STORMWATER MANAGEMENT REPORT

BROOKVIEW HEIGHTS
MAP 908 BLOCK 78E LOTS 67E, 66D, 66B & 55C
OFF WASHINGTON STREET
METHUEN, MASSACHUSETTS

GPI

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Prepared For:

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March 6, 2024

(GPI Project No.: NEX-2200136)

Brookview Heights
DHB Homes, LLC
Stormwater Management Report

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SECTION 1 EXECUTIVE SUMMARY

This report contains a stormwater management analysis for the proposed 28-lot residential subdivision in Methuen, Massachusetts. The analysis includes both pre- and post-development calculations of stormwater runoff rates at specific locations on the project site. This analysis has been prepared in accordance with both City of Methuen requirements and Stormwater Management Standards of the Massachusetts Department of Environmental Protection (MassDEP) Massachusetts Stormwater Policy.

The project site consists of four parcels located in the Single Family Residence District (RA) identified as Map 908 Block 78E Lots 67E, 66D, 66B & 53C which total approximately 38 acres. The site is currently undisturbed woodland. The site is bordered by the Washington Street ROW to the west, Hawkes Brook to the north, and Old Ferry Road to the south.

The project proponent is proposing to subdivide the property in accordance with the Methuen Subdivision Rules and Regulations. Individual lots in general range from approximately 37,800 to just over 166,000 square feet in size. A proposed conservation easement totaling 14.86 acres, or 39% of the parcel, will be created to protect the NHESP Priority Habitat. All proposed disturbance will be located outside the 200-foot Riverfront Area associated with Hawkes Brook. No direct wetland impacts are proposed and minimal encroachment into the 100-foot wetland buffer zone will occur.

Access to the new homes will be provided by extending Washington Street approximately 1300 feet to the north, ending in a hammerhead dead end. A second road, Edgewater Drive will be built off Washington Street. The roadways are designed in accordance with City of Methuen Subdivision Regulations although a number of waivers are being requested in order to create a more environmentally sensitive project.

Stormwater management is provided by a closed drainage system consisting of deep sump, hooded catch basins, First Defense stormwater treatment units, and aboveground infiltration basins.

Based on site topography and discharge points, two analysis points are identified for the purposes of this analysis. Design Point #1 is Hawkes Brook. Design Point #2 is the wetlands on the western side of Washington Street.

It should be noted that while the Definitive Subdivision Plans are for the construction of the roadways and utilities only, the stormwater drainage analysis assumes full build-out of each house lot for pipe sizing and pre- vs. post-development peak flow comparisons. Certain assumptions were made regarding house, driveway and yard size and location, which can be seen on the Site Development Overview Plan and the Post-Development Drainage Plan. As noted on the Definitive

Subdivision Plan drawings, the runoff from the roof of each house shall be infiltrated using either dry-wells, leaching trenches or stone-drip strips along the foundation. For the analysis however we did not account for any storage/infiltration of any portion of the roof runoff which yields a more conservative analysis.

The tables below summarizes the comparative pre- and post-development peak rates and volumes of stormwater runoff at the design points.

TABLE 1: PEAK RATE ANALYSIS SUMMARY

Design Storm	Pre-Development (cfs)	Post-Development (cfs)	Change (cfs)
DESIGN POINT #1 – Hawkes Brook			
2-year	8.0	8.0	0.0
10-year	27.2	25.7	-2.5
25-year	49.1	45.3	-3.8
100-year	104.5	104.2	-0.3
DESIGN POINT #2 – Wetlands west side of Washington St.			
2-year	0.9	0.4	0.5
10-year	4.4	2.2	-2.2
25-year	8.4	4.4	-4.0
100-year	18.1	10.3	-7.8

(All values shown are peak rates in CFS)

TABLE 2: VOLUME ANALYSIS SUMMARY

Design Storm	Pre-Development (acre-ft)	Post-Development (acre-ft)	Change (acre-ft)
DESIGN POINT #1 – Hawkes Brook			
2-year	1.70	1.56	-0.14
10-year	4.45	4.09	-0.36
25-year	7.40	6.98	-0.42
100-year	14.95	14.69	-0.26
DESIGN POINT #2 – Wetlands west side of Washington St.			
2-year	0.17	0.07	-0.10
10-year	0.48	0.26	-0.22
25-year	0.82	0.47	-0.35
100-year	1.70	1.03	-0.67

(All values shown are volumes in acre-ft)

In conclusion, by incorporating a new on-site stormwater management system that includes provisions for stormwater treatment and recharge, there will be a decrease in the peak rates and volumes of stormwater runoff leaving the property at the design point during all storms analyzed.

Implementing the maintenance procedures outlined in the attached Inspection and Maintenance Manual (I&M) will ensure the long-term performance of the system.

SECTION 2 EXISTING CONDITIONS

The project site consists of four parcels located in the Single Family Residence District (RA) identified as Map 908 Block 78E Lots 67E, 66D, 66B & 53C which total approximately 38 acres. The site is currently undisturbed woodland. The site is bordered by the Washington Street ROW to the west, Hawkes Brook to the north, and Old Ferry Road to the south.

The site generally slopes from south to north. Site topography is steep, with slopes approaching 25% in spots. Elevations range from 232 along Old Ferry Drive to 116 at the edge of wetlands adjacent to Hawkes Brook.

The NRCS Web Soil Survey identifies on-site soils as Freetown muck (Hydrologic Soil Group B/D), Sutton fine sandy loam (Hydrologic Soil Group B/D), and Canton fine sandy loam (Hydrologic Soil Group A & B). Refer to Appendix C for additional information.

Test pits were performed by Greenman-Pedersen, Inc (GPI) on September 13, 2023. The nine (9) drainage test pits encountered loamy sand throughout with three test pits encountering sand overlain by loamy sand. Estimated seasonal high groundwater table (ESHWT) was encountered at 30-36" below grade for Test Pits 1-3, 16-30" for Test Pits 4-6 and 12-36" for Test Pits 7-9. Test pit logs are included in Appendix D.

Hawkes Brook is a perennial stream and therefore subject to the Rivers Protection Act. Hawkes Brook also has a defined 100-year flood zone.

A portion of the project is located within zone AE, which is a special flood hazard area with a 1% annual flood chance, and in a floodway according to the Federal Emergency Management Agency (FEMA) FIRM panel 25009C0069F effective on July 3, 2012.

SECTION 3 PROPOSED CONDITIONS

The project proponent is proposing to subdivide the property in accordance with the Methuen Subdivision Rules and Regulations. Individual lots in general range from approximately 37,800 to just over 166,000 square feet in size. A proposed conservation easement totaling 14.86 acres, or 39% of the parcel, will be created to protect the NHESP Priority Habitat. All proposed disturbance will be located outside the 200-foot Riverfront Area associated with Hawkes Brook. No direct wetland impacts are proposed and minimal encroachment into the 100-foot wetland buffer zone will occur.

Access to the new homes will be provided by extending Washington Street approximately 1300 feet to the north, ending in a hammerhead dead end. A second road, Edgewater Drive, at a length of 1,570 feet, will be built off Washington Street. The roadways are designed in accordance with City of Methuen Subdivision Regulations although a number of waivers are being requested in order to create a more environmentally sensitive project.

Stormwater management is provided by a closed drainage system consisting of deep sump, hooded catch basins, First Defense stormwater treatment units, and aboveground infiltration basins.

In order to safeguard against oil, gas, debris and suspended solids from passing through the storm drainage systems and into sensitive areas or abutting properties the storm water runoff from the roadway and driveway areas will be collected into deep sump catch basins fitted with oil/gas hoods (see plans for details). Such pretreatment of stormwater reduces both suspended solids and petroleum products in the drainage system and is recommended in the MA Stormwater Handbook. A First Defense unit will provide further treatment of the stormwater through the removal of oil, debris and suspended solids before entering the infiltration basins.

An Operation and Maintenance (O&M) Plan will be implemented to safeguard against future intrusion of contaminants and TSS and ensure proper long-term functioning of drainage components.

To prevent erosion and discharge of sediment during construction, Best Management Practices including erosion control mulch berms, catch basin inlet protection, a stabilized construction exit, mulch and seeding have been incorporated into the construction sequence.

The total area of disturbance related to the proposed site improvements and stormwater management system construction is well over 200,000 square feet, and therefore the project will require an EPA Construction General Permit under the NPDES program.

Stormwater Quality Controls:

1. **Street Sweeping** - to remove sediment prior to entering the drainage system. This would be done on a scheduled basis. TSS Removal Rate = 5%
2. **Catch Basins with Deep Sumps and Hooded Outlets** – to capture, pretreat, and direct stormwater to the proposed treatment devices. TSS Removal Rate = 25%
3. **First Defense hydrodynamic particle separators with and without inlet grates** - to capture, treat, and direct stormwater to the proposed detention systems. TSS Removal Rate = 70%
4. **Above ground Infiltration Basin** – to provide treatment through groundwater recharge. TSS Removal Rate = 80%

Groundwater Recharge:

On-site groundwater recharge of the Required Recharge Volume and the Water Quality Volume is achieved by the proposed above ground infiltration basins. Refer to the calculations in Standard #3.

Stormwater Quantity Controls:

The stormwater management system has been designed to control stormwater runoff from the site during all design storms. Peak flow rates of stormwater runoff are reduced by the above ground infiltration basins.

Stormwater Management Standards:

Standard #1: Untreated Stormwater

Full compliance:

- No new untreated stormwater discharges directly to wetlands or waters of the Commonwealth are proposed.

Standard #2: Post Development Peak Discharge Rates

Full compliance:

- Implementing the stormwater management system will result in no change or a decrease in post-development peak flow rates compared with pre-development rates for all storms analyzed except a de minimis increase of 0.1 cfs for the 2-year design storm at Design Point #2. Refer to Table 1 in Section 1.

Standard #3: Groundwater Recharge

Full Compliance

On-site groundwater recharge is provided through the use of above ground infiltration basins.

In accordance with Massachusetts Stormwater Policy, the required groundwater recharge volume (Rv) is based on a target depth factor (F) over impervious areas. The target depth factors for HSG-A soils is 0.60 inches and HSG-B soils is 0.35 inches. The proposed on-site impervious area = 31,417 sf for A soils and 164,153 sf for B soils.

Required Groundwater Recharge Volume:

$$R_v = F * A_{impervious}$$

$$R_v = 0.60\ inches\left(\frac{1\ in}{12\ ft}\right) * 31{,}417\ sf = \mathbf{1{,}571\ c.f.}$$

$$R_v = 0.35\ inches\left(\frac{1\ in}{12\ ft}\right) * 164{,}153\ sf = \mathbf{4{,}788\ c.f.}$$

Total Recharge Volume = 6,359 cf

The recharge volume provided is the volume within the infiltration basin below the lowest outlet elevation (measured statically). See summary table below.

Groundwater Recharge Volume Provided		
BMP	**Elevation**	**Volume Provided (c.f.)**
Infiltration Basin #1	145.00-146.00	**7,651**
Infiltration Basin #2	144.00-146.00	**12,214**
Infiltration Basin #3	142.00-143.50	**3,780**

Total Annual Recharge Volume Provided = 23,645 c.f.
(See Appendix G for HydroCAD summaries)

Standard #4: TSS Removal

Full Compliance

Water Quality Volume Calculations:

The proposed infiltration practices are designed to store and infiltrate the water quality volume (V_{WQ}) from their contributing paved impervious surfaces. The water quality volume (V_{WQ}) is the volume of impervious surfaces times the water quality depth (D_{WQ}). A water quality depth of 1 inch is used due to the soils having an infiltration rate greater than 2.4 inches per hour.

Above Ground Infiltration Basin #1:

The contributing paved impervious area to the Infiltration Basin is 53,523 sf.

$$V_{WQ} = D_{WQ} * A_{impervious}$$

$$V_{WQ} = 1\ in \left(\frac{1\ in}{12\ ft}\right) * 53{,}523\ sf = \mathbf{4{,}460\ c.f.}$$

The infiltration basin provides storage capacity for a treatment volume of 7,651 cf of runoff and exceeds the required volume of 4,460 cf.

Above Ground Infiltration Basin #2:

The contributing paved impervious area to the Infiltration Basin is 29,098 sf.

$$V_{WQ} = D_{WQ} * A_{impervious}$$

$$V_{WQ} = 1\ in \left(\frac{1\ in}{12\ ft}\right) * 29{,}098\ sf = \mathbf{2{,}425\ c.f.}$$

The infiltration basin provides storage capacity for a treatment volume of 12,214 cf of runoff and exceeds the required volume of 2,425 cf.

Above Ground Infiltration Basin #3:

The contributing paved impervious area to the Infiltration Basin is 19,216 sf.

$$V_{WQ} = D_{WQ} * A_{impervious}$$

$$V_{WQ} = 1\ in \left(\frac{1\ in}{12\ ft}\right) * 19{,}216\ sf = \mathbf{1{,}601\ c.f.}$$

The infiltration basin provides storage capacity for a treatment volume of 3,780 cf of runoff and exceeds the required volume of 1,601 cf.

First Defense Units:

The proposed First Defense units are sized by the manufacturer to provide treatment of the water quality flow rate for each contributing area. The water quality flow rates at DMH-1(FD) DMH-

6(FD), DMH-8(FD) and DMH-10(FD) during a 1-inch water quality storm are 0.1 cfs, 0.0 cfs, 0.1 cfs and 0.2 cfs respectively. The proposed First Defense FD-4HC unit is NJDEP certified to treat runoff up to 1.50 cfs. Refer to the product brochure included in Appendix G.

TSS Removal Rates Summary:

BMP	TSS Removal Rate
Street Sweeping	5%
Deep Sump Catch Basin	25%
First Defense Unit	70%
Above ground Infiltration Basin	80%

Treatment Train 'A'
Beginning Load: 1.00 x Street Sweeping removal rate (0.05) = 0.05
Load Remaining = 1.00 – 0.05 = **0.95**
Remaining Load: 0.95 x Catch Basin w/ deep sump removal rate (0.25) = 0.24
Load Remaining = 0.95 – 0.24 = **0.71**
Remaining Load: 0.71 x First Defense removal rate (0.70) = 0.50
Load Remaining = 0.71 – 0.50 = **0.21**
Remaining Load: 0.21 x Above Ground Infiltration Basin removal rate (0.80) = 0.17
Load Remaining = 0.21 – 0.17 = **0.04**
TSS Removal Rate = (1.00 – 0.04) **= 96%**

Standard #5: Land Uses with Higher Potential Pollutant Loads (LUHPPL)

The site does not contain a land use with high potential pollutant loads (LUHPPL).

Standard #6: Protection of Critical Areas

The site is not within a Zone II, wellhead protection area, or any other critical area.

Standard #7: Redevelopment Projects

The site is not considered a redevelopment project.

As shown in the standards above, the project fully complies with the Stormwater Management Standards.

Standard #8: Erosion and Sediment Control

Full compliance:

- Erosion and sediment controls are incorporated into the project design to prevent erosion. An Erosion & Sediment Control Plan is included in the site plan set.

Standard #9: Operation and Maintenance Plan

Full compliance:

- A long-term Operation and Maintenance Plan meeting the requirements of this standard has been prepared and is included as a separate document.

Standard #10: Illicit Discharges

Full compliance:

- To the best of our knowledge, the site does not contain any illicit discharges. An illicit discharge statement is included in Appendix A.

SECTION 4 STORMWATER MODELING METHODOLOGY

The drainage system for this project was modeled using HydroCAD, a stormwater modeling computer program that analyzes the hydrology, and hydraulics of stormwater runoff. HydroCAD is based largely on the hydrology techniques developed by the Soil Conservation Service (SCS/NRCS), combined with other hydrology and hydraulics calculations. For a given rainfall event, these techniques are used to generate hydrographs throughout a watershed. This provides verification that a given drainage system is adequate for the area under consideration, or to predict where flooding or erosion is likely to occur.

In HydroCAD, each watershed is modeled as a Subcatchment, streams and culverts as a Reach (or Pond, depending on available storage capacity), and large wetlands and other natural or artificial storage areas as a Pond. SCS hydrograph generation and routing procedures were used to model both Pre-development and Post-development runoff conditions.

The Pre-development and Post-development watershed limits and the subcatchment characteristics were determined using both USGS and on-the-ground topographic survey information and through visual, on-site inspection. Conservative estimates were used at all times in estimating the hydrologic characteristics of each watershed or subcatchment.

APPENDIX A

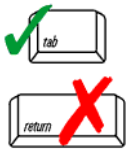
MassDEP Checklist for Stormwater Report

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.

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[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.

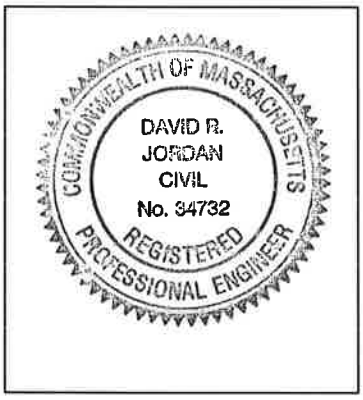
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



3/6/24
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): Above ground infiltration basin

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.

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[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.

March 6, 2024

City of Methuen Community Development Board
41 Pleasant Street
Methuen, MA 01844

Re: Washington Street
Assessors Map 908 Block 78E Lots 67E, 66D, 66B & 53C
Sub: Illicit Discharge Statement
Standard #10

Dear Board Members:

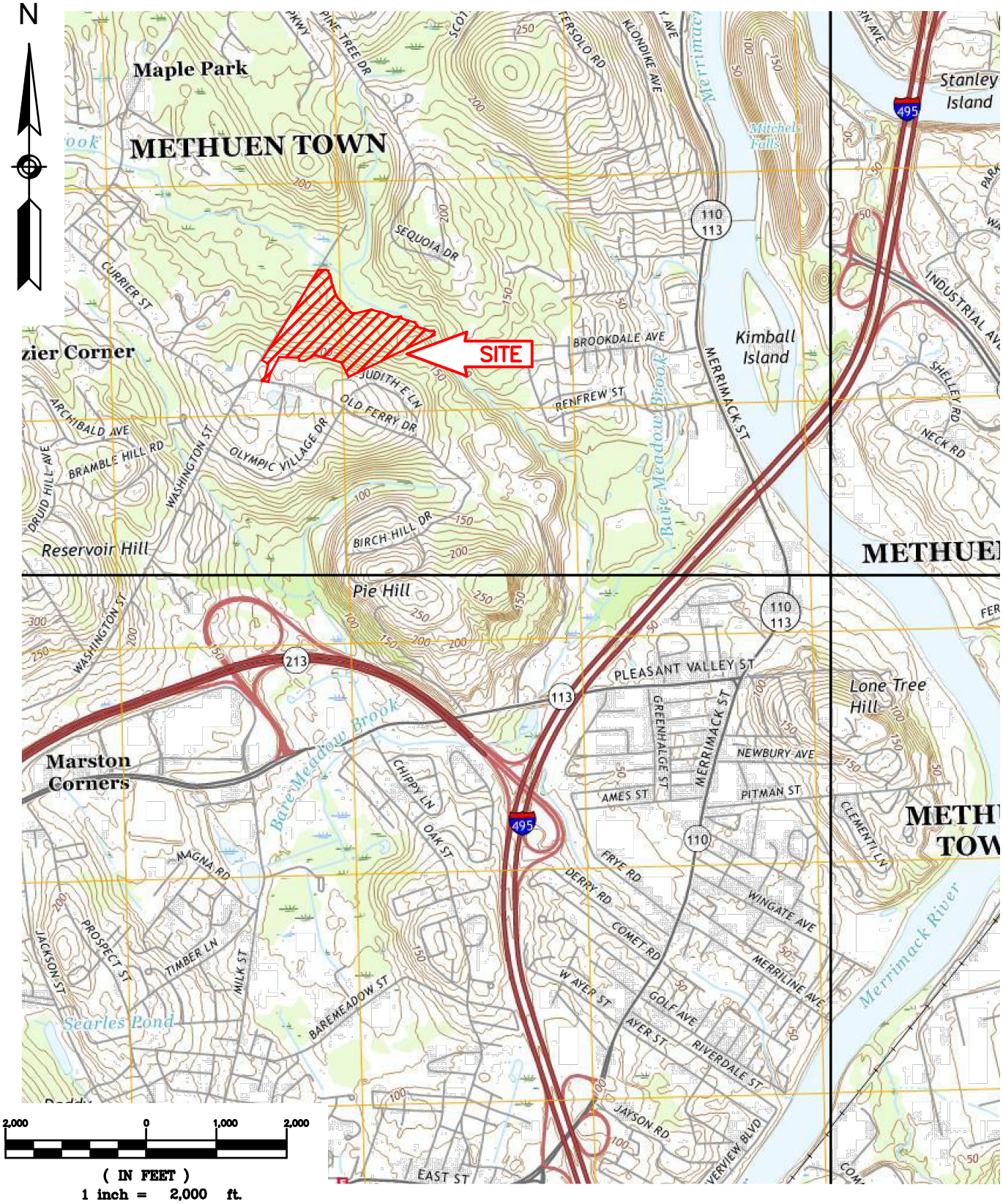
On behalf of our client, DHB Homes, LLC, we hereby state that to the best of our knowledge, no illicit discharges exist on the above referenced site and none are proposed with the subdivision plans. Implementing the pollution prevention plan measures outlined in the subdivision plans will prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. Refer to the Grading & Drainage Plan from the subdivision plan set for additional information.

Sincerely,
Greenman-Pedersen, Inc.

David R. Jordan, P.E., P.L.S., LEED AP
Director of Project Delivery – Land Development

APPENDIX B

USGS Map



F:\Projects\NEX-2200136 - Methuen, MA - DHB Homes\Drainage\Stormwater Report\Appendix B - USGS Map\2200136 - USGS Map.dwg USGS 3/05/24 4:20pm sbonfanti

USGS MAP

DHB HOMES, LLC
WASHINGTON STREET
METHUEN, MA

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

DRAWN BY: CNM
PROJECT #: NEX-2200136
DATE: 3/6/2024
FIGURE 1

APPENDIX C

NRCS Soils Information

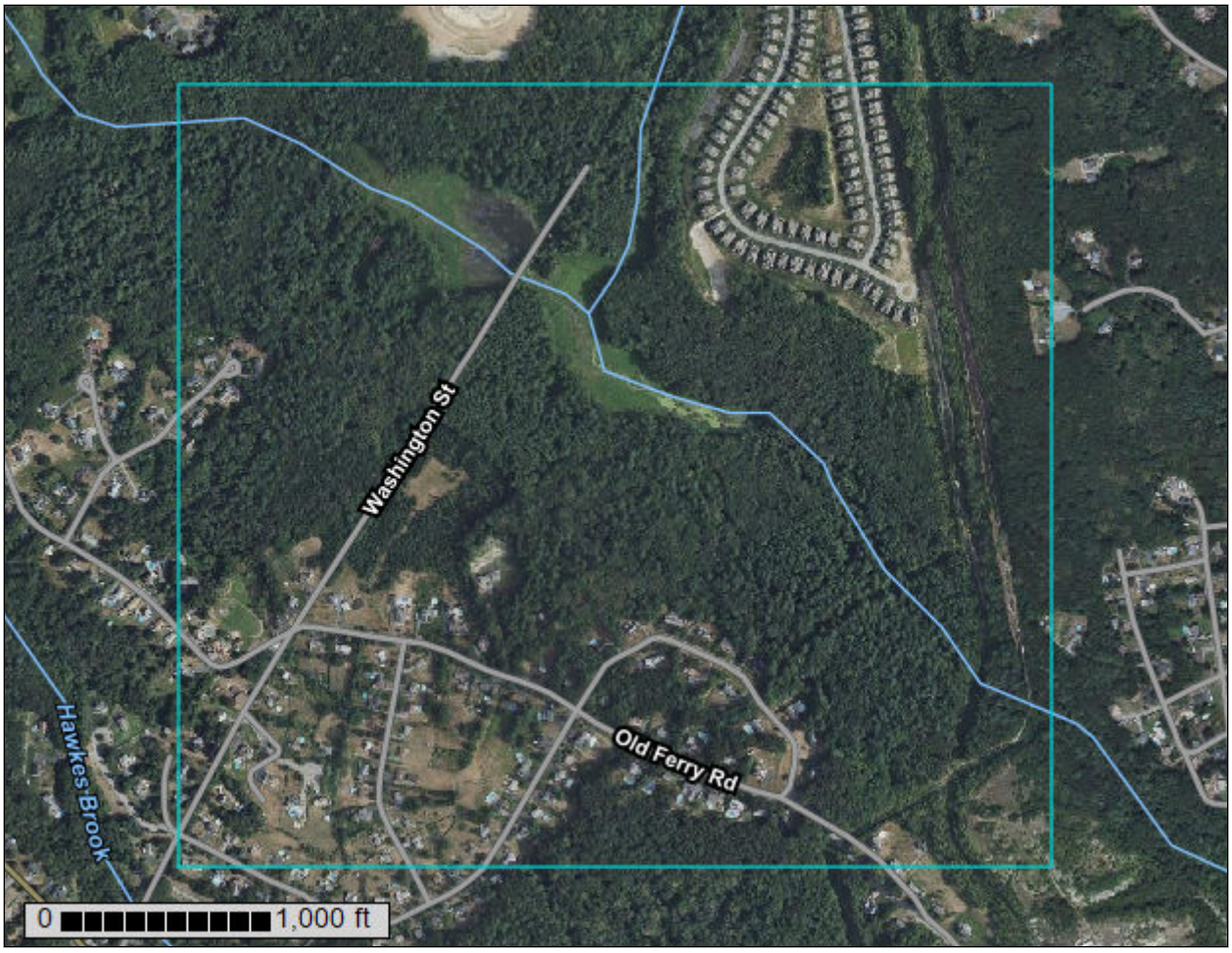
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Essex County, Massachusetts, Northern Part



July 11, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

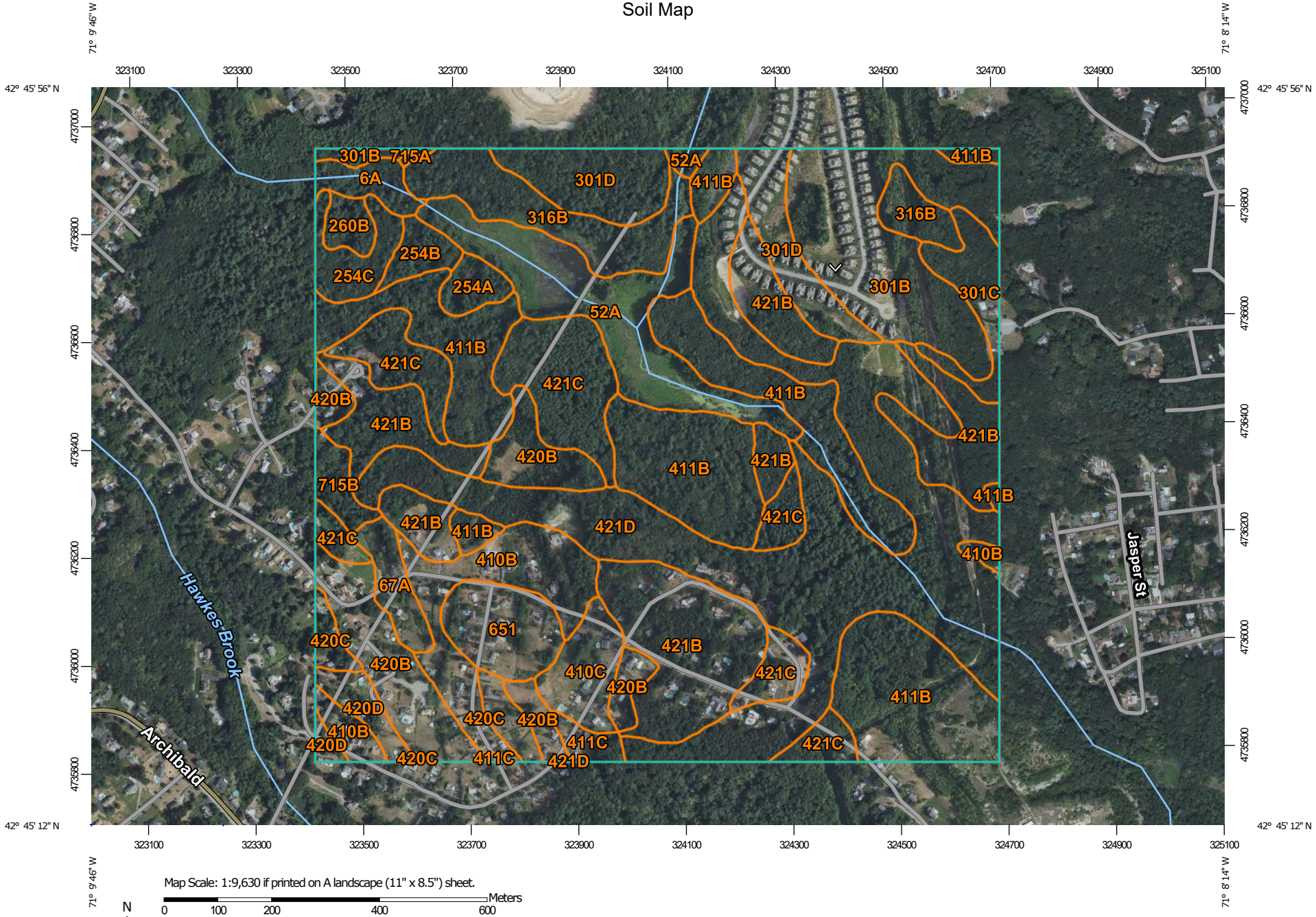
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 17, Sep 2, 2021

