GRAZ Engineering, LLC
WWW.GRAZENGINEERING.COM
• 323 West Lake Road • Fitzwilliam, NH 03447 • Telephone (603) 585-6959 • Fax (603) 585-6960

Doyle Avenue, Winchendon, MA - A-N-R Development (Part-2)
Owner/Applicant: Asher Construction, LLC; 77 Nashua Road, Sharon, NH 03458
Engineer: GRAZ Engineering, LLC; 323 W. Lake Road; Fitzwilliam, NH 03447

Project Narrative

The proposed project consists of the continuation of a subdivision of two parcels, one on the east side of Doyle Ave, and one on the west side of Doyle Ave, into six and ten lots, respectively. This submittal will focus on the southern section of development on both lots (the six southernmost lots on the western side of Doyle, and the three southernmost lots on the eastern side of Doyle. All lots to be subdivided are A-N-R Single Family House Lots. Per Winchendon's Stormwater Bylaw, a Stormwater Permit is required because of the total disturbance on the lot to develop these houses (5 acres) is over the maximum allowable disturbance without a Stormwater Permit (1.0 Acre). To achieve the requirements of the Stormwater Bylaw, we have designed several infiltration systems to reduce the flow onto each street that abut the lots. These infiltration systems have been designed to retain a 1 inch x impervious area, which is adequate to treat stormwater to a 90% TSS and 60% TP standard per Winchendon Stormwater Management Regulations Section 8.(D)(1)(b).

These lots are large in size and consist of several wetland areas/intermittent streams throughout the wetland. These lots will all be serviced by private water and septic systems, which resulted in the houses being proposed away from the wetlands near the roadway. The topography slopes moderately to the south-southwest to a very large swamp. From the swamp, water flows along a stream into Lake Dennison.

Test pits were conducted for the on-site septic systems on January 24, 2022, March 7, 2022, and November 21, 2022 by GRAZ Engineering. These test pits were dug to depths of 6'+/- with refusals only in the southwest corner of the development on Lot-245. Estimated seasonal high-water table was reported at 18" at the lowest, 40" at the highest. The soils were Fine & Loamy Sand/ Granular Sandy Loam. WebSoilSurvey reports that the soil is consistent throughout the site as a 908C – Becket-skerry association – extremely stony, with a pocket of 351B – Becket Fine Sandy Loam. Further soil testing was conducted on July 20, 2023 to determine seasonal high groundwater elevations underneath all of the infiltration practices. Further soil testing is to be conducted for septic systems on lots-246, 247, and a new proposed lot between the two (Proposed Lot-A on the A-N-R submitted herewith).

Although the infiltration basin to groundwater separation is two feet in all of the proposed basins, mounding analyses were not conducted as recharge has been omitted in the hydrology model, and it is not being used to attenuate the 10-year storm.

Hydrology Report Narrative

For the Hydrology Model, we analyzed the peak flow at four analysis points, which are 34R, where the southwest corner of Lot-245 sheds to Hitchcock Road, 2R, the large swamp that all drainage within the development typically drains to, 4P, the culvert under Doyle Ave, and 35R, the wetland area to the southeast of the development that flows to Hitchcock Road. These analyses were conducted for the 2, 10, 25, 50 and 100-year storms events. The rainfall data was obtained from NOAA Atlas 14.

The enclosed analyses document the 'pre' and 'post' development stormwater runoff for the 2, 10, 25, 50 and 100-year storm events. The peak flowrates of runoff are compared as follows (cfs):

	2 year	10 year	25 year	50 year	100 year
34R–Hitchcock Road (West) Pre	0.49	1.40	2.05	2.56	3.12
34R–Hitchcock Road (West) Post	**0.32**	**1.21**	**1.75**	**2.13**	**2.55**
2R–Wetland Pre	21.40	59.50	86.46	107.67	131.59
2R–Wetland Post	**20.91**	**57.04**	**83.47**	**104.59**	**128.47**
4P–Doyle Ave Culvert Pre	17.64	48.60	70.73	88.09	107.59
4P–Doyle Ave Culvert Post	**16.96**	**45.95**	**66.64**	**82.81**	**100.92**
35R–Hitchcock Road (East) Pre	6.76	18.89	27.65	34.50	42.20
35R–Hitchcock Road (East) Post	**6.60**	**18.43**	**26.93**	**33.61**	**41.12**

The volumes of runoff are compared as follows (acre-feet):

	2 year	10 year	25 year	50 year	100 year
34R–Hitchcock Road (West) Pre	0.034	0.084	0.120	0.149	0.181
34R–Hitchcock Road (West) Post	**0.037**	**0.088**	**0.123**	**0.150**	**0.180**
2R–Wetland Pre	6.648	16.060	22.816	28.130	34.128
2R–Wetland Post	**6.802**	**16.359**	**23.188**	**28.550**	**34.595**
4P–Doyle Ave Culvert Pre	4.774	11.533	16.384	20.200	24.507
4P–Doyle Ave Culvert Post	**4.840**	**11.657**	**16.536**	**20.370**	**24.694**
35R–Hitchcock Road (East) Pre	0.947	2.338	3.345	4.139	5.038
35R–Hitchcock Road (East) Post	**0.943**	**2.329**	**3.332**	**4.124**	**5.020**

A full stormwater report containing the full HydroCAD analysis, sizing calculations, etc. is attached.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:
Project Code: 2023-0008243
Project Name: Doyle Ave A-N-R Development

October 25, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat Update - Additionally, please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing determination for the NLEB by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of NLEB after the new listing goes into effect this will first need to be addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the

ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

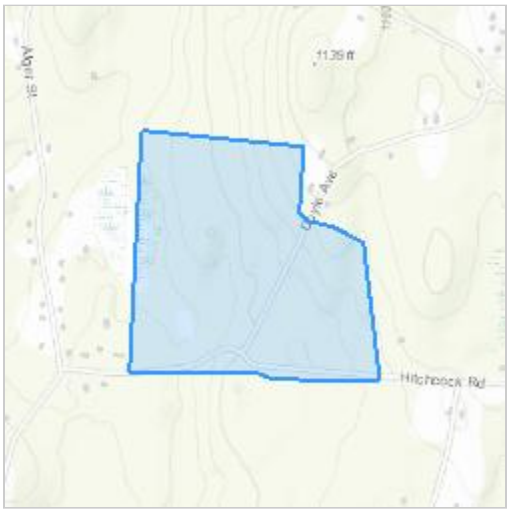
This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Project Code: 2023-0008243
Project Name: Doyle Ave A-N-R Development
Project Type: Residential Construction
Project Description: The project is located on both sides of Doyle Avenue in the sketch shown. Overall, the project will be the consruction of 15 single family homes, broken out into two phases. The first phase is the 7 northernmost lots to be permitted first, then approvals will be sought after for the rest of the development at a later date. On average, each lot will consist of 30,000 S.F. of disturbance.
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.658896049999996,-72.06471831983612,14z



Counties: Worcester County, Massachusetts

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Graz Engineering
Name: Trevor Fletcher
Address: 323 W Lake Road
City: Fitzwilliam
State: NH
Zip: 03447
Email trevorfletcher91@yahoo.com
Phone: 6035856959

EPA NeT CGP Coverage Status: Active: Doyle Ave A-N-R Development, NPDES ID: MAR1004C1

From: no-reply@epacdx.net

Date: Tuesday, November 8, 2022 at 10:31 AM EST

2022-11-08

Dear NeT User,

Coverage status has changed for a project / site under the CGP.

NPDES ID	Form Type	Coverage Status	Operator	Project/Site Name	EPA Comment
MAR1004C1	NOI	Active	Asher Construction, LLC	Doyle Ave A-N-R Development	

Your Notice of Intent (NOI) requesting coverage under EPA's Construction General Permit (CGP) has been accepted and authorization to discharge under the CGP became effective on 11/08/2022 and will expire on 02/16/2027.

Please note that this email does not represent a determination by EPA regarding the validity of the information you provided in your NOI or LEW. Your eligibility for coverage under this permit is based on the validity of the certification you provided. Your electronic signature on the NOI or LEW form certifies that you have read, understood, and are implementing all of the applicable requirements. An important aspect of this certification requires that you have correctly determined whether you are eligible for coverage under this permit.

The CGP requires you to have developed a Stormwater Pollution Prevention Plan (SWPPP) prior to submitting your NOI. The CGP also includes specific requirements for erosion and sediment controls, pollution prevention controls, conducting self-inspections, taking corrective actions, and conducting staff training. You must comply with any state, tribal, or territory-specific requirements in Part 9 (see https://www.epa.gov/npdes/stormwater-discharges-construction-activities#cgp).

A copy of the submission can be found here.

If you have questions about this email or about NeT CGP, please refer to NeT Support or e-mail NPDESereporting@epa.gov for assistance.

This is an automated notification; please do not reply to this email.

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour) (Only IB-245)
- ☐ 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: (Only east of Doyle Ave - 6 lots east of Doyle, 10 lots west of Doyle)

- ☐ 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.

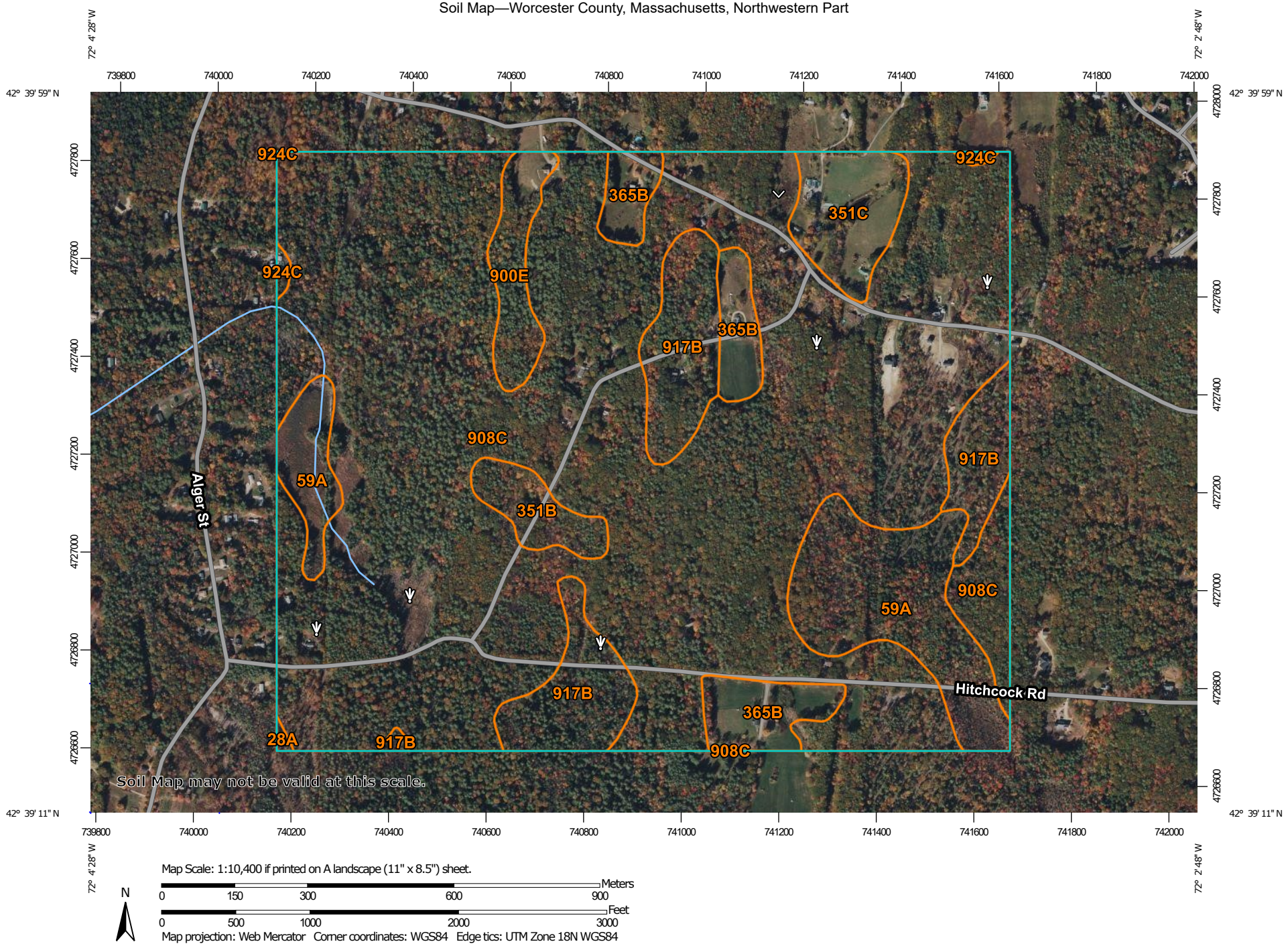
Standard 10: Prohibition of Illicit Discharges

☒ 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.

Soil Map—Worcester County, Massachusetts, Northwestern Part



Map Scale: 1:10,400 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

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

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 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
28A	Searsport loamy sand, 0 to 3 percent slopes	0.3	0.1%
59A	Bucksport and Wonsqueak mucks, 0 to 2 percent slopes	36.4	8.0%
351B	Becket fine sandy loam, 3 to 8 percent slopes	7.3	1.6%
351C	Becket fine sandy loam, 8 to 15 percent slopes	13.2	2.9%
365B	Skerry fine sandy loam, 3 to 8 percent slopes	18.8	4.1%
900E	Becket-Monadnock association, 15 to 45 percent slopes, extremely stony	9.5	2.1%
908C	Becket-Skerry association, 0 to 15 percent slopes, extremely stony	334.3	73.2%
917B	Pillsbury-Peacham association, 0 to 8 percent slopes, extremely stony	35.8	7.8%
924C	Tunbridge-Lyman-Berkshire association, 3 to 15 percent slopes, extremely stony	1.0	0.2%
Totals for Area of Interest		**456.6**	**100.0%**

Worcester County, Massachusetts, Northwestern Part

351B—Becket fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w9pk
Elevation: 230 to 1,380 feet
Mean annual precipitation: 31 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Becket

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bs1 - 7 to 14 inches: fine sandy loam
Bs2 - 14 to 24 inches: gravelly sandy loam
BC - 24 to 33 inches: gravelly sandy loam
Cd - 33 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 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 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Skerry
Percent of map unit: 6 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve, nose slope, side slope
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Pillsbury
Percent of map unit: 4 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, nose slope, side slope
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Tunbridge
Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Monadnock
Percent of map unit: 2 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

Worcester County, Massachusetts, Northwestern Part

351C—Becket fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w9pl
Elevation: 200 to 1,380 feet
Mean annual precipitation: 31 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Becket

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bs1 - 7 to 14 inches: fine sandy loam
Bs2 - 14 to 24 inches: gravelly sandy loam
BC - 24 to 33 inches: gravelly sandy loam
Cd - 33 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 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 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Skerry
Percent of map unit: 6 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Microfeatures of landform position: Open depressions, closed depressions, closed depressions, open depressions
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Tunbridge
Percent of map unit: 4 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Pillsbury
Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Microfeatures of landform position: Open depressions, closed depressions, closed depressions, open depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Monadnock
Percent of map unit: 2 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

Worcester County, Massachusetts, Northwestern Part

365B—Skerry fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w9p8
Elevation: 260 to 1,210 feet
Mean annual precipitation: 31 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Skerry

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Ap - 0 to 6 inches: fine sandy loam
Bs1 - 6 to 20 inches: gravelly fine sandy loam
Bs2 - 20 to 25 inches: gravelly fine sandy loam
Cd1 - 25 to 34 inches: gravelly loamy sand
Cd2 - 34 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 18 to 30 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 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Colonel
Percent of map unit: 6 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: No

Becket
Percent of map unit: 4 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brayton
Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hermon
Percent of map unit: 2 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

Worcester County, Massachusetts, Northwestern Part

900E—Becket-Monadnock association, 15 to 45 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2x9q3
Elevation: 750 to 1,280 feet
Mean annual precipitation: 36 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Becket, extremely stony, and similar soils: 45 percent
Monadnock, extremely stony, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Becket, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
E - 2 to 4 inches: fine sandy loam
Bhs - 4 to 5 inches: fine sandy loam
Bs1 - 5 to 7 inches: fine sandy loam
Bs2 - 7 to 14 inches: fine sandy loam
Bs3 - 14 to 24 inches: gravelly sandy loam
BC - 24 to 33 inches: gravelly sandy loam
Cd - 33 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 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 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Description of Monadnock, Extremely Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy supraglacial meltout till derived from granite and gneiss and/or mica schist and/or phyllite over sandy and gravelly supraglacial meltout till derived from granite and gneiss and/or mica schist and/or phyllite

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
E - 3 to 8 inches: fine sandy loam
Bs1 - 8 to 10 inches: fine sandy loam
Bs2 - 10 to 12 inches: fine sandy loam
Bs3 - 12 to 22 inches: gravelly fine sandy loam
BC - 22 to 25 inches: gravelly fine sandy loam
2C1 - 25 to 45 inches: gravelly loamy sand
2C2 - 45 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 6.0 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): 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 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Ecological site: F144BY505ME - Loamy over Sandy
Hydric soil rating: No

Minor Components

Skerry, extremely stony
Percent of map unit: 8 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Lyman, extremely stony
Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountaintop, mountainflank, side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Peacham, extremely stony
Percent of map unit: 2 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Pillsbury, extremely stony
Percent of map unit: 2 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

Worcester County, Massachusetts, Northwestern Part

908C—Becket-Skerry association, 0 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2x9ny
Elevation: 820 to 1,280 feet
Mean annual precipitation: 36 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Becket, extremely stony, and similar soils: 45 percent
Skerry, extremely stony, and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Becket, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
E - 2 to 4 inches: fine sandy loam
Bhs - 4 to 5 inches: fine sandy loam
Bs1 - 5 to 7 inches: fine sandy loam
Bs2 - 7 to 14 inches: fine sandy loam
Bs3 - 14 to 24 inches: gravelly sandy loam
BC - 24 to 33 inches: gravelly sandy loam
Cd - 33 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 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 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Description of Skerry, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Oa - 0 to 2 inches: highly decomposed plant material
E - 2 to 4 inches: fine sandy loam
Bhs - 4 to 6 inches: fine sandy loam
Bs1 - 6 to 20 inches: gravelly fine sandy loam
Bs2 - 20 to 25 inches: gravelly fine sandy loam
Cd1 - 25 to 34 inches: gravelly loamy sand
Cd2 - 34 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 19 to 34 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 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Pillsbury, extremely stony
Percent of map unit: 6 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Microfeatures of landform position: Closed depressions, open depressions, open depressions, closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Monadnock, extremely stony
Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Berkshire, extremely stony
Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Tunbridge, extremely stony
Percent of map unit: 4 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

Worcester County, Massachusetts, Northwestern Part

917B—Pillsbury-Peacham association, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 9c0q
Elevation: 0 to 2,100 feet
Mean annual precipitation: 39 to 55 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Pillsbury and similar soils: 45 percent
Peacham and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pillsbury

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
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

A - 0 to 4 inches: gravelly fine sandy loam
Bg - 4 to 14 inches: gravelly fine sandy loam
Bw - 14 to 24 inches: gravelly fine sandy loam
Cd - 24 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 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): Moderately low to moderately high (0.06 to 0.20 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: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144BY305ME - Wet Loamy Flat, F144BY301ME - Loamy Till Swamp
Hydric soil rating: Yes

Description of Peacham

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Highly-decomposed herbaceous organic material over dense coarse-loamy lodgment till derived from granite and gneiss

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oa - 2 to 11 inches: highly decomposed plant material
Bg - 11 to 14 inches: fine sandy loam
Cd - 14 to 18 inches: fine sandy loam
Cd - 18 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: 6 to 18 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
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 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144BY301ME - Loamy Till Swamp
Hydric soil rating: Yes

Minor Components

Peru

Percent of map unit: 10 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

Wonsqueak

Percent of map unit: 6 percent
Landform: Bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Chocorua

Percent of map unit: 4 percent
Landform: Bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Northwestern Part
Survey Area Data: Version 16, Sep 9, 2022

NOAA Atlas 14, Volume 10, Version 3
Location name: Winchendon, Massachusetts, USA*
Latitude: 42.6566°, Longitude: -72.0649°
Elevation: 1000.38 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.309** (0.250-0.384)	**0.367** (0.297-0.457)	**0.463** (0.373-0.578)	**0.542** (0.433-0.681)	**0.652** (0.501-0.858)	**0.735** (0.551-0.990)	**0.821** (0.593-1.15)	**0.915** (0.623-1.32)	**1.05** (0.682-1.57)	**1.15** (0.730-1.77)
10-min	**0.438** (0.354-0.543)	**0.521** (0.420-0.647)	**0.657** (0.529-0.820)	**0.769** (0.614-0.966)	**0.924** (0.709-1.22)	**1.04** (0.780-1.40)	**1.16** (0.839-1.63)	**1.30** (0.883-1.87)	**1.48** (0.966-2.22)	**1.63** (1.03-2.50)
15-min	**0.515** (0.416-0.639)	**0.612** (0.495-0.762)	**0.772** (0.621-0.963)	**0.904** (0.723-1.14)	**1.09** (0.835-1.43)	**1.23** (0.918-1.65)	**1.37** (0.988-1.91)	**1.53** (1.04-2.20)	**1.75** (1.14-2.61)	**1.92** (1.22-2.95)
30-min	**0.712** (0.576-0.885)	**0.844** (0.682-1.05)	**1.06** (0.853-1.32)	**1.24** (0.990-1.56)	**1.49** (1.14-1.96)	**1.67** (1.25-2.25)	**1.87** (1.35-2.61)	**2.08** (1.42-3.00)	**2.38** (1.55-3.57)	**2.63** (1.66-4.03)
60-min	**0.910** (0.736-1.13)	**1.08** (0.869-1.34)	**1.35** (1.09-1.68)	**1.57** (1.26-1.98)	**1.89** (1.45-2.48)	**2.12** (1.59-2.86)	**2.36** (1.71-3.31)	**2.64** (1.80-3.80)	**3.02** (1.97-4.53)	**3.34** (2.11-5.11)
2-hr	**1.13** (0.922-1.40)	**1.36** (1.10-1.68)	**1.72** (1.39-2.13)	**2.02** (1.63-2.53)	**2.44** (1.89-3.20)	**2.75** (2.08-3.70)	**3.08** (2.25-4.33)	**3.47** (2.37-4.97)	**4.04** (2.64-6.02)	**4.52** (2.87-6.88)
3-hr	**1.29** (1.05-1.58)	**1.55** (1.26-1.90)	**1.97** (1.60-2.44)	**2.33** (1.88-2.90)	**2.82** (2.19-3.69)	**3.18** (2.42-4.27)	**3.57** (2.62-5.01)	**4.04** (2.76-5.76)	**4.74** (3.10-7.03)	**5.33** (3.39-8.08)
6-hr	**1.60** (1.31-1.95)	**1.93** (1.59-2.36)	**2.48** (2.03-3.04)	**2.93** (2.38-3.62)	**3.56** (2.78-4.63)	**4.02** (3.07-5.37)	**4.52** (3.35-6.33)	**5.13** (3.53-7.28)	**6.07** (3.98-8.94)	**6.87** (4.38-10.3)
12-hr	**1.98** (1.64-2.40)	**2.39** (1.98-2.90)	**3.07** (2.53-3.74)	**3.63** (2.97-4.46)	**4.41** (3.47-5.70)	**4.98** (3.83-6.61)	**5.60** (4.17-7.79)	**6.36** (4.39-8.97)	**7.54** (4.96-11.0)	**8.55** (5.47-12.8)
24-hr	**2.36** (1.97-2.84)	**2.86** (2.38-3.45)	**3.68** (3.05-4.45)	**4.36** (3.58-5.31)	**5.29** (4.19-6.80)	**5.98** (4.62-7.89)	**6.73** (5.03-9.29)	**7.65** (5.29-10.7)	**9.05** (5.98-13.2)	**10.3** (6.59-15.2)
2-day	**2.71** (2.27-3.24)	**3.30** (2.77-3.95)	**4.27** (3.56-5.13)	**5.07** (4.20-6.13)	**6.17** (4.91-7.88)	**6.99** (5.43-9.15)	**7.87** (5.91-10.8)	**8.95** (6.22-12.4)	**10.6** (7.02-15.3)	**12.0** (7.72-17.7)
3-day	**2.96** (2.49-3.53)	**3.61** (3.03-4.30)	**4.66** (3.91-5.59)	**5.54** (4.61-6.68)	**6.75** (5.39-8.58)	**7.65** (5.96-9.97)	**8.61** (6.48-11.8)	**9.79** (6.82-13.6)	**11.6** (7.69-16.7)	**13.1** (8.45-19.3)
4-day	**3.19** (2.69-3.79)	**3.87** (3.27-4.61)	**4.99** (4.19-5.96)	**5.93** (4.94-7.12)	**7.21** (5.77-9.13)	**8.16** (6.37-10.6)	**9.18** (6.92-12.5)	**10.4** (7.28-14.4)	**12.3** (8.18-17.7)	**13.9** (8.99-20.4)
7-day	**3.84** (3.26-4.54)	**4.59** (3.89-5.43)	**5.82** (4.91-6.91)	**6.84** (5.73-8.17)	**8.24** (6.63-10.4)	**9.28** (7.28-12.0)	**10.4** (7.86-14.0)	**11.7** (8.23-16.1)	**13.7** (9.17-19.6)	**15.4** (10.00-22.5)
10-day	**4.49** (3.82-5.29)	**5.27** (4.48-6.21)	**6.54** (5.54-7.74)	**7.60** (6.39-9.05)	**9.06** (7.30-11.3)	**10.1** (7.96-13.0)	**11.3** (8.53-15.1)	**12.7** (8.89-17.3)	**14.6** (9.79-20.8)	**16.3** (10.6-23.7)
20-day	**6.48** (5.56-7.57)	**7.29** (6.24-8.53)	**8.61** (7.34-10.1)	**9.71** (8.22-11.5)	**11.2** (9.08-13.8)	**12.4** (9.72-15.6)	**13.6** (10.2-17.7)	**14.8** (10.5-20.0)	**16.5** (11.1-23.2)	**17.8** (11.6-25.7)
30-day	**8.13** (7.00-9.47)	**8.97** (7.71-10.5)	**10.3** (8.84-12.1)	**11.5** (9.73-13.5)	**13.0** (10.6-15.9)	**14.2** (11.2-17.8)	**15.4** (11.5-19.9)	**16.6** (11.8-22.3)	**18.0** (12.2-25.3)	**19.1** (12.5-27.4)
45-day	**10.2** (8.80-11.8)	**11.1** (9.54-12.8)	**12.5** (10.7-14.6)	**13.7** (11.7-16.1)	**15.3** (12.5-18.6)	**16.6** (13.1-20.6)	**17.9** (13.4-22.8)	**19.0** (13.5-25.4)	**20.3** (13.7-28.3)	**21.2** (13.8-30.2)
60-day	**11.9** (10.3-13.7)	**12.8** (11.1-14.8)	**14.3** (12.4-16.7)	**15.6** (13.3-18.3)	**17.4** (14.1-21.0)	**18.8** (14.8-23.1)	**20.0** (15.0-25.5)	**21.1** (15.1-28.2)	**22.4** (15.2-31.2)	**23.2** (15.3-33.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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

Please refer to NOAA Atlas 14 document for more information.

