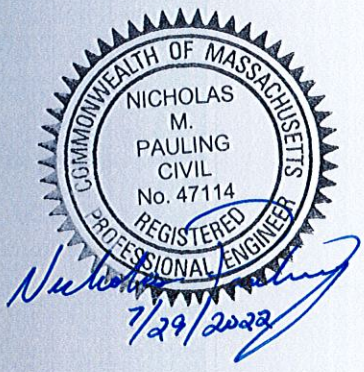
Stormwater Management Report

203 Ayer Road
Harvard, MA

March 2022
Revision-1 (7/25/2022)

Submitted to:
Harvard Planning Board &
Conservation Commission
13 Ayer Road
Harvard, MA 01451



Submitted by:
Wheeler Realty Trust
198 Ayer Road
Harvard, MA 01451

Vyonne Chern
7 Green Way
Wayland, MA 01778

Prepared by:
Goldsmith, Prest & Ringwall, Inc.
39 Main Street, Suite 301
Ayer, MA 01432

Project No:
211009

GPR Engineering Solutions for Land & Structures

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Section 1

Introduction and Methodology

Introduction and Methodology

This Stormwater Management Report is intended to accompany plans for the proposed Ayer Road Village Special Permit Application, Commercial Development at 203 Ayer Road in Harvard. Included in this report are calculations that support a final engineering design as required by the state's Wetlands Protection Act Regulations and the Town of Harvard's ordinances and regulations. Site specific information is presented under two scenarios, "pre-development" and "post-development" conditions, so that potential impacts due to the project can be identified, quantified and, as necessary, mitigated.

The final design intent seeks to meet the following interrelated goals:

1. Limit stormwater runoff rates and volume for the 2-, 10-, 50- and 100-year storm events to existing (pre-development) levels;

2. Reduce the runoff rates and volume for the 2-, 10-year storm events by 5% of the existing (pre-development) levels per Harvard's Stormwater Regulations;

3. Maintain the volume of stormwater recharged per storm event to those of existing (pre-development) levels;

4. Prevent appreciable sediment and other suspended solids and contaminants transport by trapping them on site via Best Management Practices;

5. Provide adequate drainage for new surfaces;

6. Maintain existing drainage patterns while providing a cost-effective engineering solution that addresses regulatory as well as real-world constraints.

Site Description

The proposed project is commercial development to be filed under the Town of Harvard Ayer Road Village Special Permit application. The 11.3± acre project site is located on 203 Ayer Road and designated as Parcel 8-62-002 by the Town of Harvard Assessor. The project area is a 7.95± portion located on the northeastern side of the project site.

The project area is primarily low brush vegetations with some wooded areas. There is an existing hydrologically connected Bordering Vegetated Wetlands (BVW) located at the northeastern corner of the project site. There is an existing 24" culvert located at the northeastern corner of the wetland area going under Ayer Road and allowing stormwater to discharge into a bigger wetland system east of the project site. The project area generally slopes towards the hydrologically connected Bordering Vegetated Wetlands (BVW) located at the northeastern corner of the project site at approximately 3-8%.

Available NRCS soils mapping for the project shows diverse soils, ranging from Hydrologic Soil Group A-C. Hydraulic Soil Group (HSG) A consisting approximately 1/3 of the project area, designated as Merrimac fine sandy loam, is located on the southern portion of the project area. Hydraulic Soil Group B consisting of approximately 1/3 of the project area, designated as Sudbury fine sandy loam, is located on the middle portion of the project area. Hydraulic Soil Group C consisting of the remaining 1/3 of the project area, designated as Walpole sandy loam, is located on the northern portion of the project area. Onsite soil evaluations were performed, and the logs reveal that the mapping is typically consistent with the field evaluation. Although the Hydraulic Soil Group for the project is generally split into three areas as mentioned above, the area containing HSG B is the largest portion within the project area. Proposed stormwater management systems will generally be located within this area of HSG B, therefore HSG B will be used for analysis purposes.

Under the pre-development scenario, the project area will be viewed as a single subcatchment area. As shown on the plan entitled "PRE-DEVELOPMENT – WATERSHED MAP", included within the attached Appendix, subcatchment SC1.0 outlines the project area flowing towards the proposed wetland replication, as shown as Analysis Point AP-1.

Project Description

The proposed development will construct three commercial use buildings with parking, pedestrian access, and a driveway connection on Ayer Road. The three proposed commercial-use buildings, their associated parking areas and driveway access onto Ayer Road are shown in the attached Site Plan. Building A will be constructed as a recreational center specifically for the purpose of providing court space for badminton. The badminton center will have a gross floor area of 29,998 sq. ft. The proposed development will provide 120 parking spaces, five of which shall be handicap accessible parking spaces, for the recreational center. Building B and C are shown as general commercial/office-use buildings that will be subjected to final layout design once an end-user has been identified.

In order to offset the increase in stormwater runoff on site, various stormwater Best Management Practices (BMP) are proposed. On-site stormwater BMPs are designed to capture and treat stormwater, provide groundwater recharge, and reduce stormwater runoff than existing conditions.

Under the post-development scenario, the project has been divided into a total of 15 subcatchment areas, shown on the plan entitled "POST-DEVELOPMENT – WATERSHED MAP", and included in the attached Appendix, outlining runoff to the AP-1.

Subcatchment SC1.1, SC1.2, SC1.3, and SC3.3 outline stormwater runoff that will get collected by deep sump hooded catch basins and discharge into sediment forebay No. 1 prior to continuing into Infiltration Basin (IB-1). IB-1 will have an 8" HDPE discharge pipe and an emergency overflow weir to allow stormwater to continue into the resource area.

Subcatchment SC3.1 outlines stormwater runoff from the western portion of the proposed roof area that will directly discharge into Infiltration Chambers (IC-1). SC3.2 outlines runoff from the proposed pavement area that will get collected by a deep sump hooded catch basin and discharge

Subcatchment SC3.1 outlines stormwater runoff from the western portion of the proposed roof area that will directly discharge into Infiltration Chambers (IC-1). SC3.2 outlines runoff from the proposed pavement area that will get collected by a deep sump hooded catch basin and discharge into an Isolator Row for IC-1. IC-1 will have a discharge pipe to allow stormwater to continue into the resource area.

Subcatchment SC2.1, SC2.2, SC4.2 and SC4.4 outline stormwater runoff that will get collected by deep sump hooded catch basins and discharge into an Isolator Row for Infiltration Chambers (IC-2). SC4.1 outlines stormwater runoff from the eastern portion of the proposed roof area that will directly discharge into Infiltration Chambers (IC-2). IC-2 will have a discharge pipe to allow stormwater to continue into the resource area.

Subcatchment SC2.3, SC4.2 and SC4.5 outline stormwater runoff that will get collected by deep sump hooded catch basins and discharge into Infiltration Basin (IB-2). IB-2 will have a couple of discharge pipes to allow stormwater to continue into the resource area.

Subcatchment SC5.1 outlines untreated stormwater runoff from pervious surface. As mentioned above, SC5.1 will exclude the proposed wetland replication area that was previously approved by the Town of Harvard Conservation Commission.

Hydrologic and Hydraulic Computation Methodology

Runoff rates were computed using the Soil Conservation Service TR-20 Method entitled “Urban Hydrology for Small Watersheds” within the HydroCAD Stormwater Modeling software platform. The following 24-hour rainfall events from the Northeast Regional Climate Center (NRCC) Extreme Precipitation Tables database were analyzed:

Frequency (years): 2, 10, 50 and 100

As outlined above, runoff from the site has been analyzed at one point under the pre-development and post-development conditions. As a standard for comparison AP-1 is represented in both the pre and the post development cases.

Summary of Results

Peak discharge rates and volumes of the calculated runoff for both conditions analyzed are displayed in the HYDROLOGY SUMMARY that follows. As shown within the summary, the peak discharge rates and volumes at Analysis Point AP-1 for all analyzed storm events are less than or equal to those under pre-development conditions. Peak discharge rates and volumes for the 2- and 10-yr storm events under the proposed conditions are also at least five percent lower than the existing conditions, in accordance with the Town of Harvard’s Stormwater Management Regulations.

The deep sump hooded catch basins, Isolator Row, infiltration chambers, sediment forebay and infiltration basins work together to provide an expected Total Suspended Solids (TSS) removal of 85% for each of the treatment train, prior to discharging into the proposed wetland replication area.

The two sets of infiltration chambers will retain and infiltrate 12,898 cubic feet of runoff prior to discharging, well in excess of the minimum required 3,540 cubic feet occurring under existing conditions and displaced by the proposed development. The proposed infiltration volume will also be in excess of the required Water Quality Volume generated by the proposed impervious area on site.

The proposed development meets the MADEP Stormwater Management Standards through the use of Best Management Practices that address groundwater recharge, water quality (first flush) retention, and suspended solids removal within sustainable BMP's. See Appendix for computed solids quantities / removal process trains, and water quality runoff volumes.

Section 2

Hydrology Summary for 24-hour Storm

HYDROLOGY SUMMARY FOR 24-HOUR STORM

203 Ayer Road, Harvard, MA
Project No. 211009

PEAK DISCHARGE RATE

Pre-Development (cfs)

Analysis Point	2-YR	10-YR	50-YR	100-YR
AP-1	2.8	7.9	17.2	22.9
5% Reduction [1]	2.7	7.5	--	--

Development (cfs)

Analysis Point	2-YR	10-YR	50-YR	100-YR
AP-1	2.1	7.0	15.8	22.0

Pre-Development vs. Developed (cfs)

Analysis Point	2-YR	10-YR	50-YR	100-YR
AP-1	**-0.6**	**-0.5**	**-1.4**	**-0.9**

PEAK DISCHARGE VOLUME

Pre-Development (Cubic feet)

Analysis Point	2-YR	10-YR	50-YR	100-YR
AP-1	14,651	35,658	74,457	99,179
5% Reduction [1]	13,918	33,875	--	--

Development (Cubic feet)

Analysis Point	2-YR	10-YR	50-YR	100-YR
AP-1	12,110	32,146	72,751	98,834

Pre-Development vs. Developed (Cubic feet)

Analysis Point	2-YR	10-YR	25-YR	100-YR
AP-1	**-1,808**	**-1,729**	**-1,706**	**-345**

[1] Harvard's Wetlands Protection Bylaw Regulations: Chapter 147-14.C.(1) Stormwater Management: Peak runoff rates and volume under proposed conditions must be reduced by at least five percent compared to existing conditions for the 2- and 10-yr frequency storm event, and peak runoff rates and volumes under proposed conditions compared to existing conditions shall not exceed existing peak runoff rates and volume for the 50- and 100-year frequency storm events.

Section 3

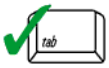
Mass DEP Stormwater Management Report Checklist

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.

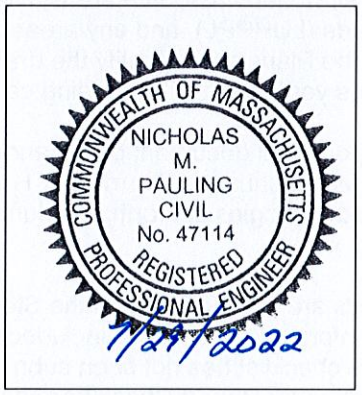
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



Signature and Date 7/29/2022

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): Direct roof recharge

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.

Section 4

Appendix

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

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 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part
Survey Area Data: Version 16, Sep 3, 2021

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

Date(s) aerial images were photographed: Aug 12, 2019—Sep 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	0.5	2.3%
31A	Walpole sandy loam, 0 to 3 percent slopes	3.4	15.2%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	4.2	18.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	3.9	17.5%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	8.1	36.2%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	1.9	8.6%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	0.3	1.3%
Totals for Area of Interest		**22.3**	**100.0%**

National Flood Hazard Layer FIRMette

FEMA

71°35'6"W 42°31'50"N

71°34'29"W 42°31'23"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

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

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/8/2022 at 2:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

FORM 11 - SOIL EVALUATOR FORM

No. 211009 Date: 1/17/22

Commonwealth of Massachusetts
Harvard, Massachusetts

Soil Suitability Assessment for Stormwater Management

Performed by: Limhuot Tiv, GPR Inc Date: 1/13/22
Witnessed by: N/A

Location Address: or Lot No. 203 Ayer Road Harvard, MA	Owner's Name: Wheeler Realty Trust Address: 198 Ayer Road Harvard, MA 01451 Telephone No.

New Construction ☑ Upgrade ☐ Repair ☐

Office Review

Published Soil Survey Available: No ☐ Yes ☑

Year Published Internet Publication Scale n/a Soil Map Unit 254A, 260B & 31A
Soil Name Merrimac fine sandy loam Soil Limitations well drained
Soil Name Sudbury fine sandy loam Soil Limitations well drained, shallow to groundwater
Soil Name Wapole sandy loam Soil Limitations poorly drained, shallow to groundwater

Surficial Geologic Report Available: No ☐ Yes ☑

Year Published Mass Mapper Publication Scale n/a
Geologic Material(Map Unit) Sand and gravel, Till or bedrock
Landform Ground Morraine

Flood Insurance Rate Map: 25027C0314E

Above 500 Year Flood Boundary	No ☐	Yes ☑
Within 500 Year Flood Boundary	No ☑	Yes ☐
Within 100 Year Flood Boundary	No ☑	Yes ☐
Within Velocity Zone	No ☑	Yes ☐

Wetland Area:

National Wetlands Inventory Map (map unit) N/A
Wetlands Conservancy Program Map (map unit) N/A

Current Water Resource Conditions (USGS): Month February

Range: Above Normal ☑ Normal ☐ Below Normal ☐
Other Reference Reviewed USGS

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-1 Date: 01/13/22 Time: 8:00AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 0-3% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-1 NB 14/E-31 Suface El. 301.9

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-12	A	FSL	10YR 3/3		
12-42	C1	S	10YR 5/4		
42-85	C2	SL	2.5Y 5/3	@42" 10YR 6/4 2.5Y 6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: 85"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 42"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-2 Date: 01/13/22 Time: 8:20AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 0-3% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-2 NB 14/E-31 Suface El. 304.0

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-12	A	FSL	10YR 3/3		
12-50	C1	S	10YR 5/4		
50-91	C2	SL	2.5Y 5/4	@50" 10YR 6/4 2.5Y 6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >91"
Depth to Groundwater: Standing Water in the Hole 88" Weeping from Pit Face: 78"
Estimated Seasonal High Groundwater in the Hole 50"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-3 Date: 01/13/22 Time: 8:40AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 3-8% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-3 NB 14/E-31 Suface El. 295.4

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-12	A	FSL	10YR 3/3		
12-27	C1	S	10YR 6/4	@24"	
27-102	C2	FSL	2.5Y 5/4	7.5YR 5/6 2.5Y 6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >102"
Depth to Groundwater: Standing Water in the Hole 60" Weeping from Pit Face: 30"
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-4 Date: 01/13/22 Time: 9:00AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 3-8% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-4 NB 14/E-31 Suface El. 289.4

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-12	A	FSL	10YR 3/3		
12-26	Fill	LS	10YR 6/4		
26-40	Ab	FSL	10YR 4/3		
40-50	C1	FS	2.5Y 6/1	@45"	
50-102	C2	FSL	2.5Y 5/4	7.5YR 5/6 2.5Y 6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >102"
Depth to Groundwater: Standing Water in the Hole 90" Weeping from Pit Face: 48"
Estimated Seasonal High Groundwater in the Hole 45"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-5 Date: 01/13/22 Time: 9:30AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 3-8% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-5 NB 14/E-31 Suface El. 288.3

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-40	Fill	FSL	10YR 3/3		
40-48	C1	S	10YR 5/4		
48-108	C2	FSL	2.5Y 5/4	@50" 7.5YR 5/6 2.5Y 6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >108"
Depth to Groundwater: Standing Water in the Hole 101" Weeping from Pit Face: 52"
Estimated Seasonal High Groundwater in the Hole 50"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-6 Date: 01/13/22 Time: 10:00AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 3-8% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-6 NB 14/E-31 Suface El. 281.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-15	A	FSL	10YR 3/3	@15"	
15-80	C1	FSL	GLEY 3/N	7.5YR 5/8	
80-108	C2	FLS	2.5Y 4/3		

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >108"
Depth to Groundwater: Standing Water in the Hole 100" Weeping from Pit Face: 35"
Estimated Seasonal High Groundwater in the Hole 15"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-7 Date: 01/13/22 Time: 10:30AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 3-8% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-7 NB 14/E-31 Suface El. 283.8

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-15	A	FSL	7.5YR 2.5/2	@15"	
15-28	C1	S	10YR 4/2	10YR 5/6	
28-99	C2	FSL	GLEY 3/N		

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >99"
Depth to Groundwater: Standing Water in the Hole 80" Weeping from Pit Face: 20"
Estimated Seasonal High Groundwater in the Hole 15"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 203 Ayer Road
Harvard, MA

On-Site Review

Deep Hole # : 122-8 Date: 01/13/22 Time: 11:00AM Weather: Cloudy 27°
Location (identify on site plan) See Attached Sketch
Land Use vacant lot Slope (%) 3-8% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	92± feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 122-8 NB 14/E-31 Suface El. 292.5

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-12	A	FSL	10YR 3/3		
12-28	C1	LS	10YR 5/4		
28-76	C2	SL	2.5Y 5/3	@60" 10YR 6/4 2.5Y 6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >76"
Depth to Groundwater: Standing Water in the Hole 72" Weeping from Pit Face: 70"
Estimated Seasonal High Groundwater in the Hole 60"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot#: 203 Ayer Road
Harvard, MA

Determination for Seasonal High Water Table

Method Used:

- ☐ Depth observed standing in observation hole _____ inches _____
- ☐ Depth weeping from side of observation hole _____ inches _____
- ☑ Depth to soil mottles * inches See individual Reports
- ☐ Ground water adjustment _____ feet _____

Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Ground Water Level _____

Depth of Naturally Occuring Pervious Material

Does at least four feet of naturally occuring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes

If not, what is the depth of naturally occuring pervious material? _____ Feet

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated, on the attached soil evaluation form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature _____ Date 2/9/22

Notes: _____

Signature

LEGEND:

SUBCATCHMENT LIMIT

SC–1 SUBCATCHMENT LABEL

TIME OF CONCENTRATION

AP–1 DRAINAGE ANALYSIS POINT

SC1.0

AP–1

APPROX. PROPOSED LIMIT OF WETLAND REPLICATION AREA

GRAVEL AREA

AYER (RT–110) ROAD

AYER ROAD

PROJECT SITE

AYER ROAD

PROJECT AREA

PLOT PLAN

1" = 300'

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)

1 INCH = 80 FEET

GPR

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CIVIL ENGINEERING • LAND SURVEYING • LAND PLANNING

VOICE: 978.772.1590 FAX: 978.772.1591

www.gpr-inc.com

PREPARED FOR:

YVONNE CHERN
7 GREEN WAY
WAYLAND, MA 01778

DES'D BY: LT | CHK'D BY: NMP

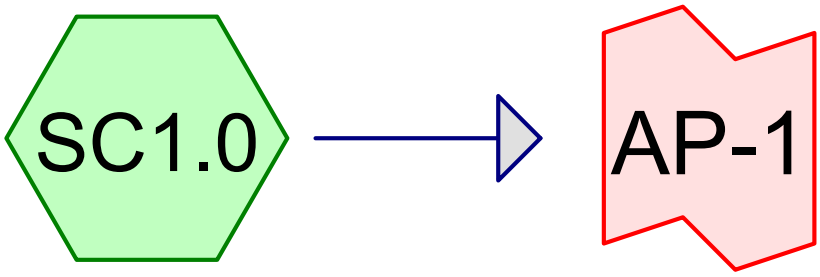
DATE: REVISION–1 7/15/2022

PRE–DEVELOPMENT WATERSHED MAP

203 AYER ROAD
HARVARD, MA

PROJECT: 211009 | 1 OF 1

P:\21---\211009\DWG\PERMIT\DRAINAGE REV–1.DWG 07–13–22 12:42:59 PM – LAYOUT PRE



Subcat Reach Pond Link

Routing Diagram for PRE Rev-1
Prepared by Goldsmith, Prest & Ringwall, Inc., Printed 7/13/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NRCC 24-hr	D	Default	24.00	1	3.13	2
2	10-Year	NRCC 24-hr	D	Default	24.00	1	4.68	2
3	50-Year	NRCC 24-hr	D	Default	24.00	1	7.00	2
4	100-Year	NRCC 24-hr	D	Default	24.00	1	8.34	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
181,979	61	>75% Grass cover, Good, HSG B (SC1.0)
52,672	96	Gravel surface, HSG B (SC1.0)
35,529	55	Woods, Good, HSG B (SC1.0)
270,181	**67**	**TOTAL AREA**