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

Date(s) aerial images were photographed: Aug 13, 2020—Sep 15, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	3.2	0.9%
52A	Freetown muck, 0 to 1 percent slopes	20.9	5.8%
67A	Leicester fine sandy loam, 0 to 3 percent slopes	3.9	1.1%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	2.5	0.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	2.7	0.8%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	4.5	1.3%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	2.1	0.6%
301B	Montauk fine sandy loam, 0 to 8 percent slopes, very stony	25.0	7.0%
301C	Montauk fine sandy loam, 8 to 15 percent slopes, very stony	5.9	1.6%
301D	Montauk fine sandy loam, 15 to 35 percent slopes, very stony	15.6	4.4%
316B	Scituate fine sandy loam, 3 to 8 percent slopes, very stony	15.3	4.3%
410B	Sutton fine sandy loam, 3 to 8 percent slopes	16.2	4.5%
410C	Sutton fine sandy loam, 8 to 15 percent slopes	6.0	1.7%
411B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	59.1	16.5%
411C	Sutton fine sandy loam, 8 to 15 percent slopes, very stony	2.0	0.5%
420B	Canton fine sandy loam, 3 to 8 percent slopes	21.2	5.9%
420C	Canton fine sandy loam, 8 to 15 percent slopes	4.1	1.1%
420D	Canton fine sandy loam, 15 to 25 percent slopes	3.7	1.0%
421B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	42.9	12.0%
421C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	25.4	7.1%
421D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	65.7	18.3%
651	Udorthents, smoothed	7.9	2.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
715A	Ridgebury and Leicester fine sandy loams, 0 to 3 percent slopes, extremely stony	0.2	0.1%
715B	Ridgebury and Leicester fine sandy loams, 3 to 8 percent slopes, extremely stony	2.7	0.8%
Totals for Area of Interest		**358.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Essex County, Massachusetts, Northern Part

6A—Scarboro mucky fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svky
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Drainageways, outwash deltas, outwash terraces, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial deposits derived from schist and/or sandy glaciofluvial deposits derived from gneiss and/or sandy glaciofluvial deposits derived from granite

Typical profile

Oe - 0 to 3 inches: mucky peat
A - 3 to 11 inches: mucky fine sandy loam
Cg1 - 11 to 21 inches: sand
Cg2 - 21 to 65 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wareham

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Walpole

Percent of map unit: 5 percent
Landform: Deltas, depressions, outwash terraces, depressions, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

52A—Freetown muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2q9
Elevation: 0 to 1,110 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Freetown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown

Setting

Landform: Depressions, depressions, swamps, kettles, marshes, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Whitman

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 5 percent
Landform: Bogs, swamps, marshes, depressions, depressions, kettles
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

67A—Leicester fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vjh4
Elevation: 30 to 280 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Leicester and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Leicester

Setting

Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over friable coarse-loamy basal till derived from granite and gneiss

Typical profile

O - 0 to 3 inches: muck
H2 - 3 to 8 inches: fine sandy loam
H3 - 8 to 31 inches: fine sandy loam
H4 - 31 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Whitman
Percent of map unit: 8 percent
Landform: Depressions
Hydric soil rating: Yes

Woodbridge
Percent of map unit: 7 percent
Hydric soil rating: No

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2tyqr
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile
Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, crest, side slope, nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Stream terraces, outwash terraces, outwash plains, moraines, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 2 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley
Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury
Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor
Percent of map unit: 3 percent
Landform: Outwash terraces, dunes, deltas, outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam
Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

254C—Merrimac fine sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2tyqt
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, outwash plains, moraines, kames, outwash terraces
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear

Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash plains, dunes, deltas, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

260B—Sudbury fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: vjsn
Elevation: 0 to 2,100 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sudbury and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sudbury

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable loamy eolian deposits over loose sandy glaciofluvial deposits derived from granite and gneiss

Typical profile

O - 0 to 1 inches: muck
H2 - 1 to 5 inches: fine sandy loam
H3 - 5 to 21 inches: sandy loam

H4 - 21 to 27 inches: loamy sand
H5 - 27 to 60 inches: Error

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 15 percent
Hydric soil rating: No

Walpole

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: Yes

301B—Montauk fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w80v
Elevation: 0 to 1,070 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Montauk, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Montauk, Very Stony

Setting

Landform: Recessionial moraines, ground moraines, hills, drumlins

Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: fine sandy loam
Bw1 - 6 to 28 inches: fine sandy loam
Bw2 - 28 to 36 inches: sandy loam
2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Scituate, very stony

Percent of map unit: 6 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Summit, footslope, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 4 percent

Landform: Depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

301C—Montauk fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w80w
Elevation: 0 to 1,120 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Montauk, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Montauk, Very Stony

Setting

Landform: Hills, recessionial moraines, ground moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: fine sandy loam
Bw1 - 6 to 28 inches: fine sandy loam
Bw2 - 28 to 36 inches: sandy loam
2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Scituate, very stony

Percent of map unit: 6 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 4 percent
Landform: Depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

301D—Montauk fine sandy loam, 15 to 35 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w80x
Elevation: 0 to 1,150 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Montauk, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Montauk, Very Stony

Setting

Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: fine sandy loam
Bw1 - 6 to 28 inches: fine sandy loam
Bw2 - 28 to 36 inches: sandy loam
2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Scituate, very stony

Percent of map unit: 6 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton, very stony

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

316B—Scituate fine sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: vjs9
Elevation: 50 to 340 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Scituate and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scituate

Setting

Landform: Drumlins
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 27 inches: fine sandy loam
H3 - 27 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 18 to 30 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Ridgebury

Percent of map unit: 20 percent
Landform: Depressions
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

410B—Sutton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w69j
Elevation: 0 to 1,410 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sutton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton

Setting

Landform: Ridges, ground moraines, hills

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 17 inches: fine sandy loam
Bw2 - 17 to 25 inches: sandy loam
C1 - 25 to 39 inches: gravelly sandy loam
C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 9 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 5 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drainageways, depressions

Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

410C—Sutton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2xffk
Elevation: 10 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sutton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton

Setting

Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 17 inches: fine sandy loam
Bw2 - 17 to 25 inches: sandy loam
C1 - 25 to 39 inches: gravelly sandy loam
C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton

Percent of map unit: 3 percent
Landform: Hills, moraines, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester

Percent of map unit: 2 percent
Landform: Drainageways, depressions, ground moraines, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

411B—Sutton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2xfff
Elevation: 0 to 1,410 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sutton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton, Very Stony

Setting

Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: fine sandy loam
Bw1 - 7 to 19 inches: fine sandy loam
Bw2 - 19 to 27 inches: sandy loam
C1 - 27 to 41 inches: gravelly sandy loam
C2 - 41 to 62 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Charlton, very stony
Percent of map unit: 7 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony
Percent of map unit: 4 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester, very stony
Percent of map unit: 3 percent
Landform: Depressions, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman, very stony
Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

411C—Sutton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2xffl
Elevation: 10 to 350 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Sutton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton, Very Stony

Setting

Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: fine sandy loam
Bw1 - 7 to 19 inches: fine sandy loam
Bw2 - 19 to 27 inches: sandy loam
C1 - 27 to 41 inches: gravelly sandy loam
C2 - 41 to 62 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Charlton, very stony

Percent of map unit: 5 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Canton, very stony

Percent of map unit: 3 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 2 percent
Landform: Depressions, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w81b
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Canton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Hills, moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 10 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk

Percent of map unit: 5 percent
Landform: Moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton

Percent of map unit: 4 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

420C—Canton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w817
Elevation: 0 to 1,330 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Hills, moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Montauk

Percent of map unit: 6 percent
Landform: Moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Scituate

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton

Percent of map unit: 4 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Newfields

Percent of map unit: 4 percent
Landform: Ground moraines, hills, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

420D—Canton fine sandy loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: vj4s

Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable sandy and gravelly basal till derived from granite and gneiss

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 33 inches: fine sandy loam
H3 - 33 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 12 percent
Hydric soil rating: No

Swansea

Percent of map unit: 3 percent
Landform: Bogs
Hydric soil rating: Yes

421B—Canton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81l
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton, very stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate, very stony
Percent of map unit: 9 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Footslope, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, very stony
Percent of map unit: 5 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Gloucester, very stony
Percent of map unit: 4 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Swansea
Percent of map unit: 2 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

421C—Canton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2w814
Elevation: 0 to 1,160 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Montauk, very stony

Percent of map unit: 6 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Scituate, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield, very stony

Percent of map unit: 3 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

421D—Canton fine sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: vj5c
Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable sandy and gravelly basal till derived from granite and gneiss

Typical profile

H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 33 inches: fine sandy loam
H3 - 33 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 10 percent
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Hydric soil rating: No

651—Udorthents, smoothed

Map Unit Setting

National map unit symbol: vjwk
Elevation: 0 to 3,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Excavated and filled land loamy and/or excavated and filled land sandy and gravelly

Typical profile

H1 - 0 to 6 inches: variable
H2 - 6 to 60 inches: variable

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Hydric soil rating: Unranked

Minor Components

Urban land

Percent of map unit: 10 percent
Hydric soil rating: Unranked

Beaches

Percent of map unit: 8 percent
Hydric soil rating: Unranked

Dumps

Percent of map unit: 2 percent
Hydric soil rating: Unranked

715A—Ridgebury and Leicester fine sandy loams, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2xfft
Elevation: 10 to 310 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 50 percent
Leicester, extremely stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Ground moraines, hills, drainageways, depressions, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Depressions, hills, ground moraines, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Sutton, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear

Hydric soil rating: No

715B—Ridgebury and Leicester fine sandy loams, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2xffv
Elevation: 0 to 370 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 50 percent
Leicester, extremely stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Ground moraines, hills, drainageways, depressions, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Depressions, hills, ground moraines, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Sutton, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Linear
Hydric soil rating: No

Woodbridge, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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:

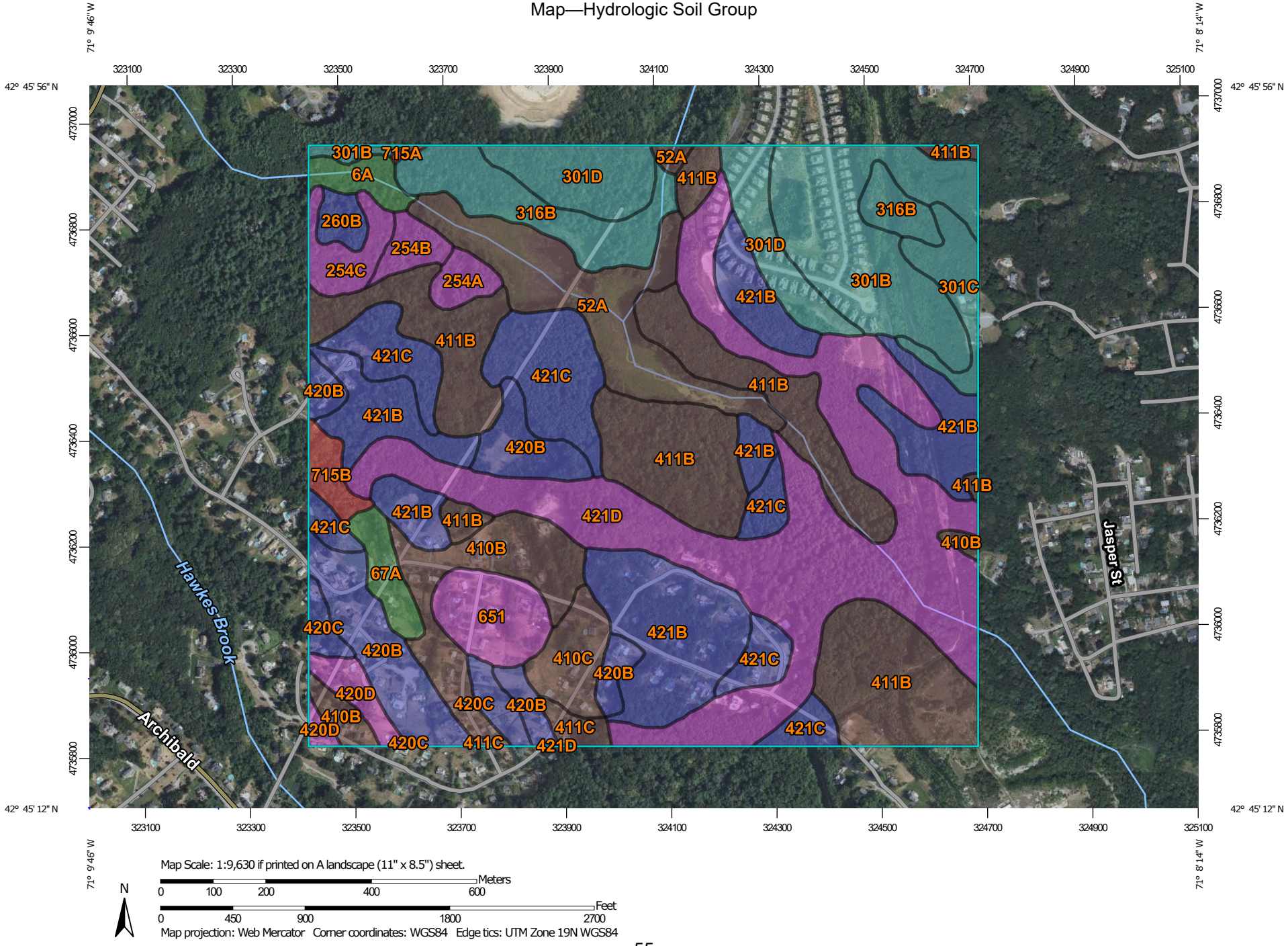
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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.


71° 9' 46" W
71° 8' 14" W
42° 45' 56" N
42° 45' 12" N
323100
323300
323500
323700
323900
324100
324300
324500
324700
324900
325100
4737000
4736800
4736600
4736400
4736200
4736000
4735800
301B
715A
6A
52A
411B
301D
316B
260B
254B
254C
254A
421B
301C
421C
420B
715B
421D
410B
67A
651
420C
410C
420D
Hawkes Brook
Archibald
Jasper St
Map Scale: 1:9,630 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0
100
200
400
600
Feet
0
450
900
1800
2700
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 1:15,800.

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: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 17, Sep 2, 2021

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

Date(s) aerial images were photographed: Aug 13, 2020—Sep 15, 2020

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	3.2	0.9%
52A	Freetown muck, 0 to 1 percent slopes	B/D	20.9	5.8%
67A	Leicester fine sandy loam, 0 to 3 percent slopes	A/D	3.9	1.1%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	A	2.5	0.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	2.7	0.8%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	A	4.5	1.3%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	B	2.1	0.6%
301B	Montauk fine sandy loam, 0 to 8 percent slopes, very stony	C	25.0	7.0%
301C	Montauk fine sandy loam, 8 to 15 percent slopes, very stony	C	5.9	1.6%
301D	Montauk fine sandy loam, 15 to 35 percent slopes, very stony	C	15.6	4.4%
316B	Scituate fine sandy loam, 3 to 8 percent slopes, very stony	C	15.3	4.3%
410B	Sutton fine sandy loam, 3 to 8 percent slopes	B/D	16.2	4.5%
410C	Sutton fine sandy loam, 8 to 15 percent slopes	B/D	6.0	1.7%
411B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	B/D	59.1	16.5%
411C	Sutton fine sandy loam, 8 to 15 percent slopes, very stony	B/D	2.0	0.5%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	21.2	5.9%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	4.1	1.1%
420D	Canton fine sandy loam, 15 to 25 percent slopes	A	3.7	1.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
421B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	B	42.9	12.0%
421C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	B	25.4	7.1%
421D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	A	65.7	18.3%
651	Udorthents, smoothed	A	7.9	2.2%
715A	Ridgebury and Leicester fine sandy loams, 0 to 3 percent slopes, extremely stony	D	0.2	0.1%
715B	Ridgebury and Leicester fine sandy loams, 3 to 8 percent slopes, extremely stony	D	2.7	0.8%
Totals for Area of Interest			**358.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX D

Test Pit Logs

TEST PIT DATA

Client: DHB Homes
Project Address: Washington Street
Town, State: Methuen, MA
Job Number: NEX-2200136
Date: September 13, 2023
Performed by: Diane Pantermoller (SE#1835)

Test Pit No. 1 SCS Soil: Canton Fine Sandy Loam
ESHWT: 30” Standing Water: None
Refusal: >100” Roots: 36”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-14”	A	Loamy Sand	10yr 3/2	FR	
14-24”	B	Loamy Sand	10yr 5/6	FR	
24-100”	C	Loamy Sand	2.5y 6/3	FR	Stones, Cobbles and Boulders

Test Pit No. 2 SCS Soil: Canton Fine Sandy Loam
ESHWT: 36” Standing Water: None
Refusal: >110” Roots: 40”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-13”	A	Loamy Sand	10yr 3/2	FR	
13-29”	B	Loamy Sand	10yr 5/6	FR	
29-110”	C	Loamy Sand	2.5y 6/3	FR	Stones, Cobbles and Boulders

Test Pit No. 3 SCS Soil: Canton Fine Sandy Loam
ESHWT: 36” Standing Water: 112”
Refusal: >114” Roots: 30”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-14”	A	Loamy Sand	10yr 3/2	FR	
14-30”	B	Loamy Sand	10yr 5/6	FR	
30-114”	C	Sand	2.5y 6/3	FR	

Test Pit No. 4 SCS Soil: Sutton Fine Sandy Loam
ESHWT: 30” Standing Water: None
Refusal: >105” Roots: 36”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-7”	A	Loamy Sand	10yr 3/2	FR	
7-26”	B	Loamy Sand	10yr 5/6	FR	
26-105”	C	Sand	2.5y 6/4	FR	

Test Pit No.	**5**	SCS Soil:	Sutton Fine Sandy Loam
ESHWT:	24”	Standing Water:	48”
Refusal:	>112”	Roots:	36”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-8”	A	Loamy Sand	10yr 3/2	FR	
8-36”	B	Loamy Sand	10yr 5/6	FR	
36-112”	C	Sand	2.5y 6/4	FR	

Test Pit No.	**6**	SCS Soil:	Sutton Fine Sandy Loam
ESHWT:	16”	Standing Water:	18”
Refusal:	>114”	Roots:	20”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-11”	A	Sandy Loam	10yr 2/1	FR	
11-26”	B	Sandy Loam	10yr 3/4	FR	
26-114”	C	Loamy Sand	2.5y 8/4	FR	

Test Pit No.	**7**	SCS Soil:	Sutton Fine Sandy Loam
ESHWT:	36”	Standing Water:	48”
Refusal:	>110”	Roots:	36”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-7”	A	Loamy Sand	10yr 3/2	FR	
7-29”	B	Loamy Sand	10yr 5/6	FR	
29-110”	C	Loamy Sand	2.5y 6/4	FR	

Test Pit No.	**8**	SCS Soil:	Sutton Fine Sandy Loam
ESHWT:	20”	Standing Water:	36”
Refusal:	>111”	Roots:	24”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-16”	A	Loamy Sand	10yr 3/2	FR	
16-36”	B	Loamy Sand	10yr 5/6	FR	
36-111”	C	Loamy Sand	2.5y 6/6	FR	

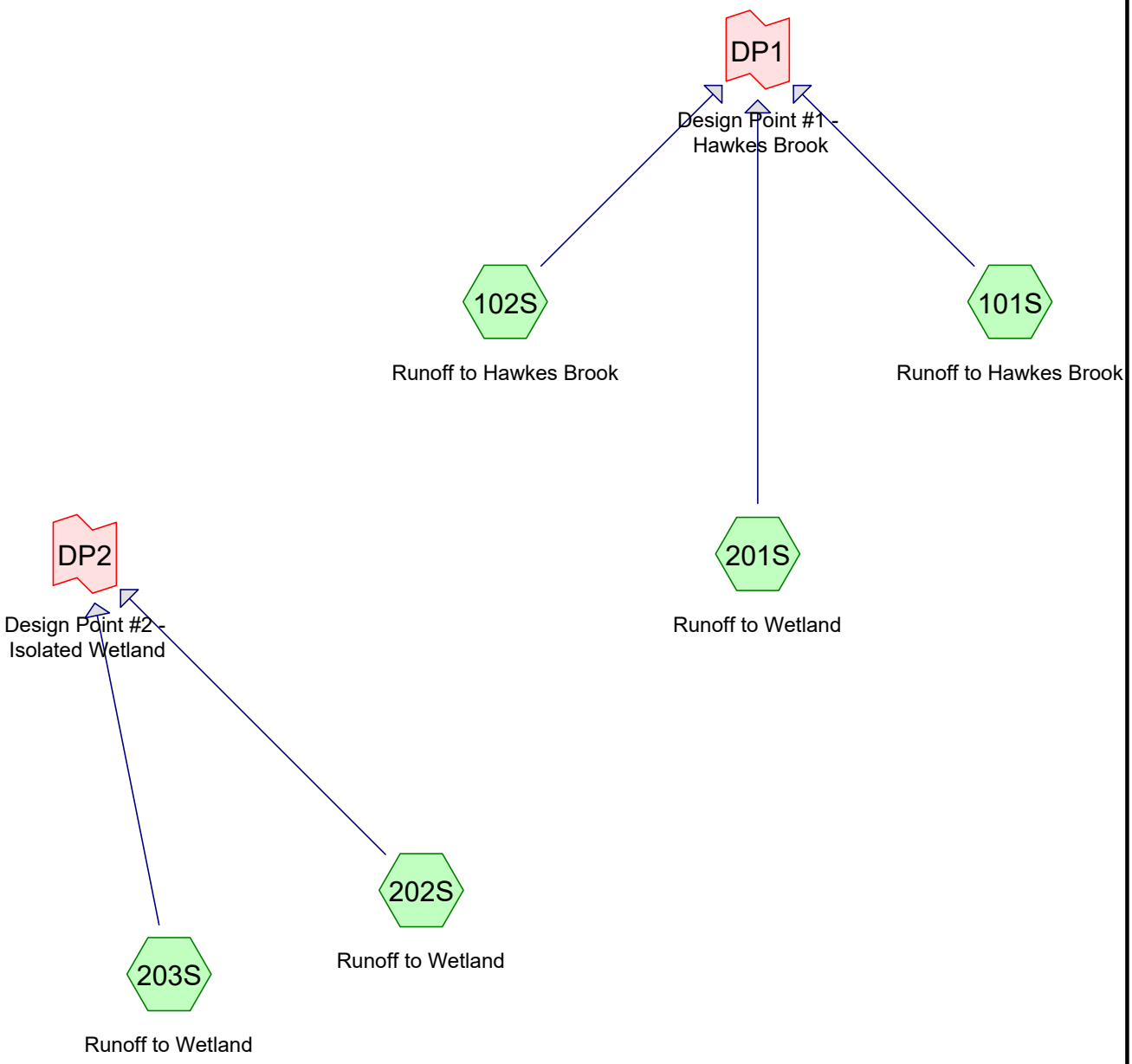
Test Pit No.	**9**	SCS Soil:	Sutton Fine Sandy Loam
ESHWT:	12”	Standing Water:	16”
Refusal:	>116”	Roots:	24”

Depth	Horizon	Soil Texture	Color	Consistence	Layer Description
0-16”	A	Loamy Sand	10yr 3/2	FR	
16-28”	B	Loamy Sand	10yr 5/6	FR	
28-116”	C	Loamy Sand	2.5y 6/3	FR	

NOTES

APPENDIX E

Pre-Development HydroCAD Computations



Subcat Reach Pond Link

Routing Diagram for 2200136_Pre-development
Prepared by Greenman-Pedersen, Inc, Printed 3/5/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.116	39	>75% Grass cover, Good, HSG A (101S, 201S)
6.745	61	>75% Grass cover, Good, HSG B (101S, 201S, 202S, 203S)
0.190	80	>75% Grass cover, Good, HSG D (201S)
0.124	96	Gravel surface, HSG A (101S, 201S, 202S)
0.489	96	Gravel surface, HSG B (101S, 102S, 201S, 202S)
0.487	98	Paved parking, HSG A (101S, 201S)
1.633	98	Paved parking, HSG B (101S, 201S, 202S)
0.153	98	Roofs, HSG A (101S, 201S)
0.856	98	Roofs, HSG B (101S, 201S, 202S, 203S)
13.034	30	Woods, Good, HSG A (101S, 201S, 202S, 203S)
39.144	55	Woods, Good, HSG B (101S, 102S, 201S, 202S, 203S)
64.972	**53**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
15.915	HSG A	101S, 201S, 202S, 203S
48.868	HSG B	101S, 102S, 201S, 202S, 203S
0.000	HSG C	
0.190	HSG D	201S
0.000	Other	
64.972		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.116	6.745	0.000	0.190	0.000	9.051	>75% Grass cover, Good	101S, 201S, 202S, 203S
0.124	0.489	0.000	0.000	0.000	0.613	Gravel surface	101S, 102S, 201S, 202S
0.487	1.633	0.000	0.000	0.000	2.120	Paved parking	101S, 201S, 202S
0.153	0.856	0.000	0.000	0.000	1.009	Roofs	101S, 201S, 202S, 203S
13.034	39.144	0.000	0.000	0.000	52.179	Woods, Good	101S, 102S, 201S, 202S, 203S
15.915	**48.868**	**0.000**	**0.190**	**0.000**	**64.972**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: Runoff to Hawkes Runoff Area=1,820,238 sf 3.51% Impervious Runoff Depth=0.28"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=4.08 cfs 0.979 af

Subcatchment102S: Runoff to Hawkes Runoff Area=59,920 sf 0.00% Impervious Runoff Depth=0.32"
Flow Length=424' Tc=11.0 min CN=WQ Runoff=0.17 cfs 0.037 af

Subcatchment201S: Runoff to Wetland Runoff Area=649,542 sf 10.83% Impervious Runoff Depth=0.55"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=4.22 cfs 0.685 af

Subcatchment202S: Runoff to Wetland Runoff Area=168,904 sf 0.86% Impervious Runoff Depth=0.40"
Flow Length=901' Tc=8.5 min CN=WQ Runoff=0.87 cfs 0.129 af

