JONES & BEACH ENGINEERS INC.

DRAINAGE ANALYSIS

EROSION AND SEDIMENT CONTROL PLAN

CARLISLE SUBDIVISION

Tax Map 33 / Lot 26
19 Watson Road
Exeter, NH

Prepared for:

Scott W. Carlisle, III
14 Cass Street
Exeter, NH 03833

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
February 25, 2021
Rev. #1- August 25, 2021
JBE Project No. 19102

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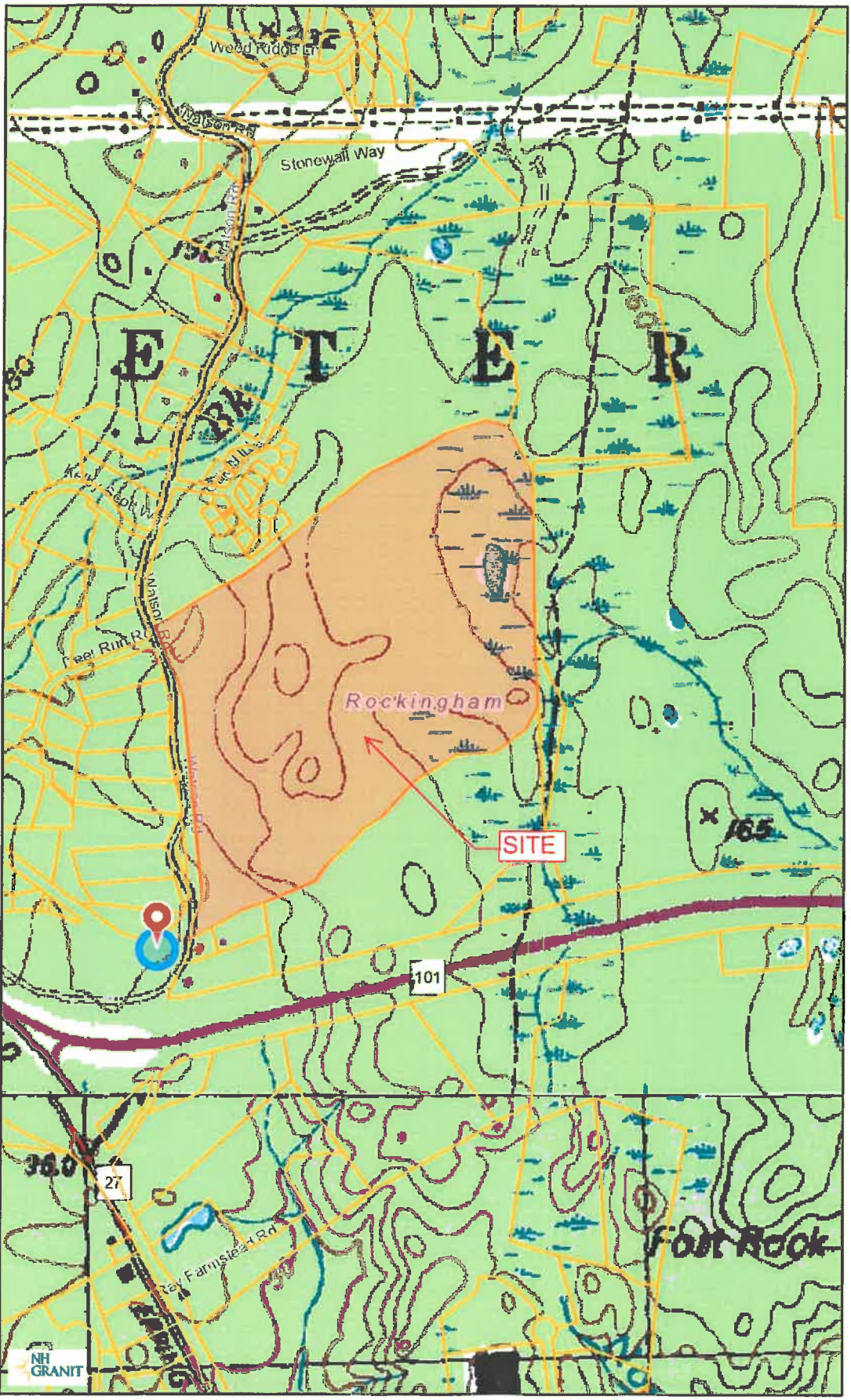
USGS Map



Legend

- Polygons
- Additional lines
- Attributes for additional lines
- State
- County
- City/Town

Map Scale
1: 10,000

Map Generated: 12/22/2020

Notes

5. EXECUTIVE SUMMARY

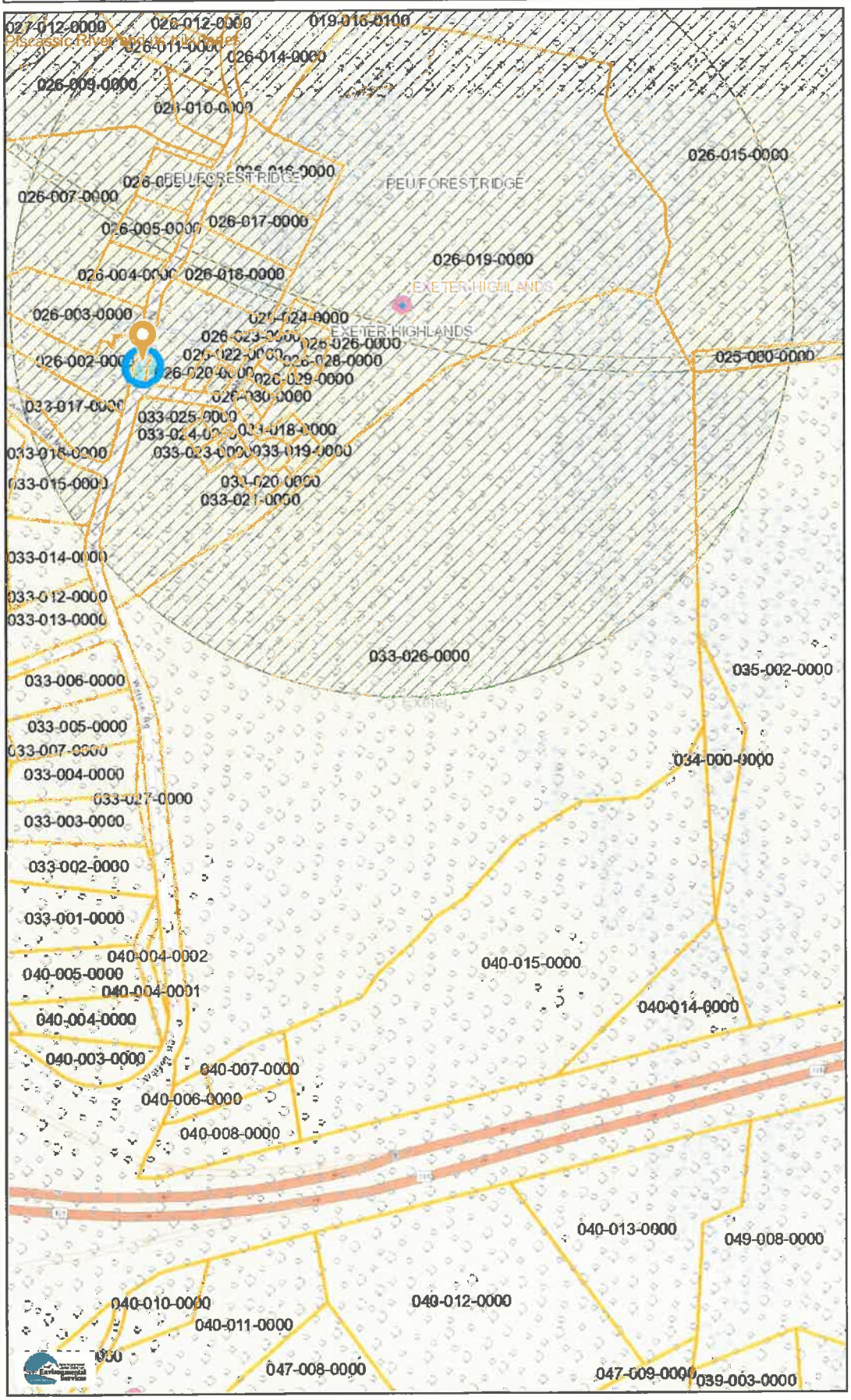
The purpose of this project is to construct a 12-lot residential subdivision services by a 920 linear foot roadway on 98-acres. Two models were compiled, one for the area in its existing (pre-development) condition, and a second for its proposed (post-development) condition. The analysis was conducted using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. A summary of the existing and proposed conditions peak rates of runoff is as follows:

Analysis Point	2-Year		10-Year		25-Year		50-Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	2.52	2.40	9.81	7.91	17.25	16.14	25.01	24.49
Analysis Point #2	1.32	1.37	7.07	6.76	13.57	12.65	20.55	18.95
Analysis Point #3	3.59	3.58	17.51	17.50	32.71	32.70	48.92	48.90
Analysis Point #4	0.94	0.87	4.67	4.07	8.76	7.35	13.15	10.79
Total	8.37	8.22	39.06	36.24	72.29	68.84	107.63	103.13

The drainage design intent for this site is to maintain the post-development peak flow to the pre-development peak flow conditions to the extent practicable and to effectively treat stormwater from the development of this project. This has been accomplished through the use of a pre-treatment swale, bioretention facilities, and an infiltration basin to maintain the peak discharge and infiltrate stormwater.

In addition, the potential for increased erosion and sedimentation is handled by way of bioretention facilities, erosion control blankets, vegetated treatment swales, sedimentation sumps, grease hoods, and riprap inlet and outlet protection aprons. The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage system and will be observed during all stages of construction. Existing wetlands and abutting property owners will suffer minimal impact resultant from this development.

AoT Screening Layers



Legend

- 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 Impairn 2016 with Quarter Mile Buffe
- Watersheds with Chloride Impairments 2016
- Parcels - polygons

Map Scale

1: 6,494

Map Generated: 9/2/2020

Notes

CONFIDENTIAL – NH Dept. of Environmental Services review

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

To: Emma Howard, Jones and Beach
PO Box 219
Stratham, NH 03885

From: Amy Lamb, NH Natural Heritage Bureau
Date: 1/7/2021 (valid until 01/07/2022)
Re: Review by NH Natural Heritage Bureau
Permits: NHDES - Other Permit, NHDES - Wetlands Permit

NHB ID: NHB20-3775 Town: Exeter Location: Tax Maps: Tax Map 33 Lot 26 and Tax Map 40 Lot 15

Description: The intent of this project is to construct a 12-lot residential subdivision with a paved roadway, associated utilities and stormwater management

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments NHB: Please provide NHB information about proposed wetland impacts on site. Wetlands impact plan, photos of wetland impact areas, and descriptions of wetland areas are requested.
F&G: No Comments At This Time

Plant species	State[1]	Federal	Notes
sharp-flowered manna grass (*Glyceria acutiflora*)*	E	--	Primarily vulnerable to changes to the hydrology of its habitat, especially alterations that change water levels. It may also be susceptible to increased pollutants and nutrients carried in stormwater runoff.
slender blue beardless-iris (*Limniris prismatica*)*	E	--	Since this plant grows at wetland edges (marshes, wet meadows, seashore), it would be threatened by changes in local water levels or shoreside development.

Vertebrate species	State[1]	Federal	Notes
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (*Coluber constrictor constrictor*)	T	--	Contact the NH Fish & Game Dept (see below).

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

CONFIDENTIAL – NH Dept. of Environmental Services review

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

Spotted Turtle (*Clemmys guttata*)	T	–	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 more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NHF&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

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Division of Forests and Lands
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DNCR/NHB
172 Pembroke Rd.
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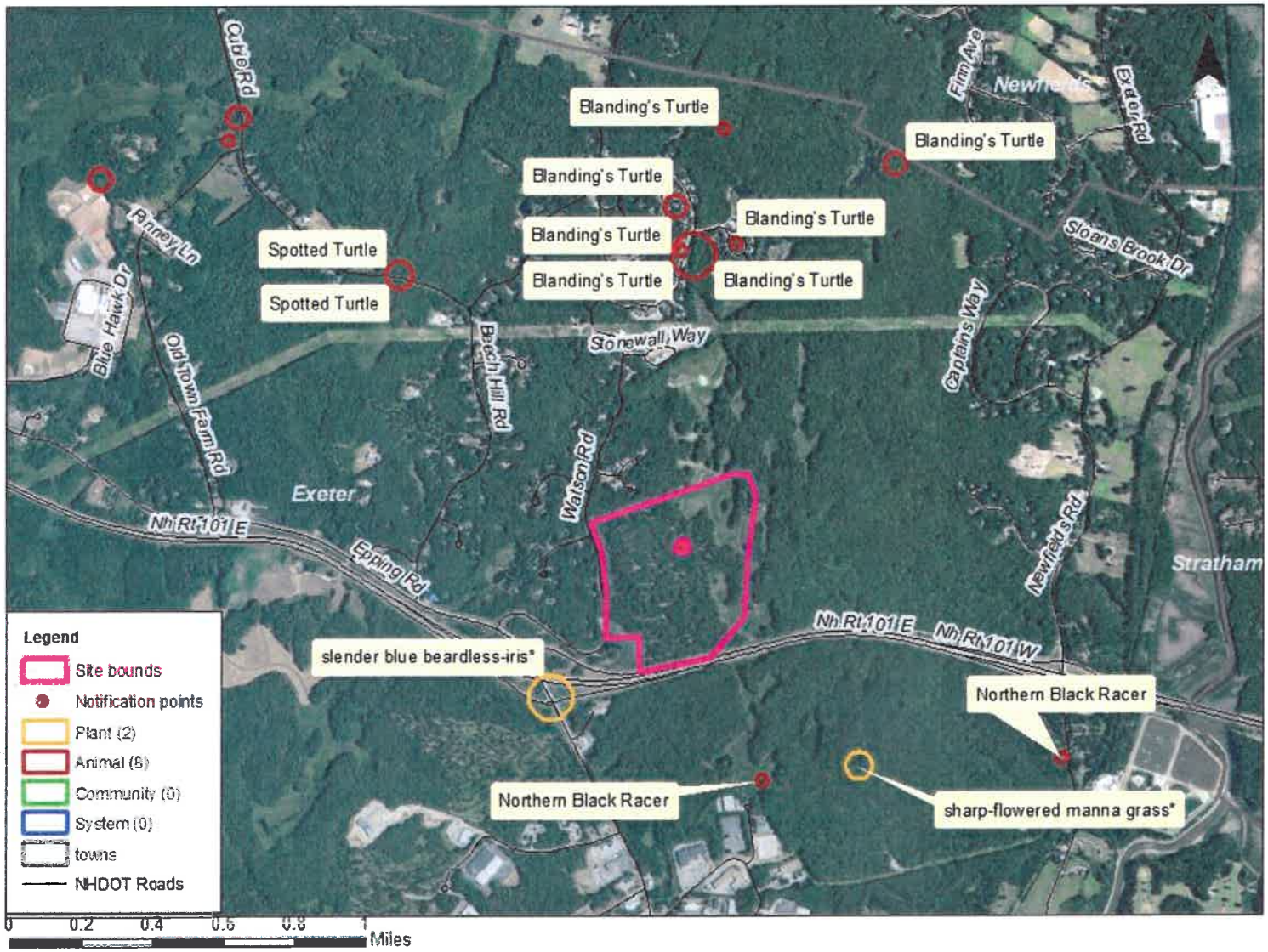
CONFIDENTIAL – NH Dept. of Environmental Services review

NHB20-3775



New Hampshire Natural Heritage Bureau - Plant Record

sharp-flowered manna grass (*Glyceria acutiflora*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank: --

Detailed Description: 1996: 200 to 300 culms in several patches, covering a total of 160 square feet.
General Area: 1996: Small (0.5 acre) *Acer rubrum* (red maple)/*Vaccinium corymbosum* (highbush blueberry) basin swamp on mucky soils. Several windthrows, root mounds and hollows in the woodland swamp provided marked relief. Shrub and herb development was patchy but moderate and included highbush blueberry, *Ilex verticillata* var. *padifolia* (swamp winterberry), *Cephalanthus occidentalis* (buttonbush), *Lysimachia terrestris* (swamp candles), Sphagnum spp. (sphagnum moss) and other bryophytes, *Sparganium americanum* (lesser bur reed), *Bidens frondosa* (common bur-marigold), and several other less abundant species. Only a few small pools of water were remaining by early September in this seasonally flooded basin. *Glyceria acutiflora* was associated with *Sparganium americanum* (lesser bur reed) in the wetter depressions.
General Comments: 1996: Fort Rock town conservation land supports a variety of good quality upland and wetland communities.
Management Comments: --

Location

Survey Site Name: Fort Rock
Managed By: Henderson-Swasey Town Forest

County: Rockingham
Town(s): Exeter
Size: 2.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: At the Rte. 101/Rte. 85 junction north of Exeter head south on Rte. 85 ca. 0.3 miles. At the railroad crossing park on the northwest side of the track at the Henderson-Swasey Town Forest. Go west ca. 0.75 miles to site.

Dates documented

First reported: 1996-09-04 Last reported: 1996-09-04

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Plant Record

slender blue beardless-iris (*Limniris prismatica*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 1991: 100 plus plants.
General Area: 1991: Roadside wet ditch with *Pogonia ophioglossoides* (rose pogonia).
General Comments: --
Management Comments: --

Location

Survey Site Name: Junction of Rtes. 101 and 27
Managed By:

County: Rockingham
Town(s): Exeter
Size: 7.7 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1991: Corner of Rtes 101 and 27.

Dates documented

First reported: 1991-06-15
Last reported: 1991-06-15

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2015: Area 14060: 3 juveniles, sex unknown.
General Area: 2015: Area 14060: Vernal pool surrounded by residential development.
General Comments: --
Management Comments: --

Location

Survey Site Name: Fresh River
Managed By:

County: Rockingham
Town(s): Exeter
Size: .4 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2015: Area 14060: Vernal pool within circle of Stone Ridge Road, Exeter.

Dates documented

First reported:	2015-08-24	Last reported:	2015-08-24

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status	Conservation Status
Federal: Not listed	Global: Apparently secure but with cause for concern
State: Listed Endangered	State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2018: Area 13886M: 1 adult female observed, laying eggs. 2014: Area 13886M: 1 adult female observed, laying eggs.
General Area: 2014: Area 13886M: Residential yard. Grassy area beside driveway.
General Comments: --
Management Comments: --

Location

Survey Site Name: Fresh River
Managed By:

County: Rockingham
Town(s): Exeter
Size: 1.9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2014: Area 13886M: 14 Wood Ridge Lane, Exeter.

Dates documented

First reported: 2014-06-15 Last reported: 2018-06-09

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status	Conservation Status
Federal: Not listed	Global: Apparently secure but with cause for concern
State: Listed Endangered	State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2010: Area 12780: 1 adult observed.
General Area: 2010: Area 12780: Residential neighborhood.
General Comments: --
Management Comments: --

Location

Survey Site Name: Fresh River
Managed By:

County: Rockingham
Town(s): Exeter
Size: 1.9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2010: Area 12780: 3 Terry's Way, Exeter.

Dates documented

First reported: 2010-06-15 Last reported: 2010-06-15

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2006: Area 11696: 1 adult female seen.
General Area: 2006: Area 11696: A trail in "Oaklands-type terrain."
General Comments: --
Management Comments: --

Location

Survey Site Name: Fresh River
Managed By:

County: Rockingham
Town(s): Exeter
Size: .4 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2006: Area 11696: On a trail (43.023861N, 70.965636W).

Dates documented

First reported: 2006-05-20 Last reported: 2006-05-20

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status	Conservation Status
Federal: Not listed	Global: Apparently secure but with cause for concern
State: Listed Endangered	State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2011: Area 11594M: 1 adult observed. 2008: Area 11594M: 1 adult female seen.
General Area: 2008: Area 11594: In the yard of 14 Wood Ridge Drive. Observer said there were several vernal pools behind the house.
General Comments: --
Management Comments: --

Location

Survey Site Name: Fresh River
Managed By:

County: Rockingham
Town(s): Exeter
Size: 7.7 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2008: Area 11594M: 14 Wood Ridge Drive, Exeter.

Dates documented

First reported: 2008-05-27 Last reported: 2011-06-16

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2012: Area 12992: 1 adult observed.
General Area: 2012: Area 12992: In leaf litter in hardwood forest.
General Comments: --
Management Comments: --

Location

Survey Site Name: Fresh River
Managed By:

County: Rockingham
Town(s): Exeter
Size: 1.9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2012: Area 12992: Along trail in Oaklands Town Forest, Exeter.

Dates documented

First reported: 2012-05-31
Last reported: 2012-05-31

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Northern Black Racer (*Coluber constrictor constrictor*)

Legal Status	Conservation Status
Federal: Not listed	Global: Demonstrably widespread, abundant, and secure
State: Listed Threatened	State: Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2012: Area 13078: 1 adult observed. 2009: Area 14214: 1 adult observed, sex unknown.
General Area: 2012: Area 13078: Residential yard. 2009: Area 14214: Edge of beaver pond which has most of its margin forested with mixed hardwood.
General Comments: --
Management Comments: --

Location

Survey Site Name: The Oaklands
Managed By:

County: Rockingham
Town(s): Exeter
Size: .9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2012: Area 13078: 20 Newfields Road, Exeter. 2009: Area 14214: Edge of beaver pond facing North in Henderson/Swasey Town Forest, Exeter.

Dates documented

First reported: 2009-04-28 Last reported: 2012-06-23

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

New Hampshire Natural Heritage Bureau - Animal Record

Spotted Turtle (*Clemmys guttata*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank:	--
Detailed Description:	2018: Area 14468: 1 adult observed, sex unknown. 2014: Area 13574: 2 adults observed, sex unknown. Area 13575: 2 adults observed, sex unknown; may be same individuals from Area 13574. 1999: Area 1653: 1 seen. 1 turtle, basking on a discarded tire.
General Area:	2018: Area 14468: Hardwood and softwood mix. Edge Environment, nearby red maple swamp and bog-like area with wetland vegetation. 2014: Area 13574: In open water near road. 1999: Area 1653: Pool of water upstream from road.
General Comments:	1999: Area 1653: D. Carroll 1999 Lamprey River Report (Obs_id 1999.0281).
Management Comments:	--

Location

Survey Site Name:	Beech Hill Brook
Managed By:	Piscassic River
County:	Rockingham
Town(s):	Exeter
Size:	7.2 acres
Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2018: Area 14468: In wetland area behind Exeter High School. 2014: Area 13574: Piscassic Wildlife Management Area. In the open water near the culvert under Cubie Road. 1999: Area 1653: Fresh River / Beech Hill Brook. South side of road running west from Oaklands Drive passing over Beech Hill Brook - HB2 on map. From Route 108 south in Newmarket, head west on Route 87 in Newfields, to a right on Piscassic Rd. Continue to a left turn on Oaklands Rd into Exeter, bearing to the right until it meets up with Beech Hill Rd. Turn right on Beech Hill Rd and continue ca. 0.24 mile to where the road goes over Beech Hill Brook. Turtle sighted on south side of road.

Dates documented

First reported:	1999-06-02	Last reported:	2018-09-26

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.

CONFIDENTIAL – NH Dept. of Environmental Services review

Map Scale: 1:5,940 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

N

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.