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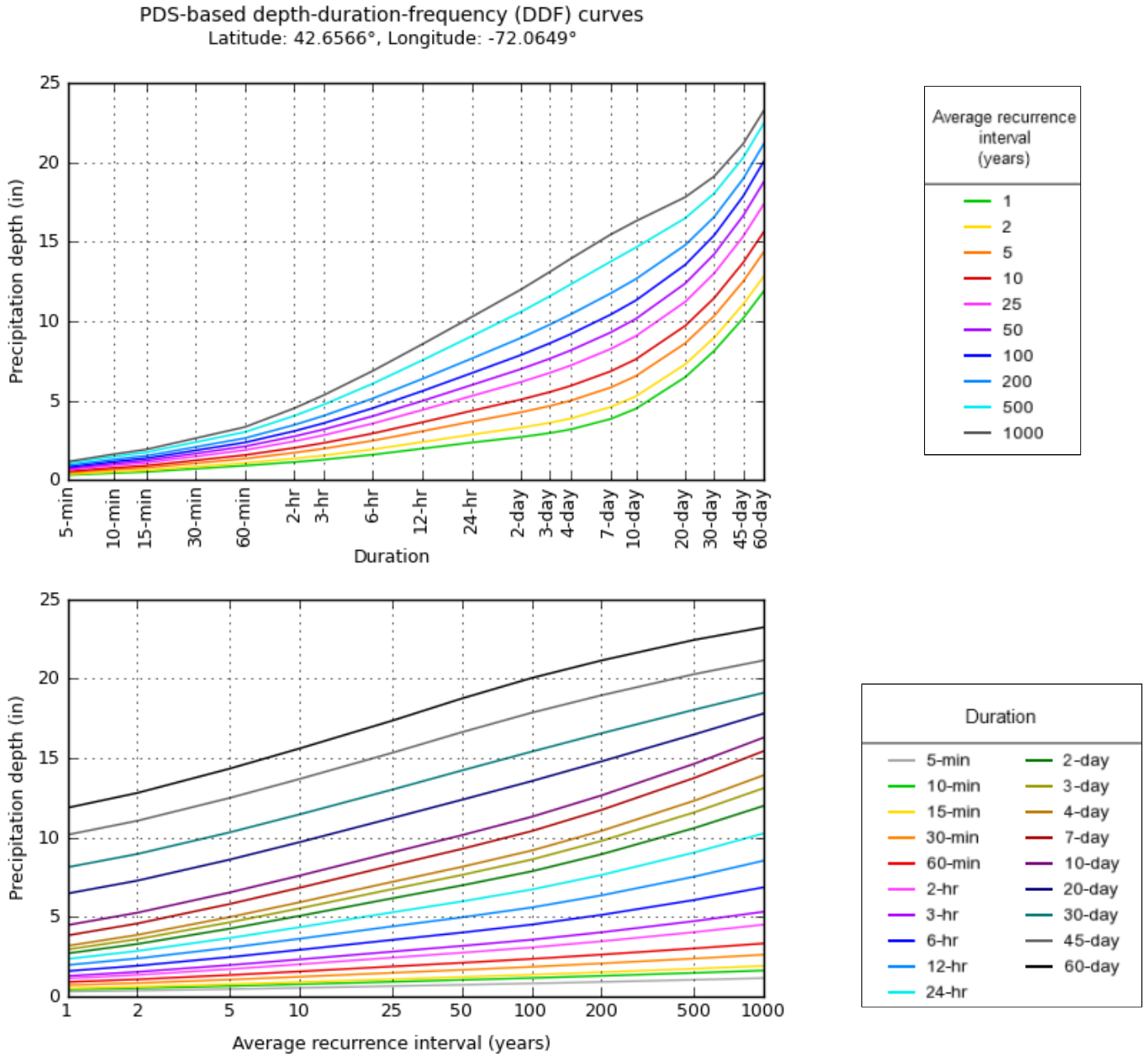
PF graphical



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Created (GMT): Tue Dec 27 21:03:55 2022

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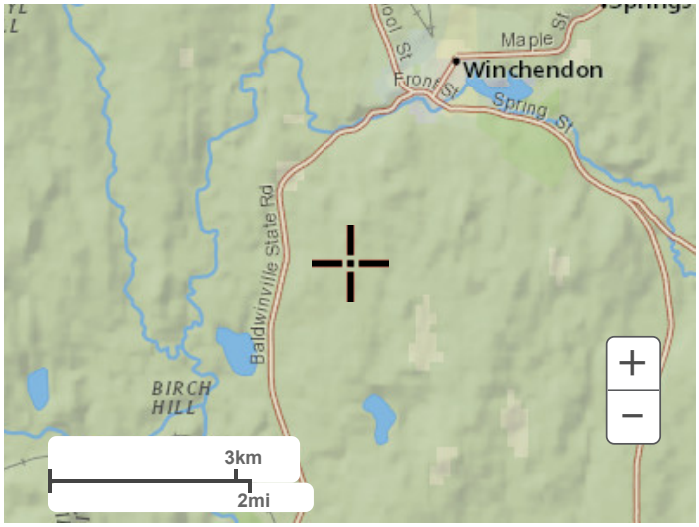
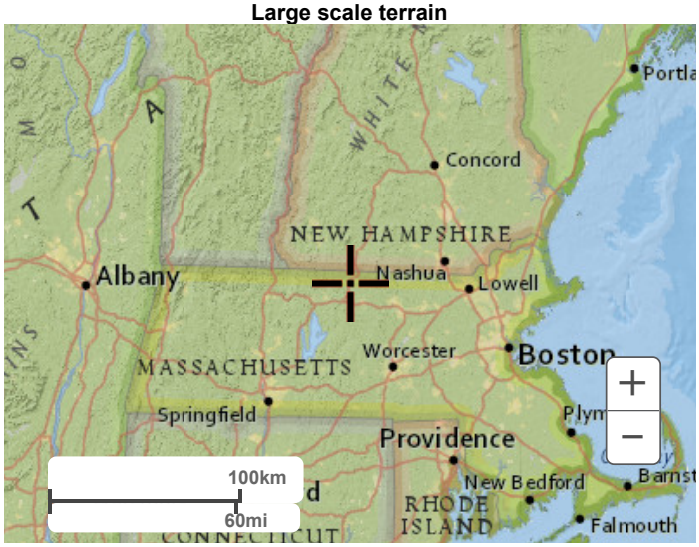
Maps & aerials

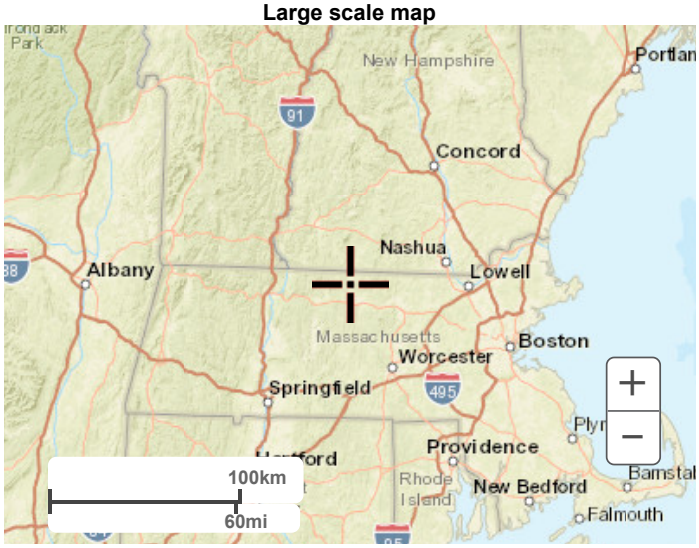
Small scale terrain



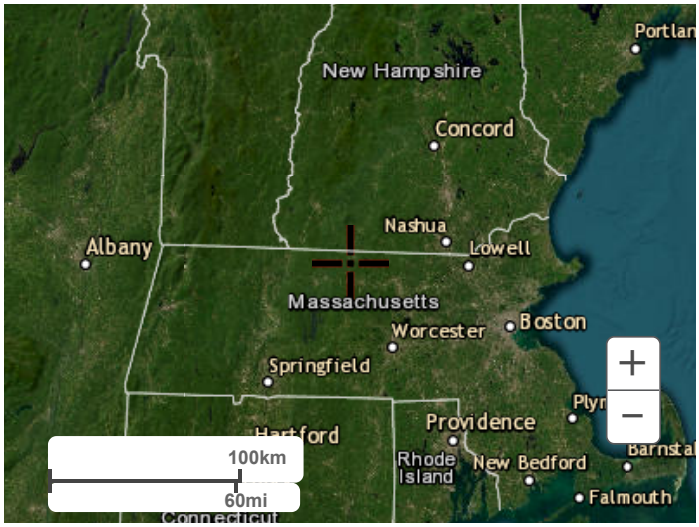
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Infiltration Basin/Infiltration Chamber Bed

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Infiltration Basin	**0.80**	**1.00**	**0.80**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**

Total TSS Removal = **80%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Doyle Ave A-N-R Subdivision
Prepared By: Trevor Fletcher
Date: 24-Oct-22

*90% Removal - sized @ 1-inch x Imperivous Area

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: L-245 Pretreatment for Rapid Infiltrating Soils

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Sediment Forebay	0.25	1.00	0.25	0.75
Sediment Forebay	0.25	0.75	0.19	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56

Total TSS Removal = 44%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Doyle Ave A-N-R Subdivision

Prepared By: Trevor Fletcher

Date: 10-Aug-23

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

Site Recharge to Groundwater — *"Static Method"*

Soil type: C — Rawls Rate: 1.02 In./Hr.
Impervious Area (A1): 19,659 s.f.

Soil type: C/D
Impervious Area (A2): 0 s.f.

Hydrologic Group	Target Depth Factor (F)	
A	0.60	inches
B	0.35	inches
C	0.25	inches
D	0.1	inches

Determine the required recharge volume:

Rv = F x impervious area

Rv = Required Recharge Volume
F = Target Depth Factor

$$Rv = \frac{F"HSGC" \times A1}{12 \text{ in./ft.}} + \frac{F"HSGC/D" \times A2}{12 \text{ in./ft.}} = 410 \text{ Cu.Ft.}$$

F"HSGC" x A1 = 4,915 — F"HSGC/D" x A2 = 0

From Hydrocad determine the elevation that will hold back the required recharge volume:

Below is a excerpt from the stage storage table of Infiltration Pond 1.
Required Site Rv= 410

	Rv Provided	
IB-247	**190**	**C.F.**
IB-247-2	**155**	**C.F.**
IB-245	**326**	**C.F.**
IB-237	**911**	**C.F.**
IB-244	**606**	**C.F.**
Total Recharge	**2,188**	**C.F.**

Determine if the infiltration BMP will drain completely within 72 hours:

$$\text{Time drawdown} = \frac{Rv}{(K)\ (\text{Bottom Area})}$$

Rv = Storage Volume at Low Level Outlet (LLO) Elevation
K = Saturated Hydraulic Conductivity (Rawls Rate)
Bottom area = Bottom surface area not including sidewall

Btm Area	Time Drawdown:	
45	**50**	**Hours**
137	**13**	**Hours**
274	**14**	**Hours**
164	**65**	**Hours**
241	**30**	**Hours**

Result is satisfactory for design purposes — 65 hrs. < 72 hrs.

Stormwater runoff volumes to be treated for water quality

- Sediment Forebay Design Criteria: 0.1-inch of runoff x total impervious area of post-develo

SF-237

Required Storage Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.1 in runoff (Cu.Ft.)	
31S	8,921		
		75	**Required Storage**

From Hydrocad determine the elevation that will hold back the required storage:

Below is a excerpt from the stage storage table of Sediment Forebay.

75 Cu.Ft., the min. storage elevation required = 1007.76

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
1007	45	0		
1007.5	119	41	1007.76	El. At Req. Storage
1008	192	119	←	

*No weir proposed - assume top of check dam

The Weir Elevation has been designed at elevation: 1,007.80

Supplied Storage Volume: 83 Cu.Ft.

Stormwater runoff volumes to be treated for water quality

Stormwater Policy Standard 4: 0.5-inch of runoff x total impervious area of post-development site

IB-237

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 1.0 in runoff (Cu.Ft.)	
31S	8,921		
38S	1,439		
		863	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of the Infiltration basin.

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

863 Cu. Ft. min. W.Q.V. storage elev req'd = 1007.14

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
1005	164	0	1007.14	El. At Req. W.Q.V
1005.5	262	105		
1006	382	265		1007.2 - El @ Lowest Outlet
1006.5	506	487		
1007	648	775		
1007.5	808	1,138		
1008	985	1,586		
1008.5	1,235	2,140		
1009	1,513	2,825		

Lowest Outlet Elevation= 1,007.20

Supplied Water Quality Volume (Infiltration Bed):	***911 Cu.Ft.***

Stormwater runoff volumes to be treated for water quality

- Sediment Forebay Design Criteria: 0.1-inch of runoff x total impervious area of post-develo

SF-244

Required Storage Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.1 in runoff (Cu.Ft.)	
32S	5,964		
		50	**Required Storage**

From Hydrocad determine the elevation that will hold back the required storage:

Below is a excerpt from the stage storage table of Sediment Forebay.

50 Cu.Ft., the min. storage elevation required = 987.00

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
986	13	0		
986.5	50	16	987.00	El. At Req. Storage
987	87	50	←	

*No weir proposed - assume top of check dam

The Weir Elevation has been designed at elevation: 987.00

Supplied Storage Volume: 50 Cu.Ft.

Stormwater runoff volumes to be treated for water quality

Stormwater Policy Standard 4: 0.5-inch of runoff x total impervious area of post-development site

IB-244

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 1.0 in runoff (Cu.Ft.)	
32S	5,964		
37S	1,204		
		597	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of the Infiltration basin.

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

597 Cu. Ft. min. W.Q.V. storage elev req'd = 987.49

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
986	241	0	987.49	El. At Req. W.Q.V
986.5	341	145		
987	458	344		987.5 - El @ Lowest Outlet
987.5	592	606		
988	744	939		
988.5	960	1,364		
989	1,204	1,904		

Lowest Outlet Elevation= 987.50

Supplied Water Quality Volume (Infiltration Bed):	***606 Cu.Ft.***

Stormwater runoff volumes to be treated for water quality

- Sediment Forebay Design Criteria: 0.1-inch of runoff x total impervious area of post-develo

SF-245

Required Storage Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.1 in runoff (Cu.Ft.)	
30S	2,150		
		18	**Required Storage**

From Hydrocad determine the elevation that will hold back the required storage:

Below is a excerpt from the stage storage table of Sediment Forebay.

18 Cu.Ft., the min. storage elevation required = 967.40

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
967	18	0		
967.5	84	26	967.40	El. At Req. Storage
968	150	84	←	
968.5	387	218		

*No weir proposed - assume top of check dam

The Weir Elevation has been designed at elevation: 967.40

Supplied Storage Volume: 18 Cu.Ft.

Stormwater runoff volumes to be treated for water quality

- Sediment Forebay Design Criteria: 0.1-inch of runoff x total impervious area of post-develo

SF-245-2

Required Storage Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.1 in runoff (Cu.Ft.)	
30S	2,150		
		18	**Required Storage**

From Hydrocad determine the elevation that will hold back the required storage:

Below is a excerpt from the stage storage table of Sediment Forebay.

18 Cu.Ft., the min. storage elevation required = 966.56

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
966.1	18	0		
966.5	61	15	966.56	El. At Req. Storage
967	103	54	←	

*No weir proposed - assume top of check dam

The Weir Elevation has been designed at elevation: 966.60

Supplied Storage Volume: 21 Cu.Ft.

Stormwater runoff volumes to be treated for water quality

Stormwater Policy Standard 4: 0.5-inch of runoff x total impervious area of post-development site

IB-245

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 1.0 in runoff (Cu.Ft.)	
30S	2,150		
34S	1,760		
		326	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of the Infiltration basin.

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

326 Cu. Ft. min. W.Q.V. storage elev req'd = 966.93

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)	
966.1	274	0	966.93 El. At Req. W.Q.V
966.5	387	132	
967	555	366	967- El @ Lowest Outlet
967.5	754	692	
968	983	1,125	
968.5	1,760	1,801	

Lowest Outlet Elevation= 967.00

Supplied Water Quality Volume (Infiltration Bed):	***366 Cu.Ft.***

Stormwater runoff volumes to be treated for water quality

Stormwater Policy Standard 4: 0.5-inch of runoff x total impervious area of post-development site

IB-247

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 1.0 in runoff (Cu.Ft.)	
29S	1,524		
28S	740		
		189	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of the Infiltration basin.

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

189 Cu. Ft. min. W.Q.V. storage elev req'd = 991.20

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)	
990.1	45	0	991.20 El. At Req. W.Q.V
990.5	138	37	
991	254	135	991.2 - El @ Lowest Outlet
991.5	370	290	
992	486	504	
992.5	740	811	

Lowest Outlet Elevation= 991.20

Supplied Water Quality Volume (Infiltration Bed):	***190 Cu.Ft.***

Stormwater runoff volumes to be treated for water quality

Stormwater Policy Standard 4: 0.5-inch of runoff x total impervious area of post-development site

Infiltrators-2

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 1.0 in runoff (Cu.Ft.)	
28S	2,075		
35S	209		
		190	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of the Infiltration basin.

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

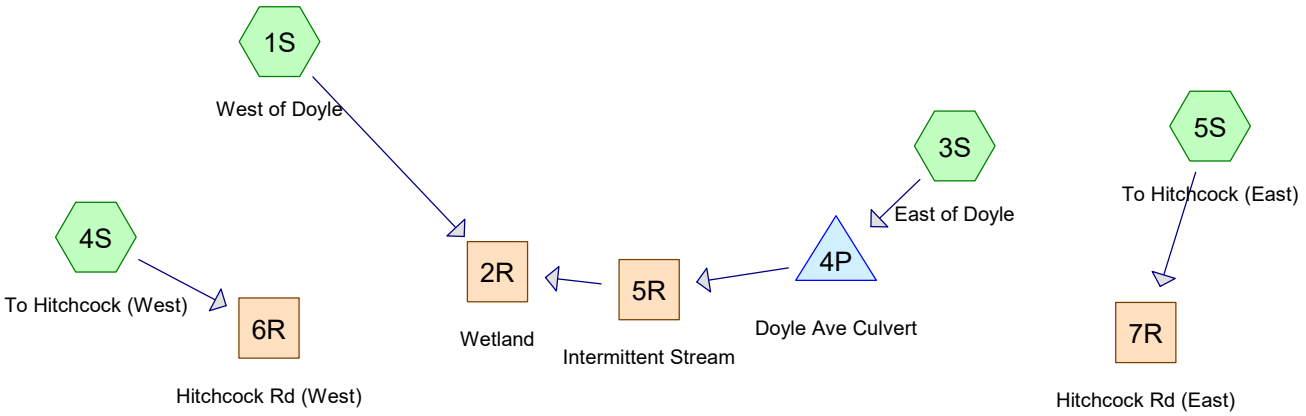
190 Cu. Ft. min. W.Q.V. storage elev req'd = 981.32

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
979.67	209	0	981.32	El. At Req. W.Q.V
980	209	28		
980.5	209	89		982.0- El @ Lowest Outlet
981	209	155		
981.5	209	206		
982	209	248		

Lowest Outlet Elevation= 982.00

Supplied Water Quality Volume (Infiltration Bed):	***248 Cu.Ft.***



Subcat Reach Pond Link

Routing Diagram for Full Doyle (Pre)
Prepared by HP, Printed 10/3/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.975	77	2 acre lots, 12% imp, HSG C (1S, 3S)
3.876	74	>75% Grass cover, Good, HSG C (3S)
1.401	96	Gravel surface, HSG C (1S, 3S)
0.440	98	Roofs, HSG C (1S, 3S)
122.857	70	Woods, Good, HSG C (1S, 3S, 4S, 5S)
135.550	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
135.550	HSG C	1S, 3S, 4S, 5S
0.000	HSG D	
0.000	Other	
135.550		**TOTAL AREA**

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,438,057 sf 0.34% Impervious Runoff Depth=0.68"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=12.68 cfs 1.874 af

Subcatchment 3S: East of Doyle Runoff Area=3,662,853 sf 1.39% Impervious Runoff Depth=0.68"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=17.99 cfs 4.774 af

Subcatchment 4S: To Hitchcock (West) Runoff Area=27,938 sf 0.00% Impervious Runoff Depth=0.64"
Tc=0.0 min CN=70 Runoff=0.49 cfs 0.034 af

Subcatchment 5S: To Hitchcock (East) Runoff Area=775,697 sf 0.00% Impervious Runoff Depth=0.64"
Flow Length=1,583' Slope=0.0530 '/' Tc=26.6 min CN=70 Runoff=6.76 cfs 0.947 af

Reach 2R: Wetland Inflow=21.40 cfs 6.648 af
Outflow=21.40 cfs 6.648 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.30' Max Vel=6.12 fps Inflow=17.64 cfs 4.774 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=17.63 cfs 4.774 af

Reach 6R: Hitchcock Rd (West) Inflow=0.49 cfs 0.034 af
Outflow=0.49 cfs 0.034 af

Reach 7R: Hitchcock Rd (East) Inflow=6.76 cfs 0.947 af
Outflow=6.76 cfs 0.947 af

Pond 4P: Doyle Ave Culvert Peak Elev=998.29' Storage=4,338 cf Inflow=17.99 cfs 4.774 af
Outflow=17.64 cfs 4.774 af

Total Runoff Area = 135.550 ac Runoff Volume = 7.628 af Average Runoff Depth = 0.68"
99.06% Pervious = 134.273 ac 0.94% Impervious = 1.277 ac

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,438,057 sf 0.34% Impervious Runoff Depth=1.65"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=33.94 cfs 4.528 af

Subcatchment 3S: East of Doyle Runoff Area=3,662,853 sf 1.39% Impervious Runoff Depth=1.65"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=48.60 cfs 11.533 af

Subcatchment 4S: To Hitchcock (West) Runoff Area=27,938 sf 0.00% Impervious Runoff Depth=1.58"
Tc=0.0 min CN=70 Runoff=1.40 cfs 0.084 af

Subcatchment 5S: To Hitchcock (East) Runoff Area=775,697 sf 0.00% Impervious Runoff Depth=1.58"
Flow Length=1,583' Slope=0.0530 '/' Tc=26.6 min CN=70 Runoff=18.89 cfs 2.338 af

Reach 2R: Wetland Inflow=59.50 cfs 16.060 af
Outflow=59.50 cfs 16.060 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.49' Max Vel=8.01 fps Inflow=48.60 cfs 11.533 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=48.59 cfs 11.533 af

Reach 6R: Hitchcock Rd (West) Inflow=1.40 cfs 0.084 af
Outflow=1.40 cfs 0.084 af

Reach 7R: Hitchcock Rd (East) Inflow=18.89 cfs 2.338 af
Outflow=18.89 cfs 2.338 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.31' Storage=12,731 cf Inflow=48.60 cfs 11.533 af
Outflow=48.60 cfs 11.533 af

Total Runoff Area = 135.550 ac Runoff Volume = 18.482 af Average Runoff Depth = 1.64"
99.06% Pervious = 134.273 ac 0.94% Impervious = 1.277 ac

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,438,057 sf 0.34% Impervious Runoff Depth=2.34"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=49.15 cfs 6.432 af

Subcatchment 3S: East of Doyle Runoff Area=3,662,853 sf 1.39% Impervious Runoff Depth=2.34"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=70.84 cfs 16.384 af

Subcatchment 4S: To Hitchcock (West) Runoff Area=27,938 sf 0.00% Impervious Runoff Depth=2.25"
Tc=0.0 min CN=70 Runoff=2.05 cfs 0.120 af

Subcatchment 5S: To Hitchcock (East) Runoff Area=775,697 sf 0.00% Impervious Runoff Depth=2.25"
Flow Length=1,583' Slope=0.0530 '/' Tc=26.6 min CN=70 Runoff=27.65 cfs 3.345 af

Reach 2R: Wetland Inflow=86.46 cfs 22.816 af
Outflow=86.46 cfs 22.816 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.58' Max Vel=8.84 fps Inflow=70.73 cfs 16.384 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=70.71 cfs 16.384 af

Reach 6R: Hitchcock Rd (West) Inflow=2.05 cfs 0.120 af
Outflow=2.05 cfs 0.120 af

Reach 7R: Hitchcock Rd (East) Inflow=27.65 cfs 3.345 af
Outflow=27.65 cfs 3.345 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.44' Storage=14,148 cf Inflow=70.84 cfs 16.384 af
Outflow=70.73 cfs 16.384 af

Total Runoff Area = 135.550 ac Runoff Volume = 26.281 af Average Runoff Depth = 2.33"
99.06% Pervious = 134.273 ac 0.94% Impervious = 1.277 ac

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,438,057 sf 0.34% Impervious Runoff Depth=2.88"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=61.08 cfs 7.930 af

Subcatchment 3S: East of Doyle Runoff Area=3,662,853 sf 1.39% Impervious Runoff Depth=2.88"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=88.22 cfs 20.200 af

Subcatchment 4S: To Hitchcock (West) Runoff Area=27,938 sf 0.00% Impervious Runoff Depth=2.79"
Tc=0.0 min CN=70 Runoff=2.56 cfs 0.149 af

Subcatchment 5S: To Hitchcock (East) Runoff Area=775,697 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=1,583' Slope=0.0530 '/' Tc=26.6 min CN=70 Runoff=34.50 cfs 4.139 af

Reach 2R: Wetland Inflow=107.67 cfs 28.130 af
Outflow=107.67 cfs 28.130 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.64' Max Vel=9.35 fps Inflow=88.09 cfs 20.200 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=88.07 cfs 20.200 af

Reach 6R: Hitchcock Rd (West) Inflow=2.56 cfs 0.149 af
Outflow=2.56 cfs 0.149 af

Reach 7R: Hitchcock Rd (East) Inflow=34.50 cfs 4.139 af
Outflow=34.50 cfs 4.139 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.52' Storage=15,065 cf Inflow=88.22 cfs 20.200 af
Outflow=88.09 cfs 20.200 af

Total Runoff Area = 135.550 ac Runoff Volume = 32.418 af Average Runoff Depth = 2.87"
99.06% Pervious = 134.273 ac 0.94% Impervious = 1.277 ac

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,438,057 sf 0.34% Impervious Runoff Depth=3.50"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=74.42 cfs 9.621 af

Subcatchment 3S: East of Doyle Runoff Area=3,662,853 sf 1.39% Impervious Runoff Depth=3.50"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=107.72 cfs 24.507 af

Subcatchment 4S: To Hitchcock (West) Runoff Area=27,938 sf 0.00% Impervious Runoff Depth=3.40"
Tc=0.0 min CN=70 Runoff=3.12 cfs 0.181 af

Subcatchment 5S: To Hitchcock (East) Runoff Area=775,697 sf 0.00% Impervious Runoff Depth=3.40"
Flow Length=1,583' Slope=0.0530 '/' Tc=26.6 min CN=70 Runoff=42.20 cfs 5.038 af

Reach 2R: Wetland Inflow=131.59 cfs 34.128 af
Outflow=131.59 cfs 34.128 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.70' Max Vel=9.85 fps Inflow=107.59 cfs 24.507 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=107.55 cfs 24.507 af

Reach 6R: Hitchcock Rd (West) Inflow=3.12 cfs 0.181 af
Outflow=3.12 cfs 0.181 af

Reach 7R: Hitchcock Rd (East) Inflow=42.20 cfs 5.038 af
Outflow=42.20 cfs 5.038 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.60' Storage=15,973 cf Inflow=107.72 cfs 24.507 af
Outflow=107.59 cfs 24.507 af

Total Runoff Area = 135.550 ac Runoff Volume = 39.348 af Average Runoff Depth = 3.48"
99.06% Pervious = 134.273 ac 0.94% Impervious = 1.277 ac

Summary for Subcatchment 1S: West of Doyle

Runoff = 33.94 cfs @ 12.47 hrs, Volume= 4.528 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,388,610	70	Woods, Good, HSG C
23,764	77	2 acre lots, 12% imp, HSG C
23,679	96	Gravel surface, HSG C
2,004	98	Roofs, HSG C
1,438,057	71	Weighted Average
1,433,201		99.66% Pervious Area
4,856		0.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.9	2,241	0.0610	1.17		**Lag/CN Method,**

Summary for Subcatchment 3S: East of Doyle

Runoff = 48.60 cfs @ 13.22 hrs, Volume= 11.533 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
3,159,423	70	Woods, Good, HSG C
168,851	74	>75% Grass cover, Good, HSG C
37,329	96	Gravel surface, HSG C
17,164	98	Roofs, HSG C
280,086	77	2 acre lots, 12% imp, HSG C
3,662,853	71	Weighted Average
3,612,079		98.61% Pervious Area
50,774		1.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
86.3	5,506	0.0350	1.06		**Lag/CN Method,**

Summary for Subcatchment 4S: To Hitchcock (West)

Runoff = 1.40 cfs @ 12.00 hrs, Volume= 0.084 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
27,938	70	Woods, Good, HSG C
27,938		100.00% Pervious Area

Summary for Subcatchment 5S: To Hitchcock (East)

Runoff = 18.89 cfs @ 12.39 hrs, Volume= 2.338 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
775,697	70	Woods, Good, HSG C
775,697		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.6	1,583	0.0530	0.99		**Lag/CN Method,**

Summary for Reach 2R: Wetland

Inflow Area = 117.101 ac, 1.09% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 59.50 cfs @ 13.08 hrs, Volume= 16.060 af
Outflow = 59.50 cfs @ 13.08 hrs, Volume= 16.060 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

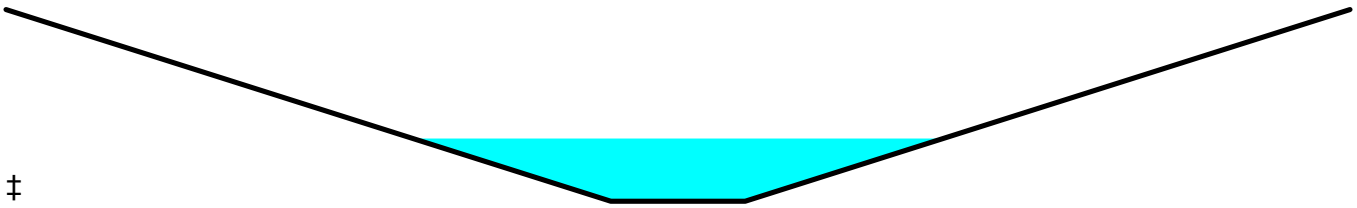
Summary for Reach 5R: Intermittent Stream

Inflow Area = 84.088 ac, 1.39% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 48.60 cfs @ 13.23 hrs, Volume= 11.533 af
Outflow = 48.59 cfs @ 13.23 hrs, Volume= 11.533 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.01 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.80 fps, Avg. Travel Time= 1.7 min

Peak Storage= 2,389 cf @ 13.23 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.50' Flow Area= 41.3 sf, Capacity= 638.10 cfs

5.00' x 1.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 15.0 '/' Top Width= 50.00'
Length= 394.0' Slope= 0.0878 '/'
Inlet Invert= 995.58', Outlet Invert= 961.00'



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Summary for Reach 6R: Hitchcock Rd (West)

Inflow Area = 0.641 ac, 0.00% Impervious, Inflow Depth = 1.58" for 10-Year event
Inflow = 1.40 cfs @ 12.00 hrs, Volume= 0.084 af
Outflow = 1.40 cfs @ 12.00 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach 7R: Hitchcock Rd (East)

Inflow Area = 17.808 ac, 0.00% Impervious, Inflow Depth = 1.58" for 10-Year event
Inflow = 18.89 cfs @ 12.39 hrs, Volume= 2.338 af
Outflow = 18.89 cfs @ 12.39 hrs, Volume= 2.338 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 4P: Doyle Ave Culvert

Inflow Area = 84.088 ac, 1.39% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 48.60 cfs @ 13.22 hrs, Volume= 11.533 af
Outflow = 48.60 cfs @ 13.23 hrs, Volume= 11.533 af, Atten= 0%, Lag= 0.4 min
Primary = 48.60 cfs @ 13.23 hrs, Volume= 11.533 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 999.31' @ 13.23 hrs Surf.Area= 10,676 sf Storage= 12,731 cf

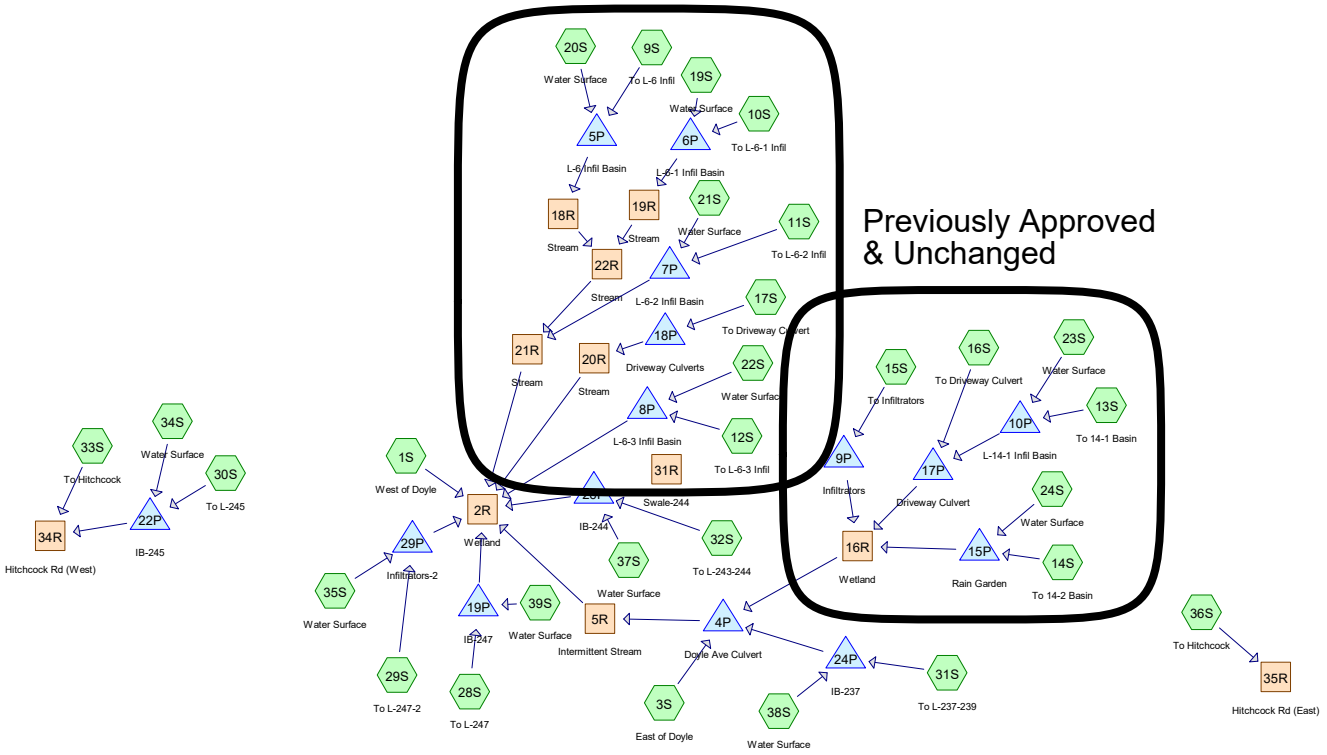
Plug-Flow detention time= 4.0 min calculated for 11.529 af (100% of inflow)
Center-of-Mass det. time= 4.0 min (931.0 - 927.0)

