STORMWATER REPORT

MINUTEMAN VILLAGE

STOW ROAD
BOXBOROUGH, MASSACHUSETTS

Prepared For: BOXBOROUGH TOWN CENTER, LLC
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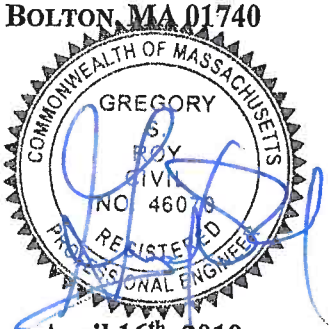

April 16th, 2019
6092

DUCHARME & DILLIS
Civil Design Group, Inc.
CIVIL ENGINEERS • LAND SURVEYORS • WETLAND CONSULTANTS

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1.0 Project Narrative

1.1 Project Type

The applicant Boxborough Town Center, LLC is proposing the construction of a 50-unit Active Adult Homes Development on the south side of Route 111 just northerly of Burroughs Road. The proposed units consist of 50 homes within 25 duplex buildings approximately 2,356 SF in area. The proposed site is located on Assessor's Map 14- lots 46 & 50 (Parcels: 14-046-000 & 14-050-000). The proposed scope of construction also includes a private roadway, the extension of an existing well-access road as a means of temporary construction access, on-site parking, community garden, stormwater management systems, on-site septic systems including a pump station & leaching field & new utility connections and their associated appurtenances.

1.2 Purpose and Scope

This report has been prepared to comply with the requirements of the Stormwater Management Standards incorporated in the Massachusetts Wetlands Protection Act Regulations, 310 CMR 10.00. These standards are intended to promote increased groundwater recharge and prevent stormwater discharges from causing or contributing to the pollution of surface waters and ground waters of the Commonwealth. The standards aim to accomplish these goals by encouraging the greater use of low impact development (LID) techniques and improving the operation and maintenance of stormwater best management practices (BMP).

This report addresses compliance of the proposed development with each of the ten stormwater standards, it provides calculations to support the compliance information, and it provides a Long-Term Pollution Prevention Plan and an Operation and Maintenance Plan for the stormwater management system.

1.3 LID Measures

Care has been taken to lay out the proposed site in a manner that works with existing topography. BMPs, have been used to manage the stormwater runoff. Stormwater from the proposed impervious surface locations are routed to infiltration basins via land flow, curb and gutter systems, or the proposed drainage pipe system. The stormwater basins will reduce run off rates below pre-developed rates while providing water quality pre-treatment by sediment forebays.

1.4 Site Description

As mentioned, the subject site is found on the south side of Route 111 just northerly of Burroughs Road in Boxborough, MA. The undeveloped wooded site is located on Parcels: 14-046-000 & 14-050-000 (62.48 acres). The site consists chiefly of undeveloped wooded areas. Multiple wetland areas as shown on the

attached Site Plans are present on site located to the north of the proposed development. There is one intermittent stream located within the mentioned BVW areas. As such there is no Riverfront Area on the subject property. The NRCS soil survey information indicates that all of the site is underlain by soils classified as belonging to Hydrologic Soil Groups A (Carlton Fine Sandy Loam), B (Charlton-Hollis-Rock outcrop & Hollis-Rock Outcrop-Charlton complex), C (Paxton Fine Sandy Loam) & D (Swansea Muck, Freetown Muck, Ridgebury Fine Sandy Loam & Whitman Fine Sandy Loam).

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

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

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

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

Due to numerous test holes performed within the vicinity of the project, it was determined that the boundary lines of the HSG D Soils depicted via the NRCS web soil survey were not consistent with the in-situ field work. As such, the boundary lines have been adjusted to appropriately correspond with the testing.

Please refer to Appendix C for further information regarding the soils on-site & existing test hole data.

1.5 Proposed Stormwater Management System

Runoff from the proposed development will be conveyed and treated through a combination of Best Management Practices (BMP's). The following is a brief discussion of each conveyance and treatment BMP proposed.

Deep Sump Hooded Catch Basin

Deep sump hooded catch basins are proposed to convey the runoff from the proposed paved areas and roofs to the infiltration basins. These catch basins will discharge to manholes and conventional storm drains.

Infiltration Basin

The infiltration basins are designed to reduce the runoff rates and increase the groundwater recharge rates. Sediment forebays designed at the entrance of each basin were included to decrease the velocity of flow and increase the settlement of heavy solids prior to the infiltration basin. Riprap will also be installed at the inlet of the sediment forebays and the outlet of the basins to control the overflow of stormwater into the adjacent wetlands and reduce the potential for scouring.

Grassed Swales

Proposed swales have been designed to convey the flows from the 100-year frequency event. The grass swales will receive runoff from the rears of the proposed roofs and will convey the stormwater flows to associated proposed infiltration basins. The proposed design of the site has increased the Post-Developed time of concentration in Post 7.A when compared to its Pre-Developed time of concentration. This is due to the chain of drainage swales conveying the runoff from the mentioned roofs to Infiltration Basin 1.

1.6 Methods of Analysis

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) soil cover complex methods (TR-20) were employed to compute runoff quantities for the subject property. Watershed analysis demonstrate that natural drainage patterns drain toward the wetlands (design point). Two design points were modeled to analyze the total runoff from the site. HydroCAD 10.0 computer software was employed in this hydrologic analysis.

A comparison of pre- and post-development runoff quantities at the analysis points were performed in order to design a stormwater management system that will limit peak rates of runoff from the development to predevelopment levels for 24-hour rainfall events of 2-, 10-, 25- and 100-year return frequencies. Watershed boundaries for existing conditions are depicted on the attached Predevelopment Watershed Plan. Post-Developed watershed boundaries are indicated on the Post-development Watershed Plan.

2.0 Stormwater Standards Compliance

2.1 Standard 1 – Untreated Discharge

The stormwater management system for the proposed development will not result in any new discharges of untreated stormwater to wetland resource areas. Stormwater management structures have been designed such that there is no erosion or scour to wetland resource areas or waters of the Commonwealth.

2.2 Standard 2 – Peak Rate Attenuation

Hydrologic calculations for existing and proposed site conditions are included in Appendices D and E respectively. Calculations for 24-hour rainfall events of 2-, 10-, 25- and 100-year return frequencies are provided. The following table provides a summary of peak rates of runoff related to each of these storms for the design point through which all runoff from the subject property must flow. For all rainfall events considered, the proposed stormwater management system will control runoff from the development such that corresponding peak flows at the design point will be lower than pre-developed rates.

Table 1: Wetland Design Point Runoff Summary

	Pre-Developed (ft^3 / sec)	**Post-Developed (ft^3 / sec)**
Design Point "A"		
2-Year	3.26	2.23
10-Year	11.42	5.92
25-Year	18.09	13.95
100-Year	33.96	31.87
Design Point "B"		
2-Year	0	0
10-Year*	0*	0.01*
25-Year	0.02	0.02
100-Year	0.21	0.17

* Design Point B in the Pre-developed condition consists of 91,035 SF of undeveloped woods. Of the 91,035 SF, 79,057 is HSG A & 11,978 SF is HSG B. This results in a weighted CN of 33. Due to the proposed grading & drainage design of the project we have greatly reduced the tributary area of Design Point B to 32,569 SF of undeveloped woods. Of the 32,569 SF, 24,680 SF is HSG A & 7,889 is HSG B. This results in a weighted CN of 36. Using the SCS runoff equation, the HydroCAD model computes a trivial increase in flow & volume during the 10-year return frequency. Due to the tributary area reduction, we do not believe there will be an increase in offsite peak flow or volume.

2.3 Standard 3 – Recharge

NRCS data indicates that the areas within the proposed development consist of soils classified as Carlton Fine Sandy Loam, Charlton-Hollis-Rock outcrop & Hollis-Rock Outcrop-Charlton complex), Paxton Fine Sandy Loam, Swansea Muck, Freetown Muck, Ridgebury Fine Sandy Loam & Whitman Fine Sandy

Loam. As mentioned, due to numerous test holes performed within the vicinity of the project, it was determined that the boundary lines of the HSG D Soils depicted via the NRCS web soil survey were not consistent with the in-situ field work. As such, the boundary lines have been adjusted to appropriately correspond with the testing. Infiltration Basin 1 has been designed with an exfiltration rate of 1.02 inches/hour (Loam soil). Infiltration Basin 2 has been designed with an exfiltration rate of 1.02 inches/hour (Loam soil). Please refer to the attached SWMA Test Hole Data from Stamski And McNary, Inc. in Appendix C.

Recharge calculations can be found in Appendix F.

2.4 Standard 4 – Water Quality

TSS removal calculations have been provided (Appendix F) showing that the proposed TSS removal efficiency from these areas will be 80% using the infiltration basins with the sediment forebay & deep sump hooded catch basin pretreatment. Two TSS calculation sheets have been provided. The sheet with a deep sump catch basin into a sediment forebay shows proper pre-treatment before entering the infiltration basins. The sheet with deep sump catch basin into a infiltration basin shows there is enough TSS removal within the whole system.

2.5 Standard 5 – Land Uses with Higher Pollutant Loads

The current and proposed uses of the subject site do not constitute land use with higher potential pollutant load, thus Standard 5 does not apply to the proposed project.

2.6 Standard 6 –Critical Areas

The proposed project does not contain a stormwater discharge within or near to any of the areas as defined as "Critical Areas" at 314 CMR 9.02 and 310 CMR 10.04.

2.7 Standard 7 – Redevelopment

The proposed project does not meet the standards to be considered a Redevelopment project.

2.8 Standard 8 – Construction Period Pollution Prevention Plan and Erosion and Sediment Control

Since the project is subject to the filing of an Environmental Protection Agency Notice of Intent (EPA NOI), and the work will be pursuant to the NPDES Construction General Permit for disturbance to an area greater than 1 acre, a copy of the Stormwater Pollution Prevention Plan (SWPPP) will be submitted prior to construction. The SWPPP will satisfy the Standard 8 Construction Period

Pollution prevention. And Erosion and Sediment Control Plan is included in the attached Site Plans.

2.9 Standard 9 – Operation and Maintenance Plan

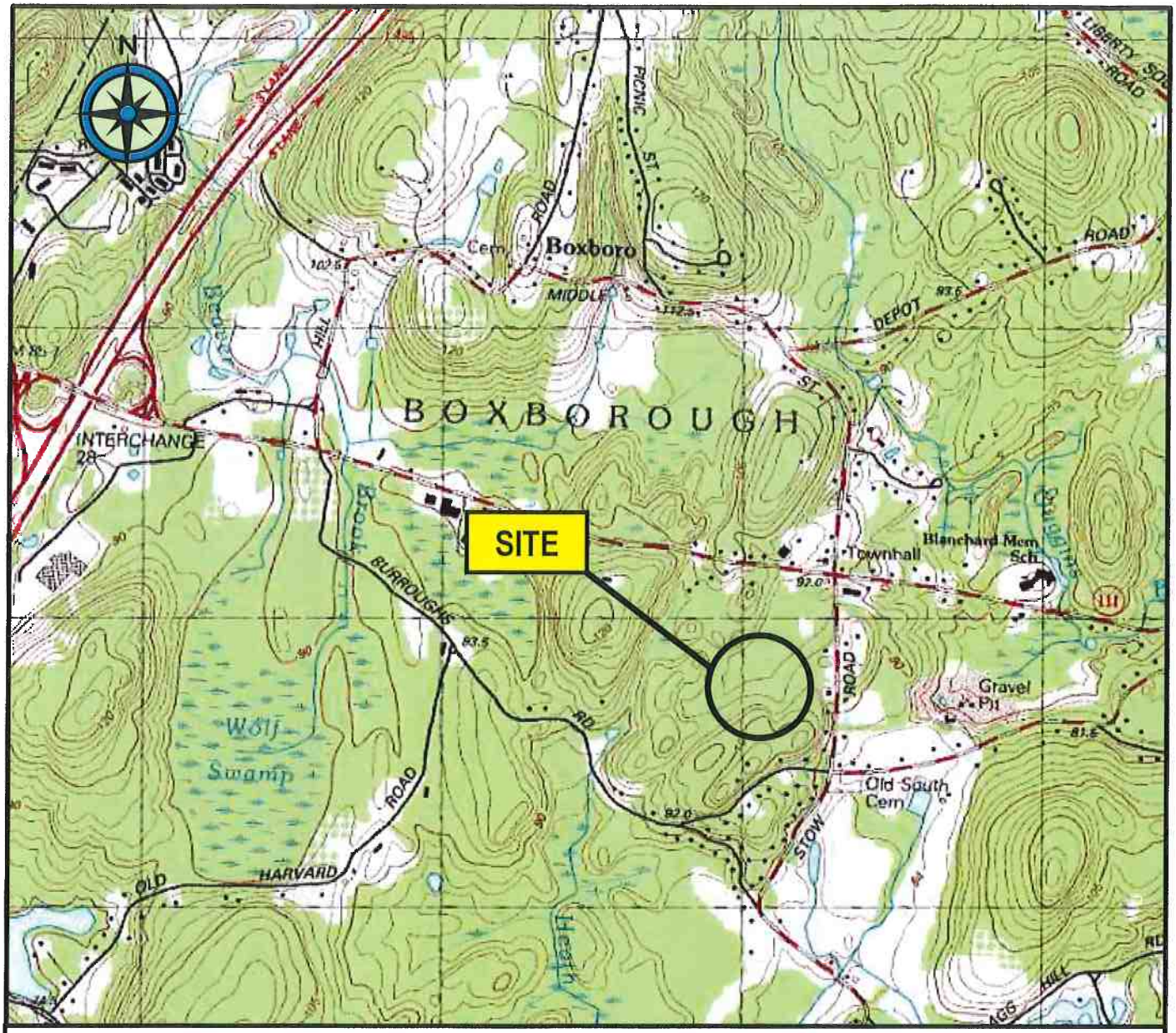
Refer to Appendix H for a complete copy of the Stormwater Operation and Maintenance Plan.

2.10 Standard 10 – Prohibition of Illicit Discharge

An illicit discharge statement will be prepared after approvals are received and prior to construction.

3.0 Appendices

Appendix A - Locus Map



Locus Map
NOT TO SCALE

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Date: 4/16/2019
CDG #: 6092

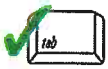
Appendix B - Checklist for Stormwater Report

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

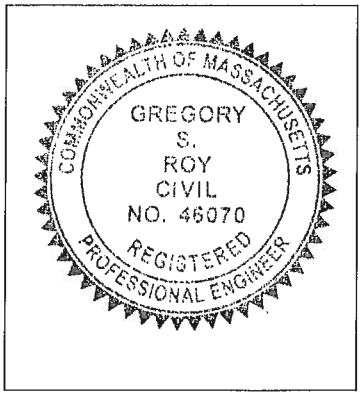
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



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Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

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

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

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

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

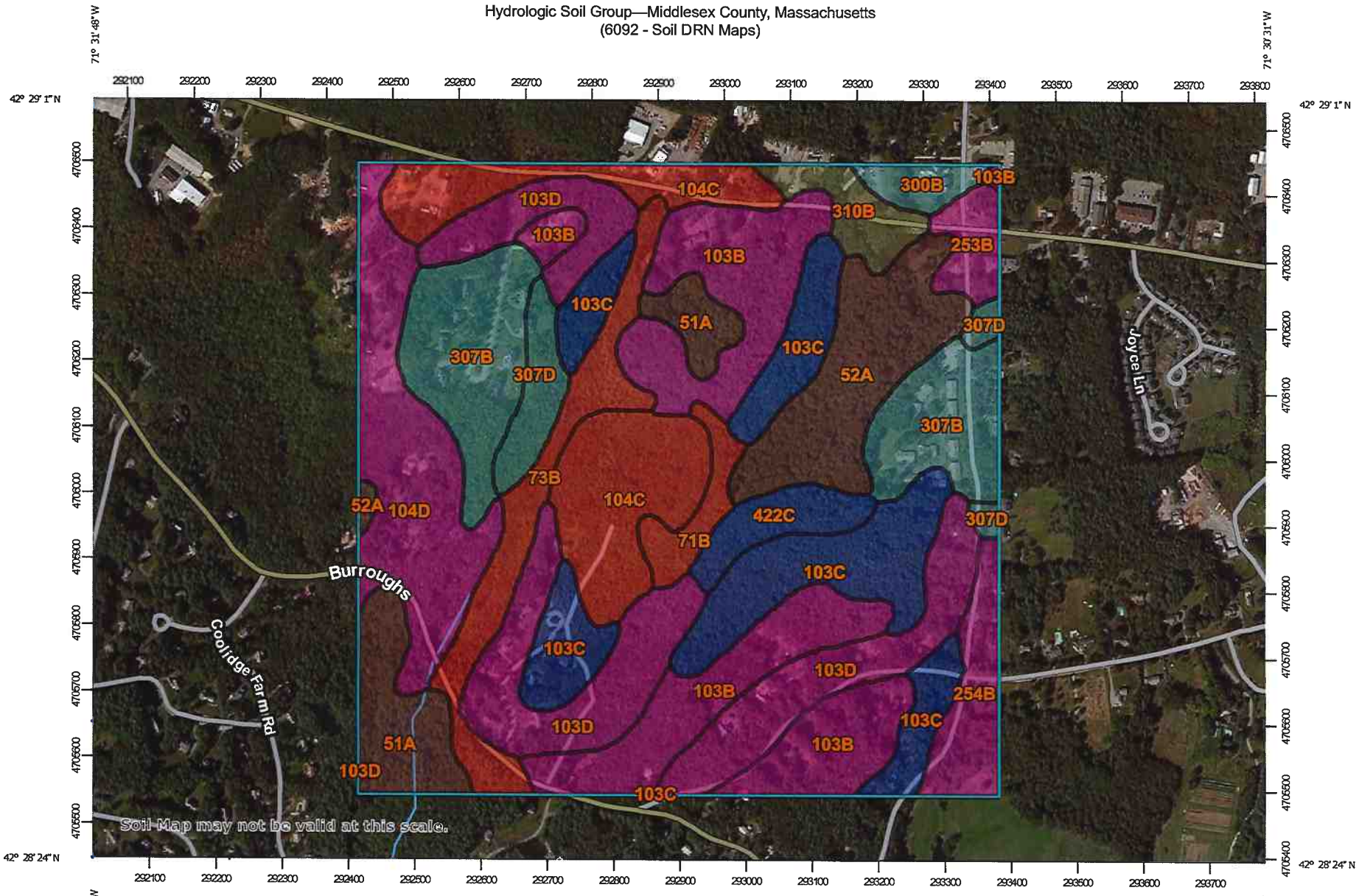
☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Appendix C - Soils Data

Hydrologic Soil Group—Middlesex County, Massachusetts
(6092 - Soil DRN Maps)



Map Scale: 1:8,080 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

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 Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 18, Sep 7, 2018

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

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
51A	Swansea muck, 0 to 1 percent slopes	B/D	11.3	4.9%
52A	Freetown muck, 0 to 1 percent slopes	B/D	15.6	6.8%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	3.7	1.6%
73B	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	11.8	5.1%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	35.3	15.4%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	27.8	12.1%
103D	Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes	A	31.5	13.8%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	21.7	9.5%
104D	Hollis-Rock outcrop-Charlton complex, 15 to 25 percent slopes	A	20.1	8.8%
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	3.5	1.5%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	6.6	2.9%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	C	2.7	1.2%
307B	Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony	C	22.6	9.9%
307D	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	C	5.6	2.4%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	4.5	2.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	4.7	2.0%
Totals for Area of Interest			**228.9**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

DEP has provided this form for use by on-site professionals and local Boards of Health. Other forms may be used, but the information must be substantially the same as provided here. Before using this form, check with your local Board of Health to determine the form they use.

A. Facility Information

1. Facility Information

Owner Name: BOXBOROUGH TOWN CENTER, LLC

Street Address: _____ Map/Lot: _____

City/Town: ACTON State: MA Zip Code: _____

* STORMWATER EVALUATIONS ONLY *
9/20/2016 16-1 ⇒ 16-15
9/21/2016 16-16 ⇒ 16-34
9/30/2016 16-35 ⇒ 16-56

B. Site Information

1. (Check one) New Construction ☒ Upgrade ☐ Repair ☐

2. Published Soil Survey available? Yes ☐ No ☐ If yes: Year Published _____ Publication Scale _____ Soil Map Unit _____

Soil Name _____ Soil limitations _____

3. Surficial Geological Report available? Yes ☐ No ☐ If yes: Year Published _____ Publication Scale _____ Map Unit _____

Geologic Material _____ Landform _____

4. Flood Rate Insurance Map:

Above the 500 year flood boundary? Yes ☒ No ☐ Within the 100 year flood boundary? Yes ☐ No ☒

Within the 500 year flood boundary? Yes ☐ No ☒ Within a Velocity Zone? Yes ☐ No ☐

5. Wetland Area: National Wetland Inventory Map Map Unit: LOWING Name: WETLANDS CONFIRMED ON-SITE

Wetlands Conservancy Program Map Map Unit: _____ Name: _____

City/Town of

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ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-1 | 9/20/2016 (Date) | _____ (Time) | OVERCAST 70° (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) WITHIN SWALE

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones | Slope (%)

PINE, HARDWOOD (Vegetation) | Landform | Position on landscape (attach sheet)

3. Distances from: Open Water Body — feet | Drainage Way — feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well 60' feet | Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit: — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 60" _____

Deep Observation Hole Number: 16-1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL	—	—	M	F	20% BOULDERS
20	B	10YR 5/6	—	—	—	SL			M	F	
66	C_1	2.5Y 7/4	60	5YR 5/8	75	LS		2C	M	F	2D
170	C_2	2.5Y 6/3				SL		SS	M	F	BOULDERS

Additional Notes STORM-WATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
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C. On-Site Review *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-2 | 9/20/2016 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

   Ground Elevation at Surface of Hole ____

   Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones ____ | Slope (%) ____

   MAPLE, PINE (Vegetation) | Landform ____ | Position on landscape (attach sheet) ____

3. Distances from: Open Water Body ____ feet | Drainage Way ____ feet | Possible Wet Area >100 feet

   Property Line ____ feet | Drinking Water Well ____ feet | Other: ____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit ____ | Depth Standing Water in Hole ____

   Estimated Depth to High Groundwater: 30" | ____

Deep Observation Hole Number: 16-2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
26	A FILL	FILL	—	—	—	SL	—	10S	M	F	BOULDERS PERVASIVE
30	B	10YR 5/6	C	—	—	SL	—	—	M	F	
48	C_1	2.5Y 6/4	30	5YR 5/8	>5	SL	—	5S	M	F	20 BLDRS
120	C_2	2.5Y 6/3				SL	—	—	M	F	

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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ACTON, MA 01720
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700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-3 | 9/20/2016 (Date) | _____ (Time) | OVERCAST 70° (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones _____ | Slope (%) _____

PINE, HARDWOOD (Vegetation) | Landform _____ | Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 60" | _____

Deep Observation Hole Number: 16-3

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	LARGE BOULDERS
22	B	10YR 5/6	—	—	—	SL	—	—	M	F	
60	C1	2.5Y 6/4	60	5YR 5/8	>5	SL		5%	M	F	
96	C2	2.5Y 6/3				SL			M	F	
	BOULDERS										

Additional Notes STORM-WATER SOIL OBSERVATIONS

RICHARD J. HANNINGTON, P.E., MA SE 1012

City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-4 | 9/20/2016 (Date) | _____ (Time) | OVERCAST 70° (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   HARDWOOD (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 | 120+/- feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: 55

Deep Observation Hole Number: 16-4

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL	—	5S	M	F	LARGE BOULDERS
20	B	10YR 5/6	—	—	—	SL	—		M	F	
120	C	2.5Y 6/3	55	5YR 5/8	>5	LS	2G	5C	M	F	BOULDERS

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

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C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-5 | 9/20/2016 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones _____ Slope (%) _____

Vegetation _____ Landform _____ Position on landscape (Attach sheet) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes; Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit ____ Depth Standing Water in Hole ____

Estimated Depth to High Groundwater: 48

Deep Observation Hole Number: 16-5

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 BOULDERS
22	B	10YR 5/6	—	—	—	SL	—	—	M	F	LARGE
36	C_1	2.5Y 7/6	—	—	—	LS	—	5C	M	F	
120	C_2	2.5Y 6/3	40	5YR 5/6	>5	SL	3G	10S	M	F	
							2C				

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

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C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-6 | 9/20/2016 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

   Ground Elevation at Surface of Hole ____

   Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) ____ (Surface Stones) ____ (Slope (%))

   ____ (Vegetation) ____ (Landform) ____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body ____ feet | Drainage Way ____ feet | Possible Wet Area >100 feet

   Property Line ____ feet | Drinking Water Well ____ feet | Other ____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 50"

Deep Observation Hole Number: 16-6

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5	A	10YR 3/2	—	—	—	SL		—	M	F	LARGE BOULDERS
21	B	10YR 5/6	—	—	—	SL		—	M	F	
44	C_1	2.5Y 7/4	—	—	—	LS		5% 2C	M	F	
130	C_2	2.5Y 6/3	50	5YR 5/8	>5	SL	3G		M	F	LARGE BOULDERS

Additional Notes: STORM-WATER SOIL OBSERVATIONS

RICHARD J. MCNARY, P.E., MA SE 1012

City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-7 | 9/20/2016 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones _____ | Slope (%) _____

Vegetation _____ | Landform _____ | Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit: — | Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 50"

Deep Observation Hole Number: 16-7

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL	—	—	M	F	LARGE
18	B	10YR 5/6	—	—	—	SL	—	—	M	F	BOULDERS
102	C	2.5Y 6/3	50	5YR 5/8	>5	LS	5G	2C 5S	M	F	GRAVELLY
102	R									BOULDERS	

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HANNIGAN, P.E., MA SE 1012

City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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700 & 800 MASSACHUSETTS AVE

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1000 Main Street
ACTON, MA 01720
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C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-8 | 9/20/2014 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones _____ | Slope (%) _____

   Vegetation _____ | Landform _____ | Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 54

Deep Observation Hole Number: 16-8

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL			M	F	
18	B	10YR 5/6	—	—	—	SL			M	F	
108	C	2.5Y	54	5YR 5/8	>5	LS	5G	2C 2S	M	VFM FMANY	
108	R					POCKETS MEDIUM SAND					

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-9 | Date: 9/20/2016 | Time: | Weather: OVERCAST 70°

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones | Slope (%)

   Vegetation | Landform | Position on landscape (attach sheet)

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other: _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 44

Deep Observation Hole Number: 16-9

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL	—	—	M	F	
23	B	10YR 5/6	—	—	—	SL	—	—	M	F	LARGE BOULDERS
108	C	2.5Y 6/3	44			LS	5G	5S 2C	M	F	

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

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ACTON, MA 01720
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BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-10 Date: 9/20/2014 Time: _____ Weather: OVERCAST 70°

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones _____ Slope (%) _____

Vegetation _____ Landform _____ Position on landscape (class shown)

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 53

Deep Observation Hole Number: 16-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Course Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL			M	F	Lngl
19	B	10YR 5/6	—	—	—	SL			M	F	Boulders
94	C	2.5Y 6/3	53	5YR 5/8	>5	LS	5G	2C 5S	M	F	
94	R										

Additional Notes: STORM-WATER SOIL OBSERVATIONS
RICHARD J. HANNINGTON, P.E., MA SE 1012
SOIL LOGS BY ENVIRON

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-11 | 9/20/2016 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones | Slope (%)

Vegetation | Landform | Position on landscape (attach sheet)

3. Distances from: Open Water Body ____ feet | Drainage Way ____ feet | Possible Wet Area >100 feet

Property Line ____ feet | Drinking Water Well ____ feet | Other ____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit: — Depth Standing Water in Hole: —

Estimated Depth to High Groundwater: 60

Deep Observation Hole Number: 16-11

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Course Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL	—		M	F	LARGE
16	B	10YR 5/6	—	—	—	SL	—		M	F	BOULDERS
100	C	2.5Y 6/3	60	5YR 5/8	>5	LS	50	5C 2-5	M	VERY FRIABLE	
100	R										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HANNIGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-12 | 9/20/2016 (Date) | ____ (Time) | OVERCAST 70° (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ (Surface Stones) | _____ (Slope (%))

_____ (Vegetation) | _____ (Landform) | _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☑

If Yes: Disturbed Soil ☐ | Fill Material ☐ | Impervious Layer(s) ☐ | Weathered/Fractured Rock ☐ | Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 44

Deep Observation Hole Number: 16-12

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3	A	10YR 3/2	—	—	—	SL	—	—	M	F	
15	B	10YR 5/6	—	—	—	SL	—	—	M	F	
72	C	2.5Y 6/3	44	5YR 5/8	>5	LS	5g	2C 2S	M	VERY FRIABLE	
72	R										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HANNIGAN, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-13 | 9/20/2016 | — | OVERCAST 70°
(Date | Time | Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones | Slope (%)

Vegetation | Landform | Position on landscape (attach sheet)

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ | Fill Material ☐ | Impervious Layer(s) ☐ | Weathered/Fractured Rock ☐ | Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 40

Deep Observation Hole Number: 16-13

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3	A	10YR 3/2	—	—	—	SL	—	—	M	F	LARGE
16	B	10YR 5/6	—	—	—	SL	—	—	M	F	BOULDERS
74	C	2.5Y 6/3	40	5YR 5/8	>5	LS	—	20 25	M	F	
74	R										

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON P.E., MA SE 1012

City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-14 | 9/20/2016 | _____ | OVERCAST 70°
(Date) (Time) (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ Surface Stones | _____ Slope (%)

_____ Vegetation | _____ Landform | _____ Position on landscape (attach sheet)

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

Estimated Depth to High Groundwater: _____ _____

Deep Observation Hole Number: 16-14

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5	A	10YR 3/2	—	—	—	SL	—	—	M	F	LARGE ROOTS
14	B	10YR 5/6	—	—	—	SL	—	—	M	F	
106	C	2.5Y 4/3	42	5YR 5/8	>5	LS	—	3C 2.5	M	F	BLDRS
106	R										

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HANNIGAN, P.E., MA SE 1012

City/Town of

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700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-15 | 9/20/2016 (Date) | _____ (Time) | OVERCAST 70° (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 42

Deep Observation Hole Number: 16-15

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL	—	—	M	F	LARGE
15	B	10YR 5/6	—	—	—	SL	—	—	M	F	BOULDERS
109	C	2.5Y 4/2	42	5YR 5/8	>5	LS	—	25 20	M	F	
109	R	L									

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HANNINGTON, P.E., MA SE 1012

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City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-16 | 9/21/2016 (Date) _____ (Time) Sm 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 40

Deep Observation Hole Number: 16-16

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 BLDR
20	B	10YR 5/6	—	—	—	SL	—	—	M	F	
108	C	2.5Y 6/4	40	5YR 5/8	>5	LS	—	SC	M	F	
	BOULDERS										