Subcatchment203S: Runoff to Wetland Runoff Area=131,585 sf 0.42% Impervious Runoff Depth=0.16"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=0.19 cfs 0.040 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=8.01 cfs 1.701 af
Primary=8.01 cfs 1.701 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=0.94 cfs 0.169 af
Primary=0.94 cfs 0.169 af

Total Runoff Area = 64.972 ac Runoff Volume = 1.870 af Average Runoff Depth = 0.35"
95.18% Pervious = 61.843 ac 4.82% Impervious = 3.129 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: Runoff to Hawkes Runoff Area=1,820,238 sf 3.51% Impervious Runoff Depth=0.81"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=16.83 cfs 2.815 af

Subcatchment102S: Runoff to Hawkes Runoff Area=59,920 sf 0.00% Impervious Runoff Depth=0.99"
Flow Length=424' Tc=11.0 min CN=WQ Runoff=1.04 cfs 0.113 af

Subcatchment201S: Runoff to Wetland Runoff Area=649,542 sf 10.83% Impervious Runoff Depth=1.22"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=10.88 cfs 1.520 af

Subcatchment202S: Runoff to Wetland Runoff Area=168,904 sf 0.86% Impervious Runoff Depth=1.06"
Flow Length=901' Tc=8.5 min CN=WQ Runoff=3.57 cfs 0.344 af

Subcatchment203S: Runoff to Wetland Runoff Area=131,585 sf 0.42% Impervious Runoff Depth=0.55"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=1.15 cfs 0.137 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=27.23 cfs 4.448 af
Primary=27.23 cfs 4.448 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=4.44 cfs 0.481 af
Primary=4.44 cfs 0.481 af

Total Runoff Area = 64.972 ac Runoff Volume = 4.929 af Average Runoff Depth = 0.91"
95.18% Pervious = 61.843 ac 4.82% Impervious = 3.129 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: Runoff to Hawkes Runoff Area=1,820,238 sf 3.51% Impervious Runoff Depth=1.39"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=31.77 cfs 4.836 af

Subcatchment102S: Runoff to Hawkes Runoff Area=59,920 sf 0.00% Impervious Runoff Depth=1.71"
Flow Length=424' Tc=11.0 min CN=WQ Runoff=2.06 cfs 0.196 af

Subcatchment201S: Runoff to Wetland Runoff Area=649,542 sf 10.83% Impervious Runoff Depth=1.90"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=17.81 cfs 2.366 af

Subcatchment202S: Runoff to Wetland Runoff Area=168,904 sf 0.86% Impervious Runoff Depth=1.76"
Flow Length=901' Tc=8.5 min CN=WQ Runoff=6.54 cfs 0.570 af

Subcatchment203S: Runoff to Wetland Runoff Area=131,585 sf 0.42% Impervious Runoff Depth=0.99"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=2.32 cfs 0.250 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=49.12 cfs 7.397 af
Primary=49.12 cfs 7.397 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=8.40 cfs 0.820 af
Primary=8.40 cfs 0.820 af

Total Runoff Area = 64.972 ac Runoff Volume = 8.217 af Average Runoff Depth = 1.52"
95.18% Pervious = 61.843 ac 4.82% Impervious = 3.129 ac

Summary for Subcatchment 101S: Runoff to Hawkes Brook

Runoff = 31.77 cfs @ 12.51 hrs, Volume= 4.836 af, Depth= 1.39"
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
64,297	39	>75% Grass cover, Good, HSG A
78,421	61	>75% Grass cover, Good, HSG B
261	96	Gravel surface, HSG A
7,245	96	Gravel surface, HSG B
10,924	98	Paved parking, HSG A
33,782	98	Paved parking, HSG B
6,167	98	Roofs, HSG A
13,058	98	Roofs, HSG B
380,438	30	Woods, Good, HSG A
1,225,644	55	Woods, Good, HSG B
1,820,238		Weighted Average
1,756,306		96.49% Pervious Area
63,931		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0250	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
4.1	193	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.6	991	0.1190	1.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
33.8	1,314	Total			

Summary for Subcatchment 102S: Runoff to Hawkes Brook

Runoff = 2.06 cfs @ 12.17 hrs, Volume= 0.196 af, Depth= 1.71"
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
2,382	96	Gravel surface, HSG B
57,538	55	Woods, Good, HSG B
59,920		Weighted Average
59,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0870	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
4.1	374	0.0910	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.0	424	Total			

Summary for Subcatchment 201S: Runoff to Wetland

Runoff = 17.81 cfs @ 12.38 hrs, Volume= 2.366 af, Depth= 1.90"
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
27,883	39	>75% Grass cover, Good, HSG A
185,646	61	>75% Grass cover, Good, HSG B
8,260	80	>75% Grass cover, Good, HSG D
3,116	96	Gravel surface, HSG A
3,166	96	Gravel surface, HSG B
10,310	98	Paved parking, HSG A
36,377	98	Paved parking, HSG B
484	98	Roofs, HSG A
23,179	98	Roofs, HSG B
118,022	30	Woods, Good, HSG A
233,099	55	Woods, Good, HSG B
649,542		Weighted Average
579,192		89.17% Pervious Area
70,350		10.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0380	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
1.1	72	0.0490	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	77	0.0360	1.33		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.8	244	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	208	0.0340	3.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	498	0.1220	1.75		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	282	0.0320	1.25		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	79	0.0630	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	1,510	Total			

Summary for Subcatchment 202S: Runoff to Wetland

Runoff = 6.54 cfs @ 12.13 hrs, Volume= 0.570 af, Depth= 1.76"
Routed to Link DP2 : Design Point #2 - Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
14,957	61	>75% Grass cover, Good, HSG B
2,026	96	Gravel surface, HSG A
8,521	96	Gravel surface, HSG B
953	98	Paved parking, HSG B
499	98	Roofs, HSG B
13,130	30	Woods, Good, HSG A
128,818	55	Woods, Good, HSG B
168,904		Weighted Average
167,452		99.14% Pervious Area
1,452		0.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.0870	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
1.0	108	0.0690	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	140	0.1110	1.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	482	0.0910	4.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.2	121	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.5	901	Total			

Summary for Subcatchment 203S: Runoff to Wetland

Runoff = 2.32 cfs @ 12.22 hrs, Volume= 0.250 af, Depth= 0.99"
Routed to Link DP2 : Design Point #2 - Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
14,809	61	>75% Grass cover, Good, HSG B
557	98	Roofs, HSG B
56,185	30	Woods, Good, HSG A
60,034	55	Woods, Good, HSG B
131,585		Weighted Average
131,028		99.58% Pervious Area
557		0.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	28	0.0430	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
4.8	22	0.0430	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
0.4	25	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	99	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	592	0.1170	1.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.8	766	Total			

Summary for Link DP1: Design Point #1 - Hawkes Brook

Inflow Area = 58.074 ac, 5.31% Impervious, Inflow Depth = 1.53" for 25-Year event
Inflow = 49.12 cfs @ 12.46 hrs, Volume= 7.397 af
Primary = 49.12 cfs @ 12.46 hrs, Volume= 7.397 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Link DP2: Design Point #2 - Isolated Wetland

Inflow Area = 6.898 ac, 0.67% Impervious, Inflow Depth = 1.43" for 25-Year event
Inflow = 8.40 cfs @ 12.14 hrs, Volume= 0.820 af
Primary = 8.40 cfs @ 12.14 hrs, Volume= 0.820 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: Runoff to Hawkes Runoff Area=1,820,238 sf 3.51% Impervious Runoff Depth=2.90"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=70.12 cfs 10.103 af

Subcatchment102S: Runoff to Hawkes Runoff Area=59,920 sf 0.00% Impervious Runoff Depth=3.49"
Flow Length=424' Tc=11.0 min CN=WQ Runoff=4.58 cfs 0.400 af

Subcatchment201S: Runoff to Wetland Runoff Area=649,542 sf 10.83% Impervious Runoff Depth=3.58"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=34.59 cfs 4.450 af

Subcatchment202S: Runoff to Wetland Runoff Area=168,904 sf 0.86% Impervious Runoff Depth=3.50"
Flow Length=901' Tc=8.5 min CN=WQ Runoff=13.80 cfs 1.132 af

Subcatchment203S: Runoff to Wetland Runoff Area=131,585 sf 0.42% Impervious Runoff Depth=2.25"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=5.27 cfs 0.566 af

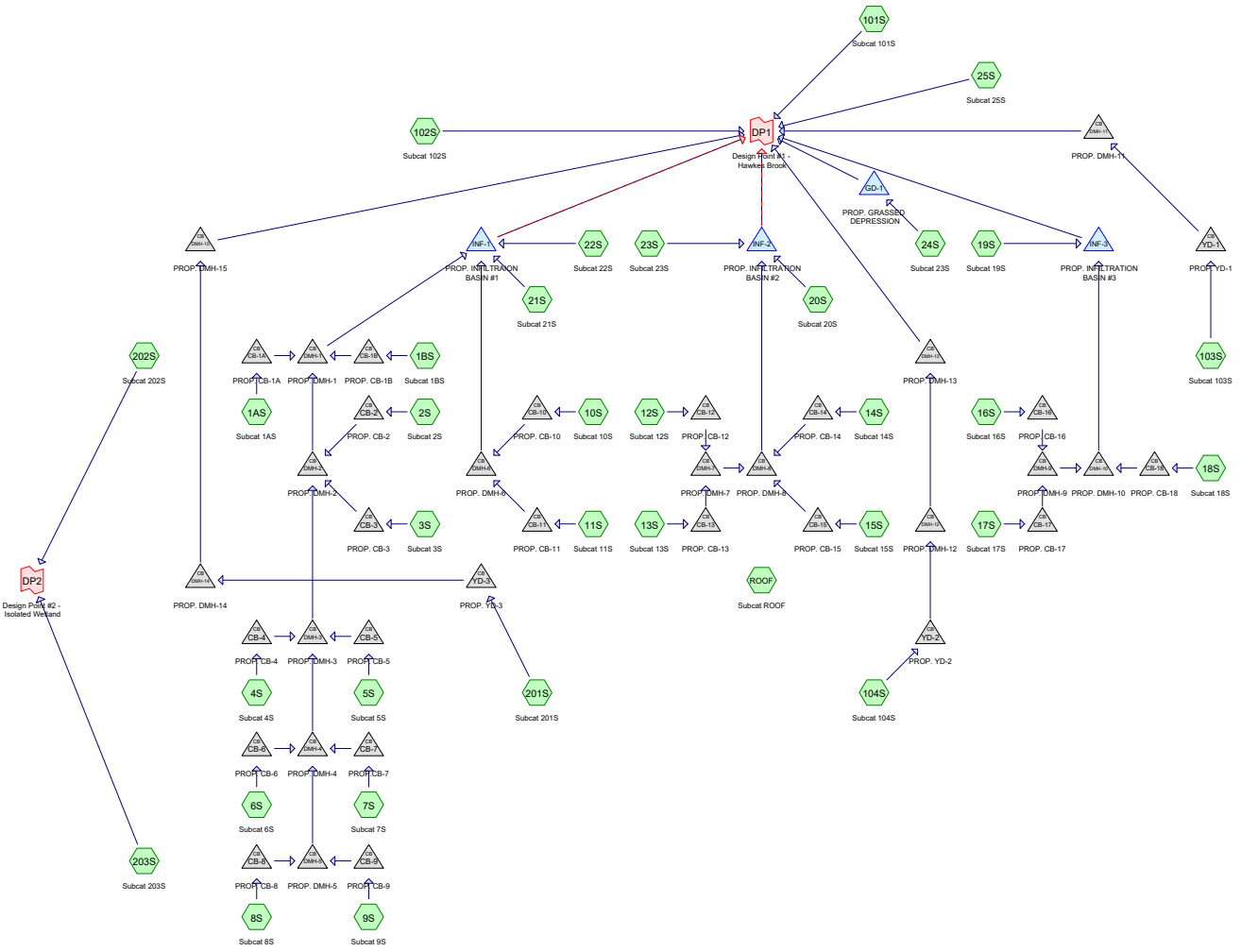
Link DP1: Design Point #1 - Hawkes Brook Inflow=104.48 cfs 14.953 af
Primary=104.48 cfs 14.953 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=18.12 cfs 1.697 af
Primary=18.12 cfs 1.697 af

Total Runoff Area = 64.972 ac Runoff Volume = 16.650 af Average Runoff Depth = 3.08"
95.18% Pervious = 61.843 ac 4.82% Impervious = 3.129 ac

APPENDIX F

Post-Development HydroCAD Computations



Subcat Reach Pond Link

Routing Diagram for 2200136_Post-development
Prepared by Greenman-Pedersen, Inc, Printed 3/5/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.251	39	>75% Grass cover, Good, HSG A (5S, 6S, 7S, 15S, 17S, 101S, 103S, 104S, 201S, 203S)
15.844	61	>75% Grass cover, Good, HSG B (2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S, 101S, 103S, 104S, 201S, 202S, 203S)
0.190	80	>75% Grass cover, Good, HSG D (201S)
0.077	96	Gravel surface, HSG A (101S, 104S, 201S)
0.195	96	Gravel surface, HSG B (101S, 104S, 201S)
0.721	98	Paved parking, HSG A (4S, 5S, 6S, 7S, 15S, 17S, 101S, 103S, 104S, 201S)
3.768	98	Paved parking, HSG B (1AS, 1BS, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 24S, 25S, 101S, 103S, 104S, 201S)
0.438	98	Roofs, HSG A (101S, 201S, ROOF)
2.467	98	Roofs, HSG B (8S, 9S, 101S, 103S, 104S, 201S, 203S, ROOF)
10.428	30	Woods, Good, HSG A (6S, 101S, 103S, 104S, 201S, 203S)
26.593	55	Woods, Good, HSG B (1AS, 2S, 3S, 4S, 6S, 7S, 8S, 9S, 21S, 101S, 102S, 103S, 104S, 201S, 202S, 203S)
64.972	**57**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
15.915	HSG A	4S, 5S, 6S, 7S, 15S, 17S, 101S, 103S, 104S, 201S, 203S, ROOF
48.868	HSG B	1AS, 1BS, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S, 101S, 102S, 103S, 104S, 201S, 202S, 203S, ROOF
0.000	HSG C	
0.190	HSG D	201S
0.000	Other	
64.972		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
4.251	15.844	0.000	0.190	0.000	20.284	>75% Grass cover, Good	2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S, 101S, 103S, 104S, 201S, 202S, 203S
0.077	0.195	0.000	0.000	0.000	0.272	Gravel surface	101S, 104S, 201S
0.721	3.768	0.000	0.000	0.000	4.490	Paved parking	1AS, 1BS, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S,

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.438	2.467	0.000	0.000	0.000	2.905	Roofs	8S, 9S, 101S, 103S, 104S, 201S, 203S, ROOF
10.428	26.593	0.000	0.000	0.000	37.021	Woods, Good	1AS, 2S, 3S, 4S, 6S, 7S, 8S, 9S, 21S, 101S, 102S, 103S, 104S, 201S, 202S, 203S
15.915	**48.868**	**0.000**	**0.190**	**0.000**	**64.972**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	CB-10	154.50	154.30	11.0	0.0182	0.012	0.0	12.0	0.0	
2	CB-11	154.50	154.30	24.0	0.0083	0.012	0.0	12.0	0.0	
3	CB-12	155.00	154.50	10.0	0.0500	0.012	0.0	12.0	0.0	
4	CB-13	155.00	154.50	24.0	0.0208	0.012	0.0	12.0	0.0	
5	CB-14	151.50	151.20	23.0	0.0130	0.012	0.0	12.0	0.0	
6	CB-15	151.50	151.20	33.0	0.0091	0.012	0.0	12.0	0.0	
7	CB-16	154.00	153.80	9.0	0.0222	0.012	0.0	12.0	0.0	
8	CB-17	154.00	153.80	23.0	0.0087	0.012	0.0	12.0	0.0	
9	CB-18	155.00	154.80	15.0	0.0133	0.012	0.0	12.0	0.0	
10	CB-1A	147.30	147.10	13.0	0.0154	0.012	0.0	12.0	0.0	
11	CB-1B	147.30	147.10	13.0	0.0154	0.012	0.0	12.0	0.0	
12	CB-2	149.50	149.20	19.0	0.0158	0.012	0.0	12.0	0.0	
13	CB-3	149.10	148.80	42.0	0.0071	0.012	0.0	12.0	0.0	
14	CB-4	156.30	156.10	14.0	0.0143	0.012	0.0	12.0	0.0	
15	CB-5	156.30	156.10	13.0	0.0154	0.012	0.0	12.0	0.0	
16	CB-6	178.30	178.10	14.0	0.0143	0.012	0.0	12.0	0.0	
17	CB-7	178.30	178.10	14.0	0.0143	0.012	0.0	12.0	0.0	
18	CB-8	206.70	206.10	13.0	0.0462	0.012	0.0	12.0	0.0	
19	CB-9	206.70	206.10	13.0	0.0462	0.012	0.0	12.0	0.0	
20	DMH-1	147.00	145.80	147.0	0.0082	0.012	0.0	18.0	0.0	
21	DMH-10	153.10	146.00	79.0	0.0899	0.012	0.0	12.0	0.0	
22	DMH-11	154.40	145.50	105.0	0.0848	0.012	0.0	18.0	0.0	
23	DMH-12	151.50	146.00	165.0	0.0333	0.012	0.0	18.0	0.0	
24	DMH-13	145.90	144.00	90.0	0.0211	0.012	0.0	18.0	0.0	
25	DMH-14	147.90	146.25	67.0	0.0246	0.012	0.0	24.0	0.0	
26	DMH-15	146.15	144.00	300.0	0.0072	0.012	0.0	24.0	0.0	
27	DMH-2	147.50	147.10	62.0	0.0065	0.012	0.0	18.0	0.0	
28	DMH-3	154.80	147.60	255.0	0.0282	0.012	0.0	12.0	0.0	
29	DMH-4	178.00	154.90	250.0	0.0924	0.012	0.0	12.0	0.0	
30	DMH-5	206.00	178.10	251.0	0.1112	0.012	0.0	12.0	0.0	
31	DMH-6	154.00	149.00	117.0	0.0427	0.012	0.0	12.0	0.0	
32	DMH-7	154.40	151.20	123.0	0.0260	0.012	0.0	12.0	0.0	
33	DMH-8	151.10	145.00	136.0	0.0449	0.012	0.0	18.0	0.0	
34	DMH-9	153.70	153.20	89.0	0.0056	0.012	0.0	12.0	0.0	
35	INF-1	145.00	144.00	36.0	0.0278	0.012	0.0	12.0	0.0	
36	INF-2	144.00	140.00	40.0	0.1000	0.012	0.0	12.0	0.0	
37	YD-1	155.00	154.50	40.0	0.0125	0.012	0.0	18.0	0.0	
38	YD-2	156.50	151.60	96.0	0.0510	0.012	0.0	18.0	0.0	
39	YD-3	148.50	148.00	43.0	0.0116	0.012	0.0	24.0	0.0	

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1AS: Subcat 1AS Runoff Area=4,115 sf 99.92% Impervious Runoff Depth=2.88"
Flow Length=310' Tc=1.7 min CN=WQ Runoff=0.33 cfs 0.023 af

Subcatchment1BS: Subcat 1BS Runoff Area=708 sf 100.00% Impervious Runoff Depth=2.88"
Flow Length=70' Slope=0.0200 '/' Tc=0.6 min CN=98 Runoff=0.06 cfs 0.004 af

Subcatchment2S: Subcat 2S Runoff Area=3,350 sf 78.95% Impervious Runoff Depth=2.36"
Flow Length=170' Tc=3.3 min CN=WQ Runoff=0.21 cfs 0.015 af

Subcatchment3S: Subcat 3S Runoff Area=39,120 sf 19.03% Impervious Runoff Depth=0.86"
Flow Length=250' Tc=2.7 min CN=WQ Runoff=0.76 cfs 0.064 af

Subcatchment4S: Subcat 4S Runoff Area=7,255 sf 55.11% Impervious Runoff Depth=1.77"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=0.35 cfs 0.025 af

Subcatchment5S: Subcat 5S Runoff Area=15,693 sf 26.94% Impervious Runoff Depth=1.04"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=0.42 cfs 0.031 af

Subcatchment6S: Subcat 6S Runoff Area=21,952 sf 23.33% Impervious Runoff Depth=0.74"
Flow Length=250' Tc=0.9 min CN=WQ Runoff=0.43 cfs 0.031 af

Subcatchment7S: Subcat 7S Runoff Area=38,779 sf 16.39% Impervious Runoff Depth=0.65"
Flow Length=480' Tc=4.5 min CN=WQ Runoff=0.57 cfs 0.048 af

Subcatchment8S: Subcat 8S Runoff Area=12,260 sf 27.96% Impervious Runoff Depth=1.02"
Flow Length=250' Tc=2.4 min CN=WQ Runoff=0.29 cfs 0.024 af

Subcatchment9S: Subcat 9S Runoff Area=12,855 sf 33.21% Impervious Runoff Depth=1.20"
Flow Length=300' Slope=0.0700 '/' Tc=3.4 min CN=WQ Runoff=0.36 cfs 0.029 af

Subcatchment10S: Subcat 10S Runoff Area=3,923 sf 69.98% Impervious Runoff Depth=2.14"
Flow Length=190' Tc=3.4 min CN=WQ Runoff=0.22 cfs 0.016 af

Subcatchment11S: Subcat 11S Runoff Area=14,342 sf 36.27% Impervious Runoff Depth=1.30"
Flow Length=235' Tc=2.6 min CN=WQ Runoff=0.47 cfs 0.036 af

Subcatchment12S: Subcat 12S Runoff Area=4,589 sf 72.91% Impervious Runoff Depth=2.21"
Flow Length=180' Tc=3.5 min CN=WQ Runoff=0.26 cfs 0.019 af

Subcatchment13S: Subcat 13S Runoff Area=16,855 sf 35.02% Impervious Runoff Depth=1.27"
Flow Length=200' Tc=2.4 min CN=WQ Runoff=0.54 cfs 0.041 af

Subcatchment14S: Subcat 14S Runoff Area=7,169 sf 66.61% Impervious Runoff Depth=2.05"
Flow Length=185' Tc=3.5 min CN=WQ Runoff=0.38 cfs 0.028 af

Subcatchment15S: Subcat 15S Runoff Area=38,051 sf 28.52% Impervious Runoff Depth=1.05"
Flow Length=280' Tc=3.4 min CN=WQ Runoff=0.96 cfs 0.076 af

Subcatchment16S: Subcat 16S Runoff Area=5,609 sf 80.43% Impervious Runoff Depth=2.39"
Flow Length=235' Tc=0.8 min CN=WQ Runoff=0.38 cfs 0.026 af

Subcatchment17S: Subcat 17S Runoff Area=36,538 sf 27.17% Impervious Runoff Depth=0.95"
Flow Length=280' Tc=3.5 min CN=WQ Runoff=0.85 cfs 0.067 af

Subcatchment18S: Subcat 18S Runoff Area=4,802 sf 58.01% Impervious Runoff Depth=1.84"
Flow Length=50' Slope=0.0200 '/' Tc=3.2 min CN=WQ Runoff=0.23 cfs 0.017 af

Subcatchment19S: Subcat 19S Runoff Area=23,856 sf 8.35% Impervious Runoff Depth=0.61"
Flow Length=140' Slope=0.1400 '/' Tc=2.4 min CN=WQ Runoff=0.31 cfs 0.028 af

Subcatchment20S: Subcat 20S Runoff Area=44,979 sf 9.40% Impervious Runoff Depth=0.64"
Flow Length=140' Slope=0.0800 '/' Tc=3.1 min CN=WQ Runoff=0.60 cfs 0.055 af

Subcatchment21S: Subcat 21S Runoff Area=65,341 sf 4.99% Impervious Runoff Depth=0.51"
Flow Length=230' Slope=0.0500 '/' Tc=4.7 min CN=WQ Runoff=0.59 cfs 0.064 af

Subcatchment22S: Subcat 22S Runoff Area=10,299 sf 0.00% Impervious Runoff Depth=0.41"
Flow Length=142' Tc=3.2 min CN=61 Runoff=0.07 cfs 0.008 af

Subcatchment23S: Subcat 23S Runoff Area=11,706 sf 0.00% Impervious Runoff Depth=0.41"
Flow Length=110' Tc=3.2 min CN=61 Runoff=0.09 cfs 0.009 af

Subcatchment24S: Subcat 23S Runoff Area=14,047 sf 9.72% Impervious Runoff Depth=0.65"
Flow Length=140' Tc=3.4 min CN=WQ Runoff=0.19 cfs 0.017 af

Subcatchment25S: Subcat 25S Runoff Area=11,916 sf 10.09% Impervious Runoff Depth=0.66"
Flow Length=70' Tc=2.0 min CN=WQ Runoff=0.17 cfs 0.015 af

Subcatchment101S: Subcat 101S Runoff Area=1,032,720 sf 5.35% Impervious Runoff Depth=0.36"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=3.27 cfs 0.721 af

Subcatchment102S: Subcat 102S Runoff Area=54,750 sf 0.00% Impervious Runoff Depth=0.22"
Flow Length=424' Tc=11.0 min CN=55 Runoff=0.10 cfs 0.024 af

Subcatchment103S: Subcat 103S Runoff Area=156,437 sf 4.63% Impervious Runoff Depth=0.25"
Flow Length=880' Tc=17.9 min CN=WQ Runoff=0.46 cfs 0.075 af

Subcatchment104S: Subcat 104S Runoff Area=269,613 sf 0.59% Impervious Runoff Depth=0.12"
Flow Length=1,090' Tc=19.8 min CN=WQ Runoff=0.33 cfs 0.063 af

Subcatchment201S: Subcat 201S Runoff Area=573,743 sf 12.29% Impervious Runoff Depth=0.61"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=4.20 cfs 0.664 af

Subcatchment202S: Subcat 202S Runoff Area=74,841 sf 0.00% Impervious Runoff Depth=0.23"
Flow Length=220' Tc=6.5 min CN=WQ Runoff=0.16 cfs 0.033 af

Subcatchment203S: Subcat 203S Runoff Area=115,362 sf 0.48% Impervious Runoff Depth=0.18"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=0.20 cfs 0.040 af

Subcatchment ROOF: Subcat ROOF Runoff Area=82,597 sf 100.00% Impervious Runoff Depth=2.88"
Tc=0.0 min CN=WQ Runoff=6.98 cfs 0.455 af

Pond CB-10: PROP. CB-10 Peak Elev=154.73' Inflow=0.22 cfs 0.016 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0182 '/' Outflow=0.22 cfs 0.016 af

Pond CB-11: PROP. CB-11 Peak Elev=154.87' Inflow=0.47 cfs 0.036 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0083 '/' Outflow=0.47 cfs 0.036 af

Pond CB-12: PROP. CB-12 Peak Elev=155.25' Inflow=0.26 cfs 0.019 af
12.0" Round Culvert n=0.012 L=10.0' S=0.0500 '/' Outflow=0.26 cfs 0.019 af

Pond CB-13: PROP. CB-13 Peak Elev=155.37' Inflow=0.54 cfs 0.041 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0208 '/' Outflow=0.54 cfs 0.041 af

Pond CB-14: PROP. CB-14 Peak Elev=151.90' Inflow=0.38 cfs 0.028 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0130 '/' Outflow=0.38 cfs 0.028 af

Pond CB-15: PROP. CB-15 Peak Elev=152.09' Inflow=0.96 cfs 0.076 af
12.0" Round Culvert n=0.012 L=33.0' S=0.0091 '/' Outflow=0.96 cfs 0.076 af

Pond CB-16: PROP. CB-16 Peak Elev=154.40' Inflow=0.38 cfs 0.026 af
12.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.38 cfs 0.026 af

