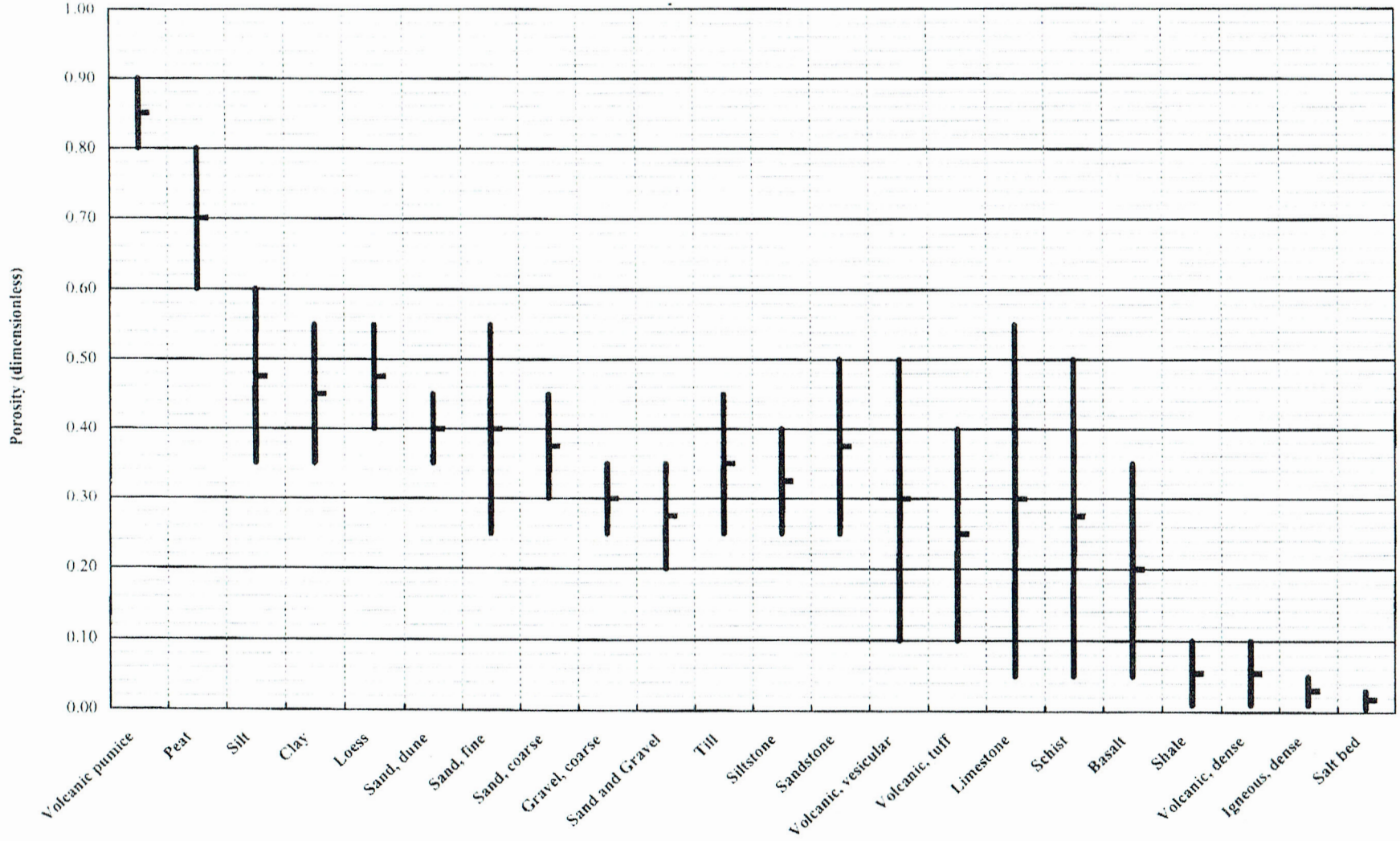
Initial Saturated Thickness: This value represents the depth to the highest natural restrictive layer (clay or bedrock). In a few cases bedrock was encountered in the on-site observation holes so the actual observed depth was used. When it was not observed this value was estimated from a Well Completion Report from the MassDEP Search Well database, where the well is located at 9 Ohlson Circle (see attached well report), and the initial saturated thickness is the depth to bedrock in the well report (20').

Length of application area: The length of the proposed infiltration practice bottom.

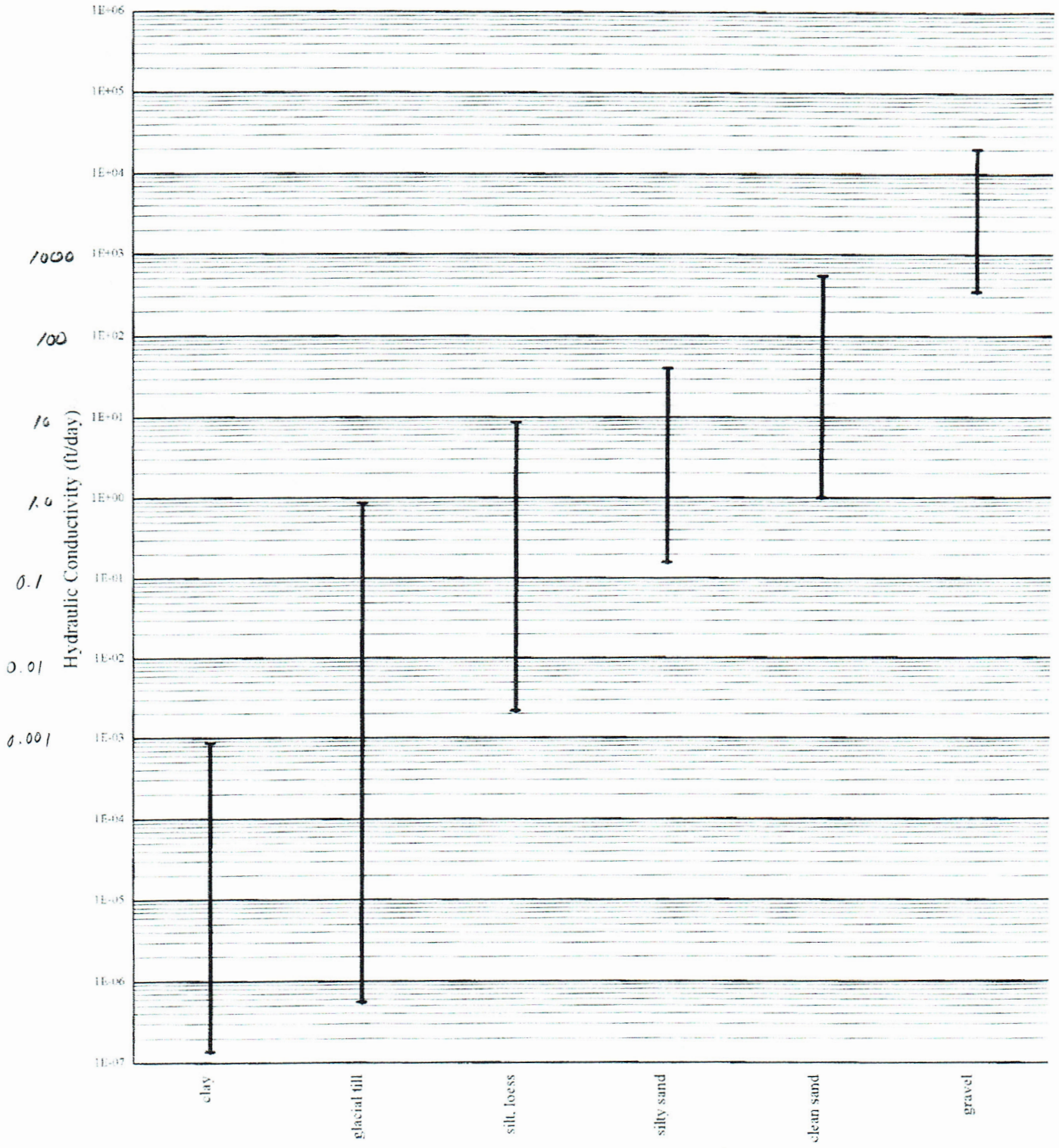
Width of application area: The width of the proposed infiltration practice bottom.