Additional Notes STORM-WATER SOIL OBSERVATIONS

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Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-17-9 | 21 | 2016 (Date) _____ (Time) SM 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 24

Deep Observation Hole Number: 16-17

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	
15	B	10YR 5/6	—	—	—	SL	—	—	M	F	
50	C_1	2.5Y 6/4	24	5YR 5/6	>10	LS	—	—	M	F	
100	C_2	2.5Y 6/3				SL	—	—	M	F	
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON P.E. MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-18 | 9/21/2016 (Date) | _____ (Time) | SM 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ (Surface Stones) | _____ (Slope (%))

   _____ (Vegetation) | _____ (Landform) | _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☑

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

   If Yes: Depth Weeping from Pit _____ | Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: _____ _____

Deep Observation Hole Number: 16 - 18

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5	A	10YR 3/1	—	—	—	SL	—	—	M	F	10 BLDR
16	B	10YR 7/2	—	—	—	SL	—	—	M	F	
55	C_1	2.5Y 6/3	18"	High CHROMA	>20	LS	POCKETS SAND	—	M	F	
96	C_2	2.5Y 6/4				SL		2C 5S			
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HAMILTON, P.E., MA SE 1017

City/Town of

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700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-19 | 9/21/2016 (Date) ____ (Time) SM 80 (Weather)

1. Location

Ground Elevation at Surface of Hole ____

Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) ____ (Surface Stones) ____ (Slope (%))

(Vegetation) ____ (Landform) ____ (Position on landscape (sketch sheet)) ____

3. Distances from: Open Water Body ____ feet Drainage Way ____ feet Possible Wet Area >100 feet

Property Line ____ feet Drinking Water Well ____ feet Other ____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 24

Deep Observation Hole Number: 16 - 19

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	10 STONES
14	B	10YR 5/6	—	—	—	SL	—	—	M	F	
30	C1	2.5Y 7/4	24	5YR 5/6	>20	LS	—	—	M	F	
100	C2	2.5Y 7/2				LS	FEW FINE	FEW GRAVEL	M SAND	F	
	NO	REFUSAL									

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON P.E., MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-20 | 9/21/2016 (Date) | ____ (Time) | SUN 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole ____

   Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) ____ (Surface Stones) ____ (Slope (%)) ____

   ____ (Vegetation) ____ (Landform) ____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body ____ feet Drainage Way ____ feet Possible Wet Area >100 feet

   Property Line ____ feet Drinking Water Well ____ feet Other ____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit ____ Depth Standing Water in Hole ____

   Estimated Depth to High Groundwater: 76 ____

Deep Observation Hole Number: 16-20

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5	A	10YR 3/2	—	—	—	SL	—		M	1st	ZONE BLDRS
16	B	10YR 5/6	—	—	—	SL			M	F	
60	C_1	2.5Y 6/4	—	—	—	LS	2G	5S 2C	M	F	
76	C_2	2.5Y 5/4	—	—	—	COARSE SAND	15G	2C	M	VERY FRIABLE	
120	C_3	2.5Y 6/2	76	5YR 5/8	>5	SL					

Additional Notes STORMWATER SOIL OBSERVATIONS

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City/Town of

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(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-Z | 9 | 21 | 2016 (Date) _____ (Time) Sm 80 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 20

Deep Observation Hole Number: 16-Z1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL			M	F	10 ROOTS
16	B	10YR 5/6				SL			M	F	
76	C	2.5Y 6/4	20	5YR 5/6	>5	LS		20C 10S	M		
	NO	REFUSAL									

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON P.E., MA SE 1012

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City/Town of

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C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-709 | 21 | 2016 (Date) _____ (Time) SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 24

Deep Observation Hole Number: 16-22

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Course Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	A	10YR 3/2	—	—	—	SL	—	—	M	F	ROOTS
18	B	10YR 5/6	—	—	—	SL	—	—	M	F	
120	C	2.5Y 6/4	24	5YR 5/8	>5	LS	20	10C 2S	M	F	

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HAMMINGTON, P.E., MA SE 1017

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-23 | 21 | 2016 (Date) _____ (Time) SUN 90 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 24

Deep Observation Hole Number: 16-23

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL		—	M	F	20 BLDR
16	B	10YR 5/6		—	—	SL			M	F	
84	C	2.5Y 7/2	24	5Y 5/8	>10	LS FINE		5C	M	F	BLDRS
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON, P.E., MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-24 | 9 | 21 | 2016 (Date) _____ (Time) SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 18

Deep Observation Hole Number: 16-24

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3	A	10YR 3/1	—	—	—	SL			M	F	LARGE BLDRS
12	B	10YR 4/2	—	—	—	SL			M	F	
60	C1	2.5Y 6/2	18	HIGH LOW	>10	LS	PREVAL GRAVEL	5% 5%	M	F	BLDR
138	C2			COMMON		SL					
132											

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON P.E., MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-25 | 9/21/2016 (Date) _____ (Time) Sm 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 26

Deep Observation Hole Number: 16 - 25

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
16	A	10YR 3/2	—	—	—	SL	—	—	M	F	LARGE BOULDERS
24	B	10YR 6/4	—	—	—	SL	—	—	M	F	
84	C	2.5Y 6/3	26	Few ORANGE	>5	LS	—	5%	M	F	BLDR

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HANNIGAN P.E., MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-269 | 21 | 2016 (Date) _____ (Time) SM 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 40

Deep Observation Hole Number: 16-26

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3	A	10YR 3/2	—	—	—	SL	—	—	M	FR	
15	B	10YR 5/6	—	—	—	SL	—	—	M	F	
100	C	2.5Y 6/4	40	5YR 5/8	>5	LS	—	10S	M	F	
100	R										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HANLINGTON P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-27 | 9 | 21 | 2016 (Date) _____ (Time) Sun 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope %)

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: 48

Deep Observation Hole Number: 16-27

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 BLDR
14	B	10YR 5/6	—	—	—	SL	—	—	M	F	
63	C	2.5Y 6/4	40	5YR 5/6	>5	LS	—		M	F	
63	R										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-289 | 21 | 2016 (Date) _____ (Time) SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☑

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 40

Deep Observation Hole Number: 16-28

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 BLDR
12	B	10YR 5/6	—	—	—	SL	—	—	M	F	
40	C_1	2.5Y 6/4	—	—	—	LS	—	—	M	F	
84	C_2	2.5Y 6/2	40	5YR 5/8	>5	FINE SAND	ROCKS & GRAVEL		M	VERY FRIABLE	
108	C_3					LS			M	F	

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-29 | 9/21/2016 (Date) | _____ (Time) | SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ (Surface Stones) | _____ (Slope (%))

   _____ (Vegetation) | _____ (Landform) | _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 30

Deep Observation Hole Number: 16 - 29

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—	SL			M	FR	20 BLDR
14	B	10YR 5/6	—	—	—	SL			M	FR	
60	C_1	2.5Y 6/2	30	5YR 5/8	>5	FINE SAND			M	FR	—
120	C_2	2.5Y 6/3				LS	GRAVELLY	10%			

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-30 | 9/21/2016 (Date) | _____ (Time) | SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ (Surface Stones) | _____ (Slope (%))

   _____ (Vegetation) | _____ (Landform) | _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 38

Deep Observation Hole Number: 16-30

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 ROOTS
14	B	10YR 5/4	—	—	—	SL	—	—	M	F	
76	C_1	2.5Y 6/3	30"	5YR 5/8	>5	LS	—	—	M	F	20 BLDR.
120	C_2	2.5Y 6/2				LS	5G	10 S	M	F	

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HANNIGAN P.E., MA SE 1017

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN COUNCIL, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-31 | 9/21/2016 (Date) | _____ (Time) | SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | Surface Stones _____ | Slope (%) _____

   Vegetation _____ | Landform _____ | Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 30' | _____

Deep Observation Hole Number: 16-31

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	LOAM 3/2	—	—	—	SL	—	—	M	F	SURFACE BOULDERS
16	B	10YR 5/6	—	—	—	SL	—	—	M	F	
70	C_1	2.5Y 6/2	30"	5Y 5/6	>5	LS			M	F	
120	C_2	2.5Y 6/3				LS			M	F	

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-329 | 21 | 2016 | _____ | Sm 90
(Date | Time | Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ Surface Stones _____ Slope (%) _____

   Vegetation _____ Landform _____ Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: _____ _____

Deep Observation Hole Number: 16-32

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
5	A	10YR 3/2				SL			M	F	
15	B	10YR 5/6				SL			M	F	
59	C	2.5Y 5/3	31		75	LS			M	F	
59	R										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-339 | 21 | 2016 (Date) _____ (Time) Sun 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: PROGLACIAL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 130 OR BELOW

Deep Observation Hole Number: 16-33

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL			M	F	
18	B	10YR 5/6	—	—	—	SL			M	F	
130	C	2.5Y 6/3	—	SEE GWC WELL INFO		MEDIUM SAND		25	SG	LOOSE	

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1017

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-34 | 9/21/2016 (Date) | _____ (Time) | Sun 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ (Surface Stones) | _____ (Slope (%))

   _____ (Vegetation) | _____ (Landform) | _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

   Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

   If Yes: Depth Weeping from Pit _____ | Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: 72

Deep Observation Hole Number: 16-34

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 BLDR
	B	10YR 5/4	—	—	—	SL	—	10C	M	F	
72	C	2.5Y 6/1	—	—	—	LS					
	BOULDERS										

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HAMILTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-359 | 30 | 2016 (Date) _____ (Time) Sun 90 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 14"

Deep Observation Hole Number: 16 - 35

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
10	A	10YR 2/2	—	—	—	SL			M	F	LO STONES
19	B	10YR 5/6	14	Low Chroma	>5	SL			M	F	
41	C1	2.5Y 6/2			>20	SL	5%		M	F	
120	C2	2.5Y 6/4				COARSE TO MEDIUM					
						WASHED LOAMY SAND					

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. MCNARY, P.E., MA SE 1012

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BUXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-36 | 9/30/2014 (Date) _____ (Time) SUN 90 (Weather)

1. Location
   Ground Elevation at Surface of Hole _____
   Location (Identify on Plan) _____
2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))
   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))
3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet
   Property Line _____ feet Drinking Water Well _____ feet Other _____
4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒
   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐
5. Groundwater Observed: Yes ☐ No ☒
   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —
   Estimated Depth to High Groundwater: 14

Deep Observation Hole Number: 16-36

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
10	A	10YR 2/2	—	—	—	SL	—	—	M	F	5 BOULDERS
17	B	10YR 5/6	14	LOW CHROMA	>5	SL	—	—	M	F	
36	C_1	2.5Y 4/2		5YR 5/8	>20	SL			M	F	
84	C_2	2.5Y 6/4				SAND VARIEGATED	30	55 50	M	VERY FRIABLE	
120	C_3	2.5Y 6/2				MEDIUM TO COARSE			M	F	20 BLDR
						C_3 SL					

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. MCNARY P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-379 | 30 | 2016 (Date) _____ (Time) Sm 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: 44

Deep Observation Hole Number: 16-37

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	
12	B	10YR 5/6	—	—	—	SL	—	—	M	F	
38	C1	2.5Y 6/4	—	—	—	COARSE SAND	10G	5C	M	VSM FRIABLE	
72	C2	2.5Y 6/3	44	5YR 5/8	>5	LOAMY SAND			M	F	
112	C3	2.5Y 6/2				SANDY LOAM			M	F	
	BOULDER										

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, PE, MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-39 | 9/30/2016 (Date) ____ (Time) Sun 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole ____

   Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) ____ (Surface Stones) ____ (Slope (%))

   ____ (Vegetation) ____ (Landform) ____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body ____ feet Drainage Way ____ feet Possible Wet Area >100 feet

   Property Line ____ feet Drinking Water Well ____ feet Other ____

4. Parent Material: GLACIAL OUTWASH Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 112

Deep Observation Hole Number: 16-39

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	
12	B	10YR 5/6	—	—	—	SL	—	—	M	F	
48	C_1	2.5Y 6/6	—	—	—	LS	—	—	M	F	
72	C_2	2.5Y 6/4	—	—	—	COARSE SAND	15G	2C	M	VERY LOOSE	
112	C_3	2.5Y 6/6				MEDIUM SAND	VARIEGATED COLORS		M	VERY LOOSE	
120	C_4	2.5Y 6/2				SL					

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. MCNARY, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review · *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-39 | 9/30/2016 (Date) _____ (Time) SUN 90 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sketch))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: PROGLACIAL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 96

Deep Observation Hole Number: 16-39

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—	—	M	F	
12	B	10YR 5/6	—	—	—	LS	—	—	M	F	
60	C1	2.5Y 6/4	—	—	—	COARSE SAND	15G	2C	M	VERY LOOSE	
96	C2	2.5Y 6/6	—	—	—	MEDIUM SAND	—		M	VERY FRIABLE	
120	C3	2.5Y 6/2	96		>5	SL	—	5S	M	F	

Additional Notes STORM WATER SOIL OBSERVATIONS
RICHARD J. HAMILTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-40 | 9/30/2016 (Date) | ____ (Time) | SUN 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole ____

   Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) ____ (Surface Stones) ____ (Slope (%))

   ____ (Vegetation) ____ (Landform) ____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body ____ feet Drainage Way ____ feet Possible Wet Area >100 feet

   Property Line ____ feet Drinking Water Well ____ feet Other ____

4. Parent Material: PROGLACIAL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 140+

Deep Observation Hole Number: 16 - 40

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—	—		—	—	M		
10	B	10YR 5/6	—	—	—		—	—	M		
70	C_1	2.5Y 6/3	—	—	—	COARSE SAND	15%	3%	M	VERY LOOSE	
140	C_2	2.5Y 6/6	—	—	—	MEDIUM SAND	—	—	M	VERY LOOSE	

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, PE, MA SE 1012

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review · *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-41 | 9/30/2014 (Date) | ____ (Time) | Sm 80 (Weather)

1. Location
   - Ground Elevation at Surface of Hole ____
   - Location (Identify on Plan) ____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) ____ (Surface Stones) ____ (Slope (%))
   ____ (Vegetation) ____ (Landform) ____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body ____ feet | Drainage Way ____ feet | Possible Wet Area >100 feet
   Property Line ____ feet | Drinking Water Well ____ feet | Other ____

4. Parent Material: PROGLACIAL | Unsuitable Materials Present: Yes ☐ No ☒
   If Yes: Disturbed Soil ☐ | Fill Material ☐ | Impervious Layer(s) ☐ | Weathered/Fractured Rock ☐ | Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒
   If Yes: Depth Weeping from Pit ____ | Depth Standing Water in Hole ____
   Estimated Depth to High Groundwater: 104

Deep Observation Hole Number: 16-41

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
4	A	10YR 3/2	—	—		SL	—	—	M		
9	B	10YR 5/6	—	—	—	LS	—	—	M		
94	C	2.5Y 6/4	—	—	—	MEDIUM COARSE SAND	10G		M	VERY FRIABLE	
132	C_2	2.5 6/3	104	5YR 5/8	>5	FINE LOAMY SAND			M		

Additional Notes: STORMWATER SOIL OBSERVATIONS
RICHARD J. MCNARY, P.E., MA SE 1012

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review · *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-429 | 30 | 2016 (Date) _____ (Time) Sm Su (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GWCGM - TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Estimated Depth to High Groundwater: 22 _____

Deep Observation Hole Number: 16-42

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	Ap	10YR 3/2	—	—	—	SL	—	—	M	F	
10	B	10YR 5/6	—	—	—	LS	—	—	M	F	
36	C1	2.5Y 6/6	22	5YR 5/8	>5	FINE LS	—	—	M	F	
72	C2	2.5Y 6/4				MEDIUM SAND			M	VERY FRIABLE	
105	C3	2.5Y 6/2				SL			M	F	
	BOULDER										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-43 | 9/30/2016 (Date) _____ (Time) SUN 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: PROGLACIAL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 54

Deep Observation Hole Number: 16-43

Depth (in)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	Ap	10YR 3/2	—	—	—	SL			M	F	
12	Bw	10YR 5/6	—	—	—	SL			M	F	
12-24	Bc	2.5Y 6/6	—	—	—	FINE LS			M	F	
114	C1	2.5Y 6/4	54	5YR 5/8	>5	MED-FINE SAND	50	25		VERY FRIABLE	
124	C2	2.5Y 6/2				SL					

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. MCNARY, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-449 | 30 | 2014 (Date) _____ (Time) Sun 80 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: PROGLACIAL Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 42

Deep Observation Hole Number: 16 - 44

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	A	10YR 3/2	—	—	—	SL	—	—	M	F	10 BLDR
18	B	10YR 5/6	—	—	—	SL	—	—	M	F	
72	C_1	2.5Y 6/4	42	low Common	>5	medium SAND	—	—	M	very FRIABLE	
100	C_2	2.5Y 6/2				SL			M	F	
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. MCNARY, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-459 | 30 | 2014 (Date) _____ (Time) Sm 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 24

Deep Observation Hole Number: 16-45

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	Ap	10YR 3/2	—	—	—	SL	—	—	M	F	
24	Bw	10YR 5/6	—	—	—	SL	—	—	M	F	
72	C	2.5Y 6/2	24		>10	SL	—	—	M	Firm	
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARKINS, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

Boxborough Town Center, LLC
700 & 800 Massachusetts Ave

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-469 | 30 | 2014 (Date) _____ (Time) Sm 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 24

Deep Observation Hole Number: 16-46

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
9	Ap	10YR 3/2	—	—	—	SL	—	—	M	F	
15	Bw	10YR 5/6	—	—	—	SL	—	—	M	F	
98	C	2.5Y 5/3	24		>10	SL	—	—	M	FIRM	

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-479 | 30 | 2016 (Date) _____ (Time) SM 90 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit ___ Depth Standing Water in Hole ___

   Estimated Depth to High Groundwater: 32

Deep Observation Hole Number: 16-47

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
10	Ap	10YR 3/2	—	—	—	SL	—	—	M	F	10 STONES
24	Bw	10YR 5/6	—	—	—	SL	—	—	M	F	
100	C	2.5Y 6/3	32	Low Chroma	>10	SL	5%	—	M	Firm	
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HANNIKAINEN, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

C. On-Site Review

(minimum of two holes required at every proposed disposal area) 60

Deep Observation Hole Number: 16-4 | 8 9 | 30 | 2014 (Date) _____ (Time) SM (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 36

Deep Observation Hole Number: 16-48

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	Ap	10YR 3/2	—	—	—	SL			M	F	20 BLDRS
14	B	10YR 5/6	—	—	—	SL			M	F	
36	C_1	2.5Y 6/4	36	5YR 5/8	>5	LS			M	Firm	
100+	C_2	2.5Y 6/3				SL					
	NO REFUSAL										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. MCNARY, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

Boxborough Town Center, LLC
700 & 800 Massachusetts Ave

C. On-Site Review · *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-49 | 30 | 2016 (Date) _____ (Time) Sun 60 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: Woodland (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

_____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 30

Deep Observation Hole Number: 16 - 49

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Course Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 Roots
14	B	10YR 5/6	—	—	—	SL	—	—	M	F	
48	C1	2.5Y 6/6	30	low chroma	>5	LS	—	—	M	Firm	
58	C2	2.5Y 6/3				SL	—	—	M	Firm	
110	C3	2.5Y 6/2				SL	5%	—	M	Firm	
	M	Parent									

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

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STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-509 | 30 | 2016 (Date) _____ (Time) Sun 60 (Weather)

OVERCAST

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 30

Deep Observation Hole Number: 16-50

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 BLDR
24	B	10YR 5/6	—	—	—	SL	—	—	M	F	
80	C	2.5Y 6/3	30	5YR 5/8	>5	SL	—	—	M	Firm	
	NO VERY										

Additional Notes STORMWATER SOIL OBSERVATIONS

RICHARD J. HARRINGTON P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-51 | 9/30/2016 (Date) _____ (Time) SUN 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☐

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: _____ _____

51"

Deep Observation Hole Number: 16-51

Depth (in)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
10	A	10YR 3/2	—	—	—	SL			M	F	
20	B	10YR 5/6	—	—	—	SL			M	F	
50	C	2.5Y 6/3	24		>20	SL			M	Firm	
50	R					SL					

Additional Notes STORM WATER SOIL OBSERVATIONS

RICHARD J. MCNARY, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BURLINGTON TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-529 | 30 | 2016 _____ SUNNY
Date Time Weather

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND _____ _____ _____
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

_____ _____ _____
Vegetation Landform Position on landscape (attach sheet)

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Estimated Depth to High Groundwater: 30

Deep Observation Hole Number: 16-52

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
8	A	10YR 3/2	—	—	—	SL	—	—	M	F	20 ROOTS
22	B	10YR 5/6	—	—	—	SL	—	—	M	F	
60	C	2.5Y 4/3	30	—	>15	SL	—	—	M	F	
60	R		30								

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HANNIGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

Boxborough Town Center, LLC
700 & 800 Massachusetts Ave

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-53 Date: 9/30/2016 Time: _____ Weather: Sun 90

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones _____ Slope (%) _____

   Vegetation _____ Landform _____ Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☐

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: 30

Deep Observation Hole Number: 16-53

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
10	A	10YR 3/2	-	-	-	SL	-	-	M	F	20 BLDR
20	B	10YR 5/6	-	-	-	SL	-	-	M	F	
100	C	2.5Y 6/3	30			SL			M	F	
100	R										
-											

Additional Notes: STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-54 | 9/30/2014 (Date) | _____ (Time) | Sun 80 (Weather)

1. Location

Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) | _____ (Surface Stones) | _____ (Slope (%))

_____ (Vegetation) | _____ (Landform) | _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area >100 feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____

4. Parent Material: GLACIAL TILL | Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit — | Depth Standing Water in Hole —

Estimated Depth to High Groundwater: _____ _____

Deep Observation Hole Number: 16-54

Depth (In:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	loam 3/2	—	—	—	SL			M	FR	
11	B	loam 5/6	—	—	—	SL			M	F	
80	C	2.5Y 6/3	28		>5	LS	50	55	VM	FRIABLE	
80	R										

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: 16-559 | 30 | 2016 (Date) _____ (Time) SM 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: PROGLACIAL Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 114

Deep Observation Hole Number: 16-55

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7	A	10YR 3/2	—	—	—		—	—			
20	B	10YR 5/6	—	—	—		—	—			
114	C	2.5Y 6/4	—	—	—	FINE SAND	—	—	M	VERY FRIABLE	
120	C2	2.5Y 6/2	114			LS	—	—			

Additional Notes STORMWATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

BOXBOROUGH TOWN CENTER, LLC
700 & 800 MASSACHUSETTS AVE

C. On-Site Review *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole Number: 16-56 | 9/30/2016 (Date) _____ (Time) Sm 80 (Weather)

1. Location

   Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: WOODLAND (e.g. woodland, agricultural field, vacant lot, etc.) _____ (Surface Stones) _____ (Slope (%))

   _____ (Vegetation) _____ (Landform) _____ (Position on landscape (attach sheet))

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area >100 feet

   Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: GLACIAL TILL Unsuitable Materials Present: Yes ☐ No ☑

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☐

   If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

   Estimated Depth to High Groundwater: 132 cm Brown

Deep Observation Hole Number: 16-56

Depth (in:)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6	A	10YR 3/2	—	—	—	SL	—		M	F	10 BLOCK
19	B	10YR 5/6	—	—	—	SL			M	F	
132	C	2.5Y 6/3	—			LS	20-35		M	F	

Additional Notes STORM-WATER SOIL OBSERVATIONS
RICHARD J. HARRINGTON, P.E., MA SE 1012

STAMSKI AND McNARY, INC.
1000 Main Street
ACTON, MA 01720
Engineering • Planning • Surveying

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method used:
   - ☐ Depth observed standing water in observation hole — A. _____ inches B. _____ inches
   - ☐ Depth weeping from side of observation hole — A. _____ inches B. _____ inches
   - ☐ Depth to soil redoximorphic features (mottles) — A. _____ inches B. _____ inches
   - ☐ Groundwater adjustment (USGS methodology) — A. _____ inches B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

   Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

9/20/16; 9/21/16 & 9/30/16

1. Depth of Naturally Occurring Pervious Material — TEST PITS 16-1 => 16-56

N/A a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☐ No ☐ * STORMWATER SOIL OBSERVATIONS

   b. If yes, at what depth was it observed? Upper boundary: _____ inches Lower boundary: _____ inches

F. 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 required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

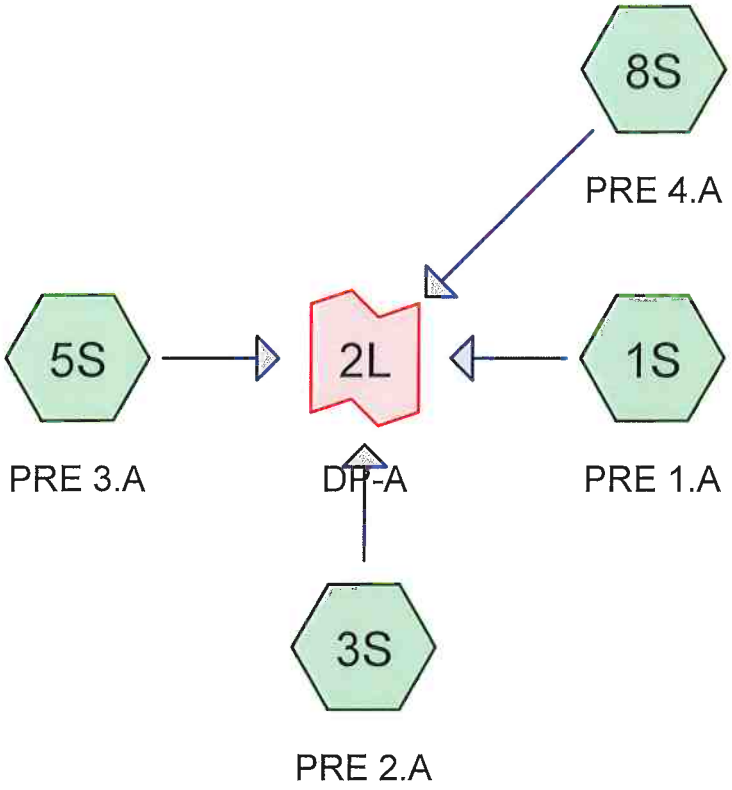
Signature of Soil Evaluator — Date: 9/21/2016

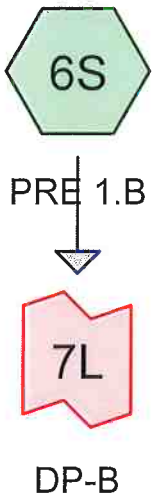
RICHARD J. HARRINGTON SE1012
Typed or Printed Name of Soil Evaluator/License Number — *Date of Soil Evaluator Exam: 10/25/1994

STORMWATER SOIL OBSERVATIONS
Name of Board of Health Witness — Board of Health: UNWITNESSED

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Appendix D - Existing Conditions Hydrologic Calculations





Subcat Reach Pond Link

Routing Diagram for 6092 - PRE

Prepared by {enter your company name here}, Printed 4/16/2019

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PRE 1.A Runoff Area=463,586 sf 0.25% Impervious Runoff Depth=0.13"
Flow Length=923' Tc=19.0 min CN=51 Runoff=0.22 cfs 0.114 af

Subcatchment 3S: PRE 2.A Runoff Area=199,629 sf 0.00% Impervious Runoff Depth=0.20"
Flow Length=572' Tc=19.6 min CN=54 Runoff=0.26 cfs 0.075 af

Subcatchment 5S: PRE 3.A Runoff Area=181,240 sf 0.00% Impervious Runoff Depth=0.92"
Flow Length=320' Tc=16.7 min CN=73 Runoff=2.99 cfs 0.319 af

Subcatchment 6S: PRE 1.B Runoff Area=91,035 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=251' Tc=10.2 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment 8S: PRE 4.A Runoff Area=11,124 sf 0.00% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=83 Runoff=0.45 cfs 0.033 af

Link 2L: DP-A Inflow=3.26 cfs 0.541 af
Primary=3.26 cfs 0.541 af

Link 7L: DP-B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 21.731 ac Runoff Volume = 0.541 af Average Runoff Depth = 0.30"
99.88% Pervious = 21.705 ac 0.12% Impervious = 0.027 ac

Summary for Subcatchment 1S: PRE 1.A

Runoff = 0.22 cfs @ 12.72 hrs, Volume= 0.114 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
86,566	30	Woods, Good, HSG A
370,745	55	Woods, Good, HSG B
5,113	70	Woods, Good, HSG C
1,162	98	Roofs, HSG B
463,586	51	Weighted Average
462,424		99.75% Pervious Area
1,162		0.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
11.4	873	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.0	923	Total			

Summary for Subcatchment 3S: PRE 2.A

Runoff = 0.26 cfs @ 12.58 hrs, Volume= 0.075 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
9,882	30	Woods, Good, HSG A
185,427	55	Woods, Good, HSG B
4,320	77	Woods, Good, HSG D
199,629	54	Weighted Average
199,629		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
7.1	522	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.6	572	Total			

Summary for Subcatchment 5S: PRE 3.A

Runoff = 2.99 cfs @ 12.26 hrs, Volume= 0.319 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
147,092	77	Woods, Good, HSG D
34,148	55	Woods, Good, HSG B
181,240	73	Weighted Average
181,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0160	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
3.0	270	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	320	Total			

Summary for Subcatchment 6S: PRE 1.B

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
79,057	30	Woods, Good, HSG A
11,978	55	Woods, Good, HSG B
91,035	33	Weighted Average
91,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	201	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.2	251	Total			

Summary for Subcatchment 8S: PRE 4.A

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
3,850	74	>75% Grass cover, Good, HSG C
5,485	96	Gravel surface, HSG C
1,789	61	>75% Grass cover, Good, HSG B
11,124	83	Weighted Average
11,124		100.00% Pervious Area

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

Summary for Link 2L: DP-A

Inflow Area = 19.641 ac, 0.14% Impervious, Inflow Depth = 0.33" for 2-year event
Inflow = 3.26 cfs @ 12.26 hrs, Volume= 0.541 af
Primary = 3.26 cfs @ 12.26 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 7L: DP-B

Inflow Area = 2.090 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PRE 1.A Runoff Area=463,586 sf 0.25% Impervious Runoff Depth=0.58"
Flow Length=923' Tc=19.0 min CN=51 Runoff=3.08 cfs 0.518 af

Subcatchment 3S: PRE 2.A Runoff Area=199,629 sf 0.00% Impervious Runoff Depth=0.73"
Flow Length=572' Tc=19.6 min CN=54 Runoff=1.91 cfs 0.281 af

Subcatchment 5S: PRE 3.A Runoff Area=181,240 sf 0.00% Impervious Runoff Depth=1.97"
Flow Length=320' Tc=16.7 min CN=73 Runoff=6.83 cfs 0.684 af