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

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

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

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

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 22, May 29, 2020

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

Date(s) aerial images were photographed: Jun 20, 2010—Jul 18, 2010

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
26B	Windsor loamy sand, 3 to 8 percent slopes	5.5	4.3%
43B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	15.5	12.3%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	20.7	16.4%
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	13.3	10.5%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	43.9	34.7%
295	Freetown mucky peat, 0 to 2 percent slopes	18.8	14.8%
313A	Deerfield loamy fine sand, 0 to 3 percent slopes	2.5	2.0%
314A	Pipestone sand, 0 to 5 percent slopes	0.6	0.5%
395	Swansea mucky peat, 0 to 2 percent slopes	5.8	4.5%
Totals for Area of Interest		**126.6**	**100.0%**

Aerial Map

Legend

- Polygons
- Additional lines
- Attributes for additional lines
- State
- County
- City/Town

Map Scale

1: 6,494

Map Generated: 12/22/2020

Notes

LOOKING EAST FROM WATSON ROAD AT ENTRANCE

Station 4+00

Station 5+50

Station 7+00

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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

-	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
1.74	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.02	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.25	inches	Rd = Weighted groundwater recharge depth	
0.4371	ac-in	GRV = AI * Rd	
1,586	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):

Infiltration completed in Infiltration Basin (1P):

Lowest outlet=35.02 ft

Volume below lowest outlet=7,451 ft^3

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.06)

Type/Node Name: **Infiltration Basin (1P)**

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
11.40	ac	A = Area draining to the practice	
1.63	ac	A_i = Impervious area draining to the practice	
0.14	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.18	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
2.04	ac-in	WQV= 1" x Rv x A	
7,394	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,849	cf	25% x WQV (check calc for sediment forebay volume)	
Pre-treatment swale		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
7,402	cf	V = Volume[1] (attach a stage-storage table)	≥ WQV
13,954	sf	A_{SA} = Surface area of the bottom of the pond	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
21.2	hours	I_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
34.50	feet	E_{BTM} = Elevation of the bottom of the basin	
31.50	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.00	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
34.5	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
35.91	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
37.22	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
38.00	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:

Stage-Area-Storage for Pond 1P: INFILTRATION BASIN

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
34.50	13,954	0	35.03	14,731	7,598
34.51	13,968	140	35.04	14,749	7,746
34.52	13,983	279	35.05	14,768	7,893
34.53	13,997	419	35.06	14,786	8,041
34.54	14,011	559	35.07	14,804	8,189
34.55	14,025	699	35.08	14,822	8,337
34.56	14,040	840	35.09	14,840	8,485
34.57	14,054	980	35.10	14,858	8,634
34.58	14,068	1,121	35.11	14,876	8,782
34.59	14,083	1,262	35.12	14,895	8,931
34.60	14,097	1,403	35.13	14,913	9,080
34.61	14,111	1,544	35.14	14,931	9,230
34.62	14,126	1,685	35.15	14,949	9,379
34.63	14,140	1,826	35.16	14,968	9,529
34.64	14,155	1,968	35.17	14,986	9,678
34.65	14,169	2,109	35.18	15,004	9,828
34.66	14,183	2,251	35.19	15,022	9,978
34.67	14,198	2,393	35.20	15,041	10,129
34.68	14,212	2,535	35.21	15,059	10,279
34.69	14,227	2,677	35.22	15,077	10,430
34.70	14,241	2,819	35.23	15,096	10,581
34.71	14,255	2,962	35.24	15,114	10,732
34.72	14,270	3,105	35.25	15,132	10,883
34.73	14,284	3,247	35.26	15,151	11,034
34.74	14,299	3,390	35.27	15,169	11,186
34.75	14,313	3,533	35.28	15,187	11,338
34.76	14,328	3,677	35.29	15,206	11,490
34.77	14,342	3,820	35.30	15,224	11,642
34.78	14,357	3,963	35.31	15,243	11,794
34.79	14,371	4,107	35.32	15,261	11,947
34.80	14,386	4,251	35.33	15,279	12,099
34.81	14,400	4,395	35.34	15,298	12,252
34.82	14,415	4,539	35.35	15,316	12,405
34.83	14,429	4,683	35.36	15,335	12,559
34.84	14,444	4,827	35.37	15,353	12,712
34.85	14,458	4,972	35.38	15,372	12,866
34.86	14,473	5,117	35.39	15,390	13,020
34.87	14,487	5,261	35.40	15,409	13,174
34.88	14,502	5,406	35.41	15,427	13,328
34.89	14,516	5,551	35.42	15,446	13,482
34.90	14,531	5,697	35.43	15,464	13,637
34.91	14,546	5,842	35.44	15,483	13,791
34.92	14,560	5,988	35.45	15,502	13,946
34.93	14,575	6,133	35.46	15,520	14,101
34.94	14,589	6,279	35.47	15,539	14,257
34.95	14,604	6,425	35.48	15,557	14,412
34.96	14,618	6,571	35.49	15,576	14,568
34.97	14,633	6,717	35.50	15,595	14,724
34.98	14,648	6,864	35.51	15,613	14,880
34.99	14,662	7,010	35.52	15,632	15,036
35.00	14,677	7,157	35.53	15,651	15,192
35.01	14,695	7,304	35.54	15,669	15,349
35.02	14,713	7,451	35.55	15,688	15,506

Lowest Outlet=35.02
WQV Req'd=7394 cu.ft.
WQV Prov'd=7451 cu.ft.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

TREATMENT SWALE DESIGN CRITERIA
(Env-Wq 1508.08)

Node Name: Pre-Treatment Swale (2R)

Enter the node name in the drainage analysis (e.g., reach TS 5), if applicable.

Yes	Yes/No	Have you reviewed the restrictions on unlined swales outlined in Env-Wq 1508.08(a)?	
No	Yes/No	Is the system lined? (required if not treated or if above SHWT)	
5.60	ac	A = Area draining to the practice	
1.51	ac	A_I = Impervious area draining to the practice	
26.5	minutes	T_c = Time of Concentration	
0.27	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.29	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x i)	
1.64	ac-in	WQV= 1" x Rv x A	
5,963	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1	inches	P = Amount of rainfall. For WQF in NH, P = 1".	
0.29	inches	D_{WQ} = Water quality depth. D_{WQ} = WQV/A	
89	unitless	CN = Unit peak discharge curve number. $CN = 1000/(10+5P+10Q-10*[Q^2 + 1.25*Q*P]^{0.5})$	
1.20	inches	S = Potential maximum retention. S = (1000/CN) - 10	
0.241	inches	Ia = initial abstraction. Ia = 0.2S	
350	cfs/mi^2/in	q_u = Unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III	
0.90	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac	
100.00	feet	L = Swale length [1]	**≥ 100'**
4.00	feet	w = Bottom of the swale width [2]	**0 - 8 feet**
	feet	E_{SHWT} = Elevation of SHWT. If none found, use the lowest elev. of test pit.	
32.25	feet	E_{BTM} = Elevation of the bottom of the practice	**≥ E_{SHWT}**
3.0	:1	SS_{RIGHT} = Right side slope	**≥3:1**
3.0	:1	SS_{LEFT} = Left side slope	**≥3:1**
0.017	ft/ft	S = Slope of swale in decimal form [3]	**0.005 - .05**
4.0	inches	d = Flow depth in swale at WQF (attach stage-discharge table)	**≤ 4"**
0.15	unitless	d must be < 4", therefore Manning's n = 0.15	
1.67	ft^2	Cross-sectional area check (assume trapezoidal channel)	
6.11	feet	Check wetted perimeter	
0.90	cfs	WQF_{check}. [4]	**WQF_{check} = WQF?**
0%		Percent difference between WQF_{check} and WQF [4]	**+/- 10%**
3	minutes	HRT = hydraulic residence time during the WQF	**≥ 10 min**
37.08	ft	Peak elevation of the 10-year storm event [5]	
38.25	ft	Elevation of the top of the swale	
YES	Yes/No	10 peak elevation ≤ the top of swale	**← yes**

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. If > 0.02 (2%) then check dams are required. No additional detention time is credited for check dams.
4. The WQF_{check} & WQF should be near equal (within 10%) if you have selected the correct depth off the stage-
5. If the swale does not discharge the 50-year storm without overtopping, hydrologic routing of secondary discharge

Designer's Notes:

Summary for Reach 2R: Pre-Treatment Swale

Inflow Area = 5.631 ac, 26.83% Impervious, Inflow Depth = 0.25" for 2.32" event
Inflow = 0.90 cfs @ 12.21 hrs, Volume= 0.117 af
Outflow = 0.88 cfs @ 12.26 hrs, Volume= 0.117 af, Atten= 2%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Max. Velocity= 0.54 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.20 fps, Avg. Travel Time= 7.7 min

Peak Storage= 149 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 5.98'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 28.91 cfs

4.00' x 2.00' deep channel, n= 0.150
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 90.0' Slope= 0.0167 '/'
Inlet Invert= 36.50', Outlet Invert= 35.00'

Stage-Discharge for Reach 2R: Pre-Treatment Swale

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
36.50	0.00	0.00	37.03	0.70	2.07	37.56	1.02	7.75
36.51	0.05	0.00	37.04	0.70	2.14	37.57	1.02	7.90
36.52	0.09	0.01	37.05	0.71	2.21	37.58	1.03	8.05
36.53	0.12	0.02	37.06	0.72	2.29	37.59	1.03	8.20
36.54	0.15	0.02	37.07	0.73	2.36	37.60	1.04	8.35
36.55	0.17	0.04	37.08	0.73	2.44	37.61	1.04	8.50
36.56	0.19	0.05	37.09	0.74	2.52	37.62	1.05	8.65
36.57	0.21	0.06	37.10	0.75	2.60	37.63	1.05	8.81
36.58	0.23	0.08	37.11	0.75	2.68	37.64	1.06	8.97
36.59	0.25	0.10	37.12	0.76	2.76	37.65	1.07	9.13
36.60	0.26	0.11	37.13	0.77	2.85	37.66	1.07	9.29
36.61	0.28	0.13	37.14	0.77	2.93	37.67	1.08	9.45
36.62	0.29	0.15	37.15	0.78	3.02	37.68	1.08	9.61
36.63	0.31	0.18	37.16	0.79	3.11	37.69	1.09	9.78
36.64	0.32	0.20	37.17	0.79	3.20	37.70	1.09	9.94
36.65	0.34	0.23	37.18	0.80	3.29	37.71	1.10	10.11
36.66	0.35	0.25	37.19	0.81	3.38	37.72	1.10	10.28
36.67	0.36	0.28	37.20	0.81	3.47	37.73	1.10	10.45
36.68	0.38	0.31	37.21	0.82	3.57	37.74	1.11	10.62
36.69	0.39	0.34	37.22	0.83	3.66	37.75	1.11	10.80
36.70	0.40	0.37	37.23	0.83	3.76	37.76	1.12	10.97
36.71	0.41	0.40	37.24	0.84	3.86	37.77	1.12	11.15
36.72	0.42	0.43	37.25	0.84	3.96	37.78	1.13	11.33
36.73	0.43	0.47	37.26	0.85	4.06	37.79	1.13	11.51
36.74	0.45	0.50	37.27	0.86	4.16	37.80	1.14	11.70
36.75	0.46	0.54	37.28	0.86	4.26	37.81	1.14	11.88
36.76	0.47	0.58	37.29	0.87	4.37	37.82	1.15	12.07
36.77	0.48	0.62	37.30	0.87	4.48	37.83	1.15	12.26
36.78	0.49	0.66	37.31	0.88	4.58	37.84	1.16	12.44
36.79	0.50	0.70	37.32	0.89	4.69	WQF=0.90 cfs		12.64
36.80	0.51	0.74	37.33	0.89	4.81	Elev @ WQF=0.33'		12.83
36.81	0.52	0.79	37.34	0.90	4.92			13.02
36.82	0.53	0.83	37.35	0.90	5.03	37.88	1.18	13.22
36.83	0.53	0.88	37.36	0.91	5.15	37.89	1.18	13.42
36.84	0.54	0.93	37.37	0.92	5.26	37.90	1.19	13.62
36.85	0.55	0.98	37.38	0.92	5.38	37.91	1.19	13.82
36.86	0.56	1.03	37.39	0.93	5.50	37.92	1.20	14.02
36.87	0.57	1.08	37.40	0.93	5.62	37.93	1.20	14.23
36.88	0.58	1.13	37.41	0.94	5.74	37.94	1.20	14.43
36.89	0.59	1.19	37.42	0.94	5.87	37.95	1.21	14.64
36.90	0.60	1.24	37.43	0.95	5.99	37.96	1.21	14.85
36.91	0.60	1.30	37.44	0.95	6.12	37.97	1.22	15.06
36.92	0.61	1.35	37.45	0.96	6.25	37.98	1.22	15.27
36.93	0.62	1.41	37.46	0.97	6.38	37.99	1.23	15.49
36.94	0.63	1.47	37.47	0.97	6.51	38.00	1.23	15.71
36.95	0.64	1.53	37.48	0.98	6.64	38.01	1.24	15.93
36.96	0.65	1.60	37.49	0.98	6.77	38.02	1.24	16.15
36.97	0.65	1.66	37.50	0.99	6.91	38.03	1.25	16.37
36.98	0.66	1.72	37.51	0.99	7.05	38.04	1.25	16.59
36.99	0.67	1.79	37.52	1.00	7.18	38.05	1.25	16.82
37.00	0.68	1.86	37.53	1.00	7.33	38.06	1.26	17.05
37.01	0.68	1.93	37.54	1.01	7.47	38.07	1.26	17.28
37.02	0.69	2.00	37.55	1.01	7.61	38.08	1.27	17.51

14. DRAINAGE ANALYSIS

14.1 INTRODUCTION

The purpose of this project is to construct a 12-lot residential development on the existing Tax Map 33 Lot 26, on Watson Road, Exeter, NH. The proposed development to be accessed via a proposed 920 linear foot road. This project will be serviced by on-site septic and wells.

14.2 METHODOLOGY

The existing and proposed watersheds were modeled utilizing HydroCad stormwater software, version 9.10. The watersheds were analyzed utilizing the SCS TR-20 methodology for hydrograph development and the TR-55 methodology for Time of Concentration (Tc) determination. The Dynamic-Storage-Indicating method for reach and pond routing was utilized. Type III, 24-hour hydrographs were developed for the 2-year, 10-year, 25-year, and 50-year storm events, corresponding to rainfall events of 3.08", 5.58", 7.10", and 8.52" respectively.

Existing topography and site features were obtained through aerial topography and on-ground topography completed by Jones & Beach Engineers. Existing soil conditions were derived from a combination of a Site Specific Soil Survey conducted by Gove Environmental, and soils information obtained from the NRCS Web Soil Survey.

14.3 EXISTING CONDITIONS ANALYSIS

The study area consists of the subject property and upstream contributing area. The study area contains 60.528 acres including offsite contributing areas. The existing site is currently undeveloped and is significantly forested. The existing site contains a high point located in the central portion of the subject parcel. The site drains away in all directions from this high point resulting in the Analysis Points as defined below.

The majority of the soils for this site are described as Hydrological Soils "B". Sections of soils, typically around the existing wetlands, are described as Hydrological Soils "C" and Hydrological Soils "D".

Four (4) Analysis Points (AP's) were defined for this project. Analysis Points are described as below:

Analysis Point #1 (AP-1) is defined as the south-west property line of the project. Stormwater to this Analysis Point is collected from the south-east portion of the proposed project. Stormwater is collected overland through a series of wetlands and is discharged to Analysis Point #1.

Analysis Point #2 (AP-2) is defined as the entrance to the existing 24" culvert passing under Watson Road located along the north-west property line. Stormwater travels overland to the existing culvert and is passed under Watson Road at this location.

Analysis Point #3 (AP-3) is defined as the east-side of the project development line. This is an arbitrary line defining the extend of the proposed development. Stormwater to this Analysis Point

travels overland, is collected in a series of channels and wetlands and is directed to the large wetland complex located along the eastern portion of the project property.

Analysis Point #4 (AP-4) is defined as the entrance to the existing culvert passing under Watson Road located along the north-west property line and the south of Analysis Point #2. Stormwater travels overland to the existing culvert and is passed under Watson Road at this location.

14.4 PROPOSED CONDITIONS ANALYSIS

The proposed site includes the construction of a 920 linear foot roadway to support a 12-lot residential subdivision.

The addition of the proposed impervious paved areas and buildings causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), the net result being a potential increase in peak rates of runoff from the site. To mitigate the potential increase in the peak rate of runoff and to effectively treat the subsequent stormwater runoff the following Best Management Practices (BMP's) have been employed at the Analysis Points as follows:

The majority of the stormwater associated with the proposed area to be developed including the roadway, and the majority of the driveways and houses is collected in a close drainage system within the proposed roadway. For watersheds 112S, 113S, 114S, 115S, 116S, 117S, 118S, 119S, and 120S, the stormwater will be collected and treated at bioretention facilities 8P, 2P, 3P, 4P, 5P, 9P, 7P, 6P, 10P, respectively, prior to being collected in the closed drainage system. This stormwater is directed to a proposed vegetated pre-treatment swale (2R) located at the south-west corner of the proposed roadway. Stormwater is pre-treated through the vegetated treatment swale and directed to the proposed Infiltration Basin (1P) for treatment and infiltration prior to being discharged. This system then drains to Analysis Point #1 (AP-1).

The drainage paths for stormwater directed to Analysis Points #2 (AP-2), Analysis Point #3 (AP-3), and Analysis Point #4 (AP-4) remain primarily unchanged.

14.5 CLIMATE RISK

Per Section 9.3.3.6 of the Town of Exeter Site and Subdivision Regulations, this project has been evaluated for potential impacts due to climate risk and the potential for increased flooding. The proposed project is located at a sufficient elevation to not be impacted by potential flooding due to climate change as shown on the C-RiSe maps "Town of Exeter – Extent of Projected Tidal Flooding Sea-Level Rise 1.7', 4.0', 6.3'" and "Town of Exeter – Extent of Project Dial Flooding + Storm Surge Sea-Level Rise 1.7', 4.0', 6.3'.

14.5 CONCLUSION

The proposed site development will have minimal adverse effect on abutting infrastructures or properties by way of stormwater runoff or siltation if properly constructed in accordance with this Drainage Analysis and approved project plan set. The post-construction peak rates of runoff for the site will be lower than the existing conditions for all analyzed storm events. Appropriate steps will be taken to control erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, curbing, catch basins with sedimentation sumps, jute matting, vegetated treatment swales, an infiltration basin, bioretention facilities, and rip-rap outlet protection aprons. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced with regular inspections throughout the construction process.

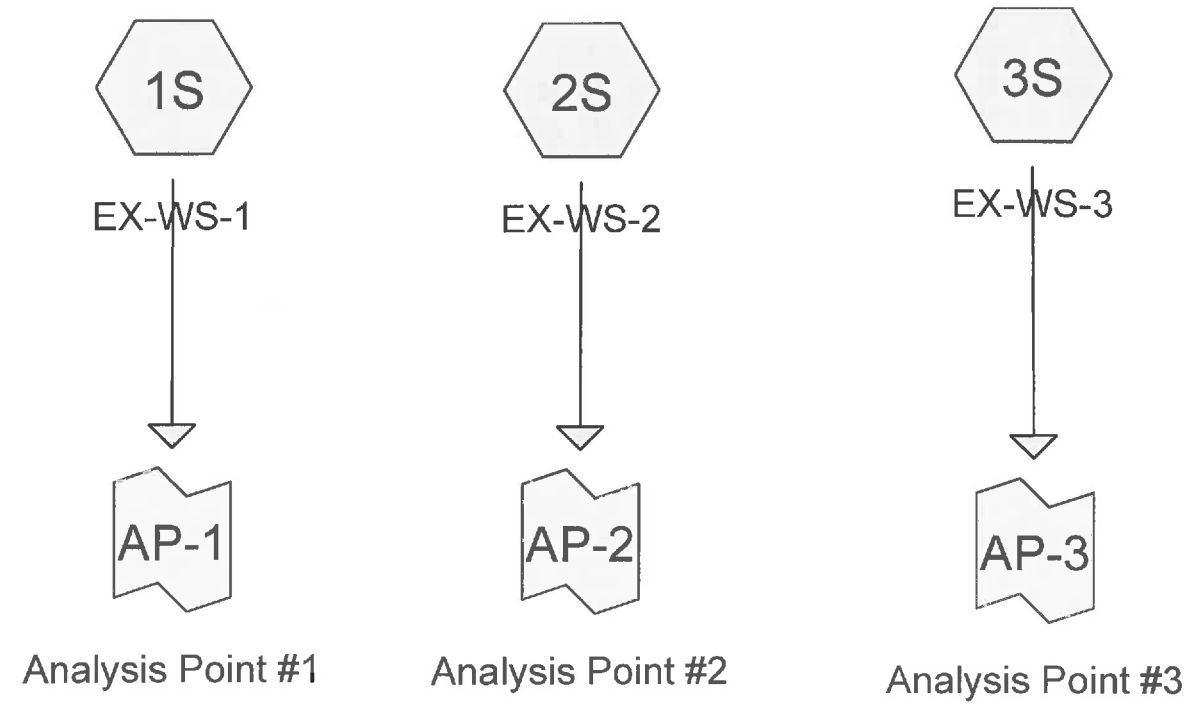
An NHDES Alteration of Terrain Permit (RSA 485:A-17) is required for this site plan due to the area of disturbance being greater than 100,000 square-feet.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

Barry W. Gier, P.E.
Vice-President

14.6 DRAINAGE CALCUALTIONS

PRE-DEVELOPMENT CONDITIONS ANALYSIS



Subcat Reach Pond Link

Routing Diagram for 19102-EXIST-DRAINAGE
Prepared by Jones & Beach Engineers, Printed 8/17/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.586	61	>75% Grass cover, Good, HSG B (1S, 2S)
0.529	74	>75% Grass cover, Good, HSG C (1S, 2S)
0.332	98	Paved roads w/curbs & sewers, HSG B (1S, 2S)
0.214	98	Paved roads w/curbs & sewers, HSG C (1S, 2S)
0.133	98	Water Surface, HSG B (1S, 2S, 3S)
0.005	98	Water Surface, HSG C (1S)
0.383	98	Water Surface, HSG D (2S, 3S)
49.965	55	Woods, Good, HSG B (1S, 2S, 3S)
5.207	70	Woods, Good, HSG C (1S, 2S, 3S)
3.174	77	Woods, Good, HSG D (1S, 2S, 3S)
60.528	**58**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
51.016	HSG B	1S, 2S, 3S
5.955	HSG C	1S, 2S, 3S
3.557	HSG D	1S, 2S, 3S
0.000	Other	
60.528		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=601,682 sf 2.63% Impervious Runoff Depth>0.37"
Flow Length=1,640' Tc=35.0 min CN=61 Runoff=2.52 cfs 0.430 af

Subcatchment2S: EX-WS-2 Runoff Area=786,454 sf 2.43% Impervious Runoff Depth>0.26"
Flow Length=807' Tc=21.8 min CN=57 Runoff=2.15 cfs 0.384 af

Subcatchment3S: EX-WS-3 Runoff Area=1,248,451 sf 0.93% Impervious Runoff Depth>0.28"
Flow Length=1,237' Tc=30.4 min CN=58 Runoff=3.59 cfs 0.673 af

Link AP-1: Analysis Point #1 Inflow=2.52 cfs 0.430 af
Primary=2.52 cfs 0.430 af

Link AP-2: Analysis Point #2 Inflow=2.15 cfs 0.384 af
Primary=2.15 cfs 0.384 af

Link AP-3: Analysis Point #3 Inflow=3.59 cfs 0.673 af
Primary=3.59 cfs 0.673 af

Total Runoff Area = 60.528 ac Runoff Volume = 1.486 af Average Runoff Depth = 0.29"
98.24% Pervious = 59.460 ac 1.76% Impervious = 1.067 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=601,682 sf 2.63% Impervious Runoff Depth>1.14"
Flow Length=1,640' Tc=35.0 min CN=61 Runoff=9.81 cfs 1.312 af

Subcatchment2S: EX-WS-2 Runoff Area=786,454 sf 2.43% Impervious Runoff Depth>0.91"
Flow Length=807' Tc=21.8 min CN=57 Runoff=11.66 cfs 1.368 af

Subcatchment3S: EX-WS-3 Runoff Area=1,248,451 sf 0.93% Impervious Runoff Depth>0.96"
Flow Length=1,237' Tc=30.4 min CN=58 Runoff=17.51 cfs 2.298 af

Link AP-1: Analysis Point #1 Inflow=9.81 cfs 1.312 af
Primary=9.81 cfs 1.312 af

Link AP-2: Analysis Point #2 Inflow=11.66 cfs 1.368 af
Primary=11.66 cfs 1.368 af

Link AP-3: Analysis Point #3 Inflow=17.51 cfs 2.298 af
Primary=17.51 cfs 2.298 af

Total Runoff Area = 60.528 ac Runoff Volume = 4.978 af Average Runoff Depth = 0.99"
98.24% Pervious = 59.460 ac 1.76% Impervious = 1.067 ac

Summary for Subcatchment 1S: EX-WS-1

Runoff = 9.81 cfs @ 12.55 hrs, Volume= 1.312 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
4,192	98	Paved roads w/curbs & sewers, HSG B
14,571	61	>75% Grass cover, Good, HSG B
4,431	98	Water Surface, HSG B
415,950	55	Woods, Good, HSG B
6,952	98	Paved roads w/curbs & sewers, HSG C
19,834	74	>75% Grass cover, Good, HSG C
221	98	Water Surface, HSG C
82,246	70	Woods, Good, HSG C
53,285	77	Woods, Good, HSG D
601,682	61	Weighted Average
585,886		97.37% Pervious Area
15,796		2.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0525	0.11		**Sheet Flow, Through Woods** Woods: Light underbrush n= 0.400 P2= 3.20"
16.7	1,140	0.0520	1.14		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
3.7	400	0.0100	1.80	539.97	**Parabolic Channel, Through Wetland** W=225.00' D=2.00' Area=300.0 sf Perim=225.0' n= 0.100 Heavy timber, flow below branches
35.0	1,640	Total			

Summary for Subcatchment 2S: EX-WS-2

Runoff = 11.66 cfs @ 12.36 hrs, Volume= 1.368 af, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
10,255	98	Paved roads w/curbs & sewers, HSG B
10,937	61	>75% Grass cover, Good, HSG B
213	98	Water Surface, HSG B
696,527	55	Woods, Good, HSG B
2,371	98	Paved roads w/curbs & sewers, HSG C
3,218	74	>75% Grass cover, Good, HSG C
44,539	70	Woods, Good, HSG C
6,260	98	Water Surface, HSG D
12,134	77	Woods, Good, HSG D
786,454	57	Weighted Average
767,355		97.57% Pervious Area
19,099		2.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0610	0.12		**Sheet Flow, Through Woods** Woods: Light underbrush n= 0.400 P2= 3.20"
8.1	707	0.0850	1.46		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
21.8	807	Total			

Summary for Subcatchment 3S: EX-WS-3

[47] Hint: Peak is 109% of capacity of segment #3

Runoff = 17.51 cfs @ 12.50 hrs, Volume= 2.298 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
1,156	98	Water Surface, HSG B
1,064,005	55	Woods, Good, HSG B
100,015	70	Woods, Good, HSG C
10,437	98	Water Surface, HSG D
72,838	77	Woods, Good, HSG D
1,248,451	58	Weighted Average
1,236,858		99.07% Pervious Area
11,593		0.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1110	0.15		**Sheet Flow, Through Woods** Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	396	0.0590	1.21		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
12.1	580	0.0050	0.80	16.01	**Parabolic Channel, Through Wetland** W=30.00' D=1.00' Area=20.0 sf Perim=30.1' n= 0.100 Heavy timber, flow below branches
2.1	161	0.0640	1.26		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
30.4	1,237	Total			