Porosity

Walton, William C., 1989, Analytical Groundwater Modeling, p. 141.



Ranges of Hydraulic Conductivity - Unconsolidated Materials
Anderson & Woessner. 1992 p. 46



MassDEP

Well Completion Report

8/24/2017 12:00:33 PM

WELL LOCATION

GPS North: **GPS West:** **Assessors Map:**
Address: 9 Ohlson Circle **Assessors Lot #:**
Subdivision Name: **Permit number:**
City/Town: Medway **Date Issued:**
Board of Heath permit obtained: NR

Work Performed	Proposed Use	Drilling Method Overburden	Drilling Method Bedrock
New Well	Domestic		

ADDITIONAL WELL INFORMATION

Developed : No
Disinfected : No
Total Well Depth : 340
Fracture Enhancement : No
Well Seal Type :
Depth to Bedrock : 20

PERMANENT PUMP (IF AVAILABLE)

Pump description :
Type :
Nominal Pump Capacity :
Intake Depth :
Horsepower :
Comments :

CASING

From (ft)	To (ft)	Type	Thickness	Diameter
35(Above Ground)	15	Steel		6

SCREEN

From (ft)	To (ft)	Type	Slot Size	Diameter

WELL SEAL / FILTER PACK / ABANDONMENT MATERIAL

From (ft)	To (ft)	Material Description	Purpose

STATIC WATER LEVEL (ALL WELLS)

Date Measured	Depth Below Ground Surface (ft)
05/20/1999	20

WELL TEST DATA (ALL SECTIONS MANDATORY FOR PRODUCTION WELLS)

Date	Method	Yield (GPM)	Time Pumped (hrs & min)	Pumping Level (Ft. BGS)	Time To Recover (Hrs & Min)	Recovery (Ft. BGS)
	Air Lift	25	00:30:00	340	00:12:00	20

OVER BURDEN

From (ft)	To (ft)	Lithology	Color	Comment	Water Zone	Loss/Add of fluid	Drill Stem Drop	Drill Rate

BEDROCK

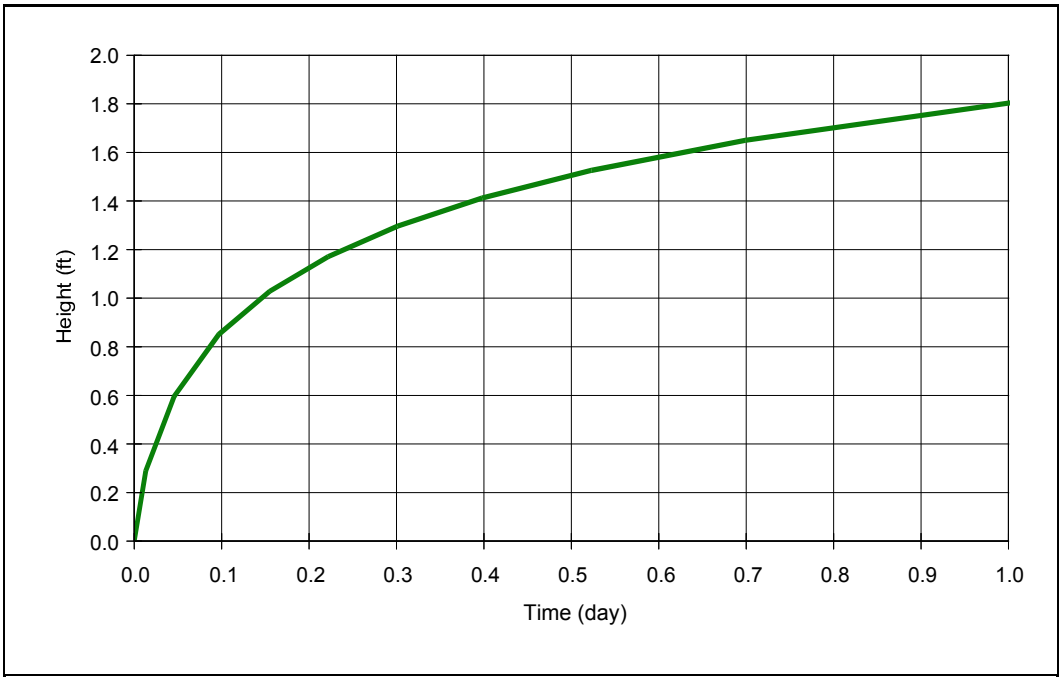
From (ft)	To (ft)	Lithology	Comment	Water Zone	Drill Stem Drop	Extra Large	Drill Rate	Rust Stain	Loss/Add of fluid	# of Fract per ft

GROUNDWATER MOUNDING SUMMARY
TIMBER CREST ESTATES
August 14, 2018

Infiltration Practice	Discarded Volume (acre-feet)	Length of Application (ft)	Width of Application (ft)	Application Rate ($ft^3/day/ft^2$)	Duration of Application	Fillable Porosity	Hydraulic Conductivity (ft/day)	Saturated Thickness (ft)	Mound Height * (ft)	Separation to Groundwater (ft)
Infiltration Basin 2	0.505	100	15	14.67	1 day	0.35	200	20	1.8	2.1
Infiltration Basin 4	0.355	130	35	3.40			60	20	2.37	3.2
Infiltration Basin 5	0.303	105	50	2.51			60	20	2.13	3.4
Infiltration Basin 6	0.409	110	30	5.40			60	20	3.08	3.8
Infiltration Basin 12	0.433	55	45	7.62			200	20	1.67	2.3
Infiltration Basin 14	0.129	75	20	3.69			60	20	1.23	2.5
Infiltration Basin 15	0.050	45	12	4.03			60	20	0.63	2.9
Infiltration Basin 16	0.108	50	12	8.64			200	20	0.55	2.0
Leaching Chamber 3	0.175	172	11.33	3.91			60	20	1.06	2.0
Leaching Chamber 4	0.020	33.5	21	2.04			9	20	1.66	3.2
Bio-Retention Area 1	0.141	60	45	1.89			60	8	2.19	2.2
Bio-Retention Area 2	0.022	180	3	1.77			60	20	0.13	2.6
Bio-Retention Area 3	0.011	155	3	1.03			60	20	0.07	2.1