Subcatchment 6S: PRE 1.B Runoff Area=91,035 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=251' Tc=10.2 min CN=33 Runoff=0.00 cfs 0.002 af

Subcatchment 8S: PRE 4.A Runoff Area=11,124 sf 0.00% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=83 Runoff=0.82 cfs 0.060 af

Link 2L: DP-A Inflow=11.42 cfs 1.542 af
Primary=11.42 cfs 1.542 af

Link 7L: DP-B Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Total Runoff Area = 21.731 ac Runoff Volume = 1.544 af Average Runoff Depth = 0.85"
99.88% Pervious = 21.705 ac 0.12% Impervious = 0.027 ac

Summary for Subcatchment 1S: PRE 1.A

Runoff = 3.08 cfs @ 12.41 hrs, Volume= 0.518 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
86,566	30	Woods, Good, HSG A
370,745	55	Woods, Good, HSG B
5,113	70	Woods, Good, HSG C
1,162	98	Roofs, HSG B
463,586	51	Weighted Average
462,424		99.75% Pervious Area
1,162		0.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
11.4	873	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.0	923	Total			

Summary for Subcatchment 3S: PRE 2.A

Runoff = 1.91 cfs @ 12.37 hrs, Volume= 0.281 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
9,882	30	Woods, Good, HSG A
185,427	55	Woods, Good, HSG B
4,320	77	Woods, Good, HSG D
199,629	54	Weighted Average
199,629		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
7.1	522	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.6	572	Total			

Summary for Subcatchment 5S: PRE 3.A

Runoff = 6.83 cfs @ 12.24 hrs, Volume= 0.684 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
147,092	77	Woods, Good, HSG D
34,148	55	Woods, Good, HSG B
181,240	73	Weighted Average
181,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0160	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
3.0	270	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	320	Total			

Summary for Subcatchment 6S: PRE 1.B

Runoff = 0.00 cfs @ 22.21 hrs, Volume= 0.002 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
79,057	30	Woods, Good, HSG A
11,978	55	Woods, Good, HSG B
91,035	33	Weighted Average
91,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	201	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.2	251	Total			

Summary for Subcatchment 8S: PRE 4.A

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.060 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
3,850	74	>75% Grass cover, Good, HSG C
5,485	96	Gravel surface, HSG C
1,789	61	>75% Grass cover, Good, HSG B
11,124	83	Weighted Average
11,124		100.00% Pervious Area

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

Summary for Link 2L: DP-A

Inflow Area = 19.641 ac, 0.14% Impervious, Inflow Depth = 0.94" for 10-year event
Inflow = 11.42 cfs @ 12.29 hrs, Volume= 1.542 af
Primary = 11.42 cfs @ 12.29 hrs, Volume= 1.542 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 7L: DP-B

Inflow Area = 2.090 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10-year event
Inflow = 0.00 cfs @ 22.21 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 22.21 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PRE 1.A Runoff Area=463,586 sf 0.25% Impervious Runoff Depth=0.92"
Flow Length=923' Tc=19.0 min CN=51 Runoff=5.87 cfs 0.820 af

Subcatchment 3S: PRE 2.A Runoff Area=199,629 sf 0.00% Impervious Runoff Depth=1.12"
Flow Length=572' Tc=19.6 min CN=54 Runoff=3.32 cfs 0.427 af

Subcatchment 5S: PRE 3.A Runoff Area=181,240 sf 0.00% Impervious Runoff Depth=2.60"
Flow Length=320' Tc=16.7 min CN=73 Runoff=9.09 cfs 0.901 af

Subcatchment 6S: PRE 1.B Runoff Area=91,035 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=251' Tc=10.2 min CN=33 Runoff=0.02 cfs 0.014 af

Subcatchment 8S: PRE 4.A Runoff Area=11,124 sf 0.00% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=83 Runoff=1.03 cfs 0.075 af

Link 2L: DP-A Inflow=18.09 cfs 2.223 af
Primary=18.09 cfs 2.223 af

Link 7L: DP-B Inflow=0.02 cfs 0.014 af
Primary=0.02 cfs 0.014 af

Total Runoff Area = 21.731 ac Runoff Volume = 2.238 af Average Runoff Depth = 1.24"
99.88% Pervious = 21.705 ac 0.12% Impervious = 0.027 ac

Summary for Subcatchment 1S: PRE 1.A

Runoff = 5.87 cfs @ 12.34 hrs, Volume= 0.820 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
86,566	30	Woods, Good, HSG A
370,745	55	Woods, Good, HSG B
5,113	70	Woods, Good, HSG C
1,162	98	Roofs, HSG B
463,586	51	Weighted Average
462,424		99.75% Pervious Area
1,162		0.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
11.4	873	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.0	923	Total			

Summary for Subcatchment 3S: PRE 2.A

Runoff = 3.32 cfs @ 12.33 hrs, Volume= 0.427 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
9,882	30	Woods, Good, HSG A
185,427	55	Woods, Good, HSG B
4,320	77	Woods, Good, HSG D
199,629	54	Weighted Average
199,629		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
7.1	522	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.6	572	Total			

Summary for Subcatchment 5S: PRE 3.A

Runoff = 9.09 cfs @ 12.24 hrs, Volume= 0.901 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
147,092	77	Woods, Good, HSG D
34,148	55	Woods, Good, HSG B
181,240	73	Weighted Average
181,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0160	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
3.0	270	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	320	Total			

Summary for Subcatchment 6S: PRE 1.B

Runoff = 0.02 cfs @ 15.30 hrs, Volume= 0.014 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
79,057	30	Woods, Good, HSG A
11,978	55	Woods, Good, HSG B
91,035	33	Weighted Average
91,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	201	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.2	251	Total			

Summary for Subcatchment 8S: PRE 4.A

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
3,850	74	>75% Grass cover, Good, HSG C
5,485	96	Gravel surface, HSG C
1,789	61	>75% Grass cover, Good, HSG B
11,124	83	Weighted Average
11,124		100.00% Pervious Area

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

Summary for Link 2L: DP-A

Inflow Area = 19.641 ac, 0.14% Impervious, Inflow Depth = 1.36" for 25-year event
Inflow = 18.09 cfs @ 12.28 hrs, Volume= 2.223 af
Primary = 18.09 cfs @ 12.28 hrs, Volume= 2.223 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 7L: DP-B

Inflow Area = 2.090 ac, 0.00% Impervious, Inflow Depth = 0.08" for 25-year event
Inflow = 0.02 cfs @ 15.30 hrs, Volume= 0.014 af
Primary = 0.02 cfs @ 15.30 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PRE 1.A Runoff Area=463,586 sf 0.25% Impervious Runoff Depth=1.76"
Flow Length=923' Tc=19.0 min CN=51 Runoff=13.21 cfs 1.557 af

Subcatchment 3S: PRE 2.A Runoff Area=199,629 sf 0.00% Impervious Runoff Depth=2.03"
Flow Length=572' Tc=19.6 min CN=54 Runoff=6.78 cfs 0.775 af

Subcatchment 5S: PRE 3.A Runoff Area=181,240 sf 0.00% Impervious Runoff Depth=3.94"
Flow Length=320' Tc=16.7 min CN=73 Runoff=13.85 cfs 1.364 af

Subcatchment 6S: PRE 1.B Runoff Area=91,035 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=251' Tc=10.2 min CN=33 Runoff=0.21 cfs 0.065 af

Subcatchment 8S: PRE 4.A Runoff Area=11,124 sf 0.00% Impervious Runoff Depth=5.03"
Tc=6.0 min CN=83 Runoff=1.44 cfs 0.107 af

Link 2L: DP-A Inflow=33.96 cfs 3.804 af
Primary=33.96 cfs 3.804 af

Link 7L: DP-B Inflow=0.21 cfs 0.065 af
Primary=0.21 cfs 0.065 af

Total Runoff Area = 21.731 ac Runoff Volume = 3.869 af Average Runoff Depth = 2.14"
99.88% Pervious = 21.705 ac 0.12% Impervious = 0.027 ac

Summary for Subcatchment 1S: PRE 1.A

Runoff = 13.21 cfs @ 12.30 hrs, Volume= 1.557 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
86,566	30	Woods, Good, HSG A
370,745	55	Woods, Good, HSG B
5,113	70	Woods, Good, HSG C
1,162	98	Roofs, HSG B
463,586	51	Weighted Average
462,424		99.75% Pervious Area
1,162		0.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
11.4	873	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.0	923	Total			

Summary for Subcatchment 3S: PRE 2.A

Runoff = 6.78 cfs @ 12.30 hrs, Volume= 0.775 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
9,882	30	Woods, Good, HSG A
185,427	55	Woods, Good, HSG B
4,320	77	Woods, Good, HSG D
199,629	54	Weighted Average
199,629		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
7.1	522	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.6	572	Total			

Summary for Subcatchment 5S: PRE 3.A

Runoff = 13.85 cfs @ 12.23 hrs, Volume= 1.364 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
147,092	77	Woods, Good, HSG D
34,148	55	Woods, Good, HSG B
181,240	73	Weighted Average
181,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0160	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
3.0	270	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	320	Total			

Summary for Subcatchment 6S: PRE 1.B

Runoff = 0.21 cfs @ 12.48 hrs, Volume= 0.065 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
79,057	30	Woods, Good, HSG A
11,978	55	Woods, Good, HSG B
91,035	33	Weighted Average
91,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	201	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.2	251	Total			

Summary for Subcatchment 8S: PRE 4.A

Runoff = 1.44 cfs @ 12.09 hrs, Volume= 0.107 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
3,850	74	>75% Grass cover, Good, HSG C
5,485	96	Gravel surface, HSG C
1,789	61	>75% Grass cover, Good, HSG B
11,124	83	Weighted Average
11,124		100.00% Pervious Area

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

Summary for Link 2L: DP-A

Inflow Area = 19.641 ac, 0.14% Impervious, Inflow Depth = 2.32" for 100-year event
Inflow = 33.96 cfs @ 12.27 hrs, Volume= 3.804 af
Primary = 33.96 cfs @ 12.27 hrs, Volume= 3.804 af, Atten= 0%, Lag= 0.0 min

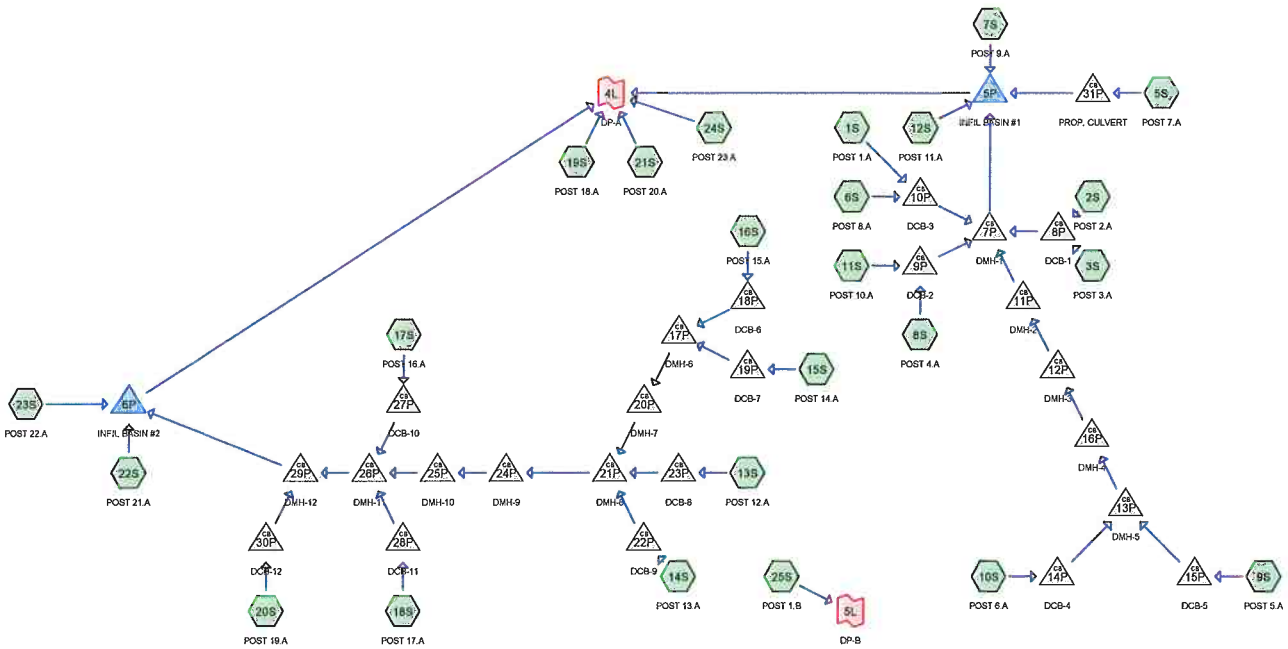
Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 7L: DP-B

Inflow Area = 2.090 ac, 0.00% Impervious, Inflow Depth = 0.37" for 100-year event
Inflow = 0.21 cfs @ 12.48 hrs, Volume= 0.065 af
Primary = 0.21 cfs @ 12.48 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Appendix E - Proposed Conditions Hydrologic Calculations



Subcat Reach Pond Link

Routing Diagram for 6092 - POST

Prepared by {enter your company name here}, Printed 4/18/2019

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: POST 1.A Runoff Area=3,425 sf 90.16% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=94 Runoff=0.21 cfs 0.016 af

Subcatchment 2S: POST 2.A Runoff Area=2,942 sf 89.12% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=94 Runoff=0.18 cfs 0.014 af

Subcatchment 3S: POST 3.A Runoff Area=23,050 sf 66.65% Impervious Runoff Depth=1.75"
Tc=6.0 min CN=86 Runoff=1.06 cfs 0.077 af

Subcatchment 5S: POST 7.A Runoff Area=116,337 sf 14.12% Impervious Runoff Depth=0.37"
Flow Length=1,092' Tc=22.1 min CN=60 Runoff=0.45 cfs 0.082 af

Subcatchment 6S: POST 8.A Runoff Area=20,015 sf 76.70% Impervious Runoff Depth=1.99"
Tc=6.0 min CN=89 Runoff=1.04 cfs 0.076 af

Subcatchment 7S: POST 9.A Runoff Area=45,778 sf 17.90% Impervious Runoff Depth=0.77"
Flow Length=337' Tc=15.7 min CN=70 Runoff=0.61 cfs 0.067 af

Subcatchment 8S: POST 4.A Runoff Area=4,121 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af

Subcatchment 9S: POST 5.A Runoff Area=25,088 sf 71.17% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=83 Runoff=1.01 cfs 0.073 af

Subcatchment 10S: POST 6.A Runoff Area=14,638 sf 79.57% Impervious Runoff Depth=1.83"
Tc=6.0 min CN=87 Runoff=0.70 cfs 0.051 af

Subcatchment 11S: POST 10.A Runoff Area=10,719 sf 79.00% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=90 Runoff=0.58 cfs 0.043 af

Subcatchment 12S: POST 11.A Runoff Area=122,862 sf 26.34% Impervious Runoff Depth=0.64"
Tc=8.0 min CN=67 Runoff=1.56 cfs 0.149 af

Subcatchment 13S: POST 12.A Runoff Area=7,009 sf 98.59% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=0.47 cfs 0.037 af

Subcatchment 14S: POST 13.A Runoff Area=16,242 sf 73.50% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=82 Runoff=0.62 cfs 0.045 af

Subcatchment 15S: POST 14.A Runoff Area=13,648 sf 50.23% Impervious Runoff Depth=1.33"
Tc=6.0 min CN=80 Runoff=0.47 cfs 0.035 af

Subcatchment 16S: POST 15.A Runoff Area=6,688 sf 98.52% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=0.44 cfs 0.035 af

Subcatchment 17S: POST 16.A Runoff Area=7,932 sf 98.75% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.53 cfs 0.044 af

Subcatchment 18S: POST 17.A Runoff Area=24,122 sf 64.18% Impervious Runoff Depth=1.60"
Tc=6.0 min CN=84 Runoff=1.02 cfs 0.074 af

Subcatchment 19S: POST 18.A Runoff Area=48,773 sf 17.56% Impervious Runoff Depth=0.72"
Tc=6.0 min CN=69 Runoff=0.81 cfs 0.068 af

Subcatchment 20S: POST 19.A Runoff Area=32,206 sf 71.58% Impervious Runoff Depth=1.83"
Tc=6.0 min CN=87 Runoff=1.55 cfs 0.113 af

Subcatchment 21S: POST 20.A Runoff Area=22,000 sf 12.53% Impervious Runoff Depth=0.59"
Tc=16.7 min CN=66 Runoff=0.20 cfs 0.025 af

Subcatchment 22S: POST 21.A Runoff Area=163,621 sf 11.94% Impervious Runoff Depth=0.37"
Flow Length=884' Tc=15.2 min CN=60 Runoff=0.70 cfs 0.116 af

Subcatchment 23S: POST 22.A Runoff Area=171,720 sf 0.00% Impervious Runoff Depth=0.97"
Tc=16.7 min CN=74 Runoff=3.03 cfs 0.319 af

Subcatchment 24S: POST 23.A Runoff Area=11,123 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.75 cfs 0.061 af

Subcatchment 25S: POST 1.B Runoff Area=32,569 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=106' Tc=11.1 min CN=36 Runoff=0.00 cfs 0.000 af

Pond 5P: INFIL BASIN #1 Peak Elev=313.15' Storage=11,998 cf Inflow=6.91 cfs 0.672 af
Discarded=0.21 cfs 0.202 af Primary=0.70 cfs 0.470 af Outflow=0.91 cfs 0.672 af

Pond 6P: INFIL BASIN #2 Peak Elev=315.79' Storage=16,201 cf Inflow=7.10 cfs 0.817 af
Discarded=0.57 cfs 0.584 af Primary=0.26 cfs 0.233 af Outflow=0.82 cfs 0.817 af

Pond 7P: DMH-1 Peak Elev=317.05' Inflow=5.07 cfs 0.373 af
24.0" Round Culvert n=0.013 L=67.0' S=0.0060 '/' Outflow=5.07 cfs 0.373 af

Pond 8P: DCB-1 Peak Elev=317.18' Inflow=1.24 cfs 0.091 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0087 '/' Outflow=1.24 cfs 0.091 af

Pond 9P: DCB-2 Peak Elev=317.54' Inflow=0.86 cfs 0.065 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=0.86 cfs 0.065 af

Pond 10P: DCB-3 Peak Elev=317.48' Inflow=1.26 cfs 0.092 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0100 '/' Outflow=1.26 cfs 0.092 af

Pond 11P: DMH-2 Peak Elev=317.58' Inflow=1.71 cfs 0.124 af
18.0" Round Culvert n=0.013 L=67.0' S=0.0134 '/' Outflow=1.71 cfs 0.124 af

Pond 12P: DMH-3 Peak Elev=322.28' Inflow=1.71 cfs 0.124 af
18.0" Round Culvert n=0.013 L=102.0' S=0.0451 '/' Outflow=1.71 cfs 0.124 af

Pond 13P: DMH-5 Peak Elev=338.38' Inflow=1.71 cfs 0.124 af
18.0" Round Culvert n=0.013 L=125.0' S=0.0712 '/' Outflow=1.71 cfs 0.124 af

Pond 14P: DCB-4 Peak Elev=338.60' Inflow=0.70 cfs 0.051 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.70 cfs 0.051 af

Pond 15P: DCB-5 Peak Elev=338.69' Inflow=1.01 cfs 0.073 af
12.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=1.01 cfs 0.073 af

Pond 16P: DMH-4 Peak Elev=329.38' Inflow=1.71 cfs 0.124 af
18.0" Round Culvert n=0.013 L=91.0' S=0.0769 '/' Outflow=1.71 cfs 0.124 af

Pond 17P: DMH-6 Peak Elev=335.92' Inflow=0.91 cfs 0.070 af
12.0" Round Culvert n=0.013 L=69.0' S=0.0100 '/' Outflow=0.91 cfs 0.070 af

Pond 18P: DCB-6 Peak Elev=336.04' Inflow=0.44 cfs 0.035 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.44 cfs 0.035 af

Pond 19P: DCB-7 Peak Elev=336.06' Inflow=0.47 cfs 0.035 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.47 cfs 0.035 af

Pond 20P: DMH-7 Peak Elev=335.13' Inflow=0.91 cfs 0.070 af
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=0.91 cfs 0.070 af

Pond 21P: DMH-8 Peak Elev=334.33' Inflow=2.00 cfs 0.152 af
18.0" Round Culvert n=0.013 L=136.0' S=0.0300 '/' Outflow=2.00 cfs 0.152 af

Pond 22P: DCB-9 Peak Elev=339.15' Inflow=0.62 cfs 0.045 af
12.0" Round Culvert n=0.013 L=18.0' S=0.0433 '/' Outflow=0.62 cfs 0.045 af

Pond 23P: DCB-8 Peak Elev=338.89' Inflow=0.47 cfs 0.037 af
12.0" Round Culvert n=0.013 L=29.0' S=0.0200 '/' Outflow=0.47 cfs 0.037 af

Pond 24P: DMH-9 Peak Elev=330.15' Inflow=2.00 cfs 0.152 af
18.0" Round Culvert n=0.013 L=99.0' S=0.0300 '/' Outflow=2.00 cfs 0.152 af

Pond 25P: DMH-10 Peak Elev=327.08' Inflow=2.00 cfs 0.152 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0300 '/' Outflow=2.00 cfs 0.152 af

Pond 26P: DMH-11 Peak Elev=324.13' Inflow=3.55 cfs 0.269 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0263 '/' Outflow=3.55 cfs 0.269 af

Pond 27P: DCB-10 Peak Elev=324.92' Inflow=0.53 cfs 0.044 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=0.53 cfs 0.044 af

Pond 28P: DCB-11 Peak Elev=325.10' Inflow=1.02 cfs 0.074 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=1.02 cfs 0.074 af

Pond 29P: DMH-12 Peak Elev=319.51' Inflow=5.10 cfs 0.382 af
24.0" Round Culvert n=0.013 L=65.0' S=0.0369 '/' Outflow=5.10 cfs 0.382 af

Pond 30P: DCB-12 Peak Elev=319.77' Inflow=1.55 cfs 0.113 af
18.0" Round Culvert n=0.013 L=53.0' S=0.0094 '/' Outflow=1.55 cfs 0.113 af

Pond 31P: PROP. CULVERT Peak Elev=315.35' Inflow=0.45 cfs 0.082 af
15.0" Round Culvert n=0.013 L=83.0' S=0.0241 '/' Outflow=0.45 cfs 0.082 af

Link 4L: DP-A Inflow=2.23 cfs 0.856 af
Primary=2.23 cfs 0.856 af

Link 5L: DP-B Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 21.732 ac Runoff Volume = 1.643 af Average Runoff Depth = 0.91"
72.94% Pervious = 15.851 ac 27.06% Impervious = 5.880 ac

Summary for Subcatchment 1S: POST 1.A

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
3,088	98	Paved parking, HSG B
337	61	>75% Grass cover, Good, HSG B
3,425	94	Weighted Average
337		9.84% Pervious Area
3,088		90.16% Impervious Area

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

Summary for Subcatchment 2S: POST 2.A

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,622	98	Paved parking, HSG B
320	61	>75% Grass cover, Good, HSG B
2,942	94	Weighted Average
320		10.88% Pervious Area
2,622		89.12% Impervious Area

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

Summary for Subcatchment 3S: POST 3.A

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.077 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
8,108	98	Paved parking, HSG B
7,688	61	>75% Grass cover, Good, HSG B
23,050	86	Weighted Average
7,688		33.35% Pervious Area
15,362		66.65% Impervious Area

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

Summary for Subcatchment 5S: POST 7.A

Runoff = 0.45 cfs @ 12.48 hrs, Volume= 0.082 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
4,364	70	Woods, Good, HSG C
748	74	>75% Grass cover, Good, HSG C
23,680	55	Woods, Good, HSG B
44,396	61	>75% Grass cover, Good, HSG B
10,564	98	Roofs, HSG B
1,307	30	Woods, Good, HSG A
5,862	98	Roofs, HSG A
25,416	39	>75% Grass cover, Good, HSG A
116,337	60	Weighted Average
99,911		85.88% Pervious Area
16,426		14.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0060	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.8	859	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	100	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
22.1	1,092	Total			

Summary for Subcatchment 6S: POST 8.A

Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.076 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
8,097	98	Paved parking, HSG B
7,254	98	Roofs, HSG B
4,664	61	>75% Grass cover, Good, HSG B
20,015	89	Weighted Average
4,664		23.30% Pervious Area
15,351		76.70% Impervious Area

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

Summary for Subcatchment 7S: POST 9.A

Runoff = 0.61 cfs @ 12.25 hrs, Volume= 0.067 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
8,194	98	Roofs, HSG B
2,704	96	Gravel surface, HSG B
34,880	61	>75% Grass cover, Good, HSG B
45,778	70	Weighted Average
37,584		82.10% Pervious Area
8,194		17.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0040	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	287	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.7	337	Total			

Summary for Subcatchment 8S: POST 4.A

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
4,121	98	Paved parking, HSG B
4,121		100.00% Impervious Area

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

Summary for Subcatchment 9S: POST 5.A

Runoff = 1.01 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,371	98	Roofs, HSG B
2,520	98	Paved parking, HSG B
1,785	61	>75% Grass cover, Good, HSG B
6,920	98	Paved parking, HSG A
6,045	98	Roofs, HSG A
5,447	39	>75% Grass cover, Good, HSG A
25,088	83	Weighted Average
7,232		28.83% Pervious Area
17,856		71.17% Impervious Area

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

Summary for Subcatchment 10S: POST 6.A

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
2,782	98	Paved parking, HSG B
981	61	>75% Grass cover, Good, HSG B
2,418	98	Roofs, HSG A
4,029	98	Paved parking, HSG A
2,010	39	>75% Grass cover, Good, HSG A
14,638	87	Weighted Average
2,991		20.43% Pervious Area
11,647		79.57% Impervious Area

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

Summary for Subcatchment 11S: POST 10.A

Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.043 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
6,050	98	Paved parking, HSG B
2,251	61	>75% Grass cover, Good, HSG B
10,719	90	Weighted Average
2,251		21.00% Pervious Area
8,468		79.00% Impervious Area

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

Summary for Subcatchment 12S: POST 11.A

Runoff = 1.56 cfs @ 12.14 hrs, Volume= 0.149 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
4,538	98	Roofs, HSG A
1,059	98	Paved parking, HSG A
19,560	39	>75% Grass cover, Good, HSG A
10,702	98	Roofs, HSG B
16,067	98	Paved parking, HSG B
70,936	61	>75% Grass cover, Good, HSG B
122,862	67	Weighted Average
90,496		73.66% Pervious Area
32,366		26.34% Impervious Area

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

Summary for Subcatchment 13S: POST 12.A

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
1,783	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
99	39	>75% Grass cover, Good, HSG A
634	98	Roofs, HSG B
1,106	98	Paved parking, HSG B
7,009	97	Weighted Average
99		1.41% Pervious Area
6,910		98.59% Impervious Area

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

Summary for Subcatchment 14S: POST 13.A

Runoff = 0.62 cfs @ 12.09 hrs, Volume= 0.045 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
6,045	98	Roofs, HSG A
4,758	98	Paved parking, HSG A
4,304	39	>75% Grass cover, Good, HSG A
1,135	98	Paved parking, HSG B
16,242	82	Weighted Average
4,304		26.50% Pervious Area
11,938		73.50% Impervious Area

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

Summary for Subcatchment 15S: POST 14.A

Runoff = 0.47 cfs @ 12.10 hrs, Volume= 0.035 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,438	98	Paved parking, HSG B
6,792	61	>75% Grass cover, Good, HSG B
13,648	80	Weighted Average
6,792		49.77% Pervious Area
6,856		50.23% Impervious Area

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

Summary for Subcatchment 16S: POST 15.A

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,171	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
6,688	97	Weighted Average
99		1.48% Pervious Area
6,589		98.52% Impervious Area

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

Summary for Subcatchment 17S: POST 16.A

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,438	98	Roofs, HSG B
5,395	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
7,932	98	Weighted Average
99		1.25% Pervious Area
7,833		98.75% Impervious Area

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

Summary for Subcatchment 18S: POST 17.A

Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
843	39	>75% Grass cover, Good, HSG A
7,797	61	>75% Grass cover, Good, HSG B
7,254	98	Roofs, HSG B
8,228	98	Paved parking, HSG B
24,122	84	Weighted Average
8,640		35.82% Pervious Area
15,482		64.18% Impervious Area

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

Summary for Subcatchment 19S: POST 18.A

Runoff = 0.81 cfs @ 12.11 hrs, Volume= 0.068 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
8,334	98	Roofs, HSG A
230	98	Paved parking, HSG B
38,161	61	>75% Grass cover, Good, HSG B
1,265	96	Gravel surface, HSG B
198	80	>75% Grass cover, Good, HSG D
585	96	Gravel surface, HSG D
48,773	69	Weighted Average
40,209		82.44% Pervious Area
8,564		17.56% Impervious Area

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

Summary for Subcatchment 20S: POST 19.A

Runoff = 1.55 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
15,799	98	Paved parking, HSG B
9,153	61	>75% Grass cover, Good, HSG B
32,206	87	Weighted Average
9,153		28.42% Pervious Area
23,053		71.58% Impervious Area

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

Summary for Subcatchment 21S: POST 20.A

Runoff = 0.20 cfs @ 12.29 hrs, Volume= 0.025 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,757	98	Roofs, HSG B
19,243	61	>75% Grass cover, Good, HSG B
22,000	66	Weighted Average
19,243		87.47% Pervious Area
2,757		12.53% Impervious Area

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

Summary for Subcatchment 22S: POST 21.A

Runoff = 0.70 cfs @ 12.36 hrs, Volume= 0.116 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
6,845	98	Roofs, HSG A
10,053	30	Woods, Good, HSG A
27,345	39	>75% Grass cover, Good, HSG A
11,252	98	Roofs, HSG B
1,437	98	Paved parking, HSG B
84,020	61	>75% Grass cover, Good, HSG B
19,267	55	Woods, Good, HSG B
2,829	80	>75% Grass cover, Good, HSG D
573	96	Gravel surface, HSG D
163,621	60	Weighted Average
144,087		88.06% Pervious Area
19,534		11.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	348	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	486	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.2	884	Total			

Summary for Subcatchment 23S: POST 22.A

Runoff = 3.03 cfs @ 12.25 hrs, Volume= 0.319 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
24,567	55	Woods, Good, HSG B
147,153	77	Woods, Good, HSG D
171,720	74	Weighted Average
171,720		100.00% Pervious Area

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

Summary for Subcatchment 24S: POST 23.A

Runoff = 0.75 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
9,334	98	Paved parking, HSG C
1,789	98	Paved parking, HSG B
11,123	98	Weighted Average
11,123		100.00% Impervious Area