Pond CB-17: PROP. CB-17 Peak Elev=154.57' Inflow=0.85 cfs 0.067 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0087 '/' Outflow=0.85 cfs 0.067 af

Pond CB-18: PROP. CB-18 Peak Elev=155.23' Inflow=0.23 cfs 0.017 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0133 '/' Outflow=0.23 cfs 0.017 af

Pond CB-1A: PROP. CB-1A Peak Elev=147.92' Inflow=0.33 cfs 0.023 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.33 cfs 0.023 af

Pond CB-1B: PROP. CB-1B Peak Elev=147.90' Inflow=0.06 cfs 0.004 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.06 cfs 0.004 af

Pond CB-2: PROP. CB-2 Peak Elev=149.72' Inflow=0.21 cfs 0.015 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0158 '/' Outflow=0.21 cfs 0.015 af

Pond CB-3: PROP. CB-3 Peak Elev=149.58' Inflow=0.76 cfs 0.064 af
12.0" Round Culvert n=0.012 L=42.0' S=0.0071 '/' Outflow=0.76 cfs 0.064 af

Pond CB-4: PROP. CB-4 Peak Elev=156.59' Inflow=0.35 cfs 0.025 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=0.35 cfs 0.025 af

Pond CB-5: PROP. CB-5 Peak Elev=156.62' Inflow=0.42 cfs 0.031 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.42 cfs 0.031 af

Pond CB-6: PROP. CB-6 Peak Elev=178.75' Inflow=0.43 cfs 0.031 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=0.43 cfs 0.031 af

Pond CB-7: PROP.CB-7 Peak Elev=178.80' Inflow=0.57 cfs 0.048 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=0.57 cfs 0.048 af

Pond CB-8: PROP. CB-8 Peak Elev=206.97' Inflow=0.29 cfs 0.024 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=0.29 cfs 0.024 af

Pond CB-9: PROP. CB-9 Peak Elev=207.00' Inflow=0.36 cfs 0.029 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=0.36 cfs 0.029 af

Pond DMH-1: PROP. DMH-1 Peak Elev=147.90' Inflow=3.58 cfs 0.294 af
18.0" Round Culvert n=0.012 L=147.0' S=0.0082 '/' Outflow=3.58 cfs 0.294 af

Pond DMH-10: PROP. DMH-10 Peak Elev=153.72' Inflow=1.38 cfs 0.109 af
12.0" Round Culvert n=0.012 L=79.0' S=0.0899 '/' Outflow=1.38 cfs 0.109 af

Pond DMH-11: PROP. DMH-11 Peak Elev=154.70' Inflow=0.46 cfs 0.075 af
18.0" Round Culvert n=0.012 L=105.0' S=0.0848 '/' Outflow=0.46 cfs 0.075 af

Pond DMH-12: PROP. DMH-12 Peak Elev=151.75' Inflow=0.33 cfs 0.063 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0333 '/' Outflow=0.33 cfs 0.063 af

Pond DMH-13: PROP. DMH-13 Peak Elev=146.15' Inflow=0.33 cfs 0.063 af
18.0" Round Culvert n=0.012 L=90.0' S=0.0211 '/' Outflow=0.33 cfs 0.063 af

Pond DMH-14: PROP. DMH-14 Peak Elev=148.77' Inflow=4.20 cfs 0.664 af
24.0" Round Culvert n=0.012 L=67.0' S=0.0246 '/' Outflow=4.20 cfs 0.664 af

Pond DMH-15: PROP. DMH-15 Peak Elev=147.02' Inflow=4.20 cfs 0.664 af
24.0" Round Culvert n=0.012 L=300.0' S=0.0072 '/' Outflow=4.20 cfs 0.664 af

Pond DMH-2: PROP. DMH-2 Peak Elev=148.46' Inflow=3.21 cfs 0.268 af
18.0" Round Culvert n=0.012 L=62.0' S=0.0065 '/' Outflow=3.21 cfs 0.268 af

Pond DMH-3: PROP. DMH-3 Peak Elev=155.66' Inflow=2.26 cfs 0.188 af
12.0" Round Culvert n=0.012 L=255.0' S=0.0282 '/' Outflow=2.26 cfs 0.188 af

Pond DMH-4: PROP. DMH-4 Peak Elev=178.67' Inflow=1.55 cfs 0.133 af
12.0" Round Culvert n=0.012 L=250.0' S=0.0924 '/' Outflow=1.55 cfs 0.133 af

Pond DMH-5: PROP. DMH-5 Peak Elev=206.41' Inflow=0.65 cfs 0.053 af
12.0" Round Culvert n=0.012 L=251.0' S=0.1112 '/' Outflow=0.65 cfs 0.053 af

Pond DMH-6: PROP. DMH-6 Peak Elev=154.42' Inflow=0.68 cfs 0.052 af
12.0" Round Culvert n=0.012 L=117.0' S=0.0427 '/' Outflow=0.68 cfs 0.052 af

Pond DMH-7: PROP. DMH-7 Peak Elev=154.85' Inflow=0.79 cfs 0.060 af
12.0" Round Culvert n=0.012 L=123.0' S=0.0260 '/' Outflow=0.79 cfs 0.060 af

Pond DMH-8: PROP. DMH-8 Peak Elev=151.77' Inflow=2.12 cfs 0.165 af
18.0" Round Culvert n=0.012 L=136.0' S=0.0449 '/' Outflow=2.12 cfs 0.165 af

Pond DMH-9: PROP. DMH-9 Peak Elev=154.33' Inflow=1.16 cfs 0.092 af
12.0" Round Culvert n=0.012 L=89.0' S=0.0056 '/' Outflow=1.16 cfs 0.092 af

Pond GD-1: PROP. GRASSED DEPRESSION Peak Elev=145.09' Storage=96 cf Inflow=0.19 cfs 0.017 af
Discarded=0.06 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.017 af

Pond INF-1: PROP. INFILTRAION BASIN #1 Peak Elev=145.77' Storage=5,820 cf Inflow=4.76 cfs 0.418 af
Discarded=0.46 cfs 0.418 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.418 af

Pond INF-2: PROP. INFILTRATION BASIN #2 Peak Elev=144.57' Storage=2,914 cf Inflow=2.79 cfs 0.229 af
Discarded=0.31 cfs 0.229 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.31 cfs 0.229 af

Pond INF-3: PROP. INFILTRATION BASIN #3 Peak Elev=142.89' Storage=2,009 cf Inflow=1.69 cfs 0.137 af
Discarded=0.16 cfs 0.137 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.137 af

Pond YD-1: PROP. YD-1 Peak Elev=155.30' Inflow=0.46 cfs 0.075 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0125 '/' Outflow=0.46 cfs 0.075 af

Pond YD-2: PROP. YD-2 Peak Elev=156.75' Inflow=0.33 cfs 0.063 af
18.0" Round Culvert n=0.012 L=96.0' S=0.0510 '/' Outflow=0.33 cfs 0.063 af

Pond YD-3: PROP. YD-3 Peak Elev=149.42' Inflow=4.20 cfs 0.664 af
24.0" Round Culvert n=0.012 L=43.0' S=0.0116 '/' Outflow=4.20 cfs 0.664 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=8.04 cfs 1.561 af
Primary=8.04 cfs 1.561 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=0.36 cfs 0.074 af
Primary=0.36 cfs 0.074 af

Total Runoff Area = 64.972 ac Runoff Volume = 2.892 af Average Runoff Depth = 0.53"
88.62% Pervious = 57.577 ac 11.38% Impervious = 7.395 ac

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1AS: Subcat 1AS Runoff Area=4,115 sf 99.92% Impervious Runoff Depth=4.50"
Flow Length=310' Tc=1.7 min CN=WQ Runoff=0.51 cfs 0.035 af

Subcatchment1BS: Subcat 1BS Runoff Area=708 sf 100.00% Impervious Runoff Depth=4.50"
Flow Length=70' Slope=0.0200 '/' Tc=0.6 min CN=98 Runoff=0.09 cfs 0.006 af

Subcatchment2S: Subcat 2S Runoff Area=3,350 sf 78.95% Impervious Runoff Depth=3.81"
Flow Length=170' Tc=3.3 min CN=WQ Runoff=0.33 cfs 0.024 af

Subcatchment3S: Subcat 3S Runoff Area=39,120 sf 19.03% Impervious Runoff Depth=1.80"
Flow Length=250' Tc=2.7 min CN=WQ Runoff=1.87 cfs 0.135 af

Subcatchment4S: Subcat 4S Runoff Area=7,255 sf 55.11% Impervious Runoff Depth=3.02"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=0.62 cfs 0.042 af

Subcatchment5S: Subcat 5S Runoff Area=15,693 sf 26.94% Impervious Runoff Depth=2.03"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=0.89 cfs 0.061 af

Subcatchment6S: Subcat 6S Runoff Area=21,952 sf 23.33% Impervious Runoff Depth=1.34"
Flow Length=250' Tc=0.9 min CN=WQ Runoff=0.78 cfs 0.056 af

Subcatchment7S: Subcat 7S Runoff Area=38,779 sf 16.39% Impervious Runoff Depth=1.33"
Flow Length=480' Tc=4.5 min CN=WQ Runoff=1.23 cfs 0.099 af

Subcatchment8S: Subcat 8S Runoff Area=12,260 sf 27.96% Impervious Runoff Depth=1.99"
Flow Length=250' Tc=2.4 min CN=WQ Runoff=0.64 cfs 0.047 af

Subcatchment9S: Subcat 9S Runoff Area=12,855 sf 33.21% Impervious Runoff Depth=2.24"
Flow Length=300' Slope=0.0700 '/' Tc=3.4 min CN=WQ Runoff=0.74 cfs 0.055 af

Subcatchment10S: Subcat 10S Runoff Area=3,923 sf 69.98% Impervious Runoff Depth=3.52"
Flow Length=190' Tc=3.4 min CN=WQ Runoff=0.36 cfs 0.026 af

Subcatchment11S: Subcat 11S Runoff Area=14,342 sf 36.27% Impervious Runoff Depth=2.41"
Flow Length=235' Tc=2.6 min CN=WQ Runoff=0.92 cfs 0.066 af

Subcatchment12S: Subcat 12S Runoff Area=4,589 sf 72.91% Impervious Runoff Depth=3.61"
Flow Length=180' Tc=3.5 min CN=WQ Runoff=0.43 cfs 0.032 af

Subcatchment13S: Subcat 13S Runoff Area=16,855 sf 35.02% Impervious Runoff Depth=2.37"
Flow Length=200' Tc=2.4 min CN=WQ Runoff=1.07 cfs 0.076 af

Subcatchment14S: Subcat 14S Runoff Area=7,169 sf 66.61% Impervious Runoff Depth=3.41"
Flow Length=185' Tc=3.5 min CN=WQ Runoff=0.63 cfs 0.047 af

Subcatchment15S: Subcat 15S Runoff Area=38,051 sf 28.52% Impervious Runoff Depth=1.99"
Flow Length=280' Tc=3.4 min CN=WQ Runoff=1.94 cfs 0.145 af

Subcatchment16S: Subcat 16S Runoff Area=5,609 sf 80.43% Impervious Runoff Depth=3.86"
Flow Length=235' Tc=0.8 min CN=WQ Runoff=0.61 cfs 0.041 af

Subcatchment17S: Subcat 17S Runoff Area=36,538 sf 27.17% Impervious Runoff Depth=1.78"
Flow Length=280' Tc=3.5 min CN=WQ Runoff=1.64 cfs 0.125 af

Subcatchment18S: Subcat 18S Runoff Area=4,802 sf 58.01% Impervious Runoff Depth=3.12"
Flow Length=50' Slope=0.0200 '/' Tc=3.2 min CN=WQ Runoff=0.39 cfs 0.029 af

Subcatchment19S: Subcat 19S Runoff Area=23,856 sf 8.35% Impervious Runoff Depth=1.49"
Flow Length=140' Slope=0.1400 '/' Tc=2.4 min CN=WQ Runoff=0.97 cfs 0.068 af

Subcatchment20S: Subcat 20S Runoff Area=44,979 sf 9.40% Impervious Runoff Depth=1.52"
Flow Length=140' Slope=0.0800 '/' Tc=3.1 min CN=WQ Runoff=1.82 cfs 0.131 af

Subcatchment21S: Subcat 21S Runoff Area=65,341 sf 4.99% Impervious Runoff Depth=1.34"
Flow Length=230' Slope=0.0500 '/' Tc=4.7 min CN=WQ Runoff=2.16 cfs 0.167 af

Subcatchment22S: Subcat 22S Runoff Area=10,299 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=142' Tc=3.2 min CN=61 Runoff=0.33 cfs 0.024 af

Subcatchment23S: Subcat 23S Runoff Area=11,706 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=110' Tc=3.2 min CN=61 Runoff=0.38 cfs 0.027 af

Subcatchment24S: Subcat 23S Runoff Area=14,047 sf 9.72% Impervious Runoff Depth=1.54"
Flow Length=140' Tc=3.4 min CN=WQ Runoff=0.56 cfs 0.041 af

Subcatchment25S: Subcat 25S Runoff Area=11,916 sf 10.09% Impervious Runoff Depth=1.55"
Flow Length=70' Tc=2.0 min CN=WQ Runoff=0.51 cfs 0.035 af

Subcatchment101S: Subcat 101S Runoff Area=1,032,720 sf 5.35% Impervious Runoff Depth=0.98"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=11.78 cfs 1.937 af

Subcatchment102S: Subcat 102S Runoff Area=54,750 sf 0.00% Impervious Runoff Depth=0.85"
Flow Length=424' Tc=11.0 min CN=55 Runoff=0.80 cfs 0.089 af

Subcatchment103S: Subcat 103S Runoff Area=156,437 sf 4.63% Impervious Runoff Depth=0.62"
Flow Length=880' Tc=17.9 min CN=WQ Runoff=1.49 cfs 0.186 af

Subcatchment104S: Subcat 104S Runoff Area=269,613 sf 0.59% Impervious Runoff Depth=0.39"
Flow Length=1,090' Tc=19.8 min CN=WQ Runoff=1.47 cfs 0.200 af

Subcatchment201S: Subcat 201S Runoff Area=573,743 sf 12.29% Impervious Runoff Depth=1.31"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=10.36 cfs 1.439 af

Subcatchment202S: Subcat 202S Runoff Area=74,841 sf 0.00% Impervious Runoff Depth=0.87"
Flow Length=220' Tc=6.5 min CN=WQ Runoff=1.32 cfs 0.124 af

Subcatchment203S: Subcat 203S Runoff Area=115,362 sf 0.48% Impervious Runoff Depth=0.62"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=1.14 cfs 0.137 af

Subcatchment ROOF: Subcat ROOF Runoff Area=82,597 sf 100.00% Impervious Runoff Depth=4.50"
Tc=0.0 min CN=WQ Runoff=10.72 cfs 0.712 af

Pond CB-10: PROP. CB-10 Peak Elev=154.81' Inflow=0.36 cfs 0.026 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0182 '/' Outflow=0.36 cfs 0.026 af

Pond CB-11: PROP. CB-11 Peak Elev=155.04' Inflow=0.92 cfs 0.066 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0083 '/' Outflow=0.92 cfs 0.066 af

Pond CB-12: PROP. CB-12 Peak Elev=155.32' Inflow=0.43 cfs 0.032 af
12.0" Round Culvert n=0.012 L=10.0' S=0.0500 '/' Outflow=0.43 cfs 0.032 af

Pond CB-13: PROP. CB-13 Peak Elev=155.54' Inflow=1.07 cfs 0.076 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0208 '/' Outflow=1.07 cfs 0.076 af

Pond CB-14: PROP. CB-14 Peak Elev=152.16' Inflow=0.63 cfs 0.047 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0130 '/' Outflow=0.63 cfs 0.047 af

Pond CB-15: PROP. CB-15 Peak Elev=152.44' Inflow=1.94 cfs 0.145 af
12.0" Round Culvert n=0.012 L=33.0' S=0.0091 '/' Outflow=1.94 cfs 0.145 af

Pond CB-16: PROP. CB-16 Peak Elev=154.70' Inflow=0.61 cfs 0.041 af
12.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.61 cfs 0.041 af

Pond CB-17: PROP. CB-17 Peak Elev=154.92' Inflow=1.64 cfs 0.125 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0087 '/' Outflow=1.64 cfs 0.125 af

Pond CB-18: PROP. CB-18 Peak Elev=155.32' Inflow=0.39 cfs 0.029 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0133 '/' Outflow=0.39 cfs 0.029 af

Pond CB-1A: PROP. CB-1A Peak Elev=148.50' Inflow=0.51 cfs 0.035 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.51 cfs 0.035 af

Pond CB-1B: PROP. CB-1B Peak Elev=148.48' Inflow=0.09 cfs 0.006 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.09 cfs 0.006 af

Pond CB-2: PROP. CB-2 Peak Elev=149.78' Inflow=0.33 cfs 0.024 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0158 '/' Outflow=0.33 cfs 0.024 af

Pond CB-3: PROP. CB-3 Peak Elev=149.93' Inflow=1.87 cfs 0.135 af
12.0" Round Culvert n=0.012 L=42.0' S=0.0071 '/' Outflow=1.87 cfs 0.135 af

Pond CB-4: PROP. CB-4 Peak Elev=156.85' Inflow=0.62 cfs 0.042 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=0.62 cfs 0.042 af

Pond CB-5: PROP. CB-5 Peak Elev=156.91' Inflow=0.89 cfs 0.061 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.89 cfs 0.061 af

Pond CB-6: PROP. CB-6 Peak Elev=179.24' Inflow=0.78 cfs 0.056 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=0.78 cfs 0.056 af

Pond CB-7: PROP.CB-7 Peak Elev=179.32' Inflow=1.23 cfs 0.099 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=1.23 cfs 0.099 af

Pond CB-8: PROP. CB-8 Peak Elev=207.10' Inflow=0.64 cfs 0.047 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=0.64 cfs 0.047 af

Pond CB-9: PROP. CB-9 Peak Elev=207.14' Inflow=0.74 cfs 0.055 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=0.74 cfs 0.055 af

Pond DMH-1: PROP. DMH-1 Peak Elev=148.48' Inflow=7.31 cfs 0.560 af
18.0" Round Culvert n=0.012 L=147.0' S=0.0082 '/' Outflow=7.31 cfs 0.560 af

Pond DMH-10: PROP. DMH-10 Peak Elev=154.04' Inflow=2.53 cfs 0.195 af
12.0" Round Culvert n=0.012 L=79.0' S=0.0899 '/' Outflow=2.53 cfs 0.195 af

Pond DMH-11: PROP. DMH-11 Peak Elev=154.95' Inflow=1.49 cfs 0.186 af
18.0" Round Culvert n=0.012 L=105.0' S=0.0848 '/' Outflow=1.49 cfs 0.186 af

Pond DMH-12: PROP. DMH-12 Peak Elev=152.05' Inflow=1.47 cfs 0.200 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0333 '/' Outflow=1.47 cfs 0.200 af

Pond DMH-13: PROP. DMH-13 Peak Elev=146.45' Inflow=1.47 cfs 0.200 af
18.0" Round Culvert n=0.012 L=90.0' S=0.0211 '/' Outflow=1.47 cfs 0.200 af

Pond DMH-14: PROP. DMH-14 Peak Elev=149.38' Inflow=10.36 cfs 1.439 af
24.0" Round Culvert n=0.012 L=67.0' S=0.0246 '/' Outflow=10.36 cfs 1.439 af

Pond DMH-15: PROP. DMH-15 Peak Elev=147.63' Inflow=10.36 cfs 1.439 af
24.0" Round Culvert n=0.012 L=300.0' S=0.0072 '/' Outflow=10.36 cfs 1.439 af

Pond DMH-2: PROP. DMH-2 Peak Elev=149.14' Inflow=6.74 cfs 0.519 af
18.0" Round Culvert n=0.012 L=62.0' S=0.0065 '/' Outflow=6.74 cfs 0.519 af

Pond DMH-3: PROP. DMH-3 Peak Elev=156.75' Inflow=4.56 cfs 0.359 af
12.0" Round Culvert n=0.012 L=255.0' S=0.0282 '/' Outflow=4.56 cfs 0.359 af

Pond DMH-4: PROP. DMH-4 Peak Elev=179.21' Inflow=3.20 cfs 0.257 af
12.0" Round Culvert n=0.012 L=250.0' S=0.0924 '/' Outflow=3.20 cfs 0.257 af

Pond DMH-5: PROP. DMH-5 Peak Elev=206.62' Inflow=1.37 cfs 0.102 af
12.0" Round Culvert n=0.012 L=251.0' S=0.1112 '/' Outflow=1.37 cfs 0.102 af

Pond DMH-6: PROP. DMH-6 Peak Elev=154.59' Inflow=1.28 cfs 0.092 af
12.0" Round Culvert n=0.012 L=117.0' S=0.0427 '/' Outflow=1.28 cfs 0.092 af

Pond DMH-7: PROP. DMH-7 Peak Elev=155.05' Inflow=1.50 cfs 0.108 af
12.0" Round Culvert n=0.012 L=123.0' S=0.0260 '/' Outflow=1.50 cfs 0.108 af

Pond DMH-8: PROP. DMH-8 Peak Elev=152.07' Inflow=4.05 cfs 0.299 af
18.0" Round Culvert n=0.012 L=136.0' S=0.0449 '/' Outflow=4.05 cfs 0.299 af

Pond DMH-9: PROP. DMH-9 Peak Elev=154.67' Inflow=2.14 cfs 0.166 af
12.0" Round Culvert n=0.012 L=89.0' S=0.0056 '/' Outflow=2.14 cfs 0.166 af

Pond GD-1: PROP. GRASSED DEPRESSION Peak Elev=145.44' Storage=528 cf Inflow=0.56 cfs 0.041 af
Discarded=0.07 cfs 0.041 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.041 af

Pond INF-1: PROP. INFILTRAION BASIN #1 Peak Elev=146.70' Storage=13,446 cf Inflow=10.80 cfs 0.844 af
Discarded=0.52 cfs 0.668 af Primary=0.63 cfs 0.176 af Secondary=0.00 cfs 0.000 af Outflow=1.15 cfs 0.844 af

Pond INF-2: PROP. INFILTRATION BASIN #2 Peak Elev=145.44' Storage=8,227 cf Inflow=6.24 cfs 0.458 af
Discarded=0.38 cfs 0.458 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.458 af

Pond INF-3: PROP. INFILTRATION BASIN #3 Peak Elev=143.56' Storage=3,971 cf Inflow=3.50 cfs 0.263 af
Discarded=0.21 cfs 0.236 af Primary=0.68 cfs 0.027 af Outflow=0.89 cfs 0.263 af

Pond YD-1: PROP. YD-1 Peak Elev=155.55' Inflow=1.49 cfs 0.186 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0125 '/' Outflow=1.49 cfs 0.186 af

Pond YD-2: PROP. YD-2 Peak Elev=157.05' Inflow=1.47 cfs 0.200 af
18.0" Round Culvert n=0.012 L=96.0' S=0.0510 '/' Outflow=1.47 cfs 0.200 af

Pond YD-3: PROP. YD-3 Peak Elev=150.14' Inflow=10.36 cfs 1.439 af
24.0" Round Culvert n=0.012 L=43.0' S=0.0116 '/' Outflow=10.36 cfs 1.439 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=25.69 cfs 4.089 af
Primary=25.69 cfs 4.089 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=2.15 cfs 0.261 af
Primary=2.15 cfs 0.261 af

Total Runoff Area = 64.972 ac Runoff Volume = 6.464 af Average Runoff Depth = 1.19"
88.62% Pervious = 57.577 ac 11.38% Impervious = 7.395 ac

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1AS: Subcat 1AS Runoff Area=4,115 sf 99.92% Impervious Runoff Depth=5.81"
Flow Length=310' Tc=1.7 min CN=WQ Runoff=0.65 cfs 0.046 af

Subcatchment1BS: Subcat 1BS Runoff Area=708 sf 100.00% Impervious Runoff Depth=5.81"
Flow Length=70' Slope=0.0200 '/' Tc=0.6 min CN=98 Runoff=0.12 cfs 0.008 af

Subcatchment2S: Subcat 2S Runoff Area=3,350 sf 78.95% Impervious Runoff Depth=5.02"
Flow Length=170' Tc=3.3 min CN=WQ Runoff=0.44 cfs 0.032 af

Subcatchment3S: Subcat 3S Runoff Area=39,120 sf 19.03% Impervious Runoff Depth=2.71"
Flow Length=250' Tc=2.7 min CN=WQ Runoff=2.94 cfs 0.203 af

Subcatchment4S: Subcat 4S Runoff Area=7,255 sf 55.11% Impervious Runoff Depth=4.11"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=0.85 cfs 0.057 af

Subcatchment5S: Subcat 5S Runoff Area=15,693 sf 26.94% Impervious Runoff Depth=2.95"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=1.33 cfs 0.088 af

Subcatchment6S: Subcat 6S Runoff Area=21,952 sf 23.33% Impervious Runoff Depth=1.95"
Flow Length=250' Tc=0.9 min CN=WQ Runoff=1.09 cfs 0.082 af

Subcatchment7S: Subcat 7S Runoff Area=38,779 sf 16.39% Impervious Runoff Depth=2.03"
Flow Length=480' Tc=4.5 min CN=WQ Runoff=1.86 cfs 0.150 af

Subcatchment8S: Subcat 8S Runoff Area=12,260 sf 27.96% Impervious Runoff Depth=2.89"
Flow Length=250' Tc=2.4 min CN=WQ Runoff=0.97 cfs 0.068 af

Subcatchment9S: Subcat 9S Runoff Area=12,855 sf 33.21% Impervious Runoff Depth=3.21"
Flow Length=300' Slope=0.0700 '/' Tc=3.4 min CN=WQ Runoff=1.09 cfs 0.079 af

Subcatchment10S: Subcat 10S Runoff Area=3,923 sf 69.98% Impervious Runoff Depth=4.68"
Flow Length=190' Tc=3.4 min CN=WQ Runoff=0.48 cfs 0.035 af

Subcatchment11S: Subcat 11S Runoff Area=14,342 sf 36.27% Impervious Runoff Depth=3.41"
Flow Length=235' Tc=2.6 min CN=WQ Runoff=1.34 cfs 0.093 af

Subcatchment12S: Subcat 12S Runoff Area=4,589 sf 72.91% Impervious Runoff Depth=4.79"
Flow Length=180' Tc=3.5 min CN=WQ Runoff=0.57 cfs 0.042 af

Subcatchment13S: Subcat 13S Runoff Area=16,855 sf 35.02% Impervious Runoff Depth=3.36"
Flow Length=200' Tc=2.4 min CN=WQ Runoff=1.56 cfs 0.108 af

Subcatchment14S: Subcat 14S Runoff Area=7,169 sf 66.61% Impervious Runoff Depth=4.55"
Flow Length=185' Tc=3.5 min CN=WQ Runoff=0.85 cfs 0.062 af

Subcatchment15S: Subcat 15S Runoff Area=38,051 sf 28.52% Impervious Runoff Depth=2.87"
Flow Length=280' Tc=3.4 min CN=WQ Runoff=2.84 cfs 0.209 af

Subcatchment16S: Subcat 16S Runoff Area=5,609 sf 80.43% Impervious Runoff Depth=5.07"
Flow Length=235' Tc=0.8 min CN=WQ Runoff=0.81 cfs 0.054 af

Subcatchment17S: Subcat 17S Runoff Area=36,538 sf 27.17% Impervious Runoff Depth=2.58"
Flow Length=280' Tc=3.5 min CN=WQ Runoff=2.36 cfs 0.181 af

Subcatchment18S: Subcat 18S Runoff Area=4,802 sf 58.01% Impervious Runoff Depth=4.23"
Flow Length=50' Slope=0.0200 '/' Tc=3.2 min CN=WQ Runoff=0.54 cfs 0.039 af