Volume	Invert	Avail.Storage	Storage Description
#1	995.85'	37,946 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
995.85	0	0	0
997.00	1,119	643	643
998.00	3,644	2,382	3,025
999.00	9,570	6,607	9,632
1,000.00	13,181	11,376	21,007
1,001.00	20,697	16,939	37,946

Device	Routing	Invert	Outlet Devices
#1	Primary	995.85'	**30.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 995.85' / 995.58' S= 0.0090 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 4.91 sf
#2	Primary	999.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 Width (feet) 30.00 125.00 172.00

Primary OutFlow Max=48.60 cfs @ 13.23 hrs HW=999.31' TW=996.07' (Dynamic Tailwater)
1=Culvert (Barrel Controls 25.50 cfs @ 5.19 fps)
2=Custom Weir/Orifice (Weir Controls 23.10 cfs @ 1.69 fps)



Subcat Reach Pond Link

Routing Diagram for Full Doyle (For Print)
Prepared by HP, Printed 10/18/2023
HydroCAD® 10.00-24 s/n 01440 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.011	77	2 acre lots, 12% imp, HSG C (1S, 3S, 9S, 13S, 16S)
10.304	74	>75% Grass cover, Good, HSG C (1S, 3S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 28S, 29S, 30S, 31S, 32S, 33S, 36S)
1.401	96	Gravel surface, HSG C (1S, 3S, 16S, 17S)
1.068	98	Paved parking, HSG C (3S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 17S, 28S, 29S, 30S, 31S, 32S)
0.021	98	Paved roads w/curbs & sewers, HSG C (16S)
0.983	98	Roofs, HSG C (1S, 3S, 9S, 10S, 11S, 12S, 13S, 14S, 31S, 32S, 36S)
0.347	98	Water Surface, HSG C (19S, 20S, 21S, 22S, 23S, 24S, 34S, 35S, 37S, 38S, 39S)
114.415	70	Woods, Good, HSG C (1S, 3S, 9S, 11S, 12S, 13S, 15S, 16S, 17S, 28S, 30S, 31S, 32S, 36S)
135.550	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
135.550	HSG C	1S, 3S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 19S, 20S, 21S, 22S, 23S, 24S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S
0.000	HSG D	
0.000	Other	
135.550		**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,118,080 sf 0.85% Impervious Runoff Depth=0.68"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=9.86 cfs 1.457 af

Subcatchment 3S: East of Doyle Runoff Area=3,283,926 sf 1.40% Impervious Runoff Depth=0.68"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=16.13 cfs 4.280 af

Subcatchment 9S: To L-6 Infil Runoff Area=99,742 sf 10.40% Impervious Runoff Depth=0.82"
Flow Length=544' Slope=0.0810 '/' Tc=8.2 min CN=74 Runoff=1.87 cfs 0.157 af

Subcatchment 10S: To L-6-1 Infil Runoff Area=22,785 sf 19.41% Impervious Runoff Depth=1.09"
Tc=6.0 min CN=79 Runoff=0.65 cfs 0.047 af

Subcatchment 11S: To L-6-2 Infil Runoff Area=34,234 sf 20.06% Impervious Runoff Depth=0.98"
Flow Length=442' Slope=0.0250 '/' Tc=11.5 min CN=77 Runoff=0.71 cfs 0.064 af

Subcatchment 12S: To L-6-3 Infil Runoff Area=23,257 sf 24.93% Impervious Runoff Depth=1.09"
Flow Length=402' Slope=0.0420 '/' Tc=7.7 min CN=79 Runoff=0.62 cfs 0.048 af

Subcatchment 13S: To 14-1 Basin Runoff Area=149,214 sf 9.43% Impervious Runoff Depth=0.82"
Flow Length=1,061' Slope=0.0600 '/' Tc=16.3 min CN=74 Runoff=2.20 cfs 0.234 af

Subcatchment 14S: To 14-2 Basin Runoff Area=7,147 sf 35.48% Impervious Runoff Depth=1.33"
Tc=6.0 min CN=83 Runoff=0.26 cfs 0.018 af

Subcatchment 15S: To Infiltrators Runoff Area=10,302 sf 32.33% Impervious Runoff Depth=1.09"
Tc=6.0 min CN=79 Runoff=0.29 cfs 0.021 af

Subcatchment 16S: To Driveway Culvert Runoff Area=153,405 sf 1.08% Impervious Runoff Depth=0.73"
Flow Length=1,094' Slope=0.0740 '/' Tc=15.9 min CN=72 Runoff=1.95 cfs 0.213 af

Subcatchment 17S: To Driveway Culvert Runoff Area=72,047 sf 0.22% Impervious Runoff Depth=0.68"
Tc=6.0 min CN=71 Runoff=1.15 cfs 0.094 af

Subcatchment 19S: Water Surface Runoff Area=1,426 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 20S: Water Surface Runoff Area=2,441 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.012 af

Subcatchment 21S: Water Surface Runoff Area=2,080 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.010 af

Subcatchment 22S: Water Surface Runoff Area=1,890 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment 23S: Water Surface Runoff Area=836 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 24S: Water Surface Runoff Area=1,097 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 28S: To L-247 Runoff Area=6,378 sf 23.89% Impervious Runoff Depth=1.09"
Tc=6.0 min CN=79 Runoff=0.18 cfs 0.013 af

Subcatchment 29S: To L-247-2 Runoff Area=11,814 sf 17.56% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=78 Runoff=0.32 cfs 0.023 af

Subcatchment 30S: To L-245 Runoff Area=21,008 sf 10.23% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=75 Runoff=0.46 cfs 0.035 af

Subcatchment 31S: To L-237-239 Runoff Area=54,940 sf 16.24% Impervious Runoff Depth=0.98"
Tc=6.0 min CN=77 Runoff=1.38 cfs 0.102 af

Subcatchment 32S: To L-243-244 Runoff Area=47,010 sf 12.69% Impervious Runoff Depth=0.92"
Tc=6.0 min CN=76 Runoff=1.10 cfs 0.083 af

Subcatchment 33S: To Hitchcock Runoff Area=1,263 sf 0.00% Impervious Runoff Depth=0.82"
Tc=6.0 min CN=74 Runoff=0.03 cfs 0.002 af

Subcatchment 34S: Water Surface Runoff Area=1,760 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment 35S: Water Surface Runoff Area=209 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.01 cfs 0.001 af

Subcatchment 36S: To Hitchcock Runoff Area=772,871 sf 0.20% Impervious Runoff Depth=0.64"
Flow Length=1,683' Slope=0.0530 '/' Tc=27.9 min CN=70 Runoff=6.60 cfs 0.943 af

Subcatchment 37S: Water Surface Runoff Area=1,204 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.006 af

Subcatchment 38S: Water Surface Runoff Area=1,439 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 39S: Water Surface Runoff Area=740 sf 100.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Reach 2R: Wetland Inflow=20.91 cfs 6.802 af
Outflow=20.91 cfs 6.802 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.30' Max Vel=6.05 fps Inflow=16.96 cfs 4.840 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=16.96 cfs 4.840 af

Reach 16R: Wetland Avg. Flow Depth=0.26' Max Vel=0.80 fps Inflow=4.33 cfs 0.471 af
n=0.100 L=505.0' S=0.0301 '/' Capacity=65.53 cfs Outflow=3.52 cfs 0.471 af

Reach 18R: Stream Avg. Flow Depth=0.22' Max Vel=1.29 fps Inflow=1.91 cfs 0.153 af
n=0.040 L=195.0' S=0.0154 '/' Capacity=46.68 cfs Outflow=1.81 cfs 0.153 af

Reach 19R: Stream Avg. Flow Depth=0.09' Max Vel=1.14 fps Inflow=0.52 cfs 0.045 af
n=0.040 L=406.0' S=0.0419 '/' Capacity=77.01 cfs Outflow=0.39 cfs 0.045 af

Reach 20R: Stream Avg. Flow Depth=0.11' Max Vel=1.95 fps Inflow=1.13 cfs 0.094 af
n=0.040 L=362.0' S=0.0925 '/' Capacity=314.84 cfs Outflow=1.04 cfs 0.094 af

Reach 21R: Stream Avg. Flow Depth=0.20' Max Vel=1.92 fps Inflow=2.38 cfs 0.259 af
n=0.040 L=400.0' S=0.0400 '/' Capacity=75.27 cfs Outflow=2.25 cfs 0.259 af

Reach 22R: Stream Avg. Flow Depth=0.17' Max Vel=2.21 fps Inflow=2.11 cfs 0.198 af
n=0.040 L=292.0' S=0.0651 '/' Capacity=96.00 cfs Outflow=2.05 cfs 0.198 af

Reach 31R: Swale-244 Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.150 L=350.0' S=0.0571 '/' Capacity=6.87 cfs Outflow=0.00 cfs 0.000 af

Reach 34R: Hitchcock Rd (West) Inflow=0.32 cfs 0.037 af
Outflow=0.32 cfs 0.037 af

Reach 35R: Hitchcock Rd (East) Inflow=6.60 cfs 0.943 af
Outflow=6.60 cfs 0.943 af

Pond 4P: Doyle Ave Culvert Peak Elev=998.23' Storage=4,005 cf Inflow=17.20 cfs 4.840 af
Outflow=16.96 cfs 4.840 af

Pond 5P: L-6 Infil Basin Peak Elev=1,041.22' Storage=971 cf Inflow=2.01 cfs 0.169 af
Outflow=1.91 cfs 0.153 af

Pond 6P: L-6-1 Infil Basin Peak Elev=1,031.55' Storage=652 cf Inflow=0.74 cfs 0.055 af
Outflow=0.52 cfs 0.045 af

Pond 7P: L-6-2 Infil Basin Peak Elev=1,010.46' Storage=985 cf Inflow=0.80 cfs 0.074 af
Outflow=0.44 cfs 0.061 af

Pond 8P: L-6-3 Infil Basin Peak Elev=992.92' Storage=786 cf Inflow=0.74 cfs 0.058 af
Outflow=0.38 cfs 0.047 af

Pond 9P: Infiltrators Peak Elev=1,015.65' Storage=100 cf Inflow=0.29 cfs 0.021 af
Outflow=0.28 cfs 0.020 af

Pond 10P: L-14-1 Infil Basin Peak Elev=1,029.37' Storage=597 cf Inflow=2.23 cfs 0.238 af
Outflow=2.22 cfs 0.227 af

Pond 15P: Rain Garden Peak Elev=1,020.02' Storage=557 cf Inflow=0.32 cfs 0.024 af
Outflow=0.06 cfs 0.011 af

Pond 17P: Driveway Culvert Peak Elev=1,015.80' Storage=124 cf Inflow=4.17 cfs 0.440 af
Outflow=4.17 cfs 0.440 af

Pond 18P: Driveway Culverts Peak Elev=1,000.34' Storage=58 cf Inflow=1.15 cfs 0.094 af
Outflow=1.13 cfs 0.094 af

Pond 19P: IB-247 Peak Elev=991.25' Storage=207 cf Inflow=0.23 cfs 0.017 af
Outflow=0.20 cfs 0.013 af

Pond 22P: IB-245 Peak Elev=967.31' Storage=553 cf Inflow=0.57 cfs 0.044 af
Outflow=0.30 cfs 0.035 af

Pond 24P: IB-237 Peak Elev=1,007.39' Storage=1,049 cf Inflow=1.47 cfs 0.110 af
Outflow=1.27 cfs 0.089 af

Pond 26P: IB-244 Peak Elev=987.67' Storage=711 cf Inflow=1.18 cfs 0.089 af
Outflow=1.11 cfs 0.075 af

Pond 29P: Infiltrators-2 Peak Elev=982.03' Storage=248 cf Inflow=0.33 cfs 0.024 af
Outflow=0.55 cfs 0.019 af

Total Runoff Area = 135.550 ac Runoff Volume = 7.912 af Average Runoff Depth = 0.70"
97.60% Pervious = 132.290 ac 2.40% Impervious = 3.260 ac

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,118,080 sf 0.85% Impervious Runoff Depth=1.65"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=26.39 cfs 3.520 af

Subcatchment 3S: East of Doyle Runoff Area=3,283,926 sf 1.40% Impervious Runoff Depth=1.65"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=43.57 cfs 10.340 af

Subcatchment 9S: To L-6 Infil Runoff Area=99,742 sf 10.40% Impervious Runoff Depth=1.87"
Flow Length=544' Slope=0.0810 '/' Tc=8.2 min CN=74 Runoff=4.57 cfs 0.356 af

Subcatchment 10S: To L-6-1 Infil Runoff Area=22,785 sf 19.41% Impervious Runoff Depth=2.26"
Tc=6.0 min CN=79 Runoff=1.39 cfs 0.098 af

Subcatchment 11S: To L-6-2 Infil Runoff Area=34,234 sf 20.06% Impervious Runoff Depth=2.10"
Flow Length=442' Slope=0.0250 '/' Tc=11.5 min CN=77 Runoff=1.60 cfs 0.137 af

Subcatchment 12S: To L-6-3 Infil Runoff Area=23,257 sf 24.93% Impervious Runoff Depth=2.26"
Flow Length=402' Slope=0.0420 '/' Tc=7.7 min CN=79 Runoff=1.33 cfs 0.101 af

Subcatchment 13S: To 14-1 Basin Runoff Area=149,214 sf 9.43% Impervious Runoff Depth=1.87"
Flow Length=1,061' Slope=0.0600 '/' Tc=16.3 min CN=74 Runoff=5.40 cfs 0.532 af

Subcatchment 14S: To 14-2 Basin Runoff Area=7,147 sf 35.48% Impervious Runoff Depth=2.60"
Tc=6.0 min CN=83 Runoff=0.50 cfs 0.036 af

Subcatchment 15S: To Infiltrators Runoff Area=10,302 sf 32.33% Impervious Runoff Depth=2.26"
Tc=6.0 min CN=79 Runoff=0.63 cfs 0.045 af

Subcatchment 16S: To Driveway Culvert Runoff Area=153,405 sf 1.08% Impervious Runoff Depth=1.72"
Flow Length=1,094' Slope=0.0740 '/' Tc=15.9 min CN=72 Runoff=5.10 cfs 0.504 af

Subcatchment 17S: To Driveway Culvert Runoff Area=72,047 sf 0.22% Impervious Runoff Depth=1.65"
Tc=6.0 min CN=71 Runoff=3.11 cfs 0.227 af

Subcatchment 19S: Water Surface Runoff Area=1,426 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 20S: Water Surface Runoff Area=2,441 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.019 af

Subcatchment 21S: Water Surface Runoff Area=2,080 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.016 af

Subcatchment 22S: Water Surface Runoff Area=1,890 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 23S: Water Surface Runoff Area=836 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.007 af

Subcatchment 24S: Water Surface Runoff Area=1,097 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment 28S: To L-247 Runoff Area=6,378 sf 23.89% Impervious Runoff Depth=2.26"
Tc=6.0 min CN=79 Runoff=0.39 cfs 0.028 af

Subcatchment 29S: To L-247-2 Runoff Area=11,814 sf 17.56% Impervious Runoff Depth=2.18"
Tc=6.0 min CN=78 Runoff=0.69 cfs 0.049 af

Subcatchment 30S: To L-245 Runoff Area=21,008 sf 10.23% Impervious Runoff Depth=1.94"
Tc=6.0 min CN=75 Runoff=1.09 cfs 0.078 af

Subcatchment 31S: To L-237-239 Runoff Area=54,940 sf 16.24% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=77 Runoff=3.09 cfs 0.220 af

Subcatchment 32S: To L-243-244 Runoff Area=47,010 sf 12.69% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=76 Runoff=2.54 cfs 0.182 af

Subcatchment 33S: To Hitchcock Runoff Area=1,263 sf 0.00% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=74 Runoff=0.06 cfs 0.005 af

Subcatchment 34S: Water Surface Runoff Area=1,760 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 35S: Water Surface Runoff Area=209 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.02 cfs 0.002 af

Subcatchment 36S: To Hitchcock Runoff Area=772,871 sf 0.20% Impervious Runoff Depth=1.58"
Flow Length=1,683' Slope=0.0530 '/' Tc=27.9 min CN=70 Runoff=18.43 cfs 2.329 af

Subcatchment 37S: Water Surface Runoff Area=1,204 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.009 af

Subcatchment 38S: Water Surface Runoff Area=1,439 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 39S: Water Surface Runoff Area=740 sf 100.00% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Reach 2R: Wetland Inflow=57.04 cfs 16.359 af
Outflow=57.04 cfs 16.359 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.48' Max Vel=7.90 fps Inflow=45.95 cfs 11.657 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=45.94 cfs 11.657 af

Reach 16R: Wetland Avg. Flow Depth=0.42' Max Vel=1.10 fps Inflow=11.22 cfs 1.106 af
n=0.100 L=505.0' S=0.0301 '/' Capacity=65.53 cfs Outflow=9.98 cfs 1.106 af

Reach 18R: Stream Avg. Flow Depth=0.34' Max Vel=1.71 fps Inflow=4.66 cfs 0.359 af
n=0.040 L=195.0' S=0.0154 '/' Capacity=46.68 cfs Outflow=4.54 cfs 0.359 af

Reach 19R: Stream Avg. Flow Depth=0.15' Max Vel=1.66 fps Inflow=1.48 cfs 0.101 af
n=0.040 L=406.0' S=0.0419 '/' Capacity=77.01 cfs Outflow=1.32 cfs 0.101 af

Reach 20R: Stream Avg. Flow Depth=0.17' Max Vel=2.67 fps Inflow=3.04 cfs 0.227 af
n=0.040 L=362.0' S=0.0925 '/' Capacity=314.84 cfs Outflow=2.91 cfs 0.227 af

Reach 21R: Stream Avg. Flow Depth=0.32' Max Vel=2.64 fps Inflow=6.55 cfs 0.600 af
n=0.040 L=400.0' S=0.0400 '/' Capacity=75.27 cfs Outflow=6.33 cfs 0.600 af

Reach 22R: Stream Avg. Flow Depth=0.27' Max Vel=3.04 fps Inflow=5.86 cfs 0.460 af
n=0.040 L=292.0' S=0.0651 '/' Capacity=96.00 cfs Outflow=5.76 cfs 0.460 af

Reach 31R: Swale-244 Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.150 L=350.0' S=0.0571 '/' Capacity=6.87 cfs Outflow=0.00 cfs 0.000 af

Reach 34R: Hitchcock Rd (West) Inflow=1.21 cfs 0.088 af
Outflow=1.21 cfs 0.088 af

Reach 35R: Hitchcock Rd (East) Inflow=18.43 cfs 2.329 af
Outflow=18.43 cfs 2.329 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.29' Storage=12,532 cf Inflow=46.05 cfs 11.657 af
Outflow=45.95 cfs 11.657 af

Pond 5P: L-6 Infil Basin Peak Elev=1,041.40' Storage=1,212 cf Inflow=4.79 cfs 0.375 af
Outflow=4.66 cfs 0.359 af

Pond 6P: L-6-1 Infil Basin Peak Elev=1,031.65' Storage=731 cf Inflow=1.52 cfs 0.110 af
Outflow=1.48 cfs 0.101 af

Pond 7P: L-6-2 Infil Basin Peak Elev=1,011.20' Storage=1,792 cf Inflow=1.75 cfs 0.154 af
Outflow=0.92 cfs 0.140 af

Pond 8P: L-6-3 Infil Basin Peak Elev=993.45' Storage=1,311 cf Inflow=1.51 cfs 0.115 af
Outflow=0.79 cfs 0.104 af

Pond 9P: Infiltrators Peak Elev=1,015.84' Storage=141 cf Inflow=0.63 cfs 0.045 af
Outflow=0.55 cfs 0.043 af

Pond 10P: L-14-1 Infil Basin Peak Elev=1,029.51' Storage=675 cf Inflow=5.44 cfs 0.539 af
Outflow=5.43 cfs 0.527 af

Pond 15P: Rain Garden Peak Elev=1,020.07' Storage=608 cf Inflow=0.61 cfs 0.044 af
Outflow=0.57 cfs 0.032 af

Pond 17P: Driveway Culvert Peak Elev=1,016.22' Storage=375 cf Inflow=10.53 cfs 1.031 af
Outflow=10.48 cfs 1.031 af

Pond 18P: Driveway Culverts Peak Elev=1,000.60' Storage=171 cf Inflow=3.11 cfs 0.227 af
Outflow=3.04 cfs 0.227 af

Pond 19P: IB-247 Peak Elev=991.29' Storage=219 cf Inflow=0.46 cfs 0.033 af
Outflow=0.45 cfs 0.029 af

Pond 22P: IB-245 Peak Elev=967.56' Storage=739 cf Inflow=1.26 cfs 0.092 af
Outflow=1.15 cfs 0.083 af

Pond 24P: IB-237 Peak Elev=1,007.55' Storage=1,175 cf Inflow=3.23 cfs 0.232 af
Outflow=3.16 cfs 0.211 af

Pond 26P: IB-244 Peak Elev=987.80' Storage=799 cf Inflow=2.66 cfs 0.191 af
Outflow=2.61 cfs 0.177 af

Pond 29P: Infiltrators-2 Peak Elev=982.04' Storage=248 cf Inflow=0.71 cfs 0.051 af
Outflow=0.77 cfs 0.045 af

Total Runoff Area = 135.550 ac Runoff Volume = 18.906 af Average Runoff Depth = 1.67"
97.60% Pervious = 132.290 ac 2.40% Impervious = 3.260 ac

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,118,080 sf 0.85% Impervious Runoff Depth=2.34"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=38.21 cfs 5.001 af

Subcatchment 3S: East of Doyle Runoff Area=3,283,926 sf 1.40% Impervious Runoff Depth=2.34"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=63.51 cfs 14.689 af

Subcatchment 9S: To L-6 Infil Runoff Area=99,742 sf 10.40% Impervious Runoff Depth=2.60"
Flow Length=544' Slope=0.0810 '/' Tc=8.2 min CN=74 Runoff=6.44 cfs 0.496 af

Subcatchment 10S: To L-6-1 Infil Runoff Area=22,785 sf 19.41% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=79 Runoff=1.87 cfs 0.133 af

Subcatchment 11S: To L-6-2 Infil Runoff Area=34,234 sf 20.06% Impervious Runoff Depth=2.87"
Flow Length=442' Slope=0.0250 '/' Tc=11.5 min CN=77 Runoff=2.20 cfs 0.188 af

Subcatchment 12S: To L-6-3 Infil Runoff Area=23,257 sf 24.93% Impervious Runoff Depth=3.05"
Flow Length=402' Slope=0.0420 '/' Tc=7.7 min CN=79 Runoff=1.80 cfs 0.136 af

Subcatchment 13S: To 14-1 Basin Runoff Area=149,214 sf 9.43% Impervious Runoff Depth=2.60"
Flow Length=1,061' Slope=0.0600 '/' Tc=16.3 min CN=74 Runoff=7.61 cfs 0.742 af

Subcatchment 14S: To 14-2 Basin Runoff Area=7,147 sf 35.48% Impervious Runoff Depth=3.44"
Tc=6.0 min CN=83 Runoff=0.66 cfs 0.047 af

Subcatchment 15S: To Infiltrators Runoff Area=10,302 sf 32.33% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=79 Runoff=0.85 cfs 0.060 af

Subcatchment 16S: To Driveway Culvert Runoff Area=153,405 sf 1.08% Impervious Runoff Depth=2.42"
Flow Length=1,094' Slope=0.0740 '/' Tc=15.9 min CN=72 Runoff=7.32 cfs 0.711 af

Subcatchment 17S: To Driveway Culvert Runoff Area=72,047 sf 0.22% Impervious Runoff Depth=2.34"
Tc=6.0 min CN=71 Runoff=4.49 cfs 0.322 af

Subcatchment 19S: Water Surface Runoff Area=1,426 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 20S: Water Surface Runoff Area=2,441 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.29 cfs 0.024 af

Subcatchment 21S: Water Surface Runoff Area=2,080 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.020 af

Subcatchment 22S: Water Surface Runoff Area=1,890 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 23S: Water Surface Runoff Area=836 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 24S: Water Surface Runoff Area=1,097 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 28S: To L-247 Runoff Area=6,378 sf 23.89% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=79 Runoff=0.52 cfs 0.037 af

Subcatchment 29S: To L-247-2 Runoff Area=11,814 sf 17.56% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=78 Runoff=0.94 cfs 0.067 af

Subcatchment 30S: To L-245 Runoff Area=21,008 sf 10.23% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=75 Runoff=1.52 cfs 0.108 af

Subcatchment 31S: To L-237-239 Runoff Area=54,940 sf 16.24% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=77 Runoff=4.24 cfs 0.301 af

Subcatchment 32S: To L-243-244 Runoff Area=47,010 sf 12.69% Impervious Runoff Depth=2.78"
Tc=6.0 min CN=76 Runoff=3.51 cfs 0.250 af

Subcatchment 33S: To Hitchcock Runoff Area=1,263 sf 0.00% Impervious Runoff Depth=2.60"
Tc=6.0 min CN=74 Runoff=0.09 cfs 0.006 af

Subcatchment 34S: Water Surface Runoff Area=1,760 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.017 af

Subcatchment 35S: Water Surface Runoff Area=209 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.02 cfs 0.002 af

Subcatchment 36S: To Hitchcock Runoff Area=772,871 sf 0.20% Impervious Runoff Depth=2.25"
Flow Length=1,683' Slope=0.0530 '/' Tc=27.9 min CN=70 Runoff=26.93 cfs 3.332 af

Subcatchment 37S: Water Surface Runoff Area=1,204 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

Subcatchment 38S: Water Surface Runoff Area=1,439 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 39S: Water Surface Runoff Area=740 sf 100.00% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Reach 2R: Wetland Inflow=83.47 cfs 23.188 af
Outflow=83.47 cfs 23.188 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.57' Max Vel=8.70 fps Inflow=66.64 cfs 16.536 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=66.62 cfs 16.536 af

Reach 16R: Wetland Avg. Flow Depth=0.50' Max Vel=1.23 fps Inflow=15.78 cfs 1.553 af
n=0.100 L=505.0' S=0.0301 '/' Capacity=65.53 cfs Outflow=14.43 cfs 1.553 af

Reach 18R: Stream Avg. Flow Depth=0.40' Max Vel=1.90 fps Inflow=6.55 cfs 0.503 af
n=0.040 L=195.0' S=0.0154 '/' Capacity=46.68 cfs Outflow=6.41 cfs 0.503 af

Reach 19R: Stream Avg. Flow Depth=0.18' Max Vel=1.83 fps Inflow=1.99 cfs 0.138 af
n=0.040 L=406.0' S=0.0419 '/' Capacity=77.01 cfs Outflow=1.81 cfs 0.138 af

Reach 20R: Stream Avg. Flow Depth=0.20' Max Vel=2.99 fps Inflow=4.36 cfs 0.322 af
n=0.040 L=362.0' S=0.0925 '/' Capacity=314.84 cfs Outflow=4.22 cfs 0.322 af

Reach 21R: Stream Avg. Flow Depth=0.38' Max Vel=2.97 fps Inflow=9.54 cfs 0.835 af
n=0.040 L=400.0' S=0.0400 '/' Capacity=75.27 cfs Outflow=9.30 cfs 0.835 af

Reach 22R: Stream Avg. Flow Depth=0.32' Max Vel=3.37 fps Inflow=8.20 cfs 0.641 af
n=0.040 L=292.0' S=0.0651 '/' Capacity=96.00 cfs Outflow=8.09 cfs 0.641 af

Reach 31R: Swale-244 Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.150 L=350.0' S=0.0571 '/' Capacity=6.87 cfs Outflow=0.00 cfs 0.000 af

Reach 34R: Hitchcock Rd (West) Inflow=1.75 cfs 0.123 af
Outflow=1.75 cfs 0.123 af

Reach 35R: Hitchcock Rd (East) Inflow=26.93 cfs 3.332 af
Outflow=26.93 cfs 3.332 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.41' Storage=13,912 cf Inflow=66.75 cfs 16.536 af
Outflow=66.64 cfs 16.536 af

Pond 5P: L-6 Infil Basin Peak Elev=1,041.50' Storage=1,360 cf Inflow=6.71 cfs 0.519 af
Outflow=6.55 cfs 0.503 af

Pond 6P: L-6-1 Infil Basin Peak Elev=1,031.69' Storage=766 cf Inflow=2.04 cfs 0.147 af
Outflow=1.99 cfs 0.138 af

Pond 7P: L-6-2 Infil Basin Peak Elev=1,011.34' Storage=1,972 cf Inflow=2.38 cfs 0.208 af
Outflow=1.95 cfs 0.194 af

Pond 8P: L-6-3 Infil Basin Peak Elev=993.61' Storage=1,490 cf Inflow=2.02 cfs 0.154 af
Outflow=1.52 cfs 0.143 af

Pond 9P: Infiltrators Peak Elev=1,016.07' Storage=186 cf Inflow=0.85 cfs 0.060 af
Outflow=0.72 cfs 0.059 af

Pond 10P: L-14-1 Infil Basin Peak Elev=1,029.59' Storage=722 cf Inflow=7.66 cfs 0.750 af
Outflow=7.65 cfs 0.738 af

Pond 15P: Rain Garden Peak Elev=1,020.09' Storage=622 cf Inflow=0.79 cfs 0.058 af
Outflow=0.76 cfs 0.045 af

Pond 17P: Driveway Culvert Peak Elev=1,016.49' Storage=675 cf Inflow=14.97 cfs 1.449 af
Outflow=14.81 cfs 1.449 af

Pond 18P: Driveway Culverts Peak Elev=1,000.74' Storage=265 cf Inflow=4.49 cfs 0.322 af
Outflow=4.36 cfs 0.322 af

Pond 19P: IB-247 Peak Elev=991.31' Storage=226 cf Inflow=0.61 cfs 0.044 af
Outflow=0.61 cfs 0.040 af

Pond 22P: IB-245 Peak Elev=967.61' Storage=780 cf Inflow=1.73 cfs 0.125 af
Outflow=1.66 cfs 0.117 af

Pond 24P: IB-237 Peak Elev=1,007.63' Storage=1,243 cf Inflow=4.41 cfs 0.315 af
Outflow=4.33 cfs 0.294 af

Pond 26P: IB-244 Peak Elev=987.88' Storage=850 cf Inflow=3.66 cfs 0.261 af
Outflow=3.60 cfs 0.247 af

Pond 29P: Infiltrators-2 Peak Elev=982.04' Storage=248 cf Inflow=0.97 cfs 0.069 af
Outflow=0.97 cfs 0.063 af

Total Runoff Area = 135.550 ac Runoff Volume = 26.773 af Average Runoff Depth = 2.37"
97.60% Pervious = 132.290 ac 2.40% Impervious = 3.260 ac

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,118,080 sf 0.85% Impervious Runoff Depth=2.88"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=47.49 cfs 6.166 af

