ALTERATION OF TERRAIN PERMIT APPLICATION

Water Division / Land Resources Management

Check the status of your application

RSA / Rule: RSA 485-A:17, Env-Wq 1500

Administrative Use Only	Administrative Use Only	Administrative Use Only	File Number:
			Check No.
			Amount:
			Initials:

1. APPLICANT INFORMATION (INTENDED PERMIT HOLDER)		
Applicant Name: Peacock Hill Road, LLC	Contact Name: Gary Fitzgerald	
Email: hotrodda57@hotmail.com	Daytime Telephone: 603-325-3112	
Mailing Address: 145 Old Town Road		
Town/City: Weare	State: NH	ZIP Code: 03281
2. APPLICANT'S AGENT INFORMATION If none, check here: ☐		
Agent's Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town/City:	State:	ZIP Code:
3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT) Check here if more than one property owner, and attach additional sheets as necessary: ☐		
Owner's Name:	Contact Name:	
Email:	Daytime Telephone:	
Mailing Address:		
Town/City:	State:	ZIP Code:
4. PROPERTY OWNER'S AGENT INFORMATION If none, check here: ☐		
Business Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town/City:	State:	ZIP Code:
5. CONSULTANT INFORMATION If none, check here: ☐		
Engineering Firm: Keach-Nordstrom Associates, Inc.	Contact Name: Jason Lopez	
Email: jlopez@keachnordstrom.com	Daytime Telephone: 603-627-2881	
Address: 10 Commerce Park N Suite 3B		
Town/City: Bedford	State: NH	ZIP Code: 03110

6. PROJECT TYPE

☐ Excavation Only ■ Residential ☐ Commercial ☐ Golf Course ☐ School ☐ Municipal
☐ Agricultural ☐ Land Conversion ☐ Other:

7. PROJECT LOCATION INFORMATION

Project Name: Jennesstown Manor

Street/Road Address: Route 103

Town/City: Warner		County: Merrimack	
Tax Map: 7	Block:	Lot Number: 39 & 39-1	Unit:

Post-development, will the proposed project withdraw from or directly discharge to any of the following? If yes, identify the purpose.

1. Stream or Wetland Purpose:	☐ Yes ☐ Withdrawal ☐ Discharge ■ No
2. Artificial pond created by impounding a stream or wetland Purpose:	☐ Yes ☐ Withdrawal ☐ Discharge ■ No
3. Unlined pond dug into the water table Purpose: Pocket Pond	■ Yes ☐ Withdrawal ☐ Discharge ■ No

Post-development, will the proposed project discharge to:
- Within one-quarter mile of a surface water impaired for phosphorus and/or nitrogen? ■ No ☐ **Yes**
- Within one-quarter mile of a Class A surface water or within the watershed area of an Outstanding Resource Water? ■ No ☐ **Yes**
- Within one-quarter mile of a lake or pond not covered previously? ■ No ☐ **Yes**

Is the project a High Load area? ☐ Yes ■ No
If yes, specify the type of high load land use or activity:

Is the project within a Water Supply Intake Protection Area (WSIPA)? ☐ Yes ■ No
Is the project within a Groundwater Protection Area (GPA)? ☐ Yes ■ No
Will the well setbacks identified in Env-Wq 1508.02 be met? ☐ Yes ■ No
For more details on the restrictions in these areas, read Chapter 3.1 in Volume 2 of the NH Stormwater Manual.

Is any part of the property within the 100-year floodplain? ☐ Yes ■ No
If yes: Cut volume: cubic feet within the 100-year floodplain.
Fill volume: cubic feet within the 100-year floodplain.

■ Project *is* within **¼ mile of a designated river** Name of River: Warner River
☐ Project *is not* within ¼ mile of a designated river.

☐ Project *is* within a Coastal/Great Bay Region community.
■ Project *is not* within a Coastal/Great Bay Region community.

8. BRIEF PROJECT DESCRIPTION (PLEASE DO NOT REPLY "SEE ATTACHED")

Two four unit buildings each with shared driveway and a parking area to take place on Map 7 Lots 39 & 39-1.

9. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT.

Tree clearing per intent to cut filed with Town.

10. ADDITIONAL REQUIRED INFORMATION

A. Date a copy of the application was sent to the municipality, as required by Env-Wq 1503.05(e) (Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the governing body of each municipality in which the project is proposed):

(Attach proof of delivery)

B. Date a copy of the application was sent to the local river advisory committee, if required by Env-Wq 1503.05(e) (Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the Local River Advisory Committee, if the project is within ¼ mile of a designated river): N/A

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C. Type of plan required: ☐ Land Conversion ■ Detailed Development ☐ Excavation, Grading and Reclamation ☐ Steep Slope

D. Additional plans required: ■ Stormwater Drainage and Hydrologic Soil Groups ☐ Source Control ☐ Chloride Management

E. Total area of disturbance, in square feet 190,000

F. Additional impervious cover as a result of the project, in square feet (use "-"to indicate a net reduction in impervious coverage).

Total final impervious cover, in square feet 25,352 SF additional cover, 39,839 SF total cover

G. Total undisturbed cover, in square feet 1,317,247

H. Number of lots proposed: 2

I. Total length of roadway, in linear feet: 0

J. Name(s) of receiving water(s): Warner River

K. Identify all other NHDES permits required for the project. For each, indicate whether an application has been filed and is pending. If the required approval has been issued, provide the permit number, registration date, or approval letter number, as applicable.

Type of Approval	Application Filed?	Pending?	If Issued
1. Water Supply Approval	☐ Yes ☐ No ■ N/A	☐	Permit number:
2. Wetlands Permit	☐ Yes ☐ No ■ N/A	☐	Permit number:
3. Shoreland Permit	☐ Yes ☐ No ■ N/A	☐	Registration date:
4. UIC Registration	☐ Yes ☐ No ■ N/A	☐	Approval letter date:
5. Large/Small Community Well Approval	☐ Yes ☐ No ■ N/A	☐	Permit number:
6. Large Groundwater Withdrawal Permit	☐ Yes ☐ No ■ N/A	☐	Permit number:
7. Other:	☐ Yes ☐ No		

L. List all species identified by the Natural Heritage Bureau as threatened or endangered or of concern:

Wood Turtle

M. Using the NHDES OneStop Data Mapper with the Surface Water Impairment layer turned on, list the impairments identified for each receiving water. If no pollutants are listed, enter "N/A."

N/A

N. Did the applicant or applicant's agent have a pre-application meeting with Alteration of Terrain Bureau staff?

☐ Yes ■ No If yes, name of staff member:

O. Will blasting of bedrock be required? ☐ Yes ■ No If yes, estimated quantity of blast rock in cubic yards:
If yes, standard blasting Best Management Practices notes must be placed on the plans.

NOTE: If greater than 5,000 cubic yards of blast rock will be generated, a groundwater monitoring program must be developed and submitted to NHDES. Contact Alteration of Terrain Bureau staff for additional detail.

11. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY (SUBMIT WITH APPLICATION IN THE ORDER LISTED BELOW)

LOOSE:

- ■ Signed application form, with attached proof(s) of delivery.
- ■ Check for the application fee, calculated using the fee schedule available on the NHDES Land Development page.
- ■ Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale).
- ☐ If the applicant is not the property owner, proof that the applicant will have a legal right to undertake the project on the property if a permit is issued to the applicant.

BOUND, IN A REPORT, IN THE FOLLOWING ORDER:

- ■ Copy of the signed application form and application checklist.
- ■ Copy of the check.
- ■ Copy of the USGS map with the property boundaries outlined (1" = 2,000' scale).
- ■ Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points.
- ■ Printout of NHDES OneStop Mapper with "Surface Water Impairments" layer turned on.
- ■ Printout of NHDES OneStop Mapper with Alteration of Terrain screening layers turned on.
- ■ Printout of Natural Heritage Bureau DataCheck Tool letter and any relevant correspondence with New Hampshire Fish and Game.
- ■ USDA Web Soil Survey Map with project's watershed outlined.
- ■ Aerial photograph (1" = 2,000' scale with the site boundaries outlined).
- ■ Photographs representative of the site.
- ■ Groundwater recharge volume calculations (include one Best Management Practices worksheet per permit application).
- ■ Drainage analysis, stamped by a professional engineer (see "Application Checklist" at the end of this document).
- ■ Riprap apron or other energy dissipation or stability calculations.
- ■ Site Specific Soil Survey report, stamped and with a certification note prepared by the soil scientist that the survey was done in accordance with the Site Specific Soil Mapping standards of the Society of Soil Scientists of Northern New England.
- ■ Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)].
- ☐ Registration and Notification Form for Stormwater Infiltration to Groundwater (UIC Registration-for underground systems only, including drywells and trenches).
- ■ Inspection and maintenance manual with, if applicable, long term maintenance agreements [Env-Wq 1503.08(g)].
- ☐ Source control plan.

PLANS:

- ■ One set of design plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details).
- ■ Pre- and post-development color-coded soil plans on 11" x 17" (see Application Checklist for details).
- ■ Pre- and post-construction drainage area plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details).

100-YEAR FLOODPLAIN REPORT:

- ☐ All information required in Env-Wq 1503.09, submitted as a separate report.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- ■ See Application Checklist (Attachment A) for details.

■ **REVIEW APPLICATION FOR COMPLETENESS. CONFIRM INFORMATION LISTED ON THE APPLICATION IS INCLUDED WITH SUBMITTAL.**

12. REQUIRED SIGNATURES

By signing below, I certify that:

- The information contained in or otherwise submitted with this application is true, complete, and not misleading to the best of my knowledge and belief;
- I understand that the submission of false, incomplete, or misleading information constitutes grounds for the department to deny the application, revoke any permit that is granted based on the information, and/or refer the matter to the board of professional engineers established by RSA 310-A:3 if I am a professional engineer; and
- I understand that I am subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641:3.

☒ **APPLICANT** ☐ **APPLICANT'S AGENT:**

Signature: _____ Date: 3/13/25

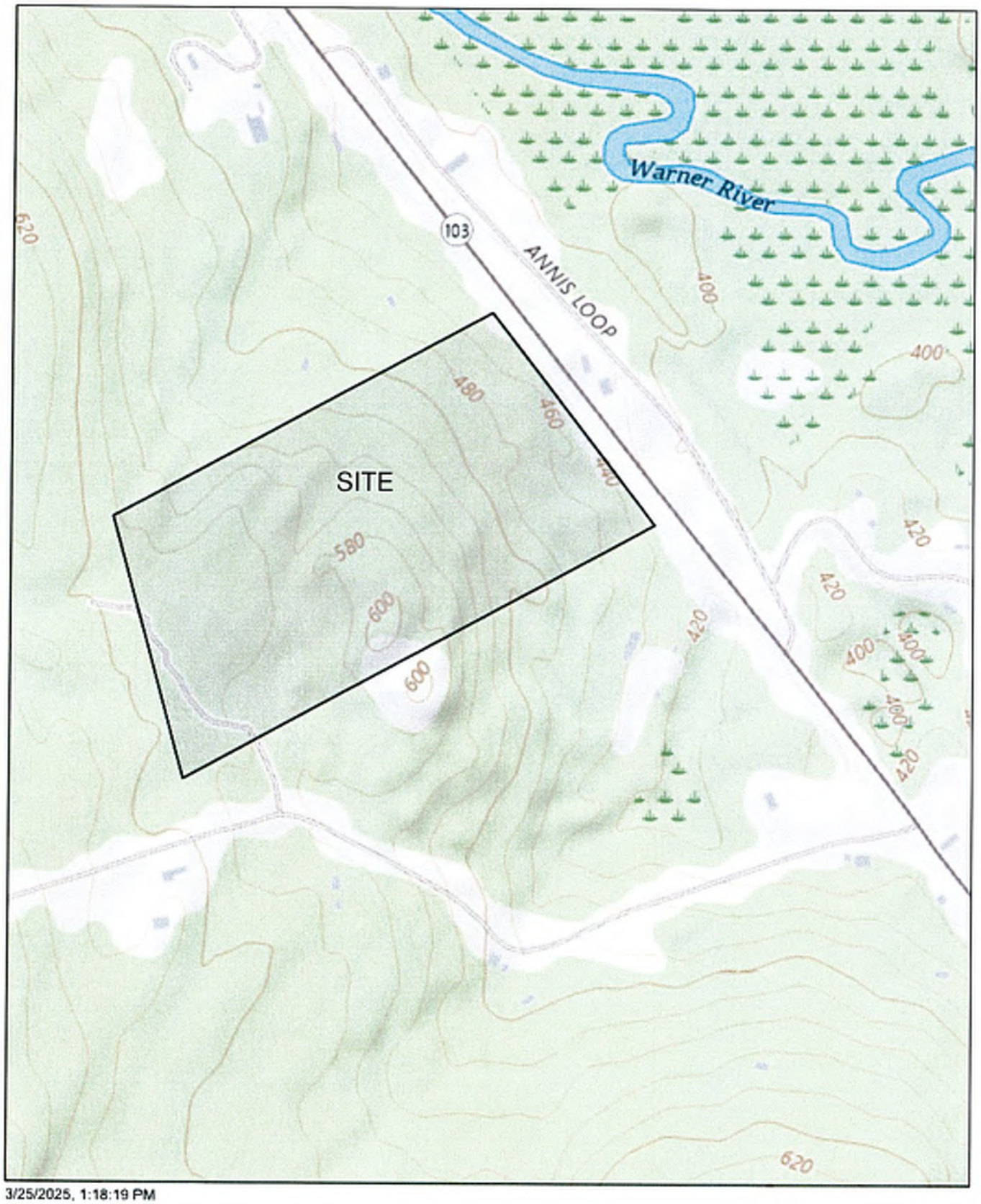
Name (print or type): GARY Fitzgerald Title: manager

☒ PROPERTY OWNER ☐ PROPERTY OWNER'S AGENT:

Signature: _____ Date: 3/13/25

Name (print or type): GARY Fitzgerald Title:

USGS Map by NH DES OneStop Data Mapper



3/25/2025, 1:18:19 PM

City/Town

Layers

Red: Band_1

Green: Band_2

Blue: Band_3

1:5,000

0 0.04 0.08 0.16 mi

0 0.05 0.1 0.2 km

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S.

Alteration of Terrain Application & Stormwater Drainage Analysis

Jennesstown Manor

Map 7, Lots 39
Route 103
Warner, New Hampshire

February 20, 2025
REVISED: MAY 27, 2025

KNA Project No. 24-0307-1

Prepared For: Peacock Hill Road, LLC
145 Old Town Road
Weare, NH 03281

Prepared By: Keach-Nordstrom Associates, Inc.
10 Commerce Park North, Suite 3
Bedford, New Hampshire 03110
(603) 627-2881
(603) 627-2915 (fax)

KNA KEACH-NORDSTROM ASSOCIATES, INC.

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    PRE-DEVELOPMENT DRAIN AREA PLAN (22"x34" – with Color)
    POST-DEVELOPMENT DRAIN AREA PLANS (22"x34" – with Color)

1. **SIGNED APPLICANT AFFADAVIT**

Owner Affidavit

I, Gary Fitzgerald, Member of Peacock Hill Road, LLC and owner of the property referenced on Tax Map 7 as Lot 39, located on Route 103 Warner, New Hampshire, hereby verify that I have authorized Keach-Nordstrom Associates, Inc. to submit on my behalf, any and all applicable State and local permit applications as they pertain to improvements on said property.

Additionally, I authorize Keach-Nordstrom Associates, Inc. to aid in the representation of these applications throughout the approval process.

Signature of Owner: _____

Printed Name of Owner: Gary Fitzgerald, Member

Address of Owner: 145 Old Town Road
Weare, NH 03281

Date: 12/10/24

2. AOT APPLICATION

ALTERATION OF TERRAIN PERMIT APPLICATION

Water Division / Land Resources Management

Check the status of your application

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Engineering Firm: Keach-Nordstrom Associates, Inc.	Contact Name: Jason Lopez	
Email: jlopez@keachnordstrom.com	Daytime Telephone: 603-627-2881	
Address: 10 Commerce Park N Suite 3B		
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- ■ See Application Checklist (Attachment A) for details.

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- I understand that I am subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641:3.

☒ **APPLICANT** ☐ **APPLICANT'S AGENT:**

Signature: _____ Date: 3/13/25

Name (print or type): GARY Fitzgerald Title: manager

☒ PROPERTY OWNER ☐ PROPERTY OWNER'S AGENT:

Signature: _____ Date: 3/13/25

Name (print or type): GARY Fitzgerald Title:

3. AOT APPLICATION CHECKLIST

ALTERATION OF TERRAIN PERMIT ATTACHMENT A: APPLICATION CHECKLIST

Check each box to indicate the item has been provided, or indicate why it does not apply.

DESIGN PLANS

- ■ Plans printed on 34 - 36" by 22 - 24" white paper.
- ■ Professional Engineer stamp.
- ■ Wetland delineation.
- ■ Temporary erosion control measures.
- ■ Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and nonresidential roof runoff. Guidance on treatment BMPs can be found in Volume 2, Chapter 4 of the New Hampshire Stormwater Management Manual.
- ■ Pre-existing 2-foot contours.
- ■ Proposed 2-foot contours.
- ■ Drainage easements protecting the drainage/treatment structures.
- ■ Compliance with state statute governing fill and dredge in wetlands, RSA 482- A. Note that artificial detention in wetlands is prohibited.
- ☐ Compliance with the New Hampshire Shoreland Protection Act, RSA 483-B. Site not in Shoreland Zone.
- ■ Benching – needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope.
- ☐ Check to see if any proposed ponds require state dam permits. No state dam permits required.

DETAILS

- ■ Typical roadway cross-section.
- ■ Detention basin with inverts noted on the outlet structure.
- ■ Stone berm level spreader.
- ■ Outlet protection – riprap aprons.
- ■ A general installation detail for an erosion control blanket.
- ■ Silt fences or mulch berm.
- ■ Storm drain inlet protection. Note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement.
- ☐ Hay bale barriers. No hale bale barriers proposed.
- ☐ Stone check dams. No stone check dams proposed.
- ■ Gravel construction exit.
- ■ Temporary sediment trap.
- ■ The treatment BMPs proposed.
- ☐ Any innovative BMPs proposed. No innovative BMPs proposed.

CONSTRUCTION SEQUENCE / EROSION CONTROL

■ Note that the project must be managed to meet the requirements and intent of RSA 430:53 and Agr 3800 relative to invasive species.

■ Note that perimeter controls shall be installed prior to earth moving operations.

■ Note that temporary water diversion (swales, basins, etc.) must be used as necessary until areas are stabilized.

■ Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site).

■ Note that all ditches and swales shall be stabilized prior to directing runoff to them.

■ Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.

■ Note that all cut and fill slopes shall be seeded or loamed within 72 hours of achieving finished grade

■ Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall.

■ Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information.

Example note: The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized.

■ Note the definition of the word "stable."

Example note: An area shall be considered stable if one of the following has occurred:

- Base course gravels have been installed in areas to be paved.
- A minimum of 85 percent vegetated growth has been established.
- A minimum of 3 inches of non-erosive material such stone or riprap has been installed.
- Or, erosion control blankets have been properly installed.

■ Note the limit of time an area may be exposed.

Example note: All areas shall be stabilized within 45 days of initial disturbance.

■ Provide temporary and permanent seeding specifications. Note that although reed canary grass is listed in the Green Book; it is a problematic species according to the Wetlands Bureau and therefore should not be specified.

■ Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
- All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
- After October 15, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.

■ Note at the end of the construction sequence that "Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable." – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit.

DRAINAGE ANALYSES

Please provide double-side 8 ½" × 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

■ Professional Engineer stamp.

■ Rainfall amount obtained from the Northeast Regional Climate Center. Include extreme precipitation table as obtained from this source.

■ Drainage analyses, in the following order:

- Pre-development analysis: Drainage diagram.
- Pre-development analysis: Area Listing and Soil Listing.
- Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year.
- Pre-development analysis: Full summary of the 10-year storm.
- Post-development analysis: Drainage diagram.
- Post-development analysis: Area Listing and Soil Listing.
- Post-development analysis: Node listing for the 2-year, 10-year and 50-year.
- Post-development analysis: Full summary of the 10-year storm.

■ Review the Area Listing and Soil Listing reports

- Hydrologic Soil Groups (HSG) match the HSGs on the soil maps provided.
- There is the same or less HSG A soil area after development (check for each HSG).
- There is the same or less "woods" cover in the post-development.
- Undeveloped land was assumed to be in "good" condition.
- The amount of impervious cover in the analyses is correct.

Note: A good check is to subtract the total impervious area used in the pre-analysis from the total impervious area used in the post-analysis. For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses or units proposed. Do these numbers make sense?

■ Check the storage input used to model the ponds.

■ Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped.

■ Check the outlet structure proposed and make sure it matches that modeled.

■ Check to see if the total areas in the pre and post analyses are same.

■ Confirm the correct NRCS storm type was modeled (Coos, Carroll and Grafton counties are Type II, all others Type III).

PRE- AND POST-CONSTRUCTION DRAINAGE AREA PLANS

■ Plans printed on 34 - 36" by 22 - 24" on white paper.

■ Submit these plans separate from the soil plans.

■ A north arrow.

■ A scale.

■ Labeled subcatchments, reaches and ponds.

- [x] Tc lines.
- [x] A clear delineation of the subcatchment boundaries.
- [ ] Roadway station numbers.
- [x] Culverts and other conveyance structures.

PRE- AND POST-CONSTRUCTION COLOR-CODED SOIL PLANS

- [x] 11" × 17" sheets suitable, as long as it is readable.
- [x] Submit these plans separate from the drainage area plans.
- [x] A north arrow.
- [x] A scale.
- [x] Name of the soil scientist who performed the survey and date the soil survey took place.
- [x] 2-foot contours (5-foot contours if application is for a gravel pit) as well as other surveyed features.
- [x] Delineation of the soil boundaries and wetland boundaries.
- [x] Delineation of the subcatchment boundaries.
- [x] Soil series symbols (e.g., 26).
- [x] A key or legend identifying each soil series symbol and its associated soil series name (for example: 26 = Windsor).
- [x] The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, and Impervious = gray).

Please note that excavation projects (including gravel pits) have similar requirements to those above, with the following common exceptions or additions:

- [ ] Drainage report is not needed if site does not have off-site flow.
- [ ] 5-foot contours are allowed rather than 2-foot.
- [ ] No Professional Engineer stamp is needed on the plans.
- [ ] Add a note to the plans that the applicant must provide NHDES a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.
- [ ] Add reclamation notes.
- [ ] A description of the subsurface conditions to the planned depth of excavation, including the elevation of the location of the Seasonal High Water Table (SHWT), as observed and described by a certified soil scientist, or an individual holding a valid permit as a permitted designer as issued by the department's Subsurface Systems Bureau.

For more resources, refer to the Natural Resources Conservation Service's Vegetating New Hampshire Sand and Gravel Pits publication.

4. COPY OF AOT APPLICATION CHECK

PEACOCK HILL ROAD LLC
PH. 603-325-3112
145 OLD TOWN RD
WEARE, NH 03281

1562

PAY TO THE ORDER OF Treasurer State of NH

DATE 3/24/25

54-7022/2114

$ 3125.00

Three Thousand one Hundred Twenty Five and 00/100 DOLLARS

FOR

"001562" "211470225" 3200272270"

5. MUNICIPAL SUBMISSION: WARNER

See Project Narrative (Section 7) and Hydrocad Drainage Analysis (Section 17)

6. USGS LOCATION MAP

USGS U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
OnDemand Topo

7.5-MINUTE TOPO QUADRANGLE
Custom Extent
7.5-MINUTE TOPO

Produced by the United States Geological Survey

SCALE 1:24 000

7.5-MINUTE TOPO, NH
2024

7. PROJECT NARRATIVE

I. INTRODUCTION

A. Project Description

The project proposes the development of Warner Tax Map 7, Lots 39 and 39-1, on the west side of Route 103. The proposal seeks to develop two buildings for multi-family residence. Each building will have four units. The project will include associated parking and utilities.

The buildings will be served by on-site septic systems and wells. Access will be provided by connection to a proposed driveway off of Route 103. The buildings will share access to the driveway. The drainage system will have two pocket ponds and an infiltration basin. After treatment and mitigation of peak runoff, the water flows to the existing catch basins on Route 103 in front of the subject parcel.

B. Existing Site Conditions

The subject lot is 34.60 acres and is currently undeveloped in Warner's Residential 2 (R-2) and Residential 3 (R-3) Zoning Districts; however, the area of proposed work is entirely within the R-2 District. The abutting properties are residential or undeveloped uses. Previously, the subject lot was partially cleared. There are several wetland pockets and steep slopes on site. There are exposed ledge faces along the edge of the site on the Route 103 frontage.

According to the Site-Specific Soil Survey soil mapping, the parcel consists of soils as shown below:

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
55	Hermon Very Stony	121	B
442	Chichester	221	B
58	Waumbek	321	A
829	Waumbek-Hermon Association	321	B
414	Moosilauke Poorly Drained	521	C
399	Ledge Outcrop	228	D

II. STORM DRAINAGE ANALYSIS & DESIGN

A. Methodology

In accordance with the provisions of the Town of Warner, NHDES, and generally accepted engineering practice, the 2-year, 10-year, 25-year and 50-year frequency storms have each been used in the various aspects of analysis and design of stormwater management considerations for the subject residential development project. All proposed stormwater measures have been designed for the 10-year return frequency storms, in accordance with the State regulations and for the 25-year return frequency storms, in accordance with the Town regulations.