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

Summary for Subcatchment 25S: POST 1.B

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
24,680	30	Woods, Good, HSG A
7,889	55	Woods, Good, HSG B
32,569	36	Weighted Average
32,569		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	56	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	106	Total			

Summary for Pond 5P: INFIL BASIN #1

Inflow Area = 8.930 ac, 34.84% Impervious, Inflow Depth = 0.90" for 2-year event
Inflow = 6.91 cfs @ 12.11 hrs, Volume= 0.672 af
Outflow = 0.91 cfs @ 13.34 hrs, Volume= 0.672 af, Atten= 87%, Lag= 74.3 min
Discarded = 0.21 cfs @ 13.34 hrs, Volume= 0.202 af
Primary = 0.70 cfs @ 13.34 hrs, Volume= 0.470 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 313.15' @ 13.34 hrs Surf.Area= 4,905 sf Storage= 11,998 cf

Plug-Flow detention time= 193.6 min calculated for 0.671 af (100% of inflow)
Center-of-Mass det. time= 194.0 min (1,048.3 - 854.3)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	30,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.00	676	116.0	0	0	676
310.00	2,025	254.0	1,290	1,290	4,743
312.00	3,788	311.0	5,722	7,012	7,368
316.00	8,295	412.0	23,585	30,597	13,356

Device	Routing	Invert	Outlet Devices
#1	Primary	309.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 309.00' / 308.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	309.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 306.73'
#3	Primary	315.60'	**20.0' long x 23.0' 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
#4	Device 1	315.00'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	310.20'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.21 cfs @ 13.34 hrs HW=313.15' (Free Discharge)
└**2=Exfiltration** (Controls 0.21 cfs)

Primary OutFlow Max=0.70 cfs @ 13.34 hrs HW=313.15' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 0.70 cfs of 21.20 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Orifice Controls 0.70 cfs @ 8.03 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: INFIL BASIN #2

Inflow Area = 10.174 ac, 22.16% Impervious, Inflow Depth = 0.96" for 2-year event
Inflow = 7.10 cfs @ 12.12 hrs, Volume= 0.817 af
Outflow = 0.82 cfs @ 14.19 hrs, Volume= 0.817 af, Atten= 88%, Lag= 124.3 min
Discarded = 0.57 cfs @ 14.19 hrs, Volume= 0.584 af
Primary = 0.26 cfs @ 14.19 hrs, Volume= 0.233 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 315.79' @ 14.19 hrs Surf.Area= 17,309 sf Storage= 16,201 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 267.4 min (1,119.6 - 852.2)

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	81,852 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)
314.00	2,813	246.0	0	0	2,813
316.00	19,770	715.0	20,027	20,027	38,692
318.00	43,606	994.0	61,825	81,852	76,674

Device	Routing	Invert	Outlet Devices
#1	Primary	314.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 314.00' / 312.60' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	314.00'	**1.020 in/hr Exfiltration over Surface area**

			Conductivity to Groundwater Elevation = 312.00'
#3	Primary	317.90'	**20.0' long x 23.0' 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
#4	Device 1	317.40'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	314.50'	**3.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.57 cfs @ 14.19 hrs HW=315.79' (Free Discharge)
└**2=Exfiltration** (Controls 0.57 cfs)

Primary OutFlow Max=0.26 cfs @ 14.19 hrs HW=315.79' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 0.26 cfs of 10.69 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.20 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: DMH-1

Inflow Area = 2.387 ac, 75.50% Impervious, Inflow Depth = 1.87" for 2-year event
Inflow = 5.07 cfs @ 12.09 hrs, Volume= 0.373 af
Outflow = 5.07 cfs @ 12.09 hrs, Volume= 0.373 af, Atten= 0%, Lag= 0.0 min
Primary = 5.07 cfs @ 12.09 hrs, Volume= 0.373 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.05' @ 12.09 hrs
Flood Elev= 319.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.90'	**24.0" Round Culvert**
			L= 67.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 315.90' / 315.50' S= 0.0060 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=4.97 cfs @ 12.09 hrs HW=317.03' TW=311.45' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 4.97 cfs @ 3.92 fps)

Summary for Pond 8P: DCB-1

Inflow Area = 0.597 ac, 69.19% Impervious, Inflow Depth = 1.83" for 2-year event
Inflow = 1.24 cfs @ 12.09 hrs, Volume= 0.091 af
Outflow = 1.24 cfs @ 12.09 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.09 hrs, Volume= 0.091 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.18' @ 12.13 hrs
Flood Elev= 319.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.20'	**12.0" Round Culvert**
			L= 23.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 316.20' / 316.00' S= 0.0087 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.89 cfs @ 12.09 hrs HW=317.13' TW=317.03' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.89 cfs @ 1.17 fps)

Summary for Pond 9P: DCB-2

Inflow Area = 0.341 ac, 84.83% Impervious, Inflow Depth = 2.30" for 2-year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.065 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.065 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.54' @ 12.09 hrs
Flood Elev= 320.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**12.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 317.00' / 316.50' S= 0.0217 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.84 cfs @ 12.09 hrs HW=317.53' TW=317.03' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.84 cfs @ 1.96 fps)

Summary for Pond 10P: DCB-3

Inflow Area = 0.538 ac, 78.66% Impervious, Inflow Depth = 2.06" for 2-year event
Inflow = 1.26 cfs @ 12.09 hrs, Volume= 0.092 af
Outflow = 1.26 cfs @ 12.09 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min
Primary = 1.26 cfs @ 12.09 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.48' @ 12.09 hrs
Flood Elev= 319.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.80'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.80' / 316.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.23 cfs @ 12.09 hrs HW=317.47' TW=317.03' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.23 cfs @ 2.20 fps)

Summary for Pond 11P: DMH-2

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 1.64" for 2-year event
Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af
Outflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.58' @ 12.10 hrs
Flood Elev= 321.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.90'	**18.0" Round Culvert** L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.90' / 316.00' S= 0.0134 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.60 cfs @ 12.09 hrs HW=317.57' TW=317.03' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.60 cfs @ 3.06 fps)

Summary for Pond 12P: DMH-3

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 1.64" for 2-year event
Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af
Outflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 322.28' @ 12.09 hrs
Flood Elev= 325.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	321.60'	**18.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 321.60' / 317.00' S= 0.0451 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.68 cfs @ 12.09 hrs HW=322.27' TW=317.57' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.68 cfs @ 2.20 fps)

Summary for Pond 13P: DMH-5

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 1.64" for 2-year event
Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af
Outflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.38' @ 12.09 hrs
Flood Elev= 341.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	337.70'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 337.70' / 328.80' S= 0.0712 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.68 cfs @ 12.09 hrs HW=338.37' TW=329.37' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.68 cfs @ 2.20 fps)

Summary for Pond 14P: DCB-4

Inflow Area = 0.336 ac, 79.57% Impervious, Inflow Depth = 1.83" for 2-year event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.60' @ 12.10 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.10'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.10' / 337.96' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.64 cfs @ 12.09 hrs HW=338.59' TW=338.37' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.64 cfs @ 2.41 fps)

Summary for Pond 15P: DCB-5

Inflow Area = 0.576 ac, 71.17% Impervious, Inflow Depth = 1.53" for 2-year event
Inflow = 1.01 cfs @ 12.09 hrs, Volume= 0.073 af
Outflow = 1.01 cfs @ 12.09 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 1.01 cfs @ 12.09 hrs, Volume= 0.073 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.69' @ 12.09 hrs
Flood Elev= 342.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.00'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.00' / 337.96' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.99 cfs @ 12.09 hrs HW=338.68' TW=338.37' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.99 cfs @ 2.47 fps)

Summary for Pond 16P: DMH-4

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 1.64" for 2-year event
Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af
Outflow = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 329.38' @ 12.09 hrs
Flood Elev= 332.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	328.70'	**18.0" Round Culvert** L= 91.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 328.70' / 321.70' S= 0.0769 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.68 cfs @ 12.09 hrs HW=329.37' TW=322.27' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.68 cfs @ 2.20 fps)

Summary for Pond 17P: DMH-6

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 1.80" for 2-year event
Inflow = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af
Outflow = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 335.92' @ 12.09 hrs
Flood Elev= 340.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.36'	**12.0" Round Culvert** L= 69.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.36' / 334.67' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.90 cfs @ 12.09 hrs HW=335.92' TW=335.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.90 cfs @ 2.00 fps)

Summary for Pond 18P: DCB-6

Inflow Area = 0.154 ac, 98.52% Impervious, Inflow Depth = 2.76" for 2-year event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.04' @ 12.11 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=336.02' TW=335.91' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.36 cfs @ 1.68 fps)

Summary for Pond 19P: DCB-7

Inflow Area = 0.313 ac, 50.23% Impervious, Inflow Depth = 1.33" for 2-year event
Inflow = 0.47 cfs @ 12.10 hrs, Volume= 0.035 af
Outflow = 0.47 cfs @ 12.10 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.47 cfs @ 12.10 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.06' @ 12.12 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.10 hrs HW=336.05' TW=335.92' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.41 cfs @ 1.79 fps)

Summary for Pond 20P: DMH-7

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 1.80" for 2-year event
Inflow = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af
Outflow = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 335.13' @ 12.09 hrs
Flood Elev= 341.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	334.57'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 334.57' / 333.69' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.90 cfs @ 12.09 hrs HW=335.13' TW=334.32' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.90 cfs @ 2.00 fps)

Summary for Pond 21P: DMH-8

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 1.82" for 2-year event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af
Outflow = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 334.33' @ 12.09 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	333.59'	**18.0" Round Culvert** L= 136.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 333.59' / 329.51' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.96 cfs @ 12.09 hrs HW=334.32' TW=330.14' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.96 cfs @ 2.30 fps)

Summary for Pond 22P: DCB-9

Inflow Area = 0.373 ac, 73.50% Impervious, Inflow Depth = 1.46" for 2-year event
Inflow = 0.62 cfs @ 12.09 hrs, Volume= 0.045 af
Outflow = 0.62 cfs @ 12.09 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.09 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.15' @ 12.09 hrs
Flood Elev= 342.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.70'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.70' / 337.92' S= 0.0433 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.61 cfs @ 12.09 hrs HW=339.15' TW=334.32' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.61 cfs @ 1.80 fps)

Summary for Pond 23P: DCB-8

Inflow Area = 0.161 ac, 98.59% Impervious, Inflow Depth = 2.76" for 2-year event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.89' @ 12.09 hrs
Flood Elev= 342.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.50'	**12.0" Round Culvert** L= 29.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.50' / 337.92' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.45 cfs @ 12.09 hrs HW=338.88' TW=334.32' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.45 cfs @ 1.66 fps)

Summary for Pond 24P: DMH-9

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 1.82" for 2-year event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af
Outflow = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 330.15' @ 12.09 hrs
Flood Elev= 338.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	329.41'	**18.0" Round Culvert** L= 99.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 329.41' / 326.44' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.96 cfs @ 12.09 hrs HW=330.14' TW=327.07' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.96 cfs @ 2.30 fps)

Summary for Pond 25P: DMH-10

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 1.82" for 2-year event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af
Outflow = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.09 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 327.08' @ 12.09 hrs
Flood Elev= 332.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.34'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 326.34' / 324.06' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.96 cfs @ 12.09 hrs HW=327.07' TW=324.12' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.96 cfs @ 2.30 fps)

Summary for Pond 26P: DMH-11

Inflow Area = 1.736 ac, 73.52% Impervious, Inflow Depth = 1.86" for 2-year event
Inflow = 3.55 cfs @ 12.09 hrs, Volume= 0.269 af
Outflow = 3.55 cfs @ 12.09 hrs, Volume= 0.269 af, Atten= 0%, Lag= 0.0 min
Primary = 3.55 cfs @ 12.09 hrs, Volume= 0.269 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 324.13' @ 12.09 hrs
Flood Elev= 327.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	323.10'	**18.0" Round Culvert** L= 175.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 323.10' / 318.50' S= 0.0263 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.48 cfs @ 12.09 hrs HW=324.12' TW=319.50' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.48 cfs @ 2.72 fps)

Summary for Pond 27P: DCB-10

Inflow Area = 0.182 ac, 98.75% Impervious, Inflow Depth = 2.87" for 2-year event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.53 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.09 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 324.92' @ 12.09 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.09 hrs HW=324.91' TW=324.12' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.52 cfs @ 1.72 fps)

Summary for Pond 28P: DCB-11

Inflow Area = 0.554 ac, 64.18% Impervious, Inflow Depth = 1.60" for 2-year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.074 af
Outflow = 1.02 cfs @ 12.09 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 12.09 hrs, Volume= 0.074 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 325.10' @ 12.09 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.00 cfs @ 12.09 hrs HW=325.09' TW=324.12' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.00 cfs @ 2.07 fps)

Summary for Pond 29P: DMH-12

Inflow Area = 2.476 ac, 72.94% Impervious, Inflow Depth = 1.85" for 2-year event
Inflow = 5.10 cfs @ 12.09 hrs, Volume= 0.382 af
Outflow = 5.10 cfs @ 12.09 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min
Primary = 5.10 cfs @ 12.09 hrs, Volume= 0.382 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 319.51' @ 12.09 hrs
Flood Elev= 322.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	318.40'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 318.40' / 316.00' S= 0.0369 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=5.00 cfs @ 12.09 hrs HW=319.50' TW=314.93' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.00 cfs @ 2.82 fps)

Summary for Pond 30P: DCB-12

Inflow Area = 0.739 ac, 71.58% Impervious, Inflow Depth = 1.83" for 2-year event
Inflow = 1.55 cfs @ 12.09 hrs, Volume= 0.113 af
Outflow = 1.55 cfs @ 12.09 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 1.55 cfs @ 12.09 hrs, Volume= 0.113 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 319.77' @ 12.12 hrs
Flood Elev= 322.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	319.00'	**18.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 319.00' / 318.50' S= 0.0094 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.31 cfs @ 12.09 hrs HW=319.74' TW=319.50' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.31 cfs @ 2.20 fps)

Summary for Pond 31P: PROP. CULVERT

Inflow Area = 2.671 ac, 14.12% Impervious, Inflow Depth = 0.37" for 2-year event
Inflow = 0.45 cfs @ 12.48 hrs, Volume= 0.082 af
Outflow = 0.45 cfs @ 12.48 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min
Primary = 0.45 cfs @ 12.48 hrs, Volume= 0.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 315.35' @ 12.48 hrs
Flood Elev= 318.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**15.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 315.00' / 313.00' S= 0.0241 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.45 cfs @ 12.48 hrs HW=315.35' TW=312.81' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.45 cfs @ 1.59 fps)

Summary for Link 4L: DP-A

Inflow Area = 20.984 ac, 28.02% Impervious, Inflow Depth = 0.49" for 2-year event
Inflow = 2.23 cfs @ 12.11 hrs, Volume= 0.856 af
Primary = 2.23 cfs @ 12.11 hrs, Volume= 0.856 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 5L: DP-B

Inflow Area = 0.748 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: POST 1.A Runoff Area=3,425 sf 90.16% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=94 Runoff=0.33 cfs 0.026 af

Subcatchment 2S: POST 2.A Runoff Area=2,942 sf 89.12% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=94 Runoff=0.28 cfs 0.022 af

Subcatchment 3S: POST 3.A Runoff Area=23,050 sf 66.65% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=86 Runoff=1.86 cfs 0.137 af

Subcatchment 5S: POST 7.A Runoff Area=116,337 sf 14.12% Impervious Runoff Depth=1.07"
Flow Length=1,092' Tc=22.1 min CN=60 Runoff=1.87 cfs 0.239 af

Subcatchment 6S: POST 8.A Runoff Area=20,015 sf 76.70% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=89 Runoff=1.74 cfs 0.130 af

Subcatchment 7S: POST 9.A Runoff Area=45,778 sf 17.90% Impervious Runoff Depth=1.74"
Flow Length=337' Tc=15.7 min CN=70 Runoff=1.53 cfs 0.153 af

Subcatchment 8S: POST 4.A Runoff Area=4,121 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.034 af

Subcatchment 9S: POST 5.A Runoff Area=25,088 sf 71.17% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=83 Runoff=1.86 cfs 0.135 af

Subcatchment 10S: POST 6.A Runoff Area=14,638 sf 79.57% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=87 Runoff=1.21 cfs 0.089 af

Subcatchment 11S: POST 10.A Runoff Area=10,719 sf 79.00% Impervious Runoff Depth=3.49"
Tc=6.0 min CN=90 Runoff=0.96 cfs 0.072 af

Subcatchment 12S: POST 11.A Runoff Area=122,862 sf 26.34% Impervious Runoff Depth=1.53"
Tc=8.0 min CN=67 Runoff=4.42 cfs 0.360 af

Subcatchment 13S: POST 12.A Runoff Area=7,009 sf 98.59% Impervious Runoff Depth=4.25"
Tc=6.0 min CN=97 Runoff=0.70 cfs 0.057 af

Subcatchment 14S: POST 13.A Runoff Area=16,242 sf 73.50% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=82 Runoff=1.17 cfs 0.085 af

Subcatchment 15S: POST 14.A Runoff Area=13,648 sf 50.23% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=80 Runoff=0.92 cfs 0.067 af

Subcatchment 16S: POST 15.A Runoff Area=6,688 sf 98.52% Impervious Runoff Depth=4.25"
Tc=6.0 min CN=97 Runoff=0.67 cfs 0.054 af

Subcatchment 17S: POST 16.A Runoff Area=7,932 sf 98.75% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.80 cfs 0.066 af

Subcatchment 18S: POST 17.A Runoff Area=24,122 sf 64.18% Impervious Runoff Depth=2.91"
Tc=6.0 min CN=84 Runoff=1.84 cfs 0.134 af

Subcatchment 19S: POST 18.A Runoff Area=48,773 sf 17.56% Impervious Runoff Depth=1.67"
Tc=6.0 min CN=69 Runoff=2.09 cfs 0.156 af

Subcatchment 20S: POST 19.A Runoff Area=32,206 sf 71.58% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=87 Runoff=2.67 cfs 0.197 af

Subcatchment 21S: POST 20.A Runoff Area=22,000 sf 12.53% Impervious Runoff Depth=1.46"
Tc=16.7 min CN=66 Runoff=0.59 cfs 0.061 af

Subcatchment 22S: POST 21.A Runoff Area=163,621 sf 11.94% Impervious Runoff Depth=1.07"
Flow Length=884' Tc=15.2 min CN=60 Runoff=3.02 cfs 0.336 af

Subcatchment 23S: POST 22.A Runoff Area=171,720 sf 0.00% Impervious Runoff Depth=2.05"
Tc=16.7 min CN=74 Runoff=6.75 cfs 0.673 af

Subcatchment 24S: POST 23.A Runoff Area=11,123 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=1.12 cfs 0.093 af

Subcatchment 25S: POST 1.B Runoff Area=32,569 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=106' Tc=11.1 min CN=36 Runoff=0.01 cfs 0.004 af

Pond 5P: INFIL BASIN #1 Peak Elev=315.17' Storage=24,183 cf Inflow=14.62 cfs 1.396 af
Discarded=0.34 cfs 0.351 af Primary=4.66 cfs 1.045 af Outflow=4.99 cfs 1.396 af

Pond 6P: INFIL BASIN #2 Peak Elev=316.77' Storage=38,392 cf Inflow=15.12 cfs 1.669 af
Discarded=0.99 cfs 1.224 af Primary=0.35 cfs 0.445 af Outflow=1.34 cfs 1.669 af

Pond 7P: DMH-1 Peak Elev=317.49' Inflow=8.66 cfs 0.644 af
24.0" Round Culvert n=0.013 L=67.0' S=0.0060 '/' Outflow=8.66 cfs 0.644 af

Pond 8P: DCB-1 Peak Elev=317.93' Inflow=2.14 cfs 0.159 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0087 '/' Outflow=2.14 cfs 0.159 af

Pond 9P: DCB-2 Peak Elev=317.76' Inflow=1.37 cfs 0.106 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=1.37 cfs 0.106 af

Pond 10P: DCB-3 Peak Elev=317.88' Inflow=2.07 cfs 0.155 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0100 '/' Outflow=2.07 cfs 0.155 af

Pond 11P: DMH-2 Peak Elev=317.94' Inflow=3.07 cfs 0.224 af
18.0" Round Culvert n=0.013 L=67.0' S=0.0134 '/' Outflow=3.07 cfs 0.224 af

Pond 12P: DMH-3 Peak Elev=322.55' Inflow=3.07 cfs 0.224 af
18.0" Round Culvert n=0.013 L=102.0' S=0.0451 '/' Outflow=3.07 cfs 0.224 af

Pond 13P: DMH-5 Peak Elev=338.65' Inflow=3.07 cfs 0.224 af
18.0" Round Culvert n=0.013 L=125.0' S=0.0712 '/' Outflow=3.07 cfs 0.224 af

Pond 14P: DCB-4 Peak Elev=338.85' Inflow=1.21 cfs 0.089 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=1.21 cfs 0.089 af

Pond 15P: DCB-5 Peak Elev=338.99' Inflow=1.86 cfs 0.135 af
12.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=1.86 cfs 0.135 af

Pond 16P: DMH-4 Peak Elev=329.65' Inflow=3.07 cfs 0.224 af
18.0" Round Culvert n=0.013 L=91.0' S=0.0769 '/' Outflow=3.07 cfs 0.224 af

Pond 17P: DMH-6 Peak Elev=336.15' Inflow=1.59 cfs 0.121 af
12.0" Round Culvert n=0.013 L=69.0' S=0.0100 '/' Outflow=1.59 cfs 0.121 af

Pond 18P: DCB-6 Peak Elev=336.24' Inflow=0.67 cfs 0.054 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.67 cfs 0.054 af

Pond 19P: DCB-7 Peak Elev=336.29' Inflow=0.92 cfs 0.067 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.92 cfs 0.067 af

Pond 20P: DMH-7 Peak Elev=335.36' Inflow=1.59 cfs 0.121 af
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=1.59 cfs 0.121 af

Pond 21P: DMH-8 Peak Elev=334.61' Inflow=3.45 cfs 0.262 af
18.0" Round Culvert n=0.013 L=136.0' S=0.0300 '/' Outflow=3.45 cfs 0.262 af

Pond 22P: DCB-9 Peak Elev=339.35' Inflow=1.17 cfs 0.085 af
12.0" Round Culvert n=0.013 L=18.0' S=0.0433 '/' Outflow=1.17 cfs 0.085 af

Pond 23P: DCB-8 Peak Elev=338.98' Inflow=0.70 cfs 0.057 af
12.0" Round Culvert n=0.013 L=29.0' S=0.0200 '/' Outflow=0.70 cfs 0.057 af

Pond 24P: DMH-9 Peak Elev=330.43' Inflow=3.45 cfs 0.262 af
18.0" Round Culvert n=0.013 L=99.0' S=0.0300 '/' Outflow=3.45 cfs 0.262 af

Pond 25P: DMH-10 Peak Elev=327.36' Inflow=3.45 cfs 0.262 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0300 '/' Outflow=3.45 cfs 0.262 af

Pond 26P: DMH-11 Peak Elev=324.67' Inflow=6.09 cfs 0.463 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0263 '/' Outflow=6.09 cfs 0.463 af

Pond 27P: DCB-10 Peak Elev=325.02' Inflow=0.80 cfs 0.066 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=0.80 cfs 0.066 af

Pond 28P: DCB-11 Peak Elev=325.38' Inflow=1.84 cfs 0.134 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=1.84 cfs 0.134 af

Pond 29P: DMH-12 Peak Elev=319.95' Inflow=8.76 cfs 0.660 af
24.0" Round Culvert n=0.013 L=65.0' S=0.0369 '/' Outflow=8.76 cfs 0.660 af

Pond 30P: DCB-12 Peak Elev=320.16' Inflow=2.67 cfs 0.197 af
18.0" Round Culvert n=0.013 L=53.0' S=0.0094 '/' Outflow=2.67 cfs 0.197 af

Pond 31P: PROP. CULVERT Peak Elev=315.77' Inflow=1.87 cfs 0.239 af
15.0" Round Culvert n=0.013 L=83.0' S=0.0241 '/' Outflow=1.87 cfs 0.239 af

Link 4L: DP-A Inflow=5.92 cfs 1.801 af
Primary=5.92 cfs 1.801 af

Link 5L: DP-B Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Total Runoff Area = 21.732 ac Runoff Volume = 3.379 af Average Runoff Depth = 1.87"
72.94% Pervious = 15.851 ac 27.06% Impervious = 5.880 ac

Summary for Subcatchment 1S: POST 1.A

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
3,088	98	Paved parking, HSG B
337	61	>75% Grass cover, Good, HSG B
3,425	94	Weighted Average
337		9.84% Pervious Area
3,088		90.16% Impervious Area

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

Summary for Subcatchment 2S: POST 2.A

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,622	98	Paved parking, HSG B
320	61	>75% Grass cover, Good, HSG B
2,942	94	Weighted Average
320		10.88% Pervious Area
2,622		89.12% Impervious Area

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

Summary for Subcatchment 3S: POST 3.A

Runoff = 1.86 cfs @ 12.09 hrs, Volume= 0.137 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
8,108	98	Paved parking, HSG B
7,688	61	>75% Grass cover, Good, HSG B
23,050	86	Weighted Average
7,688		33.35% Pervious Area
15,362		66.65% Impervious Area

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

Summary for Subcatchment 5S: POST 7.A

Runoff = 1.87 cfs @ 12.36 hrs, Volume= 0.239 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
4,364	70	Woods, Good, HSG C
748	74	>75% Grass cover, Good, HSG C
23,680	55	Woods, Good, HSG B
44,396	61	>75% Grass cover, Good, HSG B
10,564	98	Roofs, HSG B
1,307	30	Woods, Good, HSG A
5,862	98	Roofs, HSG A
25,416	39	>75% Grass cover, Good, HSG A
116,337	60	Weighted Average
99,911		85.88% Pervious Area
16,426		14.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0060	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.8	859	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	100	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
22.1	1,092	Total			

Summary for Subcatchment 6S: POST 8.A

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.130 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
8,097	98	Paved parking, HSG B
7,254	98	Roofs, HSG B
4,664	61	>75% Grass cover, Good, HSG B
20,015	89	Weighted Average
4,664		23.30% Pervious Area
15,351		76.70% Impervious Area

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

Summary for Subcatchment 7S: POST 9.A

Runoff = 1.53 cfs @ 12.23 hrs, Volume= 0.153 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
8,194	98	Roofs, HSG B
2,704	96	Gravel surface, HSG B
34,880	61	>75% Grass cover, Good, HSG B
45,778	70	Weighted Average
37,584		82.10% Pervious Area
8,194		17.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0040	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	287	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.7	337	Total			

Summary for Subcatchment 8S: POST 4.A

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
4,121	98	Paved parking, HSG B
4,121		100.00% Impervious Area

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

Summary for Subcatchment 9S: POST 5.A

Runoff = 1.86 cfs @ 12.09 hrs, Volume= 0.135 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,371	98	Roofs, HSG B
2,520	98	Paved parking, HSG B
1,785	61	>75% Grass cover, Good, HSG B
6,920	98	Paved parking, HSG A
6,045	98	Roofs, HSG A
5,447	39	>75% Grass cover, Good, HSG A
25,088	83	Weighted Average
7,232		28.83% Pervious Area
17,856		71.17% Impervious Area

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

Summary for Subcatchment 10S: POST 6.A

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.089 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
2,782	98	Paved parking, HSG B
981	61	>75% Grass cover, Good, HSG B
2,418	98	Roofs, HSG A
4,029	98	Paved parking, HSG A
2,010	39	>75% Grass cover, Good, HSG A
14,638	87	Weighted Average
2,991		20.43% Pervious Area
11,647		79.57% Impervious Area

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

Summary for Subcatchment 11S: POST 10.A

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.072 af, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
6,050	98	Paved parking, HSG B
2,251	61	>75% Grass cover, Good, HSG B
10,719	90	Weighted Average
2,251		21.00% Pervious Area
8,468		79.00% Impervious Area

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

Summary for Subcatchment 12S: POST 11.A

Runoff = 4.42 cfs @ 12.12 hrs, Volume= 0.360 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
4,538	98	Roofs, HSG A
1,059	98	Paved parking, HSG A
19,560	39	>75% Grass cover, Good, HSG A
10,702	98	Roofs, HSG B
16,067	98	Paved parking, HSG B
70,936	61	>75% Grass cover, Good, HSG B
122,862	67	Weighted Average
90,496		73.66% Pervious Area
32,366		26.34% Impervious Area

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

Summary for Subcatchment 13S: POST 12.A

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
1,783	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
99	39	>75% Grass cover, Good, HSG A
634	98	Roofs, HSG B
1,106	98	Paved parking, HSG B
7,009	97	Weighted Average
99		1.41% Pervious Area
6,910		98.59% Impervious Area

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

Summary for Subcatchment 14S: POST 13.A

Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
6,045	98	Roofs, HSG A
4,758	98	Paved parking, HSG A
4,304	39	>75% Grass cover, Good, HSG A
1,135	98	Paved parking, HSG B
16,242	82	Weighted Average
4,304		26.50% Pervious Area
11,938		73.50% Impervious Area

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

Summary for Subcatchment 15S: POST 14.A

Runoff = 0.92 cfs @ 12.09 hrs, Volume= 0.067 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,438	98	Paved parking, HSG B
6,792	61	>75% Grass cover, Good, HSG B
13,648	80	Weighted Average
6,792		49.77% Pervious Area
6,856		50.23% Impervious Area

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

Summary for Subcatchment 16S: POST 15.A

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.054 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,171	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
6,688	97	Weighted Average
99		1.48% Pervious Area
6,589		98.52% Impervious Area

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

Summary for Subcatchment 17S: POST 16.A

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.066 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,438	98	Roofs, HSG B
5,395	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
7,932	98	Weighted Average
99		1.25% Pervious Area
7,833		98.75% Impervious Area

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

Summary for Subcatchment 18S: POST 17.A

Runoff = 1.84 cfs @ 12.09 hrs, Volume= 0.134 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
843	39	>75% Grass cover, Good, HSG A
7,797	61	>75% Grass cover, Good, HSG B
7,254	98	Roofs, HSG B
8,228	98	Paved parking, HSG B
24,122	84	Weighted Average
8,640		35.82% Pervious Area
15,482		64.18% Impervious Area

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

Summary for Subcatchment 19S: POST 18.A

Runoff = 2.09 cfs @ 12.10 hrs, Volume= 0.156 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
8,334	98	Roofs, HSG A
230	98	Paved parking, HSG B
38,161	61	>75% Grass cover, Good, HSG B
1,265	96	Gravel surface, HSG B
198	80	>75% Grass cover, Good, HSG D
585	96	Gravel surface, HSG D
48,773	69	Weighted Average
40,209		82.44% Pervious Area
8,564		17.56% Impervious Area