Subcatchment 3S: East of Doyle Runoff Area=3,283,926 sf 1.40% Impervious Runoff Depth=2.88"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=79.09 cfs 18.110 af

Subcatchment 9S: To L-6 Infil Runoff Area=99,742 sf 10.40% Impervious Runoff Depth=3.17"
Flow Length=544' Slope=0.0810 '/' Tc=8.2 min CN=74 Runoff=7.88 cfs 0.605 af

Subcatchment 10S: To L-6-1 Infil Runoff Area=22,785 sf 19.41% Impervious Runoff Depth=3.66"
Tc=6.0 min CN=79 Runoff=2.24 cfs 0.160 af

Subcatchment 11S: To L-6-2 Infil Runoff Area=34,234 sf 20.06% Impervious Runoff Depth=3.46"
Flow Length=442' Slope=0.0250 '/' Tc=11.5 min CN=77 Runoff=2.66 cfs 0.227 af

Subcatchment 12S: To L-6-3 Infil Runoff Area=23,257 sf 24.93% Impervious Runoff Depth=3.66"
Flow Length=402' Slope=0.0420 '/' Tc=7.7 min CN=79 Runoff=2.16 cfs 0.163 af

Subcatchment 13S: To 14-1 Basin Runoff Area=149,214 sf 9.43% Impervious Runoff Depth=3.17"
Flow Length=1,061' Slope=0.0600 '/' Tc=16.3 min CN=74 Runoff=9.32 cfs 0.904 af

Subcatchment 14S: To 14-2 Basin Runoff Area=7,147 sf 35.48% Impervious Runoff Depth=4.07"
Tc=6.0 min CN=83 Runoff=0.77 cfs 0.056 af

Subcatchment 15S: To Infiltrators Runoff Area=10,302 sf 32.33% Impervious Runoff Depth=3.66"
Tc=6.0 min CN=79 Runoff=1.01 cfs 0.072 af

Subcatchment 16S: To Driveway Culvert Runoff Area=153,405 sf 1.08% Impervious Runoff Depth=2.98"
Flow Length=1,094' Slope=0.0740 '/' Tc=15.9 min CN=72 Runoff=9.05 cfs 0.874 af

Subcatchment 17S: To Driveway Culvert Runoff Area=72,047 sf 0.22% Impervious Runoff Depth=2.88"
Tc=6.0 min CN=71 Runoff=5.57 cfs 0.397 af

Subcatchment 19S: Water Surface Runoff Area=1,426 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.016 af

Subcatchment 20S: Water Surface Runoff Area=2,441 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.027 af

Subcatchment 21S: Water Surface Runoff Area=2,080 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af

Subcatchment 22S: Water Surface Runoff Area=1,890 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.021 af

Subcatchment 23S: Water Surface Runoff Area=836 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment 24S: Water Surface Runoff Area=1,097 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 28S: To L-247 Runoff Area=6,378 sf 23.89% Impervious Runoff Depth=3.66"
Tc=6.0 min CN=79 Runoff=0.63 cfs 0.045 af

Subcatchment 29S: To L-247-2 Runoff Area=11,814 sf 17.56% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=78 Runoff=1.13 cfs 0.080 af

Subcatchment 30S: To L-245 Runoff Area=21,008 sf 10.23% Impervious Runoff Depth=3.27"
Tc=6.0 min CN=75 Runoff=1.85 cfs 0.131 af

Subcatchment 31S: To L-237-239 Runoff Area=54,940 sf 16.24% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=77 Runoff=5.12 cfs 0.364 af

Subcatchment 32S: To L-243-244 Runoff Area=47,010 sf 12.69% Impervious Runoff Depth=3.36"
Tc=6.0 min CN=76 Runoff=4.26 cfs 0.302 af

Subcatchment 33S: To Hitchcock Runoff Area=1,263 sf 0.00% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=74 Runoff=0.11 cfs 0.008 af

Subcatchment 34S: Water Surface Runoff Area=1,760 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.019 af

Subcatchment 35S: Water Surface Runoff Area=209 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.002 af

Subcatchment 36S: To Hitchcock Runoff Area=772,871 sf 0.20% Impervious Runoff Depth=2.79"
Flow Length=1,683' Slope=0.0530 '/' Tc=27.9 min CN=70 Runoff=33.61 cfs 4.124 af

Subcatchment 37S: Water Surface Runoff Area=1,204 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 38S: Water Surface Runoff Area=1,439 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.016 af

Subcatchment 39S: Water Surface Runoff Area=740 sf 100.00% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Reach 2R: Wetland Inflow=104.59 cfs 28.550 af
Outflow=104.59 cfs 28.550 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.63' Max Vel=9.20 fps Inflow=82.81 cfs 20.370 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=82.77 cfs 20.370 af

Reach 16R: Wetland Avg. Flow Depth=0.55' Max Vel=1.32 fps Inflow=18.98 cfs 1.901 af
n=0.100 L=505.0' S=0.0301 '/' Capacity=65.53 cfs Outflow=17.77 cfs 1.901 af

Reach 18R: Stream Avg. Flow Depth=0.44' Max Vel=2.03 fps Inflow=8.01 cfs 0.615 af
n=0.040 L=195.0' S=0.0154 '/' Capacity=46.68 cfs Outflow=7.86 cfs 0.615 af

Reach 19R: Stream Avg. Flow Depth=0.19' Max Vel=1.93 fps Inflow=2.38 cfs 0.166 af
n=0.040 L=406.0' S=0.0419 '/' Capacity=77.01 cfs Outflow=2.18 cfs 0.166 af

Reach 20R: Stream Avg. Flow Depth=0.23' Max Vel=3.19 fps Inflow=5.37 cfs 0.397 af
n=0.040 L=362.0' S=0.0925 '/' Capacity=314.84 cfs Outflow=5.22 cfs 0.397 af

Reach 21R: Stream Avg. Flow Depth=0.43' Max Vel=3.21 fps Inflow=12.33 cfs 1.017 af
n=0.040 L=400.0' S=0.0400 '/' Capacity=75.27 cfs Outflow=11.95 cfs 1.017 af

Reach 22R: Stream Avg. Flow Depth=0.35' Max Vel=3.59 fps Inflow=10.02 cfs 0.781 af
n=0.040 L=292.0' S=0.0651 '/' Capacity=96.00 cfs Outflow=9.89 cfs 0.781 af

Reach 31R: Swale-244 Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.150 L=350.0' S=0.0571 '/' Capacity=6.87 cfs Outflow=0.00 cfs 0.000 af

Reach 34R: Hitchcock Rd (West) Inflow=2.13 cfs 0.150 af
Outflow=2.13 cfs 0.150 af

Reach 35R: Hitchcock Rd (East) Inflow=33.61 cfs 4.124 af
Outflow=33.61 cfs 4.124 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.49' Storage=14,798 cf Inflow=82.92 cfs 20.370 af
Outflow=82.81 cfs 20.370 af

Pond 5P: L-6 Infil Basin Peak Elev=1,041.56' Storage=1,463 cf Inflow=8.18 cfs 0.631 af
Outflow=8.01 cfs 0.615 af

Pond 6P: L-6-1 Infil Basin Peak Elev=1,031.72' Storage=791 cf Inflow=2.43 cfs 0.175 af
Outflow=2.38 cfs 0.166 af

Pond 7P: L-6-2 Infil Basin Peak Elev=1,011.39' Storage=2,046 cf Inflow=2.87 cfs 0.250 af
Outflow=2.62 cfs 0.236 af

Pond 8P: L-6-3 Infil Basin Peak Elev=993.66' Storage=1,554 cf Inflow=2.40 cfs 0.184 af
Outflow=2.08 cfs 0.172 af

Pond 9P: Infiltrators Peak Elev=1,016.29' Storage=224 cf Inflow=1.01 cfs 0.072 af
Outflow=0.84 cfs 0.071 af

Pond 10P: L-14-1 Infil Basin Peak Elev=1,029.65' Storage=756 cf Inflow=9.37 cfs 0.914 af
Outflow=9.37 cfs 0.902 af

Pond 15P: Rain Garden Peak Elev=1,020.10' Storage=631 cf Inflow=0.92 cfs 0.068 af
Outflow=0.90 cfs 0.055 af

Pond 17P: Driveway Culvert Peak Elev=1,016.74' Storage=1,073 cf Inflow=18.41 cfs 1.776 af
Outflow=17.89 cfs 1.776 af

Pond 18P: Driveway Culverts Peak Elev=1,000.86' Storage=352 cf Inflow=5.57 cfs 0.397 af
Outflow=5.37 cfs 0.397 af

Pond 19P: IB-247 Peak Elev=991.33' Storage=230 cf Inflow=0.73 cfs 0.053 af
Outflow=0.72 cfs 0.048 af

Pond 22P: IB-245 Peak Elev=967.65' Storage=806 cf Inflow=2.08 cfs 0.151 af
Outflow=2.03 cfs 0.142 af

Pond 24P: IB-237 Peak Elev=1,007.68' Storage=1,291 cf Inflow=5.31 cfs 0.380 af
Outflow=5.22 cfs 0.359 af

Pond 26P: IB-244 Peak Elev=987.93' Storage=886 cf Inflow=4.42 cfs 0.316 af
Outflow=4.36 cfs 0.302 af

Pond 29P: Infiltrators-2 Peak Elev=982.05' Storage=248 cf Inflow=1.16 cfs 0.083 af
Outflow=1.16 cfs 0.077 af

Total Runoff Area = 135.550 ac Runoff Volume = 32.953 af Average Runoff Depth = 2.92"
97.60% Pervious = 132.290 ac 2.40% Impervious = 3.260 ac

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,118,080 sf 0.85% Impervious Runoff Depth=3.50"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=57.86 cfs 7.481 af

Subcatchment 3S: East of Doyle Runoff Area=3,283,926 sf 1.40% Impervious Runoff Depth=3.50"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=96.57 cfs 21.971 af

Subcatchment 9S: To L-6 Infil Runoff Area=99,742 sf 10.40% Impervious Runoff Depth=3.81"
Flow Length=544' Slope=0.0810 '/' Tc=8.2 min CN=74 Runoff=9.47 cfs 0.727 af

Subcatchment 10S: To L-6-1 Infil Runoff Area=22,785 sf 19.41% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=79 Runoff=2.65 cfs 0.189 af

Subcatchment 11S: To L-6-2 Infil Runoff Area=34,234 sf 20.06% Impervious Runoff Depth=4.12"
Flow Length=442' Slope=0.0250 '/' Tc=11.5 min CN=77 Runoff=3.16 cfs 0.270 af

Subcatchment 12S: To L-6-3 Infil Runoff Area=23,257 sf 24.93% Impervious Runoff Depth=4.34"
Flow Length=402' Slope=0.0420 '/' Tc=7.7 min CN=79 Runoff=2.55 cfs 0.193 af

Subcatchment 13S: To 14-1 Basin Runoff Area=149,214 sf 9.43% Impervious Runoff Depth=3.81"
Flow Length=1,061' Slope=0.0600 '/' Tc=16.3 min CN=74 Runoff=11.22 cfs 1.087 af

Subcatchment 14S: To 14-2 Basin Runoff Area=7,147 sf 35.48% Impervious Runoff Depth=4.77"
Tc=6.0 min CN=83 Runoff=0.90 cfs 0.065 af

Subcatchment 15S: To Infiltrators Runoff Area=10,302 sf 32.33% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=79 Runoff=1.20 cfs 0.085 af

Subcatchment 16S: To Driveway Culvert Runoff Area=153,405 sf 1.08% Impervious Runoff Depth=3.60"
Flow Length=1,094' Slope=0.0740 '/' Tc=15.9 min CN=72 Runoff=10.98 cfs 1.057 af

Subcatchment 17S: To Driveway Culvert Runoff Area=72,047 sf 0.22% Impervious Runoff Depth=3.50"
Tc=6.0 min CN=71 Runoff=6.78 cfs 0.482 af

Subcatchment 19S: Water Surface Runoff Area=1,426 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 20S: Water Surface Runoff Area=2,441 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.030 af

Subcatchment 21S: Water Surface Runoff Area=2,080 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment 22S: Water Surface Runoff Area=1,890 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment 23S: Water Surface Runoff Area=836 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.010 af

Subcatchment 24S: Water Surface Runoff Area=1,097 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 28S: To L-247 Runoff Area=6,378 sf 23.89% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=79 Runoff=0.74 cfs 0.053 af

Subcatchment 29S: To L-247-2 Runoff Area=11,814 sf 17.56% Impervious Runoff Depth=4.23"
Tc=6.0 min CN=78 Runoff=1.34 cfs 0.096 af

Subcatchment 30S: To L-245 Runoff Area=21,008 sf 10.23% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=75 Runoff=2.21 cfs 0.157 af

Subcatchment 31S: To L-237-239 Runoff Area=54,940 sf 16.24% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=77 Runoff=6.09 cfs 0.433 af

Subcatchment 32S: To L-243-244 Runoff Area=47,010 sf 12.69% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=76 Runoff=5.08 cfs 0.361 af

Subcatchment 33S: To Hitchcock Runoff Area=1,263 sf 0.00% Impervious Runoff Depth=3.81"
Tc=6.0 min CN=74 Runoff=0.13 cfs 0.009 af

Subcatchment 34S: Water Surface Runoff Area=1,760 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.022 af

Subcatchment 35S: Water Surface Runoff Area=209 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.003 af

Subcatchment 36S: To Hitchcock Runoff Area=772,871 sf 0.20% Impervious Runoff Depth=3.40"
Flow Length=1,683' Slope=0.0530 '/' Tc=27.9 min CN=70 Runoff=41.12 cfs 5.020 af

Subcatchment 37S: Water Surface Runoff Area=1,204 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 38S: Water Surface Runoff Area=1,439 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 39S: Water Surface Runoff Area=740 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Reach 2R: Wetland Inflow=128.47 cfs 34.595 af
Outflow=128.47 cfs 34.595 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.68' Max Vel=9.68 fps Inflow=100.92 cfs 24.694 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=100.88 cfs 24.694 af

Reach 16R: Wetland Avg. Flow Depth=0.59' Max Vel=1.39 fps Inflow=22.35 cfs 2.293 af
n=0.100 L=505.0' S=0.0301 '/' Capacity=65.53 cfs Outflow=21.21 cfs 2.293 af

Reach 18R: Stream Avg. Flow Depth=0.48' Max Vel=2.15 fps Inflow=9.63 cfs 0.741 af
n=0.040 L=195.0' S=0.0154 '/' Capacity=46.68 cfs Outflow=9.47 cfs 0.741 af

Reach 19R: Stream Avg. Flow Depth=0.21' Max Vel=2.04 fps Inflow=2.80 cfs 0.198 af
n=0.040 L=406.0' S=0.0419 '/' Capacity=77.01 cfs Outflow=2.58 cfs 0.198 af

Reach 20R: Stream Avg. Flow Depth=0.25' Max Vel=3.38 fps Inflow=6.36 cfs 0.482 af
n=0.040 L=362.0' S=0.0925 '/' Capacity=314.84 cfs Outflow=6.25 cfs 0.482 af

Reach 21R: Stream Avg. Flow Depth=0.47' Max Vel=3.42 fps Inflow=15.08 cfs 1.221 af
n=0.040 L=400.0' S=0.0400 '/' Capacity=75.27 cfs Outflow=14.68 cfs 1.221 af

Reach 22R: Stream Avg. Flow Depth=0.38' Max Vel=3.79 fps Inflow=12.03 cfs 0.938 af
n=0.040 L=292.0' S=0.0651 '/' Capacity=96.00 cfs Outflow=11.89 cfs 0.938 af

Reach 31R: Swale-244 Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.150 L=350.0' S=0.0571 '/' Capacity=6.87 cfs Outflow=0.00 cfs 0.000 af

Reach 34R: Hitchcock Rd (West) Inflow=2.55 cfs 0.180 af
Outflow=2.55 cfs 0.180 af

Reach 35R: Hitchcock Rd (East) Inflow=41.12 cfs 5.020 af
Outflow=41.12 cfs 5.020 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.57' Storage=15,674 cf Inflow=101.03 cfs 24.694 af
Outflow=100.92 cfs 24.694 af

Pond 5P: L-6 Infil Basin Peak Elev=1,041.63' Storage=1,572 cf Inflow=9.82 cfs 0.757 af
Outflow=9.63 cfs 0.741 af

Pond 6P: L-6-1 Infil Basin Peak Elev=1,031.75' Storage=817 cf Inflow=2.86 cfs 0.207 af
Outflow=2.80 cfs 0.198 af

Pond 7P: L-6-2 Infil Basin Peak Elev=1,011.44' Storage=2,109 cf Inflow=3.40 cfs 0.296 af
Outflow=3.25 cfs 0.282 af

Pond 8P: L-6-3 Infil Basin Peak Elev=993.70' Storage=1,608 cf Inflow=2.82 cfs 0.216 af
Outflow=2.62 cfs 0.205 af

Pond 9P: Infiltrators Peak Elev=1,016.60' Storage=266 cf Inflow=1.20 cfs 0.085 af
Outflow=0.99 cfs 0.084 af

Pond 10P: L-14-1 Infil Basin Peak Elev=1,029.71' Storage=792 cf Inflow=11.28 cfs 1.097 af
Outflow=11.27 cfs 1.086 af

Pond 15P: Rain Garden Peak Elev=1,020.11' Storage=641 cf Inflow=1.07 cfs 0.079 af
Outflow=1.04 cfs 0.066 af

Pond 17P: Driveway Culvert Peak Elev=1,017.05' Storage=1,757 cf Inflow=22.24 cfs 2.142 af
Outflow=21.12 cfs 2.142 af

Pond 18P: Driveway Culverts Peak Elev=1,001.00' Storage=479 cf Inflow=6.78 cfs 0.482 af
Outflow=6.36 cfs 0.482 af

Pond 19P: IB-247 Peak Elev=991.34' Storage=235 cf Inflow=0.85 cfs 0.062 af
Outflow=0.85 cfs 0.058 af

Pond 22P: IB-245 Peak Elev=967.68' Storage=832 cf Inflow=2.48 cfs 0.179 af
Outflow=2.42 cfs 0.171 af

Pond 24P: IB-237 Peak Elev=1,007.74' Storage=1,340 cf Inflow=6.30 cfs 0.451 af
Outflow=6.22 cfs 0.430 af

Pond 26P: IB-244 Peak Elev=987.98' Storage=925 cf Inflow=5.26 cfs 0.376 af
Outflow=5.20 cfs 0.362 af

Pond 29P: Infiltrators-2 Peak Elev=982.06' Storage=248 cf Inflow=1.37 cfs 0.098 af
Outflow=1.37 cfs 0.093 af

Total Runoff Area = 135.550 ac Runoff Volume = 39.925 af Average Runoff Depth = 3.53"
97.60% Pervious = 132.290 ac 2.40% Impervious = 3.260 ac

Summary for Subcatchment 1S: West of Doyle

Runoff = 26.39 cfs @ 12.47 hrs, Volume= 3.520 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
988,025	70	Woods, Good, HSG C
14,283	77	2 acre lots, 12% imp, HSG C
22,519	96	Gravel surface, HSG C
7,755	98	Roofs, HSG C
85,498	74	>75% Grass cover, Good, HSG C
1,118,080	71	Weighted Average
1,108,611		99.15% Pervious Area
9,469		0.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.9	2,241	0.0610	1.17		**Lag/CN Method,**

Summary for Subcatchment 3S: East of Doyle

Runoff = 43.57 cfs @ 13.22 hrs, Volume= 10.340 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
2,834,897	70	Woods, Good, HSG C
157,712	74	>75% Grass cover, Good, HSG C
29,575	96	Gravel surface, HSG C
16,344	98	Roofs, HSG C
245,104	77	2 acre lots, 12% imp, HSG C
294	98	Paved parking, HSG C
3,283,926	71	Weighted Average
3,237,876		98.60% Pervious Area
46,050		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
86.3	5,506	0.0350	1.06		**Lag/CN Method,**

Summary for Subcatchment 9S: To L-6 Infil

Runoff = 4.57 cfs @ 12.12 hrs, Volume= 0.356 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
3,516	98	Roofs, HSG C
5,717	98	Paved parking, HSG C
9,476	77	2 acre lots, 12% imp, HSG C
10,425	74	>75% Grass cover, Good, HSG C
70,608	70	Woods, Good, HSG C
99,742	74	Weighted Average
89,372		89.60% Pervious Area
10,370		10.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	544	0.0810	1.11		**Lag/CN Method,**

Summary for Subcatchment 10S: To L-6-1 Infil

Runoff = 1.39 cfs @ 12.09 hrs, Volume= 0.098 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
762	98	Roofs, HSG C
3,660	98	Paved parking, HSG C
18,363	74	>75% Grass cover, Good, HSG C
22,785	79	Weighted Average
18,363		80.59% Pervious Area
4,422		19.41% Impervious Area

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

Summary for Subcatchment 11S: To L-6-2 Infil

Runoff = 1.60 cfs @ 12.16 hrs, Volume= 0.137 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
762	98	Roofs, HSG C
6,106	98	Paved parking, HSG C
15,683	74	>75% Grass cover, Good, HSG C
11,683	70	Woods, Good, HSG C
34,234	77	Weighted Average
27,366		79.94% Pervious Area
6,868		20.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	442	0.0250	0.64		**Lag/CN Method,**

Summary for Subcatchment 12S: To L-6-3 Infil

Runoff = 1.33 cfs @ 12.11 hrs, Volume= 0.101 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
762	98	Roofs, HSG C
5,037	98	Paved parking, HSG C
10,569	74	>75% Grass cover, Good, HSG C
6,889	70	Woods, Good, HSG C
23,257	79	Weighted Average
17,458		75.07% Pervious Area
5,799		24.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	402	0.0420	0.87		**Lag/CN Method,**

Summary for Subcatchment 13S: To 14-1 Basin

Runoff = 5.40 cfs @ 12.23 hrs, Volume= 0.532 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
6,087	98	Roofs, HSG C
4,360	98	Paved parking, HSG C
30,176	77	2 acre lots, 12% imp, HSG C
28,893	74	>75% Grass cover, Good, HSG C
79,698	70	Woods, Good, HSG C
149,214	74	Weighted Average
135,146		90.57% Pervious Area
14,068		9.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	1,061	0.0600	1.09		**Lag/CN Method,**

Summary for Subcatchment 14S: To 14-2 Basin

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
762	98	Roofs, HSG C
1,774	98	Paved parking, HSG C
4,611	74	>75% Grass cover, Good, HSG C
7,147	83	Weighted Average
4,611		64.52% Pervious Area
2,536		35.48% Impervious Area

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

Summary for Subcatchment 15S: To Infiltrators

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
3,331	98	Paved parking, HSG C
397	74	>75% Grass cover, Good, HSG C
6,574	70	Woods, Good, HSG C
10,302	79	Weighted Average
6,971		67.67% Pervious Area
3,331		32.33% Impervious Area

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

Summary for Subcatchment 16S: To Driveway Culvert

Runoff = 5.10 cfs @ 12.23 hrs, Volume= 0.504 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
7,754	96	Gravel surface, HSG C
894	98	Paved roads w/curbs & sewers, HSG C
6,376	77	2 acre lots, 12% imp, HSG C
13,882	74	>75% Grass cover, Good, HSG C
124,499	70	Woods, Good, HSG C
153,405	72	Weighted Average
151,746		98.92% Pervious Area
1,659		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	1,094	0.0740	1.15		**Lag/CN Method,**

Summary for Subcatchment 17S: To Driveway Culvert

Runoff = 3.11 cfs @ 12.09 hrs, Volume= 0.227 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,160	96	Gravel surface, HSG C
160	98	Paved parking, HSG C
5,026	74	>75% Grass cover, Good, HSG C
65,701	70	Woods, Good, HSG C
72,047	71	Weighted Average
71,887		99.78% Pervious Area
160		0.22% Impervious Area

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

Summary for Subcatchment 19S: Water Surface

Runoff = 0.14 cfs @ 12.08 hrs, Volume= 0.011 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,426	98	Water Surface, HSG C
1,426		100.00% Impervious Area

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

Summary for Subcatchment 20S: Water Surface

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
2,441	98	Water Surface, HSG C
2,441		100.00% Impervious Area

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

Summary for Subcatchment 21S: Water Surface

Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.016 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
2,080	98	Water Surface, HSG C
2,080		100.00% Impervious Area

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

Summary for Subcatchment 22S: Water Surface

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,890	98	Water Surface, HSG C
1,890		100.00% Impervious Area

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

Summary for Subcatchment 23S: Water Surface

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
836	98	Water Surface, HSG C
836		100.00% Impervious Area

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

Summary for Subcatchment 24S: Water Surface

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,097	98	Water Surface, HSG C
1,097		100.00% Impervious Area

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

Summary for Subcatchment 28S: To L-247

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,524	98	Paved parking, HSG C
2,963	74	>75% Grass cover, Good, HSG C
1,891	70	Woods, Good, HSG C
6,378	79	Weighted Average
4,854		76.11% Pervious Area
1,524		23.89% Impervious Area

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

Summary for Subcatchment 29S: To L-247-2

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
2,075	98	Paved parking, HSG C
9,739	74	>75% Grass cover, Good, HSG C
11,814	78	Weighted Average
9,739		82.44% Pervious Area
2,075		17.56% Impervious Area

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

Summary for Subcatchment 30S: To L-245

Runoff = 1.09 cfs @ 12.09 hrs, Volume= 0.078 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
2,150	98	Paved parking, HSG C
13,326	74	>75% Grass cover, Good, HSG C
5,532	70	Woods, Good, HSG C
21,008	75	Weighted Average
18,858		89.77% Pervious Area
2,150		10.23% Impervious Area

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

Summary for Subcatchment 31S: To L-237-239

Runoff = 3.09 cfs @ 12.09 hrs, Volume= 0.220 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,512	98	Roofs, HSG C
7,409	98	Paved parking, HSG C
32,077	74	>75% Grass cover, Good, HSG C
13,942	70	Woods, Good, HSG C
54,940	77	Weighted Average
46,019		83.76% Pervious Area
8,921		16.24% Impervious Area

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

Summary for Subcatchment 32S: To L-243-244

Runoff = 2.54 cfs @ 12.09 hrs, Volume= 0.182 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
3,024	98	Roofs, HSG C
2,940	98	Paved parking, HSG C
29,096	74	>75% Grass cover, Good, HSG C
11,950	70	Woods, Good, HSG C
47,010	76	Weighted Average
41,046		87.31% Pervious Area
5,964		12.69% Impervious Area

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

Summary for Subcatchment 33S: To Hitchcock

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,263	74	>75% Grass cover, Good, HSG C
1,263		100.00% Pervious Area

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

Summary for Subcatchment 34S: Water Surface

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,760	98	Water Surface, HSG C
1,760		100.00% Impervious Area

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

Summary for Subcatchment 35S: Water Surface

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.002 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
209	98	Water Surface, HSG C
209		100.00% Impervious Area

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

Summary for Subcatchment 36S: To Hitchcock

Runoff = 18.43 cfs @ 12.43 hrs, Volume= 2.329 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,512	98	Roofs, HSG C
9,320	74	>75% Grass cover, Good, HSG C
762,039	70	Woods, Good, HSG C
772,871	70	Weighted Average
771,359		99.80% Pervious Area
1,512		0.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	1,683	0.0530	1.00		**Lag/CN Method,**

Summary for Subcatchment 37S: Water Surface

Runoff = 0.12 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,204	98	Water Surface, HSG C
1,204		100.00% Impervious Area

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

Summary for Subcatchment 38S: Water Surface

Runoff = 0.14 cfs @ 12.08 hrs, Volume= 0.011 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
1,439	98	Water Surface, HSG C
1,439		100.00% Impervious Area

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

Summary for Subcatchment 39S: Water Surface

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.006 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.36"

Area (sf)	CN	Description
740	98	Water Surface, HSG C
740		100.00% Impervious Area

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

Summary for Reach 2R: Wetland

Inflow Area = 117.255 ac, 2.67% Impervious, Inflow Depth = 1.67" for 10-Year event
Inflow = 57.04 cfs @ 12.98 hrs, Volume= 16.359 af
Outflow = 57.04 cfs @ 12.98 hrs, Volume= 16.359 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

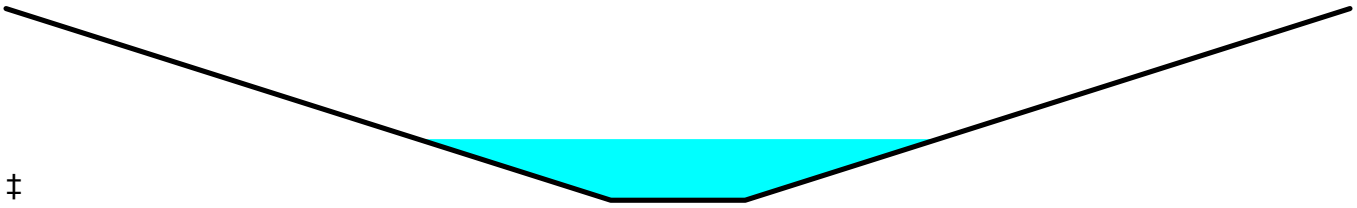
Summary for Reach 5R: Intermittent Stream

Inflow Area = 84.075 ac, 2.18% Impervious, Inflow Depth = 1.66" for 10-Year event
Inflow = 45.95 cfs @ 13.18 hrs, Volume= 11.657 af
Outflow = 45.94 cfs @ 13.19 hrs, Volume= 11.657 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.90 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.42 fps, Avg. Travel Time= 1.9 min

Peak Storage= 2,292 cf @ 13.19 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.50' Flow Area= 41.3 sf, Capacity= 638.10 cfs

5.00' x 1.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 15.0 '/' Top Width= 50.00'
Length= 394.0' Slope= 0.0878 '/'
Inlet Invert= 995.58', Outlet Invert= 961.00'



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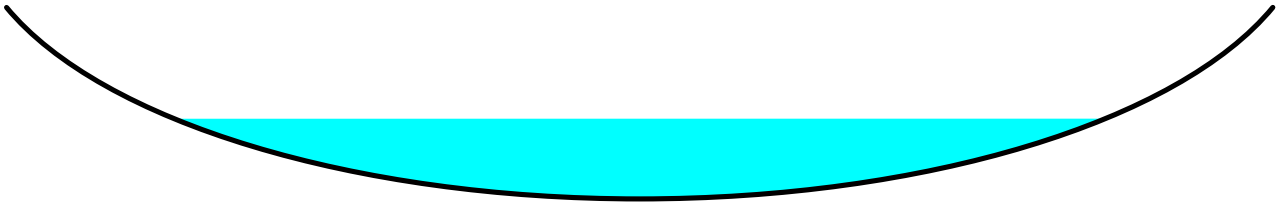
Summary for Reach 16R: Wetland

Inflow Area = 7.392 ac, 7.31% Impervious, Inflow Depth = 1.80" for 10-Year event
Inflow = 11.22 cfs @ 12.24 hrs, Volume= 1.106 af
Outflow = 9.98 cfs @ 12.33 hrs, Volume= 1.106 af, Atten= 11%, Lag= 5.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.10 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 28.2 min

Peak Storage= 4,573 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 65.53 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.100 Very weedy reaches w/pools
Length= 505.0' Slope= 0.0301 '/'
Inlet Invert= 1,014.90', Outlet Invert= 999.70'