* see attached Groundwater Mounding Analysis calculation sheets

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 2 - TIMBERCREST

ANALYST: TOM MORRIS

DATE: 9/11/2017 TIME: 12:54:56 PM

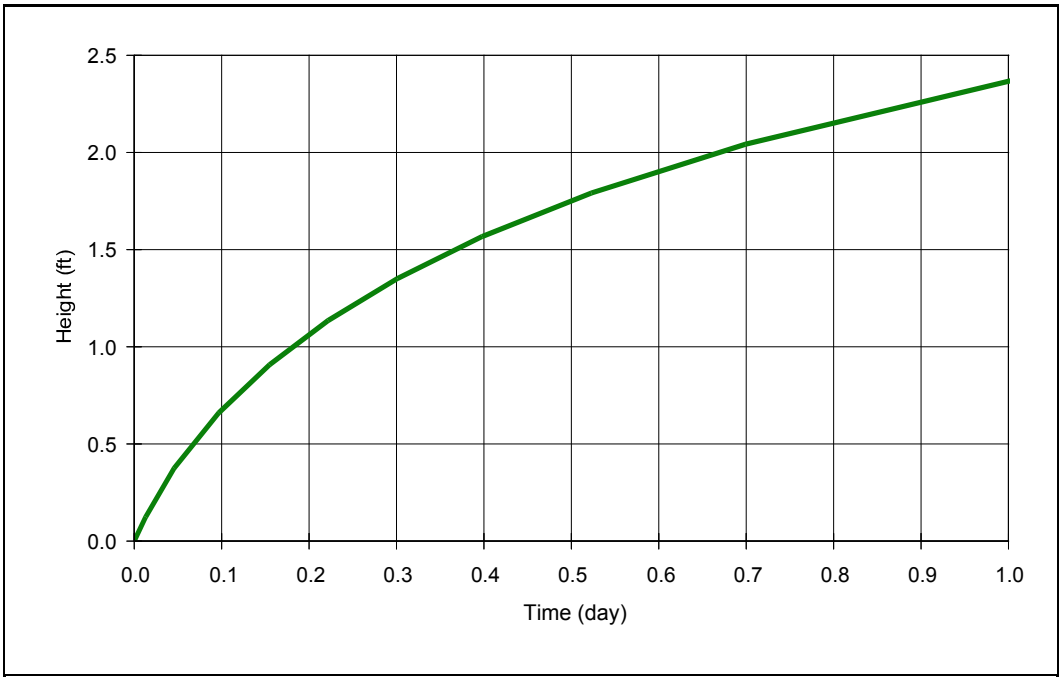
INPUT PARAMETERS

Application rate: 14.67 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 200 ft/day
Initial saturated thickness: 20 ft
Length of application area: 100 ft
Width of application area: 15 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 22005 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.29
0	0.6
0.1	0.85
0.2	1.03
0.2	1.17
0.3	1.3
0.4	1.41
0.5	1.53
0.7	1.65
1	1.8

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 4 - TIMERCREST

ANALYST: TOM MORRIS

DATE: 3/5/2018 TIME: 7:52:50 AM

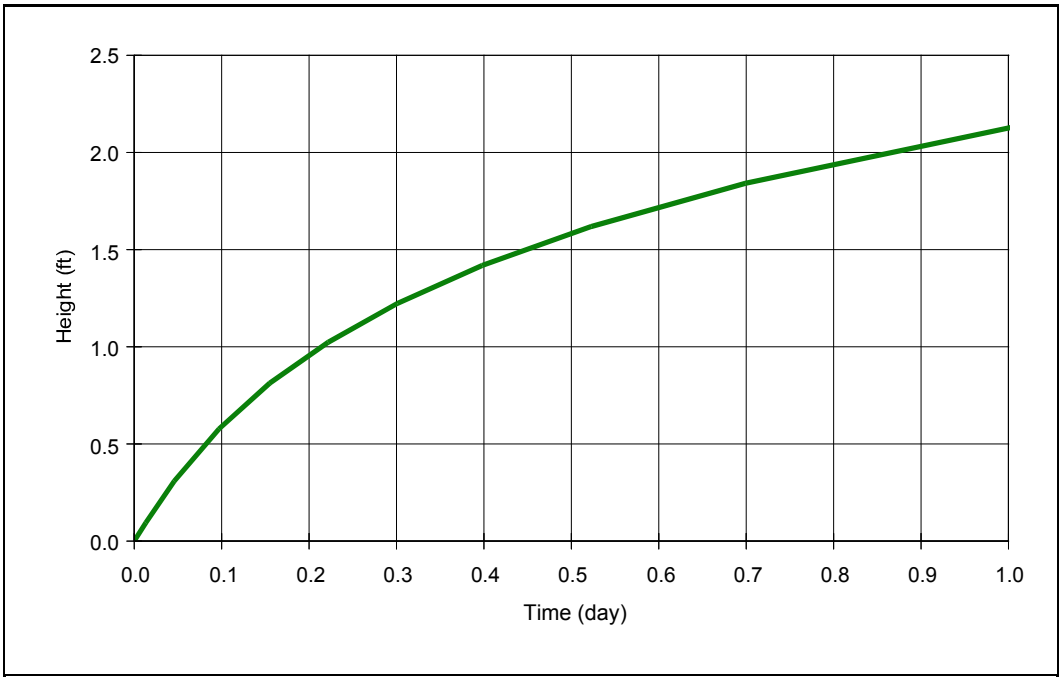
INPUT PARAMETERS

Application rate: 3.4 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 130 ft
Width of application area: 35 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 15470 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.12
0	0.38
0.1	0.66
0.2	0.91
0.2	1.14
0.3	1.35
0.4	1.57
0.5	1.79
0.7	2.04
1	2.37