KNA utilizes HydroCAD version 10.2 to analyze both pre and post-development watershed characteristics. This computer software system is based largely on hydrology techniques (TR-20) developed by the Soil Conservation Service (now the Natural Resources Conservation Service). In addition, the software derives Time of Concentration values using the methodology contained within USDA-S.C.S. publication Urban Hydrology for Small Watersheds Technical Release No. 55 (TR 55).

Rainfall data utilized in the analysis is obtained from the "Extreme Precipitation in a Changing Climate for New York and the New England States", version 1.12, published by the USDA, NRCS and Cornell University's Northeast Regional Climate Center and can be found in Section 9.

All design and analysis calculations performed using the referenced methodologies are attached to this report. The minimum time of concentrations used for the analysis is 6 minutes. These calculations document each catchment area, a breakdown of surface type, time of concentration, rainfall intensity, peak discharge volume, Manning's "n" value, peak velocity, and other descriptive design data for each watershed and pipe segment evaluated. In addition, the "Pre/Post Development Drainage Area Plans" graphically define and illustrate the extent of each watershed or catchment area investigated.

B. Pre-Development Drainage Conditions

In the pre-development scenario, 5 points of analysis (POA) were identified as the appropriate points to compare pre vs. post development rates of stormwater discharge. These points of analysis reflect the main discharge points of the site and were analyzed to show the impact of the proposed improvements.

The pre-development drainage model's POA is further described as follows:

- 10P Flow to Existing CB
- 20P Flow to Existing CB
- 30P Flow to Existing CB
- 40P Flow to Existing CB

- 50L Flow to Abutters Map 7 Lots 36 & 36-1

In general, the site slopes in an easterly direction to the catch basins along Route 103.

For a more visual description of the information presented in this section, please refer to the attached "Pre-Development Drainage Areas Plan" attached in the appendix of this report. The pre-development drainage model recognizes five points of analysis to compare pre vs. post-development peak rates of stormwater discharge.

C. Post-Development Drainage Conditions:

The same POA's that were identified in the pre-development scenario have been analyzed in the post-development scenario.

The proposed stormwater management system utilizes closed and open drainage that incorporates various best management practices for the collection, storage, and treatment of runoff. Stormwater runoff generated from the proposed development will be collected in a series of closed structures (catch basins and drain manholes) and conveyed towards the pocket ponds and the infiltration basin. The proposed ponds discharge through outlet control structures to overland flow prior to entering the closed drainage system in the Route 103 Right-Of-Way. The areas flowing towards each point of analysis are equal to or less than in comparison to the pre-development conditions. The proposal has also been designed to convey runoff in a manner consistent with the pre-development conditions. The drainage system was properly sized to control runoff for the full build-out of the project.

The proposed pocket ponds are designed to intercept groundwater and maintain a permanent pool. The ponds have been designed to mitigate the increased runoff from the proposed parking areas and common driveway.

The proposed infiltration basin is designed to infiltrate the runoff from the proposed development.

The peak stormwater runoff rate for the specific storm frequencies is presented and analyzed in the subsequent summary section of this report (Table 1). For a more visual description of the information presented in this section, please refer to the attached "Post-Development Drainage Areas Plan" attached in the appendix of this report.

D. Summary:

Through the use of the stormwater management techniques described above, we were able to implement the proposed development goals while maintaining appropriate peak rates of runoff, providing volume control, and providing treatment of stormwater generated from the proposed development. As shown in the Tables below, through the use of the aforementioned stormwater management techniques, the peak rates of stormwater discharge and volume to the point of analysis was controlled within an acceptable limit.

Table 1: Peak Flow Discharge Rate

Site Pre-Development vs. Post-Development (cfs)								
Description	**2-Year**		**10-Year**		**25-Year** (not in printout)		**50-Year**	
24-hr Rainfall	2.78 in/hr		4.04 in/hr		5.01 in/hr		5.89 in/hr	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
10P (Lot 3-1)	**0.85**	0.84	**1.93**	1.93	**3.00**	2.99	**4.07**	4.05
20P (Lot 7-38)	**2.01**	1.69	**4.94**	4.32	**8.10**	7.54	**11.29**	10.38
30P (Lot 7-38)	**0.63**	0.49	**1.36**	0.87	**2.08**	1.19	**2.80**	1.48
40P (Lot 7-38)	**1.06**	0.71	**2.46**	2.13	**4.08**	3.83	**5.77**	5.64
50L (Lots 7-36 & 7-36-1)	**0.04**	0.04	**0.13**	0.13	**0.25**	0.25	**0.39**	0.39

Table 2: Channel Protection Requirements

Site Pre-Development vs. Post-Development Flow Volume (af)			
Description	**2-Year**		**Comments**
24- hr Rainfall	2.78 in/hr		
	Pre	**Post**	
10P	**0.104**	0.103	NHDES 1507.05,(b),(1), a
20P	**0.255**	0.254	NHDES 1507.05,(b),(1), a
30P	**0.083**	0.053	NHDES 1507.05,(b),(1), a
40P	**0.150**	0.168	NHDES 1507.05,(b),(1), a
50L	**0.006**	0.006	NHDES 1507.05,(b),(1), a

III. EROSION & SEDIMENTATION CONTROL PROVISIONS

A. Temporary Erosion Control Measures

As an integral part of the engineering design of this site, an erosion and sedimentation control plan has been developed with the intent of limiting the potential for soil loss and associated receiving water quality degradation, both during and after the construction period. As the project plans indicate, traditional temporary erosion and sedimentation control devices and practices, such as siltation fencing, block and gravel sediment filters, and seeding have been specified for use during the construction period. In preparation of these provisions, reference was made to the New Hampshire Stormwater Manual; Volume 3: Erosion and Sediment Temporary Controls During Construction. Construction details for each temporary erosion control measure and practice specified have been added to the project plans. These plans also contain a number of erosion control notes, which are offered to the selected contractor in order to supplement the specified measures and practices to the extent practical.

B. Construction Sequence

A site-specific construction sequence sensitive to limiting soil loss due to erosion and associated water quality degradation was prepared specifically for this project and is shown on the project plans. As pointed out in the erosion control notes, it is important for the contractor to recognize that proper judgment in the implementation of work will be essential if erosion is to be limited and protection of completed work is to be realized. Moreover, any specific changes in sequence and/or field conditions affecting the ability of specific erosion control measures to adequately serve their intended purpose should be reported to this office by the contractor. Furthermore, the contractor is encouraged to supplement specified erosion control measures during the construction period where and when in his/ her best judgment, additional protection is warranted.

C. Permanent Erosion Control Measures

In the design of this site, consideration was given to limiting the potential for long-term erosion of completed improvements. As a result, several permanent erosion control measures were incorporated into the site design. These provisions include:

1) Specification of a turf establishment schedule and seed mixture, utilizing materials and workmanship recognized as appropriate for the site conditions at hand;

2) The design has provided catch basins to capture runoff and reduce the overland flow, thereby reducing erosion.

8. SURFACE WATER IMPAIRMENTS

Surface Water Impairments

Legend

- Surface Waters with Impairm with Quarter Mile Buffer
- Parcels
- Additional Lines

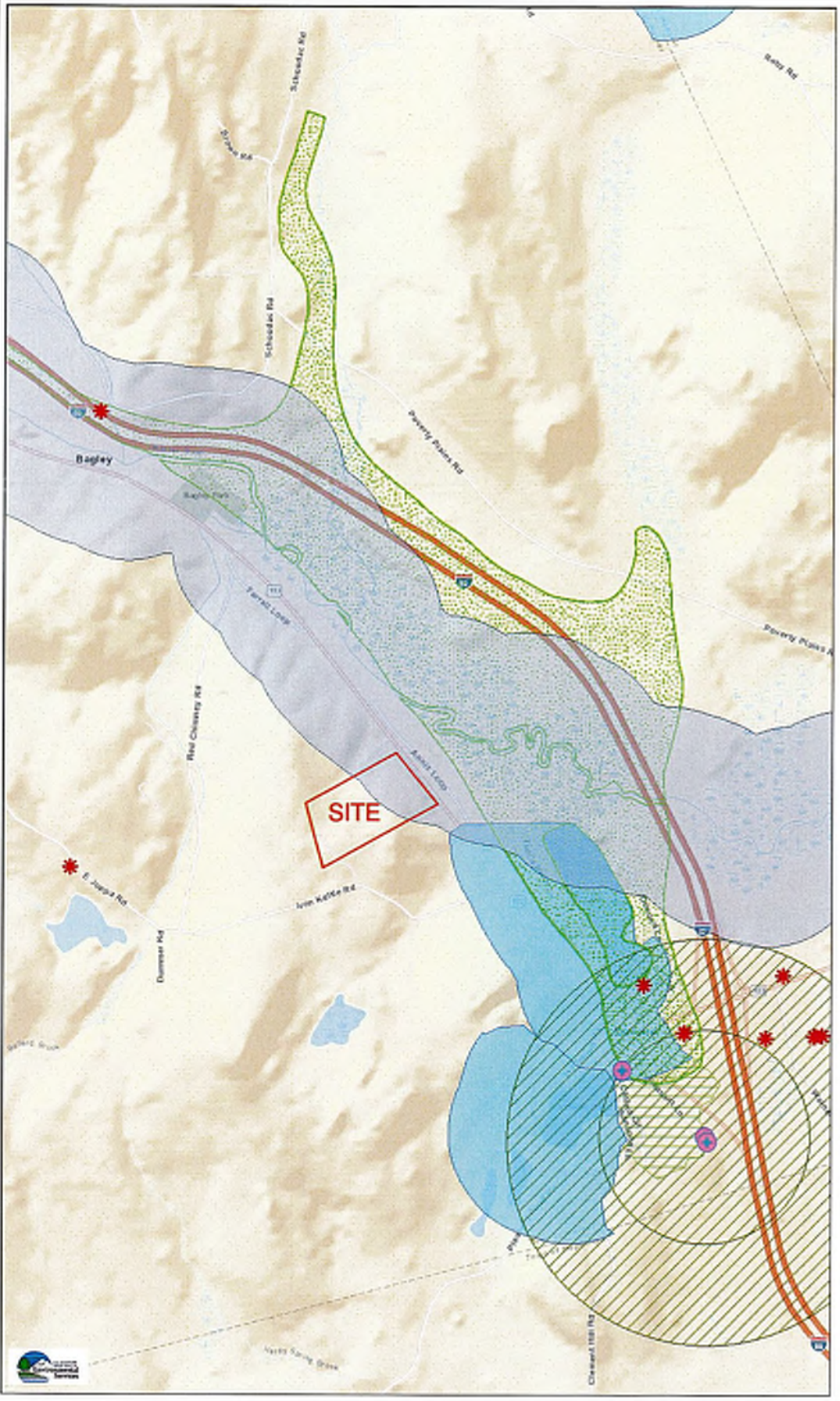
Map Scale
1: 24,000

Map Generated: 11/27/2024

Notes

9. WEB GIS FIGURES

Web GIS Figure



Legend

- Remediation Sites
- Coastal and Great Bay Regi Communities
- Designated Rivers Quarterm Buffer
- Public Water Supply Wells
- Groundwater Classification / GA1
- Groundwater Classification / GA2
- Water Supply Intake Protect Areas
- Wellhead Protection Areas
- Class A Lakes with a Quarte Buffer
- Class A - All Features
- All Lakes, with a Quarter Mil Buffer
- Outstanding Resource Wate Watersheds
- Surface Waters with Impairm with Quarter Mile Buffer
- Watersheds with Chloride Impairments

Map Scale
1: 24,000

Map Generated: 12/2/2024

Notes

10. WARNER GROUNDWATER PROTECTION OVERLAY DISTRICT

Groundwater Protection Overlay District

TOWN OF WARNER, NH

Legend

- Proposed Groundwater Protection Overlay District
- Town Boundary
- Village Water District
- Aquifer Full Extent

Water Resources

- Lakes and Ponds
- Rivers and Streams
- Intermittent Streams

Roads

- Interstates
- Class I and II State Highways
- Class V Town Maintained Roads
- Class VI Unmaintained Roads
- Other Roads/Private

N W E S

0 0.5 1 1.5 Miles

March 14, 2023

This map was produced by the Central NH Regional Planning Commission for the Town of Warner. It is intended for planning purposes only.

Data Sources: NH GRANIT, NH Dept. of Environmental Services, NH Dept. of Transportation, FEMA, CNHRPC, Town of Warner, US Geologic Survey, Hazard Mitigation Subcommittee input. Corrections should be provided to the Town of Warner and to CNHRPC.

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

Zoning District

- B-1 Business District
- C-1 Commercial District
- R-1 Village Residential District
- R-2 MediumDensity Residential District
- R-3 Low Density Residential District
- OC-1 Open Conservation District
- OR-1 Open Recreation District
- Intervale Overlay District

11. NEW HAMPSHIRE NATURAL HERITAFE INVENTORY DATABASE CHECK

NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

To: Jason Lopez, Keach-Nordstrom Associates, Inc.
10 Commerce Park North Suite 3B
Bedford, NH 03110
jlopez@keachnordstrom.com

From: NHB Review
NH Natural Heritage Bureau
Main Contact: Ashley Litwinenko - nhbreview@dncr.nh.gov

cc: NHFG Review

Date: 06/13/2024 (valid until 06/13/2025)
Re: DataCheck Review by NH Natural Heritage Bureau and NH Fish & Game
Permits: MUNICIPAL POR - Warner, NHDES - Alteration of Terrain Permit, USEPA - Stormwater Pollution Prevention

NHB ID: NHB24-0767

Town: Warner
Location: NH Route 103

Project Description: Four lot subdivision with each lot containing a 4 unit building. All lots served by a common driveway.

Next Steps for Applicant:

NHB's database has been searched for records of rare species and exemplary natural communities. Please carefully read the comments and consultation requirements below.

NHB Comments: No comments at this time.

NHFG Comments: Please refer to NHFG consultation requirements below.

NHB Consultation

If this NHB DataCheck letter includes records of rare plants and/or natural communities/systems, please contact NHB and provide any requested supplementary materials by emailing nhbreview@dncr.nh.gov.

If this NHB DataCheck letter DOES NOT include any records of rare plants and/or natural communities/systems, no further consultation with NHB is required.

NH Fish and Game Department Consultation

If this NHB DataCheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

If this NHB DataCheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://www.wildlife.nh.gov/wildlife-and-habitat/nongame-and-endangered-species/environmental-review. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB DataCheck results letter number and "Fis 1004 consultation request" in the subject line**.

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email NHFGreview@wildlife.nh.gov, and include the NHB DataCheck results letter number and "review request" in the email subject line.
Contact NH Fish & Game at (603) 271-0467 with questions.

NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

NHB Database Records:
The following record(s) have been documented in the vicinity of the proposed project.
Please see the map and detailed information about the record(s) on the following pages.

Vertebrate species	State[1]	Federal	Notes
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list.
An asterisk (*) indicates that the most recent report for that occurrence was 20 or more years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section above.

Disclaimer: NHB's database can only tell you of known occurrences that have been reported to NHFG/NHB. Known occurrences are based on information gathered by qualified biologists or members of the public, reported to our offices, and verified by NHB/NHFG.
However, many areas have never been surveyed, or have only been surveyed for certain species.
NHB recommends surveys to determine what species/natural communities are present onsite.

NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

NHB24-0767

NHB24-0767 EOCODE: ARAAD02020*161*NH

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Imperiled due to rarity or vulnerability
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank:	Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:	--
Detailed Description:	2022: Area 15062: 1 adult observed, sex unknown. 2011: Area 12918: 1 adult observed, dead on road. 2007: Area 12247: 1 observed. 2005: Area 12133: 1 observed.
General Area:	2022: Area 15062: Fallow field with clover, cinquefoil, dandelion, and other grasses and forbs. 2011: Area 12918: Roadside. 2007: Area 12247: This area contains a relatively large, open floodplain forest of white pine, maple, American hophornbeam, and various grasses and other herbaceous plants. 2005: Area 12133: Residential yard.
General Comments:	--
Management Comments:	--

Location

Survey Site Name:	West Branch of Hoyt River
Managed By:	Bradford Pines Natural Area
County:	Merrimack
Town(s):	Bradford
Size:	40.9 acres
Elevation:	
Precision:	Within (but not necessarily restricted to) the area indicated on the map.
Directions:	2022: Area 15062: Field next to Hoyt Brook on east side of Center Road in Bradford, just south of NH Route 103 and Warner River. 2011: Area 12918: On Warner Road (Rte. 103) near Bradford town line. 2007: Area 12247: In the West Branch Warner River, about 500 feet downstream from the large white pines of the Bradford Natural Pines area. 2005: Area 12133: 56 Fairgrounds Road, Bradford.

Dates documented

First reported:	2005-06-11	Last reported:	2022-05-21

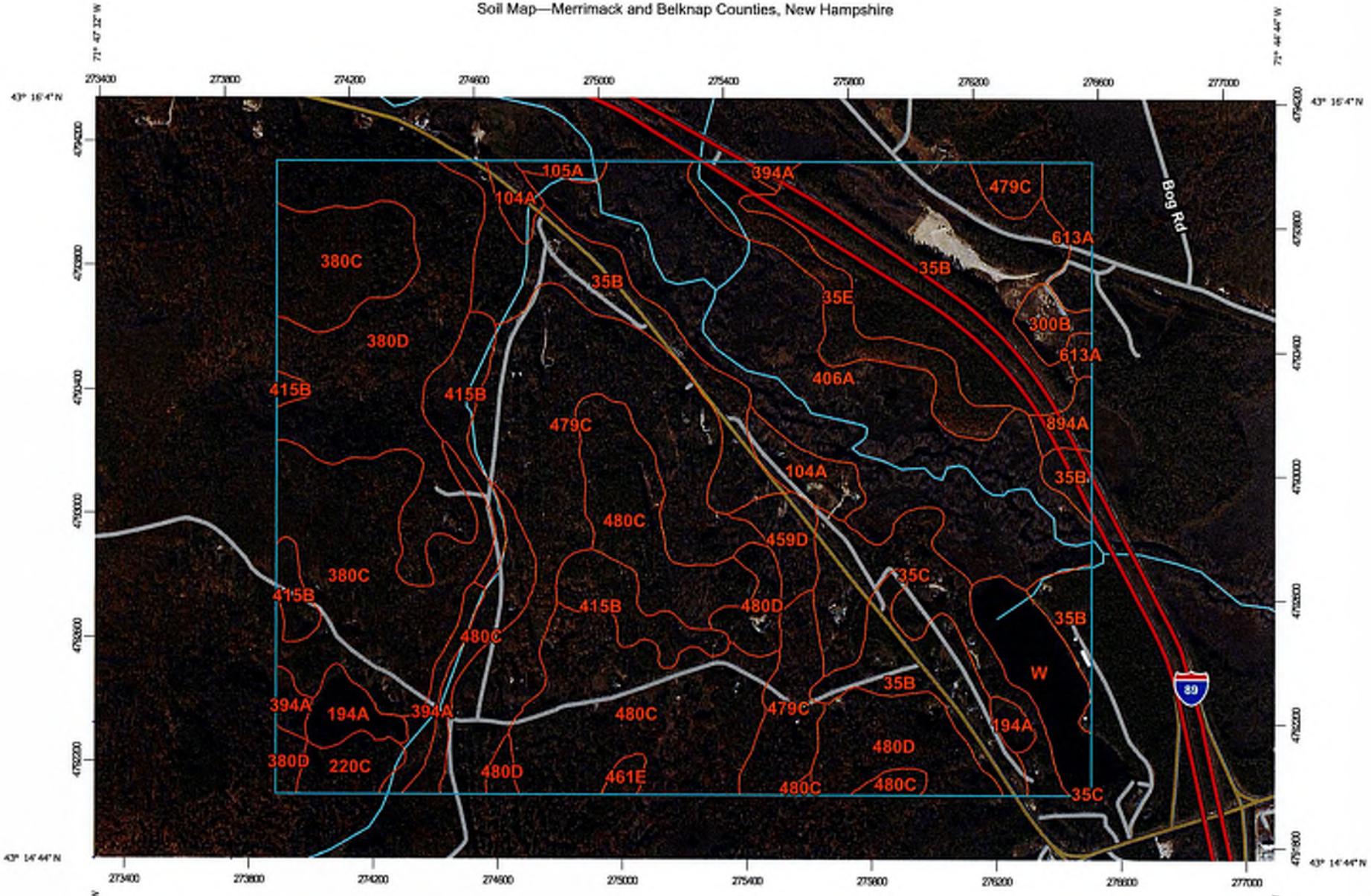
NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

NHB24-0767 EOCODE: ARAAD02020*161*NH

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

12. WEB SOIL SURVEY

Soil Map—Merrimack and Belknap Counties, New Hampshire



Map Scale: 1:17,300 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 250, 500, 1000, 1500

Feet: 0, 500, 1000, 2000, 3000

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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: Merrimack and Belknap Counties, New Hampshire
Survey Area Data: Version 29, Aug 22, 2023

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

Date(s) aerial images were photographed: Oct 6, 2022—Oct 22, 2022

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
35B	Champlain loamy fine sand, 3 to 8 percent slopes	224.3	16.9%
35C	Champlain loamy fine sand, 8 to 15 percent slopes	50.2	3.8%
35E	Champlain loamy fine sand, 15 to 60 percent slopes	36.2	2.7%
104A	Podunk fine sandy loam, 0 to 3 percent slopes, frequently flooded	21.1	1.6%
105A	Rumney fine sandy loam, 0 to 3 percent slopes, frequently flooded	3.7	0.3%
194A	Catden mucky peat, 0 to 1 percent slopes, ponded	16.2	1.2%
220C	Boscawen fine sandy loam, 8 to 15 percent slopes	13.0	1.0%
300B	Udipsamments, 0 to 6 percent slopes	9.0	0.7%
380C	Tunbridge-Lyman-Becket complex, 8 to 15 percent slopes, very stony	132.3	10.0%
380D	Tunbridge-Lyman-Becket complex, 15 to 25 percent slopes, very stony	116.7	8.8%
394A	Chocorua mucky peat, 0 to 1 percent slopes	16.8	1.3%
406A	Medomak mucky silt loam, 0 to 2 percent slopes, frequently flooded	183.8	13.9%
415B	Moosilauke fine sandy loam, 3 to 8 percent slopes, very stony	48.2	3.6%
459D	Metacomet fine sandy loam, 15 to 25 percent slopes, very stony	13.4	1.0%
461E	Woodstock-Millsite-Rock outcrop complex, 35 to 60 percent slopes	3.2	0.2%
479C	Gilmanton fine sandy loam, 8 to 15 percent slopes, very stony	172.7	13.0%
480C	Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony	158.9	12.0%
480D	Millsite-Woodstock-Henniker complex, 15 to 25 percent slopes, very stony	50.9	3.8%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
613A	Croghan loamy fine sand, 0 to 8 percent slopes, wooded	16.9	1.3%
894A	Meadowsedge peat, 0 to 1 percent slopes	7.3	0.5%
W	Water	31.0	2.3%
Totals for Area of Interest		**1,325.7**	**100.0%**

13. AERIAL PHOTOGRAPH

Aerial Map

Legend

- Parcels
- State
- County
- City/Town

Map Scale
1: 5,000

Map Generated: 2/25/2025

Notes

14. SITE PHOTOGRAPHS

Photo No. 1: Looking west on Map 7 Lot 39 (taken: 2/3/25)

Photo No. 2: Looking east on Map 7 Lot 39 (taken: 2/3/25)

Photo No. 3: Looking north to Route 103 from Map 7 Lot 39 (taken: 2/3/25)

Photo No. 4: Looking south on Map 7 Lot 39 (taken: 2/3/25)

15. GRV CALCULATIONS

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION (Env-Wq 1507.04)

0.44	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.34	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
0.01	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.33	inches	Rd = Weighted groundwater recharge depth	
0.26	ac-in	GRV = AI * Rd	
944	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

16. BMP WORKSHEETS

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Practice 21P**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	← yes
2.47	ac	A = Area draining to the practice	
0.65	ac	A_I = Impervious area draining to the practice	
0.26	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.29	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.71	ac-in	WQV= 1" x Rv x A	
2,572	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
643	cf	25% x WQV (check calc for sediment forebay volume)	
NA		Method of pretreatment? (not required for clean or roof runoff)	
-	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
2,942	cf	V = Volume[1] (attach a stage-storage table)	≥ WQV
238	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
43.2	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
466.00	feet	E_{BTM} = Elevation of the bottom of the basin	
464.22	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
456.89	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.78	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
9.1	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ 24"
	ft	D_T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←yes
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥3:1
469.69	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
469.82	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
470.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Summary for Pond 21P: Infiltration Basin

Inflow Area = 2.470 ac, 26.58% Impervious, Inflow Depth > 1.68" for 10 yr event
Inflow = 1.42 cfs @ 12.29 hrs, Volume= 0.346 af
Outflow = 1.38 cfs @ 12.54 hrs, Volume= 0.291 af, Atten= 3%, Lag= 14.7 min
Discarded = 0.12 cfs @ 12.54 hrs, Volume= 0.135 af
Primary = 1.26 cfs @ 12.54 hrs, Volume= 0.156 af
Routed to Reach 20R : Overland Flow to 20P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 469.69' @ 12.54 hrs Surf.Area= 1,784 sf Storage= 3,267 cf
Flood Elev= 470.00' Surf.Area= 1,983 sf Storage= 3,854 cf