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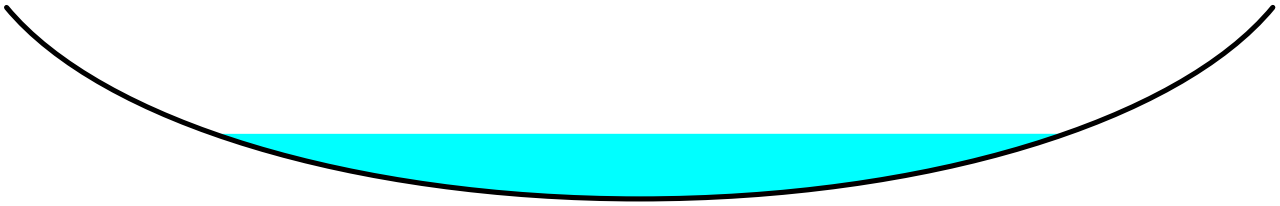
Summary for Reach 18R: Stream

Inflow Area = 2.346 ac, 12.54% Impervious, Inflow Depth = 1.84" for 10-Year event
Inflow = 4.66 cfs @ 12.14 hrs, Volume= 0.359 af
Outflow = 4.54 cfs @ 12.16 hrs, Volume= 0.359 af, Atten= 3%, Lag= 1.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 5.8 min

Peak Storage= 517 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 46.68 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 195.0' Slope= 0.0154 '/'
Inlet Invert= 1,006.00', Outlet Invert= 1,003.00'



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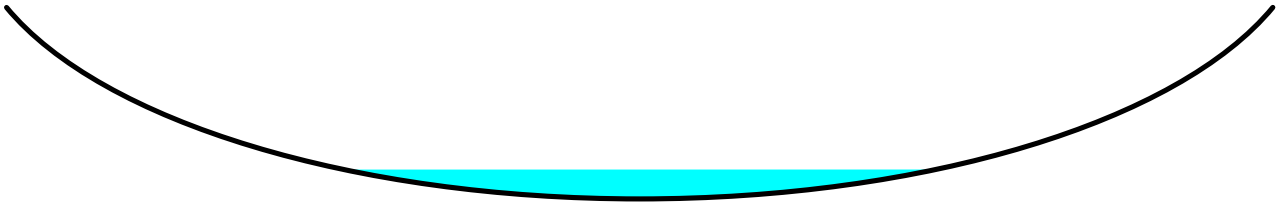
Summary for Reach 19R: Stream

Inflow Area = 0.556 ac, 24.15% Impervious, Inflow Depth = 2.17" for 10-Year event
Inflow = 1.48 cfs @ 12.11 hrs, Volume= 0.101 af
Outflow = 1.32 cfs @ 12.15 hrs, Volume= 0.101 af, Atten= 11%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.66 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 14.6 min

Peak Storage= 324 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 77.01 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 406.0' Slope= 0.0419 '/'
Inlet Invert= 1,020.00', Outlet Invert= 1,003.00'



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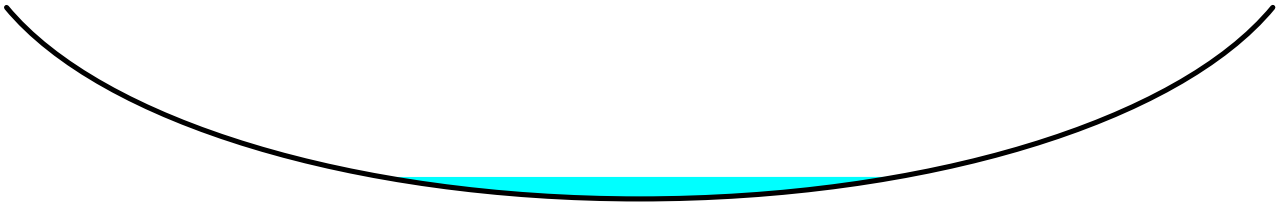
Summary for Reach 20R: Stream

Inflow Area = 1.654 ac, 0.22% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 3.04 cfs @ 12.11 hrs, Volume= 0.227 af
Outflow = 2.91 cfs @ 12.14 hrs, Volume= 0.227 af, Atten= 4%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.67 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 6.1 min

Peak Storage= 394 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.50' Flow Area= 28.0 sf, Capacity= 314.84 cfs

28.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 362.0' Slope= 0.0925 '/'
Inlet Invert= 999.50', Outlet Invert= 966.00'



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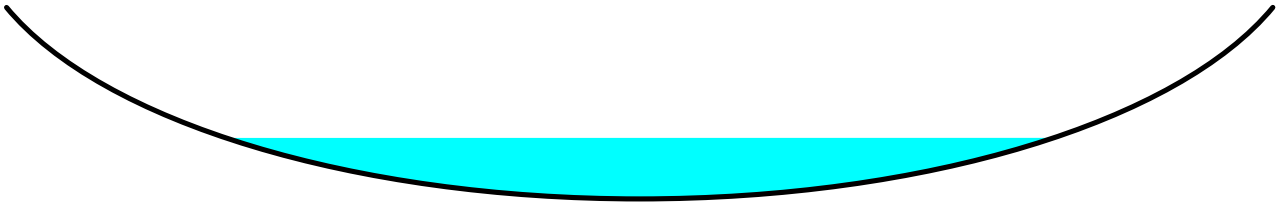
Summary for Reach 21R: Stream

Inflow Area = 3.735 ac, 16.97% Impervious, Inflow Depth = 1.93" for 10-Year event
Inflow = 6.55 cfs @ 12.18 hrs, Volume= 0.600 af
Outflow = 6.33 cfs @ 12.22 hrs, Volume= 0.600 af, Atten= 3%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 9.4 min

Peak Storage= 959 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 75.27 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 400.0' Slope= 0.0400 '/'
Inlet Invert= 984.00', Outlet Invert= 968.00'



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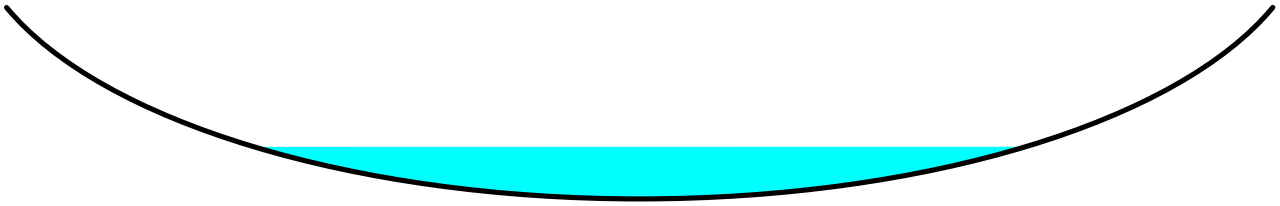
Summary for Reach 22R: Stream

Inflow Area = 2.902 ac, 14.76% Impervious, Inflow Depth = 1.90" for 10-Year event
Inflow = 5.86 cfs @ 12.16 hrs, Volume= 0.460 af
Outflow = 5.76 cfs @ 12.18 hrs, Volume= 0.460 af, Atten= 2%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.04 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 6.2 min

Peak Storage= 554 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 96.00 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 292.0' Slope= 0.0651 '/'
Inlet Invert= 1,003.00', Outlet Invert= 984.00'



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Summary for Reach 31R: Swale-244

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 6.87 cfs

2.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 350.0' Slope= 0.0571 '/'
Inlet Invert= 1,008.00', Outlet Invert= 988.00'

Summary for Reach 34R: Hitchcock Rd (West)

Inflow Area = 0.552 ac, 16.27% Impervious, Inflow Depth = 1.91" for 10-Year event
Inflow = 1.21 cfs @ 12.13 hrs, Volume= 0.088 af
Outflow = 1.21 cfs @ 12.13 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach 35R: Hitchcock Rd (East)

Inflow Area = 17.743 ac, 0.20% Impervious, Inflow Depth = 1.58" for 10-Year event
Inflow = 18.43 cfs @ 12.43 hrs, Volume= 2.329 af
Outflow = 18.43 cfs @ 12.43 hrs, Volume= 2.329 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 4P: Doyle Ave Culvert

Inflow Area = 84.075 ac, 2.18% Impervious, Inflow Depth = 1.66" for 10-Year event
Inflow = 46.05 cfs @ 13.14 hrs, Volume= 11.657 af
Outflow = 45.95 cfs @ 13.18 hrs, Volume= 11.657 af, Atten= 0%, Lag= 2.0 min
Primary = 45.95 cfs @ 13.18 hrs, Volume= 11.657 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 999.29' @ 13.18 hrs Surf.Area= 10,608 sf Storage= 12,532 cf

Plug-Flow detention time= 4.1 min calculated for 11.653 af (100% of inflow)
Center-of-Mass det. time= 4.1 min (924.6 - 920.5)

Volume	Invert	Avail.Storage	Storage Description
#1	995.85'	37,946 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
995.85	0	0	0
997.00	1,119	643	643
998.00	3,644	2,382	3,025
999.00	9,570	6,607	9,632
1,000.00	13,181	11,376	21,007
1,001.00	20,697	16,939	37,946

Device	Routing	Invert	Outlet Devices
#1	Primary	995.85'	**30.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 995.85' / 995.58' S= 0.0090 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 4.91 sf
#2	Primary	999.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 Width (feet) 30.00 125.00 172.00

Primary OutFlow Max=45.95 cfs @ 13.18 hrs HW=999.29' TW=996.06' (Dynamic Tailwater)
1=Culvert (Barrel Controls 25.30 cfs @ 5.15 fps)
2=Custom Weir/Orifice (Weir Controls 20.65 cfs @ 1.65 fps)

Summary for Pond 5P: L-6 Infil Basin

Inflow Area = 2.346 ac, 12.54% Impervious, Inflow Depth = 1.92" for 10-Year event
Inflow = 4.79 cfs @ 12.12 hrs, Volume= 0.375 af
Outflow = 4.66 cfs @ 12.14 hrs, Volume= 0.359 af, Atten= 3%, Lag= 1.4 min
Primary = 4.66 cfs @ 12.14 hrs, Volume= 0.359 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,041.40' @ 12.14 hrs Surf.Area= 1,435 sf Storage= 1,212 cf

Plug-Flow detention time= 37.3 min calculated for 0.359 af (96% of inflow)
Center-of-Mass det. time= 13.6 min (855.1 - 841.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,040.00'	3,756 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,040.00	302	0	0
1,042.00	1,926	2,228	2,228
1,042.70	2,441	1,528	3,756

Device	Routing	Invert	Outlet Devices
#1	Primary	1,041.00'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=4.66 cfs @ 12.14 hrs HW=1,041.40' TW=1,006.34' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 4.66 cfs @ 1.96 fps)

Summary for Pond 6P: L-6-1 Infil Basin

Inflow Area = 0.556 ac, 24.15% Impervious, Inflow Depth = 2.37" for 10-Year event
Inflow = 1.52 cfs @ 12.09 hrs, Volume= 0.110 af
Outflow = 1.48 cfs @ 12.11 hrs, Volume= 0.101 af, Atten= 3%, Lag= 1.2 min
Primary = 1.48 cfs @ 12.11 hrs, Volume= 0.101 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,031.65' @ 12.11 hrs Surf.Area= 853 sf Storage= 731 cf

Plug-Flow detention time= 79.7 min calculated for 0.101 af (92% of inflow)
Center-of-Mass det. time= 37.3 min (859.8 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,030.30'	2,036 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,030.30	232	0	0
1,032.00	1,015	1,060	1,060
1,032.80	1,426	976	2,036

Device	Routing	Invert	Outlet Devices
#1	Primary	1,031.50'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	1,031.20'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.48 cfs @ 12.11 hrs HW=1,031.65' TW=1,020.15' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.06 cfs @ 1.20 fps)
└**2=Orifice/Grate** (Orifice Controls 0.42 cfs @ 2.28 fps)

Summary for Pond 7P: L-6-2 Infil Basin

Inflow Area = 0.834 ac, 24.64% Impervious, Inflow Depth = 2.21" for 10-Year event
Inflow = 1.75 cfs @ 12.15 hrs, Volume= 0.154 af
Outflow = 0.92 cfs @ 12.40 hrs, Volume= 0.140 af, Atten= 47%, Lag= 14.9 min
Primary = 0.92 cfs @ 12.40 hrs, Volume= 0.140 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,011.20' @ 12.40 hrs Surf.Area= 1,250 sf Storage= 1,792 cf

Plug-Flow detention time= 88.1 min calculated for 0.140 af (91% of inflow)
Center-of-Mass det. time= 43.7 min (875.3 - 831.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,009.00'	3,844 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,009.00	427	0	0
1,010.00	755	591	591
1,012.00	1,582	2,337	2,928
1,012.50	2,080	916	3,844

Device	Routing	Invert	Outlet Devices
#1	Primary	1,011.20'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	1,010.00'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.92 cfs @ 12.40 hrs HW=1,011.20' TW=984.27' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Orifice/Grate (Orifice Controls 0.92 cfs @ 4.69 fps)

Summary for Pond 8P: L-6-3 Infil Basin

Inflow Area = 0.577 ac, 30.58% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 1.51 cfs @ 12.11 hrs, Volume= 0.115 af
Outflow = 0.79 cfs @ 12.28 hrs, Volume= 0.104 af, Atten= 47%, Lag= 10.4 min
Primary = 0.79 cfs @ 12.28 hrs, Volume= 0.104 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 993.45' @ 12.28 hrs Surf.Area= 1,123 sf Storage= 1,311 cf

Plug-Flow detention time= 91.6 min calculated for 0.104 af (90% of inflow)
Center-of-Mass det. time= 43.6 min (865.3 - 821.7)

Volume	Invert	Avail.Storage	Storage Description
#1	991.00'	3,165 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
991.00	162	0	0
992.00	338	250	250
994.00	1,419	1,757	2,007
994.70	1,890	1,158	3,165

Device	Routing	Invert	Outlet Devices
#1	Primary	993.50'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	992.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.79 cfs @ 12.28 hrs HW=993.45' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Orifice/Grate (Orifice Controls 0.79 cfs @ 4.04 fps)

Summary for Pond 9P: Infiltrators

Inflow Area = 0.237 ac, 32.33% Impervious, Inflow Depth = 2.26" for 10-Year event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af
Outflow = 0.55 cfs @ 12.13 hrs, Volume= 0.043 af, Atten= 12%, Lag= 2.6 min
Primary = 0.55 cfs @ 12.13 hrs, Volume= 0.043 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,015.84' @ 12.13 hrs Surf.Area= 317 sf Storage= 141 cf

Plug-Flow detention time= 30.8 min calculated for 0.043 af (96% of inflow)
Center-of-Mass det. time= 11.1 min (841.8 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,015.20'	173 cf	**8.17'W x 38.80'L x 1.83'H Field A** 581 cf Overall - 147 cf Embedded = 434 cf x 40.0% Voids
#2A	1,015.20'	147 cf	**ADS_StormTech SC-310 +Cap** x 10 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 10 Chambers in 2 Rows
		321 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,015.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.55 cfs @ 12.13 hrs HW=1,015.84' TW=1,015.21' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.82 fps)

Pond 9P: Infiltrators - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

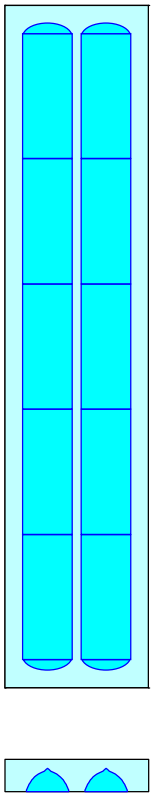
5 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 36.80' Row Length +12.0" End Stone x 2 = 38.80' Base Length
2 Rows x 34.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.17' Base Width
16.0" Chamber Height + 6.0" Cover = 1.83' Field Height

10 Chambers x 14.7 cf = 147.4 cf Chamber Storage

580.9 cf Field - 147.4 cf Chambers = 433.5 cf Stone x 40.0% Voids = 173.4 cf Stone Storage

Chamber Storage + Stone Storage = 320.8 cf = 0.007 af
Overall Storage Efficiency = 55.2%
Overall System Size = 38.80' x 8.17' x 1.83'

10 Chambers
21.5 cy Field
16.1 cy Stone



Summary for Pond 10P: L-14-1 Infil Basin

Inflow Area = 3.445 ac, 9.93% Impervious, Inflow Depth = 1.88" for 10-Year event
Inflow = 5.44 cfs @ 12.23 hrs, Volume= 0.539 af
Outflow = 5.43 cfs @ 12.24 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.4 min
Primary = 5.43 cfs @ 12.24 hrs, Volume= 0.527 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,029.51' @ 12.24 hrs Surf.Area= 574 sf Storage= 675 cf

Plug-Flow detention time= 18.3 min calculated for 0.527 af (98% of inflow)
Center-of-Mass det. time= 5.9 min (858.6 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,027.50'	1,367 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,027.50	132	0	0
1,028.00	207	85	85
1,030.00	693	900	985
1,030.50	836	382	1,367

Device	Routing	Invert	Outlet Devices
#1	Primary	1,029.20'	**10.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=5.43 cfs @ 12.24 hrs HW=1,029.51' TW=1,016.22' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 5.43 cfs @ 1.74 fps)

Summary for Pond 15P: Rain Garden

Inflow Area = 0.189 ac, 44.07% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 0.61 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.57 cfs @ 12.12 hrs, Volume= 0.032 af, Atten= 6%, Lag= 1.8 min
Primary = 0.57 cfs @ 12.12 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,020.07' @ 12.12 hrs Surf.Area= 1,368 sf Storage= 608 cf

Plug-Flow detention time= 155.5 min calculated for 0.032 af (72% of inflow)
Center-of-Mass det. time= 62.4 min (868.0 - 805.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,017.60'	283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 944 cf Overall x 30.0% Voids
#2	1,019.60'	549 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		832 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,017.60	472	0	0
1,019.60	472	944	944

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,019.60	472	0	0
1,020.30	1,097	549	549

Device	Routing	Invert	Outlet Devices
#1	Primary	1,020.00'	**9.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=0.57 cfs @ 12.12 hrs HW=1,020.07' TW=1,015.20' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.57 cfs @ 0.85 fps)

Summary for Pond 17P: Driveway Culvert

Inflow Area = 6.966 ac, 5.46% Impervious, Inflow Depth = 1.78" for 10-Year event
Inflow = 10.53 cfs @ 12.23 hrs, Volume= 1.031 af
Outflow = 10.48 cfs @ 12.25 hrs, Volume= 1.031 af, Atten= 0%, Lag= 0.9 min
Primary = 10.48 cfs @ 12.25 hrs, Volume= 1.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,016.22' @ 12.25 hrs Surf.Area= 902 sf Storage= 375 cf

Plug-Flow detention time= 0.6 min calculated for 1.031 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (859.3 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,015.20'	5,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,015.20	10	0	0
1,016.00	528	215	215
1,016.50	1,364	473	688
1,017.00	2,424	947	1,635
1,018.00	5,900	4,162	5,797

Device	Routing	Invert	Outlet Devices
#1	Primary	1,015.20'	**18.0" Round Culvert X 3.00** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,015.20' / 1,014.90' S= 0.0125 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Primary	1,017.20'	**30.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=10.48 cfs @ 12.25 hrs HW=1,016.22' TW=1,015.30' (Dynamic Tailwater)
1=Culvert (Inlet Controls 10.48 cfs @ 2.72 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 18P: Driveway Culverts

Inflow Area = 1.654 ac, 0.22% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 3.11 cfs @ 12.09 hrs, Volume= 0.227 af
Outflow = 3.04 cfs @ 12.11 hrs, Volume= 0.227 af, Atten= 2%, Lag= 1.1 min
Primary = 3.04 cfs @ 12.11 hrs, Volume= 0.227 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,000.60' @ 12.11 hrs Surf.Area= 564 sf Storage= 171 cf

Plug-Flow detention time= 0.9 min calculated for 0.227 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (853.5 - 852.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	12,612 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.00	10	0	0
1,002.00	1,870	1,880	1,880
1,003.00	4,737	3,304	5,184
1,004.00	10,120	7,429	12,612

Device	Routing	Invert	Outlet Devices
#1	Primary	1,000.00'	**12.0" Round Culvert X 3.00** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,000.00' / 999.50' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#2	Primary	1,003.00'	**60.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=3.03 cfs @ 12.11 hrs HW=1,000.60' TW=999.67' (Dynamic Tailwater)
- **1=Culvert** (Inlet Controls 3.03 cfs @ 2.07 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 19P: IB-247

Inflow Area = 0.163 ac, 31.81% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.45 cfs @ 12.10 hrs, Volume= 0.029 af, Atten= 1%, Lag= 0.8 min
Primary = 0.45 cfs @ 12.10 hrs, Volume= 0.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 991.29' @ 12.10 hrs Surf.Area= 322 sf Storage= 219 cf

Plug-Flow detention time= 91.8 min calculated for 0.029 af (87% of inflow)
Center-of-Mass det. time= 32.1 min (848.8 - 816.6)

Volume	Invert	Avail.Storage	Storage Description
#1	990.10'	811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
990.10	45	0	0
992.00	486	504	504
992.50	740	307	811

Device	Routing	Invert	Outlet Devices
#1	Primary	991.20'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=0.45 cfs @ 12.10 hrs HW=991.29' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.45 cfs @ 0.96 fps)

Summary for Pond 22P: IB-245

Inflow Area = 0.523 ac, 17.17% Impervious, Inflow Depth = 2.11" for 10-Year event
Inflow = 1.26 cfs @ 12.09 hrs, Volume= 0.092 af
Outflow = 1.15 cfs @ 12.13 hrs, Volume= 0.083 af, Atten= 9%, Lag= 2.2 min
Primary = 1.15 cfs @ 12.13 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 967.56' @ 12.13 hrs Surf.Area= 780 sf Storage= 739 cf

Plug-Flow detention time= 84.1 min calculated for 0.083 af (91% of inflow)
Center-of-Mass det. time= 38.1 min (865.9 - 827.9)

Volume	Invert	Avail.Storage	Storage Description
#1	966.10'	1,801 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)
966.10	274	80.0	0	0	274
968.00	983	163.0	1,125	1,125	1,896
968.50	1,760	225.0	676	1,801	3,812

Device	Routing	Invert	Outlet Devices
#1	Primary	967.50'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	967.00'	**12.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 967.00' / 966.10' S= 0.0360 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.15 cfs @ 12.13 hrs HW=967.56' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.24 cfs @ 0.77 fps)
└**2=Culvert** (Inlet Controls 0.91 cfs @ 2.01 fps)

Summary for Pond 24P: IB-237

Inflow Area = 1.294 ac, 18.38% Impervious, Inflow Depth = 2.15" for 10-Year event
Inflow = 3.23 cfs @ 12.09 hrs, Volume= 0.232 af
Outflow = 3.16 cfs @ 12.11 hrs, Volume= 0.211 af, Atten= 2%, Lag= 1.0 min
Primary = 3.16 cfs @ 12.11 hrs, Volume= 0.211 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,007.55' @ 12.11 hrs Surf.Area= 823 sf Storage= 1,175 cf

Plug-Flow detention time= 66.1 min calculated for 0.211 af (91% of inflow)
Center-of-Mass det. time= 21.3 min (853.2 - 832.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,005.00'	2,825 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)
1,005.00	164	61.0	0	0	164
1,006.00	382	82.0	265	265	413
1,008.00	985	119.0	1,320	1,586	1,038
1,009.00	1,513	145.0	1,240	2,825	1,600

Device	Routing	Invert	Outlet Devices
#1	Primary	1,007.20'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=3.16 cfs @ 12.11 hrs HW=1,007.54' TW=997.48' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.16 cfs @ 1.83 fps)

Summary for Pond 26P: IB-244

Inflow Area = 1.107 ac, 14.87% Impervious, Inflow Depth = 2.07" for 10-Year event
Inflow = 2.66 cfs @ 12.09 hrs, Volume= 0.191 af
Outflow = 2.61 cfs @ 12.11 hrs, Volume= 0.177 af, Atten= 2%, Lag= 0.9 min
Primary = 2.61 cfs @ 12.11 hrs, Volume= 0.177 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 987.80' @ 12.11 hrs Surf.Area= 682 sf Storage= 799 cf

Plug-Flow detention time= 55.6 min calculated for 0.177 af (93% of inflow)
Center-of-Mass det. time= 17.9 min (852.4 - 834.5)

Volume	Invert	Avail.Storage	Storage Description
#1	986.00'	1,904 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)
986.00	241	65.0	0	0	241
988.00	744	103.0	939	939	776
989.00	1,204	128.0	965	1,904	1,250

Device	Routing	Invert	Outlet Devices
#1	Primary	987.50'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=2.61 cfs @ 12.11 hrs HW=987.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.61 cfs @ 1.72 fps)

Summary for Pond 29P: Infiltrators-2

Inflow Area = 0.276 ac, 19.00% Impervious, Inflow Depth = 2.21" for 10-Year event
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.77 cfs @ 12.09 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.09 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 982.04' @ 12.09 hrs Surf.Area= 209 sf Storage= 248 cf

Plug-Flow detention time= 74.6 min calculated for 0.045 af (89% of inflow)
Center-of-Mass det. time= 21.8 min (852.5 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	979.67'	159 cf	**8.50'W x 24.56'L x 2.33'H Field A** 487 cf Overall - 88 cf Embedded = 399 cf x 40.0% Voids
#2A	980.17'	88 cf	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 6 Chambers in 2 Rows
		248 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	981.99'	**25.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=0.77 cfs @ 12.09 hrs HW=982.04' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.77 cfs @ 0.67 fps)

Pond 29P: Infiltrators-2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 10.0" Spacing = 44.0" C-C Row Spacing

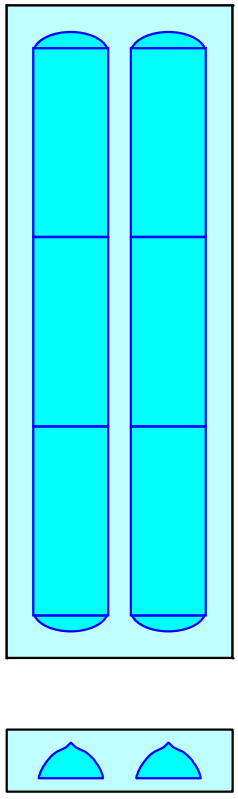
3 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 22.56' Row Length +12.0" End Stone x 2 = 24.56' Base Length
2 Rows x 34.0" Wide + 10.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

487.1 cf Field - 88.5 cf Chambers = 398.7 cf Stone x 40.0% Voids = 159.5 cf Stone Storage

Chamber Storage + Stone Storage = 247.9 cf = 0.006 af
Overall Storage Efficiency = 50.9%
Overall System Size = 24.56' x 8.50' x 2.33'

6 Chambers
18.0 cy Field
14.8 cy Stone



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: West of Doyle Runoff Area=1,118,080 sf 0.85% Impervious Runoff Depth=3.50"
Flow Length=2,241' Slope=0.0610 '/' Tc=31.9 min CN=71 Runoff=57.86 cfs 7.481 af

Subcatchment 3S: East of Doyle Runoff Area=3,283,926 sf 1.40% Impervious Runoff Depth=3.50"
Flow Length=5,506' Slope=0.0350 '/' Tc=86.3 min CN=71 Runoff=96.57 cfs 21.971 af

Subcatchment 9S: To L-6 Infil Runoff Area=99,742 sf 10.40% Impervious Runoff Depth=3.81"
Flow Length=544' Slope=0.0810 '/' Tc=8.2 min CN=74 Runoff=9.47 cfs 0.727 af

Subcatchment 10S: To L-6-1 Infil Runoff Area=22,785 sf 19.41% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=79 Runoff=2.65 cfs 0.189 af

Subcatchment 11S: To L-6-2 Infil Runoff Area=34,234 sf 20.06% Impervious Runoff Depth=4.12"
Flow Length=442' Slope=0.0250 '/' Tc=11.5 min CN=77 Runoff=3.16 cfs 0.270 af

Subcatchment 12S: To L-6-3 Infil Runoff Area=23,257 sf 24.93% Impervious Runoff Depth=4.34"
Flow Length=402' Slope=0.0420 '/' Tc=7.7 min CN=79 Runoff=2.55 cfs 0.193 af

Subcatchment 13S: To 14-1 Basin Runoff Area=149,214 sf 9.43% Impervious Runoff Depth=3.81"
Flow Length=1,061' Slope=0.0600 '/' Tc=16.3 min CN=74 Runoff=11.22 cfs 1.087 af

Subcatchment 14S: To 14-2 Basin Runoff Area=7,147 sf 35.48% Impervious Runoff Depth=4.77"
Tc=6.0 min CN=83 Runoff=0.90 cfs 0.065 af

Subcatchment 15S: To Infiltrators Runoff Area=10,302 sf 32.33% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=79 Runoff=1.20 cfs 0.085 af

Subcatchment 16S: To Driveway Culvert Runoff Area=153,405 sf 1.08% Impervious Runoff Depth=3.60"
Flow Length=1,094' Slope=0.0740 '/' Tc=15.9 min CN=72 Runoff=10.98 cfs 1.057 af

Subcatchment 17S: To Driveway Culvert Runoff Area=72,047 sf 0.22% Impervious Runoff Depth=3.50"
Tc=6.0 min CN=71 Runoff=6.78 cfs 0.482 af

Subcatchment 19S: Water Surface Runoff Area=1,426 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 20S: Water Surface Runoff Area=2,441 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.030 af

Subcatchment 21S: Water Surface Runoff Area=2,080 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment 22S: Water Surface Runoff Area=1,890 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment 23S: Water Surface Runoff Area=836 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.010 af

Subcatchment 24S: Water Surface Runoff Area=1,097 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 28S: To L-247 Runoff Area=6,378 sf 23.89% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=79 Runoff=0.74 cfs 0.053 af

Subcatchment 29S: To L-247-2 Runoff Area=11,814 sf 17.56% Impervious Runoff Depth=4.23"
Tc=6.0 min CN=78 Runoff=1.34 cfs 0.096 af

Subcatchment 30S: To L-245 Runoff Area=21,008 sf 10.23% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=75 Runoff=2.21 cfs 0.157 af

Subcatchment 31S: To L-237-239 Runoff Area=54,940 sf 16.24% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=77 Runoff=6.09 cfs 0.433 af

Subcatchment 32S: To L-243-244 Runoff Area=47,010 sf 12.69% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=76 Runoff=5.08 cfs 0.361 af

Subcatchment 33S: To Hitchcock Runoff Area=1,263 sf 0.00% Impervious Runoff Depth=3.81"
Tc=6.0 min CN=74 Runoff=0.13 cfs 0.009 af

Subcatchment 34S: Water Surface Runoff Area=1,760 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.022 af

Subcatchment 35S: Water Surface Runoff Area=209 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.003 af

Subcatchment 36S: To Hitchcock Runoff Area=772,871 sf 0.20% Impervious Runoff Depth=3.40"
Flow Length=1,683' Slope=0.0530 '/' Tc=27.9 min CN=70 Runoff=41.12 cfs 5.020 af