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 5 - TIMBERCREST

ANALYST: TOM MORRIS

DATE: 9/11/2017 TIME: 12:56:11 PM

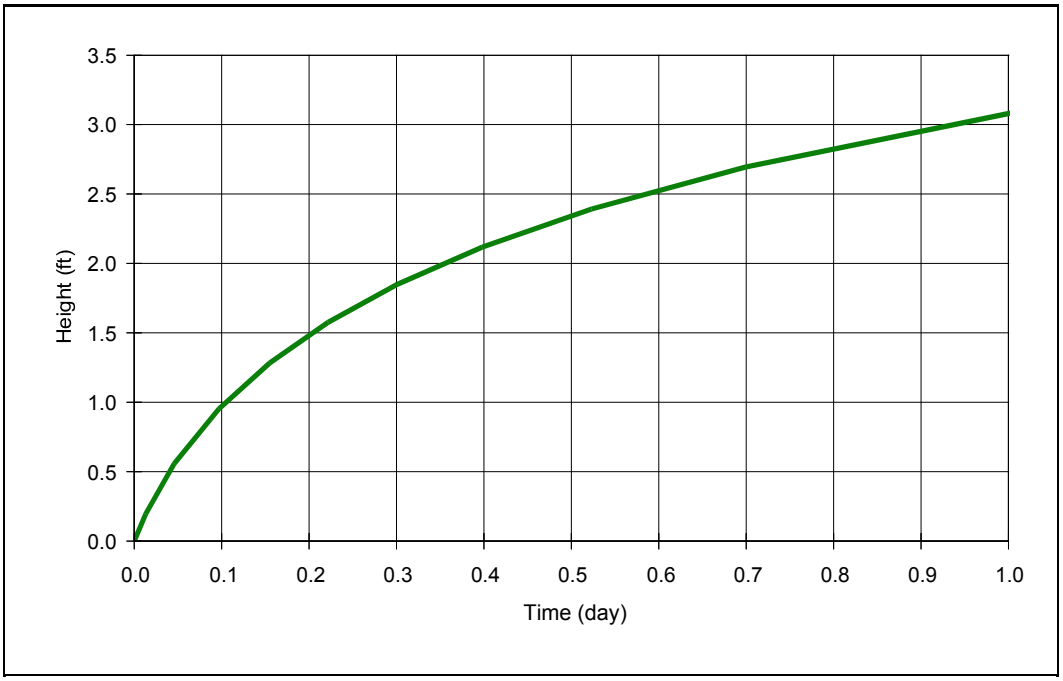
INPUT PARAMETERS

Application rate: 2.51 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 105 ft
Width of application area: 50 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 13177.5 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.09
0	0.31
0.1	0.58
0.2	0.81
0.2	1.02
0.3	1.22
0.4	1.42
0.5	1.62
0.7	1.84
1	2.13

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 6 - TIMERCREST

ANALYST: TOM MORRIS

DATE: 5/30/2018 TIME: 1:46:24 PM

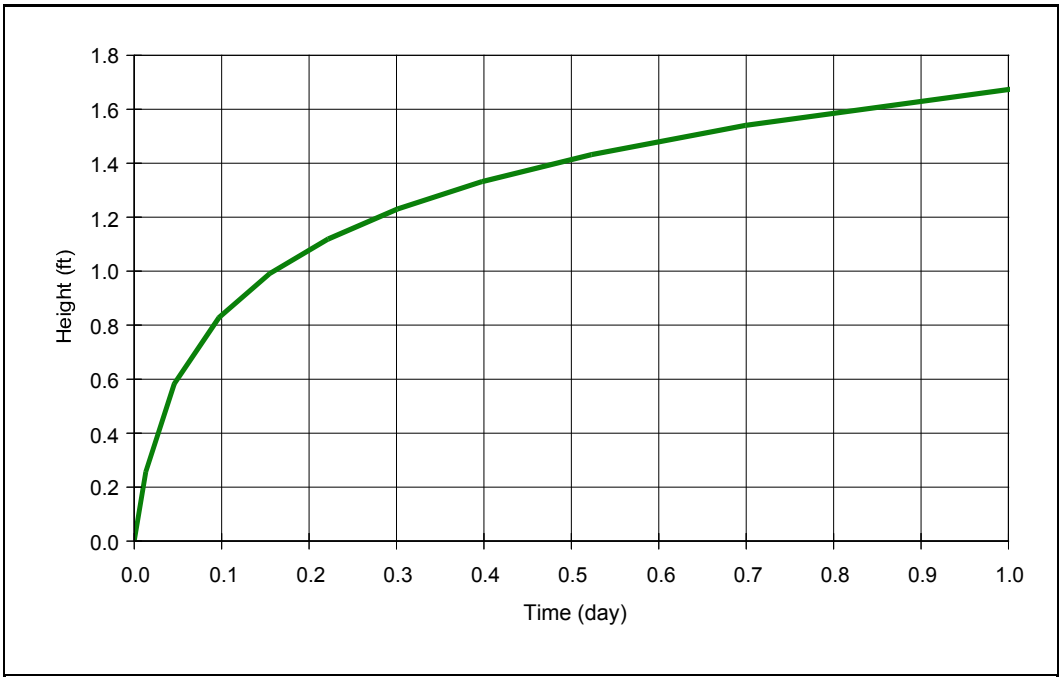
INPUT PARAMETERS

Application rate: 5.4 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 110 ft
Width of application area: 30 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 17820 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.2
0	0.56
0.1	0.95
0.2	1.28
0.2	1.58
0.3	1.85
0.4	2.12
0.5	2.39
0.7	2.69
1	3.08

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 12 - TIMBERCREST

ANALYST: TOM MORRIS

DATE: 9/11/2017 TIME: 12:57:12 PM

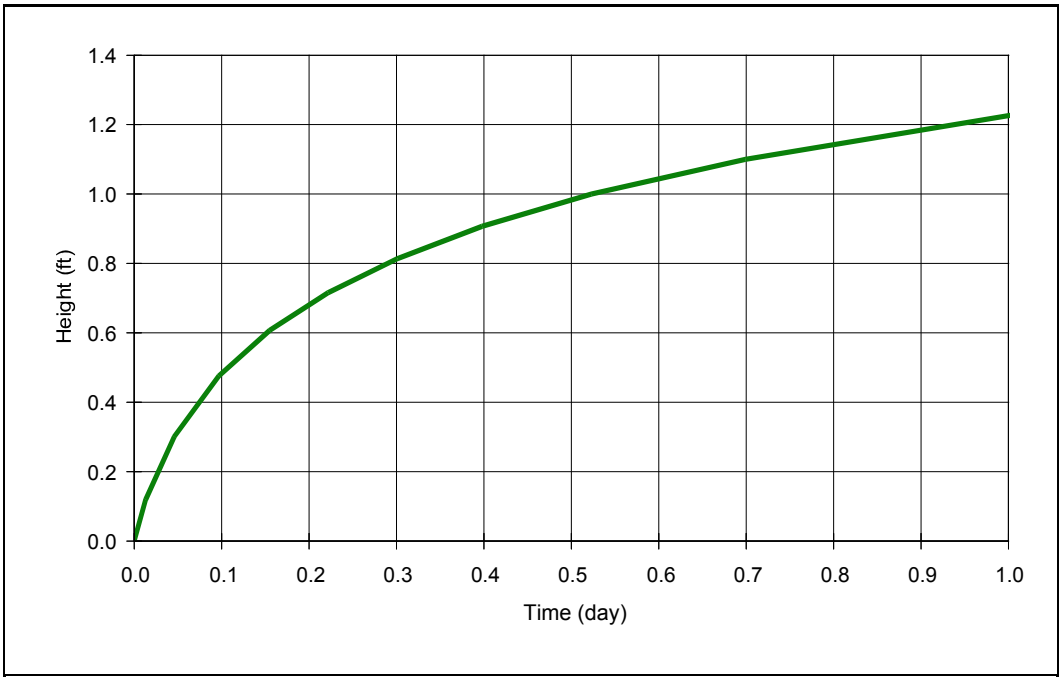
INPUT PARAMETERS

Application rate: 7.62 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 200 ft/day
Initial saturated thickness: 20 ft
Length of application area: 55 ft
Width of application area: 45 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 18859.5 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.26
0	0.58
0.1	0.83
0.2	0.99
0.2	1.12
0.3	1.23
0.4	1.33
0.5	1.43
0.7	1.54
1	1.67