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

Summary for Subcatchment 20S: POST 19.A

Runoff = 2.67 cfs @ 12.09 hrs, Volume= 0.197 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
15,799	98	Paved parking, HSG B
9,153	61	>75% Grass cover, Good, HSG B
32,206	87	Weighted Average
9,153		28.42% Pervious Area
23,053		71.58% Impervious Area

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

Summary for Subcatchment 21S: POST 20.A

Runoff = 0.59 cfs @ 12.25 hrs, Volume= 0.061 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,757	98	Roofs, HSG B
19,243	61	>75% Grass cover, Good, HSG B
22,000	66	Weighted Average
19,243		87.47% Pervious Area
2,757		12.53% Impervious Area

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

Summary for Subcatchment 22S: POST 21.A

Runoff = 3.02 cfs @ 12.25 hrs, Volume= 0.336 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
6,845	98	Roofs, HSG A
10,053	30	Woods, Good, HSG A
27,345	39	>75% Grass cover, Good, HSG A
11,252	98	Roofs, HSG B
1,437	98	Paved parking, HSG B
84,020	61	>75% Grass cover, Good, HSG B
19,267	55	Woods, Good, HSG B
2,829	80	>75% Grass cover, Good, HSG D
573	96	Gravel surface, HSG D
163,621	60	Weighted Average
144,087		88.06% Pervious Area
19,534		11.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	348	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	486	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.2	884	Total			

Summary for Subcatchment 23S: POST 22.A

Runoff = 6.75 cfs @ 12.24 hrs, Volume= 0.673 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
24,567	55	Woods, Good, HSG B
147,153	77	Woods, Good, HSG D
171,720	74	Weighted Average
171,720		100.00% Pervious Area

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

Summary for Subcatchment 24S: POST 23.A

Runoff = 1.12 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
9,334	98	Paved parking, HSG C
1,789	98	Paved parking, HSG B
11,123	98	Weighted Average
11,123		100.00% Impervious Area

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

Summary for Subcatchment 25S: POST 1.B

Runoff = 0.01 cfs @ 15.53 hrs, Volume= 0.004 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
24,680	30	Woods, Good, HSG A
7,889	55	Woods, Good, HSG B
32,569	36	Weighted Average
32,569		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	56	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	106	Total			

Summary for Pond 5P: INFIL BASIN #1

Inflow Area = 8.930 ac, 34.84% Impervious, Inflow Depth = 1.88" for 10-year event
Inflow = 14.62 cfs @ 12.11 hrs, Volume= 1.396 af
Outflow = 4.99 cfs @ 12.57 hrs, Volume= 1.396 af, Atten= 66%, Lag= 27.6 min
Discarded = 0.34 cfs @ 12.57 hrs, Volume= 0.351 af
Primary = 4.66 cfs @ 12.57 hrs, Volume= 1.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 315.17' @ 12.57 hrs Surf.Area= 7,220 sf Storage= 24,183 cf

Plug-Flow detention time= 224.1 min calculated for 1.395 af (100% of inflow)
Center-of-Mass det. time= 224.6 min (1,064.0 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	30,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.00	676	116.0	0	0	676
310.00	2,025	254.0	1,290	1,290	4,743
312.00	3,788	311.0	5,722	7,012	7,368
316.00	8,295	412.0	23,585	30,597	13,356

Device	Routing	Invert	Outlet Devices
#1	Primary	309.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 309.00' / 308.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	309.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 306.73'
#3	Primary	315.60'	**20.0' long x 23.0' 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
#4	Device 1	315.00'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	310.20'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.34 cfs @ 12.57 hrs HW=315.17' (Free Discharge)
└**2=Exfiltration** (Controls 0.34 cfs)

Primary OutFlow Max=4.55 cfs @ 12.57 hrs HW=315.17' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 4.55 cfs of 27.15 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Weir Controls 3.63 cfs @ 1.34 fps)
│ └**5=Orifice/Grate** (Orifice Controls 0.92 cfs @ 10.55 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: INFIL BASIN #2

Inflow Area = 10.174 ac, 22.16% Impervious, Inflow Depth = 1.97" for 10-year event
Inflow = 15.12 cfs @ 12.15 hrs, Volume= 1.669 af
Outflow = 1.34 cfs @ 14.80 hrs, Volume= 1.669 af, Atten= 91%, Lag= 159.2 min
Discarded = 0.99 cfs @ 14.80 hrs, Volume= 1.224 af
Primary = 0.35 cfs @ 14.80 hrs, Volume= 0.445 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 316.77' @ 14.80 hrs Surf.Area= 27,895 sf Storage= 38,392 cf

Plug-Flow detention time= 378.7 min calculated for 1.668 af (100% of inflow)
Center-of-Mass det. time= 379.0 min (1,216.8 - 837.8)

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	81,852 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)
314.00	2,813	246.0	0	0	2,813
316.00	19,770	715.0	20,027	20,027	38,692
318.00	43,606	994.0	61,825	81,852	76,674

Device	Routing	Invert	Outlet Devices
#1	Primary	314.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 314.00' / 312.60' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	314.00'	**1.020 in/hr Exfiltration over Surface area**

			Conductivity to Groundwater Elevation = 312.00'
#3	Primary	317.90'	**20.0' long x 23.0' 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
#4	Device 1	317.40'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	314.50'	**3.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.99 cfs @ 14.80 hrs HW=316.77' (Free Discharge)
└**2=Exfiltration** (Controls 0.99 cfs)

Primary OutFlow Max=0.35 cfs @ 14.80 hrs HW=316.77' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 0.35 cfs of 15.91 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Orifice Controls 0.35 cfs @ 7.06 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: DMH-1

Inflow Area = 2.387 ac, 75.50% Impervious, Inflow Depth = 3.24" for 10-year event
Inflow = 8.66 cfs @ 12.09 hrs, Volume= 0.644 af
Outflow = 8.66 cfs @ 12.09 hrs, Volume= 0.644 af, Atten= 0%, Lag= 0.0 min
Primary = 8.66 cfs @ 12.09 hrs, Volume= 0.644 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.49' @ 12.09 hrs
Flood Elev= 319.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.90'	**24.0" Round Culvert**
			L= 67.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 315.90' / 315.50' S= 0.0060 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=8.46 cfs @ 12.09 hrs HW=317.47' TW=313.02' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 8.46 cfs @ 4.40 fps)

Summary for Pond 8P: DCB-1

Inflow Area = 0.597 ac, 69.19% Impervious, Inflow Depth = 3.19" for 10-year event
Inflow = 2.14 cfs @ 12.09 hrs, Volume= 0.159 af
Outflow = 2.14 cfs @ 12.09 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.09 hrs, Volume= 0.159 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.93' @ 12.12 hrs
Flood Elev= 319.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.20'	**12.0" Round Culvert**
			L= 23.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 316.20' / 316.00' S= 0.0087 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.79 cfs @ 12.09 hrs HW=317.83' TW=317.47' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.79 cfs @ 2.28 fps)

Summary for Pond 9P: DCB-2

Inflow Area = 0.341 ac, 84.83% Impervious, Inflow Depth = 3.73" for 10-year event
Inflow = 1.37 cfs @ 12.09 hrs, Volume= 0.106 af
Outflow = 1.37 cfs @ 12.09 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.09 hrs, Volume= 0.106 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.76' @ 12.11 hrs
Flood Elev= 320.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**12.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 317.00' / 316.50' S= 0.0217 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.15 cfs @ 12.09 hrs HW=317.73' TW=317.47' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.15 cfs @ 2.60 fps)

Summary for Pond 10P: DCB-3

Inflow Area = 0.538 ac, 78.66% Impervious, Inflow Depth = 3.47" for 10-year event
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.155 af
Outflow = 2.07 cfs @ 12.09 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
Primary = 2.07 cfs @ 12.09 hrs, Volume= 0.155 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.88' @ 12.11 hrs
Flood Elev= 319.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.80'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.80' / 316.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 12.09 hrs HW=317.84' TW=317.47' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.81 cfs @ 2.31 fps)

Summary for Pond 11P: DMH-2

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 2.95" for 10-year event
Inflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af
Outflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.94' @ 12.11 hrs
Flood Elev= 321.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.90'	**18.0" Round Culvert** L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.90' / 316.00' S= 0.0134 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.67 cfs @ 12.09 hrs HW=317.91' TW=317.47' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.67 cfs @ 3.00 fps)

Summary for Pond 12P: DMH-3

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 2.95" for 10-year event
Inflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af
Outflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 322.55' @ 12.09 hrs
Flood Elev= 325.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	321.60'	**18.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 321.60' / 317.00' S= 0.0451 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.00 cfs @ 12.09 hrs HW=322.53' TW=317.91' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.00 cfs @ 2.60 fps)

Summary for Pond 13P: DMH-5

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 2.95" for 10-year event
Inflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af
Outflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.65' @ 12.09 hrs
Flood Elev= 341.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	337.70'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 337.70' / 328.80' S= 0.0712 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.00 cfs @ 12.09 hrs HW=338.63' TW=329.63' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 3.00 cfs @ 2.60 fps)

Summary for Pond 14P: DCB-4

Inflow Area = 0.336 ac, 79.57% Impervious, Inflow Depth = 3.19" for 10-year event
Inflow = 1.21 cfs @ 12.09 hrs, Volume= 0.089 af
Outflow = 1.21 cfs @ 12.09 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 1.21 cfs @ 12.09 hrs, Volume= 0.089 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.85' @ 12.11 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.10'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.10' / 337.96' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 12.09 hrs HW=338.83' TW=338.63' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.02 cfs @ 2.33 fps)

Summary for Pond 15P: DCB-5

Inflow Area = 0.576 ac, 71.17% Impervious, Inflow Depth = 2.81" for 10-year event
Inflow = 1.86 cfs @ 12.09 hrs, Volume= 0.135 af
Outflow = 1.86 cfs @ 12.09 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min
Primary = 1.86 cfs @ 12.09 hrs, Volume= 0.135 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.99' @ 12.10 hrs
Flood Elev= 342.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.00'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.00' / 337.96' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.76 cfs @ 12.09 hrs HW=338.98' TW=338.63' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.76 cfs @ 2.25 fps)

Summary for Pond 16P: DMH-4

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 2.95" for 10-year event
Inflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af
Outflow = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 12.09 hrs, Volume= 0.224 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 329.65' @ 12.09 hrs
Flood Elev= 332.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	328.70'	**18.0" Round Culvert** L= 91.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 328.70' / 321.70' S= 0.0769 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.00 cfs @ 12.09 hrs HW=329.63' TW=322.53' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.00 cfs @ 2.60 fps)

Summary for Pond 17P: DMH-6

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 3.11" for 10-year event
Inflow = 1.59 cfs @ 12.09 hrs, Volume= 0.121 af
Outflow = 1.59 cfs @ 12.09 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.09 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.15' @ 12.09 hrs
Flood Elev= 340.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.36'	**12.0" Round Culvert** L= 69.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.36' / 334.67' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.55 cfs @ 12.09 hrs HW=336.14' TW=335.35' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.55 cfs @ 2.37 fps)

Summary for Pond 18P: DCB-6

Inflow Area = 0.154 ac, 98.52% Impervious, Inflow Depth = 4.25" for 10-year event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 0.054 af
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 12.09 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.24' @ 12.12 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.45 cfs @ 12.09 hrs HW=336.20' TW=336.13' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.45 cfs @ 1.31 fps)

Summary for Pond 19P: DCB-7

Inflow Area = 0.313 ac, 50.23% Impervious, Inflow Depth = 2.55" for 10-year event
Inflow = 0.92 cfs @ 12.09 hrs, Volume= 0.067 af
Outflow = 0.92 cfs @ 12.09 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Primary = 0.92 cfs @ 12.09 hrs, Volume= 0.067 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.29' @ 12.12 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.75 cfs @ 12.09 hrs HW=336.27' TW=336.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.75 cfs @ 1.89 fps)

Summary for Pond 20P: DMH-7

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 3.11" for 10-year event
Inflow = 1.59 cfs @ 12.09 hrs, Volume= 0.121 af
Outflow = 1.59 cfs @ 12.09 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.09 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 335.36' @ 12.09 hrs
Flood Elev= 341.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	334.57'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 334.57' / 333.69' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.55 cfs @ 12.09 hrs HW=335.35' TW=334.59' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.55 cfs @ 2.37 fps)

Summary for Pond 21P: DMH-8

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af
Outflow = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min
Primary = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 334.61' @ 12.09 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	333.59'	**18.0" Round Culvert** L= 136.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 333.59' / 329.51' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.37 cfs @ 12.09 hrs HW=334.59' TW=330.41' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.37 cfs @ 2.69 fps)

Summary for Pond 22P: DCB-9

Inflow Area = 0.373 ac, 73.50% Impervious, Inflow Depth = 2.72" for 10-year event
Inflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.35' @ 12.09 hrs
Flood Elev= 342.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.70'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.70' / 337.92' S= 0.0433 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.14 cfs @ 12.09 hrs HW=339.34' TW=334.59' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.14 cfs @ 2.15 fps)

Summary for Pond 23P: DCB-8

Inflow Area = 0.161 ac, 98.59% Impervious, Inflow Depth = 4.25" for 10-year event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.057 af
Outflow = 0.70 cfs @ 12.09 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.09 hrs, Volume= 0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.98' @ 12.09 hrs
Flood Elev= 342.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.50'	**12.0" Round Culvert** L= 29.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.50' / 337.92' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.68 cfs @ 12.09 hrs HW=338.98' TW=334.59' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.68 cfs @ 1.85 fps)

Summary for Pond 24P: DMH-9

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af
Outflow = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min
Primary = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 330.43' @ 12.09 hrs
Flood Elev= 338.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	329.41'	**18.0" Round Culvert** L= 99.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 329.41' / 326.44' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.37 cfs @ 12.09 hrs HW=330.41' TW=327.34' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.37 cfs @ 2.69 fps)

Summary for Pond 25P: DMH-10

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af
Outflow = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min
Primary = 3.45 cfs @ 12.09 hrs, Volume= 0.262 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 327.36' @ 12.09 hrs
Flood Elev= 332.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.34'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 326.34' / 324.06' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.37 cfs @ 12.09 hrs HW=327.34' TW=324.63' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.37 cfs @ 2.69 fps)

Summary for Pond 26P: DMH-11

Inflow Area = 1.736 ac, 73.52% Impervious, Inflow Depth = 3.20" for 10-year event
Inflow = 6.09 cfs @ 12.09 hrs, Volume= 0.463 af
Outflow = 6.09 cfs @ 12.09 hrs, Volume= 0.463 af, Atten= 0%, Lag= 0.0 min
Primary = 6.09 cfs @ 12.09 hrs, Volume= 0.463 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 324.67' @ 12.09 hrs
Flood Elev= 327.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	323.10'	**18.0" Round Culvert** L= 175.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 323.10' / 318.50' S= 0.0263 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.95 cfs @ 12.09 hrs HW=324.63' TW=319.93' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.95 cfs @ 3.36 fps)

Summary for Pond 27P: DCB-10

Inflow Area = 0.182 ac, 98.75% Impervious, Inflow Depth = 4.36" for 10-year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.066 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 325.02' @ 12.09 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.78 cfs @ 12.09 hrs HW=325.01' TW=324.62' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.78 cfs @ 1.92 fps)

Summary for Pond 28P: DCB-11

Inflow Area = 0.554 ac, 64.18% Impervious, Inflow Depth = 2.91" for 10-year event
Inflow = 1.84 cfs @ 12.09 hrs, Volume= 0.134 af
Outflow = 1.84 cfs @ 12.09 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.84 cfs @ 12.09 hrs, Volume= 0.134 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 325.38' @ 12.09 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.80 cfs @ 12.09 hrs HW=325.36' TW=324.64' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.80 cfs @ 2.50 fps)

Summary for Pond 29P: DMH-12

Inflow Area = 2.476 ac, 72.94% Impervious, Inflow Depth = 3.20" for 10-year event
Inflow = 8.76 cfs @ 12.09 hrs, Volume= 0.660 af
Outflow = 8.76 cfs @ 12.09 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min
Primary = 8.76 cfs @ 12.09 hrs, Volume= 0.660 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 319.95' @ 12.09 hrs
Flood Elev= 322.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	318.40'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 318.40' / 316.00' S= 0.0369 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=8.56 cfs @ 12.09 hrs HW=319.93' TW=315.56' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 8.56 cfs @ 3.32 fps)

Summary for Pond 30P: DCB-12

Inflow Area = 0.739 ac, 71.58% Impervious, Inflow Depth = 3.19" for 10-year event
Inflow = 2.67 cfs @ 12.09 hrs, Volume= 0.197 af
Outflow = 2.67 cfs @ 12.09 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min
Primary = 2.67 cfs @ 12.09 hrs, Volume= 0.197 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 320.16' @ 12.12 hrs
Flood Elev= 322.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	319.00'	**18.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 319.00' / 318.50' S= 0.0094 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.99 cfs @ 12.09 hrs HW=320.10' TW=319.93' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.99 cfs @ 1.99 fps)

Summary for Pond 31P: PROP. CULVERT

Inflow Area = 2.671 ac, 14.12% Impervious, Inflow Depth = 1.07" for 10-year event
Inflow = 1.87 cfs @ 12.36 hrs, Volume= 0.239 af
Outflow = 1.87 cfs @ 12.36 hrs, Volume= 0.239 af, Atten= 0%, Lag= 0.0 min
Primary = 1.87 cfs @ 12.36 hrs, Volume= 0.239 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 315.77' @ 12.36 hrs
Flood Elev= 318.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**15.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 315.00' / 313.00' S= 0.0241 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=1.86 cfs @ 12.36 hrs HW=315.77' TW=314.75' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.86 cfs @ 2.35 fps)

Summary for Link 4L: DP-A

Inflow Area = 20.984 ac, 28.02% Impervious, Inflow Depth = 1.03" for 10-year event
Inflow = 5.92 cfs @ 12.56 hrs, Volume= 1.801 af
Primary = 5.92 cfs @ 12.56 hrs, Volume= 1.801 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 5L: DP-B

Inflow Area = 0.748 ac, 0.00% Impervious, Inflow Depth = 0.06" for 10-year event
Inflow = 0.01 cfs @ 15.53 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 15.53 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: POST 1.A Runoff Area=3,425 sf 90.16% Impervious Runoff Depth=4.70"
Tc=6.0 min CN=94 Runoff=0.39 cfs 0.031 af

Subcatchment 2S: POST 2.A Runoff Area=2,942 sf 89.12% Impervious Runoff Depth=4.70"
Tc=6.0 min CN=94 Runoff=0.34 cfs 0.026 af

Subcatchment 3S: POST 3.A Runoff Area=23,050 sf 66.65% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=86 Runoff=2.29 cfs 0.169 af

Subcatchment 5S: POST 7.A Runoff Area=116,337 sf 14.12% Impervious Runoff Depth=1.54"
Flow Length=1,092' Tc=22.1 min CN=60 Runoff=2.84 cfs 0.343 af

Subcatchment 6S: POST 8.A Runoff Area=20,015 sf 76.70% Impervious Runoff Depth=4.16"
Tc=6.0 min CN=89 Runoff=2.12 cfs 0.159 af

Subcatchment 7S: POST 9.A Runoff Area=45,778 sf 17.90% Impervious Runoff Depth=2.34"
Flow Length=337' Tc=15.7 min CN=70 Runoff=2.10 cfs 0.205 af

Subcatchment 8S: POST 4.A Runoff Area=4,121 sf 100.00% Impervious Runoff Depth=5.16"
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.041 af

Subcatchment 9S: POST 5.A Runoff Area=25,088 sf 71.17% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=83 Runoff=2.32 cfs 0.170 af

Subcatchment 10S: POST 6.A Runoff Area=14,638 sf 79.57% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=87 Runoff=1.49 cfs 0.110 af

Subcatchment 11S: POST 10.A Runoff Area=10,719 sf 79.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=90 Runoff=1.15 cfs 0.087 af

Subcatchment 12S: POST 11.A Runoff Area=122,862 sf 26.34% Impervious Runoff Depth=2.09"
Tc=8.0 min CN=67 Runoff=6.19 cfs 0.490 af

Subcatchment 13S: POST 12.A Runoff Area=7,009 sf 98.59% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=97 Runoff=0.83 cfs 0.068 af

Subcatchment 14S: POST 13.A Runoff Area=16,242 sf 73.50% Impervious Runoff Depth=3.44"
Tc=6.0 min CN=82 Runoff=1.46 cfs 0.107 af

Subcatchment 15S: POST 14.A Runoff Area=13,648 sf 50.23% Impervious Runoff Depth=3.24"
Tc=6.0 min CN=80 Runoff=1.17 cfs 0.085 af

Subcatchment 16S: POST 15.A Runoff Area=6,688 sf 98.52% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=97 Runoff=0.79 cfs 0.065 af

Subcatchment 17S: POST 16.A Runoff Area=7,932 sf 98.75% Impervious Runoff Depth=5.16"
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.078 af

Subcatchment 18S: POST 17.A Runoff Area=24,122 sf 64.18% Impervious Runoff Depth=3.64"
Tc=6.0 min CN=84 Runoff=2.29 cfs 0.168 af

Subcatchment 19S: POST 18.A Runoff Area=48,773 sf 17.56% Impervious Runoff Depth=2.25"
Tc=6.0 min CN=69 Runoff=2.86 cfs 0.210 af

Subcatchment 20S: POST 19.A Runoff Area=32,206 sf 71.58% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=87 Runoff=3.27 cfs 0.243 af

Subcatchment 21S: POST 20.A Runoff Area=22,000 sf 12.53% Impervious Runoff Depth=2.01"
Tc=16.7 min CN=66 Runoff=0.83 cfs 0.084 af

Subcatchment 22S: POST 21.A Runoff Area=163,621 sf 11.94% Impervious Runoff Depth=1.54"
Flow Length=884' Tc=15.2 min CN=60 Runoff=4.62 cfs 0.482 af

Subcatchment 23S: POST 22.A Runoff Area=171,720 sf 0.00% Impervious Runoff Depth=2.69"
Tc=16.7 min CN=74 Runoff=8.92 cfs 0.883 af

Subcatchment 24S: POST 23.A Runoff Area=11,123 sf 100.00% Impervious Runoff Depth=5.16"
Tc=6.0 min CN=98 Runoff=1.32 cfs 0.110 af

Subcatchment 25S: POST 1.B Runoff Area=32,569 sf 0.00% Impervious Runoff Depth=0.17"
Flow Length=106' Tc=11.1 min CN=36 Runoff=0.02 cfs 0.011 af

Pond 5P: INFIL BASIN #1 Peak Elev=315.34' Storage=25,411 cf Inflow=19.25 cfs 1.832 af
Discarded=0.35 cfs 0.384 af Primary=11.27 cfs 1.448 af Outflow=11.62 cfs 1.832 af

Pond 6P: INFIL BASIN #2 Peak Elev=317.23' Storage=52,445 cf Inflow=20.07 cfs 2.178 af
Discarded=1.22 cfs 1.621 af Primary=0.38 cfs 0.557 af Outflow=1.60 cfs 2.178 af

Pond 7P: DMH-1 Peak Elev=317.72' Inflow=10.58 cfs 0.794 af
24.0" Round Culvert n=0.013 L=67.0' S=0.0060 '/' Outflow=10.58 cfs 0.794 af

Pond 8P: DCB-1 Peak Elev=318.40' Inflow=2.63 cfs 0.196 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0087 '/' Outflow=2.63 cfs 0.196 af

Pond 9P: DCB-2 Peak Elev=317.95' Inflow=1.64 cfs 0.128 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=1.64 cfs 0.128 af

Pond 10P: DCB-3 Peak Elev=318.32' Inflow=2.51 cfs 0.190 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0100 '/' Outflow=2.51 cfs 0.190 af

Pond 11P: DMH-2 Peak Elev=318.14' Inflow=3.81 cfs 0.280 af
18.0" Round Culvert n=0.013 L=67.0' S=0.0134 '/' Outflow=3.81 cfs 0.280 af

Pond 12P: DMH-3 Peak Elev=322.68' Inflow=3.81 cfs 0.280 af
18.0" Round Culvert n=0.013 L=102.0' S=0.0451 '/' Outflow=3.81 cfs 0.280 af

Pond 13P: DMH-5 Peak Elev=338.78' Inflow=3.81 cfs 0.280 af
18.0" Round Culvert n=0.013 L=125.0' S=0.0712 '/' Outflow=3.81 cfs 0.280 af

Pond 14P: DCB-4 Peak Elev=339.00' Inflow=1.49 cfs 0.110 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=1.49 cfs 0.110 af

Pond 15P: DCB-5 Peak Elev=339.32' Inflow=2.32 cfs 0.170 af
12.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=2.32 cfs 0.170 af

Pond 16P: DMH-4 Peak Elev=329.78' Inflow=3.81 cfs 0.280 af
18.0" Round Culvert n=0.013 L=91.0' S=0.0769 '/' Outflow=3.81 cfs 0.280 af

Pond 17P: DMH-6 Peak Elev=336.28' Inflow=1.95 cfs 0.149 af
12.0" Round Culvert n=0.013 L=69.0' S=0.0100 '/' Outflow=1.95 cfs 0.149 af

Pond 18P: DCB-6 Peak Elev=336.36' Inflow=0.79 cfs 0.065 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.79 cfs 0.065 af

Pond 19P: DCB-7 Peak Elev=336.43' Inflow=1.17 cfs 0.085 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=1.17 cfs 0.085 af

Pond 20P: DMH-7 Peak Elev=335.49' Inflow=1.95 cfs 0.149 af
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=1.95 cfs 0.149 af

Pond 21P: DMH-8 Peak Elev=334.75' Inflow=4.24 cfs 0.324 af
18.0" Round Culvert n=0.013 L=136.0' S=0.0300 '/' Outflow=4.24 cfs 0.324 af

Pond 22P: DCB-9 Peak Elev=339.45' Inflow=1.46 cfs 0.107 af
12.0" Round Culvert n=0.013 L=18.0' S=0.0433 '/' Outflow=1.46 cfs 0.107 af

Pond 23P: DCB-8 Peak Elev=339.03' Inflow=0.83 cfs 0.068 af
12.0" Round Culvert n=0.013 L=29.0' S=0.0200 '/' Outflow=0.83 cfs 0.068 af

Pond 24P: DMH-9 Peak Elev=330.57' Inflow=4.24 cfs 0.324 af
18.0" Round Culvert n=0.013 L=99.0' S=0.0300 '/' Outflow=4.24 cfs 0.324 af

Pond 25P: DMH-10 Peak Elev=327.50' Inflow=4.24 cfs 0.324 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0300 '/' Outflow=4.24 cfs 0.324 af

Pond 26P: DMH-11 Peak Elev=325.08' Inflow=7.47 cfs 0.570 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0263 '/' Outflow=7.47 cfs 0.570 af

Pond 27P: DCB-10 Peak Elev=325.20' Inflow=0.94 cfs 0.078 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=0.94 cfs 0.078 af

Pond 28P: DCB-11 Peak Elev=325.58' Inflow=2.29 cfs 0.168 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=2.29 cfs 0.168 af

Pond 29P: DMH-12 Peak Elev=320.20' Inflow=10.74 cfs 0.813 af
24.0" Round Culvert n=0.013 L=65.0' S=0.0369 '/' Outflow=10.74 cfs 0.813 af

Pond 30P: DCB-12 Peak Elev=320.39' Inflow=3.27 cfs 0.243 af
18.0" Round Culvert n=0.013 L=53.0' S=0.0094 '/' Outflow=3.27 cfs 0.243 af

Pond 31P: PROP. CULVERT Peak Elev=316.03' Inflow=2.84 cfs 0.343 af
15.0" Round Culvert n=0.013 L=83.0' S=0.0241 '/' Outflow=2.84 cfs 0.343 af

Link 4L: DP-A Inflow=13.95 cfs 2.409 af
Primary=13.95 cfs 2.409 af

Link 5L: DP-B Inflow=0.02 cfs 0.011 af
Primary=0.02 cfs 0.011 af

Total Runoff Area = 21.732 ac Runoff Volume = 4.426 af Average Runoff Depth = 2.44"
72.94% Pervious = 15.851 ac 27.06% Impervious = 5.880 ac

Summary for Subcatchment 1S: POST 1.A

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 4.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
3,088	98	Paved parking, HSG B
337	61	>75% Grass cover, Good, HSG B
3,425	94	Weighted Average
337		9.84% Pervious Area
3,088		90.16% Impervious Area

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

Summary for Subcatchment 2S: POST 2.A

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 4.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,622	98	Paved parking, HSG B
320	61	>75% Grass cover, Good, HSG B
2,942	94	Weighted Average
320		10.88% Pervious Area
2,622		89.12% Impervious Area

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

Summary for Subcatchment 3S: POST 3.A

Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.169 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
8,108	98	Paved parking, HSG B
7,688	61	>75% Grass cover, Good, HSG B
23,050	86	Weighted Average
7,688		33.35% Pervious Area
15,362		66.65% Impervious Area

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

Summary for Subcatchment 5S: POST 7.A

Runoff = 2.84 cfs @ 12.34 hrs, Volume= 0.343 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
4,364	70	Woods, Good, HSG C
748	74	>75% Grass cover, Good, HSG C
23,680	55	Woods, Good, HSG B
44,396	61	>75% Grass cover, Good, HSG B
10,564	98	Roofs, HSG B
1,307	30	Woods, Good, HSG A
5,862	98	Roofs, HSG A
25,416	39	>75% Grass cover, Good, HSG A
116,337	60	Weighted Average
99,911		85.88% Pervious Area
16,426		14.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0060	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.8	859	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	100	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
22.1	1,092	Total			

Summary for Subcatchment 6S: POST 8.A

Runoff = 2.12 cfs @ 12.09 hrs, Volume= 0.159 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
8,097	98	Paved parking, HSG B
7,254	98	Roofs, HSG B
4,664	61	>75% Grass cover, Good, HSG B
20,015	89	Weighted Average
4,664		23.30% Pervious Area
15,351		76.70% Impervious Area

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

Summary for Subcatchment 7S: POST 9.A

Runoff = 2.10 cfs @ 12.22 hrs, Volume= 0.205 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
8,194	98	Roofs, HSG B
2,704	96	Gravel surface, HSG B
34,880	61	>75% Grass cover, Good, HSG B
45,778	70	Weighted Average
37,584		82.10% Pervious Area
8,194		17.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0040	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	287	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.7	337	Total			

Summary for Subcatchment 8S: POST 4.A

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
4,121	98	Paved parking, HSG B
4,121		100.00% Impervious Area

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

Summary for Subcatchment 9S: POST 5.A

Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,371	98	Roofs, HSG B
2,520	98	Paved parking, HSG B
1,785	61	>75% Grass cover, Good, HSG B
6,920	98	Paved parking, HSG A
6,045	98	Roofs, HSG A
5,447	39	>75% Grass cover, Good, HSG A
25,088	83	Weighted Average
7,232		28.83% Pervious Area
17,856		71.17% Impervious Area