Subcatchment 37S: Water Surface Runoff Area=1,204 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 38S: Water Surface Runoff Area=1,439 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 39S: Water Surface Runoff Area=740 sf 100.00% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Reach 2R: Wetland Inflow=128.47 cfs 34.595 af
Outflow=128.47 cfs 34.595 af

Reach 5R: Intermittent Stream Avg. Flow Depth=0.68' Max Vel=9.68 fps Inflow=100.92 cfs 24.694 af
n=0.025 L=394.0' S=0.0878 '/' Capacity=638.10 cfs Outflow=100.88 cfs 24.694 af

Reach 16R: Wetland Avg. Flow Depth=0.59' Max Vel=1.39 fps Inflow=22.35 cfs 2.293 af
n=0.100 L=505.0' S=0.0301 '/' Capacity=65.53 cfs Outflow=21.21 cfs 2.293 af

Reach 18R: Stream Avg. Flow Depth=0.48' Max Vel=2.15 fps Inflow=9.63 cfs 0.741 af
n=0.040 L=195.0' S=0.0154 '/' Capacity=46.68 cfs Outflow=9.47 cfs 0.741 af

Reach 19R: Stream Avg. Flow Depth=0.21' Max Vel=2.04 fps Inflow=2.80 cfs 0.198 af
n=0.040 L=406.0' S=0.0419 '/' Capacity=77.01 cfs Outflow=2.58 cfs 0.198 af

Reach 20R: Stream Avg. Flow Depth=0.25' Max Vel=3.38 fps Inflow=6.36 cfs 0.482 af
n=0.040 L=362.0' S=0.0925 '/' Capacity=314.84 cfs Outflow=6.25 cfs 0.482 af

Reach 21R: Stream Avg. Flow Depth=0.47' Max Vel=3.42 fps Inflow=15.08 cfs 1.221 af
n=0.040 L=400.0' S=0.0400 '/' Capacity=75.27 cfs Outflow=14.68 cfs 1.221 af

Reach 22R: Stream Avg. Flow Depth=0.38' Max Vel=3.79 fps Inflow=12.03 cfs 0.938 af
n=0.040 L=292.0' S=0.0651 '/' Capacity=96.00 cfs Outflow=11.89 cfs 0.938 af

Reach 31R: Swale-244 Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.150 L=350.0' S=0.0571 '/' Capacity=6.87 cfs Outflow=0.00 cfs 0.000 af

Reach 34R: Hitchcock Rd (West) Inflow=2.55 cfs 0.180 af
Outflow=2.55 cfs 0.180 af

Reach 35R: Hitchcock Rd (East) Inflow=41.12 cfs 5.020 af
Outflow=41.12 cfs 5.020 af

Pond 4P: Doyle Ave Culvert Peak Elev=999.57' Storage=15,674 cf Inflow=101.03 cfs 24.694 af
Outflow=100.92 cfs 24.694 af

Pond 5P: L-6 Infil Basin Peak Elev=1,041.63' Storage=1,572 cf Inflow=9.82 cfs 0.757 af
Outflow=9.63 cfs 0.741 af

Pond 6P: L-6-1 Infil Basin Peak Elev=1,031.75' Storage=817 cf Inflow=2.86 cfs 0.207 af
Outflow=2.80 cfs 0.198 af

Pond 7P: L-6-2 Infil Basin Peak Elev=1,011.44' Storage=2,109 cf Inflow=3.40 cfs 0.296 af
Outflow=3.25 cfs 0.282 af

Pond 8P: L-6-3 Infil Basin Peak Elev=993.70' Storage=1,608 cf Inflow=2.82 cfs 0.216 af
Outflow=2.62 cfs 0.205 af

Pond 9P: Infiltrators Peak Elev=1,016.60' Storage=266 cf Inflow=1.20 cfs 0.085 af
Outflow=0.99 cfs 0.084 af

Pond 10P: L-14-1 Infil Basin Peak Elev=1,029.71' Storage=792 cf Inflow=11.28 cfs 1.097 af
Outflow=11.27 cfs 1.086 af

Pond 15P: Rain Garden Peak Elev=1,020.11' Storage=641 cf Inflow=1.07 cfs 0.079 af
Outflow=1.04 cfs 0.066 af

Pond 17P: Driveway Culvert Peak Elev=1,017.05' Storage=1,757 cf Inflow=22.24 cfs 2.142 af
Outflow=21.12 cfs 2.142 af

Pond 18P: Driveway Culverts Peak Elev=1,001.00' Storage=479 cf Inflow=6.78 cfs 0.482 af
Outflow=6.36 cfs 0.482 af

Pond 19P: IB-247 Peak Elev=991.34' Storage=235 cf Inflow=0.85 cfs 0.062 af
Outflow=0.85 cfs 0.058 af

Pond 22P: IB-245 Peak Elev=967.68' Storage=832 cf Inflow=2.48 cfs 0.179 af
Outflow=2.42 cfs 0.171 af

Pond 24P: IB-237 Peak Elev=1,007.74' Storage=1,340 cf Inflow=6.30 cfs 0.451 af
Outflow=6.22 cfs 0.430 af

Pond 26P: IB-244 Peak Elev=987.98' Storage=925 cf Inflow=5.26 cfs 0.376 af
Outflow=5.20 cfs 0.362 af

Pond 29P: Infiltrators-2 Peak Elev=982.06' Storage=248 cf Inflow=1.37 cfs 0.098 af
Outflow=1.37 cfs 0.093 af

Total Runoff Area = 135.550 ac Runoff Volume = 39.925 af Average Runoff Depth = 3.53"
97.60% Pervious = 132.290 ac 2.40% Impervious = 3.260 ac

Summary for Subcatchment 1S: West of Doyle

Runoff = 57.86 cfs @ 12.44 hrs, Volume= 7.481 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
988,025	70	Woods, Good, HSG C
14,283	77	2 acre lots, 12% imp, HSG C
22,519	96	Gravel surface, HSG C
7,755	98	Roofs, HSG C
85,498	74	>75% Grass cover, Good, HSG C
1,118,080	71	Weighted Average
1,108,611		99.15% Pervious Area
9,469		0.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.9	2,241	0.0610	1.17		**Lag/CN Method,**

Summary for Subcatchment 3S: East of Doyle

Runoff = 96.57 cfs @ 13.14 hrs, Volume= 21.971 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
2,834,897	70	Woods, Good, HSG C
157,712	74	>75% Grass cover, Good, HSG C
29,575	96	Gravel surface, HSG C
16,344	98	Roofs, HSG C
245,104	77	2 acre lots, 12% imp, HSG C
294	98	Paved parking, HSG C
3,283,926	71	Weighted Average
3,237,876		98.60% Pervious Area
46,050		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
86.3	5,506	0.0350	1.06		**Lag/CN Method,**

Summary for Subcatchment 9S: To L-6 Infil

Runoff = 9.47 cfs @ 12.12 hrs, Volume= 0.727 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
3,516	98	Roofs, HSG C
5,717	98	Paved parking, HSG C
9,476	77	2 acre lots, 12% imp, HSG C
10,425	74	>75% Grass cover, Good, HSG C
70,608	70	Woods, Good, HSG C
99,742	74	Weighted Average
89,372		89.60% Pervious Area
10,370		10.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	544	0.0810	1.11		**Lag/CN Method,**

Summary for Subcatchment 10S: To L-6-1 Infil

Runoff = 2.65 cfs @ 12.09 hrs, Volume= 0.189 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
762	98	Roofs, HSG C
3,660	98	Paved parking, HSG C
18,363	74	>75% Grass cover, Good, HSG C
22,785	79	Weighted Average
18,363		80.59% Pervious Area
4,422		19.41% Impervious Area

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

Summary for Subcatchment 11S: To L-6-2 Infil

Runoff = 3.16 cfs @ 12.16 hrs, Volume= 0.270 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
762	98	Roofs, HSG C
6,106	98	Paved parking, HSG C
15,683	74	>75% Grass cover, Good, HSG C
11,683	70	Woods, Good, HSG C
34,234	77	Weighted Average
27,366		79.94% Pervious Area
6,868		20.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	442	0.0250	0.64		**Lag/CN Method,**

Summary for Subcatchment 12S: To L-6-3 Infil

Runoff = 2.55 cfs @ 12.11 hrs, Volume= 0.193 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
762	98	Roofs, HSG C
5,037	98	Paved parking, HSG C
10,569	74	>75% Grass cover, Good, HSG C
6,889	70	Woods, Good, HSG C
23,257	79	Weighted Average
17,458		75.07% Pervious Area
5,799		24.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	402	0.0420	0.87		**Lag/CN Method,**

Summary for Subcatchment 13S: To 14-1 Basin

Runoff = 11.22 cfs @ 12.22 hrs, Volume= 1.087 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
6,087	98	Roofs, HSG C
4,360	98	Paved parking, HSG C
30,176	77	2 acre lots, 12% imp, HSG C
28,893	74	>75% Grass cover, Good, HSG C
79,698	70	Woods, Good, HSG C
149,214	74	Weighted Average
135,146		90.57% Pervious Area
14,068		9.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	1,061	0.0600	1.09		**Lag/CN Method,**

Summary for Subcatchment 14S: To 14-2 Basin

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
762	98	Roofs, HSG C
1,774	98	Paved parking, HSG C
4,611	74	>75% Grass cover, Good, HSG C
7,147	83	Weighted Average
4,611		64.52% Pervious Area
2,536		35.48% Impervious Area

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

Summary for Subcatchment 15S: To Infiltrators

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
3,331	98	Paved parking, HSG C
397	74	>75% Grass cover, Good, HSG C
6,574	70	Woods, Good, HSG C
10,302	79	Weighted Average
6,971		67.67% Pervious Area
3,331		32.33% Impervious Area

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

Summary for Subcatchment 16S: To Driveway Culvert

Runoff = 10.98 cfs @ 12.22 hrs, Volume= 1.057 af, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
7,754	96	Gravel surface, HSG C
894	98	Paved roads w/curbs & sewers, HSG C
6,376	77	2 acre lots, 12% imp, HSG C
13,882	74	>75% Grass cover, Good, HSG C
124,499	70	Woods, Good, HSG C
153,405	72	Weighted Average
151,746		98.92% Pervious Area
1,659		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	1,094	0.0740	1.15		**Lag/CN Method,**

Summary for Subcatchment 17S: To Driveway Culvert

Runoff = 6.78 cfs @ 12.09 hrs, Volume= 0.482 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,160	96	Gravel surface, HSG C
160	98	Paved parking, HSG C
5,026	74	>75% Grass cover, Good, HSG C
65,701	70	Woods, Good, HSG C
72,047	71	Weighted Average
71,887		99.78% Pervious Area
160		0.22% Impervious Area

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

Summary for Subcatchment 19S: Water Surface

Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.018 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,426	98	Water Surface, HSG C
1,426		100.00% Impervious Area

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

Summary for Subcatchment 20S: Water Surface

Runoff = 0.37 cfs @ 12.08 hrs, Volume= 0.030 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
2,441	98	Water Surface, HSG C
2,441		100.00% Impervious Area

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

Summary for Subcatchment 21S: Water Surface

Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
2,080	98	Water Surface, HSG C
2,080		100.00% Impervious Area

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

Summary for Subcatchment 22S: Water Surface

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 0.023 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,890	98	Water Surface, HSG C
1,890		100.00% Impervious Area

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

Summary for Subcatchment 23S: Water Surface

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
836	98	Water Surface, HSG C
836		100.00% Impervious Area

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

Summary for Subcatchment 24S: Water Surface

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,097	98	Water Surface, HSG C
1,097		100.00% Impervious Area

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

Summary for Subcatchment 28S: To L-247

Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,524	98	Paved parking, HSG C
2,963	74	>75% Grass cover, Good, HSG C
1,891	70	Woods, Good, HSG C
6,378	79	Weighted Average
4,854		76.11% Pervious Area
1,524		23.89% Impervious Area

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

Summary for Subcatchment 29S: To L-247-2

Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.096 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
2,075	98	Paved parking, HSG C
9,739	74	>75% Grass cover, Good, HSG C
11,814	78	Weighted Average
9,739		82.44% Pervious Area
2,075		17.56% Impervious Area

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

Summary for Subcatchment 30S: To L-245

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.157 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
2,150	98	Paved parking, HSG C
13,326	74	>75% Grass cover, Good, HSG C
5,532	70	Woods, Good, HSG C
21,008	75	Weighted Average
18,858		89.77% Pervious Area
2,150		10.23% Impervious Area

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

Summary for Subcatchment 31S: To L-237-239

Runoff = 6.09 cfs @ 12.09 hrs, Volume= 0.433 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,512	98	Roofs, HSG C
7,409	98	Paved parking, HSG C
32,077	74	>75% Grass cover, Good, HSG C
13,942	70	Woods, Good, HSG C
54,940	77	Weighted Average
46,019		83.76% Pervious Area
8,921		16.24% Impervious Area

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

Summary for Subcatchment 32S: To L-243-244

Runoff = 5.08 cfs @ 12.09 hrs, Volume= 0.361 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
3,024	98	Roofs, HSG C
2,940	98	Paved parking, HSG C
29,096	74	>75% Grass cover, Good, HSG C
11,950	70	Woods, Good, HSG C
47,010	76	Weighted Average
41,046		87.31% Pervious Area
5,964		12.69% Impervious Area

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

Summary for Subcatchment 33S: To Hitchcock

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,263	74	>75% Grass cover, Good, HSG C
1,263		100.00% Pervious Area

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

Summary for Subcatchment 34S: Water Surface

Runoff = 0.27 cfs @ 12.08 hrs, Volume= 0.022 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,760	98	Water Surface, HSG C
1,760		100.00% Impervious Area

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

Summary for Subcatchment 35S: Water Surface

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 0.003 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
209	98	Water Surface, HSG C
209		100.00% Impervious Area

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

Summary for Subcatchment 36S: To Hitchcock

Runoff = 41.12 cfs @ 12.40 hrs, Volume= 5.020 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,512	98	Roofs, HSG C
9,320	74	>75% Grass cover, Good, HSG C
762,039	70	Woods, Good, HSG C
772,871	70	Weighted Average
771,359		99.80% Pervious Area
1,512		0.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	1,683	0.0530	1.00		**Lag/CN Method,**

Summary for Subcatchment 37S: Water Surface

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,204	98	Water Surface, HSG C
1,204		100.00% Impervious Area

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

Summary for Subcatchment 38S: Water Surface

Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.018 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
1,439	98	Water Surface, HSG C
1,439		100.00% Impervious Area

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

Summary for Subcatchment 39S: Water Surface

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.73"

Area (sf)	CN	Description
740	98	Water Surface, HSG C
740		100.00% Impervious Area

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

Summary for Reach 2R: Wetland

Inflow Area = 117.255 ac, 2.67% Impervious, Inflow Depth = 3.54" for 100-Year event
Inflow = 128.47 cfs @ 12.51 hrs, Volume= 34.595 af
Outflow = 128.47 cfs @ 12.51 hrs, Volume= 34.595 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

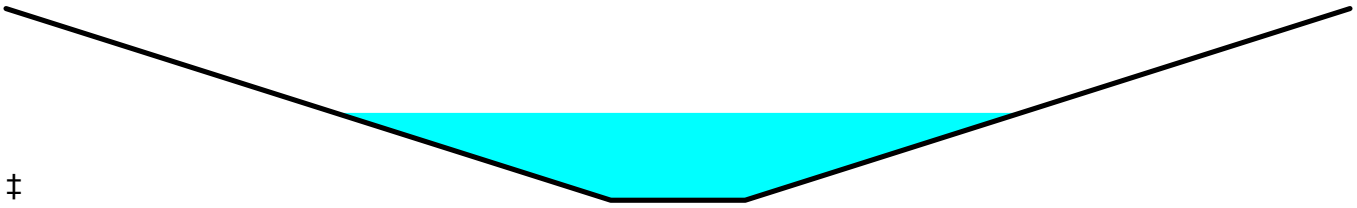
Summary for Reach 5R: Intermittent Stream

Inflow Area = 84.075 ac, 2.18% Impervious, Inflow Depth = 3.52" for 100-Year event
Inflow = 100.92 cfs @ 13.15 hrs, Volume= 24.694 af
Outflow = 100.88 cfs @ 13.16 hrs, Volume= 24.694 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.68 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 4.04 fps, Avg. Travel Time= 1.6 min

Peak Storage= 4,104 cf @ 13.16 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 1.50' Flow Area= 41.3 sf, Capacity= 638.10 cfs

5.00' x 1.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 15.0 '/' Top Width= 50.00'
Length= 394.0' Slope= 0.0878 '/'
Inlet Invert= 995.58', Outlet Invert= 961.00'



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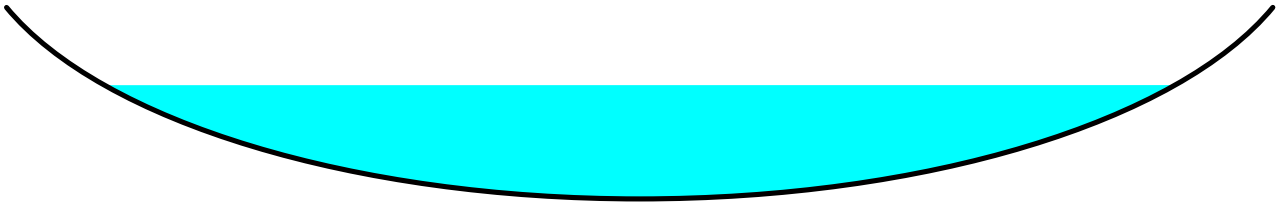
Summary for Reach 16R: Wetland

Inflow Area = 7.392 ac, 7.31% Impervious, Inflow Depth = 3.72" for 100-Year event
Inflow = 22.35 cfs @ 12.27 hrs, Volume= 2.293 af
Outflow = 21.21 cfs @ 12.34 hrs, Volume= 2.293 af, Atten= 5%, Lag= 4.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.39 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 23.6 min

Peak Storage= 7,708 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 65.53 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.100 Very weedy reaches w/pools
Length= 505.0' Slope= 0.0301 '/'
Inlet Invert= 1,014.90', Outlet Invert= 999.70'



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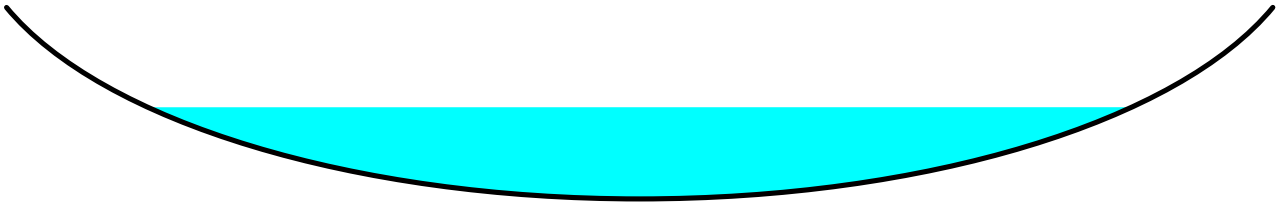
Summary for Reach 18R: Stream

Inflow Area = 2.346 ac, 12.54% Impervious, Inflow Depth = 3.79" for 100-Year event
Inflow = 9.63 cfs @ 12.13 hrs, Volume= 0.741 af
Outflow = 9.47 cfs @ 12.15 hrs, Volume= 0.741 af, Atten= 2%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.15 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 4.8 min

Peak Storage= 860 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 46.68 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 195.0' Slope= 0.0154 '/'
Inlet Invert= 1,006.00', Outlet Invert= 1,003.00'



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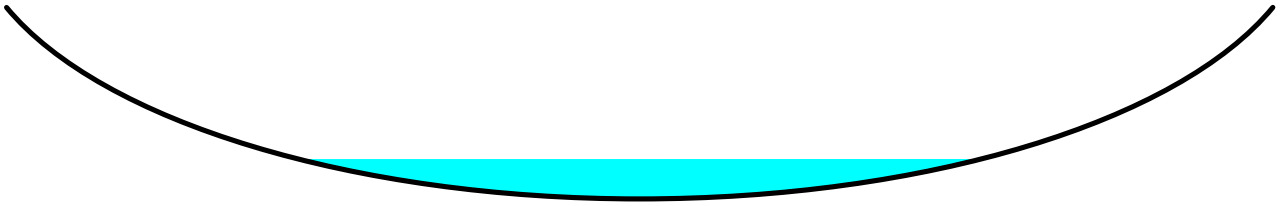
Summary for Reach 19R: Stream

Inflow Area = 0.556 ac, 24.15% Impervious, Inflow Depth = 4.27" for 100-Year event
Inflow = 2.80 cfs @ 12.10 hrs, Volume= 0.198 af
Outflow = 2.58 cfs @ 12.14 hrs, Volume= 0.198 af, Atten= 8%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.04 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 12.6 min

Peak Storage= 515 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 77.01 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 406.0' Slope= 0.0419 '/'
Inlet Invert= 1,020.00', Outlet Invert= 1,003.00'



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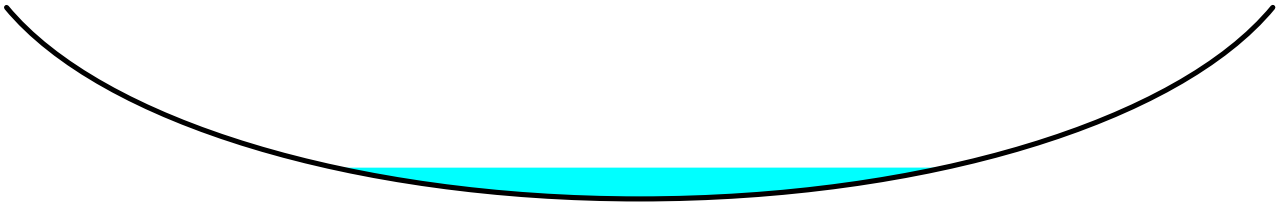
Summary for Reach 20R: Stream

Inflow Area = 1.654 ac, 0.22% Impervious, Inflow Depth = 3.50" for 100-Year event
Inflow = 6.36 cfs @ 12.12 hrs, Volume= 0.482 af
Outflow = 6.25 cfs @ 12.14 hrs, Volume= 0.482 af, Atten= 2%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.38 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 5.2 min

Peak Storage= 670 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.50' Flow Area= 28.0 sf, Capacity= 314.84 cfs

28.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 362.0' Slope= 0.0925 '/'
Inlet Invert= 999.50', Outlet Invert= 966.00'



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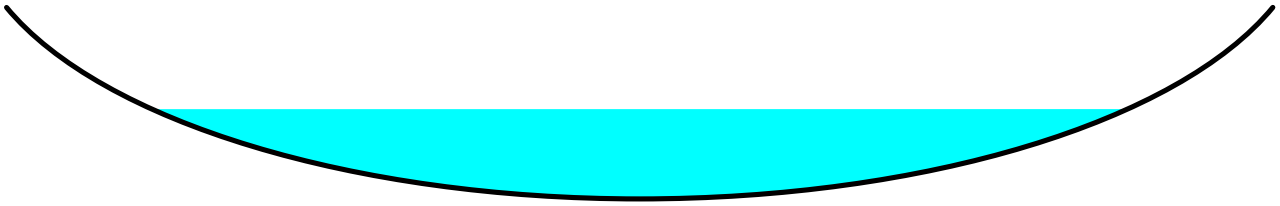
Summary for Reach 21R: Stream

Inflow Area = 3.735 ac, 16.97% Impervious, Inflow Depth = 3.92" for 100-Year event
Inflow = 15.08 cfs @ 12.17 hrs, Volume= 1.221 af
Outflow = 14.68 cfs @ 12.19 hrs, Volume= 1.221 af, Atten= 3%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 7.9 min

Peak Storage= 1,717 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 75.27 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 400.0' Slope= 0.0400 '/'
Inlet Invert= 984.00', Outlet Invert= 968.00'



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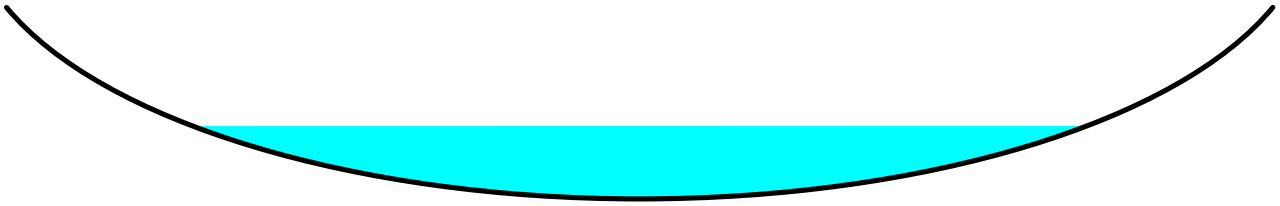
Summary for Reach 22R: Stream

Inflow Area = 2.902 ac, 14.76% Impervious, Inflow Depth = 3.88" for 100-Year event
Inflow = 12.03 cfs @ 12.15 hrs, Volume= 0.938 af
Outflow = 11.89 cfs @ 12.17 hrs, Volume= 0.938 af, Atten= 1%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.79 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 5.2 min

Peak Storage= 915 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 96.00 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 292.0' Slope= 0.0651 '/'
Inlet Invert= 1,003.00', Outlet Invert= 984.00'



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Summary for Reach 31R: Swale-244

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 6.87 cfs

2.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 350.0' Slope= 0.0571 '/'
Inlet Invert= 1,008.00', Outlet Invert= 988.00'

Summary for Reach 34R: Hitchcock Rd (West)

Inflow Area = 0.552 ac, 16.27% Impervious, Inflow Depth = 3.91" for 100-Year event
Inflow = 2.55 cfs @ 12.11 hrs, Volume= 0.180 af
Outflow = 2.55 cfs @ 12.11 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach 35R: Hitchcock Rd (East)

Inflow Area = 17.743 ac, 0.20% Impervious, Inflow Depth = 3.40" for 100-Year event
Inflow = 41.12 cfs @ 12.40 hrs, Volume= 5.020 af
Outflow = 41.12 cfs @ 12.40 hrs, Volume= 5.020 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 4P: Doyle Ave Culvert

Inflow Area = 84.075 ac, 2.18% Impervious, Inflow Depth = 3.52" for 100-Year event
Inflow = 101.03 cfs @ 13.14 hrs, Volume= 24.694 af
Outflow = 100.92 cfs @ 13.15 hrs, Volume= 24.694 af, Atten= 0%, Lag= 0.6 min
Primary = 100.92 cfs @ 13.15 hrs, Volume= 24.694 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 999.57' @ 13.15 hrs Surf.Area= 11,628 sf Storage= 15,674 cf

Plug-Flow detention time= 3.6 min calculated for 24.688 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (901.8 - 898.2)

Volume	Invert	Avail.Storage	Storage Description
#1	995.85'	37,946 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
995.85	0	0	0
997.00	1,119	643	643
998.00	3,644	2,382	3,025
999.00	9,570	6,607	9,632
1,000.00	13,181	11,376	21,007
1,001.00	20,697	16,939	37,946

Device	Routing	Invert	Outlet Devices
#1	Primary	995.85'	**30.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 995.85' / 995.58' S= 0.0090 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 4.91 sf
#2	Primary	999.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 2.00 Width (feet) 30.00 125.00 172.00

Primary OutFlow Max=100.91 cfs @ 13.15 hrs HW=999.57' TW=996.26' (Dynamic Tailwater)
↑ **1=Culvert** (Barrel Controls 28.11 cfs @ 5.73 fps)
└ **2=Custom Weir/Orifice** (Weir Controls 72.81 cfs @ 2.24 fps)

Summary for Pond 5P: L-6 Infil Basin

Inflow Area = 2.346 ac, 12.54% Impervious, Inflow Depth = 3.87" for 100-Year event
Inflow = 9.82 cfs @ 12.11 hrs, Volume= 0.757 af
Outflow = 9.63 cfs @ 12.13 hrs, Volume= 0.741 af, Atten= 2%, Lag= 1.2 min
Primary = 9.63 cfs @ 12.13 hrs, Volume= 0.741 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,041.63' @ 12.13 hrs Surf.Area= 1,626 sf Storage= 1,572 cf

Plug-Flow detention time= 22.0 min calculated for 0.740 af (98% of inflow)
Center-of-Mass det. time= 9.4 min (831.9 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,040.00'	3,756 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,040.00	302	0	0
1,042.00	1,926	2,228	2,228
1,042.70	2,441	1,528	3,756

Device	Routing	Invert	Outlet Devices
#1	Primary	1,041.00'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=9.62 cfs @ 12.13 hrs HW=1,041.63' TW=1,006.47' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.62 cfs @ 2.54 fps)

Summary for Pond 6P: L-6-1 Infil Basin

Inflow Area = 0.556 ac, 24.15% Impervious, Inflow Depth = 4.46" for 100-Year event
Inflow = 2.86 cfs @ 12.09 hrs, Volume= 0.207 af
Outflow = 2.80 cfs @ 12.10 hrs, Volume= 0.198 af, Atten= 2%, Lag= 1.0 min
Primary = 2.80 cfs @ 12.10 hrs, Volume= 0.198 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,031.75' @ 12.10 hrs Surf.Area= 898 sf Storage= 817 cf

Plug-Flow detention time= 51.9 min calculated for 0.198 af (96% of inflow)
Center-of-Mass det. time= 26.9 min (833.1 - 806.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,030.30'	2,036 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,030.30	232	0	0
1,032.00	1,015	1,060	1,060
1,032.80	1,426	976	2,036

Device	Routing	Invert	Outlet Devices
#1	Primary	1,031.50'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	1,031.20'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.80 cfs @ 12.10 hrs HW=1,031.75' TW=1,020.20' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.28 cfs @ 1.55 fps)
└─**2=Orifice/Grate** (Orifice Controls 0.51 cfs @ 2.62 fps)

Summary for Pond 7P: L-6-2 Infil Basin

Inflow Area = 0.834 ac, 24.64% Impervious, Inflow Depth = 4.26" for 100-Year event
Inflow = 3.40 cfs @ 12.15 hrs, Volume= 0.296 af
Outflow = 3.25 cfs @ 12.19 hrs, Volume= 0.282 af, Atten= 4%, Lag= 2.2 min
Primary = 3.25 cfs @ 12.19 hrs, Volume= 0.282 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,011.44' @ 12.19 hrs Surf.Area= 1,351 sf Storage= 2,109 cf

Plug-Flow detention time= 57.6 min calculated for 0.282 af (95% of inflow)
Center-of-Mass det. time= 31.7 min (846.7 - 815.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,009.00'	3,844 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,009.00	427	0	0
1,010.00	755	591	591
1,012.00	1,582	2,337	2,928
1,012.50	2,080	916	3,844

Device	Routing	Invert	Outlet Devices
#1	Primary	1,011.20'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	1,010.00'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.25 cfs @ 12.19 hrs HW=1,011.44' TW=984.47' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 2.22 cfs @ 1.53 fps)
2=Orifice/Grate (Orifice Controls 1.03 cfs @ 5.26 fps)

Summary for Pond 8P: L-6-3 Infil Basin

Inflow Area = 0.577 ac, 30.58% Impervious, Inflow Depth = 4.50" for 100-Year event
Inflow = 2.82 cfs @ 12.11 hrs, Volume= 0.216 af
Outflow = 2.62 cfs @ 12.14 hrs, Volume= 0.205 af, Atten= 7%, Lag= 2.2 min
Primary = 2.62 cfs @ 12.14 hrs, Volume= 0.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 993.70' @ 12.14 hrs Surf.Area= 1,258 sf Storage= 1,608 cf