Subcatchment19S: Subcat 19S Runoff Area=23,856 sf 8.35% Impervious Runoff Depth=2.35"
Flow Length=140' Slope=0.1400 '/' Tc=2.4 min CN=WQ Runoff=1.61 cfs 0.107 af

Subcatchment20S: Subcat 20S Runoff Area=44,979 sf 9.40% Impervious Runoff Depth=2.39"
Flow Length=140' Slope=0.0800 '/' Tc=3.1 min CN=WQ Runoff=3.01 cfs 0.206 af

Subcatchment21S: Subcat 21S Runoff Area=65,341 sf 4.99% Impervious Runoff Depth=2.17"
Flow Length=230' Slope=0.0500 '/' Tc=4.7 min CN=WQ Runoff=3.74 cfs 0.271 af

Subcatchment22S: Subcat 22S Runoff Area=10,299 sf 0.00% Impervious Runoff Depth=2.04"
Flow Length=142' Tc=3.2 min CN=61 Runoff=0.60 cfs 0.040 af

Subcatchment23S: Subcat 23S Runoff Area=11,706 sf 0.00% Impervious Runoff Depth=2.04"
Flow Length=110' Tc=3.2 min CN=61 Runoff=0.68 cfs 0.046 af

Subcatchment24S: Subcat 23S Runoff Area=14,047 sf 9.72% Impervious Runoff Depth=2.41"
Flow Length=140' Tc=3.4 min CN=WQ Runoff=0.93 cfs 0.065 af

Subcatchment25S: Subcat 25S Runoff Area=11,916 sf 10.09% Impervious Runoff Depth=2.42"
Flow Length=70' Tc=2.0 min CN=WQ Runoff=0.84 cfs 0.055 af

Subcatchment101S: Subcat 101S Runoff Area=1,032,720 sf 5.35% Impervious Runoff Depth=1.64"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=21.51 cfs 3.235 af

Subcatchment102S: Subcat 102S Runoff Area=54,750 sf 0.00% Impervious Runoff Depth=1.55"
Flow Length=424' Tc=11.0 min CN=55 Runoff=1.70 cfs 0.162 af

Subcatchment103S: Subcat 103S Runoff Area=156,437 sf 4.63% Impervious Runoff Depth=1.05"
Flow Length=880' Tc=17.9 min CN=WQ Runoff=2.62 cfs 0.313 af

Subcatchment104S: Subcat 104S Runoff Area=269,613 sf 0.59% Impervious Runoff Depth=0.73"
Flow Length=1,090' Tc=19.8 min CN=WQ Runoff=2.82 cfs 0.376 af

Subcatchment201S: Subcat 201S Runoff Area=573,743 sf 12.29% Impervious Runoff Depth=2.02"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=16.67 cfs 2.215 af

Subcatchment202S: Subcat 202S Runoff Area=74,841 sf 0.00% Impervious Runoff Depth=1.57"
Flow Length=220' Tc=6.5 min CN=WQ Runoff=2.77 cfs 0.224 af

Subcatchment203S: Subcat 203S Runoff Area=115,362 sf 0.48% Impervious Runoff Depth=1.12"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=2.26 cfs 0.247 af

Subcatchment ROOF: Subcat ROOF Runoff Area=82,597 sf 100.00% Impervious Runoff Depth=5.81"
Tc=0.0 min CN=WQ Runoff=13.72 cfs 0.918 af

Pond CB-10: PROP. CB-10 Peak Elev=154.91' Inflow=0.48 cfs 0.035 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0182 '/' Outflow=0.48 cfs 0.035 af

Pond CB-11: PROP. CB-11 Peak Elev=155.18' Inflow=1.34 cfs 0.093 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0083 '/' Outflow=1.34 cfs 0.093 af

Pond CB-12: PROP. CB-12 Peak Elev=155.43' Inflow=0.57 cfs 0.042 af
12.0" Round Culvert n=0.012 L=10.0' S=0.0500 '/' Outflow=0.57 cfs 0.042 af

Pond CB-13: PROP. CB-13 Peak Elev=155.69' Inflow=1.56 cfs 0.108 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0208 '/' Outflow=1.56 cfs 0.108 af

Pond CB-14: PROP. CB-14 Peak Elev=152.39' Inflow=0.85 cfs 0.062 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0130 '/' Outflow=0.85 cfs 0.062 af

Pond CB-15: PROP. CB-15 Peak Elev=152.88' Inflow=2.84 cfs 0.209 af
12.0" Round Culvert n=0.012 L=33.0' S=0.0091 '/' Outflow=2.84 cfs 0.209 af

Pond CB-16: PROP. CB-16 Peak Elev=155.38' Inflow=0.81 cfs 0.054 af
12.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.81 cfs 0.054 af

Pond CB-17: PROP. CB-17 Peak Elev=155.75' Inflow=2.36 cfs 0.181 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0087 '/' Outflow=2.36 cfs 0.181 af

Pond CB-18: PROP. CB-18 Peak Elev=155.38' Inflow=0.54 cfs 0.039 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0133 '/' Outflow=0.54 cfs 0.039 af

Pond CB-1A: PROP. CB-1A Peak Elev=149.51' Inflow=0.65 cfs 0.046 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.65 cfs 0.046 af

Pond CB-1B: PROP. CB-1B Peak Elev=149.49' Inflow=0.12 cfs 0.008 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.12 cfs 0.008 af

Pond CB-2: PROP. CB-2 Peak Elev=150.89' Inflow=0.44 cfs 0.032 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0158 '/' Outflow=0.44 cfs 0.032 af

Pond CB-3: PROP. CB-3 Peak Elev=151.46' Inflow=2.94 cfs 0.203 af
12.0" Round Culvert n=0.012 L=42.0' S=0.0071 '/' Outflow=2.94 cfs 0.203 af

Pond CB-4: PROP. CB-4 Peak Elev=160.13' Inflow=0.85 cfs 0.057 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=0.85 cfs 0.057 af

Pond CB-5: PROP. CB-5 Peak Elev=160.18' Inflow=1.33 cfs 0.088 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=1.33 cfs 0.088 af

Pond CB-6: PROP. CB-6 Peak Elev=180.13' Inflow=1.09 cfs 0.082 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=1.09 cfs 0.082 af

Pond CB-7: PROP.CB-7 Peak Elev=180.31' Inflow=1.86 cfs 0.150 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=1.86 cfs 0.150 af

Pond CB-8: PROP. CB-8 Peak Elev=207.21' Inflow=0.97 cfs 0.068 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=0.97 cfs 0.068 af

Pond CB-9: PROP. CB-9 Peak Elev=207.24' Inflow=1.09 cfs 0.079 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=1.09 cfs 0.079 af

Pond DMH-1: PROP. DMH-1 Peak Elev=149.49' Inflow=10.78 cfs 0.813 af
18.0" Round Culvert n=0.012 L=147.0' S=0.0082 '/' Outflow=10.78 cfs 0.813 af

Pond DMH-10: PROP. DMH-10 Peak Elev=154.48' Inflow=3.55 cfs 0.274 af
12.0" Round Culvert n=0.012 L=79.0' S=0.0899 '/' Outflow=3.55 cfs 0.274 af

Pond DMH-11: PROP. DMH-11 Peak Elev=155.15' Inflow=2.62 cfs 0.313 af
18.0" Round Culvert n=0.012 L=105.0' S=0.0848 '/' Outflow=2.62 cfs 0.313 af

Pond DMH-12: PROP. DMH-12 Peak Elev=152.28' Inflow=2.82 cfs 0.376 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0333 '/' Outflow=2.82 cfs 0.376 af

Pond DMH-13: PROP. DMH-13 Peak Elev=146.68' Inflow=2.82 cfs 0.376 af
18.0" Round Culvert n=0.012 L=90.0' S=0.0211 '/' Outflow=2.82 cfs 0.376 af

Pond DMH-14: PROP. DMH-14 Peak Elev=150.12' Inflow=16.67 cfs 2.215 af
24.0" Round Culvert n=0.012 L=67.0' S=0.0246 '/' Outflow=16.67 cfs 2.215 af

Pond DMH-15: PROP. DMH-15 Peak Elev=148.37' Inflow=16.67 cfs 2.215 af
24.0" Round Culvert n=0.012 L=300.0' S=0.0072 '/' Outflow=16.67 cfs 2.215 af

Pond DMH-2: PROP. DMH-2 Peak Elev=150.87' Inflow=10.05 cfs 0.759 af
18.0" Round Culvert n=0.012 L=62.0' S=0.0065 '/' Outflow=10.05 cfs 0.759 af

Pond DMH-3: PROP. DMH-3 Peak Elev=160.10' Inflow=6.70 cfs 0.525 af
12.0" Round Culvert n=0.012 L=255.0' S=0.0282 '/' Outflow=6.70 cfs 0.525 af

Pond DMH-4: PROP. DMH-4 Peak Elev=180.07' Inflow=4.74 cfs 0.379 af
12.0" Round Culvert n=0.012 L=250.0' S=0.0924 '/' Outflow=4.74 cfs 0.379 af

Pond DMH-5: PROP. DMH-5 Peak Elev=206.80' Inflow=2.04 cfs 0.147 af
12.0" Round Culvert n=0.012 L=251.0' S=0.1112 '/' Outflow=2.04 cfs 0.147 af

Pond DMH-6: PROP. DMH-6 Peak Elev=154.74' Inflow=1.81 cfs 0.129 af
12.0" Round Culvert n=0.012 L=117.0' S=0.0427 '/' Outflow=1.81 cfs 0.129 af

Pond DMH-7: PROP. DMH-7 Peak Elev=155.22' Inflow=2.12 cfs 0.150 af
12.0" Round Culvert n=0.012 L=123.0' S=0.0260 '/' Outflow=2.12 cfs 0.150 af

Pond DMH-8: PROP. DMH-8 Peak Elev=152.32' Inflow=5.78 cfs 0.422 af
18.0" Round Culvert n=0.012 L=136.0' S=0.0449 '/' Outflow=5.78 cfs 0.422 af

Pond DMH-9: PROP. DMH-9 Peak Elev=155.36' Inflow=3.01 cfs 0.235 af
12.0" Round Culvert n=0.012 L=89.0' S=0.0056 '/' Outflow=3.01 cfs 0.235 af

Pond GD-1: PROP. GRASSED DEPRESSION Peak Elev=145.56' Storage=676 cf Inflow=0.93 cfs 0.065 af
Discarded=0.08 cfs 0.054 af Primary=0.32 cfs 0.011 af Outflow=0.40 cfs 0.065 af

Pond INF-1: PROP. INFILTRAION BASIN #1 Peak Elev=147.59' Storage=21,553 cf Inflow=16.54 cfs 1.252 af
Discarded=0.58 cfs 0.797 af Primary=1.10 cfs 0.456 af Secondary=0.00 cfs 0.000 af Outflow=1.67 cfs 1.252 af

Pond INF-2: PROP. INFILTRATION BASIN Peak Elev=146.09' Storage=12,913 cf Inflow=9.47 cfs 0.673 af
Discarded=0.43 cfs 0.632 af Primary=0.29 cfs 0.041 af Secondary=0.00 cfs 0.000 af Outflow=0.72 cfs 0.673 af

Pond INF-3: PROP. INFILTRATION BASIN #3 Peak Elev=143.65' Storage=4,281 cf Inflow=5.16 cfs 0.381 af
Discarded=0.21 cfs 0.271 af Primary=2.85 cfs 0.110 af Outflow=3.06 cfs 0.381 af

Pond YD-1: PROP. YD-1 Peak Elev=155.77' Inflow=2.62 cfs 0.313 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0125 '/' Outflow=2.62 cfs 0.313 af

Pond YD-2: PROP. YD-2 Peak Elev=157.28' Inflow=2.82 cfs 0.376 af
18.0" Round Culvert n=0.012 L=96.0' S=0.0510 '/' Outflow=2.82 cfs 0.376 af

Pond YD-3: PROP. YD-3 Peak Elev=151.33' Inflow=16.67 cfs 2.215 af
24.0" Round Culvert n=0.012 L=43.0' S=0.0116 '/' Outflow=16.67 cfs 2.215 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=45.29 cfs 6.975 af
Primary=45.29 cfs 6.975 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=4.43 cfs 0.472 af
Primary=4.43 cfs 0.472 af

Total Runoff Area = 64.972 ac Runoff Volume = 10.118 af Average Runoff Depth = 1.87"
88.62% Pervious = 57.577 ac 11.38% Impervious = 7.395 ac

Summary for Subcatchment 1AS: Subcat 1AS

Runoff = 0.65 cfs @ 12.02 hrs, Volume= 0.046 af, Depth= 5.81"
Routed to Pond CB-1A : PROP. CB-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
4,112	98	Paved parking, HSG B
3	55	Woods, Good, HSG B
4,115		Weighted Average
3		0.08% Pervious Area
4,112		99.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
1.4	290	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	310	Total			

Summary for Subcatchment 1BS: Subcat 1BS

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.12 cfs @ 12.01 hrs, Volume= 0.008 af, Depth= 5.81"
Routed to Pond CB-1B : PROP. CB-1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
708	98	Paved parking, HSG B
708		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
0.3	50	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	70	Total			

Summary for Subcatchment 2S: Subcat 2S

Runoff = 0.44 cfs @ 12.05 hrs, Volume= 0.032 af, Depth= 5.02"
Routed to Pond CB-2 : PROP. CB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
705	61	>75% Grass cover, Good, HSG B
2,645	98	Paved parking, HSG B
0	55	Woods, Good, HSG B
3,350		Weighted Average
705		21.05% Pervious Area
2,645		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.6	150	0.0460	4.35		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.3	170	Total			

Summary for Subcatchment 3S: Subcat 3S

Runoff = 2.94 cfs @ 12.04 hrs, Volume= 0.203 af, Depth= 2.71"
Routed to Pond CB-3 : PROP. CB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
27,613	61	>75% Grass cover, Good, HSG B
7,445	98	Paved parking, HSG B
4,061	55	Woods, Good, HSG B
39,120		Weighted Average
31,674		80.97% Pervious Area
7,445		19.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	30	0.1600	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.4	70	0.1600	2.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	150	0.0460	4.35		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	250	Total			

Summary for Subcatchment 4S: Subcat 4S

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.85 cfs @ 12.02 hrs, Volume= 0.057 af, Depth= 4.11"
Routed to Pond CB-4 : PROP. CB-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
3,123	61	>75% Grass cover, Good, HSG B
82	98	Paved parking, HSG A
3,917	98	Paved parking, HSG B
134	55	Woods, Good, HSG B
7,255		Weighted Average
3,257		44.89% Pervious Area
3,998		55.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
0.7	240	0.0900	6.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	260	Total			

Summary for Subcatchment 5S: Subcat 5S

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.33 cfs @ 12.02 hrs, Volume= 0.088 af, Depth= 2.95"
Routed to Pond CB-5 : PROP. CB-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
1,087	39	>75% Grass cover, Good, HSG A
10,379	61	>75% Grass cover, Good, HSG B
134	98	Paved parking, HSG A
4,093	98	Paved parking, HSG B
15,693		Weighted Average
11,466		73.06% Pervious Area
4,227		26.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
0.7	240	0.0900	6.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	260	Total			

Summary for Subcatchment 6S: Subcat 6S

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.09 cfs @ 12.01 hrs, Volume= 0.082 af, Depth= 1.95"
Routed to Pond CB-6 : PROP. CB-6

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
9,258	39	>75% Grass cover, Good, HSG A
1,509	61	>75% Grass cover, Good, HSG B
3,858	98	Paved parking, HSG A
1,264	98	Paved parking, HSG B
2,494	30	Woods, Good, HSG A
3,569	55	Woods, Good, HSG B
21,952		Weighted Average
16,830		76.67% Pervious Area
5,122		23.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
0.6	230	0.1100	6.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	250	Total			

Summary for Subcatchment 7S: Subcat 7S

Runoff = 1.86 cfs @ 12.07 hrs, Volume= 0.150 af, Depth= 2.03"
Routed to Pond CB-7 : PROP.CB-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
15,443	39	>75% Grass cover, Good, HSG A
16,952	61	>75% Grass cover, Good, HSG B
4,961	98	Paved parking, HSG A
1,395	98	Paved parking, HSG B
28	55	Woods, Good, HSG B
38,779		Weighted Average
32,423		83.61% Pervious Area
6,356		16.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	30	0.0880	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
1.8	220	0.0880	2.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	230	0.1100	6.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	480	Total			

Summary for Subcatchment 8S: Subcat 8S

Runoff = 0.97 cfs @ 12.04 hrs, Volume= 0.068 af, Depth= 2.89"
Routed to Pond CB-8 : PROP. CB-8

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
3,825	61	>75% Grass cover, Good, HSG B
3,320	98	Paved parking, HSG B
108	98	Roofs, HSG B
5,007	55	Woods, Good, HSG B
12,260		Weighted Average
8,832		72.04% Pervious Area
3,427		27.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
2.1	230	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	250	Total			

Summary for Subcatchment 9S: Subcat 9S

Runoff = 1.09 cfs @ 12.05 hrs, Volume= 0.079 af, Depth= 3.21"
Routed to Pond CB-9 : PROP. CB-9

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
6,367	61	>75% Grass cover, Good, HSG B
3,878	98	Paved parking, HSG B
391	98	Roofs, HSG B
2,220	55	Woods, Good, HSG B
12,855		Weighted Average
8,587		66.79% Pervious Area
4,269		33.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	30	0.0700	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.4	40	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	230	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	300	Total			

Summary for Subcatchment 10S: Subcat 10S

Runoff = 0.48 cfs @ 12.05 hrs, Volume= 0.035 af, Depth= 4.68"
Routed to Pond CB-10 : PROP. CB-10

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
1,177	61	>75% Grass cover, Good, HSG B
2,745	98	Paved parking, HSG B
3,923		Weighted Average
1,177		30.02% Pervious Area
2,745		69.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.7	170	0.0350	3.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	190	Total			

Summary for Subcatchment 11S: Subcat 11S

Runoff = 1.34 cfs @ 12.04 hrs, Volume= 0.093 af, Depth= 3.41"
Routed to Pond CB-11 : PROP. CB-11

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
9,140	61	>75% Grass cover, Good, HSG B
5,201	98	Paved parking, HSG B
14,342		Weighted Average
9,140		63.73% Pervious Area
5,201		36.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	30	0.1500	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.2	35	0.1500	2.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	170	0.0350	3.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.6	235	Total			

Summary for Subcatchment 12S: Subcat 12S

Runoff = 0.57 cfs @ 12.05 hrs, Volume= 0.042 af, Depth= 4.79"
Routed to Pond CB-12 : PROP. CB-12

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
1,243	61	>75% Grass cover, Good, HSG B
3,346	98	Paved parking, HSG B
4,589		Weighted Average
1,243		27.09% Pervious Area
3,346		72.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.8	160	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	180	Total			

Summary for Subcatchment 13S: Subcat 13S

Runoff = 1.56 cfs @ 12.04 hrs, Volume= 0.108 af, Depth= 3.36"
Routed to Pond CB-13 : PROP. CB-13

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
10,952	61	>75% Grass cover, Good, HSG B
5,903	98	Paved parking, HSG B
16,855		Weighted Average
10,952		64.98% Pervious Area
5,903		35.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	40	0.3000	0.41		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.8	160	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	200	Total			

Summary for Subcatchment 14S: Subcat 14S

Runoff = 0.85 cfs @ 12.05 hrs, Volume= 0.062 af, Depth= 4.55"
Routed to Pond CB-14 : PROP. CB-14

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
2,394	61	>75% Grass cover, Good, HSG B
4,775	98	Paved parking, HSG B
7,169		Weighted Average
2,394		33.39% Pervious Area
4,775		66.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.8	165	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	185	Total			

Summary for Subcatchment 15S: Subcat 15S

Runoff = 2.84 cfs @ 12.05 hrs, Volume= 0.209 af, Depth= 2.87"
Routed to Pond CB-15 : PROP. CB-15

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
5,979	39	>75% Grass cover, Good, HSG A
21,222	61	>75% Grass cover, Good, HSG B
839	98	Paved parking, HSG A
10,012	98	Paved parking, HSG B
38,051		Weighted Average
27,201		71.48% Pervious Area
10,850		28.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	50	0.2200	0.38		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.3	55	0.2200	3.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	175	0.0280	3.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	280	Total			

Summary for Subcatchment 16S: Subcat 16S

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.81 cfs @ 12.01 hrs, Volume= 0.054 af, Depth= 5.07"
Routed to Pond CB-16 : PROP. CB-16

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
1,098	61	>75% Grass cover, Good, HSG B
4,512	98	Paved parking, HSG B
5,609		Weighted Average
1,098		19.57% Pervious Area
4,512		80.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.11"
0.5	215	0.1300	7.32		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	235	Total			

Summary for Subcatchment 17S: Subcat 17S

Runoff = 2.36 cfs @ 12.05 hrs, Volume= 0.181 af, Depth= 2.58"
Routed to Pond CB-17 : PROP. CB-17

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
11,133	39	>75% Grass cover, Good, HSG A
15,479	61	>75% Grass cover, Good, HSG B
310	98	Paved parking, HSG A
9,616	98	Paved parking, HSG B
36,538		Weighted Average
26,612		72.83% Pervious Area
9,926		27.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	50	0.2200	0.38		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.5	90	0.2200	3.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	140	0.0210	2.94		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	280	Total			

Summary for Subcatchment 18S: Subcat 18S

Runoff = 0.54 cfs @ 12.05 hrs, Volume= 0.039 af, Depth= 4.23"
Routed to Pond CB-18 : PROP. CB-18

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
2,016	61	>75% Grass cover, Good, HSG B
2,786	98	Paved parking, HSG B
4,802		Weighted Average
2,016		41.99% Pervious Area
2,786		58.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.5	30	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.2	50	Total			

Summary for Subcatchment 19S: Subcat 19S

Runoff = 1.61 cfs @ 12.04 hrs, Volume= 0.107 af, Depth= 2.35"
Routed to Pond INF-3 : PROP. INFILTRATION BASIN #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
21,865	61	>75% Grass cover, Good, HSG B
1,991	98	Paved parking, HSG B
23,856		Weighted Average
21,865		91.65% Pervious Area
1,991		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	30	0.1400	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.7	110	0.1400	2.62		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	140	Total			

Summary for Subcatchment 20S: Subcat 20S

Runoff = 3.01 cfs @ 12.05 hrs, Volume= 0.206 af, Depth= 2.39"
Routed to Pond INF-2 : PROP. INFILTRATION BASIN #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
40,751	61	>75% Grass cover, Good, HSG B
4,228	98	Paved parking, HSG B
44,979		Weighted Average
40,751		90.60% Pervious Area
4,228		9.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	30	0.0800	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.9	110	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.1	140	Total			

Summary for Subcatchment 21S: Subcat 21S

Runoff = 3.74 cfs @ 12.08 hrs, Volume= 0.271 af, Depth= 2.17"
Routed to Pond INF-1 : PROP. INFILTRAION BASIN #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
54,089	61	>75% Grass cover, Good, HSG B
3,259	98	Paved parking, HSG B
7,993	55	Woods, Good, HSG B
65,341		Weighted Average
62,082		95.01% Pervious Area
3,259		4.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	30	0.0500	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
2.1	200	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	230	Total			

Summary for Subcatchment 22S: Subcat 22S

Runoff = 0.60 cfs @ 12.05 hrs, Volume= 0.040 af, Depth= 2.04"
Routed to Pond INF-1 : PROP. INFILTRAION BASIN #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
10,299	61	>75% Grass cover, Good, HSG B
10,299		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	30	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
1.0	72	0.0270	1.15		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	40	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.2	142	Total			

Summary for Subcatchment 23S: Subcat 23S

Runoff = 0.68 cfs @ 12.05 hrs, Volume= 0.046 af, Depth= 2.04"
Routed to Pond INF-2 : PROP. INFILTRATION BASIN #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
11,706	61	>75% Grass cover, Good, HSG B
11,706		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	30	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
1.2	80	0.0270	1.15		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.2	110	Total			

Summary for Subcatchment 24S: Subcat 23S

Runoff = 0.93 cfs @ 12.06 hrs, Volume= 0.065 af, Depth= 2.41"
Routed to Pond GD-1 : PROP. GRASSED DEPRESSION

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
12,682	61	>75% Grass cover, Good, HSG B
1,365	98	Paved parking, HSG B
14,047		Weighted Average
12,682		90.28% Pervious Area
1,365		9.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	30	0.0500	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.8	110	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.4	140	Total			

Summary for Subcatchment 25S: Subcat 25S

Runoff = 0.84 cfs @ 12.03 hrs, Volume= 0.055 af, Depth= 2.42"
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
10,714	61	>75% Grass cover, Good, HSG B
1,202	98	Paved parking, HSG B
11,916		Weighted Average
10,714		89.91% Pervious Area
1,202		10.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	20	0.0800	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
0.4	50	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	70	Total			

Summary for Subcatchment 101S: Subcat 101S

Runoff = 21.51 cfs @ 12.51 hrs, Volume= 3.235 af, Depth= 1.64"
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
34,820	39	>75% Grass cover, Good, HSG A
119,922	61	>75% Grass cover, Good, HSG B
16	96	Gravel surface, HSG A
4,888	96	Gravel surface, HSG B
10,860	98	Paved parking, HSG A
29,842	98	Paved parking, HSG B
6,167	98	Roofs, HSG A
8,339	98	Roofs, HSG B
124,228	30	Woods, Good, HSG A
693,637	55	Woods, Good, HSG B
1,032,720		Weighted Average
977,512		94.65% Pervious Area
55,209		5.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.9	100	0.0250	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
4.1	193	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.6	991	0.1190	1.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
33.8	1,314	Total			

Summary for Subcatchment 102S: Subcat 102S

Runoff = 1.70 cfs @ 12.17 hrs, Volume= 0.162 af, Depth= 1.55"
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
54,750	55	Woods, Good, HSG B
54,750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0870	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
4.1	374	0.0910	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.0	424	Total			

Summary for Subcatchment 103S: Subcat 103S

Runoff = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af, Depth= 1.05"
Routed to Pond YD-1 : PROP. YD-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
9,487	39	>75% Grass cover, Good, HSG A
17,354	61	>75% Grass cover, Good, HSG B
59	98	Paved parking, HSG A
3,339	98	Paved parking, HSG B
3,844	98	Roofs, HSG B
73,084	30	Woods, Good, HSG A
49,270	55	Woods, Good, HSG B
156,437		Weighted Average
149,195		95.37% Pervious Area
7,243		4.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0380	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
1.3	80	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	390	0.1220	1.75		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	360	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.9	880	Total			

Summary for Subcatchment 104S: Subcat 104S

Runoff = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af, Depth= 0.73"
Routed to Pond YD-2 : PROP. YD-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
46,882	39	>75% Grass cover, Good, HSG A
40,738	61	>75% Grass cover, Good, HSG B
205	96	Gravel surface, HSG A
449	96	Gravel surface, HSG B
6	98	Paved parking, HSG A
712	98	Paved parking, HSG B
874	98	Roofs, HSG B
135,456	30	Woods, Good, HSG A
44,293	55	Woods, Good, HSG B
269,613		Weighted Average
268,022		99.41% Pervious Area
1,591		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1220	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
6.3	660	0.1220	1.75		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	380	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.8	1,090	Total			

Summary for Subcatchment 201S: Subcat 201S

Runoff = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af, Depth= 2.02"
Routed to Pond YD-3 : PROP. YD-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
38,392	39	>75% Grass cover, Good, HSG A
189,796	61	>75% Grass cover, Good, HSG B
8,260	80	>75% Grass cover, Good, HSG D
3,116	96	Gravel surface, HSG A
3,166	96	Gravel surface, HSG B
10,310	98	Paved parking, HSG A
36,540	98	Paved parking, HSG B
484	98	Roofs, HSG A
23,179	98	Roofs, HSG B
85,988	30	Woods, Good, HSG A
174,512	55	Woods, Good, HSG B
573,743		Weighted Average
503,230		87.71% Pervious Area
70,514		12.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0380	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
1.1	72	0.0490	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	77	0.0360	1.33		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.8	244	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	208	0.0340	3.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	498	0.1220	1.75		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	282	0.0320	1.25		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	79	0.0630	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	1,510	Total			