Time span=0.00-26.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.0: Runoff Area=270,181 sf 0.00% Impervious Runoff Depth=0.65"
Flow Length=757' Tc=13.4 min CN=67 Runoff=2.8 cfs 14,651 cf

Link AP-1: Inflow=2.8 cfs 14,651 cf
Primary=2.8 cfs 14,651 cf

Total Runoff Area = 270,181 sf Runoff Volume = 14,651 cf Average Runoff Depth = 0.65"
100.00% Pervious = 270,181 sf 0.00% Impervious = 0 sf

Summary for Subcatchment SC1.0:

Runoff = 2.8 cfs @ 12.24 hrs, Volume= 14,651 cf, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
181,979	61	>75% Grass cover, Good, HSG B
35,529	55	Woods, Good, HSG B
52,672	96	Gravel surface, HSG B
270,181	67	Weighted Average
270,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	35	0.1429	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.13"
1.0	15	0.1333	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
6.5	556	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	27	0.1481	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	124	0.0450	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.4	757	Total			

Summary for Link AP-1:

Inflow Area = 270,181 sf, 0.00% Impervious, Inflow Depth = 0.65" for 2-Year event
Inflow = 2.8 cfs @ 12.24 hrs, Volume= 14,651 cf
Primary = 2.8 cfs @ 12.24 hrs, Volume= 14,651 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs

Time span=0.00-26.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.0: Runoff Area=270,181 sf 0.00% Impervious Runoff Depth=1.58"
Flow Length=757' Tc=13.4 min CN=67 Runoff=7.9 cfs 35,658 cf

Link AP-1: Inflow=7.9 cfs 35,658 cf
Primary=7.9 cfs 35,658 cf

Total Runoff Area = 270,181 sf Runoff Volume = 35,658 cf Average Runoff Depth = 1.58"
100.00% Pervious = 270,181 sf 0.00% Impervious = 0 sf

Summary for Subcatchment SC1.0:

Runoff = 7.9 cfs @ 12.22 hrs, Volume= 35,658 cf, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
181,979	61	>75% Grass cover, Good, HSG B
35,529	55	Woods, Good, HSG B
52,672	96	Gravel surface, HSG B
270,181	67	Weighted Average
270,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	35	0.1429	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.13"
1.0	15	0.1333	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
6.5	556	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	27	0.1481	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	124	0.0450	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.4	757	Total			

Summary for Link AP-1:

Inflow Area = 270,181 sf, 0.00% Impervious, Inflow Depth = 1.58" for 10-Year event
Inflow = 7.9 cfs @ 12.22 hrs, Volume= 35,658 cf
Primary = 7.9 cfs @ 12.22 hrs, Volume= 35,658 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs

Time span=0.00-26.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.0: Runoff Area=270,181 sf 0.00% Impervious Runoff Depth=3.31"
Flow Length=757' Tc=13.4 min CN=67 Runoff=17.2 cfs 74,457 cf

Link AP-1: Inflow=17.2 cfs 74,457 cf
Primary=17.2 cfs 74,457 cf

Total Runoff Area = 270,181 sf Runoff Volume = 74,457 cf Average Runoff Depth = 3.31"
100.00% Pervious = 270,181 sf 0.00% Impervious = 0 sf

Summary for Subcatchment SC1.0:

Runoff = 17.2 cfs @ 12.22 hrs, Volume= 74,457 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
181,979	61	>75% Grass cover, Good, HSG B
35,529	55	Woods, Good, HSG B
52,672	96	Gravel surface, HSG B
270,181	67	Weighted Average
270,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	35	0.1429	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.13"
1.0	15	0.1333	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
6.5	556	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	27	0.1481	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	124	0.0450	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.4	757	Total			

Summary for Link AP-1:

Inflow Area = 270,181 sf, 0.00% Impervious, Inflow Depth = 3.31" for 50-Year event
Inflow = 17.2 cfs @ 12.22 hrs, Volume= 74,457 cf
Primary = 17.2 cfs @ 12.22 hrs, Volume= 74,457 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs

Time span=0.00-26.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.0: Runoff Area=270,181 sf 0.00% Impervious Runoff Depth=4.41"
Flow Length=757' Tc=13.4 min CN=67 Runoff=22.9 cfs 99,179 cf

Link AP-1: Inflow=22.9 cfs 99,179 cf
Primary=22.9 cfs 99,179 cf

Total Runoff Area = 270,181 sf Runoff Volume = 99,179 cf Average Runoff Depth = 4.41"
100.00% Pervious = 270,181 sf 0.00% Impervious = 0 sf

Summary for Subcatchment SC1.0:

Runoff = 22.9 cfs @ 12.21 hrs, Volume= 99,179 cf, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
181,979	61	>75% Grass cover, Good, HSG B
35,529	55	Woods, Good, HSG B
52,672	96	Gravel surface, HSG B
270,181	67	Weighted Average
270,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	35	0.1429	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.13"
1.0	15	0.1333	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
6.5	556	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	27	0.1481	1.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	124	0.0450	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.4	757	Total			

Summary for Link AP-1:

Inflow Area = 270,181 sf, 0.00% Impervious, Inflow Depth = 4.41" for 100-Year event
Inflow = 22.9 cfs @ 12.21 hrs, Volume= 99,179 cf
Primary = 22.9 cfs @ 12.21 hrs, Volume= 99,179 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs

LEGEND:

SUBCATCHMENT LIMIT

SC–1 SUBCATCHMENT LABEL

TIME OF CONCENTRATION

AP–1 DRAINAGE ANALYSIS POINT

SC1.1 SC1.2 SC1.3 SC2.1 SC2.2 SC2.3 SC3.1 SC3.2 SC3.3 SC4.1 SC4.2 SC4.3 SC4.4 SC4.5 SC5.1

60–FT BUILDING SETBACK FROM AR ZONING PROPERTY

20–FT BUILDING SETBACK

AYER (RT–110) ROAD

AYER ROAD

APPROX. PROPOSED LIMIT OF WETLAND REPLICATION AREA

AP–1

20–FT BUILDING SETBACK

50' WETLAND BUFFER ZONE (NO DISTURB ZONE)

75' WETLAND BUFFER ZONE (NO STRUCTURE ZONE)

PROJECT SITE

AYER ROAD

PROJECT AREA

PLOT PLAN

1" = 300'

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)

1 INCH = 80 FEET

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PREPARED FOR:

YVONNE CHERN
7 GREEN WAY
WAYLAND, MA 01778

DES'D BY: LT | CHK'D BY: NMP

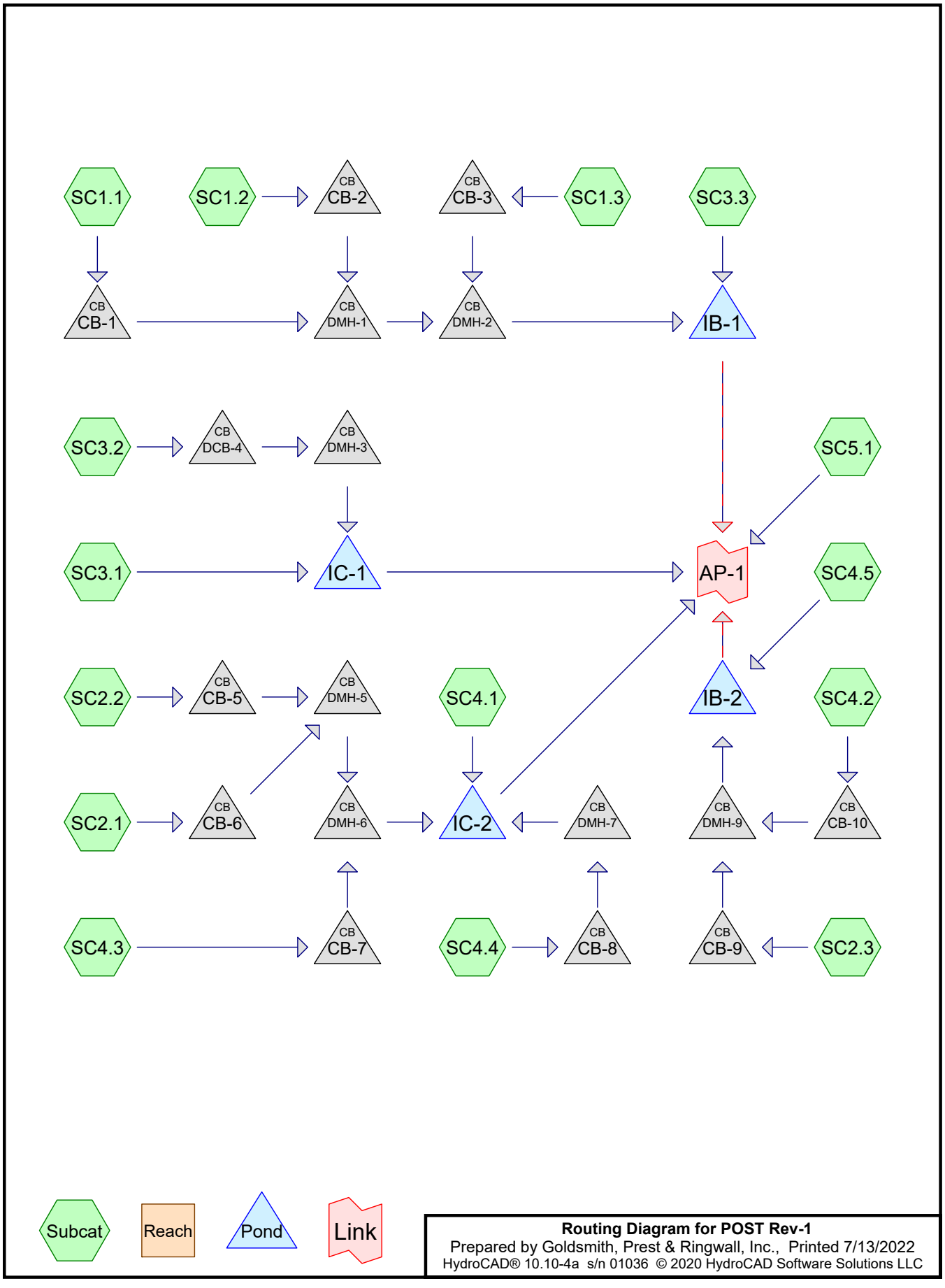
DATE: REVISION–1 7/15/2022

PRE–DEVELOPMENT WATERSHED MAP

203 AYER ROAD
HARVARD, MA

PROJECT: 211009 | 1 OF 1

P:\21---\211009\DWG\PERMIT\DRAINAGE REV–1.DWG 07–13–22 1:01:06 PM – LAYOUT POST



Routing Diagram for POST Rev-1

Prepared by Goldsmith, Prest & Ringwall, Inc., Printed 7/13/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NRCC 24-hr	D	Default	24.00	1	3.13	2
2	10-Year	NRCC 24-hr	D	Default	24.00	1	4.68	2
3	50-Year	NRCC 24-hr	D	Default	24.00	1	7.00	2
4	100-Year	NRCC 24-hr	D	Default	24.00	1	8.34	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
119,876	61	>75% Grass cover, Good, HSG B (SC1.1, SC1.2, SC1.3, SC2.1, SC2.2, SC2.3, SC3.1, SC3.2, SC3.3, SC4.2, SC4.3, SC4.4, SC4.5, SC5.1)
9,151	96	Gravel surface, HSG B (SC1.1, SC1.2, SC1.3, SC2.2, SC3.3, SC5.1)
71,721	98	Paved parking, HSG B (SC1.1, SC1.2, SC1.3, SC2.1, SC2.2, SC2.3, SC3.2, SC4.2, SC4.3, SC4.4, SC5.1)
42,613	98	Roofs, HSG B (SC1.2, SC2.1, SC2.2, SC3.1, SC4.1)
7,036	98	Unconnected pavement, HSG B (SC1.1, SC1.2, SC1.3, SC2.1, SC2.2, SC2.3, SC3.2, SC4.2, SC4.3, SC4.4, SC5.1)
19,783	55	Woods, Good, HSG B (SC1.1, SC1.2, SC1.3, SC2.2, SC5.1)
270,181	**78**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.1: Runoff Area=15,215 sf 26.17% Impervious Runoff Depth>0.83"
Flow Length=233' Tc=6.0 min CN=71 Runoff=0.3 cfs 1,058 cf

Subcatchment SC1.2: Runoff Area=26,444 sf 61.92% Impervious Runoff Depth>1.69"
Flow Length=335' Tc=9.0 min CN=85 Runoff=1.0 cfs 3,732 cf

Subcatchment SC1.3: Runoff Area=33,487 sf 38.29% Impervious Runoff Depth>1.10"
Flow Length=520' Tc=13.0 min CN=76 Runoff=0.7 cfs 3,064 cf

Subcatchment SC2.1: Runoff Area=9,281 sf 93.59% Impervious Runoff Depth>2.68"
Tc=6.0 min CN=96 Runoff=0.6 cfs 2,071 cf

Subcatchment SC2.2: Runoff Area=18,563 sf 51.01% Impervious Runoff Depth>1.41"
Flow Length=295' Tc=7.8 min CN=81 Runoff=0.6 cfs 2,182 cf

Subcatchment SC2.3: Runoff Area=11,540 sf 37.45% Impervious Runoff Depth>1.04"
Flow Length=185' Tc=6.0 min CN=75 Runoff=0.3 cfs 1,005 cf

Subcatchment SC3.1: Runoff Area=11,615 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.7 cfs 2,802 cf

Subcatchment SC3.2: Runoff Area=25,677 sf 90.76% Impervious Runoff Depth>2.57"
Flow Length=118' Slope=0.0380 '/' Tc=6.0 min CN=95 Runoff=1.5 cfs 5,506 cf

Subcatchment SC3.3: Runoff Area=14,666 sf 0.00% Impervious Runoff Depth>0.53"
Flow Length=216' Tc=6.0 min CN=64 Runoff=0.2 cfs 642 cf

Subcatchment SC4.1: Runoff Area=14,998 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.9 cfs 3,618 cf

Subcatchment SC4.2: Runoff Area=10,484 sf 51.74% Impervious Runoff Depth>1.35"
Flow Length=231' Tc=6.0 min CN=80 Runoff=0.3 cfs 1,176 cf

Subcatchment SC4.3: Runoff Area=4,682 sf 91.32% Impervious Runoff Depth>2.57"
Tc=6.0 min CN=95 Runoff=0.3 cfs 1,004 cf

Subcatchment SC4.4: Runoff Area=5,136 sf 89.01% Impervious Runoff Depth>2.47"
Tc=6.0 min CN=94 Runoff=0.3 cfs 1,058 cf

Subcatchment SC4.5: Runoff Area=6,391 sf 0.00% Impervious Runoff Depth>0.41"
Tc=6.0 min CN=61 Runoff=0.0 cfs 221 cf

Subcatchment SC5.1: Runoff Area=62,001 sf 2.46% Impervious Runoff Depth>0.49"
Flow Length=362' Tc=10.0 min CN=63 Runoff=0.5 cfs 2,510 cf

Pond CB-1: Peak Elev=297.80' Inflow=0.3 cfs 1,058 cf
12.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=0.3 cfs 1,058 cf

Pond CB-10: Peak Elev=286.23' Inflow=0.3 cfs 1,176 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=0.3 cfs 1,176 cf

Pond CB-2: Peak Elev=294.37' Inflow=1.0 cfs 3,732 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0200 '/' Outflow=1.0 cfs 3,732 cf

Pond CB-3: Peak Elev=288.01' Inflow=0.7 cfs 3,064 cf
12.0" Round Culvert n=0.013 L=8.0' S=0.0125 '/' Outflow=0.7 cfs 3,064 cf

Pond CB-5: Peak Elev=294.45' Inflow=0.6 cfs 2,182 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0570 '/' Outflow=0.6 cfs 2,182 cf

Pond CB-6: Peak Elev=295.93' Inflow=0.6 cfs 2,071 cf
12.0" Round Culvert n=0.013 L=58.0' S=0.1103 '/' Outflow=0.6 cfs 2,071 cf

Pond CB-7: Peak Elev=288.55' Inflow=0.3 cfs 1,004 cf
12.0" Round Culvert n=0.013 L=22.0' S=0.0136 '/' Outflow=0.3 cfs 1,004 cf

Pond CB-8: Peak Elev=288.80' Inflow=0.3 cfs 1,058 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0200 '/' Outflow=0.3 cfs 1,058 cf

Pond CB-9: Peak Elev=286.80' Inflow=0.3 cfs 1,005 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0200 '/' Outflow=0.3 cfs 1,005 cf

Pond DCB-4: Peak Elev=285.27' Inflow=1.5 cfs 5,506 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0429 '/' Outflow=1.5 cfs 5,506 cf

Pond DMH-1: Peak Elev=294.15' Inflow=1.3 cfs 4,790 cf
12.0" Round Culvert n=0.013 L=188.0' S=0.0322 '/' Outflow=1.3 cfs 4,790 cf

Pond DMH-2: Peak Elev=287.62' Inflow=1.9 cfs 7,855 cf
18.0" Round Culvert n=0.013 L=48.0' S=0.0100 '/' Outflow=1.9 cfs 7,855 cf

Pond DMH-3: Peak Elev=284.74' Inflow=1.5 cfs 5,506 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=1.5 cfs 5,506 cf

Pond DMH-5: Peak Elev=289.65' Inflow=1.2 cfs 4,253 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0148 '/' Outflow=1.2 cfs 4,253 cf

Pond DMH-6: Peak Elev=288.55' Inflow=1.4 cfs 5,257 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=1.4 cfs 5,257 cf

Pond DMH-7: Peak Elev=288.66' Inflow=0.3 cfs 1,058 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=0.3 cfs 1,051 cf

Pond DMH-9: Peak Elev=285.87' Inflow=0.6 cfs 2,181 cf
15.0" Round Culvert n=0.013 L=197.0' S=0.0175 '/' Outflow=0.6 cfs 2,181 cf

Pond IB-1: Peak Elev=285.46' Storage=790 cf Inflow=2.1 cfs 8,497 cf
Discarded=0.0 cfs 647 cf Primary=1.5 cfs 7,644 cf Secondary=0.0 cfs 0 cf Outflow=1.6 cfs 8,291 cf

Pond IB-2: Peak Elev=282.74' Storage=765 cf Inflow=0.7 cfs 2,401 cf
Primary=0.2 cfs 1,827 cf Secondary=0.0 cfs 0 cf Outflow=0.2 cfs 1,827 cf

Pond IC-1: Peak Elev=284.74' Storage=3,540 cf Inflow=2.2 cfs 8,308 cf
Discarded=0.1 cfs 6,382 cf Primary=0.0 cfs 0 cf Outflow=0.1 cfs 6,382 cf

Pond IC-2: Peak Elev=288.55' Storage=4,576 cf Inflow=2.7 cfs 9,926 cf
Discarded=0.1 cfs 6,350 cf Primary=0.0 cfs 129 cf Outflow=0.1 cfs 6,478 cf

Link AP-1: Inflow=2.1 cfs 12,110 cf
Primary=2.1 cfs 12,110 cf

Total Runoff Area = 270,181 sf Runoff Volume = 31,650 cf Average Runoff Depth = 1.41"
55.08% Pervious = 148,810 sf 44.92% Impervious = 121,371 sf

Summary for Subcatchment SC1.1:

Runoff = 0.3 cfs @ 12.14 hrs, Volume= 1,058 cf, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
4,381	61	>75% Grass cover, Good, HSG B
5,583	55	Woods, Good, HSG B
328	98	Unconnected pavement, HSG B
3,654	98	Paved parking, HSG B
1,269	96	Gravel surface, HSG B
15,215	71	Weighted Average
11,233		73.83% Pervious Area
3,982		26.17% Impervious Area
328		8.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	34	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.9	16	0.1875	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.0	83	0.0361	1.33		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	100	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	233	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC1.2:

Runoff = 1.0 cfs @ 12.16 hrs, Volume= 3,732 cf, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
6,620	61	>75% Grass cover, Good, HSG B
2,398	55	Woods, Good, HSG B
1,172	98	Unconnected pavement, HSG B
8,000	98	Roofs, HSG B
7,203	98	Paved parking, HSG B
1,052	96	Gravel surface, HSG B
26,444	85	Weighted Average
10,069		38.08% Pervious Area
16,375		61.92% Impervious Area
1,172		7.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	41	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
1.4	9	0.0200	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
3.4	222	0.0248	1.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	63	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	335	Total			

Summary for Subcatchment SC1.3:

Runoff = 0.7 cfs @ 12.22 hrs, Volume= 3,064 cf, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
15,029	61	>75% Grass cover, Good, HSG B
3,894	55	Woods, Good, HSG B
1,741	96	Gravel surface, HSG B
275	98	Unconnected pavement, HSG B
12,548	98	Paved parking, HSG B
33,487	76	Weighted Average
20,664		61.71% Pervious Area
12,823		38.29% Impervious Area
275		2.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
3.2	188	0.0372	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	160	0.0372	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	122	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.0	520	Total			

Summary for Subcatchment SC2.1:

Runoff = 0.6 cfs @ 12.13 hrs, Volume= 2,071 cf, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
595	61	>75% Grass cover, Good, HSG B
423	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,263	98	Paved parking, HSG B
9,281	96	Weighted Average
595		6.41% Pervious Area
8,686		93.59% Impervious Area
423		4.87% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC2.2:

Runoff = 0.6 cfs @ 12.15 hrs, Volume= 2,182 cf, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
5,529	61	>75% Grass cover, Good, HSG B
2,637	55	Woods, Good, HSG B
889	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,580	98	Paved parking, HSG B
929	96	Gravel surface, HSG B
18,563	81	Weighted Average
9,094		48.99% Pervious Area
9,469		51.01% Impervious Area
889		9.39% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.2	8	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	151	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	86	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	295	Total			

Summary for Subcatchment SC2.3:

Runoff = 0.3 cfs @ 12.14 hrs, Volume= 1,005 cf, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
7,218	61	>75% Grass cover, Good, HSG B
293	98	Unconnected pavement, HSG B
4,029	98	Paved parking, HSG B
11,540	75	Weighted Average
7,218		62.55% Pervious Area
4,321		37.45% Impervious Area
293		6.77% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	42	0.1430	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.1	8	0.0500	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.12"
0.5	135	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.1:

Runoff = 0.7 cfs @ 12.13 hrs, Volume= 2,802 cf, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
11,615	98	Roofs, HSG B
0	61	>75% Grass cover, Good, HSG B
11,615	98	Weighted Average
0		0.00% Pervious Area
11,615		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.2:

Runoff = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
2,372	61	>75% Grass cover, Good, HSG B
21,883	98	Paved parking, HSG B
1,422	98	Unconnected pavement, HSG B
25,677	95	Weighted Average
2,372		9.24% Pervious Area
23,305		90.76% Impervious Area
1,422		6.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0380	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.8	68	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.2	118	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.3:

Runoff = 0.2 cfs @ 12.15 hrs, Volume= 642 cf, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
13,540	61	>75% Grass cover, Good, HSG B
1,127	96	Gravel surface, HSG B
14,666	64	Weighted Average
14,666		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.9	166	0.0422	1.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	216	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.1:

Runoff = 0.9 cfs @ 12.13 hrs, Volume= 3,618 cf, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
14,998	98	Roofs, HSG B
14,998		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.2:

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 1,176 cf, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
5,060	61	>75% Grass cover, Good, HSG B
1,450	98	Unconnected pavement, HSG B
3,975	98	Paved parking, HSG B
10,484	80	Weighted Average
5,060		48.26% Pervious Area
5,424		51.74% Impervious Area
1,450		26.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.4	33	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	148	0.0440	4.26		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.0	231	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.3:

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 1,004 cf, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
406	61	>75% Grass cover, Good, HSG B
175	98	Unconnected pavement, HSG B
4,101	98	Paved parking, HSG B
4,682	95	Weighted Average
406		8.68% Pervious Area
4,276		91.32% Impervious Area
175		4.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.4:

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 1,058 cf, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
564	61	>75% Grass cover, Good, HSG B
541	98	Unconnected pavement, HSG B
4,030	98	Paved parking, HSG B
5,136	94	Weighted Average
564		10.99% Pervious Area
4,571		89.01% Impervious Area
541		11.83% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.5:

Runoff = 0.0 cfs @ 12.15 hrs, Volume= 221 cf, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
6,391	61	>75% Grass cover, Good, HSG B
6,391		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC5.1:

Runoff = 0.5 cfs @ 12.20 hrs, Volume= 2,510 cf, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
52,172	61	>75% Grass cover, Good, HSG B
5,271	55	Woods, Good, HSG B
70	98	Unconnected pavement, HSG B
1,456	98	Paved parking, HSG B
3,033	96	Gravel surface, HSG B
62,001	63	Weighted Average
60,476		97.54% Pervious Area
1,525		2.46% Impervious Area
70		4.56% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	36	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
2.1	14	0.0200	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
4.1	312	0.0334	1.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.0	362	Total			

Summary for Pond CB-1:

Inflow Area = 15,215 sf, 26.17% Impervious, Inflow Depth > 0.83" for 2-Year event
Inflow = 0.3 cfs @ 12.14 hrs, Volume= 1,058 cf
Outflow = 0.3 cfs @ 12.14 hrs, Volume= 1,058 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.14 hrs, Volume= 1,058 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 297.80' @ 12.14 hrs
Flood Elev= 301.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	297.50'	**12.0" Round Culvert** L= 170.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 297.50' / 293.56' S= 0.0232 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.14 hrs HW=297.80' TW=294.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.3 cfs @ 1.46 fps)

Summary for Pond CB-10:

Inflow Area = 10,484 sf, 51.74% Impervious, Inflow Depth > 1.35" for 2-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 1,176 cf
Outflow = 0.3 cfs @ 12.13 hrs, Volume= 1,176 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.13 hrs, Volume= 1,176 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.23' @ 12.13 hrs
Flood Elev= 289.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.90'	**12.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.90' / 285.70' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.13 hrs HW=286.22' TW=285.86' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.3 cfs @ 1.53 fps)

Summary for Pond CB-2:

Inflow Area = 26,444 sf, 61.92% Impervious, Inflow Depth > 1.69" for 2-Year event
Inflow = 1.0 cfs @ 12.16 hrs, Volume= 3,732 cf
Outflow = 1.0 cfs @ 12.16 hrs, Volume= 3,732 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 12.16 hrs, Volume= 3,732 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 294.37' @ 12.16 hrs
Flood Elev= 297.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.70'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.70' / 293.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.0 cfs @ 12.16 hrs HW=294.36' TW=294.14' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.0 cfs @ 1.79 fps)

Summary for Pond CB-3:

Inflow Area = 33,487 sf, 38.29% Impervious, Inflow Depth > 1.10" for 2-Year event
Inflow = 0.7 cfs @ 12.22 hrs, Volume= 3,064 cf
Outflow = 0.7 cfs @ 12.22 hrs, Volume= 3,064 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.22 hrs, Volume= 3,064 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.01' @ 12.22 hrs
Flood Elev= 291.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.50'	**12.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.50' / 287.40' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.22 hrs HW=288.00' TW=287.58' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.7 cfs @ 2.55 fps)

Summary for Pond CB-5:

Inflow Area = 18,563 sf, 51.01% Impervious, Inflow Depth > 1.41" for 2-Year event
Inflow = 0.6 cfs @ 12.15 hrs, Volume= 2,182 cf
Outflow = 0.6 cfs @ 12.15 hrs, Volume= 2,182 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.15 hrs, Volume= 2,182 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 294.45' @ 12.15 hrs
Flood Elev= 298.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	294.00'	**12.0" Round Culvert** L= 86.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 294.00' / 289.10' S= 0.0570 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.15 hrs HW=294.45' TW=289.64' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.6 cfs @ 1.80 fps)

Summary for Pond CB-6:

Inflow Area = 9,281 sf, 93.59% Impervious, Inflow Depth > 2.68" for 2-Year event
Inflow = 0.6 cfs @ 12.13 hrs, Volume= 2,071 cf
Outflow = 0.6 cfs @ 12.13 hrs, Volume= 2,071 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.13 hrs, Volume= 2,071 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 295.93' @ 12.13 hrs
Flood Elev= 299.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	295.50'	**12.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 295.50' / 289.10' S= 0.1103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.13 hrs HW=295.92' TW=289.63' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.5 cfs @ 1.73 fps)

Summary for Pond CB-7:

Inflow Area = 4,682 sf, 91.32% Impervious, Inflow Depth > 2.57" for 2-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 1,004 cf
Outflow = 0.3 cfs @ 12.13 hrs, Volume= 1,004 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.13 hrs, Volume= 1,004 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.55' @ 15.00 hrs
Flood Elev= 292.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.00'	**12.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.00' / 287.70' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.13 hrs HW=288.33' TW=288.17' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.3 cfs @ 1.75 fps)

Summary for Pond CB-8:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 2.47" for 2-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 1,058 cf
Outflow = 0.3 cfs @ 12.13 hrs, Volume= 1,058 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.13 hrs, Volume= 1,058 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.80' @ 12.13 hrs
Flood Elev= 292.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.50'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.50' / 288.20' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.13 hrs HW=288.80' TW=287.92' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.3 cfs @ 1.46 fps)

Summary for Pond CB-9:

Inflow Area = 11,540 sf, 37.45% Impervious, Inflow Depth > 1.04" for 2-Year event
Inflow = 0.3 cfs @ 12.14 hrs, Volume= 1,005 cf
Outflow = 0.3 cfs @ 12.14 hrs, Volume= 1,005 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.14 hrs, Volume= 1,005 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.80' @ 12.14 hrs
Flood Elev= 290.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.50' / 285.70' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.14 hrs HW=286.79' TW=285.86' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.3 cfs @ 1.46 fps)

Summary for Pond DCB-4:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 2.57" for 2-Year event
Inflow = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf
Outflow = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.27' @ 12.13 hrs
Flood Elev= 288.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 284.20' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.5 cfs @ 12.13 hrs HW=285.24' TW=284.69' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.5 cfs @ 2.32 fps)

Summary for Pond DMH-1:

Inflow Area = 41,659 sf, 48.86% Impervious, Inflow Depth > 1.38" for 2-Year event
Inflow = 1.3 cfs @ 12.15 hrs, Volume= 4,790 cf
Outflow = 1.3 cfs @ 12.15 hrs, Volume= 4,790 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.15 hrs, Volume= 4,790 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 294.15' @ 12.15 hrs
Flood Elev= 297.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.46'	**12.0" Round Culvert** L= 188.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.46' / 287.40' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.3 cfs @ 12.15 hrs HW=294.14' TW=287.61' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.3 cfs @ 2.22 fps)

Summary for Pond DMH-2:

Inflow Area = 75,146 sf, 44.15% Impervious, Inflow Depth > 1.25" for 2-Year event
Inflow = 1.9 cfs @ 12.17 hrs, Volume= 7,855 cf
Outflow = 1.9 cfs @ 12.17 hrs, Volume= 7,855 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.17 hrs, Volume= 7,855 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 287.62' @ 12.17 hrs
Flood Elev= 291.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.90'	**18.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.90' / 286.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.17 hrs HW=287.61' TW=285.34' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.9 cfs @ 2.26 fps)

Summary for Pond DMH-3:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 2.57" for 2-Year event
Inflow = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf
Outflow = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.13 hrs, Volume= 5,506 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 284.74' @ 14.67 hrs
Flood Elev= 288.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.10'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.10' / 284.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.5 cfs @ 12.13 hrs HW=284.69' TW=284.26' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.5 cfs @ 2.79 fps)

Summary for Pond DMH-5:

Inflow Area = 27,844 sf, 65.20% Impervious, Inflow Depth > 1.83" for 2-Year event
Inflow = 1.2 cfs @ 12.14 hrs, Volume= 4,253 cf
Outflow = 1.2 cfs @ 12.14 hrs, Volume= 4,253 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.14 hrs, Volume= 4,253 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.65' @ 12.14 hrs
Flood Elev= 293.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.00'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 289.00' / 287.70' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.1 cfs @ 12.14 hrs HW=289.64' TW=288.18' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.1 cfs @ 2.14 fps)

Summary for Pond DMH-6:

Inflow Area = 32,526 sf, 68.96% Impervious, Inflow Depth > 1.94" for 2-Year event
Inflow = 1.4 cfs @ 12.14 hrs, Volume= 5,257 cf
Outflow = 1.4 cfs @ 12.14 hrs, Volume= 5,257 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.14 hrs, Volume= 5,257 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.55' @ 14.95 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.4 cfs @ 12.14 hrs HW=288.18' TW=287.88' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.4 cfs @ 2.77 fps)

Summary for Pond DMH-7:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 2.47" for 2-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 1,058 cf
Outflow = 0.3 cfs @ 12.13 hrs, Volume= 1,051 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.13 hrs, Volume= 1,051 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.66' @ 14.67 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.3 cfs @ 12.13 hrs HW=287.92' TW=287.85' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.3 cfs @ 1.39 fps)

Summary for Pond DMH-9:

Inflow Area = 22,024 sf, 44.25% Impervious, Inflow Depth > 1.19" for 2-Year event
Inflow = 0.6 cfs @ 12.13 hrs, Volume= 2,181 cf
Outflow = 0.6 cfs @ 12.13 hrs, Volume= 2,181 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.13 hrs, Volume= 2,181 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.87' @ 12.13 hrs
Flood Elev= 290.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.45'	**15.0" Round Culvert** L= 197.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.45' / 282.00' S= 0.0175 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.6 cfs @ 12.13 hrs HW=285.86' TW=282.54' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.6 cfs @ 1.73 fps)

Summary for Pond IB-1:

Inflow Area = 89,812 sf, 36.94% Impervious, Inflow Depth > 1.14" for 2-Year event
Inflow = 2.1 cfs @ 12.17 hrs, Volume= 8,497 cf
Outflow = 1.6 cfs @ 12.26 hrs, Volume= 8,291 cf, Atten= 24%, Lag= 5.6 min
Discarded = 0.0 cfs @ 12.26 hrs, Volume= 647 cf
Primary = 1.5 cfs @ 12.26 hrs, Volume= 7,644 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.46' @ 12.26 hrs Surf.Area= 978 sf Storage= 790 cf

Plug-Flow detention time= 24.1 min calculated for 8,291 cf (98% of inflow)
Center-of-Mass det. time= 10.8 min (891.0 - 880.2)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	3,366 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)
284.00	208	72.5	0	0	208
285.00	661	129.3	413	413	1,126
286.00	1,425	189.1	1,019	1,432	2,649
287.00	2,492	246.3	1,934	3,366	4,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Secondary	285.50'	**8.0' long x 15.0' 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
#3	Primary	284.50'	**10.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 282.50' S= 0.0667 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Discarded OutFlow Max=0.0 cfs @ 12.26 hrs HW=285.46' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=1.5 cfs @ 12.26 hrs HW=285.46' TW=0.00' (Dynamic Tailwater)
↑**3=Culvert** (Inlet Controls 1.5 cfs @ 2.79 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=284.00' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond IB-2:

Inflow Area = 28,415 sf, 34.30% Impervious, Inflow Depth > 1.01" for 2-Year event
Inflow = 0.7 cfs @ 12.14 hrs, Volume= 2,401 cf
Outflow = 0.2 cfs @ 12.42 hrs, Volume= 1,827 cf, Atten= 74%, Lag= 17.1 min
Primary = 0.2 cfs @ 12.42 hrs, Volume= 1,827 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 282.74' @ 12.42 hrs Surf.Area= 1,201 sf Storage= 765 cf

Plug-Flow detention time= 175.5 min calculated for 1,827 cf (76% of inflow)
Center-of-Mass det. time= 71.7 min (959.6 - 887.8)

Volume	Invert	Avail.Storage	Storage Description
#1	282.00'	4,792 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)
282.00	870	143.0	0	0	870
283.00	1,328	162.0	1,091	1,091	1,356
284.00	1,843	181.0	1,578	2,669	1,902
285.00	2,414	200.0	2,122	4,792	2,509

Device	Routing	Invert	Outlet Devices
#1	Secondary	284.00'	**10.0' long x 22.0' 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
#2	Primary	282.50'	**10.0" Round Culvert** L= 37.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 282.50' / 278.50' S= 0.1070 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.2 cfs @ 12.42 hrs HW=282.74' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 0.2 cfs @ 1.32 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=282.00' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond IC-1:

Inflow Area = 37,292 sf, 93.64% Impervious, Inflow Depth > 2.67" for 2-Year event
Inflow = 2.2 cfs @ 12.13 hrs, Volume= 8,308 cf
Outflow = 0.1 cfs @ 10.85 hrs, Volume= 6,382 cf, Atten= 95%, Lag= 0.0 min
Discarded = 0.1 cfs @ 10.85 hrs, Volume= 6,382 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 284.74' @ 14.68 hrs Surf.Area= 4,404 sf Storage= 3,540 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 137.6 min (918.2 - 780.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.50'	3,942 cf	**53.75'W x 81.94'L x 3.50'H Field A** 15,414 cf Overall - 5,559 cf Embedded = 9,856 cf x 40.0% Voids
#2A	284.00'	5,559 cf	**ADS_StormTech SC-740 +Cap** x 121 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 121 Chambers in 11 Rows
		9,501 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	283.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	285.70'	**12.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.70' / 279.00' S= 0.1264 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	286.00'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 10.85 hrs HW=283.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=283.50' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.0 cfs)
└**3=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond IC-2:

Inflow Area = 52,660 sf, 79.76% Impervious, Inflow Depth > 2.26" for 2-Year event
Inflow = 2.7 cfs @ 12.13 hrs, Volume= 9,926 cf
Outflow = 0.1 cfs @ 14.95 hrs, Volume= 6,478 cf, Atten= 95%, Lag= 169.3 min
Discarded = 0.1 cfs @ 10.75 hrs, Volume= 6,350 cf
Primary = 0.0 cfs @ 14.95 hrs, Volume= 129 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.55' @ 14.95 hrs Surf.Area= 4,361 sf Storage= 4,576 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 119.8 min (915.3 - 795.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	287.00'	3,901 cf	**39.50'W x 110.42'L x 3.50'H Field A** 15,265 cf Overall - 5,513 cf Embedded = 9,752 cf x 40.0% Voids
#2A	287.50'	5,513 cf	**ADS_StormTech SC-740 +Cap** x 120 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 8 Rows
		9,414 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	287.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	288.30'	**12.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.30' / 279.00' S= 0.0775 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	288.50'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 10.75 hrs HW=287.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 14.95 hrs HW=288.55' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.0 cfs of 0.2 cfs potential flow)
└**3=Orifice/Grate** (Orifice Controls 0.0 cfs @ 0.76 fps)

Summary for Link AP-1:

Inflow Area = 270,181 sf, 44.92% Impervious, Inflow Depth > 0.54" for 2-Year event
Inflow = 2.1 cfs @ 12.25 hrs, Volume= 12,110 cf
Primary = 2.1 cfs @ 12.25 hrs, Volume= 12,110 cf, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.1: Runoff Area=15,215 sf 26.17% Impervious Runoff Depth>1.87"
Flow Length=233' Tc=6.0 min CN=71 Runoff=0.7 cfs 2,377 cf

Subcatchment SC1.2: Runoff Area=26,444 sf 61.92% Impervious Runoff Depth>3.07"
Flow Length=335' Tc=9.0 min CN=85 Runoff=1.8 cfs 6,758 cf

Subcatchment SC1.3: Runoff Area=33,487 sf 38.29% Impervious Runoff Depth>2.26"
Flow Length=520' Tc=13.0 min CN=76 Runoff=1.5 cfs 6,320 cf

Subcatchment SC2.1: Runoff Area=9,281 sf 93.59% Impervious Runoff Depth>4.21"
Tc=6.0 min CN=96 Runoff=0.9 cfs 3,256 cf

Subcatchment SC2.2: Runoff Area=18,563 sf 51.01% Impervious Runoff Depth>2.70"
Flow Length=295' Tc=7.8 min CN=81 Runoff=1.2 cfs 4,175 cf

Subcatchment SC2.3: Runoff Area=11,540 sf 37.45% Impervious Runoff Depth>2.19"
Flow Length=185' Tc=6.0 min CN=75 Runoff=0.6 cfs 2,105 cf

Subcatchment SC3.1: Runoff Area=11,615 sf 100.00% Impervious Runoff Depth>4.44"
Tc=6.0 min CN=98 Runoff=1.1 cfs 4,297 cf

Subcatchment SC3.2: Runoff Area=25,677 sf 90.76% Impervious Runoff Depth>4.10"
Flow Length=118' Slope=0.0380 '/' Tc=6.0 min CN=95 Runoff=2.3 cfs 8,769 cf

Subcatchment SC3.3: Runoff Area=14,666 sf 0.00% Impervious Runoff Depth>1.37"
Flow Length=216' Tc=6.0 min CN=64 Runoff=0.5 cfs 1,679 cf

Subcatchment SC4.1: Runoff Area=14,998 sf 100.00% Impervious Runoff Depth>4.44"
Tc=6.0 min CN=98 Runoff=1.4 cfs 5,548 cf

Subcatchment SC4.2: Runoff Area=10,484 sf 51.74% Impervious Runoff Depth>2.61"
Flow Length=231' Tc=6.0 min CN=80 Runoff=0.7 cfs 2,282 cf