Summary for Link AP-1: Analysis Point #1

Inflow Area = 13.813 ac, 2.63% Impervious, Inflow Depth > 1.14" for 10-YR event
Inflow = 9.81 cfs @ 12.55 hrs, Volume= 1.312 af
Primary = 9.81 cfs @ 12.55 hrs, Volume= 1.312 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link AP-2: Analysis Point #2

Inflow Area = 18.054 ac, 2.43% Impervious, Inflow Depth > 0.91" for 10-YR event
Inflow = 11.66 cfs @ 12.36 hrs, Volume= 1.368 af
Primary = 11.66 cfs @ 12.36 hrs, Volume= 1.368 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link AP-3: Analysis Point #3

Inflow Area = 28.660 ac, 0.93% Impervious, Inflow Depth > 0.96" for 10-YR event
Inflow = 17.51 cfs @ 12.50 hrs, Volume= 2.298 af
Primary = 17.51 cfs @ 12.50 hrs, Volume= 2.298 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=601,682 sf 2.63% Impervious Runoff Depth>1.91"
Flow Length=1,640' Tc=35.0 min CN=61 Runoff=17.25 cfs 2.203 af

Subcatchment2S: EX-WS-2 Runoff Area=786,454 sf 2.43% Impervious Runoff Depth>1.60"
Flow Length=807' Tc=21.8 min CN=57 Runoff=22.39 cfs 2.412 af

Subcatchment3S: EX-WS-3 Runoff Area=1,248,451 sf 0.93% Impervious Runoff Depth>1.68"
Flow Length=1,237' Tc=30.4 min CN=58 Runoff=32.71 cfs 4.001 af

Link AP-1: Analysis Point #1 Inflow=17.25 cfs 2.203 af
Primary=17.25 cfs 2.203 af

Link AP-2: Analysis Point #2 Inflow=22.39 cfs 2.412 af
Primary=22.39 cfs 2.412 af

Link AP-3: Analysis Point #3 Inflow=32.71 cfs 4.001 af
Primary=32.71 cfs 4.001 af

Total Runoff Area = 60.528 ac Runoff Volume = 8.615 af Average Runoff Depth = 1.71"
98.24% Pervious = 59.460 ac 1.76% Impervious = 1.067 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=601,682 sf 2.63% Impervious Runoff Depth>2.73"
Flow Length=1,640' Tc=35.0 min CN=61 Runoff=25.01 cfs 3.143 af

Subcatchment2S: EX-WS-2 Runoff Area=786,454 sf 2.43% Impervious Runoff Depth>2.35"
Flow Length=807' Tc=21.8 min CN=57 Runoff=34.00 cfs 3.541 af

Subcatchment3S: EX-WS-3 Runoff Area=1,248,451 sf 0.93% Impervious Runoff Depth>2.44"
Flow Length=1,237' Tc=30.4 min CN=58 Runoff=48.92 cfs 5.831 af

Link AP-1: Analysis Point #1 Inflow=25.01 cfs 3.143 af
Primary=25.01 cfs 3.143 af

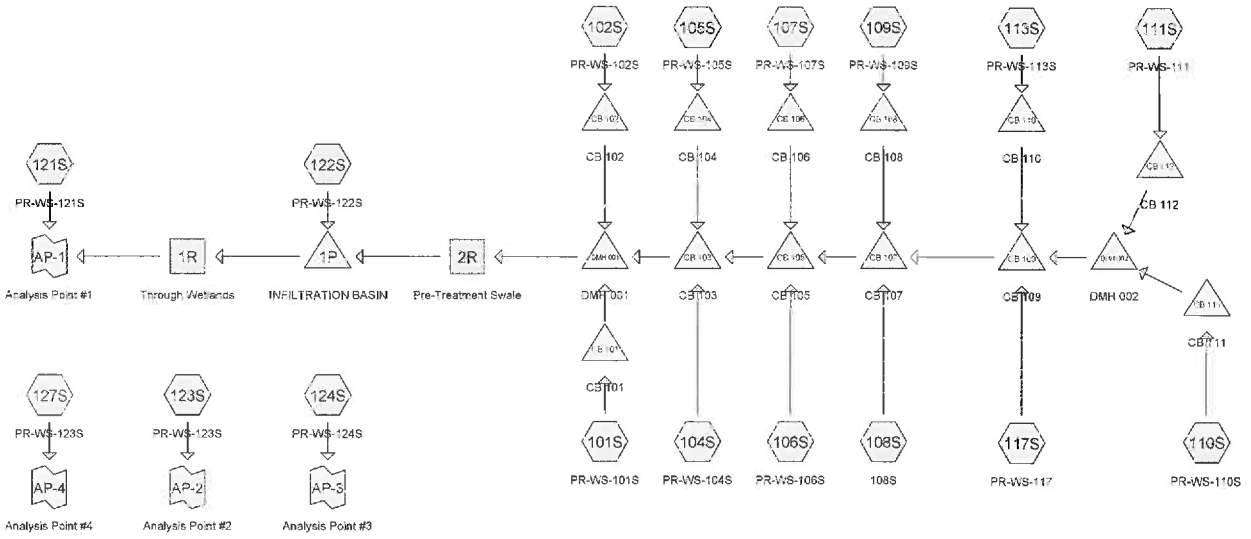
Link AP-2: Analysis Point #2 Inflow=34.00 cfs 3.541 af
Primary=34.00 cfs 3.541 af

Link AP-3: Analysis Point #3 Inflow=48.92 cfs 5.831 af
Primary=48.92 cfs 5.831 af

Total Runoff Area = 60.528 ac Runoff Volume = 12.515 af Average Runoff Depth = 2.48"
98.24% Pervious = 59.460 ac 1.76% Impervious = 1.067 ac

14.7 APPENDIX II

POST-DEVELOPMENT CONDITIONS ANALYSIS



Subcat Reach Pond Link

Routing Diagram for 19102-PROP-DRAINAGE

Prepared by {enter your company name here}, Printed 8/27/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.240	61	>75% Grass cover, Good, HSG B (101S, 102S, 104S, 105S, 106S, 107S, 108S, 109S, 110S, 111S, 113S, 117S, 121S, 122S, 123S, 127S)
1.953	74	>75% Grass cover, Good, HSG C (121S, 122S, 124S)
1.223	80	>75% Grass cover, Good, HSG D (121S)
2.073	98	Paved roads w/curbs & sewers, HSG B (101S, 102S, 104S, 105S, 106S, 107S, 108S, 109S, 110S, 111S, 113S, 117S, 121S, 122S, 123S, 127S)
0.232	98	Paved roads w/curbs & sewers, HSG C (121S, 123S, 127S)
0.102	98	Water Surface, HSG B (122S)
0.005	98	Water Surface, HSG C (122S)
0.383	98	Water Surface, HSG D (123S, 124S)
42.601	55	Woods, Good, HSG B (101S, 104S, 121S, 122S, 123S, 124S, 127S)
3.765	70	Woods, Good, HSG C (104S, 121S, 122S, 123S, 124S, 127S)
1.951	77	Woods, Good, HSG D (123S, 124S)
60.528	**60**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
51.016	HSG B	101S, 102S, 104S, 105S, 106S, 107S, 108S, 109S, 110S, 111S, 113S, 117S, 121S, 122S, 123S, 124S, 127S
5.955	HSG C	104S, 121S, 122S, 123S, 124S, 127S
3.557	HSG D	121S, 123S, 124S
0.000	Other	
60.528		**TOTAL AREA**

Time span=2.00-48.00 hrs, dt=0.02 hrs, 2301 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: PR-WS-101S Runoff Area=28,331 sf 19.34% Impervious Runoff Depth=0.68"
Flow Length=304' Tc=13.1 min CN=67 Runoff=0.34 cfs 0.037 af

Subcatchment102S: PR-WS-102S Runoff Area=6,586 sf 56.48% Impervious Runoff Depth=1.52"
Flow Length=125' Tc=9.4 min CN=82 Runoff=0.24 cfs 0.019 af

Subcatchment104S: PR-WS-104S Runoff Area=27,630 sf 7.46% Impervious Runoff Depth=0.44"
Flow Length=272' Tc=13.5 min CN=61 Runoff=0.16 cfs 0.023 af

Subcatchment105S: PR-WS-105S Runoff Area=7,451 sf 34.17% Impervious Runoff Depth=1.02"
Flow Length=158' Tc=7.3 min CN=74 Runoff=0.19 cfs 0.015 af

Subcatchment106S: PR-WS-106S Runoff Area=14,003 sf 15.16% Impervious Runoff Depth=0.68"
Flow Length=164' Tc=16.7 min CN=67 Runoff=0.15 cfs 0.018 af

Subcatchment107S: PR-WS-107S Runoff Area=6,777 sf 51.56% Impervious Runoff Depth=1.39"
Flow Length=209' Tc=25.7 min CN=80 Runoff=0.15 cfs 0.018 af

Subcatchment108S: 108S Runoff Area=30,236 sf 26.24% Impervious Runoff Depth=0.87"
Flow Length=312' Tc=11.7 min CN=71 Runoff=0.53 cfs 0.050 af

Subcatchment109S: PR-WS-109S Runoff Area=13,684 sf 39.97% Impervious Runoff Depth=1.14"
Flow Length=226' Tc=13.7 min CN=76 Runoff=0.31 cfs 0.030 af

Subcatchment110S: PR-WS-110S Runoff Area=37,990 sf 31.16% Impervious Runoff Depth=0.97"
Flow Length=332' Tc=16.3 min CN=73 Runoff=0.67 cfs 0.070 af

Subcatchment111S: PR-WS-111 Runoff Area=47,559 sf 30.54% Impervious Runoff Depth=0.92"
Flow Length=384' Slope=0.0200 '/' Tc=17.2 min CN=72 Runoff=0.77 cfs 0.083 af

Subcatchment113S: PR-WS-113S Runoff Area=16,187 sf 30.37% Impervious Runoff Depth=0.92"
Flow Length=217' Slope=0.0200 '/' Tc=15.8 min CN=72 Runoff=0.27 cfs 0.028 af

Subcatchment117S: PR-WS-117 Runoff Area=8,861 sf 19.41% Impervious Runoff Depth=0.72"
Flow Length=240' Tc=12.2 min CN=68 Runoff=0.12 cfs 0.012 af

Subcatchment121S: PR-WS-121S Runoff Area=321,535 sf 3.95% Impervious Runoff Depth=0.59"
Flow Length=783' Tc=26.9 min CN=65 Runoff=2.40 cfs 0.363 af

Subcatchment122S: PR-WS-122S Runoff Area=251,220 sf 3.89% Impervious Runoff Depth=0.44"
Flow Length=913' Tc=26.2 min CN=61 Runoff=1.19 cfs 0.209 af

Subcatchment123S: PR-WS-123S Runoff Area=434,895 sf 3.61% Impervious Runoff Depth=0.33"
Flow Length=609' Tc=23.9 min CN=58 Runoff=1.37 cfs 0.278 af

Subcatchment124S: PR-WS-124S Runoff Area=1,216,137 sf 0.86% Impervious Runoff Depth=0.33"
Flow Length=1,064' Tc=28.8 min CN=58 Runoff=3.58 cfs 0.778 af

Subcatchment127S: PR-WS-123S Runoff Area=167,523 sf 4.38% Impervious Runoff Depth=0.40"
Flow Length=371' Tc=10.9 min CN=60 Runoff=0.87 cfs 0.128 af

Reach 1R: Through Wetlands Avg. Flow Depth=0.08' Max Vel=0.21 fps Inflow=0.55 cfs 0.279 af
n=0.100 L=424.0' S=0.0101 '/' Capacity=604.22 cfs Outflow=0.53 cfs 0.279 af

Reach 2R: Pre-TreatmentSwale Avg. Flow Depth=0.35' Max Vel=2.07 fps Inflow=3.67 cfs 0.404 af
n=0.040 L=90.0' S=0.0167 '/' Capacity=108.39 cfs Outflow=3.66 cfs 0.404 af

Pond 1P: INFILTRATIONBASIN Peak Elev=35.33' Storage=12,170 cf Inflow=4.27 cfs 0.614 af
Discarded=0.12 cfs 0.335 af Primary=0.55 cfs 0.279 af Secondary=0.00 cfs 0.000 af Outflow=0.67 cfs 0.614 af

Pond CB 101: CB 101 Peak Elev=38.79' Storage=0.000 af Inflow=0.34 cfs 0.037 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0627 '/' Outflow=0.34 cfs 0.037 af

Pond CB 102: CB 102 Peak Elev=38.74' Storage=0.000 af Inflow=0.24 cfs 0.019 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0300 '/' Outflow=0.24 cfs 0.019 af

Pond CB 103: CB 103 Peak Elev=41.70' Storage=0.000 af Inflow=3.15 cfs 0.348 af
24.0" Round Culvert n=0.012 L=155.0' S=0.0270 '/' Outflow=3.15 cfs 0.348 af

Pond CB 104: CB 104 Peak Elev=43.26' Storage=0.000 af Inflow=0.19 cfs 0.015 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0500 '/' Outflow=0.19 cfs 0.015 af

Pond CB 105: CB 105 Peak Elev=55.19' Storage=0.000 af Inflow=2.87 cfs 0.311 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0750 '/' Outflow=2.87 cfs 0.311 af

Pond CB 106: CB 106 Peak Elev=55.26' Storage=0.000 af Inflow=0.15 cfs 0.018 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.15 cfs 0.018 af

Pond CB 107: CB 107 Peak Elev=68.70' Storage=0.000 af Inflow=2.61 cfs 0.274 af
18.0" Round Culvert n=0.012 L=178.0' S=0.0783 '/' Outflow=2.61 cfs 0.274 af

Pond CB 108: CB 108 Peak Elev=68.88' Storage=0.000 af Inflow=0.31 cfs 0.030 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.31 cfs 0.030 af

Pond CB 109: CB 109 Peak Elev=75.06' Storage=0.000 af Inflow=1.82 cfs 0.195 af
18.0" Round Culvert n=0.012 L=163.0' S=0.0390 '/' Outflow=1.82 cfs 0.195 af

Pond CB 110: CB 110 Peak Elev=75.32' Storage=0.000 af Inflow=0.27 cfs 0.028 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.27 cfs 0.028 af

Pond CB 111: CB 111 Peak Elev=78.26' Storage=5 cf Inflow=0.67 cfs 0.070 af
12.0" Round Culvert n=0.012 L=26.0' S=0.0400 '/' Outflow=0.67 cfs 0.070 af

Pond CB 112: CB 112 Peak Elev=77.90' Storage=0.000 af Inflow=0.77 cfs 0.083 af
12.0" Round Culvert n=0.012 L=32.0' S=0.0200 '/' Outflow=0.77 cfs 0.083 af

Pond DMH 001: DMH 001 Peak Elev=37.62' Storage=12 cf Inflow=3.67 cfs 0.404 af
24.0" Round Culvert n=0.012 L=25.0' S=0.0080 '/' Outflow=3.67 cfs 0.404 af

Pond DMH 002: DMH 002 Peak Elev=77.34' Storage=8 cf Inflow=1.44 cfs 0.154 af
12.0" Round Culvert n=0.012 L=64.0' S=0.0341 '/' Outflow=1.44 cfs 0.154 af

Link AP-1: Analysis Point #1 Inflow=2.40 cfs 0.642 af
Primary=2.40 cfs 0.642 af

Link AP-2: Analysis Point #2 Inflow=1.37 cfs 0.278 af
Primary=1.37 cfs 0.278 af

Link AP-3: Analysis Point #3 Inflow=3.58 cfs 0.778 af
Primary=3.58 cfs 0.778 af

Link AP-4: Analysis Point #4 Inflow=0.87 cfs 0.128 af
Primary=0.87 cfs 0.128 af

Total Runoff Area = 60.528 ac Runoff Volume = 2.161 af Average Runoff Depth = 0.43"
95.38% Pervious = 57.733 ac 4.62% Impervious = 2.795 ac

Time span=2.00-48.00 hrs, dt=0.02 hrs, 2301 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: PR-WS-101S Runoff Area=28,331 sf 19.34% Impervious Runoff Depth=1.70"
Flow Length=304' Tc=13.1 min CN=67 Runoff=0.98 cfs 0.092 af

Subcatchment102S: PR-WS-102S Runoff Area=6,586 sf 56.48% Impervious Runoff Depth=2.95"
Flow Length=125' Tc=9.4 min CN=82 Runoff=0.46 cfs 0.037 af

Subcatchment104S: PR-WS-104S Runoff Area=27,630 sf 7.46% Impervious Runoff Depth=1.28"
Flow Length=272' Tc=13.5 min CN=61 Runoff=0.67 cfs 0.068 af

Subcatchment105S: PR-WS-105S Runoff Area=7,451 sf 34.17% Impervious Runoff Depth=2.25"
Flow Length=158' Tc=7.3 min CN=74 Runoff=0.43 cfs 0.032 af

Subcatchment106S: PR-WS-106S Runoff Area=14,003 sf 15.16% Impervious Runoff Depth=1.70"
Flow Length=164' Tc=16.7 min CN=67 Runoff=0.44 cfs 0.046 af

Subcatchment107S: PR-WS-107S Runoff Area=6,777 sf 51.56% Impervious Runoff Depth=2.76"
Flow Length=209' Tc=25.7 min CN=80 Runoff=0.31 cfs 0.036 af

Subcatchment108S: 108S Runoff Area=30,236 sf 26.24% Impervious Runoff Depth=2.00"
Flow Length=312' Tc=11.7 min CN=71 Runoff=1.32 cfs 0.116 af

Subcatchment109S: PR-WS-109S Runoff Area=13,684 sf 39.97% Impervious Runoff Depth=2.41"
Flow Length=226' Tc=13.7 min CN=76 Runoff=0.69 cfs 0.063 af

Subcatchment110S: PR-WS-110S Runoff Area=37,990 sf 31.16% Impervious Runoff Depth=2.16"
Flow Length=332' Tc=16.3 min CN=73 Runoff=1.60 cfs 0.157 af

Subcatchment111S: PR-WS-111 Runoff Area=47,559 sf 30.54% Impervious Runoff Depth=2.08"
Flow Length=384' Slope=0.0200 '/' Tc=17.2 min CN=72 Runoff=1.88 cfs 0.190 af

Subcatchment113S: PR-WS-113S Runoff Area=16,187 sf 30.37% Impervious Runoff Depth=2.08"
Flow Length=217' Slope=0.0200 '/' Tc=15.8 min CN=72 Runoff=0.66 cfs 0.065 af

Subcatchment117S: PR-WS-117 Runoff Area=8,861 sf 19.41% Impervious Runoff Depth=1.77"
Flow Length=240' Tc=12.2 min CN=68 Runoff=0.33 cfs 0.030 af

Subcatchment121S: PR-WS-121S Runoff Area=321,535 sf 3.95% Impervious Runoff Depth=1.55"
Flow Length=783' Tc=26.9 min CN=65 Runoff=7.52 cfs 0.956 af

Subcatchment122S: PR-WS-122S Runoff Area=251,220 sf 3.89% Impervious Runoff Depth=1.28"
Flow Length=913' Tc=26.2 min CN=61 Runoff=4.67 cfs 0.615 af

Subcatchment123S: PR-WS-123S Runoff Area=434,895 sf 3.61% Impervious Runoff Depth=1.09"
Flow Length=609' Tc=23.9 min CN=58 Runoff=6.76 cfs 0.905 af

Subcatchment124S: PR-WS-124S Runoff Area=1,216,137 sf 0.86% Impervious Runoff Depth=1.09"
Flow Length=1,064' Tc=28.8 min CN=58 Runoff=17.50 cfs 2.530 af

Subcatchment127S: PR-WS-123S Runoff Area=167,523 sf 4.38% Impervious Runoff Depth=1.21"
Flow Length=371' Tc=10.9 min CN=60 Runoff=4.07 cfs 0.389 af

Reach 1R: Through Wetlands Avg. Flow Depth=0.20' Max Vel=0.39 fps Inflow=4.62 cfs 1.178 af
n=0.100 L=424.0' S=0.0101 '/' Capacity=604.22 cfs Outflow=4.12 cfs 1.178 af

Reach 2R: Pre-Treatment Swale Avg. Flow Depth=0.58' Max Vel=2.76 fps Inflow=9.30 cfs 0.931 af
n=0.040 L=90.0' S=0.0167 '/' Capacity=108.39 cfs Outflow=9.29 cfs 0.931 af

Pond 1P: INFILTRATION BASIN Peak Elev=36.02' Storage=23,024 cf Inflow=12.69 cfs 1.546 af
Discarded=0.15 cfs 0.360 af Primary=4.62 cfs 1.178 af Secondary=0.00 cfs 0.000 af Outflow=4.77 cfs 1.537 af

Pond CB 101: CB 101 Peak Elev=39.01' Storage=0.000 af Inflow=0.98 cfs 0.092 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0627 '/' Outflow=0.98 cfs 0.092 af

Pond CB 102: CB 102 Peak Elev=38.84' Storage=0.000 af Inflow=0.46 cfs 0.037 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0300 '/' Outflow=0.46 cfs 0.037 af

Pond CB 103: CB 103 Peak Elev=42.21' Storage=0.000 af Inflow=7.95 cfs 0.801 af
24.0" Round Culvert n=0.012 L=155.0' S=0.0270 '/' Outflow=7.95 cfs 0.801 af

Pond CB 104: CB 104 Peak Elev=43.37' Storage=0.000 af Inflow=0.43 cfs 0.032 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0500 '/' Outflow=0.43 cfs 0.032 af

Pond CB 105: CB 105 Peak Elev=55.82' Storage=0.000 af Inflow=7.01 cfs 0.702 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0750 '/' Outflow=7.01 cfs 0.702 af

Pond CB 106: CB 106 Peak Elev=55.83' Storage=0.000 af Inflow=0.31 cfs 0.036 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.31 cfs 0.036 af

Pond CB 107: CB 107 Peak Elev=69.25' Storage=0.000 af Inflow=6.32 cfs 0.620 af
18.0" Round Culvert n=0.012 L=178.0' S=0.0783 '/' Outflow=6.32 cfs 0.620 af

Pond CB 108: CB 108 Peak Elev=69.32' Storage=0.000 af Inflow=0.69 cfs 0.063 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.69 cfs 0.063 af

Pond CB 109: CB 109 Peak Elev=75.48' Storage=0.000 af Inflow=4.44 cfs 0.441 af
18.0" Round Culvert n=0.012 L=163.0' S=0.0390 '/' Outflow=4.44 cfs 0.441 af

Pond CB 110: CB 110 Peak Elev=75.62' Storage=0.000 af Inflow=0.66 cfs 0.065 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.66 cfs 0.065 af

Pond CB 111: CB 111 Peak Elev=78.55' Storage=9 cf Inflow=1.60 cfs 0.157 af
12.0" Round Culvert n=0.012 L=26.0' S=0.0400 '/' Outflow=1.60 cfs 0.157 af

Pond CB 112: CB 112 Peak Elev=78.39' Storage=0.000 af Inflow=1.88 cfs 0.190 af
12.0" Round Culvert n=0.012 L=32.0' S=0.0200 '/' Outflow=1.88 cfs 0.190 af

Pond DMH 001: DMH 001 Peak Elev=38.30' Storage=20 cf Inflow=9.30 cfs 0.931 af
24.0" Round Culvert n=0.012 L=25.0' S=0.0080 '/' Outflow=9.30 cfs 0.931 af

Pond DMH 002: DMH 002 Peak Elev=78.04' Storage=17 cf Inflow=3.48 cfs 0.347 af
12.0" Round Culvert n=0.012 L=64.0' S=0.0341 '/' Outflow=3.48 cfs 0.347 af

Link AP-1: Analysis Point #1 Inflow=7.91 cfs 2.134 af
Primary=7.91 cfs 2.134 af

Link AP-2: Analysis Point #2 Inflow=6.76 cfs 0.905 af
Primary=6.76 cfs 0.905 af

Link AP-3: Analysis Point #3 Inflow=17.50 cfs 2.530 af
Primary=17.50 cfs 2.530 af

Link AP-4: Analysis Point #4 Inflow=4.07 cfs 0.389 af
Primary=4.07 cfs 0.389 af

Total Runoff Area = 60.528 ac Runoff Volume = 6.325 af Average Runoff Depth = 1.25"
95.38% Pervious = 57.733 ac 4.62% Impervious = 2.795 ac

Summary for Subcatchment 101S: PR-WS-101S

Runoff = 0.98 cfs @ 12.19 hrs, Volume= 0.092 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
5,478	98	Paved roads w/curbs & sewers, HSG B
16,999	61	>75% Grass cover, Good, HSG B
5,854	55	Woods, Good, HSG B
28,331	67	Weighted Average
22,853		80.66% Pervious Area
5,478		19.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	51	0.1180	2.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	103	0.0580	1.69		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.1	304	Total			

Summary for Subcatchment 102S: PR-WS-102S

Runoff = 0.46 cfs @ 12.13 hrs, Volume= 0.037 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
3,720	98	Paved roads w/curbs & sewers, HSG B
2,866	61	>75% Grass cover, Good, HSG B
6,586	82	Weighted Average
2,866		43.52% Pervious Area
3,720		56.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0600	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.2	25	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.4	125	Total			