Plug-Flow detention time= 129.4 min calculated for 0.291 af (84% of inflow)
Center-of-Mass det. time= 61.9 min (889.7 - 827.8)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	3,854 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)
466.00	238	61.0	0	0	238
468.00	887	160.0	1,056	1,056	1,993
470.00	1,983	201.0	2,797	3,854	3,225

Device	Routing	Invert	Outlet Devices
#1	Discarded	466.00'	**3.000 in/hr Exfiltration over Surface area**
#2	Primary	465.00'	**18.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.00' / 464.75' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	469.50'	**18.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	469.75'	**4.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.12 cfs @ 12.54 hrs HW=469.69' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=1.26 cfs @ 12.54 hrs HW=469.69' TW=453.59' (Dynamic Tailwater)
├─**2=Culvert** (Passes 1.26 cfs of 16.89 cfs potential flow)
│ └─**3=Grate** (Weir Controls 1.26 cfs @ 1.42 fps)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Hydrograph for Pond 21P: Infiltration Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	466.00	0.00	0.00	0.00
0.60	0.00	0	466.00	0.00	0.00	0.00
1.20	0.00	0	466.00	0.00	0.00	0.00
1.80	0.00	0	466.00	0.00	0.00	0.00
2.40	0.00	0	466.00	0.00	0.00	0.00
3.00	0.00	0	466.00	0.00	0.00	0.00
3.60	0.01	0	466.00	0.01	0.01	0.00
4.20	0.01	0	466.00	0.01	0.01	0.00
4.80	0.02	1	466.00	0.02	0.02	0.00
5.40	0.02	11	466.04	0.02	0.02	0.00
6.00	0.03	29	466.11	0.02	0.02	0.00
6.60	0.03	54	466.21	0.02	0.02	0.00
7.20	0.04	90	466.33	0.02	0.02	0.00
7.80	0.05	138	466.47	0.02	0.02	0.00
8.40	0.06	199	466.63	0.03	0.03	0.00
9.00	0.08	281	466.82	0.03	0.03	0.00
9.60	0.10	397	467.06	0.04	0.04	0.00
10.20	0.13	554	467.33	0.04	0.04	0.00
10.80	0.17	770	467.65	0.05	0.05	0.00
11.40	0.25	1,088	468.04	0.06	0.06	0.00
12.00	**0.84**	**1,898**	**468.79**	**0.09**	**0.09**	**0.00**
12.60	**1.36**	**3,265**	**469.69**	**1.37**	**0.12**	**1.25**
13.20	0.98	3,200	469.65	1.02	0.12	0.90
13.80	0.60	3,118	469.60	0.63	0.12	0.51
14.40	0.32	3,043	469.56	0.34	0.12	0.23
15.00	0.25	3,015	469.54	0.26	0.12	0.14
15.60	0.21	3,000	469.53	0.21	0.12	0.10
16.20	0.17	2,984	469.52	0.18	0.12	0.06
16.80	0.15	2,971	469.52	0.15	0.12	0.04
17.40	0.13	2,961	469.51	0.13	0.12	0.02
18.00	0.11	2,948	469.50	0.12	0.12	0.00
18.60	0.10	2,928	469.49	0.12	0.12	0.00
19.20	0.10	2,900	469.47	0.11	0.11	0.00
19.80	0.10	2,866	469.45	0.11	0.11	0.00
20.40	0.09	2,824	469.43	0.11	0.11	0.00
21.00	0.08	2,773	469.40	0.11	0.11	0.00
21.60	0.07	2,703	469.35	0.11	0.11	0.00
22.20	0.07	2,624	469.30	0.11	0.11	0.00
22.80	0.07	2,540	469.25	0.11	0.11	0.00
23.40	0.06	2,452	469.19	0.10	0.10	0.00
24.00	0.06	2,360	469.13	0.10	0.10	0.00

Summary for Pond 21P: Infiltration Basin

Inflow Area = 2.470 ac, 26.58% Impervious, Inflow Depth > 2.92" for 50 yr event
Inflow = 3.04 cfs @ 12.38 hrs, Volume= 0.600 af
Outflow = 3.03 cfs @ 12.41 hrs, Volume= 0.533 af, Atten= 0%, Lag= 2.1 min
Discarded = 0.13 cfs @ 12.41 hrs, Volume= 0.150 af
Primary = 2.90 cfs @ 12.41 hrs, Volume= 0.383 af
Routed to Reach 20R : Overland Flow to 20P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 469.82' @ 12.41 hrs Surf.Area= 1,864 sf Storage= 3,500 cf
Flood Elev= 470.00' Surf.Area= 1,983 sf Storage= 3,854 cf

Plug-Flow detention time= 84.6 min calculated for 0.533 af (89% of inflow)
Center-of-Mass det. time= 32.1 min (855.8 - 823.7)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	3,854 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)
466.00	238	61.0	0	0	238
468.00	887	160.0	1,056	1,056	1,993
470.00	1,983	201.0	2,797	3,854	3,225

Device	Routing	Invert	Outlet Devices
#1	Discarded	466.00'	**3.000 in/hr Exfiltration over Surface area**
#2	Primary	465.00'	**18.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.00' / 464.75' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	469.50'	**18.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	469.75'	**4.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.13 cfs @ 12.41 hrs HW=469.82' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=2.90 cfs @ 12.41 hrs HW=469.82' TW=453.63' (Dynamic Tailwater)
└**2=Culvert** (Passes 2.74 cfs of 17.16 cfs potential flow)
└**3=Grate** (Weir Controls 2.74 cfs @ 1.84 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 0.16 cfs @ 0.61 fps)

Hydrograph for Pond 21P: Infiltration Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	466.00	0.00	0.00	0.00
0.60	0.00	0	466.00	0.00	0.00	0.00
1.20	0.00	0	466.00	0.00	0.00	0.00
1.80	0.00	0	466.00	0.00	0.00	0.00
2.40	0.01	0	466.00	0.01	0.01	0.00
3.00	0.01	0	466.00	0.01	0.01	0.00
3.60	0.02	4	466.02	0.02	0.02	0.00
4.20	0.03	25	466.10	0.02	0.02	0.00
4.80	0.04	58	466.22	0.02	0.02	0.00
5.40	0.04	100	466.36	0.02	0.02	0.00
6.00	0.05	149	466.50	0.03	0.03	0.00
6.60	0.06	205	466.65	0.03	0.03	0.00
7.20	0.07	275	466.81	0.03	0.03	0.00
7.80	0.08	364	467.00	0.04	0.04	0.00
8.40	0.10	478	467.21	0.04	0.04	0.00
9.00	0.13	637	467.46	0.05	0.05	0.00
9.60	0.17	858	467.76	0.05	0.05	0.00
10.20	0.22	1,151	468.10	0.06	0.06	0.00
10.80	0.29	1,543	468.49	0.08	0.08	0.00
11.40	0.44	2,115	468.95	0.09	0.09	0.00
12.00	**1.14**	**3,180**	**469.64**	**0.92**	**0.12**	**0.80**
12.60	**2.64**	**3,466**	**469.80**	**2.73**	**0.13**	**2.60**
13.20	1.37	3,270	469.69	1.40	0.12	1.28
13.80	1.04	3,210	469.66	1.07	0.12	0.95
14.40	0.73	3,147	469.62	0.76	0.12	0.64
15.00	0.50	3,093	469.59	0.53	0.12	0.41
15.60	0.36	3,053	469.57	0.38	0.12	0.26
16.20	0.29	3,029	469.55	0.30	0.12	0.18
16.80	0.25	3,014	469.54	0.25	0.12	0.14
17.40	0.22	3,002	469.54	0.22	0.12	0.10
18.00	0.19	2,991	469.53	0.19	0.12	0.08
18.60	0.17	2,980	469.52	0.17	0.12	0.05
19.20	0.16	2,974	469.52	0.16	0.12	0.04
19.80	0.15	2,969	469.52	0.15	0.12	0.03
20.40	0.14	2,964	469.51	0.14	0.12	0.02
21.00	0.13	2,959	469.51	0.13	0.12	0.02
21.60	0.12	2,955	469.51	0.13	0.12	0.01
22.20	0.12	2,949	469.50	0.12	0.12	0.00
22.80	0.11	2,942	469.50	0.12	0.12	0.00
23.40	0.11	2,927	469.49	0.12	0.12	0.00
24.00	0.10	2,905	469.48	0.11	0.11	0.00

STORMWATER POND DESIGN CRITERIA

Env-Wq 1508.03

Type/Node Name: **Pocket Pond 22P**

Enter the type of stormwater pond (e.g., Wet Pond) and the node name in the drainage analysis, if applicable.

2.47	ac	A = Area draining to the practice	
0.65	ac	A_I = Impervious area draining to the practice	
0.26	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.29	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.71	ac-in	WQV= 1" x Rv x A	
2,572	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
257	cf	10% x WQV (check calc for sediment forebay and micropool volume)	
1,286	cf	50% x WQV (check calc for extended detention volume)	
292	cf	V_{SED} = Sediment forebay volume	**≥ 10%WQV**
3,827	cf	V_{PP} = Permanent pool volume (volume below the lowest invert of the outlet structure) Attach stage-storage table.	
no	cf	Extended Detention?[1]	**≤ 50% WQV**
-		V_{ED} = Volume of extended detention (if "yes" is given in box above)	
		E_{ED} = Elevation of WQV if "yes" is given in box above[4]	
-	cfs	$2Q_{avg}$ = 2* V_{ED} / 24 hrs * (1hr / 3600 sec) (used to check against Q_{EDmax} below)	
	cfs	Q_{EDmax} = Discharge at the E_{ED} (attach stage-discharge table)	**< $2Q_{avg}$**
-	hours	t_{ED} = Drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$	**≥ 24-hrs**
3.00	:1	Pond side slopes	**≥3:1**
468.63	ft	Elevation of seasonal high water table	
469.35	ft	Elevation of lowest pond outlet	
463.63	ft	Max floor = Maximum elevation of pond bottom (ft)	
460.63	ft	Minimum floor (to maintain depth at less than 8')	**≤ 8 ft**
466.00	ft	Elevation of pond floor[3]	**≤ Max floor and > Min floor**
80.00	ft	Length of the flow path between the inlet and outlet at mid-depth	
30.00	ft	Average width ([average of the top width + average bottom width]/2)	
2.67	:1	Length to average width ratio	**≥ 3:1**
No	Yes/No	Is the perimeter curvilinear.	**← Yes**
Yes	Yes/No	Are the inlet and outlet located as far apart as possible.	**← Yes**
No	Yes/No	Is there a manually-controlled drain to dewater the pond over a 24hr period?	
If no state why:		grades	
		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of <6")?	
471.53	ft	Peak elevation of the 50-year storm event	
472.00	ft	Berm elevation of the pond	
YES		50 peak elevation ≤ the berm elevation?	**←yes**

1. If the entire WQV is stored in the perm. pool, there is no extended det., and the following five lines do not apply.

Summary for Pond 22P: Pocket Pond 22P

Inflow Area = 2.470 ac, 26.58% Impervious, Inflow Depth > 2.95" for 50 yr event
Inflow = 6.85 cfs @ 12.11 hrs, Volume= 0.608 af
Outflow = 3.04 cfs @ 12.38 hrs, Volume= 0.600 af, Atten= 56%, Lag= 16.0 min
Primary = 3.04 cfs @ 12.38 hrs, Volume= 0.600 af
Routed to Pond 21P : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Starting Elev= 469.35' Surf.Area= 1,957 sf Storage= 3,827 cf
Peak Elev= 471.53' @ 12.38 hrs Surf.Area= 4,893 sf Storage= 9,791 cf (5,964 cf above start)
Flood Elev= 472.00' Surf.Area= 5,592 sf Storage= 12,066 cf (8,239 cf above start)

Plug-Flow detention time= 142.0 min calculated for 0.512 af (84% of inflow)
Center-of-Mass det. time= 28.2 min (823.7 - 795.5)

Volume	Invert	Avail.Storage	Storage Description
#1	469.00'	0 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) 292 cf Overall x 0.0% Voids
#2	466.00'	12,066 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		12,066 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
469.00	3	16.6	0	0	3
470.00	135	65.6	53	53	326
471.00	363	86.1	240	292	585

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
466.00	492	103.6	0	0	492
468.00	1,258	151.6	1,691	1,691	1,500
470.00	2,304	194.4	3,510	5,201	2,728
471.00	2,916	213.3	2,604	7,805	3,374
471.50	4,482	493.2	1,836	9,640	19,111
472.00	5,229	502.6	2,425	12,066	19,897

Device	Routing	Invert	Outlet Devices
#1	Primary	469.00'	**12.0" Round Culvert** L= 21.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 469.00' / 468.00' S= 0.0476 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	469.35'	**5.0" Vert. 5" Orifices X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	470.80'	**5.0" Vert. 5" Orifices X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	471.25'	**Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.40 Width (feet) 0.75 0.75
#5	Device 1	471.65'	**2.0" x 2.0" Horiz. Grate X 10.00 columns** X 10 rows C= 0.600 in 36.0" x 36.0" Grate (31% open area)

Limited to weir flow at low heads

#6	Primary	471.65'	**4.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.04 cfs @ 12.38 hrs HW=471.53' TW=469.82' (Dynamic Tailwater)
- **1=Culvert** (Passes 3.04 cfs of 4.96 cfs potential flow)
  - **2=5" Orifices** (Orifice Controls 1.72 cfs @ 6.31 fps)
  - **3=5" Orifices** (Orifice Controls 0.95 cfs @ 3.49 fps)
  - **4=Weir** (Weir Controls 0.37 cfs @ 1.74 fps)
  - **5=Grate** (Controls 0.00 cfs)
- **6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Hydrograph for Pond 22P: Pocket Pond 22P

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	3,827	469.35	0.00
0.60	0.00	3,827	469.35	0.00
1.20	0.01	3,833	469.35	0.00
1.80	0.02	3,857	469.37	0.00
2.40	0.02	3,890	469.38	0.01
3.00	0.03	3,923	469.40	0.01
3.60	0.03	3,950	469.41	0.02
4.20	0.04	3,972	469.42	0.03
4.80	0.04	3,988	469.43	0.04
5.40	0.05	4,002	469.44	0.04
6.00	0.05	4,013	469.45	0.05
6.60	0.06	4,027	469.45	0.06
7.20	0.08	4,047	469.46	0.07
7.80	0.09	4,071	469.47	0.08
8.40	0.12	4,100	469.49	0.10
9.00	0.16	4,146	469.51	0.13
9.60	0.20	4,196	469.54	0.17
10.20	0.25	4,248	469.56	0.22
10.80	0.34	4,328	469.60	0.29
11.40	0.56	4,479	469.67	0.44
12.00	**3.86**	**6,158**	**470.40**	**1.14**
12.60	**1.40**	**9,221**	**471.40**	**2.64**
13.20	0.68	7,153	470.77	1.37
13.80	0.55	5,884	470.29	1.04
14.40	0.45	5,044	469.93	0.73
15.00	0.39	4,629	469.74	0.50
15.60	0.32	4,484	469.68	0.36
16.20	0.26	4,409	469.64	0.29
16.80	0.23	4,366	469.62	0.25
17.40	0.20	4,333	469.60	0.22
18.00	0.17	4,301	469.59	0.19
18.60	0.16	4,276	469.58	0.17
19.20	0.15	4,262	469.57	0.16
19.80	0.14	4,250	469.56	0.15
20.40	0.13	4,239	469.56	0.14
21.00	0.13	4,229	469.55	0.13
21.60	0.12	4,220	469.55	0.12
22.20	0.11	4,209	469.54	0.12
22.80	0.11	4,198	469.54	0.11
23.40	0.10	4,183	469.53	0.11
24.00	0.09	4,162	469.52	0.10

STORMWATER POND DESIGN CRITERIA

Env-Wq 1508.03

Type/Node Name: **Pocket Pond 41P**

Enter the type of stormwater pond (e.g., Wet Pond) and the node name in the drainage analysis, if applicable.

1.67	ac	A = Area draining to the practice	
0.13	ac	A_I = Impervious area draining to the practice	
0.08	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.12	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.20	ac-in	WQV= 1" x Rv x A	
737	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
74	cf	10% x WQV (check calc for sediment forebay and micropool volume)	
368	cf	50% x WQV (check calc for extended detention volume)	
245	cf	V_{SED} = Sediment forebay volume	**≥ 10%WQV**
5,532	cf	V_{PP} = Permanent pool volume (volume below the lowest invert of the outlet structure) Attach stage-storage table.	
no	cf	Extended Detention?[1]	**≤ 50% WQV**
-		V_{ED} = Volume of extended detention (if "yes" is given in box above)	
		E_{ED} = Elevation of WQV if "yes" is given in box above[4]	
-	cfs	$2Q_{avg}$ = 2* V_{ED} / 24 hrs * (1hr / 3600 sec) (used to check against Q_{EDmax} below)	
	cfs	Q_{EDmax} = Discharge at the E_{ED} (attach stage-discharge table)	**< $2Q_{avg}$**
-	hours	T_{ED} = Drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$	**≥ 24-hrs**
3.00	:1	Pond side slopes	**≥3:1**
437.00	ft	Elevation of seasonal high water table	
440.10	ft	Elevation of lowest pond outlet	
432.00	ft	Max floor = Maximum elevation of pond bottom (ft)	
429.00	ft	Minimum floor (to maintain depth at less than 8')	**≤ 8 ft**
434.00	ft	Elevation of pond floor[3]	**≤ Max floor and > Min floor**
51.00	ft	Length of the flow path between the inlet and outlet at mid-depth	
67.00	ft	Average width ([average of the top width + average bottom width]/2)	
0.76	:1	Length to average width ratio	**≥ 3:1**
Yes	Yes/No	Is the perimeter curvilinear.	**← Yes**
Yes	Yes/No	Are the inlet and outlet located as far apart as possible.	**← Yes**
No	Yes/No	Is there a manually-controlled drain to dewater the pond over a 24hr period?	
If no state why:		grades	
		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of <6")?	
441.62	ft	Peak elevation of the 50-year storm event	
442.00	ft	Berm elevation of the pond	
YES		50 peak elevation ≤ the berm elevation?	**←yes**

1. If the entire WQV is stored in the perm. pool, there is no extended det., and the following five lines do not apply.

Summary for Pond 41P: Pocket Pond 41P

Inflow Area = 1.667 ac, 7.82% Impervious, Inflow Depth > 1.82" for 50 yr event
Inflow = 2.68 cfs @ 12.14 hrs, Volume= 0.253 af
Outflow = 0.89 cfs @ 12.55 hrs, Volume= 0.239 af, Atten= 67%, Lag= 24.5 min
Primary = 0.89 cfs @ 12.55 hrs, Volume= 0.239 af
Routed to Pond 40P : Existing CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Starting Elev= 440.10' Surf.Area= 2,413 sf Storage= 5,532 cf
Peak Elev= 441.62' @ 12.55 hrs Surf.Area= 3,395 sf Storage= 9,542 cf (4,010 cf above start)
Flood Elev= 442.00' Surf.Area= 3,520 sf Storage= 10,747 cf (5,215 cf above start)

Plug-Flow detention time= 466.5 min calculated for 0.112 af (45% of inflow)
Center-of-Mass det. time= 134.5 min (969.1 - 834.6)

Volume	Invert	Avail.Storage	Storage Description
#1	438.50'	0 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) 245 cf Overall x 0.0% Voids
#2	434.00'	10,747 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		10,747 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
438.50	7	13.1	0	0	7
440.50	313	89.1	245	245	633

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
434.00	64	44.5	0	0	64
436.00	472	91.7	473	473	593
438.00	1,164	139.2	1,585	2,058	1,496
440.00	2,142	186.2	3,257	5,315	2,756
441.50	3,044	214.5	3,870	9,184	3,707
442.00	3,207	219.2	1,563	10,747	3,902

Device	Routing	Invert	Outlet Devices
#1	Primary	437.00'	**18.0" Round Culvert** L= 24.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 437.00' / 435.00' S= 0.0833 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	440.10'	**3.0" Vert. 3" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	441.50'	**18.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.89 cfs @ 12.55 hrs HW=441.62' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.89 cfs of 16.73 cfs potential flow)
↑—**2=3" Orifice** (Orifice Controls 0.28 cfs @ 5.68 fps)
—**3=Grate** (Weir Controls 0.61 cfs @ 1.12 fps)

Hydrograph for Pond 41P: Pocket Pond 41P

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	5,532	440.10	0.00
0.60	0.00	5,532	440.10	0.00
1.20	0.00	5,533	440.10	0.00
1.80	0.00	5,537	440.10	0.00
2.40	0.00	5,545	440.11	0.00
3.00	0.01	5,555	440.11	0.00
3.60	0.01	5,567	440.12	0.00
4.20	0.01	5,581	440.12	0.00
4.80	0.01	5,596	440.13	0.00
5.40	0.01	5,611	440.14	0.00
6.00	0.01	5,626	440.14	0.00
6.60	0.01	5,641	440.15	0.01
7.20	0.02	5,658	440.16	0.01
7.80	0.02	5,679	440.17	0.01
8.40	0.03	5,704	440.18	0.01
9.00	0.03	5,737	440.19	0.02
9.60	0.04	5,779	440.21	0.02
10.20	0.06	5,827	440.23	0.03
10.80	0.08	5,891	440.26	0.05
11.40	0.15	6,006	440.31	0.07
12.00	**1.25**	**6,762**	**440.62**	**0.15**
12.60	**0.72**	**9,527**	**441.61**	**0.86**
13.20	0.33	9,302	441.54	0.39
13.80	0.27	9,233	441.52	0.30
14.40	0.23	9,165	441.49	0.27
15.00	0.20	9,051	441.46	0.26
15.60	0.16	8,882	441.40	0.26
16.20	0.13	8,658	441.32	0.25
16.80	0.12	8,406	441.24	0.24
17.40	0.10	8,145	441.15	0.23
18.00	0.09	7,878	441.05	0.21
18.60	0.08	7,611	440.95	0.20
19.20	0.08	7,363	440.86	0.19
19.80	0.07	7,135	440.77	0.17
20.40	0.07	6,926	440.69	0.16
21.00	0.07	6,739	440.62	0.15
21.60	0.06	6,573	440.55	0.13
22.20	0.06	6,429	440.49	0.12
22.80	0.06	6,304	440.44	0.11
23.40	0.05	6,198	440.39	0.10
24.00	0.05	6,111	440.36	0.09

17. EXTREME PRECIPITATION TABLES

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.255 degrees North
Longitude	71.765 degrees West
Elevation	140 feet
Date/Time	Wed Jun 05 2024 12:33:03 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.02	**1yr**	0.70	0.97	1.18	1.48	1.87	2.35	2.55	**1yr**	2.08	2.45	2.90	3.60	4.12	**1yr**
2yr	0.31	0.48	0.60	0.79	0.99	1.25	**2yr**	0.86	1.14	1.44	1.80	2.23	2.78	3.11	**2yr**	2.46	2.99	3.48	4.16	4.75	**2yr**
5yr	0.37	0.58	0.72	0.97	1.24	1.57	**5yr**	1.07	1.44	1.81	2.26	2.79	3.44	3.93	**5yr**	3.04	3.78	4.38	5.15	5.84	**5yr**
10yr	0.42	0.66	0.83	1.13	1.47	1.87	**10yr**	1.27	1.72	2.17	2.69	3.31	4.04	4.70	**10yr**	3.58	4.52	5.21	6.05	6.83	**10yr**
25yr	0.49	0.79	1.00	1.38	1.83	2.35	**25yr**	1.58	2.16	2.73	3.38	4.14	5.01	5.94	**25yr**	4.43	5.71	6.56	7.50	8.40	**25yr**
50yr	0.56	0.90	1.15	1.61	2.17	2.80	**50yr**	1.87	2.58	3.25	4.03	4.90	5.89	7.11	**50yr**	5.22	6.83	7.81	8.82	9.82	**50yr**
100yr	0.64	1.03	1.33	1.89	2.58	3.34	**100yr**	2.22	3.07	3.89	4.80	5.81	6.94	8.50	**100yr**	6.14	8.17	9.31	10.38	11.49	**100yr**
200yr	0.73	1.20	1.55	2.22	3.06	3.98	**200yr**	2.64	3.67	4.63	5.70	6.88	8.17	10.17	**200yr**	7.23	9.78	11.09	12.22	13.45	**200yr**
500yr	0.88	1.45	1.88	2.73	3.83	5.01	**500yr**	3.30	4.64	5.84	7.17	8.61	10.16	12.90	**500yr**	8.99	12.41	14.00	15.18	16.57	**500yr**