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 14 - TIMERCREST

ANALYST: TOM MORRIS

DATE: 5/30/2018 TIME: 1:41:05 PM

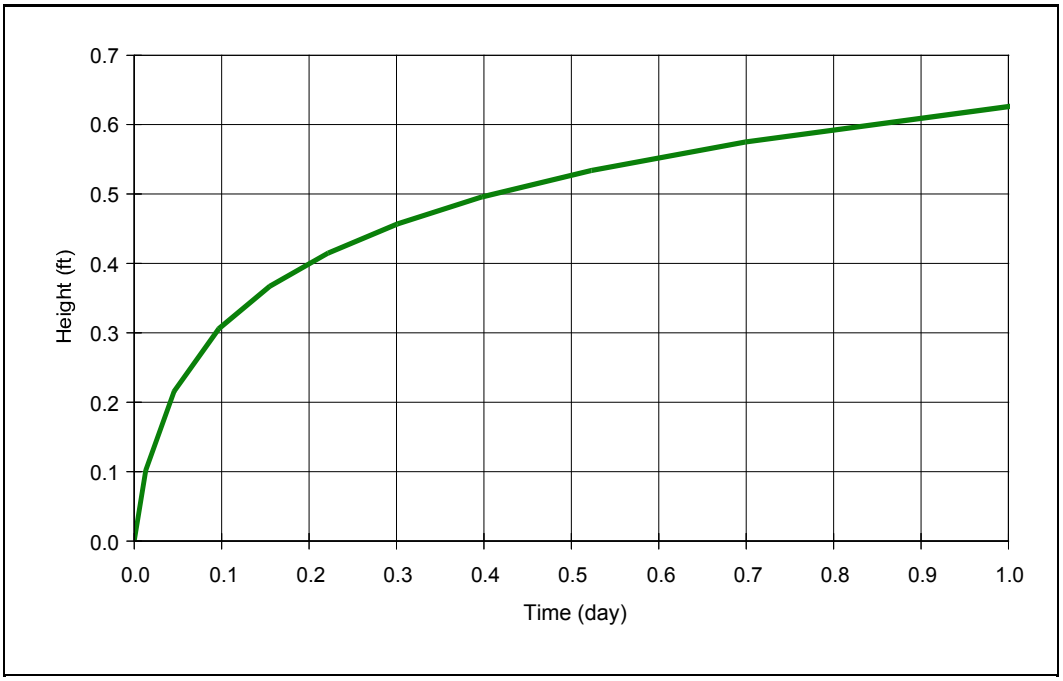
INPUT PARAMETERS

Application rate: 3.69 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 75 ft
Width of application area: 20 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 5535 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.12
0	0.3
0.1	0.48
0.2	0.61
0.2	0.72
0.3	0.81
0.4	0.91
0.5	1
0.7	1.1
1	1.23

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 15 - TIMBERCREST

ANALYST: TOM MORRIS

DATE: 9/11/2017 TIME: 12:57:47 PM

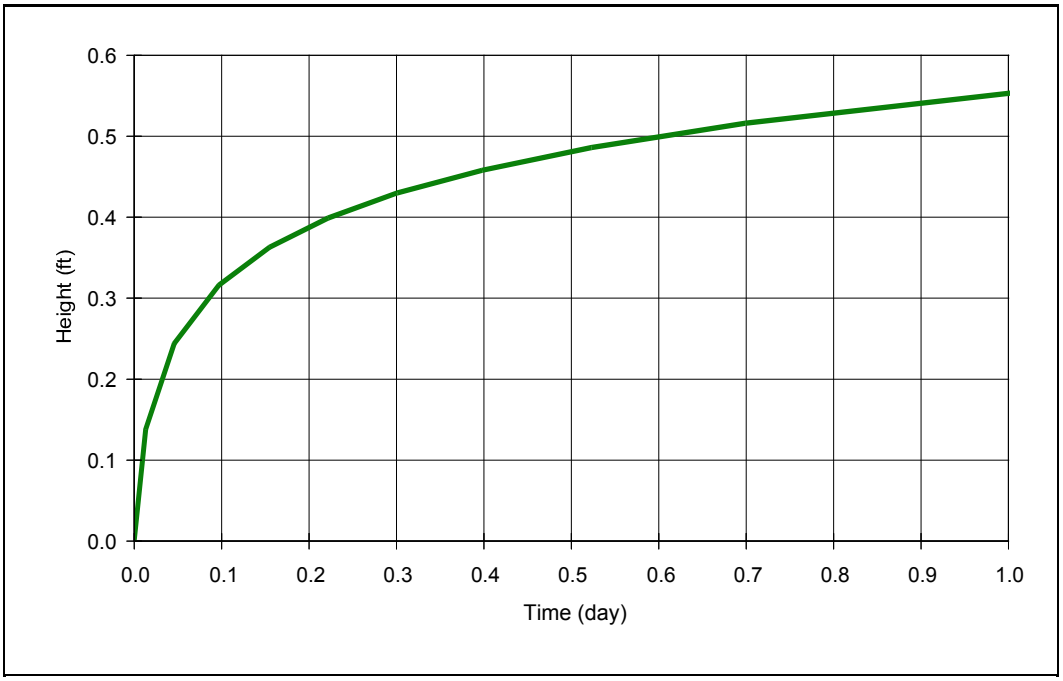
INPUT PARAMETERS

Application rate: 4.03 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 45 ft
Width of application area: 12 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 2176.2 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.1
0	0.22
0.1	0.31
0.2	0.37
0.2	0.42
0.3	0.46
0.4	0.5
0.5	0.53
0.7	0.57
1	0.63