Summary for Subcatchment 104S: PR-WS-104S

Runoff = 0.67 cfs @ 12.21 hrs, Volume= 0.068 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
2,062	98	Paved roads w/curbs & sewers, HSG B
7,836	61	>75% Grass cover, Good, HSG B
15,717	55	Woods, Good, HSG B
2,015	70	Woods, Good, HSG C
27,630	61	Weighted Average
25,568		92.54% Pervious Area
2,062		7.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0800	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	97	0.2890	2.69		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	75	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	272	Total			

Summary for Subcatchment 105S: PR-WS-105S

Runoff = 0.43 cfs @ 12.11 hrs, Volume= 0.032 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
2,546	98	Paved roads w/curbs & sewers, HSG B
4,905	61	>75% Grass cover, Good, HSG B
7,451	74	Weighted Average
4,905		65.83% Pervious Area
2,546		34.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.1400	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.7	58	0.0340	1.29		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	158	Total			

Summary for Subcatchment 106S: PR-WS-106S

Runoff = 0.44 cfs @ 12.24 hrs, Volume= 0.046 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
2,123	98	Paved roads w/curbs & sewers, HSG B
11,880	61	>75% Grass cover, Good, HSG B
14,003	67	Weighted Average
11,880		84.84% Pervious Area
2,123		15.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.2	35	0.2290	3.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	29	0.2290	3.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.7	164	Total			

Summary for Subcatchment 107S: PR-WS-107S

Runoff = 0.31 cfs @ 12.36 hrs, Volume= 0.036 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
3,494	98	Paved roads w/curbs & sewers, HSG B
3,283	61	>75% Grass cover, Good, HSG B
6,777	80	Weighted Average
3,283		48.44% Pervious Area
3,494		51.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.9	109	0.0920	2.12		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
25.7	209	Total			

Summary for Subcatchment 108S: 108S

Runoff = 1.32 cfs @ 12.17 hrs, Volume= 0.116 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
7,933	98	Paved roads w/curbs & sewers, HSG B
22,303	61	>75% Grass cover, Good, HSG B
30,236	71	Weighted Average
22,303		73.76% Pervious Area
7,933		26.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0560	0.18		**Sheet Flow, Through Grass** Grass: Dense n= 0.240 P2= 3.20"
1.2	116	0.0560	1.66		**Shallow Concentrated Flow, Through Grass** Short Grass Pasture Kv= 7.0 fps
1.0	96	0.0300	1.60		**Sheet Flow, Over Pavement** Smooth surfaces n= 0.011 P2= 3.20"
11.7	312	Total			

Summary for Subcatchment 109S: PR-WS-109S

Runoff = 0.69 cfs @ 12.19 hrs, Volume= 0.063 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
5,470	98	Paved roads w/curbs & sewers, HSG B
8,214	61	>75% Grass cover, Good, HSG B
13,684	76	Weighted Average
8,214		60.03% Pervious Area
5,470		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	92	0.0200	0.11		**Sheet Flow, Through Grass** Grass: Dense n= 0.240 P2= 3.20"
0.4	134	0.0790	5.71		**Shallow Concentrated Flow, Over Pavement** Paved Kv= 20.3 fps
13.7	226	Total			

Summary for Subcatchment 110S: PR-WS-110S

Runoff = 1.60 cfs @ 12.23 hrs, Volume= 0.157 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
11,839	98	Paved roads w/curbs & sewers, HSG B
26,151	61	>75% Grass cover, Good, HSG B
37,990	73	Weighted Average
26,151		68.84% Pervious Area
11,839		31.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	100	0.0200	0.12		**Sheet Flow, Through Grass** Grass: Dense n= 0.240 P2= 3.20"
1.4	126	0.0450	1.48		**Shallow Concentrated Flow, Through Grass** Short Grass Pasture Kv= 7.0 fps
0.6	106	0.0200	2.87		**Shallow Concentrated Flow, Over Pavement** Paved Kv= 20.3 fps
16.3	332	Total			

Summary for Subcatchment 111S: PR-WS-111

Runoff = 1.88 cfs @ 12.24 hrs, Volume= 0.190 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
14,525	98	Paved roads w/curbs & sewers, HSG B
33,034	61	>75% Grass cover, Good, HSG B
47,559	72	Weighted Average
33,034		69.46% Pervious Area
14,525		30.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	100	0.0200	0.12		**Sheet Flow, Through Grass** Grass: Dense n= 0.240 P2= 3.20"
1.9	115	0.0200	0.99		**Shallow Concentrated Flow, Through Grass** Short Grass Pasture Kv= 7.0 fps
1.0	169	0.0200	2.87		**Shallow Concentrated Flow, Over Pavement** Paved Kv= 20.3 fps
17.2	384	Total			

Summary for Subcatchment 113S: PR-WS-113S

Runoff = 0.66 cfs @ 12.23 hrs, Volume= 0.065 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
4,916	98	Paved roads w/curbs & sewers, HSG B
11,271	61	>75% Grass cover, Good, HSG B
16,187	72	Weighted Average
11,271		69.63% Pervious Area
4,916		30.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	100	0.0200	0.12		**Sheet Flow, Through Grass** Grass: Dense n= 0.240 P2= 3.20"
1.2	72	0.0200	0.99		**Shallow Concentrated Flow, Through Grass** Short Grass Pasture Kv= 7.0 fps
0.3	45	0.0200	2.87		**Shallow Concentrated Flow, Over Pavement** Paved Kv= 20.3 fps
15.8	217	Total			

Summary for Subcatchment 117S: PR-WS-117

Runoff = 0.33 cfs @ 12.18 hrs, Volume= 0.030 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
1,720	98	Paved roads w/curbs & sewers, HSG B
7,141	61	>75% Grass cover, Good, HSG B
8,861	68	Weighted Average
7,141		80.59% Pervious Area
1,720		19.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0400	0.15		**Sheet Flow, Through Grass** Grass: Dense n= 0.240 P2= 3.20"
1.2	100	0.0400	1.40		**Shallow Concentrated Flow, Through Grass** Short Grass Pasture Kv= 7.0 fps
0.2	40	0.0270	3.34		**Shallow Concentrated Flow, Over Pavement** Paved Kv= 20.3 fps
12.2	240	Total			

Summary for Subcatchment 121S: PR-WS-121S

[47] Hint: Peak is 105% of capacity of segment #4

Runoff = 7.52 cfs @ 12.41 hrs, Volume= 0.956 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
4,933	98	Paved roads w/curbs & sewers, HSG B
16,623	61	>75% Grass cover, Good, HSG B
173,444	55	Woods, Good, HSG B
7,752	98	Paved roads w/curbs & sewers, HSG C
28,102	74	>75% Grass cover, Good, HSG C
37,395	70	Woods, Good, HSG C
53,286	80	>75% Grass cover, Good, HSG D
321,535	65	Weighted Average
308,850		96.05% Pervious Area
12,685		3.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	43	0.0150	1.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
7.7	57	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
8.6	258	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	425	0.0100	0.71	7.14	**Parabolic Channel,** W=30.00' D=0.50' Area=10.0 sf Perim=30.0' n= 0.100
26.9	783	Total			

Summary for Subcatchment 122S: PR-WS-122S

Runoff = 4.67 cfs @ 12.41 hrs, Volume= 0.615 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

	Area (sf)	CN	Description
	5,114	98	Paved roads w/curbs & sewers, HSG B
*	56,381	61	>75% Grass cover, Good, HSG B
	4,431	98	Water Surface, HSG B
	147,504	55	Woods, Good, HSG B
	33,098	74	>75% Grass cover, Good, HSG C
	221	98	Water Surface, HSG C
	4,471	70	Woods, Good, HSG C
	251,220	61	Weighted Average
	241,454		96.11% Pervious Area
	9,766		3.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	60	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	120	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	326	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.5	307	0.0850	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.2	913	Total			

Summary for Subcatchment 123S: PR-WS-123S

Runoff = 6.76 cfs @ 12.39 hrs, Volume= 0.905 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
8,830	98	Paved roads w/curbs & sewers, HSG B
15,516	61	>75% Grass cover, Good, HSG B
0	98	Water Surface, HSG B
369,224	55	Woods, Good, HSG B
623	98	Paved roads w/curbs & sewers, HSG C
0	74	>75% Grass cover, Good, HSG C
22,308	70	Woods, Good, HSG C
6,260	98	Water Surface, HSG D
12,134	77	Woods, Good, HSG D
434,895	58	Weighted Average
419,182		96.39% Pervious Area
15,713		3.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	100	0.0400	0.10		**Sheet Flow, Through Woods** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	100	0.0460	1.07		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
1.2	157	0.2000	2.24		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
4.8	252	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.9	609	Total			

Summary for Subcatchment 124S: PR-WS-124S

[47] Hint: Peak is 109% of capacity of segment #3

Runoff = 17.50 cfs @ 12.47 hrs, Volume= 2.530 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
0	98	Water Surface, HSG B
1,032,849	55	Woods, Good, HSG B
23,864	74	>75% Grass cover, Good, HSG C
76,152	70	Woods, Good, HSG C
10,436	98	Water Surface, HSG D
72,836	77	Woods, Good, HSG D
1,216,137	58	Weighted Average
1,205,701		99.14% Pervious Area
10,436		0.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1110	0.15		**Sheet Flow, Through Woods** Woods: Light underbrush n= 0.400 P2= 3.20"
4.7	296	0.0450	1.06		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
12.1	580	0.0050	0.80	16.01	**Parabolic Channel, Through Wetlands** W=30.00' D=1.00' Area=20.0 sf Perim=30.1' n= 0.100
1.2	88	0.0600	1.22		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
28.8	1,064	Total			

Summary for Subcatchment 127S: PR-WS-123S

Runoff = 4.07 cfs @ 12.17 hrs, Volume= 0.389 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YR Rainfall=4.85"

Area (sf)	CN	Description
5,589	98	Paved roads w/curbs & sewers, HSG B
27,424	61	>75% Grass cover, Good, HSG B
0	98	Water Surface, HSG B
111,102	55	Woods, Good, HSG B
1,748	98	Paved roads w/curbs & sewers, HSG C
0	74	>75% Grass cover, Good, HSG C
21,660	70	Woods, Good, HSG C
167,523	60	Weighted Average
160,186		95.62% Pervious Area
7,337		4.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.1800	0.27		**Sheet Flow, THROUGH GRASS** Grass: Dense n= 0.240 P2= 3.20"
2.5	20	0.1800	0.14		**Sheet Flow, Through Woods** Woods: Light underbrush n= 0.400 P2= 3.20"
1.0	130	0.1800	2.12		**Shallow Concentrated Flow, Through Woods** Woodland Kv= 5.0 fps
2.3	141	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	371	Total			

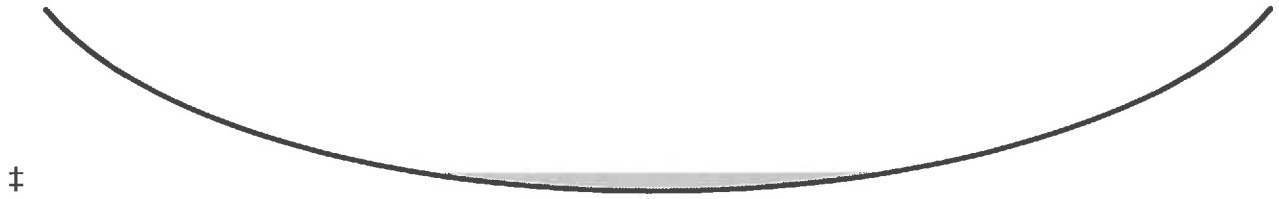
Summary for Reach 1R: Through Wetlands

Inflow Area = 11.398 ac, 15.22% Impervious, Inflow Depth = 1.24" for 10-YR event
Inflow = 4.62 cfs @ 12.81 hrs, Volume= 1.178 af
Outflow = 4.12 cfs @ 13.13 hrs, Volume= 1.178 af, Atten= 11%, Lag= 19.5 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Max. Velocity= 0.39 fps, Min. Travel Time= 18.1 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 43.8 min

Peak Storage= 4,469 cf @ 13.13 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 79.05'
Bank-Full Depth= 2.00' Flow Area= 333.3 sf, Capacity= 604.22 cfs

250.00' x 2.00' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 424.0' Slope= 0.0101 '/'
Inlet Invert= 30.00', Outlet Invert= 25.70'



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Summary for Reach 2R: Pre-Treatment Swale

Inflow Area = 5.631 ac, 26.84% Impervious, Inflow Depth = 1.98" for 10-YR event
Inflow = 9.30 cfs @ 12.21 hrs, Volume= 0.931 af
Outflow = 9.29 cfs @ 12.22 hrs, Volume= 0.931 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Max. Velocity= 2.76 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 1.7 min

Peak Storage= 303 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.58' , Surface Width= 7.51'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 108.39 cfs

4.00' x 2.00' deep channel, n= 0.040
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 90.0' Slope= 0.0167 '/'
Inlet Invert= 36.50', Outlet Invert= 35.00'

‡

Summary for Pond 1P: INFILTRATION BASIN

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.76' @ 12.92 hrs

Inflow Area = 11.398 ac, 15.22% Impervious, Inflow Depth = 1.63" for 10-YR event
Inflow = 12.69 cfs @ 12.26 hrs, Volume= 1.546 af
Outflow = 4.77 cfs @ 12.81 hrs, Volume= 1.537 af, Atten= 62%, Lag= 32.6 min
Discarded = 0.15 cfs @ 12.81 hrs, Volume= 0.360 af
Primary = 4.62 cfs @ 12.81 hrs, Volume= 1.178 af
Secondary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 36.02' @ 12.81 hrs Surf.Area= 16,570 sf Storage= 23,024 cf

Plug-Flow detention time= 247.8 min calculated for 1.537 af (99% of inflow)
Center-of-Mass det. time= 245.1 min (1,115.8 - 870.6)

Volume	Invert	Avail.Storage	Storage Description
#1	34.50'	59,764 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)
34.50	13,954	477.8	0	0	13,954
35.00	14,677	487.2	7,157	7,157	14,715
36.00	16,540	658.6	15,599	22,756	30,354
37.00	18,476	693.2	17,499	40,255	34,137
38.00	20,560	715.0	19,509	59,764	36,679

Device	Routing	Invert	Outlet Devices
#1	Device 5	35.02'	**20.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 5	37.50'	**4.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)
#3	Secondary	37.50'	**10.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	34.50'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 30.00'
#5	Primary	33.00'	**24.0" Round Culvert** L= 86.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.00' / 32.00' S= 0.0115 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Discarded OutFlow Max=0.15 cfs @ 12.81 hrs HW=36.02' (Free Discharge)
└**4=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=4.62 cfs @ 12.81 hrs HW=36.02' TW=30.18' (Dynamic Tailwater)
└**5=Culvert** (Passes 4.62 cfs of 21.48 cfs potential flow)
  ├**1=Orifice/Grate** (Orifice Controls 4.62 cfs @ 3.40 fps)
  └**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 2.00 hrs HW=34.50' TW=30.00' (Dynamic Tailwater)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond CB 101: CB 101

Inflow Area = 0.650 ac, 19.34% Impervious, Inflow Depth = 1.70" for 10-YR event
Inflow = 0.98 cfs @ 12.19 hrs, Volume= 0.092 af
Outflow = 0.98 cfs @ 12.19 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.1 min
Primary = 0.98 cfs @ 12.19 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 39.01' @ 12.19 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 0.092 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (864.2 - 863.9)

Volume	Invert	Avail.Storage	Storage Description
#1	38.50'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.50'	**12.0" Round P-201** L= 11.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 38.50' / 37.81' S= 0.0627 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.98 cfs @ 12.19 hrs HW=39.01' TW=38.29' (Dynamic Tailwater)
↑—**1=P-201** (Inlet Controls 0.98 cfs @ 2.43 fps)

Summary for Pond CB 102: CB 102

Inflow Area = 0.151 ac, 56.48% Impervious, Inflow Depth = 2.95" for 10-YR event
Inflow = 0.46 cfs @ 12.13 hrs, Volume= 0.037 af
Outflow = 0.46 cfs @ 12.13 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.1 min
Primary = 0.46 cfs @ 12.13 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 38.84' @ 12.13 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.5 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (821.2 - 820.7)

Volume	Invert	Avail.Storage	Storage Description
#1	38.50'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.50'	**12.0" Round P-202** L= 23.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 38.50' / 37.81' S= 0.0300 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.13 hrs HW=38.84' TW=38.17' (Dynamic Tailwater)
↑—**1=P-202** (Inlet Controls 0.46 cfs @ 1.98 fps)

Summary for Pond CB 103: CB 103

Inflow Area = 4.830 ac, 26.92% Impervious, Inflow Depth = 1.99" for 10-YR event
Inflow = 7.95 cfs @ 12.22 hrs, Volume= 0.801 af
Outflow = 7.95 cfs @ 12.22 hrs, Volume= 0.801 af, Atten= 0%, Lag= 0.0 min
Primary = 7.95 cfs @ 12.22 hrs, Volume= 0.801 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 42.21' @ 12.22 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.2 min calculated for 0.801 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (855.0 - 854.9)

Volume	Invert	Avail.Storage	Storage Description
#1	40.95'	0.002 af	**4.00'D x 6.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.95'	**24.0" Round P-222** L= 155.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.95' / 36.77' S= 0.0270 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=7.94 cfs @ 12.22 hrs HW=42.21' TW=38.30' (Dynamic Tailwater)
↑—**1=P-222** (Inlet Controls 7.94 cfs @ 3.82 fps)

Summary for Pond CB 104: CB 104

Inflow Area = 0.171 ac, 34.17% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 0.43 cfs @ 12.11 hrs, Volume= 0.032 af
Outflow = 0.43 cfs @ 12.11 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.1 min
Primary = 0.43 cfs @ 12.11 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 43.37' @ 12.11 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.5 min calculated for 0.032 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (840.7 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	43.05'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.05'	**12.0" Round P-203** L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.05' / 41.95' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.11 hrs HW=43.37' TW=42.02' (Dynamic Tailwater)
↑—**1=P-203** (Inlet Controls 0.42 cfs @ 1.93 fps)

Summary for Pond CB 105: CB 105

Inflow Area = 4.024 ac, 29.68% Impervious, Inflow Depth = 2.09" for 10-YR event
Inflow = 7.01 cfs @ 12.22 hrs, Volume= 0.702 af
Outflow = 7.01 cfs @ 12.22 hrs, Volume= 0.702 af, Atten= 0%, Lag= 0.0 min
Primary = 7.01 cfs @ 12.22 hrs, Volume= 0.702 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 55.82' @ 12.22 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.2 min calculated for 0.702 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (853.0 - 852.9)

Volume	Invert	Avail.Storage	Storage Description
#1	54.40'	0.001 af	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	54.40'	**18.0" Round P-223** L= 165.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.40' / 42.02' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=7.00 cfs @ 12.22 hrs HW=55.82' TW=42.21' (Dynamic Tailwater)
↑—**1=P-223** (Inlet Controls 7.00 cfs @ 4.05 fps)

Summary for Pond CB 106: CB 106

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.156 ac, 51.56% Impervious, Inflow Depth = 2.76" for 10-YR event
Inflow = 0.31 cfs @ 12.36 hrs, Volume= 0.036 af
Outflow = 0.31 cfs @ 12.36 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.36 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 55.83' @ 12.22 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.6 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (842.0 - 841.4)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	**12.0" Round P-204** L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.00' / 54.49' S= 0.0232 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.36 hrs HW=55.63' TW=55.61' (Dynamic Tailwater)
↑—**1=P-204** (Outlet Controls 0.28 cfs @ 0.78 fps)

Summary for Pond CB 107: CB 107

Inflow Area = 3.547 ac, 30.03% Impervious, Inflow Depth = 2.10" for 10-YR event
Inflow = 6.32 cfs @ 12.21 hrs, Volume= 0.620 af
Outflow = 6.32 cfs @ 12.22 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min
Primary = 6.32 cfs @ 12.22 hrs, Volume= 0.620 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 69.25' @ 12.22 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.1 min calculated for 0.620 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (852.4 - 852.3)

Volume	Invert	Avail.Storage	Storage Description
#1	67.95'	0.001 af	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	67.95'	**18.0" Round P-224** L= 178.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 67.95' / 54.02' S= 0.0783 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=6.31 cfs @ 12.22 hrs HW=69.25' TW=55.81' (Dynamic Tailwater)
↑—**1=P-224** (Inlet Controls 6.31 cfs @ 3.88 fps)

Summary for Pond CB 108: CB 108

Inflow Area = 0.314 ac, 39.97% Impervious, Inflow Depth = 2.41" for 10-YR event
Inflow = 0.69 cfs @ 12.19 hrs, Volume= 0.063 af
Outflow = 0.69 cfs @ 12.20 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.2 min
Primary = 0.69 cfs @ 12.20 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 69.32' @ 12.21 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.7 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (841.3 - 840.9)

Volume	Invert	Avail.Storage	Storage Description
#1	68.55'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	68.55'	**12.0" Round P-209** L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.55' / 68.04' S= 0.0232 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.20 hrs HW=69.31' TW=69.24' (Dynamic Tailwater)
↑—**1=P-209** (Outlet Controls 0.71 cfs @ 1.52 fps)

Summary for Pond CB 109: CB 109

Inflow Area = 2.539 ac, 29.84% Impervious, Inflow Depth = 2.09" for 10-YR event
Inflow = 4.44 cfs @ 12.24 hrs, Volume= 0.441 af
Outflow = 4.44 cfs @ 12.24 hrs, Volume= 0.441 af, Atten= 0%, Lag= 0.0 min
Primary = 4.44 cfs @ 12.24 hrs, Volume= 0.441 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 75.48' @ 12.24 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.1 min calculated for 0.441 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (854.0 - 853.9)

Volume	Invert	Avail.Storage	Storage Description
#1	74.45'	0.001 af	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	74.45'	**18.0" Round P-225** L= 163.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 74.45' / 68.09' S= 0.0390 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=4.43 cfs @ 12.24 hrs HW=75.47' TW=69.24' (Dynamic Tailwater)
↑—**1=P-225** (Inlet Controls 4.43 cfs @ 3.45 fps)

Summary for Pond CB 110: CB 110

Inflow Area = 0.372 ac, 30.37% Impervious, Inflow Depth = 2.08" for 10-YR event
Inflow = 0.66 cfs @ 12.23 hrs, Volume= 0.065 af
Outflow = 0.66 cfs @ 12.23 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.1 min
Primary = 0.66 cfs @ 12.23 hrs, Volume= 0.065 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 75.62' @ 12.23 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.4 min calculated for 0.064 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (853.6 - 853.2)

Volume	Invert	Avail.Storage	Storage Description
#1	75.05'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	75.05'	**12.0" Round P-206** L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.05' / 74.54' S= 0.0232 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.66 cfs @ 12.23 hrs HW=75.62' TW=75.47' (Dynamic Tailwater)
↑—**1=P-206** (Outlet Controls 0.66 cfs @ 2.07 fps)

Summary for Pond CB 111: CB 111

Inflow Area = 0.872 ac, 31.16% Impervious, Inflow Depth = 2.16" for 10-YR event
Inflow = 1.60 cfs @ 12.23 hrs, Volume= 0.157 af
Outflow = 1.60 cfs @ 12.23 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.3 min
Primary = 1.60 cfs @ 12.23 hrs, Volume= 0.157 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 78.55' @ 12.24 hrs Surf.Area= 13 sf Storage= 9 cf

Plug-Flow detention time= 0.2 min calculated for 0.157 af (100% of inflow)

Center-of-Mass det. time= 0.2 min (851.3 - 851.1)

Volume	Invert	Avail.Storage	Storage Description
#1	77.85'	50 cf	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	77.85'	**12.0" Round P-207** L= 26.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.85' / 76.81' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.60 cfs @ 12.23 hrs HW=78.54' TW=78.04' (Dynamic Tailwater)
↑**1=P-207** (Outlet Controls 1.60 cfs @ 3.87 fps)

Summary for Pond CB 112: CB 112

Inflow Area =	1.092 ac, 30.54% Impervious, Inflow Depth = 2.08"	for 10-YR event		
Inflow =	1.88 cfs @ 12.24 hrs, Volume=	0.190 af		
Outflow =	1.88 cfs @ 12.25 hrs, Volume=	0.190 af,	Atten= 0%,	Lag= 0.1 min
Primary =	1.88 cfs @ 12.25 hrs, Volume=	0.190 af		

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 78.39' @ 12.24 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.2 min calculated for 0.189 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (854.7 - 854.5)

Volume	Invert	Avail.Storage	Storage Description
#1	77.45'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	77.45'	**12.0" Round P-211** L= 32.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.45' / 76.81' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.88 cfs @ 12.25 hrs HW=78.39' TW=78.04' (Dynamic Tailwater)
↑**1=P-211** (Outlet Controls 1.88 cfs @ 3.19 fps)

Summary for Pond DMH 001: DMH 001

Inflow Area =	5.631 ac, 26.84% Impervious, Inflow Depth = 1.98"	for 10-YR event		
Inflow =	9.30 cfs @ 12.21 hrs, Volume=	0.931 af		
Outflow =	9.30 cfs @ 12.21 hrs, Volume=	0.931 af,	Atten= 0%,	Lag= 0.0 min
Primary =	9.30 cfs @ 12.21 hrs, Volume=	0.931 af		