Lower Confidence Limits

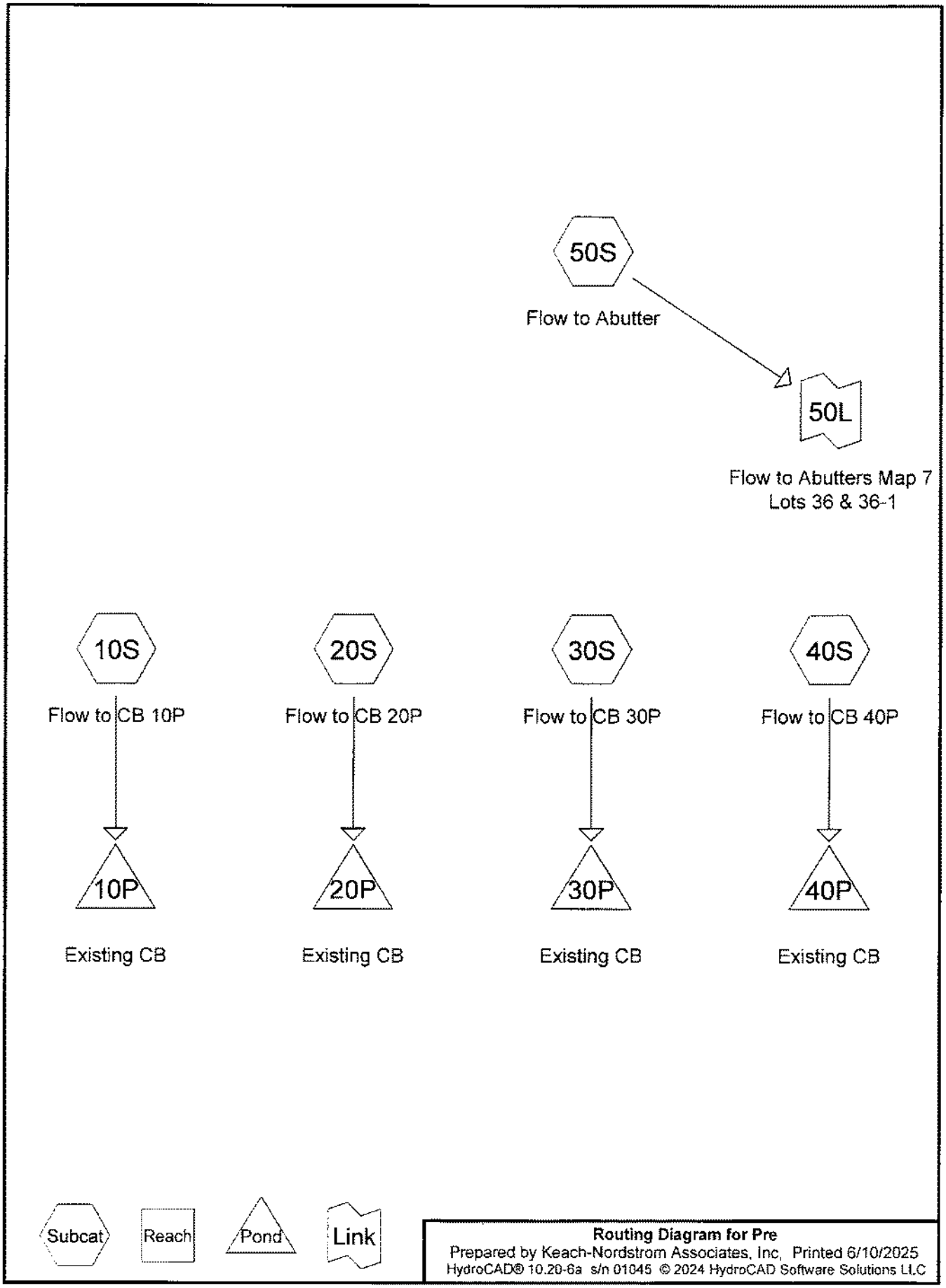
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.61	0.75	0.88	1yr	0.64	0.86	0.95	1.28	1.57	1.90	2.28	1yr	1.68	2.19	2.58	3.07	3.62	1yr
2yr	0.30	0.46	0.57	0.77	0.95	1.13	2yr	0.82	1.10	1.29	1.71	2.21	2.69	3.00	2yr	2.38	2.88	3.35	4.02	4.60	2yr
5yr	0.34	0.52	0.65	0.89	1.13	1.33	5yr	0.97	1.30	1.50	1.96	2.54	3.17	3.59	5yr	2.81	3.45	3.98	4.74	5.42	5yr
10yr	0.38	0.58	0.72	1.01	1.30	1.52	10yr	1.12	1.48	1.68	2.17	2.82	3.60	4.10	10yr	3.19	3.95	4.52	5.36	6.09	10yr
25yr	0.43	0.65	0.81	1.16	1.53	1.78	25yr	1.32	1.74	1.96	2.48	3.23	4.25	4.89	25yr	3.76	4.70	5.35	6.33	7.11	25yr
50yr	0.47	0.72	0.89	1.29	1.73	1.99	50yr	1.49	1.95	2.18	2.76	3.57	4.83	5.57	50yr	4.28	5.36	6.07	7.19	8.03	50yr
100yr	0.52	0.79	0.99	1.42	1.95	2.24	100yr	1.68	2.19	2.43	3.07	3.96	5.50	6.37	100yr	4.87	6.12	6.89	8.18	9.07	100yr
200yr	0.57	0.86	1.09	1.57	2.20	2.52	200yr	1.90	2.46	2.71	3.42	4.39	6.28	7.27	200yr	5.55	6.99	7.83	9.33	10.24	200yr
500yr	0.65	0.97	1.25	1.81	2.58	2.92	500yr	2.23	2.85	3.13	3.95	5.03	7.48	8.67	500yr	6.62	8.34	9.25	11.12	12.05	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.45	0.55	0.73	0.90	1.11	1yr	0.78	1.09	1.21	1.59	1.96	2.61	2.80	1yr	2.31	2.69	3.21	3.94	4.48	1yr
2yr	0.33	0.51	0.63	0.85	1.05	1.24	2yr	0.91	1.21	1.41	1.85	2.37	2.89	3.25	2yr	2.56	3.12	3.64	4.31	4.99	2yr
5yr	0.41	0.63	0.78	1.07	1.36	1.63	5yr	1.18	1.59	1.85	2.36	3.00	3.73	4.32	5yr	3.30	4.16	4.81	5.55	6.30	5yr
10yr	0.49	0.76	0.94	1.31	1.69	2.02	10yr	1.46	1.98	2.27	2.86	3.60	4.53	5.38	10yr	4.01	5.18	5.97	6.70	7.57	10yr
25yr	0.63	0.96	1.19	1.70	2.24	2.69	25yr	1.93	2.63	3.01	3.66	4.58	5.85	7.18	25yr	5.18	6.90	7.94	8.61	9.69	25yr
50yr	0.76	1.15	1.43	2.06	2.77	3.36	50yr	2.39	3.28	3.70	4.43	5.51	7.09	8.95	50yr	6.28	8.61	9.86	10.42	11.67	50yr
100yr	0.92	1.39	1.74	2.51	3.44	4.19	100yr	2.97	4.10	4.57	5.34	6.63	8.62	11.17	100yr	7.63	10.74	12.25	12.60	14.06	100yr
200yr	1.11	1.67	2.11	3.06	4.27	5.23	200yr	3.68	5.12	5.66	6.46	7.96	10.44	13.93	200yr	9.24	13.39	15.23	15.22	16.93	200yr
500yr	1.44	2.14	2.75	4.00	5.68	7.03	500yr	4.90	6.87	7.50	8.30	10.19	13.50	18.67	500yr	11.95	17.96	20.32	19.55	21.65	500yr

Powered by ACIS Northeast Regional Climate Center

18. HYDROCAD DRAINAGE ANALAYSIS



Routing Diagram for Pre

Prepared by Keach-Nordstrom Associates, Inc, Printed 6/10/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10 yr	Type III 24-hr		Default	24.00	1	4.04	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.460	39	>75% Grass cover, Good, HSG A (30S, 40S)
0.355	61	>75% Grass cover, Good, HSG B (10S, 30S, 40S)
0.263	80	>75% Grass cover, Good, HSG D (20S, 30S, 40S)
0.209	96	Gravel surface, HSG A (40S)
0.111	96	Gravel surface, HSG B (30S, 40S, 50S)
0.231	98	Paved parking, HSG A (30S, 40S)
0.242	98	Paved parking, HSG B (10S, 20S, 30S, 40S)
0.011	98	Paved parking, HSG D (40S)
0.183	98	Water Surface, HSG C (10S, 20S)
2.812	30	Woods, Good, HSG A (10S, 20S, 30S, 40S)
8.875	55	Woods, Good, HSG B (10S, 20S, 30S, 40S, 50S)
3.392	77	Woods, Good, HSG D (10S, 20S, 30S, 40S, 50S)
17.143	**58**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
3.712	HSG A	10S, 20S, 30S, 40S
9.582	HSG B	10S, 20S, 30S, 40S, 50S
0.183	HSG C	10S, 20S
3.666	HSG D	10S, 20S, 30S, 40S, 50S
0.000	Other	
17.143		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.460	0.355	0.000	0.263	0.000	1.078	>75% Grass cover, Good	10S, 20S, 30S, 40S
0.209	0.111	0.000	0.000	0.000	0.320	Gravel surface	30S, 40S, 50S
0.231	0.242	0.000	0.011	0.000	0.483	Paved parking	10S, 20S, 30S, 40S
0.000	0.000	0.183	0.000	0.000	0.183	Water Surface	10S, 20S
2.812	8.875	0.000	3.392	0.000	15.079	Woods, Good	10S, 20S, 30S, 40S, 50S
3.712	**9.582**	**0.183**	**3.666**	**0.000**	**17.143**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Flow to CB 10P Runoff Area=138,949 sf 3.22% Impervious Runoff Depth>0.39"
Flow Length=1,135' Tc=17.9 min CN=WQ Runoff=0.85 cfs 0.104 af

Subcatchment20S: Flow to CB 20P Runoff Area=314,828 sf 3.69% Impervious Runoff Depth>0.42"
Flow Length=1,000' Tc=16.1 min CN=WQ Runoff=2.01 cfs 0.255 af

Subcatchment30S: Flow to CB 30P Runoff Area=85,116 sf 6.62% Impervious Runoff Depth>0.51"
Flow Length=905' Tc=21.0 min CN=WQ Runoff=0.63 cfs 0.083 af

Subcatchment40S: Flow to CB 40P Runoff Area=196,868 sf 3.70% Impervious Runoff Depth>0.40"
Flow Length=1,199' Tc=18.5 min CN=WQ Runoff=1.06 cfs 0.150 af

Subcatchment50S: Flow to Abutter Runoff Area=11,007 sf 0.00% Impervious Runoff Depth>0.27"
Flow Length=213' Tc=10.6 min CN=WQ Runoff=0.04 cfs 0.006 af

Pond 10P: Existing CB Inflow=0.85 cfs 0.104 af
Primary=0.85 cfs 0.104 af

Pond 20P: Existing CB Inflow=2.01 cfs 0.255 af
Primary=2.01 cfs 0.255 af

Pond 30P: Existing CB Inflow=0.63 cfs 0.083 af
Primary=0.63 cfs 0.083 af

Pond 40P: Existing CB Inflow=1.06 cfs 0.150 af
Primary=1.06 cfs 0.150 af

Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1 Inflow=0.04 cfs 0.006 af
Primary=0.04 cfs 0.006 af

Total Runoff Area = 17.143 ac Runoff Volume = 0.597 af Average Runoff Depth = 0.42"
96.11% Pervious = 16.477 ac 3.89% Impervious = 0.666 ac

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Flow to CB 10P Runoff Area=138,949 sf 3.22% Impervious Runoff Depth>0.83"
Flow Length=1,135' Tc=17.9 min CN=WQ Runoff=1.93 cfs 0.220 af

Subcatchment20S: Flow to CB 20P Runoff Area=314,828 sf 3.69% Impervious Runoff Depth>0.95"
Flow Length=1,000' Tc=16.1 min CN=WQ Runoff=4.94 cfs 0.571 af

Subcatchment30S: Flow to CB 30P Runoff Area=85,116 sf 6.62% Impervious Runoff Depth>1.03"
Flow Length=905' Tc=21.0 min CN=WQ Runoff=1.36 cfs 0.168 af

Subcatchment40S: Flow to CB 40P Runoff Area=196,868 sf 3.70% Impervious Runoff Depth>0.86"
Flow Length=1,199' Tc=18.5 min CN=WQ Runoff=2.46 cfs 0.323 af

Subcatchment50S: Flow to Abutter Runoff Area=11,007 sf 0.00% Impervious Runoff Depth>0.74"
Flow Length=213' Tc=10.6 min CN=WQ Runoff=0.13 cfs 0.016 af

Pond 10P: Existing CB Inflow=1.93 cfs 0.220 af
Primary=1.93 cfs 0.220 af

Pond 20P: Existing CB Inflow=4.94 cfs 0.571 af
Primary=4.94 cfs 0.571 af

Pond 30P: Existing CB Inflow=1.36 cfs 0.168 af
Primary=1.36 cfs 0.168 af

Pond 40P: Existing CB Inflow=2.46 cfs 0.323 af
Primary=2.46 cfs 0.323 af

Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1 Inflow=0.13 cfs 0.016 af
Primary=0.13 cfs 0.016 af

Total Runoff Area = 17.143 ac Runoff Volume = 1.298 af Average Runoff Depth = 0.91"
96.11% Pervious = 16.477 ac 3.89% Impervious = 0.666 ac

Summary for Subcatchment 10S: Flow to CB 10P

Runoff = 1.93 cfs @ 12.26 hrs, Volume= 0.220 af, Depth> 0.83"
Routed to Pond 10P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
3,674	98	Paved parking, HSG B
6,224	61	>75% Grass cover, Good, HSG B
801	98	Water Surface, HSG C
49,768	30	Woods, Good, HSG A
39,726	55	Woods, Good, HSG B
38,756	77	Woods, Good, HSG D
138,949		Weighted Average
134,474		96.78% Pervious Area
4,475		3.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.2100	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
8.9	1,035	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.9	1,135	Total			

Summary for Subcatchment 20S: Flow to CB 20P

Runoff = 4.94 cfs @ 12.24 hrs, Volume= 0.571 af, Depth> 0.95"
Routed to Pond 20P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
4,461	98	Paved parking, HSG B
5,323	80	>75% Grass cover, Good, HSG D
7,166	98	Water Surface, HSG C
39,209	30	Woods, Good, HSG A
179,013	55	Woods, Good, HSG B
79,656	77	Woods, Good, HSG D
314,828		Weighted Average
303,201		96.31% Pervious Area
11,627		3.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.2100	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
7.1	900	0.1800	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	1,000	Total			

Summary for Subcatchment 30S: Flow to CB 30P

Runoff = 1.36 cfs @ 12.31 hrs, Volume= 0.168 af, Depth> 1.03"
Routed to Pond 30P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
5,038	98	Paved parking, HSG A
3,542	80	>75% Grass cover, Good, HSG D
6,809	39	>75% Grass cover, Good, HSG A
3,061	61	>75% Grass cover, Good, HSG B
595	98	Paved parking, HSG B
790	96	Gravel surface, HSG B
12,810	30	Woods, Good, HSG A
19,284	77	Woods, Good, HSG D
33,187	55	Woods, Good, HSG B
85,116		Weighted Average
79,483		93.38% Pervious Area
5,633		6.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.1400	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
4.3	500	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	55	0.3600	9.66		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.0	250	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
21.0	905	Total			

Summary for Subcatchment 40S: Flow to CB 40P

Runoff = 2.46 cfs @ 12.28 hrs, Volume= 0.323 af, Depth> 0.86"
Routed to Pond 40P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
5,021	98	Paved parking, HSG A
474	98	Paved parking, HSG D
1,792	98	Paved parking, HSG B
13,245	39	>75% Grass cover, Good, HSG A
6,161	61	>75% Grass cover, Good, HSG B
2,604	80	>75% Grass cover, Good, HSG D
20,716	30	Woods, Good, HSG A
124,642	55	Woods, Good, HSG B
3,540	96	Gravel surface, HSG B
9,098	96	Gravel surface, HSG A
9,575	77	Woods, Good, HSG D
196,868		Weighted Average
189,581		96.30% Pervious Area
7,287		3.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.2100	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
9.5	1,099	0.1500	1.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
18.5	1,199	Total			

Summary for Subcatchment 50S: Flow to Abutter

Runoff = 0.13 cfs @ 12.18 hrs, Volume= 0.016 af, Depth> 0.74"
Routed to Link 50L : Flow to Abutters Map 7 Lots 36 & 36-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
506	96	Gravel surface, HSG B
485	77	Woods, Good, HSG D
10,016	55	Woods, Good, HSG B
11,007		Weighted Average
11,007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
1.0	113	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	213	Total			

Summary for Pond 10P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.190 ac, 3.22% Impervious, Inflow Depth > 0.83" for 10 yr event
Inflow = 1.93 cfs @ 12.26 hrs, Volume= 0.220 af
Primary = 1.93 cfs @ 12.26 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 20P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.227 ac, 3.69% Impervious, Inflow Depth > 0.95" for 10 yr event
Inflow = 4.94 cfs @ 12.24 hrs, Volume= 0.571 af
Primary = 4.94 cfs @ 12.24 hrs, Volume= 0.571 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 30P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.954 ac, 6.62% Impervious, Inflow Depth > 1.03" for 10 yr event
Inflow = 1.36 cfs @ 12.31 hrs, Volume= 0.168 af
Primary = 1.36 cfs @ 12.31 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 40P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.519 ac, 3.70% Impervious, Inflow Depth > 0.86" for 10 yr event
Inflow = 2.46 cfs @ 12.28 hrs, Volume= 0.323 af
Primary = 2.46 cfs @ 12.28 hrs, Volume= 0.323 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1

Inflow Area = 0.253 ac, 0.00% Impervious, Inflow Depth > 0.74" for 10 yr event
Inflow = 0.13 cfs @ 12.18 hrs, Volume= 0.016 af
Primary = 0.13 cfs @ 12.18 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Flow to CB 10P Runoff Area=138,949 sf 3.22% Impervious Runoff Depth>1.64"
Flow Length=1,135' Tc=17.9 min CN=WQ Runoff=4.07 cfs 0.437 af

Subcatchment20S: Flow to CB 20P Runoff Area=314,828 sf 3.69% Impervious Runoff Depth>1.95"
Flow Length=1,000' Tc=16.1 min CN=WQ Runoff=11.29 cfs 1.177 af

Subcatchment30S: Flow to CB 30P Runoff Area=85,116 sf 6.62% Impervious Runoff Depth>2.01"
Flow Length=905' Tc=21.0 min CN=WQ Runoff=2.80 cfs 0.328 af

Subcatchment40S: Flow to CB 40P Runoff Area=196,868 sf 3.70% Impervious Runoff Depth>1.78"
Flow Length=1,199' Tc=18.5 min CN=WQ Runoff=5.77 cfs 0.670 af

Subcatchment50S: Flow to Abutter Runoff Area=11,007 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=213' Tc=10.6 min CN=WQ Runoff=0.39 cfs 0.036 af

Pond 10P: Existing CB Inflow=4.07 cfs 0.437 af
Primary=4.07 cfs 0.437 af

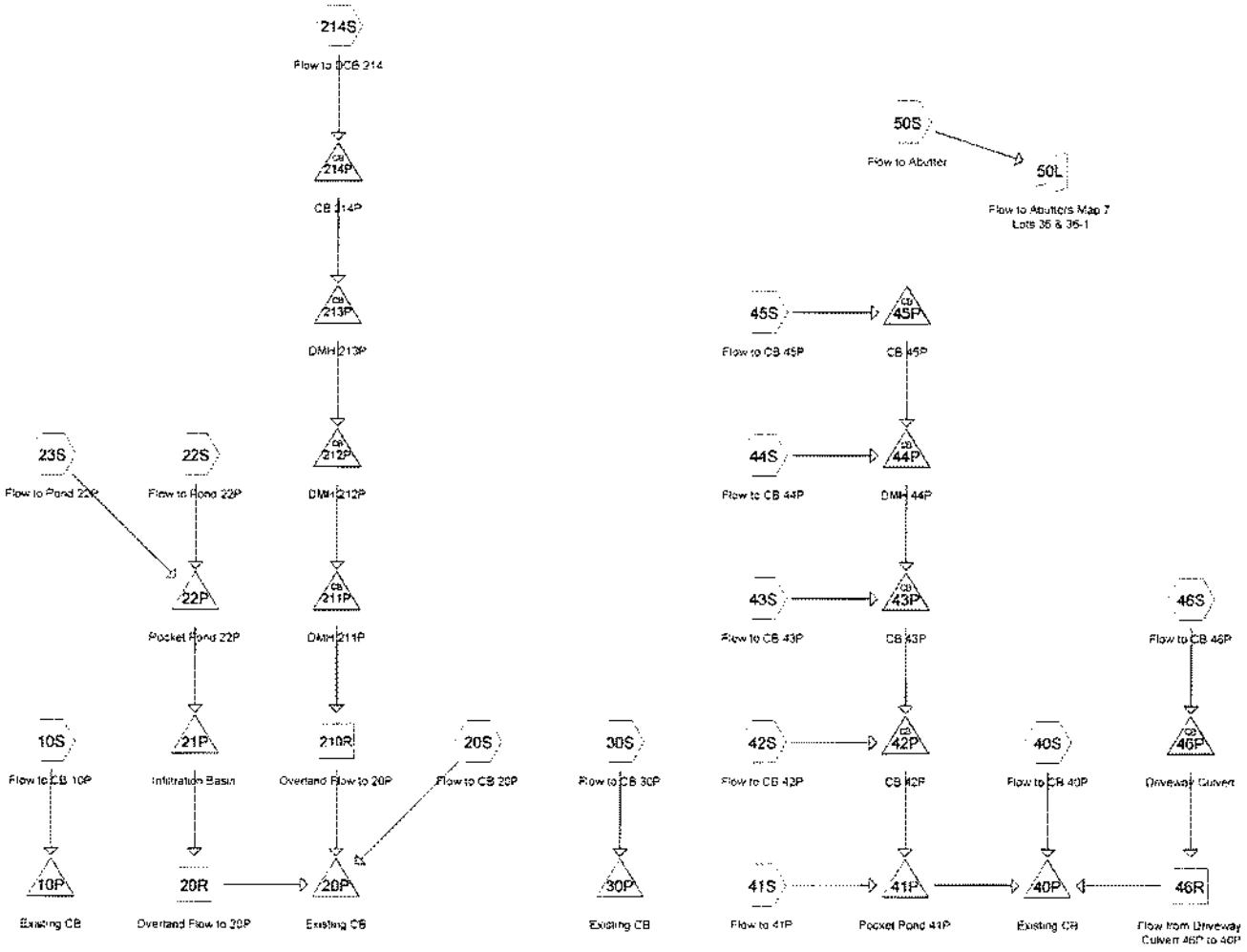
Pond 20P: Existing CB Inflow=11.29 cfs 1.177 af
Primary=11.29 cfs 1.177 af

Pond 30P: Existing CB Inflow=2.80 cfs 0.328 af
Primary=2.80 cfs 0.328 af

Pond 40P: Existing CB Inflow=5.77 cfs 0.670 af
Primary=5.77 cfs 0.670 af

Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1 Inflow=0.39 cfs 0.036 af
Primary=0.39 cfs 0.036 af

Total Runoff Area = 17.143 ac Runoff Volume = 2.648 af Average Runoff Depth = 1.85"
96.11% Pervious = 16.477 ac 3.89% Impervious = 0.666 ac



Subcat Reach Pond Link

Routing Diagram for Post

Prepared by Keach-Nordstrom Associates, Inc, Printed 6/10/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10 yr	Type III 24-hr		Default	24.00	1	4.04	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.085	39	>75% Grass cover, Good, HSG A (20S, 22S, 23S, 40S, 41S, 42S, 43S, 44S, 46S)
1.767	61	>75% Grass cover, Good, HSG B (10S, 20S, 22S, 23S, 30S, 41S, 42S, 43S, 44S, 45S, 46S, 214S)
1.021	80	>75% Grass cover, Good, HSG D (20S, 22S, 30S, 40S, 41S, 42S, 43S, 45S, 46S, 214S)
0.044	96	Gravel surface, HSG B (46S, 50S)
0.605	98	Paved parking, HSG A (22S, 23S, 30S, 40S, 41S, 42S, 43S, 44S, 46S)
0.504	98	Paved parking, HSG B (10S, 20S, 22S, 23S, 42S, 43S, 44S, 45S)
0.008	98	Paved parking, HSG D (40S, 46S)
0.065	98	Roofs, HSG A (22S, 23S)
0.159	98	Roofs, HSG B (22S, 23S)
0.001	98	Roofs, HSG D (22S)
0.183	98	Water Surface, HSG C (10S, 20S)
1.957	30	Woods, Good, HSG A (10S, 20S, 22S, 30S, 41S, 46S)
7.109	55	Woods, Good, HSG B (10S, 20S, 22S, 41S, 43S, 45S, 46S, 50S, 214S)
2.636	77	Woods, Good, HSG D (10S, 20S, 22S, 30S, 41S, 43S, 45S, 46S, 50S, 214S)
17.143	**61**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
3.712	HSG A	10S, 20S, 22S, 23S, 30S, 40S, 41S, 42S, 43S, 44S, 46S
9.582	HSG B	10S, 20S, 22S, 23S, 30S, 41S, 42S, 43S, 44S, 45S, 46S, 50S, 214S
0.183	HSG C	10S, 20S
3.666	HSG D	10S, 20S, 22S, 30S, 40S, 41S, 42S, 43S, 45S, 46S, 50S, 214S
0.000	Other	
17.143		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.085	1.767	0.000	1.021	0.000	3.873	>75% Grass cover, Good	10S, 20S, 22S, 23S, 30S, 40S, 41S, 42S, 43S, 44S, 45S, 46S, 214S
0.000	0.044	0.000	0.000	0.000	0.044	Gravel surface	46S, 50S
0.605	0.504	0.000	0.008	0.000	1.116	Paved parking	10S, 20S, 22S, 23S, 30S, 40S, 41S, 42S, 43S, 44S, 45S, 46S
0.065	0.159	0.000	0.001	0.000	0.224	Roofs	22S, 23S
0.000	0.000	0.183	0.000	0.000	0.183	Water Surface	10S, 20S
1.957	7.109	0.000	2.636	0.000	11.702	Woods, Good	10S, 20S, 22S, 30S, 41S, 43S, 45S, 46S, 50S, 214S