Plug-Flow detention time= 61.2 min calculated for 0.205 af (95% of inflow)
Center-of-Mass det. time= 32.5 min (838.4 - 806.0)

Volume	Invert	Avail.Storage	Storage Description
#1	991.00'	3,165 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
991.00	162	0	0
992.00	338	250	250
994.00	1,419	1,757	2,007
994.70	1,890	1,158	3,165

Device	Routing	Invert	Outlet Devices
#1	Primary	993.50'	**6.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	992.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.62 cfs @ 12.14 hrs HW=993.70' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.70 cfs @ 1.40 fps)
└**2=Orifice/Grate** (Orifice Controls 0.92 cfs @ 4.70 fps)

Summary for Pond 9P: Infiltrators

Inflow Area = 0.237 ac, 32.33% Impervious, Inflow Depth = 4.34" for 100-Year event
Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 0.99 cfs @ 12.14 hrs, Volume= 0.084 af, Atten= 17%, Lag= 3.2 min
Primary = 0.99 cfs @ 12.14 hrs, Volume= 0.084 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,016.60' @ 12.14 hrs Surf.Area= 317 sf Storage= 266 cf

Plug-Flow detention time= 19.6 min calculated for 0.084 af (98% of inflow)
Center-of-Mass det. time= 8.6 min (820.6 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,015.20'	173 cf	**8.17'W x 38.80'L x 1.83'H Field A** 581 cf Overall - 147 cf Embedded = 434 cf x 40.0% Voids
#2A	1,015.20'	147 cf	**ADS_StormTech SC-310 +Cap** x 10 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 10 Chambers in 2 Rows
		321 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,015.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.99 cfs @ 12.14 hrs HW=1,016.60' TW=1,015.38' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.04 fps)

Pond 9P: Infiltrators - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

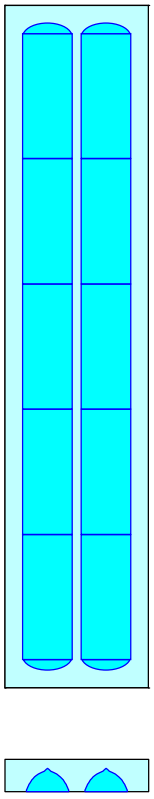
5 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 36.80' Row Length +12.0" End Stone x 2 = 38.80' Base Length
2 Rows x 34.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.17' Base Width
16.0" Chamber Height + 6.0" Cover = 1.83' Field Height

10 Chambers x 14.7 cf = 147.4 cf Chamber Storage

580.9 cf Field - 147.4 cf Chambers = 433.5 cf Stone x 40.0% Voids = 173.4 cf Stone Storage

Chamber Storage + Stone Storage = 320.8 cf = 0.007 af
Overall Storage Efficiency = 55.2%
Overall System Size = 38.80' x 8.17' x 1.83'

10 Chambers
21.5 cy Field
16.1 cy Stone



Summary for Pond 10P: L-14-1 Infil Basin

Inflow Area = 3.445 ac, 9.93% Impervious, Inflow Depth = 3.82" for 100-Year event
Inflow = 11.28 cfs @ 12.22 hrs, Volume= 1.097 af
Outflow = 11.27 cfs @ 12.23 hrs, Volume= 1.086 af, Atten= 0%, Lag= 0.3 min
Primary = 11.27 cfs @ 12.23 hrs, Volume= 1.086 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,029.71' @ 12.23 hrs Surf.Area= 622 sf Storage= 792 cf

Plug-Flow detention time= 10.4 min calculated for 1.086 af (99% of inflow)
Center-of-Mass det. time= 4.0 min (836.4 - 832.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,027.50'	1,367 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,027.50	132	0	0
1,028.00	207	85	85
1,030.00	693	900	985
1,030.50	836	382	1,367

Device	Routing	Invert	Outlet Devices
#1	Primary	1,029.20'	**10.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=11.27 cfs @ 12.23 hrs HW=1,029.71' TW=1,016.99' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 11.27 cfs @ 2.23 fps)

Summary for Pond 15P: Rain Garden

Inflow Area = 0.189 ac, 44.07% Impervious, Inflow Depth = 5.00" for 100-Year event
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.079 af
Outflow = 1.04 cfs @ 12.10 hrs, Volume= 0.066 af, Atten= 2%, Lag= 1.1 min
Primary = 1.04 cfs @ 12.10 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,020.11' @ 12.10 hrs Surf.Area= 1,401 sf Storage= 641 cf

Plug-Flow detention time= 109.3 min calculated for 0.066 af (84% of inflow)
Center-of-Mass det. time= 42.7 min (834.5 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,017.60'	283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 944 cf Overall x 30.0% Voids
#2	1,019.60'	549 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		832 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,017.60	472	0	0
1,019.60	472	944	944

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,019.60	472	0	0
1,020.30	1,097	549	549

Device	Routing	Invert	Outlet Devices
#1	Primary	1,020.00'	**9.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=1.04 cfs @ 12.10 hrs HW=1,020.11' TW=1,015.34' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.04 cfs @ 1.04 fps)

Summary for Pond 17P: Driveway Culvert

Inflow Area = 6.966 ac, 5.46% Impervious, Inflow Depth = 3.69" for 100-Year event
Inflow = 22.24 cfs @ 12.22 hrs, Volume= 2.142 af
Outflow = 21.12 cfs @ 12.28 hrs, Volume= 2.142 af, Atten= 5%, Lag= 3.2 min
Primary = 21.12 cfs @ 12.28 hrs, Volume= 2.142 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,017.05' @ 12.28 hrs Surf.Area= 2,593 sf Storage= 1,757 cf

Plug-Flow detention time= 0.7 min calculated for 2.142 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (837.6 - 836.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,015.20'	5,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,015.20	10	0	0
1,016.00	528	215	215
1,016.50	1,364	473	688
1,017.00	2,424	947	1,635
1,018.00	5,900	4,162	5,797

Device	Routing	Invert	Outlet Devices
#1	Primary	1,015.20'	**18.0" Round Culvert X 3.00** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,015.20' / 1,014.90' S= 0.0125 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Primary	1,017.20'	**30.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=21.12 cfs @ 12.28 hrs HW=1,017.05' TW=1,015.48' (Dynamic Tailwater)
1=Culvert (Inlet Controls 21.12 cfs @ 3.98 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 18P: Driveway Culverts

Inflow Area = 1.654 ac, 0.22% Impervious, Inflow Depth = 3.50" for 100-Year event
Inflow = 6.78 cfs @ 12.09 hrs, Volume= 0.482 af
Outflow = 6.36 cfs @ 12.12 hrs, Volume= 0.482 af, Atten= 6%, Lag= 1.8 min
Primary = 6.36 cfs @ 12.12 hrs, Volume= 0.482 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,001.00' @ 12.12 hrs Surf.Area= 944 sf Storage= 479 cf

Plug-Flow detention time= 0.9 min calculated for 0.482 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (831.4 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	12,612 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.00	10	0	0
1,002.00	1,870	1,880	1,880
1,003.00	4,737	3,304	5,184
1,004.00	10,120	7,429	12,612

Device	Routing	Invert	Outlet Devices
#1	Primary	1,000.00'	**12.0" Round Culvert X 3.00** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,000.00' / 999.50' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#2	Primary	1,003.00'	**60.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=6.36 cfs @ 12.12 hrs HW=1,001.00' TW=999.74' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 6.36 cfs @ 2.70 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 19P: IB-247

Inflow Area = 0.163 ac, 31.81% Impervious, Inflow Depth = 4.56" for 100-Year event
Inflow = 0.85 cfs @ 12.09 hrs, Volume= 0.062 af
Outflow = 0.85 cfs @ 12.10 hrs, Volume= 0.058 af, Atten= 1%, Lag= 0.6 min
Primary = 0.85 cfs @ 12.10 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 991.34' @ 12.10 hrs Surf.Area= 334 sf Storage= 235 cf

Plug-Flow detention time= 60.1 min calculated for 0.058 af (93% of inflow)
Center-of-Mass det. time= 22.9 min (824.7 - 801.8)

Volume	Invert	Avail.Storage	Storage Description
#1	990.10'	811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
990.10	45	0	0
992.00	486	504	504
992.50	740	307	811

Device	Routing	Invert	Outlet Devices
#1	Primary	991.20'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=0.84 cfs @ 12.10 hrs HW=991.34' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.84 cfs @ 1.18 fps)

Summary for Pond 22P: IB-245

Inflow Area = 0.523 ac, 17.17% Impervious, Inflow Depth = 4.11" for 100-Year event
Inflow = 2.48 cfs @ 12.09 hrs, Volume= 0.179 af
Outflow = 2.42 cfs @ 12.11 hrs, Volume= 0.171 af, Atten= 2%, Lag= 1.1 min
Primary = 2.42 cfs @ 12.11 hrs, Volume= 0.171 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 967.68' @ 12.11 hrs Surf.Area= 832 sf Storage= 832 cf

Plug-Flow detention time= 52.6 min calculated for 0.171 af (95% of inflow)
Center-of-Mass det. time= 26.5 min (838.3 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	966.10'	1,801 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)
966.10	274	80.0	0	0	274
968.00	983	163.0	1,125	1,125	1,896
968.50	1,760	225.0	676	1,801	3,812

Device	Routing	Invert	Outlet Devices
#1	Primary	967.50'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59
#2	Primary	967.00'	**12.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 967.00' / 966.10' S= 0.0360 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.41 cfs @ 12.11 hrs HW=967.68' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.16 cfs @ 1.31 fps)
└─**2=Culvert** (Inlet Controls 1.25 cfs @ 2.21 fps)

Summary for Pond 24P: IB-237

Inflow Area = 1.294 ac, 18.38% Impervious, Inflow Depth = 4.18" for 100-Year event
Inflow = 6.30 cfs @ 12.09 hrs, Volume= 0.451 af
Outflow = 6.22 cfs @ 12.10 hrs, Volume= 0.430 af, Atten= 1%, Lag= 0.8 min
Primary = 6.22 cfs @ 12.10 hrs, Volume= 0.430 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 1,007.74' @ 12.10 hrs Surf.Area= 890 sf Storage= 1,340 cf

Plug-Flow detention time= 40.7 min calculated for 0.430 af (95% of inflow)
Center-of-Mass det. time= 15.0 min (828.8 - 813.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,005.00'	2,825 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)
1,005.00	164	61.0	0	0	164
1,006.00	382	82.0	265	265	413
1,008.00	985	119.0	1,320	1,586	1,038
1,009.00	1,513	145.0	1,240	2,825	1,600

Device	Routing	Invert	Outlet Devices
#1	Primary	1,007.20'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=6.21 cfs @ 12.10 hrs HW=1,007.74' TW=998.69' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 6.21 cfs @ 2.31 fps)

Summary for Pond 26P: IB-244

Inflow Area = 1.107 ac, 14.87% Impervious, Inflow Depth = 4.08" for 100-Year event
Inflow = 5.26 cfs @ 12.09 hrs, Volume= 0.376 af
Outflow = 5.20 cfs @ 12.10 hrs, Volume= 0.362 af, Atten= 1%, Lag= 0.8 min
Primary = 5.20 cfs @ 12.10 hrs, Volume= 0.362 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 987.98' @ 12.10 hrs Surf.Area= 738 sf Storage= 925 cf

Plug-Flow detention time= 33.5 min calculated for 0.362 af (96% of inflow)
Center-of-Mass det. time= 12.5 min (828.6 - 816.1)

Volume	Invert	Avail.Storage	Storage Description
#1	986.00'	1,904 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)
986.00	241	65.0	0	0	241
988.00	744	103.0	939	939	776
989.00	1,204	128.0	965	1,904	1,250

Device	Routing	Invert	Outlet Devices
#1	Primary	987.50'	**5.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=5.20 cfs @ 12.10 hrs HW=987.98' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.20 cfs @ 2.16 fps)

Summary for Pond 29P: Infiltrators-2

Inflow Area = 0.276 ac, 19.00% Impervious, Inflow Depth = 4.27" for 100-Year event
Inflow = 1.37 cfs @ 12.09 hrs, Volume= 0.098 af
Outflow = 1.37 cfs @ 12.09 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.09 hrs, Volume= 0.093 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 982.06' @ 12.09 hrs Surf.Area= 209 sf Storage= 248 cf

Plug-Flow detention time= 46.2 min calculated for 0.093 af (94% of inflow)
Center-of-Mass det. time= 15.1 min (827.6 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	979.67'	159 cf	**8.50'W x 24.56'L x 2.33'H Field A** 487 cf Overall - 88 cf Embedded = 399 cf x 40.0% Voids
#2A	980.17'	88 cf	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 6 Chambers in 2 Rows
		248 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	981.99'	**25.0' long (Profile 6) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 3.12 3.41 3.59

Primary OutFlow Max=1.37 cfs @ 12.09 hrs HW=982.06' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.37 cfs @ 0.81 fps)

Pond 29P: Infiltrators-2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 10.0" Spacing = 44.0" C-C Row Spacing

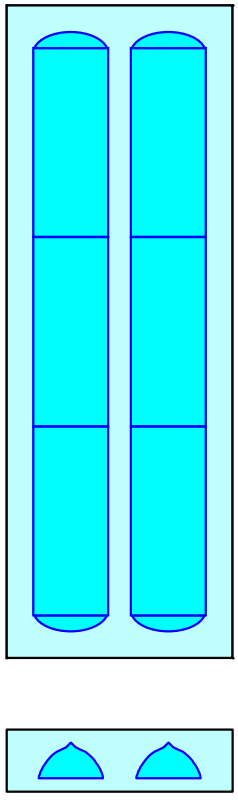
3 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 22.56' Row Length +12.0" End Stone x 2 = 24.56' Base Length
2 Rows x 34.0" Wide + 10.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

487.1 cf Field - 88.5 cf Chambers = 398.7 cf Stone x 40.0% Voids = 159.5 cf Stone Storage

Chamber Storage + Stone Storage = 247.9 cf = 0.006 af
Overall Storage Efficiency = 50.9%
Overall System Size = 24.56' x 8.50' x 2.33'

6 Chambers
18.0 cy Field
14.8 cy Stone



Doyle Avenue A-N-R Residential Development

Maintenance Agreement

The Doyle Avenue A-N-R Residential Development is proposed with a stormwater system designed to treat & retain stormwater to minimize the impact of the development on the surrounding wetlands. These stormwater features must be maintained per the Operation and Maintenance plan submitted with the Stormwater Application. This maintenance is to be the sole responsibility of the owner of the property, and that responsibility is to be transferred with the sale of the property. Examples of maintenance and estimated costs are listed below (but are not limited to):

Removal of sediment from forebays/basins	$500-$1000/yr
Erosion repair/Rip-Rap replacement	$500-$1000/yr
Catch Basin Cleaning	$250-$500/yr
Total Cost:	$1,250-$2,500/yr

By signing this document, I certify that I am the owner of the property and agree to maintain the stormwater management system on my property and am aware of the estimated costs to do so. I will uphold the integrity of the system until the property is transferred to another entity who will then bear the responsibility of maintaining the stormwater management system.

_____

Print Name

_____

Signature

Table 1
Minimum Cover Requirements for ADS N-12®, N-12 ST, and N-12 WT (per AASHTO) with AASHTO H-20, H-25, or HL-93 Load

Inside Diameter, ID, in.(mm)	Minimum Cover ft. (m)	Inside Diameter, ID, in.(mm)	Minimum Cover ft. (m)
4 (100)	1 (0.3)	24 (600)	1 (0.3)
6 (150)	1 (0.3)	30 (750)	1 (0.3)
8 (200)	1 (0.3)	36 (900)	1 (0.3)
10 (250)	1 (0.3)	42 (1050)	1 (0.3)
12 (300)	1 (0.3)	48 (1200)	1 (0.3)
15 (375)	1 (0.3)	54 (1350)	2 (0.6)
18 (450)	1 (0.3)	60 (1500)	2 (0.6)

Notes for Table 1:

1. *Minimum covers presented here were calculated assuming Class III backfill material to 95% standard Proctor density or Class II backfill material to 90% standard Proctor density around the pipe and structural backfill to the crown of the pipe, as recommended in Section 5 of the Drainage Handbook, with an additional layer of compacted traffic lane sub-base for a total cover as required. In shallow traffic installations, especially where pavement is involved, a good quality compacted material to grade is required to prevent surface rutting.*
2. *The minimum covers specified do not include pavement thickness. A pavement section of 0.4' is typical.*
3. *Backfill materials and compaction levels not shown in the table may also be acceptable. Contact ADS for further detail.*
4. *Calculations assume no hydrostatic pressure and native soils that are as strong as the specified minimum backfill recommendations.*

Maximum Cover

Wall thrust generally governs the maximum cover a pipe can withstand and conservative maximum cover heights will result when using the information presented in the *Structures* section (Section 2) of the Drainage Handbook.

The maximum burial depth is highly influenced by the type of backfill and level of compaction around the pipe. General maximum cover limits for ADS N-12, N-12 ST, N-12 WT pipe, (ASTM F2306 and AASTHO M252/M294 Type S pipes) are shown in Table 3 for a variety of backfill conditions.

Table 3 was developed assuming pipe is installed in accordance with ASTM D2321 and the *Installation* section (Section 5) of the Drainage Handbook. Additionally, the calculations assume zero hydrostatic load, incorporate the maximum safety factors represented in Structures section of the Drainage Handbook, use material properties consistent with the expected performance characteristics for N-12 (per ASTM F2306) materials as shown in Table 2 below, and assume the native soil is of adequate strength and is suitable for installation. For applications requiring fill heights greater than those shown in Table 3 or where hydrostatic pressure due to groundwater is present, contact an ADS engineering representative.

STORMWATER OPERATION & MAINTENANCE MANUAL
For The Doyle Ave A-N-R Residential Developemnt
Map-8 Lots-6, 14, 235-247
Doyle Avenue; Winchendon, MA 01475
Owner: Asher Construction, LLC
Owner Address: 77 Nashua Road; Sharon, NH 03458
Phone: 603-562-5181

This following manual outlines the inspection and maintenance requirements associated with stormwater management elements at the site. The owner, Asher Construction, LLC, shall provide the required construction controls as well as the inspections, operations and long-term maintenance for the term of his ownership. Any successor in title to the property shall also be bound by the requirements as described herein (within the confines of said successor's property) and/or as specified by the Town of Winchendon Planning Board and/or the Conservation Commission.

The Owner/operator shall review and be responsible for any requirements contained in the Stormwater Pollution Prevention Plan (SWPPP), and compliant with NPDES General Permit Conditions.

The site stormwater practices are enumerated below. Inspection and maintenance sheets are provided for each location. Refer to the BMP ID Plan for the location of the site Stormwater Management System.

An annual report shall be submitted to the DPW to ensure the town is kept up to date on inspection and maintenance procedures conducted at the site in any given year.

A- Conveyance Swales
B- Sediment Forebay
C- Infiltration Basins
D- Infiltrator Chamber Bed
E- Outlet Protection
F- Culverts
G- Catch Basin
H- Silt-Fencing
I- De-Icing Log
J- Invasive Species
K- Vegetated Filter Strip
L- Rain Garden

A- Conveyance Swales

This site contains seven conveyance swales. These swales direct runoff from impervious areas to infiltration practices.

Maintenance requirements are on the following page.

Inspect all conveyance swales in one visit to the site, if work is required, refer to the BMP ID to identify which swale needs maintenance (S1-S7).

Date	Inspector	Notes

low velocities can act as sediment traps, add extra capacity to address sediment accumulation without reducing design capacity. Add an extra 0.3 to 0.5 feet of freeboard depth, if sediment accumulation is expected. Use side slopes of 3:1 or flatter to prevent side slope erosion. Make the longitudinal slope of the channel as flat as possible and not greater than 5%.

Install check dams in drainage channels when necessary to achieve velocities of 5 feet per second or less. See check dam section of this Handbook <<LINK>>. Do not use earthen check dams because they tend to erode on the downstream side, and it is difficult to establish and maintain grass on the dams. The maximum ponding time behind the check dam should not exceed 24 hours. Use outlet protection at discharge points from a drainage channel to prevent scour at the outlet.

The design for the drainage channel must include access for maintenance. When located along a highway, provide a breakdown lane with a width of 15 feet. When located along a street, off-street parking can be doubled up as the access, provided signs are posted indicating no parking is allowed during maintenance periods. When locating drainage channels adjacent to pervious surfaces, include a 15-foot wide grass strip to provide access for maintenance trucks.

Construction

Use temporary erosion and sediment controls during construction. Soil amendments, such as using aged compost that contains no biosolids, may be needed to encourage vegetation growth. Select a vegetation mix that suits the characteristics of the site. Seeding will require mulching with appropriate materials, such as mulch matting, straw, wood chips, other natural blankets, or synthetic blankets. Anchor blanket immediately after seeding. Provide new seedlings with adequate water until they are well established. Refer to the "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials" <<LINK>> on sediment/erosion control for information regarding seeding, mulching, and use of blankets.

Maintenance

The maintenance and inspection schedule should take into consideration the effectiveness of the drainage channel. Inspect drainage channels the first few months after construction to make sure that there is no rilling or gullying, and that vegetation in the channels is adequate. Thereafter, inspect the channel twice a year for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding, and sediment accumulation.

Regular maintenance tasks include mowing, fertilizing, liming, watering, pruning, weeding, and pest control. Mow channels at least once per year. Do not cut the grass shorter than three to four inches. Keep grass height under 6 inches to maintain the design depth necessary to serve as a conveyance. Do not mow excessively, because it may increase the design flow velocity.

Remove sediment and debris manually at least once per year. Re-seed periodically to maintain the dense growth of grass vegetation. Take care to protect drainage channels from snow removal procedures and off-street parking. When drainage channels are located on private residential property, the operation and maintenance plan must clearly specify the private property owner who is responsible for carrying out the required maintenance. If the operation and maintenance plan calls for maintenance of drainage channels on private properties to be performed by a public entity or an association (e.g. homeowners association), maintenance easements must be obtained.

B- Sediment Forebay

This site contains nine sediment forebays. These forebays pretreat stormwater prior to entry into the infiltration basins and must be maintained.

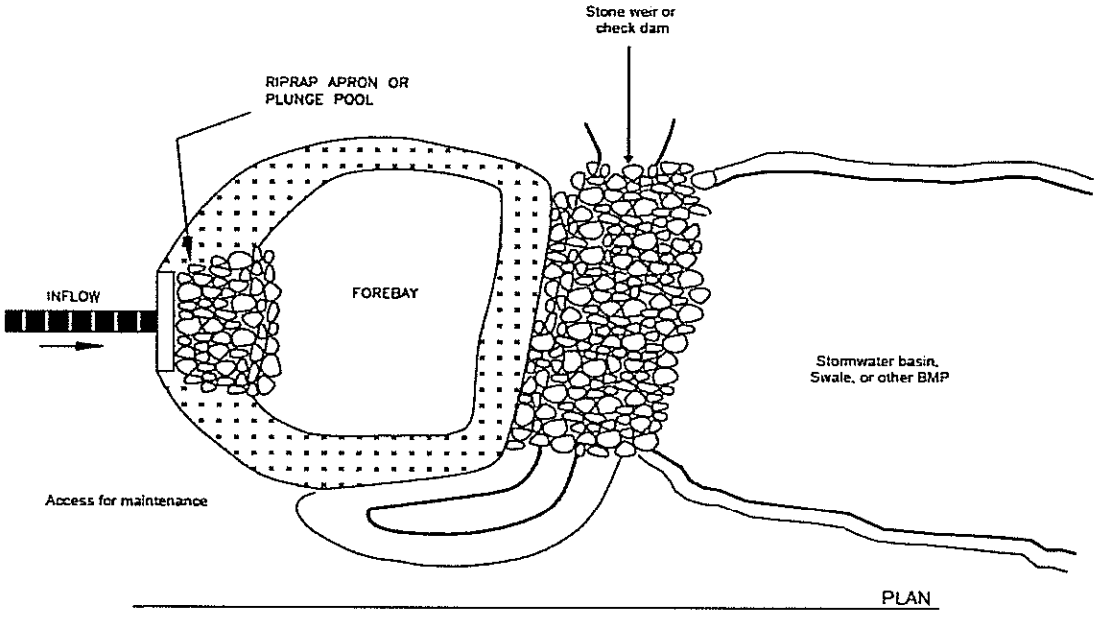
Maintenance requirements are on the following page.

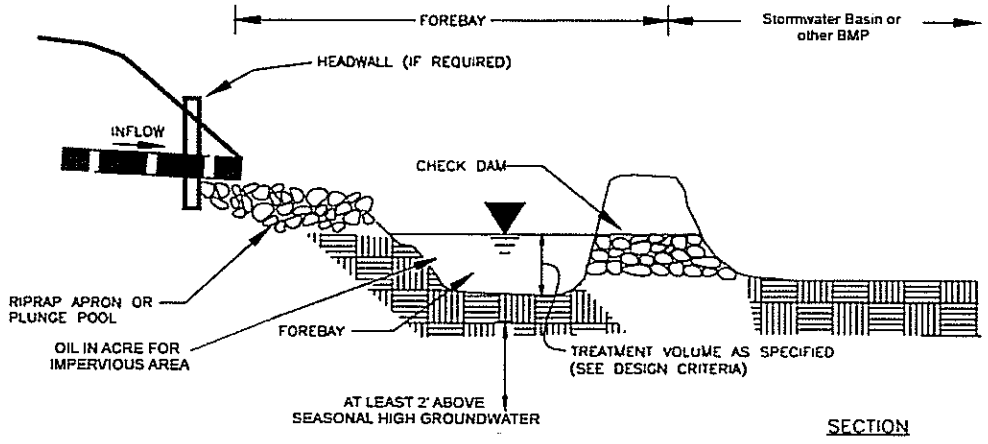
Sediment Forebays shown on BMP ID Plan labeled FB1-FB9

Date	Inspector	Notes

Maintenance

Sediments and associated pollutants are removed only when sediment forebays are actually cleaned out, so regular maintenance is essential. Frequently removing accumulated sediments will make it less likely that sediments will be resuspended. At a minimum, inspect sediment forebays monthly and clean them out at least four times per year. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of rilling and gullying and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or re-sodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots.





CONSTRUCTION PERIOD SEDIMENT FOREBAYS SIZED 0.5"/ACRE PER ENTIRE CONTRIBUTING DRAINAGE AREA

adapted from the Vermont Stormwater Handbook

C – Infiltration Basin

This site contains ten infiltration basins which should be regularly maintained. Maintenance requirements are on the following page.

The infiltration basin is shown on the BMP ID Plan labelled B1-B10

Date	Inspector	Notes

the soils beneath the basin floor and side slopes and reduces infiltration capacity. Because some compaction of soils is inevitable during construction, add the required soil amendments and deeply till the basin floor with a rotary tiller or a disc harrow to a depth of 12 inches to restore infiltration rates after final grading.

Use proper erosion/sediment control during construction. Immediately following basin construction, stabilize the floor and side slopes of the basin with a dense turf of water-tolerant grass. Use low maintenance, rapidly germinating grasses, such as fescues. Do not sod the basin floor or side slopes. After the basin is completed, keep the basin roped or fenced off while construction proceeds on other parts of the site. Never direct construction period drainage to the infiltration basin. After construction is completed, do not direct runoff into the basin until the bottom and side slopes are fully stabilized.

Maintenance

Infiltration basins are prone to clogging and failure, so it is imperative to develop and implement aggressive maintenance plans and schedules. Installing the required pretreatment BMPs will significantly reduce maintenance requirements for the basin.

The Operation and Maintenance Plan required by Standard 9 must include inspections and preventive maintenance at least twice a year, and after every time drainage discharges through the high outlet orifice. The Plan must require inspecting the pretreatment BMPs in accordance with the minimal requirements specified for those practices and after every major storm event. A major storm event is defined as a storm that is equal to or greater than the 2-year, 24-hour storm (generally 2.9 to 3.6 inches in a 24-hour period, depending in geographic location in Massachusetts).

Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots).

Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include:

- Signs of differential settlement,
- Cracking,
- Erosion,
- Leakage in the embankments
- Tree growth on the embankments
- Condition of riprap,
- Sediment accumulation and
- The health of the turf.

At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately.

Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

References:

Center for Watershed Protection, http://www.stormwatercenter.net/Manual_Builder/Construction%20Specifications/Infiltration%20Trench%20Specifications.htm

Center for Watershed Protection, http://www.stormwatercenter.net/Manual_Builder/Performance%20Criteria/Infiltration.htm

Center for Watershed Protection, Stormwater Management Fact Sheet, Infiltration Basin, http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool6_Stormwater_Practices/Infiltration%20Practice/Infiltration%20Basin.htm

Ferguson, B.K., 1994. Stormwater Infiltration. CRC Press, Ann Arbor, MI.

or below the level of the adjacent grassed areas to ensure thorough drainage of these areas. When designing the channels, consider settlement of the lining and the adjacent areas, the potential for frost impacts on the lining and the potential for erosion or scour along the edges of the lining caused by bank-full velocities. Provide impervious linings with broken stone foundations and weep holes. Design the channel to maintain a low outflow discharge rate at the downstream end of the channel.

Use low-flow underdrains, connected to the principal outlet structure or other downstream discharge point, to promote thorough drying of the channel and the basin bottom. Consider the depth of the low flow channel when preparing the final bottom-grading plan.

Design dry detention basin side slopes to be no steeper than 3:1. Flatter slopes help to prevent erosion of the banks during larger storms, make routine bank maintenance tasks (such as mowing) easier, and allow access to the basin. Include a multi-stage outlet structure to provide an adequate level of water quality and flood control. To meet the water quantity control standards, use the required design storm runoff rates as outlet release rates.

Design the outlet to control the outflow rate without clogging. Locate the outlet structure in the embankment for maintenance, access, safety and aesthetics. Design the outlet to facilitate maintenance; the vital parts of the structures should be accessible during normal maintenance and emergency situations. Include a draw-down valve to allow the dry detention basin to completely drain within 24 hours. To prevent scour at the outlet, include a flow transition structure, such as a lined apron or plunge pad, to absorb the initial impact of the flow and reduce the velocity to a level that will not erode the receiving channel or area.

Design embankments and spillways in conformance with the state regulations for Dam Safety (302 CMR 10.00). All dry detention basins must have an emergency spillway capable of bypassing runoff from large storms without damaging the impounding structure. Provide an access for maintenance by public or private right-of-way, using a minimum width of 15 feet and a maximum slope of 5:1. This access should extend to the forebay, safety bench and outflow structure, and should never cross the emergency spillway, unless the spillway has been designed for that purpose. Use vegetative buffers around the perimeter of the basin for erosion control and additional sediment and nutrient removal.