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 38.30' @ 12.21 hrs Surf.Area= 13 sf Storage= 20 cf

Plug-Flow detention time= 0.1 min calculated for 0.930 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (854.6 - 854.5)

Volume	Invert	Avail.Storage	Storage Description
#1	36.70'	73 cf	**4.00'D x 5.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	36.70'	**24.0" Round P-221** L= 25.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 36.70' / 36.50' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=9.28 cfs @ 12.21 hrs HW=38.30' TW=37.08' (Dynamic Tailwater)
↑—**1=P-221** (Barrel Controls 9.28 cfs @ 4.72 fps)

Summary for Pond DMH 002: DMH 002

Inflow Area = 1.964 ac, 30.82% Impervious, Inflow Depth = 2.12" for 10-YR event
Inflow = 3.48 cfs @ 12.24 hrs, Volume= 0.347 af
Outflow = 3.48 cfs @ 12.24 hrs, Volume= 0.347 af, Atten= 0%, Lag= 0.1 min
Primary = 3.48 cfs @ 12.24 hrs, Volume= 0.347 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 78.04' @ 12.24 hrs Surf.Area= 13 sf Storage= 17 cf

Plug-Flow detention time= 0.2 min calculated for 0.347 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (853.3 - 853.2)

Volume	Invert	Avail.Storage	Storage Description
#1	76.70'	50 cf	**4.00'D x 4.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	76.70'	**12.0" Round P-226** L= 64.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 76.70' / 74.52' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.47 cfs @ 12.24 hrs HW=78.04' TW=75.47' (Dynamic Tailwater)
↑—**1=P-226** (Inlet Controls 3.47 cfs @ 4.42 fps)

Summary for Link AP-1: Analysis Point #1

Inflow Area = 18.780 ac, 10.79% Impervious, Inflow Depth = 1.36" for 10-YR event
Inflow = 7.91 cfs @ 12.47 hrs, Volume= 2.134 af
Primary = 7.91 cfs @ 12.47 hrs, Volume= 2.134 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs

Summary for Link AP-2: Analysis Point #2

Inflow Area = 9.984 ac, 3.61% Impervious, Inflow Depth = 1.09" for 10-YR event
Inflow = 6.76 cfs @ 12.39 hrs, Volume= 0.905 af
Primary = 6.76 cfs @ 12.39 hrs, Volume= 0.905 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs

Summary for Link AP-3: Analysis Point #3

Inflow Area = 27.919 ac, 0.86% Impervious, Inflow Depth = 1.09" for 10-YR event
Inflow = 17.50 cfs @ 12.47 hrs, Volume= 2.530 af
Primary = 17.50 cfs @ 12.47 hrs, Volume= 2.530 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs

Summary for Link AP-4: Analysis Point #4

Inflow Area = 3.846 ac, 4.38% Impervious, Inflow Depth = 1.21" for 10-YR event
Inflow = 4.07 cfs @ 12.17 hrs, Volume= 0.389 af
Primary = 4.07 cfs @ 12.17 hrs, Volume= 0.389 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-48.00 hrs, dt= 0.02 hrs

Time span=2.00-48.00 hrs, dt=0.02 hrs, 2301 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: PR-WS-101S Runoff Area=28,331 sf 19.34% Impervious Runoff Depth=2.66"
Flow Length=304' Tc=13.1 min CN=67 Runoff=1.59 cfs 0.144 af

Subcatchment102S: PR-WS-102S Runoff Area=6,586 sf 56.48% Impervious Runoff Depth=4.14"
Flow Length=125' Tc=9.4 min CN=82 Runoff=0.65 cfs 0.052 af

Subcatchment104S: PR-WS-104S Runoff Area=27,630 sf 7.46% Impervious Runoff Depth=2.12"
Flow Length=272' Tc=13.5 min CN=61 Runoff=1.18 cfs 0.112 af

Subcatchment105S: PR-WS-105S Runoff Area=7,451 sf 34.17% Impervious Runoff Depth=3.33"
Flow Length=158' Tc=7.3 min CN=74 Runoff=0.64 cfs 0.047 af

Subcatchment106S: PR-WS-106S Runoff Area=14,003 sf 15.16% Impervious Runoff Depth=2.66"
Flow Length=164' Tc=16.7 min CN=67 Runoff=0.71 cfs 0.071 af

Subcatchment107S: PR-WS-107S Runoff Area=6,777 sf 51.56% Impervious Runoff Depth=3.93"
Flow Length=209' Tc=25.7 min CN=80 Runoff=0.43 cfs 0.051 af

Subcatchment108S: 108S Runoff Area=30,236 sf 26.24% Impervious Runoff Depth=3.04"
Flow Length=312' Tc=11.7 min CN=71 Runoff=2.04 cfs 0.176 af

Subcatchment109S: PR-WS-109S Runoff Area=13,684 sf 39.97% Impervious Runoff Depth=3.53"
Flow Length=226' Tc=13.7 min CN=76 Runoff=1.02 cfs 0.092 af

Subcatchment110S: PR-WS-110S Runoff Area=37,990 sf 31.16% Impervious Runoff Depth=3.23"
Flow Length=332' Tc=16.3 min CN=73 Runoff=2.42 cfs 0.235 af

Subcatchment111S: PR-WS-111 Runoff Area=47,559 sf 30.54% Impervious Runoff Depth=3.13"
Flow Length=384' Slope=0.0200 '/' Tc=17.2 min CN=72 Runoff=2.86 cfs 0.285 af

Subcatchment113S: PR-WS-113S Runoff Area=16,187 sf 30.37% Impervious Runoff Depth=3.13"
Flow Length=217' Slope=0.0200 '/' Tc=15.8 min CN=72 Runoff=1.01 cfs 0.097 af

Subcatchment117S: PR-WS-117 Runoff Area=8,861 sf 19.41% Impervious Runoff Depth=2.75"
Flow Length=240' Tc=12.2 min CN=68 Runoff=0.53 cfs 0.047 af

Subcatchment121S: PR-WS-121S Runoff Area=321,535 sf 3.95% Impervious Runoff Depth=2.48"
Flow Length=783' Tc=26.9 min CN=65 Runoff=12.43 cfs 1.523 af

Subcatchment122S: PR-WS-122S Runoff Area=251,220 sf 3.89% Impervious Runoff Depth=2.12"
Flow Length=913' Tc=26.2 min CN=61 Runoff=8.22 cfs 1.019 af

Subcatchment123S: PR-WS-123S Runoff Area=434,895 sf 3.61% Impervious Runoff Depth=1.86"
Flow Length=609' Tc=23.9 min CN=58 Runoff=12.65 cfs 1.551 af

Subcatchment124S: PR-WS-124S Runoff Area=1,216,137 sf 0.86% Impervious Runoff Depth=1.86"
Flow Length=1,064' Tc=28.8 min CN=58 Runoff=32.70 cfs 4.336 af

Subcatchment 127S: PR-WS-123S Runoff Area=167,523 sf 4.38% Impervious Runoff Depth=2.03"
Flow Length=371' Tc=10.9 min CN=60 Runoff=7.35 cfs 0.652 af

Reach 1R: Through Wetlands Avg. Flow Depth=0.28' Max Vel=0.49 fps Inflow=9.39 cfs 2.042 af
n=0.100 L=424.0' S=0.0101 '/' Capacity=604.22 cfs Outflow=8.75 cfs 2.042 af

Reach 2R: Pre-Treatment Swale Avg. Flow Depth=0.74' Max Vel=3.13 fps Inflow=14.32 cfs 1.410 af
n=0.040 L=90.0' S=0.0167 '/' Capacity=108.39 cfs Outflow=14.31 cfs 1.410 af

Pond 1P: INFILTRATION BASIN Peak Elev=36.64' Storage=33,768 cf Inflow=20.70 cfs 2.428 af
Discarded=0.17 cfs 0.374 af Primary=9.39 cfs 2.042 af Secondary=0.00 cfs 0.000 af Outflow=9.56 cfs 2.416 af

Pond CB 101: CB 101 Peak Elev=39.23' Storage=0.000 af Inflow=1.59 cfs 0.144 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0627 '/' Outflow=1.59 cfs 0.144 af

Pond CB 102: CB 102 Peak Elev=39.01' Storage=0.000 af Inflow=0.65 cfs 0.052 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0300 '/' Outflow=0.64 cfs 0.052 af

Pond CB 103: CB 103 Peak Elev=42.61' Storage=0.000 af Inflow=12.24 cfs 1.213 af
24.0" Round Culvert n=0.012 L=155.0' S=0.0270 '/' Outflow=12.24 cfs 1.213 af

Pond CB 104: CB 104 Peak Elev=43.45' Storage=0.000 af Inflow=0.64 cfs 0.047 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0500 '/' Outflow=0.64 cfs 0.047 af

Pond CB 105: CB 105 Peak Elev=56.72' Storage=0.001 af Inflow=10.66 cfs 1.054 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0750 '/' Outflow=10.66 cfs 1.054 af

Pond CB 106: CB 106 Peak Elev=56.76' Storage=0.001 af Inflow=0.43 cfs 0.051 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.45 cfs 0.051 af

Pond CB 107: CB 107 Peak Elev=69.97' Storage=0.001 af Inflow=9.59 cfs 0.931 af
18.0" Round Culvert n=0.012 L=178.0' S=0.0783 '/' Outflow=9.59 cfs 0.931 af

Pond CB 108: CB 108 Peak Elev=70.07' Storage=0.000 af Inflow=1.02 cfs 0.092 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=1.01 cfs 0.092 af

Pond CB 109: CB 109 Peak Elev=75.82' Storage=0.000 af Inflow=6.76 cfs 0.663 af
18.0" Round Culvert n=0.012 L=163.0' S=0.0390 '/' Outflow=6.76 cfs 0.663 af

Pond CB 110: CB 110 Peak Elev=75.94' Storage=0.000 af Inflow=1.01 cfs 0.097 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=1.01 cfs 0.097 af

Pond CB 111: CB 111 Peak Elev=79.59' Storage=22 cf Inflow=2.42 cfs 0.235 af
12.0" Round Culvert n=0.012 L=26.0' S=0.0400 '/' Outflow=2.41 cfs 0.235 af

Pond CB 112: CB 112 Peak Elev=79.75' Storage=0.001 af Inflow=2.86 cfs 0.285 af
12.0" Round Culvert n=0.012 L=32.0' S=0.0200 '/' Outflow=2.87 cfs 0.285 af

Pond DMH 001: DMH 001 Peak Elev=38.85' Storage=27 cf Inflow=14.32 cfs 1.410 af
24.0" Round Culvert n=0.012 L=25.0' S=0.0080 '/' Outflow=14.32 cfs 1.410 af

Pond DMH 002: DMH 002 Peak Elev=79.15' Storage=31 cf Inflow=5.28 cfs 0.520 af
12.0" Round Culvert n=0.012 L=64.0' S=0.0341 '/' Outflow=5.28 cfs 0.520 af

Link AP-1: Analysis Point #1 Inflow=16.14 cfs 3.565 af
Primary=16.14 cfs 3.565 af

Link AP-2: Analysis Point #2 Inflow=12.65 cfs 1.551 af
Primary=12.65 cfs 1.551 af

Link AP-3: Analysis Point #3 Inflow=32.70 cfs 4.336 af
Primary=32.70 cfs 4.336 af

Link AP-4: Analysis Point #4 Inflow=7.35 cfs 0.652 af
Primary=7.35 cfs 0.652 af

Total Runoff Area = 60.528 ac Runoff Volume = 10.489 af Average Runoff Depth = 2.08"
95.38% Pervious = 57.733 ac 4.62% Impervious = 2.795 ac

Time span=2.00-48.00 hrs, dt=0.02 hrs, 2301 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101S: PR-WS-101S Runoff Area=28,331 sf 19.34% Impervious Runoff Depth=3.64"
Flow Length=304' Tc=13.1 min CN=67 Runoff=2.20 cfs 0.197 af

Subcatchment102S: PR-WS-102S Runoff Area=6,586 sf 56.48% Impervious Runoff Depth=5.30"
Flow Length=125' Tc=9.4 min CN=82 Runoff=0.82 cfs 0.067 af

Subcatchment104S: PR-WS-104S Runoff Area=27,630 sf 7.46% Impervious Runoff Depth=3.00"
Flow Length=272' Tc=13.5 min CN=61 Runoff=1.72 cfs 0.159 af

Subcatchment105S: PR-WS-105S Runoff Area=7,451 sf 34.17% Impervious Runoff Depth=4.40"
Flow Length=158' Tc=7.3 min CN=74 Runoff=0.84 cfs 0.063 af

Subcatchment106S: PR-WS-106S Runoff Area=14,003 sf 15.16% Impervious Runoff Depth=3.64"
Flow Length=164' Tc=16.7 min CN=67 Runoff=0.99 cfs 0.097 af

Subcatchment107S: PR-WS-107S Runoff Area=6,777 sf 51.56% Impervious Runoff Depth=5.07"
Flow Length=209' Tc=25.7 min CN=80 Runoff=0.56 cfs 0.066 af

Subcatchment108S: 108S Runoff Area=30,236 sf 26.24% Impervious Runoff Depth=4.07"
Flow Length=312' Tc=11.7 min CN=71 Runoff=2.75 cfs 0.235 af

Subcatchment109S: PR-WS-109S Runoff Area=13,684 sf 39.97% Impervious Runoff Depth=4.62"
Flow Length=226' Tc=13.7 min CN=76 Runoff=1.33 cfs 0.121 af

Subcatchment110S: PR-WS-110S Runoff Area=37,990 sf 31.16% Impervious Runoff Depth=4.29"
Flow Length=332' Tc=16.3 min CN=73 Runoff=3.22 cfs 0.312 af

Subcatchment111S: PR-WS-111 Runoff Area=47,559 sf 30.54% Impervious Runoff Depth=4.18"
Flow Length=384' Slope=0.0200 '/' Tc=17.2 min CN=72 Runoff=3.83 cfs 0.380 af

Subcatchment113S: PR-WS-113S Runoff Area=16,187 sf 30.37% Impervious Runoff Depth=4.18"
Flow Length=217' Slope=0.0200 '/' Tc=15.8 min CN=72 Runoff=1.35 cfs 0.129 af

Subcatchment117S: PR-WS-117 Runoff Area=8,861 sf 19.41% Impervious Runoff Depth=3.74"
Flow Length=240' Tc=12.2 min CN=68 Runoff=0.73 cfs 0.063 af

Subcatchment121S: PR-WS-121S Runoff Area=321,535 sf 3.95% Impervious Runoff Depth=3.42"
Flow Length=783' Tc=26.9 min CN=65 Runoff=17.41 cfs 2.105 af

Subcatchment122S: PR-WS-122S Runoff Area=251,220 sf 3.89% Impervious Runoff Depth=3.00"
Flow Length=913' Tc=26.2 min CN=61 Runoff=11.93 cfs 1.443 af

Subcatchment123S: PR-WS-123S Runoff Area=434,895 sf 3.61% Impervious Runoff Depth=2.69"
Flow Length=609' Tc=23.9 min CN=58 Runoff=18.95 cfs 2.240 af

Subcatchment124S: PR-WS-124S Runoff Area=1,216,137 sf 0.86% Impervious Runoff Depth=2.69"
Flow Length=1,064' Tc=28.8 min CN=58 Runoff=48.90 cfs 6.263 af

Subcatchment127S: PR-WS-123S Runoff Area=167,523 sf 4.38% Impervious Runoff Depth=2.90"
Flow Length=371' Tc=10.9 min CN=60 Runoff=10.79 cfs 0.929 af

Reach 1R: Through Wetlands Avg. Flow Depth=0.33' Max Vel=0.55 fps Inflow=12.78 cfs 2.931 af
n=0.100 L=424.0' S=0.0101 '/' Capacity=604.22 cfs Outflow=12.29 cfs 2.931 af

Reach 2R: Pre-Treatment Swale Avg. Flow Depth=0.86' Max Vel=3.41 fps Inflow=19.33 cfs 1.890 af
n=0.040 L=90.0' S=0.0167 '/' Capacity=108.39 cfs Outflow=19.32 cfs 1.890 af

Pond 1P: INFILTRATION BASIN Peak Elev=37.33' Storage=46,508 cf Inflow=28.82 cfs 3.333 af
Discarded=0.20 cfs 0.387 af Primary=12.78 cfs 2.931 af Secondary=0.00 cfs 0.000 af Outflow=12.98 cfs 3.318 af

Pond CB 101: CB 101 Peak Elev=39.91' Storage=0.000 af Inflow=2.20 cfs 0.197 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0627 '/' Outflow=2.20 cfs 0.197 af

Pond CB 102: CB 102 Peak Elev=39.60' Storage=0.000 af Inflow=0.82 cfs 0.067 af
12.0" Round Culvert n=0.012 L=23.0' S=0.0300 '/' Outflow=0.79 cfs 0.067 af

Pond CB 103: CB 103 Peak Elev=43.14' Storage=0.001 af Inflow=16.53 cfs 1.626 af
24.0" Round Culvert n=0.012 L=155.0' S=0.0270 '/' Outflow=16.53 cfs 1.626 af

Pond CB 104: CB 104 Peak Elev=43.52' Storage=0.000 af Inflow=0.84 cfs 0.063 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0500 '/' Outflow=0.84 cfs 0.063 af

Pond CB 105: CB 105 Peak Elev=57.98' Storage=0.001 af Inflow=14.31 cfs 1.405 af
18.0" Round Culvert n=0.012 L=165.0' S=0.0750 '/' Outflow=14.31 cfs 1.405 af

Pond CB 106: CB 106 Peak Elev=58.05' Storage=0.001 af Inflow=0.56 cfs 0.066 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=0.59 cfs 0.066 af

Pond CB 107: CB 107 Peak Elev=70.98' Storage=0.001 af Inflow=12.85 cfs 1.242 af
18.0" Round Culvert n=0.012 L=178.0' S=0.0783 '/' Outflow=12.85 cfs 1.242 af

Pond CB 108: CB 108 Peak Elev=71.16' Storage=0.001 af Inflow=1.33 cfs 0.121 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=1.32 cfs 0.121 af

Pond CB 109: CB 109 Peak Elev=76.33' Storage=0.001 af Inflow=9.07 cfs 0.885 af
18.0" Round Culvert n=0.012 L=163.0' S=0.0390 '/' Outflow=9.06 cfs 0.885 af

Pond CB 110: CB 110 Peak Elev=76.48' Storage=0.000 af Inflow=1.35 cfs 0.129 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0232 '/' Outflow=1.35 cfs 0.129 af

Pond CB 111: CB 111 Peak Elev=81.43' Storage=45 cf Inflow=3.22 cfs 0.312 af
12.0" Round Culvert n=0.012 L=26.0' S=0.0400 '/' Outflow=3.22 cfs 0.312 af

Pond CB 112: CB 112 Peak Elev=81.73' Storage=0.001 af Inflow=3.83 cfs 0.380 af
12.0" Round Culvert n=0.012 L=32.0' S=0.0200 '/' Outflow=3.84 cfs 0.380 af

Pond DMH 001: DMH 001 Peak Elev=39.54' Storage=36 cf Inflow=19.34 cfs 1.890 af
24.0" Round Culvert n=0.012 L=25.0' S=0.0080 '/' Outflow=19.33 cfs 1.890 af

Pond DMH 002: DMH 002 Peak Elev=80.67' Storage=50 cf Inflow=7.05 cfs 0.692 af
12.0" Round Culvert n=0.012 L=64.0' S=0.0341 '/' Outflow=7.05 cfs 0.692 af

Link AP-1: Analysis Point #1 Inflow=24.49 cfs 5.036 af
Primary=24.49 cfs 5.036 af

Link AP-2: Analysis Point #2 Inflow=18.95 cfs 2.240 af
Primary=18.95 cfs 2.240 af

Link AP-3: Analysis Point #3 Inflow=48.90 cfs 6.263 af
Primary=48.90 cfs 6.263 af

Link AP-4: Analysis Point #4 Inflow=10.79 cfs 0.929 af
Primary=10.79 cfs 0.929 af

Total Runoff Area = 60.528 ac Runoff Volume = 14.870 af Average Runoff Depth = 2.95"
95.38% Pervious = 57.733 ac 4.62% Impervious = 2.795 ac

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.973 degrees West
Latitude	43.011 degrees North
Elevation	0 feet
Date/Time	Tue, 01 Sep 2020 17:35:13 -0400

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	0.66	0.82	1.04	**1yr**	0.71	0.99	1.22	1.57	2.03	2.66	2.87	**1yr**	2.35	2.76	3.16	3.87	4.49	**1yr**
2yr	0.32	0.49	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.51	1.93	2.47	3.18	3.53	**2yr**	2.82	3.39	3.90	4.63	5.27	**2yr**
5yr	0.37	0.58	0.73	0.97	1.25	1.61	**5yr**	1.08	1.46	1.88	2.43	3.13	4.05	4.53	**5yr**	3.58	4.36	4.98	5.90	6.68	**5yr**
10yr	0.41	0.65	0.82	1.12	1.45	1.89	**10yr**	1.25	1.72	2.23	2.89	3.74	4.85	5.49	**10yr**	4.29	5.28	6.00	7.11	7.98	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.34	**25yr**	1.53	2.14	2.78	3.63	4.74	6.17	7.06	**25yr**	5.46	6.79	7.67	9.08	10.12	**25yr**
50yr	0.54	0.86	1.10	1.54	2.08	2.76	**50yr**	1.79	2.52	3.30	4.33	5.68	7.41	8.56	**50yr**	6.55	8.23	9.25	10.94	12.12	**50yr**
100yr	0.60	0.97	1.25	1.78	2.43	3.27	**100yr**	2.09	2.97	3.92	5.18	6.80	8.89	10.37	**100yr**	7.87	9.97	11.14	13.18	14.52	**100yr**
200yr	0.68	1.11	1.43	2.06	2.84	3.85	**200yr**	2.45	3.51	4.64	6.16	8.13	10.68	12.56	**200yr**	9.45	12.08	13.43	15.89	17.40	**200yr**
500yr	0.81	1.32	1.73	2.50	3.50	4.80	**500yr**	3.02	4.38	5.80	7.76	10.31	13.61	16.20	**500yr**	12.04	15.58	17.20	20.37	22.12	**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	0.89	**1yr**	0.64	0.87	0.95	1.24	1.53	2.19	2.52	**1yr**	1.94	2.43	2.87	3.39	3.93	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.87	1.16	1.37	1.82	2.33	3.06	3.43	**2yr**	2.71	3.30	3.80	4.50	5.04	**2yr**
5yr	0.35	0.55	0.68	0.93	1.18	1.41	**5yr**	1.02	1.38	1.62	2.13	2.74	3.75	4.18	**5yr**	3.32	4.02	4.60	5.55	6.20	**5yr**
10yr	0.39	0.60	0.75	1.04	1.35	1.62	**10yr**	1.16	1.59	1.82	2.41	3.08	4.31	4.83	**10yr**	3.81	4.64	5.33	6.48	7.11	**10yr**
25yr	0.45	0.69	0.85	1.22	1.60	1.94	**25yr**	1.38	1.90	2.12	2.80	3.60	4.77	5.85	**25yr**	4.23	5.62	6.44	7.93	8.83	**25yr**
50yr	0.50	0.76	0.95	1.36	1.83	2.23	**50yr**	1.58	2.18	2.36	3.14	4.04	5.38	6.73	**50yr**	4.76	6.47	7.43	9.26	10.21	**50yr**
100yr	0.56	0.85	1.06	1.54	2.11	2.56	**100yr**	1.82	2.50	2.64	3.52	4.52	6.04	7.74	**100yr**	5.35	7.45	8.59	10.80	11.80	**100yr**
200yr	0.63	0.94	1.20	1.73	2.41	2.94	**200yr**	2.08	2.87	2.94	3.94	5.06	6.75	9.64	**200yr**	5.97	9.27	9.92	12.61	13.65	**200yr**
500yr	0.74	1.10	1.41	2.05	2.91	3.55	**500yr**	2.51	3.47	3.41	4.56	5.90	7.80	11.82	**500yr**	6.90	11.36	11.99	15.48	16.52	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.53	0.72	0.88	1.08	**1yr**	0.76	1.06	1.25	1.71	2.17	2.95	3.12	**1yr**	2.61	3.00	3.56	4.23	4.98	**1yr**
2yr	0.33	0.51	0.63	0.85	1.05	1.25	**2yr**	0.91	1.23	1.48	1.94	2.48	3.38	3.64	**2yr**	2.99	3.50	4.03	4.81	5.60	**2yr**
5yr	0.40	0.62	0.76	1.05	1.34	1.60	**5yr**	1.15	1.57	1.86	2.48	3.16	4.35	4.91	**5yr**	3.85	4.73	5.39	6.27	7.17	**5yr**
10yr	0.47	0.72	0.90	1.25	1.62	1.95	**10yr**	1.40	1.91	2.25	3.01	3.79	5.41	6.18	**10yr**	4.79	5.94	6.75	7.76	8.86	**10yr**
25yr	0.58	0.88	1.10	1.57	2.07	2.53	**25yr**	1.78	2.47	2.91	3.90	4.85	7.60	8.39	**25yr**	6.73	8.07	9.06	10.30	11.35	**25yr**
50yr	0.68	1.03	1.29	1.85	2.49	3.07	**50yr**	2.15	3.00	3.53	4.75	5.86	9.52	10.60	**50yr**	8.42	10.20	11.36	12.76	13.94	**50yr**
100yr	0.80	1.21	1.51	2.18	3.00	3.73	**100yr**	2.59	3.64	4.30	5.80	7.10	11.92	13.39	**100yr**	10.55	12.88	14.22	15.83	17.14	**100yr**
200yr	0.94	1.41	1.79	2.58	3.60	4.54	**200yr**	3.11	4.44	5.24	7.07	8.57	14.98	15.75	**200yr**	13.26	15.15	17.83	19.62	21.09	**200yr**
500yr	1.16	1.73	2.22	3.23	4.59	5.86	**500yr**	3.96	5.73	6.80	9.22	11.03	20.28	21.17	**500yr**	17.95	20.35	24.02	26.11	27.78	**500yr**

Powered by ACIS Northeast Regional Climate Center

Project Name:	Watson Road Subdivision	JBE #:	19102
Town/City:	Exeter, NH	Date:	8/25/2021

Rip Rap Outlet Protection Calculation

Outlet Designation: DMH 001 - Rip-Rap #1
Pipe Size (Do): 24 in. 2 ft
Q25 (cfs): 15.41 cfs
Tailwater Elevation (TW)(ft): 1 if TW = 0, assume 3"

Apron Length (La):

TW<Do YES La = 1.8Q/Do^1.5 + 7Do
La = 23.81 ft

TW>Do No La = 3.0Q/Do^1.5 + 7Do
La =

Apron Width (W_2)

TW<Do W_2 = 3Do + La
W_2 = 29.81 ft.