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
3.712	**9.582**	**0.183**	**3.666**	**0.000**	**17.143**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Flow to CB 10P Runoff Area=138,730 sf 3.23% Impervious Runoff Depth>0.39"
Flow Length=1,135' Tc=17.9 min CN=WQ Runoff=0.84 cfs 0.103 af

Subcatchment20S: Flow to CB 20P Runoff Area=102,298 sf 14.98% Impervious Runoff Depth>0.74"
Flow Length=578' Tc=20.3 min CN=WQ Runoff=1.16 cfs 0.145 af

Subcatchment22S: Flow to Pond 22P Runoff Area=77,035 sf 6.46% Impervious Runoff Depth>0.58"
Flow Length=363' Tc=9.5 min CN=WQ Runoff=0.85 cfs 0.085 af

Subcatchment23S: Flow to Pond 22P Runoff Area=30,554 sf 77.32% Impervious Runoff Depth>1.99"
Flow Length=412' Tc=6.0 min CN=WQ Runoff=1.45 cfs 0.116 af

Subcatchment30S: Flow to CB 30P Runoff Area=21,407 sf 23.53% Impervious Runoff Depth>1.29"
Flow Length=310' Slope=0.0100 '/' Tc=17.8 min CN=WQ Runoff=0.49 cfs 0.053 af

Subcatchment40S: Flow to CB 40P Runoff Area=6,946 sf 32.42% Impervious Runoff Depth>1.44"
Flow Length=126' Tc=6.3 min CN=WQ Runoff=0.25 cfs 0.019 af

Subcatchment41S: Flow to 41P Runoff Area=28,634 sf 1.45% Impervious Runoff Depth>0.30"
Flow Length=142' Tc=8.4 min CN=WQ Runoff=0.17 cfs 0.016 af

Subcatchment42S: Flow to CB 42P Runoff Area=6,835 sf 27.53% Impervious Runoff Depth>0.80"
Flow Length=128' Tc=8.1 min CN=WQ Runoff=0.12 cfs 0.010 af

Subcatchment43S: Flow to CB 43P Runoff Area=19,681 sf 12.09% Impervious Runoff Depth>0.51"
Flow Length=358' Tc=11.6 min CN=WQ Runoff=0.16 cfs 0.019 af

Subcatchment44S: Flow to CB 44P Runoff Area=1,963 sf 13.91% Impervious Runoff Depth>0.59"
Flow Length=54' Slope=0.1400 '/' Tc=6.0 min CN=WQ Runoff=0.02 cfs 0.002 af

Subcatchment45S: Flow to CB 45P Runoff Area=15,485 sf 4.70% Impervious Runoff Depth>0.38"
Flow Length=159' Tc=9.9 min CN=WQ Runoff=0.08 cfs 0.011 af

Subcatchment46S: Flow to CB 46P Runoff Area=201,304 sf 2.48% Impervious Runoff Depth>0.24"
Flow Length=1,111' Tc=17.7 min CN=WQ Runoff=0.49 cfs 0.094 af

Subcatchment50S: Flow to Abutter Runoff Area=11,007 sf 0.00% Impervious Runoff Depth>0.27"
Flow Length=213' Tc=10.6 min CN=WQ Runoff=0.04 cfs 0.006 af

Subcatchment214S: Flow to DCB 214 Runoff Area=84,870 sf 0.00% Impervious Runoff Depth>0.43"
Flow Length=816' Tc=15.2 min CN=WQ Runoff=0.55 cfs 0.069 af

Reach 20R: Overland Flow to 20P Avg. Flow Depth=0.06' Max Vel=4.09 fps Inflow=0.57 cfs 0.039 af
n=0.013 L=244.0' S=0.0922 '/' Capacity=1,102.26 cfs Outflow=0.57 cfs 0.039 af

Reach 46R: Flow from Driveway Culvert Avg. Flow Depth=0.50' Max Vel=0.38 fps Inflow=0.49 cfs 0.094 af
n=0.150 L=50.0' S=0.0074 '/' Capacity=12.13 cfs Outflow=0.49 cfs 0.094 af

Reach 210R: Overland Flow to 20P Avg. Flow Depth=0.06' Max Vel=3.93 fps Inflow=0.55 cfs 0.069 af
n=0.013 L=486.0' S=0.0874 '/' Capacity=1,073.41 cfs Outflow=0.54 cfs 0.069 af

Pond 10P: Existing CB Inflow=0.84 cfs 0.103 af
Primary=0.84 cfs 0.103 af

Pond 20P: Existing CB Inflow=1.69 cfs 0.254 af
Primary=1.69 cfs 0.254 af

Pond 21P: Infiltration Basin Peak Elev=469.61' Storage=3,132 cf Inflow=1.02 cfs 0.198 af
Discarded=0.12 cfs 0.119 af Primary=0.57 cfs 0.039 af Outflow=0.70 cfs 0.159 af

Pond 22P: Pocket Pond 22P Peak Elev=470.16' Storage=5,569 cf Inflow=2.21 cfs 0.201 af
Outflow=1.02 cfs 0.198 af

Pond 30P: Existing CB Inflow=0.49 cfs 0.053 af
Primary=0.49 cfs 0.053 af

Pond 40P: Existing CB Inflow=0.71 cfs 0.168 af
Primary=0.71 cfs 0.168 af

Pond 41P: Pocket Pond 41P Peak Elev=440.50' Storage=6,445 cf Inflow=0.54 cfs 0.059 af
Outflow=0.12 cfs 0.055 af

Pond 42P: CB 42P Peak Elev=443.60' Inflow=0.37 cfs 0.043 af
18.0" Round Culvert n=0.013 L=17.0' S=0.0782 '/' Outflow=0.37 cfs 0.043 af

Pond 43P: CB 43P Peak Elev=445.88' Inflow=0.26 cfs 0.033 af
18.0" Round Culvert n=0.013 L=38.0' S=0.0526 '/' Outflow=0.26 cfs 0.033 af

Pond 44P: DMH 44P Peak Elev=453.14' Inflow=0.10 cfs 0.014 af
15.0" Round Culvert n=0.013 L=79.0' S=0.0886 '/' Outflow=0.10 cfs 0.014 af

Pond 45P: CB 45P Peak Elev=465.93' Inflow=0.08 cfs 0.011 af
15.0" Round Culvert n=0.013 L=64.0' S=0.1219 '/' Outflow=0.08 cfs 0.011 af

Pond 46P: Driveway Culvert Peak Elev=431.37' Inflow=0.49 cfs 0.094 af
12.0" Round Culvert n=0.013 L=31.0' S=0.0161 '/' Outflow=0.49 cfs 0.094 af

Pond 211P: DMH 211P Peak Elev=473.56' Inflow=0.55 cfs 0.069 af
18.0" Round Culvert n=0.013 L=128.0' S=0.0078 '/' Outflow=0.55 cfs 0.069 af

Pond 212P: DMH 212P Peak Elev=479.57' Inflow=0.55 cfs 0.069 af
18.0" Round Culvert n=0.013 L=43.0' S=0.0988 '/' Outflow=0.55 cfs 0.069 af

Pond 213P: DMH 213P Peak Elev=488.37' Inflow=0.55 cfs 0.069 af
18.0" Round Culvert n=0.013 L=38.0' S=0.1066 '/' Outflow=0.55 cfs 0.069 af

Pond 214P: CB 214P Peak Elev=497.82' Inflow=0.55 cfs 0.069 af
18.0" Round Culvert n=0.013 L=45.0' S=0.0989 '/' Outflow=0.55 cfs 0.069 af

Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1 Inflow=0.04 cfs 0.006 af
Primary=0.04 cfs 0.006 af

Total Runoff Area = 17.143 ac Runoff Volume = 0.750 af Average Runoff Depth = 0.52"
91.11% Pervious = 15.620 ac 8.89% Impervious = 1.523 ac

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Flow to CB 10P Runoff Area=138,730 sf 3.23% Impervious Runoff Depth>0.82"
Flow Length=1,135' Tc=17.9 min CN=WQ Runoff=1.93 cfs 0.219 af

Subcatchment20S: Flow to CB 20P Runoff Area=102,298 sf 14.98% Impervious Runoff Depth>1.40"
Flow Length=578' Tc=20.3 min CN=WQ Runoff=2.27 cfs 0.274 af

Subcatchment22S: Flow to Pond 22P Runoff Area=77,035 sf 6.46% Impervious Runoff Depth>1.18"
Flow Length=363' Tc=9.5 min CN=WQ Runoff=1.93 cfs 0.174 af

Subcatchment23S: Flow to Pond 22P Runoff Area=30,554 sf 77.32% Impervious Runoff Depth>3.01"
Flow Length=412' Tc=6.0 min CN=WQ Runoff=2.17 cfs 0.176 af

Subcatchment30S: Flow to CB 30P Runoff Area=21,407 sf 23.53% Impervious Runoff Depth>2.25"
Flow Length=310' Slope=0.0100 '/' Tc=17.8 min CN=WQ Runoff=0.87 cfs 0.092 af

Subcatchment40S: Flow to CB 40P Runoff Area=6,946 sf 32.42% Impervious Runoff Depth>2.42"
Flow Length=126' Tc=6.3 min CN=WQ Runoff=0.42 cfs 0.032 af

Subcatchment41S: Flow to 41P Runoff Area=28,634 sf 1.45% Impervious Runoff Depth>0.64"
Flow Length=142' Tc=8.4 min CN=WQ Runoff=0.40 cfs 0.035 af

Subcatchment42S: Flow to CB 42P Runoff Area=6,835 sf 27.53% Impervious Runoff Depth>1.31"
Flow Length=128' Tc=8.1 min CN=WQ Runoff=0.19 cfs 0.017 af

Subcatchment43S: Flow to CB 43P Runoff Area=19,681 sf 12.09% Impervious Runoff Depth>1.04"
Flow Length=358' Tc=11.6 min CN=WQ Runoff=0.37 cfs 0.039 af

Subcatchment44S: Flow to CB 44P Runoff Area=1,963 sf 13.91% Impervious Runoff Depth>1.22"
Flow Length=54' Slope=0.1400 '/' Tc=6.0 min CN=WQ Runoff=0.05 cfs 0.005 af

Subcatchment45S: Flow to CB 45P Runoff Area=15,485 sf 4.70% Impervious Runoff Depth>0.94"
Flow Length=159' Tc=9.9 min CN=WQ Runoff=0.27 cfs 0.028 af

Subcatchment46S: Flow to CB 46P Runoff Area=201,304 sf 2.48% Impervious Runoff Depth>0.65"
Flow Length=1,111' Tc=17.7 min CN=WQ Runoff=1.79 cfs 0.250 af

Subcatchment50S: Flow to Abutter Runoff Area=11,007 sf 0.00% Impervious Runoff Depth>0.74"
Flow Length=213' Tc=10.6 min CN=WQ Runoff=0.13 cfs 0.016 af

Subcatchment214S: Flow to DCB 214 Runoff Area=84,870 sf 0.00% Impervious Runoff Depth>1.02"
Flow Length=816' Tc=15.2 min CN=WQ Runoff=1.49 cfs 0.166 af

Reach 20R: Overland Flow to 20P Avg. Flow Depth=0.09' Max Vel=5.23 fps Inflow=1.26 cfs 0.156 af
n=0.013 L=244.0' S=0.0922 '/' Capacity=1,102.26 cfs Outflow=1.26 cfs 0.156 af

Reach 46R: Flow from Driveway Culvert Avg. Flow Depth=0.90' Max Vel=0.54 fps Inflow=1.79 cfs 0.250 af
n=0.150 L=50.0' S=0.0074 '/' Capacity=12.13 cfs Outflow=1.78 cfs 0.249 af

Reach 210R: Overland Flow to 20P Avg. Flow Depth=0.09' Max Vel=5.38 fps Inflow=1.50 cfs 0.166 af
n=0.013 L=486.0' S=0.0874 '/' Capacity=1,073.41 cfs Outflow=1.48 cfs 0.166 af

Pond 10P: Existing CB Inflow=1.93 cfs 0.219 af
Primary=1.93 cfs 0.219 af

Pond 20P: Existing CB Inflow=4.32 cfs 0.596 af
Primary=4.32 cfs 0.596 af

Pond 21P: Infiltration Basin Peak Elev=469.69' Storage=3,267 cf Inflow=1.42 cfs 0.346 af
Discarded=0.12 cfs 0.135 af Primary=1.26 cfs 0.156 af Outflow=1.38 cfs 0.291 af

Pond 22P: Pocket Pond 22P Peak Elev=470.82' Storage=7,287 cf Inflow=3.90 cfs 0.350 af
Outflow=1.42 cfs 0.346 af

Pond 30P: Existing CB Inflow=0.87 cfs 0.092 af
Primary=0.87 cfs 0.092 af

Pond 40P: Existing CB Inflow=2.13 cfs 0.399 af
Primary=2.13 cfs 0.399 af

Pond 41P: Pocket Pond 41P Peak Elev=440.94' Storage=7,578 cf Inflow=1.25 cfs 0.124 af
Outflow=0.20 cfs 0.117 af

Pond 42P: CB 42P Peak Elev=443.74' Inflow=0.86 cfs 0.089 af
18.0" Round Culvert n=0.013 L=17.0' S=0.0782 '/' Outflow=0.86 cfs 0.089 af

Pond 43P: CB 43P Peak Elev=446.02' Inflow=0.68 cfs 0.072 af
18.0" Round Culvert n=0.013 L=38.0' S=0.0526 '/' Outflow=0.68 cfs 0.072 af

Pond 44P: DMH 44P Peak Elev=453.26' Inflow=0.32 cfs 0.032 af
15.0" Round Culvert n=0.013 L=79.0' S=0.0886 '/' Outflow=0.32 cfs 0.032 af

Pond 45P: CB 45P Peak Elev=466.04' Inflow=0.27 cfs 0.028 af
15.0" Round Culvert n=0.013 L=64.0' S=0.1219 '/' Outflow=0.27 cfs 0.028 af

Pond 46P: Driveway Culvert Peak Elev=431.83' Inflow=1.79 cfs 0.250 af
12.0" Round Culvert n=0.013 L=31.0' S=0.0161 '/' Outflow=1.79 cfs 0.250 af

Pond 211P: DMH 211P Peak Elev=473.64' Inflow=1.49 cfs 0.166 af
18.0" Round Culvert n=0.013 L=128.0' S=0.0078 '/' Outflow=1.50 cfs 0.166 af

Pond 212P: DMH 212P Peak Elev=479.80' Inflow=1.49 cfs 0.166 af
18.0" Round Culvert n=0.013 L=43.0' S=0.0988 '/' Outflow=1.49 cfs 0.166 af

Pond 213P: DMH 213P Peak Elev=488.60' Inflow=1.49 cfs 0.166 af
18.0" Round Culvert n=0.013 L=38.0' S=0.1066 '/' Outflow=1.49 cfs 0.166 af

Pond 214P: CB 214P Peak Elev=498.05' Inflow=1.49 cfs 0.166 af
18.0" Round Culvert n=0.013 L=45.0' S=0.0989 '/' Outflow=1.49 cfs 0.166 af

Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1 Inflow=0.13 cfs 0.016 af
Primary=0.13 cfs 0.016 af

Total Runoff Area = 17.143 ac Runoff Volume = 1.523 af Average Runoff Depth = 1.07"
91.11% Pervious = 15.620 ac 8.89% Impervious = 1.523 ac

Summary for Subcatchment 10S: Flow to CB 10P

Runoff = 1.93 cfs @ 12.26 hrs, Volume= 0.219 af, Depth> 0.82"
Routed to Pond 10P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
3,674	98	Paved parking, HSG B
6,224	61	>75% Grass cover, Good, HSG B
801	98	Water Surface, HSG C
49,768	30	Woods, Good, HSG A
39,726	55	Woods, Good, HSG B
38,537	77	Woods, Good, HSG D
138,730		Weighted Average
134,255		96.77% Pervious Area
4,475		3.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.2100	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
8.9	1,035	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.9	1,135	Total			

Summary for Subcatchment 20S: Flow to CB 20P

Runoff = 2.27 cfs @ 12.29 hrs, Volume= 0.274 af, Depth> 1.40"
Routed to Pond 20P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
8,155	98	Paved parking, HSG B
7,166	98	Water Surface, HSG C
4,336	39	>75% Grass cover, Good, HSG A
9,309	61	>75% Grass cover, Good, HSG B
12,295	80	>75% Grass cover, Good, HSG D
5,715	30	Woods, Good, HSG A
38,271	55	Woods, Good, HSG B
17,051	77	Woods, Good, HSG D
102,298		Weighted Average
86,977		85.02% Pervious Area
15,321		14.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
5.5	478	0.0840	1.45		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.3	578	Total			

Summary for Subcatchment 22S: Flow to Pond 22P

Runoff = 1.93 cfs @ 12.14 hrs, Volume= 0.174 af, Depth> 1.18"
Routed to Pond 22P : Pocket Pond 22P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
469	98	Paved parking, HSG A
31	98	Paved parking, HSG B
11,648	39	>75% Grass cover, Good, HSG A
24,828	61	>75% Grass cover, Good, HSG B
13,798	80	>75% Grass cover, Good, HSG D
1,564	30	Woods, Good, HSG A
11,521	55	Woods, Good, HSG B
8,700	77	Woods, Good, HSG D
1,268	98	Roofs, HSG A
3,178	98	Roofs, HSG B
30	98	Roofs, HSG D
77,035		Weighted Average
72,059		93.54% Pervious Area
4,976		6.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.3400	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
2.1	263	0.1790	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	363	Total			

Summary for Subcatchment 23S: Flow to Pond 22P

Runoff = 2.17 cfs @ 12.08 hrs, Volume= 0.176 af, Depth> 3.01"
Routed to Pond 22P : Pocket Pond 22P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
4,494	39	>75% Grass cover, Good, HSG A
2,436	61	>75% Grass cover, Good, HSG B
1,562	98	Roofs, HSG A
3,736	98	Roofs, HSG B
10,202	98	Paved parking, HSG A
8,124	98	Paved parking, HSG B
30,554		Weighted Average
6,930		22.68% Pervious Area
23,624		77.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0100	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.78"
2.1	312	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8	412	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 30S: Flow to CB 30P

Runoff = 0.87 cfs @ 12.24 hrs, Volume= 0.092 af, Depth> 2.25"
Routed to Pond 30P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
5,038	98	Paved parking, HSG A
214	61	>75% Grass cover, Good, HSG B
4,495	80	>75% Grass cover, Good, HSG D
995	30	Woods, Good, HSG A
10,665	77	Woods, Good, HSG D
21,407		Weighted Average
16,369		76.47% Pervious Area
5,038		23.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.78"
6.2	260	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.8	310	Total			

Summary for Subcatchment 40S: Flow to CB 40P

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af, Depth> 2.42"
Routed to Pond 40P : Existing CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
739	39	>75% Grass cover, Good, HSG A
3,955	80	>75% Grass cover, Good, HSG D
320	98	Paved parking, HSG D
1,932	98	Paved parking, HSG A
6,946		Weighted Average
4,694		67.58% Pervious Area
2,252		32.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0800	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.78"
0.3	26	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.3	126	Total			

Summary for Subcatchment 41S: Flow to 41P

Runoff = 0.40 cfs @ 12.13 hrs, Volume= 0.035 af, Depth> 0.64"
Routed to Pond 41P : Pocket Pond 41P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
414	98	Paved parking, HSG A
11,228	39	>75% Grass cover, Good, HSG A
5,692	61	>75% Grass cover, Good, HSG B
5,134	80	>75% Grass cover, Good, HSG D
4,589	30	Woods, Good, HSG A
1,576	55	Woods, Good, HSG B
1	77	Woods, Good, HSG D
28,634		Weighted Average
28,220		98.55% Pervious Area
414		1.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	91	0.2200	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
0.2	51	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.4	142	Total			

Summary for Subcatchment 42S: Flow to CB 42P

Runoff = 0.19 cfs @ 12.11 hrs, Volume= 0.017 af, Depth> 1.31"
Routed to Pond 42P : CB 42P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
1,038	98	Paved parking, HSG A
844	98	Paved parking, HSG B
3,444	39	>75% Grass cover, Good, HSG A
1,216	61	>75% Grass cover, Good, HSG B
293	80	>75% Grass cover, Good, HSG D
6,835		Weighted Average
4,953		72.47% Pervious Area
1,882		27.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.2800	0.21		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
0.1	28	0.1070	4.91		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.1	128	Total			

Summary for Subcatchment 43S: Flow to CB 43P

Runoff = 0.37 cfs @ 12.17 hrs, Volume= 0.039 af, Depth> 1.04"
Routed to Pond 43P : CB 43P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
2,222	98	Paved parking, HSG A
158	98	Paved parking, HSG B
2,678	39	>75% Grass cover, Good, HSG A
3,936	61	>75% Grass cover, Good, HSG B
1,094	80	>75% Grass cover, Good, HSG D
9,131	55	Woods, Good, HSG B
462	77	Woods, Good, HSG D
19,681		Weighted Average
17,301		87.91% Pervious Area
2,380		12.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1500	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
0.9	126	0.2220	2.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	132	0.1212	5.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
11.6	358	Total			

Summary for Subcatchment 44S: Flow to CB 44P

Runoff = 0.05 cfs @ 12.10 hrs, Volume= 0.005 af, Depth> 1.22"
Routed to Pond 44P : DMH 44P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
56	39	>75% Grass cover, Good, HSG A
39	98	Paved parking, HSG A
234	98	Paved parking, HSG B
1,634	61	>75% Grass cover, Good, HSG B
1,963		Weighted Average
1,690		86.09% Pervious Area
273		13.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	54	0.1400	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.78"
2.9	54	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 45S: Flow to CB 45P

Runoff = 0.27 cfs @ 12.16 hrs, Volume= 0.028 af, Depth> 0.94"
Routed to Pond 45P : CB 45P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
728	98	Paved parking, HSG B
9,066	61	>75% Grass cover, Good, HSG B
621	80	>75% Grass cover, Good, HSG D
4,893	55	Woods, Good, HSG B
177	77	Woods, Good, HSG D
15,485		Weighted Average
14,757		95.30% Pervious Area
728		4.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
0.3	59	0.2540	3.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	159	Total			

Summary for Subcatchment 46S: Flow to CB 46P

Runoff = 1.79 cfs @ 12.30 hrs, Volume= 0.250 af, Depth> 0.65"
Routed to Pond 46P : Driveway Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
4,985	98	Paved parking, HSG A
13	98	Paved parking, HSG D
8,657	39	>75% Grass cover, Good, HSG A
8,295	61	>75% Grass cover, Good, HSG B
2,562	80	>75% Grass cover, Good, HSG D
22,605	30	Woods, Good, HSG A
144,199	55	Woods, Good, HSG B
1,414	96	Gravel surface, HSG B
8,574	77	Woods, Good, HSG D
201,304		Weighted Average
196,306		97.52% Pervious Area
4,998		2.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.2100	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
8.7	1,011	0.1500	1.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
17.7	1,111	Total			

Summary for Subcatchment 50S: Flow to Abutter

Runoff = 0.13 cfs @ 12.18 hrs, Volume= 0.016 af, Depth> 0.74"
Routed to Link 50L : Flow to Abutters Map 7 Lots 36 & 36-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
506	96	Gravel surface, HSG B
485	77	Woods, Good, HSG D
10,016	55	Woods, Good, HSG B
11,007		Weighted Average
11,007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
1.0	113	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	213	Total			

Summary for Subcatchment 214S: Flow to DCB 214

Runoff = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af, Depth> 1.02"
Routed to Pond 214P : CB 214P

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.04"

Area (sf)	CN	Description
4,107	61	>75% Grass cover, Good, HSG B
235	80	>75% Grass cover, Good, HSG D
50,341	55	Woods, Good, HSG B
30,187	77	Woods, Good, HSG D
84,870		Weighted Average
84,870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.2100	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.78"
6.2	716	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.2	816	Total			

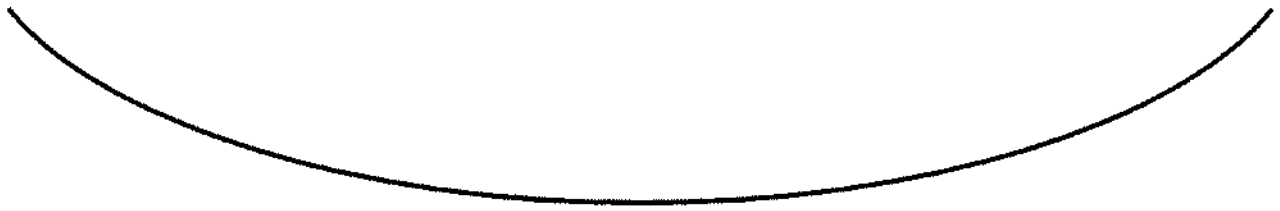
Summary for Reach 20R: Overland Flow to 20P

Inflow Area = 2.470 ac, 26.58% Impervious, Inflow Depth = 0.76" for 10 yr event
Inflow = 1.26 cfs @ 12.54 hrs, Volume= 0.156 af
Outflow = 1.26 cfs @ 12.55 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.5 min
Routed to Pond 20P : Existing CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Max. Velocity= 5.23 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.02 fps, Avg. Travel Time= 1.3 min