Summary for Subcatchment 202S: Subcat 202S

Runoff = 2.77 cfs @ 12.11 hrs, Volume= 0.224 af, Depth= 1.57"
Routed to Link DP2 : Design Point #2 - Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
3,199	61	>75% Grass cover, Good, HSG B
71,643	55	Woods, Good, HSG B
74,841		Weighted Average
74,841		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0870	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
1.9	190	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	220	Total			

Summary for Subcatchment 203S: Subcat 203S

Runoff = 2.26 cfs @ 12.22 hrs, Volume= 0.247 af, Depth= 1.12"
Routed to Link DP2 : Design Point #2 - Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
12,674	39	>75% Grass cover, Good, HSG A
21,864	61	>75% Grass cover, Good, HSG B
557	98	Roofs, HSG B
32,985	30	Woods, Good, HSG A
47,282	55	Woods, Good, HSG B
115,362		Weighted Average
114,805		99.52% Pervious Area
557		0.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	28	0.0430	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.11"
4.8	22	0.0430	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.11"
0.4	25	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	99	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	592	0.1170	1.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.8	766	Total			

Summary for Subcatchment ROOF: Subcat ROOF

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 13.72 cfs @ 12.00 hrs, Volume= 0.918 af, Depth= 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.05"

Area (sf)	CN	Description
12,443	98	Roofs, HSG A
70,154	98	Roofs, HSG B
82,597		Weighted Average
82,597		100.00% Impervious Area

Summary for Pond CB-10: PROP. CB-10

Inflow Area = 0.090 ac, 69.98% Impervious, Inflow Depth = 4.68" for 25-Year event
Inflow = 0.48 cfs @ 12.05 hrs, Volume= 0.035 af
Outflow = 0.48 cfs @ 12.05 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.05 hrs, Volume= 0.035 af
Routed to Pond DMH-6 : PROP. DMH-6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Peak Elev= 154.91' @ 12.05 hrs
Flood Elev= 158.59'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.50'	**12.0" Round Culvert**
			L= 11.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 154.50' / 154.30' S= 0.0182 '/' Cc= 0.900
			n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.05 hrs HW=154.91' TW=154.73' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.48 cfs @ 2.38 fps)

Summary for Pond CB-11: PROP. CB-11

Inflow Area = 0.329 ac, 36.27% Impervious, Inflow Depth = 3.41" for 25-Year event
Inflow = 1.34 cfs @ 12.04 hrs, Volume= 0.093 af
Outflow = 1.34 cfs @ 12.04 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 12.04 hrs, Volume= 0.093 af
Routed to Pond DMH-6 : PROP. DMH-6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.18' @ 12.04 hrs
Flood Elev= 158.59'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.50'	**12.0" Round Culvert**
			L= 24.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 154.50' / 154.30' S= 0.0083 '/' Cc= 0.900
			n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.34 cfs @ 12.04 hrs HW=155.18' TW=154.74' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 1.34 cfs @ 3.34 fps)

Summary for Pond CB-12: PROP. CB-12

Inflow Area = 0.105 ac, 72.91% Impervious, Inflow Depth = 4.79" for 25-Year event
Inflow = 0.57 cfs @ 12.05 hrs, Volume= 0.042 af
Outflow = 0.57 cfs @ 12.05 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.05 hrs, Volume= 0.042 af
Routed to Pond DMH-7 : PROP. DMH-7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.43' @ 12.05 hrs
Flood Elev= 159.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	155.00'	**12.0" Round Culvert**
			L= 10.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 155.00' / 154.50' S= 0.0500 '/' Cc= 0.900
			n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 12.05 hrs HW=155.43' TW=155.21' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.58 cfs @ 2.68 fps)

Summary for Pond CB-13: PROP. CB-13

Inflow Area = 0.387 ac, 35.02% Impervious, Inflow Depth = 3.36" for 25-Year event
Inflow = 1.56 cfs @ 12.04 hrs, Volume= 0.108 af
Outflow = 1.56 cfs @ 12.04 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.04 hrs, Volume= 0.108 af
Routed to Pond DMH-7 : PROP. DMH-7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.69' @ 12.04 hrs
Flood Elev= 159.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	155.00'	**12.0" Round Culvert** L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 155.00' / 154.50' S= 0.0208 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.54 cfs @ 12.04 hrs HW=155.69' TW=155.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.54 cfs @ 3.77 fps)

Summary for Pond CB-14: PROP. CB-14

Inflow Area = 0.165 ac, 66.61% Impervious, Inflow Depth = 4.55" for 25-Year event
Inflow = 0.85 cfs @ 12.05 hrs, Volume= 0.062 af
Outflow = 0.85 cfs @ 12.05 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.05 hrs, Volume= 0.062 af
Routed to Pond DMH-8 : PROP. DMH-8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 152.39' @ 12.06 hrs
Flood Elev= 155.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	151.50'	**12.0" Round Culvert** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 151.50' / 151.20' S= 0.0130 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.82 cfs @ 12.05 hrs HW=152.39' TW=152.32' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.82 cfs @ 1.49 fps)

Summary for Pond CB-15: PROP. CB-15

Inflow Area = 0.874 ac, 28.52% Impervious, Inflow Depth = 2.87" for 25-Year event
Inflow = 2.84 cfs @ 12.05 hrs, Volume= 0.209 af
Outflow = 2.84 cfs @ 12.05 hrs, Volume= 0.209 af, Atten= 0%, Lag= 0.0 min
Primary = 2.84 cfs @ 12.05 hrs, Volume= 0.209 af
Routed to Pond DMH-8 : PROP. DMH-8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 152.88' @ 12.05 hrs
Flood Elev= 155.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	151.50'	**12.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 151.50' / 151.20' S= 0.0091 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.83 cfs @ 12.05 hrs HW=152.88' TW=152.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.83 cfs @ 3.60 fps)

Summary for Pond CB-16: PROP. CB-16

Inflow Area = 0.129 ac, 80.43% Impervious, Inflow Depth = 5.07" for 25-Year event
Inflow = 0.81 cfs @ 12.01 hrs, Volume= 0.054 af
Outflow = 0.81 cfs @ 12.01 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.01 hrs, Volume= 0.054 af
Routed to Pond DMH-9 : PROP. DMH-9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.38' @ 12.06 hrs
Flood Elev= 158.21'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.00'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.00' / 153.80' S= 0.0222 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.01 hrs HW=154.86' TW=154.93' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB-17: PROP. CB-17

Inflow Area = 0.839 ac, 27.17% Impervious, Inflow Depth = 2.58" for 25-Year event
Inflow = 2.36 cfs @ 12.05 hrs, Volume= 0.181 af
Outflow = 2.36 cfs @ 12.05 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min
Primary = 2.36 cfs @ 12.05 hrs, Volume= 0.181 af
Routed to Pond DMH-9 : PROP. DMH-9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.75' @ 12.06 hrs
Flood Elev= 158.21'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.00'	**12.0" Round Culvert** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.00' / 153.80' S= 0.0087 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.32 cfs @ 12.05 hrs HW=155.73' TW=155.35' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.32 cfs @ 2.96 fps)

Summary for Pond CB-18: PROP. CB-18

Inflow Area = 0.110 ac, 58.01% Impervious, Inflow Depth = 4.23" for 25-Year event
Inflow = 0.54 cfs @ 12.05 hrs, Volume= 0.039 af
Outflow = 0.54 cfs @ 12.05 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.54 cfs @ 12.05 hrs, Volume= 0.039 af
Routed to Pond DMH-10 : PROP. DMH-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.38' @ 12.05 hrs
Flood Elev= 159.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	155.00'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 155.00' / 154.80' S= 0.0133 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.05 hrs HW=155.38' TW=154.48' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.53 cfs @ 2.93 fps)

Summary for Pond CB-1A: PROP. CB-1A

Inflow Area = 0.094 ac, 99.92% Impervious, Inflow Depth = 5.81" for 25-Year event
Inflow = 0.65 cfs @ 12.02 hrs, Volume= 0.046 af
Outflow = 0.65 cfs @ 12.02 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.02 hrs, Volume= 0.046 af
Routed to Pond DMH-1 : PROP. DMH-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 149.51' @ 12.05 hrs
Flood Elev= 152.32'

Device	Routing	Invert	Outlet Devices
#1	Primary	147.30'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 147.30' / 147.10' S= 0.0154 '/' Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.02 hrs HW=149.26' TW=149.40' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB-1B: PROP. CB-1B

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=556)

Inflow Area = 0.016 ac,100.00% Impervious, Inflow Depth = 5.81" for 25-Year event
Inflow = 0.12 cfs @ 12.01 hrs, Volume= 0.008 af
Outflow = 0.12 cfs @ 12.01 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.01 hrs, Volume= 0.008 af
Routed to Pond DMH-1 : PROP. DMH-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 149.49' @ 12.05 hrs
Flood Elev= 152.32'

Device	Routing	Invert	Outlet Devices
#1	Primary	147.30'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 147.30' / 147.10' S= 0.0154 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.01 hrs HW=148.88' TW=149.12' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB-2: PROP. CB-2

Inflow Area = 0.077 ac, 78.95% Impervious, Inflow Depth = 5.02" for 25-Year event
Inflow = 0.44 cfs @ 12.05 hrs, Volume= 0.032 af
Outflow = 0.44 cfs @ 12.05 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.05 hrs, Volume= 0.032 af
Routed to Pond DMH-2 : PROP. DMH-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 150.89' @ 12.05 hrs
Flood Elev= 153.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	149.50'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 149.50' / 149.20' S= 0.0158 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.05 hrs HW=150.84' TW=150.86' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB-3: PROP. CB-3

Inflow Area = 0.898 ac, 19.03% Impervious, Inflow Depth = 2.71" for 25-Year event
Inflow = 2.94 cfs @ 12.04 hrs, Volume= 0.203 af
Outflow = 2.94 cfs @ 12.04 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 12.04 hrs, Volume= 0.203 af
Routed to Pond DMH-2 : PROP. DMH-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 151.46' @ 12.05 hrs
Flood Elev= 153.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	149.10'	**12.0" Round Culvert** L= 42.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 149.10' / 148.80' S= 0.0071 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.70 cfs @ 12.04 hrs HW=151.36' TW=150.86' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.70 cfs @ 3.43 fps)

Summary for Pond CB-4: PROP. CB-4

Inflow Area = 0.167 ac, 55.11% Impervious, Inflow Depth = 4.11" for 25-Year event
Inflow = 0.85 cfs @ 12.02 hrs, Volume= 0.057 af
Outflow = 0.85 cfs @ 12.02 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.02 hrs, Volume= 0.057 af
Routed to Pond DMH-3 : PROP. DMH-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 160.13' @ 12.05 hrs
Flood Elev= 161.39'

Device	Routing	Invert	Outlet Devices
#1	Primary	156.30'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 156.30' / 156.10' S= 0.0143 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.02 hrs HW=157.94' TW=158.65' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB-5: PROP. CB-5

Inflow Area = 0.360 ac, 26.94% Impervious, Inflow Depth = 2.95" for 25-Year event
Inflow = 1.33 cfs @ 12.02 hrs, Volume= 0.088 af
Outflow = 1.33 cfs @ 12.02 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.33 cfs @ 12.02 hrs, Volume= 0.088 af
Routed to Pond DMH-3 : PROP. DMH-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 160.18' @ 12.05 hrs
Flood Elev= 161.39'

Device	Routing	Invert	Outlet Devices
#1	Primary	156.30'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 156.30' / 156.10' S= 0.0154 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.02 hrs HW=158.07' TW=158.80' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB-6: PROP. CB-6

Inflow Area = 0.504 ac, 23.33% Impervious, Inflow Depth = 1.95" for 25-Year event
Inflow = 1.09 cfs @ 12.01 hrs, Volume= 0.082 af
Outflow = 1.09 cfs @ 12.01 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.01 hrs, Volume= 0.082 af
Routed to Pond DMH-4 : PROP. DMH-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 180.13' @ 12.06 hrs
Flood Elev= 183.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.30'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 178.30' / 178.10' S= 0.0143 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.01 hrs HW=179.67' TW=179.76' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB-7: PROP.CB-7

Inflow Area = 0.890 ac, 16.39% Impervious, Inflow Depth = 2.03" for 25-Year event
Inflow = 1.86 cfs @ 12.07 hrs, Volume= 0.150 af
Outflow = 1.86 cfs @ 12.07 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min
Primary = 1.86 cfs @ 12.07 hrs, Volume= 0.150 af
Routed to Pond DMH-4 : PROP. DMH-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 180.31' @ 12.06 hrs
Flood Elev= 183.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.30'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 178.30' / 178.10' S= 0.0143 '/' Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.14 cfs @ 12.07 hrs HW=180.28' TW=179.96' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.14 cfs @ 2.72 fps)

Summary for Pond CB-8: PROP. CB-8

Inflow Area = 0.281 ac, 27.96% Impervious, Inflow Depth = 2.89" for 25-Year event
Inflow = 0.97 cfs @ 12.04 hrs, Volume= 0.068 af
Outflow = 0.97 cfs @ 12.04 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.04 hrs, Volume= 0.068 af
Routed to Pond DMH-5 : PROP. DMH-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 207.21' @ 12.04 hrs
Flood Elev= 210.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	206.70'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 206.70' / 206.10' S= 0.0462 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.97 cfs @ 12.04 hrs HW=207.21' TW=206.79' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.97 cfs @ 2.42 fps)

Summary for Pond CB-9: PROP. CB-9

Inflow Area = 0.295 ac, 33.21% Impervious, Inflow Depth = 3.21" for 25-Year event
Inflow = 1.09 cfs @ 12.05 hrs, Volume= 0.079 af
Outflow = 1.09 cfs @ 12.05 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.05 hrs, Volume= 0.079 af
Routed to Pond DMH-5 : PROP. DMH-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 207.24' @ 12.05 hrs
Flood Elev= 210.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	206.70'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 206.70' / 206.10' S= 0.0462 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.09 cfs @ 12.05 hrs HW=207.24' TW=206.79' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.09 cfs @ 2.51 fps)

Summary for Pond DMH-1: PROP. DMH-1

[80] Warning: Exceeded Pond CB-1A by 0.22' @ 12.01 hrs (1.76 cfs 0.012 af)
[80] Warning: Exceeded Pond CB-1B by 0.43' @ 13.32 hrs (0.68 cfs 0.052 af)

Inflow Area = 3.583 ac, 27.11% Impervious, Inflow Depth = 2.72" for 25-Year event
Inflow = 10.78 cfs @ 12.04 hrs, Volume= 0.813 af
Outflow = 10.78 cfs @ 12.04 hrs, Volume= 0.813 af, Atten= 0%, Lag= 0.0 min
Primary = 10.78 cfs @ 12.04 hrs, Volume= 0.813 af
Routed to Pond INF-1 : PROP. INFILTRAION BASIN #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 149.49' @ 12.04 hrs
Flood Elev= 152.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	147.00'	**18.0" Round Culvert** L= 147.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 147.00' / 145.80' S= 0.0082 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.76 cfs @ 12.04 hrs HW=149.48' TW=146.27' (Dynamic Tailwater)
1=Culvert (Barrel Controls 10.76 cfs @ 6.09 fps)

Summary for Pond DMH-10: PROP. DMH-10

Inflow Area = 1.078 ac, 36.69% Impervious, Inflow Depth = 3.05" for 25-Year event
Inflow = 3.55 cfs @ 12.05 hrs, Volume= 0.274 af
Outflow = 3.55 cfs @ 12.05 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.0 min
Primary = 3.55 cfs @ 12.05 hrs, Volume= 0.274 af
Routed to Pond INF-3 : PROP. INFILTRATION BASIN #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 154.48' @ 12.05 hrs
Flood Elev= 159.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	153.10'	**12.0" Round Culvert** L= 79.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 153.10' / 146.00' S= 0.0899 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.54 cfs @ 12.05 hrs HW=154.48' TW=143.41' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.54 cfs @ 4.51 fps)

Summary for Pond DMH-11: PROP. DMH-11

Inflow Area = 3.591 ac, 4.63% Impervious, Inflow Depth = 1.05" for 25-Year event
Inflow = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af
Outflow = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min
Primary = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.15' @ 12.27 hrs
Flood Elev= 159.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.40'	**18.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.40' / 145.50' S= 0.0848 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.62 cfs @ 12.27 hrs HW=155.15' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.62 cfs @ 2.95 fps)

Summary for Pond DMH-12: PROP. DMH-12

Inflow Area = 6.189 ac, 0.59% Impervious, Inflow Depth = 0.73" for 25-Year event
Inflow = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af
Outflow = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min
Primary = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af
Routed to Pond DMH-13 : PROP. DMH-13

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 152.28' @ 12.30 hrs
Flood Elev= 161.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	151.50'	**18.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 151.50' / 146.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.82 cfs @ 12.30 hrs HW=152.28' TW=146.68' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.82 cfs @ 3.02 fps)

Summary for Pond DMH-13: PROP. DMH-13

Inflow Area = 6.189 ac, 0.59% Impervious, Inflow Depth = 0.73" for 25-Year event
Inflow = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af
Outflow = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min
Primary = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 146.68' @ 12.30 hrs
Flood Elev= 151.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	145.90'	**18.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 145.90' / 144.00' S= 0.0211 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.82 cfs @ 12.30 hrs HW=146.68' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.82 cfs @ 3.02 fps)

Summary for Pond DMH-14: PROP. DMH-14

Inflow Area = 13.171 ac, 12.29% Impervious, Inflow Depth = 2.02" for 25-Year event
Inflow = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af
Outflow = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af, Atten= 0%, Lag= 0.0 min
Primary = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af
Routed to Pond DMH-15 : PROP. DMH-15

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 150.12' @ 12.38 hrs
Flood Elev= 154.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	147.90'	**24.0" Round Culvert** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 147.90' / 146.25' S= 0.0246 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.67 cfs @ 12.38 hrs HW=150.11' TW=148.36' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 16.67 cfs @ 5.31 fps)

Summary for Pond DMH-15: PROP. DMH-15

Inflow Area = 13.171 ac, 12.29% Impervious, Inflow Depth = 2.02" for 25-Year event
Inflow = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af
Outflow = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af, Atten= 0%, Lag= 0.0 min
Primary = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 148.37' @ 12.38 hrs
Flood Elev= 154.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	146.15'	**24.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 146.15' / 144.00' S= 0.0072 '/' Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.67 cfs @ 12.38 hrs HW=148.36' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 16.67 cfs @ 5.31 fps)

Summary for Pond DMH-2: PROP. DMH-2

[80] Warning: Exceeded Pond CB-2 by 0.34' @ 12.02 hrs (1.96 cfs 0.005 af)

Inflow Area = 3.473 ac, 24.78% Impervious, Inflow Depth = 2.62" for 25-Year event
Inflow = 10.05 cfs @ 12.04 hrs, Volume= 0.759 af
Outflow = 10.05 cfs @ 12.04 hrs, Volume= 0.759 af, Atten= 0%, Lag= 0.0 min
Primary = 10.05 cfs @ 12.04 hrs, Volume= 0.759 af
Routed to Pond DMH-1 : PROP. DMH-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 150.87' @ 12.04 hrs
Flood Elev= 153.27'

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**18.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 147.50' / 147.10' S= 0.0065 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.95 cfs @ 12.04 hrs HW=150.85' TW=149.49' (Dynamic Tailwater)
1=Culvert (Inlet Controls 9.95 cfs @ 5.63 fps)

Summary for Pond DMH-3: PROP. DMH-3

[80] Warning: Exceeded Pond CB-4 by 0.98' @ 12.02 hrs (3.75 cfs 0.013 af)
[80] Warning: Exceeded Pond CB-5 by 0.91' @ 12.02 hrs (3.61 cfs 0.012 af)

Inflow Area = 2.498 ac, 25.18% Impervious, Inflow Depth = 2.52" for 25-Year event
Inflow = 6.70 cfs @ 12.04 hrs, Volume= 0.525 af
Outflow = 6.70 cfs @ 12.04 hrs, Volume= 0.525 af, Atten= 0%, Lag= 0.0 min
Primary = 6.70 cfs @ 12.04 hrs, Volume= 0.525 af
Routed to Pond DMH-2 : PROP. DMH-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 160.10' @ 12.04 hrs
Flood Elev= 161.06'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.80'	**12.0" Round Culvert** L= 255.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.80' / 147.60' S= 0.0282 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.61 cfs @ 12.04 hrs HW=159.95' TW=150.79' (Dynamic Tailwater)
1=Culvert (Outlet Controls 6.61 cfs @ 8.42 fps)

Summary for Pond DMH-4: PROP. DMH-4

[80] Warning: Exceeded Pond CB-6 by 0.10' @ 12.01 hrs (1.22 cfs 0.006 af)
[80] Warning: Exceeded Pond CB-7 by 0.07' @ 12.00 hrs (0.99 cfs 0.003 af)

Inflow Area = 1.971 ac, 22.34% Impervious, Inflow Depth = 2.31" for 25-Year event
Inflow = 4.74 cfs @ 12.05 hrs, Volume= 0.379 af
Outflow = 4.74 cfs @ 12.05 hrs, Volume= 0.379 af, Atten= 0%, Lag= 0.0 min
Primary = 4.74 cfs @ 12.05 hrs, Volume= 0.379 af
Routed to Pond DMH-3 : PROP. DMH-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 180.07' @ 12.05 hrs
Flood Elev= 182.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	**12.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 178.00' / 154.90' S= 0.0924 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.74 cfs @ 12.05 hrs HW=180.07' TW=159.98' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.74 cfs @ 6.04 fps)

Summary for Pond DMH-5: PROP. DMH-5

Inflow Area = 0.577 ac, 30.64% Impervious, Inflow Depth = 3.05" for 25-Year event
Inflow = 2.04 cfs @ 12.05 hrs, Volume= 0.147 af
Outflow = 2.04 cfs @ 12.05 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.05 hrs, Volume= 0.147 af
Routed to Pond DMH-4 : PROP. DMH-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 206.80' @ 12.05 hrs
Flood Elev= 210.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	206.00'	**12.0" Round Culvert** L= 251.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 206.00' / 178.10' S= 0.1112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.04 cfs @ 12.05 hrs HW=206.80' TW=180.06' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.04 cfs @ 3.04 fps)

Summary for Pond DMH-6: PROP. DMH-6

Inflow Area = 0.419 ac, 43.51% Impervious, Inflow Depth = 3.68" for 25-Year event
Inflow = 1.81 cfs @ 12.04 hrs, Volume= 0.129 af
Outflow = 1.81 cfs @ 12.04 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.04 hrs, Volume= 0.129 af
Routed to Pond INF-1 : PROP. INFILTRAION BASIN #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 154.74' @ 12.04 hrs
Flood Elev= 158.18'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.00'	**12.0" Round Culvert** L= 117.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.00' / 149.00' S= 0.0427 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 12.04 hrs HW=154.74' TW=146.30' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.81 cfs @ 2.92 fps)

Summary for Pond DMH-7: PROP. DMH-7

Inflow Area = 0.492 ac, 43.13% Impervious, Inflow Depth = 3.67" for 25-Year event
Inflow = 2.12 cfs @ 12.04 hrs, Volume= 0.150 af
Outflow = 2.12 cfs @ 12.04 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min
Primary = 2.12 cfs @ 12.04 hrs, Volume= 0.150 af
Routed to Pond DMH-8 : PROP. DMH-8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.22' @ 12.04 hrs
Flood Elev= 158.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	154.40'	**12.0" Round Culvert** L= 123.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.40' / 151.20' S= 0.0260 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.12 cfs @ 12.04 hrs HW=155.22' TW=152.31' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.12 cfs @ 3.08 fps)

Summary for Pond DMH-8: PROP. DMH-8

Inflow Area = 1.530 ac, 37.31% Impervious, Inflow Depth = 3.31" for 25-Year event
Inflow = 5.78 cfs @ 12.05 hrs, Volume= 0.422 af
Outflow = 5.78 cfs @ 12.05 hrs, Volume= 0.422 af, Atten= 0%, Lag= 0.0 min
Primary = 5.78 cfs @ 12.05 hrs, Volume= 0.422 af
Routed to Pond INF-2 : PROP. INFILTRATION BASIN #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 152.32' @ 12.05 hrs
Flood Elev= 156.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	151.10'	**18.0" Round Culvert** L= 136.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 151.10' / 145.00' S= 0.0449 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.77 cfs @ 12.05 hrs HW=152.32' TW=145.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.77 cfs @ 3.76 fps)

Summary for Pond DMH-9: PROP. DMH-9

[80] Warning: Exceeded Pond CB-16 by 0.15' @ 12.02 hrs (1.46 cfs 0.004 af)

Inflow Area = 0.968 ac, 34.25% Impervious, Inflow Depth = 2.91" for 25-Year event
Inflow = 3.01 cfs @ 12.04 hrs, Volume= 0.235 af
Outflow = 3.01 cfs @ 12.04 hrs, Volume= 0.235 af, Atten= 0%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.04 hrs, Volume= 0.235 af
Routed to Pond DMH-10 : PROP. DMH-10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.36' @ 12.05 hrs
Flood Elev= 158.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	153.70'	**12.0" Round Culvert** L= 89.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 153.70' / 153.20' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.97 cfs @ 12.04 hrs HW=155.34' TW=154.48' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.97 cfs @ 3.79 fps)

Summary for Pond GD-1: PROP. GRASSED DEPRESSION

Inflow Area = 0.322 ac, 9.72% Impervious, Inflow Depth = 2.41" for 25-Year event
Inflow = 0.93 cfs @ 12.06 hrs, Volume= 0.065 af
Outflow = 0.40 cfs @ 12.26 hrs, Volume= 0.065 af, Atten= 57%, Lag= 12.0 min
Discarded = 0.08 cfs @ 12.26 hrs, Volume= 0.054 af
Primary = 0.32 cfs @ 12.26 hrs, Volume= 0.011 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 145.56' @ 12.26 hrs Surf.Area= 1,337 sf Storage= 676 cf
Flood Elev= 146.00' Surf.Area= 1,547 sf Storage= 1,314 cf

Plug-Flow detention time= 63.0 min calculated for 0.065 af (100% of inflow)

Center-of-Mass det. time= 63.0 min (893.3 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	145.00'	1,314 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)
145.00	1,094	141.0	0	0	1,094
146.00	1,547	160.0	1,314	1,314	1,573

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	145.50'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.08 cfs @ 12.26 hrs HW=145.56' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.32 cfs @ 12.26 hrs HW=145.56' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.32 cfs @ 0.57 fps)

Summary for Pond INF-1: PROP. INFILTRAION BASIN #1

Test pits indicated loamy sand. Therefore, an infiltration rate of 2.41 in/hf (based on Rawl's Rates) is utilized for this system.