TW>Do W_2 = 3Do + .4La
W_2 = ft.

Rip-Rap Diameter (D_{50}):

D_{50}: D_{50} = 0.02Q^1.3/TW*Do
D_{50} = 0.35 ft. 4.20 in.

Use 3" minimum D_{50} ==> D50 = 4.0 in.

Rip-Rap Thickness (T):

T = 2.5*D_{50}
T = 10.0 in.

Apron Width (W_1):

W_1 = 3*Do
W_1 = 6.00 ft.

Project Name:	Watson Road Subdivision	JBE #:	19102
Town/City:	Exeter, NH	Date:	8/25/2021

Rip Rap Outlet Protection Calculation

Outlet Designation: OS #1 - Rip-Rap #2
Pipe Size (Do): 24 in. 2 ft
Q25 (cfs): 8.74 cfs
Tailwater Elevation (TW)(ft): 1 if TW = 0, assume 3"

Apron Length (La):

TW<Do YES La = 1.8Q/Do^1.5 + 7Do
La = 19.56 ft

TW>Do No La = 3.0Q/Do^1.5 + 7Do
La =

Apron Width (W_2)

TW<Do W_2 = 3Do + La
W_2 = 25.56 ft.

TW>Do W_2 = 3Do + .4La
W_2 = ft.

Rip-Rap Diameter (D_{50}):

D_{50}: D_{50} = 0.02Q^1.3/TW*Do
D_{50} = 0.17 ft. 2.01 in.

Use 3" minimum D_{50} ==> D50 = 12.0 in.

Rip-Rap Thickness (T):

T = 2.5*D_{50}
T = 30.0 in.

Apron Width (W_1):

W_1 = 3*Do
W_1 = 6 ft.

SITE-SPECIFIC SOIL SURVEY REPORT
For
19 Watson Road, Exeter, NH
By
Gove Environmental Services, Inc.

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 5.0, December 2017. 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, Ksat Values for New Hampshire Soils, September 2009.

Scale of soil map:

Approximately 1" equals 100'

Contours:

Intervals of 2 feet

2. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: Spring and summer of 2020

Date(s) of test pits: October 8, 2020

Test pits recorded by: Wayne Morrill, PE and witnessed by Michael Cuomo, CSS, CWS, representing the Rockingham county Conservation District

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Exeter, NH

Location: East of Watson Road. Tax map 33, lot 26 & tax map 40, lot 15..

Size of area: approximately 55 acres

Was the map for the entire lot? No, total lot is 124 acres.

If no, where was the mapping conducted on the parcel: Portion of site adjacent Watson Road, which provides access to the parcel.

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? N/A

Who was the map prepared for? Jones & Beach Engineers

5. SOIL IDENTIFICATION LEGEND

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
125	Scarboro, muck	621	D
135	Chatfield Variant – Newfields Complex	328	B
257	Chatfield – Canton Complex, extremely rocky	228	B
299	Udorthents, smoothed, construction materials	763	C
313	Deerfield, loamy sand	311	B
393	Timakwa, muck	681	D
515	Leicester, very stony	521	C

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%+	E				

6. SOIL MAP UNIT DESCRIPTIONS

125	Scarboro, muck	621	D

The Scarboro, muck map unit is a very poorly drained soil with a histic epipedon. It is found in the wetlands and the bottom of hills and in the lowest depressions. Inclusions would be small areas of poorly drained soils such as Leicester, very stony. The hydrologic group is D because it is virtually saturated or ponded all year.

135	Chatfield Variant – Newfields Complex	328	B

The Chatfield Variant – Newfields Complex is a mix of two soil series that are impossible to separate out into individual map units on the landscape. Chatfield Variant has bedrock between 20 and 40 inches below the soil surface, and is a moderately well drained soil with an ESHWT at less than 40 inches. The Newfields fine sandy loam is also a moderately well drained soil with an ESHWT at less than 40 inches, but with bedrock deeper than 40 inches. The test pits show that many of the Newfields soil profiles has bedrock refusal at the bottom of the pits. Both Chatfield Variant and Newfields have a hydrologic soil group of B. A common inclusion is the soil series Scituate, which is also moderately well drained, but has a sandy hard pan within 40 inches of the soil surface. This would be a limiting inclusion since Scituate has a hydrologic soil group of C. The Chatfield Variant – Newfields Complex is found on the B and C slopes of the site, which are the flatter areas of this broken landscape.

257	Chatfield – Canton Complex, extremely rocky	228	B

The Chatfield – Canton Complex, extremely rocky, is also a mix of two soil series that are impossible to separate out into individual map units on the landscape. The Chatfield has bedrock between 20 and 40 inches deep, but does not have an ESHWT, Canton fine sandy loam has bedrock deeper than 40 inches, and the ESHWT is deeper than 40 inches. Both soils series are considered well to somewhat excessively drained, and both have hydrologic soil groups of B. An inclusion that was found during the test pitting is the soils series Montauk, which also has an ESHWT greater than 40 inches, but has a mineral restrictive layer less than 40 inches, and has a hydrologic group of C. Montauk fine sandy loam would be considered a limiting inclusion. The Chatfield – Canton Complex, extremely rocky, is found on the steeper portions of the site, the D and E slopes, where the ESHWTs are deeper.

299	Udorthents, smoothed, construction materials	763	C

This is a man-made soil area that was debris from the construction of NH Rte 101, as was told to me. The area is a mix of gravels, loams, and construction debris. Test pits were essential failed due to the non-soil debris buried, such as concrete, tar, steel rods, and iron. Because it was compacted, it was assigned a hydrologic group of C.

313	Deerfield, loamy sand	311	B

Deerfield, loamy sand, is an area of outwash soils found in the southern portion of the site. It is a relatively small area. Deerfield is moderately well drained with an ESHWT of 15 to 40 inches. Because of the sandy textures, it has a hydrologic group of B. Deerfield is found on the flat southwestern-most corner of the site.

393	Timakwa, muck	681	D

Timakwa, muck are the deep muck soils on the site. They are found in the wettest wetlands, and are ponded most of the year. Hydrologic group is D.

515	Leicester, very stony	521	C

Leicester, very stony is the poorly drained wetlands on the site. These are mostly forested areas, since they do dry out in the summer of most years. Because of the fluctuating water table of these soils, they have a hydrologic group of C.

7. RESPONSIBLE SOIL SCIENTIST

Name: James P. Gove

Certified Soil Scientist Number: 004

8. OTHER DISTINGUISHING FEATURES OF SITE

Is the site in a natural condition? For the most part these are natural conditions, except for the area adjacent Watson Road mapped as 299.

If no, what is the nature of the disturbance? Buried construction debris.

9. SOIL PROFILE DESCRIPTIONS of DOMINANT SOIL SERIES

1 Newfields, fine sandy loam

Ap 0-9 inches, 10YR3/3 fine sandy loam, granular, friable
Bw1 9 – 24 inches, 10YR5/4 fine sandy loam, granular, friable
Bw2 24 -33 inches, 2.5Y6/4 loamy sand, granular, friable
C 33 – 80 inches, 5Y5/4 loamy sand, massive, friable with redox features
ESHWT = 33 inches

2 Canton fine sandy loam

A 0-4 inches, 10YR3/3 fine sandy loam, granular, friable
Bw1 4 – 19 inches, 10YR5/6 fine sandy loam, granular, friable
Bw2 19 – 51 inches, 2.5Y6/4 loamy sand, granular, friable
C 51 – 76 inches, 2.5Y7/4 loamy sand, massive, friable with redox features
ESHWT = 51 inches

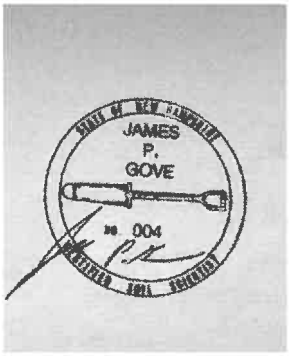
3 Chatfield fine sandy loam

A 0-4 inches, 10YR3/3 fine sandy loam, granular, friable
Bw 4-24 inches, 2.5Y5/6 fine sandy loam, granular, friable
BC 24 – 39 inches, 2.5Y7/4 fine sandy loam, granular, friable
Bedrock at 39 inches.
No ESHWT.

4 Chatfield Variant

A 0-4 inches, 10YR3/3 fine sandy loam, granular, friable
Bw 4-27 inches, 10YR6/4 fine sandy loam, granular, friable
BC 27-33 inches 2.5Y6/3 loamy sand, granular, friable, with redox features
Bedrock at 33 inches
ESHWT = 27 inches

Stamp of CSS



11-02-2020

TEST PITS
FOR
WATSON ROAD
EXETER, NEW HAMPSHIRE
OCTOBER 8, 2020
JBE Project No. 19102

Performed by: Wayne Morrill, Jones & Beach Engineers, Inc., SSD #1358
Witnessed by: Michael Cuomo, Rockingham County Conservation District

Test Pit #1
Failed
Bottom @ 72"
No original ground
Invert fill

Test Pit #1A

0" - 4"		topsoil
4" – 20"	10YR 5/6	yellowish brown loamy sand granular, friable
20" - 34"	2.5Y 5/6	light olive brown loamy sand granular, friable
34" – 75"	2.5Y 7/3	pale yellow loamy sand granular, firm

SHWT = 34"
Roots @ 50"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch

Test Pit #2
Failed
Bottom @ 72"
No original ground
Invert fill

Test Pit #2A

0" - 6"		topsoil
6" – 34"	10YR 5/6	yellowish brown loamy sand granular, friable
34" - 62"	2.5Y 5/6	light olive brown loamy sand granular, friable

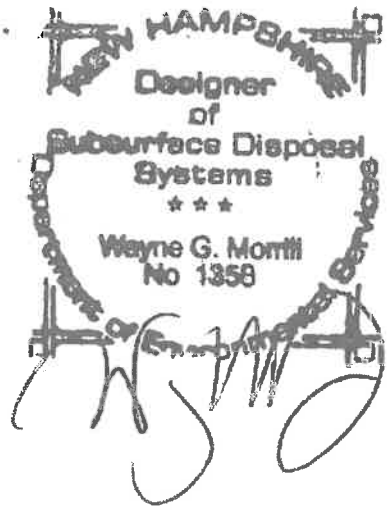
SHWT = 34"
Roots @ 40"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch

Test Pit #3
Failed
SHWT = 18"
Bottom @ 72"

Test Pit #4

0" - 9"		topsoil
9" – 24"	10YR 5/4	yellowish brown loamy sand granular, friable
24" - 33"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
33" – 80"	5Y 5/4	olive loamy sand granular, friable

SHWT = 33"
Roots @ 58"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch



Test Pit #4A

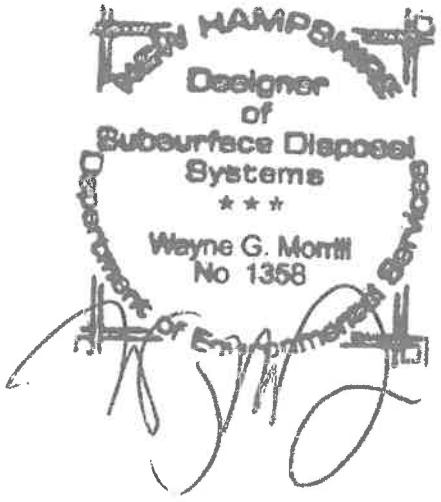
0" - 4"		topsoil
4" – 24"	10YR 5/6	yellowish brown loamy sand granular, friable
24" - 42"	2.5Y 5/6	light olive brown loamy sand granular, friable
42" – 70"	5Y 6/4	pale olive loamy sand granular, friable

SHWT = 42"
Roots @ 59"
No H2O observed
No Refusal observed
Perc Rate = 4 min/inch

Test Pit #5

0" - 4"		topsoil
4" – 42"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
42" - 70"	5Y 5/3	olive loamy sand granular, firm (hard pan)

SHWT = 42"
Roots @ 42"
No H2O observed
No Refusal observed
Perc Rate = 8 min/inch



Test Pit #6

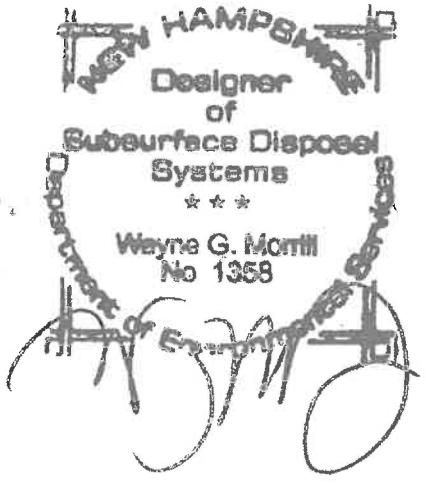
0" - 5"		topsoil
5" – 30"	2.5Y 6/6	olive yellow loamy sand granular, friable
30" - 65"	5Y 5/3	olive loamy sand granular, firm (hard pan)

SHWT = 30"
Roots @ 38"
No H2O observed
No Refusal observed
Perc Rate = 8 min/inch

Test Pit #7

0" - 4"		topsoil
4" – 20"	10YR 5/6	yellowish brown loamy sand granular, friable
20" - 32"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
32" – 40"	2.5Y 6/3	light yellowish brown loamy sand granular, friable

SHWT = 32"
Roots @ 40"
No H2O observed
Refusal @ 51"
Perc Rate = 6 min/inch



Test Pit #8

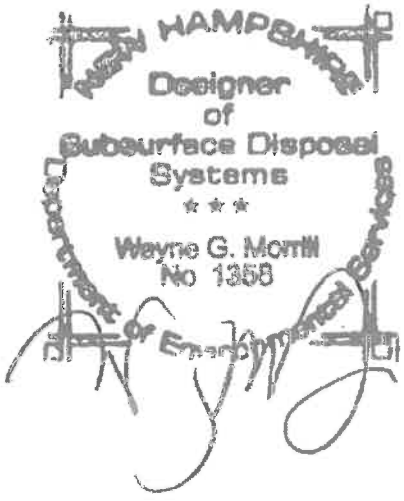
0" - 4"		topsoil
4" – 18"	10YR 5/6	yellowish brown loamy sand granular, friable
18" - 42"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
42" – 86"	2.5Y 5/6	light olive brown loamy sand granular, friable

SHWT = 39"
Roots @ 50"
No H2O observed
No Refusal observed
Perc Rate = 4 min/inch

Test Pit #9

0" - 4"		topsoil
4" – 19"	10YR 5/6	yellowish brown loamy sand granular, friable
19" - 51"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
51" – 76"	2.5Y 7/4	pale yellow loamy sand granular, friable

SHWT = 51"
Roots @ 54"
No H2O observed
Refusal @ 76"
Perc Rate = 4 min/inch



Test Pit #10

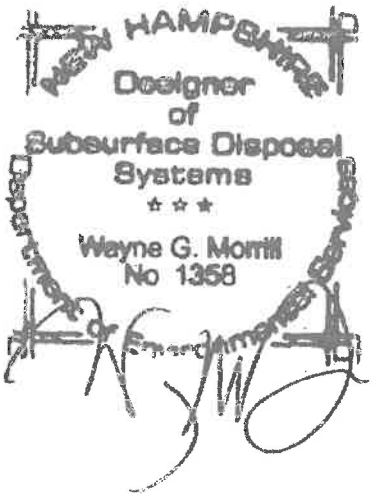
0" - 4"		topsoil
4" – 14"	10YR 5/6	yellowish brown loamy sand granular, friable
14" - 41"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
41" – 62"	2.5Y 6/3	light yellowish brown loamy sand granular, friable

SHWT = 41"
Roots @ 50"
No H2O observed
Refusal @ 62"
Perc Rate = 6 min/inch

Test Pit #11

0" - 4"		topsoil
4" – 20"	10YR 5/6	yellowish brown loamy sand granular, friable
20" - 45"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
45" – 65"	2.5Y 7/4	pale yellow loamy sand granular, friable

SHWT = 45"
Roots @ 60"
No H2O observed
Refusal @ 65"
Perc Rate = 4 min/inch



Test Pit #12

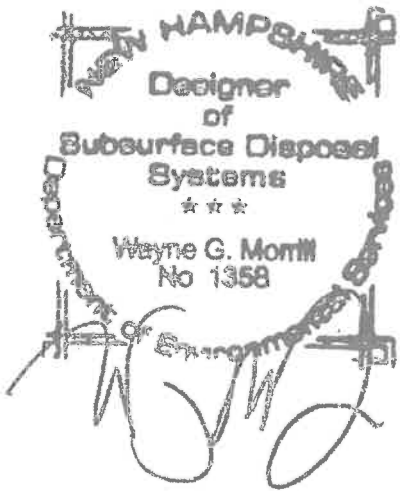
0" - 4"		topsoil
4" – 17"	10YR 6/4	light yellowish brown loamy sand granular, friable
17" - 26"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
26" – 48"	2.5Y 6/3	light yellowish brown loamy sand granular, friable

SHWT = 26"
Roots @ 30"
No H2O observed
Refusal @ 48"
Perc Rate = 10 min/inch

Test Pit #13

0" - 4"		topsoil
4" – 20"	2.5 Y 5/6	light olive brown loamy sand granular, friable
20" - 33"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
33" – 48"	5Y 7/3	pale yellow loamy sand granular, friable

SHWT = 33"
Roots @ 40"
No H2O observed
Refusal @ 48"
Perc Rate = 10 min/inch



Test Pit #14

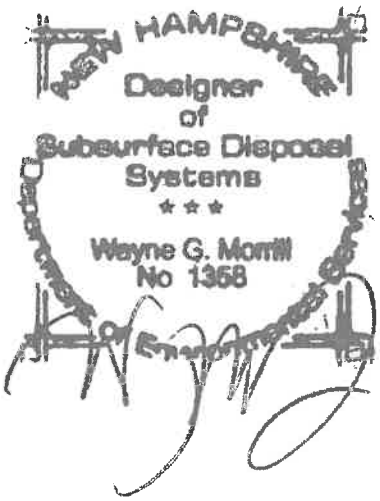
0" - 4"		topsoil
4" – 18"	10YR 6/4	light yellowish brown loamy sand granular, friable
18" - 27"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
27" - 48"	2.5Y 6/3	light yellowish brown loamy sand granular, friable

SHWT = 27"
Roots @ 36"
No H2O observed
Refusal @ 48"
Perc Rate = 10 min/inch

Test Pit #15

0" - 4"		topsoil
4" – 24"	2.5Y 5/6	light olive brown loamy sand granular, friable
24" - 40"	2.5Y 7/4	pale yellow loamy sand granular, friable

No SHWT observed
Roots @ 40"
No H2O observed
Refusal @ 40"
Perc Rate = 10 min/inch



Test Pit #15A

0" - 4"		topsoil
4" – 16"	10YR 5/6	yellowish brown fine sandy loam granular, friable
16" - 42"	2.5Y 6/3	light yellowish brown loamy sand granular, friable
42" – 64"	5Y 7/2	light gray loamy sand granular, friable

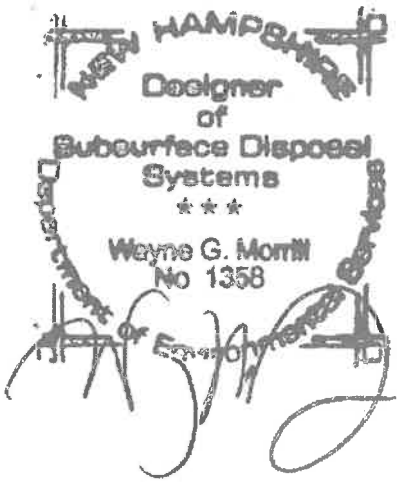
SHWT = 42"
Roots @ 50"
No H2O observed
Refusal @ 64"
Perc Rate = 6 min/inch

Test Pit #16
Failed
Refusal @ 24"

Test Pit #17

0" - 4"		topsoil
4" – 17"	2.5Y 5/4	light olive brown fine sandy loam granular, friable
17" - 37"	2.5Y 5/6	light olive brown loamy sand granular, friable
37" - 73"	5Y 7/3	pale yellow loamy sand granular, friable

SHWT = 37"
Roots @ 51"
No H2O observed
Refusal @ 73"
Perc Rate = 6 min/inch



Test Pit #18

0" - 5"		topsoil
5" – 32"	2.5Y 5/6	light olive brown fine sandy loam granular, friable
32" - 76"	5Y 5/2	olive gray loamy sand granular, firm

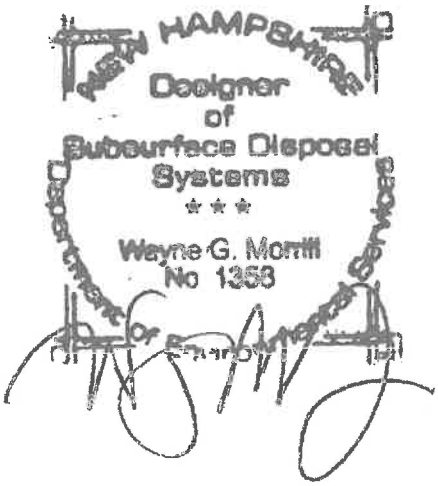
SHWT = 32"
Roots @ 40"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch

Test Pit #19

0" - 3"		topsoil
3" – 24"	10YR 5/6	yellowish brown loamy sand granular, friable
24" - 44"	2.5Y 5/6	light olive brown loamy sand granular, friable
44" – 63"	5Y 6/4	pale olive loamy sand granular, firm

SHWT = 30"
Roots @ 32"
No H2O observed
Refusal @ 63"
Perc Rate = 6 min/inch

Test Pit #20
Failed
SHWT = 20"
Depth @ 78"



Test Pit #20A

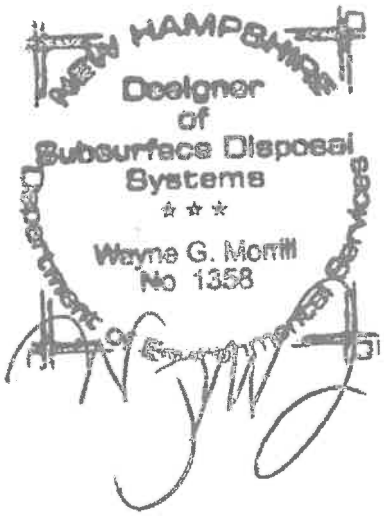
0" - 4"		topsoil
4" – 16"	10YR 5/6	yellowish brown loamy sand granular, friable
16" - 38"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
38" – 63"	2.5Y 6/3	light yellowish brown loamy sand granular, friable

SHWT = 38"
Roots @ 50"
No H2O observed
Refusal @ 63"
Perc Rate = 6 min/inch

Test Pit #21

0" - 6"		topsoil
6" – 24"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
24" - 52"	2.5Y 6/6	olive yellow loamy sand granular, friable
52" – 93"	2.5Y 5/3	light olive brown loamy sand granular, friable

SHWT = 52"
Roots @ 75"
No H2O observed
No Refusal observed
Perc Rate = 4 min/inch



Test Pit #22

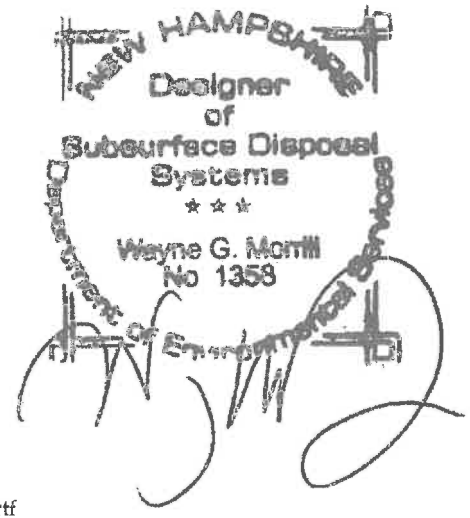
0" - 4"		topsoil
4" – 17"	10YR 5/6	yellowish brown loamy sand granular, friable
17" - 37"	2.5Y 6/6	olive yellow loamy sand granular, friable
37" – 89"	2.5Y 6/4	light yellowish brown loamy sand granular, friable