Peak Storage= 59 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 4.16'
Defined Flood Depth= 2.25' Flow Area= 31.7 sf, Capacity= 1,396.82 cfs
Bank-Full Depth= 2.00' Flow Area= 26.7 sf, Capacity= 1,102.26 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.013 Corrugated PE, smooth interior
Length= 244.0' Slope= 0.0922 '/'
Inlet Invert= 453.50', Outlet Invert= 431.00'



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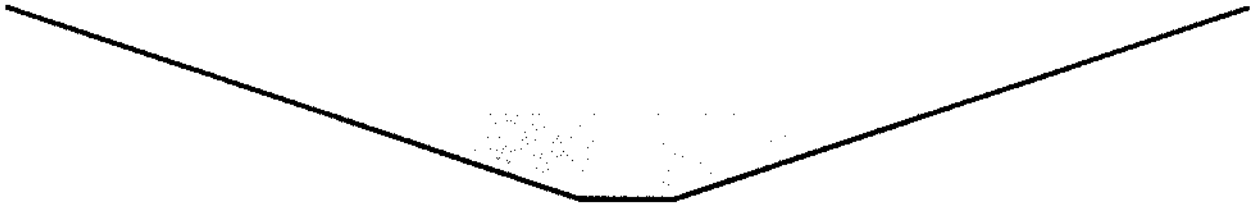
Summary for Reach 46R: Flow from Driveway Culvert 46P to 40P

Inflow Area = 4.621 ac, 2.48% Impervious, Inflow Depth > 0.65" for 10 yr event
Inflow = 1.79 cfs @ 12.30 hrs, Volume= 0.250 af
Outflow = 1.78 cfs @ 12.32 hrs, Volume= 0.249 af, Atten= 1%, Lag= 1.3 min
Routed to Pond 40P : Existing CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Max. Velocity= 0.54 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.21 fps, Avg. Travel Time= 3.9 min

Peak Storage= 167 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.90' , Surface Width= 6.40'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 12.13 cfs

1.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 13.00'
Length= 50.0' Slope= 0.0074 '/'
Inlet Invert= 430.50', Outlet Invert= 430.13'



Summary for Reach 210R: Overland Flow to 20P

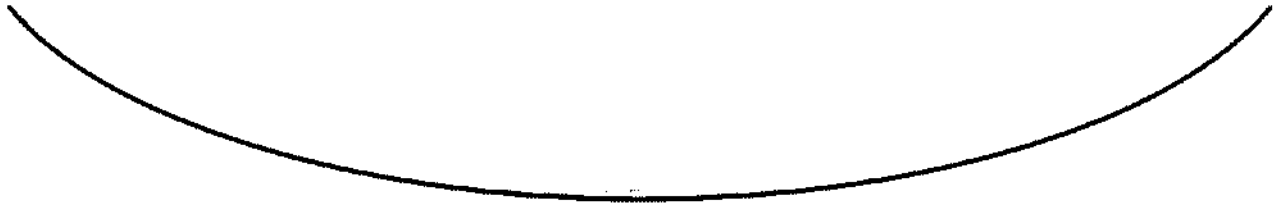
[80] Warning: Exceeded Pond 211P by 2.09' @ 0.00 hrs (9.57 cfs 1.719 af)

Inflow Area = 1.948 ac, 0.00% Impervious, Inflow Depth > 1.02" for 10 yr event
Inflow = 1.50 cfs @ 12.22 hrs, Volume= 0.166 af
Outflow = 1.48 cfs @ 12.25 hrs, Volume= 0.166 af, Atten= 1%, Lag= 1.9 min
Routed to Pond 20P : Existing CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Max. Velocity= 5.38 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.40 fps, Avg. Travel Time= 3.4 min

Peak Storage= 134 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 4.35'
Defined Flood Depth= 2.25' Flow Area= 31.7 sf, Capacity= 1,360.25 cfs
Bank-Full Depth= 2.00' Flow Area= 26.7 sf, Capacity= 1,073.41 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.013 Corrugated PE, smooth interior
Length= 486.0' Slope= 0.0874 '/'
Inlet Invert= 473.50', Outlet Invert= 431.00'



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Summary for Pond 10P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.185 ac, 3.23% Impervious, Inflow Depth > 0.82" for 10 yr event
Inflow = 1.93 cfs @ 12.26 hrs, Volume= 0.219 af
Primary = 1.93 cfs @ 12.26 hrs, Volume= 0.219 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 20P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.767 ac, 14.90% Impervious, Inflow Depth > 1.06" for 10 yr event
Inflow = 4.32 cfs @ 12.38 hrs, Volume= 0.596 af
Primary = 4.32 cfs @ 12.38 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 21P: Infiltration Basin

Inflow Area = 2.470 ac, 26.58% Impervious, Inflow Depth > 1.68" for 10 yr event
Inflow = 1.42 cfs @ 12.29 hrs, Volume= 0.346 af
Outflow = 1.38 cfs @ 12.54 hrs, Volume= 0.291 af, Atten= 3%, Lag= 14.7 min
Discarded = 0.12 cfs @ 12.54 hrs, Volume= 0.135 af
Primary = 1.26 cfs @ 12.54 hrs, Volume= 0.156 af
Routed to Reach 20R : Overland Flow to 20P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 469.69' @ 12.54 hrs Surf.Area= 1,784 sf Storage= 3,267 cf
Flood Elev= 470.00' Surf.Area= 1,983 sf Storage= 3,854 cf

Plug-Flow detention time= 129.4 min calculated for 0.291 af (84% of inflow)
Center-of-Mass det. time= 61.9 min (889.7 - 827.8)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	3,854 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)
466.00	238	61.0	0	0	238
468.00	887	160.0	1,056	1,056	1,993
470.00	1,983	201.0	2,797	3,854	3,225

Device	Routing	Invert	Outlet Devices
#1	Discarded	466.00'	**3.000 in/hr Exfiltration over Surface area**
#2	Primary	465.00'	**18.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.00' / 464.75' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	469.50'	**18.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	469.75'	**4.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.12 cfs @ 12.54 hrs HW=469.69' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=1.26 cfs @ 12.54 hrs HW=469.69' TW=453.59' (Dynamic Tailwater)
├**2=Culvert** (Passes 1.26 cfs of 16.89 cfs potential flow)
│└**3=Grate** (Weir Controls 1.26 cfs @ 1.42 fps)
└**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 22P: Pocket Pond 22P

Inflow Area = 2.470 ac, 26.58% Impervious, Inflow Depth > 1.70" for 10 yr event
Inflow = 3.90 cfs @ 12.11 hrs, Volume= 0.350 af
Outflow = 1.42 cfs @ 12.29 hrs, Volume= 0.346 af, Atten= 63%, Lag= 11.2 min
Primary = 1.42 cfs @ 12.29 hrs, Volume= 0.346 af
Routed to Pond 21P : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Starting Elev= 469.35' Surf.Area= 1,957 sf Storage= 3,827 cf
Peak Elev= 470.82' @ 12.45 hrs Surf.Area= 3,113 sf Storage= 7,287 cf (3,461 cf above start)
Flood Elev= 472.00' Surf.Area= 5,592 sf Storage= 12,066 cf (8,239 cf above start)

Plug-Flow detention time= 192.2 min calculated for 0.257 af (73% of inflow)
Center-of-Mass det. time= 30.8 min (827.8 - 796.9)

Volume	Invert	Avail.Storage	Storage Description
#1	469.00'	0 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) 292 cf Overall x 0.0% Voids
#2	466.00'	12,066 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		12,066 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
469.00	3	16.6	0	0	3
470.00	135	65.6	53	53	326
471.00	363	86.1	240	292	585

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
466.00	492	103.6	0	0	492
468.00	1,258	151.6	1,691	1,691	1,500
470.00	2,304	194.4	3,510	5,201	2,728
471.00	2,916	213.3	2,604	7,805	3,374
471.50	4,482	493.2	1,836	9,640	19,111
472.00	5,229	502.6	2,425	12,066	19,897

Device	Routing	Invert	Outlet Devices
#1	Primary	469.00'	**12.0" Round Culvert** L= 21.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 469.00' / 468.00' S= 0.0476 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	469.35'	**5.0" Vert. 5" Orifices X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	470.80'	**5.0" Vert. 5" Orifices X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	471.25'	**Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.40 Width (feet) 0.75 0.75
#5	Device 1	471.65'	**2.0" x 2.0" Horiz. Grate X 10.00 columns** X 10 rows C= 0.600 in 36.0" x 36.0" Grate (31% open area) Limited to weir flow at low heads
#6	Primary	471.65'	**4.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.43 cfs @ 12.29 hrs HW=470.75' TW=469.56' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.43 cfs of 4.12 cfs potential flow)
  - **2=5" Orifices** (Orifice Controls 1.43 cfs @ 5.24 fps)
  - **3=5" Orifices** (Controls 0.00 cfs)
  - **4=Weir** (Controls 0.00 cfs)
  - **5=Grate** (Controls 0.00 cfs)
- **6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 30P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.491 ac, 23.53% Impervious, Inflow Depth > 2.25" for 10 yr event
Inflow = 0.87 cfs @ 12.24 hrs, Volume= 0.092 af
Primary = 0.87 cfs @ 12.24 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 40P: Existing CB

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.447 ac, 4.60% Impervious, Inflow Depth > 0.74" for 10 yr event
Inflow = 2.13 cfs @ 12.31 hrs, Volume= 0.399 af
Primary = 2.13 cfs @ 12.31 hrs, Volume= 0.399 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Summary for Pond 41P: Pocket Pond 41P

Inflow Area = 1.667 ac, 7.82% Impervious, Inflow Depth > 0.89" for 10 yr event
Inflow = 1.25 cfs @ 12.14 hrs, Volume= 0.124 af
Outflow = 0.20 cfs @ 12.96 hrs, Volume= 0.117 af, Atten= 84%, Lag= 48.9 min
Primary = 0.20 cfs @ 12.96 hrs, Volume= 0.117 af
Routed to Pond 40P : Existing CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Starting Elev= 440.10' Surf.Area= 2,413 sf Storage= 5,532 cf
Peak Elev= 440.94' @ 12.96 hrs Surf.Area= 3,001 sf Storage= 7,578 cf (2,046 cf above start)
Flood Elev= 442.00' Surf.Area= 3,520 sf Storage= 10,747 cf (5,215 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 114.7 min (952.8 - 838.1)

Volume	Invert	Avail.Storage	Storage Description
#1	438.50'	0 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) 245 cf Overall x 0.0% Voids
#2	434.00'	10,747 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		10,747 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
438.50	7	13.1	0	0	7
440.50	313	89.1	245	245	633

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
434.00	64	44.5	0	0	64
436.00	472	91.7	473	473	593
438.00	1,164	139.2	1,585	2,058	1,496
440.00	2,142	186.2	3,257	5,315	2,756
441.50	3,044	214.5	3,870	9,184	3,707
442.00	3,207	219.2	1,563	10,747	3,902

Device	Routing	Invert	Outlet Devices
#1	Primary	437.00'	**18.0" Round Culvert** L= 24.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 437.00' / 435.00' S= 0.0833 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	440.10'	**3.0" Vert. 3" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	441.50'	**18.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 12.96 hrs HW=440.94' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.20 cfs of 15.20 cfs potential flow)
  ├─**2=3" Orifice** (Orifice Controls 0.20 cfs @ 4.07 fps)
  └─**3=Grate** (Controls 0.00 cfs)

Summary for Pond 42P: CB 42P

Inflow Area = 1.009 ac, 11.97% Impervious, Inflow Depth > 1.06" for 10 yr event
Inflow = 0.86 cfs @ 12.15 hrs, Volume= 0.089 af
Outflow = 0.86 cfs @ 12.15 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.15 hrs, Volume= 0.089 af
Routed to Pond 41P : Pocket Pond 41P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 443.74' @ 12.15 hrs
Flood Elev= 447.18'

Device	Routing	Invert	Outlet Devices
#1	Primary	443.33'	**18.0" Round Culvert** L= 17.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 443.33' / 442.00' S= 0.0782 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.86 cfs @ 12.15 hrs HW=443.74' TW=440.56' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.86 cfs @ 2.18 fps)

Summary for Pond 43P: CB 43P

Inflow Area = 0.852 ac, 9.11% Impervious, Inflow Depth > 1.01" for 10 yr event
Inflow = 0.68 cfs @ 12.16 hrs, Volume= 0.072 af
Outflow = 0.68 cfs @ 12.16 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.16 hrs, Volume= 0.072 af
Routed to Pond 42P : CB 42P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 446.02' @ 12.16 hrs
Flood Elev= 449.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	445.66'	**18.0" Round Culvert** L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.66' / 443.66' S= 0.0526 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.68 cfs @ 12.16 hrs HW=446.02' TW=443.74' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.68 cfs @ 2.05 fps)

Summary for Pond 44P: DMH 44P

Inflow Area = 0.401 ac, 5.74% Impervious, Inflow Depth > 0.97" for 10 yr event
Inflow = 0.32 cfs @ 12.15 hrs, Volume= 0.032 af
Outflow = 0.32 cfs @ 12.15 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.15 hrs, Volume= 0.032 af
Routed to Pond 43P : CB 43P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3

Peak Elev= 453.26' @ 12.15 hrs
Flood Elev= 462.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	453.00'	**15.0" Round Culvert** L= 79.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 453.00' / 446.00' S= 0.0886 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.32 cfs @ 12.15 hrs HW=453.26' TW=446.02' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.32 cfs @ 1.73 fps)

Summary for Pond 45P: CB 45P

Inflow Area = 0.355 ac, 4.70% Impervious, Inflow Depth > 0.94" for 10 yr event
Inflow = 0.27 cfs @ 12.16 hrs, Volume= 0.028 af
Outflow = 0.27 cfs @ 12.16 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.27 cfs @ 12.16 hrs, Volume= 0.028 af
Routed to Pond 44P : DMH 44P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 466.04' @ 12.16 hrs
Flood Elev= 471.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	465.80'	**15.0" Round Culvert** L= 64.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.80' / 458.00' S= 0.1219 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.27 cfs @ 12.16 hrs HW=466.04' TW=453.26' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.27 cfs @ 1.66 fps)

Summary for Pond 46P: Driveway Culvert

Inflow Area = 4.621 ac, 2.48% Impervious, Inflow Depth > 0.65" for 10 yr event
Inflow = 1.79 cfs @ 12.30 hrs, Volume= 0.250 af
Outflow = 1.79 cfs @ 12.30 hrs, Volume= 0.250 af, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.30 hrs, Volume= 0.250 af
Routed to Reach 46R : Flow from Driveway Culvert 46P to 40P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 431.83' @ 12.31 hrs
Flood Elev= 432.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	431.00'	**12.0" Round Culvert** L= 31.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 431.00' / 430.50' S= 0.0161 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.79 cfs @ 12.30 hrs HW=431.83' TW=431.40' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.79 cfs @ 3.47 fps)

Summary for Pond 211P: DMH 211P

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=195)

Inflow Area = 1.948 ac, 0.00% Impervious, Inflow Depth > 1.02" for 10 yr event
Inflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Outflow = 1.50 cfs @ 12.22 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 1.50 cfs @ 12.22 hrs, Volume= 0.166 af
Routed to Reach 210R : Overland Flow to 20P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 473.64' @ 12.25 hrs
Flood Elev= 479.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	471.25'	**18.0" Round Culvert** L= 128.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 471.25' / 470.25' S= 0.0078 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.48 cfs @ 12.22 hrs HW=473.64' TW=473.59' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.48 cfs @ 0.84 fps)

Summary for Pond 212P: DMH 212P

Inflow Area = 1.948 ac, 0.00% Impervious, Inflow Depth > 1.02" for 10 yr event
Inflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Outflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Routed to Pond 211P : DMH 211P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 479.80' @ 12.23 hrs
Flood Elev= 487.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	479.25'	**18.0" Round Culvert** L= 43.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 479.25' / 475.00' S= 0.0988 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.49 cfs @ 12.23 hrs HW=479.80' TW=473.64' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.49 cfs @ 2.53 fps)

Summary for Pond 213P: DMH 213P

Inflow Area = 1.948 ac, 0.00% Impervious, Inflow Depth > 1.02" for 10 yr event
Inflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Outflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Routed to Pond 212P : DMH 212P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 488.60' @ 12.23 hrs
Flood Elev= 497.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	488.05'	**18.0" Round Culvert** L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 488.05' / 484.00' S= 0.1066 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.49 cfs @ 12.23 hrs HW=488.60' TW=479.80' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.49 cfs @ 2.53 fps)

Summary for Pond 214P: CB 214P

Inflow Area = 1.948 ac, 0.00% Impervious, Inflow Depth > 1.02" for 10 yr event
Inflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Outflow = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.23 hrs, Volume= 0.166 af
Routed to Pond 213P : DMH 213P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 498.05' @ 12.23 hrs
Flood Elev= 504.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	497.50'	**18.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 497.50' / 493.05' S= 0.0989 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.49 cfs @ 12.23 hrs HW=498.05' TW=488.60' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.49 cfs @ 2.53 fps)

Summary for Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1

Inflow Area = 0.253 ac, 0.00% Impervious, Inflow Depth > 0.74" for 10 yr event
Inflow = 0.13 cfs @ 12.18 hrs, Volume= 0.016 af
Primary = 0.13 cfs @ 12.18 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Flow to CB 10P Runoff Area=138,730 sf 3.23% Impervious Runoff Depth>1.64"
Flow Length=1,135' Tc=17.9 min CN=WQ Runoff=4.05 cfs 0.435 af

Subcatchment20S: Flow to CB 20P Runoff Area=102,298 sf 14.98% Impervious Runoff Depth>2.58"
Flow Length=578' Tc=20.3 min CN=WQ Runoff=4.39 cfs 0.506 af

Subcatchment22S: Flow to Pond 22P Runoff Area=77,035 sf 6.46% Impervious Runoff Depth>2.31"
Flow Length=363' Tc=9.5 min CN=WQ Runoff=3.91 cfs 0.340 af

Subcatchment23S: Flow to Pond 22P Runoff Area=30,554 sf 77.32% Impervious Runoff Depth>4.58"
Flow Length=412' Tc=6.0 min CN=WQ Runoff=3.23 cfs 0.268 af

Subcatchment30S: Flow to CB 30P Runoff Area=21,407 sf 23.53% Impervious Runoff Depth>3.80"
Flow Length=310' Slope=0.0100 '/' Tc=17.8 min CN=WQ Runoff=1.48 cfs 0.156 af

Subcatchment40S: Flow to CB 40P Runoff Area=6,946 sf 32.42% Impervious Runoff Depth>3.97"
Flow Length=126' Tc=6.3 min CN=WQ Runoff=0.68 cfs 0.053 af

Subcatchment41S: Flow to 41P Runoff Area=28,634 sf 1.45% Impervious Runoff Depth>1.38"
Flow Length=142' Tc=8.4 min CN=WQ Runoff=0.83 cfs 0.075 af

Subcatchment42S: Flow to CB 42P Runoff Area=6,835 sf 27.53% Impervious Runoff Depth>2.26"
Flow Length=128' Tc=8.1 min CN=WQ Runoff=0.31 cfs 0.030 af

Subcatchment43S: Flow to CB 43P Runoff Area=19,681 sf 12.09% Impervious Runoff Depth>2.08"
Flow Length=358' Tc=11.6 min CN=WQ Runoff=0.80 cfs 0.078 af

Subcatchment44S: Flow to CB 44P Runoff Area=1,963 sf 13.91% Impervious Runoff Depth>2.40"
Flow Length=54' Slope=0.1400 '/' Tc=6.0 min CN=WQ Runoff=0.12 cfs 0.009 af

Subcatchment45S: Flow to CB 45P Runoff Area=15,485 sf 4.70% Impervious Runoff Depth>2.04"
Flow Length=159' Tc=9.9 min CN=WQ Runoff=0.69 cfs 0.060 af

Subcatchment46S: Flow to CB 46P Runoff Area=201,304 sf 2.48% Impervious Runoff Depth>1.51"
Flow Length=1,111' Tc=17.7 min CN=WQ Runoff=5.09 cfs 0.581 af

Subcatchment50S: Flow to Abutter Runoff Area=11,007 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=213' Tc=10.6 min CN=WQ Runoff=0.39 cfs 0.036 af

Subcatchment214S: Flow to DCB 214 Runoff Area=84,870 sf 0.00% Impervious Runoff Depth>2.16"
Flow Length=816' Tc=15.2 min CN=WQ Runoff=3.51 cfs 0.351 af

Reach 20R: Overland Flow to 20P Avg. Flow Depth=0.13' Max Vel=6.74 fps Inflow=2.90 cfs 0.383 af
n=0.013 L=244.0' S=0.0922 '/' Capacity=1,102.26 cfs Outflow=2.90 cfs 0.383 af

Reach 46R: Flow from Driveway Culvert Avg. Flow Depth=1.40' Max Vel=0.70 fps Inflow=5.09 cfs 0.581 af
n=0.150 L=50.0' S=0.0074 '/' Capacity=12.13 cfs Outflow=5.08 cfs 0.580 af

Reach 210R: Overland Flow to 20P Avg. Flow Depth=0.14' Max Vel=6.99 fps Inflow=3.53 cfs 0.351 af
n=0.013 L=486.0' S=0.0874 '/' Capacity=1,073.41 cfs Outflow=3.50 cfs 0.351 af

Pond 10P: Existing CB Inflow=4.05 cfs 0.435 af
Primary=4.05 cfs 0.435 af

Pond 20P: Existing CB Inflow=10.38 cfs 1.239 af
Primary=10.38 cfs 1.239 af

Pond 21P: Infiltration Basin Peak Elev=469.82' Storage=3,500 cf Inflow=3.04 cfs 0.600 af
Discarded=0.13 cfs 0.150 af Primary=2.90 cfs 0.383 af Outflow=3.03 cfs 0.533 af

Pond 22P: Pocket Pond 22P Peak Elev=471.53' Storage=9,791 cf Inflow=6.85 cfs 0.608 af
Outflow=3.04 cfs 0.600 af

Pond 30P: Existing CB Inflow=1.48 cfs 0.156 af
Primary=1.48 cfs 0.156 af

Pond 40P: Existing CB Inflow=5.64 cfs 0.873 af
Primary=5.64 cfs 0.873 af

Pond 41P: Pocket Pond 41P Peak Elev=441.62' Storage=9,542 cf Inflow=2.68 cfs 0.253 af
Outflow=0.89 cfs 0.239 af

Pond 42P: CB 42P Peak Elev=443.95' Inflow=1.87 cfs 0.177 af
18.0" Round Culvert n=0.013 L=17.0' S=0.0782 '/' Outflow=1.87 cfs 0.177 af

Pond 43P: CB 43P Peak Elev=446.23' Inflow=1.58 cfs 0.148 af
18.0" Round Culvert n=0.013 L=38.0' S=0.0526 '/' Outflow=1.58 cfs 0.148 af

Pond 44P: DMH 44P Peak Elev=453.42' Inflow=0.78 cfs 0.069 af
15.0" Round Culvert n=0.013 L=79.0' S=0.0886 '/' Outflow=0.78 cfs 0.069 af

Pond 45P: CB 45P Peak Elev=466.19' Inflow=0.69 cfs 0.060 af
15.0" Round Culvert n=0.013 L=64.0' S=0.1219 '/' Outflow=0.69 cfs 0.060 af

Pond 46P: Driveway Culvert Peak Elev=433.71' Inflow=5.09 cfs 0.581 af
12.0" Round Culvert n=0.013 L=31.0' S=0.0161 '/' Outflow=5.09 cfs 0.581 af

Pond 211P: DMH 211P Peak Elev=473.88' Inflow=3.51 cfs 0.351 af
18.0" Round Culvert n=0.013 L=128.0' S=0.0078 '/' Outflow=3.53 cfs 0.351 af

Pond 212P: DMH 212P Peak Elev=480.14' Inflow=3.51 cfs 0.351 af
18.0" Round Culvert n=0.013 L=43.0' S=0.0988 '/' Outflow=3.51 cfs 0.351 af

Pond 213P: DMH 213P Peak Elev=488.94' Inflow=3.51 cfs 0.351 af
18.0" Round Culvert n=0.013 L=38.0' S=0.1066 '/' Outflow=3.51 cfs 0.351 af

Pond 214P: CB 214P Peak Elev=498.39' Inflow=3.51 cfs 0.351 af
18.0" Round Culvert n=0.013 L=45.0' S=0.0989 '/' Outflow=3.51 cfs 0.351 af

Link 50L: Flow to Abutters Map 7 Lots 36 & 36-1

Inflow=0.39 cfs 0.036 af
Primary=0.39 cfs 0.036 af

Total Runoff Area = 17.143 ac Runoff Volume = 2.978 af Average Runoff Depth = 2.08"
91.11% Pervious = 15.620 ac 8.89% Impervious = 1.523 ac

19. RIPRAP APRON CALCULATIONS

KNA KEACH-NORDSTROM ASSOCIATES, INC.

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project: Jennesstown Manor — Date: 5/27/2025
KNA #: 24-0397-1

The purpose of this spreadsheet is to calculate the dimensions of Inlet/Outlet Protection apron (riprap) required during the SCS/NRCS 50-year type III 24-hr storm event. The spillway weir(s) inlet/outlet apron protection will be sized for the SCS/NRCS 50-year type III 24-hr storm event.