Inflow Area = 5.739 ac, 21.41% Impervious, Inflow Depth = 2.62" for 25-Year event
Inflow = 16.54 cfs @ 12.05 hrs, Volume= 1.252 af
Outflow = 1.67 cfs @ 12.97 hrs, Volume= 1.252 af, Atten= 90%, Lag= 55.2 min
Discarded = 0.58 cfs @ 12.97 hrs, Volume= 0.797 af
Primary = 1.10 cfs @ 12.97 hrs, Volume= 0.456 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 147.59' @ 12.97 hrs Surf.Area= 9,526 sf Storage= 21,553 cf
Flood Elev= 150.00' Surf.Area= 12,505 sf Storage= 47,980 cf

Plug-Flow detention time= 180.5 min calculated for 1.252 af (100% of inflow)
Center-of-Mass det. time= 180.5 min (985.7 - 805.2)

Volume	Invert	Avail.Storage	Storage Description
#1	145.00'	47,980 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)
145.00	7,269	340.0	0	0	7,269
147.00	8,847	380.0	16,090	16,090	9,671
149.00	11,229	416.0	20,029	36,119	12,087
150.00	12,505	435.0	11,861	47,980	13,442

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	145.00'	**12.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 145.00' / 144.00' S= 0.0278 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	146.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	148.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	148.75'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.58 cfs @ 12.97 hrs HW=147.59' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.58 cfs)

Primary OutFlow Max=1.10 cfs @ 12.97 hrs HW=147.59' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 1.10 cfs of 5.47 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 1.10 cfs @ 5.58 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=145.00' TW=0.00' (Dynamic Tailwater)
└**5=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond INF-2: PROP. INFILTRATION BASIN #2

Test pits indicated loamy sand. Therefore, an infiltration rate of 2.41 in/hf (based on Rawl's Rates) is utilized for this system.

Inflow Area = 2.832 ac, 23.59% Impervious, Inflow Depth = 2.85" for 25-Year event
Inflow = 9.47 cfs @ 12.05 hrs, Volume= 0.673 af
Outflow = 0.72 cfs @ 13.44 hrs, Volume= 0.673 af, Atten= 92%, Lag= 83.6 min
Discarded = 0.43 cfs @ 13.44 hrs, Volume= 0.632 af
Primary = 0.29 cfs @ 13.44 hrs, Volume= 0.041 af
  Routed to Link DP1 : Design Point #1 - Hawkes Brook
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
  Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 146.09' @ 13.44 hrs Surf.Area= 7,654 sf Storage= 12,913 cf
Flood Elev= 148.00' Surf.Area= 10,493 sf Storage= 30,153 cf

Plug-Flow detention time= 287.0 min calculated for 0.673 af (100% of inflow)
Center-of-Mass det. time= 287.0 min (1,089.7 - 802.7)

Volume	Invert	Avail.Storage	Storage Description
#1	144.00'	30,153 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)
144.00	4,789	438.0	0	0	4,789
146.00	7,528	475.0	12,214	12,214	7,628
148.00	10,493	513.0	17,939	30,153	10,775

Device	Routing	Invert	Outlet Devices
#1	Discarded	144.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	144.00'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 144.00' / 140.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	146.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	146.75'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.43 cfs @ 13.44 hrs HW=146.09' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=0.29 cfs @ 13.44 hrs HW=146.09' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 0.29 cfs of 4.77 cfs potential flow)
↑—**3=Orifice/Grate** (Weir Controls 0.29 cfs @ 0.99 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=144.00' TW=0.00' (Dynamic Tailwater)
↑—**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond INF-3: PROP. INFILTRATION BASIN #3

Test pits indicated loamy sand. Therefore, an infiltration rate of 2.41 in/hf (based on Rawl's Rates) is utilized for this system.

Inflow Area = 1.625 ac, 27.14% Impervious, Inflow Depth = 2.81" for 25-Year event
Inflow = 5.16 cfs @ 12.04 hrs, Volume= 0.381 af
Outflow = 3.06 cfs @ 12.13 hrs, Volume= 0.381 af, Atten= 41%, Lag= 5.3 min
Discarded = 0.21 cfs @ 12.13 hrs, Volume= 0.271 af
Primary = 2.85 cfs @ 12.13 hrs, Volume= 0.110 af
Routed to Link DP1 : Design Point #1 - Hawkes Brook

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Peak Elev= 143.65' @ 12.13 hrs Surf.Area= 3,344 sf Storage= 4,281 cf
Flood Elev= 145.00' Surf.Area= 4,623 sf Storage= 9,652 cf

Plug-Flow detention time= 146.2 min calculated for 0.381 af (100% of inflow)
Center-of-Mass det. time= 146.2 min (941.1 - 795.0)

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	9,652 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)
142.00	1,902	248.0	0	0	1,902
144.00	3,697	300.0	5,500	5,500	4,235
145.00	4,623	318.0	4,151	9,652	5,173

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	143.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.21 cfs @ 12.13 hrs HW=143.65' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=2.84 cfs @ 12.13 hrs HW=143.65' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.84 cfs @ 0.93 fps)

Summary for Pond YD-1: PROP. YD-1

Inflow Area = 3.591 ac, 4.63% Impervious, Inflow Depth = 1.05" for 25-Year event
Inflow = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af
Outflow = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min
Primary = 2.62 cfs @ 12.27 hrs, Volume= 0.313 af
Routed to Pond DMH-11 : PROP. DMH-11

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 155.77' @ 12.27 hrs
Flood Elev= 159.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	155.00'	**18.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 155.00' / 154.50' S= 0.0125 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.61 cfs @ 12.27 hrs HW=155.77' TW=155.15' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.61 cfs @ 4.17 fps)

Summary for Pond YD-2: PROP. YD-2

Inflow Area = 6.189 ac, 0.59% Impervious, Inflow Depth = 0.73" for 25-Year event
Inflow = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af
Outflow = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min
Primary = 2.82 cfs @ 12.30 hrs, Volume= 0.376 af
Routed to Pond DMH-12 : PROP. DMH-12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 157.28' @ 12.30 hrs
Flood Elev= 161.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	156.50'	**18.0" Round Culvert** L= 96.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 156.50' / 151.60' S= 0.0510 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.82 cfs @ 12.30 hrs HW=157.28' TW=152.28' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.82 cfs @ 3.02 fps)

Summary for Pond YD-3: PROP. YD-3

Inflow Area = 13.171 ac, 12.29% Impervious, Inflow Depth = 2.02" for 25-Year event
Inflow = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af
Outflow = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af, Atten= 0%, Lag= 0.0 min
Primary = 16.67 cfs @ 12.38 hrs, Volume= 2.215 af
Routed to Pond DMH-14 : PROP. DMH-14

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 151.33' @ 12.39 hrs
Flood Elev= 156.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	148.50'	**24.0" Round Culvert** L= 43.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 148.50' / 148.00' S= 0.0116 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.64 cfs @ 12.38 hrs HW=151.32' TW=150.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 16.64 cfs @ 5.30 fps)

Summary for Link DP1: Design Point #1 - Hawkes Brook

Inflow Area = 58.709 ac, 9.34% Impervious, Inflow Depth = 1.43" for 25-Year event
Inflow = 45.29 cfs @ 12.43 hrs, Volume= 6.975 af
Primary = 45.29 cfs @ 12.43 hrs, Volume= 6.975 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link DP2: Design Point #2 - Isolated Wetland

Inflow Area = 4.366 ac, 0.29% Impervious, Inflow Depth = 1.30" for 25-Year event
Inflow = 4.43 cfs @ 12.14 hrs, Volume= 0.472 af
Primary = 4.43 cfs @ 12.14 hrs, Volume= 0.472 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1AS: Subcat 1AS Runoff Area=4,115 sf 99.92% Impervious Runoff Depth=8.49"
Flow Length=310' Tc=1.7 min CN=WQ Runoff=0.94 cfs 0.067 af

Subcatchment1BS: Subcat 1BS Runoff Area=708 sf 100.00% Impervious Runoff Depth=8.49"
Flow Length=70' Slope=0.0200 '/' Tc=0.6 min CN=98 Runoff=0.17 cfs 0.012 af

Subcatchment2S: Subcat 2S Runoff Area=3,350 sf 78.95% Impervious Runoff Depth=7.55"
Flow Length=170' Tc=3.3 min CN=WQ Runoff=0.66 cfs 0.048 af

Subcatchment3S: Subcat 3S Runoff Area=39,120 sf 19.03% Impervious Runoff Depth=4.79"
Flow Length=250' Tc=2.7 min CN=WQ Runoff=5.38 cfs 0.358 af

Subcatchment4S: Subcat 4S Runoff Area=7,255 sf 55.11% Impervious Runoff Depth=6.47"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=1.35 cfs 0.090 af

Subcatchment5S: Subcat 5S Runoff Area=15,693 sf 26.94% Impervious Runoff Depth=5.04"
Flow Length=260' Tc=1.0 min CN=WQ Runoff=2.35 cfs 0.151 af

Subcatchment6S: Subcat 6S Runoff Area=21,952 sf 23.33% Impervious Runoff Depth=3.48"
Flow Length=250' Tc=0.9 min CN=WQ Runoff=2.07 cfs 0.146 af

Subcatchment7S: Subcat 7S Runoff Area=38,779 sf 16.39% Impervious Runoff Depth=3.74"
Flow Length=480' Tc=4.5 min CN=WQ Runoff=3.69 cfs 0.277 af

Subcatchment8S: Subcat 8S Runoff Area=12,260 sf 27.96% Impervious Runoff Depth=4.97"
Flow Length=250' Tc=2.4 min CN=WQ Runoff=1.72 cfs 0.117 af

Subcatchment9S: Subcat 9S Runoff Area=12,855 sf 33.21% Impervious Runoff Depth=5.37"
Flow Length=300' Slope=0.0700 '/' Tc=3.4 min CN=WQ Runoff=1.88 cfs 0.132 af

Subcatchment10S: Subcat 10S Runoff Area=3,923 sf 69.98% Impervious Runoff Depth=7.15"
Flow Length=190' Tc=3.4 min CN=WQ Runoff=0.73 cfs 0.054 af

Subcatchment11S: Subcat 11S Runoff Area=14,342 sf 36.27% Impervious Runoff Depth=5.63"
Flow Length=235' Tc=2.6 min CN=WQ Runoff=2.26 cfs 0.155 af

Subcatchment12S: Subcat 12S Runoff Area=4,589 sf 72.91% Impervious Runoff Depth=7.28"
Flow Length=180' Tc=3.5 min CN=WQ Runoff=0.87 cfs 0.064 af

Subcatchment13S: Subcat 13S Runoff Area=16,855 sf 35.02% Impervious Runoff Depth=5.58"
Flow Length=200' Tc=2.4 min CN=WQ Runoff=2.66 cfs 0.180 af

Subcatchment14S: Subcat 14S Runoff Area=7,169 sf 66.61% Impervious Runoff Depth=6.99"
Flow Length=185' Tc=3.5 min CN=WQ Runoff=1.31 cfs 0.096 af

Subcatchment15S: Subcat 15S Runoff Area=38,051 sf 28.52% Impervious Runoff Depth=4.89"
Flow Length=280' Tc=3.4 min CN=WQ Runoff=5.02 cfs 0.356 af

Subcatchment16S: Subcat 16S Runoff Area=5,609 sf 80.43% Impervious Runoff Depth=7.61"
Flow Length=235' Tc=0.8 min CN=WQ Runoff=1.21 cfs 0.082 af

Subcatchment17S: Subcat 17S Runoff Area=36,538 sf 27.17% Impervious Runoff Depth=4.46"
Flow Length=280' Tc=3.5 min CN=WQ Runoff=4.29 cfs 0.311 af

Subcatchment18S: Subcat 18S Runoff Area=4,802 sf 58.01% Impervious Runoff Depth=6.61"
Flow Length=50' Slope=0.0200 '/' Tc=3.2 min CN=WQ Runoff=0.84 cfs 0.061 af

Subcatchment19S: Subcat 19S Runoff Area=23,856 sf 8.35% Impervious Runoff Depth=4.38"
Flow Length=140' Slope=0.1400 '/' Tc=2.4 min CN=WQ Runoff=3.12 cfs 0.200 af

Subcatchment20S: Subcat 20S Runoff Area=44,979 sf 9.40% Impervious Runoff Depth=4.43"
Flow Length=140' Slope=0.0800 '/' Tc=3.1 min CN=WQ Runoff=5.78 cfs 0.381 af

Subcatchment21S: Subcat 21S Runoff Area=65,341 sf 4.99% Impervious Runoff Depth=4.15"
Flow Length=230' Slope=0.0500 '/' Tc=4.7 min CN=WQ Runoff=7.47 cfs 0.518 af

Subcatchment22S: Subcat 22S Runoff Area=10,299 sf 0.00% Impervious Runoff Depth=4.01"
Flow Length=142' Tc=3.2 min CN=61 Runoff=1.22 cfs 0.079 af

Subcatchment23S: Subcat 23S Runoff Area=11,706 sf 0.00% Impervious Runoff Depth=4.01"
Flow Length=110' Tc=3.2 min CN=61 Runoff=1.39 cfs 0.090 af

Subcatchment24S: Subcat 23S Runoff Area=14,047 sf 9.72% Impervious Runoff Depth=4.45"
Flow Length=140' Tc=3.4 min CN=WQ Runoff=1.79 cfs 0.119 af

Subcatchment25S: Subcat 25S Runoff Area=11,916 sf 10.09% Impervious Runoff Depth=4.46"
Flow Length=70' Tc=2.0 min CN=WQ Runoff=1.60 cfs 0.102 af

Subcatchment101S: Subcat 101S Runoff Area=1,032,720 sf 5.35% Impervious Runoff Depth=3.29"
Flow Length=1,314' Tc=33.8 min CN=WQ Runoff=45.85 cfs 6.507 af

Subcatchment102S: Subcat 102S Runoff Area=54,750 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=424' Tc=11.0 min CN=55 Runoff=3.98 cfs 0.345 af

Subcatchment103S: Subcat 103S Runoff Area=156,437 sf 4.63% Impervious Runoff Depth=2.25"
Flow Length=880' Tc=17.9 min CN=WQ Runoff=5.58 cfs 0.672 af

Subcatchment104S: Subcat 104S Runoff Area=269,613 sf 0.59% Impervious Runoff Depth=1.78"
Flow Length=1,090' Tc=19.8 min CN=WQ Runoff=6.92 cfs 0.917 af

Subcatchment201S: Subcat 201S Runoff Area=573,743 sf 12.29% Impervious Runoff Depth=3.74"
Flow Length=1,510' Tc=26.1 min CN=WQ Runoff=31.97 cfs 4.108 af

Subcatchment202S: Subcat 202S Runoff Area=74,841 sf 0.00% Impervious Runoff Depth=3.32"
Flow Length=220' Tc=6.5 min CN=WQ Runoff=6.41 cfs 0.476 af

Subcatchment203S: Subcat 203S Runoff Area=115,362 sf 0.48% Impervious Runoff Depth=2.49"
Flow Length=766' Tc=14.8 min CN=WQ Runoff=5.25 cfs 0.549 af

Subcatchment ROOF: Subcat ROOF Runoff Area=82,597 sf 100.00% Impervious Runoff Depth=8.49"
Tc=0.0 min CN=WQ Runoff=19.83 cfs 1.342 af

Pond CB-10: PROP. CB-10 Peak Elev=155.21' Inflow=0.73 cfs 0.054 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0182 '/' Outflow=0.73 cfs 0.054 af

Pond CB-11: PROP. CB-11 Peak Elev=155.51' Inflow=2.26 cfs 0.155 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0083 '/' Outflow=2.26 cfs 0.155 af

Pond CB-12: PROP. CB-12 Peak Elev=155.83' Inflow=0.87 cfs 0.064 af
12.0" Round Culvert n=0.012 L=10.0' S=0.0500 '/' Outflow=0.87 cfs 0.064 af

Pond CB-13: PROP. CB-13 Peak Elev=156.24' Inflow=2.66 cfs 0.180 af
12.0" Round Culvert n=0.012 L=24.0' S=0.0208 '/' Outflow=2.66 cfs 0.180 af

Pond CB-14: PROP. CB-14 Peak Elev=153.29' Inflow=1.31 cfs 0.096 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0130 '/' Outflow=1.31 cfs 0.096 af

Pond CB-15: PROP. CB-15 Peak Elev=154.94' Inflow=5.02 cfs 0.356 af
12.0" Round Culvert n=0.012 L=33.0' S=0.0091 '/' Outflow=5.02 cfs 0.356 af

Pond CB-16: PROP. CB-16 Peak Elev=158.93' Inflow=1.21 cfs 0.082 af
12.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=1.21 cfs 0.082 af

Pond CB-17: PROP. CB-17 Peak Elev=160.14' Inflow=4.29 cfs 0.311 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0087 '/' Outflow=4.29 cfs 0.311 af

Pond CB-18: PROP. CB-18 Peak Elev=156.25' Inflow=0.84 cfs 0.061 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0133 '/' Outflow=0.84 cfs 0.061 af

Pond CB-1A: PROP. CB-1A Peak Elev=154.51' Inflow=0.94 cfs 0.067 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.94 cfs 0.067 af

Pond CB-1B: PROP. CB-1B Peak Elev=154.46' Inflow=0.17 cfs 0.012 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=0.17 cfs 0.011 af

Pond CB-2: PROP. CB-2 Peak Elev=158.97' Inflow=0.66 cfs 0.048 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0158 '/' Outflow=0.66 cfs 0.048 af

Pond CB-3: PROP. CB-3 Peak Elev=160.87' Inflow=5.38 cfs 0.358 af
12.0" Round Culvert n=0.012 L=42.0' S=0.0071 '/' Outflow=5.38 cfs 0.358 af

Pond CB-4: PROP. CB-4 Peak Elev=189.42' Inflow=1.35 cfs 0.090 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=1.35 cfs 0.090 af

Pond CB-5: PROP. CB-5 Peak Elev=189.60' Inflow=2.35 cfs 0.151 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0154 '/' Outflow=2.35 cfs 0.151 af

Pond CB-6: PROP. CB-6 Peak Elev=205.75' Inflow=2.07 cfs 0.146 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=2.07 cfs 0.146 af

Pond CB-7: PROP.CB-7 Peak Elev=206.50' Inflow=3.69 cfs 0.277 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0143 '/' Outflow=3.69 cfs 0.277 af

Pond CB-8: PROP. CB-8 Peak Elev=208.20' Inflow=1.72 cfs 0.117 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=1.72 cfs 0.117 af

Pond CB-9: PROP. CB-9 Peak Elev=208.26' Inflow=1.88 cfs 0.132 af
12.0" Round Culvert n=0.012 L=13.0' S=0.0462 '/' Outflow=1.88 cfs 0.132 af

Pond DMH-1: PROP. DMH-1 Peak Elev=154.46' Inflow=19.24 cfs 1.398 af
18.0" Round Culvert n=0.012 L=147.0' S=0.0082 '/' Outflow=19.24 cfs 1.398 af

Pond DMH-10: PROP. DMH-10 Peak Elev=156.20' Inflow=6.10 cfs 0.454 af
12.0" Round Culvert n=0.012 L=79.0' S=0.0899 '/' Outflow=6.10 cfs 0.454 af

Pond DMH-11: PROP. DMH-11 Peak Elev=155.59' Inflow=5.58 cfs 0.672 af
18.0" Round Culvert n=0.012 L=105.0' S=0.0848 '/' Outflow=5.58 cfs 0.672 af

Pond DMH-12: PROP. DMH-12 Peak Elev=152.90' Inflow=6.92 cfs 0.917 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0333 '/' Outflow=6.92 cfs 0.917 af

Pond DMH-13: PROP. DMH-13 Peak Elev=147.30' Inflow=6.92 cfs 0.917 af
18.0" Round Culvert n=0.012 L=90.0' S=0.0211 '/' Outflow=6.92 cfs 0.917 af

Pond DMH-14: PROP. DMH-14 Peak Elev=157.98' Inflow=31.97 cfs 4.108 af
24.0" Round Culvert n=0.012 L=67.0' S=0.0246 '/' Outflow=31.97 cfs 4.108 af

Pond DMH-15: PROP. DMH-15 Peak Elev=153.53' Inflow=31.97 cfs 4.108 af
24.0" Round Culvert n=0.012 L=300.0' S=0.0072 '/' Outflow=31.97 cfs 4.108 af

Pond DMH-2: PROP. DMH-2 Peak Elev=158.94' Inflow=18.19 cfs 1.320 af
18.0" Round Culvert n=0.012 L=62.0' S=0.0065 '/' Outflow=18.19 cfs 1.320 af

Pond DMH-3: PROP. DMH-3 Peak Elev=189.34' Inflow=12.17 cfs 0.913 af
12.0" Round Culvert n=0.012 L=255.0' S=0.0282 '/' Outflow=12.17 cfs 0.913 af

Pond DMH-4: PROP. DMH-4 Peak Elev=205.56' Inflow=8.88 cfs 0.672 af
12.0" Round Culvert n=0.012 L=250.0' S=0.0924 '/' Outflow=8.88 cfs 0.672 af

Pond DMH-5: PROP. DMH-5 Peak Elev=208.03' Inflow=3.58 cfs 0.249 af
12.0" Round Culvert n=0.012 L=251.0' S=0.1112 '/' Outflow=3.58 cfs 0.249 af

Pond DMH-6: PROP. DMH-6 Peak Elev=155.12' Inflow=2.99 cfs 0.208 af
12.0" Round Culvert n=0.012 L=117.0' S=0.0427 '/' Outflow=2.99 cfs 0.208 af

Pond DMH-7: PROP. DMH-7 Peak Elev=155.76' Inflow=3.51 cfs 0.244 af
12.0" Round Culvert n=0.012 L=123.0' S=0.0260 '/' Outflow=3.51 cfs 0.244 af

Pond DMH-8: PROP. DMH-8 Peak Elev=153.17' Inflow=9.79 cfs 0.696 af
18.0" Round Culvert n=0.012 L=136.0' S=0.0449 '/' Outflow=9.79 cfs 0.696 af

Pond DMH-9: PROP. DMH-9 Peak Elev=158.87' Inflow=5.25 cfs 0.393 af
12.0" Round Culvert n=0.012 L=89.0' S=0.0056 '/' Outflow=5.25 cfs 0.393 af

Pond GD-1: PROP. GRASSED DEPRESSION Peak Elev=145.66' Storage=819 cf Inflow=1.79 cfs 0.119 af
Discarded=0.08 cfs 0.072 af Primary=1.55 cfs 0.047 af Outflow=1.63 cfs 0.119 af

Pond INF-1: PROP. INFILTRAION BASIN #1 Peak Elev=148.96' Storage=35,622 cf Inflow=30.28 cfs 2.204 af
Discarded=0.67 cfs 0.963 af Primary=4.13 cfs 1.134 af Secondary=4.54 cfs 0.106 af Outflow=9.34 cfs 2.204 af

Pond INF-2: PROP. INFILTRATION BASIN Peak Elev=146.78' Storage=18,545 cf Inflow=16.96 cfs 1.167 af
Discarded=0.49 cfs 0.747 af Primary=3.35 cfs 0.417 af Secondary=0.31 cfs 0.003 af Outflow=4.15 cfs 1.167 af

Pond INF-3: PROP. INFILTRATION BASIN #3 Peak Elev=143.81' Storage=4,823 cf Inflow=9.20 cfs 0.654 af
Discarded=0.22 cfs 0.325 af Primary=8.52 cfs 0.329 af Outflow=8.74 cfs 0.654 af

Pond YD-1: PROP. YD-1 Peak Elev=156.28' Inflow=5.58 cfs 0.672 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0125 '/' Outflow=5.58 cfs 0.672 af

Pond YD-2: PROP. YD-2 Peak Elev=157.90' Inflow=6.92 cfs 0.917 af
18.0" Round Culvert n=0.012 L=96.0' S=0.0510 '/' Outflow=6.92 cfs 0.917 af

Pond YD-3: PROP. YD-3 Peak Elev=162.43' Inflow=31.97 cfs 4.108 af
24.0" Round Culvert n=0.012 L=43.0' S=0.0116 '/' Outflow=31.97 cfs 4.108 af

Link DP1: Design Point #1 - Hawkes Brook Inflow=104.16 cfs 14.687 af
Primary=104.16 cfs 14.687 af

Link DP2: Design Point #2 - Isolated Wetland Inflow=10.30 cfs 1.025 af
Primary=10.30 cfs 1.025 af

Total Runoff Area = 64.972 ac Runoff Volume = 19.160 af Average Runoff Depth = 3.54"
88.62% Pervious = 57.577 ac 11.38% Impervious = 7.395 ac

APPENDIX G

Supplemental Calculations and Backup Data

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.155 degrees West
Latitude	42.758 degrees North
Elevation	0 feet
Date/Time	Mon, 22 Aug 2022 13:44:43 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.41	0.51	0.68	0.84	1.07	**1yr**	0.73	1.01	1.24	1.58	2.01	2.59	2.80	**1yr**	2.29	2.69	3.13	3.81	4.44	**1yr**
2yr	0.33	0.51	0.64	0.84	1.05	1.33	**2yr**	0.91	1.22	1.54	1.95	2.46	3.11	3.44	**2yr**	2.75	3.31	3.83	4.54	5.17	**2yr**
5yr	0.39	0.61	0.76	1.02	1.31	1.67	**5yr**	1.13	1.52	1.95	2.47	3.12	3.95	4.40	**5yr**	3.50	4.23	4.86	5.77	6.52	**5yr**
10yr	0.44	0.69	0.87	1.19	1.55	2.00	**10yr**	1.33	1.81	2.34	2.97	3.76	4.74	5.31	**10yr**	4.20	5.11	5.83	6.92	7.78	**10yr**
25yr	0.52	0.83	1.05	1.45	1.93	2.51	**25yr**	1.66	2.26	2.95	3.77	4.79	6.05	6.81	**25yr**	5.35	6.55	7.42	8.80	9.82	**25yr**
50yr	0.58	0.94	1.20	1.69	2.28	3.00	**50yr**	1.97	2.69	3.55	4.55	5.77	7.27	8.22	**50yr**	6.43	7.91	8.91	10.57	11.73	**50yr**
100yr	0.67	1.08	1.40	1.98	2.70	3.58	**100yr**	2.33	3.19	4.24	5.45	6.92	8.73	9.94	**100yr**	7.73	9.55	10.70	12.70	14.00	**100yr**
200yr	0.76	1.24	1.61	2.31	3.19	4.27	**200yr**	2.76	3.79	5.08	6.55	8.33	10.50	12.01	**200yr**	9.30	11.55	12.86	15.27	16.73	**200yr**
500yr	0.91	1.50	1.96	2.85	4.00	5.40	**500yr**	3.45	4.77	6.44	8.33	10.63	13.42	15.43	**500yr**	11.87	14.84	16.39	19.49	21.18	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.88	**1yr**	0.64	0.86	1.09	1.35	1.64	2.39	2.57	**1yr**	2.11	2.47	2.88	3.45	4.06	**1yr**
2yr	0.32	0.49	0.61	0.82	1.01	1.21	**2yr**	0.87	1.18	1.38	1.82	2.32	3.01	3.34	**2yr**	2.66	3.21	3.72	4.41	5.04	**2yr**
5yr	0.37	0.57	0.70	0.97	1.23	1.45	**5yr**	1.06	1.41	1.64	2.12	2.71	3.69	4.08	**5yr**	3.26	3.92	4.54	5.36	6.09	**5yr**
10yr	0.41	0.63	0.78	1.09	1.41	1.65	**10yr**	1.21	1.62	1.86	2.39	3.03	4.28	4.72	**10yr**	3.78	4.54	5.27	6.23	7.01	**10yr**
25yr	0.47	0.72	0.89	1.28	1.68	1.96	**25yr**	1.45	1.92	2.19	2.78	3.53	5.19	5.73	**25yr**	4.59	5.51	6.44	7.58	8.40	**25yr**
50yr	0.52	0.80	0.99	1.43	1.92	2.24	**50yr**	1.66	2.19	2.47	3.13	3.97	6.00	6.64	**50yr**	5.31	6.38	7.50	8.82	9.61	**50yr**
100yr	0.59	0.89	1.11	1.61	2.21	2.55	**100yr**	1.91	2.50	2.80	3.52	4.45	6.71	7.68	**100yr**	5.93	7.39	8.74	10.26	11.01	**100yr**
200yr	0.66	0.99	1.26	1.82	2.54	2.91	**200yr**	2.19	2.84	3.16	3.95	5.01	7.70	8.91	**200yr**	6.82	8.57	10.18	11.95	12.58	**200yr**
500yr	0.77	1.15	1.48	2.15	3.05	3.46	**500yr**	2.63	3.38	3.72	4.61	5.86	9.21	10.87	**500yr**	8.15	10.45	12.50	14.62	15.01	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.56	0.76	0.93	1.09	**1yr**	0.80	1.07	1.26	1.67	2.12	2.79	3.02	**1yr**	2.47	2.90	3.37	4.06	4.78	**1yr**
2yr	0.34	0.53	0.65	0.88	1.09	1.29	**2yr**	0.94	1.27	1.49	1.95	2.49	3.22	3.57	**2yr**	2.85	3.43	3.95	4.69	5.37	**2yr**
5yr	0.42	0.65	0.81	1.11	1.42	1.67	**5yr**	1.22	1.64	1.93	2.49	3.16	4.22	4.74	**5yr**	3.73	4.56	5.21	6.18	6.96	**5yr**
10yr	0.51	0.79	0.98	1.36	1.76	2.05	**10yr**	1.52	2.00	2.35	3.01	3.80	5.21	5.89	**10yr**	4.61	5.66	6.43	7.63	8.54	**10yr**
25yr	0.66	1.00	1.24	1.78	2.34	2.68	**25yr**	2.02	2.62	3.07	3.87	4.83	6.90	7.86	**25yr**	6.11	7.56	8.49	10.09	11.22	**25yr**
50yr	0.79	1.20	1.49	2.15	2.89	3.28	**50yr**	2.49	3.21	3.75	4.69	5.82	8.54	9.80	**50yr**	7.56	9.42	10.47	12.48	13.78	**50yr**
100yr	0.96	1.44	1.81	2.61	3.59	4.02	**100yr**	3.09	3.93	4.61	5.69	7.00	10.99	12.21	**100yr**	9.73	11.74	12.92	15.43	16.97	**100yr**
200yr	1.15	1.73	2.20	3.18	4.44	4.94	**200yr**	3.83	4.83	5.66	6.89	8.41	13.69	15.21	**200yr**	12.12	14.62	15.92	19.08	20.90	**200yr**
500yr	1.49	2.21	2.85	4.14	5.88	6.47	**500yr**	5.07	6.33	7.43	8.90	10.76	18.33	20.36	**500yr**	16.22	19.57	21.01	25.26	27.58	**500yr**

Powered by ACIS
Northeast Regional Climate Center

GPI Project No.	2200136	**Sheet**	1 of 2
Project Description	Off Washington Street - Methuen, MA		
Task	Drawdown Calculations		
Calculated By	SJB	**Date**	03/06/24
Checked By	GMP	**Date**	

Greenman-Pedersen, Inc.