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BASIN 16 - TIMERCREST

ANALYST: TOM MORRIS

DATE: 3/5/2018 TIME: 7:57:36 AM

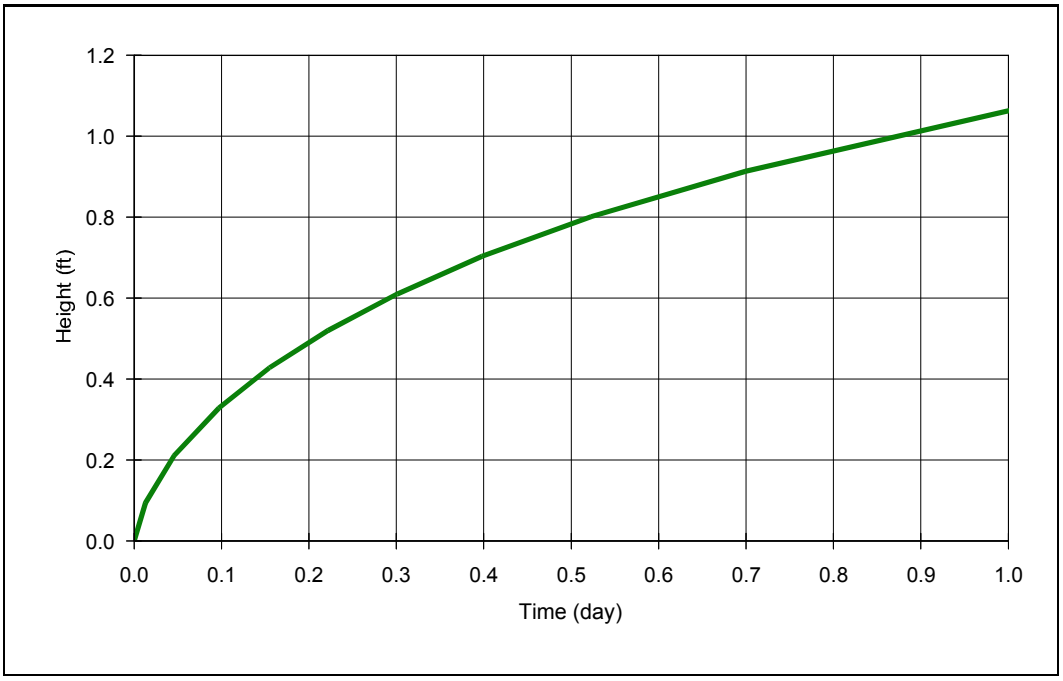
INPUT PARAMETERS

Application rate: 8.64 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 200 ft/day
Initial saturated thickness: 20 ft
Length of application area: 50 ft
Width of application area: 12 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 5184 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.14
0	0.24
0.1	0.32
0.2	0.36
0.2	0.4
0.3	0.43
0.4	0.46
0.5	0.49
0.7	0.52
1	0.55

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: LC-3 - TIMERCREST

ANALYST: TOM MORRIS

DATE: 8/10/2018 TIME: 11:49:15 AM

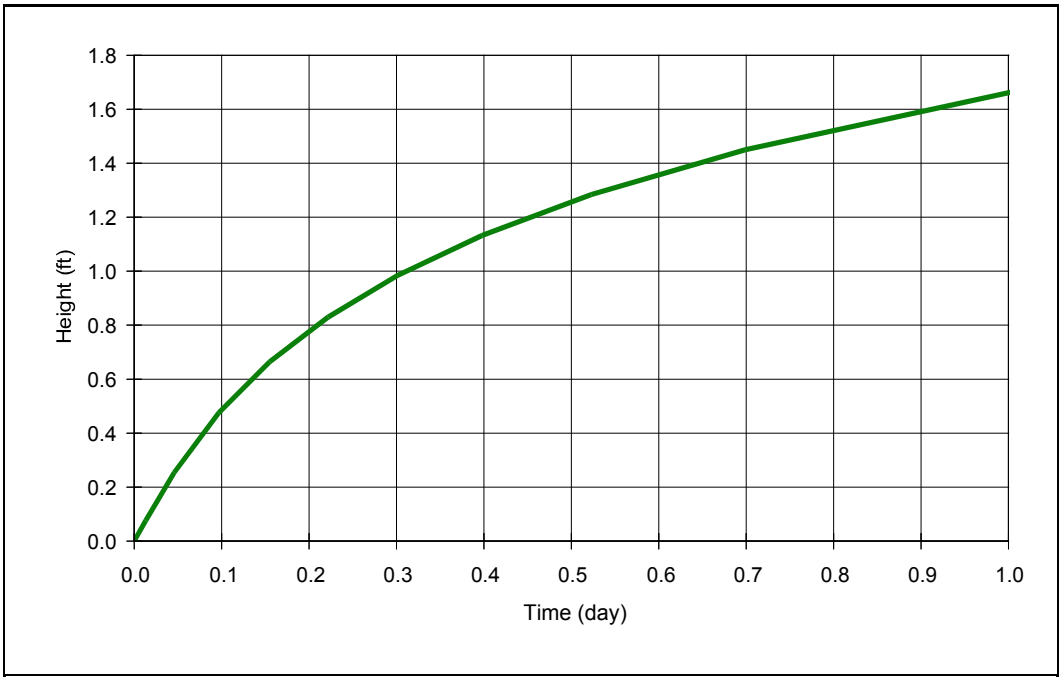
INPUT PARAMETERS

Application rate: 3.91 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 172 ft
Width of application area: 11.33 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 7619.651 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.09
0	0.21
0.1	0.33
0.2	0.43
0.2	0.52
0.3	0.61
0.4	0.7
0.5	0.8
0.7	0.91
1	1.06

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: LC-4 - TIMERCREST

ANALYST: TOM MORRIS

DATE: 5/14/2018 TIME: 12:33:26 PM

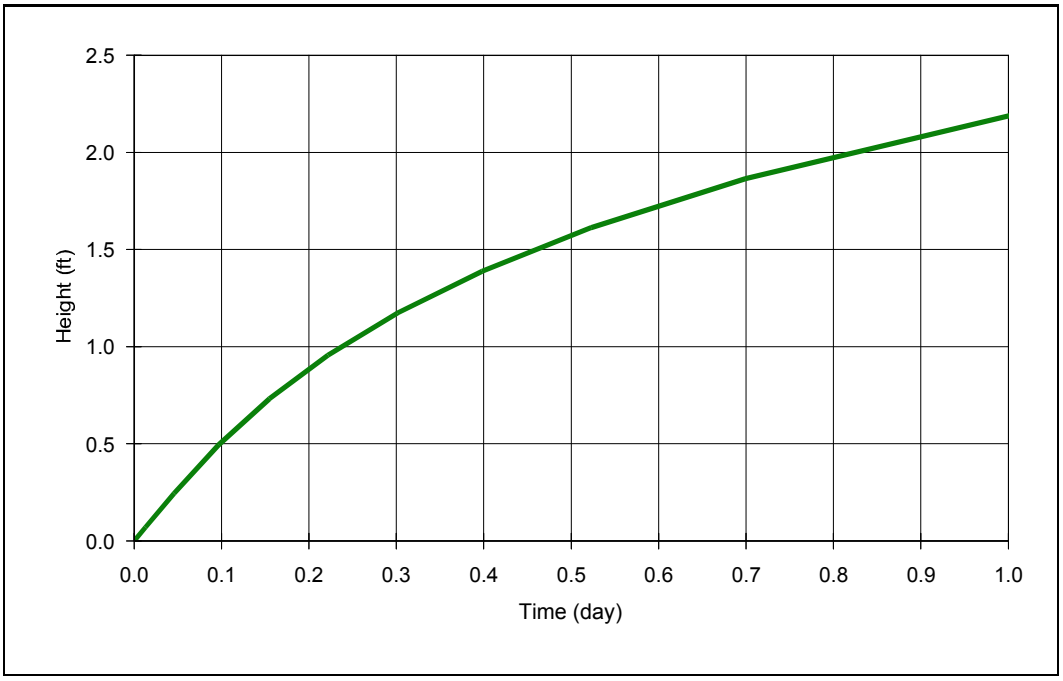
INPUT PARAMETERS

Application rate: 2.04 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 9 ft/day
Initial saturated thickness: 20 ft
Length of application area: 33.5 ft
Width of application area: 21 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 1435.14 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.08
0	0.25
0.1	0.48
0.2	0.66
0.2	0.83
0.3	0.98
0.4	1.13
0.5	1.28
0.7	1.45
1	1.66