Required Input:

Q	peak flow in CFS
Do	diameter in feet of outlet or width of channel
Tw	tail water at end of apron

Depending on the tail water conditions, either column 1 or column 2 is used for calculations

	Column One where Tw<1/2Do	Column Two where Tw>1/2Do
Length of Apron	La = (1.8Q/Do^3/2)+7Do	La = 3*Q/Do^3/2+7Do
Width of Apron at outfall	W1 = 3*Do W2 = 3*Do + La	W1 = 3*Do W2 = 3*Do+0.4*La

If defined channel, then use channel width for W1 and W2

Rock Rip Rap Size:
d50 = (0.02*Q^4/3)/(Tw*Do)

RIRAP GRADATION ENVELOPE

Calculation Summary Table:

Input to Chart					Calculated Output						d100		d85		d50		d15			USE			
Description (Optional)		Q-25** (cfs)	Do (ft)	Tw (ft)	La	W1	W2 no channel	d50, ft	d50 in	USE d50 in.	FROM in	TO in	FROM in	TO in	FROM in	TO in	FROM in	TO in	depth in	Depth in.	Length ft.	W1 ft.	W2 ft.
41P	Pond Outlet	0.89	1.50	0.75	11	5	15	0.0	0.18	4	6	8	5	7	4	6	1	2	10	10	11	5	16
21P	Infiltration Pond Outlet	2.99	1.50	0.75	13	5	18	0.1	0.92	5	8	10	7	9	5	8	2	3	12.5	13	13	5	18
22P	Pocket Pond Outlet	3.14	1.00	0.50	13	3	16	0.2	2.21	6	9	12	8	11	6	9	2	3	15	15	13	3	16
211P	Outlet Head Wall #210	2.99	1.50	0.75	13	5	18	0.1	0.92	3	5	6	4	5	3	5	1	2	7.5	8	13	5	18

* Center Apron with Headwall and Outlet Pipe (All Cases)
* Line Apron with 6.0 oz. Geotextile Fabric (All Cases)
**Q-100 Used When no Flow is Present in the Q-10

20. SWALE RIPRAP CALCULATIONS

Rockingham County Conservation District

OPEN CHANNEL FLOW DESIGN/ANALYSIS

D_{50} RIPRAP SIZING-FLOW REGIME-FILTER GRADATION CHECK

PROJECT NAME :	Jennesstown Manor, Warner, NH				
PROJECT # :	Driveway Ditch 46S to 46P				
BY :	JL		CHECKED BY :		
DATE :	5/22/2025	STORM:	25-Yr	DATE :	

UNIFORM STEADY CHANNEL FLOW:

PEAK DISCHARGE REQUIRED =	3.4	CFS
CHANNEL BOTTOM WIDTH =	0.0	FT (USE 0 IF SECTION IS A "V" DITCH)
HYDRAULIC GRADIENT =	0.15000	FT/FT
LEFT SIDE SLOPE =	2.0	:1
RIGHT SIDE SLOPE =	2.0	:1
DEPTH OF FLOW =	0.700	FT
MANNINGS "n" =	0.5321	(CHECK RIPRAP SIZING "n" BELOW)
AREA =	0.98	SQ FT
WETTED PERIMETER =	3.13	FT
HYDRAULIC RADIUS =	0.31	FT
TOP WIDTH =	2.80	FT
VELOCITY =	0.50	FT/SEC
PEAK DISC. DETERMINED =	0.5	CFS

RIPRAP SIZING, TRAPEZOIDAL SECTION:

D_{50} =	0.3893	FT
NEW "n" =	0.0483	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

RIPRAP SIZING, "V" DITCH:

D_{50} =	0.5320	FT
NEW "n" =	0.0497	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

FLOW REGIME:

		Nf <=0.7, SUB CRITICAL FLOW
Nf =	0.149	Nf >0.7 BUT <1.3, CRITICAL FLOW ZONE
		Nf >1.3, SUPER CRITICAL FLOW

IF Nf>=0.7 A HYDRAULIC JUMP WILL PROBABLY OCCUR, DESIGN ACCORDINGLY

TO AVOID MOVEMENT OF PARTICLES:

Filter fabric required beneath the rock

FORMULAS USED:

UNIFORM CHANNEL FLOW, Q = (A X 1.486 X R^(2/3) X S^(1/2))/"n"

FLOW REGIME, Nf= (Q X T^(1/2))/(A^(3/2) X g^(1/2))

RIPRAP SIZING, TRAPEZDL., ((118 X Q X S^(13/6) X R/P)^(2/5)

RIPRAP SIZING, "V", ((64.4 X Q X S^(13/6) X (Z/(Z^2 + 1))^(2/5)

NEW RIPRAP "n", (D. OF F.^(1/6)/(21.6 X LOG(D. OF F./D50)+14)

REFERENCES: KING'S HANDBOOK OF HYDRAULICS AND NCHRP-REPORT 108

Rockingham County Conservation District

OPEN CHANNEL FLOW DESIGN/ANALYSIS

D_{50} RIPRAP SIZING-FLOW REGIME-FILTER GRADATION CHECK

PROJECT NAME :	Jennesstown Manor, Warner, NH				
PROJECT # :	Driveway Ditch 45S to 45P				
BY :	JL		CHECKED BY :		
DATE :	5/22/2025	STORM:	25-Yr	DATE :	

UNIFORM STEADY CHANNEL FLOW:

PEAK DISCHARGE REQUIRED =	0.5	CFS
CHANNEL BOTTOM WIDTH =	0.0	FT (USE 0 IF SECTION IS A "V" DITCH)
HYDRAULIC GRADIENT =	0.15000	FT/FT
LEFT SIDE SLOPE =	2.0	:1
RIGHT SIDE SLOPE =	2.0	:1
DEPTH OF FLOW =	0.480	FT
MANNINGS "n" =	0.3991	(CHECK RIPRAP SIZING "n" BELOW)
AREA =	0.46	SQ FT
WETTED PERIMETER =	2.15	FT
HYDRAULIC RADIUS =	0.21	FT
TOP WIDTH =	1.92	FT
VELOCITY =	0.52	FT/SEC
PEAK DISC. DETERMINED =	0.2	CFS

RIPRAP SIZING, TRAPEZOIDAL SECTION:

D_{50} =	0.2921	FT
NEW "n" =	0.0474	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

RIPRAP SIZING, "V" DITCH:

D_{50} =	0.3991	FT
NEW "n" =	0.0492	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

FLOW REGIME:

		Nf <=0.7, SUB CRITICAL FLOW
Nf =	0.186	Nf >0.7 BUT <1.3, CRITICAL FLOW ZONE
		Nf >1.3, SUPER CRITICAL FLOW

IF Nf>=0.7 A HYDRAULIC JUMP WILL PROBABLY OCCUR, DESIGN ACCORDINGLY

TO AVOID MOVEMENT OF PARTICLES:

Filter fabric required beneath the rock

FORMULAS USED:

UNIFORM CHANNEL FLOW, Q = (A X 1.486 X R^(2/3) X S^(1/2))/"n"

FLOW REGIME, Nf= (Q X T^(1/2))/(A^(3/2) X g^(1/2))

RIPRAP SIZING, TRAPEZDL., ((118 X Q X S^(13/6) X R/P)^(2/5)

RIPRAP SIZING, "V", ((64.4 X Q X S^(13/6) X (Z/(Z^2 + 1))^(2/5)

NEW RIPRAP "n", (D. OF F.^(1/6)/(21.6 X LOG(D. OF F./D50)+14)

REFERENCES: KING'S HANDBOOK OF HYDRAULICS AND NCHRP-REPORT 108

Rockingham County Conservation District

OPEN CHANNEL FLOW DESIGN/ANALYSIS

D_{50} RIPRAP SIZING-FLOW REGIME-FILTER GRADATION CHECK

PROJECT NAME :	Jennesstown Manor, Warner, NH				
PROJECT # :	Driveway Ditch 44S to 44P				
BY :	JL			CHECKED BY :	
DATE :	5/27/2025	STORM:	25-Yr	DATE :	

UNIFORM STEADY CHANNEL FLOW:

PEAK DISCHARGE REQUIRED =	0.1	CFS
CHANNEL BOTTOM WIDTH =	0.0	FT (USE 0 IF SECTION IS A "V" DITCH)
HYDRAULIC GRADIENT =	0.15000	FT/FT
LEFT SIDE SLOPE =	2.0	:1
RIGHT SIDE SLOPE =	2.0	:1
DEPTH OF FLOW =	0.110	FT
MANNINGS "n" =	0.1299	(CHECK RIPRAP SIZING "n" BELOW)
AREA =	0.02	SQ FT
WETTED PERIMETER =	0.49	FT
HYDRAULIC RADIUS =	0.05	FT
TOP WIDTH =	0.44	FT
VELOCITY =	0.59	FT/SEC
PEAK DISC. DETERMINED =	0.0	CFS

RIPRAP SIZING, TRAPEZOIDAL SECTION:

D_{50} =	0.0951	FT
NEW "n" =	0.0450	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

RIPRAP SIZING, "V" DITCH:

D_{50} =	0.1299	FT
NEW "n" =	0.0487	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

FLOW REGIME:

		Nf <=0.7, SUB CRITICAL FLOW
Nf =	0.447	Nf >0.7 BUT <1.3, CRITICAL FLOW ZONE
		Nf >1.3, SUPER CRITICAL FLOW

IF Nf>=0.7 A HYDRAULIC JUMP WILL PROBABLY OCCUR, DESIGN ACCORDINGLY

TO AVOID MOVEMENT OF PARTICLES:

Filter fabric required beneath the rock

FORMULAS USED:

UNIFORM CHANNEL FLOW,	Q = (A X 1.486 X R^(2/3) X S^(1/2))/"n"
FLOW REGIME,	Nf= (Q X T^(1/2))/(A^(3/2) X g^(1/2))
RIPRAP SIZING, TRAPEZDL.,	((118 X Q X S^(13/6) X R/P)^(2/5)
RIPRAP SIZING, "V",	((64.4 X Q X S^(13/6) X (Z/(Z^2 + 1))^(2/5)
NEW RIPRAP "n",	(D. OF F.^(1/6)/(21.6 X LOG(D. OF F./D50)+14)

REFERENCES: KING'S HANDBOOK OF HYDRAULICS AND NCHRP-REPORT 108

Rockingham County Conservation District

OPEN CHANNEL FLOW DESIGN/ANALYSIS

D_{50} RIPRAP SIZING-FLOW REGIME-FILTER GRADATION CHECK

PROJECT NAME :	Jennesstown Manor, Warner, NH				
PROJECT # :	Driveway Ditch 43S to 43P				
BY :	JL		CHECKED BY :		
DATE :	5/22/2025	STORM:	25-Yr	DATE :	

UNIFORM STEADY CHANNEL FLOW:

PEAK DISCHARGE REQUIRED =	0.6	CFS
CHANNEL BOTTOM WIDTH =	0.0	FT (USE 0 IF SECTION IS A "V" DITCH)
HYDRAULIC GRADIENT =	0.15000	FT/FT
LEFT SIDE SLOPE =	2.0	:1
RIGHT SIDE SLOPE =	2.0	:1
DEPTH OF FLOW =	0.360	FT
MANNINGS "n" =	0.3206	(CHECK RIPRAP SIZING "n" BELOW)
AREA =	0.26	SQ FT
WETTED PERIMETER =	1.61	FT
HYDRAULIC RADIUS =	0.16	FT
TOP WIDTH =	1.44	FT
VELOCITY =	0.53	FT/SEC
PEAK DISC. DETERMINED =	0.1	CFS

RIPRAP SIZING, TRAPEZOIDAL SECTION:

D_{50} =	0.2346	FT
NEW "n" =	0.0468	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

RIPRAP SIZING, "V" DITCH:

D_{50} =	0.3206	FT
NEW "n" =	0.0489	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

FLOW REGIME:

		Nf <=0.7, SUB CRITICAL FLOW
Nf =	0.221	Nf >0.7 BUT <1.3, CRITICAL FLOW ZONE
		Nf >1.3, SUPER CRITICAL FLOW

IF Nf>=0.7 A HYDRAULIC JUMP WILL PROBABLY OCCUR, DESIGN ACCORDINGLY

TO AVOID MOVEMENT OF PARTICLES:

Filter fabric required beneath the rock

FORMULAS USED:

UNIFORM CHANNEL FLOW, Q = (A X 1.486 X R^(2/3) X S^(1/2))/"n"
FLOW REGIME, Nf= (Q X T^(1/2))/(A^(3/2) X g^(1/2))
RIPRAP SIZING, TRAPEZDL., ((118 X Q X S^(13/6) X R/P)^(2/5)
RIPRAP SIZING, "V", ((64.4 X Q X S^(13/6) X (Z/(Z^2 + 1))^(2/5)
NEW RIPRAP "n", (D. OF F.^(1/6)/(21.6 X LOG(D. OF F./D50)+14)

REFERENCES: KING'S HANDBOOK OF HYDRAULICS AND NCHRP-REPORT 108

Rockingham County Conservation District

OPEN CHANNEL FLOW DESIGN/ANALYSIS

D_{50} RIPRAP SIZING-FLOW REGIME-FILTER GRADATION CHECK

PROJECT NAME :	Jennesstown Manor, Warner, NH				
PROJECT # :	Driveway Ditch 42S to 41P				
BY :	JL			CHECKED BY :	
DATE :	5/27/2025	STORM:	25-Yr	DATE :	

UNIFORM STEADY CHANNEL FLOW:

PEAK DISCHARGE REQUIRED =	0.3	CFS
CHANNEL BOTTOM WIDTH =	0.0	FT (USE 0 IF SECTION IS A "V" DITCH)
HYDRAULIC GRADIENT =	0.15000	FT/FT
LEFT SIDE SLOPE =	2.0	:1
RIGHT SIDE SLOPE =	2.0	:1
DEPTH OF FLOW =	0.170	FT
MANNINGS "n" =	0.1810	(CHECK RIPRAP SIZING "n" BELOW)
AREA =	0.06	SQ FT
WETTED PERIMETER =	0.76	FT
HYDRAULIC RADIUS =	0.08	FT
TOP WIDTH =	0.68	FT
VELOCITY =	0.57	FT/SEC
PEAK DISC. DETERMINED =	0.0	CFS

RIPRAP SIZING, TRAPEZOIDAL SECTION:

D_{50} =	0.1324	FT
NEW "n" =	0.0455	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

RIPRAP SIZING, "V" DITCH:

D_{50} =	0.1810	FT
NEW "n" =	0.0485	(ADJUST DESIGN/ANALYSIS "n" ABOVE)

FLOW REGIME:

		Nf <=0.7, SUB CRITICAL FLOW
Nf =	0.345	Nf >0.7 BUT <1.3, CRITICAL FLOW ZONE
		Nf >1.3, SUPER CRITICAL FLOW

IF Nf>=0.7 A HYDRAULIC JUMP WILL PROBABLY OCCUR, DESIGN ACCORDINGLY

TO AVOID MOVEMENT OF PARTICLES:

Filter fabric required beneath the rock

FORMULAS USED:

UNIFORM CHANNEL FLOW,	Q = (A X 1.486 X R^(2/3) X S^(1/2))/"n"
FLOW REGIME,	Nf= (Q X T^(1/2))/(A^(3/2) X g^(1/2))
RIPRAP SIZING, TRAPEZDL.,	((118 X Q X S^(13/6) X R/P)^(2/5)
RIPRAP SIZING, "V",	((64.4 X Q X S^(13/6) X (Z/(Z^2 + 1))^(2/5)
NEW RIPRAP "n",	(D. OF F.^(1/6)/(21.6 X LOG(D. OF F./D50)+14)

REFERENCES: KING'S HANDBOOK OF HYDRAULICS AND NCHRP-REPORT 108

21. SITE SPECIFIC SOIL SURVEY REPORT

Hurley Environmental
AND LAND PLANNING, LLC

SITE-SPECIFIC SOIL SURVEY REPORT
Route 103
Warner

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 7.0, July 2021. This map product is within the technical standards of the National Cooperative Soil Survey. It is a special product, intended for the submission to NH DES Alteration of Terrain. It was produced by a professional soil scientist and is not a product of the USDA Natural Resource Conservation Service.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5.
Scale of soil map:
Approximately 1" equals 40'
Contours:
Intervals of 2 feet

2. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: 11/23/24
Date(s) of test pits: 2/3/25
Test pits recorded by: Gifford Colburn, Keach Nordstrom

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Warner
Location: Route 103, Map 7, Lot 39
Size of area: approximately 10 acres
Was the map for the entire lot? No
The area where the map was created is for the front, 10 acres of the lot. Tis portion of the lot has been recently cleared. Several areas of open rock outcrops and steep hillsides are present as, well as low areas within the topography. The site slopes steeply from the road up to the west. Several small wetlands are present.

4. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? Yes
If no, what was the purpose of the map?
Who was the map prepared for? Keach Nordstrom.

5. SOIL IDENTIFICATION LEGEND

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
55	Hermon Very Stony	121	B
442	Chichester	221	B
58	Waumbek	321	A
829	Waumbek-Hermon Association	321	B
399	Ledge Outcrop	228	D
414	Moosilauke Poorly Drained	521	C

SLOPE PHASE:
0-8% B 8-15% C 15-25% D 25%+ E

55 Hermon Very Stony 121 B
The Hermon series consists of very deep, somewhat excessively drained soils on upland till plains, hills and ridges. These soils formed in glacial till. Estimated saturated hydraulic conductivity is high or very high throughout the mineral soil. Slopes ranges from 0 through 60 percent. These soils are dominated by sandy loam over loamy sand and sand. Some profiles have single grain sand to gravel and some cobble. No ESHWT was encountered within 60 inches and no significant ledge was encountered. These soils are found in a few isolated areas on the site.
Typical Profile
0-10" 10YR3/2, FSL, GR, FR
10-24" 7.5YR4/6, LS, GR, FR
24-72" 10YR4/3, FSL, GR, FR
72-108" 2.5Y5/3, S, GR, FR, Redox 20%
ESHWT 72
Observed Water None
Refusal None

442 Chichester 221 B
The Chichester series consists of very deep, well drained soils that formed in a loamy mantle overlying sandy till on glaciated hills, valley sides and till plains. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. Slope ranges from 3 through 50 percent. These soils are found within the central portion of the site. No ESHWT was encountered within 40 inches and no significant ledge was encountered.
Typical Profile
0-12" 10YR3/2, FSL, GR, FR
12-16" 7.5YR4/6, LS, GR, FR
16-55" 10YR5/3, FSL, GR, FR
55-90" 10YR4/2, S, GR, FR, Redox 20%
ESHWT 55
Observed Water None
Refusal None

58 Waumbek 321 A
The Waumbek series consists of very deep, moderately well drained soils formed in stony, sandy till. They are on glaciated uplands. Permeability is moderately rapid or rapid in the solum and rapid in the substratum. These soils are found in the higher elevations on the site. They are dominated by sandy loam in the upper layers and underlain by loam y sand and sand. They have ESHWT between 15-40 inches and no significant ledge was encountered. These soils are found in the mid-slope areas of the site in the southern portion of the site.

Typical Profile
0-10" 10YR3/2, FSL, GR, FR
10-32" 7.5YR4/6, LS, GR, FR
32-108" 10YR6/23, FSL, GR, FR, Redox 20%
ESHWT 32
Observed Water None
Refusal None

829 Waumbek-Hermon Association 321 B
The Waumbek-Hermon Association is an overlapping soil type where the two individual series cannot be separated out into sizeable individual units. This series has an ESHWT between 15-40 inches and no significant ledge.
The Waumbek series consists of very deep, moderately well drained soils formed in stony, sandy till. They are on glaciated uplands. Permeability is moderately rapid or rapid in the solum and rapid in the substratum.
The Hermon series consists of very deep, somewhat excessively drained soils on upland till plains, hills and ridges. These soils formed in glacial till. Estimated saturated hydraulic conductivity is high or very high throughout the mineral soil.

399 Ledge Outcrop 228 D
Several areas of the site have steep rock slopes of either exposed ledge or ledge very close to the surface.

414 Moosilauke Poorly Drained 521 C
The Moosilauke series consists of very deep, poorly and somewhat poorly drained soils that formed in glacial outwash or drift in low depressions and shallow drainageway on uplands. Saturated hydraulic conductivity is high in the solum and high or very high in the substratum. Slope ranges from 0 to 15 percent. These are the small isolated wetlands found on the site.

6. RESPONSIBLE SOIL SCIENTIST
Name: Luke Hurley
Certified Soil Scientist Number: CSS #095

7. OTHER DISTINGUISHING FEATURES OF SITE
Is the site in a natural condition? The current mapping portion, yes.

8. Inclusions
No Inclusions were mapped.

22. INFILTRATION FEASIBILITY REPORT

INFILTRATION FEASIBILITY REPORT

Jenesstown Manor

Map 7; Lots 39 & 39-1
Route 103
Warner, New Hampshire

March 7, 2025

KNA Project No. 24-0307-1

KNA KEACH-NORDSTROM ASSOCIATES, INC.

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I. Location of Infiltration Practices

II. Existing Topography

III. Test Pit Locations

IV. Seasonal High Water Table Elevation Summaries

V. Infiltration Rate Summary

VI. Profile Descriptions

I. Location of Practice

One infiltration practice is proposed for this project. An above ground infiltration pond (21P) is proposed on Map 7 Lot 39-1, but will handle runoff from Map 7 Lot 39 as well as Map 7 Lot 39-1. There will be a drainage and grading easement between these two lots.

II. Existing Topography

The existing grade on this site are primarily moderately steep (15-25%) or steep slopes (25%+) that slope northeasterly to Route 103.

III. Test Pit Locations

There were nine test pits performed for the area of development. Test Pit 2 was used for the design of the infiltration pond 21P.

IV. Seasonal High Water Table Elevation Summaries

The results from the Test Pit 2 performed is as follows:

Test Pit #2

The existing elevation of the ground in the area of the practice	= 468.89 (approx. original grade)
Distance to SHWT	= 32"
Elevation of SHWT	= 464.22
Lowest Elevation of Test Pit	= 456.89
Elevation of SHWT	= 464.22
Required separation	= 1.0 (prior treatment)
Bottom of infiltration practice	= 466.00

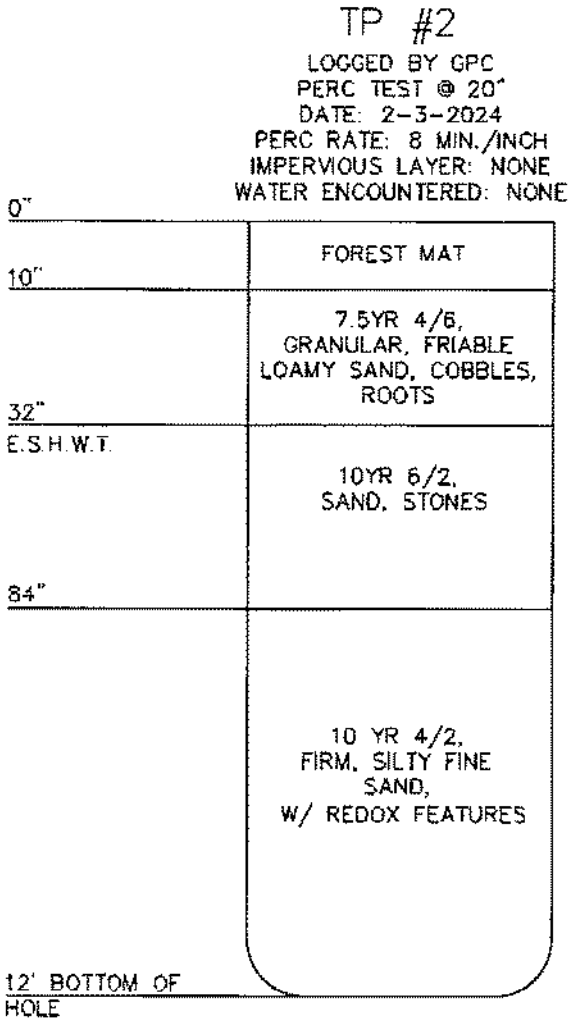
V. Infiltration Rate Summary

The infiltration rate for the Infiltration Pond 21P was calculated by the default method, as described in Env-Wq 1504.14. The practice is located in an area primarily identified in the Site-Specific Soil Survey as 58D – Waumbek. The area for the proposed infiltration system is natural undisturbed woodland, therefore the soil used to determine the infiltration was Waumbeck.

The Ksat Values for New Hampshire Soils by USDA Natural for New Hampshire Soils, Society of Soil Scientists for Northen New England, Special Publication No. 5, September 2009, provides a value for the Waumbeck soil type of 6.00 inches per hour. Using an applicable factor of safety of 2 at a conservative rate of 6 inches per hour, the infiltration rate utilized in the drainage analysis is 3.0 inches per hour.

VI. Profile Descriptions

Profile descriptions are provided as follows.



23. OPERATIONS AND MAINATENANCE PLAN WITH CHECKLIST

STORMWATER

OPERATION & MAINTENANCE PLAN

Jennesstown Manor
Route 103
Warner, New Hampshire

Map 7 / Lots 39 & 39-1

March 7, 2025

KEACH-NORDSTROM ASSOCIATES, INC.

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Long-Term Inspection & Maintenance Plan Checklist

Long-Term Inspection & Maintenance Log

Anti-Icing Route Data Form

III. **Control of Invasive Plants**

Invasive Plant Guide

IV. **Stormwater Practice Location Plan**

11"x17" "Grading, Drainage & Utility Plan"

I. General

Introduction

The project owner or their assigned heirs will maintain the stormwater treatment facilities after construction is completed. The Applicant of the project is Peacock Hill Road, LLC located at 145 Old Town Road Weare, NH. The Applicant will maintain the stormwater system.