Subcatchment SC4.3: Runoff Area=4,682 sf 91.32% Impervious Runoff Depth>4.10"
Tc=6.0 min CN=95 Runoff=0.4 cfs 1,599 cf

Subcatchment SC4.4: Runoff Area=5,136 sf 89.01% Impervious Runoff Depth>3.99"
Tc=6.0 min CN=94 Runoff=0.5 cfs 1,707 cf

Subcatchment SC4.5: Runoff Area=6,391 sf 0.00% Impervious Runoff Depth>1.18"
Tc=6.0 min CN=61 Runoff=0.2 cfs 628 cf

Subcatchment SC5.1: Runoff Area=62,001 sf 2.46% Impervious Runoff Depth>1.30"
Flow Length=362' Tc=10.0 min CN=63 Runoff=1.6 cfs 6,742 cf

Pond CB-1: Peak Elev=297.98' Inflow=0.7 cfs 2,377 cf
12.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=0.7 cfs 2,377 cf

Pond CB-10: Peak Elev=286.37' Inflow=0.7 cfs 2,282 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=0.7 cfs 2,282 cf

Pond CB-2: Peak Elev=295.01' Inflow=1.8 cfs 6,758 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0200 '/' Outflow=1.8 cfs 6,758 cf

Pond CB-3: Peak Elev=288.30' Inflow=1.5 cfs 6,320 cf
12.0" Round Culvert n=0.013 L=8.0' S=0.0125 '/' Outflow=1.5 cfs 6,320 cf

Pond CB-5: Peak Elev=294.65' Inflow=1.2 cfs 4,175 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0570 '/' Outflow=1.2 cfs 4,175 cf

Pond CB-6: Peak Elev=296.04' Inflow=0.9 cfs 3,256 cf
12.0" Round Culvert n=0.013 L=58.0' S=0.1103 '/' Outflow=0.9 cfs 3,256 cf

Pond CB-7: Peak Elev=288.93' Inflow=0.4 cfs 1,599 cf
12.0" Round Culvert n=0.013 L=22.0' S=0.0136 '/' Outflow=0.4 cfs 1,599 cf

Pond CB-8: Peak Elev=288.93' Inflow=0.5 cfs 1,707 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0200 '/' Outflow=0.5 cfs 1,707 cf

Pond CB-9: Peak Elev=286.95' Inflow=0.6 cfs 2,105 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0200 '/' Outflow=0.6 cfs 2,105 cf

Pond DCB-4: Peak Elev=285.71' Inflow=2.3 cfs 8,769 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0429 '/' Outflow=2.3 cfs 8,769 cf

Pond DMH-1: Peak Elev=294.65' Inflow=2.5 cfs 9,134 cf
12.0" Round Culvert n=0.013 L=188.0' S=0.0322 '/' Outflow=2.5 cfs 9,134 cf

Pond DMH-2: Peak Elev=287.98' Inflow=3.8 cfs 15,454 cf
18.0" Round Culvert n=0.013 L=48.0' S=0.0100 '/' Outflow=3.8 cfs 15,454 cf

Pond DMH-3: Peak Elev=285.71' Inflow=2.3 cfs 8,769 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=2.3 cfs 8,763 cf

Pond DMH-5: Peak Elev=289.95' Inflow=2.0 cfs 7,431 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0148 '/' Outflow=2.0 cfs 7,431 cf

Pond DMH-6: Peak Elev=288.93' Inflow=2.4 cfs 9,030 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=2.4 cfs 9,030 cf

Pond DMH-7: Peak Elev=288.92' Inflow=0.5 cfs 1,707 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=0.5 cfs 1,697 cf

Pond DMH-9: Peak Elev=286.08' Inflow=1.3 cfs 4,387 cf
15.0" Round Culvert n=0.013 L=197.0' S=0.0175 '/' Outflow=1.3 cfs 4,387 cf

Pond IB-1: Peak Elev=285.72' Storage=1,069 cf Inflow=4.3 cfs 17,133 cf
Discarded=0.0 cfs 788 cf Primary=1.9 cfs 14,604 cf Secondary=2.2 cfs 1,511 cf Outflow=4.1 cfs 16,903 cf

Pond IB-2: Peak Elev=283.11' Storage=1,243 cf Inflow=1.5 cfs 5,014 cf
Primary=0.9 cfs 4,410 cf Secondary=0.0 cfs 0 cf Outflow=0.9 cfs 4,410 cf

Pond IC-1: Peak Elev=285.71' Storage=6,710 cf Inflow=3.4 cfs 13,060 cf
Discarded=0.1 cfs 7,157 cf Primary=0.0 cfs 0 cf Outflow=0.1 cfs 7,157 cf

Pond IC-2: Peak Elev=288.92' Storage=5,776 cf Inflow=4.3 cfs 16,275 cf
Discarded=0.1 cfs 7,126 cf Primary=1.0 cfs 4,880 cf Outflow=1.1 cfs 12,006 cf

Link AP-1: Inflow=7.0 cfs 32,146 cf
Primary=7.0 cfs 32,146 cf

Total Runoff Area = 270,181 sf Runoff Volume = 58,240 cf Average Runoff Depth = 2.59"
55.08% Pervious = 148,810 sf 44.92% Impervious = 121,371 sf

Summary for Subcatchment SC1.1:

Runoff = 0.7 cfs @ 12.13 hrs, Volume= 2,377 cf, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
4,381	61	>75% Grass cover, Good, HSG B
5,583	55	Woods, Good, HSG B
328	98	Unconnected pavement, HSG B
3,654	98	Paved parking, HSG B
1,269	96	Gravel surface, HSG B
15,215	71	Weighted Average
11,233		73.83% Pervious Area
3,982		26.17% Impervious Area
328		8.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	34	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.9	16	0.1875	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.0	83	0.0361	1.33		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	100	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	233	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC1.2:

Runoff = 1.8 cfs @ 12.16 hrs, Volume= 6,758 cf, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
6,620	61	>75% Grass cover, Good, HSG B
2,398	55	Woods, Good, HSG B
1,172	98	Unconnected pavement, HSG B
8,000	98	Roofs, HSG B
7,203	98	Paved parking, HSG B
1,052	96	Gravel surface, HSG B
26,444	85	Weighted Average
10,069		38.08% Pervious Area
16,375		61.92% Impervious Area
1,172		7.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	41	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
1.4	9	0.0200	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
3.4	222	0.0248	1.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	63	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	335	Total			

Summary for Subcatchment SC1.3:

Runoff = 1.5 cfs @ 12.21 hrs, Volume= 6,320 cf, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
15,029	61	>75% Grass cover, Good, HSG B
3,894	55	Woods, Good, HSG B
1,741	96	Gravel surface, HSG B
275	98	Unconnected pavement, HSG B
12,548	98	Paved parking, HSG B
33,487	76	Weighted Average
20,664		61.71% Pervious Area
12,823		38.29% Impervious Area
275		2.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
3.2	188	0.0372	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	160	0.0372	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	122	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.0	520	Total			

Summary for Subcatchment SC2.1:

Runoff = 0.9 cfs @ 12.13 hrs, Volume= 3,256 cf, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
595	61	>75% Grass cover, Good, HSG B
423	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,263	98	Paved parking, HSG B
9,281	96	Weighted Average
595		6.41% Pervious Area
8,686		93.59% Impervious Area
423		4.87% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC2.2:

Runoff = 1.2 cfs @ 12.15 hrs, Volume= 4,175 cf, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
5,529	61	>75% Grass cover, Good, HSG B
2,637	55	Woods, Good, HSG B
889	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,580	98	Paved parking, HSG B
929	96	Gravel surface, HSG B
18,563	81	Weighted Average
9,094		48.99% Pervious Area
9,469		51.01% Impervious Area
889		9.39% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.2	8	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	151	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	86	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	295	Total			

Summary for Subcatchment SC2.3:

Runoff = 0.6 cfs @ 12.13 hrs, Volume= 2,105 cf, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
7,218	61	>75% Grass cover, Good, HSG B
293	98	Unconnected pavement, HSG B
4,029	98	Paved parking, HSG B
11,540	75	Weighted Average
7,218		62.55% Pervious Area
4,321		37.45% Impervious Area
293		6.77% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	42	0.1430	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.1	8	0.0500	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.12"
0.5	135	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.1:

Runoff = 1.1 cfs @ 12.13 hrs, Volume= 4,297 cf, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
11,615	98	Roofs, HSG B
0	61	>75% Grass cover, Good, HSG B
11,615	98	Weighted Average
0		0.00% Pervious Area
11,615		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.2:

Runoff = 2.3 cfs @ 12.13 hrs, Volume= 8,769 cf, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
2,372	61	>75% Grass cover, Good, HSG B
21,883	98	Paved parking, HSG B
1,422	98	Unconnected pavement, HSG B
25,677	95	Weighted Average
2,372		9.24% Pervious Area
23,305		90.76% Impervious Area
1,422		6.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0380	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.8	68	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.2	118	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.3:

Runoff = 0.5 cfs @ 12.14 hrs, Volume= 1,679 cf, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
13,540	61	>75% Grass cover, Good, HSG B
1,127	96	Gravel surface, HSG B
14,666	64	Weighted Average
14,666		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.9	166	0.0422	1.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	216	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.1:

Runoff = 1.4 cfs @ 12.13 hrs, Volume= 5,548 cf, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
14,998	98	Roofs, HSG B
14,998		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.2:

Runoff = 0.7 cfs @ 12.13 hrs, Volume= 2,282 cf, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
5,060	61	>75% Grass cover, Good, HSG B
1,450	98	Unconnected pavement, HSG B
3,975	98	Paved parking, HSG B
10,484	80	Weighted Average
5,060		48.26% Pervious Area
5,424		51.74% Impervious Area
1,450		26.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.4	33	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	148	0.0440	4.26		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.0	231	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.3:

Runoff = 0.4 cfs @ 12.13 hrs, Volume= 1,599 cf, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
406	61	>75% Grass cover, Good, HSG B
175	98	Unconnected pavement, HSG B
4,101	98	Paved parking, HSG B
4,682	95	Weighted Average
406		8.68% Pervious Area
4,276		91.32% Impervious Area
175		4.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.4:

Runoff = 0.5 cfs @ 12.13 hrs, Volume= 1,707 cf, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
564	61	>75% Grass cover, Good, HSG B
541	98	Unconnected pavement, HSG B
4,030	98	Paved parking, HSG B
5,136	94	Weighted Average
564		10.99% Pervious Area
4,571		89.01% Impervious Area
541		11.83% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.5:

Runoff = 0.2 cfs @ 12.14 hrs, Volume= 628 cf, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
6,391	61	>75% Grass cover, Good, HSG B
6,391		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC5.1:

Runoff = 1.6 cfs @ 12.19 hrs, Volume= 6,742 cf, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
52,172	61	>75% Grass cover, Good, HSG B
5,271	55	Woods, Good, HSG B
70	98	Unconnected pavement, HSG B
1,456	98	Paved parking, HSG B
3,033	96	Gravel surface, HSG B
62,001	63	Weighted Average
60,476		97.54% Pervious Area
1,525		2.46% Impervious Area
70		4.56% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	36	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
2.1	14	0.0200	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
4.1	312	0.0334	1.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.0	362	Total			

Summary for Pond CB-1:

Inflow Area = 15,215 sf, 26.17% Impervious, Inflow Depth > 1.87" for 10-Year event
Inflow = 0.7 cfs @ 12.13 hrs, Volume= 2,377 cf
Outflow = 0.7 cfs @ 12.13 hrs, Volume= 2,377 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.13 hrs, Volume= 2,377 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 297.98' @ 12.13 hrs
Flood Elev= 301.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	297.50'	**12.0" Round Culvert** L= 170.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 297.50' / 293.56' S= 0.0232 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.13 hrs HW=297.97' TW=294.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.7 cfs @ 1.85 fps)

Summary for Pond CB-10:

Inflow Area = 10,484 sf, 51.74% Impervious, Inflow Depth > 2.61" for 10-Year event
Inflow = 0.7 cfs @ 12.13 hrs, Volume= 2,282 cf
Outflow = 0.7 cfs @ 12.13 hrs, Volume= 2,282 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.13 hrs, Volume= 2,282 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.37' @ 12.13 hrs
Flood Elev= 289.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.90'	**12.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.90' / 285.70' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.13 hrs HW=286.36' TW=286.06' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.6 cfs @ 1.83 fps)

Summary for Pond CB-2:

Inflow Area = 26,444 sf, 61.92% Impervious, Inflow Depth > 3.07" for 10-Year event
Inflow = 1.8 cfs @ 12.16 hrs, Volume= 6,758 cf
Outflow = 1.8 cfs @ 12.16 hrs, Volume= 6,758 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.16 hrs, Volume= 6,758 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 295.01' @ 12.15 hrs
Flood Elev= 297.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.70'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.70' / 293.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.8 cfs @ 12.16 hrs HW=294.96' TW=294.61' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.8 cfs @ 2.24 fps)

Summary for Pond CB-3:

Inflow Area = 33,487 sf, 38.29% Impervious, Inflow Depth > 2.26" for 10-Year event
Inflow = 1.5 cfs @ 12.21 hrs, Volume= 6,320 cf
Outflow = 1.5 cfs @ 12.21 hrs, Volume= 6,320 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.21 hrs, Volume= 6,320 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.30' @ 12.21 hrs
Flood Elev= 291.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.50'	**12.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.50' / 287.40' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.5 cfs @ 12.21 hrs HW=288.29' TW=287.92' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 1.5 cfs @ 3.01 fps)

Summary for Pond CB-5:

Inflow Area = 18,563 sf, 51.01% Impervious, Inflow Depth > 2.70" for 10-Year event
Inflow = 1.2 cfs @ 12.15 hrs, Volume= 4,175 cf
Outflow = 1.2 cfs @ 12.15 hrs, Volume= 4,175 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.15 hrs, Volume= 4,175 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 294.65' @ 12.15 hrs
Flood Elev= 298.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	294.00'	**12.0" Round Culvert** L= 86.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 294.00' / 289.10' S= 0.0570 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.2 cfs @ 12.15 hrs HW=294.65' TW=289.94' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.2 cfs @ 2.17 fps)

Summary for Pond CB-6:

Inflow Area = 9,281 sf, 93.59% Impervious, Inflow Depth > 4.21" for 10-Year event
Inflow = 0.9 cfs @ 12.13 hrs, Volume= 3,256 cf
Outflow = 0.9 cfs @ 12.13 hrs, Volume= 3,256 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.13 hrs, Volume= 3,256 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 296.04' @ 12.13 hrs
Flood Elev= 299.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	295.50'	**12.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 295.50' / 289.10' S= 0.1103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.8 cfs @ 12.13 hrs HW=296.03' TW=289.91' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.8 cfs @ 1.95 fps)

Summary for Pond CB-7:

Inflow Area = 4,682 sf, 91.32% Impervious, Inflow Depth > 4.10" for 10-Year event
Inflow = 0.4 cfs @ 12.13 hrs, Volume= 1,599 cf
Outflow = 0.4 cfs @ 12.13 hrs, Volume= 1,599 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.13 hrs, Volume= 1,599 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.93' @ 12.42 hrs
Flood Elev= 292.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.00'	**12.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.00' / 287.70' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.13 hrs HW=288.56' TW=288.62' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.0 cfs)

Summary for Pond CB-8:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 3.99" for 10-Year event
Inflow = 0.5 cfs @ 12.13 hrs, Volume= 1,707 cf
Outflow = 0.5 cfs @ 12.13 hrs, Volume= 1,707 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.13 hrs, Volume= 1,707 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.93' @ 12.42 hrs
Flood Elev= 292.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.50'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.50' / 288.20' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.4 cfs @ 12.13 hrs HW=288.88' TW=288.48' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.4 cfs @ 1.65 fps)

Summary for Pond CB-9:

Inflow Area = 11,540 sf, 37.45% Impervious, Inflow Depth > 2.19" for 10-Year event
Inflow = 0.6 cfs @ 12.13 hrs, Volume= 2,105 cf
Outflow = 0.6 cfs @ 12.13 hrs, Volume= 2,105 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.13 hrs, Volume= 2,105 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.95' @ 12.13 hrs
Flood Elev= 290.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.50' / 285.70' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.13 hrs HW=286.94' TW=286.06' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.6 cfs @ 1.79 fps)

Summary for Pond DCB-4:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 4.10" for 10-Year event
Inflow = 2.3 cfs @ 12.13 hrs, Volume= 8,769 cf
Outflow = 2.3 cfs @ 12.13 hrs, Volume= 8,769 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.3 cfs @ 12.13 hrs, Volume= 8,769 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.71' @ 16.83 hrs
Flood Elev= 288.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 284.20' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.2 cfs @ 12.13 hrs HW=285.57' TW=284.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.2 cfs @ 2.86 fps)

Summary for Pond DMH-1:

Inflow Area = 41,659 sf, 48.86% Impervious, Inflow Depth > 2.63" for 10-Year event
Inflow = 2.5 cfs @ 12.15 hrs, Volume= 9,134 cf
Outflow = 2.5 cfs @ 12.15 hrs, Volume= 9,134 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.15 hrs, Volume= 9,134 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 294.65' @ 12.15 hrs
Flood Elev= 297.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.46'	**12.0" Round Culvert** L= 188.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.46' / 287.40' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.5 cfs @ 12.15 hrs HW=294.64' TW=287.97' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.5 cfs @ 3.14 fps)

Summary for Pond DMH-2:

Inflow Area = 75,146 sf, 44.15% Impervious, Inflow Depth > 2.47" for 10-Year event
Inflow = 3.8 cfs @ 12.17 hrs, Volume= 15,454 cf
Outflow = 3.8 cfs @ 12.17 hrs, Volume= 15,454 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.17 hrs, Volume= 15,454 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 287.98' @ 12.17 hrs
Flood Elev= 291.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.90'	**18.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.90' / 286.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.7 cfs @ 12.17 hrs HW=287.96' TW=285.71' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.7 cfs @ 2.77 fps)

Summary for Pond DMH-3:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 4.10" for 10-Year event
Inflow = 2.3 cfs @ 12.13 hrs, Volume= 8,769 cf
Outflow = 2.3 cfs @ 12.13 hrs, Volume= 8,763 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.3 cfs @ 12.13 hrs, Volume= 8,763 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 285.71' @ 16.79 hrs
Flood Elev= 288.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.10'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.10' / 284.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.3 cfs @ 12.13 hrs HW=284.94' TW=284.71' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.3 cfs @ 1.82 fps)

Summary for Pond DMH-5:

Inflow Area = 27,844 sf, 65.20% Impervious, Inflow Depth > 3.20" for 10-Year event
Inflow = 2.0 cfs @ 12.14 hrs, Volume= 7,431 cf
Outflow = 2.0 cfs @ 12.14 hrs, Volume= 7,431 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.0 cfs @ 12.14 hrs, Volume= 7,431 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.95' @ 12.14 hrs
Flood Elev= 293.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.00'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 289.00' / 287.70' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.0 cfs @ 12.14 hrs HW=289.92' TW=288.66' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.0 cfs @ 2.58 fps)

Summary for Pond DMH-6:

Inflow Area = 32,526 sf, 68.96% Impervious, Inflow Depth > 3.33" for 10-Year event
Inflow = 2.4 cfs @ 12.14 hrs, Volume= 9,030 cf
Outflow = 2.4 cfs @ 12.14 hrs, Volume= 9,030 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.14 hrs, Volume= 9,030 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.93' @ 12.37 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.4 cfs @ 12.14 hrs HW=288.65' TW=288.52' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.4 cfs @ 1.41 fps)

Summary for Pond DMH-7:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 3.99" for 10-Year event
Inflow = 0.5 cfs @ 12.13 hrs, Volume= 1,707 cf
Outflow = 0.5 cfs @ 12.13 hrs, Volume= 1,697 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.13 hrs, Volume= 1,697 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.92' @ 12.38 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.5 cfs @ 12.13 hrs HW=288.48' TW=288.47' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.5 cfs @ 0.34 fps)

Summary for Pond DMH-9:

Inflow Area = 22,024 sf, 44.25% Impervious, Inflow Depth > 2.39" for 10-Year event
Inflow = 1.3 cfs @ 12.13 hrs, Volume= 4,387 cf
Outflow = 1.3 cfs @ 12.13 hrs, Volume= 4,387 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.13 hrs, Volume= 4,387 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.08' @ 12.13 hrs
Flood Elev= 290.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.45'	**15.0" Round Culvert** L= 197.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.45' / 282.00' S= 0.0175 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.13 hrs HW=286.06' TW=283.02' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.2 cfs @ 2.10 fps)

Summary for Pond IB-1:

Inflow Area = 89,812 sf, 36.94% Impervious, Inflow Depth > 2.29" for 10-Year event
Inflow = 4.3 cfs @ 12.16 hrs, Volume= 17,133 cf
Outflow = 4.1 cfs @ 12.19 hrs, Volume= 16,903 cf, Atten= 3%, Lag= 1.5 min
Discarded = 0.0 cfs @ 12.19 hrs, Volume= 788 cf
Primary = 1.9 cfs @ 12.19 hrs, Volume= 14,604 cf
Secondary = 2.2 cfs @ 12.19 hrs, Volume= 1,511 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.72' @ 12.19 hrs Surf.Area= 1,183 sf Storage= 1,069 cf

Plug-Flow detention time= 16.1 min calculated for 16,868 cf (98% of inflow)
Center-of-Mass det. time= 8.4 min (864.8 - 856.4)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	3,366 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)
284.00	208	72.5	0	0	208
285.00	661	129.3	413	413	1,126
286.00	1,425	189.1	1,019	1,432	2,649
287.00	2,492	246.3	1,934	3,366	4,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Secondary	285.50'	**8.0' long x 15.0' 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
#3	Primary	284.50'	**10.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 282.50' S= 0.0667 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Discarded OutFlow Max=0.0 cfs @ 12.19 hrs HW=285.72' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=1.9 cfs @ 12.19 hrs HW=285.72' TW=0.00' (Dynamic Tailwater)
↑**3=Culvert** (Inlet Controls 1.9 cfs @ 3.40 fps)

Secondary OutFlow Max=2.2 cfs @ 12.19 hrs HW=285.72' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 2.2 cfs @ 1.25 fps)

Summary for Pond IB-2:

Inflow Area = 28,415 sf, 34.30% Impervious, Inflow Depth > 2.12" for 10-Year event
Inflow = 1.5 cfs @ 12.13 hrs, Volume= 5,014 cf
Outflow = 0.9 cfs @ 12.22 hrs, Volume= 4,410 cf, Atten= 39%, Lag= 5.2 min
Primary = 0.9 cfs @ 12.22 hrs, Volume= 4,410 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 283.11' @ 12.22 hrs Surf.Area= 1,382 sf Storage= 1,243 cf

Plug-Flow detention time= 100.9 min calculated for 4,400 cf (88% of inflow)
Center-of-Mass det. time= 40.9 min (902.8 - 861.9)

Volume	Invert	Avail.Storage	Storage Description
#1	282.00'	4,792 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)
282.00	870	143.0	0	0	870
283.00	1,328	162.0	1,091	1,091	1,356
284.00	1,843	181.0	1,578	2,669	1,902
285.00	2,414	200.0	2,122	4,792	2,509

Device	Routing	Invert	Outlet Devices
#1	Secondary	284.00'	**10.0' long x 22.0' 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
#2	Primary	282.50'	**10.0" Round Culvert** L= 37.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 282.50' / 278.50' S= 0.1070 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.9 cfs @ 12.22 hrs HW=283.11' TW=0.00' (Dynamic Tailwater)
↑└**2=Culvert** (Inlet Controls 0.9 cfs @ 2.09 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=282.00' TW=0.00' (Dynamic Tailwater)
↑└**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond IC-1:

Inflow Area = 37,292 sf, 93.64% Impervious, Inflow Depth > 4.20" for 10-Year event
Inflow = 3.4 cfs @ 12.13 hrs, Volume= 13,060 cf
Outflow = 0.1 cfs @ 9.60 hrs, Volume= 7,157 cf, Atten= 97%, Lag= 0.0 min
Discarded = 0.1 cfs @ 9.60 hrs, Volume= 7,157 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.71' @ 16.79 hrs Surf.Area= 4,404 sf Storage= 6,710 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 91.6 min (859.4 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.50'	3,942 cf	**53.75'W x 81.94'L x 3.50'H Field A** 15,414 cf Overall - 5,559 cf Embedded = 9,856 cf x 40.0% Voids
#2A	284.00'	5,559 cf	**ADS_StormTech SC-740 +Cap** x 121 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 121 Chambers in 11 Rows
		9,501 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	283.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	285.70'	**12.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.70' / 279.00' S= 0.1264 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	286.00'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 9.60 hrs HW=283.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=283.50' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.0 cfs)
└**3=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond IC-2:

Inflow Area = 52,660 sf, 79.76% Impervious, Inflow Depth > 3.71" for 10-Year event
Inflow = 4.3 cfs @ 12.13 hrs, Volume= 16,275 cf
Outflow = 1.1 cfs @ 12.38 hrs, Volume= 12,006 cf, Atten= 74%, Lag= 14.8 min
Discarded = 0.1 cfs @ 9.30 hrs, Volume= 7,126 cf
Primary = 1.0 cfs @ 12.38 hrs, Volume= 4,880 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.92' @ 12.38 hrs Surf.Area= 4,361 sf Storage= 5,776 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.8 min (842.0 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	287.00'	3,901 cf	**39.50'W x 110.42'L x 3.50'H Field A** 15,265 cf Overall - 5,513 cf Embedded = 9,752 cf x 40.0% Voids
#2A	287.50'	5,513 cf	**ADS_StormTech SC-740 +Cap** x 120 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 8 Rows
		9,414 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	287.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	288.30'	**12.0" Round Culvert**
			L= 120.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 288.30' / 279.00' S= 0.0775 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	288.50'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 9.30 hrs HW=287.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.0 cfs @ 12.38 hrs HW=288.92' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 1.0 cfs of 1.1 cfs potential flow)
└**3=Orifice/Grate** (Orifice Controls 1.0 cfs @ 2.20 fps)

Summary for Link AP-1:

Inflow Area = 270,181 sf, 44.92% Impervious, Inflow Depth > 1.43" for 10-Year event
Inflow = 7.0 cfs @ 12.20 hrs, Volume= 32,146 cf
Primary = 7.0 cfs @ 12.20 hrs, Volume= 32,146 cf, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.1: Runoff Area=15,215 sf 26.17% Impervious Runoff Depth>3.72"
Flow Length=233' Tc=6.0 min CN=71 Runoff=1.4 cfs 4,714 cf

Subcatchment SC1.2: Runoff Area=26,444 sf 61.92% Impervious Runoff Depth>5.24"
Flow Length=335' Tc=9.0 min CN=85 Runoff=3.0 cfs 11,551 cf

Subcatchment SC1.3: Runoff Area=33,487 sf 38.29% Impervious Runoff Depth>4.24"
Flow Length=520' Tc=13.0 min CN=76 Runoff=2.8 cfs 11,836 cf

Subcatchment SC2.1: Runoff Area=9,281 sf 93.59% Impervious Runoff Depth>6.52"
Tc=6.0 min CN=96 Runoff=1.3 cfs 5,040 cf

Subcatchment SC2.2: Runoff Area=18,563 sf 51.01% Impervious Runoff Depth>4.80"
Flow Length=295' Tc=7.8 min CN=81 Runoff=2.0 cfs 7,419 cf

Subcatchment SC2.3: Runoff Area=11,540 sf 37.45% Impervious Runoff Depth>4.14"
Flow Length=185' Tc=6.0 min CN=75 Runoff=1.2 cfs 3,984 cf

Subcatchment SC3.1: Runoff Area=11,615 sf 100.00% Impervious Runoff Depth>6.75"
Tc=6.0 min CN=98 Runoff=1.6 cfs 6,537 cf

Subcatchment SC3.2: Runoff Area=25,677 sf 90.76% Impervious Runoff Depth>6.40"
Flow Length=118' Slope=0.0380 '/' Tc=6.0 min CN=95 Runoff=3.6 cfs 13,692 cf

Subcatchment SC3.3: Runoff Area=14,666 sf 0.00% Impervious Runoff Depth>3.00"
Flow Length=216' Tc=6.0 min CN=64 Runoff=1.1 cfs 3,662 cf

Subcatchment SC4.1: Runoff Area=14,998 sf 100.00% Impervious Runoff Depth>6.75"
Tc=6.0 min CN=98 Runoff=2.1 cfs 8,442 cf

Subcatchment SC4.2: Runoff Area=10,484 sf 51.74% Impervious Runoff Depth>4.69"
Flow Length=231' Tc=6.0 min CN=80 Runoff=1.2 cfs 4,096 cf

Subcatchment SC4.3: Runoff Area=4,682 sf 91.32% Impervious Runoff Depth>6.40"
Tc=6.0 min CN=95 Runoff=0.7 cfs 2,497 cf

Subcatchment SC4.4: Runoff Area=5,136 sf 89.01% Impervious Runoff Depth>6.28"
Tc=6.0 min CN=94 Runoff=0.7 cfs 2,688 cf

Subcatchment SC4.5: Runoff Area=6,391 sf 0.00% Impervious Runoff Depth>2.70"
Tc=6.0 min CN=61 Runoff=0.4 cfs 1,436 cf

Subcatchment SC5.1: Runoff Area=62,001 sf 2.46% Impervious Runoff Depth>2.89"
Flow Length=362' Tc=10.0 min CN=63 Runoff=3.8 cfs 14,937 cf

Pond CB-1: Peak Elev=298.23' Inflow=1.4 cfs 4,714 cf
12.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=1.4 cfs 4,714 cf

Pond CB-10: Peak Elev=286.61' Inflow=1.2 cfs 4,096 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=1.2 cfs 4,096 cf

Pond CB-2: Peak Elev=297.08' Inflow=3.0 cfs 11,551 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0200 '/' Outflow=3.0 cfs 11,551 cf

Pond CB-3: Peak Elev=289.45' Inflow=2.8 cfs 11,836 cf
12.0" Round Culvert n=0.013 L=8.0' S=0.0125 '/' Outflow=2.8 cfs 11,836 cf

Pond CB-5: Peak Elev=294.96' Inflow=2.0 cfs 7,419 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0570 '/' Outflow=2.0 cfs 7,419 cf

Pond CB-6: Peak Elev=296.19' Inflow=1.3 cfs 5,040 cf
12.0" Round Culvert n=0.013 L=58.0' S=0.1103 '/' Outflow=1.3 cfs 5,040 cf

Pond CB-7: Peak Elev=289.87' Inflow=0.7 cfs 2,497 cf
12.0" Round Culvert n=0.013 L=22.0' S=0.0136 '/' Outflow=0.7 cfs 2,497 cf

Pond CB-8: Peak Elev=289.85' Inflow=0.7 cfs 2,688 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0200 '/' Outflow=0.7 cfs 2,688 cf

Pond CB-9: Peak Elev=287.15' Inflow=1.2 cfs 3,984 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0200 '/' Outflow=1.2 cfs 3,984 cf

Pond DCB-4: Peak Elev=286.90' Inflow=3.6 cfs 13,692 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0429 '/' Outflow=3.6 cfs 13,692 cf

Pond DMH-1: Peak Elev=296.08' Inflow=4.3 cfs 16,264 cf
12.0" Round Culvert n=0.013 L=188.0' S=0.0322 '/' Outflow=4.3 cfs 16,264 cf

Pond DMH-2: Peak Elev=288.69' Inflow=6.8 cfs 28,101 cf
18.0" Round Culvert n=0.013 L=48.0' S=0.0100 '/' Outflow=6.8 cfs 28,101 cf

Pond DMH-3: Peak Elev=286.49' Inflow=3.6 cfs 13,692 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=3.6 cfs 13,684 cf

Pond DMH-5: Peak Elev=290.72' Inflow=3.3 cfs 12,459 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0148 '/' Outflow=3.3 cfs 12,459 cf

Pond DMH-6: Peak Elev=289.87' Inflow=4.0 cfs 14,956 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=4.0 cfs 14,956 cf

Pond DMH-7: Peak Elev=289.85' Inflow=0.7 cfs 2,688 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=0.7 cfs 2,680 cf

Pond DMH-9: Peak Elev=286.34' Inflow=2.4 cfs 8,080 cf
15.0" Round Culvert n=0.013 L=197.0' S=0.0175 '/' Outflow=2.4 cfs 8,080 cf

Pond IB-1: Peak Elev=285.90' Storage=1,300 cf Inflow=7.9 cfs 31,762 cf
Discarded=0.0 cfs 946 cf Primary=2.1 cfs 24,858 cf Secondary=5.6 cfs 5,699 cf Outflow=7.6 cfs 31,502 cf

Pond IB-2: Peak Elev=283.53' Storage=1,860 cf Inflow=2.8 cfs 9,517 cf
Primary=1.6 cfs 8,876 cf Secondary=0.0 cfs 0 cf Outflow=1.6 cfs 8,876 cf

Pond IC-1: Peak Elev=286.49' Storage=8,594 cf Inflow=5.2 cfs 20,221 cf
Discarded=0.1 cfs 7,929 cf Primary=0.8 cfs 4,784 cf Outflow=0.9 cfs 12,713 cf

Pond IC-2: Peak Elev=289.85' Storage=8,264 cf Inflow=6.8 cfs 26,078 cf
Discarded=0.1 cfs 7,884 cf Primary=3.1 cfs 13,596 cf Outflow=3.2 cfs 21,480 cf

Link AP-1: Inflow=15.8 cfs 72,751 cf
Primary=15.8 cfs 72,751 cf

Total Runoff Area = 270,181 sf Runoff Volume = 102,532 cf Average Runoff Depth = 4.55"
55.08% Pervious = 148,810 sf 44.92% Impervious = 121,371 sf

Summary for Subcatchment SC1.1:

Runoff = 1.4 cfs @ 12.13 hrs, Volume= 4,714 cf, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
4,381	61	>75% Grass cover, Good, HSG B
5,583	55	Woods, Good, HSG B
328	98	Unconnected pavement, HSG B
3,654	98	Paved parking, HSG B
1,269	96	Gravel surface, HSG B
15,215	71	Weighted Average
11,233		73.83% Pervious Area
3,982		26.17% Impervious Area
328		8.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	34	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.9	16	0.1875	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.0	83	0.0361	1.33		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	100	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	233	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC1.2:

Runoff = 3.0 cfs @ 12.16 hrs, Volume= 11,551 cf, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
6,620	61	>75% Grass cover, Good, HSG B
2,398	55	Woods, Good, HSG B
1,172	98	Unconnected pavement, HSG B
8,000	98	Roofs, HSG B
7,203	98	Paved parking, HSG B
1,052	96	Gravel surface, HSG B
26,444	85	Weighted Average
10,069		38.08% Pervious Area
16,375		61.92% Impervious Area
1,172		7.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	41	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
1.4	9	0.0200	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
3.4	222	0.0248	1.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	63	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	335	Total			

Summary for Subcatchment SC1.3:

Runoff = 2.8 cfs @ 12.21 hrs, Volume= 11,836 cf, Depth> 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
15,029	61	>75% Grass cover, Good, HSG B
3,894	55	Woods, Good, HSG B
1,741	96	Gravel surface, HSG B
275	98	Unconnected pavement, HSG B
12,548	98	Paved parking, HSG B
33,487	76	Weighted Average
20,664		61.71% Pervious Area
12,823		38.29% Impervious Area
275		2.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
3.2	188	0.0372	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	160	0.0372	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	122	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.0	520	Total			

Summary for Subcatchment SC2.1:

Runoff = 1.3 cfs @ 12.13 hrs, Volume= 5,040 cf, Depth> 6.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
595	61	>75% Grass cover, Good, HSG B
423	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,263	98	Paved parking, HSG B
9,281	96	Weighted Average
595		6.41% Pervious Area
8,686		93.59% Impervious Area
423		4.87% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC2.2:

Runoff = 2.0 cfs @ 12.15 hrs, Volume= 7,419 cf, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
5,529	61	>75% Grass cover, Good, HSG B
2,637	55	Woods, Good, HSG B
889	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,580	98	Paved parking, HSG B
929	96	Gravel surface, HSG B
18,563	81	Weighted Average
9,094		48.99% Pervious Area
9,469		51.01% Impervious Area
889		9.39% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.2	8	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	151	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	86	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	295	Total			

Summary for Subcatchment SC2.3:

Runoff = 1.2 cfs @ 12.13 hrs, Volume= 3,984 cf, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
7,218	61	>75% Grass cover, Good, HSG B
293	98	Unconnected pavement, HSG B
4,029	98	Paved parking, HSG B
11,540	75	Weighted Average
7,218		62.55% Pervious Area
4,321		37.45% Impervious Area
293		6.77% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	42	0.1430	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.1	8	0.0500	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.12"
0.5	135	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.1:

Runoff = 1.6 cfs @ 12.13 hrs, Volume= 6,537 cf, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
11,615	98	Roofs, HSG B
0	61	>75% Grass cover, Good, HSG B
11,615	98	Weighted Average
0		0.00% Pervious Area
11,615		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.2:

Runoff = 3.6 cfs @ 12.13 hrs, Volume= 13,692 cf, Depth> 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
2,372	61	>75% Grass cover, Good, HSG B
21,883	98	Paved parking, HSG B
1,422	98	Unconnected pavement, HSG B
25,677	95	Weighted Average
2,372		9.24% Pervious Area
23,305		90.76% Impervious Area
1,422		6.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0380	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.8	68	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.2	118	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.3:

Runoff = 1.1 cfs @ 12.13 hrs, Volume= 3,662 cf, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
13,540	61	>75% Grass cover, Good, HSG B
1,127	96	Gravel surface, HSG B
14,666	64	Weighted Average
14,666		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.9	166	0.0422	1.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	216	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.1:

Runoff = 2.1 cfs @ 12.13 hrs, Volume= 8,442 cf, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
14,998	98	Roofs, HSG B
14,998		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.2:

Runoff = 1.2 cfs @ 12.13 hrs, Volume= 4,096 cf, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
5,060	61	>75% Grass cover, Good, HSG B
1,450	98	Unconnected pavement, HSG B
3,975	98	Paved parking, HSG B
10,484	80	Weighted Average
5,060		48.26% Pervious Area
5,424		51.74% Impervious Area
1,450		26.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.4	33	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	148	0.0440	4.26		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.0	231	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.3:

Runoff = 0.7 cfs @ 12.13 hrs, Volume= 2,497 cf, Depth> 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
406	61	>75% Grass cover, Good, HSG B
175	98	Unconnected pavement, HSG B
4,101	98	Paved parking, HSG B
4,682	95	Weighted Average
406		8.68% Pervious Area
4,276		91.32% Impervious Area
175		4.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.4:

Runoff = 0.7 cfs @ 12.13 hrs, Volume= 2,688 cf, Depth> 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
564	61	>75% Grass cover, Good, HSG B
541	98	Unconnected pavement, HSG B
4,030	98	Paved parking, HSG B
5,136	94	Weighted Average
564		10.99% Pervious Area
4,571		89.01% Impervious Area
541		11.83% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.5:

Runoff = 0.4 cfs @ 12.13 hrs, Volume= 1,436 cf, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
6,391	61	>75% Grass cover, Good, HSG B
6,391		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC5.1:

Runoff = 3.8 cfs @ 12.18 hrs, Volume= 14,937 cf, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
52,172	61	>75% Grass cover, Good, HSG B
5,271	55	Woods, Good, HSG B
70	98	Unconnected pavement, HSG B
1,456	98	Paved parking, HSG B
3,033	96	Gravel surface, HSG B
62,001	63	Weighted Average
60,476		97.54% Pervious Area
1,525		2.46% Impervious Area
70		4.56% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	36	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
2.1	14	0.0200	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
4.1	312	0.0334	1.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.0	362	Total			

Summary for Pond CB-1:

Inflow Area = 15,215 sf, 26.17% Impervious, Inflow Depth > 3.72" for 50-Year event
Inflow = 1.4 cfs @ 12.13 hrs, Volume= 4,714 cf
Outflow = 1.4 cfs @ 12.13 hrs, Volume= 4,714 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.13 hrs, Volume= 4,714 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 298.23' @ 12.13 hrs
Flood Elev= 301.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	297.50'	**12.0" Round Culvert** L= 170.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 297.50' / 293.56' S= 0.0232 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.3 cfs @ 12.13 hrs HW=298.21' TW=295.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.3 cfs @ 2.26 fps)

Summary for Pond CB-10:

Inflow Area = 10,484 sf, 51.74% Impervious, Inflow Depth > 4.69" for 50-Year event
Inflow = 1.2 cfs @ 12.13 hrs, Volume= 4,096 cf
Outflow = 1.2 cfs @ 12.13 hrs, Volume= 4,096 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.13 hrs, Volume= 4,096 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.61' @ 12.13 hrs
Flood Elev= 289.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.90'	**12.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.90' / 285.70' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.1 cfs @ 12.13 hrs HW=286.59' TW=286.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.1 cfs @ 1.98 fps)

Summary for Pond CB-2:

Inflow Area = 26,444 sf, 61.92% Impervious, Inflow Depth > 5.24" for 50-Year event
Inflow = 3.0 cfs @ 12.16 hrs, Volume= 11,551 cf
Outflow = 3.0 cfs @ 12.16 hrs, Volume= 11,551 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.0 cfs @ 12.16 hrs, Volume= 11,551 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 297.08' @ 12.15 hrs
Flood Elev= 297.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.70'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.70' / 293.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.9 cfs @ 12.16 hrs HW=296.94' TW=295.97' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.9 cfs @ 3.74 fps)

Summary for Pond CB-3:

Inflow Area = 33,487 sf, 38.29% Impervious, Inflow Depth > 4.24" for 50-Year event
Inflow = 2.8 cfs @ 12.21 hrs, Volume= 11,836 cf
Outflow = 2.8 cfs @ 12.21 hrs, Volume= 11,836 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.8 cfs @ 12.21 hrs, Volume= 11,836 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.45' @ 12.18 hrs
Flood Elev= 291.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.50'	**12.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.50' / 287.40' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.7 cfs @ 12.21 hrs HW=289.36' TW=288.51' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.7 cfs @ 3.49 fps)

Summary for Pond CB-5:

Inflow Area = 18,563 sf, 51.01% Impervious, Inflow Depth > 4.80" for 50-Year event
Inflow = 2.0 cfs @ 12.15 hrs, Volume= 7,419 cf
Outflow = 2.0 cfs @ 12.15 hrs, Volume= 7,419 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.0 cfs @ 12.15 hrs, Volume= 7,419 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 294.96' @ 12.15 hrs
Flood Elev= 298.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	294.00'	**12.0" Round Culvert** L= 86.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 294.00' / 289.10' S= 0.0570 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.0 cfs @ 12.15 hrs HW=294.96' TW=290.71' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.0 cfs @ 2.63 fps)

Summary for Pond CB-6:

Inflow Area = 9,281 sf, 93.59% Impervious, Inflow Depth > 6.52" for 50-Year event
Inflow = 1.3 cfs @ 12.13 hrs, Volume= 5,040 cf
Outflow = 1.3 cfs @ 12.13 hrs, Volume= 5,040 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.13 hrs, Volume= 5,040 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 296.19' @ 12.13 hrs
Flood Elev= 299.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	295.50'	**12.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 295.50' / 289.10' S= 0.1103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.2 cfs @ 12.13 hrs HW=296.17' TW=290.61' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.2 cfs @ 2.21 fps)

Summary for Pond CB-7:

Inflow Area = 4,682 sf, 91.32% Impervious, Inflow Depth > 6.40" for 50-Year event
Inflow = 0.7 cfs @ 12.13 hrs, Volume= 2,497 cf
Outflow = 0.7 cfs @ 12.13 hrs, Volume= 2,497 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.13 hrs, Volume= 2,497 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.87' @ 12.31 hrs
Flood Elev= 292.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.00'	**12.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.00' / 287.70' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.13 hrs HW=289.35' TW=289.53' (Dynamic Tailwater)
1=Culvert (Controls 0.0 cfs)

Summary for Pond CB-8:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 6.28" for 50-Year event
Inflow = 0.7 cfs @ 12.13 hrs, Volume= 2,688 cf
Outflow = 0.7 cfs @ 12.13 hrs, Volume= 2,688 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.13 hrs, Volume= 2,688 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.85' @ 12.31 hrs
Flood Elev= 292.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.50'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.50' / 288.20' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.13 hrs HW=289.27' TW=289.43' (Dynamic Tailwater)
1=Culvert (Controls 0.0 cfs)

Summary for Pond CB-9:

Inflow Area = 11,540 sf, 37.45% Impervious, Inflow Depth > 4.14" for 50-Year event
Inflow = 1.2 cfs @ 12.13 hrs, Volume= 3,984 cf
Outflow = 1.2 cfs @ 12.13 hrs, Volume= 3,984 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.13 hrs, Volume= 3,984 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 287.15' @ 12.13 hrs
Flood Elev= 290.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.50' / 285.70' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.1 cfs @ 12.13 hrs HW=287.13' TW=286.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.1 cfs @ 2.14 fps)

Summary for Pond DCB-4:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 6.40" for 50-Year event
Inflow = 3.6 cfs @ 12.13 hrs, Volume= 13,692 cf
Outflow = 3.6 cfs @ 12.13 hrs, Volume= 13,692 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.13 hrs, Volume= 13,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.90' @ 12.14 hrs
Flood Elev= 288.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 284.20' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.1 cfs @ 12.13 hrs HW=286.78' TW=285.69' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.1 cfs @ 3.97 fps)

Summary for Pond DMH-1:

Inflow Area = 41,659 sf, 48.86% Impervious, Inflow Depth > 4.68" for 50-Year event
Inflow = 4.3 cfs @ 12.15 hrs, Volume= 16,264 cf
Outflow = 4.3 cfs @ 12.15 hrs, Volume= 16,264 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.3 cfs @ 12.15 hrs, Volume= 16,264 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 296.08' @ 12.15 hrs
Flood Elev= 297.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.46'	**12.0" Round Culvert** L= 188.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.46' / 287.40' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.3 cfs @ 12.15 hrs HW=296.06' TW=288.66' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.3 cfs @ 5.51 fps)

Summary for Pond DMH-2:

Inflow Area = 75,146 sf, 44.15% Impervious, Inflow Depth > 4.49" for 50-Year event
Inflow = 6.8 cfs @ 12.16 hrs, Volume= 28,101 cf
Outflow = 6.8 cfs @ 12.16 hrs, Volume= 28,101 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.8 cfs @ 12.16 hrs, Volume= 28,101 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.69' @ 12.16 hrs
Flood Elev= 291.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.90'	**18.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.90' / 286.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.7 cfs @ 12.16 hrs HW=288.64' TW=285.90' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.7 cfs @ 3.79 fps)

Summary for Pond DMH-3:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 6.40" for 50-Year event
Inflow = 3.6 cfs @ 12.13 hrs, Volume= 13,692 cf
Outflow = 3.6 cfs @ 12.13 hrs, Volume= 13,684 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.13 hrs, Volume= 13,684 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 286.49' @ 12.55 hrs
Flood Elev= 288.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.10'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.10' / 284.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.5 cfs @ 12.13 hrs HW=285.69' TW=285.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.5 cfs @ 1.29 fps)

Summary for Pond DMH-5:

Inflow Area = 27,844 sf, 65.20% Impervious, Inflow Depth > 5.37" for 50-Year event
Inflow = 3.3 cfs @ 12.14 hrs, Volume= 12,459 cf
Outflow = 3.3 cfs @ 12.14 hrs, Volume= 12,459 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.3 cfs @ 12.14 hrs, Volume= 12,459 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.72' @ 12.14 hrs
Flood Elev= 293.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.00'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 289.00' / 287.70' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.0 cfs @ 12.14 hrs HW=290.67' TW=289.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.0 cfs @ 3.84 fps)

Summary for Pond DMH-6:

Inflow Area = 32,526 sf, 68.96% Impervious, Inflow Depth > 5.52" for 50-Year event
Inflow = 4.0 cfs @ 12.14 hrs, Volume= 14,956 cf
Outflow = 4.0 cfs @ 12.14 hrs, Volume= 14,956 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.0 cfs @ 12.14 hrs, Volume= 14,956 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.87' @ 12.25 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.9 cfs @ 12.14 hrs HW=289.59' TW=289.48' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.9 cfs @ 1.24 fps)

Summary for Pond DMH-7:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 6.28" for 50-Year event
Inflow = 0.7 cfs @ 12.13 hrs, Volume= 2,688 cf
Outflow = 0.7 cfs @ 12.13 hrs, Volume= 2,680 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.13 hrs, Volume= 2,680 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.85' @ 12.26 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.7 cfs @ 12.13 hrs HW=289.43' TW=289.43' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.7 cfs @ 0.23 fps)

Summary for Pond DMH-9:

Inflow Area = 22,024 sf, 44.25% Impervious, Inflow Depth > 4.40" for 50-Year event
Inflow = 2.4 cfs @ 12.13 hrs, Volume= 8,080 cf
Outflow = 2.4 cfs @ 12.13 hrs, Volume= 8,080 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.13 hrs, Volume= 8,080 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.34' @ 12.13 hrs
Flood Elev= 290.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.45'	**15.0" Round Culvert** L= 197.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.45' / 282.00' S= 0.0175 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.3 cfs @ 12.13 hrs HW=286.32' TW=283.37' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.3 cfs @ 2.50 fps)

Summary for Pond IB-1:

Inflow Area = 89,812 sf, 36.94% Impervious, Inflow Depth > 4.24" for 50-Year event
Inflow = 7.9 cfs @ 12.16 hrs, Volume= 31,762 cf
Outflow = 7.6 cfs @ 12.18 hrs, Volume= 31,502 cf, Atten= 3%, Lag= 1.2 min
Discarded = 0.0 cfs @ 12.18 hrs, Volume= 946 cf
Primary = 2.1 cfs @ 12.18 hrs, Volume= 24,858 cf
Secondary = 5.6 cfs @ 12.18 hrs, Volume= 5,699 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 285.90' @ 12.18 hrs Surf.Area= 1,340 sf Storage= 1,300 cf

Plug-Flow detention time= 11.5 min calculated for 31,437 cf (99% of inflow)
Center-of-Mass det. time= 6.7 min (842.0 - 835.4)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	3,366 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)
284.00	208	72.5	0	0	208
285.00	661	129.3	413	413	1,126
286.00	1,425	189.1	1,019	1,432	2,649
287.00	2,492	246.3	1,934	3,366	4,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Secondary	285.50'	**8.0' long x 15.0' 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
#3	Primary	284.50'	**10.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 282.50' S= 0.0667 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Discarded OutFlow Max=0.0 cfs @ 12.18 hrs HW=285.90' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=2.1 cfs @ 12.18 hrs HW=285.90' TW=0.00' (Dynamic Tailwater)
↑**3=Culvert** (Inlet Controls 2.1 cfs @ 3.76 fps)

Secondary OutFlow Max=5.4 cfs @ 12.18 hrs HW=285.90' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 5.4 cfs @ 1.70 fps)

Summary for Pond IB-2:

Inflow Area = 28,415 sf, 34.30% Impervious, Inflow Depth > 4.02" for 50-Year event
Inflow = 2.8 cfs @ 12.13 hrs, Volume= 9,517 cf
Outflow = 1.6 cfs @ 12.22 hrs, Volume= 8,876 cf, Atten= 42%, Lag= 5.5 min
Primary = 1.6 cfs @ 12.22 hrs, Volume= 8,876 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 283.53' @ 12.22 hrs Surf.Area= 1,589 sf Storage= 1,860 cf

Plug-Flow detention time= 67.8 min calculated for 8,876 cf (93% of inflow)
Center-of-Mass det. time= 31.2 min (870.7 - 839.5)

Volume	Invert	Avail.Storage	Storage Description
#1	282.00'	4,792 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)
282.00	870	143.0	0	0	870
283.00	1,328	162.0	1,091	1,091	1,356
284.00	1,843	181.0	1,578	2,669	1,902
285.00	2,414	200.0	2,122	4,792	2,509

Device	Routing	Invert	Outlet Devices
#1	Secondary	284.00'	**10.0' long x 22.0' 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
#2	Primary	282.50'	**10.0" Round Culvert** L= 37.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 282.50' / 278.50' S= 0.1070 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.6 cfs @ 12.22 hrs HW=283.52' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Inlet Controls 1.6 cfs @ 2.94 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=282.00' TW=0.00' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond IC-1:

Inflow Area = 37,292 sf, 93.64% Impervious, Inflow Depth > 6.51" for 50-Year event
Inflow = 5.2 cfs @ 12.13 hrs, Volume= 20,221 cf
Outflow = 0.9 cfs @ 12.55 hrs, Volume= 12,713 cf, Atten= 83%, Lag= 25.5 min
Discarded = 0.1 cfs @ 7.25 hrs, Volume= 7,929 cf
Primary = 0.8 cfs @ 12.55 hrs, Volume= 4,784 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.49' @ 12.55 hrs Surf.Area= 4,404 sf Storage= 8,594 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.6 min (819.9 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.50'	3,942 cf	**53.75'W x 81.94'L x 3.50'H Field A** 15,414 cf Overall - 5,559 cf Embedded = 9,856 cf x 40.0% Voids
#2A	284.00'	5,559 cf	**ADS_StormTech SC-740 +Cap** x 121 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 121 Chambers in 11 Rows
		9,501 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	283.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	285.70'	**12.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.70' / 279.00' S= 0.1264 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	286.00'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 7.25 hrs HW=283.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.8 cfs @ 12.55 hrs HW=286.48' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 0.8 cfs of 1.6 cfs potential flow)
↑**3=Orifice/Grate** (Orifice Controls 0.8 cfs @ 2.37 fps)

Summary for Pond IC-2:

Inflow Area = 52,660 sf, 79.76% Impervious, Inflow Depth > 5.94" for 50-Year event
Inflow = 6.8 cfs @ 12.13 hrs, Volume= 26,078 cf
Outflow = 3.2 cfs @ 12.26 hrs, Volume= 21,480 cf, Atten= 53%, Lag= 7.7 min
Discarded = 0.1 cfs @ 6.95 hrs, Volume= 7,884 cf
Primary = 3.1 cfs @ 12.26 hrs, Volume= 13,596 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.85' @ 12.26 hrs Surf.Area= 4,361 sf Storage= 8,264 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 44.2 min (817.8 - 773.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	287.00'	3,901 cf	**39.50'W x 110.42'L x 3.50'H Field A** 15,265 cf Overall - 5,513 cf Embedded = 9,752 cf x 40.0% Voids
#2A	287.50'	5,513 cf	**ADS_StormTech SC-740 +Cap** x 120 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 8 Rows
		9,414 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	287.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	288.30'	**12.0" Round Culvert**
			L= 120.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 288.30' / 279.00' S= 0.0775 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	288.50'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 6.95 hrs HW=287.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=3.0 cfs @ 12.26 hrs HW=289.84' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 3.0 cfs @ 3.87 fps)
└**3=Orifice/Grate** (Passes 3.0 cfs of 3.4 cfs potential flow)

Summary for Link AP-1:

Inflow Area = 270,181 sf, 44.92% Impervious, Inflow Depth > 3.23" for 50-Year event
Inflow = 15.8 cfs @ 12.19 hrs, Volume= 72,751 cf
Primary = 15.8 cfs @ 12.19 hrs, Volume= 72,751 cf, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SC1.1: Runoff Area=15,215 sf 26.17% Impervious Runoff Depth>4.87"
Flow Length=233' Tc=6.0 min CN=71 Runoff=1.8 cfs 6,173 cf

Subcatchment SC1.2: Runoff Area=26,444 sf 61.92% Impervious Runoff Depth>6.53"
Flow Length=335' Tc=9.0 min CN=85 Runoff=3.7 cfs 14,386 cf

Subcatchment SC1.3: Runoff Area=33,487 sf 38.29% Impervious Runoff Depth>5.45"
Flow Length=520' Tc=13.0 min CN=76 Runoff=3.5 cfs 15,206 cf

Subcatchment SC2.1: Runoff Area=9,281 sf 93.59% Impervious Runoff Depth>7.85"
Tc=6.0 min CN=96 Runoff=1.6 cfs 6,073 cf

Subcatchment SC2.2: Runoff Area=18,563 sf 51.01% Impervious Runoff Depth>6.05"
Flow Length=295' Tc=7.8 min CN=81 Runoff=2.6 cfs 9,363 cf

Subcatchment SC2.3: Runoff Area=11,540 sf 37.45% Impervious Runoff Depth>5.34"
Flow Length=185' Tc=6.0 min CN=75 Runoff=1.5 cfs 5,137 cf

Subcatchment SC3.1: Runoff Area=11,615 sf 100.00% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=98 Runoff=2.0 cfs 7,832 cf

Subcatchment SC3.2: Runoff Area=25,677 sf 90.76% Impervious Runoff Depth>7.73"
Flow Length=118' Slope=0.0380 '/' Tc=6.0 min CN=95 Runoff=4.3 cfs 16,544 cf

Subcatchment SC3.3: Runoff Area=14,666 sf 0.00% Impervious Runoff Depth>4.05"
Flow Length=216' Tc=6.0 min CN=64 Runoff=1.5 cfs 4,947 cf

Subcatchment SC4.1: Runoff Area=14,998 sf 100.00% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=98 Runoff=2.5 cfs 10,114 cf

Subcatchment SC4.2: Runoff Area=10,484 sf 51.74% Impervious Runoff Depth>5.94"
Flow Length=231' Tc=6.0 min CN=80 Runoff=1.5 cfs 5,187 cf

Subcatchment SC4.3: Runoff Area=4,682 sf 91.32% Impervious Runoff Depth>7.73"
Tc=6.0 min CN=95 Runoff=0.8 cfs 3,017 cf

Subcatchment SC4.4: Runoff Area=5,136 sf 89.01% Impervious Runoff Depth>7.61"
Tc=6.0 min CN=94 Runoff=0.9 cfs 3,258 cf

Subcatchment SC4.5: Runoff Area=6,391 sf 0.00% Impervious Runoff Depth>3.70"
Tc=6.0 min CN=61 Runoff=0.6 cfs 1,970 cf

Subcatchment SC5.1: Runoff Area=62,001 sf 2.46% Impervious Runoff Depth>3.93"
Flow Length=362' Tc=10.0 min CN=63 Runoff=5.2 cfs 20,281 cf

Pond CB-1: Peak Elev=298.38' Inflow=1.8 cfs 6,173 cf
12.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=1.8 cfs 6,173 cf

Pond CB-10: Peak Elev=286.78' Inflow=1.5 cfs 5,187 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=1.5 cfs 5,187 cf

Pond CB-2: Peak Elev=298.79' Inflow=3.7 cfs 14,386 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0200 '/' Outflow=3.7 cfs 14,386 cf

Pond CB-3: Peak Elev=290.54' Inflow=3.5 cfs 15,206 cf
12.0" Round Culvert n=0.013 L=8.0' S=0.0125 '/' Outflow=3.5 cfs 15,206 cf

Pond CB-5: Peak Elev=295.23' Inflow=2.6 cfs 9,363 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0570 '/' Outflow=2.6 cfs 9,363 cf

Pond CB-6: Peak Elev=296.28' Inflow=1.6 cfs 6,073 cf
12.0" Round Culvert n=0.013 L=58.0' S=0.1103 '/' Outflow=1.6 cfs 6,073 cf

Pond CB-7: Peak Elev=290.53' Inflow=0.8 cfs 3,017 cf
12.0" Round Culvert n=0.013 L=22.0' S=0.0136 '/' Outflow=0.8 cfs 3,017 cf

Pond CB-8: Peak Elev=290.50' Inflow=0.9 cfs 3,258 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0200 '/' Outflow=0.9 cfs 3,258 cf

Pond CB-9: Peak Elev=287.26' Inflow=1.5 cfs 5,137 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0200 '/' Outflow=1.5 cfs 5,137 cf

Pond DCB-4: Peak Elev=288.05' Inflow=4.3 cfs 16,544 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0429 '/' Outflow=4.3 cfs 16,544 cf

Pond DMH-1: Peak Elev=297.29' Inflow=5.4 cfs 20,560 cf
12.0" Round Culvert n=0.013 L=188.0' S=0.0322 '/' Outflow=5.4 cfs 20,560 cf

Pond DMH-2: Peak Elev=289.30' Inflow=8.6 cfs 35,765 cf
18.0" Round Culvert n=0.013 L=48.0' S=0.0100 '/' Outflow=8.6 cfs 35,765 cf

Pond DMH-3: Peak Elev=287.18' Inflow=4.3 cfs 16,544 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=4.3 cfs 16,544 cf

Pond DMH-5: Peak Elev=291.73' Inflow=4.1 cfs 15,436 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0148 '/' Outflow=4.1 cfs 15,436 cf

Pond DMH-6: Peak Elev=290.54' Inflow=4.8 cfs 18,453 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=4.8 cfs 18,453 cf

Pond DMH-7: Peak Elev=290.50' Inflow=0.9 cfs 3,258 cf
24.0" Round Culvert n=0.013 L=5.0' S=0.0200 '/' Outflow=0.9 cfs 3,256 cf

Pond DMH-9: Peak Elev=286.49' Inflow=3.0 cfs 10,324 cf
15.0" Round Culvert n=0.013 L=197.0' S=0.0175 '/' Outflow=3.0 cfs 10,324 cf

Pond IB-1: Peak Elev=286.00' Storage=1,430 cf Inflow=10.0 cfs 40,712 cf
Discarded=0.0 cfs 1,020 cf Primary=2.2 cfs 30,646 cf Secondary=7.6 cfs 8,770 cf Outflow=9.8 cfs 40,437 cf