SHWT = 37"
Roots @ 63"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch

Test Pit #23

0" - 12"		topsoil
12" – 24"	10YR 5/6	yellowish brown loamy sand granular, friable
24" - 57"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
57" – 70"	5Y 6/4	pale olive loamy sand granular, firm

SHWT = 39"
Roots @ 64"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch



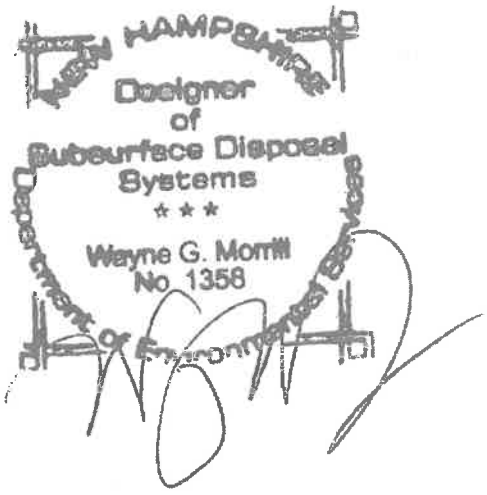
Test Pit #24

0" - 8"		topsoil
8" – 18"	10YR 5/6	yellowish brown loamy sand granular, friable
18" - 41"	2.5Y 6/4	light yellowish brown loamy sand granular, friable
41" – 70"	5Y 6/3	pale olive loamy sand granular, firm

SHWT = 41"
Roots @ 47"
No H2O observed
No Refusal observed
Perc Rate = 4 min/inch

Test Pit #25
No SHWT = 75"
Invert fill

Test Pit #26
No SHWT = 78"
Invert fill



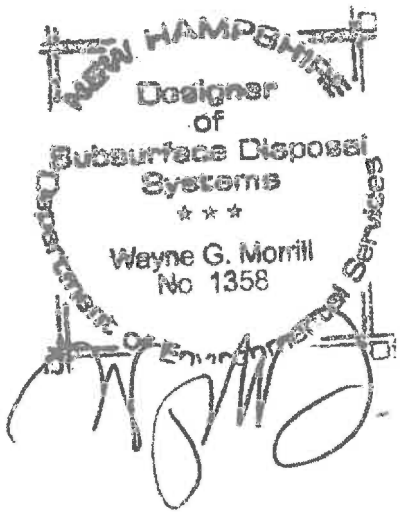
TEST PITS
FOR
WATSON ROAD
EXETER, NEW HAMPSHIRE
MARCH 3, 2021
JBE Project No. 19102

Performed by: Wayne Morrill, Jones & Beach Engineers, Inc., SSD #1358
Witnessed by: Michael Cuomo, Rockingham County Conservation District

Test Pit #27

0" – 6"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
6" - 26"	10YR 6/6	brownish yellow loamy sand massive, friable few roots
26" – 40"	2.5Y 5/4	light olive brown loamy sand massive, friable few roots
40" – 58"	2.5Y 5/4	light olive brown loamy sand massive, friable 2% redox

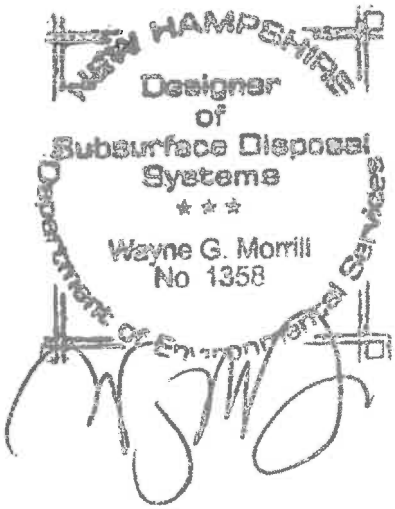
SHWT = 40"
Roots @ 40"
No H2O observed
No Refusal observed
Perc Rate = 4 min/inch



Test Pit #28

0" – 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8" - 20"	10YR 6/6	brownish yellow fine sandy loam massive, friable common roots
20" – 32"	2.5Y 5/4	light olive brown loamy sand massive, friable few roots
32" – 56"	2.5Y 5/4	light olive brown loamy sand blocky, firm 2% redox few roots

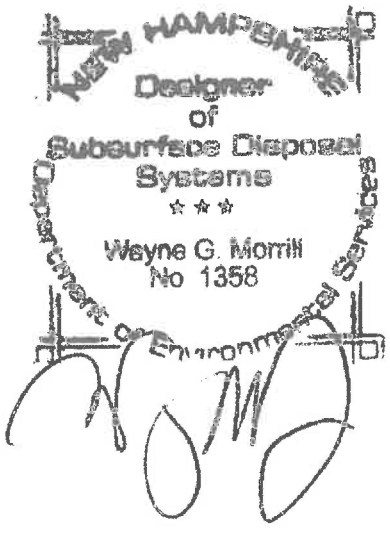
SHWT = 32"
Roots @ 40"
No H2O observed
No Refusal observed
Perc Rate = 8 min/inch



Test Pit #29

0" – 6"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
6" - 32"	2.5Y 5/6	light olive brown loamy sand granular, friable
32" – 48"	2.5Y 6/6	olive yellow loamy sand massive, friable 2% redox
48" – 60"	2.5Y 6/4	light yellowish brown loamy sand blocky, firm 5% redox

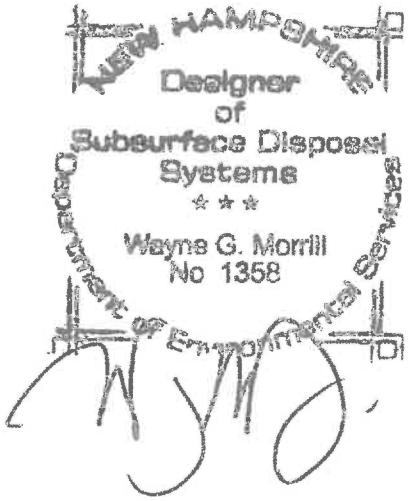
SHWT = 32"
Roots @ 32"
No H2O observed
Refusal @ 60"
Perc Rate = 8 min/inch



Test Pit #30

0" – 4"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
4" - 18"	2.5Y 5/6	light olive brown loamy sand granular, very friable common roots
18" – 30"	2.5Y 6/4	light yellowish brown loamy sand granular, friable few roots
30" – 46"	2.5Y 5/4	light olive brown loamy sand granular, friable 2% redox
46" – 66"	2.5Y 6/4	light yellowish brown loamy sand blocky, firm 5% redox

SHWT = 30"
Roots @ 38"
No H2O observed
Refusal @ 66"
Perc Rate = 8 min/inch



Test Pit #31

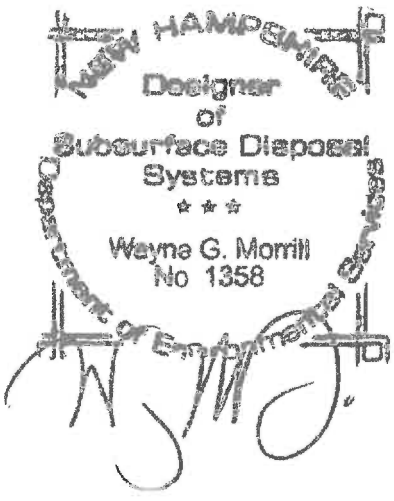
0" – 4"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
4" - 24"	2.5Y 5/6	light olive brown loamy sand massive, very friable common roots
24" – 36"	2.5Y 4/3	olive brown loamy sand blocky, firm 10% redox

SHWT = 24"
Roots @ 24"
No H2O observed
Refusal @ 36"
Perc Rate = 10 min/inch

Test Pit #32

0" – 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8" - 17"	2.5Y 5/6	light olive brown loamy sand granular, friable common roots
17" – 32"	2.5Y 5/4	light olive brown loamy sand massive, very friable 2% redox few roots
32" – 72"	2.5Y 6/4	light yellowish brown loamy sand massive, very friable 10% redox

SHWT = 17"
Roots @ 32"
No H2O observed
No Refusal observed
Perc Rate = 16 min/inch



Test Pit #33

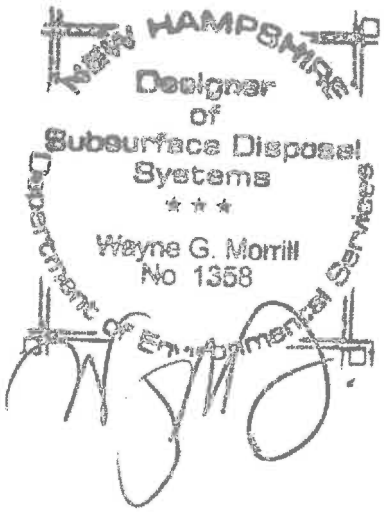
0" – 10"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
10" - 32"	10YR 5/6	yellowish brown loamy sand massive, friable common roots
32" – 59"	2.5Y 5/4	light olive brown loamy sand granular, friable 2% redox boulders

SHWT = 32"
Roots @ 32"
No H2O observed
No Refusal observed
Perc Rate = 6 min/inch

Test Pit #34

0" – 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8" - 28"	10YR 5/6	yellowish brown loamy sand granular, friable common roots
28" – 60"	2.5Y 5/4	light olive brown loamy sand massive, friable 2% redox

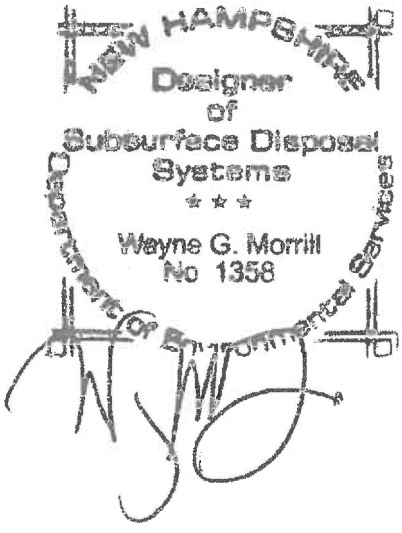
SHWT = 28"
Roots @ 28"
No H2O observed
Refusal @ 60"
Perc Rate = 8 min/inch



Test Pit #35

0" – 6"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
6" - 18"	2.5Y 5/4	light olive brown loamy sand massive, very friable few roots
18" – 44"	2.5Y 5/4	light olive brown loamy sand massive, friable few roots
44" – 70"	2.5Y 6/4	light yellowish brown loamy sand massive, friable 2% redox

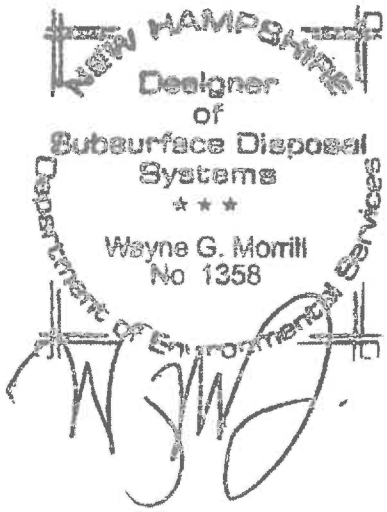
SHWT = 44"
Roots @ 44"
No H2O observed
No Refusal observed
Perc Rate = 4 min/inch



Test Pit #36A

0" – 12"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
12" - 20"	10YR 5/6	yellowish brown fine sandy loam granular, friable common roots
20" – 48"	2.5Y 5/4	light olive brown loamy sand massive, friable 2% redox
48" – 58"	2.5Y 6/4	light yellowish brown loamy sand massive, friable 10% redox boulders

SHWT = 20"
Roots @ 20"
No H2O observed
No Refusal observed
Perc Rate = 12 min/inch



Test Pit #36

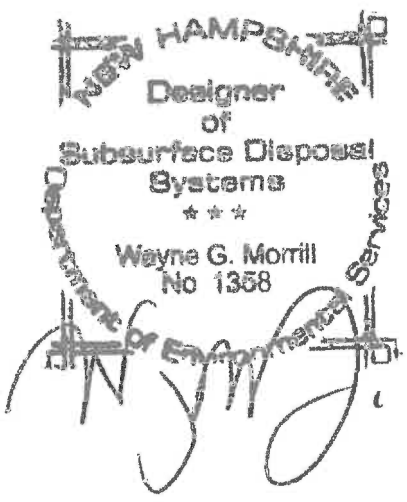
0" – 6"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
6" - 27"	2.5Y 5/4	light olive brown loamy sand massive, friable common roots
27" – 66"	2.5Y 5/2	grayish brown loamy sand granular, firm 5% redox

SHWT = 27"
Roots @ 27"
No H2O observed
Refusal @ 66"
Perc Rate = 8 min/inch

Test Pit #37

0" – 6"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
6" - 18"	2.5Y 5/6	light olive brown loamy sand granular, friable few roots
18" – 48"	2.5Y 5/4	grayish brown loamy sand granular, very firm 10% redox

SHWT = 18"
Roots @ 18"
No H2O observed
Refusal @ 48"
Perc Rate = 14 min/inch



Test Pit #38

0" – 12"	10YR 5/6	yellowish brown fine sandy loam granular, friable many roots

No SHWT observed
Roots @ 12"
No H2O observed
Refusal @ 12"

Test Pit #39

0" – 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8" - 24"	10YR 4/4	dark yellowish brown fine sandy loam granular, friable common roots
24" – 32"	2.5Y 5/4	grayish brown fine sandy loam massive, friable 2% redox
32" – 60"	2.5Y 5/4	light olive brown loamy sand single grain friable 5% redox boulders

SHWT = 24"
Roots @ 24"
No H2O observed
No Refusal observed
Perc Rate = 8 min/inch

NEW HAMPSHIRE
Designer
of
Subsurface Disposal
Systems
☆ ☆ ☆
Wayne G. Morrill
No 1358
Department of Environmental Services

Test Pit #39A

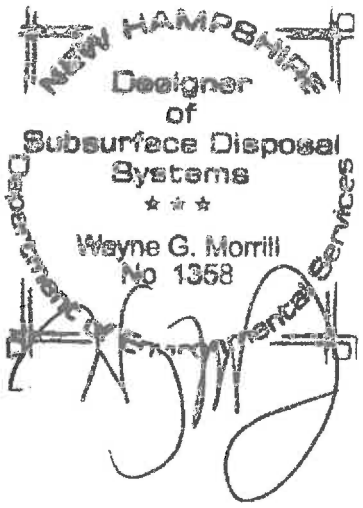
0" – 18"	2.5Y 5/6	light olive brown fine sandy loam massive, friable many roots
18" - 24"	2.5Y 5/6	light olive brown fine sandy loam granular, friable 2% redox
24" – 48"	2.5Y 5/6	light olive brown loamy sand granular, friable 2% redox

SHWT = 18"
Roots @ 18"
No H2O observed
Refusal @ 48"
Perc Rate = 12 min/inch

Test Pit #40

0" – 2"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
2" - 27"	2.5Y 5/6	light olive brown loamy sand massive, friable few roots
27" – 52"	2.5Y 5/4	light olive brown loamy sand granular, firm 10% redox

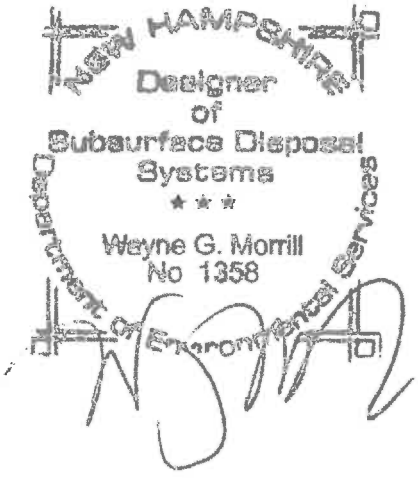
SHWT = 27"
Roots @ 24"
No H2O observed
Refusal @ 52"
Perc Rate = 8 min/inch



Test Pit #41

0" – 6"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
6" - 26"	10YR 5/6	yellowish brown fine sandy loam granular, friable common roots
26" – 54"	2.5Y 5/6	light olive brown loamy sand massive, friable 2% redox

SHWT = 26"
Roots @ 26"
No H2O observed
Refusal @ 54"
Perc Rate = 8 min/inch



STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

Carlisle Subdivision
Tax Map 33 Lot 26
Watson Road
Exeter, NH

Prepared for:

Scott W. Carlisle, III
14 Cass Street
Exeter, NH 03833

Prepared by:
Jones & Beach Engineers, Inc.
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P.O. Box 219
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(603) 772-4746
December 22, 2020
JBE Project No. 19102

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The Property Owner is responsible for maintenance of all stormwater infrastructure associated with this site, until such time that the town of Exeter take owner ship of said infrastructure.

B. General Inspection and Maintenance Requirements

1. The Owner shall perform all inspections and maintenance with greater than annual frequency as required by this report.

2. Inspection reports must be provided to the DES upon request.

3. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:

    a. Culverts
    b. Erosion
    c. Vegetation and landscaping
    d. Catch basins and drain manholes
    e. Riprap inlet and outlet protection aprons
    f. Infiltration Basin

2. Maintenance of permanent measures shall follow the following schedule:

   a. **Culverts: Inspection** of culvert inlets and outlets at least **once per month** during the rainy season (March to November). Any debris is to be removed and disposed of properly.

   b. **Erosion: Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately.

   c. **Vegetation and Landscaping: Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.

   d. **Catch basins and Drain Manholes: Annual inspection** of catch basins and drain manholes to determine if they need to be cleaned. Catch basins are to be cleaned if the depth of deposits is greater than one-third the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a catch basin significantly exceeds the one-third depth standard during the inspection, then it should be cleaned more frequently. If woody debris or trash accumulates in a catch basin, then it should be cleaned on a weekly basis. Manholes should be cleaned of any material upon inspection. Catch basins and manholes can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials should be stored, treated, and disposed.

   e. **Riprap**: Rock riprap should be **inspected annually** and after every major storm event in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water should be kept clear of obstructions, debris, and sediment deposits.

   f. Infiltration Basin:
   - Removal of debris from inlet and outlet structures
   - Removal of accumulated sediment
   - Inspection and repair of outlet structures and appurtenances
   - Inspection of infiltration components 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.

- Inspection of pretreatment measures at least twice annually, and removal of accumulated sediment as warranted by inspection, but no less than once annually.
- Periodic mowing of embankments
- Removal of woody vegetation from embankments
- Inspection and repair of embankments and spillways
- If an infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

C. Invasive Species

An invasive plant is a non-native plant that is able to persist and proliferate outside of cultivation, resulting in ecological and/or economic harm. These plants readily colonize disturbed areas and habitat edges, such as transportation and river corridors. Once established in these areas, invasive plants often continue to spread to adjacent habitats. All invasive plant species are aggressive competitors with the ability to significantly reduce diversity of native plant and animal species.

For additional information refer to the "New Hampshire Department of Transportation: *Best Management Practices for Roadside Invasive Plants*"

1. Invasive Plant Prevention:

Invasive plants spread by a variety of mechanisms, including birds, wind, and water. Human activities are also a major factor in the spread of these plants, from gardening and transport of nursery stock to erosion control and wildlife plantings. Routine maintenance and construction activities along transportation corridors can also play a significant role in the spread of invasive plants by dispersing or introducing seeds and other viable plant materials.

Eliminating or reducing the spread and establishment of invasive plants requires a proactive approach, in which there are two key elements. First, new introductions, especially those that occur due to human activities, must be avoided to the maximum extent possible. Second, there must be an emphasis on early detection and eradication of new populations. Control measures are far more likely to be successful, as well as

significantly less expensive, on small, young populations rather than on larger, more established populations, as shown in Figure 1.

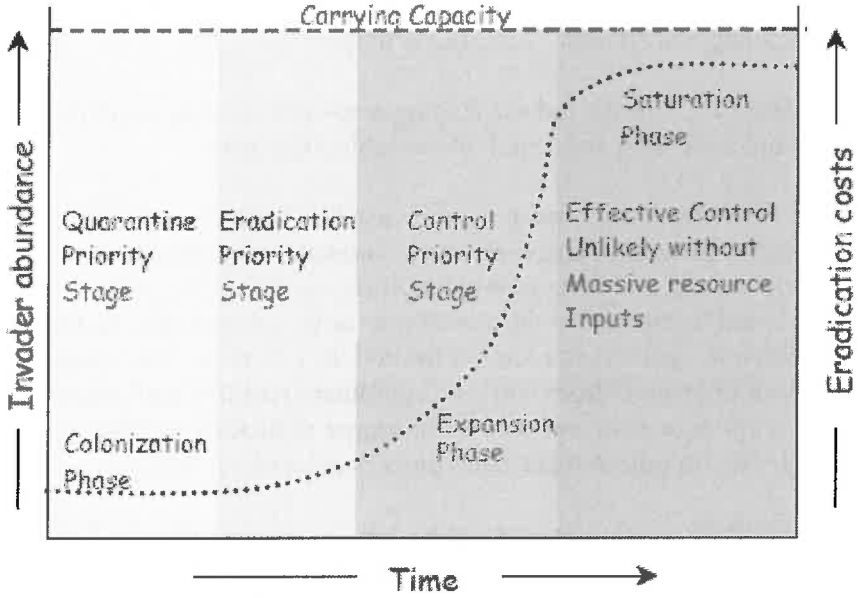


Figure 1. Typical invasive species population curve (from the University of Arizona and USGS Desert Laboratory http://wwwpeztcn.wr.usgs.gov)

2. Best Management Practices

Soil Disturbance and Stabilization:

• BMP #1: Minimize soil disturbance whenever possible. Invasive plants readily colonize areas of disturbed soil. Monitor recent work sites for the emergence of invasive plants for a minimum of two years after project completion.

• BMP #2: Stabilize disturbed soils as soon as possible by seeding and/or using mulch, hay, rip-rap, or gravel that is free of invasive plant material. Seeds of native species should be used whenever possible. Species on the prohibited invasive plant list should never be planted.

• BMP #3: Materials such as fill, loam, mulch, hay, rip-rap, and gravel should not be brought into project areas from sites where invasive plants are known to occur. If the absence of invasive plant parts in these materials cannot be guaranteed, recent work sites should be monitored for the emergence of invasive plants for a minimum of two years after project completion.

Movement and Maintenance of Equipment:

• BMP #4: If work in areas containing invasive plants cannot be avoided, then the movement of maintenance and construction equipment should be from areas not infested by invasive plants to areas infested by invasive plants whenever possible. This is especially important during ditch cleaning and shoulder scraping activities.

• BMP #5: Locate and use staging areas that are free of invasive plants to avoid spreading seeds and other viable plant parts.

• BMP #6: If equipment must be used in areas where invasive plants occur, all equipment, machinery, and hand tools should be cleaned of all visible soil and plant material before leaving the project site. Equipment should be cleaned at the site of infestation. Acceptable methods of cleaning include, but are not limited to: *f* Portable wash station that contains runoff from washing equipment (containment must be in compliance with wastewater discharge regulations); *f* High pressure air; Brush, broom, or other hand tools (used without water).

• BMP #7: If equipment must be used in areas containing Japanese knotweed, phragmites, or purple loosestrife, aboveground plant material should be cut and properly disposed of (see BMP #11) prior to the start of work. If excavation occurs in these areas, see BMPs #13-16.

Mowing:

• BMP #8: These invasive plants have the ability to sprout from stem and root fragments: purple loosestrife, phragmites, and Japanese knotweed. Mowing these plants should be avoided whenever possible. Staking roadside populations of these plants as "do not mow" is one way to accomplish this. If these plants are cut, all plant material must be rendered nonviable and extra care should be taken to avoid spreading plant fragments (see BMP #11).

• BMP #9: In areas where invasive plants occur and the plants listed in BMP #8 (purple loosestrife, phragmites, and Japanese knotweed) are not present, an attempt should be made to mow the right-of-way prior to seed maturation (approximately August 1st). This could be accomplished by identifying specific roads that are either heavily infested with invasive plants or roads that are in sensitive habitat areas, and making those roads a priority in the mowing schedule.

• BMP #10: Mowing equipment should be cleaned at least daily, as well as prior to transport (see BMP #6). This is particularly important if mowing occurs after seed maturation (after August 1st).

Disposal of Plants:

• BMP #11: When invasive plants are cut or removed for roadside maintenance, construction, or control of plants, the spread of viable plant material must be avoided by rendering plant material nonviable. The following methods can be used to destroy plant material:

- Drying/Liquefying: For large amounts of plant material or for plants with rigid stems, place the material on asphalt, tarps, or heavy plastic, and cover with tarps or heavy plastic to prevent the material from blowing away. For smaller amounts of plant material or for plants with pliable stems, bag the material in heavyduty (3-mil or thicker) garbage bags. Keep plant material covered or bagged for at least one month. Material is nonviable when it is partially decomposed, very slimy, or brittle. Once material is nonviable, it can be disposed of in a landfill or brush pile. Recommended for: Japanese knotweed, purple loosestrife, phragmites.
- Brush Piles: Plant material from most invasive plants can be piled on site to dry out. However, when piling purple loosestrife, phragmites, and Japanese knotweed, care must be taken to pile stems so that cut surfaces are not in contact with the soil. Recommended for: Woody shrubs, trees, and vines; spotted knapweed; large quantities of purple loosestrife, phragmites, and Japanese knotweed. NOT recommended for: any invasive plant with seeds or fruit attached, unless plants can be piled within the limits of the infestation.
- Burying: Plant material from most invasive plants can be buried a minimum of three feet below grade. This method is best used on a job site that already has disturbed soils. Recommended for: any invasive plant. NOT recommended for: Japanese knotweed, unless other options are not feasible and knotweed can be buried at the site of infestation at least five feet below grade. *f*
- Burning: Plant material should be taken to a designated burn pile. (All necessary permits must be obtained before burning.) Recommended for: any invasive plant, especially purple loosestrife, phragmites, Japanese knotweed.
- Herbicide: Herbicide applications must be carried out by a licensed applicator with a permit from the NH Department of Agriculture Division of Pesticide Control. Recommended for: any invasive plant, especially purple loosestrife, phragmites, Japanese knotweed.