The subject property is referenced on Map 7; Lots 39 and 39-1 in Warner, New Hampshire. Any transfer of responsibility for inspection and maintenance activities or transfer of ownership shall be documented to Warner in writing. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction. Long-term operation and maintenance for the stormwater management facilities are presented below.

Maintenance will be performed as described unless and until the system is formally accepted by a municipality or quasi-municipal district or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system.

Post Construction:

The following standards will be met after construction is complete:

Documentation:

A maintenance log will be kept summarizing inspections, maintenance, and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. The log will be made accessible to department and/or Warner staff and a copy provided upon request.

Maintenance Requirements

Pocket Ponds:

- Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- System embankments should be mowed periodically to maintain grass cover and any other vegetation found on the embankment should be removed at each inspection.
- Trash and debris found within the pond or in the outlet structure should be removed at each inspection.
- Removal of accumulated sediment
- Inspection and repair of embankments, inlet and outlet structures, and appurtenances

Infiltration Ponds:

- Systems should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Trash and debris should be removed at each inspection.
- Inspection of pre-treatment measures at least twice annually and removal of accumulated sediment as warranted by inspection, but no less than once annually.
- At least once annually, the system should be inspected for drawdown time. If the pond does not drain within 72-hours following a rainfall event, a qualified professional should assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to the removal of accumulated sediments or reconstruction of the basin bottom.

Catch Basins and Closed Drainage Network:

- Catch basins may require frequent maintenance. This may require several cleanings of the sumps each year. At a minimum, it is recommended that catch basins be inspected at least twice annually.
- Sediment should be removed when it approaches half of the sump depth.
- If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other methods and disposed in conformance with the applicable state and federal regulations.

Outlet Protection:

- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.

General:

- If any invasive species begin to grow in the stormwater management practices the species shall be disposed of in an appropriate manner that will not allow the pest to survive or spread. The disposal of such species shall be witnessed or approved by a state inspector. Methods for disposal may include, but not be limited to:
    - Encapsulating the plant(s) in plastic bags and disposing of the plant material in one of the following ways:
        - Trash pickup;
        - Discarding;
        - Open burning;
        - Incineration; or
        - Burial of infested nursery.

II. Supporting Documents

Annual Inspection and Maintenance Reporting Form
for
Jennesstown Manor
Warner, New Hampshire

Date: _____

To: **Peacock Hill Road, LLC**

Re: **Certification of Inspection and Maintenance; Submittal of Forms**

Property Name: _____

Property Address: _____

Contact Name: _____

Contact Phone #: _____

Contact Email Address: _____

I verify that the required stormwater facility inspections and required maintenance have been completed in accordance with the Operation & Maintenance Plan associated with the above referenced property.

The required Long-Term Inspection & Maintenance Plan Checklist is attached to this form.

_____ _____
Name of Party Responsible for Inspection & Maintenance

Property Owner

_____ _____
Authorized Signature

Signature

Long-Term Inspection & Maintenance Plan Checklist
Jennesstown Manor – Warner, NH

Current Owner Name:	Date:
Business Address:	Inspector:
Weather:	
Date of Last Rainfall:	Amount: Inches:

Best Management Practice

Pocket Pond #22P	Reason for Inspection		
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐
Maintenance Required? Corrective Action Needed & Notes:	Yes ☐ No ☐		
Sideslopes & berms need repair? Clean inlet & outlet structures?	Yes ☐ No ☐ Yes ☐ No ☐		

Pocket Pond #41P	Reason for Inspection		
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐
Maintenance Required? Corrective Action Needed & Notes:	Yes ☐ No ☐		
Sideslopes & berms need repair? Clean inlet & outlet structures?	Yes ☐ No ☐ Yes ☐ No ☐		

Infiltration Pond #21P	Reason for Inspection		
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐
Maintenance Required? Corrective Action Needed & Notes:	Yes ☐ No ☐		
Visual Inspection of vegetation? Maintenance Required? Corrective Action Needed & Notes:	Yes ☐ No ☐ Yes ☐ No ☐		
Visual inspection of drawdown time? Drawdown time less than 72 hours?	Yes ☐ No ☐ Yes ☐ No ☐		

(if no, call a qualified professional for inspection)			
Catch Basins & Closed Drainage Network	Reason for Inspection		
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐
Maintenance Required? Corrective Action Needed & Notes: Photo:	Yes ☐ No ☐		
Outlet Protection	Reason for Inspection		
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐
Maintenance Required? Corrective Action Needed & Notes:	Yes ☐ No ☐		
General	Reason for Inspection		
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐
Maintenance Required? Corrective Action Needed & Notes:	Yes ☐ No ☐		

Long-Term Inspection & Maintenance Log
Jennesstown Manor - Warner, NH

Date	Inspection (Yes or No)	Maintenance (Yes or No)	List BMPs Inspected and/or Provide Comments	Inspected By:

III. Control of Invasive Plants

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some Exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

During maintenance activities, check for the presence of invasive plants and suitably remove according to the methods provided in the table below. The following table, based on the "Control of Invasive Plants" published by the New Hampshire Department of Agriculture, describes the most common invasive plants in this region and proper methods of disposal.

Name	Description	Invasive Qualities	Control Methods
Invasive Trees			
Norway Maple	- Large leaves - Will exude milky white sap when leaves are broken - Leaves turn color in Late October (fall foliage is yellow)	- Suppresses growth of grass, garden plants, and forest understory -Wind-borne seeds can germinate and grow in deep shade	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out plants, including the root systems. Use a forked spade or weed wrench. - Cut down the tree. Grind out the stump, or clip off re-growth. - Girdle[1] - Frill[2] - Cut stem/ cut stump with glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray with glyphosate [3]* (mid-October to early November).
Tree of Heaven	- Long compound leaves with 11-25 lance shaped leaflets - Smell like peanut butter or burnt coffee when crushed	- Tough, can grow in poor conditions - Produces large quantities of wind-borne seeds - Grows rapidly - Secretes a toxin that kills other plants - Cannot be removed by mechanical means alone	- Pull seedlings when soil is moist. - Frill[2] (no more than 1" gap between cuts). Use Garlon 3a herbicide. - Cut stem/ cut stump with Garlon 3a. Follow label directions for cut stump application. Clip off sucker sprouts or paint with Garlon 3a.* - Foliar spray[3]* (on regrowth) - Paint bottom 12" of bark with Garlon 4 Ultra (February/March). Use maximum strength specified on label for all herbicide applications.
Invasive Shrubs			
Autumn Olive	- Formerly recommended for erosion control and wildlife value	- Highly invasive, diminishes the overall quality of wildlife habitat	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs (up to 4" diameter trunks). - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Bury stump - Do not mow

Invasive Shrubs (continued)			
Multiflora Rose	- Formerly recommended for erosion control, hedges, and wildlife habitat - Covered in white flowers in June - Very hard, curved thorns - Fringed edge to leaf stalk	- Huge shrub that chokes out all other vegetation - Too dense for most birds to nest in - Grows up trees like a vine in Shade	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems (at least 6" from the crown and 6" down). Use a forked spade or weed wrench for trees or shrubs. - Controlled burning[4] (on extensive infestations) - Cut stem/ cut stump with glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]* (mix Rodeo with extra sticker-spreader, or use Roundup Sure Shot Foam on small plants) - Herbicide may be applied in winter when other plants are dormant.
Bush Honeysuckles	- Includes Belle, Amur, Morrow's, and Tatarian Honeysuckle	- Creates dense shade reducing plant diversity and eliminating nest sites in forest interior spaces	- Deadhead to prevent spread of seeds (on ornamentals). Cut off seeds or fruits before they ripen. Bag and burn, or send to a landfill. - Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year (on shady sites only, brush cut in early spring and fall). - Controlled burning[4] (during growing season) - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate (late in the growing season). Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.*

Invasive Shrubs (continued)			
Blunt-Leaved Privet	- Medium sized shrub - Simple, oblong, dark green leaves 1-2" in length - Fragrant white flowers (spring) - Blackish-purple fruit (late summer)	- Toxic to mammals - Loss of valuable habitat	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Trim off all flowers - Do not cut back or mow
Burning Bush, Winged Euonymus	- Wide, corky wings on the Branches - Brilliant red autumn leaves - Fruit	- High seed production	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Trim off all flowers
Japanese Barberry	- Spiny deciduous shrub - Small leaves	- Very dense, displaces native plants - Can change chemistry of soil	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Trim off all flowers

Invasive Woody Vines			
Japanese Honeysuckle	- Gold and White flowers - Heavy scent and sweet nectar in June	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle - Rampant grower - Spirals around trees, often strangling them	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]* (fall or early spring when native vegetation is dormant) Plan to re-treat repeatedly
Oriental Bittersweet	- Bright orange seed capsules in clusters all along the stem - Flowers	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Keep ornamental plants cut back, remove all fruits as soon as they open, and bag or burn fruits. - Cut stem/ cut stump with Garlon 3a. Follow label directions for cut stump application. Clip off sucker sprouts or paint with Garlon 3a.*
Japanese Knotweed, Mexican Bamboo	- The stems have knotty joints, similar to bamboo - Grows 6-10' tall - Large, pointed oval or triangular leaves	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle - Can grow in shade	- Cut stem/ cut stump with Glyphosate (at least 3 times each during growing season). Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]* - Treat with Rodeo - In gardens, heavy mulch or dense shade may kill it.

Invasive Herbaceous Plants			
Garlic Mustard	- White-flowered biennial - Rough scalloped leaves (kidney, heart, or arrow shaped) - Garlic smell, mustard taste when its leaves are crushed	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle - Rampant grower - Spirals around trees, often strangling them	- Pull seedlings and small or shallow-rooted plants when soil is moist (before it flowers in spring). Dig out larger plants, including the crown and root systems. Use a forked spade or weed wrench for trees or shrubs. Tamp down soil afterwards. - Deadhead to prevent spread of seeds. Cut off seeds or fruits before they ripen. Bag and burn or send to a landfill. - Foliar spray[3*] (may be appropriate in some settings)
Japanese Stilt Grass	- Lime green color - Line of silvery hairs down the middle of the 2-3" long blade	- Tolerates sun or dense shade -Quickly invades areas left bare or disturbed by tilling or flooding - Builds a large seed bank in the soil	- Pull seedlings and small or shallow-rooted plants when soil is moist (pulled easily in early to mid-summer).Dig out larger plants, including root systems. Use a forked spade or weed wrench for trees or shrubs. Be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to a landfill. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year. Mowing weekly or when it has just begun to flower may prevent it from setting seed. - Foliar spray[3*] (use glyphosate or herbicidal soap on large infestations. - Use a corn-based pre-emergence herbicide on annual weeds (spring). This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.

Invasive Herbaceous Plants (continued)			
Mile-A-Minute Vine, Devil's Tail Tearthumb	- Triangular leaves - Barbed stems - Turquoise berries	- Rapid growth - Quickly covers and shades out herbaceous plants	- Pull seedlings and small or shallow-rooted plants when soil is moist (pulled easily in early to mid-summer).Dig out larger plants, including root systems. Use a forked spade or weed wrench for trees or shrubs. Be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to a landfill. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year. Mowing weekly or when it has just begun to flower may prevent it from setting seed. - Foliar spray[3*] (use glyphosate or herbicidal soap on large infestations. - Use a corn-based pre-emergence herbicide on annual weeds (spring). This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.
Spotted Knapweed	- Thistle-like flowers	- Dense, crowds out native species	- Do not pull unless the plant is young and the ground is very soft. The root will break and produce several new plants. - Wear sturdy gloves - Deadhead to prevent spread of seeds. Cut off seeds or fruits before they ripen. Bag and burn, or send to a landfill. - In lawns, spot treat with broad-leaf weed killer. Good lawn care practices (test soil; use lime and fertilizer only when soil test shows a need; mow high and frequently; leave clippings on lawn) reduce weed infestations. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3*]

[1]Girdle: Cut through the bark and growing layer all around the trunk, about 6" above the ground. Girdling is most effective in spring (when the sap is rising) & middle-late summer (when the tree is sending food to the roots). Clip off sucker sprouts.

[2]Frill: Using a machete, hatchet, or similar device, hack scars (several holes in larger trees) downward into the growing layer, and squirt in glyphosate (or triclopyr if specified in table). Follow label directions for injection and frill applications. This is most effective from middle to late summer. Clip off any sucker sprouts or treat with glyphosate.

[3]Foliar Spray: Use a backpack or garden sprayer or mist blower, following label directions. Avoid overspray and/or dripping onto non-target plants, because glyphosate kills most plants except moss. If it rolls off waxy or grass-like foliage, use additional sticker-spreader. Deciduous trees, shrubs, and perennials move nutrients down to the roots in late summer. Glyphosate is particularly effective at this time and when plants have just gone out of flowering. Several invasive species retain their foliage after native plants have lost theirs, and resume growth earlier in spring than most natives. This allows you to treat them without harming the natives. However, the plant must be actively growing for the herbicide to work. Retreatments may be necessary the following year if suckering occurs or the plant hasn't been entirely killed.

[4]Controlled Burning: Burning during the spring (repeated over several years) will allow native vegetation to compete more effectively with the invasive species. This requires a permit. Spot treatment with glyphosate in late fall can be used to make this method more effective

*Herbicides: It is highly recommended that small populations try to be controlled using non-chemical methods where feasible. However, for large infestations, and for a few plants herbicide use is essential. Apply herbicides carefully to avoid non-target plants, glyphosate is the least environmentally damaging herbicide in most cases. Add food coloring for visibility, and a soap-based sticker such as Cide-Kick. Glyphosate is ineffective on some plants; for these, triclopyr or Garlon 3a may be indicated. When using herbicides read the entire label and observe all precautions listed, including proper disposal. If in doubt, call your local Cooperative Extension Service.

IV. Stormwater Practice Location Plan

24. PLANS

NON-RESIDENTIAL SITE PLAN SET (11" x 17" - COLORLESS)
PRE-DEVELOPMENT DRAIN AREAS PLAN (11"x17" - COLORLESS)
POST-DEVELOPMENT DRAIN AREAS PLAN (11"x17" - COLORLESS)
PRE-DEVELOPMENT SOILS MAP (11"x17" - COLOR)
POST-DEVELOPMENT SOILS MAP (11"x17" - COLOR)
NON-RESIDENTIAL SITE PLAN SET (22" x 34" - COLORLESS)
PRE-DEVELOPMENT DRAIN AREAS PLAN (22"x34" - COLORLESS)
POST-DEVELOPMENT DRAIN AREAS PLAN (22"x34" - COLORLESS)

UTILITY NOTE

THE UNDERGROUND UTILITIES DEPICTED HEREON HAVE BEEN DRAWN FROM FIELD SURVEY INFORMATION AND OR PLOTTED FROM EXISTING DRAWINGS. KEACH-NORDSTROM ASSOCIATES, INC. MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES DEPICTED COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. FURTHER, KEACH-NORDSTROM ASSOCIATES, INC. DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. KEACH-NORDSTROM ASSOCIATES, INC. HAS NOT PHYSICALLY LOCATED THE UNDERGROUND PORTIONS OF THE UTILITIES.

NPDES NOTE

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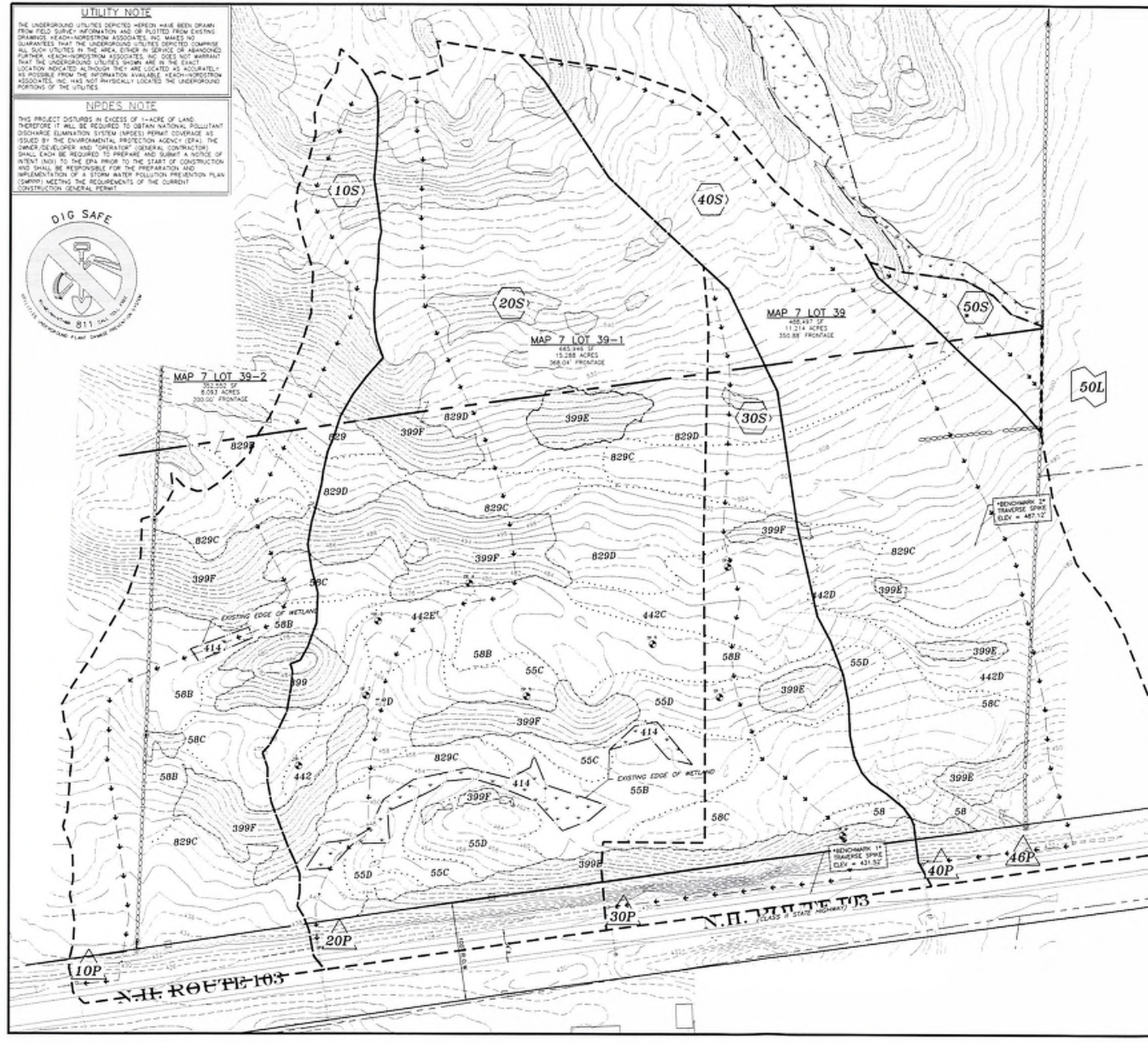
DIG SAFE

811 CALL TOLL-FREE

UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM



GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

- SSSM SOIL LINES
- 30B — DENOTES SOIL TYPE
- P — DENOTES POND
- S — DENOTES SUBCATCHMENT AREA
- R — DENOTES REACH
- L — DENOTES POINT OF INTEREST
- LIMIT OF SUBCATCHMENT AREA
- TIME OF CONCENTRATION

MAGNETIC NORTH

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HESS SYM	HSG
55	HERMON VERY STONY	121	B
442	CHICHESTER	221	B
58	WALPOLE	321	A
829	WALPOLE-HERMON ASSOCIATION	321	B
414	MOOSILAUKE POORLY DRAINED	521	C
399	LEDGE OUTCROP	228	D

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

THE SITE SPECIFIC SOIL SURVEY (SSSS) WAS PRODUCED NOVEMBER 23, 2024 AND WAS PREPARED BY LUKE HURLEY, CSS # 095, HURLEY ENVIRONMENTAL AND LAND PLANNING, LLC.

SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH, ISSUE # 10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOIL COMPONENTS OF THE COMPLEX.

HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO. 5, SEPTEMBER, 2009.

PRE-DEVELOPMENT DRAINAREAS PLAN

JENNESSTOWN MANOR
MAP 7, LOTS 39 & 39-1

ROUTE 103
WARNER, NEW HAMPSHIRE
MERRIMACK COUNTY

OWNER/APPLICANT:
PEACOCK HILL ROAD, LLC
145 OLD TOWN ROAD
WEARE, NH 03281
BK. 3829 PG. 2512

KNA KEACH-NORDSTROM ASSOCIATES, INC.
Civil Engineering Land Surveying Landscape Architecture
10 Commerce Park North, Suite 3B, Bedford, NH 03110 Phone (603) 627-2881

REVISIONS

No.	DATE	DESCRIPTION	BY
1	5/22/25	PER PB AND AOT COMMENTS	AEW

DATE: MARCH 25, 2025 | SCALE: 1" = 50'
PROJECT NO: 24-0307-1 | SHEET 1 OF 2

UTILITY NOTE

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DIG SAFE

811 CALL TOLL FREE

MAP 7 LOT 39-2
553,555 SF
8.093 ACRES
200.00' FRONTAGE

MAP 7 LOT 39-1
665,946 SF
15.288 ACRES
368.04' FRONTAGE

MAP 7 LOT 39
488,497 SF
11.214 ACRES
350.88' FRONTAGE

N.H. ROUTE 103
(CLASS II STATE HIGHWAY)

BENCHMARK 2"
TRAVERSE SPIKE
ELEV = 467.17'

TRAVERSE SPIKE
ELEV = 431.55'

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

- SSSM SOIL LINES
- 30B DENOTES SOIL TYPE
- P DENOTES POND
- S DENOTES SUBCATCHMENT AREA
- R DENOTES REACH
- L DENOTES POINT OF INTEREST
- LIMIT OF SUBCATCHMENT AREA
- TIME OF CONCENTRATION

MAGNETIC NORTH

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HSG SIM	HSG
55	HERMON VERY STONY	121	B
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POST-DEVELOPMENT DRAINAREAS PLAN

JENNESSTOWN MANOR
MAP 7, LOTS 39 & 39-1

ROUTE 103
WARNER, NEW HAMPSHIRE
MERRIMACK COUNTY

OWNER/APPLICANT:
PEACOCK HILL ROAD, LLC
145 OLD TOWN ROAD
WEARE, NH 03281
BK. 3829 PG. 2512

KEACH-NORDSTROM ASSOCIATES, INC.
Civil Engineering Land Surveying Landscape Architecture
10 Commerce Park North, Suite 3B, Bedford, NH 03110 Phone (603) 627-2881

REVISIONS

No.	DATE	DESCRIPTION	BY
1	5/22/25	PER PB AND AOT COMMENTS	AEW

DATE: MARCH 25, 2025 | SCALE: 1" = 50'
PROJECT NO: 24-0307-1 | SHEET 2 OF 2

HYDROLOGIC SOIL GROUP A
HYDROLOGIC SOIL GROUP B
HYDROLOGIC SOIL GROUP D
OPEN WATER FEATURE
IMPERVIOUS COVER

10S
20S
30S
40S
50S
50L
10P
20P
30P
40P
46P
MAP 7 LOT 39-1
645,346 SF
15.288 ACRES
368.04' FRONTAGE
MAP 7 LOT 39
488,497 SF
11.214 ACRES
350.88' FRONTAGE
MAP 7 LOT 39-2
382,552 SF
8.093 ACRES
200.00' FRONTAGE
N.H. ROUTE 103
(CLASS II STATE HIGHWAY)
EXISTING EDGE OF WETLAND
*BENCHMARK 1" TRAVERSE SPIKE ELEV. = 487.10'
*BENCHMARK 1" TRAVERSE SPIKE ELEV. = 431.52'
399F
399E
829D
829C
829B
442D
442C
442E
58B
58C
55C
55D
55B
56
414
442
399

GRAPHIC SCALE
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1 inch = 50 ft.

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MAGNETIC NORTH

DIG SAFE
811 CALL TOLL FREE

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PRE-DEVELOPMENT DRAINAREAS PLAN

JENNESSTOWN MANOR
MAP 7, LOTS 39 & 39-1

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WARNER, NEW HAMPSHIRE
MERRIMACK COUNTY

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PROJECT NO: 24-0307-1 | SHEET 1 OF 2

HYDROLOGIC SOIL GROUP A
HYDROLOGIC SOIL GROUP B
HYDROLOGIC SOIL GROUP D
OPEN WATER FEATURE
IMPERVIOUS COVER

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352,552 SF
8.093 ACRES
200.00' FRONTAGE

MAP 7 LOT 39-1
665,946 SF
15.288 ACRES
368.04' FRONTAGE

MAP 7 LOT 39
488,497 SF
11.214 ACRES
350.88' FRONTAGE

214S 50S 50L 10S 22S 213P 212P 211P 45S 43S 46S 45P 44S 44P 22P 23S 21P 42S 42P 43P 210R 41S 20R 20S 41P 40S 46R 46P 30S 40P 30P 20P 10P 21S 21P

399F 399E 829D 829C 442D 58B 58C 55C 55D 414 442

EXISTING EDGE OF WETLAND

•BENCHMARK 2" TRAVERSE SPIKE ELEV = 437.12'

•BENCHMARK 1" TRAVERSE SPIKE ELEV = 431.53'

N.H. ROUTE 103 (CLASS II STATE HIGHWAY)

GRAPHIC SCALE

(IN FEET)
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MAGNETIC

DIG SAFE
811

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