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

Summary for Subcatchment 10S: POST 6.A

Runoff = 1.49 cfs @ 12.09 hrs, Volume= 0.110 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
2,782	98	Paved parking, HSG B
981	61	>75% Grass cover, Good, HSG B
2,418	98	Roofs, HSG A
4,029	98	Paved parking, HSG A
2,010	39	>75% Grass cover, Good, HSG A
14,638	87	Weighted Average
2,991		20.43% Pervious Area
11,647		79.57% Impervious Area

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

Summary for Subcatchment 11S: POST 10.A

Runoff = 1.15 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
6,050	98	Paved parking, HSG B
2,251	61	>75% Grass cover, Good, HSG B
10,719	90	Weighted Average
2,251		21.00% Pervious Area
8,468		79.00% Impervious Area

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

Summary for Subcatchment 12S: POST 11.A

Runoff = 6.19 cfs @ 12.12 hrs, Volume= 0.490 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
4,538	98	Roofs, HSG A
1,059	98	Paved parking, HSG A
19,560	39	>75% Grass cover, Good, HSG A
10,702	98	Roofs, HSG B
16,067	98	Paved parking, HSG B
70,936	61	>75% Grass cover, Good, HSG B
122,862	67	Weighted Average
90,496		73.66% Pervious Area
32,366		26.34% Impervious Area

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

Summary for Subcatchment 13S: POST 12.A

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
1,783	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
99	39	>75% Grass cover, Good, HSG A
634	98	Roofs, HSG B
1,106	98	Paved parking, HSG B
7,009	97	Weighted Average
99		1.41% Pervious Area
6,910		98.59% Impervious Area

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

Summary for Subcatchment 14S: POST 13.A

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 0.107 af, Depth= 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
6,045	98	Roofs, HSG A
4,758	98	Paved parking, HSG A
4,304	39	>75% Grass cover, Good, HSG A
1,135	98	Paved parking, HSG B
16,242	82	Weighted Average
4,304		26.50% Pervious Area
11,938		73.50% Impervious Area

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

Summary for Subcatchment 15S: POST 14.A

Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,438	98	Paved parking, HSG B
6,792	61	>75% Grass cover, Good, HSG B
13,648	80	Weighted Average
6,792		49.77% Pervious Area
6,856		50.23% Impervious Area

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

Summary for Subcatchment 16S: POST 15.A

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,171	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
6,688	97	Weighted Average
99		1.48% Pervious Area
6,589		98.52% Impervious Area

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

Summary for Subcatchment 17S: POST 16.A

Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.078 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,438	98	Roofs, HSG B
5,395	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
7,932	98	Weighted Average
99		1.25% Pervious Area
7,833		98.75% Impervious Area

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

Summary for Subcatchment 18S: POST 17.A

Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.168 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
843	39	>75% Grass cover, Good, HSG A
7,797	61	>75% Grass cover, Good, HSG B
7,254	98	Roofs, HSG B
8,228	98	Paved parking, HSG B
24,122	84	Weighted Average
8,640		35.82% Pervious Area
15,482		64.18% Impervious Area

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

Summary for Subcatchment 19S: POST 18.A

Runoff = 2.86 cfs @ 12.10 hrs, Volume= 0.210 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
8,334	98	Roofs, HSG A
230	98	Paved parking, HSG B
38,161	61	>75% Grass cover, Good, HSG B
1,265	96	Gravel surface, HSG B
198	80	>75% Grass cover, Good, HSG D
585	96	Gravel surface, HSG D
48,773	69	Weighted Average
40,209		82.44% Pervious Area
8,564		17.56% Impervious Area

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

Summary for Subcatchment 20S: POST 19.A

Runoff = 3.27 cfs @ 12.09 hrs, Volume= 0.243 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
15,799	98	Paved parking, HSG B
9,153	61	>75% Grass cover, Good, HSG B
32,206	87	Weighted Average
9,153		28.42% Pervious Area
23,053		71.58% Impervious Area

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

Summary for Subcatchment 21S: POST 20.A

Runoff = 0.83 cfs @ 12.25 hrs, Volume= 0.084 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
2,757	98	Roofs, HSG B
19,243	61	>75% Grass cover, Good, HSG B
22,000	66	Weighted Average
19,243		87.47% Pervious Area
2,757		12.53% Impervious Area

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

Summary for Subcatchment 22S: POST 21.A

Runoff = 4.62 cfs @ 12.23 hrs, Volume= 0.482 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
6,845	98	Roofs, HSG A
10,053	30	Woods, Good, HSG A
27,345	39	>75% Grass cover, Good, HSG A
11,252	98	Roofs, HSG B
1,437	98	Paved parking, HSG B
84,020	61	>75% Grass cover, Good, HSG B
19,267	55	Woods, Good, HSG B
2,829	80	>75% Grass cover, Good, HSG D
573	96	Gravel surface, HSG D
163,621	60	Weighted Average
144,087		88.06% Pervious Area
19,534		11.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	348	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	486	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.2	884	Total			

Summary for Subcatchment 23S: POST 22.A

Runoff = 8.92 cfs @ 12.24 hrs, Volume= 0.883 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
24,567	55	Woods, Good, HSG B
147,153	77	Woods, Good, HSG D
171,720	74	Weighted Average
171,720		100.00% Pervious Area

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

Summary for Subcatchment 24S: POST 23.A

Runoff = 1.32 cfs @ 12.09 hrs, Volume= 0.110 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
9,334	98	Paved parking, HSG C
1,789	98	Paved parking, HSG B
11,123	98	Weighted Average
11,123		100.00% Impervious Area

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

Summary for Subcatchment 25S: POST 1.B

Runoff = 0.02 cfs @ 13.80 hrs, Volume= 0.011 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
24,680	30	Woods, Good, HSG A
7,889	55	Woods, Good, HSG B
32,569	36	Weighted Average
32,569		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	56	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	106	Total			

Summary for Pond 5P: INFIL BASIN #1

Inflow Area = 8.930 ac, 34.84% Impervious, Inflow Depth = 2.46" for 25-year event
Inflow = 19.25 cfs @ 12.11 hrs, Volume= 1.832 af
Outflow = 11.62 cfs @ 12.36 hrs, Volume= 1.832 af, Atten= 40%, Lag= 15.2 min
Discarded = 0.35 cfs @ 12.36 hrs, Volume= 0.384 af
Primary = 11.27 cfs @ 12.36 hrs, Volume= 1.448 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 315.34' @ 12.36 hrs Surf.Area= 7,431 sf Storage= 25,411 cf

Plug-Flow detention time= 191.5 min calculated for 1.831 af (100% of inflow)
Center-of-Mass det. time= 192.0 min (1,025.6 - 833.6)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	30,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.00	676	116.0	0	0	676
310.00	2,025	254.0	1,290	1,290	4,743
312.00	3,788	311.0	5,722	7,012	7,368
316.00	8,295	412.0	23,585	30,597	13,356

Device	Routing	Invert	Outlet Devices
#1	Primary	309.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 309.00' / 308.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	309.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 306.73'
#3	Primary	315.60'	**20.0' long x 23.0' 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
#4	Device 1	315.00'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	310.20'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.35 cfs @ 12.36 hrs HW=315.34' (Free Discharge)
└**2=Exfiltration** (Controls 0.35 cfs)

Primary OutFlow Max=11.11 cfs @ 12.36 hrs HW=315.34' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 11.11 cfs of 27.59 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Weir Controls 10.17 cfs @ 1.90 fps)
│ └**5=Orifice/Grate** (Orifice Controls 0.94 cfs @ 10.73 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: INFIL BASIN #2

Inflow Area = 10.174 ac, 22.16% Impervious, Inflow Depth = 2.57" for 25-year event
Inflow = 20.07 cfs @ 12.15 hrs, Volume= 2.178 af
Outflow = 1.60 cfs @ 14.99 hrs, Volume= 2.178 af, Atten= 92%, Lag= 170.5 min
Discarded = 1.22 cfs @ 14.99 hrs, Volume= 1.621 af
Primary = 0.38 cfs @ 14.99 hrs, Volume= 0.557 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.23' @ 14.99 hrs Surf.Area= 33,374 sf Storage= 52,445 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 430.5 min (1,262.6 - 832.1)

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	81,852 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)
314.00	2,813	246.0	0	0	2,813
316.00	19,770	715.0	20,027	20,027	38,692
318.00	43,606	994.0	61,825	81,852	76,674

Device	Routing	Invert	Outlet Devices
#1	Primary	314.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 314.00' / 312.60' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	314.00'	**1.020 in/hr Exfiltration over Surface area**

			Conductivity to Groundwater Elevation = 312.00'
#3	Primary	317.90'	**20.0' long x 23.0' 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
#4	Device 1	317.40'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	314.50'	**3.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.22 cfs @ 14.99 hrs HW=317.23' (Free Discharge)
└**2=Exfiltration** (Controls 1.22 cfs)

Primary OutFlow Max=0.38 cfs @ 14.99 hrs HW=317.23' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 0.38 cfs of 17.85 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Orifice Controls 0.38 cfs @ 7.78 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: DMH-1

Inflow Area = 2.387 ac, 75.50% Impervious, Inflow Depth = 3.99" for 25-year event
Inflow = 10.58 cfs @ 12.09 hrs, Volume= 0.794 af
Outflow = 10.58 cfs @ 12.09 hrs, Volume= 0.794 af, Atten= 0%, Lag= 0.0 min
Primary = 10.58 cfs @ 12.09 hrs, Volume= 0.794 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.72' @ 12.09 hrs
Flood Elev= 319.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.90'	**24.0" Round Culvert**
			L= 67.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 315.90' / 315.50' S= 0.0060 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=10.33 cfs @ 12.09 hrs HW=317.69' TW=313.82' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 10.33 cfs @ 4.60 fps)

Summary for Pond 8P: DCB-1

Inflow Area = 0.597 ac, 69.19% Impervious, Inflow Depth = 3.94" for 25-year event
Inflow = 2.63 cfs @ 12.09 hrs, Volume= 0.196 af
Outflow = 2.63 cfs @ 12.09 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary = 2.63 cfs @ 12.09 hrs, Volume= 0.196 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 318.40' @ 12.11 hrs
Flood Elev= 319.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.20'	**12.0" Round Culvert**
			L= 23.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 316.20' / 316.00' S= 0.0087 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.28 cfs @ 12.09 hrs HW=318.27' TW=317.69' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.28 cfs @ 2.90 fps)

Summary for Pond 9P: DCB-2

Inflow Area = 0.341 ac, 84.83% Impervious, Inflow Depth = 4.51" for 25-year event
Inflow = 1.64 cfs @ 12.09 hrs, Volume= 0.128 af
Outflow = 1.64 cfs @ 12.09 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Primary = 1.64 cfs @ 12.09 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.95' @ 12.12 hrs
Flood Elev= 320.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**12.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 317.00' / 316.50' S= 0.0217 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.26 cfs @ 12.09 hrs HW=317.89' TW=317.69' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.26 cfs @ 1.70 fps)

Summary for Pond 10P: DCB-3

Inflow Area = 0.538 ac, 78.66% Impervious, Inflow Depth = 4.24" for 25-year event
Inflow = 2.51 cfs @ 12.09 hrs, Volume= 0.190 af
Outflow = 2.51 cfs @ 12.09 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min
Primary = 2.51 cfs @ 12.09 hrs, Volume= 0.190 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 318.32' @ 12.11 hrs
Flood Elev= 319.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.80'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.80' / 316.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.16 cfs @ 12.09 hrs HW=318.21' TW=317.69' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.16 cfs @ 2.75 fps)

Summary for Pond 11P: DMH-2

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 3.69" for 25-year event
Inflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af
Outflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 318.14' @ 12.12 hrs
Flood Elev= 321.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.90'	**18.0" Round Culvert** L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.90' / 316.00' S= 0.0134 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.18 cfs @ 12.09 hrs HW=318.09' TW=317.69' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.18 cfs @ 2.92 fps)

Summary for Pond 12P: DMH-3

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 3.69" for 25-year event
Inflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af
Outflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 322.68' @ 12.09 hrs
Flood Elev= 325.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	321.60'	**18.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 321.60' / 317.00' S= 0.0451 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.72 cfs @ 12.09 hrs HW=322.66' TW=318.09' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.72 cfs @ 2.77 fps)

Summary for Pond 13P: DMH-5

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 3.69" for 25-year event
Inflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af
Outflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 338.78' @ 12.09 hrs
Flood Elev= 341.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	337.70'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 337.70' / 328.80' S= 0.0712 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.72 cfs @ 12.09 hrs HW=338.76' TW=329.76' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.72 cfs @ 2.77 fps)

Summary for Pond 14P: DCB-4

Inflow Area = 0.336 ac, 79.57% Impervious, Inflow Depth = 3.95" for 25-year event
Inflow = 1.49 cfs @ 12.09 hrs, Volume= 0.110 af
Outflow = 1.49 cfs @ 12.09 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.09 hrs, Volume= 0.110 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.00' @ 12.12 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.10'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.10' / 337.96' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 12.09 hrs HW=338.96' TW=338.76' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.21 cfs @ 1.69 fps)

Summary for Pond 15P: DCB-5

Inflow Area = 0.576 ac, 71.17% Impervious, Inflow Depth = 3.54" for 25-year event
Inflow = 2.32 cfs @ 12.09 hrs, Volume= 0.170 af
Outflow = 2.32 cfs @ 12.09 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min
Primary = 2.32 cfs @ 12.09 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.32' @ 12.10 hrs
Flood Elev= 342.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.00'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.00' / 337.96' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.13 cfs @ 12.09 hrs HW=339.27' TW=338.77' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.13 cfs @ 2.71 fps)

Summary for Pond 16P: DMH-4

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 3.69" for 25-year event
Inflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af
Outflow = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.09 hrs, Volume= 0.280 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 329.78' @ 12.09 hrs
Flood Elev= 332.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	328.70'	**18.0" Round Culvert** L= 91.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 328.70' / 321.70' S= 0.0769 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.72 cfs @ 12.09 hrs HW=329.76' TW=322.66' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.72 cfs @ 2.77 fps)

Summary for Pond 17P: DMH-6

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 3.84" for 25-year event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 0.149 af
Outflow = 1.95 cfs @ 12.09 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min
Primary = 1.95 cfs @ 12.09 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.28' @ 12.09 hrs
Flood Elev= 340.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.36'	**12.0" Round Culvert** L= 69.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.36' / 334.67' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.91 cfs @ 12.09 hrs HW=336.26' TW=335.47' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.91 cfs @ 2.56 fps)

Summary for Pond 18P: DCB-6

Inflow Area = 0.154 ac, 98.52% Impervious, Inflow Depth = 5.05" for 25-year event
Inflow = 0.79 cfs @ 12.09 hrs, Volume= 0.065 af
Outflow = 0.79 cfs @ 12.09 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min
Primary = 0.79 cfs @ 12.09 hrs, Volume= 0.065 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.36' @ 12.13 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 12.09 hrs HW=336.29' TW=336.26' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.39 cfs @ 0.95 fps)

Summary for Pond 19P: DCB-7

Inflow Area = 0.313 ac, 50.23% Impervious, Inflow Depth = 3.24" for 25-year event
Inflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.43' @ 12.12 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.90 cfs @ 12.09 hrs HW=336.39' TW=336.27' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.90 cfs @ 1.34 fps)

Summary for Pond 20P: DMH-7

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 3.84" for 25-year event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 0.149 af
Outflow = 1.95 cfs @ 12.09 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min
Primary = 1.95 cfs @ 12.09 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 335.49' @ 12.09 hrs
Flood Elev= 341.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	334.57'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 334.57' / 333.69' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.91 cfs @ 12.09 hrs HW=335.47' TW=334.73' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.91 cfs @ 2.56 fps)

Summary for Pond 21P: DMH-8

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 3.88" for 25-year event
Inflow = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af
Outflow = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 334.75' @ 12.09 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	333.59'	**18.0" Round Culvert** L= 136.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 333.59' / 329.51' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.14 cfs @ 12.09 hrs HW=334.73' TW=330.55' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.14 cfs @ 2.87 fps)

Summary for Pond 22P: DCB-9

Inflow Area = 0.373 ac, 73.50% Impervious, Inflow Depth = 3.44" for 25-year event
Inflow = 1.46 cfs @ 12.09 hrs, Volume= 0.107 af
Outflow = 1.46 cfs @ 12.09 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min
Primary = 1.46 cfs @ 12.09 hrs, Volume= 0.107 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.45' @ 12.09 hrs
Flood Elev= 342.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.70'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.70' / 337.92' S= 0.0433 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.43 cfs @ 12.09 hrs HW=339.44' TW=334.73' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.43 cfs @ 2.31 fps)

Summary for Pond 23P: DCB-8

Inflow Area = 0.161 ac, 98.59% Impervious, Inflow Depth = 5.05" for 25-year event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 0.068 af
Outflow = 0.83 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.09 hrs, Volume= 0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.03' @ 12.09 hrs
Flood Elev= 342.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.50'	**12.0" Round Culvert** L= 29.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.50' / 337.92' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.09 hrs HW=339.02' TW=334.73' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.80 cfs @ 1.94 fps)

Summary for Pond 24P: DMH-9

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 3.88" for 25-year event
Inflow = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af
Outflow = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 330.57' @ 12.09 hrs
Flood Elev= 338.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	329.41'	**18.0" Round Culvert** L= 99.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 329.41' / 326.44' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.14 cfs @ 12.09 hrs HW=330.55' TW=327.48' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.14 cfs @ 2.87 fps)

Summary for Pond 25P: DMH-10

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 3.88" for 25-year event
Inflow = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af
Outflow = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.24 cfs @ 12.09 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 327.50' @ 12.09 hrs
Flood Elev= 332.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.34'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 326.34' / 324.06' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.14 cfs @ 12.09 hrs HW=327.48' TW=325.03' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.14 cfs @ 2.87 fps)

Summary for Pond 26P: DMH-11

Inflow Area = 1.736 ac, 73.52% Impervious, Inflow Depth = 3.94" for 25-year event
Inflow = 7.47 cfs @ 12.09 hrs, Volume= 0.570 af
Outflow = 7.47 cfs @ 12.09 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.47 cfs @ 12.09 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 325.08' @ 12.09 hrs
Flood Elev= 327.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	323.10'	**18.0" Round Culvert** L= 175.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 323.10' / 318.50' S= 0.0263 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=7.30 cfs @ 12.09 hrs HW=325.03' TW=320.17' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 7.30 cfs @ 4.13 fps)

Summary for Pond 27P: DCB-10

Inflow Area = 0.182 ac, 98.75% Impervious, Inflow Depth = 5.16" for 25-year event
Inflow = 0.94 cfs @ 12.09 hrs, Volume= 0.078 af
Outflow = 0.94 cfs @ 12.09 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min
Primary = 0.94 cfs @ 12.09 hrs, Volume= 0.078 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 325.20' @ 12.13 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.09 hrs HW=325.10' TW=325.02' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.52 cfs @ 1.51 fps)

Summary for Pond 28P: DCB-11

Inflow Area = 0.554 ac, 64.18% Impervious, Inflow Depth = 3.64" for 25-year event
Inflow = 2.29 cfs @ 12.09 hrs, Volume= 0.168 af
Outflow = 2.29 cfs @ 12.09 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min
Primary = 2.29 cfs @ 12.09 hrs, Volume= 0.168 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 325.58' @ 12.10 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.17 cfs @ 12.09 hrs HW=325.56' TW=325.03' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.17 cfs @ 2.76 fps)

Summary for Pond 29P: DMH-12

Inflow Area = 2.476 ac, 72.94% Impervious, Inflow Depth = 3.94" for 25-year event
Inflow = 10.74 cfs @ 12.09 hrs, Volume= 0.813 af
Outflow = 10.74 cfs @ 12.09 hrs, Volume= 0.813 af, Atten= 0%, Lag= 0.0 min
Primary = 10.74 cfs @ 12.09 hrs, Volume= 0.813 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 320.20' @ 12.09 hrs
Flood Elev= 322.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	318.40'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 318.40' / 316.00' S= 0.0369 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=10.49 cfs @ 12.09 hrs HW=320.17' TW=315.86' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 10.49 cfs @ 3.57 fps)

Summary for Pond 30P: DCB-12

Inflow Area = 0.739 ac, 71.58% Impervious, Inflow Depth = 3.95" for 25-year event
Inflow = 3.27 cfs @ 12.09 hrs, Volume= 0.243 af
Outflow = 3.27 cfs @ 12.09 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min
Primary = 3.27 cfs @ 12.09 hrs, Volume= 0.243 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 320.39' @ 12.13 hrs
Flood Elev= 322.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	319.00'	**18.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 319.00' / 318.50' S= 0.0094 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.14 cfs @ 12.09 hrs HW=320.30' TW=320.17' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.14 cfs @ 1.77 fps)

Summary for Pond 31P: PROP. CULVERT

Inflow Area = 2.671 ac, 14.12% Impervious, Inflow Depth = 1.54" for 25-year event
Inflow = 2.84 cfs @ 12.34 hrs, Volume= 0.343 af
Outflow = 2.84 cfs @ 12.34 hrs, Volume= 0.343 af, Atten= 0%, Lag= 0.0 min
Primary = 2.84 cfs @ 12.34 hrs, Volume= 0.343 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 316.03' @ 12.37 hrs
Flood Elev= 318.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**15.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 315.00' / 313.00' S= 0.0241 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.77 cfs @ 12.34 hrs HW=316.02' TW=315.33' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.77 cfs @ 3.52 fps)

Summary for Link 4L: DP-A

Inflow Area = 20.984 ac, 28.02% Impervious, Inflow Depth = 1.38" for 25-year event
Inflow = 13.95 cfs @ 12.35 hrs, Volume= 2.409 af
Primary = 13.95 cfs @ 12.35 hrs, Volume= 2.409 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 5L: DP-B

Inflow Area = 0.748 ac, 0.00% Impervious, Inflow Depth = 0.17" for 25-year event
Inflow = 0.02 cfs @ 13.80 hrs, Volume= 0.011 af
Primary = 0.02 cfs @ 13.80 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: POST 1.A Runoff Area=3,425 sf 90.16% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=94 Runoff=0.52 cfs 0.041 af

Subcatchment 2S: POST 2.A Runoff Area=2,942 sf 89.12% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=94 Runoff=0.44 cfs 0.035 af

Subcatchment 3S: POST 3.A Runoff Area=23,050 sf 66.65% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=86 Runoff=3.15 cfs 0.237 af

Subcatchment 5S: POST 7.A Runoff Area=116,337 sf 14.12% Impervious Runoff Depth=2.60"
Flow Length=1,092' Tc=22.1 min CN=60 Runoff=5.07 cfs 0.579 af

Subcatchment 6S: POST 8.A Runoff Area=20,015 sf 76.70% Impervious Runoff Depth=5.71"
Tc=6.0 min CN=89 Runoff=2.85 cfs 0.219 af

Subcatchment 7S: POST 9.A Runoff Area=45,778 sf 17.90% Impervious Runoff Depth=3.62"
Flow Length=337' Tc=15.7 min CN=70 Runoff=3.30 cfs 0.317 af

Subcatchment 8S: POST 4.A Runoff Area=4,121 sf 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.63 cfs 0.053 af

Subcatchment 9S: POST 5.A Runoff Area=25,088 sf 71.17% Impervious Runoff Depth=5.03"
Tc=6.0 min CN=83 Runoff=3.26 cfs 0.241 af

Subcatchment 10S: POST 6.A Runoff Area=14,638 sf 79.57% Impervious Runoff Depth=5.48"
Tc=6.0 min CN=87 Runoff=2.03 cfs 0.153 af

Subcatchment 11S: POST 10.A Runoff Area=10,719 sf 79.00% Impervious Runoff Depth=5.82"
Tc=6.0 min CN=90 Runoff=1.55 cfs 0.119 af

Subcatchment 12S: POST 11.A Runoff Area=122,862 sf 26.34% Impervious Runoff Depth=3.31"
Tc=8.0 min CN=67 Runoff=10.02 cfs 0.777 af

Subcatchment 13S: POST 12.A Runoff Area=7,009 sf 98.59% Impervious Runoff Depth=6.64"
Tc=6.0 min CN=97 Runoff=1.07 cfs 0.089 af

Subcatchment 14S: POST 13.A Runoff Area=16,242 sf 73.50% Impervious Runoff Depth=4.92"
Tc=6.0 min CN=82 Runoff=2.07 cfs 0.153 af

Subcatchment 15S: POST 14.A Runoff Area=13,648 sf 50.23% Impervious Runoff Depth=4.69"
Tc=6.0 min CN=80 Runoff=1.67 cfs 0.123 af

Subcatchment 16S: POST 15.A Runoff Area=6,688 sf 98.52% Impervious Runoff Depth=6.64"
Tc=6.0 min CN=97 Runoff=1.03 cfs 0.085 af

Subcatchment 17S: POST 16.A Runoff Area=7,932 sf 98.75% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=1.22 cfs 0.103 af

Subcatchment 18S: POST 17.A Runoff Area=24,122 sf 64.18% Impervious Runoff Depth=5.14"
Tc=6.0 min CN=84 Runoff=3.19 cfs 0.237 af

Subcatchment 19S: POST 18.A Runoff Area=48,773 sf 17.56% Impervious Runoff Depth=3.51"
Tc=6.0 min CN=69 Runoff=4.52 cfs 0.328 af

Subcatchment 20S: POST 19.A Runoff Area=32,206 sf 71.58% Impervious Runoff Depth=5.48"
Tc=6.0 min CN=87 Runoff=4.47 cfs 0.338 af

Subcatchment 21S: POST 20.A Runoff Area=22,000 sf 12.53% Impervious Runoff Depth=3.20"
Tc=16.7 min CN=66 Runoff=1.36 cfs 0.135 af

Subcatchment 22S: POST 21.A Runoff Area=163,621 sf 11.94% Impervious Runoff Depth=2.60"
Flow Length=884' Tc=15.2 min CN=60 Runoff=8.30 cfs 0.815 af

Subcatchment 23S: POST 22.A Runoff Area=171,720 sf 0.00% Impervious Runoff Depth=4.04"
Tc=16.7 min CN=74 Runoff=13.48 cfs 1.328 af

Subcatchment 24S: POST 23.A Runoff Area=11,123 sf 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=1.71 cfs 0.144 af

Subcatchment 25S: POST 1.B Runoff Area=32,569 sf 0.00% Impervious Runoff Depth=0.56"
Flow Length=106' Tc=11.1 min CN=36 Runoff=0.17 cfs 0.035 af

Pond 5P: INFIL BASIN #1 Peak Elev=315.60' Storage=27,357 cf Inflow=29.06 cfs 2.773 af
Discarded=0.37 cfs 0.441 af Primary=24.88 cfs 2.332 af Outflow=25.24 cfs 2.773 af

Pond 6P: INFIL BASIN #2 Peak Elev=317.64' Storage=66,926 cf Inflow=30.62 cfs 3.270 af
Discarded=1.44 cfs 1.979 af Primary=6.41 cfs 1.291 af Outflow=7.85 cfs 3.270 af

Pond 7P: DMH-1 Peak Elev=318.35' Inflow=14.43 cfs 1.099 af
24.0" Round Culvert n=0.013 L=67.0' S=0.0060 '/' Outflow=14.43 cfs 1.099 af

Pond 8P: DCB-1 Peak Elev=319.58' Inflow=3.59 cfs 0.272 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0087 '/' Outflow=3.59 cfs 0.272 af

Pond 9P: DCB-2 Peak Elev=318.75' Inflow=2.18 cfs 0.173 af
12.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=2.18 cfs 0.173 af

Pond 10P: DCB-3 Peak Elev=319.41' Inflow=3.37 cfs 0.260 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0100 '/' Outflow=3.37 cfs 0.260 af

Pond 11P: DMH-2 Peak Elev=318.80' Inflow=5.29 cfs 0.395 af
18.0" Round Culvert n=0.013 L=67.0' S=0.0134 '/' Outflow=5.29 cfs 0.395 af

Pond 12P: DMH-3 Peak Elev=322.96' Inflow=5.29 cfs 0.395 af
18.0" Round Culvert n=0.013 L=102.0' S=0.0451 '/' Outflow=5.29 cfs 0.395 af

Pond 13P: DMH-5 Peak Elev=339.06' Inflow=5.29 cfs 0.395 af
18.0" Round Culvert n=0.013 L=125.0' S=0.0712 '/' Outflow=5.29 cfs 0.395 af

Pond 14P: DCB-4 Peak Elev=339.45' Inflow=2.03 cfs 0.153 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=2.03 cfs 0.153 af

Pond 15P: DCB-5 Peak Elev=340.15' Inflow=3.26 cfs 0.241 af
12.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=3.26 cfs 0.241 af

Pond 16P: DMH-4 Peak Elev=330.06' Inflow=5.29 cfs 0.395 af
18.0" Round Culvert n=0.013 L=91.0' S=0.0769 '/' Outflow=5.29 cfs 0.395 af

Pond 17P: DMH-6 Peak Elev=336.67' Inflow=2.70 cfs 0.208 af
12.0" Round Culvert n=0.013 L=69.0' S=0.0100 '/' Outflow=2.70 cfs 0.208 af

Pond 18P: DCB-6 Peak Elev=336.75' Inflow=1.03 cfs 0.085 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=1.03 cfs 0.085 af

Pond 19P: DCB-7 Peak Elev=336.90' Inflow=1.67 cfs 0.123 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=1.67 cfs 0.123 af

Pond 20P: DMH-7 Peak Elev=335.88' Inflow=2.70 cfs 0.208 af
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=2.70 cfs 0.208 af

Pond 21P: DMH-8 Peak Elev=335.09' Inflow=5.84 cfs 0.449 af
18.0" Round Culvert n=0.013 L=136.0' S=0.0300 '/' Outflow=5.84 cfs 0.449 af

Pond 22P: DCB-9 Peak Elev=339.67' Inflow=2.07 cfs 0.153 af
12.0" Round Culvert n=0.013 L=18.0' S=0.0433 '/' Outflow=2.07 cfs 0.153 af

Pond 23P: DCB-8 Peak Elev=339.12' Inflow=1.07 cfs 0.089 af
12.0" Round Culvert n=0.013 L=29.0' S=0.0200 '/' Outflow=1.07 cfs 0.089 af

Pond 24P: DMH-9 Peak Elev=330.91' Inflow=5.84 cfs 0.449 af
18.0" Round Culvert n=0.013 L=99.0' S=0.0300 '/' Outflow=5.84 cfs 0.449 af

Pond 25P: DMH-10 Peak Elev=327.84' Inflow=5.84 cfs 0.449 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0300 '/' Outflow=5.84 cfs 0.449 af

Pond 26P: DMH-11 Peak Elev=326.17' Inflow=10.25 cfs 0.789 af
18.0" Round Culvert n=0.013 L=175.0' S=0.0263 '/' Outflow=10.25 cfs 0.789 af