Pond IB-2: Peak Elev=283.78' Storage=2,273 cf Inflow=3.6 cfs 12,294 cf
Primary=1.9 cfs 11,636 cf Secondary=0.0 cfs 0 cf Outflow=1.9 cfs 11,636 cf

Pond IC-1: Peak Elev=287.17' Storage=9,501 cf Inflow=6.2 cfs 24,376 cf
Discarded=0.1 cfs 8,217 cf Primary=2.3 cfs 8,512 cf Outflow=2.4 cfs 16,729 cf

Pond IC-2: Peak Elev=290.50' Storage=9,407 cf Inflow=8.2 cfs 31,823 cf
Discarded=0.1 cfs 8,158 cf Primary=3.9 cfs 18,988 cf Outflow=4.0 cfs 27,146 cf

Link AP-1: Inflow=22.0 cfs 98,834 cf
Primary=22.0 cfs 98,834 cf

Total Runoff Area = 270,181 sf Runoff Volume = 129,488 cf Average Runoff Depth = 5.75"
55.08% Pervious = 148,810 sf 44.92% Impervious = 121,371 sf

Summary for Subcatchment SC1.1:

Runoff = 1.8 cfs @ 12.13 hrs, Volume= 6,173 cf, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
4,381	61	>75% Grass cover, Good, HSG B
5,583	55	Woods, Good, HSG B
328	98	Unconnected pavement, HSG B
3,654	98	Paved parking, HSG B
1,269	96	Gravel surface, HSG B
15,215	71	Weighted Average
11,233		73.83% Pervious Area
3,982		26.17% Impervious Area
328		8.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	34	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.9	16	0.1875	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.0	83	0.0361	1.33		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	100	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	233	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC1.2:

Runoff = 3.7 cfs @ 12.16 hrs, Volume= 14,386 cf, Depth> 6.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
6,620	61	>75% Grass cover, Good, HSG B
2,398	55	Woods, Good, HSG B
1,172	98	Unconnected pavement, HSG B
8,000	98	Roofs, HSG B
7,203	98	Paved parking, HSG B
1,052	96	Gravel surface, HSG B
26,444	85	Weighted Average
10,069		38.08% Pervious Area
16,375		61.92% Impervious Area
1,172		7.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	41	0.2400	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
1.4	9	0.0200	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
3.4	222	0.0248	1.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	63	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	335	Total			

Summary for Subcatchment SC1.3:

Runoff = 3.5 cfs @ 12.21 hrs, Volume= 15,206 cf, Depth> 5.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
15,029	61	>75% Grass cover, Good, HSG B
3,894	55	Woods, Good, HSG B
1,741	96	Gravel surface, HSG B
275	98	Unconnected pavement, HSG B
12,548	98	Paved parking, HSG B
33,487	76	Weighted Average
20,664		61.71% Pervious Area
12,823		38.29% Impervious Area
275		2.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
3.2	188	0.0372	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	160	0.0372	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	122	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.0	520	Total			

Summary for Subcatchment SC2.1:

Runoff = 1.6 cfs @ 12.13 hrs, Volume= 6,073 cf, Depth> 7.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
595	61	>75% Grass cover, Good, HSG B
423	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,263	98	Paved parking, HSG B
9,281	96	Weighted Average
595		6.41% Pervious Area
8,686		93.59% Impervious Area
423		4.87% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC2.2:

Runoff = 2.6 cfs @ 12.15 hrs, Volume= 9,363 cf, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
5,529	61	>75% Grass cover, Good, HSG B
2,637	55	Woods, Good, HSG B
889	98	Unconnected pavement, HSG B
4,000	98	Roofs, HSG B
4,580	98	Paved parking, HSG B
929	96	Gravel surface, HSG B
18,563	81	Weighted Average
9,094		48.99% Pervious Area
9,469		51.01% Impervious Area
889		9.39% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
0.2	8	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	151	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	86	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.8	295	Total			

Summary for Subcatchment SC2.3:

Runoff = 1.5 cfs @ 12.13 hrs, Volume= 5,137 cf, Depth> 5.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
7,218	61	>75% Grass cover, Good, HSG B
293	98	Unconnected pavement, HSG B
4,029	98	Paved parking, HSG B
11,540	75	Weighted Average
7,218		62.55% Pervious Area
4,321		37.45% Impervious Area
293		6.77% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	42	0.1430	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.1	8	0.0500	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.12"
0.5	135	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.1:

Runoff = 2.0 cfs @ 12.13 hrs, Volume= 7,832 cf, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
11,615	98	Roofs, HSG B
0	61	>75% Grass cover, Good, HSG B
11,615	98	Weighted Average
0		0.00% Pervious Area
11,615		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.2:

Runoff = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf, Depth> 7.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
2,372	61	>75% Grass cover, Good, HSG B
21,883	98	Paved parking, HSG B
1,422	98	Unconnected pavement, HSG B
25,677	95	Weighted Average
2,372		9.24% Pervious Area
23,305		90.76% Impervious Area
1,422		6.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0380	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.8	68	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.2	118	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC3.3:

Runoff = 1.5 cfs @ 12.13 hrs, Volume= 4,947 cf, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
13,540	61	>75% Grass cover, Good, HSG B
1,127	96	Gravel surface, HSG B
14,666	64	Weighted Average
14,666		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
1.9	166	0.0422	1.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	216	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.1:

Runoff = 2.5 cfs @ 12.13 hrs, Volume= 10,114 cf, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
14,998	98	Roofs, HSG B
14,998		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.2:

Runoff = 1.5 cfs @ 12.13 hrs, Volume= 5,187 cf, Depth> 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
5,060	61	>75% Grass cover, Good, HSG B
1,450	98	Unconnected pavement, HSG B
3,975	98	Paved parking, HSG B
10,484	80	Weighted Average
5,060		48.26% Pervious Area
5,424		51.74% Impervious Area
1,450		26.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
0.4	33	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	148	0.0440	4.26		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.0	231	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.3:

Runoff = 0.8 cfs @ 12.13 hrs, Volume= 3,017 cf, Depth> 7.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
406	61	>75% Grass cover, Good, HSG B
175	98	Unconnected pavement, HSG B
4,101	98	Paved parking, HSG B
4,682	95	Weighted Average
406		8.68% Pervious Area
4,276		91.32% Impervious Area
175		4.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.4:

Runoff = 0.9 cfs @ 12.13 hrs, Volume= 3,258 cf, Depth> 7.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
564	61	>75% Grass cover, Good, HSG B
541	98	Unconnected pavement, HSG B
4,030	98	Paved parking, HSG B
5,136	94	Weighted Average
564		10.99% Pervious Area
4,571		89.01% Impervious Area
541		11.83% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC4.5:

Runoff = 0.6 cfs @ 12.13 hrs, Volume= 1,970 cf, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
6,391	61	>75% Grass cover, Good, HSG B
6,391		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC5.1:

Runoff = 5.2 cfs @ 12.18 hrs, Volume= 20,281 cf, Depth> 3.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
52,172	61	>75% Grass cover, Good, HSG B
5,271	55	Woods, Good, HSG B
70	98	Unconnected pavement, HSG B
1,456	98	Paved parking, HSG B
3,033	96	Gravel surface, HSG B
62,001	63	Weighted Average
60,476		97.54% Pervious Area
1,525		2.46% Impervious Area
70		4.56% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	36	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.12"
2.1	14	0.0200	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.12"
4.1	312	0.0334	1.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.0	362	Total			

Summary for Pond CB-1:

Inflow Area = 15,215 sf, 26.17% Impervious, Inflow Depth > 4.87" for 100-Year event
Inflow = 1.8 cfs @ 12.13 hrs, Volume= 6,173 cf
Outflow = 1.8 cfs @ 12.13 hrs, Volume= 6,173 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.13 hrs, Volume= 6,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 298.38' @ 12.13 hrs
Flood Elev= 301.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	297.50'	**12.0" Round Culvert** L= 170.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 297.50' / 293.56' S= 0.0232 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.8 cfs @ 12.13 hrs HW=298.35' TW=296.95' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.8 cfs @ 2.48 fps)

Summary for Pond CB-10:

Inflow Area = 10,484 sf, 51.74% Impervious, Inflow Depth > 5.94" for 100-Year event
Inflow = 1.5 cfs @ 12.13 hrs, Volume= 5,187 cf
Outflow = 1.5 cfs @ 12.13 hrs, Volume= 5,187 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.13 hrs, Volume= 5,187 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.78' @ 12.13 hrs
Flood Elev= 289.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.90'	**12.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.90' / 285.70' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.4 cfs @ 12.13 hrs HW=286.74' TW=286.46' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.4 cfs @ 2.02 fps)

Summary for Pond CB-2:

Inflow Area = 26,444 sf, 61.92% Impervious, Inflow Depth > 6.53" for 100-Year event
Inflow = 3.7 cfs @ 12.16 hrs, Volume= 14,386 cf
Outflow = 3.7 cfs @ 12.16 hrs, Volume= 14,386 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.7 cfs @ 12.16 hrs, Volume= 14,386 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 298.79' @ 12.15 hrs
Flood Elev= 297.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.70'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.70' / 293.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.6 cfs @ 12.16 hrs HW=298.58' TW=297.12' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.6 cfs @ 4.60 fps)

Summary for Pond CB-3:

Inflow Area = 33,487 sf, 38.29% Impervious, Inflow Depth > 5.45" for 100-Year event
Inflow = 3.5 cfs @ 12.21 hrs, Volume= 15,206 cf
Outflow = 3.5 cfs @ 12.21 hrs, Volume= 15,206 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.21 hrs, Volume= 15,206 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.54' @ 12.18 hrs
Flood Elev= 291.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.50'	**12.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.50' / 287.40' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.5 cfs @ 12.21 hrs HW=290.40' TW=289.02' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.5 cfs @ 4.46 fps)

Summary for Pond CB-5:

Inflow Area = 18,563 sf, 51.01% Impervious, Inflow Depth > 6.05" for 100-Year event
Inflow = 2.6 cfs @ 12.15 hrs, Volume= 9,363 cf
Outflow = 2.6 cfs @ 12.15 hrs, Volume= 9,363 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.6 cfs @ 12.15 hrs, Volume= 9,363 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 295.23' @ 12.15 hrs
Flood Elev= 298.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	294.00'	**12.0" Round Culvert** L= 86.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 294.00' / 289.10' S= 0.0570 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.5 cfs @ 12.15 hrs HW=295.22' TW=291.69' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.5 cfs @ 3.22 fps)

Summary for Pond CB-6:

Inflow Area = 9,281 sf, 93.59% Impervious, Inflow Depth > 7.85" for 100-Year event
Inflow = 1.6 cfs @ 12.13 hrs, Volume= 6,073 cf
Outflow = 1.6 cfs @ 12.13 hrs, Volume= 6,073 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.13 hrs, Volume= 6,073 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 296.28' @ 12.13 hrs
Flood Elev= 299.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	295.50'	**12.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 295.50' / 289.10' S= 0.1103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.5 cfs @ 12.13 hrs HW=296.26' TW=291.42' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.5 cfs @ 2.34 fps)

Summary for Pond CB-7:

Inflow Area = 4,682 sf, 91.32% Impervious, Inflow Depth > 7.73" for 100-Year event
Inflow = 0.8 cfs @ 12.13 hrs, Volume= 3,017 cf
Outflow = 0.8 cfs @ 12.13 hrs, Volume= 3,017 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.13 hrs, Volume= 3,017 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.53' @ 12.30 hrs
Flood Elev= 292.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.00'	**12.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.00' / 287.70' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.13 hrs HW=289.73' TW=290.02' (Dynamic Tailwater)
1=Culvert (Controls 0.0 cfs)

Summary for Pond CB-8:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 7.61" for 100-Year event
Inflow = 0.9 cfs @ 12.13 hrs, Volume= 3,258 cf
Outflow = 0.9 cfs @ 12.13 hrs, Volume= 3,258 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.13 hrs, Volume= 3,258 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.50' @ 12.30 hrs
Flood Elev= 292.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	288.50'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 288.50' / 288.20' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.13 hrs HW=289.60' TW=289.88' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.0 cfs)

Summary for Pond CB-9:

Inflow Area = 11,540 sf, 37.45% Impervious, Inflow Depth > 5.34" for 100-Year event
Inflow = 1.5 cfs @ 12.13 hrs, Volume= 5,137 cf
Outflow = 1.5 cfs @ 12.13 hrs, Volume= 5,137 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.13 hrs, Volume= 5,137 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 287.26' @ 12.13 hrs
Flood Elev= 290.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.50' / 285.70' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.4 cfs @ 12.13 hrs HW=287.24' TW=286.46' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.4 cfs @ 2.31 fps)

Summary for Pond DCB-4:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 7.73" for 100-Year event
Inflow = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf
Outflow = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 288.05' @ 12.14 hrs
Flood Elev= 288.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**12.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 284.20' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.7 cfs @ 12.13 hrs HW=287.88' TW=286.38' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.7 cfs @ 4.65 fps)

Summary for Pond DMH-1:

Inflow Area = 41,659 sf, 48.86% Impervious, Inflow Depth > 5.92" for 100-Year event
Inflow = 5.4 cfs @ 12.15 hrs, Volume= 20,560 cf
Outflow = 5.4 cfs @ 12.15 hrs, Volume= 20,560 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.4 cfs @ 12.15 hrs, Volume= 20,560 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 297.29' @ 12.15 hrs
Flood Elev= 297.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	293.46'	**12.0" Round Culvert** L= 188.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 293.46' / 287.40' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.4 cfs @ 12.15 hrs HW=297.24' TW=289.25' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.4 cfs @ 6.88 fps)

Summary for Pond DMH-2:

Inflow Area = 75,146 sf, 44.15% Impervious, Inflow Depth > 5.71" for 100-Year event
Inflow = 8.6 cfs @ 12.16 hrs, Volume= 35,765 cf
Outflow = 8.6 cfs @ 12.16 hrs, Volume= 35,765 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.6 cfs @ 12.16 hrs, Volume= 35,765 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 289.30' @ 12.16 hrs
Flood Elev= 291.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.90'	**18.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 286.90' / 286.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.5 cfs @ 12.16 hrs HW=289.23' TW=285.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 8.5 cfs @ 4.78 fps)

Summary for Pond DMH-3:

Inflow Area = 25,677 sf, 90.76% Impervious, Inflow Depth > 7.73" for 100-Year event
Inflow = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf
Outflow = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.3 cfs @ 12.13 hrs, Volume= 16,544 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 287.18' @ 12.30 hrs
Flood Elev= 288.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	284.10'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.10' / 284.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.1 cfs @ 12.13 hrs HW=286.38' TW=286.26' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.1 cfs @ 1.30 fps)

Summary for Pond DMH-5:

Inflow Area = 27,844 sf, 65.20% Impervious, Inflow Depth > 6.65" for 100-Year event
Inflow = 4.1 cfs @ 12.14 hrs, Volume= 15,436 cf
Outflow = 4.1 cfs @ 12.14 hrs, Volume= 15,436 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.1 cfs @ 12.14 hrs, Volume= 15,436 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.73' @ 12.15 hrs
Flood Elev= 293.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.00'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 289.00' / 287.70' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.5 cfs @ 12.14 hrs HW=291.59' TW=290.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.5 cfs @ 4.48 fps)

Summary for Pond DMH-6:

Inflow Area = 32,526 sf, 68.96% Impervious, Inflow Depth > 6.81" for 100-Year event
Inflow = 4.8 cfs @ 12.14 hrs, Volume= 18,453 cf
Outflow = 4.8 cfs @ 12.14 hrs, Volume= 18,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.8 cfs @ 12.14 hrs, Volume= 18,453 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.54' @ 12.24 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.7 cfs @ 12.14 hrs HW=290.12' TW=289.96' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.7 cfs @ 1.50 fps)

Summary for Pond DMH-7:

Inflow Area = 5,136 sf, 89.01% Impervious, Inflow Depth > 7.61" for 100-Year event
Inflow = 0.9 cfs @ 12.13 hrs, Volume= 3,258 cf
Outflow = 0.9 cfs @ 12.13 hrs, Volume= 3,256 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.13 hrs, Volume= 3,256 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.50' @ 12.26 hrs
Flood Elev= 292.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.60'	**24.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 287.60' / 287.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.8 cfs @ 12.13 hrs HW=289.88' TW=289.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.8 cfs @ 0.26 fps)

Summary for Pond DMH-9:

Inflow Area = 22,024 sf, 44.25% Impervious, Inflow Depth > 5.63" for 100-Year event
Inflow = 3.0 cfs @ 12.13 hrs, Volume= 10,324 cf
Outflow = 3.0 cfs @ 12.13 hrs, Volume= 10,324 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.0 cfs @ 12.13 hrs, Volume= 10,324 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.49' @ 12.13 hrs
Flood Elev= 290.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	285.45'	**15.0" Round Culvert** L= 197.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.45' / 282.00' S= 0.0175 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.9 cfs @ 12.13 hrs HW=286.46' TW=283.57' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.9 cfs @ 2.70 fps)

Summary for Pond IB-1:

Inflow Area = 89,812 sf, 36.94% Impervious, Inflow Depth > 5.44" for 100-Year event
Inflow = 10.0 cfs @ 12.16 hrs, Volume= 40,712 cf
Outflow = 9.8 cfs @ 12.17 hrs, Volume= 40,437 cf, Atten= 2%, Lag= 1.1 min
Discarded = 0.0 cfs @ 12.17 hrs, Volume= 1,020 cf
Primary = 2.2 cfs @ 12.17 hrs, Volume= 30,646 cf
Secondary = 7.6 cfs @ 12.17 hrs, Volume= 8,770 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 286.00' @ 12.17 hrs Surf.Area= 1,424 sf Storage= 1,430 cf

Plug-Flow detention time= 10.2 min calculated for 40,437 cf (99% of inflow)
Center-of-Mass det. time= 6.1 min (832.9 - 826.9)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	3,366 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)
284.00	208	72.5	0	0	208
285.00	661	129.3	413	413	1,126
286.00	1,425	189.1	1,019	1,432	2,649
287.00	2,492	246.3	1,934	3,366	4,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Secondary	285.50'	**8.0' long x 15.0' 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
#3	Primary	284.50'	**10.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 284.50' / 282.50' S= 0.0667 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Discarded OutFlow Max=0.0 cfs @ 12.17 hrs HW=285.99' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=2.1 cfs @ 12.17 hrs HW=285.99' TW=0.00' (Dynamic Tailwater)
↑**3=Culvert** (Inlet Controls 2.1 cfs @ 3.93 fps)

Secondary OutFlow Max=7.4 cfs @ 12.17 hrs HW=285.99' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 7.4 cfs @ 1.89 fps)

Summary for Pond IB-2:

Inflow Area = 28,415 sf, 34.30% Impervious, Inflow Depth > 5.19" for 100-Year event
Inflow = 3.6 cfs @ 12.13 hrs, Volume= 12,294 cf
Outflow = 1.9 cfs @ 12.23 hrs, Volume= 11,636 cf, Atten= 46%, Lag= 6.1 min
Primary = 1.9 cfs @ 12.23 hrs, Volume= 11,636 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 283.78' @ 12.23 hrs Surf.Area= 1,721 sf Storage= 2,273 cf

Plug-Flow detention time= 58.5 min calculated for 11,612 cf (94% of inflow)
Center-of-Mass det. time= 28.7 min (859.3 - 830.6)

Volume	Invert	Avail.Storage	Storage Description
#1	282.00'	4,792 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)
282.00	870	143.0	0	0	870
283.00	1,328	162.0	1,091	1,091	1,356
284.00	1,843	181.0	1,578	2,669	1,902
285.00	2,414	200.0	2,122	4,792	2,509

Device	Routing	Invert	Outlet Devices
#1	Secondary	284.00'	**10.0' long x 22.0' 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
#2	Primary	282.50'	**10.0" Round Culvert** L= 37.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 282.50' / 278.50' S= 0.1070 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.9 cfs @ 12.23 hrs HW=283.77' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 1.9 cfs @ 3.51 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=282.00' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond IC-1:

Inflow Area = 37,292 sf, 93.64% Impervious, Inflow Depth > 7.84" for 100-Year event
Inflow = 6.2 cfs @ 12.13 hrs, Volume= 24,376 cf
Outflow = 2.4 cfs @ 12.30 hrs, Volume= 16,729 cf, Atten= 62%, Lag= 10.3 min
Discarded = 0.1 cfs @ 5.90 hrs, Volume= 8,217 cf
Primary = 2.3 cfs @ 12.30 hrs, Volume= 8,512 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 287.17' @ 12.30 hrs Surf.Area= 4,404 sf Storage= 9,501 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.9 min (810.5 - 753.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	283.50'	3,942 cf	**53.75'W x 81.94'L x 3.50'H Field A** 15,414 cf Overall - 5,559 cf Embedded = 9,856 cf x 40.0% Voids
#2A	284.00'	5,559 cf	**ADS_StormTech SC-740 +Cap** x 121 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 121 Chambers in 11 Rows
		9,501 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	283.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	285.70'	**12.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 285.70' / 279.00' S= 0.1264 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	286.00'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 5.90 hrs HW=283.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=2.3 cfs @ 12.30 hrs HW=287.16' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 2.3 cfs of 2.9 cfs potential flow)
↑**3=Orifice/Grate** (Orifice Controls 2.3 cfs @ 4.16 fps)