Maintenance

It is critical to provide access for maintenance, especially to the interior of the basin. Inspect dry detention basins at least once per year to ensure that they are operating as intended. Inspect basins during and after storms to determine if the basin is meeting the expected detention times. Inspect the outlet structure for evidence of clogging or outflow release velocities that are greater than design flow. Potential problems that should be checked include: subsidence, erosion, cracking or tree growth on the embankment; damage to the emergency spillway; sediment accumulation around the outlet; inadequacy of the inlet/outlet channel erosion control measures; changes in the condition of the pilot channel; and erosion within the basin and banks. Make any necessary repairs immediately. During inspections, note changes to the detention basin or the contributing watershed because these changes could affect basin performance. Mow the side slopes, embankment, and emergency spillway at least twice per year. Remove trash and debris at this time. Remove sediment from the basin as necessary, and at least once every 10 years or when the basin is 50% full. Provide for an on-site sediment disposal area to reduce the overall sediment removal costs.

Resources:

MassHighway. Stormwater handbook for Highways and Bridges. May 2004.
T.R. Schueler. Center for Watershed Protection. Design of Stormwater Pond Systems. 1996.

D – Infiltrator Chamber Bed

This site contains one infiltrator chamber beds which should be regularly maintained.

Maintenance requirements consist of cleaning off the outlet grate cover to prevent blockage of overflow and undesirables from entering the infiltration system.

The infiltration chamber bed is shown on the BMP ID Plan labelled IC.

Date	Inspector	Notes
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E – Outlet Protection

This site contains ten outlet protection areas, one on each of the basins. Each are crucial to the function of the basins, and must be maintained regularly.

Maintenance requirements are on the following page.

The outlet protection locations are at the outlets of the infiltration basins. All outlet protection locations should be inspected in one visit and if work is required, refer to the ID Plan to identify which outlet needs maintenance.

Date	Inspector	Notes
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F – Culverts

This site contains thirteen culverts which must be regularly inspected and maintained. Culverts must be inspected after every major rain event, and all debris must be cleared from the inlet/outlet of each culvert to ensure maximum flow through each culvert. Each culvert should be visually inspected for any structural damage, and should be repaired/replaced accordingly.

The culvert locations are shown on the BMP ID plan and are labelled as C1-C13. All culverts should be inspected during one visit, any maintenance done or needed on the culverts should be logged below with the correct BMP ID.

Date	Inspector	Notes
_____	_____	_____
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G – Catch Basin

This site contains one catch basin preceding the infiltration chamber bed and is to be regularly maintained.

Maintenance requirements are listed on the following sheet.

The catch basin precedes the infiltration chamber bed, shown on the BMP ID Plan as ‘IC’.

Date	Inspector	Notes
_____	_____	_____
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_____	_____	_____
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_____	_____	_____
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Maintenance

Activity	Frequency
Inspect units	Four times per year
Clean units	Four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.

Maintenance

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. One study found that once 50% of the sump volume is filled, the catch basin is not able to retain additional sediments.

Inspect or clean deep sump basins at least four times per year and at the end of the foliage and snow-removal seasons. Sediments must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. If handling runoff from land uses with higher potential pollutant loads or discharging runoff near or to a critical area, more frequent cleaning may be necessary.

Clamshell buckets are typically used to remove sediment in Massachusetts. However, vacuum trucks are preferable, because they remove more trapped sediment and supernatant than clamshells. Vacuuming is also a speedier process and is less likely to snap the cast iron hood within the deep sump catch basin.

Always consider the safety of the staff cleaning deep sump catch basins. Cleaning a deep sump catch basin within a road with active traffic or even within a parking lot is dangerous, and a police detail may be necessary to safeguard workers.

Although catch basin debris often contains concentrations of oil and hazardous materials such as petroleum hydrocarbons and metals, MassDEP classifies them as solid waste. Unless there is evidence that they have been contaminated by a spill or other means, MassDEP does not routinely require catch basin cleanings to be tested before disposal. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste, without any prior approval by MassDEP. However, some landfills require catch basin cleanings to be tested before they are accepted.

With prior MassDEP approval, catch basin cleanings may be used as grading and shaping materials at landfills undergoing closure (see Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites) or as daily cover at active landfills. MassDEP also encourages the beneficial reuse of catch basin cleanings whenever possible. A Beneficial Reuse Determination is required for such use.

MassDEP regulations prohibit landfills from accepting materials that contain free-draining liquids. One way to remove liquids is to use a hydraulic lift truck during cleaning operations so that the material can be decanted at the site. After loading material from several catch basins into a truck, elevate the truck so that any free-draining liquid can flow back into the structure. If there is no free water in the truck, the material may be deemed to be sufficiently dry. Otherwise the catch basin cleanings must undergo a Paint Filter Liquids Test. Go to www. Mass.gov/dep/recycle/laws/cafacts.doc for information on all of the MassDEP requirements pertaining to the disposal of catch basin cleanings.

H – Silt Fencing

Below, log the inspection of all silt fencing on site, which surrounds the area of disturbance and prevents silt-laden runoff from escaping the site. It is important to be inspected and maintained regularly, with any deficiencies corrected immediately to prevent unnecessary erosion pollution.

Date	Amount	Type
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I - De-Icing Log

Below, log the amount and type of de-icing materials applied to the site during the winter months.

Date	Amount	Type
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J – Invasive Species

If any invasive species begin to grow in the stormwater management practices, immediately call GRAZ Engineering (603)-585-6959 to be advised on actions to be taken regarding the specific invasive species.

K - Vegetated Filter Strip

This site contains two vegetated filter strips. This filter strips pretreat stormwater prior to entry into rain gardens/infiltration basins and must be maintained.

Maintenance requirements are on the following page.

Filter Strips shown on BMP ID Plan as ‘FS1-FS2’.

Date	Inspector	Notes

Protect the area to be used for the filter strip by using upstream sediment traps.

Use as much of the existing topsoil on the site as possible to enhance plant growth.

Maintenance

Regular maintenance is critical for filter strips to be effective and to ensure that flow does not short-circuit the system. Conduct semi-annual inspections during the first year (and annually thereafter). Inspect the level spreader for sediment buildup and the vegetation for signs of erosion, bare spots, and overall health. Regular, frequent mowing of the grass is required. Remove sediment from the toe of slope or level spreader, and reseed bare spots as necessary. Periodically, remove sediment that accumulates near the top of the strip to maintain the appropriate slope and prevent formation of a "berm" that could impede the distribution of runoff as sheet flow.

When the filter strip is located in the buffer zone to a wetland resource area, the operation and maintenance plan must include strict measures to ensure that maintenance operations do not alter the wetland resource areas. Please note, filter strips are restricted to the outer 50 feet of the buffer zone.

Cold Climate Considerations

In cold climates such as Massachusetts, the depth of soil media that serves as the planting bed must extend below the frost line to minimize the effects of freezing. Avoid using peat and compost media, which retain water and freeze during the winter, and become impermeable and ineffective.

References:

Center for Watershed Protection, Stormwater Management Fact Sheet: Grassed Filter Strip, http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool6_Stormwater_Practices/Filtering%20Practice/Grassed%20Filter%20Strip.htm

Claytor, R.A. and T.R. Schueler. 1996. Design of Stormwater Filtering Systems. Center for Watershed Protection. Silver Spring, Maryland.

Connecticut Department of Environmental Protection. 2004. Connecticut Stormwater Quality Manual.

International Stormwater BMP Database, Biofilter – Grass Strip, http://www.bmpdatabase.org

Knox County, Stormwater Management Manual, Volume 2, Section 4.3.9, Filter Strip, Pp. 4-155 to 4-164, http://knoxcounty.org/stormwater/pdfs/vol2/4-3-9%20Filter%20Strip.pdf

Knoxville, City of, 2003, Knoxville BMP Manual Stormwater Treatment, Filter Strips and Swales, Practice No. ST – 05, http://www.ci.knoxville.tn.us/engineering/bmp_manual/ST-05.pdf

Maine Department of Environmental Protection. 2006, Maine Stormwater Best Management Practices Manual, Chapter 5, Pp. 5-1 to 5-18, http://www.maine.gov/dep/blwq//docstand/stormwater/stormwaterbmps/vol3/chapter5.pdf

Maryland Department of the Environment, 2000, Maryland Stormwater Design Manual, Volume I, Chapter 2, Unified Sizing Criteria, P. 2.39, http://www.mde.state.md.us/assets/document/chapter2.pdf

Massachusetts Highway Department. 2004. Storm Water Handbook for Highways and Bridges.

Metropolitan Council. 2001. Minnesota Urban Small Sites BMP Manual: Stormwater Best Management Practices for Cold Climates. Prepared by Barr Engineering Company. St. Paul, Minnesota.

New Jersey Department of Environmental Protection, 2004, Best Management Practice Manual, Chapter 9.10, Standard for Vegetated Filter Strip, Pp. 9.10-1 to 9.11-10, http://www.njstormwater.org/tier_A/pdf/NJ_SWBMP_9.10.pdf

New York State Department of Environmental Conservation (NYDEC). 2001. New York State Stormwater Management Design Manual. Prepared by Center for Watershed Protection. Albany, New York.

United States Environmental Protection Agency (EPA). 1999. Preliminary Data Summary of Urban Storm Water Best Management Practices. EPA 821-R99-012.

L - Rain Garden

This site contains a rain garden. This rain garden treats stormwater prior to discharge and eventual flow into wetlands, and must be maintained regularly.

Maintenance requirements are on the following page.

Rain Garden shown on BMP ID Plan as ‘RG’.

Date	Inspector	Notes

On-site soil mixing or placement is not allowed if soil is saturated or subject to water within 48 hours. Cover and store soil to prevent wetting or saturation.

Test soil for fertility and micro-nutrients and, only if necessary, amend mixture to create optimum conditions for plant establishment and early growth.

Grade the area to allow a ponding depth of 6 to 8 inches; depending on site conditions, more or less ponding may be appropriate.

Cover the soil with 2 to 3 inches of fine-shredded hardwood mulch.

The planting plan shall include a mix of herbaceous perennials, shrubs, and (if conditions permit) understory trees that can tolerate intermittent ponding, occasional saline conditions due to road salt, and extended dry periods. A list of plants that are suitable for bioretention areas can be found at the end of this section. To avoid a monoculture, it is a good practice to include one tree or shrub per 50 square feet of bioretention area, and at least 3 species each of herbaceous perennials and shrubs. Invasive and exotic species are prohibited. The planting plan should also meet any applicable local landscaping requirements.

All exfiltrating bioretention areas must be designed to drain within 72 hours. However, rain gardens are typically designed to drain water within a day and are thus unlikely to breed mosquitoes.

Bioretention cells, including rain gardens, require pretreatment, such as a vegetated filter strip. A stone or pea gravel diaphragm or, even better, a concrete level spreader upstream of a filter strip will enhance sheet flow and sediment removal.
Bioretention cells can be dosed with sheet flow, a surface inlet, or pipe flow. When using a surface inlet, first direct the flow to a sediment forebay. Alternatively, piped flow may be introduced to the bioretention system via an underdrain.

For bioretention cells dosed via sheet flow or surface inlets, include a ponding area to allow water to pond and be stored temporarily while stormwater is exfiltrating through the cell. Where bioretention areas are adjacent to parking areas, allow three inches of freeboard above the ponding depth to prevent flooding.

Most bioretention cells have an overflow drain that allows ponded water above the selected ponding depth to be dosed to an underdrain. If the bioretention system is designed to exfiltrate, the underdrain is not connected to an outlet, but instead terminates in the bioretention cell. If the bioretention area is not designed to exfiltrate, the underdrain is connected to an outlet for discharge or conveyance to additional best management practices.

Construction

During construction, avoid excessively compacting soils around the bioretention areas and accumulating silt around the drain field. To minimize sediment loading in the treatment area, direct runoff to the bioretention area only from areas that are stabilized; always divert construction runoff elsewhere.

To avoid compaction of the parent material, work from the edge of the area proposed as the location of an exfiltrationg bioretention cell. Never direct runoff to the cell until the cell and the contributing drainage areas are fully stabilized.

Place planting soils in 1-foot to 2-foot lifts and compact them with minimal pressure until the desired elevation is reached. Some engineers suggest flooding the cell between each lift placement in lieu of compaction.

Maintenance

Premature failure of bioretention areas is a significant issue caused by lack of regular maintenance. Ensuring long-term maintenance involves sustained public education and deed restrictions or covenants for privately owned cells. Bioretention areas require careful attention while plants are being established

Bioretention Maintenance Schedule

Activity	*Time of Year*	*Frequency*
Inspect & remove trash	Year round	Monthly
Mulch	Spring	Annually
Remove dead vegetation	Fall or Spring	Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace entire media & all vegetation	Late Spring/early Summer	As needed*

** Paying careful attention to pretreatment and operation & maintenance can extend the life of the soil media*

and seasonal landscaping maintenance thereafter.

In many cases, a landscaping contractor working elsewhere on the site can complete maintenance tasks. Inspect pretreatment devices and bioretention cells regularly for sediment build-up, structural damage, and standing water.

Inspect soil and repair eroded areas monthly. Re-mulch void areas as needed. Remove litter and debris monthly. Treat diseased vegetation as needed. Remove and replace dead vegetation twice per year (spring and fall).

Proper selection of plant species and support during establishment of vegetation should minimize—if not eliminate—the need for fertilizers and pesticides. Remove invasive species as needed to prevent these species from spreading into the bioretention area. Replace mulch every two years, in the early spring. Upon failure, excavate bioretention area, scarify bottom and sides, replace filter fabric and soil, replant, and mulch. A summary of maintenance activities can be found on the previous page.

Because the soil medium filters contaminants from runoff, the cation exchange capacity of the soil media will eventually be exhausted. When the cation exchange capacity of the soil media decreases, change the soil media to prevent contaminants from migrating to the groundwater, or from being discharged via an underdrain outlet. Using small shrubs and plants instead of larger trees will make it easier to replace the media with clean material when needed.

Plant maintenance is critical. Concentrated salts in roadway runoff may kill plants, necessitating removal of dead vegetation each spring and replanting. The operation and maintenance plan must include measures to make sure the plants are maintained. This is particularly true in residential subdivisions, where the operation and maintenance plan may assign each homeowner the legal responsibility to maintain a bioretention cell or rain garden on his or her property. Including the requirement in the property deed for new subdivisions may alert residential property owners to their legal responsibilities regarding the bioretention cells constructed on their lot.

Cold Climate Considerations

Never store snow in bioretention areas. The Operation and Maintenance plan must specify where on-site snow will be stored. All snow dumps must comply with MassDEP's guidance. When bioretention areas are located along roads, care must be taken during plowing operations to prevent snow from being plowed into the bioretention areas. If snow is plowed into the cells, runoff may bypass the cell and drain into downgradient wetlands without first receiving the required water quality treatment, and without recharging the groundwater.

References

Center for Watershed Protection, 2000, Bioretention as a Water Quality Best Management Practice, Article 110 from Watershed Protection Techniques; http://www.cwp.org/Downloads/ELC_PWP110.pdf

Federal Highway Administration , YEAR, Bioretention Fact Sheet, http://www.fhwa.dot.gov/environment/

Low Impact Development Center, 2003, Drainage – Bioretention Specification, http://www.lowimpactdevelopment.org/epa03/biospec.htm

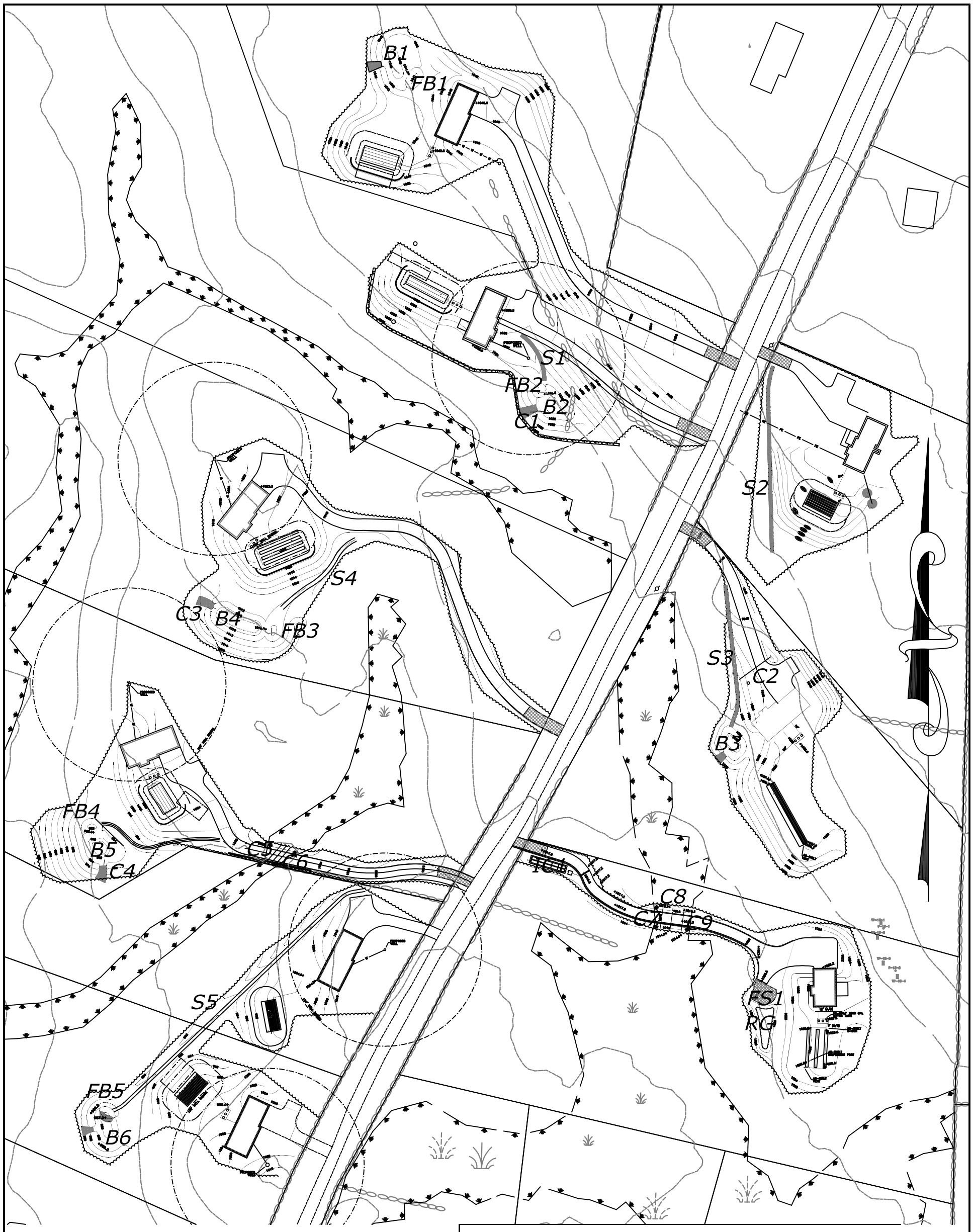
Prince Georges County, 2002, Bioretention Manual, http://www.goprincegeorgescounty.com/der/bioretention.asp

Puget Sound Action Team, 2005, Low Impact Development, Pp. 174 - 184 http://www.psat.wa.gov/Publications/LID_tech_manual05/LID_manual2005.pdf

U.S. Environmental Protection Agency, 1999, Stormwater Technology Fact Sheet, Bioretention, EPA 832-F-99-012, http://www.epa.gov/owm/mtb/biortn.pdf

U.S. Environmental Protection Agency, 2005, National Management Measures to Control Nonpoint Source Pollution from Urban Areas, Publication Number EPA 841-B-05-004, Pp. 5-29 http://www.epa.gov/nps/urbanmm/

University of North Carolina, www.bae.ncsu.edu/topic/bioretention www.bae.ncsu.edu/stormwater/PublicationFiles/DesigningRainGardens2001.pdf



S1	SWALE
B1	BASIN
C1	CULVERT
FB1	SEDIMENT FOREBAY
RG	RAIN GARDEN
FS	VEGETATED FILTER STRIP
IC1	INFILTRATOR CHAMBER BED

0 100 200 300

SCALE: 1"=100' ON ORIGINAL

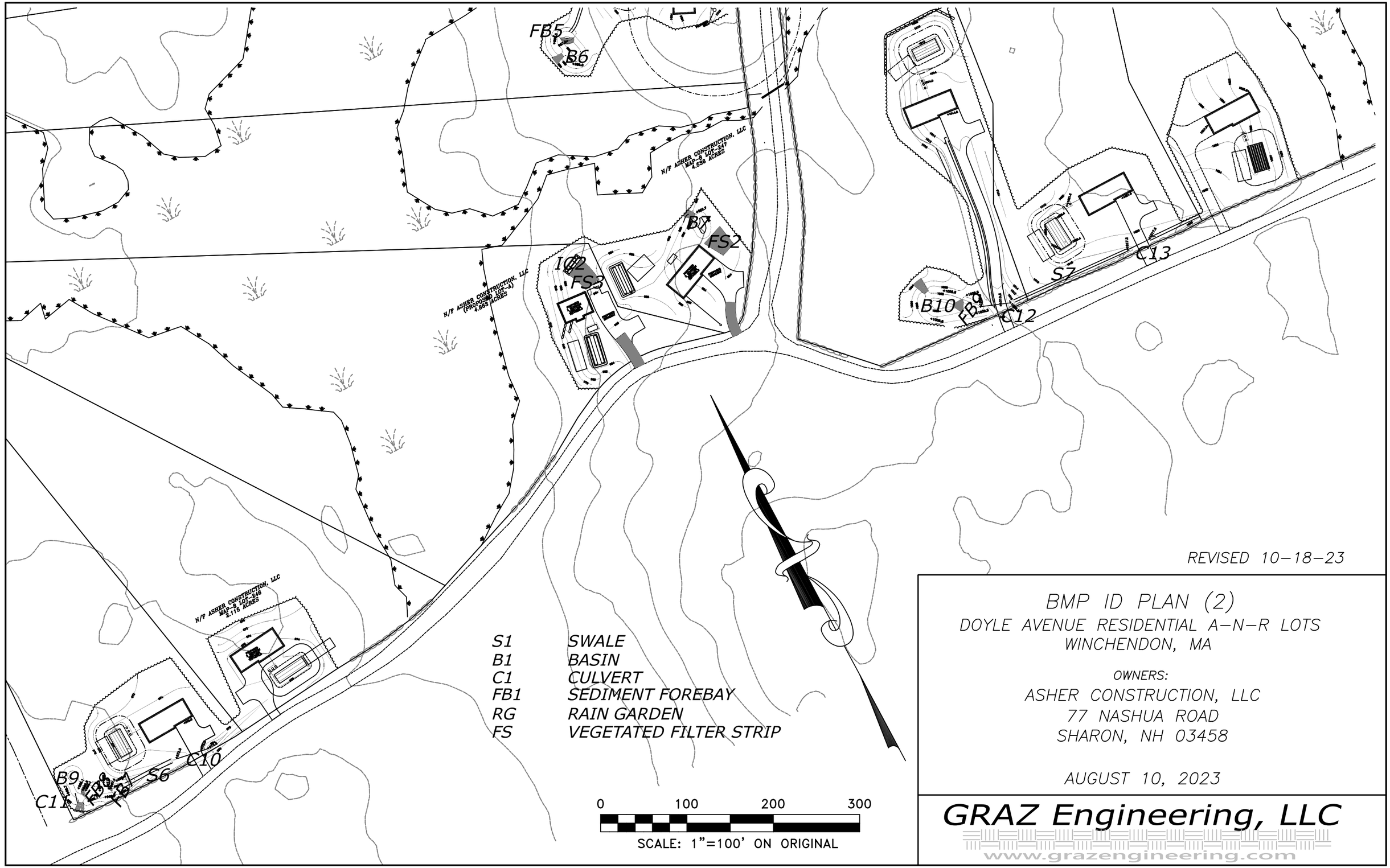
BMP ID PLAN

DOYLE AVENUE RESIDENTIAL A–N–R LOTS
WINCHENDON, MA

OWNERS:
ASHER CONSTRUCTION, LLC
77 NASHUA ROAD
SHARON, NH 03458

AUGUST 10, 2023

GRAZ Engineering, LLC
www.grazengineering.com



REVISED 10-18-23

BMP ID PLAN (2)

DOYLE AVENUE RESIDENTIAL A-N-R LOTS
WINCHENDON, MA

OWNERS:
ASHER CONSTRUCTION, LLC
77 NASHUA ROAD
SHARON, NH 03458

AUGUST 10, 2023

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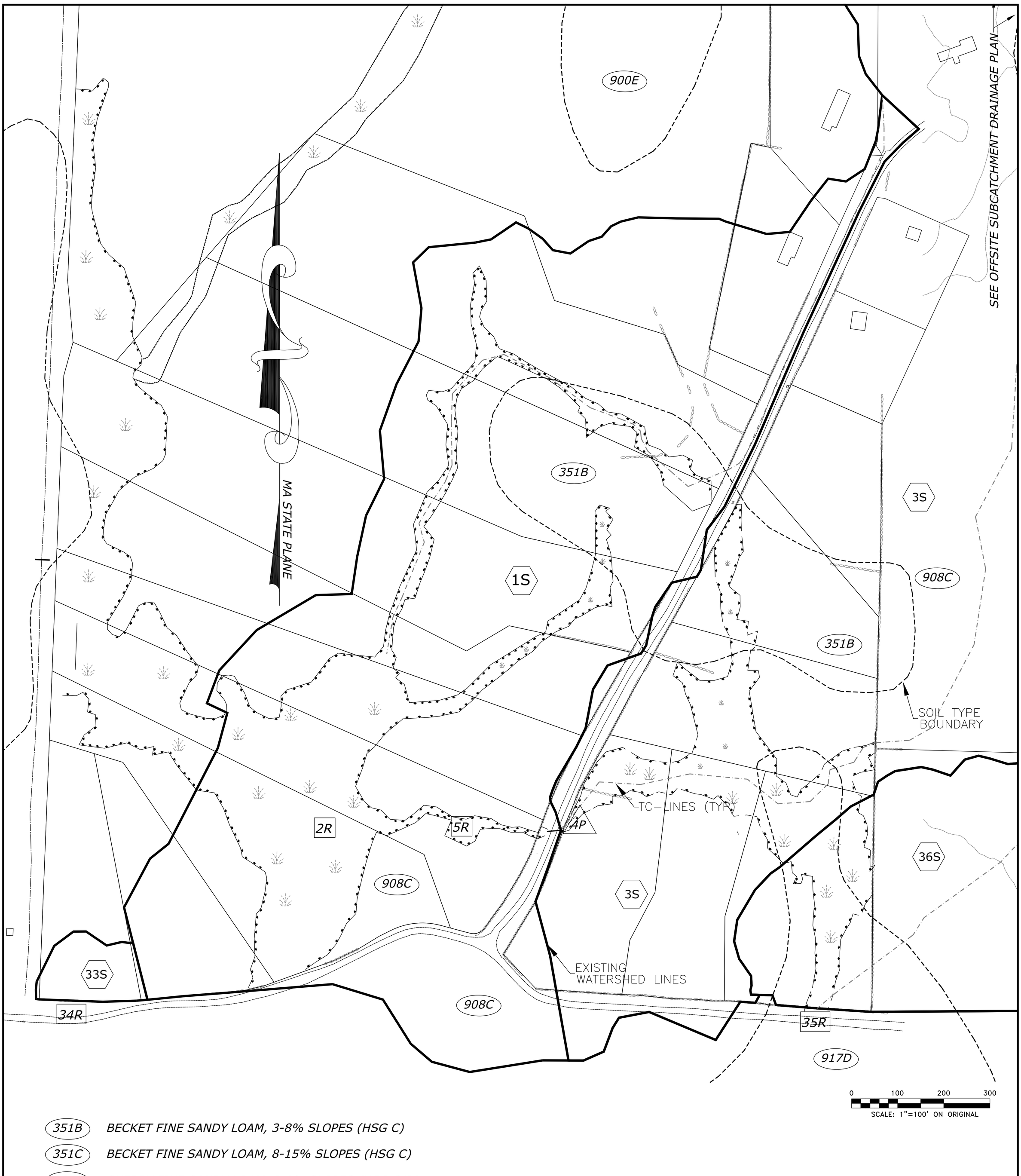

351B BECKET FINE SANDY LOAM, 3-8% SLOPES (HSG C)

351C BECKET FINE SANDY LOAM, 8-15% SLOPES (HSG C)

365B SKERRY FINE SANDY LOAM, 3-8% SLOPES (HSG C/D)

900E BEKCET-MONADNOCK ASSOC, 15-45% SLOPES (HSG B)

908C BECKET-SKERRY ASSOC, 0-15% SLOPES (HSG C)

917B PILLSBURY-PEACHAM ASSOC, 0-8% SLOPES (HSG C/D)

3S SUBCATCHMENT (TYP)

8P POND (TYP)

20R REACH (TYP)

EXISTING CONDITION DRAINAGE PLAN

DOYLE AVENUE RESIDENTIAL A-N-R LOTS
WINCHENDON, MA

OWNERS:
ASHER CONSTRUCTION, LLC
77 NASHUA ROAD
SHARON, NH 03458

AUGUST 10, 2023

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SEE OFFSITE SUBCATCHMENT DRAINAGE PLAN

SOIL TYPE BOUNDARY

PROPOSED WATERSHED LINES

TC-LINES (TYP)

SCALE: 1"=100' ON ORIGINAL

MA STATE PLANE

351B	BECKET FINE SANDY LOAM, 3-8% SLOPES (HSG C)
351C	BECKET FINE SANDY LOAM, 8-15% SLOPES (HSG C)
365B	SKERRY FINE SANDY LOAM, 3-8% SLOPES (HSG C/D)
900E	BEKCET-MONADNOCK ASSOC, 15-45% SLOPES (HSG B)
908C	BECKET-SKERRY ASSOC, 0-15% SLOPES (HSG C)
917D	PILLSBURY-PEACHAM ASSOC, 0-8% SLOPES (HSG C/D)
3S	SUBCATCHMENT (TYP)
8P	POND (TYP)
20R	REACH (TYP)

REVISED 10-18-23

PROPOSED CONDITION DRAINAGE PLAN

DOYLE AVENUE RESIDENTIAL A-N-R LOTS
WINCHENDON, MA

OWNERS:
ASHER CONSTRUCTION, LLC
77 NASHUA ROAD
SHARON, NH 03458

AUGUST 10, 2023

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351B BECKET FINE SANDY LOAM, 3-8% SLOPES (HSG C)

351C BECKET FINE SANDY LOAM, 8-15% SLOPES (HSG C)

365B SKERRY FINE SANDY LOAM, 3-8% SLOPES (HSG C/D)

900E BEKCET-MONADNOCK ASSOC, 15-45% SLOPES (HSG B)

908C BECKET-SKERRY ASSOC, 0-15% SLOPES (HSG C)

917D PILLSBURY-PEACHAM ASSOC, 0-8% SLOPES (HSG C/D)

3S SUBCATCHMENT (TYP)

8P POND (TYP)

20R REACH (TYP)

PROPOSED WATERSHED LINES

TC-LINES (TYP)

SOIL TYPE BOUNDARY

MA STATE PLANE

SCALE: 1"=150' ON ORIGINAL

REVISED 10-18-23

OFFSITE SUBCATCHMENT DRAINAGE PLAN

DOYLE AVENUE RESIDENTIAL A-N-R LOTS
WINCHENDON, MA

OWNERS:
ASHER CONSTRUCTION, LLC
77 NASHUA ROAD
SHARON, NH 03458

AUGUST 10, 2023

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