Pond 27P: DCB-10 Peak Elev=326.28' Inflow=1.22 cfs 0.103 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=1.22 cfs 0.103 af

Pond 28P: DCB-11 Peak Elev=327.03' Inflow=3.19 cfs 0.237 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0314 '/' Outflow=3.19 cfs 0.237 af

Pond 29P: DMH-12 Peak Elev=320.92' Inflow=14.72 cfs 1.127 af
24.0" Round Culvert n=0.013 L=65.0' S=0.0369 '/' Outflow=14.72 cfs 1.127 af

Pond 30P: DCB-12 Peak Elev=321.24' Inflow=4.47 cfs 0.338 af
18.0" Round Culvert n=0.013 L=53.0' S=0.0094 '/' Outflow=4.47 cfs 0.338 af

Pond 31P: PROP. CULVERT Peak Elev=316.81' Inflow=5.07 cfs 0.579 af
15.0" Round Culvert n=0.013 L=83.0' S=0.0241 '/' Outflow=5.07 cfs 0.579 af

Link 4L: DP-A Inflow=31.87 cfs 4.230 af
Primary=31.87 cfs 4.230 af

Link 5L: DP-B Inflow=0.17 cfs 0.035 af
Primary=0.17 cfs 0.035 af

Total Runoff Area = 21.732 ac Runoff Volume = 6.684 af Average Runoff Depth = 3.69"
72.94% Pervious = 15.851 ac 27.06% Impervious = 5.880 ac

Summary for Subcatchment 1S: POST 1.A

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 6.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
3,088	98	Paved parking, HSG B
337	61	>75% Grass cover, Good, HSG B
3,425	94	Weighted Average
337		9.84% Pervious Area
3,088		90.16% Impervious Area

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

Summary for Subcatchment 2S: POST 2.A

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 6.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,622	98	Paved parking, HSG B
320	61	>75% Grass cover, Good, HSG B
2,942	94	Weighted Average
320		10.88% Pervious Area
2,622		89.12% Impervious Area

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

Summary for Subcatchment 3S: POST 3.A

Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.237 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
8,108	98	Paved parking, HSG B
7,688	61	>75% Grass cover, Good, HSG B
23,050	86	Weighted Average
7,688		33.35% Pervious Area
15,362		66.65% Impervious Area

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

Summary for Subcatchment 5S: POST 7.A

Runoff = 5.07 cfs @ 12.33 hrs, Volume= 0.579 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
4,364	70	Woods, Good, HSG C
748	74	>75% Grass cover, Good, HSG C
23,680	55	Woods, Good, HSG B
44,396	61	>75% Grass cover, Good, HSG B
10,564	98	Roofs, HSG B
1,307	30	Woods, Good, HSG A
5,862	98	Roofs, HSG A
25,416	39	>75% Grass cover, Good, HSG A
116,337	60	Weighted Average
99,911		85.88% Pervious Area
16,426		14.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0060	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.8	859	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	100	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.0200	10.18	31.99	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
22.1	1,092	Total			

Summary for Subcatchment 6S: POST 8.A

Runoff = 2.85 cfs @ 12.09 hrs, Volume= 0.219 af, Depth= 5.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
8,097	98	Paved parking, HSG B
7,254	98	Roofs, HSG B
4,664	61	>75% Grass cover, Good, HSG B
20,015	89	Weighted Average
4,664		23.30% Pervious Area
15,351		76.70% Impervious Area

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

Summary for Subcatchment 7S: POST 9.A

Runoff = 3.30 cfs @ 12.22 hrs, Volume= 0.317 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
8,194	98	Roofs, HSG B
2,704	96	Gravel surface, HSG B
34,880	61	>75% Grass cover, Good, HSG B
45,778	70	Weighted Average
37,584		82.10% Pervious Area
8,194		17.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0040	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	287	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.7	337	Total			

Summary for Subcatchment 8S: POST 4.A

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
4,121	98	Paved parking, HSG B
4,121		100.00% Impervious Area

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

Summary for Subcatchment 9S: POST 5.A

Runoff = 3.26 cfs @ 12.09 hrs, Volume= 0.241 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,371	98	Roofs, HSG B
2,520	98	Paved parking, HSG B
1,785	61	>75% Grass cover, Good, HSG B
6,920	98	Paved parking, HSG A
6,045	98	Roofs, HSG A
5,447	39	>75% Grass cover, Good, HSG A
25,088	83	Weighted Average
7,232		28.83% Pervious Area
17,856		71.17% Impervious Area

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

Summary for Subcatchment 10S: POST 6.A

Runoff = 2.03 cfs @ 12.09 hrs, Volume= 0.153 af, Depth= 5.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
2,782	98	Paved parking, HSG B
981	61	>75% Grass cover, Good, HSG B
2,418	98	Roofs, HSG A
4,029	98	Paved parking, HSG A
2,010	39	>75% Grass cover, Good, HSG A
14,638	87	Weighted Average
2,991		20.43% Pervious Area
11,647		79.57% Impervious Area

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

Summary for Subcatchment 11S: POST 10.A

Runoff = 1.55 cfs @ 12.09 hrs, Volume= 0.119 af, Depth= 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
6,050	98	Paved parking, HSG B
2,251	61	>75% Grass cover, Good, HSG B
10,719	90	Weighted Average
2,251		21.00% Pervious Area
8,468		79.00% Impervious Area

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

Summary for Subcatchment 12S: POST 11.A

Runoff = 10.02 cfs @ 12.12 hrs, Volume= 0.777 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
4,538	98	Roofs, HSG A
1,059	98	Paved parking, HSG A
19,560	39	>75% Grass cover, Good, HSG A
10,702	98	Roofs, HSG B
16,067	98	Paved parking, HSG B
70,936	61	>75% Grass cover, Good, HSG B
122,862	67	Weighted Average
90,496		73.66% Pervious Area
32,366		26.34% Impervious Area

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

Summary for Subcatchment 13S: POST 12.A

Runoff = 1.07 cfs @ 12.09 hrs, Volume= 0.089 af, Depth= 6.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
1,783	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
99	39	>75% Grass cover, Good, HSG A
634	98	Roofs, HSG B
1,106	98	Paved parking, HSG B
7,009	97	Weighted Average
99		1.41% Pervious Area
6,910		98.59% Impervious Area

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

Summary for Subcatchment 14S: POST 13.A

Runoff = 2.07 cfs @ 12.09 hrs, Volume= 0.153 af, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
6,045	98	Roofs, HSG A
4,758	98	Paved parking, HSG A
4,304	39	>75% Grass cover, Good, HSG A
1,135	98	Paved parking, HSG B
16,242	82	Weighted Average
4,304		26.50% Pervious Area
11,938		73.50% Impervious Area

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

Summary for Subcatchment 15S: POST 14.A

Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.123 af, Depth= 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,438	98	Paved parking, HSG B
6,792	61	>75% Grass cover, Good, HSG B
13,648	80	Weighted Average
6,792		49.77% Pervious Area
6,856		50.23% Impervious Area

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

Summary for Subcatchment 16S: POST 15.A

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 6.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,418	98	Roofs, HSG B
4,171	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
6,688	97	Weighted Average
99		1.48% Pervious Area
6,589		98.52% Impervious Area

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

Summary for Subcatchment 17S: POST 16.A

Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.103 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,438	98	Roofs, HSG B
5,395	98	Paved parking, HSG B
99	61	>75% Grass cover, Good, HSG B
7,932	98	Weighted Average
99		1.25% Pervious Area
7,833		98.75% Impervious Area

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

Summary for Subcatchment 18S: POST 17.A

Runoff = 3.19 cfs @ 12.09 hrs, Volume= 0.237 af, Depth= 5.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
843	39	>75% Grass cover, Good, HSG A
7,797	61	>75% Grass cover, Good, HSG B
7,254	98	Roofs, HSG B
8,228	98	Paved parking, HSG B
24,122	84	Weighted Average
8,640		35.82% Pervious Area
15,482		64.18% Impervious Area

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

Summary for Subcatchment 19S: POST 18.A

Runoff = 4.52 cfs @ 12.09 hrs, Volume= 0.328 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
8,334	98	Roofs, HSG A
230	98	Paved parking, HSG B
38,161	61	>75% Grass cover, Good, HSG B
1,265	96	Gravel surface, HSG B
198	80	>75% Grass cover, Good, HSG D
585	96	Gravel surface, HSG D
48,773	69	Weighted Average
40,209		82.44% Pervious Area
8,564		17.56% Impervious Area

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

Summary for Subcatchment 20S: POST 19.A

Runoff = 4.47 cfs @ 12.09 hrs, Volume= 0.338 af, Depth= 5.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
7,254	98	Roofs, HSG B
15,799	98	Paved parking, HSG B
9,153	61	>75% Grass cover, Good, HSG B
32,206	87	Weighted Average
9,153		28.42% Pervious Area
23,053		71.58% Impervious Area

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

Summary for Subcatchment 21S: POST 20.A

Runoff = 1.36 cfs @ 12.24 hrs, Volume= 0.135 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,757	98	Roofs, HSG B
19,243	61	>75% Grass cover, Good, HSG B
22,000	66	Weighted Average
19,243		87.47% Pervious Area
2,757		12.53% Impervious Area

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

Summary for Subcatchment 22S: POST 21.A

Runoff = 8.30 cfs @ 12.22 hrs, Volume= 0.815 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
6,845	98	Roofs, HSG A
10,053	30	Woods, Good, HSG A
27,345	39	>75% Grass cover, Good, HSG A
11,252	98	Roofs, HSG B
1,437	98	Paved parking, HSG B
84,020	61	>75% Grass cover, Good, HSG B
19,267	55	Woods, Good, HSG B
2,829	80	>75% Grass cover, Good, HSG D
573	96	Gravel surface, HSG D
163,621	60	Weighted Average
144,087		88.06% Pervious Area
19,534		11.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	348	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	486	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.2	884	Total			

Summary for Subcatchment 23S: POST 22.A

Runoff = 13.48 cfs @ 12.23 hrs, Volume= 1.328 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
24,567	55	Woods, Good, HSG B
147,153	77	Woods, Good, HSG D
171,720	74	Weighted Average
171,720		100.00% Pervious Area

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

Summary for Subcatchment 24S: POST 23.A

Runoff = 1.71 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
9,334	98	Paved parking, HSG C
1,789	98	Paved parking, HSG B
11,123	98	Weighted Average
11,123		100.00% Impervious Area

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

Summary for Subcatchment 25S: POST 1.B

Runoff = 0.17 cfs @ 12.41 hrs, Volume= 0.035 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
24,680	30	Woods, Good, HSG A
7,889	55	Woods, Good, HSG B
32,569	36	Weighted Average
32,569		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	56	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	106	Total			

Summary for Pond 5P: INFIL BASIN #1

Inflow Area = 8.930 ac, 34.84% Impervious, Inflow Depth = 3.73" for 100-year event
Inflow = 29.06 cfs @ 12.11 hrs, Volume= 2.773 af
Outflow = 25.24 cfs @ 12.19 hrs, Volume= 2.773 af, Atten= 13%, Lag= 4.6 min
Discarded = 0.37 cfs @ 12.19 hrs, Volume= 0.441 af
Primary = 24.88 cfs @ 12.19 hrs, Volume= 2.332 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 315.60' @ 12.19 hrs Surf.Area= 7,761 sf Storage= 27,357 cf

Plug-Flow detention time= 149.8 min calculated for 2.771 af (100% of inflow)
Center-of-Mass det. time= 150.5 min (974.9 - 824.4)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	30,597 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.00	676	116.0	0	0	676
310.00	2,025	254.0	1,290	1,290	4,743
312.00	3,788	311.0	5,722	7,012	7,368
316.00	8,295	412.0	23,585	30,597	13,356

Device	Routing	Invert	Outlet Devices
#1	Primary	309.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 309.00' / 308.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	309.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 306.73'
#3	Primary	315.60'	**20.0' long x 23.0' 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
#4	Device 1	315.00'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	310.20'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.37 cfs @ 12.19 hrs HW=315.59' (Free Discharge)
└**2=Exfiltration** (Controls 0.37 cfs)

Primary OutFlow Max=24.58 cfs @ 12.19 hrs HW=315.59' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 24.58 cfs of 28.24 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Weir Controls 23.62 cfs @ 2.51 fps)
│ └**5=Orifice/Grate** (Orifice Controls 0.96 cfs @ 11.01 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: INFIL BASIN #2

Inflow Area = 10.174 ac, 22.16% Impervious, Inflow Depth = 3.86" for 100-year event
Inflow = 30.62 cfs @ 12.16 hrs, Volume= 3.270 af
Outflow = 7.85 cfs @ 12.73 hrs, Volume= 3.270 af, Atten= 74%, Lag= 34.4 min
Discarded = 1.44 cfs @ 12.73 hrs, Volume= 1.979 af
Primary = 6.41 cfs @ 12.73 hrs, Volume= 1.291 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 317.64' @ 12.73 hrs Surf.Area= 38,583 sf Storage= 66,926 cf

Plug-Flow detention time= 372.5 min calculated for 3.267 af (100% of inflow)
Center-of-Mass det. time= 373.1 min (1,196.2 - 823.1)

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	81,852 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)
314.00	2,813	246.0	0	0	2,813
316.00	19,770	715.0	20,027	20,027	38,692
318.00	43,606	994.0	61,825	81,852	76,674

Device	Routing	Invert	Outlet Devices
#1	Primary	314.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 314.00' / 312.60' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Discarded	314.00'	**1.020 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 312.00'

#3	Primary	317.90'	**20.0' long x 23.0' 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
#4	Device 1	317.40'	**16.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	314.50'	**3.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.44 cfs @ 12.73 hrs HW=317.64' (Free Discharge)
└**2=Exfiltration** (Controls 1.44 cfs)

Primary OutFlow Max=6.40 cfs @ 12.73 hrs HW=317.64' TW=0.00' (Dynamic Tailwater)
├**1=Culvert** (Passes 6.40 cfs of 19.39 cfs potential flow)
│ ├**4=Sharp-Crested Rectangular Weir** (Weir Controls 5.99 cfs @ 1.59 fps)
│ └**5=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.36 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: DMH-1

Inflow Area = 2.387 ac, 75.50% Impervious, Inflow Depth = 5.52" for 100-year event
Inflow = 14.43 cfs @ 12.09 hrs, Volume= 1.099 af
Outflow = 14.43 cfs @ 12.09 hrs, Volume= 1.099 af, Atten= 0%, Lag= 0.0 min
Primary = 14.43 cfs @ 12.09 hrs, Volume= 1.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 318.35' @ 12.09 hrs
Flood Elev= 319.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.90'	**24.0" Round Culvert**
			L= 67.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 315.90' / 315.50' S= 0.0060 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=14.08 cfs @ 12.09 hrs HW=318.29' TW=315.24' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 14.08 cfs @ 4.48 fps)

Summary for Pond 8P: DCB-1

Inflow Area = 0.597 ac, 69.19% Impervious, Inflow Depth = 5.47" for 100-year event
Inflow = 3.59 cfs @ 12.09 hrs, Volume= 0.272 af
Outflow = 3.59 cfs @ 12.09 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min
Primary = 3.59 cfs @ 12.09 hrs, Volume= 0.272 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 319.58' @ 12.11 hrs
Flood Elev= 319.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.20'	**12.0" Round Culvert**
			L= 23.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 316.20' / 316.00' S= 0.0087 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.11 cfs @ 12.09 hrs HW=319.37' TW=318.29' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.11 cfs @ 3.96 fps)

Summary for Pond 9P: DCB-2

Inflow Area = 0.341 ac, 84.83% Impervious, Inflow Depth = 6.08" for 100-year event
Inflow = 2.18 cfs @ 12.09 hrs, Volume= 0.173 af
Outflow = 2.18 cfs @ 12.09 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min
Primary = 2.18 cfs @ 12.09 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 318.75' @ 12.13 hrs
Flood Elev= 320.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**12.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 317.00' / 316.50' S= 0.0217 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.09 hrs HW=318.49' TW=318.29' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.36 cfs @ 1.73 fps)

Summary for Pond 10P: DCB-3

Inflow Area = 0.538 ac, 78.66% Impervious, Inflow Depth = 5.79" for 100-year event
Inflow = 3.37 cfs @ 12.09 hrs, Volume= 0.260 af
Outflow = 3.37 cfs @ 12.09 hrs, Volume= 0.260 af, Atten= 0%, Lag= 0.0 min
Primary = 3.37 cfs @ 12.09 hrs, Volume= 0.260 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 319.41' @ 12.11 hrs
Flood Elev= 319.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.80'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.80' / 316.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.85 cfs @ 12.09 hrs HW=319.20' TW=318.29' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.85 cfs @ 3.63 fps)

Summary for Pond 11P: DMH-2

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 5.19" for 100-year event
Inflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af
Outflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af, Atten= 0%, Lag= 0.0 min
Primary = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 318.80' @ 12.12 hrs
Flood Elev= 321.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.90'	**18.0" Round Culvert** L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 316.90' / 316.00' S= 0.0134 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.90 cfs @ 12.09 hrs HW=318.63' TW=318.29' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.90 cfs @ 2.21 fps)

Summary for Pond 12P: DMH-3

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 5.19" for 100-year event
Inflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af
Outflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af, Atten= 0%, Lag= 0.0 min
Primary = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 322.96' @ 12.09 hrs
Flood Elev= 325.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	321.60'	**18.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 321.60' / 317.00' S= 0.0451 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.16 cfs @ 12.09 hrs HW=322.94' TW=318.63' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.16 cfs @ 3.11 fps)

Summary for Pond 13P: DMH-5

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 5.19" for 100-year event
Inflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af
Outflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af, Atten= 0%, Lag= 0.0 min
Primary = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.06' @ 12.09 hrs
Flood Elev= 341.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	337.70'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 337.70' / 328.80' S= 0.0712 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.16 cfs @ 12.09 hrs HW=339.04' TW=330.04' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.16 cfs @ 3.11 fps)

Summary for Pond 14P: DCB-4

Inflow Area = 0.336 ac, 79.57% Impervious, Inflow Depth = 5.48" for 100-year event
Inflow = 2.03 cfs @ 12.09 hrs, Volume= 0.153 af
Outflow = 2.03 cfs @ 12.09 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min
Primary = 2.03 cfs @ 12.09 hrs, Volume= 0.153 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.45' @ 12.12 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.10'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.10' / 337.96' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.67 cfs @ 12.09 hrs HW=339.35' TW=339.03' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.67 cfs @ 2.12 fps)

Summary for Pond 15P: DCB-5

Inflow Area = 0.576 ac, 71.17% Impervious, Inflow Depth = 5.03" for 100-year event
Inflow = 3.26 cfs @ 12.09 hrs, Volume= 0.241 af
Outflow = 3.26 cfs @ 12.09 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min
Primary = 3.26 cfs @ 12.09 hrs, Volume= 0.241 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 340.15' @ 12.10 hrs
Flood Elev= 342.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.00'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.00' / 337.96' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.00 cfs @ 12.09 hrs HW=340.05' TW=339.04' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.00 cfs @ 3.82 fps)

Summary for Pond 16P: DMH-4

Inflow Area = 0.912 ac, 74.27% Impervious, Inflow Depth = 5.19" for 100-year event
Inflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af
Outflow = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af, Atten= 0%, Lag= 0.0 min
Primary = 5.29 cfs @ 12.09 hrs, Volume= 0.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 330.06' @ 12.09 hrs
Flood Elev= 332.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	328.70'	**18.0" Round Culvert** L= 91.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 328.70' / 321.70' S= 0.0769 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.16 cfs @ 12.09 hrs HW=330.04' TW=322.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.16 cfs @ 3.11 fps)

Summary for Pond 17P: DMH-6

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 5.33" for 100-year event
Inflow = 2.70 cfs @ 12.09 hrs, Volume= 0.208 af
Outflow = 2.70 cfs @ 12.09 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.09 hrs, Volume= 0.208 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.67' @ 12.09 hrs
Flood Elev= 340.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.36'	**12.0" Round Culvert** L= 69.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.36' / 334.67' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.63 cfs @ 12.09 hrs HW=336.64' TW=335.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.63 cfs @ 3.35 fps)

Summary for Pond 18P: DCB-6

Inflow Area = 0.154 ac, 98.52% Impervious, Inflow Depth = 6.64" for 100-year event
Inflow = 1.03 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.03 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.03 cfs @ 12.09 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.75' @ 12.14 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=336.57' TW=336.63' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 19P: DCB-7

Inflow Area = 0.313 ac, 50.23% Impervious, Inflow Depth = 4.69" for 100-year event
Inflow = 1.67 cfs @ 12.09 hrs, Volume= 0.123 af
Outflow = 1.67 cfs @ 12.09 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Primary = 1.67 cfs @ 12.09 hrs, Volume= 0.123 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 336.90' @ 12.13 hrs
Flood Elev= 339.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	335.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 335.60' / 335.46' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.12 cfs @ 12.09 hrs HW=336.78' TW=336.64' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.12 cfs @ 1.43 fps)

Summary for Pond 20P: DMH-7

Inflow Area = 0.467 ac, 66.11% Impervious, Inflow Depth = 5.33" for 100-year event
Inflow = 2.70 cfs @ 12.09 hrs, Volume= 0.208 af
Outflow = 2.70 cfs @ 12.09 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.09 hrs, Volume= 0.208 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 335.88' @ 12.09 hrs
Flood Elev= 341.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	334.57'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 334.57' / 333.69' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.63 cfs @ 12.09 hrs HW=335.85' TW=335.06' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.63 cfs @ 3.35 fps)

Summary for Pond 21P: DMH-8

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 5.39" for 100-year event
Inflow = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af
Outflow = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min
Primary = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 335.09' @ 12.09 hrs
Flood Elev= 342.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	333.59'	**18.0" Round Culvert** L= 136.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 333.59' / 329.51' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.72 cfs @ 12.09 hrs HW=335.06' TW=330.88' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.72 cfs @ 3.25 fps)

Summary for Pond 22P: DCB-9

Inflow Area = 0.373 ac, 73.50% Impervious, Inflow Depth = 4.92" for 100-year event
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.153 af
Outflow = 2.07 cfs @ 12.09 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min
Primary = 2.07 cfs @ 12.09 hrs, Volume= 0.153 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.67' @ 12.09 hrs
Flood Elev= 342.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.70'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.70' / 337.92' S= 0.0433 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.03 cfs @ 12.09 hrs HW=339.65' TW=335.06' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.03 cfs @ 2.62 fps)

Summary for Pond 23P: DCB-8

Inflow Area = 0.161 ac, 98.59% Impervious, Inflow Depth = 6.64" for 100-year event
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.089 af
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.09 hrs, Volume= 0.089 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 339.12' @ 12.09 hrs
Flood Elev= 342.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	338.50'	**12.0" Round Culvert** L= 29.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 338.50' / 337.92' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 12.09 hrs HW=339.11' TW=335.05' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.05 cfs @ 2.09 fps)

Summary for Pond 24P: DMH-9

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 5.39" for 100-year event
Inflow = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af
Outflow = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min
Primary = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 330.91' @ 12.09 hrs
Flood Elev= 338.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	329.41'	**18.0" Round Culvert** L= 99.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 329.41' / 326.44' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.72 cfs @ 12.09 hrs HW=330.88' TW=327.81' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.72 cfs @ 3.25 fps)

Summary for Pond 25P: DMH-10

Inflow Area = 1.001 ac, 74.09% Impervious, Inflow Depth = 5.39" for 100-year event
Inflow = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af
Outflow = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min
Primary = 5.84 cfs @ 12.09 hrs, Volume= 0.449 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 327.84' @ 12.09 hrs
Flood Elev= 332.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.34'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 326.34' / 324.06' S= 0.0300 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.72 cfs @ 12.09 hrs HW=327.81' TW=326.07' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.72 cfs @ 3.25 fps)

Summary for Pond 26P: DMH-11

Inflow Area = 1.736 ac, 73.52% Impervious, Inflow Depth = 5.45" for 100-year event
Inflow = 10.25 cfs @ 12.09 hrs, Volume= 0.789 af
Outflow = 10.25 cfs @ 12.09 hrs, Volume= 0.789 af, Atten= 0%, Lag= 0.0 min
Primary = 10.25 cfs @ 12.09 hrs, Volume= 0.789 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 326.17' @ 12.09 hrs
Flood Elev= 327.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	323.10'	**18.0" Round Culvert** L= 175.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 323.10' / 318.50' S= 0.0263 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=10.00 cfs @ 12.09 hrs HW=326.07' TW=320.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 10.00 cfs @ 5.66 fps)

Summary for Pond 27P: DCB-10

Inflow Area = 0.182 ac, 98.75% Impervious, Inflow Depth = 6.76" for 100-year event
Inflow = 1.22 cfs @ 12.09 hrs, Volume= 0.103 af
Outflow = 1.22 cfs @ 12.09 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.09 hrs, Volume= 0.103 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 326.28' @ 12.14 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=325.74' TW=326.05' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond 28P: DCB-11

Inflow Area = 0.554 ac, 64.18% Impervious, Inflow Depth = 5.14" for 100-year event
Inflow = 3.19 cfs @ 12.09 hrs, Volume= 0.237 af
Outflow = 3.19 cfs @ 12.09 hrs, Volume= 0.237 af, Atten= 0%, Lag= 0.0 min
Primary = 3.19 cfs @ 12.09 hrs, Volume= 0.237 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 327.03' @ 12.12 hrs
Flood Elev= 327.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 324.50' / 324.06' S= 0.0314 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.40 cfs @ 12.09 hrs HW=326.72' TW=326.07' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.40 cfs @ 3.06 fps)

Summary for Pond 29P: DMH-12

Inflow Area = 2.476 ac, 72.94% Impervious, Inflow Depth = 5.46" for 100-year event
Inflow = 14.72 cfs @ 12.09 hrs, Volume= 1.127 af
Outflow = 14.72 cfs @ 12.09 hrs, Volume= 1.127 af, Atten= 0%, Lag= 0.0 min
Primary = 14.72 cfs @ 12.09 hrs, Volume= 1.127 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 320.92' @ 12.09 hrs
Flood Elev= 322.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	318.40'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 318.40' / 316.00' S= 0.0369 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=14.36 cfs @ 12.09 hrs HW=320.85' TW=316.41' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 14.36 cfs @ 4.57 fps)

Summary for Pond 30P: DCB-12

Inflow Area = 0.739 ac, 71.58% Impervious, Inflow Depth = 5.48" for 100-year event
Inflow = 4.47 cfs @ 12.09 hrs, Volume= 0.338 af
Outflow = 4.47 cfs @ 12.09 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min
Primary = 4.47 cfs @ 12.09 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 321.24' @ 12.13 hrs
Flood Elev= 322.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	319.00'	**18.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 319.00' / 318.50' S= 0.0094 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.17 cfs @ 12.09 hrs HW=320.95' TW=320.85' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.17 cfs @ 1.23 fps)

Summary for Pond 31P: PROP. CULVERT

Inflow Area = 2.671 ac, 14.12% Impervious, Inflow Depth = 2.60" for 100-year event
Inflow = 5.07 cfs @ 12.33 hrs, Volume= 0.579 af
Outflow = 5.07 cfs @ 12.33 hrs, Volume= 0.579 af, Atten= 0%, Lag= 0.0 min
Primary = 5.07 cfs @ 12.33 hrs, Volume= 0.579 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 316.81' @ 12.33 hrs
Flood Elev= 318.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**15.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 315.00' / 313.00' S= 0.0241 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.04 cfs @ 12.33 hrs HW=316.79' TW=315.50' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.04 cfs @ 4.11 fps)

Summary for Link 4L: DP-A

Inflow Area = 20.984 ac, 28.02% Impervious, Inflow Depth = 2.42" for 100-year event
Inflow = 31.87 cfs @ 12.17 hrs, Volume= 4.230 af
Primary = 31.87 cfs @ 12.17 hrs, Volume= 4.230 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Link 5L: DP-B

Inflow Area = 0.748 ac, 0.00% Impervious, Inflow Depth = 0.56" for 100-year event
Inflow = 0.17 cfs @ 12.41 hrs, Volume= 0.035 af
Primary = 0.17 cfs @ 12.41 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Appendix F – Stormwater Calculations

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: TSS removal with pretreatment calculation.

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Sediment Forebay	0.25	0.75	0.19	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56

Total TSS Removal = 44%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Minuteman Village
Prepared By: RPV
Date: 16-Apr-19

*Equals remaining load from previous BMP (E) which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

TSS Removal Calculation Worksheet

Location: TSS removal for overall site.