Summary for Pond IC-2:

Inflow Area = 52,660 sf, 79.76% Impervious, Inflow Depth > 7.25" for 100-Year event
Inflow = 8.2 cfs @ 12.13 hrs, Volume= 31,823 cf
Outflow = 4.0 cfs @ 12.26 hrs, Volume= 27,146 cf, Atten= 51%, Lag= 7.4 min
Discarded = 0.1 cfs @ 5.55 hrs, Volume= 8,158 cf
Primary = 3.9 cfs @ 12.26 hrs, Volume= 18,988 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 290.50' @ 12.26 hrs Surf.Area= 4,361 sf Storage= 9,407 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 44.6 min (813.9 - 769.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	287.00'	3,901 cf	**39.50'W x 110.42'L x 3.50'H Field A** 15,265 cf Overall - 5,513 cf Embedded = 9,752 cf x 40.0% Voids
#2A	287.50'	5,513 cf	**ADS_StormTech SC-740 +Cap** x 120 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 8 Rows
		9,414 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	287.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	288.30'	**12.0" Round Culvert**
			L= 120.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 288.30' / 279.00' S= 0.0775 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	288.50'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 5.55 hrs HW=287.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=3.9 cfs @ 12.26 hrs HW=290.49' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 3.9 cfs @ 4.94 fps)
└**3=Orifice/Grate** (Passes 3.9 cfs of 4.3 cfs potential flow)

Summary for Link AP-1:

Inflow Area = 270,181 sf, 44.92% Impervious, Inflow Depth > 4.39" for 100-Year event
Inflow = 22.0 cfs @ 12.20 hrs, Volume= 98,834 cf
Primary = 22.0 cfs @ 12.20 hrs, Volume= 98,834 cf, Atten= 0%, Lag= 0.0 min

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

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Pre-Development Conditions

203 Ayer Road, Harvard, MA
Project No. 211009

			Area (sf)	Area (Ac)
Total Subcatchment Areas			270,181	6.2
Total Subcatchment Areas On-Site			270,181	6.2
Total Area of Hydrolic Soil Groups On-Site		B	270,181	6.2
Surface Type Areas				
	Grass	B	181,979	4.2
	Woods	B	35,529	0.8
	Gravel	B	52,672	1.2
Total Impervious Area			0	0.0

Infiltration Volume

Inches of Recharge per Storm Event	A	0.60
	B	0.35
	C	0.25
	D	0.10

Infiltration Volume = ∑ {[(Total Subcatchment Area within HSG) - (Total Impervious Area within HSG)]
x (inches of Recharge Per Storm)}

Infiltration Volume	**7,880**	**CF**

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Post Development Conditions

203 Ayer Road, Harvard, MA
Project No. 211009

		Area (sf)	Area (Ac)
Total Subcatchment Areas		270,181	6.2
Total Subcatchment Areas On-Site		270,181	6.2
Total Area of Hydrolic Soil Groups On-Site	B	270,181	6.2
Surface Type Areas			
Grass	B	119,876	2.8
Gravel	B	9,151	0.2
Woods	B	19,783	0.5
Unconnected pavement	B	7,036	0.2
Paved parking	B	71,721	1.6
Roofs	B	42,613	1.0
Total Impervious Area		121,370	2.8

Infiltration Volume

Inches of Recharge per Storm Event	A	0.60
	B	0.35
	C	0.25
	D	0.10

Infiltration Volume = ∑ {[(Total Subcatchment Area within HSG) - (Total Impervious Area within HSG)] x (inches of Recharge Per Storm)}

Natural Infiltration Volume	4,340	CF
Pre-Development Infiltration Volume	7,880	CF
Required Iniltration Volume	**3,540**	**CF**

Provided Infiltration Volume

Infiltration Chambers (IC-1)	7,531	CF	Volume below 286.00' Orifice
Infiltration Chambers (IC-2)	4,409	CF	Volume below 288.50' Orifice
Infiltration Basin (IB-1)	150	CF	Volume below 284.50' Orifice
Infiltration Basin (IB-2)	488	CF	Volume below 282.50' Orifice
Total Provided Iniltration Volume	**12,578**	**CF**	

Stage-Area-Storage for Pond IB-1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
284.00	208	0
284.05	225	11
284.10	242	22
284.15	260	35
284.20	278	48
284.25	297	63
284.30	317	78
284.35	338	95
284.40	359	112
284.45	380	130
284.50	403	150
284.55	426	171
284.60	449	193
284.65	473	216
284.70	498	240
284.75	524	265
284.80	550	292
284.85	577	321
284.90	604	350
284.95	632	381
285.00	661	413
285.05	692	447
285.10	724	483
285.15	757	520
285.20	791	558
285.25	825	599
285.30	860	641
285.35	895	685
285.40	932	730
285.45	969	778
285.50	1,007	827
285.55	1,045	878
285.60	1,085	932
285.65	1,125	987
285.70	1,165	1,044
285.75	1,207	1,104
285.80	1,249	1,165
285.85	1,292	1,228
285.90	1,336	1,294
285.95	1,380	1,362
286.00	1,425	1,432
286.05	1,471	1,505
286.10	1,518	1,579
286.15	1,566	1,656
286.20	1,615	1,736
286.25	1,664	1,818
286.30	1,714	1,902
286.35	1,765	1,989
286.40	1,816	2,079
286.45	1,868	2,171
286.50	1,921	2,266
286.55	1,975	2,363
286.60	2,030	2,463
286.65	2,085	2,566
286.70	2,141	2,672
286.75	2,197	2,780
286.80	2,255	2,891
286.85	2,313	3,006
286.90	2,372	3,123
286.95	2,432	3,243
287.00	**2,492**	**3,366**

Stage-Area-Storage for Pond IB-2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
282.00	870	0
282.05	891	44
282.10	911	89
282.15	933	135
282.20	954	182
282.25	975	231
282.30	997	280
282.35	1,019	330
282.40	1,042	382
282.45	1,064	434
282.50	1,087	488
282.55	1,110	543
282.60	1,133	599
282.65	1,157	656
282.70	1,180	715
282.75	1,204	775
282.80	1,229	835
282.85	1,253	897
282.90	1,278	961
282.95	1,303	1,025
283.00	1,328	1,091
283.05	1,352	1,158
283.10	1,376	1,226
283.15	1,400	1,296
283.20	1,424	1,366
283.25	1,449	1,438
283.30	1,474	1,511
283.35	1,499	1,585
283.40	1,524	1,661
283.45	1,549	1,738
283.50	1,575	1,816
283.55	1,601	1,895
283.60	1,627	1,976
283.65	1,653	2,058
283.70	1,680	2,141
283.75	1,706	2,226
283.80	1,733	2,312
283.85	1,760	2,399
283.90	1,788	2,488
283.95	1,815	2,578
284.00	1,843	2,669
284.05	1,870	2,762
284.10	1,897	2,856
284.15	1,924	2,952
284.20	1,951	3,049
284.25	1,979	3,147
284.30	2,006	3,247
284.35	2,034	3,348
284.40	2,062	3,450
284.45	2,090	3,554
284.50	2,119	3,659
284.55	2,148	3,766
284.60	2,176	3,874
284.65	2,205	3,983
284.70	2,235	4,094
284.75	2,264	4,207
284.80	2,294	4,321
284.85	2,323	4,436
284.90	2,353	4,553
284.95	2,384	4,672
285.00	**2,414**	**4,792**

Stage-Area-Storage for Pond IC-1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.50	**4,404**	0
283.55	4,404	88
283.60	4,404	176
283.65	4,404	264
283.70	4,404	352
283.75	4,404	440
283.80	4,404	528
283.85	4,404	617
283.90	4,404	705
283.95	4,404	793
284.00	4,404	881
284.05	4,404	1,065
284.10	4,404	1,249
284.15	4,404	1,433
284.20	4,404	1,616
284.25	4,404	1,799
284.30	4,404	1,981
284.35	4,404	2,163
284.40	4,404	2,344
284.45	4,404	2,524
284.50	4,404	2,703
284.55	4,404	2,882
284.60	4,404	3,060
284.65	4,404	3,237
284.70	4,404	3,413
284.75	4,404	3,588
284.80	4,404	3,763
284.85	4,404	3,936
284.90	4,404	4,108
284.95	4,404	4,280
285.00	4,404	4,450
285.05	4,404	4,619
285.10	4,404	4,787
285.15	4,404	4,954
285.20	4,404	5,119
285.25	4,404	5,283
285.30	4,404	5,446
285.35	4,404	5,607
285.40	4,404	5,766
285.45	4,404	5,924
285.50	4,404	6,081
285.55	4,404	6,236
285.60	4,404	6,389
285.65	4,404	6,540
285.70	4,404	6,689
285.75	4,404	6,835
285.80	4,404	6,979
285.85	4,404	7,121
285.90	4,404	7,260
285.95	4,404	7,397
286.00	4,404	7,531
286.05	4,404	7,661
286.10	4,404	7,788
286.15	4,404	7,911
286.20	4,404	8,028
286.25	4,404	8,139
286.30	4,404	8,244
286.35	4,404	8,343
286.40	4,404	8,438
286.45	4,404	8,531
286.50	4,404	8,620
286.55	4,404	8,708
286.60	4,404	8,796
286.65	4,404	8,884
286.70	4,404	8,972
286.75	4,404	9,061
286.80	4,404	9,149
286.85	4,404	9,237
286.90	4,404	9,325
286.95	4,404	9,413
287.00	4,404	**9,501**
287.05	4,404	9,501
287.10	4,404	9,501
287.15	4,404	9,501

Stage-Area-Storage for Pond IC-2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
287.00	**4,361**	0
287.05	4,361	87
287.10	4,361	174
287.15	4,361	262
287.20	4,361	349
287.25	4,361	436
287.30	4,361	523
287.35	4,361	611
287.40	4,361	698
287.45	4,361	785
287.50	4,361	872
287.55	4,361	1,055
287.60	4,361	1,237
287.65	4,361	1,419
287.70	4,361	1,601
287.75	4,361	1,782
287.80	4,361	1,963
287.85	4,361	2,143
287.90	4,361	2,322
287.95	4,361	2,501
288.00	4,361	2,678
288.05	4,361	2,856
288.10	4,361	3,032
288.15	4,361	3,207
288.20	4,361	3,382
288.25	4,361	3,556
288.30	4,361	3,728
288.35	4,361	3,900
288.40	4,361	4,071
288.45	4,361	4,241
288.50	4,361	4,409
288.55	4,361	4,577
288.60	4,361	4,744
288.65	4,361	4,909
288.70	4,361	5,072
288.75	4,361	5,235
288.80	4,361	5,396
288.85	4,361	5,556
288.90	4,361	5,714
288.95	4,361	5,871
289.00	4,361	6,026
289.05	4,361	6,179
289.10	4,361	6,331
289.15	4,361	6,481
289.20	4,361	6,628
289.25	4,361	6,773
289.30	4,361	6,916
289.35	4,361	7,056
289.40	4,361	7,194
289.45	4,361	7,330
289.50	4,361	7,462
289.55	4,361	7,592
289.60	4,361	7,717
289.65	4,361	7,839
289.70	4,361	7,955
289.75	4,361	8,065
289.80	4,361	8,169
289.85	4,361	8,267
289.90	4,361	8,361
289.95	4,361	8,453
290.00	4,361	8,541
290.05	4,361	8,629
290.10	4,361	8,716
290.15	4,361	8,803
290.20	4,361	8,890
290.25	4,361	8,978
290.30	4,361	9,065
290.35	4,361	9,152
290.40	4,361	9,239
290.45	4,361	9,326
290.50	4,361	**9,414**

DRAINAGE GROUNDWATER SEPARATION SUMMARY:

Stormwater Infiltration Basin #1

Groundwater Depth =	45	IN	[See 122-4]
Bottom Basin Elev. =	286.0		
Existing grade @ Bot. Basin =	287.6		
Groundwater Separation =	**2.15**	**FT**	

Infiltration Chambers-1

Groundwater Depth =	50	IN	[See 122-5]
Bottom Bed Elev. =	283.5		
Existing grade @ Bot. Bed =	285.4		
Groundwater Separation =	**2.27**	**FT**	

Stormwater Infiltration Basin #2

Groundwater Depth =	15	IN	[See 122-6]
Bottom Basin Elev. =	282.0		
Existing grade @ Bot. Basin =	280.0		
Groundwater Separation =	**3.25**	**FT**	

Infiltration Chambers-2

Groundwater Depth =	60	IN	[See 122-8]
Bottom Bed Elev. =	287.0		
Existing grade @ Bot. Bed =	290.0		
Groundwater Separation =	**2.00**	**FT**	

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Infiltration Area Requirements

203 Ayer Road, Harvard, MA
Project No. 211009

Drawdown Time

(Per Massachusetts Stormwater regulations, infiltration areas must completely drain within 72 hours)

		Infiltration Chambers (IC-1)	Infiltration Chambers (IC-2)
Infiltration Area Storage Volume	cf	7,531	4,409
Design infiltration Rate	in/hr	1.02	1.02
Infiltration Bottom Area	sf	4,404	4,362

Drawdown Time = Infiltration Area Storage Volume / [Design Infiltration Rate x Infiltration Area Bottom Area]

Drawdown Time (Hrs)	**20.1**	**11.9**

Mounding Analysis

Per the Massachusetts Stormwater Handbook, mounding analysis is required when ".. The vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four (4) feet and the recharge system is proposed to attenuate the peak discharge from a 10-year or higher 24-hour storm." The mounding analysis "... must show that the REQUIRED RECHARGE VOLUME is fully dewatered within 72 hours..."

		Infiltration Chambers (IC-1)	Infiltration Chambers (IC-2)
Hydraulic Conductivity	ft/day	16	16
		Lower Range Standard Value for "Medium Sand" material	
Specific Yield		0.23	0.23
		Standard Value for "Medium Sand" material	
Initial Saturated Thickness	ft	10	10
		Depth to bedrock	
Design Recharge Rate	ft/day	2.04	2.04
		infiltration rate	
Time	days	3	3
		Minimum 72 hr evaluation period	
Bottom Infiltrating Area	sf	4,404	4,362
Length of Infiltration Area	ft	81.94	110.42
Width of Infiltration Area	ft	53.7	39.5
Time when Infiltration Stops	days	0.84	0.50
		Calculated Drawdown Time (see Above)	
Maximum Water table rise at 72 hours[1]	**ft**	**1.27**	**0.74**
	in	**15 1/4**	**8 7/8**

- Resulting mound will not interfere with the full draining of the infiltration area in accordance with Mass Stormwater Standards -

[1] - mounding analysis calculated using the Hantush (1967) method. Automated report generated by MOUNDSOLV V2.1 (www.aqtesolv.com) by HydroSOLVE, Inc.

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Infiltration Area Requirements

203 Ayer Road, Harvard, MA
Project No. 211009

Drawdown Time

(Per Massachusetts Stormwater regulations, infiltration areas must completely drain within 72 hours)

		Infiltration Basin (IB-1)	Infiltration Basin (IB-2)
Infiltration Area Storage Volume	cf	150	488
Design infiltration Rate	in/hr	1.02	1.02
Infiltration Bottom Area	sf	208	834

Drawdown Time = Infiltration Area Storage Volume / [Design Infiltration Rate x Infiltration Area Bottom Area]

Drawdown Time (Hrs)	**8.5**	**6.9**

Mounding Analysis

Per the Massachusetts Stormwater Handbook, mounding analysis is required when ".. The vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four (4) feet and the recharge system is proposed to attenuate the peak discharge from a 10-year or higher 24-hour storm." The mounding analysis "... must show that the REQUIRED RECHARGE VOLUME is fully dewatered within 72 hours..."

		Infiltration Basin (IB-1)	Infiltration Basin (IB-2)
Hydraulic Conductivity	ft/day	16	16
		Lower Range Standard Value for "Medium Sand" material	
Specific Yield		0.23	0.23
		Standard Value for "Medium Sand" material	
Initial Saturated Thickness	ft	10	10
		Depth to bedrock	
Design Recharge Rate	ft/day	2.04	2.04
		infiltration rate	
Time	days	3	3
		Minimum 72 hr evaluation period	
Bottom Infiltrating Area	sf	208	834
Length of Infiltration Area	ft	31	12.67
Width of Infiltration Area	ft	6.7	65.8
Time when Infiltration Stops	days	0.35	0.29
		Calculated Drawdown Time (see Above)	
Maximum Water table rise at 72 hours[1]	**ft**	**0.03**	**0.08**
	in	**1/4**	**1**

- Resulting mound will not interfere with the full draining of the infiltration area in accordance with Mass Stormwater Standards -

[1] - mounding analysis calculated using the Hantush (1967) method. Automated report generated by MOUNDSOLV V2.1 (www.aqtesolv.com) by HydroSOLVE, Inc.

Stormwater Management Standard 4
WATER QUALITY RETENTION VOLUME

203 Ayer Road, Harvard, MA
Project No. 211009

Parameter	Unit	Quantity	Remarks
Watershed area	sf	270,181	
Predevelopment impervious area	sf	0	
Total impervious area added	sf	121,370	
Total impervious area	sf	121,370	
Total impervious area required for retention	sf	121,370	
Runoff depth over impervious area	IN	0.5	
Required Water Quality Volume	**CF**	**5,057**	

Provided Water Quality Volume

Infiltration Chambers (IC-1)	7,531	CF	Volume below 286.00' Orifice
Infiltration Chambers (IC-2)	4,409	CF	Volume below 288.50' Orifice
Infiltration Basin (IB-1)	150	CF	Volume below 284.50' Orifice
Infiltration Basin (IB-2)	488	CF	Volume below 282.50' Orifice

DESIGN VOLUME PROVIDED	**CF**	**12,578**

Stormwater Management Standard 4
TSS REMOVAL

203 Ayer Road, Harvard, MA
Project No. 211009

Process Train No.	Impervious Area (SF)	BMP Type	TSS Removal Rate	TSS Remaining at Discharge	TSS Removed at Discharge
SC1.1, SC1.2, SC1.3, SC3.3	33,180	CB	25%	75%	25%
		FB-1 / IB-1	80%	15%	**85%**
SC3.1, SC3.2	37,292	CB	25%	75%	25%
		IC-1	80%	15%	**85%**
SC2.1, SC2.2, SC4.1, SC4.3, SC4.4	42,001	CB	25%	75%	25%
		IC-2	80%	15%	**85%**
SC2.3, SC4.2, SC4.5	4,471	CB	25%	75%	25%
		FB-2 / IB-2	80%	15%	**85%**

ABBREVIATIONS:
TSS=total suspended solids; SF=square feet; SC=subcatchment; GC=grassed channel; BMP=best management practices; CB=deep CB=deep sump hooded catch basin; FB = Sediment Forebay; IB=infiltration basin; IC=infiltration chambers

Massachusetts Stormwater Standards

Standard 10 - Illicit Discharge Compliance Statement

Site Address:	203 Ayer Road, Harvard, MA
Owner:	Wheeler Realty Trust
Applicant, if different:	Yvonne Chern & Wheeler Realty Trust
Plan Reference:	Commercial Development Special Permit 203 Ayer Rd
DEP File Number:	CE 177-0711

As required by Standard 10 of the Massachusetts Stormwater Standards, I, the undersigned, being the Owner of the subject property do hereby certify that the stormwater system, as shown on the referenced plan, does not permit any illicit discharges to enter the stormwater management system. I also certify that the existing use of the property does not permit any illicit discharges.

Illicit discharges are discharges not associated with the following: stormwater; water from fire fighting; water line flushing or street washing; landscape watering and irrigation; uncontaminated groundwater; potable water; foundation or footing drains; air conditioning condensate; residential vehicle washing; residential non-detergent building cleaning water, de-chlorinated water from swimming pools; flows from riparian habitats or wetlands.

Further, I certify that the stormwater management system shown on the referenced plan will be maintained in accordance with the Operations and Maintenance Manual submitted with the Notice of Intent and approved by the Conservation Commission.

Signed: Yvonne Chern, GPR, AS AGENT OF OWNER

Print: LIMHUOT TIV — Owner or Authorized Applicant

7/21/22 — Date