• BMP #12: Invasive plant material must be covered during transport.

Excavated Material:

• BMP #13: Excavated material taken from sites that contain invasive plants cannot be used away from the site of infestation until all viable

plant material is destroyed. Excavated material from areas containing invasive plants may be reused within the exact limits of the infestation.

• BMP #14: Any excavated material that contains viable plant material and is not reused within the limits of the infestation must be stockpiled on an impervious surface until viable plant material is destroyed OR the material must be disposed of by burying a minimum of three feet below grade. Japanese knotweed must be buried at least five feet below grade.

• BMP #15: Whenever possible, excavation should be avoided in areas containing Japanese knotweed, purple loosestrife, and phragmites. If excavation does occur in these areas, the BMPs described in Section II must be followed.

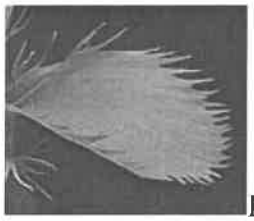
• BMP #16: Soil and other materials containing invasive plants must be covered during transport.

D. Threatened Plant Species

1. Greater Fringed-Gentian (Gentianopsis Crinita)

2. *Plant Description*

Flower:



Blooms are singular on slender, 2 to 7 inch stalks at the end of the main stem and arising from side branches. The trumpet shaped, royal blue to blue-violet flowers are 1½ to 2 inches long. with 4 rounded petal lobes that have long, delicate fringes around the edges. The broad white and blue striped throat is enclosed by 4 green or red-tinged sepals, broad at the base tapering to slender tips that reach the base of the spreading lobes. The mid-rib of the sepals is strongly ridged, making the closed buds appear square with a sharp point at the top. Inside the tube are 4 yellow to orangish stamens and a creamy white style. Flowers open on sunny days.

Leaves and stems:

Leaves are 1 to 2½ inches long, ¼ to ¾ inch wide, toothless, hairless with a glossy surface, opposite, stalkless or clasping the stem, the lower leaves broadly egg-lance shaped, rounded at the base, becoming narrower higher on the stem. The erect stems are hairless, slightly 4-

angled and leafy, the few to numerous side branches narrowly angled to the main stem.

3. *Best Management Practices*

Following NHB review there is a possibility Greater Fringed-Gentian is located on site. Contractor shall survey areas for this plant species prior to large earth disturbing activities take place. Should a possible specimen be located the contractor should notify the project engineer of its location on site.

If Greater Fringed-Gentian be confirmed onsite the project engineer will review the location and determine if reasonable modifications to the design can be made to avoid the location. If avoidance of the area cannot be accomplished, replanting of the specimen to the rear field in an ideal area should be undertaken. This replanting process should be done with the guidance of the project engineer to ensure the success of the replanting.

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above-mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746
F#: (603) 772-0227

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION PERIOD AND CRITERIA
Tax Map 33 Lot 26
Carlisle Subdivision
Exeter, NH

Stormwater Component	Inspection Period	Inspection Criteria/Methods
Culverts	Once per month	Inspect inlet/outlet. Remove debris.
Erosion	Annually	Repair site erosion.
Vegetation	Annually	Repair bare unvegetated areas.
Catch Basins and Drain Manholes	Annually (or more as required)	Remove trash and debris. Inspect for sediment. Remove if sediment greater than 1/3 sump depth.
Riprap	Annually	Relocate displaced rocks, remove woody vegetation and debris.
Infiltration Basin	Bi-annually	Inspect for sediment/debris collection, inspect inlets/outlets, inspection for erosion.

STORM WATER OPERATIONS AND MAINTENANCE PLAN
INSPECTION REPORT

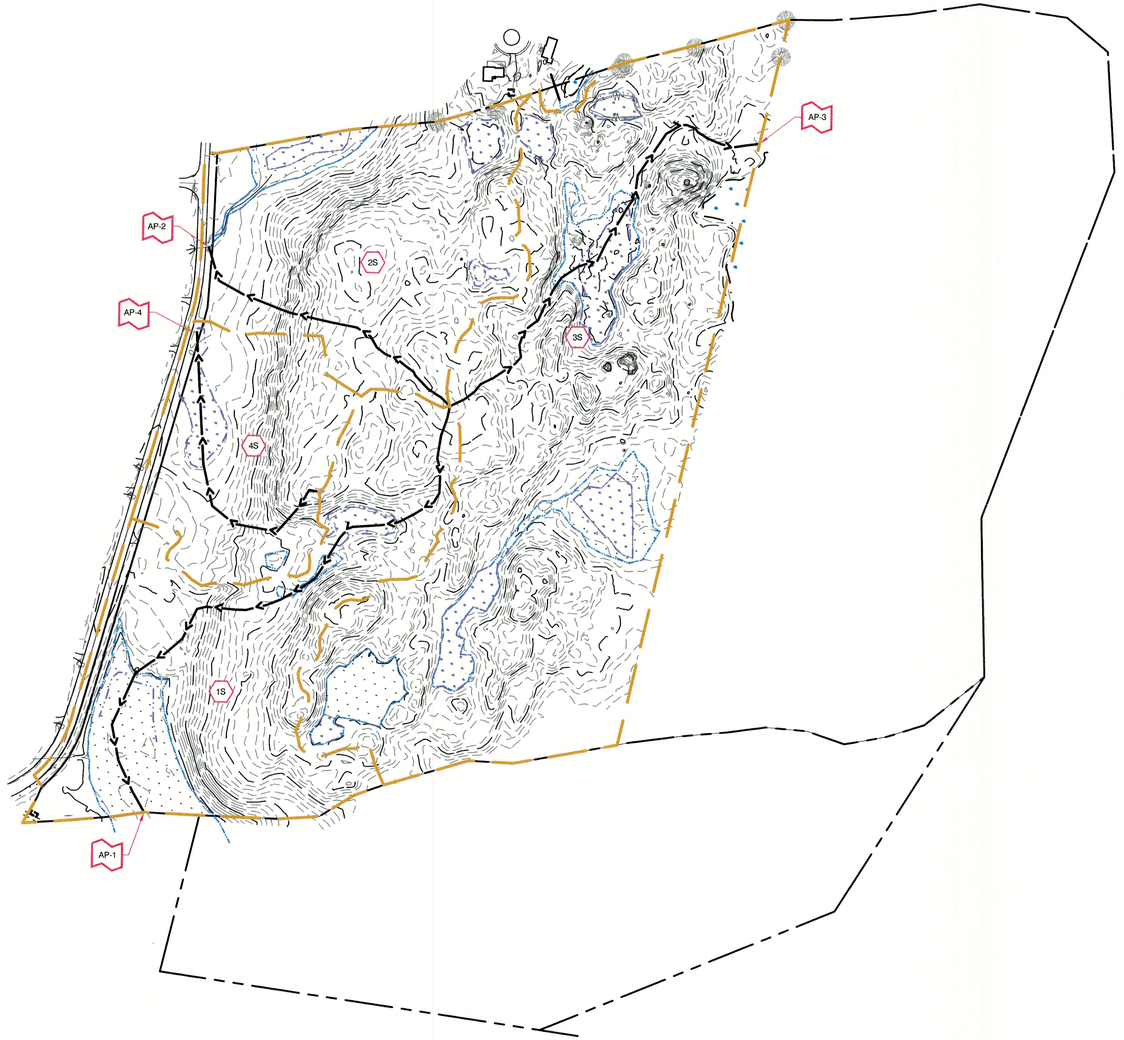
Tax Map 33 Lot 26
Carlisle Subdivision
Exeter, NH

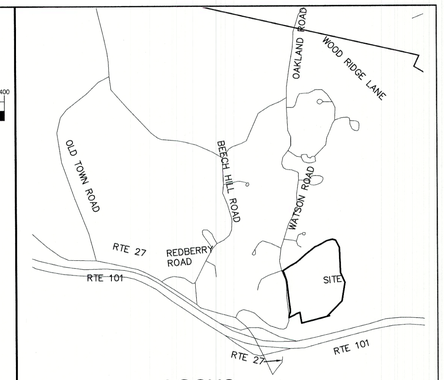
Yearly Inspection Form			
Inspected Component	**Date of Inspection**	**Inspector**	**Issue Detected / Action Taken**
Culverts			
Erosion			
Vegetation			
Catch Basins and Drain Manholes			
Riprap			
Infiltration Basin			

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200 feet





LOCUS SCALE: 1"=2000'

REFERENCE

LEGEND

SUBCATCHMENT BOUNDARY

SUBCATCHMENT X

REACH X

POND X

TC PATH

WETLANDS

HISS SOILS

FLOW ARROW

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 33, LOT 26

APPLICANT/OWNER
W. SCOTT CARLISLE
14 CASS STREET
EXETER, NH 03833

TOTAL LOT AREA
4,268,578 SQ. FT.
97.99 ACRES

Design: BWG	Draft: DFP	Date: 8/11/21
Checked: BWG	Scale: AS SHOWN	Project No.: 19102
Drawing Name: 19102-WATERSHED.dwg		

REV.	DATE	REVISION	BY
0	12/21/20	ISSUED FOR REVIEW	BWG

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

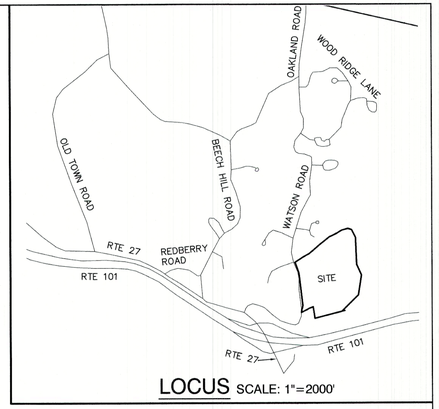
Plan Name:	EXISTING WATERSHED PLAN
Project:	CARLISLE SUBDIVISION 19 WATSON ROAD, EXETER, NH
Owner of Record:	SCOTT W. CARLISLE, III 14 CASS STREET, EXETER, NH 03833

DRAWING No.
W1
SHEET 1 OF 8
JBE PROJECT NO. 19102

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet



LOCUS SCALE: 1"=2000'

DEER RUN ROAD

WATSON ROAD

REFERENCE

AP-1

AP-2

AP-3

AP-4

1S

2S

3S

Tc

MATCH LINE
SHEET W1B

MATCH LINE
SHEET W1B

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH (X)
- POND (X)
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 33, LOT 26

APPLICANT/OWNER
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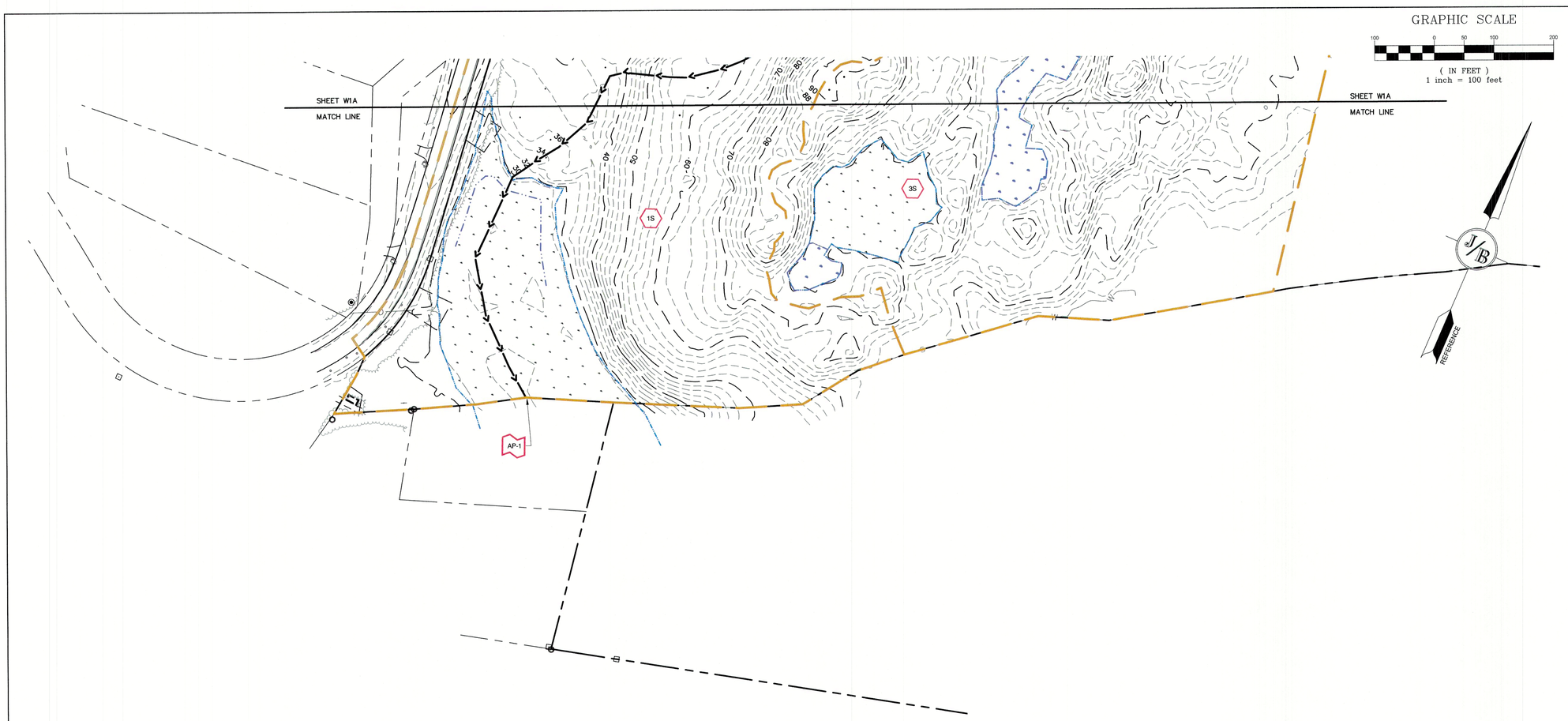
Owner of Record:	SCOTT W. CARLISLE, III 14 CASS STREET, EXETER, NH 03833

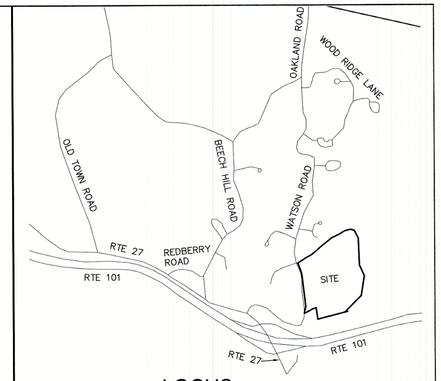
DRAWING No.
W1A
SHEET X OF 8
JBE PROJECT NO. **19102**



GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet



LOCUS SCALE: 1"=2000'

LEGEND

SUBCATCHMENT BOUNDARY

SUBCATCHMENT X

REACH X

POND X

TC PATH

WETLANDS

HISS SOILS

FLOW ARROW

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 33, LOT 26

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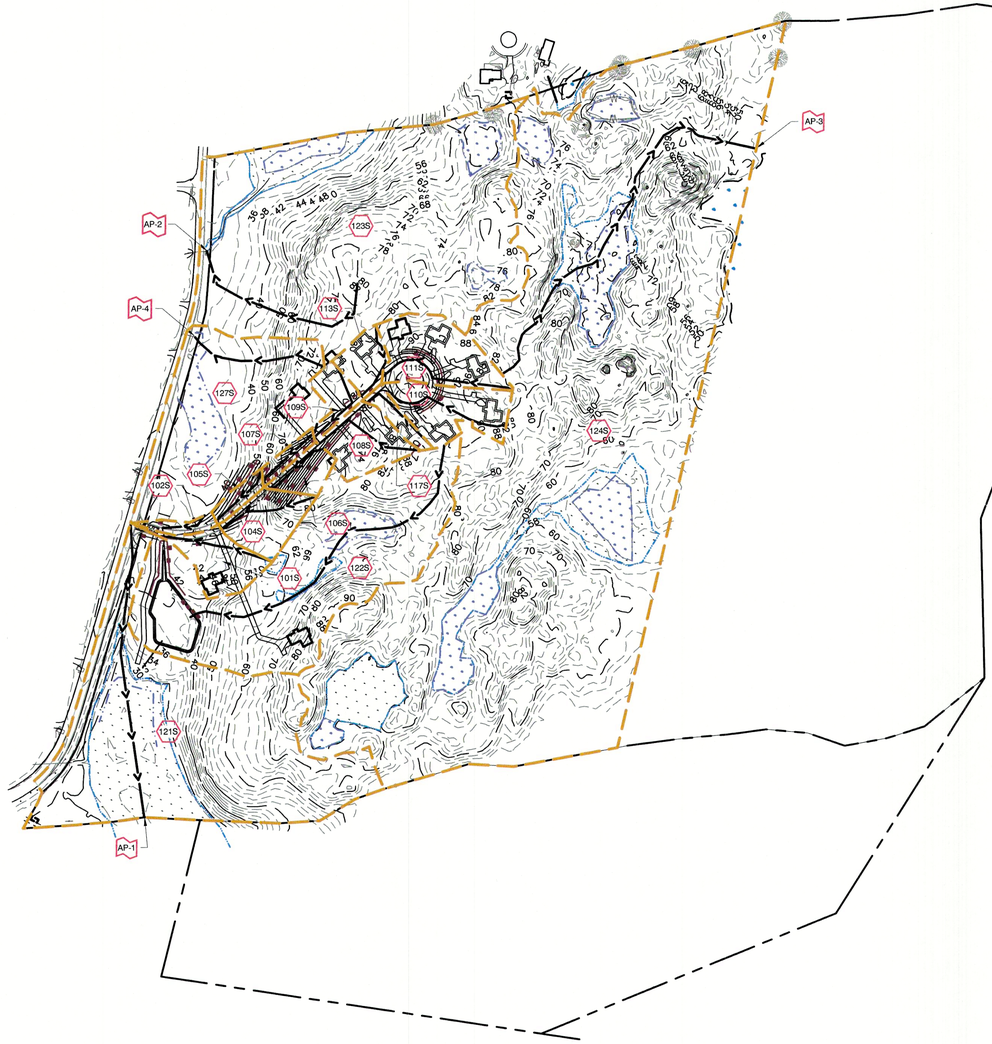
Owner of Record:	SCOTT W. CARLISLE, III 14 CASS STREET, EXETER, NH 03833

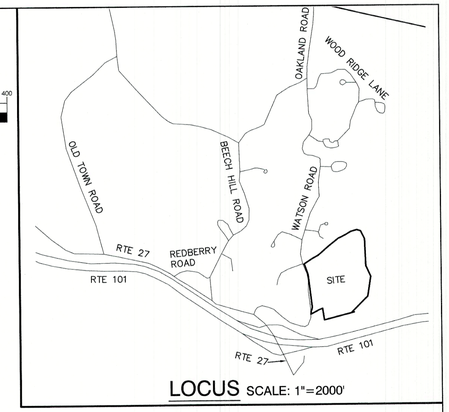
DRAWING No.
W1B
SHEET X OF 8
JBE PROJECT NO. 19102

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200 feet





LOCUS SCALE: 1"=2000'

REFERENCE

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH (X)
- POND (X)
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 33, LOT 26

APPLICANT/OWNER
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14 CASS STREET
EXETER, NH 03833

TOTAL LOT AREA
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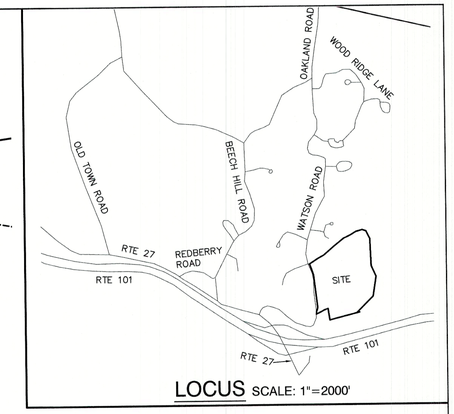
Plan Name:	PROPOSED WATERSHED PLAN
Project:	CARLISLE SUBDIVISION 19 WATSON ROAD, EXETER, NH
Owner of Record:	SCOTT W. CARLISLE, III 14 CASS STREET, EXETER, NH 03833

DRAWING No.
W2
SHEET X OF 8
JBE PROJECT NO. 19102

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet



LOCUS SCALE: 1"=2000'

DEER RUN ROAD

WATSON ROAD

AP-2

AP-3

AP-4

1235

PROP. PRE-TREATMENT SWALE

PROP. INFILTRATION BASIN

MATCH LINE
SHEET W2B

MATCH LINE
SHEET W2B

REFERENCE

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH (X)
- POND (X)
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 33, LOT 26

APPLICANT/OWNER
W. SCOTT CARLISLE
14 CASS STREET
EXETER, NH 03833

TOTAL LOT AREA
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97.99 ACRES

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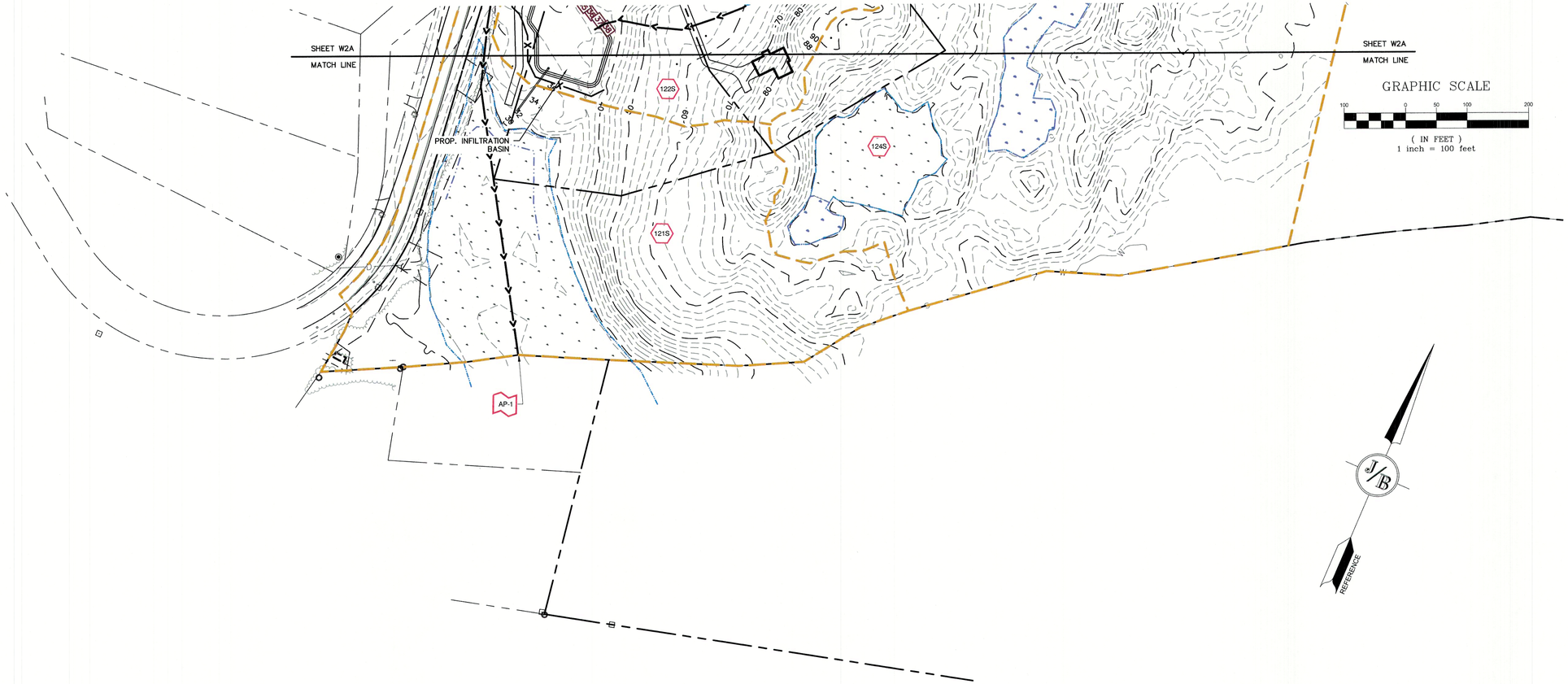
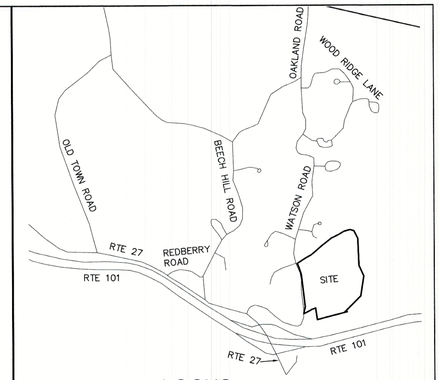
DRAWING No.
W2A
SHEET X OF 8
JBE PROJECT NO. 19102





LOCUS SCALE: 1"=2000'

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH (X)
- POND (X)
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DRAWING No.
W2B
SHEET X OF 8
JBE PROJECT NO. 19102