Drawdown within 72 hours Analysis for Static Method

Above ground Infiltration Basin #1

Infiltration Rate: 2.41 inches/hour (From table 2.3.3: Rawls, Brakensiek, Saxton, 1982)

Design Infiltration Rate: 2.41 inches/hour

Total Volume: 7,269 cf

Basin bottom area: 6,270 sf

Time $_{drawdown}$ = (Required Recharge Volume in cubic feet as determined by the Static Method)(1/Design Infiltration Rate in inches per hour)(conversion for inches to feet)(1/bottom area in feet)

Time $_{drawdown}$ = (7,269 cf) (1 / 2.41 in/hr) (1ft/12 in.) (1 / 6,270 sf)

= 5.77 hours

Above ground Infiltration Basin #2

Infiltration Rate: 2.41 inches/hour (From table 2.3.3: Rawls, Brakensiek, Saxton, 1982)

Design Infiltration Rate: 2.41 inches/hour

Total Volume: 12,214 cf

Basin bottom area: 4,789 sf

Time $_{drawdown}$ = (Required Recharge Volume in cubic feet as determined by the Static Method)(1/Design Infiltration Rate in inches per hour)(conversion for inches to feet)(1/bottom area in feet)

Time $_{drawdown}$ = (12,214 cf) (1 / 2.41 in/hr) (1ft/12 in.) (1 / 4,789 sf)

= 12.70 hours

Drawdown within 72 hours Analysis for Static Method

Above ground Infiltration Basin #3

Infiltration Rate:	2.41	inches/hour (From table 2.3.3: Rawls, Brakensiek, Saxton, 1982)
Design Infiltration Rate:	2.41	inches/hour
Total Volume:	3,780	cf
Basin bottom area:	1,902	sf

Time $_{drawdown}$ = (Required Recharge Volume in cubic feet as determined by the Static Method)(1/Design Infiltration Rate in inches per hour)(conversion for inches to feet)(1/bottom area in feet)

Time $_{drawdown}$ = (3,780 cf) (1 / 2.41 in/hr) (1ft/12 in.) (1 / 1,902 sf)

= 9.90 hours

Technical Abstract

First Defense® - High Capacity

NJCAT Verified 80% TSS Removal & Sizing - “Down to 50 microns”

Abstract

Hydro International has a state-of-the-art hydraulics and test facility that is used both to develop products and to evaluate performance. Through controlled testing using industry standard test protocols, Hydro’s treatment products are evaluated under varying hydraulic and sediment load conditions. With a known drainage area or water quality flow rate, these test results are used to benchmark treatment objectives and to select the correct model size.

A common performance expectation for hydrodynamic stormwater separators is to remove 80% of Total Suspended Solids (TSS). To support this approach, Hydro International has completed efficiency tests for a range of flow rates and particle size ranges. All tests are conducted with an independent observer present and use industry accepted protocols. All analytics are completed by externally certified laboratories. The test procedures and results have been reviewed and verified by New Jersey Corporation for Advanced Technology (NJCAT).

First Defense

The FDHC (Figure 1) has patented flow-modifying internal components that create a gentle swirling flow path within the Vortex Chamber. The rotating flow creates low energy vortex forces that supplement gravitational settling forces to enhance separation of pollutants

The internal components are designed to fit into standard precast manholes and are installed to collect runoff as part of typical drainage network system. During a rain event, flow enters either from a surface inlet grate or inlet pipe. As flow enters the manhole, components divert flow and pollutants into a Vortex Chamber beneath a separation module, that includes both Inlet\Outlet Chutes and Bypass Weirs. The internal Bypass Weirs divert peak flows over the separation module and away from the Vortex Chamber where pollutants are collecting. This prevents high velocities from re-suspending captured pollutants during infrequent but large storm events.

Capable of providing high pollutant removals for a wide range of flow rates and pipe sizes, the FDHC can be installed ether online or offline depending on pipes and peak flows. Its efficiency and simplicity make it economical to install and maintain.

Fine Sediment Removal Test Material

The feed sediment used for the removal efficiency testing was high purity silica (SiO2 99.8%) supplied by two different commercial silica suppliers, blended in the proportions to produce a wide range of particle sizes distributed from less than 10 µm to over 1000 µm, with a D_{50} = 63 µm. This provides a loading bias towards finer particle sizes and produces more conservative results. In the presence of an independent observer, composited samples were sealed, signed, and packaged for independent transport to the outside laboratory for analysis.

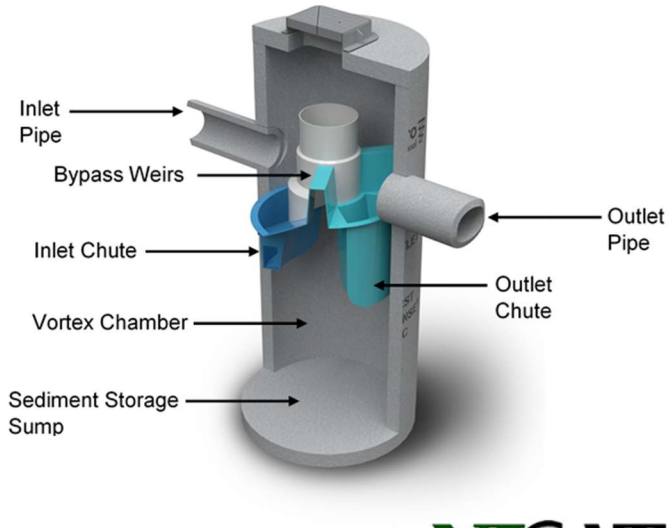


Figure 1 – First Defense High Capacity

The independent laboratory, GeoTesting Express, analyzed the three test sand samples for particle size distribution (PSD) using ASTM D 422-63. The particle size results were averaged to produce an overall measure of the test sediment. Because the goal was to verify the removal rate of the First Defense for various PSD ranges, the test sand was also graded into subset PSD ranges shown in Figure 2. Each subset is expressed as a separate PSD “Down To” the smallest particle size in that subset, as a fraction of subset’s total mass.

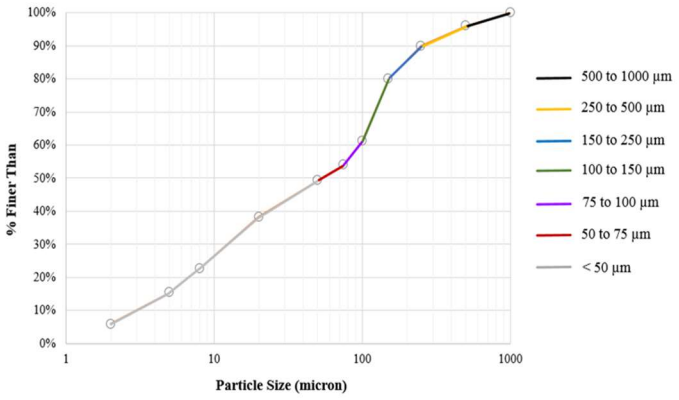


Figure 2 - Particle Size Distribution of Test Sediment

First Defense®

Laboratory Testing Arrangement

The laboratory setup consisted of a recirculating closed loop system with an 8-inch (200 mm) submersible Flygt pump that conveyed water from a 23,000 gal (87,064 L) reservoir through a PVC pipe network to the 4-ft (1.2m) First Defense (Fig.3). The flow rate of the pump was controlled by a GE Fuji Electric AF-300 P11 Adjustable Frequency Drive and measured by an EMCO Flow Systems 4411e Electromagnetic Flow Transmitter.

The sediment storage sump of the First Defense measures 18 inches (457 mm) in height. But it was fitted with a false bottom positioned 9 inches (229 mm) above the floor of the sump to simulate a 50% full condition during testing to ensure a conservative test result.

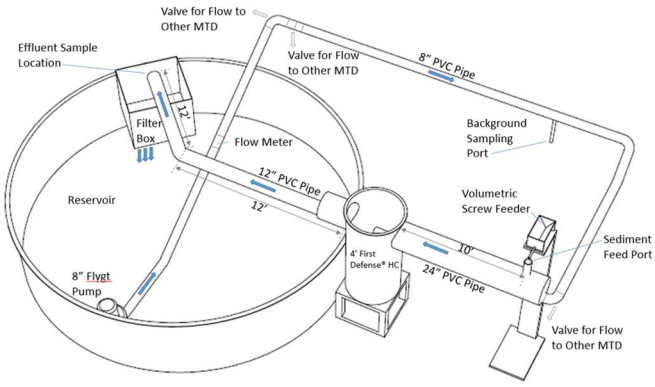


Figure 3 - Set-up of the Portland, Maine hydraulic testing facility

Performance Test Procedures

Removal efficiency testing was conducted in accordance with Section 5 of the NJDEP Laboratory Protocol for HDS MTDs. Particle sizes were determined for both the inlet feed and captured sediment removed from the sump between each test run.

A total of 15 evenly spaced effluent samples were taken at five flow rates: 0.38 cfs (10.8 L/s), 0.54 cfs (15.3 L/s), 0.82 cfs (23.2 L/s), 1.07 cfs (30.3 L/s), and 1.38 cfs (39.1 L/s).

Duplicate effluent samples were also takes at the first, middle and last sample at each flow. These were composited and analyzed for particle size distribution using laser diffraction. Background concentrations were also taken to ensure the recirculation and filter system kept background concentration below 20 mg/L.

To determine the effluent concentration within a specific particle size range, the percentage of particles in the particle size band was multiplied by the overall adjusted average effluent concentration. Removal efficiencies were calculated using the average influent concentration and average effluent concentration adjusted for background concentrations.

These results are summarized below and the full report can be viewed at: FDHC_PSD_Removal_Verification_Report_9-16.pdf

Performance Results

The First Defense performed well under the full range of tested flow rates showing high removal rates across a broad range of particle sizes. For all particles from 50 µm to 1,000 µm, the FDHC removed greater than 90% TSS for all tested flow rates up to 1.88 cfs, or 1.5 cfs with a safety factor of 1.25.

The results for all tests were plotted on a flow vs. removal efficiency graph and a best fit curve produced (Figure 4).

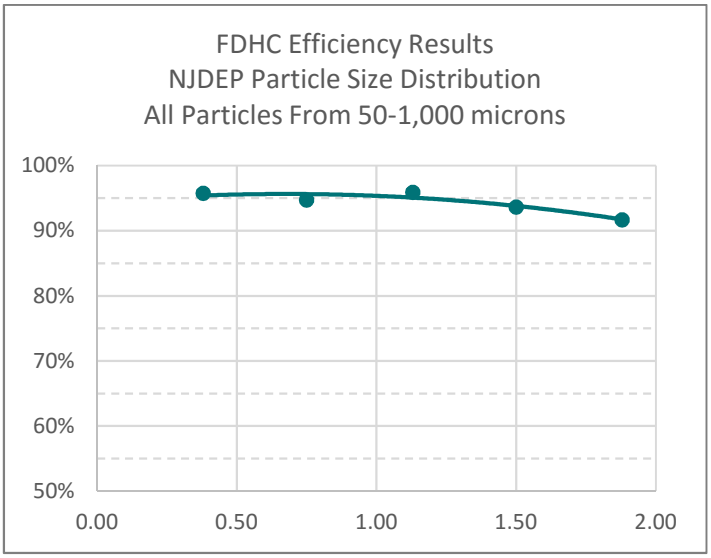


Figure 4 - Removal Efficiency Results of the 4-ft First Defense

First Defense Sizing for > 80% TSS Removal

Table 1 includes the treatment flow rates for different First Defense models based on surface loading rate scaling of the test unit, for greater than 80% TSS removal down to 50 microns. The treatment flow rates include a safety factor of 1.25 and actual removals from test results were greater than 90%.

For design purposes, the selected model's Treatment Flow Rate must be equal or greater to the site's required Water Quality Flow Rate.

The peak flow rate and maximum pipe size must be considered to determine whether an online or offline configuration is appropriate.

Refer to the First Defense product information brochure for visit www.hydro-int.com/us for more information.

Table 1. First Defense verified flow rates for greater than 80% TSS* removal with safety factor of 1.25.

Model:	FD-3HC	FD-4HC	FD-6HC	FD-8HC
Size:	3 ft (900 mm)	4 ft (1.2 m)	6 ft (1.8 m)	8 ft (2.4m)
cfs:	0.85	1.5	3.38	6.00
L/s:	24.0	42.5	95.7	170.0

**Actual removals for all particles down to 50µm were > 90%.*

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Email: stormwaterinquiry@hydro-int.com Web: www.hydro-int.com

Stormwater Solutions

Hydro International

First Defense® High Capacity

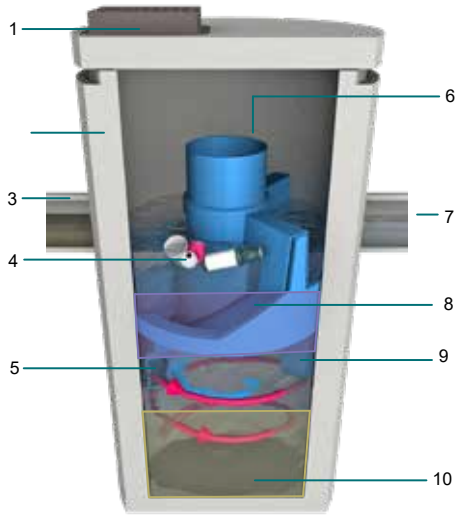
Advanced Hydrodynamic Separator

Product Summary

A Simple Solution for your Trickiest Sites

First Defense® High Capacity is a versatile stormwater separator with some of the highest approved flow rates in the United States, enabling engineers and contractors to save site space and projects costs by using the smallest possible footprint. It also works with single and multiple inlet pipes and inlet grates has an internal bypass to convey infrequent peak flows directly to the outlet.

Fig.1 The First Defense® High Capacity has internal components designed to efficiently capture pollutants and prevent washout at



Product Profile

1. Inlet Grate (optional)
2. Precast chamber
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Inlet Chute
6. Internal Bypass
7. Outlet pipe
8. Oil and Floatables Storage
9. Outlet chute
10. Sediment Storage Sump

Applications

- Areas requiring a minimum of 50% TSS removal
- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Highways, car parks, industrial areas and urban developments
- Pre-treatment to ponds, storage systems, green infrastructure

How it Works

Highest Flow through the Smallest Footprint

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

Benefits

Small & Simple

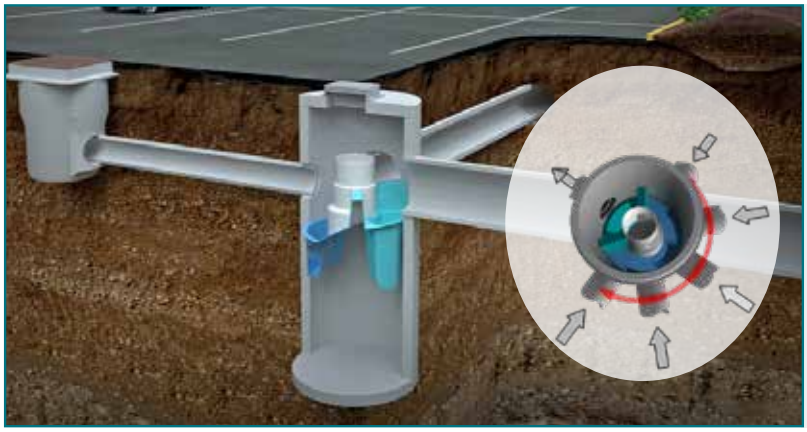
- Cut footprint size, cut costs: First Defense® provides space-saving, easy-to-install surface water treatment in standard sized chambers/ manholes.
- Adapt to site limitations: Variable configuratoins will help you effectively slip First Defense® into a tight spot. It also works well with large pipes, multiple inlet pipes and inlet grates.
- Save installation time: Every First Defense® unit is delivered to site pre-assembled and ready for installation – so installation is as easy as fitting any chamber/manhole.

Stormwater Solutions

→ hydro-int.com/firstdefense

Sizing & Design

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows. Designed with site flexibility in mind, the First Defense® High Capacity allows engineers to maximize available site space without compromising treatment level.



Free Sizing Tool

This simple online tool will recommend the best separator, model size and online/offline arrangement based on site-specific data entered by the user.

Go to hydro-int.com/sizing to access the tool.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Standard Distance from Outlet Invert to Sump Floor
		NJDEP Certified	110µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	1.06 / 30.0	15 / 424	18 / 450	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	1.88 / 53.2	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC	5 / 1.5	2.35 / 66.2	2.94 / 83.2	20 / 566	24 / 600	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	4.23 / 119.8	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	7.52 / 212.9	50 / 1415	48 / 1200	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2
FD-10HC	10 / 3.0	9.38 / 265.6	11.75 / 332.7	50 / 1415	48 / 1200	1742 / 6594	4.4 / 3.3	6.5 -8.0 / 2.0 - 2.4	10.25 / 3.12

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

Maintenance

Easy vactor hose access through the center shaft of the system makes for quick, simple sump cleanout while trash and floatables can be fished out from the surface with a net.

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients.

Hydro International

Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200
Email: stormwaterinquiry@hydro-int.com
Web: www.hydro-int.com/firstdefense

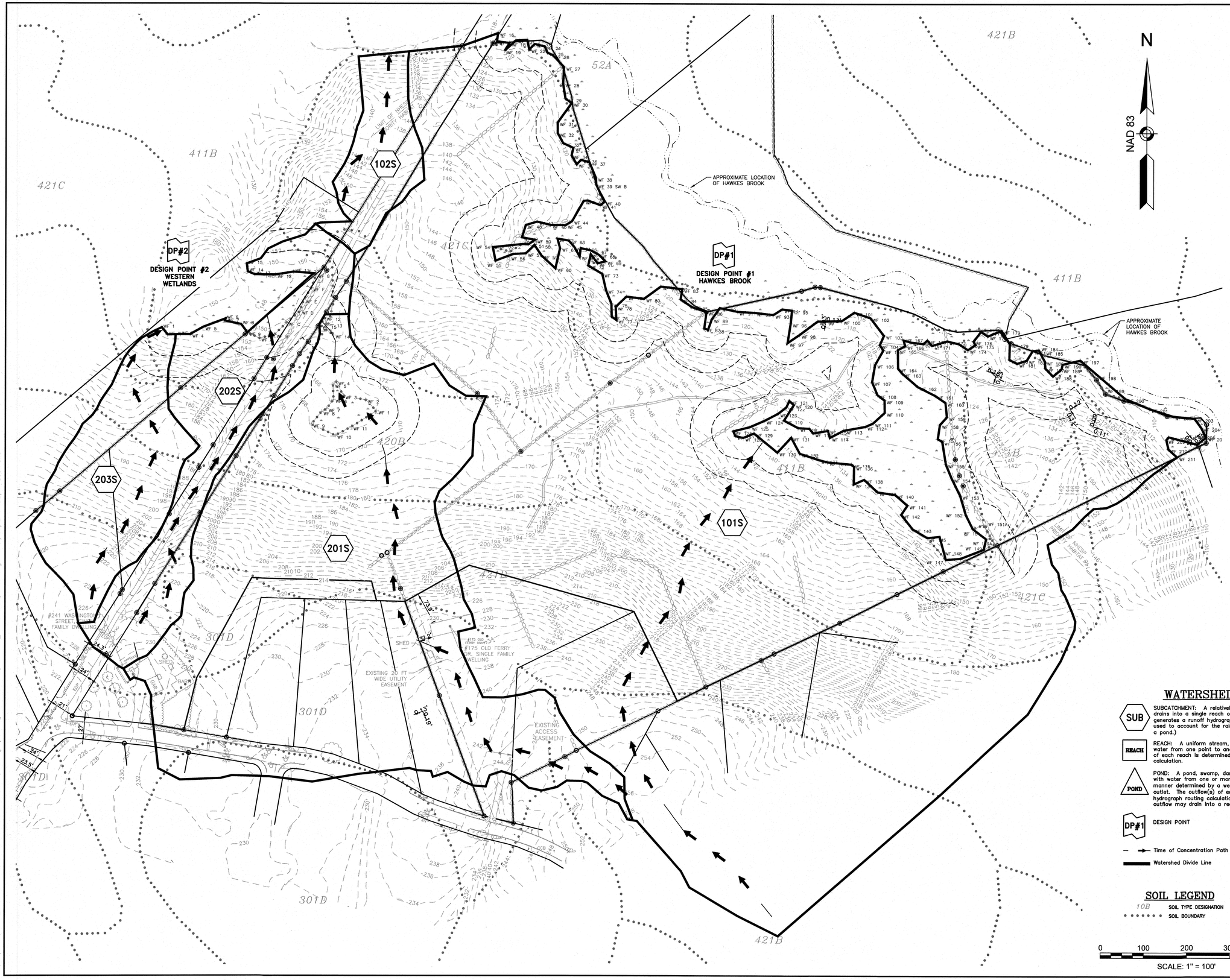
FD_SS_B_2105

Download Drawings!

→ hydro-int.com/fddrawings

Access the Operation & Maintenance Manual

→ hydro-int.com/fd-om



WATERSHED LEGEND

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DP#1 — DESIGN POINT

Time of Concentration Path (Tc)

Watershed Divide Line

SOIL LEGEND

10B — SOIL TYPE DESIGNATION

SOIL BOUNDARY

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
DHB HOMES, LLC
25 BUTTRICK ROAD, UNIT A1
LONDONDERRY, NH 03053

BROOKVIEW HEIGHTS
DEFINITIVE SUBDIVISION PLAN
DHB HOMES, LLC

LAND OFF WASHINGTON STREET
METHUEN, MASSACHUSETTS

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PRE - DEVELOPMENT DRAINAGE AREA PLAN

SCALE: 1"=100'

PROJECT NO. NEX-2200136

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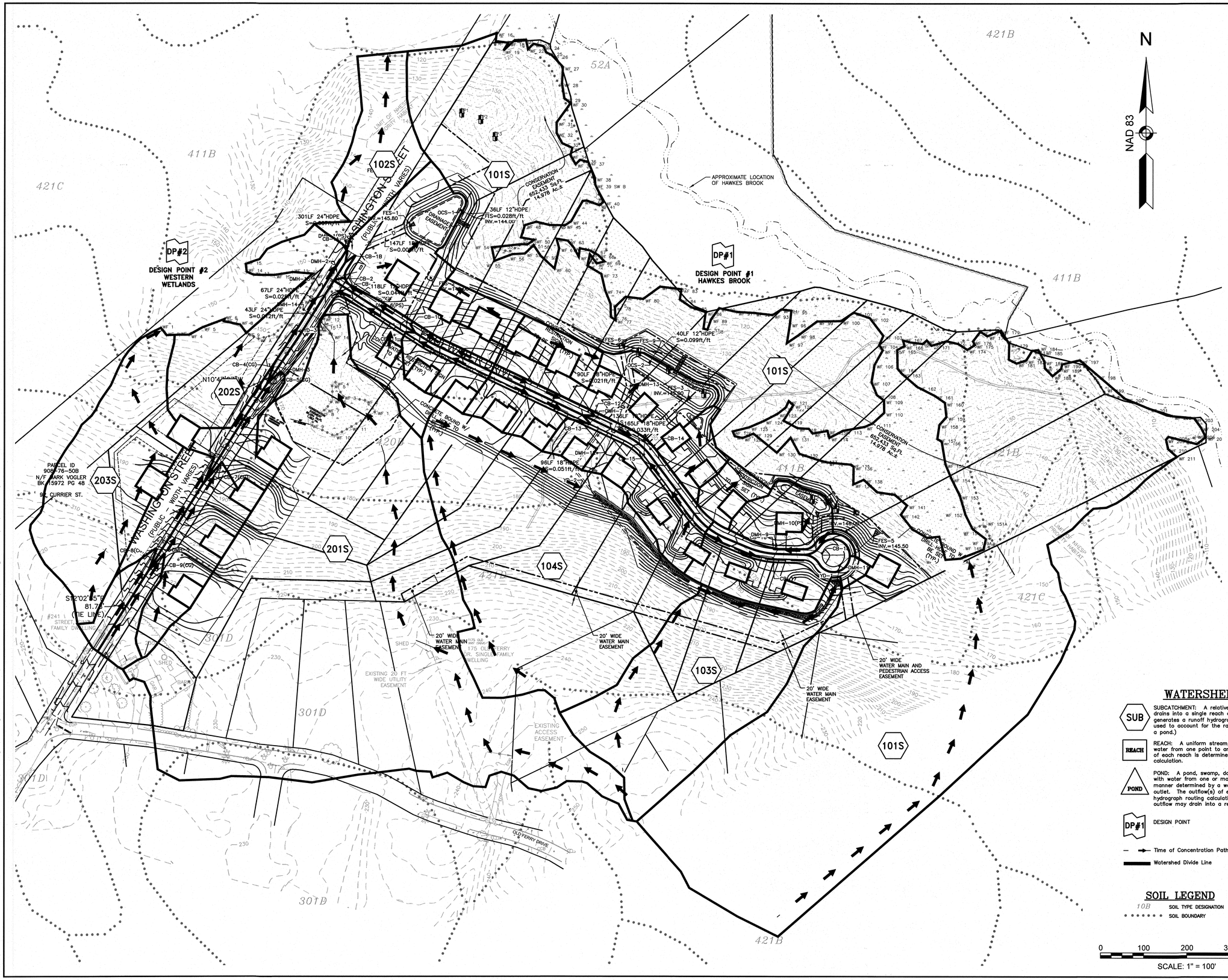

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