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BIORETENTION AREA 1

ANALYST: TOM MORRIS

DATE: 8/14/2018 TIME: 3:19:13 PM

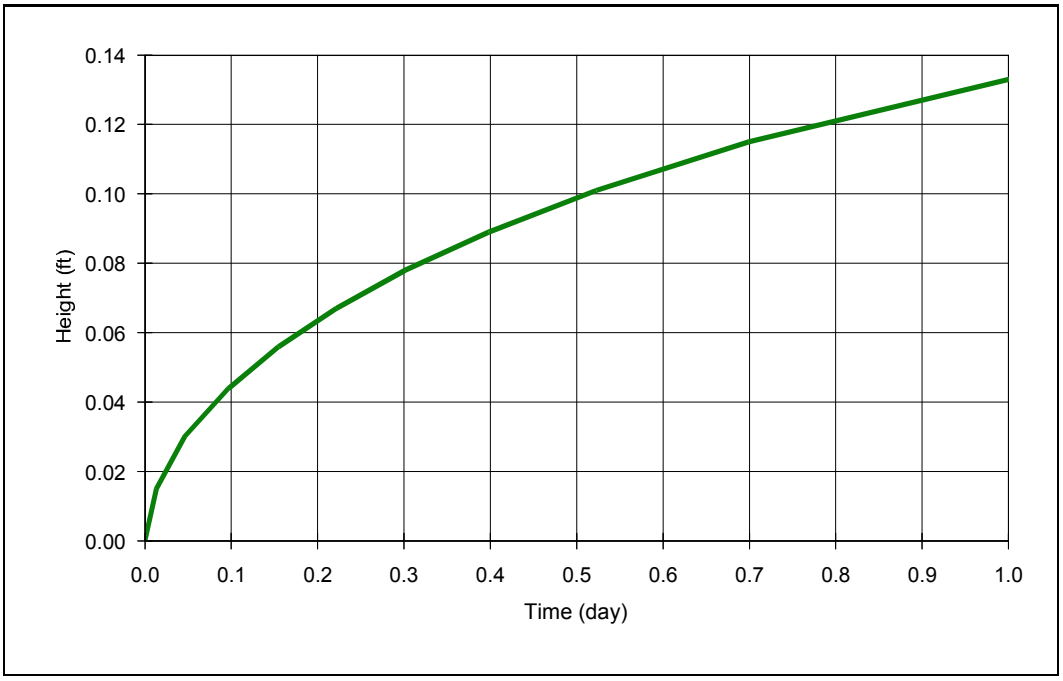
INPUT PARAMETERS

Application rate: 1.89 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 8 ft
Length of application area: 65 ft
Width of application area: 50 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 6142.5 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.07
0	0.24
0.1	0.5
0.2	0.73
0.2	0.96
0.3	1.17
0.4	1.39
0.5	1.61
0.7	1.86
1	2.19

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BIORETENTION AREA 2

ANALYST: TOM MORRIS

DATE: 8/14/2018 TIME: 3:20:59 PM

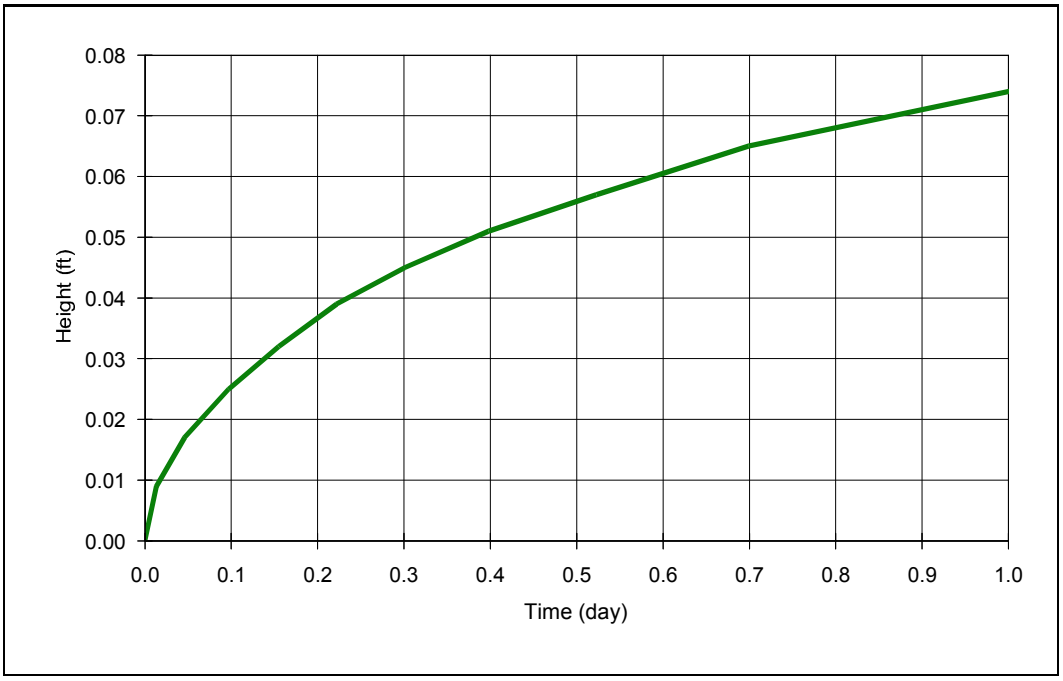
INPUT PARAMETERS

Application rate: 1.77 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 180 ft
Width of application area: 3 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 955.8 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.02
0	0.03
0.1	0.04
0.2	0.06
0.2	0.07
0.3	0.08
0.4	0.09
0.5	0.1
0.7	0.12
1	0.13

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: OUTBACK ENGINEERING INC.

PROJECT: BIORETENTION AREA 3

ANALYST: TOM MORRIS

DATE: 8/14/2018 TIME: 3:22:04 PM

INPUT PARAMETERS

Application rate: 1.03 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 1 day
Fillable porosity: 0.35
Hydraulic conductivity: 60 ft/day
Initial saturated thickness: 20 ft
Length of application area: 155 ft
Width of application area: 3 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 478.95 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.01
0	0.02
0.1	0.02
0.2	0.03
0.2	0.04
0.3	0.04
0.4	0.05
0.5	0.06
0.7	0.06
1	0.07

Appendix I

Illicit Discharge Statement (Standard #10)

The project does not have any illicit discharges to any of the stormwater management facilities as shown on the plans of the submittal.

James A. Pavlik

8-14-18

James A. Pavlik, P.E.
Project Manager

Appendix J

Pre- and Post-Development Drainage Maps

FAIRWAY LANE

DRAINAGE BOUNDARY FOR EMERGENCY ACCESS ROAD (SEE DRAINAGE REPORT FOR 13 FAIRWAY LANE DATED MARCH 15, 2018)

EDA-1

EDA-2

EDA-2A

EDA-3

EDA-3A

EDA-4

EDA-4A

EDA-4B

EDA-5

EDA-6

CERTIFIED VERNAL POOL A (CVP #2696)

CERTIFIED VERNAL POOL B (CVP #7840)

CERTIFIED VERNAL POOL C (CVP #1540)

CERTIFIED VERNAL POOL G (CVP #8345)

POTENTIAL VERNAL POOL H (PVP #2)

PVP E (PVP #5)

PVP D (PVP #7)

BORDERING VEGETATED WETLANDS

VEGETATED WETLAND

UPLAND

EX. BARN

EX. HOUSE

STONE WALL (TYP.)