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Infiltration Basin	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal = 85%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Minuteman Village
Prepared By: RPV
Date: 16-Apr-19

*Equals remaining load from previous BMP (E) which enters the BMP

Minuteman Village
Boxborough, MA

April 16, 2019
6092

Infiltration Basin #1

Stormwater Recharge Calculations

CALCULATIONS

Recharge Volume, Rv:

$R_v = A_C x F$

Hydrologic Soil Group	Impervious Area (Ac) [1]	Target Depth (F)	Recharge Volume (Rv) Ac-feet
A	0.709	0.6	0.035
B	2.402	0.35	0.070
C		0.25	0.000
Total	**3.111**		**0.106**

Total Recharge Volume Required = 0.038 Ac-ft
Total Recharge Volume Required (Rv) = 1,673 C.ft
***Recharge Vol. Provided (from Infil. Basin 1) = 1,710.0 C.ft**
*Storage at elevation of outlet control structure = 310.2

Required Sediment Forebay vol, Fv:

$F_v = A_C(cu.ft)x0.1inch$ of impervious area

[1] Imp. area captured by ponds, Ap = 3.111 Ac
Required Sediment Forebay vol, Fv= 1,129 C.ft

Sediment Forebay Volume Provided = 2,028 C.ft

REFERENCES

Table 2.3.2: Recharge Target Depth by Hydrologic Soil Group

NRCS Hydrologic Soil Group	Approx. Soil Texture	Target Depth Factor (F)
A	sand	0.6 inch
B	loam	0.35 inch
C	silty loam	0.25 inch
D	clay	0.1 inch

Drawdown Calculations

CALCULATIONS

Proposed Infiltration Area Calculations:

$$Drawdown = \frac{R_V}{(Rawls\ Rate)(Bottom\ Area)}$$

Drawdown Calculations:

Soil Texture: 3 Sandy Loam

[2] **Bottom Surface Area (A): 1,425 SF**
Rawls Rate: 1.02 in/hr
Total Recharge Volume Required = 1,673 C.ft
Drawdown: 13.81 hr
Drawdown is less than 72 Hours as Required

REFERENCES

Table 2.3.3: 1982 Rawls Rates

Texture Class	NRCS Hydrologic Soil Group	Infiltration Rate
1 Sand	A	8.27 in/hr
2 Loamy Sand	A	2.41 in/hr
3 Sandy Loam	B	1.02 in/hr
4 Loam	B	0.52 in/hr
5 Silt Loam	C	0.27 in/hr
6 Sandy Clay Loam	C	0.17 in/hr
7 Clay Loam	D	0.09 in/hr
8 Silty Clay Loam	D	0.06 in/hr
9 Sandy Clay	D	0.05 in/hr
10 Silty Clay	D	0.04 in/hr
11 Clay	D	0.02 in/hr

NOTES:
Input Values
[1] = Refer to Proposed Conditions HydroCAD modeling report

Hydrograph for Pond 5P: INFIL BASIN #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	309.00	0.00	0.00	0.00
2.50	0.01	0	309.00	0.01	0.01	0.00
5.00	0.04	37	309.05	0.02	0.02	0.00
7.50	0.16	587	309.58	0.04	0.04	0.00
10.00	**0.69**	**2,804**	**310.66**	**0.31**	**0.09**	**0.23**
12.50	**12.14**	**25,740**	**315.38**	**13.70**	**0.35**	**13.34**
15.00	1.94	23,375	315.06	2.00	0.33	1.67
17.50	0.98	22,546	314.94	1.22	0.32	0.90
20.00	0.68	19,004	314.41	1.13	0.29	0.84
22.50	0.53	14,811	313.69	1.01	0.24	0.77
25.00	0.00	9,436	312.60	0.81	0.18	0.63
27.50	0.00	3,758	311.02	0.44	0.10	0.34
30.00	0.00	1,779	310.23	0.07	0.07	0.00
32.50	0.00	1,209	309.96	0.06	0.06	0.00
35.00	0.00	755	309.70	0.04	0.04	0.00
37.50	0.00	415	309.45	0.03	0.03	0.00
40.00	0.00	168	309.21	0.02	0.02	0.00
42.50	0.00	0	309.00	0.00	0.00	0.00
45.00	0.00	0	309.00	0.00	0.00	0.00
47.50	0.00	0	309.00	0.00	0.00	0.00
50.00	0.00	0	309.00	0.00	0.00	0.00
52.50	0.00	0	309.00	0.00	0.00	0.00
55.00	0.00	0	309.00	0.00	0.00	0.00
57.50	0.00	0	309.00	0.00	0.00	0.00
60.00	0.00	0	309.00	0.00	0.00	0.00
62.50	0.00	0	309.00	0.00	0.00	0.00
65.00	0.00	0	309.00	0.00	0.00	0.00
67.50	0.00	0	309.00	0.00	0.00	0.00
70.00	0.00	0	309.00	0.00	0.00	0.00

Stage-Area-Storage for Pond 5P: INFIL BASIN #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
309.00	676	0	310.04	2,055	1,372
309.02	696	14	310.06	2,070	1,413
309.04	716	28	310.08	2,085	1,455
309.06	737	42	310.10	2,100	1,497
309.08	757	57	310.12	2,115	1,539
309.10	778	73	310.14	2,131	1,581
309.12	800	88	310.16	2,146	1,624
309.14	821	105	310.18	2,161	1,667
309.16	843	121	310.20	2,177	1,710
309.18	866	138	310.22	2,192	1,754
309.20	888	156	310.24	2,208	1,798
309.22	911	174	310.26	2,223	1,842
309.24	934	192	310.28	2,239	1,887
309.26	957	211	310.30	2,255	1,932
309.28	981	231	310.32	2,270	1,977
309.30	1,005	251	310.34	2,286	2,023
309.32	1,029	271	310.36	2,302	2,069
309.34	1,054	292	310.38	2,318	2,115
309.36	1,078	313	310.40	2,334	2,161
309.38	1,104	335	310.42	2,350	2,208
309.40	1,129	357	310.44	2,366	2,255
309.42	1,155	380	310.46	2,382	2,303
309.44	1,181	403	310.48	2,398	2,351
309.46	1,207	427	310.50	2,414	2,399
309.48	1,233	452	310.52	2,431	2,447
309.50	1,260	477	310.54	2,447	2,496
309.52	1,287	502	310.56	2,463	2,545
309.54	1,315	528	310.58	2,480	2,595
309.56	1,342	555	310.60	2,496	2,644
309.58	1,370	582	310.62	2,513	2,694
309.60	1,399	609	310.64	2,530	2,745
309.62	1,427	638	310.66	2,546	2,796
309.64	1,456	667	310.68	2,563	2,847
309.66	1,485	696	310.70	2,580	2,898
309.68	1,515	726	310.72	2,597	2,950
309.70	1,544	757	310.74	2,613	3,002
309.72	1,575	788	310.76	2,630	3,054
309.74	1,605	820	310.78	2,647	3,107
309.76	1,635	852	310.80	2,664	3,160
309.78	1,666	885	310.82	2,682	3,214
309.80	1,697	919	310.84	2,699	3,268
309.82	1,729	953	310.86	2,716	3,322
309.84	1,761	988	310.88	2,733	3,376
309.86	1,793	1,023	310.90	2,751	3,431
309.88	1,825	1,059	310.92	2,768	3,486
309.90	1,858	1,096	310.94	2,785	3,542
309.92	1,891	1,134	310.96	2,803	3,598
309.94	1,924	1,172	310.98	2,820	3,654
309.96	1,957	1,211	311.00	2,838	3,710
309.98	1,991	1,250	311.02	2,856	3,767
310.00	2,025	1,290	311.04	2,873	3,825
310.02	2,040	1,331	311.06	2,891	3,882

Stage-Area-Storage for Pond 5P: INFIL BASIN #1 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
311.08	2,909	3,940	312.12	3,898	7,473
311.10	2,927	3,999	312.14	3,916	7,551
311.12	2,945	4,057	312.16	3,935	7,630
311.14	2,963	4,116	312.18	3,953	7,709
311.16	2,981	4,176	312.20	3,972	7,788
311.18	2,999	4,236	312.22	3,991	7,868
311.20	3,017	4,296	312.24	4,009	7,948
311.22	3,035	4,356	312.26	4,028	8,028
311.24	3,054	4,417	312.28	4,047	8,109
311.26	3,072	4,479	312.30	4,066	8,190
311.28	3,090	4,540	312.32	4,084	8,271
311.30	3,109	4,602	312.34	4,103	8,353
311.32	3,127	4,665	312.36	4,122	8,435
311.34	3,146	4,727	312.38	4,141	8,518
311.36	3,164	4,790	312.40	4,160	8,601
311.38	3,183	4,854	312.42	4,179	8,685
311.40	3,202	4,918	312.44	4,198	8,768
311.42	3,220	4,982	312.46	4,218	8,852
311.44	3,239	5,046	312.48	4,237	8,937
311.46	3,258	5,111	312.50	4,256	9,022
311.48	3,277	5,177	312.52	4,275	9,107
311.50	3,296	5,243	312.54	4,295	9,193
311.52	3,315	5,309	312.56	4,314	9,279
311.54	3,334	5,375	312.58	4,333	9,366
311.56	3,353	5,442	312.60	4,353	9,452
311.58	3,372	5,509	312.62	4,372	9,540
311.60	3,392	5,577	312.64	4,392	9,627
311.62	3,411	5,645	312.66	4,412	9,715
311.64	3,430	5,713	312.68	4,431	9,804
311.66	3,450	5,782	312.70	4,451	9,893
311.68	3,469	5,851	312.72	4,471	9,982
311.70	3,489	5,921	312.74	4,490	10,071
311.72	3,508	5,991	312.76	4,510	10,161
311.74	3,528	6,061	312.78	4,530	10,252
311.76	3,548	6,132	312.80	4,550	10,343
311.78	3,567	6,203	312.82	4,570	10,434
311.80	3,587	6,275	312.84	4,590	10,525
311.82	3,607	6,347	312.86	4,610	10,617
311.84	3,627	6,419	312.88	4,630	10,710
311.86	3,647	6,492	312.90	4,650	10,803
311.88	3,667	6,565	312.92	4,670	10,896
311.90	3,687	6,638	312.94	4,690	10,989
311.92	3,707	6,712	312.96	4,711	11,083
311.94	3,727	6,787	312.98	4,731	11,178
311.96	3,747	6,861	313.00	4,751	11,273
311.98	3,768	6,937	313.02	4,772	11,368
312.00	3,788	7,012	313.04	4,792	11,463
312.02	3,806	7,088	313.06	4,813	11,560
312.04	3,824	7,164	313.08	4,833	11,656
312.06	3,843	7,241	313.10	4,854	11,753
312.08	3,861	7,318	313.12	4,874	11,850
312.10	3,879	7,395	313.14	4,895	11,948

Stage-Area-Storage for Pond 5P: INFIL BASIN #1 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
315.24	7,304	24,673
315.26	7,330	24,819
315.28	7,355	24,966
315.30	7,380	25,113
315.32	7,406	25,261
315.34	7,431	25,410
315.36	7,457	25,559
315.38	7,482	25,708
315.40	7,508	25,858
315.42	7,533	26,008
315.44	7,559	26,159
315.46	7,585	26,311
315.48	7,610	26,463
315.50	7,636	26,615
315.52	7,662	26,768
315.54	7,688	26,922
315.56	7,714	27,076
315.58	7,740	27,230
315.60	7,766	27,385
315.62	7,792	27,541
315.64	7,818	27,697
315.66	7,844	27,853
315.68	7,870	28,011
315.70	7,896	28,168
315.72	7,923	28,326
315.74	7,949	28,485
315.76	7,975	28,644
315.78	8,002	28,804
315.80	8,028	28,964
315.82	8,055	29,125
315.84	8,081	29,287
315.86	8,108	29,449
315.88	8,134	29,611
315.90	8,161	29,774
315.92	8,188	29,937
315.94	8,215	30,101
315.96	8,241	30,266
315.98	8,268	30,431
316.00	**8,295**	**30,597**

Stage-Area-Storage for Pond 5P: INFIL BASIN #1 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
313.16	4,915	12,046	314.20	6,051	17,738
313.18	4,936	12,144	314.22	6,074	17,860
313.20	4,957	12,243	314.24	6,097	17,981
313.22	4,978	12,343	314.26	6,120	18,103
313.24	4,999	12,442	314.28	6,143	18,226
313.26	5,020	12,543	314.30	6,166	18,349
313.28	5,040	12,643	314.32	6,190	18,473
313.30	5,061	12,744	314.34	6,213	18,597
313.32	5,083	12,846	314.36	6,236	18,721
313.34	5,104	12,948	314.38	6,260	18,846
313.36	5,125	13,050	314.40	6,283	18,972
313.38	5,146	13,153	314.42	6,306	19,097
313.40	5,167	13,256	314.44	6,330	19,224
313.42	5,188	13,359	314.46	6,353	19,351
313.44	5,210	13,463	314.48	6,377	19,478
313.46	5,231	13,568	314.50	6,400	19,606
313.48	5,252	13,672	314.52	6,424	19,734
313.50	5,274	13,778	314.54	6,448	19,863
313.52	5,295	13,883	314.56	6,472	19,992
313.54	5,317	13,990	314.58	6,495	20,122
313.56	5,338	14,096	314.60	6,519	20,252
313.58	5,360	14,203	314.62	6,543	20,382
313.60	5,382	14,310	314.64	6,567	20,513
313.62	5,403	14,418	314.66	6,591	20,645
313.64	5,425	14,527	314.68	6,615	20,777
313.66	5,447	14,635	314.70	6,639	20,910
313.68	5,469	14,744	314.72	6,663	21,043
313.70	5,490	14,854	314.74	6,687	21,176
313.72	5,512	14,964	314.76	6,711	21,310
313.74	5,534	15,075	314.78	6,736	21,445
313.76	5,556	15,185	314.80	6,760	21,580
313.78	5,578	15,297	314.82	6,784	21,715
313.80	5,600	15,409	314.84	6,808	21,851
313.82	5,622	15,521	314.86	6,833	21,987
313.84	5,645	15,633	314.88	6,857	22,124
313.86	5,667	15,747	314.90	6,882	22,262
313.88	5,689	15,860	314.92	6,906	22,399
313.90	5,711	15,974	314.94	6,931	22,538
313.92	5,734	16,089	314.96	6,955	22,677
313.94	5,756	16,204	314.98	6,980	22,816
313.96	5,779	16,319	315.00	7,005	22,956
313.98	5,801	16,435	315.02	7,029	23,096
314.00	5,823	16,551	315.04	7,054	23,237
314.02	5,846	16,668	315.06	7,079	23,378
314.04	5,869	16,785	315.08	7,104	23,520
314.06	5,891	16,902	315.10	7,129	23,663
314.08	5,914	17,020	315.12	7,154	23,805
314.10	5,937	17,139	315.14	7,179	23,949
314.12	5,959	17,258	315.16	7,204	24,093
314.14	5,982	17,377	315.18	7,229	24,237
314.16	6,005	17,497	315.20	7,254	24,382
314.18	6,028	17,617	315.22	7,279	24,527

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Infiltration Area #2

Stormwater Recharge Calculations

CALCULATIONS

Recharge Volume, Rv:

$R_v = A_C x F$

Hydrologic Soil Group	Impervious Area (Ac) [1]	Target Depth (F)	Recharge Volume (Rv) Ac-feet
A	0.524	0.6	0.026
B	1.731	0.35	0.050
C		0.25	0.000
Total	**2.255**		**0.077**

Total Recharge Volume Required = 0.045 Ac-ft
Total Recharge Volume Required (Rv) = 1,952 C.ft
***Recharge Vol. Provided (from Infil. Area 2) = 2,067.0 C.ft**
*Storage at elevation of outlet control structure = 314.5

Required Sediment Forebay vol, Fv:

$F_v = A_C(cu.ft)x0.1inch$ of impervious area

[1] Imp. area captured by ponds, Ap = 2.255 Ac
Required Sediment Forebay vol, Fv= 819 C.ft

Sediment Forebay Volume Provided = 1,266.0 C.ft

REFERENCES

Table 2.3.2: Recharge Target Depth by Hydrologic Soil Group

NRCS Hydrologic Soil Group	Approx. Soil Texture	Target Depth Factor (F)
A	sand	0.6 inch
B	loam	0.35 inch
C	silty loam	0.25 inch
D	clay	0.1 inch

Drawdown Calculations

CALCULATIONS

Proposed Infiltration Area Calculations:

$$Drawdown = \frac{R_V}{(Rawls\ Rate)(Bottom\ Area)}$$

Drawdown Calculations:

Soil Texture: 3 Sandy Loam

Bottom Surface Area (A): 4,134 SF
Rawls Rate: 1.02 in/hr
Total Recharge Volume Required = 1,952 C.ft
Drawdown: 5.56 hr
Drawdown is less than 72 Hours as Required

REFERENCES

Table 2.3.3: 1982 Rawls Rates

Texture Class	NRCS Hydrologic Soil Group	Infiltration Rate
1 Sand	A	8.27 in/hr
2 Loamy Sand	A	2.41 in/hr
3 Sandy Loam	B	1.02 in/hr
4 Loam	B	0.52 in/hr
5 Silt Loam	C	0.27 in/hr
6 Sandy Clay Loam	C	0.17 in/hr
7 Clay Loam	D	0.09 in/hr
8 Silty Clay Loam	D	0.06 in/hr
9 Sandy Clay	D	0.05 in/hr
10 Silty Clay	D	0.04 in/hr
11 Clay	D	0.02 in/hr

NOTES:
Input Values
[1] = Refer to Proposed Conditions HydroCAD modeling report

Hydrograph for Pond 6P: INFIL BASIN #2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	314.00	0.00	0.00	0.00
2.50	0.02	0	314.00	0.02	0.02	0.00
5.00	0.05	0	314.00	0.05	0.05	0.00
7.50	0.16	238	314.08	0.08	0.08	0.00
10.00	**0.85**	3,001	314.65	0.23	0.19	0.04
12.50	**15.69**	**63,319**	**317.54**	**4.57**	**1.39**	**3.18**
15.00	2.27	**60,492**	**317.46**	**2.60**	**1.34**	**1.26**
17.50	1.14	57,067	317.37	1.68	1.29	0.39
20.00	0.79	50,616	317.18	1.57	1.19	0.38
22.50	0.62	43,404	316.95	1.43	1.07	0.36
25.00	0.00	34,647	316.64	1.26	0.93	0.34
27.50	0.00	24,325	316.21	1.04	0.74	0.30
30.00	0.00	15,984	315.78	0.81	0.56	0.25
32.50	0.00	9,642	315.35	0.60	0.40	0.20
35.00	0.00	5,178	314.93	0.40	0.26	0.13
37.50	0.00	2,557	314.58	0.19	0.17	0.01
40.00	0.00	1,222	314.33	0.12	0.12	0.00
42.50	0.00	314	314.10	0.08	0.08	0.00
45.00	0.00	0	314.00	0.00	0.00	0.00
47.50	0.00	0	314.00	0.00	0.00	0.00
50.00	0.00	0	314.00	0.00	0.00	0.00
52.50	0.00	0	314.00	0.00	0.00	0.00
55.00	0.00	0	314.00	0.00	0.00	0.00
57.50	0.00	0	314.00	0.00	0.00	0.00
60.00	0.00	0	314.00	0.00	0.00	0.00
62.50	0.00	0	314.00	0.00	0.00	0.00
65.00	0.00	0	314.00	0.00	0.00	0.00
67.50	0.00	0	314.00	0.00	0.00	0.00
70.00	0.00	0	314.00	0.00	0.00	0.00

Stage-Area-Storage for Pond 6P: INFIL BASIN #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
314.00	2,813	0
314.05	3,050	147
314.10	3,297	305
314.15	3,553	476
314.20	3,819	661
314.25	4,094	858
314.30	4,379	1,070
314.35	4,673	1,296
314.40	4,977	1,538
314.45	5,291	1,794
314.50	5,614	2,067
314.55	5,947	2,356
314.60	6,290	2,662
314.65	6,642	2,985
314.70	7,003	3,326
314.75	7,375	3,686
314.80	7,755	4,064
314.85	8,146	4,461
314.90	8,546	4,879
314.95	8,955	5,316
315.00	9,374	5,774
315.05	9,803	6,254
315.10	10,241	6,755
315.15	10,689	7,278
315.20	11,147	7,824
315.25	11,614	8,393
315.30	12,091	8,985
315.35	12,577	9,602
315.40	13,073	10,243
315.45	13,578	10,909
315.50	14,093	11,601
315.55	14,618	12,319
315.60	15,152	13,063
315.65	15,695	13,834
315.70	16,249	14,633
315.75	16,812	15,459
315.80	17,384	16,314
315.85	17,966	17,198
315.90	18,558	18,111
315.95	19,159	19,054
316.00	19,770	20,027
316.05	20,252	21,027
316.10	20,741	22,052
316.15	21,235	23,102
316.20	21,735	24,176
316.25	22,241	25,275
316.30	22,752	26,400
316.35	23,269	27,551
316.40	23,793	28,727
316.45	24,322	29,930
316.50	24,857	31,159
316.55	25,397	32,416
316.60	25,944	33,699
316.65	26,496	35,010
316.70	27,054	36,349
316.75	27,618	37,716
316.80	28,188	39,111
316.85	28,763	40,534
316.90	29,345	41,987
316.95	29,932	43,469
317.00	30,525	44,980
317.05	31,123	46,522
317.10	31,728	48,093
317.15	32,339	49,694
317.20	32,955	51,327
317.25	33,577	52,990
317.30	34,205	54,685
317.35	34,838	56,411
317.40	35,478	58,169
317.45	36,123	59,959
317.50	36,775	61,781
317.55	37,431	63,636
317.60	38,094	65,524
317.65	38,763	67,446
317.70	39,437	69,401
317.75	40,118	71,389
317.80	40,804	73,412
317.85	41,495	75,470
317.90	42,193	77,562
317.95	42,897	79,689
318.00	**43,606**	**81,852**

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Adjusted Recharge/WQV Calcs

Stormwater Recharge Calculations

Capture Area Adjustment, Rvadj:

$$R_v adj = \frac{A_t}{A_p} x R_v$$

[1] Imp. area captured by ponds, Ap =	5.365	Ac
Total impervious area on site, AT =	5.880	Ac
Recharge volume required, Rv =	12,807	C.ft
Capture Rate=	**91%**	OK
Capture Area Adjustment Factor=	**1.10**	
Adjusted Recharge Volume Required Rvadj =	**14,036**	**C.ft**
[1] Total Recharge Volume Provided =	3,777.0	**C.ft**

NOTES:

Input Values

[1] = Sum of Recharge Vol. Provided from Infil. Basin 1, Infil. Basin 2

Water Quality Calculations

CALCULATIONS

Water Quality Calculation:

$$V_{WQ} = D_{WQ}(ft) x\ A_T(ft^2)$$

Water Quality Depth =	0.5	in
Water Quality Depth , DWQ =	**0.04**	**ft.**
Total impervious area on site, AT =	5.880	Ac.
AT =	**256,133**	**ft²**
Required Water Quality Volume, VWQ =	**10,672**	**C.ft.**

REFERENCES

1 inch depth
Zone II discharges
IWPA discharges
Critical Area
Runoff from LUHPPL
Infiltration rate >2.4 inches/hour
1/2 inch depth
Discharge to other ares
8 inch
9 inch
10 inch
11 inch

Appendix G – Construction Period Pollution Prevention

The project is covered under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit, which will be submitted in place of the Construction Period Pollution Prevention Plan, prior to any land disturbance.

Appendix H - Operation and Maintenance Plan

STORMWATER OPERATION & MAINTENANCE MANUAL

MINUTEMAN VILLAGE

STOW ROAD
BOXBOROUGH, MASSACHUSETTS

Prepared For: **BOXBOROUGH TOWN CENTER, LLC**
P.O. BOX 985
ACTON, MA

Prepared By: **DUCHARME & DILLIS CIVIL DESIGN GROUP, INC.**
1092 MAIN STREET
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April 16th, 2019
6092

DUCHARME & DILLIS
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CIVIL ENGINEERS • LAND SURVEYORS • WETLAND CONSULTANTS

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1.0 Project Narrative

1.1 Proposed Stormwater Management System

The proposed stormwater management system was designed to reduce the peak rate of stormwater leaving the site, promote groundwater recharge, and increase the water quality. Runoff from the proposed development will be conveyed and treated using sedimentation forebays & infiltration basins.

Infiltration Basin with Sediment Forebay

Two infiltration basins with sediment forebays will treat the runoff. The volumes of the infiltration basins were designed to reduce runoff rates up to the 100-year storm event, infiltrate the require recharge volume and sized to handle the appropriate water quality volume. The basins are combined with sediment forebays. The sediment forebays are designed to reduce the velocity of flow which will increase the settlement of heavy solids before emptying to the basins. Riprap will also be installed at the inlet of the sediment forebays to reduce the potential for scouring.

Deep Sump Hooded Catch Basins

Deep sump hooded catch basins are proposed to convey the runoff from the proposed roadway & roofs to the infiltration basins. These catch basins will discharge to manholes and conventional storm drains.

1.2 Operation & Maintenance Tasks

The following activities should be performed routinely to allow for proper functioning of the stormwater system. The following are guidelines referring to each major component of the stormwater management system.

Street Sweeping

Street sweeping should be performed at least semiannually. For most effective results, sweeping should be performed by a vacuum style truck in the early spring before spring rain events can wash silt and sediment into the stormwater system. Silt and sediment should be disposed of in accordance with local, state and federal guidelines for hazardous waste.

Drain Manholes

Manholes shall be inspected semi-annually for signs of wear, settling, cracking or other fatigue. Manhole casting should be inspected for signs of root intrusion, or significant water infiltration. Manhole sumps should be checked for silt /sediment buildup and cleaned as necessary. Cleaning should be performed by a vacuum truck. Manholes should be resealed as

required and outlets should be inspected incidentally with all structure inspections.

Storm Drain Lines

Storm drainage inlets and outlets should be inspected incidentally with all structure inspections. Evidence of debris intrusion or excessive siltation or sedimentation could result in the need to clean a storm drain line. Flushing or jetting should be performed as required. All flushing and jetting should be performed in the direction away from any outlet devices. A vacuum truck should be used at the opposite end of the flushing or jetting to remove any silt or sediment that is cleaned from the storm drain.

Deep Sump Catch Basins

Deep sump catch basins shall be inspected at least semi-annually for signs of wear, settling, cracking or other fatigue. Catch basin castings should be inspected for signs of root intrusion, or significant water infiltration. Catch basin sump should be check for silt/sediment buildup and cleaned as necessary. Cleaning should be performed by a vacuum truck. Catch basins should be resealed as required and outlets should be inspected incidentally with all structure inspections.

Infiltration Basins

Infiltration basins are stormwater runoff impoundments that are constructed over permeable soils and require pretreatment from sediment forebays. Runoff from the design storm is stored until it exfiltrates through the soil of the basin floor. The basins were located to capture most of the runoff from the impervious areas of the site.

Infiltration basins are prone to clogging and failure if proper maintenance is not scheduled. The basin should be inspected at least twice per year or after a major storm event to ensure that the basin is operating as intended. The outlet structures should be inspected for clogging or overflow release velocities that are causing scouring or erosion. The upper stage, side slopes, embankments and emergency spillway should be mowed twice a year.

Sediment forebay

A sediment forebay is required as a pretreatment device prior to discharging stormwater to the extended dry detention basin. It will provide pretreatment by slowing stormwater runoff and increasing settlement of the sediment. The sediment forebay should be inspected monthly and cleaned of accumulated sediment on a quarterly basis. After sediment removal, repair any damaged vegetation by reseeding or

resodding. Maintain grass at a height of 4-6 inches.

Stone Rip Rap

The proposed swales have been designed with angular stone riprap. The stone riprap will be placed approximately 1-foot deep over Tencate Mirafi filter fabric.

Rip Rap should be inspected periodically for signs of failure. Such signs would include, undermining, high velocity wear (displacement of stones downstream), sliding, settlement, siltation, etc. Riprap should be repaired immediately upon the observation of such conditions mentioned.

Periodically, rip rap should be cleaned of silt. Siltation will be most prevalent in low velocity areas (such as directly up-stream of outlet control structures). Silt and sediment should be removed from these areas by hand.

Grass Swales

Swales should be checked for scouring, sloughing, erosion and/or accumulation of silt. The vegetation helps reduce velocity of runoff, which helps to maintain the swale, and encourages the sedimentation filtrations prior to exfiltration. Grass should be mowed and kept below 6 inches. Debris and trash should be removed as encountered.

O&M Schedule

	O&M Task	Monthly	Quarterly	Spring	Fall	2-years	As-required
1.	**Infiltration Basin**						
	Inspection			x	x		x
	Mowing	**3-4 times during the growing season**					
	Remove Debris			x	x		x
	Remove Sediment						x
	Re-seed						x
2.	**Sediment Forebay**						
	Inspection	x		x	x		x
	Mowing	**3-4 times during the growing season**					
	Remove Debris		x				x
	Remove Sediment		x				x
	Re-seed						x
3.	**Stone Rip Rap**						
	Inspection			x			
	Remove Debris			x			x
	Remove Silt/Sediment					x	x
	Repair						x
4.							
	Storm drain Lines						
	Inspection			x			x
	Clean						x
5.	**Catchbasins**						
	Inspection			x	x		
	Remove Debris						x
	Remove Silt/Sediment						x
6.	**Grass Swales**						
	Inspection			x			x
	Clean			x			x
7.	**Drain Manholes**						
	Inspect Rims						
	Inspect inside/inlet and outlet pipes			x	x		
	Remove sediment					x	x

APPENDIX A

Stormwater Management System Owners/Operators

Stormwater Management System Owners/Operators

1.	Stormwater Management System Owners:	TBD
2.	Current and future operators:	TBD
3.	Emergency contact information:	TBD
4.	Change of trustee:	TBD
5.	Financial Responsible Party:	TBD
6.	Routine Maintenance:	TBD
7.	O&M activities:	TBD
8.	Record keeping	TBD

Appendix I - Long Term Pollution Prevention Plan

LONG TERM POLUTION PREVENTION PLAN

MINUTEMAN VILLAGE

STOW ROAD
BOXBOROUGH, MASSACHUSETTS

Prepared For: **BOXBOROUGH TOWN CENTER, LLC**
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1.0 Summary

This Long-Term Pollution Prevention Plan (LTPPP) has been prepared by Ducharme & Dillis Civil Design Group, Inc. pursuant to the Massachusetts Stormwater Regulations. The proposed development consists of the construction of a 50-unit Active Adult Home Development on the south side of Route 111 just northerly of Burroughs Road.

The layout of the development including the roadways and the locations of buildings and septic systems has been carefully planned to minimize disturbance to the existing land and natural features. The stormwater management system has been designed in accordance with the Massachusetts Stormwater Regulations to provide pretreatment of the stormwater prior to discharge to the resource areas.

2.0 Spill Prevention Plan

No hazardous materials other than normal and common household items are expected to be stored on site after the construction period has ended (refer to the Stormwater Pollution Prevention Plan for details pertaining to spill prevention during construction).

It is expected that normal DEP notification procedures would be triggered for major spills such as home heating oil or propane and natural gas leaks.

3.0 Stormwater System O&M

A Stormwater Operation & Maintenance plan has been prepared for the proposed stormwater management system. Refer to this document for details pertaining to the required inspections, routine maintenance and operation details.

Implementation of the stormwater operation and maintenance plan is critical in order for the site to function as designed, and for the protection of the downstream areas from the potential for scour and erosion.

Special care should be paid to the protection and maintenance of the existing and proposed catch basins that support the drainage system. Refer to the O&M Plan for specific instructions.

4.0 Fertilizers, herbicides and pesticides

Application of fertilizer, herbicides and pesticides shall be performed in a manner consistent with the industry standards for the application.

No application of chemicals is to be performed within the stormwater management areas on the site.

5.0 Snow/Salt Management

5.1 Snow Plowing

The roadway and driveways are designed to comply with the Town of Boxborough Standards. It is expected that snow plowing practices and procedures will be used similar to those currently employed by Boxborough residents.

5.2 Street Sweeping

The streets should be swept as needed to reduce the potential for silt build up in the drainage pipes and sump catch basins.

6.0 Waste Management

6.1 Septic Systems

An on-site sewage disposal system is proposed to service each of the proposed dwellings. The operation & maintenance of these systems will be in accordance with the requirements of the 310 CMR 15,0 (Title 5) regulations. The septic system has been designed in accordance with Title V regulations, and therefore will provide adequate protection against potential pollution.

On-site portable restrooms will be used during construction. The portable restrooms will be cleaned and maintained on a regular basis and disposal will be performed weekly or as required with a private or public waste removal company. All portable restrooms will be removed after construction.

6.2 Solid Waste

It is expected that the home owner's will contact directly with a private or public waste removal company.

A dumpster will be located on the site during construction. This area will be the primary area for the on-site storage of solid waste prior to pick-up by a waste management company.

4.0 Plans

Pre-development Watershed Plan

Post-development Watershed Plan