UTILITY TOWER

ALGONQUIN GAS TRANSMISSION R.O.W.

BOSTON EDISON EASEMENT

U.P.

SOIL BOUNDARY LINE (TYP.)

APPROX. WETLANDS LIMIT (TYP.)

20' R.O.W.

PARKING LOT

ROMAN CATHOLIC ARCHBISHOP OF 145 HOLLISTON ST

WOODLAND ROAD

HOLLISTON STREET

WINTHROP STREET

OHLSON CIRCLE

LOVERING STREET

HEMLOCK DRIVE

BUTTERCUP LANE

ASH LANE

HOWE STREET

FIELD ROAD

BRAMBLE ROAD

FERN PATH

AR-I

AR-II

CB RIM=254.33
INV. IN CB LT=250.81
INV. IN CB RT=250.03
INV. IN DMH=250.11
INV. OUT=249.58

CB RIM=254.91
INV.=251.91

CB RIM=254.67
INV.=251.67

CB RIM=254.67
INV.=251.67

DMH RIM=255.23
INV. IN CB=251.79
INV. IN DMH=251.19
INV. OUT=251.01

CB RIM=255.28
INV.=252.28

CB RIM=254.91
INV.=251.91

DMH RIM=257.71
INV. OUT=253.21

CB RIM=257.67
INV.=254.67

CB RIM=254.91
INV.=251.91

18" RCP INV.=253.86

DMH RIM=255.47

15" RCP

REVISIONS

NO.	DATE	DESCRIPTION

PRE-DEVELOPMENT DRAINAGE MAP "TIMBER CREST ESTATES & KINGSBURY VILLAGE" OFF WINTHROP STREET, OHLSON CIRCLE, HOLLISTON STREET, FAIRWAY LANE & FERN PATH IN MEDWAY MASSACHUSETTS

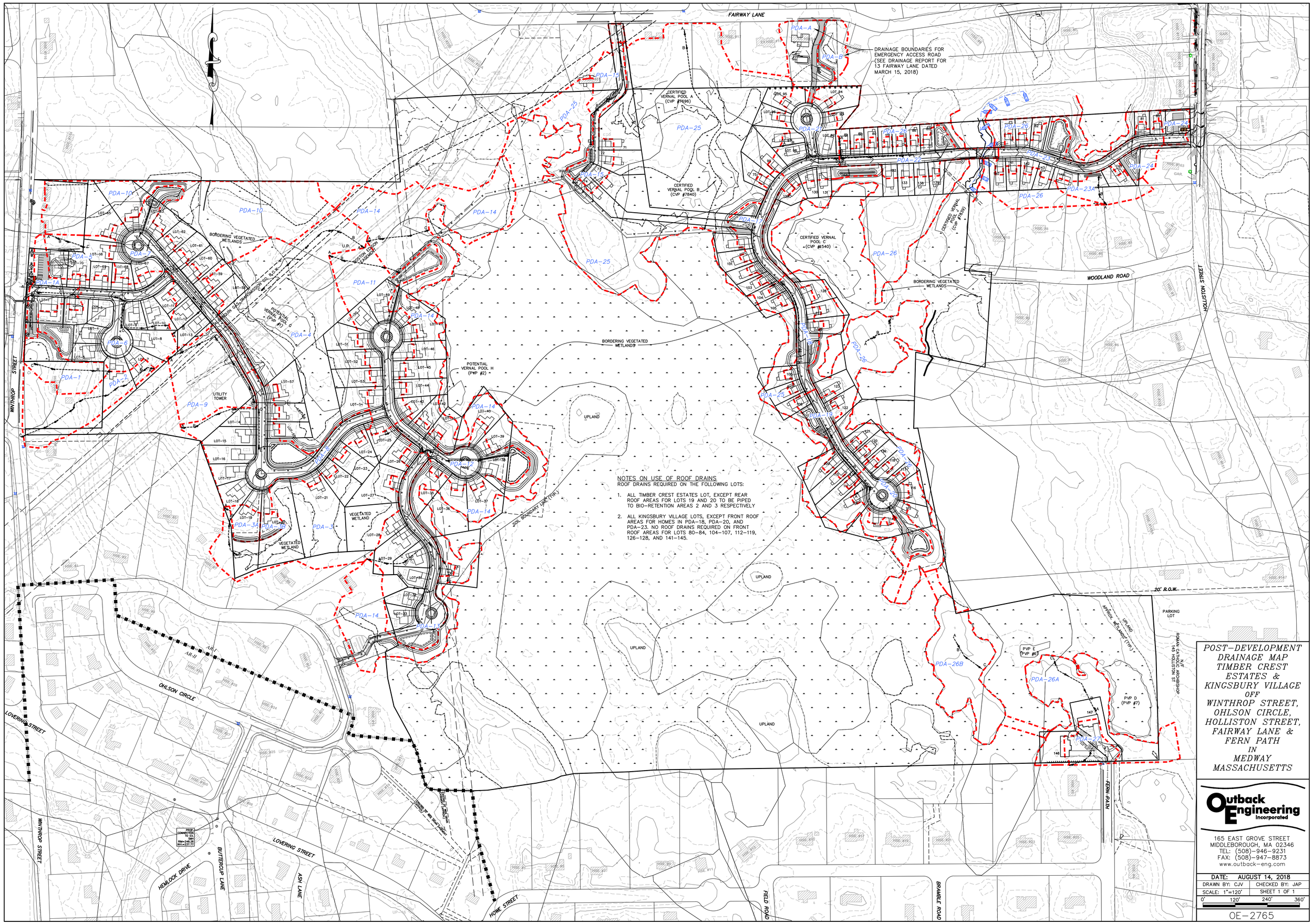
Outback Engineering Incorporated

165 EAST GROVE STREET
MIDDLEBOROUGH, MA 02346
TEL: (508)-946-9231
FAX: (508)-947-8873
www.outback-eng.com

DATE: AUGUST 14, 2018
DRAWN BY: CJV | CHECKED BY: JAP
SCALE: 1"=120' | SHEET 1 OF 1

0' 120' 240' 360'

OE-2765



NOTES ON USE OF ROOF DRAINS

ROOF DRAINS REQUIRED ON THE FOLLOWING LOTS:

1. ALL TIMBER CREST ESTATES LOT, EXCEPT REAR ROOF AREAS FOR LOTS 19 AND 20 TO BE PIPED TO BIO-RETENTION AREAS 2 AND 3 RESPECTIVELY
2. ALL KINGSBURY VILLAGE LOTS, EXCEPT FRONT ROOF AREAS FOR HOMES IN PDA-18, PDA-20, AND PDA-23. NO ROOF DRAINS REQUIRED ON FRONT ROOF AREAS FOR LOTS 80-84, 104-107, 112-119, 126-128, AND 141-145.

POST-DEVELOPMENT DRAINAGE MAP TIMBER CREST ESTATES & KINGSBURY VILLAGE OFF WINTHROP STREET, OHLSON CIRCLE, HOLLISTON STREET, FAIRWAY LANE & FERN PATH IN MEDWAY MASSACHUSETTS

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